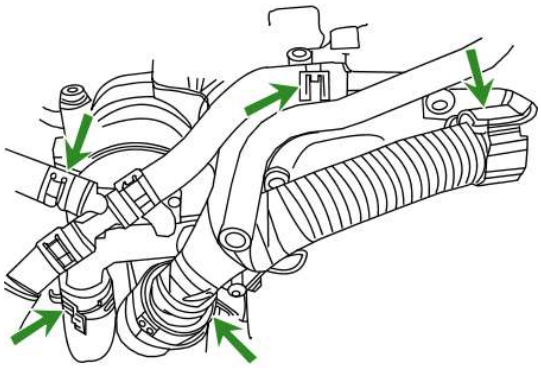
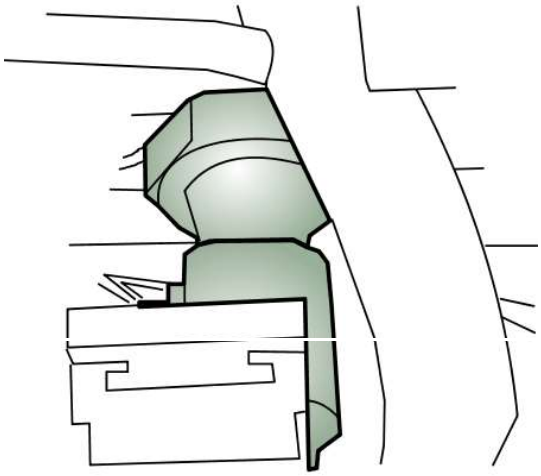
Volkswagen Beetle 1.4L
TSi CAVD

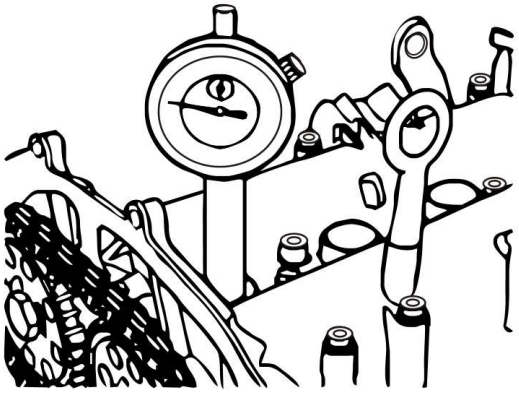
Timing chain: removal/installation

General
Before disconnecting the battery cable, check the audio system security code
Removal
Disconnect the battery earth cable
Remove the engine upper cover
Remove the air filter housing
Remove the expansion tank pressure cap
Disconnect the lower radiator hose
Drain the coolant
Disconnect the coolant hoses
Remove the harnesses

Remove the camshaft rear cover plates
Disconnect the oil pressure switch

Timing chain: removal/installation

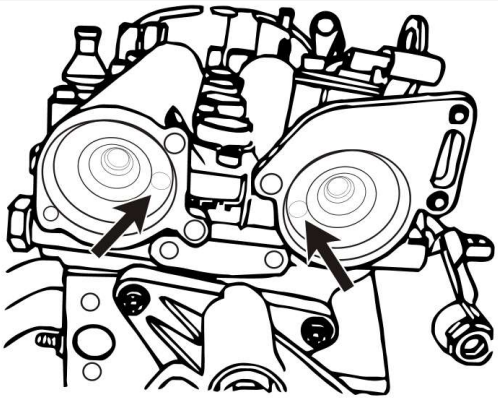


Remove the spark plug for cylinder 1		
Use the special tools	(T10094 A, 3122 B)	
Turn the crankshaft to TDC for cylinder 1		
Fit a dial gauge	(VAS 6079)	
Use the special tools	(T10170 + T10170/1)	
Check that the indicator is in the correct position		(± 0.01 mm)



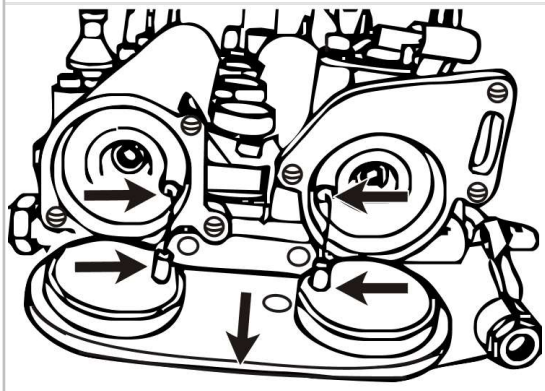
Check the position of the camshafts

Timing chain: removal/installation

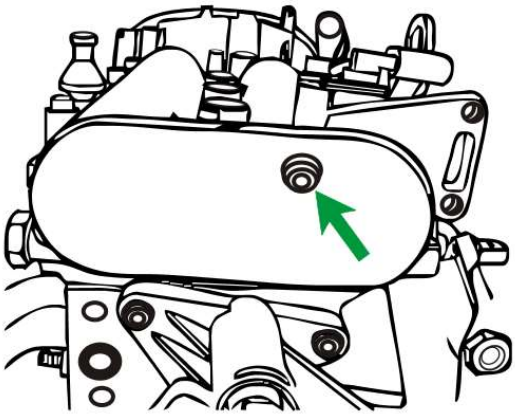


If the marks are misaligned, rotate the engine 1 turn

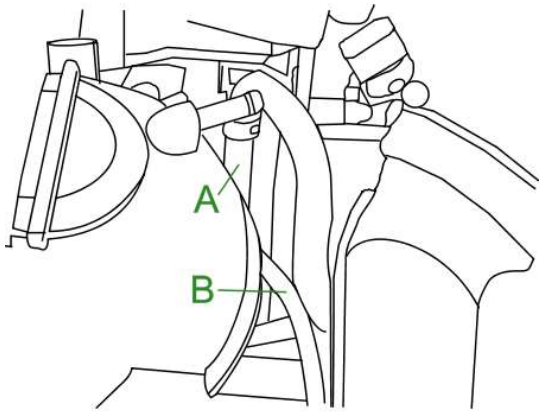
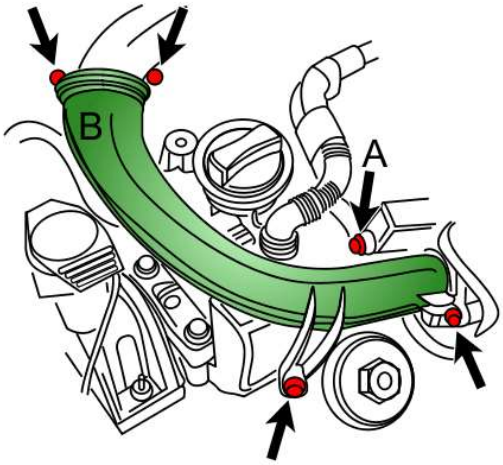
Fit the camshaft timing tool (T10171A)



