

Instructions to transfer the hydro pump on a BMW Z4 (E85) to the trunk (AKA boot) and replace the hydraulic hinges and hydraulic hoses if necessary.

Graciously provided by Chuck B in Illinois.



BMW Z4 - By: Eigenes Bild (CC-BY-SA)

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It is well known that the hydraulic pump in the E85 model BMW Z4 is prone to dying due to severe corrosion. This occurs because the pump is housed in an unsealed housing (AKA main support funnel) located in the drainage well behind the driver's seat. Figure 1 is a picture of the main support funnel.

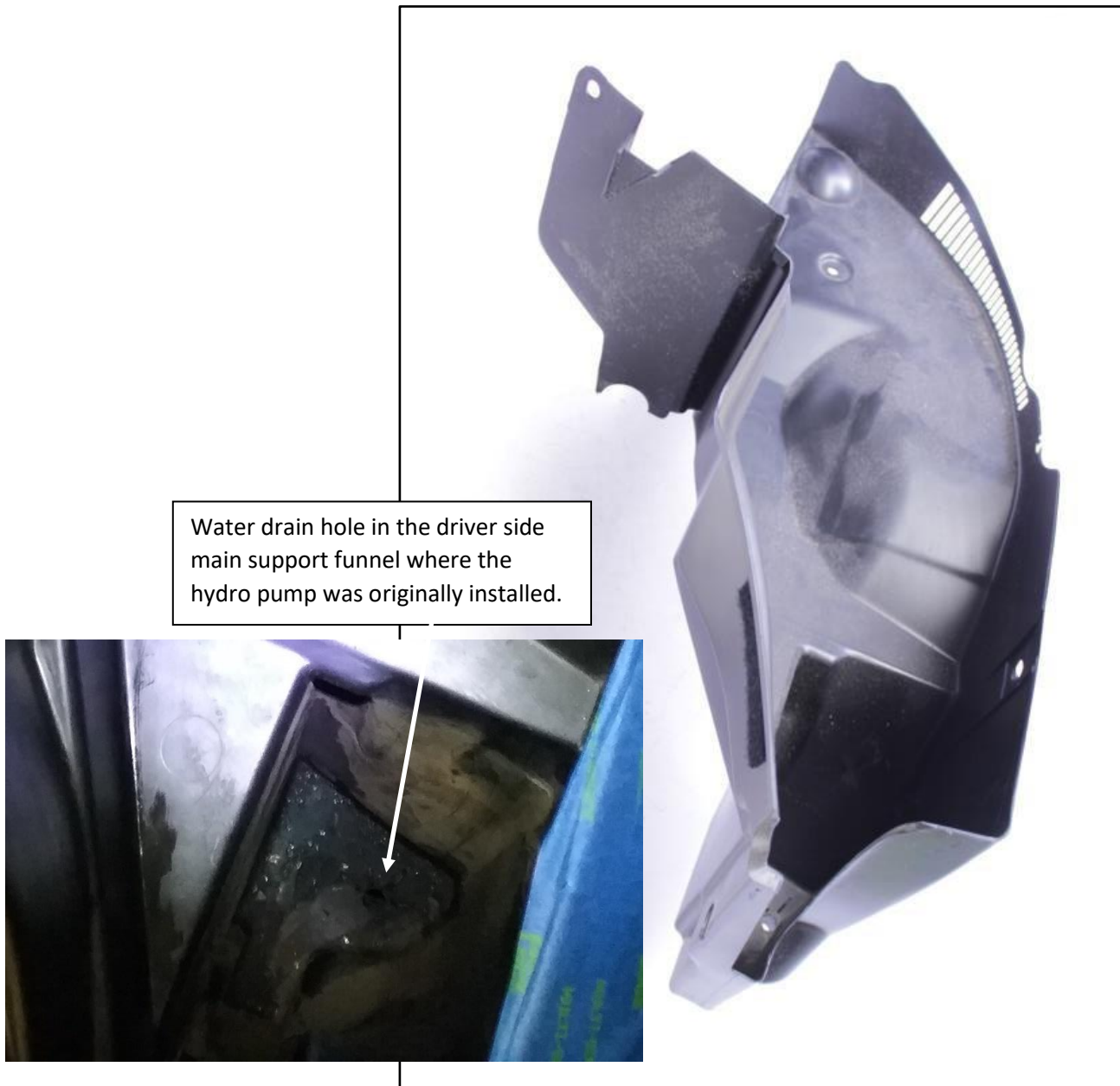


FIGURE 1

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The hole at the bottom of the funnel is usually obstructed with debris that causes rainwater to fill the funnel and leak into the hydro pump housing, which slowly corrodes the pump. Given the eventuality that corrosion will destroy the pump, and the (steadily increasing) replacement price for a new hydro pump, it is commonsensical to transfer the pump from the drainage well to the trunk.

