# Troubleshoot the Kinetix 6200 and Kinetix 6500 Drive System

This chapter provides troubleshooting tables for your Kinetix® 6200 and Kinetix 6500 system components.



## Safety Precautions

Observe the following safety precautions when troubleshooting your Kinetix 6200 and Kinetix 6500 drive.

**ATTENTION:** Capacitors on the DC bus may retain hazardous voltages after input power has been removed. Before working on the drive, measure the DC bus voltage to verify it has reached a safe level or wait the full time interval as indicated in the warning on the front of the drive. Failure to observe this precaution could result in severe bodily injury or loss of life.

**ATTENTION:** Do not attempt to defeat or override the drive fault circuits. You must determine the cause of a fault and correct it before you attempt to operate the system. Failure to correct the fault could result in personal injury and/or damage to equipment as a result of uncontrolled machine operation.

**ATTENTION:** Provide an earth ground for test equipment (oscilloscope) used in troubleshooting. Failure to ground the test equipment could result in personal injury.

# Interpret Status Indicators

Refer to these troubleshooting tables to identify faults, potential causes, and the appropriate actions to resolve the fault. If the fault persists after attempting to troubleshoot the system, please contact your Rockwell Automation sales representative for further assistance.

## Kinetix 6000M IDM System Error Codes

The IAM module reports a single, generic IPIM Fault whenever a fault occurs on any IPIM in the same backplane as the IAM module. All IPIM faults result in an open contactor. The Logix Axis Tag for this fault is IPIMFault.

The IPIM module is not a Sercos device, so the IAM module reports any IPIM faults to the Logix motion subsystem. IPIM faults are reset by performing a fault reset on the IAM module. Issuing a fault reset command to the IAM module also generates a fault reset to all the IPIM modules in the same backplane as the IAM. Detailed information about the IPIM fault status may be obtained by messaging to the IAM module.

Connecting the IPIM module into the Logix environment as an EtherNet/IP device does not disable fault reporting through the IAM module. Only the IAM fault reporting lets the Logix motion sub-system take action based on the IPIM module fault status. IPIM faults are also reported to Logix over the Ethernet connection. However, IPIM faults must be reset by applying a fault reset instruction to the IAM module. The integration of the IPIM module into the Logix environment through the EtherNet/IP network provides additional capabilities you may choose to take advantage of in your Logix program.

Refer to the Kinetix 6000M Integrated Drive-Motor System User Manual, publication 2094-UM003, for more information on troubleshooting the IDM drive-motor system.

## Four-character Display Messages

The control modules include a four-character display for status and fault messages. The display scrolls to display long text strings.

The Four-character Display Messages table lists the messages along with their priorities. When messages of different priorities need to be displayed, for example, when the drive has both a fault and an alarm, only the higher priority message is displayed. When messages of equal priority are needed, for example, when there is more than one fault, the messages are displayed in a round-robin fashion.

The IP address is displayed only once after powerup and an IP address has been acquired. The safety signature ID is displayed for 20 seconds when a new safety configuration is applied from the safety configuration tool.

Refer to the table on page 181 for a description of the messages that scroll across the display during powerup.

**Table 87 - Four-character Display Messages**

| Drive Condition | Display String | | | Priority | Maximum Number of Messages Displayed |
|---|---|---|---|---|---|
| | Auxiliary Feedback Not Configured as Feedback Only | Auxiliary Feedback Configured as Feedback Only | | | |
| | Axis 1 | Axis 1 | Axis 2 | | |
| IP Address Display (1) | IP = *xxx.xxx.xxx.xxx* | | | 1 | 2 |
| Sercos Node Address Display (2) | Sercos NODE = *xx* | | | 1 | 2 |
| Safety Signature ID (3) | SAFETY SIGNATURE = *xxxxxx* | | | | |
| Firmware Upgrade | FIRMWARE UPDATE | | | 2 | 2 |
| Decelerating to a Stop as a Result of a Fault | ABORTING | | Refer to footnote (4) | | |
| Initialization Fault - Std. and Fault Code (5) | INIT FLT S*xx* | X1:INIT FLT S*xx* | X2:INIT FLT S*xx* | 3 | 4 (6) |
| Initialization Fault - Mfg. and Fault Code (5) | INIT FLT M*xx* | X1:INIT FLT M*xx* | X2:INIT FLT M*xx* | | |
| Safety Fault (5) | SAFE FLT *xx* | | Refer to footnote (4) | | |
| Node Fault (5) | NODE FLT *xx* | | Refer to footnote (4) | | |
| Major Fault - Std. and Fault Code (5) | FLT S*xx* | X1:FLT S*xx* | X2:FLT S*xx* | | |
| Major Fault - Mfg. and Fault Code (5) | FLT M*xx* | X1:FLT M*xx* | X2:FLT M*xx* | | |
| Minor Fault - Std. and Fault Code (5) | FLT S*xx* | X1:FLT S*xx* | X2:FLT S*xx* | 4 | 3 (7) |
| Minor Fault - Mfg. and Fault Code (5) | FLT M*xx* | X1:FLT M*xx* | X2:FLT M*xx* | | |
| Inhibit - Std. and Fault Code (5) | INHIBIT S*xx* | | Refer to footnote (4) | 5 | 2 |
| Inhibit Fault - Mfg. and Fault Code (5) | INHIBIT M*xx* | | Refer to footnote (4) | | |
| Safe Limited Speed | SAFE LIMITED SPEED | | Refer to footnote (4) | 6 | 10 |
| Power-up (8) | 'BOOT'...'INIT'...'LOAD'...'DONE'...'BOOT'...'INIT'...'DONE'...'LOAD'...'TEST'...FW Version: X.XXX | | | | |
| Waiting for CIP™ connection | STANDBY | | | | |
| Connecting | CONNECTING | | | | |
| Configuring Drive Attributes | CONFIGURING | | | | |
| Synchronizing (1) | SYNCING | | | | |
| Waiting for DC-bus Up | PRE-CHARGE | | | | |
| Drive has been Shutdown | SHUTDOWN | | Refer to footnote (4) | | |
| Drive Axis has Stopped | STOPPED | | Refer to footnote (9) | | |
| Drive is Starting | STARTING | | Refer to footnote (4) | | |
| Drive is Running | RUNNING | | Refer to footnote (4) | | |
| Drive is Executing a Test Procedure | TESTING | | Refer to footnote (4) | | |
| Decelerating to a Stop as a Result of a Disable | STOPPING | | Refer to footnote (4) | | |
| Alarm Fault - Standard Fault Code (5) | ALARM S*xx* | X1:ALARM S*xx* | X2:ALARM S*xx* | | |
| Alarm Fault - Mfg. Specific Fault Code (5) | ALARM M*xx* | X1:ALARM M*xx* | X2:ALARM M*xx* | | |
| Node Alarm | NODE ALARM *xx* | | Refer to footnote (4) | | |

(1) Applies to only 2094-EN02D-M01-S*x* EtherNet/IP control modules.
(2) Applies to only 2094-SE02F-M00-S*x* Sercos control modules.
(3) Applies to only 2094-*xx*02*x*-M0*x*-S1 (Safe Speed Monitor) control modules.
(4) Condition not supported by auxiliary feedback-only axis.
(5) A short descriptive string follows the displayed code.
(6) One node fault, two initialization, safety, major, or minor faults for axis 1, and one initialization, major, or minor fault for axis 2.
(7) One node fault, one initialization, safety, major, or minor faults for axis 1, and one initialization, major, or minor fault for axis 2.
(8) Text in single quotation marks, 'BOOT' for example, is shown one word at a time (not scrolled).
(9) Condition not displayed.

