

TOYOTA Epic S22/SX

Annual Maintenance Procedures

(Does not include winterization)

Engine oil & filter replacement
Transmission fluid replacement
V-drive oil replacement
Fuel/water separator replacement
Water pump impeller replacement
Spark arrestor cleaning
Serpentine belt inspection



Overview

Refer to your owner's manual for factory-recommended service intervals.

This procedure doesn't describe normal winterization like draining block, etc.

NOT included in this procedure (but wish they were):

- Engine alignment check
- Shift linkage lubrication
- Steering linkage lubrication
- Trailer brake fluid replacement
- Trailer brake pad inspection
- Engine OBDII message inspection

Please direct comments or suggestions to Derek Boyer (damndialup@netzero.net) or Cyclone at (hiwatt@bellsouth.net)



Sequence (part one)

- Remove forward and center floor panels
- Remove transmission cover and aft floor panels
- Remove both engine side bulkheads

Hook up Fake-A-Lake
and turn on water

Start water/engine, put in gear, at
idle, occasionally squirting water
onto propeller strut

Inspect oil filter, cooling, fuel tank
and pumps, and exhaust for leaks

After five minutes, turn off engine
and water

ANNUAL SERVICE

*Perform at end of
season*

Estimated cost: \$125

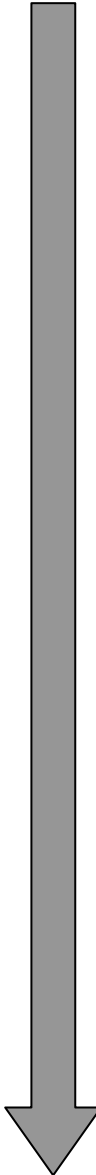
Estimated time: 8-12
hours with engine
alignment check and
trailer maintenance

4 hours with fluids,
impeller and filter
only.

- Suck engine oil (about 6 quarts)
- Suck transmission fluid (about 2.0 quarts)
- Suck v-drive gear oil (about 1 quart)
- Place shallow pan or cut plastic water bottle under oil
filter and then slowly drain and remove filter, being careful
to keep upright until out of the boat.
- Install new Mobil1 M1-102 oil filter
- Remove spark arrestor; blow from inside out, spray with
carb cleaner, blow from inside out and set aside. Cover
intake with rag or tape.
- Fill engine with 5 quarts Mobil 1 5W-30 oil
- Fill transmission with 2 quarts Mobil 1 ATF
- Fill V-drive with 1 quart Mobile 1 Gear Oil



Sequence (part two)



Remove serpentine belt and inspect for cracking, fraying

Replace water pump impeller with Johnson 812 and retain old one for on-boat spare

Reinstall serpentine belt

Clamp shut either side of fuel filter and then carefully remove fuel filter - it's full of gas.

Fill new Quicksilver/Mercruiser Fuel/Water Separator 3502893T with clean gas and install.

Disconnect propellor shaft under v-drive/tranny and check engine/propshaft alignment; align engine if necessary

If needed, replace prop shaft packing

Reconnect propellor shaft

Lubricate rudder port

Lubricate steering cable

Lubricate shift cable

Wipe down forward and aft bilge and engine components

Remove Fake-a-lake

Jack trailer, Drain trailer brake fluid

Remove wheels, replace bearings, check brake pads

Drain brake fluid, refill (DOT 3) and manually bleed brakes

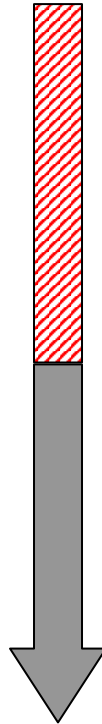
Replace wheels (95 ft/lbs), check tire inflation (50 psi), lower trailer

Replace spark arrestor when THOROUGHLY dry



Sequence (part three)

Replace Fake-a-Lake and turn on
Start water/engine, put in gear, at
idle, occasionally squirting water
onto propeller strut
Inspect oil filter, cooling, fuel tank
and pumps, and exhaust for leaks
After five total minutes, turn off
engine and water



Check engine, tranny and v-drive levels, fill as necessary - DO
NOT OVERFILL

Replace both engine side bulkheads

Replace transmission cover and aft floor panels

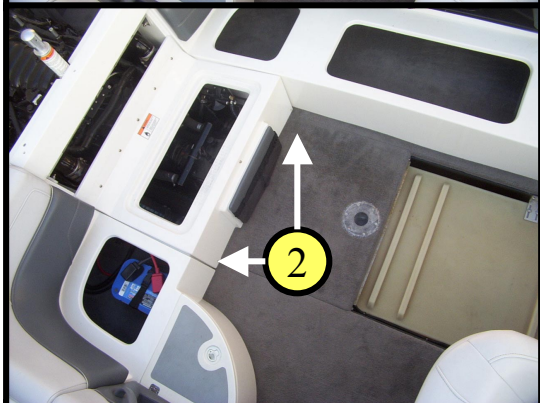
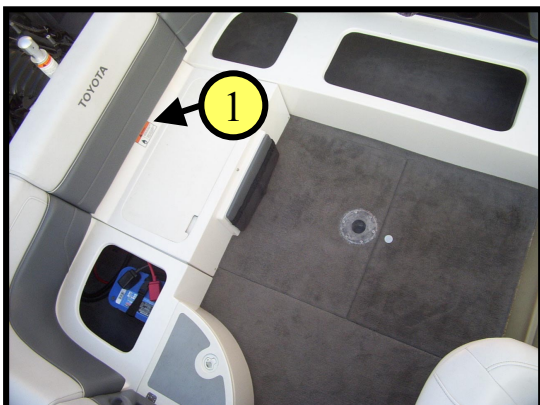
Replace forward and center floor panels

Ingredients

• Fake-A-Lake, Oil Boy or other fluid sucker, small funnel, binding lube or detergent, brake cleaner or throttle body spray cleaner, metric hand tools, two clamps, strap wrench and assorted hand tools.	
• Johnson 812 impeller - www.skidim.com p/n 0714	\$30
• Mercury 35-802893T Water Separating Fuel Filter (any boat dealer)	\$10
• Mobil1 engine oil 5W-30 (6 quarts times \$5.00 list at Autozone, etc.)	\$30
• Mobil1 oil filter M1-102 (Autozone, etc.)	\$11
• Mobil1 gear oil 75W-90 (1 quart at Autozone, etc.)	\$8
• Mobil1 ATF (2 quarts times \$6.00 list at Autozone, etc.)	<u>\$12</u>
	\$101



