TurboWerx “Spartan-series” TWX-175-12V Electric Scavenge Pump

Thank you for purchasing the TurboWerx Base-Model “Spartan-series” Electric Scavenge Pump. Please read through this entire document before starting any work. TurboWerx cannot be held responsible for any specific use or misuse of this product. If you still have any specific questions after reading this document, please contact the distributor or reseller where you purchased it, or contact TurboWerx at **sales@turbowerx.com**.

Mounting

Choose a location with some air-flow. The least desirable location is a small boxed in region with no air-flow at all. Although the pump is very resilient, avoid locations that expose it directly to excessive water splashing.

It makes no difference whether the pump is mounted low, near the turbo, or up near the engine or on a firewall, or somewhere in between. The pump can self-prime from any

height less than 5 ft. above the lowest point in the turbo drain plumbing. It can push the oil virtually any height or distance in any automotive and truck application.

The pump will run in any orientation – vertical, horizontal, upside down, and at any angle.

You are free to mount it however you like. However for minimum noise and maximum reliability, the recommended bolt/screw is a 1/4"-20 (or equivalent), with a Nylon insert lock, and a washer.

Electrical Connections

When the engine is running, there should be a minimum of 12V at the pump at all times.

The pump should be energized any time the engine is cranking or running. It is OK to have the pump running when the engine is off, such as when the key is in "Accessory" position. The pump draws only about 3-4 amps worst case, thus using a dedicated switched relay is not required.

The pump red wire should be connected to a key-switched, fuse-protected +12V source. Use 16 gauge or larger diameter for runs of less than 10ft. Use 14 gauge or larger diameter for runs of 10-20 ft. Always keep the wires away from any moving surfaces. Remember when the car is jacked up the suspension is fully extended – once it is back on the ground, many suspension pieces can move substantially. Keep wiring and plumbing away from these.

The other wire is black. This needs to be connected to any good ground point on the chassis. Be sure and scrape away any paint, corrosion/oxidation, etc.

After the electrical connections are completed, energize the pump and verify that it is getting no less than 1 volt below the voltage measured at the battery. First measure the voltage at the battery with the pump on. Then measure the voltage in the red wire as close to the pump body as possible. If you are measuring much below this, locate where the voltage drop is occurring, and correct. For some systems with unavoidable voltage drops, it may require running the pump from a key-switched external relay connected directly to the battery through an in-line 10 amp fuse.

Pump plumbing

The inlet and outlet ports are 3/8" NPT female. Two -8AN fittings are included - these fittings are very high-temp PA66-GF30 polyamide material and do not require sealant but these fittings should be torqued to no more than 5ft-lbs. The plastic on plastic surfaces mate very snugly. However if you choose to use metal fittings (brass/aluminum/steel, etc), then in addition to being torqued to no more than 5ft-lbs you should also use thin

Teflon thread sealing tape. 5ft-lbs will "feel" light but anything more can damage the threads and nor is required. However if you do damage the pump cover replacements are available from TurboWerx (email sales@turbowerx.com**).**

If using metal fittings in some severe-duty applications, you can forego the Teflon and coat the threads with epoxy (or "JB Weld"). This works well, since it can still be broken later, and then peeled away manually. Be sure and clean the threads on the fitting and the pump head with some no-residue cleaner (brake-cleaner works well).

The pump inlet side should be plumbed from the pump to the turbo oil drain outlet or turbo's drip-tank with a minimum of 3/8" ID reinforced hose suitable for exposure to oil. Pressure rating is not important, since there is none in a scavenge application. It is **highly** recommended to use stainless steel braided hose, especially if the hose is with a few inches of exhaust pipes or turbo exhaust housing.

The pump outlet side can use smaller diameter plumbing. Plumbing size as small as –4AN and –3AN have been used successfully, where less cost and easier routing was desired. In most cases, the return oil is plumbing into an existing fill or vent cap that has a direct pathway to the sump, e.g., cam tower vents, timing chain covers, oil filler caps, oil dip stick holes, air-oil separators inlets, etc.

Some installations have plumbed the returned oil directly into the bottom of the oil pan. This works well, since the pump will easily create the pressure needed to force the oil in. If the pump is located below the topmost oil level in the sump, you will need to prevent oil back-flow at engine shut-down. This can be done most simply by using a long enough return line to create a "hump" by raising any portion of the return line well above the topmost oil level. If this is inconvenient, then adding a one-way valve in the return line is the alternative.

