



## Hale Products, Inc. Service Bulletin

Bulletin # **SB# 98** Revision Level **A** Date **06/29/2007**

Product Type Covered **Hale Products** **X** Class 1

Product Covered **ESP PRIMER SYSTEM SOLENOID TROUBLESHOOTING**

### Problem Statement

Additional troubleshooting information is provided for the solenoid relay / switch, used on the ESP Primer Systems.

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Customer Service Designee

## BODY OF BULLETIN

Additional information is now available for troubleshooting the solenoid relay / switch used on 12VDC and 24VDC ESP Primer Systems. (See Figure 1: "Solenoid Troubleshooting Chart.") This information is also available in the latest version of the ESP Primer Installation, Operation and Service Maintenance Manual, p/n: 029-0810-01-0.

### 1.1 12VDC AND 24VDC SOLENOID TROUBLESHOOTING

Condition	Possible Cause	Suggested Corrective Action
<b>Switch is dead - no click is heard.</b>  <b>For 12VDC Solenoid, see Figure 2: "12VDC Solenoid Arrangement" on page 3.</b>  <b>For 24VDC solenoid, see Figure 3: "24VDC Solenoid Arrangement" on page 3.</b>	<i>Bad base ground. (For 24VDC - bad ground at ( I ) terminal.)</i>  <i>Low voltage on switch terminal. (For 24VDC - bad voltage at ( S ) terminal.)</i>  <i>Dead switch wire.</i>  <i>Bad Battery.</i>  <i>Hardware not properly tightened.</i>	<ul style="list-style-type: none"><li>• Check solenoid base screws for tightness and corrosion, especially under the hold-down tangs - clean accordingly. Switch base must be properly grounded to motor and motor to chassis.</li><li>• Continuity test and check each cable for defects, i.e., fraying, splits, corrosion, etc. See Electrical Installation Details Plate Drawing PL#821 or PL#938. Repair and/or replace accordingly.</li><li>• Check apparatus battery for full charge - service accordingly.</li><li>• Using VOM (volt ohm meter), check wires for proper voltage - 12VDC requires minimum of 9.0VDC; 24VDC requires minimum of 18.0VDC.</li><li>• Check that hardware is tight and torqued to specifications. See Mechanical Installation Details Plate Drawing PL#821 or PL#938.</li><li>• Hair line cracks in the plastic body allow moisture to enter and short the internal circuitry. If suspect, replace solenoid.</li></ul> <p><i>Chart continued on next page.</i></p>

Figure 1: Solenoid Troubleshooting Chart

Condition	Possible Cause	Suggested Corrective Action
Switch is dead - continued.	Check plastic body for cracks allowing moisture to enter.	<ul style="list-style-type: none"> <li>• Hair line cracks in the plastic body allow moisture to enter and short the internal circuitry. If suspect, replace solenoid.</li> </ul>
Switch chatters, pops or clicks, but the motor does not work.	Bad base ground. <i>(For 24VDC - bad ground at ( I ) terminal.)</i>  Bad positive (+) or negative (-) cables. Bad or weak battery.  Low voltage to switch terminal. <i>(For 24VDC - bad voltage at ( S ) terminal.)</i>  Hardware not properly tightened.  Check plastic body for cracks allowing moisture to enter.	<ul style="list-style-type: none"> <li>• Check solenoid base screws for tightness and corrosion, especially under the hold-down tangs - clean accordingly.</li> <li>• Continuity test and check each cable for defects, i.e., fraying, splits, corrosion, etc. See Electrical Installation Details Plate Drawing PL#821 or PL#938. Repair and/or replace accordingly.</li> <li>• Check that each cable is tight and torqued to specifications. See Mechanical Installation Details Plate Drawing PL#821 or PL#938.</li> <li>• Check apparatus battery for full charge - service accordingly.</li> <li>• Using VOM (volt ohm meter), check wires for proper voltage - 12VDC requires minimum of 9.0VDC; 24VDC requires minimum of 18.0VDC.</li> <li>• Check that hardware is tight and torqued to specifications. See Mechanical Installation Details Plate Drawing PL#821 or PL#938.</li> <li>• Hair line cracks in the plastic body allow moisture to enter and short the internal circuitry. If suspect, replace solenoid.</li> </ul>
Switch stays ON (sticks) - motor keeps running.	Positive (+) cable touching the switch terminal on the solenoid.  Switch wire and cable wire shorted.  Bad solenoid switch.	<ul style="list-style-type: none"> <li>• Check that cables are not touching each other or other objects.</li> <li>• Continuity test and check each cable for defects, i.e., fraying, splits, corrosion, etc. Repair and/or replace accordingly.</li> <li>• Check that each cable is tight and torqued to specifications. See Mechanical Installation Details Plate Drawing PL#821 or PL#938.</li> <li>• Using VOM, check solenoid for proper operation, i.e., solenoid opens and closes with the control switch. If it does not - replace solenoid.</li> <li>• Using VOM (volt ohm meter), check wires for proper voltage - 12VDC requires minimum of 9.0VDC; 24VDC requires minimum of 18.0VDC.</li> </ul>
<b>Notes:</b> If problems still exists, replace solenoid and recheck all connections and batteries.  It is NOT recommended to use RTV silicone or epoxy over the solenoid connections. Use <b>Never-Seez®</b> , White Food Grade with PTFE or a suitable battery spray. Also see heading "Lubricants" on page 3.		