Uncover fuel tank and drivetrain



1. Remove snaps and lift upward on cushion

2. Remove two screws and lift upward

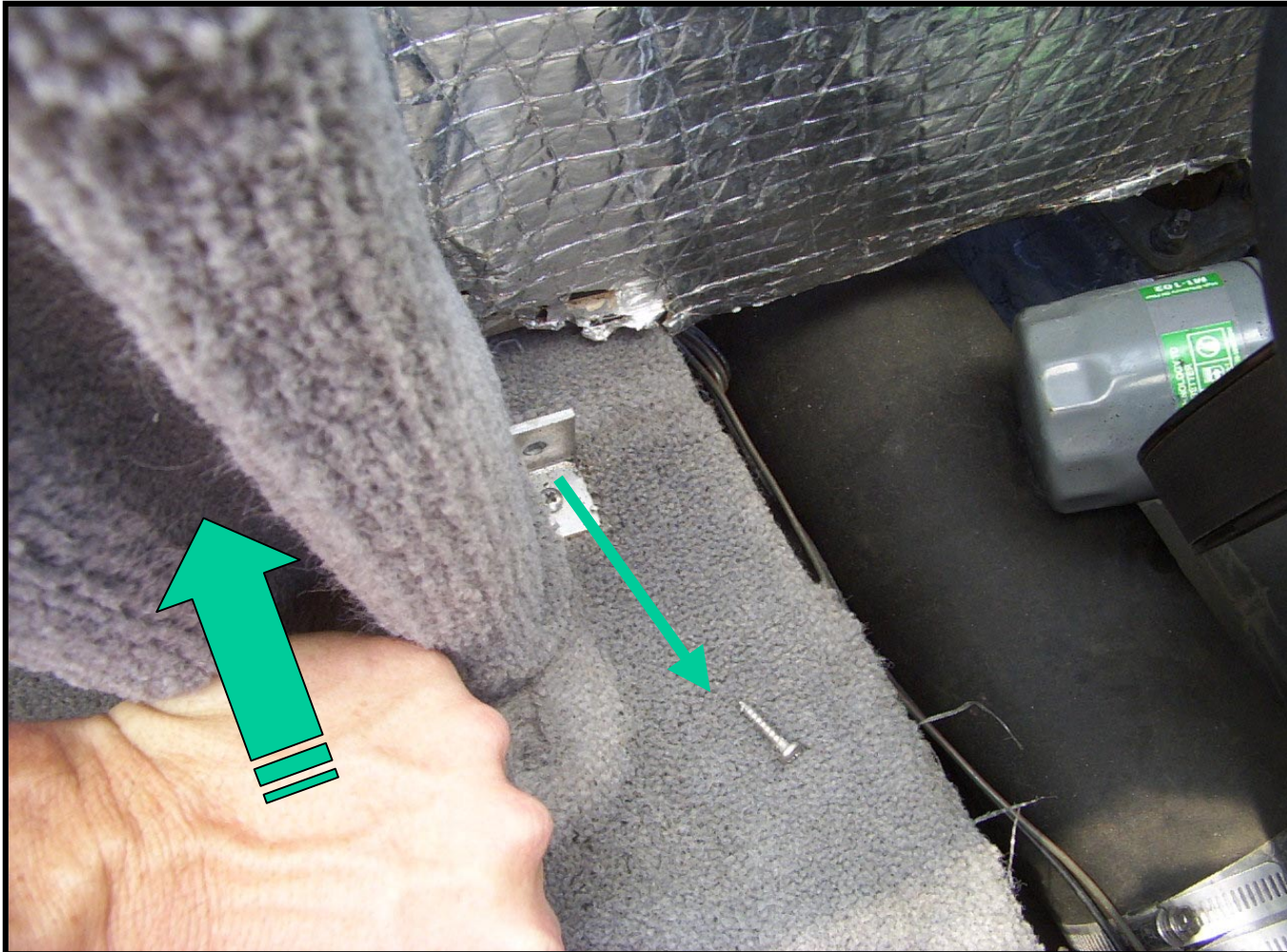
3. Remove final floor section

Inspect whole area for fuel/fluid leaks, corrosion, or mechanical damage



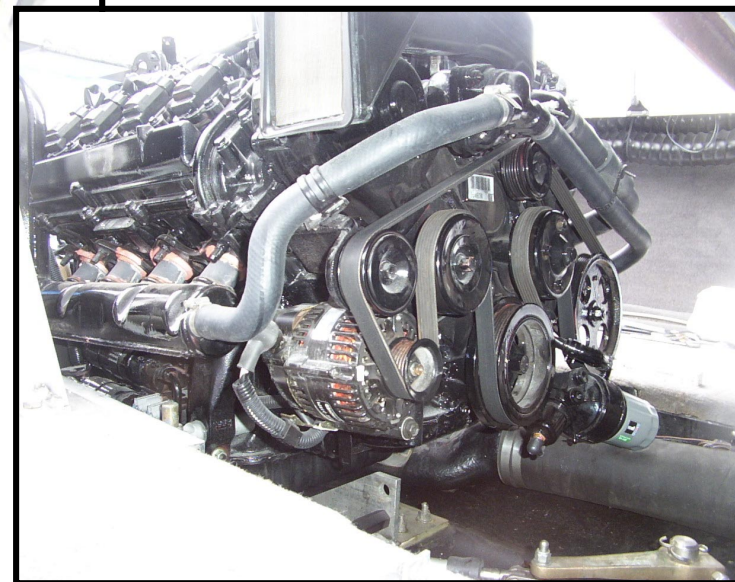
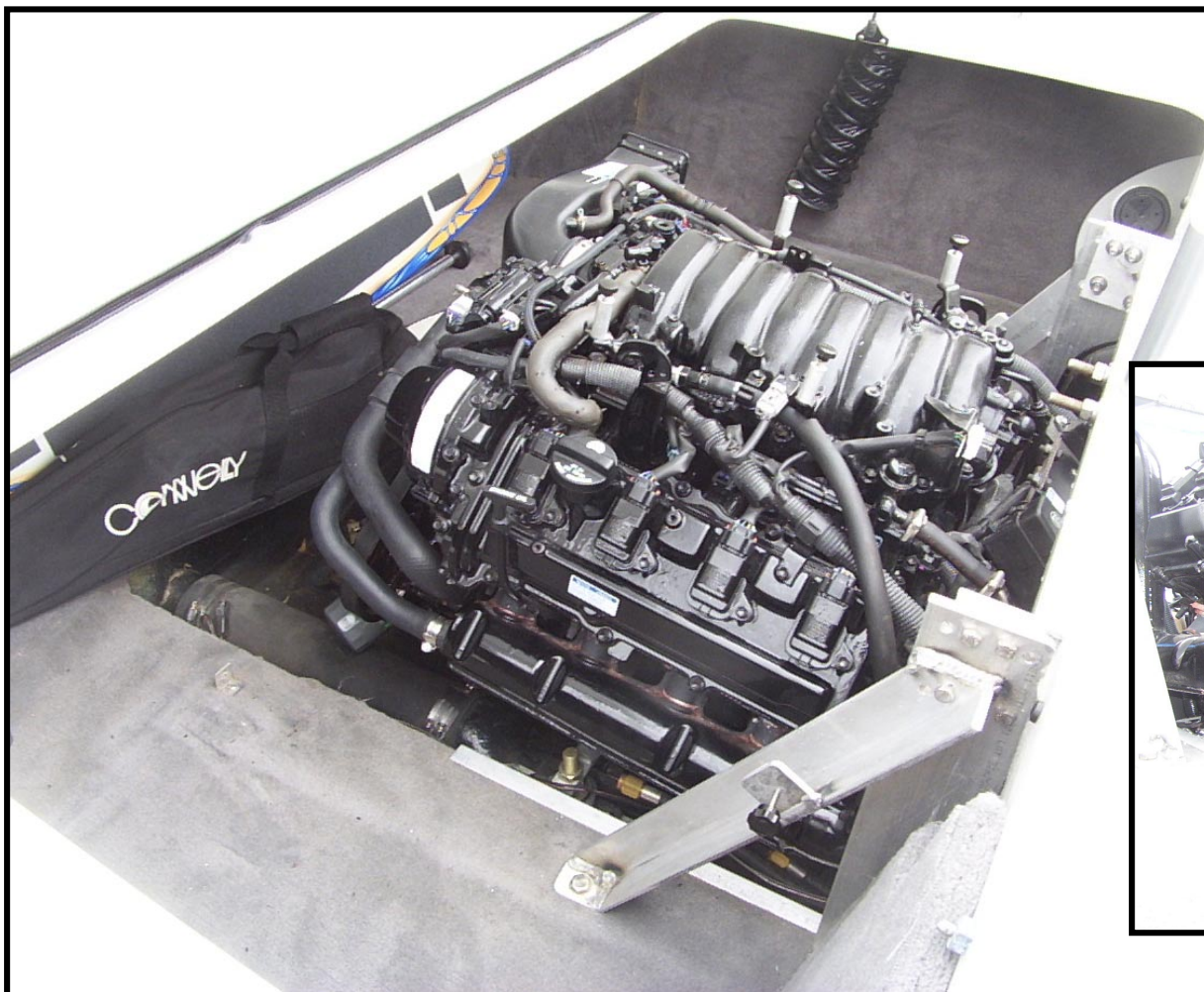
Remove bulkheads

- Remove the two bulkheads on either side of the engine by unscrewing the one knurled knob on each.
- Remove the two side bulkheads that separate the trunk from the engine bay by removing one knurled knob on each.
- Remove the one screw on each side of the center aft bulkhead (just aft of the engine) as shown below, then smack the bottom of the bulkhead aft a few inches to provide access to the engine oil filter.



Aft bulkhead (optional)

- Alternatively, you may enter the trunk and remove the four or so screws securing the top of the aft bulkhead to the engine cover cross member. This will allow you to REALLY open things up as shown here. It's kind of a pain, but I don't regret doing it for the first service.





Warm-up the fluids

Running you engine, tranny and v-drive will make it easier to pump the stuff, but more importantly, it causes the oil to pick up all the particulate matter and put it in suspension - when you suck out the fluid, all the trash will come with it.

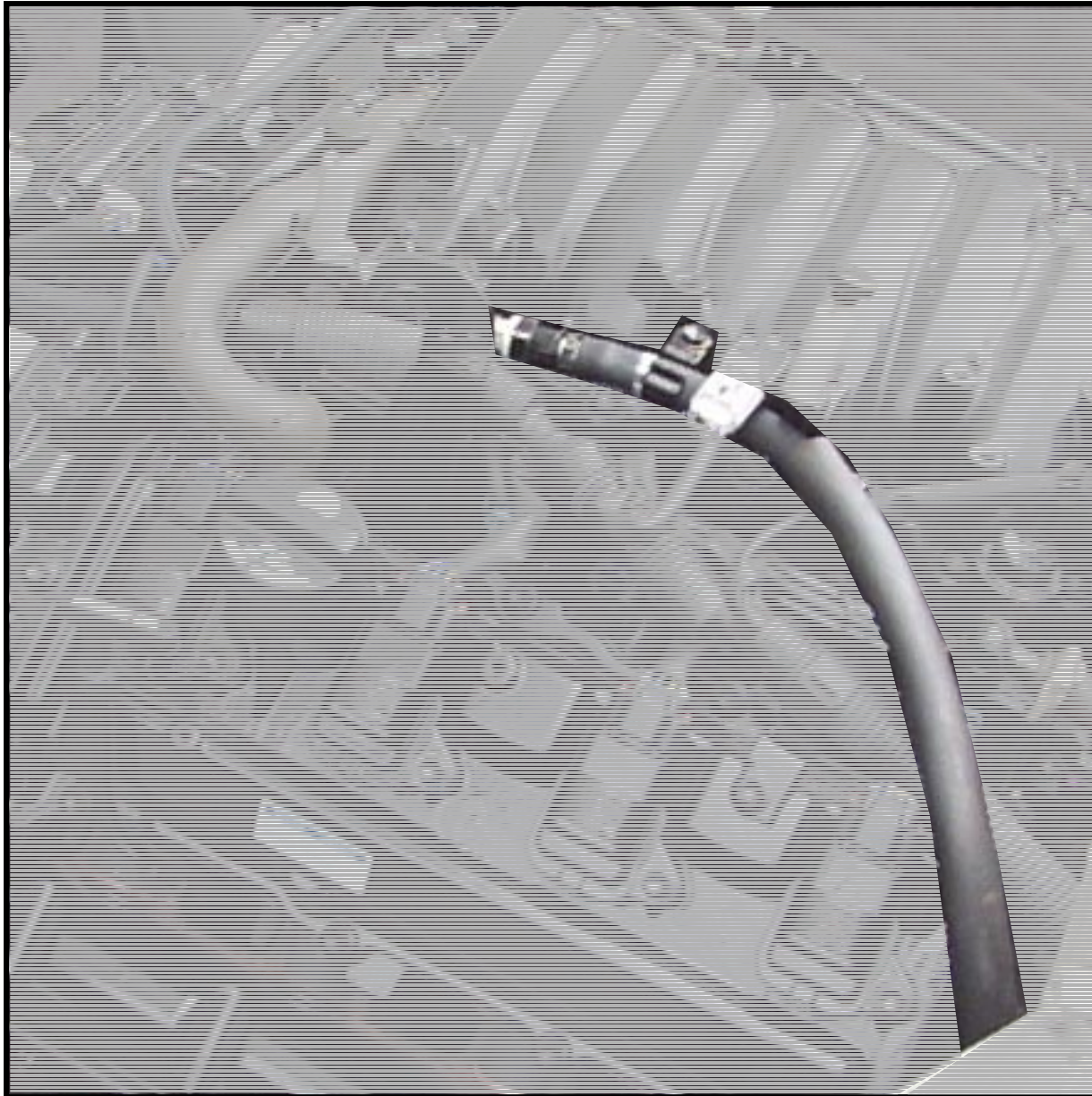
- Connect your Fake-a-Lake to the water scoop under the boat and turn on water.
- Ensure the prop is clear
- The propshaft strut has a bearing in it that'll heat up and squeal since it's not meant to be run dry. I use a spray bottle full of water and just spray a stream of water on the upper area of the propshaft occasionally. Best case would be if you could rig the Fake-a-Lake to where it was keeping that strut bearing wet, too.
- Start the engine and put in forward gear. Do not rev, just keep in gear, at idle for like five minutes.
- Inspect the fuel lines, filters, oil pan, block, tranny, etc for leaks, etc.
- **Pay attention to keep the prop clear of kids, cats, skateboards.**
- Also, make sure the propshaft bearing doesn't run dry, heat up and start squeaking.
- Gather your fluid sucker and metric wrenches, place on the starboard side of the engine.
- Take out of gear, turn off engine and water.

