## Warnings and alarms

The table gives the different warnings and alarms and indicates whether the fault locks the adjustable frequency drive. After Trip locked, the mains supply must be cut and the fault must be corrected. Reconnect the mains supply and reset the adjustable frequency drive before being ready. Wherever a cross is placed under both Warning and Alarm, this can mean that a warning precedes the alarm. It can also mean that it is possible to program whether a given fault is to result in a warning or an alarm. This is possible, e.g. in parameter 404 *Brake check*. After a trip, alarm and warning will flash, but if the fault is removed, only alarm will flash. After a reset, the adjustable frequency drive will be ready to start operation again.

| No. | Description | Warning | Alarm | Trip locked |
|---|---|---|---|---|
| 1 | 10 Volts low (10 VOLT LOW) | X | | |
| 2 | Live zero fault (LIVE ZERO ERROR) | X | X | |
| 3 | No motor (NO MOTOR) | X | | |
| 4 | Phase fault (MAINS PHASE LOSS) | X | X | X |
| 5 | Voltage warning high (DC LINK VOLTAGE HIGH) | X | | |
| 6 | Voltage warning low (DC LINK VOLTAGE LOW) | X | | |
| 7 | Overvoltage (DC LINK OVERVOLT) | X | X | |
| 8 | Undervoltage (DC LINK UNDERVOLT) | X | X | |
| 9 | Inverter overladed (INVERTER TIME) | X | X | |
| 10 | Motor overloaded (MOTOR TIME) | X | X | |
| 11 | Motor thermistor (MOTOR THERMISTOR) | X | X | |
| 12 | Torque limit (TORQUE LIMIT) | X | X | |
| 13 | Overcurrent (OVERCURRENT) | X | X | X |
| 14 | Earth fault (EARTH FAULT) | | X | X |
| 15 | Switch mode fault (SWITCH MODE FAULT) | | X | X |
| 16 | Short-circuit (CURR.SHORT CIRCUIT) | | X | X |
| 17 | Standard bus timeout (STD BUS TIMEOUT) | X | X | |
| 18 | HPFB bus timeout (HPFB TIMEOUT) | X | X | |
| 19 | Fault in EEprom on power card (EE ERROR POWER CARD) | X | | |
| 20 | Fault in EEprom on conrol card (EE ERROR CTRL. CARD) | X | | |
| 21 | Auto-optimisation OK (AUTO MOTOR ADAPT OK) | | X | |
| 22 | Auto-optimisation not OK (AUTO MOT ADAPT FAIL) | | X | |
| 23 | Brake test failed (BRAKE TEST FAILED) | X | X | |
| 25 | Brake resistor short-circuited (BRAKE RESISTOR FAULT ) | X | | |
| 26 | Brake resistor power 100% (BRAKE POWER 100%) | X | X | |
| 27 | Brake transistor short-circuited (BRAKE IGBT FAULT) | X | | |
| 29 | Heat-sink temperature too high (HEAT SINK OVER TEMP.) | | X | X |
| 30 | Motor phase U missing (MISSING MOT.PHASE U) | | X | |
| 31 | Motor phase V missing (MISSING MOT.PHASE V) | | X | |
| 32 | Motor phase W missing (MISSING MOT.PHASE W) | | X | |
| 33 | Quick discharge not OK (QUICK DISCHARGE FAIL) | | X | X |
| 34 | Profibus communication fault (PROFIBUS COMM. FAULT) | X | X | |
| 35 | Out of frequency range (OUT FREQ RNG/ROT LIM) | X | | |
| 36 | Mains failure (MAINS FAILURE) | X | X | |
| 37 | Inverter fault (INVERTER FAULT) | | X | X |
| 39 | Check parameters 104 and 106 (CHECK P.104 & P.106) | X | | |
| 40 | Check parameters 103 and 105 (CHECK P.103 & P.105) | X | | |
| 41 | Motor too big (Motor too big) | X | | |
| 42 | Motor too small (Motor too small) | X | | |
| 43 | Brake fault (BRAKE FAULT) | | X | X |
| 44 | Encoder loss (ENCODER FAULT) | X | X | |

## Warnings

The display flashes between normal state and warning. A warning comes up on the first and second line of the display. See examples below. If parameter 027 is set to line 3/4, the warning will be shown in these lines if the display is in read-out state 1-3.


Alarm messages

The alarm comes up in the 2. and 3. line of the display, see example below:


**WARNING 1**
**Under 10 Volts (10 VOLT LOW):**
The 10 Volts voltage from terminal 50 on the control card is below 10 Volts.
Remove some of the load from terminal 50, as the 10 Volts supply is overloaded. Max. 17 mA/min. 590 Ω.

