

Section 8. MAINTENANCE & TROUBLESHOOTING

Maintenance

Routine maintenance is not necessary, but occasional checking of the following points is recommended.

Motor Maintenance

Periodically check the motor to ensure that no bolts or couplings have become loose during operation, and check the motor cable or leads periodically for signs of wear. Do not make very tight bends or pull on the cable during normal operation. Check all cable connectors.

Drive Maintenance

Check that the drive is clear of loose material and has a free flow of air through the ventilation slots. Enclosures must be connected to earth ground to provide a low-impedance path for ground-fault or noise-induced currents. Check the security of the ground connections.

Fuses

PDHXE drives are fitted with fuses which limit circuit damage in the event of a fault occurring, they are not user replaceable. If the drive fails to operate correctly or you suspect a fuse has blown return the drive for repair. Warranty is void if the case is opened.

Troubleshooting

Fault LED

The red LED indicates one of the following fault conditions:

1. Motor wiring short-circuit either across phases or between phases.
2. Motor wiring short-circuit phase to GND (earth).
3. Motor supply overvoltage or undervoltage.
4. Internal supply failure.
5. Drive internal overtemperature.

The fault LED will also light up if the motor is decelerating a high - inertia load too quickly. The drive will shut down under this condition. If this occurs, you can either reduce the deceleration rate/load inertia, or use a PDS15E-D (power dump option). See INSTALLATION section for more information on the regenerative power dump option.

Note that the fault LED comes on momentarily when power is removed from the drive. This is caused by the supply rails dropping below a safe operating level, and is an indication that the fault circuitry is functioning correctly. You should always ensure that the fault LED is extinguished before re-applying the power.

Motor Fails to Move

Test the motor to see if it has holding torque. If there is no holding torque, here are some probable causes:

- There is no power.
- Current DIP switch selection is not set properly.
- There are bad connections or bad cables in the motor circuit. Disconnect the power to the drive and remove the motor connector. Using a meter, check the continuity in the motor circuit between pins A+ and A- of the motor connector. Repeat for pins B+ and B-.
- Check the resistance of the motor and cables to make sure that shorts do not exist between phases or to earth GND. The resistance across each motor phase should be consistent and there should be no connection between motor phases and between each phase and earth ground.
- Check the motor cables for signs of damage.
- The shutdown input may be active.
- If the power LED is out and the motor will not energise, the drive must be returned for repair.

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

- The load is jammed. You should *hear* the drive attempting to move the motor. Remove power from the driver and verify that you can move the load manually away from the point of the jam. Try running the motor using the self-test switch.

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 - lower acceleration may be required. Check the torque/speed curves in the published data and make sure you are trying to run the motor within the system capabilities.
- The load inertia and rotor inertia may be grossly mismatched.

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 switch setting for the motor current selection is incorrect. The motor may not be receiving enough current to drive the load.

Motor is Jerky or Weak

Check that there are no mechanical problems at the load causing variable loading conditions. Disconnect the motor from the load and run it without a load connected. Check the switch current settings.

Motor Overheats

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

Motor Runs the Wrong Way

Turn off the power and interchange the connections between A+ and A- on the motor connector.

Controller problems

The 7-segment display on the drive front panel gives an indication of a number of possible fault conditions. The fault codes are listed below. Under normal operating conditions the display will show 0.

Code 0 - No faults, drive is energised.

Code 1 - No faults, drive is de-energised.

Code 2 - Drive fault. When code 2 is displayed, the Drive Fault LED should also be on. Please refer to 'Fault LED' earlier in this section.

Code 3 - Changed memory map (factory use only)

Code 4 - not applicable to the PDHX15-E.

Code 5 - Checksum error. This indicates a failure in the battery-backed RAM. It may be caused by the unit remaining unused for an exceptionally long period (e.g. several months).

Codes 6 & 7 - not applicable to the PDHX15-E.

Code 8 - Watchdog failure - the processor has 'hung', which will shut down the drive. This may be caused for instance by excessive interference from neighbouring equipment. Cycle power to restart.

Code E - Exception error. This is caused by a hardware or firmware malfunction resulting in incorrect operation of the user program.. Cycle power to recover.

Code P - Power failure. The motor supply in the drive has fallen below the minimum level.

Code U - UART error. This is normally caused by ASCII characters being transmitted in an incorrect format (baud rate, number of start or stop bits). Reset by typing the address followed by R.

No communication

Perhaps the commonest controller problem, especially during initial commissioning, is apparent lack of communication with the terminal or host controller.

If the Controller echoback is turned off by accident, causing an apparent loss of communication (hanging), it may be re-enabled by typing the following sequence:

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CTRL-Q<space>E<space>1R<carriage return>
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Note:

[1] This sequence is case sensitive - make sure you are in upper case.

[2] CTRL-Q means hold the 'control' key down and press the Q key at the same time. This sends the X-ON ASCII character. The Controller obeys the X-ON X-OFF communications protocol which is used to hold up communications if an interface is sending too much data too quickly. This means that if X-OFF is sent down the chain (the character CTRL-S) all communications from the axes stop until CTRL-Q (X-ON) is sent down the chain. This includes echoback of commands. If CTRL-Q is never sent the system will 'hang'.

[3] You may type CTRL-S by mistake. This condition can be cleared by cycling the power.

[4] The E command is the enable RS-232 command which can easily be mis-typed as the F command which will lock out the keyboard. Cycling the power will not cure this problem since SV cannot be typed following a keyboard lock out.

Certain 'tidy up' commands can be useful. For example:

- If you are not getting the typed characters echoed back you may need to use the SSA0 command.
- To get a prompt (\$ or >) you may need to use the EX1 command.
- To get out of a \$ prompt (indicating a sequence definition) type XT.
- If buffered commands are being ignored, type S in case the indexer is busy. You should avoid typing Z or cycling the power.

In summary:

- Don't type CTRL-S
- Don't type the command F
- Don't address a non-existent axis
- Don't rubout a device address
- Type carefully

None of the above conditions is an error so the status LED on the Controller will not indicate a fault and the axis may well be energised or even moving.

Returning the System

In the event that the drive is considered to be faulty, it should be returned for repair. Do not attempt to open the case - there are no user-serviceable parts inside. Opening the case not only voids the warranty but may also invalidate the EMC compliance.

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).