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Service Manual

Rebuilding the IVP Manually Operated Butterfly Valve

Valid for all IVP KF and CF series manually operated butterfly valves

SM-MBV-11282022 - V1.0.2

1. INTRODUCTION

This service manual provides step-by-step instructions for rebuilding Ideal Vacuum's manually operated butterfly valves, and is valid for all KF and CF series valves. When the valve becomes contaminated and more difficult to open and close, or when it starts to leak, it likely needs rebuilding.

Routine cleaning can extend valve service intervals. Even with scheduled maintenance, there are many factors that determine how long the O-ring seals will last before needing replacement. These include the required vacuum level, process temperature, and chemistry involved. The more aggressive or dirty the process, the more frequently the valve will need to be serviced and the seals replaced..

A note about CommandValves:

Although CommandValves use the same valve bodies and components as similar sized manually operated butterfly valves, replacement of the shaft O-rings requires complete CommandValve disassembly. It is not recommended to rebuild the CommandValve in the field. Please contact Ideal Vacuum for rebuild service which includes replacement parts, leak testing, and warranty.

2. TOOLS, MATERIALS AND SUPPLIES CHECKLIST

Standard safety equipment and only a few tools are needed to rebuild the valve. Below is a table of what is needed. PFPE grease is required. Kluber, Krytox or similar greases are recommended. The specific grease used depends on the vacuum level required. Note that Viton O-rings have a vacuum limit in the 10^{-8} range because of their permeability.

✓	NEEDED
	Gloves
	Safety glasses
	5/64" and 3/32" hex wrenches
	O-ring removal tool (P1010547)
	Dental pick
	Small piece of paper
	Isopropyl alcohol (IPA)
	Lint free cloth
	PFPE Grease (examples): Kluber Y VAC 3 (P102908) Kluber GR RT 15 (P103012) Dupont Krytox®

Table 1 - Required rebuild items

Figure 1 - PFPE grease examples

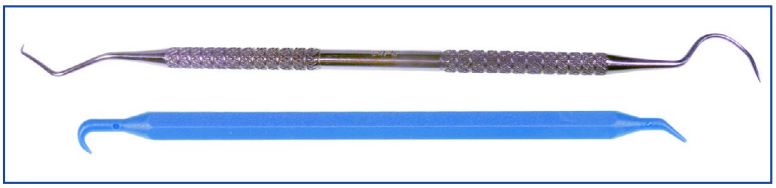


Figure 2 - Dental pick and O-ring removal tool

3. BUTTERFLY VALVE COMPONENTS

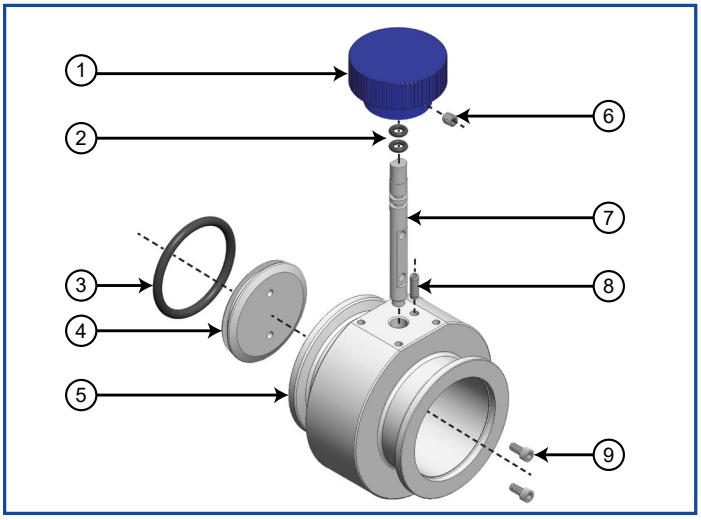


Figure 3 - Butterfly valve components

Item	Description
1	Knob
2	Valve stem O-ring seals (Viton)
3	Butterfly O-ring (Viton)
4	Butterfly
5	Valve body
6	Knob set screw
7	Valve stem (shaft)
8	Split spring (roll pin) knob stop
9	Vented butterfly retaining screws

Table 3 - Butterfly parts identifier

4. REBUILD KITS

Rebuild kits for all sizes of Ideal Vacuum's manual butterfly valves are normally stocked for immediate shipment.

