



**SET-UP, OPERATING and MAINTENANCE INSTRUCTIONS**

**For**

***SAFE Systems, Inc.***

**VACUUM RECOVERY UNIT**

**MODELS:**

**PD 2400-E, VDC-4, CT 200, CT STAND**

## **SET-UP PROCEEDURE**

1. Ask the driver for the **Packing Slip** from the shipper. Keep this paperwork with the equipment so that when the unit is returned there is a list of the components that came with the unit. The person loading the equipment for its return can check this list to insure that all the components are present. This will help to avoid additional charges for missing components.
2. Unload the equipment with the properly sized forklift or crane.
3. Locate the equipment on a level surface where it is to be operated.
4. Have a licensed electrician connect the proper power source to the equipment.
5. Remove the shipping seal from the 4" vacuum inlet on the top of the vacuum producer.
6. Have the electrician start and stop the unit to check for the proper rotation of the pump. If the rotation is incorrect, have it corrected. (Warning: Do not change the power cord connections inside the control box, this may cause damage to the circuit breaker). If changes in the wire connections are required do those changes at the power source.
7. Connect the vacuum hose to the 4" vacuum inlet on top of the machine and connect the other end of that hose to the top (clean air side) of the VDC-4.
8. Connect another 4" vacuum hose to the bottom side (dirty air) of the VDC-4 and connect the other end of that hose to the vacuum side of the CT 200 collection tank. Note: The vacuum side of the collection tank is the connection that comes out of the top of the vessel without the "Wear Tee".
9. Connect the 4" vacuum recovery hose to the other connection on the collection tank (the one with the large "Wear Tee" at the top of the inlet pipe). This "Wear Tee" reduces the amount of wear in this connection caused by the transport of the abrasive.
10. If a collection tank stand is being used, place the CT-200 on the stand to elevate it high enough to allow the dumping of the contents into drums, bags or other storage devices.
11. Make sure all the hose connections are vacuum tight by taping or clamping these connections.
12. Connect 120 Volt, single-phase power and a ¾" air line to the VDC-4 for the pulse cleaning of the filters.
13. Insure that the butterfly valves on VDC-4 and the CT 200 are **COMPLETELY CLOSED**. If these valves are left open (even a little bit) it will cause damage to the valve and possibly to the vessel very quickly.

## OPERATING PROCEEDURE

1. Close the butterfly dump valves on the VDC-4 and the CT 200.
2. Turn on the dry air supply to the filter/regulator on the VDC-4 pulse cleaning system. Set pressure @ 90-95 psi.
3. Connect the VDC-4 to a 120-volt, single-phase power supply. With air and power applied you should hear a periodic (about every 20 seconds) burst of air coming from inside the VDC4 vessel. This indicates that the filter pulsing (cleaning) system is operating.
4. Turn breaker on the PD 2400-E control box to the "ON" position, a green POWER ON indicator light should illuminate.
5. Make sure the end of the vacuum recovery hose in a safe location and is not lying near any unsuspecting personnel.
6. Make sure the vacuum recovery hose in not lying in water, near trash or against a structure. There should be no restriction in airflow during start-up. Any restriction in airflow during the start-up of the vacuum may cause the motor to draw too much amperage and it may damage the electrical control system.
7. Push the START button on the PD 2400-E control box to start the pump and motor. This unit is equipment with a Wye/Delta start system that allows the motor and pump to "Ramp-up" to speed. This keeps the amperage draw low at start-up and it allows the drive system to start spinning slowly and then ramps up to normal operating speed.
8. Once the system is running, check and record the readings on the magnehelic gauges on the VDC-4 and the PD 2400-E. **The normal operating range for both the VDC-4 and the PD 2400-E is between 0.5" to 15" of differential pressure.**
9. Check and record the reading on the vacuum gauge on the PD 2400-E.
10. Let the vacuum run for about 5 minutes prior to starting the abrasive recovery process. This allows the hoses to clear of any residue and allows the pump to warm-up with no restrictions in the airflow (free air).
11. **The normal operating range of this equipment is between .05" to 15" of differential pressure as indicated on the magnehelic gauges.** If the reading is above or below this range the equipment should be shut down and the cause for the high or low reading determined.
12. The normal vacuum reading can range from 4" to 25". It will vary up and down during the vacuum recovery operation. If the reading is always very high (24'-27") and it does not vary up and down during the recovery operation the equipment should be shut down and the hose should be checked to see if it is blocked or plugged. It is not a good practice to run the pump and motor while the airflow is completely blocked. This is hard on the equipment and can cause damage to the pump or motor.
13. Periodically check the reading of the magnehelic gauges and the vacuum gauge. This should be checked on a regular basis (every couple of hours). If the readings start to climbing rapidly the system should be shut down and the cause determined.
14. The filters (PN 1000 1245) in the VDC-4 are rated @ 99.9% at .5 microns. Refer to the **Filter Performance Specifications** for more information
15. Shut the system down every 2 hours of operation and dump the dust from the VDC-4. This time frame can be adjusted to more often or less often depending on the dust amount being collected. Do not use the VDC-4 as a collection device. This will cause the dust collected inside the VDC-4 cone to be re-entrained back onto the filters, thus shorting the life of the filters.
16. Do not open the butterfly valve on the VDC-4 or CT 200 while the vacuum is running. This will re-entrain the dust that has been collected in the hopper back onto the filters.
17. Drain the moisture from the air filter/regulator and the air manifold daily on the VDC-4 or as needed to insure that the filters are not being pulse with wet or damp air.
18. Do not allow rope, rages or other debris to get sucked up into the equipment. This debris can clog the collection tank and can cause serious damage to the equipment.