**WARNING/ALARM 2**
**Live zero fault (LIVE ZERO ERROR):**
The current signal on terminal 60 is less than 50% of the value set in parameter 315 *Terminal 60,min. scaling.*

**WARNING/ALARM 3**
**No motor (NO MOTOR):**
The motor check function (see parameter 122) indicates that no motor has been connected to the output of the frequency converter.

**WARNING/ALARM 4**
**Phase fault (MAINS PHASE LOSS):**
A phase is missing on the supply side or the mains voltage imbalance is too high.
This message can also appear if there is a fault in the input rectifier on the frequency converter.
Check the supply voltage and supply currents to the frequency converter.

**WARNING 5**
**Voltage warning high**
**(DC LINK VOLTAGE HIGH):**
The intermediate circuit voltage (DC) is higher than the overvoltage limit of the control SYSTEM. The frequency converter is still active.

**WARNING 6**
**Voltage warning low (DC LINK VOLTAGE LOW):**
The intermediate circuit voltage (DC) is below the undervoltage limit of the control SYSTEM. The frequency converter is still active.

**WARNING/ALARM 7**
**Overvoltage (DC LINK OVERVOLT):**
If the intermediate circuit voltage (DC) exceeds the inverter overvoltage limit (see table), the frequency converter will trip after the time set in parameter 410 has passed.
Furthermore, the voltage will be stated in the display. The fault can be eliminated by connecting a brake resistor (if the frequency converter has an integral brake chopper, EB or SB) or by extending the time chosen in parameter 410. In addition, *Brake function/overvoltage control* can be activated in parameter 400.

| Alarm/warning limits: | | | | |
|---|---|---|---|---|
| VLT 5000 Series | 3 x 200 - 240 V [VDC] | 3 x 380 - 500 V [VDC] | 3 x 525 - 600 V [VDC] | 3 X 525 - 690 v [VDC] |
| Undervoltage | 211 | 402 | 557 | 553 |
| Voltage warning low | 222 | 423 | 585 | 585 |
| Voltage warning high (w/ o brake - w/brake) | 384/405 | 801/840[1)] | 943/965 | 1084/1109 |
| Overvoltage | 425 | 855 | 975 | 1130 |

The voltages stated are the intermediate circuit voltage of the frequency converter with a tolerance of ± 5 %. The corresponding mains voltage is the intermediate circuit voltage divided by 1.35

1) VLT 5122 - VLT 5552: 817/828 VDC.

**WARNING/ALARM 8**

**Undervoltage (DC LINK UNDERVOLT):**

If the intermediate circuit voltage (DC) drops below the inverter lower voltage limit (see table on previous page), it will be checked whether 24 V power supply is connected.

If no 24 V power supply is connected, the frequency converter will trip after a given time that depends on the unit.

Furthermore, the voltage will be stated in the display. Check whether the supply voltage matches the frequency converter, see technical data.

**WARNING/ALARM 9**

**Inverter overload (INVERTER TIME):**

The electronic, thermal inverter protection reports that the frequency converter is about to cut out because of an overload (too high current for too long). The counter for electronic, thermal inverter protection gives a warning at 98% and trips at 100%, while giving an alarm. The frequency converter cannot be reset until the counter is below 90%.

The fault is that the frequency converter is overloaded by more than 100% for too long.

**WARNING/ALARM 10**

**Motor overtemperature (MOTOR TIME):**

According to the electronic thermal protection (ETR), the motor is too hot. Parameter 128 allows a choice of whether the frequency converter is to give a warning or an alarm when the counter reaches 100%. The fault is that the motor is overloaded by more than 100% for too long. Check that motor parameters 102-106 have been set correctly.

**WARNING/ALARM 11**

**Motor thermistor (MOTOR THERMISTOR):**

The thermistor or the thermistor connection has been disconnected. Parameter 128 allows a choice of whether the frequency converter is to give a warning or an alarm. Check that the thermistor has been correctly connected between terminal 53 or 54 (analogue voltage input) and terminal 50 (+ 10 Volts supply).

**WARNING/ALARM 12**

**Torque limit (TORQUE LIMIT):**

The torque is higher than the value in parameter 221 (in motor operation) or the torque is higher than the value in parameter 222 (in regenerative operation).

**WARNING/ALARM 13**

**Overcurrent (OVERCURRENT):**

The inverter peak current limit (approx. 200% of the rated current) has been exceeded. The warning will last approx. 1-2 seconds, following which the frequency converter will trip, while giving an alarm. Turn off the frequency converter and check whether the motor shaft can be turned and whether the motor size matches the frequency converter.

