

Assembly instruction M54 SK+





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1. Reference on exploded view and parts lists

These installation instructions will be completed by the explosion views and part lists.
These documents can be downloaded from:

<https://gp-infinitas.com/downloads/>

Make yourself known with the parts lists and exploded views of the kit's scope of parts, while checking for completeness.

2. Notes before the conversion

Please follow the assembly instructions and the guide value for tightening torques exactly. When you are working on the engine, always pay attention to cleanliness and order.

It is recommended to read the entire installation documentation first.

In some cases, the conversion work is described using the vehicle E46 330i as an example. Other vehicles differ in detail. All significant differences are described in this manual.

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3. Guide values for tightening torques

These torques are valid for all bolted connections with bolts of property class 8.8.
Excluding screw connections with special torque's instructions.

Standard values for ISO Metric - Standard thread

M5	6 Nm / 4,4 Lb.ft
M6	10 Nm / 7,4 Lb.ft
M8	25 Nm / 18,4 Lb.ft
M10	49 Nm / 36,1 Lb.ft
M12	86 Nm / 63,4 Lb.ft
ASA Oil supply screw compressor M10x1	14 Nm / 10,3 Lb.ft
Hose clamp Width 9 mm	3 Nm / 2,2 Lb.ft
Hose clamp Width 12 mm	6 Nm / 4,4 Lb.ft



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4. Software customization

It is essential to read the map out BEFORE starting the conversion and send it to support@infinitas-automotive.com. We usually need two working days to customize the map.

The software adaptation is done with two different I-Flash OBD tools. The tools differentiate between E46 and E85/86, you will find the appropriate instructions afterwards.

Please note before reading out:

- Connect the vehicle to the charger.
- Check the battery status of your laptop.
- Check if the original BMW software is installed on the ECU of the vehicle. If not, you must inform us urgently.
- Turn on the ignition of the vehicle, do not start.
- Turn off data displays or other retrofitted devices that access the CAN-BUS.

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4.1 E46/E39/Z3

First steps

- Deactivate you antivirus software, also Windows Defender, otherwise "MS4XFlasher" will be deleted automatically.
- Download „MS4x Flasher“ from following link
https://www.ms4x.net/index.php?title=Flashing_Tools.
- Unzip „MS4x Flasher“.

Install the driver

- Connect the OBD cable to your laptop.
- Open the folder „Driver“.
- Open „OBD Setup“ and follow the instructions.
- If you are asked to run in compatibility mode, than do it.

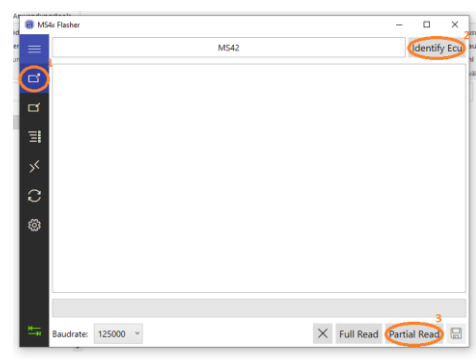


Activate MS4x Flasher

- Connect the OBD cable to your laptop
- Open „MS4x Flasher“ and follow the instructions for activation.
- Copy the license file into the same folder as „MS4x Flasher“.

Read out ECU data

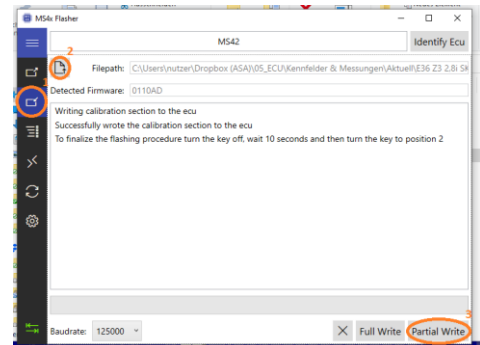
- Connect the OBD cable to your laptop and your vehicle.
- Click on „Identify ECU“.
- Click on „Partial Read“ and send the data to
support@gp-infinitas.com.



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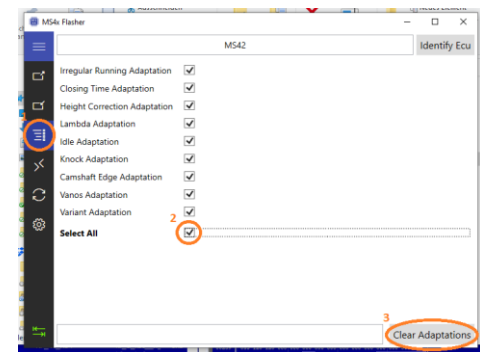
Write on ECU data

- Connect the OBD cable to your laptop and your vehicle.
- Open „MS4x Flasher“.
- Click on „Write to ECU“ on the left side.
- Select the modified data that you have received from us.
- Click on „Partial Write“.



Adaptionswerte löschen

- Click on „Reset Adaptations“ on the left side.
- Click on „Select All“.
- Click on „Clear Adaptations“



You have customized the software now.

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4.2 E85/E86/E60

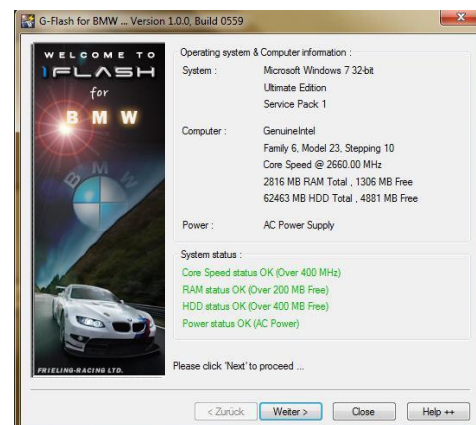
Installation

- Download „I-FLASH“ from <https://gp-infinitas.com/downloads/>.
- Instal I-FLASH on your laptop.
- Open I-FLASH and confirm the license.
- Click on download Updates.
- Click on „Weiter“.



Check Laptop

- The software checks now automatically the system status of the laptop. If all dots light up green, the laptop can be used for the I-FLASH, if not, another laptop must be used.
- Click on „Weiter“.



Read out vehicle data

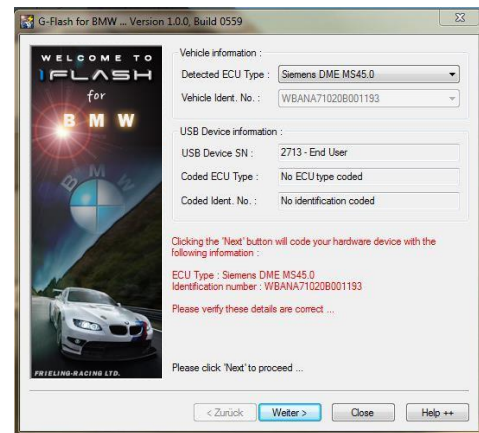
- Connect the OBD-cable to the OBD interface of your vehicle and your laptop
- Wait till Windows informed you, that the USB device has been recognized and is ready for use.
- Make sure that the ignition of the vehicle is on and that the connection is not interrupted.
- Click on “Weiter”.
- I-FLASH automatically identifies your vehicle to pair the vehicle with the cable.



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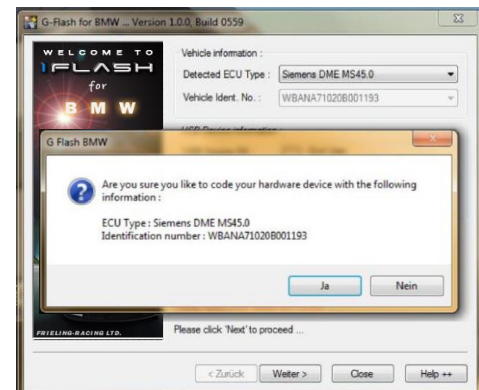
Check vehicle data

- The I-FLASH has read out your vehicle data. Please check them.
- Please click on "Weiter".



Encrypt I-FLASH

- In this window you will be asked the last time, if you want to pair this I-FLASH cable to this vehicle. You cannot use it for any other vehicle after that.
- To read out the map of this vehicle, please confirm with "Ja".



Main menu

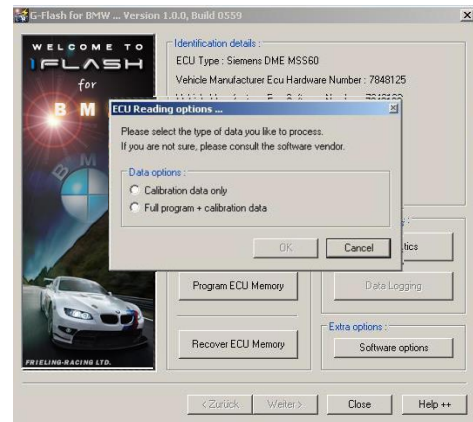
- Now you are in the main menu.
- Under Read ECU-Memory you can read out the software of your vehicle.
- Under Program ECU-Memory you can write the modified map on your ECU.
- Under Diagnostics you can read the error memory of this vehicle and delete the adaptation data.
- Under Recover ECU Memory you can restore your original BMW map.



