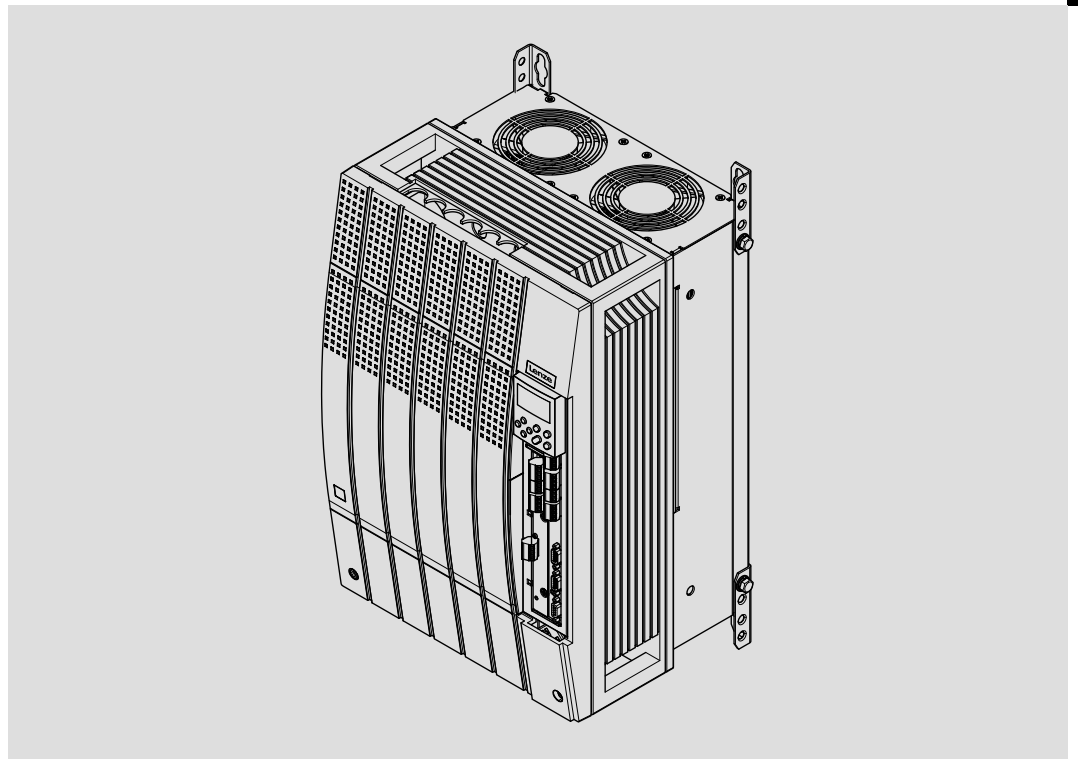


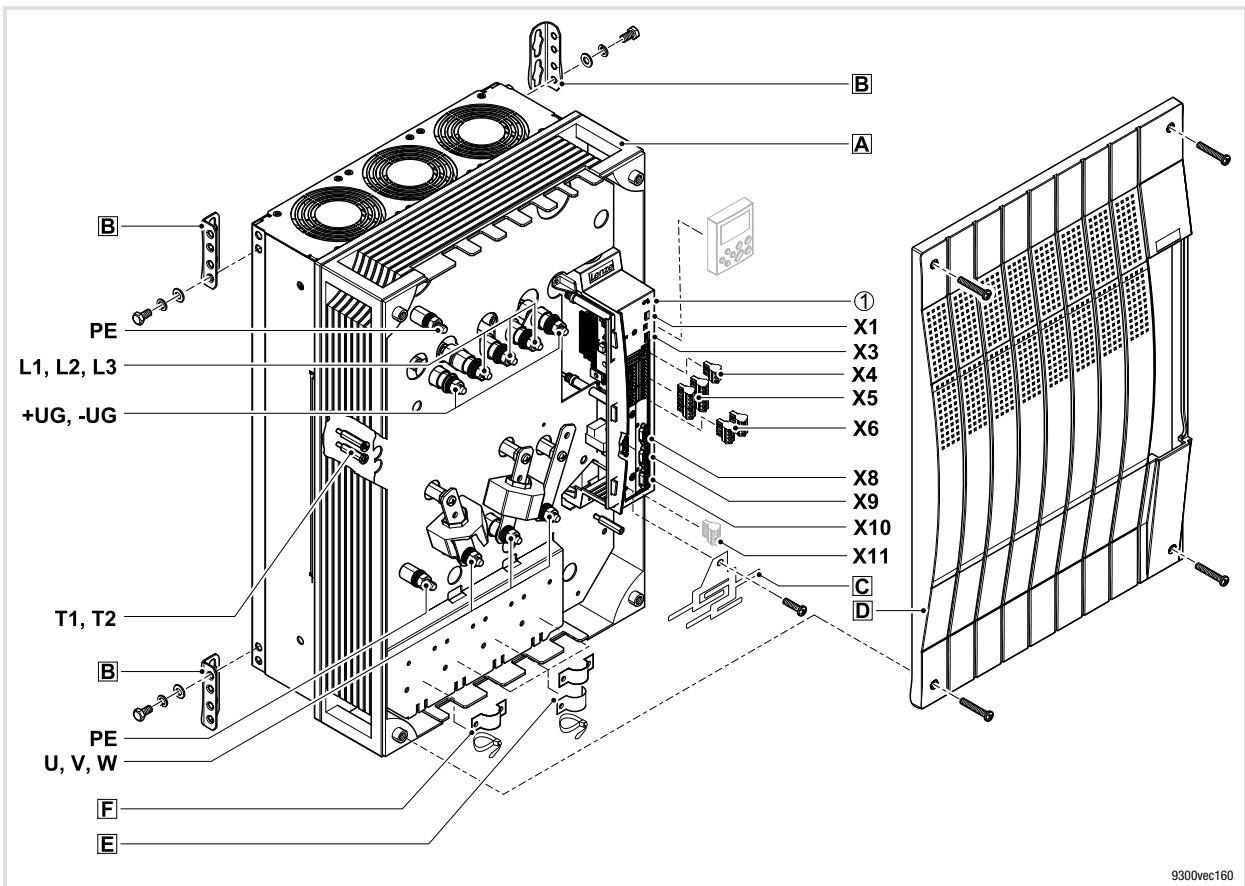
Information for the operator of the machine

## 9300 vector 45 ... 90 kW



**EVF9330-xV ... EVF9333-xV**

**Frequency inverter**



## Key for overview

| Position | Description  |
|----------|--|
| A        | Controller   |
| B        | Fixing bracket for standard mounting   |
| C        | EMC shield sheet with fixing screws for shielded control cables  |
| D        | Cover with fixing screws   |
| E        | Shield clamp and strain relief for the motor cable   |
| F        | Strain relief for the PE motor cable and the feed cable for the motor temperature monitoring with PTC thermistor or thermal contact (NC contact) |

## Connections and interfaces

| Position       | Description  |
|----------------|--|
| L1, L2, L3, PE | Mains connection   |
| +UG, -UG       | DC supply  |
| U, V, W, PE    | Motor connection   |
| T1, T2         | Connection of PTC thermistor or thermal contact (NC contact) of the motor                                  |
| X1             | AIF interface (automation interface)<br>Slot for communication module (e. g. XT EMZ9371BC keypad)          |
| X3             | Jumper for setting analog input signal at X6/1, X6/2   |
| X4             | System bus (CAN) connection  |
| X5             | Connection of digital inputs and outputs   |
| X6             | Connection of analog inputs and outputs  |
| X8             | Connection of incremental encoder with TTL level or SinCos encoder and KTY temperature sensor of the motor |
| X9             | Connection of digital frequency input signal   |
| X10            | Connection of digital frequency output signal  |
| X11            | Connection of K <sub>SR</sub> relay output for "safe standstill" (for variants V004 and V024 only)         |

## Status displays

| Position | LED red          | LED green       | Operating status                                      |
|----------|------------------|-----------------|---|
| ①        | Off              | On              | Controller is enabled                                 |
|          | On               | On              | Mains is switched on and automatic start is inhibited |
|          | Off              | Blinking slowly | Controller is inhibited                               |
|          | Off              | On              | Motor data identification is active                   |
|          | Blinking quickly | Off             | Undervoltage or overvoltage                           |
|          | Blinking slowly  | Off             | Active fault  |

|          |   |           |
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# 1 About this documentation



## Note!

This documentation contains all the information required by the machine operator to run the drive controllers of the 9300 vector series installed in your machine/system.

You may make further use of the information contained in this documentation without asking Lenze for permission if you do not change the contents.

## 1.1 Document history

### What is new / what has changed?

| Material number | Version |         |      | Description   |
|-----------------|---------|---------|------|---|
| 13445291        | 3.0     | 11/2013 | TD06 | Error corrections   |
| 13330576        | 2.1     | 03/2010 | TD23 | Change of the company's address   |
| 13330576        | 2.0     | 03/2010 | TD14 | New edition due to reorganisation of the company<br>UL-warnings updated<br>Revision for software version 8x |
| 13217738        | 1.0     | 07/2007 | TD23 | First edition   |



## Tip!

Information and auxiliary devices related to the Lenze products can be found in the download area at

<http://www.Lenze.com>

## 1.2 Target group

This documentation is directed at qualified skilled personnel according to IEC 60364.

Qualified skilled personnel are persons who have the required qualifications to carry out all activities involved in installing, mounting, commissioning, and operating the product.

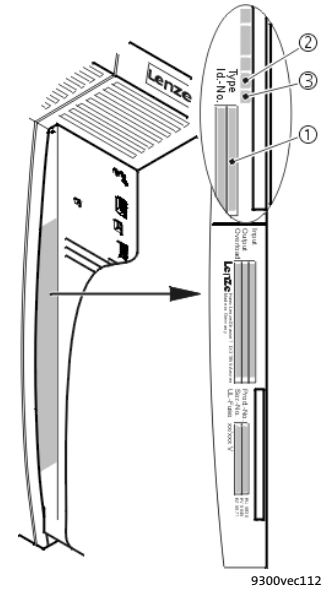
# 1 About this documentation

## Validity information

### 1.3 Validity information







... 9300 vector frequency inverters as of nameplate data:

|                               | ①  | ②    | ③     | Nameplate  |      |       |              |       |              |       |              |       |              |        |
|-------------------------------|--|------|-------|------------|------|-------|--------------|-------|--------------|-------|--------------|-------|--------------|--------|
|                               | EVF  | 93xx | - x V | Vxxx 1x 8x |      |       |              |       |              |       |              |       |              |        |
| <b>Product series</b>         | EVF = Frequency inverter   |      |       |            |      |       |              |       |              |       |              |       |              |        |
| <b>Type no. / rated power</b> | <table border="1"> <tr> <td>400V</td> <td>480 V</td> </tr> <tr> <td>9330 = 45 kW</td> <td>55 kW</td> </tr> <tr> <td>9331 = 55 kW</td> <td>75 kW</td> </tr> <tr> <td>9332 = 75 kW</td> <td>90 kW</td> </tr> <tr> <td>9333 = 90 kW</td> <td>110 kW</td> </tr> </table> |      |       |            | 400V | 480 V | 9330 = 45 kW | 55 kW | 9331 = 55 kW | 75 kW | 9332 = 75 kW | 90 kW | 9333 = 90 kW | 110 kW |
| 400V                          | 480 V  |      |       |            |      |       |              |       |              |       |              |       |              |        |
| 9330 = 45 kW                  | 55 kW  |      |       |            |      |       |              |       |              |       |              |       |              |        |
| 9331 = 55 kW                  | 75 kW  |      |       |            |      |       |              |       |              |       |              |       |              |        |
| 9332 = 75 kW                  | 90 kW  |      |       |            |      |       |              |       |              |       |              |       |              |        |
| 9333 = 90 kW                  | 110 kW   |      |       |            |      |       |              |       |              |       |              |       |              |        |
| <b>Type</b>                   | E = Built-in unit<br>C = Built-in unit in "cold plate" technique   |      |       |            |      |       |              |       |              |       |              |       |              |        |
| <b>Design</b>                 | V = Vector-controlled frequency inverter   |      |       |            |      |       |              |       |              |       |              |       |              |        |
| <b>Variant</b>                | - Standard<br>V003 = In "cold plate" technique<br>V004 = With "safe standstill" function<br>V024 = With "safe standstill" function and for IT mains<br>V100 = For IT systems   |      |       |            |      |       |              |       |              |       |              |       |              |        |
| <b>Hardware version</b>       |  |      |       |            |      |       |              |       |              |       |              |       |              |        |
| <b>Software version</b>       |  |      |       |            |      |       |              |       |              |       |              |       |              |        |



