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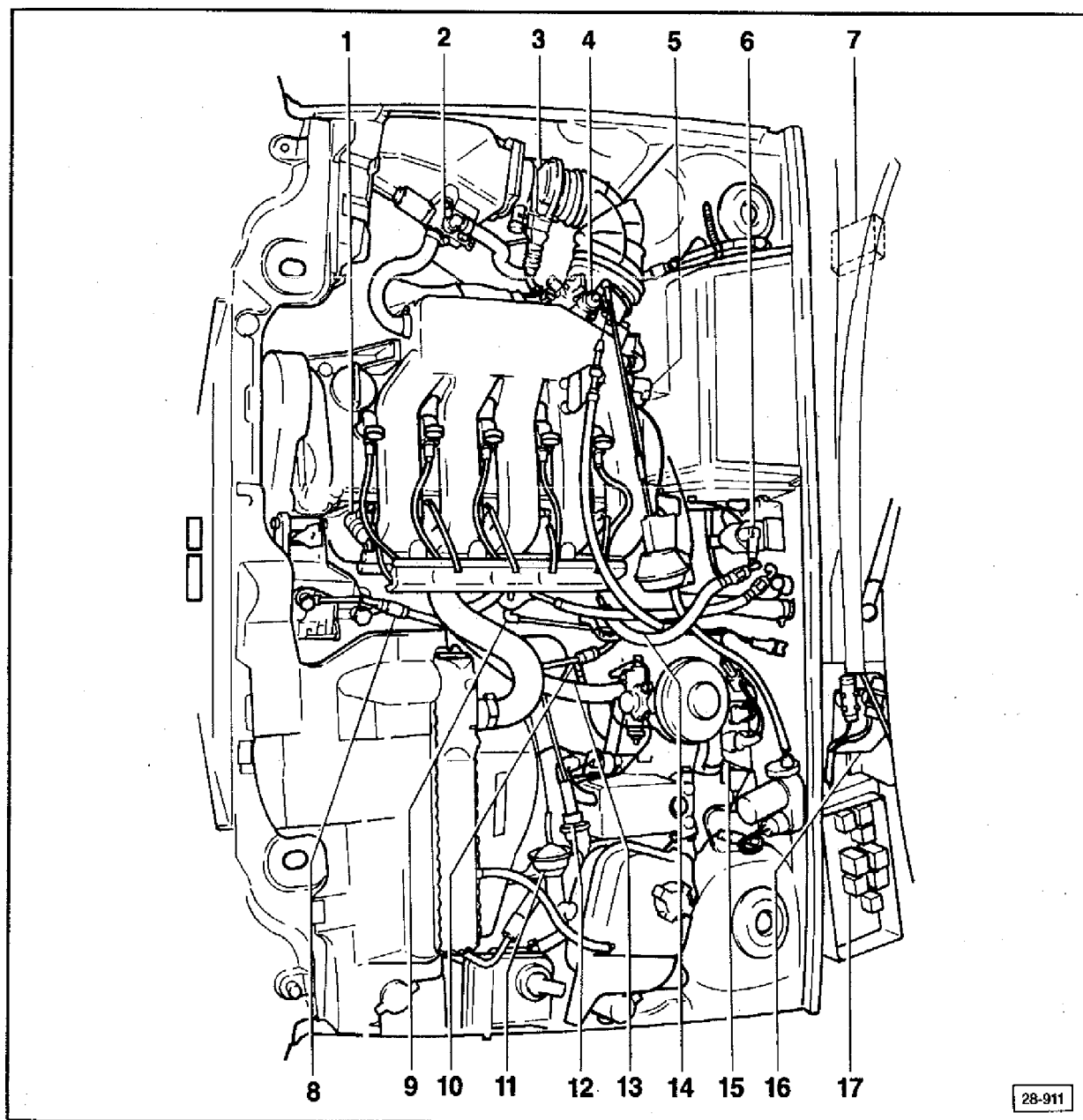
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28-911

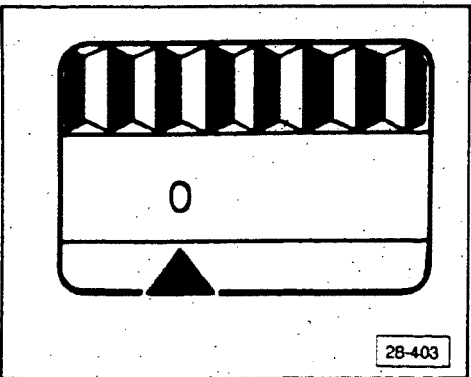
Multimeter US 1119, LED tester US 1115 and the VW 1594 adaptor kit are required for checking the following components.

