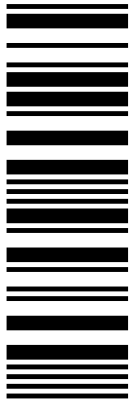
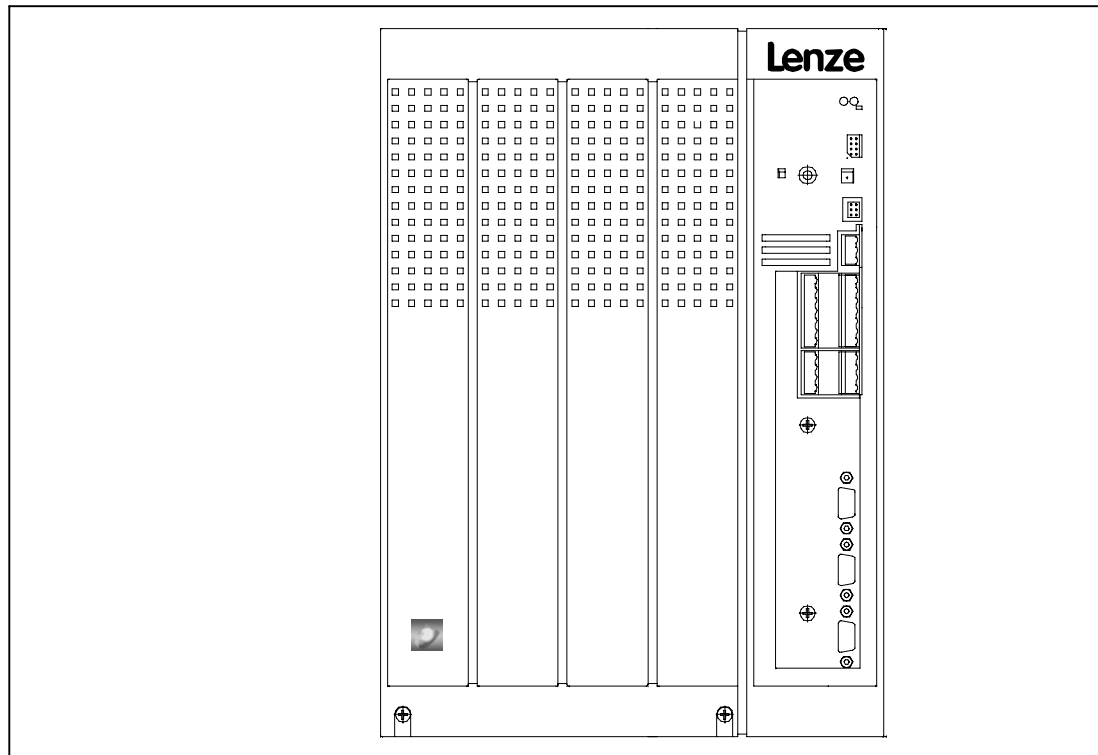


EDKVF9333
00457767



Lenze

Information for the operator of the machine/system



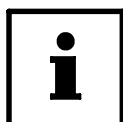
Global Drive

Series 9300 vector

0.37 kW ... 110 kW

This documentation is valid for controller types 9300 vector control as from the version

	33.932X	-	EV	3x	2x	(9321 - 9333)
Type						
Design: E = Enclosure IP20						
Hardware version and index						
Software version and index						
Explanation						



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This documentation contains all information required to operate controllers of the 9300 series in your machine/system.

All information given in this documentation can be used further without asking Lenze for permission, if you do not change the contents of the information.

Information required for planning a machine/system can be found in the Operating Instructions and Manuals for 9300 controllers. The Operating Instructions are part of the delivery package, the Manual can be ordered from Lenze.

All Lenze documentation can be downloaded from the Internet as Adobe Acrobat[®] file: at Lenze website.



1 Safety instructions

1.1 General safety and application notes for Lenze controllers

(according to Low-Voltage Directive 73/23/EEC)

1. General

Lenze controllers (frequency inverters, servo inverters, DC controllers) can carry a voltage or parts of the controllers can rotate during operation. Surfaces can be hot. If the required cover is removed, the controllers are used inappropriately or installed or operated incorrectly, severe damage to persons or material assets can occur. For more information please see the documentation.

All operations concerning transport, installation, and commissioning as well as maintenance must be carried out by qualified, skilled personnel (IEC 364 and CENELEC HD 384 or DIN VDE 0100 and IEC report 664 or DIN VDE 0110 and national regulations for the prevention of accidents must be observed).

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.

2. Intended use

Drive controllers are components which are designed for the installation into electrical systems or machinery. They are not to be used as domestic appliances, but only for industrial purposes according to EN 61000-3-2. The documentation contains information about the compliance of the limit values with EN 61000-3-2.

When installing controllers into machines, commissioning of the drive controllers (i.e. the starting of operation as directed) is prohibited until it is proven that the machine corresponds to the regulations of the EC Directive 98/37/EG (Machinery Directive); EN 60204 (VDE 0113) must be observed.

Commissioning (i.e. starting of operation as directed) is only allowed when there is compliance with the EMC Directive (89/336/EEC).

The drive controllers meet the requirements of the Low-Voltage Directive 73/23/EEC. The harmonised standards EN 50178/DIN VDE 0160 apply to the controllers.

The technical data as well as the connection conditions can be obtained from the nameplate and the documentation. The instructions given must be strictly observed.

Warning: Controllers are products with restricted availability according to EN 61800-3. These products can cause interferences in residential premises. If controllers are used in residential premises, corresponding measures are required.

3. Transport, storage

The notes on transport, storage and appropriate handling must be observed.

Climatic conditions according to EN 50178 apply.

4. Installation

The controllers must be installed and cooled according to the regulations given in the corresponding Instructions.

Ensure careful handling and avoid mechanical overload. Do not bend any components and do not change the insulation distances during transport and storage. Electronic components and contacts must not be touched.

Controllers contain electrostatically sensitive components which can easily be damaged by inappropriate handling. Do not damage or destroy any electrical components since this could mean hazards for your health!

5. Electrical connection

When working on live controllers, the valid national regulations for the prevention of accidents (e. g. VBG 4) must be observed.

The electrical installation must be carried out in compliance with the corresponding regulations (e.g. cable cross-sections, fuses, PE connection). Additional notes and information can be obtained from the corresponding Instructions.

