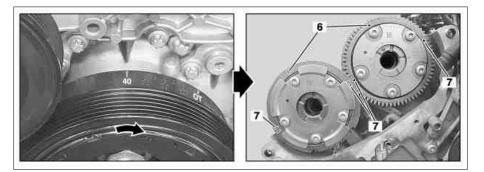


P05.10-2238-09

- Exhaust camshaft Intake camshaft
- Markings on camshaft adjuster Markings on camshaft adjuster
- 3 Old timing chain4 New timing chain

5 Pulse wheel markings



P05.10-2239-04

| Ξ | Removing | | |
|------------------|---|---------------|---|
| 1 | Disconnect battery ground cable Notes on battery | | AR54.10-P-0003EW AH54.10-P-0001-01A |
| 2 ⊯ AP | Remove spark plugs Replace spark plugs | | AP15.10-P-1580EW |
| 3 | Remove exhaust and intake camshafts (1, 2) at right cylinder head | | AR05.20-P-6992EW |
| 4 | Disconnect old timing chain (3) | 3. 3. | AR05.10-P-7601-01VA *602589009800 *602589023300 |
| | | 3 | *602589056300 *602589056301 |
| × | Install | | |
| 5 | Draw in new timing chain (4) | 3 3 | AR05.10-P-7601-04VA *602589009800 *272589036300 |
| 6 | Rivet new timing chain (4) | 3 | AR05.10-P-7601-02VA *602589009800 |
| | | Y | *272589003900 *272589006300 |
| | | 3 | *272589016300 *271589016300 |

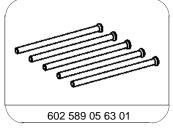
| | | Nm | | *BA05.10-P-1007-01B |
|-------------------------------|--|---|--|----------------------------------|
| 7 | Crank engine at crankshaft in direction of rotation of engine to a 55° crank angle before ignition TDC on first cylinder (305° marking on belt pulley) | See "Check basic position front cover installed at cylin 55° crankshaft angle before and the markings (5) on purintake and exhaust camships." | nder head at a ore ignition TDC ". ulse wheels of | AR05.20-P-6010EW . *001589650900 |
| | | left cylinder head must be in bores for camshaft Hall not the case, turn engine a direction of engine rotation revolution. | located centrally sensors. If this is at crankshaft in | |
| 8 | Crank engine at crankshaft in its direction of rotation through a 95° crank angle to a 40° crank angle after ignition TDC on first cylinder | | | |
| 9 | Install intake camshaft (1) and exhaust camshaft (2) on right cylinder head in the basic position | i Markings (6) point upwards and markings (7) align with contact surfaces on the cylinder head covers. | | |
| | | See "Check basic position front cover removed at the 40° crankshaft angle afte | cylinder head at | AR05.20-P-6010-01V |
| 10 | Crank engine at crankshaft in the direction of rotation of the engine and check that the basic position of the camshafts for an installed front cover on the cylinder head is at a 55° crank angle before ignition TDC (305° marking on the belt pulley) | i The markings (5) on pulse wheels of intake and exhaust camshafts (1, 2) must be located centrally in bores for camshaft Hall sensors. | | AR05.20-P-6010EW |
| ¹¹ ⊯ AP | Install spark plugs Replace spark plugs | | | AP15.10-P-1580EW |
| 12 | Connect ground cable to battery | | | AR54.10-P-0003EW |
| ⚠ Danger! | Risk of accident caused by vehicle starting off by itself when engine is running. Risk of injury caused by contusions and burns during starting procedure or when working near the engine as it is running | | | AS00.00-Z-0005-01A |
| 13 | Carry out an engine test run and check engine for leaks | | | |
| ^{Nm} Timing chain, c | chain tensioner | | | |
| | Designation | Engine | Engine | |

| Number | Designation | | Engine 272 | Engine 273 |
|--------------------|---|----|---------------|---------------|
| BA05.10-P-1007-01B | Bolt for timing chain rivet element (reference value) | Nm | 32 | 32 |



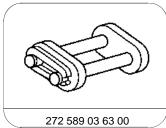




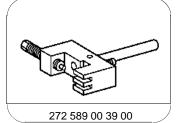


Thrust spindle

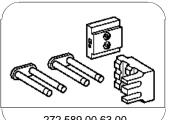
Thrust pins



Assembly link



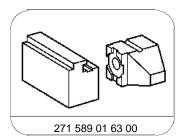
Riveting tool



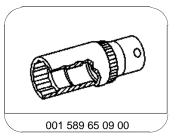
272 589 00 63 00
Assembly inserts



Guide



Assembly inserts



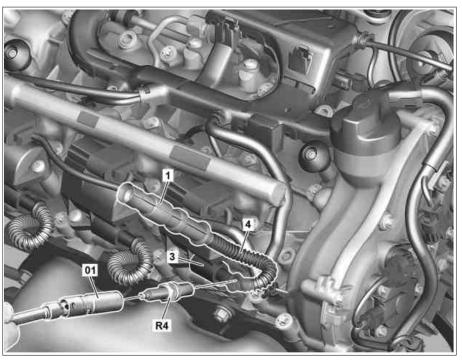
Wrench socket

ENGINE 157, 272, 273, 276, 278 in MODEL 212

ENGINE 157, 276, 278 in MODEL 218 ENGINE 272, 273, 276, 278 in MODEL 207

Shown on engine 272.983 in model 212.057

- 01 Spark plug wrench
- Spark plug connector
- 3 Ignition coil connector
- 4 Ignition cable
- R4 Spark plugs



P15.10-2349-06

| 23 33 | Remove/install | | |
|--------------|---|--|----------------------|
| ⚠ Danger ! | Risk of death caused by contact with parts conducting high voltages. | Do not touch parts which conduct high voltages. Persons who have electronic implants (e.g. cardiac pacemakers) should never perform any work on the ignition system. | AS15.10-Z-0001-01A |
| ⚠ Danger ! | Risk of injury . Skin or eye injuries may result when handling hot or glowing objects. | Wear protective gloves, protective clothing and safety glasses, if necessary. | AS00.00-Z-0002-01A |
| (9) | Notes on avoiding damage through contamination and foreign objects | | AH00.00-P-5000-01A |
| () | Notes on avoiding damage to ignition system | | AH15.10-P-0002-01V |
| 1 | Switch off ignition | | |
| 2 | Open engine hood | | |
| 3 | Remove ignition coils | | |
| ⊯ AR | | Model 207 except engine 276, 278 | AR15.12-P-2003CV |
| ⊯ AR | | Model 212 except engine 157, 276, 278 | AR15.12-P-2003EW |
| ⊯ AR | | ENGINE 276, 278 in MODEL 207 | AR15.12-P-2003FH |
| ⊯ AR | | ENGINE 157, 276, 278 in MODEL 212, 218 | AR15.12-P-2003EL |
| 4 | Detach spark plug connectors (1) from spark plugs (R4) | | |
| ₽ AR | | ENGINE 272.982/983/984 | AR15.12-P-1010-01CDE |
| | | i Installation: Observe correct assembly of | |
| | | spark plug connector and ignition coil | |
| | | connector (1, 3) and correct routing of | |
| | | ignition lines (4). | *272589013300 |
| | | S Puller | 272569013300 |
| 4 | Check | | |
| 5 | Check spark plug connector (1) | i Check for damage, deformation and crack formation, replace if necessary. | |
| 6 | Check ignition coil plug (3) and ignition lines (4) | ENGINE 272.982/983/984 | |
| | | i Check for damage, deformation and crack formation, replace if necessary. | |

| | heads using spark plug wrench (01) | Installation: It is essential to adhere to the tightening torque as it influences the position of the spark plug electrodes in the cylinder. An incorrect tightening torque causes misfires which can lead to damage to the engine and catalytic converter damage Spark plug to cylinder head Motor 272, 273 Spark plug wrench Motor 157, 276, 278 Spark plug wrench | *BA15.10-P-1001-01C *112589010900 *278589000900 |
|---|------------------------------------|--|---|
| 8 | Install in the reverse order | | |

Nm Spark plugs

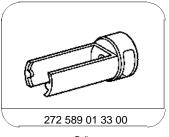
| Number | Designation | | ENGINE 157 | ENGINE 272 |
|--------------------|-----------------------------|----|------------|------------|
| BA15.10-P-1001-01C | Spark plug to cylinder head | Nm | 23 | 23 |

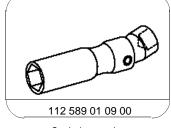
Nm Spark plugs

| Number | Designation | | ENGINE 273 | ENGINE 276 |
|--------------------|-----------------------------|----|------------|------------|
| BA15.10-P-1001-01C | Spark plug to cylinder head | Nm | 23 | 23 |