Suck the engine oil

- Here, you can see the sucker is stuffed all the way down into the oil pan through the dipstick hole. Although this is the easiest approach, I found it to be MUCH slower than the alternative (next slide).
- Loosen or remove the oil fill cap.
- Since you're sucking 6 quarts, you may need to interrupt the suck to drain your oil boy.



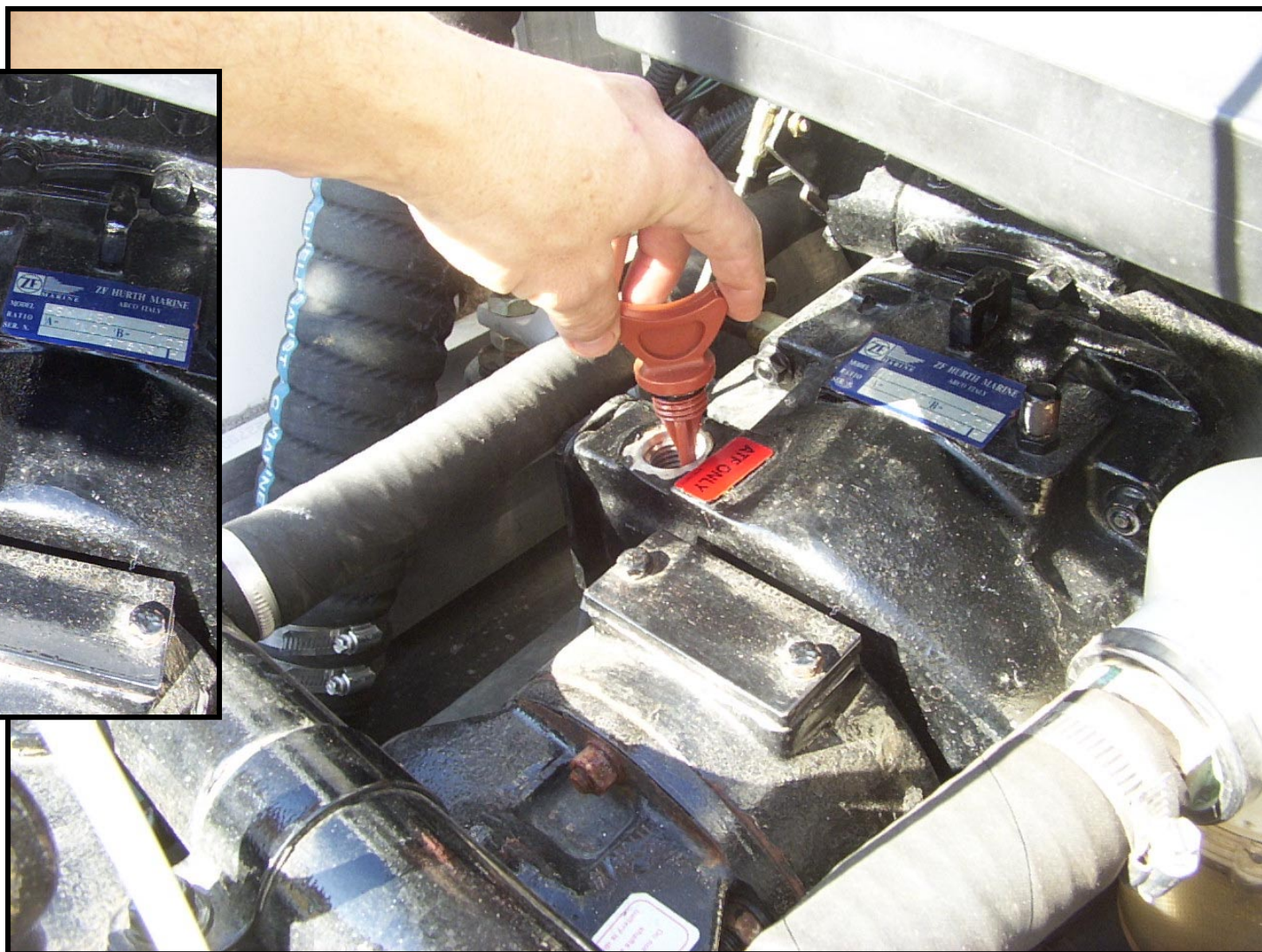
The quicker sucker



- In the past I've been happy stuffing my fluid sucker through this hose - allows me to use a bigger sucker tube and get the stuff out quicker. There's a 12mm bolt in the end of it, so just unclip the hose, remove the bolt and stuff the sucker tube all the way down into the oil pan.
- Make sure you tighten this up real good and return to clip when you're done sucking.

Suck transmission fluid

- Wipe off sucker tip to keep engine oil out of tranny.
- Remove the tranny dipstick and stuff your sucker straight down in there.
- Note the oil boy's starting fluid level - you should get like two quarts out of the tranny.



Suck v-drive oil

- Wipe off sucker tip to keep tranny fluid out of the gearbox.
- Remove the v-drive disptick and stuff your sucker straight down in there.
- Note the oil boy's starting fluid level - you should get like one quart out of the v-drive.



Drain and remove engine oil filter

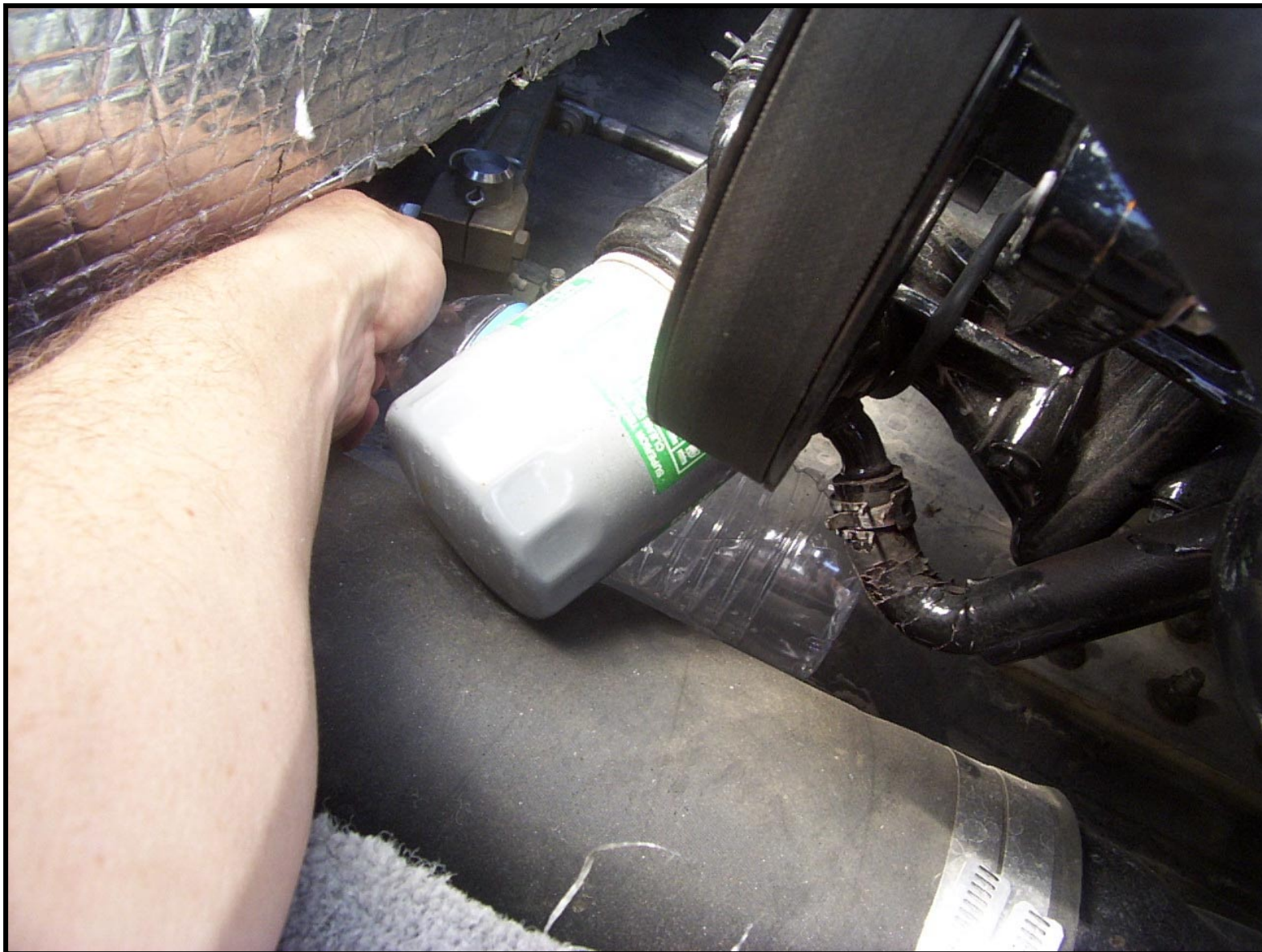
When you pull the oil filter, it'll try to dump oil everywhere.

I've had good results cutting a plastic bottle to fit underneath the filter, then SLOWLY draining the filter. Once the filter stops draining, CAREFULLY get the plastic bottle and then the filter out of the boat.



Oil filter, continued

This is kinda tricky - worse case you're cleaning a cup of oil out of the bilge.



Oil filter, continued

- The more full it gets, the more fun.
- This is where taking the time to remove the center aft bulkhead makes things a little easier.

