

Auspuff

Exhaust system
Dispositif d'échappement
Impianto di scarico
Dispositivo de escape
Avgassystem
Uitlaatinstallatie

Kupplung

Clutch
Embrayage
Frizione
Embrague
Koppling
Koppeling

18 Exhaust System

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1800020 Complete exhaust system—removing and installing	00/1
1812030 Secondary muffler(silencer)—removing and installing or renewing	12/1

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2.78

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Specifications

Exhaust system

Model	320/6 320/6 A	323 i 323 i A*)	Tightening torques
18 11 ... Exhaust pipe			
Exhaust pipe to exhaust manifold – when renewing exhaust pipe	Nm kpm lb.ft	60 ... 67 6.0 ... 6.7 44 ... 49	
– when taking up slack	Nm kpm lb.ft	43 ... 48 4.3 ... 4.8 32 ... 35	
Exhaust pipe to triangular flange	Nm kpm lb.ft	22 ... 24 2.2 ... 2.4 16 ... 18	
18 21 ... Exhaust system fastenings			
Exhaust pipe carrier to retaining plate	Nm kpm lb.ft	22 ... 24 2.2 ... 2.4 16 ... 18	
Exhaust pipe carrier to exhaust pipe	Nm kpm lb.ft	22 ... 24 2.2 ... 2.4 16 ... 18	

*) Version for Sweden

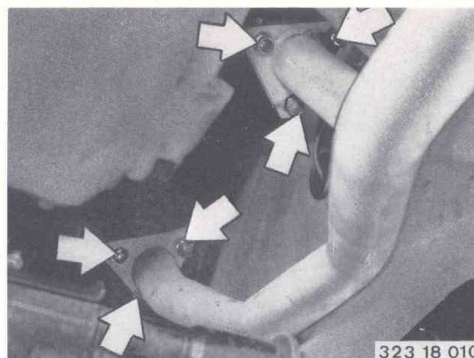
**18 00 020 Complete exhaust system
– removing and installing**

Detach the front exhaust pipes from the exhaust manifolds.

When installing: Note correct tightening torque¹⁾

Coat the studs with "Molykote" G paste.

Use new gaskets.

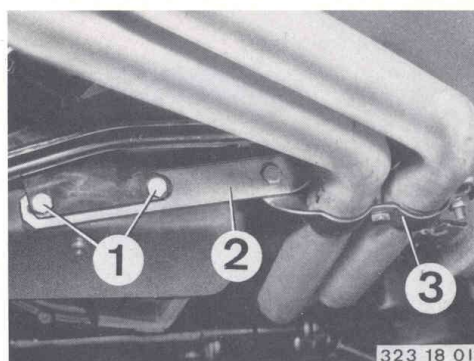


Detach the exhaust pipe carrier.

When installing: Loosen bolts (1). Press the exhaust pipe carrier (2) against the exhaust pipe until free from stress. Secure the retaining plate (2) to the transmission and the exhaust pipe carrier.

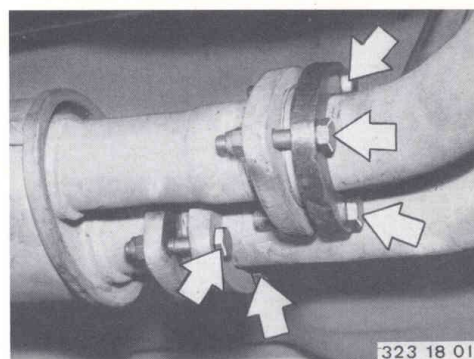
Finally, tighten bracket (3).

If any other installing sequence is used, severe drumming noises may result.



Detach front exhaust pipes from primary muffler.

When installing: Check condition of sealing rings and renew if necessary. Install primary muffler at exhaust pipes so that no stresses are trapped.

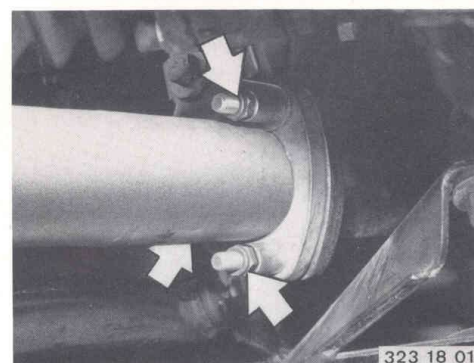


Separate the secondary muffler (silencer) at the flange.

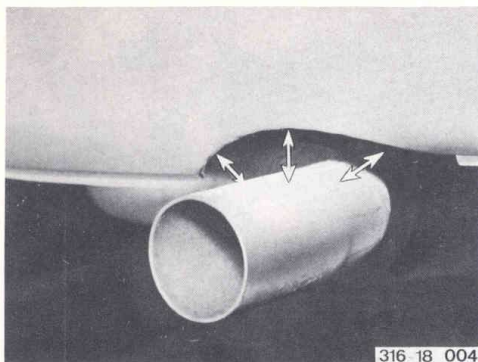
When installing: Install mounting. Before attaching the secondary muffler, align the pipe so that it does not make contact with the vehicle at any point.

Check condition of sealing ring and renew if necessary.

To prevent the secondary muffler from becoming loose when heat causes expansion, use long bolts with spacing sleeves.



