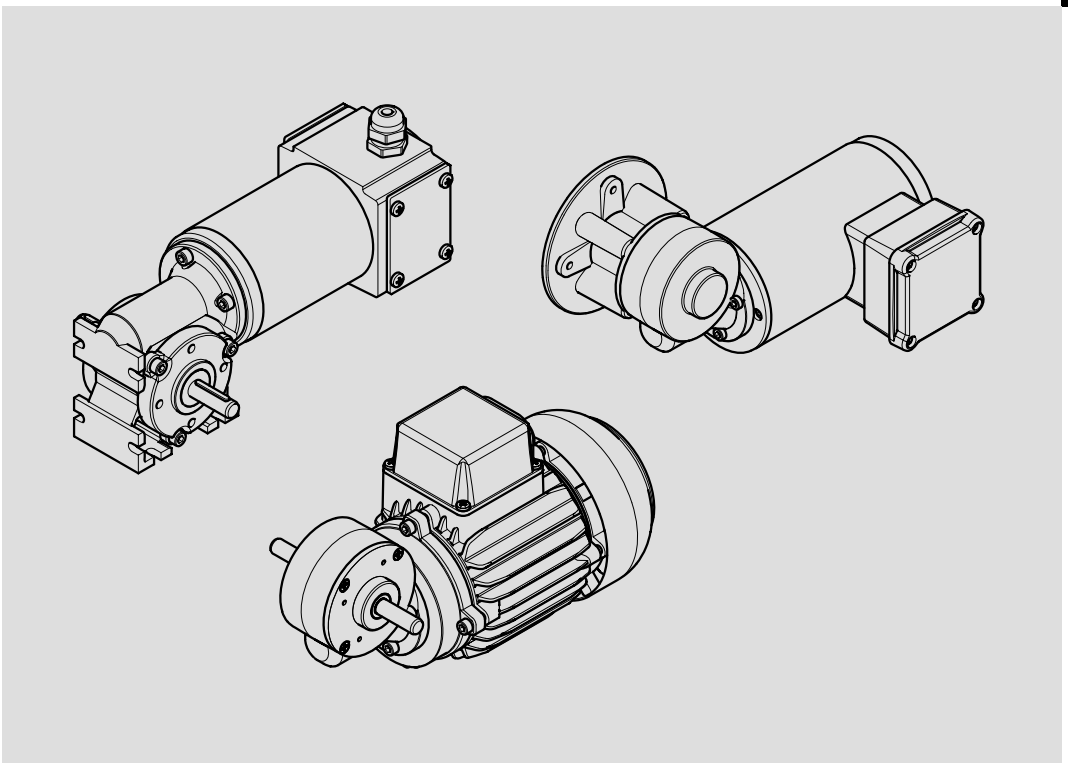
BA 13.0009 - EN
13219664

Operating Instructions



Type 13.12□; 13.5□□; 13.7□□

DC permanent-magnet motors and
DC permanent-magnet geared motors (PM)

DC shunt-wound motors and
DC shunt-wound geared motors (GN)

Three-phase asynchronous motors and
three-phase asynchronous geared motors (AC)

Lenze

Please read these instructions before you start working!
Follow the enclosed safety instructions.

This documentation applies to ...

Three-phase asynchronous motors and
three-phase asynchronous geared motors of series

13.71☐ / 13.75☐

DC shunt-wound motors and
DC shunt-wound geared motors of series

13.53☐ / 13.55☐

DC permanent-magnet motors and
DC permanent-magnet geared motors of series

13.12☐

Document history

Material number	Version			Description
411281	1.0	11/1999		First edition for pilot series
411281	2.0	06/2001		Chapter 5.5.3: extension of the table by gearbox type SPL42 All chapters: error correction and complete editorial revision
452562	1.0	04/2002		Extension by chapter 5.6 ”Type and quantity of lubricants”
453986	1.0	06/2002	TD09	Chapter 3.1.3 supplemented Chapter 3.2 supplemented Chapter 5.5.3: extension of the table by gearbox type SPL120 and by the flange size
13219664	2.0	07/2007	TD09	Complete revision of all chapters
13219664	2.1	05/2009	TD09	Change of address

Tip!

Current documentation and software updates concerning Lenze products can be found on the Internet in the ”Services & Downloads” area under

http://www.Lenze.com

Nameplates

Three-phase AC motor

Field	Contents			Example
1	Manufacturer CE designation			Lenze D - 32696 Extertal Germany CE
2	Current type	Motor type/geared motor type		
3	Manufacturing date	Commission no.	Enclosure (IP)	Nr. IP
4	Rated power (kW)	Rated speed ($1/_{min}$)		kW 1/min.
5	Rated voltage (V)	Rated frequency (Hz)		V Hz
6	Rated current (A)	Output torque (Nm) [1]		A Nm
7	Operating mode	Temperature class	Ratio [1]	S I.Cl I=

1) Additional data for geared motors

DC current and permanent magnet motors

Field	Contents			Example
1	Manufacturer Mark of conformity			Lenze D - 32696 Extertal Germany CE
2	Motor type	Motor type/geared motor type		
3	Manufacturing date	Commission no.		Nr.
4	Rated power (kW)	Rated speed ($1/_{min}$)		kW 1/min.
5	Rated voltage (V)	Rated current (A)	Maximum current (A)	Feld V Imax. A
6	Armature voltage (V) current Enclosure (IP)	Armature current (A)	Form factor of armature	Anker V F IP
7	Temperature class Output torque (Nm) [1]		Ratio [1]	I.Cl I= M_2 Nm

The type of design can be gathered via the specification of the motor type in the type code (📖 4).
1) Additional data for geared motors

Gearbox

Field	Contents		Example
1	Manufacturer CE designation		Lenze D - 32696 Extertal Germany CE
2	Gearbox type	Manufacturing date	Typ
3	Commission no.	Ratio	Nr. i
4	Torque M_2 in Nm		M_{2max} Nm
5			

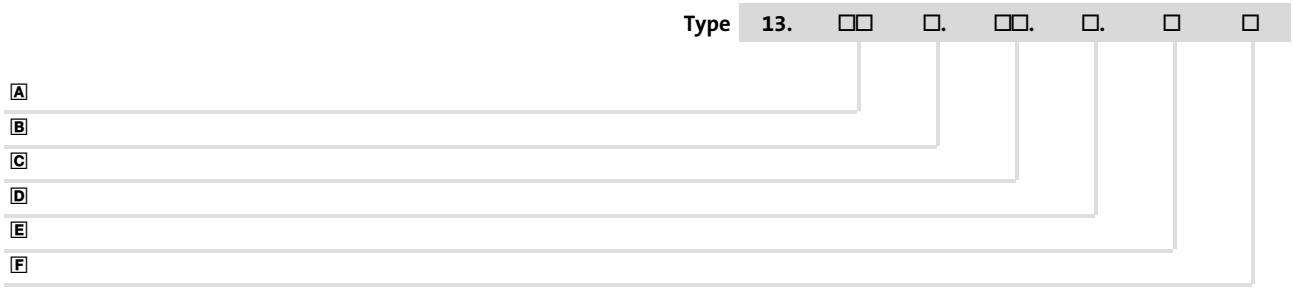
Brakes

Indication of an integrated brake

Field	Contents			Example
1	Brake type/size	Voltage		BFK457-05 205V DC
2	Electric power	Braking torque	ID number	13W 2Nm ID.475684

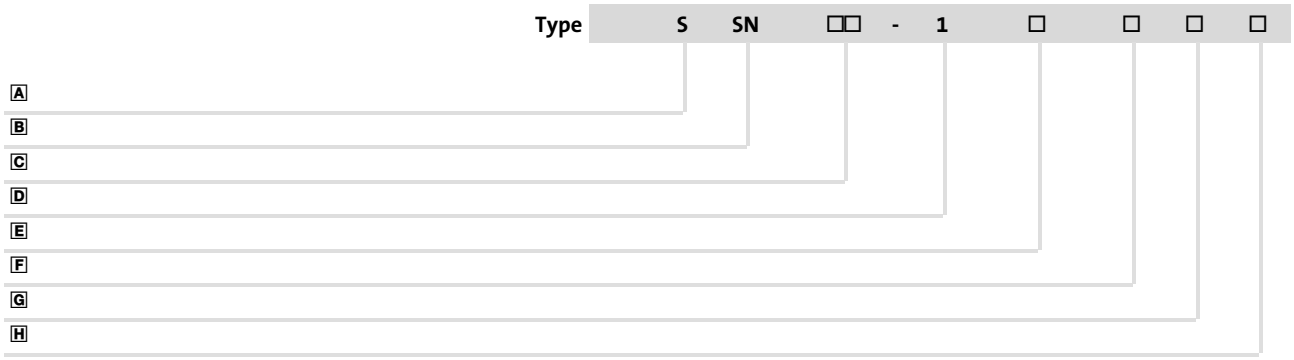
Type code

DC current and permanent magnet motors



Legend for type code type 13.□□□			
A	Motor type:	12	Permanent magnet motor with smooth housing
		53	DC shunt motor uncompensated with ribbed housing
		55	DC shunt motor compensated with ribbed housing
		71	Three-phase asynchronous motor with smooth housing
		75/78	Three-phase asynchronous motor with ribbed housing
B	A-side specification: 0		Lenze standard; IEC or special version
		1	For worm gearbox SSN
		3	For helical gearbox 12.130
		6	For helical gearbox GST
C	Motor size	1. position	Size coded
		2. position	Overall length coded
D	Design gearbox size A-side		
		0	Lenze standard dimensions
		1	IEC dimensions
		9	Special dimensions
	Helical gearbox 12.130		
		5	Gearbox size 30
		6	Gearbox size 60
	Worm gearbox SSN		
		2	Gearbox size 25
		3	Gearbox size 31
		5	Gearbox size 40
	Helical gearbox GST		
		3	GST03
		4	GST04
		5	GST05
E	Motor design:	1	Flange mounting B5
		2	Flange mounting B14
		3	Foot mounting B3
		4	Foot-flange mounting B3/B5
		5	Foot-flange mounting B3/B14
		6	For helical gearbox GST(integrated)
F	B-side specification: 0		Without built-on accessories, no mounting possibilities
		1	With brake
		2	With brake and DC tachometer
		3	With brake and three-phase tachometer
		4	With DC tachometer
		5	With three-phase tachometer
		6	For tachometer mounting
		7	For brake mounting
		9	Miscellaneous

Worm gearbox type SSN

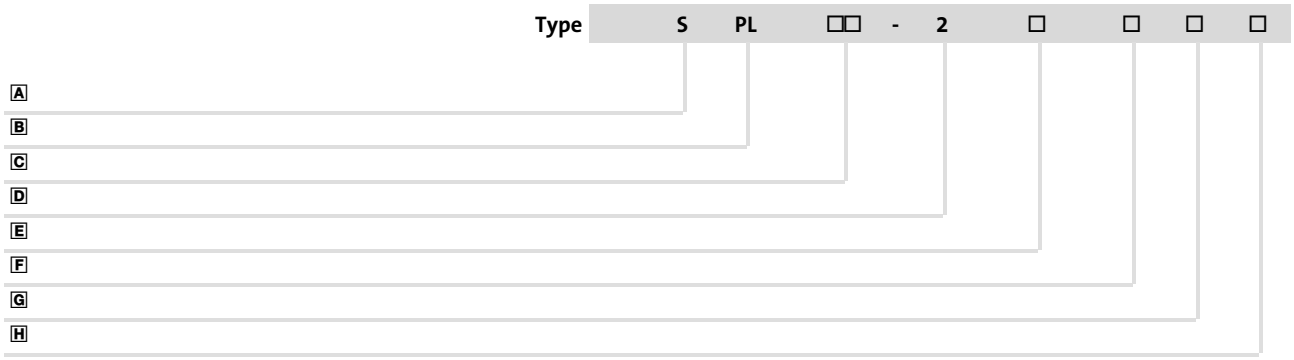


Legend for the SSN type code		
A	S	Product group - small drives
B	SN	Product series
C		Gearbox size 25, 31, 40 (distance between axes in mm)
D		Number of stages
Design at the input end		
E	F	Open gearbox
Design at the output end		
F	Shaft design	
	V	Solid shaft
	D	Double wall corrugated board
	H	Hollow shaft
G	Housing design	
	A	With foot mounting and centering
	B	With foot mounting, without centering
	C	Without foot mounting, with centering
	D	Without foot mounting, without centering
H	Flange design	
	R	Without flange
	K	Round flange with bore holes
	L	Round flange with threaded holes

Type	12.130.	□□.	□

Legend for type code of type 12.130		
A	Small helical gearbox	12.130
B	Size	30 drive torque max. 30 Nm 60 drive torque max. 60 Nm
C	Design	1 - B3 (gearbox with foot mounting) 3 - B14 (flange mounting)
Additional variants		
i	Speed reduction gearbox	
1; 2 or 3	Foot mounting assembly (for B3 only)	

Planetary gearbox type SPL



Legend for the SPL type code		
A	Product group - small drives	S
B	Product family	PL
C	Size	42; 52; 62, 81, 120
D	Number of stages	1, 2, 3
Design at the input end		
E	Standard motor	N
Design at the output end		
F	Shaft design	
	Solid shaft	V
G	Housing design	
	Without foot mounting, with centering	C
H	Flange design	
	Without flange	R
Additional variants		
i	Ratio	

1 Preface and general information

1.1 About these Operating Instructions

- The Operating Instructions at hand serve to the safety-relevant working on and with the AC / GN / PM motors. They contain safety instructions that must be observed.
- All personnel working on and with the AC / GN / PM motors must have the Operating Instructions available during work and observe the information and notes relevant for them.
- The Operating Instructions must always be complete and in a perfectly readable state.

