

# RAVE+ Diaphragm Valves Rebuild Kit

cat.# 26389 and 26390

*Caution: Only experienced personnel should attempt to rebuild valves. Valves can be irreparably damaged if replacement parts are not installed correctly.*

## Contents

Each kit contains one preassembled stack of three diaphragms, one button assembly (button and button retainer), and one tube of lubricating grease. Valves and other components are not included.

**Figure 1:** A disassembled RAVE+ diaphragm valve.



## Disassembly Instructions

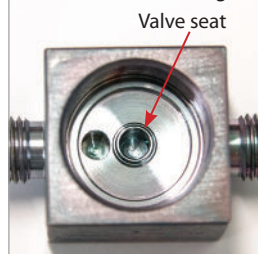
1. Before disassembling the valve, turn the valve to the open position to vent and eliminate any pressure.
2. Hold the valve body securely in a vise, and then open the valve completely by turning the knob counterclockwise. (Be certain the valve is fully in the open position.)
3. Remove the screw and lock washer from the stem, then remove the knob.
4. Loosen the bonnet nut using a 1" wrench or socket, making sure that the flat hex sides of the bonnet nut are fully engaged with the tool.
5. Remove the bonnet nut/upper stem assembly and retain them for reassembly. If the bonnet has adhered to the bonnet nut/upper stem assembly, remove the bonnet and retain it.
6. Remove and discard both the diaphragm stack and the button assembly; do not reuse these components. Check the stem to ensure that the button assembly has not adhered to it. A correctly disassembled valve is shown in Figure 1.

## Assembly Instructions

1. Confirm that the valve cavity and sealing surface (valve seat) are free of damage and foreign matter. Clean the valve, if necessary, following in-house procedures or using methanol and a nonabrasive, low-lint clean cloth or wipe. An undamaged valve seat is shown in Figure 2. **Note that a damaged valve seat may leak and is not repairable.**
2. Hold the valve securely in a vise, and insert the preassembled diaphragm stack into the valve, dome side up (Figure 3). The dome side is indicated by a black dot on the top diaphragm.
3. Lightly lubricate the top diaphragm and the threads on the bonnet nut by applying a small amount of the supplied grease directly from the tube. Extra lubricant is included in the tube; do not use the entire amount.
4. Install the bonnet in the valve cavity with the stepped surface facing up toward the top of the valve, and the shallow, angled surface resting on the top of the diaphragm stack (Figure 4).
5. Prior to installing the button assembly, verify that the plastic button is firmly pressed into the metal button retainer. If these items were dislodged during shipping, reinstall the button by pressing it firmly into the retainer. When properly assembled, the button will be housed almost entirely in the retainer.
6. Install the button assembly in the valve cavity by placing the button assembly into the bonnet (Figure 5). When installed correctly, the side of the button assembly with the wider button diameter will face down toward the diaphragm stack, and the side of the button assembly with the black dot and narrower button diameter will face up toward the top of the valve.

(continued)

**Figure 2:** Inspect the valve seat carefully to ensure that it is clean and undamaged.



**Figure 3:** Preassembled diaphragm stack installed in valve (black dot side up).



**Figure 4:** Bonnet installed in valve on top of diaphragm stack.



**Figure 5:** Button installed into bonnet inside of valve (black dot side up).



7. Verify that the stem is fully retracted into the bonnet nut (Figure 6). Then, thread the bonnet nut/stem assembly into the valve body until hand tight (Figure 7). **Note that the valve can be damaged if torque is applied when the stem is not fully threaded into the bonnet nut.**
8. Tighten the bonnet nut with 92 ft/lb of torque using a torque wrench.
9. With the valve fully closed, begin knob installation by first aligning the knob channel (Figure 7.1) directly above the valve pin without making contact. Then, with light pressure, gently place the knob on top of the stem and slowly rotate the knob counterclockwise. Turn the knob a minimum of 45 degrees and continue rotation until it fully engages with the stem (do not allow the stem to turn during knob rotation). The knob should be positioned on the stem such that travel is reduced to approximately  $\frac{3}{4}$  of a turn.
10. Being careful not to remove the knob from the stem, turn the knob through its full range (approximately  $\frac{3}{4}$  of a turn). Confirm that the end of the channel contacts the pin when in the fully open position (Figure 7.2), and also that it does not contact the pin when the valve is closed.
11. If the end of the channel does not contact the pin in the fully open position, and/or if it does contact the pin when fully closed, ensure that the valve was fully closed prior to step 9, then repeat the knob installation steps.
12. If the valve was fully closed during knob installation, and the end of the channel still does not contact pin in the fully open position, turn the knob halfway between open and closed. Then, gently lift the knob off of the stem, rotate it 45 degrees counterclockwise to the next position in the star-shaped guide, and then press it onto the stem. Repeat step 10 to confirm the knob has been installed correctly.
13. Once correct knob placement has been verified, insert the washer and screw into the knob. Tighten the screw firmly to lock the knob onto the stem (Figure 8).
14. Prior to use, perform a valve cycling procedure by first attaching the valve inlet to a 20 psi regulated purge gas source. While under purge, cycle the valve closed with a calibrated torque wrench using 10 in/lb of torque. Repeat this step five times, allowing the purge gas to flow through the valve when it is in the open position.
15. Perform appropriate seal integrity tests, and clean the valve thoroughly prior to returning it to service. **Note that valve cleanliness can be compromised by repair; only a person thoroughly familiar with the intended use of the valve should attempt to repair it.**

Note: Replacement mounting screws are provided for use with RAVE+ valves installed on Restek air sampling canisters.

**Figure 6:** The stem must be fully threaded (retracted) into the bonnet nut before the bonnet nut/stem assembly is installed or the valve may be damaged during installation.



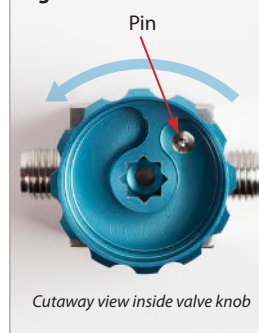
**Figure 7:** Bonnet nut/stem assembly installed on valve. Orient the channel and pin correctly prior to knob installation.



**Figure 7.1:**



**Figure 7.2:**



**Figure 8:** Knob reattached to valve.



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