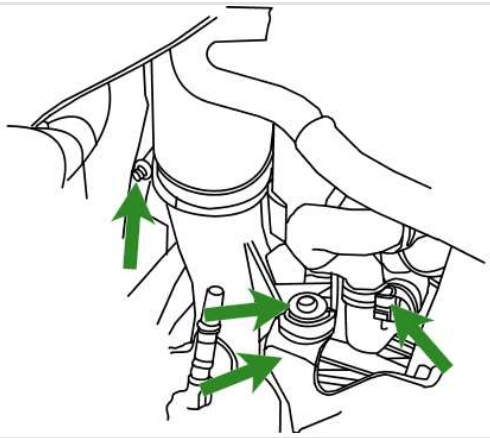
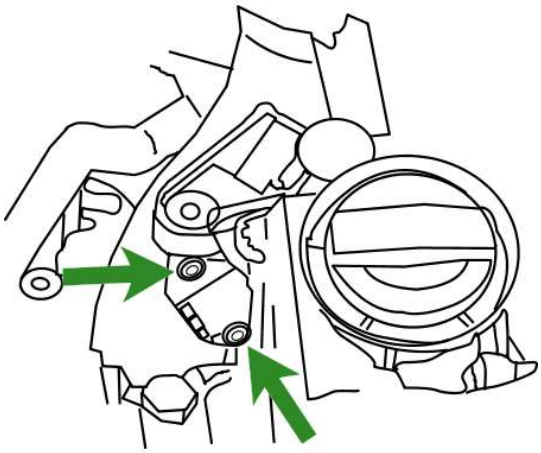
Secure the special tool with a bolt (M6)



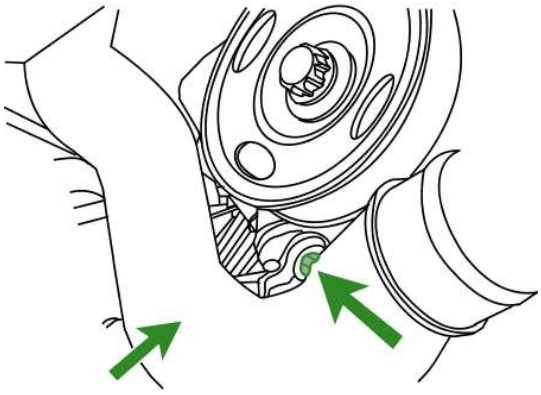
Timing chain: removal/installation

Remove the engine lower cover
Remove the right wheel arch liner
Remove the windscreen washer reservoir filler neck
Remove the ancillary drive belt
Check that cylinder 1 is still at TDC
Disconnect the fuel feed line (A)
Disconnect the charcoal filter vacuum hose (B)

Disconnect the hose (A)
Disconnect the pressure line(s) (B)


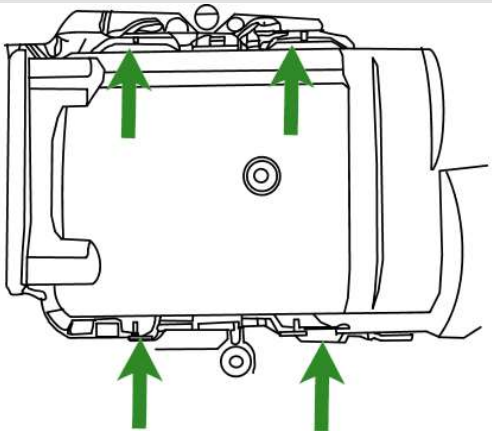
Timing chain: removal/installation

Unclip the hoses
Remove the air duct bracket

Remove the turbo boost pressure sensor

Remove the intercooler/turbocharger air hose

Timing chain: removal/installation



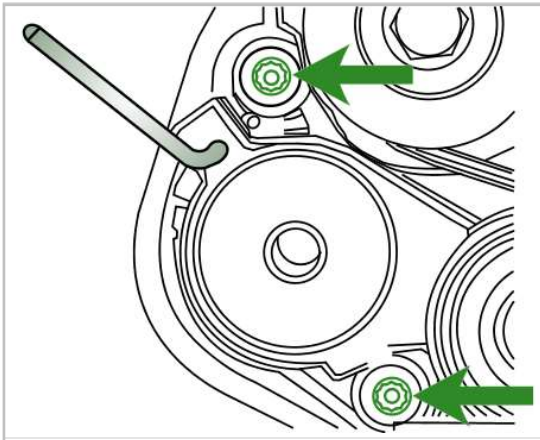
Remove the noise insulation cover



Remove the supercharger drive belt

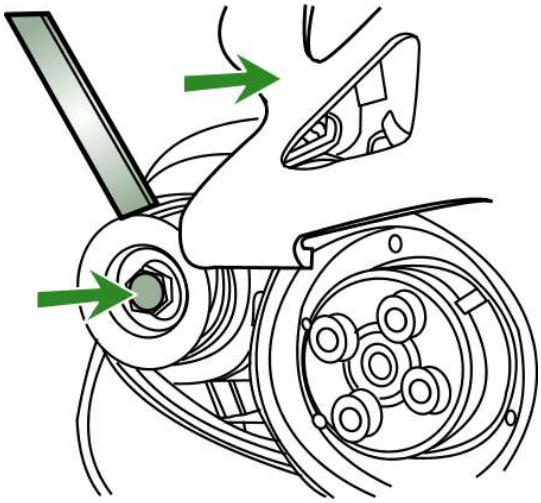
Remove the supercharger drive belt tensioner

Timing chain: removal/installation



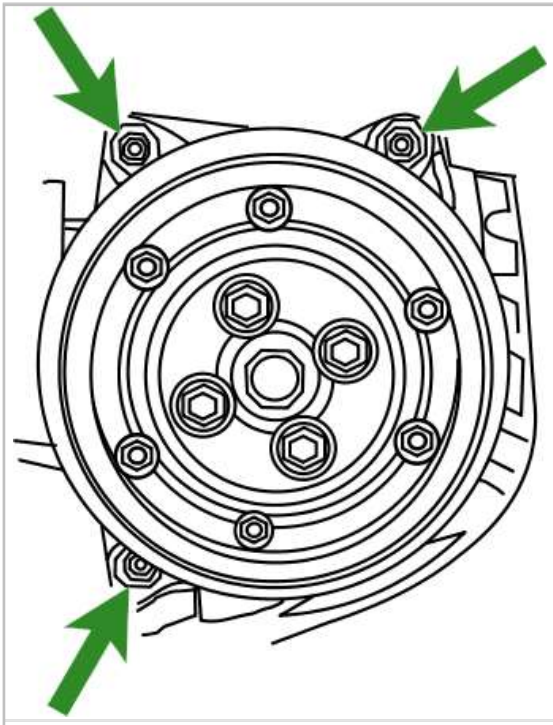
Remove the upper bracket

Remove the belt pulley



Remove the coolant pump

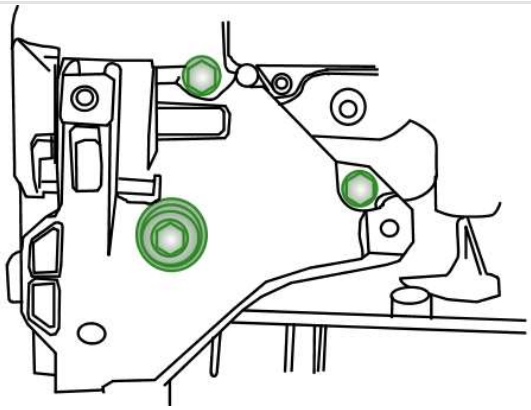
Timing chain: removal/installation



Remove the turbocharger oil feed line

Remove the air-conditioning compressor but do not disconnect

Remove the ancillary pulley bracket



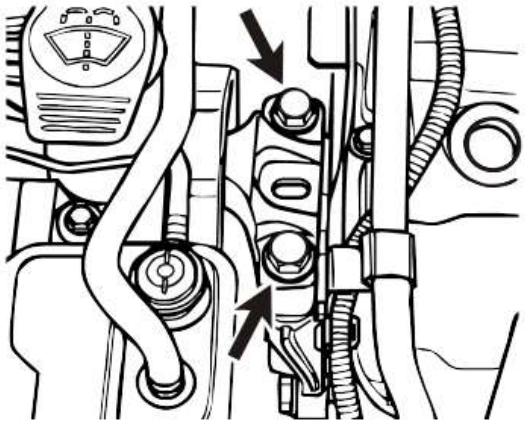
Remove the alternator

Fit the special tool to support the engine (10-222 A, 10-222 A/12)

