

2007-08 BRAKES**Brakes - Repair Instructions - X5****00 BRAKE TESTING AND BLEEDING****34 00 ... GENERAL INFORMATION**

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.

General:

- Ensure cleanliness and only use rags which do not lose lint.
- Wash away or vacuum up brake dust, do not clear it away using compressed air. This dust is a health hazard.
- Ensure that no oils or grease enter the brake system: these substances would cause complete failure of the entire brake system.
- When cleaning brake components with brake cleaner (refer to BMW Parts Service), do not allow brake cleaner to get into the brake system.
- Even the most minute traces of brake cleaner must be avoided.

Brake fluid:

- Replace brake fluid at least every two years.
- Never re-use drained brake fluid.
- Always use BMW-approved brake fluid, refer to **BRAKES - OPERATING FLUIDS** .
- Always dispose of brake fluid in approved receptacles, refer to BMW Service Workshop 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.

Wheel brakes:

- Brake pads:

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

See **34 11 FRONT BRAKE E70**, **34 21 REAR BRAKE DISCS E70**

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

The friction surfaces of the brake linings must not come into contact with oils or greases. The brake linings must be replaced if they are fouled by such substances.

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

One-sided angled areas on the brake linings must be located on the disk contact side of the brake caliper for when the vehicle is moving forward.

- Brake discs:

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

Refer to **34 11 FRONT BRAKE E70** , **34 21 REAR BRAKE DISCS E70** .

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

- Brake drums:

Brake drums must not be scored or cracked. Furthermore, the maximum drum inside diameter, radial runout and surface roughness of the friction surfaces must not exceed or drop below the permitted values.

Always strip preservative off new parts before installation.

- Brake calipers:

Only approved pastes on the basis of glycine must 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, brake hoses:

- 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.
- The system must be bled each time any brake lines have been detached.
- All connection points must be checked for leaks of 3160
- Only tighten down brake hoses on the front axle when wheels are in straight-ahead position.

- Close open connections on brake lines and individual components to prevent dirt from entering the brake system.
- Observe tightening torques when tightening down brake line screw connections.

Tightening torque, 34 32 1AZ. See **34 32 BRAKE LINES** .

Wheel-slip control system:

The wheel-slip control system is basically maintenance-free.

However, be sure to adhere to the following:

- 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.

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 complies 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 200 km after brake replacement.**
- **Attach mirror tag to interior rearview mirror.**

34 00 009 CHECKING BRAKES ON TEST STAND

IMPORTANT: Only brake test stands (analyzers) with test speeds of 2.5 - 6 km/h may be used. Before driving onto the brake test stand (dynamic brake analyzer), switch off the Hill Descent Control (HDC) and keep it switched off while testing the brakes.

The HDC indicator lamp must not light up!

NOTE: It is possible for the HDC indicator lamp to go out or not to light up even when

HDC mode is activated if HDC is temporarily unavailable on account of high operating temperature.



Fig. 1: Identifying HDC Indicator Lamp
Courtesy of BMW OF NORTH AMERICA, INC.

Necessary preliminary tasks:

- Check tires for damage
- Check Tyre treads
- Check Tyre pressure
- The brakes must be at normal operating temperature. For this purpose, gently warm up the brake discs while dry by braking the vehicle several times.

IMPORTANT: For testing, turn on the ignition and make sure the transmission selector lever is in the "N" position.

Comfort access: insert remote control in ignition lock.

NOTE: If the remote control is not inserted in the ignition lock, the "P" transmission position is selected automatically after approx. 30 minutes.
Failure to comply with this instruction may result in damage to the test stand or to the vehicle.

Visual and function checks of actuating and warning devices.

Front brakes:

- Drive vehicle with front axle into roller dynamometer
- Move transmission selector lever to "N" position
- Start roller dynamometer
- Press service brake pedal
- Read off maximum brake power on left / right

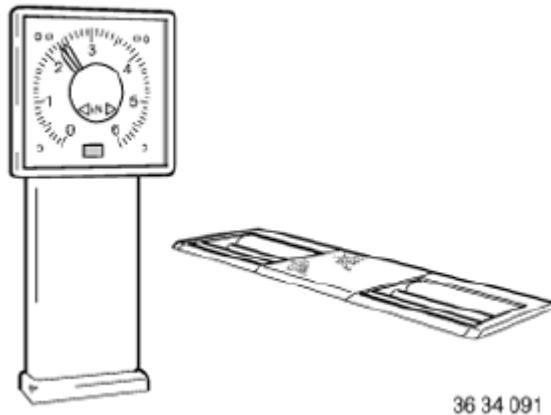


Fig. 2: Identifying Front Brake Actuating And Warning Devices
 Courtesy of BMW OF NORTH AMERICA, INC.

Rear brakes:

- Drive vehicle with rear axle into roller dynamometer
- Move transmission selector lever to "N" position
- Start roller dynamometer
- Press service brake pedal
- Read off maximum brake power on left / right

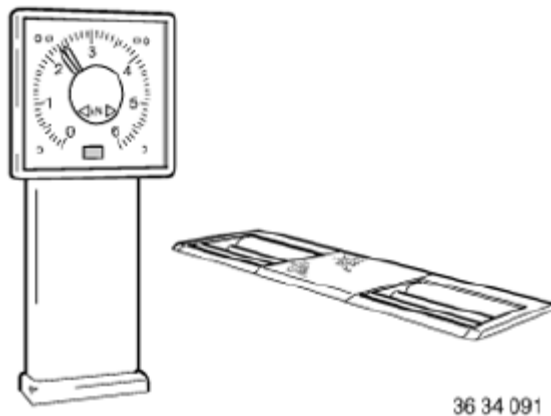


Fig. 3: Identifying Front Brakes Actuating And Warning Devices
 Courtesy of BMW OF NORTH AMERICA, INC.

Parking brake :

IMPORTANT: The test may only be carried out with the engine switched off, the transmission selector lever in the "N" position and the ignition switched on.

NOTE: The electromechanical parking brake cannot be tested on a plate test stand!

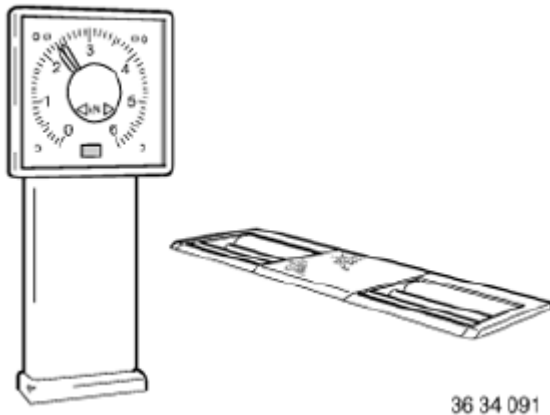


Fig. 4: Identifying Front Brakes Actuating And Warning Devices
 Courtesy of BMW OF NORTH AMERICA, INC.

- Drive vehicle with rear axle into roller dynamometer
- Move transmission selector lever to "N" position
- Switch off engine

NOTE: When the engine is running, additional braking action will otherwise be exerted by the DSC system on all the wheels.

- Turn on ignition
- Start roller dynamometer
- Activate parking brake, pull button (1) for this purpose

NOTE: Parking brake indicator lamp in instrument cluster lights up red. Duo-servo brake (actuating unit) is applied. Roller dynamometer shuts down after locking of wheels (slip) or vehicle is pushed out of roller dynamometer

- Deactivate parking brake:
 - Press button (1) and simultaneously press service brake pedal

NOTE: Duo-servo brake (actuating unit) is released.

- Read off maximum brake power on left / right

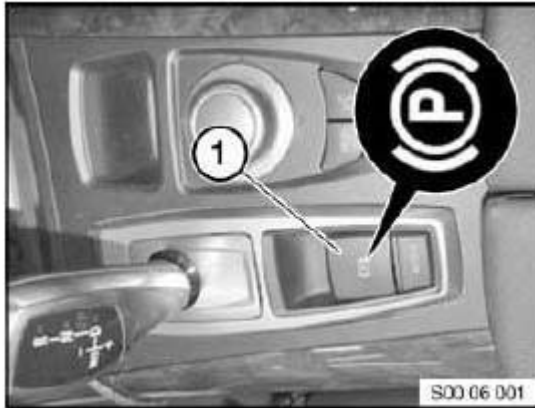


Fig. 5: Identifying Parking Brake Indicator Lamp Button
Courtesy of BMW OF NORTH AMERICA, INC.

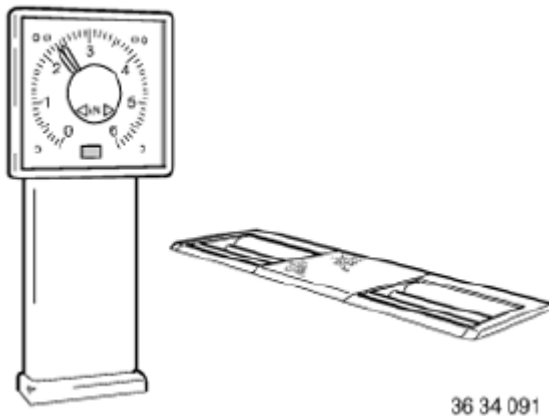


Fig. 6: Identifying Front Brakes Actuating And Warning Devices
Courtesy of BMW OF NORTH AMERICA, INC.

34 00 010 CHECKING THICKNESS OF BRAKE PAD

Special tools required:

- 34 1 260. See 34 1 260 BRAKE LINING MEASURING GAUGE

NOTE: The thickness of the outer brake pads can be determined without removing the wheels.
If necessary, move car until opening for brake pad wear indicator (brake pad) can be seen through rim styling.

Insert special tool 34 1 260 through rim into opening for brake pad wear indicator. See 34 1 260 BRAKE LINING MEASURING GAUGE

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

- NOTE:**
- A. Brake disk**
 - B. Brake pad with backplate**

Safe limit for lining wear, front brake. See 34 11 FRONT BRAKE E70

Safe limit for lining wear, rear brake. See 34 21 REAR BRAKE DISCS E70 .

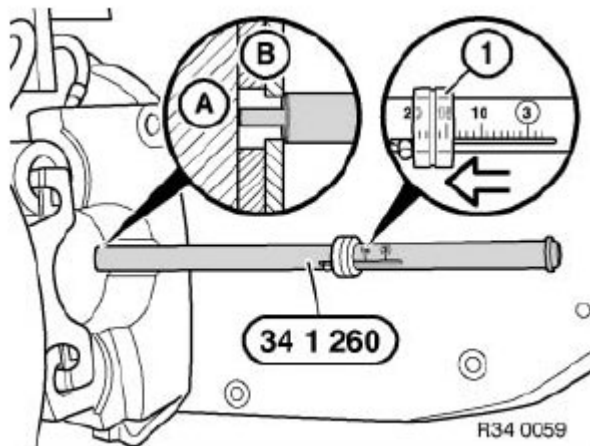


Fig. 7: Identifying Special Tool (34 1 260)

Courtesy of BMW OF NORTH AMERICA, INC.

34 00 012 PARKING BRAKE FUNCTION CHECK

Connect BMW Diagnosis and Information System (DIS) or MoDiC.

Call up "Workshop braking-in" service function.

Start braking-in program.

(Parking brake indicator lamp in instrument cluster flashes at low frequency)

Drive vehicle onto roller dynamometer and pull parking brake button once.

Parking brake is applied at approx. 15 km/h with reduced force.

(Parking brake indicator lamp in instrument cluster flashes at high frequency)

Braking-in procedure takes 3 minutes.

Braking-in procedure can be terminated by pressing the parking brake button.

Now clear the fault memory.



Fig. 8: Display Of Parking Brake Function

Courtesy of BMW OF NORTH AMERICA, INC.

34 00 050 BLEEDING BRAKE SYSTEM WITH DSC

Necessary preliminary tasks:

- Remove left microfilter housing cover. **64 31 101 REMOVING AND INSTALLING/REPLACING LEFT MICROFILTER HOUSING COVER** .

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

- Tandem brake master cylinder
- Hydraulic unit
- Components and connecting 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.

Connect DIS.

Select path: Service functions - Chassis/Suspension - Slip control systems - Bleeding procedure.

Connect brake fluid changer to expansion tank and switch on.

IMPORTANT: Check relevant Operating Instructions for each device.
Charging pressure should not exceed 2 bar.

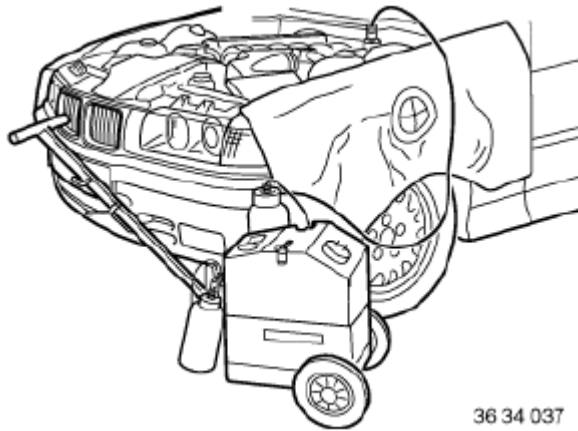


Fig. 9: Connecting Brake Fluid Changer To Expansion Tank
Courtesy of BMW OF NORTH AMERICA, INC.

Flushing brake system completely

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 bleed valve.

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

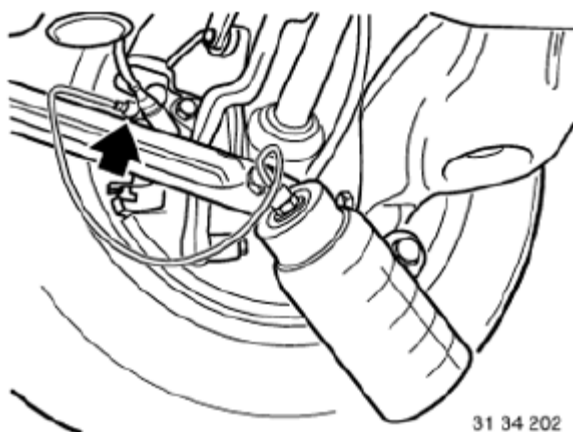


Fig. 10: Connecting Bleeder Hose With Collecting Tray
Courtesy of BMW OF NORTH AMERICA, INC.

Bleeding rear-axle brake circuit

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

Close bleeder valve.

Run bleeding routine with DIS with bleeder valve open.

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

Close bleed valve.

Repeat procedure at rear left.

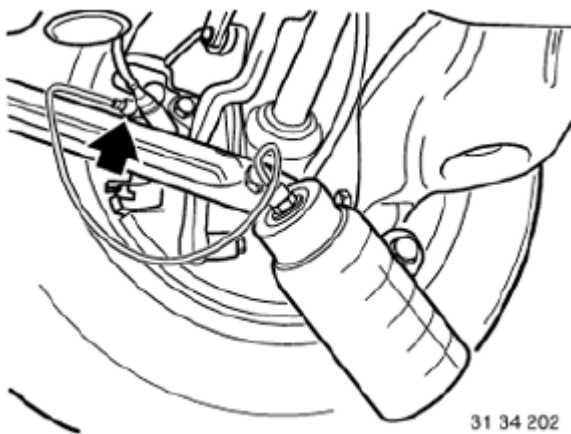


Fig. 11: Connecting Bleeder Hose With Collecting Tray
Courtesy of BMW OF NORTH AMERICA, INC.

Bleeding front-axle brake circuit

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

Close bleeder valve.

Run bleeding routine with DIS with bleeder valve open.

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

Close bleed valve.

Repeat procedure at front left.

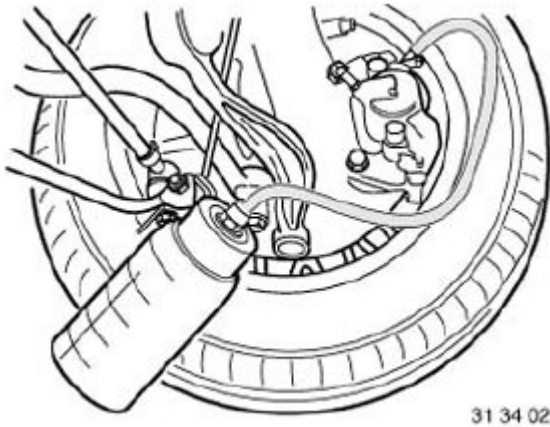


Fig. 12: Connecting Bleeder Hose With Collecting Tray To Bleeder Valve
 Courtesy of BMW OF NORTH AMERICA, INC.

Switch off brake fluid changer and remove from expansion tank.

Check brake fluid level.

Close expansion tank.

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

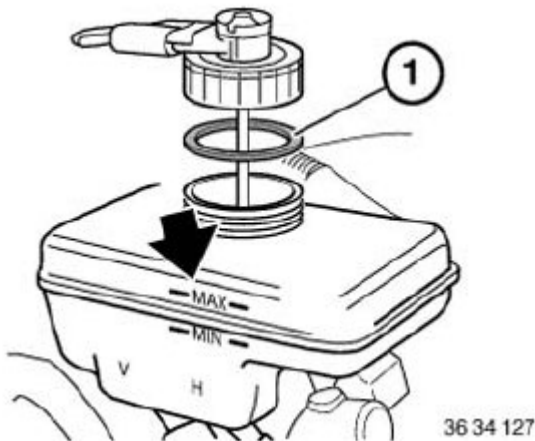


Fig. 13: Identifying Rubber Seal
 Courtesy of BMW OF NORTH AMERICA, INC.

34 00 025 REPLACING FLUID IN ABS/ASC+T BRAKE SYSTEM

Necessary preliminary tasks:

- Remove left microfilter housing cover. See **64 31 101 REMOVING AND INSTALLING/REPLACING LEFT MICROFILTER HOUSING COVER**.

- Read and comply with General Information. See 34 00 ... General Information

IMPORTANT: When carrying out repairs to the brake system, follow the procedure set out in Bleeding brake system with DSC. See 34 00 050 Bleeding Brake System with DSC

Connect brake fluid changer to expansion tank and switch on.

NOTE: Check relevant Operating Instructions for each device.
Charging pressure should not exceed 2 bar.

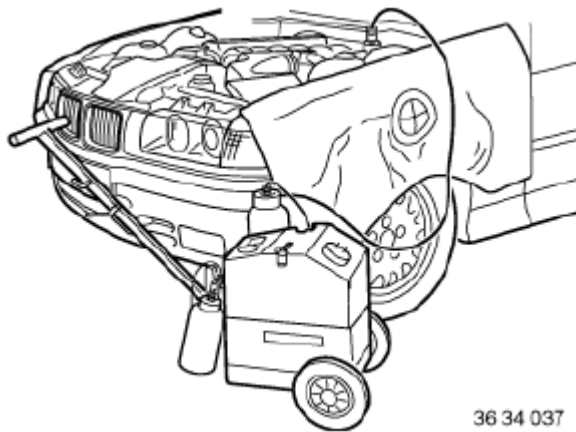


Fig. 14: Connecting Brake Fluid Changer To Expansion Tank
Courtesy of BMW OF NORTH AMERICA, INC.

Flushing brake system completely

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 bleed valve.

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

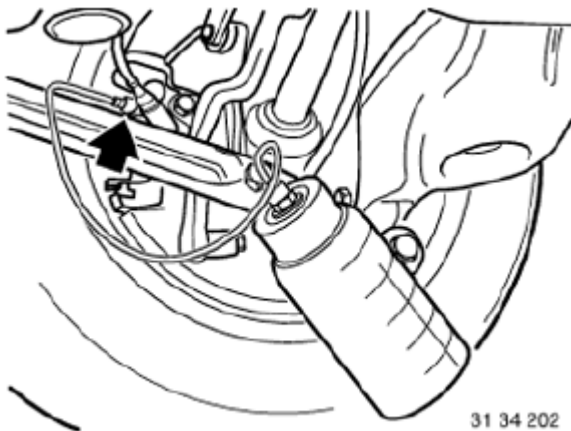


Fig. 15: Connecting Bleeder Hose With Collecting Tray
 Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: The clutch slave cylinder must also be scavenged in vehicles with manual transmissions.

Switch off brake fluid changer and remove from expansion tank.

Check brake fluid level.

Close expansion tank.

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

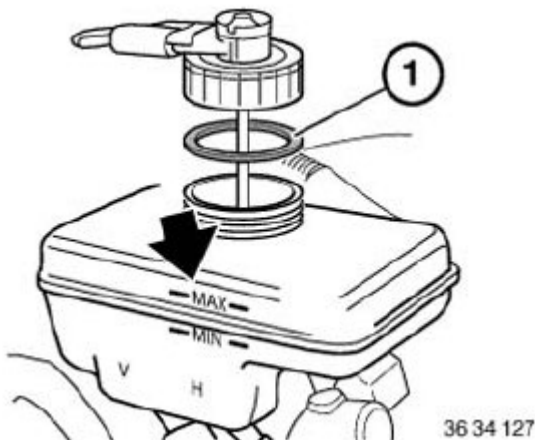


Fig. 16: Identifying Rubber Seal
 Courtesy of BMW OF NORTH AMERICA, INC.