The Instructions contain notes concerning wiring according to EMC regulations (shielding, earthing, filters and cable routing). These notes must also be observed when using CE-marked controllers. The compliance with limit values required by the EMC legislation is the responsibility of the manufacturer of the machine or system.

6. Operation

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

After a controller has been disconnected from the voltage supply, all live components and power connections 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.

Note for UL-approved systems with integrated controllers: UL warnings are notes which only apply to UL systems. The Instructions give UL-related information.

7. Safe standstill

The variant V004 of 9300 and 9300 vector, the variant Bx4x of 8200 vector controller and the axis controller ECSXA064 support the function "Safe standstill", protection against unexpected start, according to the requirements of Annex I No. 1.2.7 of the EC Directive "Machinery" 98/37/EG, DIN EN 954-1 category 3 and DIN EN 1037. Please observe the notes on the function "Safe standstill" given in the corresponding Instructions.

8. Maintenance and service

Please observe the Instructions given by the manufacturer.

Please observe the product-specific safety and application notes in these Instructions.



Safety information

Lenze low-voltage machinery

1.2 General safety and application notes for Lenze low-voltage machinery

(in conformity with the Low-Voltage Directive 73/23/EEC)

1. General

Low-voltage machines have dangerous, live and rotating parts as well as possibly hot surfaces. All operations serving transport, connection, commissioning and maintenance are to be carried out by skilled, responsible technical personnel (observe EN 50110-1 (VDE 0105-100); IEC 60364). Improper handling can cause severe injuries or damages.

Synchronous machines induce voltages at open terminals during operation.

2. Application as directed

These low-voltage machines are intended for industrial and commercial installations. They comply with the harmonized standards of the series EN 60034 (VDE 0530). Their use in hazardous areas is prohibited unless they are expressly intended for such use (follow additional instructions).

The enclosures \leq IP23 are by no means intended for outdoor use. Air-cooled designs are rated for ambient temperatures between $-15\text{ }^{\circ}\text{C}$ and $-10\text{ }^{\circ}\text{C}$ and $+40\text{ }^{\circ}\text{C}$ and altitudes \leq 1000 m a.m.s.l., from $-20\text{ }^{\circ}\text{C}$ to $+40\text{ }^{\circ}\text{C}$ without brake or with spring-operated brake, with separate ventilation or self ventilation, from $-15\text{ }^{\circ}\text{C}$ to $+40\text{ }^{\circ}\text{C}$ with permanent magnet brake and from $-10\text{ }^{\circ}\text{C}$ to $+40\text{ }^{\circ}\text{C}$ with separate fan. Check indications on the nameplate and if they are different, observe them. The conditions on site must correspond to all nameplate data.

Low-voltage machines are components for the installation into machines as defined in the Machinery Directive 98/37/EC. Commissioning is prohibited until the conformity of the end product with this Directive has been established (follow a.o. EN 60204-1).

The integrated brakes cannot be used as safety brakes. It cannot be ruled out that factors which cannot be influenced, such as oil ingress because of a defective A-side shaft seal, cause a torque reduction.

3. Transport, storage

The forwarder must be informed directly after receipt of the goods about all damages or deficiencies; if necessary, commissioning must be stopped. Tighten screwed-in ring bolts before transport. They are designed for the weight of the low-voltage machine, do not apply extra loads. If necessary, use suitable and adequately dimensioned means of transport (e.g. rope guides).

Remove the shipping brace before commissioning. Reuse it for further transports. For storage of low-voltage machines ensure a dry, dust-free and low-vibration ($v_{\text{rms}} \leq 0.2\text{ mm/s}$) environment (danger of bearing damage at rest). Measure the insulation resistance before commissioning. If the values are $\leq 1\text{ k}\Omega$ per volt of rated voltage, dry the winding.

4. Installation

Ensure an even surface, solid foot or flange mounting and exact alignment if a direct clutch is connected. Avoid resonances with the rotational frequency and double mains frequency which may be caused by the assembly. Turn rotor by hand, listen for unusual slipping noises. Check the direction of rotation when the clutch is not active (observe section 5).

Use appropriate tools to mount or remove belt pulleys and clutches (heat generation!) and cover them with a touch guard. Impermissible belt tensions must be avoided (technical list).

The machines are half-key balanced. The clutch must be half-key balanced, too. The visibly protruding part of the key must be removed.

If required, provide pipe connections. Mounting positions with shaft end at bottom must be protected with a cover which avoids the ingress of foreign particles into the fan. Free circulation of the cooling air must be ensured. The exhaust air - also the exhaust air of other machines next to the drive system - must not be immediately taken in again.

5. Electrical connection

All operations must be carried out only by qualified and skilled personnel when the low-voltage machine is at standstill and when the machine is de-energized and protected against unintentional restart. This also applies to auxiliary circuits (e.g. brake, encoder, separate fan).

Check safe isolation from the supply!

If the tolerances in EN 60034-1; IEC 34 (VDE 0530-1) - voltage $\pm 5\%$, frequency $\pm 2\%$, waveform, symmetry - are exceeded, more heat will be generated and the electromagnetic compatibility will be influenced.

Observe the indications on the nameplate, operating notes, and the connection diagram in the terminal box.

The connection must ensure a continuous and safe electrical supply (no loose wire ends); use appropriate cable terminals. The connection to the PE conductor must be safe. The plug-in connector must be screwed up tightly (to stop).

The clearances between bare, live parts and earth must not fall below: 8 mm at $V_{\text{rated}} \leq 550\text{ V}$, 10 mm at $V_{\text{rated}} \leq 725\text{ V}$, 14 mm at $V_{\text{rated}} \leq 1000\text{ V}$.

The terminal box must be clean and dry; foreign particles, dirt and moisture affect operation. All unused cable entries and the box itself must be sealed against dust and water. For the trial run without output elements, lock the key. Check brake operation before the commissioning of low-voltage machines with brakes.

6. Operation

Vibration severities $v_{\text{rms}} \leq 3.5\text{ mm/s}$ ($P_{\text{rated}} \leq 15\text{ kW}$) or 4.5 mm/s ($P_{\text{rated}} > 15\text{ kW}$) are acceptable when the clutch is activated. If deviations from normal operation occur, e.g. increased temperature, noise, vibration, find the cause and, if necessary, contact the manufacturer. Switch-off the machine in problematic situations.

