

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

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 ± 0.05)	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

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 ±	64 53 1 382

		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.

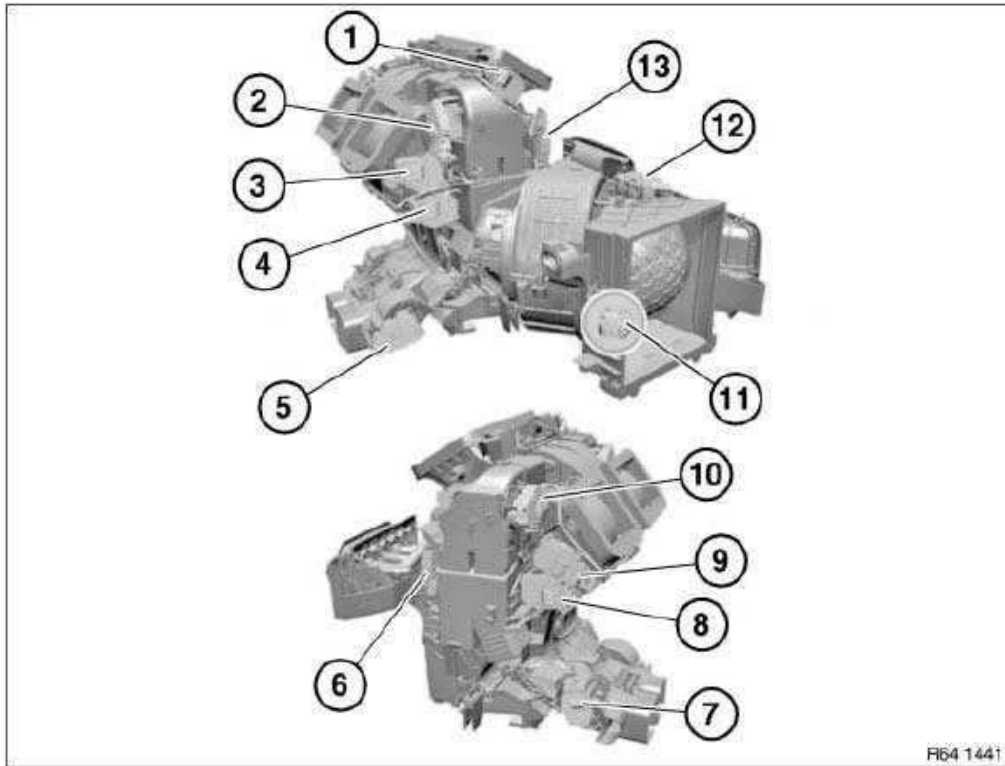
2. Production start of 1993 MY E34/S38 (M5) 9/92; E32/M70 (750iL) 11/92.
3. R-134a, the environmentally friendly air conditioning refrigerant, was introduced to the U.S. market beginning with 3/92 production E32/M30 (735i/iL) vehicles.
4. Labels reflecting the proper charging volumes given on this chart 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 - Repair Instructions - X6

HEATER

64 11 ... OVERVIEW OF HEATER/AIR CONDITIONER SERVOMOTORS



- | | | | |
|---|---|----|---|
| 1 | Servomotor, defrosting | 8 | Servomotor, air blending, front left |
| 2 | Servomotor, footwell, rear cabin, right | 9 | Servomotor, ventilation, front left |
| 3 | Servomotor, ventilation, front right | 10 | Servomotor, footwell, rear cabin, left |
| 4 | Servomotor, stratification, front right | 11 | Servomotor, dynamic pressure compensation |
| 5 | Servomotor, air blending, rear right | 12 | Servomotor, fresh air/recirculated air |
| 6 | Servomotor, footwell, front left | 13 | Servomotor, footwell, front left |
| 7 | Servomotor, air blending, rear left | | |

Fig. 1: Identifying Heater And Air Conditioner Servomotors Components
Courtesy of BMW OF NORTH AMERICA, INC.

64 11 ... INSTALLING SERVODRIVE

Installation:

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



Fig. 2: Identifying Shaft Of Flap

Courtesy of BMW OF NORTH AMERICA, INC.

64 11 206 REMOVING AND INSTALLING/REPLACING HEATER

WARNING: Risk of injury!

Refrigerant circuit is under high pressure!

Follow safety instructions for handling refrigerant R 134a

Avoid contact with refrigerant and refrigerant oil.

Follow safety instructions for Instructions for handling refrigerant oil (for refrigerant R 134a)

IMPORTANT: Risk of damage!

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

Follow Instructions for opening and replacing parts in refrigerant circuit for opening and replacing parts in refrigerant circuit!

If A/C system is opened for more than 24 hours: see 64 53 517 Replacing desiccant insert for A/C system

.

Necessary preliminary tasks:

- Drain off A/C system. See 64 50 009 Drawing off, evacuating and filling A/C system (R 134a)
- Remove CARRIER FOR INSTRUMENT PANEL .
- Unclip wiring harness holders from heater

Recycling

Coolant emerges when coolant lines are detached. Have a suitable collecting container ready.

Catch and dispose of escaping coolant.

Observe country-specific waste-disposal regulations.

Release screw (1) and remove refrigerant lines with cover (1) and associated seal.

Tightening torque **64 53 2AZ** , see **64 53 REFRIGERANT LINES AND EXPANSION VALVE** .

Replace sealing rings and moisten with refrigerant oil.

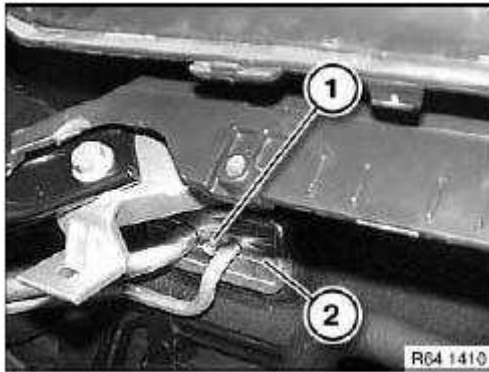


Fig. 3: Identifying Refrigerant Lines With Cover
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Connections must not be mixed up!
Mark connection sequence of water hoses prior to removal.

Release hose clamps (1) and detach water hoses.

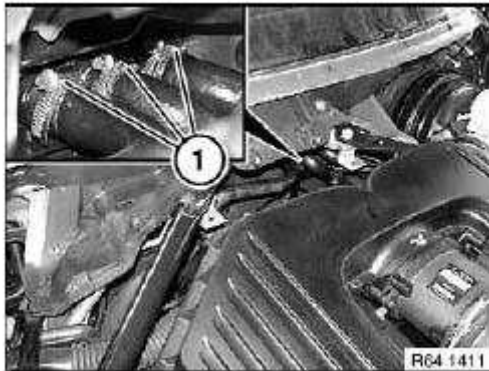


Fig. 4: Identifying Hose Clamps
Courtesy of BMW OF NORTH AMERICA, INC.

Release nut (1) and nut (2) underneath.

Tightening torque **64 11 4AZ** , see **64 11 HOUSING, HEATER/AIR CONDITIONER** .

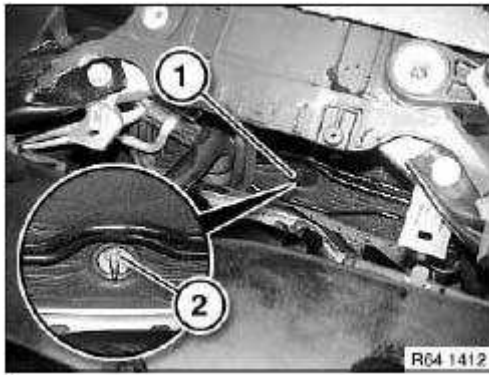


Fig. 5: Identifying Hose Clamps Nut
 Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1) and remove windscreen air guide (2).

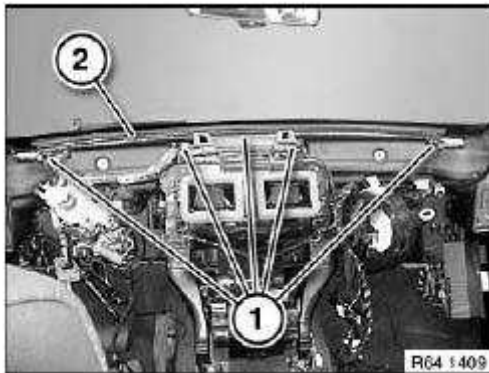


Fig. 6: Identifying Windscreen Air Guide And Screw
 Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Tightening torque **64 11 4AZ** , see **64 11 HOUSING, HEATER/AIR CONDITIONER** .

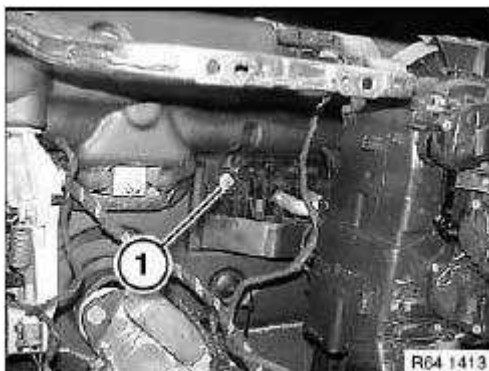


Fig. 7: Identifying Windscreen Air Guide Screw Location

Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Tightening torque **64 11 4AZ** , see **64 11 HOUSING, HEATER/AIR CONDITIONER** .

IMPORTANT: Cover vehicle interior with protective cover to prevent interior being fouled by escaping coolant.

Feed out heater (2).

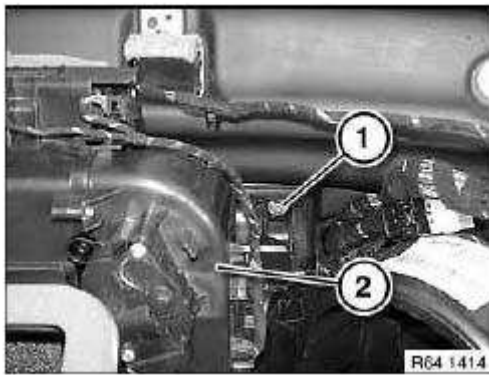


Fig. 8: Identifying Heater And Screw

Courtesy of BMW OF NORTH AMERICA, INC.

Replacement:

- Modify **evaporator** , see **64 51 002 Replacing evaporator**.
- Modify heater core
- Modify **expansion valve** , see **64 51 525 Removing and installing or replacing expansion valve**.
- Modify all servodrives

Installation:

Water drain (1) must be inserted on both sides into outlet channel (2).

IMPORTANT: In the event of incorrect fitting, there is a risk of leakage in the passenger compartment!

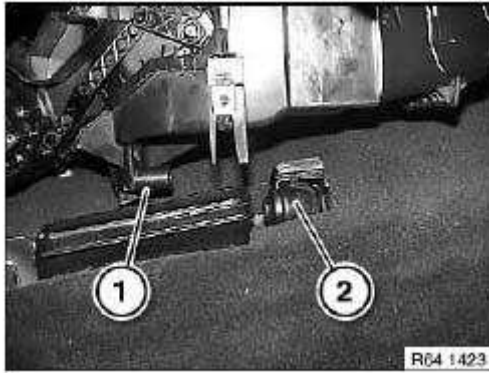


Fig. 9: Identifying Water Drain And Outlet Channel
 Courtesy of BMW OF NORTH AMERICA, INC.

After installation:

- Evacuate and fill A/C system , see **64 50 009 Drawing off, evacuating and filling A/C system (R 134a).**
- Fill and vent cooling system, see **17 00 008 DRAINING AND ADDING COOLANT IN RADIATOR (N62TU, N63) , and 17 00 039 VENTING COOLING SYSTEM AND CHECKING FOR WATER LEAKS (N63) , or 17 00 005 DRAINING AND ADDING COOLANT (N54) , 17 00 039 VENTING COOLING SYSTEM AND CHECKING FOR WATER LEAKS (N54) .**

64 11 208 REPLACING HEATER CORE

Necessary preliminary tasks:

- Remove heater. See **64 11 206 Removing and installing/replacing heater**

Release screw (1).

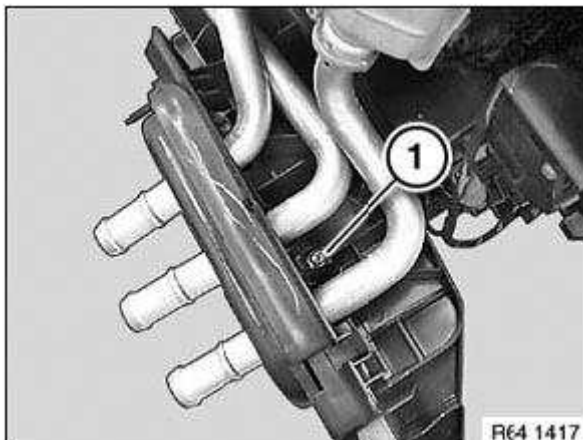


Fig. 10: Identifying Heater Screw Location
 Courtesy of BMW OF NORTH AMERICA, INC.

Unclip retaining tabs (1) and lift out bracket (2).

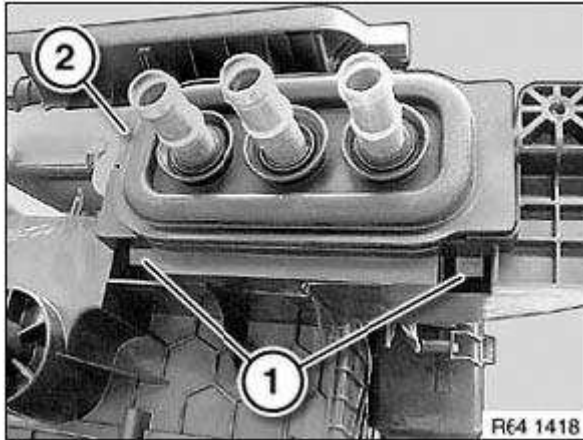


Fig. 11: Identifying Retaining Tabs And Bracket
Courtesy of BMW OF NORTH AMERICA, INC.

Unclip retaining lug (1) on both sides and feed out heater core (2).

Installation:

Make sure heater core (2) is securely seated.

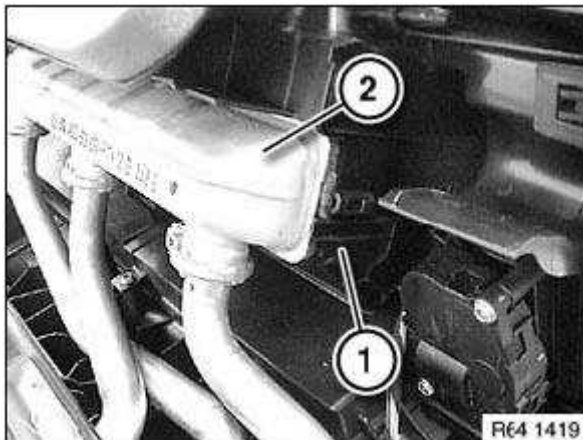


Fig. 12: Identifying Retaining Lug And Heater Core
Courtesy of BMW OF NORTH AMERICA, INC.

After installation:

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

Necessary preliminary tasks:

- Switch off ignition
- Remove lower trim from instrument panel, see **51 45 181 REMOVING AND INSTALLING/REPLACING TRIM FOR INSTRUMENT PANEL, BOTTOM RIGHT** .

Release screws (1).

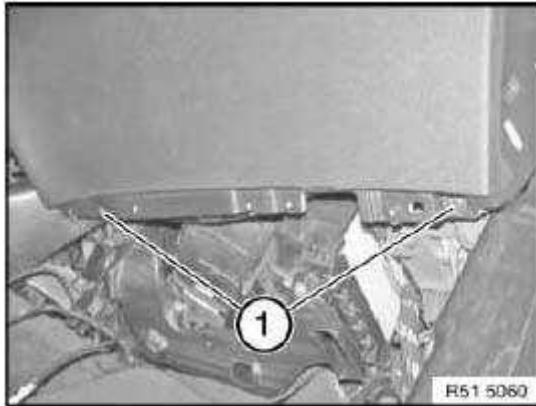


Fig. 13: Identifying Lower Trim Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1) and remove air duct (2).

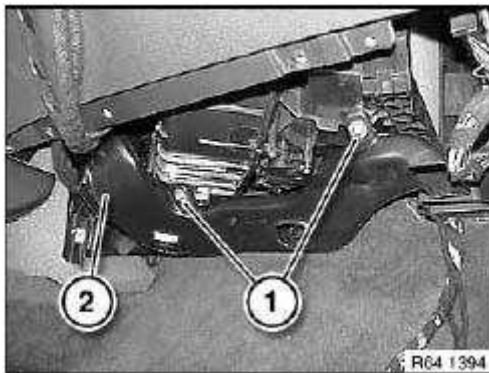


Fig. 14: Identifying Air Duct And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).



Fig. 15: Identifying Air Duct Screw Location
 Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Risk of damage to instrument panel trim (2) if it is pulled away too forcefully.

Release screw (1).

Carefully pull instrument panel trim (2) away in direction of arrow and feed out fan (3).

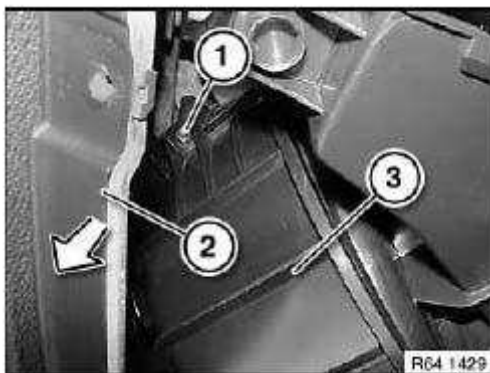


Fig. 16: Identifying Instrument Panel Trim And Fan
 Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

Installation:

Make sure cover (2) is securely seated.

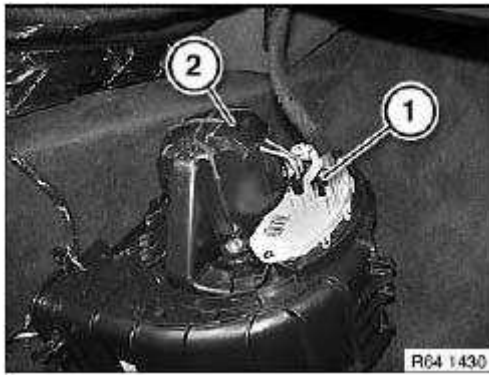


Fig. 17: Identifying Plug Connection And Cover
Courtesy of BMW OF NORTH AMERICA, INC.

Replacement:

Disconnect plug connection (1) and release screws (2).

Remove controller for fan (3).

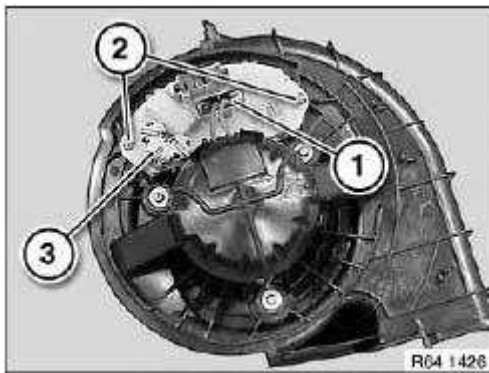


Fig. 18: Identifying Plug Connection And Release Screws
Courtesy of BMW OF NORTH AMERICA, INC.

64 11 224 REPLACING CONTROLLER FOR HEATER/AIR CONDITIONER FAN (US VERSION)

Necessary preliminary tasks:

- Remove heater/air conditioner fan. See **64 11 212 Removing and installing/replacing heater/air conditioner fan**

Disconnect plug connection (1) and release screws (2).

Remove controller (3).

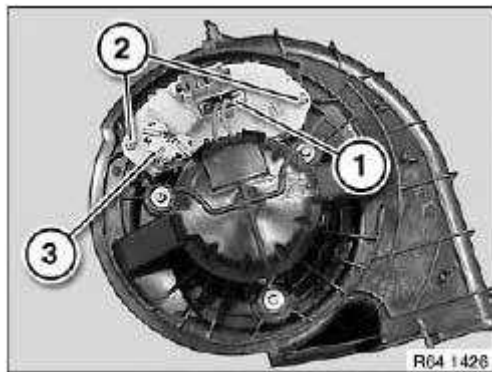


Fig. 19: Identifying Controller
 Courtesy of BMW OF NORTH AMERICA, INC.

64 11 225 REPLACING CONTROLLER FOR HEATING AND AIR CONDITIONING SYSTEM

Necessary preliminary tasks:

- Remove insert for right glovebox, see **51 16 360 REMOVING AND INSTALLING RIGHT GLOVEBOX** .

Disconnect plug connection (1).

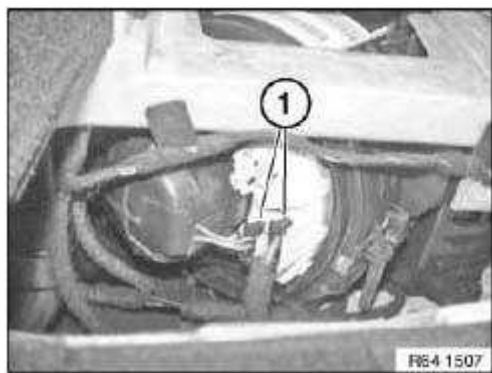


Fig. 20: Identifying Plug Connection
 Courtesy of BMW OF NORTH AMERICA, INC.

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

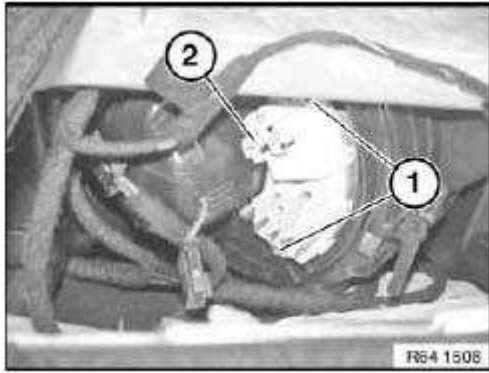


Fig. 21: Identifying Controller And Screws
 Courtesy of BMW OF NORTH AMERICA, INC.

64 11 263 REMOVING AND INSTALLING COMPLETE REAR CABIN FAN

Necessary preliminary tasks:

- Remove complete centre console. See **51 16 165 REMOVING AND INSTALLING/REPLACING COMPLETE CENTRE CONSOLE** .

If necessary, release screw (1) on both sides and disconnect plug connection on rear cabin fan controller.

Remove rear cabin fan housing (2) from air duct in centre console (3).

Replacement:

Remove rear cabin fan controller. See **64 11 794 Removing and installing/replacing controller for rear cabin fan**.

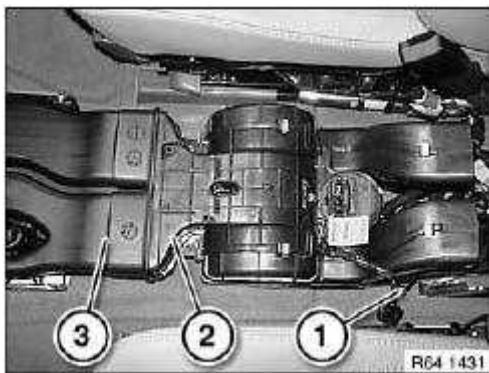


Fig. 22: Identifying Rear Cabin Fan Housing And Screw
 Courtesy of BMW OF NORTH AMERICA, INC.

64 11 273 REPLACING WATER VALVE FOR HEATER

WARNING: Scalding hazard!

Work on the cooling system may only be carried out when it has cooled down.

Follow instructions for working on cooling system. See 17 00 ... INSTRUCTIONS FOR WORKING ON COOLING SYSTEM .

NOTE: Disconnect coolant hoses on water valve. See INSTRUCTIONS FOR DISASSEMBLY/ASSEMBLY OF COOLANT HOSE FAST-RELEASE COUPLINGS .

Recycling

Coolant emerges when coolant lines are detached. Have a suitable collecting container ready.

Catch and dispose of escaping coolant.

Observe country-specific waste-disposal regulations.

NOTE: Engine is shown removed for purposes of clarity.

Disconnect plug connection (1).

Release hose clamps (2, 3) and detach coolant hoses.

Installation:

Do **not** mix up connections of coolant hoses.

Replace damaged coolant hoses.

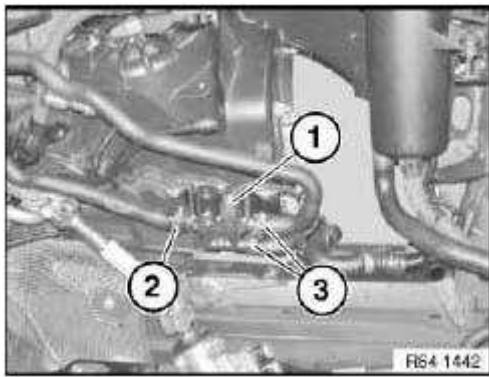


Fig. 23: Identifying Plug Connection And Hose Clamps
Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

To avoid the buildup of noise, make sure that the rubber mounts (1) on the water valve are securely seated in the

mounting on the frame side member (2).

