34 00 050 Bleeding brake system with DSC

Necessary preliminary work:

- Remove the left engine compartment cover.
- Read and comply with General Information.

Attention!

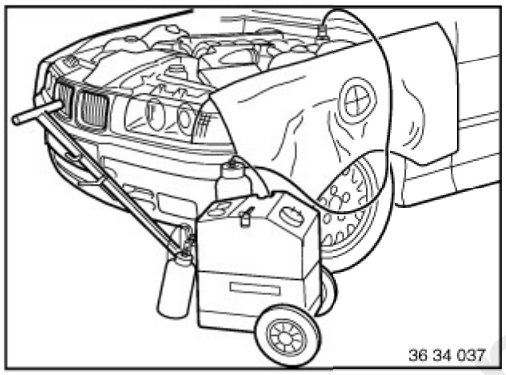
When replacing or repairing, observe the filling and bleeding instructions for the following parts:

- Tandem brake master cylinder
- Hydraulic unit
- Components and lines which are fitted between these assemblies.

Connect bleeder unit with max. 2 bar filling pressure.

A second person is needed to help carry out this work.

Use only BMW-approved brake fluids, see BMW operating fluids.



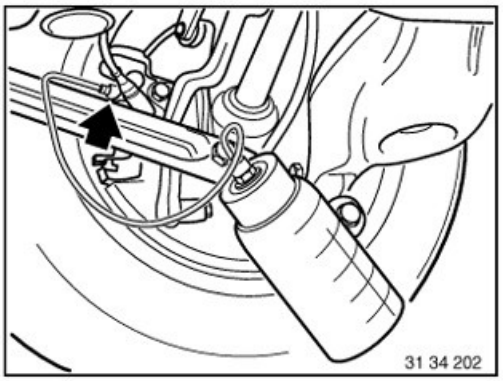
Attention!

Check relevant equipment manufacturer's operating instructions for each device.

Charging pressure should not exceed 2 bar.

Connect bleeder unit to expansion tank and switch on.

Connect ISID to vehicle and select brake bleeding procedure.



Completely bleed the brake system.

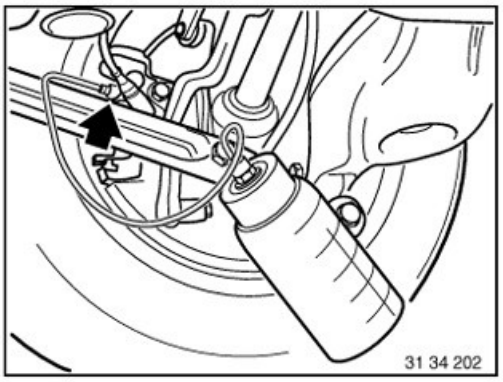
Connect bleeder hose with collecting tray to bleeder valve on rear right brake caliper.

Open bleeder valve and purge until clear, bubble-free brake fluid emerges.

Close vent valve.

Follow same procedure on rear left, front right and front left wheel brake.

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Bleed the rear axle brake circuit.

Connect bleeder hose with collecting tray to bleeder valve on rear right brake caliper.

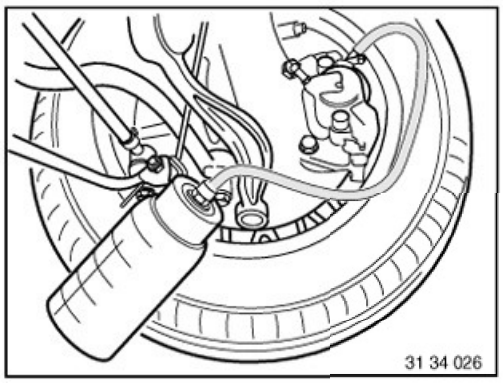
Open vent valve.

Run brake bleeding procedure with ISID with vent valve open.

After completing routine, press brake pedal 5 times to floor; clear and bubble-free brake fluid must flow out.

Close vent valve.

Repeat procedure at rear left.



Bleed front-axle brake circuit.

Connect bleeder hose with collecting tray to bleeder valve on front right brake caliper.

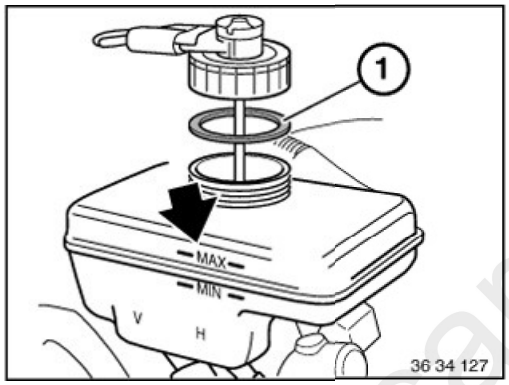
Open vent valve.

Run brake bleeding procedure with ISID with vent valve open.

After completing routine, press brake pedal 5 times to floor, clear and bubble-free brake fluid must flow out.

Close vent valve.

Repeat procedure at front left.



Switch off bleeder unit and remove from expansion tank.

Check brake fluid level. If necessary, top up/draw off to "MAX" level.

Close expansion tank.

Note:
Pay attention to seal (1) in sealing cap.

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34 00 017 Checking brake booster (vacuum test)

Special tools required:

- 34 3 100

Necessary preliminary work:

- If necessary, expose the brake booster



- Pull off the vacuum hose on the brake booster. Install vacuum tester 34 3 100 between the brake booster and the vacuum hose of the non-return valve.
- Start the engine.
- Check the vacuum build-up.
- Switch off engine.
- Adjust the vacuum to no more than 0.8 bar by pressing the brake pedal and wait until the value stabilises.
- If the brake pedal is not pressed, the vacuum must reduce by maximum 0.06 bar during a test period of 1 minute.

If the required values are not reached:

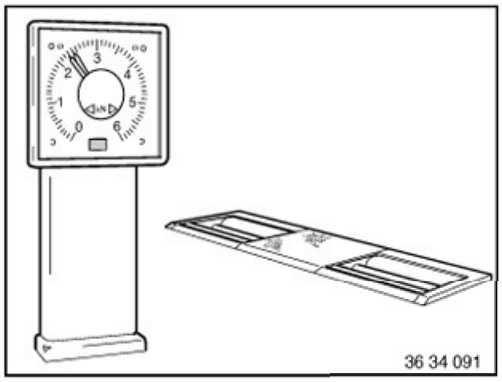
- Change the non-return valve
- Check that the sealing between the brake servo and the tandem brake master cylinder (sealing ring) is in proper condition and fits correctly.
- If necessary, check the tightness of the brake booster with a smoke tester
- If the setpoint values are not reached during the repeat check, the brake booster must be changed.

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34 00 009 Checking brakes on test stand

Necessary preliminary tasks:

- Check tyres for damage
- Check tyre treads
- Checking tyre pressure



Important!

The corresponding system must be deactivated on vehicles equipped with DSC.

The DSC indicator and warning light in the dashboard must light up!

The brakes must be at normal operating temperature. To do so, gently warm up the brake discs and brake drums while dry by braking the vehicle several times.

Important!

Only brake test stands with test speeds of 2.5-6 km/h may be used.

Maximum brake bedding-in time 2Â min.

You must observe the regulation contained in the operating instructions of the relevant test stand manufacturer.

Failure to do so may result in damage to the vehicle and the system and also personal injury.

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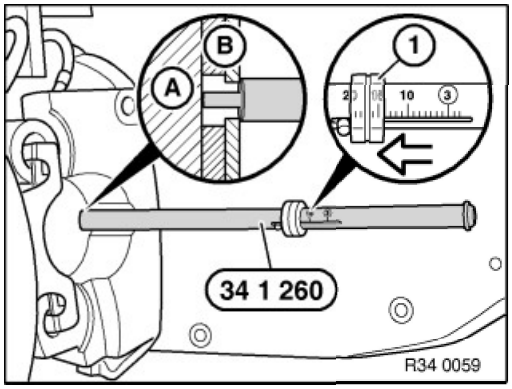
34 00 010 Checking thickness of brake pad

Special tools required:

- 34 1 260

Note:
The thickness of the outer brake pads can be determined without removing the wheels.

If necessary, move vehicle until opening for brake pad wear indicator (brake pad) can be seen through rim styling.



Insert special tool 34 1 260 wheel rim into opening for brake pad wear indicator.

Press special tool onto brake pad. Slide ring (1) in direction of arrow up to stop and read off measured value.

Note:
(A) Brake disc

(B) Brake pad with backplate

Remaining brake pad thickness of front brake.

Remaining brake pad thickness of rear brake.

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34 00 ... General information on braking in new brake discs / brake pads



Important!

After completing work:

- Carry out function check on brake analyzer (test stand) to ensure that the brakes comply with legal requirements.
- Carry out test braking while driving at low speed; the effectiveness of the brakes may be reduced during the initial braking operations.
- Exaggerated drastic and continuous braking operations for faster braking in are not permitted.
- Advise the customer not to perform any wilful drastic braking in the first 200Â km after brake replacement.
- Attach mirror tag to inside mirror.

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34 00 ... General notes

The brake system is one of the most important safety systems on any motor vehicle. It is therefore essential to act with utmost care when working on the brake system and to follow the instructions below.

- Ensure cleanliness and only use fluff-free cleaning cloths.
- Wash away or vacuum up brake dust, do not clear it away using compressed air. This dust is a health hazard.
- Do not under any circumstances allow any oil or grease to get into the brake system. This would result in a complete malfunction of the brake system.
- When cleaning brake components with brake cleaner (refer to BMW Parts Department), do not allow brake cleaner to get into in the brake system.
- Even the most minute traces of brake cleaner must be avoided.
- Replace brake fluid at least every two years.
- Never reuse drained brake fluid.
- Always use BMW-approved brake fluid, refer to BMW Service Operating Fluids.
- Dispose of brake fluid in approved appliances only, refer to BMW Service Workshop Equipment Planning documentation.
- Do not allow brake fluid to drain into drain pipes, into the outside environment or into unsuitable facilities. This would create the risk of groundwater contamination since brake fluid is classed as a fluid that is hazardous to water.
- Do not allow brake fluid to come into contact with paintwork as this will destroy the paint.
- Brake fluid must not be allowed to remain on bare skin too long in order to avoid skin problems. Wash skin coated with brake fluid with water and soap.
- If brake fluid makes contact with eyes, immediately flush with large quantity of clean water and visit eye doctor.
- Brake pads:

  Brake pads must be replaced when the warning threshold of the brake pad wear indicator is reached.

  Brake pads must always be replaced on both sides of any axle.

  The friction surfaces of the brake pads must not come into contact with oil or grease. The brake pads must be replaced if they are fouled by such substances.

  In the case of rotation-dependent brake pads, make sure the arrow marking points in the direction of rotation of the brake disc for when the vehicle is moving forward. Brake pads with left/right markings must be fitted on the relevant side of the vehicle.

  One-sided angled areas on the brake pads must be located on the disc contact side of the brake caliper for when the vehicle is moving forward.
- Brake discs:

  Brake discs must not be scored or cracked. Furthermore, minimum brake disc thickness, disc runout, parallelism and surface roughness of the friction surfaces must not exceed or drop below the permitted values.

  Always strip preservative off new parts before installation. With the rear brake discs, also strip preservative off brake drum on parking brake.
- Always strip preservative off new parts before installation.
- Brake calipers:

  Only approved glycol-based pastes may be used for repairs on brake calipers.

  All moving parts on the brake caliper must move freely: note grease specifications.

  Use only BMW-approved lubricants to grease caliper guides (refer to BMW Service Operating Fluids).
- Brake lines and brake hoses must be correctly routed and must not abut with body or components in a way which would cause chafing.
- To prevent damage, release and tighten brake line couplings with a special brake line wrench only.

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- The system must be bled each time any brake lines have been detached.
- All connection points must be checked for leaks.
- Only tighten down brake hoses on the front axle when wheels are in straight-ahead driving position.
- Close off open connections of brake lines and individual components to prevent dirt from getting into the brake system.
- When tightening down brake line couplings, observe tightening torque 34 32 1AZ.

The traction control system is essentially maintenance-free; however the following must be observed:

- When carrying out welding work with electric welding equipment, be sure to disconnect the plug from the electronic control unit (ignition turned off).
- During painting work, the control unit may be subjected for brief periods to loads of max. 95 °C and for long periods (approx. 2 hours) to loads of max. 85 °C.
- Terminals must be completely tight on end poles of battery.
- Brake lines on hydraulic unit must not be swapped over: if applicable, mark them prior to disassembly.

On completion of repair work, carry out swap-over test with the DIS diagnosis system.

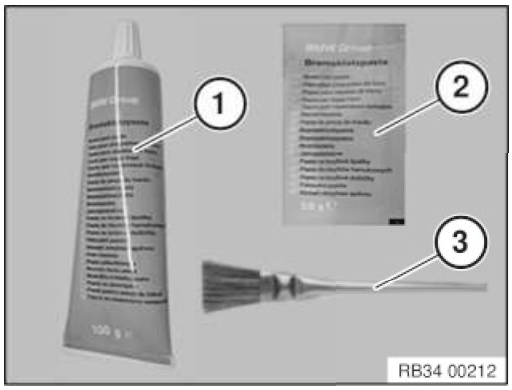
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34 00 x01 Guideline for applying brake pad paste on brake pads and caliper carrier

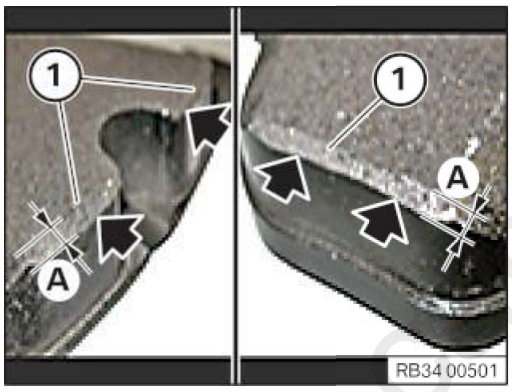
Attention!

So as not to damage the surface coating, if possible do not mechanically clean the guide surfaces for the brake pads on the brake caliper mounting bracket, but rather clean with brake cleaner BMW TI. Clean number 83 19 2 154 780 and apply a thin coating of BMW TI break pad paste. Coat number 83 19 2 158 851 (3 gr.) or 83 19 2 158 852 (100 gr.).

Spread brake pad paste onto the marked surfaces using a brush!



- (1) Brake pad paste 100 gr. BMW TI. Number 83 19 2 158 852
- (2) Brake pad paste 3 gr. BMW TI. Number 83 19 2 158 851
- (3) Brush for spreading brake pad paste over the marked areas.



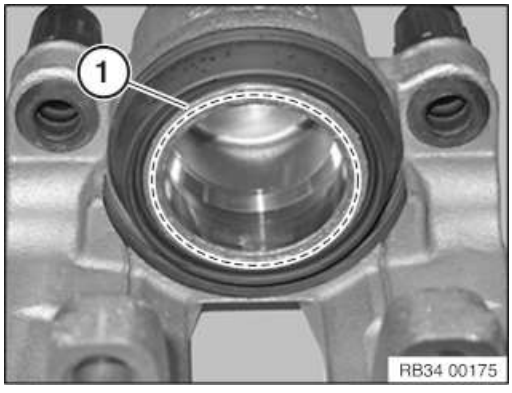
Attention!

If new brake pads are mounted on a brake disc, the following must be observed:

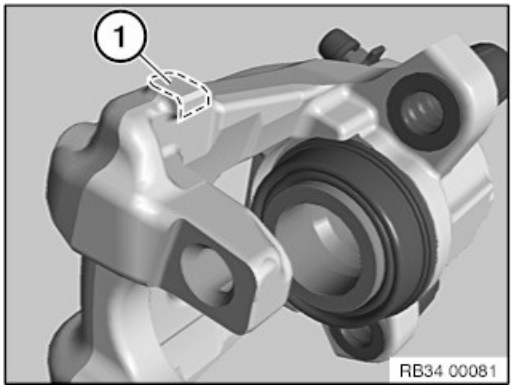
- Bevel edges in the area (1) slightly (dimension A must not exceed maximum 1 mm).

These procedures applies for all the following described brake systems.

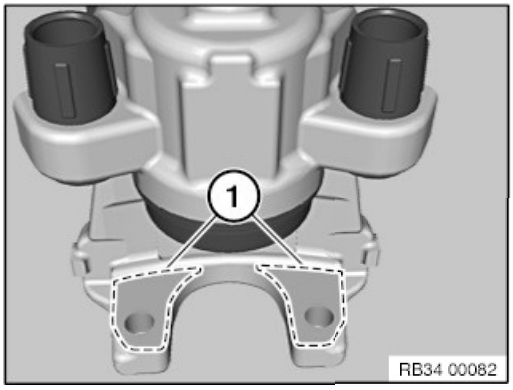
IPS brake (made by CBI), 1-piston floating caliper brake (model ranges: 1-Series, 3-Series, 4-Series, X3)



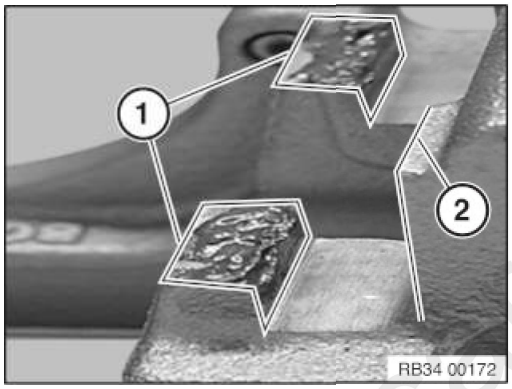
Clean contact surface (1) of brake piston with brake cleaner and apply a thin coating of brake pad paste.



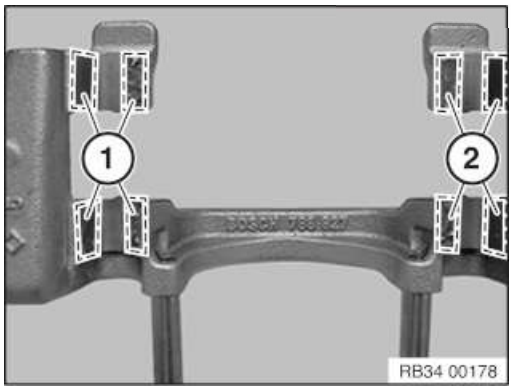
Clean contact surfaces (1) of T-heads/brake calliper housing with brake cleaner and apply a thin coating of brake pad paste.



Clean contact surface (1) of brake caliper with brake cleaner and apply a thin coating of brake pad paste.

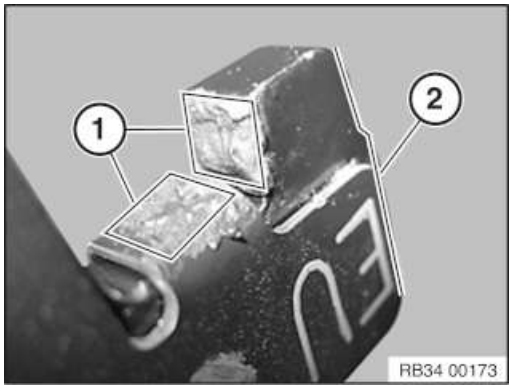


So as not to damage the surface coating, <u>if possible do not mechanically clean</u> the guide surfaces (1) for the brake pads on the brake caliper mounting bracket. Clean guide surfaces (1 and 2) with brake cleaner and apply a thin coating of brake pad paste.

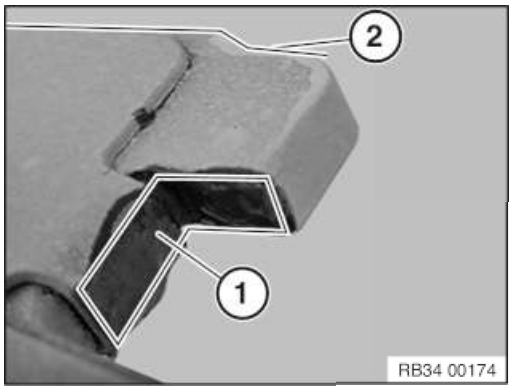


So as not to damage the surface coating, <u>if possible do not mechanically clean</u> the guide surfaces (1 and 2) for the brake pads on the brake calliper mounting bracket. Clean guide surfaces (1 and 2) with brake cleaner and apply a thin coating of brake pad paste.

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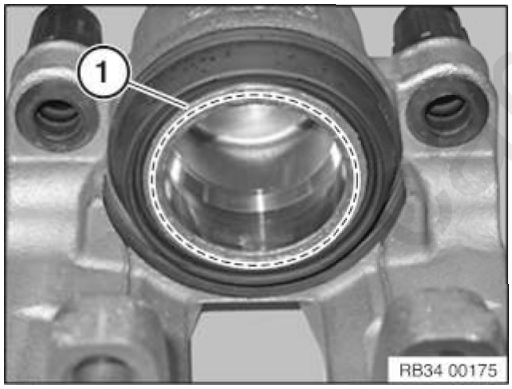


Apply a thin coating of brake pad paste to T-head of inner brake pad in area (1) and (2).

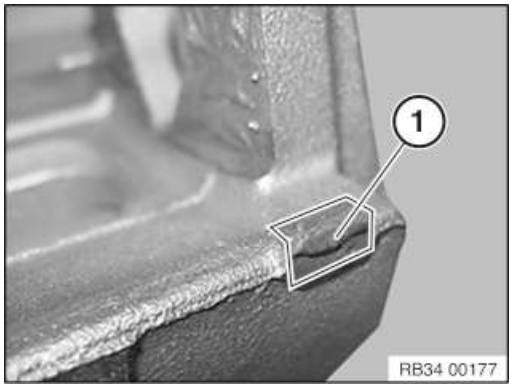


Apply a thin coating of brake pad paste to T-head of outer brake pad in area (1) and (2).

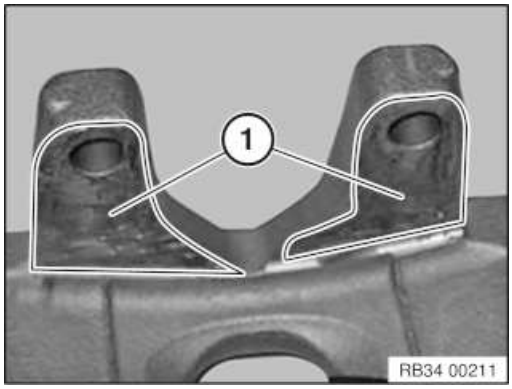
FN brake (made by Continental Teves), 1-piston floating caliper brake (model ranges: 5-Series, 6-Series, 7-Series, 8-Series, X1, X3, X5, Z4, Rolls-Royce)



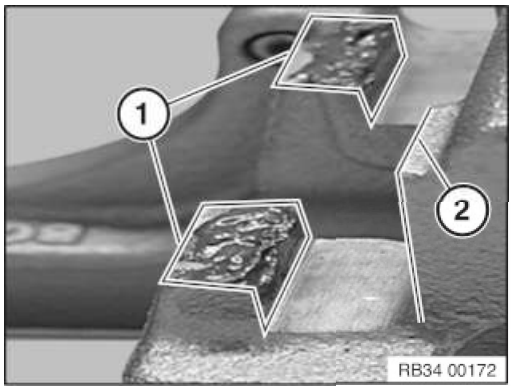
Clean contact surface (1) of brake piston with brake cleaner and apply a thin coating of brake pad paste.



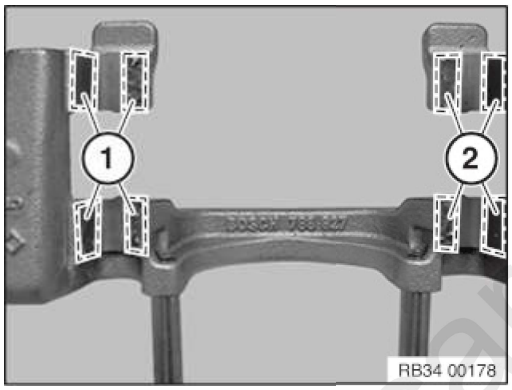
Clean contact surfaces (1) of T-heads/brake calliper housing with brake cleaner and apply a thin coating of brake pad paste.



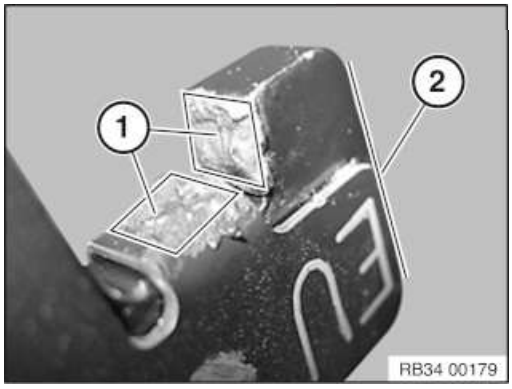
Clean contact surface (1) of brake caliper with brake cleaner and apply a thin coating of brake pad paste.



So as not to damage the surface coating, if possible do not mechanically clean the guide surfaces (1) for the brake pads on the brake caliper mounting bracket. Clean guide surfaces (1) with brake cleaner and apply a thin coating of brake pad paste.

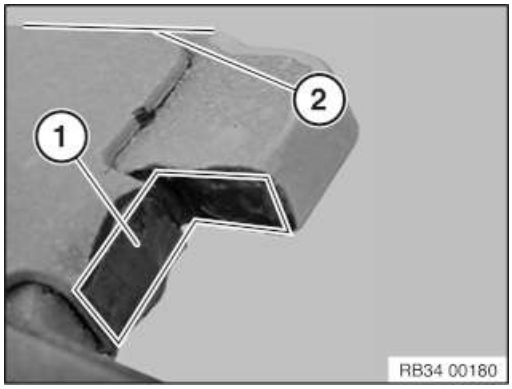


So as not to damage the surface coating, if possible do not mechanically clean the guide surfaces (1 and 2) for the brake pads on the brake calliper mounting bracket. Clean guide surfaces (1 and 2) with brake cleaner and apply a thin coating of brake pad paste.



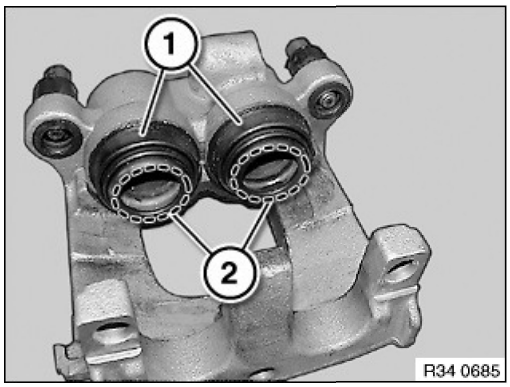
Lightly coat the T-head of the inner brake pad with brake pad paste in area (1 and 2).

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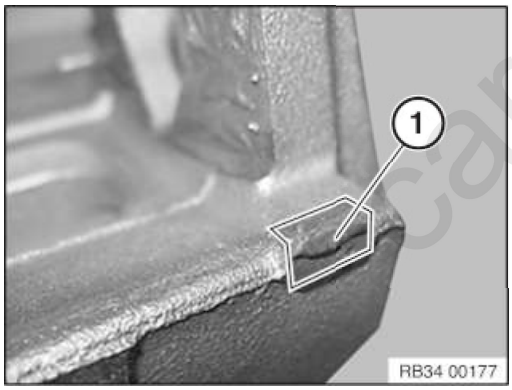


Lightly coat the T-head of the outer brake pad with brake pad paste in area (1 and 2).

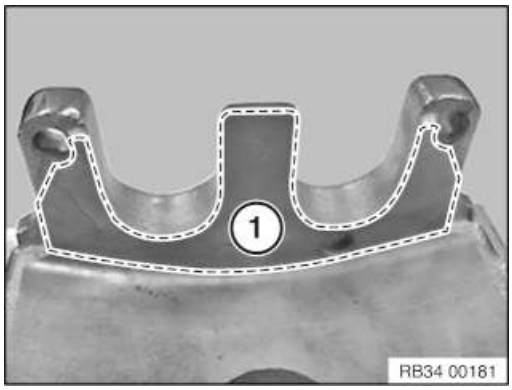
FN brake (made by Continental Teves), 2-piston floating caliper brake (model ranges: 5-Series, 6-Series, 7-Series, 8-Series, X5, Rolls-Royce)



Clean contact surface (2) of brake piston with brake cleaner and apply a thin coating of brake pad paste.

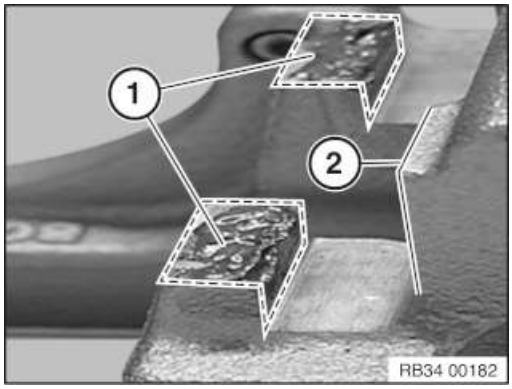


Clean contact surfaces (1) of T-heads/brake calliper housing with brake cleaner and apply a thin coating of brake pad paste.

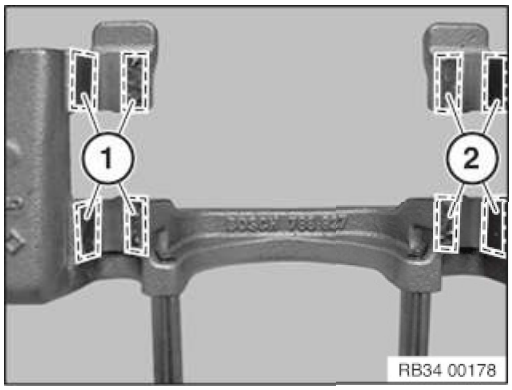


Clean contact surface (1) and brake caliper with brake cleaner and apply a thin coating of brake pad paste.

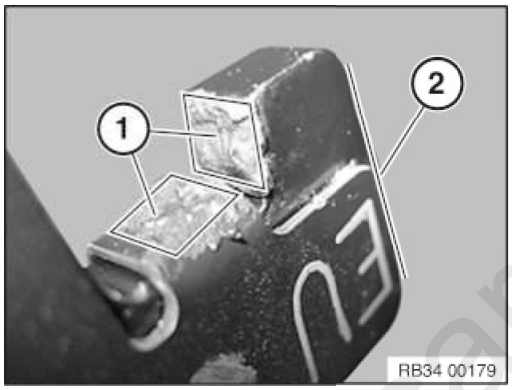
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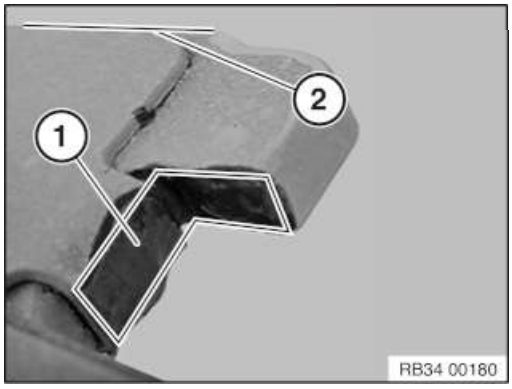
So as not to damage the surface coating, if possible do not mechanically clean the guide surfaces (1 and 2) for the brake pads on the brake calliper mounting bracket. Clean guide surfaces (1 and 2) with brake cleaner and apply a thin coating of brake pad paste.



So as not to damage the surface coating, if possible do not mechanically clean the guide surfaces (1 and 2) for the brake pads on the brake calliper mounting bracket. Clean guide surfaces (1 and 2) with brake cleaner and apply a thin coating of brake pad paste.



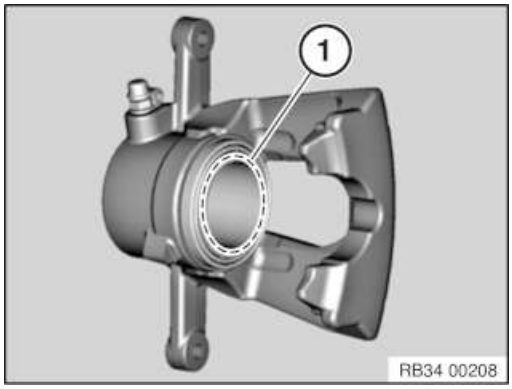
Lightly coat the T-head of the inner brake pad with brake pad paste in area (1 and 2).



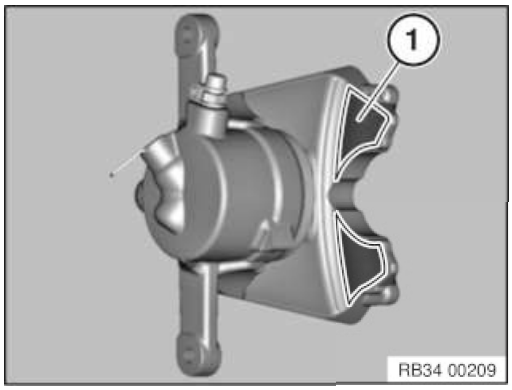
Lightly coat the T-head of the outer brake pad with brake pad paste in area (1 and 2).

Collette brake (made by TRW), 1-piston brake caliper (model ranges: MINI, 1-Series, 5-Series, 6-Series, Z4)

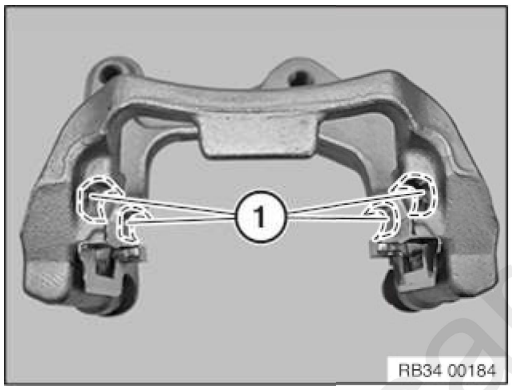
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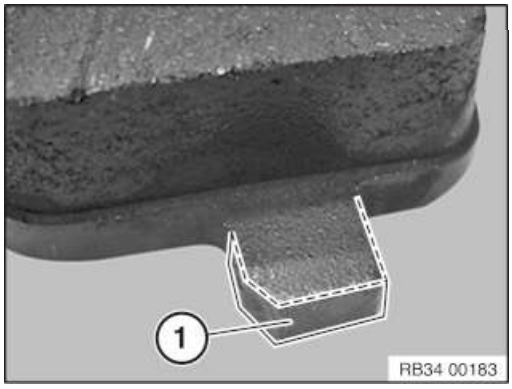
Clean contact surface (1) of brake piston with brake cleaner and apply a thin coating of brake pad paste.



Clean contact surface (1) of brake caliper with brake cleaner and apply a thin coating of brake pad paste.



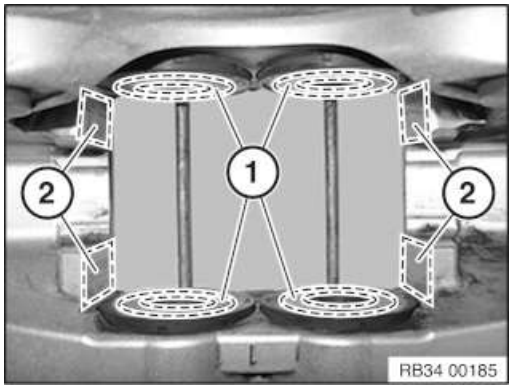
So as not to damage the surface coating, if possible do not mechanically clean the guide surface (1) for the brake pads on the brake caliper mounting bracket. Clean guide surface (1) with brake cleaner and apply a thin coating of brake pad paste.



Apply a thin coating of brake pad paste to both sides of T-head of brake pad in area (1).

P 4.40 brake (made by Brembo), 4-piston fixed caliper brake (model ranges: MINI, 1-Series, 3-Series, 4-Series, 5-Series, 6-Series, 7-Series, 8-Series, X5, Rolls-Royce)

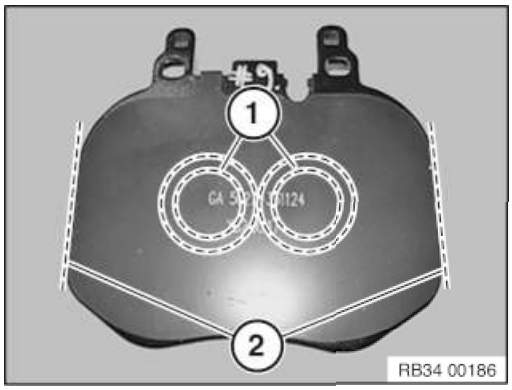
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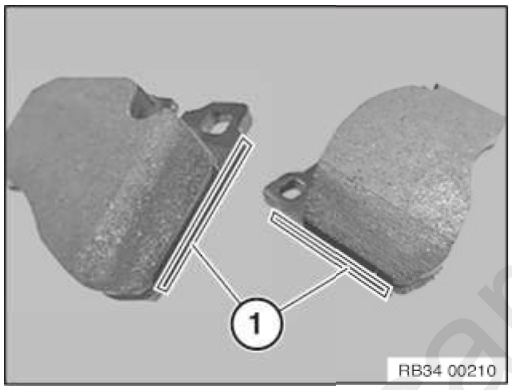
Clean contact surface (1) of brake piston with brake cleaner and apply a thin coating of brake pad paste.

So as not to damage the surface coating, if possible do not mechanically clean the guide surfaces (2) for the brake pads on the brake calliper mounting bracket. Clean guide surface (2) with brake cleaner and apply a thin coating of brake pad paste.

Clean both inner and outer guide surfaces (2) and apply a thin coating of brake pad paste.

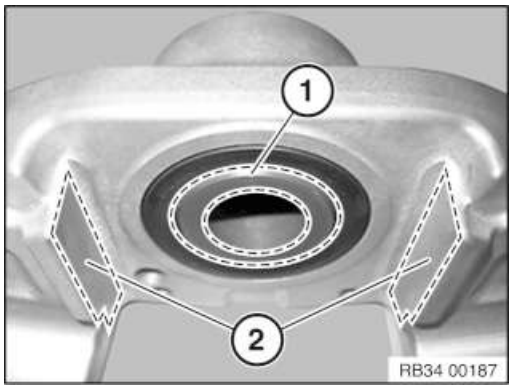


Lightly coat both sides of the contact surface in area (1 and 2) with brake pad paste.