1.1.1 Terminology used

Term	Used in the following text for
Motor	Three-phase asynchronous motors and three-phase asynchronous geared motors
	DC shunt-wound motors and DC shunt-wound geared motors
	DC permanent-magnet motors and DC permanent-magnet geared motors
	AC / GN / PM motors

Drive systems

For drives with AC / GN / PM motors in connection with other drive components the term ”drive system” will be used in the following text.

1.2 Scope of supply

- Short description

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.

Claim

- visible transport damage immediately to the forwarder.
- visible deficiencies/incompleteness immediately to your Lenze representative.

1.3 Legal regulations

Labelling	**Nameplate**	**Manufacturer**
	Lenze products are clearly labelled and defined by the indications on the nameplates.	Lenze GmbH & Co KG Kleinantriebe Postfach 10 13 52 D-31763 Hameln
Application as directed	**Drive products** ● must only be operated under the operating conditions prescribed in these instructions. ● must only be used for the purposes ordered and confirmed. ● meet the protection requirements of the EC "Low-Voltage Directive". ● are not machines in the sense of the EC Machine Directive. ● must not be operated beyond the respective capacities. **Drive systems with AC / GN / PM motors** ● meet the "Electromagnetic compatibility" EC Directive if they are installed according to the specifications of the CE-typical drive system. ● can be used: – in public and non-public mains, – in industrial as well as residential and commercial areas. ● The responsibility for ensuring that the application is in compliance with the EC Directive lies with the user. **Any other use shall be deemed inappropriate!**	
Liability	● The information, data, and notes in these instructions met the state of the art at the time of printing. Claims on modifications referring to controllers which have already been supplied cannot be derived from the information, illustrations, and descriptions. ● The specifications, processes, and circuitry described in these Instructions are for guidance only and must be adapted to your own specific application. Lenze does not take responsibility for the suitability of the process and circuit proposals. ● Lenze does not accept any liability for damage and operating interference caused by: – disregarding the Operating Instructions – unauthorised modifications to the drive controllers – operating errors – improper working on and with the drive controllers	
Warranty	● Terms of warranty: see Sales and Delivery Conditions of Lenze GmbH & Co KG Kleinantriebe. ● Warranty claims must be made to Lenze immediately after detecting the deficiency or fault. ● The warranty is void in all cases where liability claims cannot be made.	
In-house transport	● Transport the motors free of vibration. ● Avoid heavy shocks. ● If possible, use manufacturer's packaging for transport. Cushioned bag ensures: – dust protection – moisture protection – mechanical protection	
Storage conditions	● Storage: – free of vibration if a certain risk of vibration exists, we recommend to rotate the rotor once per week – dry, in a non-aggressive environment – free of dust – free of extreme temperature changes ● Corrosion: – Steel parts are corrosion-protected when being delivered. Do not remove the protection! Check it every three months and, if necessary, renew it.	

2 Safety instructions

2.1 Personnel responsible for safety

Operator

- An operator is any natural or legal person who uses the drive system or on behalf of whom the drive system is used.
- The operator or his safety officer must ensure
  - that all relevant regulations, instructions and legislation are observed.
  - that only qualified personnel work with and on the drive system.
  - that the personnel have the Operating Instructions available for all corresponding operations.
  - that non-qualified personnel are prohibited from working with and on the drive system.

Skilled personnel

Skilled personnel are persons who - because of their education, experience, instructions, and knowledge about corresponding standards and regulations, rules for the prevention of accidents, and operating conditions - are authorised by the person responsible for the safety of the plant to perform the required actions and who are able to recognise potential hazards.
(See IEC 364, definition of skilled personnel)

2.2 Residual hazards

Protection of persons

- The motor surfaces can become very hot. Danger of burns when touching!
  - If necessary, provide protection against contact.
- If the motor is inverter driven, high-frequency voltages may be capacitively transferred to the motor housing.
  - Ensure careful earthing of motor housing.
- Danger through unintended starts or electric shocks
  - Connections must only be made when the equipment is deenergised and the motor is at standstill.
  - Built-in brakes are not fail-safe brakes .

Device protection

- Integrated temperature sensors do not provide **full protection** for the machine.
  - If necessary, limit the maximum current, ensure a function block interconnection with disconnection after a few seconds of operation with $I > I_r$, particularly if a danger of blocking exists.
  - Integrated overload protection does not protect against overloading under all conditions.
- Built-in brakes are **not fail-safe brakes**
  - Torque can be reduced.
- Fuses do not protect the motor.
  - Use current-dependent motor protection switches for average switching frequency.
  - Use integrated temperature sensors for high switching frequency.
- Excessive torques may lead to demagnetisation or a breakage of the motor shaft.
  - Never exceed the maximum torques specified in the catalogue.
- Shear forces from the motor shaft are possible.
  - Shafts of motor and drive machine must be exactly aligned.

Fire protection

- Danger of fire
  - Avoid contact with inflammable substances.

2.3 Safety instructions for low-voltage machines

in compliance with Low-Voltage Directive 73/23/EEC

General

Low-voltage machines have hazardous live and rotating parts and possibly also hot surfaces.

Synchronous machines induce voltages at open terminals during operation.

All operations concerning transport, connections, commissioning and maintenance must be carried out by qualified, skilled personnel (EN 50110-1 (VDE 0105-100) and IEC 60364 must be observed). Inappropriate use creates the risk of severe injury to persons and damage to material assets.

Low-voltage machines may only be operated under the conditions that are indicated in the section ”Application as directed”.

The conditions at the place of installation must comply with the data given on the nameplate and in the documentation.

Application as directed

Low-voltage machines are intended for commercial installations. They comply with the harmonised standards of the series EN 60034 (VDE 0530). Their use in potentially explosive atmospheres is prohibited unless they are expressly intended for such use (follow additional instructions).

Low-voltage machines are components for 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 i. a. EN 60204-1).

Low-voltage machines with IP23 protection or less are only intended for outdoor use when applying special protective features.

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

Transport, storage

Damage must be reported immediately to the forwarder upon receipt; if required, commissioning must be excluded. Tighten screwed-in ring bolts before transport. They are designed for the weight of the low-voltage machines, do not apply extra loads. If necessary, use suitable and adequately dimensioned means of transport (e. g. rope guides).

Remove transport locking devices before commissioning. Reuse them for further transport. When storing low-voltage machines, ensure a dry, dust-free and low-vibration ($v_{eff} \leq 0.2$ mm/s) environment (bearing damage while being stored).

Installation

Ensure an even surface, solid foot/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 ”Electrical connection”).

Use appropriate means to mount or remove belt pulleys and clutches (heating) and cover them with a touch guard. Avoid impermissible belt tensions.

The machines are half-key balanced. The clutch must be half-key balanced, too. The visible jutting out part of the key must be removed.

If required, provide pipe connections. Designs with shaft end at bottom must be protected with a cover which prevents 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 taken in immediately.

Electrical connection

All operations must only be carried out by qualified and skilled personnel on the low-voltage machine at standstill and deenergised and provided with a safe guard to prevent an unintentional restart.This also applies to auxiliary circuits (e. g. brake, encoder, blower).

Check safe isolation from supply!

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

Observe the data 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 connectors must be bolted tightly (to stop).

The clearances between blank, live parts and to earth must not fall below 8 mm at $U_r \leq 550$ V, 10 mm at $U_r \leq 725$ V, 14 mm at $U_r \leq 1000$ V.

The terminal box must be free of foreign particles, dirt and moisture. All unused cable entries and the box itself must be sealed against dust and water.

Commissioning and operation

Before commissioning after longer storage periods, measure insulation resistance. In the case of values ≤ 1 kΩ per volt of rated voltage, dry winding.

For trial run without output elements, lock the featherkey. Do not deactivate the protective devices, not even in a trial run.

Check the correct operation of the brake before commissioning low-voltage machines with brakes.

Integrated thermal detectors do not provide full protection for the machine. If necessary, limit the maximum current. Parameterise the controller so that the motor will be switched off with $I > I_r$ after a few seconds of operation, especially at the risk of blocking.

Vibrational severities $v_{eff} \leq 3.5$ mm/s ($P_r \leq 15$ kW) or 4.5 mm/s ($P_r > 15$ kW) are acceptable if the clutch is activated.

If deviations from normal operation occur, e.g. increased temperatures, noises, vibrations, find the cause and, if required, contact the manufacturer. In case of doubt, switch off the low-voltage machine.

If the machine is exposed to dirt, clean the air paths regularly.

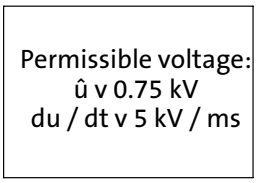
Shaft sealing rings and roller bearings have a limited service life.

Regrease bearings with relubricating devices while the low-voltage machine is running. Only use the grease recommended by the manufacturer. If the grease drain holes are sealed with a plug, (IP54 drive end; IP23 drive and non-drive end), remove plug before commissioning. Seal bore holes with grease. Replace prelubricated bearings (2Z bearing) after approx. 10,000 h - 20,000 h, at the latest however after 3 - 4 years.

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

Operation on the frequency inverter for AC motors

The label in the terminal box specifies the limit values of the voltages with which the isolation system of the motor may permanently be loaded. Example of product series 13.7□□.



Protection of the motor against impermissible voltage peaks

- During operation of the motors on the frequency inverter or during switching operations on the mains, voltage peaks that may damage the motor isolation can occur.
- In order to avoid malfunctions, the limit values specified in the table may not be exceeded:

Application of the motor on	Limit values for voltage peaks	
	max. amplitude û (kV)	max. rate of rise du / dt (kV / µs)
Frequency inverter, single-phase	0.75	5
Frequency inverter, three-phase	1.5	
Mains (switching operation)	0.75	

Note!

For switching operations on the mains you can limit the voltage peaks by means of a suppressor circuit with RC elements or varistors (not included in the scope of supply).
Dimension the suppressor circuit for the respective application case!

2.4 Definition of 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
 **Danger!**	**Danger of personal injury through dangerous electrical voltage.** Reference to an imminent danger that may result in death or serious personal injury if the corresponding measures are not taken.
 **Danger!**	**Danger of personal injury through a general source of danger.** Reference to an imminent danger that may result in death or serious personal injury if the corresponding measures are not taken.
 **Stop!**	**Danger of property damage.** 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
 **Note!**	Important note to ensure troublefree operation
 **Tip!**	Useful tip for simple handling
	Reference to another documentation

3 Technical data

3.1 Functional description

3.1.1 Motor series 13.7□□ (AC)

The asynchronous motors are divided into three-phase AC motors of the types 13.71□/75□. They are squirrel cage motors, the stators of which according to the design bear a three-strand three-phase winding.

