

Thermo-Bob™ Installation Manual: KLR250 (1984-2005)



Thank you for purchasing the Thermo-Bob™ radiator bypass system for the KLR250.

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 engine to cool off if ridden recently.

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
- Less than 2 quarts of 50/50 coolant
- Depending on the age / mileage of your bike, you might want to have new radiator hoses ready for the installation.

The Thermo-Bob is already assembled, but if you ever plan to disassemble it, you will need a 4mm (or 5/32 inch) allen wrench.

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

(1) Thermo-Bob, assembled from:

Housing
Cap
Six screws
Thermostat
Large skinny o-ring
45° brass hose barb

- (1) 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

DRAIN COOLANT AND REMOVE ORIGINAL THERMOSTAT

- 1) 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.**
- 2) 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 coolant pump housing as shown in **Figure 2**. Approximately 38 fluid oz of coolant will drain. Tilt the bike left, then right to help drain the system further. Do not reinstall the drain plug yet.
- 3) Loosen and then remove the three bolts (8mm head) on the factory thermostat housing – the bolts are circled in red in **Figure 3**. You'll get another ounce or so of coolant here, so be prepared. In the side of the cylinder head you'll see the original thermostat and gasket as shown in **Figure 4**. Remove them as shown in **Figure 5**. This is where the small, fat o-ring is going to be installed as shown in **Figure 6**. Inspect the sealing surfaces -a few gentle swipes with fine sandpaper will clean this surface up if necessary, then wipe clean with a damp cloth to remove any grit that may be left behind. 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 (that's 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 housing.**
- 4) If you wish, at this point you could pour some distilled water into the radiator opening and let it flush through the cooling system and exit out the open drain plug. Repeat until you're comfortable with the clarity of fluid that drains out.
- 5) Reinstall the drain plug in the bottom of the coolant pump with its sealing washer, and torque to 70 inch-pounds (that's only 5.75 foot-pounds).
- 6) OK. Let's take one final look at the work area before we start cutting hoses. **Figure 7** shows a completed Thermo-Bob installation, and the hoses have been color-coded for clarity. Two of the three hoses in the cooling system will be modified to install this kit. The tee fitting from the kit will be installed in the upper hose (RED) that runs from the engine to the bottom of the right radiator. The Thermo-Bob will be installed in the lower hose (BLUE) between the bottom of the left radiator and the coolant pump. **Note that this particular hose attaches to the REAR nipple on the coolant pump housing.** The hose that connects to the FRONT nipple on the coolant pump housing (marked "CYL" on the pump housing in **Figure 2**) delivers coolant back to the bottom of the engine cylinder, and this hose will NOT be modified at all during installation. I have not colored this hose in **Figure 7**. **If you mistakenly install the Thermo-Bob in this particular hose, there will be no coolant flow, the engine will overheat and engine damage could result.** For clarity, the provided bypass hose has been colored green in **Figure 7** for identification.

(Steps 7 through 10 have already been completed for you but are spelled out below if you ever take the Thermo-Bob apart in the future.)

7) Locate the thermostat from the kit and verify that the retention tabs have been cut off as shown in **Figures 8 and 9**. The thermostat will not fit in the housing until the tabs are removed.

8) Lubricate the outside diameter of the thermostat's rubber seal and the inside of the Thermo-Bob housing with a thin film of coolant as shown in **Figure 10**. Then push the thermostat into the housing as shown in **Figure 11**. Before pushing it in, orient the thermostat in the housing as shown in **Figure 12**. It is important to push it in firmly until it bottoms squarely in the housing and does not protrude more than 0.005" above the edge as shown in **Figure 13**.

9) Lubricate the large, skinny o-ring with coolant and install it in the housing cap as shown in **Figures 14 and 15**. Be sure it is down in the groove all the way around. Then install the cap onto the housing - **Figure 16** reminds you that the o-ring will slightly separate the housing and cap. Install the six housing screws. They should spin in easily: if one does not, back the screw out a turn and try again. Install them finger tight, *then* tighten them in a cross-pattern, ½ turn at a time to seat the cap against the housing as shown in **Figure 17**. Finally, torque the screws to 45 to 50 in-lb.