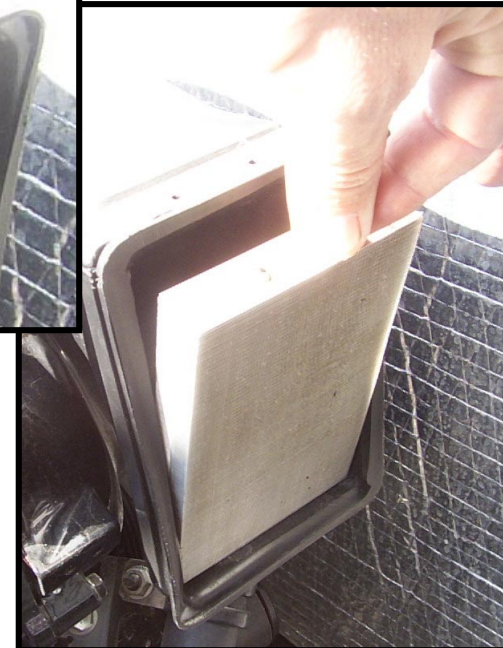
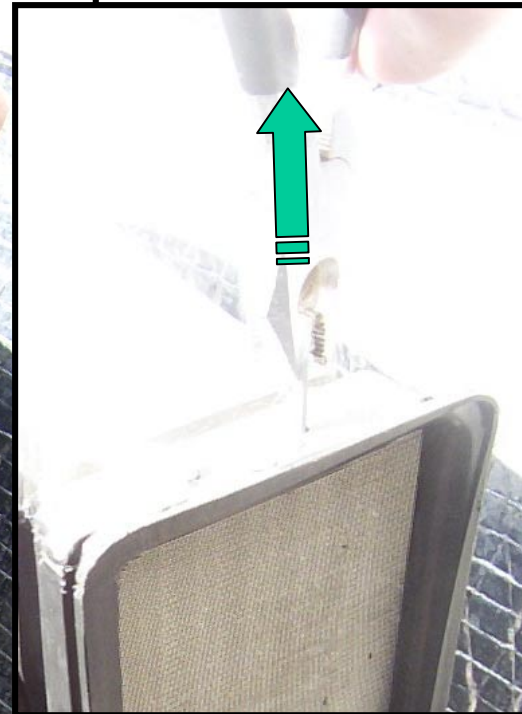
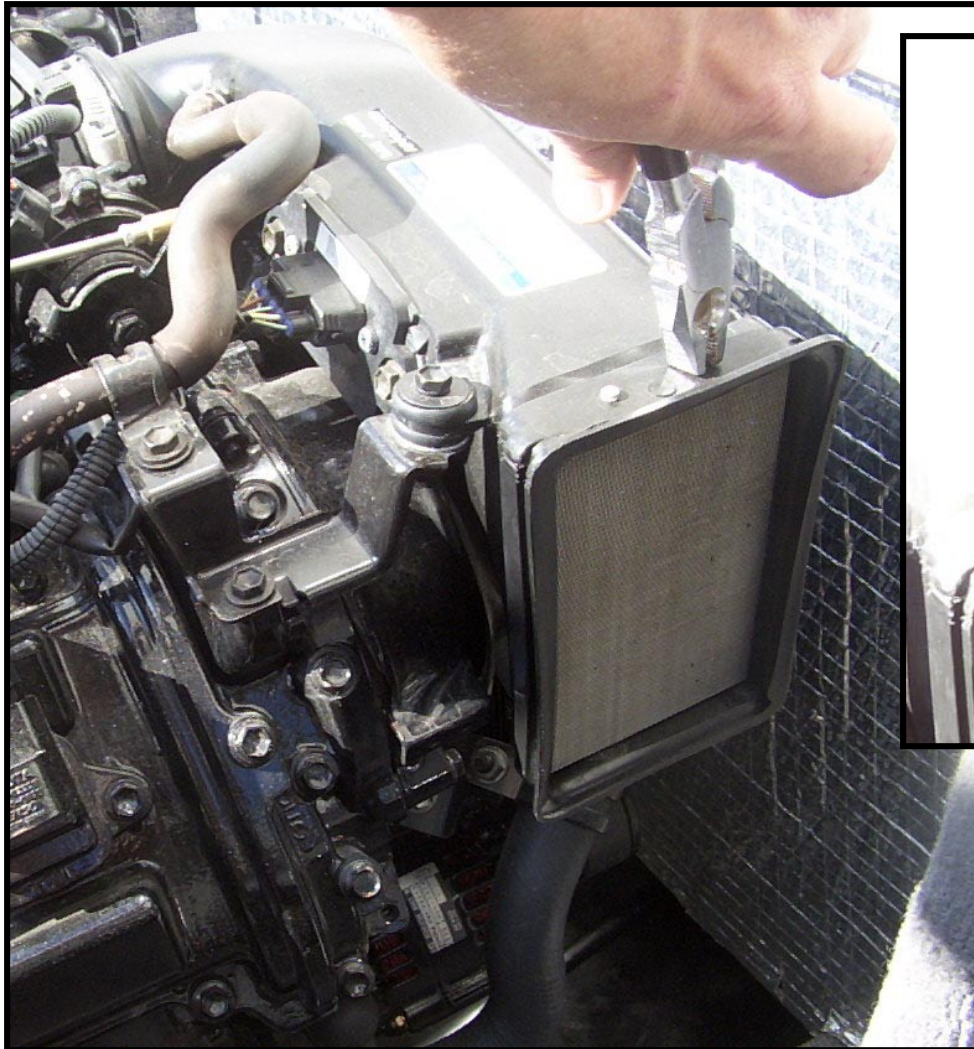


Take your new \$12 Mobil1 M1-102 filter and spread a little oil around the rubber seal.
Wipe clean the seating surface on the oil cooler.
Screw it on carefully until it seats, and then an extra 3/4 turn or so to tighten.

Remove and clean spark arrestor

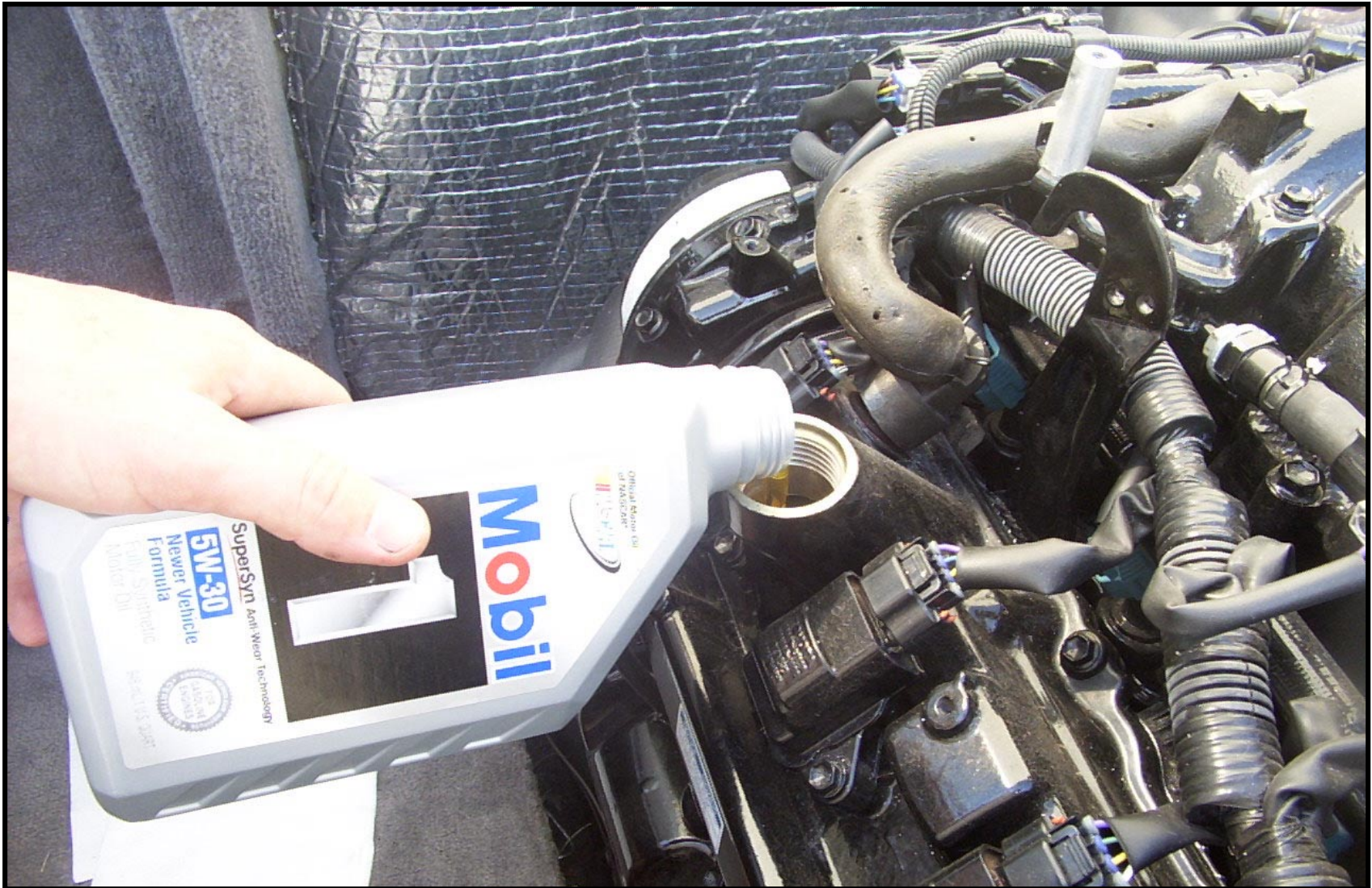
The spark arrestor is an air filter of sorts. Pull the two rods that hold it in, CAREFULLY remove the arrestor, then spray clean with Brake System cleaner or Throttle Body spray cleaner. Let soak for a little while then spray with compressed air and set aside.

The spark arrestor MUST BE COMPLETELY DRY before you reinstall it, so we leave that for later.



Fill engine

- Fill with 5 to 5.5 quarts of Mobil1 5W-30 engine oil.
- Better to underfill at this point than overfill, cuz it's easier to add oil than suck it.