Remove the engine support

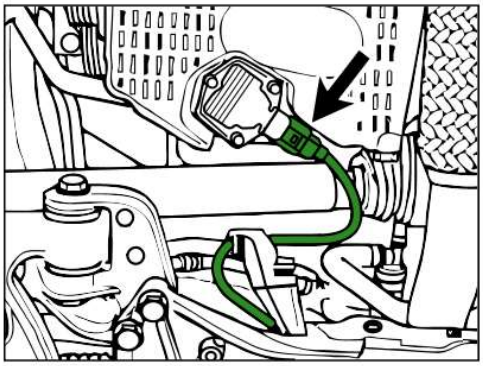
Timing chain: removal/installation

Remove the engine support bracket



Disconnect the front exhaust pipe from the catalytic converter

Disconnect the oil temperature sensor



Drain the engine oil

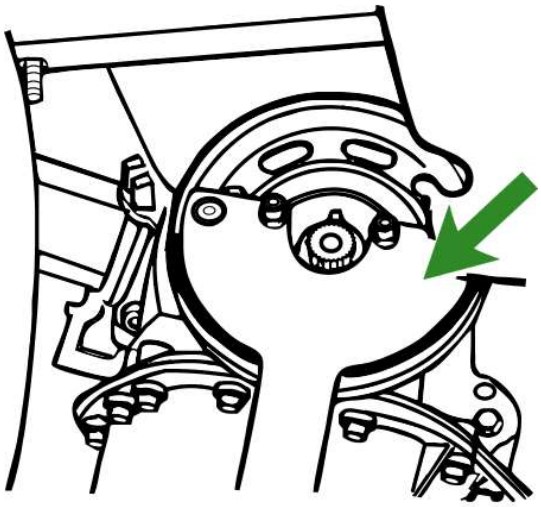
Remove the oil sump

Clean off the old sealant

Loosen the crankshaft pulley centre bolt

Use the special tool to counterhold (3415, 3145/2)

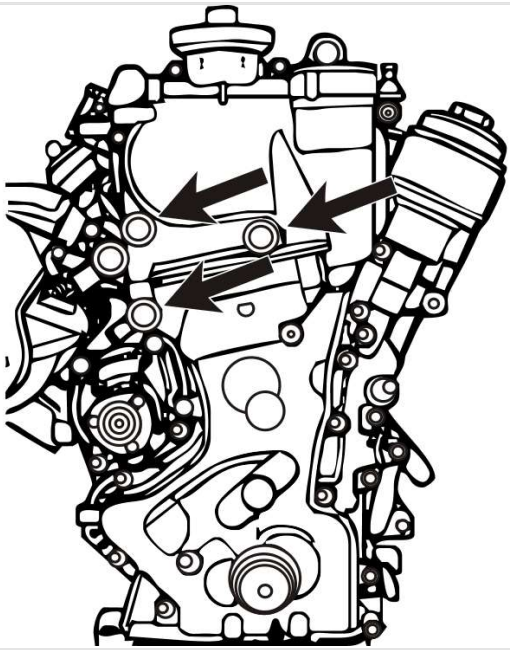
Timing chain: removal/installation



Remove the crankshaft pulley

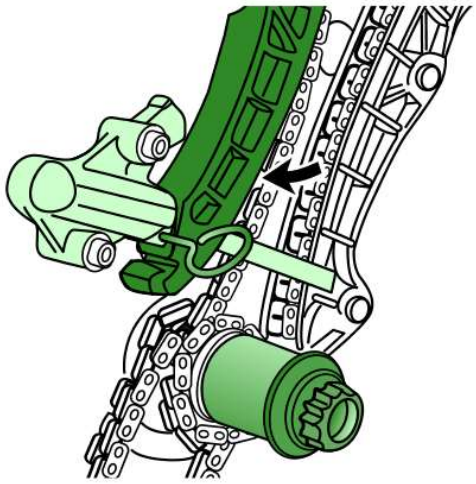
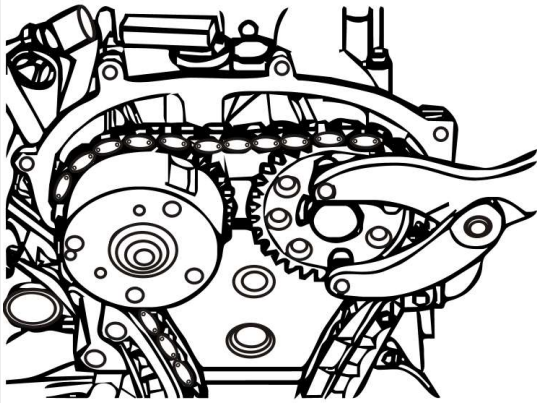
Remove the timing cover bolts

Remove the bolts shown

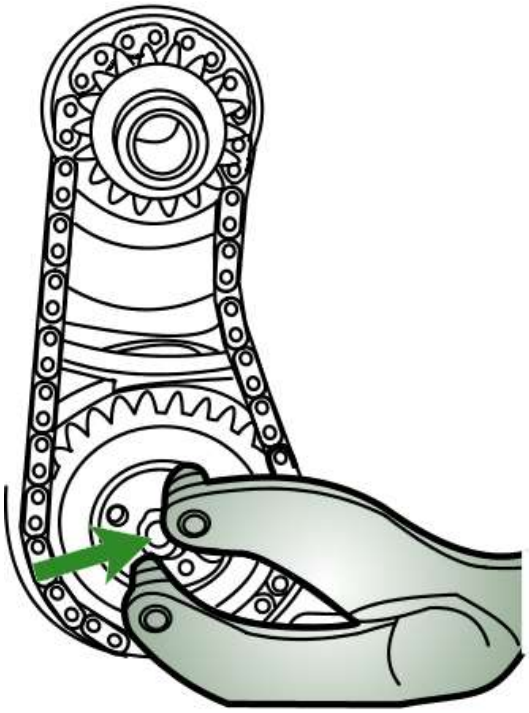


Remove the timing chain cover

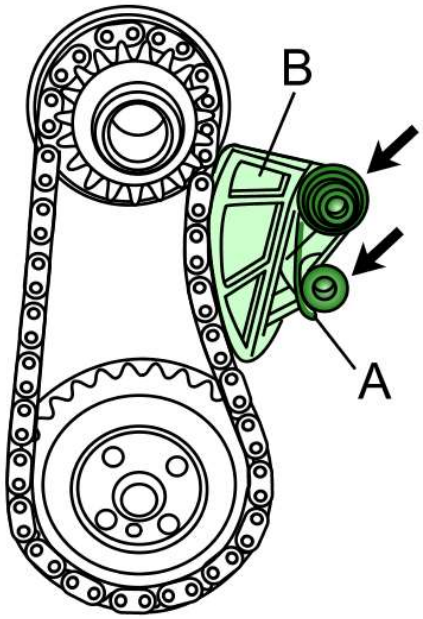
Timing chain: removal/installation

Remove the oil pump gearwheel cover
Compress the tensioner
Lock the tensioner; use a locking pin (T40011)

Loosen the camshaft gearwheel (inlet)
Note: Left-hand thread
Loosen the camshaft gearwheel (exhaust)
Remove the camshaft gearwheel(s) together with the timing chain
Use the special tool to counterhold (T10172)


