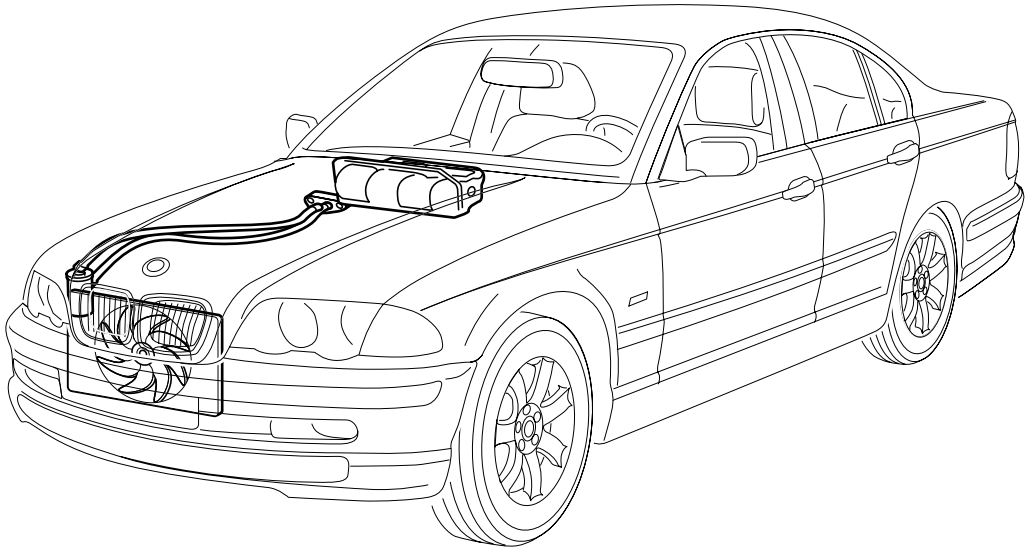
Teile und Zubehör - Einbauanleitung



F 46 64 053 R

BMW Parts and Accessories – Installation Instruction
Automatic air conditioning
BMW 3 Series (E46) left and right-hand drive with M43 engine (from start of series)

Best.-Nr. 01 29 9 410 901 I/98 Printed in Germany

Technical knowledge is required.
Installation time approx.10 - 11 hours, which can vary according to the condition and fittings of the vehicle.

Important notes on installing the automatic air conditioning system

Installation of the air conditioning system may be undertaken only by a specialist workshop which has the necessary special tools and appropriate equipment for evacuating and filling the air conditioning system.

 All work is shown as taking place on a left-hand drive vehicle. Many of the operations are to be carried out in mirror image for right-hand drive vehicles. ◄

By installing the air conditioning system, the payload of the vehicle is reduced by approx. 26 kg.

All seals and O-rings are to be moistened with refrigerator oil before installation.

It is advisable to remove plugs to all parts of the refrigerant circuit only just before installing the system as the system is damaged by moisture penetrating into it.

In vehicles which have automatic transmission it is not necessary to change radiator and suction fan as these vehicles are already fitted with the High radiator and the 390 W suction fan.

If any pins or terminals are already allocated, bridges, double crimpings or parallel connections must be made.

Important notes on operating the air conditioning system:

1. The condensation water forming on the evaporator is drained off under the vehicle and can amount to 2 litres/h, depending on the air humidity.

2. The air conditioning system must be run at least once a month for a short time (also in cold seasons), to ensure continuous and faultless functioning of the system.

3. If any malfunction occurs in the air conditioning system, e.g. no issuing of cold air despite switched-on system, the system must be switched off and a BMW service centre consulted immediately.

4. Before commissioning the air conditioning system a control unit coding and a changing of the central coding key must be made by the BMW Customer Service (otherwise no control of the air conditioning compressor relay).

For addresses of BMW Customer Service for air conditioning systems: see directory "BMW Service" (which is in the vehicle).

Required tools and auxiliary materials
MoDiC III or DIS
Flat-tip screwdriver
Phillips screwdriver
TORX screwdriver T25
1/2 inch torque spanner
1/2 inch reversible ratchet
1/2 inch extension
1/2 inch socket-wrench insert SW 12 mm, 13 mm, 17 mm, 22 mm, 24 mm
1/4 inch reversible ratchet
1/4 inch extension
1/4 inch socket-wrench insert SW 6 mm, 8 mm, 10 mm, 13 mm
Hexagon socket screw key SW 6 mm

Contents

Section

1 Preparatory work

On grounds of safety, steering wheels with integrated airbag may only be disassembled by a BMW specialist workshop.

- Print out error memory
- Disconnect battery
- Dismantle instrument panel and unclip fresh air louver
- Dismantle microfilter/housing/cover/underpart
- Dismantle lower engine cowling
- Dismantle right headlight
- Dismantle front bumper
- Drain off coolant
- Dismount battery and battery plate
- Dismantle radiator
- Dismantle suction fan
- Dismantle heater
- Dismantle cover of control unit box on left

To avoid coolant getting into the passenger compartment when dismantling the heater, the return nozzles should be carefully blown through with compressed air (max. 1 bar overpressure).

2. Installation and wiring layout

F 46 64 050 R

Key

1. Control unit IHKA (automatic heating and air conditioning)
2. Heater/air conditioner unit
3. Air conditioning compressor
4. Condenser
5. Auxiliary fan
6. AUC (automatic recirculating air control) sensor
7. Drying container
8. Cable set for air conditioning system
9. Outside temperature sensor
10. Instrument cluster
11. Water valve
12. Branch cable DME

3. Connection overview

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Item	Designation	Cable colour	Cable cross-section	Connection point in vehicle
A1	Branch cable DME (digital motor electronics)	black/blue	0.5 mm²	To engine control module **A60004**, connector X60004, pin no. 29
A2.1	Branch cable water valve	yellow/brown	0.50 mm²	To water valve **Y4**, connector X85, pin no. 1.
A2.2	Branch cable water valve	red/grey	0.75 mm²	To water valve **Y4**, connector X85, pin no. 2.
A3	Branch cable outside temp. sensor	——	——	To outside temp. sensor **B21**
A3.1	Branch cable outside temp. sensor	blue/brown	0.5 mm²	To outside temp. sensor **B21**, connector X770, pin no. 1
A3.2	Branch cable outside temp. sensor	blue/red	0.5 mm²	To outside temp. sensor **B21**, connector X770, pin no. 2
B1	Relay base X51 air cond. comp.	——	——	Behind the glove box to relay carrier
B2	Joint connector terminal 31	brown	0.75 mm²	Behind the glove box to joint connector X219
B3	Joint connector TD signal	black	0.35 mm²	Behind the glove box to joint connector X243
B4	Joint connector K-Bus	white/red/yellow	0.35 mm²	Behind the glove box to joint connector X10116
B5	Branch cable fuse connection compressor	red/violet/yellow	0.75 mm²	Behind the glove box to current distributor **A46**, fuse plug-in place **F63**
B6	Branch cable fuse connection water valve	red/grey	0.75 mm²	Behind the glove box to current distributor **A46**, fuse plug-in place **F62**
B7	Branch cable terminal 15	green/yellow	0.50 mm²	Join with mini-connector to outgoing green/yellow line of fuse no. 28
C1	Connector X163	——	——	To air conditioning compressor **Y2**, connector X163
C1.1	Branch cable compressor	black/grey	0.75 mm²	To air cond. compressor **Y2**, connector X163, pin no. 1
C2	Connector X126	——	——	To pressure sensor **B8** at the drying container
C2.1	Branch cable pressure sensor	black/yellow	0.35 mm²	To pressure sensor **B8**, connector X126, pin no. 1
C2.2	Branch cable pressure sensor	black/grey	0.35 mm²	To pressure sensor **B8**, connector X126, pin no. 2
C2.3	Branch cable pressure sensor	black/green	0.35 mm²	To pressure sensor **B8**, connector X126, pin no. 3
C3	Connector X3211	——	——	To AUC sensor (auto. recirc. air ctrl) **B414** at radiator right
C3.1*****	B. c. AUC (auto. recirc. air ctrl) sens.	brown	0.50 mm²	To AUC sensor **B414**, connector X3211, pin no. 1
C3.2	Branch cable AUC sensor	yellow	0.50 mm²	To AUC sensor **B414**, connector X3211, pin no. 2
C3.3*****	Branch cable AUC sensor	brown	0.50 mm²	To AUC sensor **B414**, connector X3211, pin no. 3
C3.4	Branch cable AUC sensor	blue	0.50 mm²	To AUC sensor **B414**, connector X3211, pin no. 4
D	Connector X610	——	——	To heater/air conditioning control unit **A11**
D1	Branch cable water valve	yellow/brown	0.50 mm²	To heater/air conditioning control unit **A11**, connector X608 (natural colour) pin no. 4
E1	Connection to outside temp. display	blue/red	0.5 mm²	To instrument cluster **A2**, connector X11176 (natural colour) pin no. 1
E2	Connection to outside temp. display	blue/brown	0.5 mm²	To instrument cluster **A2** connector X11176 (natural colour) pin no. 2

***** Connectors **C3.1** and **C3.3** have the same colour. The resistance must therefore be tested to ensure that the correct branch cable is connected to connector **X3211** in each case. See circuit diagram for pin allocation. ◄

4. Install compressor

F 46 64 045 R

The screw lengths specified are to be complied with unreservedly! ◄

1. Air conditioning compressor
2. Torx screw M8 x 55 with washer (3 pces)
3. Ribbed V-belt
4. Hexagon-head screw M8 x 35 with washer (2 pces)
5. Hexagon-head screw M8 x 100 with washer (1 pce)*
6. Hexagon-head screw M8 x 55 with washer (4 pces)
7. Mounting bracket
8. Pulley
9. Hexagon-head screw M8 x 14 with washer (3 pces)
10. Tensioning device
11. Hexagon-head screw with washer M8 x 55 (1 pce)
12. Locking pin

Sequence of work steps:
1. Install mounting bracket (7)
2. Install pulley (8)
3. Install tensioning device (10)
4. Install compressor (1) (but first loosen the locking screws of the refrigerant line)
5. Put on ribbed V-belt (3)
6. Remove locking pin from tensioning device (10).

