

Thermo-Bob 3™ Installation Manual: KLR650E (2008-2018)

Thank you for purchasing the Thermo-Bob 3™ radiator bypass system for the KLR650. Since the KLR already has a *doohickey*, it seemed that this *thingamabob* for the KLR needed a name too. We usually install Thermo-Bob 2's on KLRs, but if you plan on going to a 10 gallon aftermarket fuel tank, the Thermo-Bob 3 is the right kit for you as it installs in an area that won't interfere with the enlarged fuel tank.

Proper installation is critical: if you are not familiar with or feel uncomfortable with heated, pressurized liquid cooling systems, you should have a professional install the kit. Improper installation can cause engine overheating and possible engine damage.

Read through these instructions completely to familiarize yourself with the hardware names and installation procedure. This will also allow the bike to cool off if ridden recently. The installation process is easier with low fuel as the fuel tank will be lighter and therefore easier to remove.

Other than basic tools (small wrenches / slotted screwdriver), gather the following items that you will need but are not included in the kit:

- Box cutter or sharp knife
- ~48 oz. of 50/50 coolant

Familiarize yourself with the parts in the kit per **Figure 1**:



Figure 1. Contents of Thermo-Bob 3 Kit for E-model KLR650.

(1) Thermo-Bob 3, assembled from:

- Housing
- Cap
- Four screws
- Thermostat
- Brass hose barb with 90° bend
- BSPP Plug (removable for installation of Trail Tech Temp Sensor)

- (1) Bypass Tee Fitting with 45° 'bypass' hose barb
- (2) Small hose clamps
- (1) Piece of bypass hose
- (4) Large hose clamps
- (1) Small, fat o-ring
- (1) Tie-wrap

PREPARE THE AREA

- 1) Turn the fuel petcock off. Remove the skid plate, side covers and seat. Remove the black cover from the coolant overflow tank (two Phillips-head screws).
- 2) Remove the fuel tank. If you still have the stock fuel tank, remove the left and right fairing shrouds that are an extension of the fuel tank (3 bolts with 8mm heads and one Phillips-head screw each) – don't lose the spacer under each Phillips-head screw.
- 3) Remove the fuel tank (don't forget; there are two 10 mm head bolts at the rear of the tank, 2 rubber lines at the petcock, plus rubber evaporative / vent line(s) at the rear of the tank as well). If you do this with the engine still hot, there is a fire risk – so wait until the engine has cooled off.
- 4) Carefully remove the radiator cap after the engine is cool and pressure has been relieved from the cooling system. **If you do this while the coolant is still hot, you will burn yourself.**
- 5) Drain the coolant into a suitable container, remembering to keep it away from children and pets due to the toxicity. The drain plug (8mm head) is in bottom of the water pump housing as shown in **Figures 2 and 3**. Approximately one quart of coolant will drain. Reinstall the drain plug with its sealing washer, and torque to 70 inch-pounds (that's only 5.75 ft-lb).



Figure 2



Figure 3

6) OK. Now you have a good view of where you're going to work. Viewing from the left side of the bike, **Figure 4** shows a finished installation to help you visualize the final product. The three main hoses involved in the installation have been colored to help in identification. The upper hose (red/purple) will have the Thermo-Bob 3 installed in it. The lower hose (blue) will have the bypass tee installed in it. The bypass hose (gold) connects to barb fittings; one on the Thermo-Bob 3 (in the red/purple hose), the other on the bypass tee in the blue hose.

