

SMD

Frequency Inverter 0.37 kW... 22 kW

Operating Instructions	EN
Betriebsanleitun	DE
Instructions de mise en service	FR
Instrucciones de funcionamiento	IT
Istruzioni di funzionamento	ES





Contents

Abo	ut the	ese inst	ructions	2
1	Safe 1.1	ety infor Pictog	mation raphs used in these instructions	3 4
2	Tech 2.1 2.2	nnical d Standa Rating	ata ards and application conditions s	6 6 7
3	Insta	allation		8
	3.1	Mecha	anical installation	8
		3.1.1	Dimensions and mounting	8
3.2	Elec	trical in	stallation	9
		3.2.1	Installation according to EMC requirements	9
		3.2.2	Fuses/cable cross-sections	9
		3.2.3	Connection diagram	10
		3.2.4	Control terminals	11
4	Corr	nmissio	ning	12
	4.1	Param	eter setting	12
	4.2	Electro	onic programming module (EPM)	12
	4.3	Param	eter menu	13
5	Trou	iblesho	oting and fault elimination	20



About these instructions

This documentation applies to the smd frequency inverter, and contains important technical data and describes installation, operation, and commissioning.

Please read the instructions before commissioning.



Scope of delivery	Important
• 1 <i>smd</i> inverter (ESMD) with EPM installed (see Section 4.2)	After receipt of the delivery, check immediately whether the items delivered match the accompanying papers. Lenze does not accept any liability for deficiencies claimed subsequently.
1 Operating Instructions	 Claim visible transport damage immediately to the forwarder. visible deficiencies/incompleteness immediately to your Lenze representative.

1 Safety information

General

Some parts of Lenze controllers (frequency inverters, servo inverters, DC controllers) can be live, moving and rotating. Some surfaces can be hot.

Non-authorized removal of the required cover, inappropriate use, and incorrect installation or operation creates the risk of severe injury to personnel or damage to equipment.

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 VDE0110 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 installation, assembly, commissioning, and operation of the product and who have the qualifications necessary for their occupation.

Application as directed

Drive controllers are components which are designed for installation in electrical systems or machinery. They are not to be used as appliances. They are intended exclusively for professional and commercial purposes according to EN 61000-3-2. The documentation includes information on compliance with the EN 61000-3-2.

When installing the drive controllers in machines, commissioning (i.e. the starting of 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 operation as directed) is only allowed when there is compliance with the EMC Directive (2004/108/EC).

The drive controllers meet the requirements of the Low Voltage Directive 2006/95/EC. The harmonised standards of the series EN 50178/DIN VDE 0160 apply to the controllers.

Note: The availability of controllers is restricted according to EN 61800-3. These products can cause radio interference in residential areas. In this case, special measures can be necessary.

Installation

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 electrostatically sensitive components, 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 drive controllers, applicable national regulations for the prevention of accidents (e.g. VBG 4) must be observed.

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.

The documentation contains information about installation in compliance with EMC (shielding, grounding, filters and cables). These notes must also be observed for CE-marked controllers.

The manufacturer of the system or machine is responsible for compliance with the required limit values demanded by EMC legislation.

=

Safety information

Operation

Systems including controllers must be equipped with additional monitoring and protection devices according to the corresponding standards (e.g. technical equipment, regulations for prevention of accidents, etc.). You are allowed to adapt the controller to your application as described in the documentation.



DANGER!

- After the controller has been disconnected from the supply voltage, live components and power connection must not be touched immediately, since capacitors could be charged. Please observe the corresponding notes on the controller.
- Do not continuously cycle input power to the controller more than once every three minutes.
- Please close all protective covers and doors during operation.

Explosion Proof Applications

Explosion proof motors that are not rated for inverter use lose their certification when used for variable speed. Due to the many areas of liability that may be encountered when dealing with these applications, the following statement of policy applies:

Lenze AC Tech Corporation inverter products are sold with no warranty of fitness for a particular purpose or warranty of suitability for use with explosion proof motors. Lenze AC Tech Corporation accepts no responsibility for any direct, incidental or consequential loss, cost or damage that may arise through the use of AC inverter products in these applications. The purchaser expressly agrees to assume all risk of any loss, cost or damage that may arise from such application.

1.1	Pictographs used in these instructions
-----	--

Pictograph	Signal word	Meaning	Consequences if ignored
Ŕ	DANGER!	Warning of Hazardous Electrical Voltage.	Reference to an imminent danger that may result in death or serious personal injury if the corresponding measures are not taken.
\triangle	WARNING!	Impending or possible danger for persons	Death or injury
STOP	STOP!	Possible damage to equipment	Damage to drive system or its surroundings
i	Note	Useful tip: If observed, it will make using the drive easier	

Safety Information

=	

Note for UL approved system with integrated controllers

UL warnings are notes which apply to UL systems. The documentation contains special information about UL.