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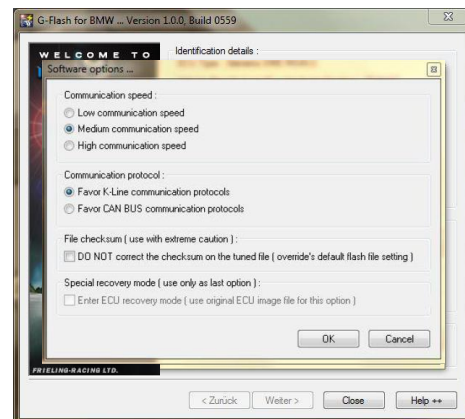
Read out map

- Click on “Read ECU Memory”.
- Click on “Calibration data only”.
- Confirm your selection with „OK“.



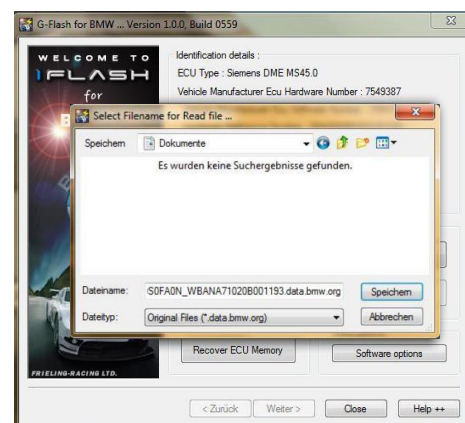
Software options

- In this window are the software options shown.
- Confirm them with „OK“.



Select storage location

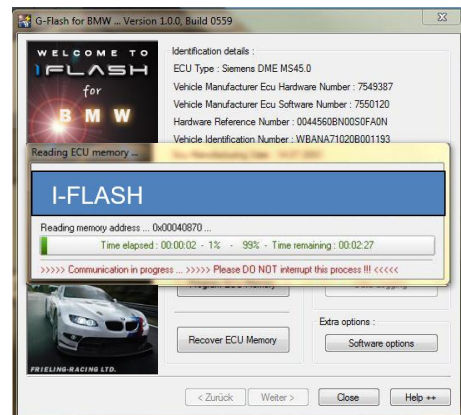
- Select a location for your map.
- Click on “Speichern”.



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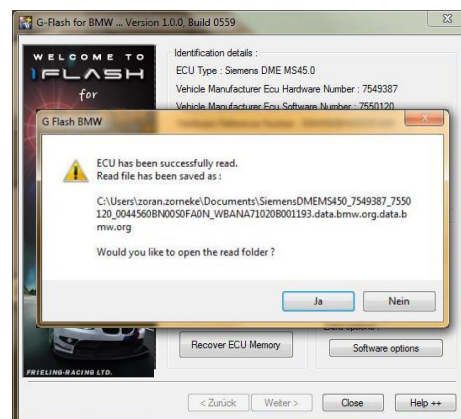
Do not disturb

- Now the map of your vehicle read out. Make sure that the transaction will not be interrupted.
- In this window the read out status is displayed, no matter how long it takes, do not interrupt it.



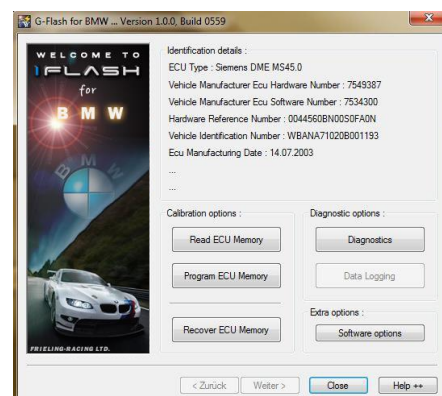
Open storage location

- In this window you will be asked if you want to open the storage location.
- Confirm with "Ja".
- Now send us this file to support@gp-infinitas.com.



Load modified map

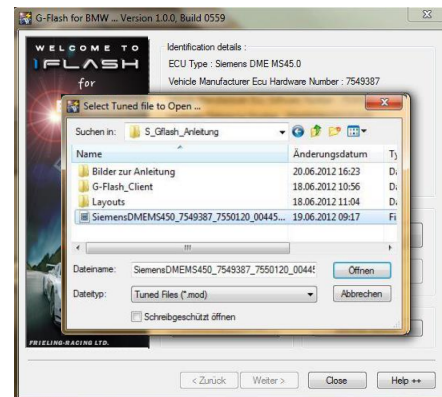
- Reconnect the I-FLASH to your laptop and your vehicle.
- Open the main menu.
- Now select "Program ECU Memory".



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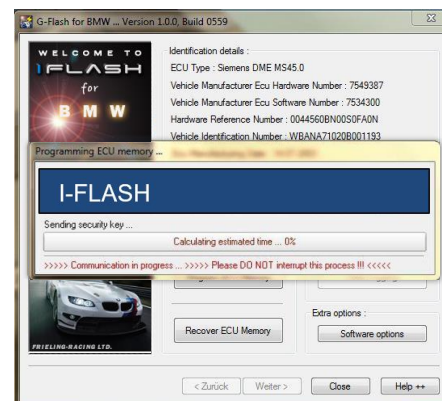
Select map

- Now select the modified map that you received from us.
- Confirm the programming with "Öffnen".



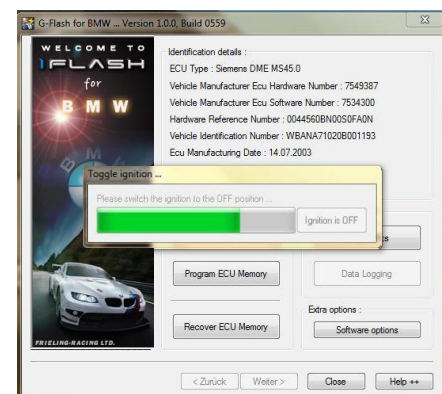
Do not disturb

- I-FLASH write now, make sure, that the transfer will not be interrupt.
- This window displays the upload status, no matter how long it takes, do not interrupt it.



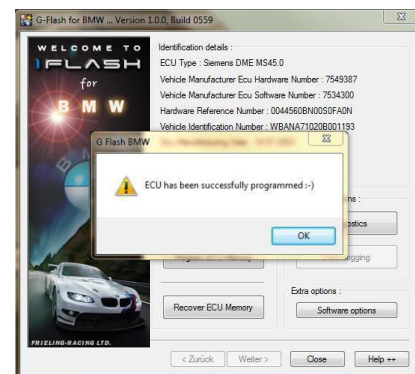
Security

- Here you are asked to switch off the ignition.
- Switch off the ignition and confirm with "Ignition is Off".
- Do not remove the I-FLASH cable.



Last steps

- Only if this message appears the programming was successful.
- Confirm the message and the switch ignition on again.
- Then select Diagnostics in the main menu.

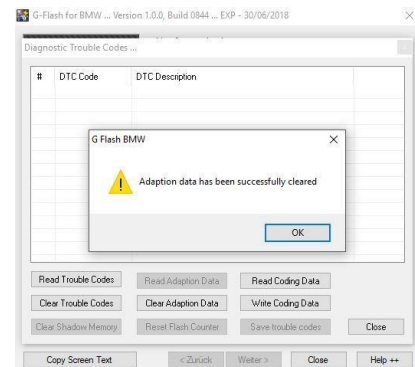


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Delete adaptation values

- Select „Clear Adaption Data“.
- Then confirm with „OK“.

You have customized the software now.



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5. Installation preparation

1. We recommend to clean your engine bay.
2. We recommend a car lift.
3. Remove the cover of the fuel rail (Ill.1 pos.8).

