MAINTENANCE AND TROUBLESHOOTING

CONTENTS OF THIS CHAPTER

Maintenance and Inspection .......................................................... 6–2
Monthly Inspection ........................................................................ 6–2
Annual Inspection .......................................................................... 6–2
Recharge Capacitors (for unused drives) ........................................ 6–2
Troubleshooting ........................................................................... 6–3
Fault Messages .............................................................................. 6–3
Chapter 6: Maintenance and Troubleshooting

**Maintenance and Inspection**

Modern AC drives are based on solid state electronics technology. Preventive maintenance is required to operate the AC drive in its optimal condition, and to ensure a long life. We recommend that a qualified technician perform a regular inspection of the AC drive. Some items should be checked once a month, and some items should be checked yearly.

*If the drive is stored or is otherwise unused for more than a year, the drive’s internal DC link capacitors should be recharged before use. Otherwise, the capacitors may be damaged when the drive starts to operate. We recommend recharging the capacitors of any unused drive at least once per year.*

**WARNING!** **DISCONNECT AC POWER AND ENSURE THAT THE INTERNAL CAPACITORS HAVE FULLY DISCHARGED BEFORE INSPECTING THE AC DRIVE! WAIT AT LEAST TWO MINUTES AFTER ALL DISPLAY LAMPS HAVE TURNED OFF.**

### Monthly Inspection

Check the following items at least once a month.

1) Make sure the motors are operating as expected.
2) Make sure the installation environment is normal.
3) Make sure the cooling system is operating as expected.
4) Check for irregular vibrations or sounds during operation.
5) Make sure the motors are not overheating during operation.
6) Check the input voltage of the AC drive and make sure the voltage is within the operating range.

**Check the voltage with a voltmeter.**

### Annual Inspection

Check the following items once annually.

1) Tighten and reinforce the screws of the AC drive if necessary. They may loosen due to vibration or changing temperatures.
2) Make sure the conductors and insulators are not corroded or damaged.
3) Check the resistance of the insulation with a megohmmeter.
4) Check the capacitors and relays, and replace if necessary.
5) Clean off any dust and dirt with a vacuum cleaner. Pay special attention to cleaning the ventilation ports and PCBs. Always keep these areas clean. Accumulation of dust and dirt in these areas can cause unforeseen failures.
6) Recharge the capacitors of any drive that is in storage or is otherwise unused.

**Recharge Capacitors (for unused drives)**

Recharge the DC link before using any drive that has not been operated within a year:

1) Disconnect the motor from the drive.
2) Apply input power to the drive for 2 hours.
## Troubleshooting

### Fault Messages

The AC drive has a comprehensive fault diagnostic system that includes several different alarms and fault messages. Once a fault is detected, the corresponding protective functions will be activated. The fault messages are then displayed on the digital keypad LCD display. The six most recent faults can be read on the digital keypad display by viewing parameters P06.31 to P06.36.

**NOTE:** Faults can be cleared by a reset from the keypad or input terminal.

<table>
<thead>
<tr>
<th>Fault Name/Description</th>
<th>Corrective Actions</th>
</tr>
</thead>
</table>
| OVER-CURRENT           | 1. Check whether the motor's horsepower is equal to or less than the AC drive output power.  
2. Check the wiring connections between the AC drive and motor for possible short circuits.  
3. Increase the Acceleration time (P1.01 or P1.05).  
4. Check for possible excessive loading conditions at the motor.  
5. If there are any abnormal conditions when operating the AC drive after short-circuit is removed, or fault does not clear, call ADC Support for assistance. |
| OVER-VOLTAGE           | 1. Check whether the input voltage falls within the rated AC drive input voltage.  
2. Check for possible voltage transients.  
3. Bus over-voltage may also be caused by motor regeneration. Either increase the decel time or add an optional braking resistor.  
4. Check whether the required braking power is within the specified limits.  
5. Check braking resistor on drives under 20hp and dynamic brake unit & braking resistor on drives 20hp and above. |
| OVER-TEMPERATURE       | 1. Ensure that the ambient temperature falls within the specified temperature range.  
2. Make sure that the ventilation holes are not obstructed.  
3. Remove any foreign objects on the heat sinks and check for possible dirty heat sink fins.  
4. Provide enough spacing for adequate ventilation. |
| UNDER-VOLTAGE          | Check whether the input voltage falls within the rated AC drive input voltage. |
| OVERLOAD               | 1. Check whether the motor is overloaded.  
2. Reduce torque compensation setting as set in P2.03.  
3. Increase the AC drive's output capacity.  
**Note:** The AC drive can withstand up to 150% of the rated current for a maximum of 60 seconds. |
| THERMAL OVERLOAD       | If P6.07 is set to ‘1’ to enable during steady state:  
1. Check for possible motor overload.  
2. Check electronic thermal overload relay setting (P6.00).  
3. Increase motor capacity.  
4. Reduce the current level so that the AC drive output current does not exceed the value set by the Motor Rated Current P0.01. |
| OVER-TORQUE            | If P6.07 is set to ‘2’ to enable detection during accel/decel:  
1. Reduce the motor overload.  
2. Adjust the over-torque detection setting to an appropriate level. |