Lightly coat the brake pad contact surface on both sides in area (1) with brake pad paste.

P 4.40 brake (made by Brembo), 2-piston fixed caliper brake (model ranges: 1 Series, 2 Series, 3 Series; does not apply to M2 F87)

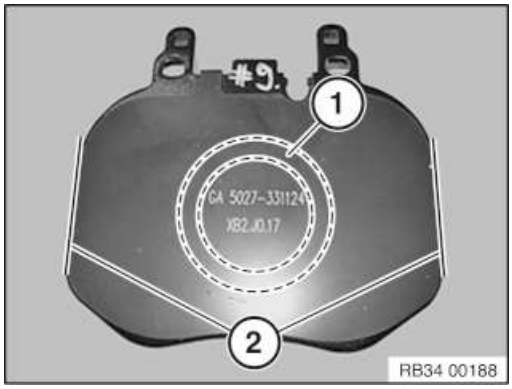


Clean contact surface (1) of brake piston with brake cleaner and apply a thin coating of brake pad paste.

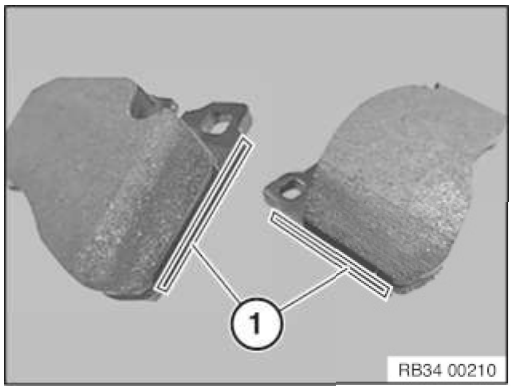
So as not to damage the surface coating, if possible do not mechanically clean the guide surfaces (2) for the brake pads on the brake calliper mounting bracket. Clean guide surface (2) with brake cleaner and apply a thin coating of brake pad paste.

Clean both inner and outer guide surfaces (2) and apply a thin coating of brake pad paste.

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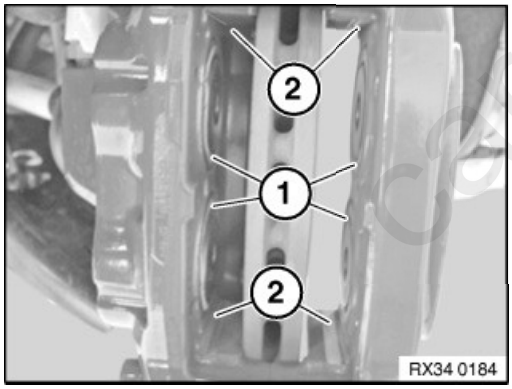


Lightly coat both sides of the contact surface in area (1 and 2) with brake pad paste.



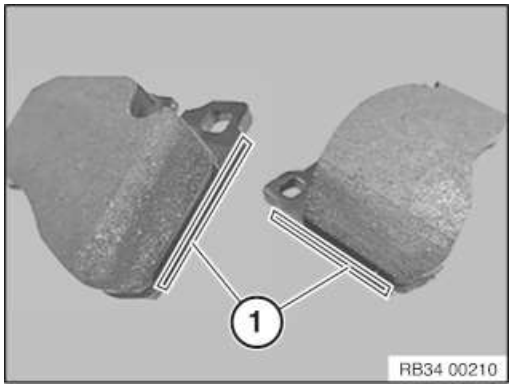
Lightly coat the brake pad contact surface on both sides in area (1) with brake pad paste.

Brake (made by Brembo), 4-piston fixed caliper brake (model ranges: MINI F5x sport brake)



Check dust boot (1) for damage and replace if necessary.

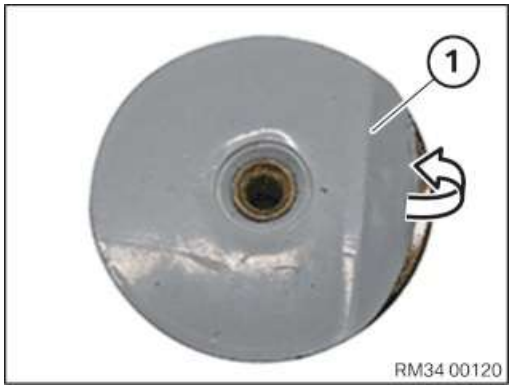
Clean brake caliper compartments (2) and apply a thin coating of brake pad paste.



Lightly coat the brake pad contact surface on both sides in area (1) with brake pad paste.

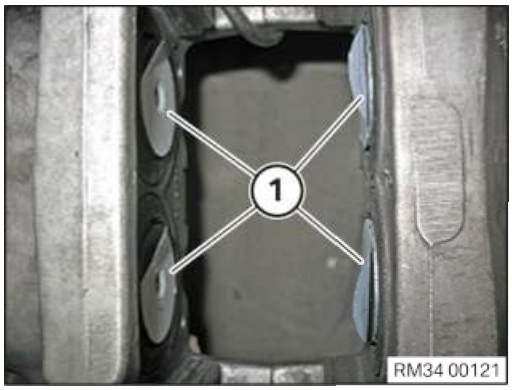
Do not grease the brake lining backplate and thoroughly clean it with brake cleaner!

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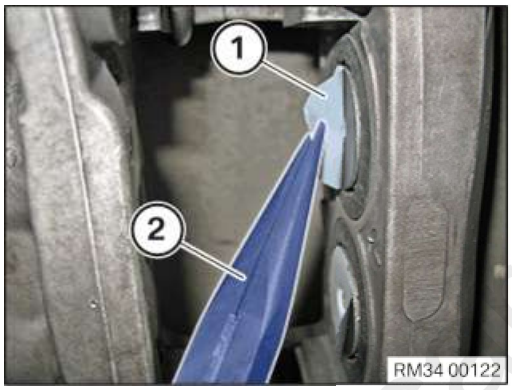


Only use new claw plates!

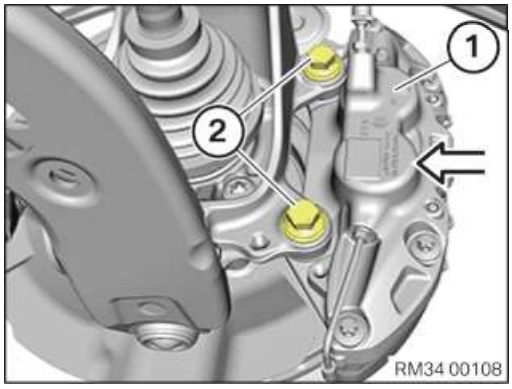
Slightly raise the protective film (1) at a place.



Insert the claw plates (1) into the brake pistons.



Pull off the protective film (1) with long-nose pliers (2).**Attention!**
The bonding surface of the claw plates must not be touched!

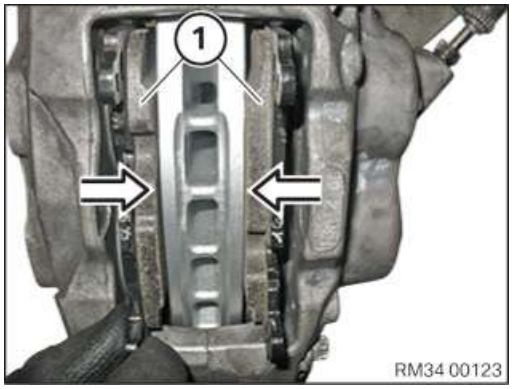


Install the brake caliper (1) in direction of arrow.

Parts: Replace screws (2).

Insert screws (2) and tighten.

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Install the brake pad (1).**Attention!**

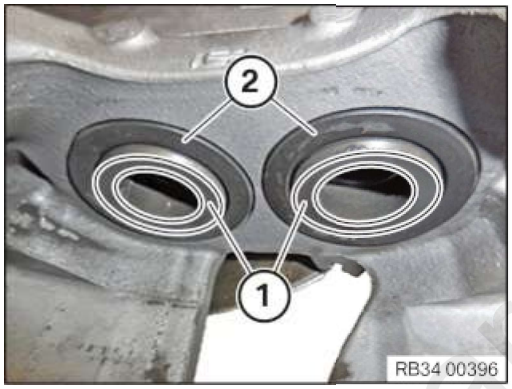
The brake pads must not touch the bonding surface of the claw plates when inserting!

Apply the brake pads to the brake disc and insert.

In order to ensure a complete bonding of the claw plates with the brake pads, the following instruction must be strictly adhered to:

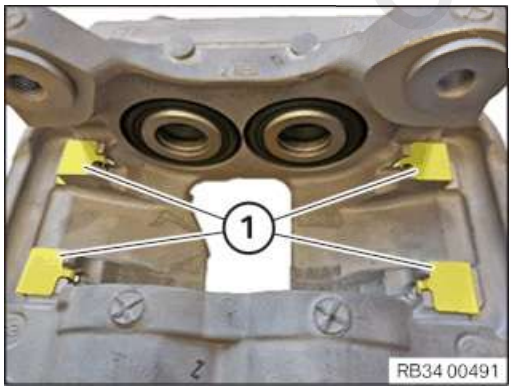
Strongly press the brake pedal and hold it for at least 1 min!

Brake (made by Continental), 4-piston fixed caliper brake (model ranges: 7-Series (G11, G12)



Clean the contact surface (1) of the brake piston (4 pieces) with brake cleaner.

Check the dust boots (2) and renew as necessary.

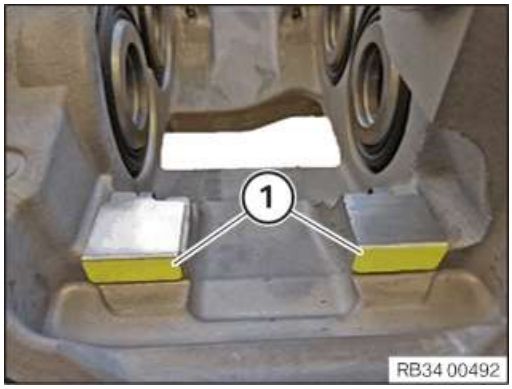


Always renew retaining plates 1!

Mount retaining plate 1.

It is paramount that the slide panels are correctly positioned in the guides!

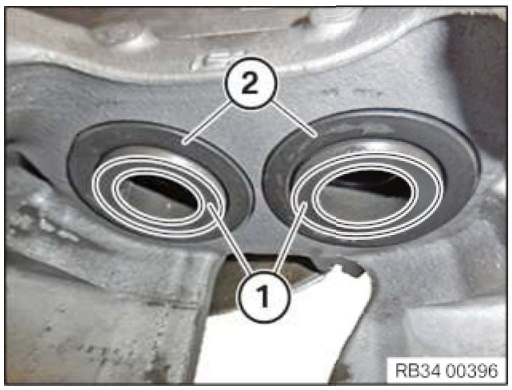
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So as not to damage the surface coating, if possible do not mechanically clean the guide surfaces for the brake pads on the brake caliper mounting bracket.

Apply a thin layer of brake pad paste to the surfaces of the sliding plates (1).

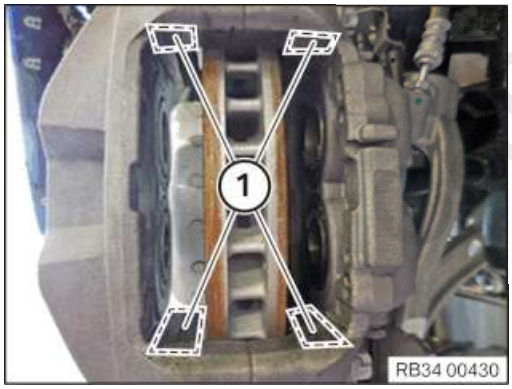
Brake (made by Brembo), 4-piston fixed caliper brake (model ranges: 7-Series (G11, G12)



Clean the contact surface (1) of the brake piston (4 pieces) with brake cleaner.

Adhesive residues must be completely removed.

Check the dust boots (2) and renew as necessary.



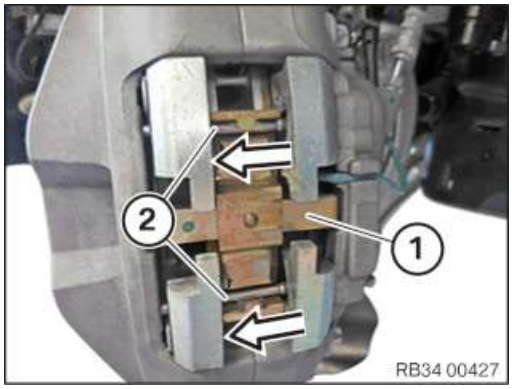
To prevent damage to the surface coating, do not clean the guide surfaces (1) for the brake pads on the brake calliper mechanically, if possible.

Clean guide surfaces (1) with brake cleaner and apply a thin coating of brake pad paste.



Remove the protective film of the adhesive layer (1) from the brake pads.

Do not touch the adhesive layer!



Insert brake pads in the brake caliper, making sure the adhesive layer does not touch the brake pistons.

Fit retaining clip (1).

Drive in the locking pins (2) in the direction of the arrow.

Attention!

After the brake pads have been installed they must immediately be bonded to the brake pistons:

- Step on the brake pedal to the floor and hold the pressure for one minute. This causes the brake pads to adhere to the brake pistons.

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34 00 ... Manual determination for the extrapolation of the total braking force and minimum brake force shares for front and rear axle.

To the extent that the test stand computer does not provide an automatic calculation of the braking forces, the necessary evaluation values can also be determined manually.

Premisses:

- Statutory minimum total braking force throughout the EU: z = > 58 %
- additionally in Germany: Minimum share of VA and HA brake force according to manufacturer specifications

Input values:

1. Permitted total weight according to registration certificate part 1 column F1
2. maximum brake pedal force for minimum brake force 58% according to manufacturer specification
3. Input of the brake pedal force range for test application
4. x % minimum front axle brake force share of the total brake force according to type or series specific manufacturer specifications.
5. x % minimum rear axle brake force share of the total brake force according to type or series specific manufacturer specifications.

Manufacturer specific specifications for brake effect test as part of periodic vehicle inspections

Baureihe	Basismodel	Bemerkung	zulässiges Gesamtgewicht [kg]	max. Pedalkraft zur Erreichung einer Verzögerung von 58 % in [N]	minimaler Vorderachs-bremskraftanteil in [%]	minimaler Hinterachs-bremskraftanteil in [%]
E70/71/72	3.0i	X5	2680	240	53,3	19,4
E83	2.0i	X3	2200	200	52,3	19,8
E81	116i	3-türer	1780	170	51,8	21,2
E82	120d	Coupe	1820	170	51,3	21,6
E87	116i	5-türer	1745	170	51,8	21,2
E88	118i	Cabrio	1885	170	50,4	21,2
E90	316i	Limousine	1860	170	51,0	19,6
E91	316i	Touring	1960	170	48,8	19,6
E92	316i	Coupe	1800	170	51,9	19,6
E93	320i	Cabrio	2055	200	52,7	19,6
F01/04	730i	Limousine	2505	240	53,1	20,4
F02	730Li	Limousine lang	2515	240	53,1	20,4
F07	530dA	GT	2590	240	53,0	20,4
F10	523i	Limousine	2235	200	52,2	18,7
F11	523iT	Touring	2365	200	52,2	18,7
F12	635dA EU5	Cabrio	2080	200	55,9	18,6
F13	635dA EU5	Coupe	1920	170	55,9	18,6
R55	Mini One	Clubman	1680	170	60,8	13,8
R56	Mini One	2-türer	1550	170	60,8	14,9
R57	Mini One	Cabrio	1630	170	60,8	14,9
R60	Cooper D	Countryman	1575	170	54,8	19,3
E89	Z4 2.0i	Roadster	1750	170	51,7	21,3
E84	sDrive 1.8i	X1	2010	200	50,5	22,1
F25	sDrive 2.3i	X3	2275	200	51,3	21,6
RR01	xxx	Phantom	3200	240	51,6	21,4
RR04	xxx	Ghost	2940	240	50,9	21,9

Formulas

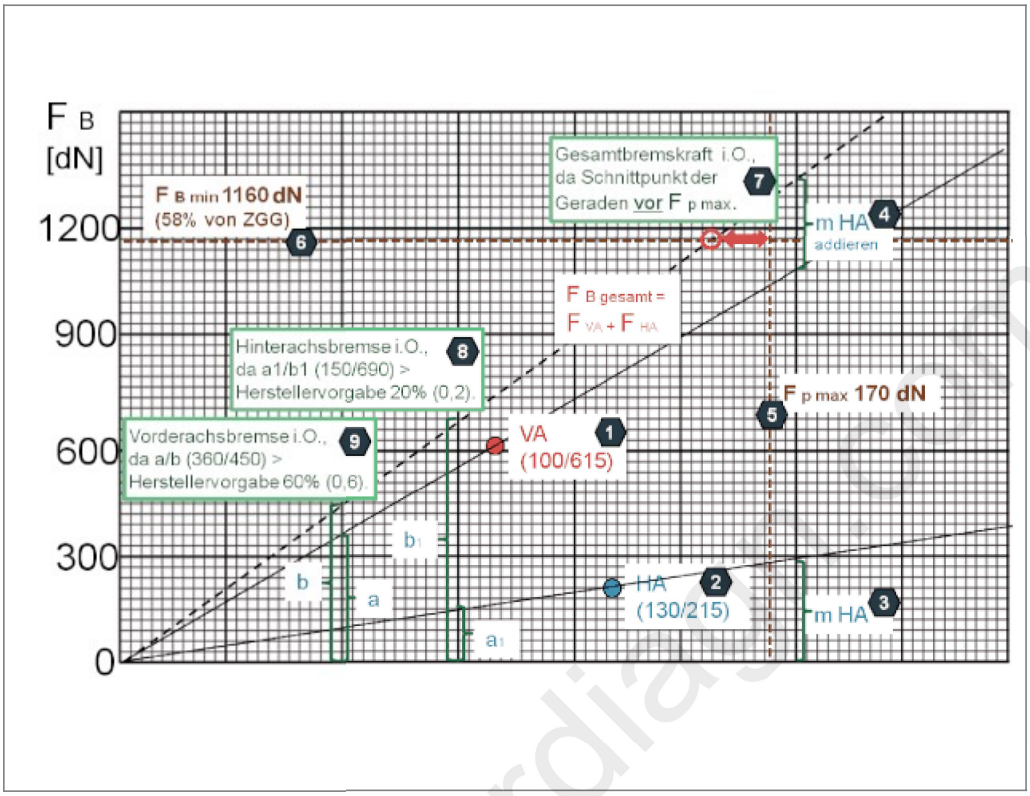
Total brake force	F total	= F VA + F HA
Rise VA	mVA	= F VA / Fp VA
Rise HA	mHA	= F HA / Fp HA
Total rise	m total	= m VA +m HA
Minimum share VA%	VA min	= VA / m total
Minimum share HA%	HA min	= HA / m total
Minimum brake force	F B min	â‰¥ ZGG x 0.58
Brake force with F p max	F total nominal	= m total x Fp max

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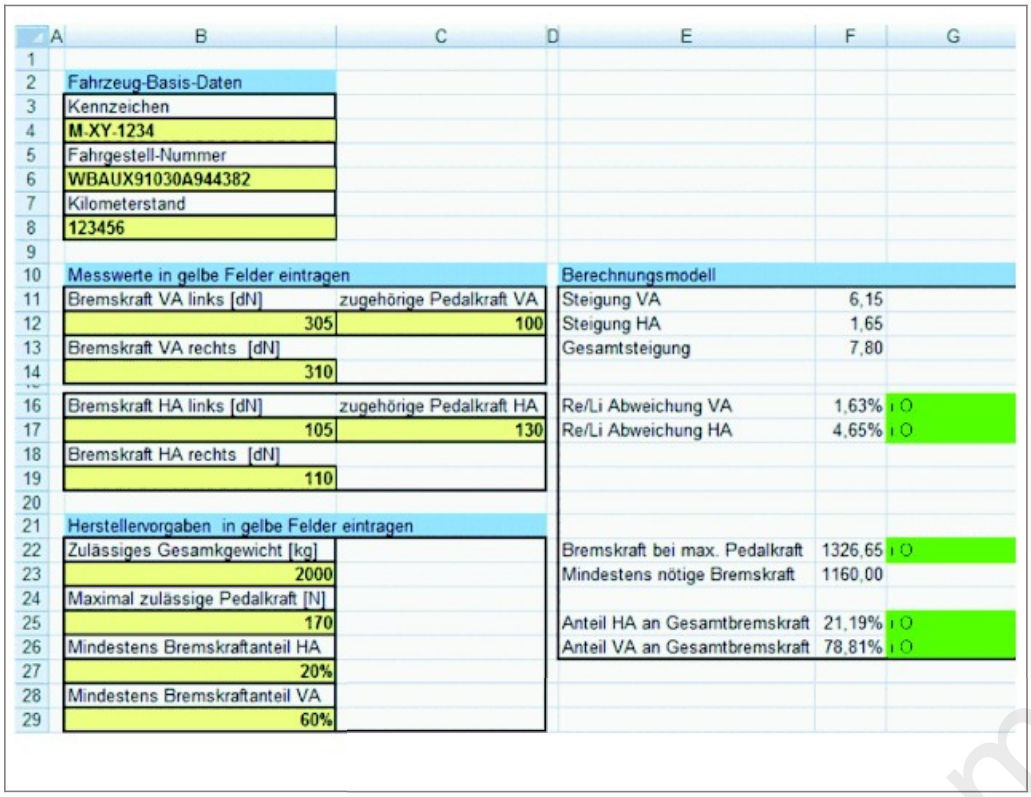
Definitions

FB VA	=Total of brake forces of the left and right front wheel
FB HA	=Total of brake forces of the left and right rear wheel
Fp VA	= Brake pedal force at the time of brake force measurement on VA
Fp HA	= Brake pedal force at the time of brake force measurement on HA
zGG	= Approved total weight of the vehicle
Fp max	= Maximum permitted brake pedal force according to manufacturer specifications

Practical implementation with millimetre paper and computer.

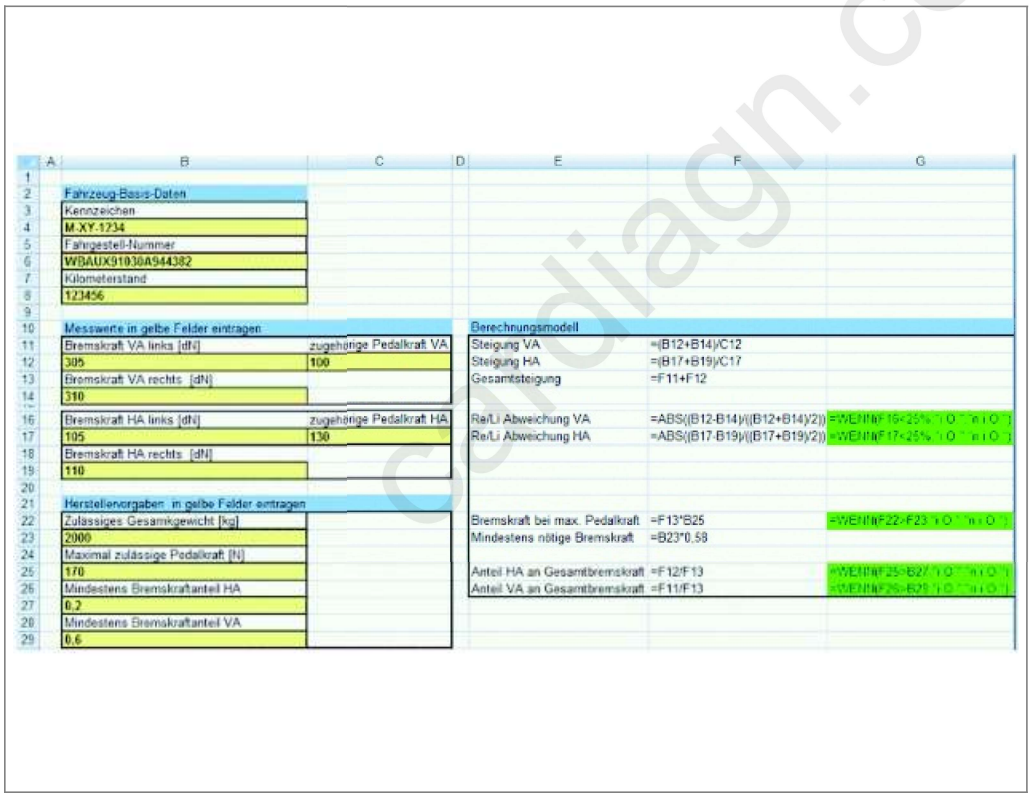


Practical implementation in an Excel table calculation.



Fahrzeug-Basis-Daten					
Kennzeichen					
M-XY-1234					
Fahrgestell-Nummer					
WBAUX91030A944382					
Kilometerstand					
123456					
Messwerte in gelbe Felder eintragen			Berechnungsmodell		
Bremskraft VA links [dN]	zugehörige Pedalkraft VA		Steigung VA	6,15	
305	100		Steigung HA	1,65	
Bremskraft VA rechts [dN]			Gesamtsteigung	7,80	
310					
Bremskraft HA links [dN]	zugehörige Pedalkraft HA		Re/Li Abweichung VA	1,63%	i O
105	130		Re/Li Abweichung HA	4,65%	i O
Bremskraft HA rechts [dN]					
110					
Herstellervorgaben in gelbe Felder eintragen					
Zulässiges Gesamkgewicht [kg]			Bremskraft bei max. Pedalkraft	1326,65	i O
2000			Mindestens nötige Bremskraft	1160,00	
Maximal zulässige Pedalkraft [N]					
170			Anteil HA an Gesamtbremskraft	21,19%	i O
Mindestens Bremskraftanteil HA			Anteil VA an Gesamtbremskraft	78,81%	i O
20%					
Mindestens Bremskraftanteil VA					
60%					

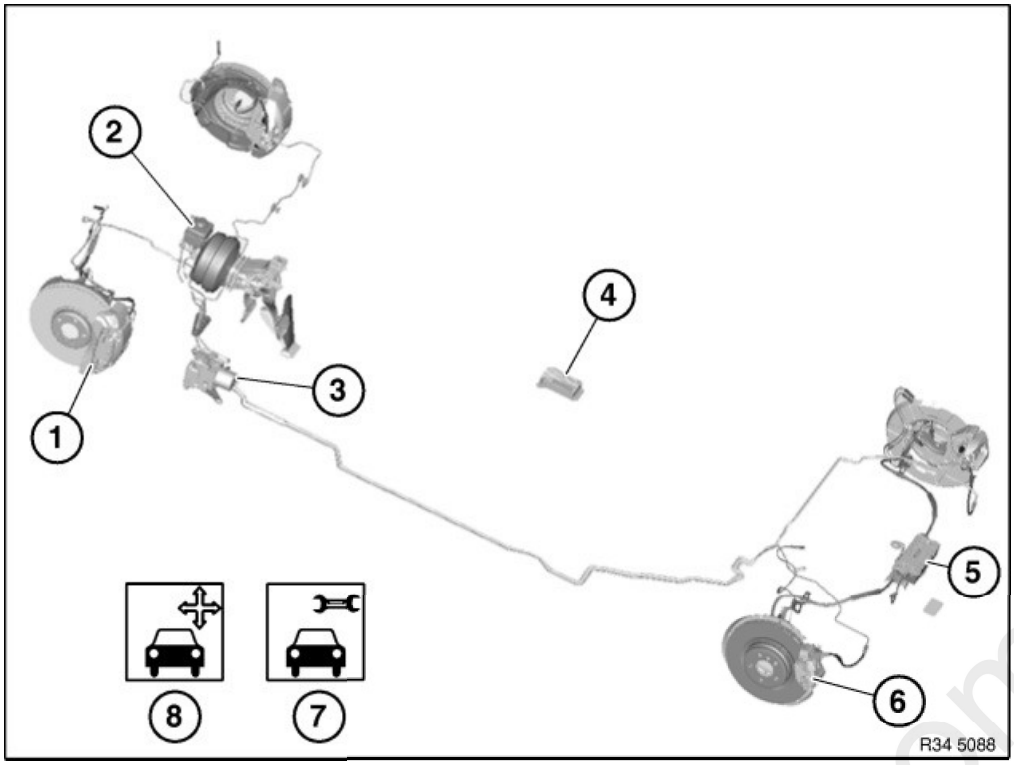
Practical implementation in an Excel table calculation including display of the stored calculation formulas.



Fahrzeug-Basis-Daten					
Kennzeichen					
M-XY-1234					
Fahrgestell-Nummer					
WBAUX91030A944382					
Kilometerstand					
123456					
Messwerte in gelbe Felder eintragen			Berechnungsmodell		
Bremskraft VA links [dN]	zugehörige Pedalkraft VA		Steigung VA	=(B12+B14)/C12	
305	100		Steigung HA	=(B17+B19)/C17	
Bremskraft VA rechts [dN]			Gesamtsteigung	=F11+F12	
310					
Bremskraft HA links [dN]	zugehörige Pedalkraft HA		Re/Li Abweichung VA	=ABS((B12-B14)/((B12+B14)/2))	=WENN(F16<25%;"i O";"n i O")
105	130		Re/Li Abweichung HA	=ABS((B17-B19)/((B17+B19)/2))	=WENN(F17<25%;"i O";"n i O")
Bremskraft HA rechts [dN]					
110					
Herstellervorgaben in gelbe Felder eintragen					
Zulässiges Gesamkgewicht [kg]			Bremskraft bei max. Pedalkraft	=F13*B25	=WENN(F22>F23;"i O";"n i O")
2000			Mindestens nötige Bremskraft	=B23*0,58	
Maximal zulässige Pedalkraft [N]					
170			Anteil HA an Gesamtbremskraft	=F12/F13	=WENN(F25>B27;"i O";"n i O")
Mindestens Bremskraftanteil HA			Anteil VA an Gesamtbremskraft	=F11/F13	=WENN(F26>B28;"i O";"n i O")
0,2					
Mindestens Bremskraftanteil VA					
0,6					

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34 00 ... Overview of brakes



0 General Information

1 Front brake	2 Brake master cylinder / brake booster
3 Hydraulic unit	4 Electrical components
5 Parking brake	6 Brake, rear
7 Adjustment work	8 Testing

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34 00 012 Parking brake function check



Important!

Follow instructions for Brake testing on test stand.



Note:

If deviations are identified during the following check, the parking brake must be adjusted:

Drive vehicle onto brake test stand

Warm up brakes.

Check parking brake.

0th tooth (handbrake released):	Vehicles with manual transmission: Shift lever in neutral position. Vehicles with automatic transmission: Selector lever in selector lever position "N". • Without locking differential ≤150 N. • With locking differential ≤ 200 N (possibly odd display).
1st tooth:	No increase in braking force with regard to 0th tooth. Indicator lamp can be lit.
2nd tooth:	Indicator lamp must be lit.
3rd tooth:	Increase in braking force.
5th tooth:	The brake force display must have reached ≥ 400 N.

<u>Checking brake force differential at wheel:</u>

Apply parking brake until a wheel circumferential force (measured on brake test stand) of min. 1000 N is reached.

Max. permitted brake force differential right/left ≤50 % (referred to greater brake value).

Braking with locked wheels must be possible with the parking brake.

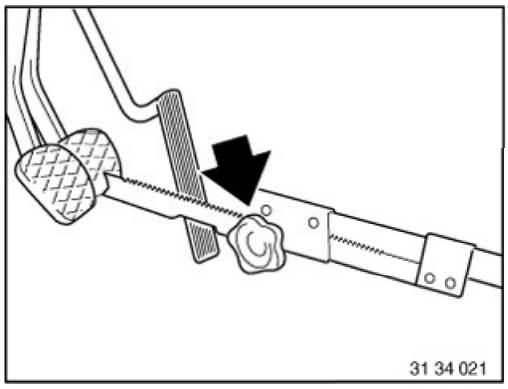
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34 00 xxx Removing and installing/replacing vent valve for brake caliper

Necessary preliminary work:

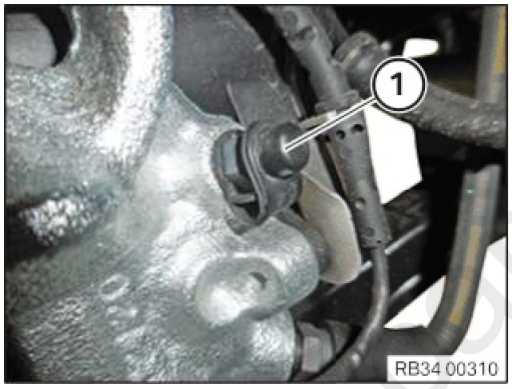
- Raise vehicle.

Removal:

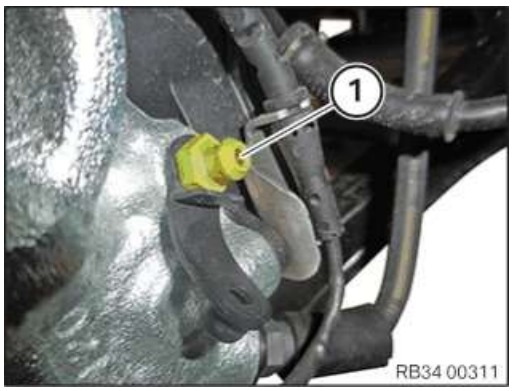


Press brake pedal down to floor and secure with pedal support.*Note:*
The pedal support may only be released when the brake lines are reconnected.

This prevents brake fluid from emerging from the expansion tank and air from entering the system when the brake lines are opened.



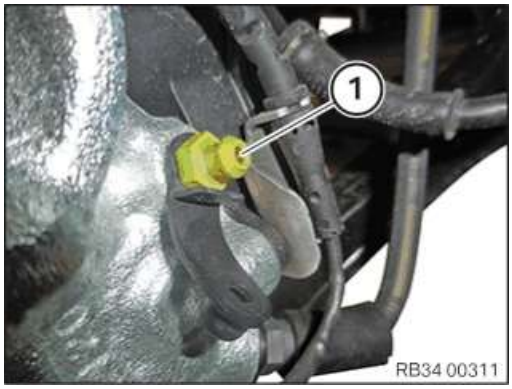
Remove the dust cap (1).



Remove vent valve (1).**Attention!**
Collect escaping brake fluid in a suitable collecting vessel.

Installation:

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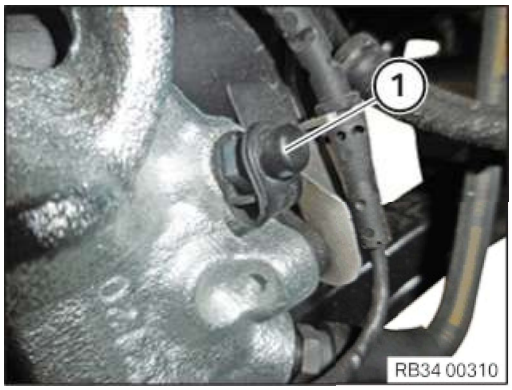


Attention!

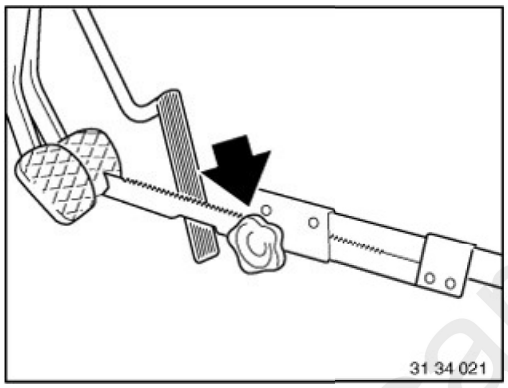
The bore hole must be free of contamination!

Install vent valve (1).

Tightening torque: 34 00 1AZ.



Mount the dust cap (1).



Remove pedal support.

Required reworking:

- Bleed brake system.

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34 00 027 Replacing fluid in brake system

Note:
Read and comply with General Information.

The capacities are oil change quantities. For this purpose, refer to the Electronic Parts Catalogue/Commercial Service Data (capacities)

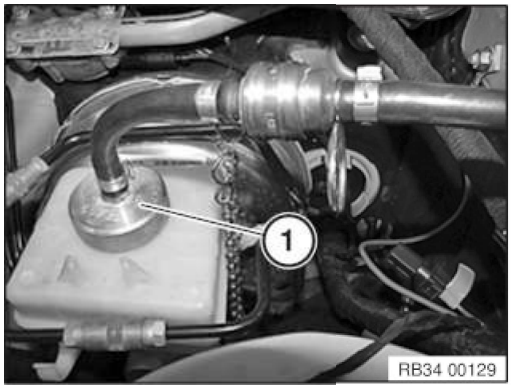
Necessary preliminary work:

- Remove the left engine compartment cover.

Important!

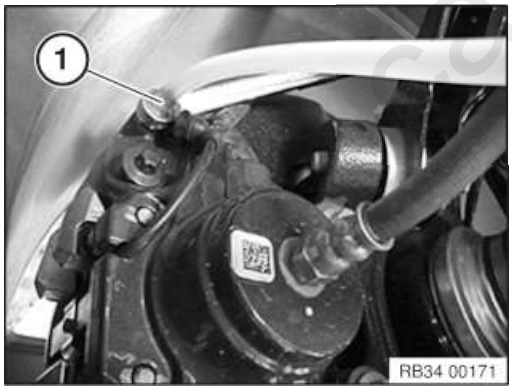
When carrying out repairs to the brake system, follow the procedure set out in Bleeding brake system with DSC.

Use only BMW-approved brake fluids, see BMW operating fluids.