Nm Spark plugs

| Number | Designation | | ENGINE 278 |
|--------------------|-----------------------------|----|------------|
| BA15.10-P-1001-01C | Spark plug to cylinder head | Nm | 23 |



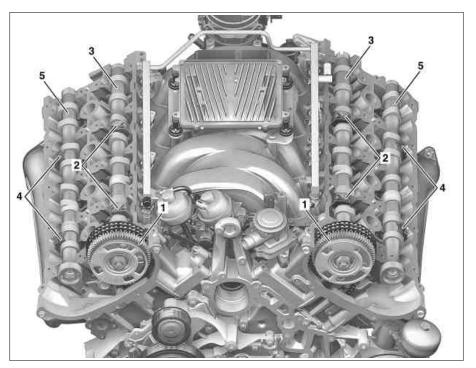




Spark plug wrench

Spark plug wrench

- 1 Camshaft adjuster for intake camshaft
- 2 Auxiliary bearing cap of intake camshaft
- 3 Intake camshaft
- 4 Auxiliary bearing cap of exhaust camshaft
- 5 Exhaust camshaft



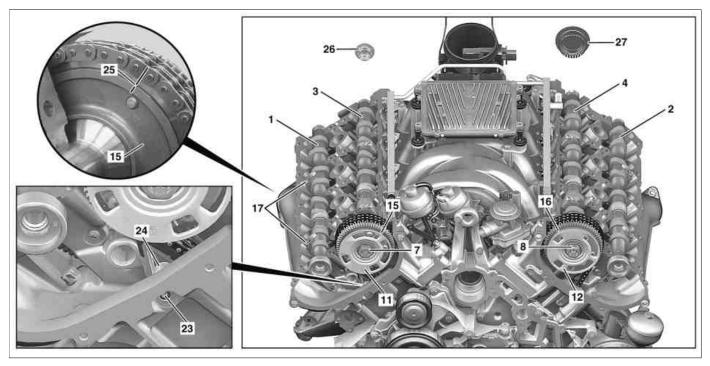
P05.20-2270-06

| X | Remove/install | | |
|-----------|--|--|---------------------|
| i | The ground line on the battery must <u>always</u> be detached before beginning work on the fuel system otherwise pressure will be lost in the fuel system through opening a vehicle door or the trunk lid | Model 212.057 | |
| | Remove intake camshafts | | |
| 1 | Remove respective camshaft adjusters (1) | | AR05.20-P-7201EWE |
| 2 | Remove auxiliary bearing cap (2) and intake camshaft (3) | Nm | *BA05.20-P-1010-02A |
| | Remove exhaust camshafts | | |
| 3 | Remove respective camshaft adjusters | | AR05.20-P-7201EWA |
| 4 | Remove respective cylinder head cover | Right cylinder head cover, except model 212.057 | AR01.20-P-5012EL |
| | | Right cylinder head cover, model 212.057 | AR01.20-P-5012ELD |
| | | Left cylinder head cover, except model 212.057 | AR01.20-P-5013EL |
| | | Left cylinder head cover, model 212.057 | AR01.20-P-5013ELD |
| 5 | Take off auxiliary bearing cap (4) and remove exhaust camshaft (5) | Nm | *BA05.20-P-1010-02A |
| 6 | Install in the reverse order | | |
| ⚠ Danger! | Risk of accident caused by vehicle starting off by itself when engine is running. Risk of injury caused by contusions and burns during starting procedure or when working near the engine as it is running Conduct engine test run and check engine for leaks | Secure vehicle to prevent it from moving by itself. Wear closed and snug-fitting work clothes. Do not touch hot or rotating parts. | AS00.00-Z-0005-01A |

Nm Camshaft, camshaft adjustment

| Number | Designation | | Engine 272 | Engine 273 | |
|--------------------|--|---------|---------------|---------------|---|
| | | | | | |
| BA05.20-P-1010-02A | Bolt, auxiliary bearing cap to cylinder head | Stage 1 | Nm | 8 | 8 |
| | | Stage 2 | Δ° | - | - |

On intake camshafts



P05.20-2246-09

- 1, 2 Exhaust camshaft
- 3, 4 7, 8 Intake camshaft
- Center valve of intake camshaft
- 15 Camshaft adjuster for intake camshaft
- 18 Dowel pin
- 19 Pin
- 20 Bore in camshaft adjuster
- 11, 12 Pulse wheel for intake camshaft 15, 16 Camshaft adjuster for intake

camshaft

- 24 Tensioning rail 25 Color coding 26, 27 Cap



P05.20-2248-04

Dowel pin in camshaft adjuster 21 Fitted bore for intake camshaft 22

P05.20-2249-10

| XX | Remove/install | | |
|----|---|--------------|-------------------|
| i | The ground line on the battery must <u>always</u> be detached before beginning work on the fuel system otherwise pressure will be lost in the fuel system through opening a vehicle door or the trunk lid | Type 212.057 | |
| 1 | Remove air filter housing | | AR09.10-P-1150EWS |

| 2 | Remove chain tensioner | Installation: Install new chain tensioner. The previously installed chain tensioner must not be reinstalled because during removal, its pressure pin is pressed into the end position. The thrust pin latch prevents this return stroke. This would overstretch the timing chain on reinstalling. | AR05.10-P-7800EW |
|----|--|--|---------------------------------------|
| 3 | Removal on right cylinder head Remove camshaft adjuster for right exhaust camshaft (1) | | AR05.20-P-7201EWA |
| 4 | Remove cap (26) | | |
| 5 | Detach center valve (7) | Observe loosening direction. Installation: The center valve (7) may only be tightened when chain tensioner is removed, otherwise this can lead to malfunctioning of camshaft adjustment. | *BA05.20-P-1009-02A |
| 6 | Remove right cylinder head cover | Except model 212.057 Type 212.057 | AR01.20-P-5012EL AR01.20-P-5012ELD |
| 7 | Mark timing chain relative to the camshaft adjuster (15) using color codes (25) | i Engine positioned at 40° crankshaft angle after ignition TDC. i Installation: Check position of intake camshaft (3) based on color coding (25). | |
| 8 | Remove tensioning rail (24) | carrishart (o) based on color coding (25). | AR05.10-P-8127EW |
| 9 | Remove center valve (7) and pulse wheel (11) | Check dowel pin (18) and pin (19). If a dowel pin (18) or pin (19) is sheared off then this must be removed from camshaft adjuster (15). Installation: Always replace pulse wheel (11). When tightening center valve (7) there is a risk that dowel pin (18) or pin (19) may shear off at pulse wheel (11). Installation: Lubricate center valve (7) at contact surface with pulse wheel (11) before assembly. Installation: Align dowel pin (18) on pulse wheel (11) with bore (20) in camshaft adjuster (15). | |
| 10 | Lift timing chain and pull off camshaft adjuster (15) from intake camshaft (3) towards the front | i Installation: Lubricate contact surfaces to intake camshaft (3) and camshaft adjuster (15) before mounting camshaft adjuster (15). i Installation: Align color coding (25) on camshaft adjuster (15) and timing chain with each other. Align dowel pin (21) in camshaft adjuster (15) with fitted bore (22) in intake camshaft (3). | |
| 11 | Removal on left cylinder head | | AR05.20-P-7201EWA |
| | Remove camshaft adjuster for exhaust camshaft (2) | | ARUS.20-P-7201EWA |
| 12 | Remove cap (27) | | |
| 13 | Detach center valve (8) | i Observe loosening direction. limits Installation: Tightening of center valve (8) may only take place for a removed chain tensioner. Malfunctions of camshaft adjustment can occur otherwise. | *BA05.20-P-1009-02A |
| 14 | Remove cylinder head cover | Except model 212.057 Type 212.057 | AR01.20-P-5013EL AR01.20-P-5013ELD |
| 15 | Mark timing chain relative to camshaft adjuster (16) using color codes (25) | i Engine positioned at 40° crankshaft angle after ignition TDC. i Installation: Check position of intake camshaft (4) based on color coding (25). | |
| 16 | Remove center valve (8) and pulse wheel (12) | Check dowel pin (18) and pin (19). If a dowel pin (18) or pin (19) is sheared off then this must be removed from camshaft adjuster (16). Installation: Always replace pulse wheel (12). When tightening center valve (8) there is a risk that dowel pin (18) or pin (19) may shear off at pulse wheel (12). Installation: Lubricate center valve (8) at contact surface with pulse wheel (12) before assembly. | |