Tightening torque of the hexagon-head screws 22 Nm.

* This screw replaces the original screw fitted in the vehicle

5. Install drier

F 46 64 005 R

Place drier (1) together with support in the rebate in the body and secure with hexagon head screw (2) 6.3 x 16.
Tightening torque of the hexagon head screw 10 Nm.

F 46 64 006 R

Fasten support of the drier to the lower longitudinal carrier with hexagon head self-tapping screw (1) 6.3 x 16.
Tightening torque of the hexagon head screw 10 Nm.

6. Install condenser

F 46 64 007 R

Attach condenser (1) on left and right into the guide (2) of the radiator support.

F 46 64 008 R

Secure condenser (1) at above right to the radiator support using self-cutting Torx screw (2) taken from the installation kit.

F 46 64 009 R

Fix condenser (1) at above left to the radiator support using expanding rivet (2).
Only vehicles with automatic transmission:
Install radiator again in reverse order of disassembly.

7. Change radiator (only vehicles with manual gearbox)

F 46 64 037 R

Remove Torx screws (1). Remove mounting plate (2) and fit it to the new radiator.

F 46 64 038 R

Unclip seal (1) and attach to new radiator.

F 46 64 039 R

Change the support (1) for the coolant drain plug. Install radiator and new suction fan again in reverse order of disassembly (if necessary, rearrange the hose support of the secondary air injection).

In vehicles with automatic transmission the suction fan must not be changed. (See also note on page 2). ◄

F 46 64 042 R

Remove the covers (1) from the air guide.

8. Install water valve

F 46 64 036 R

Dismantle water hose (1) and replace it with the hose supplied in the installation kit.

F 46 64 047 R

Insert water valve (1) in the bracket (2) provided for it at the left Macpherson strut tower.
Connect water hose (3) coming from the engine to the lower connection point of the water valve (1).
Connect water hose (4) going towards the heating/air conditioning unit to the upper connection point of the water valve (1).

The flow direction shown in the illustration must be complied with unreservedly. ◄

9. Install automatic air-conditioning cable set and connect it

F 46 64 043 R

Install air conditioning cable set along the standard wiring harness in the vehicle.
Install branch cables **A1**, **A2** and **A3** on the left side into the E-box.
Lay **B1-B7** and **C1-C3** to the power distribution box.

Insert **E1**, connection of outside temperature display to instrument cluster, cable colour blue/red, into connector X11176 (natural colour) in pin no. 1.
Insert **E2**, connection of outside temperature display to instrument cluster, cable colour blue/brown, into connector X11176 (natural colour) in pin no. 2.

F 46 64 014 R

Insert **A1** branch cable, DME (digital motor electronics), cable colour black/blue, in connector (1) X60004 of the engine control module (2), **A60004** pin no. 29
Install **A2** branch cable, water valve **Y4**, through the rubber grommet (3) of the E-box to the water valve.
Install **A3** branch cable, outside temperature sensor, through the rubber grommet (3) of the E-box along the standard wiring harness to the installation location of the outside temperature sensor

F 46 64 048 R

Insert **A2.1** branch cable (1), water valve, cable colour yellow/brown, into connector X85 (3), pin no. 1

Insert **A2.2** branch cable (2), water valve, cable colour red/grey, into connector X85 (3), pin no. 2
Put connector X85 (3) on to water valve (4).

F 46 64 015 R

Install branch cables **C1**, **C2** and **C3** (1) through the rubber grommet (2) on the right-hand side into the engine compartment.

F 46 64 016 R

Install branch cable C1.1 (1) up to the air conditioning compressor Y2.

Insert **C1.1** branch cable (1), compressor **Y2**, cable colour black/grey, into connector (2) X163, pin no. 1.
Connect connector (2) to the compressor **Y2** (3).
Fasten branch cable (1) with cable clip (4) to the longitudinal carrier of the body.

Care should be taken to see that the white safety contact is properly interlocked. ◄

F 46 64 017 R

Install branch cables C2.1-2.3 (1) up to drying container.

Insert **C2.1** branch cable, cable colour black/yellow, into connector (3) X126, pin no. 1.
Insert **C2.2** branch cable, cable colour black/grey, into connector (3) X126, pin no. 2.
Insert **C2.3** branch cable, cable colour black/green, into connector (3) X126, pin no. 3.

F 46 64 046 R

Install branch cables C3.1-C4.1 (1) up to engine fan shroud of the radiator.

Insert **C3.1** branch cable, cable colour brown (twisted with blue lead), into connector (2) X3211, pin no. 1.
Insert **C3.2** branch cable, cable colour yellow, into connector (2) X3211, pin no. 2.
Insert **C3.3** branch cable, cable colour brown (twisted with yellow lead), into connector (2) X3211, pin no. 3.
Insert **C3.4** branch cable, cable colour blue, into connector (2) X3211, pin no. 4.

Connections **C3.1** and **C3.3** are the same colour. Therefore before installation the resistance must be tested to ensure that the correct branch cable is connected to connector **X3211** in each case (see circuit diagram or connection overview).
The branch cable **C3.1** must be joined with the plug-in connection **X610**, pin 11.
The branch cable **C3.3** must be joined with the plug-in connection **X610**, pin 15. ◄

Clip AUC (automatic recirculating air control) sensor (3) into the engine fan shroud (4) and connect connector (2) X3211.

Connect together connection of the auxiliary fan (5) and attach it to the engine fan shroud (4).

Only vehicles <u>with</u> auxiliary relay carrier.

F 46 64 019 R

Put **B1** relay K19 on to relay base **X51** (1) and attach it to relay carrier (2) as shown.

Only vehicles <u>without</u> auxiliary relay carrier.

F 46 64 020 R

Put **B1** relay K19 on to relay base **X51** (1) and attach it as illustrated.

All vehicles

F 46 64 021 R

Insert **B2** branch cable (1) terminal 31, cable colour brown, into joint connector (2) X219, cable colour brown/black.
Insert **B3** branch cable (3) TD signal, cable colour black, into joint connector (2) X243, cable colour black.
Insert **B4** branch cable (4) K-bus, cable colour white/red/yellow, into joint connector (2) X10116, cable colour white/red/yellow.

F 46 64 022 R

Connect **B5** branch cable compressor, cable colour red/violet/yellow, to current distributor (1) plug-in place F63.
Connect **B6** branch cable water valve, cable colour red/grey, to current distributor (1) plug-in place F62.
Connect **B7** branch cable terminal 15, cable colour green/yellow, together with mini-connector to the outgoing green/yellow line of fuse no. 28.

Insert fuse 7.5 A into plug-in place no. F63 (2) and F62 (3).

10. Install condensation water drain

F 46 64 002 R

Remove pre-stamped carpet cut-out and rubber bung at the gearbox tunnel (1).

F 46 64 003 R

Insert condensation water drain (1) in the opening.

Take note of the installation arrow on the condensation water drain. The arrow must point in the driving direction. ◄

11. Install heater/air conditioner unit

The heater/air conditioner unit must be inspected for possible transportation damage before it is installed. ◄

F 46 64 023

Place heater/air conditioner unit (1) in carefully, straighten it and attach it with the hexagon nuts (2) which have been removed previously.
Tightening torque of the hexagon nuts 10 Nm.

Make sure that branch cable **D** to the cable set (connection to air conditioner control unit) does not get jammed. ◄

F 46 64 024 R

Attach Bowden cable (1) to the switch lever (2) of the heater/air conditioner unit.
Attach coolant hoses again and re-install instrument panel in the reverse order of disassembly.

F 46 64 025 R

Attach Bowden cable (1) to the switch lever of the fresh air louver (2). Push fresh air louver into the instrument panel and make it click home.