- | | |
|---|--|
| <p>1 — Fuel injector
• control, checking see Repair Group 24</p> <p>2 — Idle stabilizer valve
• control, checking see Repair Group 24</p> <p>3 — Air mass sensor
• checking see Repair Group 24</p> <p>4 — Throttle body potentiometer
• checking see Repair Group 24</p> <p>5 — Coolant temperature sensor
• checking see Repair Group 24</p> | <p>6 — Ignition coil with power output stage
• checking see section 28-220</p> <p>7 — MPI control unit
checking see Repair Group 24</p> <p>8 — Knock sensor I — 10 Nm (7 ft lb)</p> <p>9 — Knock sensor II — 10 Nm (7 ft lb)</p> <p>10 — Ignition timing sensor
• checking, section 28-230</p> <p>11 — Carbon canister shut-off valve
• checking see Repair Group 24</p> <p>12 — Carbon canister frequency valve
• checking see Repair Group 24</p> |
|---|--|

- 13 — **Engine speed sensor**
 - checking see Repair Group 24
- 14 — **Ignition distributor with Hall sender**
checking, see section 28-240
- 15 — **Connector bracket**
- 16 — **Series resistor pack**
 - checking see Repair Group 24
- 17 — **Fuel pump relay**
 - checking see Repair Group 24

Tuneup specifications

1990-1991 m.y.

Engine code letters	7A	
Ignition distributor	034 905 205 J	
Ignition distributor basic setting*	TDC	
Timing mark location		
Ignition timing sensor**	resistance	approximately 1000 ohms
Engine speed sensor***	resistance	approximately 1000 ohms
CAUTION It is NOT possible to adjust the ignition timing. Ignition timing is determined by the control unit ignition map.		
Spark plugs	part no.	191 905 450 J
		Bosch F 6 DTC
Electrode gap		0.8 + 0.1 mm (0.031 + 0.004 in)
Tightening torque		20 Nm (15 ft lb)
Firing order	1-2-4-5-3	
RPM limit (cutout)	starts at 7200 RPM, completes at 7400 RPM	
Ignition coil	secondary resistance	6500 to 8000 ohms
	primary resistance	approximately 0 to 1 ohm
Ignition distributor rotor	resistance	1000 ohms

*see section 28-250

**Ignition timing sensor, checking, section 28-230

***Engine speed sensor, checking, see Repair Group 24

CAUTION

Part numbers are for reference only. Always consult with the Parts Department for the latest information.

System precautions

Safety measures

CAUTION

Observe the following precautions to prevent personal injury as well as possible damage to the ignition system components.

- switch **OFF** the ignition before connecting or disconnecting components or test equipment
- do **NOT** crank engine before high tension wire of ignition distributor (terminal 4) is connected to ground
- do **NOT** use battery booster longer than one minute nor should 16.5 volts be exceeded
- do **NOT** wash engine unless ignition is switched **OFF**
- disconnect **BOTH** battery terminals whenever arc or spot welding
- before towing, vehicles with a defective ignition system (or where this is suspected) must have terminal 1 (green) of the ignition coil disconnected
- do **NOT** connect a condenser of any kind to terminal 1 of the ignition coil
- when installing noise suppressor, **ONLY** use 1000 ohms for high tension wires and 5000 ohms for spark plug connectors
- do **NOT** replace distributor rotor (marked **R1**) with a different type
- if the vehicle is heated up (e.g. in a painting booth) do **NOT** start the engine until it has had sufficient time to return to room temperature