Connect bleeder unit to expansion tank (1) and switch on.*Note:*
Follow the applicable machine manufacturer's operating instructions.

Charging pressure should not exceed 2 bar.



Completely bleed the brake system.

Connect vent hose (1) with collecting vessel to vent valve on rear right brake caliper.

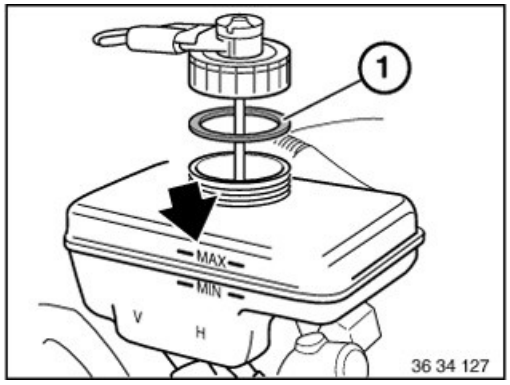
Open bleeder valve and purge until clear, bubble-free brake fluid emerges.

Close vent valve.

Follow same procedure on rear left, front right and front left wheel brake.

Note:
Additionally flush the clutch slave cylinder in vehicles with manual gearbox.

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Switch off bleeder unit and remove from expansion tank.

Check brake fluid level. If necessary, top up/draw off to "Maximum" level.

Close expansion tank.

Note:
Pay attention to seal (1) in sealing cap.

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34 00 027 Replacing fluid in brake system (M sport brake)

Note:
Read and comply with General Information.

The capacities are oil change quantities. See Electronics Parts Catalogue/Commercial Service Data (ETK/KSD) (capacities)

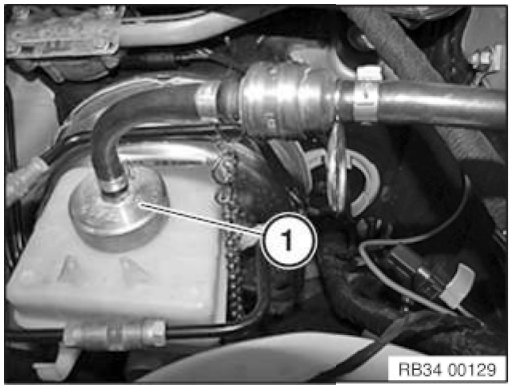
Necessary preliminary work:

- Remove the left engine compartment cover.

Important!

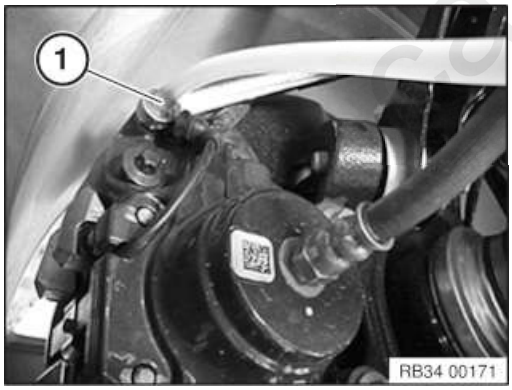
When carrying out repairs to the brake system, follow the procedure set out in Bleeding brake system with DSC.

Use only BMW-approved brake fluids, see BMW operating fluids.



Connect bleeder unit to expansion tank (1) and switch on.*Note:*
Follow the applicable machine manufacturer's operating instructions.

Charging pressure should not exceed 2 bar.



Completely flush brake system, rear.

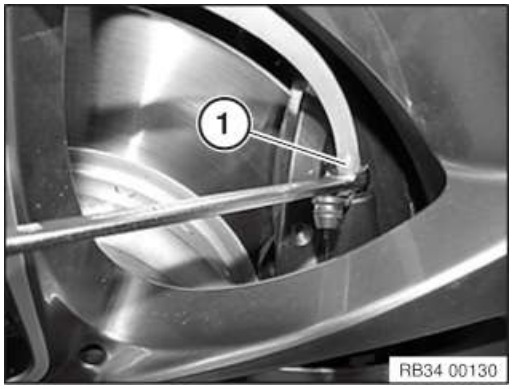
Connect tank ventilation line (1) with collecting vessel to vent valve on **rear right** brake caliper.

Open bleeder valve and purge until clear, bubble-free brake fluid emerges.

Close vent valve.

Carry out the same procedure on the **rear left** wheel brake.

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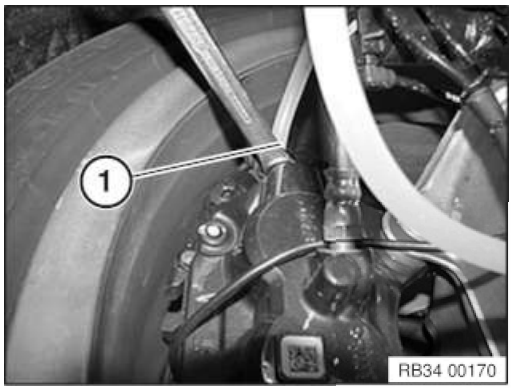


Completely flush brake system, front right outer.

Connect tank ventilation line (1) with collecting vessel to vent valve on front right outer brake caliper.

Open bleeder valve and purge until clear, bubble-free brake fluid emerges.

Close vent valve.



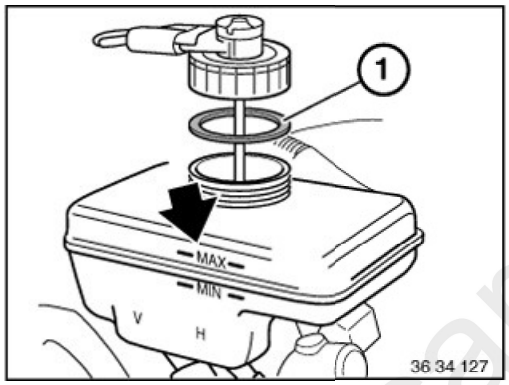
Completely flush brake system, front right inner.

Connect tank ventilation line (1) with collecting vessel to vent valve on front right inner brake caliper.

Open bleeder valve and purge until clear, bubble-free brake fluid emerges.

Close vent valve.

Carry out the same procedure on the front left wheel brake.



Switch off bleeder unit and remove from expansion tank.

Check brake fluid level. If necessary, top up/draw off to "MAX" level.

Close expansion tank.

Note:
Pay attention to seal (1) in sealing cap.

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00 Safety information for working on vehicles with automatic engine start-stop function (MSA)



Warning!

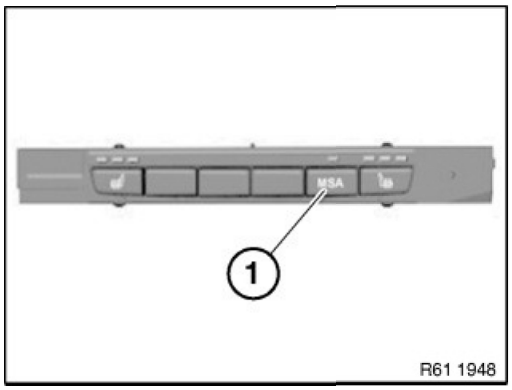
If the engine hood/bonnet contact is pulled upwards (workshop mode), the information "switch closed" is output. The automatic engine start-stop function is active.

An automatic engine start is possible.

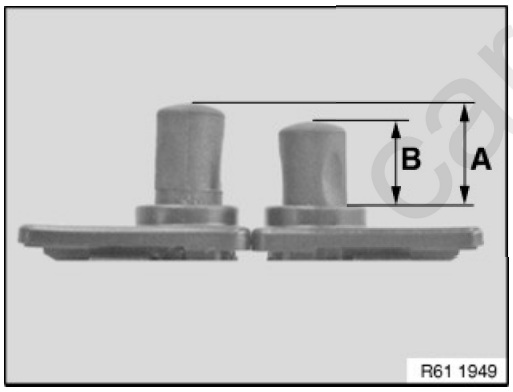
Observe safety precautions when working on MSA vehicles.

Before carrying out practical work on the engine, always ensure that the MSA functionality is deactivated so as to prevent automatic engine starting while work is being carried out in the engine compartment.

MSA function is deactivated by:



- Deactivate MSA by means of button (1) in passenger compartment
- Open seat belt buckle and driver's door



- Open engine bonnet/hood and ensure that engine hood/bonnet contact is not in workshop mode
  - Workshop mode

    A = 10 mm
  - Basic setting (engine hood/bonnet open)

    B = 7 mm

To make sure that the engine hood/bonnet contact is at the basic setting, if necessary press the hood/bonnet contact up to the limit position before starting work and slowly release.



When working with diagnosis tools:

- Observe instructions in diagnosis tool

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Note:
For further information on automatic engine start-stop function (MSA):

- Refer to the Service Information (bulletin) (for manual transmissions) Service Information (bulletin) 61 01 07 335
- Refer to the Service Information (bulletin) (for automatic transmissions or twin-clutch gearboxes) Service Information (bulletin) 61 01 10 629

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34 00 ... Table for the manufacturer type and/or series specific specified value for the service brake effect test for the official vehicle inspection

The following tables contain the values that are required for the calculation.

- Maximum brake pedal force for the statutory minimum braking force of 58 % in relation to the approved total vehicle weight.
- The percentages of minimum brake force shares for the front axle brake.
- The percentages of minimum brake force shares for the rear axle brake.

The specified value "Prüfbereich_Pedalkraft" for all vehicles: 50 – 150 N.

Vehicle specific value of the approved total weight for the evaluation of the statutory minimum brake force of 58 % on the vehicle to be tested. This value is included in the registration certificate, part 1 under column F1 and/or F2.

This only indicates the values for the basic models of the corresponding series, which means that the brake pedal forces that are listed for the minimum total brake force and percentage of minimum front and rear axle brake shares also apply to other types of this model and/or development series.

Baureihe	Basismodel	Bemerkung	zulässiges Gesamtgewicht [kg]	max. Pedalkraft zur Erreichung einer Verzögerung von 58 % in [N]	minimaler Vorderachs-bremskraftanteil in [%]	minimaler Hinterachs-bremskraftanteil in [%]
E31	840Ci	Coupe	2240	200	57,9	17,4
E32	730i	Limousine	2185	200	58,2	17,2
E34	518i	Limousine	1840	170	58,2	17,2
E34	518i	Touring	2015	200	55,7	18,7
E36/2	316i	Coupe	1735	170	57,0	17,9
E36/3	316i	Touring	1820	170	54,4	19,6
E36/4	316i	Limousine	1735	170	57,0	17,9
E36/5	316i	Compact	1680	170	60,4	16,0
E36/C	318i	Cabrio	1810	170	54,4	19,6
Z3	1.8i	Roadster	1490	170	57,6	17,6
E38	728i	Limousine	2300	200	57,2	17,2
E39	520i	Limousine	2010	200	57,2	17,0
E39/2	520i	Touring	2225	200	56,3	18,4
E39	M5	Limousine	2490	200	54,7	19,3
E46/2	316Ci	Coupe	1820	170	51,8	21,0
E46/3	316iT	Touring	1920	170	52,2	19,4
E46/4	316i	Limousine	1820	170	51,8	19,4
E46/5	316ti	Compact	1820	170	51,8	21,0
E46	M3	Coupe	2000	200	50,8	20,1
E53	3.0i	X5	2620	240	55,8	17,6
E60	520i	Limousine	2000	200	51,6	19,5
E61	520iT	Touring	2160	200	51,6	19,5
E63	630Ci	Coupe	1960	170	52,9	19,5
E64	630i	Cabrio	2120	200	54,5	19,5
E65	730i	Limousine	2505	240	51,6	20,5

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Baureihe	Basismodel	Bemerkung	zulässiges Gesamtgewicht [kg]	max. Pedalkraft zur Erreichung einer Verzögerung von 58 % in [N]	minimaler Vorderachs-bremskraftanteil in [%]	minimaler Hinterachs-bremskraftanteil in [%]
E70/71/72	3.0i	X5	2680	240	53,3	19,4
E83	2.0i	X3	2200	200	52,3	19,8
E81	116i	3-türer	1780	170	51,8	21,2
E82	120d	Coupe	1820	170	51,3	21,6
E87	116i	5-türer	1745	170	51,8	21,2
E88	118i	Cabrio	1885	170	50,4	21,2
E90	316i	Limousine	1860	170	51,0	19,6
E91	316i	Touring	1960	170	48,8	19,6
E92	316i	Coupe	1800	170	51,9	19,6
E93	320i	Cabrio	2055	200	52,7	19,6
F01/04	730i	Limousine	2505	240	53,1	20,4
F02	730Li	Limousine lang	2515	240	53,1	20,4
F07	530dA	GT	2590	240	53,0	20,4
F10	523i	Limousine	2235	200	52,2	18,7
F11	523iT	Touring	2365	200	52,2	18,7
F12	635dA EU5	Cabrio	2080	200	55,9	18,6
F13	635dA EU5	Coupe	1920	170	55,9	18,6
R55	Mini One	Clubman	1680	170	60,8	13,8
R56	Mini One	2-türer	1550	170	60,8	14,9
R57	Mini One	Cabrio	1630	170	60,8	14,9
R60	Cooper D	Countryman	1575	170	54,8	19,3
E89	Z4 2.0i	Roadster	1750	170	51,7	21,3
E84	sDrive 1.8i	X1	2010	200	50,5	22,1
F25	sDrive 2.3i	X3	2275	200	51,3	21,6
RR01	xxx	Phantom	3200	240	51,6	21,4
RR04	xxx	Ghost	2940	240	50,9	21,9

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34 00 ... Testing of service brakes at the official periodic vehicle check according to EU Directive 2010/48/EU and Germany § 29_StVZO for vehicles with first registration beginning on July 28, 2010.

Series: 1: E81-E88; F20-F21 / 3: E90-E93; F30-F31 / 5: F07-F11; F18 / 6: F06,F12-F13 / 7: F01-F04; X1: E84 / X3: F25 / X5: E70 / X6: E71-E72 / Z4: E89 / MINI: R55-R61 / Rolls Royce

Situation:

For official periodic vehicle inspections according to EU Directive 2010/48/EU and § 29 of the German road traffic licensing regulations (StVZO) as per the revised directive, new inspection specifications apply beginning on 01.07.2012 for the functional test of the service brakes on EU Class M1 vehicles (passenger car up to 3.5 t permitted total weight) and first registered from 28.07.2010 onwards.

Prior the mechanical brake force measurement the electronic function check for the corresponding brake system must always be performed by way of evaluation of the system specific function control gauges in the instrument cluster and/or messages on the Check Control display (ABS, DSC, and brake pad wear and brake fluid display)!

Functional check of the service brake:

Prior to the brake test, the service brake must be conditioned by braking 2 or 3 times from increased walking speed to vehicle standstill.

For vehicles with combustion engines, the engine must run to maintain the vacuum for the power assistance of the service brake. For the same reason, the driving readiness ("ignition") must be switched on with electrical vehicles to ensure the electrical vacuum generation.

EU and Germany:

Vehicle braking (z) with the service brake **at least 58 % of the authorized vehicle total weight**, instead of the previous 50 %.

Reference value for this minimum braking action **is**, according to ECE Directive 13H, is a **brake pedal operating force of max. 500 N.**

Note: For M1 vehicles with a first registration date prior to July 28, 2010, a minimum brake force of 50% continues to be valid!

Braking according to the guidelines listed above is defined as:

$$z = \frac{\text{Total of brake forces of all wheels at the wheel output}}{\text{Weight force of the vehicle (zGG)}} \times 100\ (\%)$$

Example: BMW X3 F25: approved total weight (zGG.).: 2300 kg.

Measured brake force values on brake test stand:

Service brake	Front	Rear
Left	435 daN	335 daN
Right	434 daN	336 daN

Evaluation of service brake:

$$z = \frac{1540}{2300} \times 100\ (\%) = 66.96\ \%$$ **is OK because greater than 58%**

Note:

Since the vehicles to be tested usually do not indicate the approved total weight at the time of the test, and the test stand rollers may prematurely switch off due to the lower axle weight before the possible higher brake

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forces are reached as a result of the wheel roll slipping limit, the determined total brake force is often below the total brake force that is required to meet the statutory minimum braking.

This may result in a false evaluation (not OK) even though the brake system is intact.

To prevent such a "mis-evaluation" and eliminate the need for a general vehicle load to the approved total weight, the vehicle manufacturers will provide **a maximum pedal force as reference value for minimum brake action** type and/or series-specific in the future. See table in Appendix 1.

To correspond to the actual conditions especially when checking on the brake test stand, the vehicle manufactures are enhancing the series-specific input specification values, which means the brake pedal forces, with additional **"test stand suitable" brake pedal forces**, in which the actual measurements must be performed.

These are usually low brake pedal force reference values that are generally in front of the banding point of the brake servo reference line.

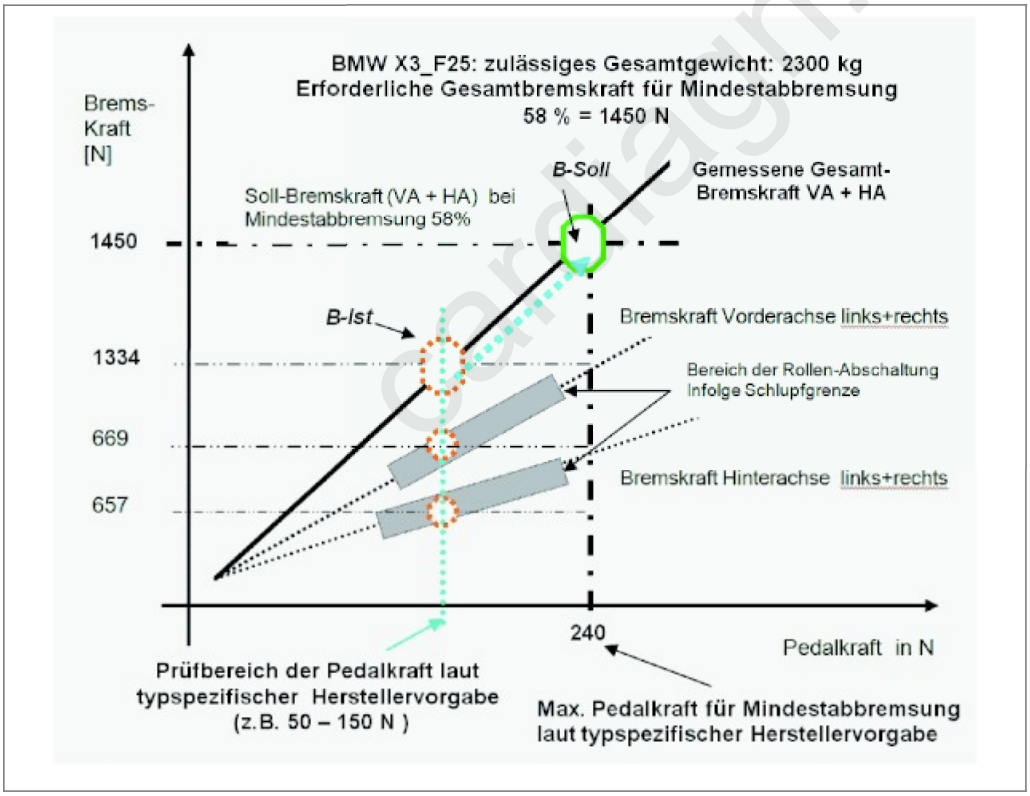
The brake force can thereby be measured in front of the blocking limit in most cases, which serves to preserve the tyres and provides a significantly more accurate approved right / left deviation in the upper test range.

In practice, this means:

When the measured total brake force "B Actual" is below the total value "B Target" for the required minimum braking due to premature shut down of the brake test stand or a vehicle test weight near the vehicle kerb weight, this actual value must be extrapolated on the line of the total brake force to the specified brake pedal force and then entered in reference to the approved total weight of the vehicle to be tested (see vehicle documentation). This new total value "B Target" will now be used to calculate the braking.

If this total brake value that was extrapolated to the specified maximum brake pedal force does not meet the required minimum brake force of 58%, the braking effect must be rated not OK.

The schematic graphic below clarifies this correlation:



Other statutory specifications EU and Germany:

Just as for vehicles first registered **before** 01.07.2012, the deviation of the wheel brake forces of each axle to each other may not exceed 25%.

Also valid for vehicles in Germany first registered from 01.07.2012 onwards:

Evaluation of the minimum brake force share of the front and rear axle in % to the total brake force of all wheels according to the vehicle manufacturer's specified values. See formulas below and type or series specific manufacturer values according the table in Appendix 1.

1. Front axle share=	**Total front axle brake forces ---------- x 100 (%) Total brake force of all axles**

Manufacturer specification:

The following calculation results from the previous example for the BMW X3:

Front axle brake force share=	**435 daN + 434 daN ---------- x 100 (%) =56% is OK because greater than 51.3% - 435+434+335 +336daN**

2. Rear axle brake share=	**Total rear axle brake forces ---------- x 100 (%) Total brake force of all axles**

Manufacturer specification:

The following calculation results from the previous example for the BMW X3:

Rear axle brake force share=	**335 daN + 336 daN ---------- x 100 (%) =44% is OK because greater than 21% 435+434+335 +336 daN**

General note:

This means that the official test of the service brake **absolutely requires the use of a brake pedal force measuring sensor.**

The manufacturers of brake test stands have been offering these items for many years as test stand accessory.

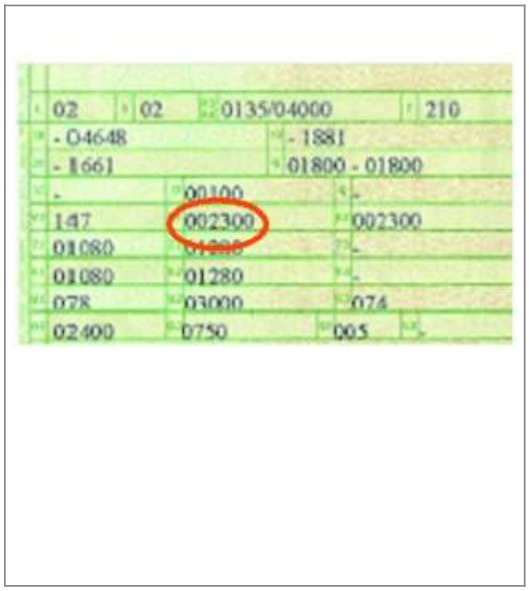
Examples are:



Position 1: MAHA, Haldenwang

Position 2: AHS, Bremen

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02	02	0135/04000	210
- 04648		- 1881	
- 1661		01800 - 01800	
-	00100		-
147	002300		002300
01080			-
01080	01280		-
078	03000		074
02400	0750		005

The approved total weight of the vehicle must be derived from the registration Part 1 from column F1 or F2.

Since the law primarily requires that brake effect tests are performed on brake test stands, BMW Group vehicles **must be tested on roller test stands!**

Next, the statutory tolerance of the axle "right-left deviation, limit value max. 25%, must be determined in the upper range of the measured brake forces.

In addition, the minimum brake force shares must be determined separately for the front and rear axle in compliance with the additional German specifications and referenced to the manufacturer specifications.

General notes:

It is recommended to check the brakes as part of the manufacturer required vehicle inspection and **before** the official vehicle inspection according to the specified values indicated here.

To make work easier for the **referencing: Brake pedal force to brake force** we urgently recommend to have your test stand manufacturer set up an electronic measured value transmission from the brake pedal force measuring tool to the test stand computer.

The installation of a calculation program to determine the minimum total braking on the test stand computer to achieve the correct evaluation - especially when it is necessary to extrapolate the actual brake force in relation to the setpoint value at the corresponding brake pedal force - is also deemed absolutely necessary.

The integration of a database for the type specific vehicle specifications (brake pedal forces, front and rear axle brake shares) simplifies the overall brake test.

These specification will also be indicated in the technical data and/or repair instructions in the future as minimum values, which will only be updated and/or maintained model-specific there.

The test procedure for the mechanical or electrical operated parking brakes, and/or the regenerative valve for hybrid or electric vehicles are listed in the corresponding repair instructions.

In the event of specifications for the brake test that deviate from country authorities of EU states and/or newer issues of the German road traffic licensing regulations, or the application of manufacturer and/or type specific target data is prohibited, compliance with same is required.

In this case, we request that you will send the corresponding information to the publisher of this service information.

- Enclosure 1: Type specific specifications to test the service brake
- Enclosure 2: Manual calculation of braking when this is not supported by the test stand.

34 11 552 Overhauling left or right front brake caliper (brake caliper removed)

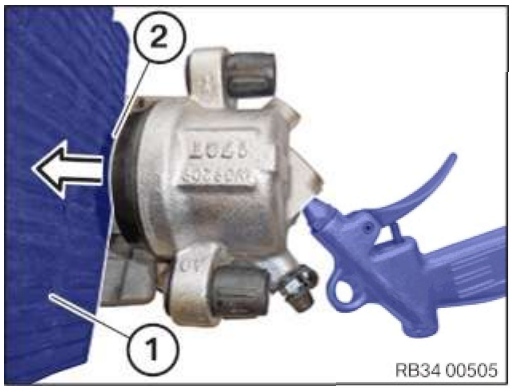
Necessary preliminary tasks:

- Remove the front brake caliper.

Warning!

In the following operation, large forces occur at the brake caliper piston.

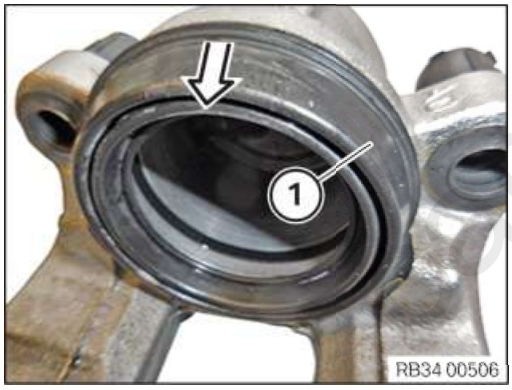
Danger of injury!



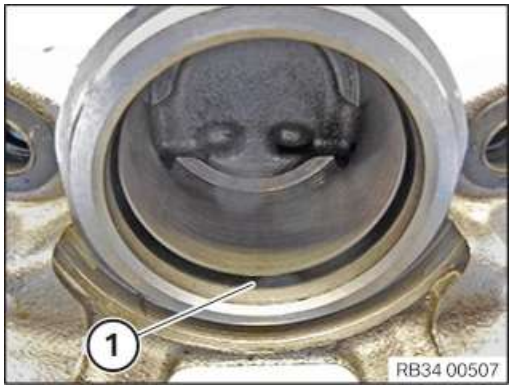
Carefully force piston out through connecting bore with compressed air.

To protect the piston, place a protective plate (e.g. hardwood or rubber plate) in the caliper recess.

Do not grip piston with fingers - pinch hazard!



Press off dust boot (1).



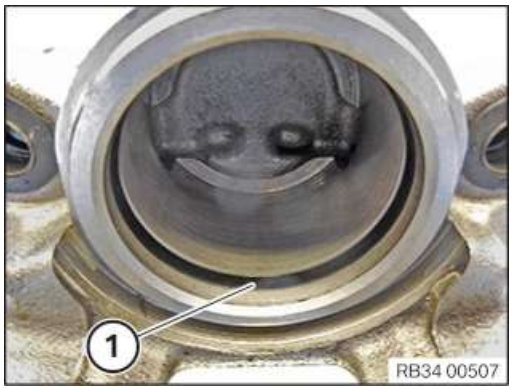
Carefully remove sealing ring (1).

Clean cylinder bores and parts and dry with compressed air.

Thoroughly inspect cylinder bore, piston and flange surfaces for damage.

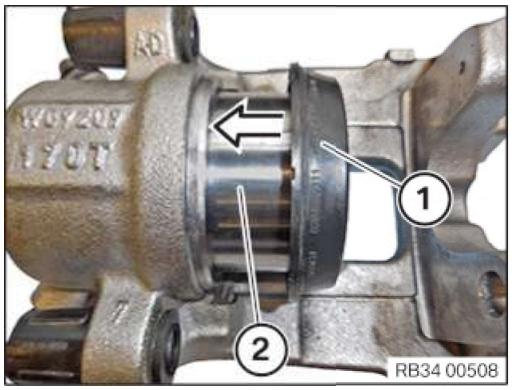
Material removing rework on cylinders and pistons is not permitted.

Installation:



Insert sealing ring (1).

Apply a light coat of ATE brake cylinder paste to cylinder bore, piston and sealing ring,



Fit dust boot (1) in annular groove of piston (2).

Attention!

Do not twist brake piston.

Press piston into cylinder bore.

Evenly press dust boot (1) onto brake caliper housing up to limit position.

Note:

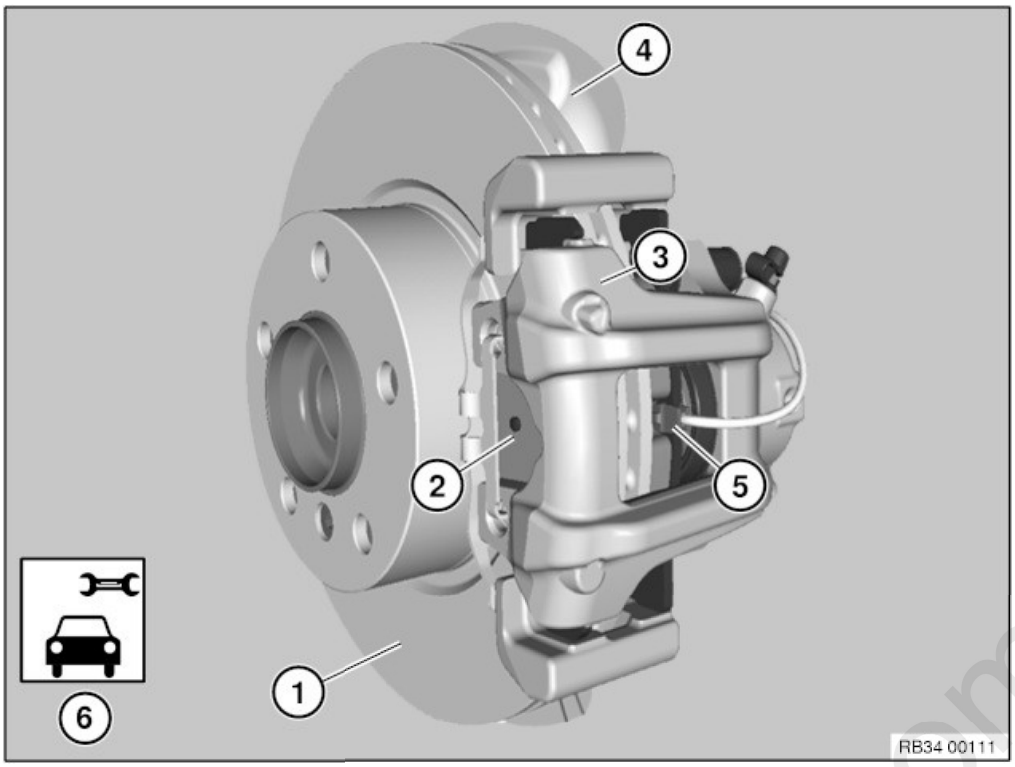
The area between the dust boot and the brake caliper housing must be kept dry. It must not come into contact with Ate brake cylinder paste or brake fluid so as to ensure that the dust boot is perfectly fitted.

Required follow-up work:

- Install front brake caliper.

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34 11 ... Overview of front brake



1 Brake disc
2 Brake pad
3 Brake calliper
4 Brake guard plate
5 Brake pad wear sensor
6 Checking brake pad thickness

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34 11 667 Precision-turning both front brake discs on both sides

Attention!

Always precision-turn both sides of both brake discs on one axle.

Maximum machining dimension per friction ring side is 0.8Â mm!

Minimum brake disc thickness (MIN TH)

Brake discs of M models (Compound brake discs) must **not** be machined!

Only one brake pad set may be used up on brake discs which have been lathe-turned to minimum thickness (MIN TH).



Mobile brake disc lathe:

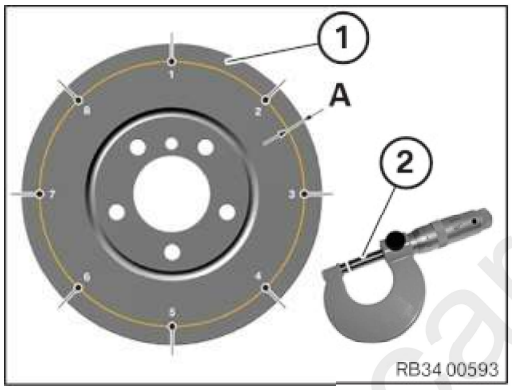
Attention!

Only BMW-approved brake disc lathes may be used!

In the case of mobile brake disc lathes, the brake caliper and the brake anchor plate must be removed.

The brake discs remain on the vehicle.

Please refer to the equipment manufacturer's operating instructions for the exact procedure.



After the precision turn of the brake disc, the difference in thickness must be measured at 8 different points (1) approx. 10 mm (dimension A) from the outer edge of the disc using a caliper gauge (2)!

Permissible thickness difference: see Technical Data!

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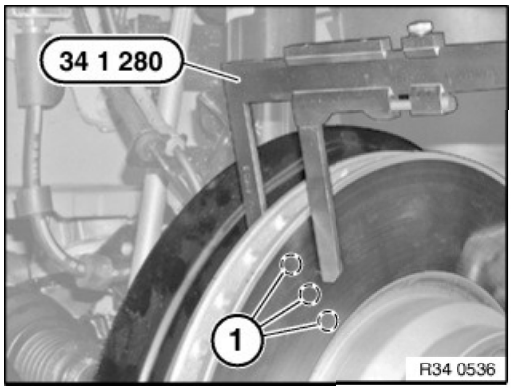
34 11 220 Removing and installing/replacing both front brake discs

Special tools required:

- 34 1 280

Necessary preliminary tasks:

- Remove wheels.
- Remove and clean brake pads.



Check minimum brake disc thickness:

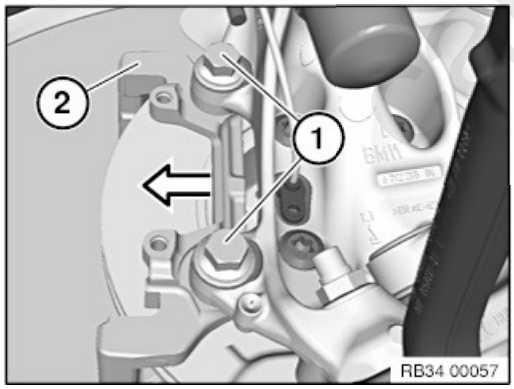
- Position special tool 34 1 280 at three measuring points in area (1) and measure.
- Compare measuring result and lowest value with setpoint value.

If the brake discs are replaced, you must also fit new brake pads.

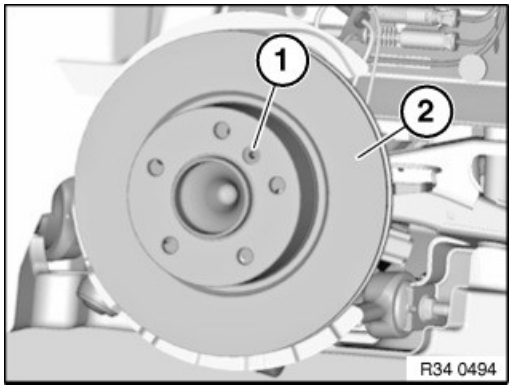
Brake discs may only be replaced in pairs (on each axle).

Important!

New brake pads may only be fitted if the brake disc thickness is greater than the minimum brake disc thickness (MIN TH).



Release screws (1) and remove brake anchor plate (2) to the rear.*Installation note:*
Tightening torque 34 11 2AZ.



Important!

To release brake disc: Do not under any circumstances strike friction ring with a hammer or similar!

If necessary, carefully tap on base of brake disc chamber with a rubber mallet.

Clean contact surface of brake disc at wheel hub thoroughly and remove traces of corrosion.

Unevenness on contact surface may result in distortion of brake disc!

Release screw (1) and remove brake disc (2).*Installation note:*
Replace screw.

Tightening torque 34 11 1AZ.

After installation:

- Read and comply with notes on braking in new brake discs / brake pads.

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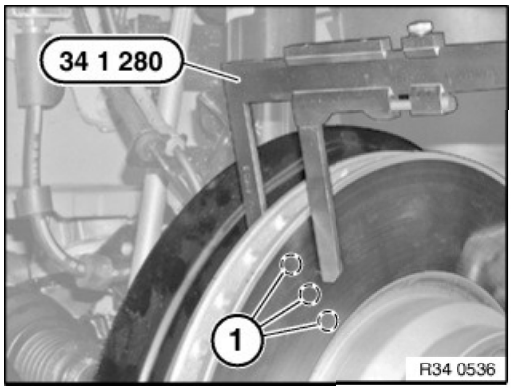
34 11 220 Removing and installing/replacing both front brake discs (Brembo)

Special tools required:

- 34 1 280

Necessary preliminary tasks:

- Remove wheels.
- Remove and clean brake pads.



Check minimum brake disc thickness:

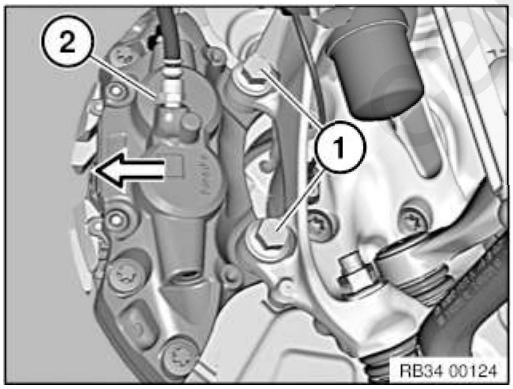
- Position special tool 34 1 280 at three measuring points in area (1) and measure.
- Compare measuring result and lowest value with setpoint value.

If the brake discs are replaced, you must also fit new brake pads.