10) Place a thin layer of pipe dope (not provided) around the threaded end of the 45° brass hose barb and thread it into the bypass port on the Thermo-Bob. The hose barb and housing use tapered pipe thread, so the effort required to continue turning the fitting will increase as you continue - snug it up good. The final orientation of the brass barb is shown in **Figure 18**.

11) Locate the short piece of bypass hose from the kit and slide it onto the brass barb on the Thermo-Bob as shown in **Figure 19**. Orient the natural curvature of the hose in the direction shown. Locate one small clamp from the kit and install it as shown, and tighten it appropriately. Note in **Figure 19** how coolant moves through the part so you can install it properly.

UPPER HOSE MODIFICATION

12) Measure along the upper radiator hose as shown in **Figure 20** and mark the hose at a distance of 1.5 inches, and 2.25 inches from the engine end. Cut the upper radiator hose at those two points, being cautious to make a straight cut that is perpendicular to the axis of the hose.

LOWER HOSE MODIFICATION AND THERMO-BOB INSTALLATION

13) Mark the lower radiator hose approximately 0.75 inches above the top of the engine mount plate, and 2.0 inches further up the hose as shown in **Figure 21**. Cut the lower radiator hose at these two locations, being cautious to make a straight cut that is perpendicular to the axis of the hose. Locate two large clamps from the kit and place them on the hose in the orientations shown in **Figure 22**.

14) Dip the free end of the Thermo-Bob's bypass hose into coolant and wipe off the outside of the hose. This will lubricate the inside of the free end of the hose which will make things easier in step 15. Then place the Thermo-Bob in the gap of the lower radiator hose for a trial fit, placing it in the orientation shown in **Figure 7**. **The letters "Thermo-Bob" should be aiming down at the skid plate, not up at the fuel tank. If you install it backwards, the engine will overheat and engine damage could result.** During this trial fit, your goal is to rotate the Thermo-Bob to its final location that doesn't touch the frame

downtube, while aiming the Thermo-Bob's brass fitting at the other brass fitting in the tee that you'll place in step 15. Do not tighten either of the large clamps yet.

TEE INSTALLATION, FINAL ALIGNMENT AND CLAMP TIGHTENING

15) Install the remaining small clamp from the kit on the bypass hose in the orientation at the top of the green hose shown in **Figure 7**, and slide the free end of the Thermo-Bob's bypass hose onto the brass barb on the tee fitting. Then install the tee fitting into the upper hose as shown in **Figure 23**. You can now fine-tune proper alignment of the Thermo-Bob hardware and properly tighten all six clamps that were provided in the kit.

16) Installation is now complete, it should look like **Figure 7**.

REFILL THE COOLING SYSTEM

17) The KLR250 cooling system typically holds about 38 oz of 50/50 coolant. With the small bleed hole in the thermostat, you should be able to fill the cooling system in a single pour, but you'll find the last few ounces will need to be poured in slowly. Some people find that they can speed up the process by pouring in enough coolant to fill to the top of the radiator cap, then start the engine and let the bike run between idle and 2000 rpm with the radiator cap off. By running the engine for less than 15 seconds, the air should be purged in the system and the coolant level will drop in the radiator. Shut off the engine and you should be able to add the final amount of coolant to top off the radiator. Then replace the radiator cap, being sure it is on correctly.

18) If you wish, this would be a good time to drain and refill the radiator overflow tank (on the left side of the bike) with fresh coolant.

19) Ride the bike a short distance to allow the cooling system to heat and pressurize itself so you can conduct leak checks. Once home, let the bike completely cool. Then you can remove the radiator cap again to be sure the system is truly topped off. Check all hose clamps one more time.