F 46 64 055 R

Insert **D** connector (1) X610, into the connection on the heater/air conditioner control unit (2).
Insert **D1** branch cable water valve, cable colour yellow/brown to the connector X608 (natural colour) (4) into pin no. 4.
Insert the connectors (3) which were removed when the instrument panel was disassembled into the connections on the heater/air conditioner control unit (2).
Press the heater/air conditioner control unit (2) into the instrument panel and make it click home.

12. Install refrigerant lines

F 46 64 027 R

Remove pre-stamped area of the insulation mat (1) in the engine compartment front right and screw (2).
Break out the pre-stamping (3) for the suction line.

F 46 64 028 R

Remove plastic cover (1).
Secure rubber buffer (2) with hexagon nut M6.
Tightening torque of hexagon nut 10 Nm

F 46 64 029 R

Insert double tube (1) and secure with locking tooth nut (2) M6.
Tightening torque of the locking tooth nut 10 Nm.
Make sure the rubber grommet (3) is seated properly !

F 46 64 030 R

Install and screw pressure line (1) from drier to evaporator to double tube using hexagon socket head screw M8 x 30 (2).
Tightening torque of hexagon socket head screw 25 Nm

F 46 64 031 R

Screw pressure line (1) from drier to evaporator to drier (3) using hexagon socket head screw (2) M8 x 30.
Tightening torque of hexagon socket head screw 25 Nm
Put connector X126 (4) on to the pressure sensor **B8** (5).

F 46 64 033 R

Screw suction line (1) from evaporator to compressor to double tube (3) using hexagon socket head screw (2) M8 x 30 and to rubber buffer (5) with hexagon nut (4), and clip to the side wall.
Tightening torque of the hexagon socket head screw 25 Nm, hexagon nut 10 Nm.

F 46 64 034 R

Screw suction line (1) from evaporator to compressor to compressor (3) using hexagon socket head screw (2) M8 x 30.
Screw pressure line (4) from compressor to condenser to condenser (5) and to compressor (3) using hexagon socket head screws (2) M8 x 30.
Tightening torque of the hexagon socket head screws 25 Nm.

F 46 64 035 R

Screw pressure line (1), from condenser to drier, to condenser (3) and to drier (4) using hexagon socket head screws (2) M8 x 30.
Tightening torque of the hexagon socket head screws 25 Nm.

13. Install temperature sensor

F 46 64 040 R

Insert temperature sensor (1) in recess provided for it on the left bottom covering (2)

F 46 64 041 R

Insert **A3.1** branch cable (1), cable colour blue/brown, into connector (2) X770, pin no.1
Insert **A3.2** branch cable (1), cable colour blue/red, into connector (2) X770, pin no. 2
Put connector X770 (2) on to outside temperature sensor (3)

14. Finalising operations

F 46 64 051 R

- Build back the vehicle in the reverse order of disassembly.
- Evacuate and fill cooling system according to specifications and check for leakages.
- Check headlight adjustment and correct if necessary.
- Stick on filling-capacity sticker (1)
- Evacuate air conditioning system and fill it. (filling quantity 740 g must be observed)
- Evacuate and fill air conditioning
  Check air conditioning for leakage.

15. Coding

Coding is required in every case and is to be carried out using coding software which is currently valid.

Procedure:
- connect DIS or MoDIC III to the vehicle
- ignition "ON"
- select **"Coding ZCS"**
- select **"7 Series E46"**
- select **"2 Retrofit"**
- select **"3 IHKA"**
- automatic recirculation control Yes/No
- start automatic coding (confirm with **"Y"**)
- after coding, disconnect vehicle battery for at least 10 seconds, connect it again and carry out function test.
- when the coding operation has finished, print out coding label and stick it in the lid of the E-box.

16. Circuit diagram/ key IHKA M43

BL = blue
BR = brown
GE = yellow
GN = green
GR = grey
RT = red
SW = black
VI = violet

F 46 64 049 R

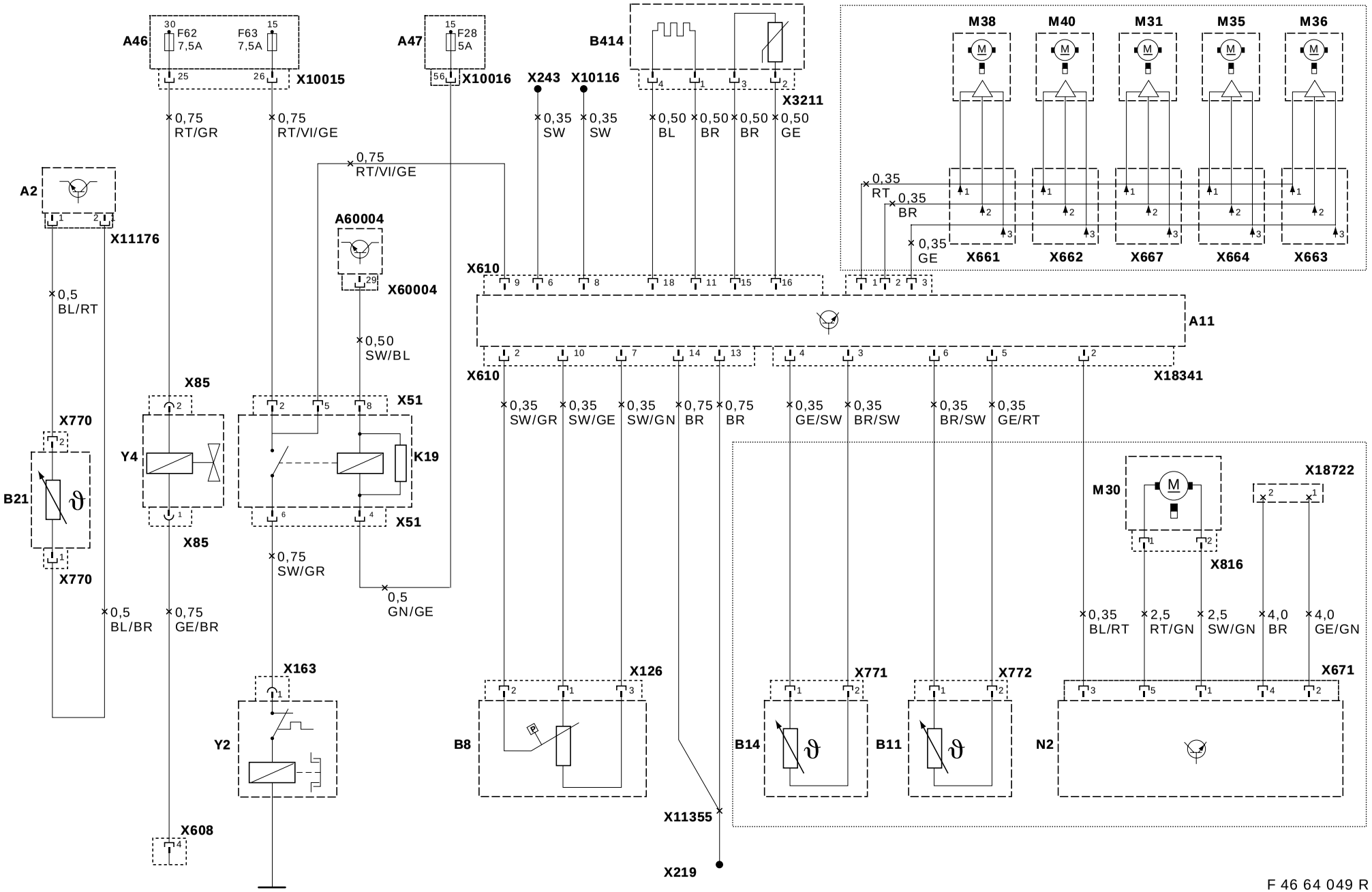
Key

A2	Instrument cluster
A11	Control unit IHKA (automatic heating and air conditioning)
A46	Fuse holder I
A47	Fuse holder II
A60004	Engine control module DME
B8	Pressure sensor low-high pressure
B11	Heat exchanger sensor L1
B14	Temperature sensor evaporator
B21	Outside temperature sensor
B414	Sensor AUC (automatic recirculating air control)
K19	Relay air conditioner
M30	Blower
M31	Footwell left
M35	Defrosting
M36	Actuator fresh air
M38	Ventilation left
N2	Output stage

X51	Relay air conditioner
X85	Water valve
X126	Pressure sensor
X163	Magnetic clutch
X243	Connector TD
X219	Ground
X608	Heating/air conditioning unit
X610	IHKA 3
X661	Ventilation left
X662	Recirculation
X663	Actuator fresh air
X664	Defrosting
X667	Footwell left
X671	Output stage
X770	Outside temperature sensor
X771	Evaporator sensor
X772	Exchanger sensor L1
X816	Blower
X3211	Sensor AUC
X10015	Fuse holder 1 A46
X10016	Fuse holder 1 A47
X10116	Connector K-Bus
X11176	Instrument cluster
X18341	IHKA
X18722	Blower
X60004	Connection DME (engine control module)