## SHUT DOWN PROCEEDURE

1. Stop the abrasive recovery process and set the vacuum hose in a safe location away from personnel where it is only sucking "free air".
2. Allow the system to run in the free air condition until all the abrasive is out of the recovery hose. This can take up to 15 minutes to completely clear the hoses. **This step is very important!** Do not start this system with the recovery hose blocked or plugged. This can cause damage to the equipment.
3. Record the magnehelic and vacuum gauge reading on a Daily Log Sheet.
4. Push the stop button and the PD 2400-E. Warning: Do not use the main circuit breaker on the control panel to turn the PD 2400-E.
5. Turn the main circuit breaker to the "OFF" position.
6. Turn the air pressure off and secure the power to the VDC-4. Drain any moisture from the filter regulator and the air manifold.
7. Open the dust discharge butterfly valve on the VDC-4 and drain the dust residue into the waste drum or container. Completely close the butterfly valve.
8. Open the grit discharge butterfly valve on the CT 200 and drain the abrasive/residue into the grit drum or container. Completely close the butterfly valve.

## OPERATIONAL TIPS

1. The vacuum produced by this equipment is very dangerous! Only trained personnel should be allowed to operate this equipment.
2. When recovering abrasive try to maintain a 60% air to 40% abrasive mix. The more air flow you have the better the recovery. A consistent air to grit mixture will produce the fastest recovery rates.
3. Try to keep the vacuum hose runs as short as possible. Long horizontal hose runs will cause the abrasive to settle out in the hose and can eventually block off the air flow completely especially if the air flow goes below the 60/40 mix.
4. Be careful not to overfill the CT 200 with abrasive. Dump this tank as often as possible. This will help limit the amount of abrasive dust being carried over to the VDC-4 and will lengthen the life of the VDC filters.
5. Dump the VDC-4 as often as possible to prevent dust from building up in the cone and being re-entrained back on to the filters.
6. The compressed air used to clean the filters in the VDC-4 must be **DRY**. Wet or damp air will greatly reduce the life and efficiency of the filters. The filter media is basically made from a paper and polyester blend material, which can be damaged by water or high moisture.
7. The pulse air pressure can be increased gradually from the initial setting of 90 PSI to a maximum of 105 PSI after the filters have formed the dust cake and the differential pressure reading on the magnehelic gauge has started to climb. Back pulsing the filters with air pressure higher than 105 PSI will damage the filter media and may allow dust particles to get through the filter media. High pulse pressure can also cause the filter to "Blow-out" which actually forms a hole in the filter and allows dust to by-pass the filter altogether. In the case of a filter failure in the VDC-4, the vacuum pump is protected by a **Safety Filter**. If this filter become blinded and fails this will cause damage to the vacuum pump.
8. A daily log recording the reading of the magnehelic gauge and the air pressure gauge is recommended to help track how the equipment is operating and it gives the operator a chance to address issues before they become problems.

## PREPARATION OF EQUIPMENT FOR RETURN FROM RENTAL

1. Allow the vacuum to run with free air to clear all the hoses of abrasive and debris.
2. Disconnect the abrasive recovery hose and the vacuum hose to the VDC-4 from the CT 200. Dump all the contents out of the CT 200.
3. Lower the CT 200 off the CT stand and lay it down into the shipping position.
4. Secure/disconnect the AC power from the PD 2400-E and the VDC-4. Coil the power cords up for transport.
5. Secure and disconnect the compressed air from the VDC-4
6. Disconnect all vacuum hoses and cover all the hose connections for transport.
7. Open the filter access doors on the VDC-4 and remove the filters. **Note: These filters are the property of the renter and they should NOT BE RETURNED with the equipment. It is the renter's responsibility to properly store or dispose of these filters.**
8. Remove any dust residue or trash from the VDC-4 and the CT 200.
9. Remove the remaining dust residue in the filter area by vacuuming, or washing the interior of the unit.
10. Close and secure the filter access door for shipment.
11. Close the butterfly valves on the VDC-4 and the CT 200.
12. Gather and secure for transport all the accessories sent with the equipment (if any).
13. Properly secure the equipment on the truck or trailer using proper tie-down procedures. Use the lifting eyes and forklift tubes for attachment of the chains or straps. This will minimize the risk of causing damage to the unit during transport.
14. Make a note of any problems experienced during the operation of this equipment and a contact name and phone number so our technician can contact this person. Give this note to the delivery person returning the equipment.
15. We hope this equipment rental went well for you and we look forward to assisting your company in future projects. Thank you for your business.