Rules of cleanliness

CAUTION

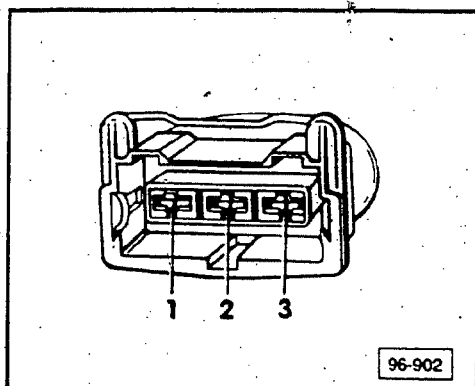
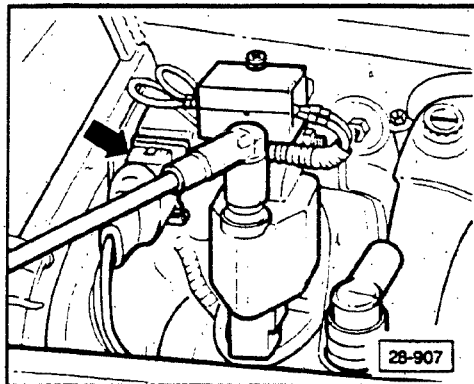
When working on the fuel supply/injection system, carefully observe the following rules:

- 1 — Thoroughly clean connection and surrounding areas before loosening connection.
- 2 — After removing components, place in clean area and cover with foil or paper. Avoid using rags!
- 3 — Components which have been opened or disassembled must be carefully covered or sealed if repair cannot be carried out immediately.
- 4 — Install clean parts only.
 - remove replacement parts from package just before installing.
 - do **NOT** use spare parts that were stored loose or unpackaged (e.g. in tool boxes, etc.).
- 5 — When fuel system is open:
 - Avoid using compressed air whenever possible.
 - Avoid moving the vehicle whenever possible.

Ignition coil (with power output stage), checking

Control, checking

- remove harness connector (arrow) from power output stage of ignition coil



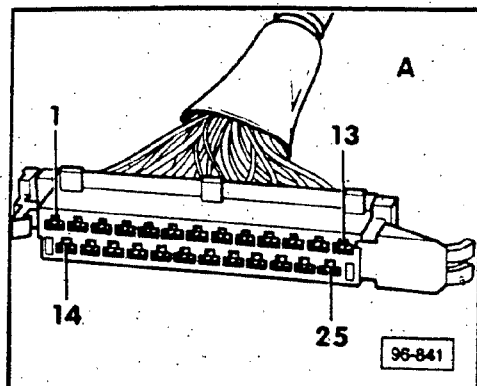
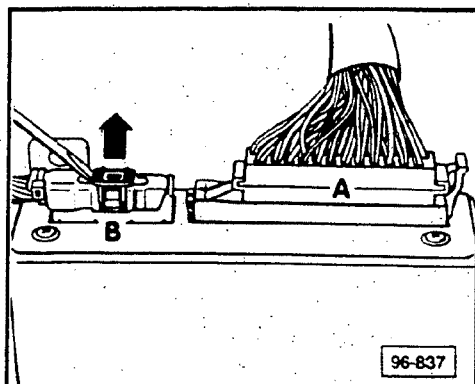
- switch multimeter **US 1119** to 20 volt range
- connect multimeter first between terminals 1 and ground then between terminals 1 and 3
- switch ignition **ON**
 - approximately 12 volts

If voltage value is **NOT** obtained

- check wiring using wiring diagram
- connect multimeter between terminals 2 and 3
- crank engine with starter
 - 0.2 volts minimum

If voltage value is **NOT** obtained

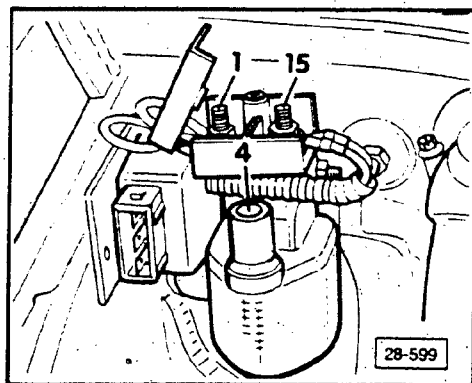
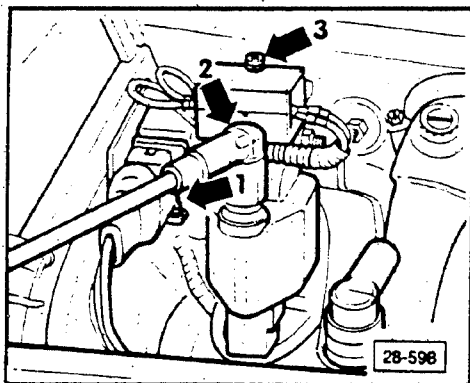
- remove foot-well cover under glove compartment
- remove (black) harness connector **A** from control unit