- Integral solid state protection does not provide branch circuit protection. Branch circuit protection must be provided in accordance with the National Electrical Code and any additional local codes. The use of fuses or circuit breakers is the only approved means for branch circuit protection.
- When protected by CC and T Class Fuses, suitable for use on a circuit capable
 of delivering not more than 200,000 rms symmetrical amperes, at the maximum
 voltage rating marked on the drive.
- Additionally suitable when protected by a circuit breaker having an interrupting rating not less than 200,000 rms symmetrical amperes, at the maximum voltage rating marked on the drive. (Excludes ESMD113_4T_, ESMD112_2Y_, ESMD13_2T_, ESMD152_2Y_, ESMD153_2T_, ESMD222_2Y_, ESMD223_4T_, ESMD402_2T_, ESMD552_2T_, ESMD752_2T_, ESMD153_4T_, and ESMD183_4T_).
- Use minimum 75°C copper wire only, except for control circuits.
- · For control circuits, use wiring suitable for NEC Class 1 circuits only.
- Torque Requirements are listed in section 3.2.3, Connection diagram.
- · Shall be installed in a pollution degree 2 macro-environment.



DANGER!

Risk of Electric Shock! Capacitors retain charge for approximately 180 seconds after power is removed. Disconnect incoming power and wait at least 3 minutes before touching the drive.



WARNING!

The opening of branch-circuit protective device may be an indication that a fault has been interrupted. To reduce the risk of fire or electric shock, current carrying parts and other components of the controller should be examined and replaced if damaged.



Technical data

2 Technical data

2.1 Standards and application conditions

Conformity	CE	Low Voltage Directive (2006/95/EC)				
Approvals	UL 508C	Underwriters Laboratories - Power Conversion Equipment				
Max. permissible motor cable	shielded:	50 m (low-capacitance)				
length (1)	unshielded:	100 m				
Input voltage phase imbalance	≤2%					
Humidity	≤ 95% non-con	densing				
Output frequency	0500 Hz					
Environmental conditions	Class 3K3 to El	N 50178				
	Transport	-25 +70 °C				
Temperature range	Storage	-20 +70 °C				
	Operation	0 +55 °C (with 2.5 %/°C current derating above +40 °C)				
Installation height	0 4000 m a.r	n.s.l. (with 5 %/1000 m current derating above 1000 m a.m.s.l.)				
Vibration resistance	acceleration resistant up to 0.7 g					
A Earth leakage current	> 3.5 mA to PE					
Enclosure (EN 60529)	IP 20					
Protection measures against	short circuit, ea	rth fault, overvoltage, motor stalling, motor overload				
Operation in public supply networks (Limitation of harmonic currents)	Total power connected to the mains	Compliance with the requirements ⁽²⁾				
	< 0.5 kW	With mains choke				
EN 61000-3-2	0.5 1 kW	With active filter (in preparation)				
	> 1 kW	Without additional measures				
EN 61000-3-12	16 75A	Additional measures are required for compliance with the standard				
Supply Conditions	AC Mains	Direct Connection				
	тт	For central grounded systems operation is permitted without restrictions				
Power System	TN	For corner grounded 400/500V systems, operation is possible, but reinforced insulation to control circuits is compromised.				
	IT Mains	IT Mains power systems are not supported.				

(1) For compliance with EMC regulations, the permissible cable lengths may change.

(2) The additional measures described only ensure that the controllers meet the requirements of the EN 61000-3-2. The machine/system manufacturer is responsible for the compliance with the regulations of the machine.