## 1.4 Conventions used

This documentation uses the following conventions to distinguish between different types of information:

| Type of information     | Identification  | Examples/notes   |
|-------------------------|---|--|
| Spelling of numbers     |   |  |
| Decimal separator       | language-dependent  | In each case, the signs typical for the target language are used as decimal separators.<br>For example: 1234.56 or 1234,56   |
| Warnings                |   |  |
| UL warnings             |  | Given in English and French  |
| UR warnings             |  |  |
| Text                    |   |  |
| Program name            | » «   | PC software<br>For example: »Engineer«, »Global Drive Control« (GDC)   |
| Icons                   |   |  |
| Page reference          |  | Reference to another page with additional information<br>For instance:  16 = see page 16                            |
| Documentation reference |  | Reference to another documentation with additional information<br>For example:  EDKxxx = see documentation EDKxxx |

# 1 About this documentation

Notes used

## 1.5 Notes used

The following pictographs and signal words are used in this documentation to indicate dangers and important information:

### Safety instructions

Structure of safety instructions:






#### **Danger!**




(characterises the type and severity of danger)

#### **Note**



(describes the danger and gives information about how to prevent dangerous situations)

| Pictograph and signal word  | Meaning  |
|---|--|
|  <b>Danger!</b>  | <b>Danger of personal injury through dangerous electrical voltage.</b><br>Reference to an imminent danger that may result in death or serious personal injury if the corresponding measures are not taken. |
|  <b>Danger!</b> | <b>Danger of personal injury through a general source of danger.</b><br>Reference to an imminent danger that may result in death or serious personal injury if the corresponding measures are not taken.   |
|  <b>Stop!</b>  | <b>Danger of property damage.</b><br>Reference to a possible danger that may result in property damage if the corresponding measures are not taken.  |

### Application notes

| Pictograph and signal word   | Meaning  |
|--|--|
|  <b>Note!</b> | Important note to ensure troublefree operation |
|  <b>Tip!</b>  | Useful tip for simple handling                 |
|               | Reference to another documentation             |

### Special safety instructions and application notes

| Pictograph and signal word   | Meaning   |
|--|---|
|  <b>Warnings!</b> | <b>Safety note or application note for the operation according to UL or CSA requirements.</b> |
|  <b>Warnings!</b> | The measures are required to meet the requirements according to UL or CSA.                    |



## 2 Safety instructions

### 2.1 General safety and application notes for Lenze controllers

(in accordance with Low-Voltage Directive 2006/95/EC)

#### For your personal safety

Disregarding the following safety measures can lead to severe injury to persons and damage to material assets:

- ▶ Only use the product as directed.
- ▶ Never commission the product in the event of visible damage.
- ▶ Never commission the product before assembly has been completed.
- ▶ Do not carry out any technical changes on the product.
- ▶ Only use the accessories approved for the product.
- ▶ Only use original spare parts from Lenze.
- ▶ Observe all regulations for the prevention of accidents, directives and laws applicable on site.
- ▶ Transport, installation, commissioning and maintenance work must only be carried out by qualified personnel.
  - Observe IEC 364 and CENELEC HD 384 or DIN VDE 0100 and IEC report 664 or DIN VDE 0110 and all national regulations for the prevention of accidents.
  - According to this basic safety information, qualified, skilled personnel are persons who are familiar with the assembly, installation, commissioning, and operation of the product and who have the qualifications necessary for their occupation.
- ▶ Observe all specifications in this documentation.
  - This is the condition for safe and trouble-free operation and the achievement of the specified product features.
  - The procedural notes and circuit details described in this documentation are only proposals. It is up to the user to check whether they can be transferred to the particular applications. Lenze Automation GmbH does not accept any liability for the suitability of the procedures and circuit proposals described.
- ▶ Depending on their degree of protection, some parts of the Lenze controllers (frequency inverters, servo inverters, DC speed controllers) and their accessory components can be live, moving and rotating during operation. Surfaces can be hot.
  - Non-authorized removal of the required cover, inappropriate use, incorrect installation or operation, creates the risk of severe injury to persons or damage to material assets.
  - For more information, please see the documentation.
- ▶ High amounts of energy are produced in the controller. Therefore it is required to wear personal protective equipment (body protection, headgear, eye protection, ear protection, hand guard).

**Application as directed**

Controllers are components which are designed for installation in electrical systems or machines. They are not to be used as domestic appliances, but only for industrial purposes according to EN 61000-3-2.

When controllers are installed into machines, commissioning (i.e. starting of the operation as directed) is prohibited until it is proven that the machine complies with the regulations of the EC Directive 2006/42/EC (Machinery Directive); EN 60204 must be observed.

Commissioning (i.e. starting of the operation as directed) is only allowed when there is compliance with the EMC Directive (2004/108/EC).

The controllers meet the requirements of the Low-Voltage Directive 2006/95/EC. The harmonised standard EN 61800-5-1 applies to the controllers.

The technical data and supply conditions can be obtained from the nameplate and the documentation. They must be strictly observed.

**Warning:** Controllers are products which can be installed in drive systems of category C2 according to EN 61800-3. These products can cause radio interferences in residential areas. In this case, special measures can be necessary.

**Transport, storage**

Please observe the notes on transport, storage, and appropriate handling.

Observe the climatic conditions according to the technical data.

**Installation**

The controllers must be installed and cooled according to the instructions given in the corresponding documentation.

The ambient air must not exceed degree of pollution 2 according to EN 61800-5-1.

Ensure proper handling and avoid excessive mechanical stress. Do not bend any components and do not change any insulation distances during transport or handling. Do not touch any electronic components and contacts.

Controllers contain electrostatic sensitive devices which can easily be damaged by inappropriate handling. Do not damage or destroy any electrical components since this might endanger your health!

### Electrical connection

When working on live controllers, observe the applicable national regulations for the prevention of accidents (e.g. VBG 4).

The electrical installation must be carried out according to the appropriate regulations (e.g. cable cross-sections, fuses, PE connection). Additional information can be obtained from the documentation.

This documentation contains information on installation in compliance with EMC (shielding, earthing, filter, and cables). These notes must also be observed for CE-marked controllers. The manufacturer of the system is responsible for compliance with the limit values demanded by EMC legislation. The controllers must be installed in housings (e.g. control cabinets) to meet the limit values for radio interferences valid at the site of installation. The housings must enable an EMC-compliant installation. Observe in particular that e.g. the control cabinet doors have a circumferential metal connection to the housing. Reduce housing openings and cutouts to a minimum.

Lenze controllers may cause a DC current in the PE conductor. If a residual current device (RCD) is used for protection against direct or indirect contact for a controller with three-phase supply, only a residual current device (RCD) of type B is permissible on the supply side of the controller. If the controller has a single-phase supply, a residual current device (RCD) of type A is also permissible. Apart from using a residual current device (RCD), other protective measures can be taken as well, e.g. electrical isolation by double or reinforced insulation or isolation from the supply system by means of a transformer.

### Operation

If necessary, systems including controllers must be equipped with additional monitoring and protection devices according to the valid safety regulations (e.g. law on technical equipment, regulations for the prevention of accidents). The controllers can be adapted to your application. Please observe the corresponding information given in the documentation.

After the controller has been disconnected from the supply voltage, all live components and power terminals must not be touched immediately because capacitors can still be charged. Please observe the corresponding stickers on the controller.

All protection covers and doors must be shut during operation.

### Safety functions

Certain controller versions support safety functions (e.g. "Safe torque off", formerly "Safe standstill") according to the requirements of the EC Directive 2006/42/EC (Machinery Directive). The notes on the integrated safety system provided in this documentation must be observed.

### Maintenance and servicing

The controllers do not require any maintenance if the prescribed operating conditions are observed.

### Disposal

Recycle metal and plastic materials. Ensure professional disposal of assembled PCBs.

**The product-specific safety and application notes given in these instructions must be observed!**

## 2.2

## Thermal motor monitoring

**Note!**

From software version 8.1 onwards, the 9300 vector controllers are provided with an I<sup>2</sup>x t function for sensorless thermal monitoring of the connected motor.

- ▶ I<sup>2</sup>x t monitoring is based on a mathematical model which calculates a thermal motor utilisation from the detected motor currents.
- ▶ The calculated motor utilisation is saved when the mains is switched off.
- ▶ The function is UL-certified, i.e. additional protective measures for the motor are not required in UL-approved systems.
- ▶ Nevertheless, I<sup>2</sup>x t monitoring does **not** provide full motor protection because other influences on the motor utilisation such as changes in the cooling conditions (e.g. cooling air flow interrupted or too warm) cannot be detected.

The I<sup>2</sup> x t load of the motor is displayed in C0066.

The thermal loading capacity of the motor is expressed by the thermal motor time constant ( $\tau$ , C0128). Find the value in the rated motor data or contact the manufacturer of the motor.

The I<sup>2</sup> x t monitoring has been designed such that it will be activated after 179 s in the event of a motor with a thermal motor time constant of 5 minutes (Lenze setting C0128), a motor current of 1.5 x I<sub>N</sub> and a trigger threshold of 100 %.

Two adjustable trigger thresholds provide for different responses.

- ▶ Adjustable response OC8 (TRIP, warning, off).
  - The trigger threshold is set in C0127.
  - The response is set in C0606.
  - The response OC8, for instance, can be used for an advance warning.
- ▶ Fixed response OC6-TRIP.
  - The trigger threshold is set in C0120.

| Behaviour of the I <sup>2</sup> x t monitoring  | Condition   |
|---|---|
| The I <sup>2</sup> x t monitoring is deactivated.<br>C0066 is set = 0 % and<br>MCTRL-LOAD-I2XT is set = 0.00 %.         | When C0120 = 0 % and C0127 = 0 %, set controller inhibit. |
| I <sup>2</sup> x t monitoring is stopped.<br>The current value in C0066 and at the<br>MCTRL-LOAD-I2XT output is frozen. | When C0120 = 0 % and C0127 = 0 %, set controller enable.  |
| I <sup>2</sup> x t monitoring is deactivated.<br>The motor load is displayed in C0066.                                  | Set C0606 = 3 (off) and C0127 > 0 %.                      |

**Note!**

An error message OC6 or OC8 can only be reset if the I<sup>2</sup> x t load falls below the set trigger threshold by 5 %.

### 2.2.1 Forced ventilated or naturally ventilated motors

#### Parameter setting

The following codes can be set for I<sup>2</sup> x t monitoring:

| Code  | Meaning   | Value range        | Lenze setting |
|-------|---|--------------------|---------------|
| C0066 | Display of the I <sup>2</sup> x t load of the motor | 0 ... 250 %        | -             |
| C0120 | Threshold: Triggering of error "OC6"                | 0 ... 120 %        | 0 %           |
| C0127 | Threshold: Triggering of error "OC8"                | 0 ... 120 %        | 0 %           |
| C0128 | Thermal motor time constant                         | 0.1 ... 50.0 min   | 5.0 min       |
| C0606 | Response to error "OC8"                             | TRIP, warning, off | Warning       |

#### Calculate release time and I<sup>2</sup>x t load

| Formula for release time  | Information                                     |
|---|---|
| $t = -(\tau) \times \ln \left[ 1 - \frac{z + 1}{\left(\frac{I_{Mot}}{I_N}\right)^2 \times 100} \right]$ | I <sub>Mot</sub> Actual motor current (C0054)   |
|   | I <sub>r</sub> Rated motor current (C0088)      |
|   | τ Thermal motor time constant (C0128)           |
|   | z Threshold value in C0120 (OC6) or C0127 (OC8) |

| Formulae for I <sup>2</sup> x t load   | Information  |
|--|--|
| $L(t) = \left(\frac{I_{Mot}}{I_N}\right)^2 \times 100\% \times \left(1 - e^{-\frac{t}{\tau}}\right)$ | L(t) Chronological sequence of the I <sup>2</sup> x t load of the motor (Display: C0066) |
|  | I <sub>Mot</sub> Actual motor current (C0054)  |
|  | I <sub>r</sub> Rated motor current (C0088)   |
|  | τ Thermal motor time constant (C0128)  |

If the controller is inhibited, the I<sup>2</sup> x t load is reduced:

|  |   |
|--|---|
| $L(t) = L_{start} \times \sqrt{e^{-\frac{t}{\tau}}}$ | L <sub>start</sub> I <sup>2</sup> x t load before controller inhibit<br>If an error is triggered, the value corresponds to the threshold value set in C0120 (OC6) or C0127 (OC8). |
|--|---|

#### Read release time in the diagram

Diagram for detecting the release times for a motor with a thermal motor time constant of 5 minutes (Lenze setting C0128):

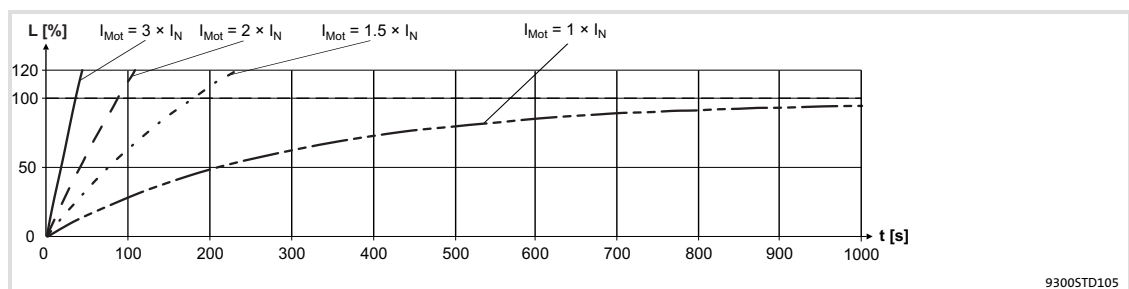


Fig. 2-1 I<sup>2</sup> x t-monitoring: Release times for different motor currents and trigger thresholds

- I<sub>Mot</sub> Actual motor current (C0054)
- I<sub>r</sub> Rated motor current (C0088)
- L I<sup>2</sup> x t load of the motor (display: C0066)
- T Time

## 2.2.2 Self-ventilated motors

Due to the construction, self-ventilated standard motors are exposed to an increased heat generation in the lower speed range compared to forced ventilated motors.