All rebuild kits consist of:

- Viton butterfly O-ring (1 ea)
- Valve shaft O-rings (1, 2, or 3 ea, depending on valve size)
- Vented socket head screws (2 or 3 ea depending on valve size)
- Knob set screw (1 ea)

Figure 1 - Rebuild kit

Similar sized KF and CF valves have the same kit components:

1. All valves use the same size shaft O-rings.
2. KF-16 and CF 1.33 valves use one shaft O-ring. All others have two.
3. KF-16 and CF 1.33 valves use two 2-56 vented screws to secure the butterfly.
4. KF 25, CF 2.125, KF-40, and CF 2.75 valves use two 4-40 vented screws to secure the butterfly.
5. KF-50 and CF 3.375 valves use three vented screws to secure the butterfly.

CommandValve Part #	KF Flange	Rebuild Kit Part #
P108390	KF-16	P108968
P108389	KF-25	P108970
P108388	KF-40	P108972
P108185	KF-50	P108974

CommandValve Part #	CF Flange	Rebuild Kit Part #
P108517	CF 1.33"	P108968
P108436	CF 2.215"	P108970
P108437	CF 2.75"	P108972
P108438	CF 3.375"	P108974

Table 2 - Rebuild kit part numbers for KF and CF series valves

5. REBUILD PROCEDURE

STEP 1 - DISASSEMBLY

Put gloves on before starting the rebuild procedure.

Rotate the blue knob clockwise to completely close the butterfly.

Unscrew the two or three vented butterfly socket head retaining screws with the appropriate hex wrench:

KF-16 or CF 1.33” valves use 5/64” wrench.

All larger valves use 3/32” wrench.

Replacement vented screws are included in the rebuild kit.

STEP 2

Carefully pull the valve stem out of the valve by the knob.

STEP 3

Turn the valve over so that the flat (non holed) side of the butterfly is facing you.

Push the butterfly out of the back of the valve body and put it aside.

STEP 4

Remove the knob from the valve shaft.

Unscrew the knob set screw with a 5/64” hex wrench and slide it off the shaft.

The set screw is very tight. Put the short end of the wrench in the set screw and use the long arm for leverage.

STEP 5

Unscrew the knob set screw completely and discard it. The rebuild kit includes a new knob set screw.

Put the knob aside.

STEP 6

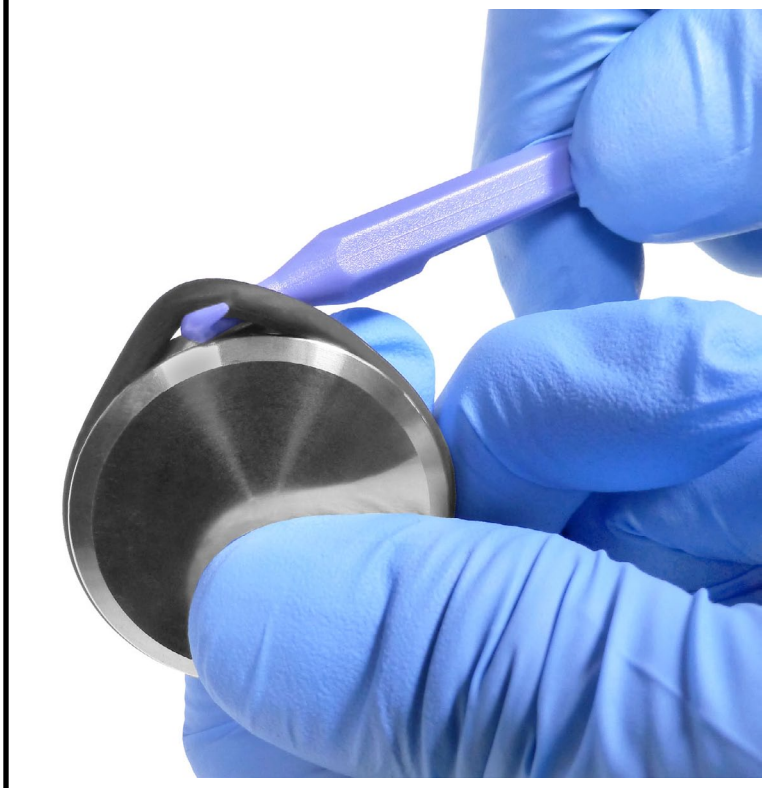
Get the valve shaft and the dental pick. Stab the O-ring closest to the long side of the shaft with the point of the tool and CAREFULLY pry it out of its groove. Pull it over the first O-ring and off the shaft.

Try not to touch the valve shaft or groove with the tool as it could cause damage.

Pull it over the other O-ring towards the short side of the shaft and discard it.