34 00 519 CHECKING SERVICE BRAKE: HIGH- AND LOW-PRESSURE TESTS

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IMPORTANT: The high/low-pressure test (leakage test) must be carried out with the engine

switched off.

Observe safety instructions on raising the vehicle. See 00 LIFTING VEHICLE WITH A LIFTING PLATFORM

High-pressure test (leakage test):

Perform test on both brake circuits.

1st brake circuit, front axle

2nd brake circuit, rear axle

Remove bleeder screw, connect pressure tester and bleed.

Load brake pedal with a force and block brake pedal with pedal support, refer to Technical Data. See **34 00 TESTING AND BLEEDING BRAKES E70**

After 2 minutes, pressure is permitted to drop by max. 8 %.

Low-pressure test:

Perform test on both brake circuits.

Reset pedal support until test pressure in braking system is 2 ... 5 bar.

Vehicle and measuring apparatus must remain steady as vibrations will distort the result.

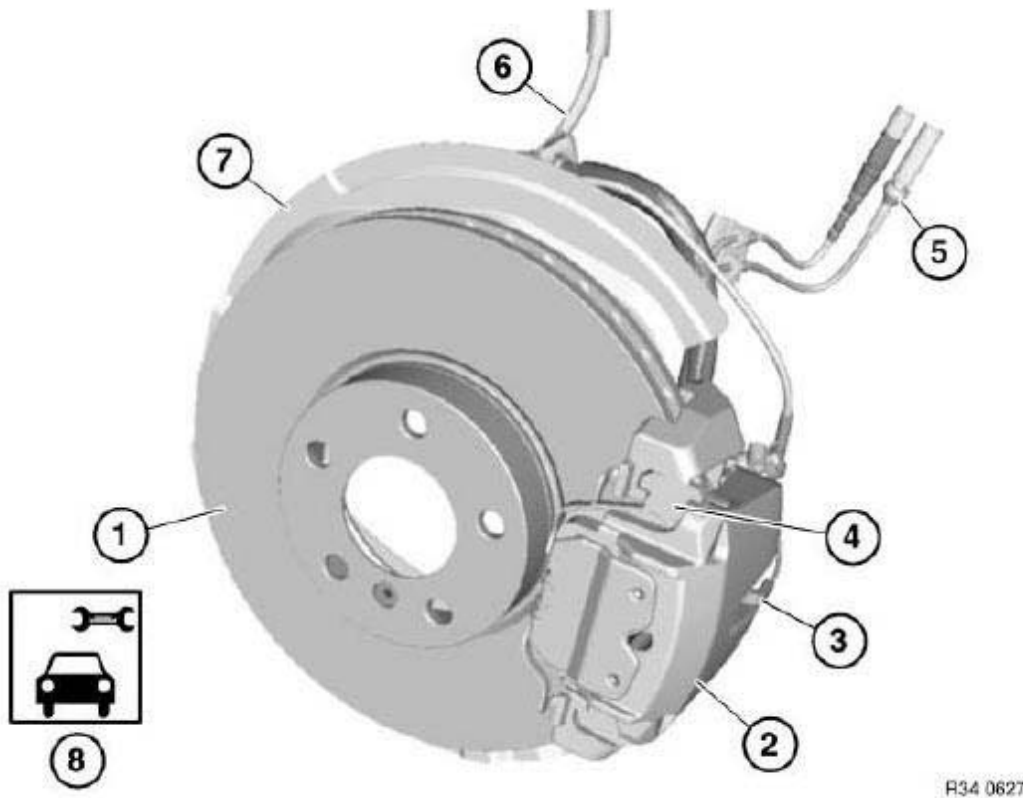
Pressure must remain constant for a test period of 5 minutes.

Check all rubber parts in case of excessive pressure drop.

Bleed brake calipers and wheel brake cylinders after finishing test.

11 FRONT BRAKES

34 11 ... OVERVIEW OF FRONT BRAKES



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- | | | | |
|---|------------------------------|---|--|
| 1 | <u>Brake disc</u> | 2 | <u>Brake caliper</u> |
| 3 | <u>Brake-pad wear sensor</u> | 4 | <u>Brake pads</u> |
| 5 | <u>Pulse generator</u> | 6 | <u>Brake hose</u> |
| 7 | <u>Brake guard plate</u> | 8 | <u>Checking thickness of brake pad</u> |

Fig. 17: Identifying Front Brake Components
 Courtesy of BMW OF NORTH AMERICA, INC.

1. Brake disc. See **34 11 220 Removing and Installing/Replacing Both Front Brake Discs, 34 11 667 Precision-turning Both Front Brake Discs On Both Sides**
2. Brake caliper. See **34 11 519 Removing and Installing/Replacing Left Or Right Front Brake Caliper**
3. Brake-pad wear sensor. See **34 35 001 Replacing a Brake Pad Sensor (Front)**
4. Brake pads. See **34 11 000 Removing and Installing/Replacing Brake Linings On Both Front Disc Brakes**
5. Pulse generator. See **34 52 525 Replacing One Front Pulse Generator**
6. Brake hose. See **34 32 980 Replacing Rear Left Or Right Brake Hoses**
7. Brake guard plate. See **34 11 250 Removing and Installing / Replacing A Brake Carrier / Brake Guard Plate At Front**
8. Checking thickness of brake pad. See **34 00 010 Checking Thickness Of Brake Pad**

BRAKES

Special tools required:

- 34 1 050
- 34 1 080
- 34 1 280

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).

Necessary preliminary tasks:

- Remove wheels
- Remove brake pad wear sensor

Lever out retaining spring (1) in direction of arrow towards rear.

Installation:

Attach retaining spring (1) first at top and bottom on brake caliper and then allow to engage in recesses of brake caliper housing.

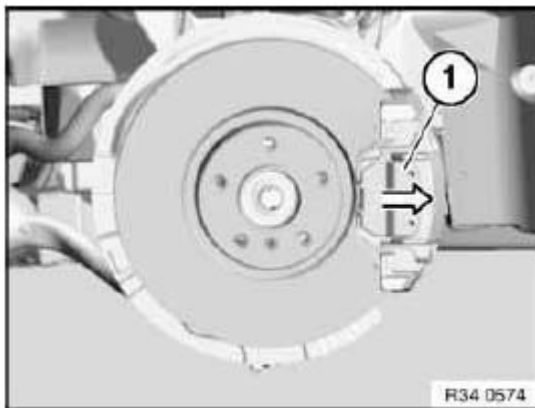


Fig. 18: Removing Retaining Spring
Courtesy of BMW OF NORTH AMERICA, INC.

Remove plastic plugs (1).

If necessary, when replacing linings, reset CBS display in accordance with factory specification.

Release guide screws (2) with special tool 34 1 080. See **34 1 080 BIT INSERT** . Withdraw brake caliper backwards.

IMPORTANT: Tie brake caliper back and do not allow to hang from brake hose.

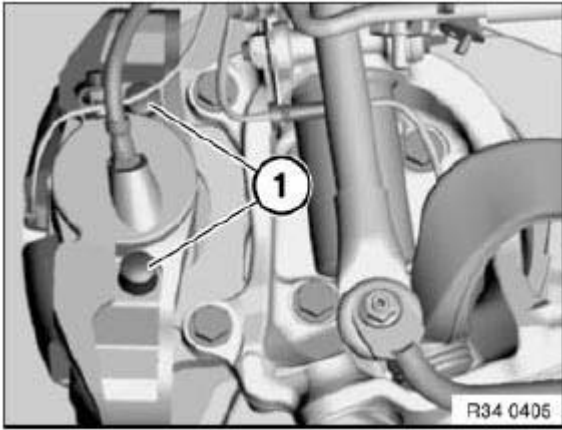


Fig. 19: Identifying Plastic Plugs

Courtesy of BMW OF NORTH AMERICA, INC.

Left:

Pull brake lining wear sensor (1) towards rear out of lining.

If necessary, replace brake lining wear sensor.

Installation:

Only clean guide screws; do not grease.

Check threads.

Replace all guide screws which are not in perfect condition.

Tightening torque 34 11 4AZ. See **34 11 FRONT BRAKE**

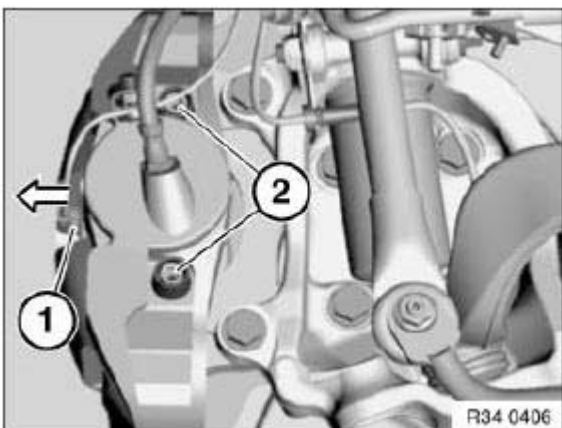


Fig. 20: Pulling Brake Lining Wear Sensor

Courtesy of BMW OF NORTH AMERICA, INC.

Remove outer brake pad (1) in direction of arrow.

Force inner brake pad (2) in direction of arrow off piston and remove.

The inner brake pad is seated with a spring in the piston or in the brake caliper housing.

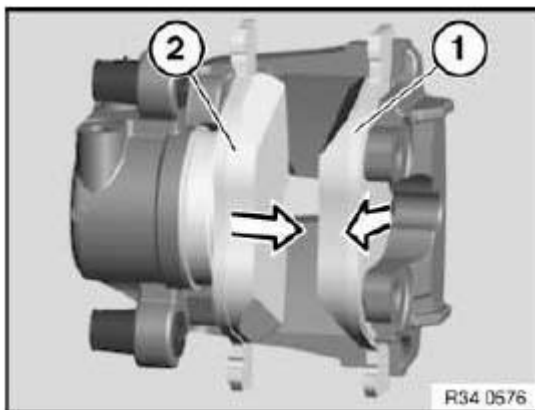
IMPORTANT: Mark any worn brake linings.

In the event of one-sided brake lining wear, do not change brake linings round.

Observe minimum thickness of brake pads. See **34 11 FRONT BRAKE E70**

Clean brake linings.

Do not apply grease to brake pad backplate.

**Fig. 21: Removing Outer Brake Pad**

Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: When forcing piston back:

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

Press back brake pads and piston with special tool 34 1 050. See 34 1 050 FIXTURE

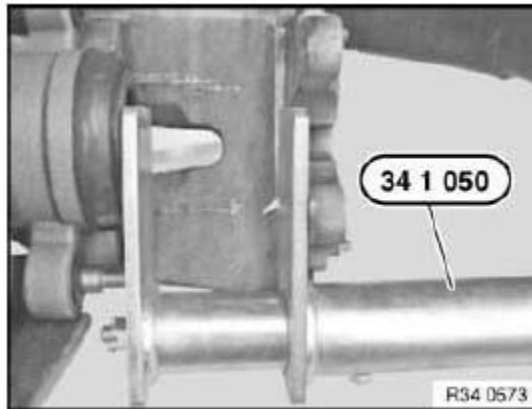


Fig. 22: Identifying Special Tool (34 1 050)
Courtesy of BMW OF NORTH AMERICA, INC.

Check minimum brake disc thickness:

- Position special tool 34 1 280 at three measuring points in area (1) and measure. See **34 1 280 SLIDING CALIPER**
- Compare measurement result and lowest value with setpoint value. See **34 11 FRONT BRAKE E70**

New brake linings may only be installed if the brake disc thickness is greater than or equal to the minimum brake disc thickness (MIN TH). See **34 11 FRONT BRAKE E70** .

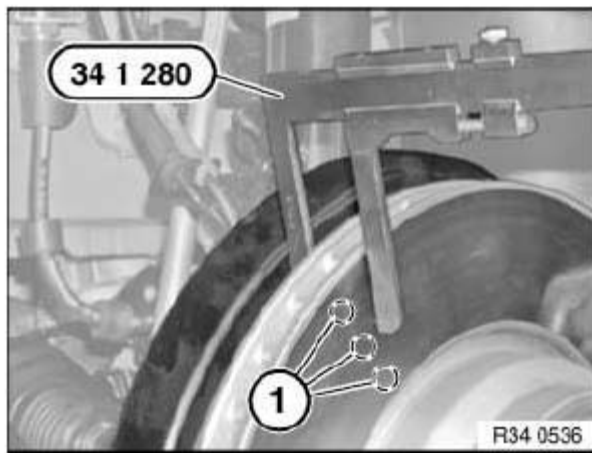


Fig. 23: Identifying Special Tool (34 1 280)
Courtesy of BMW OF NORTH AMERICA, INC.

Check dust sleeve (2) for damage and replace if necessary.

Clean contact face (1) of brake piston and apply a thin coating of anti-squeak compound .

may cause the dust sleeve to swell.

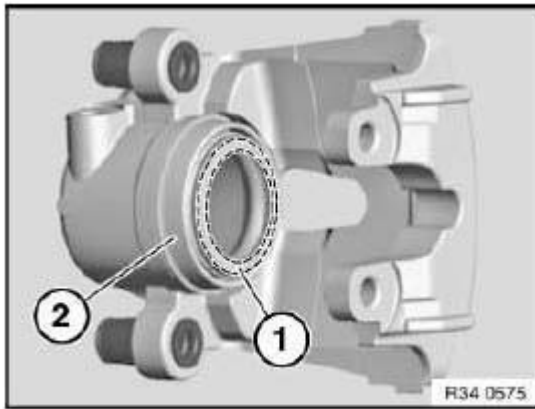


Fig. 24: Identifying Dust Sleeve

Courtesy of BMW OF NORTH AMERICA, INC.

Clean mounting faces (1) and (2) of brake lining hammer heads/brake caliper housing and coat with Plastilube.

NOTE: Grease contact surfaces on brake caliper at top and bottom.

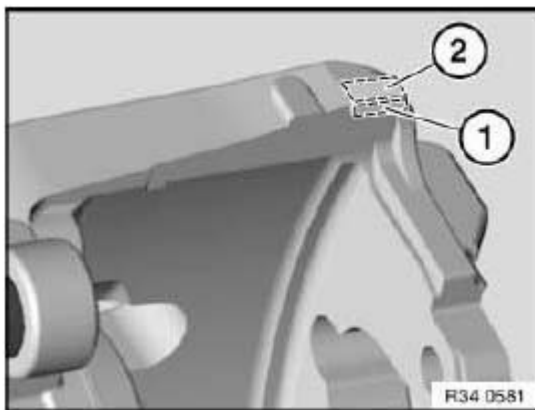


Fig. 25: Identifying Mounting Faces And Brake Lining Hammer Heads

Courtesy of BMW OF NORTH AMERICA, INC.

Clean mounting face (1) of brake caliper and apply a thin coating of Plastilube.

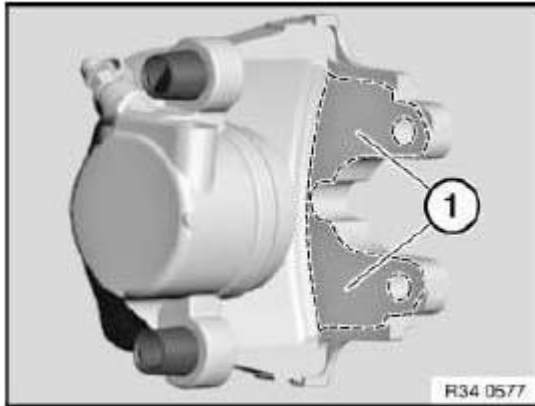


Fig. 26: Identifying Mounting Face Of Brake Caliper
Courtesy of BMW OF NORTH AMERICA, INC.

Clean hammerhead guides (1) and apply a thin coating of Plastilube.

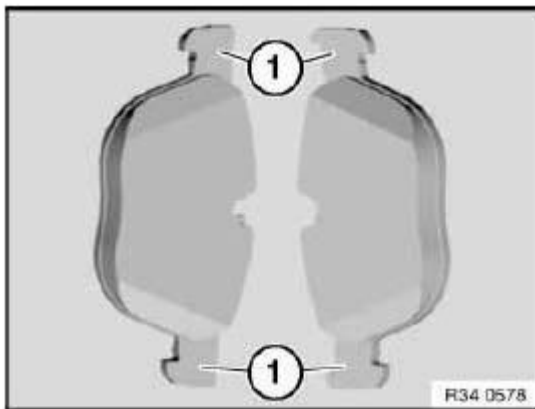


Fig. 27: Identifying Hammerhead Guides
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: After completing work:

- Fully depress brake pedal several times so that brake linings contact brake discs.
- When installing new brake linings 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. See 34 00 ... General Information On Braking In New Brake Discs / Brake Pads
- When replacing pads, reset CBS display in accordance with factory specification.

Special tools required:

- 34 1 280. See **34 1 280 SLIDING CALIPER**

Necessary preliminary tasks:

- Remove front wheels. See **36 10 300 REMOVING OR INSTALLING FRONT OR REAR WHEEL** .
- Remove and clean brake pads. See **34 11 000 Removing and Installing/Replacing Brake Linings On Both Front Disc Brakes**.

After completing work, read and comply with notes on braking in new brake discs / brake pads.

Check minimum brake disc thickness:

- Position special tool 34 1 280 at three measuring points in area (1) and measure. See **34 1 280 SLIDING CALIPER**
- Compare measurement result and lowest value with setpoint value. See **34 11 FRONT BRAKE E70**

New brake linings may only be installed if the brake disc thickness is greater than or equal to the minimum brake disc thickness (MIN TH). See **34 11 FRONT BRAKE E70**

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

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

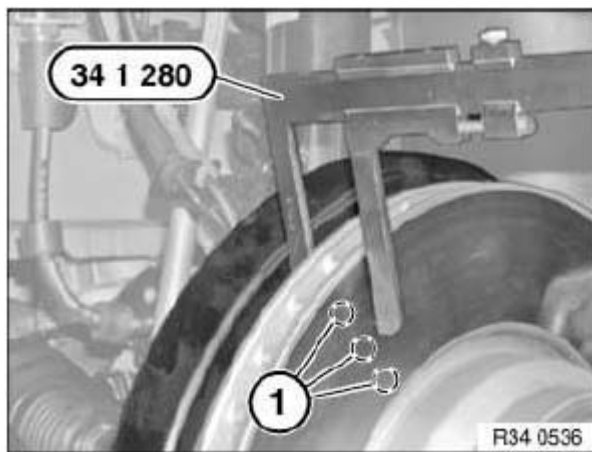


Fig. 28: Identifying Special Tool (34 1 280)
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1) and remove brake caliper mounting bracket.

Installation:

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Tightening torque 34 11 2AZ. See **34 11 FRONT BRAKE**

Brake hose remains connected.

Check that brake hose is correctly seated in holder.

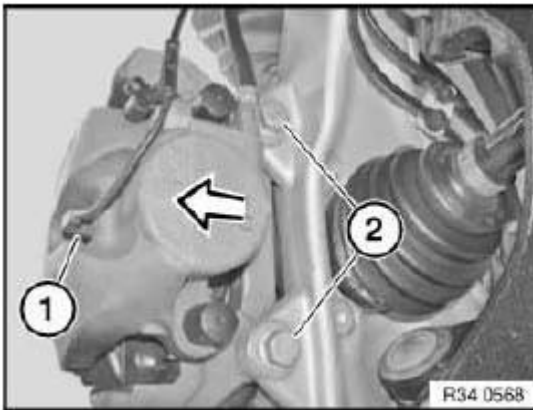


Fig. 29: Pulling Brake Lining Wear Sensor
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1) and remove brake disc (2).

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!

Installation:

Replace screw.

Tightening torque 34 11 1AZ. See 34 11 FRONT BRAKE

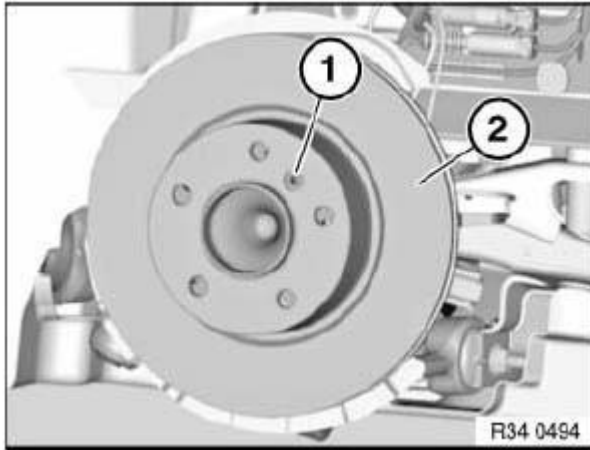


Fig. 30: Identifying Brake Disc Screw

Courtesy of BMW OF NORTH AMERICA, INC.

34 11 250 REMOVING AND INSTALLING / REPLACING A BRAKE CARRIER / BRAKE GUARD PLATE AT FRONT

Necessary preliminary tasks:

- Remove front brake disks. See **34 11 220 Removing and Installing/Replacing Both Front Brake Discs**

Release screws (1) and remove brake guard plate (2).