**Warnings!**

For complying with the UL 508C standard, you have to set the speed-dependent evaluation of the permissible torque via code **C0129/x**.

**Parameter setting**

The following codes can be set for  $I^2 \times t$  monitoring:

| Code    | Meaning   | Value range        | Lenze setting |
|---------|---|--------------------|---------------|
| C0066   | Display of the $I^2 \times t$ load of the motor | 0 ... 250 %        | -             |
| C0120   | Threshold: Triggering of error "OC6"            | 0 ... 120 %        | 0 %           |
| C0127   | Threshold: Triggering of error "OC8"            | 0 ... 120 %        | 0 %           |
| C0128   | Thermal motor time constant                     | 0.1 ... 50.0 min   | 5.0 min       |
| C0606   | Response to error "OC8"                         | TRIP, warning, off | Warning       |
| C0129/1 | S1 torque characteristic $I_1/I_{rated}$        | 10 ... 200 %       | 100 %         |
| C0129/2 | S1 torque characteristics $n_2/n_{rated}$       | 10 ... 200 %       | 40 %          |

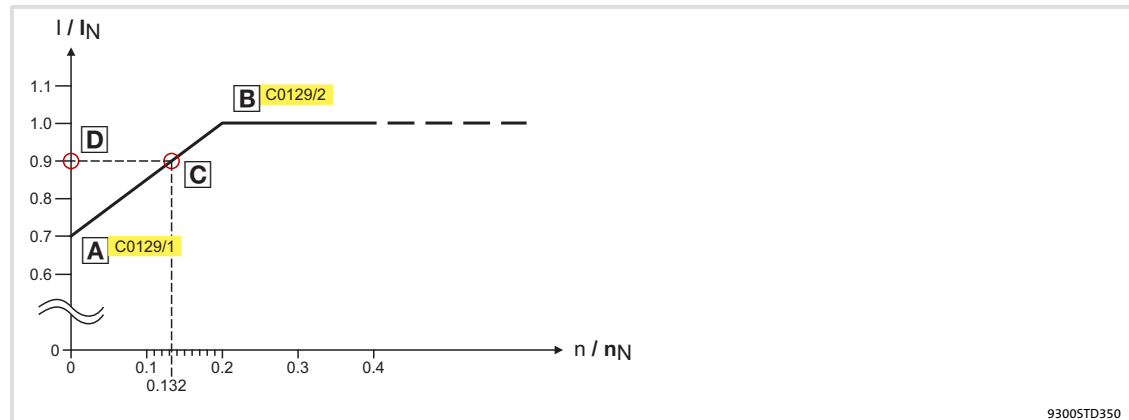
**Effect of code C0129/x**

Fig. 2-2 Working point in the range of characteristic lowering

The lowered speed / torque characteristic (Fig. 2-2) reduces the permissible thermal load of self-ventilated standard motors. The characteristic is a line the definition of which requires two points:

- ▶ Point **A**: Definition with **C0129/1**  
This value also enables an increase of the maximally permissible load.
- ▶ Point **B**: Definition with **C0129/2**  
With increasing speeds, the maximally permissible load remains unchanged ( $I_{Mot} = I_{rated}$ ).

In Fig. 2-2, the motor speed and the corresponding permissible motor torque (**D**) can be read for each working point (**C** on the characteristic (**A**) ... **B**). **D** can also be calculated using the values in **C0129/1** and **C0129/2** (evaluation coefficient "y", [15](#)).

### Calculate release time and I<sup>2</sup>xt load

Calculate the release time and the I<sup>2</sup> x t load of the motor considering the values in **C0129/1** and **C0129/2**(evaluation coefficient "y").

| Formulae for release time   | Information        |   |
|---|--------------------|---|
| $T = - (\tau) \times \ln \left[ 1 - \frac{z + 1}{\left( \frac{I_{Mot}}{y \times I_N} \right)^2 \times 100} \right]$ | T                  | Release time of the I <sup>2</sup> x t monitoring |
|   | τ                  | Thermal motor time constant (C0128)               |
| $y = \frac{100\% - C0129/1}{C0129/2} \times \frac{n}{n_N} + C0129/1$  | ln                 | Function: Natural logarithm                       |
|   | I <sub>Mot</sub>   | Actual motor current (C0054)                      |
|   | I <sub>r</sub>     | Rated motor current (C0088)                       |
|   | z                  | Threshold value in C0120 (OC6) or C0127 (OC8)     |
|   | y                  | Evaluation coefficient                            |
|   | n <sub>rated</sub> | Rated speed (C0087)                               |

| Formulae for I <sup>2</sup> x t load  | Information      |   |
|---|------------------|---|
| $L(t) = \left( \frac{I_{Mot}}{y \times I_N} \right)^2 \times 100\% \times \left( 1 - e^{-\frac{t}{\tau}} \right)$ | L(t)             | Chronological sequence of the I <sup>2</sup> x t load of the motor (Display: C0066) |
|   | y                | Evaluation coefficient  |
|   | I <sub>Mot</sub> | Actual motor current (C0054)  |
|   | I <sub>r</sub>   | Rated motor current (C0088)   |
|   | τ                | Thermal motor time constant (C0128)   |

If the controller is inhibited, the I<sup>2</sup> x t load is reduced:

|  |                    |  |
|--|--------------------|--|
| $L(t) = L_{start} \times \sqrt{e^{-\frac{t}{\tau}}}$ | L <sub>start</sub> | I <sup>2</sup> x t load before controller inhibit<br>If an error is triggered, the value corresponds to the threshold value set in C0120 (OC6) or C0127 (OC8). |
|--|--------------------|--|

**2.3****Residual hazards****Protection of persons**

- ▶ Before working on the controller, check that no voltage is applied to the power terminals:
  - Because the power terminals V, W, +U<sub>G</sub> and -U<sub>G</sub> remain live for at least 3 minutes after disconnecting from mains.
  - Because the power terminals L1, L2, L3; U, V, W, +U<sub>G</sub> and -U<sub>G</sub> remain live when the motor is stopped.
- ▶ The leakage current to earth (PE) is >3.5 mA. According to EN 61800-5-1
  - a fixed installation is required,
  - a double PE connection is required, or, if there is only a single PE connection, the PE conductor must have a cross-section of at least 10 mm<sup>2</sup>.
- ▶ The heat sink of the controller has an operating temperature of > 80 °C:
  - Contact with the heatsink results in burns.
- ▶ If you use the "flying-restart circuit" function (C0142 = 2, 3) for machines with a low moment of inertia and minimum friction:
  - After controller enable in standstill, the motor may start or change its direction of rotation for a short time, because the flying restart process also is carried out at a speed of 0.
- ▶ During parameter set transfer, the control terminals of the controller can have undefined states!
  - Therefore the plugs X5 and X6 must be unplugged, before the transfer is executed. This ensures that the controller is inhibited and all control terminals have the defined "LOW" state.

**Device protection**

- ▶ Frequent mains switching (e.g. inching mode via mains contactor) can overload and destroy the input current limitation of the drive controller:
  - At least 3 minutes must pass between switching off and restarting the devices EVF9321-xV and EVF9322-xV.
  - At least 3 minutes must pass between two starting procedures of the devices EVF9323-xV ... EVF9333-xV.
  - Use the "safe torque off" safety function (STO) if safety-related mains disconnections occur frequently. The drive variants Vxx4 are equipped with this function.

**Motor protection**

- ▶ Certain drive controller settings can overheat the connected motor:
  - E. g. long-time operation of the DC injection brake.
  - Long-time operation of self-ventilated motors at low speeds.



**Protection of the machine/system**

- ▶ Drives can reach dangerous overspeeds (e. g. setting of high output frequencies in connection with motors and machines not suitable for this purpose):
  - The drive controllers do not provide protection against such operating conditions. For this purpose, use additional components.

**Original - English****Warnings!**

- ▶ **Motor Overload Protection**
  - For information on the protection level of the internal overload protection for a motor load, see the corresponding manuals or software helps.
  - If the integral solid state motor overload protection is not used, external or remote overload protection must be provided.
- ▶ **Branch Circuit Protection**
  - The integral solid state protection does not provide branch circuit protection.
  - Branch circuit protection has to be provided externally in accordance with corresponding instructions, the National Electrical Code and any additional codes.
- ▶ Please observe the specifications for fuses and screw-tightening torques in these instructions.
- ▶ **EVF9330 ... EVF9333:**
  - Suitable for use on a circuit capable of delivering not more than 10000 rms symmetrical amperes, 480 V maximum, when protected by fuses.
  - Suitable for use on a circuit capable of delivering not more than 50000 rms symmetrical amperes, 480 V maximum, when protected by J, T or R class fuses.
  - Maximum surrounding air temperature: 0 ... +50 °C
  - > +40 °C: reduce the rated output current by 2.5 %/°C
  - Use 60/75 °C or 75 °C copper wire only.

**Original - French**



**Warnings!**

- ▶ **Motor Overload Protection**
  - For information on the protection level of the internal overload protection for a motor load, see the corresponding manuals or software helps.
  - If the integral solid state motor overload protection is not used, external or remote overload protection must be provided.
- ▶ **Branch Circuit Protection**
  - The integral solid state protection does not provide branch circuit protection.
  - Branch circuit protection has to be provided externally in accordance with corresponding instructions, the National Electrical Code and any additional codes.
- ▶ Please observe the specifications for fuses and screw-tightening torques in these instructions.
- ▶ **EVF9330 ... EVF9333 :**
  - Convient aux circuits non susceptibles de délivrer plus de 10000 ampères symétriques eff., maximum 480 V, avec protection par fusibles.
  - Convient aux circuits non susceptibles de délivrer plus de 50000 ampères symétriques eff., maximum 480 V, avec protection par des fusibles de calibre J, T ou R.
  - Température ambiante maximale : 0 ... +50 °C
  - > +40 °C: ramener le courant assigné de sortie à 2,5 %/°C
  - Utiliser exclusivement des conducteurs en cuivre 60/75 °C ou 75 °C.
- ▶ **EVF9330 ... EVF9333 :**
  - Convient aux circuits non susceptibles de délivrer plus de 10000 ampères symétriques eff., maximum 480 V, avec protection par fusibles.
  - Convient aux circuits non susceptibles de délivrer plus de 50000 ampères symétriques eff., maximum 480 V, avec protection par des fusibles de calibre J, T ou R.
  - Température ambiante maximale : 0 ... +50 °C
  - > +40 °C: ramener le courant assigné de sortie à 2,5 %/°C
  - Utiliser exclusivement des conducteurs en cuivre 60/75 °C ou 75 °C.

### 3 Parameter setting

Parameter setting with the XT EMZ9371BC keypad  
General data and operating conditions

### 3 Parameter setting

#### 3.1 Parameter setting with the XT EMZ9371BC keypad

##### Description

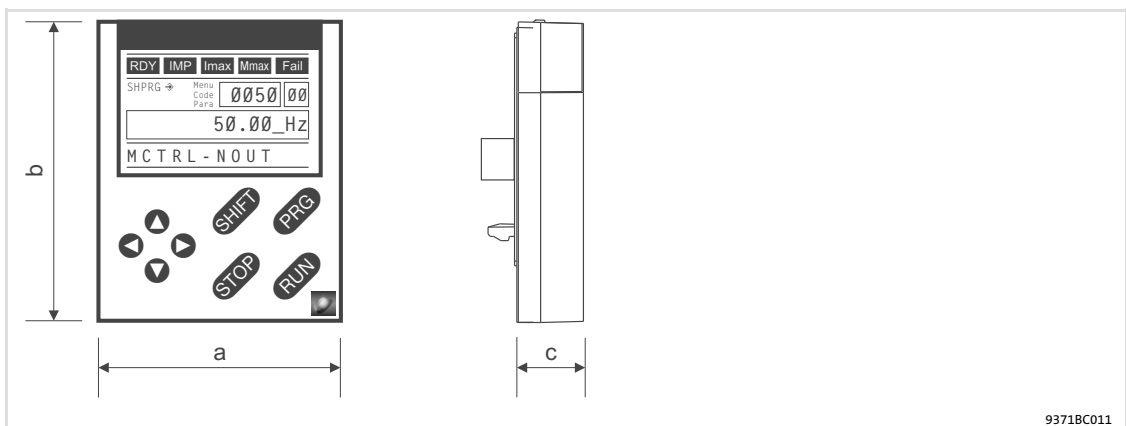
The keypad is available as an accessory. A full description of the keypad can be obtained from the Instructions included in the keypad delivery.