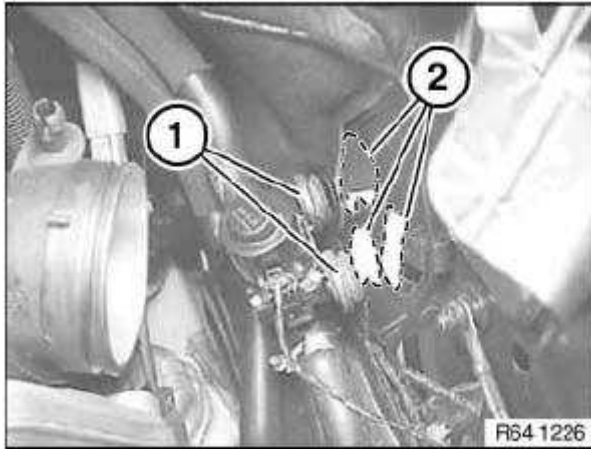


Fig. 24: Identifying Rubber Mounts And Frame Side Member
Courtesy of BMW OF NORTH AMERICA, INC.

After installation:

- Fill and vent **cooling system** , see **17 00 008 DRAINING AND ADDING COOLANT IN RADIATOR (N62TU, N63)** and check for leaks, see **17 00 009 CHECKING COOLING SYSTEM FOR WATER LEAKS** , or **17 00 005 DRAINING AND ADDING COOLANT (N54)** , **17 00 039 VENTING COOLING SYSTEM AND CHECKING FOR WATER LEAKS (N54)** .

64 11 376 REMOVING AND INSTALLING (REPLACING) CONTROL PANEL FOR HEATER - A/C SYSTEM

Necessary preliminary tasks:

- Remove **CENTRE TRIM FOR INSTRUMENT PANEL**

Disconnect plug connection (1).

Unclip control panel (2) along dashed line from trim (3) and remove.

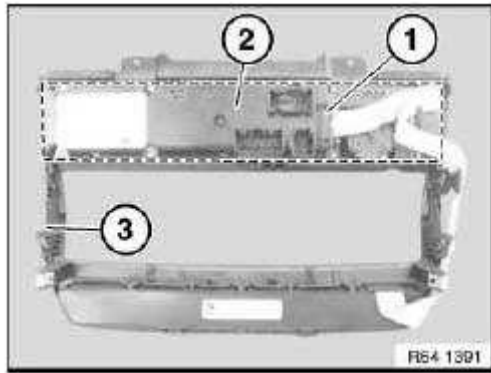


Fig. 25: Identifying Control Panel And Trim
Courtesy of BMW OF NORTH AMERICA, INC.

When replacing or programming:

- Carry out **32 31 ... NORMALIZATION OF ELECTRIC STEERING COLUMN ADJUSTMENT** of electric steering column adjustment.

64 11 395 REMOVING AND INSTALLING CONTROL PANEL FOR REAR CABIN A/C SYSTEM

Necessary preliminary tasks:

- Remove **CENTRE CONSOLE TRIM (GEAR SELECTOR SWITCH)** .

Carefully unclip control panel (1) along dashed line from trim (2).

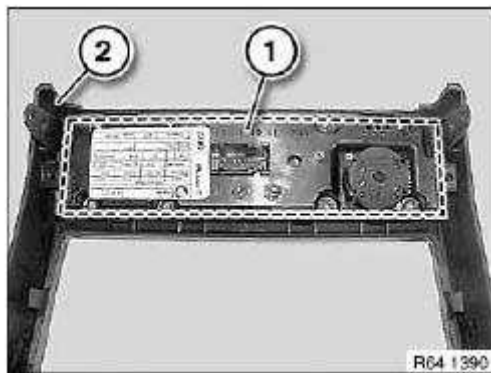


Fig. 26: Identifying Control Panel And Trim
Courtesy of BMW OF NORTH AMERICA, INC.

64 11 794 REMOVING AND INSTALLING/REPLACING CONTROLLER FOR REAR CABIN FAN

Necessary preliminary tasks:

- Remove **COMPLETE CENTRE CONSOLE**

Disconnect plug connection (1).

Unlock controller (2) in counterclockwise direction and remove.

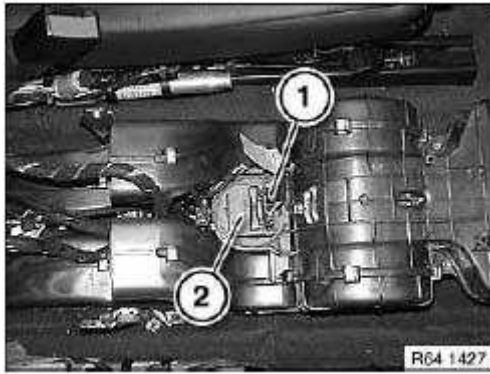


Fig. 27: Identifying Controller

Courtesy of BMW OF NORTH AMERICA, INC.

64 11 806 REMOVING AND INSTALLING/REPLACING SERVODRIVE FOR FRESH-/RECIRCULATED-AIR FLAP

Necessary preliminary tasks:

- Remove **DVD CHANGER**

Release screws (1).

Remove servomotor (2) and disconnect plug connection (3).

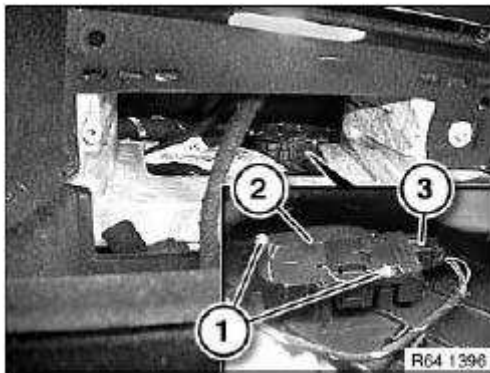


Fig. 28: Identifying Servomotor And Plug Connection

Courtesy of BMW OF NORTH AMERICA, INC.

64 11 822 REPLACING SERVODRIVE FOR LEFT REAR CABIN BLENDING FLAP

Necessary preliminary tasks:

- Remove **CARRIER FOR INSTRUMENT PANEL**

Release screws (1) and feed out air duct (2).

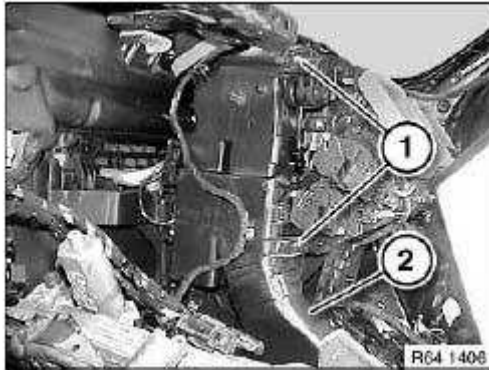


Fig. 29: Identifying Feed Out Air Duct And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

Release screws (2) and remove servodrive (3).

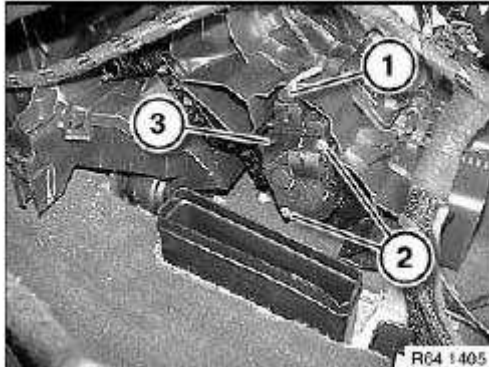


Fig. 30: Identifying Servodrive And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

64 11 823 REPLACING SERVODRIVE FOR RIGHT REAR CABIN AIR BLENDING FLAP

Necessary preliminary tasks:

- Remove **servodrive for right footwell flap**

Remove right side section housing (1).

Remove air duct (2).

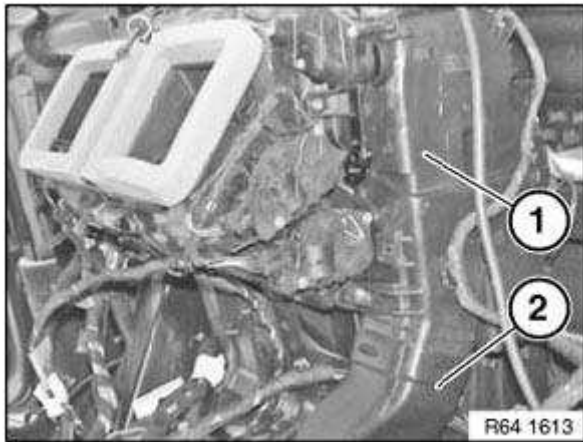


Fig. 31: Identifying Right Side Section Housing And Air Duct
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

Release screws (2) and remove servodrive (3).

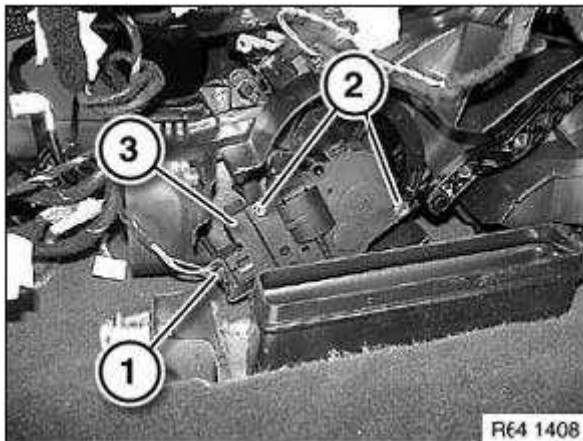


Fig. 32: Identifying Servodrive And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

64 11 830 REPLACING SERVODRIVE FOR LEFT VENTILATION FLAP

Necessary preliminary tasks:

- Remove **CARRIER FOR INSTRUMENT PANEL**

Release screws (1).

Remove servomotor (2) and disconnect plug connection (3).

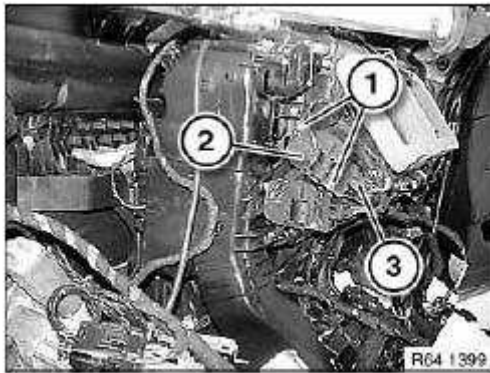


Fig. 33: Identifying Plug Connection And Servomotor
Courtesy of BMW OF NORTH AMERICA, INC.

64 11 832 REPLACING SERVODRIVE FOR RIGHT VENTILATION FLAP

Necessary preliminary tasks:

- Remove **CARRIER FOR INSTRUMENT PANEL**

Release screws (1).

Remove servodrive (2) and disconnect plug connection (3).

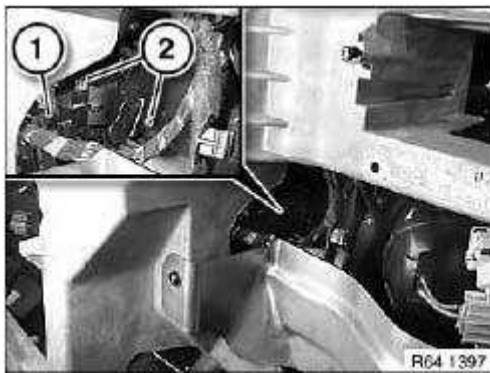


Fig. 34: Identifying Plug Connection And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

64 11 835 REPLACING SERVODRIVE FOR LEFT BLENDING FLAP

Necessary preliminary tasks:

- Remove **CARRIER FOR INSTRUMENT PANEL**

Release screws (1).

Remove servodrive (2) and disconnect plug connection (3).

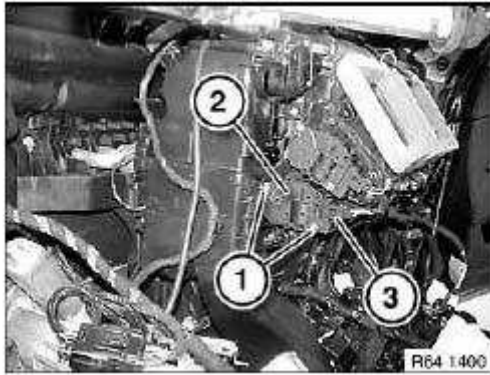


Fig. 35: Identifying Servodrive And Plug Connection
Courtesy of BMW OF NORTH AMERICA, INC.

64 11 837 REPLACING SERVODRIVE FOR RIGHT BLENDING FLAP

Necessary preliminary tasks:

- Remove trim, see **51 45 031 REPLACING INSTRUMENT PANEL TRIM** .

NOTE: For purposes of clarity, following graphics show instrument panel carrier removed.

Release screws (1).

Remove servomotor (2) and disconnect plug connection (3).

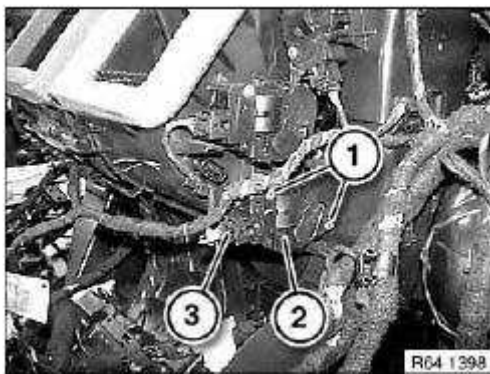


Fig. 36: Identifying Servodrive And Plug Connection
Courtesy of BMW OF NORTH AMERICA, INC.

64 11 840 REPLACING SERVODRIVE FOR LEFT FOOTWELL FLAP

Necessary preliminary tasks:

- Remove carrier, see **51 45 075 REMOVING AND INSTALLING CARRIER FOR INSTRUMENT PANEL** .
- If necessary, remove left side section housing
- If necessary, remove air duct at side

Release screws (1).

Disconnect plug connection (2) and remove servodrive.

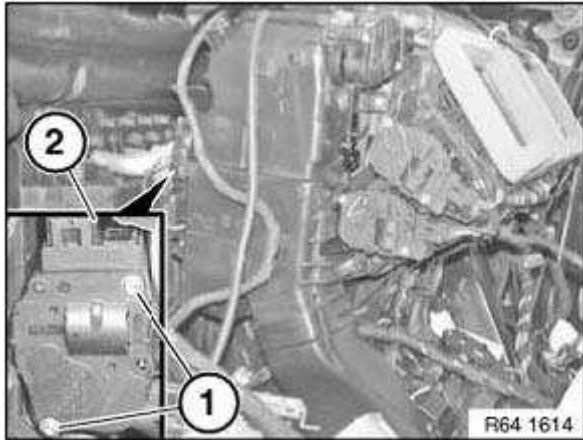


Fig. 37: Identifying Servodrive And Plug Connection
 Courtesy of BMW OF NORTH AMERICA, INC.

64 11 842 REPLACING SERVODRIVE FOR RIGHT FOOTWELL FLAP

Necessary preliminary tasks:

- Remove instrument panel, see **51 45 031 REPLACING INSTRUMENT PANEL TRIM** .

Disconnect plug connection (1).

Release screws (2) and remove servodrive.

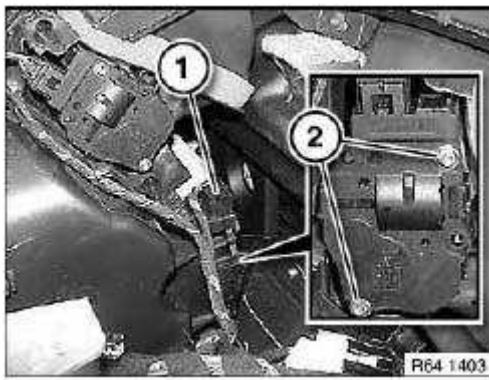


Fig. 38: Identifying Servodrive And Plug Connection
Courtesy of BMW OF NORTH AMERICA, INC.

64 11 846 REPLACING ACTUATOR DRIVE OF DEFROSTING FLAPS

Necessary preliminary tasks:

- Remove instrument panel, see **51 45 031 REPLACING INSTRUMENT PANEL TRIM** .

Release screws (1).

Remove servodrive (2) and disconnect plug connection (3).

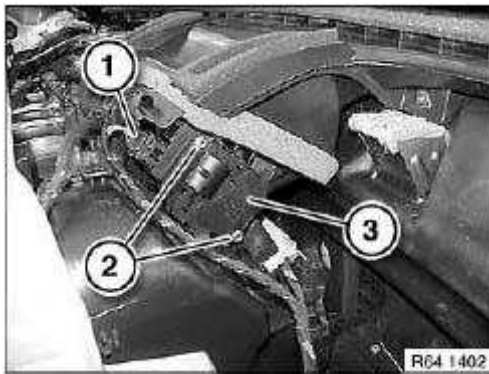


Fig. 39: Identifying Servodrive And Plug Connection
Courtesy of BMW OF NORTH AMERICA, INC.

64 11 849 REPLACING SERVODRIVE FOR DYNAMIC PRESSURE COMPENSATION

Necessary preliminary tasks:

- Remove trim, see **51 45 181 REMOVING AND INSTALLING/REPLACING TRIM FOR INSTRUMENT PANEL, BOTTOM RIGHT** .

Release screws (1) and remove air duct (2).

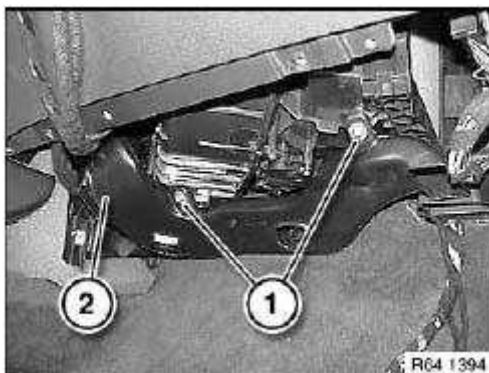


Fig. 40: Identifying Air Duct And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Remove servomotor (2) and disconnect associated plug connection.

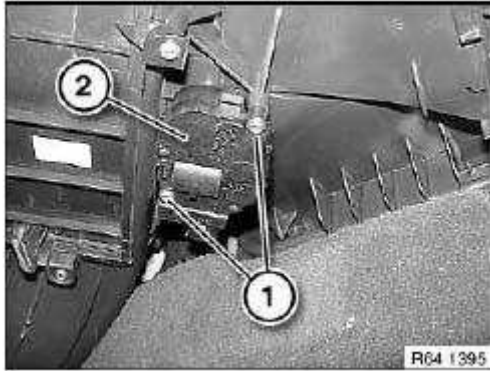


Fig. 41: Identifying Servomotor And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

64 11 857 REPLACING SERVODRIVE FOR LEFT REAR CABIN FOOTWELL FLAP

Necessary preliminary tasks:

- Remove carrier, see **51 45 075 REMOVING AND INSTALLING CARRIER FOR INSTRUMENT PANEL** .

Release screws (1).

Remove servodrive (2) and disconnect plug connection (3).

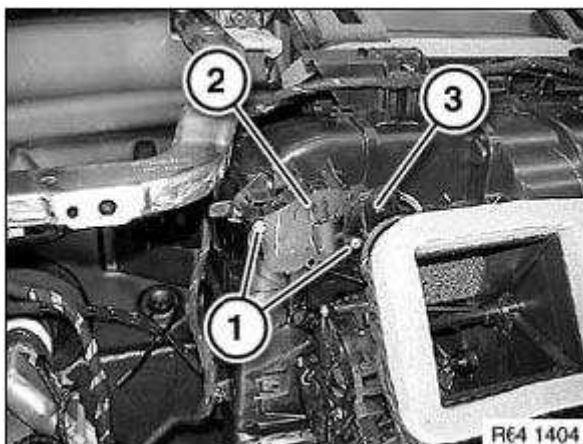


Fig. 42: Identifying Plug Connection And Servodrive

Courtesy of BMW OF NORTH AMERICA, INC.

64 11 858 REPLACING SERVODRIVE FOR RIGHT REAR CABIN FOOTWELL FLAP

Necessary preliminary tasks:

- Remove carrier, see **51 45 075 REMOVING AND INSTALLING CARRIER FOR INSTRUMENT PANEL** .

Release screws (1).

Remove servodrive (2) and disconnect plug connection (3).

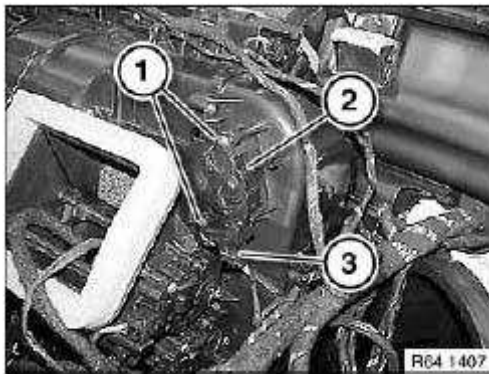


Fig. 43: Identifying Plug Connection And Servodrive

Courtesy of BMW OF NORTH AMERICA, INC.

64 11 906 REMOVING AND INSTALLING/REPLACING VENTILATION TEMPERATURE SENSOR (MIDDLE FRESH-AIR GRILLE)

Necessary preliminary tasks:

- Remove middle fresh-air grille, see **64 22 164 Removing and installing or replacing middle fresh-air grille**.

Disconnect plug connection (1).

Turn temperature sensor (2) in direction of arrow as far as it will go.

Remove temperature sensor (2) from middle fresh-air grille (4).

Installation:

On version with two temperature sensors, pay attention to lead identification (3):

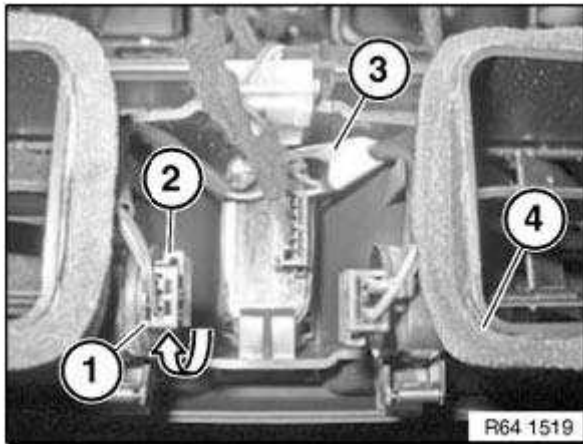


Fig. 44: Identifying Temperature Sensor And Plug Connection
 Courtesy of BMW OF NORTH AMERICA, INC.

- Always connect lead identification (3) on right from driver's viewpoint

Make sure temperature sensor (2) is correctly engaged in middle fresh-air grille (4).

64 11 939 REPLACING (ONE) TEMPERATURE SENSOR FOR HEATER

Necessary preliminary tasks:

- Remove INSTRUMENT PANEL, see **65 13 065 REMOVING AND INSTALLING/REPLACING FRONT SPEAKER CARRIER (INSTRUMENT PANEL)**.

Unlock temperature sensor (1) and feed out.

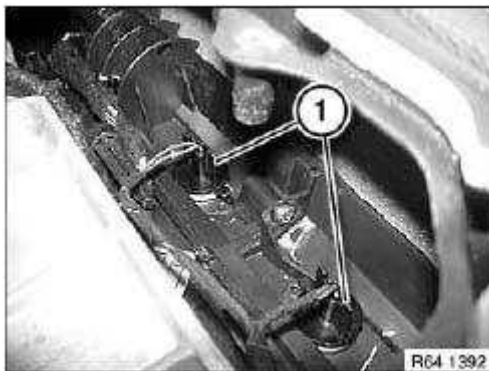


Fig. 45: Identifying Temperature Sensor
 Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect cables (1).

Connect cables to new temperature sensor with butt connectors and heat-shrink sleeves.

Insulate cables with insulating tape.

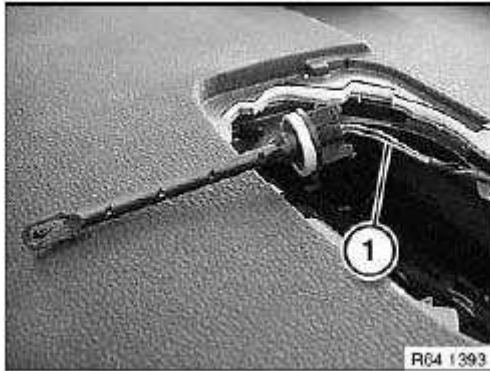


Fig. 46: Disconnecting Cables

Courtesy of BMW OF NORTH AMERICA, INC.