- check wiring between terminal 2 of power output stage harness connector and terminal 9 from harness connector **A** of control unit

If **NO** open circuits are found

- replace MPI control unit



Ignition coil, checking

Note

Check connectors and wiring between power output stage and ignition coil and between power output stage and engine for corrosion or insulation damage.

Secondary resistance, checking

- remove harness connector 1 from power output stage
- remove coil wire 2 from ignition coil
- remove screw 3
- switch multimeter **US 1119** to resistance range
- connect multimeter between terminals 1 and 4 of ignition coil
 - 5000 to 9000 ohms

If resistance value is **NOT** obtained

- replace ignition coil

Primary resistance, checking

- connect multimeter between terminals 1 and 15 of ignition coil
 - 0.5-1.5 ohms

If resistance value is **NOT** obtained

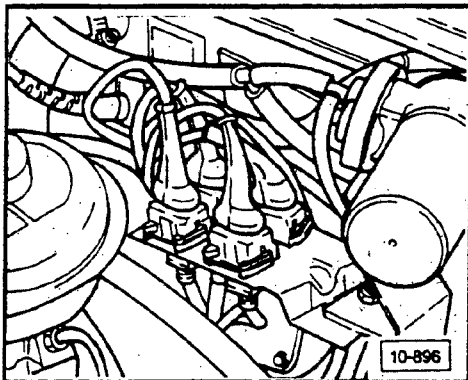
- replace ignition coil

If coil resistance values are obtained but ignition pulse is still **NOT** present; power output stage is defective

- replace ignition coil assembly

CAUTION

The function of the power output stage **CANNOT** be checked.



Ignition timing sensor, checking

- separate black connector (left side engine compartment near plenum) and remove from bracket (sensor side of cable is color marked)
- switch multimeter **US 1119** to resistance range

- switch multimeter **US 1119** to resistance range
- connect multimeter between terminals 1 and 2
 - approximately 1000 ohms

If resistance value is **NOT** obtained

- replace ignition timing sensor

If resistance value **IS** obtained

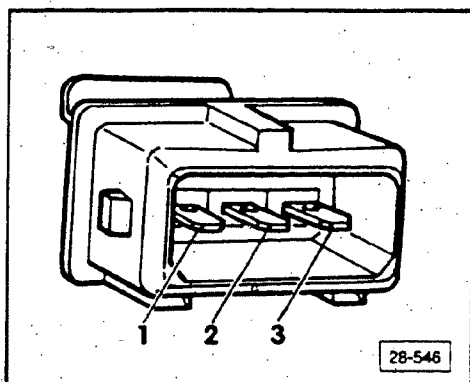
- connect multimeter between terminals 1 and 3 then 2 and 3
 - infinite ohms (open)

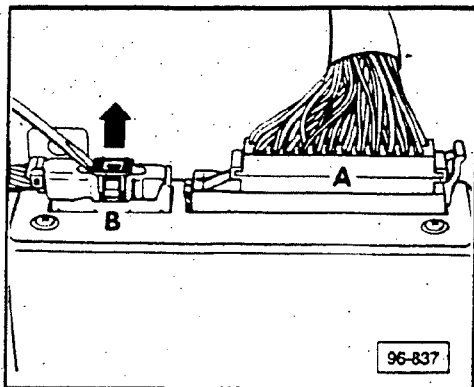
If resistance values are **NOT** obtained