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

REPLACEMENT PARTS

(Recommended replacement frequency: every 5 years or 40,000 miles, whichever comes first)

The standard application of a Thermo-Bob on a KLR650 controls the coolant temperature *exiting* the engine at 195°F. The KLR250 application is controlling the coolant temperature *entering* the engine, so a cooler thermostat is recommended to obtain the same engine operating temperatures. Based on testing, the STANT 180° “Superstat” is recommended (and came pre-installed in your Thermo-Bob). The Superstat is a heavy-duty thermostat with a weir-based opening that smoothes out temperature variation at low lift, as well as having a larger heat motor and small bleed hole in the ‘stat.

Physically, any of four STANT thermostats will fit the Thermo-Bob housing:

- Standard 180° (Part number 13828 (catalog) or 29828 (sold on card))
- **Superstat 180°(Recommended) (Part number 45828 (catalog), or 59828 or 65828 (sold on card... see photo below))**
- Standard 195° (Part number 13829 (catalog) or 29829 (sold on card))
- Superstat 195° (Part number 45829 (catalog), or 59829 (sold on card)).

The KLR250 has a non-conventional location for the radiator fan switch, measuring temperature at the radiator *inlet* rather than the radiator *exit*. For this reason, the 195° thermostats are not recommended as the engine exit temperatures will typically be 205°-208°F, and the fan will run unnecessarily even though the radiators are doing a great job of providing cool water to be mixed by the Thermo-Bob.

Do not try to cross-reference these part numbers to different thermostat brands, they typically will not fit properly. If you are unable to find parts locally, replacement thermostats are available below and include shipping fees to the US or Canada:

Thermostat: \$12

O-ring kit: \$5 (includes both o-rings from the kit – one ‘large/skinny’ and one ‘small/fat’).

There are two methods to provide payment:

1) A personal check or money order to:
Watt-man LLC
6501 E. Greenway Pkwy
#103-296
Scottsdale, AZ 85254

and at the same time, send an e-mail to watt-man@cox.net so I'll be able to box up your order and wait for your check.

2) PayPal to watt-man@cox.net

If you need other parts (brass fittings, aluminum housing pieces etc.) contact me as well. Same e-mail address as above.





Figure 1 – Thermo-Bob™ kit contents.



Figure 2. Drain coolant by removing drain plug at bottom of coolant pump.



Figure 3. Remove 3 bolts.



Figure 4. Original thermostat.

Figure 5. Remove original thermostat.



Figure 6. Place small, fat o-ring in place.