64 11 942 REPLACING EVAPORATOR TEMPERATURE SENSOR

Necessary preliminary tasks:

- Remove PANEL FOR PEDALS, see **51 45 185 REMOVING AND INSTALLING/REPLACING PANEL FOR PEDALS** .

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

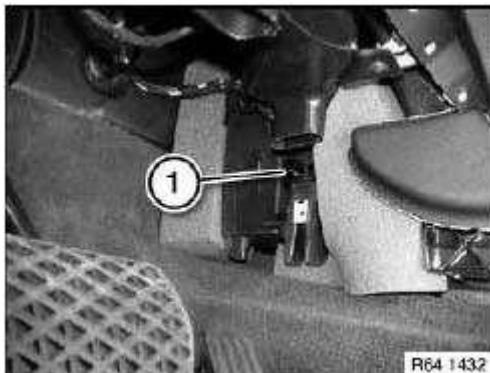


Fig. 47: Identifying Temperature Sensor

Courtesy of BMW OF NORTH AMERICA, INC.

64 11 970 REPLACING FOGGING SENSOR (FROM 10/2008)

Special tools required:

- **00 9 317 00 9 317 TRIM PANEL WEDGE**

WARNING: Make sure rooms are well ventilated when working with adhesive remover

indoors.

IMPORTANT: Do not under any circumstances use paint thinner to clean the bonding surface.

Press on end caps (1) and at same time press them apart; this releases clip connection of both caps (1).

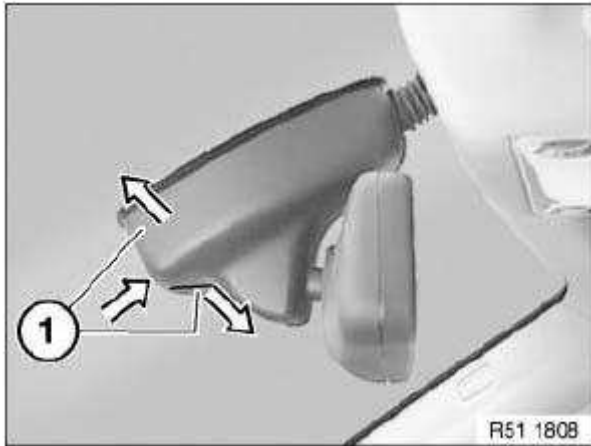


Fig. 48: Pressing End Caps

Courtesy of BMW OF NORTH AMERICA, INC.

Twist mirror (1) at an angle towards front and right/top.

Swivel left end cap (2) off ball neck in direction of arrow; this detaches the engagement clip (3) from the metal foot.

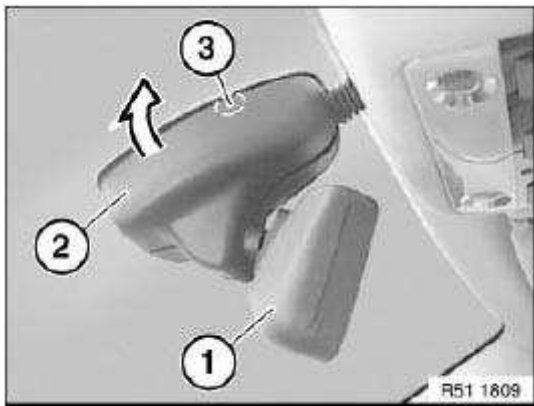


Fig. 49: Identifying Twist Mirror And Engagement Clip

Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

NOTE: If necessary, carefully heat fogging sensor (2) with a hot air blower to approx. 40-60°C.

Lift off fogging sensor (2) with special tool **00 9 317** and slowly pull off from windshield.

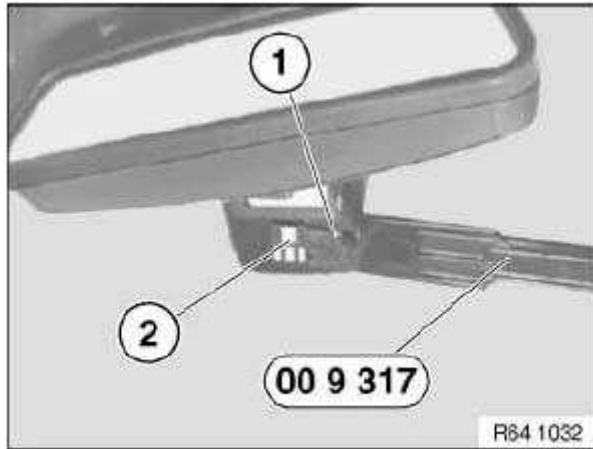


Fig. 50: Identifying Heat Fogging Sensor And Plug Connection
Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Bonding surface must be dry and free of dust and grease.

Clean bonding surface with adhesive remover (sourcing reference: BMW Parts Service).

After cleaning, do not touch bonding surface with bare hands.

Pull off protective film completely from fogging sensor (3).

Place mounting template (1) as pictured on rain sensor (2).

Press fogging sensor (3) in direction of arrow with a contact pressure of $> \text{ or } = 15 \text{ N/cm}^2$ onto inside of windshield.

NOTE: Firm thumb pressure attains approx. 30 N/cm^2 .

Remove mounting template (1) carefully from fogging sensor (3).

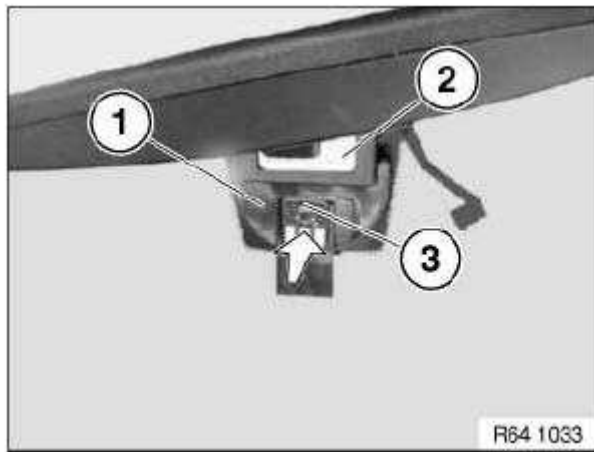


Fig. 51: Identifying Mounting Template And Fogging Sensor
 Courtesy of BMW OF NORTH AMERICA, INC.

64 11 970 REPLACING FOGGING SENSOR (UP TO 10/2008)

Necessary preliminary tasks:

- Remove INTERIOR REARVIEW MIRROR, see **51 16 060 REMOVING AND INSTALLING/REPLACING INTERIOR REARVIEW MIRROR (OVERVIEW)** .

Unclip fogging sensor (1) from retaining tabs (2).

Disconnect plug connection (3).

Installation:

Make sure fogging sensor (1) is securely seated.

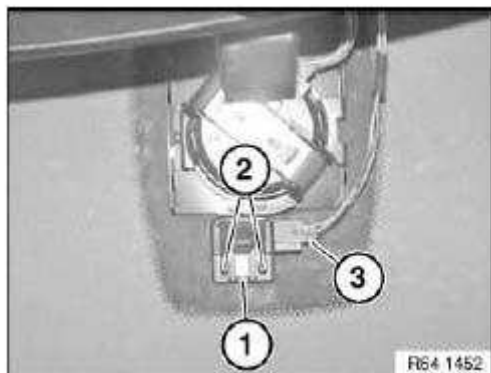


Fig. 52: Identifying Fogging Sensor And Plug Connection
 Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Sensor surface (1) must be clean and free from grease.

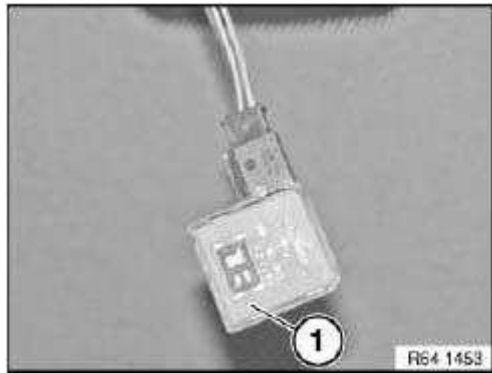


Fig. 53: Identifying Sensor Surface

Courtesy of BMW OF NORTH AMERICA, INC.

64 11 990 REMOVING AND INSTALLING/REPLACING SENSOR FOR AUTOMATIC RECIRCULATED AIR CONTROL (AUC)

Necessary preliminary tasks:

- Remove microfilter housing cover, see **64 31 106 Removing and installing/replacing right microfilter housing cover.**

Disconnect plug connection (1).

Unlock AUC sensor (2) and remove.

Installation:

Make sure AUC sensor (2) is securely seated.

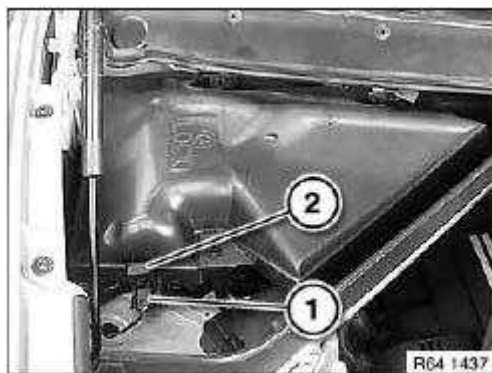


Fig. 54: Identifying AUC Sensor And Plug Connection

Courtesy of BMW OF NORTH AMERICA, INC.

AUXILIARY HEATER WITH CONTROL ELEMENTS

64 12 ... INITIALIZING TELESTART HAND TRANSMITTER (T93) (FROM BUILD DATE 03/2007)

NOTE: The Telestart hand transmitter must be initialized when:

- Hand transmitter is replaced
- Car Access System control unit is replaced

The independent heating is switched on under an outside temperature of approx. 15°C with the hand transmitter and at a preselected switch-on time. Direct activation is possible at any outside temperature via the "Climate" menu item in the i-Drive, but not in driving mode.

To initialize a new hand transmitter, perform the following operations from inside the vehicle:

- Close all doors on vehicle (vehicle must be unlocked!)
- Within 5 seconds: Turn ignition lock from terminal "0" to terminal "R" and then back to terminal "0" (by inserting and removing key, insertion duration: 1 to 5 secs.)
- Within 5 seconds: Simultaneously press both buttons (1, 2) on hand transmitter until LED (3) **lights up** orange.
- Release both buttons. Briefly press ON button (1) three times within 10 seconds; LED (3) flashes orange as confirmation.



Fig. 55: Identifying Hand Transmitter Button

Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: The vehicle's central locking closes and opens automatically on successful initialization.
The initialization process must be repeated if there is no checkback signal from the central locking system.

64 12 089 REMOVING AND INSTALLING OR REPLACING MUFFLER/SILENCER

WARNING: Scalding hazard!

Work on independent heating may only be carried out when it has cooled down.

Necessary preliminary tasks:

- Remove UNDERBODY PANELLING, see 51 47 ... REMOVING AND INSTALLING/REPLACING LEFT OR RIGHT UNDERBODY PANELLING

Slacken clamp (1).

Release screws (2) and remove muffler (3).

Tightening torque **64 12 1AZ** , see 64 12 ADDITIONAL HEATER WITH CONTROLS .

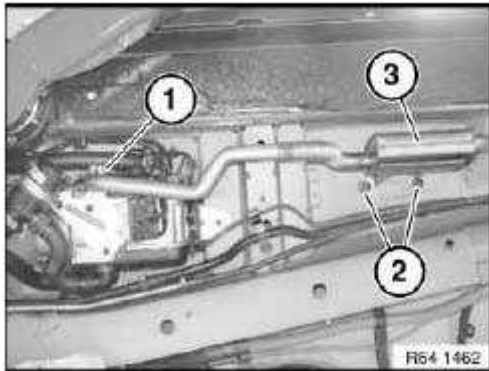


Fig. 56: Identifying Muffler, Clamp And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

64 12 120 REMOVING AND INSTALLING/REPLACING INTAKE MUFFLER FOR INDEPENDENT/AUXILIARY HEATER

WARNING: Scalding hazard!

Work on independent heating may only be carried out when it has cooled down.

Necessary preliminary tasks:

- Remove FRONT LEFT WHEEL ARCH, see 41 14 021 REPLACING FRONT LEFT WHEEL ARCH .
- Remove FRONT LEFT WHEEL ARCH, see 41 14 021 REPLACING FRONT LEFT WHEEL ARCH .

Release screw (1) and unclip intake muffler (2).

Installation:

Retaining clip on intake muffler must not be damaged!

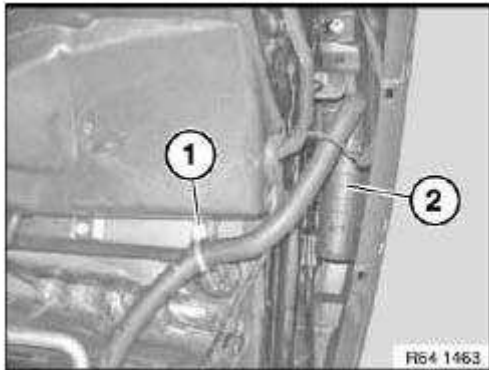


Fig. 57: Identifying Unclip Intake Muffler And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Release hose clamp (1), disconnect air intake hose (2) and feed out.

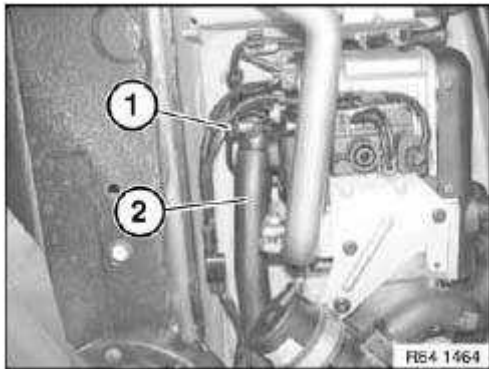


Fig. 58: Identifying Hose Clamp And Air Intake Hose
Courtesy of BMW OF NORTH AMERICA, INC.

64 12 160 REMOVING AND INSTALLING/REPLACING COMPLETE INDEPENDENT HEATER WITH BRACKET

Special tools required:

- 13 3 010

See **FUEL SYSTEM - SPECIAL TOOLS** .

WARNING: Scalding hazard!

Work on independent heating may only be carried out when it has cooled down.

Recycling

Fuel escapes when fuel lines are detached. Have a suitable collecting container ready.

Catch and dispose of escaping fuel.

Observe country-specific waste-disposal regulations.

Necessary preliminary tasks:

- Remove **LEFT OR RIGHT UNDERBODY PANELLING**

Disconnect plug connection (1).

Release hose clamp (2) and detach fuel line.

Release screw (3).

Tightening torque **64 12 2AZ** , see **64 12 INDEPENDENT HEATING** .

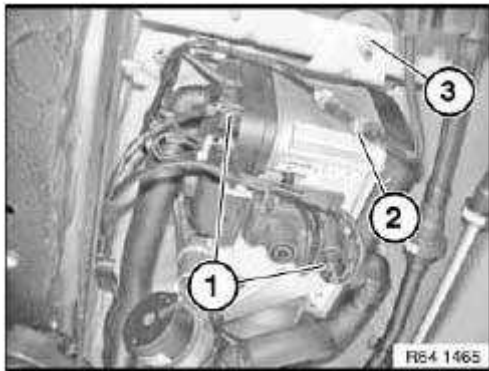


Fig. 59: Identifying Hose Clamp And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Secure heater (3) against falling out.

Disconnect coolant hoses (1) with special tool **13 3 010** .

Release hose clamps (2) and detach coolant hoses (1).

Release nuts (4) and unclip associated hoses from holder (5).

Remove heater (3) and set down on a suitable surface.

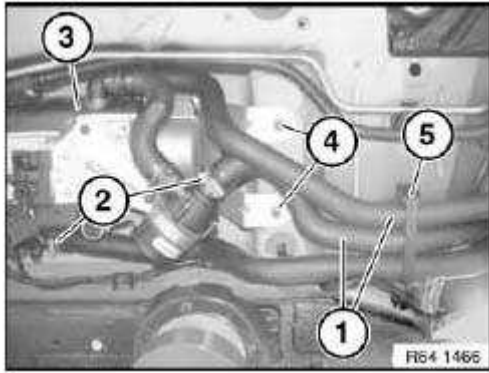


Fig. 60: Identifying Heater And Nuts
 Courtesy of BMW OF NORTH AMERICA, INC.

Release hose clamp (1) and remove complete heater (2) with bracket.

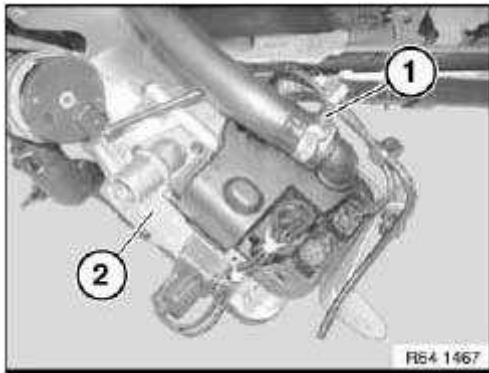


Fig. 61: Identifying Hose Clamp And Complete Heater
 Courtesy of BMW OF NORTH AMERICA, INC.

Replacement:

Modify **muffler**.

Release hose clamp (1) and detach coolant hose.

Release bolt (2).

Tightening torque **64 12 3AZ**. See **AUXILIARY HEATER** .

Disconnect plug connection (3) and remove auxiliary water pump (4).

Installation:

Check coolant hoses for damage and replace if necessary.

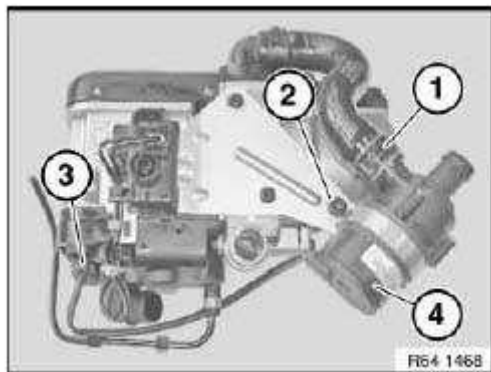


Fig. 62: Identifying Plug Connection And Auxiliary Water Pump
 Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1) and remove heater from bracket (2).

Tightening torque **64 12 4AZ**. See **AUXILIARY HEATER** .

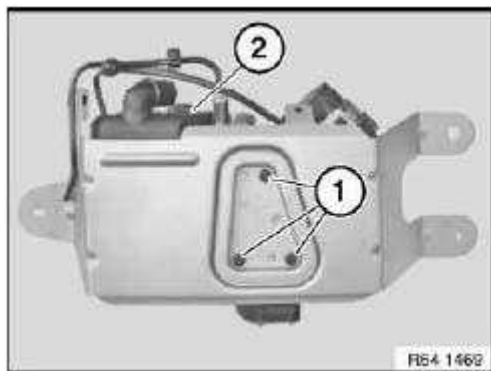


Fig. 63: Identifying Bracket And Screw
 Courtesy of BMW OF NORTH AMERICA, INC.

After installation:

- Vent cooling system

64 12 570 REPLACING AUXILIARY WATER PUMP FOR INDEPENDENT/AUXILIARY HEATER

Special tools required:

- 13 3 010

See **FUEL SYSTEM - SPECIAL TOOLS** .

WARNING: Scalding hazard!

Work on the cooling system may only be carried out when it has cooled

down.

Recycling

Coolant emerges when coolant lines are detached. Have a suitable collecting container ready.

Catch and dispose of emerging coolant.

Observe country-specific waste-disposal regulations.

Necessary preliminary tasks:

- Remove **LEFT OR RIGHT UNDERBODY PANELLING**

NOTE: Disconnect coolant hoses

Disconnect coolant hoses (1) with special tool **13 3 010** and release associated hose clamps.

Release screw (2).

Detach auxiliary water pump (3) and disconnect associated plug connection.

Tightening torque **64 12 3AZ** , see **64 12 INDEPENDENT HEATING** .

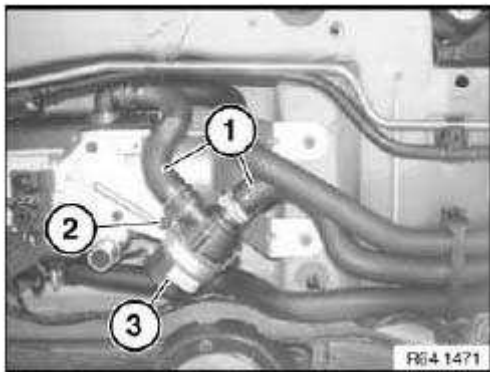


Fig. 64: Identifying Auxiliary Water Pump And Plug Connection
Courtesy of BMW OF NORTH AMERICA, INC.

After installation:

- **Fill and vent cooling system and check for leaks** , see **17 00 008 DRAINING AND ADDING COOLANT IN RADIATOR (N62TU, N63)** , and **17 00 039 VENTING COOLING SYSTEM AND CHECKING FOR WATER LEAKS (N63)** , or **17 00 005 DRAINING AND ADDING COOLANT (N54)** , **17 00 039 VENTING COOLING SYSTEM AND CHECKING FOR WATER LEAKS (N54)** .

64 12 577 REPLACING CHANGEOVER VALVE FOR INDEPENDENT/AUXILIARY HEATER

WARNING: Danger of scalding!

Only perform the following tasks on an engine that has cooled down. Follow instructions for working on cooling system , see 17 00 008 DRAINING AND ADDING COOLANT IN RADIATOR (N62TU, N63) and check for leaks, see 17 00 009 CHECKING COOLING SYSTEM FOR WATER LEAKS , or 17 00 005 DRAINING AND ADDING COOLANT (N54) , 17 00 039 VENTING COOLING SYSTEM AND CHECKING FOR WATER LEAKS (N54) .

NOTE: Disconnect coolant hoses from changeover valve for independent/auxiliary heater.

Necessary preliminary tasks:

- Remove FRONT LEFT WHEEL ARCH .

IMPORTANT: Risk of damage!

Observe coolant throughflow direction, mark coolant hoses before removing.

NOTE: If necessary, catch escaping coolant.

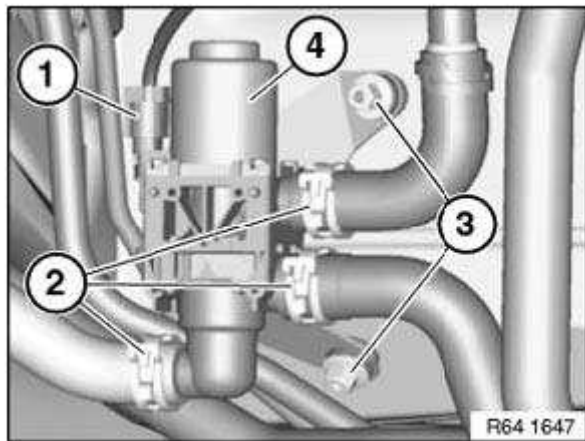


Fig. 65: Identifying Plug Connection And Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

Release spring clamps (2) and detach coolant hoses.

Release nuts (3) and remove changeover valve for independent/auxiliary heater (4).

After installation:

Vent cooling system and check for water leaks

64 12 600 REMOVING AND INSTALLING OR REPLACING FUEL PUMP

Special tools required:

- 13 3 010

See **FUEL SYSTEM - SPECIAL TOOLS** .

Necessary preliminary tasks:

- Remove **LEFT OR RIGHT UNDERBODY PANELLING**

Seal off water hoses at fuel pump with special tool 13 3 010.

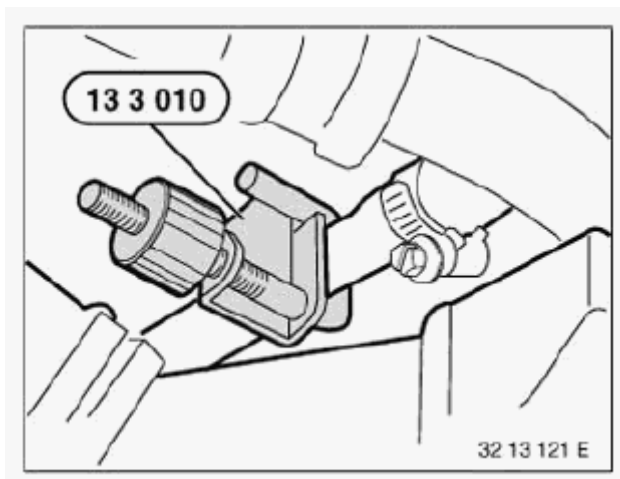


Fig. 66: Identifying Water Hoses With Special Tool
Courtesy of BMW OF NORTH AMERICA, INC.

Recycling

Fuel escapes when fuel lines are detached. Have a suitable collecting container ready.

Catch and dispose of escaping fuel.

Observe country-specific waste-disposal regulations.

Disconnect plug connection (1).

