

BRAKES

Repair - X6

BRAKE TESTING AND BLEEDING

34 00 ... CHECKING BRAKE DISCS

Special tools required:

- 34 1 280

See BRAKES - SPECIAL TOOLS .

Necessary preliminary tasks:

- Remove **wheels**

Checking thickness difference:

- Measure thickness difference within brake surfaces at 8 point (spread over the circumference) with a micrometer gauge
- Compare measurement result with **setpoint value** . See BRAKES - TECHNICAL DATA .

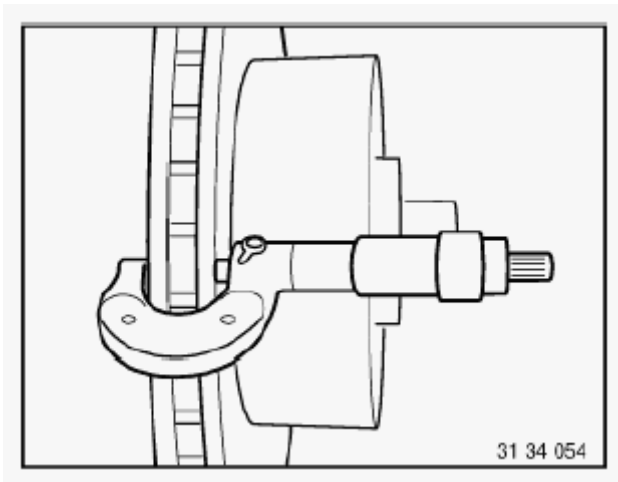


Fig. 1: Measuring Thickness Brake Discs
Courtesy of BMW OF NORTH AMERICA, INC.

Check minimum brake disc thickness:

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

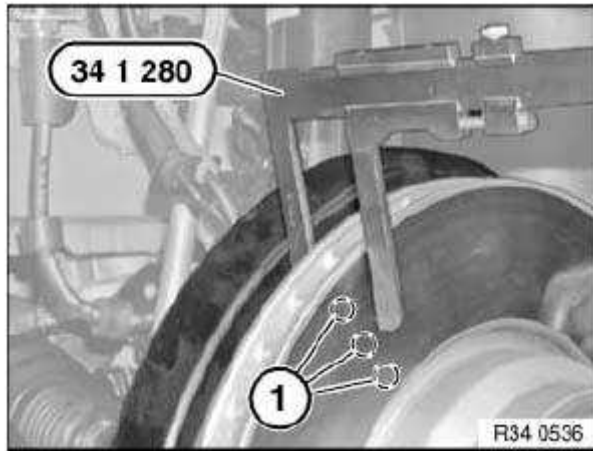


Fig. 2: Checking Minimum Brake Disc Thickness
 Courtesy of BMW OF NORTH AMERICA, INC.

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.
- Do not under any circumstances allow any oil or grease to get into the brake system. This would result in a complete malfunction of the brake system.
- When cleaning brake components with brake cleaner, do not allow brake cleaner to get into in 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 reuse drained brake fluid.
- Always use BMW-approved brake fluid, refer to **BRAKES - OPERATING FLUIDS** .
- Dispose of brake fluid in approved appliances only.
- 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 pad wear indicator** is reached. See **FRONT BRAKES** or **REAR BRAKES** .

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

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

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

One-sided angled areas on the brake pads must be located on the disk contact side of the brake calliper 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.

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

- Always strip preservative off new parts before installation.
- Brake callipers:

Only approved pastes on the basis of glycol must be used for repairs on brake callipers.

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

Use only BMW-approved lubricants to grease calliper guides (refer to **BRAKES - 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.
- Only tighten down brake hoses on the front axle when wheels are in straight-ahead position.
- Close off open connections of brake lines and individual components to prevent dirt from getting into the brake system.
- When tightening down brake line couplings, observe tightening torque **34 32 1AZ** . See **34 32 BRAKE LINES** .

Wheel-slip control system

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

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

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

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 ... INSTRUCTIONS FOR BRAKE TESTING FOR E70/E71 (AWD)

Production period: from volume production launch

1. Checking service brake:

IMPORTANT: 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!

**It is possible for the HDC indicator lamp to go out or not to light up even when HDC operation is activated. This may be because HDC is temporarily unavailable due to high brake temperature.
Carry out brake testing with selector lever in N position (Neutral) only.**

Selecting a gear causes the transfer case clutch to close when the analyzer rollers start up. Consequently the stationary axle is also driven, and the vehicle surges from the analyzer. Because the front and rear axles are now coupled, the axle to be tested then increases the brake force until the analyzer is shut down.

2. Checking parking brake:

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

The electromechanical parking brake cannot be tested on a plate test stand.

34 00 ... TESTING AWD VEHICLES ON DYNAMIC BRAKE AND POWER ANALYZERS (E30, E34, E46, E53, E83, E60, E61, E90, E91, E92, E70, E71)

NOTE: Running AWD vehicles on dynamic brake analyzers is governed by different instructions, depending on the vehicle model.

IMPORTANT: Power measurements on single-axle roller dynamometers are generally not permitted as total failure of the transfer case cannot be ruled out during such measurements.

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.

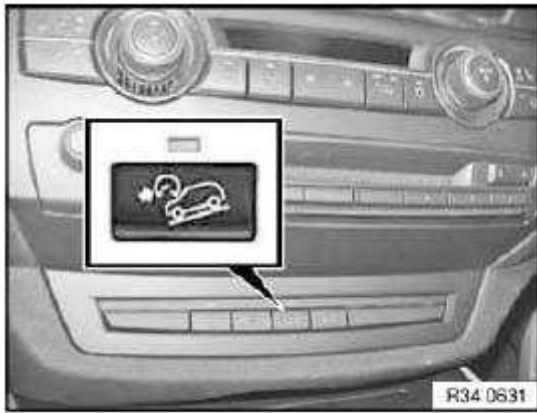


Fig. 3: Identifying HDC Indicator Lamp
Courtesy of BMW OF NORTH AMERICA, INC.

Necessary preliminary tasks:

- Check tires for damage
- Check tire treads
- Check tire 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

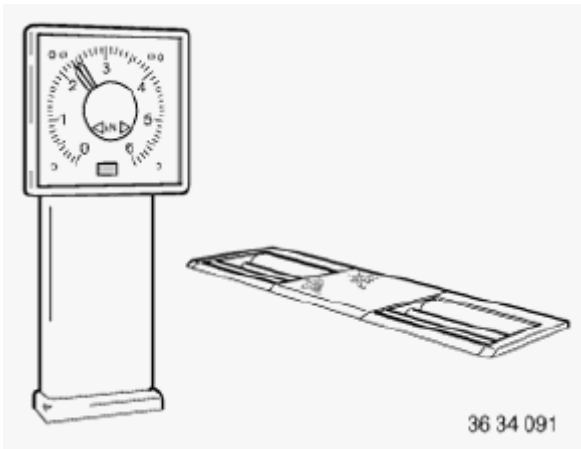


Fig. 4: Identifying Dynamometer

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

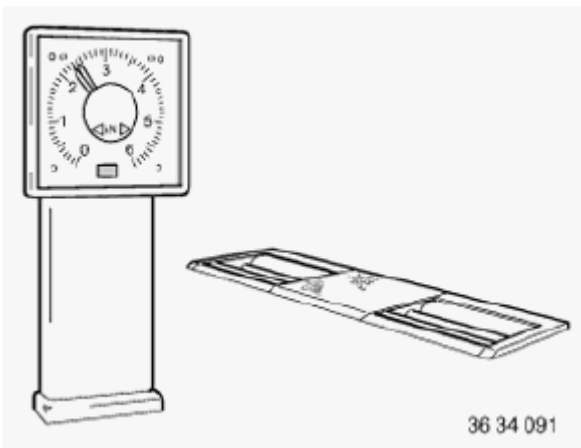


Fig. 5: Identifying Dynamometer

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!

- Drive vehicle with rear axle into roller dynamometer

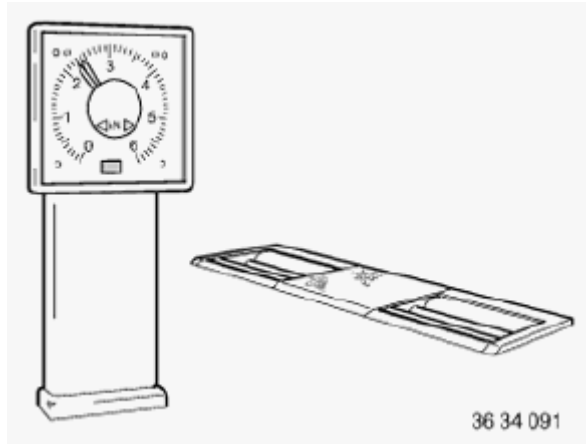


Fig. 6: Identifying Dynamometer
Courtesy of BMW OF NORTH AMERICA, INC.

- 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.

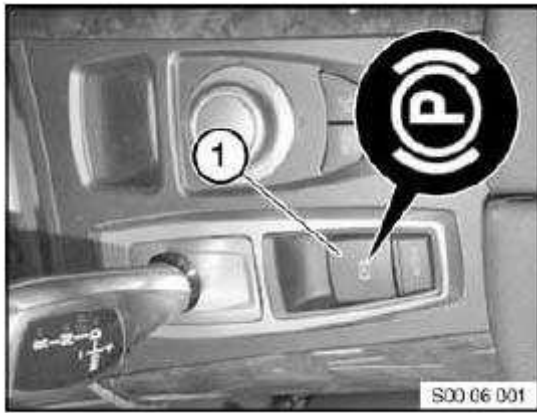


Fig. 7: Identifying Parking Butter

Courtesy of BMW OF NORTH AMERICA, INC.

- Read off maximum brake power on left/right

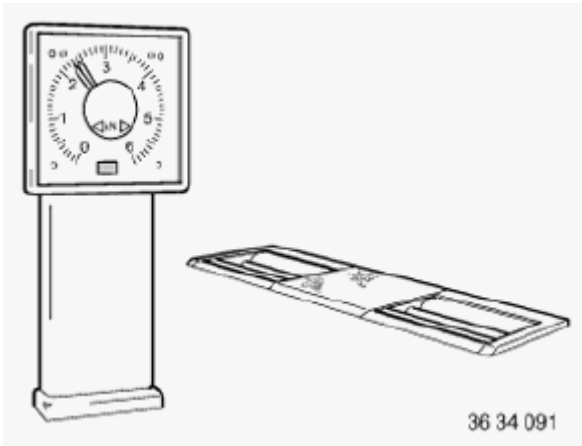


Fig. 8: Identifying Dynamometer

Courtesy of BMW OF NORTH AMERICA, INC.

34 00 009 NOTES ON BRAKE AND STABILITY SYSTEMS (ASC+T AND DSC) ON ROLLER DYNAMOMETERS

NOTE: Running BMW/MINI vehicles on dynamic brake analyzers is governed by different instructions, depending on the vehicle model.

IMPORTANT: In the case of all-wheel drive vehicles , power measurements on single-axle roller dynamometers are generally not permitted as total failure of the transfer case cannot be ruled out during such measurements.

34 00 010 CHECKING THICKNESS OF BRAKE PAD

Special tools required:

- 34 1 260

See **BRAKES - SPECIAL TOOLS** .

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.

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 **FRONT BRAKES** .

Safe limit for lining wear, rear brake. See **REAR BRAKES** .

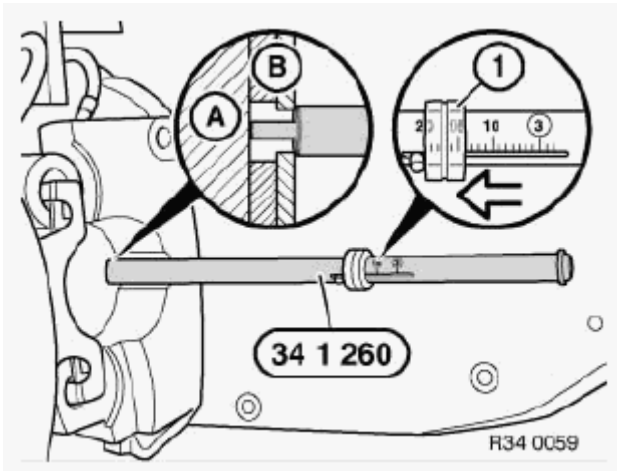


Fig. 9: Pressing Special Tool Onto Brake Pad
Courtesy of BMW OF NORTH AMERICA, INC.

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)

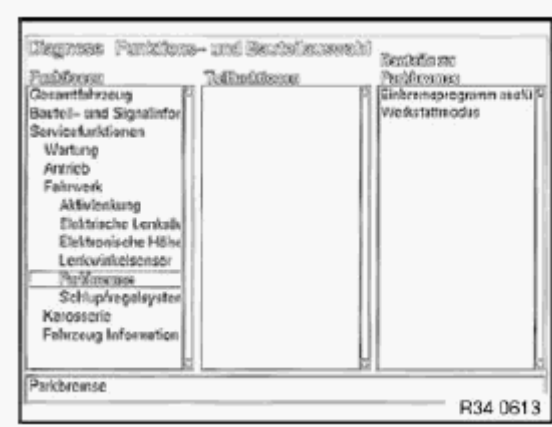


Fig. 10: Service Function Information System Screen Display
Courtesy of BMW OF NORTH AMERICA, INC.

Braking-in procedure takes 3 minutes.

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

Now clear the fault memory.

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**.

IMPORTANT: When carrying out repairs to the brake system, follow the procedure set out in **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.

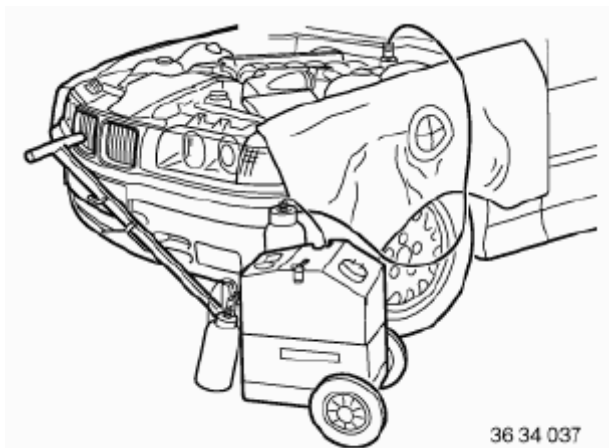


Fig. 11: Checking Relevant Operating Instructions For Each Device
 Courtesy of BMW OF NORTH AMERICA, INC.

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.

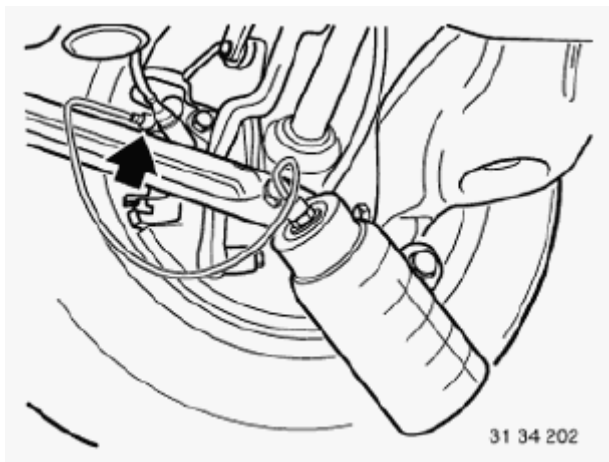


Fig. 12: Flushing Brake System
 Courtesy of BMW OF NORTH AMERICA, INC.

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. If necessary, top up/draw off to max. level.

Close expansion tank.

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

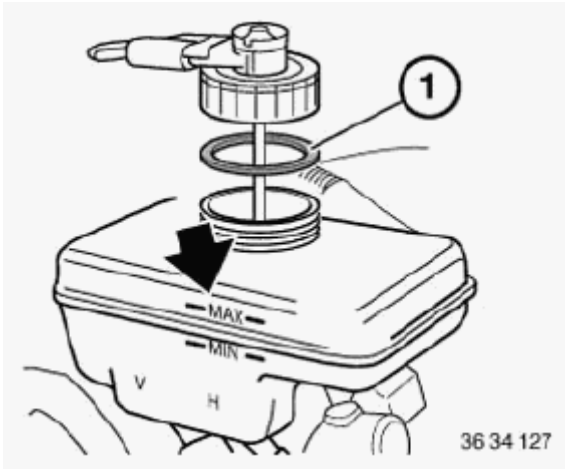


Fig. 13: Checking Brake Fluid Level

Courtesy of BMW OF NORTH AMERICA, INC.

34 00 050 BLEEDING BRAKE SYSTEM WITH DSC

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**.

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.

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

Connect brake fluid changer to expansion tank and switch on.

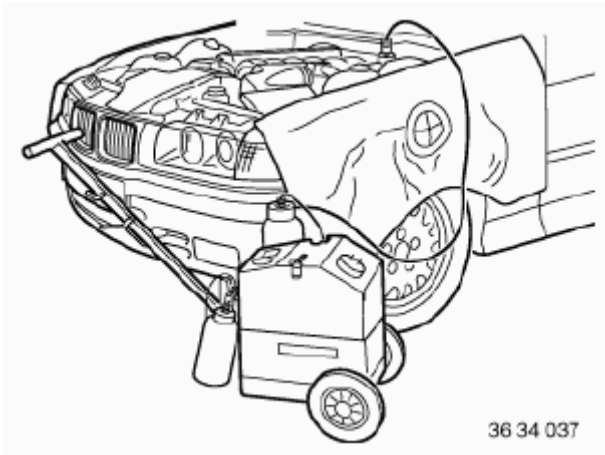


Fig. 14: Checking Relevant Operating Instructions For Each Device
Courtesy of BMW OF NORTH AMERICA, INC.

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.

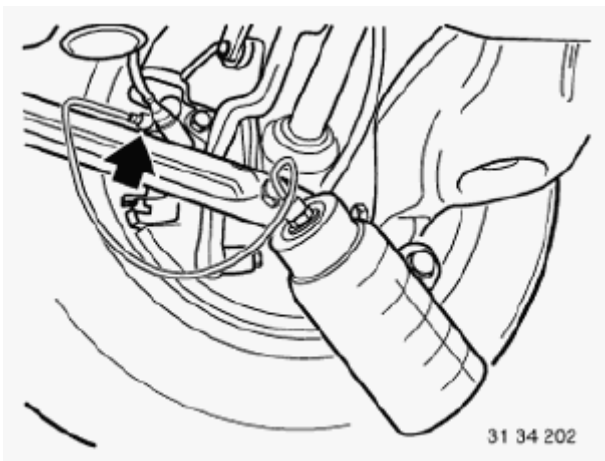


Fig. 15: Connecting Bleeder Hose With Collecting Tray To Bleeder Valve On Rear Right Brake Caliper
Courtesy of BMW OF NORTH AMERICA, INC.

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.

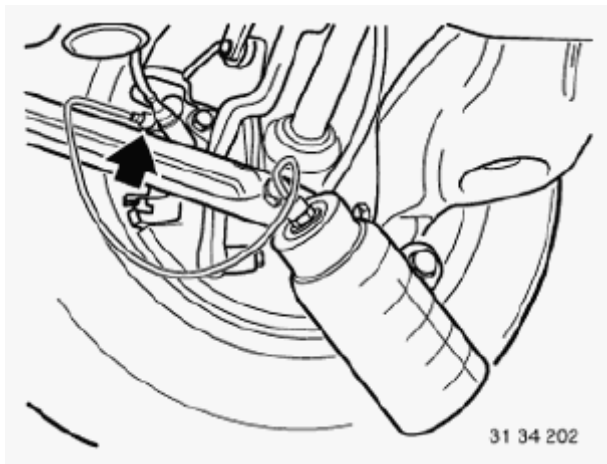


Fig. 16: Connecting Bleeder Hose With Collecting Tray To Bleeder Valve On Rear Right Brake Caliper
Courtesy of BMW OF NORTH AMERICA, INC.

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.

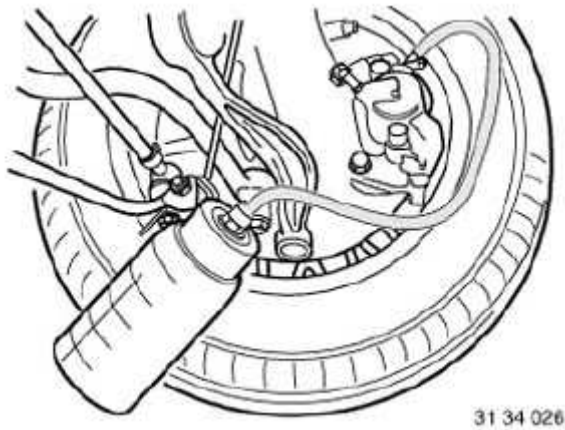


Fig. 17: Connecting Bleeder Hose With Collecting Tray To Bleeder Valve On Front Right Brake Caliper
 Courtesy of BMW OF NORTH AMERICA, INC.

Switch off brake fluid changer and remove from expansion tank.

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

Close expansion tank.

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

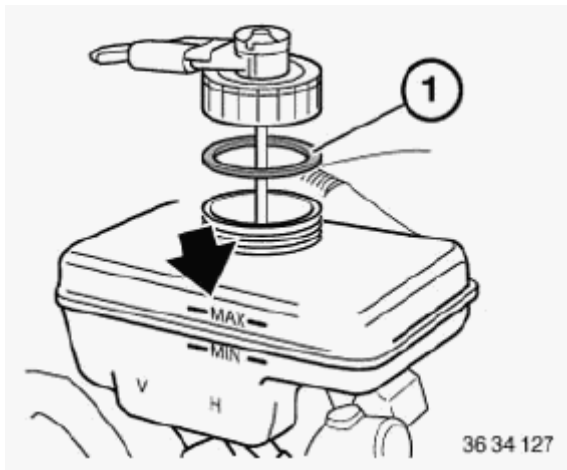
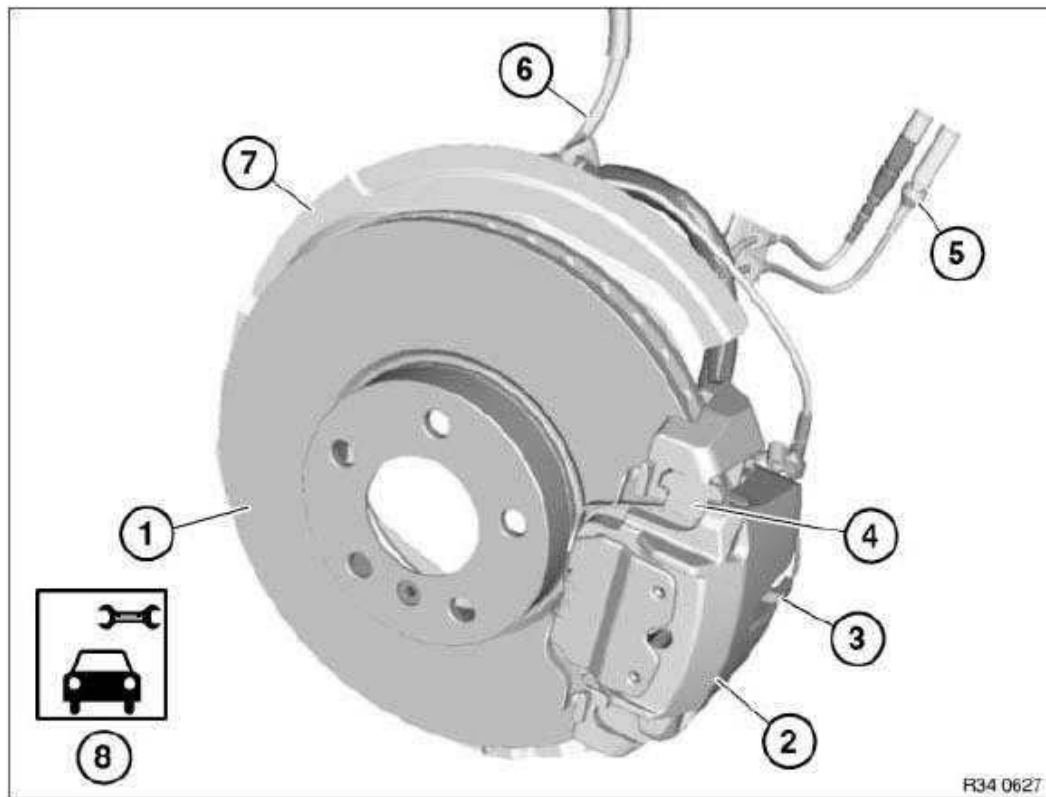


Fig. 18: Checking Brake Fluid Level
 Courtesy of BMW OF NORTH AMERICA, INC.

