

TOYOTA Epic22 Perfect Pass Install

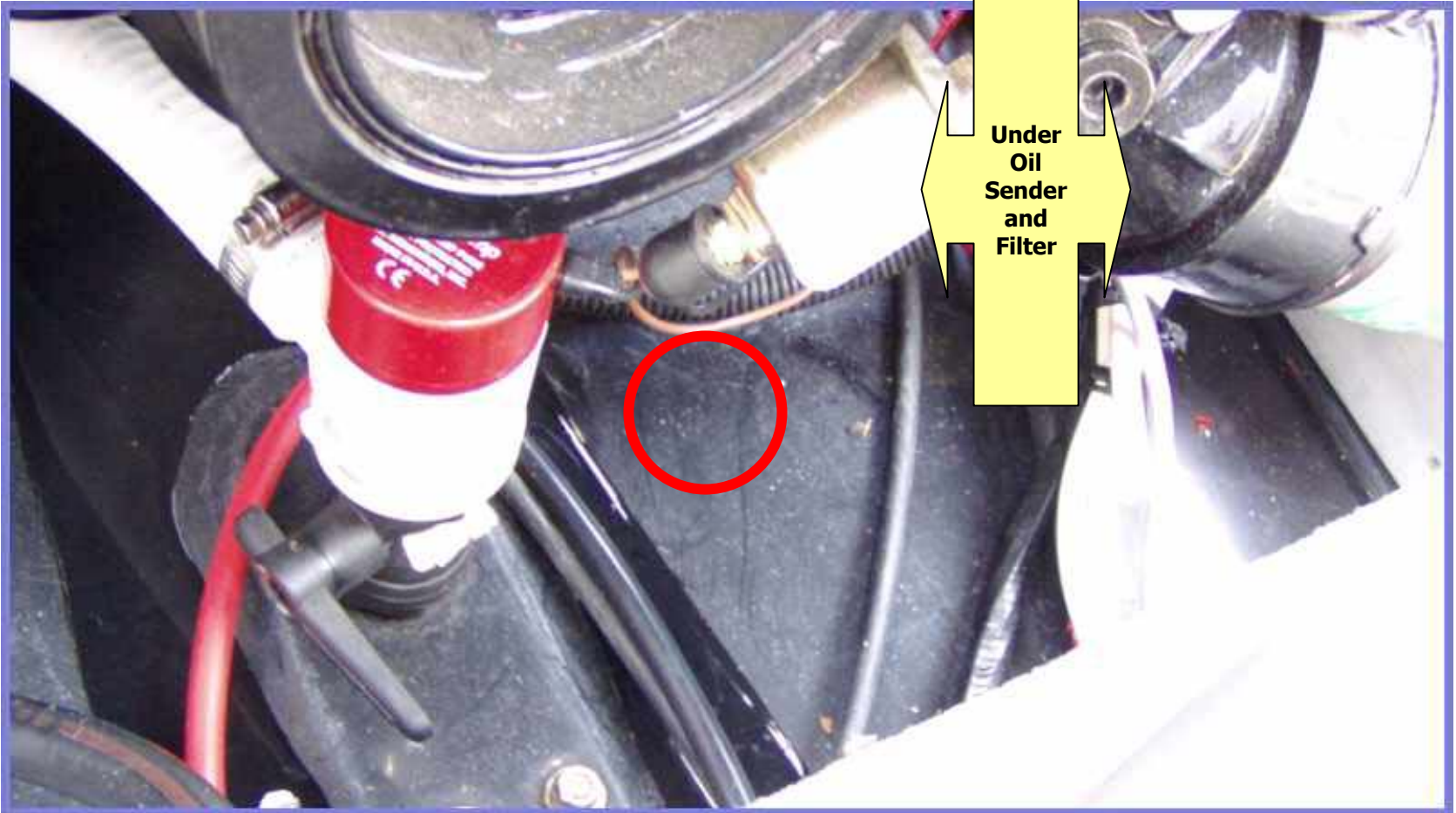
To start, here is the paddle wheel speedometer install. This alone is almost worth the price of the kit. You'll need:

- 2" hole saw and drill
- 5200 Marine Sealant
- Tape Measure
- Sharpie
- Sandpaper, coarse
- 5 Minute Epoxy
- Perfect Pass Kit
 - Includes paddle wheel assy, all fittings and cable
 - Brain box
 - Wiring and wire ties, screws and hardware.
 - Servomotor and cables
 - Dash Gauge
 - Installation Manual