Installation:

Tightening torque 34 11 3AZ. See **34 11 FRONT BRAKE**

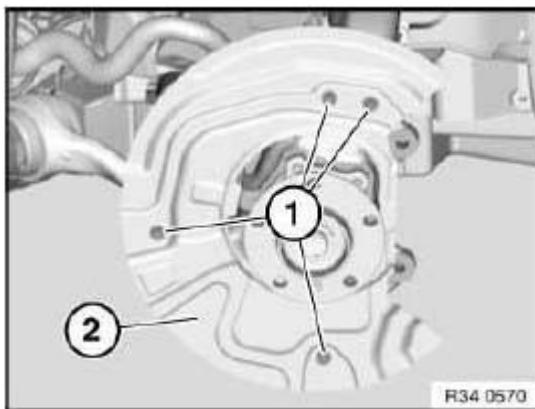


Fig. 31: Identifying Brake Guard Plate Screw

Courtesy of BMW OF NORTH AMERICA, INC.

34 11 519 REMOVING AND INSTALLING/REPLACING LEFT OR RIGHT FRONT BRAKE CALIPER

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).

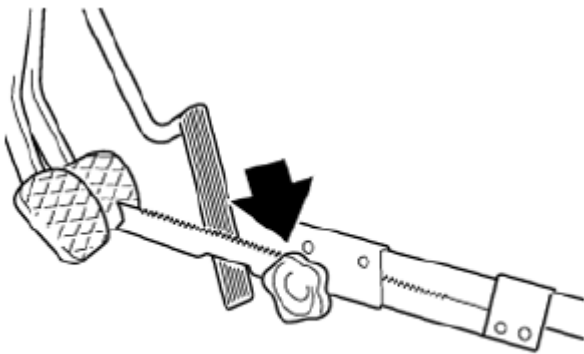
Necessary preliminary tasks:

- Remove wheel. See **36 10 300 REMOVING OR INSTALLING FRONT OR REAR WHEEL** .
- Remove brake pad wear sensor. See **34 35 001 Replacing a Brake Pad Sensor (Front)**
- Read and comply with General Information. See **34 00 ... General Information**

After completing tasks, bleed brake system. See **34 00 025 Replacing Fluid in ABS/ASC+T Brake System, 34 00 050 Bleeding Brake System with DSC**

Press clutch 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.



31 34 021

Fig. 32: Locating Brake Pedal Knob

Courtesy of BMW OF NORTH AMERICA, INC.

Detach retainer (1) from bracket on spring strut in upward direction.

Installation:

Retainer (1) must be felt and heard to snap into place.

Ensure correct seating in guide.

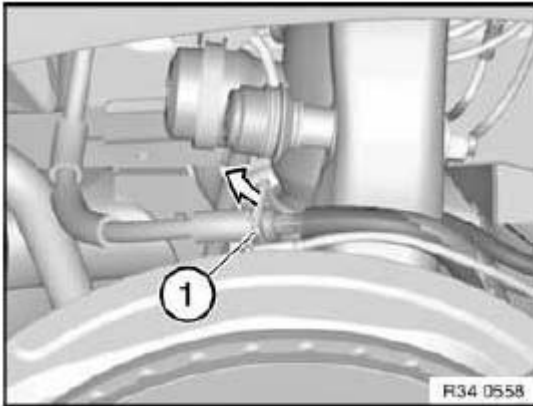


Fig. 33: Detaching Retainer From Bracket On Spring Strut
Courtesy of BMW OF NORTH AMERICA, INC.

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

Installation:

Tightening torque 34 32 1AZ.

Disconnect brake hose from brake line (1).

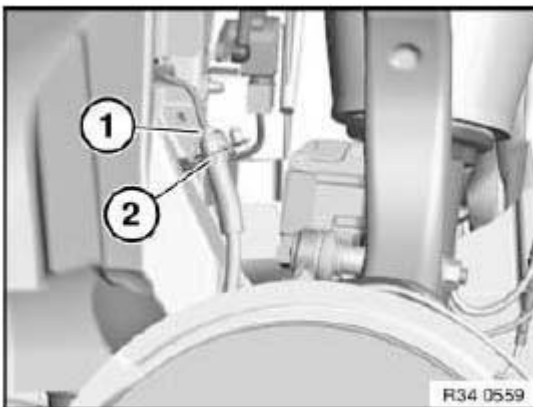


Fig. 34: Identifying Brake Hose And Brake Hose Square Head
Courtesy of BMW OF NORTH AMERICA, INC.

Detach brake hose from brake caliper (1).

Installation:

Tightening torque 34 32 2AZ. Refer **34 32 BRAKE LINES**
829 of 3160

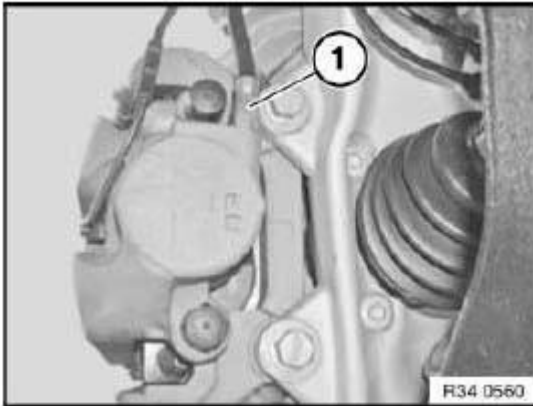


Fig. 35: Identifying Brake Caliper

Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: First tighten brake hose on brake caliper.
Move wheels into straight-ahead position.
Insert brake hose in bracket and screw onto brake pipe.
Never twist brake hose when installing it and avoid all contact with parts attached rigidly to the body.

Release screws (2).

Installation:

Tightening torque 34 11 2AZ. See 34 11 FRONT BRAKE .

Detach brake caliper in direction of arrow from swivel bearing.

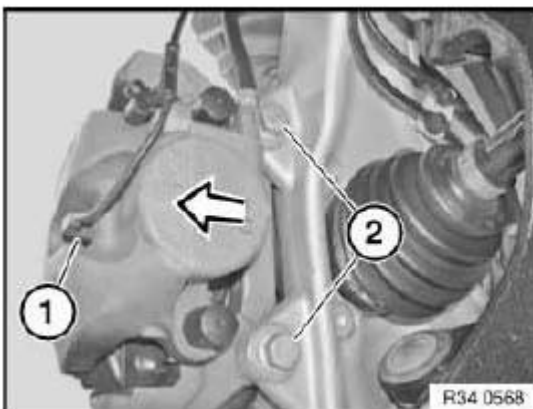


Fig. 36: Pulling Brake Lining Wear Sensor

Courtesy of BMW OF NORTH AMERICA, INC.

Special tools required:

- 00 9 316. See **00 9 310 ASSEMBLY WEDGES (SET IN PLASTIC CASE)**

WARNING: In the following work step, large forces occur at the brake calliper piston (up to more than 2800 N). Risk of injury!

NOTE: Use repair kit, refer to BMW Parts Service.

Check guide sleeves (5), fitting repair-kit guide sleeve if necessary.

Carefully force piston out through connection bore with compressed air.

To protect piston, place a protective plate (e.g. hard wood or hard felt) in calliper recess.

Do not grip piston with fingers - risk of trapping!

Press off dust sleeve (1).

Carefully remove seal (1) with special tool 00 9 316. See **00 9 310 ASSEMBLY WEDGES (SET IN PLASTIC CASE)**

Clean cylinder bores and parts with alcohol and dry with compressed air.

Thoroughly inspect cylinder bore, piston and flange surfaces. Machining of cylinders and pistons is not permitted.

Install new seal.

Installation:

Apply a light coat of ATE brake cylinder paste to cylinder bore, piston and seal, Refer to BMW Service Operating Fluids.

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

IMPORTANT: Do not twist brake piston.

Press piston into cylinder bore.

Evenly press dust sleeve (1) onto brake calliper housing as far as it will go.

Installation:

The area between the dust sleeve and the brake calliper 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 sleeve is perfectly seated.

34 11 667 PRECISION-TURNING BOTH FRONT BRAKE DISCS ON BOTH SIDES

IMPORTANT: Always precision-turn both sides of both brake discs on one axle.
Observe Max. machining dimension per friction ring side Minimum brake disc thickness (MIN TH). See 34 11 FRONT BRAKE E70 .
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). See 34 11 FRONT BRAKE E70

Stationary brake disc lathe:

IMPORTANT: Only BMW-approved brake disc lathes may be used!

In the case of stationary brake disc lathes, the brake disc must be removed.

Please refer to the lathe manufacturer's instruction manual for the exact procedure.

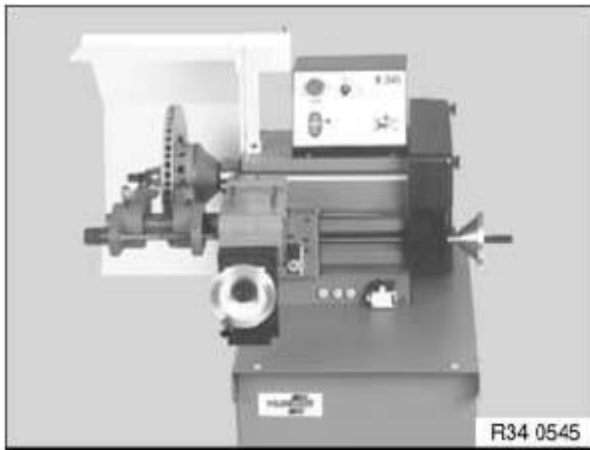


Fig. 37: Identifying Stationary Brake Disc Lathe
Courtesy of BMW OF NORTH AMERICA, INC.

Mobile brake disc lathe:

IMPORTANT: Only BMW-approved brake disc lathes may be used!

In the case of mobile brake disc lathes, only the brake calliper has must be removed.

The brake discs remain on the car.

Please refer to the lathe manufacturer's instruction manual for the exact procedure.



Fig. 38: Identifying Mobile Brake Disc Lathe
Courtesy of BMW OF NORTH AMERICA, INC.

After fine-grinding the brake discs, measure the thickness difference inside the braking surfaces at 8 points with an external micrometer. See **34 11 FRONT BRAKE E70** .

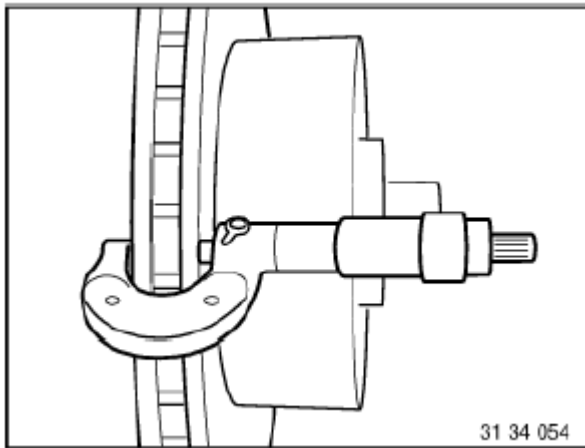
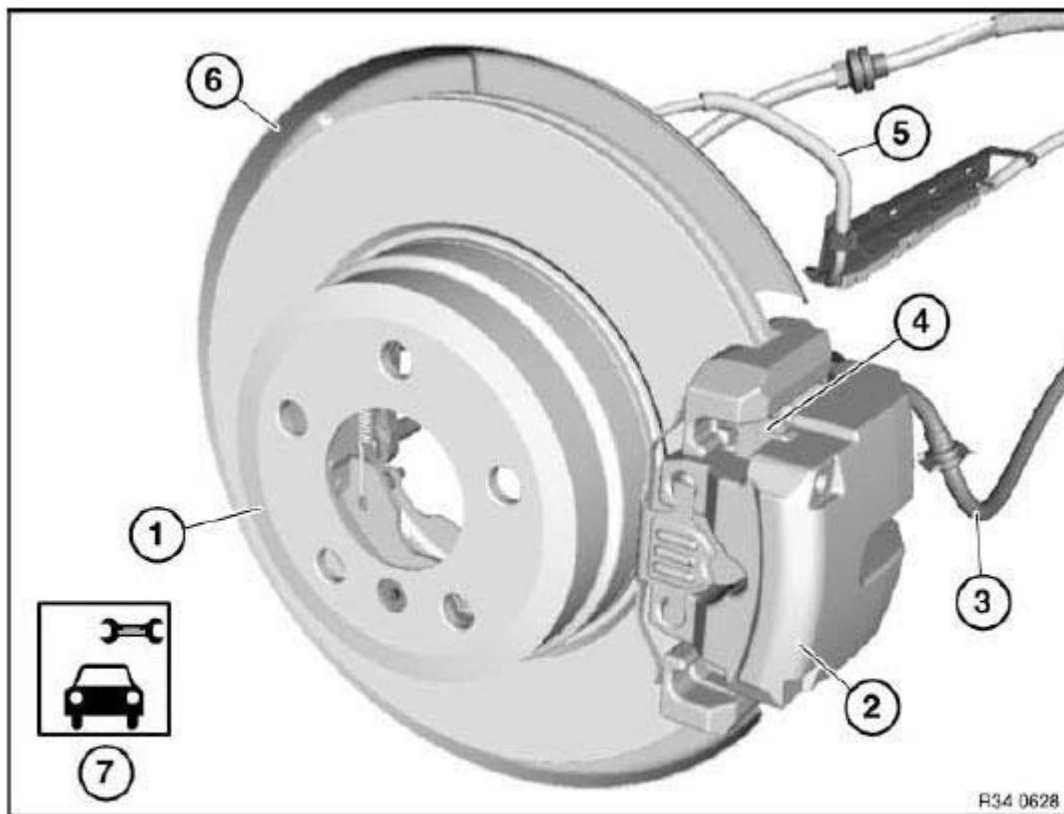


Fig. 39: Measuring Thickness Of Brake Discs
Courtesy of BMW OF NORTH AMERICA, INC.

21 REAR BRAKES

34 21 ... OVERVIEW OF REAR BRAKE



- | | | | |
|---|---|---|--------------------------|
| 1 | <u>Brake disc</u> | 2 | <u>Brake caliper</u> |
| 3 | <u>Brake hose</u> | 4 | <u>Brake pads</u> |
| 5 | <u>Pulse generator / brake pad sensor</u> | 6 | <u>Brake guard plate</u> |
| 7 | <u>Checking thickness of brake pad</u> | | |

Fig. 40: Identifying Rear Brake Components
 Courtesy of BMW OF NORTH AMERICA, INC.

1. Brake disc. See 34 21 320 Removing and Installing Or Replacing Both Rear Brake Discs, 34 21 947 Precision-turning Both Rear Brake Discs On Both Sides
2. Brake caliper. See 34 21 745 Removing and Installing/Replacing Left Or Right Rear Brake Caliper
3. Brake hose. See 34 32 980 Replacing Rear Left Or Right Brake Hoses
4. Brake pads. See 34 21 200 Removing and Installing/Replacing Brake Linings On Both Rear Disc Brakes (Teves Floating Caliper)
5. Pulse generator / brake pad sensor. See 34 35 513 Replacing a Brake Pad Sensor (Rear), 34 52 535 Replacing a Rear Pulse Generator
6. Brake guard plate. See 34 21 169 Removing and Installing / Replacing A Brake Carrier / Brake Guard At Rear
7. Checking thickness of brake pad. See 34 00 010 Checking Thickness Of Brake Pad

AT REAR

Necessary preliminary tasks:

- Remove handbrake shoes. See **34 41 220 Removing and Installing/Replacing All Handbrake Shoes**
- Remove wheel hub. See **33 41 151 REPLACING LEFT OR RIGHT WHEEL BEARING ON REAR AXLE SHAFT**

Release screws (1) and remove brake carrier (2).

Installation:

Tightening torque 34 21 3AZ. See **34 21 REAR BRAKE** .

34 21 171 REMOVING AND INSTALLING / REPLACING A BRAKE CARRIER / BRAKE GUARD AT REAR

Necessary preliminary tasks:

- Remove handbrake shoes
- Remove wheel hub

Release screws (1) and remove brake carrier (2).

Installation:

Tightening torque 34 21 3AZ . See **34 21 REAR BRAKE** ..

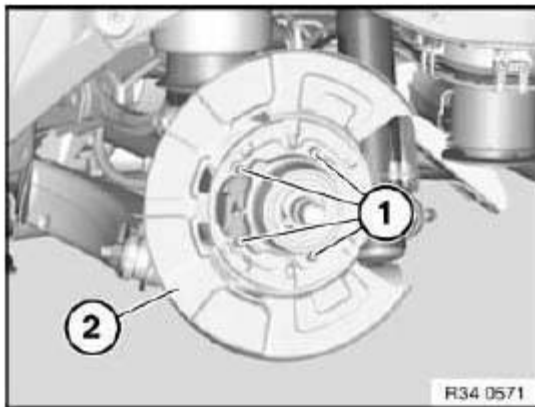


Fig. 41: Identifying Brake Carrier Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Special tools required:

- 34 1 050. See 34 1 050 FIXTURE
- 34 1 280. See 34 1 280 SLIDING CALIPER

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).

Necessary preliminary tasks:

- Remove wheels. See 36 10 300 REMOVING OR INSTALLING FRONT OR REAR WHEEL
- Remove brake pad wear sensor. See 34 35 513 Replacing a Brake Pad Sensor (Rear)

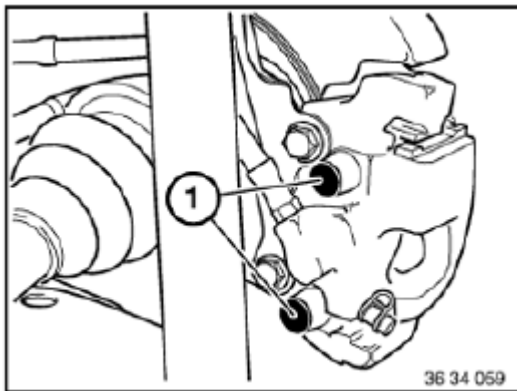


Fig. 42: Identifying Cover Plug

Courtesy of BMW OF NORTH AMERICA, INC.

Lift out retaining spring (1).

Remove cover plug (1).

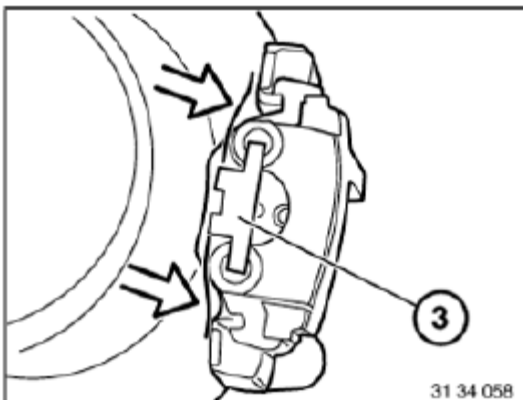


Fig. 43: Lifting Out Retaining Spring

Courtesy of BMW OF NORTH AMERICA, INC.

Unscrew guide screws (2).

Withdraw brake caliper backwards.

IMPORTANT: Tie brake caliper back and do not allow to hang from brake hose.

Installation:

Tightening torque 34 21 4AZ. See **34 21 REAR BRAKE** .

Clean guide screws only; do not grease.

Check threads.

Replace all guide screws which are not in perfect condition.

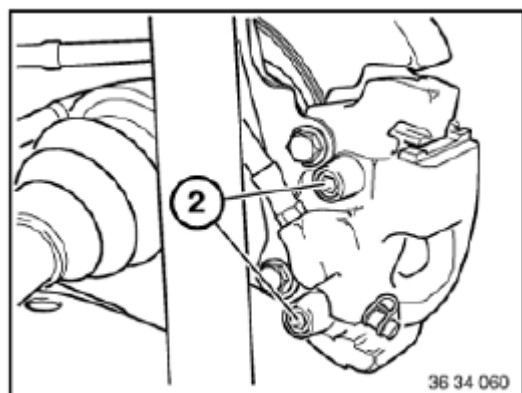


Fig. 44: Identifying Plastic Plugs And Guide Screws

Courtesy of BMW OF NORTH AMERICA, INC.

**IMPORTANT: When pressing down piston, note brake fluid level in expansion tank.
Overflowing brake fluid will damage the paintwork.**

Turn piston fully back with special tool 34 1 050. See **34 1 050 FIXTURE**

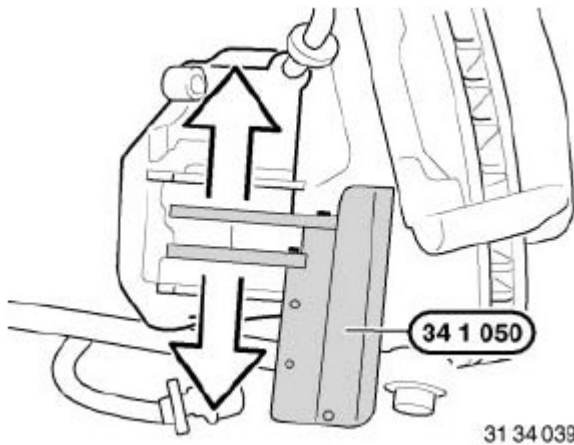


Fig. 45: Identifying Special Tool (34 1 050)

Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Mark any worn brake linings.

