

HVAC

Air Conditioning & Heating Systems - Repair Instructions - X3

11 HEATER WITH OPERATION

64 11 ... INSTALLING SERVODRIVE

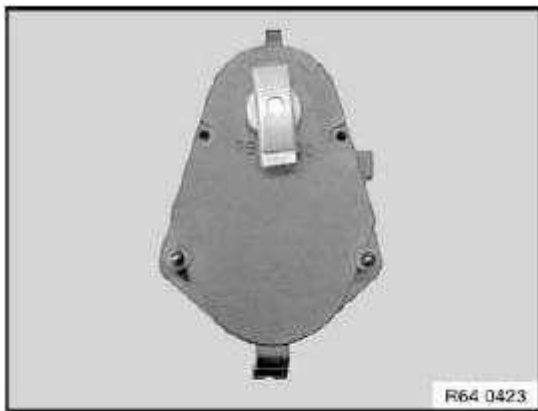


Fig. 1: Servodrive

Courtesy of BMW OF NORTH AMERICA, INC.

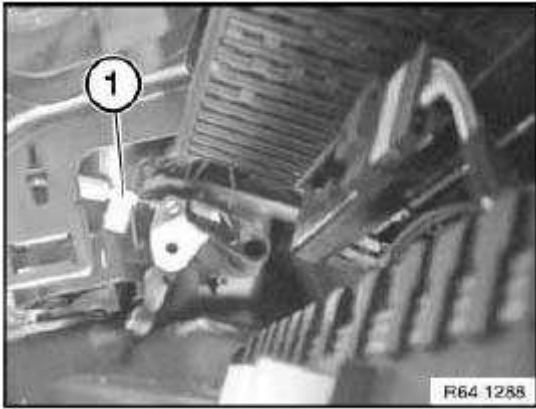
Installation:

If necessary, align shaft of flap(s) to be actuated to position of servodrive to be installed.

64 11 077 REMOVING AND INSTALLING/REPLACING BOWDEN CABLE FOR TEMPERABLE VENTILATION

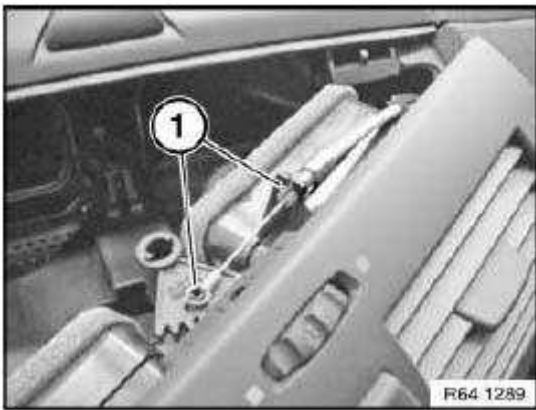
Necessary preliminary tasks:

- Remove center fresh air grille, see **64 22 162 Removing and installing/replacing center fresh-air grill.**
- Remove right glovebox with housing, see **51 16 366 REMOVING AND INSTALLING RIGHT GLOVEBOX WITH HOUSING .**

**Fig. 2: Bowden Cable**

Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect Bowden cable (1).

**Fig. 3: Bowden Cable**

Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect Bowden cable from mountings (1) and feed out.

Installation:

Make sure Bowden cable can move freely.

If necessary, perform function test prior to assembly.

64 11 213 REMOVING AND INSTALLING/REPLACING HEATER - A/C UNIT FAN

Special tools required:

- 51 3 057

Necessary preliminary tasks:

E46 and E83:

Remove heater bulkhead, see **51 71 080 REMOVING AND INSTALLING/REPLACING HEATER BULKHEAD** .

E46 M43TU only:

Remove cylinder head.

E46 M47, M47TU only:

Remove complete wiper console.

Remove air cleaner element.

E46 M52TU, M54 only:

Remove engine cover.

E46 M57 only:

Remove intake air manifold.

E46 N42 only:

Remove cylinder head.

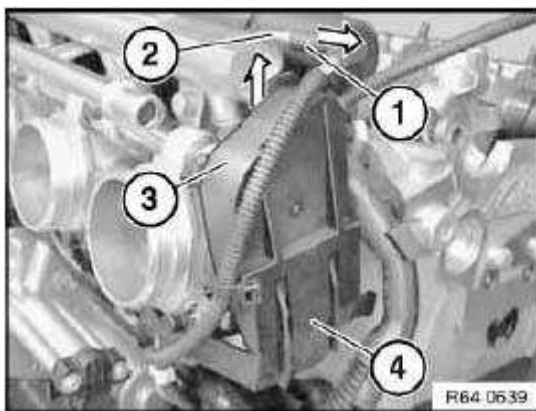


Fig. 4: Hose And Cover Strip

Courtesy of BMW OF NORTH AMERICA, INC.

Necessary preliminary tasks:

E46 S54 only:

Remove intake air manifold.

Detach hose (1) in direction of arrow from fitting (2).

Remove cover strip (3) in direction of arrow from guide (4).

Pull lock (1) in direction of arrow and feed out flap (2).

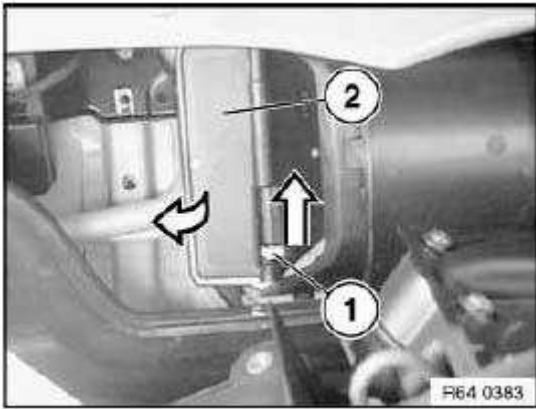


Fig. 5: Pulling Lock

Courtesy of BMW OF NORTH AMERICA, INC.

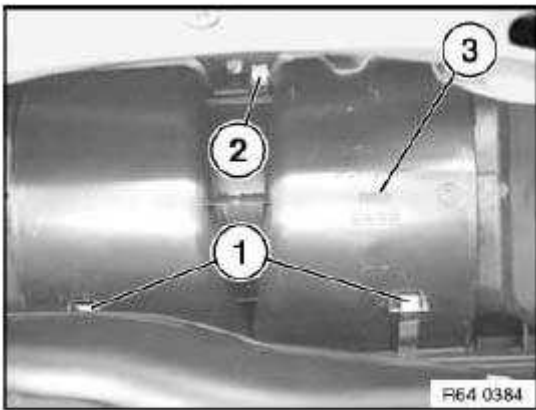


Fig. 6: Retainers And Fan Cover

Courtesy of BMW OF NORTH AMERICA, INC.

Unclip retainers (1).

Unscrew bolt (2).

Feed out fan cover (3).

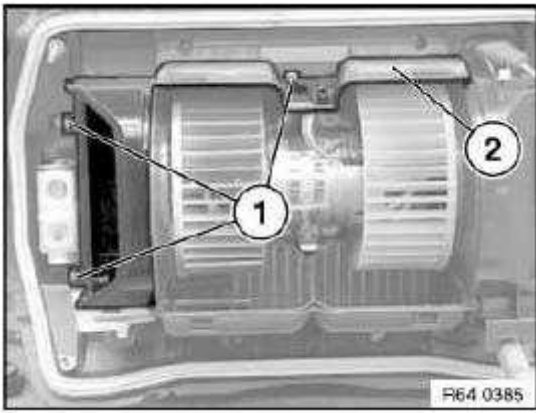


Fig. 7: Screws And Fan Cover

Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Pull out fan cover (2).

Installation:

Make sure fan cover (2) is correctly seated.

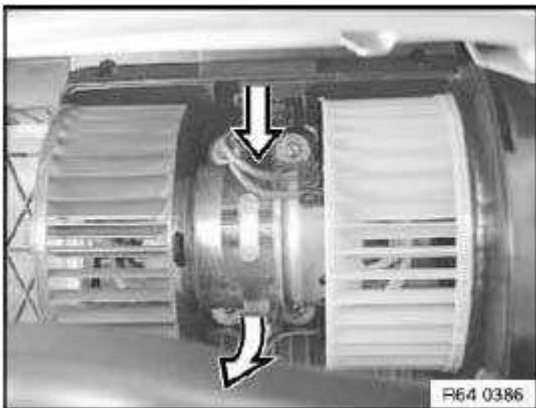


Fig. 8: Unfastening Plug Connection

Courtesy of BMW OF NORTH AMERICA, INC.

Unfasten plug connection and disconnect.

Release retainer with special tool 51 3 057.

Installation:

Bridge (1) must snap into place in opening (2) of fan motor.

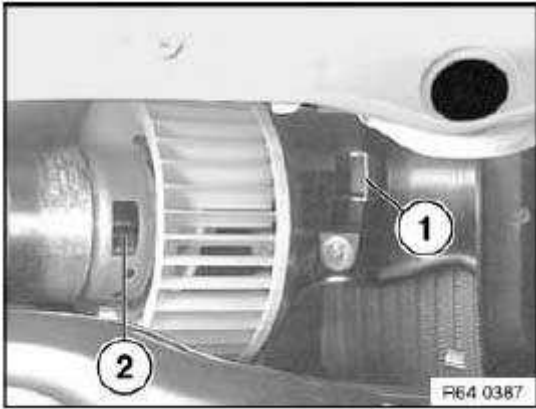


Fig. 9: Bridge

Courtesy of BMW OF NORTH AMERICA, INC.

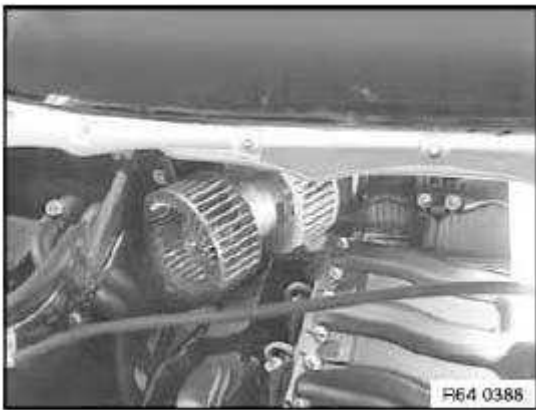


Fig. 10: Fan For Heater - A/C Unit

Courtesy of BMW OF NORTH AMERICA, INC.

Remove fan for heater - A/C unit towards front.

Installation:

Make sure fan for heater - A/C unit is correctly seated.

64 11 227 REPLACING OUTPUT STAGE/SWITCH FOR HEATER - A/C SYSTEM BLOWER

Necessary preliminary tasks:

- Remove servodrives of right fresh-air/recirculated-air flap, see **64 11 807 Removing and installing/replacing servodrives for right fresh-air flap.**

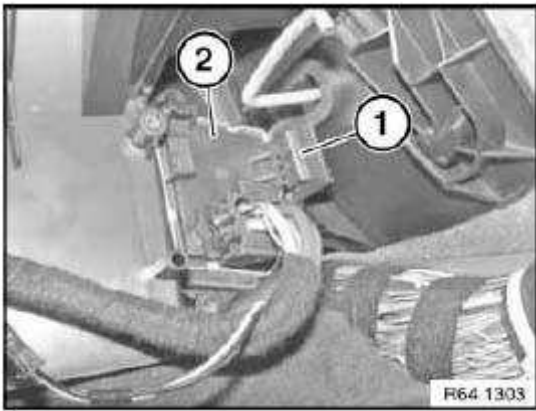


Fig. 11: Catch

Courtesy of BMW OF NORTH AMERICA, INC.

Release catch (1) and pull output stage (2) out of heater.

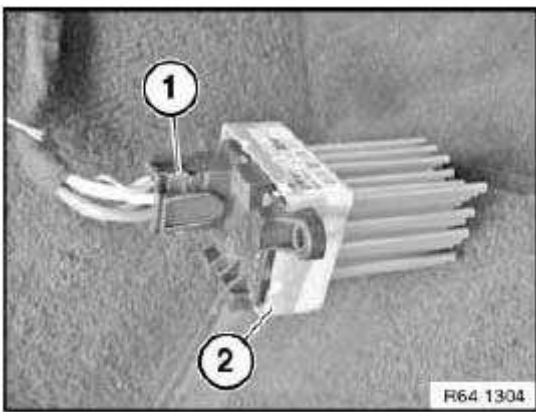


Fig. 12: Plug Connection

Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1) and remove output stage (2).

64 11 377 REMOVING AND INSTALLING CONTROL PANEL FOR HEATER - A/C SYSTEM (REPLACING, AUTOMATIC AIR CONDITIONING)

Special tools required:

- **64 1 020 RELEASE HOOK**

IMPORTANT: Read and comply with 61 35 ... NOTES ON ESD PROTECTION (ELECTRO STATIC DISCHARGE) .

Necessary preliminary tasks:

- Remove center fresh air grill, see **64 22 162 Removing and installing/replacing center fresh-air grill.**
- Remove ignition key from ignition switch
- Pull fuse 63 from distribution box in glovebox

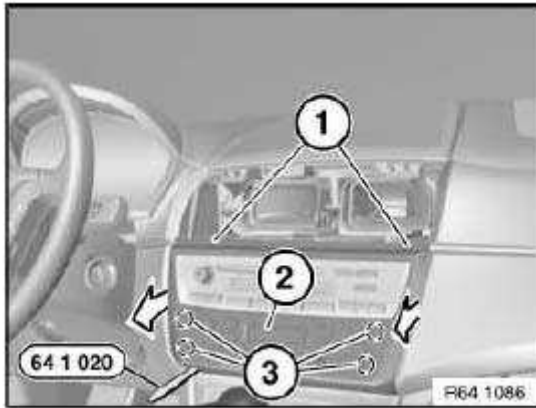


Fig. 13: Special Tool And Retaining Points
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Unclip control panel for heater - A/C system (2) with special tool 64 1 020 at retaining points (3) all round and pull back.

Unlock associated plug connections and disconnect.

Remove control panel for heater - A/C system (2).

Replacement:

Carry out programming/coding using appropriate BMW service tool.

64 11 807 REMOVING AND INSTALLING/REPLACING SERVODRIVE FOR RIGHT FRESH-AIR FLAP

Necessary preliminary tasks:

- Remove right glovebox with housing, see **51 16 366 REMOVING AND INSTALLING RIGHT GLOVEBOX WITH HOUSING .**

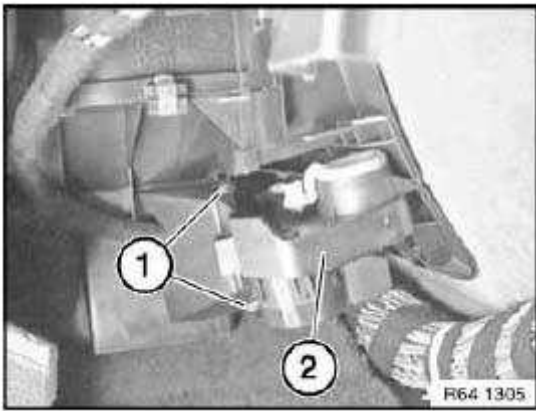


Fig. 14: Screws And Servomotor

Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1) and remove servomotor (2) complete with bracket.

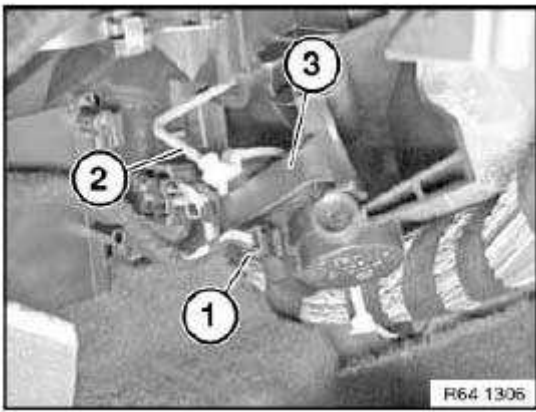


Fig. 15: Plug Connection And Actuating Lever

Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

Disengage actuating lever (2) and remove bracket with servomotor (3).

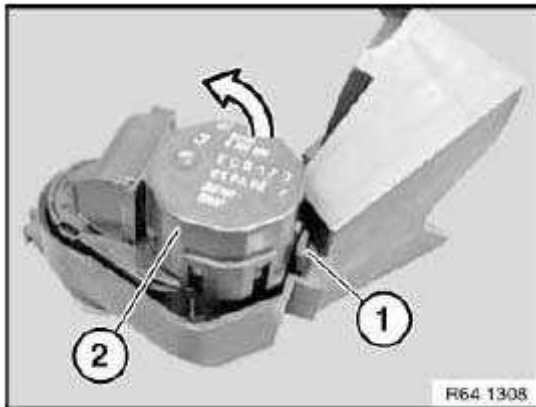


Fig. 16: Removing Servomotor From Holder
Courtesy of BMW OF NORTH AMERICA, INC.

Replacement:

Release lock (1) and remove servomotor (2) from holder.

Installation:

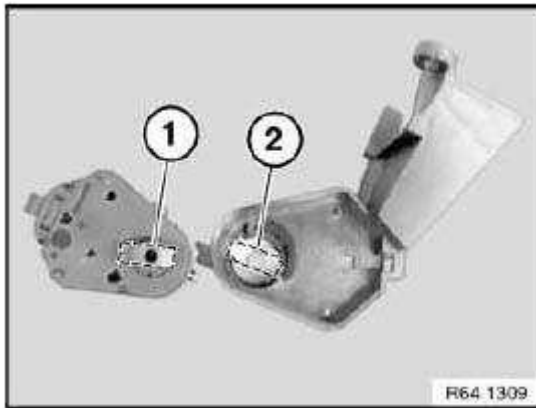


Fig. 17: Lug
Courtesy of BMW OF NORTH AMERICA, INC.

Lug (1) must be adapted to fit in counterpiece (2) on holder.

64 11 992 REMOVING AND INSTALLING/REPLACING SOLAR SENSOR

Special tools required:

- **64 1 020 RELEASE HOOK**

Necessary preliminary tasks:

- Remove instrument panel trim, see **51 45 030 REMOVING AND INSTALLING INSTRUMENT PANEL TRIM**.

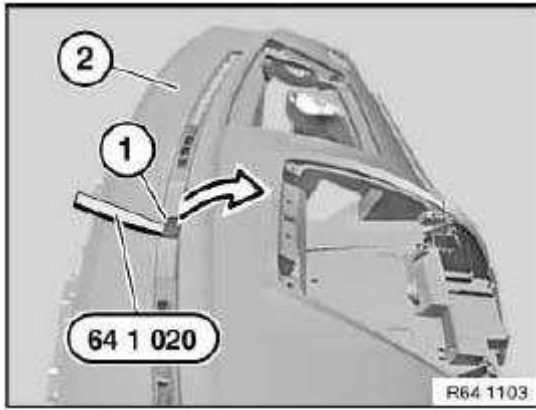


Fig. 18: Special Tool (64 1 020)

Courtesy of BMW OF NORTH AMERICA, INC.

Lever out solar sensor (1) with special tool 64 1 020 in direction of arrow.

Feed wiring harness of solar sensor (1) out of retainers of instrument panel trim (2).

Remove solar sensor (1) from instrument panel trim (2).

64 11 910 REMOVING AND INSTALLING/REPLACING TEMPERATURE SENSOR FOR HEATER CORE

Necessary preliminary tasks:

- Remove switch unit in centre console. See **61 31 057 REMOVING AND INSTALLING/REPLACING SWITCH UNIT IN CENTER CONSOLE**.

Remove temperature sensor (1) and disconnect plug connection (2).

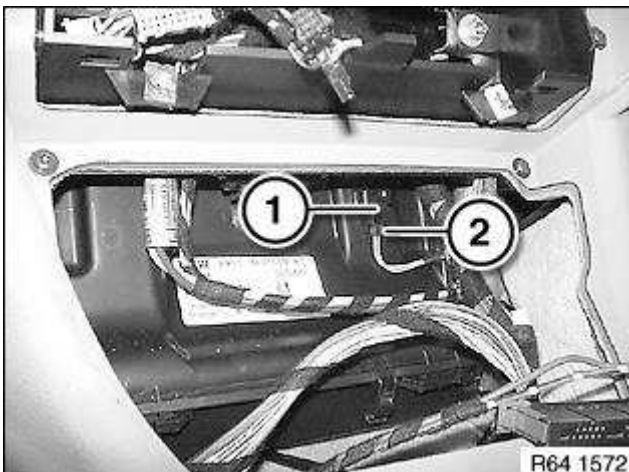


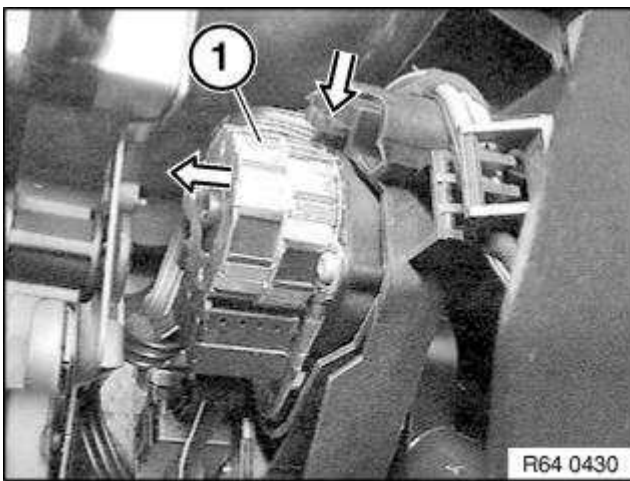
Fig. 19: Remove Temperature Sensor (1) And Disconnect Plug Connection (2)

Courtesy of BMW OF NORTH AMERICA, INC.