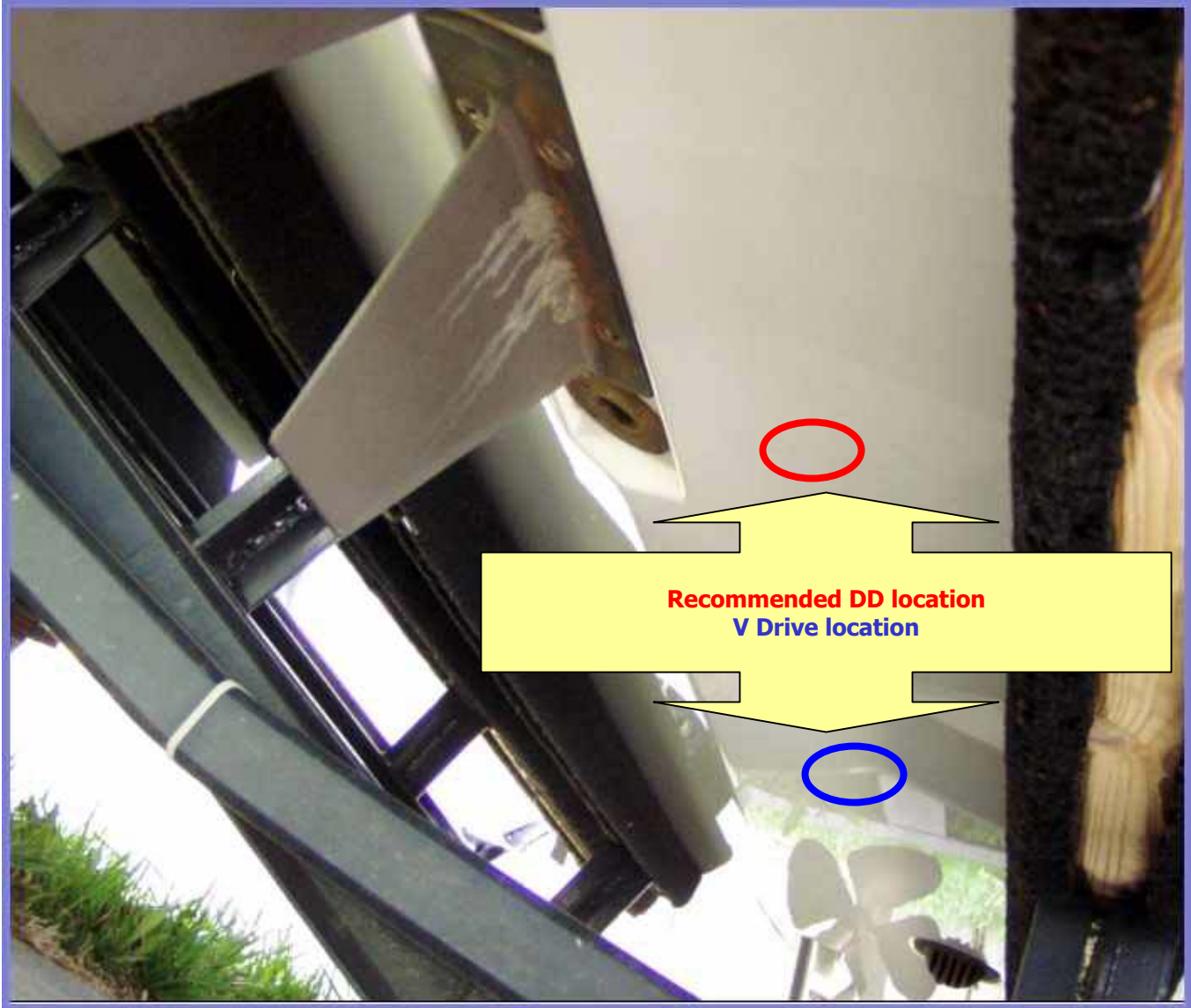


Locate paddle wheel

This is the location recommended by the Perfect Pass manual for a Direct Drive. 6-7" off centerline adjacent to drain plug. I chose to put my paddle wheel about 18" further back, in the typical V drive location. I did this because I like to run with gobs of weight in the back.