Timing chain: removal/installation

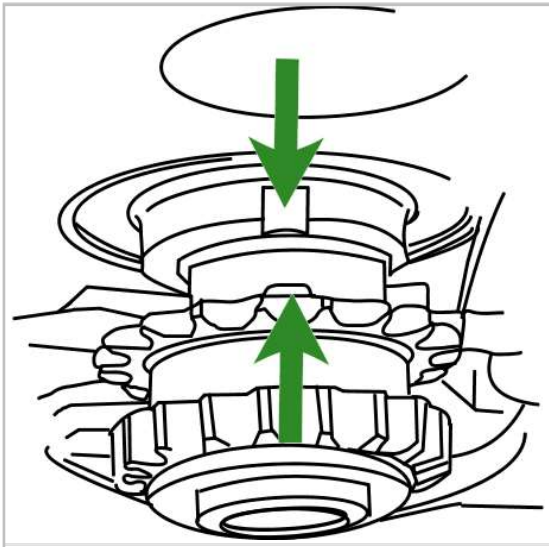
Loosen the gearwheel centre bolt	
Use the special tool to counterhold	(T10172 13)
	
Remove the tensioner spring	(A)
Remove the oil pump chain tensioner	(B)

Timing chain: removal/installation

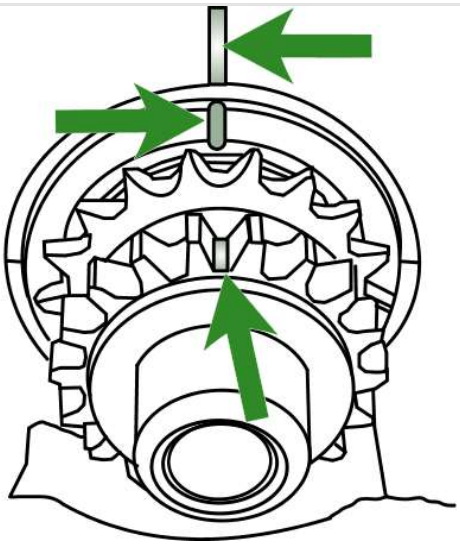


Remove the crankshaft gearwheel
Remove the oil pump gearwheel
Remove the oil pump chain together with the gearwheels
Note: Before removing, mark the direction of rotation
Installation
Check that cylinder 1 is still at TDC
Refit the crankshaft gearwheel
Centre the crankshaft gearwheel

Timing chain: removal/installation



Apply alignment marks



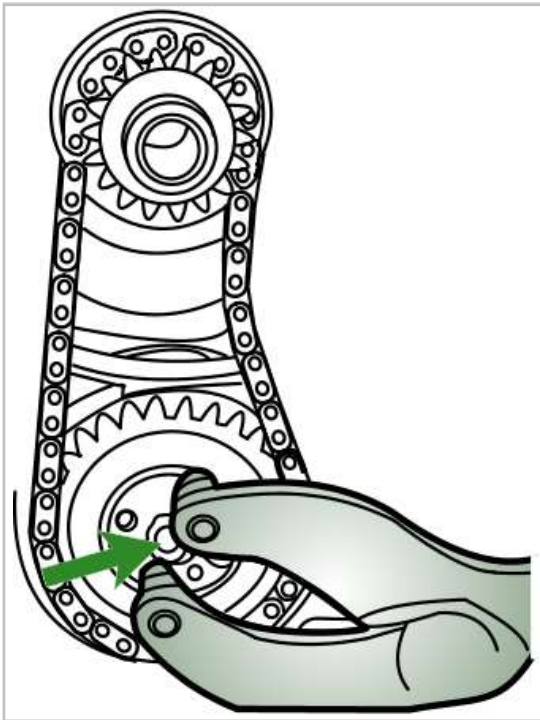
Refit the oil pump chain

Refit the oil pump gearwheel

use new bolt(s) (20 Nm + 90°)

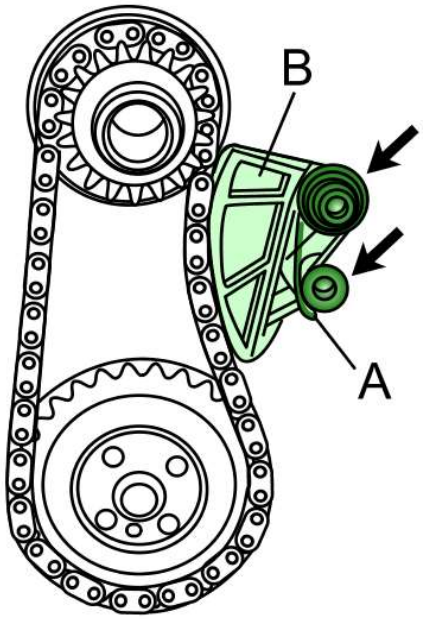
Use the special tool to counterhold (T10172)

Timing chain: removal/installation



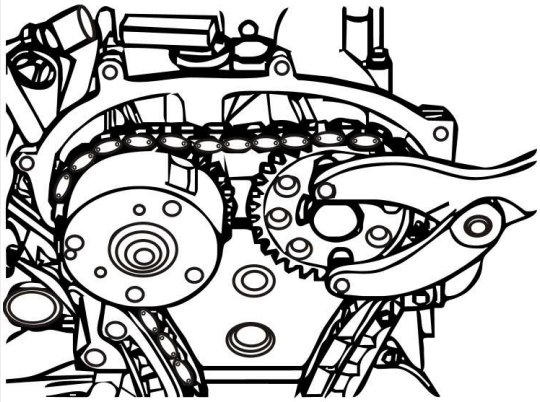
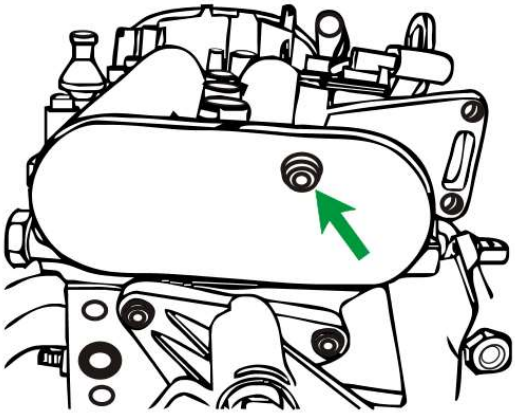
Refit the oil pump chain tensioner	(B: 8 Nm)
Refit the tensioner spring	(A)

Timing chain: removal/installation

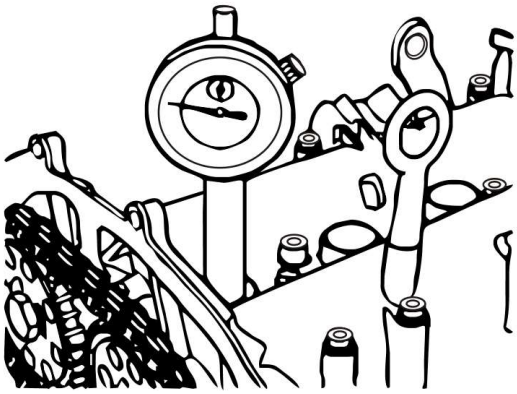


Check the crankshaft timing marks
Renew the crankshaft pulley/gearwheel bolt(s)
Tighten the bolt by hand
Fit the timing chain onto the crankshaft gearwheel
Fit the timing chain onto the exhaust camshaft gearwheel
Fit the timing chain onto the inlet camshaft gearwheel
Tighten the camshaft adjuster bolts by hand
use new bolt(s)
Note: Left-hand thread
Remove the locking pin from the chain tensioner
Check the crankshaft timing marks
Tighten the inlet camshaft gearwheel (40 Nm)
Tighten the exhaust camshaft gearwheel
use new bolt(s) (50 Nm)
Note: Do not rotate the crankshaft

