



HAC 4500 Service Note 1201-022

Routine Outdoor Helium Compressor Maintenance Instructions

Introduction

Every month of operation the outdoor compressor of the HAC4500 will need to be thoroughly cleaned and serviced to ensure many years of reliable operation. This maintenance is best performed by a trained Heat, Ventilation and Air Conditioning (HVAC) technician or building facility personnel.

In practice, the HAC 4500 maintenance should be accomplished in approximately 1.5 hours and will not require the PPMS EverCool II system to be warmed up. This Service note can be used as a guideline for an HVAC technician to familiarize himself with the different routine maintenance requirements of the HAC 4500 outdoor helium compressor.

Tools Needed

- Medium size Philips screwdriver
- Water Hose

Parts Needed

- Spare 8-32 screws (zs-8csm.38tp)

I. Scheduling a maintenance event

In the PPMS EverCool II the most evident symptom that Cold Head maintenance might need to be performed is that the system will not be able to maintain a constant liquid helium level.

II. Shutting down the system for Service Maintenance

The Outdoor Compressor unit maintenance should be scheduled every 2500 hours of operation or when overheating of the compressor capsule is observed. The maintenance can be accomplished in just about two hours and should not require the PPMS EverCool II system to be completely warmed up.

1. Set the system in standby mode from MultiVu by clicking Instrument → Shutdown → click OK.
2. Power down the indoor compressor by toggling the switch in the back of the indoor unit.
3. Power down high voltage power by turning off the high voltage breaker. **WAIT FOR 30 MINUTES BEFORE PROCEEDING TO THE NEXT STEP!!** This will allow all the capacitors in the compressor discharge to a safe level before opening the fuse bay.



WARNING!!

Handling High Voltage Power Connections Requires Precautions to AVOID Electrical hazards that could result in bodily harm, or loss of life. The Fuse Bay Encloses both 200-230 V and 380-408 V power outlets.

III. Removal and cleaning of the Air Filters

1. Remove the four Air Filters on each side of the compressor by sliding each one up and out of the frame.

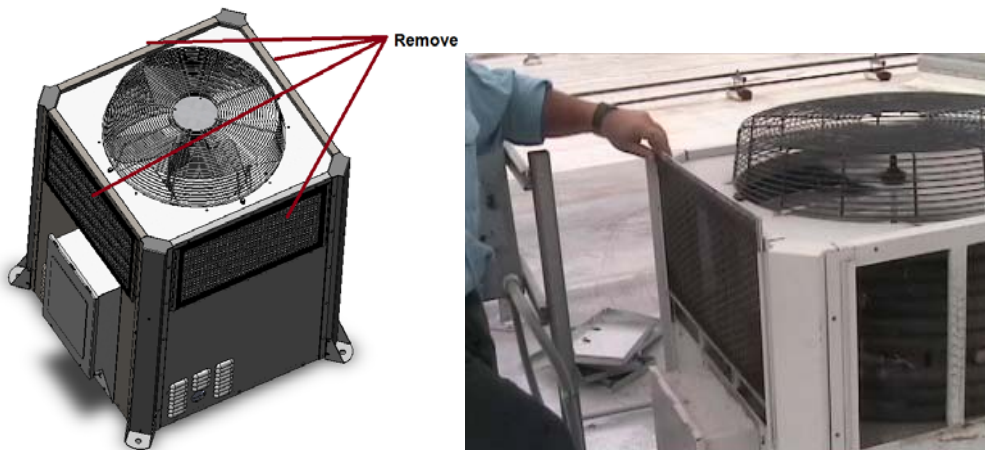


Figure 1. Remove the four Air filters from the compressor frame

2. Using a water hose thoroughly wash the filters and brush off any dirt and debris. A soft brush can be used during this operation.



Figure 2. Wash the compressor air filter screens with a water hose

3. Let the filters dry while accomplishing the other maintenance tasks.

IV. Clean Heat Exchanger Cooling Coils

1. With the Air Filters removed the Heat Exchanger cooling coils are now ready to be cleaned.
2. Wash the cooling coils all around the perimeter of the compressor. Remove as much dirt as possible from the upper compressor structure onto which the coils are resting.
3. Note any rust spots which might require additional care and touch ups.



Figure 3. Wash the Heat Exchanger coils

V. Cleaning Compressor Interior

1. Remove at least two of the four panels by unscrewing the 16 screws from each panel. Be careful not to cross thread the screws as they might have dirt and rust on them. If any of the screws are damaged replace them with new ones.

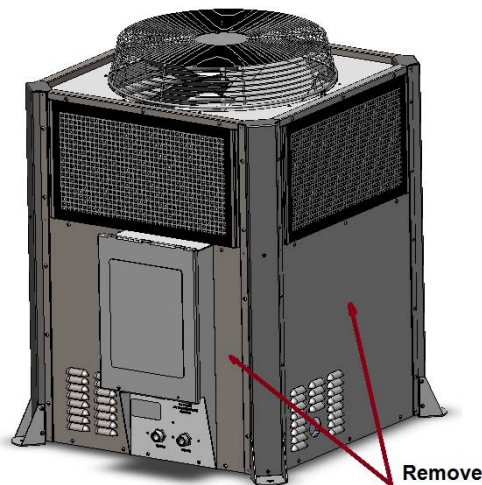


Figure 4. Remove the compressor side panels

2. Make sure the electronics bay is free of debris. Dirt and other obstructions might be limiting the air ventilation through the louvers.



Figure 5. Remove any debris from the electronics bay ventilation louvers

3. Carefully directing the water jet, wash out any dirt and debris in the lower shelf of the compressor. Make sure to keep the jet away from electrical connections as much as possible (see figure 6).