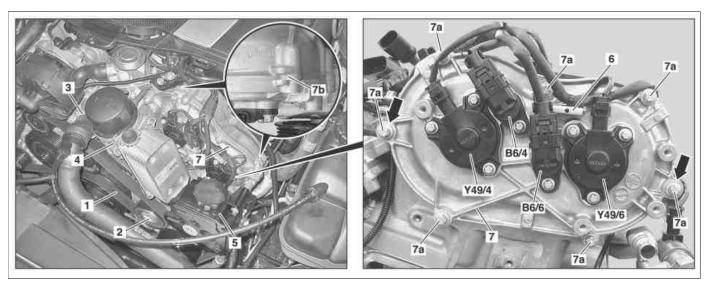
| 17 | Lift timing chain and detach camshaft adjuster (16) forwards from the intake camshaft (4) | i Installation: Align dowel pin (18) for pulse wheel (12) with fitted bore (20) in camshaft adjuster (16). i Installation: Lubricate contact surfaces to intake camshaft (4) and camshaft adjuster (16) before the mounting camshaft adjuster (16). i Installation: Align color coding (25) on camshaft adjuster (16) and timing chain with each other. Align dowel pin (21) in camshaft adjuster (16) with fitted bore (22) in intake camshaft (4). | |
|-----------|--|--|--------------------|
| 18 | Install in the reverse order | | |
| 4 | Checking | | |
| ⚠ Danger! | Risk of accident caused by vehicle starting off by itself when engine is running. Risk of injury caused by contusions and burns during starting procedure or when working near the engine as it is running | Secure vehicle to prevent it from moving by itself. Wear closed and snug-fitting work clothes. Do not touch hot or rotating parts. | AS00.00-Z-0005-01A |
| 19 | Conduct engine test run and check engine for leaks | | |

Nm Camshaft, camshaft adjustment

| Number | | | Engine 272 | Engine 273 |
|--------------------|--|----|---------------|---------------|
| | | | | |
| BA05.20-P-1009-02A | Center valve for pulse wheel/ camshaft adjuster to camshaft | Nm | 145 | 145 |

B6/4

ENGINES 272, 273 in MODEL 212 Front cover at left cylinder head



Left intake camshaft Hall sensor

P01.30-2237-08

Poly-V-belt
 Poly-V belt tensioning device
 Coolant thermostat housing
 Oil filter housing

Power steering expansion reservoir

Clamp

7 Front cover B6/6 Left exhaust camshaft Hall sensor 7a Bolts Y49/4 Left intake camshaft solenoid 7b Prying lugs Y49/6 Left exhaust camshaft solenoid

| XX | Remove/install | | |
|----------|--|--|---------------------|
| (3) | Information on preventing damage to electronic components due to electrostatic discharge | | AH54.00-P-0001-01A |
| 1 | Turn key in ignition lock to position "0" | | |
| 2 | Remove bottom engine compartment paneling | | AR61.20-P-1105EW |
| 3 | Drain coolant at radiator | | AR20.00-P-1142EWS |
| (1) | Notes on coolant | | AH20.00-N-2080-01A |
| 4 | Remove left engine intake air duct and front engine cover | See Remove air filter housing. | AR09.10-P-1150EWS |
| 5 | Remove poly-V belt (1) and poly-V belt tensioning device (2) | | AR13.20-P-0001EWS |
| 6 | Remove coolant thermostat housing (3) | | AR20.10-P-2460EW |
| 7 | Remove oil filter housing (4) | | AR18.20-P-3471EW |
| 8 | Remove expansion reservoir (5) | | AR46.25-P-1000EWL |
| 9 | Disconnect electrical connectors on left intake camshaft Hall sensor (B6/4) and left exhaust camshaft Hall sensor (B6/6) | | |
| 10 | Disconnect electrical connectors on left intake camshaft solenoid (Y49/4) and left exhaust camshaft solenoid (Y49/6) | | |
| 11 | Detach clamp (6) | | |
| 12 | Remove bolts (7a) from front cover (7) | Nm | *BA01.30-P-1006-01O |
| 13 | Carefully loosen front cover (7) on lifting lugs (7b) and detach from the front | i Pay attention to fitted sleeves in area of outer threaded connections (arrows). i Installation: Apply sealant to the front | |
| i | Notes on sealant path for front cover to cylinder head | cover (7). | AH01.30-P-1000-02V |
| | | 3 | *112589002500 |
| | | Loctite sealant 5970 | *BR00.45-Z-1013-01A |
| 1 | Clean | | |
| 14 | Clean sealing surfaces on cylinder head, on cylinder head cover and on front cover (7) | Do not use any sharp-edged tools or abrasive paper as this will damage the sealing surfaces. | AR01.00-P-0050-01A |
| | | Loctite 7200 | *BR00.45-Z-1038-04A |
| | | Cleaning spray, Loctite 7063 (150ml) | *BR00.45-Z-1046-04A |

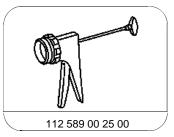
| 15 | Detach left intake camshaft Hall sensor (B6/4) and left exhaust camshaft Hall sensor (B6/6) from front cover (7) | When replacing the front cover (7) | *BA15.10-P-1002-03E |
|-----------|--|--|---------------------|
| 16 | Detach left intake camshaft solenoid (Y49/4) and left exhaust camshaft solenoid (Y49/6) from front cover (7) | When replacing the front cover (7) | |
| | | Nm | *BA15.10-P-1003-03E |
| 17 | Install in the reverse order | | |
| 4 | Checking | | |
| ⚠ Danger! | Risk of accident caused by vehicle starting off by itself when engine is running. Risk of injury caused by contusions and burns during starting procedure or when working near the engine as it is running | Secure vehicle to prevent it from moving by itself. Wear closed and snug-fitting work clothes. Do not touch hot or rotating parts. | AS00.00-Z-0005-01A |
| 18 | Conduct engine test run and check engine for leaks | | |

Nm Cylinder head

| Number | Designation | | | Engine 272 | Engine 273 |
|--------------------|------------------------------------|----|----|---------------|---------------|
| BA01.30-P-1006-01O | Bolt, front cover to cylinder head | M6 | Nm | 9 | 9 |

Nm Position sensor

| Number | Designation | Engine 272 | Engine 273 |
|--------------------|---|---------------|---------------|
| BA15.10-P-1002-03E | Bolt, camshaft Hall sensor to front cover on cylinder head Nn | 8 | 8 |
| BA15.10-P-1003-03E | Bolt, camshaft solenoid to front cover Nn to cylinder head | 8 | 8 |

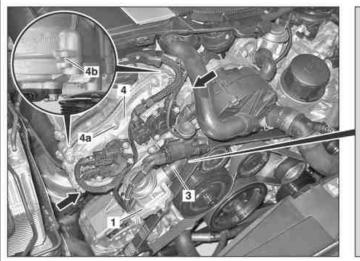


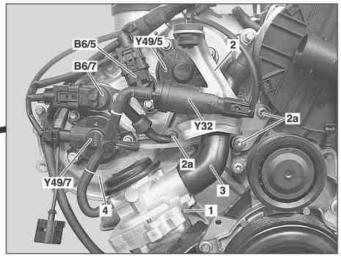
Squeeze gun

Repair materials

| Number | Designation | Order number |
|--------------------|--------------------------------------|--|
| BR00.45-Z-1013-01A | Loctite sealant 5970 | A 003 989 98 20 |
| BR00.45-Z-1038-04A | Loctite 7200 | Henkel Loctite Deutschland GmbH Arabellastrasse 17 81925 M nchen Germany Tel. +49 899268-0 Fax + 49 899101978 www.Loctite.de |
| BR00.45-Z-1046-04A | Cleaning spray, Loctite 7063 (150ml) | A 001 986 71 71 10 |

ENGINES 272, 273 in MODEL 212 Front cover at right cylinder head





P01.30-2238-08

1 Air shutoff valve

2 Bracket

2a Bolts

3 Hose

4 Front cover

4a Screw

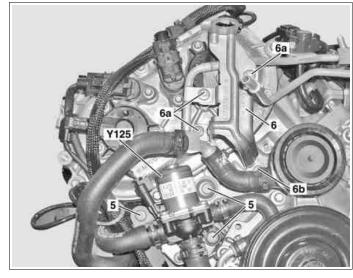
5 Bolts 6 Bracket 6a Bolts 6b Screw

Y125 Low-temperature circuit shutoff valve

4b Prying lugs

B6/5 Right intake camshaft Hall sensorB6/7 Right exhaust camshaft Hall sensor

Y32 Air pump switchover valve Y49/5 Right intake camshaft solenoid Y49/7 Right exhaust camshaft solenoid