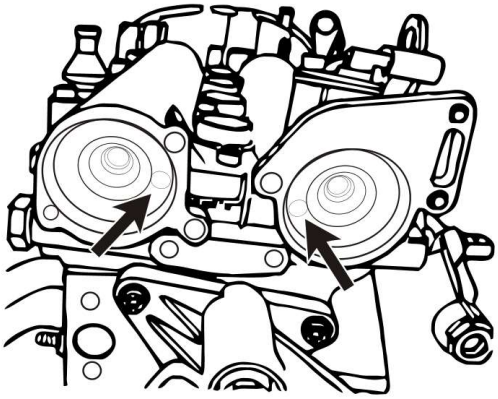
Timing chain: removal/installation

Use the special tool to counterhold (T10172)

Remove the camshaft timing tool

Check the timing
Fit the special tools (T10170 + T10170/1; VAS 6079)
Turn the crankshaft to TDC for cylinder 1
Check that the indicator is in the correct position (± 0.01 mm)

Timing chain: removal/installation

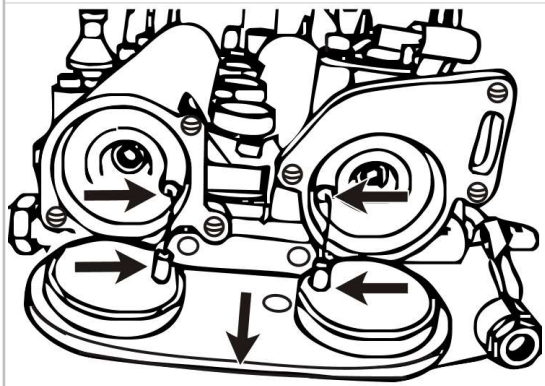


Check the position of the camshafts



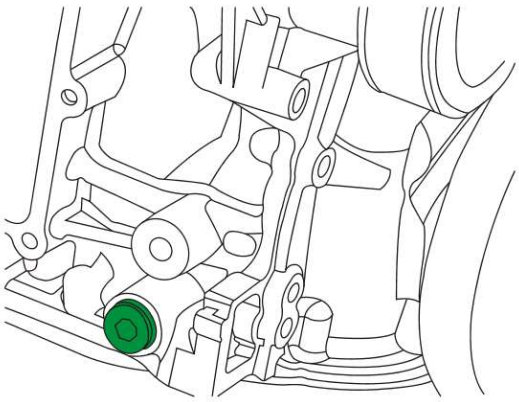
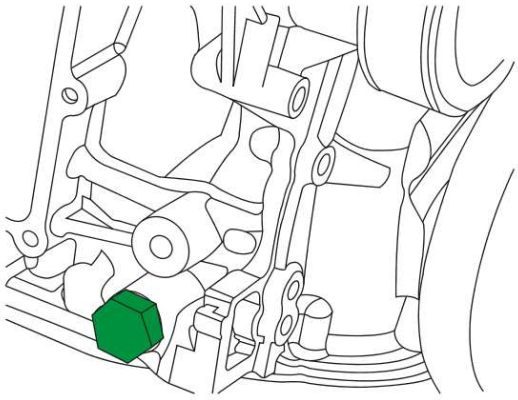
If the marks are misaligned, rotate the engine 1 turn

Fit the camshaft timing tool (T10171A)

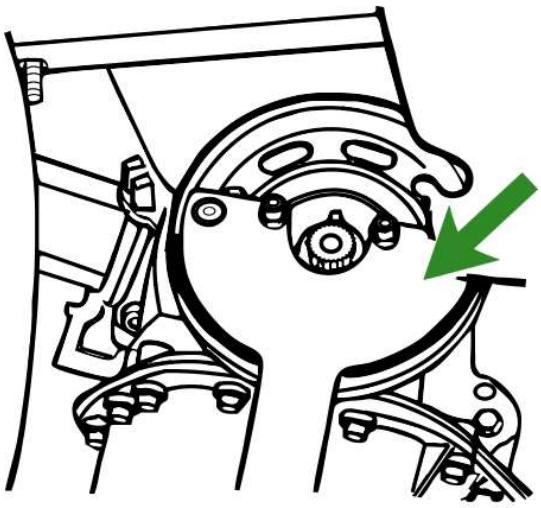
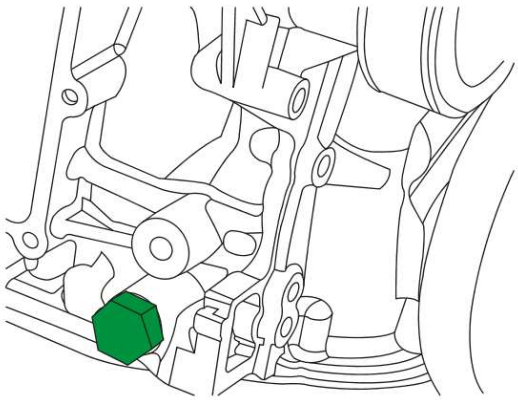


The timing is set when the special tool(s) fit correctly (T10171A)

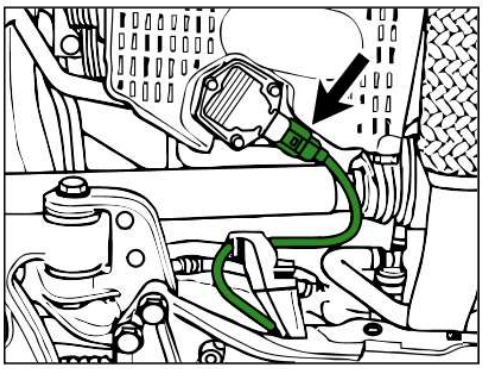
Timing chain: removal/installation

Remove the camshaft timing tool	(T10171A)
Tighten the inlet camshaft gearwheel	(90°)
Tighten the exhaust camshaft gearwheel	(90°)
Refit the oil pump gearwheel cover	
Remove the crankshaft gearwheel centre bolt	
Refit the timing chain cover (M6: 10 Nm, M10: 50 Nm)	
Renew the gasket	
Note: Apply sealant before fitting	
Turn the crankshaft to TDC for cylinder 1	
Remove the access plug	
	
Fit the crankshaft locking tool	(T10340: 30 Nm)
	

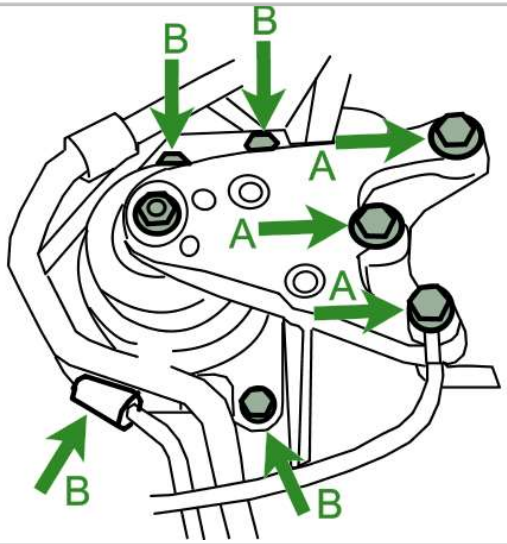
Timing chain: removal/installation

Refit the crankshaft pulley
Note: Use a new bolt
Stage 1: (150 Nm)
Stage 2: (180°)
Use the special tool to counterhold (3415, 3145/2)

