

## Technical Service Bulletin

**Date:** January 29, 2009  
**To:** Minuteman Dealers and Service Centers  
**From:** The Technical Support Department  
**Regarding:** All E17 and E20 Series Scrubbers

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### **On Machines That Are Experiencing a Loss of Run Time You Should Check the Following:**

#### **Charger Doesn't Turn On**

- Does the battery charger turn on when plugged into the A.C. outlet? Can you hear the cooling fan turn on? If not, check the A.C. outlet for power. Try a different outlet, if needed.
- If it still doesn't turn on, inspect the A.C. cord. Repair if needed.
- If the A.C. cord is Ok, check to see if the battery connector has been plugged in to the machine's connector.
- Inspect the battery cables. Make sure they are clean and tight.
- Test the voltage of the batteries; it must be above two volts minimum, before the charger will turn on.
- If everything above checks OK, and the charger still doesn't turn on, replace the battery charger.

### **The Charger Turns On**

- If the charger appears to be on: Remove the rear metal cover on the rear of the machine.
- The charger's display should be lighted, when plugged in the A.C. outlet. If not, replace the charger.
- Check for errors on the chargers display
- Press the number 5 on the charger decal. This will display different pieces of information about the charging process such as errors (see error list), battery voltage, output amperage, hours of charging and estimated amp hour of battery and wattage.
- The voltage and amperage output should start to climb after a few minutes of starting the charger, unless batteries are still hot from charging. If not, replace the charger.

### **Excessive Gassing or Water Consumption in Batteries**

- If the charger appears to be charging and excessive gassing or water consumption had been or is occurring in the batteries. Check the following:
- Have the batteries been maintained on a consistent basis? Failure to maintain batteries will shorten their life and reduce their performance.
- Test the batteries with a hydrometer. The batteries should be fully charged and cooled for 2 hours after charging, before testing. Top the batteries off with distilled water prior to charging, if needed.
- Compare the cell readings of all the cells in each battery.

- The greater the variation between cells in any one battery, the greater loss of running time. A battery with variations of .040 or greater should be replaced. The variation of .020 is considered normal.
- Specific Gravity Readings are as follows:
  - 1.280 and above = 100% charged cell
  - 1.235 to 1.240 = 75% charged cell
  - 1.190 to 1.195 = 50% charged cell
  - 1.150 to 1.175 = 25% charged cell
  - 1.250 and less = 0% charged cell
- Load test the batteries with a battery load tester. The voltage difference should be less than 1 volt, when testing under load. Any battery that has 1 or more volt(s) less than the other should be replaced.

**Errors that could be displayed on the charger are as follows:**

- “Bat” = batteries not detected. Voltage is below 2 volts, The polarity could be reversed or batteries disconnected.
- “Acid” = the charger programming set for wet lead acid batteries.
- “Gel” = charger programming set for gel batteries
- “E01” = maximum battery voltage has been reached
- “E02” = charger is overheating, faulty cooling fan or the cooling air to charger is obstructed
- “E03” = the batteries have exceeded the normal charge time. Possible battery sulfation has occurred. Cycle the batteries several times (charge and discharge).
- “Sct” = safety timer operation. This normally occurs after any allotted phase time period has expired
- “Srt” = internal short circuit in charger. Replace the Charger.

If you have any questions please call us at 1-847-264-5400.