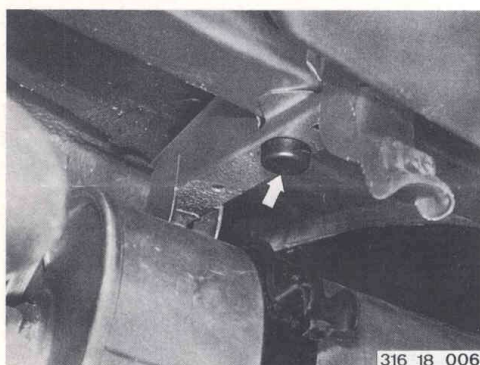
¹⁾ See specifications



Align the tail pipe with the cutout in the body tail panel.



Detach and remove the secondary muffler. Remove the front exhaust pipe with primary muffler.
When installing: **Renew rubber rings if porous or torn.**



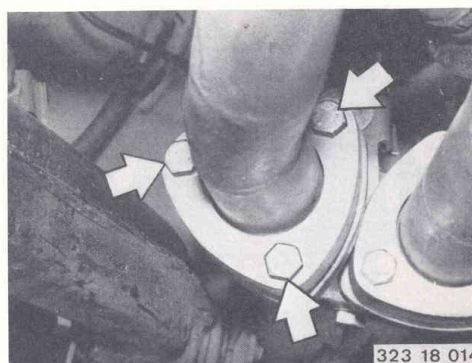
When installing: **Check condition of rubber stop.**

18 12 030 Secondary muffler (silencer) – removing and installing or renewing

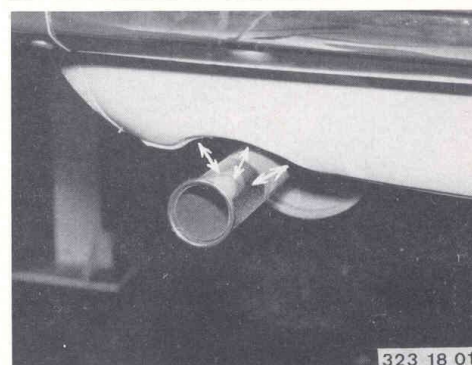
Left secondary muffler:

detach secondary muffler at flange.

When installing: before attaching the secondary muffler, align the pipe so that it cannot strike the body at any point.

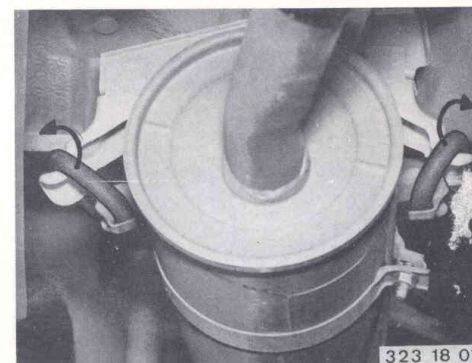


**Align the tailpipe with the cutout in the body end panel.
Renew the tailpipe trim.**

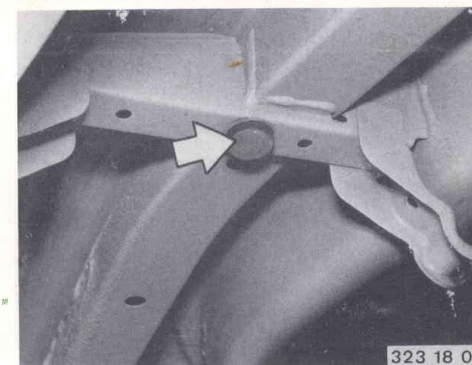


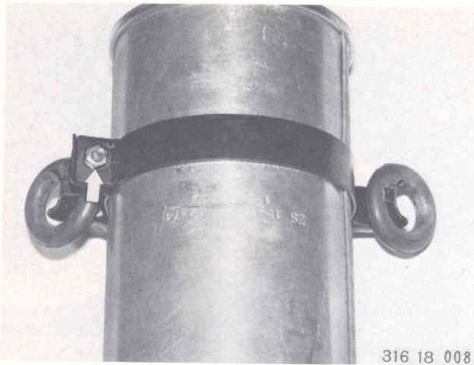
Disconnect the secondary muffler and remove it.

When installing: renew porous, cracked or torn rubber rings.

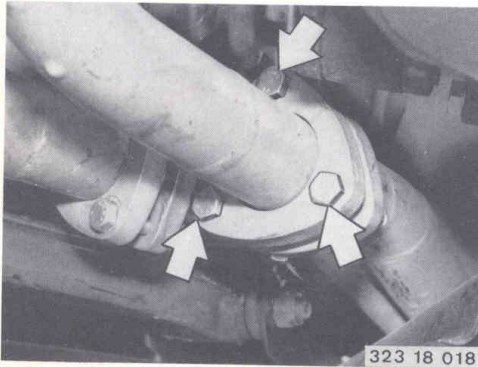


When installing: check rubber stop pad.

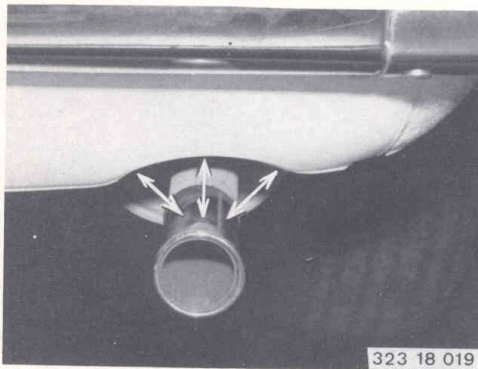




Transfer holder from old secondary muffler.



Right secondary muffler:
detach muffler at flange.
When installing: before securing the secondary muffler, align the pipe so that it does not strike the body at any point.