Figure
7

Completed Installation,
Hoses colored for clarity

T-stat with full
tabs still in place



Figure 8

T-stat with
tabs cut off



Figure 9

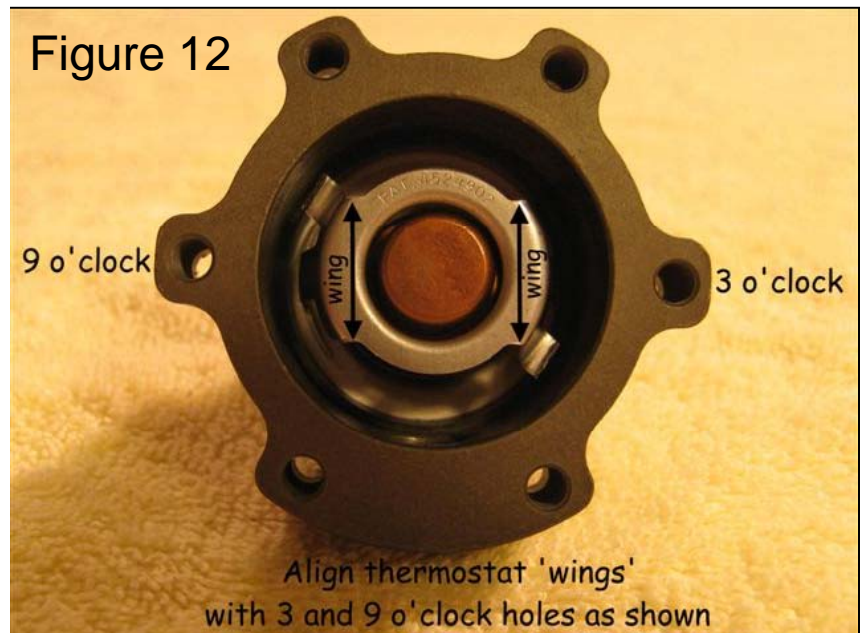
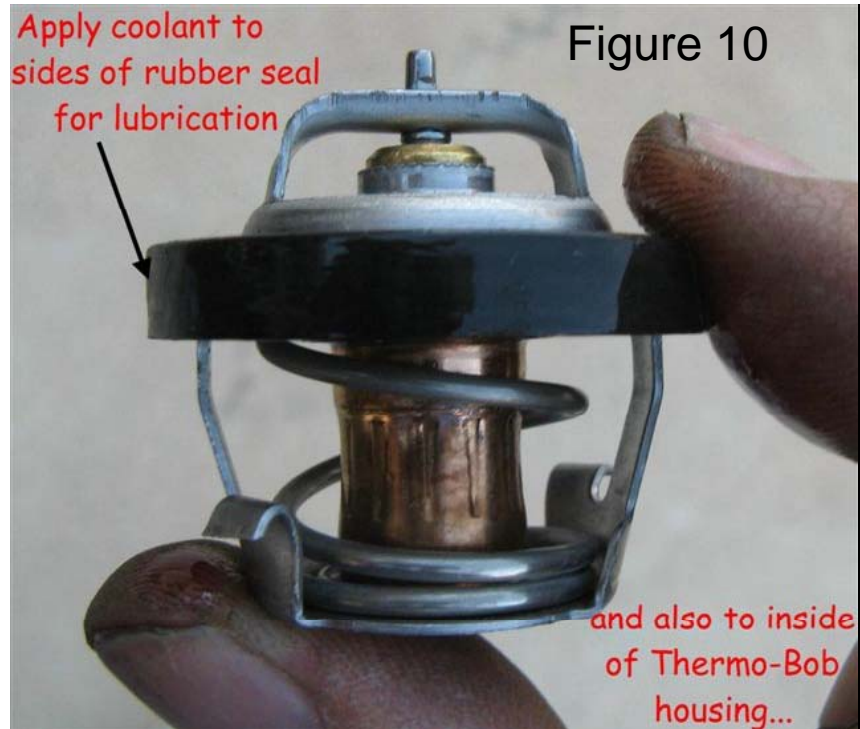
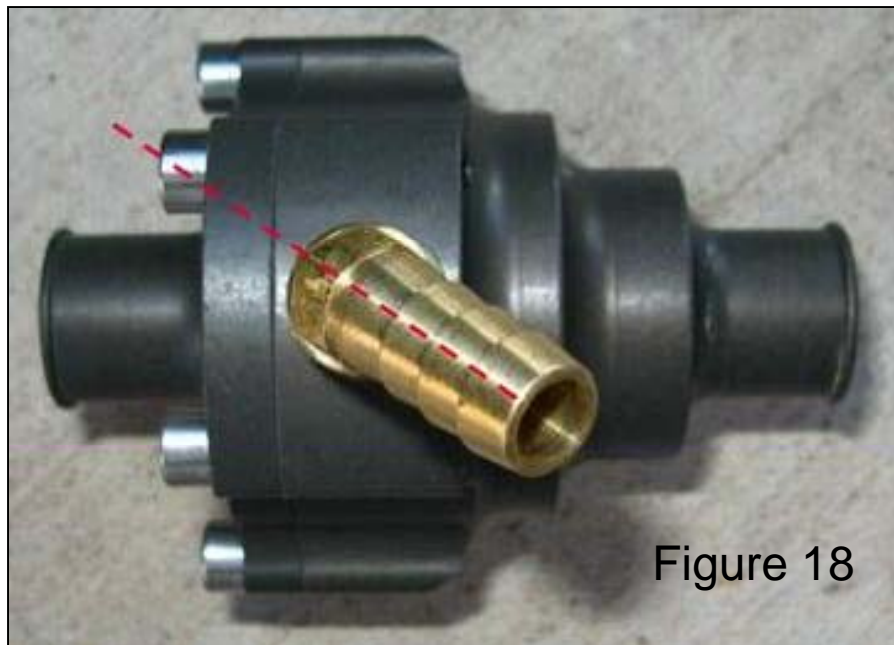