## Fault Codes

These fault code tables are designed to help you resolve anomalies. When a fault is detected, the four-character status indicator scrolls the display message. This is repeated until the fault code is cleared.

For information on troubleshooting SAFE FLT fault codes, refer to the Kinetix 6200 and Kinetix 6500 Safe Speed Monitoring Safety Reference Manual, publication 2094-RM001.

**Table 88 - Fault Code Summary**

| Fault Code Type | Description |
|---|---|
| FLT S*xx* | Standard runtime anomalies. |
| FLT M*xx* | |
| INIT FLT S*xx* | Anomalies that prevent normal operation and occur during the initialization process. |
| INIT FLT M*xx* | |
| NODE FLT*xx* | Anomalies that prevent normal operation of all drives on the power rail. |
| NODE ALARM *xx* | Anomalies that prevent normal operation of all drives on the power rail, but do not result in any action other than reporting the alarm to the controller. |
| INHIBIT S*xx* | Conditions that prevent normal operation and indicate that the drive module is prevented from being enabled. |
| INHIBIT M*xx* | |
| ALARM S*xx*<br>ALARM M*xx* | Warnings of conditions that may affect normal operation, but do not result in any action other than reporting the alarm to the controller. |

Fault codes triggered by conditions that fall outside factory-set limits are identified by FL at the end of the display message. For example, FLT S03...MTR OVERSPEED FL.

Fault codes triggered by conditions that fall outside user-set limits are identified by UL at the end of the display message. For example, FLT S04...MTR OVERSPEED UL.

**Table 89 - FLT S*xx* Fault Codes**

| Four-character Display Message | Logix Designer Fault Message | Problem or Symptom | Potential Cause | Possible Resolution |
|---|---|---|---|---|
| FLT S02...MTR COMMUTATION | Illegal Hall State | State of Hall feedback inputs is incorrect. | Improper connections. | • Check Hall wiring at motor feedback (MF) connector.<br>• Check 5V power supply to the encoder. |
| FLT S03...MTR OVERSPEED FL | Motor Overspeed | Motor speed has exceeded 125% of maximum rated speed. | | • Check cables for noise.<br>• Check tuning. |
| FLT S04...MTR OVERSPEED UL (Kinetix 6500 drives only) | Motor Overspeed | Motor speed has exceeded user velocity limits. | | |
| FLT S05...MTR OVERTEMP FL nn | Motor Overtemperature | The motor thermostat, motor thermistor, or encoder temperature sensor indicates that the motor factory temperature limit has been exceeded. The nn sub-code is defined as follows: | High motor ambient temperature and/or Excessive Current. | • Operate within (not above) the continuous torque rating for the ambient temperature.<br>• Lower ambient temperature or increase motor cooling. |
| | | 01: Motor Thermostat or Thermistor. | Motor wiring error. | Check motor wiring at motor feedback (MF) connector. |
| | | 02: Encoder Temperature Sensor. | Incorrect motor selection. | Verify the proper motor has been selected. |
| FLT S06...MTR OVERTEMP UL nn (Kinetix 6500 drives only) | Motor Overtemperature | The motor thermostat, motor thermistor, or encoder temperature sensor indicates that the motor factory temperature limit has been exceeded. The nn sub-code is defined as follows: | High motor ambient temperature and/or Excessive Current. | • Operate within (not above) the continuous torque rating for the ambient temperature.<br>• Lower ambient temperature or increase motor cooling. |
| | | 01: Motor Thermostat or Thermistor. | Motor wiring error. | Check motor wiring at motor feedback (MF) connector. |
| | | 02: Encoder Temperature Sensor. | Incorrect motor selection. | Verify the proper motor has been selected. |
| FLT S07...MTR OVERLOAD FL | Motor Thermal Protection | The thermal model for the motor indicates that the temperature has exceeded 110% of its rating. | The machine duty cycle requires an RMS current exceeding the continuous rating of the motor. | Change the command profile to reduce speed or increase time. |
| FLT S08...MTR OVERLOAD UL (Kinetix 6500 drives only) | Motor Thermal Protection | The thermal model for the motor indicates that the temperature has exceeded a user programmable limit. | | |

**Table 89 - FLT S*xx* Fault Codes (continued)**

| Four-character Display Message | Logix Designer Fault Message | Problem or Symptom | Potential Cause | Possible Resolution |
|---|---|---|---|---|
| FLT S10...INV OVERCURRENT | IPM Fault | The IPM fault output indicates that the power transistors were turned off because of overcurrent, overtemperature, or power supply problems. | Motor cables shorted. | Verify continuity of motor power cable and connector. |
| | | | Motor winding shorted internally. | Disconnect motor power cables from the motor. If the motor is difficult to turn by hand, it may need to be replaced. |
| | | | The drive temperature is too high. | • Check for clogged vents or defective fan.<br>• Make sure cooling is not restricted by insufficient space around the unit.<br>• Verify ambient temperature is not too high. |
| | | | Operation above continuous power rating and/or product environmental ratings. | • Operate within the continuous power rating.<br>• Reduce acceleration rates.<br>• Reduce deceleration rates. |
| | | | The drive has a short circuit, overcurrent, or failed component. | Remove all power and motor connections, and preform a continuity check from the DC bus to the U, V, and W motor outputs. If a continuity exists, check for wire fibers between terminals, or send drive in for repair. |
| FLT S11...INV OVERTEMP FL | Inverter Overtemperature | Inverter thermal switch tripped. | IAM or AM power module fan failed. | Replace the failed module. |
| | | | The cabinet ambient temperature is above rating. | Check the cabinet temperature. |
| | | | The machine duty cycle requires an RMS current exceeding the continuous rating of the inverter. | Change the command profile to reduce speed or increase time. |
| | | | The airflow access to the drive system is limited or blocked. | Check airflow and re-route cables away from the drive system. |
| FLT S13...INV OVERLOAD FL | Inverter Thermal Protection | The thermal model for the power transistors indicates that the temperature has exceeded 110% of its rating. | The machine duty cycle requires an RMS current exceeding the continuous rating of the inverter. | Change the command profile to reduce speed or increase time. |
| FLT S14...INV OVERLOAD UL (Kinetix 6500 drives only) | Inverter Thermal Protection | The thermal model for the power transistors indicates that the temperature has exceeded the user-programable limit. | | |
| FLT S16...GROUND CURRENT | Ground Fault | Excessive ground current was detected in the converter. | Wiring error. | • Check motor power wiring.<br>• Check input power wiring. |
| | | | Motor internal ground short. | Replace motor. |
| | | | Internal malfunction. | Disconnect motor power cable from drive and enable drive with current limit set to 0. If fault clears, then a wiring error or motor internal anomaly exists. If fault remains, call your sales representative. |
| FLT S18...CONV OVERTEMP FL | Converter Overtemperature | Converter thermal switch tripped. | Excessive heat exists in the power circuitry. | • Reduce acceleration rates.<br>• Reduce duty cycle (ON/OFF) of commanded motion.<br>• Increase time permitted for motion.<br>• Use larger IAM power module.<br>• Check for clogged vents or defective fan.<br>• Make sure cooling is not restricted by insufficient space around the unit. |
| FLT S20...CONV OVERLOAD FL | Converter Thermal Protection | The thermal model for the converter indicates that the temperature has exceeded its rating. | Excessive current is being drawn by the power circuitry. | • Reduce acceleration rates.<br>• Reduce duty cycle (ON/OFF) of commanded motion.<br>• Increase time permitted for motion.<br>• Use larger IAM power module. |
| FLT S21...CONV OVERLOAD UL (Kinetix 6500 drives only) | Converter Thermal Protection | The thermal model for the converter indicates that the temperature has exceeded a user-programmable limit. | | |
| FLT S22...AC POWER LOSS | AC Power Loss | All three AC input phases are detected as absent when an axis is enabled. | Axis was enabled when main (three-phase) power was removed. | Disable axis before removing power. |
| FLT S23...AC PHASE LOSS nn | AC Phase Loss | Some, but not all AC input phases are detected as absent. The nn sub-code is defined as follows:<br>01: L1 is missing.<br>02: L2 is missing.<br>03: L3 is missing. | Faulty AC line control equipment. | Check input AC voltage on all phases. |
| FLT S25...PRECHARGE FAILURE | Pre-charge Failure | The converter precharge circuit detected that the DC bus did not reach an appropriate voltage level after charging for a period of time. | Low AC input voltage. | Check input AC voltage on all phases |
| | | | Internal malfunction. | Call your sales representative. |