64 11 845 REPLACING ACTUATOR DRIVE OF DEFROSTER FLAPS*Necessary preliminary tasks:*

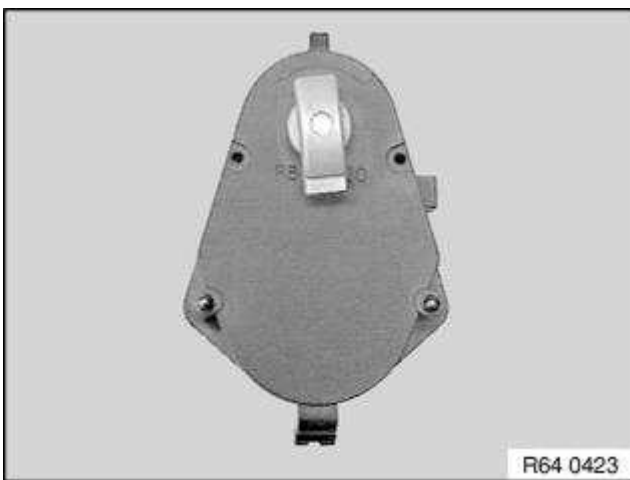
- Remove **actuator drive for ventilation flaps**.

Unlock actuator drive (1) and feed out towards side. Disconnect plug connection.

**Fig. 20: Unlock Actuator Drive (1) And Feed Out Towards Side**

Courtesy of BMW OF NORTH AMERICA, INC.

Installation note: If necessary, align shaft for defroster flaps and drive (see illustration).

**Fig. 21: Align Shaft For Defroster Flaps And Drive**

Courtesy of BMW OF NORTH AMERICA, INC.

Replacement: Servomotors must be re-addressed in the event of replacement! Addressing can only be carried out with the BMW diagnosis system. Service functions: Body, Heating and air conditioning function, Flap

motors, Re-address flap motors.

64 11 839 REPLACING ACTUATOR DRIVE OF FOOTWELL FLAP

Necessary preliminary tasks:

- Remove **RIGHT GLOVEBOX WITH HOUSING** .

Unhook adjusting lever (1).

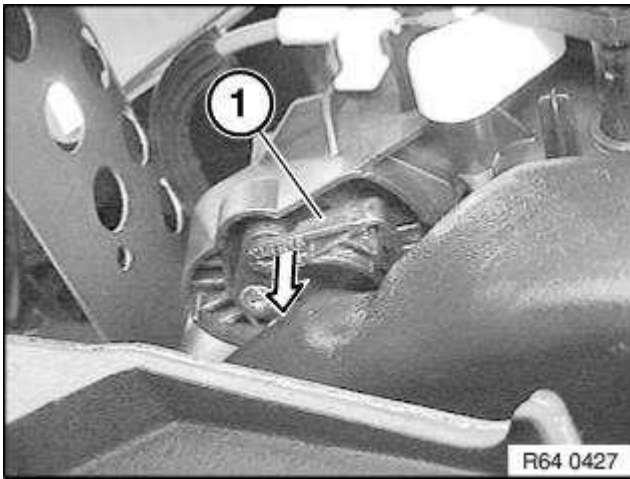


Fig. 22: Unhook Adjusting Lever (1)
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1). Unlock actuator drive (2) and feed out towards rear.

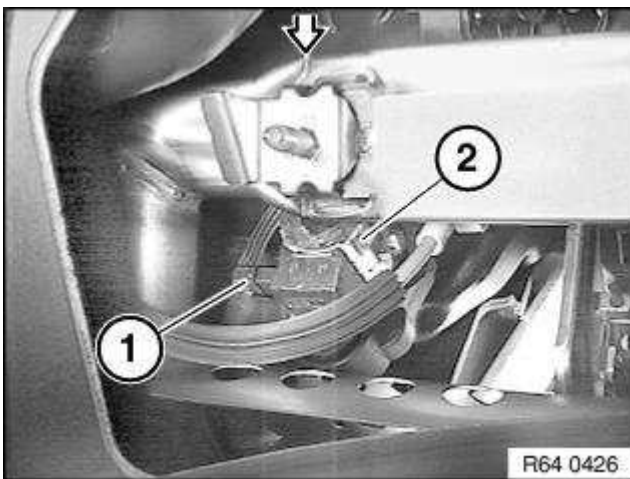


Fig. 23: Unlock Actuator Drive (2) And Feed Out Towards Rear
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note: If necessary, align shaft for footwell flap and drive (see illustration).

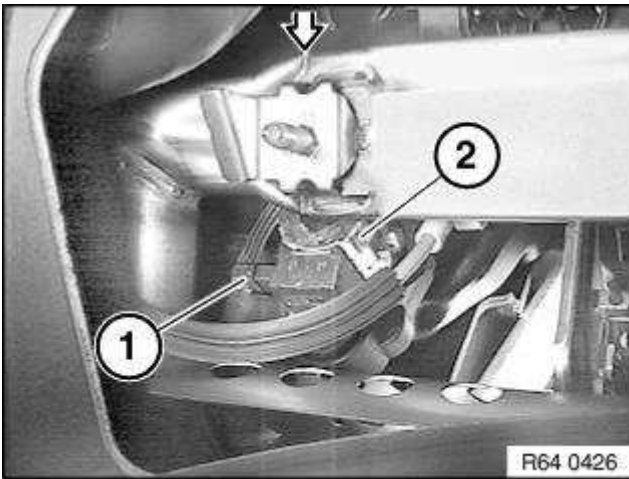


Fig. 24: Align Shaft For Footwell Flap And Drive
 Courtesy of BMW OF NORTH AMERICA, INC.

Replacement: Servomotors must be re-addressed in the event of replacement! Addressing can only be carried out with the BMW diagnosis system. Service functions: Body, Heating and air conditioning function, Flap motors, Re-address flap motors.

64 11 829 REPLACING ACTUATOR DRIVE OF VENTILATION FLAPS

Necessary preliminary tasks:

- Remove trim panel for pedal mechanism. See **51 45 185 REMOVING AND INSTALLING/REPLACING TRIM FOR PEDAL ASSEMBLY** .
- Remove lower section of steering column trim. See **32 31 020 REMOVING AND INSTALLING / REPLACING LOWER SECTION OF STEERING COLUMN TRIM** .

NOTE: Heater is removed for purposes of clarity.

Release screw (1). Unclip adjusting clasp (2) and feed out servomotor (3).

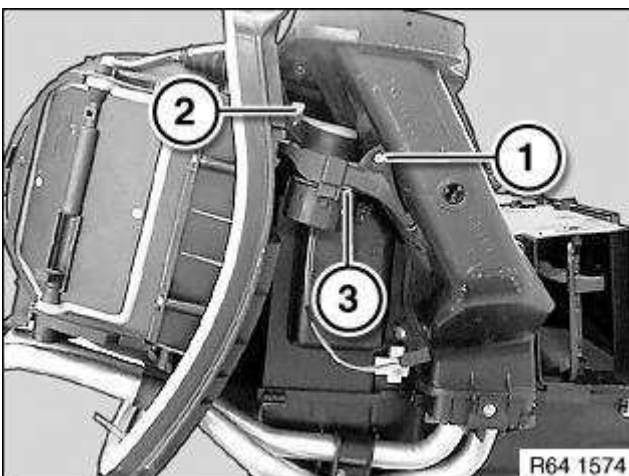


Fig. 25: Unclip Adjusting Clasp (2) And Feed Out Servomotor (3)

Courtesy of BMW OF NORTH AMERICA, INC.

Replacement: Servomotors must be re-addressed in the event of replacement! Addressing can only be carried out with the BMW diagnosis system. Service functions: Body, Heating and air conditioning function, Flap motors, Re-address flap motors.

64 11 829 REPLACING ACTUATOR DRIVE OF VENTILATION FLAPS

Necessary preliminary tasks:

- Disconnect battery negative lead. See **61 20 900 DISCONNECTING AND CONNECTING BATTERY NEGATIVE LEAD** .
- Remove glovebox. See **51 16 366 REMOVING AND INSTALLING RIGHT GLOVEBOX WITH HOUSING** .
- Partially remove fuse box

Disconnect plug connection (1). Unlock actuator drive (2) and remove

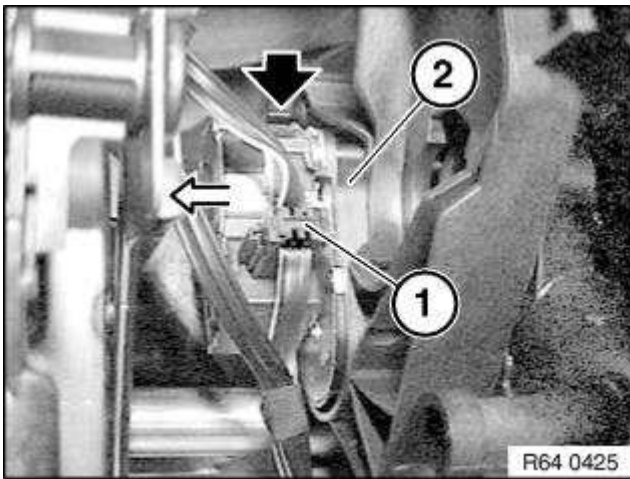


Fig. 26: Unlock Actuator Drive (2) And Remove
Courtesy of BMW OF NORTH AMERICA, INC.

Installation: If necessary, align shaft for defrosting flaps and drive (see illustration).

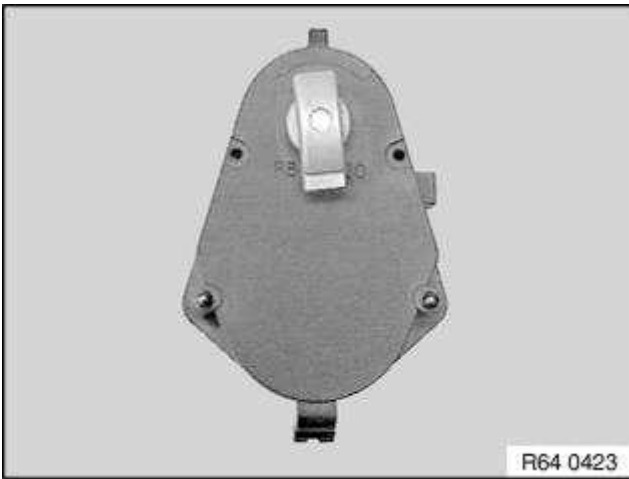


Fig. 27: Align Shaft For Defrosting Flaps And Drive
Courtesy of BMW OF NORTH AMERICA, INC.

64 11 942 REPLACING EVAPORATOR TEMPERATURE SENSOR

Necessary preliminary tasks:

- Remove trim panel for pedal assembly. See 45 INSTRUMENT CLUSTER TRIM PANEL .

NOTE: Left footwell heating duct removed for purposes of clarity.

Pull out evaporator temperature sensor (1) and disconnect plug connection (2).

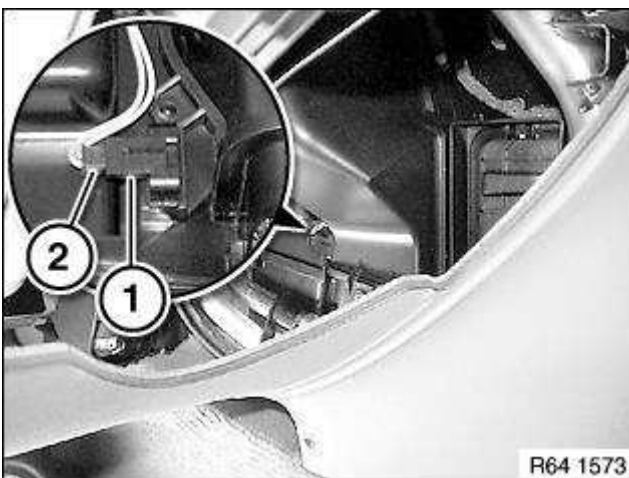


Fig. 28: Pull Out Evaporator Temperature Sensor (1) And Disconnect Plug Connection (2)
Courtesy of BMW OF NORTH AMERICA, INC.

Installation: Ensure evaporator temperature sensor (1) is correctly seated.

64 11 208 REPLACING HEATER CORE

WARNING: Scalding hazard! Work on the cooling system may only be carried out when it has cooled down.

Necessary preliminary tasks:

- Remove **microfilter housing**.
- Remove instrument panel trim. See **51 45 030 REMOVING AND INSTALLING INSTRUMENT PANEL TRIM**.

Recycling: Coolant emerges when coolant hoses are detached. Have a suitable collecting container ready. Catch and dispose of escaping coolant. Observe country-specific waste-disposal regulations.

Detach hot water hoses (1) from heater and blow coolant out of heater core.

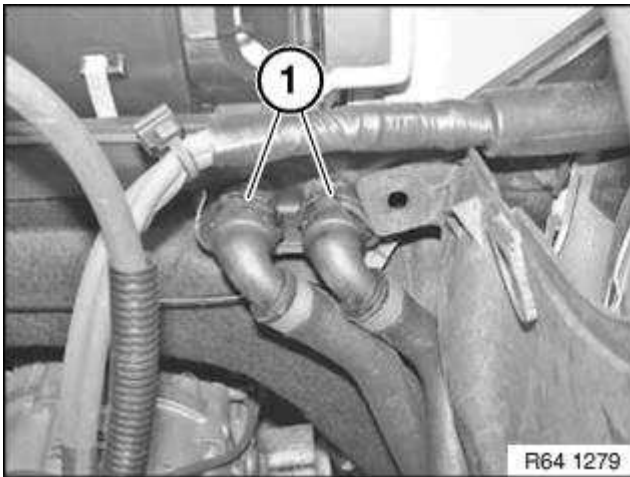


Fig. 29: Detach Hot Water Hoses (1) From Heater
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: For purposes of clarity, the following operations are shown on the removed heater core.

Pull out temperature sensor (1) and unclip wiring harness (2) from holder.

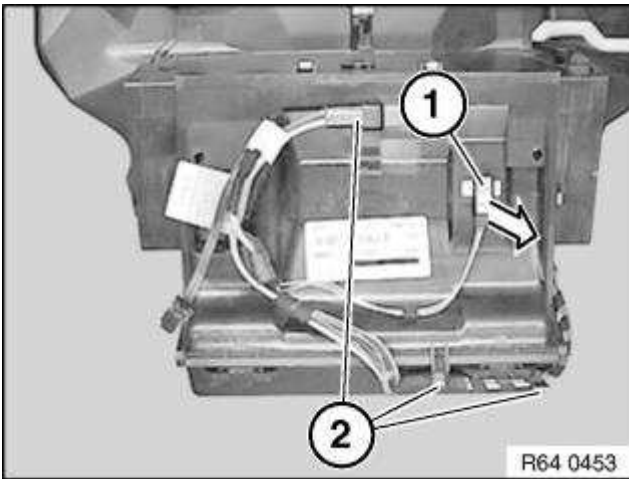


Fig. 30: Pull Out Temperature Sensor (1) And Unclip Wiring Harness (2) From Holder
 Courtesy of BMW OF NORTH AMERICA, INC.

Installation: Ensure correct lead routing.

Release screw (1) and remove bracket (2) from double pipe. Unclip retainers (3) and lift off cover for heating element (4).

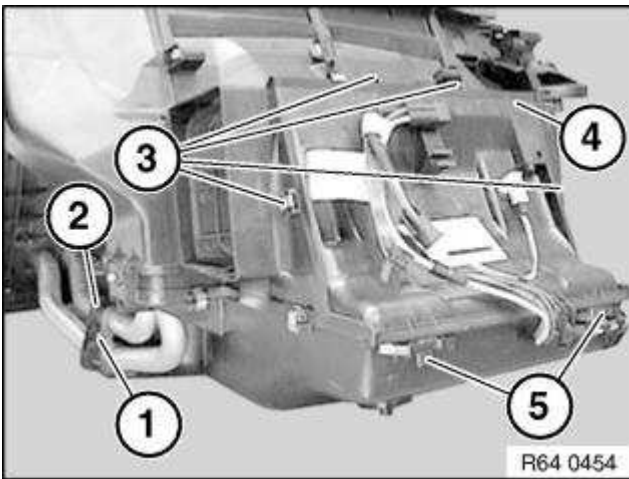


Fig. 31: Release Screw (1) And Remove Bracket (2) From Double Pipe
 Courtesy of BMW OF NORTH AMERICA, INC.

Installation: First insert lugs (5).

Remove retainers (1) and remove double pipe (2) towards top. Raise heater core (3) at front and remove.

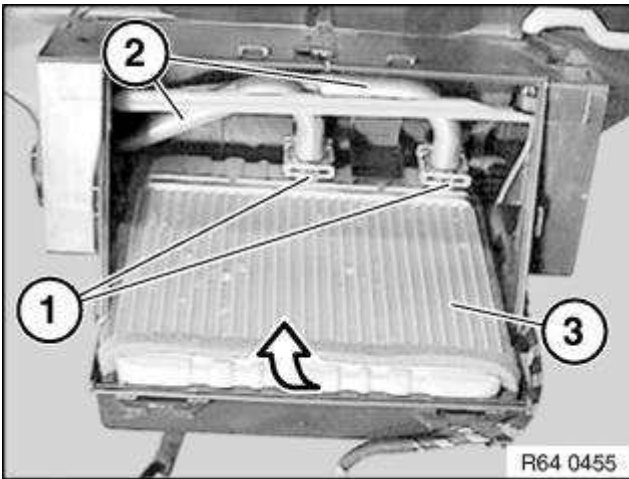


Fig. 32: Remove Retainers (1) And Remove Double Pipe (2) Towards Top
Courtesy of BMW OF NORTH AMERICA, INC.

Installation: Replace sealing rings, coat with anti-friction agent and make sure sealing rings and lines are correctly seated.

After installation: Venting cooling system and checking for water leaks. See **00 COOLANT, CHECKING COOLING SYSTEM** .

64 11 800 REPLACING SERVODRIVE ON GEAR FOR FLAP CONTROL (A/C CONTROL)

Necessary preliminary tasks:

- Remove **RIGHT GLOVEBOX WITH HOUSING** .

Move rotary knob (1) into position illustrated.



Fig. 33: Move Rotary Knob (1) Into Position Illustrated
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1). Unlock servo-drive (2) and remove towards bottom.

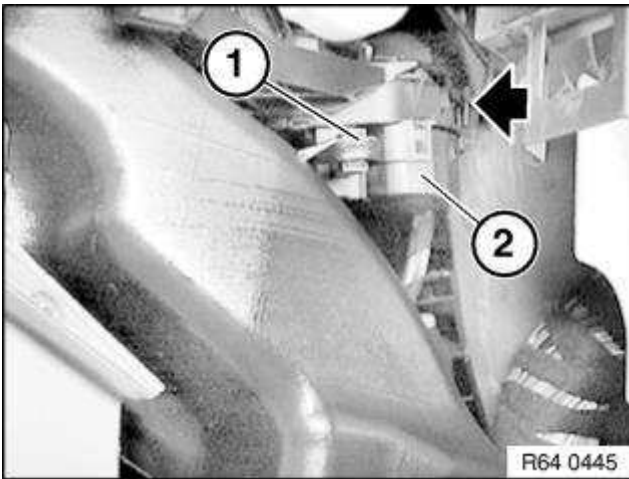


Fig. 34: Disconnect Plug Connection (1)
 Courtesy of BMW OF NORTH AMERICA, INC.

Installation: If necessary, align shaft for defrosting flaps and drive (see illustration).

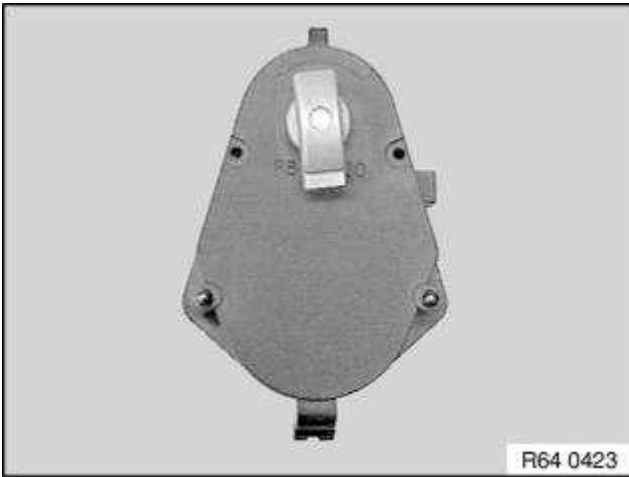


Fig. 35: Align Shaft For Defrosting Flaps And Drive
 Courtesy of BMW OF NORTH AMERICA, INC.

22 NOZZLES AND OUTLETS

64 22 135 REMOVING AND INSTALLING/REPLACING LEFT FRESH-AIR GRILL

Special tools required:

- 00 9 341

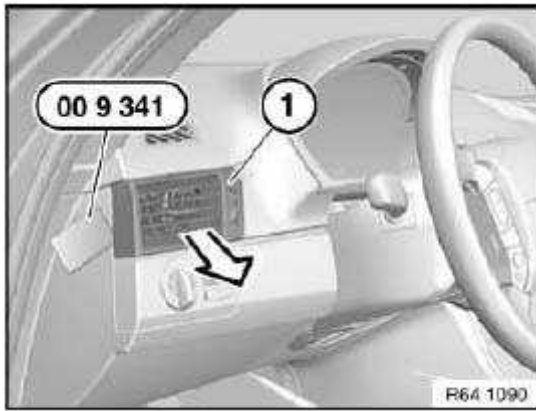


Fig. 36: Special Tool (00 9 341)

Courtesy of BMW OF NORTH AMERICA, INC.

Fit special tool 00 9 341 at side as illustrated.

Lever out left fresh-air grill (1) all round and remove in direction of arrow.