Alternative applications

The pump can be used as a transmission fluid pump, to pump system coolant, and as a pressure pump for water/alcohol injection. It can handle diesel fuel as well. All the same conditions/suggestions above still apply. **The pump seals are NOT compatible with automatic transmission fluid (ATF)**. Warranty void if exposed to ATF (and easily determined if pump is returned like this under warranty). For a modest cost, we can rebuild any Base-Model Pump suffering from exposure to ATF.

Optional system check ideas

Some installers have pre-verified the system before actual driving. This can be done by setting up a small tank (1/2-1 gallon) directly below the turbo drain outlet or outlet line so that the oil accumulates in it while idling. The pump's inlet line is dropped into the tank and rests near the bottom. While the engine is idling, you can observe the pump scavenge it out. This also allows you to verify any oil leaks, or any other mistake. Note that it

might be easier to temporarily replace the installed lines with longer ones to route to the tank more easily.

If you are measuring the scavenge rate, please note that the full pump-rating is not achieved until the oil temperature reaches a minimum of 150F. In most applications, the engine oil temperature will reach 150F within a few minutes at idle.

Troubleshooting

If you start to see blue oil smoke after a short while on the initial check out drive, stop and verify the pump is actually getting power (with the engine off, you can usually hear it with the ignition on the key in the Accessory position). The next thing to check is if it is actually pumping oil – if you can access the oil outlet line, feel the outside of it…it should feel very warm/hot from the oil being pumped through it. If not, either the pump is not getting power, or it's not able to draw in oil from the turbo outlet. In this case, verify that the oil is actually draining from the turbo into the lines or drip tank (see Optional System Check Ideas above). It's also possible that the line is pinched, kinked, or obstructed.
If everything appears in order on the scavenge side and there is still some smoking, the problem may be elsewhere. It is surprisingly common the oil pressure to turbo is excessive. Most high-performance aftermarket (and many newer cars') oil pumps can produce too high oil pressure for turbos and must be controlled. In this case, you need to install the appropriate sized oil-restrictor (hand-made typically 0.035"-0.050", or like units from www.atpturbo.com, et al) in-line to reduce the oil pressure seen at the turbo - *especially* ball-bearing turbos. Note many times even when a turbo comes with a restrictor it can still be too large and adding a smaller one is needed to control the oil pressure.

Ball-bearing turbos should be limited to around **20psi** maximum **AT ALL TIMES**.

Journal-bearing turbos should be limited to 60psi at max engine rpm.

After manufacturing and supplying scavenging pumps since 2005 to tens of thousands of customers world-wide and working through every scenario imaginable, regardless of whatever you have been told (even by some turbo "manufacturers" staff), limiting the oil pressure seen by the turbo to the aforementioned values always work without problem and has solved virtually every oiling issue we have seen. (Be sure to consider the fact that any still on-going oiling issues could be due to damage suffered by the turbo seal failure from prior exposure to excessive oil pressure before it was corrected/controlled. In this case, you will need to have the turbo seals replaced.)

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Specifications

Pumping Rate*: 1.75GPM (105GPH) @ 12.8 volts.
Maximum Fluid Temperature: 300F (149C)
Current consumption: 3.5 amps maximum
Inlet/Outlet fittings: 3/8" NPT F
Dimensions: 7.0" x 4.5" x 4.0"
Weight: 5 lbs

*measured with SAE30 (or equivalent) engine oil at 100C or greater temperature. Due to the increases viscosity testing with oil at lower temperatures will reduce measured pump rate proportionally, eg, oil at 27C (room temp) will reduce pump rate by approximately 50%.

Product Warranty

Unless specified otherwise, TurboWerx offers a limited warranty on all products for a period of One Year from the date of sale. Warranty covers defects in materials and workmanship only. TurboWerx does not warrant any product for any specific application. Warranty is valid only for the original purchaser. Warranty is not transferrable. Warranty is void from any misapplication, abuse, improper installation, or acts of God. TurboWerx will determine validity of warranty claim based on inspection and analysis of parts returned to TurboWerx. TurboWerx will, at it's discretion, repair or replace any products found defective under the conditions set-forth herein. In the event replacement product not available, TurboWerx reserves to the right to choose a substitute of the nearest equivalent part available.
