5 Faults and Alarms

5.1 Fault messages

In the event of a failure, the inverter switches off and a fault code appears on the display.

**NOTE**
To reset the fault code, one of three methods listed below can be used:
1. Cycle the power to the drive.
2. Press the button on the BOP or AOP.
3. Via Digital Input 3 (default setting)

Fault messages are stored in parameter r0947 under their code number (e.g. F0003 = 3). The associated error value is found in parameter r0949. The value 0 is entered if a fault has no error value. It is furthermore possible to read out the point in time that a fault occurred (r0948) and the number of fault messages (P0952) stored in Parameter r0947.

**F0001 OverCurrent STOP II**

**Quit**
- Remove fault and reset fault memory by disconnecting the drive converter from the line supply and powering-up again
- Press the Fn key on the BOP or AOP
- Acknowledge fault P2103, P2104
- P0952 (complete fault memory)

**Cause**
- Short circuit at the output
- Earth faults
- Excessively large motor
- Defective end stage

**Diagnosis & Remedy**
- Check the following:
  - Cable length limits must not be exceeded.
  - Motor cable and motor must have no short-circuits or earth faults
  - Motor parameters must match the motor in use
  - Value of stator resistance (P0350) must be correct
  - Motor must not be obstructed or overloaded
  - Increase the ramp time
  - Reduce the boost level
  - Connect a smaller motor (lower rating)

**F0002 OverVoltage STOP II**

**Quit**
- Refer to F0001

**Cause**
- DC-link voltage (r0026) exceeds the overvoltage threshold (refer to parameter r0026)
- Ground fault

**NOTE**
Overvoltage can be caused either by too high main supply voltage or if motor is in regenerative mode. Regenerative mode can be cause by fast ramp downs or if the motor is driven from an active load.
Faults and Alarms Issue 03/05

MICROMASTER 440 Parameter List

304

6SE6400-5BB00-0BP0

Diagnosis & Remedy
Check the following:
- Supply voltage (P0210) must lie within limits indicated on rating plate.
- DC-link voltage controller must be enabled (P1240) and parameterized properly.
- Extend the deceleration ramps (ramp-down time P1121, P1135)
- Remove the ground fault
- Required braking power must lie within specified limits.
- Check the feeder cable to the braking resistor
- Check the technical data of the braking resistor
- Check the load duty cycle of the braking resistor with reference to the application

NOTE
Higher inertia requires longer ramp times; otherwise, apply braking resistor.

F0003 UnderVoltage STOP II
Quit
Refer to F0001
Cause
- Main supply failed.
- Shock load outside specified limits.

F0004 Inverter Over Temperature STOP II
Quit
Refer to F0001
Cause
- Ventilation inadequate
- Ambient temperature is too high.
- Actual drive converter temperature r0037 exceeds the overtemperature threshold (refer to P0292)

Diagnosis & Remedy
Check the following:
- Fan must turn when inverter is running
- Pulse frequency must be set to default value
- Ambient temperature could be higher than specified for the inverter
- Reduce the load and / or ensure adequate cooling

Additional meaning for frame sizes FX and GX:
- P949 = 1: Rectifier overtemperature
- P949 = 2: Ambient overtemperature
- P949 = 3: EBOX overtemperature

F0005 Inverter I2T STOP II
Quit
Refer to F0001
Cause
- Inverter overloaded.
- Duty cycle too demanding.
- Motor power (P0307) exceeds inverter power capability (r0206).
- 100 % overload reached (refer to utilization r0036)

Diagnosis & Remedy
Check the following:
- Load duty cycle must lie within specified limits.
- Motor power (P0307) must match inverter power (r0206)

F0011 Motor Over Temperature STOP II
Quit
Refer to F0001
Cause
Motor overloaded

Diagnosis & Remedy
Check the following:
- Load duty cycle must be correct
- Motor nominal overtemperatures (P0626-P0628) must be correct
- Motor temperature warning level (P0604) must match
- Voltage boost (increase) too high and / or frequency setpoint too low?
- Adapt the motor cooling to the application
F0012  Inverter temp. signal lost  STOP I

Quit
Refer to F0001

Cause
Wire breakage of inverter temperature (heatsink) sensor

F0015  Motor temperature signal lost  STOP II

Quit
Refer to F0001

Cause
Open or short circuit of motor temperature sensor. If signal loss is detected, temperature monitoring switches over to monitoring with the motor thermal model.