Fill tranny

- Using funnel, fill with two quarts Mobil1 ATF.
- *Two quarts has worked for me but it clearly doesn't match the dipstick. To match the dipstick tick marks, there'd only be like a half-quart in there. The owner's manual describes reading the dipstick AS SOON AS the engine's turned off, so the high reading with two quarts probably has to do with the capacity of the tranny cooling system. Am open to suggestions here.*



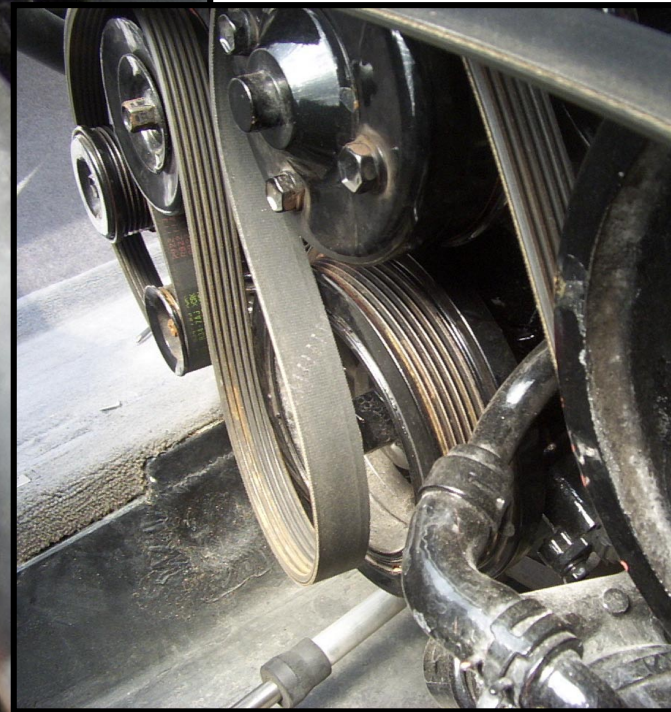
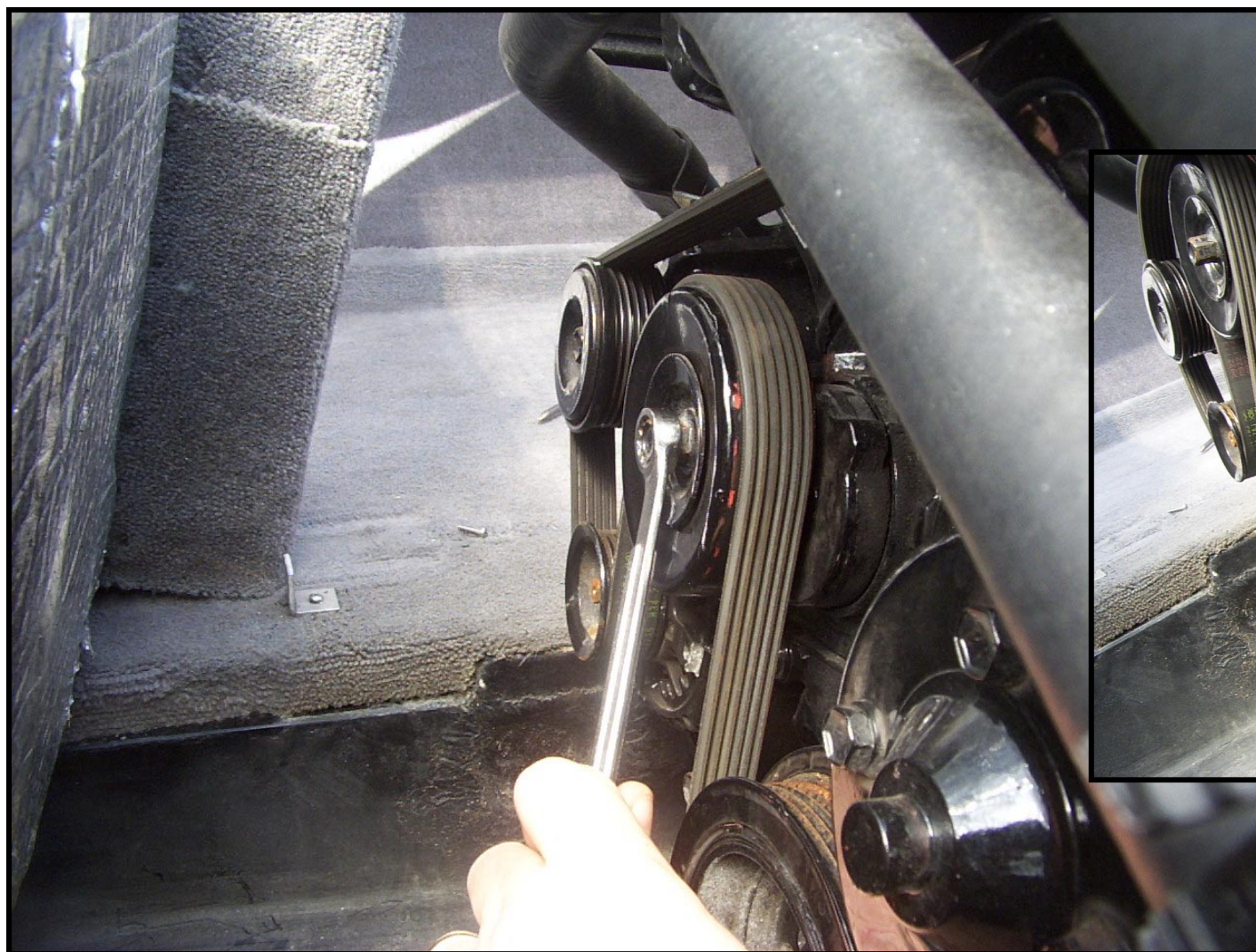
Fill v-drive

- Using small funnel, fill the v-drive gear box with one quart of Mobil1 75W-90 gear oil.



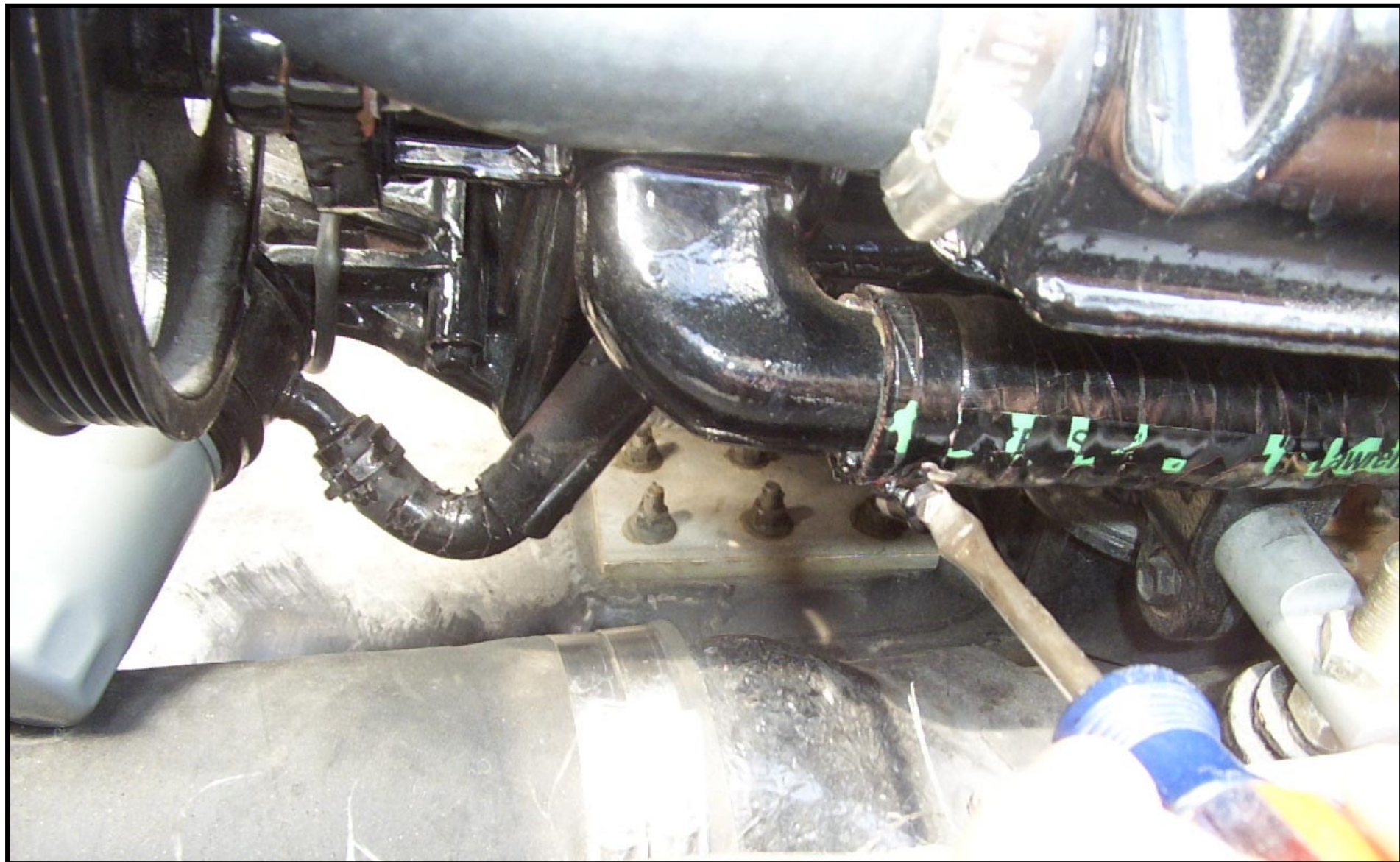
Remove serpentine belt

- The belt is held in place by a tensioner. Put a wrench on the tensioner and turn to loosen the belt. At the same time, slide the belt off a pulley or idler.
- Take the belt completely off and inspect for cracking, fraying, broken grooves. It's a 1000 hour or 10year belt, but you DON'T want to have this sucker break.