FRONT BRAKES

34 11 ... OVERVIEW OF FRONT BRAKES



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

Fig. 19: Overview Of Front Brakes

Courtesy of BMW OF NORTH AMERICA, INC.

34 11 000 REMOVING AND INSTALLING/REPLACING BRAKE PADS ON BOTH DISC BRAKES (2 PISTONS)

Special tools required:

- 34 1 050
- 34 1 280

See **BRAKES - SPECIAL TOOLS** .

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). So as not to damage the surface coating, if possible do not mechanically clean the guide surfaces for the brake pads on the brake caliper holder. Instead, clean with brake cleaner BMW part no. 83 19 2 147 681 and apply a thin coating

of Never Seez Compound brake pad paste BMW part no. 83 23 9 407 830.

Necessary preliminary tasks:

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

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

Installation:

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

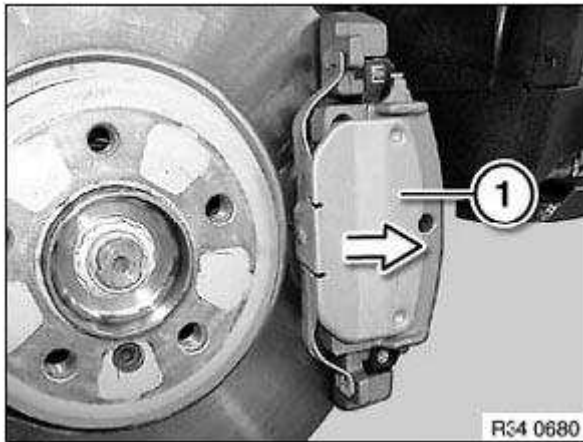


Fig. 20: Levering Out Retaining Spring
Courtesy of BMW OF NORTH AMERICA, INC.

Remove plastic plugs (1).

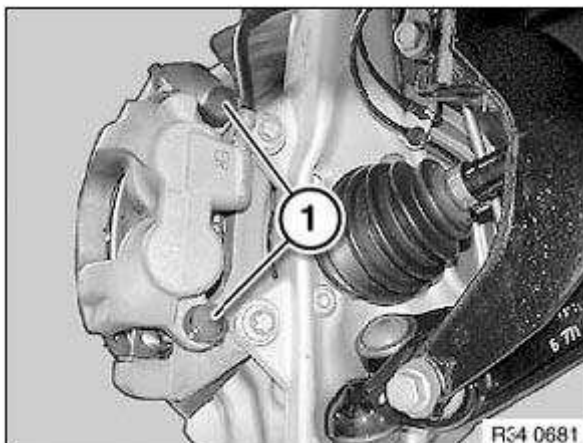


Fig. 21: Identifying Plastic Plugs

Courtesy of BMW OF NORTH AMERICA, INC.

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

Unscrew guide bolts (1). Withdraw brake caliper backwards.

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** .

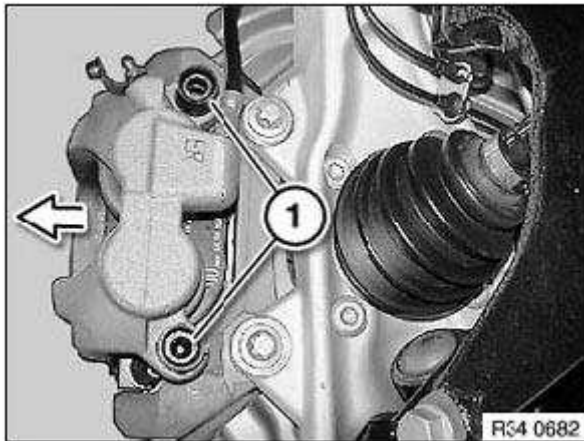


Fig. 22: Identifying Guide Bolts

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** .

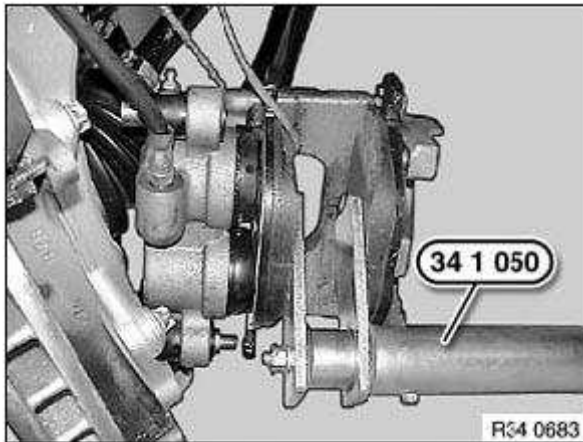


Fig. 23: Pressing Back Brake Pads And Piston With Special Tool (34 1 050)
 Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Mark any worn brake pads.

In the event of one-sided brake pad wear, do not change brake pads round.
 Observe minimum thickness of brake pads. See **BRAKES - TECHNICAL DATA** .
 Do not apply grease to brake pad backplate.

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

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

NOTE: The inner brake pad is seated with springs in the piston or in the brake caliper housing.

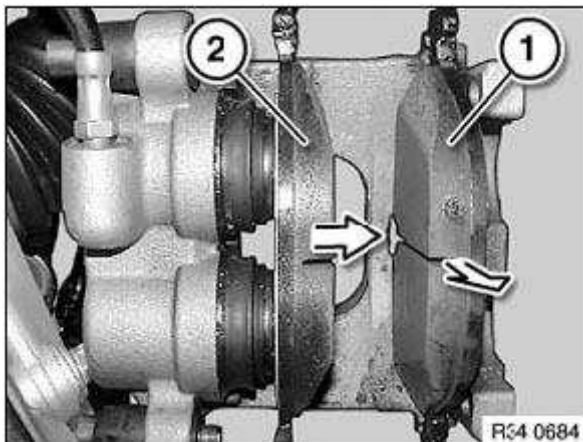


Fig. 24: Removing Outer Brake Pad
 Courtesy of BMW OF NORTH AMERICA, INC.

Clean brake pads.

Check minimum brake disc thickness:

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

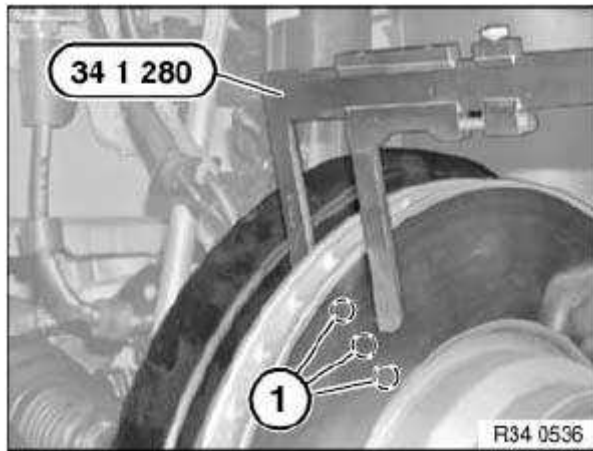


Fig. 25: Checking Minimum Brake Disc Thickness
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: New brake pads may only be installed if the brake disc thickness is greater than or equal to the minimum brake disc thickness (MIN TH) (not incl. M vehicles).
In the case of M vehicles and perforated brake discs, new brake pads may only be installed if the brake disc thickness is greater than the minimum brake disc thickness (MIN TH). See **BRAKES - TECHNICAL DATA** .

NOTE: The minimum brake disc thickness is configured in such a way that it lasts the life of a further set of brake pads (does not apply to M vehicles and perforated brake discs).

IMPORTANT: Dust sleeve must not come into contact with Plastilube as this may cause the dust sleeve to swell.

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

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

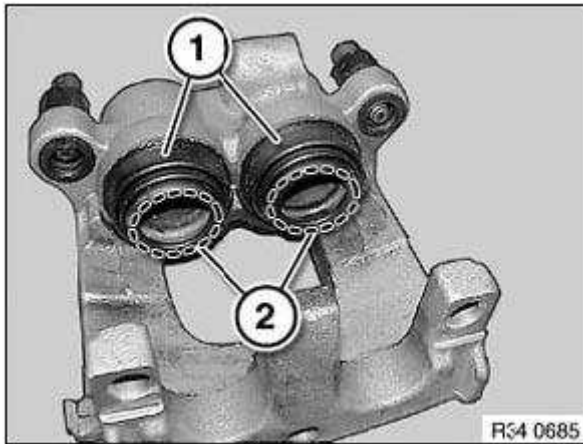


Fig. 26: Identifying Dust Sleeve
 Courtesy of BMW OF NORTH AMERICA, INC.

Clean contact surfaces (1) of brake pad tee heads/brake caliper housing with brake cleaner and apply a thin coating of **brake pad paste** .

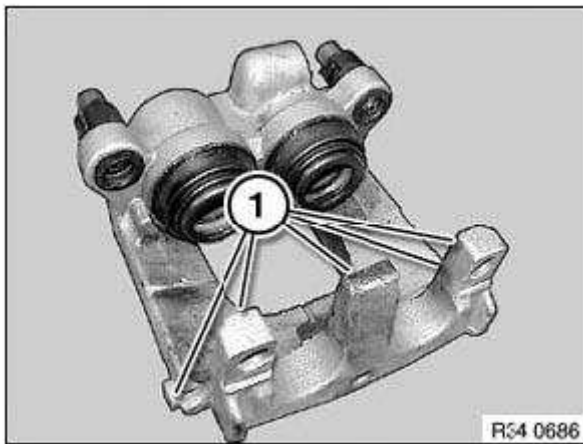


Fig. 27: Identifying Contact Surfaces Of Brake Pad
 Courtesy of BMW OF NORTH AMERICA, INC.

So as not to damage the surface coating, **if possible do not mechanically clean** pad guides (1). Instead, clean with **brake cleaner** and apply a thin coating of Never Seez Compound brake pad paste.

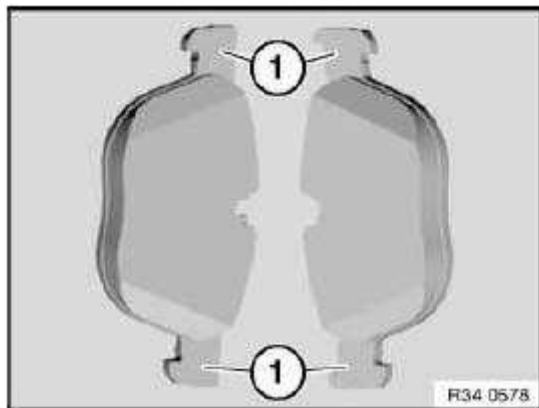


Fig. 28: Identifying Pad Guides

Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: After completing work:

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

34 11 000 REMOVING AND INSTALLING/REPLACING BRAKE PADS ON BOTH FRONT DISC BRAKES (1 PISTON)

Special tools required:

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

See **BRAKES - SPECIAL TOOLS** .

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). So as not to damage the surface coating, if possible do not mechanically clean the guide surfaces for the brake pads on the brake caliper holder. Instead, clean with brake cleaner BMW part no. 83 19 2 147 681 and apply a thin coating of Never Seez Compound brake pad paste BMW part no. 83 23 9 407 830.

Necessary preliminary tasks:

- Remove **front 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.

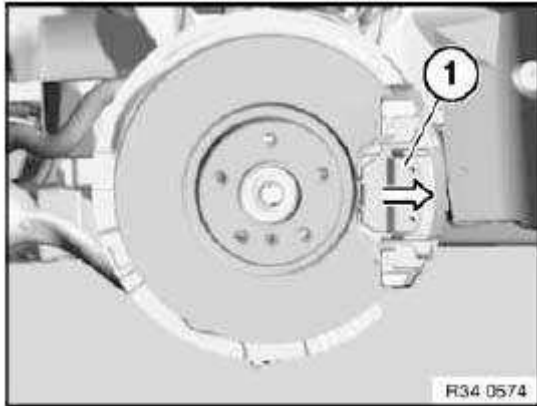


Fig. 29: Identifying Retaining Spring
Courtesy of BMW OF NORTH AMERICA, INC.

Remove plastic plugs (1).

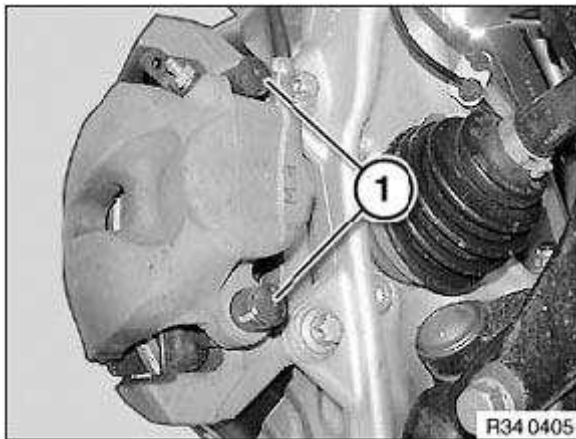


Fig. 30: Identifying Plastic Plugs
Courtesy of BMW OF NORTH AMERICA, INC.

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

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

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** .

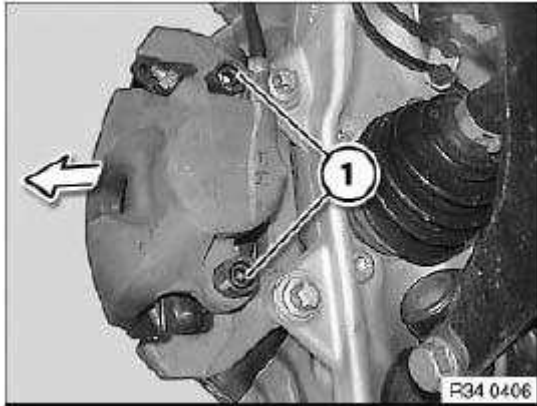


Fig. 31: Identifying Guide Screws

Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Mark any worn brake pads.

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.

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

Observe **minimum thickness of brake pads**. See **BRAKES - TECHNICAL DATA** .

Clean brake pads.

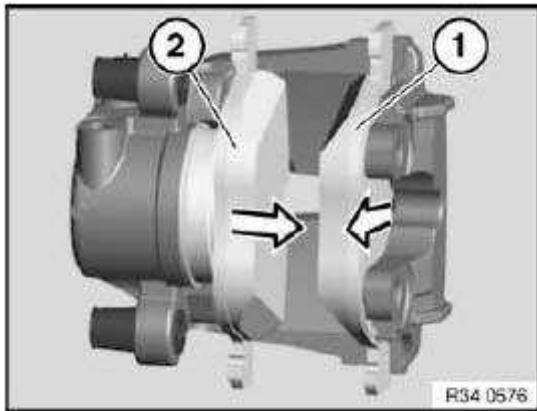


Fig. 32: Identifying Outer And Inner Brake Pad
 Courtesy of BMW OF NORTH AMERICA, INC.

Do not apply grease to brake pad backplate.

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 .

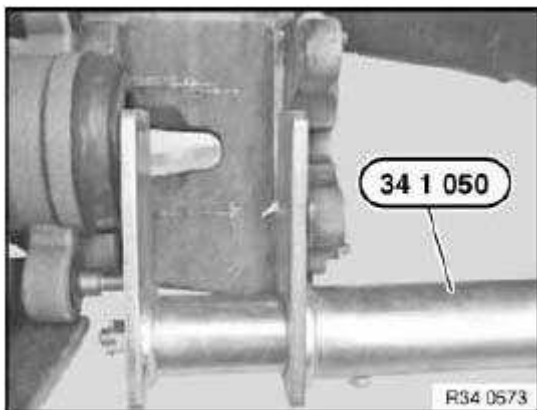


Fig. 33: Pressing Back Brake Pads And Piston With Special Tool (34 1 050)
 Courtesy of BMW OF NORTH AMERICA, INC.

Check minimum brake disc thickness:

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

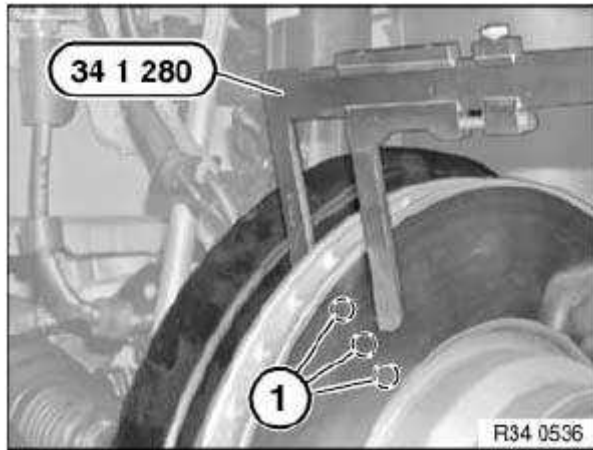


Fig. 34: Checking Minimum Brake Disc Thickness
 Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: New brake pads may only be installed if the brake disc thickness is greater than or equal to the minimum brake disc thickness (MIN TH) (not incl. M vehicles).
 In the case of M vehicles and perforated brake discs, new brake pads may only be installed if the brake disc thickness is greater than the minimum brake disc thickness (MIN TH). See BRAKES - TECHNICAL DATA .

NOTE: The minimum brake disc thickness is configured in such a way that it lasts the life of a further set of brake pads (does not apply to M vehicles and perforated brake discs).

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

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

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

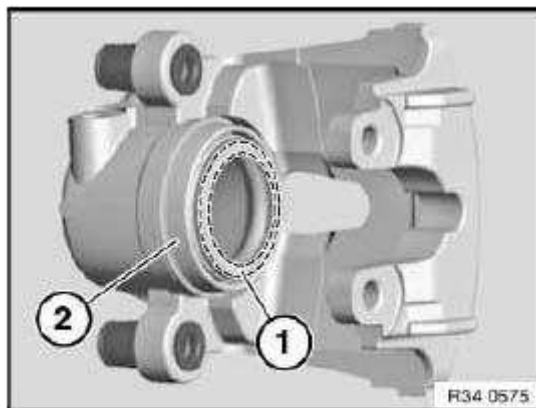


Fig. 35: Identifying Dust Sleeve

Courtesy of BMW OF NORTH AMERICA, INC.

Clean contact surfaces (1) and (2) with brake cleaner and apply a thin coating of **brake pad paste** .

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

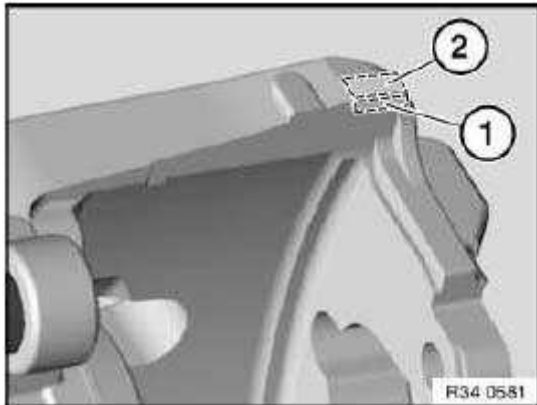


Fig. 36: Applying Thin Coating Of Brake Pad Paste

Courtesy of BMW OF NORTH AMERICA, INC.

So as not to damage the surface coating, **if possible do not mechanically clean** the guide surfaces for the brake pads on the brake caliper holder. Instead, clean with **brake cleaner** and apply a thin coating of Never Seez Compound brake pad paste.

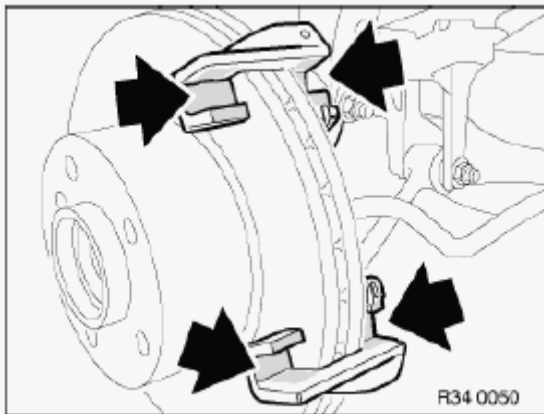


Fig. 37: Identifying Thin Coating Applying Area

Courtesy of BMW OF NORTH AMERICA, INC.

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

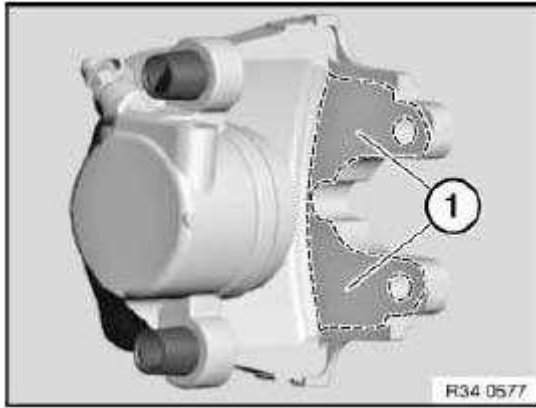


Fig. 38: Identifying Contact Surface Of Brake Caliper
Courtesy of BMW OF NORTH AMERICA, INC.

So as not to damage the surface coating, **if possible do not mechanically clean** pad guides (1). Instead, clean with **brake cleaner** and apply a thin coating of Never Seez Compound brake pad paste.

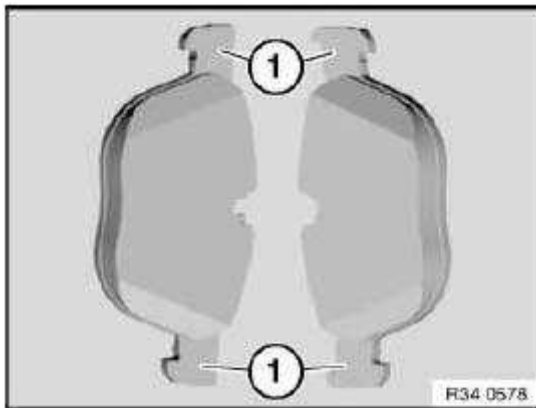


Fig. 39: Identifying Pad Guides
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **After completing work:**

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

Special tools required:

- 34 1 050
- 34 1 280

See **BRAKES - SPECIAL TOOLS** .