STEP 7

Using the same careful technique, remove the other shaft O-ring and discard it.



STEP 8

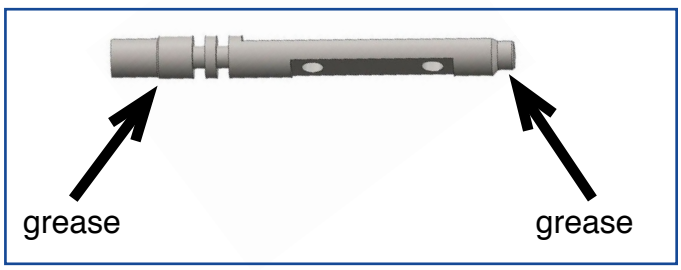
Get the butterfly and plastic O-ring removal tool. Slide the hooked end along the O-ring and then pry the O-ring out of the groove.

Discard the used O-ring.

STEP 9

Clean all valve parts with Isopropyl alcohol.

Use a clean, lint free wipe.



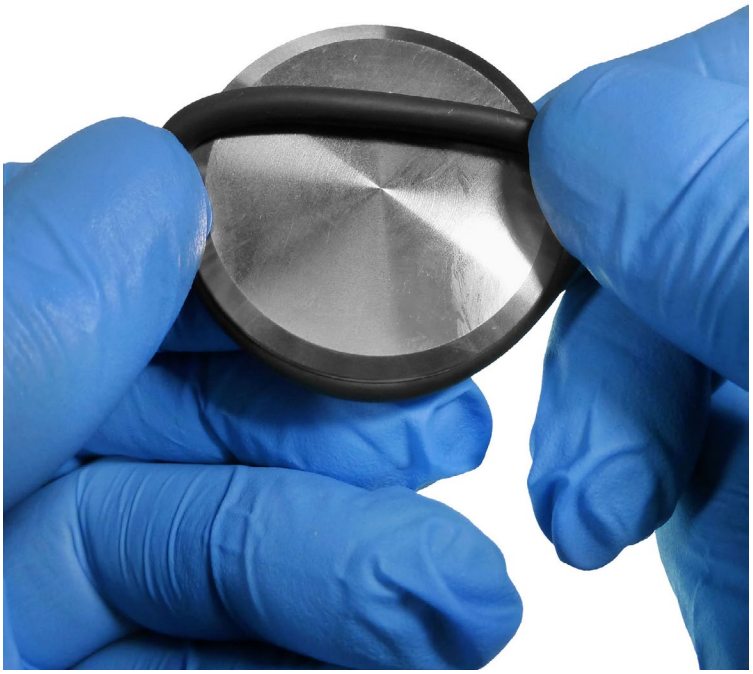
STEP 10 - REASSEMBLY

Once the valve is disassembled and cleaned, it can be rebuilt with the new parts.

Get the butterfly and valve shaft O-rings and the PFPE grease.

Apply a very light coat of grease onto all surfaces of the O-rings, and at the ends of the valve shaft.

Note: Do not over-grease the parts. They should only have a slight “sheen” of grease on them.

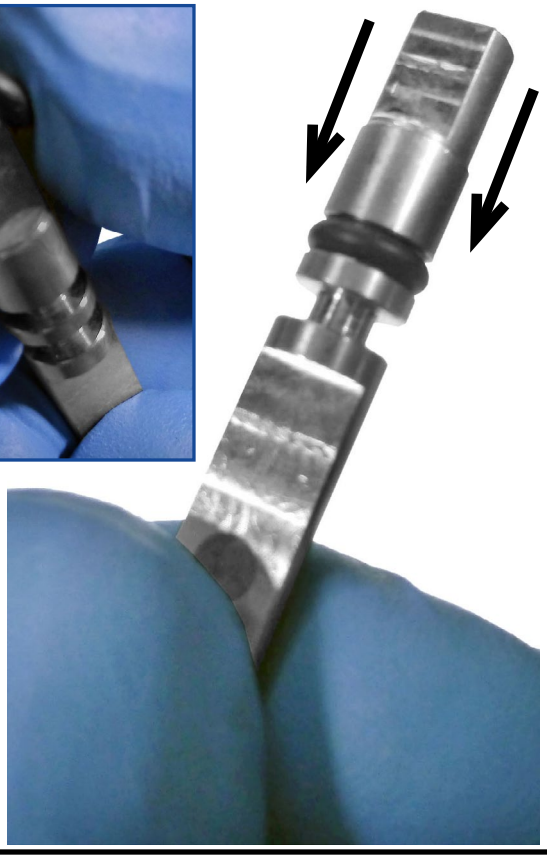


STEP 11

Get the butterfly and greased butterfly O-ring.