Release hose clamps (2) and detach fuel hoses.

NOTE: **Secure fuel pump (4) against falling out.**

Disengage rubber retainers (3).

Installation:

Observe direction of flow of fuel pump (4).

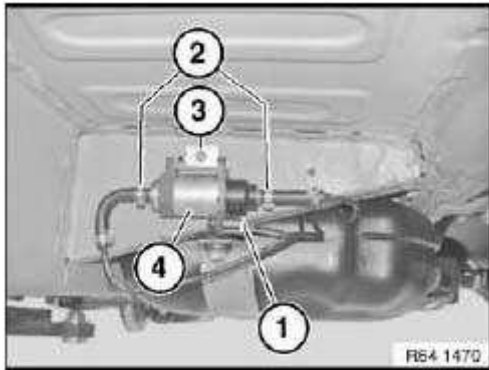


Fig. 67: Identifying Fuel Pump And Rubber Retainers
Courtesy of BMW OF NORTH AMERICA, INC.

64 12 670 REPLACING FRONT ELECTRIC AUXILIARY HEATER

Necessary preliminary tasks:

- Remove **CARRIER FOR INSTRUMENT PANEL**

NOTE: For purposes of clarity, the following graphics show the heater/air conditioner removed.

Disconnect plug connection (1).



Fig. 68: Identifying Plug Connection And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Lay servomotor (2) to one side.



Fig. 69: Identifying Servomotor And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

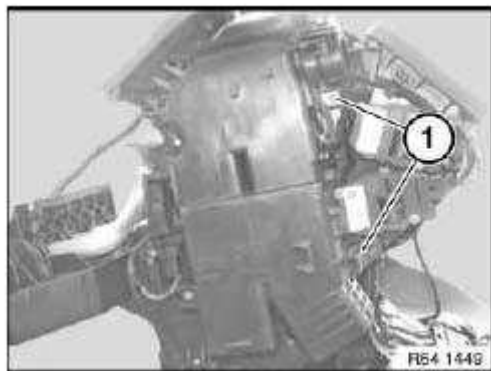


Fig. 70: Identifying Servomotor Screw Location
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (2) and remove housing side section (2).



Fig. 71: Identifying Housing Side Section And Screws

Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

Release screw (2).

Pull out electric auxiliary heater (3) and detach associated ground cable (4).

Installation:

Make sure ground cable (4) is securely seated.

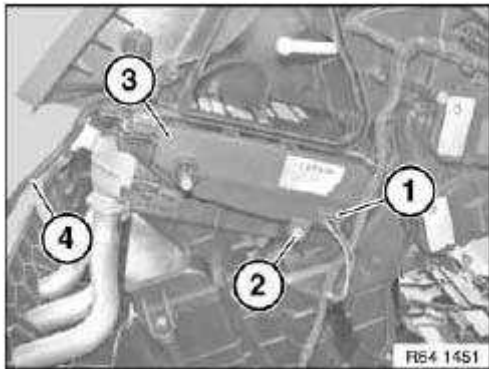


Fig. 72: Identifying Electric Auxiliary Heater And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

64 12 673 REPLACING LEFT OR RIGHT ELECTRIC AUXILIARY HEATER - REAR CABIN

Necessary preliminary tasks:

- Move driver's seat into "front" and "top" position.

For purposes of clarity, pictures show driver's seat removed.

Remove speaker trim (1) and fold back floor carpet (2) in working area.

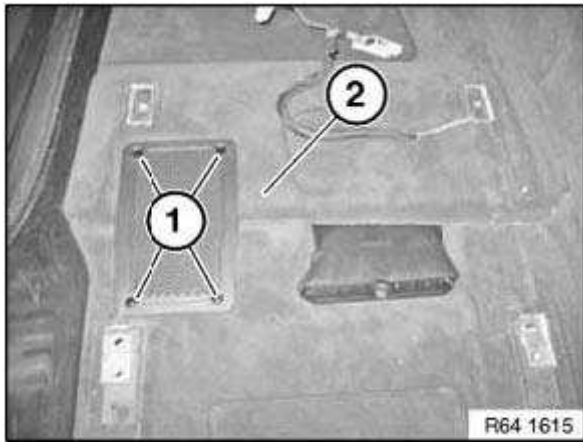


Fig. 73: Identifying Back Floor Carpet And Speaker Trim
 Courtesy of BMW OF NORTH AMERICA, INC.

Remove rear cabin air duct (1) and disconnect plug connections (2).

Installation:

Ensure that air duct (1) is correctly seated.

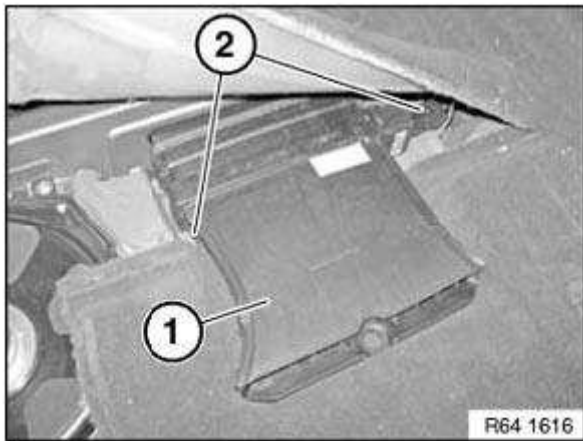


Fig. 74: Identifying Rear Cabin Air Duct And Plug Connections
 Courtesy of BMW OF NORTH AMERICA, INC.

Unlock electrical connection (1) and remove.

Unlock retaining tabs (2) on both sides from air duct and remove upper vent section (3).

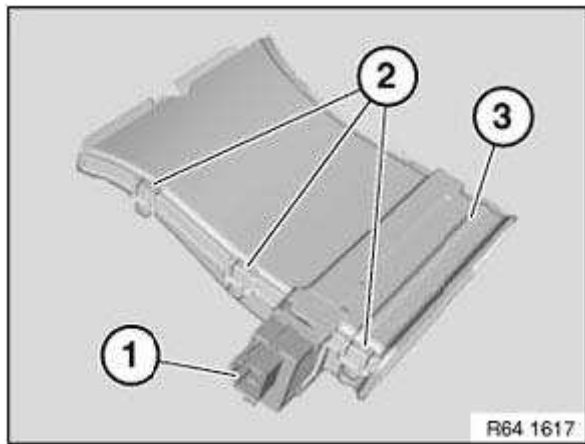


Fig. 75: Identifying Electrical Connection And Retaining Tabs
Courtesy of BMW OF NORTH AMERICA, INC.

Remove auxiliary heater (1) from lower vent section (2).

Installation:

Make sure auxiliary heater (1) is correctly seated in lower vent section (2).

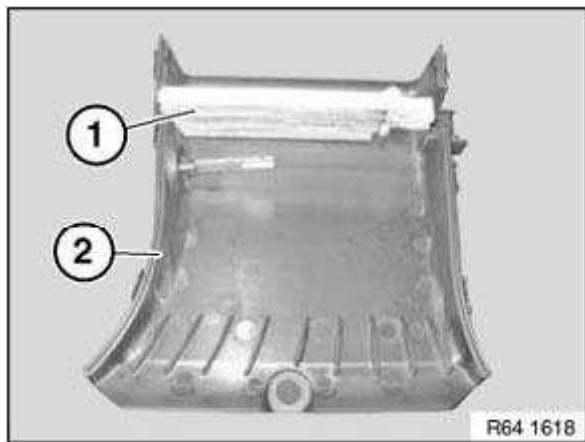


Fig. 76: Identifying Auxiliary Heater And Lower Vent Section
Courtesy of BMW OF NORTH AMERICA, INC.

64 12 681 REPLACING TEMPERATURE SENSOR FOR LEFT OR RIGHT ELECTRIC AUXILIARY HEATER - REAR CABIN

Necessary preliminary tasks:

- Remove electric auxiliary heater, see **64 12 673 Replacing left or right electric auxiliary heater - rear cabin.**

Unlock temperature sensor (1) by turning and feed out.

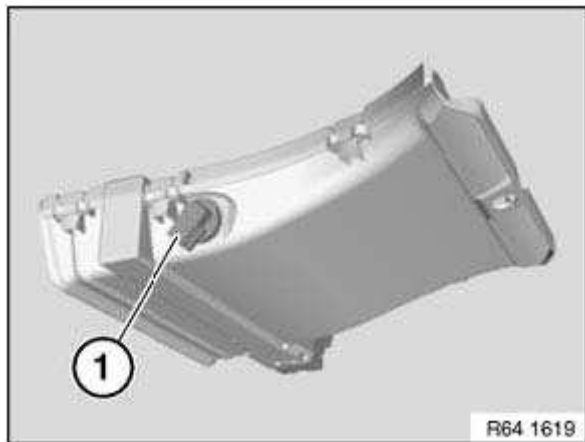


Fig. 77: Identifying Temperature Sensor
Courtesy of BMW OF NORTH AMERICA, INC.

NOZZLES AND OUTLETS

64 22 ... REMOVING AND INSTALLING WINDSCREEN AIR DUCT

Necessary preliminary tasks:

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

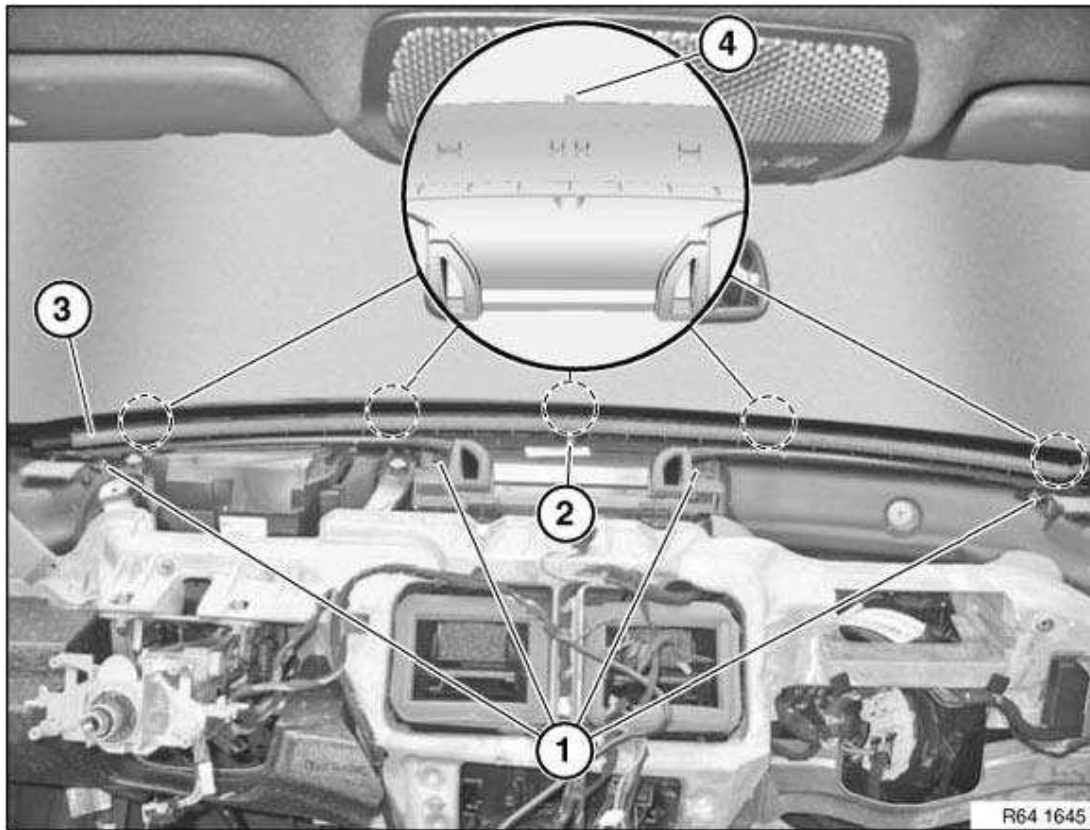


Fig. 78: Identifying Windscreen Air Duct And Screw
 Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1) and (2) and remove windscreen air duct (3).

Installation:

Make sure guides (4) are correctly seated in associated body openings.

64 22 135 REMOVING AND INSTALLING OR REPLACING LEFT FRESH-AIR GRILLE

Special tools required:

- 64 1 030

See **FUEL SYSTEM - SPECIAL TOOLS** .

Necessary preliminary tasks:

- Remove **DECORATIVE STRIP ON LEFT FRESH-AIR GRILLE**

Release screw (1).



Fig. 79: Identifying Fresh-Air Grille And Screws
 Courtesy of BMW OF NORTH AMERICA, INC.

Insert special tool **64 1 030** on both sides into guide holes (1).

Pull out fresh-air grille (2) with special tool **64 1 030**.

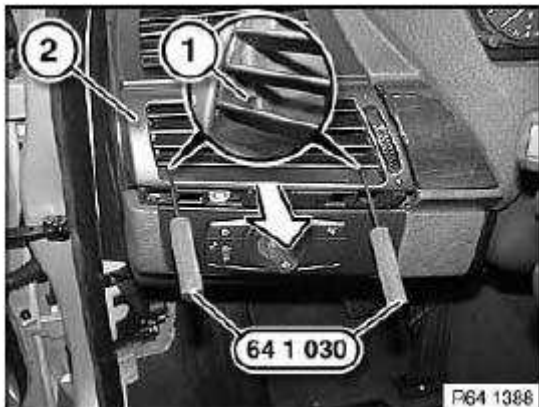


Fig. 80: Pulling Fresh-Air Grille Using Special Tool
 Courtesy of BMW OF NORTH AMERICA, INC.

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

Operation is described in:

Removing and installing/replacing left fresh-air grille

64 22 164 REMOVING AND INSTALLING OR REPLACING MIDDLE FRESH-AIR GRILLE

Special tools required:

- 64 1 030

See **FUEL SYSTEM - SPECIAL TOOLS** .

Lever out fresh-air grille (1) with special tool **64 1 030** towards top and feed out.

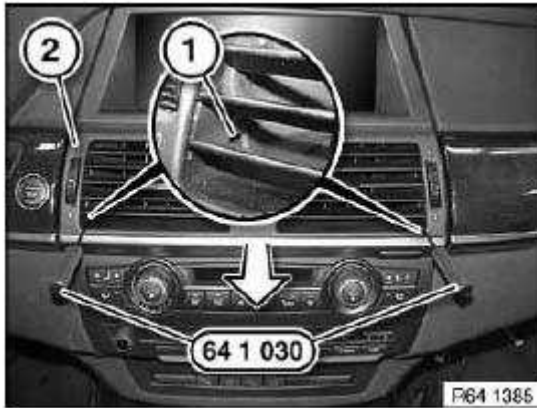


Fig. 81: Identifying Fresh-Air Grille With Special Tool
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connections (1) and remove fresh-air grille (2).

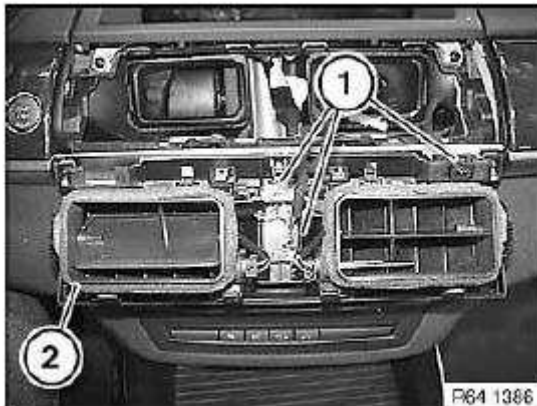


Fig. 82: Identifying Plug Connections And Fresh-Air Grille
Courtesy of BMW OF NORTH AMERICA, INC.

Replacement:

- Modify **decorative trim on middle fresh-air grille**
- Modify **ventilation temperature sensor**

64 22 191 REMOVING AND INSTALLING/REPLACING REAR CABIN FRESH-AIR GRILLE

Necessary preliminary tasks:

- Remove REAR CENTRE CONSOLE TRIM, see **51 16 163 REMOVING AND**

INSTALLING/REPLACING REAR CENTRE CONSOLE TRIM .

- If necessary, remove TRIM FOR REAR CABIN MONITOR BASE, see **65 50 150 REMOVING AND INSTALLING/REPLACING TRIM FOR REAR CABIN MONITOR BASE AT FRONT AND REAR .**

Unclip catches (1) on both sides.

Carefully lever out fresh-air grille (2) in upward direction and disconnection associated plug connection.

NOTE: Trim grille must not be detached from air duct!

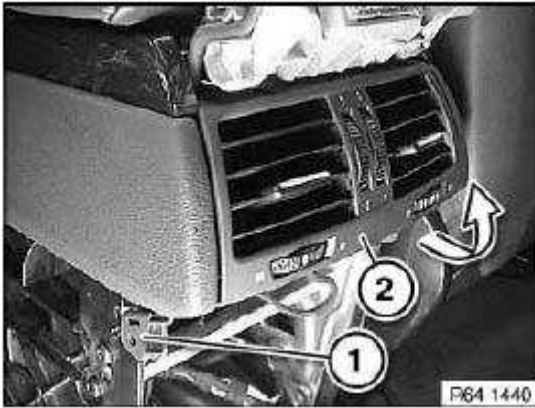


Fig. 83: Identifying Fresh-Air Grille And Catches
Courtesy of BMW OF NORTH AMERICA, INC.

MICROFILTER

64 31 011 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.

Necessary preliminary tasks:

- Remove **microfilter housing**.

Unclip catches (1) and remove microfilter (2).

Installation:

Reset Condition Based Service display according to factory specification.

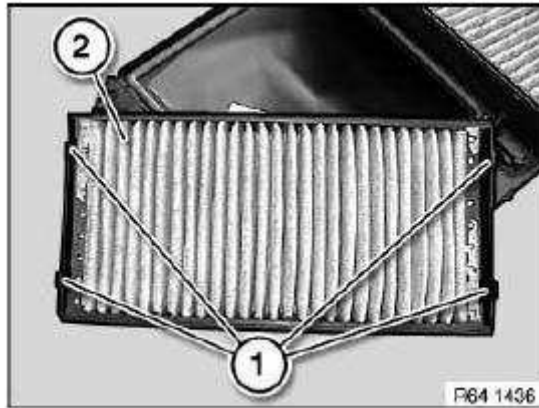


Fig. 84: Identifying Microfilter And Catches
Courtesy of BMW OF NORTH AMERICA, INC.

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. (BMW part number: 0 447 913).

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

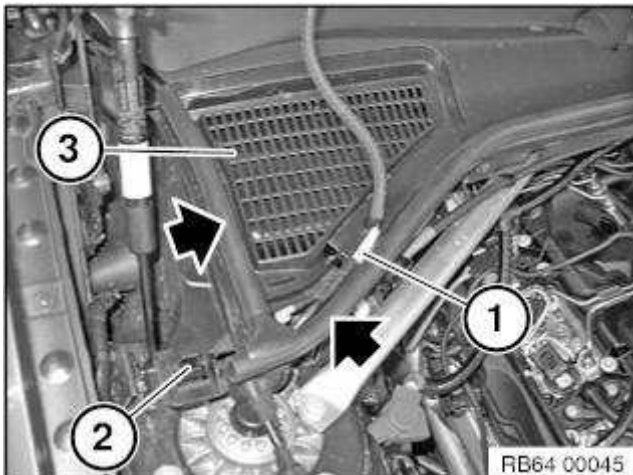


Fig. 85: Unclip Line And Water Hose From Cover

Courtesy of BMW OF NORTH AMERICA, INC.

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

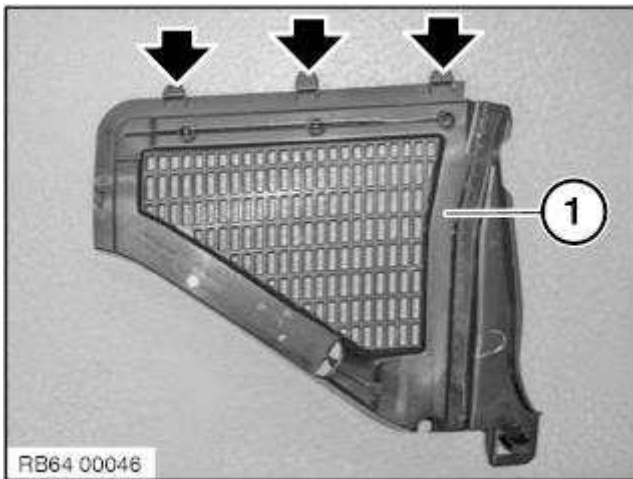


Fig. 86: Cover Tabs (1) Must Snap In Correctly Under Cowl Panel
Courtesy of BMW OF NORTH AMERICA, INC.

Remove filter cover (1) in direction of arrow.

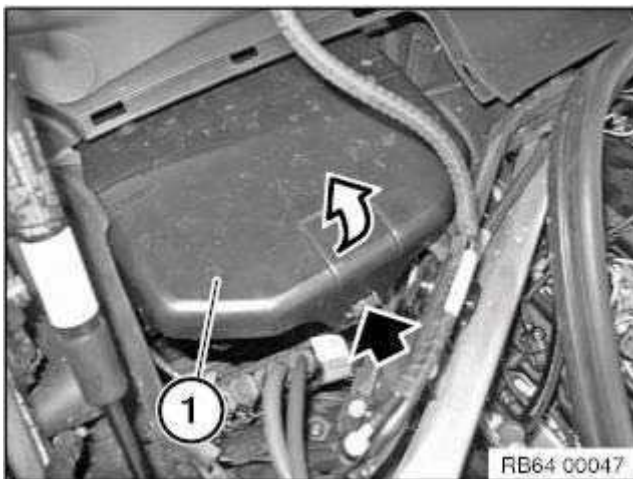


Fig. 87: Cover Tabs (1) Must Snap In Correctly Under Cowl Panel
Courtesy of BMW OF NORTH AMERICA, INC.

Remove upper microfilter (1) in direction of arrow.

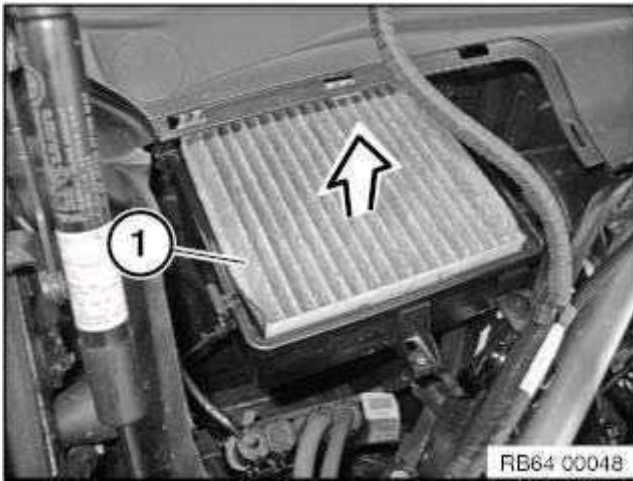


Fig. 88: Remove Upper Microfilter (1) In Direction Of Arrow
Courtesy of BMW OF NORTH AMERICA, INC.

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

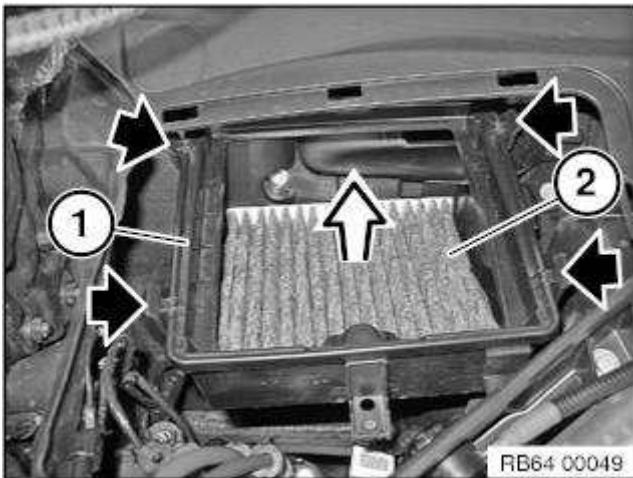


Fig. 89: Remove Lower Microfilter (2) In Direction Of Arrow
Courtesy of BMW OF NORTH AMERICA, INC.

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.

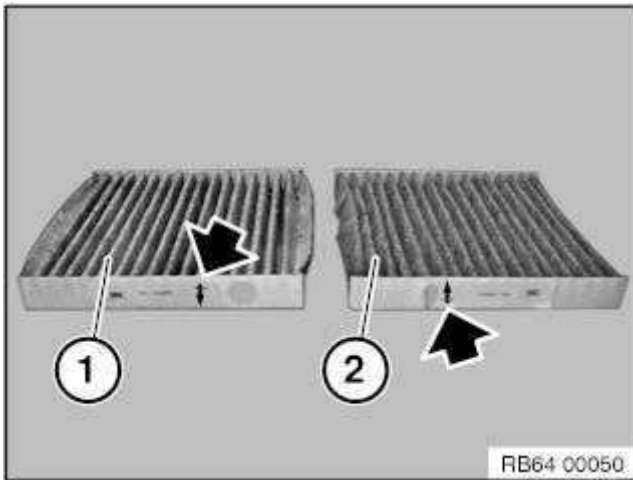


Fig. 90: Arrows Mark The Direction Of The Air Intake
 Courtesy of BMW OF NORTH AMERICA, INC.

