

THE INNARDS OF A PISTON-TYPE QCTP

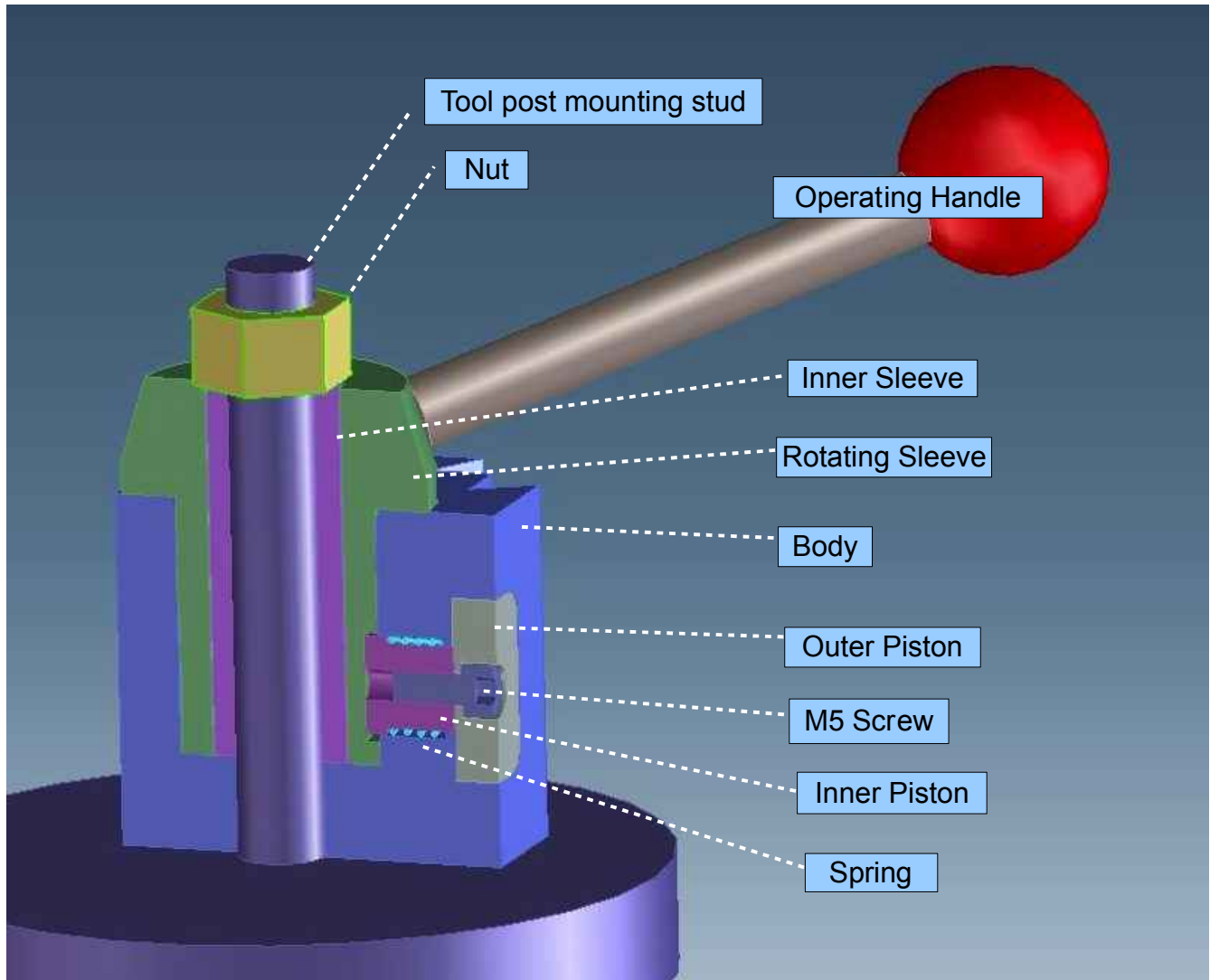
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NOTE: The text and illustrations herein describe an AXA size piston-type QCTP. Larger versions (BXA, CXA, etc.) very probably have the same design, but I have no way of being sure. I *am* pretty sure of the AXA, as I have worked on at least five of them over several years (generally adding extra threaded holes to the rotating sleeve, so the operating handle can be moved to a more convenient spot).