If the drive is exposed to dirt, clean it regularly.

Do not switch-off the protection devices, not even for trial runs.

Integrated temperature sensors do not provide full protection. If necessary, limit the maximum current. Connect the function blocks to the option switch-off after several seconds of operation at $I > I_{\text{rated}}$, especially if blocking may occur.

Shaft seals and bearings have a limited service life.

Regrease the bearings using the relubrication facility while the low-voltage machine is running. Observe the saponification number. If the grease drain hole is sealed with a plug (IP54 drive end; IP23 drive end and non-drive end), remove the plug before commissioning. Seal the bore holes with grease. Replace the prelubricated bearings (ZZ-bearings) after approx. 10.000 h - 20.000 h, at the latest however after 3 - 4 years. Observe the manufacturer's instructions.

Safety information

Residual hazards, Layout of the safety instructions



1.3 Residual hazards

Protection of persons	<p>After mains switch-off, the power terminals U, V, W and +U_{DC}, -U_{DC} remain live for at least three minutes.</p> <ul style="list-style-type: none"> • Before working on the controller, check that no voltage is applied to the power terminals. <p>The discharge current to PE is > 3.5 mA. EN 50178</p> <ul style="list-style-type: none"> • requires a fixed installation. • requires double PE connection or a minimum cable cross-section of 10 mm².
Protection of devices	<p>Cyclic connection and disconnection of the controller supply voltage at L1, L2, L3 or +U_{DC}, -U_{DC} can overload the current input limitation:</p> <ul style="list-style-type: none"> • Allow at least 3 minutes between disconnection and reconnection.
Overspeeds	<p>Drive systems can reach dangerous overspeeds (e.g. setting high field frequencies for motors and machines which are not suitable):</p> <ul style="list-style-type: none"> • The controllers do not offer any protection against these operating conditions. Use additional components for this.
Parameter set transfer	<p>During parameter set transfer, the control terminals of the 9300 controller can have undefined states! Therefore the plugs X5 and X6 must be removed before transfer. Thus it is ensured that the controller is inhibited and all control terminals have the defined state "LOW".</p>

1.4 Layout of the safety information

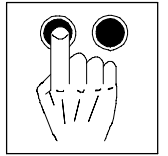
All safety information given in these Operating Instructions have the same layout:



Signal word (characterises the severity of danger)

Note (describes the danger and gives information how to avoid it)

	Icons used		Signal words	
Warning of danger to persons		Warning of hazardous electrical voltage	Danger!	Warns of impending danger . Consequences if disregarded: Death or most severe injuries
		Warning of a general danger	Warning!	Warns of potential, very hazardous situations . Possible consequences if disregarded: Death or most severe injuries
Warning of damage to material			Caution!	Warns of potential, hazardous situations . Possible consequences if disregarded: Light or minor injuries
			Stop!	Warns of potential damage to material . Possible consequences if disregarded: Damage of the controller/drive system or its environment
More information			Tip!	Designates a general, useful note. If you observe it, handling of the controller/drive system is made easier.



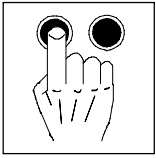
2 Parameter setting

- The parameter setting of the controller is used to adapt the drive to your applications.
- The complete parameter set is organized in codes which are consecutively numbered and always begin with "C".
- You can save the parameter set of an application.
 - Four parameter sets are available, so that the controller can be adjusted rapidly from one application to another.
 - When delivered, the parameter sets have the factory-set default values.

2.1 Ways of parameter setting

Parameters can be changed through:

- A keypad
- A superimposed host (PC or PLC) via fieldbus modules and operating programs.



Parameter setting

Parameter setting using the keypad

2.1.1 Structure of the parameter set

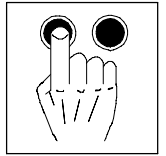
To simplify operation, the keypad 9371BB and the PC programs GLOBAL DRIVE CONTROL and LEMOC2 consist of menu levels which will guide you rapidly to the desired codes:

- Main menu
 - contains submenus
 - contains the complete code list
- Submenus
 - contain codes which are assigned to them

Codes consist of:

- Code level
 - Codes without subcodes contain one parameter
 - Codes with subcodes contain several parameters
- Parameter level/operating level
There are 4 different parameter classes:
 - Absolute values of a physical variable
(e. g. 400 V, 10 s)
 - Relative values of instrument variables
(e.g. 50 % setpoint)
 - Numbers for certain states
(e.g. 0 = controller inhibited, 1 = controller enabled)
 - Display values
These values can only be displayed but not changed.
(e.g. actual motor current under C0054)

You can change absolute and relative values in discrete steps.



2.2 Parameter setting using the keypad

2.2.1 Keypad

(Order no.: EMZ9371BB)

The keypad can also be plugged on the X1 interface and removed during operation. When the keypad is plugged on the controller, the module is initialised. The keypad is ready to operate after "GLOBAL DRIVE READY" has been displayed.