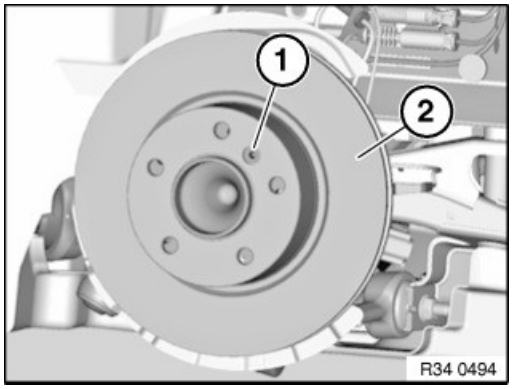
Brake discs may only be replaced in pairs (on each axle).

Important!

New brake pads may only be installed if the brake disk thickness is greater than the minimum brake disc thickness.



Release screws (1), remove brake calliper (2) towards rear and tie up.*Installation note:*
Tightening torque 34 11 2AZ.



Important!

To release brake disc: Do not under any circumstances strike friction ring with a hammer or similar!

If necessary, carefully tap on base of brake disc chamber with a rubber mallet.

Clean contact surface of brake disc at wheel hub thoroughly and remove traces of corrosion.

Unevenness on contact surface may result in distortion of brake disc!

Release screw (1) and remove brake disc (2).*Installation note:*
Replace screw.

Tightening torque 34 11 1AZ.

After installation:

- Read and comply with notes on braking in new brake discs / brake pads.

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34 11 000 Removing and installing/replacing brake pads on both front disc brakes

Special tools required:

- 34 1 050
- 34 1 280
- 2 352 960

Caution!

- **Brake pad wear sensor: After removal it must be replaced (brake pad wear sensor loses its retention capability in the break pad).**
- **Retaining pin and expanding spring: for vehicles older than 48 months it is recommended to replace the retaining spring!**

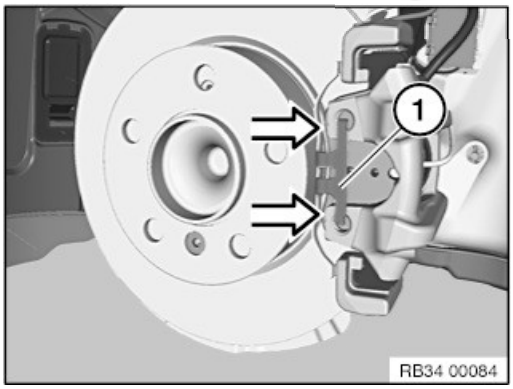
So as not to damage the surface coating, if possible do not mechanically clean the guide surfaces for the brake pads on the brake caliper mounting bracket, but rather clean with brake cleaner BMW TI. number 83 19 2 154 780 and apply a thin coating of break pad paste BMW TI. number 83 19 2 158 851 (3 gr.) or 83 19 2 158 852 (100 gr.).

Spread brake pad paste onto the marked surfaces using a brush!

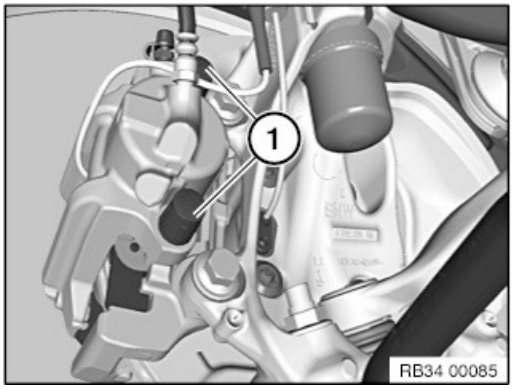
Observe regulation on applying brake pad paste to brake pads and brake anchor plates!

Necessary preliminary work:

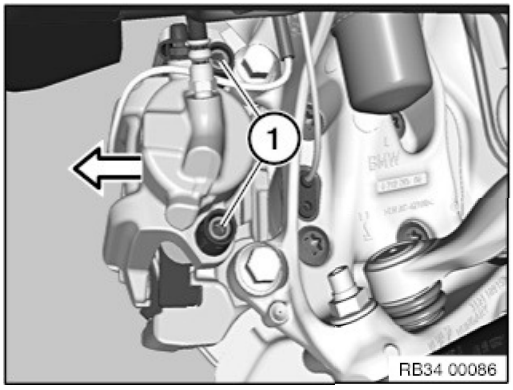
- Remove wheels.
- Remove brake pad wear sensor.



Lift out retaining spring (1).



Remove plastic plugs (1).



Unfasten guide bolts (1) and lift out brake caliper towards rear of vehicle.*Installation note:*
Tightening torque 34 11 4AZ.

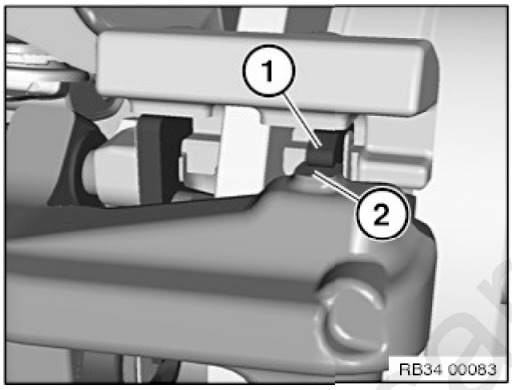
Clean guide screws only; do not grease.

Check threads.

Replace all guide screws which are not in perfect condition.

Caution!

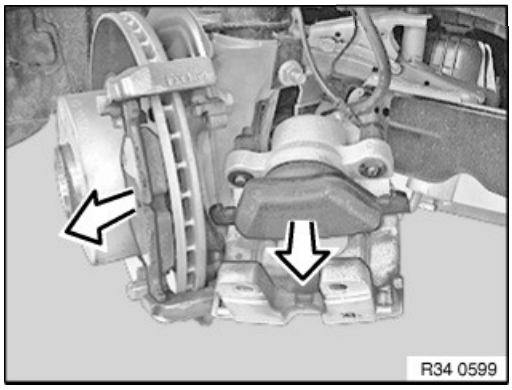
Tie brake calliper back and do not allow to hang from brake hose.



Installation note:
When putting on the brake caliper, it is absolutely necessary to make sure that the T-head (1) of the outer brake pad is seated correctly on the contact surface (2).

Caution!

With brake pads that are already partially worn, pay particular attention that the position of the outer brake pad in relation to the contact surface (2) is ensured!



Remove outer brake pad.

Inner brake pad is located with its spring in the piston.

Caution!

Mark any worn brake pads.

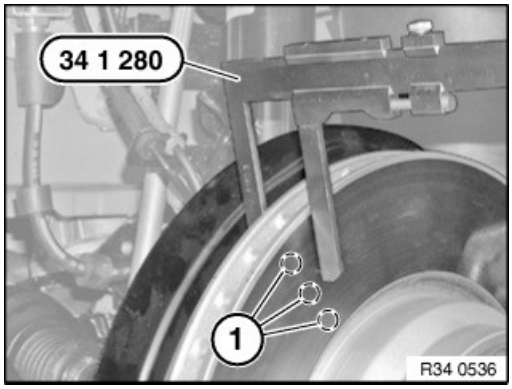
In the event of one-sided brake pad wear, do not change brake pads round.

Observe minimum thickness of brake pads.

Clean brake pads.

Do not grease backs of brake pads sleeve.

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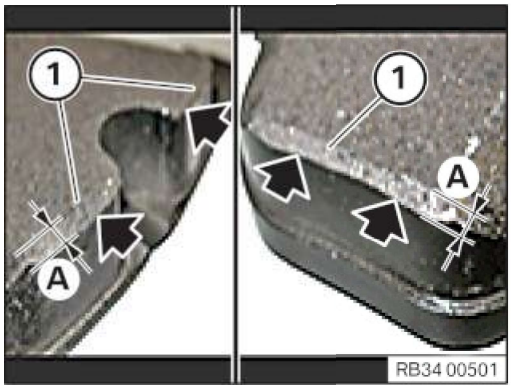
Check minimum brake disc thickness:

- Position special tool 34 1 280 at three measuring points in area (1) and measure.
- Compare measuring result and lowest value with setpoint value.



Caution!

New brake pads may only be installed if the brake disk thickness is greater than the minimum brake disc thickness.



Caution!

If new brake pads are mounted on a brake disc, the following must be observed:

- Bevel edges in the area (1) slightly (dimension A must not exceed maximum 1 mm).

These procedures applies for all the following described brake systems.

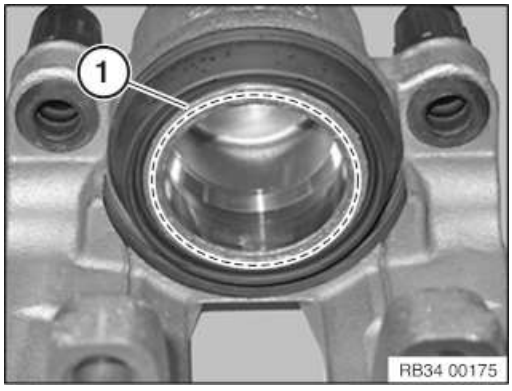


Caution!

When pressing down piston, note brake fluid level in expansion tank.

Overflowing brake fluid will damage the paintwork.

Turn piston back fully with special tool 2 352 960 .



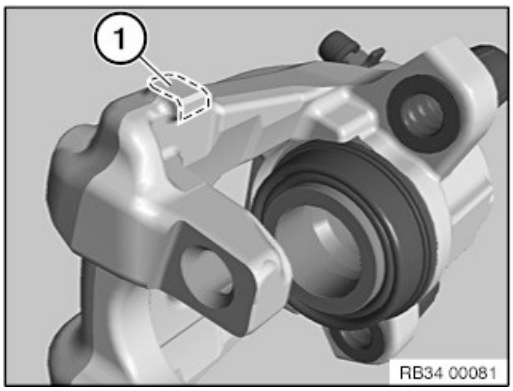
Check dust boot for damage and renew if necessary.

Clean contact surface (1) of brake piston with brake cleaner and apply a thin coating of brake pad paste.

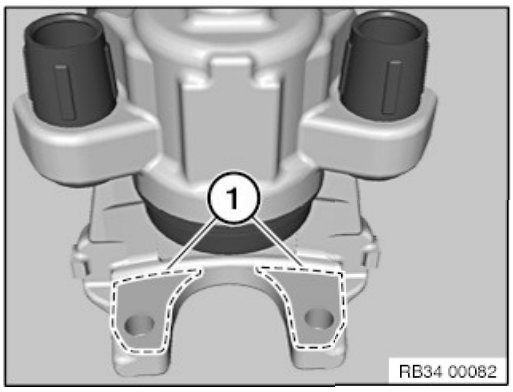
Caution!

Dust boot must not come into contact with brake pad paste as this may cause the dust boot to swell.

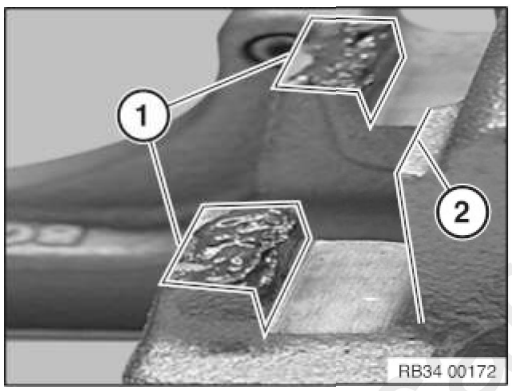
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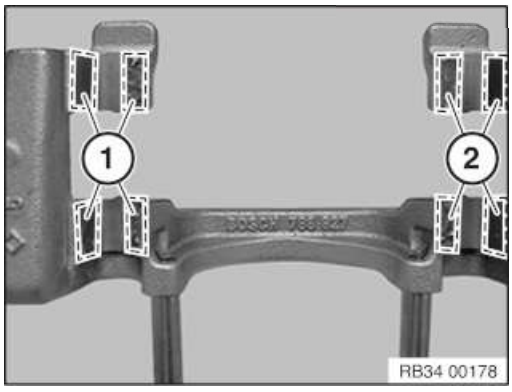
Clean contact surface (1) of T-head/brake caliper housing with brake cleaner and apply a thin coating of brake pad paste.



Clean contact surface (1) of brake pads with brake cleaner and apply a thin coating of brake pad paste.

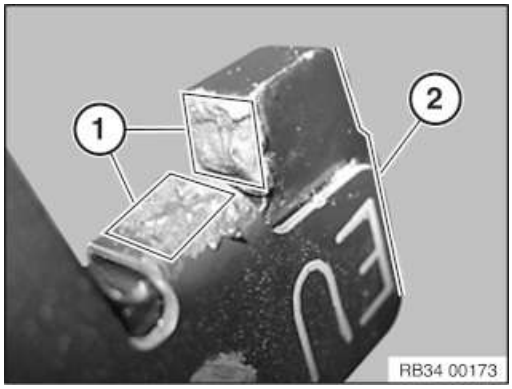


So as not to damage the surface coating, <u>if possible do not mechanically clean</u> the guide surfaces (1) for the brake pads on the brake caliper mounting bracket. Clean guide surfaces (1 and 2) with brake cleaner and apply a thin coating of brake pad paste.

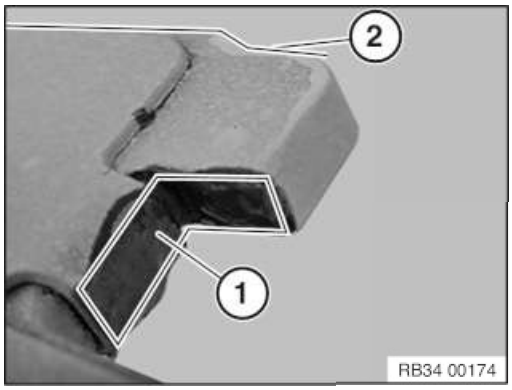


So as not to damage the surface coating, <u>if possible do not mechanically clean</u> the guide surfaces (1 and 2) for the brake pads on the brake calliper mounting bracket. Clean guide surfaces (1 and 2) with brake cleaner and apply a thin coating of brake pad paste.

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Apply a thin coating of brake pad paste to T-head of inner brake pad in area (1) and (2).



Apply a thin coating of brake pad paste to T-head of outer brake pad in area (1) and (2).

Note:
After completing work:

- When installing new brake pads at front and rear axles, brake fluid level must be brought up to "MAX" mark.
- Fully depress brake pedal several times so that brake pads contact brake discs.
- Read and comply with notes on braking in new brake discs / brake pads.
- When exchanging brake pads, reset CBS display in accordance with factory specification.

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34 11 000 Removing and installing/replacing brake pads on both front disc brakes (Brembo)



Special tools required:

- 34 1 050
- 34 1 280



Attention!

- **Brake pad wear sensor: After removal it must be replaced (brake pad wear sensor loses its retention capability in the break pad).**
- **Retaining pins and expanding spring: for vehicles older than 48 months it is recommended to replace the retaining spring!**

So as not to damage the surface coating, if possible do not mechanically clean the guide surfaces for the brake pads on the brake caliper mounting bracket, but rather clean with brake cleaner BMW TI. number 83 19 2 154 780 and apply a thin coating of break pad paste BMW TI. number 83 19 2 158 851 (3 gr.) or 83 19 2 158 852 (100 gr.).

Spread brake pad paste onto the marked surfaces using a brush!

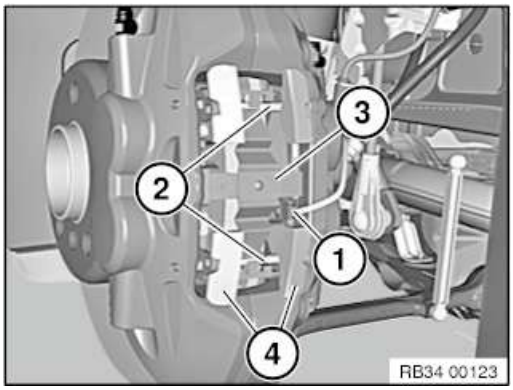
Observe guideline for applying brake pad paste on brake pads and brake anchor plate!



Necessary preliminary tasks:

- Remove front wheels.
- Remove brake pad wear sensor.

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Pull brake pad wear sensor (1) forward out of the brake pad (left side only when replacing brake pads).

Drive out retaining pins (2).

Remove expanding spring (3).

Remove brake pads (4).

Installation note:
The following installation sequence must be followed.

- Install new brake pads.
- Align brake pads with the retaining pins in the brake caliper.
- Fully depress brake pedal several times so that brake pads contact brake discs.
- Fit retaining pins and expanding spring.

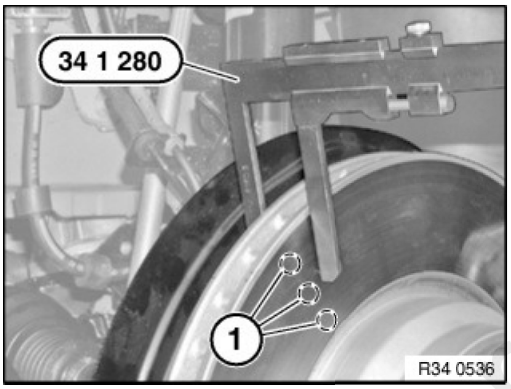
Attention!

Mark any worn brake pads.

In the event of one-sided brake pad wear, do not change brake pads round.

Do not grease backs of brake pads sleeve.

Clean brake pads.



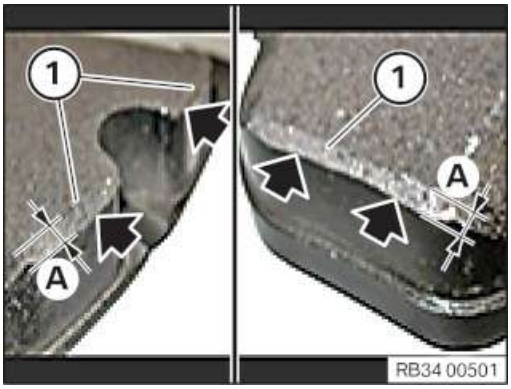
Check minimum brake disc thickness:

- Position special tool 34 1 280 at three measuring points in area (1) and measure.
- Compare measuring result and lowest value with setpoint value.



Attention!

New brake pads may only be installed if the brake disk thickness is greater than the minimum brake disc thickness.



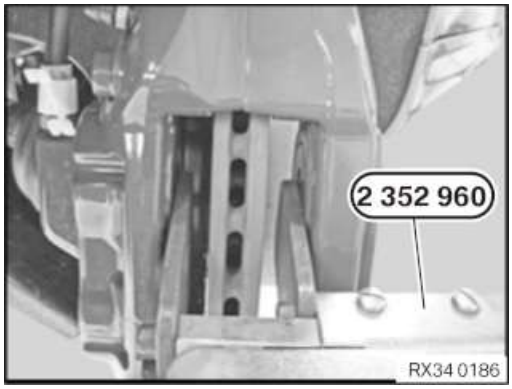
Attention!

If new brake pads are mounted on a brake disc, the following must be observed:

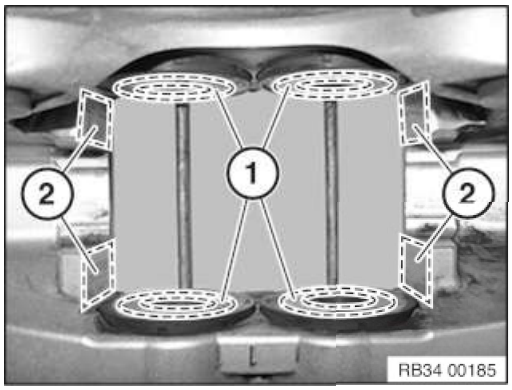
- Bevel edges in the area (1) slightly (dimension A must not exceed maximum 1 mm).

These procedures applies for all the following described brake systems.

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Press brake piston fully back with special tool 34 1 050 .**Attention!**
When pressing piston back, note brake fluid level in expansion tank.
Overflowing brake fluid will damage the paintwork.

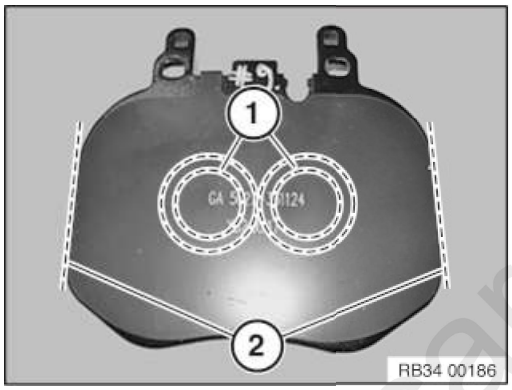


Check dust boot for damage and renew if necessary.

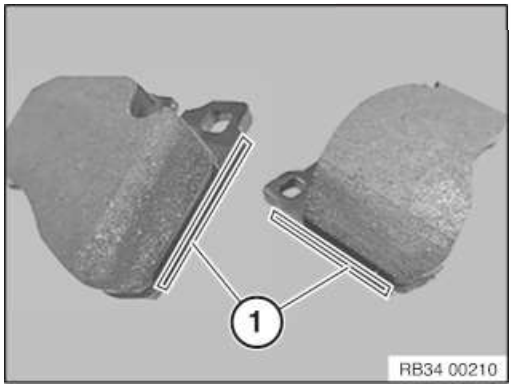
Clean contact surface (1) of brake piston with brake cleaner and apply a thin coating of brake pad paste.

So as not to damage the surface coating, if possible do not mechanically clean the guide surfaces (2) for the brake pads on the brake calliper mounting bracket. Clean guide surface (2) with brake cleaner and apply a thin coating of brake pad paste.

Clean both inner and outer guide surfaces (2) and apply a thin coating of brake pad paste.



Lightly coat both sides of the contact surface in area (1 and 2) with brake pad paste.



Lightly coat the brake pad contact surface on both sides in area (1) with brake pad paste.

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Note:

After completing repair work:

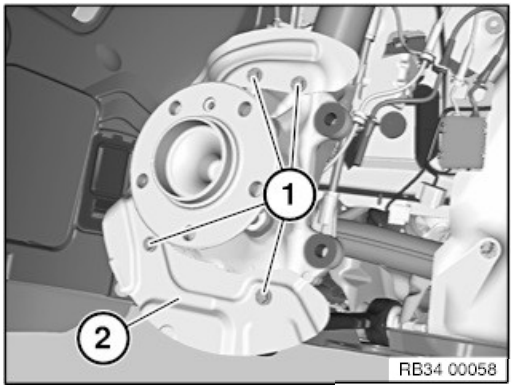
- Fully depress brake pedal several times so that brake pads contact brake discs.
- When installing new brake pads at front and rear axles, brake fluid level must be brought up to "MAX" marking.
- Read and comply with notes on braking in new brake discs / brake pads.
- If necessary, when replacing brake pads, reset CBS display as per factory specification.

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34 11 280 Removing and installing/replacing front left protective plate

Necessary preliminary work:

- Remove front brake discs.



Release screws (1) and remove brake guard plate (2).*Installation note:* Tightening torque 34 11 3AZ.

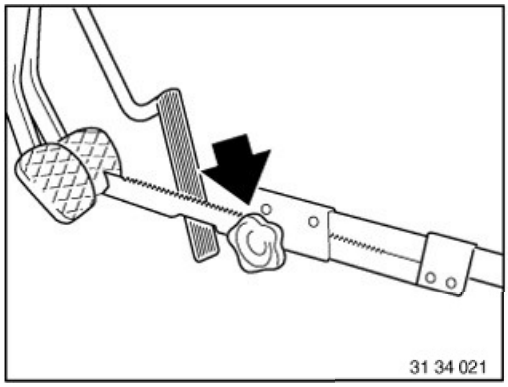
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34 11 020 Removing and installing/replacing left or right front brake caliper

Necessary preliminary tasks:

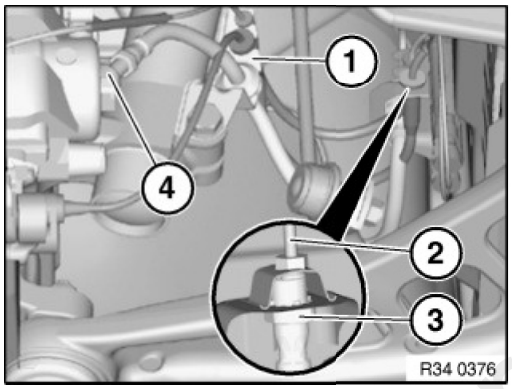
- Remove wheels.
- Read and comply with General Information.

After completing work: Bleed brake system.



Press brake pedal down to floor and secure with pedal support.*Note:*
The pedal support may only be released when the brake lines are reconnected.

This prevents brake fluid from emerging from the expansion tank and air from entering the system when the brake lines are opened.



If necessary, pull brake hose out of holder (1).

Attention!
Grip brake hose at square head (3) to prevent connector from turning in retaining bracket.

Disconnect brake hose from brake line (2).

Installation note:
Tightening torque 34 32 1AZ.

Detach brake hose from brake caliper (4).

Installation note:
Tightening torque 34 32 2AZ.

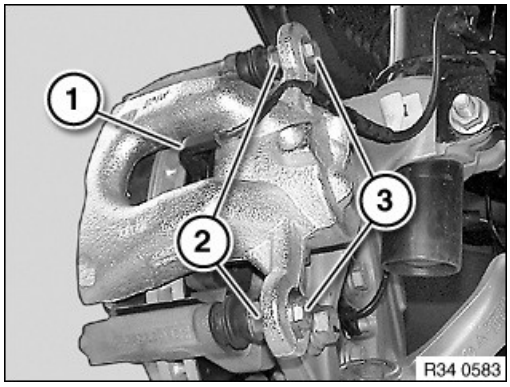
Attention!
Never twist brake hose when installing it and avoid all contact with parts attached rigidly to the body.

Note:
First tighten brake hose on brake caliper.

Move wheels into straight-ahead position.

Insert brake hose in bracket and screw onto brake pipe.

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Pull brake pad wear sensor (1) towards rear out of brake pad (left side only).

If necessary, replace brake pad wear sensor.

Unscrew guide bolts (3).

If necessary, grip at hexagon head (2).

Remove brake caliper by pulling upwards.

Installation note:
Replace guide bolts.

Tightening torque 34 11 4AZ.

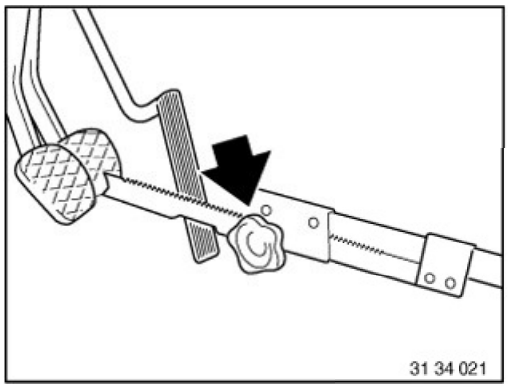
cardiagn.com

34 00 xxx Removing and installing/replacing vent valve for brake caliper

Necessary preliminary work:

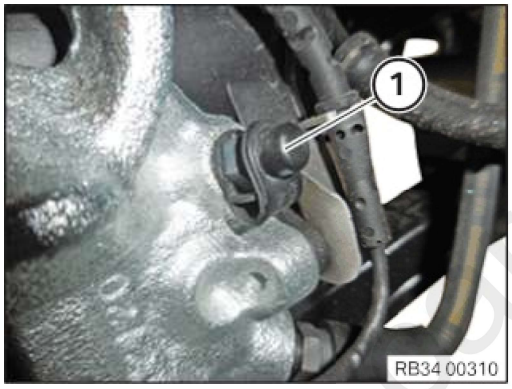
- Raise vehicle.

Removal:

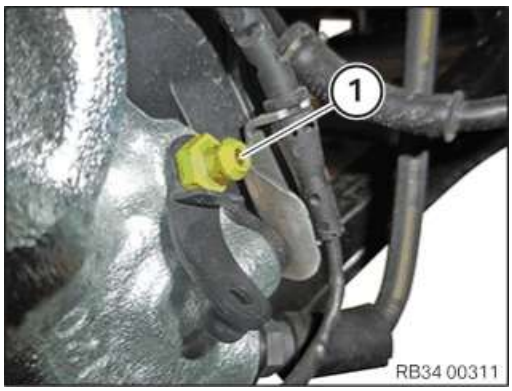


Press brake pedal down to floor and secure with pedal support.*Note:*
The pedal support may only be released when the brake lines are reconnected.

This prevents brake fluid from emerging from the expansion tank and air from entering the system when the brake lines are opened.



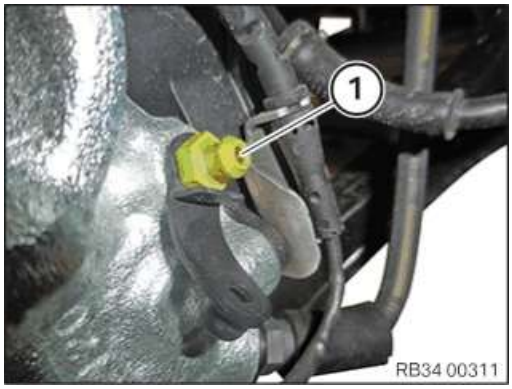
Remove the dust cap (1).



Remove vent valve (1).**Attention!**
Collect escaping brake fluid in a suitable collecting vessel.

Installation:

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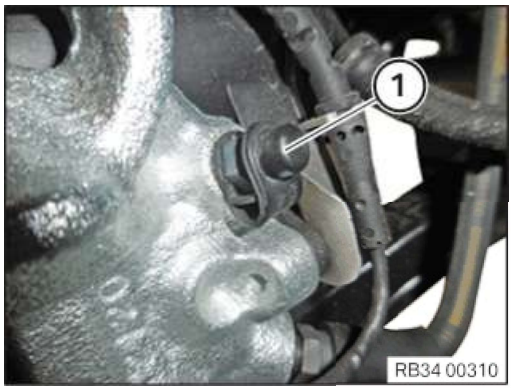


Attention!

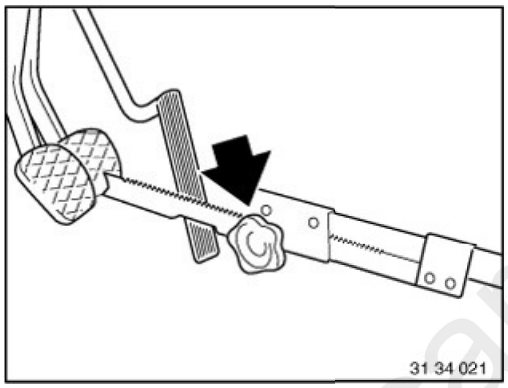
The bore hole must be free of contamination!

Install vent valve (1).

Tightening torque: 34 00 1AZ.



Mount the dust cap (1).



Remove pedal support.

Required reworking:

- Bleed brake system.

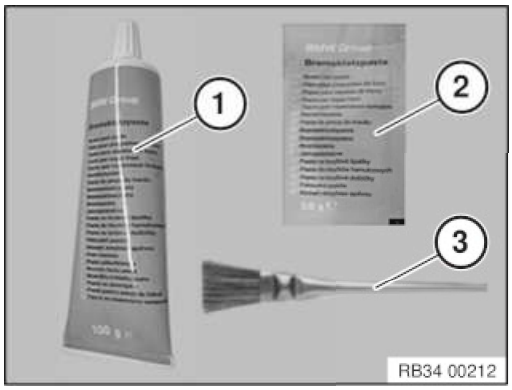
cardiagn.com

34 00 x01 Guideline for applying brake pad paste on brake pads and caliper carrier

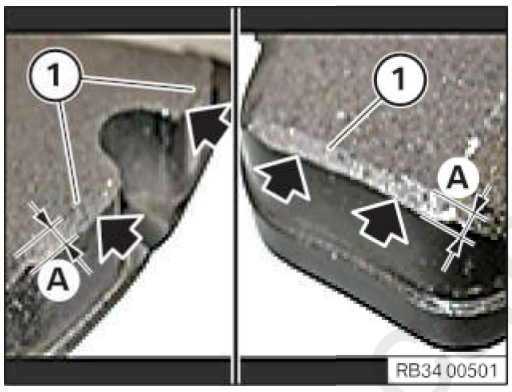
Attention!

So as not to damage the surface coating, if possible do not mechanically clean the guide surfaces for the brake pads on the brake caliper mounting bracket, but rather clean with brake cleaner BMW TI. Clean number 83 19 2 154 780 and apply a thin coating of BMW TI break pad paste. Coat number 83 19 2 158 851 (3 gr.) or 83 19 2 158 852 (100 gr.).

Spread brake pad paste onto the marked surfaces using a brush!



- (1) Brake pad paste 100 gr. BMW TI. Number 83 19 2 158 852
- (2) Brake pad paste 3 gr. BMW TI. Number 83 19 2 158 851
- (3) Brush for spreading brake pad paste over the marked areas.



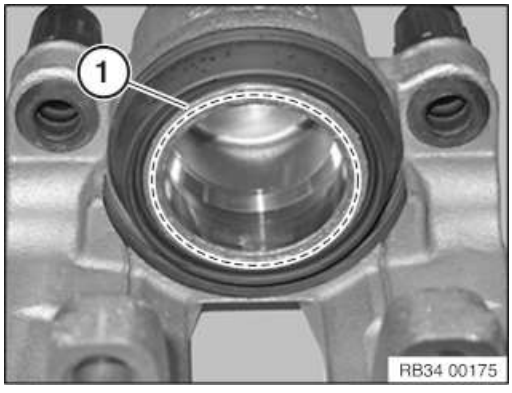
Attention!

If new brake pads are mounted on a brake disc, the following must be observed:

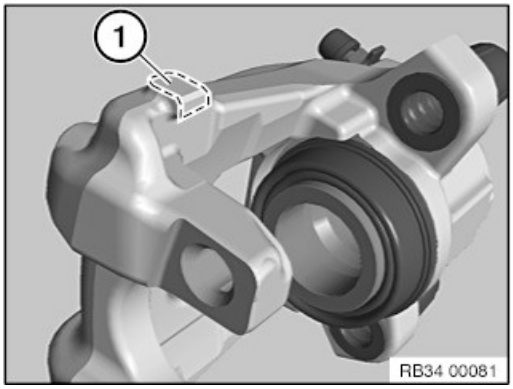
- Bevel edges in the area (1) slightly (dimension A must not exceed maximum 1 mm).

These procedures applies for all the following described brake systems.

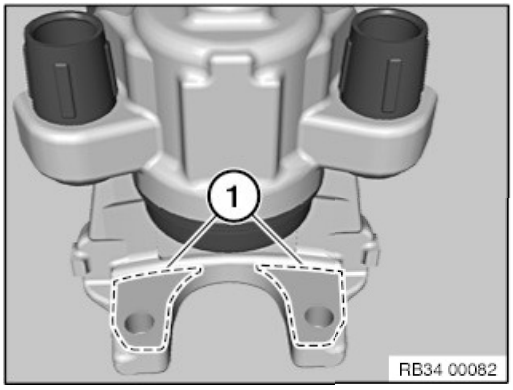
IPS brake (made by CBI), 1-piston floating caliper brake (model ranges: 1-Series, 3-Series, 4-Series, X3)



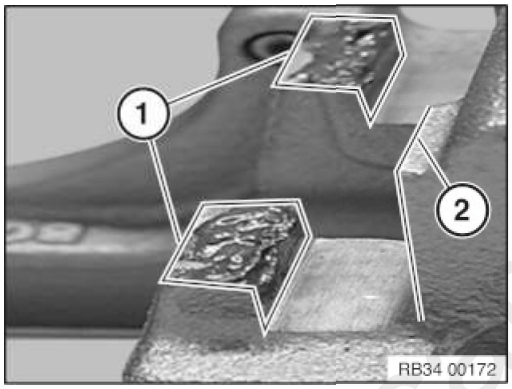
Clean contact surface (1) of brake piston with brake cleaner and apply a thin coating of brake pad paste.



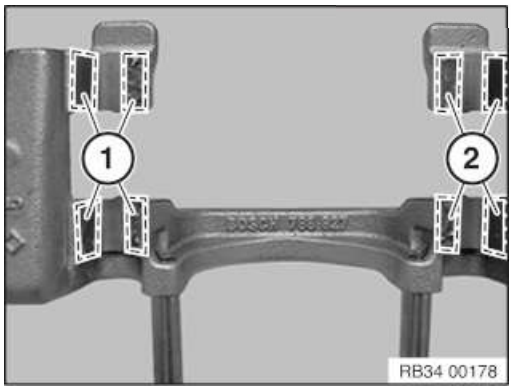
Clean contact surfaces (1) of T-heads/brake calliper housing with brake cleaner and apply a thin coating of brake pad paste.



Clean contact surface (1) of brake caliper with brake cleaner and apply a thin coating of brake pad paste.

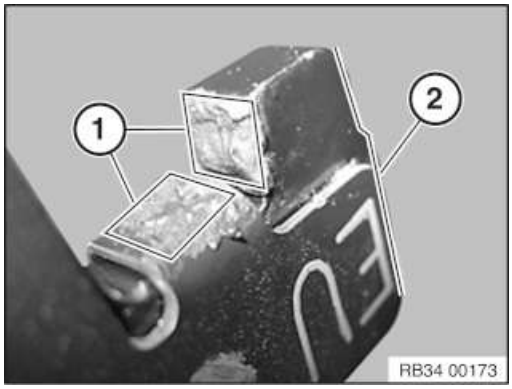


So as not to damage the surface coating, <u>if possible do not mechanically clean</u> the guide surfaces (1) for the brake pads on the brake caliper mounting bracket. Clean guide surfaces (1 and 2) with brake cleaner and apply a thin coating of brake pad paste.

