CHAPTER 5

Troubleshooting

The information in this chapter will enable you to:

- Maintain the system's components to ensure smooth, efficient operation
- Isolate and resolve system hardware problems

Maintenance

The following items, which are included with the S Drive, can be reordered from Compumotor.

Part	Part Number
9-Pin Phoenix Connector	43-008755-01
7-Pin Phoenix Connector	43-013575-01
AC Power Cord	44-000054-01
Mounting Bracket	53-006007-01

Spare Parts List

Drive Maintenance

Ensure that the drive heatsink is free of particles and has a free flow of air over its entire surface. Enclosures must be connected to earth ground through a grounding electrode conductor to provide a low-impedance path for ground-fault or noise-induced currents. All earth ground connections must be continuous and permanent.

Motor Maintenance

You should inspect all mechanical parts of the motor regularly to ensure that no bolts or couplings have loosened during normal operation. This will prevent minor problems from developing into serious problems.

You should inspect the motor cable periodically for signs of wear. This inspection interval is duty-cycle, environment, and travel-length dependent. The cable should not have excessive tensile force applied to it and should not be bent beyond a one-inch radius of curvature during normal operation. Tighten all cable connectors.

Reducing Electrical Noise

For detailed information on reducing electrical noise in your system, refer to the current Compumotor Catalog.

Problem Isolation

When your system does not function properly (or as you expect it to operate), the first thing that you must do is identify and isolate the problem. When the problem is defined, you can begin to resolve and eradicate the problem.

The first step is to isolate each system component and ensure that each component functions properly when it is run independently. You may have to dismantle your system and put it back together piece by piece to detect the problem. If you have additional units available, you may want to use them to replace existing components in your system to help identify the source of the problem.

Determine if the problem is mechanical, electrical, or software-related. Can you repeat or re-create the problem? Do not make quick rationalizations about the problems. Random events may appear to be related, but they may not be contributing factors to your problem. Carefully investigate and decipher the events that occur before the subsequent system problem.

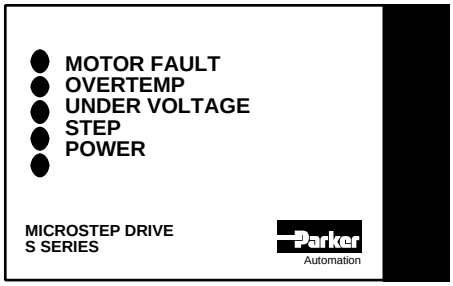
You may be experiencing more than one problem. You must solve one problem at a time. Document all testing and problem isolation procedures. You may need to review and consult these notes later. This will also prevent you from duplicating your testing efforts.

Once you have isolated the problem, take the necessary steps to resolve it. Refer to the problem solutions contained in this chapter. If your system's problem persists, contact Parker Compumotor at 800-358-9070.

Front Panel LEDs

There are five LEDs on the front panel of the S Drive.

Bottom of S Drive Front Panel



The **MOTOR FAULT** LED is **red** and turns on when the amplifier is disabled. The Fault LED will be activated when any of the following conditions occur:

- Motor short-circuit
- The interlock is broken (opened)
- Shutdown enabled

The **OVERTEMP** LED is **red** and turns on when the internal drive temperature exceeds 70°C.

The **UNDERVOLTAGE** LED is **red** and turns on when AC line voltage is below 85VAC.

The **STEP** LED is **green** and turns on when the drive is receives step pulses from an indexer. This LED is a pseudo proportional step indicator. Steps less than 200 Hz may not be visible.

The **POWER** LED is **green** and turns on when the internal bias supply is operating and providing +5V.

Common Problems and Solutions

The table below contains common problems, probable causes, and solutions to the problems. It should help you eradicate most of the problems you might encounter with the S Drive.