64 31 017 REPLACING RECIRCULATED AIR MICROFILTER

IMPORTANT: Risk of damage!

**A/C system must not be operated without the prescribed filter element.
 Follow manufacturer's instructions.**

Necessary preliminary tasks:

- Remove **TRIM FOR INSTRUMENT PANEL, BOTTOM RIGHT**

Release screws (1) and remove air duct (2).

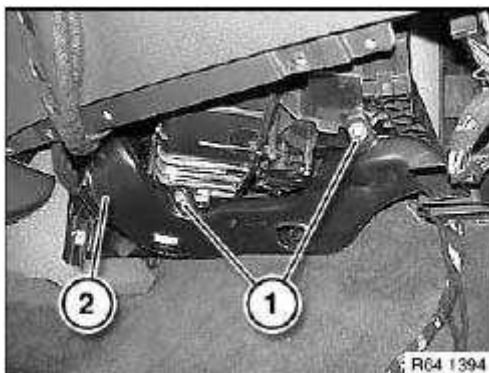


Fig. 91: Identifying Air Duct And Screws
 Courtesy of BMW OF NORTH AMERICA, INC.

Unclip air vent (1).

Slide lock (2) in direction of arrow and remove.

Feed out filter (3) towards bottom.

Installation:

Replacement filter consists of two halves.

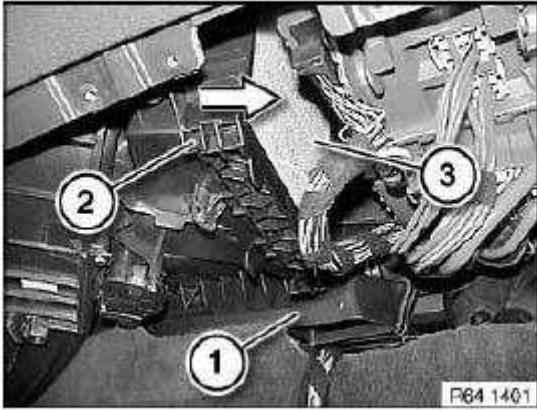


Fig. 92: Identifying Filter And Vent
Courtesy of BMW OF NORTH AMERICA, INC.

64 31 053 REMOVING AND INSTALLING OR REPLACING FRESH-AIR DUCT

Necessary preliminary tasks:

- Remove **microfilter housing**

Unclip retaining pin (1).

Release retaining clips (2) and feed out fresh-air duct (3).

Installation:

Make sure fresh-air duct (3) is securely seated.

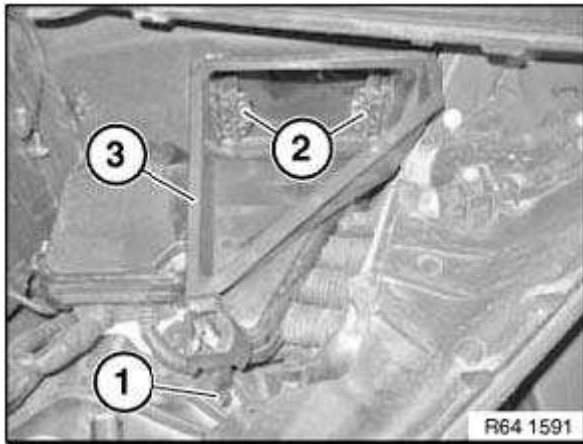


Fig. 93: Identifying Fresh-Air Duct And Retaining Pin
 Courtesy of BMW OF NORTH AMERICA, INC.

Make sure retaining clips (1) are correctly seated on fresh-air duct (2).

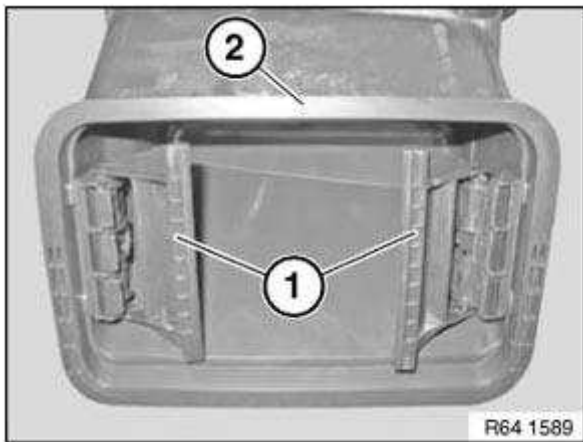


Fig. 94: Identifying Retaining Clips On Fresh-Air Duct
 Courtesy of BMW OF NORTH AMERICA, INC.

64 31 081 REMOVING AND INSTALLING/REPLACING MICROFILTER HOUSING

IMPORTANT: Risk of damage!

A/C system must not be operated without the prescribed filter element.
 Follow manufacturer's instructions.

Necessary preliminary tasks:

- Remove microfilter housing cover

Additionally E70 Security:

Disconnect plug connection (1).

Unlock rotary catches (2) and remove microfilter housing.

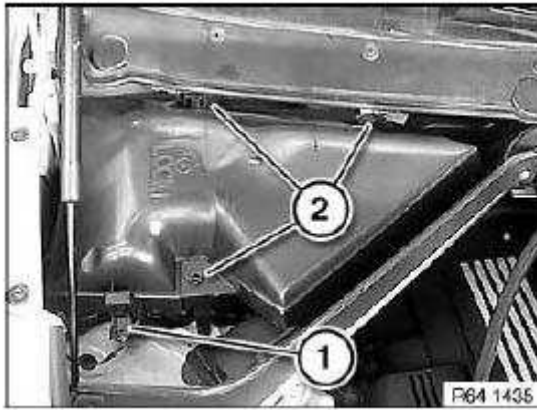


Fig. 95: Identifying Rotary Catches And Microfilter Housing
Courtesy of BMW OF NORTH AMERICA, INC.

Replacement:

- Remove **sensor for automatic recirculated air control** , see **64 11 990 Removing and installing/replacing sensor for automatic recirculated air control (AUC).**
- Modify **microfilter element** , see **64 31 011 Replacing microfilter for interior ventilation.**

64 31 101 REMOVING AND INSTALLING/REPLACING LEFT MICROFILTER HOUSING COVER

Detach mocket (1) in working area.

Unlock rotary catches (2) and remove microfilter housing cover.

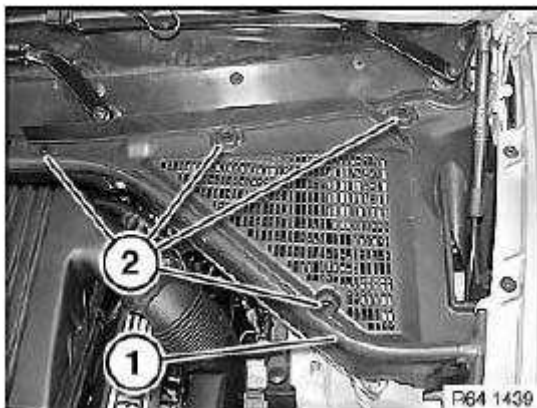


Fig. 96: Identifying Mocket And Rotary Catches
Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Make sure water gutter (1) is correctly seated in guide (2).

Make sure flap (3) moves freely; if necessary, clean to remove major dirt.

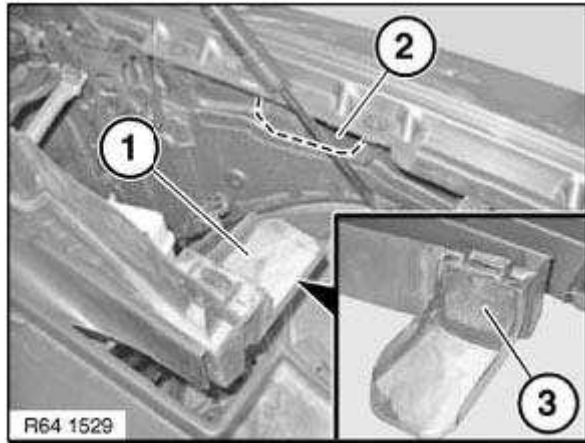


Fig. 97: Identifying Water Gutter And Guide
Courtesy of BMW OF NORTH AMERICA, INC.

64 31 106 REMOVING AND INSTALLING/REPLACING RIGHT MICROFILTER HOUSING COVER

Detach mocket (1) in working area.

Unlock rotary catches (2) and remove microfilter housing cover (3).

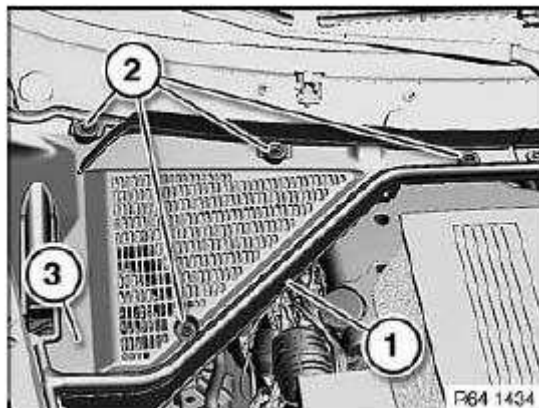


Fig. 98: Identifying Rotary Catches And Microfilter Housing Cover
Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Make sure water gutter (1) is correctly seated in guide (2).

Make sure flap (3) moves freely; if necessary, clean to remove major dirt.

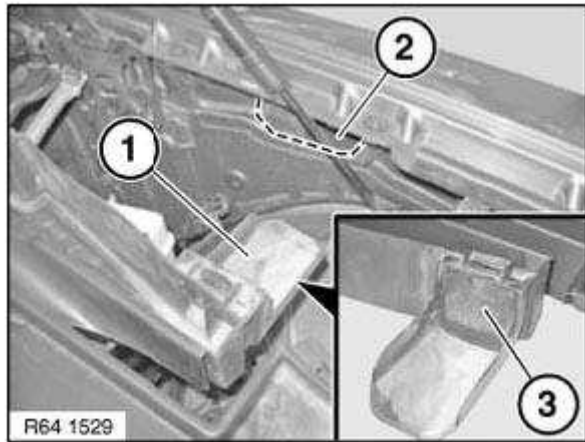


Fig. 99: Identifying Water Gutter And Guide
Courtesy of BMW OF NORTH AMERICA, INC.

AIR CONDITIONING SYSTEM

64 50 ... A/C EFFICIENCY TEST (R 134A)

Observe the following conditions prior to the A/C efficiency test:

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 the heating process
- Close all windows and doors.

- Set recirculated air mode.
- In A/C menu (MMI) in Air distribution index tab: select 100 % footwell for driver and front passenger and 100 % defrosting for driver (this applies here to driver and front passenger)
- Maximum temperature setting (28°C)
- Maximum fan speed (adjust 9 pixels from 9 possible on front A/C control panel)
- Run engine at approx. 2000 RPM until operating temperature is reached, then idle speed.

A/C efficiency test:

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

Vehicles with MAX-AC button ("MAX"):

- Activation of MAX-AC (= maximum chilling capacity)

Vehicles without MAX-AC button ("MAX"):

- Set maximum chilling capacity by means of following steps:
 - Temperature setting = 16°C
 - Fan setting 9 pixels from 9 possible
 - Stratification maximum cold (4 blue bars)

Evaporator sensor temperature must be < or = 15°C after 3-4 minutes at approx. 2000 RPM.

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

If drawn-off quantity does not correspond to specified fill quantity, see **64 50 A/C SYSTEM, REFRIGERANT AMOUNTS E71/N54, M57T2, N63** .

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

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

If drawn-off quantity does not correspond to **specified fill quantity, see 64 50 A/C SYSTEM, REFRIGERANT AMOUNTS E71/N54, M57T2, N63** .

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 colourless, 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.

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), extinguishant 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 extinguishant, 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:

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

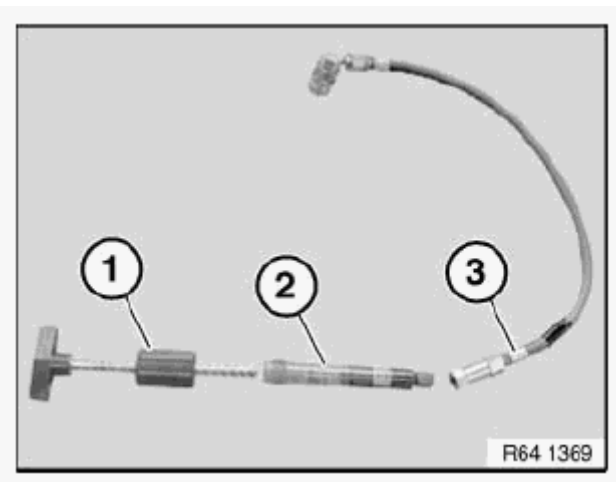


Fig. 100: Identifying Hand Pump, Additive Cartridge And Hose Piece
Courtesy of BMW OF NORTH AMERICA, INC.

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.

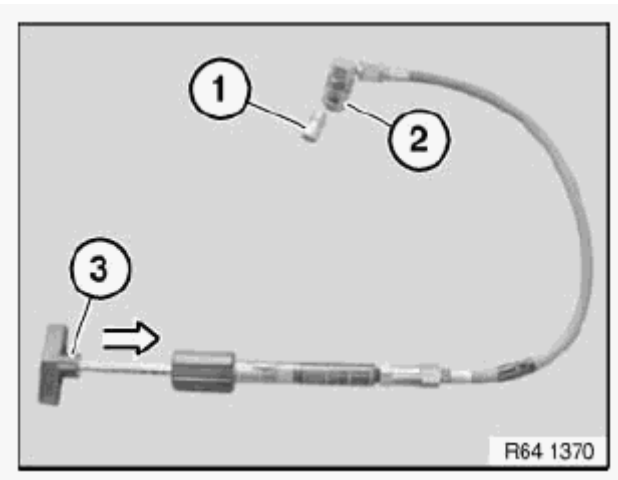


Fig. 101: Identifying Vent Valve And Quick-Connect Coupling
Courtesy of BMW OF NORTH AMERICA, INC.

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

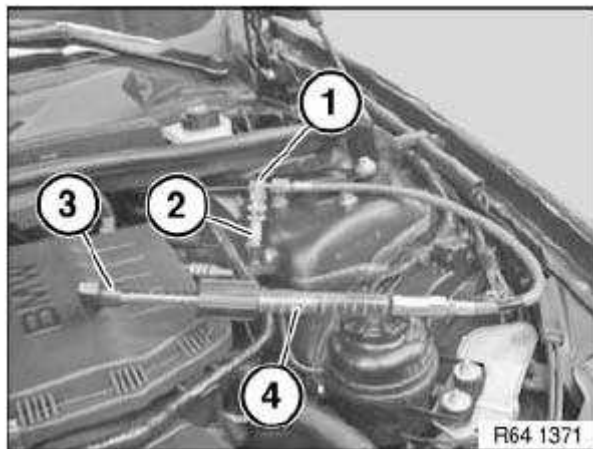


Fig. 102: Identifying Hand Pump And Quick-Connect Coupling
Courtesy of BMW OF NORTH AMERICA, INC.

- 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

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

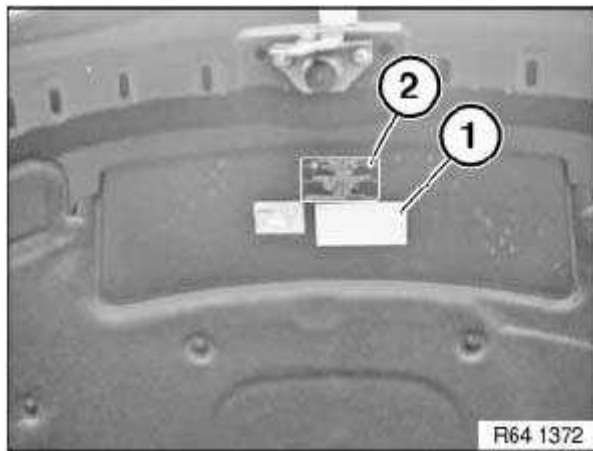


Fig. 103: Identifying Information Label
Courtesy of BMW OF NORTH AMERICA, INC.

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 an ophthalmologist.
- **Skin contact:** In the event of contact with skin, remove affected clothing immediately and rinse with plenty of water.
- **After inhalation:** If refrigerant vapours 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 ... SAFETY INSTRUCTIONS FOR HANDLING REFRIGERANT OIL

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:

- **If swallowed:** Do NOT induce vomiting, unless expressly instructed to do so by medical personnel. Do not administer anything to an unconscious person through their mouth. Consult a doctor immediately if larger quantities of this substance are swallowed. Loosen tight-fitting items of clothing (e.g. collar, tie, belt or similar).
- **Eye contact:** Remove contact lenses if worn. In the event of eye contact, rinse eyes for at least 15 minutes with plenty of water. **It is essential to use WARM WATER. Consult a doctor.**
- **Skin contact:** In the event of skin contact, rinse immediately with plenty of water. Remove contaminated clothes and shoes. Wash affected clothes before wearing again. Clean shoes thoroughly before reusing.

Call for a doctor.

- **After inhalation:** If inhaled, take the person affected outside into fresh air immediately and keep them under supervision. **Call for a doctor.** If breathing difficulties are experienced, administer additional oxygen. If the person affected stops breathing, administer the kiss of life.

Recycling

Catch and dispose of emerging refrigerant oil.

Observe country-specific waste-disposal regulations.

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 ... Instructions for handling refrigerant R 134a.

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

IMPORTANT: Risk of damage!

Only BMW-approved R134a refrigerant may be used.

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 vapour 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. See **64 50 ... Leak testing with ultraviolet additives (UV additives) (BMW leak-testing case).**

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, see **64 52 ... Instructions for opening and replacing parts in refrigerant circuit** in refrigerant circuit!



Fig. 104: Identifying Rating Plate
Courtesy of BMW OF NORTH AMERICA, INC.

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.

If necessary, refer to Technical Data for fill quantities. See **64 50 A/C SYSTEM, REFRIGERANT AMOUNTS E71/N54, M57T2, N63** .

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 ... Safety instructions for handling refrigerant oil**

CAUTION:

- **Always use new O-rings each time A/C connections are opened (refer to Electronic Parts Catalogue)**
- **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**

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)**

AC HOUSING/EVAPORATOR, SWITCHING ELEMENTS

64 51 ... LEAK-TESTING CONDENSER

WARNING: Risk of injury!

Refrigerant circuit is under high pressure!

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

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, see **64 50 009 Drawing off, evacuating and filling A/C system (R 134a)**
- Detach refrigerant lines from condenser

Tightening torque 64 53 6AZ. See **64 53 REFRIGERANT LINES AND EXPANSION VALVE** .

E70 only:

Tightening torque 64 53 3AZ, see **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.

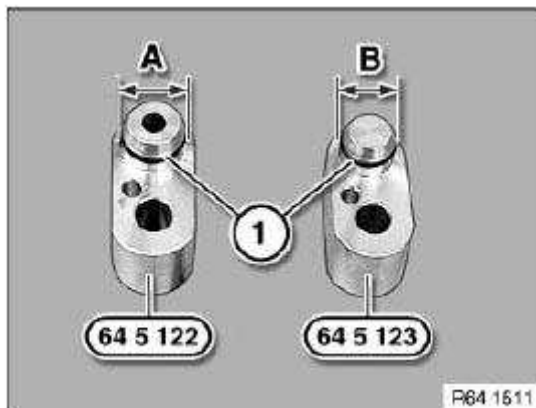


Fig. 105: Identifying Sealing Rings

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 64 53 6AZ . See **64 53 REFRIGERANT LINES AND EXPANSION VALVE**

E70 only:

Tightening torque 64 53 3AZ . See **64 53 REFRIGERANT LINES AND EXPANSION VALVE**

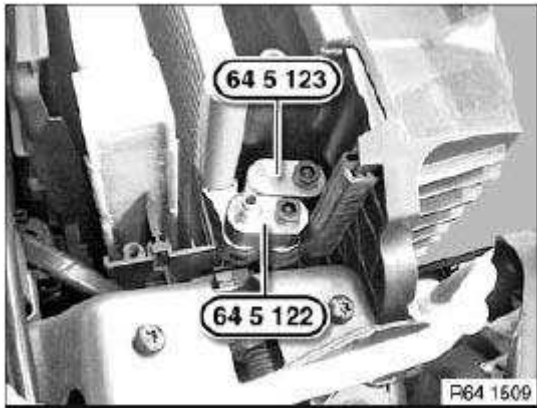


Fig. 106: Identifying Sealing Rings With Special Tool
 Courtesy of BMW OF NORTH AMERICA, INC.

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

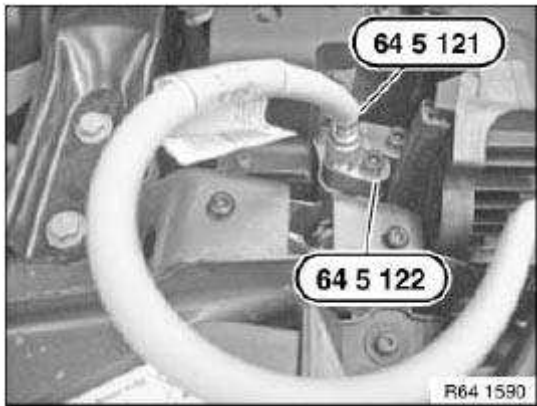


Fig. 107: Connecting Special Tool (64 5 122)
 Courtesy of BMW OF NORTH AMERICA, INC.

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

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** , see 64 51 525 Removing and installing or replacing expansion valve

Replace sealing rings (1) and coat with refrigerant oil.

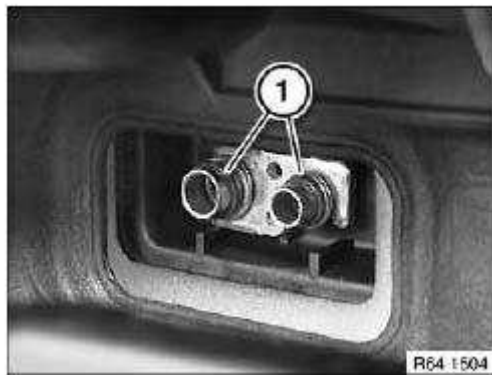


Fig. 108: Identifying Sealing Rings
Courtesy of BMW OF NORTH AMERICA, INC.

Mount special tool **64 5 125** and retainer (1) with screws of expansion valve.

Tightening torque **64 53 2AZ** , see **64 53 REFRIGERANT LINES AND EXPANSION VALVE** .

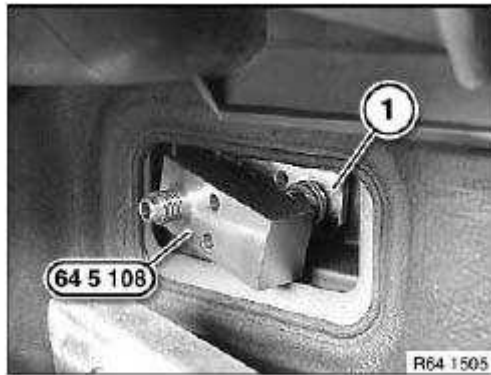


Fig. 109: Identifying Retainer With Screws
Courtesy of BMW OF NORTH AMERICA, INC.

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

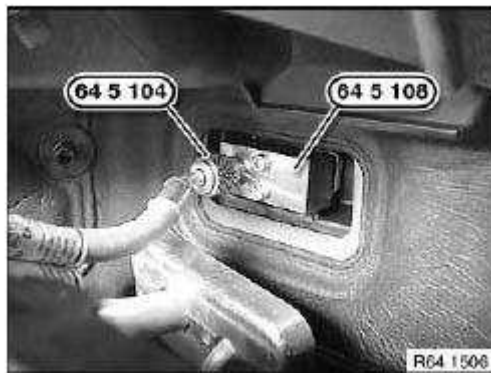


Fig. 110: Connecting Special Tool (64 5 121)
Courtesy of BMW OF NORTH AMERICA, INC.

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

Pressurize 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

64 51 001 CLEANING EVAPORATOR

WARNING: When handling cleaning agent, observe following protection measures:

Wear protective rubber gloves and protective goggles.

If cleaning agent comes into contact with eyes or skin, wash immediately with lots of water.