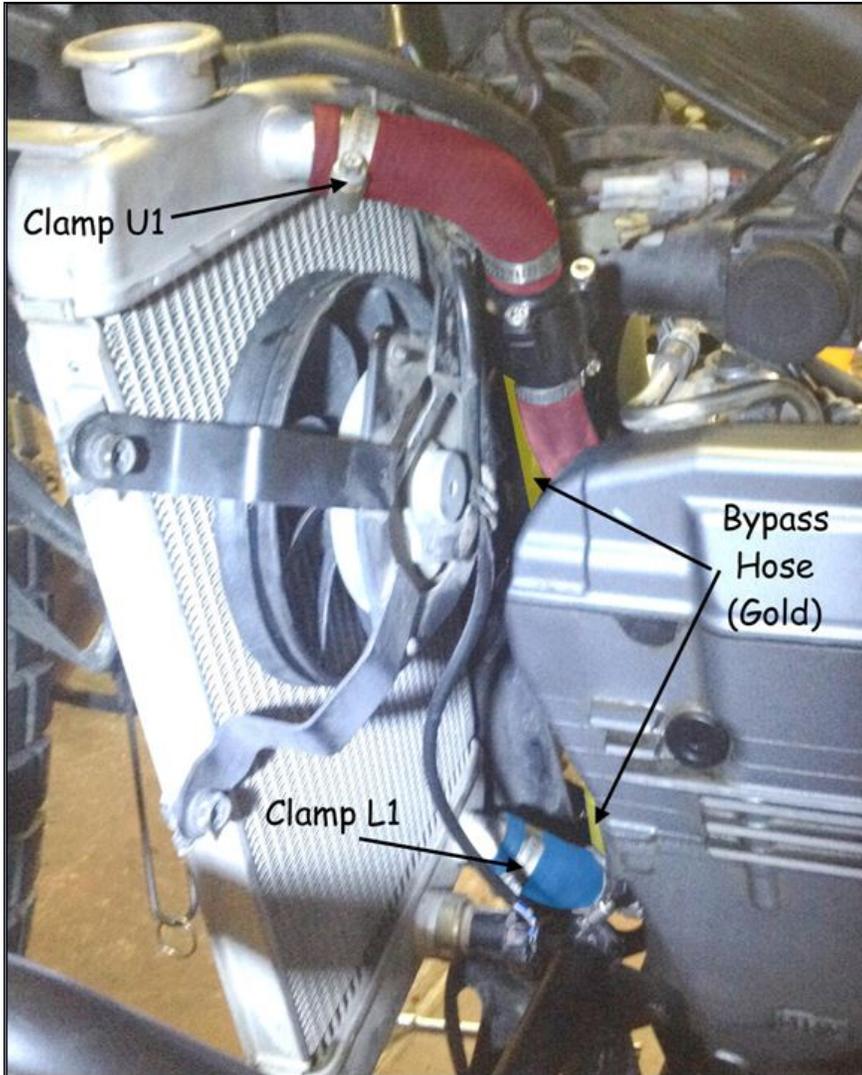


Figure 4: Completed Thermo-Bob 3 Installation. Hoses have been color coded to help in identification; red/purple is upper radiator hose, blue is lower radiator hose, gold is new bypass hose.

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UPPER HOSE MODIFICATION AND OLD THERMOSTAT REMOVAL

7) Remove the upper (red/purple) radiator hose first. To do this, loosen and remove clamp U1 in **Figure 4**. Then work on the opposite side of the engine by removing the three bolts (8mm head) on the factory thermostat housing – the bolts are circled in red in **Figure 5**. Lift the factory thermostat housing away from the cylinder head and remove the upper radiator hose (red/purple) from the motorcycle. In the side of the cylinder head, you'll see the original thermostat and gasket as shown in **Figure 6**. Remove them as shown in **Figure 7**.

12) **Figure 8** shows the upper hose before modification. With a sharp knife, remove a 2 inch section from the hose as outlined in the Figure.

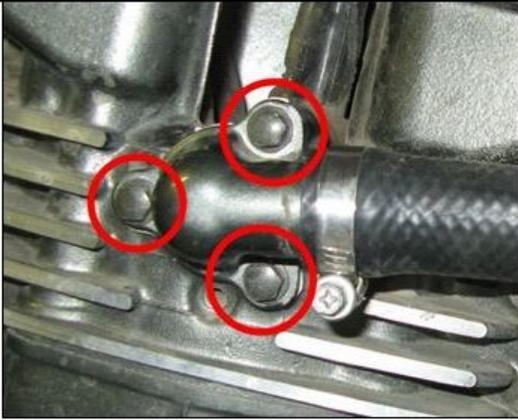


Figure 5: Three bolts on factory thermostat housing.



Figure 6: Factory thermostat.

Figure 7: Remove factory thermostat and gasket.