##### Plugging in the keypad

It is possible to plug the keypad into the AIF interface or remove it during operation.

As soon as the keypad is supplied with voltage, it carries out a self-test. The keypad is ready for operation if it is in display mode.

#### 3.1.1 General data and operating conditions



| Feature                         | Values           |                      |
|---------------------------------|------------------|----------------------|
| <b>Dimensions</b>               |                  |                      |
| Width                           | a                | 60 mm                |
| Height                          | b                | 73.5 mm              |
| Depth                           | c                | 15 mm                |
| <b>Environmental conditions</b> |                  |                      |
| Climate                         |                  |                      |
| Storage                         | IEC/EN 60721-3-1 | 1K3 (-25 ... +60 °C) |
| Transport                       | IEC/EN 60721-3-2 | 2K3 (-25 ... +70 °C) |
| Operation                       | IEC/EN 60721-3-3 | 3K3 (-10 ... +60 °C) |
| Enclosure                       | IP 20            |                      |

### 3.1.2 Installation and commissioning

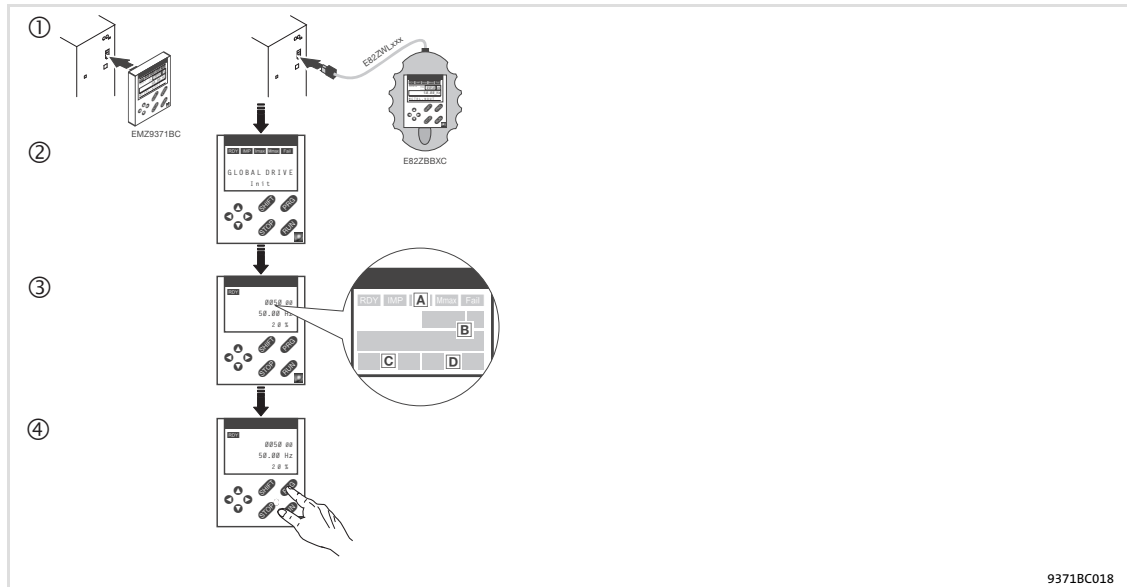


Fig. 3-1 Installation and commissioning of XT EMZ9371BC keypad or E82ZBBXC diagnosis terminal

- ① Connect keypad to the AIF interface on the front of the standard device.  
The keypad can be connected/disconnected during operation.
- ② As soon as the keypad is supplied with voltage, it carries out a short self-test.
- ③ The operation level indicates when the keypad is ready for operation:
  - Ⓐ Current state of the standard device
  - Ⓑ Memory location 1 of the user menu (C0517):  
Code number, subcode number, and current value
  - Ⓒ Active fault message or additional status message
  - Ⓓ Actual value in % of the status display defined in C0004
- ④ **PRG** must be pressed to leave the operation level

### 3.1.3 Display elements and function keys

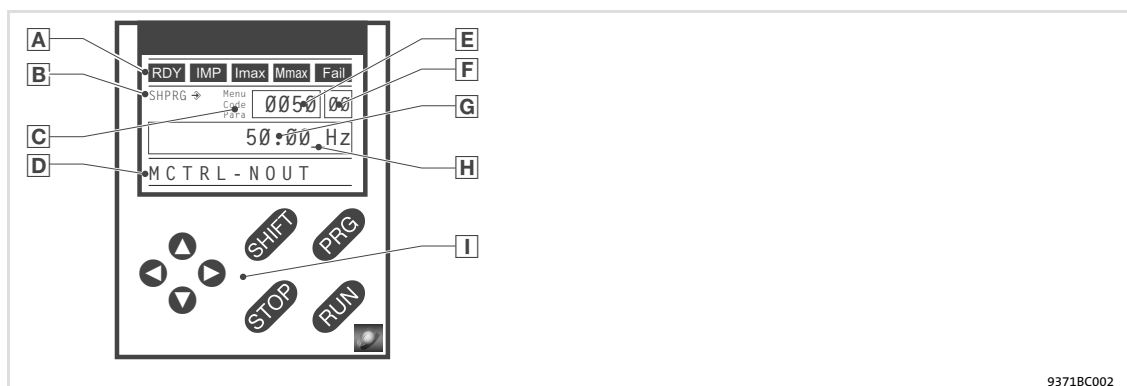


Fig. 3-2 Display elements and function keys of the XT EMZ9371BC keypad

## Parameter setting

Parameter setting with the XT EMZ9371BC keypad  
Display elements and function keys

### Displays

| A Status displays of standard device |  |  |
|--------------------------------------|--|--|
| Display                              | Meaning  | Explanation  |
| <b>RDY</b>                           | Ready for operation  |  |
| <b>IMP</b>                           | Pulse inhibit is active  | Power outputs are inhibited  |
| <b>Imax</b>                          | The set current limit is exceeded in motor or generator mode                         |  |
| <b>Mmax</b>                          | Speed controller 1 in the limitation   | Drive is torque-controlled<br>(Only active for operation with standard devices of the 9300 series) |
| <b>Fail</b>                          | Active fault   |  |
| B Acceptance of the parameters       |  |  |
| Display                              | Meaning  | Explanation  |
| ↔                                    | Parameter is accepted immediately  | Standard device operates immediately with the new parameter value                                  |
| SHPRG ↔                              | Parameter must be acknowledged with <b>SHIFT</b> <b>PRG</b>                          | Standard device operates with the new parameter value after being acknowledged                     |
| SHPRG                                | Parameter must be acknowledged in case of controller inhibit <b>SHIFT</b> <b>PRG</b> | Standard device operates with the new parameter value after the controller is enabled again        |
| None                                 | Display parameter  | Change is not possible   |
| C Active level                       |  |  |
| Display                              | Meaning  | Explanation  |
| Menu                                 | Menu level is active   | Select main menu and submenus  |
| Code                                 | Code level is active   | Select codes and subcodes  |
| Para                                 | Parameter level is active  | Change parameters in the codes or subcodes   |
| None                                 | Operating level is active  | Display operating parameters   |
| D Short text                         |  |  |
| Display                              | Meaning  | Explanation  |
| alphanumeric                         | Contents of the menus, meaning of the codes and parameters                           |  |
|                                      | In the operating level display of C0004 in % and the active fault                    |  |
| E Number                             |  |  |
| Active level                         | Meaning  | Explanation  |
| Menu level                           | Menu number  | Display is only active for operation with standard devices of the 8200 vector or 8200 motec series |
| Code level                           | Four-digit code number   |  |
| F Number                             |  |  |
| Active level                         | Meaning  | Explanation  |
| Menu level                           | Submenu number   | Display is only active for operation with standard devices of the 8200 vector or 8200 motec series |
| Code level                           | Two-digit subcode number   |  |
| G Parameter value                    |  |  |
|                                      | Parameter value with unit  |  |
| H Cursor                             |  |  |
|                                      | In the parameter level, the digit above the cursor can be directly changed           |  |
| I Function keys                      |  |  |
|                                      | For description see the following table  |  |

## Function keys



### Note!

Shortcuts with **SHIFT**:

Press and hold **SHIFT**, then press the second key in addition.

| Key                              | Function   |                               |  |                          |
|----------------------------------|--|-------------------------------|--|--------------------------|
|                                  | Menu level   | Code level                    | Parameter level                                      | Operating level          |
| <b>PRG</b>                       |  | Change to the parameter level | Change to the operating level                        | Change to the code level |
| <b>SHIFT PRG</b>                 | Go to the "Short setup" menu and load predefined configurations <sup>1)</sup>                                  |                               | Accept parameters when SHPRG ⇌ or SHPRG is displayed |                          |
| <b>▲</b><br><b>▼</b>             | Change between menu items  | Change of code number         | Change of digit via cursor                           |                          |
| <b>SHIFT ▲</b><br><b>SHIFT ▼</b> | Quick change between menu items  | Quick change of code number   | Quick change of digit via cursor                     |                          |
| <b>▶</b><br><b>◀</b>             | Change between main menu, submenu and code level   |                               | Cursor to the right<br>Cursor to the left            |                          |
| <b>RUN</b>                       | Deactivate the function of the key <b>STOP</b> , the LED in the key goes off                                   |                               |  |                          |
| <b>STOP</b>                      | Inhibit the controller, the LED in the key is lit.   |                               |  |                          |
|                                  | Reset fault (TRIP-Reset):<br>1. Remove the cause of malfunction<br>2. Press <b>STOP</b><br>3. Press <b>RUN</b> |                               |  |                          |

<sup>1)</sup> Only active for operation with standard devices of the 8200 vector or 8200 motec series

### 3.1.4 Changing and saving parameters



### Note!

Your settings have an effect on the current parameters in the main memory. You must save your settings in a parameter set so that they are not lost when the mains are connected.

If you only need one parameter set, save your settings as parameter set 1, since parameter set 1 is loaded automatically after mains connection.

| Step |   | Key sequence              | Action  |
|------|---|---------------------------|---|
| 1.   | Select the menu                                 | <b>▲▼▲▼</b>               | Use the arrow keys to select the desired menu |
| 2.   | Change to the code level                        | <b>▶</b>                  | Display of the first code in the menu         |
| 3.   | Select code or subcode                          | <b>▲▼</b>                 | Display of the current parameter value        |
| 4.   | Change to the parameter level                   | <b>PRG</b>                |   |
| 5.   | When SHPRG is displayed, inhibit the controller | <b>STOP</b> <sup>1)</sup> | The drive coasts                              |
| 6.   | Change parameter                                | A <b>▶▶</b>               | Move cursor below the digit to be changed     |
|      |   | B <b>▲▼</b>               | Change of digit                               |
|      |   | <b>SHIFT ▼</b>            | Quick change of digit                         |
|      |   | <b>SHIFT ▲</b>            |   |

## Parameter setting

Parameter setting with the XT EMZ9371BC keypad  
Changing and saving parameters

| Step   | Key sequence                | Action                                |
|--|-----------------------------|---------------------------------------|
| 7. Accept the changed parameter              | Display of SHPRG or SHPRG ⇨ | SHIFT PRG                             |
|  | Display ⇨                   | -                                     |
|  |                             |                                       |
| 8. Enable the controller, if required        | RUN <sup>1)</sup>           | The drive runs again                  |
| 9. Change to the code level                  | A                           | PRG                                   |
|  | B                           | PRG                                   |
| 10. Change further parameters                |                             | Restart the "loop" with step 1. or 3. |
| 11. Save changed parameters                  | A                           | ▲▼▶◀                                  |
|  | B                           | PRG                                   |
|  | C                           | ▲                                     |
|  | D                           | SHIFT PRG                             |
| 12. Change to the code level                 | A                           | PRG                                   |
|  | B                           | PRG                                   |
| 13. Set parameters for another parameter set |                             | Restart the "loop" with step 1. or 3. |

- <sup>1)</sup> The function of the STOP key can be programmed:  
C0469 = 1: Controller inhibit  
C0469 = 2: Quick stop (Lenze setting)



3.1.5 Loading a parameter set

The keypad serves to load a saved parameter set into the main memory when the controller is inhibited. After the controller is enabled, it operates with the new parameters.



