

Assembling Double Cylinders

Items You Will Need

- Two identical size cylinders
- Tank bands and bolt kit that match cylinder size
- Manifold
- Large flat surface—preferably a solid table
- Grease—silicone or O₂-compatible (depending on the application)
- One 22mm wrench (3/8-inch will do in a pinch)
- Two 1/2-inch wrenches (the longer the better)

Telling Right From Left

How do you tell a right-hand K-valve (or the outboard portion of a dual-orifice manifold) from a left-hand one? Here is how:

- Look at the valve orifice.
- Whichever side the turn wheel is on determines whether it is a right- or left-hand valve.
- A “normal” K-valve is left-handed—as is the portion of a dual-orifice manifold which is on a diver’s right side.

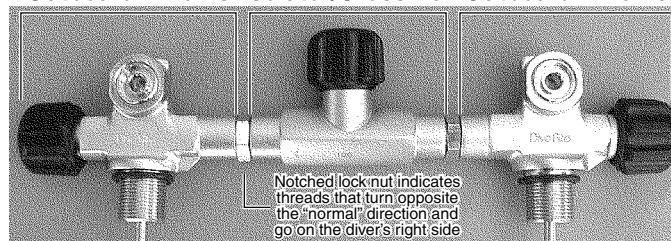
Left-hand K-valves mate with plug or cross bar sections whose threads turn opposite the “normal” direction. To indicate this, the plug or cross-bar lock nuts are notched, as shown in the accompanying illustration.

AMONG THE MOST common questions Dive Rite gets is, “How do you assemble a set of doubles?” Here is what we recommend:

1. Disassemble the manifold into its three primary components (outboard K-valves and center isolator or cross bar). Lubricate all exposed threads and O-rings with the appropriate grease (O₂-compatible for components that will, at any time, be exposed to gas mixtures with F_{O₂}s of greater than 40 percent). Make certain the isolator lock nuts are tight against the center of the isolator or cross bar body.
2. Install one outboard K-valve into each cylinder.
3. Place the cylinders on the table or flat surface upon which you will be working, parallel to one another.
4. Carefully orient the center isolator or cross bar so that its threads correctly match those of the outboard K-valves (this is important; serious manifold damage may result otherwise). The notched lock nut (indicating threads that turn opposite the normal direction) goes on the side of the manifold which will be on the diver’s right (or on the left, when facing the orifices, as shown below).
5. Slowly turn the isolator or cross bar in the direction that will cause it to thread itself into both K-valves simultaneously. **This is very important:** If one side does not engage you must back the isolator or cross bar all the way out and begin again. Be patient. This may take more than one try.
6. When the isolator or cross bar threads engage properly, turning this center unit will draw the tops of the cylinders together. To keep the cylinders parallel to one another as this happens, stop periodically to gently tap the bottom of the cylinders together. You can tell when to do so because the isolator or cross bar will become difficult to turn when the cylinders are no longer in proper alignment. (This also helps explain why it is important you avoid using wrenches for this step and turn the isolator or cross bar only by hand; any resistance you feel will tell you something is wrong.)
7. Repeat step 6 as often as necessary until you reach a point where no more than 1/8-inch/3mm of threads shows on each side of the center section.
8. (Isolation manifolds only.) Make certain the isolator knob is positioned at the desired angle. (Again, if necessary, it is permissible to have as much as 1/8-inch/3mm worth of threads showing on each side of the isolator section; this may be necessary to ensure adequate clearance between tanks for the bolts.)
9. Turn the center unit lock nuts so that they rest snugly against the outboard K-valves. Lock them in place with the 22mm wrench. Do so gently; these components are brass and easily damaged by unnecessary force.

Now you are ready to install the tank bands and bolts.

Outboard K-Valve Isolator/Cross Bar Outboard K-Valve



10. Remove all the nuts and washers from the all-thread shafts (headless bolts)—except the aircraft nut (the nut with the nylon insert).
11. On the end of each shaft, opposite the aircraft nut, install a wing nut (turned upside down) followed by a regular nut. Lock these nuts against one another. This will enable you to hold the shaft without damaging any threads.
12. Place a ½-inch box-end wrench (or a ½-inch deep socket wrench) on the aircraft nut and another ½-inch wrench on the regular nut. Turn the aircraft nut until it is positioned so that approximately ¼-inch of shaft protrudes from its top. Unlock the regular nut from the wing nut and take them both off the shaft.
13. Prepare the bands by stretching them outward (this will make them easier to work with). Begin by grasping the bands by the flat sections and pulling outward. Repeat by pulling on the outside of the hoops. Doing so pulls the bands in four opposite directions (with the wider 1033W bands for larger cylinders, this may take some additional effort).
14. Pull the cylinders to the edge of the table. Let the cylinders extend beyond the edge so that the portion where the upper band will go will be exposed. Make sure the valve orifices face upward.
15. Place the top band right at, or just below, the shoulder of each cylinder (the shoulder is where the side of the cylinder begins to turn toward the valve).
16. Place a flat washer on the end of the shaft with the aircraft nut. Push the shaft up through the band's bolt hole from below. On the other end of the shaft, place a flat washer, followed by the lock washer and regular nut. Put one ½-inch wrench on the aircraft nut; the other on the regular nut. Tighten the regular nut until the band is moderately snug.
17. Turn the cylinders around so their bottom ends will be exposed. Position the bottom band so that the bolts will be spaced 11 inches apart, when measured center to center. (A back plate makes a good measuring device.) Repeat step 16 to install the bolt in the lower band.
18. Examine the entire assembly. The bolts should not extend past the outside edges of the bands. If the cylinders are parallel to one another (or reasonably close) and able to lie flat, finish tightening the nuts. This last step should cause the cylinders to be parallel to one another if they were slightly splayed.