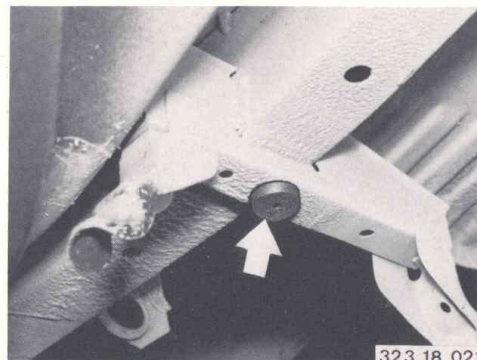


Align the tailpipe with the cutout in the body end panel.
Renew the tailpipe trim.

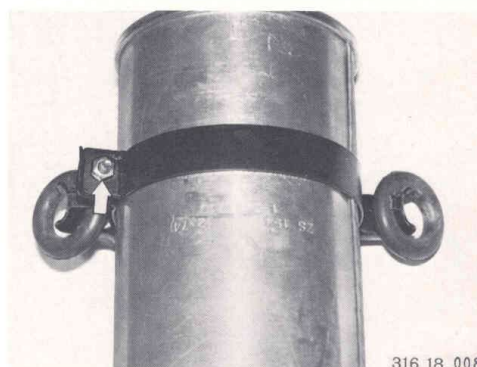


Disconnect the secondary muffler and take it out.
When installing: renew porous, cracked or torn rubber rings.

When installing: Check condition of rubber stop.



Transfer holder from secondary muffler (silencer) to new unit.



21 Clutch

Specifications	Page 21-0/3
2100006 Clutch hydraulic system—bleeding	00/1
2121000 Clutch—removing and installing	21/1
2151000 Clutch release mechanism—removing and installing	51/1
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010 Clutch slave cylinder—removing and installing	52/2
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Specifications

Clutch

Model	320/6		323 i
21 00 . . . General information			
Clutch type	Hydraulically operated single dry plate, with diaphragm spring, torsional vibration damper and automatic lining wear compensation		
Hydraulic fluid (brake fluid) ¹⁾ designation	BMW Brake Fluid DOT 4 ATE-DOT 4 "SL" Pentosin Super DOT 4 Castrol Disc Brake Fluid DOT 4		
21 21 . . . Clutch			
Make/Type	F & S/MF 228 K Sph		
Color code	yellow		brown
Contact pressure,	min.	N (kp, lb.f) 4412 (450, 991)	5300 (540, 1191)
	max.	N (kp, lb.f) 5099 (520, 1146)	6003 (612, 1349)
Withdrawal force,	min.	N (kp, lb.f) 1176 (120, 264)	1400 (143, 315)
	max.	N (kp, lb.f) 1372 (140, 308)	1550 (158, 348)
Max. imbalance	gcm		20
Max. deviation from plane (vertical runout) of diaphragm spring outer ends	mm (in)		0.6 (0.024)
¹⁾ Must be renewed once a year			

¹⁾ Must be renewed once a year

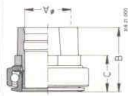
Specifications

Clutch

Model	320/6	323 i
2121 ... Driving plate (with torsional vibration damper)		
Make/Type	F & S/228 PSD	F & S/228 TD
Color code	white	silver
External diameter	mm (in)	228 ± 1 (8.98 ± 0.04)
Internal diameter	mm (in)	150 ± 1 (5.91 ± 0.04)
Overall thickness (removed, incl. lining)	mm (in)	10.45 ± 0.4 (0.411 ± 0.016)
compressed at 4800 N (480 kp, 1079 lb.f)	mm (in)	9.3 ± 0.25 (0.366 ± 0.010)
Minimum thickness (removed, incl. lining)	mm (in)	9.35 (0.368)
(compressed at 4800 N (480 kp, 1079 lb.f)	mm (in)	8.20 (0.323)
Max. runout	mm (in)	0.6 (0.024)
– measured at plate dia.	mm (in)	220 (8.66)
Max. imbalance	gcm	10

Specifications

Clutch

Model	320/6	323 i
2121 . . . Driving plate (with torsional vibration damper) (continued)		
Permissible deviation from parallel of the two lining faces	mm (in)	0.15 (0.006)
Clutch lining designation		Textar 50 s/17
– engine side/gearbox side		
Lining thickness	mm (in)	3.9 (0.154)
– engine side/gearbox side		
Minimum thickness	mm (in)	3.2 (0.126)
– engine side/gearbox side		
2151 . . . Clutch withdrawal mechanism (self-centering ball thrust bearing)		
Withdrawal bearing internal dia. A	mm (in)	 $38 \begin{matrix} + 0.112 \\ + 0.050 \end{matrix} \begin{matrix} (1.4961 \\) \end{matrix} \begin{matrix} + 0.0044 \\ + 0.0020 \end{matrix}$
Height B	mm (in)	52.5 ± 0.4 (2.067 ± 0.016)
Height C	mm (in)	30.5 ± 0.25 (1.201 ± 0.010)

Specifications

Clutch

Model	320/6	323 i
2152 . . . Hydraulic clutch operation		
Clutch master cylinder Make ¹⁾		Kugelfischer or Teves
Bore	mm (in)	19.05 (0.75)
Stroke	mm (in)	32.00 (1.26)
Clutch slave cylinder Make		Kugelfischer or Teves
Bore	mm (in)	20.64 (0.8125)
Stroke	mm (in)	23.00 (0.906)