F0020  Mains Phase Missing  STOP II

Quit
Refer to F0001

Cause
Fault occurs if one of the three input phases are missed and the pulses are enabled and drive is loaded

Diagnosis & Remedy
check the input wiring of the mains phases

F0021  Earth fault  STOP II

Quit
Refer to F0001

Cause
Fault occurs if the sum of the phase currents is higher than 5 % of the nominal inverter current.

NOTE
This fault only occurs on inverters that have 3 current sensors. Framesizes D to F

F0022  HW monitoring active  STOP II

Quit
Refer to F0001

Cause
That hardware fault (P0947 = 22 and P0949 = 1) caused by the following events:
(1) DC-link overcurrent = short circuit of IGBT
(2) Short circuit of chopper
(3) Earth fault
(4) I/O board is not properly inserted.
- Framesizes A to C (1),(2),(3),(4)
- Framesizes D to E (1),(2),(4)
- Framesize F (2),(4)

Since all these faults are assigned to one signal on the power stack, it is not possible to establish which one actually occurred.
The following faults (UCE and I2C) occur for frame size FX / GX only:
- UCE failure was detected, when P0947 = 22 and fault value P0949 = 12 or 13 or 14, depending on UCE.
- I2C bus read out error, when P0947 = 22 and fault value P0949 = 21 (the power has to be switched off/on).

Diagnosis & Remedy
First you must see if the fault is permanent (i.e. the inverter cannot be started without the fault occurring) or sporadic (occurs occasionally or in certain defined operating conditions).
Permanent F0022 fault:
- Check the I/O board. It has to be fully pressed home.
- Is there an earth fault or short circuit on the output of the inverter or in an IGBT? Disconnecting the motor cables will establish which of these.
  In the case where the fault occurs permanently when all external wiring (apart from mains) is disconnected, then the unit almost certainly has a defect and should be repaired.
Sporadic F0022 fault:
This should be treated as "overcurrent". The following may cause the sporadic occurrence of F0022:
- Sudden load changes or mechanical blockages.
- Very short ramp times.
- If the Sensorless Vector Control is badly optimized.
- If an incorrect braking resistor of too low a resistance is fitted.
F0023  Output fault  STOP II
Quit
Refer to F0001
Cause
One phase of output is disconnected

F0024  Rectifier Over Temperature  STOP II
Quit
Refer to F0001
Cause
- Ventilation inadequate
- Fan inoperative
- Ambient temperature is too high.
Diagnosis & Remedy
Check the following:
- Fan must turn when inverter is running
- Pulse frequency must be set to default value
- Ambient temperature could be higher than specified for the inverter

F0030  Fan has failed  STOP II
Quit
Refer to F0001
Cause
Fan no longer working
Diagnosis & Remedy
- Fault cannot be masked while options module (AOP or BOP) is connected.
- Need a new fan.

F0035  Auto restart after n  STOP II
Quit
reset fault memory or Power On / Stop
Cause
Auto restart attempts exceed value of P1211.

F0040  Automatic Calibration Failure  STOP II
Quit
Refer to F0001
Cause
A calibration error occurred when automatically calibrating the analog inputs / outputs or the current actual value sensing. In the factory, the calibration is only carried-out once. This means that fault F0040 is only to be expected during the production process of the drive converter and not while the converter is being used.
Diagnostics and removing faults
Replace the drive

F0041  Motor Data Identification Failure  STOP II
Quit
Refer to F0001
Cause
Motor data identification failed.
Alarm value = 0: Load missing
Alarm value = 1: Current limit level reached during identification.
Alarm value = 2: Identified stator resistance less than 0.1% or greater than 100%.
Alarm value = 3: Identified rotor resistance less than 0.1% or greater than 100%.
Alarm value = 4: Identified stator reactance less than 50% and greater than 500%
Alarm value = 5: Identified main reactance less than 50% and greater than 500%
Alarm value = 6: Identified rotor time constant less than 10ms or greater than 5s
Alarm value = 7: Identified total leakage reactance less than 5% and greater than 50%
Alarm value = 8: Identified stator leakage reactance less than 25% and greater than 250%
Alarm value = 9: Identified rotor leakage inductance less than 25% and greater than 250%
Alarm value = 20: Identified IGBT on-voltage less than 0.5 or greater than 10V
Alarm value = 30: Current controller at voltage limit
Alarm value = 40: Inconsistence of identified data set, at least one identification failed
Percentage values based on the impedance $Z_b = \frac{V_{mot,nom}}{\sqrt{3}} / \frac{I_{mot,nom}}{\sqrt{2}}$
Diagnosis & Remedy
Check the following:
- 0: Check that the motor is connected to the inverter.
- 1-40: Check if motor data in P0304 P0311 are correct.
- Check what type of motor wiring is required (star, delta).