- replace ignition timing sensor

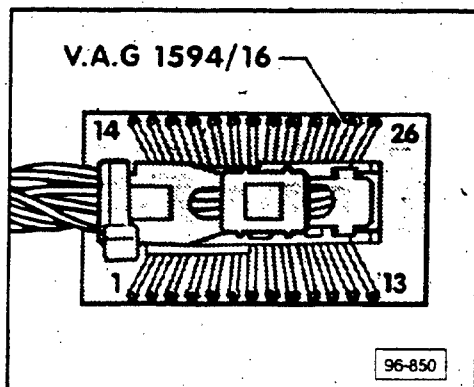
If resistance values **ARE** obtained

- check wiring between ignition timing sensor harness connector and control unit harness connector **B** as follows:
- remove foot-well cover under glove compartment

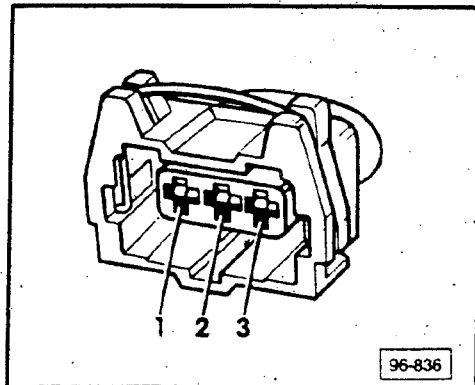




- pry open secondary lock (black) of control unit harness connector **B** and remove



- attach harness connector **B** to test adaptor **VAG 1594/16**
- check continuity between sensor connector and measuring adaptor



Harness connector B	Test adaptor
1	12
2	24
3	24

- approximately 0 ohms (continuity)

If resistance values are **NOT** obtained

- check wiring using wiring diagram

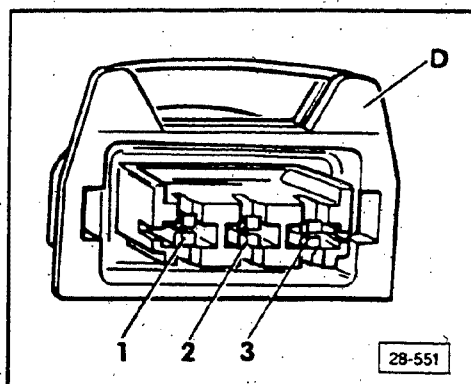
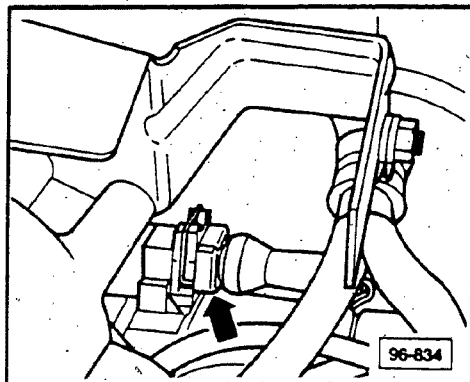
If resistance values **ARE** obtained

- check gap between pin and ignition timing sensor (see group 13)

If gap is **OK**

- replace MPI control unit

Hall Sensor, checking



CAUTION

To check Hall Sensor, remove wiring (terminal 4) from ignition distributor and connect to ground using jumper and clip.

- remove Hall Sensor harness connector (on ignition distributor, see arrow)
- switch multimeter **US 1119** to 20 volt range
- connect multimeter to outer terminals (1 and 3) and connector **D**
- switch **ON** ignition
 - 9 volts minimum

If voltage value is **NOT** obtained

- check wiring using wiring diagram
- switch **OFF** ignition

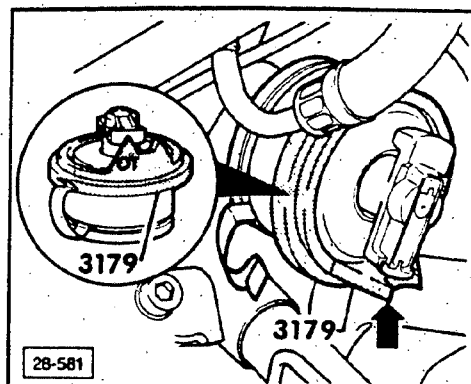
Note

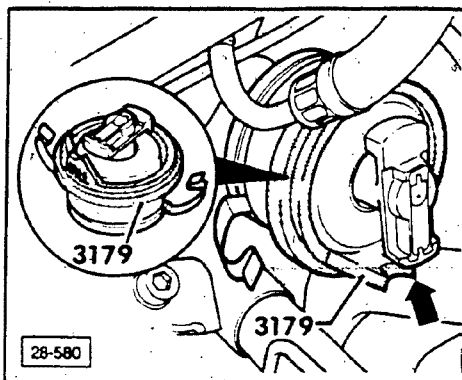
The connector cavities are correspondingly numbered on the rear side of the connector.