¹⁾ On RHD cars, Kugelfischer only

Specifications

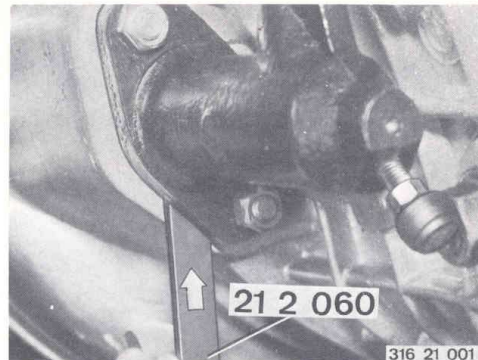
Clutch		Specifications	
Model		320/6	323 i
Tightening torques			
21 11 ... Clutch housing			
Clutch (gearbox) housing to crankcase	M 12 × 60 mm	Nm kpm lb.ft	78 ... 86 8 ... 8.8 58 ... 64
	M 12 × 45 mm	Nm kpm lb.ft	78 ... 86 8 ... 8.8 58 ... 64
Cover plate and gearbox cover plate at gearbox (M 6)		Nm kpm lb.ft	9 ... 10 0.9 ... 1.0 6.6 ... 7.4
21 21 ... Clutch with driving plate			
Clutch to flywheel (M 8)		Nm kpm lb.ft	22 ... 24 2.2 ... 2.4 16 ... 18

Specifications

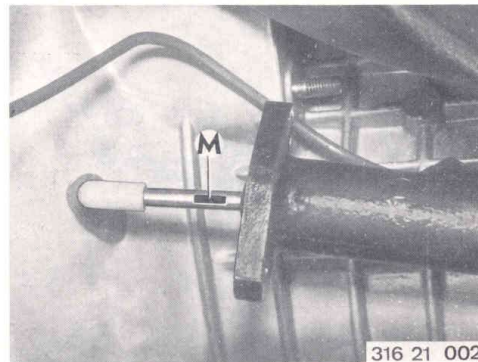
Specifications				
Clutch		320/6		323 i
Model				
Tightening torques				
21 52 . . . Clutch operating mechanism (hydraulic)				
Master cylinder to mount (M 8)	Nm	22 . . . 24		
	kpm	2.2 . . . 2.4		
	lb.ft	16 . . . 18		
– to clutch pedal (M 10)	Nm	32 . . . 36		
	kpm	3.3 . . . 3.7		
	lb.ft	24 . . . 27		
Slave cylinder to clutch housing (gearbox) – M 8	Nm	25 . . . 28		
	kpm	2.5 . . . 2.9		
	lb.ft	18.4 . . . 20.6		
Collar screws for clutch line (master and slave cylinders)	Nm	13 . . . 16		
	kpm	1.3 . . . 1.6		
	lb.ft	9.6 . . . 11.8		

21 00 006 Clutch hydraulic system – bleeding

Determining release trouble:
Insert feeler gauge 21 2 060 into the cutout provided, and push up as far as the piston rod.

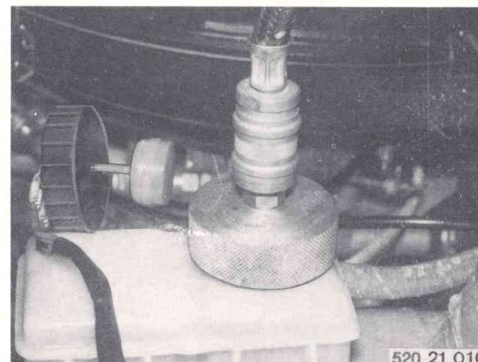


Depress the clutch pedal fully. Detach the slave cylinder and measure the line marked by the feeler gauge (M).
If the release travel (indicated by the line) is less than 20 mm (0.8 in), there may be air in the hydraulic system or a sleeve may be defective.

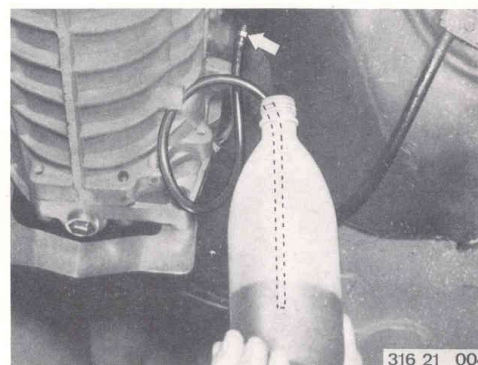


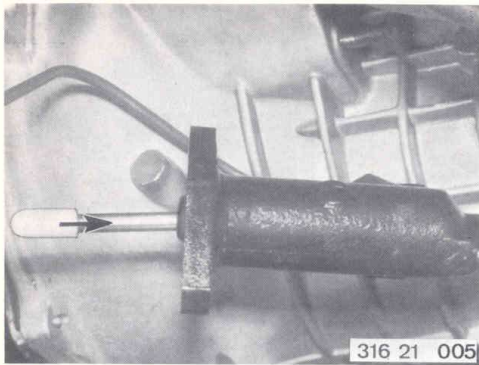
A) With bleeding device

Unscrew the threaded union on the fluid reservoir.
Connect the bleeding device.