Symptoms	Probable Causes	Solutions
The power LED is not on (illuminated).	A. The drive is not receiving AC voltage.	A1. Verify that the connector on the drive is fully seated. A2. Verify that there is AC voltage at the AC outlet that the drive is plugged into. A3. Verify that there is AC voltage at the drive at the AC power connector.
The power LED is flashing.	A. AC Line voltage is too low.	A1. Check AC line voltage (90VAC minimum).
	B. There is insufficient load regulation on the AC line.	B1. Increase the AC line wire size. Increase the isolation transformer size (if used).
There is little or no holding torque. The power LED is on. The motor fault LED is off.	A. The motor current is set too low.	A1. Check the current select switches and verify that the current is set correctly.
	B. The motor winding or cable is open.	B1. Check the motor and cable with an ohmmeter.
	C. The Auto Standby function is enabled.	C1. Disable the Auto Standby function if this function does not allow enough holding torque for your application.
	D. Remote shutdown is enabled.	D1. Disconnect the INDEXER connector to check if the shutdown input is enabled.
The motor fault LED is on.	A. The motor cable is disconnected or not fully seated at the drive.	A1. Check the motor cable
	B. The motor connector interlock jumper is missing or is disconnected.	B1. Check the interlock jumper.
	C. The drive has detected a motor/wiring short circuit.	C1. Check the motor and cable wiring.
The overtemperature LED is on.	A. The internal drive temperature is greater than 70° C.	A. Remove fin cooling obstructions and/or add fan cooling (Compumotor offers a fan kit).
The undervoltage LED is on.	A. The AC line voltage is less than 85VAC.	A. Provide a min. of 90VAC under load to the drive.
The motor moves erratically at low speeds.	A. Motor current is set incorrectly.	A1. Check the current select switches and verify that the current is set correctly.
	B. Indexer pulses are being sent to the drive erratically.	B1. Verify, with an oscilloscope, that the indexer pulses are being sent at a constant rate and are not being frequency modulated.
	C. Motor resolution is set for 200 or 400 steps per revolution.	C1. Full and half step modes will cause the motor to run roughly at low speeds.
The drive loses pulses at high speed.	A. The indexer is overdriving the step input.	A1. Verify that the step input current is not greater than 15 mA.
	B. The indexer is underdriving the step input.	B1. Verify that the step input current is $\geq$ 6.25 mA.
	C. The indexer is sending pulses too fast.	C1. Verify that the indexer is not exceeding the 2 MHz maximum pulse rate.
	D. The motor is out of torque.	D1. Verify that the motor is sized correctly for your application.
The motor stalls at high speeds.	A. The velocity is too high.	A1. The drive can handle a max. pulse rate of 2 MHz or 50 rps, whichever comes first. Decrease the velocity.
	B. Motor current is not set correctly.	B1. Check the current DIP switches and verify that the current is set correctly.
	C. The motor is undersized for the application.	C1. Verify that the motor is sized correctly.
The motor stalls during acceleration.	A. Motor current is not set correctly.	A1. Check the current select switches and verify that the current is set correctly.
	B. The acceleration is set too high.	B1. Decrease the acceleration.
	C. There is insufficient rotor inertia.	C1. Add inertia to the motor shaft.
	D. The motor is undersized for the application.	D1. Verify that the motor is sized correctly for your application
The motor (unloaded) stalls at nominal speed.	A. There is insufficient rotor inertia.	A1. Add inertia to the motor shaft.
The motor does not move the commanded distance.	A. The motor resolution is set incorrectly.	A1. Determine the resolution on your indexer and verify that the drive resolution is the same.
The motor will not change direction as commanded.	A. The direction input is not being enabled.	A1. Verify that the direction input is being enabled (6.4 mA to 15 mA).
The indexer moves the motor in the wrong direction.	A. There is a direction conflict within the indexer.	A1. Change the direction sense within your indexer. A2. Change the motor direction by swapping motor leads A+ and A- at the drive connector.

Problems & Solutions Table

Testing the Motor

If the motor fails to move, you should test the motor with an ohmmeter to examine the resistance between the motor connections. If the motor is not malfunctioning, the source of the problem is probably within the drive. If you operate a faulty drive with a reliable motor, you may damage the motor. If you find that the motor is not faulty, remove power, and remove the motor from the drive. Use the following steps to test the motor.

1. Remove power from the system. Detach the motor from the drive.
2. With the motor detached from the system, use an ohmmeter to check the resistance across Phase A. **It should be approximately 2 ohms.**
3. Now use the ohmmeter to check the resistance across Phase B. It should be approximately 2 ohms too (the resistance across Phase A and Phase B should be nearly identical).
4. Use the ohmmeter to check the resistance between Phase A and Phase B. It should be infinite ( ).
5. Use the ohmmeter to check the resistance between Phase A and Earth (the motor case shaft). It should be infinite ( ).
6. Use the ohmmeter to check the resistance between Phase B and Earth (the motor case shaft). It should be infinite ( ).
7. Turn the shaft manually. There should not be any torque.

If the motor responds as described to each of these steps, it is functioning properly. The source of the problem is probably within the drive.

Returning the System

If your S Drive system is faulty, return the drive and motor for replacement or repair. A failed drive can damage motors. If you return your S Drive to effect repairs or upgrades, use the following steps:

① Get the serial number and the model number of the defective unit(s), and a purchase order number to cover repair costs in the event the unit is determined by Parker Compumotor to be out of warranty.

② Before you ship the drive to Parker Compumotor, have someone from your organization with a technical understanding of the S Drive and its application include answers to the following questions:

- What is the extent of the failure/reason for return?
- How long did it operate?
- How many units are still working?
- How many units failed?
- What was happening when the unit failed (i.e., installing the unit, cycling power, starting other equipment, etc.)?
- How was the product configured (in detail)?
- What, if any, cables were modified and how?
- With what equipment is the unit interfaced?
- What was the application?
- What was the system sizing (speed, acceleration, duty cycle, inertia, torque, friction, etc.)?
- What was the system environment (temperature, enclosure, spacing, unit orientation, contaminants, etc.)?
- What upgrades, if any, are required (hardware, software, User Guide)?

③ Call Parker Compumotor's Applications Engineering Department [(800) 358-9070] for a Return Material Authorization (RMA) number. Returned products cannot be accepted without an RMA number.

④ Ship the unit to:

Parker Compumotor Corporation
5500 Business Park Drive
Rohnert Park, CA 94928
Attn: RMA # xxxxxxx