Technical data



2.2 Ratings

	_	Mains		Output Current ⁽³⁾								
Туре	Power [kW]	Voltage frequency		Current		I _N			I _{max} for 60 s			
			[A]] (3)	[A] ⁽¹⁾		[A] ⁽²⁾		[A]	(1)	[A]] (2)
			1~	3~	3	~	3	~	3	~	3	~
ESMD371L2YXA	0.37		4.7	2.7	2	.2	2	.0	3	.3	3.	.0
ESMD751L2YXA	0.75	1/N/PE 230 V OR 3/PE 230 V	8.4	4.8	4	.0	3	.7	6	.0	5	.6
ESMD112L2YXA	1.1	(180 V -0%264 V +0%)	12.0	6.9	6	.0	5	.5	9	.0	8	.3
ESMD152L2YXA	1.5	50/60 Hz (48 Hz -0%62 Hz +0%)	12.9	7.9	6	.8	6	.3	10).2	9	.5
ESMD222L2YXA	2.2	(17.1	10.8	9	.6	8	.8	14	1.4	13	3.2
ESMD302L2TXA	3.0			13.5	12	2.0	11	.0	18	3.0	16	3.5
ESMD402L2TXA	4.0	3/PE 230 V (180 V -0%264 V +0%) 50/60 Hz		17.1	15	5.2	14	1.0	2	3	2	1
ESMD552L2TXA	5.5			25	2	2	20		3	3	30	
ESMD752L2TXA	7.5			32	2	28		26		42		39
ESMD113L2TXA	11	(40112 -0 /002112 -0 /0)		48	42		39		63		58	
ESMD153L2TXA	15			59	54		50		81		75	
			400V	480V	400V	480V	400V	480V	400V	480V	400V	480V
ESMD371L4TXA	0.37		1.6	1.4	1.3	1.1	1.2	1.0	2.0	1.7	1.8	1.5
ESMD751L4TXA	0.75		3.0	2.5	2.5	2.1	2.3	1.9	3.8	3.2	3.5	2.9
ESMD112L4TXA	1.1		4.3	3.6	3.6	3.0	3.3	2.8	5.4	4.5	5.0	4.2
ESMD152L4TXA	1.5		4.8	4.0	4.1	3.4	3.8	3.1	6.2	5.1	5.7	4.7
ESMD222L4TXA	2.2		6.4	5.4	5.8	4.8	5.3	4.4	8.7	7.2	8.0	6.6
ESMD302L4TXA	3.0	3/PE 400/480 V	8.3	7.0	7.6	6.3	7.0	5.8	11.4	9.5	10.5	8.7
ESMD402L4TXA	4.0	(320 V -0%528 V +0%) 50/60 Hz	10.6	8.8	9.4	7.8	8.6	7.2	14.1	11.7	12.9	10.8
ESMD552L4TXA	5.5	(48 Hz -0%62 Hz +0%)	14.2	12.4	12.6	11.0	11.6	10.1	18.9	16.5	17.4	15.2
ESMD752L4TXA	7.5		18.1	15.8	16.1	14.0	14.8	12.9	24	21	22	19.4
ESMD113L4TXA	11		27	24	24	21	22	19.3	36	32	34	29
ESMD153L4TXA	15		35	31	31	27	29	25	47	41	43	37
ESMD183L4TXA	18.5		44	38	39	34	36	31	59	51	54	47
ESMD223L4TXA	22		52	45	46	40	42	37	69	60	64	55

(1) For rated mains voltage and carrier frequencies 4, 6, and 8 kHz

(2) For rated mains voltage and carrier frequency 10 kHz

(3) Maximum current is a function of setting C90 (input voltage selection)



Installation

3 Installation

3.1 Mechanical installation

3.1.1 Dimensions and mounting



	Туре	a [mm]	a1 [mm]	b [mm]	b1 [mm]	b2 [mm]	c [mm]	s1 [mm]	s2 [mm]	m [kg]
	ESMD371L2YXA ESMD371L4TXA	93	84	146	128	17	100	15	50	0.6
A	ESMD751L2YXA ESMD751L4TXA	93	84	146	128	17	120	15	50	0.9
	ESMD112L4TXA	93	84	146	128	17	146	15	50	1.0
	ESMD112L2YXA	114	105	146	128	17	133	15	50	1.4
	ESMD152L4TXA	114	105	146	128	17	122	15	50	1.4
	ESMD222L4TXA	114	105	146	128	17	139	15	50	1.4
B	ESMD152L2YXA, ESMD222L2YXA ESMD302L2TXA ESMD302L4TXA	114	105	146	128	17	171	15	50	2.0
	ESMD402L2TXA ESMD402L4TXA, ESMD552L4TXA	114	105	146	100	17	171	15	50	2.0
0	ESMD552L2TXA, ESMD752L2TXA ESMD752L4TXA, ESMD113L4TXA	146	137	197	140	17	182	30	100	3.2
D	ESMD113L2TXA, ESMD153L2TXA ESMD153L4TXA ESMD223L4TXA	195	183	248	183	23	203	30	100	6.4



WARNING!

Drives must not be installed where subjected to adverse environmental conditions such as: combustible, oily, or hazardous vapors or dust; excessive moisture; excessive vibration or excessive temperatures. Contact Lenze for more information.

3.2 Electrical installation

3.2.1 Installation according to EMC requirements

EMC

Compliance with EN 61800-3/A11

Noise emission

Compliance with limit value class A according to EN 55011 if installed in a control cabinet with the appropriate footprint filter and the motor cable length does not exceed 10m

A Screen clamps

B Control cable

C Low-capacitance motor cable (core/core ≤ 75 pF/m, core/screen ≤ 150 pF/m)