Figure 14



Figure 15



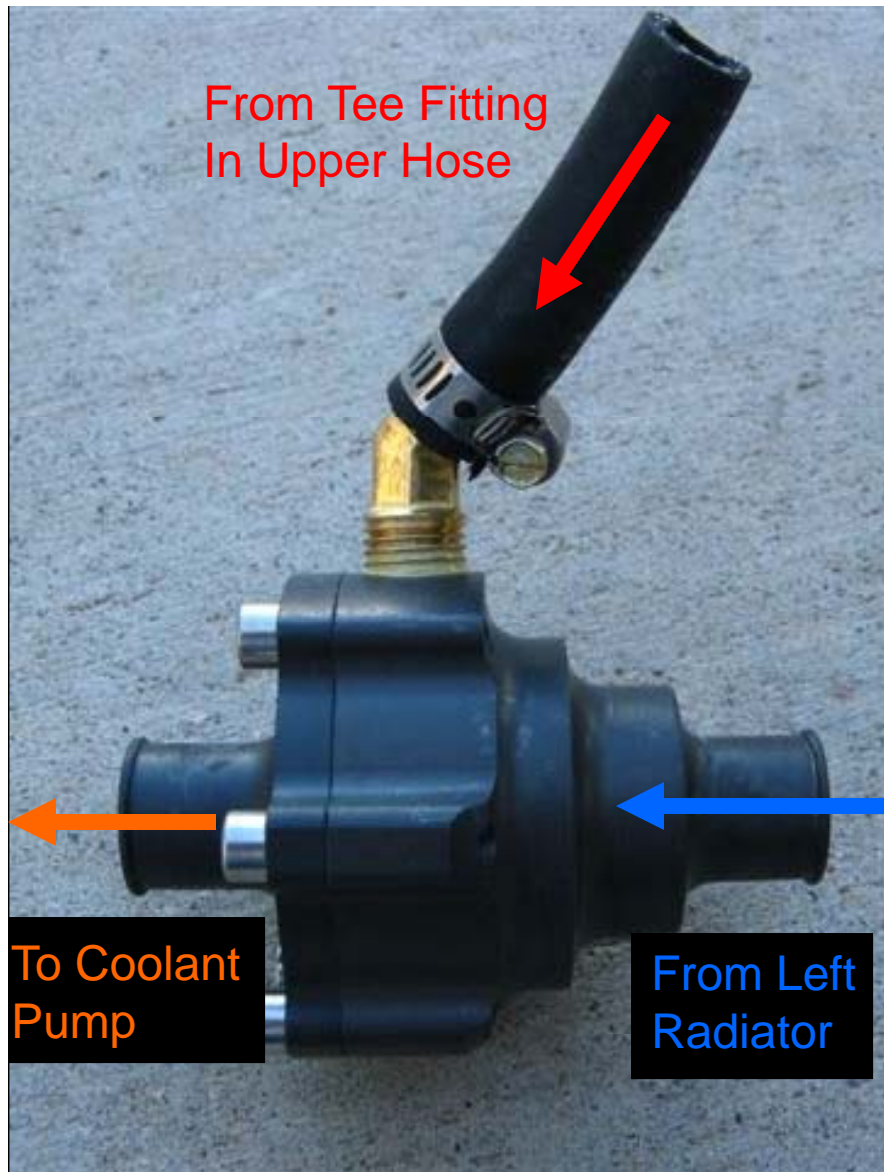


Figure 19. Bypass hose installed and coolant flow directions.