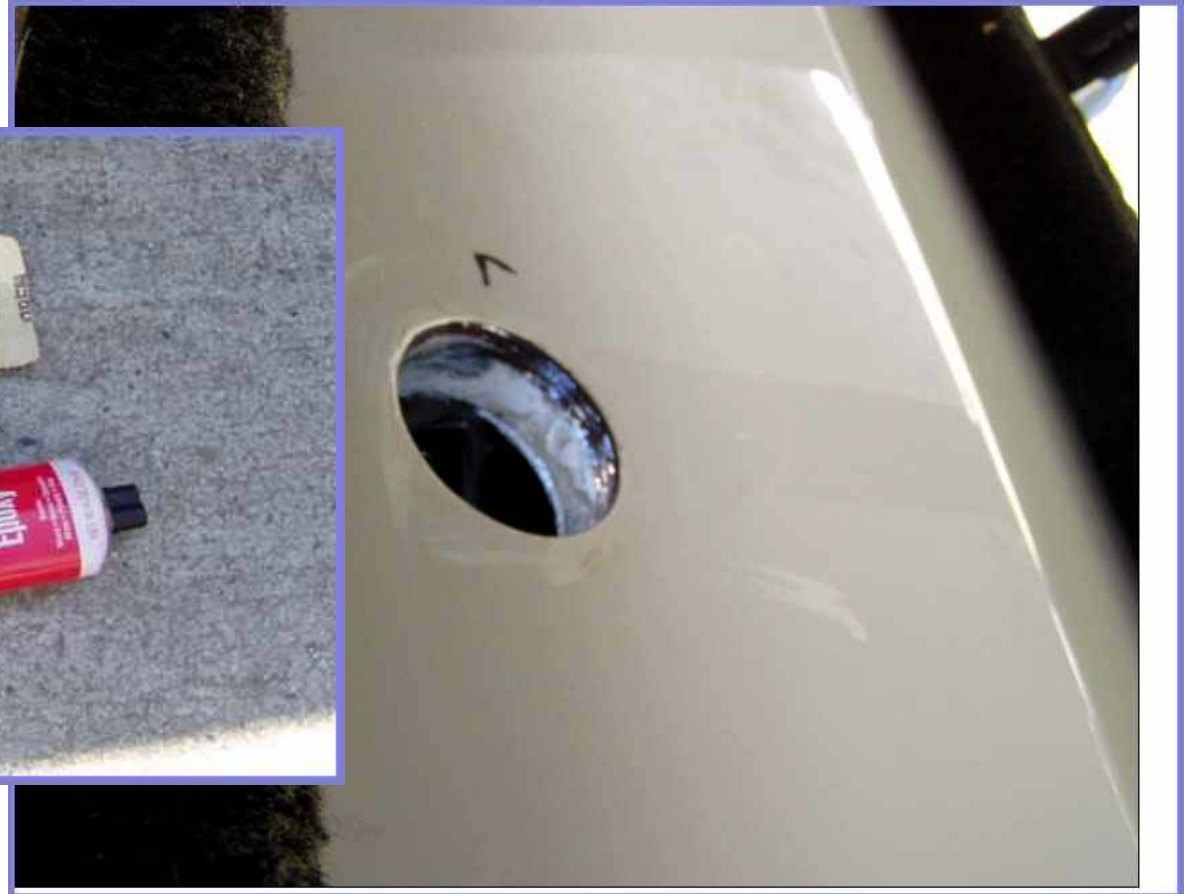


Mount the
paddle
wheel
away from
trailer
bunks.