F0042 Speed Control Optimisation Failure
Quit
Refer to F0001
Cause
- Motor data identification failed.
- Alarm value = 0: Time out waiting for stable speed
- Alarm value = 1: Inconsistent readings

F0051 Parameter EEPROM Fault
Quit
Refer to F0001
Cause
- Read or write failure while saving non-volatile parameter.
Diagnosis & Remedy
- Factory Reset and new parameterization
- Change drive

F0052 power stack Fault
Quit
Refer to F0001
Cause
- Read failure for power stack information or invalid data.

F0053 IO Eeprom Fault
Quit
Refer to F0001
Cause
- Read failure for IO EEPROM information or invalid data.
Diagnosis & Remedy
- Check data
- Change IO module

F0054 Wrong IO Board
Quit
Refer to F0001
Cause
- Wrong IO board is connected.
- No ID detected on IO board, No data.
Diagnosis & Remedy
- Check data
- Change IO module

F0060 Asic Timeout
Quit
Refer to F0001
Cause
- Internal communications failure
Diagnosis & Remedy
- If fault persists, change inverter
- Contact Service Department
F0070  CB setpoint fault
Quit
Refer to F0001
Cause
No setpoint values from CB (communication board) during telegram off time
Diagnosis & Remedy
Check CB and communication partner

F0071  USS (BOP-link) setpoint fault
Quit
Refer to F0001
Cause
No setpoint values from USS during telegram off time
Diagnosis & Remedy
Check USS master

F0072  USS (COMM link) setpoint fault
Quit
Refer to F0001
Cause
No setpoint values from USS during telegram off time
Diagnosis & Remedy
Check USS master

F0080  ADC lost input signal
Quit
Refer to F0001
Cause
- Broken wire
- Signal out of limits

F0085  External Fault
Quit
Refer to F0001
Cause
External fault triggered via terminal inputs
Diagnosis & Remedy
Disable terminal input for fault trigger.

F0090  Encoder feedback loss
Quit
Refer to F0001
Cause
Signal from Encoder lost (check alarm value r0949):
Diagnosis & Remedy
- Alarm value = 0: Encoder signal lost.
- Alarm value = 5: Encoder not configured in P0400, but required for sensored control (P1300 = 21 or 23).
- Alarm value = 6: Encoder module not found, but configured in P0400.
- Check connections between encoder and inverter. Check that encoder not faulty (select P1300 = 0, run at fixed speed, check encoder feedback signal in r0061)
- Increase encoder loss threshold in P0492

F0101  Stack Overflow
Quit
Refer to F0001
Cause
Software error or processor failure
Diagnosis & Remedy
Run self test routines
**F0221  PID Feedback below min. value**    STOP II

**Quit**
- Refer to F0001

**Cause**
- PID Feedback below min. value P2268.

**Diagnosis & Remedy**
- Change value of P2268.
- Adjust feedback gain.

**F0222  PID Feedback above max. value**    STOP II

**Quit**
- Refer to F0001

**Cause**
- PID feedback above max. value P2267.

**Diagnosis & Remedy**
- Change value of P2267.
- Adjust feedback gain.

**F0450  BIST Tests Failure**    STOP II

**Quit**
- Refer to F0001

**Cause**
- Fault value:
  1. Some power section tests have failed
  2. Some control board tests have failed
  4. Some functional tests have failed
  8. Some IO module tests have failed (MM 420 only)
  16. Internal RAM failed on power-up check

**Diagnosis & Remedy**
- Drive may run but some features will not work properly. Replace drive.

**F0452  Belt Failure Detected**    STOP II

**Quit**
- Refer to F0001

**Cause**
- Load conditions on motor indicate belt failure or mechanical fault.

**Diagnosis & Remedy**
- Check the following:
  1. No breakage, seizure or obstruction of drive train.
  2. If using an external speed sensor, check for correct function. Check parameters:
     - P2192 (delay time for permitted deviation)
  3. If using the torque envelope, check parameters:
     - P2182 (threshold frequency f1)
     - P2183 (threshold frequency f2)
     - P2184 (threshold frequency f3)
     - P2185 (upper torque threshold 1)
     - P2186 (lower torque threshold 1)
     - P2187 (upper torque threshold 2)
     - P2188 (lower torque threshold 2)
     - P2189 (upper torque threshold 3)
     - P2190 (lower torque threshold 3)
     - P2192 (delay time for permitted deviation)
  4. Apply lubrication if required.
5.2 Alarm Messages

Alarm messages are stored in parameter r2110 under their code number (e.g. A0503 = 503) and can be read out from there.