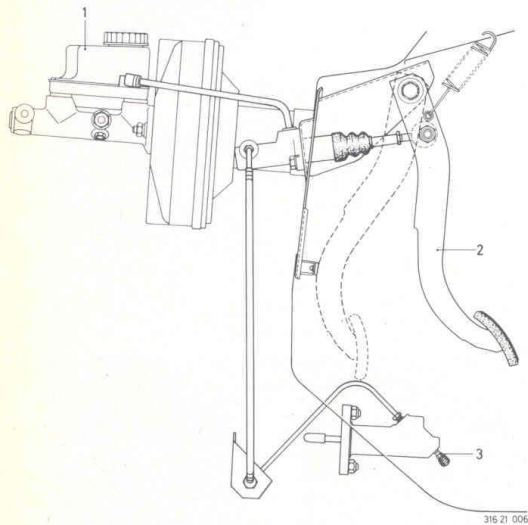


Keep the bleed screw on the clutch slave cylinder open until no further air bubbles emerge, and at the same time depress the clutch pedal fully several times.





Detach the slave cylinder from the gearbox. Press the thrust rod in until it makes contact inside the slave cylinder, then release slowly. This will expel any remaining air in the fluid reservoir and ensure that the maximum release travel is available. Never depress the clutch pedal when the slave cylinder is removed.



B) Without bleeding device

Fill the fluid reservoir (1). Connect the bleed hose to the bleed screw (3). The end of the bleed hose must be immersed in a vessel containing brake fluid, so that no air is drawn into the system during bleeding. Depress the clutch pedal (2) fully approx. 10 times, then hold down in this position. Open the bleed screw (3). When no further air bubbles emerge, close the screw. Release the clutch pedal and depress again approx. 10 times. Repeat these operations until no further air bubbles emerge from the hydraulic system. *Warning:* Top up the level of fluid in the reservoir (1) during the above procedure.

21 21 000 Clutch – removing and installing

Inspect clutch for wear before removing:

If the feeler gauge 21 2 060 can be inserted as far as its handle into the opening on the slave cylinder, the clutch plates are still in good working order.

If a gap approx. 5 mm (0.2 in) wide is formed between the handle of test gauge 21 2 060 and the slave cylinder, the clutch lining is worn and should be renewed.

Remove the gearbox 23 00 020.

Check runout at ends of diaphragm spring¹⁾. Prevent the flywheel from turning with special tool 11 2 170.

Loosen all retaining bolts by 1 to 1½ turns in succession until the clutch spring pressure has been released.

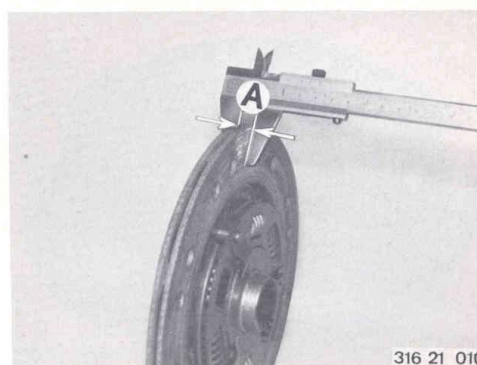
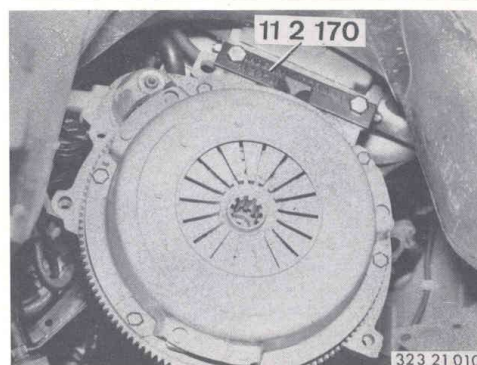
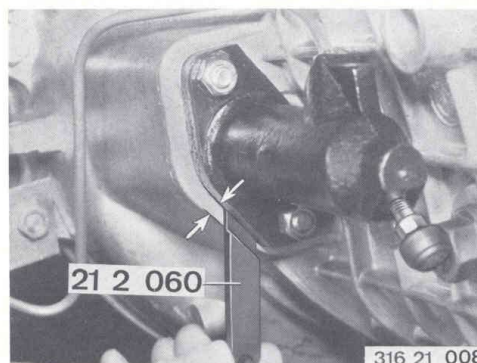
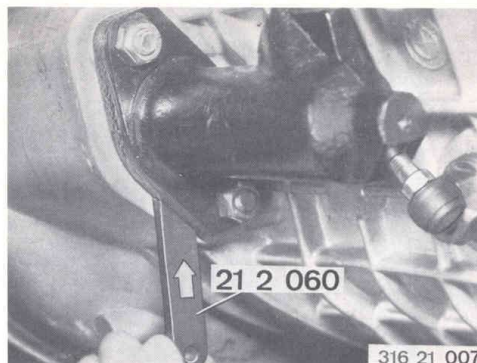
Remove the retaining bolts and take off the clutch and driving plate.

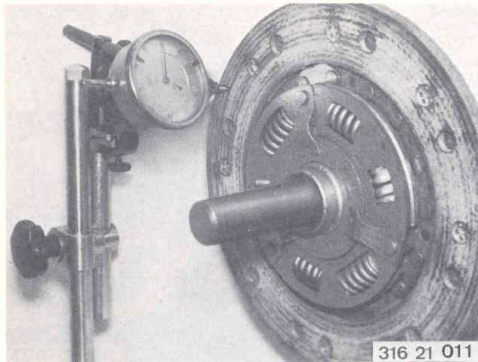
Important: Never throw or drop clutch. Improper handling of the clutch could snap off the three tangential leaf springs holding the clutch in its direction of rotation. The diaphragm spring will then permit the release stroke, but the weak leaf springs cannot lift the pressure ring sufficiently and the drive plate will not be released.

