

**Special tools required:**

- 11 4 280
- 11 4 281
- 11 4 282
- 11 4 283

*Necessary preliminary tasks:*

- Remove Cylinder Head Cover.

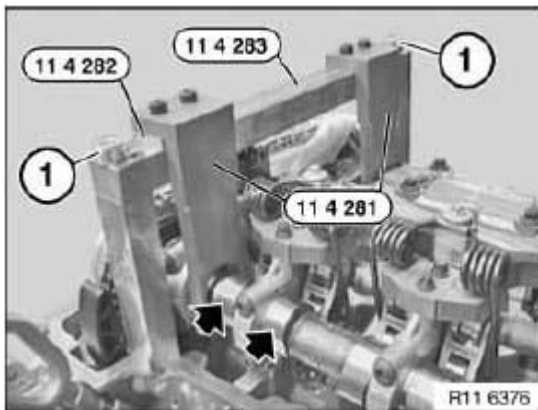
**IMPORTANT:** To open central bolts on adjustment units and camshafts.

**Fit special tool 11 4 280.**

Fit special tool 11 4 283 with screws (1).

Fit special tool 11 4 281 on special tool 11 4 283.

**IMPORTANT:** Special tool 11 4 282 must be fitted underneath on inlet camshaft.



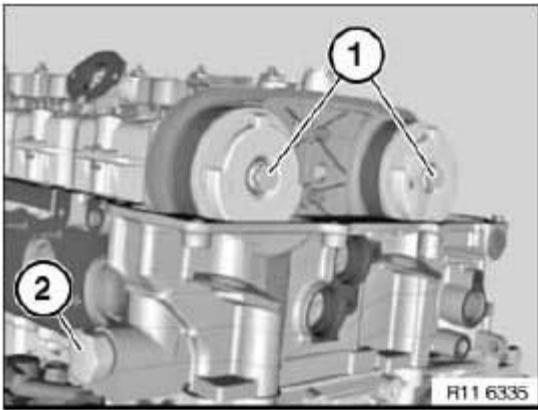
**Fig. 222: Identifying Special Tool (11 4 281), (11 4 282), (11 4 283) And Screws**  
Courtesy of BMW OF NORTH AMERICA, INC.

Release chain tensioner (2).

For tightening torque refer to 11 31 5AZ in 11 31 CAMSHAFT (N52) .

Release central bolt on inlet/exhaust adjustment units (1).

For tightening torque refer to 11 36 1AZ in 11 36 VARIABLE CAMSHAFT CONTROL (N52) .



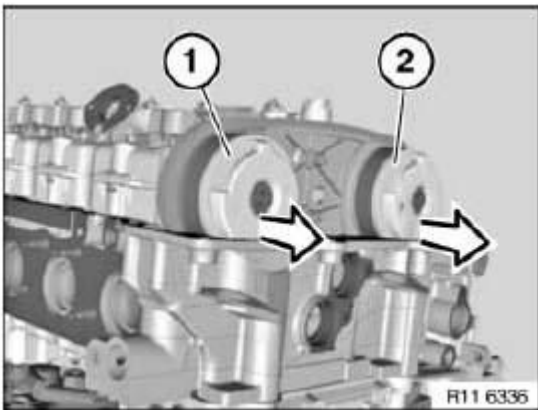
**Fig. 223: Identifying Engine Central Bolt And Chain Tensioner**  
Courtesy of BMW OF NORTH AMERICA, INC.

Detach exhaust adjustment unit (1) from exhaust camshaft.

Detach inlet adjustment unit (2) from inlet camshaft.

*Installation:*

To facilitate removal and installation of adjustment units, turn sensor gears at cutout downwards.