D Electrically conductive mounting plate

E Filter

3.2.2 Fuses/cable cross-sections

			E.I.c.b.(2)				
	Туре		Miniature circuit	Fuse ⁽³⁾ or Breaker ⁽⁶⁾	Input Pov (L1, L2/N	ver Wiring I, L3, PE)	
			breaker ⁽⁵⁾	(N. America)	[mm²]	[AWG]	
	ESMD371L2YXA	M10 A	C10 A	10 A	2.5	14	
	ESMD751L2YXA	M16 A	C16 A	15 A	2.5	14	
1/N/PE	ESMD112L2YXA	M20 A	C20 A	20 A	4 (4)	12	
	ESMD152L2YXA	M25 A	C25 A	25 A	6 (4)	12	
	ESMD222L2YXA	M32 A	C32 A	30 A	4	10	
	ESMD371L2YXA ESMD751L2YXA ESMD371L4TXA ESMD222L4TXA	M10 A	C10 A	10 A	2.5	14	
	ESMD112L2YXA, ESMD152L2YXA ESMD302L4TXA	M16 A	C16 A	12 A	2.5	14	
	ESMD222L2YXA	M16 A	C16 A	15 A	2.5	12	
	ESMD402L4TXA	M16 A	C16 A	15 A	2.5	14	
	ESMD302L2TXA ESMD552L4TXA	M20 A	C20 A	20 A	4 (4)	12	≥ 30 mA
3/PE	ESMD402L2TXA ESMD752L4TXA	M25 A	C25 A	25 A	6 (4)	10	
	ESMD552L2TXA ESMD113L4TXA	M40 A	C40 A	35 A	6	8	
	ESMD752L2TXA ESMD153L4TXA	M50 A	C50 A	45 A	10	8	
	ESMD183L4TXA	M63 A	C63 A	60 A	16	6]
	ESMD113L2TXA ESMD223L4TXA	M80 A	C80 A	70 A	16	6	
	ESMD153L2TXA	M100 A	C100 A	90 A	16	4	

(1) Observe the applicable local regulations.

(2) Pulse-current or universal-current sensitive earth leakage circuit breaker.

(3) UL Class CC or T fast-acting current-limiting type fuses, 200,000 AIC, required. Bussman KTK-R, JJN, JJS or equivalent.

(4) Connection without end ferrules or with attached pin end connectors.

(5) Installations with high fault current due to large supply mains may require a type D circuit breaker.

(6) Thermomagnetic type breakers preferred.







Installation



WARNING!

Per UL requirements, use a FUSE (not a circuit breaker) for 240VAC drives requiring >40A protection and for 480VAC & 600VAC drives requiring >32A protection.

Observe the following when using E.I.c.b:

- Installation of E.I.c.b only between supplying mains and controller.
- The E.I.c.b can be activated by:
 - capacitive leakage currents between the cable screens during operation (especially with long, screened motor cables)
 - connecting several controllers to the mains at the same time
 - RFI filters

Installation After a Long Period of Storage



STOP!

Severe damage to the drive can result if it is operated after a long period of storage or inactivity without reforming the DC bus capacitors.

If input power has not been applied to the drive for a period of time exceeding three years (due to storage, etc), the electrolytic DC bus capacitors within the drive can change internally, resulting in excessive leakage current. This can result in premature failure of the capacitors if the drive is operated after such a long period of inactivity or storage. In order to reform the capacitors and prepare thedrive for operation after a long period of inactivity, apply input power to the drive for 8 hours prior to actually operating the motor.

3.2.3 Connection diagram





DANGER!

- Hazard of electrical shock! Circuit potentials are up to 240 VAC above earth ground. Capacitors retain charge after power is removed. Disconnect power and wait until the voltage between B+ and B- is 0 VDC before servicing the drive.
- Do not connect mains power to the output terminals (U,V,W)! Severe damage to the drive will result.
- Do not cycle mains power more than once every three minutes. Damage to the drive will result.





STOP!

If the kVA rating of the AC supply transformer is greater than 10 times the input kVA rating of the drive(s), an isolation transformer or 2-3% input line reactor must be added to the line side of the drive(s).

3.2.4 Control terminals

Terminal	Data for control connections (printed in bold = Lenze setting)					
71	RS-485 serial communication input	RXB/TXB (B+)				
72	RS-485 serial communication input	RXA/TXA (A-)				
7	Reference potential					
8	Analog input 0 10 V (changeable under C34)	input resistance: >50 kΩ (with current signal: 250Ω)				
9	Internal DC supply for setpoint potentiometer	+10 V, max. 10 mA				
20	Internal DC supply for digital inputs	+12 V, max. 20 mA				
28	Digital input Start/Stop	LOW = Stop HIGH = Run Enable				
E1	Digital input configurable with CE1 Activate fixed setpoint 1 (JOG1)	HIGH = JOG1 active	3 kΩ			
E2	Digital input configurable with CE2 Direction of rotation	LOW = CW rotation HIGH = CCW rotation	R = 3.			
E3	Digital input configurable with CE3 Activate DC injection brake (DCB)	HIGH = DCB active				
A1	Digital output configurable with c17	DC 24 V / 50 mA; NPN				
62	Analog output configurable with c08 & c11					
K14	Relay output (normally-open contact)	AC 250 V / 3 A				
K12	Fault (TRIP)	DC 24 V / 2 A 240 V / 0.22 A				

LOW = 0 ... +3 V, HIGH = +12 ... +30 V

Protection against contact

All terminals have basic isolation (single insulating distance)

· Protection against contact can only be ensured by additional measures (i.e. double insulation)



STOP!

In the case of a Spinning Motor:

To bring free-wheeling loads such as fans to a rest before starting the drive, use the DC injection braking function ("Auto-DCB"). Starting a drive into a freewheeling motor creates a direct short-circuit and may result in damage to the drive.

Confirm motor suitability for use with DC injection braking.



4 Commissioning

4.1 Parameter setting





Note

If the password function is enabled, the password must be entered into C00 to access the parameters. C00 will not appear unless the password function is enabled. See C94.