Y2	Magnetic clutch
Y4	Water valve

····· The components framed in this way are already mounted on the heating/air conditioning unit.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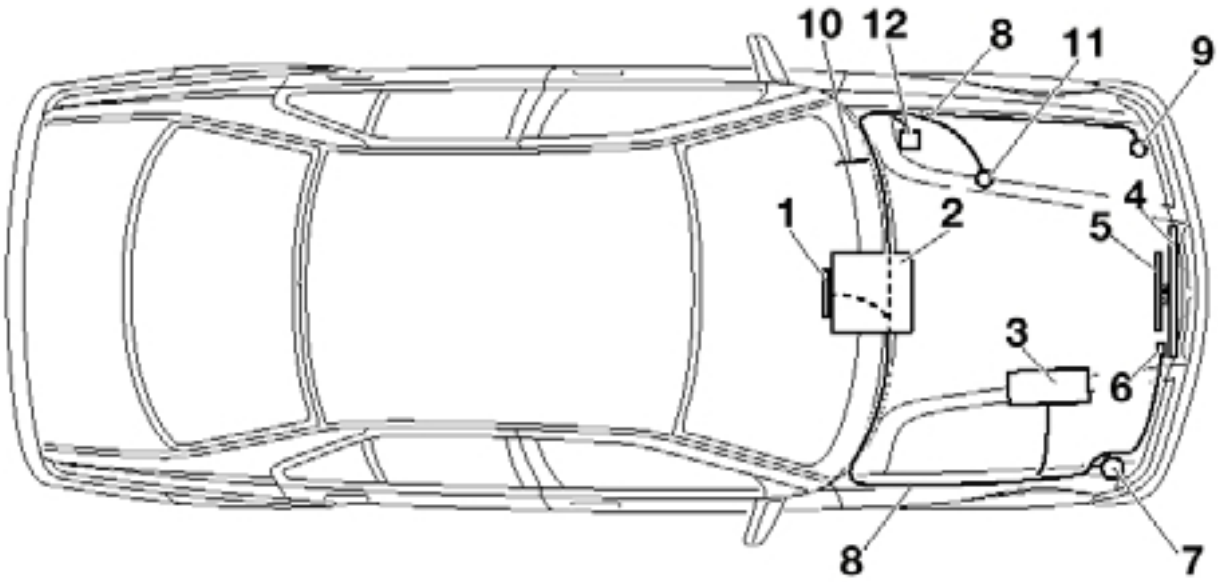

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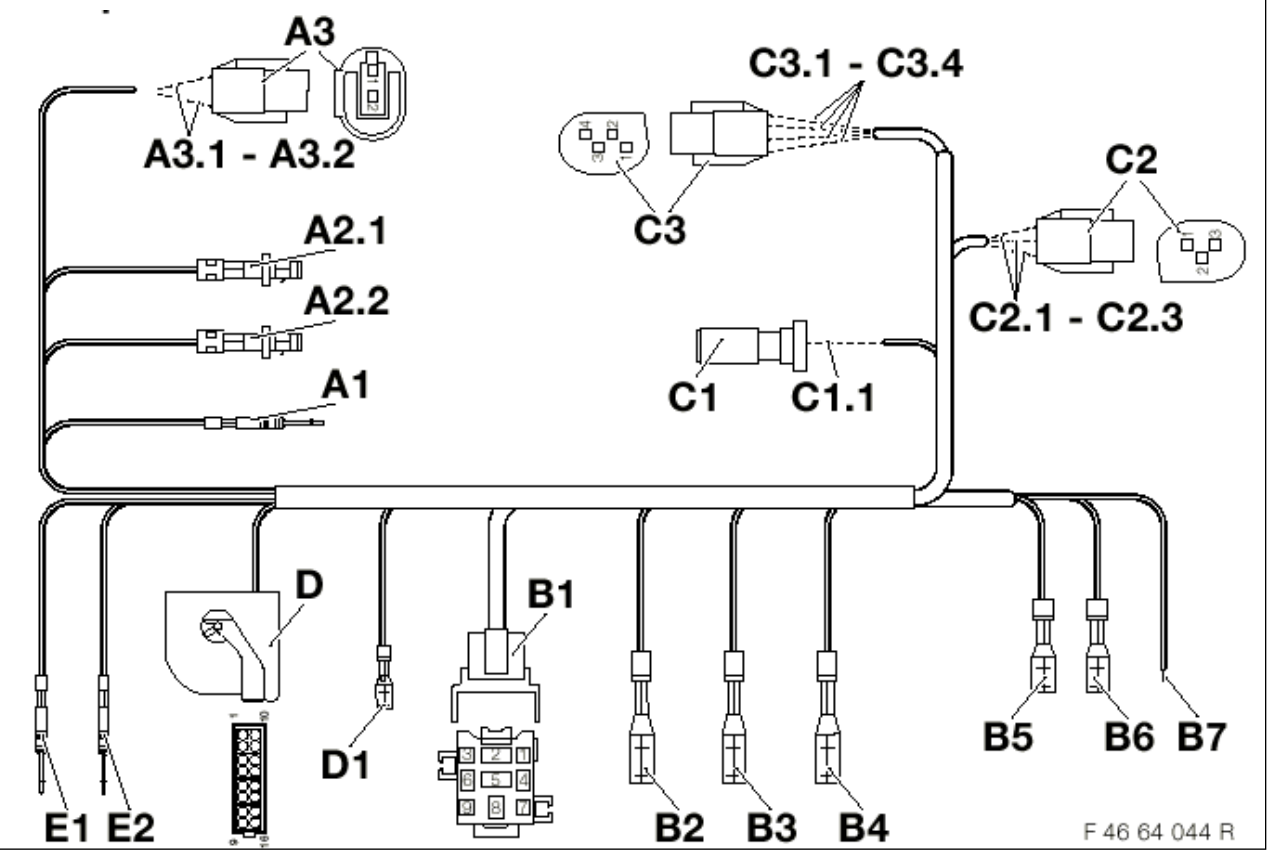

