AeroConversions
A Product Line of Sonex Aircraft LLC

Smoke Oil Tank Installation - Firewall
(Rev N/C 010809)

The AeroConversions' Smoke Oil Tank includes the following major components:

- ❑ Smoke Oil Tank, Part no. ACV-S02-01, Qty. 1
- ❑ Shut-off Solenoid, Part no. ACV-S02-12, Qty. 1
- ❑ Electric Fuel Pump, Part no. ACV-S02-13, Qty. 1 Includes Fuel Filter

Hardware and fittings not included with the kit may be sourced form your favorite supplier(s). A shopping list with suggested parts suppliers is included at the end of these instructions.
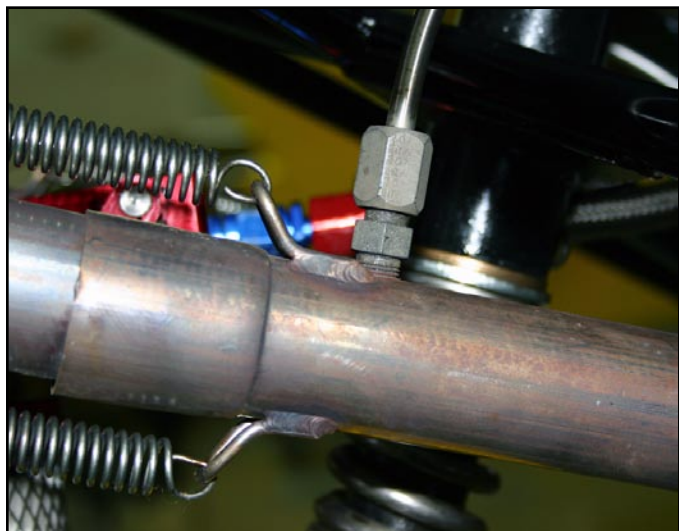
As there are many variables in any installation of this nature, only the primary details are illustrated by these photos.

Exhaust System

1. Drill a 1/16" diameter hole , just below the slip joint, in each of the exhaust extensions.

   Note: The hole in the exhaust pipe can be drilled to 1/8" diameter if desired. A larger hole will not necessarily create more smoke and un-atomized oil will collect on the bottom of the aircraft.

2. Weld a stainless steel bung to each exhaust extension, centered over the drilled hole.

3. Apply anti-seize compound to the threads and install a 1/8 NPT stainless steel straight pipe adapter in each bung.

The oil is injected in the exhaust, just below the slip joint. Stainless steel tubing must be used for the oil line as other materials (copper, aluminum) will melt.

Tank Installation

1. Flush the tank to remove debris.

2. Install an AN816-8D Nipple in the 3/8 NPT filler port.

3. Install an AN816-4D Nipple in the 1/8NPT vent port.

The upper ports of the oil tank are shown here. 90- or 45-degree elbows may be substituted for the straight fittings.

4. Install a 3/8 NPT finger strainer and MS20822-4D elbow in the supply port.
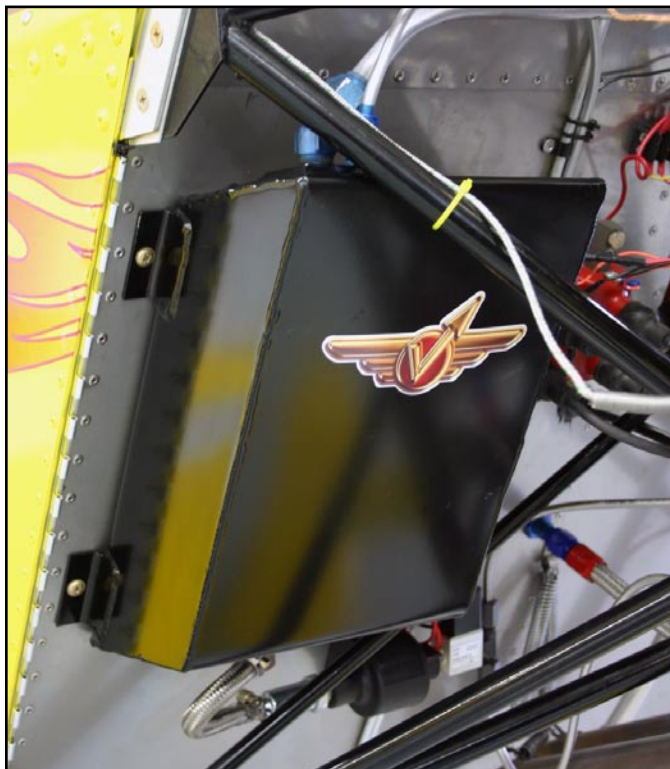

The supply port of the oil tank receives a 3/8NPT finger strainer and a straight, 90- or 45-degree elbow.