4.2 Electronic programming module (EPM)



The EPM contains the controller's memory. Whenever parameter settings are changed, the values are stored in the EPM. It can be removed, but must be installed for the controller to operate (a missing EPM will trigger an FI fault). The controller ships with protective tape over the EPM that can be removed after installation.

An optional EPM Programmer (model EEPM1RA) is available that allows: the controller to be programmed without power; OEM settings to be default settings; fast copying of EPMs when multiple controllers require identical settings. It can also store up to 60 custom parameter files for even faster controller programming.





4.3 Parameter menu

Code	Code		ble Settings	IMPOPTANT	
No.	Name	Lenze	Selection		
C00	Password entry	0	0 999	Visible only when password is active (see C94)	
CO 1	Setpoint and control	0	Setpoint source:	Control configuration:	
	source		0 Analog input (terminal 8; see C34)	Control = terminals Programming = keypad	
			1 Code c40	Monitoring = LECOM	
			2 Analog input (terminal 8; see C34)	Control = terminals Programming = LECOM / keypad Monitoring = LECOM	
			3 LECOM	Control = LECOM Programming = LECOM / keypad Monitoring = LECOM	
			4 Analog input (terminal 8; see C34)	Control = terminals	
			5 Code c40	Monitoring = remote keypad	
			6 Analog input (terminal 8; see C34)	Control = remote keypad Programming = remote keypad	
			7 Code c40	Monitoring = remote keypad	
			8 Analog input (terminal 8; see C34)	Control = terminals Programming = Modbus / keypad	
			9 Code c40	Monitoring = Modbus	
			10 Analog input (terminal 8; see C34)	Control = Modbus Programming = Modbus / keypad	
			11 Code c40	Monitoring = Modbus	
		1	Note When C01 = 1, 5, 7, 9, or 11, use c40 When C01 = LECOM (3), write speed	for speed setpoint command to C46	
203	Load Lenze setting		0 No action/loading complete	C02 = 14 only possible with DEE or Inb	
			1 Load 50 Hz Lenze settings	• C02 = 2 : C11, C15 = 60 Hz	
			2 Load 60 Hz Lenze settings		
			3 Load OEM settings (if present)		
			4 Translate		
		\triangle	WARNING! C02 = 13 overwrites all settings! TRIP CE1CE3.	circuitry may be disabled! Check codes	
		1	NOTE If an EPM that contains data from a prev 4 converts the data to the current version	vious software version is installed, C02 = n.	



Code	Code Possible Settings		IMPOPTANT			
No.	Name	Lenze	Selection			
CE I	Configuration -	1	1 Activate fixed setpoint 1 (JOG1)	· Use C37C39 to adjust fixed setpoints		
Digital input E1			2 Activate fixed setpoint 2 (JOG2)	 Activate JOG3: Both terminals = HIGH 		
			3 DC braking (DCB)	See also C36		
			4 Direction of rotation	LOW = CW rotation HIGH = CCW rotation		
			5 Quick stop	Controlled deceleration to standstill, active LOW; Set decel rate in C13 or c03		
CE5	Configuration -	4	6 CW rotation	CW rotation = LOW and CCW rotation =		
	Digital input E2		7 CCW rotation	LOW: Quick stop; Open-circuit protected		
			8 UP (setpoint ramp-up)	UP = LOW and DOWN = LOW: Quick		
			9 DOWN (setpoint ramp-down)	stop, use momentary NC contacts		
			10 TRIP set	Active LOW, triggers EE r (motor coasts to standstill) NOTE: NC thermal contact from the motor can be used to trigger this input		
CE3	Configuration -	3	11 TRIP reset	See also c70		
	Digital input L3		12 Accel/decel 2	See c01 and c03		
			13 Deactivate PI	Disables PI function for manual control		
			14 Activate fixed PI setpoint 1	Use C37C39 to adjust fixed setpoints		
			15 Activate fixed PI setpoint 2	 Activate fixed PI setpoint 3: Both terminals = HIGH 		
		i	Note A [FL] fault will occur under the following conditions: • E1E3 settings are duplicated (each setting can only be used once) • One input is set to UP and another is not set to DOWN, or vice-versa			
COB	Configuration - Relay output	1	Relay is energized if 0 Ready 1 Fault 2 Motor is running - CW rotation 3 Motor is running - CW rotation 4 Motor is running - CW rotation 5 Output frequency = 0 Hz 6 Frequency setpoint reached 7 Threshold (C17) exceeded 8 Current limit (motor or generator mode) reached 9 Feedback within min/max alarm (d46, d47) range 10 Feedback outside min/max alarm (d46, d47) range			
C09	Network address	1	1 247	Each controller on network must have unique address		