**Fig. 224: Identifying Engine Inlet And Exhaust Adjustment Unit**  
Courtesy of BMW OF NORTH AMERICA, INC.

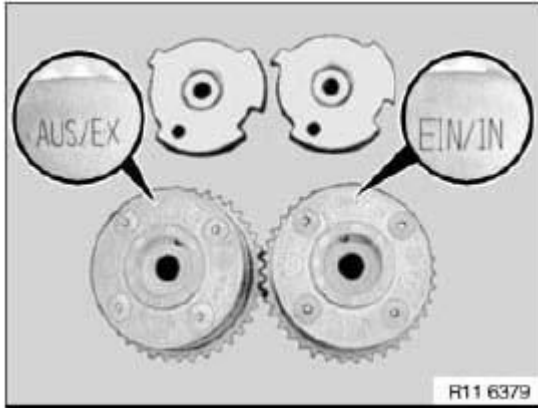
- IMPORTANT:**
- **Danger of mixing up adjustment units.**
  - **Mixing up the adjustment units will result in engine damage.**

The inlet and exhaust adjustment units are different.

VANOS is marked with AUS and EX for the exhaust camshaft.

VANOS is marked with EIN and IN for the inlet camshaft.

Sensor gears can be fitted alternatively.



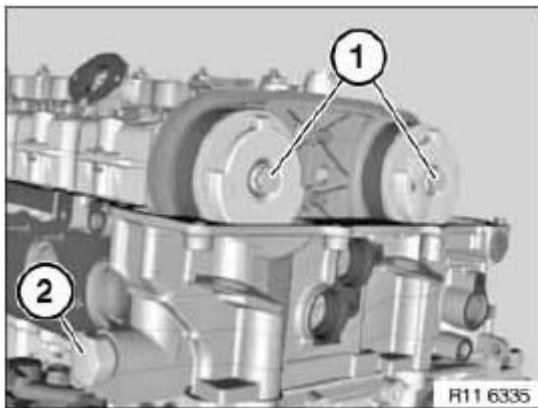
**Fig. 225: Identifying Inlet And Exhaust Camshaft Mark**  
Courtesy of BMW OF NORTH AMERICA, INC.

Fit both adjustment units on camshafts.

The installation position of the adjustment units can be freely selected.

Insert screws (1).

For tightening torque refer to 11 36 1AZ in **11 36 VARIABLE CAMSHAFT CONTROL (N52)** .

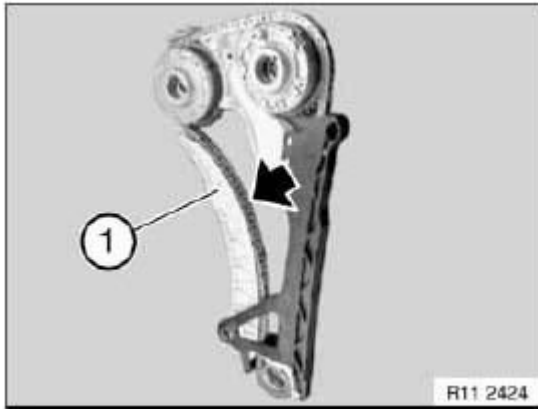


**Fig. 226: Identifying Central Screw And Chain Tensioner**  
Courtesy of BMW OF NORTH AMERICA, INC.

**IMPORTANT: Incorrect installation possible.**

Press clamping rail (1) by hand against timing chain and make sure timing chain is guided in clamping rail (1).

**NOTE:** Schematic representation on removed chain drive.



**Fig. 227: Identifying Clamping Rail**  
Courtesy of BMW OF NORTH AMERICA, INC.

Adjust Valve Timing.

Fit Chain Tensioner.

Assemble engine.

## 11 36 655 REMOVING AND INSTALLING/REPLACING BOTH SOLENOID VALVES (N52)

**IMPORTANT:** Always check that the solenoid valves are clean during removal and installation.

**Possible malfunction if valves are contaminated:**

- **Rough running.**
- **OBD fault entry.**
- **Exhaust emission behavior.**
- **Low engine power.**

*Necessary preliminary tasks:*

- Remove Acoustic Cover

Disconnect plug connection (1) for inlet solenoid valve (2).