64 22 136 REMOVING AND INSTALLING/REPLACING RIGHT FRESH-AIR GRILL

Special tools required:

- 00 9 318

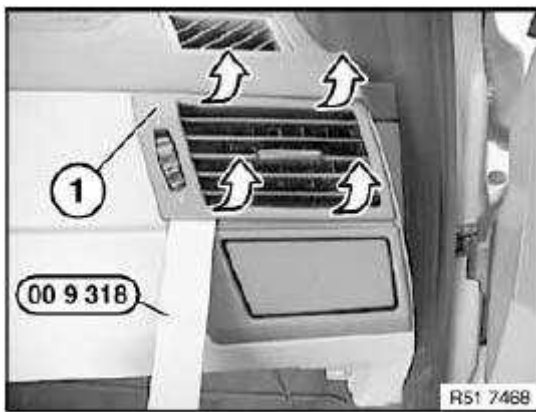


Fig. 37: Special Tool (00 9 318)

Courtesy of BMW OF NORTH AMERICA, INC.

Unclip right fresh-air grill (1) with special tool 00 9 318 and remove in direction of arrow.

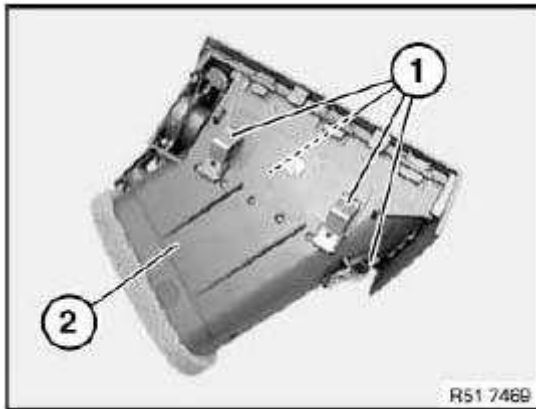


Fig. 38: Catches On Fresh-Air Grill

Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Catches (1) on fresh-air grill (2) must not be damaged or missing.

64 22 162 REMOVING AND INSTALLING/REPLACING CENTER FRESH-AIR GRILL

Special tools required:

- **64 1 020 RELEASE HOOK**

Necessary preliminary tasks:

- Remove switch for hazard warning system/central locking, see **61 31 079 REMOVING AND INSTALLING/REPLACING SWITCH FOR HAZARD WARNING FLASHERS/CENTRAL LOCKING**.

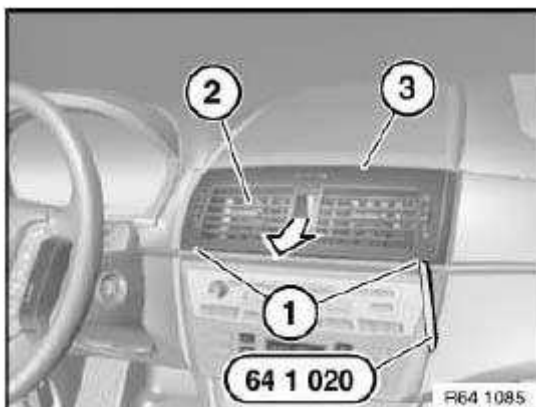


Fig. 39: Special Tool (64 1 020)

Courtesy of BMW OF NORTH AMERICA, INC.

Fit special tool 64 1 020 at lower attachment points (1).

Lever out center fresh-air grill (2) and pull back.

Unclip Bowden cable (3) and remove center fresh-air grill (2).

31 MICROFILTER

64 31 010 REPLACING MICROFILTER FOR INTERIOR VENTILATION

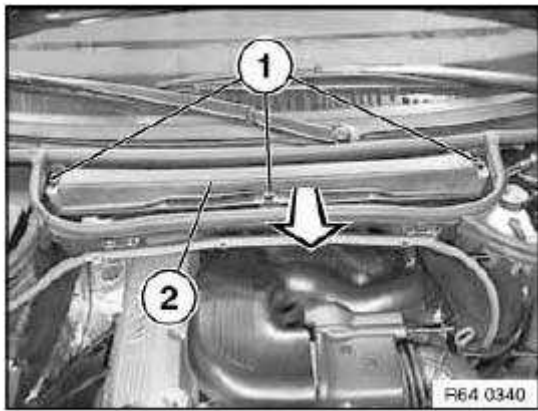


Fig. 40: Toggle And Cover

Courtesy of BMW OF NORTH AMERICA, INC.

Turn toggle (1) through approx. 90° and remove cover (2) towards front.

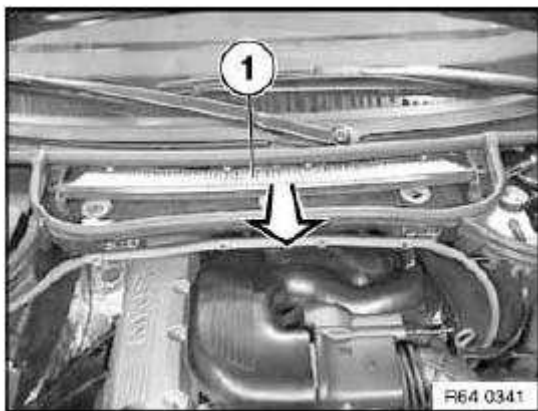


Fig. 41: Microfilter Element

Courtesy of BMW OF NORTH AMERICA, INC.

Remove microfilter element (1).

64 31 010 REPLACING MICROFILTER FOR INTERIOR VENTILATION

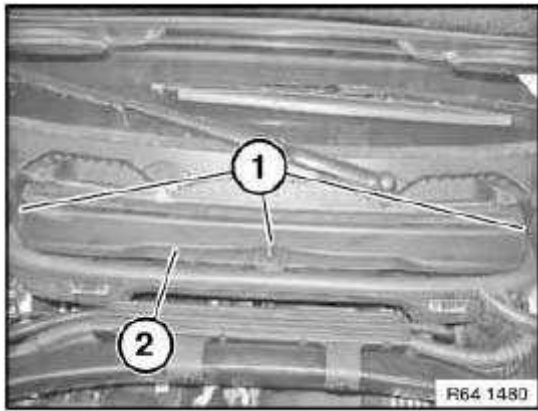


Fig. 42: Rotary Catches And Raise Cover
 Courtesy of BMW OF NORTH AMERICA, INC.

Unlock rotary catches (1), raise cover (2) and remove microfilter.

64 31 010 REPLACING MICROFILTER FOR INTERIOR VENTILATION

IMPORTANT: Risk of damage! A/C system must not be operated without the prescribed filter element.

Note on cleaning: Spray microfilter housing from inside with BMW pollen filter housing cleaner. Wipe away excess liquid. This kills off germs, bacteria and fungi that cause smells. The smell that results on the plastic parts of the microfilter housing is eliminated.

Remove sealing lips at marked points. Unclip line and water hose (1) from cover (3). Release retaining lug (2). Feed out cover (3).

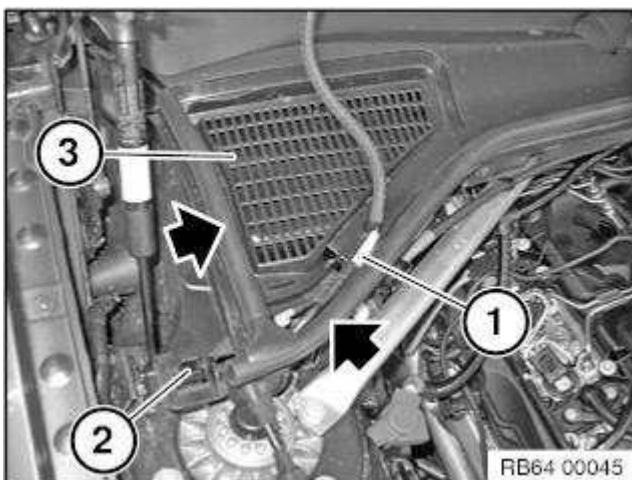


Fig. 43: Unclip Line And Water Hose (1) From Cover (3)
 Courtesy of BMW OF NORTH AMERICA, INC.

Cover tabs (1) must snap in correctly under cowl panel.

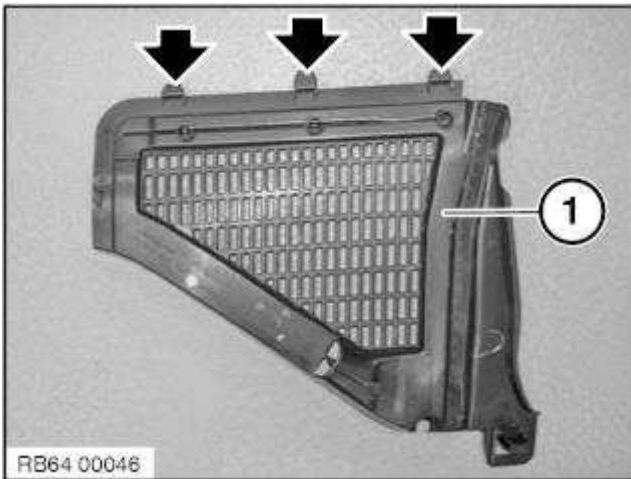


Fig. 44: Cover Tabs (1) Must Snap In Correctly Under Cowl Panel
Courtesy of BMW OF NORTH AMERICA, INC.

Remove filter cover (1) in direction of arrow.

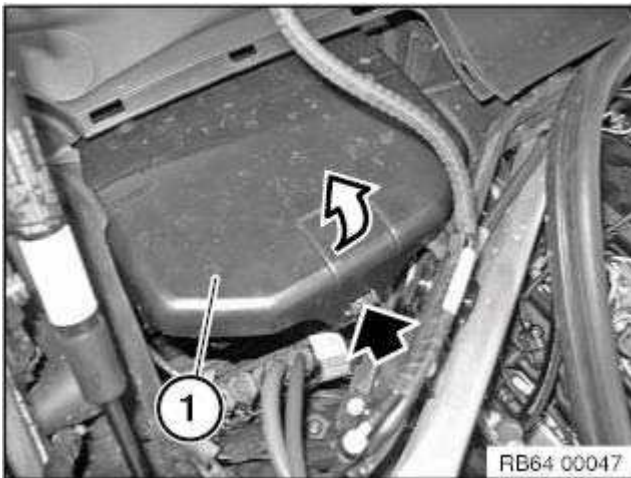


Fig. 45: Remove Filter Cover (1) In Direction Of Arrow
Courtesy of BMW OF NORTH AMERICA, INC.

Remove upper microfilter (1) in direction of arrow.

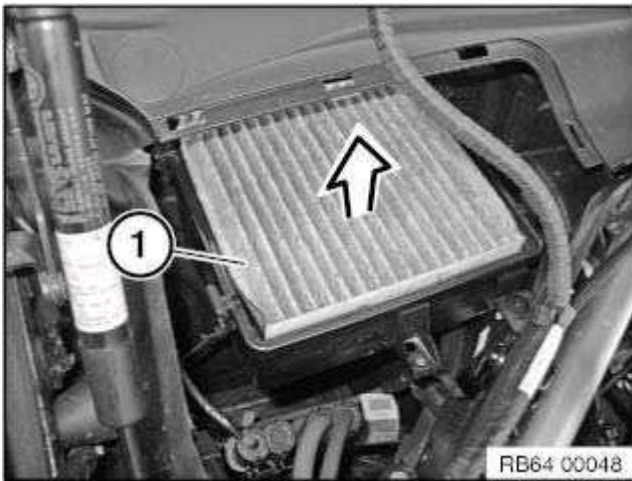


Fig. 46: Remove Upper Microfilter (1) In Direction Of Arrow
 Courtesy of BMW OF NORTH AMERICA, INC.

Unclip filter frame (1) at the marked points and detach. Remove lower microfilter (2) in direction of arrow.

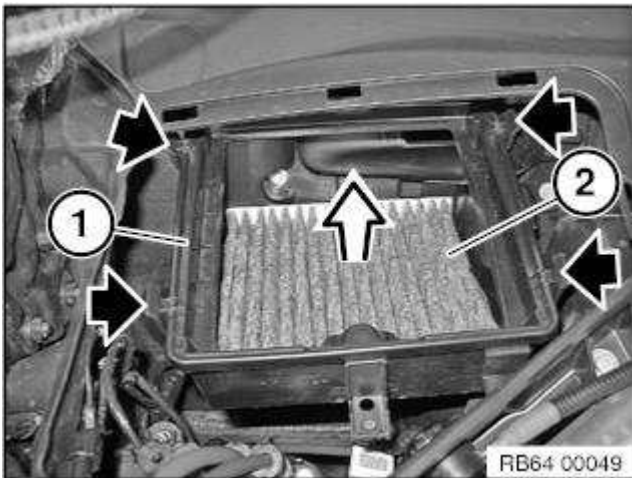


Fig. 47: Unclip Filter Frame (1) At The Marked Points And Detach
 Courtesy of BMW OF NORTH AMERICA, INC.

Installation note: Make sure upper microfilter (1) and lower microfilter (2) are installed in the correct position. The arrows mark the direction of the air intake.

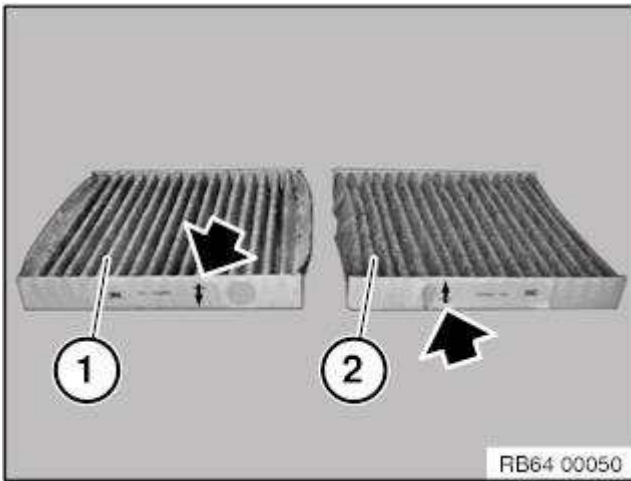


Fig. 48: Make Sure Upper Microfilter (1) And Lower Microfilter (2) Are Installed In The Correct Position

Courtesy of BMW OF NORTH AMERICA, INC.

64 31 080 REMOVING AND INSTALLING/REPLACING MICROFILTER HOUSING

Necessary preliminary tasks:

- Remove microfilter.
- Remove cable duct cover .

Release screws (1). Remove lines from cable duct (2). Feed microfilter housing (3) upwards in direction of arrow.

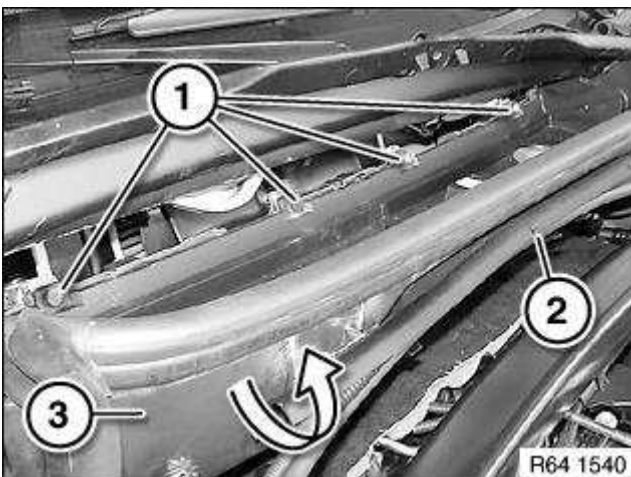


Fig. 49: Feed Microfilter Housing (3) Upwards In Direction Of Arrow

Courtesy of BMW OF NORTH AMERICA, INC.

Installation: Make sure water drain hoses (1) are correctly seated.

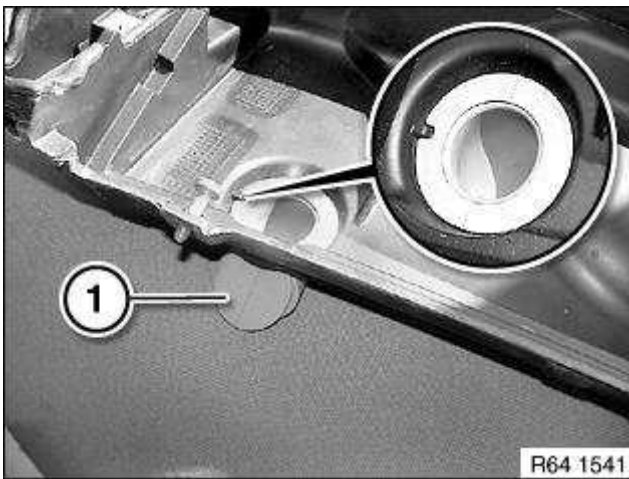


Fig. 50: Make Sure Water Drain Hoses (1) Are Correctly Seated
Courtesy of BMW OF NORTH AMERICA, INC.

50 AIR CONDITIONING SYSTEM

64 50 ... AIR CONDITIONER TEST (R 134A)

Before A/C efficiency test, satisfy following conditions:

1. Provide a MoDiC or DIS. Safeguard electrical system integrity by checking the fault memory (no faults in the fault memory).
2. Provide a thermometer with separate gauge.
3. Perform the test in a suitable work bay with an ambient temperature between 20°C and 30°C.

Re 1:

Connect MoDiC or DIS to car and display evaporator temperature.

Re 2:

Position a thermometer with a separate gauge approx. 5 cm below the roof liner at the height of the B-pillar. Lay gauge outwards out of vehicle interior.

Re 3:

Heating up vehicle interior:

- A/C button is not activated during heating up.
- Close all windows and doors.
- Set recirculated air mode.
- Select air distribution mode for footwell and defrosting.
- Maximum temperature setting.

- Maximum fan stage.
- Run engine at approx. 2000 RPM until operating temperature is reached, then idle speed.

A/C efficiency test:

Turn on A/C compressor at a vehicle interior temperature of 50°C.

After 3-4 minutes, the evaporator sensor temperature must be $<$ or $=$ 15°C.

Draw off A/C system if this temperature is not reached, see **64 50 009 Drawing off, evacuating and filling A/C system (R 134a)**. Measure amount of refrigerant drawn off.

If drawn-off quantity does not correspond to specified fill quantity: **64 50 A/C SYSTEM, REFRIGERANT AMOUNTS E83** supplement refrigerant and repeat test.

If fill quantity is correct, continue troubleshooting by pressure measurement .

NOTE: **A/C systems with uncontrolled compressors only:
If necessary, then continue troubleshooting by pressure measurement .**

64 50 ... INSTRUCTIONS FOR HANDLING REFRIGERANT R 134A

WARNING: Although R 134a at normal temperature is non-toxic, non-flammable and not explosive in air in any mixture ratio, it is still essential to follow various safety precautions.

The filled refrigerant circuit of the A/C system is subject to gauge pressure. When carrying out repairs on the A/C system, it is absolutely essential to draw off the refrigerant.

Do not weld or solder on filled A/C systems or in rooms into which R 134a may have leaked. Exposure to flames or high temperatures ($<$ or $=$ 50°C) may give rise to toxic decomposition products (fluorine gas). For this reason, do not smoke either.

R 134a must be drawn off, cleaned and returned to the A/C system with a service station following the relevant operating instructions.

Avoid all contact with liquid or gaseous R 134a. Wear protective goggles and gloves when working on the refrigerant circuit. R 134a acting on the skin can cause frostbite. Rinse affected body parts thoroughly with cold water. If R 134a gets into your eyes, likewise rinse with plenty of water and, if necessary, remove contact lenses if worn. Then seek immediate medical attention. Likewise seek immediate medical attention if you experience problems after inhaling R 134a fumes.

As a gas, R 134a is colorless, odorless and heavier than air. If it gets into the atmosphere, this may result especially in workshop pits in an imperceptible danger of asphyxiation or in cardiac palpitations. Ventilate rooms adequately; if necessary, turn on installed extractor systems.

For a properly functioning A/C system, it is essential to have the greatest possible levels of cleanliness when working on the A/C system and the best possible evacuation (at least 30 minutes dehumidification from refrigerant circuit) before each filling of the A/C system.

R 134a absorbs moisture very easily. Therefore seal off opened pipes, condenser, evaporator, compressor and drier bottle immediately with plugs.

With replacement parts, the plugs may only be removed immediately before the lines are connected.

In the event of warranty claims, the old parts must be provided with plugs to be able to determine the cause of the damage.

If an A/C system has been completely drained by leakage, accident or repair, the drier element must be replaced as excessive moisture may have entered the system.

Store filled pressurized refrigerant bottles in such a way that they are not exposed to direct sunlight or other heat sources (max. 45°C). Also avoid exposing them to mechanical stress (e.g. by dropping).

In the event of fire, carbon dioxide (CO₂), extinguishing powder and a sprayed water jet are deemed to be suitable extinguishants. Cool reservoirs at risk with a sprayed water jet (risk of bursting!).

IMPORTANT: After each refill of an A/C system, check that protective caps of filling valves are hand-tight. They serve as additional seals.

64 50 ... INSTRUCTIONS FOR HANDLING REFRIGERANT OIL (FOR REFRIGERANT R 134A)

WARNING: Observe the following points when handling refrigerant oil:

- Wear protective goggles.
- Wear gloves made from impermeable plastic.
- Do not swallow.
- Do not inhale.

Action to be taken after contact with refrigerant oil:

- After contact with eyes, rinse thoroughly with plenty of water and take out contact lenses (if worn). Then seek immediate medical attention.
- After contact with the skin, wash body parts affected with plenty of soap and water.
- Do not induce vomiting if oil is swallowed, seek immediate medical attention.
- If inhaled, introduce the person affected to fresh air. Seek medical attention if problems persist.

WARNING: Refrigerant oil is non-combustible and non-explosive at normal temperatures. In spite of this, the following precautions must be observed:

- Do not store in the vicinity of flames, heat sources or strongly oxidizing materials.
- Suitable extinguishants: carbon dioxide (CO²), dry extinguishing, foam.