Check the driving plate¹⁾ (A) for signs of cracking, and ensure that the spring elements of the vibration damper are firmly seated.

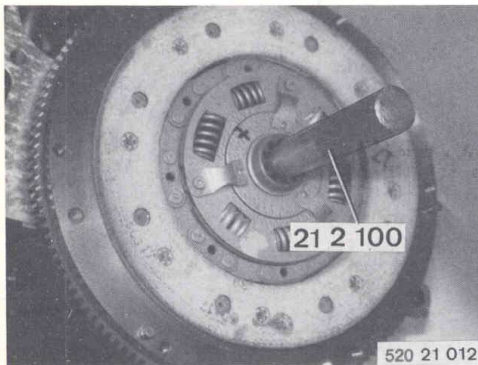
When installing: Note correct side of clutch.

¹⁾ See specifications





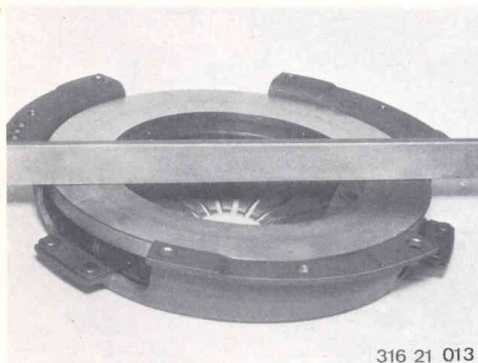
Check the driving plate with lining for lateral runout¹⁾.



When installing: Check free movement of needle roller bearing in crankshaft and renew if necessary.

Check flywheel for score marks.

Center the driving plate in the flywheel with centering arbor 21 2 100.



Inspect the clutch for signs of cracking, wear or localized burns.

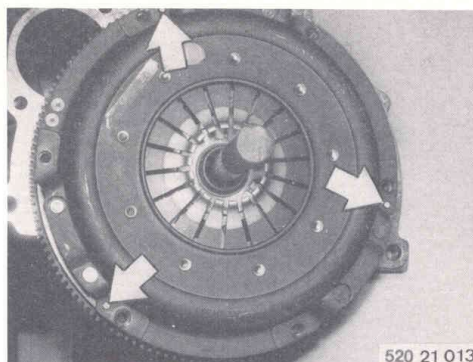
The pressure face must be absolutely flat.



Inspect the riveted joints for wear and firm grip. Renew the clutch if the rivet heads are loose or worn.

¹⁾ See specifications

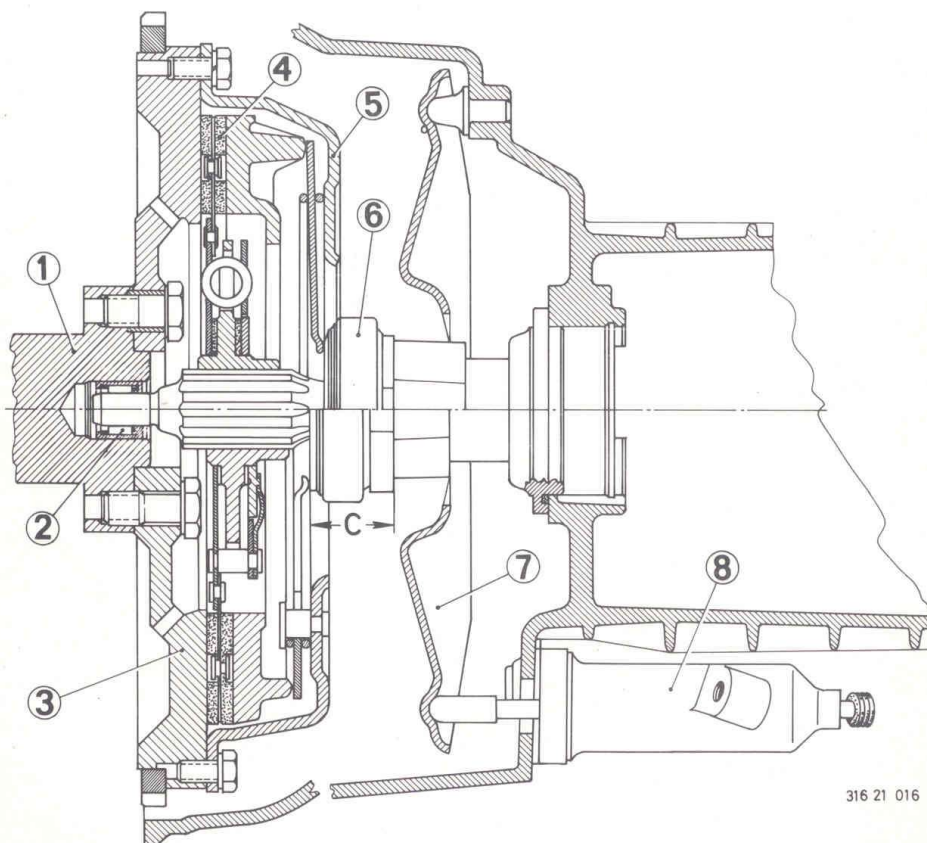
Place the clutch on the locating pins.
Tighten the retaining bolts uniformly in sequence until the specified torque¹⁾ is reached.
When installing: Apply a small amount of "Molykote Longterm 2" grease to the gearbox input shaft splines.