In the event of one-sided brake lining wear, do not change brake linings round.

Remove outer brake pad.

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

Clean brake pads.

Do not grease backs of brake linings sleeve.

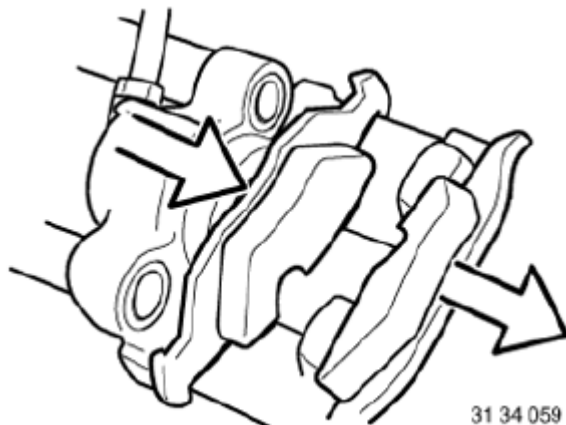


Fig. 46: Removing Outer Brake Lining

Courtesy of BMW OF NORTH AMERICA, INC.

Check minimum brake disc thickness:

- Position special tool 34 1 280 at three measuring points in area (1) and measure. See **34 1 280 SLIDING**

CALIPER

- Compare measurement result and lowest value with setpoint value. See **34 21 REAR BRAKE DISCS E70**

New brake linings may only be installed if the brake disc thickness is greater than or equal to the minimum brake disc thickness (MIN TH). See **34 21 REAR BRAKE DISCS E70**

NOTE: The minimum thickness of the brake disc is designed so that it holds over the service life of a further set of brake pads if it is greater than or equal to the minimum brake disc thickness (MIN TH). See **34 21 REAR BRAKE DISCS E70**

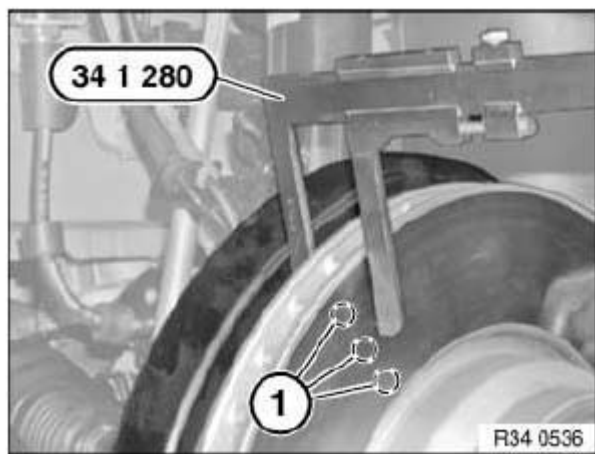


Fig. 47: Identifying Special Tool (34 1 280)
Courtesy of BMW OF NORTH AMERICA, INC.

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

IMPORTANT: Dust sleeve must not come into contact with anti-squeak compound as this may cause the dust sleeve to swell.

Clean contact face (2) of brake piston and apply a thin coating of anti-squeak compound.

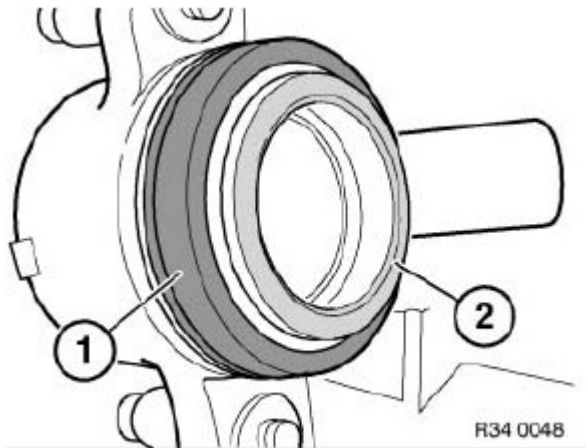


Fig. 48: Identifying Dust Sleeve

Courtesy of BMW OF NORTH AMERICA, INC.

Clean contact surfaces (1...2) of brake lining hammer heads/brake caliper housing and coat with anti-squeak compound.

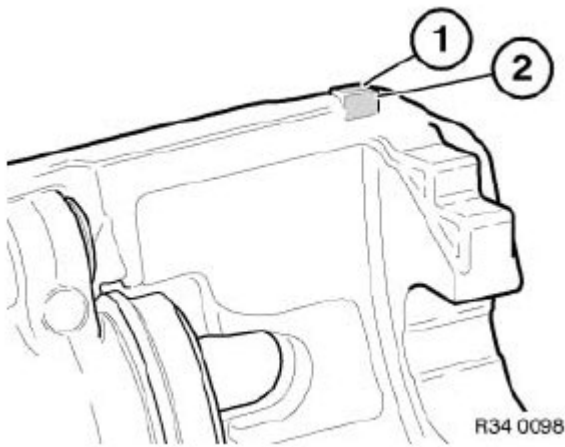


Fig. 49: Identifying Contact Faces Of Brake Lining Hammer Heads

Courtesy of BMW OF NORTH AMERICA, INC.

Clean contact surface (3) of brake caliper and apply a thin coating of anti-squeak compound.

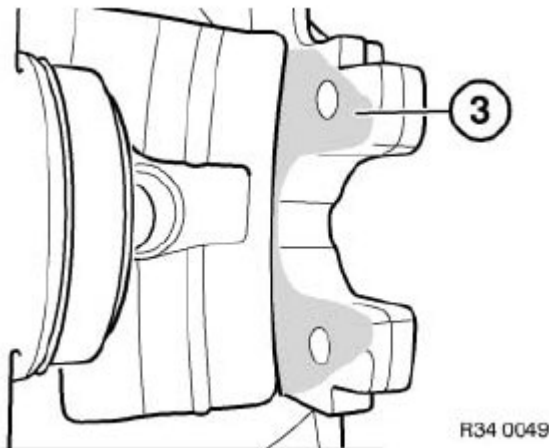


Fig. 50: Identifying Contact Face Of Brake Caliper
 Courtesy of BMW OF NORTH AMERICA, INC.

Clean brake caliper mounting bracket at hammer head guides and apply a thin coating of anti-squeak compound.

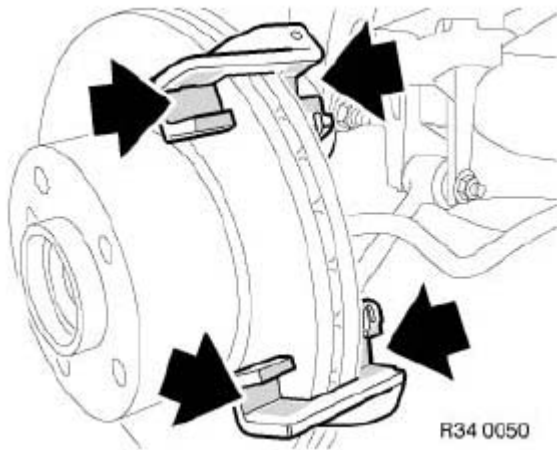


Fig. 51: Locating Brake Caliper Mounting Bracket
 Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: After completing work:

- Fully depress brake pedal several times so that brake linings contact brake discs.
- When installing new brake linings 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. See 34 00 ... General Information
- If necessary, when replacing pads, reset CBS display in accordance with factory specification.

34 21 320 REMOVING AND INSTALLING OR REPLACING BOTH REAR BRAKE DISCS

Special tools required:

- 34 1 280. See **34 1 280 SLIDING CALIPER**

Necessary preliminary tasks:

- Remove wheels. See **36 10 300 REMOVING OR INSTALLING FRONT OR REAR WHEEL**
- Remove and clean brake pads. See **34 21 200 Removing and Installing/Replacing Brake Linings On Both Rear Disc Brakes (Teves Floating Caliper)**

After completing work:

- Adjusting handbrake. See **34 41 006 Adjusting Parking Brake**
- Read and comply with notes on braking in new brake discs / brake pads. See **34 00 ... General Information On Braking In New Brake Discs / Brake Pads**

Check minimum brake disc thickness:

- Position special tool 34 1 280 at three measuring points in area (1) and measure. See **34 1 280 SLIDING CALIPER**
- Compare measurement result and lowest value with setpoint value. See **34 21 REAR BRAKE DISCS E70**

New brake linings may only be installed if the brake disc thickness is greater than or equal to the minimum brake disc thickness (MIN TH). See **34 21 REAR BRAKE DISCS E70**

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

Always replace brake discs in pairs.

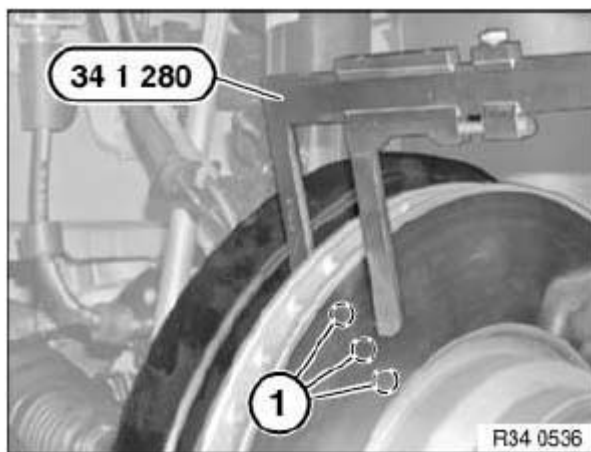


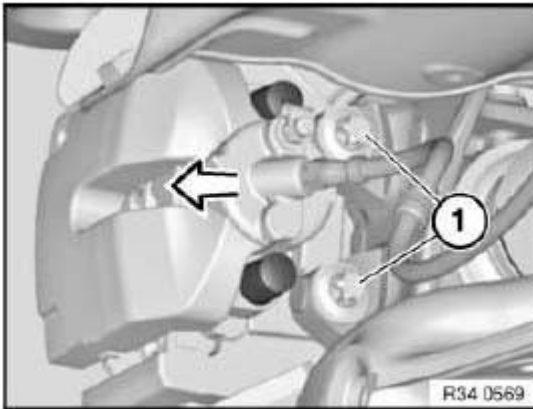
Fig. 52: Identifying Special Tool (34 1 280)

Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1) and detach brake caliper mounting bracket.

Installation:

Tightening torque 34 21 2AZ. See **34 21 REAR BRAKE DISCS E70** .

**Fig. 53: Removing Brake Caliper Screw**

Courtesy of BMW OF NORTH AMERICA, INC.

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).

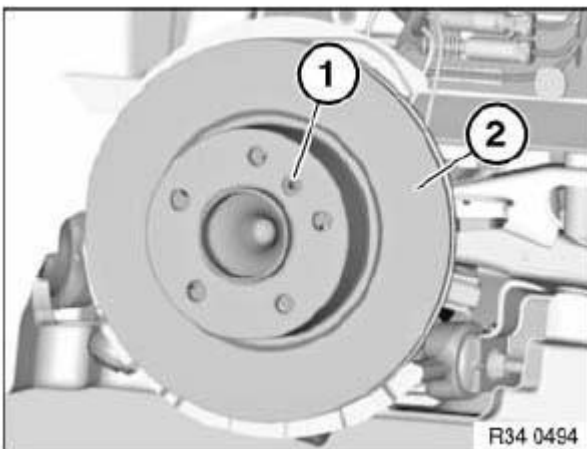


Fig. 54: Identifying Brake Disc Screw

Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Replace screw.

Tightening torque 34 21 1AZ. See **34 21 REAR BRAKE**

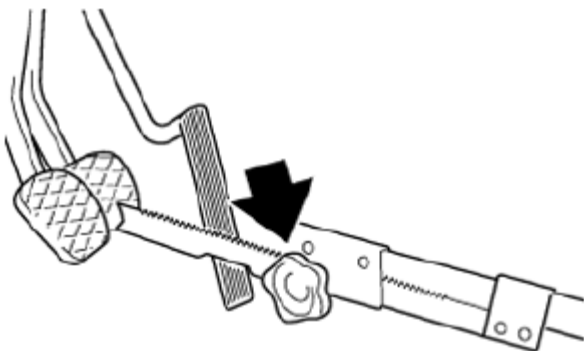
34 21 745 REMOVING AND INSTALLING/REPLACING LEFT OR RIGHT REAR BRAKE CALIPER*Necessary preliminary tasks:*

- Remove wheel. See **36 10 300 REMOVING OR INSTALLING FRONT OR REAR WHEEL**
- Read and comply with General Information. See **34 00 ... General Information**

After completing work: Bleed braking system. See **34 00 025 Replacing Fluid in ABS/ASC+T Brake System**

Press clutch 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.



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Fig. 55: Locating Brake Pedal Knob

Courtesy of BMW OF NORTH AMERICA, INC.

Detach retaining clip (1) in direction of arrow.

Installation:

Retaining clip must be felt and heard to snap into place.

Disconnect brake hose from brake line (2).

IMPORTANT: Grip brake hose at square head (3) to prevent connecting piece from turning in retaining bracket.

Disconnect brake hose from brake line (2).

Installation:

Tightening torque 34 32 1AZ. See **34 32 BRAKE LINES**

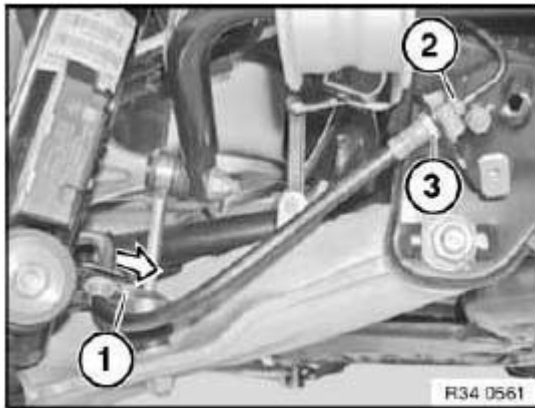


Fig. 56: Detaching Retaining Clip
Courtesy of BMW OF NORTH AMERICA, INC.

Detach brake hose from brake caliper (1).

Installation:

Tightening torque 34 32 3AZ. See **34 32 BRAKE LINES**

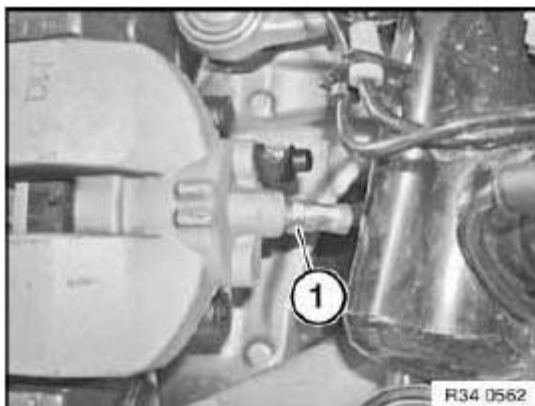


Fig. 57: Identifying Brake Hose

Courtesy of BMW OF NORTH AMERICA, INC.

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.

Remove brake pads. See **34 21 200 Removing and Installing/Replacing Brake Linings On Both Rear Disc Brakes (Teves Floating Caliper)**

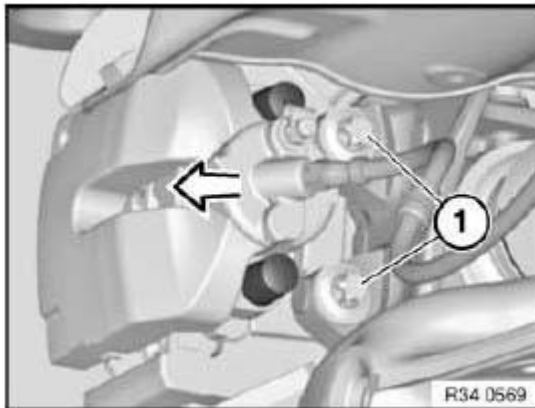
Release screws (1).

Remove brake anchor plate in direction of arrow.

Installation:

Tightening torque 34 21 2AZ. See **34 21 REAR BRAKE**

Remove brake caliper in direction of arrow.

**Fig. 58: Removing Brake Caliper Screw**

Courtesy of BMW OF NORTH AMERICA, INC.

34 21 812 OVERHAULING LEFT OR RIGHT REAR BRAKE CALIPER (BRAKE CALIPER REMOVED)

Special tools required:

- 00 9 316. See **00 9 310 ASSEMBLY WEDGES (SET IN PLASTIC CASE)**

WARNING: In the following work step, large forces occur at the brake calliper piston

(up to more than 2800 N). Risk of injury!

NOTE: Use repair kit, refer to BMW Parts Service.

Check guide sleeves (5), fitting repair-kit guide sleeve if necessary.

Carefully force piston out through connection bore with compressed air.

To protect piston, place a protective plate (e.g. hard wood or hard felt) in calliper recess.

Do not grip piston with fingers - risk of trapping!

Press off dust sleeve (1).

Carefully remove seal (1) with special tool 00 9 316. See **00 9 310 ASSEMBLY WEDGES (SET IN PLASTIC CASE)**

Clean cylinder bores and parts with alcohol and dry with compressed air.

Thoroughly inspect cylinder bore, piston and flange surfaces. Machining of cylinders and pistons is not permitted.

Install new seal.

Installation:

Apply a light coat of Ate brake cylinder paste to cylinder bore, piston and seal, Refer to BMW Service Operating Fluids.

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

IMPORTANT: Do not twist brake piston.

Press piston into cylinder bore.

Evenly press dust sleeve (1) onto brake calliper housing as far as it will go.

Installation:

The area between the dust sleeve and the brake calliper 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 sleeve is perfectly seated.

34 21 947 PRECISION-TURNING BOTH REAR BRAKE DISCS ON BOTH SIDES

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

Observe Max. machining dimension per friction ring side Minimum brake disc thickness (MIN TH). See 34 21 REAR BRAKE DISCS E70
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). See 34 21 REAR BRAKE DISCS E70

Stationary brake disc lathe:

IMPORTANT: Only BMW-approved brake disc lathes may be used!

In the case of stationary brake disc lathes, the brake disc must be removed. See 34 21 320 Removing and Installing Or Replacing Both Rear Brake Discs

Please refer to the lathe manufacturer's instruction manual for the exact procedure.

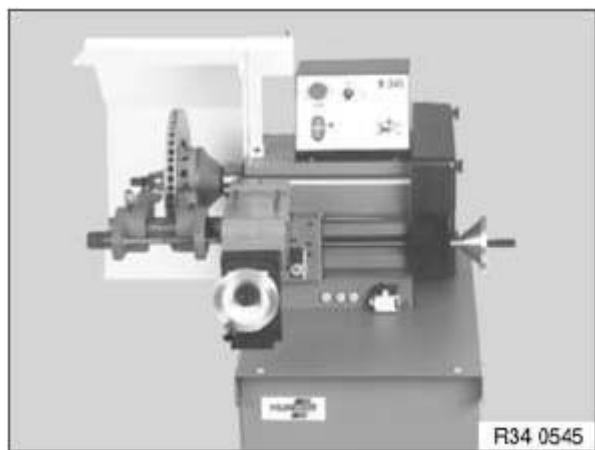


Fig. 59: Identifying Stationary Brake Disc Lathe
Courtesy of BMW OF NORTH AMERICA, INC.

Mobile brake disc lathe:

IMPORTANT: Only BMW-approved brake disc lathes may be used!

In the case of mobile brake disc lathes, only the brake calliper has must be removed. See 34 21 745 Removing and Installing/Replacing Left Or Right Rear Brake Caliper

The brake discs remain on the car.

Please refer to the lathe manufacturer's instruction manual for the exact procedure.



Fig. 60: Identifying Mobile Brake Disc Lathe
Courtesy of BMW OF NORTH AMERICA, INC.

