Installation Instructions for 12v Predator Mechanical Lift Pump

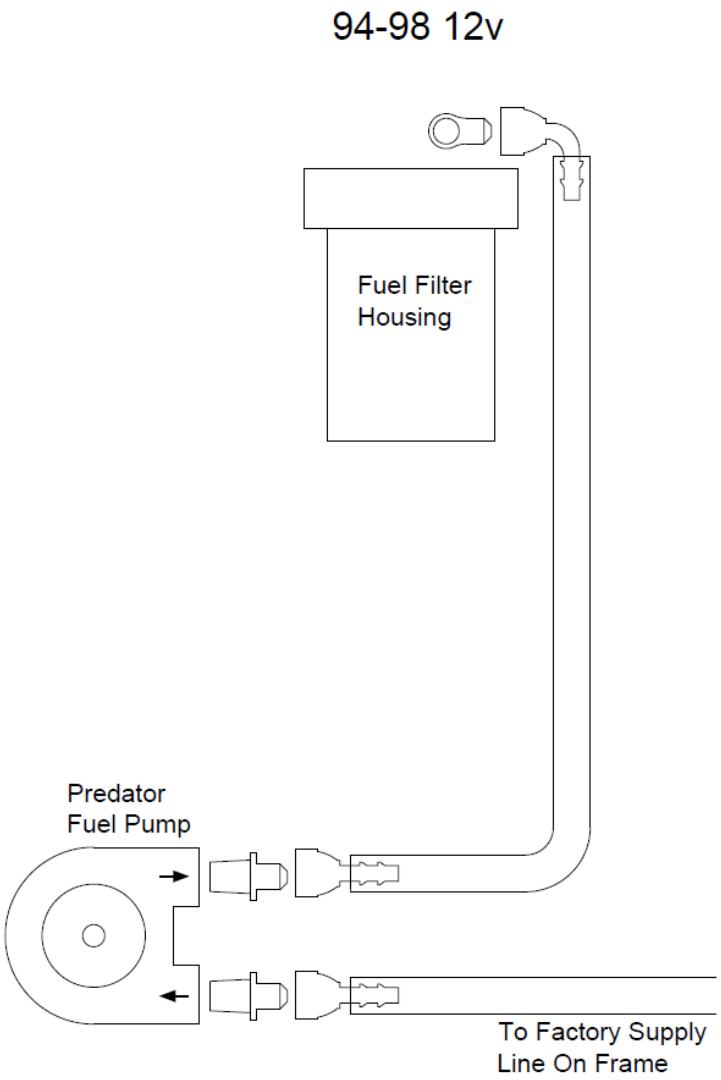
1) Install the drive hub:
    a. Install a barring tool or place manual-transmission vehicles in gear to keep the engine stationary.
    b. De-tension or remove the serpentine belt.
    c. Remove the factory damper bolts.
    d. Remove the damper and clean any loose rust or paint from the mating surfaces. For best results, clean the mating surfaces down to bare metal.
    e. Clean the crankshaft snout face and pilot until it is free of rust and foreign material. For best results, use a light abrasive scouring disc (similar to Scotchbrite) in an air tool.
    f. Replace the damper on the crankshaft snout.
        i. Fluidampr users: Install the wave spring and pilot extension, cone-side out, into the bore on the back of the hub. Install the drive hub over the damper using the new bolts and washers provided.
        ii. Stock damper users: Install the drive hub over the damper using the new damper bolts and washers provided.
    g. Snug and then torque the new damper bolts to 92 ft-lbs in a criss-cross pattern.
    h. Install the drive sprocket on the hub.
        i. Fluidampr users: Install the provided shim between the sprocket and the hub. Apply a single drop of Loctite 242 or equivalent to the bolt threads, and torque to 96 in-lbs. **Do not overtighten!**
        ii. Stock damper users: Apply a single drop of Loctite 242 or equivalent to the bolt threads, and torque to 96 in-lbs. **Do not overtighten!**

2) If equipped with stock mechanical fan, verify clearance:
    a. Apply force to move the tip of a fan blade back and forth in a line parallel with the crankshaft. **If there is detectable play in the fan pulley bearing or clutch, STOP!** Do not proceed until the worn parts have been replaced.
    b. Manually pass each fan blade in front of the belt drive sprocket. Verify that the clearance is a minimum 1/4" across all blades. **If individual blades have less clearance than this, STOP!** Do not proceed until the fan is repaired or replaced.
    c. If your clearance is less than 1/4”, or not consistent, **do not bend the fan blades to achieve this clearance!** When the fan is under heavy load, the blades twist along their centerline. This deflection restores the blades to their original position, and contact between the drive sprocket and fan blades can result.
    d. If additional clearance is required, use one of the provided spacers. Remove the fan clutch nut from the pulley to install. The flat washer will add .125” of clearance. The threaded spacer will add .900” of clearance. If using the threaded spacer, verify there is enough clearance between the radiator and fan clutch to prevent contact and radiator damage.
    e. The serpentine belt may now be reinstalled at any time.