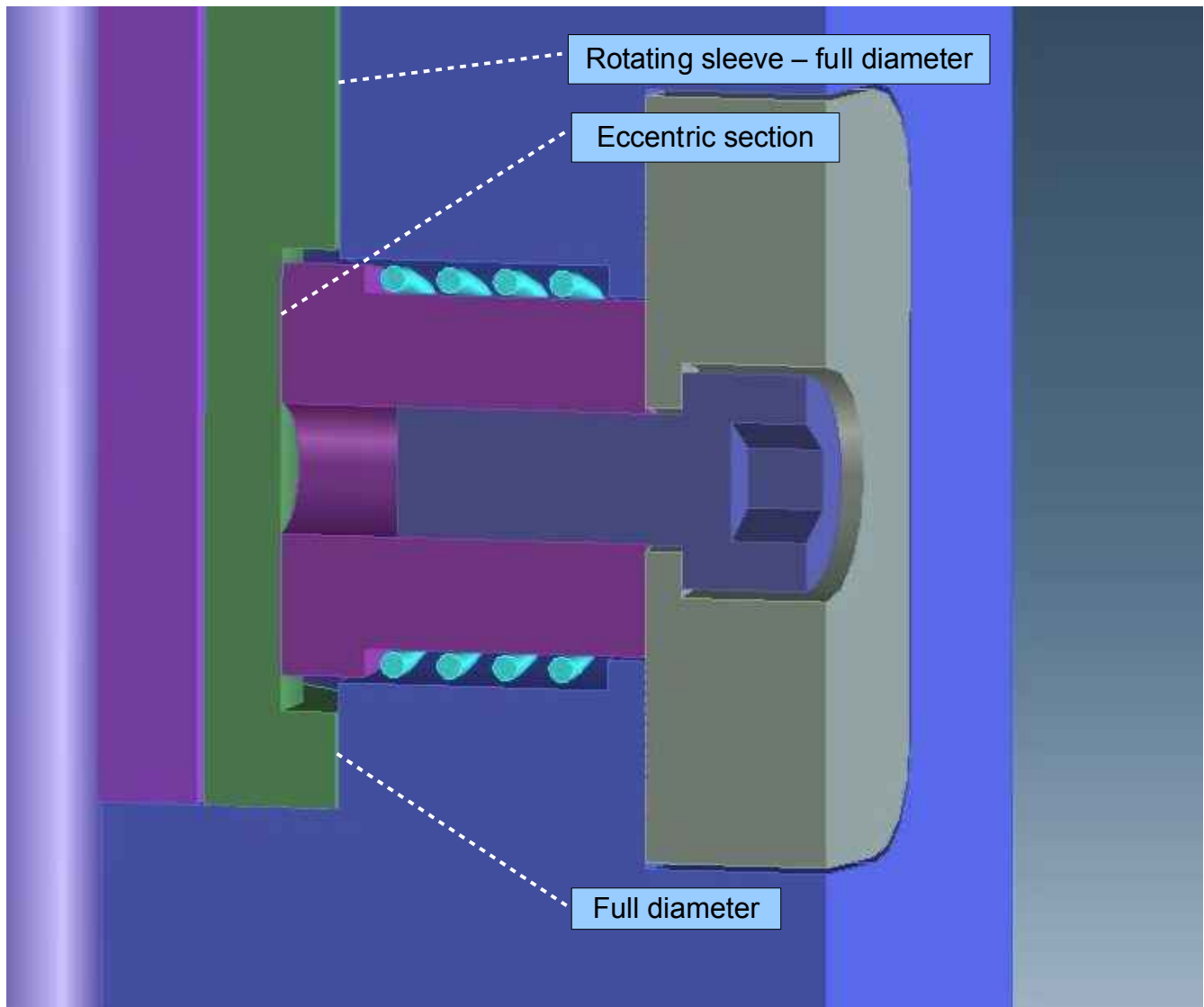
The “working” mechanism of an AXA piston-type QCTP consists of an outer body (the part with the two dovetails), a rotating sleeve (rotated by the operating handle), and two piston assemblies. Each of the piston assemblies consists of a cylindrical inner piston, a spring, a rectangular outer piston and a screw to hold them together. The QCTP also includes an inner sleeve. This transmits hold-down force from the nut on top of the tool post mounting stud (which usually comes with the QCTP, but is sometimes part of the compound). See the illustration below.



The inner sleeve itself is pretty simple. It just has to be taller than the rotating sleeve, slip over the mounting stud and slip inside the rotating sleeve. If the ID of the inner sleeve is sloppy on the stud and the OD is too close a fit inside the rotating sleeve, it can sometimes jam sideways against the rotating sleeve when the nut is tightened, preventing free rotation. If this is the case, the OD of the sleeve should be reduced slightly.

The rotating sleeve has an eccentric cut into the lower section of its OD, with a thin section of the original diameter at the very bottom. The eccentric is what forces the pistons in and

out as the sleeve is rotated by the operating handle. The full OD section below the pistons retains the sleeve. Because the pistons are spring loaded inward and the eccentric section is recessed, the lower edges of the pistons catch the rim on the sleeve and prevent it from moving upward and lifting out. See the close-up below.



Disassembly of the QCTP (once it's been taken off the lathe) starts with removal of the rotating sleeve. There are two ways to do this:

Sleeve removal method #1 (worth trying, but not always successful): Use a 4mm allen wrench to remove the screws from both piston assemblies. Because the inner piston is round, this may or may not work - the piston can spin when you turn the screw. Assuming you can get the screws out, you can then thread on a couple of longer M5 screws. Pull outward on both of the screws, and you should be able to lift and remove the sleeve.

Sleeve removal method #2: Hold the outer body of the QCTP in a vise. Rotate the sleeve so

one of the pistons is at full extension. Clamp a pair of vise grips on the extended piston, pull it outward as far as possible (maybe .015-.030" further) and clamp with another pair of vise grips. Release the first set. Rotate the sleeve to extend the other piston, clamp on the vise grips and pull outward. Lift the sleeve upward and out.

Once the sleeve is removed, disassemble both piston assemblies and remove the loose pieces from inside the QCTP body. Having access to the insides, you can wedge something against the round inner pistons to keep them from rotating as you remove the screws. The following photo shows the QCTP body section and one piston assembly disassembled. The other one is re-assembled. Clean, service and lubricate the working parts as needed.



Reassembly consists of placing the spring over the inner piston, "fishing" the smaller diameter section through the hole in the QCTP body from the inside, and holding it there with one hand while you replace the rectangular outer piston and the screw with the other. Again, you can jam a screwdriver or other tool against the inner piston to keep it from turning as you tighten the screw. It's probably *not* a good idea to use Loctite on the screw. That could make it very difficult to disassemble the QCTP later!

Once you have both pistons in place, extend one by pushing from inside and hold it extended with vise grips. Extend the other one and hold it extended (either with vise grips or by jamming a screwdriver against it), then drop in the rotating sleeve.