If extended mechanical brake control is selected, trip can be reset externally.

**ALARM: 14**

**Earth fault (Earth fault):**

There is a discharge from the output phases to earth, either in the cable between the frequency converter and the motor or in the motor itself.

Turn off the frequency converter and remove the earth fault.

**ALARM: 15**

**Switch mode fault (SWITCH MODE FAULT):**

Fault in the switch mode power supply (internal ± 15 V supply).

Contact your Danfoss supplier.

**ALARM: 16**
**Short-circuiting (CURR.SHORT CIRCUIT):**
There is short-circuiting on the motor terminals or in the motor itself.
Turn off the frequency converter and remove the short-circuit.

**WARNING/ALARM 17**
**Standard bus timeout (STD BUS TIMEOUT)**
There is no communication to the frequency converter. The warning will only be active when parameter 514 has been set to another value than *OFF*.
If parameter 514 has been set to stop and *trip*, it will first give a warning and then ramp down until it trips, while giving an alarm.
Parameter 513 *Bus time interval* could possibly be increased.

**WARNING/ALARM 18**
**HPFB bus timeout (HPFB BUS TIMEOUT )**
There is no communication with the frequency converter.
The warning will only be active when parameter 804 has been set to another value than *OFF*.
If parameter 804 has been set to *Stop and trip*, it will first give a warning and then ramp down until it trips, while giving an alarm.
Parameter 803 *Bus time interval* could possibly be increased.

**WARNING 19**
**Fault in the EEprom on the power card**
**(EE ERROR POWER CARD)**
There is a fault on the power card EEPROM. The frequency converter will continue to function, but is likely to fail at the next power-up. Contact your Danfoss supplier.

**WARNING 20**
**Fault in the EEprom on the control card**
**(EE ERROR CTRL CARD)**
There is a fault in the EEPROM on the control card. The frequency converter will continue to function, but is likely to fail at the next power-up. Contact your Danfoss supplier.

**ALARM 21**
**Auto-optimisation OK**
**(AUTO MOTOR ADAPT OK)**
The automatic motor tuning is OK and the frequency converter is now ready for operation.

**ALARM: 22**
**Auto-optimisation not OK**
**(AUTO MOT ADAPT FAIL)**
A fault has been found during automatic motor adaptation. The text shown in the display indicates a fault message. The figure after the text is the error code, which can be seen in the fault log in parameter 615.

**CHECK P.103,105 [0]**
See section *Automatic motor adaptation, AMA*.

**LOW P.105 [1]**
See section *Automatic motor adaptation, AMA*.

**ASYMMETRICAL IMPEDANCE [2]**
See section *Automatic motor adaptation, AMA*.

**MOTOR TOO BIG [3]**
See section *Automatic motor adaptation, AMA*.

**MOTOR TOO SMALL [4]**
See section *Automatic motor adaptation, AMA*.

**TIME OUT [5]**
See section *Automatic motor adaptation, AMA*.

**INTERRUPTED BY USER [6]**
See section *Automatic motor adaptation, AMA*.

**INTERNAL FAULT [7]**
See section *Automatic motor adaptation, AMA*.

**LIMIT VALUE FAULT [8]**
See section *Automatic motor adaptation, AMA*.

**MOTOR ROTATES [9]**
See section *Automatic motor adaptation, AMA*.

**NOTE**
AMA can only be carried out if there are no alarms during tuning.

**WARNING/ALARM 23**
**Fault during brake test (BRAKE TEST FAILED):**
The brake test is only run after power-up. If *Warning* has been selected in parameter 404, the warning will come when the brake test finds a fault.
If *Trip* has been selected in parameter 404, the frequency converter will trip when the brake test finds a fault.
The brake test may fail for the following reasons:
No brake resistor connected or fault in the connections; defective brake resistor or defective brake transistor. A warning or alarm will mean that the brake function is still active.

**WARNING 25**
**Brake resistor fault**
**(BRAKE RESISTOR FAULT):**
The brake resistor is monitored during operation and if it short-circuits, the brake function is disconnected and the warning comes up. The frequency converter will still be able to work, although without the brake function. Turn off the frequency converter and replace the brake resistor.

**ALARM/WARNING 26**
**Brake resistor power 100%**
**(BRAKE PWR WARN 100%):**
The power transmitted to the brake resistor is calculated as a percentage, as a mean value over the last 120 sec., on the basis of the resistance value of the brake resistor (parameter 401) and the intermediate circuit voltage. The warning is active when the dissipated braking power is higher than 100%. If *Trip* [2] has been selected in parameter 403, the frequency converter will cut out while giving this alarm.