A0501 Current Limit

Cause
- Motor power does not correspond to the inverter power
- Motor leads are too long
- Earth faults

Diagnosis & Remedy
Check the following:
- Motor power (P0307) must correspond to inverter power (r0206).
- Cable length limits must not be exceeded.
- Motor cable and motor must have no short-circuits or earth faults
- Motor parameters must match the motor in use
- Value of stator resistance (P0350) must be correct
- Motor must not be obstructed or overloaded
- Increase the ramp-up-time.
- Reduce the boost.

A0502 Overvoltage limit

Cause
Overvoltage limit is reached.
This warning is generated,
- if the dc-link controller is disabled (P1240 = 0).
- if pulses are enabled
- if actual dc voltage r0026 > r1242.

Diagnosis & Remedy
If this warning is displayed permanently, check drive input voltage.

A0503 UnderVoltage Limit

Cause
- Main supply failed
- Main supply (P0210) and consequently DC-link voltage (r0026) below specified limit (refer to parameter r0026).

Overvoltage can be caused either by too high main supply voltage or if motor is in regenerative mode.

Diagnosis & Remedy
Check main supply voltage (P0210).

A0504 Inverter OverTemperature

Cause
Warning level of inverter heat-sink temperature (P0614) is exceeded, resulting in pulse frequency reduction and/or output frequency reduction (depending on parameterization in (P0610)

Diagnosis & Remedy
Check the following:
- Ambient temperature must lie within specified limits
- Load conditions and duty cycle must be appropriate

A0505 Inverter I2T

Cause
- Overload alarm limit P0294 is exceeded (refer to utilization r0036)
- Pulse frequency and output frequency are reduced as a function of the parameter setting P0290.

Diagnosis & Remedy
Check that duty cycle lies within specified limits

A0506 Inverter duty cycle

Cause
Difference between heatsink and IGBT junction temperature exceeds warning limits

Diagnosis & Remedy
Check that duty cycle and shock loads lie within specified limits
A0511  Motor Over Temperature

**Cause**
- Motor overloaded.
- Load duty cycle too high.

**Diagnosis & Remedy**
Indepedently of the kind of temperature determination check:
- P0604 motor temperature warning threshold
- P0625 motor ambient temperature
- If (P0601 = 0 or 1) Check the following:
  1. Check if name plate data are correct (if not perform quick commissioning)
  2. Accurate equivalent circuit data can be found by performing motor identification (P1910=1).
  3. Check if motor weight (P0344) is reasonable. Change if necessary.
  4. Via P0626, P0627, P0628 the standard overtemperatures can be changed, if the motor is not a Siemens standard motor.
- If (P601 = 2) Check the following:
  1. Check if temperature shown in r0035 is reasonable.
  2. Check if the sensor is a KTY84 (other sensors are not supported)

A0520  Rectifier OverTemperature

**Cause**
Warning level of rectifier heat-sink temperature (P) is exceeded

**Diagnosis & Remedy**
Check the following:
- Ambient temperature must lie within specified limits
- Load conditions and duty cycle must be appropriate
- Fan must turn when drive is running

A0521  Ambient OverTemperature

**Cause**
Warning level of ambient temperature (P) is exceeded

**Diagnosis & Remedy**
Check the following:
- Ambient temperature must lie within specified limits
- Fan must turn when drive is running
- Fan intake air has to be without any resistance

A0522  I2C read out timeout

**Cause**
the cyclic access to the UCE Values and powerstack temperatures via the i2c bus (only for frame sizes FX and GX) is disturbed

A0523  Output fault

**Cause**
One phase of output is disconnected

**Diagnosis & Remedy**
Warning can be masked.

A0535  Braking Resistor Hot

A0541  Motor Data Identification Active

**Cause**
Motor data identification (P1910) selected or running

A0542  Speed Control Optimization Active

**Cause**
Speed Control Optimization (P1960) is selected or running
A0590 Encoder feedback loss warning

Cause
Signal from Encoder lost; Inverter might have switched to sensorless vector control (check also alarm value r0949):