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). So as not to damage the surface coating, if possible do not mechanically clean the guide surfaces for the brake pads on the brake caliper holder. Instead, clean with brake cleaner BMW part no. 83 19 2 147 681 and apply a thin coating of Never Seez Compound brake pad paste BMW part no. 83 23 9 407 830.

Necessary preliminary tasks:

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

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

Installation:

Place retaining spring (1) first at top and bottom of brake caliper and then allow to engage in recess (2) of brake caliper housing.

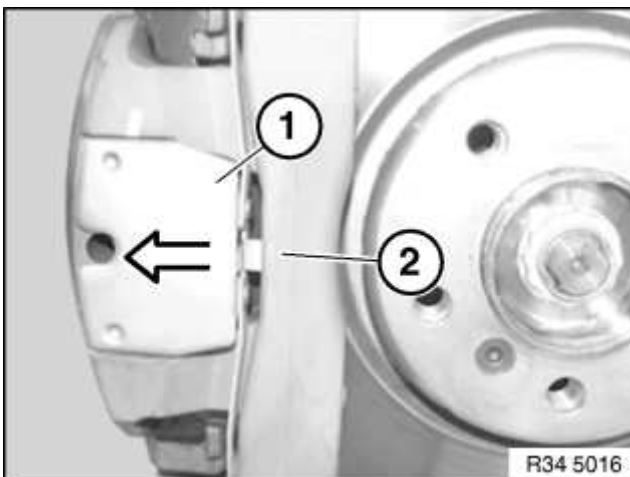


Fig. 40: Place Retaining Spring (1) At Top And Bottom Of Brake Caliper And Engage In Recess (2) Of Brake Caliper Housing

Courtesy of BMW OF NORTH AMERICA, INC.

Remove plastic plugs (1). Release guide screws. Tie brake caliper back and do not allow to hang from brake hose. Withdraw brake caliper backwards.

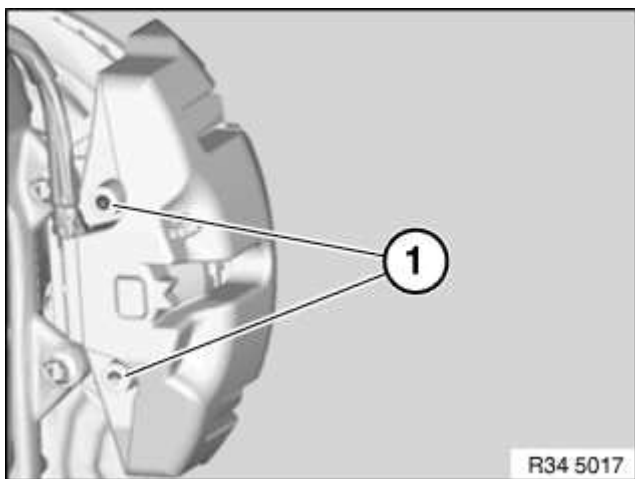


Fig. 41: Remove Plastic Plugs (1)

Courtesy of BMW OF NORTH AMERICA, INC.

To install, 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** . Mark any worn brake pads.

Remove brake pads in direction of arrow. In the event of one-sided brake pad wear, do not change brake pads round. Observe minimum thickness of brake pads. See **BRAKES - TECHNICAL DATA** . Clean brake pads. Do not apply grease to brake pad backplate.

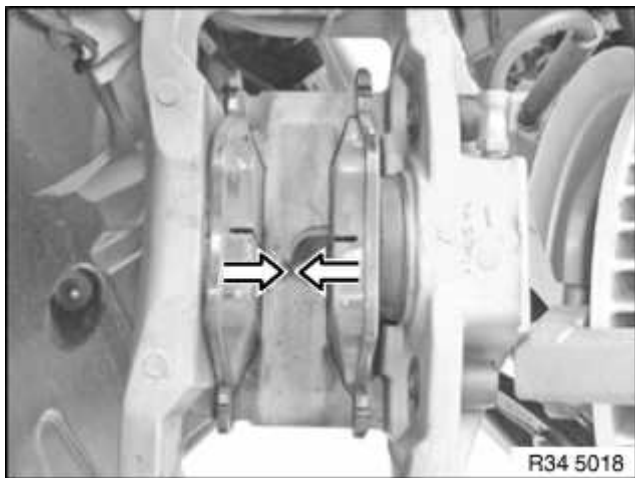


Fig. 42: Observe Minimum Thickness Of Brake Pads

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.

Check minimum brake disc thickness: Position special tool 34 1 280 at three measuring points in area (1) and measure. Compare measurement result and lowest value with setpoint value. See **BRAKES - TECHNICAL DATA** .

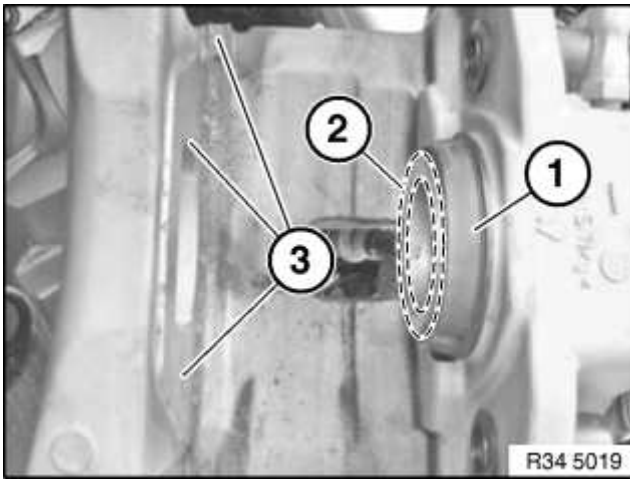


Fig. 43: Position Special Tool 34 1 280 At Three Measuring Points In Area (1) And Measure
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: New brake pads may only be installed if the brake disc thickness is greater than or equal to the minimum brake disc thickness (MIN TH) (not incl. M vehicles). In the case of M vehicles and perforated brake discs, new brake pads may only be installed if the brake disc thickness is greater than the minimum brake disc thickness (MIN TH).

NOTE: The minimum brake disc thickness is configured in such a way that it lasts the life of a further set of brake pads (does not apply to M vehicles and perforated brake discs).

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

IMPORTANT: Dust sleeve must not come into contact with anti-squeak Plastilube as this may cause the dust sleeve to swell. Clean contact surface (2) of brake piston and brake pads (3) with brake cleaner and apply a thin coat of brake pad paste.

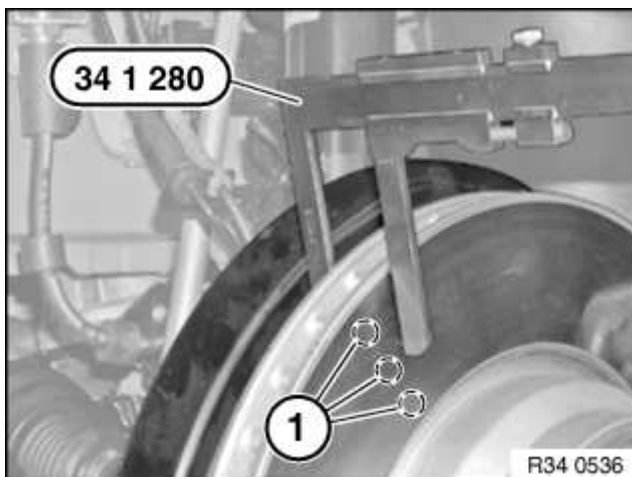


Fig. 44: Clean Contact Surface (2) Of Brake Piston And Brake Pads (3) With Brake Cleaner

Courtesy of BMW OF NORTH AMERICA, INC.

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

So as not to damage the surface coating, if possible do not mechanically clean the guide surfaces for the brake pads on the brake caliper holder. Instead, clean with brake cleaner and apply a thin coating of Never Seez Compound brake pad paste.

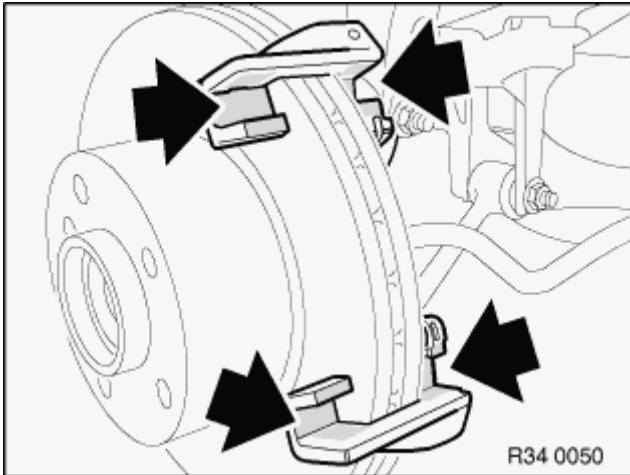


Fig. 45: Do Not Mechanically Clean The Guide Surfaces For The Brake Pads On Brake Caliper Holder
Courtesy of BMW OF NORTH AMERICA, INC.

So as not to damage the surface coating, if possible do not mechanically clean pad guides (1). Instead, clean with brake cleaner and apply a thin coating of Never Seez Compound brake pad paste.

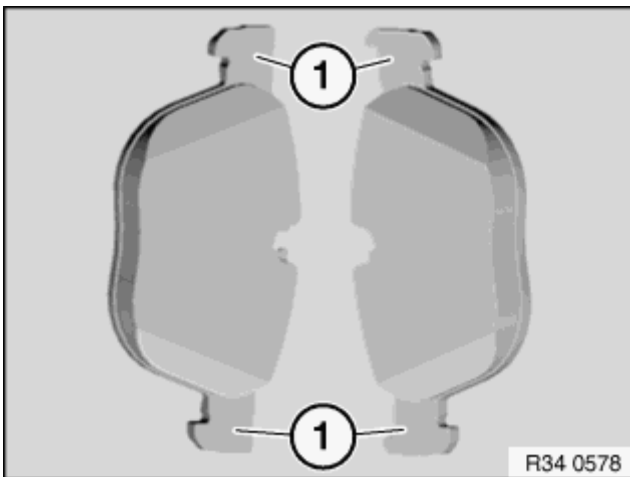


Fig. 46: Do Not Mechanically Clean Pad Guides (1)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: After completing work: Fully depress brake pedal several times so that brake pads contact brake discs. When installing new brake pads at front and rear axles, brake fluid level must be brought up to "MAX" marking. Read and comply

with notes on braking in new brake discs/brake pads. When replacing pads, reset CBS display in accordance with factory specification.

34 11 220 REMOVING AND INSTALLING/REPLACING BOTH FRONT BRAKE DISCS

Special tools required:

- 34 1 280

Necessary preliminary tasks:

- Remove **front wheels**
- Remove and clean brake pads

See BRAKES - SPECIAL TOOLS .

NOTE: 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.
- Compare measurement result and lowest value with **setpoint value** . See BRAKES - TECHNICAL DATA .

NOTE: If the brake discs are replaced, you must also fit new brake pads. Brake discs may only be replaced in pairs (on each axle).

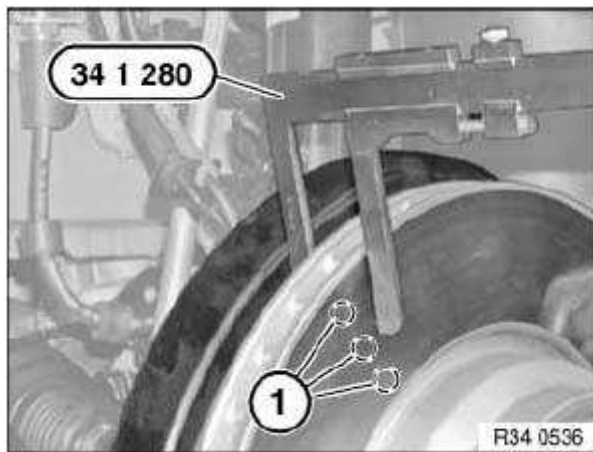


Fig. 47: Checking Minimum Brake Disc Thickness
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: New brake pads may only be installed if the brake disc thickness is greater

than or equal to the minimum brake disc thickness (MIN TH) (not incl. M vehicles).

In the case of M vehicles and perforated brake discs, new brake pads may only be installed if the brake disc thickness is greater than the minimum brake disc thickness (MIN TH). See BRAKES - TECHNICAL DATA .

Release screws (1). Remove brake caliper mounting bracket.

Installation:

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

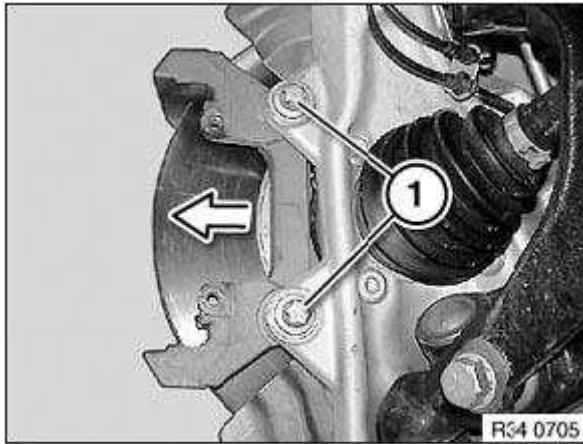


Fig. 48: Identifying Brake Caliper Mounting Bracket Screws

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).

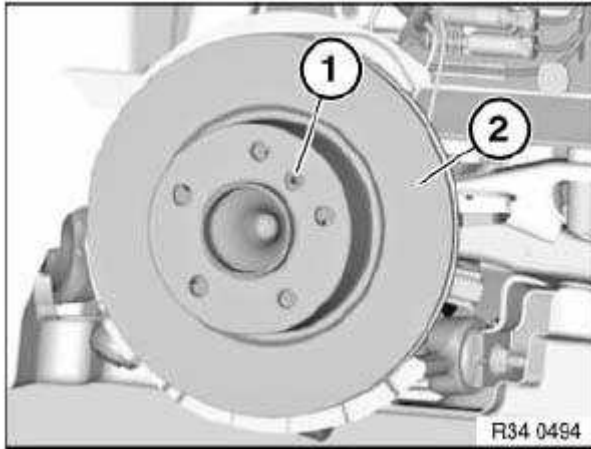


Fig. 49: Identifying Brake Disc Screw

Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Replace screw.

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

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

Necessary preliminary tasks:

- Remove front **brake disks**.

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

Installation:

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

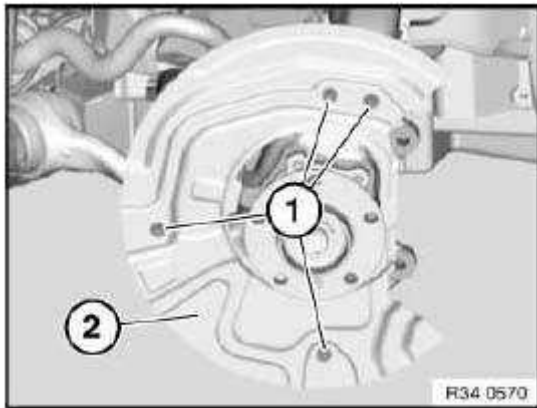


Fig. 50: Identifying Brake Guard Plate Screws
Courtesy of BMW OF NORTH AMERICA, INC.

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**
- Remove **brake pad wear sensor**
- Read and comply with **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.

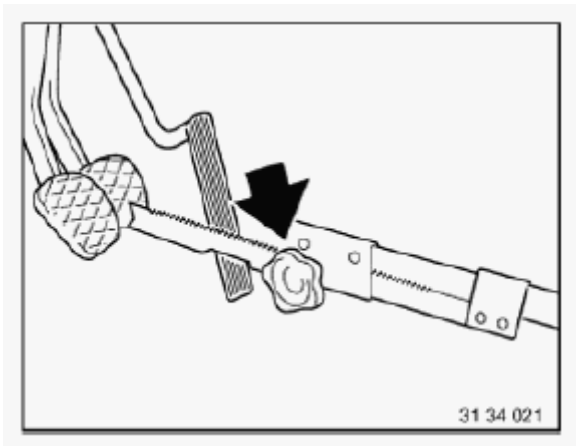


Fig. 51: Pressing Clutch Pedal Down To Floor
 Courtesy of BMW OF NORTH AMERICA, INC.

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.

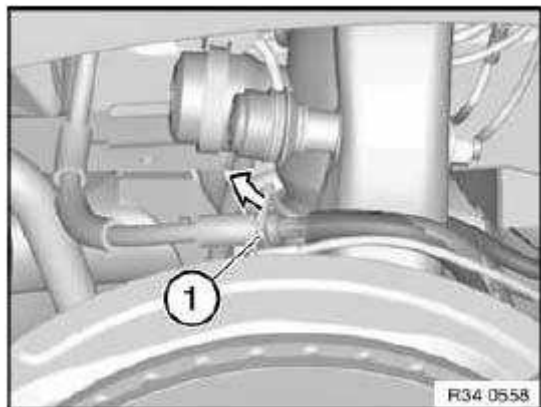


Fig. 52: Detaching Retainer From Bracket On Spring Strut
 Courtesy of BMW OF NORTH AMERICA, INC.

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** .

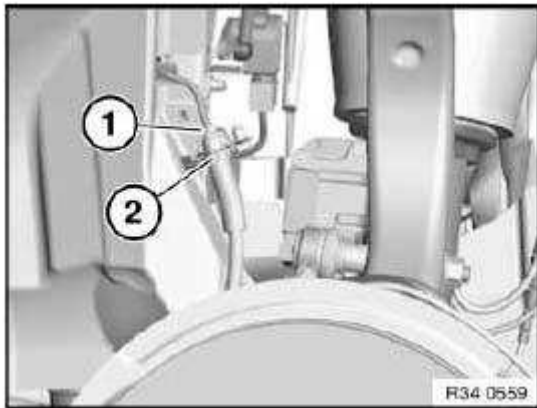


Fig. 53: Identifying Brake Line
 Courtesy of BMW OF NORTH AMERICA, INC.

Detach brake hose from brake caliper (1).

Installation:

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

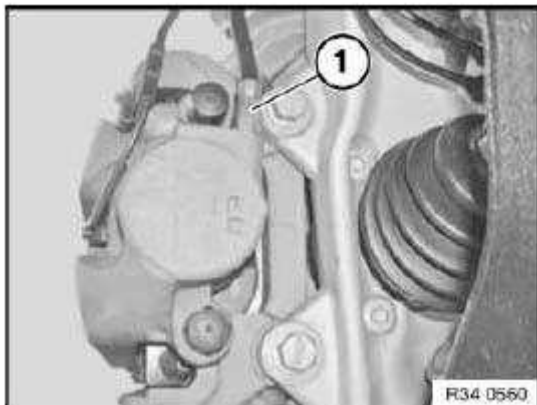


Fig. 54: Identifying Brake Caliper
 Courtesy of BMW OF NORTH AMERICA, INC.

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 (1).

Installation:

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

Detach brake caliper in direction of arrow from swivel bearing.

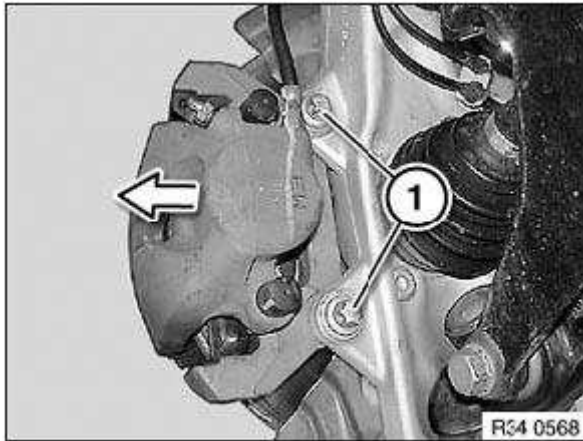


Fig. 55: Identifying Brake Caliper Screws

Courtesy of BMW OF NORTH AMERICA, INC.

34 11 552 OVERHAULING LEFT OR RIGHT FRONT BRAKE CALIPER (BRAKE CALIPER REMOVED)

Special tools required:

- **00 9 316**

See **BRAKES - SPECIAL TOOLS** .

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

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



Fig. 56: Identifying Guide Sleeves

Courtesy of BMW OF NORTH AMERICA, INC.

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!

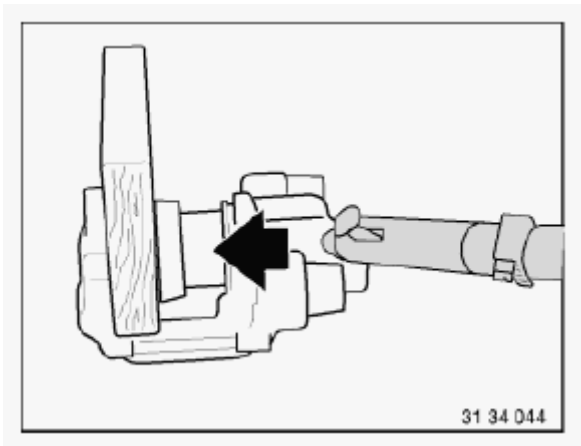


Fig. 57: Placing Protective Plate In Calliper

Courtesy of BMW OF NORTH AMERICA, INC.

Press off dust sleeve (1).

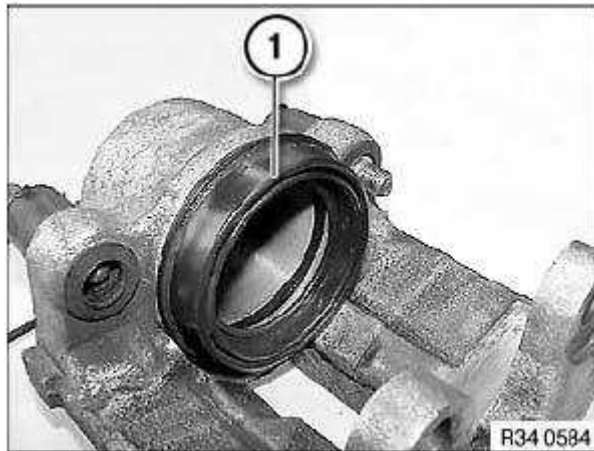


Fig. 58: Identifying Dust Sleeve

Courtesy of BMW OF NORTH AMERICA, INC.

Carefully remove seal (1) with special tool **00 9 316** .

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 **BRAKES - OPERATING FLUIDS** .

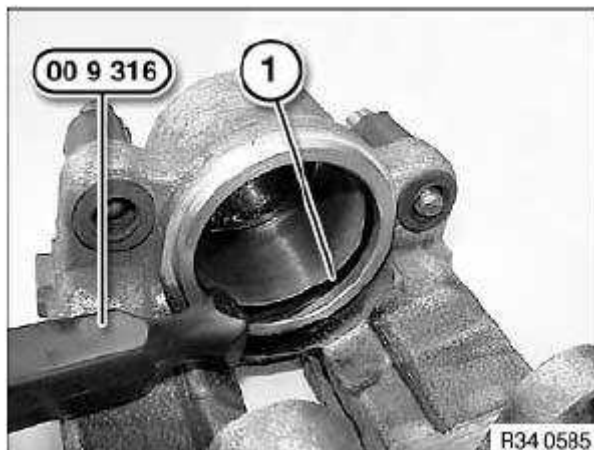


Fig. 59: Removing Seal With Special Tool (00 9 316)

Courtesy of BMW OF NORTH AMERICA, INC.

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.