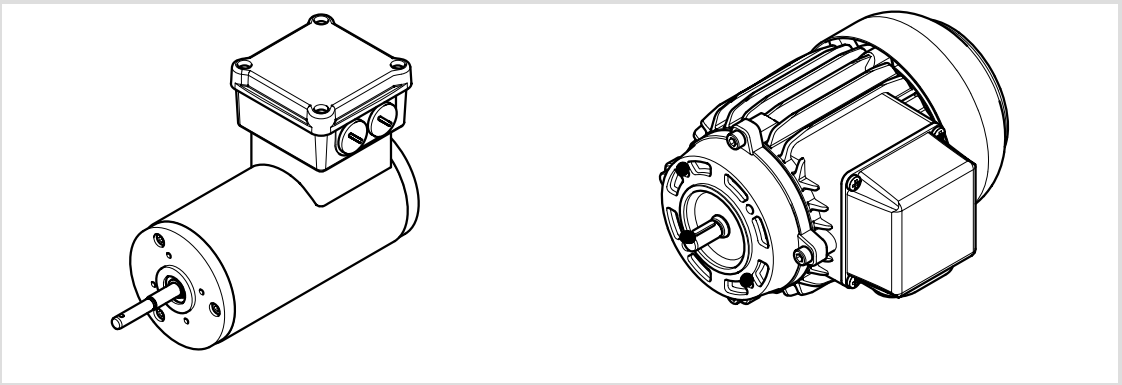


Fig. 1

Motor type 13.710
- smooth housing
- no fan, heat dissipation by convection and radiation via the motor surface

Motor type 13.750
- ribbed housing
- integral fan and fan cover

3.1.2 Motor series 13.5□□ (GN)

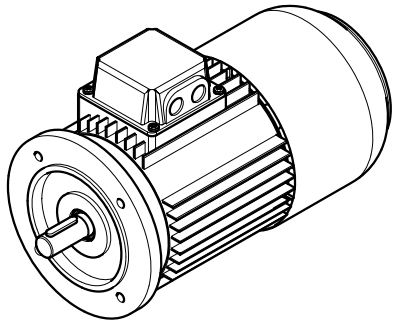


Fig. 2 Motor type 13.5□□

DC shunt motors feature wound magnet coils for generating the magnetic flux in the stator. In the laminated core the rotor has a winding which is guided to a collector. The current entry is effected via carbon brushes to the collector. The winding through which the current flows in the constant magnetic flux generates a torque proportional to the motor current, which is transferred to the motor shaft. Shunt motors are characterised by low speed variations when the load is varied. The DC shunt-wound motors are unaffected by start-ups under load, short-time accidental blocking and countercurrent braking.

The motors of type 13.550 are fully compensated, i. e. they are equipped with a compensation and interpole winding. This winding technology provides the motors with very good running characteristics and long brush lives.

The motors are equipped with internal fans operating irrespectively of the direction of rotation. In the case of speed-controlled motors it is to be observed that the cooling effect clearly decreases at a speed of < 1000 min^{-1}. If it is not possible to reduce the load, the motor cooling has to be effected via a separate fan.

Reversal of rotation direction by inverting the connection polarity of either the armature winding or the field winding.

3.1.3 Motor series 13.12☐ (PM)

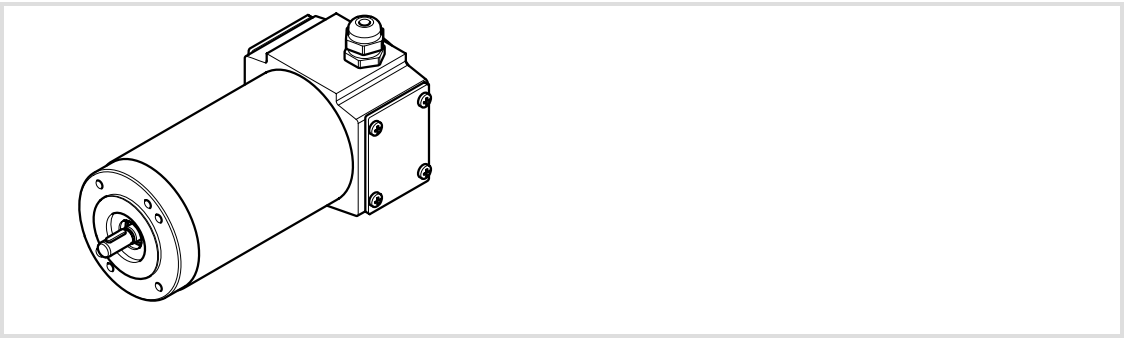


Fig. 3 Motor type 13.12☐

- smooth housing
- no fan, heat dissipation by convection and radiation via the motor surface

Permanent magnet motors are DC motors. The magnetic flux is generated by permanent magnets in the stator. The rotor in the laminated core has a winding that is guided to a collector. The current entry is effected via carbon brushes to the collector. The winding through which the current flows in the constant permanent magnet flux generates a torque proportional to the motor current, which is transferred to the motor shaft. PM motors feature distinct shunt characteristics, i. e. only low speed variations in the case of load variations. Reversal of rotation direction by inverting the connection polarity; a change-over **only** is permissible in standstill.

Stop!

The maximum permissible current ($I_{max.}$) may not (not even for a short time) be exceeded! If required, the current has to be limited to permissible values!

Speed-independent heat dissipation is effected by convection and radiation via the motor surface. The motors can be operated at very small speeds at rated torque without additional cooling measures.

3.2 General data and operating conditions

Field	Values		
Conformity	CE	Low-Voltage Directive (73/23/EEC)	
Climatic conditions	Average relative humidity 85 %, without condensation		
Admissible temperature ranges	Designs		
	• Non-ventilated or with integral fan without brake or with spring-applied brake	-20 °C ... +40 °C	Without power reduction, over +40°C with power reduction, see catalog
	• With permanent magnet brake	-10 °C...+40 °C	
	• With separate fan, without permanent magnet brake	-15 °C...+40 °C	Without power reduction
Mounting positions	Suitable for all mounting positions		Vertical arrangements in accordance with DIN-IEC 34 Part 7 are possible if they meet the designs
Enclosure	See nameplate		Enclosures only apply to horizontal installation
Thermal class	F (155 °C) according to DIN-IEC 34 / VDE 0530		Exceeding the temperature limit weakens or destroys the insulation
Tropical protection	Not guaranteed		
Permissible installation height h	$h \leq 1000$ m AMSL 1000 m AMSL $< h \leq 4000$ m AMSL		Without power reduction With power reduction, see catalog
Permissible voltage	1.5 kV peak value		5 kV/µs rate of rise
Vibration	Up to 2.0g / 20m/s² without resonance excitation, e.g. of the fan.		

3.2.1 Other application conditions

► Other application conditions require a power derating or torque reduction using the factors listed in table 2 and 3 (see below).

3.2.1.1 Power derating

Data for power derating in the case of differing conditions					
Cooling air temperature °C [1]	40	45	50	55	60
Power derating k_υ [1]	1.00	0.95	0.90	0.83	0.77
Site altitude above amsl in m [2]	1000	2000	3000	4000	5000
Power derating k_h [2]	1.00	0.92	0.83	0.77	0.67

1) Derating in the case of differing ambient or cooling air temperature
2) Derating in the case of differing site altitude

3.3 Rated data

Note!

For special versions, like for instance special speed or special voltage, gather the characteristics from the nameplate (📖 3).

3.3.1 Motor series AC motors type 13.7□□

Motor type	P_n W	n_n 1/min	M_n Nm	J kg cm²	I_n 380V A	M_A/M_n	I_A/I_n	cos φ	F_r N	F_a N	m_{Mot} approx. kg
13.710.35	12	1350	0.085	0.22	0.1	2.6	1.5	0.7	240	230	1.8
13.710.35	25	2700	0.088		0.20	2.6	2.6	0.53	190	170	
13.710.47	40	1350	0.28	0.41	0.22	2.2	2.1	0.61	350	320	2.9
13.710.47	75	2700	0.27		0.23	2.4	3.2	0.76	280	240	
13.710.55	60	1350	0.42	1.4	0.21	1.9	2.3	0.72	340	320	3.6
13.710.55	90	2700	0.32	0.85	0.25	2.1	3.2	0.86	270	240	
13.750.45	30	1350	0.21	0.31	0.24	2.8	1.5	0.56	240	120	2.3
13.750.45	60	2700			0.28	3.3	3.5	0.62	190	90	
13.750.55	90	1350	0.64	1.3	0.40	2.1	2.5	0.65	400	380	3.7
13.750.55	150	2700	0.53	0.79	0.42	2.3	3.9	0.86	320	280	
13.750.65	180	1350	1.27	2.1	0.70	1.7	2.6	0.79	570	520	5.0
13.750.65	250	2750	0.86	1.4	0.73	2.7	4.2	0.83	450	390	

Tab. 1 Rated voltage (standard) 3~230/400 V, 50 Hz

3.3.2 Motor series GN motors type 13.5□0

Motor type	P_n W	n_n 1/min	M_n Nm	J kg cm²	U_A V	I_n A	R_A Ohm	L_A mH	U_f V	I_f V	F_r N	F_a N	m_{Mot} approx. kg
13.530.55	110	3000	0.35	2.0	180	0.85	22.5	170	200	0.16	390	220	3.3
13.530.63	160		0.51	2.6		1.35	15.6	115		0.15	440	330	4.6
13.530.65	250		0.80	3.2		2.00	10.5	100		0.20	440	330	4.6
13.530.75	400		1.27	7.3	160	3.20	4.00	57		0.21	430	370	7.4
13.530.83	550		1.75	11.6		4.40	2.50	51		0.22	710	370	13
13.550.85	800		2.55	21.7		7.60	2.50	5.5		0.20	710	590	13
13.550.86	1100		3.50	28.9		9.30	1.40	2.6		0.70	710	590	13

Tab. 2 Characteristics for standard design

3.3.3 Motor series PM motors type 13.120

Motor type	P_n W	n_n 1/min	M_n Nm	J kg cm²	U_A V	I_n A	I_{max} A	R_A Ohm	L_A mH	F_r N	F_a N	m_{Mot} approx. kg
13.120.35	55	3000	0.17	0.46	24 180	3.7 0.46	41 5.0	1.3 68	2 98	220	200	1.4
13.120.45	110		0.35	1.03	24 180	6.7 0.86	44 6	0.46 27.4	1.4 52	320	280	2.4
13.120.55	200		0.64	3.8	24 180	11.8 1.4	71 9	0.19 9.8	0.54 31.5	340	280	3.7
13.120.65	370		1.18	10.7	24 180	18.6 2.5	90 11.2	0.09 4.1	0.4 25	580	330	8.0
13.120.75	540 600		1.72 1.91	16.8	24 160	27 4.5	130 20	0.06 1.6	0.2 9	570	460	10.2

Tab. 3 Characteristics for standard design

Description of scientific terms			
P_r	Rated power	F_r	Perm. radial load
n_r	Rated speed	F_a	Perm. axial load
M_n	Rated torque	m_{Mot}	Motor weight (mass)
J	Moment of inertia	U_A	Armature voltage
I_r	Rated current	R_A	Armature resistance
M_A/M_n	Ratio of starting torque to rated torque	L_A	Armature inductance
		U_F	Excitation voltage
I_A/I_n	Ratio of starting current to rated current	I_F	Rated excitation current
$cos\varphi$	Power factor	I_{max}	Permissible peak current

3.3.4 Shaft loads

The permissible loads mentioned in the tables (Tab. 1 - Tab. 3) either are to be understood as radial or axial forces.