**Danger!**

- ▶ When a new parameter set is loaded, the controller is reinitialised and acts as if it had been connected to the mains:
  - System configurations and terminal assignments can be changed. Make sure that your wiring and drive configuration comply with the settings of the parameter set.
- ▶ Only use terminal X5/28 as source for the controller inhibit! Otherwise the drive may start in an uncontrolled way when switching over to another parameter set.



**Note!**

- ▶ After switching on the supply voltage, the controller always loads parameter set 1 into the main memory.
- ▶ It is also possible to load other parameter sets into the main memory via the digital inputs or bus commands.

| Step |   | Key sequence | Action   |
|------|---|--------------|--|
| 1.   | Inhibit controller                                |              | Terminal X5/28 = LOW   |
| 2.   | Load the saved parameter set into the main memory |              |  |
|      |   | A            | Select the code C0002 "PAR LOAD" in the menu "Load/Store"  |
|      |   | B            | Change to the parameter level<br>The active parameter set is displayed, e. g. display "0" and "Load Default"<br>If you want to restore the delivery status, proceed with D |
|      | Select the parameter set to be loaded             | C            | Load parameter set 1:<br>⇒ Set "1" "Load PS1"  |
|      |   |              | Load parameter set 2:<br>⇒ Set "2" "Load PS2"  |
|      |   |              | Load parameter set 3:<br>⇒ Set "3" "Load PS3"  |
|      |   |              | Load parameter set 4:<br>⇒ Set "4" "Load PS4"  |
|      |   | D            | "RDY" goes off. The parameter set is loaded completely into the main memory if "RDY" is displayed again.   |
| 3.   | Change to the code level                          |              |  |
|      |   | A            | Display of the operating level   |
|      |   | B            | Display of C0002 "PAR LOAD"  |
| 4.   | Enable controller                                 |              | Terminal X5/28 = HIGH<br>The drive is running with the settings of the loaded parameter set  |

## Parameter setting

Parameter setting with the XT EMZ9371BC keypad  
Transferring parameters to other standard devices

### 3.1.6 Transferring parameters to other standard devices

Parameter settings can be easily copied from one standard device to another by using the keypad.

For this purpose use the "Load/Store" menu



#### Danger!

During the parameter transfer from the keypad to the standard device the control terminals can adopt undefined states!

Therefore the plugs X5 and X6 must be disconnected from the standard device before the transfer takes place. This ensures that the controller is inhibited and all control terminals have the defined state "LOW".

### Copying parameter sets from the standard device into the keypad



#### Note!

After copying the parameter sets into the XT keypad (C0003 = 11), always the parameter set that was loaded last via C0002 is activated.

Like this the current parameters also remain active after copying:

- ▶ Save the current parameters in the parameter set before copying and load this parameter set in the controller via C0002.

| Step | Key sequence                            | Action  |
|------|---|---|
| 1.   | Connect the keypad to standard device 1 |   |
| 2.   | Inhibit controller                      | Terminal X5/28 = LOW<br>The drive coasts.   |
| 3.   | Select C0003 in the "Load/Store" menu   | ●●●●●<br>Select code C0003 "PAR SAVE" in the "Load/Store" menu using the arrow keys.  |
| 4.   | Change to the parameter level           | PRG<br>Display "0" and "READY"  |
| 5.   | Copy all parameter set into the keypad  | The settings saved in the keypad are overwritten.<br>●<br>Set "11" "Save extern"  |
| 6.   | Start copying                           | SHIF PRG<br>The "RDY" status display goes off. As parameter value "BUSY" is displayed.<br>If "BUSY" goes off after approx. one minute, all parameter sets were copied into the keypad. The "RDY" status display is lit. |
| 7.   | Change to the code level                | A PRG<br>B PRG<br>Display of the operating level<br>Display C0003 and "PAR SAVE"  |
| 8.   | Enable controller                       | Terminal X5/28 = HIGH   |
| 9.   | Remove keypad from standard device 1    |   |

## Copying parameter sets from keypad into the standard device

| Step | Key sequence | Action   |
|------|--------------|--|
| 1.   |              | Connect the keypad to standard device 2  |
| 2.   |              | Inhibit controller<br>Terminal X5/28 = LOW<br>The "IMP" status display is lit.<br>The drive coasts   |
| 3.   |              | Pull the plugs X5 and X6<br>All control terminals have the defined "LOW" status.   |
| 4.   | ▲▼◀▶         | Select C0002 in the "Load/Store" menu<br>Select code C0002 "PAR LOAD" in the "Load/Store" menu using the arrow keys.   |
| 5.   | PRG          | Change to the parameter level<br>The active parameter set is shown, e. g. display "0" and "Load Default"   |
| 6.   |              | Select the correct copy function<br>The settings saved in the standard device are overwritten.   |
|      |              | <ul style="list-style-type: none"> <li>Copy all parameter sets available into the EEPROM of the standard device and save them permanently.</li> <li>The parameter set that was active before copying is overwritten.</li> <li>The parameters are not yet active after copying. Select parameter set and load it in the main memory. [ ] 25</li> </ul>                    |
|      | ●            | Set "20" "ext -> EEPROM"   |
|      |              | <ul style="list-style-type: none"> <li>Copy individual parameter sets into the main memory of the standard device.</li> </ul>  |
|      | ●            | Copy parameter set 1 into the main memory:<br>Set ⇒ "11" "Load ext PS1"  |
|      |              | Copy parameter set 2 into the main memory:<br>Set ⇒ "12" "Load ext PS2"  |
|      |              | Copy parameter set 3 into the main memory:<br>Set ⇒ "13" "Load ext PS3"  |
|      |              | Copy parameter set 4 into the main memory:<br>Set ⇒ "14" "Load ext PS4"  |
| 7.   | SHIFT PRG    | Start copying<br>The "RDY" status display goes off. As parameter value "BUSY" is displayed.<br>If "BUSY" goes off, the parameter sets selected were copied into the standard device. The "RDY" status display is lit.  |
| 8.   |              | Change to the code level   |
|      | A PRG        | Display of the operating level   |
|      | B PRG        | Display C0002 and "PAR LOAD"   |
| 9.   | ▲▼◀▶         | <ul style="list-style-type: none"> <li>If the function "Copy all parameter sets into the EEPROM" (C0002 = 20) is selected, they might have to be loaded in the main memory manually.</li> <li>If the function "Copy individual parameter sets into the main memory" (C0002 = 1x) is selected, they might have to be saved permanently in the EEPROM manually.</li> </ul> |
| 10.  |              | Plug in plugs X5 and X6  |
| 11.  |              | Enable controller<br>Terminal X5/28 = HIGH<br>The drive is running with the new settings.  |

## Parameter setting

Parameter setting with the XT EMZ9371BC keypad  
Activating password protection

### 3.1.7 Activating password protection



#### Note!

- ▶ If the password protection is activated (C0094 = 1 ... 9999), you only have free access to the user menu.
- ▶ To access the other menus, you must enter the password. By this, the password protection is annulled until you enter a new password.
- ▶ Please observe that the password-protected parameters can be overwritten as well when transferring the parameter sets to other standard devices. The password is not transferred.
- ▶ Do not forget your password! If you have forgotten your password, it can only be reset via a PC or a bus system!

#### Activate password protection

| Step                             | Key sequence | Action                                       |
|----------------------------------|--------------|--|
| 1. Select the "USER menu"        | ⬅➡⬅➡         | Change to the user menu using the arrow keys |
| 2. Change to the code level      | ➡            | Display of code C0051 "MCTRL-NACT"           |
| 3. Select C0094                  | ⬆            | Display of code C0094 "Password"             |
| 4. Change to the parameter level | PRG          | Display "0" = no password protection         |
| 5. Set password                  | A ⬆          | Select password (1 ... 9999)                 |
|                                  | B SHIFT PRG  | Confirm password                             |
| 6. Change to the code level      | A PRG        | Display of the operating level               |
|                                  | B PRG        | Display of C0094 and "Password"              |
| 7. Change to the "USER menu"     | ⬅➡⬅➡         |  |

The password protection is active now.

You can only quit the user menu if you re-enter the password and confirm it with SHIFT PRG.

#### Remove password protection

| Step   | Key sequence | Action   |
|--|--------------|--|
| 1. Change to the code level in the user menu | ➡            |  |
| 2. Select C0094                              | ⬆            | Display of code C0094 "Password"   |
| 3. Change to the parameter level             | PRG          | Display "9999" = password protection is active   |
| 4. Enter password                            | A ⬆          | Set valid password   |
|  | B SHIFT PRG  | Confirm<br>The password protection is deactivated by entering the password once again. |
| 5. Change to the code level                  | A PRG        | Display of the operating level   |
|  | B PRG        | Display of C0094 and "Password"  |

The password protection is deactivated now. All menus can be freely accessed again.

### 3.1.8 Diagnostics

In the "Diagnostic" menu the two submenus "Actual info" and "History" contain all codes for

- ▶ monitoring the drive
- ▶ fault/error diagnosis

In the operating level, more status messages are displayed. If several status messages are active, the message with the highest priority is displayed.

| Priority | Display   | Meaning   |
|----------|---|---|
| 1        | GLOBAL DRIVE INIT   | Initialisation or communication error between keypad and controller |
| 2        | XXX - TRIP  | Active TRIP (contents of C0168/1)                                   |
| 3        | XXX - MESSAGE   | Active message (contents of C0168/1)                                |
| 4        | Special device states:  |   |
|          |   | Switch-on inhibit   |
| 5        | Source for controller inhibit (the value of C0004 is displayed simultaneously): |   |
|          | STP1  | 9300 servo: Terminal X5/28<br>ECSxS/P/M/A: Terminal X6/SI1          |
|          | STP3  | Operating module or LECOM A/B/LI                                    |
|          | STP4  | INTERBUS or PROFIBUS-DP   |
|          | STP5  | 9300 servo, ECSxA/E: System bus (CAN)<br>ECSxS/P/M: MotionBus (CAN) |
|          | STP6  | C0040   |
| 6        | Source for quick stop (QSP):  |   |
|          | QSP-term-Ext  | The MCTRL-QSP input of the MCTRL function block is on HIGH signal.  |
|          | QSP-C0135   | Operating module or LECOM A/B/LI                                    |
|          | QSP-AIF   | INTERBUS or PROFIBUS-DP   |
|          | QSP-CAN   | 9300 servo, ECSxA: System bus (CAN)<br>ECSxS/P/M: MotionBus (CAN)   |
| 7        | XXX - WARNING   | Active warning (contents of C0168/1)                                |
| 8        | xxxx  | Value below C0004   |

### 3.1.9 Menu structure

For simple, user-friendly operation, the codes are clearly arranged in function-related menus:

| Main menu    | Submenus    | Description  |
|--------------|-------------|--|
| Display      | Display     |  |
| User-Menu    |             | <b>Codes defined in C0517</b>  |
| Code list    |             | <b>All available codes</b>   |
|              | ALL         | All available codes listed in ascending order (C0001 ... C7999)  |
|              | PS 1        | Codes in parameter set 1 (C0001 ... C1999)   |
|              | PS 2        | Codes in parameter set 2 (C2001 ... C3999)   |
|              | PS 3        | Codes in parameter set 3 (C4001 ... C5999)   |
|              | PS 4        | Codes in parameter set 4 (C6001 ... C7999)   |
| Load/Store   |             | <b>Parameter set management</b><br>Parameter set transfer, restore delivery status   |
| Diagnostic   |             | <b>Diagnostic</b>  |
|              | Actual info | Display codes to monitor the drive   |
|              | History     | Fault analysis with history buffer   |
| Short setup  |             | <b>Quick configuration of predefined applications</b><br><b>Configuration of the user menu</b><br>The predefined applications depend on the type of the standard device (frequency inverter, servo inverter, position controller, ...) |
| Main FB      |             | <b>Configuration of the main function blocks</b>   |
|              | NSET        | Setpoint processing  |
|              | NSET-JOG    | Fixed setpoints  |
|              | NSET-RAMP1  | Ramp function generator  |
|              | MCTRL       | Motor control  |
|              | DFSET       | Digital frequency processing   |
|              | DCTRL       | Internal control   |
| Terminal I/O |             | <b>Connection of inputs and outputs with internal signals</b>  |
|              | AIN1 X6.1/2 | Analog input 1   |
|              | AIN2 X6.3/4 | Analog input 2   |
|              | AOUT1 X6.62 | Analog output 1  |
|              | AOUT2 X6.63 | Analog output 2  |
|              | DIGIN       | Digital inputs   |
|              | DIGOUT      | Digital outputs  |
|              | DFIN        | Digital frequency input  |
|              | DFOUT       | Digital frequency output   |
|              | State bus   | State bus (not with 9300 frequency inverter)   |
| Controller   |             | <b>Configuration of internal control parameters</b>  |
|              | Speed       | Speed controller   |
|              | Current     | Current controller or torque controller  |
|              | Phase       | Phase controller (not with 9300 frequency inverter)  |
| Motor/Feedb. |             | <b>Input of motor data, configuration of speed feedback</b>  |
|              | Motor adj   | Motor data   |
|              | Feedback    | Configuration of feedback systems  |
| Monitoring   |             | <b>Configuration of monitoring functions</b>   |

| Main menu   | Submenus      | Description  |
|-------------|---------------|--|
| Display     | Display       |  |
| LECOM/AIF   |               | <b>Configuration of operation with communication modules</b>                                     |
|             | LECOM A/B     | Serial interface   |
|             | AIF interface | Process data   |
|             | Status word   | Display of status words  |
| System bus  |               | <b>Configuration of system bus (CAN)</b>   |
|             | Management    | CAN communication parameters   |
|             | CAN-IN1       | CAN object 1   |
|             | CAN-OUT1      |  |
|             | CAN-IN2       | CAN object 2   |
|             | CAN-OUT2      |  |
|             | CAN-IN3       | CAN object 3   |
|             | CAN-OUT3      |  |
|             | Status word   | Display of status words  |
|             | FDO           | Free digital outputs   |
|             | Diagnostic    | CAN diagnostic   |
| FB config   |               | <b>Configuration of function blocks</b>  |
| Func blocks |               | <b>Parameterisation of function blocks</b><br>The submenus contain all available function blocks |
| FCODE       |               | <b>Configuration of free codes</b>   |
| Identify    |               | <b>Identification</b>  |
|             | Drive         | Software version of standard device  |
|             | Op Keypad     | Software version of keypad   |

## 4 Troubleshooting and fault elimination

Display of operating data, diagnostics

Display of operating data

## 4 Troubleshooting and fault elimination

### 4.1 Display of operating data, diagnostics

#### 4.1.1 Display of operating data

##### Description

Important operating parameters are measured by the controller. They can be displayed with the keypad or PC.