**WARNING 27**
**Brake transistor fault**
**(BRAKE IGBT FAULT):**
The brake transistor is monitored during operation and if it short-circuits, the brake function is disconnected and the warning comes up. The frequency converter will still be able to run, but since the brake transistor has short-circuited, substantial power will be transmitted to the brake resistor, even if it is inactive.
Turn off the frequency converter and remove the brake resistor.

Warning: There is a risk of substantial power being transmitted to the brake resis- tor if the brake transistor has short-circuited.

**ALARM: 29**
**Heat sink temperature too high**
**(HEAT SINK OVER TEMP.):**
If the enclosure is IP 00 or IP 20/NEMA 1, the cut-out temperature of the heat-sink is 90°C. If IP 54 is used, the cut-out temperature is 80°C.
The tolerance is ± 5°C. The temperature fault cannot be reset, until the temperature of the heat-sink is below 60°C.
The fault could be the following:
- Ambient temperature too high
- Too long motor cable
- Too high switching frequency.

**ALARM: 30**
**Motor phase U missing**
**(MISSING MOT.PHASE U):**
Motor phase U between frequency converter and motor is missing.
Turn off the frequency converter and check motor phase U.

**ALARM: 31**
**Motor phase V missing**
**(MISSING MOT.PHASE V):**
Motor phase V between frequency converter and motor is missing.
Turn off the frequency converter and check motor phase V.

**ALARM: 32**
**Motor phase W missing**
**(MISSING MOT.PHASE W):**
Motor phase W between frequency converter and motor is missing.
Turn off the frequency converter and check motor phase W.

**ALARM: 33**
**Quick discharge not OK**
**(QUICK DISCHARGE NOT OK):**
Check whether a 24 Volt external DC supply has been connected and that an external brake/discharge resistor has been fitted.

**WARNING/ALARM: 34**
**Fieldbus communication fault**
**(FIELDBUS COMMUNICATION FAULT):**
The fieldbus on the communication option card is not working.

**WARNING: 35**
**Out of frequency range**
**(OUT OF FREQUENCY RANGE):**
This warning is active if the output frequency has reached its *Output frequency low limit* (parameter 201) or *Output frequency high limit* (parameter 202). If the frequency converter is in *Process control, closed loop* (parameter 100), the warning will be active in the display. If the frequency converter is in another mode than *Process control, closed loop*, bit 008000 Out of *frequency range* in extended status word will be active, while there will be no warning in the display.

**WARNING/ALARM: 36**
**Mains failure (MAINS FAILURE):**
This warning/alarm is only active if the supply voltage to the frequency converter is lost and if parameter 407 *Mains fault* has been set to another value than *OFF*.
If parameter 407 has been set to *Contr. ramp-down trip* [2], the frequency converter will first give a warning and then ramp down and trip, while giving an alarm. Check the fuses to the frequency converter.

**ALARM: 37**
**Inverter fault (Inverter fault):**
IGBT or the power card is defective. Contact your Danfoss supplier.
**Auto-optimisation warnings**
Automatic motor adaptation has stopped, since some parameters have probably been set wrongly, or the motor used is too big/small for AMA to be carried out. A choice must thus be made by pressing [CHANGE DATA] and choosing `Continue' + [OK] or `Stop' + [OK].
If parameters need to be changed, select `Stop'; start up AMA all over.

**WARNING: 39**
**CHECK P.104,106**
The setting of parameter 102, 104 or 106 is probably wrong. Check the setting and choose `Continue' or `Stop'.

**WARNING: 40**
**CHECK P.103,105**
The setting of parameter 102, 103 or 105 is probably wrong. Check the setting and choose `Continue' or `Stop'.

**WARNING: 41**
**MOTOR TOO BIG**
The motor used is probably too big for AMA to be carried out. The setting in parameter 102 may not match the motor. Check the motor and choose `Continue' or `Stop'.

**WARNING: 42**
**MOTOR TOO SMALL**
The motor used is probably too small for AMA to be carried out. The setting in parameter 102 may not match the motor. Check the motor and choose `Continue' or `Stop'.

**ALARM: 43**
**Brake fault (BRAKE FAULT)**
A fault has arisen on the brake. The text shown in the display indicates a fault message. The figure after the text is the fault code that can be seen in the fault log, parameter 615.

**Brake check failed (BRAKE CHECK FAILED) [0]**
The brake check carried out during power-up indicates that the brake has been disconnected. Check whether the brake has been connected correctly and that it has not been disconnected.