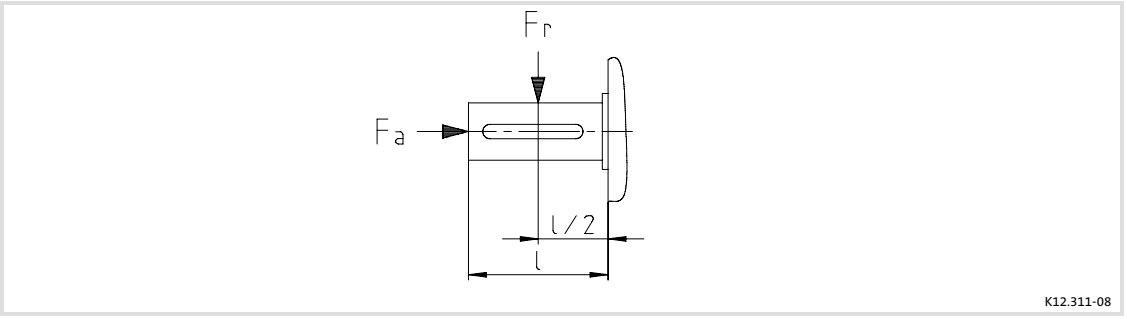


Fig. 4 Points of application of radial and axial forces

3.4 Emission

Danger!

Depending on the operating status, high surface temperatures are reached!

- ► Risk of burns when touching.
  – Surface temperature of the motors up to 95°C
- ► If required, provide for protection against contact.

- ► A limit value of 70dB (A) is not exceeded during rated operation. In the case of AC motors, operating states during which higher noise emissions occur can appear.
- ► The carbon brush debris inside GN and PM motors is composed of different metals, graphite, possibly epoxy resin, or other binders.

4 Mechanical installation

4.1 Transport, storage and installation

Danger!

- ► Use appropriate means of transport or hoists:
  – Ensure safe fixing.
- ► Transport the motors free of vibrations.
- ► Avoid heavy shocks.

Storage

- ► free of vibration
  if a certain risk of vibration exists, we recommend to rotate the rotor once per week
- ► dry, in a non-aggressive environment
- ► free of dust
- ► free of extreme temperature changes

Corrosion

- ► Steel parts are corrosion-protected when being delivered. Do not remove the protection! Check it every three months and, if necessary, renew it.

Installation

The motors are tested for operation and are ready for use.

Preparations

- ► Remove the corrosion protection from the steel parts.
- ► Check for transport damage and fix key, if necessary.
- ► The mounting depends on the motor design, the weight and the motor torque.
- ► Before mounting the motor, foot and flange surfaces must contact the mounting surfaces evenly. Insufficient motor alignment reduces the service life of the bearings and the transmission elements!
- ► Clutches and other transmission elements must be mounted according to the corresponding instructions. Avoid shocks onto the shafts and do not exceed the permissible radial and axial forces to avoid damage to the bearings!
- ► Provide sufficient space for unimpeded ventilation.

4.2 Site

Danger!
Do not use in hazardous areas!

The motors are designed for the following rated conditions:

- Ambient and cooling air temperatures up to +40 °C (in case of other temperatures see chapter 3.2.1).
- Installation height up to 1000 m amsl (in case of other installation heights see chapter 3.2.1).
- Ensure unimpeded ventilation!
- The exhaust air must not be intaken again!
- Operation within the permissible control range for self-ventilated motors.

5 Electrical installation

Danger!

- ► Have the electrical connection carried out by qualified personnel for electronics only!
- ► Carry out all connection operations in the deenergised state only! Danger of unintentional start-ups or electric shocks.

Stop!

It has to be ensured that the supply voltage and the nameplate data comply with each other.

Cable cross-sections

- ► Sufficiently dimension the connecting cables to avoid impermissible heating (observe DIN 57100/VDE 0100 T523).
- ► If supply cables are very long, the cross-section next in size is recommended, so as to decrease the loss of power. Minimum cross-sections according to DIN VDE 0298-4 are to be observed.
- ► Carry out the electrical connection according to the circuit diagram enclosed with each motor. The circuit diagrams for the standard versions by the factory are given in chapters 5.1, 5.2, 5.3 and 5.4.

5.1 AC motor connection

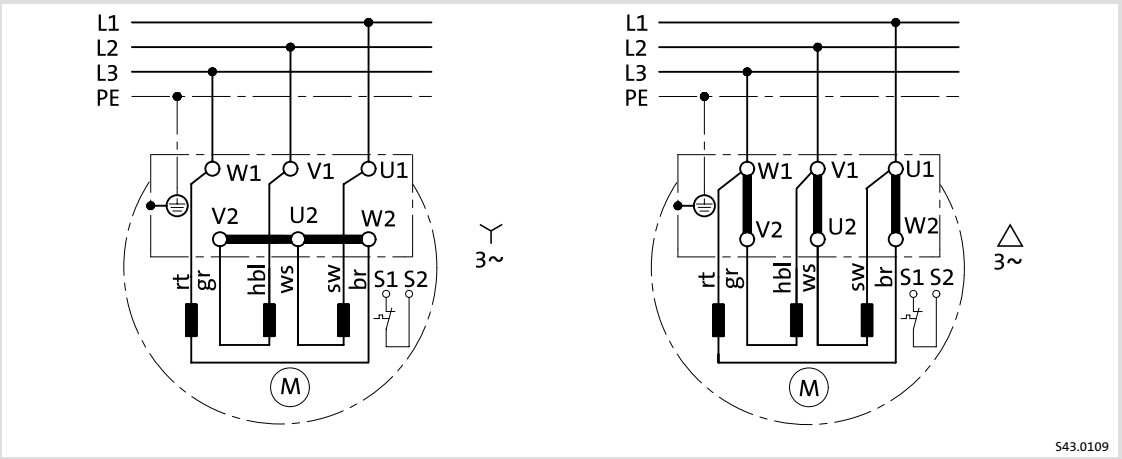


Fig. 5 Circuit diagram for three-phase asynchronous motors

lb	light blue	bl	black
br	brown	gr	grey
rd	red	wh	white

Stop!

If the direction of rotation is reversed, invert the mains cables!

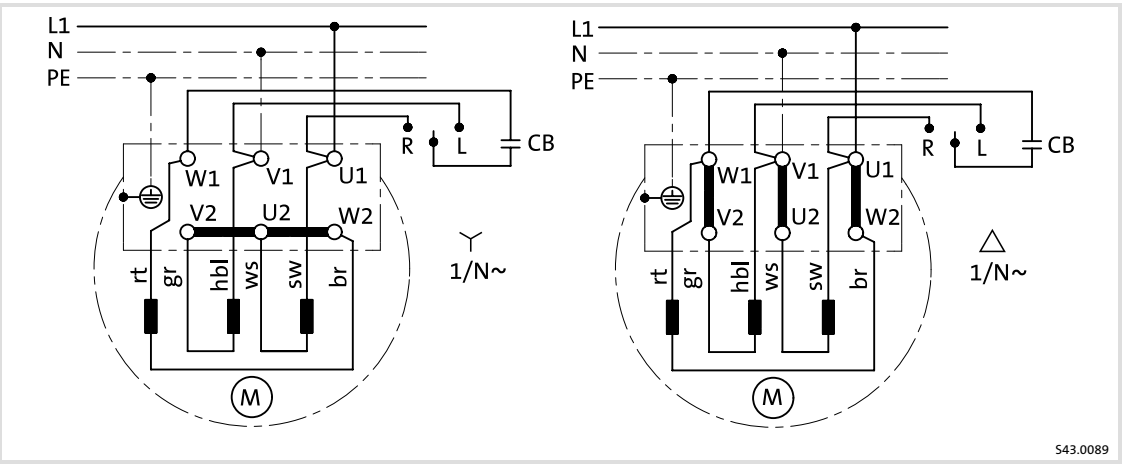


Fig. 6 Circuit diagram for three-phase asynchronous motors in Steinmetz circuits

R	clockwise rotation	L	counter-clockwise rotation
lb	light blue	bl	black
br	brown	gr	grey
rd	red	wh	white

5.2 GN motor connection

DC shunt-wound motors are only operated on DC voltage. Among other things, the supply is effected by DC speed controllers. It has to be ensured that the supply voltage or the output voltage of the DC speed controller and the nameplate data comply with each other.

If there is a separate fan, it requires an AC voltage or a three-phase voltage system, according to the nameplate.

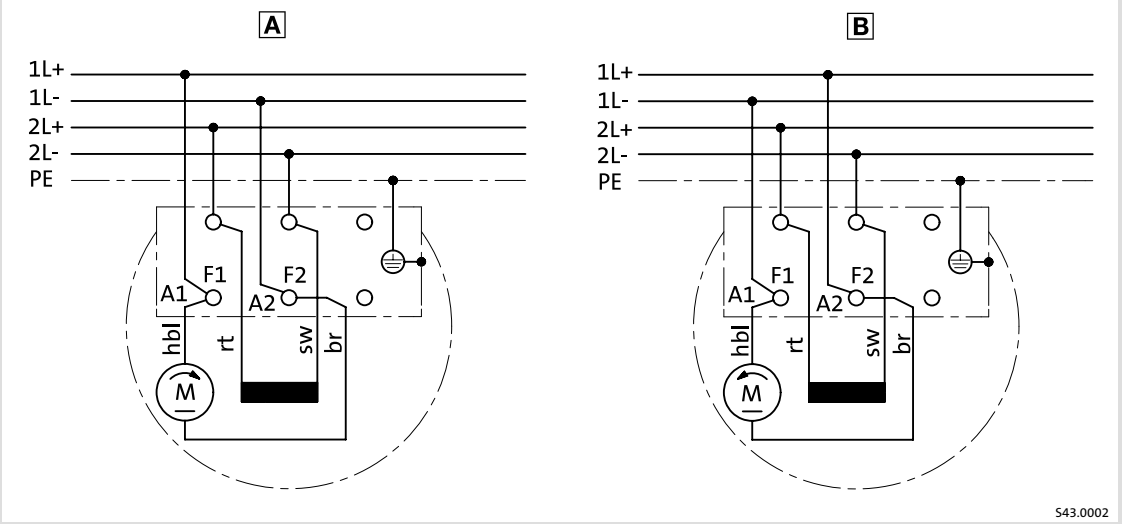


Fig. 7 Circuit diagram for GN motors in standard design

A	clockwise rotation	B	counter-clockwise rotation
lb	light blue	br	brown
rd	red	bl	black

5.3 PM motor connection

The PM motors are to be operated with DC voltage. The voltage supply has to provide the opportunity to start up the motors in a current-limited manner!

Stop!

- ► Never exceed the maximum permissible peak current "I_{max}"! (Chapter 3.3.3)
- ► The motors as of size 55 may not be switched on directly when the rated voltage is applied, as the starting current would exceed the permissible peak current "I_{max}".

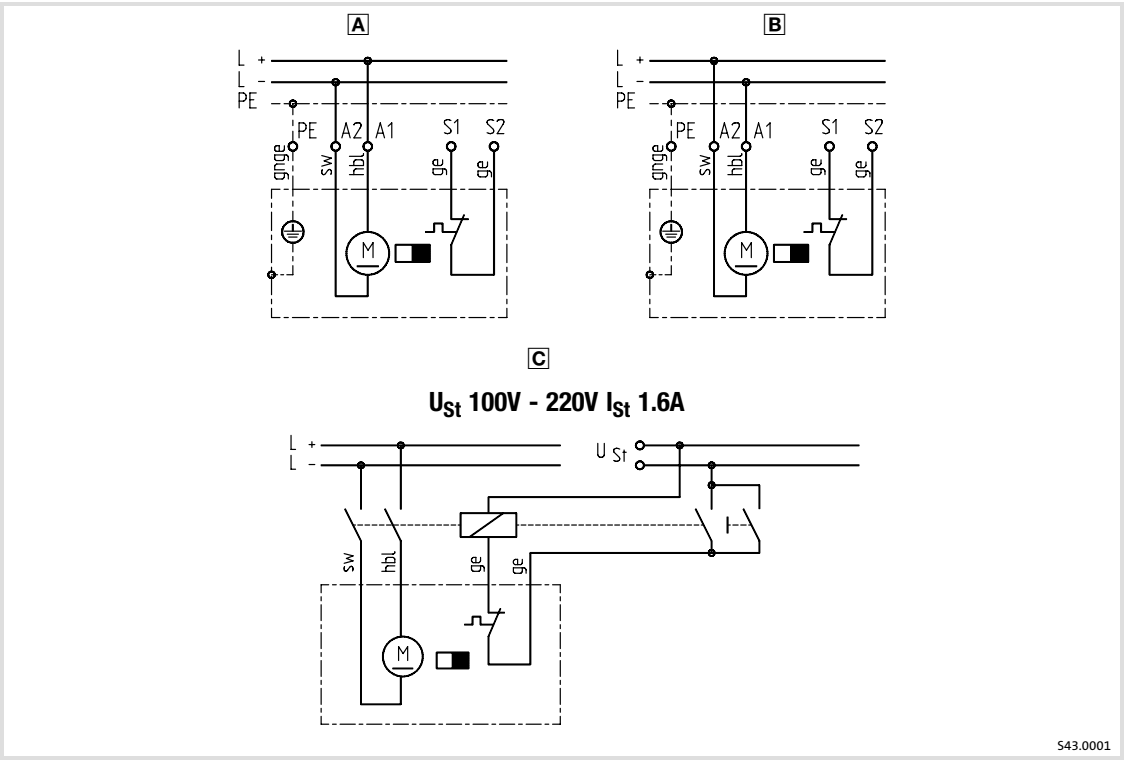


Fig. 8 Circuit diagram for PM motors

A	clockwise rotation	B	counter-clockwise rotation
C	circuit proposal for thermal switch (NC contact)		
lb	light blue	ye	yellow
gr-ye	green-yellow	bl	black

5.4 Attachments

Danger!