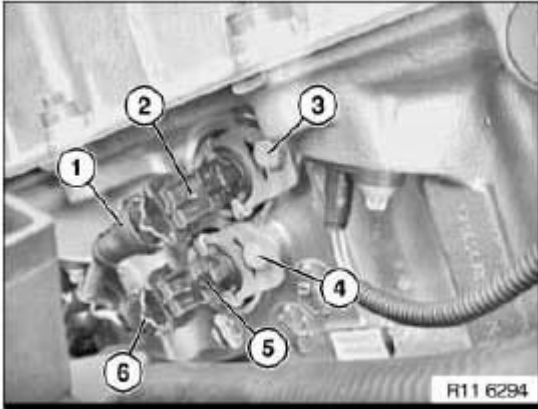
Unscrew bolt (3).

Remove inlet solenoid valve (2) with bracket towards front.

Disconnect plug connection (6) for exhaust solenoid valve (5).

Release screw (4).

Remove exhaust solenoid valve (5) with bracket towards front.



**Fig. 228: Identifying Inlet Solenoid Valve, Plug Connections, Exhaust Solenoid Valve, Screw And Bolt**  
Courtesy of BMW OF NORTH AMERICA, INC.

**IMPORTANT: Risk of mixing up plug connections (1 and 6)**

Assemble engine.

Check function of DME.

## 37 VARIABLE VALVE GEAR

### 11 37 005 REMOVING AND INSTALLING/REPLACING ECCENTRIC SHAFT (N52)

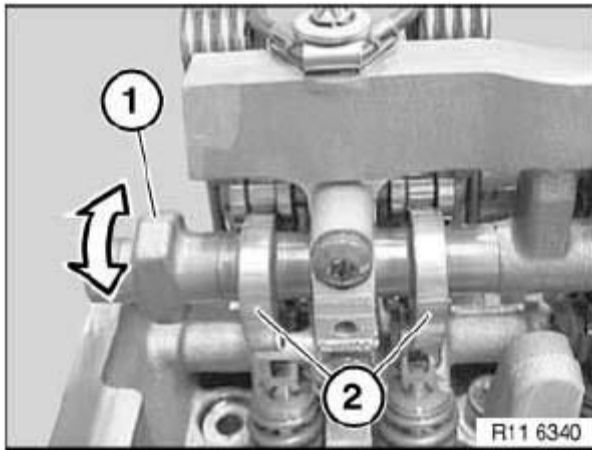
**Special tools required:**

- 11 4 481

*Necessary preliminary tasks:*

- Remove **Cylinder Head Cover**.
- Remove **Intermediate Lever**.

If necessary, move eccentric shaft (1) on twin surface to minimum lift (2).



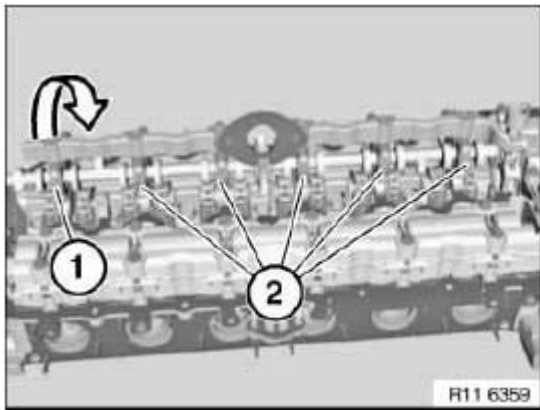
**Fig. 229: Identifying Eccentric Shaft And Lift**  
 Courtesy of BMW OF NORTH AMERICA, INC.

Release screws on bearing cap number (1).

Release screws on all bearing caps (2).

All bearing caps are identified with numbers; set caps down in special tool 11 4 481 in a tidy and orderly fashion.

Remove intermediate shaft with a light tilting and rotating motion.



**Fig. 230: Identifying Bearing Cap And Number**  
 Courtesy of BMW OF NORTH AMERICA, INC.

Release screw and remove magnet wheel (1).

**IMPORTANT: Screw is not magnetic and is secured against falling out.**