520 21 013

Clutch – general arrangement

- 1 Crankshaft
- 2 Needle roller bearing
- 3 Flywheel
- 4 Driving plate¹⁾
- 5 Pressure plate¹⁾
- 6 Release mechanism¹⁾
- 7 Release lever
- 8 Slave cylinder



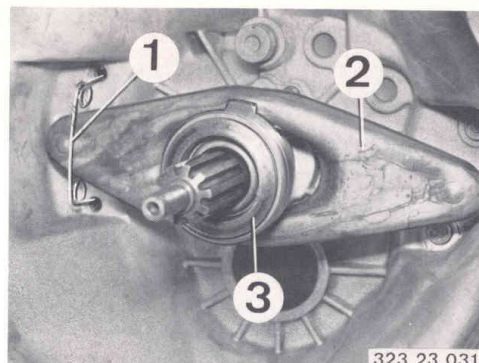
316 21 016

¹⁾ See specifications

21 51 000 Clutch release mechanism – removing and installing

Remove the gearbox 23 00 020.

Take out spring (1) and release lever (2) with release unit (3).

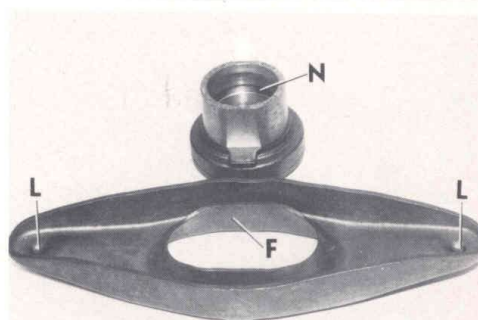


323 23 031

When installing: Pack the lubricating groove (N) with "Molykote Longterm 2".

Coat the guides (F) and support points (L) with "Molykote Longterm 2".

If this precaution is neglected, the bearing may seize on the guide sleeve.



316 23 025

**Note correct release unit heights B and C¹⁾.
BMW 320/323i Fichtel & Sachs No. 3151 047 001.**

Grease the lubricating groove with "Molykote Longterm 2".

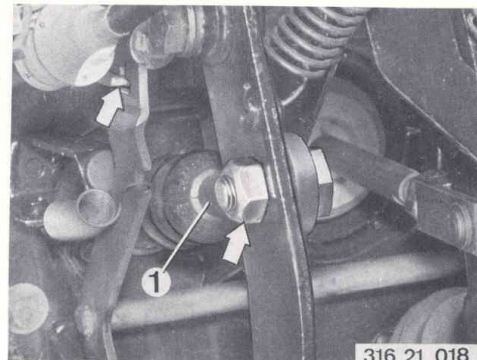


316 21 017

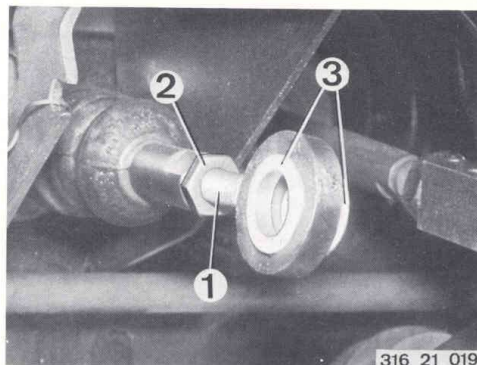
¹⁾ See specifications

21 52 000 Clutch master cylinder – removing and installing

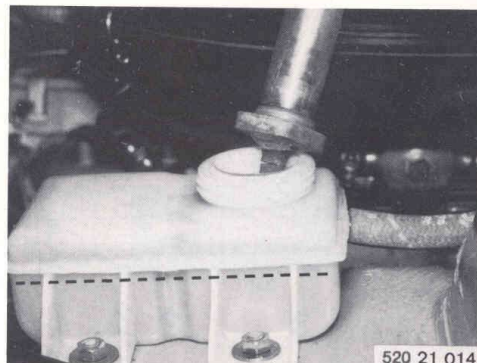
Detach the thrust rod (1) from the clutch pedal lever.



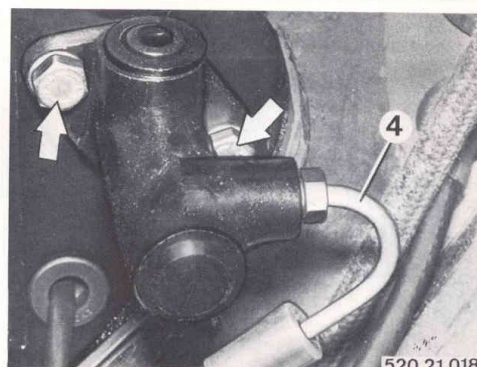
Loosen nut (2) and unscrew piston rod (1).
When installing: Use piston rod (1) to adjust clutch pedal travel¹⁾.
Warning: Note presence of bushings (3).
Coat the bushings and pin with "Molykote Longterm 2".



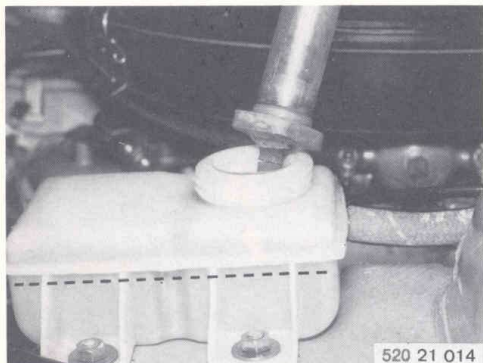
Siphon off the brake fluid from the reservoir until the level drops below the refill line outlet.