Remove water pump

Loosen hose clamp and slide forward (to the right) - you won't get the hose off until the water pump's loose



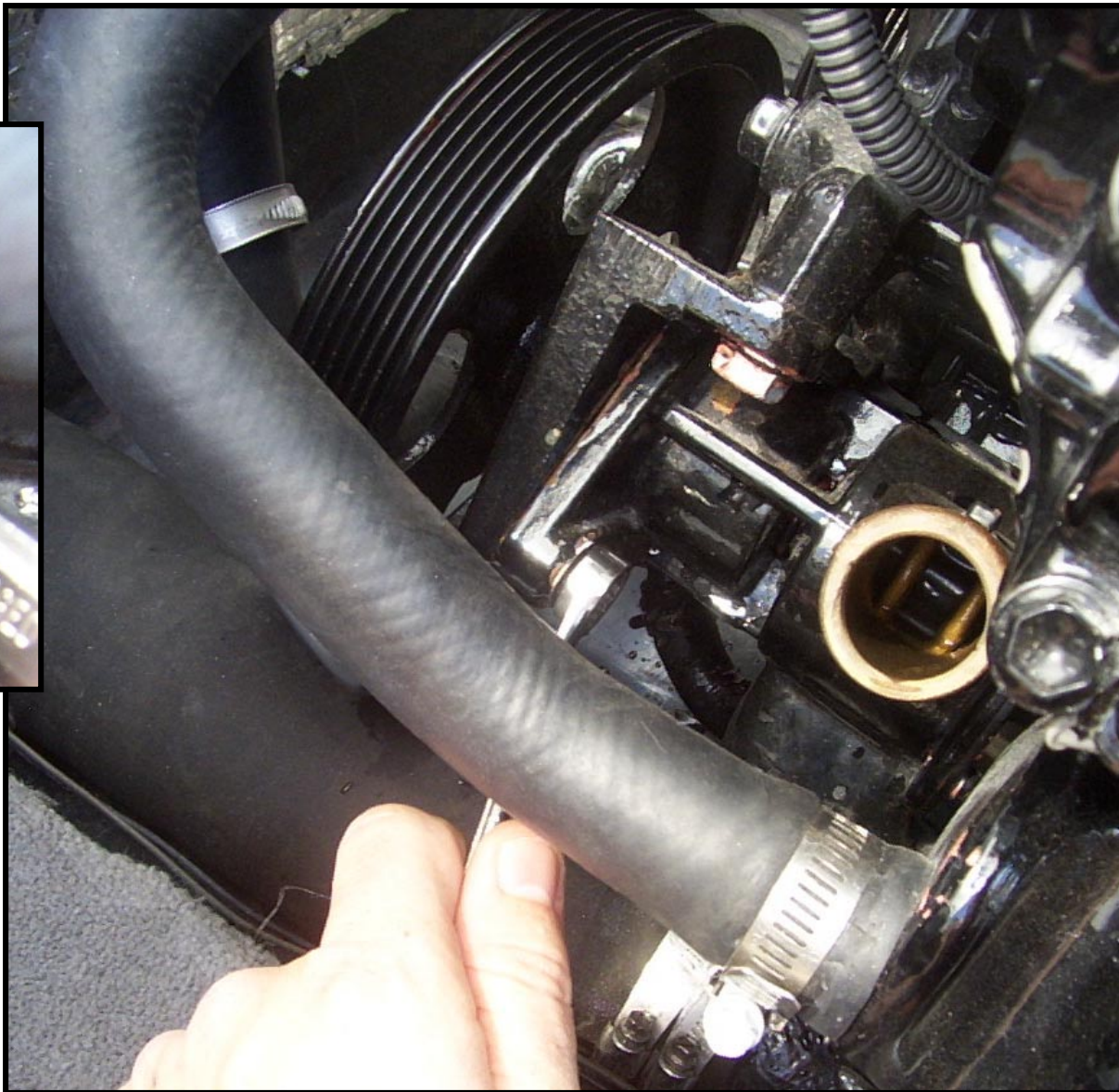
Remove water pump, continued

Loosen upper hose clamp and pull hose off and up & out of the way



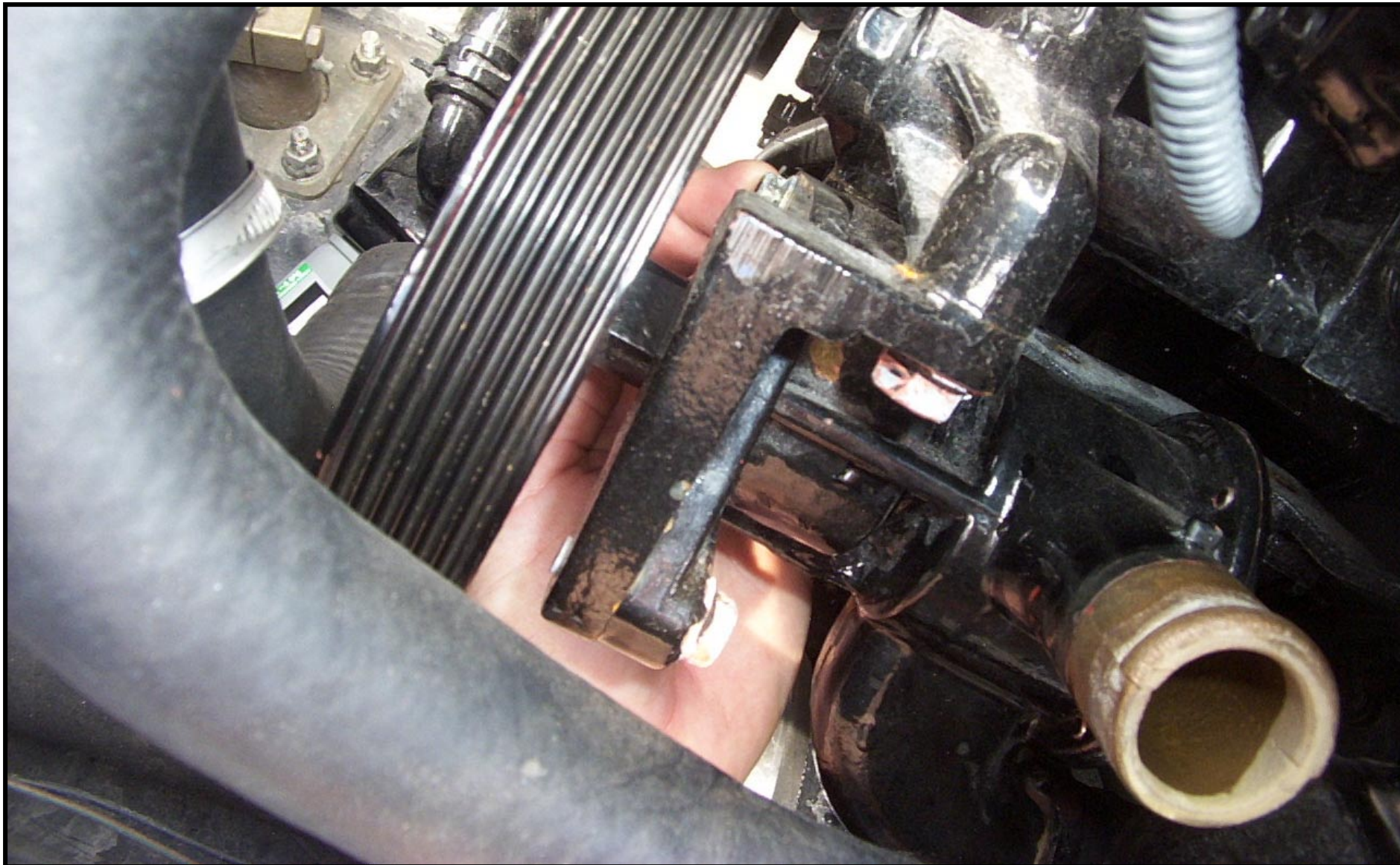
Remove water pump, continued

Remove outboard bolt



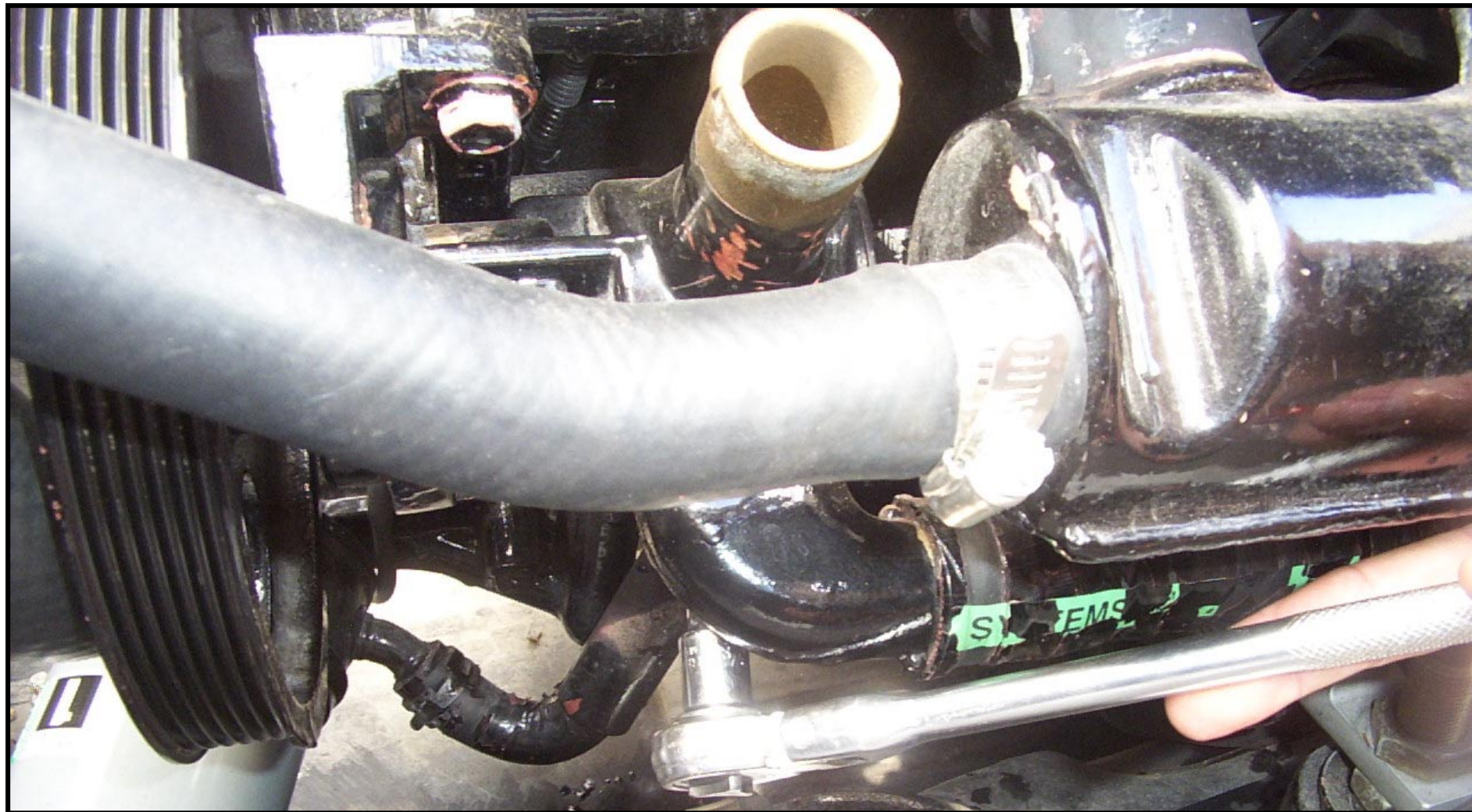
Remove water pump, continued

Remove second, inboard bolt (my pointer finger's on it)