IMPORTANT: Refrigerant oil is hygroscopic and must therefore be stored in suitable containers that are sealed airtight!

Recycling:

Dispose of drawn-off refrigerant oil as hazardous waste.

Observe country-specific waste-disposal regulations.

Absorb escaping refrigerant oil with fluid-binding material.

Notify the relevant authorities if larger amounts of refrigerant oil are discharged into above-ground water supplies, drainage systems or subsoil.

64 50 ... LEAK TESTING WITH ULTRAVIOLET ADDITIVES (UV ADDITIVES) (BMW LEAK-TESTING CASE)

IMPORTANT: It is absolutely essential to read and comply with the equipment manufacturer's instructions for use provided in the equipment case!

Read and comply with the instructions for use provided with the special tool particularly with regard to accident prevention, health protection and environmental protection.

Use only BMW-approved UV-additives (e.g. TRACER).

Only the basic procedure is described in the following!

WARNING: Avoid contact with refrigerant.

Follow safety precautions when handling refrigerant, see 64 50 ... Instructions for handling refrigerant R 134a.

IMPORTANT: UV lamp gets very hot in the radiation area!

Do not use the UV lamp without the filter glass.

Eyes and skin will suffer damage if the UV lamp is used without the filter glass.

When using the UV lamp, wear the protective goggles provided in the case.

NOTE:

- Fill the hose system of the hand pump completely with UV additive PRIOR to use

- **Use the UV additive exclusively for BMW-approved refrigerant oils**
- **Do not operate the A/C system while the hand pump is connected or in use**
- **The A/C system must always be filled with an adequate amount of refrigerant to enable the leak-detecting agent to be properly distributed**

Necessary preliminary tasks:

Before actually testing for leaks, check the entire refrigerant circuit using the UV leak-detecting lamp to ensure that no AV additive is already in the area of the refrigerant circuit.

If already illuminated areas are found, carefully clean the area in question with the cleaning agent contained in the case.

On initial use:

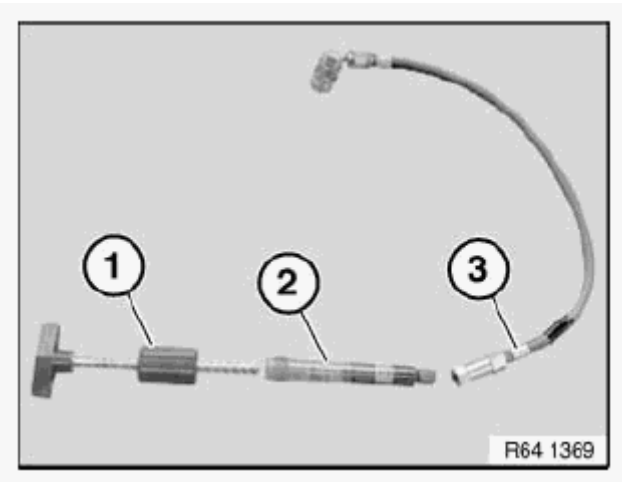


Fig. 51: Additive Cartridge And Hose Piece
Courtesy of BMW OF NORTH AMERICA, INC.

Connect hand pump (1) to additive cartridge (2) and hose piece (3).

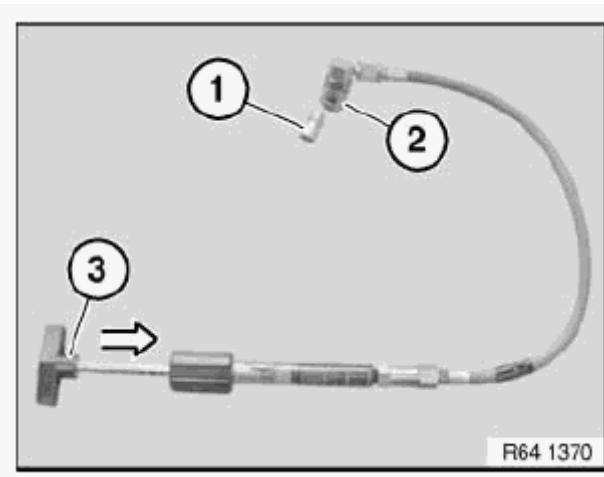


Fig. 52: Vent Valve And Quick-Connect Coupling
 Courtesy of BMW OF NORTH AMERICA, INC.

On Initial use:

Attach vent valve (1) to quick-connect coupling (2).

Turn handle (3) on hand pump to advance the plunger until a small amount of UV additive emerges. This vents the hose system.

IMPORTANT: The entire hand pump with hose system must not be disassembled again once the filling work has been completed.

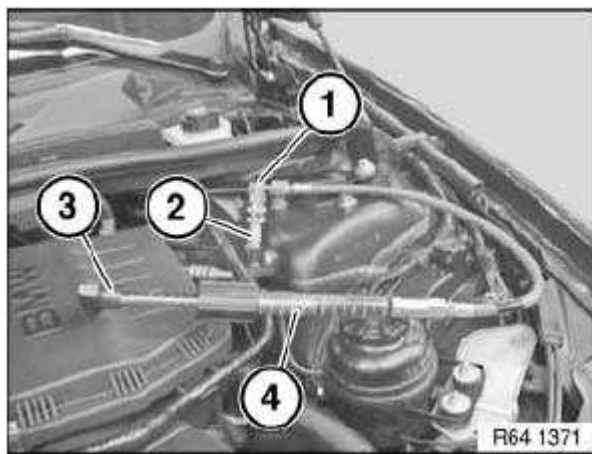


Fig. 53: Quick-Connect Coupling
 Courtesy of BMW OF NORTH AMERICA, INC.

Attach quick-connect coupling (1) to low-pressure connection (2) of A/C system.

Turn handle on hand pump (3) until the required amount of UV additive is added.

The quantity of UV additive to be added is dependent on the amount of refrigerant in the refrigerant circuit, see **64 50 A/C SYSTEM, REFRIGERANT AMOUNTS E83** :

- A/C systems with refrigerant filling up to 900 g: one graduation mark (4) on additive cartridge
- A/C systems with refrigerant filling in excess of 900 g: two graduation marks (4) on additive cartridge

NOTE: After filling, remove quick-connect coupling (1) and if necessary use the cleaning agent contained in the special tool case to clean up the UV additive.

Further tasks:

- Start engine.
- Run A/C system at highest setting for 5-10 minutes in order to ensure adequate distribution of dye in the system
- Switch off engine
- Check all A/C system components for possible leaks
- Possible leaks show up in luminous green

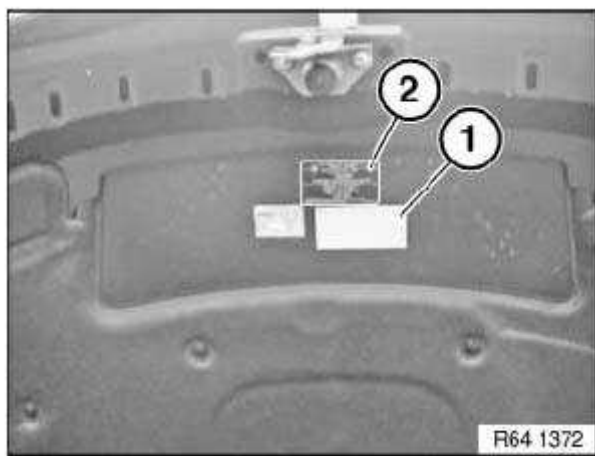


Fig. 54: Accompanying Information Label And Filling Capacity Information Label
Courtesy of BMW OF NORTH AMERICA, INC.

Complete accompanying information label (1) with the relevant data and attach in an easily visible position next to the filling capacity information label (2).

64 50 ... LEAK-TESTING WITH LEAK TESTER DEVICE

WARNING: Avoid contact with refrigerant.

Follow safety precautions when handling refrigerant, see **64 50 ... Instructions for handling refrigerant R 134a**.

Carry out leak-testing with a leak tester device from the workshop equipment catalog following the device manufacturer's operating instructions.

If leaks not to be localized are already identified during evacuation, the A/C system must nevertheless be filled, see **64 50 009 Drawing off, evacuating and filling A/C system (R 134a)**. Then test for leaks with leak tester device.

NOTE: Refrigerant is heavier than air.
Therefore always conduct the leak test below the lines and components to be tested.
Shield lines and components against strong blasts of air (wind, drawing off).

Tighten down loose lines, mark leaks.

Then draw off **64 50 009 Drawing off, evacuating and filling A/C system (R 134a)** A/C system and seal off or repair leakage points.

Then refill **64 50 009 Drawing off, evacuating and filling A/C system (R 134a)** A/C system and test for leaks.

64 50 ... SAFETY INSTRUCTIONS FOR HANDLING REFRIGERANT R134A

WARNING: Risk of injury!

Refrigerant circuit is under high pressure! Work on the refrigerant circuit may only be carried out by experts!

Draw off refrigerant without fail BEFORE all repair work on the refrigerant circuit.

The refrigerant circuit is depressurized AFTER drawing off!

It is absolutely essential to read and observe the relevant operating instructions for the A/C service unit used!

Protective measures/rules of conduct:

- Wear protective goggles
- Wear oil-resistant protective gloves
- Do not smoke!
- Observe country-specific safety regulations.

First aid measures:

- Eye contact: In the event of contact with the eyes, rinse immediately with plenty of running water and consult a doctor.
- Skin contact: In the event of contact with skin, remove affected clothing immediately and rinse with plenty of water.
- After inhalation: If refrigerant vapors are inhaled in greater concentrations, remove the person affected to an area of fresh air and keep them under supervision. Consult a doctor. If breathing problems are experienced, breathe additional oxygen. If the person affected is breathing with difficulty or has stopped breathing, incline the person's head at the neck and administer the kiss of life.

64 50 009 DRAWING OFF, EVACUATING AND FILLING A/C SYSTEM (R 134A)

WARNING: Refrigerant circuit is under high pressure!

Repair work may only be carried out on a DEPRESSURIZED refrigerant circuit!

Avoid contact with refrigerant and refrigerant oil.

Follow safety instructions for handling refrigerant R 134a, see 64 50 ...

Safety instructions for handling refrigerant R134a.

Follow safety instructions for handling refrigerant oil, see 64 50 ...

Instructions for handling refrigerant oil (for refrigerant R 134a).

IMPORTANT: Risk of damage!

Restart engine only when A/C system has been correctly filled.

NOTE: Draw off, evacuate and fill the A/C system in accordance with the operating instructions of the relevant service station.

E60 only:

If necessary, to connect service station, use manufacturer's adapter for high-pressure connection (red).

Instructions for drawing off A/C system:

To help separation of refrigerant and refrigerant oil, run engine at low speed (800-1200 RPM) and with A/C system turned on for a few minutes.

The limits the entrainment of refrigerant oil while it is drawn off.

Drawn-off refrigerant oil must be changed and reintroduced via the service station.

If at the end of the drawing-off procedure the service station moisture indicator shows that the drawn-off refrigerant is excessively moist, clean the refrigerant in accordance with the service station operating instructions.

Recycling:

Dispose of drawn-off refrigerant oil as hazardous waste.

Observe country-specific waste-disposal regulations.

Instructions for evacuating off A/C system:

The evacuation procedure removes all traces of ambient air, water vapor and any other gases present from the A/C system. This enables subsequent system filling with refrigerant.

A decrease in the vacuum level indicates a leak in the refrigerant circuit. 64 50 ... Leak testing with ultraviolet

additives (UV additives) (BMW leak-testing case)

Fig. 55: Instructions For Filling A/C System Screen
Courtesy of BMW OF NORTH AMERICA, INC.

Instructions for filling A/C system:

Before filling with refrigerant, top up the refrigerant oil entrained during drawing off.

Follow instructions for opening and replacing parts in refrigerant circuit! **64 52 ... Instructions for opening and replacing parts in refrigerant circuit.**

Depending on the type of component replaced on the A/C system, it may be necessary to top up the refrigerant oil, even if no measurable losses have occurred during drawing off. Read and comply with the A/C system manufacturer's notes in this regard and the operating instructions of the relevant service station.

Information on the required refrigerant fill quantity for the entire A/C system is contained on the rating plate (1) in the engine compartment.

Installation:

Reseal refrigerant filler necks on vehicle with sealing caps.

64 52 ... INSTRUCTIONS FOR OPENING AND REPLACING PARTS IN REFRIGERANT CIRCUIT

WARNING:

- Avoid contact with refrigerant and refrigerant oil
- Follow safety instructions for handling R134a refrigerant, see **64 50 ... Safety instructions for handling refrigerant R134a.**
- Follow safety instructions for handling refrigerant oil, see **64 50 ... Instructions for handling refrigerant oil (for refrigerant R 134a).**

CAUTION:

- Always use new O-rings each time A/C connections are opened.

- **Moisten O-rings with refrigerant oil prior to fitting**
- **Seal all parts to be returned at openings to prevent ingress of moisture or foreign bodies**

I. Opening refrigerant circuit without part replacement, as preliminary work to further work

(e.g. engine removal):

Work sequence:

- Draw off A/C system, then determine drawn-off refrigerant oil quantity, see **64 50 009 Drawing off, evacuating and filling A/C system (R 134a)**.
- Carry out main work
- Replace removed refrigerant oil with new refrigerant oil
- Evacuate and fill A/C system, see **64 50 009 Drawing off, evacuating and filling A/C system (R 134a)**.

II. Part replacement and part replacement on account of insidious leak

(minor leak, e.g. hairline crack)

Work sequence:

- Draw off A/C system, then determine drawn-off refrigerant oil quantity, see **64 50 009 Drawing off, evacuating and filling A/C system (R 134a)**.
- Carry out part replacement
- Replace removed refrigerant oil with new refrigerant oil
- Additionally replenish new refrigerant oil in accordance with replaced parts:
 - Compressor: refer to **64 52 ... Instructions for compressor replacement**.
 - Evaporator: 10 ml
 - Condenser: 10 ml
 - Desiccant insert / desiccant bottle: 30 ml
 - Each replaced refrigerant line: 10 ml
 - Condenser with integrated dryer: 30 ml
 - Safety pressure switch and seals: no additional refrigerant oil
- Evacuate and fill A/C system, see **64 50 009 Drawing off, evacuating and filling A/C system (R 134a)**.

III. Part replacement on account of sudden leak

(major leak, e.g. pipe break due to accident)

Work sequence:

- Draw off A/C system, then determine drawn-off refrigerant oil quantity, see **64 50 009 Drawing off, evacuating and filling A/C system (R 134a)**.
- Carry out part replacement
- Replace removed refrigerant oil with new refrigerant oil
- Additionally replenish 25 ml new refrigerant oil and new refrigerant oil in accordance with replaced parts:
 - Compressor: refer to **64 52 ... Instructions for compressor replacement**.
 - Evaporator: 10 ml
 - Condenser: 10 ml
 - Desiccant insert / desiccant bottle: 30 ml
 - Each replaced refrigerant line: 10 ml
 - Condenser with integrated dryer: 30 ml
 - Safety pressure switch and seals: no additional refrigerant oil
- Evacuate and fill A/C system, see **64 50 009 Drawing off, evacuating and filling A/C system (R 134a)**.

51 A/C HOUSING/EVAPORATOR, SWITCHING ELEMENTS

64 51 522 REMOVING AND INSTALLING OR REPLACING EXPANSION VALVE

Necessary preliminary tasks:

- Draw off A/C system, then determine drawn-off refrigerant oil quantity, see **64 50 009 Drawing off, evacuating and filling A/C system (R 134a)**.
- Remove heater bulkhead, see **51 71 080 REMOVING AND INSTALLING/REPLACING HEATER BULKHEAD**.

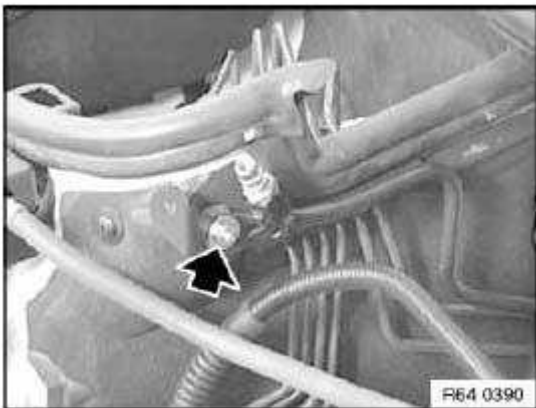


Fig. 56: Locating Nut

Courtesy of BMW OF NORTH AMERICA, INC.

Unfasten nut.

Installation:

Tightening torque: 64 53 10AZ, see **64 11 HOUSING, HEATER/AIR CONDITIONER** .

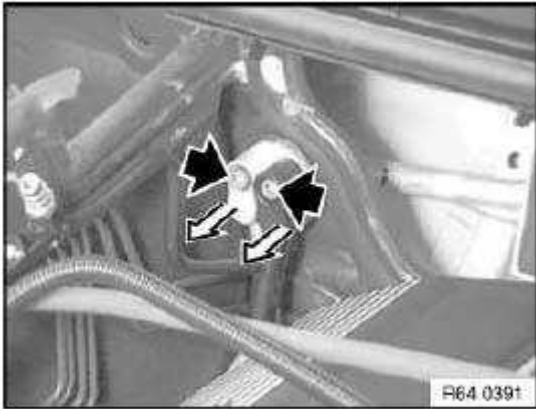


Fig. 57: Locating Screws

Courtesy of BMW OF NORTH AMERICA, INC.

Unfasten screws.

Detach refrigerant lines in direction of arrow.

Installation:

Replace sealing rings.

Tightening torque: 64 53 2AZ, see **64 11 HOUSING, HEATER/AIR CONDITIONER** .

If necessary, pull lock (1) in direction of arrow and feed out flap (2).

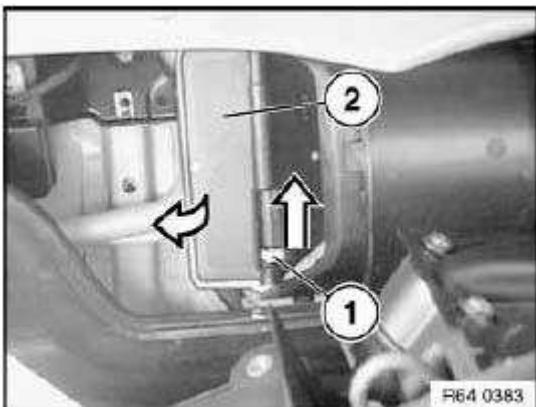


Fig. 58: Pulling Lock

Courtesy of BMW OF NORTH AMERICA, INC.

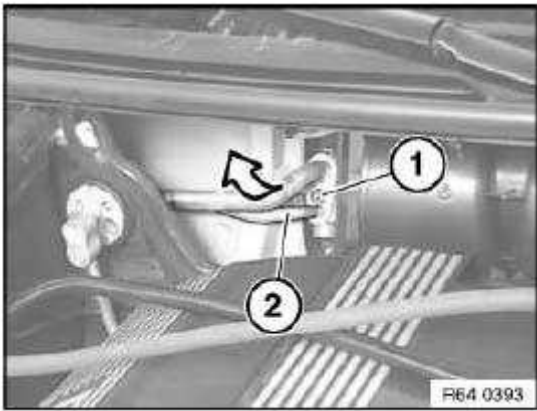


Fig. 59: Double Pipe

Courtesy of BMW OF NORTH AMERICA, INC.

Unscrew nut (1).

Installation:

Replace sealing rings.

Tightening torque: 64 53 11AZ, see **64 11 HOUSING, HEATER/AIR CONDITIONER** .

Detach double pipe (2) in direction of arrow and lay to one side.

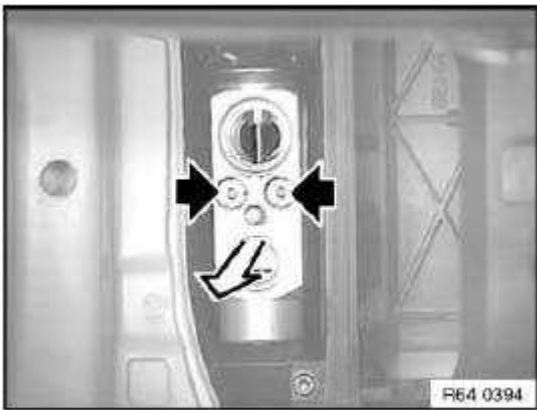


Fig. 60: Screws

Courtesy of BMW OF NORTH AMERICA, INC.

Unfasten screws.

Installation:

Replace sealing rings.

Tightening torque: 64 53 9AZ, see **64 11 HOUSING, HEATER/AIR CONDITIONER** .

Pull out expansion valve in direction of arrow.

64 52 ... INSTRUCTIONS FOR OPENING AND REPLACING PARTS IN REFRIGERANT CIRCUIT

WARNING:

- Avoid contact with refrigerant and refrigerant oil
- Follow safety instructions for handling R134a refrigerant, see **64 50 ... Safety instructions for handling refrigerant R134a**.
- Follow safety instructions for handling refrigerant oil, see **64 50 ... Instructions for handling refrigerant oil (for refrigerant R 134a)**.

CAUTION:

- Always use new O-rings each time A/C connections are opened
- Moisten O-rings with refrigerant oil prior to fitting
- Seal all parts to be returned at openings to prevent ingress of moisture or foreign bodies

I. Opening refrigerant circuit without part replacement, as preliminary work to further work

(e.g. engine removal):

Work sequence:

- Draw off A/C system, then determine drawn-off refrigerant oil quantity, see **64 50 009 Drawing off, evacuating and filling A/C system (R 134a)**.
- Carry out main work
- Replace removed refrigerant oil with new refrigerant oil
- Evacuate and fill A/C system, see **64 50 009 Drawing off, evacuating and filling A/C system (R 134a)**.

