	Troubleshooting Guide: E1 Error/No Belt Movement	
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## **PROBLEM**

Use this guide to troubleshoot E1 errors and/or no treadmill belt movement.

## **SOLUTION**

If you experience a problem with powered belt movement and/or an E1 error, first perform a check of the treadmill with the power off.

1. Use one foot to accelerate the belt by pushing it in the normal direction. Determine if it moves freely without any grinding, rubbing, or other abnormal noises. If it does not move freely, the problem must be identified and corrected before the treadmill is powered on.
2. Check the motor shaft/flywheel rotation for binding or grinding.
3. Check the belt alignment and tension.
4. Check the rotation of the front and rear rollers.
5. Check the running belt for binding, pinching, obstructions, etc.
6. Verify that the running belt/deck has adequate/appropriate lubrication.

If the issue persists after the unit is powered on, go to the appropriate section for further troubleshooting steps:

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  - [Console Cable Testing](#)
  - [Commutator Appearance](#)
  - [Stoning the Commutator](#)
  - [Troubleshooting the Optic Speed Sensor](#)
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## No Belt Movement at Start-Up and/or E1 Error at Start-Up

**Test the treadmill after each step and proceed to the next step only if the issue is not resolved.**

1. Make sure the unit has a dedicated circuit (20 amps is ideal) and that the wall outlet voltage is 120 VAC. Make sure the machine is not on an extension cord, surge protector, or GFCI.
2. If the treadmill has no belt movement *and* no incline, replace the console cable. Otherwise, check the console cable and replace only if necessary.
  - a. Unplug the console cable from the upper board and the MCB and examine the pins on the connectors to make sure they are not damaged. Examine the length of the cable to make sure there is no damage and that all cable connection points are secure. Make sure there are no crimps where the console cable exits the mast and connects to the console. [Test the console cable continuity](#).
  - b. Plug the cable in and make sure all connections are snug. The cable must be plugged in for the console to get power and turn on, but if the RPM or PWM wires within the cable are cut or not connected, the unit will give an E1 error. [Test the console cable voltage](#).
3. Inspect the MCB. Make sure there are no burnt components and no moisture on the MCB. Replace the MCB if necessary.
4. Start the treadmill with no load.
  - If the belt does not move, verify that all wires that connect to the motor control board are securely plugged in and are not burnt, pinched, or cut. Replace the wires if necessary. If the belt still does not move, replace the MCB.
  - If the belt moves, increase the speed to 1 mph to 2 mph immediately after start-up. If this corrects the error, **technician only**: Adjust the VR1 Potentiometer [torque cube] (if there is one) on the MCB. Use a Phillips head screwdriver to turn the screw labeled TQEV1. The TQE VR1 setting should be near the middle of its range to provide non-stalling and steady, non-jerky belt movement at .5 mph to 1 mph with a load. Walk on the unit to test it. If the screw does not turn, replace the MCB.



5. Inspect the commutator inside the drive motor by removing the black button and looking inside. The commutator should be a copper color. (See [Commutator Appearance](#).) If it is dirty, **technician only**: [Stone the commutator](#). (Non-technician: Replace the drive motor.)
6. Follow the directions in [Troubleshooting the Optic Speed Sensor](#).
7. [Measure the voltage output from the motor](#). Replace the drive motor if necessary.

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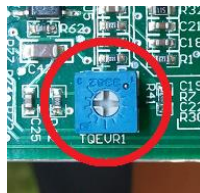
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## Belt Stops with E1 Error within 10 Seconds after Start-Up

Test the treadmill after each step and proceed to the next step only if the issue is not resolved.

1. Verify that the unit is on a 20 amp dedicated circuit. If it is sharing power, it can cause the unit to run erratically.
2. Software programming will shut down the unit with an E1 error within 10 seconds after start-up if it does not detect a speed sensor signal. To test this, start the treadmill again without a load and if it shuts down the same way, check the speed sensor wire connection at the MCB and check that the wire is not pinched or cut.
  - If the unit has an optic/digital speed sensor, follow the directions in [Troubleshooting the Optic Speed Sensor](#).
  - If the unit has an analog sensor, check the position of the sensor:
    - a. The wire coming from the sensor should point toward the front of the machine.
    - b. The sensor should be as close to the front roller as possible without touching it.
    - c. The sensor bracket should be at a 90-degree angle and otherwise not bent.
3. Verify that the speed sensor is reading properly by running mode ENG1. The speed should fluctuate .01-.02 mph while the treadmill is running. Replace the speed sensor if necessary.
4. Check the console cable and replace if necessary.
  - a. Unplug the console cable from the upper board and the MCB and examine the pins on the connectors to make sure they are not damaged. Examine the length of the cable to make sure there is no damage and that all cable connection points are secure. Make sure there are no crimps where the console cable exits the mast and connects to the console. [Test the console cable continuity](#).
  - b. Plug the cable in and make sure all connections are snug. The cable must be plugged in for the console to get power and turn on, but if the RPM or PWM wires within the cable are cut or not connected, the unit will give an E1 error. [Test the console cable voltage](#).
5. If the MCB on the unit was recently replaced, **technician only**: Adjust the VR1 Potentiometer [torque cube] (if there is one) on the MCB. Use a Phillips head screwdriver to turn the screw labeled TQEV1. The TQE VR1 setting should be near the middle of its range to provide non-stalling and steady, non-jerky belt movement at .5 mph to 1 mph with a load. Walk on the unit to test it. If the screw does not turn, replace the MCB.



