

NO SOUND THROUGH EMPTY SPACE

MAINTENANCE INSTRUCTIONS

GENERAL INFORMATION:

In No Sound Through Empty Space, a plastic jar containing a bell, a fan and a pinwheel lets you investigate what happens to sound in a vacuum. After pushing the button, the jar is filled with air, the bell rings and the spinning fan causes the pinwheel to turn around. When the vacuum button is released, forcing the air out of the jar, the pinwheel stops spinning (even though the fan is still turning) and the bell's ring becomes difficult to hear (even though you can still see the striker hitting the bell), vividly demonstrating that sound cannot travel through a vacuum.

The vacuum pump is a low speed belt drive unit that usually runs trouble free for years if maintained properly. A healthy pump and leak free plumbing will pull the gage below a pressure of 1 Torr, (.001 atmospheres.) A mist trap is provided to minimize the exhaust oil mist. The vacuum pump and ventilation fan both exhaust through the bottom of the exhibit. Oil mist, which appears as smoke, will begin to emerge from beneath the exhibit as the mist trap becomes saturated. This is normal and generally takes a month of usage before the trap needs to be cleaned or replaced. An anti-backstream valve allows air into the vacuum pump inlet to prevent oil from backing into the hose and chamber when the power is shut off.

The circuit breaker is accessed at the rear of the cabinet. An air filter is located in the rear access panel.

Initial Set-Up:

The exhibit is shipped with the vacuum pump exhaust port plugged. The plug needs to be removed and replaced with the mist trap. Check the vacuum pump's oil level and belt tension in accordance with the Vacuum Pump Maintenance section. We suggest that a drip pan be positioned underneath the exhibit to catch any drips that may drain out of the exhaust pipe.

General Cleaning:

The finished or painted surfaces of the exhibit may be cleaned with a mild soap solution or general purpose cleaner. The Plexiglas panels should be cleaned with a plexi cleaner and a soft wipe that will not leave scratches, (we suggest Wype-All™). DO NOT use alcohol on the Plexiglas bell jar, as it may cause the plastic to craze or crack.

Push-button Replacement:

The switches are accessed from underneath the graphic panel by removing the rear access panel. The micro-switches can be removed by sliding the wire connectors off and bending the plastic clip just enough to rotate the switch body out of the button mechanism. Replacement is the reversal of this procedure.

Filter cleaning & replacement:

The air filter is located in the rear of the cabinet and accessed by removing the rear access panel. Two flathead fasteners with finishing washers retain this panel. The filter slides out by pulling on the sheet metal tab. The filter unit should be checked periodically and cleaned (vacuumed) or changed as needed.

Vacuum Pump Maintenance:

The pump should be periodically checked for proper oil level and belt tension. Oil is added through the exhaust port by unscrewing the mist trap and pouring vacuum oil directly into the port. The sight glass indicates proper oil level. The oil should be drained and changed once a year. The oil is the first thing to check if the pressure does not pull down to .001 atmospheres.

The ballast valve located on the pump allows small amounts of air to be bled into the inlet. This warms the oil to keep moisture evaporated. Under most conditions, this valve is cracked open just enough to here a slight popping sound. Since the visitors operate an air bleed valve, the pump ballast may be kept closed. Too much air flowing through the vacuum pump will cause excessive oil consumption and raise the minimum pressure that the exhibit can be pumped down to.

As air is bleed through the exhibit, the mist trap will become saturated with oil. Eventually smoke will start to emanate from the exhaust, indicating the mist trap requires cleaning or replacing. We recommend that a second mist element be kept on hand to swap out with the clogged element. The clogged element may be reused by leaving it stand in a suitable pan for several days, so that excess oil can drain off, then soaking the element in lacquer thinner to rinse the remaining oil out. Let the element dry out in a well ventilated place. After drying, the unit can be used again. Filter elements may be reused several times if cleaned in this fashion. New replacement elements are available from most distributors of vacuum pumps.

Bell Jar Maintenance:

The plastic bell jar is held in place by the vacuum inside. To access the inside, switch off the vacuum pump and either push the add air button, or slide the vacuum hose off the pump inlet fitting. After the pressure in the bell jar has equalized, the plastic cylinder can be slid off the base. Pull straight up and watch that the bell doesn't scratch the inside of the cylinder when it pops free.

The cylinder seals to the lid and base with O-rings. There should be a slight amount of vacuum grease on these when re-assembling.

The bell, fan and striker are all mounted on shock mounts so that sound cannot be mechanically transmitted into the base and cabinet. Check that the plate is suspended properly on the shock mounts and not rubbing metal on metal.