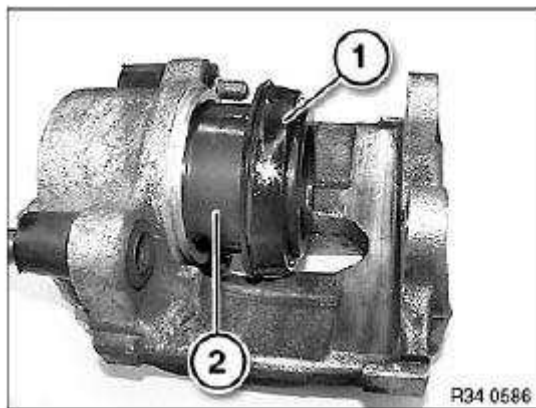


Fig. 60: Pressing Dust Sleeve Onto Brake Calliper Housing
Courtesy of BMW OF NORTH AMERICA, INC.

34 11 552 OVERHAULING LEFT OR RIGHT FRONT BRAKE CALIPER (BRAKE CALIPER REMOVED)

Special tools required:

- 00 9 316

See **BRAKES - SPECIAL TOOLS** .

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

Press off dust sleeve (1).

Installation:

Dust sleeve must be correctly seated in groove (2) of piston and groove (3) of brake caliper.

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.

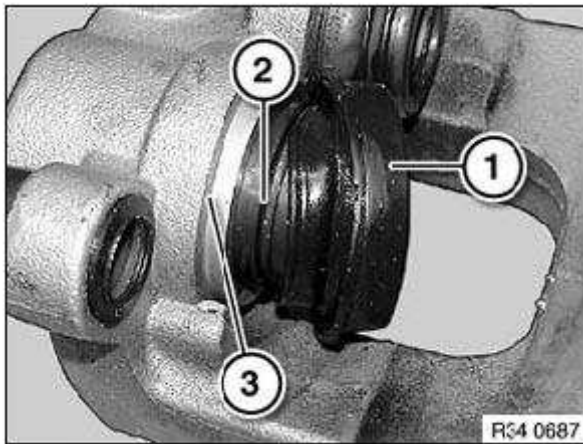


Fig. 61: Pressing Dust Sleeve

Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: To protect the pistons, place a protective plate (2) (e.g. hard wood or hard felt) in caliper recess.

Do not grip piston with fingers - risk of trapping!

Check guide sleeves (1), fitting repair-kit guide sleeve if necessary.

Carefully force piston out through connection bore with compressed air.

Installation:

Do not jam piston when pressing in.

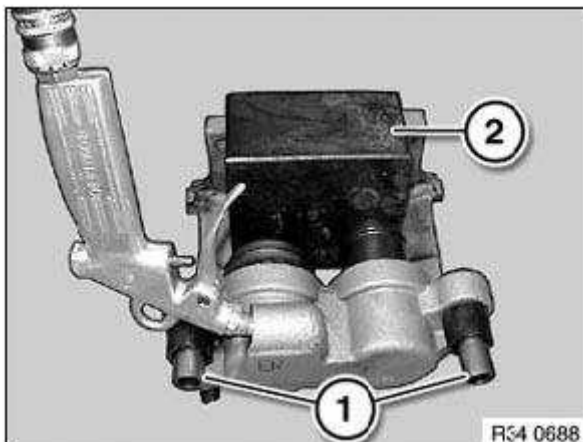


Fig. 62: Placing Protective Plate In Caliper
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Machining of cylinders and pistons is not permitted.

Carefully remove seal (1) with special tool **00 9 316** .

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

Thoroughly inspect cylinder bore, piston and flange surfaces.

Install new seal.

Installation:

Apply a light coat of **ATE brake cylinder paste** to cylinder bore, piston and seal,

Refer to **BRAKES - OPERATING FLUIDS** .

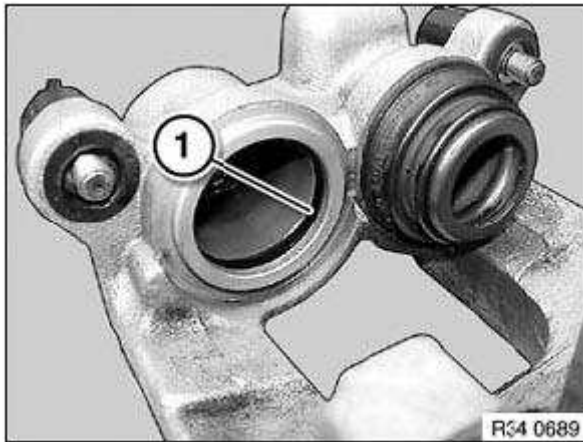


Fig. 63: Identifying Seal
Courtesy of BMW OF NORTH AMERICA, INC.

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)
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) .

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** .

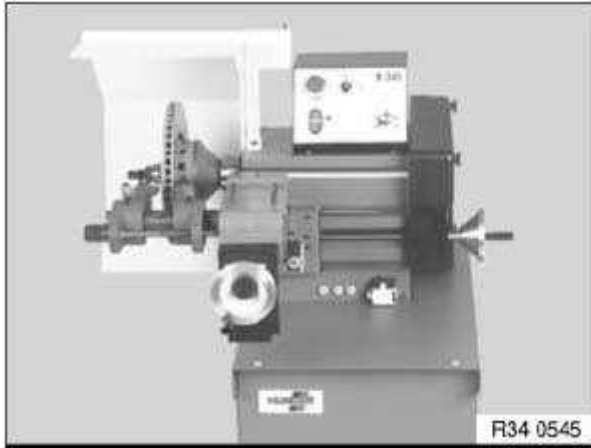


Fig. 64: Identifying Stationary Brake Disc Lathe
Courtesy of BMW OF NORTH AMERICA, INC.

Mobile brake disc lathe

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

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

The brake discs remain on the car.



Fig. 65: 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.

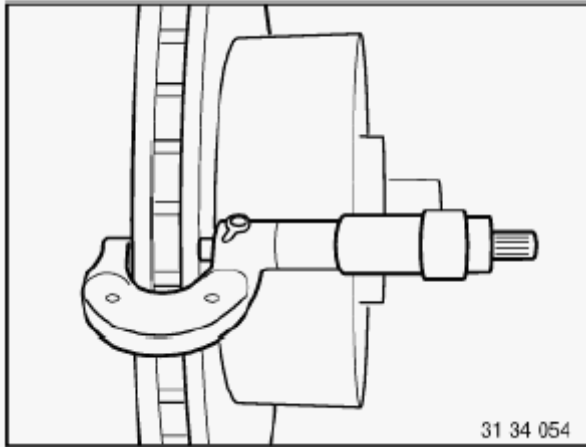
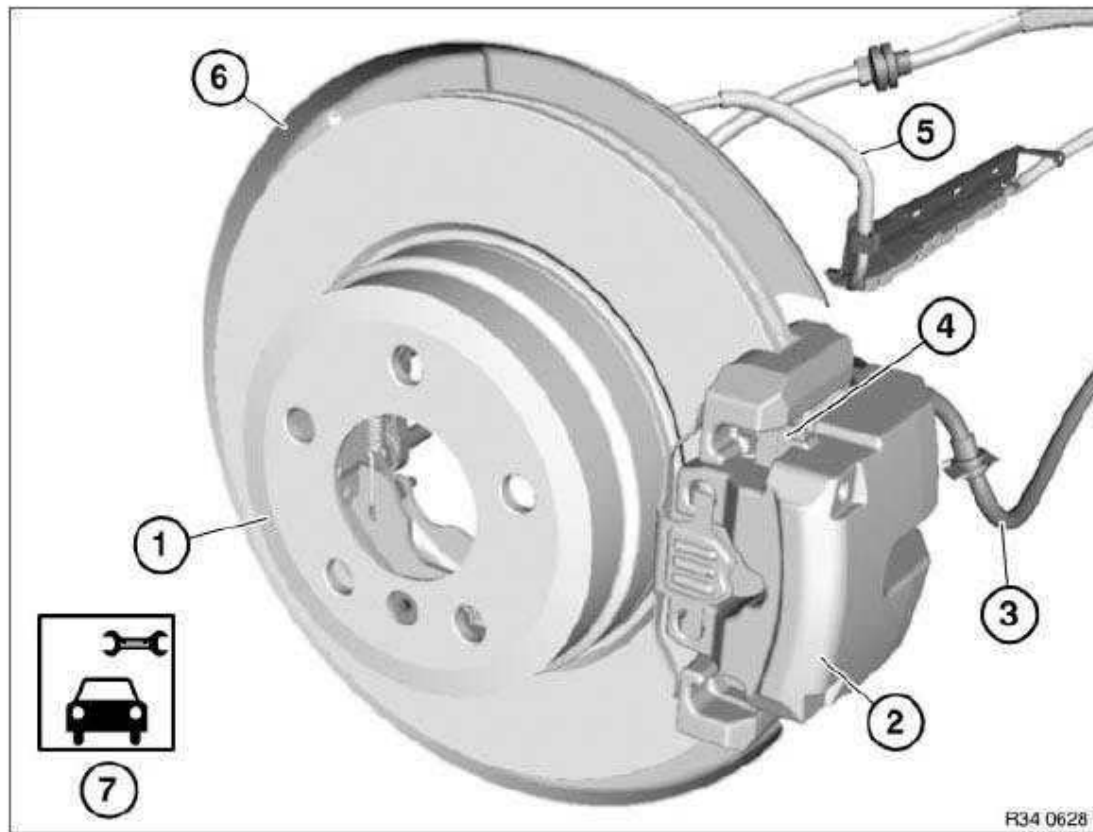


Fig. 66: Measuring Thickness Of Brake Disc
Courtesy of BMW OF NORTH AMERICA, INC.

REAR BRAKES

34 21 ... OVERVIEW OF REAR BRAKE



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

Fig. 67: Overview Of Rear Brake

Courtesy of BMW OF NORTH AMERICA, INC.

34 21 169 REMOVING AND INSTALLING/REPLACING A BRAKE CARRIER/BRAKE GUARD AT REAR

Necessary preliminary tasks:

- Remove **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** .

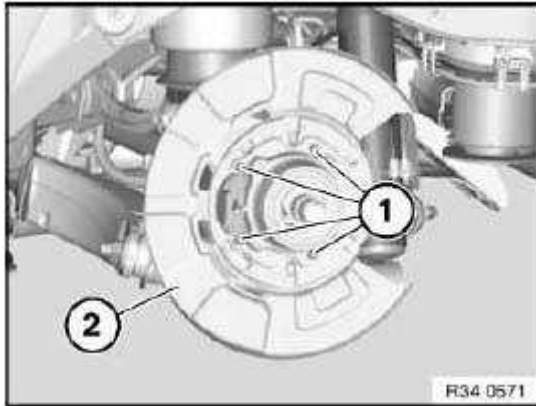


Fig. 68: Identifying Brake Carrier Screws
 Courtesy of BMW OF NORTH AMERICA, INC.

34 21 200 REMOVING AND INSTALLING OR REPLACING BRAKE PADS ON BOTH REAR DISC BRAKES (TEVES FLOATING CALIPER)

Special tools required:

- 34 1 050
- 34 1 280

See **BRAKES - SPECIAL TOOLS** .

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).
 So as not to damage the surface coating, if possible do not mechanically clean the guide surfaces for the brake pads on the brake caliper holder. Instead, clean with brake cleaner BMW part no. 83 19 2 147 681 and apply a thin coating of Never Seez Compound brake pad paste BMW part no. 83 23 9 407 830.

Necessary preliminary tasks:

- Remove **wheels**
- Remove **brake pad wear sensor**

Lift out retaining spring (1).

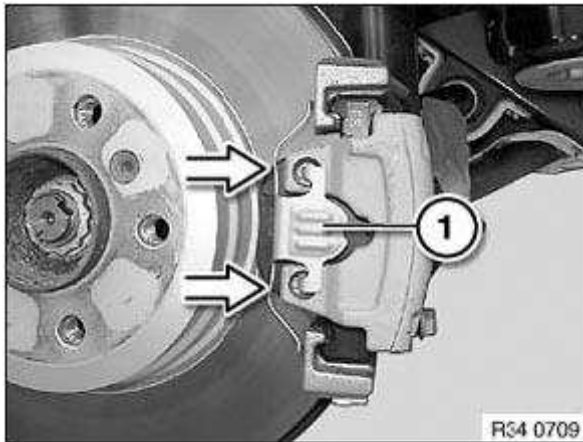


Fig. 69: Identifying Retaining Spring
 Courtesy of BMW OF NORTH AMERICA, INC.

Remove cover plug (1).

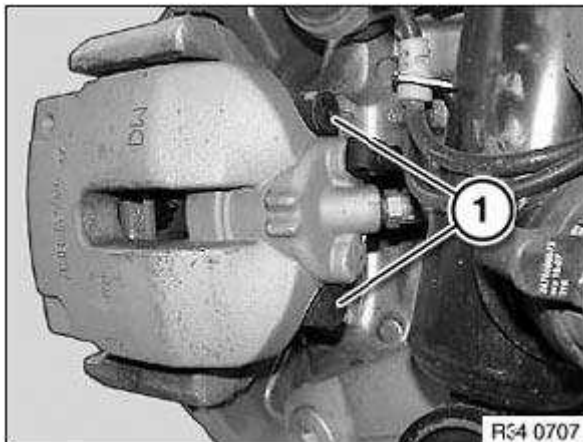


Fig. 70: Identifying Cover Plug
 Courtesy of BMW OF NORTH AMERICA, INC.

Unscrew guide bolts (1).

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.

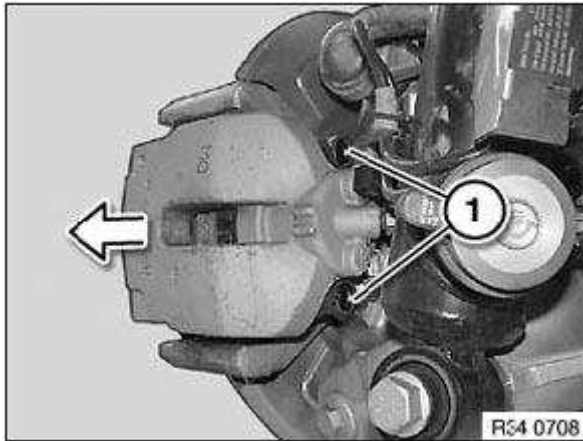


Fig. 71: Identifying Guide Bolts

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 .

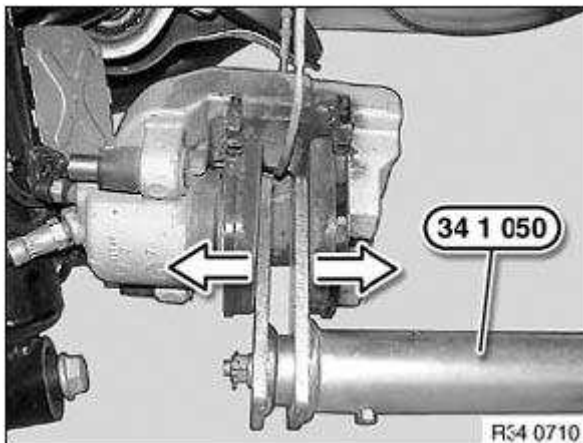


Fig. 72: Identifying Special Tool (34 1 050)

Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Mark any worn brake pads.
In the event of one-sided brake pad wear, do not change brake pads round.

Remove outer brake pad.

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

Clean brake pads.

Do not grease backs of brake pads sleeve.

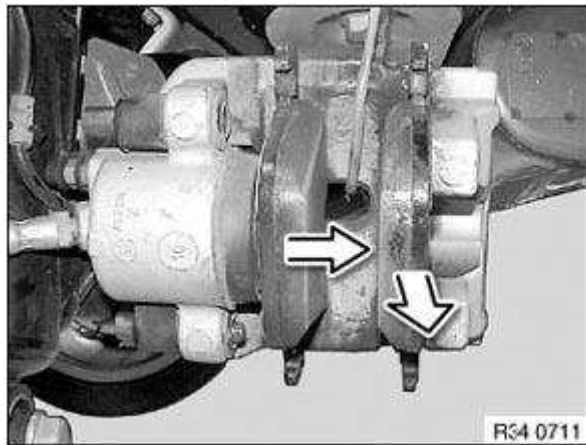


Fig. 73: Removing Outer Brake Pad
Courtesy of BMW OF NORTH AMERICA, INC.

Check minimum brake disc thickness:

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

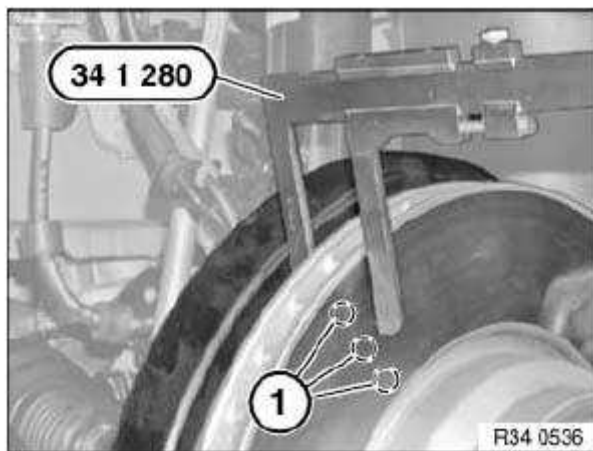


Fig. 74: Checking Minimum Brake Disc Thickness
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: New brake pads may only be installed if the brake disc thickness is greater than or equal to the minimum brake disc thickness (MIN TH) (not incl. M

vehicles).

In the case of M vehicles and perforated brake discs, new brake pads may only be installed if the brake disc thickness is greater than the minimum brake disc thickness (MIN TH).

See BRAKES - TECHNICAL DATA .

NOTE: The minimum brake disc thickness is configured in such a way that it lasts the life of a further set of brake pads (does not apply to M vehicles and perforated brake discs).

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

IMPORTANT: Dust sleeve must not come into contact with Plastilube as this may cause the dust sleeve to swell.

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

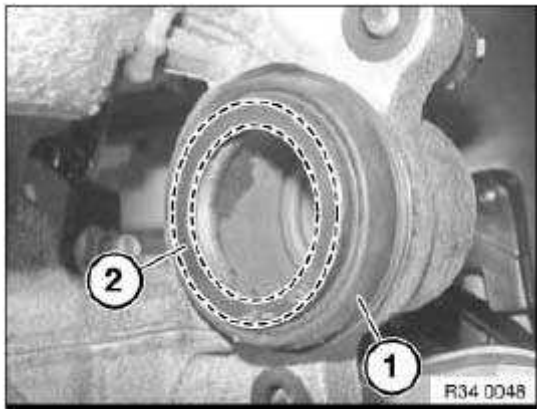


Fig. 75: Identifying Contact Surface Of Brake Piston
Courtesy of BMW OF NORTH AMERICA, INC.

Clean contact surfaces (1...2) of brake pad tee heads/brake caliper housing with brake cleaner and apply a thin coating of **brake pad paste** .

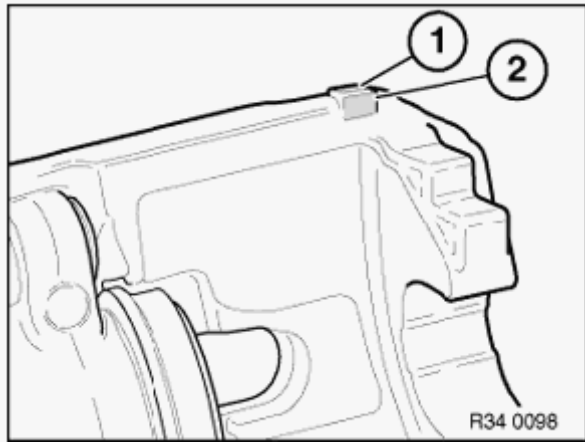


Fig. 76: Identifying Contact Surfaces Of Brake Pad Tee Heads/Brake Caliper Housing
 Courtesy of BMW OF NORTH AMERICA, INC.

Clean contact surface (3) of brake caliper with brake cleaner and apply a thin coating of **brake pad paste** .

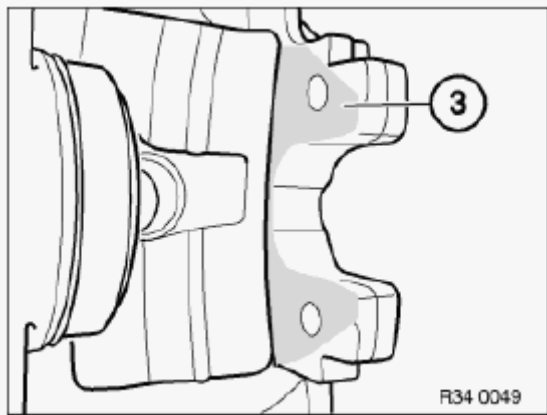


Fig. 77: Identifying Contact Surface Of Brake Caliper With Brake Cleaner
 Courtesy of BMW OF NORTH AMERICA, INC.

So as not to damage the surface coating, **if possible do not mechanically clean** the guide surfaces for the brake pads on the brake caliper holder. Instead, clean with **brake cleaner** and apply a thin coating of Never Seez Compound brake pad paste.

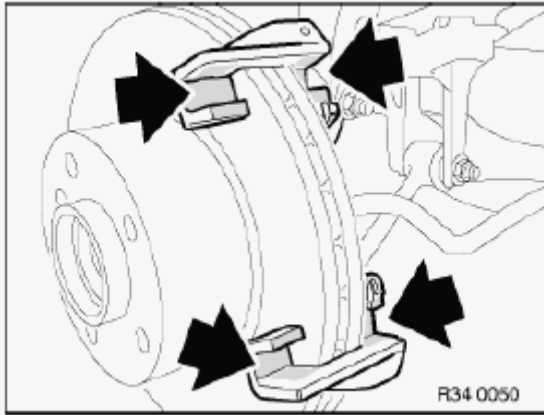


Fig. 78: Identifying Thin Coating Applying Area
 Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: After completing work:

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

Necessary preliminary tasks:

- Remove **wheels**
- Remove and clean **brake pads**

After completing work:

- Adjusting **parking brake**
- 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.
- Compare measurement result and lowest value with **setpoint value** . See **BRAKES - TECHNICAL DATA** .

NOTE: If the brake discs are replaced, you must also fit new brake pads.
Always replace brake discs in pairs.

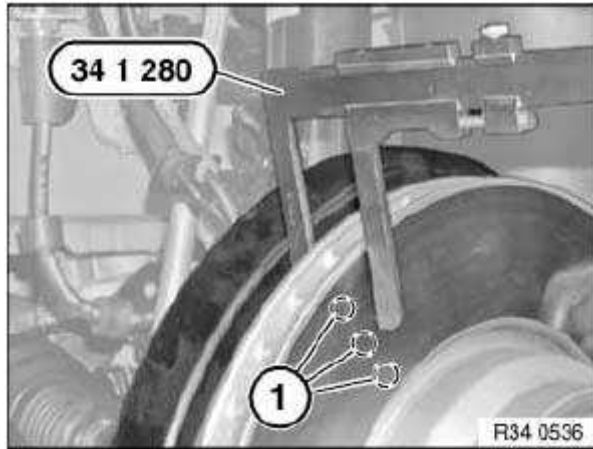


Fig. 79: Checking Minimum Brake Disc Thickness
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: New brake pads may only be installed if the brake disc thickness is greater than or equal to the minimum brake disc thickness (MIN TH) (not incl. M vehicles).
In the case of M vehicles and perforated brake discs, new brake pads may only be installed if the brake disc thickness is greater than the minimum brake disc thickness (MIN TH).
See **BRAKES - TECHNICAL DATA** .