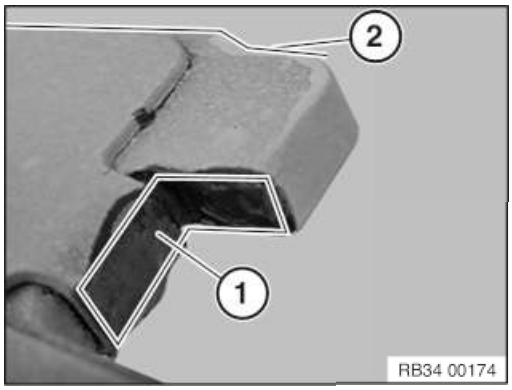


So as not to damage the surface coating, <u>if possible do not mechanically clean</u> the guide surfaces (1 and 2) for the brake pads on the brake calliper mounting bracket. Clean guide surfaces (1 and 2) with brake cleaner and apply a thin coating of brake pad paste.

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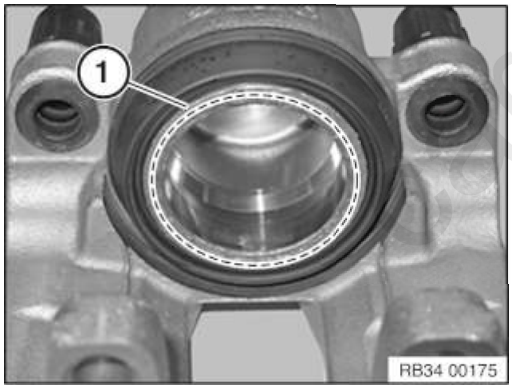


Apply a thin coating of brake pad paste to T-head of inner brake pad in area (1) and (2).

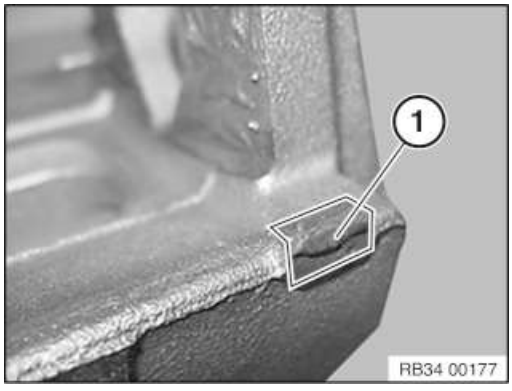


Apply a thin coating of brake pad paste to T-head of outer brake pad in area (1) and (2).

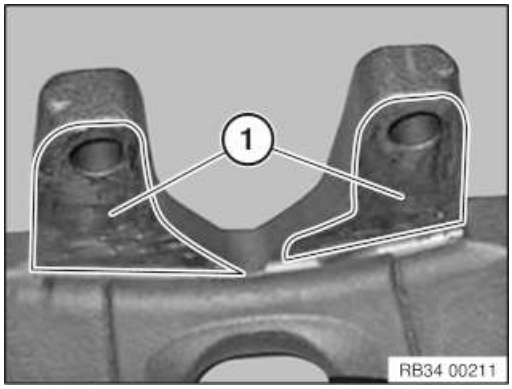
FN brake (made by Continental Teves), 1-piston floating caliper brake (model ranges: 5-Series, 6-Series, 7-Series, 8-Series, X1, X3, X5, Z4, Rolls-Royce)



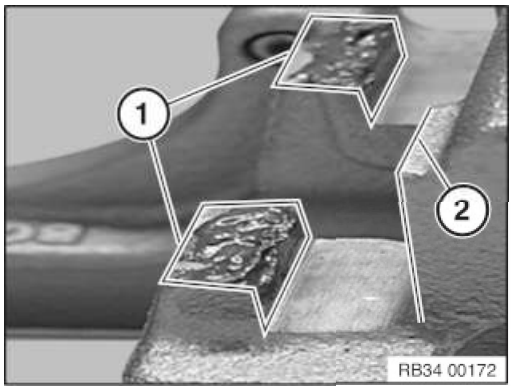
Clean contact surface (1) of brake piston with brake cleaner and apply a thin coating of brake pad paste.



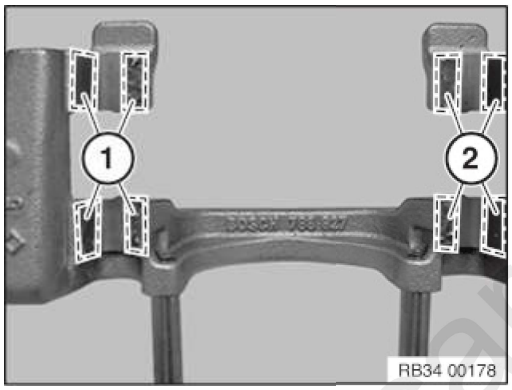
Clean contact surfaces (1) of T-heads/brake calliper housing with brake cleaner and apply a thin coating of brake pad paste.



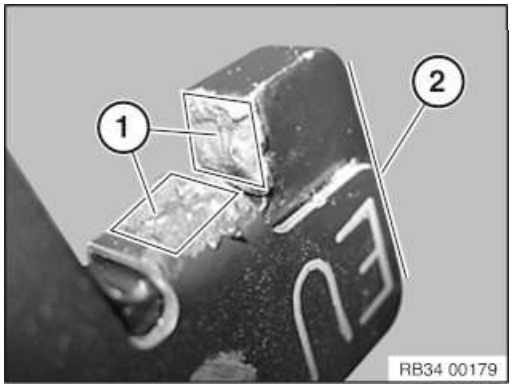
Clean contact surface (1) of brake caliper with brake cleaner and apply a thin coating of brake pad paste.



So as not to damage the surface coating, if possible do not mechanically clean the guide surfaces (1) for the brake pads on the brake caliper mounting bracket. Clean guide surfaces (1) with brake cleaner and apply a thin coating of brake pad paste.

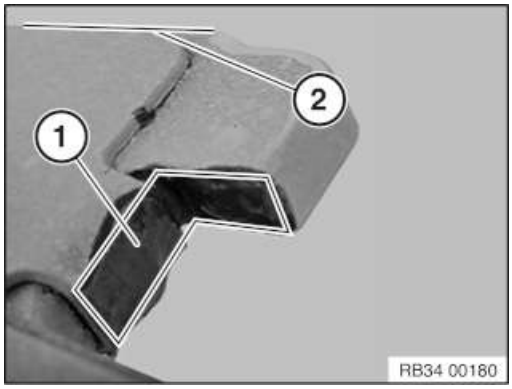


So as not to damage the surface coating, if possible do not mechanically clean the guide surfaces (1 and 2) for the brake pads on the brake calliper mounting bracket. Clean guide surfaces (1 and 2) with brake cleaner and apply a thin coating of brake pad paste.



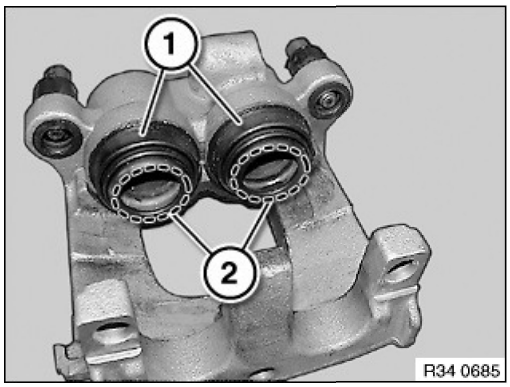
Lightly coat the T-head of the inner brake pad with brake pad paste in area (1 and 2).

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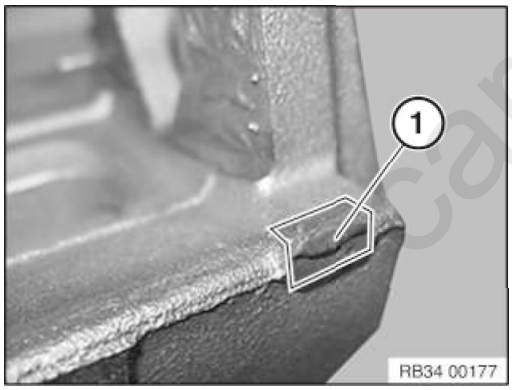


Lightly coat the T-head of the outer brake pad with brake pad paste in area (1 and 2).

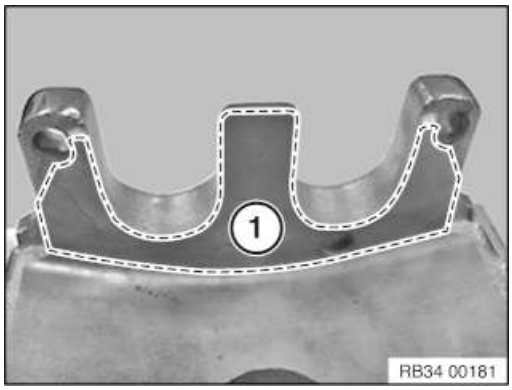
FN brake (made by Continental Teves), 2-piston floating caliper brake (model ranges: 5-Series, 6-Series, 7-Series, 8-Series, X5, Rolls-Royce)



Clean contact surface (2) of brake piston with brake cleaner and apply a thin coating of brake pad paste.

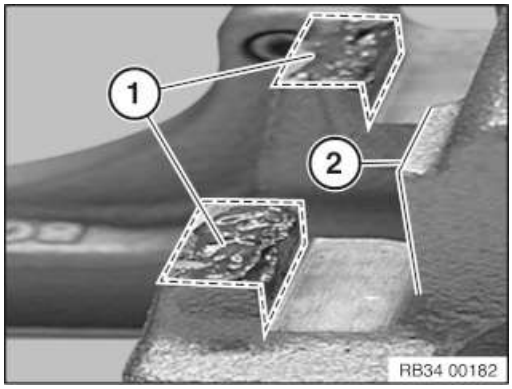


Clean contact surfaces (1) of T-heads/brake calliper housing with brake cleaner and apply a thin coating of brake pad paste.

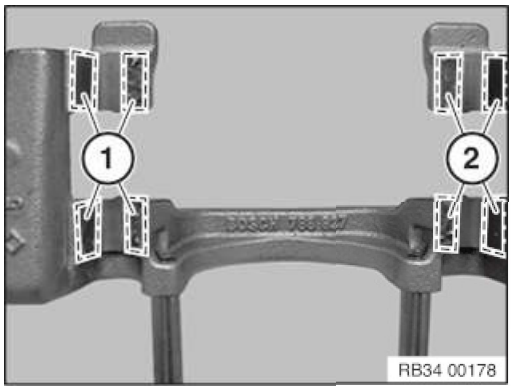


Clean contact surface (1) and brake caliper with brake cleaner and apply a thin coating of brake pad paste.

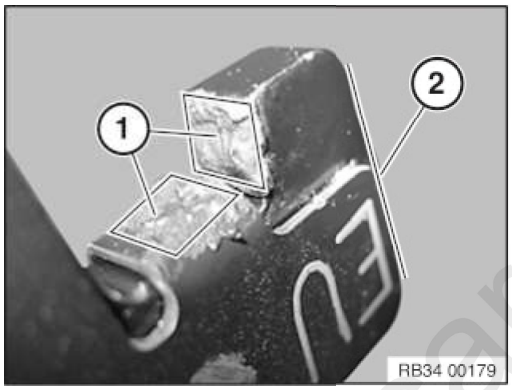
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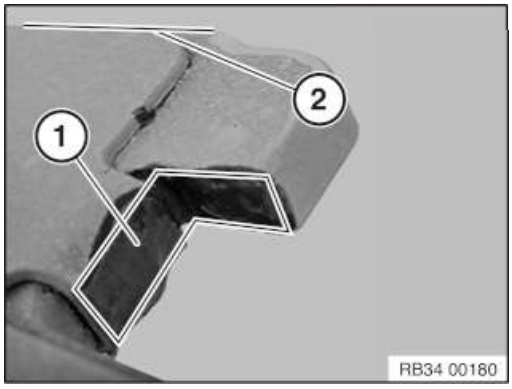
So as not to damage the surface coating, if possible do not mechanically clean the guide surfaces (1 and 2) for the brake pads on the brake calliper mounting bracket. Clean guide surfaces (1 and 2) with brake cleaner and apply a thin coating of brake pad paste.



So as not to damage the surface coating, if possible do not mechanically clean the guide surfaces (1 and 2) for the brake pads on the brake calliper mounting bracket. Clean guide surfaces (1 and 2) with brake cleaner and apply a thin coating of brake pad paste.



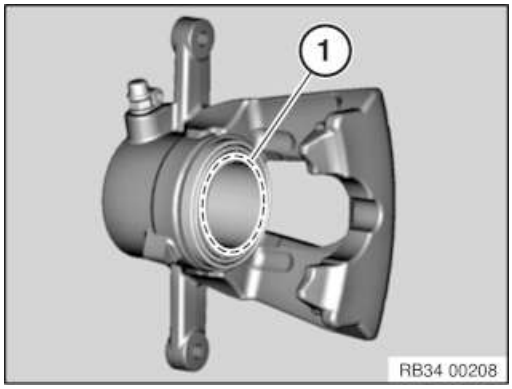
Lightly coat the T-head of the inner brake pad with brake pad paste in area (1 and 2).



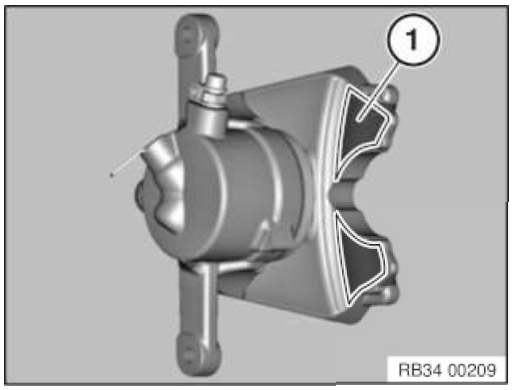
Lightly coat the T-head of the outer brake pad with brake pad paste in area (1 and 2).

Collette brake (made by TRW), 1-piston brake caliper (model ranges: MINI, 1-Series, 5-Series, 6-Series, Z4)

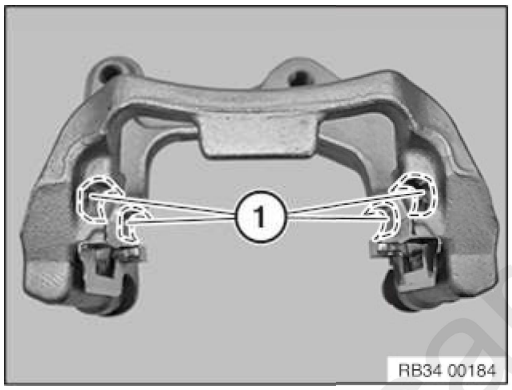
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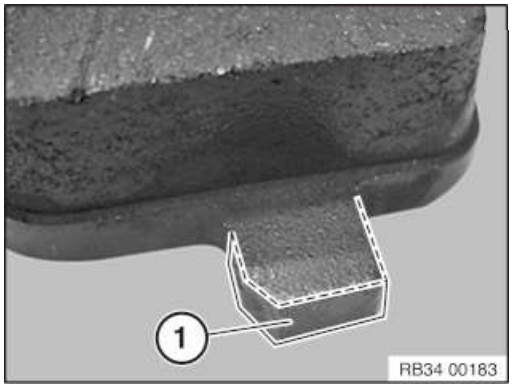
Clean contact surface (1) of brake piston with brake cleaner and apply a thin coating of brake pad paste.



Clean contact surface (1) of brake caliper with brake cleaner and apply a thin coating of brake pad paste.



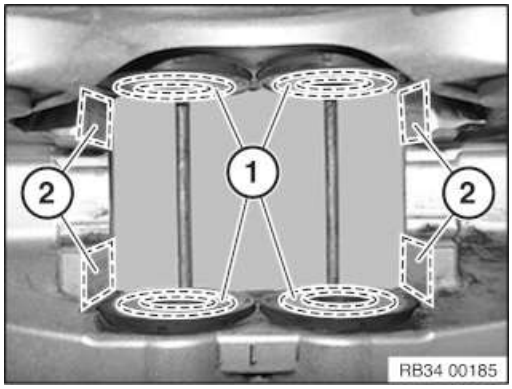
So as not to damage the surface coating, if possible do not mechanically clean the guide surface (1) for the brake pads on the brake caliper mounting bracket. Clean guide surface (1) with brake cleaner and apply a thin coating of brake pad paste.



Apply a thin coating of brake pad paste to both sides of T-head of brake pad in area (1).

P 4.40 brake (made by Brembo), 4-piston fixed caliper brake (model ranges: MINI, 1-Series, 3-Series, 4-Series, 5-Series, 6-Series, 7-Series, 8-Series, X5, Rolls-Royce)

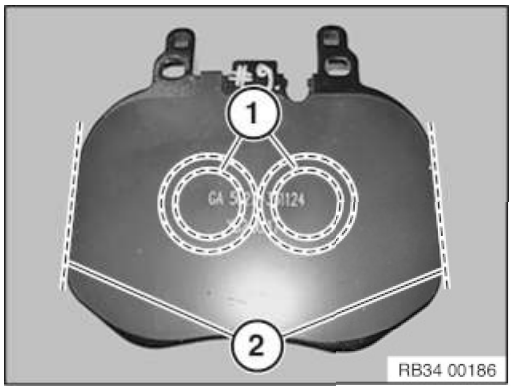
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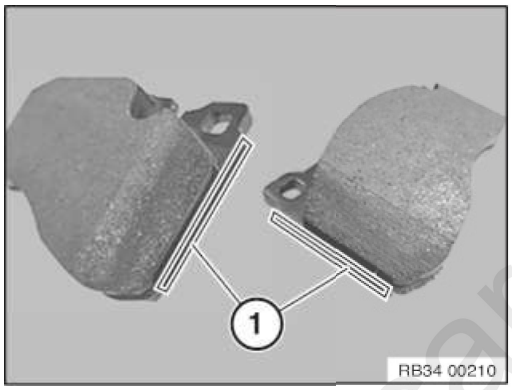
Clean contact surface (1) of brake piston with brake cleaner and apply a thin coating of brake pad paste.

So as not to damage the surface coating, if possible do not mechanically clean the guide surfaces (2) for the brake pads on the brake calliper mounting bracket. Clean guide surface (2) with brake cleaner and apply a thin coating of brake pad paste.

Clean both inner and outer guide surfaces (2) and apply a thin coating of brake pad paste.

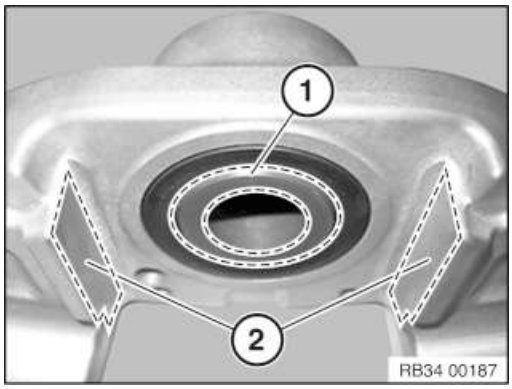


Lightly coat both sides of the contact surface in area (1 and 2) with brake pad paste.



Lightly coat the brake pad contact surface on both sides in area (1) with brake pad paste.

P 4.40 brake (made by Brembo), 2-piston fixed caliper brake (model ranges: 1 Series, 2 Series, 3 Series; does not apply to M2 F87)

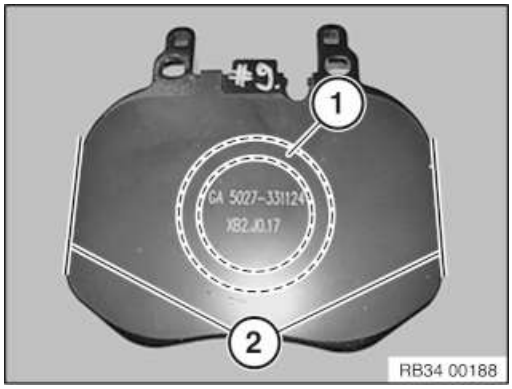


Clean contact surface (1) of brake piston with brake cleaner and apply a thin coating of brake pad paste.

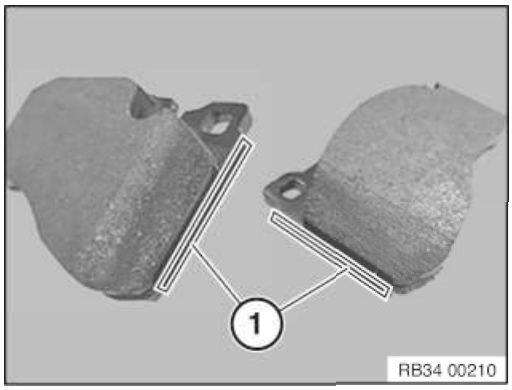
So as not to damage the surface coating, if possible do not mechanically clean the guide surfaces (2) for the brake pads on the brake calliper mounting bracket. Clean guide surface (2) with brake cleaner and apply a thin coating of brake pad paste.

Clean both inner and outer guide surfaces (2) and apply a thin coating of brake pad paste.

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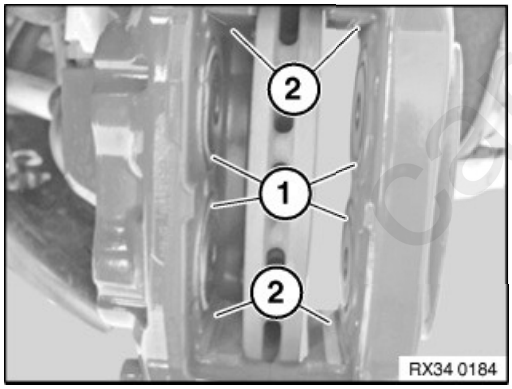


Lightly coat both sides of the contact surface in area (1 and 2) with brake pad paste.



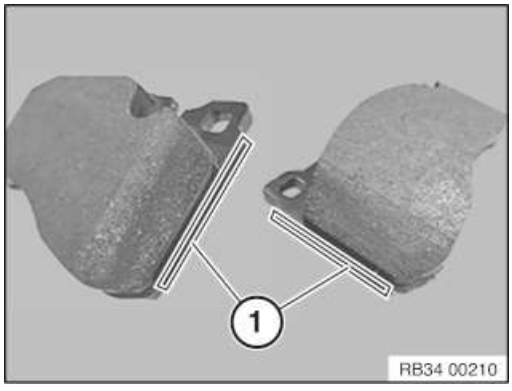
Lightly coat the brake pad contact surface on both sides in area (1) with brake pad paste.

Brake (made by Brembo), 4-piston fixed caliper brake (model ranges: MINI F5x sport brake)



Check dust boot (1) for damage and replace if necessary.

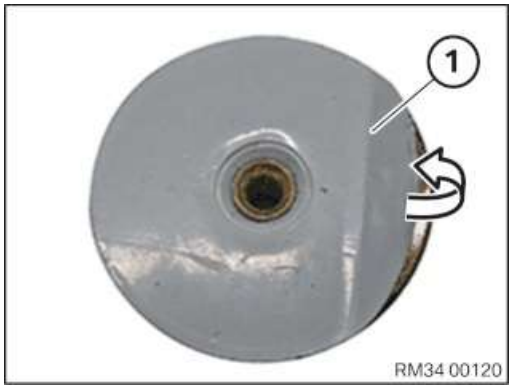
Clean brake caliper compartments (2) and apply a thin coating of brake pad paste.



Lightly coat the brake pad contact surface on both sides in area (1) with brake pad paste.

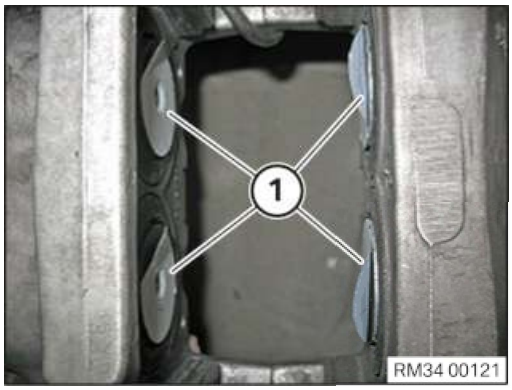
Do not grease the brake lining backplate and thoroughly clean it with brake cleaner!

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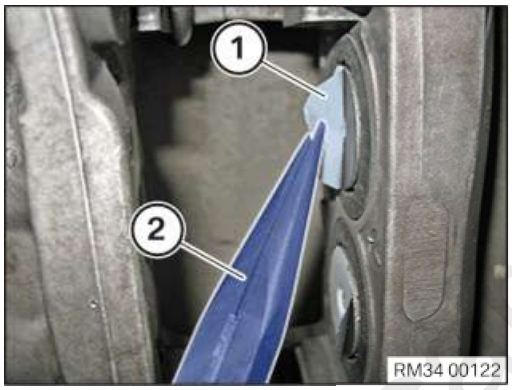


Only use new claw plates!

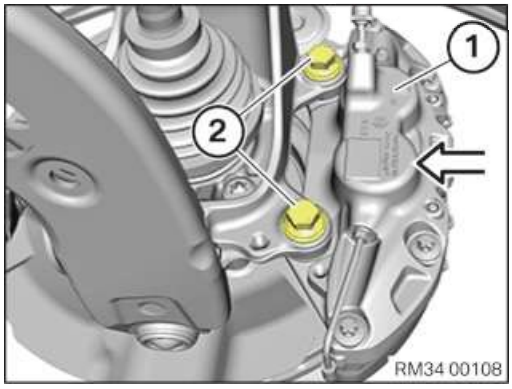
Slightly raise the protective film (1) at a place.



Insert the claw plates (1) into the brake pistons.



Pull off the protective film (1) with long-nose pliers (2).**Attention!**
The bonding surface of the claw plates must not be touched!

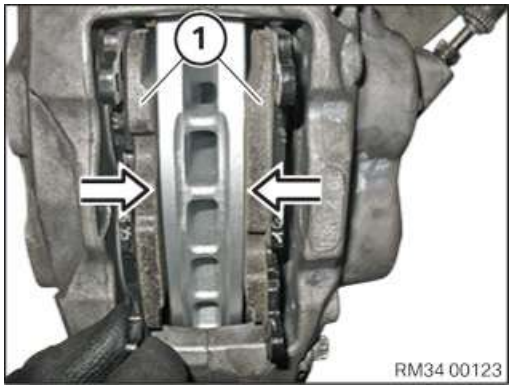


Install the brake caliper (1) in direction of arrow.

Parts: Replace screws (2).

Insert screws (2) and tighten.

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Install the brake pad (1).**Attention!**

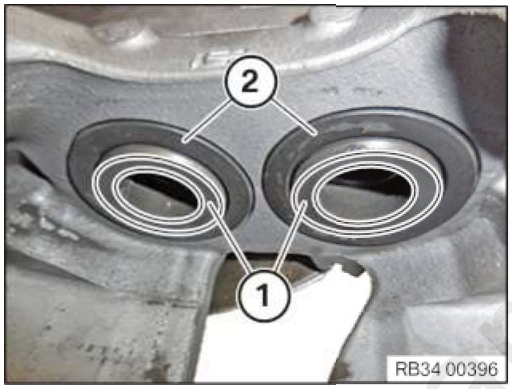
The brake pads must not touch the bonding surface of the claw plates when inserting!

Apply the brake pads to the brake disc and insert.

In order to ensure a complete bonding of the claw plates with the brake pads, the following instruction must be strictly adhered to:

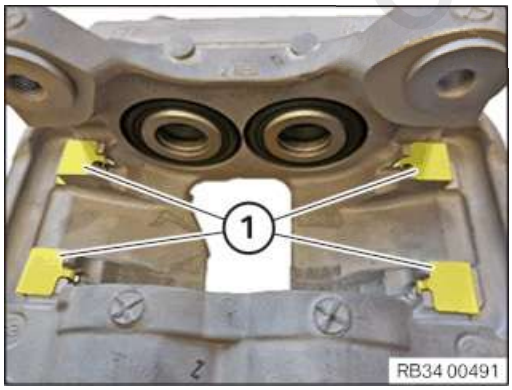
Strongly press the brake pedal and hold it for at least 1 min!

Brake (made by Continental), 4-piston fixed caliper brake (model ranges: 7-Series (G11, G12)



Clean the contact surface (1) of the brake piston (4 pieces) with brake cleaner.

Check the dust boots (2) and renew as necessary.

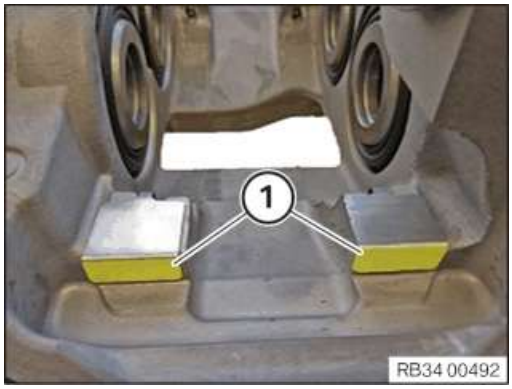


Always renew retaining plates 1!

Mount retaining plate 1.

It is paramount that the slide panels are correctly positioned in the guides!

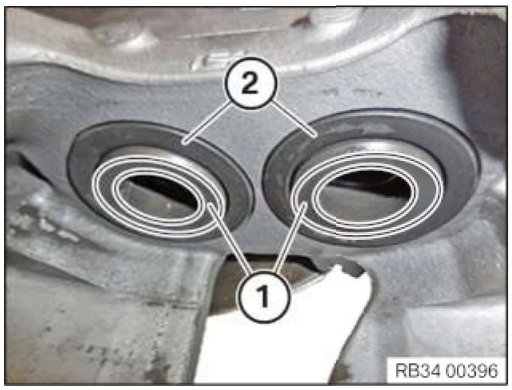
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So as not to damage the surface coating, if possible do not mechanically clean the guide surfaces for the brake pads on the brake caliper mounting bracket.

Apply a thin layer of brake pad paste to the surfaces of the sliding plates (1).

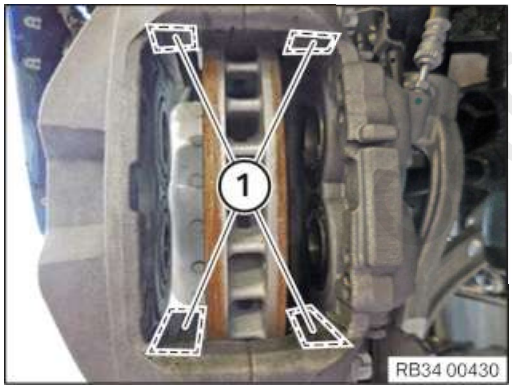
Brake (made by Brembo), 4-piston fixed caliper brake (model ranges: 7-Series (G11, G12)



Clean the contact surface (1) of the brake piston (4 pieces) with brake cleaner.

Adhesive residues must be completely removed.

Check the dust boots (2) and renew as necessary.



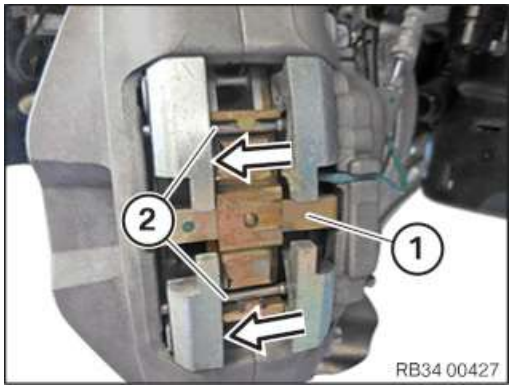
To prevent damage to the surface coating, do not clean the guide surfaces (1) for the brake pads on the brake calliper mechanically, if possible.

Clean guide surfaces (1) with brake cleaner and apply a thin coating of brake pad paste.



Remove the protective film of the adhesive layer (1) from the brake pads.

Do not touch the adhesive layer!



Insert brake pads in the brake caliper, making sure the adhesive layer does not touch the brake pistons.

Fit retaining clip (1).

Drive in the locking pins (2) in the direction of the arrow.

Attention!

After the brake pads have been installed they must immediately be bonded to the brake pistons:

- Step on the brake pedal to the floor and hold the pressure for one minute. This causes the brake pads to adhere to the brake pistons.

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34 21 812 Overhauling left or right rear brake caliper (brake caliper removed)

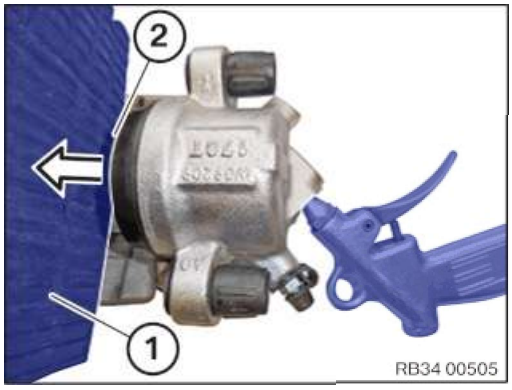
Necessary preliminary tasks:

- Remove the rear brake caliper.

Warning!

In the following operation, large forces occur at the brake caliper piston.

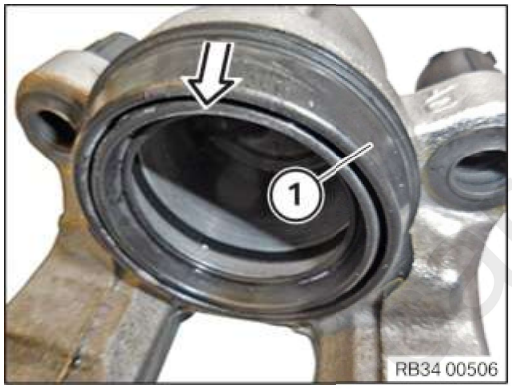
Danger of injury!



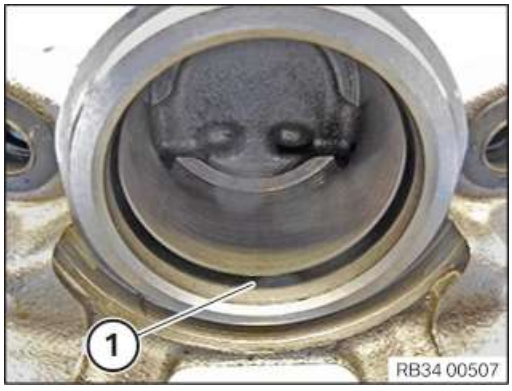
Carefully force piston out through connecting bore with compressed air.

To protect the piston, place a protective plate (e.g. hardwood or rubber plate) in the caliper recess.

Do not grip piston with fingers - pinch hazard!



Press off dust boot (1).



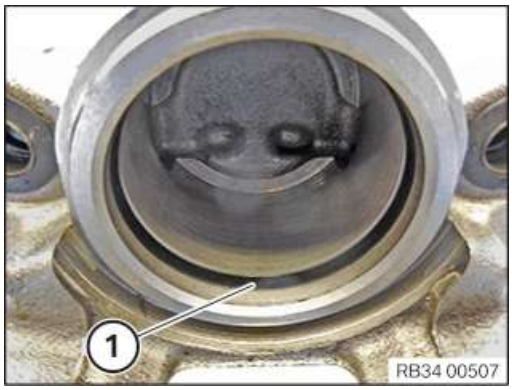
Carefully remove sealing ring (1).

Clean cylinder bores and parts and dry with compressed air.

Thoroughly inspect cylinder bore, piston and flange surfaces for damage.

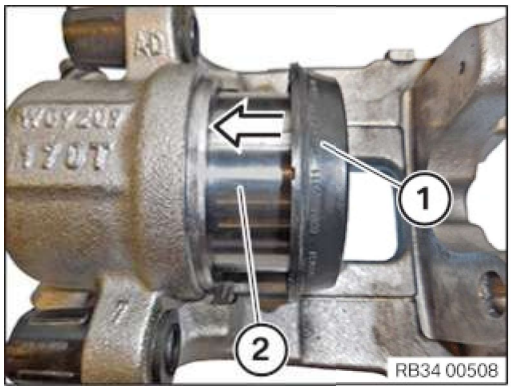
Material removing rework on cylinders and pistons is not permitted.

Installation:



Insert sealing ring (1).

Apply a light coat of ATE brake cylinder paste to cylinder bore, piston and sealing ring,



Fit dust boot (1) in annular groove of piston (2).

Attention!

Do not twist brake piston.

Press piston into cylinder bore.

Evenly press dust boot (1) onto brake caliper housing up to limit position.

Note:

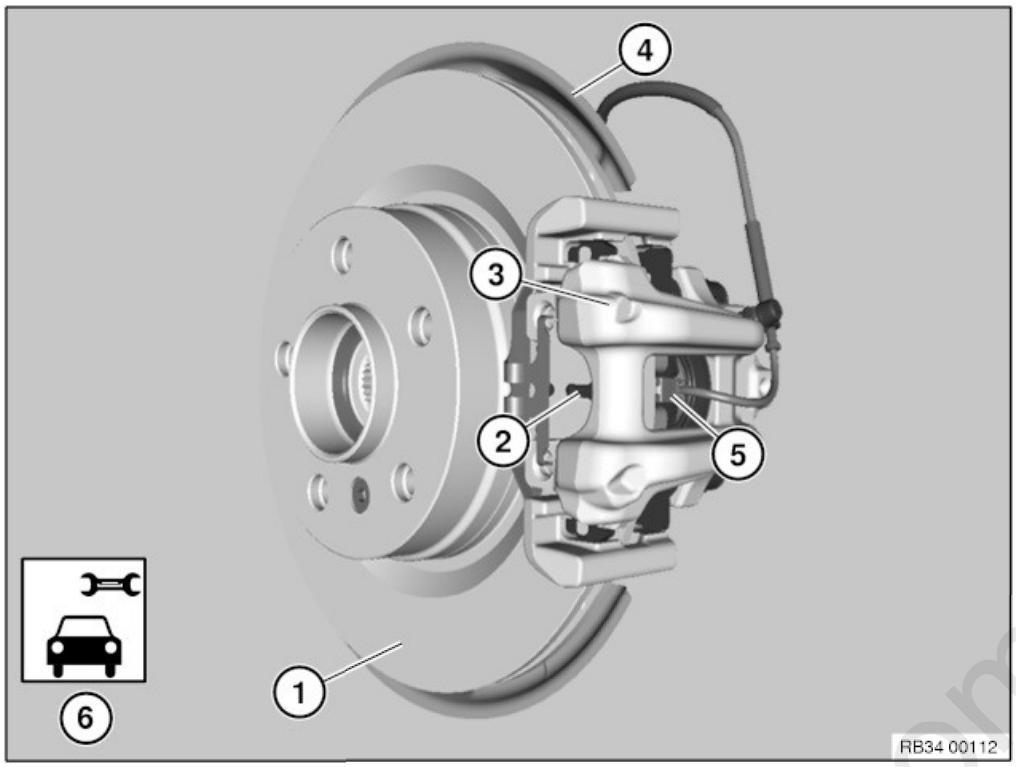
The area between the dust boot and the brake caliper housing must be kept dry. It must not come into contact with Ate brake cylinder paste or brake fluid so as to ensure that the dust boot is perfectly fitted.