( table continued next page )
## Fault Messages (continued from previous page)

<table>
<thead>
<tr>
<th>Fault Name/Description</th>
<th>Corrective Actions</th>
</tr>
</thead>
</table>
| OVER-CURRENT ACC       | 1. Check for possible poor insulation at the output line.  
2. Decrease the torque boost setting in P2.02.  
3. Increase the acceleration time P1.01 and P1.05.  
4. Replace the AC drive with one that has a higher output capacity. |
| OVER-CURRENT DEC       | 1. Check for possible poor insulation at the output line.  
2. Increase the deceleration time P1.02 and P1.06.  
3. Replace the AC drive with one that has a higher output capacity. |
| OVER-CURRENT STD       | 1. Check for possible poor insulation at the output line.  
2. Check for possible motor stall.  
3. Replace the AC drive with one that has a higher output capacity. |
| CPU FAILURE 1          | 1. Switch off power supply.  
2. Check whether the input voltage falls within the AC drive’s rated input voltage.  
3. Switch the AC drive back on. If fault does not clear, contact ADC Support for assistance. |
| CPU FAILURE 2          | 1. Reset drive to factory defaults P9.08 to 99.  
2. Switch off power supply  
3. Switch the AC drive back on. If fault does not clear, contact ADC Support for assistance. |
| CPU FAILURE 3          | 1. Check all connections at L1, L2 and L3.  
2. Verify correct voltage at L1, L2, and L3.  
3. Contact ADC Support for assistance. |
| HARDWARE FAILURE       | 1. Check all connections at L1, L2 and L3.  
2. Verify correct voltage at L1, L2, and L3.  
3. Contact ADC Support for assistance. |
| MOM POWER LOSS         | Check line power to drive |
| EXTERNAL FAULT         | When external terminal EF-CM is closed, the output will be turned off (under Normally Open. External Fault.). |
| AUTO RAMP FAULT        | Refer to Over-current or Over-voltage error |
| GROUND FAULT           | 1. Check the motor for possible insulation damage.  
2. Check for possible poor insulation at the output line. |
| EXT. BASE-BLOCK        | 1. When the external input terminal (base-block) is active, the AC drive output will be turned off.  
2. Disable this connection and the AC drive will begin to work again. |

(continued on next page)
## Fault Messages (continued from previous page)