P01.30-2319-11

| XX | Remove/install | | |
|-----|---|--|---------------------|
| (3) | Information on preventing damage to electronic components due to electrostatic discharge | | AH54.00-P-0001-01A |
| 1 | Turn key in ignition lock to position "0" | | |
| 2 | Remove bottom engine compartment paneling | | AR61.20-P-1105EW |
| 3 | Remove front engine cover | i Pull the front engine cover upward and out of the mountings. | |
| 4 | Remove right engine intake air duct | See "Remove air filter housing". | AR09.10-P-1150EWS |
| 5 | Remove air shutoff valve (1) at the right cylinder head | Except model 212.057 | AR14.30-P-7200EW |
| 6 | Remove bolts (2a) and set bracket (2) for front engine cover with air pump switchover valve (Y32) to one side | Except model 212.057 i Do not detach lines at the air pump | |
| | | switchover valve (Y32). | |
| | | Nm | *BA01.30-P-1009-01O |
| 7 | Remove hose (3) | Except model 212.057 | |

| Г | | | 1 |
|-----------|--|--|---------------------|
| 8 | Remove bolts (5) and place low-temperature circuit shutoff valve (Y125) to one side with lines connected | Model 212.057 | |
| | | Nm | *BA01.30-P-1019-01O |
| 9 | Remove bolts (6a), loosen bolt (6b) and swivel holder to the side | Model 212.057 | |
| | | Nm | *BA01.30-P-1018-01O |
| 10 | Disconnect electrical connectors on right intake camshaft solenoid (Y49/5) and right exhaust camshaft solenoid (Y49/7) | | |
| 11 | Disconnect electrical connectors on right intake camshaft Hall sensor (B6/5) and right exhaust camshaft Hall sensor (B6/7) | | |
| 12 | Remove bolts (4a, 7 pieces) from front cover (4) | Installation: Check seating of the seal for the oil dipstick guide tube in the oil pan to avoid oil leakage. | |
| | | Nm | *BA01.30-P-1006-010 |
| | | Nm | *BA01.45-P-1006-01M |
| 13 | Carefully loosen front cover (4) on lifting lugs (4b) and detach from the front | Pay attention to fitted sleeves in area of outer threaded connections (arrows). | |
| | | i Installation: Apply sealant to front cover (4). | |
| i | Notes on sealant path for front cover to cylinder head | | AH01.30-P-1000-02V |
| | | 3 | *112589002500 |
| | | Loctite sealant 5970 | *BR00.45-Z-1013-01A |
| | Clean | | |
| 14 | Clean sealing surfaces on front cover (4), on cylinder head cover and on cylinder head | Do not use any sharp-edged tools or abrasive paper as this will damage the sealing surfaces. | AR01.00-P-0050-01A |
| | | Loctite 7200 | *BR00.45-Z-1038-04A |
| | | Cleaning spray, Loctite 7063 (150ml) | *BR00.45-Z-1046-04A |
| 15 | Detach right intake camshaft Hall sensor (B6/5) and right exhaust camshaft Hall sensor (B6/7) from front cover (4) | When replacing the front cover (4) | |
| | | Nm | *BA15.10-P-1002-03E |
| 16 | Detach right intake camshaft solenoid (Y49/5) and right exhaust camshaft solenoid (Y49/7) from front cover (4) | When replacing the front cover (4) | |
| | , , | Nm | *BA15.10-P-1003-03E |
| 17 | Install in the reverse order | | |
| 4 | Checking | | |
| ⚠ Danger! | Risk of accident caused by vehicle starting off by itself when engine is running. Risk of injury caused by contusions and burns during starting procedure or when working near the engine as it is running | Secure vehicle to prevent it from moving by itself. Wear closed and snug-fitting work clothes. Do not touch hot or rotating parts. | AS00.00-Z-0005-01A |
| 18 | Conduct engine test run and check engine for leaks | | |

Nm Cylinder head

| Number | Designation | | Engine 272 | Engine 273 |
|--------------------|---|-------|---------------|---------------|
| BA01.30-P-1006-01O | Bolt, front cover to cylinder head | M6 Nm | 9 | 9 |
| BA01.30-P-1009-01O | Bolt, switchover valve bracket to cylinder head | M6 Nm | 9 | 9 |
| BA01.30-P-1018-01O | Bolt, NT circuit coolant line bracket to cylinder head or cylinder head front cover | Nm | 9 | - |
| BA01.30-P-1019-01O | Bolt, shutoff valve bracket to cylinder head | Nm | 9 | - |

| Number | Designation | Engine 272 | Engine 273 |
|--------------------|--|------------|------------|
| | | | |
| | | | |
| BA01.45-P-1006-01M | Mounting bolt for oil dipstick guide tube Nm | 9 | 9 |
| | | | |

Nm Position sensor

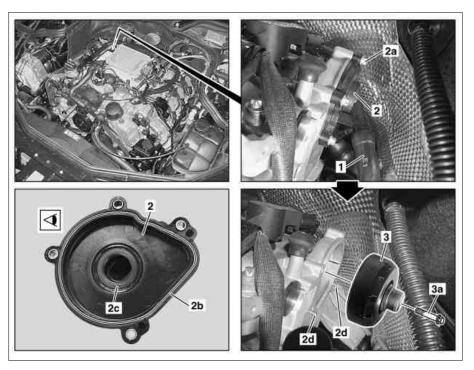
| Number | Designation | | Engine 272 | Engine 273 |
|--------------------|--|----|---------------|---------------|
| BA15.10-P-1002-03E | Bolt, camshaft Hall sensor to front cover on cylinder head | Nm | 8 | 8 |
| BA15.10-P-1003-03E | Bolt, camshaft solenoid to front cover to cylinder head | Nm | 8 | 8 |



Squeeze gun

| Number | Designation | Order number |
|--------------------|--------------------------------------|--|
| BR00.45-Z-1013-01A | Loctite sealant 5970 | A 003 989 98 20 |
| BR00.45-Z-1038-04A | Loctite 7200 | Henkel Loctite Deutschland GmbH Arabellastrasse 17 81925 M nchen Germany Tel. +49 899268-0 Fax + 49 899101978 www.Loctite.de |
| BR00.45-Z-1046-04A | Cleaning spray, Loctite 7063 (150ml) | A 001 986 71 71 10 |

- 1 Crankcase ventilation hose
- 2 Centrifuge cover
- 2a Screw
- 2b Gasket
- 2c Radial shaft seal
- 2d Dowel pins
- 3 Centrifuge
- 3a Screw



P01.20-2131-06

| XX | Remove/install | | |
|-----------|--|---|---------------------|
| 1 | Remove air filter housing | | AR09.10-P-1150EWS |
| 2 | Detach hose (1) at centrifuge cover (2) | | |
| 3 | Remove bulkhead between wheel wells | Engine 272.983 | |
| | | i Installation: Ensure that rubber strips are seated correctly on bulkhead. | |
| 4 | Unscrew bolts (2a, 4 each) and remove centrifuge cover (2) | i Intercept engine oil that flows out with an absorbent rag. | |
| | | Installation: Check seal (2b) and radial shaft sealing ring (2c) for wear and damage and replace centrifuge cover (2) if necessary. | |
| | | The fitted pins (2d) determine the installation position of the centrifuge cover (2). | *BA01.20-P-1001-01L |
| 5 | Remove bolt (3a) and remove the centrifuge (3) | Left-hand thread | *BA01.20-P-1002-01L |
| 6 | Install in the reverse order | | |
| 4 | Checking | | |
| ⚠ Danger! | Risk of accident caused by vehicle starting off by itself when engine is running. Risk of injury caused by contusions and burns during starting procedure or when working near the engine as it is running | Secure vehicle to prevent it from moving by itself. Wear closed and snug-fitting work clothes. Do not touch hot or rotating parts. | AS00.00-Z-0005-01A |
| 7 | Carry out an engine test run and check engine for leaks | | |
| 8 | Check engine oil level | | |
| ₩AP | Engine oil and filter change | | AP18.00-P-0101EW |

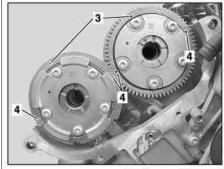
Nm Crankcase ventilation, cylinder head cover

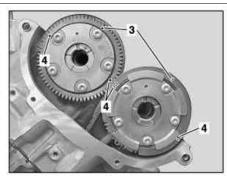
| Number | Designation | | | Engine 272 | Engine 273 |
|--------------------|---|---------|----|---------------|---------------|
| BA01.20-P-1001-01L | Bolt, centrifuge cover to cylinder head/cylinder head cover | Stage 1 | Nm | 6 | 6 |

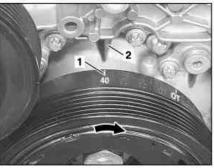
| | | Stage 2 | Δ° | 90 | 90 |
|--------------------|---------------------------------------|---------|----|----|----|
| BA01.20-P-1002-01L | Bolt, centrifuge to camshaft sprocket | Stage 1 | Nm | 6 | 6 |
| | | Stage 2 | Δ° | 90 | 90 |

Shown without pulse wheels on the camshaft adjusters

- Crank the engine at the crankshaft in Turn the direction of engine rotation (arrow) to 40° crank angle after ignition TDC.
 - The 40° marking (1) on the belt pulley must be aligned with the positioning edge (2) on the timing case cover.
 - The markings (3) on the camshaft adjusters face upward, and the markings (4) align with the contact surfaces on the cylinder head covers.