Front view

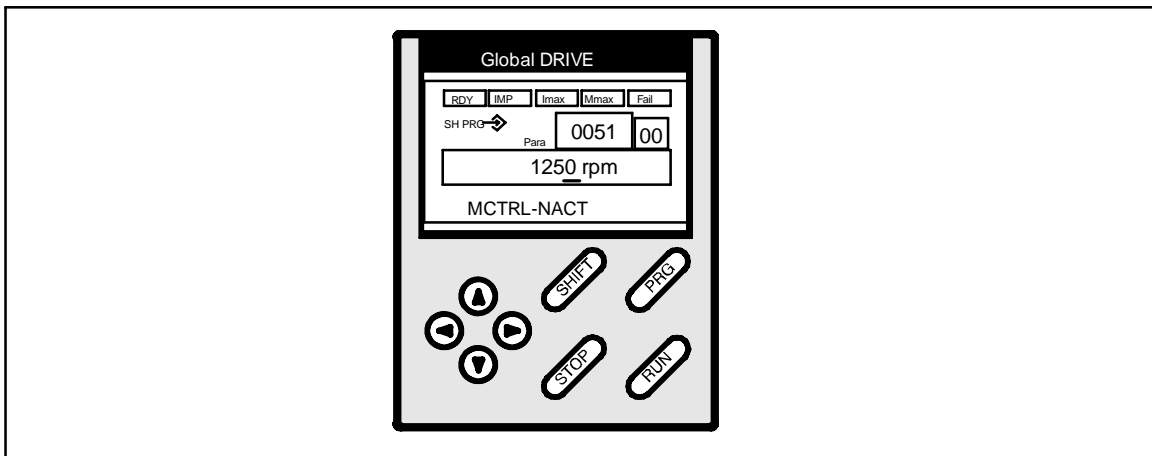


Fig. 2-1 The keypad

LCD display

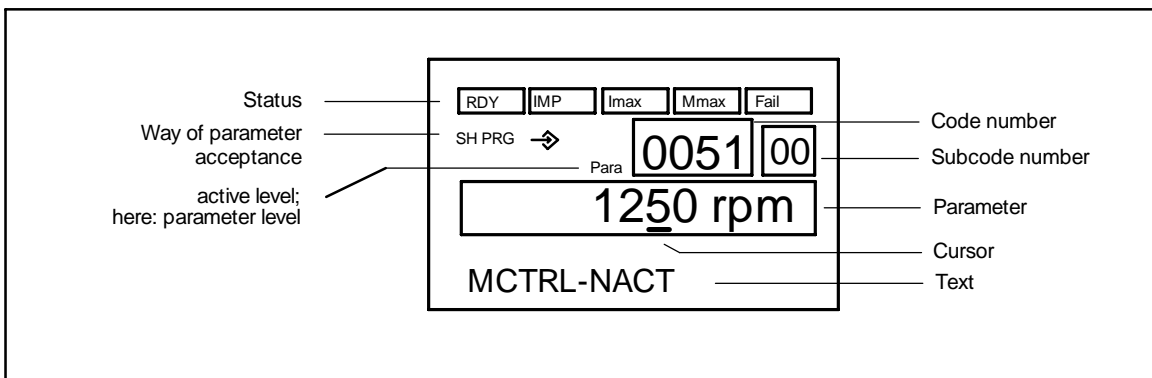
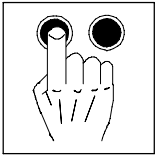


Fig. 2-2 LCD display of the keypad



Parameter setting

Parameter setting using the keypad

Segments and status indications of the LCD display:

Segment	Explanation
Code number	four-digit code number
Subcode number	two-digit subcode number
Parameter	Parameter value with max. twelve digits
Text	Auxiliary text (max. 13 digits) In the operating level: status information of C0183 or contents of C0004
SH PRG ↔	SH PRG ↔: Parameter is accepted only with SHIFT + PRG (OFFLINE)
	SH PRG: Parameter is only accepted with SHIFT + PRG during controller inhibit (OFFLINE)
	↔: Parameter is accepted directly by the controller (ONLINE)
	Not assigned: Parameter cannot be changed
Active level	Menu = Menu level
	Code = Code level
	Para = Parameter level
	No display Operating level

Status indications of the keypad		
Display	on	off
RDY	Ready for operation	Initialisation or fault
IMP	Power outputs inhibited	Power outputs enabled
Fail	Active fault	No error
I_{max}	Motor current setpoint ≥ C0022	Motor current setpoint < C0022
M_{max}	Speed controller 1 in its limitation Drive is torque-controlled.	Drive speed-controlled

Key functions

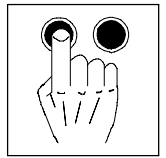
"SHIFT + " means:

1. Press the SHIFT key and keep it pressed.
2. Press the second key indicated.

Keys	Function		
	Menu level	Code level	Parameter level/operating level
PRG	-	Change between code, parameter and operating level	
SHIFT + PRG	-	-	Accept parameters (depending on the parameter and menu)
▲	next higher menu item	next higher code number	increase displayed number
SHIFT + ▲	next higher menu item fast	increase code number fast	increase displayed number fast
▼	next lower menu item	next lower code number	decrease displayed number
SHIFT + ▼	next lower menu item fast	decrease code number fast	decrease displayed number fast
◀	next higher menu level	go to the menu level	Cursor to the left
▶	next lower menu level (submenus) or code level	-	Cursor to the right
RUN	cancel function of the STOP key		
STOP	Inhibit controller: Quick stop, controller inhibited or switched off (definition in C0469) The LED in the key shows the status: • LED on: STOP pressed • LED off: RUN pressed		
	Trip reset: Active trip: (independent of C0469) 1. Remove cause of malfunction 2. STOP press 3. RUN press		

Parameter setting

Parameter setting using the keypad



Operating level

From the parameter level, you reach the operating level by pressing PRG.

- In the operating level, additional status information and the additional display value specified under C0004 is displayed (presetting: actual speed C0051).
 - When the USER menu has been selected, the first code level of the USER menu will be displayed in the first line.
- Additional information is displayed according to the following priority list:

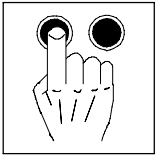
Priority	Display	Meaning
1	GLOBAL DRIVE INIT	Initialisation or communication error between keypad and controller
2	XXX - TRIP	active TRIP (contents of C0168/1)
3	XXX - MESSAGE	active message (contents of C0168/1)
4	Special controller states:	
		Switch-on inhibit
5	Source for controller inhibit (the value of C0004 is displayed at the same time):	
	STP1	Terminal X5/28
	STP3	Keypad or LECOM A/B/LI
	STP4	InterBus-S or Profibus
	STP5	System bus (CAN)
	STP6	C0040
j6	Source of quick stop:	
	QSP-term-Ext	HIGH signal is applied at input MCTRL-QSP on the function block MCTRL (in factory setting applied to terminals X5/E1 and X5/E2)
	QSP-C0135	Keypad or LECOM A/B/LI
	QSP-AIF	InterBus-S or Profibus
	QSP-CAN	System bus (CAN)
7	XXX - WARNING	active warning (contents of C0168/1)
8	xxxx	Value under C0004

User menu

In some applications, specific codes must be changed often.

You can therefore establish a menu with max. 32 codes which you use frequently under C0517.

- The number before the comma is the code number.
- The number after the comma is the subcode.
- Code-subcode combinations are allowed only once.



Parameter setting

Parameter setting using the keypad

2.2.2 Change of parameters



Tip!