IMPORTANT: To avoid dirtying vehicle interior:

- Close all air vents
- Heater - A/C system must be switched to recirculated-air mode
- Cover carpet in work area

Recycling:

Carry out the cleaning operation in a suitable washing bay as the emerging cleaning agent escapes through the drain openings in the transmission tunnel.

After completing cleaning, allow car to drip-dry for approx. 5 minutes.

Necessary preliminary tasks:

- Remove **rear underbody protection**, see 51 47 491 REMOVING AND INSTALLING/REPLACING REAR UNDERBODY PROTECTION
- Move steering column in "top" and "extended" position.
- Remove **evaporator temperature sensor**, see 64 11 942 Replacing evaporator temperature sensor

NOTE: Direction arrows on special tool 64 1 300 must point in direction of travel. Insert guide lug (1) of special tool 64 1 300 into opening of evaporator temperature sensor.

Guide lug (1) must be firmly seated in opening of evaporator temperature sensor.

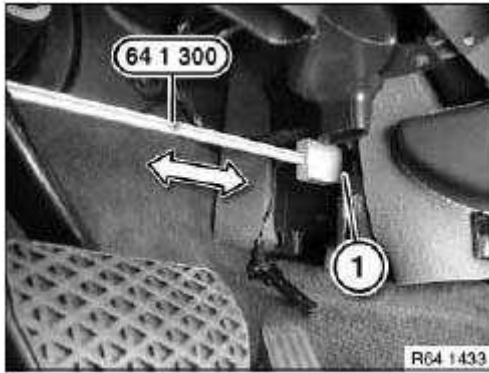


Fig. 111: Identifying Guide Lug
Courtesy of BMW OF NORTH AMERICA, INC.

Connect special tool 64 1 300 to spray apparatus.

Move special tool 64 1 300 inwards.

Release clamping screw (2) and pull out guide wire (1) in order to position the folding spray element vertically.

Apply cleaning agent uniformly to evaporator by carefully moving special tool 64 1 300 back and forth.

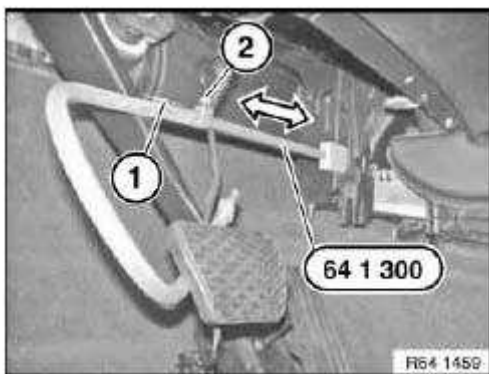


Fig. 112: Identifying Clamping Screw And Guide Wire
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: For purposes of clarity, the cleaning procedure is shown on the removed heater/air conditioner.

Set up spray element (1) by pulling out guide wire and carefully move lance (2) back and forth.

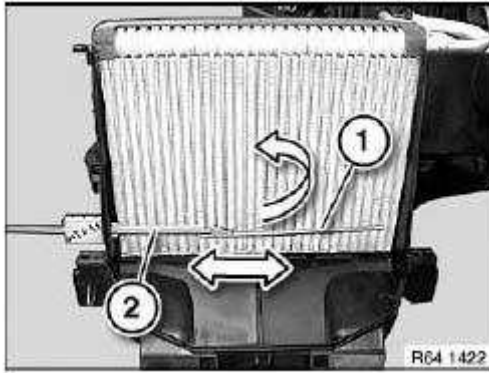


Fig. 113: Pulling Guide Wire And Lance
 Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Set heating - A/C system to footwell ventilation and fresh-air mode. Open windows/doors.
 Start car and run heating - A/C system at max. fan power for approx. 5 minutes in order to dry evaporator.
 In order to eliminate the last remnants of cleaning agent, repeat this procedure shortly before handover to the customer.

64 51 002 REPLACING EVAPORATOR

Necessary preliminary tasks:

- Remove heater , see **64 11 206 Removing and installing/replacing heater**

Release screws (1).

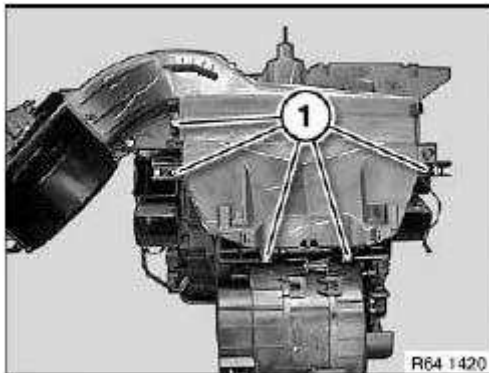


Fig. 114: Identifying Heater And Screw
 Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1) and remove expansion valve (2).

Installation:

Ensure that seals are correctly seated.

Replace sealing rings and moisten with refrigerant oil.

Tightening torque **64 53 2AZ**. See **64 53 REFRIGERANT LINES AND EXPANSION VALVE** .

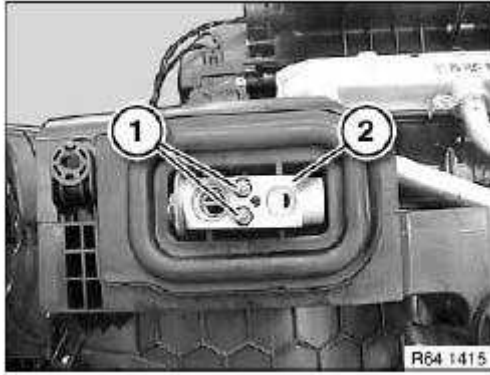


Fig. 115: Identifying Expansion Valve And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1) and carefully remove upper housing section (2).

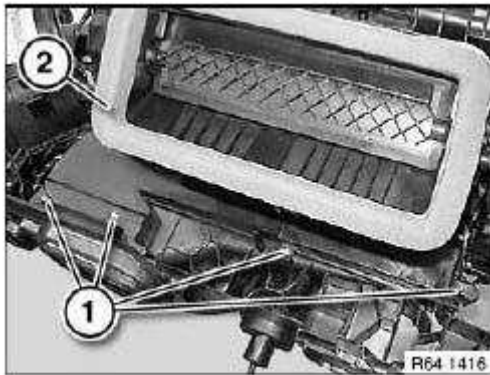


Fig. 116: Identifying Upper Housing Section And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Remove evaporator (1).

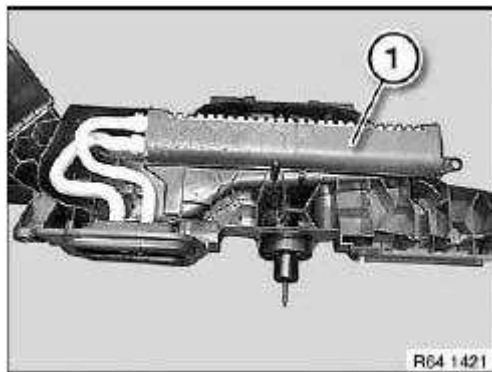


Fig. 117: Identifying Evaporator
 Courtesy of BMW OF NORTH AMERICA, INC.

After installation:

- Evacuate and fill A/C system , see 64 50 009 Drawing off, evacuating and filling A/C system (R 134a).
- Fill and vent cooling system , see 17 00 008 DRAINING AND ADDING COOLANT IN RADIATOR (N62TU, N63) , and 17 00 039 VENTING COOLING SYSTEM AND CHECKING FOR WATER LEAKS (N63) , or 17 00 005 DRAINING AND ADDING COOLANT (N54) , 17 00 039 VENTING COOLING SYSTEM AND CHECKING FOR WATER LEAKS (N54) .

64 51 525 REMOVING AND INSTALLING OR REPLACING EXPANSION VALVE

WARNING: Risk of injury!

Refrigerant circuit is under high pressure!

Follow safety instructions for handling R 134a refrigerant. See 64 50 ... Safety instructions for handling refrigerant R134a

Avoid contact with refrigerant and refrigerant oil.

Follow safety instructions for handling refrigerant oil. See 64 50 ... Safety instructions for handling refrigerant oil.

IMPORTANT: Risk of damage!

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

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:

- Remove **double pipe**
- **Drawing off, evacuating and filling the A/C system** , see 64 50 009 Drawing off, evacuating and filling A/C system (R 134a).

Remove gasket (1).

Installation:

Observe direction arrows (2) without fail.

If necessary, replace damaged seal (1).

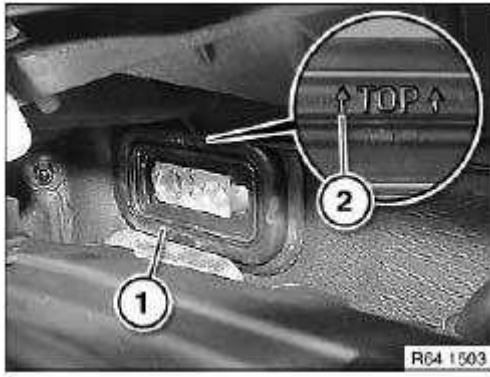


Fig. 118: Identifying Seal Location

Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1) and carefully remove expansion valve (2).

Replace sealing rings and moisten with refrigerant oil.

Tightening torque **64 53 2AZ** , see **64 53 REFRIGERANT LINES AND EXPANSION VALVE** .

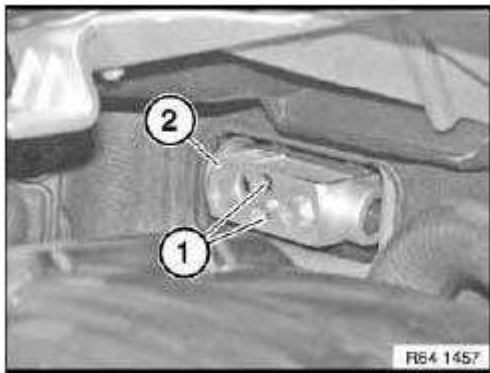


Fig. 119: Identifying Expansion Valve And Screws

Courtesy of BMW OF NORTH AMERICA, INC.

After installation:

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

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 ... Safety instructions for handling refrigerant oil

CAUTION:

- Always use new O-rings each time A/C connections are opened (refer to Electronic Parts Catalogue)
- 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, see **64 50 009 Drawing off, evacuating and filling A/C system (R 134a)** then determine drawn-off refrigerant oil quantity
- 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)**.

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!)

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

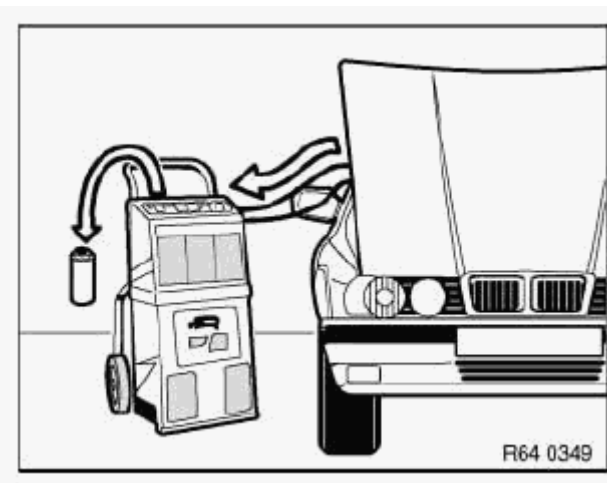


Fig. 120: Measuring Quantity Of Refrigerant Oil
Courtesy of BMW OF NORTH AMERICA, INC.

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

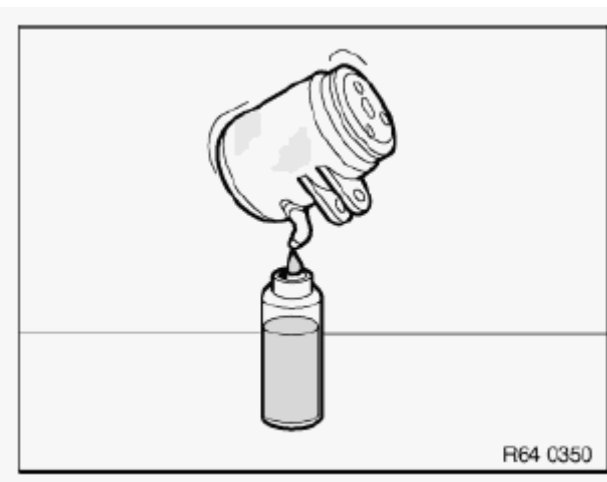


Fig. 121: Identifying Compressor Oil Remove
Courtesy of BMW OF NORTH AMERICA, INC.

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

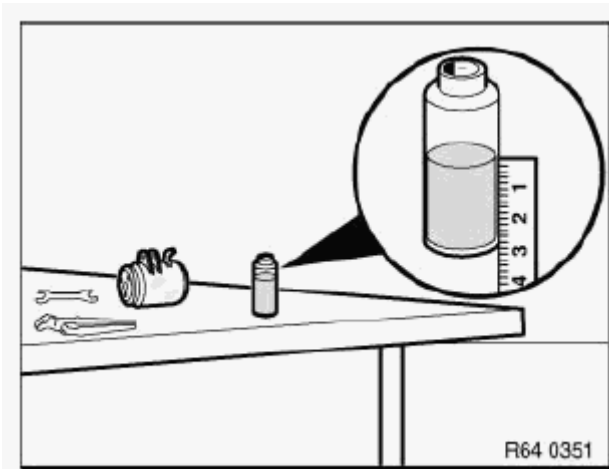


Fig. 122: Measuring Amount Of Refrigerant Oil
Courtesy of BMW OF NORTH AMERICA, INC.

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 .

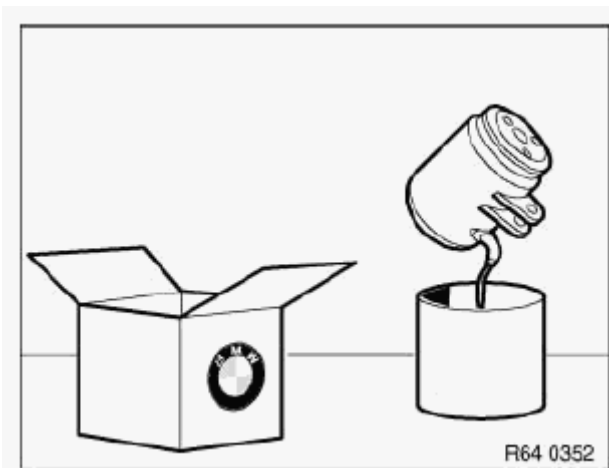


Fig. 123: Identifying Compressor Oil Remove
Courtesy of BMW OF NORTH AMERICA, INC.

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 **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.

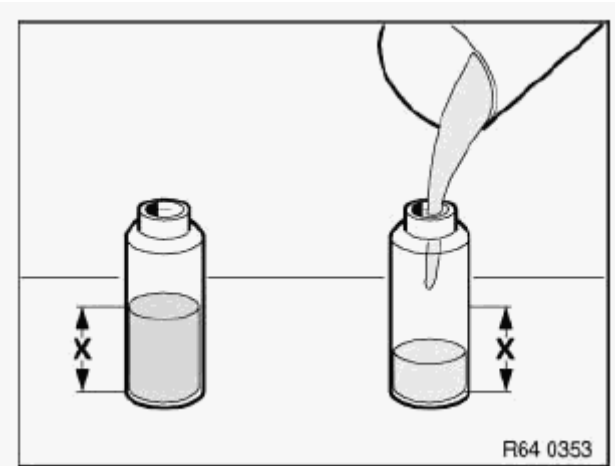


Fig. 124: Identifying Refrigerant Oil Amount
Courtesy of BMW OF NORTH AMERICA, INC.

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.

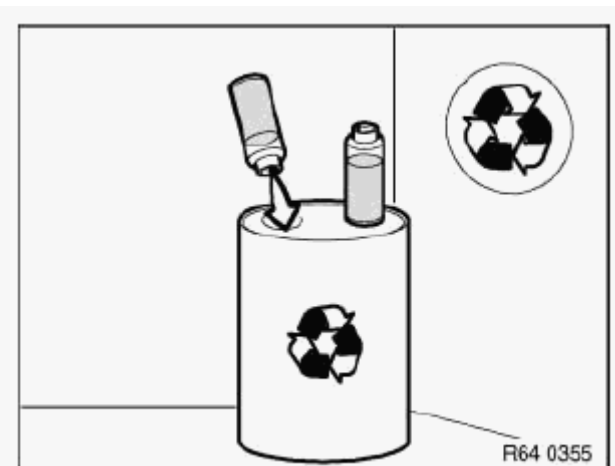


Fig. 125: Identifying Refrigerant Oil Drawn From Oil Separator
Courtesy of BMW OF NORTH AMERICA, INC.

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

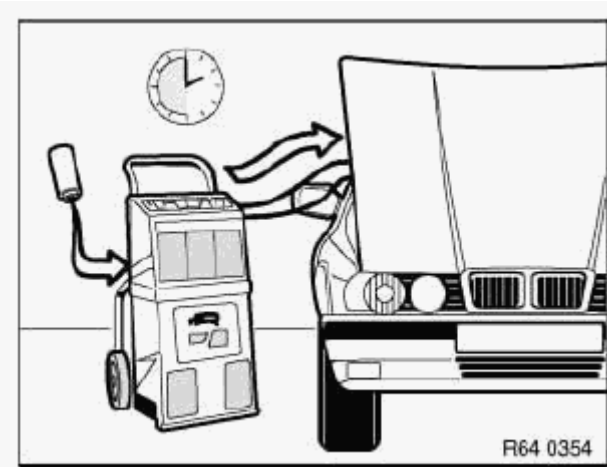


Fig. 126: Measuring Quantity Of Refrigerant Oil
Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

If A/C system is opened for more than 24 hours: **Replace drier bottle/drier insert.** See **64 53 517 Replacing desiccant insert for A/C system.**

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 ... Instructions for handling refrigerant R 134a.**
- Follow safety instructions for handling refrigerant oil . See **64 50 ... Safety instructions for handling refrigerant oil.**

CAUTION:

- Always use new O-rings each time A/C connections are opened (refer to Electronic Parts Catalogue)
- 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 52 ... REMOVING AND INSTALLING COMPRESSOR BEARING BLOCK (N54)

Necessary preliminary tasks:

- Remove **compressor** for A/C system, see **64 52 ... Instructions for compressor replacement**.

IMPORTANT: Different bolt lengths!

Release bolts (1).

Tightening torque **64 52 5AZ** , see **64 52 A/C COMPRESSOR**

Release bolts (2) and remove bearing block (3).

Tightening torque **64 52 5AZ** , see **64 52 A/C COMPRESSOR**

Installation:

Replace damaged adapter sleeves.

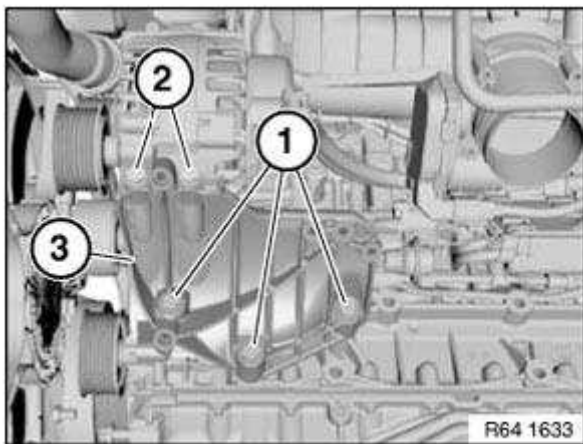


Fig. 127: Identifying Bearing Block And Bolts

Courtesy of BMW OF NORTH AMERICA, INC.

64 52 521 REPLACING A/C SYSTEM COMPRESSOR (N54)

Special tools required:

- 32 1 270 PLUGS (SET)

WARNING: Risk of injury!

Refrigerant circuit is under high pressure!

Follow safety instructions for handling R134a refrigerant.

Avoid contact with refrigerant and refrigerant oil.

Follow safety instructions for handling refrigerant oil. See 64 50 ... Safety instructions for handling refrigerant oil.

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. See 64 52 ... 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. See 64 53 517 Replacing desiccant insert for A/C system.

Necessary preliminary tasks:

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

Release screws (1) and (2).

Remove refrigerant line.

Tightening torque **64 52 1AZ** , see 64 52 A/C COMPRESSOR .

Installation:

Replace all sealing rings and moisten with refrigerant oil.

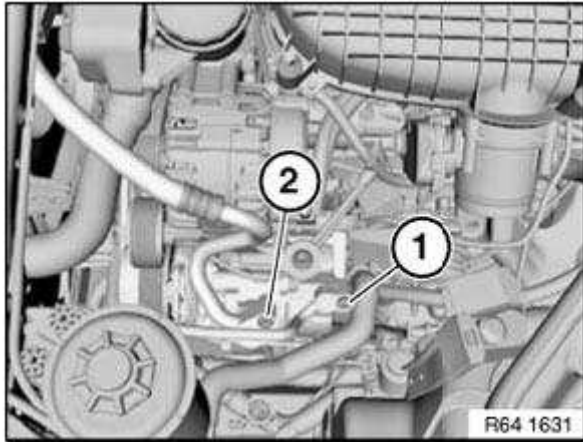


Fig. 128: Identifying Sealing Rings And Screws
 Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Seal openings or lines on compressor with special tool 32 1 270 , see 32 1 270 PLUGS (SET) to prevent escape of media and fouling.

IMPORTANT: Secure compressor against falling out.

Disconnect plug connection (1).

Release screws (2).

Release screw (3) and feed out compressor in upward direction.

Tightening torque **64 52 3AZ** , see 64 52 A/C COMPRESSOR .

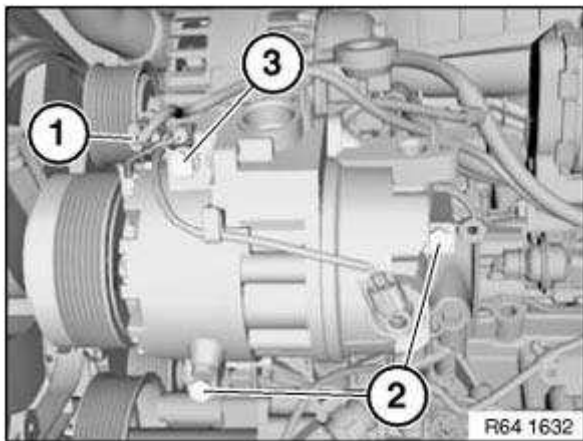


Fig. 129: Identifying Plug Connection And Screws
 Courtesy of BMW OF NORTH AMERICA, INC.

Replacement:

Read and comply with notes on replacing compressor.

If necessary, release screws (1) and modify holder (2).

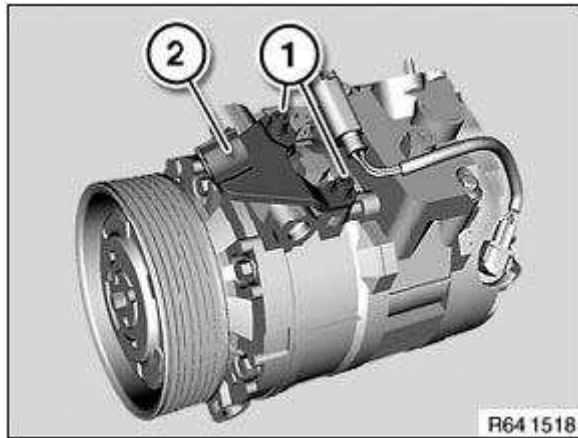


Fig. 130: Identifying Modify Holder And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

After installation:

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

64 52 521 REPLACING A/C SYSTEM COMPRESSOR (N63)

Special tools required:

- **32 1 270 PLUGS**

WARNING: Risk of injury!

Refrigerant circuit is under high pressure!

Follow safety instructions for handling R134a refrigerant.

Avoid contact with refrigerant and refrigerant oil.

Follow safety instructions for handling refrigerant oil. See **64 50 ... Safety instructions for handling refrigerant oil.**

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. See **64 52 ... 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. See 64 53 517 Replacing desiccant insert for A/C system.

Necessary preliminary tasks:

- **Drawing off**, evacuating and filling the A/C system is not included in the time value given for this work operation, see **64 50 009 Drawing off, evacuating and filling A/C system (R 134a)**.
- Remove A/C compressor drive belt . See **11 28 050 REPLACING A/C COMPRESSOR DRIVE BELT WITH BELT TENSIONER (N63)** .
- Remove right front wheel.
- Remove steering gear cover. See **51 71 ... REMOVING AND INSTALLING/REPLACING BOTTOM LEFT OR RIGHT STEERING GEAR COVER** .
- Remove front underbody protection. See **51 47 490 REMOVING AND INSTALLING/REPLACING FRONT UNDERBODY PROTECTION** .
- Remove tank venting valve. See **36 10 300 REMOVING OR INSTALLING FRONT OR REAR WHEEL** .