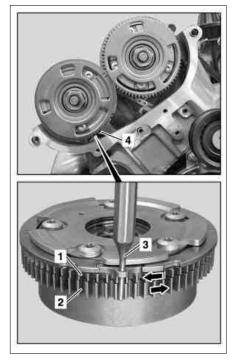




P05.20-2164-06

- The tooth flanks (1, 2) are held against each other by spring pressure and should not be skewed, otherwise the camshaft adjuster will be irreparably damaged
- 1 Insert the drift (3, diameter 3mm) into the bore (4) of the cover plate and lock the tooth flanks (1, 2) with each other.
 - i Push the drift (3) through to the end of tooth flank (2).
 - To allow the drift (3) to be inserted more easily, align the tooth flanks with each other (in the direction of the arrows).

Shown on camshaft adjuster, engine 273.965



P05.20-2160-03



P05.20-2322-01

Shown on camshaft adjuster, engine 272.968

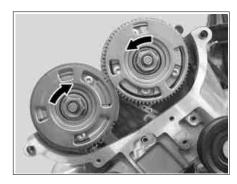
Nm Camshaft, camshaft adjustment

| | | Engine 272 | Engine 273 | |
|--------------------|--|---------------|---------------|-----|
| | | | | |
| BA05.20-P-1009-02A | Center valve for pulse wheel/ camshaft adjuster to camshaft | Nm | 145 | 145 |

i Counterhold camshafts at the rear with a Torx screwdriver bit using a suitable tool to unfasten and fasten the center valves. Before installing, the center valves must be lubricated with oil on the contact surfaces with the pulse wheels.

Center valves of right cylinder head

- 1 Loosen the center valves in the direction of the arrow.
- 2 Tighten the center valves against the direction of the arrow.



P05.20-2161-01

Center valves of left cylinder head

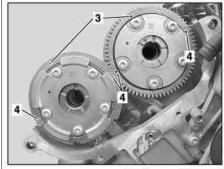
- 3 Loosen the center valves in the direction of the arrow.
- 4 Tighten the center valves against the direction of the arrow.

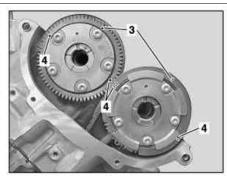


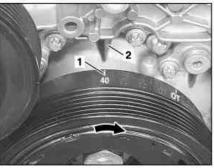
P05.20-2162-01

Shown without pulse wheels on the camshaft adjusters

- Crank the engine at the crankshaft in Turn the direction of engine rotation (arrow) to 40° crank angle after ignition TDC.
 - The 40° marking (1) on the belt pulley must be aligned with the positioning edge (2) on the timing case cover.
 - The markings (3) on the camshaft adjusters face upward, and the markings (4) align with the contact surfaces on the cylinder head covers.







P05.20-2164-06

272, 273 (except 272.983) in MODEL 212

P01.20-2127-09

- 1 Bracket1a Screw
- 1a Screw2 Air shutoff valve
- 3 Front cover
- 4 Cover
- 5l Left control unit bracket
- 5r Right control unit bracket
- 6 Ground cable
- 7 Cylinder head cover
- 8 Feed duct
- 9 Resonance intake manifold
- 10 Engine lifting eye

N3/10 ME-SFI [ME] control unit Y32 Air pump switchover valve

L Left connector R Right connector

| X X | Remove/install | | |
|------------|--|--|---------------------|
| (b) | Information on preventing damage to electronic components due to electrostatic discharge | | AH54.00-P-0001-01A |
| 1 | Turn key in ignition lock to position "0" | | |
| 2 | Remove air filter housing | | AR09.10-P-1150EWS |
| 3 | Remove bolts (1a) and remove bracket (1) for front engine cover with air pump switchover valve (Y32) | Mm | *BA01.30-P-1009-01O |
| 4 | Remove right air shutoff valve (2) | | AR14.30-P-7200EW |
| 5 | Remove front cover (3) on the right cylinder head | | AR01.30-P-5700EWR |
| 6 | Remove ignition coils at right cylinder head | | AR15.12-P-2003EW |
| 7 | Remove cover (4) on centrifuge | | AR01.20-P-2100EWS |
| 8 | Disconnect right connector (R) at ME-SFI [ME] control unit (N3/10) | | |
| 9 | Detach ME-SFI [ME] control unit (N3/10) from control unit brackets (5I, 5r) and lay to one side | i Do not disconnect left connector (L) at ME-SFI [ME] control unit (N3/10). | |
| 10 | Remove right control unit bracket (5r) | Nm | *BA07.08-P-1002-01A |
| 11 | Detach ground line (6) from cylinder head cover (7) | Nm | *BA01.30-P-1010-01O |
| 12 | Remove feed duct (8) from resonance intake manifold (9), cylinder head cover (7) and rear right engine lifting eye (10) and place to one side | Nm | *BA15.18-P-1001-01B |
| | | Nm | *BA15.18-P-1002-01B |
| | | Nm | *BA15.18-P-1003-01B |
| 13 | Loosen bolts for cylinder head cover (7) in reverse order of tightening procedure and remove them | Engine 272 | AR01.20-P-5014-03VA |
| | | Engine 273 | AR01.20-P-5014-03SX |
| | | Nm | *BA01.30-P-1004-01O |

| 14 | Carefully pry off cylinder head cover (7) from cylinder head | To avoid damaging sealing surfaces, do not pound in the prying tool between the cylinder head cover (7) and the cylinder head. Installation: Apply sealing compound to cylinder head cover (7): | |
|-----------|--|--|---------------------|
| i | Notes on sealant path for cylinder head cover | Engine 272 | AH01.30-P-1000-08V |
| i | | Engine 273 | AH01.30-P-1000-08SX |
| | | 3. | *112589002500 |
| | | Loctite sealant 5970 | *BR00.45-Z-1013-01A |
| | Clean | | |
| 15 | Clean sealing surfaces at cylinder head and at cylinder head cover (7) | Do not use any sharp-edged tools or abrasive paper as this will damage the sealing surfaces. | AR01.00-P-0050-01A |
| | | Loctite 7200 | *BR00.45-Z-1038-04A |
| | | Cleaning spray, Loctite 7063 (150ml) | *BR00.45-Z-1046-04A |
| 16 | Install in the reverse order | | |
| 4 | Checking | | |
| ⚠ Danger! | Risk of accident caused by vehicle starting off by itself when engine is running. Risk of injury caused by contusions and burns during starting procedure or when working near the engine as it is running Conduct engine test run and check engine | Secure vehicle to prevent it from moving by itself. Wear closed and snug-fitting work clothes. Do not touch hot or rotating parts. | AS00.00-Z-0005-01A |
| | for leaks whilst it is running | | |

Nm Cylinder head

| Number | Designation | | | | Engine 272 | Engine 273 |
|--------------------|---|----|---------|----|---------------|---------------|
| BA01.30-P-1004-01O | Bolt, cylinder head cover to cylinder head | M7 | Stage 1 | Nm | 12 | 12 |
| | _ | | Stage 2 | ۷° | 90 | 90 |
| BA01.30-P-1009-01O | Bolt, switchover valve bracket to cylinder head | M6 | | Nm | 9 | 9 |
| BA01.30-P-1010-01O | Bolt, ground line to cylinder head cover | M6 | | Nm | 9 | 9 |

Nm Control unit

| Number | Designation | Engine 272 | Engine 273 |
|--------------------|--|---------------|---------------|
| BA07.08-P-1002-01A | Bolt, control unit bracket to resonance intake manifold Nm | 8 | 8 |

Nm Engine wiring harness

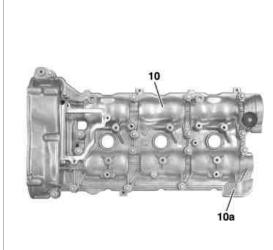
| Number | Designation | | Engine 272 | Engine 273 |
|--------------------|--|----|---------------|---------------|
| BA15.18-P-1001-01B | Bolt, feed duct to resonance intake manifold | Nm | 8 | 8 |
| BA15.18-P-1002-01B | Bolt, feed duct to cylinder head cover | Nm | 8 | 8 |
| BA15.18-P-1003-01B | Bolt, feed duct to engine lifting eye | Nm | 8 | 8 |