**Brake resistor short-circuited**
**(BRAKE RESISTOR FAULT) [1]**
The brake output has short-circuited. Replace the brake resistor.

**Brake IGBT short-circuited**
**(BRAKE IGBT FAULT) [2]**
The brake IGBT has short-circuited. This fault means that the unit is not able to stop the brake and that, consequently, the resistor is constant being energized.

**WARNING/ALARM: 44**
**Encoder loss (ENCODER FAULT)**
The encoder signal is interrupted from terminal 32 or 33. Check the connections.

**WARNING/ALARM: 57**
**Overcurrent (OVERCURRENT)**
As warning/alarm 13, but in this case the warning/alarm occurs together with a quick stop.

**ALARM: 60**
**Safety stop (EXTERNAL FAULT)**
Terminal 27 (parameter 304 Digital Inputs) has been programmed for a safety interlock [3] and is a logic '0'.

### Warning word 1, Extended status word and Alarm word

The **warning word 1, extended status word** and the **alarm word** return the different status, warning and alarm messages of the adjustable frequency drive as hexdecimal value. If there are more than one warning or alarm, a sum of all warnings or alarms will be shown. Warning word 1, extended status word and alarm word can also be displayed using the serial bus in parameter 540, 541 and 538.

| Bit (Hex) | Warning word 1 (parameter 540) |
|---|---|
| 000001 | Fault during brake test |
| 000002 | EE-prom power card fault |
| 000004 | EE-prom control card |
| 000008 | HPFP bus timeout |
| 000010 | Standard bus timeout |
| 000020 | Overcurrent |
| 000040 | Torque limit |
| 000080 | Motor thermistor |
| 000100 | Motor overload |
| 000200 | Inverter overload |
| 000400 | Undervoltage |
| 000800 | Overvoltage |
| 001000 | Voltage warning low |
| 002000 | Voltage warning high |
| 004000 | Phase fault |
| 008000 | No motor |
| 010000 | Live zero fault (4-20 mA current signal low) |
| 020000 | 10 Volts low |
| 040000 | |
| 080000 | Brake resistor power 100% |
| 100000 | Brake resistor fault |
| 200000 | Brake transistor fault |
| 400000 | Out of frequency range |
| 800000 | Fieldbus communication fault |
| 1000000 | |
| 2000000 | Mains failure |
| 4000000 | Motor too small |
| 8000000 | Motor too big |
| 10000000 | Check P. 103 and P. 105 |
| 20000000 | Check P. 104 and P. 106 |
| 40000000 | Encoder loss |

| Bit (Hex) | Extended status word (parameter 541) |
|---|---|
| 000001 | Ramping |
| 000002 | Automatic motor tuning |
| 000004 | Start clockwise/anti-clockwise |
| 000008 | Slow down |
| 000010 | Catch-up |
| 000020 | Feedback high |
| 000040 | Feedback low |
| 000080 | Output current high |
| 000100 | Output current low |
| 000200 | Output frequency high |
| 000400 | Output frequency low |
| 000800 | Brake test ok |
| 001000 | Braking max. |
| 002000 | Braking |
| 004000 | Quick discharge OK |
| 008000 | Out of frequency range |

| Bit (Hex) | Alarm word 1 (parameter 538) |
|---|---|
| 000001 | Brake test failed |
| 000002 | Trip locked |
| 000004 | AMA tuning not OK |
| 000008 | AMA tuning OK |
| 000010 | Power-up fault |
| 000020 | ASIC fault |
| 000040 | HPFP bus timeout |
| 000080 | Standard bus timeout |
| 000100 | Short-circuiting |
| 000200 | Switchmode fault |
| 000400 | Earth fault |
| 000800 | Overcurrent |
| 001000 | Torque limit |
| 002000 | Motor thermistor |
| 004000 | Motor overload |
| 008000 | Inverter overload |
| 010000 | Undervoltage |
| 020000 | Overvoltage |
| 040000 | Phase fault |
| 080000 | Live zero fault (4 - 20 mA current signal low) |
| 100000 | Heat sink temperature too high |
| 200000 | Motor phase W missing |
| 400000 | Motor phase V missing |
| 800000 | Motor phase U missing |
| 1000000 | Quick discharge not ok |
| 2000000 | Fieldbus communication fault |
| 4000000 | Mains failure |
| 8000000 | Inverter fault |
| 10000000 | Brake power fault |
| 20000000 | Encoder loss |
| 40000000 | Safety interlock |
| 80000000 | Reserved |