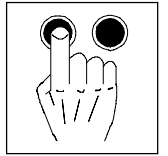
Changed parameter sets must be saved, if you do not want to lose the modifications after mains disconnection (see chapter 2.2.3).

Basic procedure

1. Change to the code level from the menus using the arrow keys ▲ ▼, ◀ or ▶ to the code level. "Code" is displayed.
2. Select C0810/1 using ▲ or ▼ select code or subcode.
3. Change to the parameter level using PRG. "Para" is displayed.
4. Select C0810/1 using ◀ or ▶ move the cursor (small, black bar) under the number to be changed.
5. Select C0810/1 using ▲ or ▼ change number.
6. Repeat 4. and 5. to change other numbers, if necessary.
7. Accept parameters. The way the controller accepts the modified parameters is shown in the LCD display in front of the parameter:

Display in front of the parameter	Controller uses the new value
⇒	Immediately during the change
SH+PRG ⇒	after pressing SH+PRG. Confirmation: ok in the display
SH+PRG	Press STOP to inhibit the controller. Press SHIFT + PRG. Confirmation: ok in the display Press RUN to enable the controller

8. Press PRG twice to go to the code level. "Code" is displayed.



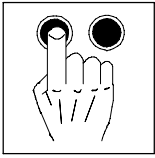
2.2.3 Save parameter set

The parameters must be saved so that the changed settings do not get lost after mains disconnection.

- You can establish up to four parameter sets, e.g. if you process different materials on a machine or if this is required by different operating states (setup mode, "stand-by").
- If you need only one parameter set, save the modifications permanently under parameter set 1, since the controller automatically loads parameter set 1 after mains connection.

How to proceed

1. Change from the menus to the code level using the arrow keys.
"Code" is displayed.
2. Select C0810/1 using ▲ or ▼ C0003.
3. Change to the parameter level using PRG.
"Para" is displayed.
4. Select C0810/1 using ▲ or ▼ parameter on 1 (also possible at travelling drive).
Note: If the parameter set is to be saved under another number, select 2, 3, or 4 instead of 1.
5. Press SHIFT + PRG.
"OK" is indicated for approx. 1 s.
Now your settings are saved permanently under parameter set 1 (or 2, 3, 4).



Parameter setting

Parameter setting using the keypad

2.2.4 Load parameter set

(possible only when the controller is inhibited)



Warning!

- When a new parameter set is loaded, the controller is reinitialised and acts as if it was connected to the mains:
 - System configurations and terminal assignments may be changed. Ensure, that your wiring and drive configuration correspond to the settings of the parameter set.
- Only use terminal X5/28 as a source for controller inhibit! Otherwise the drive may start accidentally when changing to another parameter set.



Tip!

The RDY message is not displayed while the parameter set is loaded since the controller cannot be operated then.

Mains connection

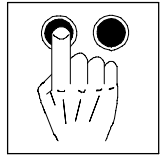
The controller automatically loads parameter set 1.

Via keypad

1. X5/28 = LOW
2. Select C0810/1 using ▲ or ▼ select C0002.
3. Change to the parameter level using PRG.
4. Select C0810/1 using ▲ or ▼ select the desired parameter set.
5. Press SHIFT + PRG.
"OK" is displayed. When "OK" is no longer displayed, the loading is completed.
6. Enable controller with X5/28 = HIGH.

Parameter setting

Parameter setting using the keypad



For terminal control

You can change to other parameter sets via e.g. the digital inputs X5/E1...X5/E5.

After mains connection, the controller reads parameter set 1 first. Then, the terminals are evaluated and the desired parameter set is loaded. A LOW-HIGH edge at input DCTRL-PAR-LOAD ("Load parameter set") is not necessary in this case:

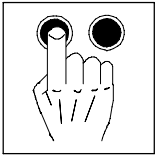
- One or two digital inputs must be assigned to "Select parameter set" in every parameter set.
 - Determine the source(s) for "Select parameter set" under C0880. The signal names are: DCTRL-PAR*1 and DCTRL-PAR*2.
- One digital input must be assigned to "Load parameter set" in every parameter set:
 - Determine the source for "Load parameter set" under C0881. The signal name is: DCTRL-PAR-LOAD.
- These inputs must have the same assignment in all parameter sets which you want to use.
- The controller reads the terminals assigned with "Select parameter" as a binary code. The input DCTRL-PAR*1 is the first input, the input DCTRL-PAR*2 is the second input (e.g. E1 = first input, E2 = second input).
 - The signal must be applied constantly at the terminals for at least 10 ms so that the parameter set to be loaded is recognized correctly.
 - Terminal signals to select parameter sets:

	1st input (DCTRL-PAR*1)	2nd input (DCTRL-PAR*2)
Parameter set 1	LOW	LOW
Parameter set 2	HIGH	LOW
Parameter set 3	LOW	HIGH
Parameter set 4	HIGH	HIGH

- A LOW-HIGH edge at the input "Load parameter set" DCTRL-PAR-LOAD changes to the new parameter set.

Procedure:

1. Trigger digital inputs, which are assigned to the function "Select parameter set".
2. Inhibit controller with X5/28 = LOW.
3. Trigger LOW-HIGH edge at the input "Load parameter set".
4. When the loading is completed:
 - C0002 displays the number of the loaded parameter set.
 - RDY is illuminated.
5. Enable controller with X5/28 = HIGH.



Parameter setting

Parameter setting using the keypad

2.2.5 Parameter set transfer

(possible only when the controller is inhibited)



Warning!

During parameter set transfer, the control terminals of the 9300 servo can have undefined states! Therefore the plugs X5 and X6 must be removed before transfer. Thus it is ensured that the controller is inhibited and all control terminals have the defined state "LOW".

You can transfer complete parameter sets from one controller to another using the keypad. When copying from the controller to the keypad all parameter sets will be copied and saved in the keypad.

1. Plug keypad on controller 1.
2. Inhibit controller with X5/28 = LOW.
3. Save the last modifications in the corresponding parameter set under C0003.
4. Change from the menus to the code level using the arrow keys. "Code" is displayed.
5. Select C0810/1 using ▲ or ▼ C0003.
6. Change to the parameter level using PRG."Para" is displayed.
7. Select parameter 11.
8. Press SHIFT + PRG. RDY is no longer displayed. BUSY is displayed.
All parameter sets are copied to the keypad. Copying is completed when BUSY is no longer displayed (after approx. one minute).