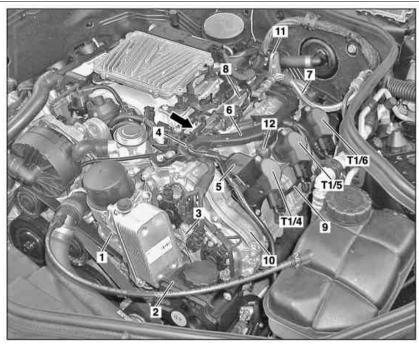


Squeeze gun

Repair materials

| Number | Designation | Order number |
|--------------------|--------------------------------------|--|
| BR00.45-Z-1013-01A | Loctite sealant 5970 | A 003 989 98 20 |
| BR00.45-Z-1038-04A | Loctite 7200 | Henkel Loctite Deutschland GmbH Arabellastrasse 17 81925 M nchen Germany Tel. +49 899268-0 Fax + 49 899101978 |
| | | www.Loctite.de |
| BR00.45-Z-1046-04A | Cleaning spray, Loctite 7063 (150ml) | A 001 986 71 71 10 |





P01.20-2126-09

- Oil filter housing
- Power steering expansion reservoir
- Front cover
- Purge line
- Oil separator

- 6 Feed duct
- 7
- Fuel pipe Fuel distributor 8
- Ground cable

- 10 Cylinder head cover
- 10a Heat shield
- Engine lifting eye 11
- 12 Rubber mount

| XX | Remove/install | | |
|-----------|--|--|---------------------|
| ⚠ Danger! | Risk of death caused by vehicle slipping or toppling off the lifting platform. | Align vehicle between columns of vehicle lift and position four support plates at vehicle lift support points specified by vehicle manufacturer. | AS00.00-Z-0010-01A |
| 1 | Turn key in ignition lock to position "0" | | |
| 2 | Remove bottom engine compartment paneling | | AR61.20-P-1105EW |
| 3 | Drain coolant at radiator | | AR20.00-P-1142EWS |
| (3) | Notes on coolant | | AH20.00-N-2080-01A |
| 4 | Remove air filter housing | | AR09.10-P-1150EWS |
| 5 | Remove poly-V belt and poly-V belt tensioning device | | AR13.20-P-0001EWS |
| 6 | Remove coolant thermostat | | AR20.10-P-2460EW |
| 7 | Remove oil filter housing (1) | | AR18.20-P-3471EW |
| 8 | Remove expansion reservoir (2) | | AR46.25-P-1000EWL |
| 9 | Remove front cover (3) at left cylinder head | | AR01.30-P-5700EWL |
| 10 | Detach the purge line (4) at separation point (arrow), unclip it from brackets on oil separator (5) and feed line duct (6) and place it to the side | | |
| 11 | Reduce fuel pressure at service valve | | AR07.03-P-1460-01VA |
| | | Nm Engine 272 | *BA07.03-P-1004-01B |
| | | 8 | *119589046300 |
| 12 | Detach fuel line (7) at fuel distributor (8) | i Catch escaping fuel with an absorbent rag! i Seal connections immediately with stop plugs. | |
| | | Nm | *BA07.03-P-1001-01B |
| | | <u>3</u> | *129589009100 |
| 13 | Remove ignition coils on left cylinder head | | AR15.12-P-2003EW |
| 14 | Remove oil separator (5) | | AR01.20-P-9750EWS |
| 15 | Detach ground line (9) from cylinder head cover (10) | Nm | *BA01.30-P-1001-010 |
| 16 | Remove left rear engine lifting eye (11) | Nm | *BA01.30-P-1005-01O |

| | | Nm | *BA15.18-P-1003-01B |
|-----------|--|--|--|
| 17 | Remove feed line duct (6) from cylinder head cover (10) | Nm | *BA15.18-P-1002-01B |
| 18 | Detach front rubber mount (12) for air filter housing from cylinder head cover (10) | Nm | *BA01.30-P-1011-01O |
| 19 | Remove heat shield (10a) | Nm | *BA01.30-P-1017-01O |
| 20 | Remove vacuum pump | Engine 272 | AR43.05-P-1320ED |
| 21 | Loosen bolts for cylinder head cover (10) in reverse order of tightening procedure and remove them | Engine 272 | AR01.20-P-5014-03VA |
| | | Engine 273 | AR01.20-P-5014-03SX |
| | | Nm | *BA01.30-P-1004-01O |
| 22 | Pry off cylinder head cover (10) from cylinder head carefully | To avoid damaging sealing surfaces, do not pound in the prying tool between the cylinder head cover (10) and the cylinder head. Installation: Apply sealant to cylinder | |
| | Notes as analysis of the subside should | head cover (10) | ALIO4 00 D 4000 00\/ |
| i | Notes on sealant path for cylinder head cover | Engine 272 | AH01.30-P-1000-08V |
| i | | Engine 273 | AH01.30-P-1000-08SX |
| | | 3 | *112589002500 |
| | | Loctite sealant 5970 | *BR00.45-Z-1013-01A |
| ₽ | Clean | | |
| 23 | Clean sealing surfaces at cylinder head and at cylinder head cover (10) | Do not use any sharp-edged tools or abrasive paper as this will damage the sealing surfaces. Loctite 7200 | AR01.00-P-0050-01A |
| | | Cleaning spray, Loctite 7063 (150ml) | *BR00.45-Z-1038-04A *BR00.45-Z-1046-04A |
| 24 | Install in the reverse order | Oleaning Spray, Locale 7003 (130111) | DIVUU.40-7-1040-04A |
| <u> </u> | Checking | | |
| ⚠ Danger! | Risk of accident caused by vehicle starting off by itself when engine is running. Risk of injury caused by contusions and burns during starting procedure or when working near the engine as it is running | Secure vehicle to prevent it from moving by itself. Wear closed and snug-fitting work clothes. Do not touch hot or rotating parts. | AS00.00-Z-0005-01A |
| 25 | Conduct engine test run and check engine for leaks | | |

${\rm \underline{Nm}}$ Injectors, injection valves, lines

| Number | Designation | | | Engine 272 | Engine 273 |
|--------------------|--|---------|----|---------------|---------------|
| BA07.03-P-1001-01B | Union nut, fuel line to fuel distributor | | Nm | 20 | 20 |
| BA07.03-P-1004-01B | Protective cap on service valve | Plastic | Nm | 2 | - |
| | | Metal | Nm | 15 | - |

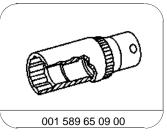
Nm Cylinder head

| Number | Designation | | | Engine 272 | Engine 273 |
|--------------------|--|------------|----|---------------|---------------|
| BA01.30-P-1001-01O | Bolt, ground line to front cover | M6 | Nm | 9 | 9 |
| BA01.30-P-1004-01O | Bolt, cylinder head cover to cylinder head | M7 Stage 1 | Nm | 12 | 12 |
| | | Stage 2 | ∡° | 90 | 90 |
| BA01.30-P-1005-01O | Bolt, lifting eye to cylinder head | M8 | Nm | 20 | 20 |

| 7 | Rotate engine at center bolt for crankshaft in direction of engine rotation by a 90° crank angle | i The thrust pin (1a) for chain tensioner (1) will be pushed out and tensions the timing chain. | |
|-----------|--|--|--------------------|
| 8 | Install end cover (3) | | |
| 9 | Install alternator | | AR15.40-P-5032EW |
| ⚠ Danger! | Risk of accident caused by vehicle starting off by itself when engine is running. Risk of injury caused by contusions and burns during starting procedure or when working near the engine as it is running | Secure vehicle to prevent it from moving by itself. Wear closed and snug-fitting work clothes. Do not touch hot or rotating parts. | AS00.00-Z-0005-01A |
| 10 | Carry out an engine test run and check engine for leaks | | |

Nm Timing chain, chain tensioner

| Number | Designation | | | Engine 272 | Engine 273 |
|--------------------|----------------------------------|---------|----|---------------|---------------|
| BA05.10-P-1008-01B | Chain tensioner on timing case | M22×1.5 | Nm | 70 | 70 |
| BA05.10-P-1009-01B | Torque on unlock chain tensioner | | Nm | 70 | 70 |

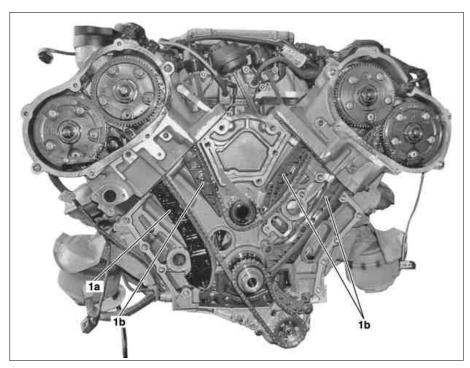


Wrench socket

ProCarManuals.com

Tensioning rail

ENGINES 272, 273 in MODEL 212

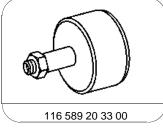


P05.10-2390-06

1 1

| X | Remove/install | | |
|---|--|---|---------------------|
| 1 | Remove camshaft adjuster | Camshaft adjuster of intake camshaft | AR05.20-P-7201EWE |
| | | Camshaft adjuster of exhaust camshaft | AR05.20-P-7201EWA |
| 2 | Remove tensioning rail bolt | | AR01.30-P-5800-04V |
| | | 3 | *116589203300 |
| | | 3 | *116589013400 |
| | | i Installation: Apply sealant to tensioning | |
| | | rail bolts before assembly. | |
| | | 3 | *112589002500 |
| | | Loctite sealant 5970 | *BR00.45-Z-1013-01A |
| 3 | Pull tensioning rail (1a) upwards and out of | | |
| | timing case | | |
| 4 | Install in the reverse order | | |