CAUTION

The distributor rotor is bonded to the shaft and cannot be removed. Replace distributor assembly if there is damage.

- push back rubber boot on Hall Sensor harness connector and reconnect
- connect multimeter between terminals 2 and 1
- remove ignition distributor cap
- install special tool **3179** on ignition distributor and engage in groove
- switch **ON** ignition
- turn crankshaft using special tool **2079** until rotor marking is precisely lined up with TDC mark on **3179**
 - 4.0 volts minimum





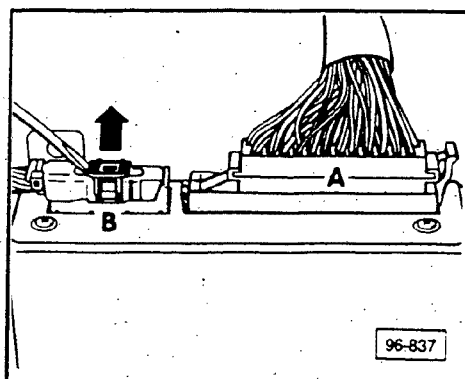
- turn crankshaft until rotor mark is precisely lined up with Hall mark
 - 0-0.5 volts

If voltage value is **NOT** obtained

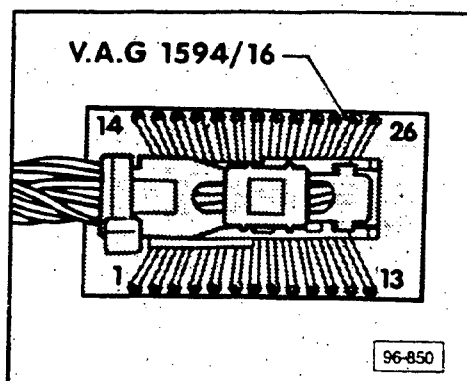
- replace distributor assembly

If voltage value **IS** obtained

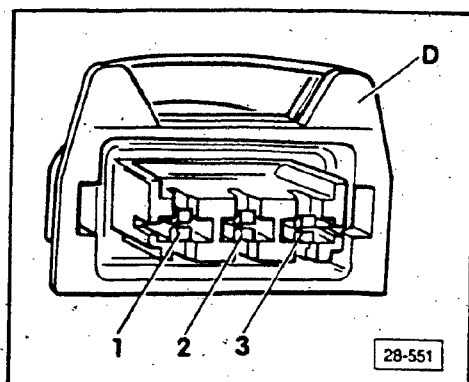
- check wiring between Hall Sensor and control unit as follows
- remove foot-well cover under glove compartment



- pry open secondary lock (black) of control unit harness connector B and remove



- connect measuring adaptor VAG 1594/16 to control unit harness connector B



- switch multimeter US 1119 to resistance range
- check continuity between Hall Sensor connector D and measuring adaptor

Connector D	Measuring adaptor
1	23
2	11
3	1

- approximately 0 ohms (continuity)

If continuity is **NOT** obtained

- check wiring using wiring diagram

If continuity **IS** obtained

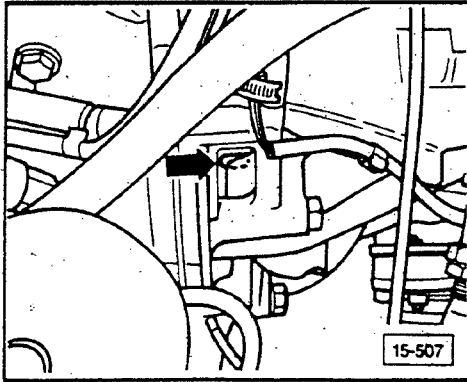
- replace MPI control unit

Ignition distributor, installing

Note

The distributor rotor is bonded to its shaft and cannot be removed without being destroyed.

