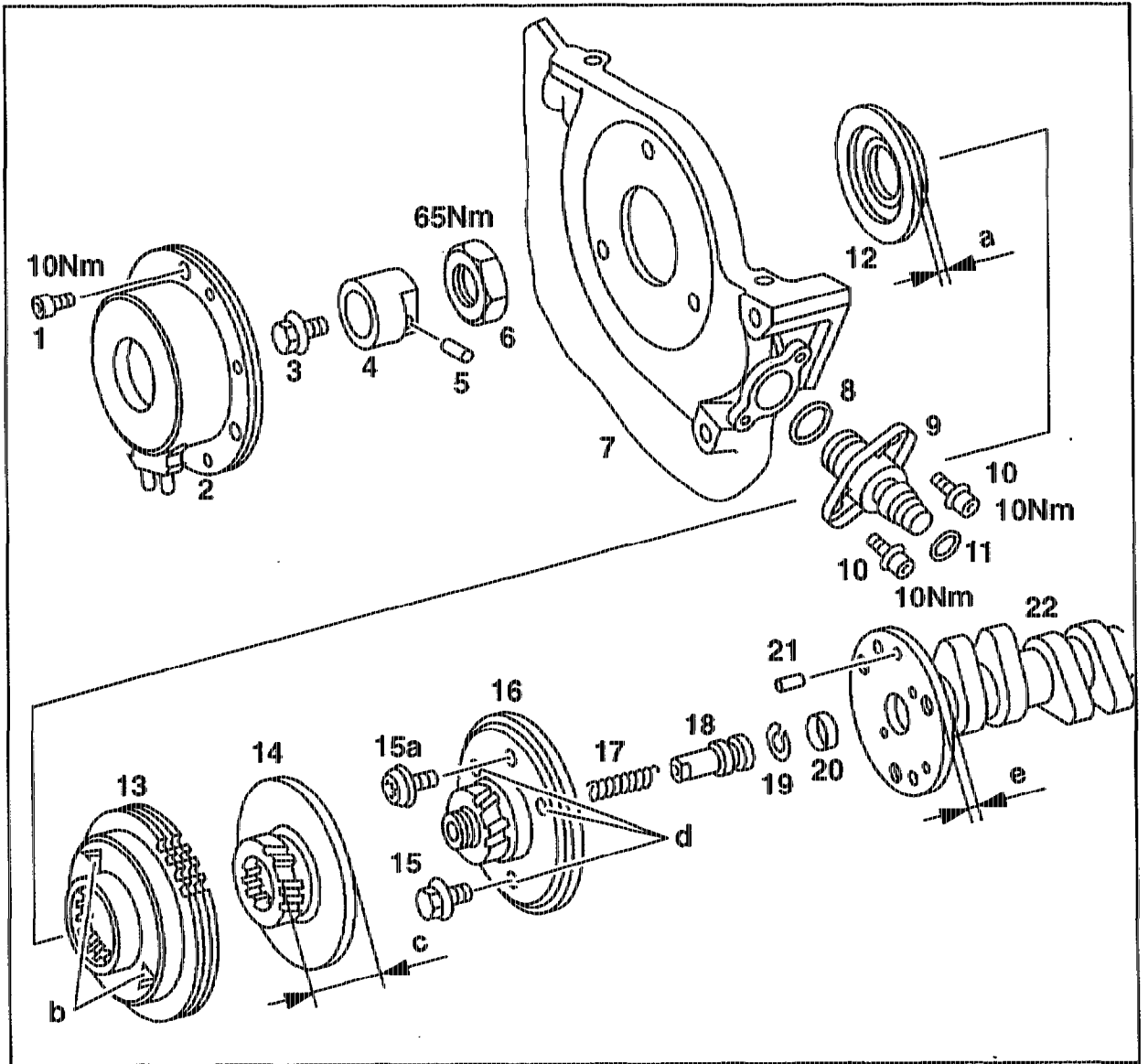


# 05-2170 Removing and Installing camshaft adjuster

Operation no. of operation texts and work units or standard texts and flat rates  
05-7201



P05-5401-59

Piston of cylinder 1 .....	position to ignition TDC (step 1).
Front cover (7) .....	remove (01-2120).
Timing chain .....	mark relative to exhaust and inlet camshaft sprocket (step 3).
Bolt (3), armature (4) .....	unscrew, pull off (step 4).