**Table 89 - FLT S*xx* Fault Codes (continued)**

| Four-character Display Message | Logix Designer Fault Message | Problem or Symptom | Potential Cause | Possible Resolution |
|---|---|---|---|---|
| FLT S29...SHUNT OVERLOAD FL | Shunt Thermal Protection | The thermal model for the shunt circuitry indicates that the temperature has exceeded its rating. | | • Use a properly sized shunt or modify duty cycle of the application.<br>• System uses internal shunt and requires external shunt for additional capacity. |
| FLT S30...SHUNT OVERLOAD UL (Kinetix 6500 drives only) | Shunt Thermal Protection | The thermal model for the shunt circuitry indicates that the temperature has exceeded a user-programmable limit. | | |
| FLT S31...SHUNT MODULE | Shunt Module Fault | The shunt module in a multi-axis system has a fault. | Over-temperature fault indicator on Bulletin 2094 shunt module is steady red. | Refer to Temperature Fault Status Indicator on page 200. |
| | | | Shunt-fault indicator on Bulletin 2094 shunt module is steady red. | Refer to Shunt Fault Status Indicator on page 200. |
| | | | Bulletin 2094 shunt module is missing from power rail. | Install missing module on power rail. |
| | | | | Fill empty slot with slot-filler module. |
| FLT S33...BUS UNDERVOLT FL | Bus Undervoltage | With three-phase power present, the DC bus voltage is below limits.<br>DC bus voltage fell below the undervoltage limit while an axis on the follower power rail was enabled. | DC bus voltage for 460V system is below 275V. | • Verify voltage level of the incoming AC power.<br>• Check AC power source for glitches or line drop.<br>• Install an uninterruptible power supply (UPS) on your AC input.<br>• Disable follower axis before removing power. |
| FLT S34...BUS UNDERVOLT UL (Kinetix 6500 drives only) | Bus Undervoltage | The DC bus voltage is measured below a user limit when the DC bus was expected to be charged. | | |
| FLT S35...BUS OVERVOLT FL | Bus Overvoltage | The DC bus voltage is measured above a factory limit. | Excessive regeneration of power. | Change the deceleration or motion profile. |
| | | | When the motor is driven by an external mechanical power source, it may regenerate too much peak energy through the drive power supply. The system faults to save itself from an overload. | Use a larger system (motor and drive). |
| | | | DC bus voltage for 460V system is over 820V. | Install shunt module. |
| FLT S38...FUSE BLOWN | Blown Fuse (Bus Loss) | A blown fuse was detected in the power structure. | Blown fuse. | Call your Rockwell Automation sales representative to return module for repair. |
| FLT S41...MTR AQB STATE FL | Motor Feedback State Error | The number of illegal state transitions of the AQB encoder signals has exceeded a factory limit. | The motor feedback wiring is open, shorted, or missing. | • Use shielded cables with twisted pair wires.<br>• Route the feedback away from potential noise sources.<br>• Check the system grounds.<br>• Replace the motor/encoder. |
| FLT S41...AUX AQB STATE FL | Aux Feedback State Error | | The auxiliary feedback wiring is open, shorted, or missing. | |
| FLT S42...MTR AQB STATE UL | Motor Feedback State Error | The number of illegal state transitions of the AQB encoder signals has exceeded a user limit. | The motor feedback wiring is open, shorted, or missing. | • Use shielded cables with twisted pair wires.<br>• Route the feedback away from potential noise sources.<br>• Check the system grounds.<br>• Replace the motor/encoder. |
| FLT S42...AUX AQB STATE UL | Aux Feedback State Error | | The auxiliary feedback wiring is open, shorted, or missing. | |
| FLT S43...MTR FDBK LOSS FL | Feedback Loss | • On sin/cos encoders, the sum of the square of the sin/cos signals has been measured below a factory limit.<br>• On TTL encoders, the absolute value of the differential A/B signals is below a factory limit. | The motor feedback wiring is open, shorted, or missing. | • Check motor encoder wiring.<br>• Run Hookup test in the Logix Designer application. |
| FLT S43...AUX FDBK LOSS FL | | | The auxiliary feedback wiring is open, shorted, or missing. | |
| FLT S44...MTR FDBK LOSS UL (Kinetix 6500 drives only) | Motor Feedback Loss | • On sin/cos encoders, the sum of the square of the sin/cos signals has been measured below a user limit.<br>• On TTL encoders, the absolute value of the differential A/B signals is below a user limit. | The motor feedback wiring is open, shorted, or missing. | • Check motor encoder wiring.<br>• Run Hookup test in the Logix Designer application. |
| FLT S44...AUX FDBK LOSS UL (Kinetix 6500 drives only) | Aux Feedback Loss | | The auxiliary feedback wiring is open, shorted, or missing. | |
| FLT S45...MTR FDBK COMM FL | Feedback Serial Comms | The number of consecutive missed or corrupted serial data packets from the feedback device has exceeded a factory set limit. | Communication was not established with an intelligent encoder. | • Verify motor selection.<br>• Verify the motor supports automatic identification.<br>• Verify motor encoder wiring.<br>• Consult Possible Solutions for FLT S47 |
| FLT S45...AUX FDBK COMM FL | | | | |
| FLT S46...MTR FDBK COMM UL (Kinetix 6500 drives only) | Motor Fdbk Serial Comms | The number of consecutive missed or corrupted serial data packets from the feedback device has exceeded a user set limit. | Communication was not established with an intelligent encoder. | • Verify motor selection.<br>• Verify the motor supports automatic identification.<br>• Verify motor encoder wiring. |
| FLT S46...AUX FDBK COMM UL (Kinetix 6500 drives only) | Aux Feedback Serial Comms | | | |