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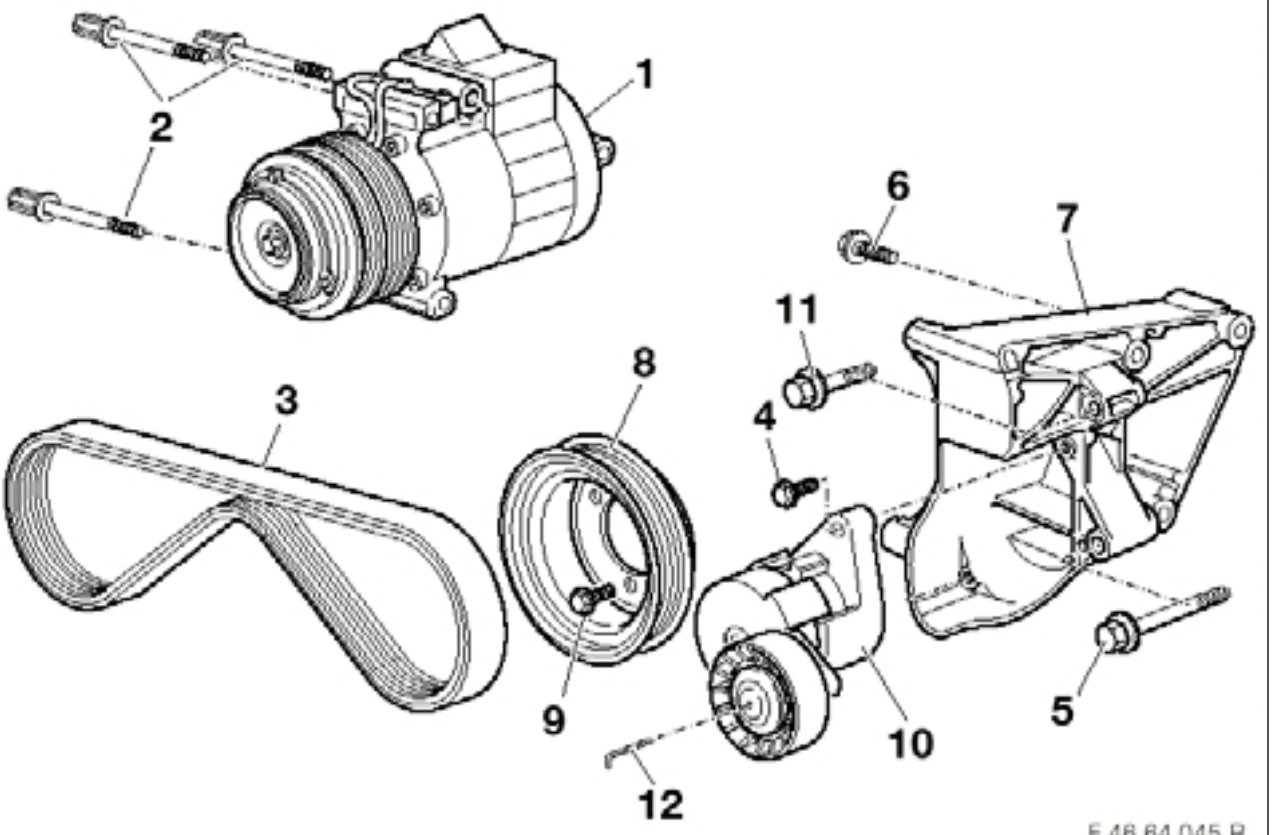
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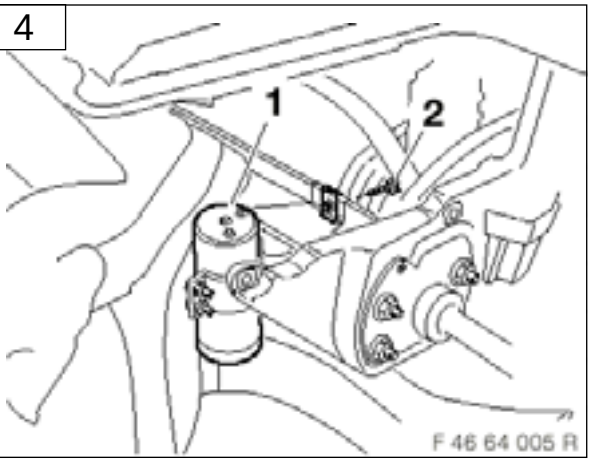
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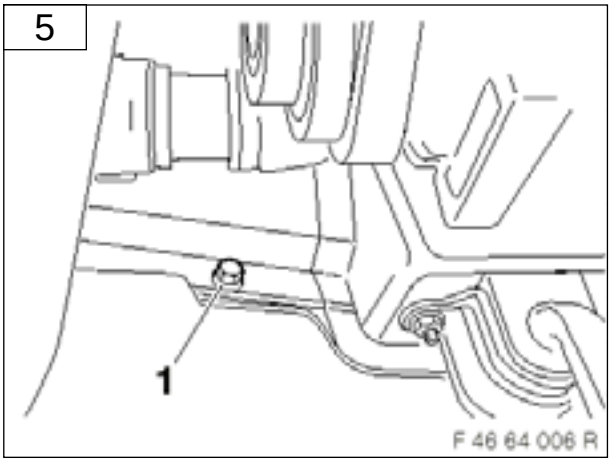
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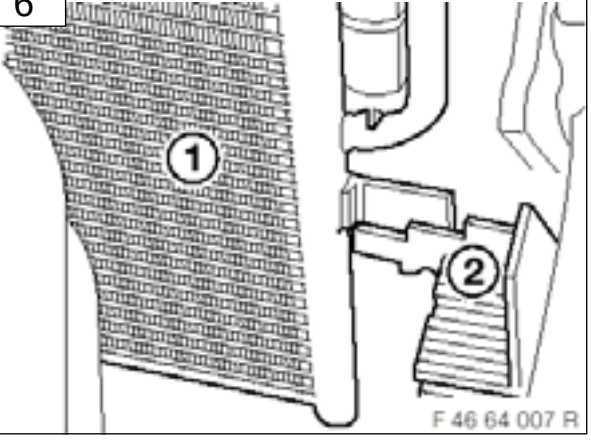
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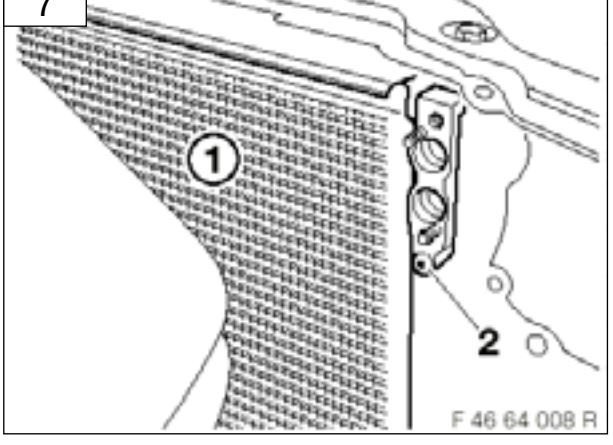
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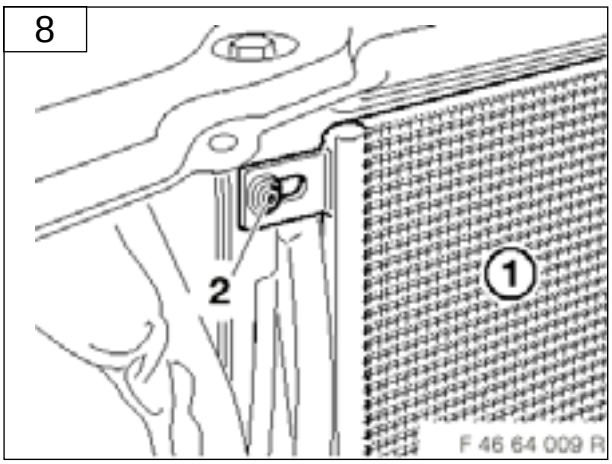

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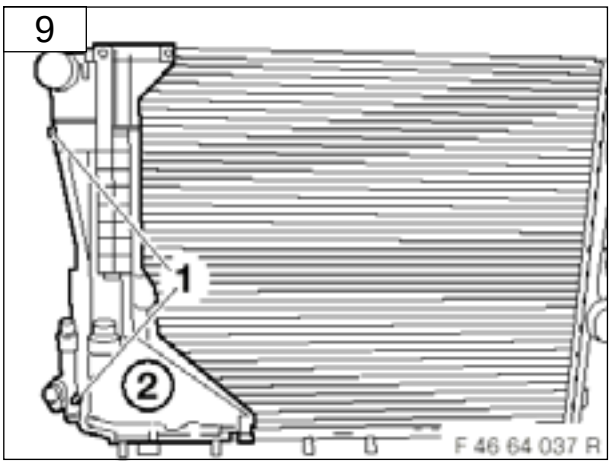

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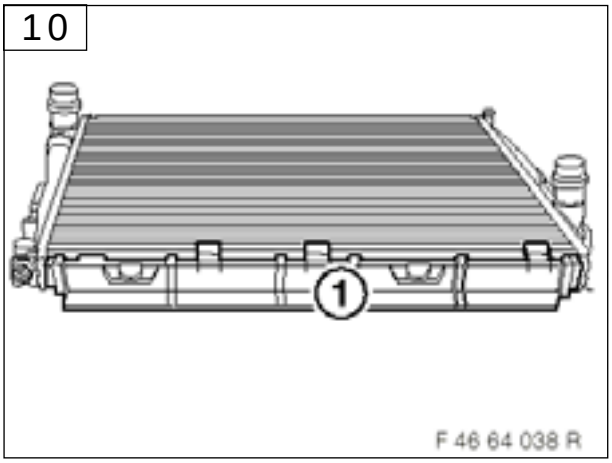

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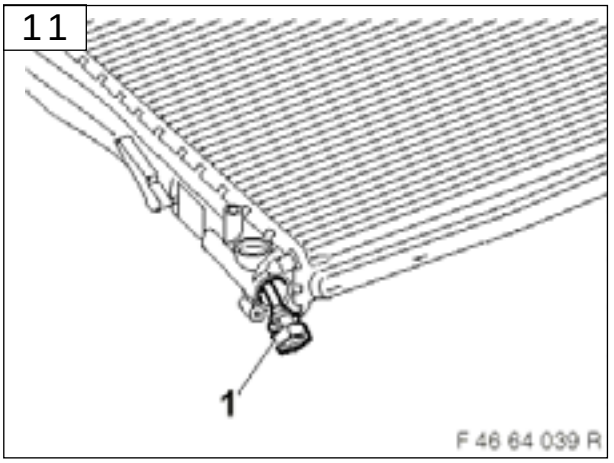

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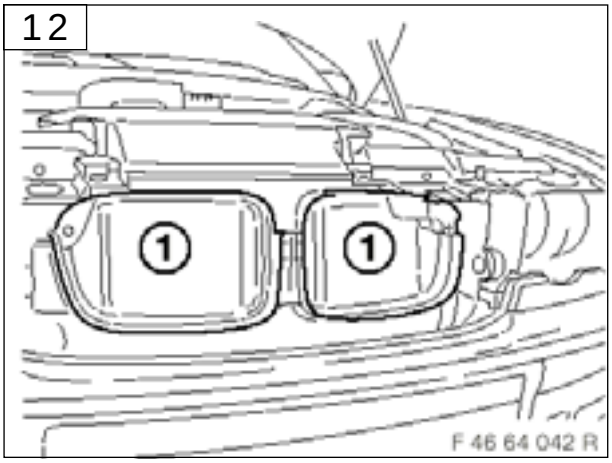