Remove the crankshaft locking tool (T10340)

Refit the access plug (30 Nm)
Refit the oil sump (13 Nm)
Note: Apply sealant before fitting

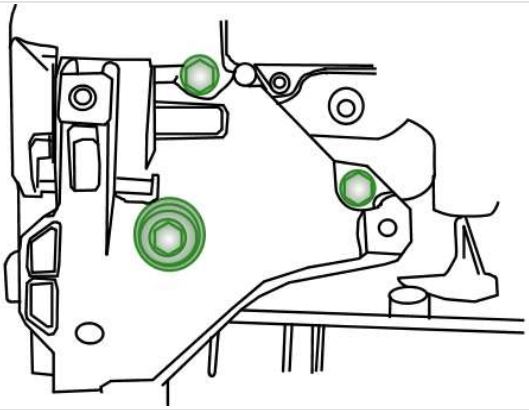
Timing chain: removal/installation

Wait for 30 minutes
Before filling with oil
Reconnect the oil temperature sensor

Refit the front exhaust pipe
Refit the engine support
use new bolt(s) (B)
Stage 1: (20 Nm)
Stage 2: (90°)
Refit the engine support bracket
use new bolt(s) (A)
Stage 1: (30 Nm)
Stage 2: (90°)

Timing chain: removal/installation

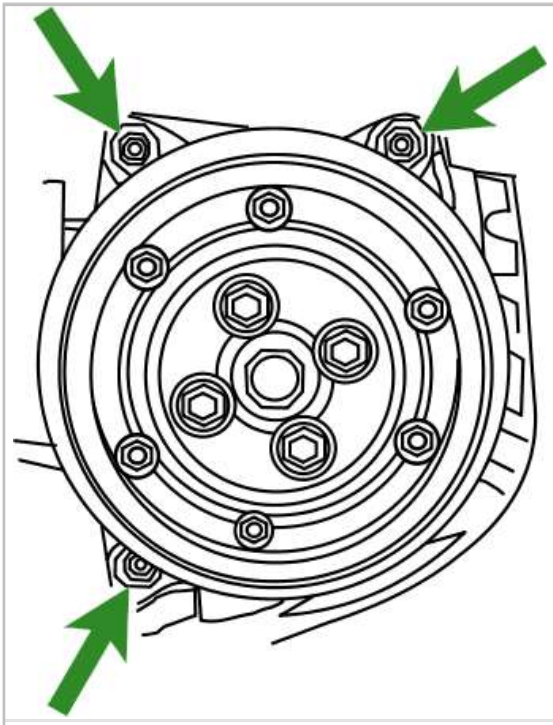


Align the engine mounts stress-free by rocking; if necessary loosen the engine-to-body mounts
Remove the engine support tool (10-222 A, 10-222 A/12)
Refit the alternator (23 Nm)
Fit the ancillary pulley bracket (25 Nm)



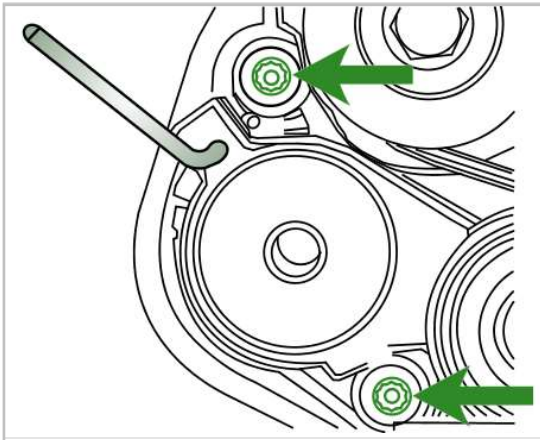
Refit the air-conditioning compressor
Reconnect the turbocharger oil lines
Fit the coolant pump (8 Nm)

Timing chain: removal/installation

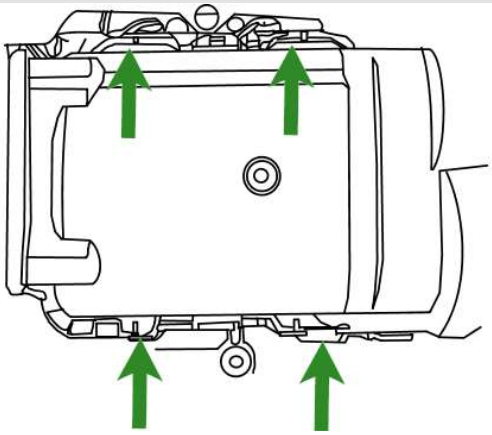


Refit the supercharger drive belt
Fit the pulley
Note: Use a new bolt
Stage 1: (40 Nm)
Stage 2: (90°)
Fit the upper engine support bracket (10)
Refit the supercharger drive belt tensioner (23 Nm)

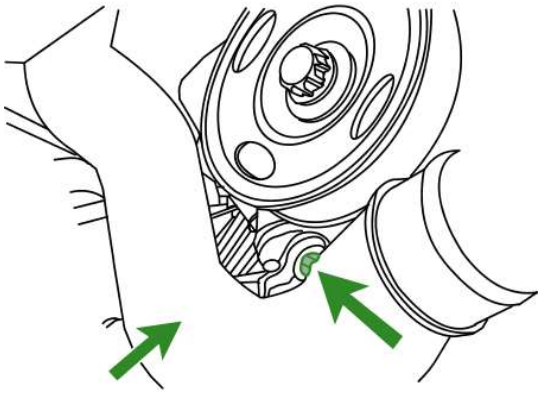
Timing chain: removal/installation



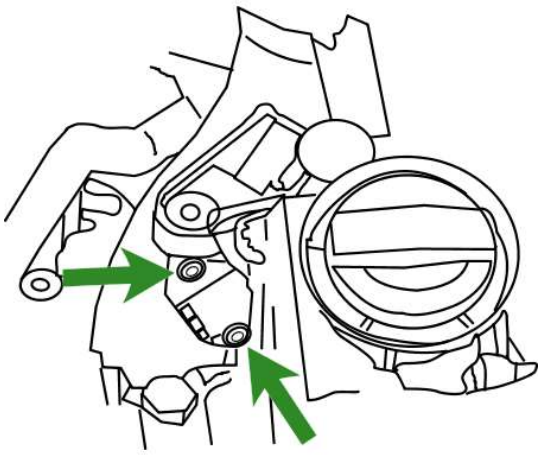
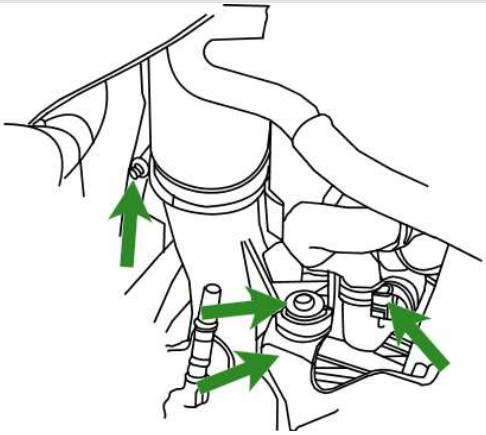
Refit the noise insulation cover



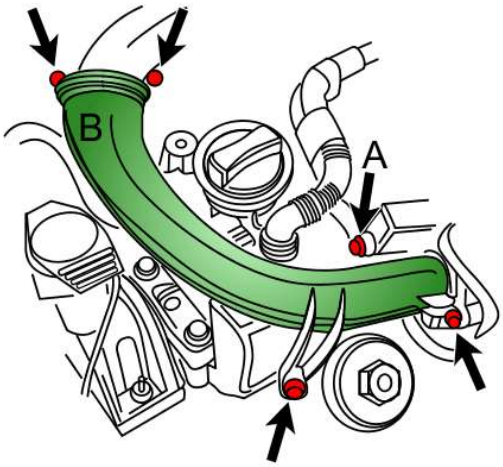
Refit the turbocharger/intercooler pressure pipe



