



PPMS Service Note 1085-301

Diaphragm Pump Rebuild and Upgrade

The following procedure should be performed on existing PPMS Heat Capacity systems. These instructions describe two modifications to the diaphragm pump: the replacement of the diaphragm (diaphragm rebuild), which may need to be performed again depending upon the usage of the pump, and the replacement of the pump frame to include a fan for improved cooling (diaphragm upgrade).

Along with these instructions, you should have the pump rebuild kit (part number HPN813-R) and the replacement frame. If you do not have these parts, please contact your Quantum Design Service Center before continuing. In addition to these parts, you will need an adjustable wrench and a flat-head screwdriver.

Diaphragm Rebuild

1. To begin, the system should be at room temperature (300 K) and stable. (This procedure may be performed with the system fully warmed as well.)
2. Disconnect the pump from the probe by partially disconnecting the large (3/8") stainless steel connector that attaches to the annulus port on the probe head. Pull the connector out until you hear it click into the retracted position. When the connector is in this position, air cannot flow into the impedance tube. The opposite end of this pumping line is connected to the annulus port on the rear of the Model 6000.
3. Turn off the power to the system pump by toggling the switch that is at the rear of the diaphragm pump assembly.

The following steps refer to items designated in **Figure 1, 2, and 3.**

4. Disconnect the 9-pin serial cable from the RS 232 port on the pump assembly (item "A").
5. Disconnect the pump assembly power cable (item "B").
6. Disconnect the turbo pump controller cable from the pump assembly (item "C").

Note: For the remainder of this procedure, it is convenient to remove the pump assembly from the cabinet without fully disconnecting it from the system. This may be accomplished by placing a small table or other suitable work surface directly behind the cabinet. The pump assembly may then be pulled out from the cabinet and placed on this surface.

Caution! Do not allow the plastic hoses to become pinched damaged. Doing so may result in a vacuum leak.

Replacing the Diaphragm

1. The pump manufacturer (KNF) describes the diaphragm replacement on the attached document, *Operating and Maintenance Instructions*. Before referring to that document, disconnect one single end of the head connecting line (item “D”) by unscrewing the black bolt on top of one of the connectors.
2. Referring to the attached instructions, the diaphragm rebuild kit (HPN813-R) should include two sets of the parts required for this procedure. Perform the procedure for both diaphragms on your pump.
3. Once the pump heads are reassembled, continue to the next section below for instructions to perform the fan modification.

Installing the New Pump Chassis and Fan

In this portion of the procedure, you will be removing the pump, controller box, and manifold from the existing chassis and reconnecting these parts to the new chassis, which includes the cooling hardware.

1. Disconnect the diaphragm pump power cord (item “K”).
2. Remove the nuts (items “F”) that hold the pump motor in place. You will not need these nuts on the new chassis.
3. Remove the bolts (items “G”) from the manifold and lift the pump and manifold off of the chassis. Save the nuts (items “G”) for use on the new chassis.
4. Remove the controller mounting bolts, nuts, and pads (items “H”) and remove the controller from the chassis. Save the bolts, nuts, and foot pads for installation onto the new chassis. Discard the original chassis.
5. Install the controller into the new chassis, using the original bolts (items “H”). The front of the controller (with the two power plugs, items “B” and “K”) should be at the same end as the pump motor. The frame has pre-drilled holes for the manifold on the back end. These should be closest to the rear of the controller.
6. Install the manifold onto the new chassis using the original bolts (items “G”).
7. Install the pump onto the new chassis, placing it over the fan with the pump motor over the aluminum blocks. Use the bolts (items “J”) included with the chassis to do this in place of the original bolts (items “F”).
8. Reconnect the diaphragm pump power cord (item “K”).
9. Reconnect the turbo pump controller cable from the pump assembly (item “C”).
10. Reconnect the pump assembly power cable (item “B”).
11. Reconnect the 9-pin serial cable from the RS 232 port on the pump assembly (item “A”).
12. Plug in the fan.
13. Return the entire assembly to the system cabinet.

14. Turn on the power to the system pump by toggling the switch that is at the rear of the diaphragm pump assembly. After the pump has been turned on, **wait at least 2 minutes before continuing.**
15. Reconnect the pump to the probe by connecting the large (3/8") stainless steel connector that attaches to the annulus port on the probe head. The opposite end of this pumping line is connected to the "Annulus" port on the rear of the Model 6000.
16. Refer to the *Heat Capacity User's Manual*, Appendix A, Section A.4.7, and follow steps 2 through 6 to test the pump.