Required follow-up work:

- Install the rear brake caliper.

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34 21 ... Overview of rear brake



1 Brake disc
2 Brake pad
3 Brake calliper
4 Brake guard plate
5 Brake pad wear sensor
6 Checking brake pad thickness

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34 21 947 Precision-turning both rear brake discs on both sides

Attention!

Always precision-turn both sides of both brake discs on one axle.

Maximum machining dimension per friction ring side is 0.8 mm!

Minimum brake disc thickness (MIN TH)

Brake discs of M models (Compound brake discs) must **not** be machined!

Only one brake pad set may be used up on brake discs which have been lathe-turned to minimum thickness (MIN TH).



Mobile brake disc lathe:

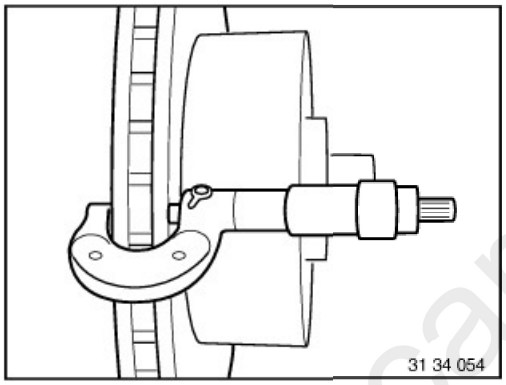
Attention!

Only BMW-approved brake disc lathes may be used!

In the case of mobile brake disc lathes, the brake caliper and the caliper carrier must be removed.

The brake discs remain on the vehicle.

Please refer to the equipment manufacturer's operating instructions for the exact procedure.



After fine-grinding the brake discs, measure the thickness difference inside the braking surfaces at 8 points with an caliper gauge.

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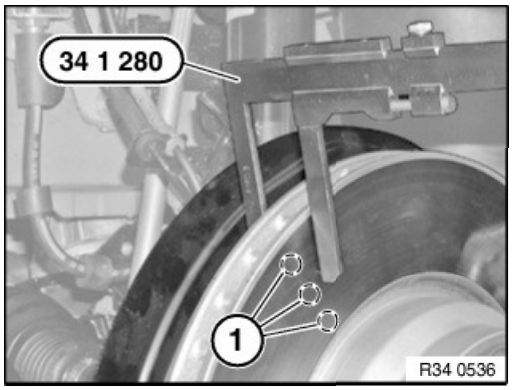
34 21 320 Removing and installing/renewing both brake discs

Special tools required:

- 34 1 280

Necessary preliminary work:

- Remove and clean brake pads.



Check minimum brake disc thickness:

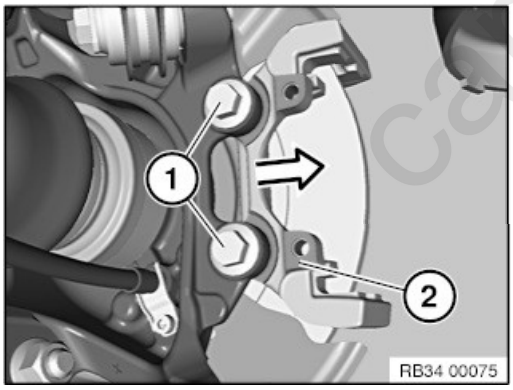
- Position special tool 34 1 280 at three measuring points in area (1) and measure.
- Compare measuring result and lowest value with setpoint value.

If the brake discs are replaced, you must also fit new brake pads.

Always replace brake discs in pairs.

Attention!

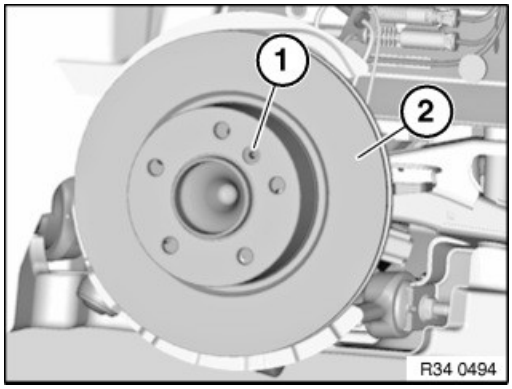
New brake pads may only be installed if the brake disk thickness is greater than the minimum brake disc thickness.



Release bolts (1) and detach caliper carrier.*Installation note:*
Renew screws.

Tightening torque 34 21 2AZ.

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Attention!

To release brake disc: Do not under any circumstances strike friction ring with a hammer or similar!

If necessary, carefully tap on base of brake disc chamber with a rubber mallet.

Clean contact surface of brake disc at wheel hub thoroughly and remove traces of corrosion.

Unevenness on contact surface may result in distortion of brake disc!

Release screw (1) and remove brake disc (2).*Installation note:* Renew screw.

Tightening torque 34 21 1AZ.

After installation:

- Adjusting parking brake
- Read and comply with notes on braking in new brake discs / brake pads.

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34 21 200 Removing and installing/replacing both rear brake pads of disc brake

Special tools required:

- 34 1 050
- 34 1 280
- 2 352 960

Caution!

- **Brake pad wear sensor: After removal it must be replaced (brake pad wear sensor loses its retention capability in the break pad).**
- **Retaining pin and expanding spring: for vehicles older than 48 months it is recommended to replace the retaining spring!**

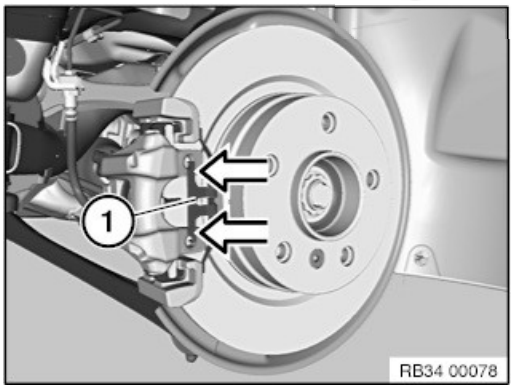
So as not to damage the surface coating, if possible do not mechanically clean the guide surfaces for the brake pads on the brake caliper mounting bracket, but rather clean with brake cleaner BMW TI. number 83 19 2 154 780 and apply a thin coating of break pad paste BMW TI. number 83 19 2 158 851 (3 gr.) or 83 19 2 158 852 (100 gr.).

Spread brake pad paste onto the marked surfaces using a brush!

Observe regulation on applying brake pad paste to brake pads and brake anchor plates!

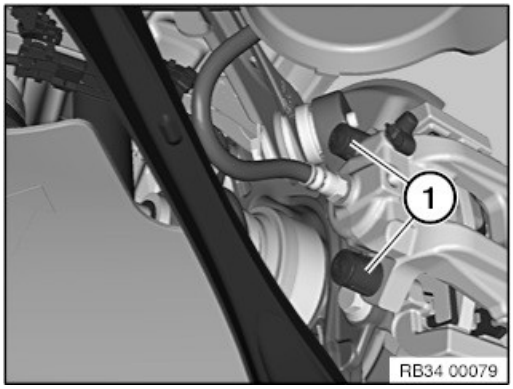
Necessary preliminary work:

- Remove wheels.
- Remove brake pad wear sensor.

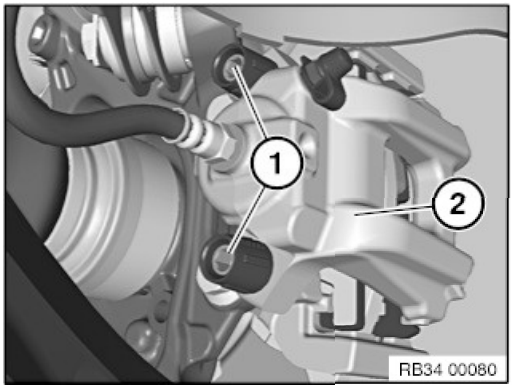


Lift out retaining spring (1).

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Remove cover plug (1).



Caution!

Tie brake calliper back and do not allow to hang from brake hose.

Unscrew guide bolts (1).

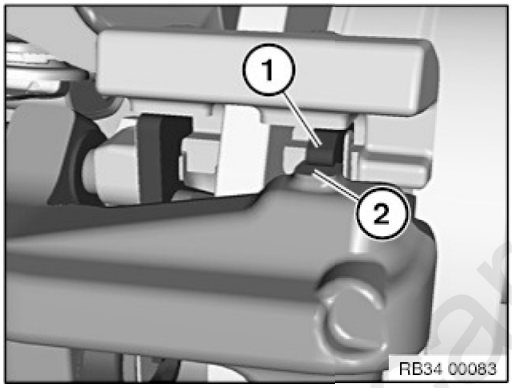
Remove brake caliper (2) by pulling forward.

Installation note:
Tightening torque 34 21 4AZ.

Clean guide screws only; do not grease.

Check thread.

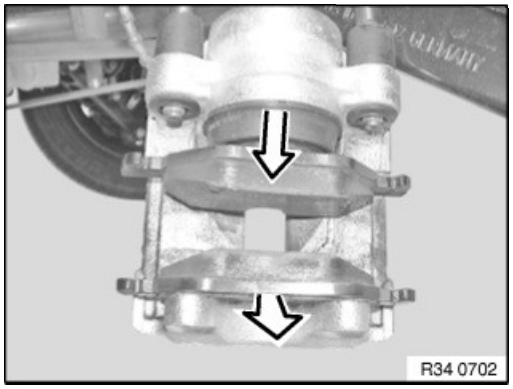
Replace all guide screws which are not in perfect condition.



Installation note:
When putting on the brake caliper, it is absolutely necessary to make sure that the T-head (1) of the outer brake pad is seated correctly on the contact surface (2).

Caution!

With brake pads that are already partially worn, pay particular attention that the position of the outer brake pad in relation to the contact surface (2) is ensured!



Remove outer brake pad.

Inner brake pad is located with its spring in the piston.

Caution!

Mark any worn brake pads.

In the event of one-sided brake pad wear, do not change brake pads round.

Clean brake pads.

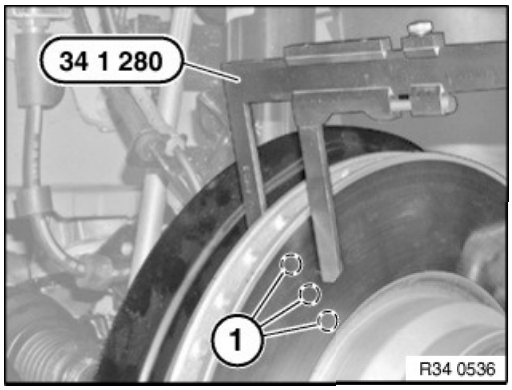
Do not grease backs of brake pads sleeve.

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Press back brake pads and piston with special tool 2 352 960 .**Caution!**
When forcing piston back:

- Pay attention to brake fluid level in expansion tank; brake fluid that spills over will damage paintwork.

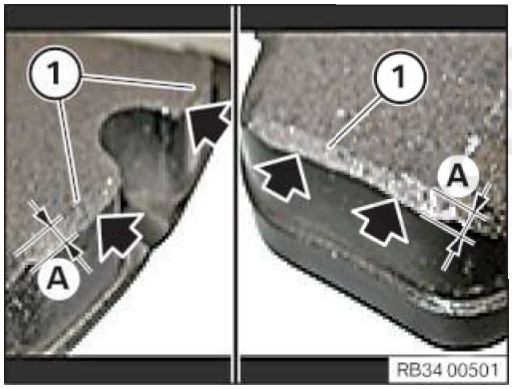


Check minimum brake disc thickness:

- Position special tool 34 1 280 at three measuring points in area (1) and measure.
- Compare measuring result and lowest value with setpoint value.



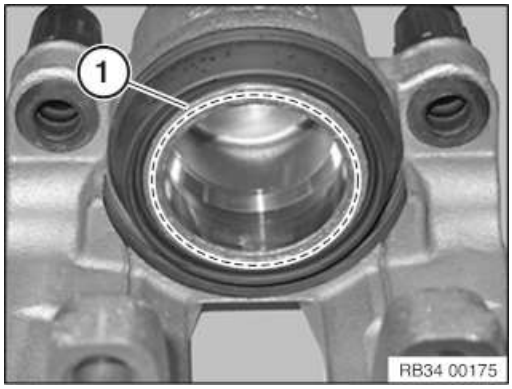
Caution!
New brake pads may only be installed if the brake disk thickness is greater than the minimum brake disc thickness.



Caution!
If new brake pads are mounted on a brake disc, the following must be observed:

- Bevel edges in the area (1) slightly (dimension A must not exceed maximum 1 mm).

These procedures applies for all the following described brake systems.

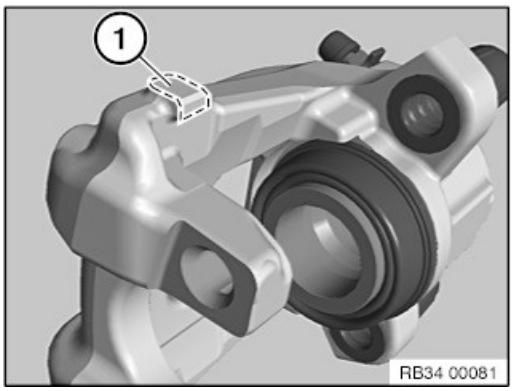


Check dust boot for damage and renew if necessary.

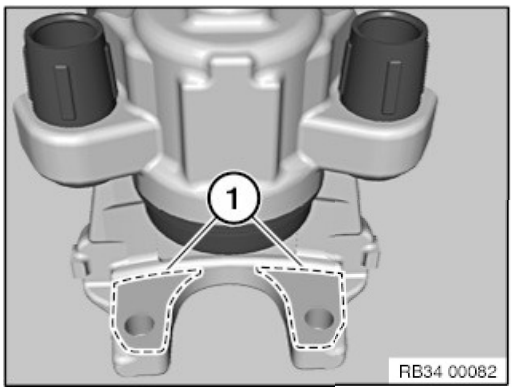
Clean contact surface (1) of brake piston with brake cleaner and apply a thin coating of brake pad paste.

Caution!
Dust boot must not come into contact with brake pad paste as this may cause the dust boot to swell.

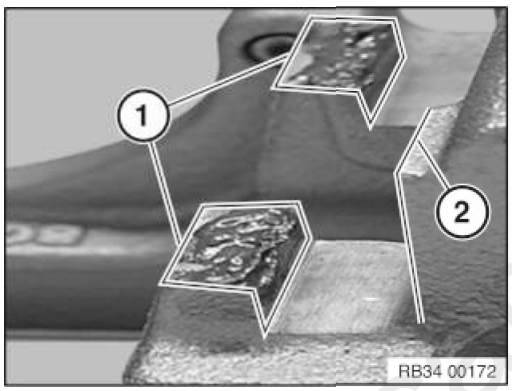
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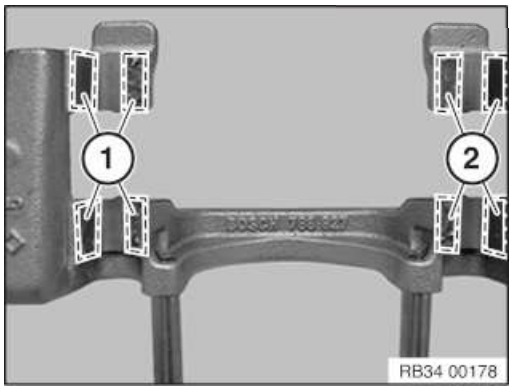
Clean contact surfaces (1) of T-head/brake caliper housing with brake cleaner and apply a thin coating of brake pad paste.



Clean contact surface (1) of brake caliper with brake cleaner and apply a thin coating of brake pad paste.

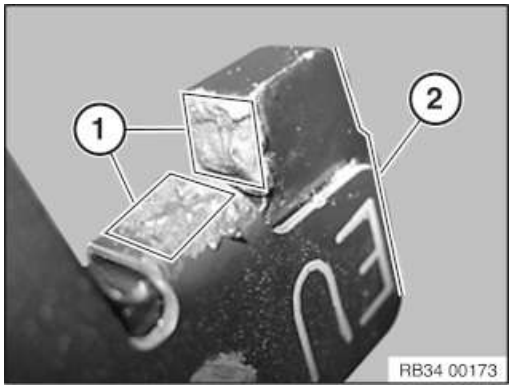


So as not to damage the surface coating, <u>if possible do not mechanically clean</u> the guide surfaces (1) for the brake pads on the brake caliper mounting bracket. Clean guide surfaces (1 and 2) with brake cleaner and apply a thin coating of brake pad paste.

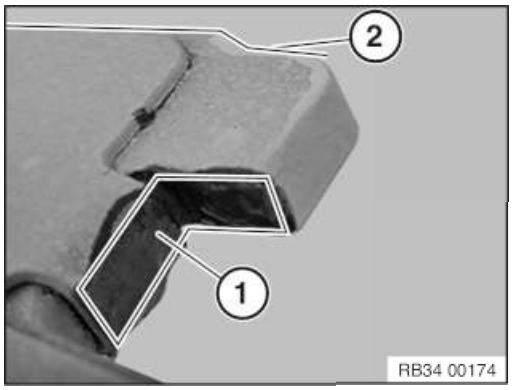


So as not to damage the surface coating, <u>if possible do not mechanically clean</u> the guide surfaces (1 and 2) for the brake pads on the brake calliper mounting bracket. Clean guide surfaces (1 and 2) with brake cleaner and apply a thin coating of brake pad paste.

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Apply a thin coating of brake pad paste to T-head of inner brake pad in area (1) and (2).



Apply a thin coating of brake pad paste to T-head of outer brake pad in area (1) and (2).

Note:

After completing repair work:

- Fully depress brake pedal several times so that brake pads contact brake discs.
- When installing new brake pads at front and rear axles, brake fluid level must be brought up to "MAX" marking.
- Read and comply with notes on braking in new brake discs / brake pads.
- When exchanging brake pads, reset CBS display in accordance with factory specification.

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34 21 200 Removing and installing/replacing brake pads on both rear disc brakes (Brembo)

Special tools required:

- 34 1 000
- 34 1 050
- 34 1 280
- 2 352 960

Attention!

- **Brake pad wear sensor: After removal it must be replaced (brake pad wear sensor loses its retention capability in the break pad).**
- **Retaining pins and expanding spring: for vehicles older than 48 months it is recommended to replace the retaining spring!**

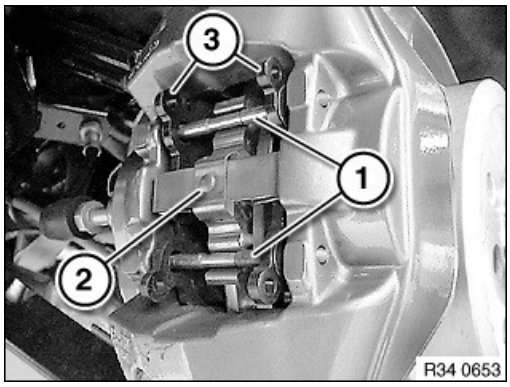
So as not to damage the surface coating, if possible do not mechanically clean the guide surfaces for the brake pads on the brake caliper mounting bracket, but rather clean with brake cleaner BMW part number: 83 19 2 154 780 and thinly coat with brake pad paste BMW part number 83 19 2 158 851 (3 gr.) or 83 19 2 158 852 (100 gr.).

Spread brake pad paste onto the marked surfaces using a brush!

Observe regulation on applying brake pad paste to brake pads and brake anchor plates!

Necessary preliminary tasks:

- Remove wheels.
- Remove brake pad wear sensor



Drive out retaining pins (1).

Remove expanding spring (2).

Pull out brake pads (3) with special tool 34 1 000 .

Attention!

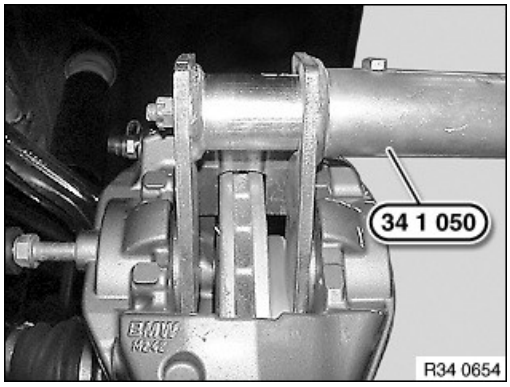
Mark any worn brake pads.

In the event of one-sided brake pad wear, do not change brake pads round.

Clean brake pads.

Do not grease backs of brake pads sleeve.

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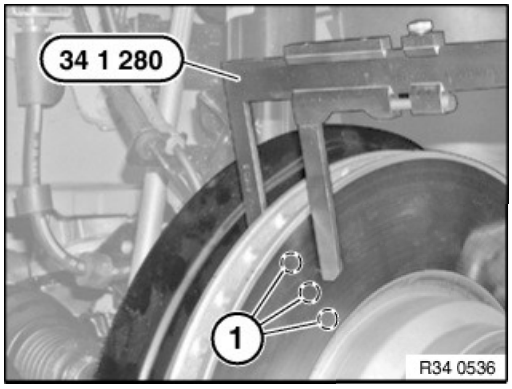


Attention!

When pressing down piston, note brake fluid level in expansion tank.

Overflowing brake fluid will damage the paintwork.

Turn piston back fully with special tool 2 352 960 .



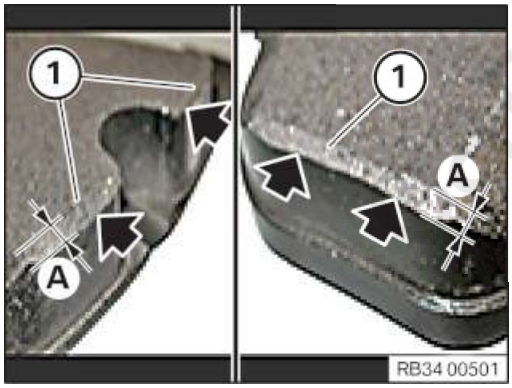
Check minimum brake disc thickness:

- Position special tool 34 1 280 at three measuring points in area (1) and measure.
- Compare measuring result and lowest value with setpoint value.



Attention!

New brake pads may only be installed if the brake disk thickness is greater than the minimum brake disc thickness.

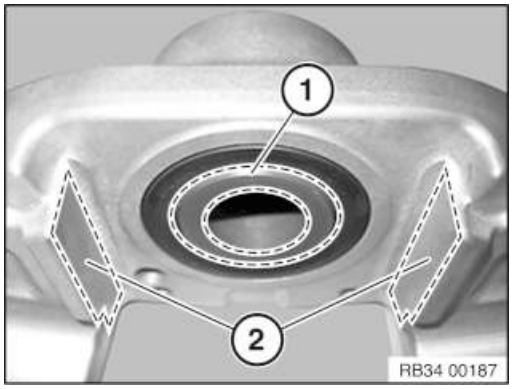


Attention!

If new brake pads are mounted on a brake disc, the following must be observed:

- Bevel edges in the area (1) slightly (dimension A must not exceed maximum 1 mm).

These procedures applies for all the following described brake systems.



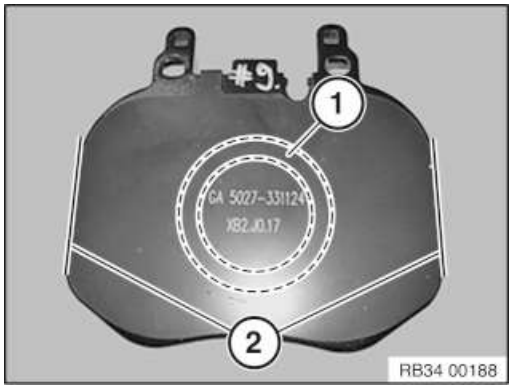
Check dust boot for damage and renew if necessary.

Clean contact surface (1) of brake piston with brake cleaner and apply a thin coating of brake pad paste.

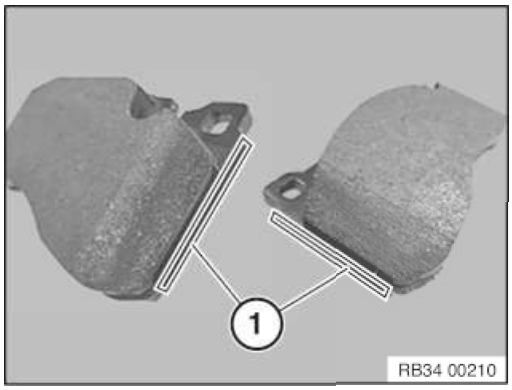
So as not to damage the surface coating, if possible do not mechanically clean the guide surfaces (2) for the brake pads on the brake calliper mounting bracket. Clean guide surface (2) with brake cleaner and apply a thin coating of brake pad paste.

Clean both inner and outer guide surfaces (2) and apply a thin coating of brake pad paste.

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Lightly coat both sides of the contact surface in area (1 and 2) with brake pad paste.



Lightly coat the brake pad contact surface on both sides in area (1) with brake pad paste.

Note:

After completing work:

- Fully depress brake pedal several times so that brake pads contact brake discs.
- When installing new brake pads at front and rear axles, the brake fluid level must be brought up to the ”maximum” mark.
- Read and comply with notes on braking in new brake discs / brake pads.
- When exchanging brake pads, reset CBS display in accordance with factory specification.

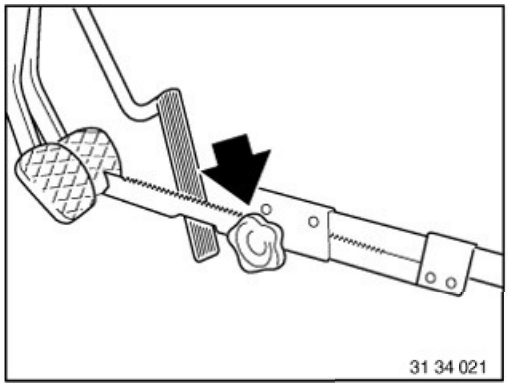
cardiagn.com

34 21 745 Removing and installing/replacing left or right rear brake caliper

Necessary preliminary tasks:

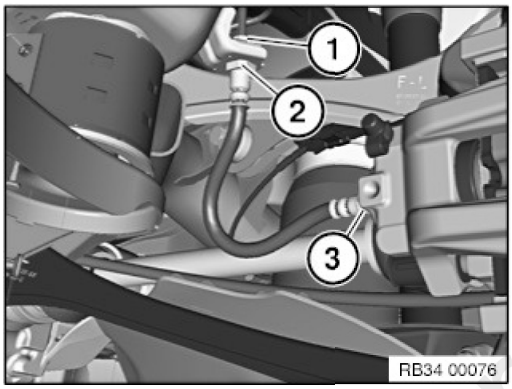
- Read and comply with General Information.
- Remove brake pads.

After completing repair work: Bleed brake system.



Press brake pedal down to floor and secure with pedal support.*Note:*
The pedal support may only be released when the brake lines are reconnected.

This prevents brake fluid from emerging from the expansion tank and air from entering the system when the brake lines are opened.



Important!

Grip brake hose at square head (2) so that connecting piece cannot rotate in retaining bracket.

Disconnect brake hose from brake line (1).

Installation note:
Tightening torque 34 32 1AZ.

Detach brake hose from brake caliper (3).

Installation note:
Tightening torque 34 32 3AZ.

Important!

Never twist brake hose when installing it and avoid all contact with parts attached rigidly to the body.

Note:
First tighten brake hose on brake caliper.

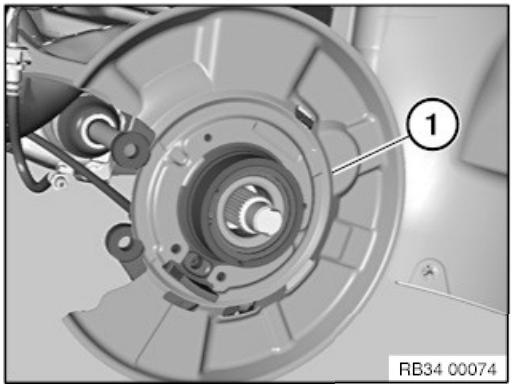
Insert brake hose in bracket and screw onto brake pipe.

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34 21 280 Removing and installing/replacing rear left (or right) protective plate

Necessary preliminary work:

- Removing the retaining ring.



Removing the brake anchor plate (1).*Installation note:*
If applicable, clean the contact surface on the wheel carrier.

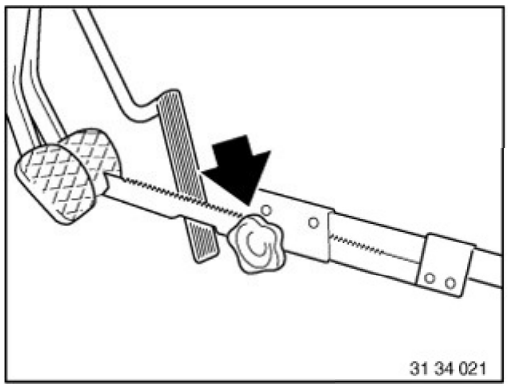
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34 00 xxx Removing and installing/replacing vent valve for brake caliper

Necessary preliminary work:

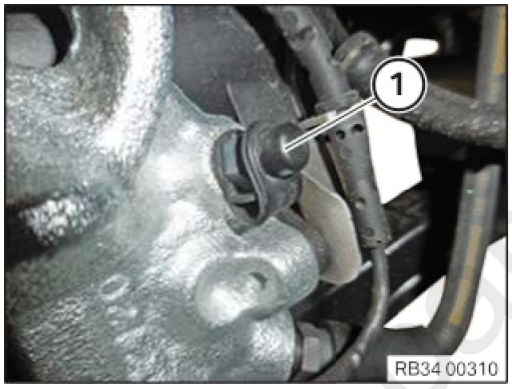
- Raise vehicle.

Removal:

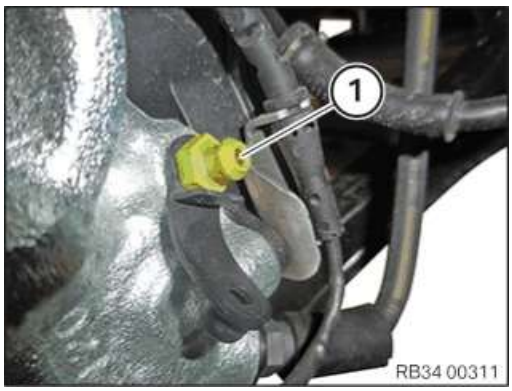


Press brake pedal down to floor and secure with pedal support.*Note:*
The pedal support may only be released when the brake lines are reconnected.

This prevents brake fluid from emerging from the expansion tank and air from entering the system when the brake lines are opened.



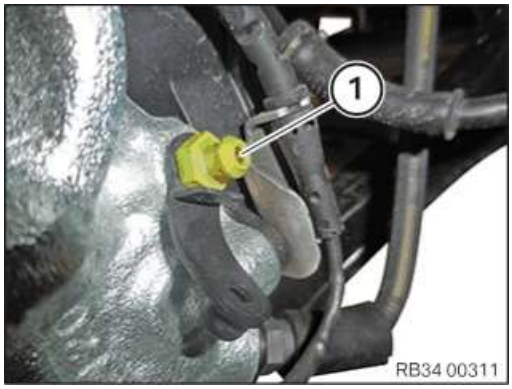
Remove the dust cap (1).



Remove vent valve (1).**Attention!**
Collect escaping brake fluid in a suitable collecting vessel.

Installation:

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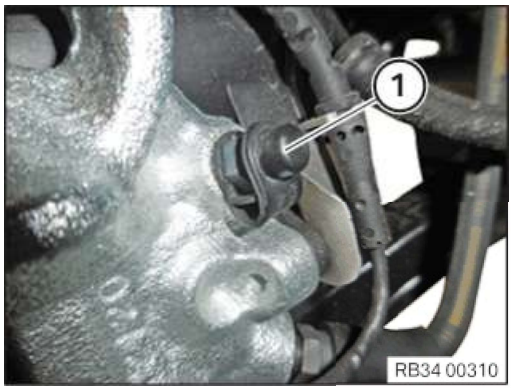


Attention!

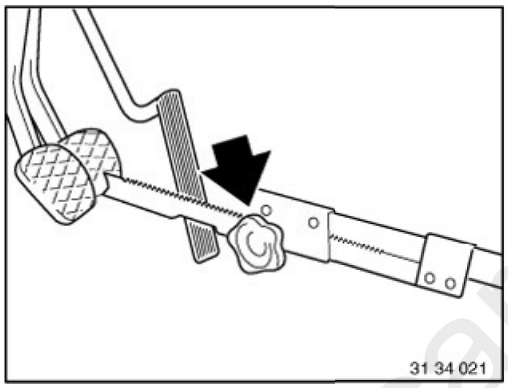
The bore hole must be free of contamination!

Install vent valve (1).

Tightening torque: 34 00 1AZ.



Mount the dust cap (1).



Remove pedal support.

Required reworking:

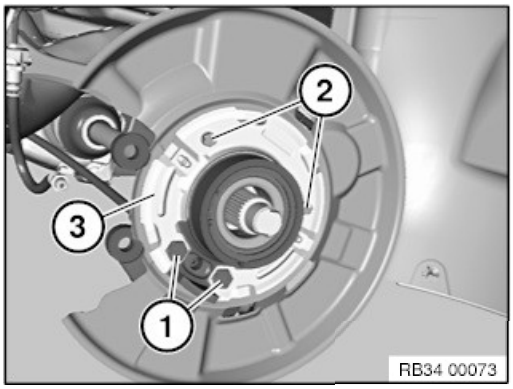
- Bleed brake system.

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34 21 131 Replace the retaining ring for the left (or right) brake pads

Necessary preliminary tasks:

- Remove brake shoe expander.
- Remove wheel hub.



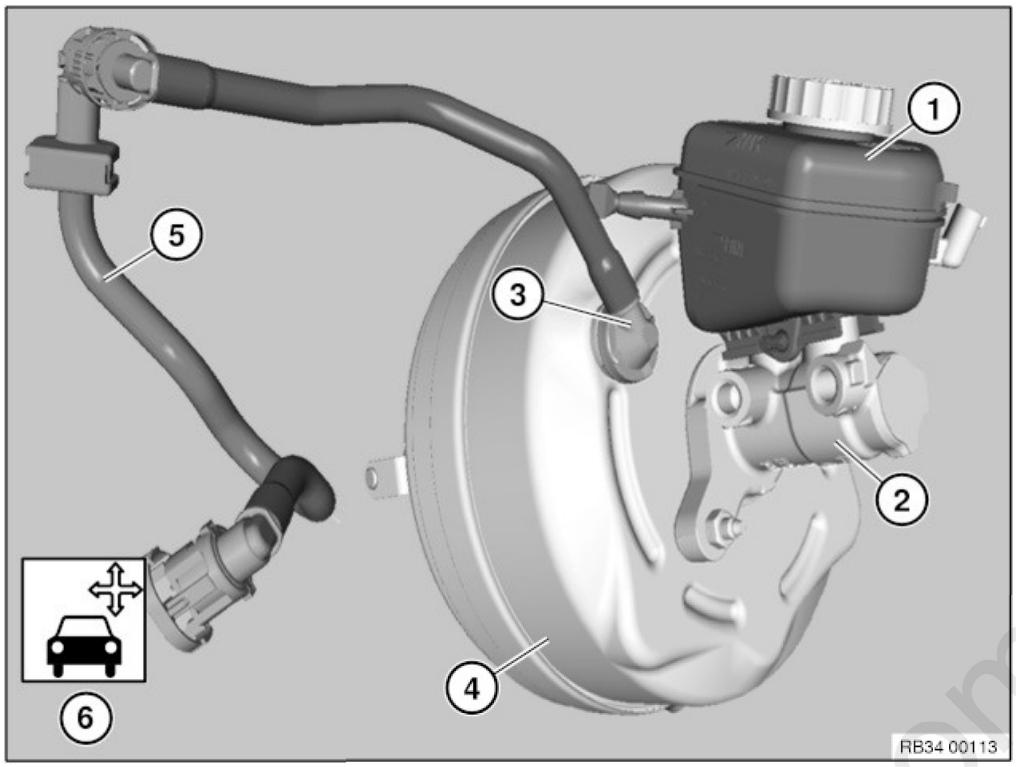
Release screws (2) and remove caliper carrier (3).

Release screws (1).

Installation note:
Tightening torque 34 21 3AZ.

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34 31 ... Overview of brake master cylinder / brake booster



1 Expansion tank
2 Brake master cylinder
3 Non-return valve
4 Brake servo
5 Vacuum hose
6 Bleed braking system

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34 31 181 Removing and installing / replacing expansion tank for hydraulic brake control

Necessary preliminary tasks:

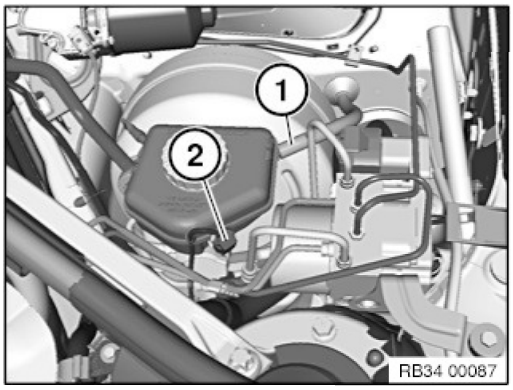
- Read and comply with General Information.
- Remove cover in engine compartment, left.