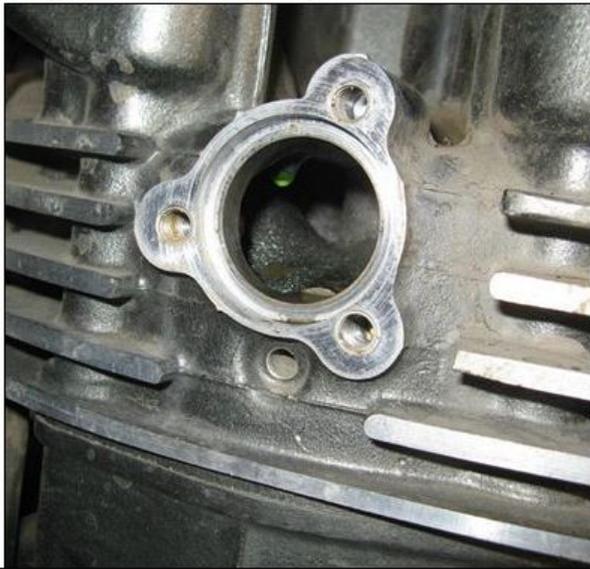


Figure 8: Remove 2 inch section from upper hose.



13) After viewing **Figures 9 and 10**, slide one end of the supplied piece of bypass hose onto the Thermo-Bob 3's brass barb, and insert the Thermo-Bob 3 into the upper hose as shown in the Figures. Install clamps TB1, TB2 and B1 as shown, noting the orientation of not only the Thermo-Bob 3, but each of the three clamps. Tighten clamp B1 but leave clamps TB1 and TB2 a little loose.



Figure 9



Figure 10

Upper hose assembly with Thermo-Bob 3 and bypass hose in place

14) Dip the free end of the bypass hose in some coolant and wipe off the outside. This will leave coolant on the inside of the bypass hose which will assist in final installation. Take the upper hose assembly and thread it through the frame in front of the engine as shown in **Figures 11 and 12**. The assembly shows color-coded hoses to help you identify what is being installed. Slide the upper end of the hose onto the upper nipple of the radiator. Reinstall and tighten clamp U1 (**Figure 4**).



Figure 11



Figure 12

Installing upper hose assembly: hoses are color-coded to help in visualizing placement. The gold hose is hidden from view in Figure 12, see Figure 4 for placement.

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15) It is time to install the small, fat o-ring as shown in **Figure 13**. Lubricate the o-ring with coolant and place the factory thermostat housing over the o-ring. **IMPORTANT: Be careful installing this – run the bolts down finger tight, then turn each bolt ½ turn at a time in succession to slowly seat the housing against the cylinder head, then torque to 70 INCH-pounds (only 5.75 ft-lb). If you don't do this 'shared' method of tightening the housing bolts and crank only one bolt all the way down first, you will damage or break an ear off the factory thermostat housing.**

LOWER HOSE MODIFICATION

16) Remove clamp L1 in **Figure 4**, and clamp WP1 in **Figure 14**, and remove the lower hose. After viewing **Figures 15 and 16**, mark the hose accordingly and remove a three-quarters inch section of the lower hose. Note that the measurements in **Figure 16** are taken from the completion of the bend in the hose in the 'radiator end', not the 'water pump end'.



Figure 13: Attach upper hose to cylinder head with o-ring in place (see Step 15 of instructions for fastener torquing process).



Figure 14: Lower hose is color-coded blue in this picture to identify it. Black hose will not be disturbed.

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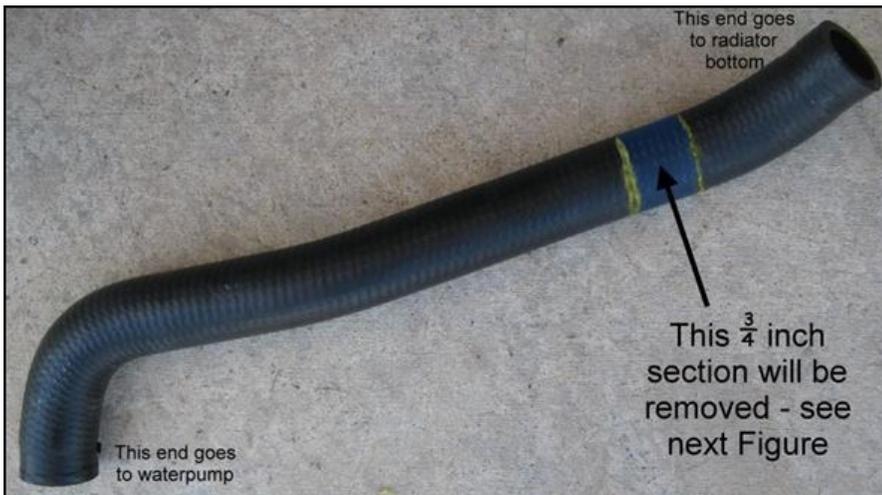


Figure 15

Remove three-quarter inch section of lower hose.

