

## **DIFUSOR DE ALTA PRESSÃO PARA CONTAGEM DE PARTÍCULAS EM AR COMPRIMIDO**



This outline describes how to install and clean the high-pressure diffuser. The high-pressure diffuser is an accessory that permits direct particle sampling of pressurized air, nitrogen, and inert gases. By means of flow control orifices, pressures as high as 150 psi are reduced to atmospheric pressure at the diffuser outlet. This allows the particle counter to count particles while maintaining its calibrated airflow rate. The diffuser can be ordered at any time. Currently, two types of high-pressure diffusers are in use. The latest type diffuser is currently being manufactured and is covered in this manual. For information on the other (obsolete) diffuser, call the factory and ask for manual part number 701058. Address and telephone number are shown on the back cover of this manual.

Warnings and Cautions appear in this manual as required to highlight precautionary measures. Familiarize yourself with the meaning of a warning and a caution before operating any instrumentation. A Warning appears before the procedure or step to which it applies. A Caution appears in the narrow column and next to the step to which it applies. Take extreme care when doing any procedures preceded by or containing a Warning. A WARNING indicates a hazard for you. It calls attention to a procedure which, if not correctly performed or adhered to, could result in injury or possibly death. A WARNING appears directly above the step to which it applies. Do not proceed beyond a WARNING until the indicated conditions are fully understood and met.

The high-pressure diffuser is thoroughly inspected and tested at the factory. When the diffuser is received, inspect the shipping carton for damage. If the carton is damaged, notify the carrier and save the carton for carrier inspection. Inspect the diffuser for broken parts, scratches, dents, or other damage. If it is necessary to return the diffuser to the factory for any reason, contact customer service and obtain a Return Authorization number. Reference this number on all shipping documentation and purchase orders. This will prevent confusion at the factory. After receipt of the return number, follow the shipping instructions provided below.

1. Use the original carton and packing materials whenever possible.
2. If the original carton and packing materials are not available, wrap the instrument in "bubble pack" plastic, surround it with shock-absorbent material, and place it in a double-walled carton.
3. Seal container or carton securely. Mark "Fragile" and enter Return Authorization number in any unmarked corner.
4. Return the instrument to the address given on the back cover of this manual.

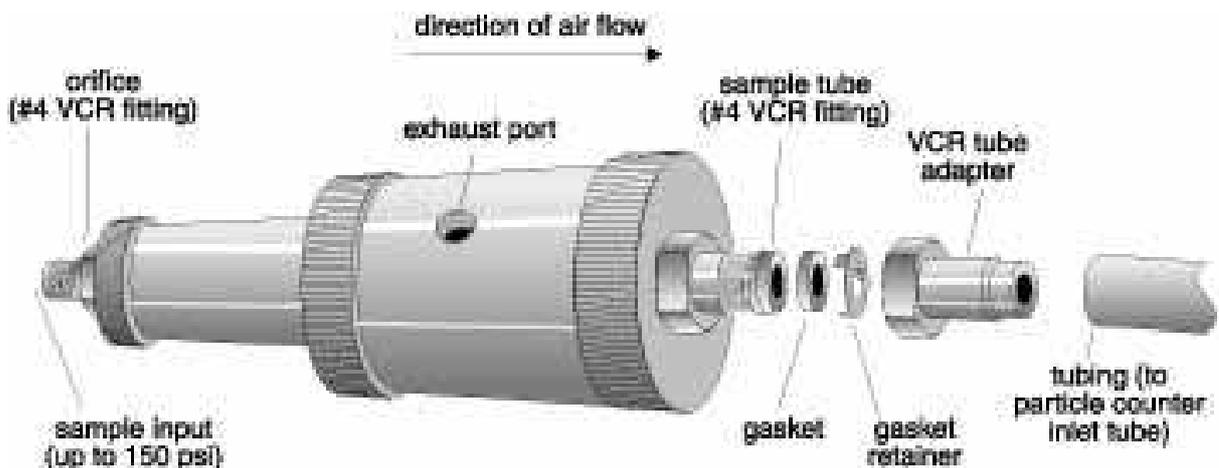
Your high-pressure diffuser has been equipped with an orifice that produces a flowrate equal to the flowrate through your particle counter. For additional information on other orifices, contact the factory. The orifice has been installed in the inlet or "PRESSURE" side of your diffuser. Several types of fittings exist for connecting the diffuser to your particle counting device. You have been supplied with the correct fitting for your application. Two fittings are shown in the following procedure. Each time a fitting is removed from the

installation, the internal gasket should be replaced. Remove old gasket from the gasket retainer and insert new gasket as shown in the following figure. The gasket may instead be placed on the #4 VCR fitting.

