PNEUMATIC
VACUUM ELEVATORS LLC

INSTALLATION MANUAL

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IMPORTANT SAFEGUARDS

When using an elevator, basic precautions should always be followed, including the following:
READ ALL INSTRUCTIONS BEFORE USING THIS VACUUM ELEVATOR.

WARNING

- **Never allow children or people unfamiliar with the instructions to operate the elevator.**
- **The elevator is intended for the transportation of people from one landing to another.**
- **Keep all nuts, bolts and screws tight to ensure that the equipment is in safe operating condition.**
- **Never open the door when in operation.**
- **Never remove car ceiling.**
- **Never remove any of the covers that the elevator has.**
- **Do not use elevator when covers have been removed.**
- **ONLY an authorized PVE dealer distributor is to install, work on, and/or service the elevator.**
- **Do not force or kick the doors open.**
- **Do not lay any objects against the cylinder elevator walls.**
- **Never wedge anything between the car and the cylinder.**
- **Do not remove any weather stripping located on the doors.**
- **Do not remove any hardware that is part of the elevator or shipped with the unit.**
- **Do not use elevator if ambient temperature is less than 65°F (18°C).**
- **Do not spill water on any of the electronics.**
- **Do not obstruct the door opening, door clearance, and door locks.**
- **Keep your door key in a secure place.**
- **Do not use elevator if home is under construction and there is dust / particles that are air born.**
- **If voltage exceeds nominal 220VAC it can cause damage to system. Assure a regulated, clean, and dedicated line is supplied to elevator.**
- **Turn OFF motor circuit breaks (power interrupts) before entering hoistway (cylinder)**
- **An approved ANSI or EN 131 "A-Frame" ladder is required to access controls.**
- **Elevator may have a small step into car.**

Requirements of Installation Organization

The following are important items the installation organization needs to comply with.

- The installation organization needs to carry out the work of installation in conformity with the instructions and check list. After the checks are performed the installation organization needs to determine if conformity or additional steps that need to be taken.
- The installation organization needs to verify that the elevator will used for its intended environmental conditions.
- The installation organization needs to ensure that a risk assessment for any working area has been carried out taking into account all information supplied by the owner of elevator.
- The installation organization needs to inform the owner of elevator of any work that needs to be carried out as a consequence of the risk assessment especially for the access and/or the environment related to the installation.
- The installation organization needs to carry out the installation of elevator by competent installation persons and provided them with the necessary tools / equipment.
- The installation organization needs to maintain the competency of the installation persons.
- The installation organization needs to make available for the attendance of a competent installation person(s), given at a reasonable notice, for any inspection carried out by an authorized third party.
- The installation organization needs to take into consideration any additional work that might be required if a

Requirements of Elevator Owner

The following are important items the owner of elevator needs to comply with.

- It is recommended that the owner of elevator to have the same installation organization in case of multiple installations having the same elevator and installation.
- The owner of elevator needs to inform the installation organization immediately:
  - before any modification related to the installation and/or its environment
- The owner of elevator needs to keep the access to working areas and working rooms safe and free for the installation persons and to inform installation organization about any hazard or change in the workplace and/or the access ways.
- The owner of elevator needs to take into consideration the consequence of the risk assessment.
- The owner of elevator needs to ensure the risk assessment is carried out.
- If a

Installation Risk Assessment

It is necessary that a risk assessment be carried out to determine the safety in installation operations of the elevator by adopting safety measures. Safety measure instructions on the building/residence shall be provided to the owner of the elevator. For safe maintenance and to provide relevant instructions, it is necessary, first of all, to identify the maintenance operations. Maintenance operations are:
a) those operations considered necessary for a correct and safe functioning of the elevator and its components after the completion of the installation
b) those operations considered necessary during the

The intent of this manual is to provide a guide with the instructions necessary to install a pneumatic vaccum elevator. It is advisable, in order to achieve a better understanding of the reading process, to watch the images of the installation video.

Notice: Only elevator technicians that have been fully trained by Pneumatic Vacuum Elevators can install and/or service vacuum elevators.

Installation manual

1. Tasks prior to the installation.

1.1 Verify whether the installation is feasible in the customer

3. Keep in mind that the ground floor cylinder and the LCU inserted.

4. In case the hauling hook has not been installed, as detailed in the file ***"Installation Requirements"***, setup the installation tripod.

