

The following list shows possible Error-States of the BMR SFU frequency converters and possible solutions.

In case of doubts a change should be verified with the spindle manufacturer or BMR always.

The Error-States can be looked up with the Debug-Tool of SFU-Terminal software or can be read out with the command string 0x0C 0x5A 0x08.

As answer the Error-Word is sent in the format 0xCC- LowByte - HiByte.

Bit 0 **Error Overload** (after delay time has expired)

Reason:

- The spindle was operated too long within the permitted overload (Current Overload) range.
- The maximum peak current was exceeded (Switch Off Current).

Rectification:

- Check the set values for overload condition →ask BMR or spindle supplier
 - Check the sharpness of the tool
 - Check the strategy for milling and tooling
→ reducing the feeding speed
 - Check the power supply for the spindle: Is it sufficient in power and voltage and is it matching to the spindle?
 - Should the admissible delay time be extended? → on own risk, only!
→ In Menu **SFU-Terminal > Delay Times** change the value for **Delay time overload**
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Bit 1 **Overtemperature Converter** (after delay time has expired)

Reason:

The converter was operated too long beyond the permitted temperature.

Rectification:

- Check the ambient temperature (must not exceed +40°C)
- Check if heatsink of the converter has enough venting air
- Check, if the fan is spinning or if blocked or if the air inlet is blocked
- Adjust the power requirements – reducing the output power
- Should the admissible delay time be extended? → on own risk, only!→ In Menu **SFU-Terminal > Delay Times** change the value for **Delay time overtemperature converter**

Bit 2 **Overtemperature Spindle** (after delay time has expired)

Reason:

The spindle was operated too long beyond the permitted temperature.
The built-in temperature sensor within the spindle indicates an excess temperatur

Rectification:

- Check the spindle temperature
- Check the spindle is there a resistance while spinning the spindle by hand?
- Check the spindle cable: check for an interruption of one of the temperature sensor line.
- Check the switching point of the temperature sensor (if variable setup possible)
→ In Menu **SFU-Terminal > current spindle characteristic > Basic parameter: KTY Switch Value**
- Should the admissible delay time be extended? → on own risk, only!
→ In Menu **SFU-Terminal > Delay Times** change the value for **Delay time overtemperature spindle**

Bit 3 **Overtemperature Spindle or Converter** (after delay time has expired)→Combi Error of Bit1 and Bit2

Reason:

The converter was operated too long beyond the permitted temperature.
or the spindle is overheated

Rectification:

- Check the spindle temperature
- Check the spindle is there a resistance while spinning the spindle by hand?
- Check the spindle cable: check for an interruption of one of the temperature sensor line.
- Check the switching point of the temperature sensor (if variable setup possible)
→ In Menu **SFU-Terminal > current spindle characteristic > Basic parameter: KTY Switch Value**
- Should the admissible delay time be extended? → on own risk, only!
→ In Menu **SFU-Terminal > Delay Times** change the value for **Delay time excess overtemperature spindle**
- Check the ambient temperature (must not exceed +40°C)
- Check if heatsink of the converter has enough venting air
- Check, if the fan is spinning or if blocked or if the air inlet is blocked
- Adjust the power requirements – reducing the output power
- Should the admissible delay time be extended? → on own risk, only!
→ In Menu **SFU-Terminal > Delay Times** change the value for **Delay time overtemperature converter**

Bit 4 **Overvoltage OFF**

Reason:

The supply voltage or the AC mains network voltage is too high.

Rectification:

- Check the mains network voltage
 - At open frame drives check the power supply and the supply voltage for the spindle
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Bit 5 Undervoltage OFF

Reason:

The supply voltage or the AC mains network voltage is too low.

Rectification:

- Check the mains network voltage
 - At open frame drives check the power supply and the supply voltage for the spindle
 - Power OFF – Power ON
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Bit 6 Undervoltage STOP

Reason:

The supply voltage or the AC mains network voltage is too low.