II. Part replacement and part replacement on account of insidious leak

(minor leak, e.g. hairline crack)

Work sequence:

- Draw off A/C system, then determine drawn-off refrigerant oil quantity, see **64 50 009 Drawing off, evacuating and filling A/C system (R 134a)**.
- Carry out part replacement
- Replace removed refrigerant oil with new refrigerant oil
- Additionally replenish new refrigerant oil in accordance with replaced parts:
 - Compressor: refer to **64 52 ... Instructions for compressor replacement**.
 - Evaporator: 10 ml

- Condenser: 10 ml
- Desiccant insert / desiccant bottle: 30 ml
- Each replaced refrigerant line: 10 ml
- Condenser with integrated dryer: 30 ml
- Safety pressure switch and seals: no additional refrigerant oil
- Evacuate and fill A/C system, see **64 50 009 Drawing off, evacuating and filling A/C system (R 134a)**.

III. Part replacement on account of sudden leak

(major leak, e.g. pipe break due to accident)

Work sequence:

- Draw off A/C system, then determine drawn-off refrigerant oil quantity, see **64 50 009 Drawing off, evacuating and filling A/C system (R 134a)**.
- Carry out part replacement
- Replace removed refrigerant oil with new refrigerant oil
- Additionally replenish new refrigerant oil in accordance with replaced parts:
 - Compressor: refer to **64 52 ... Instructions for compressor replacement**.
 - Evaporator: 10 ml
 - Condenser: 10 ml
 - Desiccant insert / desiccant bottle: 30 ml
 - Each replaced refrigerant line: 10 ml
 - Condenser with integrated dryer: 30 ml
 - Safety pressure switch and seals: no additional refrigerant oil
- Evacuate and fill A/C system, see **64 50 009 Drawing off, evacuating and filling A/C system (R 134a)**.

IV. Part replacement on account of sudden leak

(major leak, e.g. pipe break due to accident)

Work sequence:

- Draw off A/C system, then determine drawn-off refrigerant oil quantity, see **64 50 009 Drawing off, evacuating and filling A/C system (R 134a)**.
- Carry out part replacement
- Replace removed refrigerant oil with new refrigerant oil
- Additionally replenish 25 ml new refrigerant oil and new refrigerant oil in accordance with replaced parts:
 - Compressor: refer to **64 52 ... Instructions for compressor replacement**.
 - Evaporator: 10 ml

- Condenser: 10 ml
- Desiccant insert / desiccant bottle: 30 ml
- Each replaced refrigerant line: 10 ml
- Condenser with integrated dryer: 30 ml
- Safety pressure switch and seals: no additional refrigerant oil
- Evacuate and fill A/C system, see **64 50 009 Drawing off, evacuating and filling A/C system (R 134a)**.

64 51 ... LEAK-TESTING CONDENSER

Special tools Required

- 00 9 030 (Wedge)
- 64 5 121 (Connection hose with clamp)
- 64 5 122 (Climate condenser test adapter)
- 64 5 123 (Climate condenser seal plug)

WARNING: Risk of injury!

Refrigerant circuit is under high pressure!

Follow safety instructions for handling refrigerant

Comply with the standard national safety instructions and precautions on handling nitrogen.

Ensure that employees are advised of how to handle pressurized vessels and nitrogen correctly (danger of asphyxiation). For this purpose, follow the notes and instructions in the technical safety specifications available from the gas supplier.

Necessary preliminary tasks:

- Drain off **air conditioner**
- Detach refrigerant lines from condenser

Tightening torque, see 64 53 6AZ in **64 53 REFRIGERANT LINES AND EXPANSION VALVE** .

IMPORTANT: Risk of damage!

Special tool 64 5 122 and special tool 64 5 123 have different diameters (A, B) at the seal plugs!

Ensure correct connection assignment on condenser.

Replace sealing rings (1) prior to each use.

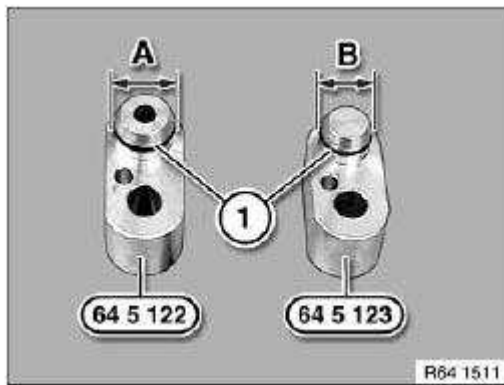


Fig. 61: Identifying Special Tool 64 5 122, 64 5 123 & Sealing Rings
Courtesy of BMW OF NORTH AMERICA, INC.

Fit and secure sealing adapter **64 5 123** to connection of low-pressure line.

Fit and secure test adapter **64 5 122** to connection of low-pressure line.

Tightening torque, see 64 53 6AZ in **64 53 REFRIGERANT LINES AND EXPANSION VALVE** .

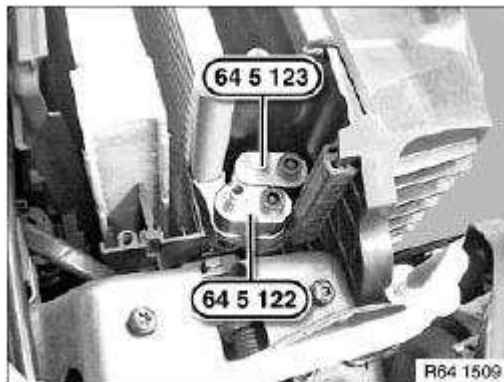


Fig. 62: Identifying Special Tool 64 5 122 & 64 5 123
Courtesy of BMW OF NORTH AMERICA, INC.

Connect special tool **64 5 122** to special tool **64 5 121** .

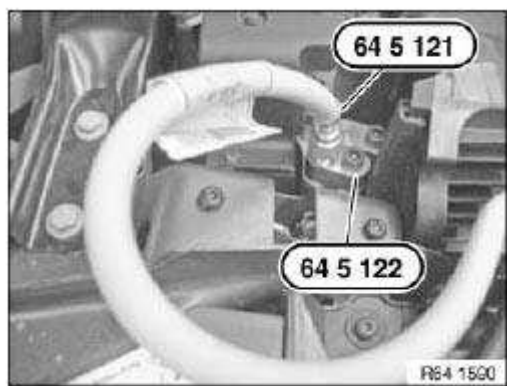


Fig. 63: Identifying Special Tool 64 5 122 & 64 5 121
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Risk of damage: Use only nitrogen pressure bottles with pressure reducers for leak-testing.

Pressurize condenser to 10 bar slowly only. Excessively fast pressurization and pressures in excess of 20 bar may cause damage to the condenser.

Connect nitrogen pressure bottle with pressure reducer to pressure gauge and then connect to special tool **64 5 121** (connecting hose).

NOTE:

- **Testing apparatus must be leakproof.**
- **Ambient temperature and temperature of vehicle must not change during the test procedure.**
- **Do not move the vehicle during this period**

Apply test pressure of 10 bar **slowly** and close nitrogen pressure bottle.

Check leak-tightness of testing apparatus and of connection to refrigerant line.

Set test pressure of 10 bar is only permitted to drop by 2 bar to 8.5 bar over a test period of 1.5 hours.

If the pressure loss is greater than 1.5 bar, this indicates that there is a leak in the condenser unit.

WARNING: After leak-testing, unscrew special tool 64 5 121 slowly from special tool 64 5 122 to reduce pressure.

After leak-testing:

- Replace all sealing rings and moisten with refrigerant oil
- Assemble A/C system
- Evacuate and fill A/C system

64 51 ... LEAK-TESTING EVAPORATOR

Special tools Required

- 64 5 121
- 64 5 125

WARNING: It is essential, when handling nitrogen, to observe the standard national safety regulations.

Ensure that employees are advised of how to handle pressurized vessels and nitrogen correctly (danger of asphyxiation). For this purpose, follow the notes and instructions in the technical safety specifications available from the gas supplier.

Necessary preliminary tasks:

- Remove expansion valve .

Replace sealing rings (1) and coat with refrigerant oil

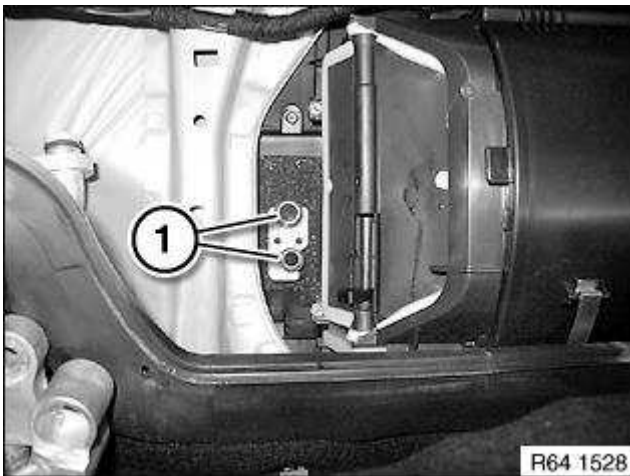


Fig. 64: Replace Sealing Rings (1) And Coat With Refrigerant Oil
Courtesy of BMW OF NORTH AMERICA, INC.

Connect special tool **64 5 125** to retainer and screws of expansion valve.

Tightening torque, see 64 53 9AZ in **64 53 REFRIGERANT LINES AND EXPANSION VALVE** .

Connect special tool **64 5 121** to special tool 64 5 125.

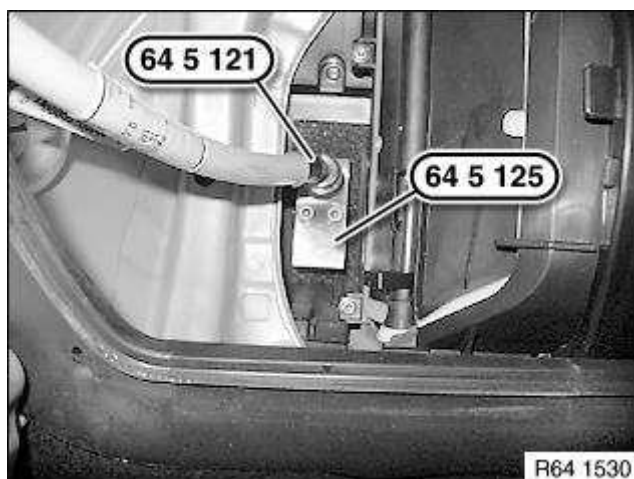


Fig. 65: Identifying Special Tool 64 5 121 & 64 5 125
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Risk of damage: Use only nitrogen pressure bottles with pressure reducers for leak-testing.

Pressurize evaporator to 10 bar slowly only. Excessively fast pressurization and pressures in excess of 20 bar may cause damage to the evaporator.

Connect nitrogen pressure bottle with pressure reducer to pressure gauge and then connect to special tool **64 5 121** (connecting hose).

NOTE:

- **Testing apparatus must be leakproof.**
- **Ambient temperature and temperature of vehicle must not change during the test procedure.**
- **Do not move the vehicle during this period**

Apply test pressure of 10 bar slowly and close nitrogen pressure bottle.

Check leak-tightness of testing apparatus and of connection to refrigerant line.

Set test pressure of 10 bar is only permitted to drop by 2 bar to 8.5 bar over a test period of 1.5 hours.

If the pressure loss is greater than 1.5 bar, this indicates that there is a leak in the evaporator unit.

WARNING: After leak-testing, unscrew special tool 64 5 121 slowly from special tool 64 5 125 to reduce pressure.

After leak-testing:

- **Replace all sealing rings and moisten with refrigerant oil**

52 COMPRESSOR

64 52 ... INSTRUCTIONS FOR COMPRESSOR REPLACEMENT

IMPORTANT: Compressors with plastic belt pulleys:

- Avoid impacts/knocks to plastic belt pulley (caused by tools, contact with base).
- Return faulty compressors in their original packaging only.

IMPORTANT: When starting up a new compressor for the first time, it is absolutely essential to carry out the following breaking-in procedure:

- Switch on A/C system
- Set all air vents in instrument cluster to "OPEN"
- Start engine and let it stabilize at idle speed
- Set blower output to min. 75 % of max. blower output
- Switch on A/C system and run for at least 2 minutes at idle speed (risk of damage at higher speed!)

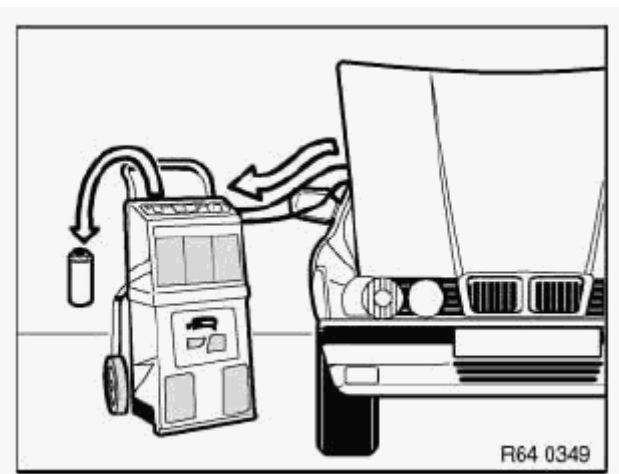


Fig. 66: Evacuating Refrigerant Oil From Air-Conditioning System
Courtesy of BMW OF NORTH AMERICA, INC.

When evacuating the air-conditioning system, refrigerant oil is also extracted and collected in the oil separator of the service station.

After evacuation, the refrigerant must be filtered in the service station as the oil separator could still contain a liquid refrigerant/oil mixture. The filtering process gasifies the refrigerant completely and only the previously bound refrigerant oil remains in the oil separator. Measure and note down this quantity of refrigerant oil, refer to Evacuate and fill A/C system, see **64 50 009 Drawing off, evacuating and filling A/C system (R 134a)**..

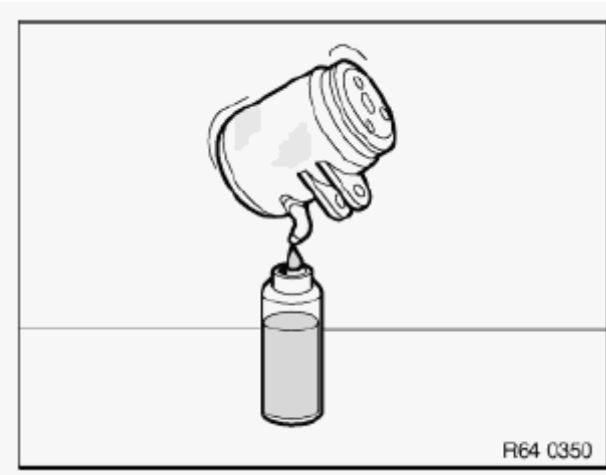


Fig. 67: Transferring Refrigerant Oil Into Container
Courtesy of BMW OF NORTH AMERICA, INC.

Transfer the refrigerant oil remaining in the previous compressor via the filler plug completely into a measuring container.

Measure the amount of refrigerant oil collected from the previous compressor.

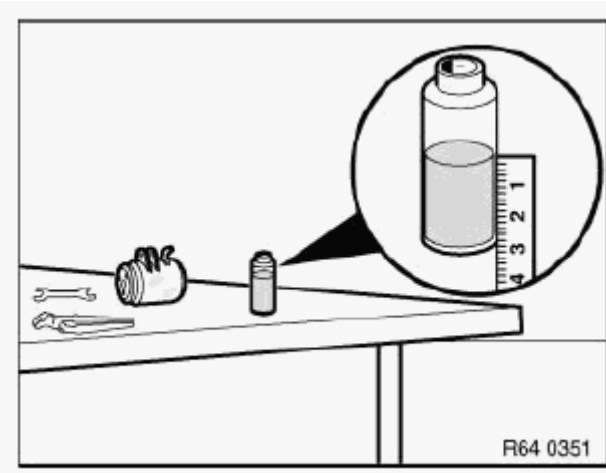


Fig. 68: Measuring Amount Of Refrigerant Oil
Courtesy of BMW OF NORTH AMERICA, INC.

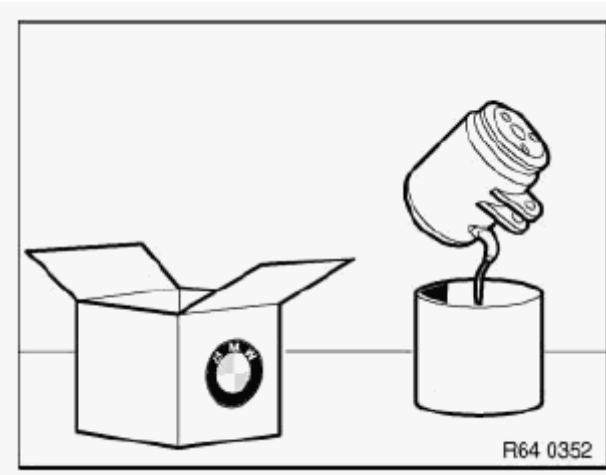


Fig. 69: Removing Refrigerant Oil Into Clean Container
 Courtesy of BMW OF NORTH AMERICA, INC.

The new compressor is filled at the factory with refrigerant oil.

Open filler plug and pour entire contents of compressor into a clean container.

Installation:

Replace sealing ring and moisten with refrigerant oil.

Observe tightening torque: 64 52 2AZ, see **64 52 A/C COMPRESSOR** .

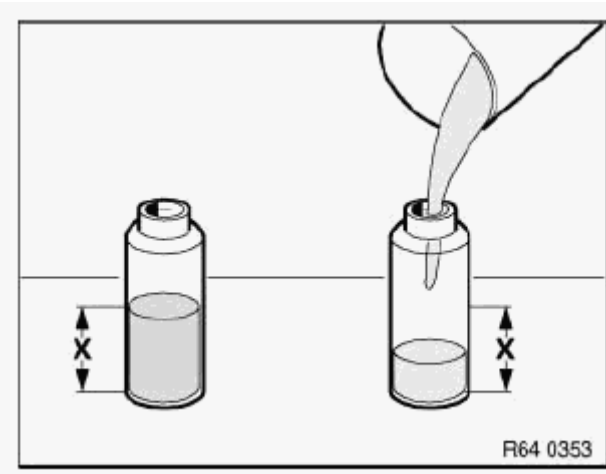


Fig. 70: Pouring Same Amount Of Refrigerant Oil Extra Into Clean Measuring Container
 Courtesy of BMW OF NORTH AMERICA, INC.

From the new compressor, pour the same amount of refrigerant oil (as drained from the previous compressor) + 10 g extra into a clean measuring container and pour again into the new compressor.

Remaining refrigerant oil can be poured into service station tank, refer to Evacuate and fill A/C system, see **64**

50 009 Drawing off, evacuating and filling A/C system (R 134a)..

Otherwise the excess refrigerant oil must be disposed of correctly.

On account of its hygroscopic properties, refrigerant oil must not be stored in open containers.

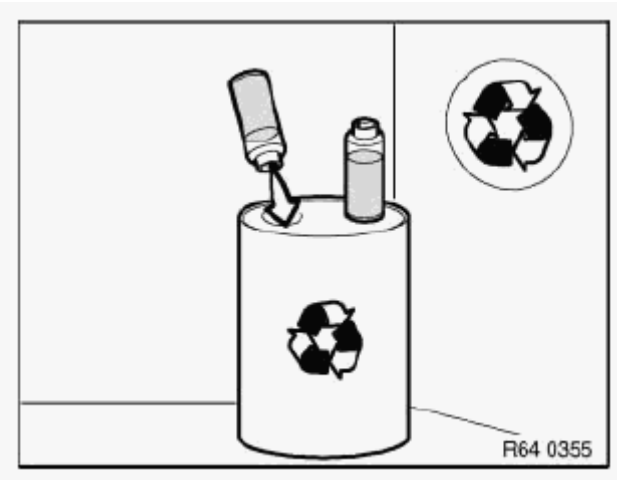


Fig. 71: Draining Refrigerant Oil

Courtesy of BMW OF NORTH AMERICA, INC.

The refrigerant oil drawn off from the oil separator of the service station and from the previous compressor must not be reused and must be correctly disposed of.

After installing the new compressor, it is essential before filling the A/C system to pour the same amount of the previously drawn off refrigerant oil into the system again, refer to Evacuate and fill A/C system, see **64 50 009 Drawing off, evacuating and filling A/C system (R 134a)..**

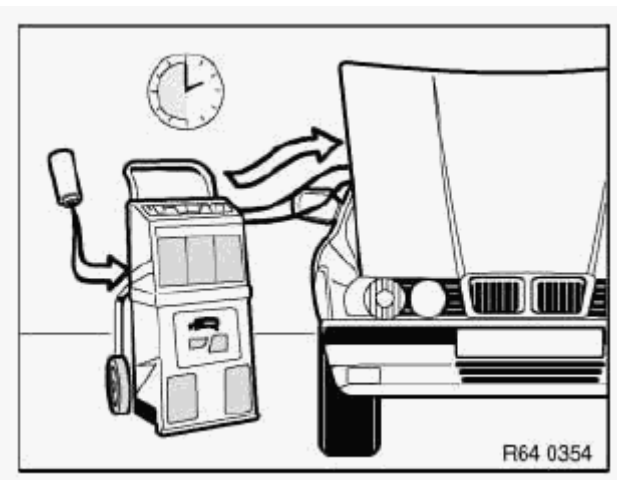


Fig. 72: Evacuating Refrigerant Oil Into A/C System

Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

If A/C system is opened for more than 24 hours: Replace drier bottle/drier insert .

64 52 ... INSTRUCTIONS FOR OPENING AND REPLACING PARTS IN REFRIGERANT CIRCUIT

WARNING: Avoid contact with refrigerant and refrigerant oil

- Follow safety instructions for handling R134a refrigerant, see 64 50 ... Safety instructions for handling refrigerant R134a.
- Follow safety instructions for handling refrigerant oil, see 64 50 ... Instructions for handling refrigerant oil (for refrigerant R 134a).