Figure 20. Upper Hose Modification.

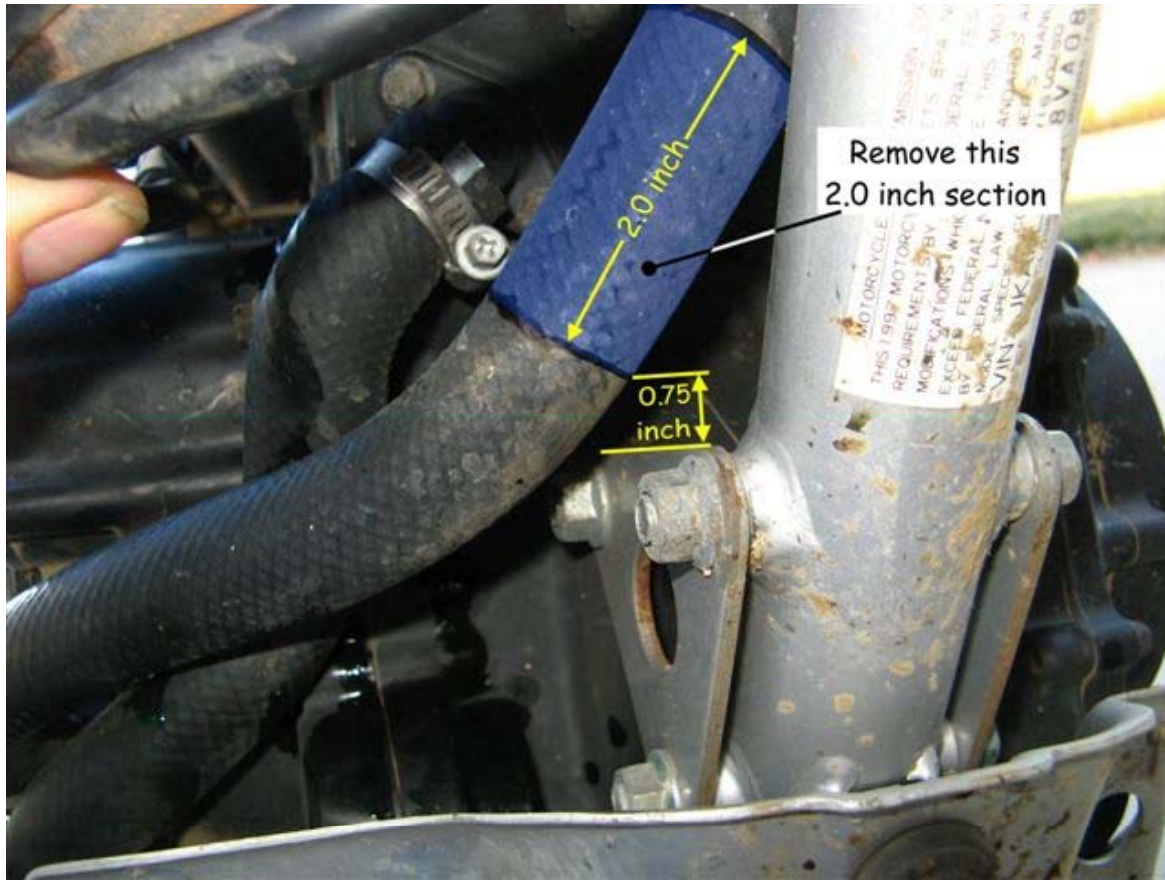


Figure 21. Lower Hose Modification.



Figure 22.
Clamp Alignment.



Figure 23. Tee placement in upper hose.