Under the boat

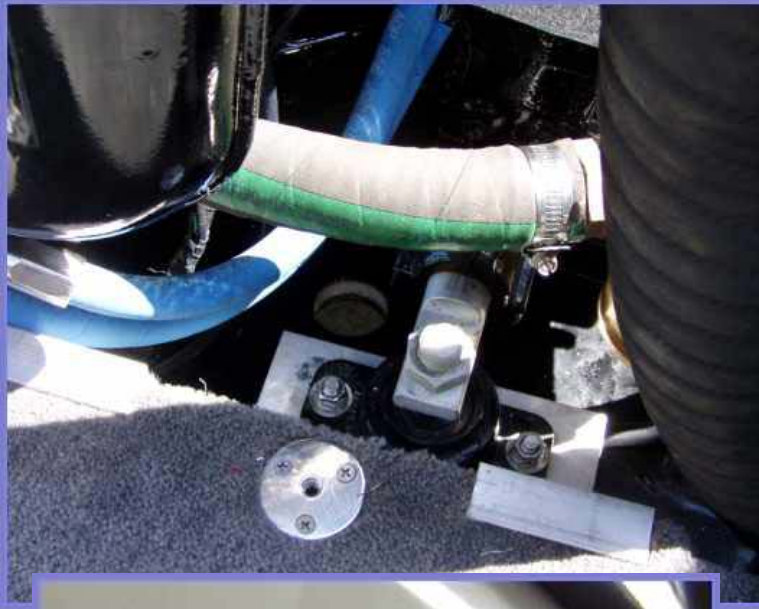
Using the tape measure, mark a spot 7-8" off centerline, 10-12 inches in front of the scupper. Drill a hole. Start the hole, then reverse the direction on the drill. This will cut through the gelcoat without chipping. Using the coarse (80 Grit) sandpaper, smooth the edges of the hole and the fiberglass inner and outer shell. I used silicone marine caulk to fill an open area between the shells. After it cured, I sanded the edges and applied 5 minute epoxy with a Q tip to seal the fiberglass.



Drill and seal hole

Dry fit the speedo flange in the hole, make sure the housing fits flush with the hull. Clean the hull top and bottom. Using the 5200 caulk, goop up the outside of the threaded flange where it will contact the boat. Slip it in, with the arrow (underside) and notch (top side) pointed at the bow eye. From the top, put on the rubber washer and the plastic nut. Tighten while maintaining bow orientation. Sealant should squeeze out equally around the underside fitting. I used only enough (3/4") of sealant so that the gasket and nut are not glued in place.