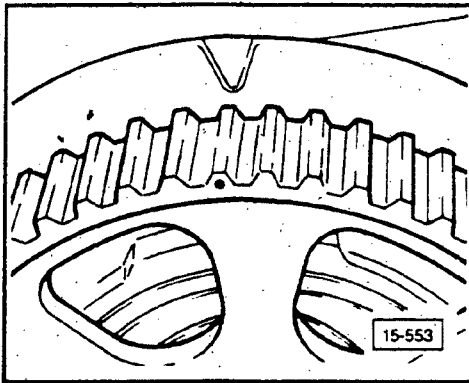
- turn crankshaft to TDC (arrow) with tool 2079



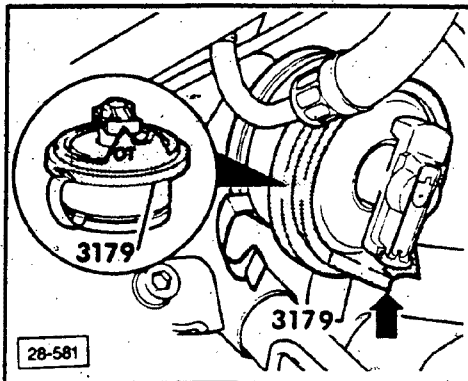
- dot on camshaft must line up with marking on cylinder head cover

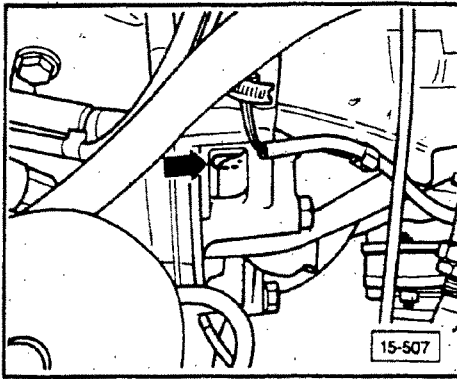
Note

Basic setting is required because final position of distributor is limited by ignition wire lengths.



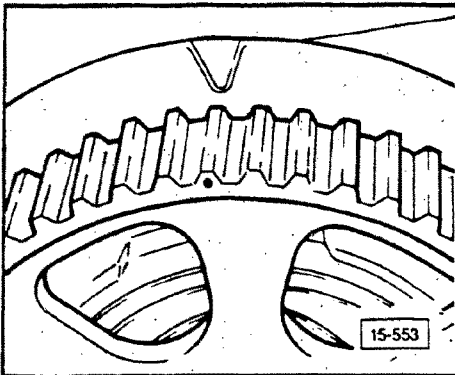
- install tool 3179 on distributor and position in groove (arrow)
- align rotor mark with TDC mark
- insert distributor then turn housing until rotor mark precisely aligns with TDC mark on tool 3179
- tighten distributor base clamp





Ignition distributor, basic setting (engine not running)

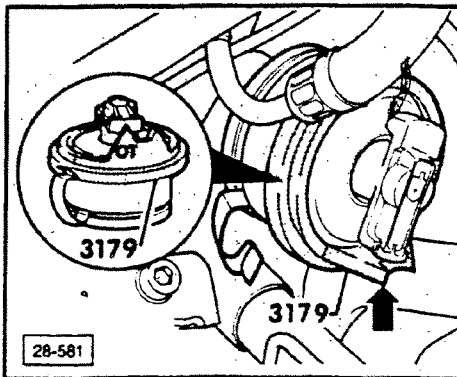
- turn crankshaft to TDC (arrow) using tool 2079



- dot on camshaft must line up with marking on cylinder head cover
- remove distributor cap

CAUTION

Distributor rotor is bonded to shaft, and cannot be removed. Replace distributor assembly if damaged.



- install tool 3179 on distributor and position in groove
- loosen distributor base clamp
- turn distributor housing until rotor mark is precisely aligned with TDC mark on 3179 (arrow)
- tighten distributor base clamp