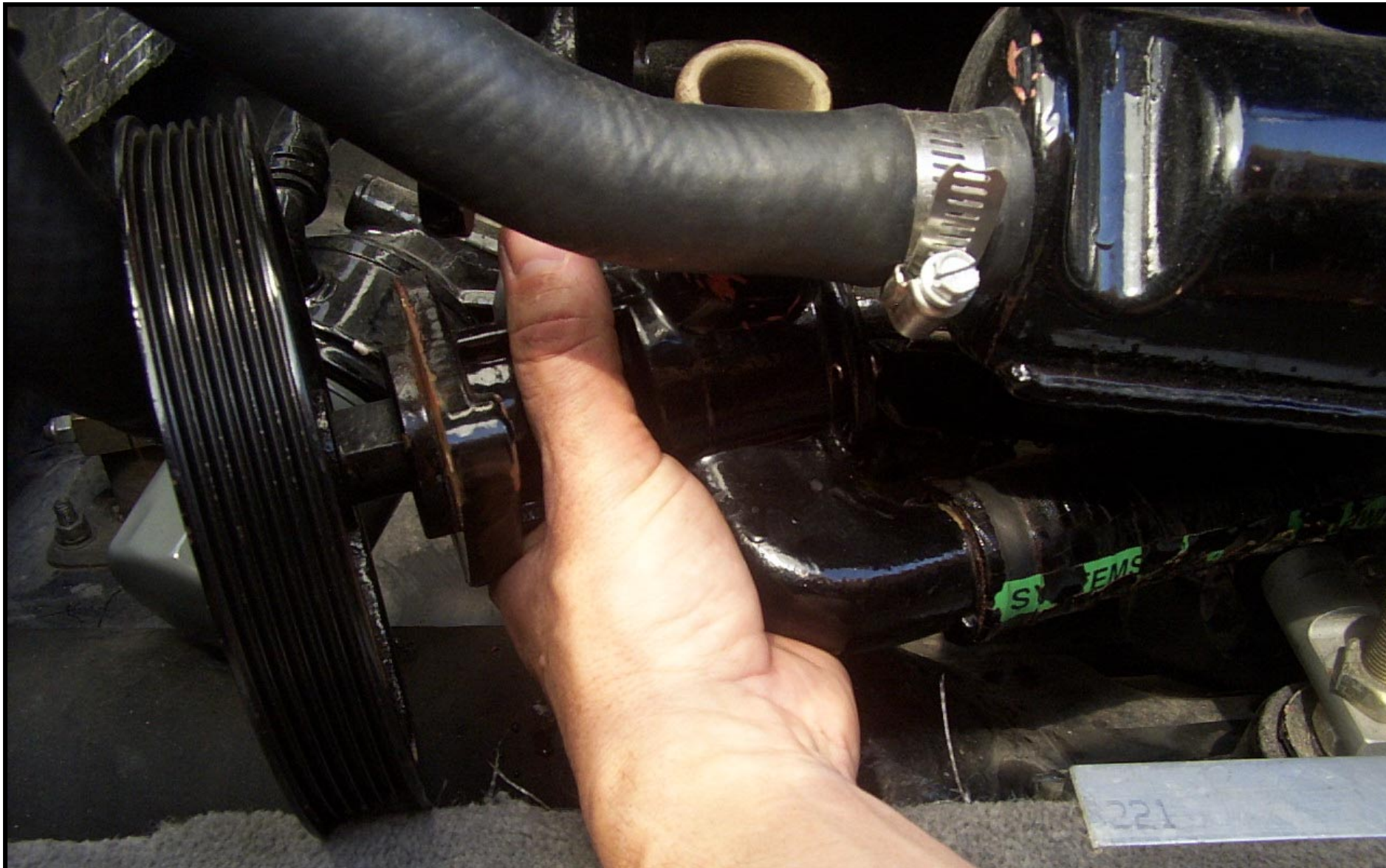
Remove water pump, continued

Remove third bolt, the inward-pointing one



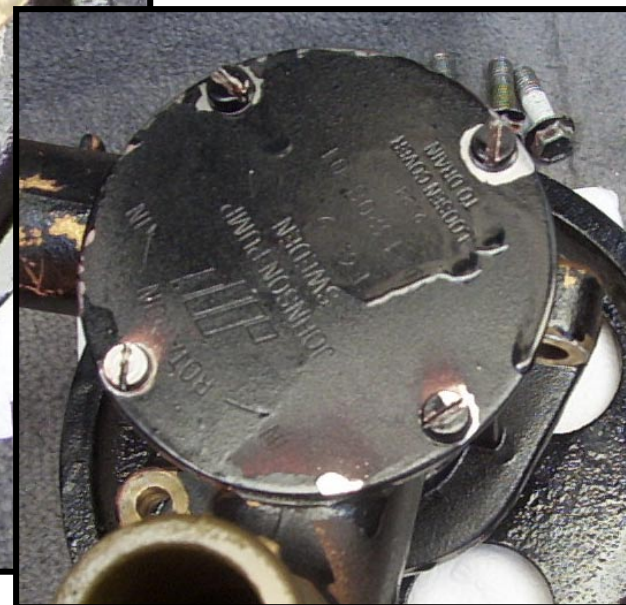
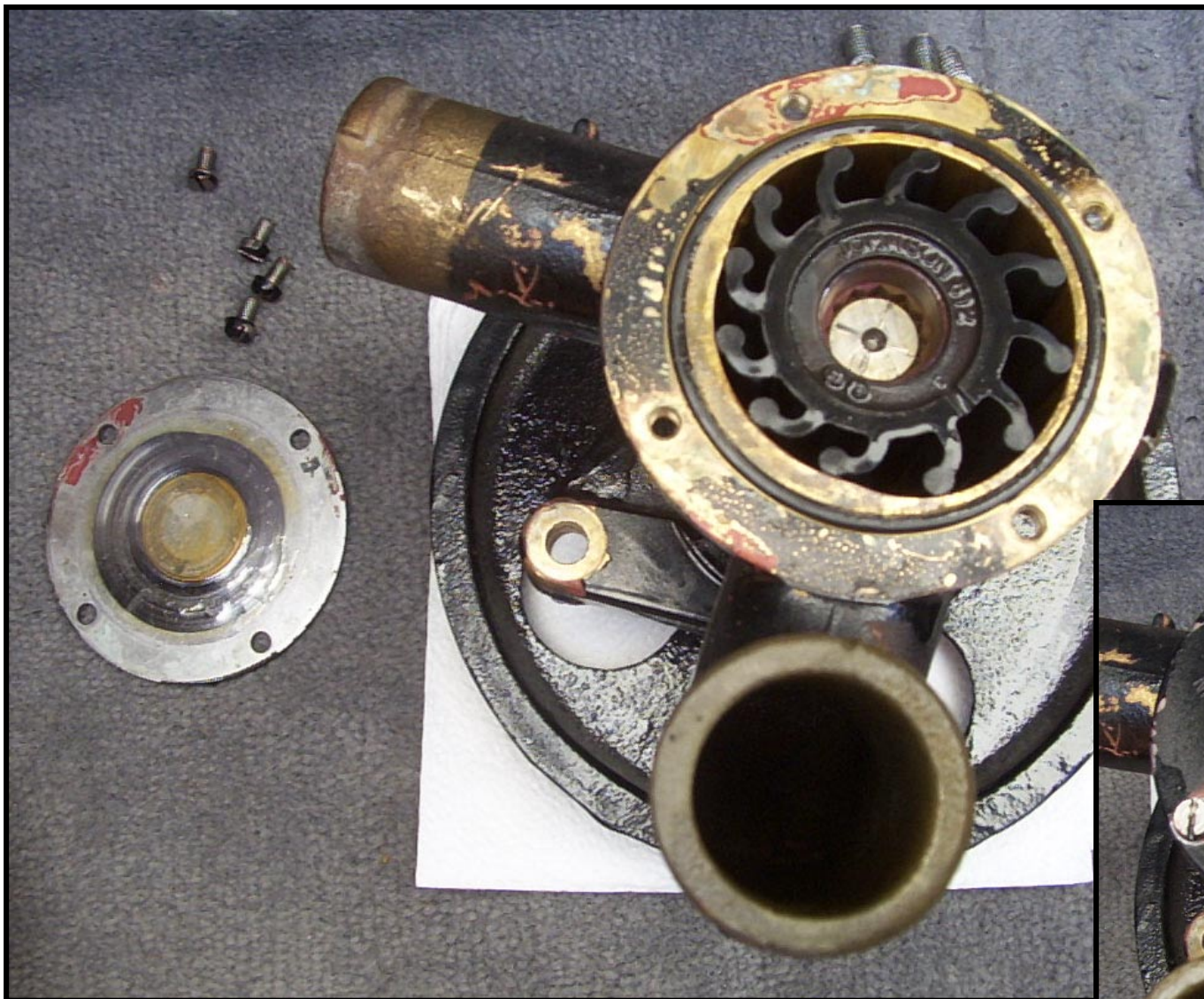
Remove water pump, continued

The pump is now free except for the lower hose. Wiggle and pull pump nipple out of hose.