Hold the butterfly in both hands with the smooth face (without holes) towards you.

Take the O-ring, insert one section of it into the butterfly's edge slot, then "walk" it over the butterfly with your thumbs until it is fully seated in the slot.



STEP 12

Get the greased valve shaft and a greased shaft O-ring.

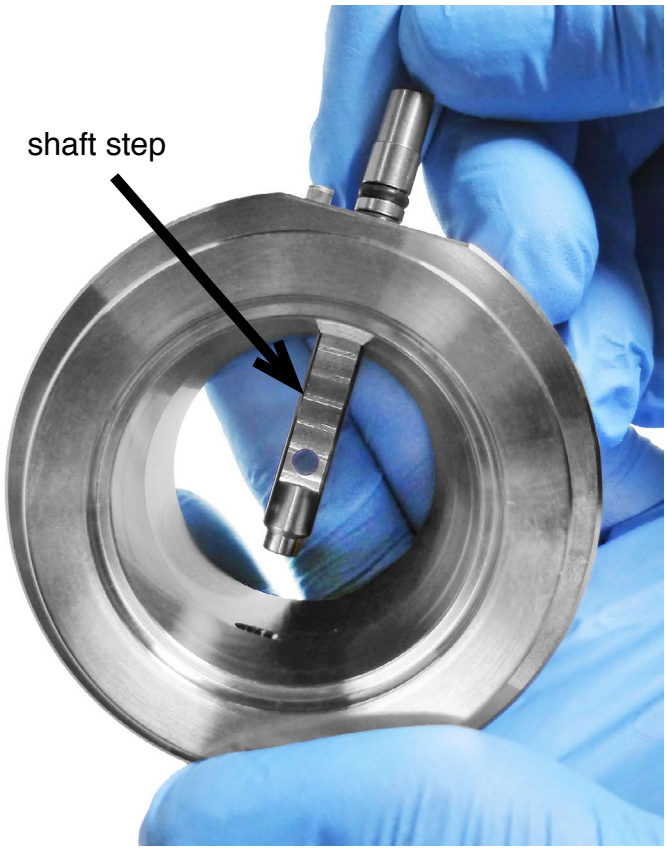
Slide the O-ring over the shaft from the "D" shaped shaft end.

Roll the O-ring over the shaft until it seats in the first groove.

Note: If you are rebuilding a KF-16 or CF 1.33" valve, then proceed to Step 14 (the shaft has only one shaft O-ring).

STEP 13

Get the second greased shaft O-ring. Slide it onto the shaft and roll it over the first O-ring until it seats in the second groove.

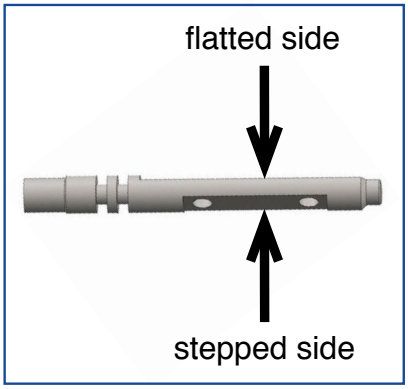


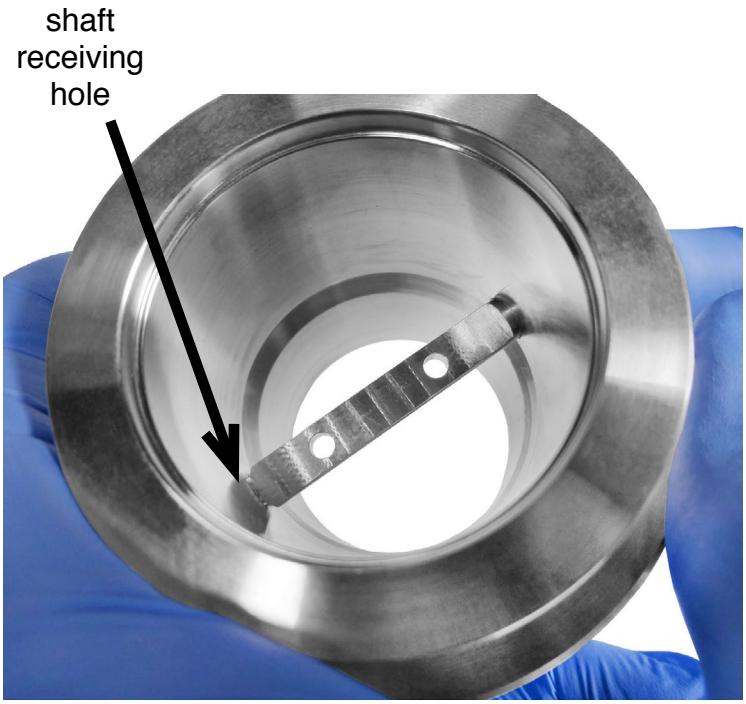
STEP 14

Get the valve body.