5. Haul up the head.

5.1 Decide which is the most convenient way to take the head to the upper floor:

a) Carrying it up the stairs by hand and or

b) Hauling it through the hole in the mid- ceiling .

5.2 Set up the head-spider (hauling bar) on the head by fastening the locks (T shaped) on the head unit.

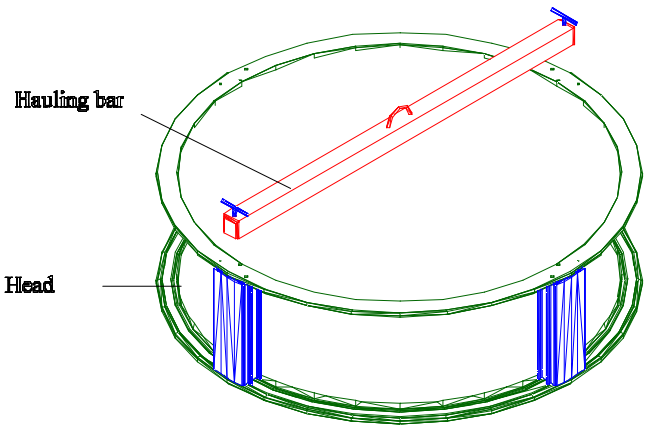

Figure 1

5.3 Set the head unit below the floor hole on the upper level. Align the tripod hook and the head-spider hook. Attach the hook/rope/chain from the installation tripod to the hook of the head-spider.

5.4 Lift the head unit pulling the rope/chain of the gear softly and, once upstairs, take the hook off the gear and leave the head beside on the upper floor.

Note: Be careful not hit/scratch the cylinder against the walls of the hole.

6. Hauling the upper floor cylinder up.

6.1 Set the cylinder of the upper floor below the floor hole.

6.2 Install the cylinder-hoist tool inside the cylinder by first remove the fixing bolts and slide one arm into the other.

6.3 Place the cylinder-hoist tool inside the cylinder, to do this first open the cylinder door using the door key.

6.4 Put the hook of the gear in the hook of the cylinder-hoist tool.

6.5 Extend the arm to the columns of the cylinder to which the cylinder-hoist is to be clamped to.

6.6 Adjust the fixing bolts of the arm and clamp the brakes.

6.7 Haul the cylinder to a height that allows to put below it the intermediate or next cylinder immediately below it (usually the intermediate cylinder).

7. Assembling the upper floor cylinder and the intermediate cylinder.

7.1 Clean the support surface of the structural ring of the intermediate cylinder and the lower structural ring of the floor cylinder. Apply silicon to the male and female connectors. Check weather strip on structural rings add silicon if weather strip has been damaged during un-boxing. Or replace weather strip with an auto-adhesive strip of rubber type EPDM thickness 0.08

8. Set up the electric connection of the column cables.

8.1 Loosen the

10.5 Put the band tightening tool on the band. Remove the bolt and the adjusting screw.

10.6 Carefully open the band and place around/on top of mating structural rings of cylinders. Close the band and using a rubber mallet hit around it so that it fits appropriately on the structural rings.

10.7 Fix the adjusting screw of the band tightening tool and tighten the screw to close the band. When the band is completely closed and tight, tighten the Allen square head screws 5/16

15.2 Fix the hook of the gear/rope/chain to the hole of the Head-spider (hauling bar), if height allows this. If it is not possible due the height constrains, the head must be lifted manually. *use caution

15.3 Haul the head unit above the top floor cylinder, to caution not to hit or scratch unit.

15.4 Lower the head unit and place it on the top floor cylinder. Contrary to the previous assemblies, the head assembly does not require male and female connectors.

15.5 Align the cable column of the head with the assembled units. Control box is to be on the same side as top floor cylinder door.

15.6 Place the band as described above.

Warning: Be careful when moving the head on the surface of the ring covered with silicone, since this may become slippery with the risk that the head may slide and fall to the floor.

Note: Bear in mind that the Split model has a split plate that is placed on top cylinder instead of head unit.

16. Proceeding to the electric connection of the head.

16.1 Remove the polycarbonate cover from the quad point of where the control box is located.

16.2 Open control box by removing screws. Note: a micro switch is located on control box not allowing the unit to run if cover is removed.

16.3 Connect the cylinder column cables; refer to electrical prints (control box layout) for indication of location.

16.4 Put on the

Note: Make sure that the traveling cable is not twisted or coiled that can effect the slide movement in the seal of the car.