Release screws (1). Detach brake caliper mounting bracket.

Installation:

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

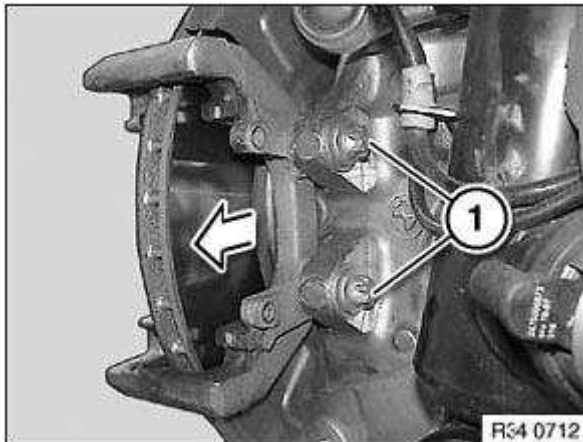


Fig. 80: Identifying Brake Caliper Mounting Bracket Screws
 Courtesy of BMW OF NORTH AMERICA, INC.

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).

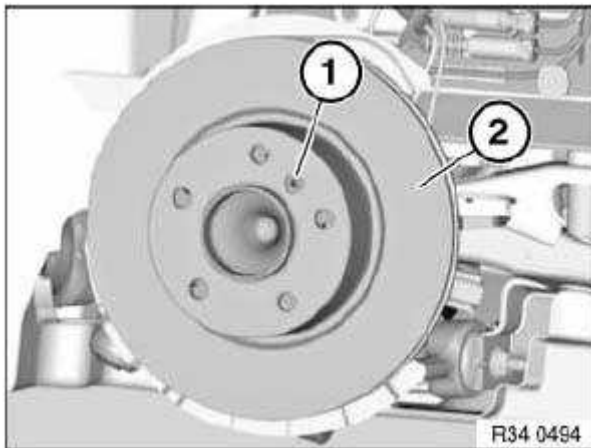


Fig. 81: Identifying Brake Disc Screw
 Courtesy of BMW OF NORTH AMERICA, INC.

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**
- Read and comply with **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.

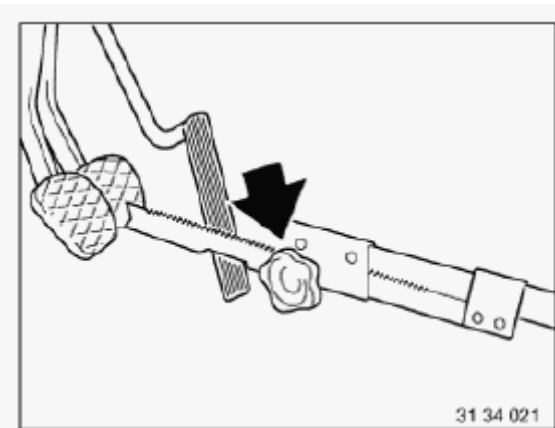


Fig. 82: Pressing Clutch Pedal Down To Floor
Courtesy of BMW OF NORTH AMERICA, INC.

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.

Disconnect brake hose from brake line (2).

Installation:

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

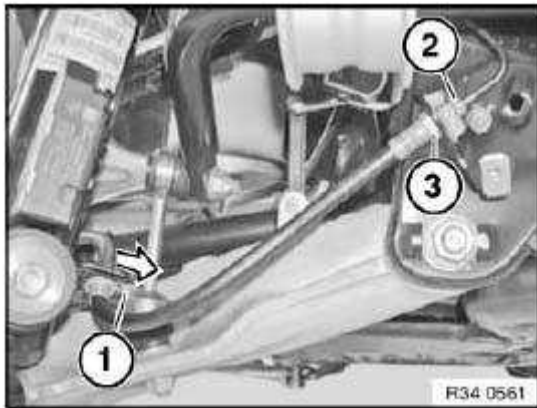


Fig. 83: Detaching Retaining Clip
 Courtesy of BMW OF NORTH AMERICA, INC.

Detach brake hose from brake caliper (1).

Installation:

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

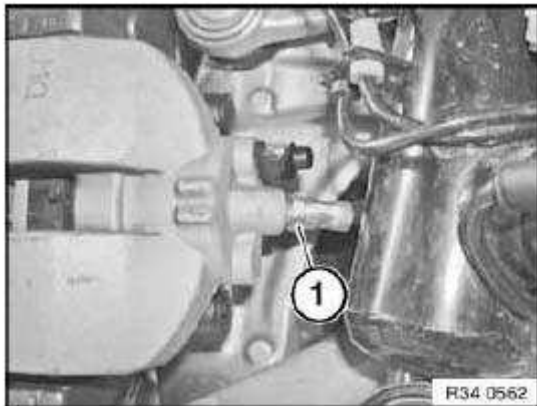


Fig. 84: Identifying Brake Hose
 Courtesy of BMW OF NORTH AMERICA, INC.

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**.

Release screws (1).

Remove brake anchor plate in direction of arrow.

Installation:

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

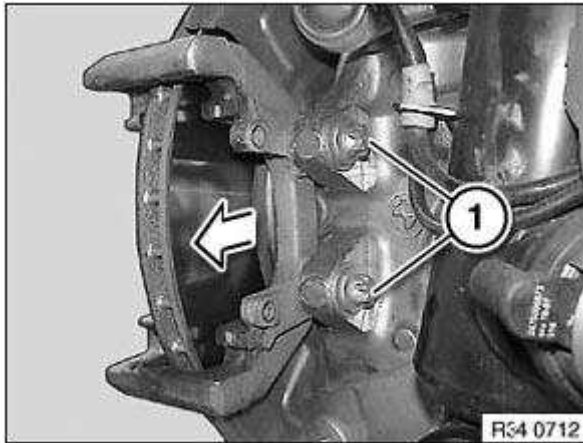


Fig. 85: Identifying Brake Caliper Mounting Bracket Screws
Courtesy of BMW OF NORTH AMERICA, INC.

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

Special tools required:

- 00 9 316

See **BRAKES - SPECIAL TOOLS** .

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

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

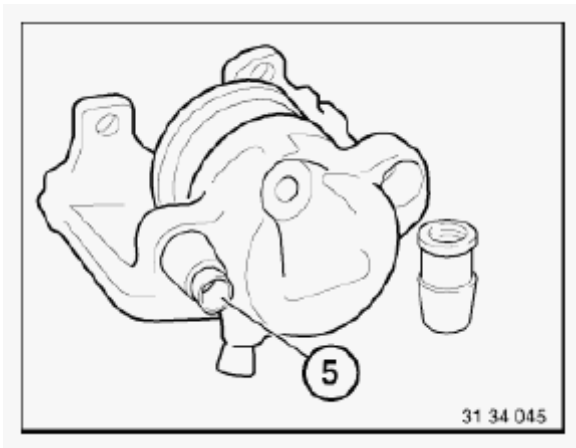


Fig. 86: Identifying Guide Sleeves

Courtesy of BMW OF NORTH AMERICA, INC.

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!

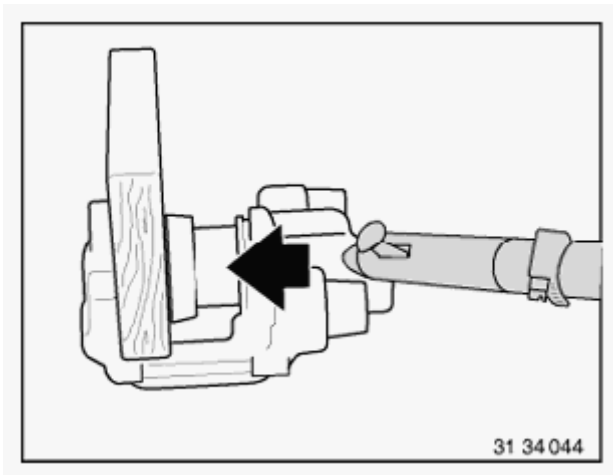


Fig. 87: Placing Protective Plate In Calliper

Courtesy of BMW OF NORTH AMERICA, INC.

Press off dust sleeve (1).

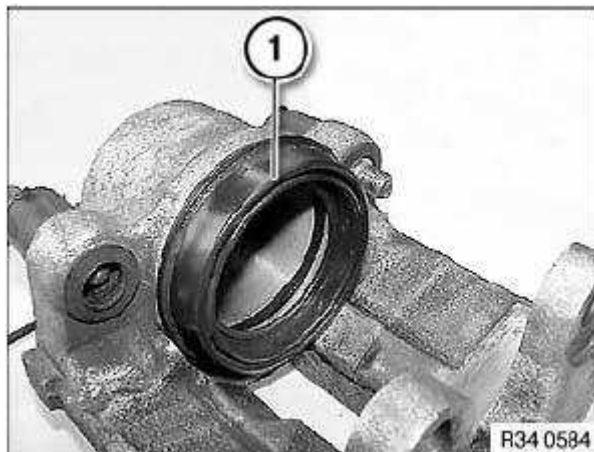


Fig. 88: Identifying Dust Sleeve

Courtesy of BMW OF NORTH AMERICA, INC.

Carefully remove seal (1) with special tool **00 9 316** .

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 **BRAKES - OPERATING FLUIDS** .



Fig. 89: Removing Seal With Special Tool (00 9 316)

Courtesy of BMW OF NORTH AMERICA, INC.

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

Press piston into cylinder bore.

IMPORTANT: Do not twist brake piston.

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.

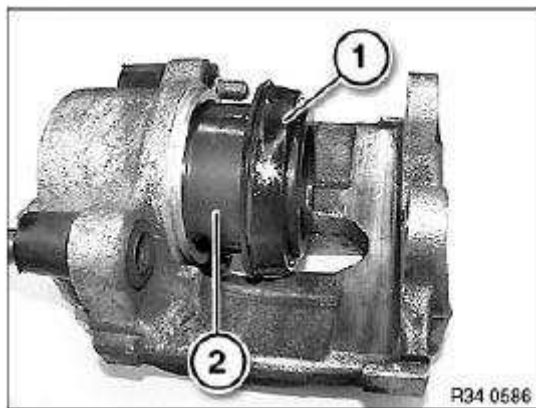


Fig. 90: Pressing Dust Sleeve Onto Brake Calliper Housing
Courtesy of BMW OF NORTH AMERICA, INC.

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)
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 **BRAKES - TECHNICAL DATA** .

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** .

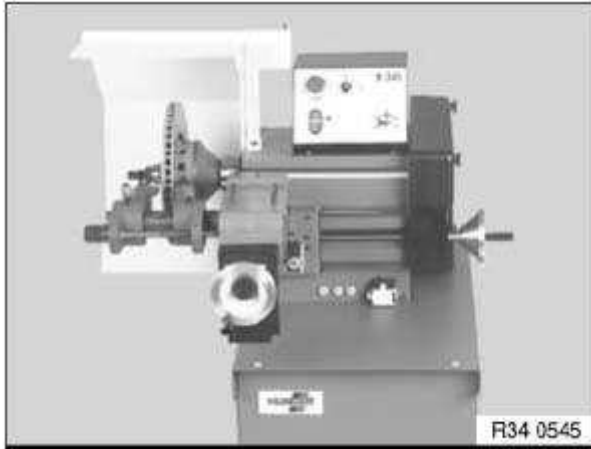


Fig. 91: Identifying Stationary Brake Disc Lathe
 Courtesy of BMW OF NORTH AMERICA, INC.

Mobile brake disc lathe

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

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

The brake discs remain on the car.



Fig. 92: 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 **BRAKES - TECHNICAL DATA** .

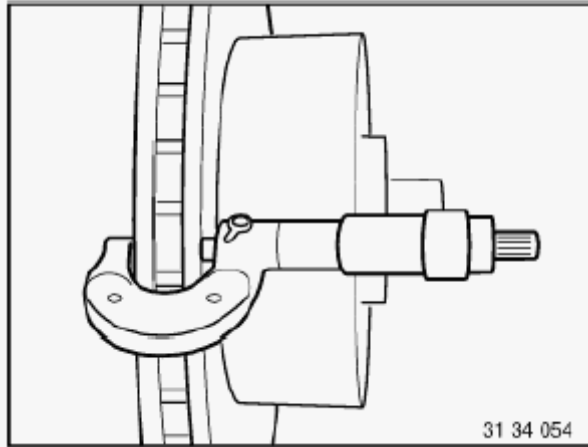
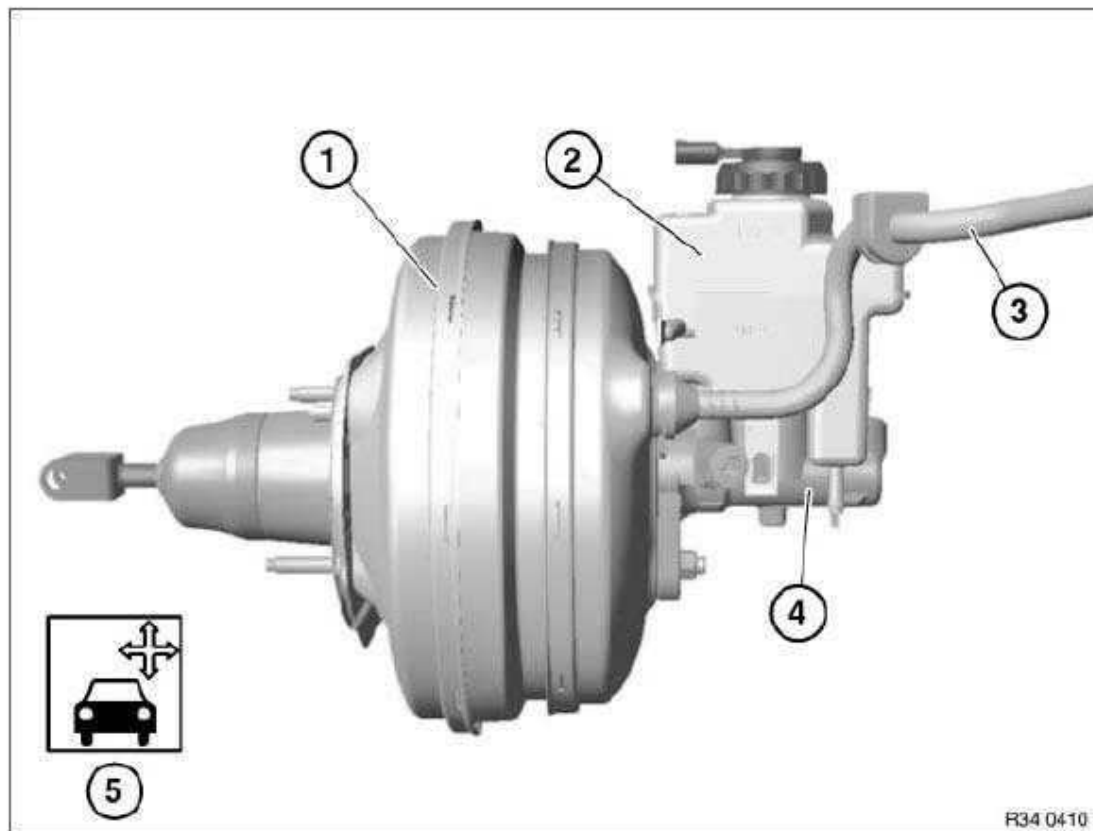


Fig. 93: Measuring Thickness Brake Discs
Courtesy of BMW OF NORTH AMERICA, INC.

MASTER BRAKE CYLINDER

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



- 1 [Brake booster](#)
- 3 [Vacuum hose](#)
- 5 [Bleed braking system](#)

- 2 [Expansion tank](#)
- 4 [Brake master cylinder](#)

Fig. 94: Overview Of Brake Master Cylinder/Brake Booster
 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**.
- 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.

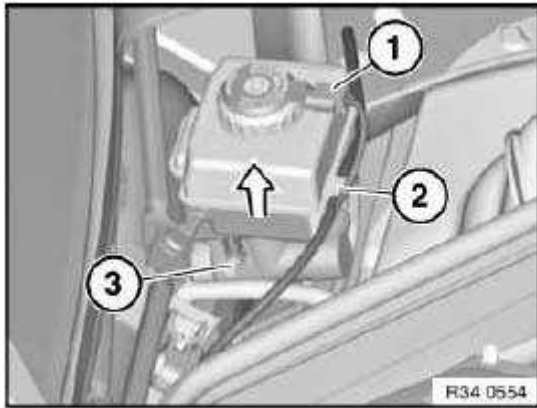


Fig. 95: Removing Wiring Harness From Holder
Courtesy of BMW OF NORTH AMERICA, INC.

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

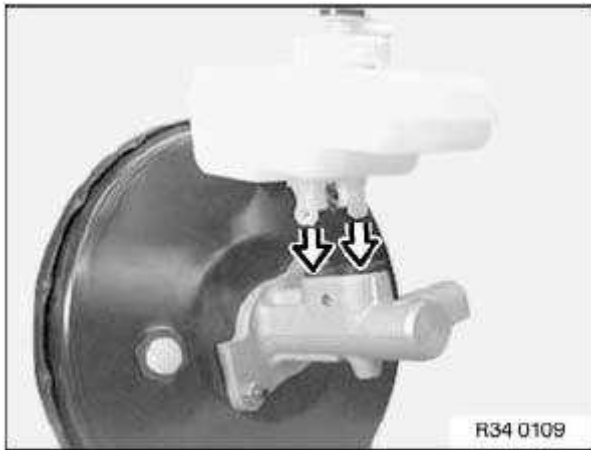


Fig. 96: Pushing Expansion Tank Vertically Onto Master Brake Cylinder
Courtesy of BMW OF NORTH AMERICA, INC.

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

Special tools required:

- 32 1 270

See **BRAKES - SPECIAL TOOLS** .

Necessary preliminary tasks:

- Remove **expansion tank**.
- Read and comply with **GENERAL INFORMATION**.

After completing tasks, **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** . See **34 32 BRAKE LINES** .

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

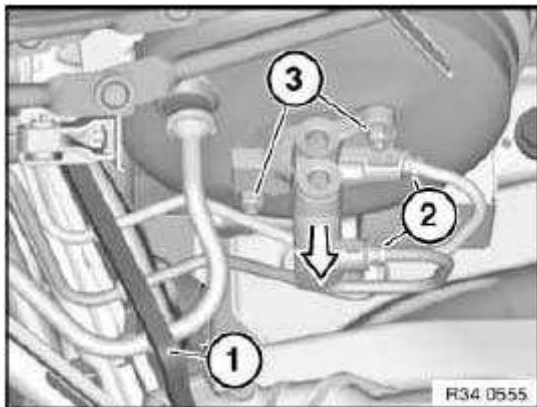


Fig. 97: Removing Both Brake Lines From Guides
Courtesy of BMW OF NORTH AMERICA, INC.

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

Installation:

Replace self-locking nuts.

Tightening torque **34 31 1AZ** . See **34 31 BRAKE MASTER CYLINDER** .

Installation:

Replace sealing ring.

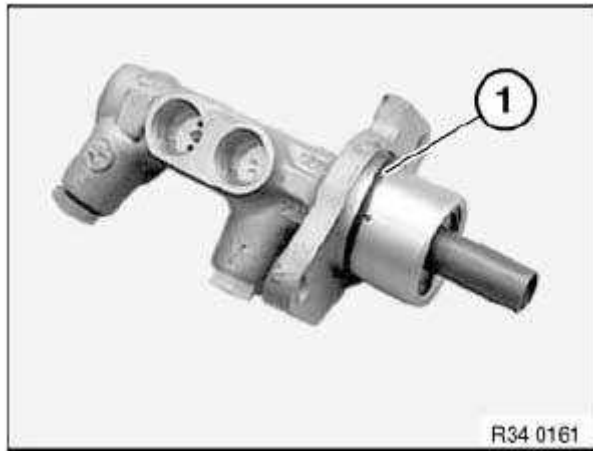


Fig. 98: Identifying Sealing Ring
 Courtesy of BMW OF NORTH AMERICA, INC.

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.

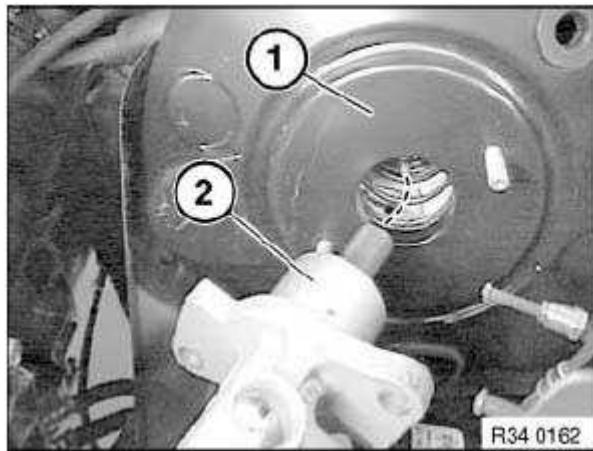
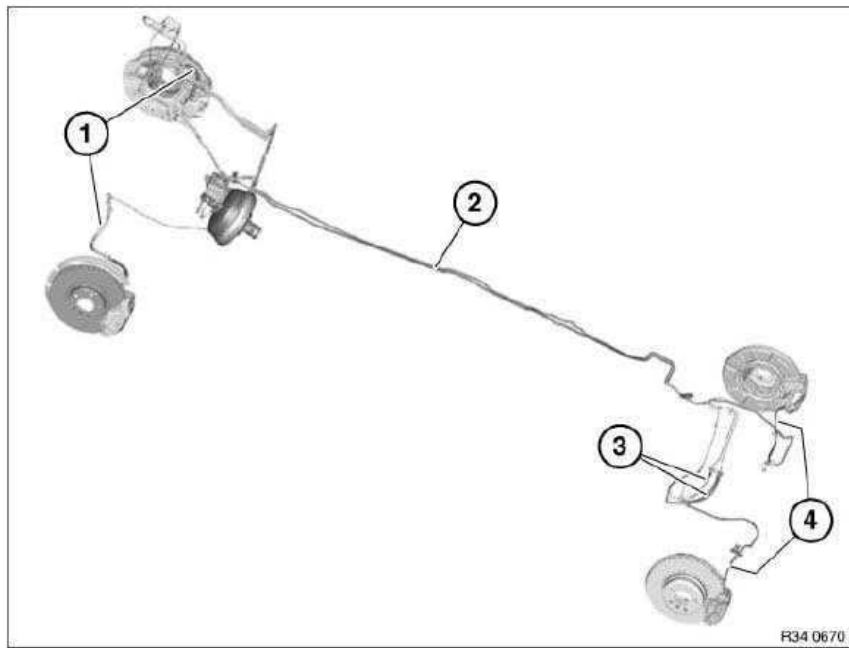


Fig. 99: Inserting Brake Master Cylinder Into Brake Booster
 Courtesy of BMW OF NORTH AMERICA, INC.

BRAKE LINES

34 32 ... OVERVIEW OF BRAKE LINES



- 1 [Brake hose, front](#)
3 [Brake hose, rear, to body](#)

- 2 [Brake tubes](#)
4 [Brake hose, rear, to wheel brake cylinder](#)

Fig. 100: Overview Of Brake Lines

Courtesy of BMW OF NORTH AMERICA, INC.