First off, you must accomplish the folding top removal procedure.

If you cannot manually open the folding top then proceed to **Section B**.

If you can accomplish the folding top removal procedure, check the hydraulic hinges for hydraulic fluid leaks after removing the top from the car.

Any indication of hydraulic fluid signifies failed hinge seals. See [Figure 2](#). In the event a hinge has a fluid leak, proceed to **Section B** before continuing with **Section A**.



FIGURE 2

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Items Needed:

- A pair of hydraulic hoses from Top Hydraulics, Inc. for the driver side hydraulic hinge. Request that they make both hoses 4 inches longer to accommodate the transfer of the hydro pump to the trunk. Top Hydraulics, Inc. includes new M12x8x1 copper crush washers with the order, which saves time and cost.
- Bottle of BMW or Febi 02615 hydraulic fluid to refill the hydro pump unit's reservoir during the priming of the hinges and hoses.
- A new Plastic Squeeze Squirt Condiment Bottle with a narrow tip (and cap to prevent spills) to easily dispense the hydraulic fluid in to the reservoir's port on the top of the hydro pump.
- Two 4 inch stainless steel worm-gear clamps (UPC 078575175652).
- Package of 20 or more 4 inch nylon cable zip ties.
- 5"x 3" metal nail plate from the lumber section of your local hardware store.
- Fine-tip permanent marker
- Impact Screwdriver.
- Razor utility knife.
- 9.1oz container of Clorox disinfectant wipes (will serve as new housing for hydro pump unit).

Section A: Instructions to re-locate the hydro pump unit on a BMW Z4 (E85) to the trunk.

Remove the corroded hydro pump unit from its OEM plastic housing. Before disconnecting any hydraulic hoses, track them from the pump to their corresponding hydraulic hinge. Make a note of which hoses connect to each side of the hydro pump because that is how you must attach them to the new pump.

Take a picture of how the hydraulic hoses are attached to the driver side hinge. Use this picture as a reference of how to connect the new hoses.

Also take note of how the metal retaining clip (see Figure 3) which connects the upper hydraulic hose to the hinge. It is important to install the clip the correct way or the hose tip will easily disconnect from the hinge.



FIGURE 3

The lower hydraulic hose is secured by a tiny bolt with a torx head. The torx inset in this bolts strips easily during removal. Replace it with a new hex head bolt from Ace Hardware (see Figure 3)

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Connect the new hydraulic hoses to the hinges in the same manner they were removed and zip tie them.

Now is a good time to inspect and repair tears in folding top's fabric near the metal rim that secures the folding top to the vehicle. Small tears can be repaired with Loctite Plumber Marine Clear Adhesive. Place tape over the tear on the outside of the folding top fabric to keep the adhesive from leaking through, then coat adhesive on the "inside" fabric to seal the tear where it won't be seen. Allow the adhesive to cure as directed then remove the tape.

The new hydro pump must be re-located in the recessed area on the left side of the trunk just behind the driver's seat because the Bowden cable length will not allow it to be located any further away.

Create a brace in the recess of the driver's side of the trunk to secure the hydro pump unit to the vehicle. Use a 5 inch x 3 inch metal nail plate from the lumber section of a hardware store to fit behind the carpet in the recess. Drill a pair of holes about 4 inches apart toward each end of the plate. Secure nylon zip ties through each pair of holes. The zip ties serve as mounts (see [Figure 4](#)) for two 4 inch worm-gear clamps that will wrap around the plastic housing and hold it in the recessed area of the trunk.



View of clamps connected to the zip ties with the plate installed behind the carpet inside the trunk



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FIGURE 4

Pull the carpet away from the sidewall of the trunk in the recess behind the driver's seat and slide the metal plate between the car body and the carpet. Expose the zip ties by using a razor blade to make slits in the carpet. Fully open each worm-gear clamp and pass the end of each clamp through the zip tie then return the remainder of the fabric to its original position.

The folding top's hydraulic hinges rest in a black plastic body piece (BMW part # 54317053455) above the driver side wheel well called a "main support funnel."