After fine-grinding the brake discs, measure the thickness difference inside the braking surfaces at 8 points with an external micrometer. See **34 21 REAR BRAKE DISCS E70**

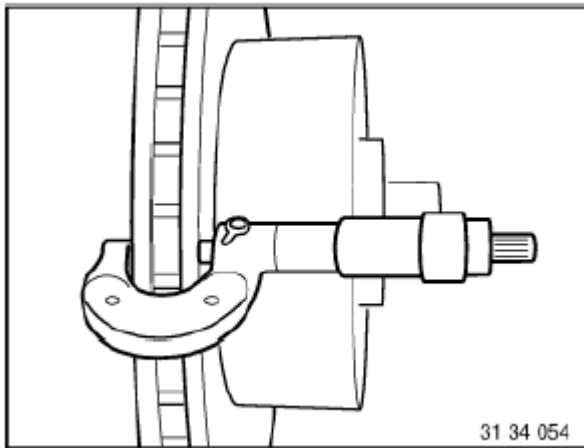


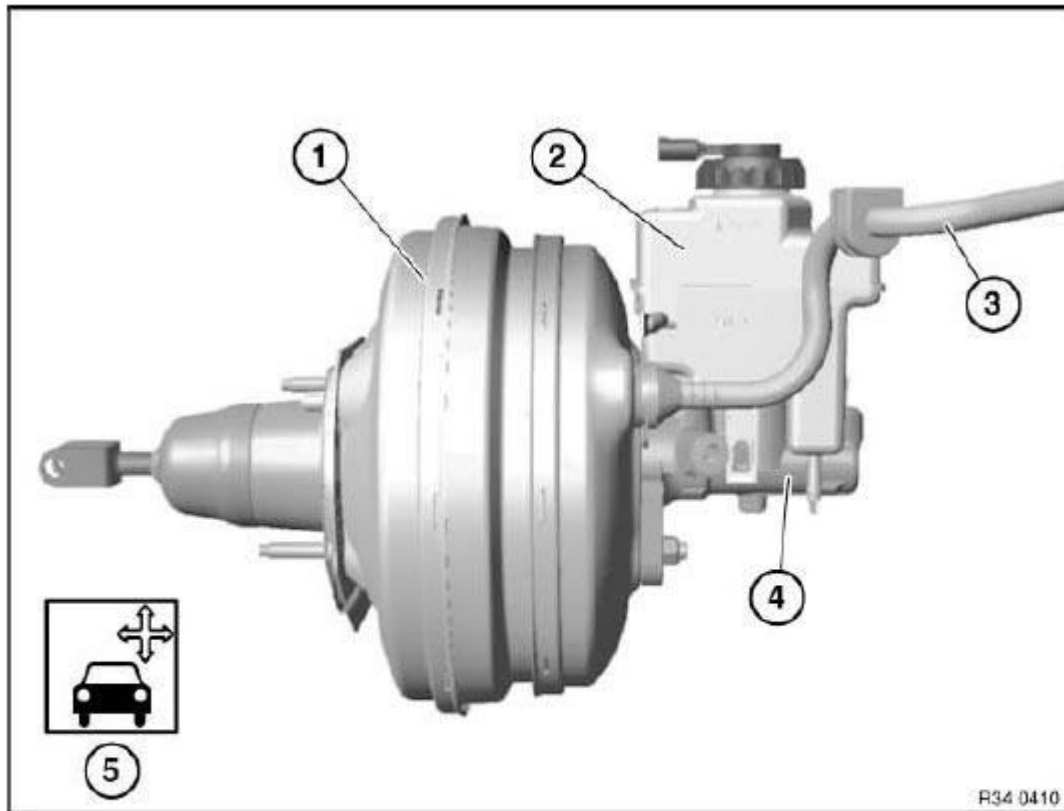
Fig. 61: Measuring Thickness Of Brake Discs
Courtesy of BMW OF NORTH AMERICA, INC.

31 MASTER BRAKE CYLINDER

34 31 ... OVERVIEW OF BRAKE MASTER CYLINDER / BRAKE BOOSTER

1. Brake booster. See **34 33 505 Removing and Installing/Replacing Brake Booster**
2. Expansion tank. See **34 31 181 Removing and Installing / Replacing Expansion Tank For Hydraulic Brake Actuation**
3. Vacuum hose. See **34 33 071 Replacing Vacuum Hose For Brake Booster (N52K)**
4. Brake master cylinder. See **34 33 505 Removing and Installing/Replacing Brake Booster**

5. Bleed braking system. See **34 00 050 Bleeding Brake System with DSC**



1 Brake booster

2 Expansion tank

3 Vacuum hose

4 Brake master cylinder

5 Bleeding braking system

Fig. 62: Identifying Brake Master Cylinder/Brake Booster Components

Courtesy of BMW OF NORTH AMERICA, INC.

34 31 181 REMOVING AND INSTALLING / REPLACING EXPANSION TANK FOR HYDRAULIC BRAKE ACTUATION

Necessary preliminary tasks:

- Read and comply with General Information. See **34 00 ... General Information**
- Remove left microfilter housing cover. See **64 31 101 REMOVING AND INSTALLING/REPLACING LEFT MICROFILTER HOUSING COVER**

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.

Unfasten plug connection (1) and disconnect.

Remove wiring harness from holder (2).

Release screw (3) and lift off expansion tank.

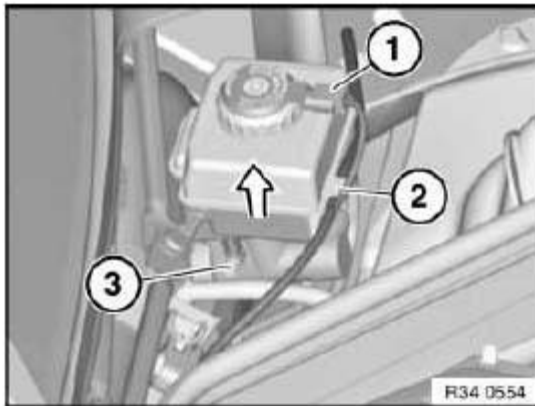


Fig. 63: Removing Wiring Harness From Holder
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Check rubber plug in brake master cylinder for damage and replace if necessary.
Push the expansion tank vertically onto the master brake cylinder.

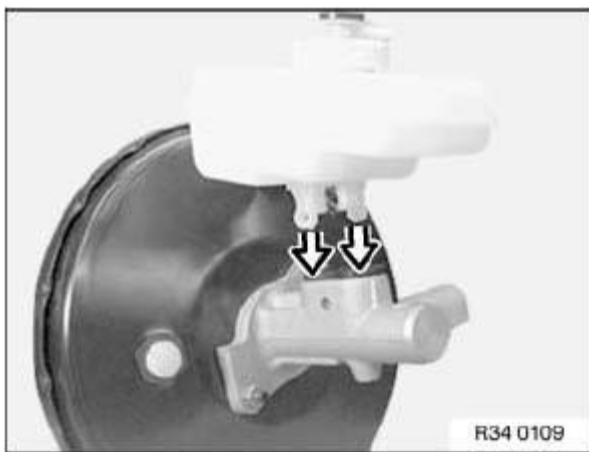


Fig. 64: Locating Rubber Plug In Brake Master Cylinder
Courtesy of BMW OF NORTH AMERICA, INC.

34 31 505 REMOVING AND INSTALLING / REPLACING MASTER BRAKE CYLINDER FOR DSC

Special tools required:

851 of 3160

- 32 1 27032 1 270 PLUGS (SET)

Necessary preliminary tasks:

- Remove expansion tank. [34 31 181 Removing and Installing / Replacing Expansion Tank For Hydraulic Brake Actuation](#)
- Read and comply with General Information. [34 00 ... General Information](#)

After completing tasks, bleed brake system with DSC. [34 00 050 Bleeding Brake System with DSC](#)

IMPORTANT: Do not bend brake lines.

Unfasten brake lines (2).

Unclip retaining bar (1) and remove both brake lines from guides.

Installation:

Tightening torque 34 32 1AZ. [34 32 BRAKE LINES](#)

Close off brake lines and brake master cylinder with plugs 32 1 270. [32 1 270 PLUGS \(SET\)](#)

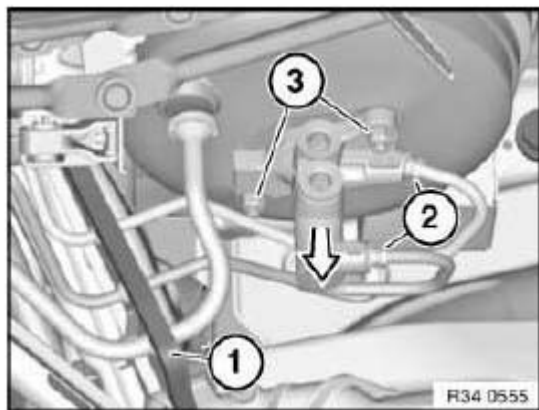


Fig. 65: Unclipping Retaining Bar
Courtesy of BMW OF NORTH AMERICA, INC.

Release nuts (3) and feed brake master cylinder out of brake booster.

Installation:

Replace self-locking nuts.

Tightening torque 34 31 1AZ.

Installation:

Replace sealing ring.

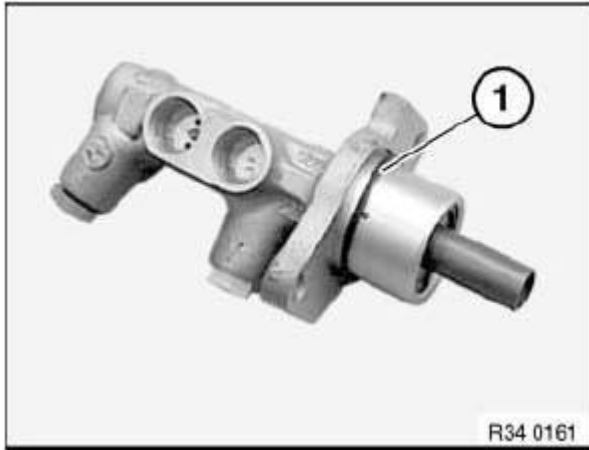


Fig. 66: Identifying Sealing Ring
 Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

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.

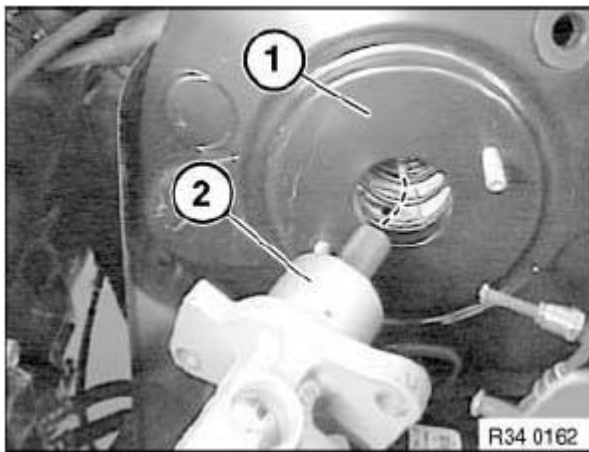


Fig. 67: Identifying Brake Master Cylinder And Brake Booster
 Courtesy of BMW OF NORTH AMERICA, INC.

32 BRAKE LINES

34 32 ... OVERVIEW OF BRAKE LINES

1. Brake hose, front. See **34 32 881 Replacing Front Left Or Right Brake Hoses**
2. Brake tubes. See **34 32 861 Replacing All Brake Pipes**
3. Brake hose, rear, to body. See **34 32 951 Replacing Rear Left Or Right Brake Hose (Between Rear Axle Carrier And Body)**

4. Brake hose, rear, to wheel brake cylinder. See **34 32 980 Replacing Rear Left Or Right Brake Hoses**

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. See **34 00 ... General Information**

After completing work, bleed brake system. See **34 00 050 Bleeding Brake System with DSC**

Observe safety instructions on raising the vehicle. See **00 LIFTING VEHICLE WITH A LIFTING PLATFORM**

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

Removed brake pipes can be used as templates for bending.

- IMPORTANT:**
- **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. Brake lines may not make contact or rub.**
 - **Tighten down brake line couplings with torque wrench.**

Installation:

Tightening torque 34 32 1AZ. See **34 32 BRAKE LINES**

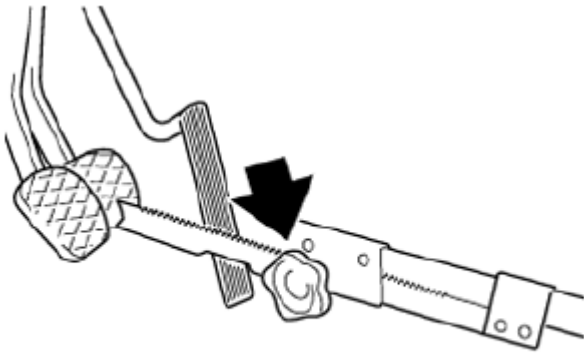
34 32 881 REPLACING FRONT LEFT OR RIGHT BRAKE HOSES

Necessary preliminary tasks:

- Remove wheel. See **36 10 300 REMOVING OR INSTALLING FRONT OR REAR WHEEL**
- Read and comply with General Information. See **34 00 ... General Information**

After completing tasks, bleed brake system.

Press clutch pedal down to floor and secure with pedal support.



31 34 021

Fig. 68: Locating Brake Pedal Knob

Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: The pedal support may only be released when the brake lines are reconnected.

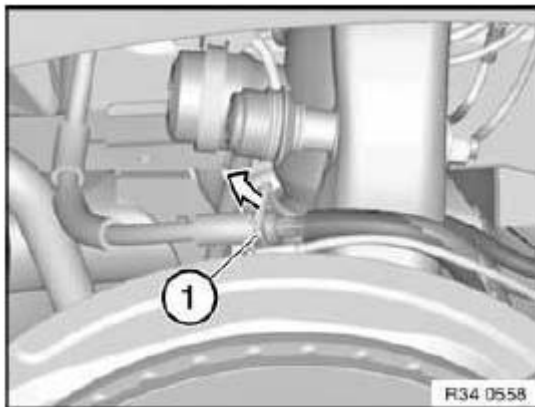
This prevents brake fluid from emerging from the expansion tank and air from entering the system when the brake lines are opened.

Detach retainer (1) from bracket on spring strut in upward direction.

Installation:

Retainer (1) must be felt and heard to snap into place.

Ensure correct seating in guide.

**Fig. 69: Detaching Retainer From Bracket On Spring Strut**

Courtesy of BMW OF NORTH AMERICA, INC.

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:

Tightening torque 34 32 1AZ. See **34 32 BRAKE LINES**

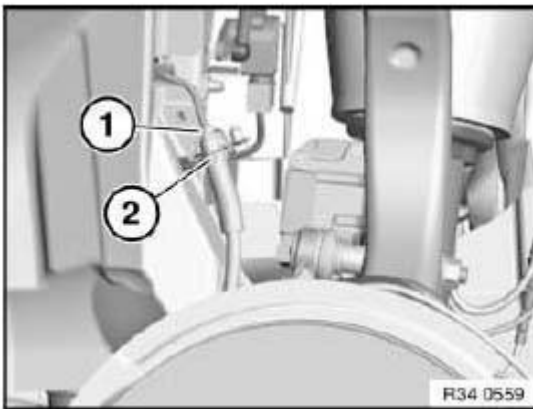


Fig. 70: Identifying Brake Hose And Brake Hose Square Head
Courtesy of BMW OF NORTH AMERICA, INC.

Detach brake hose from brake caliper (1).

Installation:

Tightening torque 34 32 2AZ. See **34 32 BRAKE LINES**

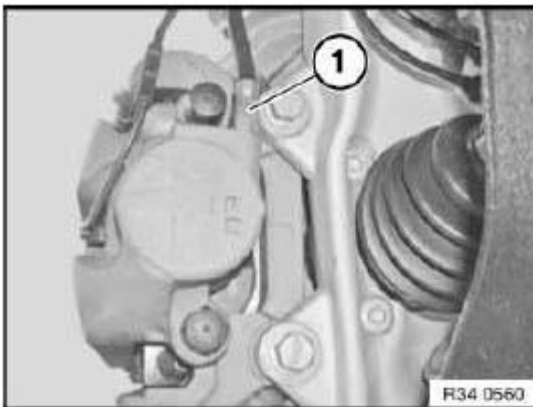


Fig. 71: Identifying Brake Caliper
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: First tighten brake hose on brake caliper.

**Move wheels into straight-ahead position.
Insert brake hose in bracket and screw onto brake pipe.
Never twist brake hose when installing it and avoid all contact with parts
attached rigidly to the body.**

34 32 951 REPLACING REAR LEFT OR RIGHT BRAKE HOSE (BETWEEN REAR AXLE CARRIER AND BODY)

Special tools required:

- 34 3 170. See **34 3 170 SET OF SOCKET WRENCHES**

NOTE: Read and comply with General Information. See **34 00 ... General Information**

After completing work: Bleed braking system

Press clutch 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 drive to prevent connecting piece from turning in retaining bracket. Never twist brake hose (2) when installing it and avoid all contact with parts attached rigidly to the body.

Disconnect brake hose (2) from brake line (1).

Detach brake hose from brake line (3) and remove brake hose (2).

Installation:

Tightening torque 34 32 1AZ. See **32 BRAKE LINES**

Installation:

Use torque wrench (Hazet 6282-1CT with reversible ratchet head).

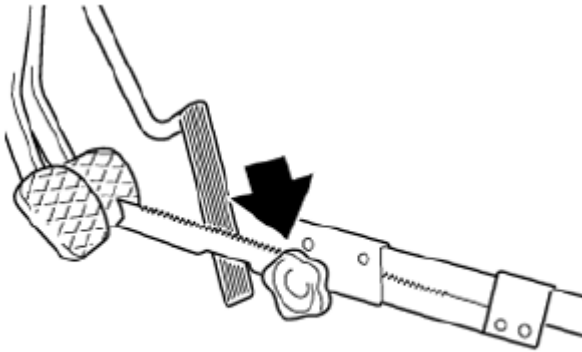
Tighten brake line using torque wrench (1) and special tool 34 3 170. See **34 3 170 SET OF SOCKET WRENCHES**

34 32 980 REPLACING REAR LEFT OR RIGHT BRAKE HOSES

NOTE: Read and comply with General Information. See **34 00 ... General Information**

After completing takes, bleed brake system. See 34 00 025 Replacing Fluid in ABS/ASC+T Brake System

Apply pedal prop and depress brake pedal slightly. This prevents brake fluid from emerging from the expansion tank and air from entering the system when the brake lines are opened.



31 34 021

Fig. 72: Locating Brake Pedal Knob
Courtesy of BMW OF NORTH AMERICA, INC.

Detach retaining clip (1) in direction of arrow.

Installation:

Retaining clip must be felt and heard to snap into place.

IMPORTANT: Grip brake hose at square head (3) to prevent connecting piece from turning in retaining bracket.

Detach brake hose from brake line (2).

Installation:

Tightening torque 34 32 1AZ. See 34 32 BRAKE LINES

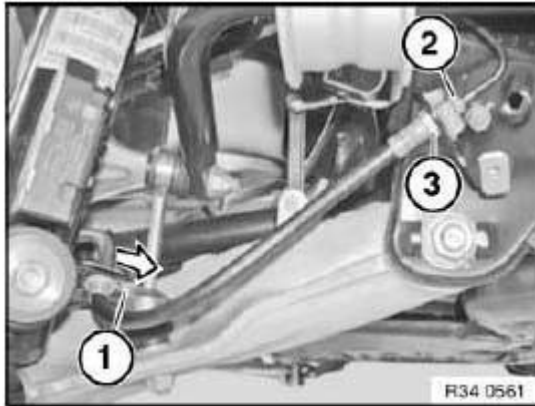


Fig. 73: Detaching Retaining Clip

Courtesy of BMW OF NORTH AMERICA, INC.

Detach brake hose from brake caliper (1).

Installation:

Tightening torque 34 32 3AZ. See **34 32 BRAKE LINES**

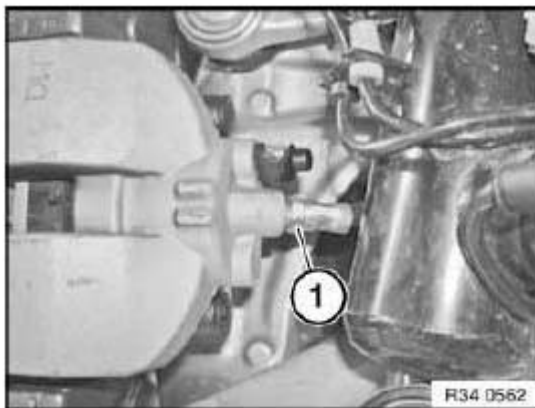


Fig. 74: Identifying Brake Hose

Courtesy of BMW OF NORTH AMERICA, INC.

Insert brake hose in bracket and screw onto brake pipe.

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.

34 33 071 REPLACING VACUUM HOSE FOR BRAKE BOOSTER (N52K)

IMPORTANT: Before beginning work, fully press the brake pedal several times to reduce the vacuum pressure in the brake booster. This makes it easier to remove the vacuum hose. Vacuum hose and non-return valve are welded together and are replaced together as a single unit.

Necessary preliminary tasks:

- Read and comply with General Information. See **34 00 ... General Information**
- Remove left partition wall for equipment compartment

Detach partition wall seal upper section (1) in direction of arrow.

Remove non-return valve (2) from brake booster.

Installation:

Check seal for non-return valve and replace if necessary.

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

34 33 505 REMOVING AND INSTALLING/REPLACING BRAKE BOOSTER

Necessary preliminary tasks:

- Read and comply with General Information. See **34 00 ... General Information**
- Remove brake master cylinder. See **34 31 505 Removing and Installing / Replacing Master Brake Cylinder for DSC**
- Remove left footwell trim. See **51 45 185 REMOVING AND INSTALLING/REPLACING PANEL FOR PEDALS**

Detach locking clip (1) from brake pedal, disengage and pull out locking pin.

Unscrew nuts (2).

Installation:

Replace self-locking nuts.

