
MAINTENANCE & TROUBLESHOOTING

Maintenance

Motor Maintenance

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

You should also inspect the motor cable or leads for signs of wear. Sharp bends or stretching of cables should be avoided.

Drive Maintenance

Check 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 to provide a low-impedance path for ground-fault or noise-induced currents; check the security of all ground connections.

Troubleshooting

This section discusses methods to identify, isolate, and resolve problems that may occur with your CD60M/CD80M drive system. Take care, unexpected motion may occur at any time whilst troubleshooting motion control equipment.

Motor Fails to Move

If it is safe to do so, test the motor to see if it has holding torque. If there is no holding torque, here are some possible causes:

- There is no AC power.
- Current selection jumper links are not set properly (see Table 9).
- There are bad connections or bad cables. Disconnect the power connector, then use an ohm meter to monitor continuity between the motor and drive.
- The drive may not be connected properly to the motherboard. Make sure the drive is securely plugged into the DIN connector on the inside of the motherboard.
- The shutdown input may be active.

- The drive supply fuse may be blown. Disconnect AC power, remove the drive from the rack, and inspect the line fuse on the drive motherboard. **If the fuse is blown, return the system for repair.**

If the unit has holding torque and the motor shaft still fails to move, here are some probable causes:

- The limit switches have been tripped or are faulty. Make sure that your limit switches are OFF or that the limits are disabled.
- The load is jammed. You should *hear* the drive attempting to move the motor. Remove AC power and verify that you can move the load manually away from the point of the jam.
- Indexer parameters are incorrectly set up, in particular, if **MR** is set for a resolution greater than 4000 steps/rev. More importantly, if the pulse width is $< 1\mu\text{s}$, the motor may not move. If certain parameters are out of range or are missing, the motor will not move when you issue the GO or START command.

The following are additional troubleshooting techniques:

- Check the motor for damage. Also check the motor leads/cable to see if they are damaged or shorted. These conditions may cause the drive to fault.
- Check the motor and cables to make sure that shorts do not exist between phases or earth GND. The resistance across each motor phase should be consistently low. The resistance between motor phases and between each phase and earth ground should be very high.

Fault LEDs

There are three protection systems built into the CD drive, any of which may cause the drive to shut down. Three red LEDs on the front panel of the CD drive indicate which of the following fault conditions exist.

- ***Overcurrent.*** This LED normally indicates a short circuit in the motor. Use a meter to make sure that there is not a short circuit between phase A and B, or to earth ground. Remove AC power, disconnect the motor and switch on again. If the overcurrent LED still comes on, the drive is damaged.

- *Supply Failure:* The supply protection circuit shuts down the drive if one of the following conditions exist:
 - Motor supplies fall below approximately 40V
 - Motor supply rises above 170V
 - Internally-derived voltage rails fail

- *Over-temperature:* This LED lights if the drive is overheating (heatsink temperature is above 85°C). You may consider cooling the rack cabinet or drive. Installing a fan nearby may help the problem. In high duty cycle applications, fan cooling may be required during prolonged operation at speeds below 15 rps and at full current.

The drive fault output goes active no matter what the reason for shutdown. You can reset the fault circuit by temporarily removing power from the system or cycling the shutdown or reset pins. If the fault is due to over-temperature, you must allow time for the drive to cool down.

Motor Stalls

A motor stall during acceleration may be caused by one or more of the following factors:

- The torque requirements may be excessive
- The acceleration ramp may be too steep
- The load inertia and rotor inertia may be grossly mismatched.

Lower acceleration may be required.

If the motor stalls during the constant velocity portion of a move, the shaft and/or coupler may be damaged or binding due to improper coupling or excessive motor load.

A stall may occur if the jumper link settings for the motor current selection is incorrect. The motor may not be receiving enough current to operate.

Motor Fails to Run at High Speeds

If the motor fails to run at high speeds, it is possible that the motor may not produce enough torque to move a given load at these velocities. Check the torque/speed curves in the catalogue and make sure you are trying to run the motor within its range.

Note: The indexer pulse width and drive resolution must be matched or pulses will be lost at high speed.

Motor is Jerky or Weak

Check that there are no mechanical problems at the load causing highly variable loading condition. Disconnect the motor from the load and run it without a load connected. Try to manually turn the motor shaft; this will determine if the motor is maintaining full holding torque. Check the jumper links for proper current settings.

Motor Overheats

If the motor exceeds its maximum motor case temperature rating, failure will eventually result. Check your jumper link settings to ensure that the current setting is correct for the motor you are using.

The Standby Current feature reduces motor current by 50% or 80% when the motor is not moving. If the motor is hot after a long period at standstill (standby), check the standby current with a current probe.

Reducing Electrical Noise

For information on identifying and suppressing electrical noise, refer to the Technical Data section of the *Digiplan Programmable Motion Control Catalogue*.

Returning the System

Contact the Parker Automation Technology Centre or the machinery manufacturer who supplied the product. Equipment for repair should NOT be returned directly to Digiplan without prior authorisation. Repairs will be carried out by Digiplan but will be processed via your supplier.

Digiplan may at their discretion authorise direct shipment to and from Poole or Rohnert Park, but only by prior arrangement with your supplier. Existing UK and USA customers who purchase equipment directly from Digiplan should contact Poole or Rohnert Park for further information (contact numbers are at the front of this User Guide).