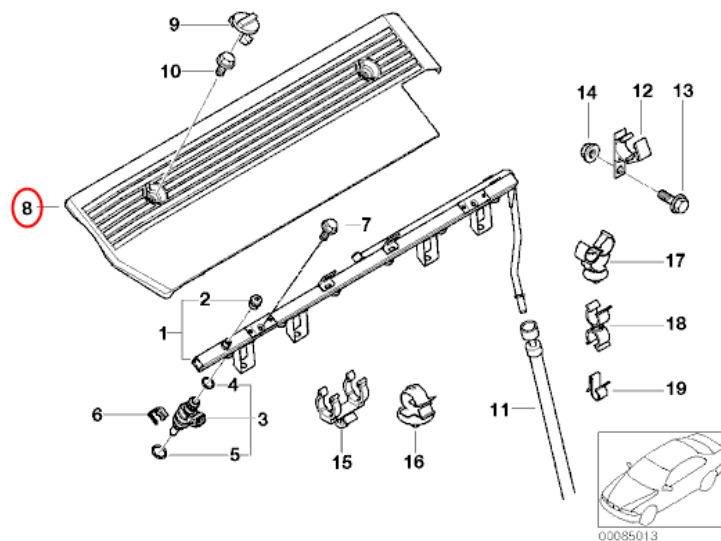


Illustration 1

4. Disassemble intake (item 12) and air filter box (Pos1). These components are no longer needed. Leave vacuum hose for fuel pressure regulator unconnected (E46/E39/Z3)

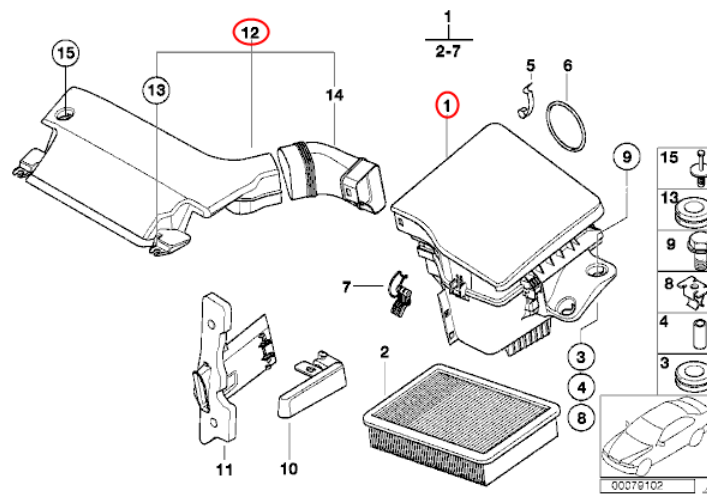


Illustration 2

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5. Disassemble air mass sensor (Ill. 3; item 1).
6. Only E85 (Z4) 3.0-liter:
- 4.3 Dismantle the built-in sound generator.
- 4.4 Close the opening to the interior with the supplied cap.
7. Disassembly Rubber hoses and hose clamps (Ill. 3, item 3 and 6). These Components are no longer needed. Pull off the hose plugged in item 3. This is needed later in Ill.8.

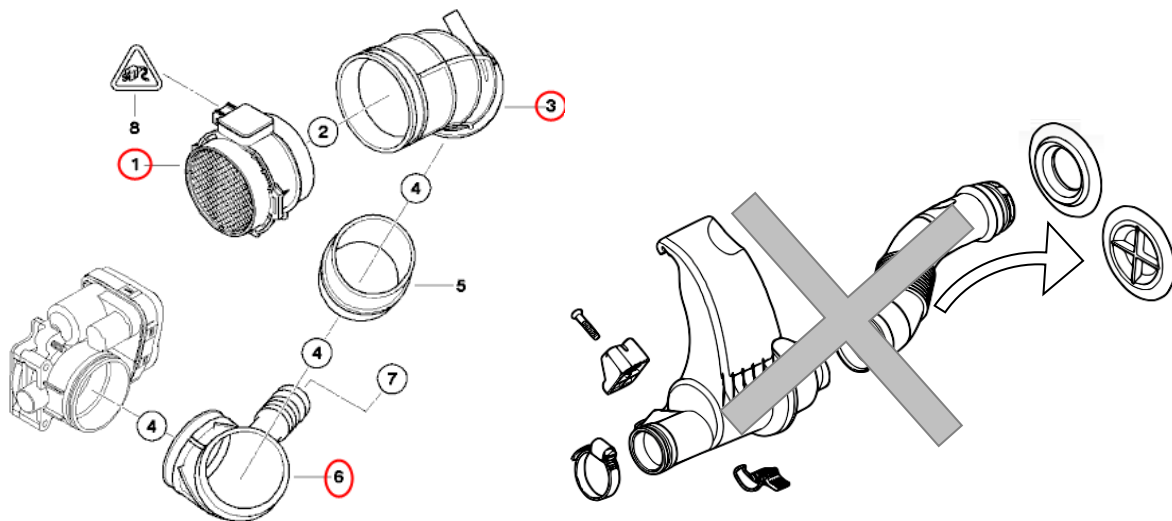


Illustration 3

8. Unplug and dismantle DISA (Ill. 8, Item 7) and idle speed control (Ill. 8, item 8).



Make sure that the bolt of the DISA (Ill.8, Item7) does not fall into the intake manifold

9. Unplug and remove throttle valve (Ill. 3, Item 4).
10. Disassembly the air conditioning compressor belt.
11. Disassembly the belt for the auxiliary units. This belt is no longer needed.
12. Dismantling underdrive protection (Ill. 5, item 1).
13. Dismantling the power steering pump pulley (Ill.6, Item 4) (not on Z4)
14. Disconnect electric fan and remove it (Ill. 4, item 1.2, and 3).

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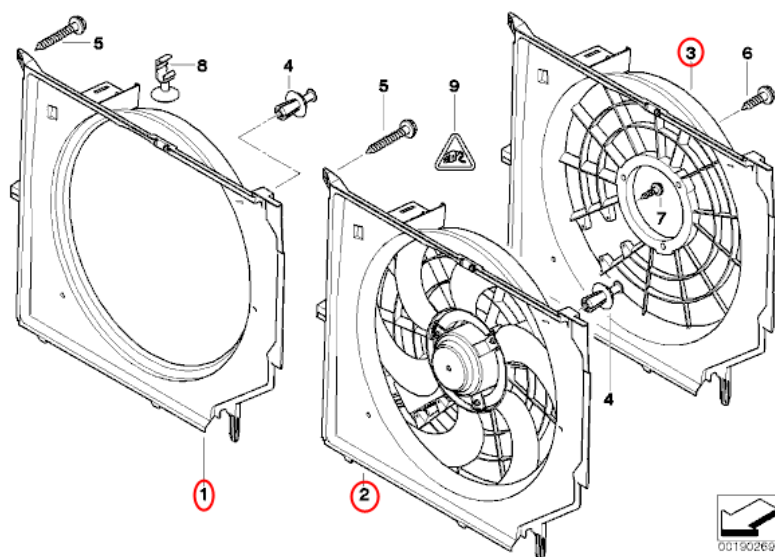


Illustration 4

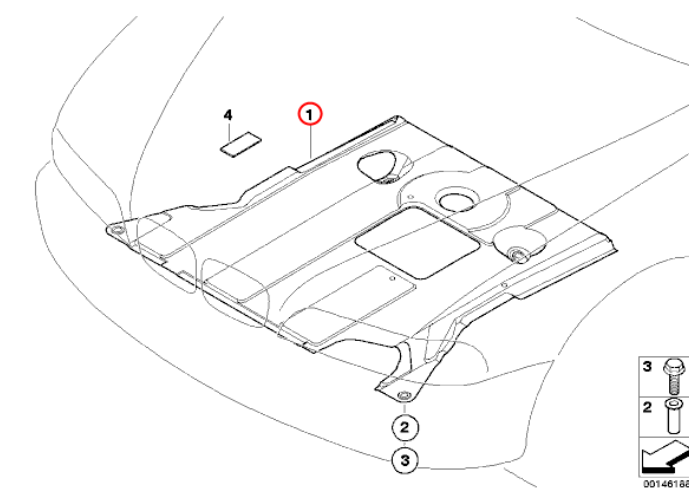


Illustration 5

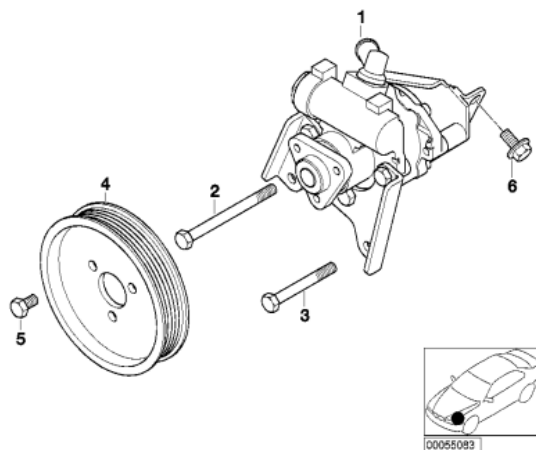


Illustration 6

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15. Important:

Dismantle both brackets of the power steering pump, the front and the rear one (not on the Z4). BMW installed 3 different holders. The conversion is the same for all 3 variants and the supplied holder fits **ALL** available servo pumps.