**Table 89 - FLT S*xx* Fault Codes (continued)**

| Four-character Display Message | Logix Designer Fault Message | Problem or Symptom | Potential Cause | Possible Resolution |
|---|---|---|---|---|
| FLT S47...MTR ENC SELF TEST nn<br>FLT S47...AUX ENC SELF TEST nn | Feedback Self Test | The Hiperface feedback device has detected an internal error.<br>The nn sub-code is defined as follows:<br>01: INCORRECT ALIGNMENT DATA<br>02: INCORRECT INTERNAL ANGULAR OFFSET<br>03: DATA FIELD PARTITIONING TABLE DESTROYED<br>04: ANALOG LIMIT VALUES NOT AVAILABLE<br>05: INTERNAL I2C BUS INOPERATIVE<br>06: INTERNAL CHECKSUM ERROR<br>07: ENCODER RESET OCCURRED AS A RESULT OF PROGRAM MONITORING<br>08: COUNTER OVERFLOW<br>09: PARITY ERROR<br>10: CHECKSUM OF TRANSMITTED DATA IS INCORRECT<br>11: UNKNOWN COMMAND CODE<br>12: NUMBER OF TRANSMITTED DATA IS INCORRECT<br>13: TRANSMITTED COMMAND AGRUMENT IS NOT ALLOWED<br>14: THE SELECTED DATA FIELD MAY NOT BE WRITTEN TO<br>15: INCORRECT ACCESS CODE<br>16: SIZE OF SPECIFIED DATA FIELD CANNOT BE CHANGED<br>17: SPECIFIED WORD ADDRESS LIES OUTSIDE THE DATA FIELD<br>18: ACCESS TO NON-EXISTENT DATA FIELD<br>28: VALUE MONITORING OF THE ANALOG SIGNALS (process data)<br>29: TRANSMITTER CURRENT CRITICAL (contamination, transmitter breakage)<br>30: ENCODER TEMPERATURE CRITICAL<br>31: SPEED TOO HIGH, NO POSITION FORMATION POSSIBLE<br>32: SINGLETURN POSITION UNRELIABLE<br>33: MULTITURN POSITION ERROR<br>34: MULTITURN POSITION ERROR<br>35: MULTITURN POSITION ERROR | | • Check motor feedback cable for proper connectivity and continuity<br>• Check motor phasing (U, V, W) and Hiperface feedback 15-pin wire connections at the drive<br>• Review Electrical Noise Reduction on page 36<br>– See bonding painted panels on page 37<br>– See wire-braid bonding on page 38<br>• Cycle control power<br>• Check feedback shield connection<br>• Reduce shock and vibration to motor<br>• Upgrade firmware, revision 2.045 or later (Kinetix 6200 drives)<br>• Upgrade firmware, revision 2.010 or later (Kinetix 6500 drives)<br>• Replace motor if fault continues |
| FLT S50...POS HW OTRAVEL | Hardware Overtravel - Positive | Axis moved beyond the physical travel limits in the positive direction. | Dedicated overtravel input is inactive. | • Check wiring.<br>• Verify motion profile.<br>• Verify axis configuration in software. |
| FLT S51...NEG HW OTRAVEL | Hardware Overtravel - Negative | Axis moved beyond the physical travel limits in the negative direction. | | |
| FLT S52...POS SW OTRAVEL (Kinetix 6200 drives only) | Software Overtravel - Positive | Axis position exceeded maximum software setting. | | • Verify motion profile.<br>• Verify overtravel settings are appropriate. |
| FLT S53...NEG SW OTRAVEL (Kinetix 6200 drives only) | Software Overtravel - Negative | | | |
| FLT S54...POSN ERROR | Excessive Position Error | Position error limit was exceeded. | Improperly sized drive or motor. | • Increase the feed forward gain.<br>• Increase following error limit or time.<br>• Check position loop tuning.<br>• Verify sizing of system. |
| | | | Mechanical system out of specifications. | • Verify mechanical integrity of system within specification limits.<br>• Check motor power wiring. |
| FLT S55...VEL ERROR nn | Excessive Velocity Error | The velocity error has exceeded a limit for a period of time. The nn sub-code is defined as follows:<br>00:Velocity error referenced to the velocity loop feedback.<br>01:Velocity error referenced to the nonvelocity feedback (in dual-feedback configurations). | Improperly sized drive or motor. | • Increase velocity error limit or time.<br>• Check velocity loop tuning.<br>• Verify sizing of system. |
| | | | Mechanical system out of specifications. | • Verify mechanical integrity of system within specification limits.<br>• Check motor power wiring.<br>• Reduce acceleration. |
| FLT S56...OVERTORQUE (Kinetix 6500 drives only) | Overtorque Limit | Motor torque has exceeded a user-programmable setting. | • Overly aggressive motion profile<br>• Mechanical binding | • Verify motion profile.<br>• Verify Overtorque settings are appropriate.<br>• Verify sizing of system.<br>• Verify torque offset |
| | | | Mechanical system out of specifications. | • Verify mechanical integrity of system within specification limits. |
| FLT S57...UNDERTORQUE (Kinetix 6500 drives only) | Undertorque Limit | Motor torque has fallen below a user-programmable setting. | • Improperly configured limit<br>• Improperly configured motion<br>• Improperly drive/motor sizing | • Verify motion profile.<br>• Verify Overtorque settings are appropriate.<br>• Verify sizing of system. |
| | | | Mechanical system out of specifications. | • Verify mechanical integrity of system within specification limits. |
| FLT S60...ILLEGAL MODE | Illegal Control mode | An illegal mode of operation was attempted. | Axis 1 was configured for dual feedback or load feedback with Axis 2 also configured for Feedback Only operation, but with different feedback attribute values. | • Use Aux Feedback for one axis only.<br>• Verify Axis 1 and Axis 2 have identical feedback configuration for aux feedback. |

**Table 89 - FLT S*xx* Fault Codes (continued)**

| Four-character Display Message | Logix Designer Fault Message | Problem or Symptom | Potential Cause | Possible Resolution |
|---|---|---|---|---|
| FLT S61...ENABLE INPUT | Drive Enable Input | The hardware enable input was deactivated while the drive was enabled. | An attempt was made to enable the axis through software while the Drive Enable hardware input was inactive. | Disable the Drive Enable Input fault. |
| | | | The Drive Enable input transitioned from active to inactive while the axis was enabled. | Verify that Drive Enable hardware input is active whenever the drive is enabled through software. |
| FLT S62...CONTROLLER (Kinetix 6500 drives only) | Controller Initiated Exception | The controller has requested the drive to generate an exception. | User configured software overtravel | • Move axis out of soft overtravel range.<br>• Clear soft overtravel fault.<br>• Check soft overtravel configuration.<br>• Consult controller documentation. |