(Continued)

Select a mounting location that provides access to the ports, particularly the filler port. The tank can be mounted to the sloped firewall of the Sonex, Waiex, and Xenos airframes, or to any vertical surface.

5. Attach the tank to the firewall with AN3 hardware. An AN970 ("fender") washer on the inside of the firewall helps distribute the weight.

The tank is mounted to the firewall with a single AN3 bolt or screw through each flange. The pump assembly, detailed in the following section, can be seen mounted below and to the side of the oil tank.
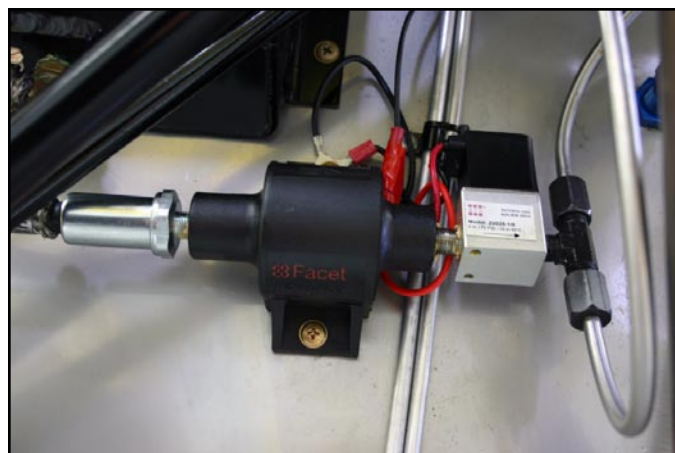
Pump and Solenoid Installation

1. Attach the filter supplied with the fuel pump to the input port of the fuel pump.

2. Install an AN911-1D nipple in the output port of the fuel pump.

3. Attach the input port of the shut-off solenoid to the nipple.

4. Attach a 1/8" pipe to 1/4" tube tee to the output port of the solenoid.

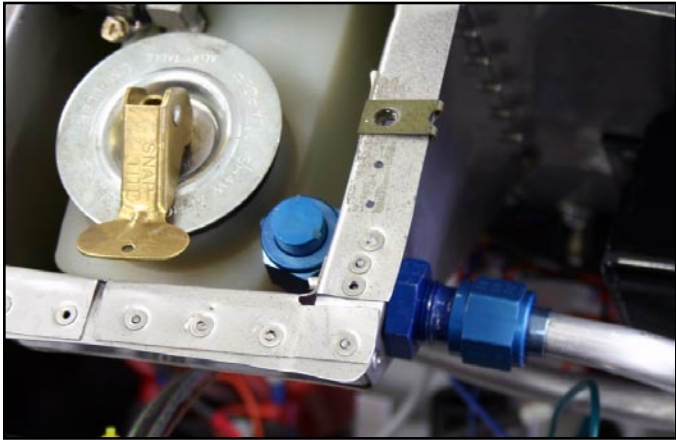*The pump sub assembly prior to installation on the firewall.*

5. Select a mounting location below the oil tank that will allow a Pro-flex hose to be attached between the filter of the pump assembly and the oil supply port on the bottom of the tank.

6. Mount the pump assembly to the firewall with AN3 hardware.

The pump assembly mounted to the firewall.

Filler Neck (Optional)

The Sonex Aircraft factory airplanes are fitted with a 1/2"
O.D. tube which extends from the filler port of the oil tank to a
capped bulkhead fitting in the fuel filler neck. This allows the
smoke tank to be refilled through the fuel filler door.

*A 90-degree bulkhead fitting (AN833-8D) installed in the side
of the fuel filler box provides a readily accessible port for
refilling the smoke oil tank. This installation also includes a
AN924-8D nut to secure the bulkhead fitting, and an AN929-
8D cap.*

Plumbing the Smoke System

The primary fittings of the smoke system have been illustrated
in the previous sections of this instruction. This section de-
scribes the hoses and tubes which complete the system.

Oil Supply Port to Oil Pump

This line is a -06 Pro-flex oil hose. One end must be fitted with
a -6AN hose fitting which will couple to the oil supply port.
The other end slips over the pump filter and is held in place
with a hose clamp.