Only on F80,F82,F83:

- Remove tension strut on spring strut dome.

After completing repair work:

- Bleed braking system

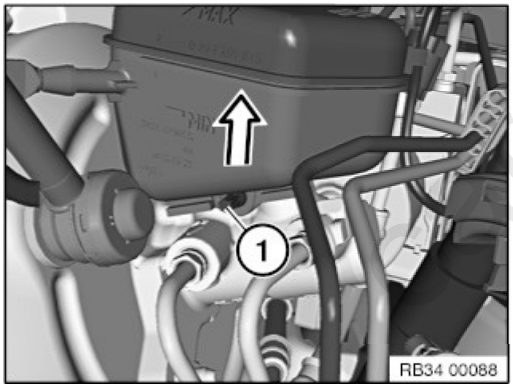


Note:
Extract brake fluid out of expansion tank. Use a suction bottle used exclusively for drawing off brake fluid.

Do not reuse drawn out brake fluid.

Pull off supply hose (1) of clutch hydraulic system if necessary.

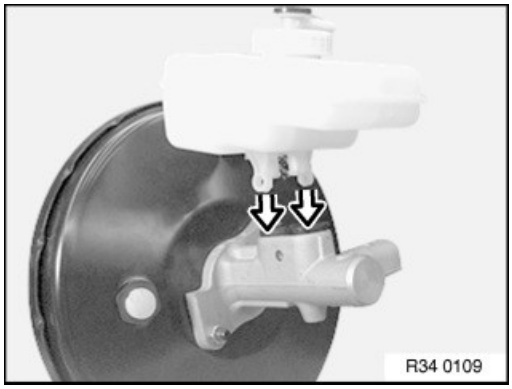
Unfasten plug connection (2) and disconnect.



Loosen the lock screw (1).

Installation note:
Tightening torque: 34 31 2AZ.

Pull expansion tank in direction of arrow vertically out of tandem brake master cylinder.



Important!

Check rubber plug in tandem brake master cylinder for damage and replace if necessary.

Push the expansion tank vertically onto the tandem brake master cylinder.

34 31 505 Removing and installing / replacing master brake cylinder for DSC

Special tools required:

- 32 1 270

Necessary preliminary work:

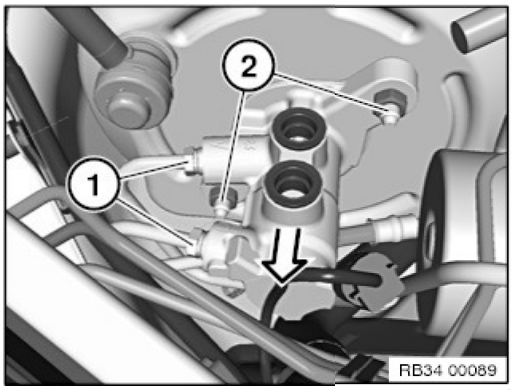
- Read and comply with General Notes.
- Remove expansion tank.

After completing repair work:

- Bleeding brake system with DSC.

Important!

Before beginning work, fully press the brake pedal several times to reduce the vacuum pressure in the brake servo.



Important!

Do not bend brake lines.

Unfasten brake lines (1).

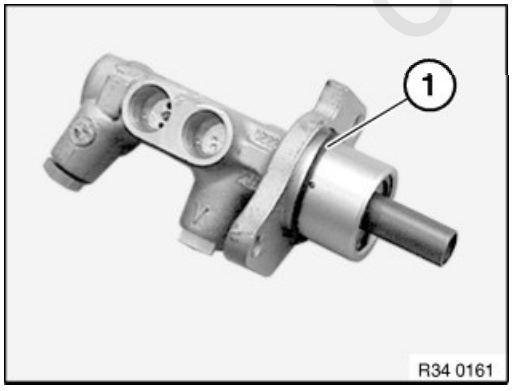
Installation note:
Tightening torque 34 32 1AZ.

Close off brake lines and brake master cylinder with seal plugs 32 1 270 .

Release nuts (2) and feed brake master cylinder out of brake booster.

Installation note:
Replace self-locking nuts.

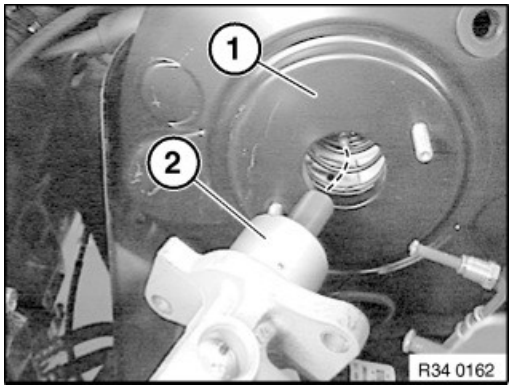
Tightening torque 34 31 1AZ.



Installation note:

Replace sealing ring.

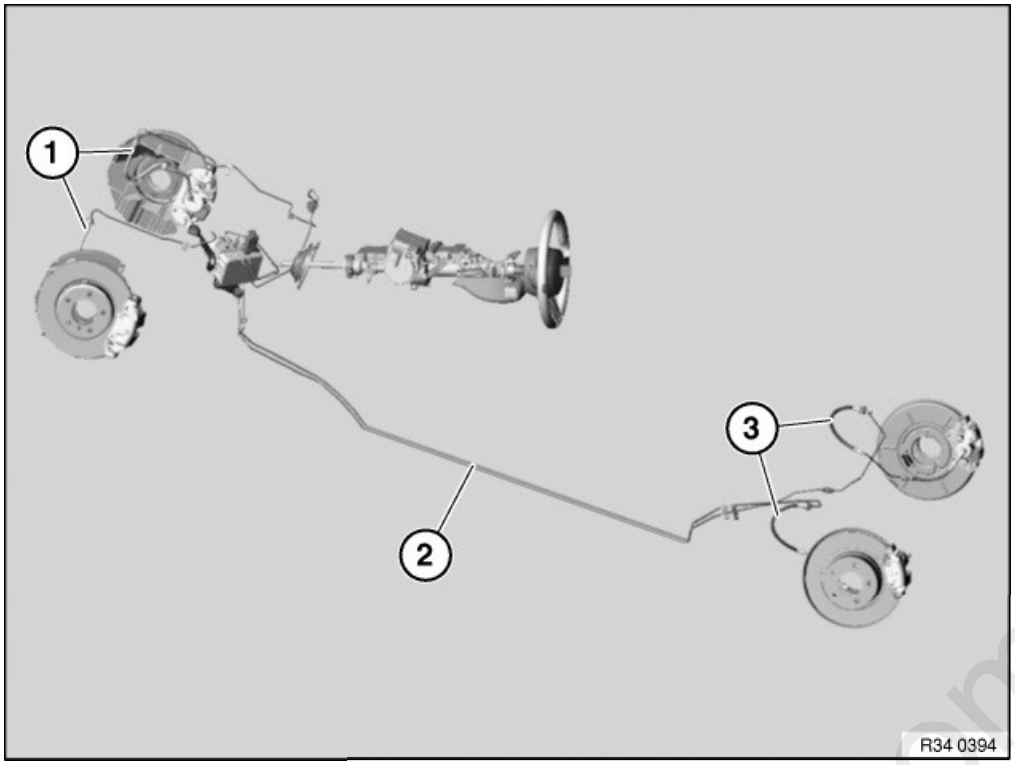
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Installation note:
When inserting the brake master cylinder (2) into the brake booster (1), make sure the pressure rod of the brake booster and that of the brake master cylinder meet each other on one level.

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34 32 ... Overview of brake lines



1 Brake hose, front 3 Brake hose, rear

2 Brake pipes

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34 32 861 Replacing all brake pipes

Special tools required:

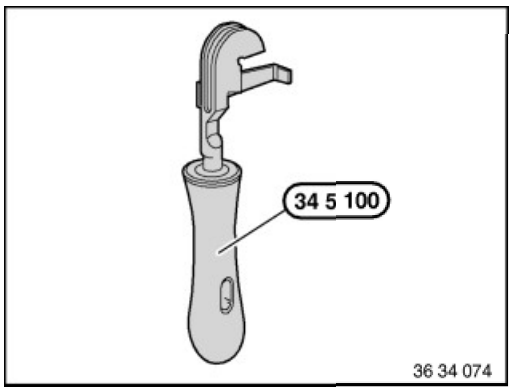
- 34 5 100

Note:
The brake lines are only supplied in the straight version and correct length with connecting nipple.

Read and comply with General Information.

After completing tasks, bleed brake system.

Observe safety information on raising the vehicle.



The new brake lines are bent into shape with bending tool 34 5 100 .

Removed brake lines can be used as templates for bending.

Attention!

- Protective coating of brake line must not be damaged during bending.
- Do not kink or bend back brake lines.
- Watch distances to rigid and movable vehicle parts.
  - Minimum of 5 mm to vehicle components fixed rigidly to body.
  - Minimum of 10 mm to moving vehicle components.
  - Minimum of 10 mm to vehicle components fixed rigidly to body, if brake line is fastened to moving vehicle components (e.g. axle support).
- Brake lines may not make contact or rub.
- Tighten down brake line couplings with torque wrench.

Installation note:
Tightening torque 34 32 1AZ.

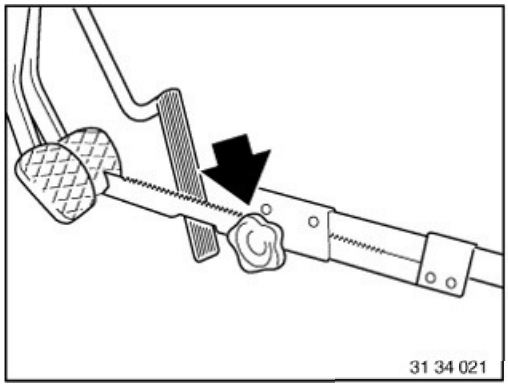
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34 32 881 Replacing front left or right brake hose

Note:

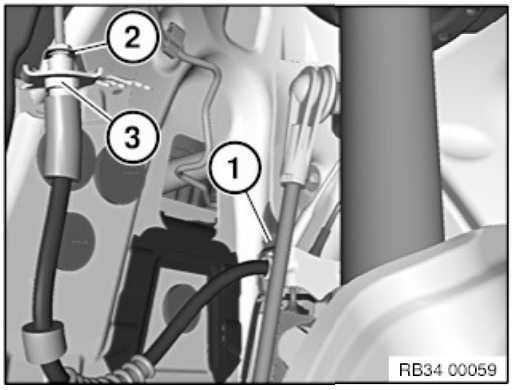
- Read and comply with General Information.

After completing repair work: Bleed brake system.



Press brake pedal down to floor and secure with pedal support.*Note:*
The pedal support may only be released when the brake lines are reconnected.

This prevents brake fluid from emerging from the expansion tank and air from entering the system when the brake lines are opened.



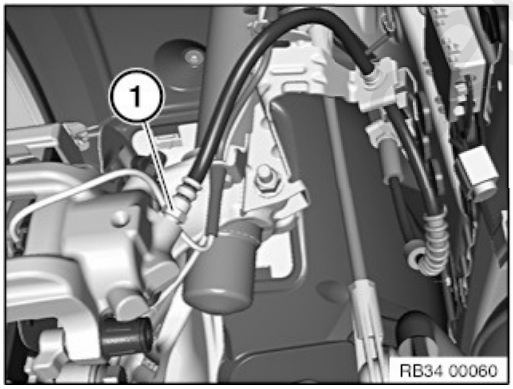
Pull out retaining clip (1) upwards.

Important!

Grip brake hose at square head (3) to prevent connector from turning in retaining bracket.

Detach brake hose from brake line (2).

Installation note:
Tightening torque 34 32 1AZ.



Detach brake hose (1) from brake caliper.*Installation note:*
Tightening torque 34 32 2AZ.

Important!

Make sure that the brake hose is routed correctly!

Brake hose must run between body and anti-roll bar link (see graphic)!



Important!

First tighten brake hose on brake caliper.

Move wheels into straight-ahead position.

Insert brake hose into holder on spring strut side and attach with retaining clip.

Insert brake hose into holder on body side and screw onto brake line.

Never twist brake hose when installing it and avoid all contact with parts attached rigidly to the body.

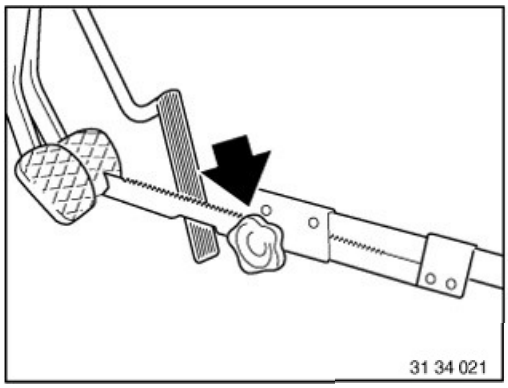
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34 32 980 Replacing rear left or right brake hose

Note:

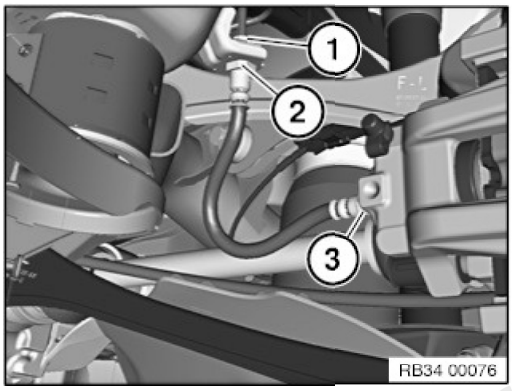
- Read and comply with General Information.
- Remove wheel.

After completing repair work: Bleed brake system.



Press brake pedal down to floor and secure with pedal support.*Note:*
The pedal support may only be released when the brake lines are reconnected.

This prevents brake fluid from emerging from the expansion tank and air from entering the system when the brake lines are opened.



Important!

Grip brake hose at square head (2) so that connecting piece cannot rotate in retaining bracket.

Never twist brake hose when installing it and avoid all contact with parts attached rigidly to the body.

Disconnect brake hose from brake line (1).

Installation note:
Tightening torque 34 32 1AZ.

Detach brake hose from brake caliper (3).

Installation note:
Tightening torque 34 32 3AZ.

Installation note:
First tighten brake hose on brake caliper.

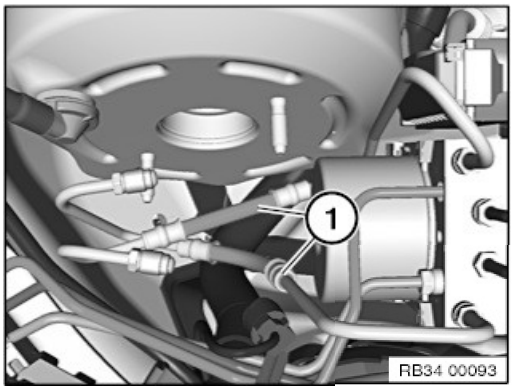
Insert brake hose in bracket and screw onto brake pipe.

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34 33 505 Removing and installing or replacing brake booster

Necessary preliminary work:

- Read and comply with General Information.
- Remove the tandem brake master cylinder.
- Remove hydraulic unit.
- Remove left footwell trim

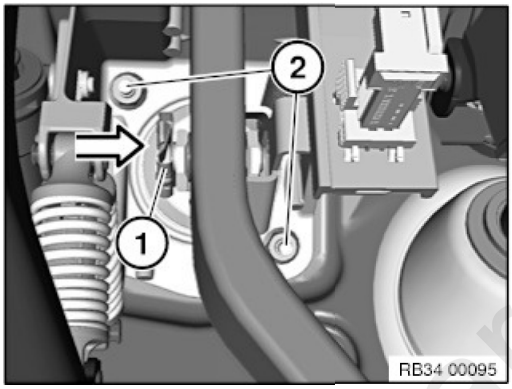


Important!

There is a risk of switching the two brake lines (1)!

After removing tandem brake master cylinder and hydraulic unit, both brake lines (1) are exposed.

The installation position (see graphic) of the brake lines (1) must be marked prior to removal.

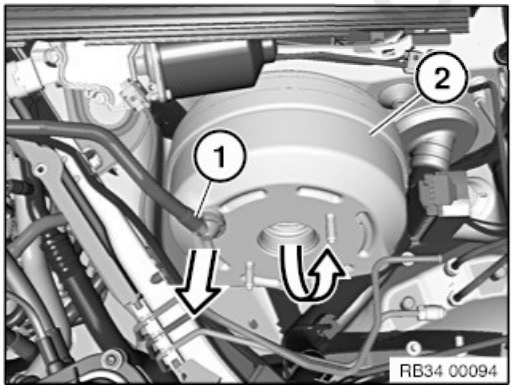


Pull the retaining clip (1) off the brake pedal and pull out the locking pin.

Unscrew nuts (2).

Installation note:
Replace self-locking nuts.

Tightening torque 35 11 1AZ.



Important!

Do not use any force when removing and installing the brake booster; the brake booster can be damaged under certain circumstances.

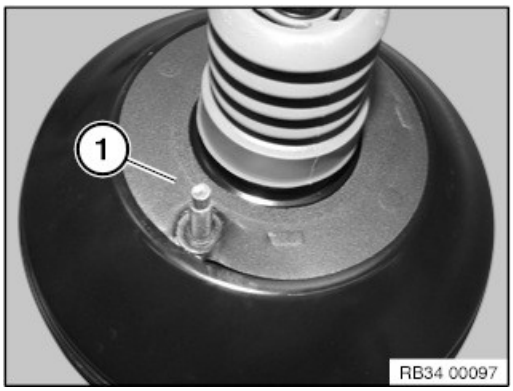
Brake lines must not be bent.

Remove non-return valve (1) from brake booster.

Carefully pull brake booster (2) out of bulkhead and tilt out.

If necessary, disengage brake line from holder on bulkhead and press slightly to one side.

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Installation note:
Seal (1) must always be replaced.

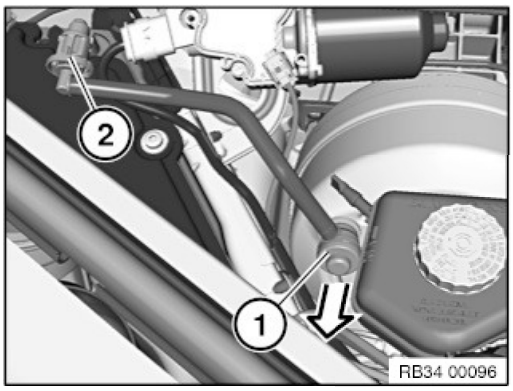
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34 33 051 Removing and installing/replacing non-return valve for brake booster

Necessary preliminary work:

- Read and comply with General Information.
- Remove the left engine compartment cover.

Note:
Before beginning repair work, fully press the brake pedal several times to reduce the vacuum pressure in the brake servo. This makes it easier to remove the non-return valve.



Remove non-return valve (1) from brake servo.

Unlock quick-release coupling (2) and detach vacuum line.

Remove vacuum line.

Installation note:
Check sealing ring in brake servo and replace if necessary.

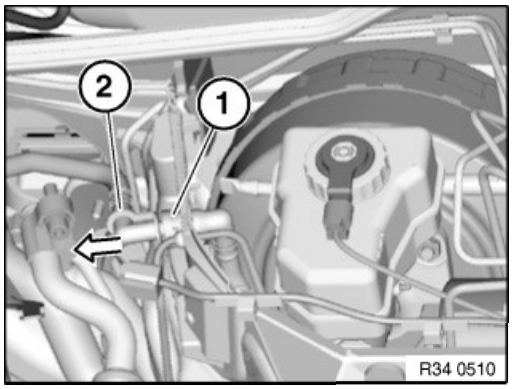
The snap fastener (2) must be latched correctly.

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34 33 071 Replacing vacuum hose for brake booster

Necessary preliminary work:

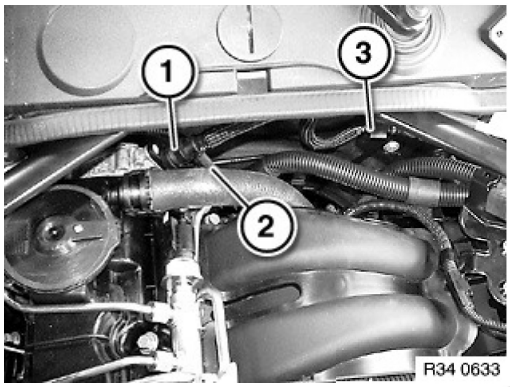
- Read and comply with General Information.
- Remove the cover in the engine compartment, left.



Attention!

Before beginning work, fully press the brake pedal several times to reduce the vacuum pressure in the brake servo. This makes it easier to pull off the vacuum hose.

Unlock quick-release fastener (1) and pull out vacuum line (2).



Unlock quick-release coupling (1) and detach vacuum line.

Disconnect vacuum hose (2) from vacuum line.

Release vacuum hose at clamp (3) and remove.

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34 35 001 Replacing a brake pad sensor (front)

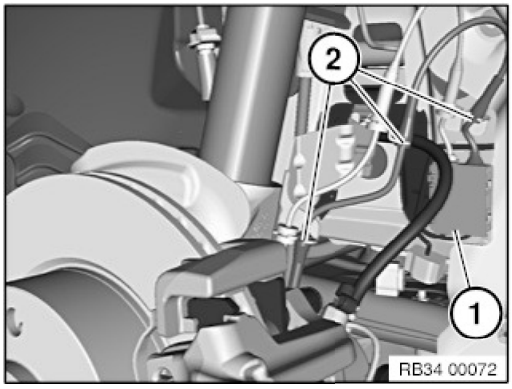
Important!

The brake pad wear sensor must be replaced once it has been removed (brake pad wear sensor loses its retention capability in the brake pad).

If a brake pad wear sensor that has already been ground has to be replaced even though the minimum brake pad thickness has not yet been reached, you must observe the following: The new sliding contact must be filed down with a file to the same length as the sanded sliding contact.

Necessary preliminary tasks:

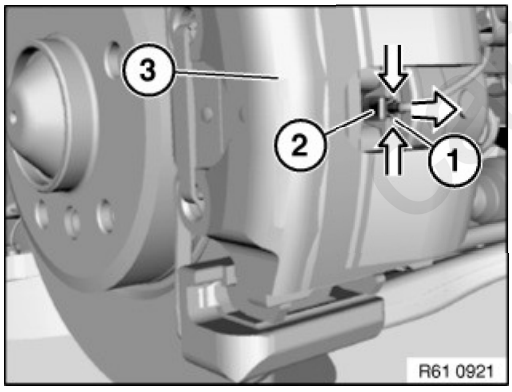
- Remove wheel



Fold the connector housing (1) up and disconnect the plug connection.

Detach the brake pad wear sensor from the brackets (2).

Installation note:
Do not route/fix the brake pad wear sensor cable via the dust cap of the brake ventilation valve!



Press clamps (1) together and pull brake pad wear sensor (2) from brake pad (3) in direction of arrow.*Installation note:*
Make sure clamps (1) and brake pad wear sensor (2) are correctly seated in brake pad (3).

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34 35 003 Replacing a brake pad sensor (rear)

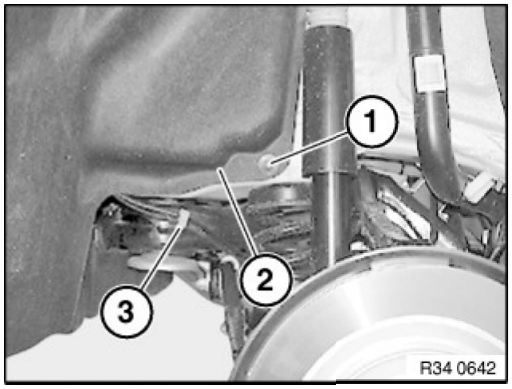
Important!

The brake pad wear sensor must be replaced once it has been removed (brake pad wear sensor loses its retention capability in the brake pad).

If a brake pad wear sensor that has already been ground has to be replaced even though the minimum brake pad thickness has not yet been reached, you must observe the following: The new sliding contact must be filed down with a file to the same length as the sanded sliding contact.

Necessary preliminary tasks:

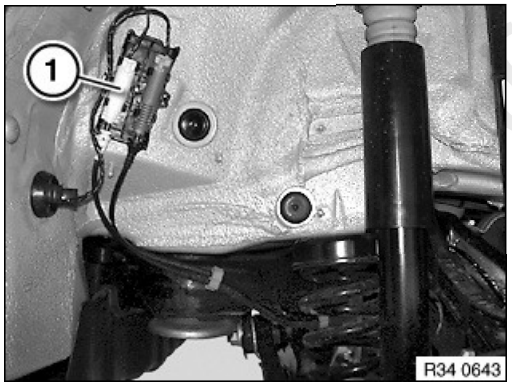
- Remove rear right wheel



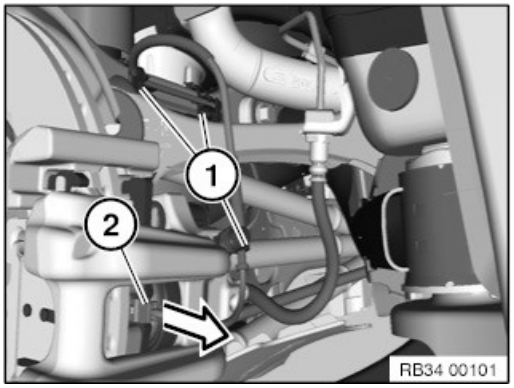
Slacken nut (1).

Pull wheel arch trim (2) gently to one side.

Disengage cable from holders (3).



Disconnect plug connection (1).*Installation note:*
Ensure proper locking of the plug connector and proper seating of the cable in the brackets.



Disengage cable from holders (1).

Detach brake pad wear sensor (2) in direction of arrow from brake pad.

Installation note:
Make sure holders (1) and brake pad wear sensor (2) are correctly seated in brake caliper.

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34 41 014 Adjusting parking brake

Special tools required:

- 32 1 030

Perform inspection in the following manner:

When 1st ratchet is engaged, no braking force should be exerted.

The difference in wheel circumferential forces between the left and right wheels may deviate by max. 30% from the greater value (measured on brake test stand).

In event of larger deviations of wheel circumferential force: carry out readjustment.

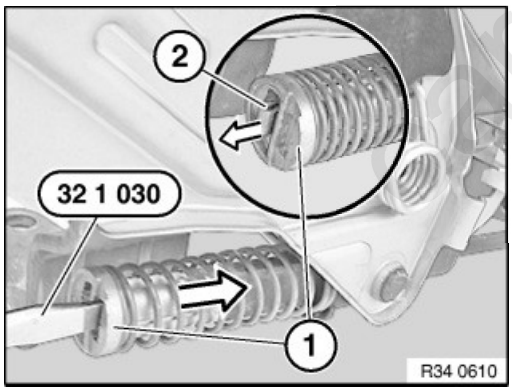
Braking with locked wheels must be possible with the parking brake.

The parking brake must be reset if the actuation stroke is greater than 10 teeth.

Note:
Accurate adjustment of the parking brake is only possible if the parking brake Bowden cables and all moving parts on the parking brake move easily and function correctly.

Basic setting of the parking brake is required:

- Parking brake shoes and add-on parts are replaced
- Brake discs are replaced
- In event of excessive actuation stroke (10 teeth)
- When replacing parking brake Bowden cables



1. Adjusting instructions for brake pads (basic setting)

Unclip gaiter for parking brake lever.

Lock adjustment unit (ASZE).

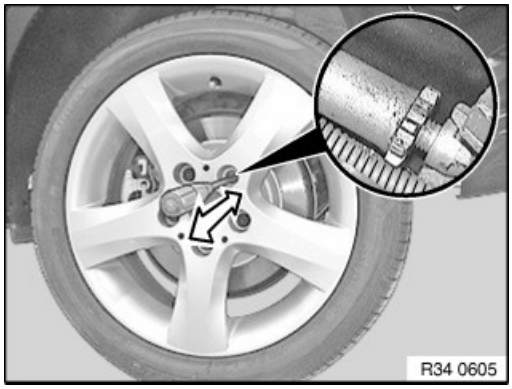
Actuate parking brake lever. Connect special tool 32 1 030 . Press limit position (1) of adjusting spring back to such an extent that retaining hook (2) engages in limit position (1).



Completely unscrew one wheel stud on each rear wheel.

Installation note:
Tightening torque 36 10 1AZ.

Turn wheel until adjustment screw is visible in threaded hole.



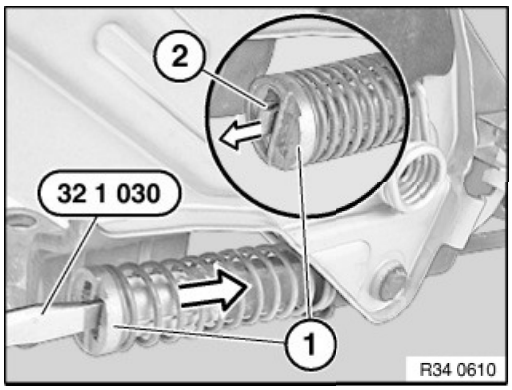
Turn adjusting screw with a screwdriver until wheel can not be turned anymore by hand.

Then at adjusting screw:

- Duo-servo parking brake ⌀ 185 release by 8 catches
- Duo-servo parking brake ⌀ 160 release by 9 catches

Attention!

Basic setting with less than 8 catches on the duo-servo parking brake may lead to the brake pads being damaged. A reduction in the number of catches on the duo-servo parking brake to shorten lever travel is not permitted.



Unlock adjustment unit (ASZE).

Lever out restraining hook (2) with a suitable screwdriver.

Restraining hook (2) must detach from limit position (1) of adjusting spring.



Attention!

Follow notes for Brake testing for test stand.

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2. Adjusting instructions for parking brake Bowden cables

The parking brake lever must be applied 5 times with medium hand force.

2.1	On brake test stand
0th tooth (parking brake released):	Vehicles with manual transmission: Shift lever in neutral position. Vehicles with automatic transmission: Selector lever position "N". • Without locking differential ≤150 N. • With locking differential ≤ 200 N (possibly odd display).
1st tooth:	No brake force increase with regard to the 0th tooth. Indicator light may light up.
2nd tooth:	Indicator lamp must be lit.
3rd tooth:	Increase in braking force.
5th tooth:	The brake force display must have reached ≥ 400 N.

Checking brake force differential at wheel:

Apply parking brake until a wheel circumferential force (brake force display) of min. 1000 N is reached.

Max. permitted brake force differential right/left ≤30 % (referred to greater brake value).

3. Bedding in the duo-servo parking brake

The following bedding-in instructions are applicable in case of insufficient braking effect or after replacing brake discs and/or brake pads.

3.1 On brake test stand

Apply parking brake lever until wheel circumferential force at first wheel is 800 N.

Lock parking brake lever in next lower tooth.

Attention!

Bedding-in time maximum 2 min!

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3.2 When driving on road

(If possible on company grounds or on an unused road)

When driving at low speed (maximum 40 km/h) apply parking brake lever until a braking effect can be felt.

Pull parking brake lever into the next catch and continue driving for maximum approx. 400 metres (maximum 40 km/h).

A basic requirement is that parking brake is adjusted uniformly.

Note:
If necessary, repeat bedding-in procedure.

Allow brake to cool down sufficiently.

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34 00 ... General information on braking in new brake discs / brake pads



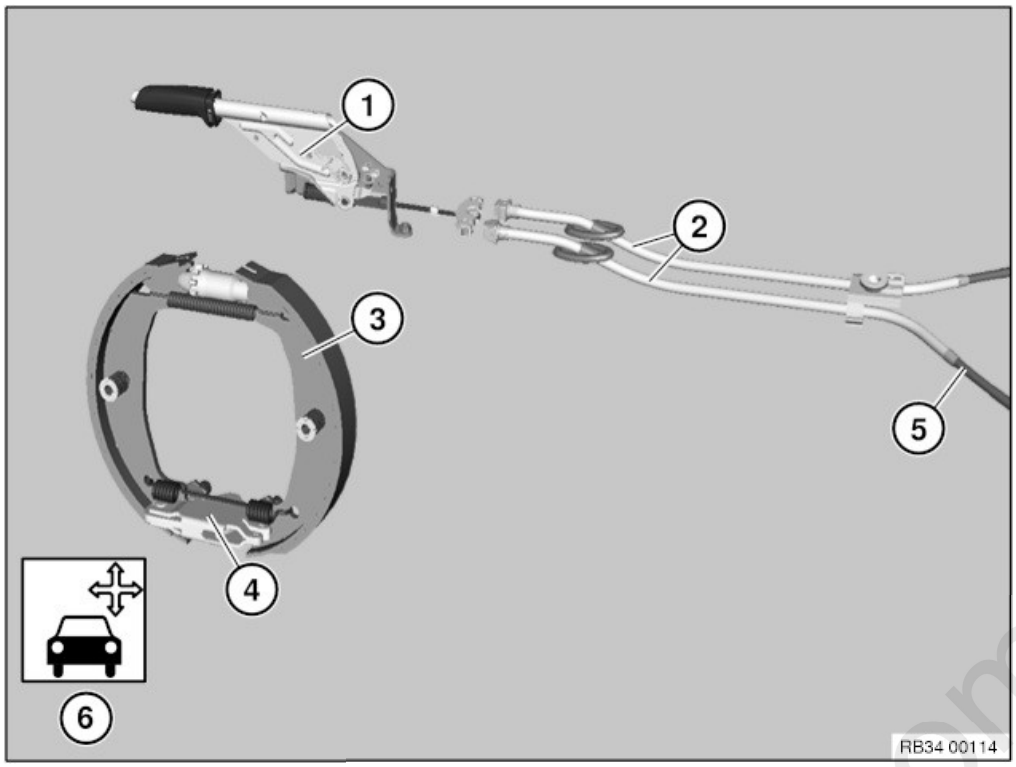
Important!

After completing work:

- Carry out function check on brake analyzer (test stand) to ensure that the brakes comply with legal requirements.
- Carry out test braking while driving at low speed; the effectiveness of the brakes may be reduced during the initial braking operations.
- Exaggerated drastic and continuous braking operations for faster braking in are not permitted.
- Advise the customer not to perform any wilful drastic braking in the first 200Â km after brake replacement.
- Attach mirror tag to inside mirror.

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34 41 ... Overview of handbrake



1 Handbrake lever
2 Guide tube
3 Handbrake shoes
4 Brake shoe expander
5 Handbrake Bowden cables
6 Adjusting handbrake

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34 41 120 Removing and installing / replacing both parking brake Bowden cables

Special tools required:

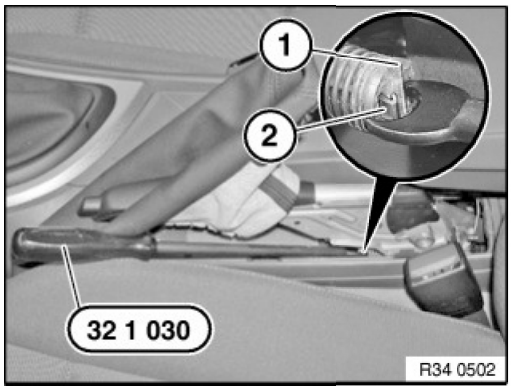
- 32 1 030

Necessary preliminary work:

- Remove centre console.

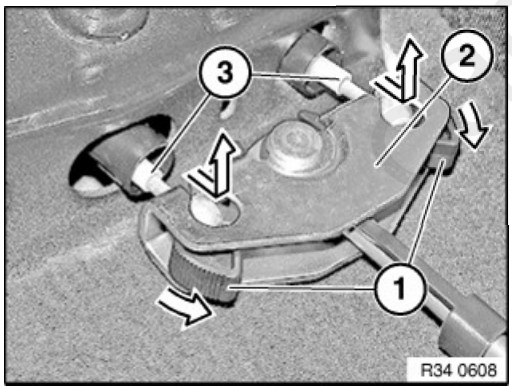
Note:
After completing repair work:

- Adjusting parking brake



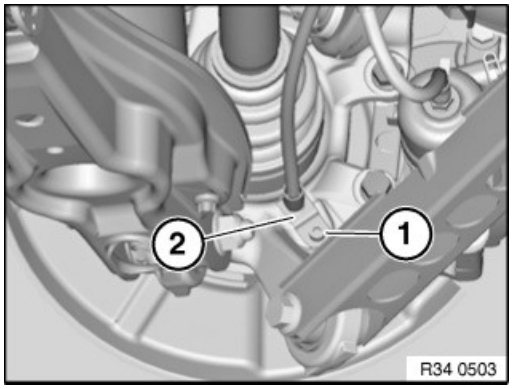
Lock adjustment unit (ASZE).

Actuate parking brake lever. Connect special tool 32 1 030 . Press limit position (1) of adjusting spring back to such an extent that retaining hook (2) engages in limit position (1).

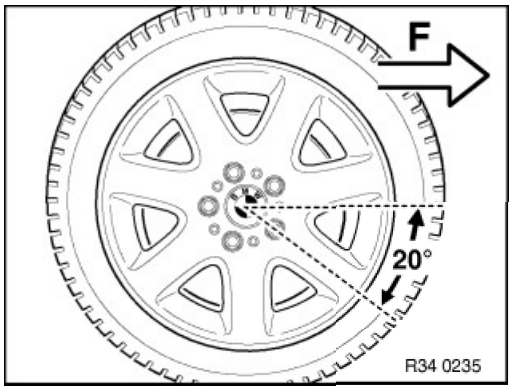


Press retainer (1) in balance arm (2) forward in direction of arrow.

Detach parking brake Bowden cables (3) from balance arm (2).



Release screw (1) and remove holder (2).*Installation note:*
Tightening torque 34 41 2AZ.