**Table 90 - FLT M*xx* Fault Codes**

| Four-character Display Message | Logix Designer Fault Message | Problem or Symptom | Potential Cause | Possible Resolution |
|---|---|---|---|---|
| FLT M01...SELF SENSING | Self-sensing Startup Fault | The self-sensing commutation start-up algorithm failed. | Extremely light or heavy load on the motor. | Clear faults and re-try. |
| | | | Mechanical obstruction. | • Reduce friction.<br>• Check for mechanical obstruction. |
| FLT M02...MOTOR VOLTAGE | Motor Voltage Mismatch | Motor voltage incompatible with drive voltage. | Check the Logix Designer configuration. | Correct the Logix Designer configuration. |
| | | | Wrong motor connected to drive. | Connect appropriate motor to drive. |
| FLT M04...MTR FDBK FILTER nn (Kinetix 6500 drives only) | Motor Feedback Filter | Excessive levels of noise have been detected by the digital feedback filter. The nn field is defined as follows:<br>01: Sine or A channel<br>02: Cosine or B channel | The motor feedback wiring is open, shorted, or missing. | • Use shielded cables with twisted pair wires.<br>• Route the feedback away from potential noise sources.<br>• Check the system grounds.<br>• Replace the motor/encoder. |
| FLT M04...AUX FDBK FILTER nn (Kinetix 6500 drives only) | Aux Feedback Filter | | The auxiliary feedback wiring is open, shorted, or missing. | |
| FLT M05...MTR FDBK BATT LOSS | Motor Encoder Battery Loss | The battery voltage on a battery-backed motor encoder is low enough such that absolute position is no longer available. | Weak battery or poor battery connection. | • Replace battery.<br>• Check battery connection. |
| FLT M06...MTR FDBK BATT LOW | Motor Encoder Battery Caution | The battery voltage on a battery-backed motor encoder is below a caution level. | | |
| FLT M07...MTR INCR LOSS | Motor Incremental Position Loss | The periodic check of the incremental encoder position against the absolute encoder position or Hall edges (when available) indicates they are out of tolerance. | The motor feedback wiring is open, shorted, or missing. | • Check motor encoder wiring.<br>• Run Hookup test in the Logix Designer application. |
| FLT M07...AUX INCR LOSS | Aux Incremental Position Loss | | The auxiliary feedback wiring is open, shorted, or missing. | |
| FLT M10...CTRL OVERTEMP FL | Control Module Overtemperature | The control module temperature has exceeded its limit. | Cabinet ambient temperature has exceeded 50 °C (122 °F). | Reduce cabinet ambient temperature. |
| FLT M11...CTRL OVERTEMP UL (Kinetix 6500 drives only) | Control Module Overtemperature | The control module temperature has exceeded a user limit. | | |
| FLT M12...POWER CYCLE FL | Pre-charge Overload | The converter estimates that the precharge circuit has exceeded its limit due to excessive power cycling. | The DC bus power has been cycled too frequently. | Limit power cycles to two per minute maximum. |
| FLT M13...POWER CYCLE UL (Kinetix 6500 drives only) | Pre-charge Overload | The converter estimates that the precharge circuit is approaching its user-defined limit due to excessive power cycling. | | |
| FLT M14...CURR FDBK OFFSET | Excessive Current Feedback Offset | Current feedback hardware fault detected. | | Replace the power module. |
| FLT M15...REGEN PWR SUPPLY | Regenerative Power Supply Fault | The hardware Regeneration OK input was deactivated while the drive was enabled. | Regen unit faulted. | Reset faulted regen unit. |
| FLT M18...TORQUE PROVE FAILURE (Kinetix 6500 drives only) | Torque Prove Failure | Torque prove test has failed. | One or more phases of motor wiring is open or incorrect. | Check motor power wiring. |
| FLT M19...DC BUS LIMIT | DC Bus Limited Position Error | During a DC bus limit condition, the position error exceeded a user limit for a programmable period of time. | Excessive load drawn from DC bus by application. | Modify application to reduce loading on DC Bus.<br>Increase converter size to provide additional bus capacity. |
| FLT M25...COMMON BUS | DC Common Bus Fault | AC Power was detected by the drive while configured for Common Bus Follower operation. | Improper configuration or connection. | Check IAM power configuration and wire accordingly. |
| FLT M26...RUNTIME ERROR | Runtime Drive Error | The drive firmware encountered an unrecoverable runtime error. | | Cycle control power.<br>Replace Module |

**Table 90 - FLT M*xx* Fault Codes (continued)**

| Four-character Display Message | Logix Designer Fault Message | Problem or Symptom | Potential Cause | Possible Resolution |
|---|---|---|---|---|
| FLT M27...BACKPLANE COMM | Backplane COM | Communication over the backplane detected a problem. | Electrical Noise. | Cycle control power. |
| | | | Poor module connection. | With power off, reseat power module in rail and control module in power module. |
| | | | Faulty module. | Replace module. |
| FLT M28...SAFETY COMM | Internal Safety Communication | Communication with the safety hardware within the drive malfunctioned. | | Cycle control power.<br>Replace module. |
| FLT M64...SENSOR ASSIGNMENT | No Quick View message | • The Home, Registration1, or Registration2 digital input function has been requested but is not assigned to an input.<br>• Multiple inputs have been assigned the same function. | | Assign proper function to the four available digital inputs. |
| FLT M68...IPIM | IPIM Module Fault | A fault has occurred in one or more IPIM modules on the power rail. | | Refer to the troubleshooting chapter in the Kinetix 6000M Integrated Drive-Motor System User Manual, publication 2094-UM003. |

**Table 91 - INIT FLT Fault Codes**

| Four-character Display Message | Logix Designer Fault Message | Problem or Symptom | Potential Cause | Possible Resolution |
|---|---|---|---|---|
| INIT FLT S03...NVMEM CHKSUM | User Non-volatile Memory Checksum | Data in the user nonvolatile memory has a checksum error. | Non-volatile memory is corrupt due to control board software error. | • Cycle power or reset the drive.<br>• Contact your Rockwell Automation sales representative and return module for repair. |
| INIT FLT M01...ENCODER DATA | Smart Encoder Data Corruption Fault | The motor data stored in a smart encoder has a checksum error. | Faulty intelligent encoder. | • Cycle power or reset the drive.<br>• Replace motor if faulting continues. |
| INIT FLT M02...MTR DATA RANGE nn | Motor Data Range Error | Data within a motor data blob is out of range. The nn sub-code is defined as follows:<br>01: Memory map revision of the blob is not supported by the firmware.<br>02: Rated current is out of range.<br>03: Peak current is out of range.<br>04: Rated power is out of range.<br>05: Overload limit is out of range.<br>06: Thermal capacitance is out of range.<br>07: Thermal resistance is out of range.<br>08: Motor resistance is out of range.<br>09: Motor inductance is out of range.<br>10: Inertia is out of range.<br>11: Rated speed is out of range.<br>12: Max speed is out of range.<br>13: Rated torque is out of range.<br>14: Torque constant is out of range.<br>15: Back EMF is out of range.<br>16: Pole pitch is out of range.<br>If there is error in the blob that comes from the controller then 50 is added to the subcode. | Faulty intelligent encoder or incorrect motor file. | • Cycle power or reset the drive.<br>• Check validity of the motion database.<br>• Replace motor if faulting continues. |
| INIT FLT M03...MTR ENC STARTUP | Motor Feedback Communication Startup | Communication with a smart encoder could not be established on the motor feedback port. | Incorrect motor selected or connected. | Check motor selection. |
| | | | Faulty wiring. | Check motor encoder wiring. |
| INIT FLT M03...AUX ENC STARTUP | Auxiliary Feedback Communication Startup | Communication with a smart encoder could not be established on the auxiliary feedback port. | Incorrect motor selected or connected. | Check motor selection. |
| | | | Faulty wiring. | Check motor encoder wiring. |
| INIT FLT M04...MTR ABS SPEED | Motor Absolute Encoder Overspeed Fault | Excessive speed was detected in the motor battery-backed encoder while power was off. | High motor speed while power was off. | Clear faults and re-home. |
| INIT FLT M05...MTR ABS TRAVEL | Motor Absolute Encoder Power-off Travel | The power-off travel range of the motor battery-backed encoder has been exceeded. | Large travel distance while power was off. | Clear faults and re-home. |
| INIT FLT M06...MTR ABS STARTUP | Motor Absolute Startup Speed | The motor absolute encoder was not able to accurately determine the position after powerup due to motor speed greater than 100 rpm. | Mechanical movement of machine causing excessive rotation of motor during powerup. | Allow machine motion to stop before powerup. |
| INIT FLT M07...COMMUTATION OFFSET (Kinetix 6500 drive only) | Uninitialized Commutation Offset | The commutation offset stored in a third-party motor has not been initialized. | Third party motors do not contain Rockwell Automation® motor data. | Run Commutation Test from the Logix Designer application. |
| INIT FLT M12...INVALID KCL REV | Invalid KCL revision | The FPGA image is incompatible with hardware operation. | | • Flash control module with correct firmware.<br>• Replace module. |
| INIT FLT M13...INVALID BSP REV | Invalid BSP revision | The board support package is incompatible with hardware operation. | | • Flash control module with correct firmware.<br>• Replace module. |