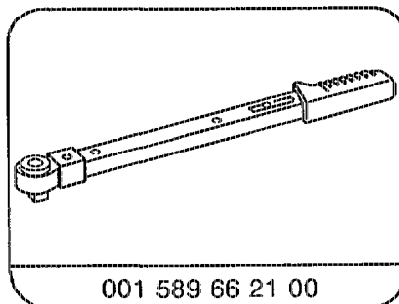
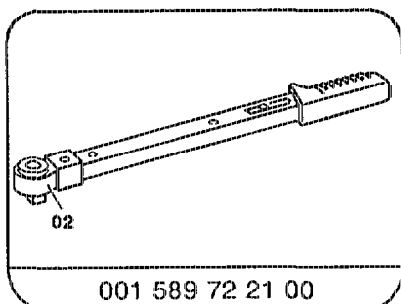
Nut (6) of camshaft adjuster and cover with ring (12) .....	unscrew, take off (step 5).
Engine 104.98: .....	remove guide sprocket, bearing body (left-hand thread, step 6).
Engine 104.99: .....	remove camshaft sprocket of exhaust camshaft, install (step 7).
Camshaft adjuster (parts 13, 14, 16) .....	take off, remove (step 8).
Flanged shaft (16) at inlet camshaft .....	install (step 9).
Positioning piston (14) and camshaft sprocket (13) .....	fit onto flanged shaft (16) (steps 10, 11).
Cover with ring (12) and nut (6) .....	install (step 12).
Engine 104.99: .....	install camshaft sprocket of exhaust camshaft (step 13).
Timing chain .....	fit onto camshaft sprocket; pay attention to marking (step 14).
Engine 104.98: .....	install guide sprocket with bearing journals (35 Nm, step 15).
Nut (6) .....	tighten (65 Nm, step 16).
Armature (4) .....	install (step 17).
Front cover (7) .....	install (01-2120).

#### Tightening torques in Nm or tightening angle

Bolt of armature to control plunger	1st version 1) bolt + washer	7
	2nd version 2) collar bolt angle of rotation	5 + 90°
M20 x 1.5 nut		65
Flanged shaft to camshaft		(see 05-2180)
Bolt of guide sprocket (left-hand thread, engine 104.98)		35

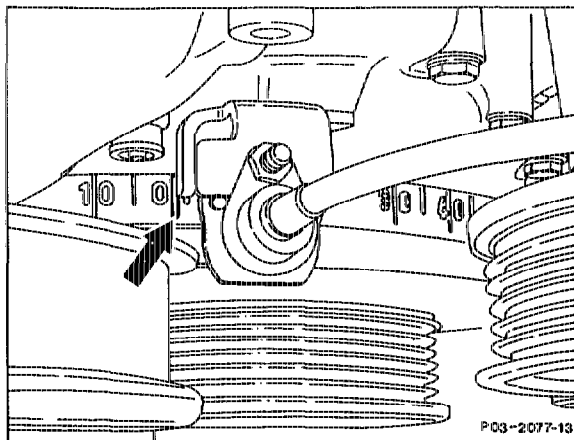
- 1) When performing repairs, replace by 2nd version  
2) Use only once

#### Special tools

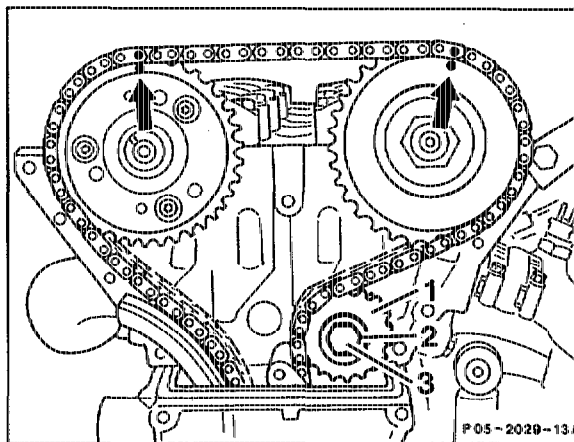


## Removing

- 1 Position piston of cylinder 1 to ignition TDC.
- 2 Remove front cover at top, install (01-2120).

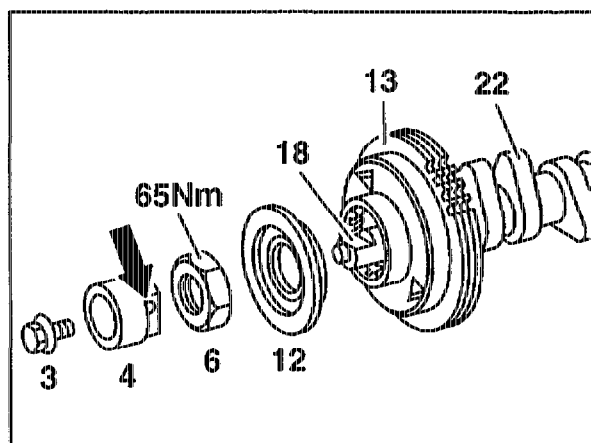


- 3 Mark timing chain relative to exhaust and inlet camshaft sprockets (arrows).