Mount Speedo flange

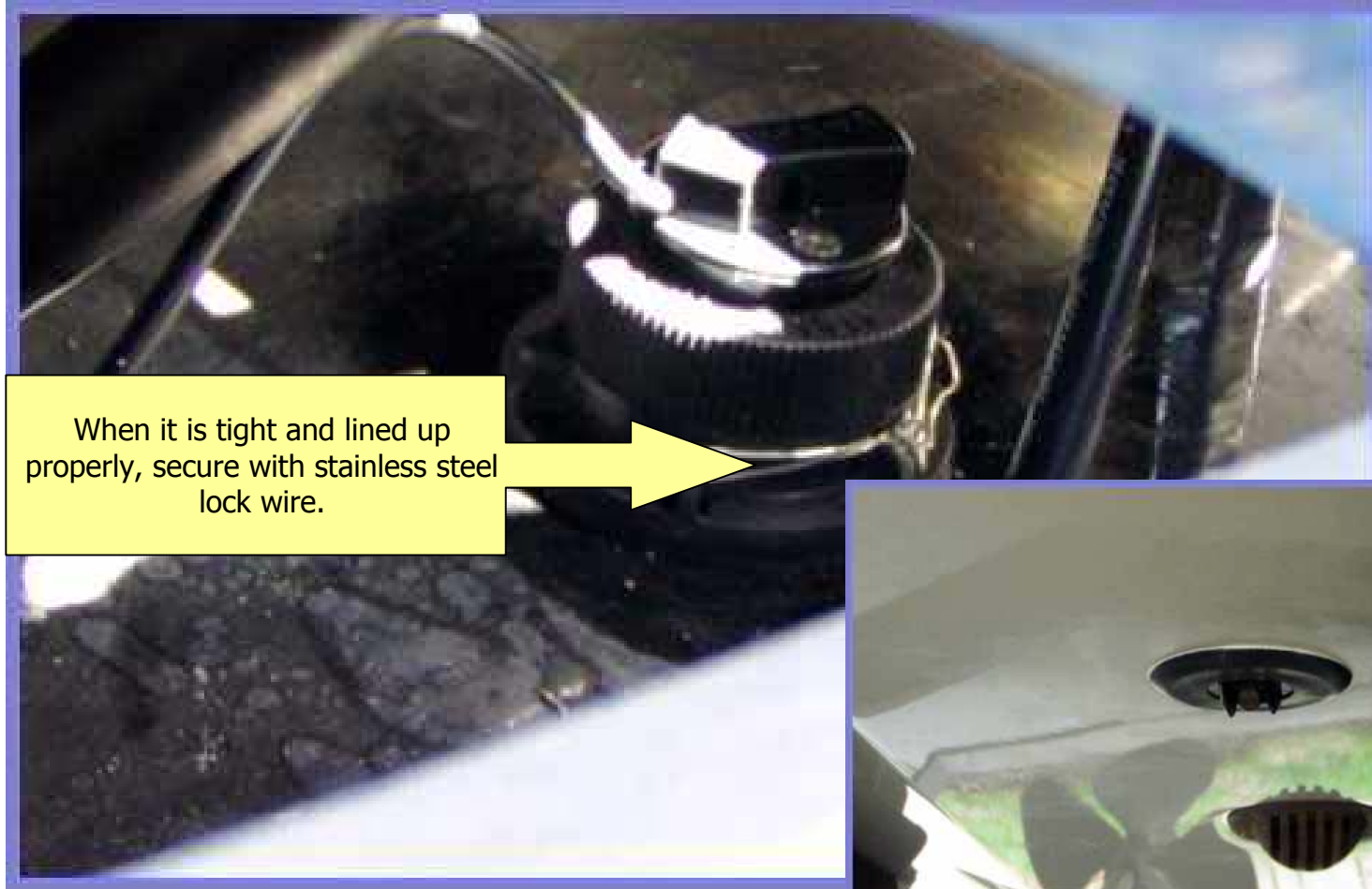




This is the secret to dealing with 3m 5200 sealant. After you have the nut tight, blast the fitting and the hull with cheap Brake Cleaner. It dissolves the sealant. Wipe off with paper towels.

Tip #1 5200 Sealant

Insert the paddle wheel module, screw cap down on fitting. Do this before the 5200 sets up, as you tighten the cap the assembly will turn. Note that wire exits to the front, arrow on top of the unit.



When it is tight and lined up properly, secure with stainless steel lock wire.