Timing chain: removal/installation

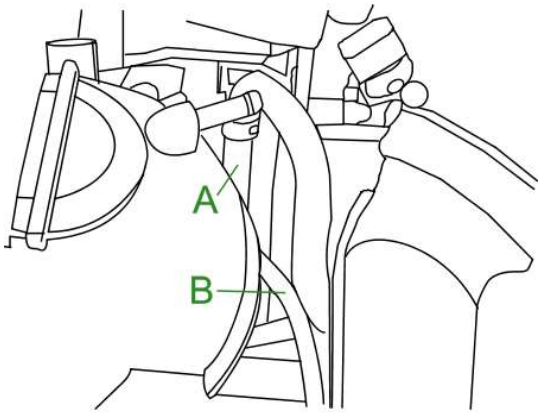
Refit the turbo boost pressure sensor

Refit the bracket
Reconnect the hoses

Reconnect the pressure line(s) (B)
Reconnect the hose (A)

Timing chain: removal/installation



Reconnect the charcoal filter vacuum hose (B)

Reconnect the fuel feed line (A)



Refit the ancillary drive belt

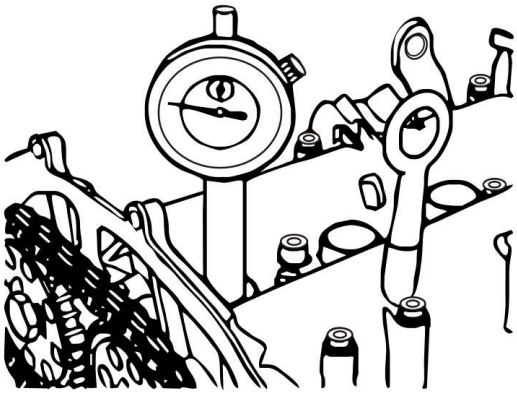
Refit the windscreen washer reservoir filler neck

Refit the right wheel arch liner

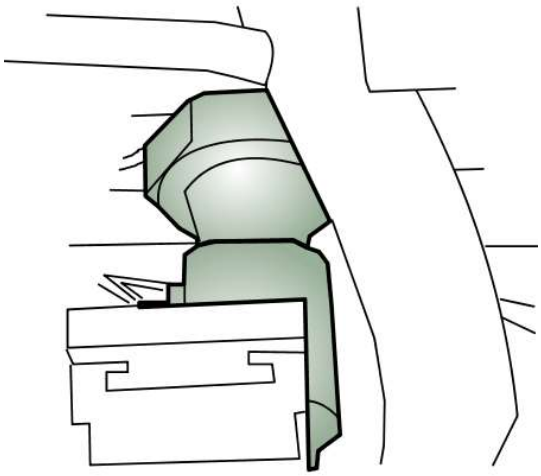
Refit the engine lower cover

Remove the special tools (T10170, T10170/1, VAS 6079)

Timing chain: removal/installation

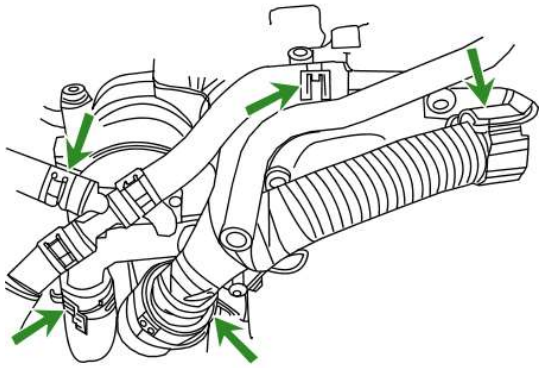


Refit the spark plug for cylinder 1	(25 Nm)
Reconnect the oil pressure switch	(25 Nm)



Fit the camshaft rear cover plates
Refit the harness
Reconnect the coolant hoses

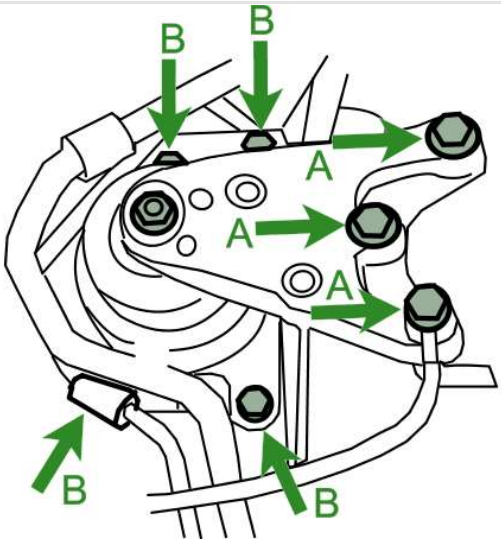
Timing chain: removal/installation



Refit the lower radiator hose
Refit the air filter housing
Refit the engine upper cover
Refill the engine oil
Refill the cooling system
Reconnect the battery earth cable
Torque settings
Oil pump gearwheel
use new bolt(s)
Stage 1: (20 Nm)
Stage 2: (90°)
Inlet camshaft gearwheel:
Renew the bolt(s)
Stage 1: (40 Nm)
Stage 2: (90°)
Exhaust camshaft gearwheel:
Renew the bolt(s)
Stage 1: (50 Nm)
Stage 2: (90°)
Timing chain cover: (M6: 10 Nm, M10: 50 Nm)

Timing chain: removal/installation

Crankshaft pulley:		
use new bolt(s)		
Stage 1:	(150 Nm)	
Stage 2:	(180°)	
Access plug:	(30 Nm)	
Alternator:	(23 Nm)	
Engine support:		
use new bolt(s)		(B)
Stage 1:	(20 Nm)	
Stage 2:	(90°)	
Engine support bracket:		
use new bolt(s)		(A)
Stage 1:	(30 Nm)	
Stage 2:	(90°)	

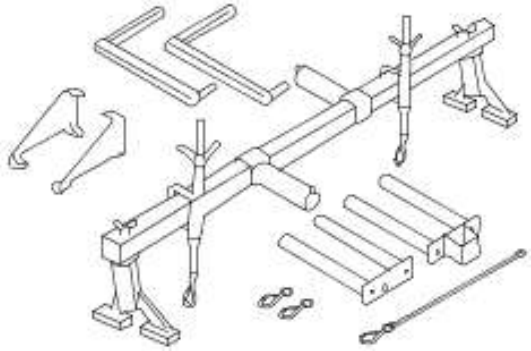


Oil pressure switch	(25 Nm)

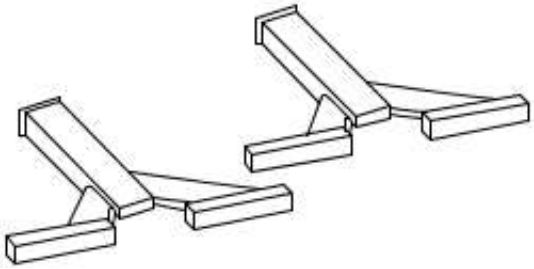
Special tools

Engine support tool:	(10-222 A)