6. If the problem persists, send a speed sensor and console cable.

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## **Belt Stops with E1 Error During Workout**

Software programming will shut down the unit with an E1 error 3 seconds after losing a speed sensor signal during a workout. This could be due to faulty speed sensor detection, faulty MCB motor drive function, intermittent cable connections (including console cable), a defective belt or drive motor, or something that is causing too great of a load (too much belt rotation resistance) on the MCB.

**Test the treadmill after each step and proceed to the next step only if the issue is not resolved.**

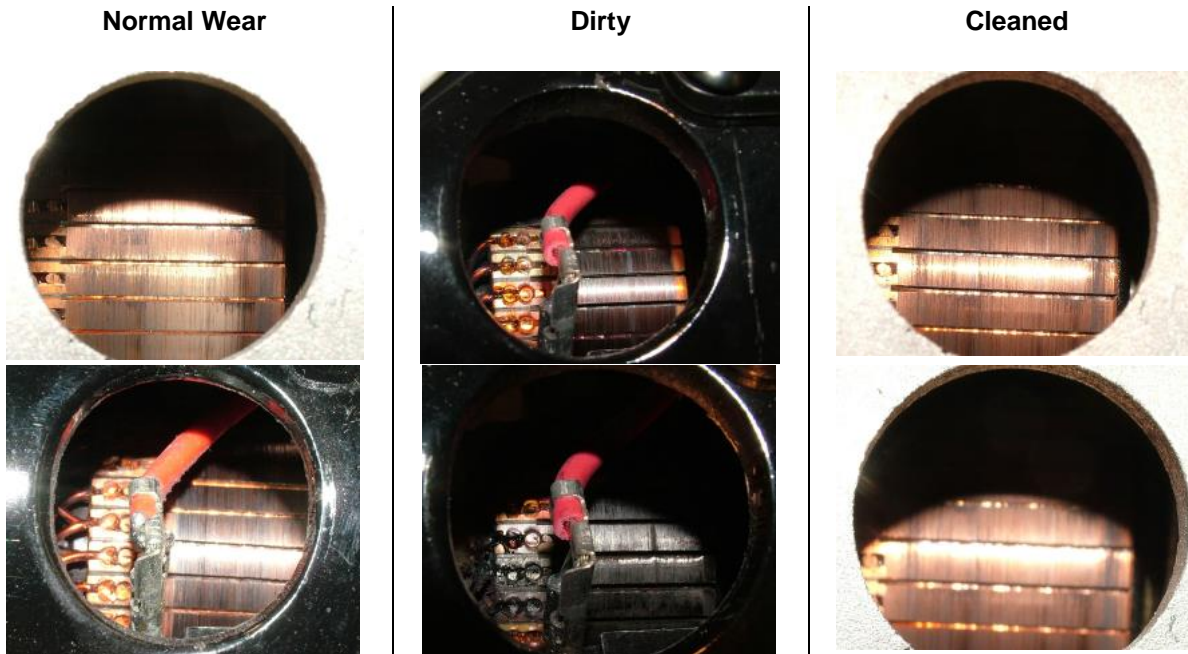
1. Make sure the unit has a dedicated circuit (20 amps is ideal) and that the wall outlet voltage is 120 VAC. Make sure the machine is not on an extension cord, surge protector, or GFCI.
2. Check to make sure all wires are securely plugged into the MCB.
3. If the unit has an analog sensor, check the speed sensor for secure mounting at the front roller bracket. Confirm that the sensor is aligned with the magnet in the front roller pulley as the pulley rotates. Realign or replace the sensor if necessary.
4. Check the console cable and replace if necessary.
  - a. Unplug the console cable from the upper board and the MCB and examine the pins on the connectors to make sure they are not damaged. Examine the length of the cable to make sure there is no damage and that all cable connection points are secure. Make sure there are no crimps where the console cable exits the mast and connects to the console. [Test the console cable continuity.](#)
  - b. Plug the cable in and make sure all connections are snug. The cable must be plugged in for the console to get power and turn on, but if the RPM or PWM wires within the cable are cut or not connected, the unit will give an E1 error. Try to restart the unit. If the unit does not restart, [test the console cable voltage.](#)
5. If the unit will restart but then shuts down again, check the drive motor and running belt.
  - a. Inspect the commutator inside the drive motor by removing the black button and looking inside. The commutator should be a copper color. (See [Commutator Appearance.](#)) If it is dirty, **technician only:** [Stone the commutator.](#) (Non-technician: Replace the drive motor.)
  - b. If the motor is extremely hot or smells bad, replace the drive motor.
  - c. If the running belt can still move freely after the unit shuts down, allow the unit to cool and then restart the treadmill.
    - If the belt moves after restarting, the deck and belt are likely worn. Send a running belt and deck. (Lubricating the belt and deck may temporarily solve the problem.)
    - If the belt does not move after restarting, send an MCB and drive motor.