Align the shaft so that the shaft's stepped side is oriented towards the smaller opening in the valve body.

Insert the shaft through the center hole of the valve body.





STEP 15

Press the shaft into the receiving hole on the opposite side of the valve body.

The shaft should be pushed in as far as it will go.

This image shows the shaft orientation from the larger valve body opening side. The valve shaft is flatted on this side.

STEP 16

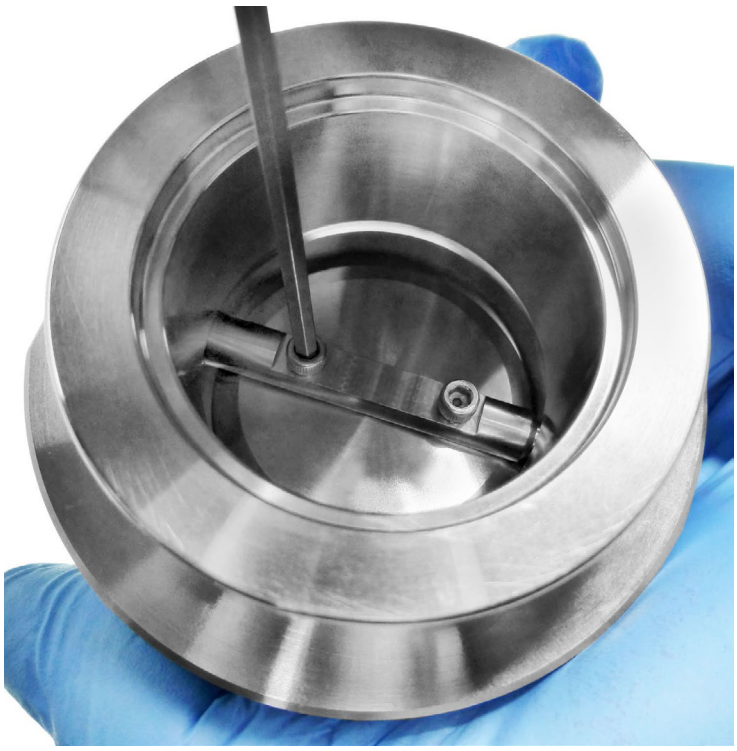
Get the butterfly with the pre-installed O-ring, the new vented socket head screws, and the correct hex wrench:

Insert the butterfly into the large end of the valve body.

Press and hold the butterfly onto the flatted side of the valve stem with a finger.

Roughly align the holes in the shaft with the holes in the butterfly.

Note: The butterfly does not need to be perfectly centered right now.



STEP 17

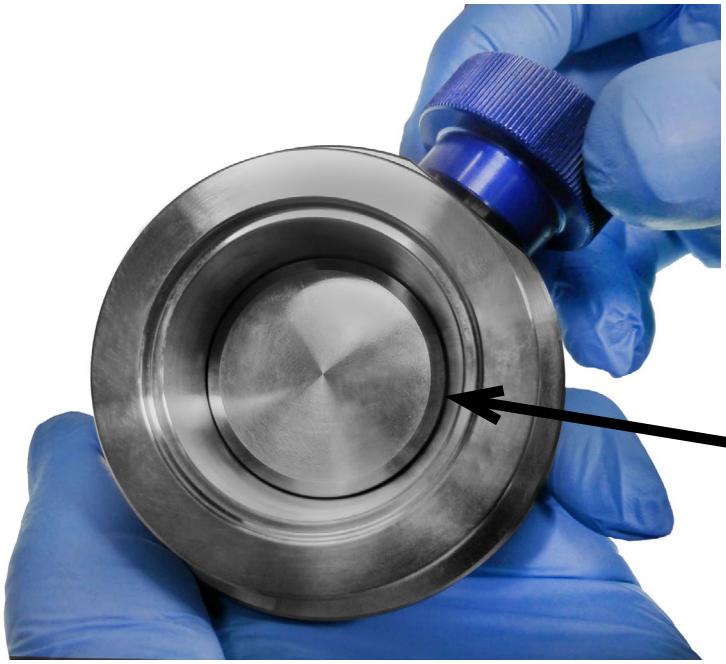
Loosely thread the vented screws through the shaft and into the butterfly.