WARNING!!

Please note that no water should be directed or otherwise enter through the electronics bay vents. This could cause malfunctioning of the equipment!!



Figure 6. Wash the bottom shelf of the compressor unit

VI. Re-installing the compressor side panels

Once the compressor is cleaned you will need to re-install the compressor side panels. Because of the large number of screws on the panels it will be important to start but not tighten completely each screw to assure that the panels are aligned. This will avoid the screws to be stripped and the PEM nuts on the frame to be damaged

1. Hang the side panels to the compressor frame
2. Start but do not tighten each of the 16 screws holding up the side panels (see Figure 7).



Figure 7. Start but do not tighten all of the screws holding up the side panels

3. Once all the screws have been started and the side panel is aligned, start tightening every screw until tight.

The Routine maintenance is now complete and the system can be re-started.

VII. Starting the PPMS EverCool II System back to operation

1. Restart the helium compressor:
 - Turn the High Voltage Power back on by switching on the High Voltage Power Breaker and wait 5 minutes.
 - Power on the indoor compressor unit by toggling the switch on the back of the indoor compressor unit. Wait 2 minutes for the Indoor Compressor Control Unit to initialize.
 - Set the Indoor Compressor Control Unit to “RUN” by depressing the “RUN” button in the front control panel once. The front panel will then display “RUNNING REMOTE CTRL”.
2. Verify you do not have any communication error messages when opening up MultiVu. To do this open a Windows explorer window and navigate to C:\QDPPMS\QDTools\CANDataLogger and open the program.
 - Press the “Initialize CanOpen Master” button to initialize the CAN bus communications.
 - Click on File and open the EvercoolIII.cdl file in the C:\Evercool II\Tools directory.

- Click the SDO Read tab and press the “Read ALL (Once)” button.
- Click the Alarms tabs and select node 4, and press “Upload and Parse” button to check if any messages appear. Typically you might see the following three messages shown in Figure 8.

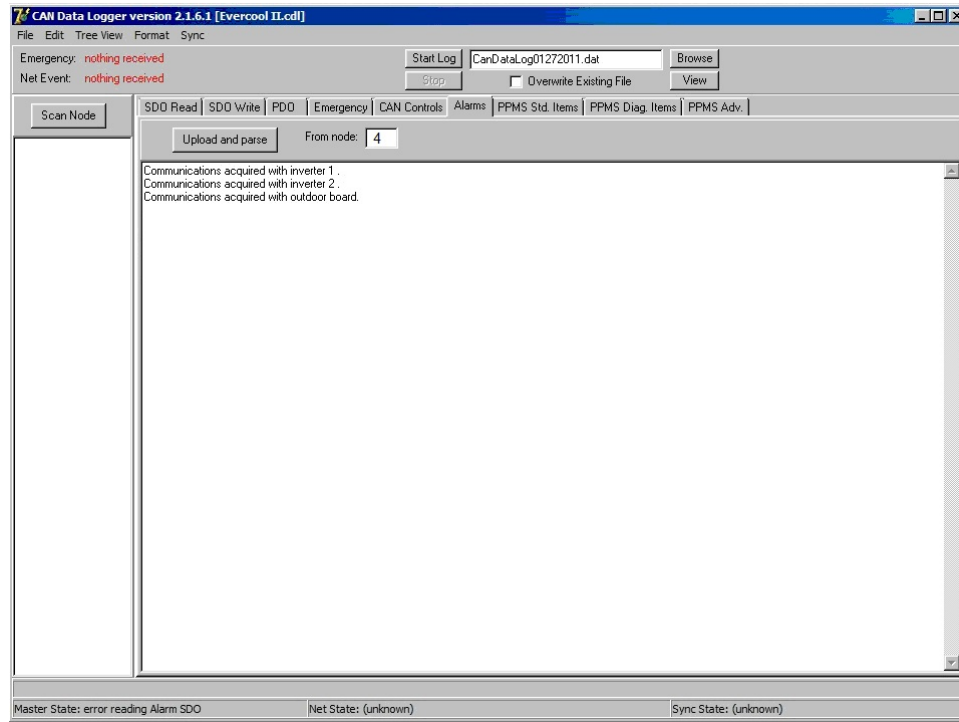


Figure 8. Typical CAN Data Logger Alarms Tab upon power up

In particular the messages can be interpreted as follow:

“Communication acquired with inverter 1” informs the user know that successful communications with the Cold Head inverter has been established.

“Communication acquired with inverter 2” informs the user know that successful communications with the Scroll Capsule inverter has been established.

“Communication acquired with outdoor unit” informs the user that all communications are established with the outdoor unit.

Depending on the specific version of the Compressor Firmware you are running you might also see one more message:

“Capsule temperature at 999.00 C” is a default value it is displayed every time the power is lost - again all normal here.

3. If everything is communicating at this point, verify that the compressor and helium level control are enabled from within MultiVu by clicking on the EverCool II status box located on the bottom of MultiVu application. Once the Evercool II Instrument window appears check the status of both “Compressor Control” and “Helium Level”. These should be reading “Automatic” and “Enabled” respectively.
4. If you have lost too much Liquid Helium (below 60%), wait for the system to refill to above 60% before using the magnet and temperature control. The status should be in “Recirc. & Filling” if it is below that level. Contact a qualified Quantum Design representative for assistance if need be.

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5. Set the temperature to 300 K (**Instrument >> Temperature**). When you set the temperature to 300 K, the equipment automatically opens the valves and starts pumping out the lines.
6. Wait five minutes for the system to stabilize.
7. Set a new temperature and activate an option.