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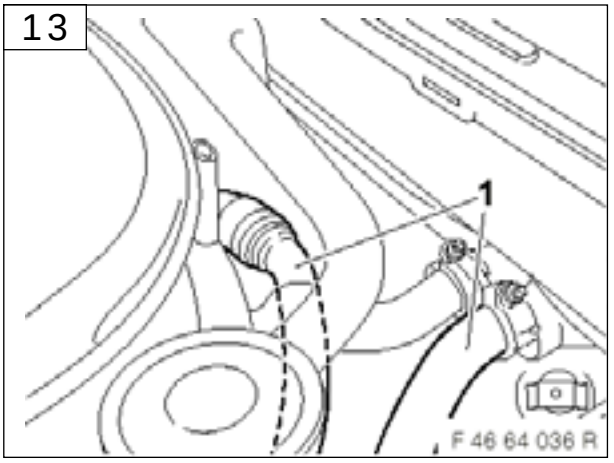

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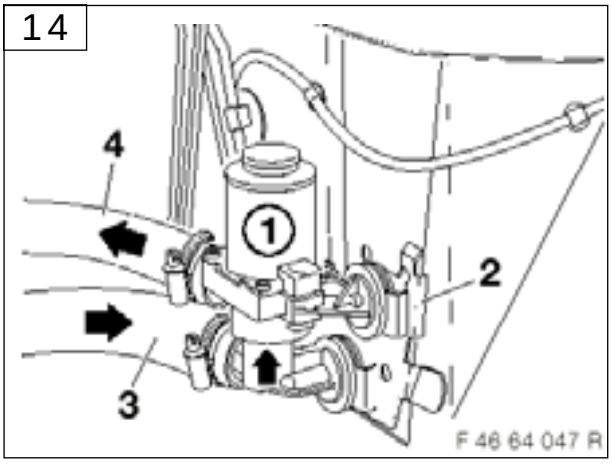

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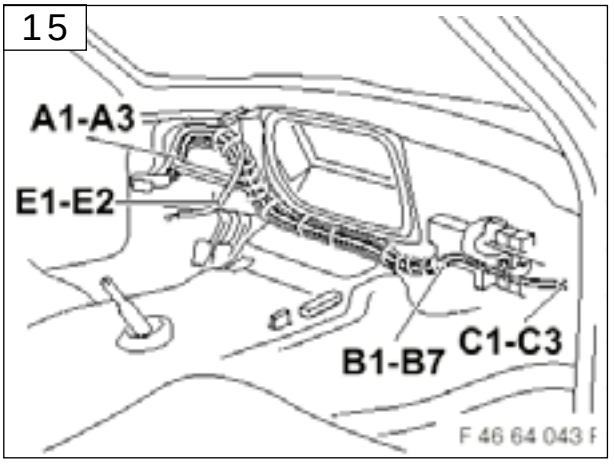

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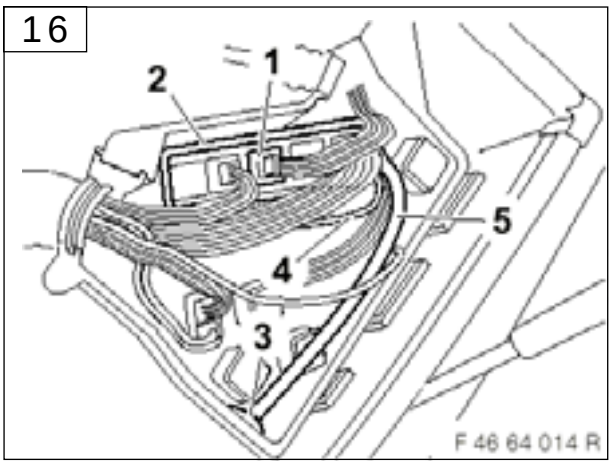

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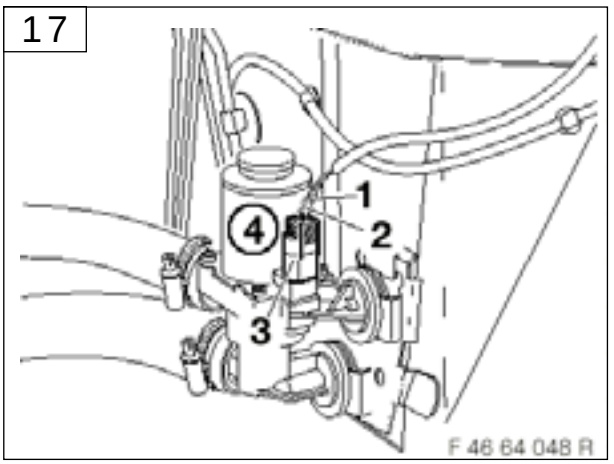

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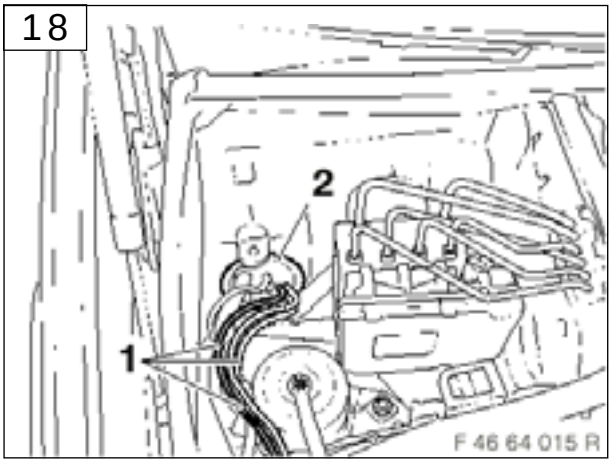

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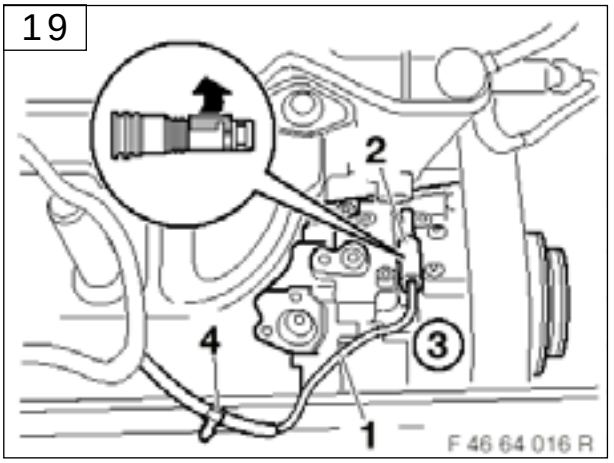

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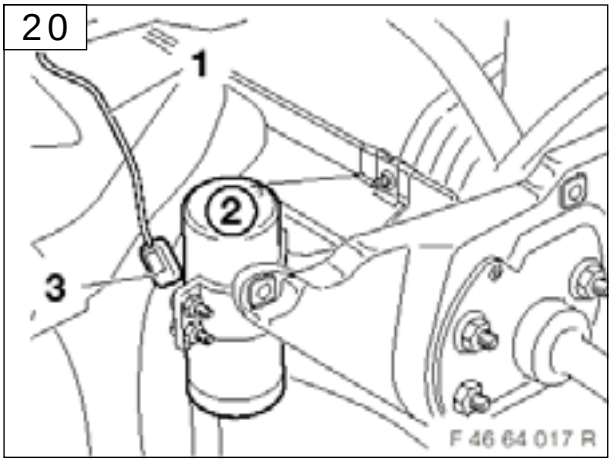

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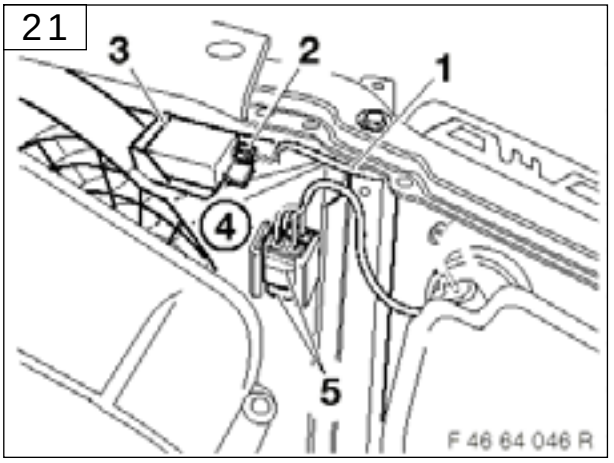

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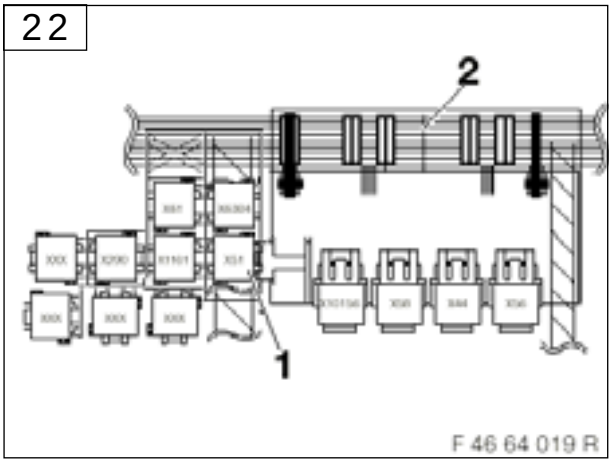