Note: It can be useful to put a VERY small dab of grease on the end of the wrench to help hold the screws.

Make sure the vent holes do not get filled with grease which could cause a virtual leak.

Once both screws are started, tighten them.

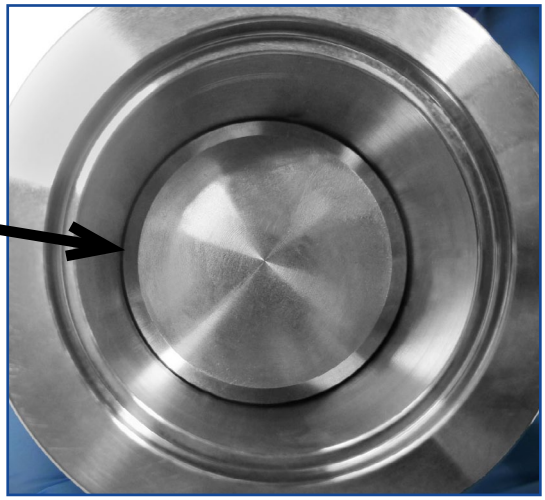
Then, back out each screw by 1/4 turn.



STEP 18

Get the knurled blue knob and slip it on the valve shaft.

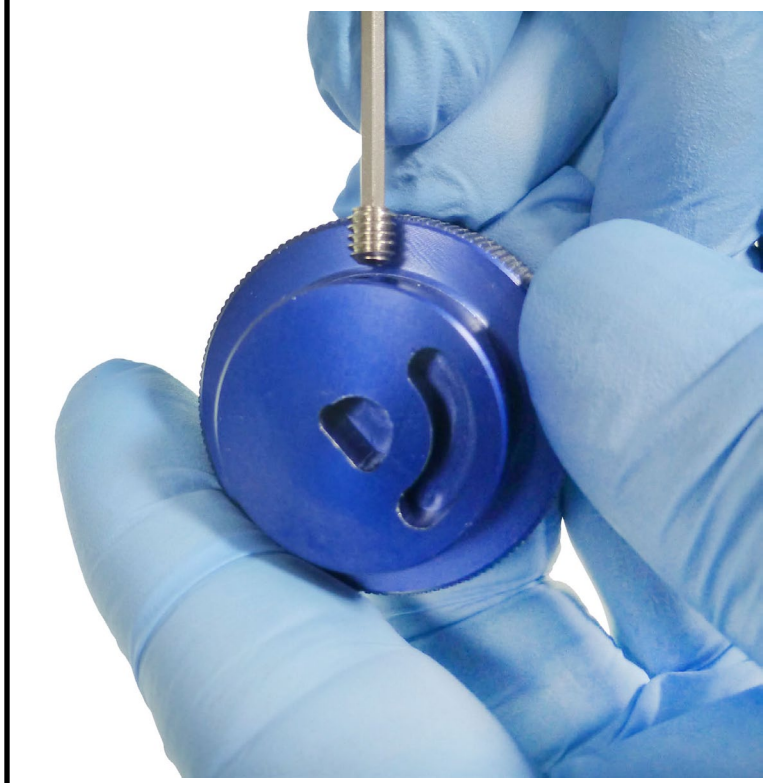
Open and close the valve several times. The butterfly will center itself in the valve body.



STEP 19

When the butterfly is closed, remove the knob.

Tighten the butterfly screws to snug.



STEP 20

Get the knob and the new set screw from the rebuild kit.

Use the 5/64” hex wrench to thread the set screw into the side of the knob.

The set screw tip should not protrude into the “D” shaped shaft hole.

STEP 21

Get the small piece of paper.

Slide the knob onto the valve shaft with the slip of paper between the knob and the valve body. This creates a few thousandths gap between the knob and body for smoothest operation.

Tighten the knob set screw. Use the long arm of the hex wrench to make the screw very tight.

Remove the paper.

If you have the facility for leak testing the valve, test it.

Otherwise, the rebuild procedure is complete.

CUSTOMER SERVICE AND SUPPORT

If you have any questions concerning the installation or operation of this equipment, or if you need warranty or repair service, please contact us. Customer Service and Technical Support is available weekdays, from 8am-5pm, Mountain Time.

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