Code	-	Possi	ble Settings		IMPORTANT
No.	Name	Lenze	Selection		INFORTANT
C 10	Minimum output frequency	0.0	0.0 {Hz}	500	 Output frequency at 0% analog setpoint C10 not active for fixed setpoints or setpoint selection via c40
E 1 I	Maximum output frequency	50.0	7.5 {Hz}	500	 Output frequency at 100% analog setpoint C11 is never exceeded
		Â	WARNING! Consult motor/machin Overspeeding the mot personnel!	e manufacturer be or/machine may ca	fore operating above rated frequency. ause damage to equipment and injury to
C 12	Acceleration time 1	5.0	0.0 {s}	999	 C12 = frequency change 0 HzC11 C13 = frequency change C11 0 Hz
C 13	Deceleration time 1	5.0	0.0 {s}	999	For S-ramp accel/decel, adjust c82
EH	Operating Mode	2	0 Linear characteris Auto-Boost	tic with	Linear characteristic: for standard applications
			1 Square-law chara Auto-Boost	cteristic with	 Square-law characteristic: for fans and pumps with square-law load
			2 Linear characteris V _{min} boost	tic with constant	 characteristic Auto boost: load-dependent output
			3 Square-law chara constant V _{min} boo	cteristic with st	voltage for low-loss operation
C 15	V/f reference point	50.0	25.0 {Hz}	999	U A
			Set the rated motor fre (nameplate) for standa	equency ard applications	
C 16	V _{min} boost (optimization of torque behavior)	4.0	0.0 {%} Set after commissioni motor should run at sli (approx. 5 Hz), increas motor current (C54) = current	40.0 ng: The unloaded p frequency se C16 until 0.8 x rated motor	C16 C15 f smd006
сn	Frequency threshold (Q _{min})	0.0	0.0 {Hz}	500	See C08 and c17, selection 7 Reference: setpoint
C 18	Chopper frequency	2	 0 4 kHz 1 6 kHz 2 8 kHz 3 10 kHz 		 As chopper frequency is increased, motor noise is decreased Observe derating in Section 2.2 Automatic derating to 4 kHz at 1.2 x l_r
[5]	Slip compensation	0.0	0.0 {%}	40.0	Change C21 until the motor speed no longer changes between no load and maximum load
C55	Current limit	150	30 {%} Reference: <i>smd</i> rated	150 output current	 When the limit value is reached, either the acceleration time increases or the output frequency decreases When C90 = 2, max setting is 180%
C24	Accel boost	0.0	0.0 {%}	20.0	Accel boost is only active during acceleration



Code		Possi	ible Settings		IMPOPTANT	
No.	Name	Lenze	Selection			INFORTANT
[] [Analog input dead band	0	0 Enabled 1 Disabled			C31 = 0 activates dead band for analog input. When analog signal is within dead band, controller's output = 0.0 Hz and display will read 5LP
	O a sef as set is a	0	0 0 101/			
634	configuration - analog input	0	0 010 V			
			1 05 V			
			2 020 mA			
			3 420 mA			
			4 420 mA r	nonitored		Will trigger 5d5 fault if signal falls below 2 mA
C36	Voltage - DC injection brake (DCB)	4.0	0.0	{%}	50.0	 See CE1CE3 and c06 Confirm motor suitability for use with DC braking
רבס	Fixed setpoint 1 (JOG 1)	20.0	0.0	{Hz}	999	When PI is active (see d38), C37C39 are fixed PI setpoints
C38	Fixed setpoint 2 (JOG 2)	30.0	0.0	{Hz}	999	
C 39	Fixed setpoint 3 (JOG 3)	40.0	0.0	{Hz}	999	
C46	Frequency setpoint		0.0	{Hz}	500	Display: Setpoint via analog input, function UP/DOWN,or LECOM
C50	Output frequency		0.0	{Hz}	500	Display
C53	DC bus voltage		0.0	{%}	255	Display
C54	Motor current		0.0	{%}	255	Display
C59	PI feedback		c86	{%}	c87	Display
סרס	Proportional gain	5.0	0.0	{%}	99.9	
ורז	Integral gain	0.0	0.0	{s}	99.9	
C90	Input voltage selection		0 Auto			Automatically sets to Low (1) or High (2) upon next power-up, depending on input voltage
			1 Low			For 200 V or 400 V input
			2 High			For 240 V or 480 V input
		1	Note • To simplify cc on model: C90 = 1 for 44 C90 = 2 for 23 • Upon reset (C	ommissioning, the 00/480 V models 30/240 V models C02 = 1, 2), C90 =	Lenze 0. Cor	setting is preset at the factory, depending
C94	User password	0	0 Changing from value will start a	"0" (no password) at 763	999 ,	When set to a value other than 0, must enter password at C00 to access parameters
C99	Software version					Display, format: x.yz
c0 I	Acceleration time 2	5.0	0.0	{s}	999	 Activated using CE1CE3 c01 = frequency change 0 HzC11
c03	Deceleration time 2	5.0	0.0	{s}	999	 c03 = frequency change C110 Hz For S-ramp accel/decel, adjust c82