34 32 861 REPLACING ALL BRAKE PIPES

Special tools required:

- 34 5 100

See **BRAKES - SPECIAL TOOLS** .

NOTE: The brake lines are only supplied in the straight version and correct length with connecting nipple.
Read and comply with **GENERAL INFORMATION**.
After completing work, bleed brake system . See **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.

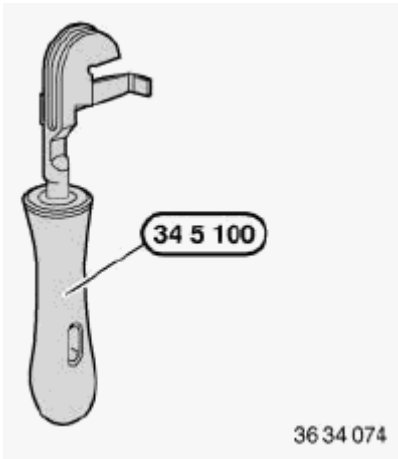


Fig. 101: Identifying Special Tool (34 5 100)
 Courtesy of BMW OF NORTH AMERICA, INC.

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**
- Read and comply with **GENERAL INFORMATION**.

After completing work: **Bleed braking system** . See **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.

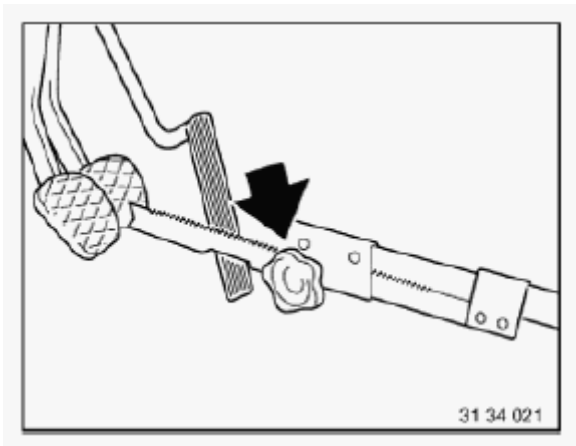


Fig. 102: Pressing Clutch Pedal Down To Floor
 Courtesy of BMW OF NORTH AMERICA, INC.

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.

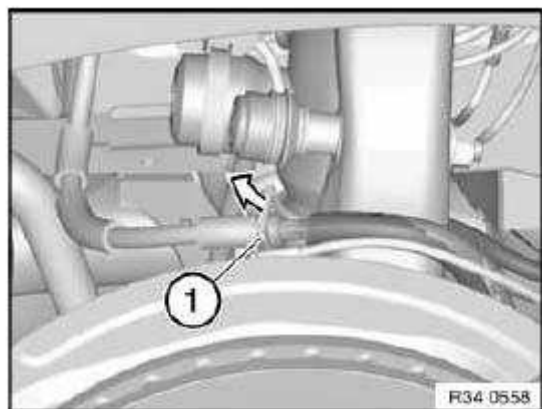


Fig. 103: Detaching Retainer From Bracket On Spring Strut
 Courtesy of BMW OF NORTH AMERICA, INC.

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** .

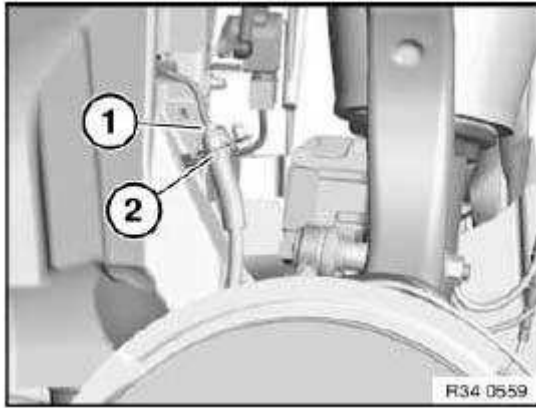


Fig. 104: Identifying Brake Line

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** .

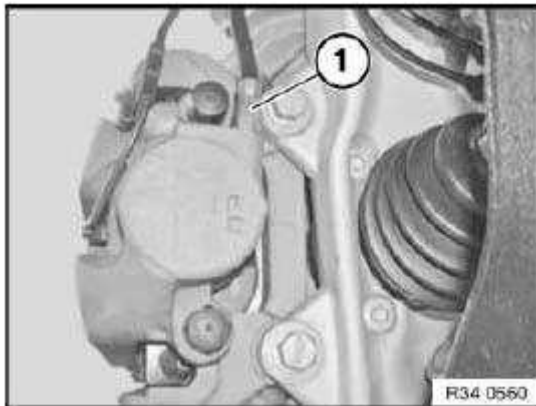


Fig. 105: Identifying Brake Caliper

Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: First tighten brake hose on brake calliper.
 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 **BRAKES - SPECIAL TOOLS** .

Necessary preliminary tasks:

- Remove **rear differential** . See **33 10 010 REMOVING AND INSTALLING/REPLACING REAR DIFFERENTIAL (DYNAMIC PERFORMANCE CONTROL)** .

NOTE: Read and comply with **GENERAL INFORMATION**.
After completing work: Bleed brake system . See **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.

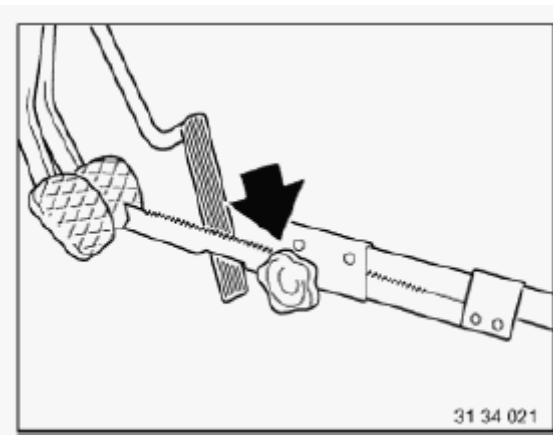


Fig. 106: Pressing Clutch Pedal Down To Floor
Courtesy of BMW OF NORTH AMERICA, INC.

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 **34 32 BRAKE LINES** .

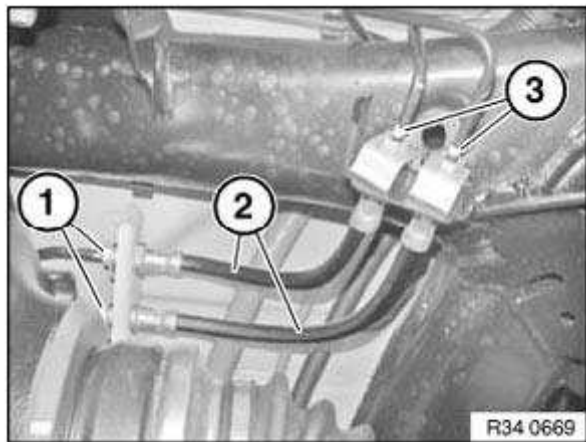


Fig. 107: Identifying Brake Hose And Brake Line
Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

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

Tighten brake line using torque wrench (1) and special tool **34 3 170** .

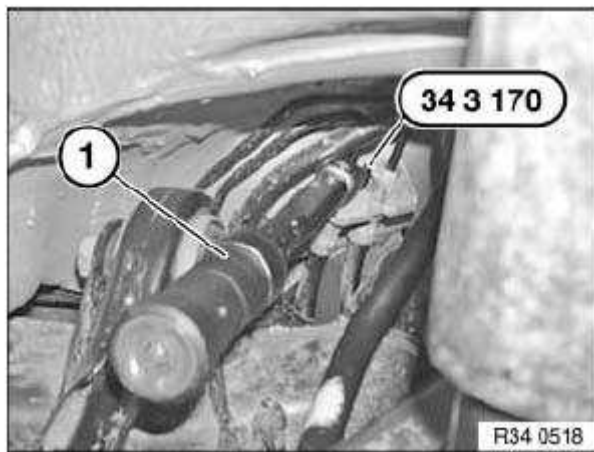


Fig. 108: Tightening Brake Line
Courtesy of BMW OF NORTH AMERICA, INC.

34 32 980 REPLACING REAR LEFT OR RIGHT BRAKE HOSES

NOTE: Read and comply with GENERAL INFORMATION.
After completing work: Bleed braking system . See 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.

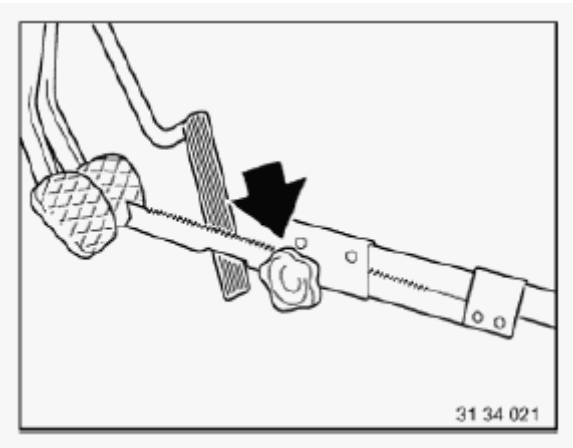


Fig. 109: Pressing Clutch Pedal Down To Floor
Courtesy of BMW OF NORTH AMERICA, INC.

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 .

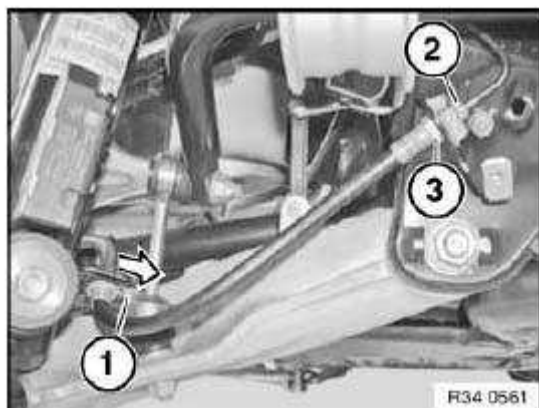


Fig. 110: Detaching Retaining Clip

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** .

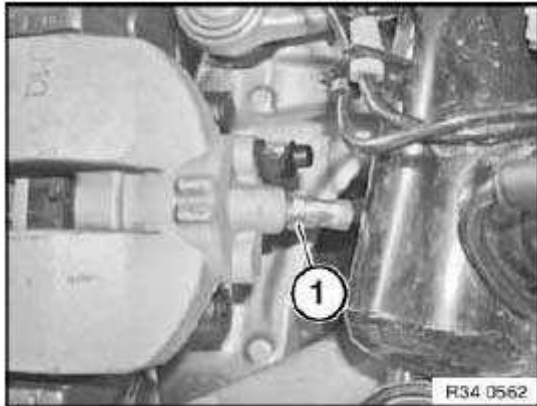


Fig. 111: Identifying Brake Hose

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 calliper.
Insert brake hose in bracket and screw onto brake pipe.

BRAKE BOOSTER

34 33 071 REPLACING VACUUM HOSE FOR BRAKE BOOSTER (N54)

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**.
- Remove left partition wall for equipment compartment . See **51 71 ... REMOVING AND INSTALLING/REPLACING ASSEMBLY COMPARTMENT PARTITION WALL** .

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.

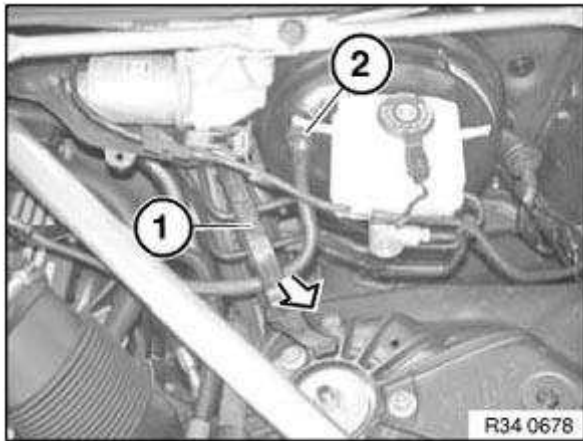


Fig. 112: Removing Non-Return Valve From Brake Booster
Courtesy of BMW OF NORTH AMERICA, INC.

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

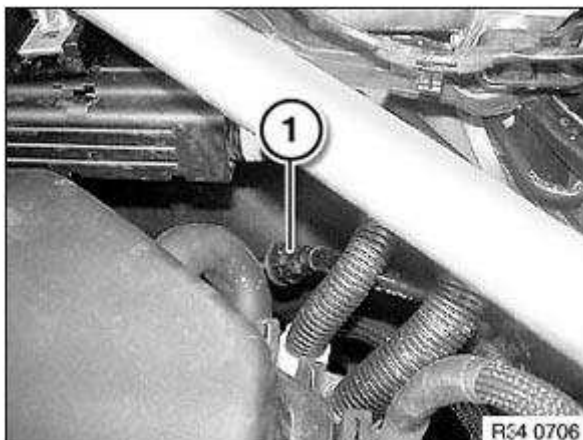


Fig. 113: Unlocking Quick-Connect Coupling
Courtesy of BMW OF NORTH AMERICA, INC.

34 33 071 REPLACING VACUUM HOSE FOR BRAKE BOOSTER (N63)

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.**
- **Remove left partition wall for equipment compartment . See 51 71 ... REMOVING AND INSTALLING/REPLACING ASSEMBLY COMPARTMENT PARTITION WALL .**

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.

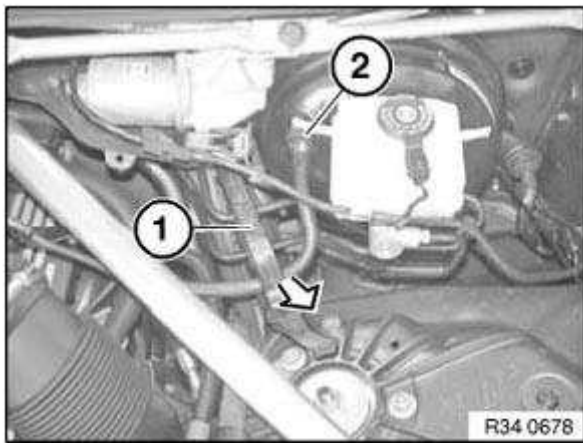


Fig. 114: Removing Non-Return Valve From Brake Booster
Courtesy of BMW OF NORTH AMERICA, INC.

Unclip vacuum line (1) from line holder (2). Unlock quick-connect coupling (3) and detach vacuum line.

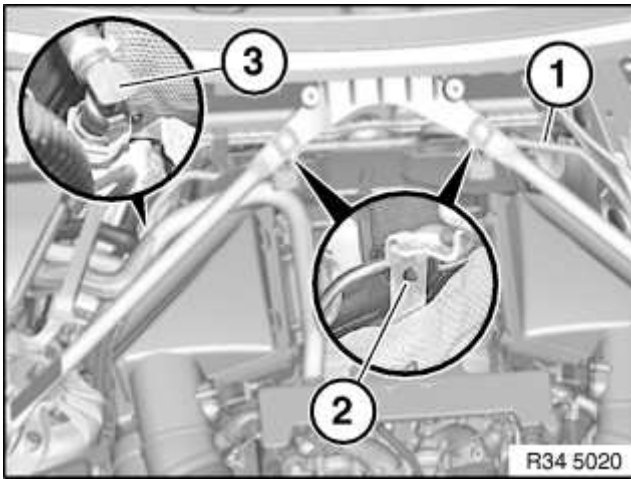


Fig. 115: Unclip Vacuum Line (1) From Line Holder (2)
 Courtesy of BMW OF NORTH AMERICA, INC.

34 33 505 REMOVING AND INSTALLING OR REPLACING BRAKE BOOSTER

Necessary preliminary tasks:

- Read and comply with **GENERAL INFORMATION**.
- Remove **brake master cylinder** .
- 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 **35 11 000 REMOVING AND INSTALLING (REPLACING) COMPLETE BEARING BLOCK FOR FOOT PEDAL** .

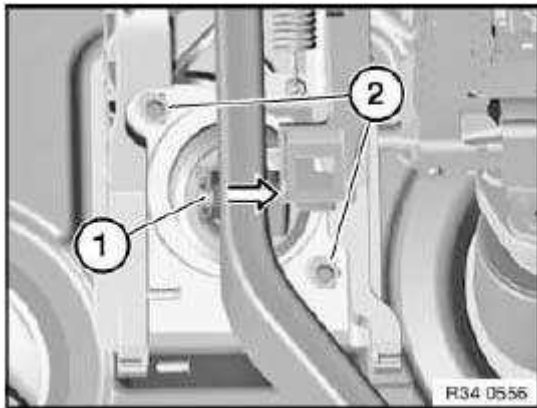


Fig. 116: Detaching Locking Clip From Brake Pedal
Courtesy of BMW OF NORTH AMERICA, INC.

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.

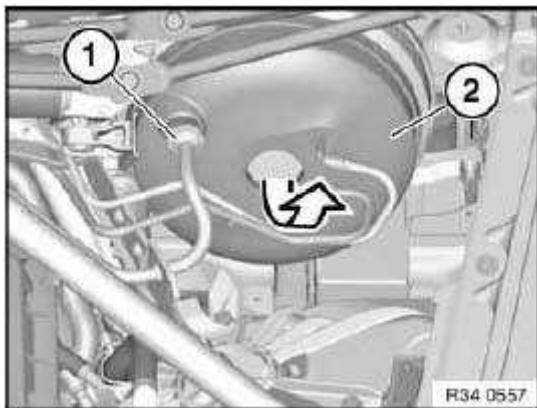


Fig. 117: Removing Non-Return Valve From Brake Booster
Courtesy of BMW OF NORTH AMERICA, INC.

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

Necessary preliminary tasks:

- Remove wheel

Disengage cable guides (2).

Open cover (1) on plug housing.

Disconnect plug connection.

Disengage cable from cable guide (3).

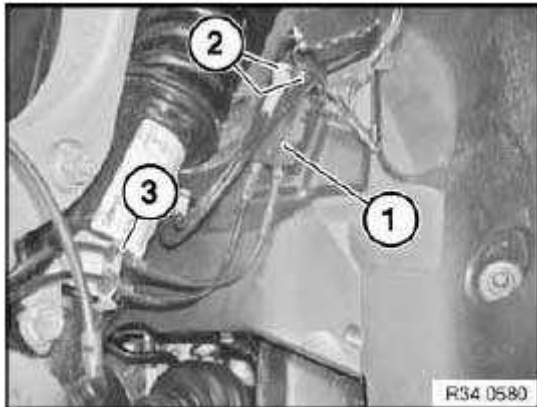


Fig. 118: Identifying Cable Guides With Cover
Courtesy of BMW OF NORTH AMERICA, INC.

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).

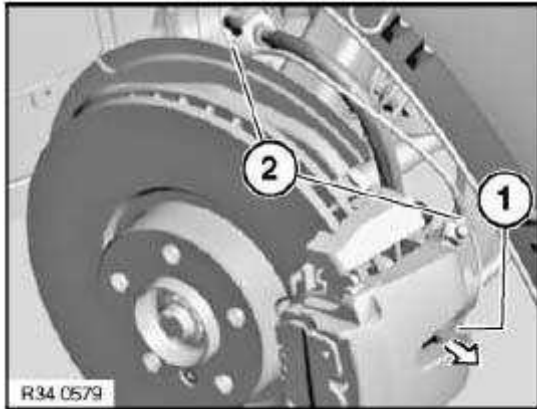


Fig. 119: Identifying Brake Pad Sensor
Courtesy of BMW OF NORTH AMERICA, INC.

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

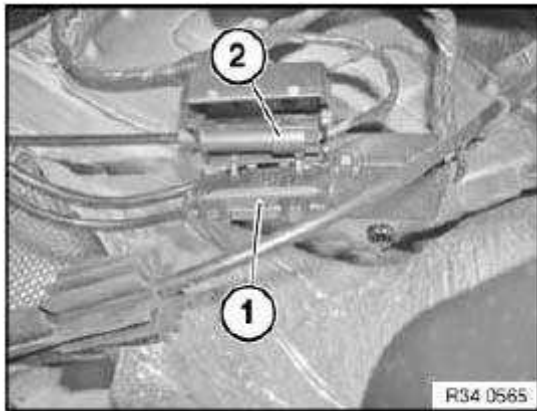


Fig. 120: Identifying Housing Cover And Plug Connection
 Courtesy of BMW OF NORTH AMERICA, INC.

Disengage cable (1) along marked lines from holders.

Installation:

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

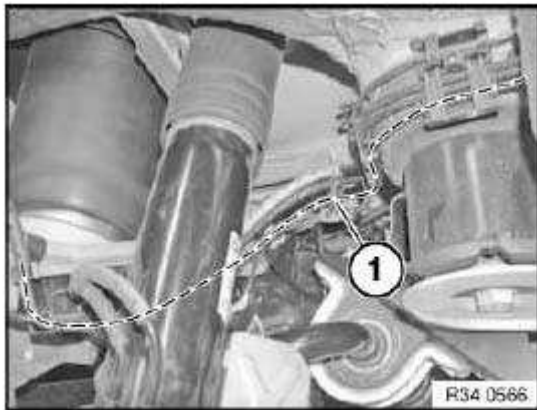


Fig. 121: Identifying Cable
 Courtesy of BMW OF NORTH AMERICA, INC.

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).

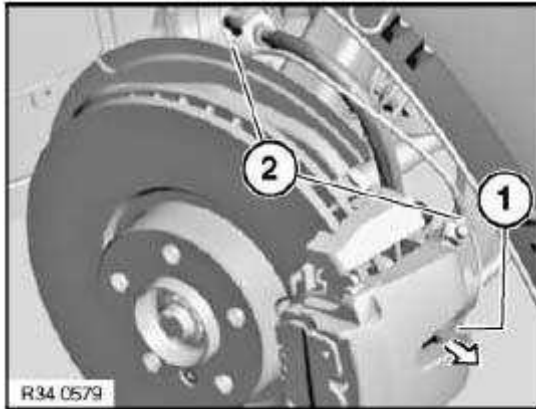


Fig. 122: Identifying Brake Pad Sensor
 Courtesy of BMW OF NORTH AMERICA, INC.

PARKING BRAKE

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.