Ensure that the drives are disconnected from the power supply when working on them!

Stop!

- ► Unload motors or secure load applied to the drive.
- ► Do not use hammers or other heavy tools for assembly or disassembly!

Motors with B-sided built-on accessories (brakes and/or encoders) are mounted, electrically connected, and function-tested. Observe the corresponding Operating Instructions!

For the subsequent mounting of these products:
Observe the "Connection plans for additional equipment" (fig. 10.1 - 10.4), the Mounting Instructions, and the corresponding Operating Instructions!

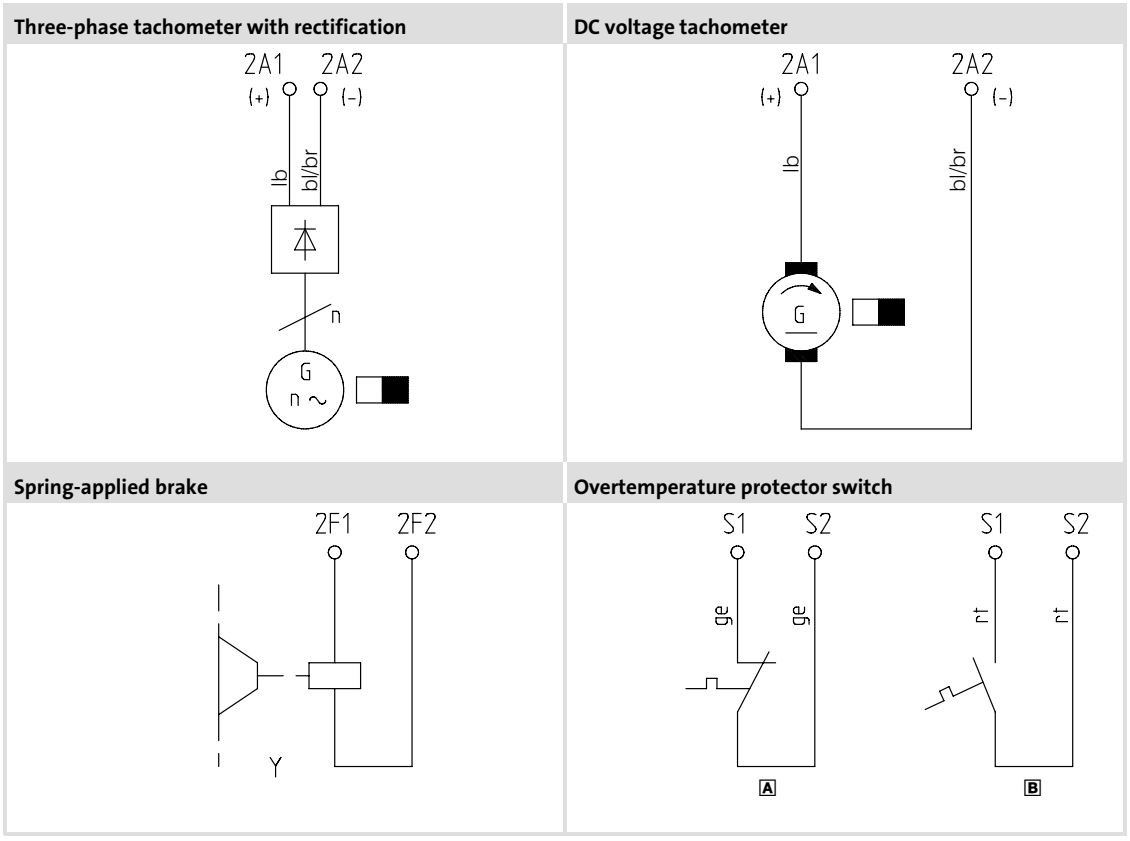


Fig. 9 Connection plans for additional equipment

- A NC contact
- B NO contact

5.5 Gearbox mounting

Stop!

- ► In order to avoid bearing failures, please be absolutely sure to prevent exceeding the permissible radial and axial forces!
- ► In order to avoid damage to the sealing lips, the shaft sealing rings basically have to be mounted with a mounting sleeve.

5.5.1 Worm gearbox type SSN

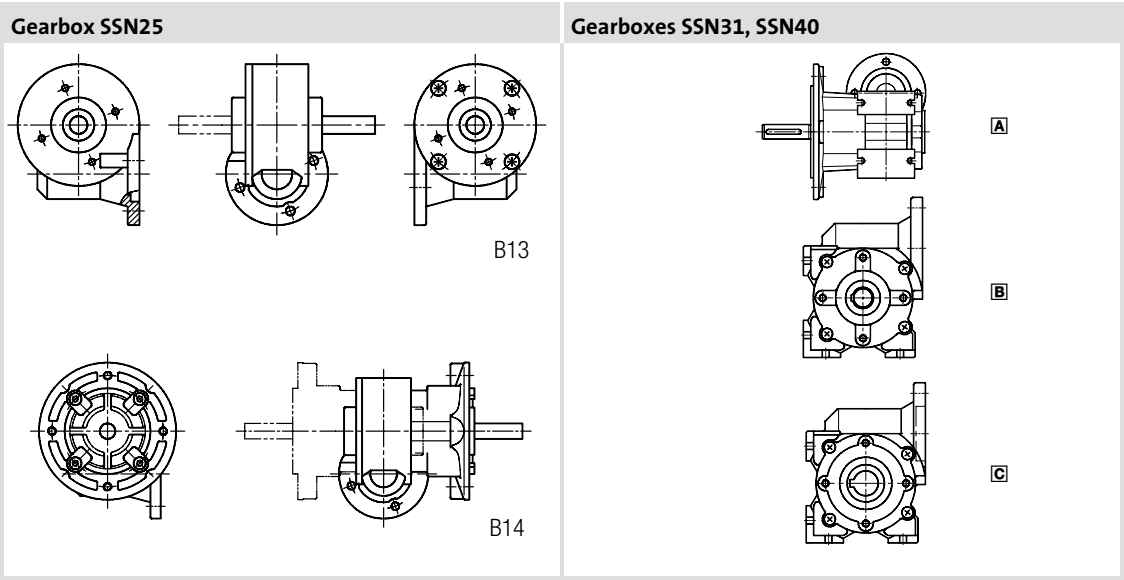


Fig. 10 Worm gearbox

- A Solid shaft version with flange
- B Solid shaft version without flange
- C Hollow shaft version

Stop!

After the shaft sealing ring has been mounted, the motor shaft end should be supported when the dowel pin is inserted.

Use the screws and corresponding lock washers which are part of the mounting kit of the motor for fixing the gearbox to the motor:

Gearbox size	Gearbox design		
	Without flange	Flange on the housing side	Flange on the cover side
SSN25	3 x chs.	2 x chs. / 1 x fl. head scr.	
SSN31		3 x chs.	
SSN40			

Tab. 4

Chs. cheese head screw with hexagon socket
Fl. head scr. flat head screw

Stop!

For the flange mounting, seal the four threads. For this, insert the screws with liquid sealing compound (e. g. Loctite).

5.5.2 Small helical gearbox type 12.130

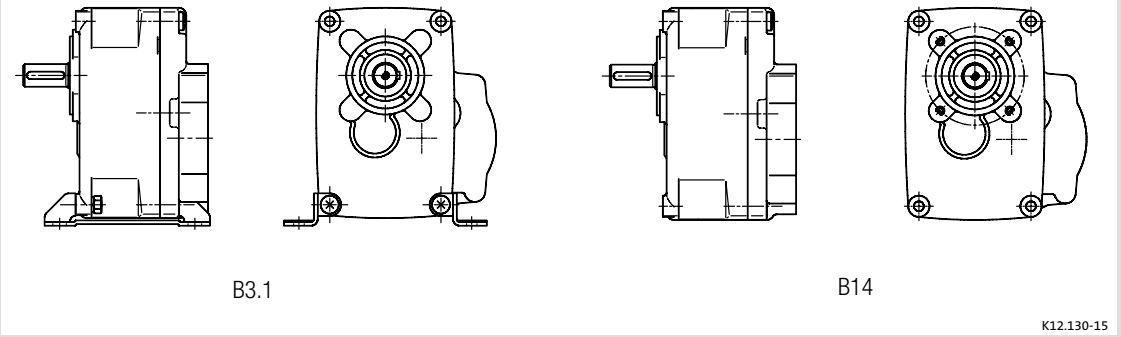


Fig. 11 Gearbox type 12.130

Stop!

After the shaft sealing ring has been mounted, the motor shaft end should be supported when the dowel pin is inserted.

- Use the screws and corresponding lock washers supplied with the mounting kit of the motor type 13.123 for fixing the intermediate plate and the gearbox to the motor:
  - Sheet: 4 cheese head screws M5x14
  - Gearbox: 4 cheese head screws M6x12
- In the case of gearbox size 12.130.60, for the purpose of centering attach the sleeve supplied with the mounting kit to the centering of the motor bearing assembly.

5.5.3 Planetary gearbox type SPL

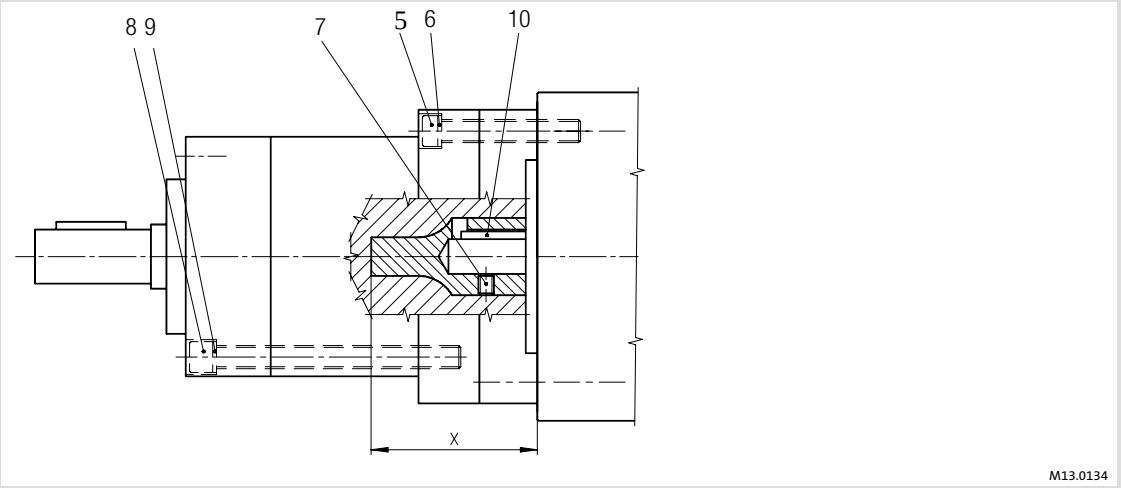


Fig. 12

5	Screw	8	Screw
6	Disc	9	Disc
7	Set screw	10	Keyway (does not apply for SPL42)
7	Dowel pin (for SPL42)		

Gearbox type / size	Dimensions	
	Flange size	Size x in mm
SPL42	---	31
SPL52	C80	38.6
SPL62	C80 / C90	43 / 43
SPL81	C90 / C105	51.6 / 58.6
SPL120	C105	73.7

► The power transmission from the gearbox to the motor in the case of the planetary gearbox is effected by means of a keyway (does not apply for type SPL 42!).