16. Remove the idler pulley (item 15,16 and 17).

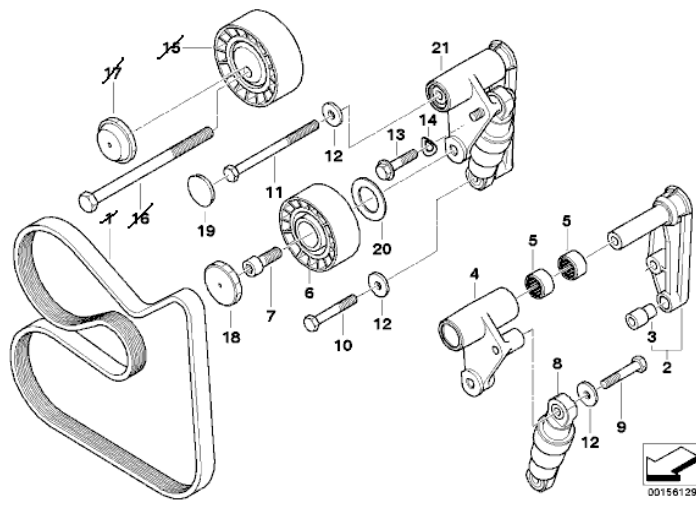


Illustration 7

17. Removing the plug from the alternator, oil temperature sensor and oil pressure sensor
18. Dismantling casing brake booster
19. Remove the hose (Ill. 9, Item 7) from the intake manifold and close the air intake manifold with the added closing plugs (see P341-53-05 and Ill. 10).
20. Remove the plastic hose crankcase ventilation (Ill. 9, Item 3), for this cut the hose (item 3) between the intake manifold (Ill. 8, item 1) and separator (Ill. 9, item 1) at the high of the marker.
21. Remove the connector on the oil separator by rotating counter-clockwise and pull off (photo when removed). The other side of the shortened hose (item 3) is not necessary anymore.

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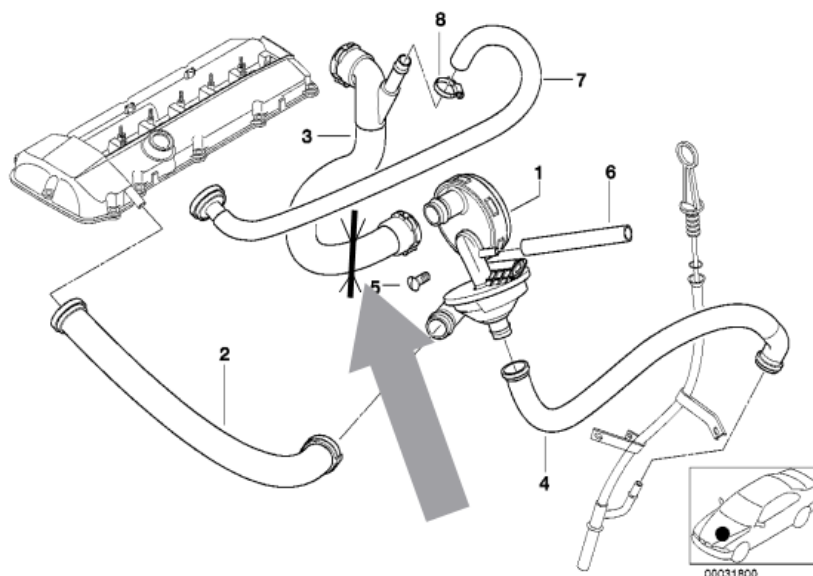


Illustration 8

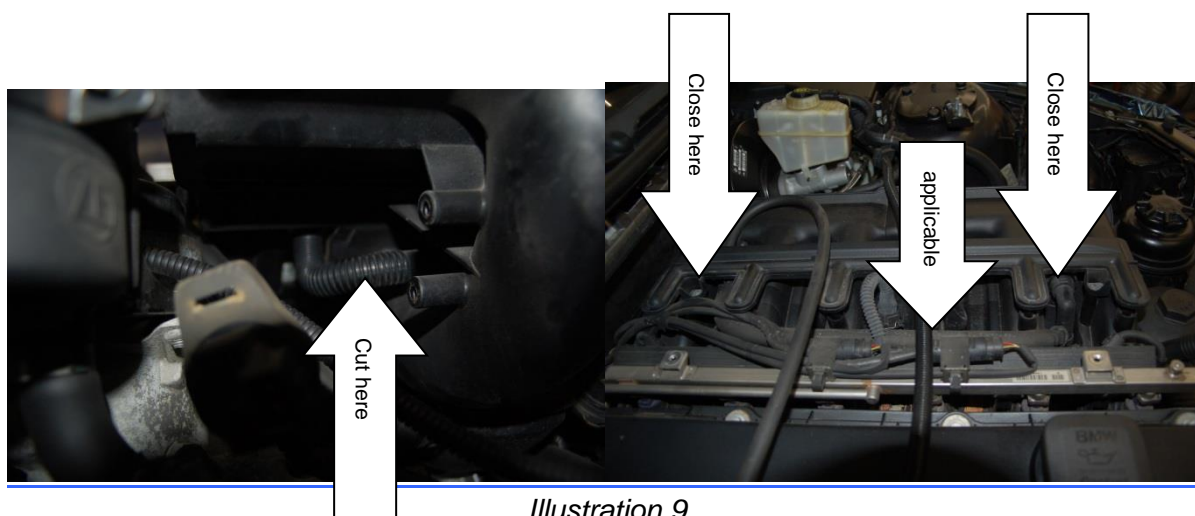


Illustration 9

22. Mount the crankcase ventilation hose P341-53-20 on the pipe from step 21 and fix it with one hose clamp. To simplify the assembly of the components (nozzles, hose and hose clamp) should be aligned as shown in Figure 11.

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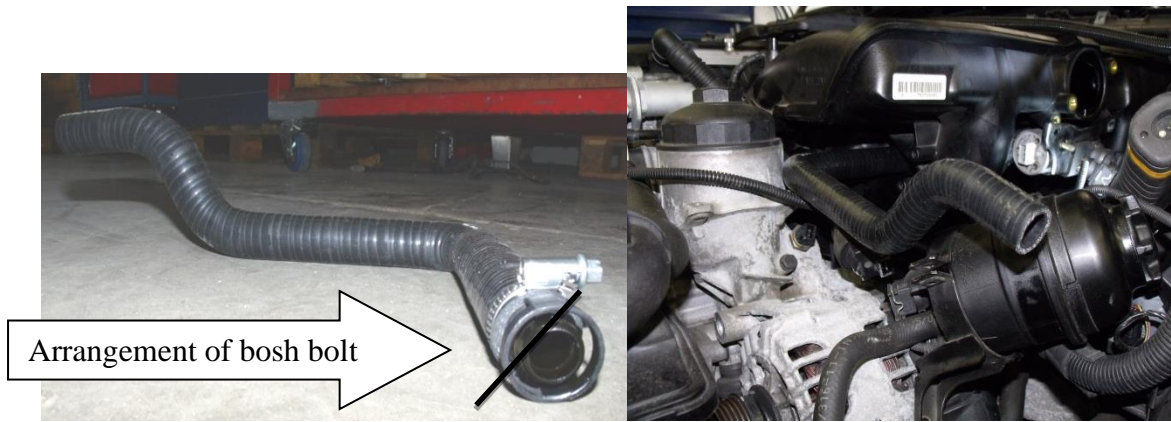


Illustration 10

23. Separate servo oil cooler hose from container in the middle of the hose (Ill. 12).
Catch the liquid with a clean container and keep it to refill later.



Illustration 11

24. Remove the clamp and the cut of hose piece from the reservoir.
25. Use Hose P341-53-57 as a new hose between the radiator and expansion tank.
26. Remove the holder of the fuel tank ventilation valve.

Please look for in the following steps especially for cleanliness. All contaminants are washed into the compressor or in the engine and cause damage.



27. Dismount oil pressure sensor (Fig. 14, item 1) on the oil filter housing.
28. Remove the hollow screw (Fig. 14, item 2).