**Figure 1: Solenoid Troubleshooting Chart**



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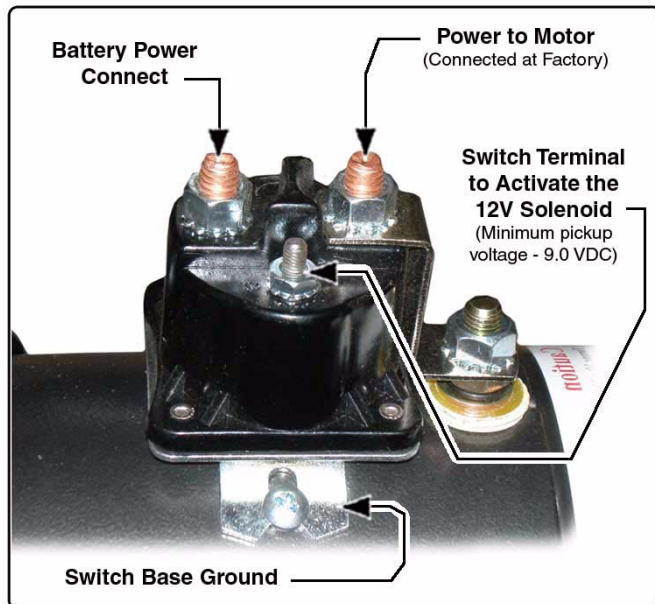


Figure 2: 12VDC Solenoid Arrangement

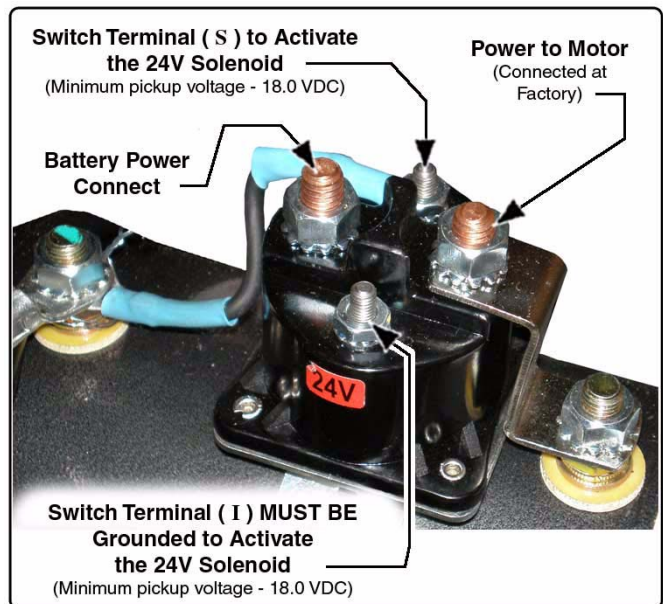


Figure 3: 24VDC Solenoid Arrangement



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