STOP

Stop!

Use liquid sealant (e. g. Loctite) for enclosure IP55 between connection flange and gearbox.

5.6 Lubricant table

Gearbox type	Lubricant type	Quantity [ml]
SSN25	Klübersynth GH6 460	25
SSN31-1FVAL		60
SSN31-1FVAR		40
SSN31-1FDAR		40
SSN31-1FHAR		40
SSN40-1FVAL		120
SSN40-1FVAR		80
SSN40-1FDAR		80
SSN40-1FHAR		80
12.130.30	Shell Alvania GL 00	440
12.130.60		600

6 Commissioning and operation

Stop!

- ► Ensure that the drives are deenergised before working on them!
- ► Commissioning of the drive may only be carried out by qualified personnel!
- ► Do not commission in explosive rooms!
- ► Fire hazard! Do not clean or spray drives with flammable detergents or solvents.
- ► Avoid overheating! Deposits on the drives impede the heat dissipation required and have to be removed regularly.

During mounting and commissioning, ensure that no contaminants enter the interior of the motor!

6.1 Before switching on

- ► the first commissioning,
- ► commissioning after a longer down-time,
- ► commissioning after overhauling the motor:

Stop!

Commission the drive system according to the Operating Instructions of the controller.

Please check:

- ► Is the mechanical and electrical fixing all right?
- ► Are the electrical connections o.k.?
- ► Is a free intake and exit of the cooling air provided?
- ► Is the effectiveness of the protective equipment against overheating (overtemperature protector switch evaluation) ensured?
- ► Is the phase sequence of the motor connection correct?
- ► Does the parameter setting of the controller correspond to that of the motor (see Operating Instructions of controller)?
- ► Is the direction of rotation of the separate fan correct?

6.1.1 Functional test of motor series13.7□□

Commission drives and check all individual functions, like for instance:

– torque behaviour and current consumption,
– braking effect of the brake mounted
– output signal of the encoder system

► In the case of failures or faults, see chapter 8 “Troubleshooting and fault elimination”.

6.1.2 Functional test of motor series13.5□□

Check the following items before

► initial commissioning

► commissioning after a longer down-time

► commissioning after overhauling the motor
– Stability of all screw connections of the mechanical and electrical parts;
– Smooth-running sliding of the carbon brushes in the brush holders;
– Mounting of all brush holder pressure fingers on the carbon;
– If an oxide film has formed on the collector contact surface:
Polish it using a collector sanding bar or corund stone. **On no account** use solvents for cleaning.
– Free intake and exit of the cooling air;
– Effectiveness of the protective devices against overheating (overtemperature protector switch evaluation);
– Direction of rotation of the separate fan.

Stop!

Only apply armature voltage to the motor when the excitation is switched on!

If the armature voltage is applied when the excitation is not switched on, this can destroy the motor. The motor possibly may “overspeed”, i. e. the speed of the motor can increase until the rotor bursts.

► Commission drives and check all individual functions, like for instance
– torque behaviour and current consumption,
– braking effect of the brake mounted,
– output signal of the encoder system.

► In the case of failures or faults, see chapter 8 “Troubleshooting and fault elimination”.

6.1.3 Functional test of motor series13.1□□

6.1.4

Stop!

Maximum permissible peak current may never be exceeded!

- ► Commission drives and check all individual functions, like for instance
  - – the torque behaviour and current consumption,
  - – the braking effect of the braking unit mounted,
  - – the output signal of the tachogenerator.
- ► In the case of failures or faults, see chapter 8 “Troubleshooting and fault elimination”.

6.2 During operation

Stop!

- ► Fire hazard! Do not clean or spray motors with flammable detergents or solvents.
- ► Avoid overheating! Deposits on the drives impede the heat dissipation required and have to be removed regularly.

Danger!

During operation, motor surfaces may not be touched. According to the operating status, the surface temperature for motors can be up to 95°C. For the protection against burn injuries, provide protection against contact, if necessary. Observe cooling-off times!

- ► According to the operating conditions, carry out regular inspections during operation.

In doing this, especially observe:

- – Unusual or undue noise or temperature development,
- – Loose fixing elements,
- – The condition of the electrical cables,
- – Oily drive components or leakages,
- – Increased vibrations and the like,
- – Speed variations
- – Hindered heat dissipation by deposits on the drive system and in the cooling ducts.

- ► If faults occur, go through the table for fault diagnostics in chapter 8. If the fault cannot be eliminated, please inform the Lenze service department.

7 Maintenance/repair

Danger!

- ► Ensure that the drive system is deenergised before working on it!
- ► High temperatures of the motor surfaces. Observe cooling times!
- ► Remove the load from the motors or secure loads acting upon the drive!
- ► When carrying out repairs, ensure that no contaminants enter inside the motor!

7.1 Inspection intervals

7.1.1 Inspection intervals of the AC motors

The asynchronous motors generally are considered as maintenance-free.

Note!

To avoid overheating, simply remove the deposits on the drives regularly.

Apart from ball bearings, the motors do not feature any wearing parts. If the maximum permissible radial and axial forces are observed (Tab. 1), the bearing is designed for a service life of 10,000 h.

Defective ball bearings (running noises, possibly increased current consumption) can be replaced together with possibly available gaskets by the operator himself. For this purpose, remove A- and B-sided bearing shields and disassemble the motor. Always replace both ball bearings in pairs using appropriate means. Please be absolutely sure to avoid blows to shafts and exceeding the permissible radial and axial forces! Afterwards assemble the motor again.

During each disassembly of a motor, replace shaft sealing rings that are possibly available. In order to avoid damage to the sealing lips, basically mount shaft sealing rings with mounting sleeves. The deep-groove ball bearings to be used are listed in Tab. 5 for the individual motor types. The shaft sealing rings vary according to the application case and have to be requested from the manufacturer or be identified on the motor at hand.

Motor type	Frame size	DIN625 deep-groove ball bearing	
		A - side	B - side
13.71☐	35	608-2Z / 608-2RS	608-2Z
	47	608-2Z / 608-2RS / 6000-2Z / 6000-2RS	
	55	6000-2Z / 6000-2RS	6000-2Z
13.75☐	45	608-2Z / 608-2RS	608-2RS
	55	6201-2Z / 6201-2RS	6201-2RS
	65	6202-2Z / 6202-2RS	6202-2RS

Tab. 5 Ball bearings of motor types 13.7☐☐

7.1.2 Inspection intervals of the GN motors

Carbon brushes and, to a limited extent also the collectors, are wearing parts in the case of commutator machines.

As the wear of the carbon brushes to a great extent depends on the respective operating conditions, we recommend the following inspection intervals:

– First inspection after approx. 100 operating hours
– Second inspection after 300 further operating hours

Note!

For safety reasons the inspection intervals should not exceed 1000 operating hours!

7.1.2.1 Wear control of the carbon brushes

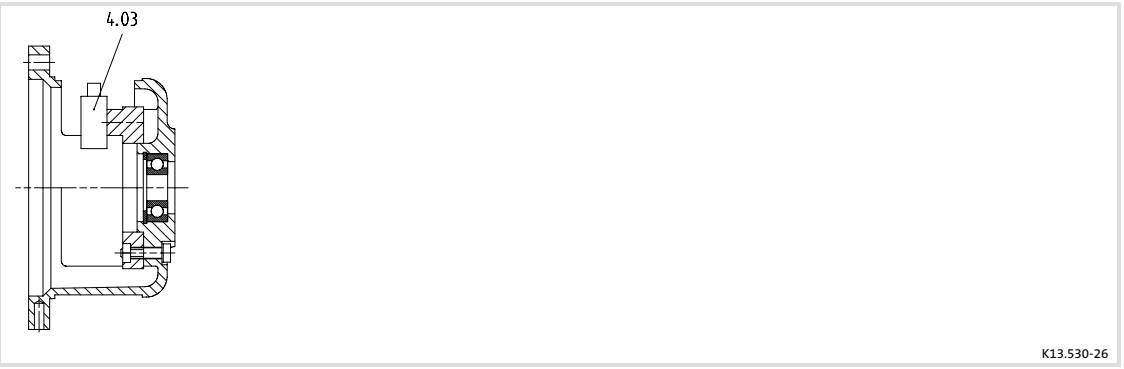


Fig. 13

4.03 Carbon brush

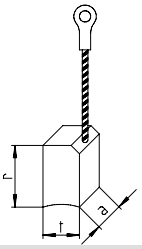
Subject the carbon brushes to the following wear control:

1. Remove fan cover,
2. Remove tightening strap on the B-bearing shield,
3. Remove, exhaust and vacuum the carbon debris in the interior of the motor using a brush or similar,
4. Remove the carbon brushes (see Fig. 13) from the guide sleeves,
5. Measure the length (see Tab. 6) with a caliper gauge.

Note!

If the minimum length for the carbon brushes is reached (see Tab. 6), they basically have to be replaced in sets!

- ► Only use original replacement carbons or types approved by the manufacturer, (for order, see chapter 7.3)!
- ► Use carbon brushes so that they smoothly slide in the brush holders.
- ► Install pigtails so that the carbons can unimpededly follow through if they are shortened due to wear.
- ► Support the running-in of the carbon brushes, if required by using sanding chalk.

Dimensions of the carbon brushes	Motor type	Length "r" new [mm]	Minimum length "$r_{min.}$" [mm]
	13.53□.55	16	7.5
	13.53□.63/65		5.5
	13.53□.75/83	22	7.0
	13.53□.85/86	20	6.5

Tab. 6 Specifications regardingthe carbon brushes

7.1.3 Inspection intervals of the PM motors

Stop!

Permanent magnetic field!

During mounting and repair, ensure that no contaminants enter the interior of the motor!

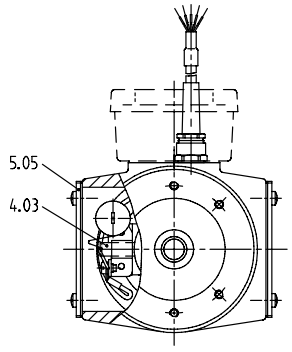
Carbon brushes and, to a limited extent also the collectors, are wearing parts in the case of commutator machines.

As the wear of the carbon brushes to a great extent depends on the respective operating conditions, we recommend the following inspection intervals:

– First inspection after approx. 100 operating hours
– Second inspection after 300 further operating hours

Subject the carbon brushes to the following wear control:

1. Remove the carbon holder covers on the B-bearing shield (pos. 5.05 Fig. 14).
2. Remove, exhaust and vacuum the carbon debris in the interior of the motor using a brush or similar,
3. Remove the carbon brushes (see Fig. 14) from the guide sleeves,
4. Measure the length (see Tab. 7) with a caliper gauge.



K13.120-23

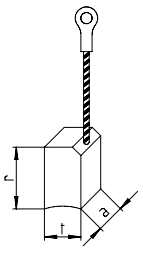
Fig. 14 Carbon covers

4.03 Carbon brushes
5.05 Cover for carbon brush holders

Note!

If the minimum length for the carbon brushes is reached (see Tab. 7), they basically have to be replaced in sets!

- ► Only use original replacement carbons or types approved by the manufacturer, (for order, see chapter 7.3)!
- ► Use carbon brushes so that they smoothly slide in the brush holders.
- ► Install pigtails so that the carbons can unimpededly follow through if they are shortened due to wear.
- ► Support the running-in of the carbon brushes, if required by using sanding chalk.