16.6 Insert the cable through the left side of the control box.

16.7 Connect the individual wires of the traveling cable as shown on the electrical prints (control box layout print).

--SEE ELECTRICAL DRAWINGS

18. Remove the protection film of any polycarbonate sheet that still has it and follow previously described steps.

19. Place and attach the two half circles of the aluminum floor-finish-rings to the floor of the upper floors.

20. Place and attach the four quad wood ceiling-finishing-rings to the ceiling of each floor penetrated by elevator. Fix each quarter of termination with 2 pegs and contact cement.

Starting the elevator

1. Turn on the end user provided circuit breaker which provides energy to the elevator.

2. In the control box, turn on the double-pole circuit protector. Next turn on the rest of the circuits.

3. Verify that the PVE Board is powered up.

4. Verify that the ***EMERGENCY STOP*** button in the car is in ***OFF*** mode (opposite direction of the arrow.

5. Verify that when the door is opened on the lower floor, the light and ventilation of car turned on. Also, when the door has been closed for 10 seconds, that it shuts off. Note: fan and light are shipped unplugged.

6. Verify that when the ***ALARM*** button is hit, a warning signal is sent out.

7. PVE Board information.

From the PVE Board there is a menu that gives you several option into which you can view input/outputs. One screen allows you to view all inputs at once called

7.1 Try all of the buttons and functions on every floor and car. Verify that all signal are recognized by PVE board.

8. Run car top different floors. Note: more than likely doors will have to be aligned.

9. Stop the car in the middle floor in between the ground floor and upper floor in order to place strings on bottom of car. With the car on the upper floor manually put the turbines into action ***(See USER MANUAL).*** The car will start to slowly descend. Then open the door of the ground floor cylinder, allow the car to start descending down and push up against it using both arms the car will stop. After the car has anchor itself with its emergency brakes. Place the springs on the base of the car. Now close the door and manually press the motor contactor for a few seconds in order to unlock the car-releasing the emergency brake system ***(See USER MANUAL).*** The car will descend to the ground floor.

10. *TEST THE FUNCTION OF THE ELEVATOR*

10.1 Car Guides.

10.1.1 Press the ***CALL*** button and verify that the correct movement of the car over the cylinder guides is taking place. As the car passes through the different unions of cylinders, there should be no noise. In this case, it is probably that the regulated guides of the car, which are located in the inferior and superior extremes, need better adjustment. Note: air leaks will cause a buff sound and need to be fix.

10.1.2. Verify that the doors close, the seal and orifice where the traveling cable pass through is working properly. If you are exeriencing a loss of air, it will be noticeable due to noise you will hear in the car as you ride in it.

10.1.3. Verify that the traveling cable at the head unit location is properly sealed. The cable should not role on to the top of the car. It should slide inside the same way that it is moving. If for some reason it tends to role over the car, enlarge the passway of the orifice and also fill and seal the cable with liquid silicone.

10.2. Adjustment of location for sensors and functions.

10.2.1 With the car in ascending movement and with the maximum weight permitted, verify that at the end of the ride, the car does not crash the roof of the cylinder. If this occurs, it means that the upper magnetic sensor (MU) is located extremely high. Lower it ½

10.3. Power shortage

With the car in ascending mode, place the double-pole circuit breaker in the off position. This action is similar to a power shortage. The car should hold itself up and then slowly descend onto the ground floor. Once the car reaches the ground floor, the door should be unlocked.

10.4. Emergency stop

While the car is descending, hit the ***EMERGENCY STOP*** button. The car should hold itself up and then slowly descend onto the ground floor just like it was described in the power shortage section.

10.5. Brakes

10.5.1. In order to test the brake system we should first see to it that while the car is descending a large amount of air is entering the cylinder, simulating the rotation of a polycarbonate iron, the rotation of a door, etc. For this, with the car descending without having past the door, we will need to manually open the door of the upper floor, maintaining a small opening between the door and the frame so that we can quickly close the door in case the brake system fails. This is done in order to avoid the free fall of the car. As you close the door, avoid letting air into the exterior cylinder and the car will stop quickly so that it can keep descending onto the ground floor.

10.5.2. PROCEDURE: With the car is locked on the upper floor manually hit the switch for the group of turbines that unlock the car and open the superior door ***(See USER MANUAL).*** The car will descend slowly until it finds the vane of the door on the upper floor; from this moment the car will automatically activate the emergency brakes allowing only about a 2