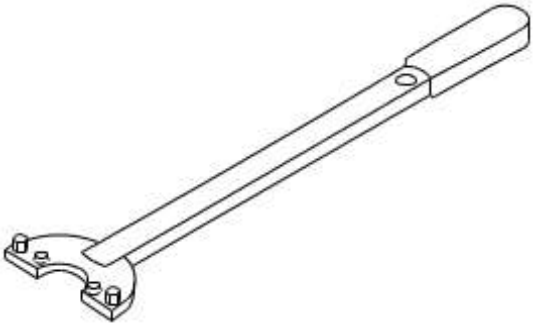
Timing chain: removal/installation



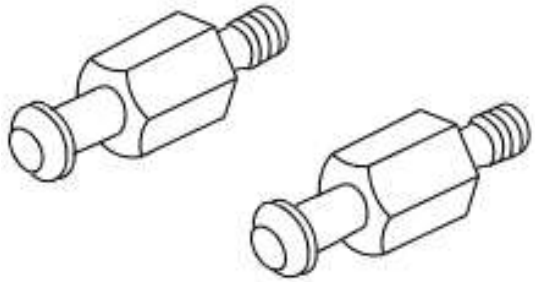
Adapter: (10-222A/1)



Crankshaft pulley removal tool: (3415)

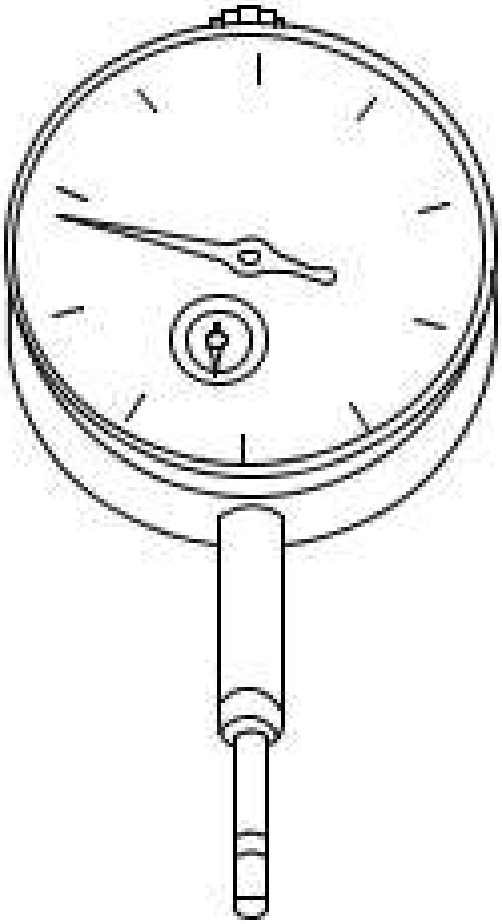


Crankshaft pulley removal tool: (3415/1)

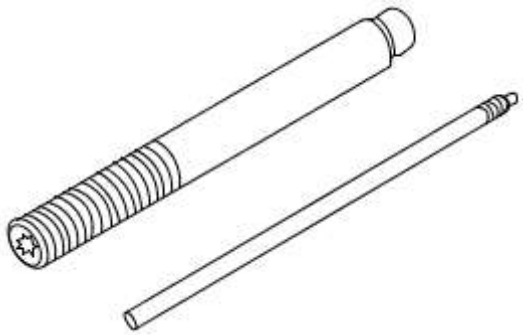


Timing chain: removal/installation

Dial gauge: (VAS 6079)

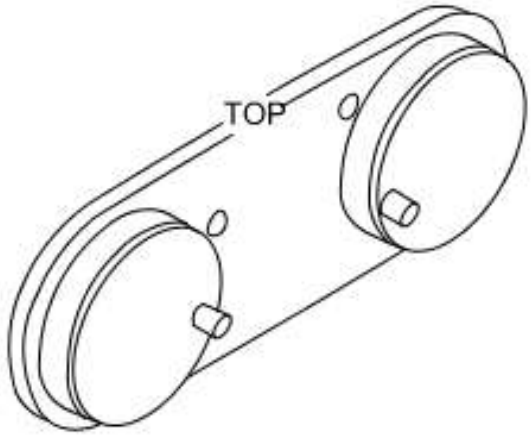


Adjustment tool: (T10170, T10170/1)

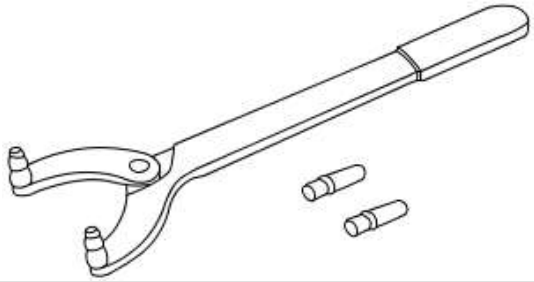


Timing chain: removal/installation

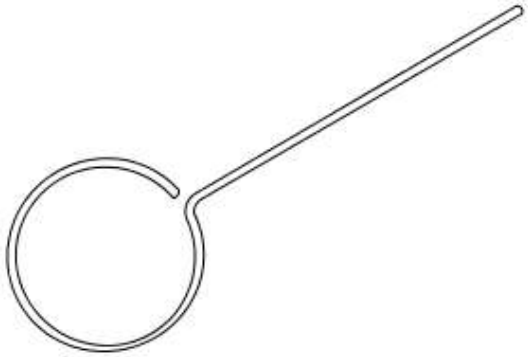
Camshaft alignment tool: (T10171 A)



Counterhold tool: (T10172, T10172/2)

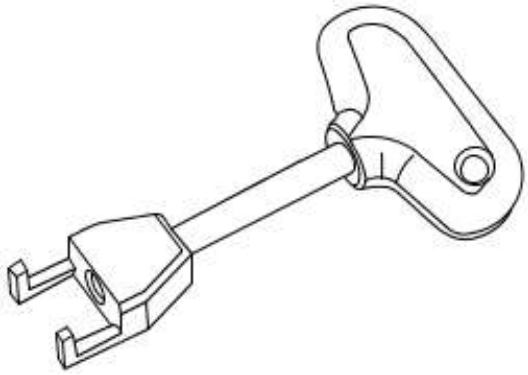


Tensioner locking tool: (T40011)

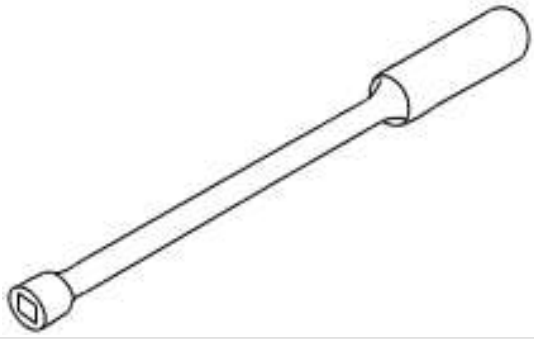


Puller: (T10094 A)

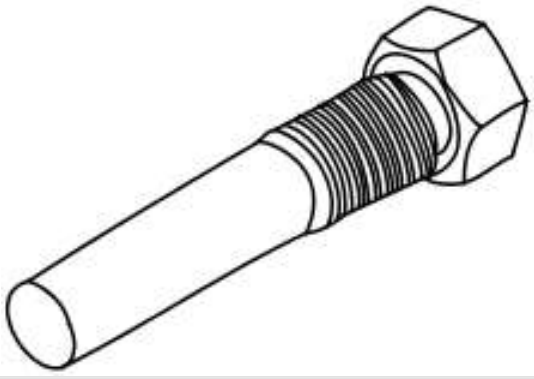
Timing chain: removal/installation



Spark plug removal tool: (3122 B)



Crankshaft locking tool: (T10340)



Counterhold tool: (VAG 1590 9)