Some operating data can be calibrated to be displayed or selected directly with the unit of the process quantity (e.g. pressure, temperature, speed).



##### Note!

The calibration always affects all specified codes simultaneously.

##### Codes for parameter setting

| Code  |               | Possible settings |                |       | IMPORTANT   |
|-------|---------------|-------------------|----------------|-------|---|
| No.   | Name          | Lenze             | Selection      |       |   |
| C0051 | MCTRL-NACT    |                   | -36000 {1 rpm} | 36000 | Actual speed value, function block MCTRL <ul style="list-style-type: none"><li>● Read only</li></ul>  |
| C0052 | MCTRL-Umot    |                   | 0 {1 V}        | 800   | Motor voltage, function block MCTRL <ul style="list-style-type: none"><li>● Read only</li><li>● MCTRL-VACT = 100 % = C0090</li></ul>  |
| C0053 | UG-VOLTAGE    |                   | 0 {1 V}        | 900   | DC-bus voltage, function block MCTRL <ul style="list-style-type: none"><li>● Read only</li><li>● MCTRL-DCVOLT = 100 % = 1000 V</li></ul>  |
| C0054 | IMot          |                   | 0.0 {0.1 A}    | 500.0 | Current motor current, function block MCTRL <ul style="list-style-type: none"><li>● Read only</li><li>● MCTRL-IACT = 100 % = C0022</li></ul>  |
| C0061 | Heatsink temp |                   | 0 {1 °C}       | 100   | Heatsink temperature <ul style="list-style-type: none"><li>● Read only</li><li>● If the temperature of the heatsink &gt; 85 °C, the controller sets TRIP <i>OH</i></li><li>● Early warning is possible via <i>OH4</i>, temperature is set in C0122</li></ul>  |
| C0063 | Mot temp      |                   | 0 {1 °C}       | 200   | Motor temperature <ul style="list-style-type: none"><li>● Read only</li><li>● Monitoring of the motor temperature must be activated.</li><li>● KTY at X8/5, X8/8:<ul style="list-style-type: none"><li>– At 150 °C, TRIP <i>OH3</i> is set</li><li>– Early warning is possible via <i>OH7</i>, temperature is set in C0121</li></ul></li><li>● PTC, thermal contact at T1, T2:<ul style="list-style-type: none"><li>– Release sets TRIP or warning <i>OH8</i></li></ul></li></ul> |



| Code  |             | Possible settings |   |  | IMPORTANT |   |
|-------|-------------|-------------------|---|--|-----------|---|
| No.   | Name        | Lenze             | Selection   |  |           |   |
| C0064 | Utilization |                   | 0   | {1 %}  | 150       | Device utilisation I×t <ul style="list-style-type: none"> <li>• Read only</li> <li>• Device utilisation during the last 180 s of operating time</li> <li>• C0064 &gt; 100 % releases warning 005</li> <li>• C0064 &gt; 140 % limits the output current of the controller to 67 % of the maximum current in C0022</li> </ul> |
| C0150 | Status word |                   | Bit00 –<br>Bit01 IMP<br>Bit02 –<br>Bit03 –<br>Bit04 –<br>Bit05 –<br>Bit06 n = 0<br>Bit07 CINH | Bit08 Status code<br>Bit09 Status code<br>Bit10 Status code<br>Bit11 Status code<br>Bit12 Warning<br>Bit13 Message<br>Bit14 –<br>Bit15 – |           | Read only<br>Decimal status word for networking via automation interface (AIF) <ul style="list-style-type: none"> <li>• Binary interpretation indicates the bit states</li> </ul>   |

## 4.1.2 Diagnostics

### Description

Display codes for diagnostics

### Codes for parameter setting

| Code  |             | Possible settings |                                       |         | IMPORTANT  |
|-------|-------------|-------------------|---------------------------------------|---------|--|
| No.   | Name        | Lenze             | Selection                             |         |  |
| C0093 | DRIVE IDENT |                   |                                       |         | Controller identification  |
|       |             |                   |                                       |         | • Read only  |
|       |             |                   | 0                                     | invalid | Damaged power section  |
|       |             |                   | 1                                     | none    | No power section   |
|       |             |                   | 9321                                  | 9321VC  | Display of the controller used   |
|       | ...         | ...               |                                       |         |  |
|       | 9333        | 9333VC            |                                       |         |  |
| C0099 | S/W version |                   | x.y<br>x Main version<br>y Subversion |         | Software version <ul style="list-style-type: none"> <li>• Read only</li> </ul> |

## 4 Troubleshooting and fault elimination

Troubleshooting  
Status display via controller LEDs

### 4.2 Troubleshooting

#### Detecting breakdowns

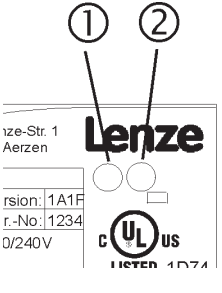
A breakdown can be detected quickly via the LEDs at the controller or via the status information at the keypad.

#### Analysing errors

Analyse the error using the history buffer. The list of fault messages gives you advice how to remove the fault. (📖 40)

#### 4.2.1 Status display via controller LEDs

During operation the operating status of the controller is shown by 2 LEDs.

| LED              |                 | Operating status                                      |  |
|------------------|-----------------|---|--|
| Red ①            | Green ②         |   |  |
| Off              | On              | Controller is enabled                                 |  |
| On               | On              | Mains is switched on and automatic start is inhibited |  |
| Off              | Blinking slowly | Controller is inhibited                               |  |
| Off              | On              | Motor data identification is being performed          |  |
| Blinking quickly | Off             | Undervoltage  |  |
| Blinking slowly  | Off             | Active fault  |  |

## 4.2.2 Fault analysis with the history buffer

### Retracing faults

Faults can be retraced via the history buffer. Fault messages are stored in the 8 memory locations in the order of their appearance.

The memory locations can be retrieved via codes.

### Structure of the history buffer

| Code    |         |         | Memory location   | Entry                | Note  |
|---------|---------|---------|-------------------|----------------------|---|
| C0168/1 | C0169/1 | C0170/1 | Memory location 1 | Active fault         | If the fault is no longer pending or has been acknowledged: <ul style="list-style-type: none"> <li>• The contents of the memory locations 1 ... 7 are shifted "up" to the next memory location.</li> <li>• The content of memory location 8 is deleted from the history buffer and cannot be retrieved anymore.</li> <li>• Memory location 1 is deleted (= no active fault).</li> </ul> |
| C0168/2 | C0169/2 | C0170/2 | Memory location 2 | Last fault           |   |
| C0168/3 | C0169/3 | C0170/3 | Memory location 3 | Last but one fault   |   |
| C0168/4 | C0169/4 | C0170/4 | Memory location 4 | Last but two fault   |   |
| C0168/5 | C0169/5 | C0170/5 | Memory location 5 | Last but three fault |   |
| C0168/6 | C0169/6 | C0170/6 | Memory location 6 | Last but four fault  |   |
| C0168/7 | C0169/7 | C0170/7 | Memory location 7 | Last but five fault  |   |
| C0168/8 | C0169/8 | C0170/8 | Memory location 8 | Last but six fault   |   |

### Explanations regarding the codes

|       |  |
|-------|--|
| C0168 | <b>Fault indication and response</b> <ul style="list-style-type: none"> <li>• The entry is effected as a LECOM error number</li> <li>• If several faults with different responses occur at the same time:                             <ul style="list-style-type: none"> <li>– Only the fault with the highest priority response is entered (1. TRIP, 2. message, 3. warning).</li> </ul> </li> <li>• If several faults with the same response (e.g. 2 messages) occur at the same time:                             <ul style="list-style-type: none"> <li>– Only the fault which occurred first is entered.</li> </ul> </li> </ul> |
| C0169 | <b>Time of fault occurrence</b> <ul style="list-style-type: none"> <li>• The reference time is provided by the power-on time meter (C0179).</li> <li>• If the same fault occurs several times in succession, only the time of the last occurrence is stored.</li> </ul>  |
| C0170 | <b>Fault frequency</b> <ul style="list-style-type: none"> <li>• Only the time of the last occurrence is stored.</li> </ul>   |

### Clear history buffer

Set C0167 = 1 to clear the history buffer.

## 4 Troubleshooting and fault elimination


Drive behaviour in the event of faults  
Fault analysis with the history buffer

### 4.3 Drive behaviour in the event of faults

The controller responds differently to the three possible fault types TRIP, message, or warning:

#### TRIP

**TRIP (display in keypad XT: **)

- ▶ Switches the power outputs U, V, W to a high-resistance state until TRIP reset is executed.
- ▶ The fault indication is entered into the history buffer as "current fault" in C0168/1.
- ▶ The drive coasts without any control!
- ▶ After TRIP reset ( 45):
  - The drive travels along the ramps to its setpoint.
  - The fault indication is moved to C0168/2 as "last fault".

#### Messages

**Message (display in keypad XT: **)


- ▶ Switches the power outputs U, V, W to a high-resistance state.
- ▶ The fault indication is entered into the history buffer as "current fault" in C0168/1.
- ▶ In case of a fault  $\leq 5$  s:
  - The drive coasts without any control as long as the message is active!
  - If the message is not active anymore, the drive travels to its setpoint with maximum torque.
- ▶ In case of a fault  $> 5$  s:
  - The drive coasts without any control as long as the message is active!
  - If the message is not active anymore, the drive travels to its setpoint along the adjusted ramps.
- ▶ If the message is not active anymore, the fault indication is moved to C0168/2 as "last fault".

#### Warnings

**"Heatsink overtemperature" (keypad XT: **)

- ▶ The drive continues to travel in a controlled way!
- ▶ The warning signal goes off when the fault is not active anymore.

**"Error in motor phase" (keypad XT: **)

**"PTC monitoring" (keypad XT: **)

- ▶ The drive continues to travel in a controlled way!
- ▶ The fault indication is entered into the history buffer as "current fault" in C0168/1.
- ▶ After TRIP reset, the fault indication is moved to C0168/2 as "last fault".