Squeeze gun

Impact extractor

Threaded stud

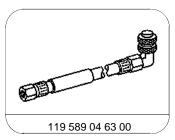
Repair materials

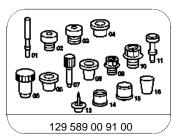
| Number | Designation | Order number |
|--------------------|----------------------|-----------------|
| BR00.45-Z-1013-01A | Loctite sealant 5970 | A 003 989 98 20 |

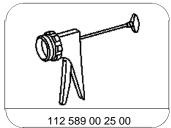
| BA01.30-P-1011-01O | Bolt, air filter housing rubber mount to cylinder head cover | M6 | Nm | 9 | 9 | |
|--------------------|--|----|----|---|---|--|
| BA01.30-P-1017-01O | Bolt, heat shield to cylinder head | M6 | Nm | 9 | 9 | |

Nm Engine wiring harness

| Number | Designation | | Engine 272 | Engine 273 |
|--------------------|--|----|---------------|---------------|
| BA15.18-P-1002-01B | Bolt, feed duct to cylinder head cover | Nm | 8 | 8 |
| BA15.18-P-1003-01B | Bolt, feed duct to engine lifting eye | Nm | 8 | 8 |







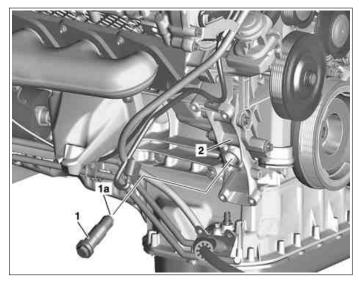
Pressure hose

Set of stop plugs

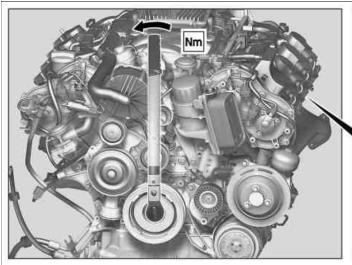
Squeeze gun

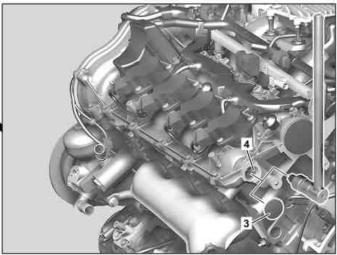
| | ₩ | | |
|--------------------------|-------------------------------------|--------------------|--|
| 119 589 04 6 | 3 00 129 589 00 91 0 | 0 112 589 00 25 00 | |
| Pressure hose | Set of stop plugs | Squeeze gun | |
| | | | |
| | | | |
| Repair materials Number | | | |
| Number | Designation | | Order number |
| BR00.45-Z-1013-01A | Loctite sealant 5970 | | A 003 989 98 20 |
| BR00.45-Z-1038-04A | Loctite 7200 | | Henkel Loctite Deutschland GmbH Arabellastrasse 17 81925 M nchen Germany Tel. +49 899268-0 Fax + 49 899101978 www.Loctite.de |
| BR00.45-Z-1046-04A | Cleaning spray, Loctite 7063 (150ml | l) | A 001 986 71 71 10 |
| | | | |

- 1 Chain tensioner
- 1a Pressure pin
- 2 Timing case cover



P05.10-2353-11





P05.10-2354-08

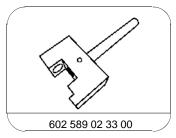
3 Сар

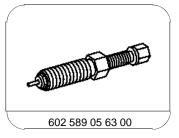
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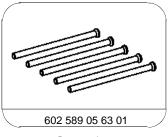
Left exhaust camshaft

| \mathbf{Z} | Removing | | |
|--------------|---|---|---------------------|
| 1 | Rotate engine at crankshaft center bolt in direction of engine rotation to a 40° crankshaft angle after ignition TDC | 8 | *001589650900 |
| 2 | Remove alternator | | AR15.40-P-5032EW |
| 3 | Remove chain tensioner (1) from timing case cover (2) | | |
| X | Install | | |
| 4 | Screw new chain tensioner (1) into timing case cover (2) and tightened to prescribed torque | Replace chain tensioner (1). The previously installed chain tensioner (1) must not be reinstalled since, on removal of pressure bolt (1a), it is pressed into the end position and the locking device of the pressure bolt (1a) prevents its return stroke This would overstretch the timing chain on reinstalling. | *BA05.10-P-1008-01B |
| 5 | Remove cap (3) | | |
| 6 | Turn engine at center bolt on the crankshaft with prescribed torque against direction of engine rotation (arrow), while counterholding left exhaust camshaft (4) at rear with a suitable tool | This unlocks the chain tensioner (1). | |
| | | Nm | *BA05.10-P-1009-01B |





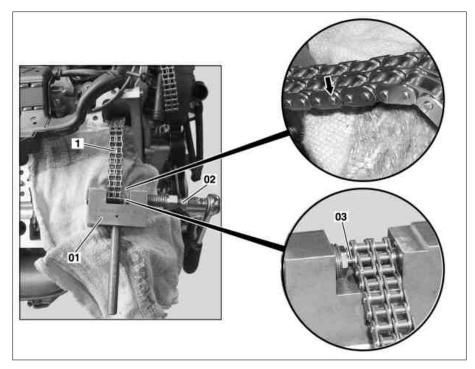




- Chain separating tool
- Thrust spindle

Pressure pins

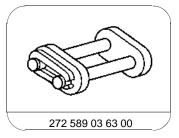
- 1 Cover over timing case recess with a clean cloth.
 - i The timing case recess must be secured against parts falling down. Parts that have fallen into the timing case recess must be removed.
- 2 S Assemble the chain separating tool (01) and the P pressure screw (02) together.
- 3 Fit the chain separating tool (01) at the timing chain (1).
 - i Ensure that the gressure pin (03) lies at the pin (arrow) of a timing chain link.



P05.10-2225-06

- Screw in the pressure screw (02) and separate the timing chain (1).
 - i Do not let the pins that have been pushed out fall into the timing case recess.
- 5 Remove the gressure screw (02) and take off the chain separating tool (01).

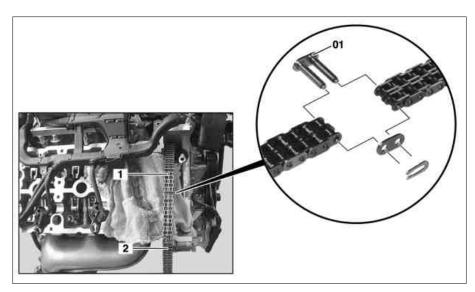




Case

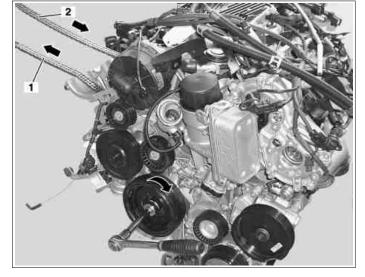
Assembly link

- Cover over timing case recess with a clean cloth.
 - i The timing case recess must be secured against parts falling down. Parts that have fallen into the timing case recess must be removed.
- Connect the new timing chain (2) and the old timing chain (1) with the assembly link (01).
 - i S' Fit the lock of the S' assembly link (01) in the direction opposite to that in which the timing chain is drawn; otherwise it could get jammed on the slide rails and come off when the timing chain is drawn.



P05.10-2226-05

- Remove the rags from the timing case recess.
 - i Otherwise, they could get pulled into the timing case recess when the engine is cranked.
- Turn the crankshaft slowly in the engine's direction of rotation (arrow) and draw in the new timing chain (2) until the ends of the new timing chain (2) can be connected.
 - i As the new timing chain (2) is being drawn in (arrows), pull out the end of the old timing chain (1) evenly as it becomes free.
- 5 Cover over timing case recess with a clean cloth.
 - i The timing case recess must be secured against parts falling down. Parts that have fallen into the timing case recess must be removed.
- 6 S Detach the assembly link (01), and separate the old timing chain (1) from the new timing chain (2).
 - i The assembly link (01) must be removed. The assembly link is only an aid for assembly and is not suitable for engine operation.