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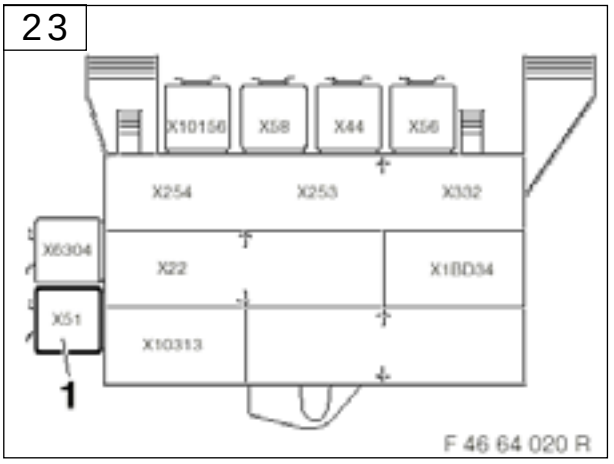

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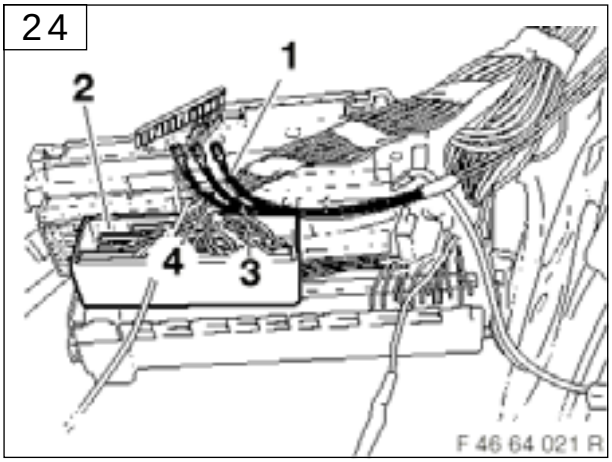

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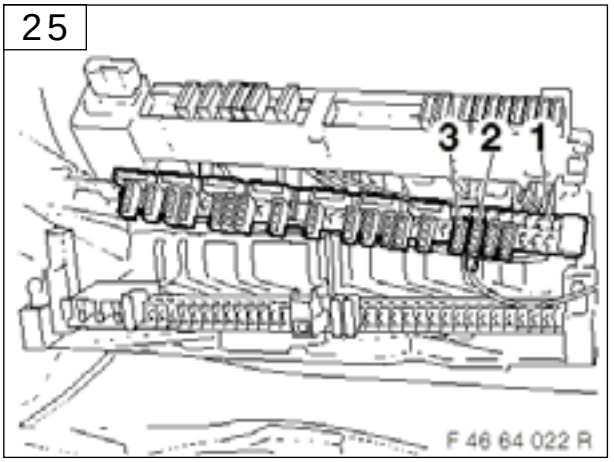

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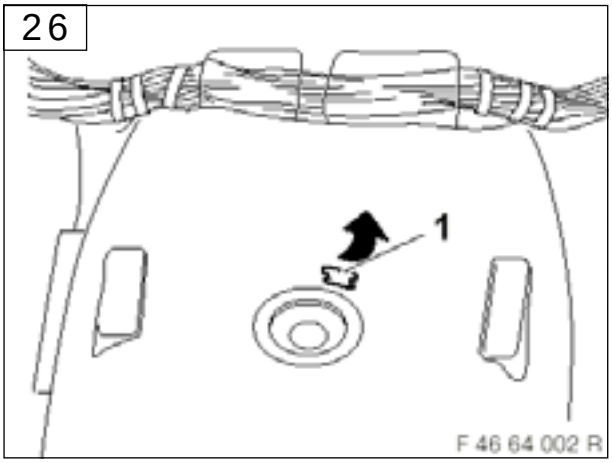

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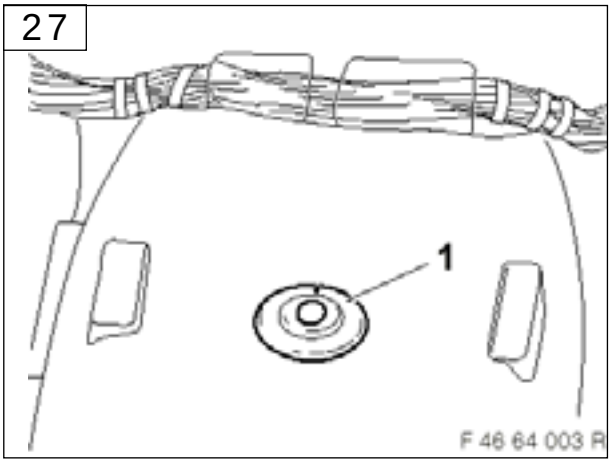

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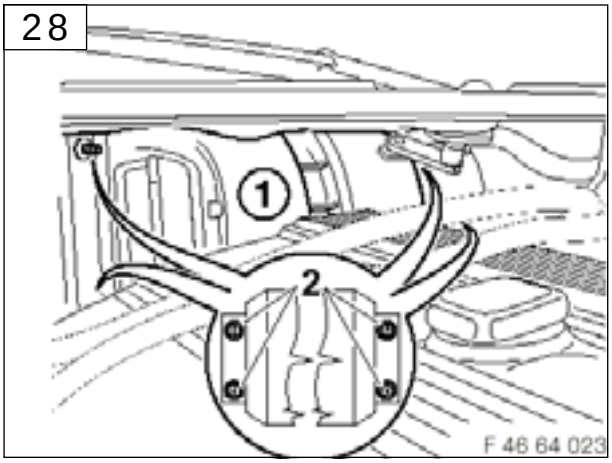

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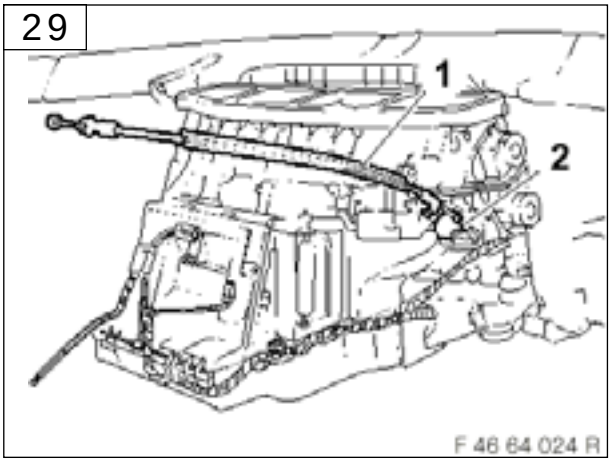

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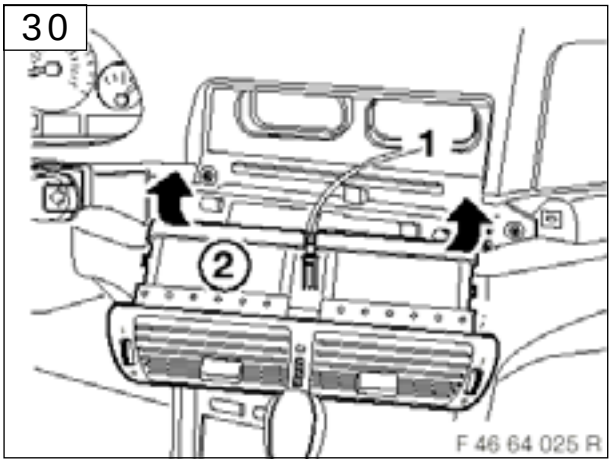

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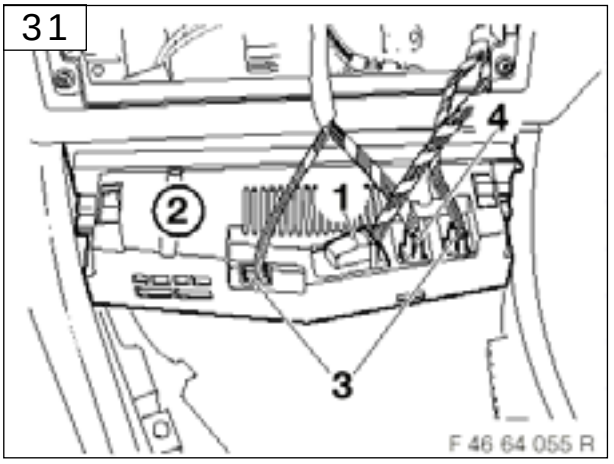