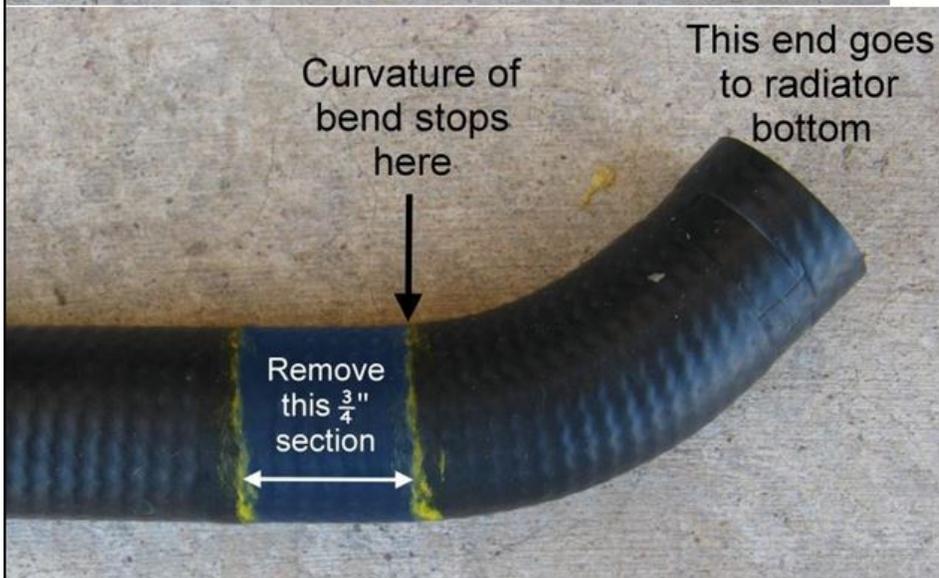


Figure 16

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17) Place the supplied bypass tee in the lower hose with clamps Tee1 and Tee2 (supplied) as shown in **Figure 17**. Try to match the tee and clamp orientations shown, and do not tighten the clamps yet. Reinstall the lower hose on the bike and tighten hose clamps WP1 (**Figure 14**) and L1 (**Figure 4**). Rotate the tee fitting in the lower hose for best alignment to the bypass hose which will soon be installed. Tighten clamps Tee1 and Tee2.

18) Using **Figure 18** as a reference, install small clamp B2 onto the loose end of the bypass hose then slide the loose end of the bypass hose onto the Tee's brass hose barb. Tighten clamp B2.



Figure 17:
Tee Installed in lower hose.



Figure 18:
Details of complete
installation of lower
radiator hose and
bypass hose
connection.

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19) Inspect for interference between hoses and metal parts that could rub a hole in them. Rotate the Thermo-Bob 3 in the upper hose so that clearances are maximized between the frame and Thermo-Bob 3 lugs as shown in **Figure 19**. Be sure the outer diameter of the fan cannot contact the Thermo-Bob 3. Tighten hose clamps TB1 and TB2 (**Figure 9**). Rotate the radiator fan by hand to verify that the Thermo-Bob 3 is at least 1/4" away from the rotating fan shroud. To maximize clearance between the brass fitting on the Thermo-Bob 3 and the radiator, the tie wrap provided can be used to apply tension in the direction you wish, with an example shown in **Figure 20**.

20) Verify that all hose clamps are tight one final time.

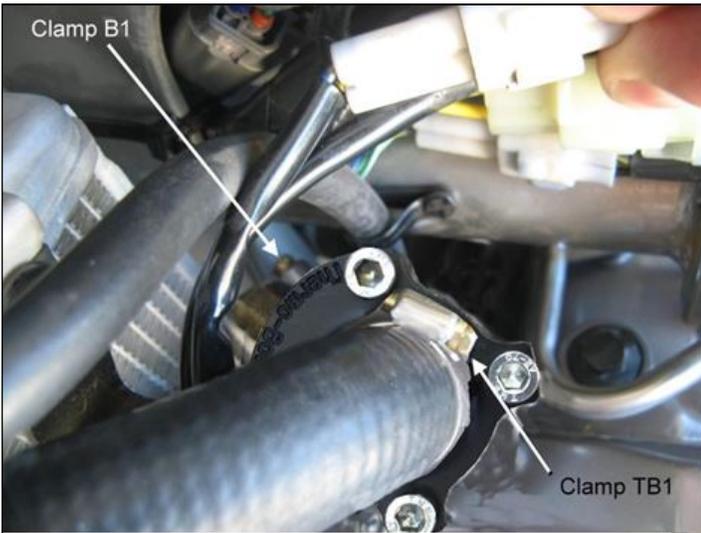


Figure 19: Verify Thermo-Bob 3 housing and brass fitting orientation relative to upper frame tube and radiator.