Stop!

Remove keypad only when BUSY is off. Otherwise, TRIP "PRX" will be activated.

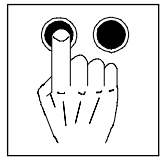
9. Enable controller with X5/28 = HIGH.
10. Plug the keypad on controller 2.
11. Inhibit controller 2 with X5/28 = LOW.
12. Change from the menus to the code level using the arrow keys. "Code" is displayed.
13. Select C0810/1 using ▲ or ▼ select C0002.
14. Change to the parameter level using PRG."Para" is displayed.
15. Select parameter 20 to copy all parameter sets from the keypad to controller 2 **and** to save them.
16. Press SHIFT + PRG. RDY is no longer displayed. BUSY is displayed.
All parameter sets are copied to and saved in controller 2. Copying and saving are completed when BUSY is no longer indicated.
17. Enable controller with X5/28 = HIGH.



Tip!

You can also copy individual parameter sets from the keypad to controller 2:

- For this, use the 15. parameters 11, 12, 14 or 14 instead of parameter 20 in step 15, to copy the parameter sets 1, 2, 3 or 4 to controller 2.
- You have to save the copied parameter sets if you do not want to lose the modifications after mains disconnection.



2.2.6 Password protection

You can restrict the code access via the keypad using the password protection in C0094.

- Reading C0094 using the keypad:
 - C0094 = 0: password protection is not activated.
 - C0094 = 9999: password protection is activated.
- Activate password protection:
 - Enter four-digit number in C0094.
 - Confirm using SH + PRG.
- Deactivate password protection:
 - Enter four-digit number again.
 - All other inputs are refused.

Effect

- Working with the keypad:
 - The codes of the USER menu can still be read and changed.
 - All other codes are no longer displayed.
- Working with the fieldbus:
 - It is possible to extend the protection under C0096/1 (AIF) and C0096/2 (CAN) when working with a fieldbus.
Selection under C0096/X
 - C0096/X = 0: No access protection
 - C0096/X = 1: Read protection
 - C0096/X = 2: Write protection
 - C0096/X = 3: Read/write protection

2.3 Display functions

Actual value display

You can read different actual values using the following codes:

Code	Meaning
C0051	Absolute actual speed [rpm]
C0052	Absolute motor voltage [V]
C0053	Absolute DC bus voltage [V]
C0054	Absolute motor current [A]
C0060	Rotor position [Inc/rev]
C0061	Heatsink temperature [°C]
C0063	Absolute motor temperature [°C] Display only with connected KTY (PTC) via X7 or X8
C0064	Controller load [%]

Identification

- You can read the software version of the controller under C0099.
- Under C0093 you can read the controller type.



3 Troubleshooting and fault elimination

- You can recognize immediately whether a fault has occurred from the display elements or status information. (☞ 1, chapter "Troubleshooting")
- You can analyze the fault
 - by means of the history buffer (☞ 3)
 - and by means of the list "Fault indications". (☞LEERER MERKER)
- The list "Fault indications" indicates how to eliminate faults. (☞LEERER MERKER)

3.1 Troubleshooting

Display on the controller

Two LEDs on the front of the controller indicate the controller status.

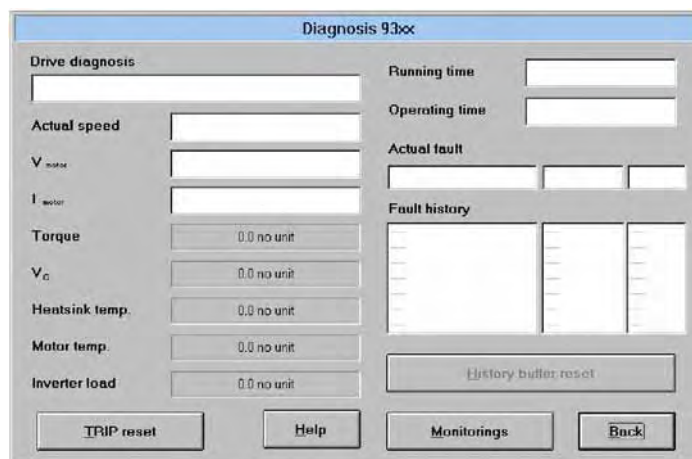
LED green	LED red	Cause	Check
■	□	Controller enabled; no fault	
★	□	Controller inhibit, switch-on inhibit	C0183; or C0168/1
□	★	Fail	C0168/1
■	★	Warning, fail-QSP	C0168/1

■ : on □ : off ★ : blinking

Display in Global Drive Control

Double-click "Dialog Diagnostics" in the Parameter menu of the GDC to open the dialog box *Diagnosis 93xx*.

- The dialog box *Diagnosis 93xx* informs about the controller status:



Display on the keypad

Status messages in the display indicate the controller status.

Display	Controller status	Check
RDY	Controller ready for operation, controller can be inhibited	C0183, C0168/1
IMP	Pulses at the power stage inhibited	C0183, C0168/1
I _{max}	Max. current reached	
M _{max}	Max. torque reached	
Fail	Fault through TRIP, message, fail QSP or warning	C0183, C0168/1



Troubleshooting and fault elimination

Troubleshooting

Display via the LECOM status word C0150

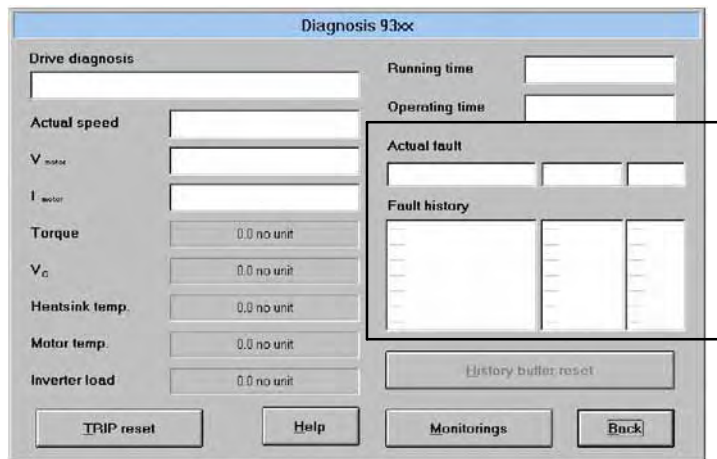
Bit		Meaning		
		hex	bin	
0	FREE 0	freely combinable		
1	IMP (pulse inhibit)	0 = Pulses enabled for power stage 1 = Pulses inhibited for power stage		
2	FREE 2	freely combinable		
3	FREE 3	freely combinable		
4	FREE 4	freely combinable		
5	FREE 5	freely combinable		
6	$f_d = 0$ (actual speed value = 0)	0 = [n \neq 0] 1 = [n = 0]		
7	RSP (controller inhibit)	0 = No controller inhibit 1 = Controller inhibit		
8-11	Controller status			
		0	0000	Unit initialisation
		1	0001	Switch-on inhibit
		3	0011	Operation inhibited (controller inhibit)
		6	0110	Operation enabled
		7	0111	Message active
		8	1000	Active fault
		9	1001	Power off
	A	1010	Fail-QSP	
12	Warning	0 = No warning 1 = Warning		
13	Meldung	0 = No message 1 = Message		
14	FREE 14	freely combinable		
15	FREE 15	freely combinable		



