



# EMS Engine Monitoring System Troubleshooting Guide For All Versions

## TROUBLESHOOTING INFORMATION



**CAUTION:** Certain danger to human and to equipment such as applied in a mobile or marine application may occur if some equipment is stopped without pre-warning. It is therefore, recommended that monitored functions be limited to alarm only or to alarm before shutdown in such applications.

**DO THIS FIRST:** Read and follow all installation instructions. Verify that all wiring is intact and connections are tight, look for broken wiring. Verify that the EMS has not been damaged (hit/dropped). Verify that the alarm or shutdown devices are fully operable and check other components such as spark plugs, ignition, fuel pump, filter, motor starters, auxiliary equipment, and all sensors and switches for proper operation and good working condition. Do NOT run sensor wires (senders, transducers, switches) in conduit with any other wire. Do NOT apply improper (AC) voltage to any controller input terminals. Do NOT bundle sensor wires with any other wiring. The EMS controller has built in diagnostics to help the operator get the equipment "on

line". These are explained in the "Operation instructions" furnished with the EMS controller. The EMS also has two lines on the display called the "SELECTOR" and the "ST". The "SELECTOR" line tells the operator what position the "Test-Off-Auto" selector switch is in. The "ST" (state) line tells the operator what part of the control sequence the controller is performing. These lines can be very helpful when experiencing start up problems, and are also explained in the "Installation and Operation Instructions".

Below are the most common problems that occur after the EMS controller is installed. If your experiencing a symptom not listed, or the "Probable Cause" did not help, please contact any of the Murphy Locations listed on the back page.

<u>SYMPTOMS</u>	<u>PROBABLE CAUSE</u>
<p><u>DISPLAY</u></p> <p>No display characters or display back light.</p>	<p>No battery voltage connected to controller. Check all fuses. Terminal 9 (+), Terminal 11 (-) for EMS447 models. Terminal 20 (+) Terminal 10 (-) for EMS448 models. Terminal 9 (+) Terminal 11 (-) for EMS547 models. On EMS447 &amp; EMS547, the external selector switch may need to be in Test or Auto to supply battery voltage to the controller.</p>
<p>Display back light on with black bar across top line.</p>	<p>Program EPROM not installed or installed incorrectly, call factory.</p>
<p>Controller operates properly, but the display is too dark to read.</p>	<p>Controller installed so display is unprotected from direct sunlight. Display viewing angle needs adjusting, call factory.                      Controller is operating above maximum operating temperature.</p>
<p><u>STARTING</u></p> <p>Will start in Test, but not in Auto.</p>	<p>See S# listing for "Start/Stop Type" Configuration not set properly. See S# listing for "Start Delay" time set too long. See S# listing for "Auto Start" set point set too high or too long. Remote start contact not closing, or not wired to controller.                      Check inputs status (X's &amp; O's) compare to I/O list.                      Check state and status display.</p>
<p>Will not start in Auto or Test.</p>	<p>See S# listing for "Prelube Delay" having time in the set point, &amp; no prelube required. Set to zero if not required.                      See S# listings for "Crank Time" or "Crank Attempts" set to zero.</p>
<p>In Auto or Test, starter won't stay engaged long enough to start engine.</p>	<p>Check S# listings for "Crank Stop RPM" set point set too low.</p>
<p>Starts in Auto and Test, but starter won't dis-engage, or cycle cranks with the engine running.</p>	<p>Check S# listings for "Crank Stop RPM" set point set too high.                      Magnetic pickup not wired to the controller.                      Magnetic pickup not adjusted properly, or has metal fillings on the end. (2 VAC minimum output required while connected to EMS).</p>
<p>The starter "Bumps" On then Off, and the controller resets (the display goes blank momentarily and returns o Tittle page).</p>	<p>Battery too small to crank engine &amp; supply enough power to the controller. (200 AMP hour battery recommended).                      Battery has bad cells or not fully charged.                      EMS power wiring (+ &amp; -) not going directly to battery posts.                      Poor connection between controller and battery posts.</p>
<p><u>RUNNING</u></p> <p>While the engine is running, the controller resets (display goes blank momentarily, &amp; returns to tittle or display values change erratically.</p>	<p>DC control wiring not separated properly from AC, magneto, ignition, and/or battery charger wiring.                      Suppression spark plug wires not used. Resistor type spark plugs and secondary leads required.</p>

<u>SYMPTOMS</u>	<u>PROBABLE CAUSE</u>
While the engine is running, the tachometer reading is erratic, possibly causing false overspeed shutdowns.	Magnetic pickup wiring improperly separated from AC, magneto, ignitions, and/or battery charger wiring. Not using or improperly used shielded wire from magnetic pickup to EMS. Faulty charging alternator components. Making noise on DC battery.
During cranking or right after starting, the controller shuts down on Low Oil Pressure or High Temperature.	Check oil level and cooling system. Check S# listing for "Lock Out Delay" set too short. Check senders, transducers or transmitters (2-wire senders required).
<u>THROTTLING</u> AT67207 Throttler is in Full Seed position instead of Full Idle position at start up.	Reversed wires going to terminals 2 & 3 on the AT67207 throttler.
After starting, instead of the engine throttling up in speed, the engine remains at idle and the "ST" (state) line says "At Load".	AT67207 throttler wired incorrectly to controller. Battery (+) not wired to AT67207 terminal 1 or fuse blown. Check S# listings for "Max. RPM" set point set lower or same as Engine Idle Speed. Increase input to controller not grounded.
While running "At Load", the engine RPM surges or "Hunts" UP and DOWN.	No load on engine, or no drive line installed. AT67207 throttler cable bowing because it's not secured on both ends. See S# listings for "Throttle Feedback Delay". Increase value until hunting stop. See S# listings for "Throttle Sensitivity" & "Throttle Minimum Pulse", decrease setting by 100. Refer to Operation Directions for explanation of these set points.
After the controller receives an Auto Stop signal, the engine shuts down before the AT67207 throttler is in the Idle position.	Check S# listings for "Cooldown Delay" set too short. Fuse blown going to term. 1 of AT-67207 throttler. Check S# listings for Throttling Set Points different than factory settings.
<u>SENDERS</u> Oil pressure & engine temperature readings are not correct on the controller's display.  Oil pressure, engine temperature, & battery voltage readings are not correct on the controller's display.	Not using 2-wire senders with both the signals and round wire going directly to the controller. Not using proper type sender. Make sure sender resistance curves match program.  Factory set up or battery calibration is required, call the factory.



**CAUTION:** Before Arc Welding on equipment where the EMS is mounted do the following:



### Before Welding:

1. Disconnect external battery power from the EMS controller.
2. **EMS448:** Unplug one end of the 25-pin ribbon cable between the 448 and 449 circuit boards. This is done by removing two screws at one end of the ribbon cable and gently pulling the ribbon cable out of the board mounted socket.  
**EMS447 / EMS547:** Unplug the 25-pin ribbon cable from the back of the case. This is done by removing the two screws and gently pulling the ribbon cable out of the board mounting socket.

### After Welding:

1. Reconnect the 25-pin ribbon cable and secure with the two screws.
2. Reconnect external battery power to the EMS controller.



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Printed in U.S.A.