Oil Pump Assembly to Exhaust Pipes

These lines must be fabricated from 1/4" O.D. x .035" wall
304 stainless steel tube. Allowing "extra" material in the
length of each tube (in the form of 90 and 180-degree bends)
will allow the tube to absorb vibrations without failing, as well
as ease removal of the tube from the exhaust pipe as needed.

Oil Filler Line

If you chose to install an oil filler line a 1/2" diameter 3003-0
aluminum tube works well. It is easily formed and the large
diameter makes filling easy and adds to the system's oil capac-
ity. The filler line is secured to the fittings with MS20819-8D
coupling sleeves and AN818-8D coupling nuts.

Vent Line

The vent line, made from 1/4" diameter 3003-0 aluminum
tube, should rise a few inches above the tank before curving
downward and out the bottom of the cowl. The vent line is
secured to the fittings with an MS20819-4D coupling sleeve
and AN818-4D coupling nut.

Wiring

The pump and solenoid can be wired to a single switch in the
cockpit. Activating the switch turns on the pump and opens the
solenoid.

Installing an indicator light in the cockpit will alert you when
the pump is on.

Wire sizes and fusing must be determined from the pump and
solenoid manufacturer's specifications, and the needs of your
particular installation.

Smoke Oil

Sonex Aircraft does not endorse any particular oil for use in
the smoke system. This brief list is provided to jump-start your
own research into an oil that is suitable to you.

> Super Dri, from MDW Aviation Associates, Inc.
> Diesel Fuel
> Concrete Form Oil

Other Items You May Need - By Supplier

This list is provided as a reference of the parts used to install the smoke oil tank in the Sonex Aircraft factory aircraft. Your particular installation may vary.

This list is provided as a convenience. Vendors may change part numbers or discontinue items without notice. You do not need to use the sources listed below.

Not included in this list are common hardware items (AN bolts, nusts, washers, hose clamp), electrical wire, switches, fuses, etc. These must be determined by the individual builder/installer to suit your particular installation.

Wicks Aircraft Supply

❑ AN816-4D, Coupling Nut, Qty. 1
  Installs in breather port of oil tank.

❑ AN816-8D, Nipple, Qty. 1
  Installs in filler port of oil tank.

❑ AN818-8D Coupling Nut, Qty. 2
  Installed on each end of the remote filler tube

❑ AN911-1D, 1/8 NPT Nipple, Qty. 1
  Installed between pump and solenoid.

❑ AN818-4D Coupling Nut, Qty. 1
  Secures aluminum vent line to vent port.

❑ MS20819-4D, Coupling Sleeve, Qty. 1
  For use with AN818-4D, above.

❑ AN833-8D, 90º Elbow, Qty. 1
  Installs through fuel filler box when installing remote filler port.

❑ AN924-8D, Retaining Nut, Qty. 1
  Secures AN833-8D in fuel filler box.

❑ AN929-8D, Cap, Qty. 1
  Caps inlet of optional oil filler tube.

❑ MS20819-8D, Coupling Sleeve, Qty. 2
  For optional 1/2" diameter filler neck tube.

❑ MS20822-4D, 90º Elbow, Qty. 1
  Install in finger strainer in supply port of tank.

❑ FS-375-125, Finger Strainer, Qty. 1
  Installs in supply port of oil tank

❑ R1/4x032-3003-0, 1/4" OD x .032" wall Aluminum Tubing, Qty. 6 feet
  Tank vent line

❑ R1/2x035-3003-0, 1/2" OD x .035" wall Aluminum Tubing, Qty. A/R
  For remote filler port

McMaster-Carr

❑ 52245K567, Tee Fitting, 1/8" Pipe Tee to 1/4" Tube, Qty. 1
  Fitted to output port of solenoid

❑ 52245K531, 1/4" Tube to 1/8 Pipe Adapter, Qty. 2
  Fitted in bungs on exhaust extensions

❑ 8989K721, 1/4" OD x .035" 304 Stainless Tube, Qty. 6 feet
  Oil supply line to exhaust pipes

❑ 45525K571, 304 Stainless 1/8NPT Bung, Qty. 2
  Weld to exhaust extensions

Summit Racing

❑ EAR-800106ERL, -6AN Straight Hose fitting, Qty. 1
  Install on hose end which attaches to oil supply port.

❑ RUS-632050, -6 Pro-Flex Hose, Qty. 3 feet
  Install on hose end which attaches to oil supply port.