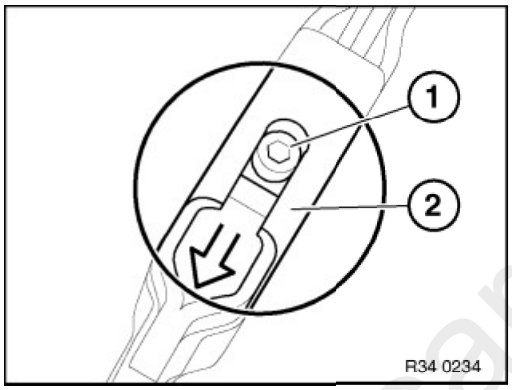
Release one wheel stud.

Bring wheel into position (threaded hole turned down approx. 20° from horizontal).

F = direction of travel

Installation note:
Reinstall wheel stud only after handbrake has been adjusted.

Tightening torque 36 10 1AZ.



Nipple (1) and brake shoe expander lock (2) are visible through threaded hole.

Push in core of parking brake Bowden cable in direction of brake shoe expander to limit position and grip firmly.

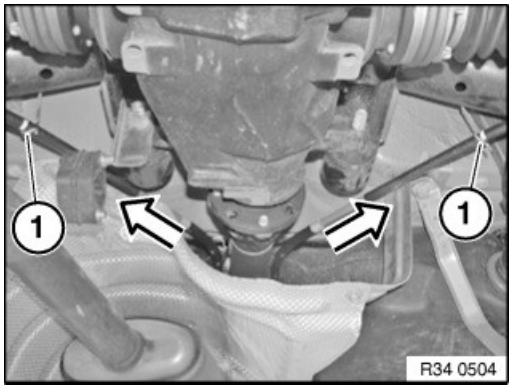
Press nipple (1) downwards through threaded hole with a screwdriver.

Pull parking brake Bowden cables out of wheel carrier.

Installation note:
Insert parking brake Bowden cable into brake anchor plate/brake guard plate. Sleeve must be inserted up to stop.

Nipple of parking brake Bowden cable must audibly snap into place in brake shoe expander.

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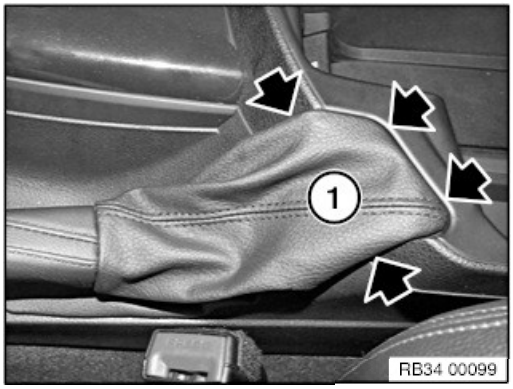
Disconnect parking brake Bowden cables from holders (1).
Pull parking brake Bowden cables rearwards out of guide tube.

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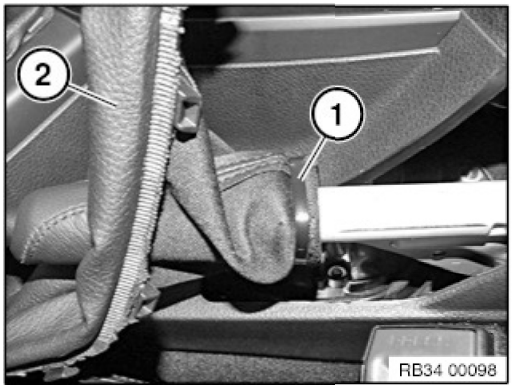
34 41 ... Removing and installing or replacing gaiter for handbrake lever

Special tools required:

- 00 9 317



Unclip gaiter (1), top, with special tool 00 9 317 , if applicable.*Installation note:*
First insert the gaiter (1) on the bottom and then clip in on the top.



Pull gaiter (2) over parking brake lever.

Cut cable ties (1) and remove gaiter.

Installation note:
Eye of cable tie must face downward

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34 41 220 Removing and installing/replacing all parking brake shoes

Special tools required:

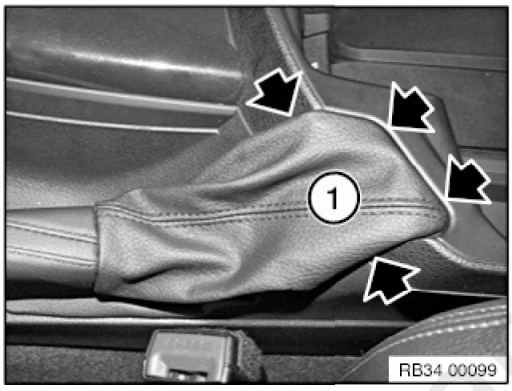
- 32 1 030
- 34 4 000
- 00 9 317

Necessary preliminary work:

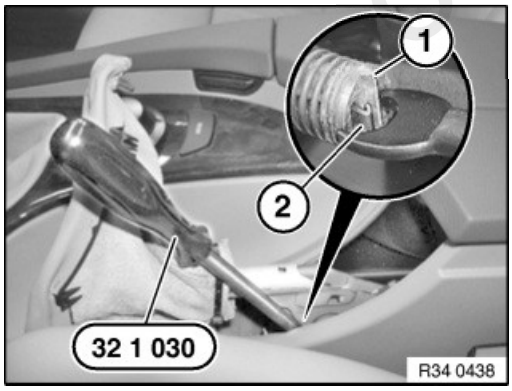
- Remove rear brake disk.

Note:
During replacement of the hand brake coverings, the following components must also be renewed:

- Brake shoe expander
- Adjusting screw
- Spring set



If applicable unclip the gaiter (1) with special tool 00 9 317 at top.*Installation note:*
First insert the gaiter (1) on the bottom and then clip in on the top.



Lock adjustment unit (ASZE).

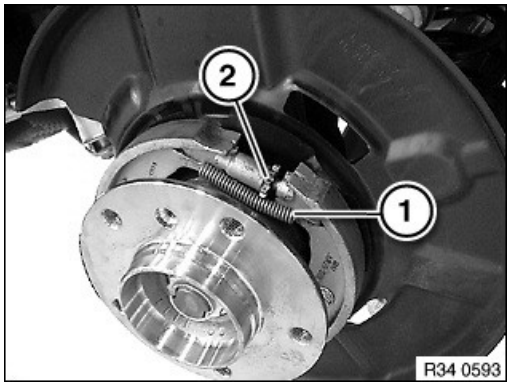
Actuate parking brake lever. Connect special tool 32 1 030 . Press limit position (1) of adjusting spring back to such an extent that retaining hook (2) engages in limit position (1).

Installation note:
Unlock adjustment unit (ASZE).

Lever out restraining hook (2) with a suitable screwdriver.

Restraining hook (2) must detach from limit position (1) of adjusting spring.

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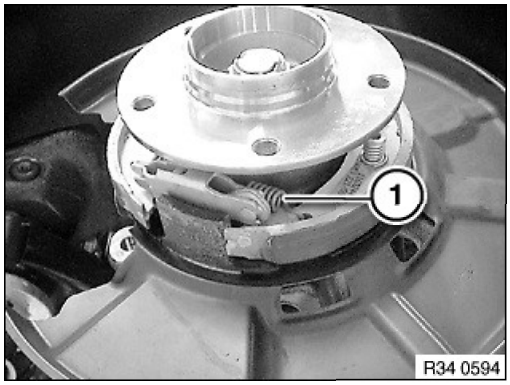


Disconnect return spring (1) with brake spring pliers.*Installation note:* Return spring (1) must not be overelongated.

Check and if necessary replace return spring (1).

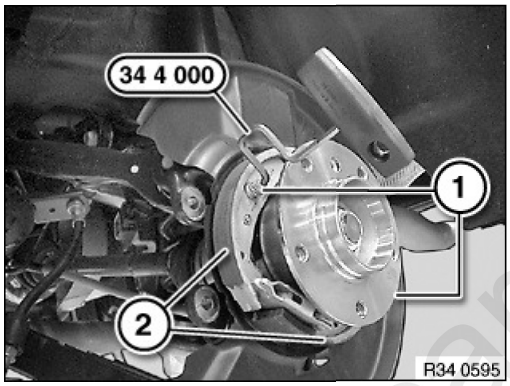
Pay attention to installation position of adjusting screw (2).

Apply a thin coat of grease to bush and screw threads



Disconnect return spring (1) with brake spring pliers.*Installation note:* Return spring (1) must not be overelongated.

Check and if necessary replace return spring (1).



Twist roll pins (1) 90° with special tool 34 4 000 and detach.

Remove brake pads (2).

After installation:

- Adjusting parking brake

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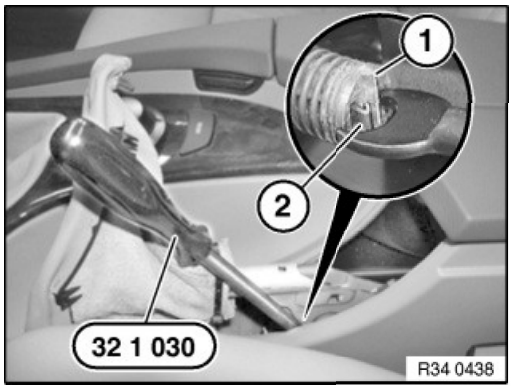
34 41 250 Removing and installing/replacing brake shoe expander for parking brake shoe

Special tools required:

- 32 1 030

Necessary preliminary work:

- Remove parking brake shoes.



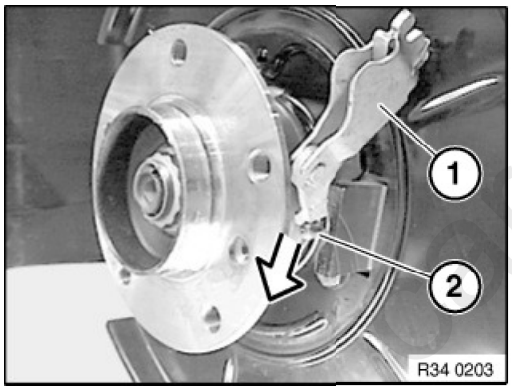
Lock adjustment unit (ASZE).

Actuate parking brake lever. Connect special tool 32 1 030 . Press limit position (1) of adjusting spring back to such an extent that retaining hook (2) engages in limit position (1).

Installation note:
Unlock adjustment unit (ASZE).

Lever out restraining hook (2) with a suitable screwdriver.

Restraining hook (2) must detach from limit position (1) of adjusting spring.



Pull brake shoe expander (1) forward, disconnect parking brake Bowden cable (2) and remove brake shoe expander.

After installation:

- Adjust parking brake.

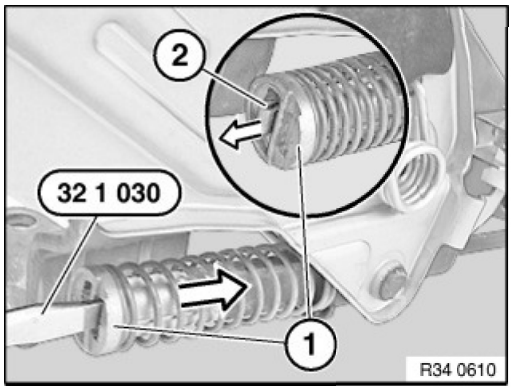
34 41 140 Removing and installing/replacing guide tube for parking brake Bowden cable

Special tools required:

- 32 1 030

Necessary preliminary work:

- Remove centre console.
- Remove exhaust system.
- Remove heat shield.



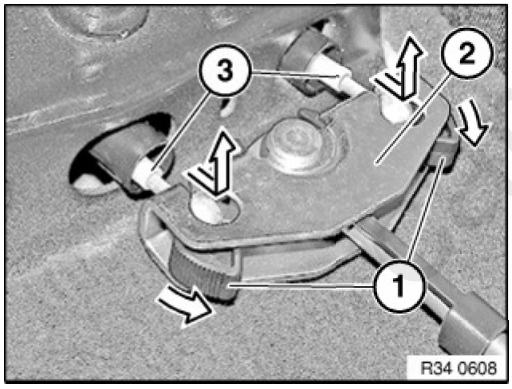
Lock adjustment unit (ASZE).

Actuate parking brake lever. Connect special tool 32 1 030 . Press limit position (1) of adjusting spring back to such an extent that retaining hook (2) engages in limit position (1).

Installation note:
Unlock adjustment unit (ASZE).

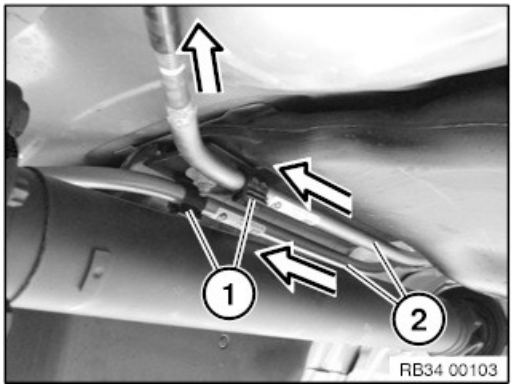
Lever out restraining hook (2) with a suitable screwdriver.

Restraining hook (2) must detach from limit position (1) of adjusting spring.



Press retainer (1) in balance arm (2) forward in direction of arrow.

Detach parking brake Bowden cables (3) from balance arm (2).



Pull parking brake Bowden cables out of guide tube.

Detach guide tubes from mounting clip (1).

Installation note:
Replacing damaged mounting clips (1) is mandatory.

Pull both guide tubes (2) a little in direction of arrow to the back and remove guide tubes.

Installation note:
The two guide tubes must be inserted into the holder under the centre console by touch!

After fastening guide tubes in mounting clip (1), both rubber grommets must be correctly pressed into body.

After installation:

- Adjusting parking brake

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34 41 000 Removing and installing/replacing parking brake lever

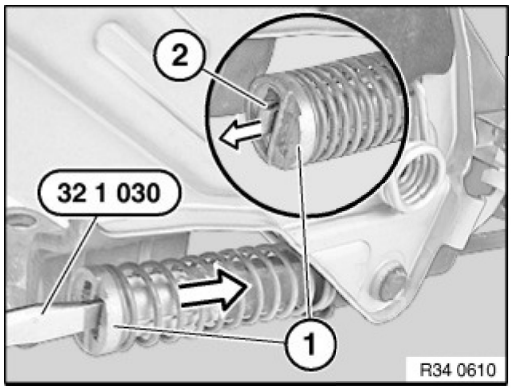
Special tools required:

- 32 1 030

Necessary preliminary tasks:

- Remove centre console.

Note:
If the parking brake lever is replaced, the parking brake lever handle must also be replaced.



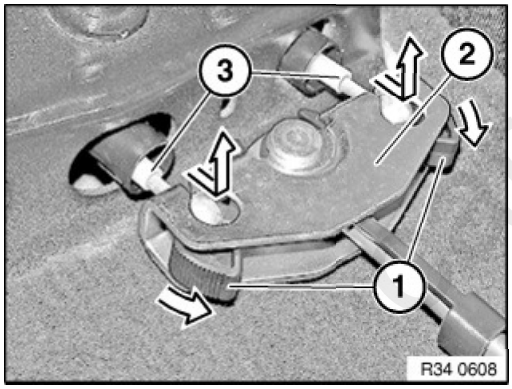
Lock adjustment unit (ASZE).

Actuate parking brake lever. Connect special tool 32 1 030 . Press limit position (1) of adjusting spring back to such an extent that retaining hook (2) engages in limit position (1).

Installation note:
Unlock adjustment unit (ASZE).

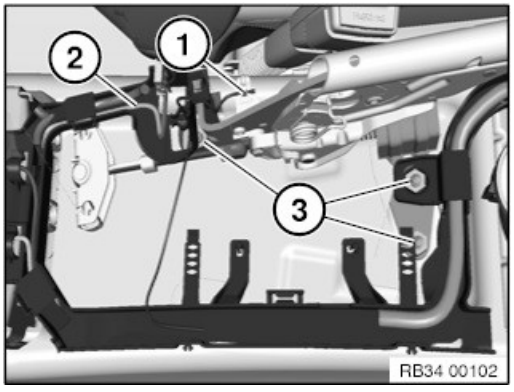
Lever out restraining hook (2) with a suitable screwdriver.

Restraining hook (2) must detach from limit position (1) of adjusting spring.



Press retainer (1) in balance arm (2) forward in direction of arrow.

Detach parking brake Bowden cables (3) from balance arm (2).



Disconnect cable (1) from the switch of the parking brake indicator light.

Unclip cable clip (2) from parking brake lever.

Release nuts and remove parking brake lever (3).

Installation note:
Replace self-locking nuts.

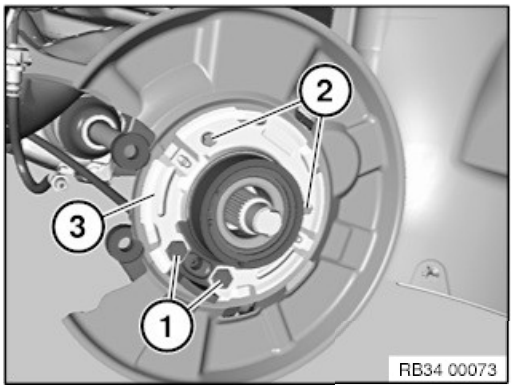
Tightening torque 34 41 1AZ.

Parking brake lever and adjustment unit (ASZE) are only exchanged completely as a single unit.

34 21 131 Replace the retaining ring for the left (or right) brake pads

Necessary preliminary tasks:

- Remove brake shoe expander.
- Remove wheel hub.



Release screws (2) and remove caliper carrier (3).

Release screws (1).

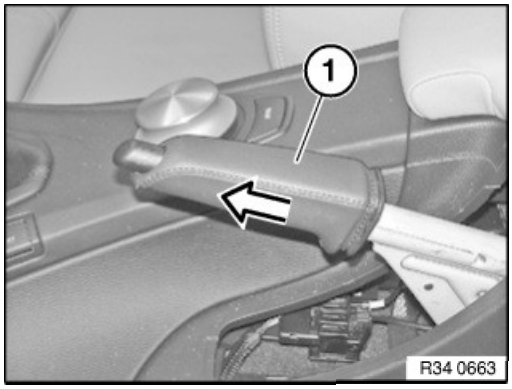
Installation note:
Tightening torque 34 21 3AZ.

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34 41 071 Replacing handle for parking brake lever

Necessary preliminary work:

- Remove gaiter for parking brake lever.



Pull handle for parking brake lever (1) off in direction of arrow.*Installation note:*
Parking brake lever handle (1) must audibly engage.

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34 51 527 Removing and installing/replacing DSC hydraulic unit

Necessary preliminary work:

- Read and comply with General Information.
- Remove sound insulation bulkhead upper part, centre.
- Draw off brake fluid.

Only with F80, F82:

- Remove tension strut on spring strut dome.

Note:
Extract brake fluid out of expansion tank. Use a suction bottle used exclusively for drawing off brake fluid.

Do not reuse drawn out brake fluid.

After completing repair work:

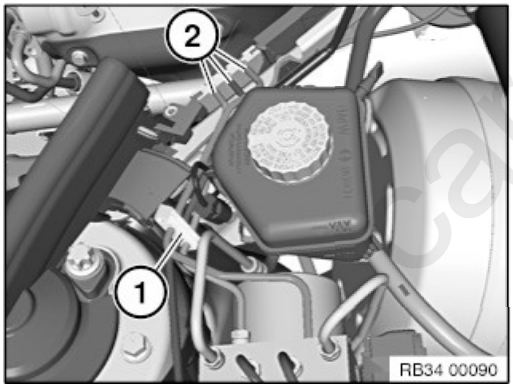
- Bleed braking system
- Brake line mix-up test:

Important!

Do not mix up brake lines.

If necessary, mark before removal.

Close off connecting bores with seal plugs.

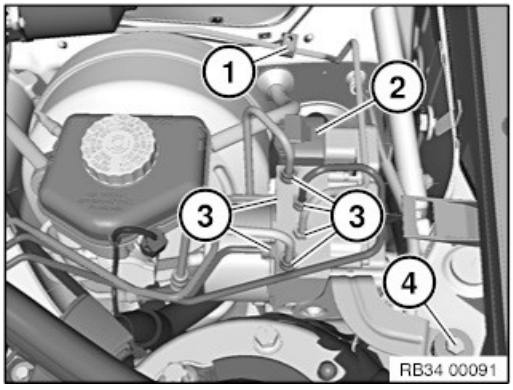


Important!

Remove and/or loosen the following holders for better movement of brake lines!

Remove holder for brake lines (1).

Detach the brake lines (2) from the rubber grommet.



Detach brake line (1) from holder.

Disconnect plug connection (2).

Unfasten brake lines (3).

Installation note:
Tightening torque 34 32 1AZ.

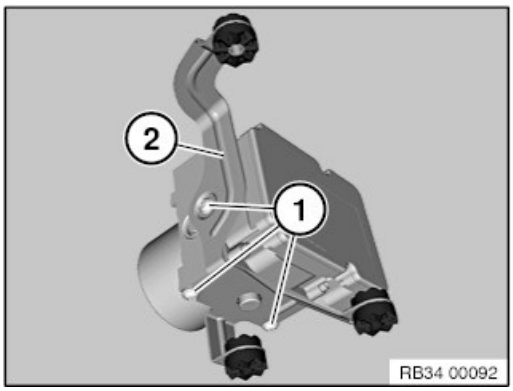
Release screw (4) and feed out hydro aggregate in upward direction.

Important!

Brake lines must not be bent!

Installation note:
Tightening torque 34 51 5AZ.

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When replacing hydraulic unit:

Release screws (1) and convert holder (2).

Installation note:
Tightening torque 34 51 4AZ.

Modify DSC control unit.

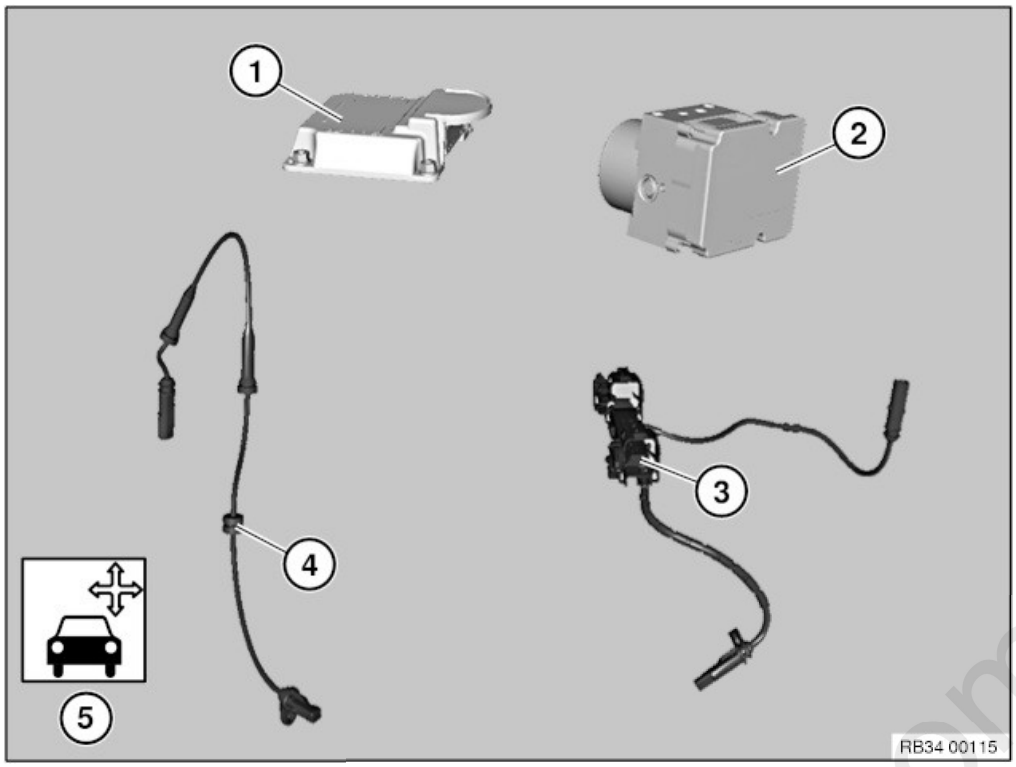


When replacing control unit:

- Carry out programming/encoding
- Adjustment of steering angle sensor

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34 52 ... Overview of electronic components



1 ICM control unit
2 DSC control unit
3 Pulse sensor, rear
4 Pulse sensor, front
5 Start-up of ICM control unit

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34 52 121 Removing and installing/renewing ICM control unit

Important!

Read and comply with notes on protection against damage from electrostatic discharge (ESD protection).

Warning!

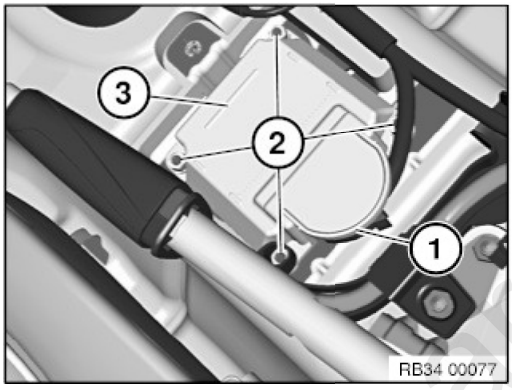
The sensor system for triggering the airbag is installed in the ICM control unit!

The battery must be disconnected before removing the ICM control unit (ICM control unit de-energised)!

There is a risk of the airbag being triggered inadvertently if this requirement is disregarded!

Necessary preliminary work:

- Disconnect negative battery cable.
- Remove centre console assy.



Warning!

Make sure that the negative battery lead is disconnected!

There is a risk of the airbag being triggered inadvertently!

Disconnect plug connection (1).

Release nuts (2) and remove ICM control unit (3).

Installation note:
Replace self-locking nuts.

Tightening torque 34 51 2AZ.

Important!
Do not trap any electrical wires when installing ICM control unit!

After removing and installing ICM control unit:

After completing repairs, use BMW Diagnosis and Information System to

- carry out adjustment/start-up of ICM control unit

Replacement:

After completing repairs, use BMW Diagnosis and Information System to

- carry out programming/encoding
- Carry out ride height adjustment
- Carry out adjustment/start-up of ICM control unit

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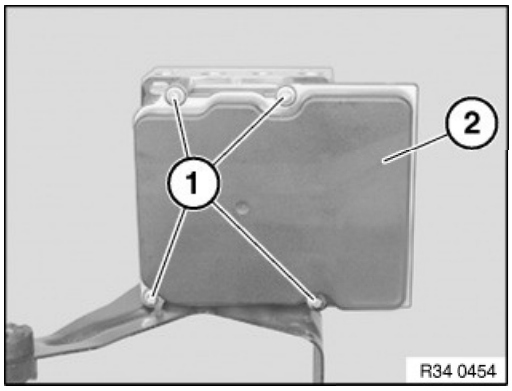
34 52 516 Removing and installing/replacing DSC control unit

Important!

Read and comply with notes on protection against electrostatic discharge (ESD protection).

Necessary preliminary tasks:

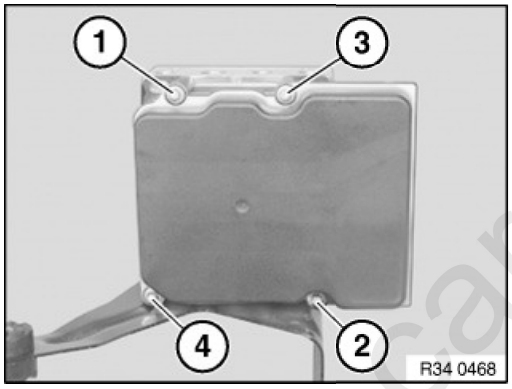
- Remove hydraulic unit.



Important!

Risk of damage to the contacts when removing and installing the hydraulic unit.

Release screws (1) and carefully detach control unit (2) towards front.



Installation note:

Keep sealing surfaces clean.

Replace screws.

Observe tightening sequence (1-4).

Tightening torque 34 51 1AZ.

Replacement:

- Carry out programming/encoding
- Steering angle sensor adjustment

  or

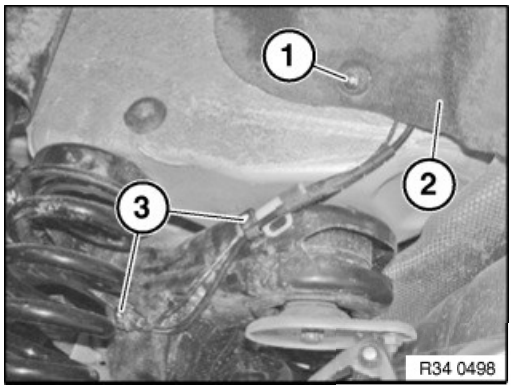
  adjustment for active steering
- Brake line mix-up test:
- Function check, hydraulic unit

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34 52 535 Replacing a rear pulse sensor

Necessary preliminary tasks:

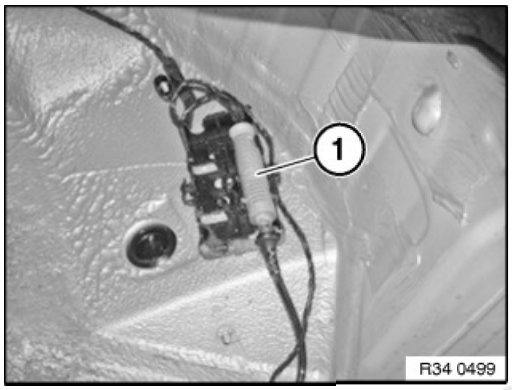
- Remove wheel
- Read and comply with General Information.



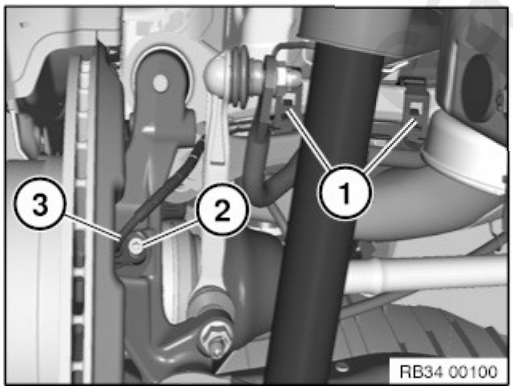
Slacken nut (1).

Pull wheel arch trim (2) gently to one side.

Disengage cable from holders (3).



Disconnect plug connection (1).*Installation note:*
Ensure proper locking of the plug connector and proper seating of the cable in the brackets.



Disengage cable from holders (1).

Unfasten socket head cap screw (2).

Withdraw wheel speed sensor (3) from bore hole.

Installation note:

Tightening torque 34 51 4AZ.

Clean bore hole for pulse sensor and lubricate with Staburags NBU 12/K lubricating grease.

Important!

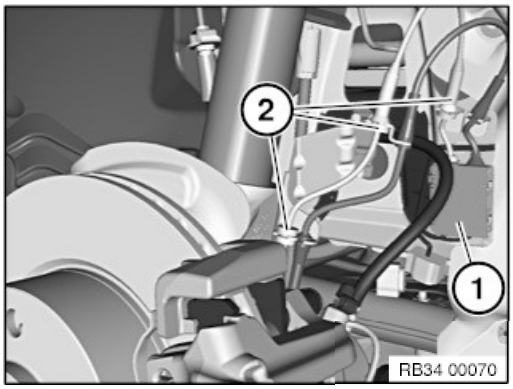
Check sensor head prior to installation for external damage, replacing if necessary.

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34 52 525 Replacing one front pulse sensor

Necessary preliminary tasks:

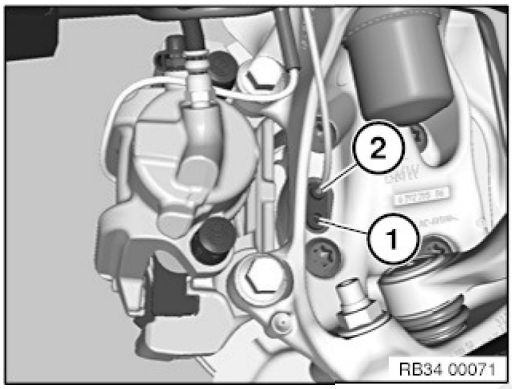
- Remove front wheel.
- Read and comply with General Information.



Open connector housing (1), pull plug connection out of holder and disconnect.

Disengage cable with rubber grommets from holders (2).

Installation note:
Ensure proper locking of plug connection and proper seating of rubber grommets.



Release hexagon socket screw (1) and pull wheel speed sensor (2) out of bore hole.*Installation note:*
Tightening torque 34 51 3AZ.

Clean bore for pulse sensor and lubricate with Staburags NBU 12/K grease.

Important!

Check sensor head prior to installation for external damage, replacing if necessary.

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34 52 .. Start-up of ICM control unit



Note:
Start-up of ICM control unit must be carried out:

- After replacement or removal and installation of ICM control unit



Connect vehicle to BMW diagnosis system.

Select and carry out start-up of ICM control unit under Service functions.

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64 00 ... Information on using cleaning agent/paints (personal protection equipment)



Warning!

Use of cleaning agents/paints not compliant with instructions can cause serious injuries or burns!

Handling cleaning agents/paints can trigger allergic skin and respiratory reactions!



Important!

Observe following instructions:

- Store cleaning agents/paints only in a secure cabinet.
- Keep cleaning agents/paints away from naked flames and other sources of ignition.
- Protect cleaning agents/paints from high temperatures and direct sunlight.
- Always keep an eye douche on hand, change the water regularly (once a month).



Important!

Observe following instructions before use:

- Manufacturer's instructions (on container/packaging)
- Hazard warnings (on container/packaging)
- Manufacturer's instructions on package insert
- Material safety data sheet of manufacturer
- Product information in EPC
- National market regulations



Important!

Observe following instructions during use:

- Do not eat, drink or smoke while working with these products.
- Avoid direct contact with skin and eyes.
- Wear personal protective clothing/equipment.
- Ensure that all enclosed areas are well ventilated or extract fumes directly.
- Immediately change working clothes soiled with cleaning agent/paint.
- After finishing work, wash your hands and apply protective skin cream.



Important!

Follow hazard warnings and wear personal protection equipment!

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First Aid:

- If product comes in contact with eyes, immediately flush with running water for about 10 - 15 minutes. Seek the advice of eye specialist.
- In the event of skin contact and where applicable an allergic skin reaction, clean the affected areas immediately with soap and water and then apply silicone-free skin cream. Seek advice of physician.
- If an adhesive product is swallowed, rinse mouth/parts of mouth thoroughly with running water. Drink 1-2 glasses of water. Do not induce vomiting. Consult a doctor.
- After inhaling vapours ensure ample supply of fresh air. Keep calm, keep respiratory tracks clear and call doctor.



Recycling:

Dispose of cleaning agents/paints in a professional manner!

Observe national/country-specific disposal regulations.

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00 00 ... Microencapsulated screws



Screw securing adhesive is a means of preventing a screwed connection from being loosened by external influences.

Once the screw has been coated with adhesive, the adhesive remains inactive until such time that it is activated by the encapsulation breaking when the screw is inserted and then cures (hardens) at room temperature.

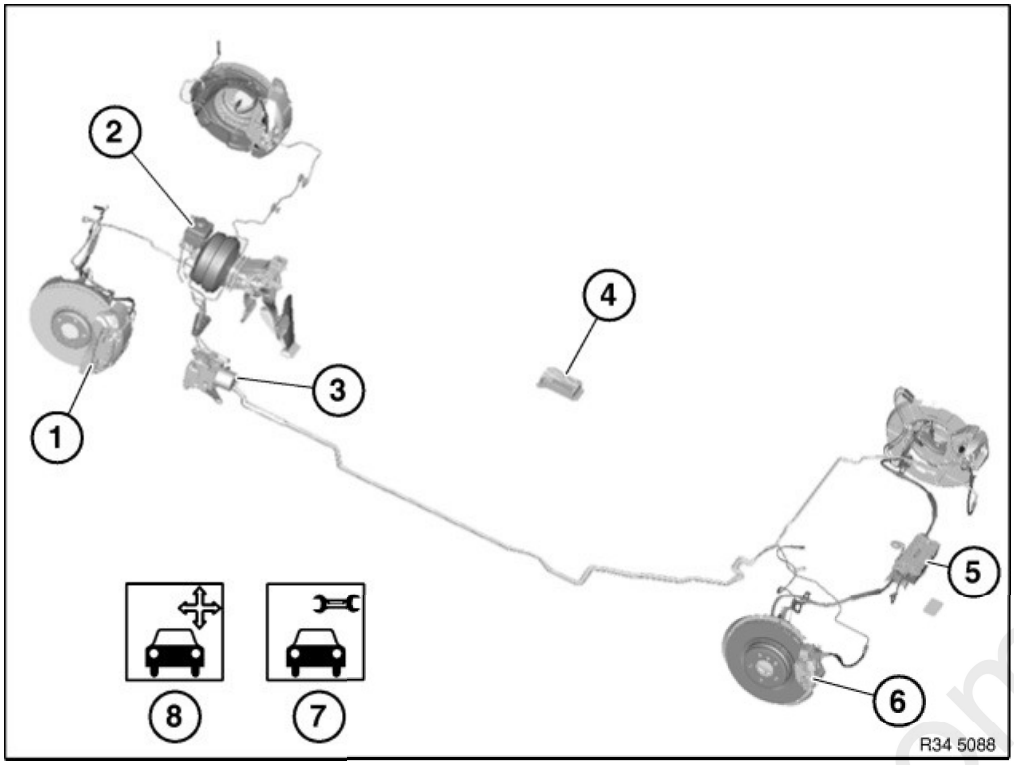


Installation note:

- Screw connection must be completed within 20 mins. (start of curing)
- Microencapsulated screws must not be retightened
- Thread of nut must be cleaned beforehand in event of repeated use

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34 00 ... Overview of brakes



0 General Information

1 Front brake	2 Brake master cylinder / brake booster
3 Hydraulic unit	4 Electrical components
5 Parking brake	6 Brake, rear
7 Adjustment work	8 Testing

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