3.2 Error analysis with the history buffer

- The history buffer is used to trace faults.
- Error messages are stored in the order of their occurrence.

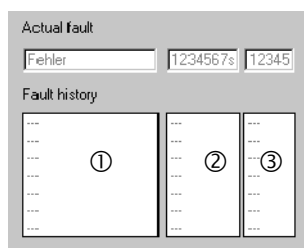
Double-click the entry "Diagnostics dialog" in the parameter menu of GDC to open the dialog box *Diagnosis 93xx*:



History buffer

3.2.1 Structure of the history buffer

- The history buffer provides 8 memory locations. The fields under "Fault history" show the memory locations 2 to 7.
- The fields under "Actual fault" show memory unit 1. It contains information on the active fault.
 - The first memory unit is written only after the elimination or acknowledgement of the active fault. This entry eliminates the last fault from the history buffer so that it can no longer be read.
- The history buffer holds three information units for every error that had occurred:



- ① Fault recognition and reaction
- ② Time of the fault
- ③ Frequency of the fault

The following table shows the assignment of information and codes.

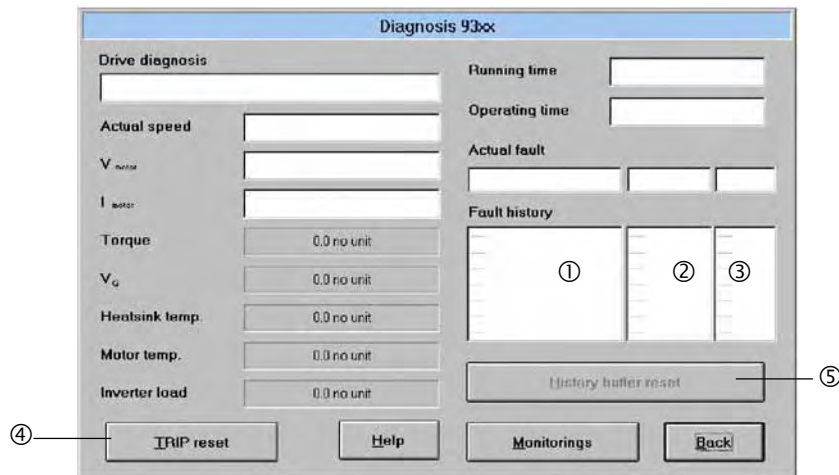
Code and information to be retrieved				Memory location
C0168	C0169	C0170	Subcode	
Fault recognition and reaction	Time of the last occurrence	Frequency of the immediately following occurrence	1	Active fault
			2	History buffer location 1
			3	Memory location 2
			4	Memory location 3
			5	Memory location 4
			6	History buffer location 5
			7	History buffer location 6
			8	Memory unit 7



Troubleshooting and fault elimination

Troubleshooting

3.2.2 Working with the history buffer



Fault detection and reaction ①

- Contains the fault detection for every memory location and the reaction to the fault.
 - e.g. "OH3 TRIP"
 - With a fieldbus, the faults are indicated by a fault number. (LEERER MERKER, column 2)

Please note:

- For faults occurring at the same time with different reactions:
 - Only the reaction of the fault with the highest priority (priority = TRIP → Message → FAIL-QSP → Warning) is entered into the memory.
- For faults occurring at the same time and with the same reaction (e.g. 2 messages):
 - Only the fault which occurred first is entered.

Time ②

- Contains the times when the faults occurred
 - e.g. "1234567 s"
 - Reference time is the mains switch-on time (see dialog box *Diagnosis 93xx*, top right field)

Please note:

- If a fault is immediately followed by another several times, only the time of the last occurrence is stored.

Frequency ③

- Contains the frequency of a fault immediately followed by the same fault. The time of the last occurrence is stored.

Reset fault ④

- Click **TRIP reset** to reset the fault

Delete history buffer ⑤

- This function is possible only when no fault is active.
- Click **History buffer reset** to delete the history buffer.



3.3 Error messages



Tip!

If you use GDC or a fieldbus module to find out about an error (C0168/x), the error message will be represented by an error number.