Diagnosis & Remedy
- Stop inverter and then
  - Check encoder fitted. If encoder fitted and r0949 = 5, select encoder type via P0400.
  - If encoder fitted and r0949 = 6, check connections between encoder module and inverter.
  - If encoder not fitted and r0949 = 5, select SLVC mode (P1300 = 20 or 22).
  - If encoder not fitted and r0949 = 6, set P0400 = 0.
  - Check connections between encoder and inverter
  - Check that encoder not faulty (select P1300 = 0, run at fixed speed, check encoder feedback signal in r0061)
  - Increase encoder loss threshold in P0492

A0600 RTOS Overrun Warning

A0700 CB warning 1 see CB manual for details.

A0701 CB warning 2 see CB manual for details.

A0702 CB warning 3 see CB manual for details.

A0703 CB warning 4 see CB manual for details.

A0704 CB warning 5 see CB manual for details.

A0705 CB warning 6 see CB manual for details.

A0706 CB warning 7 see CB manual for details.

A0707 CB warning 8 see CB manual for details.

A0708 CB warning 9 see CB manual for details.

A0709 CB warning 10 see CB manual for details.

A0710 CB communication error

Cause
Communication with CB (communication board) is lost

Diagnosis & Remedy
Check CB hardware

A0711 CB configuration error

Cause
CB (communication board) reports a configuration error.

Diagnosis & Remedy
Check CB parameters
A0910  Vdc-max controller de-activated

Cause
- Vdc max controller has been de-activated, since controller is not capable of keeping DC-link voltage (r0026) within limits (refer to r0026 and P1240).
- Occurs if main supply voltage (P0210) is permanently too high.
- Occurs if motor is driven by an active load, causing motor to go into regenerative mode.
- Occurs at very high load inertias, when ramping down.

Diagnosis & Remedy
Check the following:
- Input voltage (P0210) must lie within range.
- Load must be match.

A0911  Vdc-max controller active

Cause
Vdc max controller is active; so ramp-down times will be increased automatically to keep DC-link voltage (r0026) within limits (refer to r0026 and P1240).

A0912  Vdc-min controller active

Cause
- Vdc min controller will be activated if DC-link voltage (r0026) falls below minimum level (refer to r0026 and P1240).
- The kinetic energy of the motor is used to buffer the DC-link voltage, thus causing deceleration of the drive!
- So short mains failures do not necessarily lead to an undervoltage trip.

A0920  ADC parameters not set properly.

Cause
ADC parameters should not be set to identical values, since this would produce illogical results.
- Index 0: Parameter settings for output identical
- Index 1: Parameter settings for input identical
- Index 2: Parameter settings for input do not correspond to ADC type

A0921  DAC parameters not set properly.

Cause
DAC parameters should not be set to identical values, since this would produce illogical results.
- Index 0: Parameter settings for output identical
- Index 1: Parameter settings for input identical
- Index 2: Parameter settings for output do not correspond to DAC type

A0922  No load applied to inverter

Cause
No Load is applied to the inverter. As a result, some functions may not work as under normal load conditions.

A0923  Both JOG Left and JOG Right are requested

Cause
Both JOG right and JOG left (P1055/P1056) have been requested. This freezes the RFG output frequency at its current value.

Diagnosis & Remedy
Do not press JOG right and left simultaneously.
A0952  Belt Failure Detected

Cause
Load conditions on motor indicate belt failure or mechanical fault.

Diagnosis & Remedy
Check the following:
1. No breakage, seizure or obstruction of drive train.
2. If using an external speed sensor, check for correct function. Check parameters:
   - P0409 (pulse per min at rated speed).
   - P2191 (Belt failure speed tolerance).
   - P2192 (delay time for permitted deviation)
3. If using the torque envelope, check parameters:
   - P2182 (threshold frequency f1)
   - P2183 (threshold frequency f2)
   - P2184 (threshold frequency f3)
   - P2185 (upper torque threshold 1)
   - P2186 (lower torque threshold 1)
   - P2187 (upper torque threshold 2)
   - P2188 (lower torque threshold 2)
   - P2189 (upper torque threshold 3)
   - P2190 (lower torque threshold 3)
   - P2192 (delay time for permitted deviation)
4. Apply lubrication if required.

A0936  PID Autotuning Active

Cause
PID Autotuning (P2350) selected or running