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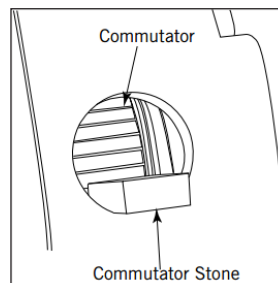
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## Commutator Appearance



## Stoning the Commutator

1. Unplug the unit from the wall outlet.
2. Remove the cap and brush covers from the motor and insert a commutator stone perpendicular to the commutator. (See diagram below.)
3. Manually spin the flywheel to remove carbon deposits from the commutator.
4. Use compressed air to blow the deposits out of the motor.
5. Replace the brush and cap and run the treadmill for 15 minutes at 3-5 mph.
6. Inspect the commutator again and repeat the stoning process if necessary.



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## Console Cable Testing

### **Console Cable Continuity**

**Procedure:** Touch the voltmeter lead on each end of the cable, matching pin to pin for each wire. The voltmeter should beep. If the voltmeter does not beep after testing any pair of pins, replace the console cable.

### **Console Cable Voltage Check**

**Procedure:** Touch one voltmeter lead on the console cable ground and the other lead on the desired wire. See the document "Console Cable" which is listed under Troubleshooting Guides on Treadmill product pages in Online Remedy.

## Drive Motor Testing

### **Drive Motor Connection**

**Procedure:** Using a dc volt meter (if non-auto ranging set for the 200vdc range), test the voltage at the red and black motor leads with the motor still attached.

**Note:** This should be tested after the console cable and optic sensor points because they can give the same results as a defective lower board.

**Note:** A non-functional system may still have a voltage present with no motor attached. For accurate results, the motor must be attached when the voltage is checked.

**Desired Results:** The voltage charts contain typical desired results on a fully functional system. A variance from the norm would indicate a defective component.

Checkpoint	Voltage Before Start	Voltage After Start @ 0.5mph	Voltage After Start @ 10.0mph
Across Motor Out, No Motor Attached	0.0-22.5 vdc	0.0-22.5 vdc	0.0-22.5 vdc
Across Motor Out, W/ Motor Attached	0.0 vdc	2.5- 0 vdc	80-100.0 vdc

### **Drive Motor Checkpoints**

**Procedure:** Unplug the motor from the lower board. Using a dc volt meter (if non-auto ranging set for the 20vdc range), attach volt meter leads directly into the motor leads and manually spin the flywheel.

**Desired Results:** The motor should generate 5-15 vdc depending on the speed it is turned.

**Procedure:** Unplug the motor from the lower board. Using an ohm meter (if non-auto ranging set for the 200 ohm range), attach ohm meter leads directly into the motor leads.

**Desired Results:** The motor should read approximately 1.0-1.5 ohms.

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## **Troubleshooting the Optic Speed Sensor**

- 1) Unplug the treadmill power cord from the wall socket.
- 2) Use a Phillips screwdriver to remove the screws holding the motor cover to the frame and remove the motor cover (Figures A & B).