Rectification:

- Check the mains network voltage
- At open frame drives check the power supply and the supply voltage for the spindle
- Power OFF – Power ON

Bit 7 **Hardware current trip / Powerstage switch off (PDPINT)**

Reason:

The converter has switched off due to a short circuit detection by hardware. Possibly this could be a Ground Shortage of one of the spindle lines

Rectification:

- Check the spindle cable: Disconnect spindle cable at converter and spindle: While measuring the resistance between the phases, there must not be any shortage In case the cable is fixed at the spindle the resistance should be low (some Ohms) but never zero. Move and bend the cable during both measurements.
- Check the spindle: Disconnect spindle cable at converter, only. While measuring the resistance between the phases, the resistance should be low (some Ohms) but never zero. Move and bend the cable during both measurements.
- Check on Ground Shortage: There must not be a measurable connection from any phase to PE-Ground or shielding

Bit 8 **Emergency-stop active**

Reason:

- The input for Emergency Stop is activated, but not unlocked.
- Only with SFU0303: The power stage of the converter is disabled by the pulse blocking circuit.

Rectification:

- For unlocking with configuration *active high* it has to be applied a Lo-signal, and with configuration *active low* vice versa.
- Only with SFU0303: The power stage can be unlocked with a Hi-Signal at Input X2.2. (to be realized with a bridge X2.2 – X2.10)

Bit 9 **No spindle connected / cable error**

Reason:

The spindle test is activated and during this, between one or more spindle phases lines was detected a too high resistance

Rectification:

- Check if the proper spindle characteristic is selected
- Check the spindle cable with spindle: Disconnect plug at converter and make a resistance measurement between the phases. As result the resistance should be rather low (some Ohms), in case there is a high value, the cable or the spindle is defective. Check also the plug itself.
- Check the spindle cable: Disconnect plug at converter and spindle and make a resistance measurement between the phases: Every phase should show zero ohms. If true, the cable is ok and the spindle is defective. Move and bend the cable during the measurements.

Bit 10 **Time-Out RS232 / serial Interface (not at all SFU)**

Reason:

Interruption of communication after starting with serial command. An operation with serial commands requires a periodical communication. After 4sec without communication the converter stops the spindle automatically, for safety reasons.

Rectification:

- Check interface cable
 - faster periodically request of the STATUS word, for triggering regularly
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Bit 11 **Invalid spindle characteristic**

Reason:

It was selected an empty or invalid spindle characteristic

Rectification:

- Select or load the appropriate characteristic for this spindle
→ In Menu **SFU-Terminal > current diagram**
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Bit 12 Error Back Energy / DC Motor Stall

Reason at an AC-spindle:

- The energy which was generated within the spindle during deceleration could not be dissipated sufficiently by the brake chopper. So the spindle voltage raised to too high values and converter was forced to switch off the power stage to protect itself.
- The parameter setup in the spindle characteristic is not appropriate for the used tool, by this the inertia at deceleration is too high.
- the spindle characteristic is wrong or wrongly setup.

Rectification:

- Check the proper spindle characteristic is selected
- Check if the proper tool is used
- Increasing the ramp time at deceleration (make it slower)
 - ➔ Contact BMR or the spindle supplier

Reason at an BLDC-spindle:

- The rotor could not follow, the electrical field within the stator, which occurs mostly at startup. This is called *STALL*
- The settings in the spindle characteristic are not matching to the spindle data or to the application. The weight of the tool is too high and by this, the inertia at acceleration is too high.
- The rotor is mechanically blocked or has a too high mechanical resistance at spinning
- Check the strategy of milling and tooling process:
 - ➔ Reduction of the feeding speed

Rectification:

- Check the spindle is there a resistance while spinning the spindle by hand?
 - Check if the proper tool is used
 - Check the spindle parameters
 - ➔ Contact BMR or the spindle supplier
 - Increasing the ramp time at acceleration (make it slower)
 - ➔ Contact BMR or the spindle supplier
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Bit 13 reserved / Memory Error (not at all SFU)

Reason:

It was detected an error at the internal EE2Prom memory of the converter

Rectification:

- not possible
 - Contact BMR or the spindle supplier
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Bit 14 reserved / spindle not at standstill (not at all SFU)

Reason:

At operation with speed sensor it was detected at power on or after spindle Stop no standstill after a certain time
→ possibly the spindle is driven by external force, e.g. strong coolant spray

Rectification:

- Deactivating or reducing coolant spray at standstill
 - Check speed sensor signal, if there are disturbances superimposed, which are interpreted as spinning spindle
 - Check the spindle cable
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Bit 15 Encoder Error

Reason:

At operation with speed sensor it were detected missing sensor pulses

Rectification:

- Check the spindle cable
 - Change to operation without speed sensor signal.
→ In Menu **SFU-Terminal > current diagram**
 - Possibly a different spindle characteristic is required.
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*A **spindle characteristic** is a set of values, which define the electrical requirements for driving the spindle. It is also called spindle diagram.