Dimensions of the carbon brushes	Motor type		Carbon dimensions a x t x r [mm]	Minimum length "$r_{min.}$" [mm]
	13.12☐.35	U < 60V	6.4 x 8 x 12	6.5
		U > 60V	5 x 8 x 12	
	13.12☐.45	U < 60V	8 x 10 x 16	6.5
		U > 60V	5 x 8 x 16	7.0
	13.12☐.55	U < 60V	6.4 x 12.5 x 16	7.0
		U > 60V		
	13.12☐.65	U < 60V	8 x 16 x 22	5.5
		U > 60V	6.4 x 16 x 20	6.0
	13.12☐.75	U < 60V	10 x 16 x 21	7.0
		U > 60V	6.4 x 16 x 20	6.5

Tab. 7 Information on the lengths of carbon brushes

7.1.4 Wear control of collectors

Generally the collectors only show low traces of wear and do not have to be reworked over several carbon brush sets.

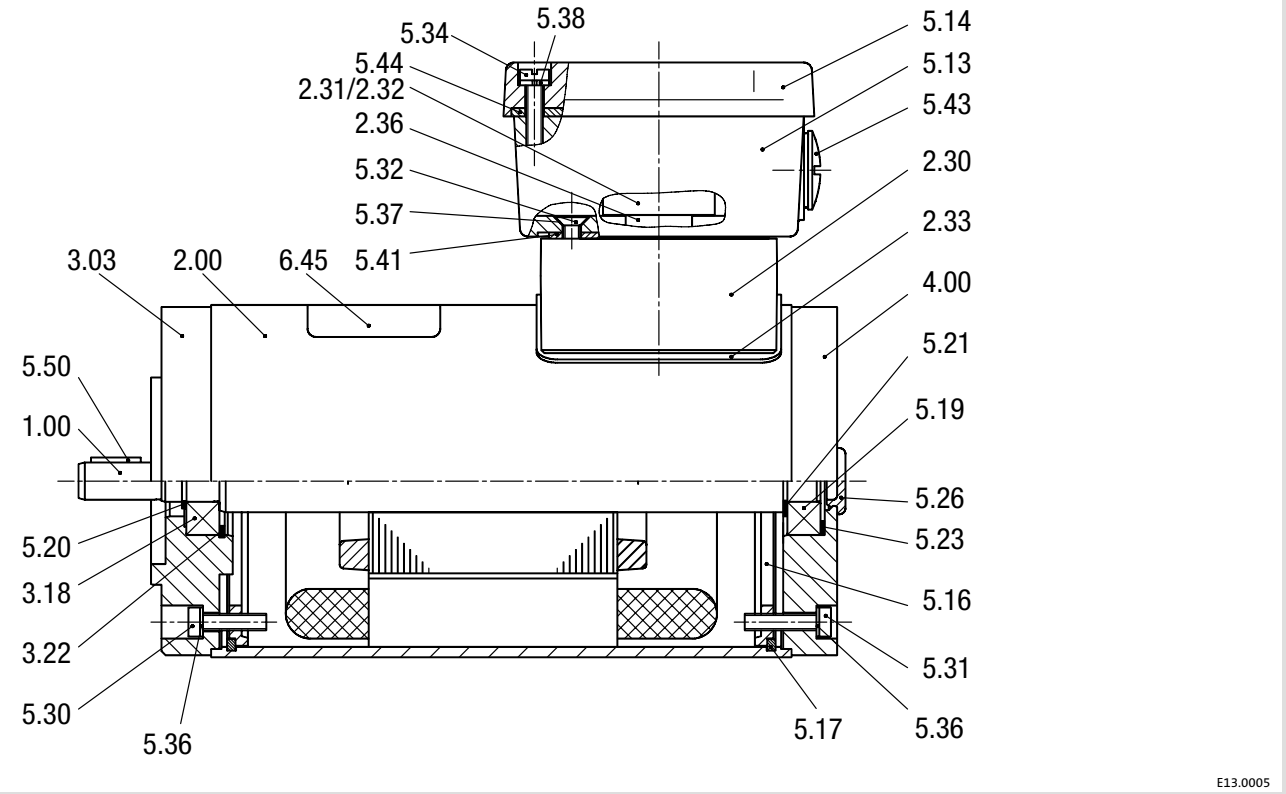
If there are grooves >0.3 mm (sporadical phenomenon in the case of frequent overload), we recommend to overspeed the collectors.

7.2 Repair

Lenze recommends that repairs are carried out by the Lenze Service.

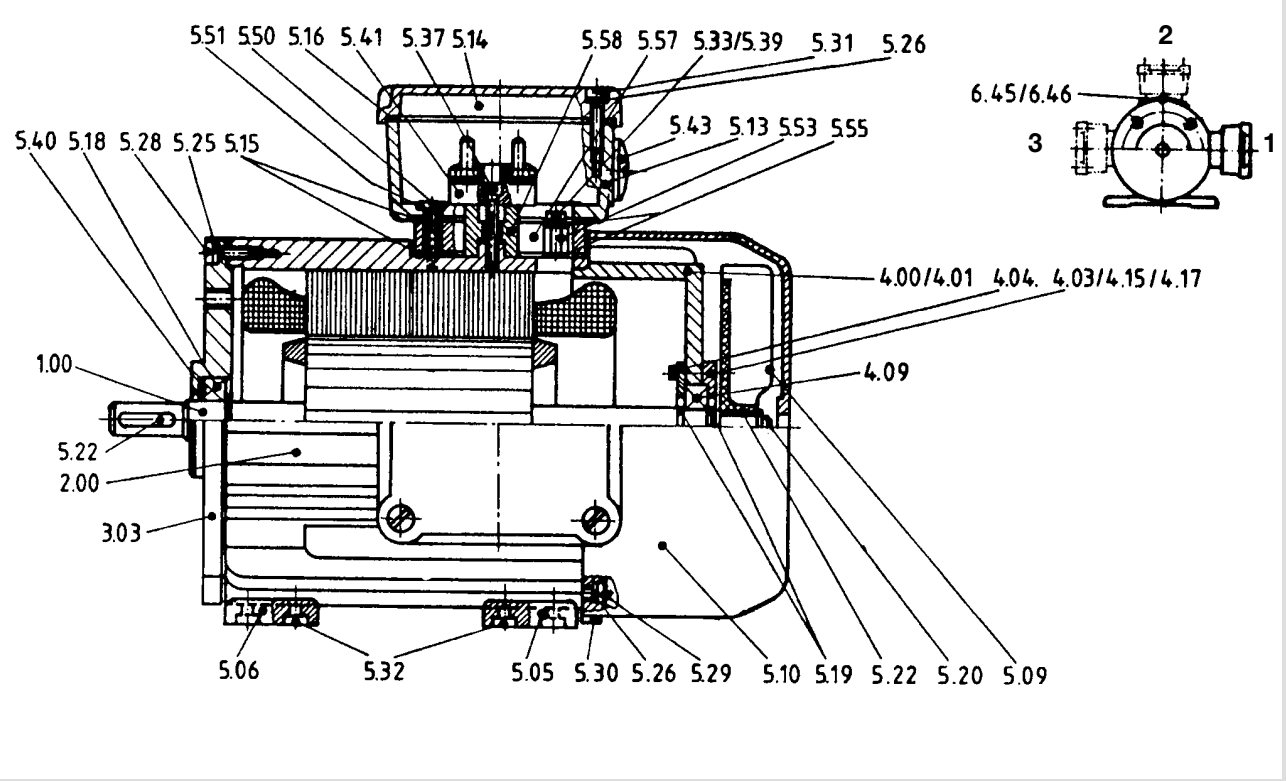
7.3 Spare-parts list

7.3.1 Motor type 13.71□



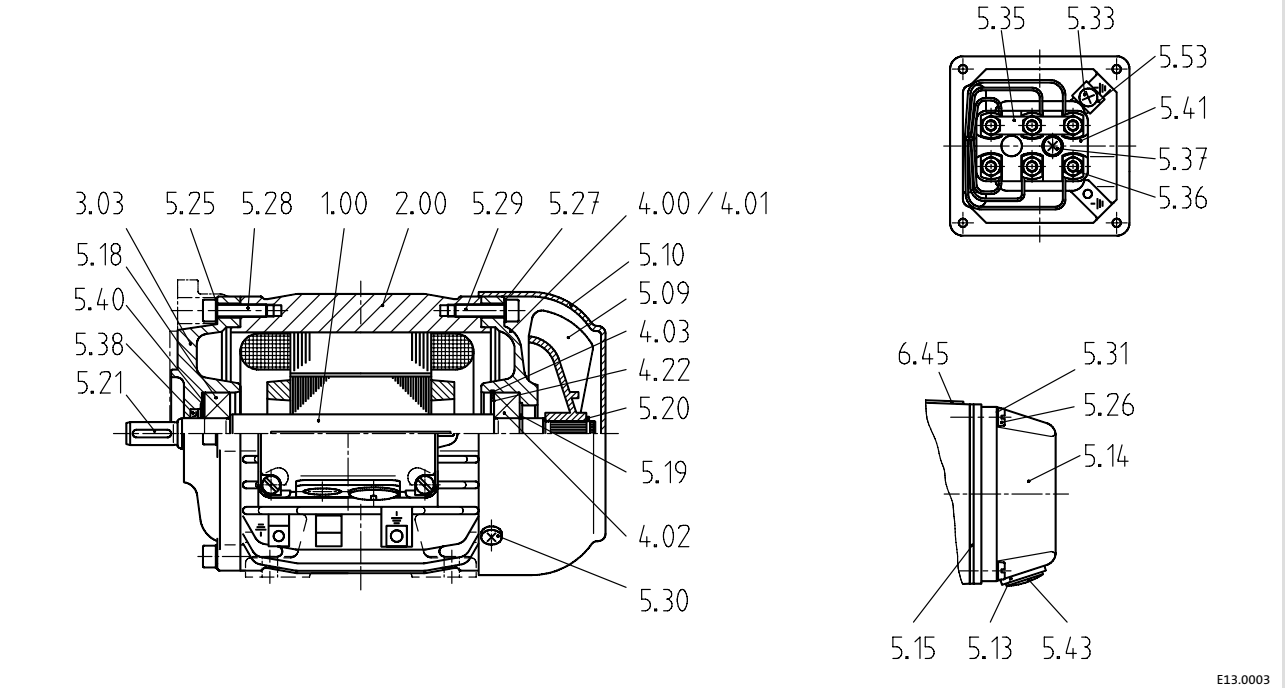
Pos.	Name	Pos.	Name
1.00	Rotor complete	5.21	Circlip
2.00	Housing complete	5.23	Ball bearing compensating discs
2.30	Panel	5.26	Cover
2.31	Junction plate	5.30	Screw
2.32	Screw	5.31	Screw
2.33	Seal	5.32	Screw
2.36	Spacer	5.34	Screw
3.03	A - bearing shield	5.36	Spring washer
3.18	Deep-groove ball bearing	5.37	Disc
3.22	Circlip	5.38	Spring washer
4.00	B - bearing shield	5.41	Seal
5.13	Bottom part of terminal box	5.43	Catch
5.14	Top cover of terminal box	5.44	Seal
5.16	Ring	5.50	Keyway
5.17	Snap ring	6.45	Nameplate
5.19	Deep-groove ball bearing	7.00	Mounting kit (loosely enclosed)
5.20	Circlip	9.105	Capacitor