3) Install the lift pump:
    a. Install the lift pump on the bracket using the supplied M6 flange bolts and flange locknuts. Install the bolts so the threads face away from the sprocket.
    b. For easier access, remove the sway bar mounts from the frame and move the sway bar aside.
    c. Remove the four front oil pan bolts.
    d. Clean any loose debris from around the bolt holes.
    e. Place the two upper mounts into their mating slots on the intermediate mount. The radiused end of the key must point towards the front.
    f. Thread the four new M8 oil pan bolts in and tighten the two inboard bolts just enough to remove vertical movement of the mount. Leave the outboard ones loose and threaded out enough that you can visually compare the position of the bolt in the slot to ensure it is consistent on both sides.
    g. Use a straightedge on the front faces of the sprockets to determine a starting alignment.
    h. Tighten the pan bolts to 18 ft-lbs.

i. Install the pump assembly onto the intermediate plate using the supplied M10 flange bolts and flange locknuts. Leave the bolts loose enough to allow the pump bracket to slide, but tight enough there is not significant play.

4) Install the plumbing:
   a. Slip the supplied Push-Lok hose over the factory hard suction line where it terminates at the frame rail, just behind the starter and secure with hose clamp. This will be the larger of the two hard lines.
   b. Route the line appropriately, cut it at the suction (bottom) port of the pump, and install a straight -6 hose end.
      i. **Tech Tip: JIC fittings seal via metal-on-metal contact at the flare face. This connection is made without thread sealant.**
   c. For best results installing the Push-Lok hose onto the fittings, soften the rubber hose with a heat gun or hairdryer and lubricate the fitting barbs with clean oil or diesel fuel.
   d. Route the remaining line to connect the pump's discharge port (top) to the fuel filter inlet using the supplied JIC hose end and banjo fitting. Trim excess length as necessary.



5) Prime the system:
   a. Loosen the fuel tank filler cap.
   b. Install a 4mm hex bit in a cordless drill/driver.
   c. Remove the lift pump assembly from the intermediate plate.
   d. Using the driver, on its highest speed setting, spin the pump clockwise as viewed from the front. There will be a distinct change in the speed and load on the drill/driver when fuel reaches the pump. Continue priming for approximately 20-30 seconds after fuel has reached the pump.

e. Reinstall the pump assembly onto the intermediate plate.
f. Tighten the fuel tank filler cap.

6) Install the belt and perform final drive setup:
   a. Slip the drive belt over both sprockets.
   b. Slide the pump bracket toward the passenger side until all slack is removed from the belt. When making a tension adjustment, be sure to index the pump bracket against the alignment shelf on the intermediate plate before tightening. Failure to do so may result in improper drive alignment.
   c. Tighten the tension adjustment bolts.
   d. Prohibit the engine from starting by unplugging the FSS and crank the engine for 5-10 seconds.
   e. Observe how the belt tracked.
   f. If there is significant contact between the belt and sprocket flanges, make an adjustment to minimize this contact and repeat steps 7d and 7e.
   g. Once the drive is aligned, check the belt tension. Belt tension is correct when all slack is removed. Grab the pump sprocket and turn it against the stationary crankshaft. If slack develops, readjust the tension so no slack can be produced by twisting the pump against the crankshaft. **Under no circumstances should a prying tool be used to tension the belt. Doing so will result in excessive tension and drive failure.**

7) Verify fuel pressure:
   a. Start the engine and observe fuel pressure. P7100s are not sensitive to fuel pressure, so long as a minimum of 25 psi is present at idle and supply pressure at the injection pump inlet is kept to 80 psi or less. Hot street applications using 160 and 175hp pumps will benefit from supply pressures on the higher end of this range (particularly if operated above 3200 rpm), but 180 and 215hp pumps will not experience significant performance gains above 45 psi. “Built” pumps should generally see 60 psi at full load. Refer to your pump builder for specific recommendations on fuel pressure.
   b. The Predator is equipped with an internal pressure regulator that allows operation with the stock overflow valve (OFV), as well as all aftermarket **adjustable** OFVs and external fuel pressure regulators (FPRs) on the market. Note, fixed OFVs (such as the TorkTek OFV040HP through OFV075HP) will result in low fuel pressure at idle when used with a mechanical lift pump like the Predator. The Predator’s internal regulator is calibrated to deliver full fuel flow until 60 psi. At 60 psi, the regulator will start recirculating fuel flow within the pump. Once 80 psi is present at the discharge port, all pump flow will be internally recirculated.
   c. Making a pressure adjustment:
      i. If using an aftermarket adjustable OFV or external FPR, make the adjustment at the OFV or FPR first. If the adjustment cannot be achieved here, adjust the internal regulator in the Predator (see step 8d).
      ii. If using a stock overflow valve, adjust the internal regulator in the Predator (see step 8d).
   d. If an adjustment to the Predator is required, remove the acorn nut on the bottom of the pump. With the engine running, turn the adjuster screw in to raise pressure or out to reduce pressure. Reinstall the acorn nut and verify the adjustment.

8) Finish up:
   a. If equipped, delete the factory lift pump using the included block-off plate and gasket.
   b. If removed, reinstall the sway bar. Torque bolts to 40 ft-lbs.

Post-Installation

Test drive the vehicle. The belt tension may relax slightly in the first several hours of operation. Check and adjust as necessary. Check all fasteners for signs of loosening and correct immediately. Check all fuel line connections for leakage and correct immediately. Properly installed, the drive is essentially maintenance-free until belt replacement is required. There is no specific interval for replacing the drive belt. A lifespan comparable to that of the serpentine belt can be expected. Inspect periodically for signs of wear or deterioration and replace.