- 4 Unscrew bolt (3); counter-hold armature (4) at flat (arrow) for this step. Pull off armature (4).

- 5 Unscrew nut (6), take off cover with ring (12).



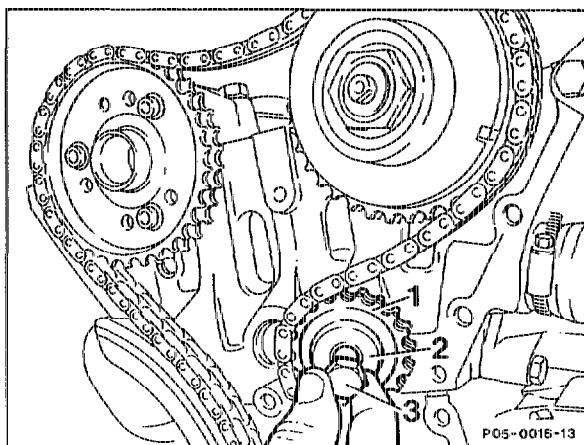
## Engine 104.98

- 6 Remove guide sprocket (1) together with bearing journal (2).



Left-hand thread.

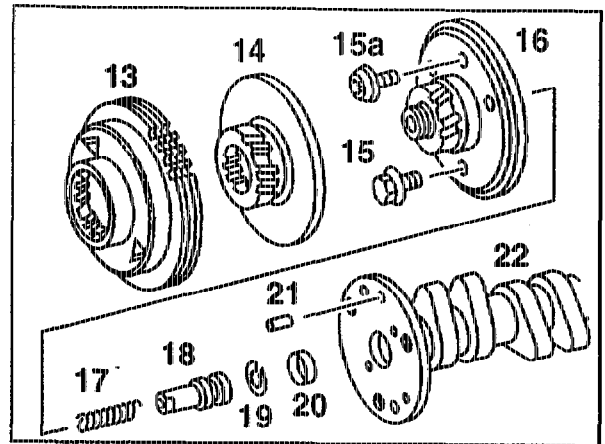
Mark guide sprocket on front before removing so that the direction of rotation is maintained when re-installing.



### Engine 104.99

7 Unbolt camshaft sprocket of exhaust camshaft.

8 Take off camshaft sprocket (13) and positioning piston (14). Unscrew bolts (15 and 15a) and take flanged shaft (16) of inlet camshaft (22).



P05-5403-13.

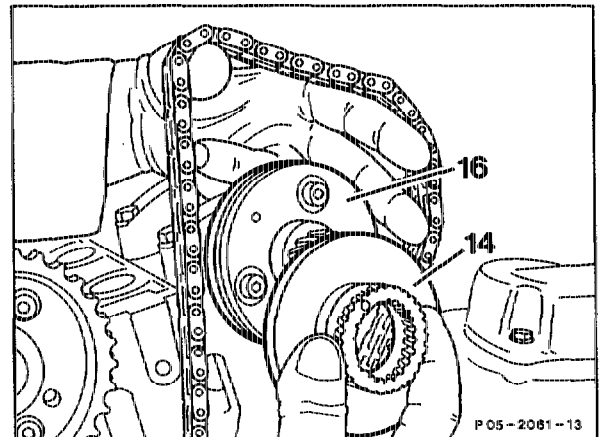
### Installing

9 Fit flanged shaft (16) onto camshaft (22). Pay attention to locating pin (21), screw on.



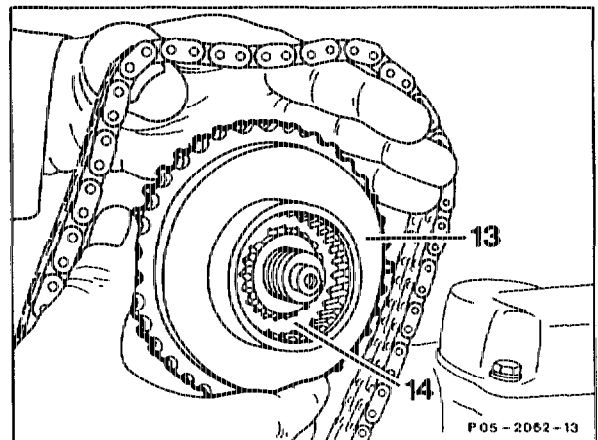
Matching of securing bolt of flanged shaft to camshaft flange (see table 05-2180).

10 Fit positioning piston (14) onto flanged shaft (16) into specified position, turning to the left; hold up timing chain when performing this step.