### Connecting to CNC

If your counting device is a condensation nucleus counter (CNC), install the high-pressure diffuser by following the procedure and figure below.

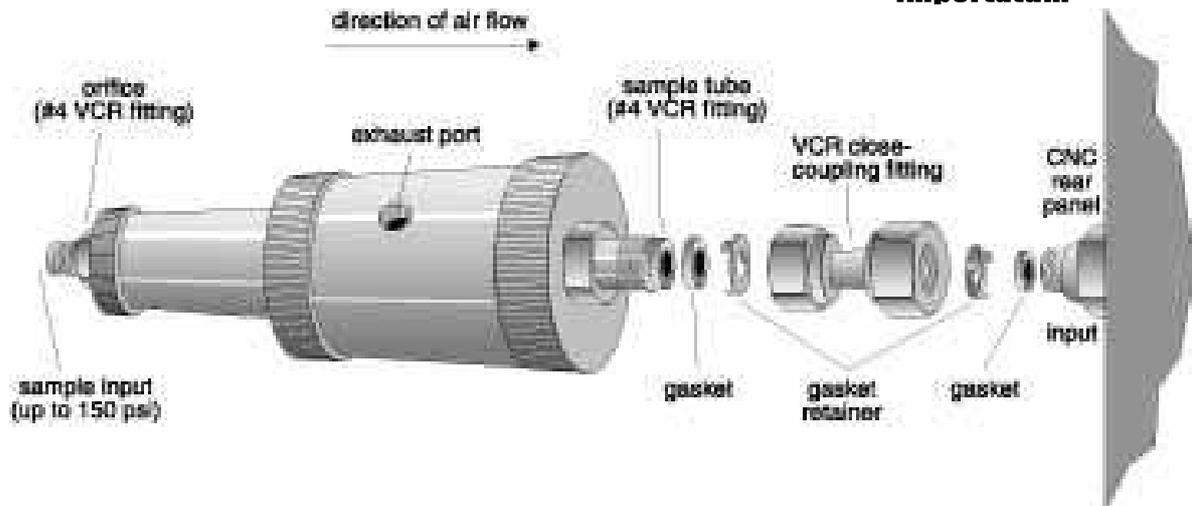
1. Turn CNC power on; allow CNC to warm up for 10 minutes before using.
2. Verify gaskets in the VCR fitting are new (flat surface, no indentation). To replace gaskets refer to "Gasket Replacement" procedure on previous page.
3. Using proper hardware, attach pressurized air line (150 psi maximum) to orifice (#4 VCR fitting) at "PRESSURE" end of diffuser.
4. Screw one end of VCR close-coupling fitting onto sample tube (#4 VCR fitting); tighten fitting finger-tight.
5. While holding sample tube nut with wrench, tighten nut on VCR close-coupling fitting 1/8 turn past finger-tight.
6. Repeat steps 4 and 5 above to attach other end of VCR close-coupling fitting to CNC rear panel INPUT fitting.
7. (Optional) To vent gases away from the working area, insert into the exhaust port the hardware for venting to an environmentally safe ventilation system.
8. Pressurize sample input line then begin a run cycle. Refer to CNC Owner's Manual for CNC operating instructions.



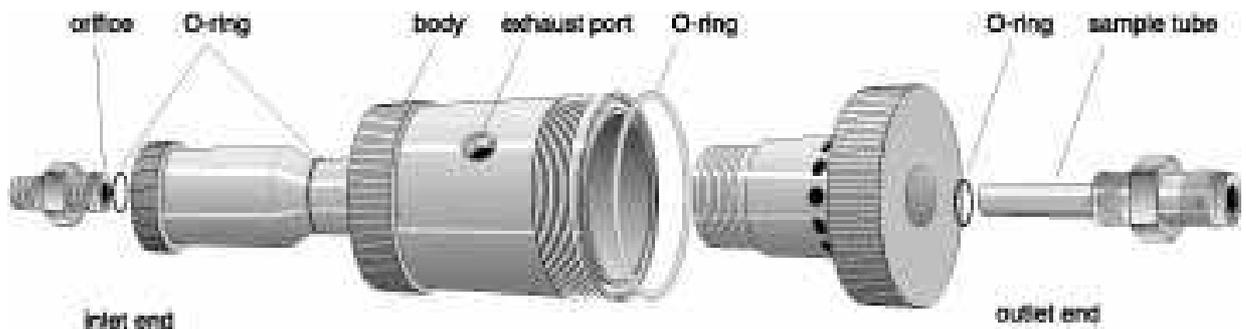
### Connecting to Particle Counter

Install the high-pressure diffuser to your particle counter by following the procedure and figure below. If your counter has a 1/8" inlet tube, use a 1/4"-to-1/8" tubing reducer.