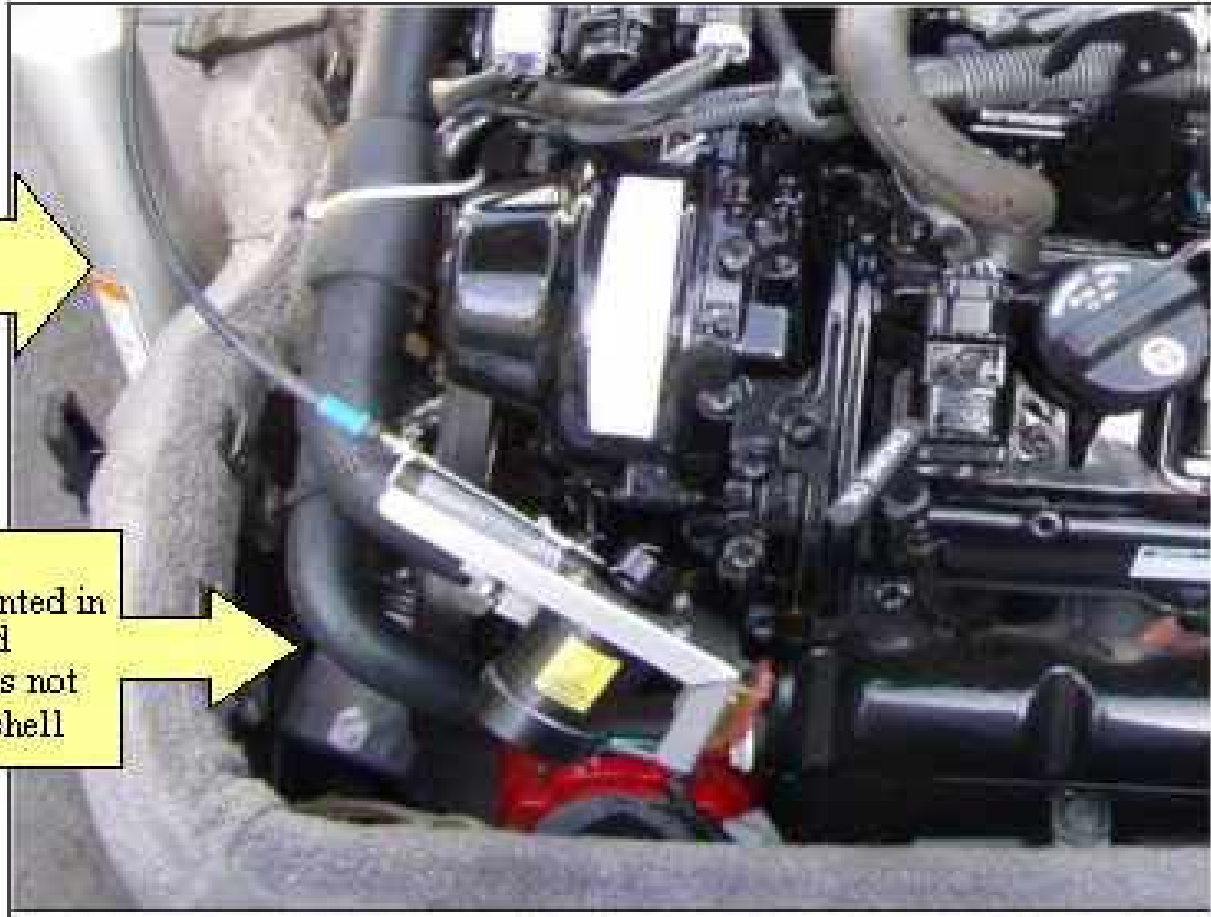


Mount Speedo

The Servomotor mounts with hose clamps to the top cooling hose, port side on a Direct Drive. Two Perfect Pass cables came with the kit, I used the long one. There is a pigtail off the servomotor assembly, and a long gray cable with Molex connectors. Make SURE that the motor and wiring does not contact the serpentine belt. Also, make sure your bilge pump works, Perfect Pass won't honor the warrantee on the motor for water damage.

Stabilized hoses with wire tie to support weight of actuator. Hoses could flex and contact drive belt without support

Perfect Pass actuator mounted in recommended location. Does not contact clamshell



You can see that you must remove the battery and floor panel to run the cables. The panel pops out once the battery is removed, no screws. You have to turn it while lifting to clear the seat and the ski pole. Two people the first time, until you're good like me!
Run cable along passenger side with main harness. Secure with loose wire ties. When you get to the hole by the bilge pump, stop.