Display	Error	Cause	Remedy
---	No error	-	-
CCr	System fault	Strong interferences on control cables Ground or earth loops in the wiring	Screen the control cables Ensure PE wiring complies with EMC requirements ()
CE0	Communication error	Error during the transfer of control commands via the automation interface X1	Plug in the automation module firmly and, if necessary, bolt it down
CE1	Communication error at the process data input object CAN_IN_1	CAN_IN_1 object receives faulty data, or communication is interrupted	Check cable at X4 Check transmitter Increase monitoring time under C0357/1 if necessary
CE2	Communication error at the process data input object CAN_IN_2	CAN_IN_2 object receives faulty data, or communication is interrupted	Check cable at X4 Check transmitter Increase monitoring time under C0357/2 if necessary
CE3	Communication error at the process data input object CAN_IN_3	CAN_IN_3 object receives faulty data, or communication is interrupted	Check cable at X4 Check transmitter Increase monitoring time under C0357/3 if necessary
CE4	BUS-OFF state	Controller has received too many incorrect telegrams via system bus X4 and has disconnected from the bus	Check wiring Check bus termination (if any) Check screen contact of the cables Check PE connection Check bus load: Reduce baud rate (observe cable length)
EEr	External fault (TRIP-Set)	A digital input assigned to the TRIP set function has been activated	Check external encoder
H05	Internal error		Contact Lenze
H07	Incorrect power stage	During initialization of the controller, an incorrect power stage was detected	Contact Lenze
H10	Sensor fault: heat sink temperature	Sensor of the heat sink temperature detection indicates undefined values	Contact Lenze
H11	Sensor fault indoor temperature	Sensor of indoor temperature detection indicates undefined values	Contact Lenze
ID1	Fault during motor identification	Measuring of the characteristic failed Motor too small ($P_{motor} \ll P_{controller}$)	Check motor cable Select bigger motor
ID2	Fault during motor identification	No identification of the motor parameters	Enter data of the nameplate of the connected motor
LP1	Motor phase failure	A current-carrying motor phase has failed	Check motor; Check supply module
		The current limit is set too low	Set a higher current limit under C0599
		This monitoring is not suitable for: <ul style="list-style-type: none"> Synchronous servo motors for rotating-field frequencies > 480 Hz 	Deactivate monitoring with C0597= 3
LU	Undervoltage	DC bus voltage is smaller than the value fixed under C0173	Check mains voltage Check supply cable
r _{MAX}	Max. plant speed exceeded (C0596)	Active load too high (e.g. for hoists)	Check drive dimensioning
		Drive is not speed-controlled, torque excessively limited	Increase torque limit
		The current speed has been detected incorrectly.	Check encoder selection (C0025) Check motor data
OC1	Short-circuit	Short-circuit Excessive capacitive charging current in the motor cable	Find out cause of short-circuit; check cable Use motor cable which is shorter or has a lower capacitance



Troubleshooting and fault elimination




Error messages

Display	Error	Cause	Remedy
OC2	Earth fault	One of the motor phases has an earth contact Excessive capacitive charging current in the motor cable	Check motor; check cable Use motor cable which is shorter or has a lower capacitance
OC3	Trip due to overload	Acceleration and/or deceleration too short (C0012, C0013)	Increase acceleration and deceleration times
		Value for current parameter V_p (C0075) too low	Check setting
OC5	l x t overload	acceleration with overcurrent is too frequent and too long Continuous overload with $I_{motor} > 1.5 \times I_{rx}$	Check drive dimensioning
OH	Heat sink temperature is higher than the value set in the controller	Ambient temperature $T_{amb} > 40\text{ °C}$ or 50 °C	Allow controller to cool and ensure better ventilation Check ambient temperature in the control cabinet
		Heat sink very dirty	Clean heat sink
		Incorrect mounting position	Change mounting position
OH3 ¹⁾	Motor temperature is higher than the value set in the controller	Motor too hot because of excessive current, or acceleration is too frequent and too long	Check drive dimensioning
		No PTC connected to X7 or X8	Connect PTC or switch off monitoring (C0583=3)
OH4	Heat sink temperature is higher than the value set under C0122	Ambient temperature $T_{amb} > 40\text{ °C}$ or 50 °C	Allow controller to cool and ensure better ventilation Check ambient temperature in the control cabinet
		Heat sink very dirty	Clean heat sink
		Incorrect mounting position	Change mounting position
		Value set under C0122 was too low	Enter higher value
OH7 ¹⁾	Motor temperature is higher than the value set under C0121	Motor too hot because of excessive current, or acceleration is too frequent and too long	Check drive dimensioning
		No PTC connected to X7 or X8	Connect PTC or switch off monitoring (C0584=3)
		Value set under C0121 was too low	Enter higher value
OH8	PTC at terminals T1, T2 indicates motor overheating	Motor too hot because of excessive current, or acceleration is too frequent and too long	Check drive dimensioning
		Terminals T1, T2 are not assigned	Connect PTC or thermostat or switch off monitoring (C0585=3)
OU	Overvoltage	Excessive braking energy (DC bus voltage higher than the value set under C0173)	Use brake unit or supply module and brake module or feedback module
PEr	Program fault	A fault in the program was detected	Send controller with data (on diskette) to Lenze
PI	Initializing error	A fault was detected during the parameter set transfer between the drive controllers Parameter set does not match the controller	Correct parameter set
PRO PR1 PR2 PR3 PR4	Parameter set error	Fault when reading a parameter set CAUTION: • The factory setting is loaded automatically	Set the desired parameters and save under C0003. For PRO, the supply voltage must be switched off as well
Sd3	Encoder fault at X9/8	Cable interrupted Input X9 PIN 8 not assigned	Check cable for open circuit Assign input X9 PIN 8 with 5V or switch off monitoring (C0587 = 3)
Sd5	Master current source defective	Master current at X6/1, X6/2 < 2 mA	Check cable for open circuit Check master current source
Sd6	Sensor fault	Encoder of the motor temperature detection at X7 or X8 indicates undefined values	Check supply cable for firm connection Switch off monitoring with C0594 = 3 if necessary

¹⁾ Temperature sensing through incremental encoder X8



3.4 Reset of fault messages

Reaction on operating errors	Measures for re-commissioning	Danger notes
TRIP/ FAIL-QSP	<ul style="list-style-type: none"> • After the error has been eliminated, the drive can be restarted when an acknowledgement has been sent. • TRIP / FAIL-QSP acknowledgement by: <ul style="list-style-type: none"> – Global-Drive-Control: Click "Trip reset" in dialog box "Diagnostics 9300". –  4, ("Working with the history buffer") – Keypad 9371 BB: Press STOP key. Then press RUN to enable the controller again. – Fieldbus module: Set C0043 = 0 – Control word C0135 – Terminal X5/E5 (default setting) or "DCTRL-TRIP-RESET" – Control word AIF – Control word system bus (CAN) 	<div style="display: flex; align-items: center;"> <div style="border: 2px solid black; padding: 5px; margin-right: 10px;">  </div> <p>If a TRIP source is still active, TRIP cannot be reset.</p> </div>
Message	<ul style="list-style-type: none"> • After eliminating the fault, the message is reset automatically. 	<div style="display: flex; align-items: center;"> <div style="border: 2px solid black; padding: 5px; margin-right: 10px;">  </div> <p>The drive restarts automatically if the fault is eliminated.</p> </div>
Warning	<ul style="list-style-type: none"> • After eliminating the fault, the warning is reset automatically. 	