**Table 91 - INIT FLT Fault Codes (continued)**

| Four-character Display Message | Logix Designer Fault Message | Problem or Symptom | Potential Cause | Possible Resolution |
|---|---|---|---|---|
| INIT FLT M14...SAFETY FIRMWARE | Invalid Safety Firmware | The loaded Safety firmware is not a valid revision for the rev of drive firmware. | | Flash control module with correct revision of safety firmware. |
| INIT FLT M19...VOLTAGE MISMATCH | Voltage Mismatch on Power Rail | The IAM detected that both 230V and 460V modules have been installed on the same power rail. | | Replace the mismatched AM module with one that matches the IAM module. |
| INIT FLT M20...UNKNOWN MODULE | Unknown Axis on Backplane | Unknown module is detected on the modular backplane. | Faulty Module. | • Recycle control power.<br>• Replace module. |
| INIT FLT M21...FACTORY CFG | Factory Configuration | Factory Configuration Data is missing or invalid. | Defective memory in module. | Replace defective module. |
| INIT FLT M22...ILLEGAL ADDRESS | Illegal Node Switch Setting | AM Node Address is out of range (>254). | IAM node switch set such that an AM node address is greater than 254. | Select IAM node address that permits all AM node addresses to be less than 254. |
| INIT FLT M23...SERIES MISMATCH | Series Mismatch on Power Rail | Sercos and EtherNet/IP control modules exist on the same power rail. | | Replace the mismatched control module. |
| INIT FLT M24...OPEN SLOT | Open Power Rail Slot | IAM detects an open slot on the power rail. | Missing module or bent pins on module. | • Check control pin on back of module.<br>• Install slot filler module in open slot. |
| INIT FLT M32...MTR KEYING nn (Kinetix 6200 drives only) | Motor Keying Fault | The attached motor model does not match the model in the axis configuration. The nn sub-code is defined as follows:<br>01: Encoder communication expected but not operational.<br>02: Feedback type does not match.<br>03: Motor ID does not match.<br>04: Single-turn resolution does not match. | Incorrect motor selected from motor database. | Verify motor selection in Axis Properties configuration. |
| INIT FLT M33...ENABLE UNASSIGNED (Kinetix 6200 drives only) | Enable Input Not Assigned | The enable function has been requested for use but has not been assigned to a digital input. | | Assign an available digital input as Enable. |
| INIT FLT M34...OTRAVEL UNASSIGNED (Kinetix 6200 drives only) | Overtravel Input Not Assigned | The positive or negative overtravel function has been requested for use but has not been assigned to a digital input. | | Assign an available digital input for the desired overtravel function. |
| INIT FLT M35... NAND FLASH nn | Storage failure | The nn sub-code is defined as follows:<br>01: Main application storage failed.<br>02: Log file storage failed.<br>03: Web file storage failed. | Faulty memory component. | • Recycle control power or reset the drive.<br>• Replace control module if problem persists. |

**Table 92 - NODE FLT Fault Codes**

| Four-character Display Message | Logix Designer Fault Message | Problem or Symptom | Potential Cause | Possible Resolution |
|---|---|---|---|---|
| NODE FLT 01...LATE CTRL UPDATE (Kinetix 6500 drives only) | Control Update Fault | Several consecutive updates from the controller have been lost. | Excessive network traffic. | • Remove unnecessary network devices from the motion network.<br>• Change the network topology so that fewer devices share common paths.<br>• Use faster/higher performance network equipment. |
| | | | Noisy environment. | • Segregate signal wiring from power wiring.<br>• Use shielded cables.<br>• Add snubbers to power devices. |
| NODE FLT 02...PROC WATCHDOG | Processor Watchdog Fault | The watchdog circuit monitoring processor operation detected a problem. | | • Recycle control power or reset the drive.<br>• Replace control module if problem persists. |
| NODE FLT 03...HARDWARE nn | Hardware Fault | The drive has an internal hardware problem. The nn sub-code is defined as follows: | | • Recycle control power or reset the drive.<br>• Replace power module or power rail if problem persists |
| | | 01: Invalid slot ID. | Faulty power rail or power module. | |
| | | 02: Cannot read slot ID. | | |
| | | 03: Nonvolatile write to memory failed. | Faulty memory component. | • Recycle control power or reset the drive.<br>• Replace control module if problem persists. |
| | | 04: Nonvolatile memory read failed. | | |
| NODE FLT 04...DATA FORMAT ERROR (Kinetix 6200 drives only) | Data Format Error | A data format error was discovered in the controller-to-drive message. | Faulty memory component. | • Recycle control power or reset the drive.<br>• Replace control module if problem persists. |
| NODE FLT 06...LOST CTRL CONN (Kinetix 6500 drives only) | Lost Controller Connection | communication with the controller have been lost | • Faulty Ethernet cable.<br>• Ethernet cable disconnected. | Check Ethernet connection. |
| | | | Controller lost power. | Check controller operation. |
| NODE FLT 08...LOGIC WATCHDOG (Kinetix 6500 drives only) | Custom Logic Update Timeout | The watchdog circuit monitoring custom logic operation detected a problem. | Faulty control module. | • Recycle control power or reset the drive.<br>• Replace control module if problem persists. |

**Table 92 - NODE FLT Fault Codes (continued)**

| Four-character Display Message | Logix Designer Fault Message | Problem or Symptom | Potential Cause | Possible Resolution |
|---|---|---|---|---|
| NODE FLT 09...IP ADDRESS (Kinetix 6500 drives only) | Duplicate IP Address | This drive and another EtherNet device on the same subnet have identical IP addresses. | Incorrect node switch setting. | Select a node address not already in use on the network. |
| NODE FLT 128...DRAM TEST | DRAM Test Fault | A power-up test of the DRAM indicated a memory problem. | Faulty memory component. | • Recycle control power or reset the drive.<br>• Replace Control module if problem persists. |
| NODE FLT 129...FPGA CONFIG | FPGA Configuration Fault | The FPGA could not be configured properly. | Faulty component. | Replace module. |
| NODE FLT 133...SERCOS ADDRESS (Kinetix 6200 drives only) | Duplicate Sercos Node Address | This axis and one or more other axes have identical Sercos addresses. | | Check Node Switch configuration of all axes on the Sercos ring and adjust for no overlap of addresses. |
| NODE FLT 139...SERCOS RING (Kinetix 6200 drives only) | Sercos Ring Fault | The Sercos ring is not active after being active and operational. | Loose or damaged Sercos cable. | Check that fiber-optic cable is present and connected properly. |