## 4.4 Fault elimination

### 4.4.1 Drive errors

| Malfunction  | Cause   | Remedy  |
|--|---|---|
| An asynchronous motor with feedback rotates in an uncontrolled manner and with low speed                                     | <p>The motor phases are reversed so that the rotating field of the motor is not identical with the rotating field of the feedback system. The drive shows the following behaviour:</p> <ul style="list-style-type: none"> <li>• V/f characteristic control (C0006 = 5)                             <ul style="list-style-type: none"> <li>– The motor rotates faster than the speed setpoint by the value set in C0074 (influence of the speed controller, Lenze setting 10 % of <math>n_{max}</math>). After the controller is enabled, it does not stop at zero speed setpoint or quick stop (QSP).</li> <li>– The final motor current depends, among other things, on the set value of the <math>V_{min}</math> boost (C0016) and can rise to <math>I_{max}</math> (C0022). This may activate the fault message OC5.</li> </ul> </li> <li>• Vector control (C0006 = 1)                             <ul style="list-style-type: none"> <li>– The motor rotates slowly with maximum slip speed (depending on motor data and maximum current) and does not react to a speed setpoint. The direction of rotation, however, is determined by the sign of the speed setpoint.</li> <li>– The motor current rises up to <math>I_{max}</math> (C0022). This may activate the fault message OC5 with a time delay.</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>• Check motor cable for correct phase relation.</li> <li>• If possible, operate the motor with deactivated feedback (C0025 = 1) and check the direction of rotation of the motor.</li> </ul>   |
| Motor does not rotate although the controller is enabled ( $\overline{IMP}$ is off) and a speed setpoint has been specified. | The two terminal strips X5 are reversed. Since X5/A1 and X5/28 face each other, the controller can be enabled if the control terminals are internally supplied. All other connections, however, are assigned incorrectly so that the motor cannot start.  | <p>Check the position of the terminal strips:</p> <ul style="list-style-type: none"> <li>• If you look at the connection unit in reading direction, the left terminal strip X5 must be connected with the input signals and the right terminal strip X5 must be connected with the output signals.</li> </ul>                             |
| The monitoring of the motor phases (LP1) does not respond if a motor phase is interrupted, although C0597 = 0 or 2           | The function block MLP1 is not entered into the processing table.   | Enter the function block MLP1 into the processing table. The function block MLP1 requires 30 $\mu$ s of calculating time.   |
| If during high speeds DC-injection braking (GSB) is activated, the fault OC1 (TRIP) or OU (TRIP) occurs                      | During DC-injection braking the controller sets pulse inhibit for a short time (DCTRL-IMP) to reduce the magnetisation in the motor before a DC voltage is injected into the motor. At high speeds (e. g. in case of mid-frequency motors) the residual voltage which develops from the residual magnetism and high speed can generate such a high motor current that OC1 or OU are activated.  | <p>Prolong the duration of the pulse inhibit:</p> <ul style="list-style-type: none"> <li>• Connect the output signal DCTRL-IMP to the function block TRANSx and adjust the desired switch-off time there (usually 500 ms). If DCTRL-CINH1 is set to HIGH, the duration of the pulse inhibit is prolonged by the time adjusted.</li> </ul> |

#### 4.4.2 Controller in clamp operation

The clamp operation is a permissible operating mode. But since, however, pulse inhibit is set again and again, the controller cannot provide the optimum power.

If the output power is optimal, the output current mainly is right below the clamp threshold.

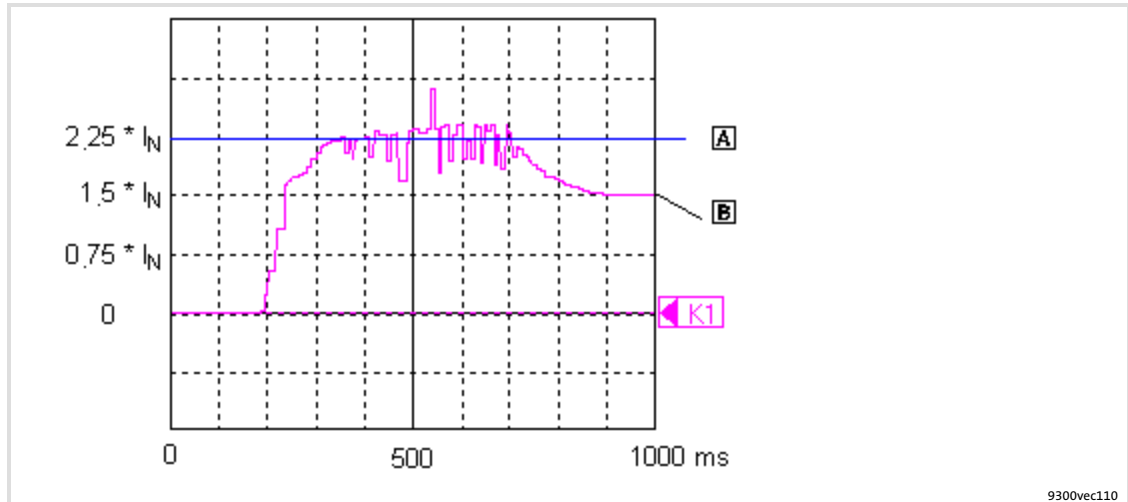


Fig. 4-1 Output current when starting a motor with high load (shown with the oscilloscope in GDC)

- Ⓐ Clamp threshold
- Ⓑ Output current

#### Function

1. When the output current reaches  $2.25 \times I_r$ , a software clamp is activated.
2. The controller sets pulse inhibit for a short time. The motor current decreases as a function of the inductance in the motor circuit.
  - An internal counter is increased by the value one.
3. After max. 250  $\mu$ s the pulse inhibit is deactivated.
4. If a software clamp reoccurs within 2 s, the internal counter is again increased by the value one. Otherwise the counter is set to zero.
  - If the counter reaches the value 4300, OC3 (TRIP) is activated.

## 4.4.3 Behaviour in case of overvoltage in the DC bus (OU message)

### Description

If the DC-bus voltage ( $U_{DC}$ ) exceeds the switch-off threshold OU, the pulse inhibit is set. At the same time, an internal timing element starts for a delay time (C0912).

The pulse inhibit is deactivated if the voltage falls below the switch-on threshold OU and the delay time has elapsed.

Switching thresholds in case of overvoltage in the DC bus (OU):

| Mains voltage range |  | C0173 | Switch-off threshold OU | Switch-on threshold OU |
|---------------------|--|-------|-------------------------|------------------------|
| < 400 V             | Operation with / without brake chopper | 0     | 770 V                   | 755 V                  |
| 400 V               | Operation with / without brake chopper | 1 *   | 770 V                   | 755 V                  |
| 460 V               | Operation with / without brake chopper | 2     | 770 V                   | 755 V                  |
| 480 V               | Operation without brake chopper        | 3     | 770 V                   | 755 V                  |
| 480 V               | Operation with brake chopper           | 4     | 800 V                   | 785 V                  |

\* Lenze setting

### Codes for parameter setting

| Code  |               | Possible settings |           | IMPORTANT   |
|-------|---------------|-------------------|-----------|---|
| No.   | Name          | Lenze             | Selection |   |
| C0912 | OV delay time | →                 | - {1 ms}  | - Delay time of the pulse enable after an OU message<br>→ Depending on C0082, C0086, C0087, C0088, C0089, C0090, C0091, C0092<br>A change of one of the codes resets C0912 to the time of the selected motor<br>● The time is derived from the double rotor time constant |

### Adjustment

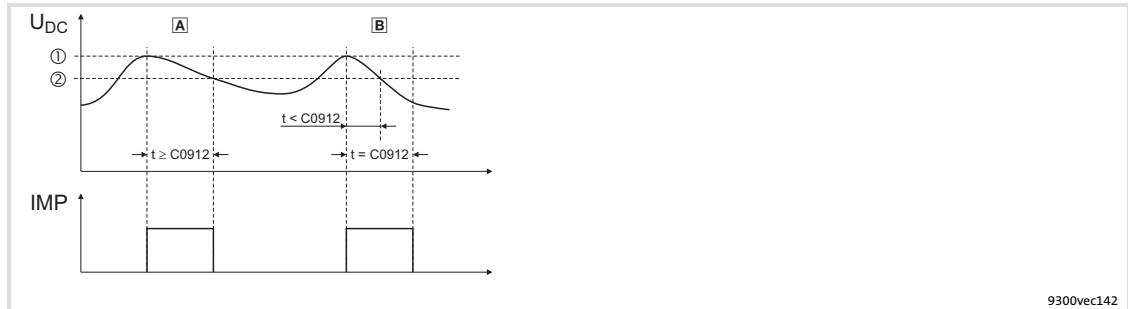


Fig. 4-2 Influence of the delay time (C0912)

① Switch-off threshold OU

② Switch-on threshold OU

**A** The period of time between exceeding the switch-off threshold OU and undershooting the switch-on threshold OU equals or is higher than the delay time set in C0912.

After undershooting the switch-on threshold OU, the pulse inhibit is deactivated.

**B** The period of time between exceeding the switch-off threshold OU and undershooting the switch-on threshold OU is lower than the delay time set in C0912.

The pulse inhibit is deactivated after the delay time in C0912 has elapsed.

- ▶ The delay time in [ms] is set under C0912. The Lenze setting can be changed by the factor 0.5 ... 2.

## 4.5 System error messages

### 4.5.1 General error messages



#### Note!

In the case of a query via system bus (CAN), the fault messages are represented as numbers (see first column of the table).



| Fault message |         | Description   | Cause   | Remedy   |
|---------------|---------|---|---|--|
| No.           | Display |   |   |  |
| ---           | ---     | No fault  | -   | -  |
| 0011          | OC1     | Overcurrent in motor cable ( $I_a > 2.25 \times I_N$ ; Hardware monitoring) | In the event of a short circuit   | <ul style="list-style-type: none"> <li>Search for the cause of the short circuit.</li> <li>Check the motor cable.</li> </ul>   |
|               |         |   | Capacitive charging current of the motor cable is too high  | Use motor cable which is shorter or of lower capacitance   |
|               |         |   | Too short acceleration or deceleration times in proportion to the load (C0012, C0013, C0105)  | <ul style="list-style-type: none"> <li>Increase the gain (P component) of the <math>I_{max}</math> controller (C0075).</li> <li>Reduce integral-action time (integral action component) of the <math>I_{max}</math> controller (C0076)</li> </ul>  |
|               |         |   | The drive is connected to the coasting machine. The coasting is caused by a short-time pulse inhibit, e.g. at <ul style="list-style-type: none"> <li>OU (overvoltage in the DC bus)</li> <li>external or internal controller inhibit</li> </ul> | <ul style="list-style-type: none"> <li>Activate flying restart circuit</li> </ul>  |
|               |         |   | <ul style="list-style-type: none"> <li>Encoder error</li> <li>Tracks during encoder feedback of the motor speed are interchanged</li> </ul>   | Check wiring of the encoder  |
|               |         |   | DC-injection braking at high speeds   | <ul style="list-style-type: none"> <li>See <a href="#">37</a></li> </ul>   |
|               |         |   | Missing mains phase   | <ul style="list-style-type: none"> <li>Check the connections and the supply cable of the device</li> <li>Check mains voltage</li> </ul>  |
| 0012          | OC2     | Motor cable earth fault   | One of the motor phases has earth contact.  | <ul style="list-style-type: none"> <li>Search for cause of short circuit.</li> <li>Check motor cable.</li> </ul>   |
| 0013          | OC3     | Overload during acceleration.   | Too short acceleration or deceleration times in proportion to the load (C0012, C0013, C0105).   | <ul style="list-style-type: none"> <li>Increase the gain (P component) of the current controller (C0075).</li> <li>Reduce the reset time (integral action component) of the <math>I_{max}</math> controller (C0076).</li> <li>Increase ramp times.</li> <li><a href="#">38</a>, "controller in clamp operation (fault OC3)"</li> </ul> |
| 0015          | OC5     | $I \times t$ overload   | <ul style="list-style-type: none"> <li>Frequent and too long acceleration with overcurrent</li> <li>Continuous overload with <math>I_{motor} &gt; 1.05 \times I_{rx}</math>.</li> </ul>   | Check drive dimensioning.  |
| 0016          | OC6     | $I^2 \times t$ overload   | <ul style="list-style-type: none"> <li>Frequent and too long acceleration processes with motor overcurrent.</li> <li>Permanent motor overload with <math>I_{motor} &gt; I_{r_{motor}}</math></li> </ul>   | Check drive dimensioning.  |
| x018          | OC8     | $I^2 \times t$ overload advance warning                                     | <ul style="list-style-type: none"> <li>Frequent and too long acceleration processes with motor overcurrent.</li> <li>Permanent motor overload with <math>I_{motor} &gt; I_{r_{motor}}</math></li> </ul>   | Check drive dimensioning.  |
| 2020          | OU      | Overvoltage in the DC bus   | Braking energy is too high. (DC-bus voltage is higher than set in C0173.)   | <ul style="list-style-type: none"> <li>Use a braking unit or regenerative module.</li> <li>Check dimensioning of the brake resistor.</li> </ul>  |
| 1030          | LU      | Undervoltage in the DC bus  | DC bus voltage is lower than specified in C0173.  | <ul style="list-style-type: none"> <li>Check mains voltage</li> <li>Check supply cable</li> </ul>  |