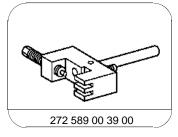


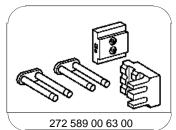
P05.10-2227-11

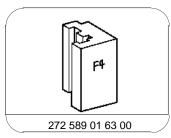
Nm Timing chain, chain tensioner

| Number | Designation | Engine 272 | Engine 273 |
|--------------------|--|---------------|---------------|
| BA05.10-P-1007-01B | Bolt for rivet element in timing chain (reference value) | 32 | 32 |

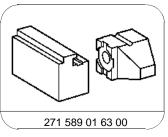








ase Riveting tool Assembly inserts Guide



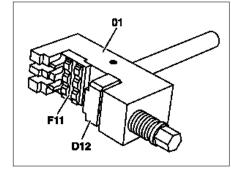
Assembly inserts

i When carrying out work on the timing case recess, safeguard this with a clean cloth to prevent items dropping down. Parts which have fallen into the timing case recess, must be removed.

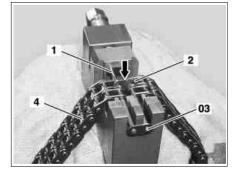
Press the riveted link into the press-fit center plate

- 2 Place the assembly insert (D12) in the rivet press tool (01).
- Insert the riveted link (1), the centering fork (03) and the press-fit center plate (2) into the ends of the timing chain (4), and press the pins of the centering fork (03) into the holes of the press-fit center plate (2) and center the press-fit center plate (2).

 i Insert riveted link (1) from the rear.



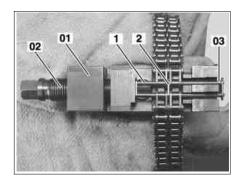
P05.10-2229-01



P05.10-2230-01

- Screw in the pressure screw (02) at the rivet press tool (01), and press the riveted link (1) into the press-fit center plate (2) all the way to the backstop.

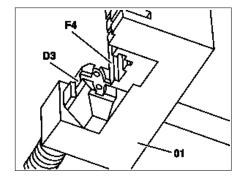
 i Ensure that the riveted link (1) and the riveted link (1) are aligned. While screwing in the Pressure screw (02) ensure that the pins of the riveted link (1) are pressed into the holes of the press-fit center plate (2), and that the centering fork (03) that has been squeezed out does not fall into the timing case recess.
- Remove the pressure screw (02) and take off the rivet press tool (01). 5



P05.10-2231-01

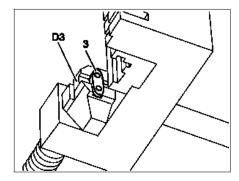
Press the outer plate on the riveted link

- Place the assembly insert (F401) in the rivet press tool (01) and fix in place with the mounting screw.
- Place the assembly insert (01D3) in the rivet press tool (01). 7



P05.10-2232-01

Insert the outer plate (3) into the sessembly insert (D3). 8 i The outer plate (3) is held magnetically.



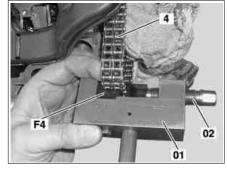
P05.10-2233-01

Screw in the gressure screw (02) at the grivet press tool (01) until there is solid i While turning the pressure screw (02), ensure that the pins of the riveted link (1) are pressed into the outer plate (3).

Place the rivet press tool (01) in such a way that the spacer webs of the assembly insert (F4) lies on the rolls of the timing chain (4).

i Ensure that the riveted link (1) and the outer plate (3) are aligned.

Remove rivet press tool (01).



P05.10-2234-01

Shift the assembly insert (D3) on the riveted section (arrow).

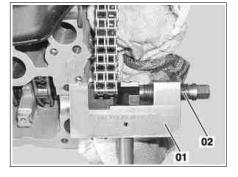
8

P05.10-2235-01

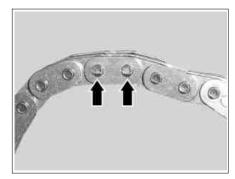
Rivet timing chain

- 13 i Rivet the pins of the riveted link (1) individually.
- Tighten the pressure screw (02) at the rivet press tool (01).

 Tightening torque of the ressure screw (02): reference value 32 Nm. 14
- Remove rivet press tool (01). 15



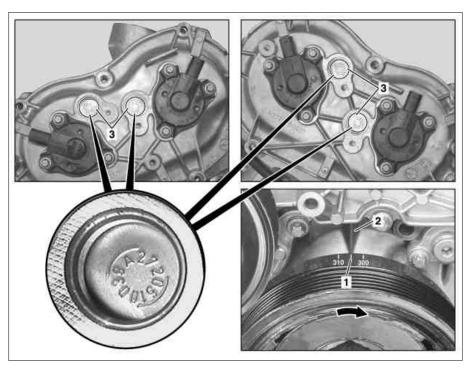
P05.10-2236-01



P05.10-2237-01

Inspect riveting (arrows), re-rivet if necessary.

- Marking on belt pulley
- 2 positioning edge on timing case cover
- Pulse wheel markings



P05.20-2163-06

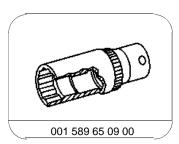
1 2

| XX | Remove/install | | |
|-----------|--|--|-----------------------------------|
| 1 | Remove front engine cover | See Remove air filter housing. | AR09.10-P-1150EWS |
| 2 | Remove Hall sensors on camshafts | Nm | *BA15.10-P-1002-03E |
| 4 | Checking | | |
| 3 | Turn engine at crankshaft in direction of rotation of engine (arrow) to a 55° crank before ignition TDC (305° marking on belt pulley) and check basic position of camshafts | i The 305° marking (1) on belt pulley must be aligned with positioning edge (2) on timing case cover and markings (3) on pulse wheels must be located in center of bores for Hall sensors. If necessary: ↓ | |
| | | Set basic position of camshafts. | AR05.20-P-6020EW *001589650900 |
| 4 | Install in the reverse order | | |
| ⚠ Danger! | Risk of accident caused by vehicle starting off by itself when engine is running. Risk of injury caused by contusions and burns during starting procedure or when working near the engine as it is running | Secure vehicle to prevent it from moving by itself. Wear closed and snug-fitting work clothes. Do not touch hot or rotating parts. | AS00.00-Z-0005-01A |
| 5 | Carry out an engine test run and check engine for leaks | | |

Nm Position sensor

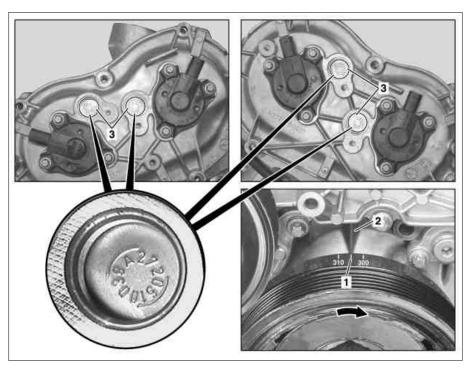
| Number | Designation | | Engine 272 | Engine 273 |
|--------------------|--|----|---------------|---------------|
| BA15.10-P-1002-03E | Bolt, camshaft Hall sensor to front cover on cylinder head | Nm | 8 | 8 |

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Wrench socket

- Marking on belt pulley
- 2 positioning edge on timing case cover
- Pulse wheel markings



P05.20-2163-06

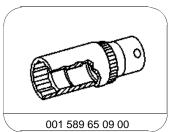
1 2

| XX | Remove/install | | |
|-----------|--|--|-----------------------------------|
| 1 | Remove front engine cover | See Remove air filter housing. | AR09.10-P-1150EWS |
| 2 | Remove Hall sensors on camshafts | Nm | *BA15.10-P-1002-03E |
| 4 | Checking | | |
| 3 | Turn engine at crankshaft in direction of rotation of engine (arrow) to a 55° crank before ignition TDC (305° marking on belt pulley) and check basic position of camshafts | i The 305° marking (1) on belt pulley must be aligned with positioning edge (2) on timing case cover and markings (3) on pulse wheels must be located in center of bores for Hall sensors. If necessary: ↓ | |
| | | Set basic position of camshafts. | AR05.20-P-6020EW *001589650900 |
| 4 | Install in the reverse order | | |
| ⚠ Danger! | Risk of accident caused by vehicle starting off by itself when engine is running. Risk of injury caused by contusions and burns during starting procedure or when working near the engine as it is running | Secure vehicle to prevent it from moving by itself. Wear closed and snug-fitting work clothes. Do not touch hot or rotating parts. | AS00.00-Z-0005-01A |
| 5 | Carry out an engine test run and check engine for leaks | | |

Nm Position sensor

| Number | Designation | | Engine 272 | Engine 273 |
|--------------------|--|----|---------------|---------------|
| BA15.10-P-1002-03E | Bolt, camshaft Hall sensor to front cover on cylinder head | Nm | 8 | 8 |

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Wrench socket