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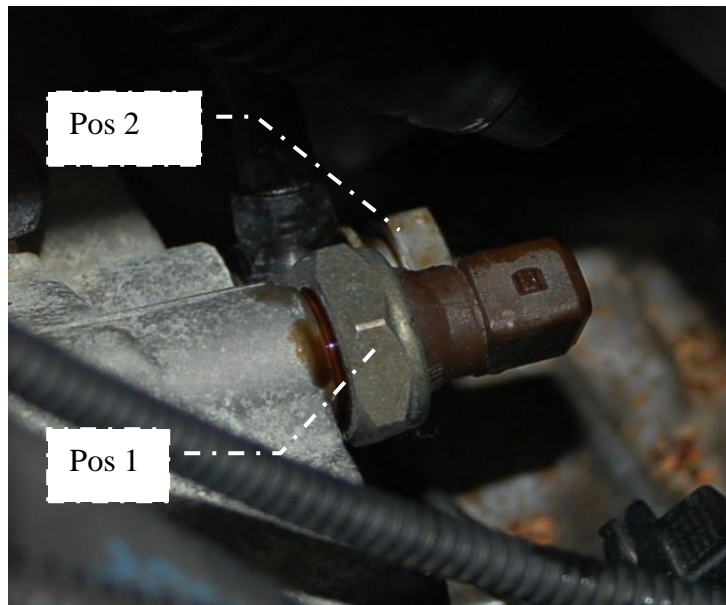


Illustration 12: BEFORE the conversion

29. Mount Hollow Screw Adapter (P341-53-40), oil pressure sensor and the supply of the Vanos unit with the provided sealing in the rear mount of the oil filter housing (see Illustration 15 left). Thereby observe the tightening torque of 20Nm.

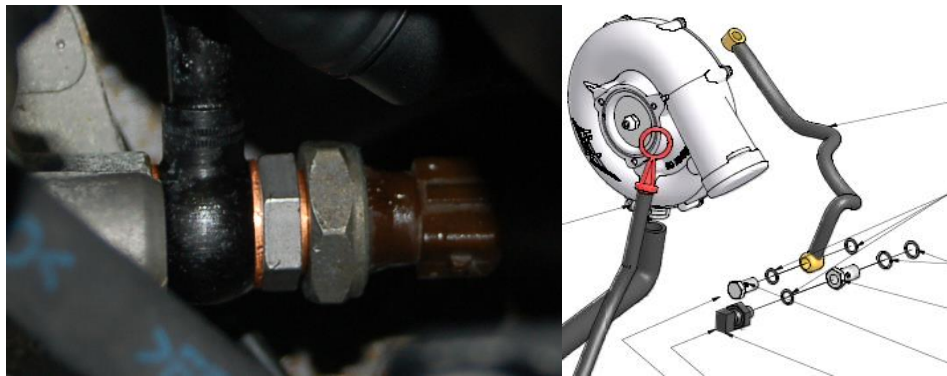


Illustration 13: AFTER the conversion with diversion for compressor

30. Reconnect the electrical connector of the oil pressure switch with extension (P341-71-12 / P341-70-05)
31. Mount the oil supply hose to the compressor (P4030 3716) with the M12 hollow screw and the sealing rings on the front port of the oil filter housing (where the oil pressure sensor was before). Thereby observe the tightening torque of 20Nm. The hollow screw has to show up after tightening.
32. Remove the threaded bolt from the strut of the vehicle (only E46). Tape the strut to protect the area around the pin while cutting. Then seal the bare spot with paint pen in car color.

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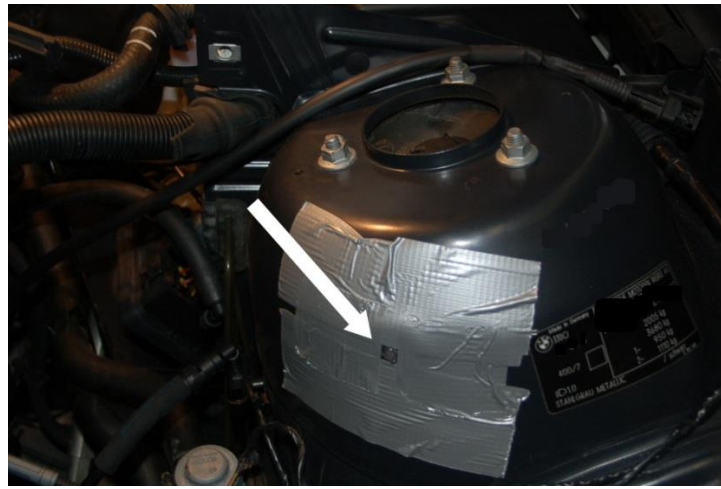


Illustration 14

33. First, pull out the dipstick and then dismount the measuring tube. You can disconnected the hose from the dipstick (Fig. 9, Item 4) to facilitate the dismantling
34. Before cutting the oil dip tube check again if the oil dipstick was pulled out, because otherwise this will cut into the following steps! Conversion dipstick tube with extension to the compressor oil return. Remove all swarfs thoroughly after handling.
35. Replace the seal between oil pan and oil dip tube.



Illustration 15

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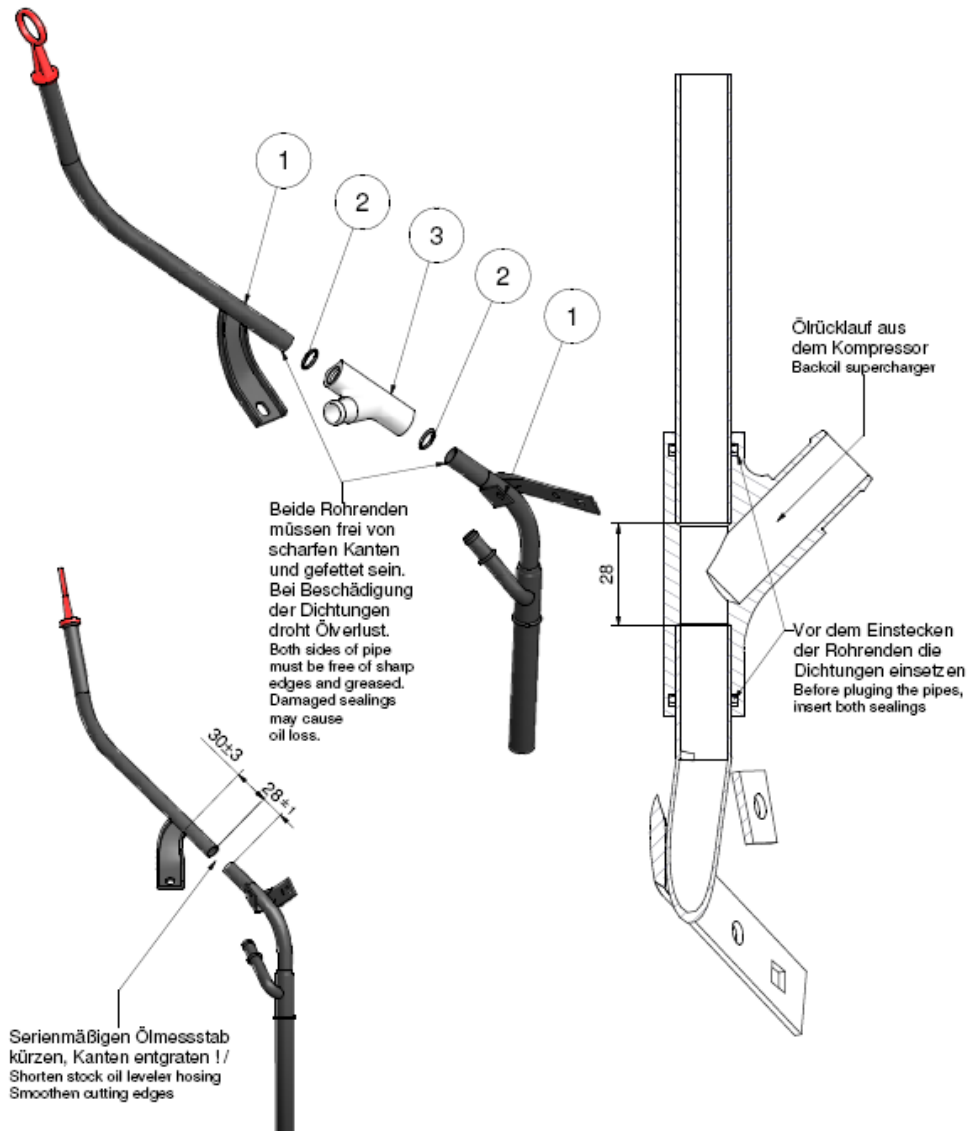


Illustration 16

36. Provided before mounting the tube on the motor the cut with grease and bevel (Ill.17). Finally, for the correct seating of the pipe, the seal must not be damaged (risk of leakage).



Caution: Do not confuse the wire colors and attention to neat joints: A faulty electrical connection leads to malfunction.