## 4

# Troubleshooting and fault elimination

## System error messages

### General error messages

| Fault message |         | Description   | Cause   | Remedy   |
|---------------|---------|---|---|--|
| No.           | Display |   |   |  |
| x032          | LP1     | Motor phase failure   | A current-carrying motor phase has failed.  | <ul style="list-style-type: none"> <li>• Check motor.</li> <li>• Check motor cable.</li> <li>• Switch off monitoring (C0597 = 3).</li> </ul>   |
|               |         |   | The current limit value is set too low.   | <ul style="list-style-type: none"> <li>• Set higher current limit value via C0599.</li> </ul>  |
| 0050          | OH      | Heatsink temperature > +90 °C   | Ambient temperature $T_u > +40\text{ °C}$ or $> +50\text{ °C}$  | <ul style="list-style-type: none"> <li>• Allow module to cool and ensure better ventilation.</li> <li>• Check ambient temperature in the control cabinet.</li> </ul>   |
|               |         |   | Heatsink is very dirty.   | Clean heatsink.  |
|               |         |   | Wrong mounting position   | Change mounting position.  |
| x053          | OH3     | Motor temperature > +150 °C threshold (temperature detection via resolver or incremental value encoder) | Motor is thermally overloaded due to: <ul style="list-style-type: none"> <li>• Impermissible continuous current</li> <li>• Frequent or too long acceleration processes</li> </ul> | <ul style="list-style-type: none"> <li>• Check drive dimensioning.</li> <li>• Switch off monitoring (C0583 = 3).</li> </ul>  |
|               |         |   | No PTC/temperature contact connected.   | Correct wiring.  |
| x054          | OH4     | Heatsink temperature > C0122  | Ambient temperature $T_u > +40\text{ °C}$ or $> +50\text{ °C}$  | <ul style="list-style-type: none"> <li>• Allow module to cool and ensure better ventilation.</li> <li>• Check ambient temperature in the control cabinet.</li> <li>• Switch off monitoring (C0582 = 3).</li> </ul> |
|               |         |   | Heatsink is very dirty.   | Clean heatsink   |
|               |         |   | Wrong mounting position   | Change mounting position.  |
|               |         |   | The value specified under C0122 is set too low.   | Enter a higher value under C0122.  |
| x057          | OH7     | Motor temperature > C0121 (temperature detection via resolver or incremental value encoder)             | Motor is thermally overloaded due to: <ul style="list-style-type: none"> <li>• Impermissible continuous current</li> <li>• Frequent or too long acceleration processes</li> </ul> | <ul style="list-style-type: none"> <li>• Check drive dimensioning.</li> <li>• Switch off monitoring (C0584 = 3).</li> </ul>  |
|               |         |   | No PTC/temperature contact connected.   | Correct wiring.  |
|               |         |   | The value specified under C0121 is set too low.   | Enter a higher value in C0121.   |
| x058          | OH8     | Motor temperature via inputs T1 and T2 is too high.   | Motor is thermally overloaded due to: <ul style="list-style-type: none"> <li>• Impermissible continuous current</li> <li>• Frequent or too long acceleration processes</li> </ul> | <ul style="list-style-type: none"> <li>• Check drive dimensioning.</li> <li>• Switch off monitoring (C0585 = 3).</li> </ul>  |
|               |         |   | Terminals T1 and T2 are not connected   | Connect PTC/temperature contact.   |
| x061          | CE0     | Automation interface (AIF) communication error  | Faulty transfer of control commands via AIF.  | <ul style="list-style-type: none"> <li>• Plug in the communication module/keypad XT firmly, screw down, if necessary.</li> <li>• Switch off monitoring (C0126 = 3).</li> </ul>                                     |

| Fault message |         | Description   | Cause   | Remedy   |
|---------------|---------|---|---|--|
| No.           | Display |   |   |  |
| x062          | CE1     | Communication error on the process data input object CAN1_IN  | CAN1_IN object receives faulty data or communication is interrupted.  | <ul style="list-style-type: none"> <li>• Check wiring at X4.</li> <li>• Check sender.</li> <li>• Increase monitoring time under C0357/1, if necessary.</li> <li>• Switch off monitoring (C0591 = 3).</li> </ul>  |
| x063          | CE2     | Communication error on the process data input object CAN2_IN  | CAN2_IN object receives faulty data or communication is interrupted.  | <ul style="list-style-type: none"> <li>• Check wiring at X4.</li> <li>• Check sender.</li> <li>• Increase monitoring time under C0357/2, if necessary.</li> <li>• Switch off monitoring (C0592 = 3).</li> </ul>  |
| x064          | CE3     | Communication error on the process data input object CAN3_IN  | CAN3_IN object receives faulty data or communication is interrupted.  | <ul style="list-style-type: none"> <li>• Check wiring at X4.</li> <li>• Check sender.</li> <li>• Increase monitoring time under C0357/3, if necessary.</li> <li>• Switch off monitoring (C0593 = 3).</li> </ul>  |
| x065          | CE4     | BUS-OFF state of system bus (CAN)   | The controller has received too many faulty telegrams via the system bus (CAN) and has disconnected from the bus.   | <ul style="list-style-type: none"> <li>• Check wiring at X4: Is the bus correctly terminated?</li> <li>• Check shield connection of the cables.</li> <li>• Check PE connection.</li> <li>• Check bus load, reduce the baud rate if necessary. (Observe the cable length!)</li> <li>• Switch off the monitoring (C0595 = 3).</li> </ul> |
| 0071          | CCr     | System failure  | Strong interference injection on the control cables   | Screen control cables  |
|               |         |   | Ground or earth loops in the wiring   | <ul style="list-style-type: none"> <li>• Check wiring</li> <li>• Check PE connection</li> </ul> <p><b>After troubleshooting: Deenergise the device completely (disconnect 24 V supply, discharge DC bus)!</b></p>  |
| 0072          | PR1     | Checksum error in parameter set 1<br><b>CAUTION: The Lenze setting is loaded automatically!</b>     | <ul style="list-style-type: none"> <li>• Fault when loading a parameter set.</li> <li>• Interruption while transmitting the parameter set via keypad.</li> </ul>      | <ul style="list-style-type: none"> <li>• Set the required parameters and store them under C0003 = 1.</li> <li>• As to PLC devices, check the use of pointers.</li> </ul>   |
|               |         |   | The stored parameters are incompatible with the loaded software version.  | Store the parameter set under C0003 = 1 first to allow for a faults reset.   |
| 0073          | PR2     | Checksum error in parameter set 2<br><b>PLEASE NOTE: The Lenze setting is loaded automatically!</b> | <ul style="list-style-type: none"> <li>• Fault while loading a parameter set.</li> <li>• Interruption during the transfer of the parameter set via keypad.</li> </ul> | <ul style="list-style-type: none"> <li>• Set the required parameters and save them with C0003 = 2.</li> </ul>  |
|               |         |   | The parameters saved do not comply with the software version loaded.  | In order to be able to acknowledge the error, first save the parameter set with C0003 = 2.   |

| Fault message |         | Description   | Cause   | Remedy  |
|---------------|---------|---|---|---|
| No.           | Display |   |   |   |
| 0074          | PEr     | Program error   | Error in the program flow   | Send the parameter set (on floppy disk/CD-ROM) with a detailed description of the problem to Lenze.<br><b>After troubleshooting: Deenergise the device completely (disconnect 24 V supply, discharge DC bus)!</b> |
| 0075          | PR0     | Error in parameter set.   | The operating system software has been updated.   | Storage of the Lenze setting C0003 = 1.<br><b>After troubleshooting: Deenergise the device completely (disconnect 24 V supply, discharge DC bus)!</b>   |
| 0077          | PR3     | Checksum error in parameter set 3<br><b>PLEASE NOTE: The Lenze setting is loaded automatically!</b> | <ul style="list-style-type: none"> <li>• Fault while loading a parameter set.</li> <li>• Interruption during the transfer of the parameter set via keypad.</li> </ul> <p>The parameters saved do not comply with the software version loaded.</p>   | <ul style="list-style-type: none"> <li>• Set the required parameters and save them with C0003 = 3.</li> </ul> <p>In order to be able to acknowledge the error, first save the parameter set with C0003 = 3.</p>   |
| 0078          | PR4     | Checksum error in parameter set 4<br><b>PLEASE NOTE: The Lenze setting is loaded automatically!</b> | <ul style="list-style-type: none"> <li>• Fault while loading a parameter set.</li> <li>• Interruption during the transfer of the parameter set via keypad.</li> </ul> <p>The parameters saved do not comply with the software version loaded.</p>   | <ul style="list-style-type: none"> <li>• Set the required parameters and save them with C0003 = 4.</li> </ul> <p>In order to be able to acknowledge the error, first save the parameter set with C0003 = 4.</p>   |
| 0079          | PI      | Fault during parameter initialisation   | <ul style="list-style-type: none"> <li>• An error has been detected during the parameter set transfer between two devices.</li> <li>• The parameter set does not match the controller, e.g. if data has been transferred from a higher-power controller to a lower-power controller.</li> </ul> | <ul style="list-style-type: none"> <li>• Correct parameter set.</li> <li>• Send parameter set (on floppy disk/CD-ROM) and a detailed description of the problem to Lenze.</li> </ul>                              |
| x083          | Sd3     | Encoder error at X9   | <p>Cable interrupted.</p> <p>Pin X9/8 not connected.</p>  | <p>Check cable for open circuit.</p> <p>Apply 5 V to pin X9/8 or switch off monitoring (C0587 = 3).</p>   |
| x085          | Sd5     | Encoder error at X6/1 and X6/2 (C0034 = 1)  | Current signal at X6/1 X6/2 < 2mA.  | <ul style="list-style-type: none"> <li>• Check cable for open circuit.</li> <li>• Check current signal encoder.</li> <li>• Switch off monitoring (C0598 = 3).</li> </ul>  |
| x086          | Sd6     | Motor temperature sensor error (X7 or X8)   | Encoder for detecting the motor temperature at X7 or X8 indicates undefined values.   | <ul style="list-style-type: none"> <li>• Check cable for firm connection.</li> <li>• Switch off the monitoring (C0594 = 3).</li> </ul>  |
| x091          | EEr     | External monitoring has been triggered via DCTRL.   | A digital signal assigned to the TRIP-SET function has been activated.  | <ul style="list-style-type: none"> <li>• Check external encoder.</li> <li>• Switch off the monitoring (C0581 = 3).</li> </ul>   |
| 0105          | H05     | Internal fault (memory)   |   | Contact Lenze.  |
| 0107          | H07     | Internal fault (power stage)  | During initialisation of the controller, an incorrect power stage was detected.   | Contact Lenze.  |
| x110          | H10     | Heatsink temperature sensor error   | Sensor for detecting the heatsink temperature indicates undefined values.   | <ul style="list-style-type: none"> <li>• Contact Lenze.</li> <li>• Switch off the monitoring (C0588 = 3).</li> </ul>  |
| x111          | H11     | Temperature sensor error: Temperature inside the controller   | Sensor for detecting the internal temperature indicates undefined values.   | <ul style="list-style-type: none"> <li>• Contact Lenze.</li> <li>• Switch off the monitoring (C0588 = 3).</li> </ul>  |



| Fault message |         | Description                                     | Cause   | Remedy   |
|---------------|---------|---|---|--|
| No.           | Display |   |   |  |
| 0140          | ID1     | Error during motor data identification.         | No motor connected.   | Check motor connection.  |
|               |         |   | Stator resistance too high.   | Check entered motor data.  |
|               |         |   | Controller inhibited externally.  | Enable controller and repeat motor data identification. The controller enable must be pending continuously until the end of the identification process.  |
| 0141          | ID2     | Error during motor data identification.         | Motor too small.  | <ul style="list-style-type: none"> <li>Check entered motor data. For parameterisation with Global Drive Control, use the input assistant for motor data.</li> <li>The measurements for the inverter error characteristic and the stator resistance are correct (save measured values in C0003). For the operating mode V/f characteristic control the motor data identification can be completed.</li> </ul> |
|               |         |   | Controller inhibited externally.  | Enable controller and repeat motor data identification. The controller enable must be pending continuously until the end of the identification process.  |
| x200          | NMAX    | Maximum system speed (C0596) has been exceeded. | <ul style="list-style-type: none"> <li>Active load (e.g. for hoists) is too high.</li> <li>Drive is not speed-controlled, torque is excessively limited.</li> </ul> | <ul style="list-style-type: none"> <li>Check drive dimensioning.</li> <li>Increase torque limit, if necessary.</li> <li>Switch off monitoring (C0607 = 3).</li> </ul>  |

Representation of the error number:

x 0 = TRIP, 1 = message, 2 = warning

E. g. "2091": An external monitoring function has triggered EEr warning

### 4.5.2 Resetting system error messages

| Response | Measures for resetting the fault message  |
|----------|---|
| TRIP     |  <b>Note!</b><br>If a TRIP source is still active, the pending TRIP cannot be reset.<br><br>Resetting the TRIP can be effected by: <ul style="list-style-type: none"> <li>Pressing the keypad XT EMZ9371 BC ⇒ <b>STOP</b>. Then press <b>RUN</b> to re-enable the controller.</li> <li>Setting code C0043 = 0.</li> <li>Control word C0135, bit 11</li> <li>Control word AIF</li> <li>Control word of system bus (CAN)</li> </ul> After resetting the TRIP, the drive remains at standstill. |
| Message  |  <b>Danger!</b><br>After elimination of the fault, the fault message is cancelled automatically and the drive restarts automatically.  |
| Warning  | After elimination of the fault, the fault message is cancelled automatically.   |



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