1. Verify gasket in the VCR tube adapter is new (flat surface, no indentation). To replace gasket refer to "Gasket Replacement" procedure.
2. Using proper hardware, attach pressurized air line (150 psi maximum) to orifice (#4 VCR fitting) at "PRESSURE" end of diffuser.
3. Screw one end of VCR tube adapter onto sample tube (#4 VCR fitting); tighten nut on VCR tube adapter finger-tight.
4. While holding sample tube nut with wrench, tighten nut on VCR tube adapter 1/8 turn past finger-tight.
5. Attach tubing from VCR tube adapter to particle counter inlet tube. If the inlet tube on your counter requires 1/8" tubing, insert a tubing reducer in the line.
6. (Optional) To vent gases away from the working area, insert into the exhaust port the hardware for venting to an environmentally safe ventilation system.
7. Pressurize sample input line then turn particle counter power on.



Particles cannot be "generated" by the diffuser. However, the diffuser can become contaminated with particles if it is used or stored in an uncontrolled environment, or if the sample air is extremely contaminated. If you suspect the diffuser is contributing to particle counts, clean it by following the procedure below. You will need an ultrasonic bath of clean deionized water. For best results do all disassembly and assembly of the diffuser on a unidirectional-flow clean bench. Clean the high-pressure diffuser as follows:



1. Disconnect diffuser from the high pressure line by removing both inlet and outlet tubing from diffuser.
2. Remove the orifice from inlet end of diffuser and remove the sample tube from outlet end of diffuser.
3. Unscrew outlet end from diffuser body; remove o-ring from inlet end.
4. Unscrew sample end from body of diffuser; remove o-ring from body.
5. Spray all parts under a unidirectional-flow clean hood with solvent and flux remover.
6. Place all parts except body (muffler) in an ultrasonic bath of clean deionized water (under a clean hood) for 15 minutes.
7. Remove parts from ultrasonic bath; allow cleaned parts to dry in a clean environment such as a unidirectional-flow clean hood. A general purpose pressurized duster (filtered to <0.5 micron) may, instead, be used for drying parts.
8. For ease in assembly, place o-rings onto parts as shown above then coat o-rings with a thin layer of Dow Corning high vacuum grease.
9. To reassemble diffuser, repeat steps 1 through 4 above in reverse order.

### Specifications

Sample Gas Pressure Range 30 to 150 psig  
 Sample Flow Rate 0.05, 0.1, 1.0, or 2.0 cfm  
 Sample Gas dry, inert, non-toxic  
 Pressure Line Connector stainless #4 VCR fitting (modified)  
 Outlet Flow Connector stainless #4 VCR fitting (modified)  
 Exhaust Port ¼-inch NPT  
 Orifice Material sapphire  
 Dimension 7.5" long x 2.25" diameter (19.1 cm x 5.7 cm)

Weight 1.25 lbs. (0.57 kg)  
 Material nickel-plated aluminum, stainless steel

With the curves shown, you can determine what flow rate will appear at the input to the diffuser when the gas is at a specific pressure. They provide the relationship of total flow rate change to pressure change and they show how the flowrate increases with increasing pressure. The curves also inform you as to how much gas you will be using.

The orifice placed in the inlet VCR fitting regulates the gas velocity inside the diffuser. The size of the orifice (stamped on the fitting) is determined by the airflow rate of the particle counter (or CNC) and is given on each flow curve below. The isokinetic point on each curve is the location where velocity in the sample tube (flow to counter) is equal to the velocity around the sample tube (flow to exhaust port). Total flow rate equals the flow rate into the counter (always constant) plus flow rate out the exhaust port (increases as pressure increases).

The following curves are based on air samples at pressures from 30 psi to 150 psi. The curves also apply to nitrogen. For curves on other gases, contact the factory.