CAUTION:

- Always use new O-rings each time A/C connections are opened
- Moisten O-rings with refrigerant oil prior to fitting
- Seal all parts to be returned at openings to prevent ingress of moisture or foreign bodies

I. Opening refrigerant circuit without part replacement, as preliminary work to further work

(e.g. engine removal):

Work sequence:

- Draw off A/C system, then determine drawn-off refrigerant oil quantity, see 64 50 009 Drawing off, evacuating and filling A/C system (R 134a).
- Carry out main work
- Replace removed refrigerant oil with new refrigerant oil
- Evacuate and fill A/C system, see 64 50 009 Drawing off, evacuating and filling A/C system (R 134a).

II. Part replacement and part replacement on account of insidious leak

(minor leak, e.g. hairline crack)

Work sequence:

- Draw off A/C system, then determine drawn-off refrigerant oil quantity, see 64 50 009 Drawing off, evacuating and filling A/C system (R 134a).
- Carry out part replacement
- Replace removed refrigerant oil with new refrigerant oil
- Additionally replenish new refrigerant oil in accordance with replaced parts:
 - Compressor: refer to 64 52 ... Instructions for compressor replacement.
 - Evaporator: 10 ml
 - Condenser: 10 ml
 - Desiccant insert / desiccant bottle: 30 ml

- Each replaced refrigerant line: 10 ml
- Condenser with integrated dryer: 30 ml
- Safety pressure switch and seals: no additional refrigerant oil
- Evacuate and fill A/C system, see **64 50 009 Drawing off, evacuating and filling A/C system (R 134a)**.

III. Part replacement on account of sudden leak

(major leak, e.g. pipe break due to accident)

Work sequence:

- Draw off A/C system, then determine drawn-off refrigerant oil quantity, see **64 50 009 Drawing off, evacuating and filling A/C system (R 134a)**.
- Carry out part replacement
- Replace removed refrigerant oil with new refrigerant oil
- Additionally replenish new refrigerant oil in accordance with replaced parts:
 - Compressor: refer to **64 52 ... Instructions for compressor replacement**.
 - Evaporator: 10 ml
 - Condenser: 10 ml
 - Desiccant insert / desiccant bottle: 30 ml
 - Each replaced refrigerant line: 10 ml
 - Condenser with integrated dryer: 30 ml
 - Safety pressure switch and seals: no additional refrigerant oil
- Evacuate and fill A/C system, see **64 50 009 Drawing off, evacuating and filling A/C system (R 134a)**.

64 52 521 REPLACING A/C SYSTEM COMPRESSOR (N52K)

Special tools required:

- 32 1 270 (Plug)

WARNING: Avoid contact with refrigerant and refrigerant oil.

Follow safety instructions for handling R134a refrigerant, see **64 50 ... Safety instructions for handling refrigerant R134a**.

Follow safety instructions for handling refrigerant oil, see **64 50 ... Instructions for handling refrigerant oil (for refrigerant R 134a)**.

IMPORTANT: Risk of damage! Restart engine only when A/C system has been correctly filled. Read and comply with notes on replacing compressor. Follow instructions for opening and replacing parts in refrigerant circuit. If A/C system is opened for more than 24 hours: Replace desiccant insert for A/C system.

Necessary preliminary tasks:

- Evacuate and fill A/C system, see **64 50 009 Drawing off, evacuating and filling A/C system (R 134a)**. are not included in the time value given for this work operation
- Remove A/C compressor drive belt
- Remove coolant thermostat. See **11 53 000 REMOVING AND INSTALLING/REPLACING COOLANT THERMOSTAT (N52K)** .

Release screws (1) and disconnect plug connection on compressor. Disconnect pressure and suction lines.

Installation: Replace all sealing rings and moisten with refrigerant oil. Tightening torque, see 64 52 1AZ in **64 52 A/C COMPRESSOR** .

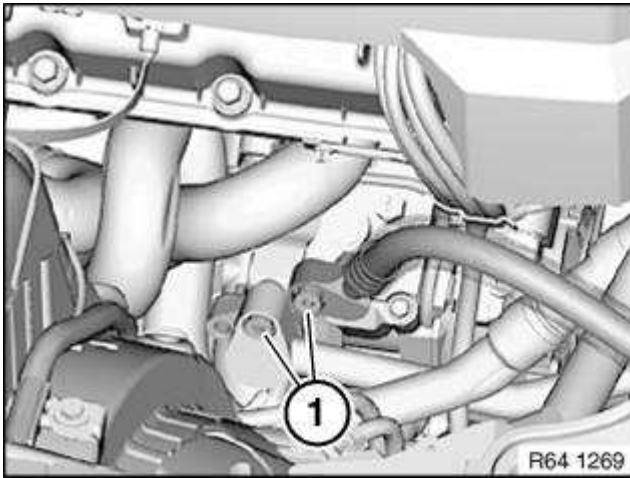


Fig. 73: Release Screws (1) And Disconnect Plug Connection On Compressor

Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Seal openings or lines on compressor with special tool 32 1 270 to prevent escape of media and fouling.

NOTE: Secure compressor (3) against falling out. Release screw (1). Release screws (2) and feed out compressor towards front. Tightening torque, see 64 52 3AZ in **64 52 A/C COMPRESSOR** .

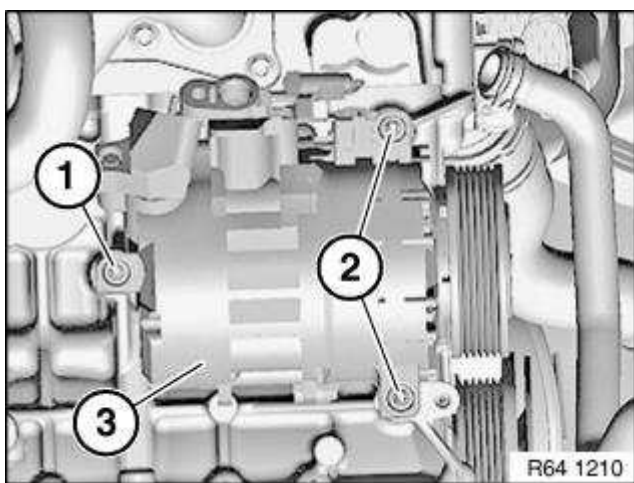


Fig. 74: Release Screws (2) And Feed Out Compressor Towards Front
 Courtesy of BMW OF NORTH AMERICA, INC.

After installation: Fill and vent cooling system. Evacuate and fill A/C system.

64 52 521 REPLACING AIR CONDITIONING COMPRESSOR (N54, N55)

Special tools required:

- 00 9 030 (Wedge)
- 32 1 270 (Plug)

WARNING: Avoid contact with refrigerant and refrigerant oil.
 Follow safety instructions for handling R134a refrigerant, see 64 50 ...
Safety instructions for handling refrigerant R134a.
 Follow safety instructions for handling refrigerant oil, see 64 50 ...
Instructions for handling refrigerant oil (for refrigerant R 134a).

IMPORTANT: Risk of damage! Restart engine only when A/C system has been correctly filled.
 Read and comply with notes on replacing compressor. Follow instructions for opening and replacing parts in refrigerant circuit. If A/C system is opened for more than 24 hours: Replace desiccant insert for A/C system.

Necessary preliminary tasks:

- Evacuate and fill A/C system, see 64 50 009 Drawing off, evacuating and filling A/C system (R 134a). are not included in the time value given for this work operation
- Remove A/C compressor drive belt
- Remove left charge air duct

Release screws (1) and (2). Remove refrigerant line. Tightening torque 64 52 1AZ. Installation note: Replace sealing rings. Use special tool 00 9 030 to mount sealing rings without damaging them.

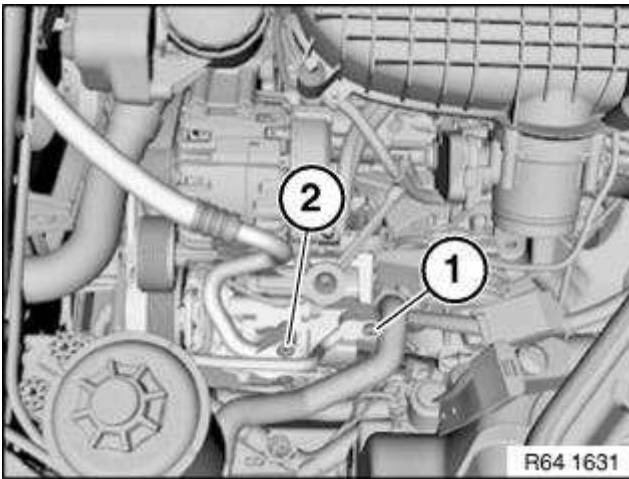


Fig. 75: Release Screws (1) And (2)

Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Seal openings or lines on compressor with special tool 32 1 270 to prevent escape of media and dirt contamination.

IMPORTANT: Secure compressor against falling.

Disconnect plug connection (1). Unfasten screws (2). Release screw (3) and feed out compressor in upward direction. Tightening torque 64 52 3AZ.

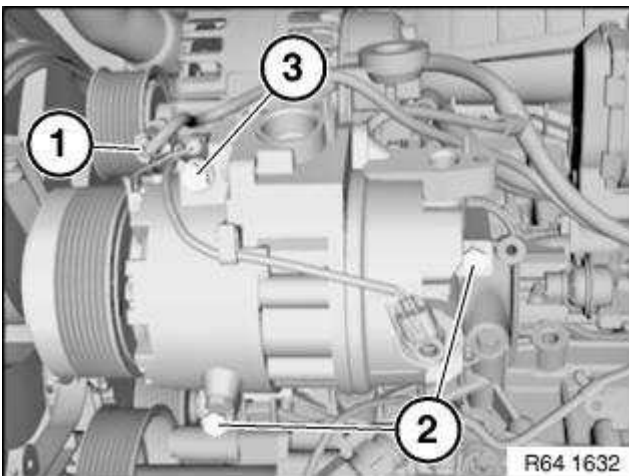


Fig. 76: Release Screw (3) And Feed Out Compressor In Upward Direction

Courtesy of BMW OF NORTH AMERICA, INC.

Replacement: Read and comply with notes on compressor replacement. If necessary, release screws (1) and modify holder (2).

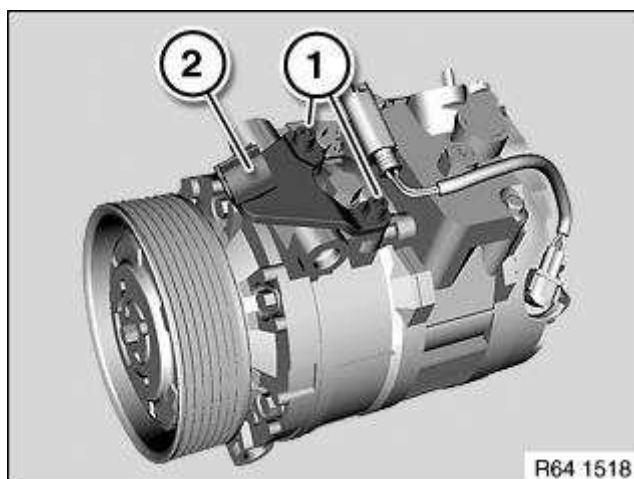


Fig. 77: Release Screws (1) And Modify Holder (2)
 Courtesy of BMW OF NORTH AMERICA, INC.

After installation: Evacuate and fill air conditioning system. Assemble engine.

53 CONDENSER AND DRYER WITH LINES

64 52 ... INSTRUCTIONS FOR OPENING AND REPLACING PARTS IN REFRIGERANT CIRCUIT

WARNING:

- Avoid contact with refrigerant and refrigerant oil
- Follow safety instructions for handling R134a refrigerant, see 64 50 ... Safety instructions for handling refrigerant R134a.
- Follow safety instructions for handling refrigerant oil, see 64 50 ... Instructions for handling refrigerant oil (for refrigerant R 134a).

CAUTION:

- Always use new O-rings each time A/C connections are opened.
- Moisten O-rings with refrigerant oil prior to fitting
- Seal all parts to be returned at openings to prevent ingress of moisture or foreign bodies

I. Opening refrigerant circuit without part replacement, as preliminary work to further work

(e.g. engine removal):

Work sequence:

- Draw off A/C system, then determine drawn-off refrigerant oil quantity, see 64 50 009 Drawing off, evacuating and filling A/C system (R 134a).
- Carry out main work
- Replace removed refrigerant oil with new refrigerant oil
- Evacuate and fill A/C system, see 64 50 009 Drawing off, evacuating and filling A/C system (R

134a).**II. Part replacement and part replacement on account of insidious leak**

(minor leak, e.g. hairline crack)

Work sequence:

- Draw off A/C system, then determine drawn-off refrigerant oil quantity, see **64 50 009 Drawing off, evacuating and filling A/C system (R 134a).**
- Carry out part replacement
- Replace removed refrigerant oil with new refrigerant oil
- Additionally replenish new refrigerant oil in accordance with replaced parts:
 - Compressor: refer to **64 52 ... Instructions for compressor replacement.**
 - Evaporator: 10 ml
 - Condenser: 10 ml
 - Desiccant insert / desiccant bottle: 30 ml
 - Each replaced refrigerant line: 10 ml
 - Condenser with integrated dryer: 30 ml
 - Safety pressure switch and seals: no additional refrigerant oil
- Evacuate and fill A/C system, see **64 50 009 Drawing off, evacuating and filling A/C system (R 134a).**

III. Part replacement on account of sudden leak

(major leak, e.g. pipe break due to accident)

Work sequence:

- Draw off A/C system, then determine drawn-off refrigerant oil quantity, see **64 50 009 Drawing off, evacuating and filling A/C system (R 134a).**
- Carry out part replacement
- Replace removed refrigerant oil with new refrigerant oil
- Additionally replenish 25 ml new refrigerant oil and new refrigerant oil in accordance with replaced parts:
 - Compressor: refer to **64 52 ... Instructions for compressor replacement.**
 - Evaporator: 10 ml
 - Condenser: 10 ml
 - Desiccant insert / desiccant bottle: 30 ml
 - Each replaced refrigerant line: 10 ml
 - Condenser with integrated dryer: 30 ml
 - Safety pressure switch and seals: no additional refrigerant oil
- Evacuate and fill A/C system, see **64 50 009 Drawing off, evacuating and filling A/C system (R**

134a).

64 53 ... NOTES ON REPLACING DRIER BOTTLE OR DRIER INSERT

The drier bottle or drier insert does not have to be replaced at regular service intervals in a functioning, leakproof A/C system.

However, the drier bottle or drier insert must be replaced without fail in the event of:

- fouling of the refrigerant by filings/shavings (e.g. when the compressor is clamped)
- a leaking A/C system or loss of refrigerant
- the refrigerant circuit being opened for a period exceeding 24 hours, e.g. during repair work.

64 53 ... REPLACING VALVE INSERT FOR REFRIGERANT LINE

Avoid contact with refrigerant and refrigerant oil.

Follow safety instructions for handling R134a refrigerant, see **64 50 ... Safety instructions for handling refrigerant R134a.**

Follow safety instructions for handling refrigerant oil, see **64 50 ... Instructions for handling refrigerant oil (for refrigerant R 134a).**

IMPORTANT: Risk of damage!

Restart engine only when A/C system has been correctly filled.

If A/C system is opened for more than 24 hours: Replacing drier insert for A/C system

NOTE: The special tool is available under BMW order number: 81 34 0 427 679 from the BMW workshop equipment catalogue.

Necessary preliminary tasks:

- Evacuate and fill A/C system, see **64 50 009 Drawing off, evacuating and filling A/C system (R 134a).** are not included in the time value given for this work operation

Twist valve insert out of filler neck (2) with remover (1).

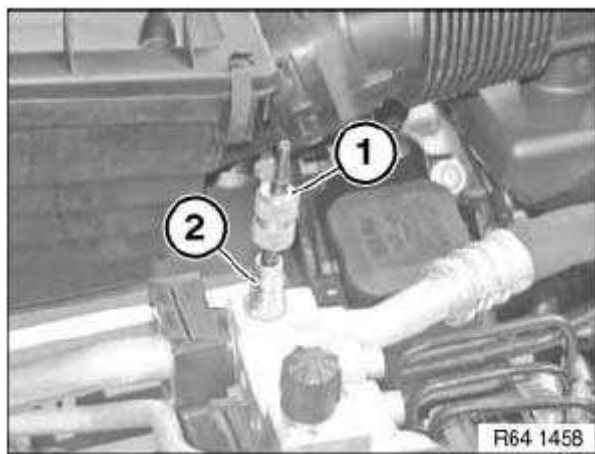


Fig. 78: Screw

Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Screw in valve insert hand-tight only.

After installation:

- Evacuate and fill A/C system, see **64 50 009 Drawing off, evacuating and filling A/C system (R 134a).**
- Check leak-tightness of valve insert with soapy solution

In event of leakage:

- Evacuate and fill A/C system, see **64 50 009 Drawing off, evacuating and filling A/C system (R 134a).**
- Check sealing faces on line and valve insert for damage, replace line or valve insert if necessary

64 53 510 REMOVING AND INSTALLING/REPLACING DRYER BOTTLE FOR AIR CONDITIONER

WARNING: Avoid contact with refrigerant and refrigerant oil.

Follow safety instructions for handling R134a refrigerant, see **64 50 ... Safety instructions for handling refrigerant R134a.**

Follow safety instructions for handling refrigerant oil, see **64 50 ... Instructions for handling refrigerant oil (for refrigerant R 134a).**

IMPORTANT: Risk of damage!

Restart engine only when A/C system has been correctly filled.

A/C system is opened for more than 24 hours:

Replacing drier insert for A/C system

Necessary preliminary tasks:

- Evacuate and fill A/C system, see **64 50 009 Drawing off, evacuating and filling A/C system (R 134a)**. are not included in the time value given for this work operation
- Release fluid reservoir for windscreen washer system and place to one side
- Partially detach front right wheel arch, see **51 71 040 REMOVING AND INSTALLING/REPLACING FRONT LEFT OR RIGHT WHEEL ARCH COVER** .

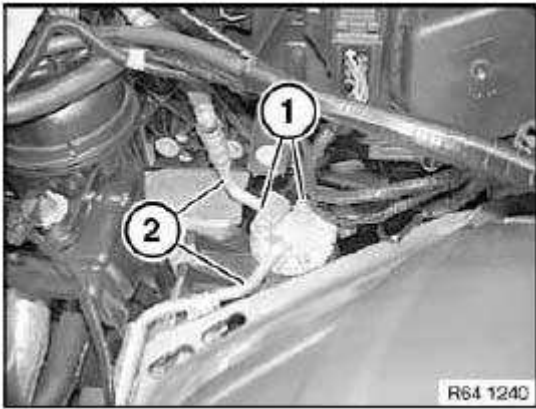


Fig. 79: Screws And Refrigerant Lines
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1) and remove refrigerant lines (2).

Installation:

Replace all sealing rings.

Tightening torque: 64 53 1AZ, see **64 11 HOUSING, HEATER/AIR CONDITIONER** .

Slacken screws (1) and remove dryer bottle (2) towards top.

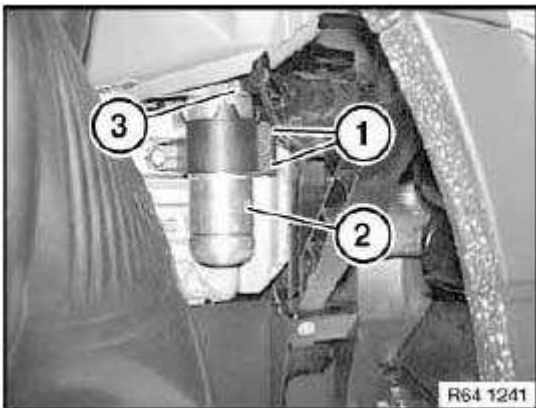


Fig. 80: Dryer Bottle And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (3).

Installation:

Make sure dryer bottle is securely seated.

After installation:

- Evacuate and fill A/C system, see 64 50 009 Drawing off, evacuating and filling A/C system (R 134a).

64 53 520 REPLACING SAFETY PRESSURE SWITCH

WARNING: Avoid contact with refrigerant and refrigerant oil.

Follow safety instructions for handling R134a refrigerant, see 64 50 ... Safety instructions for handling refrigerant R134a.

Follow safety instructions for handling refrigerant oil, see 64 50 ... Instructions for handling refrigerant oil (for refrigerant R 134a).

NOTE: The time value given for this work operation does not include drawing off, evacuating and filling the A/C system!

- Drain off air conditioner, see 64 50 009 Drawing off, evacuating and filling A/C system (R 134a).

IMPORTANT: Risk of damage!

Restart engine only when A/C system has been correctly filled.

NOTE: If A/C system is opened for more than 24 hours: Replace drier for A/C system, see 64 53 510 Removing and installing/replacing dryer bottle for air conditioner.

Necessary preliminary tasks:

- Release fluid reservoir for windscreen washer system and place to one side

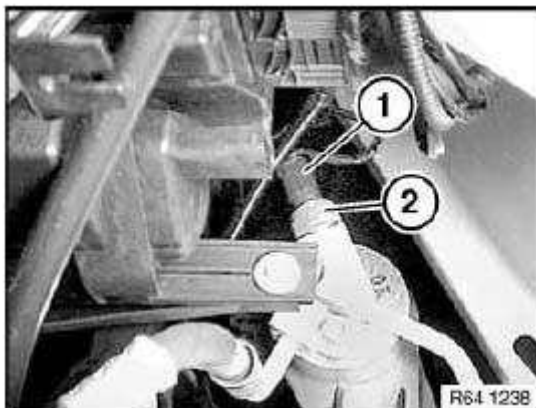


Fig. 81: Safety Pressure Switch

Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

Release safety pressure switch (2).