<table>
<thead>
<tr>
<th>Fault Name/Description</th>
<th>Corrective Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INPUT POWER LOSS</strong></td>
<td>1. Check for possible poor connection on the input power line.</td>
</tr>
<tr>
<td></td>
<td>2. Check for possible loss of phase on input power line.</td>
</tr>
<tr>
<td></td>
<td><strong>OUTPUT SHORTED</strong></td>
</tr>
<tr>
<td></td>
<td><strong>IGBT Short Circuit</strong></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>PID Warning:</td>
</tr>
<tr>
<td></td>
<td>PID Feedback Loss - The 4-20mA PID signal has been lost.</td>
</tr>
<tr>
<td></td>
<td>The corrective action can be set with the PID Feedback Loss parameter (P7.27).</td>
</tr>
<tr>
<td></td>
<td>The available settings are:</td>
</tr>
<tr>
<td></td>
<td>00 - Warn and AC Drive Stop</td>
</tr>
<tr>
<td></td>
<td>01 - Warn and Continue</td>
</tr>
<tr>
<td></td>
<td>The default setting is 00.</td>
</tr>
<tr>
<td></td>
<td>2. Check to be sure it is not mis-wired.</td>
</tr>
<tr>
<td></td>
<td>3. Check both the mechanical and electrical integrity of the encoder.</td>
</tr>
<tr>
<td></td>
<td><strong>ENC SIGNAL ERROR</strong></td>
</tr>
<tr>
<td></td>
<td>Encoder A/B phase signal is in error when the control mode is from the encoder.</td>
</tr>
<tr>
<td></td>
<td>2. If P10.05 = 0 (warn and continue operation), Encoder feedback loss would not be recorded.</td>
</tr>
<tr>
<td></td>
<td>3. Check encoder feedback card dip switch settings and encoder voltage requirements</td>
</tr>
</tbody>
</table>
### Warning Messages: Serial Communication and Keypad Errors

There are several Warning Messages that a DURApulse GS3 AC Drive may give. The DURApulse GS3 AC Drive allows you to decide its response to these messages. The descriptions of the Warning Messages are listed below.

<table>
<thead>
<tr>
<th>Error/Warning Name/Description</th>
<th>Corrective Actions</th>
</tr>
</thead>
</table>
| No display shown on the keypad | 1. The Keypad LCD display has failed.  
2. Check input power.  
3. Make sure the keypad is tightly connected to the drive. |
| Invalid Cmd Code               | Invalid Command Code when communicating |
| Invalid Address                | Invalid Address when communicating |
| Invalid Data                   | Invalid Data when communicating |
| Slave Comm Fault               | Slave Comm Fault device failure |
| Comm Time-Out                  | Communication Time Out |
| Drive Error                    | Drive model doesn’t match keypad |
| EEPROM Fault                   | When the copy function is enabled (P9.40), there is a Read/Write EEPROM Fault. |
| Rating Mismatch                | Data range doesn’t match |
| Group# Overflow                | When the copy function is enabled (P9.40), keypad’s group number data is more than the drive’s. |
| No Space                       | When the copy function is enabled (P9.40), EEPROM data block in the keypad is full. |
| Delete Failure                 | When the copy function is enabled (P9.40), delete EEPROM block fails. |
| No Data                        | When the copy function is enabled (P9.40), EEPROM data block is null. |
| R1 Detect Error                | 1. Check to make sure the motor is connected to the drive correctly.  
2. Check line power to drive.  
3. STOP key was pressed during Auto-Tune procedure. |
| No Load Error                  | 1. Check to make sure the motor is connected to the drive correctly.  
2. Check line power to drive.  
3. STOP key was pressed during Auto-Tune procedure. |
| Copy Error-COMMS               | 1. Check connection between the keypad and drive and make sure it is not loose.  
2. Check communications protocol for correct settings. |
| Copy Error-Data                | 1. Check connection between the keypad and drive and make sure it is not loose.  
2. Check communications protocol for correct settings. |

( table continued next page )
### Warning Messages (continued from previous page)

<table>
<thead>
<tr>
<th>Error/Warning Name/Description</th>
<th>Corrective Actions</th>
</tr>
</thead>
</table>
| Overheat Warning              | 1. Ensure that the ambient temperature falls within the specified temperature range.  
                                  2. Make sure that the ventilation holes are not obstructed.  
                                  3. Remove any foreign objects on the heat sinks and check for possible dirty heat sink fins.  
                                  4. Provide enough spacing for adequate ventilation. |
| Write Failure                 | When the copy function is enabled (P9.40), Write to EEPROM fails. |
| Parameter Locked              | Parameters have been locked: read only – cannot be set / cannot write. |
| --- ERR ---                   | Error: The configuration is not accepted, or the parameter is locked. |
| Value Accepted                | Value Accepted. |
| Error: Duplicate Function     | This occurs when attempting to set two mutually exclusive parameters to the same value. This is most commonly seen when P4.00 and P4.13 are both set to the same value.  
                                  (Firmware version 1.04 or higher only.) |