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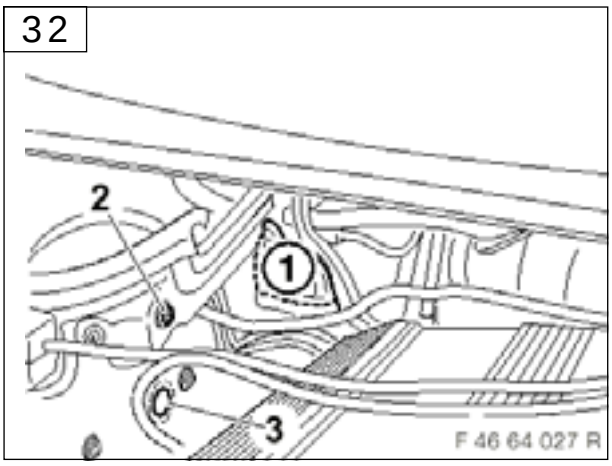

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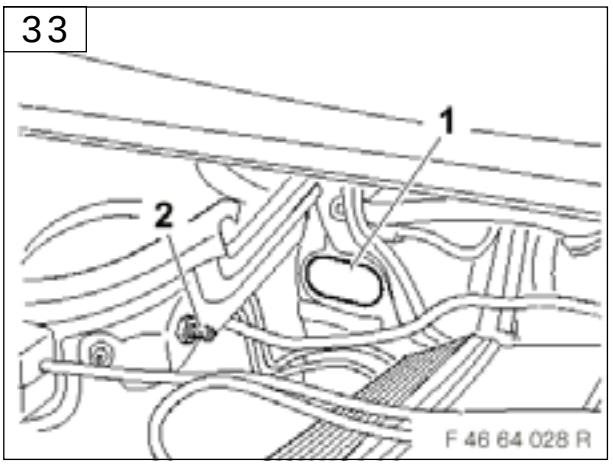

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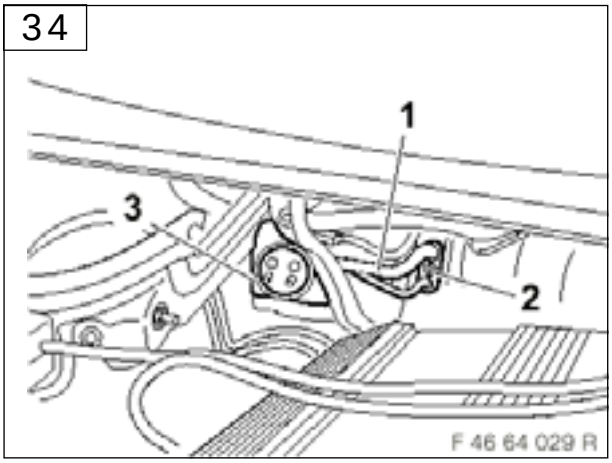

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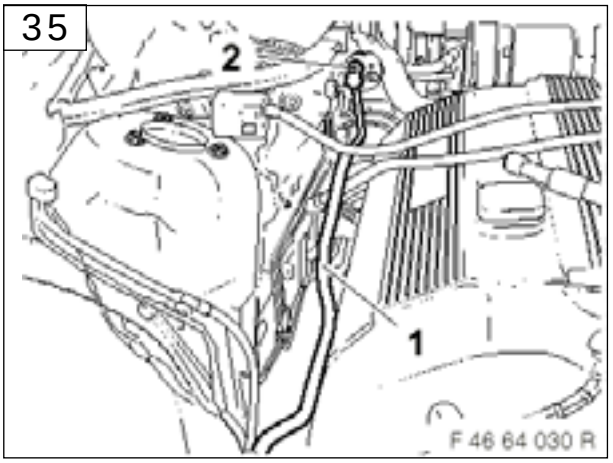

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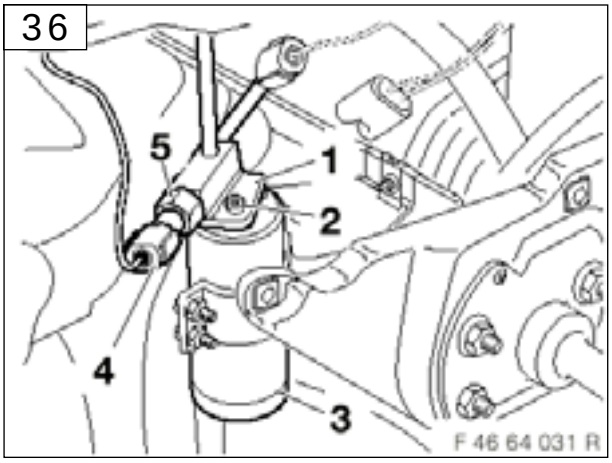

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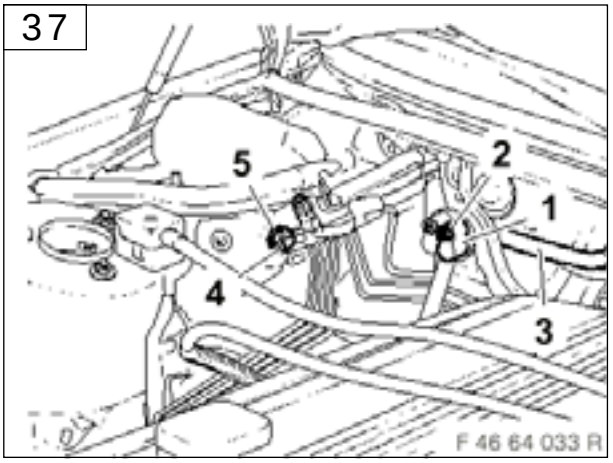

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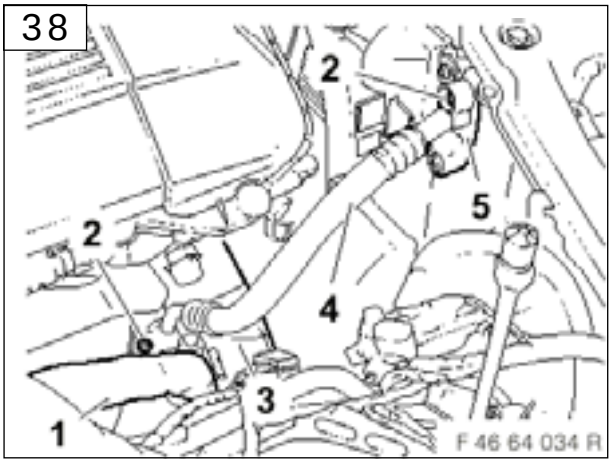

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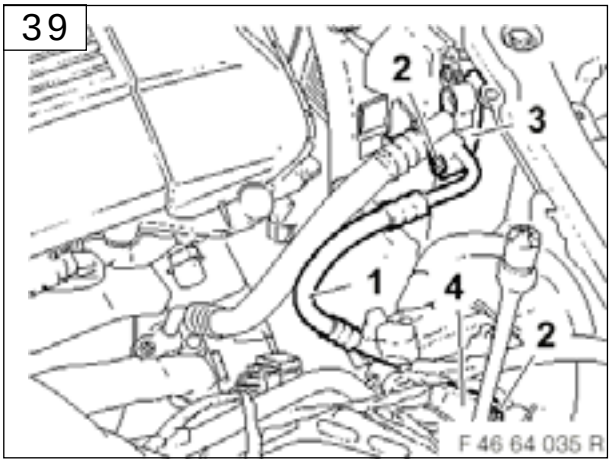

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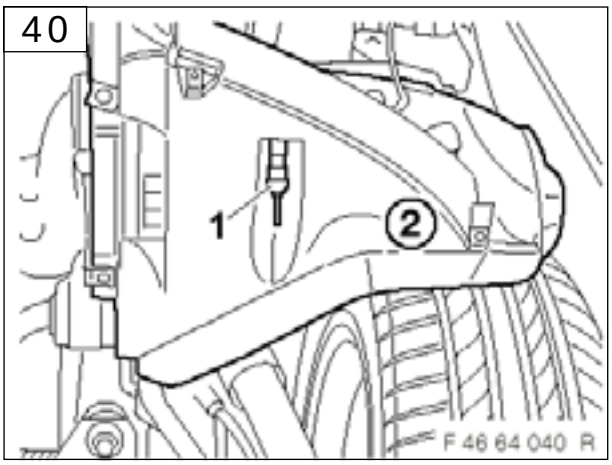

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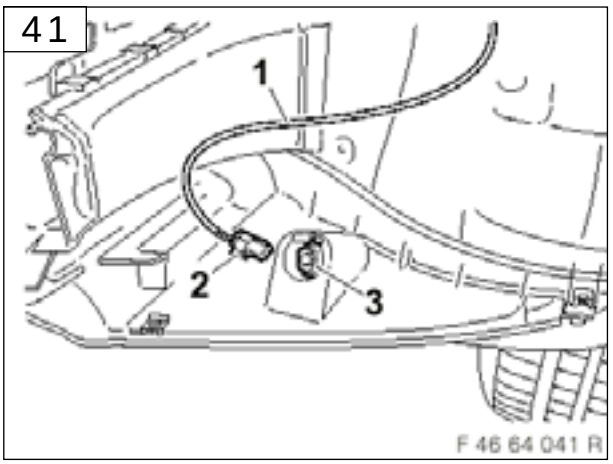

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