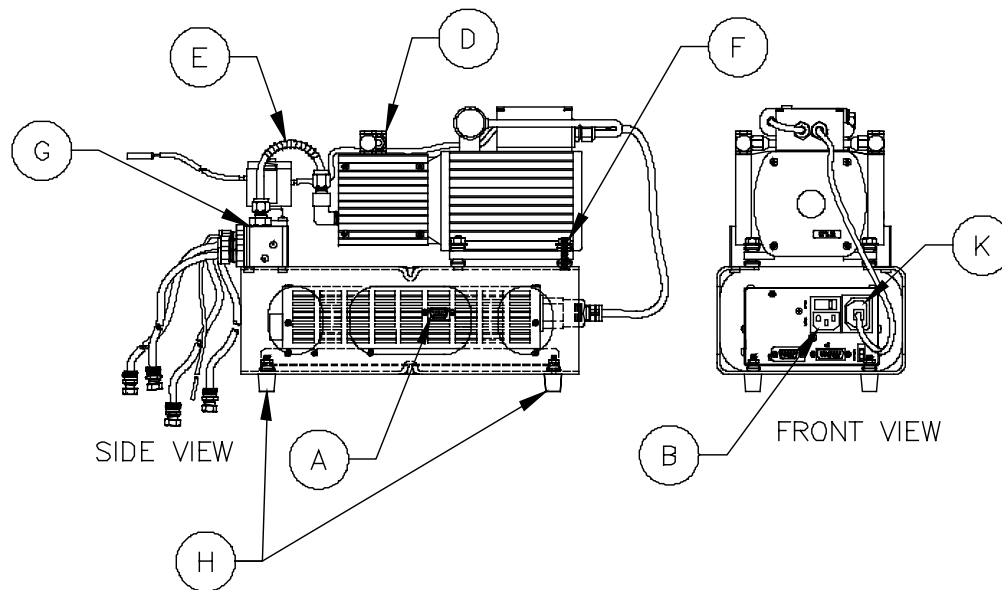


Figure 1. Side and front views of the diaphragm pump assembly.

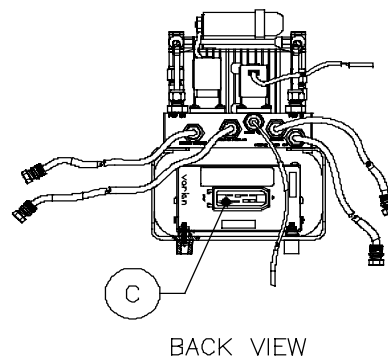


Figure 2. Back view of the diaphragm pump assembly.

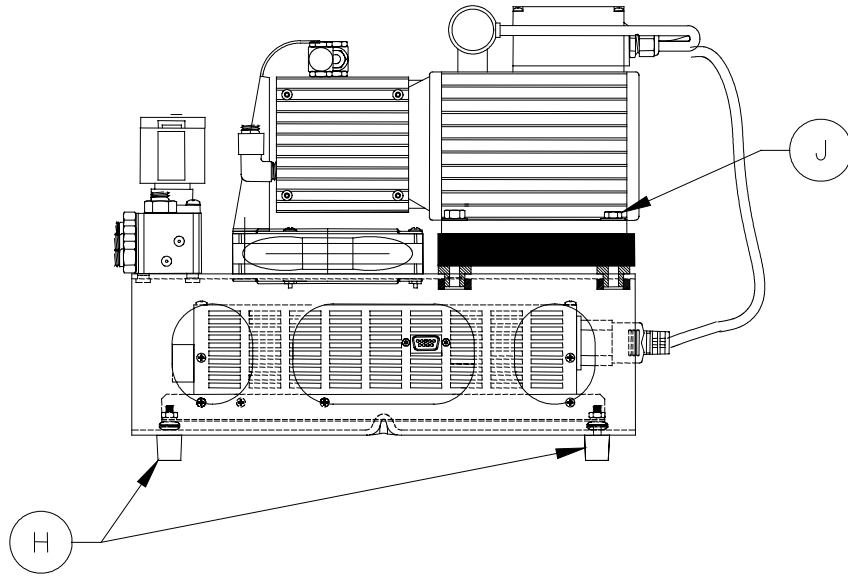


Figure 3. Diaphragm pump assembly shown with new chassis and fan.