37. Extension of the cable for the air mass meter (MAF):

- a. E85, E60:
 - Cut the cable in the middle
 - Put on shrink hoses

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- Soldering the cable
 - Heat the shrink hoses
- b. E46, Z3: Use the extension cable P341-72-01

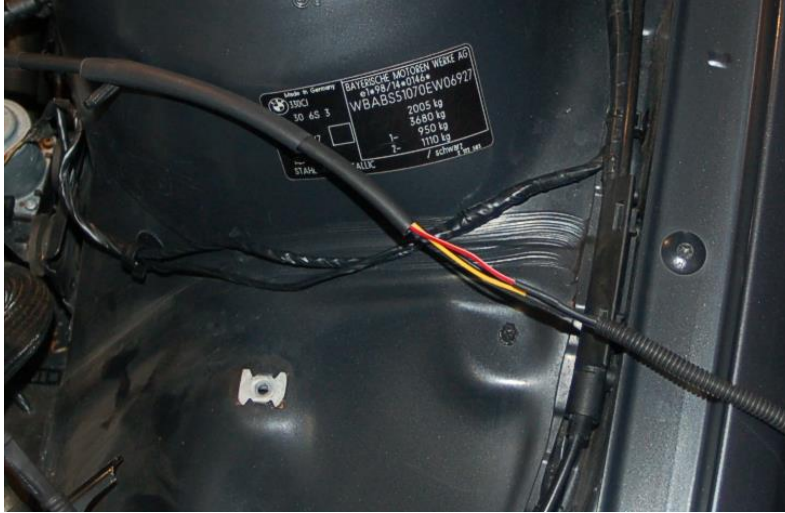


Illustration 17

38. Extend the throttle cable according to drawing P4030 3090 (see LMM cable extension point a). Required on all vehicles
39. Connecting the alternator cable.
40. Plug in the oil pressure sensor with attached extension.

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6. Installation airflow after compressor

1. Remove the strain relief at the oil temperature sensor. This component is not necessary any more.

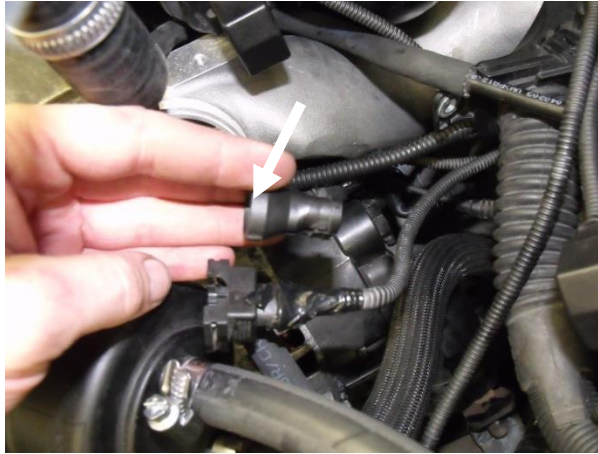


Illustration 18

2. To install the pressure pipe, remove the servo reservoir (only E46).
3. Insert the gasket into the pressure pipe.
4. Install the sticker with the part number on pressure pipe and install the pressure pipe after that. Check the tight fit of the pressure pipe.
5. Install servo reservoir.



Illustration 19

6. Assembly of the casing of the brake booster.
7. Installation of idle controller and DISA.
8. Mount the engine wiring harness.
9. Mount the dipstick.

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7. Mounting belt drive compressor and oil supply

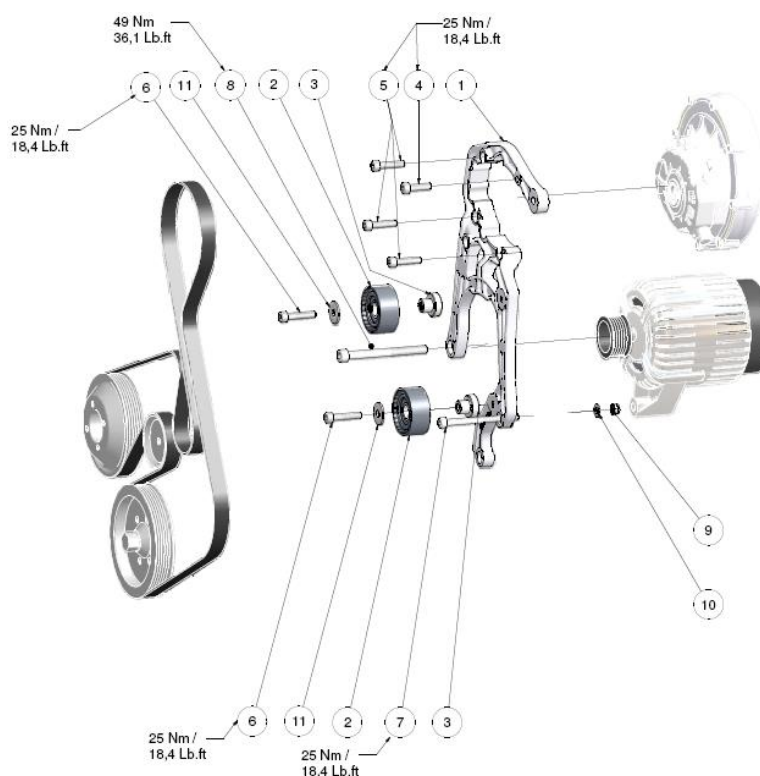


Illustration 20: Components belt drive

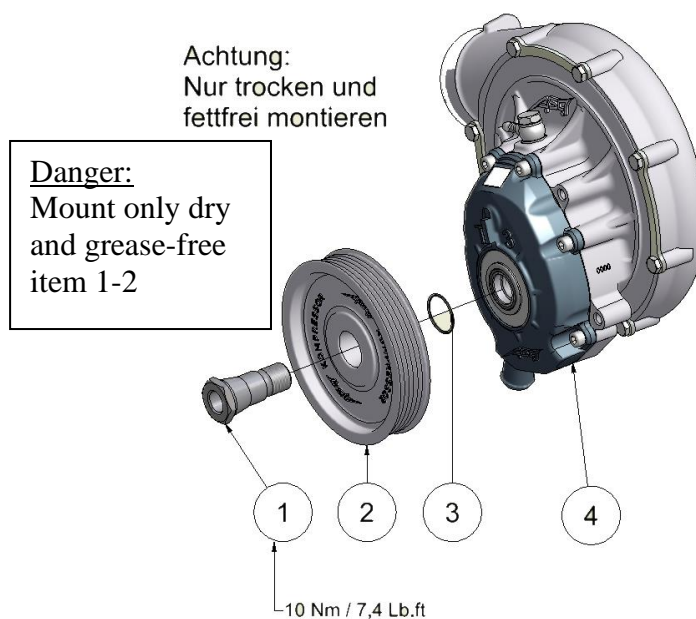


Illustration 21: Install the pulley on the compressor

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1. Mount the upper idle roll (item 2) on the base plate (item 1) as on the drawing with 24 Nm.
2. Mount the base plate in following order (first 2-3 threads engaged, then with tightening torque)
 - a) M10x120 (49Nm)
 - b) M8x75 (24 Nm) with servo pump holder P341-15-15
 - c) M8x110 (24 Nm)
3. Prepare compressor: mounting flange P341-24-15 with O-ring seal (greased) on the compressor. Note the angle of the flattening (Ill. 23). The flattening points shows in the opposite direction than the pressure tube and is located at the bottom of the compressor.

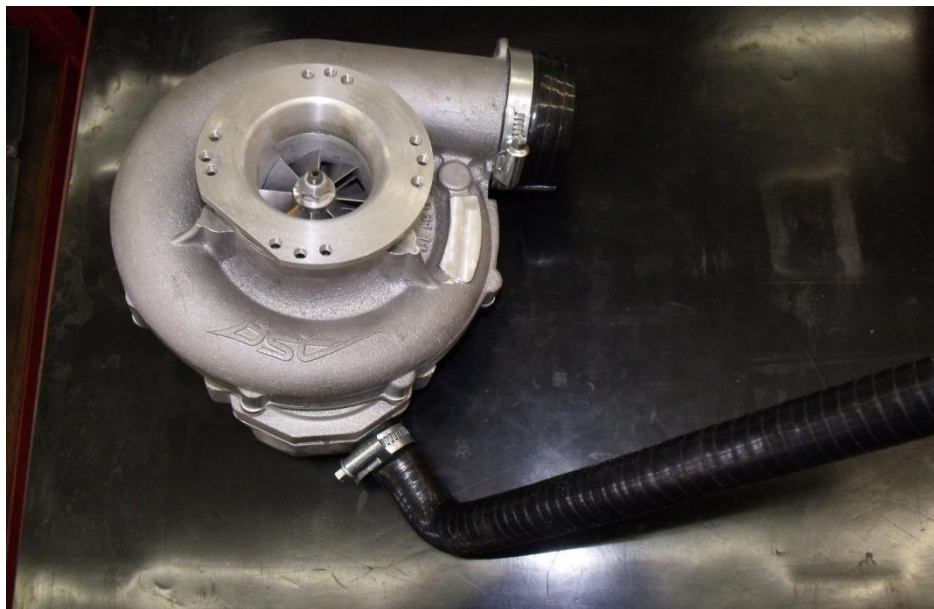


Illustration 22: Flange position on compressor including hose

4. Mount oil return hose on the compressor with clamp. *Ensure secure fit of the hose.*
5. Set up silicone hose P341-44-20 to compressor and attract.
6. Mount compressor on base plate. Attract M8 screws with 24 Nm.
7. Mounting the belt pulley at the compressor:
 - a) Insert sealing ring (Ill. 23 item 3) with grease into the groove of the shaft of the built-in compressor
 - b) Insert the conical screw (Ill. 23 item 1) in the pulley (item 2). The conical surfaces of the shaft and pulley must be clean, grease and oil free.
 - c) Attract the conical screw into the thread by hand and press the O-ring against the belt pulley
 - d) Hold the pulley with the strap down and tighten the conical bolt to 10 Nm. The connection is self-tightenend on the first engine start and during operation.