Route Cables

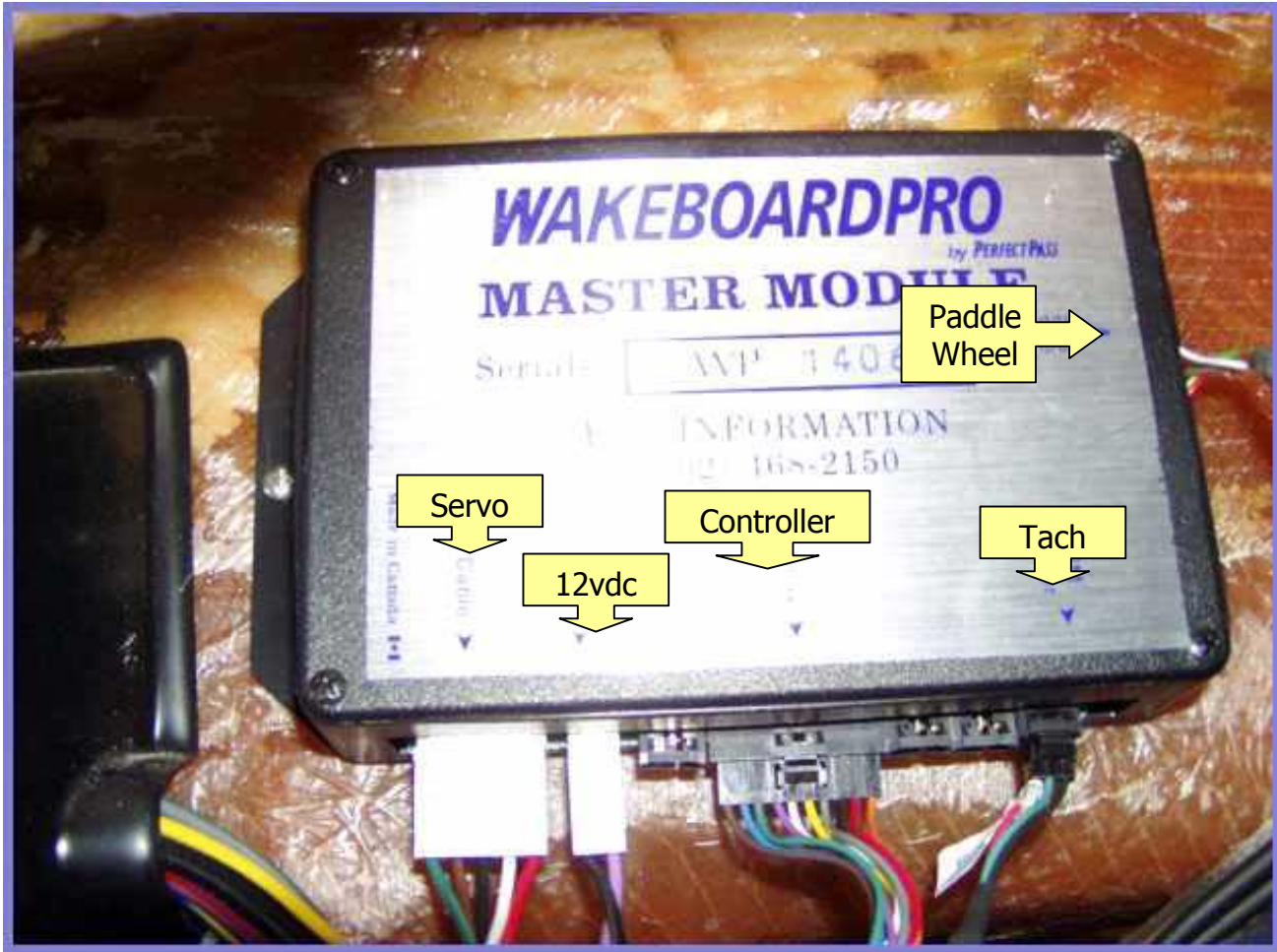
Facing the stern, reach under aft part of driver side front seat. Feel for a hole on the right side going down into the bilge. Straighten a coathanger and stick it down into the bilge. From the access hole by the bilge pump, look up inside hole with flashlight, grab the end of the coathanger. Tape the connector end of the cables to it, pull it back through into the front seat.



Hole to bilge is at deck level inside compartment

Tip #2 Routing to dash

Route the cable up to the module See the pics further down. I installed my module under the dash, on the back upper bulkhead to the right of the circuit breaker box. It's the back side of the driver side bow seat. The paddle wheel plugs into the upper right side of the box.



Installed dash gauge with speedo input. To remove the old gauge, get someone with skinny arms to reach up into the dash and unscrew the two nuts on the back of the gauge. There is a clamp that holds in the gauge. The PP gauge installs the same way.



Back of Speedo, 2 x 5/16 nuts. Long shafts to accommodate thick dashboards. Aluminum clamp secures gauge to dash. Obviously not a Toyota specific part. The nuts were hand tight.



Gauge Detail

Tach input is 2 pulse per revolution. Special firmware is required for this. The Perfect Pass module is programmed specifically for Toyota. It only matters if you want to use RPM based towing. Speed based towing is done off the paddle wheel.

This is the main engine harness, the wire colors are purple/black stripe, purple/white stripe, It blue, tan, yellow with red stripe, brown and GREY (no stripe) I pulled the grey wire out of the bundle a bit here, the colors look weird in this pic.

Toyota engine harness colors use the same standard as most boat brands. Tap into the grey wire, using the blue vampire tap. That's the 2PPR tach signal from the engine.

Incidentally, 2ppr is typical for a 4 cyl engine, 4ppr is a typical 8 cyl, and the paddle wheel speed is 4ppr.

As you can see, it is located under the dash by the breaker box, in the trunk of wires coming up from the hole from the bilge.