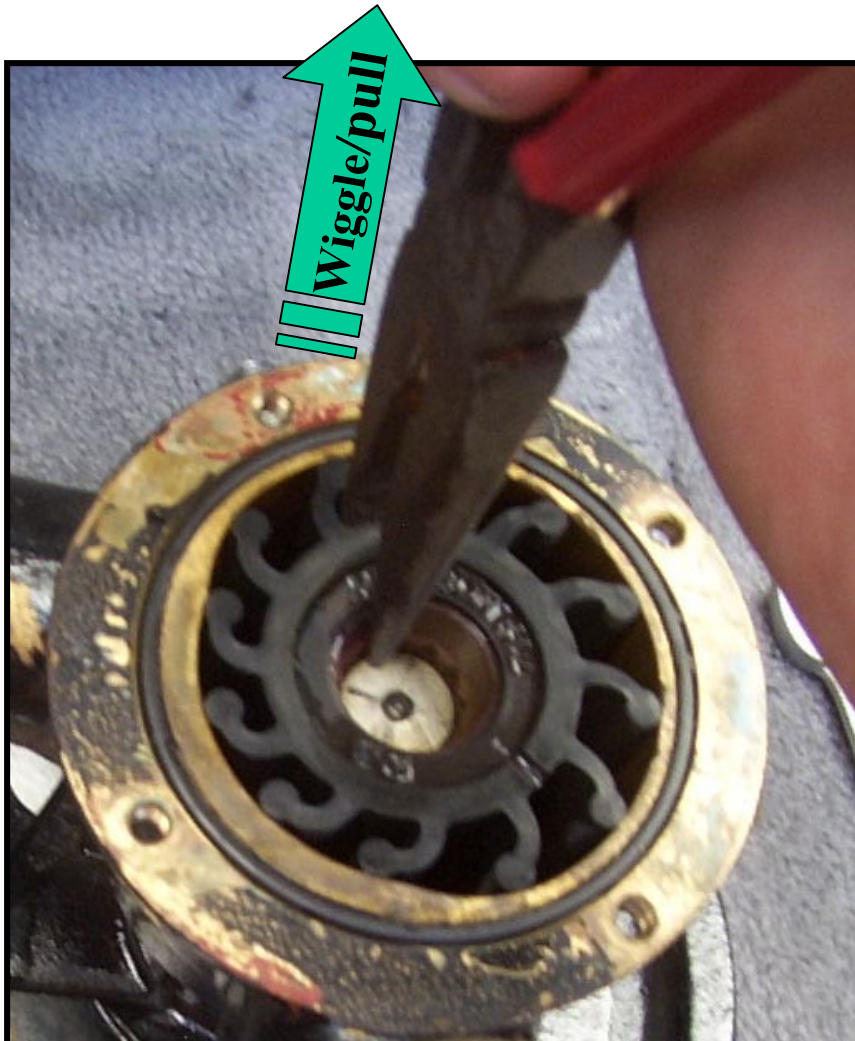
Open the water pump

....by unscrewing the four screws and pulling plate off. Inspect seal for nicks, etc.



Remove old impeller

If you're gonna try to keep the impeller as a spare, use caution when pulling this thing. If not, just yank it. Also kinda helps to rotate the housing at the same time (hence the big toe treatment)



This is a lot easier if you're not taking pictures

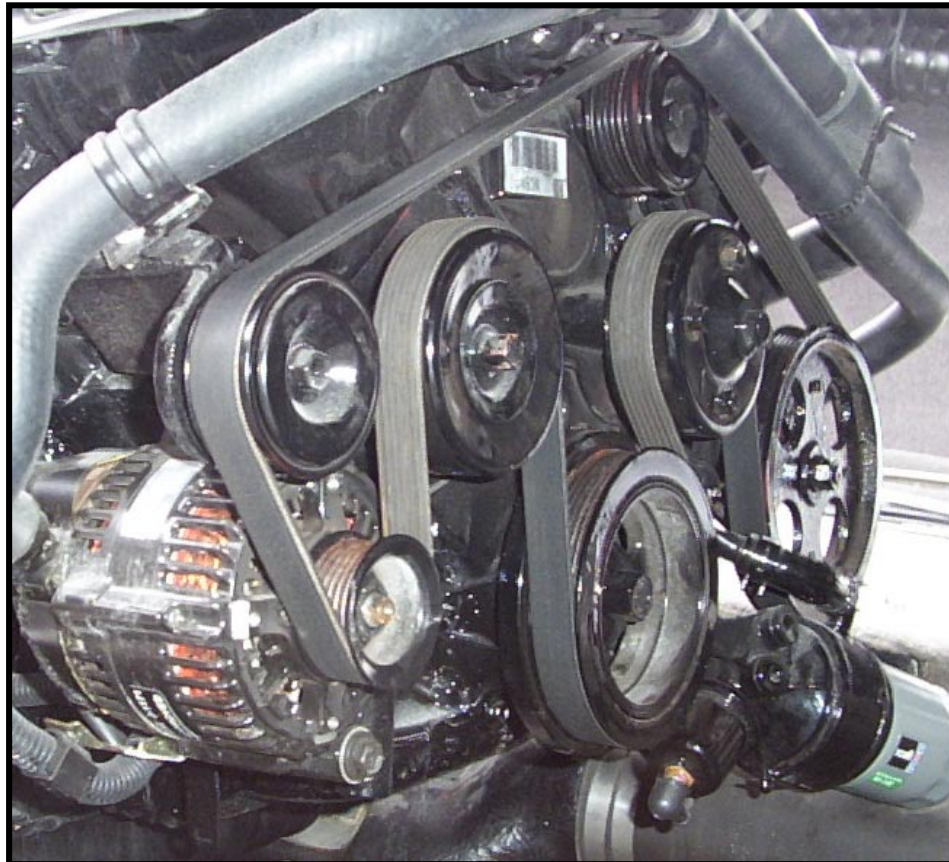
Insert new impeller

- Next, install new impeller (make sure the correct side is facing up but don't worry about which direction the vanes are pointed.)
- I coat the impeller with binding lube, but you can use detergent just as well.
- Cover will only go on one way due to screw holes.



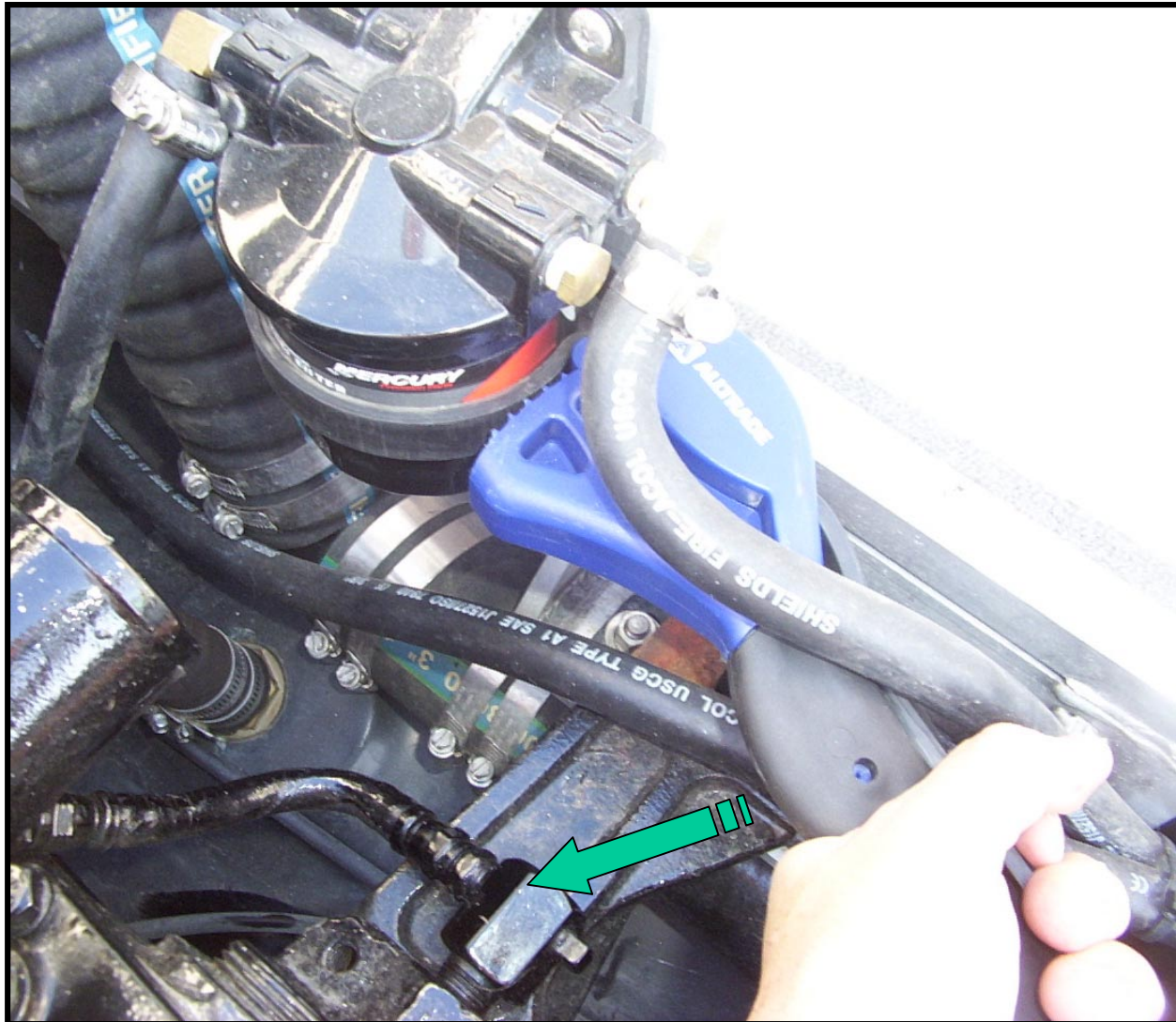
Reinstall pump and belt

- Slide lower hose onto pump nipple.
- Loosely install three water pump bolts, then tighten.
- Slide upper hose onto pump and tighten hose clamp.
- Tighten lower hose clamp.
- Route serpentine belt across all pulleys except the tensioner wheel.
- Use wrench to load tensioner pulley and slide belt over it.
- Make sure belt's routed correctly and that belt is centered in each pulley track.



Remove fuel/water separator

- Clamp fuel lines on either side of fuel filter shut. Not critical, but helps minimize amount of air in the system.
- CAREFULLY unscrew and remove fuel filter. IT'S FULL OF GAS, so have a drip rag ready.



Fill and install new fuel filter

- Fill filter with new gas (whatever you do, don't use crappy old lawnmower gas like I do ;-)) and install.
- Follow tightening directions on filter box (it's like 3/4 turn past contact).
- Be very careful to get it on correctly and tight.
- Remove clamps.





The other important stuff

This'd be a good time to:

- Disconnect drive shaft coupler and perform engine alignment inspection.
- Replace propshaft packing if required.
- Reconnect drive shaft coupler.
- Lubricate steering/rudder and throttle/shift linkage.
- Wipe down bilge and engine/drivetrain.

Trailer stuff:

- Remove Fake-a-Lake.
- Jack trailer (put on blocks or jack stands).
- Remove wheels and inspect brake pads and lines, replace bearings if necessary.
- Drain brake fluid, refill with DOT 3 brake fluid and manually bleed brakes.
- Replace wheels (95 ft/lbs), check tire inflation (50 psi) and lower trailer.
- Replace Fake-a-Lake

Finish boat:

- Verify spark arrestor is clean and dry, then reinstall.
- Turn on water, spray prop strut bearing, and run engine at idle, in gear for five minutes.
- While it's running, inspect for fuel, oil, exhaust or water leaks.
- Secure engine and water.
- Check engine oil level, fill if necessary.
- Replace bulkheads, floorboards, etc.