**Table 93 - NODE ALARM Fault Codes**

| Four-character Display Message | Logix Designer Fault Message | Problem or Symptom | Potential Cause | Possible Resolution |
|---|---|---|---|---|
| NODE ALARM 01...CTRL UPDATE | Control Connection Update Alarm | The Control Update Alarm bit is used to indicate that updates from the controller have been late | Excessive network traffic. | • Remove unnecessary network devices from the motion network.<br>• Change the network topology so that fewer devices share common paths.<br>• Use faster/higher performance network equipment. |
| | | | Noisy environment. | • Segregate signal wiring from power wiring.<br>• Use shielded cables.<br>• Add snubbers to power devices. |
| NODE ALARM 05...CLOCK SYNC | Clock Jitter Alarm | Sync Variance has exceeded the Sync Threshold while the device is running in Sync mode. | • Switched to grandmaster clock of significantly different frequency.<br>• Lost connection to grandmaster clock. | • Drive auto-corrects upon time synchronization.<br>• Restore network connections. |
| NODE ALARM 128...NODE SWITCH | No Quick View message | The node address switches have been altered because they were first read after powerup. | Node Switches adjusted after powerup. | Return node switches to power-up setting. |

**Table 94 - INHIBIT Fault Codes**

| Four-character Display Message | Logix Designer Fault Message | Problem or Symptom | Potential Cause | Possible Resolution |
|---|---|---|---|---|
| INHIBIT S01...ENABLE INPUT | Axis Enable Input Fault - Start Inhibit | When Enable Input Checking is enabled, the drive displays Axis Enable Input start inhibit when it detects the enable input is inactive and while the axis is in Starting/Running/Testing/Hold sub-state of Stopped state. | | • Confirm that the digital input assigned to the Enable is active<br>• Check module enable input wiring<br>• Check digital input assignments |
| INHIBIT S02...MOTOR NOT CONFIGURED | Motor Not Configured | The motor has not been properly configured for use. | | Verify motor configuration in the Logix Designer application. |
| INHIBIT S03...FEEDBACK NOT CONFIGURED | Feedback Not Configured | The feedback has not been properly configured for use. | | Verify feedback configuration in the Logix Designer application. |
| INHIBIT S04...COMMUTATION NOT CONFIGURED | Commutation Not Configured - Standard Start Inhibit | • Associated permanent magnet motor commutation has not been configured for use.<br>• After commutation test, the offset value stored on the motor encoder differs from value sent from the controller by 15° or more. | | 1. Verify that the proper motor feedback commutation alignment has been selected. To run the commutation test and to measure the commutation offset it should be set as Controller Offset.<br>2. Download project or power-cycle drive after accepting commutation test results. |
| INHIBIT M05...SAFE TORQUE OFF | Start Inhibit – Safe Torque Off | The safety function has disabled the power structure. | | • Check safety input wiring<br>• Check state of safety devices |
| INHIBIT M07...SAFETY NOT CONFIGURED | Start Inhibit – Safety Not Configured Inhibit | Drive firmware was uploaded. | | Reapply safety configuration signature by using Apply File from the Safety Main web page. |

**Table 95 - ALARM Fault Codes**

| Four-character Display Message | Logix Designer Fault Message | Problem or Symptom | Potential Cause | Possible Resolution |
|---|---|---|---|---|
| ALARM S52...POS SW OTRAVEL (Kinetix 6200 drives only) | Software Overtravel - Positive | Axis position exceeded maximum software setting. | | • Verify motion profile.<br>• Verify overtravel settings are appropriate. |
| ALARM S53...NEG SW OTRAVEL (Kinetix 6200 drives only) | Software Overtravel - Negative | | | |
| ALARM M13...POWER CYCLE UL (Kinetix 6200 drives only) | Does not apply (1) | The converter estimates that the precharge circuit has exceeded its limit due to excessive power cycling. | The DC bus power has been cycled too frequently. | Limit power cycles to two per minute maximum. |

(1) Use the Sercos Read IDN message instruction to check the status of this fault condition.

# Control Module Status Indicators

**Table 96 - Drive Status Indicator (Sercos control modules)**

| Condition | Drive Status | Possible Resolution |
|---|---|---|
| Off | No power | Apply power. |
| Alternating green/red | Self-test (power-up diagnostics) | Wait for steady green. |
| Flashing green (1) | Standby (device not configured) | Wait for steady green. |
| Steady green | Normal operation, no faults | – |
| Flashing red | Minor fault (recoverable) | Refer to four-character fault message. |
| Steady red | Major fault (non-recoverable) | Refer to four-character fault message. |

(1) This condition is the same as Sercos ring phases 0, 1, 2, and 3.

**Table 97 - Comm Status Indicator (Sercos control modules)**

| Condition | Drive Status | Potential Cause | Possible Resolution |
|---|---|---|---|
| Off | No communication (1) | Loose fiber-optic connection. | Verify proper fiber-optic cable connections. |
| | | Broken fiber-optic cable. | Replace fiber-optic cable. |
| | | Receive fiber-optic cable connected to Sercos transmit connector and vice versa. | Check proper Sercos fiber-optic cable connections. |
| Flashing green (2) | Establish communication | System is still in the process of establishing Sercos communication. | Wait for steady green indicator. |
| | | Node address setting on the drive module does not match Sercos controller configuration. | Verify proper node switch setting. |
| Steady green | Communication ready | No faults or failures. | – |
| Steady red | No communication | Duplicate node address | Verify proper node addressing. Refer to Configure the Drive Modules on page 161. |

(1) Refer to Fiber-optic Cable Installation and Handling Instructions, publication 2090-IN010, for more information.
(2) This condition is the same as Sercos ring phases 1, 2, and 3.

**Table 98 - Bus Status Indicator**

| Condition | Bus Status | Condition |
|---|---|---|
| Off | No power or DC bus is not present. | • Normal when bus power is not applied.<br>• Fault exists, refer to Fault Codes troubleshooting on page 189. |
| | Bus power is present in follower IAM. | • Follower IAM power module is not configured as CommonBus Follow in Logix Designer application.<br>• After DC bus voltage is applied, a 2.5 second delay before the indicator begins flashing green is normal operation to provide the common-bus leader module time to complete precharge. |
| Flashing green | Bus power is present, axis disabled. No major faults. | Normal when:<br>• 24V is not applied to Hardware Enable Input.<br>• MSO instruction is not commanded in the Logix Designer application. |
| Steady green | Bus power is present, axis enabled. No major faults. | Normal when:<br>• 24V is applied to Hardware Enable Input.<br>• MSO instruction is commanded in the Logix Designer application. |

**Table 99 - Safety Lock Status Indicator**

| Condition (1) | Status |
|---|---|
| Off | No power or safety circuitry not configured. |
| Flashing amber | Safety circuitry configured, but not locked. |
| Steady amber | Safety circuitry locked. |

(1) This status indicator applies to only 2094-xx02x-M0x-S1 control modules.

**Table 100 - Port 1 and Port 2 Ethernet Communication Status Indicators**

| Condition | Status |
|---|---|
| Off | No link partner present. |
| Flashing green | Link partner present, communication occurring. |
| Steady green | Link partner present, no communication occurring. |

**Table 101 - Module and Network Status Indicators (EtherNet/IP control modules)**

| Condition | Status |
|---|---|
| Off | No power or no IP address defined. |
| Alternating green/red | Self-test mode (powerup diagnostics). |
| Flashing green | Standby (device not configured, or connection not established. |
| Steady green | Normal operation. Device has at least one established connection. |
| Flashing red | Recoverable minor fault or connection timeout. |
| Steady red | Non-recoverable major fault or duplicate IP address. |

## Shunt Module Status Indicators

Each of the shunt module status indicators provide specific troubleshooting information.