Re-locating the hydro pump unit to the trunk requires cutting of an oblong hole toward rear of the plastic funnel so the Bowden cable end, along with the 4 hydraulic hoses and the electrical wires can pass through the funnel to the trunk. See [Figure 5](#) for the location to cut the hole above the trunk recessed area.



25mm x 75mm hole in the funnel above the recess of the driver's side of the trunk.



View of hole from inside the trunk

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FIGURE 5

Use a marker to draw an oval 1 US quarter wide by 3 US quarters long (25 mm x 75 mm) on the plastic funnel. Carefully drill many small holes along the inside of the perimeter of the mark before using a razor blade to cut between the drill holes. A sanding bit on a Dremel tool will easily smooth the rough edges from cutting the plastic funnel.

The OEM electrical wires need to be lengthened about 4-5 inches to reach the hydro pump terminals when it is located in the trunk. The new hydro pump should arrive with new 4 inch long electrical leads. Use these leads to extend the length of the OEM electrical hoses to the bottom of the new pump housing by crimping or soldering them to the OEM electrical leads.

Before putting the folding top back on the car, clean out all visible debris from the water drain at the bottom of the funnel on both sides of the car. Use high pressure air to clear debris out of the water drain at the bottom.

One method to create high pressure air is to place the end of a small funnel in the drain hole and blow air through the wide end of the funnel with a Shop-Vac hose connected to the exhaust port.

With the help of another person, lift the folding top into position over the trunk area. Before installing the folding top's hinges, first push the plastic end of the Bowden cable through the new hole, then push the 4 circular ends of the hydraulic hoses through the hole into the trunk area.

The extra 4 inches added to the driver side hydraulic hoses provides the needed length to maneuver the folding top into place with low risk of the hoses pulling out of the hole.

The extra length also affords the necessary flexibility to rotate the hydro pump unit for the purpose of refilling the pump reservoir, and to maneuver the pump into place in the left side well. Protect the carpet in the trunk from possible hydraulic fluid spills when refilling the reservoir by covering the carpet with plastic sheeting, like a garbage bag, with some newspaper on top.

Top Hydraulics, Inc. conveniently labels each hydraulic hose by its circular end to easily reference which hoses go to which side of the pump.

Find the 2 hydraulic hoses from the hydraulic hinge on the passenger side and loosely tighten a banjo bolt to the right side of the hydro pump using the three new copper crush washers. It doesn't matter which hose is closest to the banjo bolt head.

With the circular ends of the hydraulic hoses connected to the banjo bolt, the hoses should point toward the fluid reservoir's top. Be certain to hold the hydraulic hoses in parallel while tightening the banjo bolt. Then connect and tighten the remaining 2 hydraulic hoses to the other side of the hydro pump.

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The driver side recess in the trunk is too small to reuse the OEM pump housing. One way to customize a new "housing" for the pump and add noise dampening foam is as follows:

Peel away the label on one 9.1 ounce plastic bottle of Clorox disinfectant wipes and slice off the top to leave the bottom 6 inch inches that will serve as the new housing. See [Figure 6](#).



FIGURE 6

Rubber Self-Stick Pipe Insulation is a good noise dampening material around the hydro pump motor. Duct tape the insulation around the pump's circumference to secure it. Place a piece of insulation at the bottom of the housing to raise the hydro pump's electrical contacts off the bottom of the housing.

Connect the electrical leads to the insulated hydro pump then slide it into the new 6 inch long plastic housing.

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There is not enough space to mount the hydro pump vertically in the driver side well, but there is just enough space in the well to mount the hydro pump at a 45 degree angle with the fluid reservoir pointing to the rear of the car and the banjo bolts pointing skyward. This pump orientation in the recessed well allows the hydraulic hoses to bend naturally (without kinks) skyward through the hole in the funnel piece then naturally bend toward the driver's seat.

Before pressing the console button to test the hydro pump operation, take notice of how much hydraulic fluid is in the pump's reservoir. It should be about $\frac{3}{4}$ full. That fluid and MORE is needed to prime the hoses and hinges. The pump is out of fluid when the motor sound increases in pitch. Quickly release the console button and add additional hydraulic fluid to the pump reservoir, by slowly opening the screw on the top of the reservoir and using a new condiment squeeze bottle to easily add more fluid.

Refill the hydro pump reservoir as required while cycling the folding top open and closed several times. The reservoir should be $\frac{3}{4}$ full when the folding top is open.

Now attach the Bowden cable to the hydro pump and check its operation.