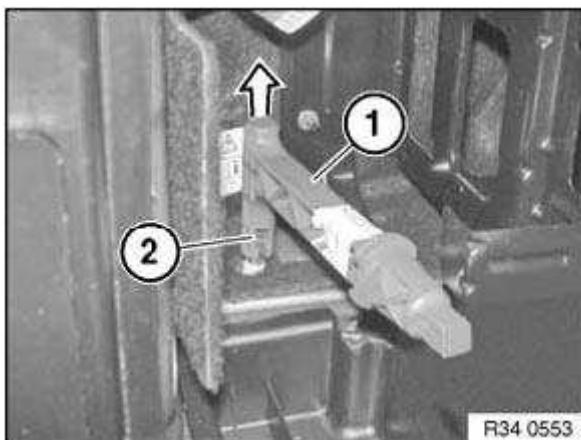
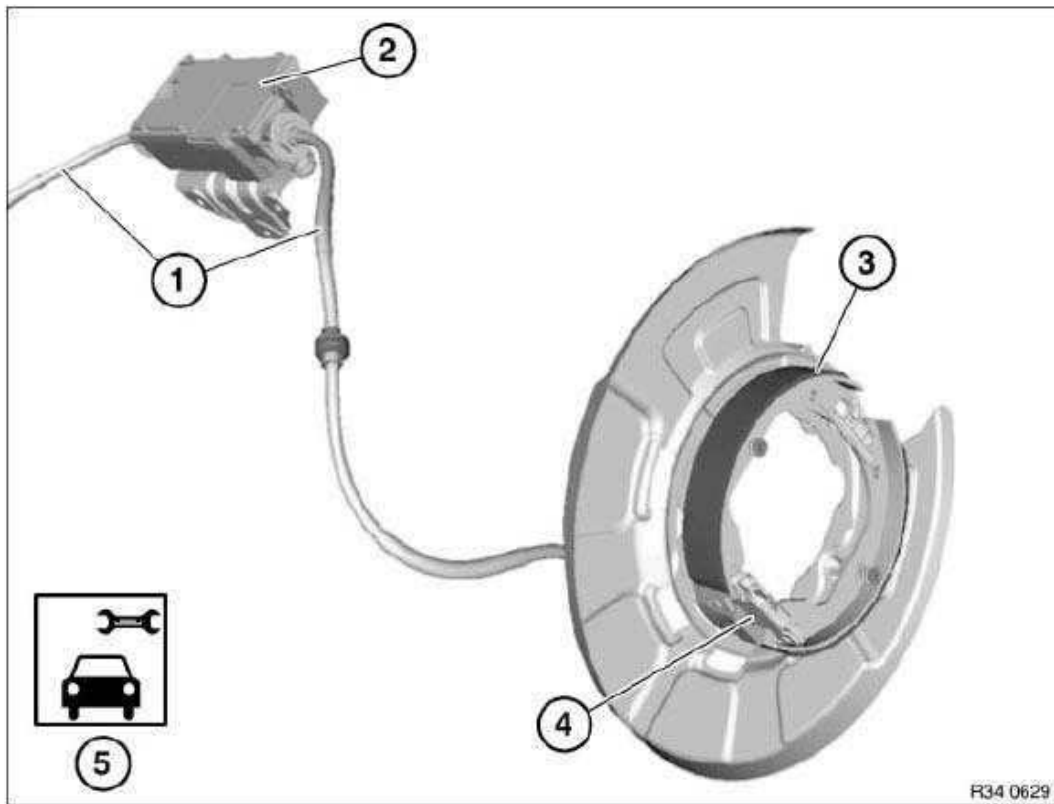


Fig. 123: Pulling Release Tool
 Courtesy of BMW OF NORTH AMERICA, INC.

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 [Actuating unit with control unit](#)

3 [Handbrake shoes](#)

4 [Expander lock](#)

5 [Adjust handbrake](#)

Fig. 124: Overview Of Parking Brake

Courtesy of BMW OF NORTH AMERICA, INC.

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.

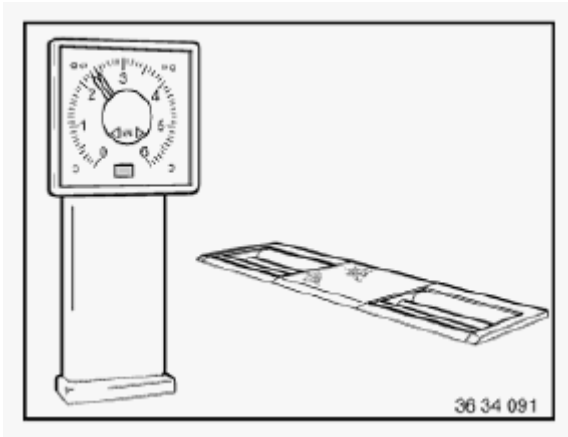


Fig. 125: Identifying Dynamometer

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 center 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. 126: 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.

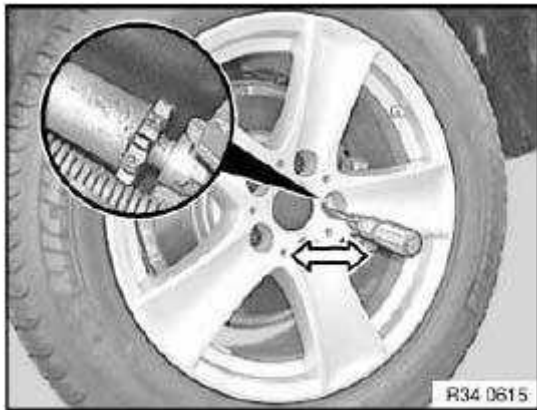


Fig. 127: Turning Adjusting Screw With Screwdriver

Courtesy of BMW OF NORTH AMERICA, INC.

2. Braking in duo-servo parking brake

1. On roller dynamometer:

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

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

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

4. Braking-in procedure takes 3 minutes.

5. Braking-in procedure can be terminated by pressing the parking brake button.
6. Now clear the fault memory.
2. **When road driving** (if possible on company property or an unused road):
 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. Pull parking brake button once.

Increase driving speed to 15 km/h, braking-in distance is 400 metres.
 3. Parking brake is applied with reduced force.
(Parking brake indicator lamp in instrument cluster flashes at high frequency)
 4. Braking-in procedure can be terminated by pressing the parking brake button.
 5. Now clear the fault memory.

34 41 135 REPLACING BOTH BOWDEN CABLES FOR PARKING BRAKE

**IMPORTANT: Read and comply with GENERAL INFORMATION.
Bowden cables may only be replaced in pairs.**

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

Necessary preliminary tasks:

- Remove **actuating unit with control unit for parking brake**

Bowden cable, left

Release union nut (1).

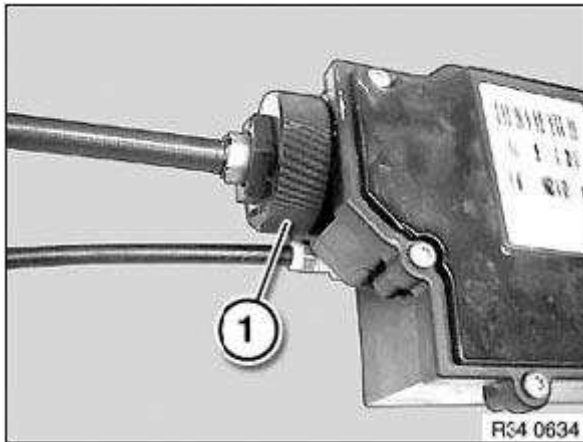


Fig. 128: Identifying Union Nut
 Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Tightening torque **34 41 5AZ** . See **34 41 PARKING BRAKE** .

Pull Bowden cable (1) out of actuating unit (2).

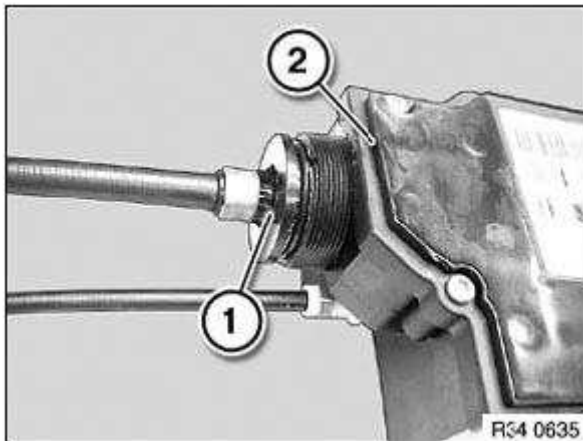


Fig. 129: Identifying Bowden Cable And Actuating Unit
 Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Make sure all parts are absolutely clean.

Turn spindle (1) out of actuating unit (2) and remove Bowden cable.

Installation:

Lubricate new spindle with grease provided.

Insert spindle (1) 3 turns into inner spline shaft of actuating unit (2).

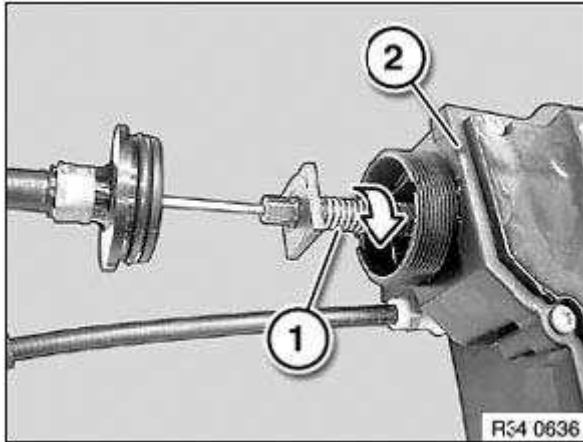


Fig. 130: Removing Bowden Cable

Courtesy of BMW OF NORTH AMERICA, INC.

Bowden cable, right

Release union nut (1).

Installation:

Tightening torque **34 41 5AZ** . See **34 41 PARKING BRAKE** .

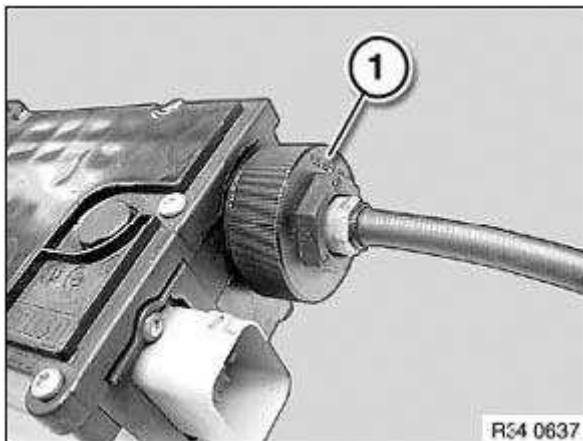


Fig. 131: Identifying Union Nut

Courtesy of BMW OF NORTH AMERICA, INC.

Pull Bowden cable (1) out of actuating unit (2).

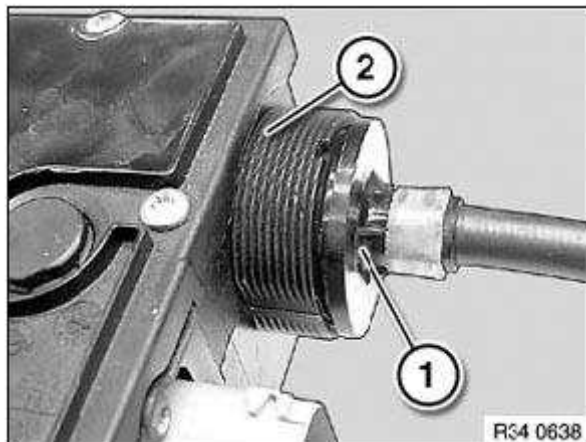


Fig. 132: Identifying Bowden Cable And Actuating Unit
 Courtesy of BMW OF NORTH AMERICA, INC.

Unlock locking sleeve (1) and pull out of housing a little.

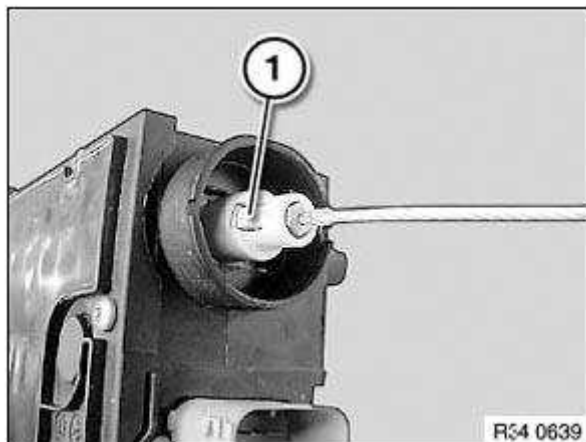


Fig. 133: Unlocking Locking Sleeve
 Courtesy of BMW OF NORTH AMERICA, INC.

Snap out coupling (1) in direction of arrow.

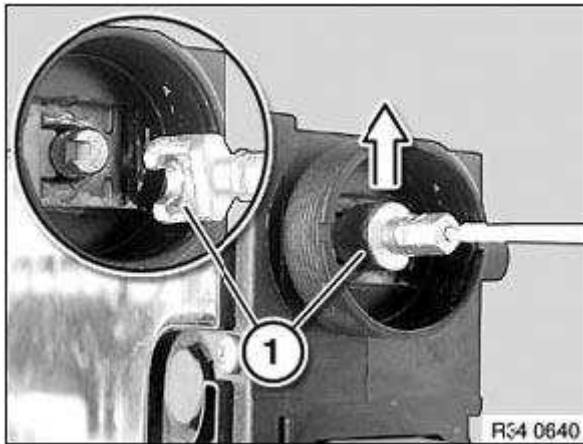


Fig. 134: Removing Coupling
Courtesy of BMW OF NORTH AMERICA, INC.

After installation:

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

34 41 220 REMOVING AND INSTALLING/REPLACING ALL HANDBRAKE SHOES

Special tools required:

- **34 4 000**

See **BRAKES - SPECIAL TOOLS** .

Installation:

- Remove rear **brake disc**
- Release electromechanical parking brake (EMF)

After completing tasks, adjust **parking brake** .

Disconnect return springs (1) with brake spring pliers.

Installation:

Return springs (1) must not be overelongated.

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 Operating Fluids. See **BRAKES - OPERATING FLUIDS** .

NOTE: Illustration does not show wheel hub.

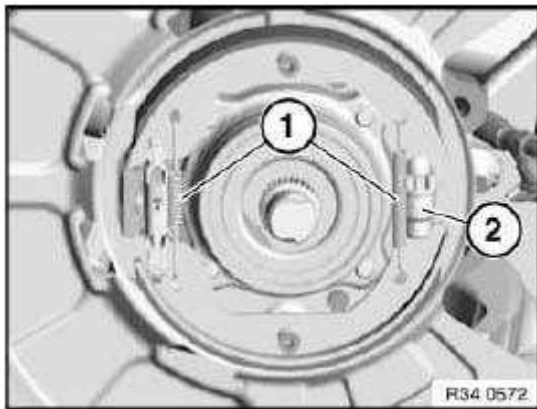


Fig. 135: Identifying Return Springs And Adjustment Screw
Courtesy of BMW OF NORTH AMERICA, INC.

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

Remove brake shoes (2).

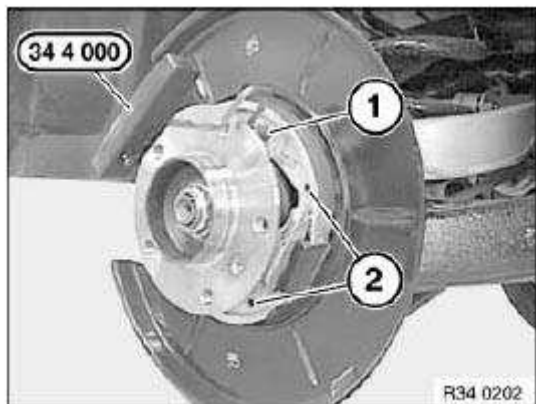


Fig. 136: Identifying Clamping Pins And Brake Shoes

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

After completing tasks, adjust handbrake .

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

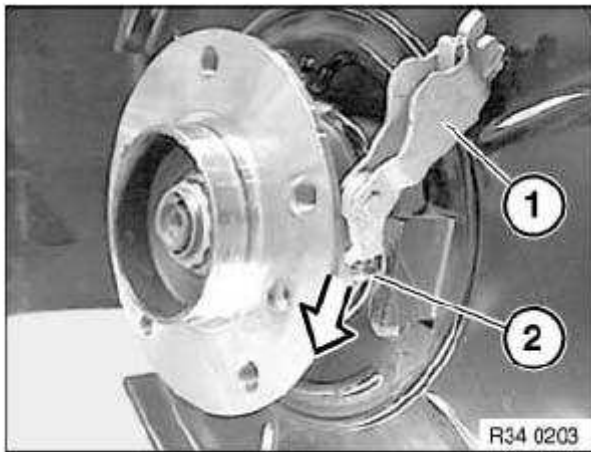


Fig. 137: Disconnecting Handbrake Bowden Cable

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

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).

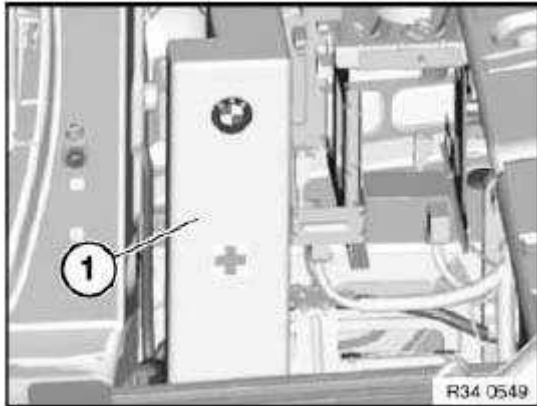


Fig. 138: Identifying First Aid Kit

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.

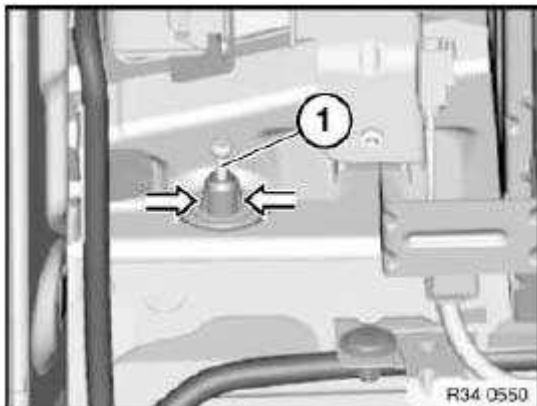


Fig. 139: Identifying Emergency Cable

Courtesy of BMW OF NORTH AMERICA, INC.

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

Release **stabilizer** at bearing points and swing downwards.

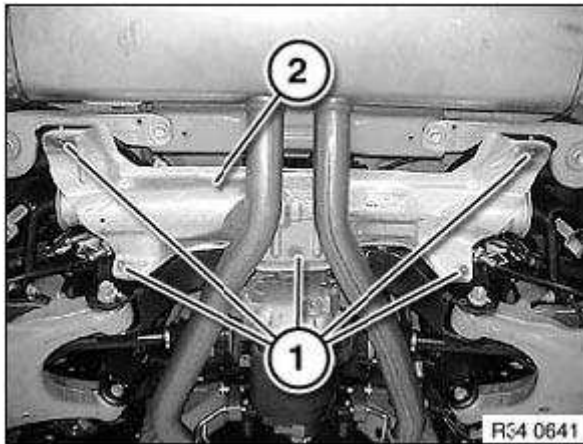


Fig. 140: Identifying Heat Shield Screws
 Courtesy of BMW OF NORTH AMERICA, INC.

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

Installation:

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

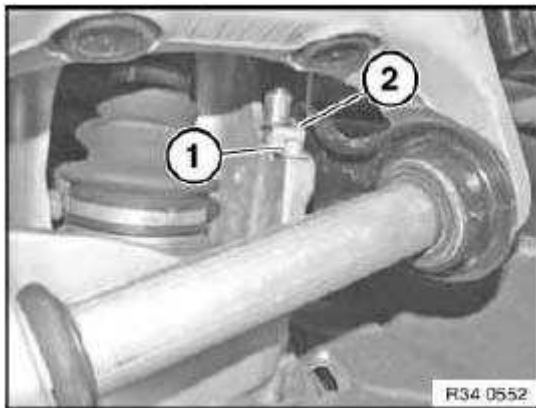


Fig. 141: Identifying Spring Clip
 Courtesy of BMW OF NORTH AMERICA, INC.

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.

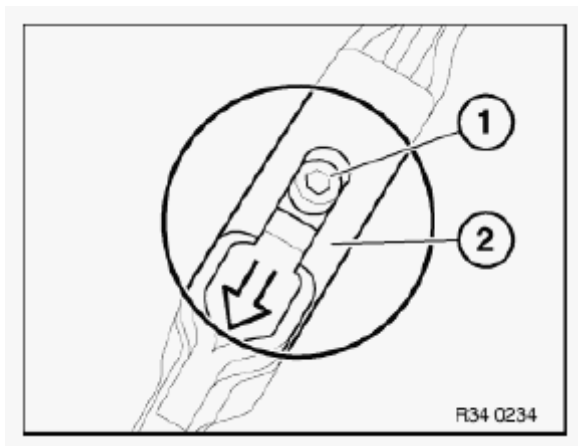


Fig. 142: Pushing Core Of Parking Brake Cable
Courtesy of BMW OF NORTH AMERICA, INC.

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.

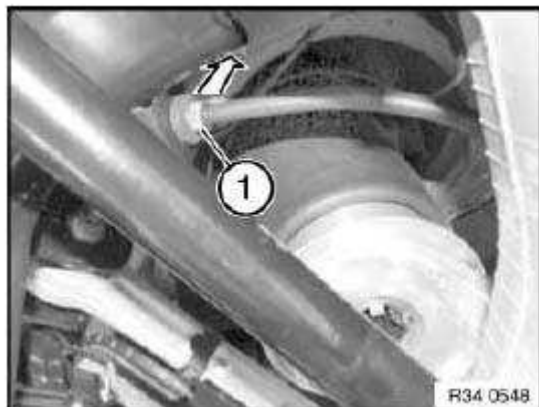


Fig. 143: Disengaging Parking Brake Bowden Cable
Courtesy of BMW OF NORTH AMERICA, INC.

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.

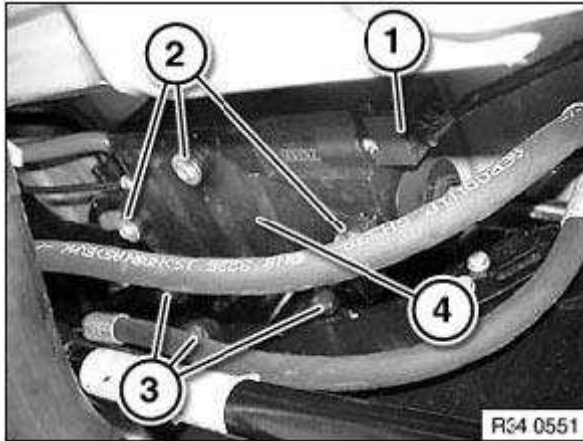


Fig. 144: Identifying Plug Connection, Holder With Screws
Courtesy of BMW OF NORTH AMERICA, INC.

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.

MECHANICAL HYDRAULIC COMPONENTS

34 51 527 REMOVING AND INSTALLING OR REPLACING DSC HYDRAULIC UNIT

Necessary preliminary tasks:

- Read and comply with 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:

- Bleed braking system . See brake system with DSC.

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.

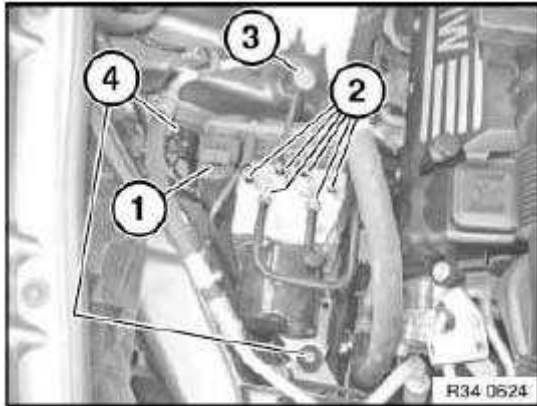


Fig. 145: Identifying Plug Connection And Brake Lines With Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

When replacing hydraulic unit

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

Installation:

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

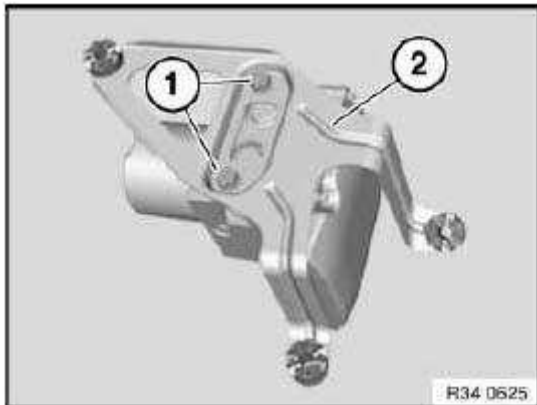


Fig. 146: Identifying Convert Holder With Screws
Courtesy of BMW OF NORTH AMERICA, INC.