Tightening torque 35 11 1AZ. See **34 11 FRONT BRAKE**

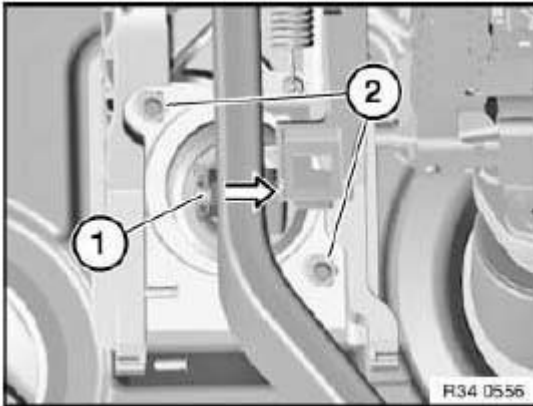


Fig. 75: Detaching Locking Clip From Brake Pedal

Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Do not use any force when removing and installing the brake unit; the brake unit 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, press brake lines to one side slightly.

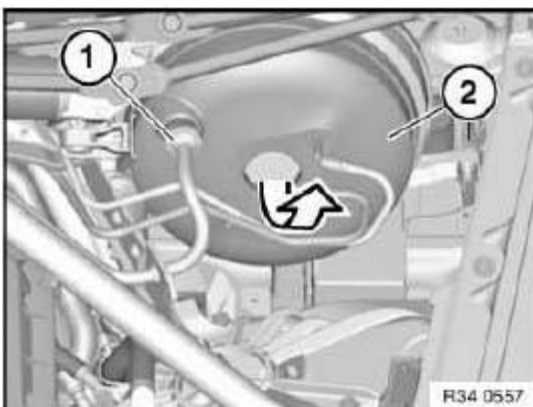


Fig. 76: Removing Non-Return Valve From Brake Booster

Courtesy of BMW OF NORTH AMERICA, INC.

35 ELECTRICAL COMPONENTS

34 35 001 REPLACING A BRAKE PAD SENSOR (FRONT)

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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 lining sensor that has already been ground has to be replaced even though the minimum brake lining thickness (See 34 11 FRONT BRAKE E70) 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 ground sliding contact.

Necessary preliminary tasks:

- Remove wheel. See 36 10 300 REMOVING OR INSTALLING FRONT OR REAR WHEEL

Disengage cable from cable guides (2).

Open cover (1) on plug housing.

Disconnect plug connection.

Disengage cable guides (3).

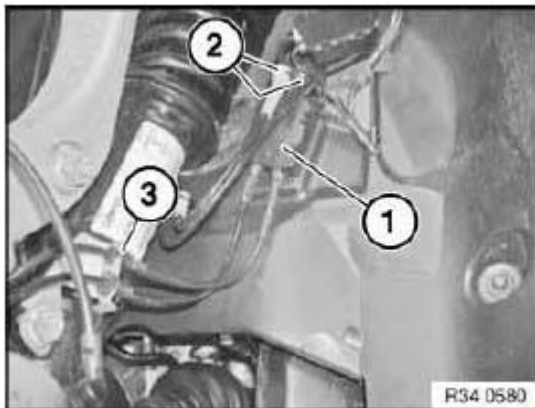


Fig. 77: Identifying Cover And Cable Guide
Courtesy of BMW OF NORTH AMERICA, INC.

Pull brake pad sensor (1) in direction of arrow out of brake pad.

Installation:

Make sure brake pad sensor (1) is correctly seated in brake pad.

Disengage cable of brake pad sensor from holders (2).

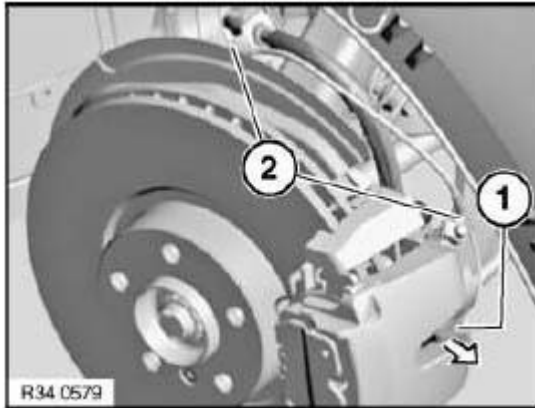


Fig. 78: Identifying Brake Pad Sensor

Courtesy of BMW OF NORTH AMERICA, INC.

34 35 513 REPLACING A BRAKE PAD SENSOR (REAR)

Necessary preliminary tasks:

- Partially detach rear wheel arch trim. See **51 71 041 REMOVING AND INSTALLING/REPLACING REAR LEFT OR RIGHT WHEEL ARCH COVER** .

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 lining sensor that has already been ground has to be replaced even though the minimum brake lining thickness (See **34 21 REAR BRAKE DISCS E70**) 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 ground sliding contact.

Open housing cover (1).

Disconnect plug connection (2).

Installation:

Ensure proper locking of the plug connector and proper seating of the cable in the brackets.

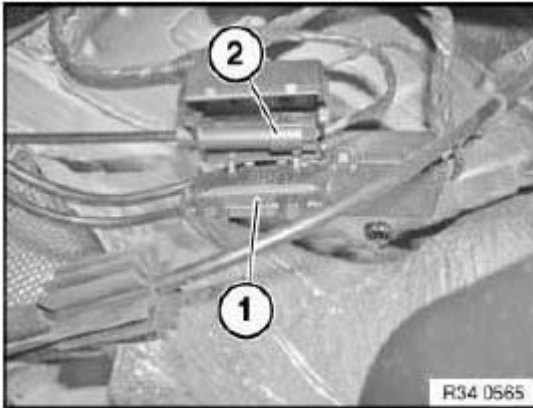


Fig. 79: Identifying Plug Connection And Housing Cover
Courtesy of BMW OF NORTH AMERICA, INC.

Disengage cable (1) along marked lines from holders.

Installation:

Ensure proper locking of the holders and proper seating of the cable in the holders.

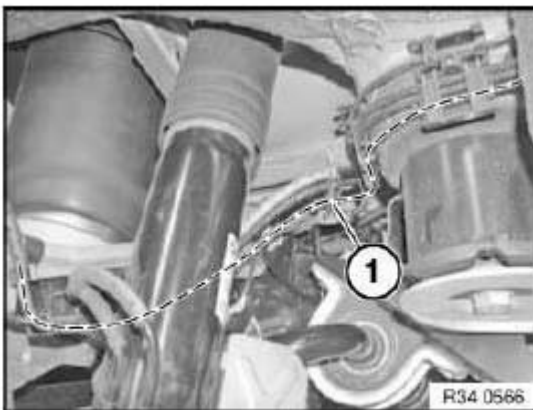


Fig. 80: Identifying Cable Route
Courtesy of BMW OF NORTH AMERICA, INC.

Pull brake pad sensor (1) in direction of arrow out of brake pad.

Installation:

Make sure brake pad sensor (1) is correctly seated in brake pad.

Disengage cable of brake pad sensor from holders (2).

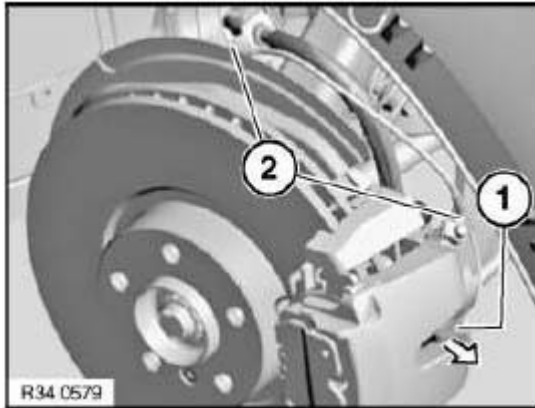


Fig. 81: Identifying Brake Pad Sensor

Courtesy of BMW OF NORTH AMERICA, INC.

41 PARKING BRAKE

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 complies 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 200 km after brake replacement.
- Attach mirror tag to interior rearview mirror.

34 41 ... ELECTROMECHANICAL PARKING BRAKE - EMERGENCY RELEASE

Necessary preliminary tasks:

- Open side trim panel in luggage compartment at rear left
- Remove first aid pouch and warning triangle

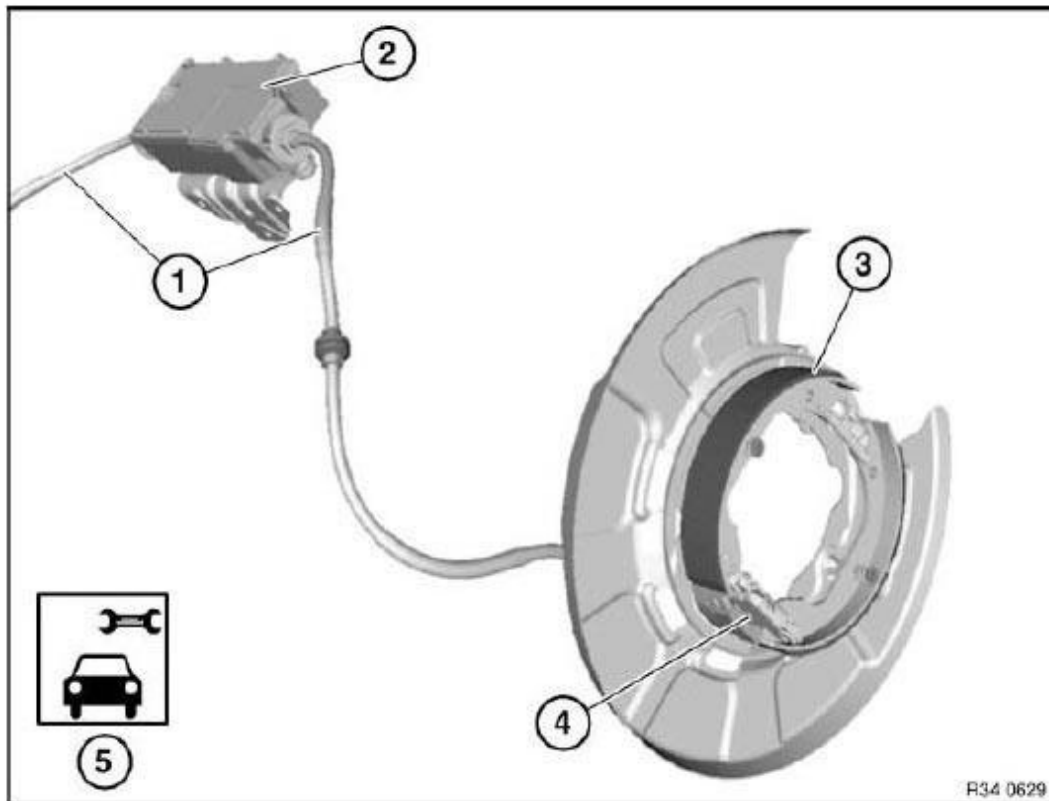
IMPORTANT: Secure vehicle against rolling, e.g. with chocks.

Attach release tool (1) at release point (2).

Forcefully pull release tool against mechanical resistance upwards in direction of arrow until a clear increase in force can be felt and the parking brake can be clearly heard to release.

NOTE: Startup after power failure:

1. Switch ignition on
2. Press brake button with brake pedal depressed.
3. The indicator lamp in the instrument cluster goes out as soon as the parking brake is released.

34 41 ... OVERVIEW OF PARKING BRAKE

- | | | | |
|---|----------------------------|---|---|
| 1 | Handbrake Bowden cables | 2 | <u>Actuating unit with control unit</u> |
| 3 | <u>Handbrake shoes</u> | 4 | <u>Expander lock</u> |
| 5 | <u>Adjusting handbrake</u> | | |

Fig. 82: Identifying Parking Brake Components
 Courtesy of BMW OF NORTH AMERICA, INC.

1. Handbrake Bowden cables
2. Actuating unit with control unit **34 41 280 Removing and Installing/Replacing Actuating Unit With Control Unit For Parking Brake (EMF)**
3. Handbrake shoes **34 41 220 Removing and Installing/Replacing All Handbrake Shoes**
4. Expander lock **34 41 250 Removing and Installing/Replacing Expander Lock For Handbrake Shoes**

5. Adjust handbrake 34 41 006 Adjusting Parking Brake, 34 41 682 Initializing Parking Brake (After Manual Unlocking Of Actuating Unit)

34 41 006 ADJUSTING PARKING BRAKE

The parking brake test must be carried out on the roller dynamometer as follows.

Release position (**engine off / ignition on**):

- Wheel circumferential force right / left $< \text{or} = 300 \text{ N}$.

Press parking brake button (**engine off / ignition on**):

- Car must be pulled uniformly out of brake roller or drive of brake roller is deactivated on both sides.

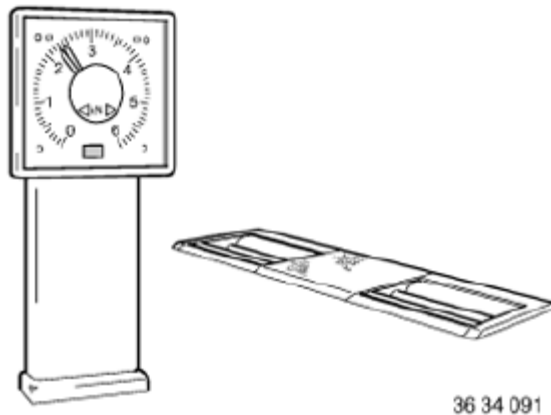


Fig. 83: Identifying Front Brakes Actuating And Warning Devices
Courtesy of BMW OF NORTH AMERICA, INC.

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

Basic setting of the parking brake is required whenever:

- After replacing brake shoes
- Brake discs are replaced

1. Adjustment specification for brake shoes

Release parking brake (switch on centre console).

Completely unscrew one wheel stud on each rear wheel.

Installation:

Install and tighten wheel bolt.

Tightening torque, 36 10 1AZ. See **36 10 WHEELS**



Fig. 84: Locating Wheel Bolt

Courtesy of BMW OF NORTH AMERICA, INC.

Turn adjusting screw with a screwdriver until it is no longer possible to turn the wheel.

Then unfasten the adjusting screw 10 notches.

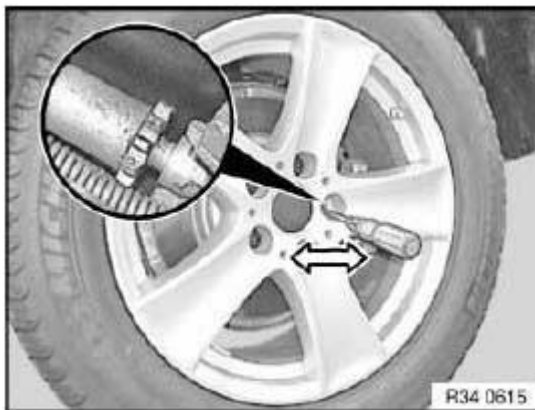


Fig. 85: Turning Adjusting Screw With Screwdriver

Courtesy of BMW OF NORTH AMERICA, INC.

2. Braking in duo-servo parking brake

2.1 On roller dynamometer:

2.1.1 Call up braking-in program via diagnosis interface using DIS diagnosis system.

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(Parking brake indicator lamp in instrument cluster flashes at low frequency)

2.1.2 Drive vehicle onto roller dynamometer and pull parking brake button once.

2.1.3 Parking brake is applied at approx. 15 km/h with reduced force.

(Parking brake indicator lamp in instrument cluster flashes at high frequency)

2.1.4 Braking-in procedure takes 3 minutes.

2.1.5 Braking-in procedure can be terminated by pressing the parking brake button.

2.1.6 Now clear the fault memory.

2.2 When road driving (if possible on company property or an unused road):

2.2.1 Call up braking-in program via diagnosis interface using DIS diagnosis system.

(Parking brake indicator lamp in instrument cluster flashes at low frequency)

2.2.2 Pull parking brake button once.

Increase driving speed to 15 km/h, braking-in distance is 400 metres.

2.2.3 Parking brake is applied with reduced force.

(Parking brake indicator lamp in instrument cluster flashes at high frequency)

2.2.4 Braking-in procedure can be terminated by pressing the parking brake button.

2.2.6 Now clear the fault memory.



Fig. 86: Display Of Parking Brake Function

Courtesy of BMW OF NORTH AMERICA, INC.

34 41 220 REMOVING AND INSTALLING/REPLACING ALL HANDBRAKE SHOES

Special tools required:

- 34 4 000. See **34 4 000 ALLEN KEY**

Installation:

- Remove rear brake disc. See **34 21 320 Removing and Installing Or Replacing Both Rear Brake Discs**
- Release electromechanical parking brake (EMF)

After completing tasks, adjust handbrake. See **34 41 006 Adjusting Parking Brake**

Disconnect return springs (1) with brake spring pliers.

Installation:

Check return springs (1) and replace if necessary.

Return springs (1) must not be mixed up.

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

Apply a thin coat of grease to bush and screw threads, Refer to BMW Service Operating Fluids.

NOTE: Illustration does not show wheel hub.

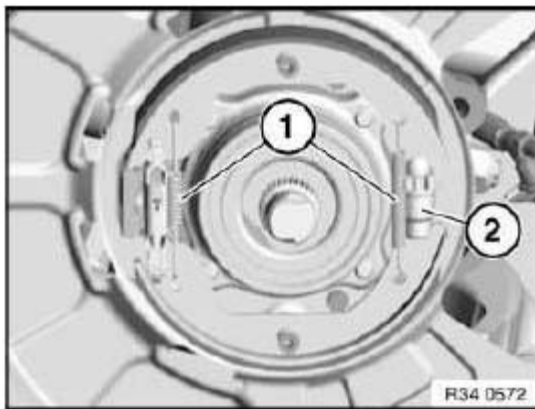


Fig. 87: Identifying Return Springs

Courtesy of BMW OF NORTH AMERICA, INC.

Turn clamping pins (1) with special tool 34 4 000 (See **34 4 000 ALLEN KEY**) through 90° and disconnect.

Remove brake shoes (2).

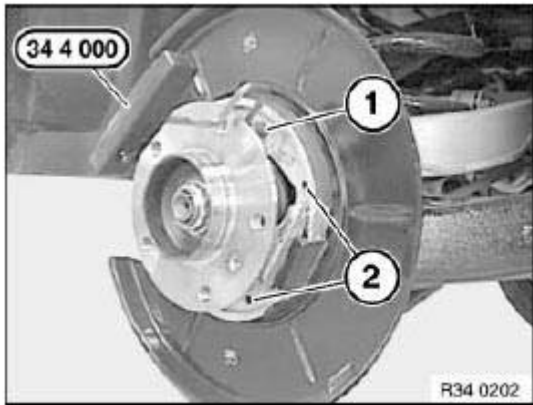


Fig. 88: Identifying Special Tool (34 4 400)

Courtesy of BMW OF NORTH AMERICA, INC.

34 41 250 REMOVING AND INSTALLING/REPLACING EXPANDER LOCK FOR HANDBRAKE SHOES

Necessary preliminary tasks:

- Remove handbrake shoes [34 41 220 Removing and Installing/Replacing All Handbrake Shoes](#)

After completing tasks, adjust handbrake. [34 41 006 Adjusting Parking Brake](#)

Pull expander lock (1) forwards, disconnect handbrake Bowden cable (2) and remove expander lock.

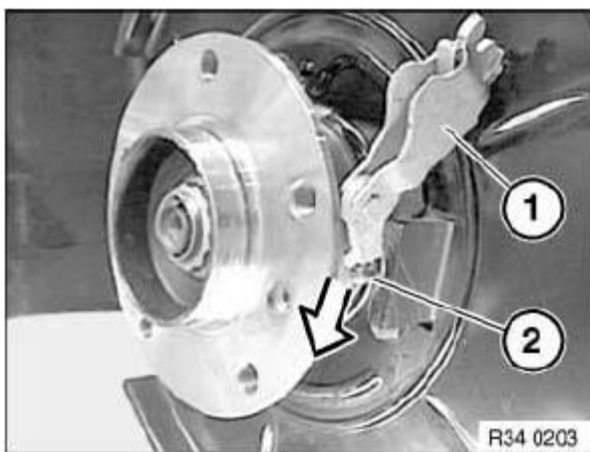


Fig. 89: Pulling Expander Lock

Courtesy of BMW OF NORTH AMERICA, INC.

34 41 280 REMOVING AND INSTALLING/REPLACING ACTUATING UNIT WITH CONTROL UNIT FOR PARKING BRAKE (EMF)

Necessary preliminary tasks:

- Remove both brake discs **34 21 320 Removing and Installing Or Replacing Both Rear Brake Discs**

Set workshop mode in BMW diagnosis system.

- Path:
 - Function selection
 - Service functions
 - Chassis
 - Parking brake
 - Workshop mode

NOTE: This facilitates removal as the EMF approaches the outer position.

Open flap in luggage compartment at rear left. Remove first aid kit (1).

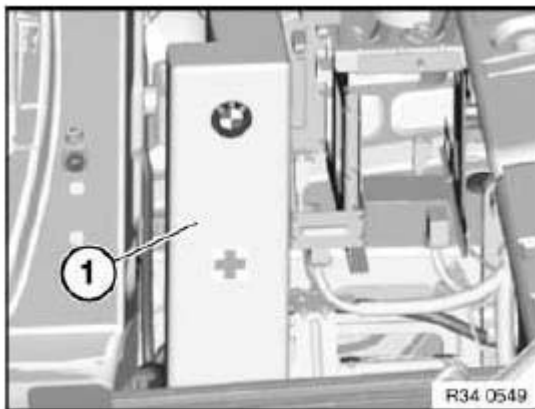


Fig. 90: Identifying First Aid Kit

Courtesy of BMW OF NORTH AMERICA, INC.