Tightening torque: 64 53 13AZ, see **64 11 HOUSING, HEATER/AIR CONDITIONER** .

64 53 550 REMOVING AND INSTALLING OR REPLACING CAPACITOR FOR THE HEATING AND AIR CONDITIONING SYSTEM**WARNING:**

- Avoid contact with refrigerant and refrigerant oil
- Follow safety instructions for handling R134a refrigerant, see **64 50 ... Safety instructions for handling refrigerant R134a**.
- Follow safety instructions for handling refrigerant oil, see **64 50 ... Instructions for handling refrigerant oil (for refrigerant R 134a)**.

IMPORTANT: Risk of damage! Restart engine only when heating and air conditioning system has been correctly filled.

NOTE: Follow notes for opening and replacing parts in refrigerant circuit. If Air conditioning system is opened for more than 24 hours: Replacing desiccant insert for air conditioning system

IMPORTANT: The desiccant insert can only be replaced in vehicles up to 12/08! In vehicles after 12/08, the air conditioning capacitor must be replaced!

Necessary preliminary tasks:

- Draw off A/C system, then determine drawn-off refrigerant oil quantity, see **64 50 009 Drawing off, evacuating and filling A/C system (R 134a)**.
- Remove radiator.

Release screws (1) and remove refrigerant lines. Installation note: Tightening torque 64 53 6AZ, see **64 53 REFRIGERANT LINES AND EXPANSION VALVE** . Replace all sealing rings and moisten with refrigerant oil.

Release screw (2) and remove the spacers (3). Release retaining clip (4) and remove capacitor (5).

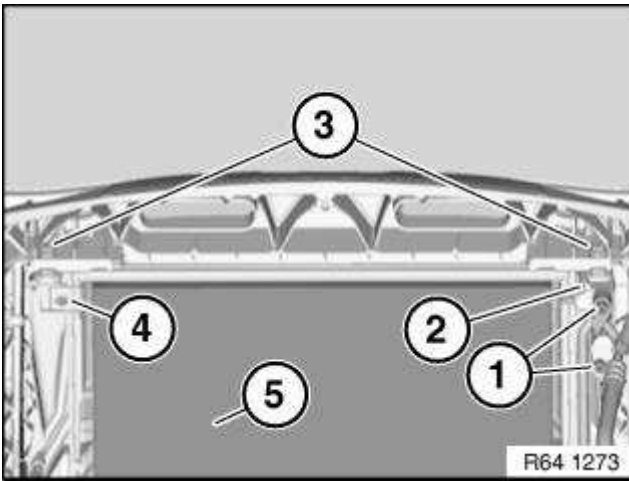


Fig. 82: Release Screw (2) And Remove The Spacers (3)
Courtesy of BMW OF NORTH AMERICA, INC.

After installation: **Evacuate and fill heating and air conditioning system.** Fill and vent cooling system and check for leaks. See **CHECKING COOLING SYSTEM** .

CABIN AIR FILTER

BMW - X3 (E83)

REMOVAL & INSTALLATION

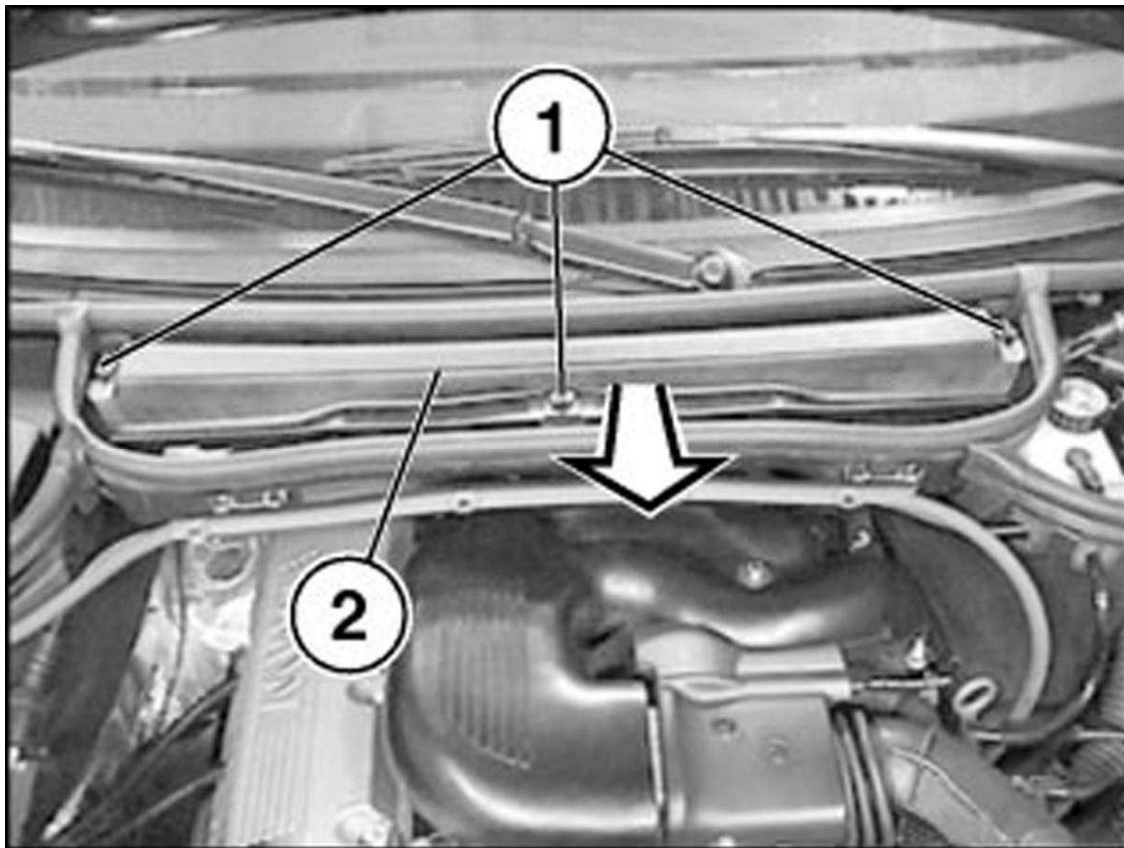
NOTE: Manufacturer's terminology for this filter is microfilter.

NOTE: Numbers in parenthesis refer to numbers in figures.

CABIN AIR FILTER

Removal & Installation

1. Turn toggle (1) approximately 90 degrees and remove cover (2) towards front. See **Fig. 1**.



G00213245

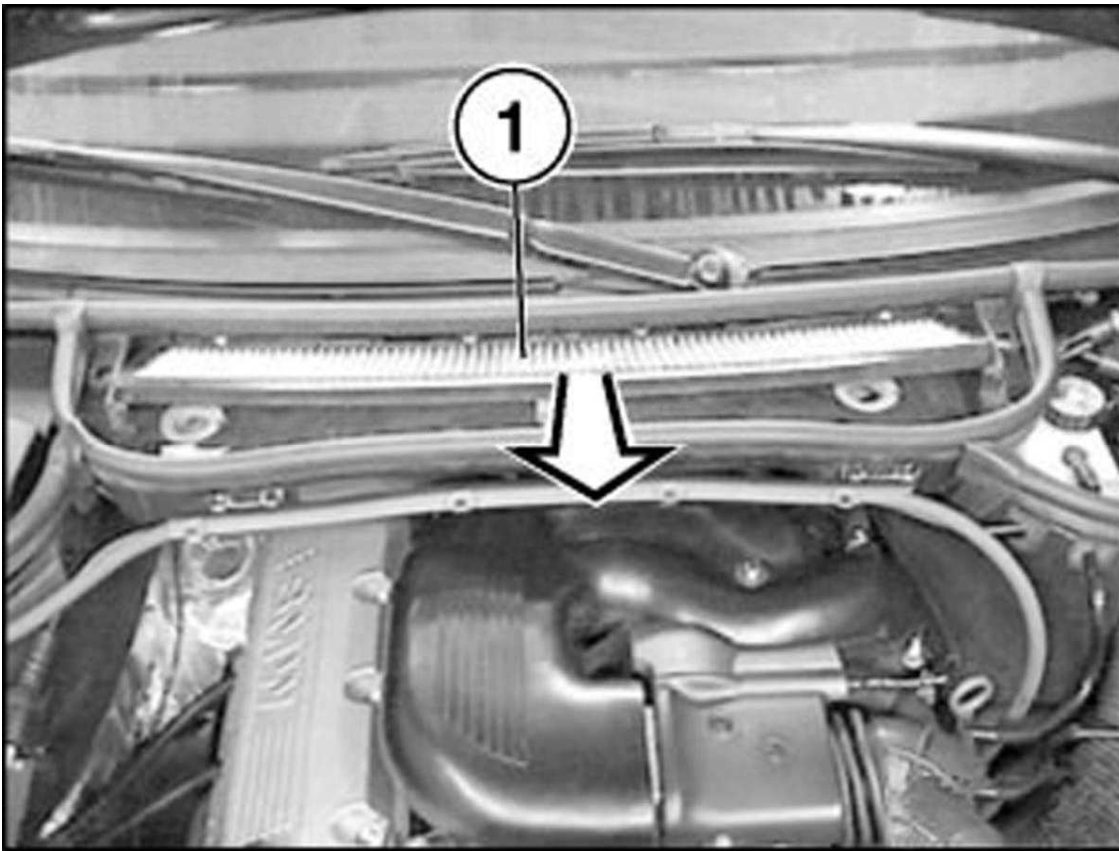
Fig. 1: Removing Cover

Courtesy of BMW OF NORTH AMERICA, INC.

2. Remove microfilter (1). See **Fig. 2**. To install microfilter, reverse removal procedure.

2007 BMW X3

CABIN AIR FILTER BMW - X3 (E83)



G00213246

Fig. 2: Removing Microfilter

Courtesy of BMW OF NORTH AMERICA, INC.

HVAC**Heating and Air Conditioning - Operating Fluids****1.0 AIR CONDITIONER REFRIGERANT****FREON®**

The refrigerant Freon® R12 is used in most BMW automobiles with an air conditioner up through the 1992 model year. It has a boiling point of - 29.8°C (sea level), at which the refrigerant is transformed from a liquid into a gaseous state. This boiling point, however, is not constant. It is displaced in the direction of higher temperatures as pressure increases.

Freon® R12 complies with the requirements expected of a safety refrigerant. Freon® is not combustible and does not turn into an explosive mixture with air. It is also odorless and non-toxic. Conformance with certain safety regulations is essential to the handling of refrigeration systems.

There are currently no BMW-approved alternative refrigerants to R12.

SAFETY WARNING

64 Avoid any contact with liquid refrigerant, since this could cause frostbite. Protect eyes with safety goggles and hands with gloves. Contact a doctor without delay in case of an accident.

64 Freon® R12 is heavier than air, so this refrigerant must not be discharged in closed rooms. There is danger of asphyxiation in a sunken work area (pit). Do not store bottles of refrigerant at temperatures above 113°F/45°C or heat them.

64 Never weld on or near a system filled with refrigerant. Heat could cause excessive pressure and an explosion. In addition, Freon® R12 will decompose at high temperature or when subjected to an open flame. The resulting decomposition products would be hazardous to health.

64 Make sure you read the container label instructions completely prior to use.

64 Obtain and use the correct type of refrigerant recovery/recycling machine. Follow the directions included in the machine's instruction manual.

HFC-134A

The refrigerant HFC-134a (also known as R-134a) is used as of the following models with an air conditioner:

64 1992 E32/M30 from March 1992 production

64 1993 E34, E36, 325iC. E31, E32 from August 1992 production

This environmentally friendly refrigerant performs similar functions as Freon® R12, but the refrigerants Freon® R12 and R-134a must NEVER be mixed or combined in any way under any circumstances.

SAFETY WARNING

64 Always wear eye protection and gloves while handling refrigerant or servicing air conditioning systems.

64 Avoid breathing R-134a and lubricant vapor or mist. Exposure may irritate eyes, nose, throat, and lungs. Use only approved service equipment to discharge A/C systems. If accidental system discharge occurs, ventilate work area before resuming service.

64 If refrigerant or compressor oil contacts the skin or eyes, large quantities of cool water should be used to flush the affected area.

64 Never heat a refrigerant container with an open flame. Keep all refrigerants away from open flames, since burning refrigerant can produce poisonous gas.

64 Under no circumstances should R-134a service equipment or vehicle A/C systems be pressure tested with air/R 134a mixtures. Some mixtures of air and R-134a have been shown to be combustible at elevated pressures.

The use of compressed air (shop air) for leak detection in R-134a systems could result in fire or explosion causing injury or property damage. In addition, introducing compressed air into A/C systems or components contaminates the system and/or refrigerant with moisture.

64 Obtain and use the correct type of refrigerant recovery/recycling machine. Follow the directions included in the machine's instruction manual.

2.0 REFRIGERATION OIL**OIL USED IN FREON®-CHARGED SYSTEMS**

A mineral-based oil is used. The oil level in the compressor must be checked before filling an air conditioner with refrigerant. It can be checked only if the system is without refrigerant.

Always check the oil level each time a new system is filled with Freon® R12 or after repairs. The oil level is very important for the entire air conditioning system. Part of the oil (approx. 25% depending on amount of refrigerant) is mixed with the refrigerant and is continuously circulated in the system. This oil lubricates the moving parts of the system, such as the expansion valve and compressor.

Oil Used in R-134a-Charged Systems:

A synthetic oil is used, which is totally different than the mineral-based oils used in Freon® R12 systems.

R-134a systems require Polyalkylene Glycol lubricants, often referred to as "PAG" oil. Use of R-12 compressor oil in R-134a systems will cause the compressor to seize and fail. The R-12 mineral oil does not stay in solution in R-134a. In addition, R-134a compressor should not be used in an R-12 system. Long term damage and corrosion will result.

The **GREEN** R-134a system labels, usually located near the top side of the fan shroud in the engine

compartment, will display the refrigerant requirement for R-134a systems. An example is illustrated.

R-12 systems will have a **BLACK** label in a similar location.



Fig. 1: Identifying R-12 Systems - Black Label
Courtesy of BMW OF NORTH AMERICA, INC.

PAG oil should only be stored in its original container, and sealed as tightly as possible. PAG oil is totally devoid of moisture when packaged, and will absorb moisture readily (hygroscopic) if exposed to the atmosphere, rendering it useless. Dispose of all extracted lubricants from A/C systems. Never reuse old compressor oil. Contaminated PAG oil should never be added to the air-conditioning system, and old PAG oil is typically contaminated with moisture. R-134a is even more sensitive to moisture contamination than R-12 systems.

PAG oil may be obtained from BMW of North America.

BMW Part No. 82 11 1 468 042.

3.0 AIR CONDITIONING UNIT DISINFECTANTS

A musty odor may be detected in the vehicle, particularly when the air conditioner is first switched on.

This is caused by microorganisms growing on the evaporator from moisture condensation.

A disinfectant can be applied to the air conditioning system:

"Airguard" by J. J. Products, Inc.; "Airsept" by The Auto Doctor or Air Conditioning and Heating System Treatment by Wurth USA, Inc.

Such disinfectants are not available from BMW of North America.

4.0 AIR CONDITIONER REFRIGERATION/OIL FILL CAPACITIES

Note that some 1993 Model Year early production R-134a equipped vehicles have under-hood labels that

2007 BMW X3

HVAC Heating and Air Conditioning - Operating Fluids

specify higher charge values than those specified in the chart. Testing has confirmed that the values given are the optimum fill capacities. Consult the chart before refilling. Labels with the lower refrigerant charge amount specified on the chart have been phased into production as of 11/92.

When performing repairs to the A/C system that require recharging, only the specifications given in this chart should be used, as well as the label part numbers, as appropriate. However, inadvertent refrigerant charging up to the fill capacity given on an "original" ('93 MY production prior to 11/92) under-hood label will not cause any problems.

See appropriate HVAC article for oil refill capacity for specifications not indicated in **A/C LABEL BMW P/N REFERENCE** table.

Refrigerant, Special Features, Production Range, Fill Capacity g (lbs), Fill Capacity ml (oz), BMW P/N

A/C LABEL BMW P/N REFERENCE

Series/Body, Refrigerant	Model or Type Special Features	Production Range	Fill Capacity g (lbs)	Refrigerant Oil Total Fill Capacity ml (oz)	A/C Label BMW P/N
1/E82, R-134a	N52K, N54	All	590 ± 10 (1.30 ± 0.02)		64 50 6 985 512
1/E88, R-134a	N52K, N54	All	590 ± 10 (1.30 ± 0.02)		64 50 6 985 512
3/E30, R-12	M3	All up to 9/92	875 ± 25 (1.93 ± 0.05)	200 ± 20 (6.8 ± 0.7)	64 50 1 381 958
3/E30, R-12	All Others	All up to 9/92	975 ± 25 (2.15 ± 0.05)	200 ± 20 (6.8 ± 0.7)	64 50 1 380 981
3/E30, R-134a	Convertible	All from 9/92	900 ± 25 (1.76 ±	.05) 100 ± 20 (3.4 ± 0.7) 5	64 50 8 391 0264
3/E36, R-12	Modine Condenser1	9/91 - 3/921	1000 ± 25 (2.20 ± 0.05)	167 ± 20 (5.6 ± 0.7)	90 00 1 000 006
3/E36, R-12	Original Condenser	All up to 9/92	1200 ± 25 (2.65 ± 0.05)	200 ± 20 (6.8 ± 0.7)	71 21 2 122 023
3/E36, R-134a	All	9/92 - 11/923	1000 ± 25 (2.20 ± 0.05)	120 ± 20 (4.1 ± 0.7) 5	64 50 8 391 5244
3/E36, R-134a	Z3 except M coupe and M roadster	All	900 ± 25 (1.98 ± 0.05)	120 ± 20 (4.1 ± 0.7) ^{5,6} 150 ± 10 (5.1 ± 0.3) ^{5,7}	64 50 8 391 026
3/E36, R-134a	M coupe and M roadster	All	950 ± 26 (2.09 ± 0.05)		64 50 8 391 525
3/E36, R-134a	All	All from 11/92	825 ± 25 (1.82 ± 0.05)	120 ± 20 (4.1 ± 0.7) ^{5,6} 150 ± 10 (5.1 ± 0.3) ^{5,7}	64 50 8 367 947

2007 BMW X3

HVAC Heating and Air Conditioning - Operating Fluids

3/E46, R-134a	All	All	740 ± 25 (1.63 ± 0.05)	160 ± 10 (5.4 ± 0.3) ^{5,6}	64 50 8 380 053
3/E90/E91, R134a	N52	All	500 ± 15 (1.10 ± 0.03)		64 50 6 952 937
3/E90/E91/E92/E93, R134a	N52KP, N54	All	590 ± 10 (1.30 ± 0.02)		64 50 6 985 512
3/E90/E92/E92, R134a	S65	All	590 ± 10 (1.30 ± 0.02)		64 50 6 985 512
5/E28, R-12	524, 535, M5	All	975 ± 25 (2.15 ± 0.05)	170 ± 20 (5.7 ± 0.7)	64 50 1 380 981
5/E28, R-12	528e, 533	All	1275 ± 25 (2.81 ± 0.05)	170 ± 20 (5.7 ± 0.7)	64 50 1 380 984
5/E34, R-12	525i, 535i, 525iT	All up to 9/92	1925 ± 25 (4.24 ± 0.05)	200 ± 20 (6.8 ± 0.7)	64 53 1 382 614
5/E34, R-12	M5	All up to 9/92	1500 ± 25 (3.31 ± 0.05)	200 ± 20 (6.8 ± 0.7)	64 53 1 378 247
5/E34, R-134a	M5	From 9/92 ²	1450 ± 25 (3.19 ± 0.05)	160 ± 20 (5.4 ± 0.7) ⁵	64 50 8 391 751 ⁴
5/E34, R-134a	All Others	All from 9/92	1550 ± 25 3.42 ± 0.05)	160 ± 20 (5.4 ± 0.7) ⁵	64 50 8 391 523 ⁴
5/E39, R-134a	All	Up to 9/98	1210 ± 25 (2.67 ± 0.05)	160 ± 15 (5.4 ± 0.5) ^{5,6} 180 ± 20 (6.1 ± 0.7) ^{5,7}	64 50 8 362 434
5/E39, R-134a	All	From 9/98	750 ± 25 (1.65 ± 0.05)	160 ± 15 (5.4 ± 0.5) ^{5,6} 180 ± 20 (6.1 ± 0.7) ^{5,7}	64 50 8 387 412
5/E60, R-134a	All (Includes M5)	From 8/03	810 ± 10 (1.78 ± 0.02)		64 50 6 920 708
5/E61, R134a	All	All	810 ± 10 (1.78 ± 0.02)		64 50 6 920 708
6/E24, R-12	Rear Air Conditioner	All	1800 ± 25 (3.97 ± 0.05)	170 ± 20 (5.7 ± 0.7)	653 1 380 728
6/E24, R-12	All Others	All	1100 ± 25 (2.43 ± 0.05)	170 ± 20 (5.7 ± 0.7)	64 50 1 380 982
6/E63/E64, R-134a	All	From 8/03	810 ± 10 (1.78 ± 0.02)		64 50 6 920 708
7/E23, R-12	733, 735	All up to 9/85	1275 ± 25 (2.81 ± 0.05)	170 ± 20 (5.7 ± 0.7)	64 50 1 380 984
7/E23, R-12	735	All from 9/85	1175 ± 25 (2.59 ± 0.05)	170 ± 20 (5.7 ± 0.7)	64 50 1 380 983
7/E32, R-12	750iL	All up to	1925 ± 25	200 ± 20 (6.8 ± 0.7)	64 53 1 382

2007 BMW X3

HVAC Heating and Air Conditioning - Operating Fluids

		11/92 ²	(4.24 ± 0.05)	0.7)	614
7/E32, R-12	735i, 735iL	All up to 3/92	1925 ± 25 (4.24 ± 0.05)	200 ± 20 (6.8 ± 0.7) ⁵	64 53 1 382 614
7/E32, R-134a	735i, 735iL	From 3/92 ³	1550 ± 25 (3.42 ± 0.05)	160 ± 20 (5.4 ± 0.7) ⁵	64 50 8 391 523
7/E32, R-134a	740i, 740iL, 750iL	From 9/92 ²	1550 ± 25 (3.42 ± 0.05)	160 ± 20 (5.4 ± 0.7) ⁵	64 50 8 391 5234
7/E38, R-134a	All	All up to 11/97	1210 ± 25 (2.67 ± 0.05)	180 ± 30 (6.1 ± 1.0) ^{5,6}	64 50 8 362 434
	All	All from 11/97	680 ± 25 (1.50 ± 0.05)	180 ± 20 (6.1 ± 0.7) ^{5,7}	64 50 8 381 241
7/E65, R-134a	745i, 750i	All	810 ± 25 (1.78 ± 0.05)		64 50 6 920 708
7/E66, R-134a	745Li, 750Li	All	810 ± 25 (1.78 ± 0.05)		64 50 6 920 708
7/E66, R-134a	760Li	All	1120 ± 25 (2.46 ± 0.05)		64 50 6 924 568
8/E31, R-12	All	All up to 9/92	1925 ± 25 (4.24 ± 0.05)	200 ± 20 (6.8 ± 0.7)	64 53 1 382 614
8/E31, R-134a	All	All from 9/92	1550 ± 25 (3.42 ± 0.05)	Nippon Denso 160 ± 30 (5.4 ± 1.0) Seiko Seiki 180 ± 20 (6.0 ± 0.7)	64 50 8 391 523
Z4/E85, R-134a	M54, N52, N52KP, S54	All	740 ± 10 (1.63 ± 0.05)		64 50 6 920 364
Z8/E52, R-134a	All	All	710 ± 25 (1.56 ± 0.05)		64 50 8 384 651
X5/E53, R-134a	3.0, 4.4i, 4.6i, 4.8iS	All	440 ± 10 (0.970 ± 0.02)		64 50 8 385 985
X5/E70, R-134a	3.0i, 4.8i	All	700 ± 10 (1.540 ± 0.02)		64 50 6 917 364
X6/xDrive35i	All	All	700 ± 10 (1.540 ± 0.02)		64 50 6 917 364
X3/E83, R134a	2.5, 3.0	All	740 ± 25g (1.63 ± 0.05)		64 50 8 385 985
X3/E83, R134a	3.0Si	All	740 ± 25g (1.63 ± 0.05)		64 50 8 380 053

NOTE:

1. The Modine condenser was used in many E36 vehicles over the production range 9/91-3/92. This condenser has a smaller volume, and the A/C system must be charged accordingly.