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CAUTION: The pulley can not be removed without a special tool.
The compressor is damaged when using a percussion screwdriver.



8. Mount silicone hose P341-44-20 on the tube with hose clamps
9. Mount the remaining screws on the base plate and the second pulley and tight them with a defined torque (see table on page 3)
10. Only E46, E60 and Z3: Install the power steering pump pulley
11. Assembly of P341-44-16 at the oil filter housing (Ill. 24). Holder of the servo reservoir and supporting the base plate. If necessary, rotate the container so that the hoses are exposed on the reservoir. Make sure the hoses do not chafe or be crushed.

Attract first on the base plate and then on the oil filter case, only than the optimal position guaranteed.

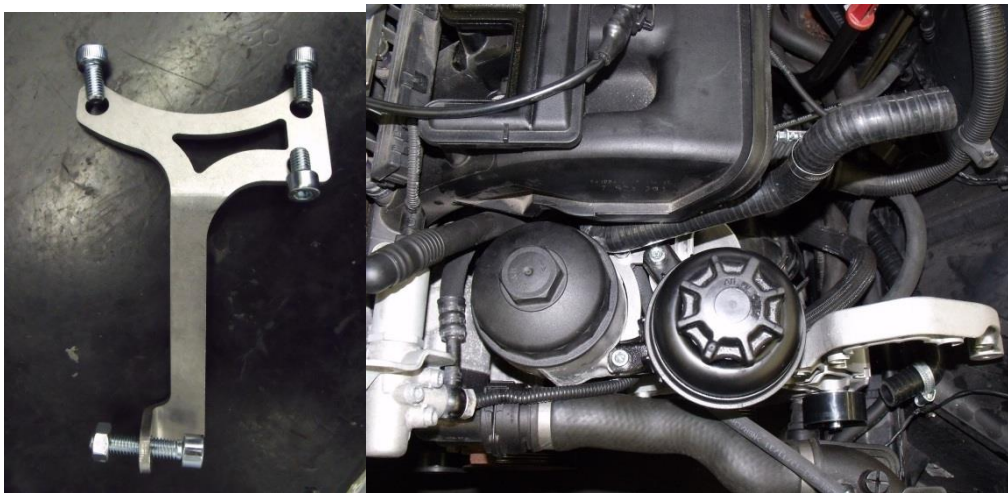


Illustration 23

12. Attach the oil return hose from the compressor to the nozzle of the dipstick tube and secure with hose clamp. If necessary, shorten this hose a bit and make sure that it does not rub against other components. The hose between the compressor and oil pipe must also be constantly falling, otherwise, the engine oil can't drain from the compressor!
13. Mounting the oil feed to the compressor. Paying attention to proper positioning of sealing rings and cleanliness. Tightening torque of banjo bolt: 14 Nm (Fig. 26).



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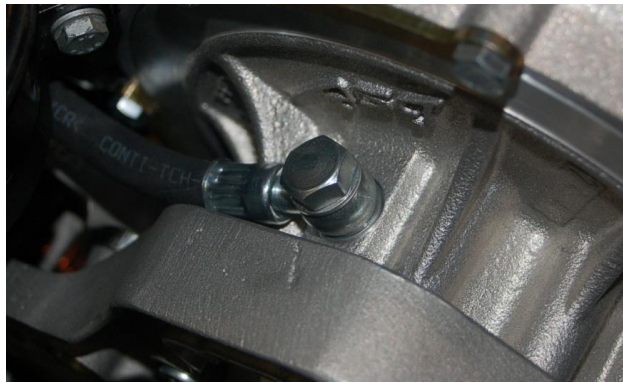


Illustration 24

14. Hook the belt. Paying attention to the proper belt guide (Fig. 27). Note to the belt tensioner: The tensioning of the belt hook must be at about $1/3$ of the total displacement (Fig. 27 right).

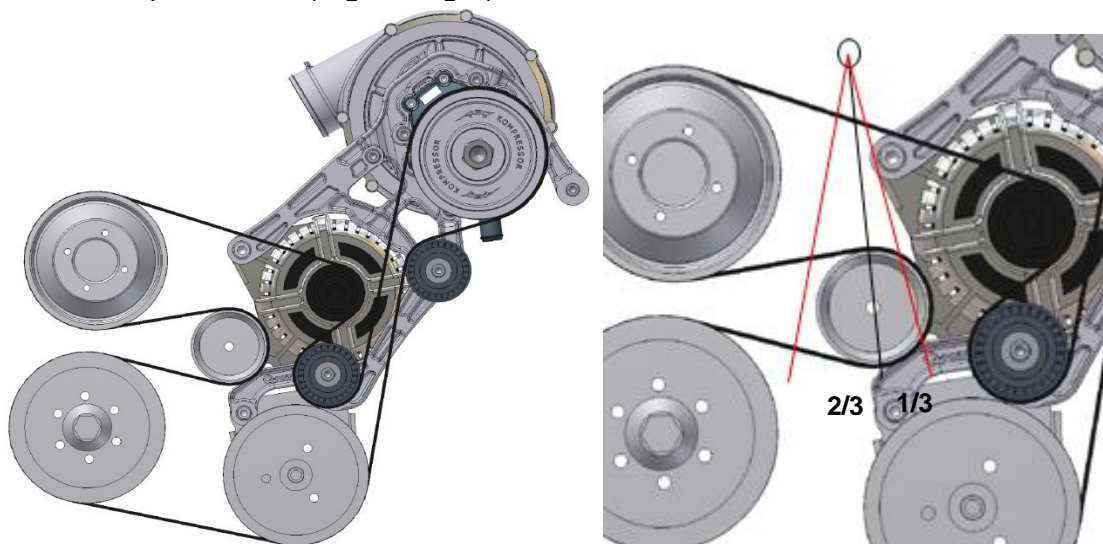


Illustration 25: belt guide E46, Z3 and E60 (deviant at the Z4 steering pump)



Illustration 27a: Z4: check the distance between the belt and the hose

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8. Air installations guide before compressor

When rebuilding a vehicle Z3 please follow the different instructions (P341-95-17)

1. Prepare the ejector pump (Fig. 28 arrow). Remove the hose (item 3 with item 6). These components can be dispensed.

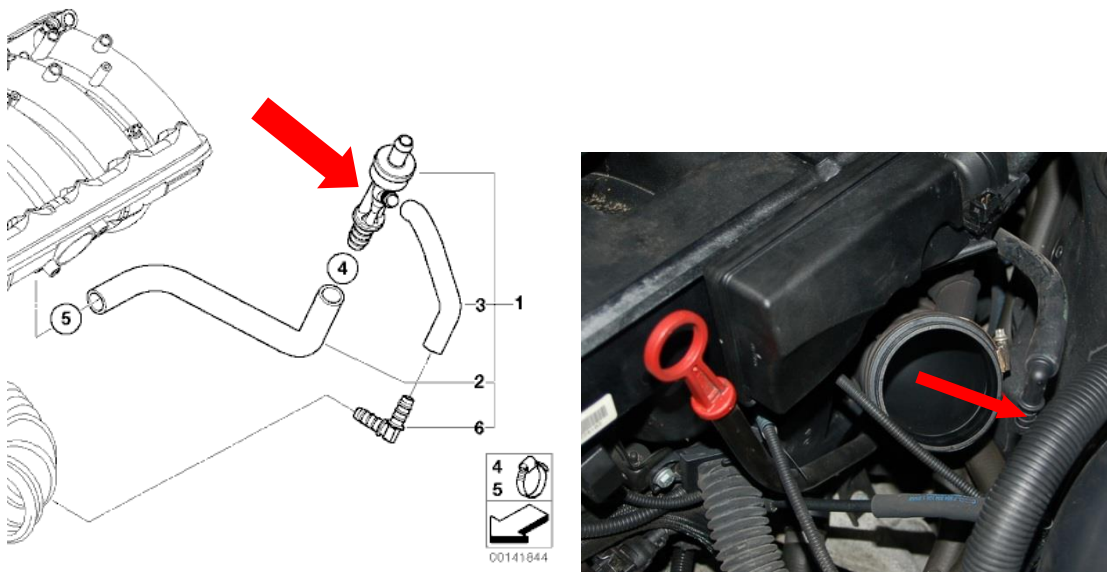


Illustration 26

2. Connect the tube of the idle adjuster (Fig. 29). The clamp (item 18) is mounted on the load plate. The clamp (item 16) is mounted on the free movement of the ejector nozzle (from step 1)