Unscrew nuts (1). Tightening torque: 51 11 05AZ, see **64 11 HOUSING, HEATER/AIR CONDITIONER** . Press module carrier and coolant radiator in direction of arrow to create space in the lower area for subsequent compressor removal. Then cover cooling fins with cardboard, for example, to provide protection.

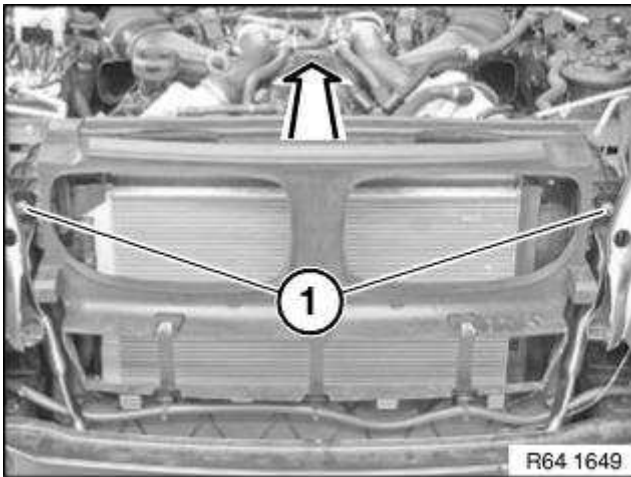


Fig. 131: Unscrew Nuts (1)

Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1) on holder (2). Take off holder (2). Tightening torque: 17 22 03AZ, see **17 22 TRANSMISSION OIL COOLER LINES** (N54) or **17 22 ENGINE OIL COOLER LINES AND TRANSMISSION OIL COOLER LINES** (N63). Version with Dynamic Drive: Release nuts (3) on holders for pressure lines (4). Remove holders for pressure lines (4). Tightening torque: 32 41 07AZ, see **32 41 PUMP AND OIL SUPPLY** .

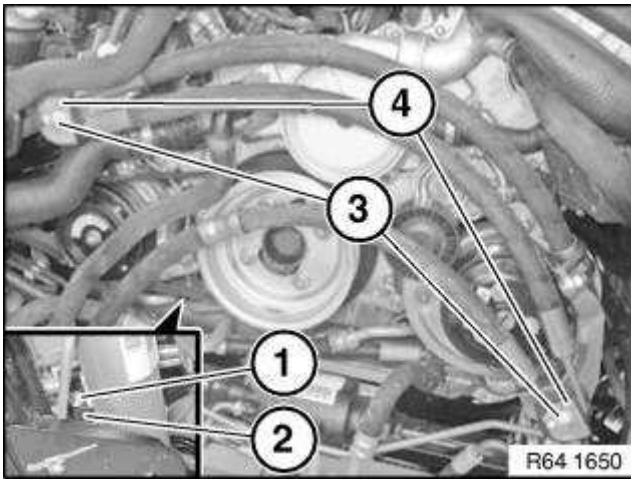


Fig. 132: Release Nuts (3) On Holders For Pressure Lines (4)
Courtesy of BMW OF NORTH AMERICA, INC.

Release bolts (1). Tightening torque: 64 52 03AZ. See **64 52 A/C COMPRESSOR** .

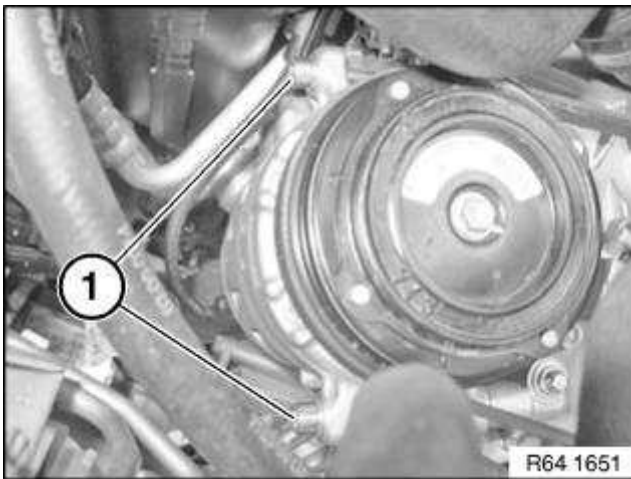


Fig. 133: Release Bolts (1)
Courtesy of BMW OF NORTH AMERICA, INC.

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

NOTE: Secure compressor (5) against falling out. Release screw (1).

Tightening torque: 64 52 03AZ, see **64 52 A/C COMPRESSOR** . Disconnect plug connection (2). Lower compressor (5). Release screws (3) and (4) and remove refrigerant lines. Tightening torque 64 52 01AZ, see **64 52 A/C COMPRESSOR** . Carefully feed out compressor (5) towards front.

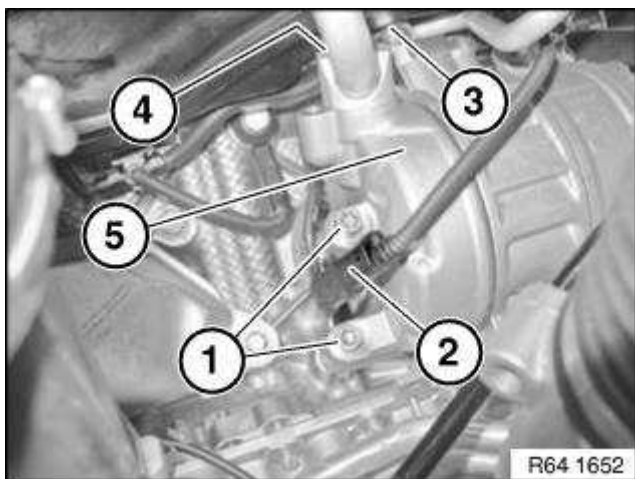
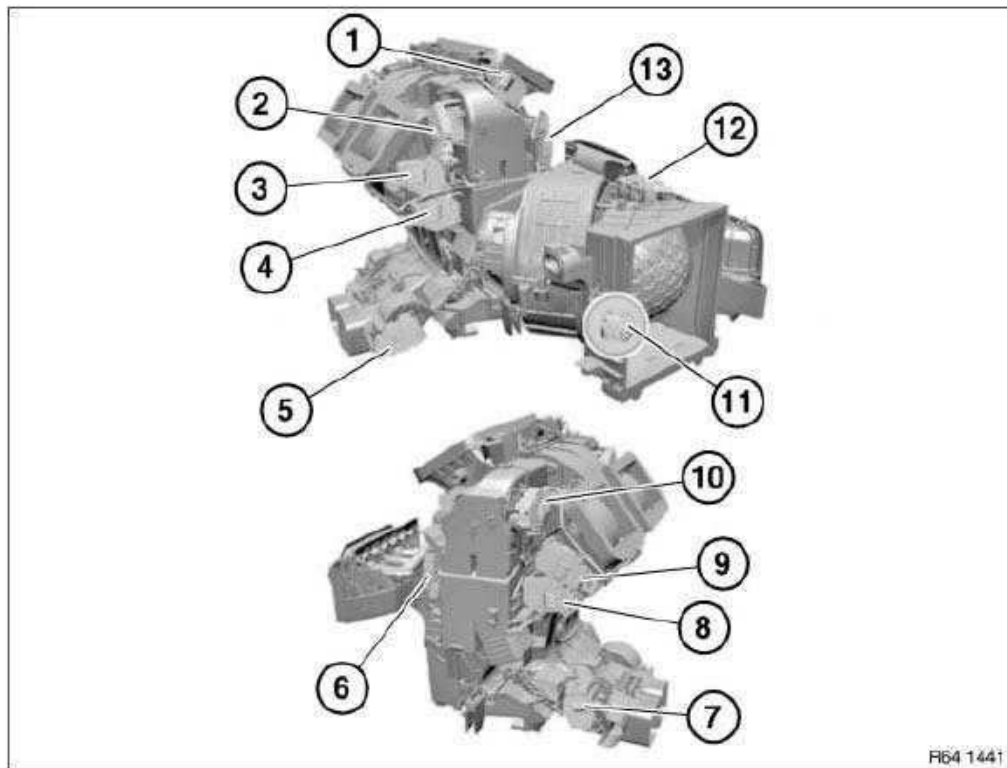


Fig. 134: Release Screws (3) And (4) And Remove Refrigerant Lines
Courtesy of BMW OF NORTH AMERICA, INC.

After installation, evacuate and fill A/C system. See **64 50 009 Drawing off, evacuating and filling A/C system (R 134a)**.

CONDENSER AND DRYER WITH LINES

64 11 ... OVERVIEW OF HEATER/AIR CONDITIONER SERVOMOTORS



- | | | | |
|---|---|----|---|
| 1 | Servomotor, defrosting | 8 | Servomotor, air blending, front left |
| 2 | Servomotor, footwell, rear cabin, right | 9 | Servomotor, ventilation, front left |
| 3 | Servomotor, ventilation, front right | 10 | Servomotor, footwell, rear cabin, left |
| 4 | Servomotor, stratification, front right | 11 | Servomotor, dynamic pressure compensation |
| 5 | Servomotor, air blending, rear right | 12 | Servomotor, fresh air/recirculated air |
| 6 | Servomotor, footwell, front left | 13 | Servomotor, footwell, front left |
| 7 | Servomotor, air blending, rear left | | |

Fig. 135: Identifying Heater And Air Conditioner Servomotors Components
 Courtesy of BMW OF NORTH AMERICA, INC.

64 51 ... LEAK-TESTING CONDENSER

WARNING: Risk of injury!

Refrigerant circuit is under high pressure!

Follow safety instructions for handling refrigerant , see [64 50 ... Safety instructions for handling refrigerant R134a](#).

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** , see **64 50 009 Drawing off, evacuating and filling A/C system (R 134a)**.
- Detach refrigerant lines from condenser

Tightening torque **64 53 6AZ** , see **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.

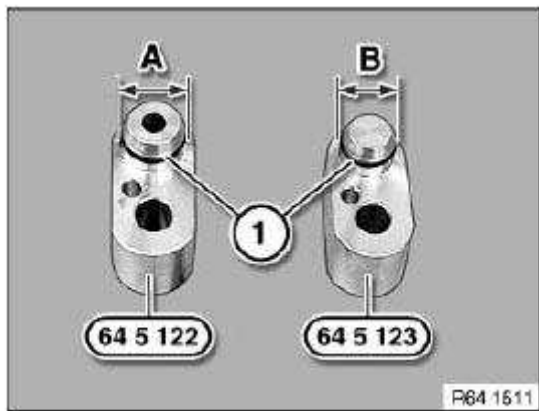


Fig. 136: Identifying Sealing Rings

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

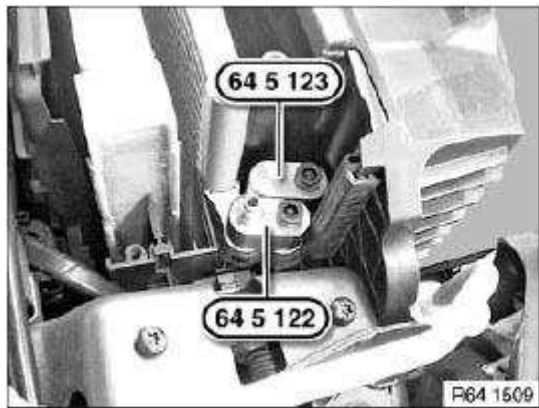


Fig. 137: Identifying Sealing Rings With Special Tool
 Courtesy of BMW OF NORTH AMERICA, INC.

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

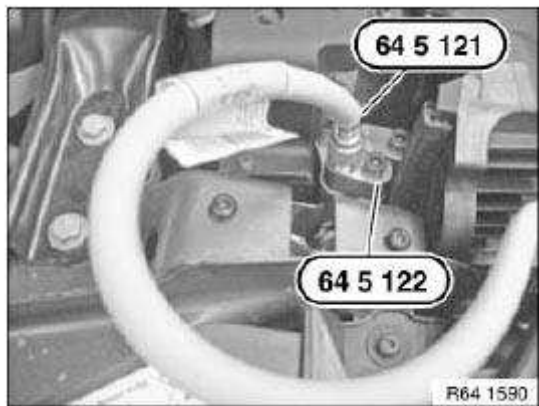


Fig. 138: Connecting Special Tool (64 5 122)
 Courtesy of BMW OF NORTH AMERICA, INC.

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 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 ... Safety instructions for handling refrigerant oil

CAUTION:

- Always use new O-rings each time A/C connections are opened (refer to Electronic Parts Catalogue)
- 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 53 517 REPLACING DESICCANT INSERT FOR A/C SYSTEM

WARNING: Risk of injury!

Refrigerant circuit is under high pressure!

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

Safety instructions for handling refrigerant R134a.

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

Avoid contact with refrigerant and refrigerant oil.

IMPORTANT: Risk of damage!

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

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

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

Replacing drier insert for A/C system

Necessary preliminary tasks:

- Remove **condenser** , see 64 53 551 Removing and installing or replacing condenser for A/C system.

Remove cover cap (1) from condenser (2).

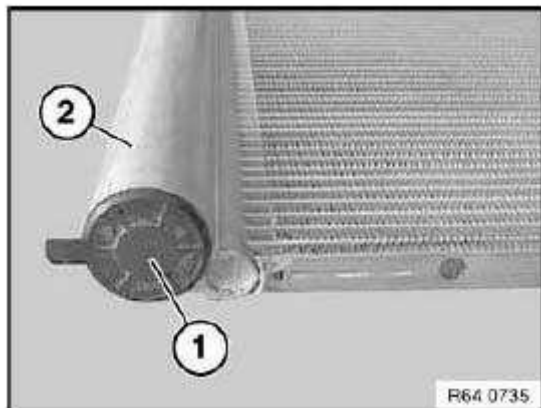


Fig. 139: Identifying Cover Cap And Condenser
 Courtesy of BMW OF NORTH AMERICA, INC.

Press sealing cap (1) inwards and remove circlip (2).

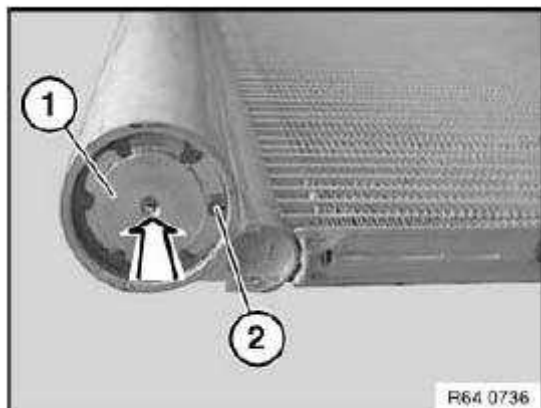


Fig. 140: Identifying Sealing Cap And Remove Circlip
 Courtesy of BMW OF NORTH AMERICA, INC.

With assistance of a screwed-in screw (1), remove sealing cap from condenser (3).

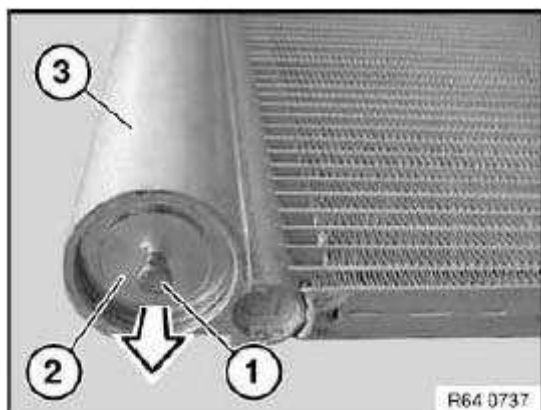


Fig. 141: Identifying Condenser And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Replace sealing rings (1) of sealing cap (2) and coat with refrigerant oil.



Fig. 142: Identifying Sealing Rings And Sealing Cap
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Risk of damage!

Removal is made more difficult if rib (2) is damaged!

Carefully pull out desiccant insert (1) with a pair of wide pliers on rib (2).

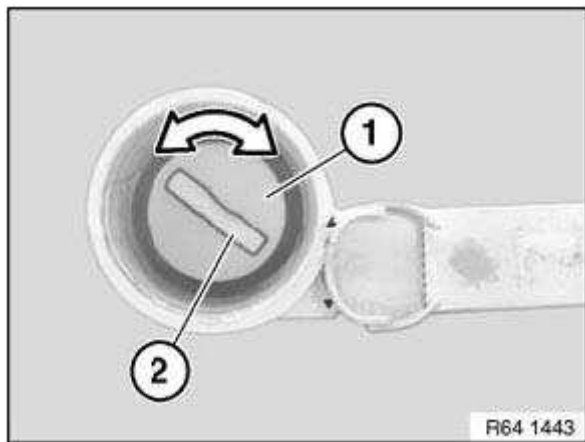


Fig. 143: Identifying Rib Location
Courtesy of BMW OF NORTH AMERICA, INC.

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: Risk of injury!

Refrigerant circuit is under high pressure!

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

Safety instructions for handling refrigerant R134a.

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

Avoid contact with refrigerant and refrigerant oil.

IMPORTANT: Risk of damage!

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

Follow instructions for opening and replacing parts in refrigerant circuit. See 64 52 ... 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:

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

Disconnect plug connection (1) and release safety pressure switch (2).

Installation:

Moisten sealing ring with refrigerant oil.

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

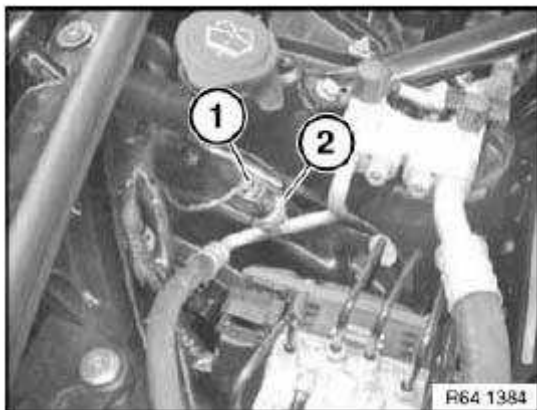


Fig. 144: Identifying Plug Connection And Safety Pressure Switch
Courtesy of BMW OF NORTH AMERICA, INC.

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:

- **Draw off** 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
- If necessary, carry out **leak detection** , see 64 52 ... Instructions for opening and replacing parts in refrigerant circuit.

64 53 551 REMOVING AND INSTALLING OR REPLACING CONDENSER FOR A/C SYSTEM

WARNING: Risk of injury!

Refrigerant circuit is under high pressure!

Follow safety instructions for handling R 134a refrigerant. , see 64 50 ... Safety instructions for handling refrigerant R134a.

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

Avoid contact with refrigerant and refrigerant oil.

IMPORTANT: Risk of damage!

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

Follow instructions for opening and replacing parts in refrigerant circuit!

See 64 52 ... 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 , see 64 53 517 Replacing desiccant insert for A/C system.

Necessary preliminary tasks:

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

Slacken screws (1) on both sides and pull fan cowl upwards.

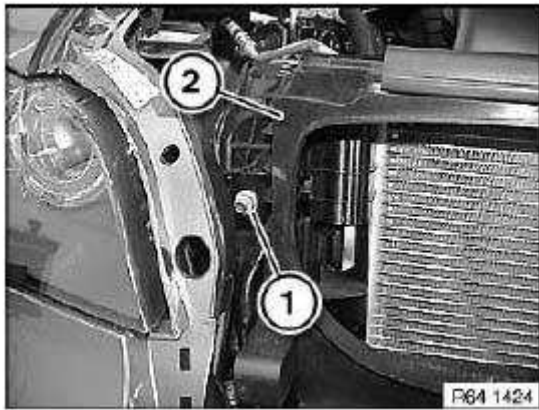


Fig. 145: Identifying Slacken Screws And Fan Cowl
 Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1) and pull condenser (2) up and out.

Installation:

Replace sealing rings and moisten with refrigerant oil.

Tightening torque **64 53 3AZ** , see **64 53 REFRIGERANT LINES AND EXPANSION VALVE** .

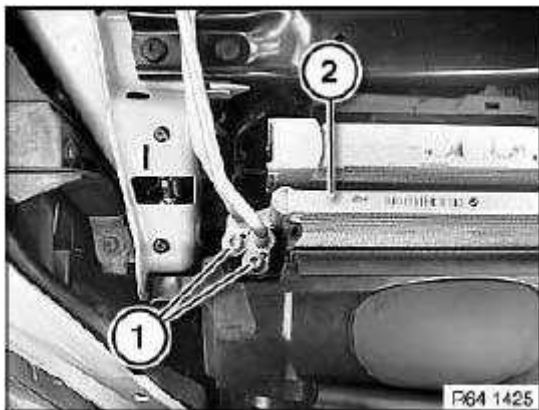


Fig. 146: Identifying Condenser And Screws
 Courtesy of BMW OF NORTH AMERICA, INC.

After installation:

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

64 53 642 REPLACING LINE FROM COMPRESSOR TO CONDENSER

WARNING: Risk of injury!

Refrigerant circuit is under high pressure!
Follow safety instructions for handling R 134a refrigerant. , see 64 50 ... Safety instructions for handling refrigerant R134a.
Avoid contact with refrigerant and refrigerant oil.
Follow safety instructions for handling refrigerant oil. , see 64 50 ... Safety instructions for handling refrigerant oil.

IMPORTANT: Risk of damage!

Restart engine only when A/C system has been correctly filled.
Follow instructions for opening and replacing parts in refrigerant circuit. See 64 52 ... 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 , see 64 53 517 Replacing desiccant insert for A/C system.

Necessary preliminary tasks:

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

Release screw (1).

Remove refrigerant line (2).

Installation:

Replace sealing rings and moisten with refrigerant oil.

Tightening torque **64 53 4AZ** , see 64 53 REFRIGERANT LINES AND EXPANSION VALVE .

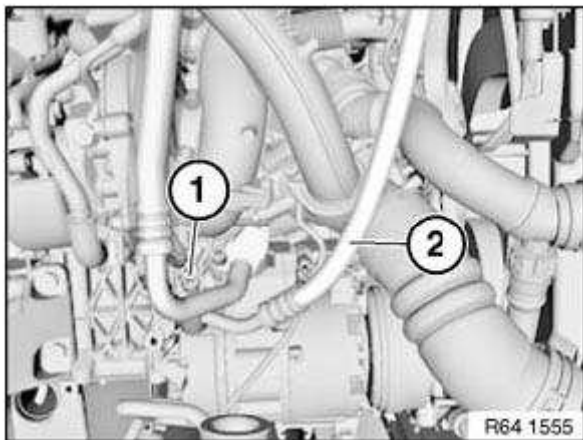


Fig. 147: Identifying Refrigerant Line And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Remove foam material (1).

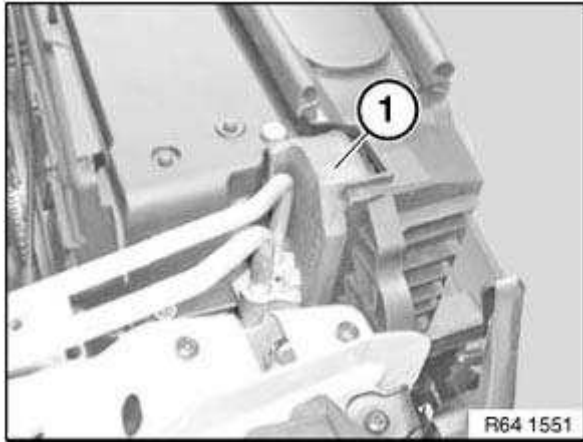


Fig. 148: Removing Foam Material

Courtesy of BMW OF NORTH AMERICA, INC.

Undo screw (1) and feed out refrigerant line (2).

Installation:

Replace sealing rings and moisten with refrigerant oil.

Tightening torque **64 53 3AZ** , see **64 53 REFRIGERANT LINES AND EXPANSION VALVE** .

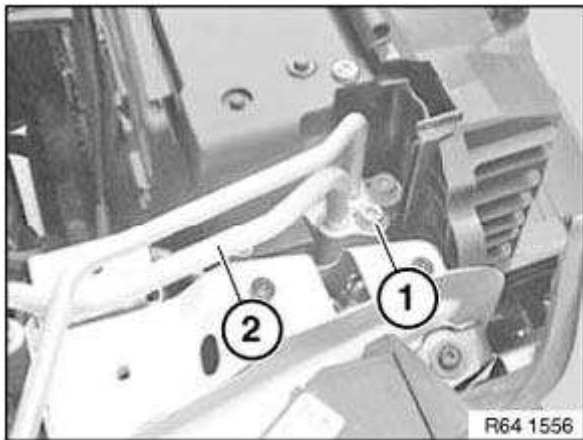


Fig. 149: Identifying Refrigerant Line And Screws

Courtesy of BMW OF NORTH AMERICA, INC.

After installation:

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

64 53 660 REPLACING LINE FROM COMPRESSOR TO DOUBLE PIPE

WARNING: Risk of injury!

Refrigerant circuit is under high pressure!

