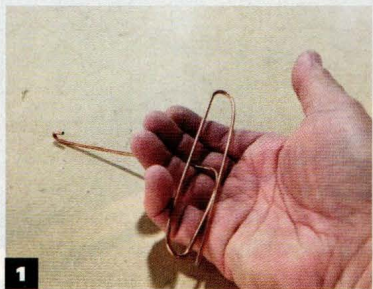




# Exhaust Springs Care and Feeding

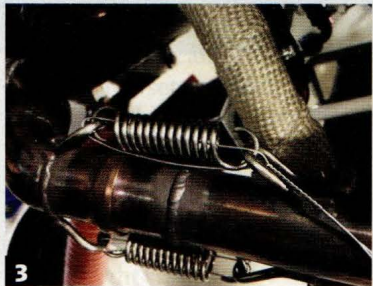
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**ALL TOO OFTEN** during an inspection one of the springs on the spring-loaded exhaust system is found to be broken or missing. Let's look at what this type of system needs to last longer.

Overstretching the spring can lead to premature failure and lock up the joint. Too much tension can also lead to cracking the muffler or pipes. Too little can allow gas leakage leading to high joint wear and possible carbon monoxide emissions into the cockpit.

To install springs correctly, avoid stress risers on the spring by using a spring hook tool instead of tools that bite into the wire. Spring hook tools sell for less than \$10 at any auto parts or hardware store, or you can make one from some larger gas welding wire (Image 1).

Check the spring eye on the pipes to see if the system has been vibrating a lot. If there is notable wear in the mounting eye, the spring is vibrating excessively and may be too loose, may not have enough pressure, or may be overstretched. If your spring has a permanent stretch compared to a new spring, replace it.

Using your spring tool to pull it from eye to eye, ensure the springs are pulling over the joint at right angles. If they are at any other angle, the eye is not mounted in the correct place. The idea is to hold the joint closed and not to introduce a twisting tension into the exhaust system.

Broken springs can damage many parts, allow an exhaust leak, and in pusher aircraft the broken part can exit and hit the spinning propeller.

Rotax recommends wrapping a safety wire around the joint to hold the springs together. This damps the vibration somewhat, but if the spring breaks, it will only hold the larger part of a broken spring, and small parts or the coil will depart the aircraft.

I recommend running safety wire from eye to eye on the inside of the spring. I allow about a 1/8-inch gap on the wire for free movement of the joint.

Run the wire, loop it from eye to eye, and place a small Phillips screwdriver at one end (Image 2). Twist the wire end and bend it back. Removing the screwdriver tip will give you the desired clearance and retain any broken coils should the spring fail (Image 3).

Left to its own, the spring has a natural resonance frequency, and over time this vibration will fail the coil or damage the spring mount eye. Damp this using high-temperature (red) RTV silicone. In order to allow the spring coils to cool, do not fill the coils completely; just run a bead of silicone from eye to eye. The bead should be about 1/4-inch to no more than 1/2-inch wide from the mount eye to the opposite mount eye outside of the coil. Capture at least one end of the safety wire inside the coil to stop it from vibrating at the same time (Image 4).

In summary, do your inspections. Check the eyes for wear and the joints for leakage. When servicing the joints, don't overlubricate them. Check that springs are not stretched. Always use a spring hook tool to avoid creating a stress riser during installation. Safety wire retains coils in the event of a failure, and a small bead of silicone on the outer coils dampens the spring vibration.