Cable for emergency release (1) must be removed with actuating unit.

Press both detent lugs together and press cable for emergency release (1) downwards.

Unclip cable for emergency release from guides on rear axle.

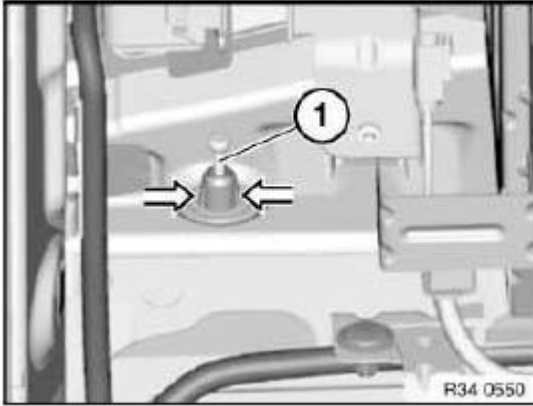


Fig. 91: Pressing Cable For Emergency Release
 Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1) and remove heat shield (2).

Release stabilizer (**33 55 000 REMOVING AND INSTALLING/REPLACING REAR STABILIZER** , **37 12 220 REMOVING AND INSTALLING/REPLACING REAR ACTIVE STABILIZER**) at bearing points and swing downwards.

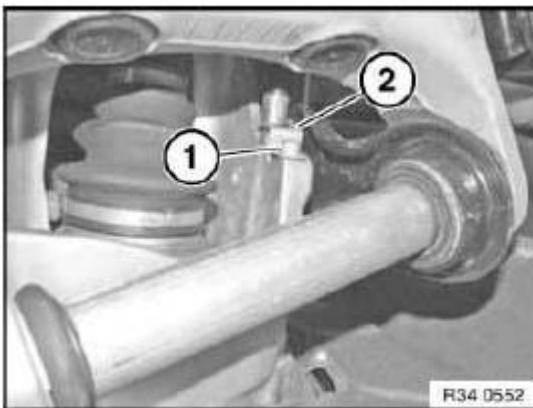


Fig. 92: Identifying Spring Clip And Screw
 Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1) and remove spring clip (2) on left and right.

Installation:

Tightening torque 34 41 1AZ. See **34 41 PARKING BRAKE**

Push in core of parking brake cable in direction of expander lock (2) as far as it will go and grip firmly.

Press nipple (1) down with a screwdriver.

Pull handbrake cables out of wheel carrier.

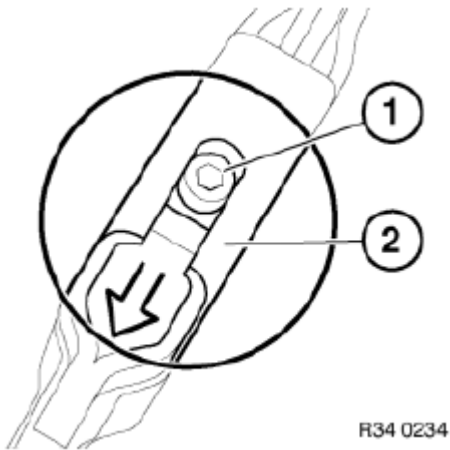


Fig. 93: Identifying Expander Lock And Nipple
Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Insert handbrake cable into brake carrier/brake guard plate.

Sleeve must be inserted up to stop.

Nipple of handbrake cable must audibly snap into place in expander lock.

Disengage parking brake Bowden cable (1) from holders on left and right.

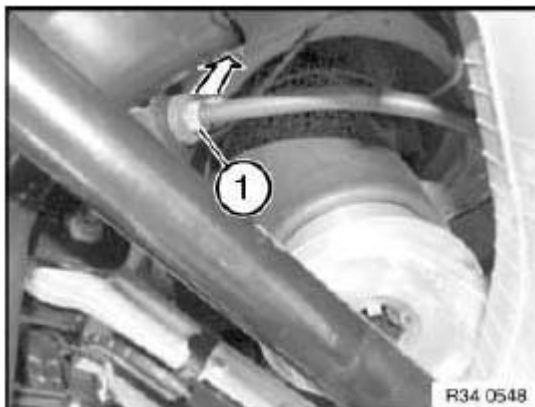


Fig. 94: Disengaging Parking Brake Bowden Cable
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

Release screws (2).

Installation:

Tightening torque 34 41 4AZ. See **34 41 PARKING BRAKE**

Release screws (3) and remove holder (4).

Installation:

Tightening torque 34 41 3AZ. See **34 41 PARKING BRAKE**

Feed out actuating unit with parking brake Bowden cables and cable for emergency release.

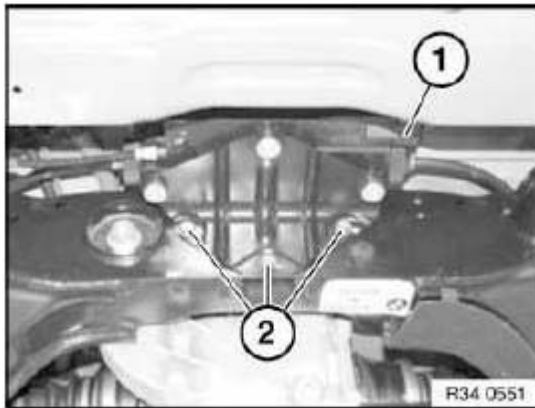


Fig. 95: Identifying Plug Connection And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

After installation:

- Carry out initial operation/function test in BMW diagnosis system.
 - Path
 - Function selection
 - Service functions
 - Chassis
 - Parking brake
 - Initial operation/function test

Replacement:

- Carry out programming/coding of control units.

34 41 682 INITIALIZING PARKING BRAKE (AFTER MANUAL UNLOCKING OF ACTUATING UNIT)

IMPORTANT: When the actuating unit is manually unlocked, the actual status of the parking brake may not correspond to the status indicated by the indicator lamp.
Vehicle condition before initialization:

- Rectify fault
- Vehicle at standstill
- Ignition turned on

Press parking brake button with brake activated.

NOTE: The indicator lamp in the instrument cluster goes out as soon as the parking brake is ready for operation again.
It is normal for noises to be heard.
Startup can take several seconds.

51 MECHANICAL-HYDRAULIC

34 51 527 REMOVING AND INSTALLING OR REPLACING DSC HYDRAULIC UNIT

Necessary preliminary tasks:

- Read and comply with General Information. See 34 00 ... General Information
- Extract brake fluid

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 work:

- Bleeding braking system

IMPORTANT: Do not mix up brake lines.
If necessary, mark before removal.
Brake lines must not be bent.
Close off connection bores with plugs.

Disconnect plug connection (1).

Unfasten brake lines (2).

Tightening torque 34 32 1AZ. See 34 32 BRAKE LINES

If necessary, release brake lines from holder on bulkhead.

Unscrew bolt (3).

Tightening torque 34 51 6AZ. See **34 51 SLIP CONTROL SYSTEM (DSC)** .

Pull hydraulic control unit with holder out of guide pins (4) and remove.

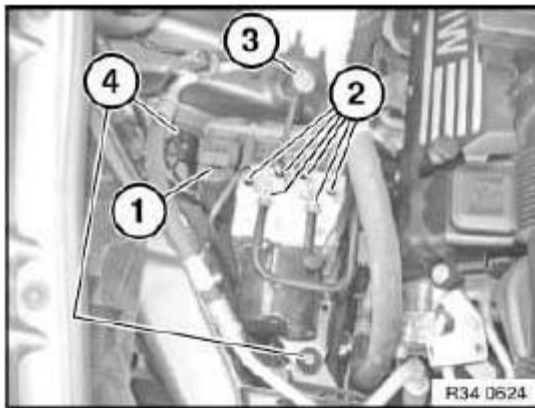


Fig. 96: Identifying Brake Lines And Plug Connection
Courtesy of BMW OF NORTH AMERICA, INC.

When replacing hydraulic unit:

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

Installation:

Tightening torque 34 51 5AZ. See **34 51 SLIP CONTROL SYSTEM (DSC)**

Modify DSC control unit. See **34 52 516 Removing and Installing / Replacing DSC Control Unit**

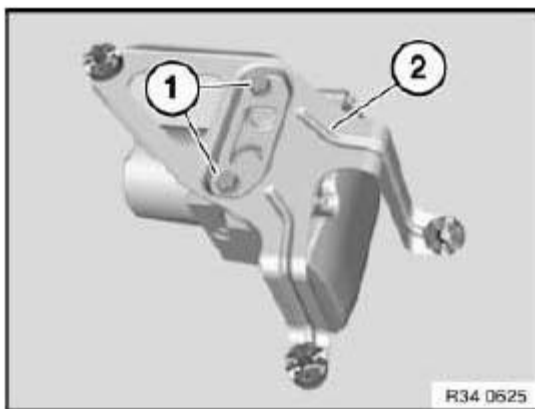


Fig. 97: Identifying Convert Holder And Screw

Courtesy of BMW OF NORTH AMERICA, INC.

When replacing control unit:

- Carry out programming/coding. See **CODING & PROGRAMMING**
- Adjustment of steering angle sensor. See **61 31 996 CARRY OUT STEERING ANGLE SENSOR ADJUSTMENT**
- Mix-up check of brake lines
- Function check, hydraulic unit

52 ELECTRONIC COMPONENTS

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 lining sensor that has already been ground has to be replaced even though the minimum brake pad (See 34 11 FRONT BRAKE E70) 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 ground sliding contact.

Necessary preliminary tasks:

- Remove wheel. See **36 10 300 REMOVING OR INSTALLING FRONT OR REAR WHEEL** .

Disengage cable guides (2).

Open cover (1) on plug housing.

Disconnect plug connection.

Disengage cable from cable guide (3).

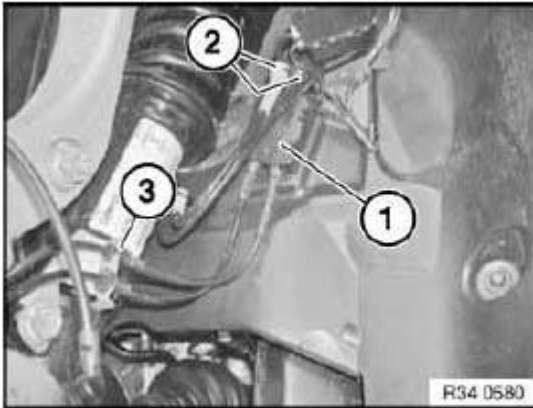


Fig. 98: Identifying Cover And Cable Guide
 Courtesy of BMW OF NORTH AMERICA, INC.

Pull brake pad sensor (1) in direction of arrow out of brake pad.

Installation:

Make sure brake pad sensor (1) is correctly seated in brake pad.

Disengage cable of brake pad sensor from holders (2).

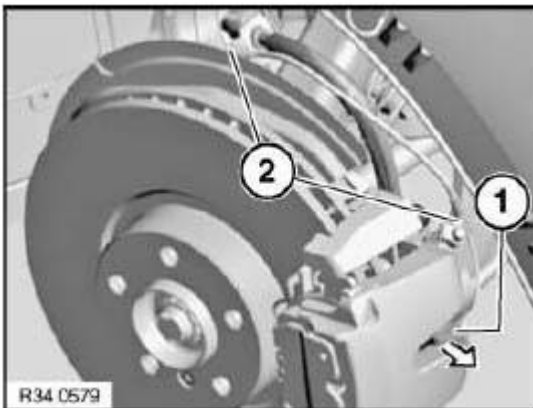


Fig. 99: Identifying Brake Pad Sensor
 Courtesy of BMW OF NORTH AMERICA, INC.

34 35 513 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 lining sensor that has already been ground has to be replaced even though the minimum brake pad (See 34 11 FRONT BRAKE E70) 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 ground sliding contact.

Necessary preliminary tasks:

- Partially detach rear wheel arch trim. See **51 71 041 REMOVING AND INSTALLING/REPLACING REAR LEFT OR RIGHT WHEEL ARCH COVER**

Open housing cover (1).

Disconnect plug connection (2).

Installation:

Ensure proper locking of the plug connector and proper seating of the cable in the brackets.

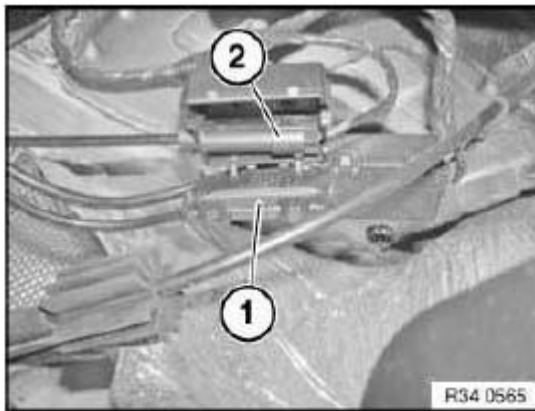
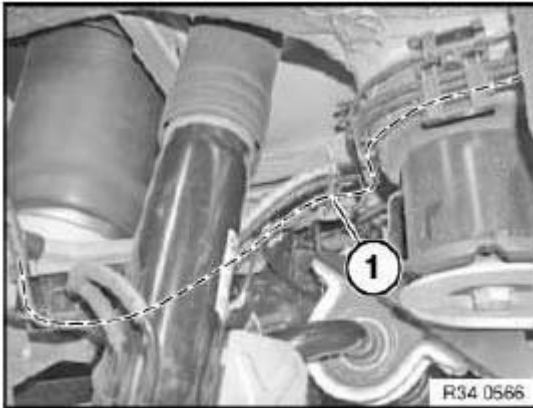


Fig. 100: Identifying Plug Connection And Housing Cover
Courtesy of BMW OF NORTH AMERICA, INC.

Disengage cable (1) along marked lines from holders.

Installation:

Ensure proper locking of the holders and proper seating of the cable in the holders.

**Fig. 101: Identifying Cable Route**

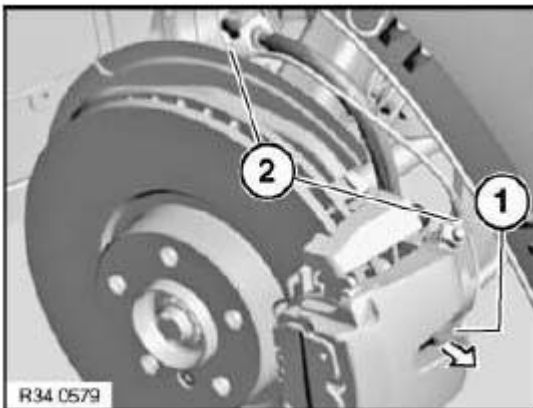
Courtesy of BMW OF NORTH AMERICA, INC.

Pull brake pad sensor (1) in direction of arrow out of brake pad.

Installation:

Make sure brake pad sensor (1) is correctly seated in brake pad.

Disengage cable of brake pad sensor from holders (2).

**Fig. 102: Identifying Brake Pad Sensor**

Courtesy of BMW OF NORTH AMERICA, INC.

34 52 ... OVERVIEW OF ELECTRONIC COMPONENTS

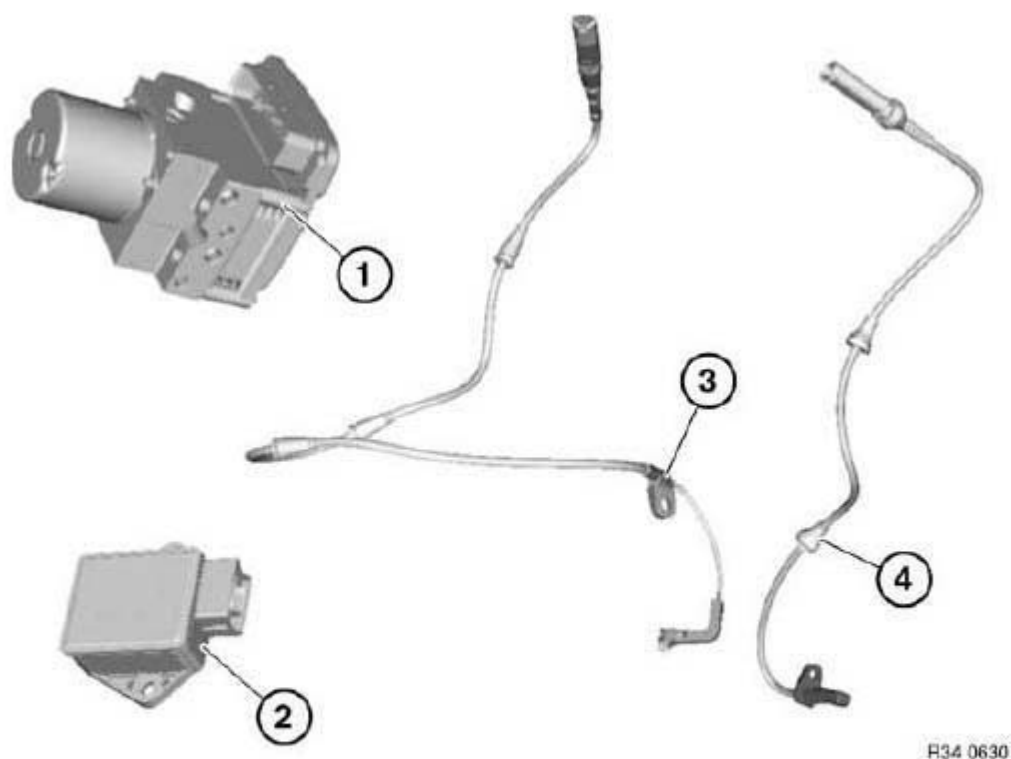
1 DSC control unit2 Rotation rate sensor3 Brake-pad-wear sensor4 Pulse generator

Fig. 103: Identifying Electronic Components
 Courtesy of BMW OF NORTH AMERICA, INC.

1. DSC control unit. See 34 52 516 Removing and Installing / Replacing DSC Control Unit
2. Rotation rate sensor. See 34 52 550 Removing and Installing/Replacing DSC Yaw Sensor
3. Brake-pad-wear sensor. See 34 35 001 Replacing a Brake Pad Sensor (Front), 34 35 513 Replacing a Brake Pad Sensor (Rear)
4. Pulse generator. See 34 52 525 Replacing One Front Pulse Generator, 34 52 535 Replacing a Rear Pulse Generator

34 52 516 REMOVING AND INSTALLING / REPLACING DSC CONTROL UNIT

IMPORTANT: Read and comply with notes on protection against electrostatic damage (ESD protection). See 61 35... NOTES ON ESD PROTECTION (ELECTRO STATIC DISCHARGE)

Necessary preliminary tasks:

- Remove hydraulic unit. See 34 51 527 Removing and Installing or Replacing DSC Hydraulic Unit

IMPORTANT: Removing pump motor from valve block is not permitted!
Do not twist pump motor.

IMPORTANT: Secure provided retaining lugs (2) from repair kit for control unit with aid of plugs (3).

Close off pipe connections with plugs (1).

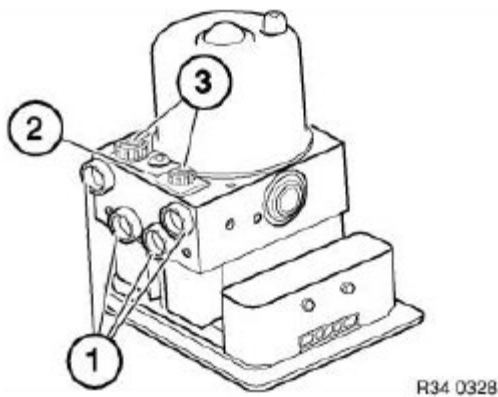


Fig. 104: Identifying Retaining Lugs

Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Control unit must not come into contact with dirt or moisture. Contacts must not be bent!

Release screws (1) and carefully remove control unit (2).

Installation:

Tightening torque 34 51 1AZ. See **34 51 SLIP CONTROL SYSTEM (DSC)**

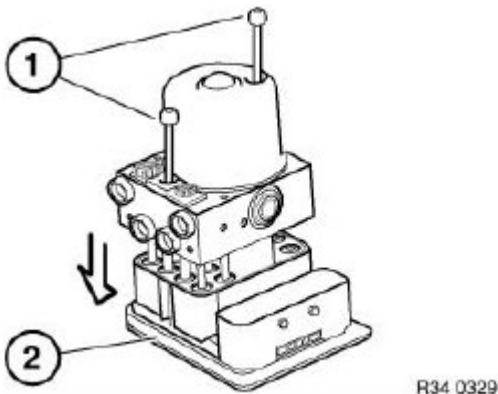


Fig. 105: Removing Control Unit

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Courtesy of BMW OF NORTH AMERICA, INC.

Replacement:

- Carry out programming/coding. See **CODING & PROGRAMMING**
- Adjustment of steering angle sensor. See **61 31 996 CARRY OUT STEERING ANGLE SENSOR ADJUSTMENT**
- Mix-up check of brake lines

34 52 525 REPLACING ONE FRONT PULSE GENERATOR

IMPORTANT: Read and comply with notes on protection against electrostatic damage (ESD protection). See **61 35... NOTES ON ESD PROTECTION (ELECTRO STATIC DISCHARGE)**

Necessary preliminary tasks:

- Read and comply with General Information. See **34 00 ... General Information**

Disengage cable guides (2).