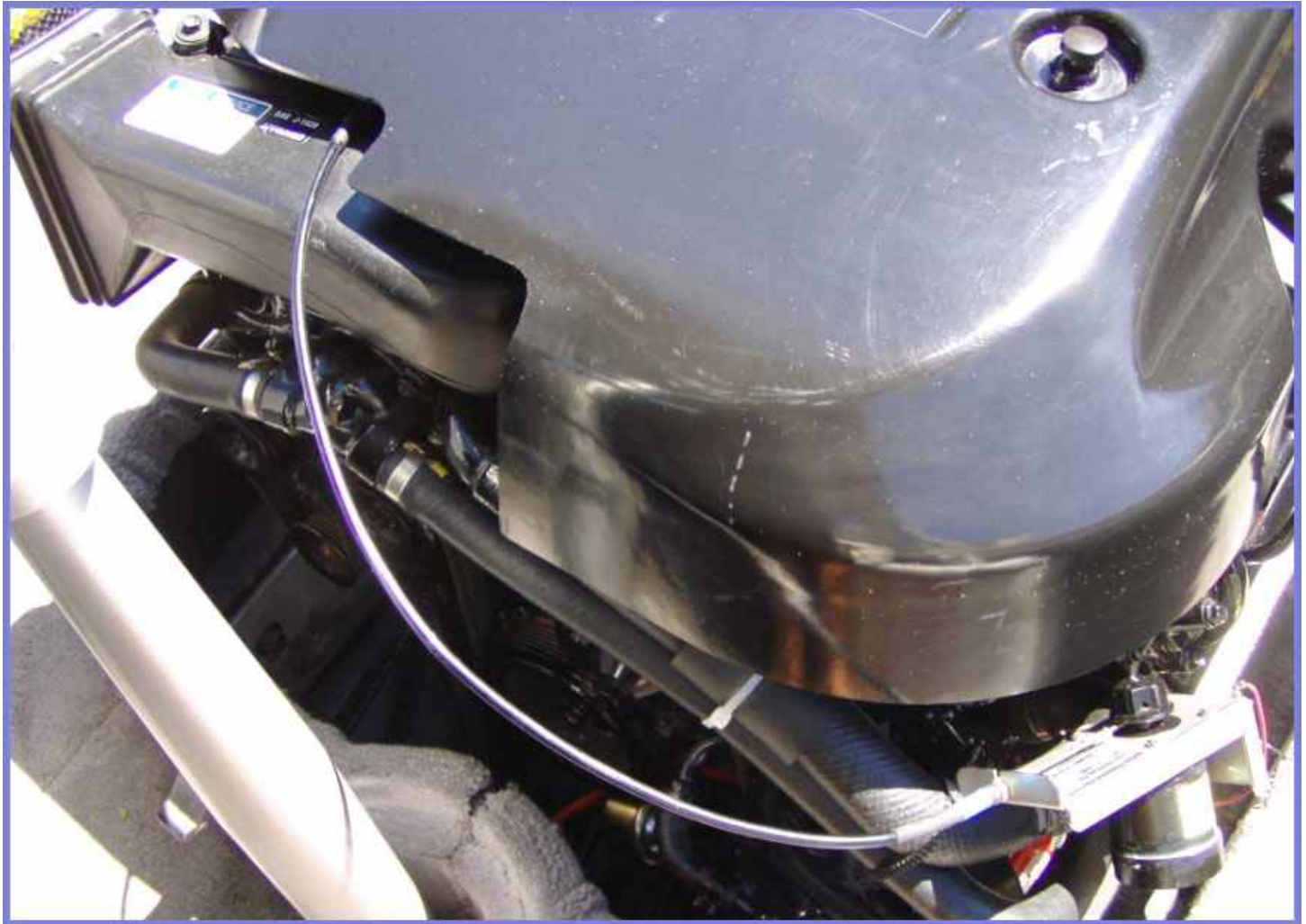


Detach the ball stud from the ball connector by sliding back the spring loaded outer shell. Remove the ball stud from the throttle arm. Attach the stainless adapter bracket from the PP kit with the supplied hardware. Mount brass swivel and attach cable as per directions from the kit. Use the long cable from the kit, and make sure that it does not contact inside of clamshell. You can adjust by moving the servo assy.



Mount Cable and bracket

If desired, you can cut a 4"x6" section of the engine cover away to accommodate the cable movement. I used a sabre saw and a drum sander to smooth the cut.





Power up and test the system according to the Perfect Pass manual. If you have trouble, call them or email, they will help you get things straight.

On the water, I found that the stock tuning parameters worked well. Here are values that work for me:

KDW (gain) Higher number = more throttle

Stock = 70

NN (Paddle wheel filter factor)

Stock = 140

With 1.2K weight I increase KDW to 75

Tuning and Testing