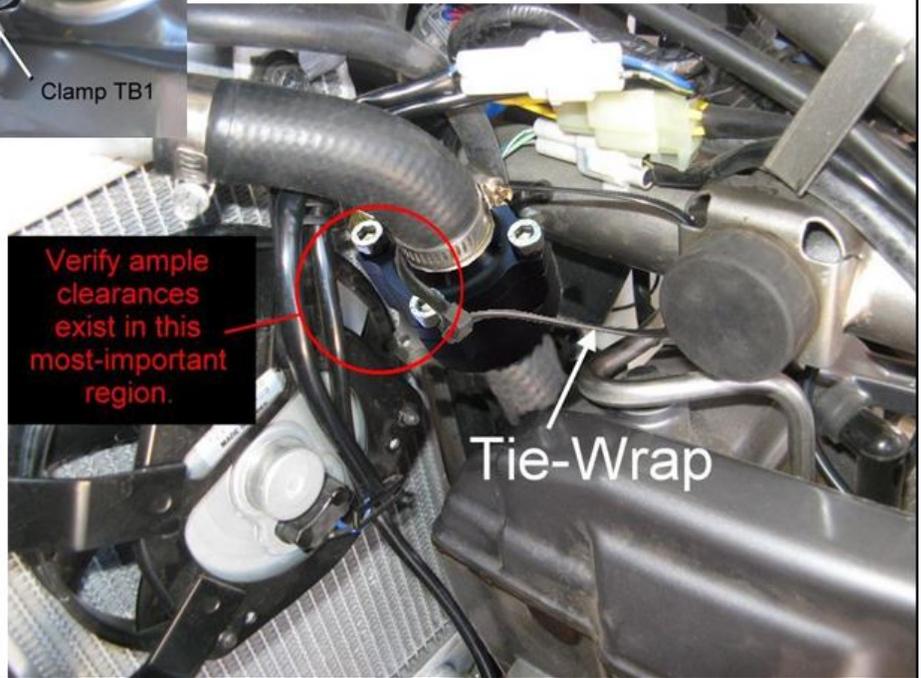


Figure 20: Verify that ample clearances exist.

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REFILL THE COOLING SYSTEM

21) The cooling system typically holds about 34 fluid oz. of 50/50 coolant. Fill the radiator nearly to the top by pouring in 50/50 coolant – pour slowly not to spill, and this will take 24 to 34 fluid oz. If the bike was ridden in the last week or less, there will be enough fuel in the carburetor fuel bowl to start the engine and let the bike idle with the radiator cap off. (Others will have to reinstall the fuel tank first). By running the engine between 1000 and 2000 rpm for less than 30 seconds, the air should be purged in the system and the coolant level will drop in the radiator if you weren't able to pour in the full 34 fluid ounces on that first pass. Shut off the engine and you then should be able to complete the fill to 34 fluid oz. total. Replace the radiator cap, being sure it is on correctly. Reinstall the fuel tank only (no shrouds yet) and reconnect the fuel line, vacuum hose, and the vent/overflow hose(s) and turn the petcock back on. Torque the restraining bolts to Kawasaki specification. Start the engine and let the bike continue to run and heat up for a few more minutes until the radiator fan operates once, implying that the thermostat has opened for the first time. This will also allow the cooling system to heat and pressurize itself so you can conduct leak checks. Then shut off the engine, and after the bike cools completely you should remove the radiator cap and top off the coolant. Be sure to re-install the radiator cap correctly.

22) Replace the left and right fairing shrouds, black coolant overflow tank cover, seat, side covers, and skid plate, and torque all bolts to Kawasaki specification.

Installation is complete. If you have any comments or questions, contact me at watt-man@cox.net .

REPLACEMENT PARTS

The thermostat and the radiator hoses are the only two things that have a replacement interval. We recommend the thermostat be replaced every 5 years or 40,000 miles. Replacement thermostats are available at watt-man.com.

We've found the Kawasaki factory coolant hoses to be quite robust, typically going 10 years or more without any issues.

IM TB3-KE V2