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11 Fit camshaft sprocket (13) onto positioning piston (14) in specified position, turning to the right; hold up timing chain when performing this step.

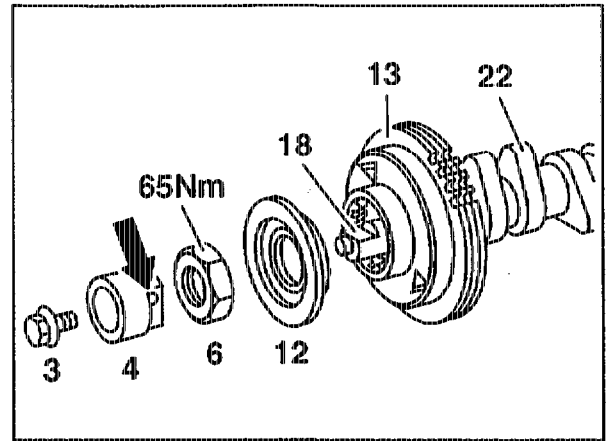


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12 Fit on cover with ring (12) and screw on nut (6), but do not tighten finally at this stage.

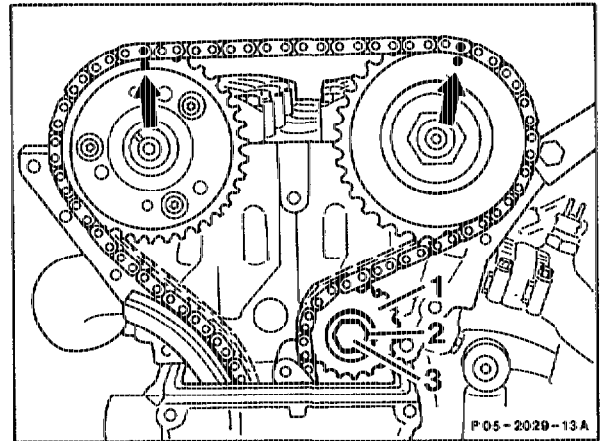
13 Engine 104.99: install camshaft sprocket of exhaust camshaft.

For tightening torques see (05-2180).



P05-5402-13

14 Fit timing chain onto both camshaft sprockets, pay attention to markings.



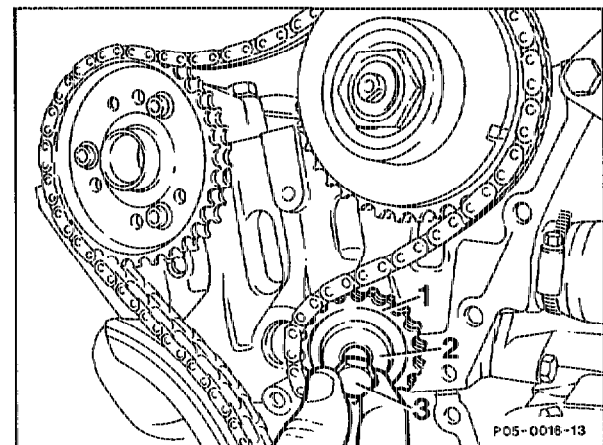
#### Engine 104.98

15 Insert guide sprocket (1) together with bearing journal (2) and bolt (3), screw on. Tightening torque 35 Nm.



The timing chain must be fitted on centrally on the tensioning rail.

Bolt (3) of guide pulley "left-hand thread".



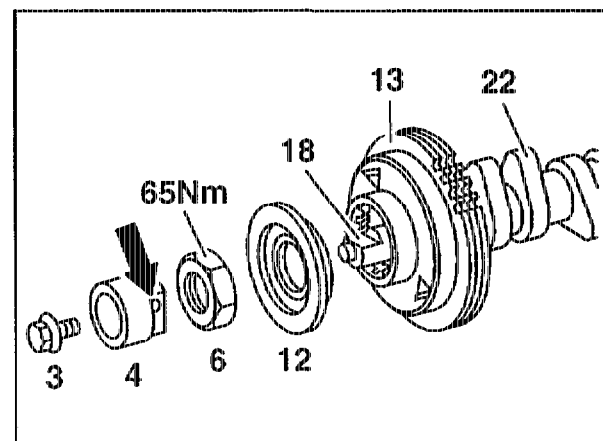
16 Tighten nut (6) on camshaft adjuster. Tightening torque 65 Nm.

17 Fit armature (4) onto control plunger (18). Tighten bolt (3).

Tightening torque (see table).

The roll pin (arrow) in the armature (4) must be aligned with the flat face on the control plunger (18).

18 Install front cover at top (01-2120).



P05-5402-13