Code	Code Possible Settings		IMPODIANI	
No.	Name	Lenze	Selection	IMPORTANT
c06	Holding time - automatic DC injection brake (Auto-DCB)	0.0	0.0 {s} 999 0.0 = not active 999 = continuous brake	 Automatic motor braking below 0.1 Hz by means of motor DC current for the entire holding time (afterwards: U, V, W inhibited) Confirm motor suitability for use with DC braking
c08	Analog output scaling	100	1.0 999	When 10 VDC is output at terminal 62, it will equal this value (see c11)
c	Configuration -	0	0 None	
	Analog output (62)		1 Output frequency 0-10 VDC	Use c08 to scale signal
			2 Output frequency 2-10 VDC	Example: $c11 = 1$ and $c08 = 100$:
			3 Load 0-10 VDC	At 100 Hz, terminal $62 = 3 \text{ VDC}$
			4 Load 2-10 VDC	
	Orafination	0	5 Dynamic braking	Unly used with DB option
	Digital output (A1)	0	 O Ready Fault Motor is running Motor is running - CW rotation Motor is running - CCW rotation Output frequency = 0 Hz Frequency setpoint reached Frequency setpoint reached Frequency threshold (C17) exceeded Current limit (motor or generator mode) reached Feedback within min/max alarm (d46, d47) range Feedback outside min/max alarm (d46, d47) range 	
c20	I²t switch-off (thermal motor monitoring)	100	30 {%} 100 100% = <i>smd</i> rated output current	 Triggers <i>IJE5</i> fault when motor current exceeds c20 for too long Correct setting = (motor nameplate current) / (<i>smd</i> output current rating) X 100% Example: motor = 6.4 amps and <i>smd</i> = 7.0 amps; correct setting = 91% (6.4 / 7.0 = 0.91 x 100% = 91%)
		∕!\	Do not set above rated motor current as provide full motor protection!	listed on the motor dataplate. Does not
c2 I	Motor Overload Type	00	 00 Speed Compensation Reduces the allowable continuous current when operating below 30Hz. 01 No Speed Compensation Example: Motor is cooled by forced ventilation as apposed to shaft mounted, self cooling fans. 	Ir 100% 60% Ir: rated current (%), f: motor frequency (Hz)



Code		Possible Settings			IMPORTANT
No.	Name	Lenze	Selection		IMPONTANT
c25	Serial baud rate	0	0 LECOM: 9600 bps	S	• See C01
			1 LECOM: 4800 bbs	i,∠ S	 Modbus if C01 = 811
			Modbus: 9600,8,N	, 1,1	
			2 LECOM: 2400 bps	3	
			Modbus: 9600,8,E	.,1	
			Modbus: 9600,8,C),1	
c38	Actual PI setpoint		c86	c87	Display
c40	Frequency setpoint via keys	0.0	0.0 {Hz}	500	Only active if C01 is set properly (C01 = 1,5,7,9,11)
c42	Start condition (with mains on)	1	0 Start after LOW-HI terminal 28	GH change at	See also c70
			1 Auto start if termina	al 28 = HIGH	
			WARNING! Automatic starting/resta personnel! Automatic s inaccessible to personr	arting may cause starting/restarting nel.	damage to equipment and/or injury to should only be used on equipment that is
c60	Mode selection for c61	0	0 Monitoring only		$c60 = 1$ allows the keys $\bigcirc \bigcirc$ to adjust
			1 Monitoring and editing		speed setpoint (c40) while monitoring c61
c6 I	Present status/error		status/error message		• Display
c62	Last error		error message		 Refer to Section 5 for explanation of status and error messages
c63	Last error but one				
כרס	Configuration TRIP reset (error reset)	0	0 TRIP reset after LC change at terminal switching, or after I change at digital in	DW-HIGH 28, mains LOW-HIGH put "TRIP reset"	
			1 Auto-TRIP reset		 Auto-TRIP reset after the time set in c71
					 More than 8 errors in 10 minutes will trigger -5L fault
			WARNING! Automatic starting/restarting may cause da personnel! Automatic starting/restarting sh inaccessible to personnel.		damage to equipment and/or injury to should only be used on equipment that is
c7	Auto-TRIP reset delay	0.0	0.0 {s}	60.0	See c70
c78	Operating time		Display		0999 h: format xxx
	counter		Total time in status "Sta	art"	10009999 h: format x.xx (x1000) 10000 99999 h: format xx x (x1000)
c79	Mains connection		Display		
	time counter		Total time of mains = or	n	
c8 I	PI setpoint	0.0	c86	c87	
c82	S-ramp integration time	0.0	0.0 {s}	50.0	 c82 = 0.0: Linear accel/decel ramp c82 > 0.0: Adjusts S-ramp curve for smoother ramp
c86	Minimum feedback	0.0	0.0	999	Select feedback signal at C34
c87	Maximum feedback	100	0.0	999	 If feedback is reverse-acting, set c86>c87