**Table 102 - General Shunt Module Troubleshooting**

| Module | Status | Under These Conditions |
|---|---|---|
| Shunt | Fault is latched. | Until fault condition is corrected and cleared. |
| | Fault is cleared. | • Using MASR, MAFR, MGSR instructions or the HIM (red stop button).<br>• Only after the DC bus is discharged (bus status indicator is flashing).<br>• Drive must be configured with 2094-BSP2 shunt module or Bulletin 1394 external shunt module. |
| IAM/AM | Disabled (for DC bus regulation). | • When the 2094-BSP2 shunt module is used on a 230V system.<br>• When either 230V or 460V system is configured with a Bulletin 1394 external shunt module.<br>• When configured in Common-bus Follower mode. |
| | Enabled to discharge the DC bus. | Drive (IAM or leader IAM module) three-phase power is removed. |
| | Disabled from discharging the DC bus. | When configured in Common-bus Follower mode. |

**IMPORTANT** Under some fault conditions, two reset commands can be required to clear drive and shunt module faults.

**Table 103 - Bus Status Indicator**

| Bus Status Indicator | Status | Potential Cause | Possible Resolution |
|---|---|---|---|
| Flashing | Normal condition when control power is applied and bus voltage is less than 60V DC. | | – |
| Steady Green | Normal condition when control power is applied and bus voltage is greater than 60V DC. | | – |
| Off | Control power is not present. | Internal power supply failure. | Replace shunt module. |

**Table 104 - Temperature Fault Status Indicator**

| Over-Temp Fault Indicator | Status | Potential Cause | Possible Resolution |
|---|---|---|---|
| Off | Normal condition. | | – |
| Steady Red | Shunt module internal temperature exceeds operating temperature specification. | Shunt module fan failed. | Replace shunt module. |
| | | Shunt module temperature exceeds rating. | • Wait for shunt module to cool.<br>• Reset faults.<br>• Verify IAM module bus regulator configuration. |
| | External over temperature condition. | External temperature switch is open. | • Wait for shunt module to cool.<br>• Reset faults.<br>• Verify IAM module bus regulator configuration. |
| | | TS jumper is not present. | Install jumper. |

**Table 105 - Shunt Fault Status Indicator**

| Shunt Fault Indicator | Status | Potential Cause | Possible Resolution |
|---|---|---|---|
| Off | Normal condition | | – |
| Steady Red | Shorted internal or external shunt resistor. | Mis-wired shunt jumper or other short on RC connector. | • Correct mis-wire (shorted) condition.<br>• If problem persists, replace shunt module. |
| | | Mis-wired (shorted) external shunt wiring. | |

**Table 106 - All Shunt Module Status Indicators**

| Shunt Module Status Indicator | Status | Potential Cause | Possible Resolution |
|---|---|---|---|
| • Bus Status<br>• Over-Temp Fault<br>• Shunt Fault | All three status indicators flash simultaneously. | Shunt module hardware failure. | • Cycle power.<br>• If problem persists, replace shunt module. |

## General System Anomalies

These anomalies do not always result in a fault code, but may require troubleshooting to improve performance.

**Table 107 - General System Anomalies**

| Condition | Potential Cause | Possible Resolution |
|---|---|---|
| **Axis or system is unstable.** | The position feedback device is incorrect or open. | Check wiring. |
| | Unintentionally in Torque mode. | Check to see what primary operation mode was programmed. |
| | Motor tuning limits are set too high. | Run Tune in the Logix Designer application. |
| | Position loop gain or position controller accel/decel rate is improperly set. | Run Tune in the Logix Designer application. |
| | Improper grounding or shielding techniques are causing noise to be transmitted into the position feedback or velocity command lines, causing erratic axis movement. | Check wiring and ground. |
| | Motor Select limit is incorrectly set (servo motor is not matched to axis module). | • Check setups.<br>• Run Tune in the Logix Designer application. |
| | Mechanical resonance. | Notch filter or output filter may be required (refer to Axis Properties dialog box, Output tab in the Logix Designer application). |

**Table 107 - General System Anomalies (continued)**

| Condition | Potential Cause | Possible Resolution |
|---|---|---|
| **You cannot obtain the motor acceleration/deceleration that you want.** | Torque Limit limits are set too low. | Verify that current limits are set properly. |
| | Incorrect motor selected in configuration. | Select the correct motor and run Tune in the Logix Designer application again. |
| | The system inertia is excessive. | • Check motor size versus application need.<br>• Review servo system sizing. |
| | The system friction torque is excessive. | Check motor size versus application need. |
| | Available current is insufficient to supply the correct accel/decel rate. | • Check motor size versus application need.<br>• Review servo system sizing. |
| | Acceleration limit is incorrect. | Verify limit settings and correct them, as necessary. |
| | Velocity Limit limits are incorrect. | Verify limit settings and correct them, as necessary. |
| **Motor does not respond to a velocity command.** | The axis cannot be enabled for 1.5 seconds after disabling. | Disable the axis, wait for 1.5 seconds, and enable the axis. |
| | Enable signal has not been applied or the enable wiring is incorrect. | • Check the controller.<br>• Check the wiring. |
| | The motor wiring is open. | Check the wiring. |
| | The motor thermal switch has tripped. | • Check for a fault.<br>• Check the wiring. |
| | The motor has malfunctioned. | Repair or replace the motor. |
| | The coupling between motor and machine has broken (for example, the motor moves, but the load/machine does not). | Check and correct the mechanics. |
| | Primary operation mode is set incorrectly. | Check and properly set the limit. |
| | Velocity or current limits are set incorrectly. | Check and properly set the limits. |
| **Presence of noise on command or motor feedback signal wires.** | Recommended grounding per installation instructions have not been followed. | • Verify grounding.<br>• Route wire away from noise sources.<br>• Refer to System Design for Control of Electrical Noise, publication GMC-RM001. |
| | Line frequency may be present. | • Verify grounding.<br>• Route wire away from noise sources. |
| | Variable frequency may be velocity feedback ripple or a disturbance caused by gear teeth or ballscrew balls, and so forth. The frequency may be a multiple of the motor power transmission components or ballscrew speeds resulting in velocity disturbance. | • Decouple the motor for verification.<br>• Check and improve mechanical performance, for example, the gearbox or ballscrew mechanism. |
| **No rotation** | The motor connections are loose or open. | Check motor wiring and connections. |
| | Foreign matter is lodged in the motor. | Remove foreign matter. |
| | The motor load is excessive. | Verify the servo system sizing. |
| | The bearings are worn. | Return the motor for repair. |
| | The motor brake is engaged (if supplied). | • Check brake wiring and function.<br>• Return the motor for repair. |
| | The motor is not connect to the load. | Check coupling. |
| **Motor overheating** | The duty cycle is excessive. | Change the command profile to reduce accel/decel or increase time. |
| | The rotor is partially demagnetized causing excessive motor current. | Return the motor for repair. |
| **Abnormal noise** | Motor tuning limits are set too high. | Run Tune in the Logix Designer application. |
| | Loose parts are present in the motor. | • Remove the loose parts.<br>• Return motor for repair.<br>• Replace motor. |
| | Through bolts or coupling is loose. | Tighten bolts. |
| | The bearings are worn. | Return motor for repair. |
| | Mechanical resonance. | Notch filter may be required (refer to Axis Properties dialog box, Output tab in Logix Designer application). |
| **Erratic operation - Motor locks into position, runs without control or with reduced torque.** | Motor power phases U and V, U and W, or V and W reversed. | Check and correct motor power wiring. |
| | Sine, Cosine or Rotor leads are reversed in the feedback cable connector. | Check and correct motor feedback wiring. |