2007 BMW X3

HVAC Heating and Air Conditioning - Operating Fluids

- 2. Production start of 1993 MY E34/S38 (M5) 9/92; E32/M70 (750iL) 11/92.**
- 3. R-134a, the environmentally friendly air conditioning refrigerant, was introduced to the U.S. market beginning with 3/92 production E32/M30 (735i/iL) vehicles.**
- 4. Labels reflecting the proper charging volumes given on this chart are available from BMW Parts. These may be used in place of the original equipment labels on '93 model year vehicles produced before 11/92.**
- 5. All vehicles equipped with R-134a refrigerant require special PAG lubricant.**
- 6. Nippon Denso**
- 7. Seiko Seiki**

HVAC**Heating and Air Conditioning - Special Tools - X3****64 HEATING AND AIR CONDITIONING****64 1 020 RELEASE HOOK****Minimum set: Mechanical tools**

Note: For releasing and removing fresh air grille. For removing various trims.

Series: E36, E36/2, E36/3, E36/5, E36/7, E36/C, E36tou, E38, E38/3, E39, E39PL, E39tou, E46, E46/16, E46/2, E46/3, E46/5, E46/C, E52, E53, E60, E61, E63, E64, E65, E66, E67, E68, E70, E81, E82, E83, E85, E86, E87, E90, E91, E92, E93, R50, R52, R53, R56, RR1, RR2

Storage location: C33

SI number: 1 15 99 (483)

Order number: 64 1 020 Release hook

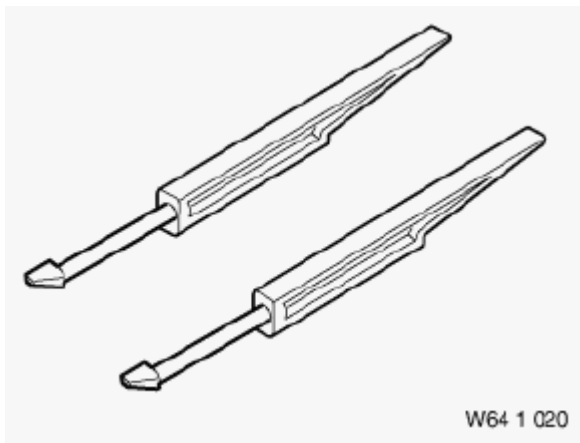


Fig. 1: Release Hook (64 1 020)

Courtesy of BMW OF NORTH AMERICA, INC.

64 1 251 SPRAY LANCE, RHD VEHICLES

In conjunction with: Guide 64 1 252

Note: from spray apparatus set 64 1 250 (RHD vehicles)

SI number: 1 26 03 (044)

Order number: 64 1 251 Spray lance, RHD vehicles

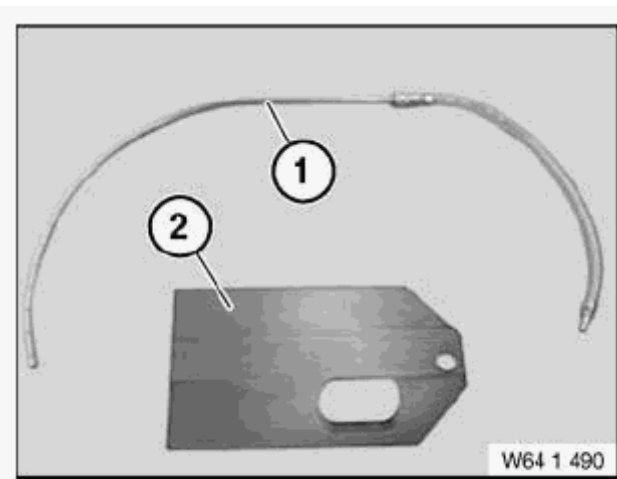


Fig. 2: Spray Lance, RHD Vehicles (64 1 251)
Courtesy of BMW OF NORTH AMERICA, INC.

64 1 252 GUIDE

In conjunction with: Lance 64 1 251

Note: Guide from spray apparatus set 64 1 250

SI number: 1 26 03 (044)

Order number: 64 1 252 Guide

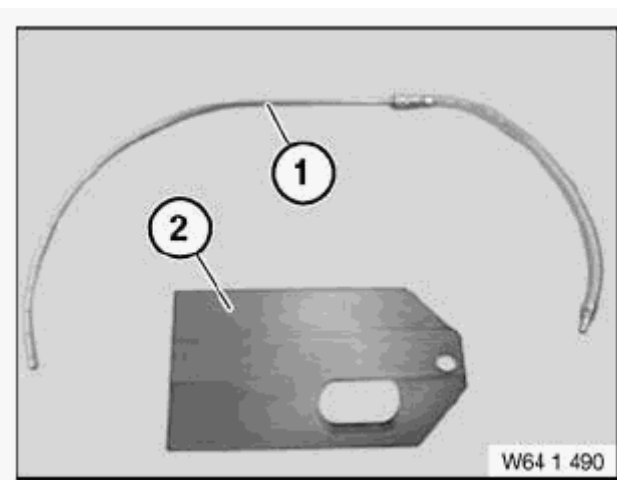


Fig. 3: Spray Lance, RHD Vehicles (64 1 251)
Courtesy of BMW OF NORTH AMERICA, INC.

64 1 450 SPRAY UNIT

In conjunction with: Pressure vessel spray gun, manufacturer: SATA (81 45 9 429 217)

2007 BMW X3

HVAC Heating and Air Conditioning - Special Tools - X3

Note: For cleaning and disinfecting evaporator in A/C system

Series: E39, E46, E53, E83

SI number: 1 22 00(648)

Order number: 64 1 450 Spray unit

Consisting of:

1 = 64 1 451 Spray lance

2 = 64 1 452 Drilling hole template

Note: Model series: E39, E53 IHKA

3 = 64 1 453 Center bit

Note: Model series: E39, E53 IHKA

4 = 64 1 454 Guide

Note: Model series: E39, E53 IHKA

5 = 64 1 455 Positioner

Note: Model series: E39, E53 IHKA

6 = 64 1 456 Retaining screw

Note: Model series: E39, E53 IHKA

7 = 64 1 457 Adapter

Note: Model series: E46 IHKA / R Model series: E39, E53 IHKR

8 = 64 1 458 Seal plug

Note: Model series: E46 IHKA / R Model series: E39, E53 IHKR

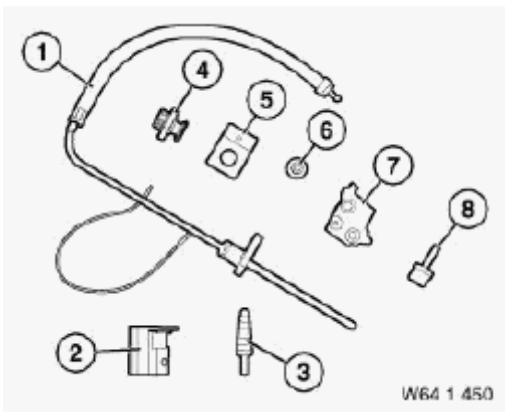


Fig. 4: Spray Unit (64 1 450)

Courtesy of BMW OF NORTH AMERICA, INC.

64 1 491 SPRAY LANCE (LHD VEHICLES)

In conjunction with: Guide 64 1 492

Order number: 64 1 491 Spray lance (LHD vehicles)

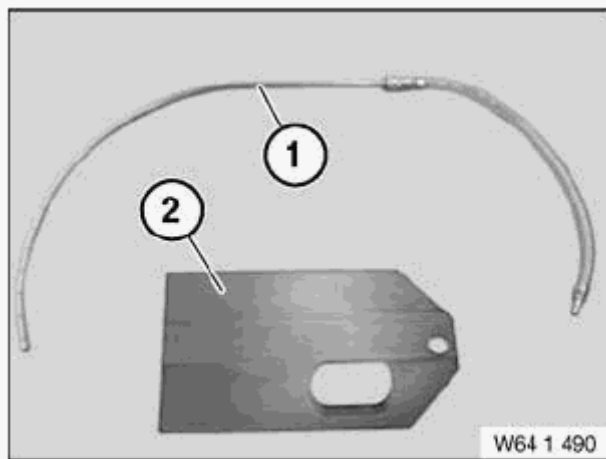


Fig. 5: Spray Lance, RHD Vehicles (64 1 251)

Courtesy of BMW OF NORTH AMERICA, INC.

64 1 492 GUIDE FOR SPRAY LANCE (LHD VEHICLES)

In conjunction with: Spray lance 64 1 491 for evaporator cleaning

Order number: 64 1 492 Guide for spray lance (LHD vehicles)

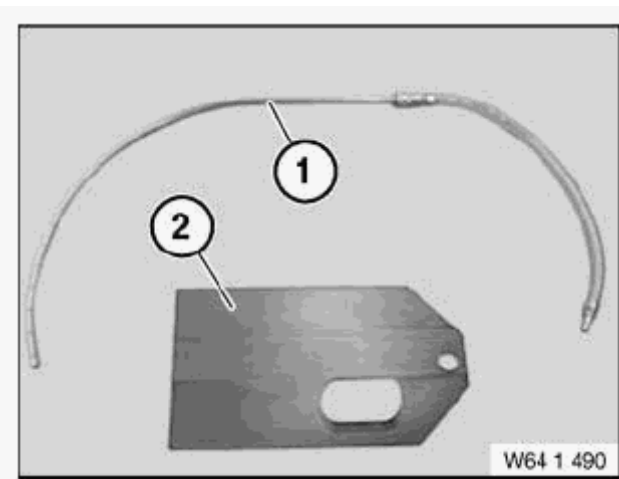


Fig. 6: Spray Lance, RHD Vehicles (64 1 251)
Courtesy of BMW OF NORTH AMERICA, INC.

64 5 100 SET OF SEALING ADAPTERS

Note: For closing off line flanges of A/C components (evaporator, condenser, compressor) for leak testing. Special tool 64 5 101 replaced by 64 5 105 (from 01/2005).

Series: E32, E34, E36, E38, E39, E46, E53, E60, E61, E63, E64, E70, E81, E83, E87, E90, E91, E92, E93

SI number: 1 17 98 (359)

Order number: 64 5 100 Set of sealing adapters

Consisting of:

1 = 64 5 104 Connecting hose

Note: For connecting pressure cylinder to filler adapter

2 = 64 5 102 Sealing adapter

Note: For closing off intake line

3 = 64 5 103 Sealing adapter

Note: For closing of intake connection on compressor

4 = 64 5 105 Filler adapter

Note: For closing off the pressure line and connection at connecting hose (replacement for special tool SWZ 64 5 101 since 01/2005)

2007 BMW X3

HVAC Heating and Air Conditioning - Special Tools - X3

5 = 64 5 106 Sealing adapter

Note: For closing off line during leak test (included in scope of delivery from 01/2005)

6 = 64 5 107 Sealing adapter

Note: For closing off line during leak test for E81, E87, E90, E91, E92, E93 (included in scope of delivery from 02/2007)

7 = 64 5 108 Sealing adapter

Note: For closing off line during evaporator leak test in E70 (included in scope of delivery from 02/2007)

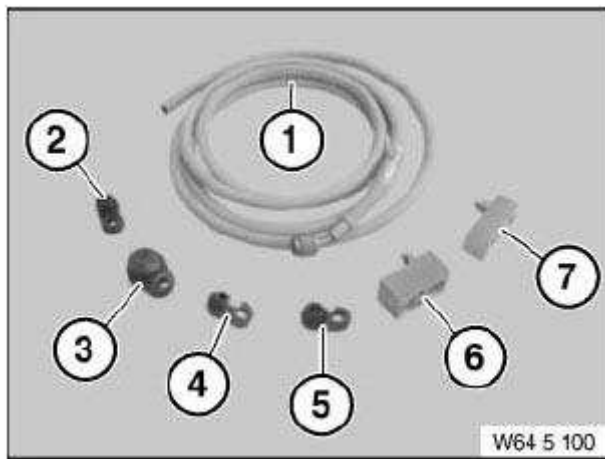


Fig. 7: Set Of Sealing Adapters (64 5 100)
Courtesy of BMW OF NORTH AMERICA, INC.

2007 BMW X3

HVAC Heating and Air Conditioning - Technical Data - X3

HVAC

Heating and Air Conditioning - Technical Data - X3

50 AIR CONDITIONING SYSTEM

64 50 A/C SYSTEM, REFRIGERANT AMOUNTS E83

TECHNICAL DATA - A/C SYSTEM, REFRIGERANT AMOUNTS E83

Refrigerant filling quantity R 134a		
Sourcing reference EPC (Electronic Parts Catalog)	g	M47 T2/ M57 TU: 680 ±10
The data on the nameplate in the engine compartment are definitive		
	g	M54: 740±10
	g	N46: 740±10

51 AC HOUSING-EVAPORATOR

64 51 AIR CONDITIONER (EVAPORATOR), SHIFT ELEMENTS

TECHNICAL DATA - AIR CONDITIONER (EVAPORATOR), SHIFT ELEMENTS

Resistance depending on temperature	°C/k	-5/11.4 ... 11.9 0/8.8 ... 9.2 5/6.8 ... 7.2 10/5.3 ... 5.6 15/4.2 ... 4.5 20/3.3 ... 3.6 25/2.6 ... 2.9 30/2.1 ... 2.3 35/1.7 ... 1.9
-------------------------------------	------	--

64 51 AIR CONDITIONER (EXPANSION VALVE), SHIFT ELEMENTS

TECHNICAL DATA - AIR CONDITIONER (EXPANSION VALVE), SHIFT ELEMENTS

Inlet pressure	bar	14
Outlet pressure	bar	1.8
Leak test with detector at pressure of	bar	1 ... 2

2007 BMW X3**HVAC Heating and Air Conditioning - Tightening Torques - X3****HVAC****Heating and Air Conditioning - Tightening Torques - X3****11 HEATER WITH OPERATION****64 11 HOUSING, HEATER/AIR CONDITIONER****HOUSING, HEATER/AIR CONDITIONER - TIGHTENING TORQUES**

	Type	Thread	Tightening specification	Measure
1AZ Bulkhead adapter	E85, E86			1.0 ± 0.3 Nm
2AZ Fan for heater/air conditioner	E85, E86			1.5 ± 0.3 Nm
3AZ Controller for heater - A/C system fan	E85, E86			1.0 ± 0.3 Nm
4AZ Air conditioner to bulkhead	E60, E61, E63, E64, E83, E81, E87, E90, E91, E92, E93			6 Nm
	E70			6.5 Nm
5AZ Cooler box to luggage compartment partition wall	E65, E66, E67			4.5 Nm
6AZ Air conditioner to support tube	E81, E87, E90, E91, E92, E93			9 Nm

12 AUXIL. HEATER WITH CONTROL ELEMENTS**64 12 ADDITIONAL HEATER WITH CONTROLS****ADDITIONAL HEATER WITH CONTROLS - TIGHTENING TORQUES**

	Type	Thread	tightening specification	Dimension
1AZ Additional heater to body floor	All			4.5 Nm
2AZ Glow plug	E24			17.5 Nm
	E31 / E32 / E34			4 Nm
3AZ Temperature sensor	E31 / E32 / E34			0.5 Nm
4AZ Oil control plug and oil filler plug	All			16 Nm
5AZ Mounting screws	All	M5		6 Nm
	All	M6		10 Nm
	All	M8		24 Nm
	All	M10		48 Nm
6AZ Screws for filter cover	All			0.9 Nm

2007 BMW X3**HVAC Heating and Air Conditioning - Tightening Torques - X3**

7AZ Central cover on heater	All			1.5 Nm
8AZ Combustion air fan unit on heater	All			1.5 Nm
9AZ Recirculating pump on heater	All			1.5 Nm
10AZ Control unit/transfers heat to heater Install screws with Loctite 243	All			4.5 Nm

64 12 ELECTRIC AUXILIARY HEATER**ELECTRIC AUXILIARY HEATER - TIGHTENING TORQUES**

	Type	Thread	Tightening specification	Measure
1AZ Battery positive and negative leads to auxiliary heater	E46	M6		8.8 Nm

52 COMPRESSOR**64 52 A/C COMPRESSOR****A/C COMPRESSOR - TIGHTENING TORQUES**

	Type	Thread	Tightening specification	Measure
1AZ Refrigerant lines to A/C compressor	E36/7 M54, E36/7 S54, E38, E39, E46, E52, E53, E60, E61, E63, E64, E65, E66, E67, E83, E85, E87, E90, E91, E92, E93	M8		20 Nm
2AZ Filler plug, A/C compressor	E36, E38, E39, E46, E52, E53, E60, E61, E63, E64, E65, E66, E67, E83, E85, E87, E90, E91, E92, E93			30± 1 Nm
3AZ A/C compressor to carrier	M54, N62, S85, N54	M8		21 Nm
	N45, N46, M47T2, M57TU, M57T2	M8		19 Nm
	N52	M8 x 87	Replace aluminium screw/bolt	
			Jointing torque	10 Nm
			Torque angle	180±15±
	E85 S54, E86 S54			20 Nm
4AZ Belt pulley/hub to A/C compressor	M47T2			35±5 Nm
5AZ Bracket, A/C compressor to lower crankcase	N54			19 Nm
6AZ Cable holder to A/C compressor	M47T2			3 Nm

53 CONDENSER AND DRYER WITH LINES

64 53 REFRIGERANT LINES AND EXPANSION VALVE

REFRIGERANT LINES AND EXPANSION VALVE - TIGHTENING TORQUES

	Type	Thread	Tightening specification	Measure
1AZ Refrigerant lines to dryer bottle	E83, E85, E86	M8		20 Nm
2AZ Refrigerant lines to expansion valve/double pipe	E46, E83, E85, E86, E81, E87, E90, E91, E92	M8		20 Nm
	E53	M8		18 Nm
3AZ Adapter plate to expansion valve	E85, E86	M6		10±2 Nm
4AZ Expansion valve to heater - A/C	E85, E86	M5		3.5±0.7 Nm
5AZ Refrigerant line to bulkhead	E85, E86	M6		8.6 Nm
6AZ Refrigerant lines to condenser	E60, E61, E63, E64, E81, E83, E85, E86, E87, E90, E91, E92, E93	M8		20 Nm
7AZ Refrigerant lines to expansion valve	E60, E61, E63, E64	M6		8.8 Nm
8AZ Refrigerant line to assembly compartment partition reinforcement	E60, E61, E63, E64	M6		7.6 Nm
9AZ Expansion valve to heater - A/C	E46, E60, E61, E63, E64, E83	M5		5.5 Nm
	E85, E86	M5		3.5±0.7 Nm
10AZ Refrigerant line to body	E46, E83	M6		5.5 Nm
11AZ Double pipe to expansion valve	E46, E83	M6		8.0 Nm
12AZ Screw plug to condenser	E53, E81, E87, E90, E91, E92			3.0±0.5 Nm
13AZ Expansion valve to retainer	E81, E87, E90, E91, E92, E93	M6		8.0 Nm
14AZ Pressure sensor in refrigerant line	E53, E60, E61, E63, E64, E65, E66, E81, E83, E85, E86, E87, E90, E91, E92, E93			10 Nm