Code		Possible Settings				IMPORTANT
No.	Name	Lenze	Selection			IMPORTANT
d25	PI setpoint accel/ decel	5.0	0.0	{s}	999	Sets rate of change for PI setpoint
d30	PI mode	0	0 PI disabled			
			1 PI enabled:	normal-acting		When feedback (terminal 8) exceeds setpoint, speed decreases
			2 PI enabled:	reverse-acting		When feedback (terminal 8) exceeds setpoint, speed increases
d46	Feedback minimum alarm	0.0	0.0		999	
<u>4</u> 47	Feedback maximum alarm	0.0	0.0		999	See C08 and c17, selections 9 and 10
n20	LECOM power up	0	0 Quick stop			
	state		1 Inhibit			
n22	Serial time-out	0	0 Not active			Selects controller reaction to serial
	action		1 Inhibit			timeout
			2 Quick stop			
			3 Trip fault FL	:3		
n23	Serial fault time	50	50	{ms}	65535	Sets the serial timeout length



Trouble Shooting & Fault Elimination

5 Troubleshooting and fault elimination

	Status	Cause	Remedy
e.g. 50.0	Present output frequency	Trouble free operation	
OFF	Stop (outputs U, V, W inhibited)	LOW signal at terminal 28	Set terminal 28 to HIGH
Inh	Inhibit (outputs U, V, W inhibited)	Controller is set up for remote keypad or serial control (see C01)	Start the controller via the remote keypad or serial link
SEP	Output frequency = 0 Hz	Setpoint = 0 Hz (C31 = 0)	Setpoint selection
	(outputs 0, v, w innibited)	Quick stop activated through digital input or serial link	Deactivate Quick stop
br	DC-injection brake active	DC-injection brake activated • via digital input • automatically	Deactivate DC-injection brake • digital input = LOW • automatically after holding time c06 has expired
EL	Current limit reached	Controllable overload	Automatically (see C22)
LU	Undervoltage on DC bus	Mains voltage too low	Check mains voltage
dEC	Overvoltage on DC bus during deceleration (warning)	Excessively short deceleration time (C13, c03)	Automatically if overvoltage < 1 s, DU , if overvoltage > 1 s
nEd	No access to code	Can only be changed when the controller is in DFF or Inh	Set terminal 28 to LOW or inhibit by serial link
٢C	Remote keypad is active	Attempt to use buttons on front of controller	Buttons on front of controller are disabled when remote keypad is active

Error		Cause	Remedy (1)	
cF		Data not valid for controller		
CF	Data on EPM not valid	Data error	 Use EPM providing valid data Load Lenze setting 	
GF		OEM data not valid	· Load Lenze setting	
FI	EPM error	EPM missing or defective	Power down and replace EPM	
CFG	Digital inputs not uniquely assigned	E1E3 assigned with the same digital signals	Each digital signal can only be used once	
		Either just "UP" or "DOWN" used	Assign the missing digital signal to a second terminal	
dF	Dynamic braking fault	Dynamic braking resistors are overheating	Increase deceleration time	
EEr	External error	Digital input "TRIP set" is active	Remove external error	
F2F0	Internal fault		Please contact Lenze	
FC3	Communication error	Serial timer has timed out	Check serial link connections	
FES	Communication error	Serial communication failure	Please contact Lenze	
JF	Remote keypad fault	Remote keypad disconnected	Check remote keypad connections	
LC	Automatic start inhibited	c42 = 0	LOW-HIGH signal change at terminal 28	

(1) The drive can only be restarted if the error message has been reset; see c70

Trouble Shooting & Fault Elimination



	Error	Cause	Remedy (1)
DC I	Short-circuit or overload	Short-circuit	Find reason for short-circuit; check motor cable
		Excessive capacitive charging current of the motor cable	Use shorter motor cables with lower charging current
		Acceleration time (C12, c01) too short	Increase acceleration timeCheck controller selection
		Defective motor cable	Check wiring
		Internal fault in motor	Check motor
		Frequent and long overload	Check controller selection
002	Earth fault	Grounded motor phase	Check motor/motor cable
		Excessive capacitive charging current of the motor cable	Use shorter motor cables with lower charging current
006	Motor overload (I ² t overload)	Motor is thermally overloaded, due to: • impermissable continuous current • frequent or too long acceleration processes	Check controller selection Check setting of c20
DH	Controller overtemperature	Controller too hot inside	Reduce controller loadImprove cooling
00	Overvoltage on DC bus	Mains voltage too high	Check mains voltage
		Excessively short deceleration time or motor in generator mode	Increase deceleration time or use dynamic braking option
		Earth leakage on the motor side	Check motor/motor cable (separate motor from controller)
r5t	Faulty auto-TRIP reset	More than 8 errors in 10 minutes	Depends on the error
545	Loss of 4-20 mA reference	4-20 mA signal is below 2 mA (C34 = 4)	Check signal/signal wire
SF	Single phase fault	A mains phase has been lost	Check mains voltage

(1) The drive can only be restarted if the error message has been reset; see c70



NOTE

In the event of an "OC6" (Motor Overload) failure there is a 3-minute delay before resetting is possible. This is a requirement of UL508C. This delay is intended to allow time for the motor to cool.

If power is removed when the drive is in an "OC6" fault state, when the power is restored the "OC6" fault will still be present and the delay will still be active even if power was removed for longer than 3 minutes.