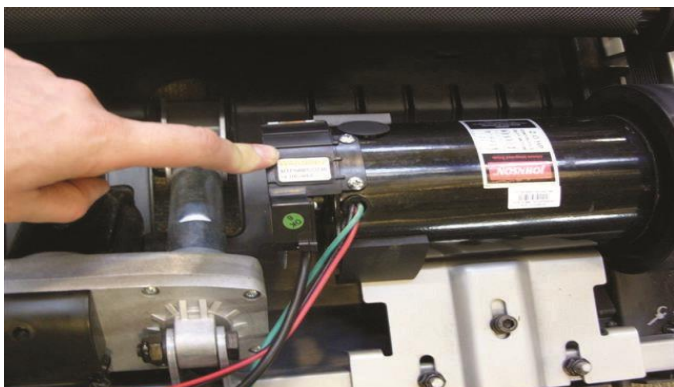


**Figure A**

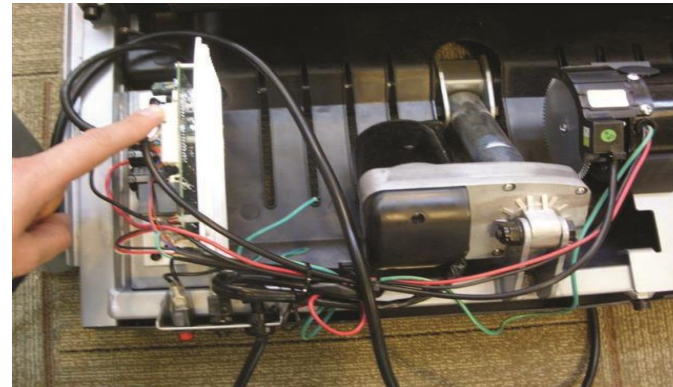


**Figure B**

- 3) Locate the optic speed sensor mounted to the motor (Figure C).
- 4) Verify that the speed sensor is plugged into the lower control board (Figure D). If it is not, plug the speed sensor into the board and re-test the treadmill.



**Figure C**



**Figure D**

- 5) Unplug the speed sensor from the lower control board (Figure E) and use a small cutting pliers or knife to cut any wire ties holding the speed sensor wire in place.

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- 6) Remove the two screws holding the speed sensor to the motor (Figure F).

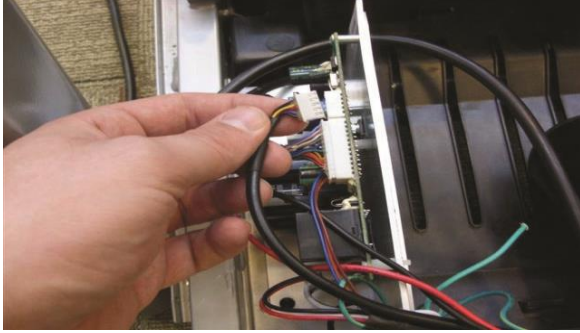


Figure E

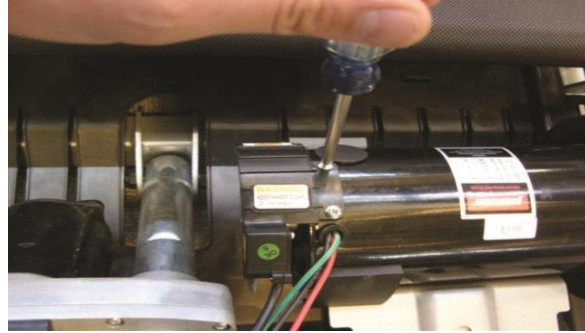


Figure F

- 7) The speed sensor can now be removed from the motor (Figure G).  
8) Inspect the speed sensor for any dust or debris. Clean the optical sensor gap with a cotton swab or clean cloth to remove any dust or debris (Figure H).



Figure G



Figure H

- 9) Before re-installing the speed sensor, spin the optical disc on the motor (Figure I). Inspect the movement of the optical disc to ensure that the disc is not warped or bent.

**NOTE: Be careful as the optic disc can be sharp.** Replace the optic disc if needed.

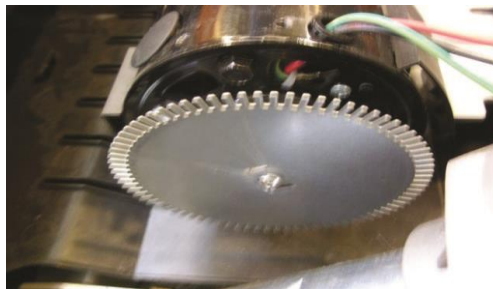


Figure I

- 10) Re-install the speed sensor to the motor and plug the speed sensor wire into the lower control board. Test the treadmill for function. If the treadmill is still having issues with the speed sensor, replace the speed sensor.

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