Mount the pump in the new "housing" into the two clamps installed in the left side well of the trunk. Turn the screw to close the lower clamp and slightly tighten it, then do the same to the upper clamp. Simultaneously tighten both clamps slowly until the pump is held securely in place.

Figure 7 displays the completed project.



FIGURE 7

<<<<<<<<<<<<<<<<<<<<<<<< END OF SECTION A >>>>>>>>>>>>>>>>>>>>>>>>>>

Section B: Replacing both hydraulic hinges and both pairs of hydraulic hoses on a BMW Z4 (E85).

Items Needed:

- Order both pairs of hydraulic hoses from Top Hydraulics, Inc. Request that they make both hoses for the driver side hydraulic hinge 4 inches longer to accommodate the transfer of the hydro pump to the trunk. Top Hydraulics, Inc. includes new M12x8x1 copper crush washers with the order, which saves time and cost.
- Impact screwdriver (\$8.99 at Harbor Freight).
- Package of 20 or more 4 inch nylon cable zip ties.

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Seals in the hydraulic hinges often fail. When these seals fail they often do so in pairs. Given the time and complexity to remove/install the folding top, it is strongly recommend you replace BOTH hinges and all FOUR hydraulic hoses with higher quality materials from Top Hydraulics, Inc. at the same time that you order the replacement hydro pump unit. Shipping is fast and the hydraulic hinges have a 3-year warranty because they are rebuilt with superior seals that are advertised to last 30 years or more under normal circumstances.

When starting the procedure to remove the folding top, many people are unable to manually open the folding top after unlocking it with the console button and pulling the Bowden cable (red plastic ring) in the trunk. Those steps are supposed to create a hydraulic fluid bypass in the hydro pump that permits the folding top to be manually opened; however, the bypass often fails because the other end of the Bowden cable cannot depress a severely corroded pressure switch on the hydro pump unit. Figure 8 shows the Bowden cable and Figure 9 shows the pressure switch on a corroded hydro pump.



FIGURE 8



Bowden cable end
over the corroded
fluid bypass button

FIGURE 9

Inability to manually open the folding top using this procedure requires relieving hydraulic pressure to the hinges in order to allow the roof to be moved manually. Perform the procedure below.

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Procedure: The simplest way to release the pressure is to clip the 4 hydraulic hoses. Reference the folding top removal procedure to disconnect the plastic luggage tray and remove it from the trunk. After removing the tray, lay in the trunk and maneuver your head into the space above where the luggage tray was, and to the left of the driver's seat. Use a flashlight to find the black hydraulic hoses wrapped around the hydro pump plastic case. Use cable cutters to clip the 4 lines where indicated in [Figure 10](#). Clipping the lines will release the hydraulic pressure so the folding top can be manually moved from its open to closed position. Cover the clipped hoses with a shop rag to prevent hydraulic fluid from spraying on the hydraulic top's fabric when the folding top is moved.



FIGURE 10

Set the impact screwdriver to the 'loosen' setting and use a T40 impact bit to loosen the 2 bolts on each folding top hinge shown in [Figure 11](#). Each bolt is secured with thread lock so the star inset on the bolt head will easily strip if an impact screwdriver is not first used to loosen them. Stripping the bolt head makes it nearly impossible to remove the bolt because they are recessed in a plastic hinge component that prevents an extractor socket from fitting over the bolt head, and the thread lock prevents using a drill bit type extractor tool. (I stripped the inset on one bolt, which required 7 hours to remove it without damaging the folding top.)





FIGURE 11

Replace all 4 hinge bolts with hex head bolts (with washers) from Ace Hardware.

Remove each hydraulic hinge from the folding top, then take a picture of how both hydraulic hoses are attached to the hinge. Use this picture as a reference of how to connect the new hoses.

Make a drawing of how the hydraulic hoses are weaved along the folding top's metal rim before cutting the zip ties that hold the hoses to the rim. Use a piece of painters tape to mark where the zip ties are located along the rim. Also annotate the path of the Bowden cable in relation to the hoses.

Use painters tape to mark the location of the 7 bolt holes in the folding top's U-shaped rim that secure it to the trunk compartment of the car. Do not cover these holes with zip ties or hoses. Doing so will complicate installation of the folding top.

Pull the plastic end caps off the NEW hoses from Top Hydraulics and use them to protect the tips of the OLD hoses before you remove from your folding top. The end caps will help prevent hydraulic fluid from leaking out of that end of the hose on the fabric of the folding top. After removing the old hydraulic hoses, put the end caps back on the new hoses to protect them.

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