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

Safety instructions for handling refrigerant R134a.

Avoid contact with refrigerant and refrigerant oil.

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

IMPORTANT: Risk of damage!

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

Follow instructions for opening and replacing parts in refrigerant circuit. See 64 52 ... 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 , see 64 53 517 Replacing desiccant insert for A/C system.

Necessary preliminary tasks:

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

Release screw (1) and remove refrigerant line (2).

Installation:

Replace sealing ring and moisten with refrigerant oil.

Tightening torque **64 53 5AZ** , see 64 53 REFRIGERANT LINES AND EXPANSION VALVE .

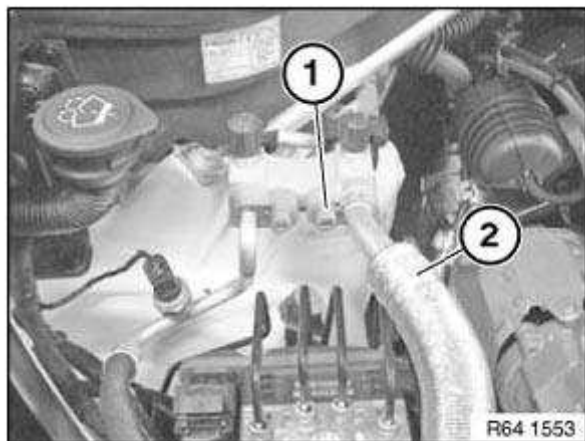


Fig. 150: Identifying Refrigerant Line And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Remove refrigerant line (2) and feed out towards top.

Installation:

Replace sealing rings and moisten with refrigerant oil.

Tightening torque **64 53 4AZ** , see **64 53 REFRIGERANT LINES AND EXPANSION VALVE** .

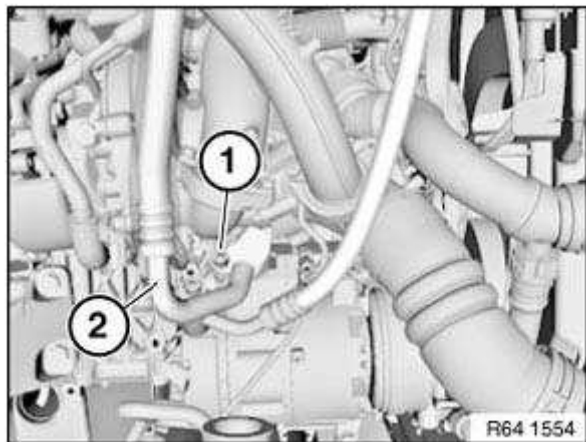


Fig. 151: Identifying Refrigerant Line And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

After installation:

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

64 53 670 REPLACING LINE FROM COMPRESSOR TO DOUBLE PIPE

WARNING: Risk of injury!

Refrigerant circuit is under high pressure!

Follow safety instructions for handling R 134a refrigerant. , see **64 50 ... Safety instructions for handling refrigerant R134a.**

Avoid contact with refrigerant and refrigerant oil.

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

IMPORTANT: Risk of damage!

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

Follow instructions for opening and replacing parts in refrigerant circuit. See **64 52 ... 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 , see 64 53 517 Replacing desiccant insert for A/C system.

Necessary preliminary tasks:

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

Disconnect plug connection (1).

Release screw (2) and remove refrigerant line (3).

Installation:

Replace sealing rings and moisten with refrigerant oil.

Tightening torque **64 53 5AZ** , see **64 53 REFRIGERANT LINES AND EXPANSION VALVE** .

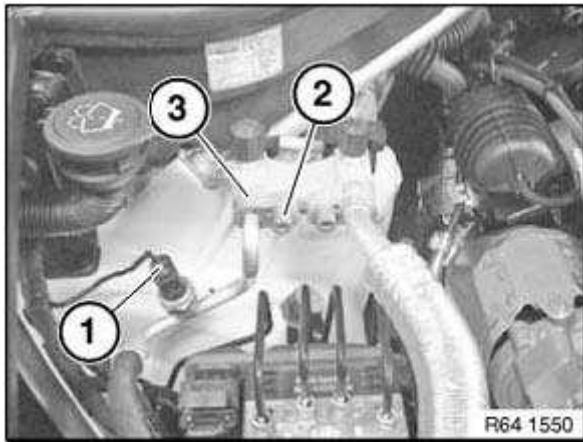


Fig. 152: Identifying Refrigerant Line And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Remove foam wedge (1).

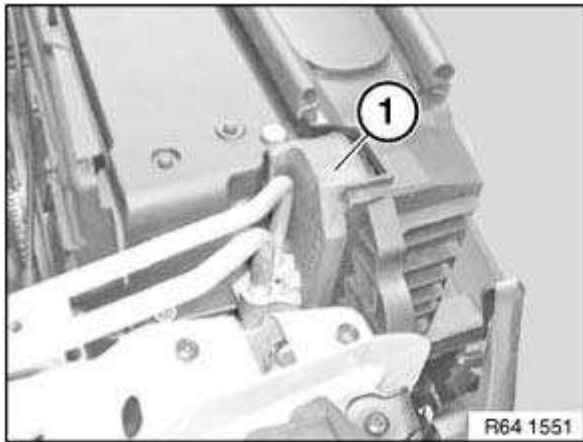


Fig. 153: Removing Foam Wedge
 Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1) and remove refrigerant line (2).

Installation:

Replace sealing ring and moisten with refrigerant oil.

Tightening torque **64 53 3AZ** , see **64 53 REFRIGERANT LINES AND EXPANSION VALVE** .

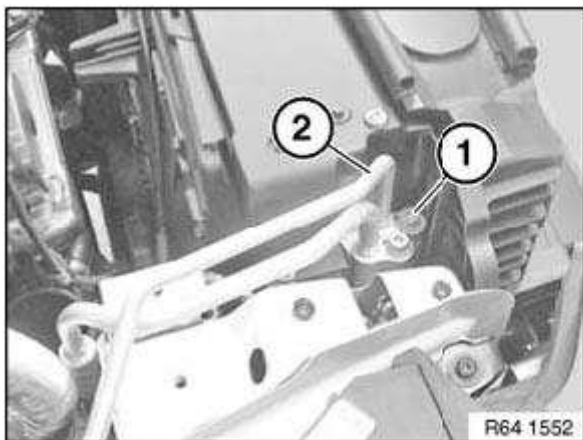


Fig. 154: Identifying Refrigerant Line And Screws
 Courtesy of BMW OF NORTH AMERICA, INC.

Replacement:

Modify **safety pressure switch**. See **64 53 520 Replacing safety pressure switch**.

After installation:

- Evacuate and fill A/C system , see **64 50 009 Drawing off, evacuating and filling A/C system (R**

134a).

64 53 733 REPLACING DOUBLE PIPE

WARNING: Risk of injury!

Refrigerant circuit is under high pressure!

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

Safety instructions for handling refrigerant R134a.

Avoid contact with refrigerant and refrigerant oil.

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

IMPORTANT: Risk of damage!

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

Follow instructions for opening and replacing parts in refrigerant circuit! See 64 52 ... 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 , see 64 53 517 Replacing desiccant insert for A/C system.

Necessary preliminary tasks:

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

Release screw (1).

Installation:

Check that rubber seal is correctly seated.

Tightening torque **64 53 1AZ** , see 64 53 REFRIGERANT LINES AND EXPANSION VALVE .

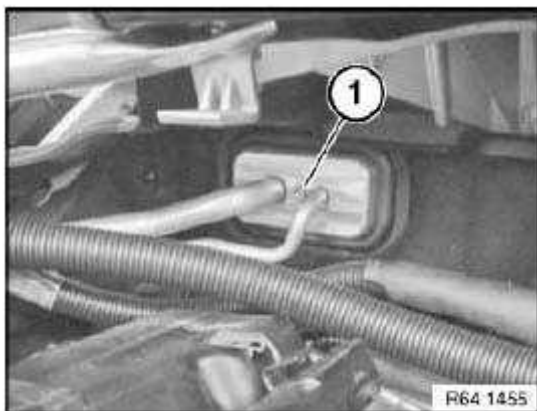


Fig. 155: Identifying Rubber Seal And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1) and remove refrigerant lines.

Remove refrigerant line from double pipe holder (2).

Installation:

Replace all sealing rings and moisten with refrigerant oil.

Tightening torque **64 53 5AZ**. See **64 53 REFRIGERANT LINES AND EXPANSION VALVE** .

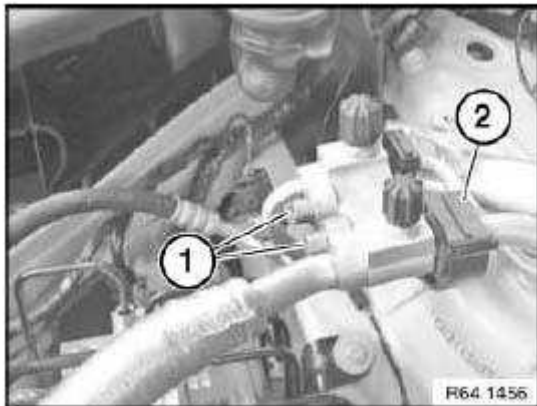


Fig. 156: Identifying Double Pipe Holder And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

After installation:

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

HVAC

Heating and Air Conditioning - Special Tools - X6

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, E36 tou, E38, E38/3, E39, E39PL, E39 tou, E46, E46/16, E46/2, E46/3, E46/5, E46/C, E52, E53, E60, E61, E63, E64, E65, E66, E67, E68, E70, E71, E81, E82, E83, E85, E86, E87, E88, E90, E91, E92, E93, F01, F02, R50, R52, R53, R55, R56, RR1, RR2, RR3

Storage location: A3, B3

SI number: 1 15 99(483)

Order number: 64 1 020

Release hook

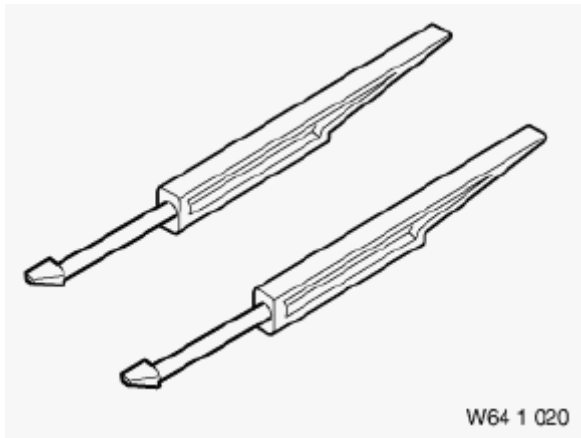


Fig. 1: Identifying Special Tool (64 1 020)

Courtesy of BMW OF NORTH AMERICA, INC.

64 1 030 RELEASE HOOK

Minimum set: Mechanical tools

NOTE: For removing fresh-air grille (2 pcs. supplied)

Series: E65, E66, E70, E71, F01

Storage location: B46

SI number: 1 14 01(766)

Order number: 64 1 030

Release hook

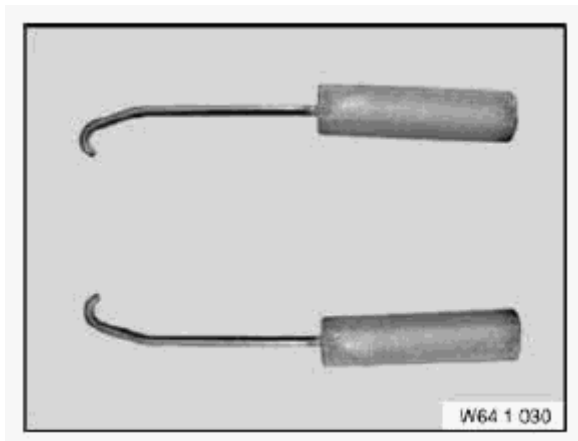


Fig. 2: Identifying Special Tool (64 1 030)
Courtesy of BMW OF NORTH AMERICA, INC.

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

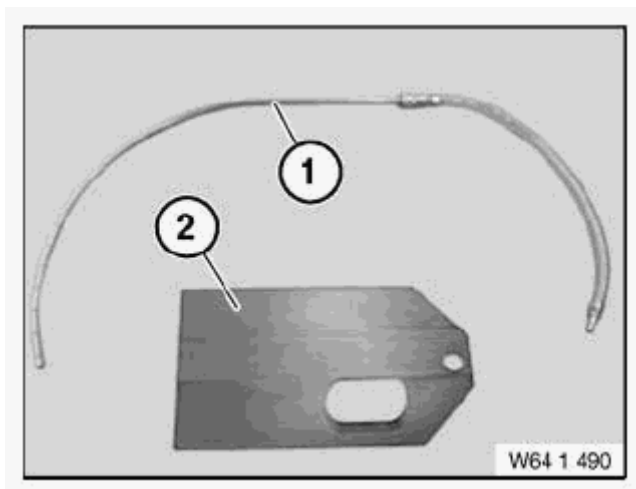


Fig. 3: Identifying Special Tool (64 1 251)
Courtesy of BMW OF NORTH AMERICA, INC.

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

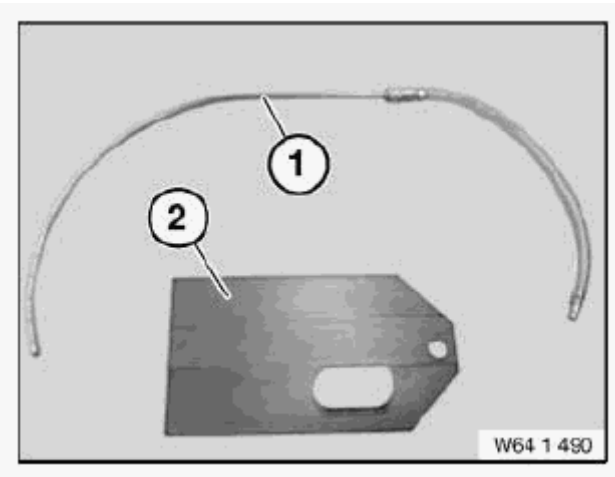


Fig. 4: Identifying Special Tool (64 1 252)
Courtesy of BMW OF NORTH AMERICA, INC.

64 1 491 SPRAY LANCE (LHD VEHICLES)

In conjunction with: Guide 64 1 492

Order number: 64 1 491

Spray lance (LHD vehicles)

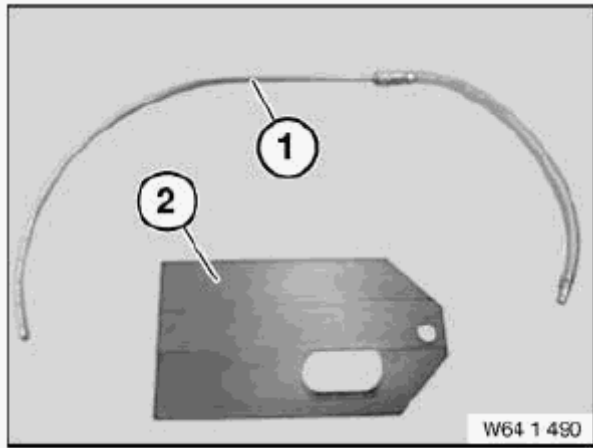


Fig. 5: Identifying Special Tool (64 1 491)

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)

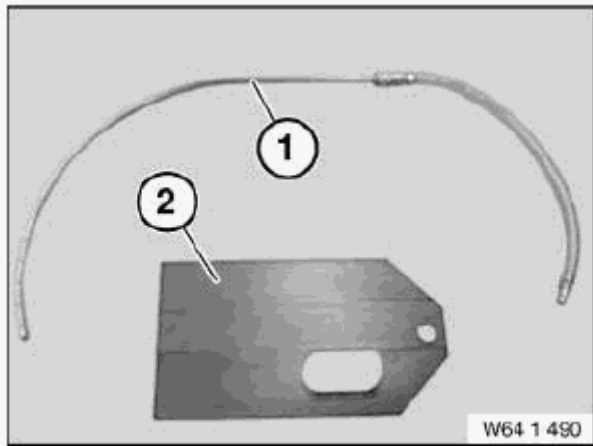


Fig. 6: Identifying Special Tool (64 1 492)

Courtesy of BMW OF NORTH AMERICA, INC.

HVAC

Heating and Air Conditioning - Technical Data

50 AIR CONDITIONING SYSTEM

64 50 A/C SYSTEM, REFRIGERANT AMOUNTS E70, E71

TECHNICAL DATA - A/C SYSTEM, REFRIGERANT AMOUNTS E70

Refrigerant filling quantity R 134a Sourcing reference EPC (Electronic Parts Catalog) The data on the nameplate in the engine compartment are definitive	g	700 ± 10
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64 50 A/C SYSTEM, REFRIGERANT AMOUNTS E71/N54, M57T2, N63

TECHNICAL DATA - A/C SYSTEM, REFRIGERANT AMOUNTS E71//N54/M57T2/N63

Refrigerant filling quantity R 134a Sourcing reference EPC (Electronic Parts Catalog) The data on the nameplate in the engine compartment are definitive	g	700 ± 10
--	---	----------

51 AC HOUSING-EVAPORATOR

64 51 AIR CONDITIONER (EVAPORATOR), SHIFT ELEMENTS

TECHNICAL DATA - AIR CONDITIONER (EVAPORATOR), SHIFT ELEMENTS

Resistance depending on temperature	°C/kohms	-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
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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	bar	1 ... 2

of

HVAC

Heating and Air Conditioning - Tightening Torques

HEATER WITH OPERATION

64 11 HOUSING, HEATER/AIR CONDITIONER

HOUSING, HEATER/AIR CONDITIONER-TIGHTENING TORQUE SPECIFICATIONS

	Type	Thread	Tightening specification	Measure
1AZ Bulkhead adapter	E85, E86, E89			1.0 ± 0.3 Nm
2AZ Fan for heater/air conditioner	E85, E86			1.5 ± 0.3 Nm
3AZ Controller for heater - heating and air conditioning system	E85, E86, E89			1.0 ± 0.3 Nm
4AZ Air conditioner to bulkhead	E60, E61, E63, E64, E83, E81, E82, E87, E88, E90, E91, E92, E93			6 Nm
	E70, E71			6.5 Nm
5AZ Cooler box to luggage compartment partition wall	E65, E66, E67			4.5 Nm
6AZ Air conditioner to support tube	E81, E82, E87, E88, E90, E91, E92, E93			9 Nm
7AZ Mounting, positive/negative lead, to electric auxiliary heater	E83			8.8 Nm

AUXILIARY HEATER

64 12 ADDITIONAL HEATER WITH CONTROLS

ADDITIONAL HEATER WITH CONTROLS-TIGHTENING TORQUE SPECIFICATIONS

	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

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 TORQUE SPECIFICATIONS

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

64 12 INDEPENDENT HEATING

INDEPENDENT HEATING-TIGHTENING TORQUE SPECIFICATIONS

	Type	Thread	Tightening specification	Measure
1AZ Exhaust muffler to floor pan	E70, E71			2.5 Nm
2AZ Bracket, independent heater, to floor plate	E70, E71			7.6 Nm
3AZ Bracket, auxiliary water pump, to independent heater	E70, E71			8.0 Nm
4AZ Rubber mount to independent heater	E70, E71			8.0 Nm
5AZ Bracket, fuel pump, to floor pan	E70, E71			7.6 Nm

AC HOUSING-EVAPORTOR

64 51 AIR CONDITIONER (EVAPORATOR) CONTROL UNITS

AIR CONDITIONER (EVAPORATOR) CONTROL UNITS-TIGHTENING TORQUE SPECIFICATIONS

	Type	Thread	Tightening specification	Measure
1AZ High/medium pressure pressostat Bolt cement, Part No. 81 22 9 407 144.	E32/E34			25 Nm
2AZ Low pressure pressostat. Bolt cement, Part No. 81 22 9 407 144	E32/E34			19 Nm
3AZ Three-way safety switch	E32/E34			25 Nm

COMPRESSOR

64 11 HOUSING, HEATER/AIR CONDITIONER

HOUSING, HEATER/AIR CONDITIONER-TIGHTENING TORQUE SPECIFICATIONS

	Type	Thread	Tightening specification	Measure
1AZ Bulkhead adapter	E85, E86, E89			1.0 ± 0.3 Nm
2AZ Fan for heater/air conditioner	E85, E86			1.5 ± 0.3 Nm
3AZ Controller for heater - heating and air conditioning system	E85, E86, E89			1.0 ± 0.3 Nm
4AZ Air conditioner to bulkhead	E60, E61, E63, E64, E83, E81, E82, E87, E88, E90, E91, E92, E93			6 Nm
	E70, E71			6.5 Nm
5AZ Cooler box to luggage compartment partition wall	E65, E66, E67			4.5 Nm
6AZ Air conditioner to support tube	E81, E82, E87, E88, E90, E91, E92, E93			9 Nm
7AZ Mounting, positive/negative lead, to electric auxiliary heater	E83			8.8 Nm

64 52 A/C COMPRESSOR

A/C COMPRESSOR-TIGHTENING TORQUE SPECIFICATIONS

	Type	Thread	Tightening specification	Measure
1AZ Refrigerant lines to A/C compressor	E70, E71	M8		21 Nm
	E60/N47, E61/N47, E81, E82, E87, E88, E90/N47, E91/N47, E92/N47	M8		18.5 Nm
	E92/S65	M8		21 Nm
2AZ Filler plug, A/C compressor	E70, E71			30±1 Nm
	E81/N43, E82, E88			25 Nm
3AZ A/C compressor to carrier	E70	M8 x 15		20 Nm
	N52, N52K	M8 x 87	Replace aluminum screw/bolt	
			Jointing torque	10 Nm
			Torque angle	180±15 °
	N52, N52K	M8 x	Replace aluminum	

		52	screw/bolt	
			Jointing torque	10 Nm
			Torque angle	90±15 °
	E81/N43, E88			23 Nm
	E82/N47, E90/N47, E91/N47, E92/N47			19 Nm
	E71/N54	M8 x 85		19 Nm
	E71/M57	M8 x 85		19 Nm
	E71/N63	M8 x 95		21.4 ±3.2 Nm
	E71/N63	M8 x 55		19 Nm
4AZ Bracket, pressure line, to compressor	E82/N54			7.6 Nm
5AZ Bearing block, compressor, to crankcase	E70/E71			19 Nm

64 53 REFRIGERANT LINES AND EXPANSION VALVE

REFRIGERANT LINES AND EXPANSION VALVE-TIGHTENING TORQUE SPECIFICATIONS

	Type	Thread	Tightening specification	Measure
1AZ Double pipe to expansion valve/bulkhead	E70, E71	M6		8.8 Nm
2AZ Expansion valve to heater - A/C	E70, E71	M6		5.5 Nm
3AZ Refrigerant lines to condenser	E70, E71	M8		18 Nm
4AZ Refrigerant lines to air-conditioning compressor	E70, E71	M8		21 Nm
5AZ Pressure/suction lines to double pipe	E70, E71	M8		18 Nm
6AZ Pressure sensor in refrigerant line	E70, E71			10 Nm

CONDENSER AND DRYER

64 11 HOUSING, HEATER/AIR CONDITIONER

HOUSING, HEATER/AIR CONDITIONER-TIGHTENING TORQUE SPECIFICATIONS

	Type	Thread	Tightening specification	Measure

1AZ Bulkhead adapter	E85, E86, E89			1.0 ± 0.3 Nm
2AZ Fan for heater/air conditioner	E85, E86			1.5 ± 0.3 Nm
3AZ Controller for heater - heating and air conditioning system	E85, E86, E89			1.0 ± 0.3 Nm
4AZ Air conditioner to bulkhead	E60, E61, E63, E64, E83, E81, E82, E87, E88, E90, E91, E92, E93			6 Nm
	E70, E71			6.5 Nm
5AZ Cooler box to luggage compartment partition wall	E65, E66, E67			4.5 Nm
6AZ Air conditioner to support tube	E81, E82, E87, E88, E90, E91, E92, E93			9 Nm
7AZ Mounting, positive/negative lead, to electric auxiliary heater	E83			8.8 Nm

64 53 REFRIGERANT LINES AND EXPANSION VALVE

REFRIGERANT LINES AND EXPANSION VALVE-TIGHTENING TORQUE SPECIFICATIONS

	Type	Thread	Tightening specification	Measure
1AZ Double pipe to expansion valve/bulkhead	E70, E71	M6		8.8 Nm
2AZ Expansion valve to heater - A/C	E70, E71	M6		5.5 Nm
3AZ Refrigerant lines to condenser	E70, E71	M8		18 Nm
4AZ Refrigerant lines to air-conditioning compressor	E70, E71	M8		21 Nm
5AZ Pressure/suction lines to double pipe	E70, E71	M8		18 Nm
6AZ Pressure sensor in refrigerant line	E70, E71			10 Nm