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

Pull cable with rubber grommet out of holders (3).

Installation:

Ensure proper locking of plug connector and proper seating of rubber grommets.

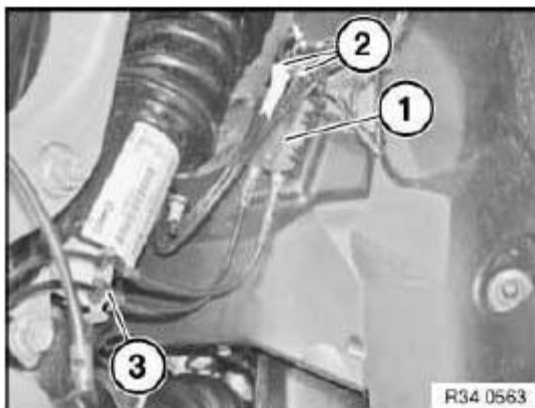


Fig. 106: Identifying Connector Housing And Cable Guides
Courtesy of BMW OF NORTH AMERICA, INC.

Disengage cable guides (1).

Release Torx socket screw (2) and pull pulse generator (3) out of bore.

Installation:

Tightening torque 31 51 3AZ. See **34 51 SLIP CONTROL SYSTEM (DSC)**

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

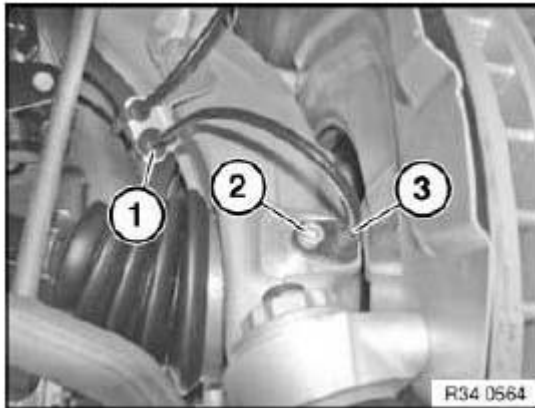


Fig. 107: Identifying Torx Socket Screw And Cable Guides
Courtesy of BMW OF NORTH AMERICA, INC.

34 52 535 REPLACING A REAR PULSE GENERATOR

IMPORTANT: Read and comply with notes on protection against electrostatic damage (ESD protection). See **61 35... NOTES ON ESD PROTECTION (ELECTRO STATIC DISCHARGE)**

Necessary preliminary tasks:

- Partially detach rear wheel arch trim. See **51 71 041 REMOVING AND INSTALLING/REPLACING REAR LEFT OR RIGHT WHEEL ARCH COVER**
- Read and comply with General Information. See **34 00 ... General Information**

Open housing cover (1).

Disconnect plug connection (2).

Installation:

Ensure proper locking of the plug connector and proper seating of the cable in the brackets.

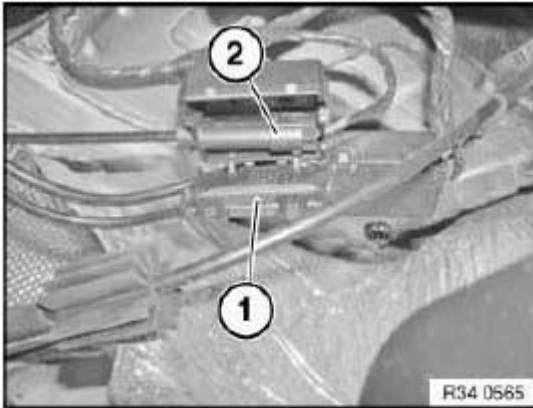


Fig. 108: Identifying Plug Connection And Housing Cover
 Courtesy of BMW OF NORTH AMERICA, INC.

Disengage cable (1) along marked lines from holders.

Installation:

Ensure proper locking of the holders and proper seating of the cable in the holders.

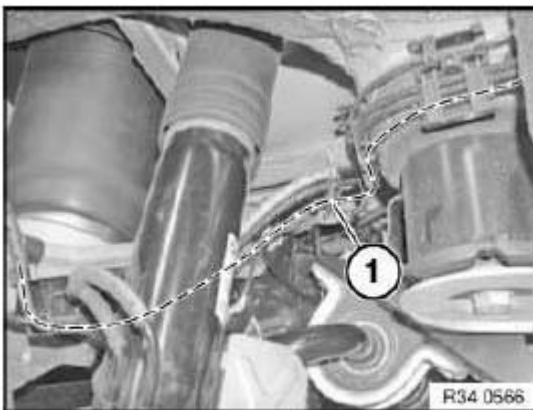


Fig. 109: Identifying Cable Route
 Courtesy of BMW OF NORTH AMERICA, INC.

Release Torx socket screw (1).

Withdraw wheel speed sensor (2) from bore hole.

Installation:

Tightening torque 34 51 3AZ. See **34 51 SLIP CONTROL SYSTEM (DSC)**

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

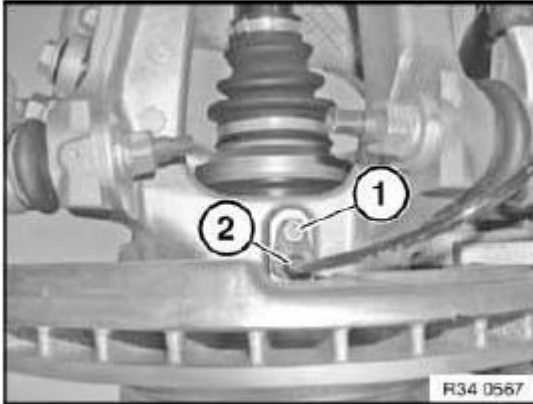


Fig. 110: Identifying Torx Socket Screw And Wheel Speed Sensor
 Courtesy of BMW OF NORTH AMERICA, INC.

34 52 550 REMOVING AND INSTALLING/REPLACING DSC YAW SENSOR

IMPORTANT: Read and comply with notes on protection against electrostatic damage (ESD protection). See **61 35... NOTES ON ESD PROTECTION (ELECTRO STATIC DISCHARGE)**

IMPORTANT: Do not kink floor panelling under any circumstances!

Necessary preliminary tasks:

- Remove right front seat. See **52 14 000 REMOVING AND INSTALLING LEFT OR RIGHT FRONT SEAT**
- Lift floor panelling and fold back to one side

Remove floor inlay (2).

Release screws.

Tightening torque 34 51 2AZ. See **34 51 SLIP CONTROL SYSTEM (DSC)**

Disconnect plug connection and remove yaw sensor (1).

Carry out calibration/adjustment of DSC sensor.

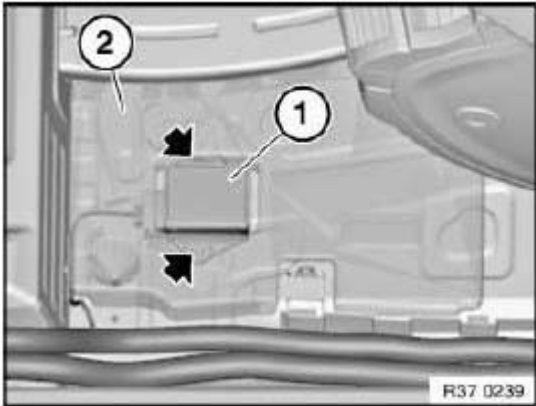


Fig. 111: Identifying Yaw Sensor And Floor Inlay
Courtesy of BMW OF NORTH AMERICA, INC.

34 90 ... TROUBLESHOOTING

34 90 ... TROUBLESHOOTING BRAKE SYSTEM

Troubleshooting brake system

Fault	Cause	Remedy
Brakes pull to one side	a) Tyre inflation pressure not in keeping with regulations b) Unevenly worn Tyre treads c) Oil on pads/liners d) Wrong type of pads/liners f) Guide bolts dirty or damaged g) Axle geometry not correct h) Corrosion in floating calipers i) No shock absorber action k) Pad of one caliper worn	a) Correct Tyre inflation pressure b) Change or replace tires. See 36 12 001 REPLACING A TIRE , 36 12 005 REPLACING A RUNFLAT TIRE c) Replace brake pad. See 34 11 000 Removing and Installing/Replacing Brake Linings On Both Front Disc Brakes , 34 21 200 Removing and Installing/Replacing Brake Linings On Both Rear Disc Brakes (Teves Floating Caliper) . Check for causes d) Replace brake pads. See 34 11 000 Removing and Installing/Replacing Brake Linings On Both Front Disc Brakes , 34 21 200 Removing and Installing/Replacing Brake Linings On Both Rear Disc Brakes (Teves Floating Caliper) f) Replace guide bolts. See 34 11 000 Removing and Installing/Replacing Brake Linings On Both Front Disc Brakes , 34 21 200 Removing and Installing/Replacing Brake Linings On Both Rear Disc Brakes (Teves

Floating Caliper)

g) Check wheel alignment. See **32 00 ... CHASSIS/WHEEL ALIGNMENT CHECK PROCEDURE**, **32 00 150 KDS CHASSIS/WHEEL ALIGNMENT CHECK WITH LOAD UP TO DESIGN POSITION**, **32 00 155 KDS CHASSIS/WHEEL ALIGNMENT CHECK WITH RIDE-HEIGHT MEASUREMENT WITHOUT LOAD**

h) Remove and install, repair or replace floating callipers. See **34 11 000 Removing and Installing/Replacing Brake Linings On Both Front Disc Brakes**, **34 11 552 Overhauling Left Or Right Front Brake Caliper (Brake Caliper Removed)**

i) Check shock absorber, replacing if necessary. See **31 31 031 REPLACING FRONT LEFT OR RIGHT SPRING STRUT SHOCK ABSORBER**, **33 52 000 REMOVING AND INSTALLING/REPLACING REAR LEFT OR RIGHT SHOCK ABSORBER**

k) Replace brake pads, check floating calliper. See **34 11 000 Removing and Installing/Replacing Brake Linings On Both Front Disc Brakes**, **34 21 200 Removing and Installing/Replacing Brake Linings On Both Rear Disc Brakes (Teves Floating Caliper)**

Brakes excessively hot while driving

- a) Compensating port in brake master cylinder blocked
- c) Swollen rubber parts due to use of wrong brake fluid
- d) Bleeder hole on expansion tank blocked
- e) Corroded floating calipers
- f) Handbrake lever not released fully

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- a) Replace brake master cylinder **34 31 505 Removing and Installing / Replacing Master Brake Cylinder for DSC**
- c) Replace brake master cylinder **34 31 505 Removing and Installing / Replacing Master Brake Cylinder for DSC**
- d) Clean expansion tank **34 31 181 Removing and Installing / Replacing**

		<u>Expansion Tank For Hydraulic Brake Actuation</u> e) Remove and install, repair or replace floating callipers <u>34 11 519 Removing and Installing/Replacing Left Or Right Front Brake Caliper, 34 11 552 Overhauling Left Or Right Front Brake Caliper (Brake Caliper Removed)</u> f) Check handbrake and handbrake Bowden cables, repair if necessary. <u>34 41 280 Removing and Installing/Replacing Actuating Unit With Control Unit For Parking Brake (EMF)</u>
Fault	Cause	Remedy
Poor braking effect in spite of great force on pedal Travel at brake pedal normal	Brake pads oil-splattered or burnt; wrong type of brake pads	Replace brake pads. See <u>34 11 000 Removing and Installing/Replacing Brake Linings On Both Front Disc Brakes</u>
Poor braking effect in spite of great force on pedal Travel at brake pedal too short	Brake booster malfunctions - engine vacuum	Check brake booster
Poor braking effect in spite of great force on pedal Travel at brake pedal too long	One brake circuit failed due to leaks or damage	Leakage test of brake system. See <u>34 00 519 Checking Service Brake: High- And Low-Pressure Tests</u>
Brake pedal can be pressed down softly and springily	a) Air in brake system b) Not enough brake fluid in expansion tank c) Overheated brake fluid - vapour lock due to excessive water content in brake fluid or excessive brake loads	a) Bleed brakes. See <u>34 00 050 Bleeding Brake System with DSC</u> b) Top up or change brake fluid Bleed brakes. See <u>34 00 050 Bleeding Brake System with DSC</u> c) Change brake fluid, Bleed brakes. See <u>34 00 050 Bleeding Brake System with DSC</u>
Brake is bled and readjusted, but brake pedal can be pressed down too far	a) Primary cup seal in brake master cylinder damaged b) Leaking separating cup seals on floating piston of brake master cylinder c) Leak in brake system	a) Replace master brake cylinder. See <u>34 31 505 Removing and Installing / Replacing Master Brake Cylinder for DSC</u> b) Replace master brake cylinder. See <u>34 31 505 Removing and Installing / Replacing Master Brake Cylinder for DSC</u> c) Leakage test of brake system. See <u>34 00 519 Checking Service Brake: High- And Low-Pressure Tests</u>
Brake pedal can be pressed	a) Air in brake system	a) Bleed brakes. See <u>34 00 050</u>

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down softly and springily	b) Not enough brake fluid in expansion tank c) Overheated brake fluid - vapour lock due to excessive water content in brake fluid or excessive brake loads	Bleeding Brake System with DSC b) Top up or change brake fluid Bleed brakes. See <u>34 00 050 Bleeding Brake System with DSC</u> c) Change brake fluid, Bleed brakes. See <u>34 00 050 Bleeding Brake System with DSC</u>
Brake is bled and readjusted, but brake pedal can be pressed down too far	a) Primary cup seal in brake master cylinder damaged b) Leaking separating cup seals on floating piston of brake master cylinder c) Leak in brake system	a) Replace master brake cylinder. See <u>34 31 505 Removing and Installing / Replacing Master Brake Cylinder for DSC</u> b) Replace master brake cylinder. See <u>34 31 505 Removing and Installing / Replacing Master Brake Cylinder for DSC</u> c) Leakage test of brake system. See <u>34 00 050 Bleeding Brake System with DSC</u>
Fault	Cause	Remedy
Uneven pad wear	a) Wrong type of pads/liners b) Dirty floating caliper recesses, damaged caps c) Corrosion in floating calipers d) Swollen rubber ring for piston control	a) Replace brake pads. See <u>34 11 000 Removing and Installing/Replacing Brake Linings On Both Front Disc Brakes</u> b) Remove and install, repair or replace floating calipers. See <u>34 11 519 Removing and Installing/Replacing Left Or Right Front Brake Caliper</u> c) Remove and install, repair or replace floating callipers. See <u>34 11 519 Removing and Installing/Replacing Left Or Right Front Brake Caliper</u> d) Remove and install, repair or replace floating callipers. See <u>34 11 519 Removing and Installing/Replacing Left Or Right Front Brake Caliper</u>
Brake pads worn at angle	a) Wheel-bearing play excessive b) Brake disc not aligned with floating caliper c) Corrosion in floating calipers d) Angular brake-disc wear e) Minimum pad thickness undershot f) Spring force insufficient g) Guide bolts damaged	a) Replace wheel bearings. See <u>33 41 151 REPLACING LEFT OR RIGHT WHEEL BEARING ON REAR AXLE SHAFT</u> b) Check floating caliper installation c) Remove and install, repair or replace floating calipers. See <u>34 11 519 Removing and Installing/Replacing Left Or Right</u>

		<u>Front Brake Caliper</u> d) Grind or replace brake disks. See <u>34 11 220 Removing and Installing/Replacing Both Front Brake Discs</u> e) Replace brake pads. See <u>34 11 000 Removing and Installing/Replacing Brake Linings On Both Front Disc Brakes</u> f) Replace spring. See <u>34 11 000 Removing and Installing/Replacing Brake Linings On Both Front Disc Brakes</u> g) Replace guide bolts. See <u>34 11 000 Removing and Installing/Replacing Brake Linings On Both Front Disc Brakes</u>
Seized brake pads, pad does not move off brake disc	a) Dirty floating caliper recesses, damaged caps b) Corrosion in floating calipers c) Compensating port in brake master cylinder blocked	a) Remove and install, repair or replace floating callipers. See <u>34 11 519 Removing and Installing/Replacing Left Or Right Front Brake Caliper</u> b) Remove and install, repair or replace floating callipers. See <u>34 11 519 Removing and Installing/Replacing Left Or Right Front Brake Caliper</u> c) Replace master brake cylinder. See <u>34 31 505 Removing and Installing / Replacing Master Brake Cylinder for DSC</u>
Fault	Cause	Remedy
Brakes squeal or rattle	a) Wrong type of pads/liners b) Dirty floating caliper recesses c) Spring force insufficient d) Brake disc not aligned with floating caliper e) Brake-disc runout f) Excessive thickness deviation within braking surface g) Liner wear excessive or one-sided h) Rust edges on brake discs i) Pad loose j) Wheel-bearing play excessive	a) Replace brake pads. See <u>34 11 000 Removing and Installing/Replacing Brake Linings On Both Front Disc Brakes</u> b) Remove and install/clean floating callipers. See <u>34 11 519 Removing and Installing/Replacing Left Or Right Front Brake Caliper</u> c) Replace spring. See <u>34 11 000 Removing and Installing/Replacing Brake Linings On Both Front Disc Brakes</u> d) Check floating caliper installation. See <u>34 11 519 Removing and Installing/Replacing Left Or Right</u>

Front Brake Caliper

e) Replace brake discs. See **34 11 220 Removing and Installing/Replacing Both Front Brake Discs**

f) Measure brake disc thickness Grind or replace disks. See **34 11 667**

Precision-turning Both Front Brake Discs On Both Sides

g) Replace brake shoes. See **34 41 220 Removing and Installing/Replacing All Handbrake Shoes**

h) Grind or replace brake disks. See **34 11 667 Precision-turning Both Front Brake Discs On Both Sides**

i) Replace brake pads. See **34 11 000 Removing and Installing/Replacing Brake Linings On Both Front Disc Brakes**

j) Replace wheel bearings. See **33 41 151 REPLACING LEFT OR RIGHT WHEEL BEARING ON REAR AXLE SHAFT**

Brake-pedal dead travel excessive

- a) Wheel-bearing play excessive
- b) Brake disc not aligned with floating caliper
- c) Brake-disc runout
- d) Excessive thickness deviation within braking surface
- e) Brake system leaking
- f) Air in brake system
- g) Wrong type of pads/liners

a) Replace wheel bearings. See **33 41 151 REPLACING LEFT OR RIGHT WHEEL BEARING ON REAR AXLE SHAFT**

b) Check floating caliper installation

c) Replace brake discs. See **34 11 220 Removing and Installing/Replacing Both Front Brake Discs**

d) Measure brake disc thickness Grind or replace disks. See **34 11 667**

Precision-turning Both Front Brake Discs On Both Sides

e) Leakage test of brake system. See **34 00 519 Checking Service Brake: High- And Low-Pressure Tests**

f) Bleed brakes **34 00 519 Checking Service Brake: High- And Low-Pressure Tests**

g) Replace brake pads. See **34 11 000 Removing and Installing/Replacing Brake Linings On Both Front Disc Brakes**

Fault

Cause

Remedy

Jammed piston in brake caliper

a) Dirty floating calliper recesses, damaged caps

a) Remove and install, repair or replace floating calliper. See **34 11 519**

	b) Brake disc not aligned with floating caliper c) Pistons corroded in floating calipers	<u>Removing and Installing/Replacing Left Or Right Front Brake Caliper</u> b) Check floating caliper installation. See <u>34 11 519 Removing and Installing/Replacing Left Or Right Front Brake Caliper</u> c) Remove and install, repair or replace floating calliper. See <u>34 11 519 Removing and Installing/Replacing Left Or Right Front Brake Caliper</u>
Pulsating effect on brake pedal	a) Wheel-bearing play excessive b) Brake disc not aligned with floating caliper c) Brake-disc runout d) Excessive thickness deviation within braking surface	a) Replace wheel bearings. See <u>31 21 180 REPLACING BEARING (WHEEL BEARING) FOR FRONT WHEEL</u> b) Check floating caliper installation. See <u>34 11 519 Removing and Installing/Replacing Left Or Right Front Brake Caliper</u> c) Replace brake discs. See <u>34 11 220 Removing and Installing/Replacing Both Front Brake Discs</u> d) Measure brake disc thickness Grind or replace disks. See <u>34 11 667 Precision-turning Both Front Brake Discs On Both Sides</u>
Handbrake effect insufficient	a) Brake shoes oil-splattered b) Excessive dead travel between brake shoes and brake drums c) Corroded transmitting elements	a) Replace brake shoes. See <u>34 41 220 Removing and Installing/Replacing All Handbrake Shoes</u> determine cause b) Adjust handbrake. See <u>34 41 006 Adjusting Parking Brake</u> c) Remove and install handbrake and expander locks Check Bowden cables, replacing if necessary. See <u>34 41 280 Removing and Installing/Replacing Actuating Unit With Control Unit For Parking Brake (EMF)</u>