When replacing hydraulic unit

- Carry out **programming/coding** using BMW scan tool.
- **Adjustment of steering angle sensor** . See **61 31 996 CARRYING OUT STEERING ANGLE SENSOR ADJUSTMENT** .
- Mix-up check of brake lines

- Function check, hydraulic unit

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

Necessary preliminary tasks:

- Remove **wheel**

Disengage cable guides (2).

Open cover (1) on plug housing.

Disconnect plug connection.

Disengage cable from cable guide (3).

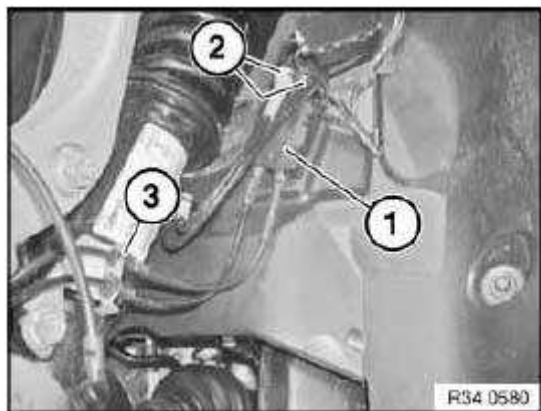


Fig. 147: Identifying Cable Guides With Cover
Courtesy of BMW OF NORTH AMERICA, INC.

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).

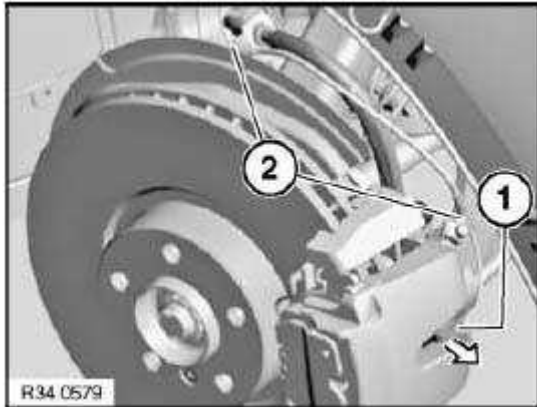


Fig. 148: Identifying Brake Pad Sensor
Courtesy of BMW OF NORTH AMERICA, INC.

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

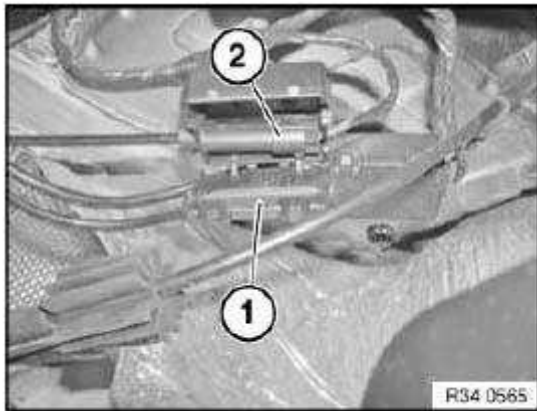


Fig. 149: Identifying Housing Cover And Plug Connection
 Courtesy of BMW OF NORTH AMERICA, INC.

Disengage cable (1) along marked lines from holders.

Installation:

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

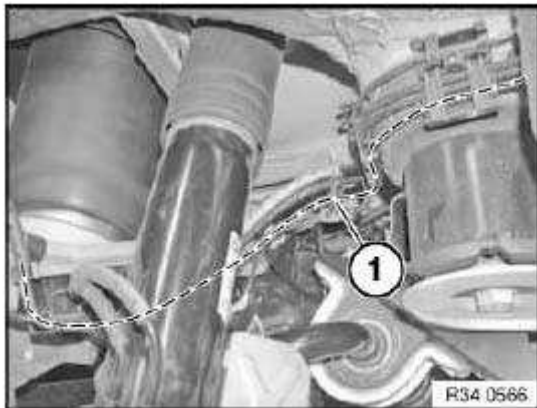


Fig. 150: Identifying Cable
 Courtesy of BMW OF NORTH AMERICA, INC.

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).

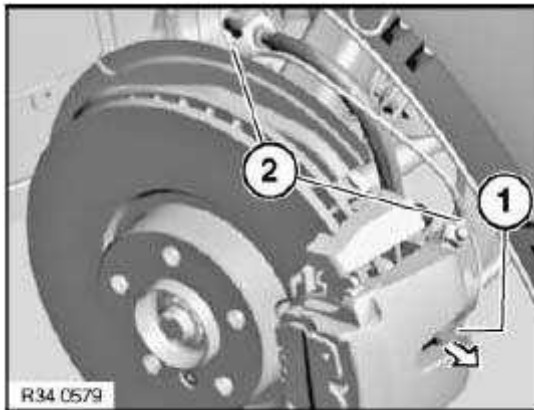
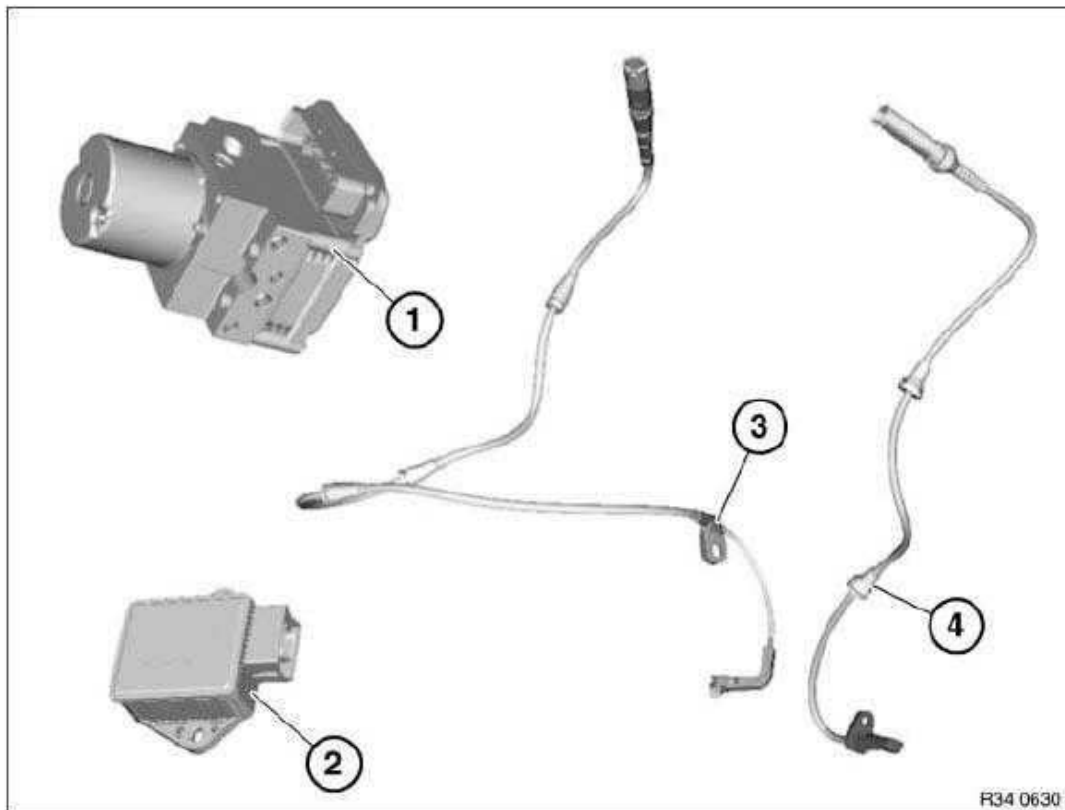


Fig. 151: Identifying Brake Pad Sensor
 Courtesy of BMW OF NORTH AMERICA, INC.

34 52 ... OVERVIEW OF ELECTRONIC COMPONENTS



1 [DSC control unit](#)

3 [Brake-pad wear sensor](#)

2 [Yaw sensor / ICM control unit](#)

4 [Pulse generator](#)

Fig. 152: Overview Of Electronic Components
 Courtesy of BMW OF NORTH AMERICA, INC.

34 52 121 REMOVING AND INSTALLING/REPLACING ICM 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 **center console**. See 51 16 165 REMOVING AND INSTALLING/REPLACING COMPLETE CENTRE CONSOLE .

Disconnect plug connection (1).

Unclip wiring harness (2) from control unit.

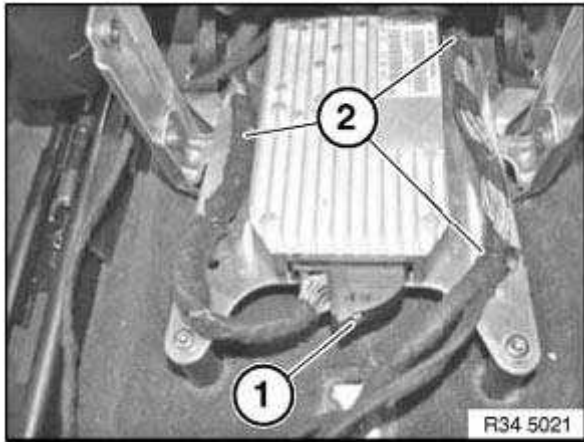


Fig. 153: Identifying Plug Connection And Wiring Harness
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Installation:

Replace screws.

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

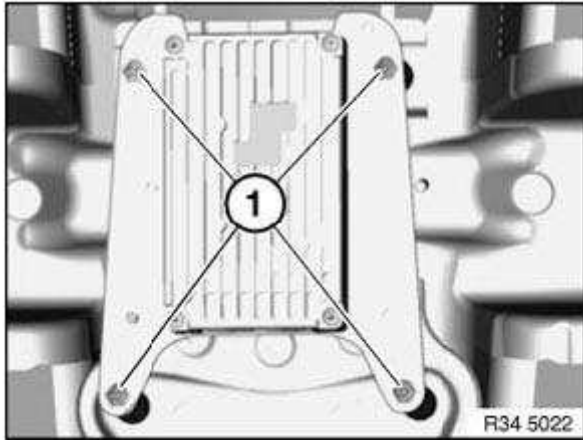


Fig. 154: Identifying Control Unit Screws
 Courtesy of BMW OF NORTH AMERICA, INC.

Replacement

After completing work:

- Active front steering only: carry out adjustment/initial operation of active front steering

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 control unit

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

Installation:

Tightening torque **34 51 4AZ** . See 34 51 SLIP CONTROL SYSTEM (DSC) .

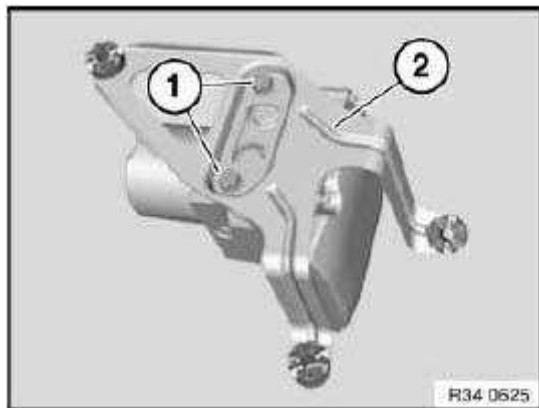


Fig. 155: Identifying Convert Holder With Screws
 Courtesy of BMW OF NORTH AMERICA, INC.

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

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

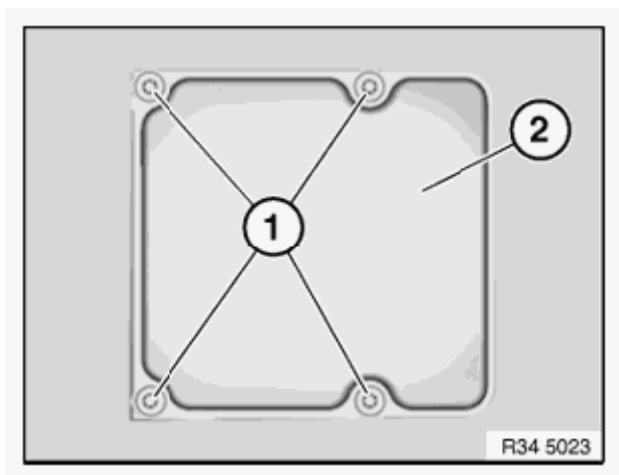


Fig. 156: Identifying Control Unit Screws
 Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Cleaning with compressed air, chemical solvents and sharp-edged objects is not permitted.
 Do not touch pressure sensor contacts (2) with your fingers or clean the contacts.

If necessary, clean sealing surface (1) with a plastic scraper or a fluff-free cloth.

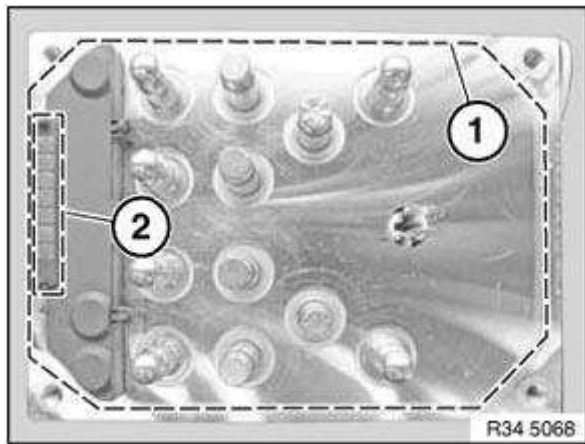


Fig. 157: Cleaning Sealing Surface With Plastic Scraper
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Do not touch valve coils (1) and pressure sensor contact springs (2) with your fingers, do not clean or readjust these components either.

Check gasket (3) for damage. If damaged, replace DSC control unit (4).

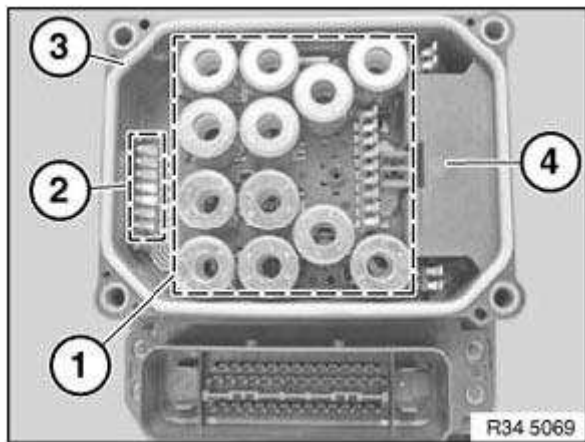


Fig. 158: Identifying Valve Coils And Gasket With Control Unit
Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Make sure screws are inserted evenly and DSC control unit rests on hydraulic control unit.

Replace screws.

Observe tightening sequence (1-4).

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

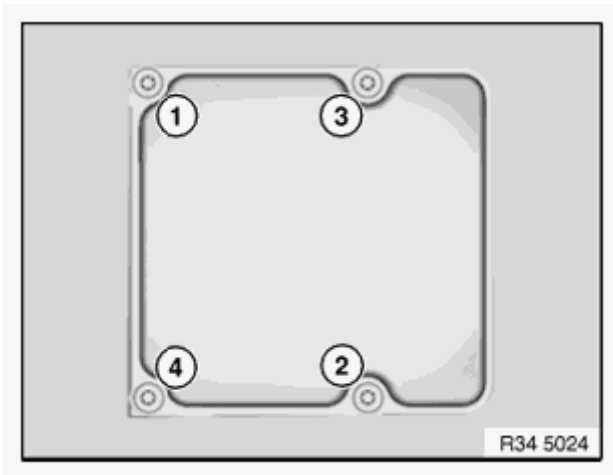


Fig. 159: Identifying DSC Control Unit Screws Tightening Sequence
 Courtesy of BMW OF NORTH AMERICA, INC.

Replacement:

- Carry out **programming/coding** using BMW scan tool.
- **Steering angle sensor adjustment** . See **61 31 996 CARRYING OUT STEERING ANGLE SENSOR ADJUSTMENT** .
- Mix-up check of brake lines
- Function check of hydraulic control unit

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**.

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.

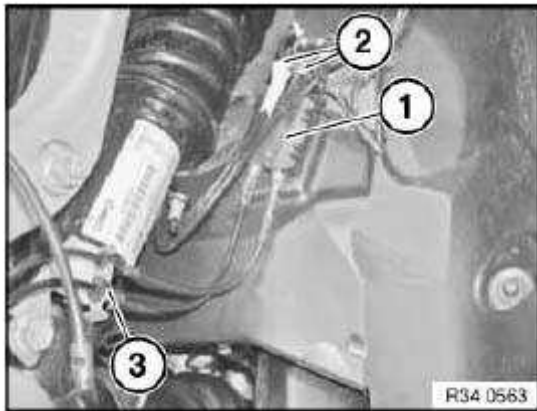


Fig. 160: Identifying Cable Guides And Connector Housing
 Courtesy of BMW OF NORTH AMERICA, INC.

Disengage cable guides (1).

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

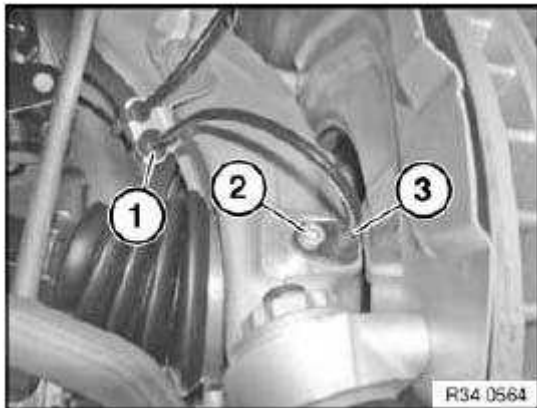


Fig. 161: Identifying Cable Guides And Pulse Generator
 Courtesy of BMW OF NORTH AMERICA, INC.

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.

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.

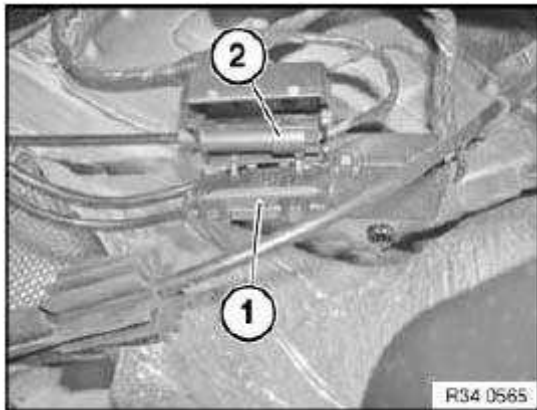


Fig. 162: Identifying Housing Cover And Plug Connection
Courtesy of BMW OF NORTH AMERICA, INC.

Disengage cable (1) along marked lines from holders.

Installation:

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

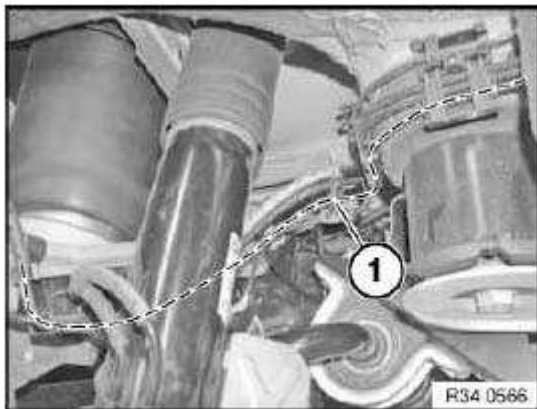


Fig. 163: Identifying Cable
Courtesy of BMW OF NORTH AMERICA, INC.

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 for pulse generator and lubricate with **Staburags NBU 12/K lubricating grease** .

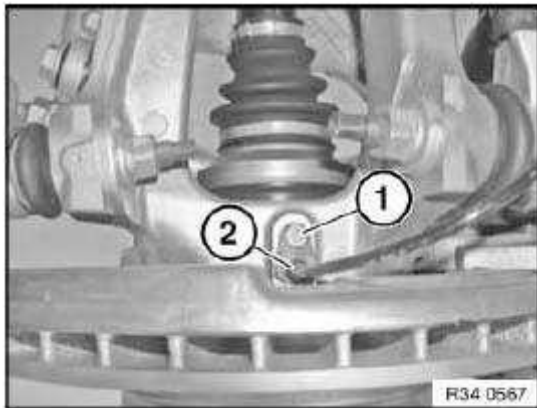


Fig. 164: Identifying Wheel Speed Sensor With Screw
Courtesy of BMW OF NORTH AMERICA, INC.

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 **SEATS - REPAIR INSTRUCTIONS** .
- 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).

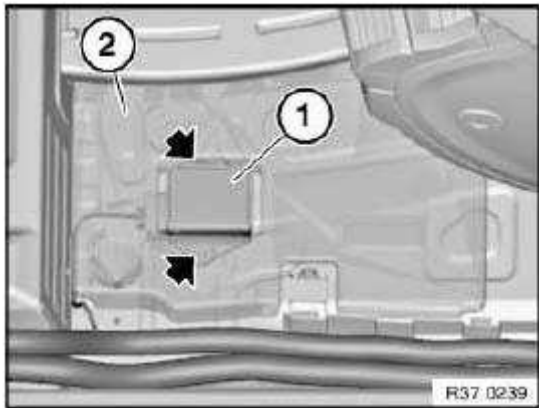


Fig. 165: Identifying Yaw Sensor And Floor Inlay
 Courtesy of BMW OF NORTH AMERICA, INC.

Carry out calibration/adjustment of DSC sensor.

TROUBLESHOOTING

34 90 ... TROUBLESHOOTING BRAKE SYSTEM

TROUBLESHOOTING CHART

Fault	Cause	Remedy
Brake squeaks	1. Fouled brake system	Remove and install, clean and grease brake calipers Clean and grease brake pads
	2. Pad wear excessive or one-sided	Replace brake pads
	3. Brake disc not flush with floating caliper	a. Clean guide screws, do not grease b. Clean contact face between wheel hub and brake disc
	4. Contact pattern of pads and brake discs	a. Visually inspect brake discs and pads b. If necessary, precision-turn brake discs c. If necessary, replace brake discs and pads
	5. Rust edges on brake discs	Precision-turn brake discs or replace
	6. Pad loose	Replace brake pads
	7. Wrong type of pads	Replace brake pads
Fault	Cause	Remedy
Rattling, humming, steering wheel	1. Fouling of contact surface	

torsional vibrations during brake operation	between brake disc and wheel hub	Clean contact surface between brake disc and wheel hub
	2. Excessive thickness deviation within braking surface	Measure brake disc thickness Precision-turn brake discs or replace
	2. Contact pattern of pads and brake discs	a. Visually inspect discs and pads b. If necessary, precision-turn brake discs c. If necessary, replace brake discs and pads
	4. Brake disc runout	Precision-turn brake discs , replace if necessary
	5. Excessive wheel bearing play	Replace wheel bearing