Disconnect brake pipe from engine bulkhead and bend up.
Pull out the refill line.
Detach line (4) to the slave cylinder.
Detach the master cylinder from the engine bulkhead and remove forwards.
Bleed the clutch hydraulic system – 21 00 006.

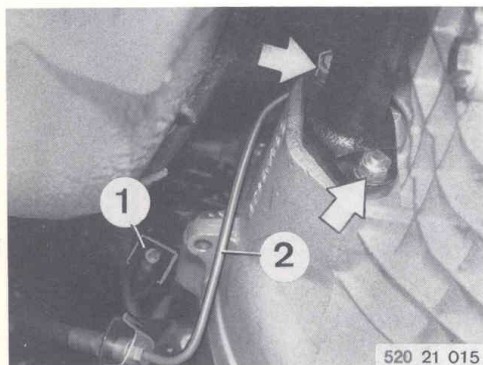


¹⁾ See specifications



21 52 010 Clutch slave cylinder – removing and installing

Siphon off the brake fluid from the reservoir down to the refill line connection.



Detach the slave cylinder from the gearbox. Take off the slave cylinder.

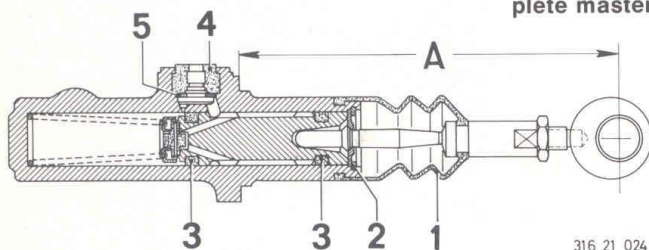
Detach pipe (1).

When installing: The bleed screw points down. Coat the thrust rod at the front with Molykote Longterm 2.

Bleed the clutch hydraulic circuit – 21 00 006.

21 52 502 Clutch master cylinder – reconditioning (removed)

Clean the master cylinder and interior components with cleaning spirit. If the cylinder bore is scored or locally corroded, renew the complete master cylinder.



Install the repair kit.

Components:

Dust cap 1

Circlip 2

Slotted rings 3

Sealing plug 4

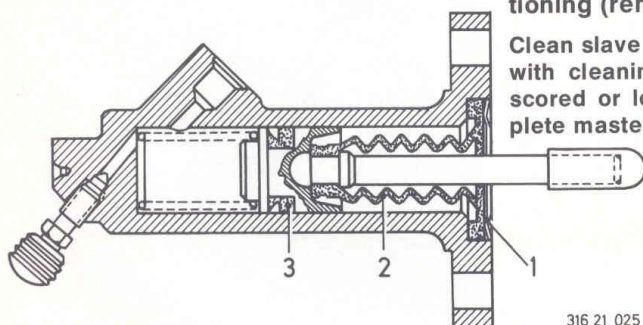
Washer 5

Installed dimension

A $140 \pm 0.5 \text{ mm}$ ($5.512 \pm 0.020 \text{ in}$)

21 52 512 Clutch slave cylinder – reconditioning (removed)

Clean slave cylinder and interior components with cleaning spirit. If the cylinder bore is scored or locally corroded, renew the complete master cylinder.



Install the repair kit.

Components:

1 Serrated ring

2 Dust cap

3 Slotted sleeve

Trouble shooting – Clutch

Fault	Cause	Remedy
Clutch slipping	<ul style="list-style-type: none"> a) Clutch contact pressure¹⁾ too low b) Clutch lining¹⁾ severely worn c) Oil on lining – gearbox – or crankshaft sealing ring defective d) Clutch has been running too hot e) Clutch was not a genuine BMW component 	<ul style="list-style-type: none"> a) Renew clutch b) Renew driving plate c) Renew defective seal and clutch driving plate d) Renew clutch e) Install genuine BMW component
Clutch juddering	<ul style="list-style-type: none"> a) Lining¹⁾ not to specification b) Oil on lining c) Release mechanism exerting pressure to one side d) Pressure plate acting at an angle e) Crankshaft not aligned with gearbox input shaft f) Defective engine and transmission mounting g) Driving plate is not a genuine BMW component 	<ul style="list-style-type: none"> a) Renew driving plate b) Renew driving plate c) Check withdrawal arm d) Renew pressure plate e) Check centering faces at engine and transmission f) Renew engine and transmission mounting g) Install a genuine BMW component
Clutch will not release	<ul style="list-style-type: none"> a) Driving plate out of alignment or lining fractured b) Driving plate lateral runout¹⁾ c) Lining rusted to flywheel d) Driving plate sticking on gearbox input shaft e) Defective gearbox input shaft bearing in crankshaft f) Air in clutch hydraulic system g) Tangential leaf springs in clutch snapped off 	<ul style="list-style-type: none"> a) Renew driving plate b) Straighten or renew c) Clean flywheel, roughen lining with emery paper d) Free driving plate on gearbox input shaft or renew damaged components e) Renew crankshaft bearing f) Bleed clutch hydraulic system g) Renew clutch
Noise from clutch	<ul style="list-style-type: none"> a) Clutch and driving plate severely out of balance¹⁾ b) Defective vibration damper c) Defective clutch release mechanism d) Defective gearbox input shaft bearing in crankshaft e) Loose rivets in clutch 	<ul style="list-style-type: none"> a) Renew clutch or driving plate b) Renew driving plate c) Renew clutch return mechanism d) Renew crankshaft bearing e) Renew clutch

¹⁾ See specifications