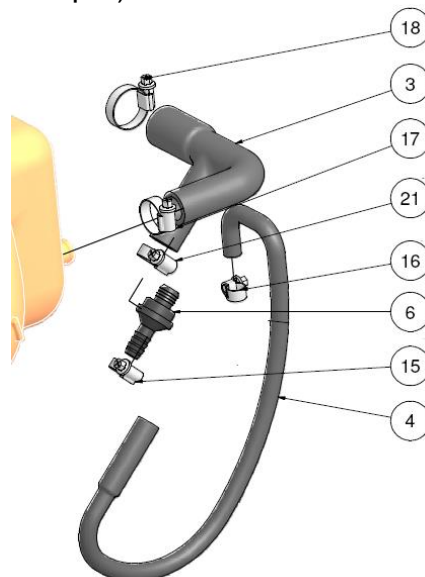


Illustration 27

Assembly instruction M54 SK+

3. Throttle valve on the compressor screw flange. Paying attention to proper seating of the O-ring. Grease the O-ring.

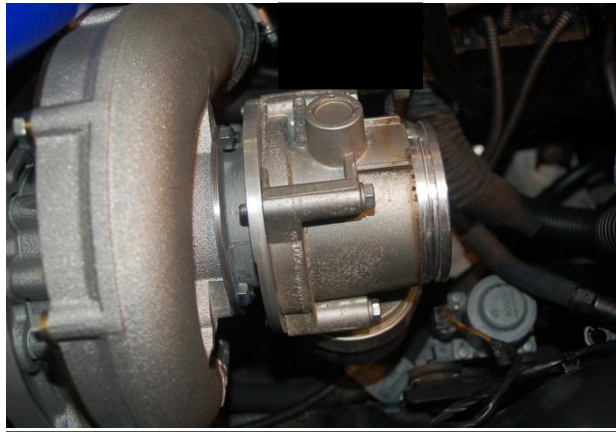


Illustration 28

4. Attach the intake throttle. While the lubricated O-ring damage and not pay attention to proper fit. Then plate holder P341-24-18 at intake (6 Nm) Screw
5. Screw the plate-holder P341 24-18 to the compressor housing
6. Mount the silicone hose kit of the idle actuator on the intake tube (Fig. 29)
7. Connect the crankcase breather tube (P341-53-20 from Fig.11) to the intake pipe
8. Mount the air filter and air mass sensor at the inlet of the suction tube and attach with hose clamps. At the displacement variants (B25 and B22), the air mass sensor at the inlet and outlet provided with a hose to the outside diameter adapted.
9. Plug the air mass sensor
10. Mount all panels and the fan again
11. Fill the power steering reservoir.



Assembly instruction M54 SK+

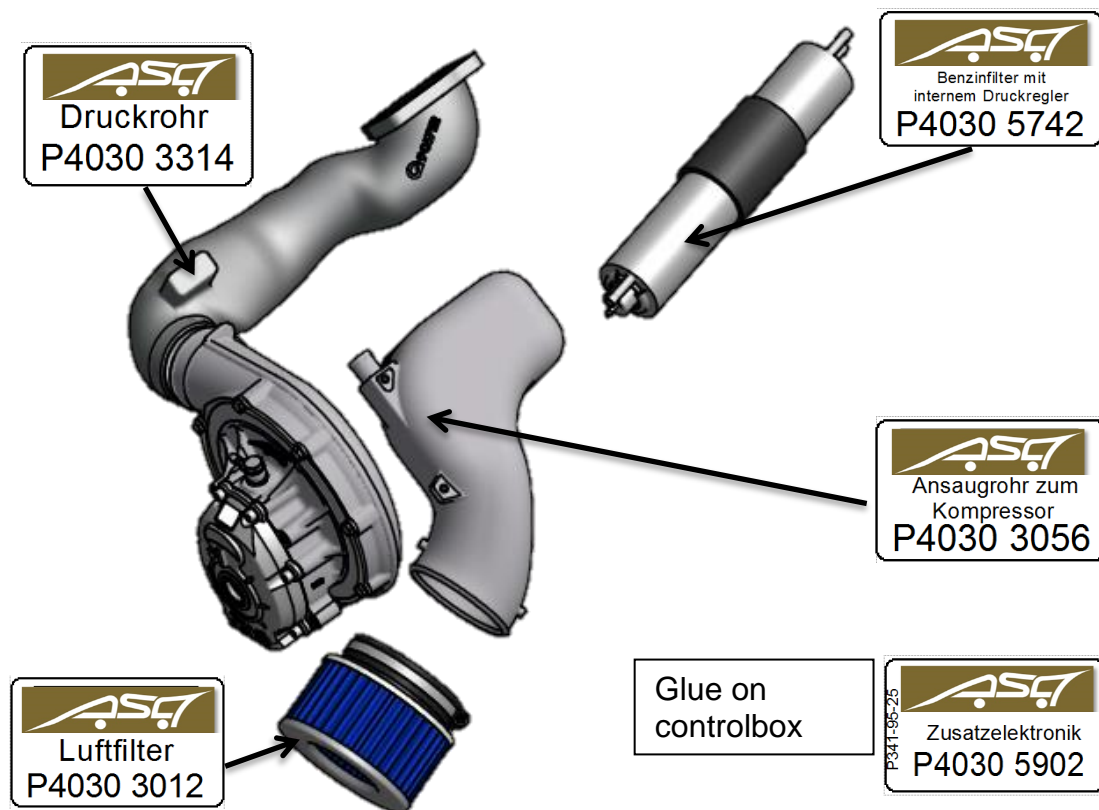
9. Fuel injectors

1. Install fuel injectors by manufacturers guideline

Assembly instruction M54 SK+

10. Marking of parts according to the report

According to the TÜV certificate, in the download, the enclosed stickers, in the installed state, must be visible on the parts shown





Assembly instruction M54 SK+

11. Hits after the conversion

After the conversion of vehicles, the engine can be started. Delay in starting the engine is caused by the work on the fuel system and disappears by itself.

In uneven running engine, leaks or other abnormalities, turn off the engine and remove the cause.

To control for the conversion, the out checklist

Components:

- | | | |
|--|-----------------------------|-------------------------------|
| 1. Belt drive control, belt seated properly | <input type="checkbox"/> ja | <input type="checkbox"/> nein |
| 2. Abrasive belt / belt drive detected | <input type="checkbox"/> ja | <input type="checkbox"/> nein |
| 3. Has the belt tensioner enough tensioning | <input type="checkbox"/> ja | <input type="checkbox"/> nein |
| 4. Air filters free of belt drive | <input type="checkbox"/> ja | <input type="checkbox"/> nein |
| 5. Engine control unit flashed with ASA software | <input type="checkbox"/> ja | <input type="checkbox"/> nein |

Supplies:

- | | | |
|--|-----------------------------|-------------------------------|
| 6. Engine oil level check | <input type="checkbox"/> ja | <input type="checkbox"/> nein |
| 7. Servo oil level checked | <input type="checkbox"/> ja | <input type="checkbox"/> nein |
| 8. Leaks under vehicle | <input type="checkbox"/> ja | <input type="checkbox"/> nein |
| 9. Leakage of oil supply to the compressor | <input type="checkbox"/> ja | <input type="checkbox"/> nein |
| 10. Leak in the fuel supply | <input type="checkbox"/> ja | <input type="checkbox"/> nein |

Optical:

- | | | |
|--|-----------------------------|-------------------------------|
| 11. Headlights adjusted or controlled | <input type="checkbox"/> ja | <input type="checkbox"/> nein |
| 12. Memory errors and adaptations tested and cleared | <input type="checkbox"/> ja | <input type="checkbox"/> nein |
| Sticker affixed (1x cap) | <input type="checkbox"/> ja | <input type="checkbox"/> nein |
| 13. Maintenance instruction inserted | <input type="checkbox"/> ja | <input type="checkbox"/> nein |

Note for a trouble-free operation, the maintenance instructions for SK+ Systems. For questions or problems, please email at support@infinitas-automotive.com or phone 0049 8252-90 986 0.