7.3.2 Motor type 13.75☐.45



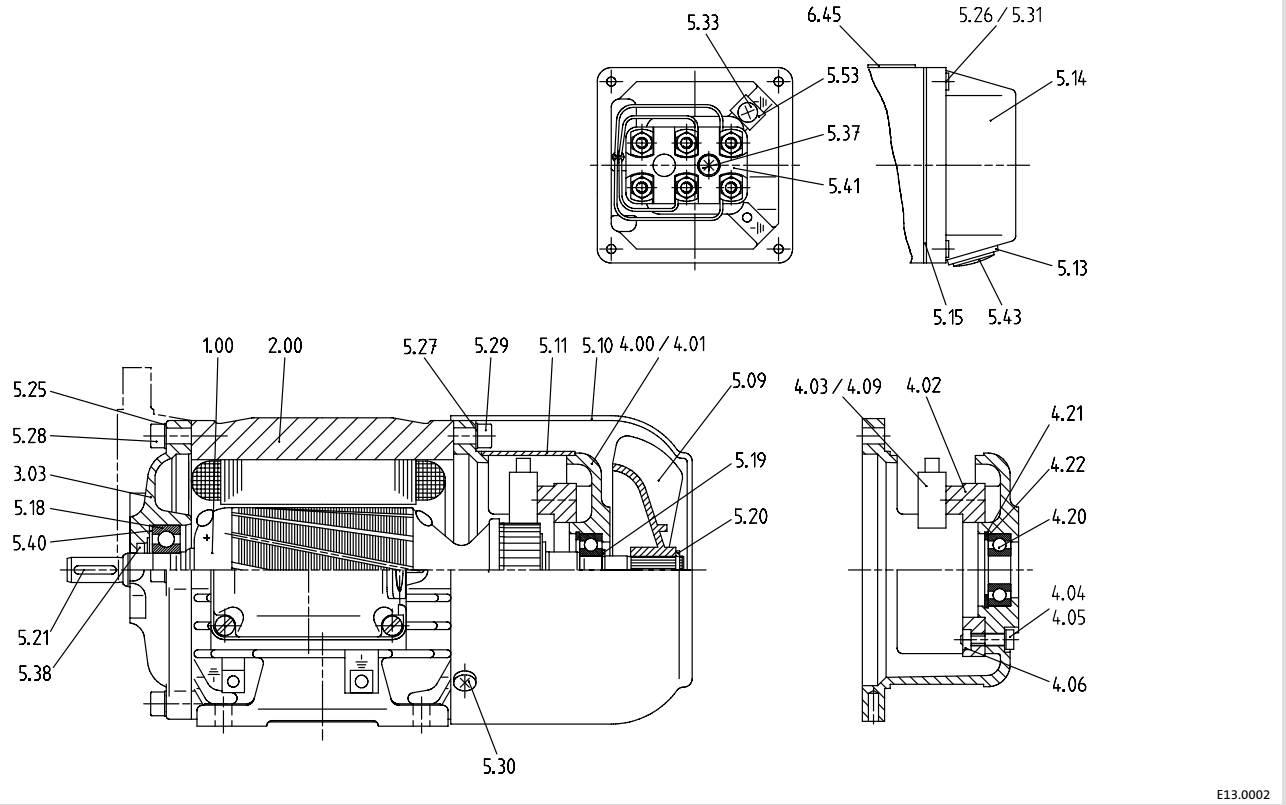
Pos.	Name	Pos.	Name
1.00	Rotor complete	5.25	Lock washer
2.00	Housing complete	5.26	Spring washer
3.03	A - bearing shield	5.28	Screw
4.00	B - bearing shield complete	5.29	Screw
4.01	B - bearing shield	5.30	Screw
4.03	Flange, external	5.31	Screw
4.04	Flange, internal	5.32	Screw
4.09	Ball bearing	5.33	Screw
4.15	Screw	5.37	Screw
4.17	Nut	5.39	Disc
5.05	Base, rear	5.40	Ball bearing compensating disc
5.06	Base, front	5.41	Junction plate
5.09	Fan blade	5.43	Catch
5.10	Fan cover	5.50	Screw
5.13	Bottom part of terminal box	5.51	Serrated lock washer
5.14	Top cover of terminal box	5.53	Bolt
5.15	Seal	5.55	Spring washer
5.16	Seal	5.57	Spacer
5.18	Ball bearing	5.58	Spacer
5.19	Circlip	6.45	Nameplate
5.20	Circlip	7.00	Mounting kit
5.22	Keyway		

7.3.3 Motor type 13.75☐



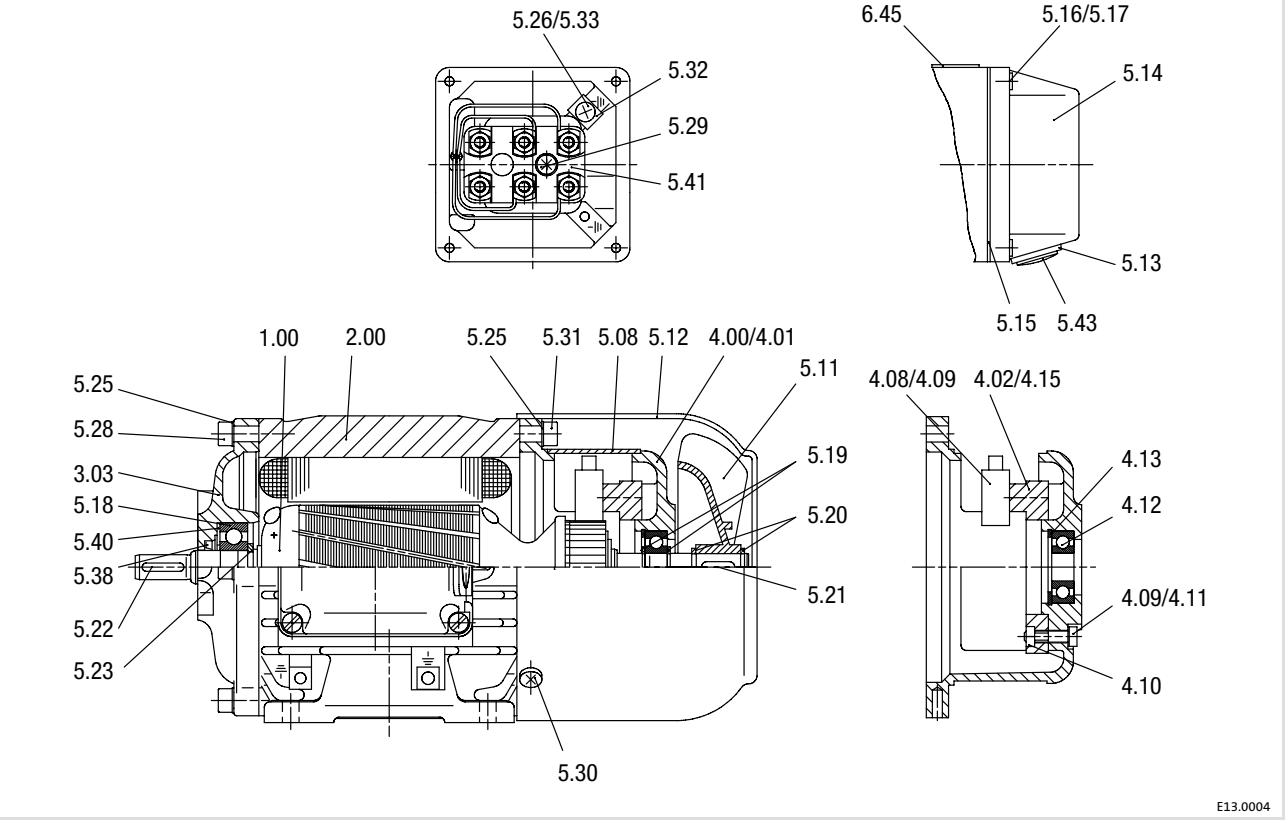
Pos.	Name	Pos.	Name
1.00	Rotor complete	5.27	Lock washer
2.00	Housing complete	5.28	Cheese head screw
3.03	A - bearing shield	5.29	Cheese head screw
4.00	B - bearing shield complete	5.30	Screw
4.01	B - bearing shield	5.31	Lock washer
4.02	Ball bearing	5.33	Screw
4.03	Circlip	5.35	Connecting bridge
4.22	Shim ring	5.36	Nut
5.09	Fan blade	5.37	Screw
5.10	Fan cover	5.38	Gasket
5.13	Slide valve	5.40	Ball bearing compensating discs
5.14	Terminal box	5.41	Junction plate
5.15	Seal	5.43	Catch
5.18	Ball bearing	5.53	Wire clamp
5.19	Circlip	6.45	Nameplate
5.20	Circlip	7.00	Mounting kit (loosely enclosed)
5.21	Keyway		
5.25	Lock washers	9.105	Capacitor
5.26	Screw		

7.3.4 Motor type 13.53☐.55 / 63 / 65



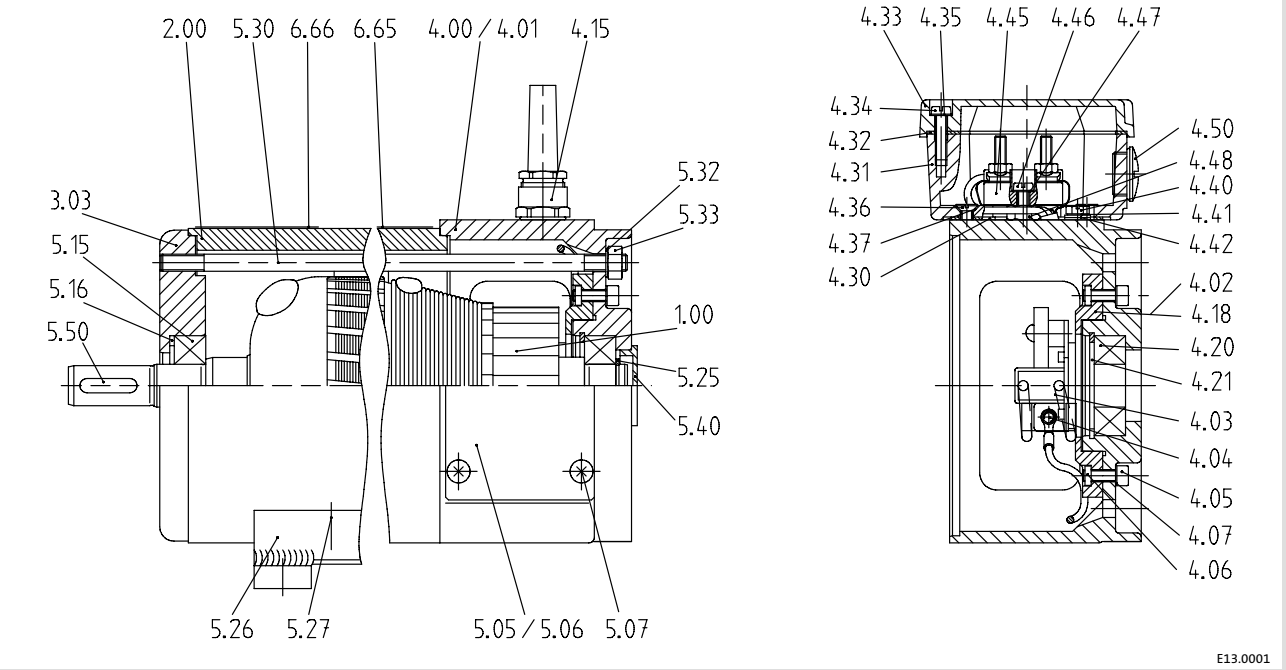
Pos.	Name	Pos.	Name
1.00	Armature shaft complete	5.19	Circlip
2.00	Housing complete	5.20	Circlip
3.03	A - bearing shield	5.21	Keyway
4.00	B - bearing shield complete	5.25	Lock washer
4.01	B - bearing shield	5.26	Screw
4.02	Brush rocker	5.27	Lock washer
4.03	Carbon brush	5.28	Cheese head screw
4.04	Lock washer	5.29	Cheese head screw
4.05	Cheese head screw	5.30	Screw
4.06	Square nut	5.31	Lock washer
4.09	Cheese head screw	5.33	Screw
4.20	Ball bearing	5.37	Screw
4.21	Circlip	5.38	Gasket
4.22	Shim ring	5.40	Ball bearing compensating disc
5.09	Fan blade	5.41	Junction plate
5.10	Fan cover	5.43	Catch
5.11	Tensioning belt	5.53	Wire clamp
5.13	Slide valve	6.45	Nameplate
5.14	Terminal box	7.00	Mounting kit (loosely enclosed)
5.15	Seal		
5.18	Ball bearing		

7.3.5 Motor types 13.530.75 / 83 and 13.550.85 / 86



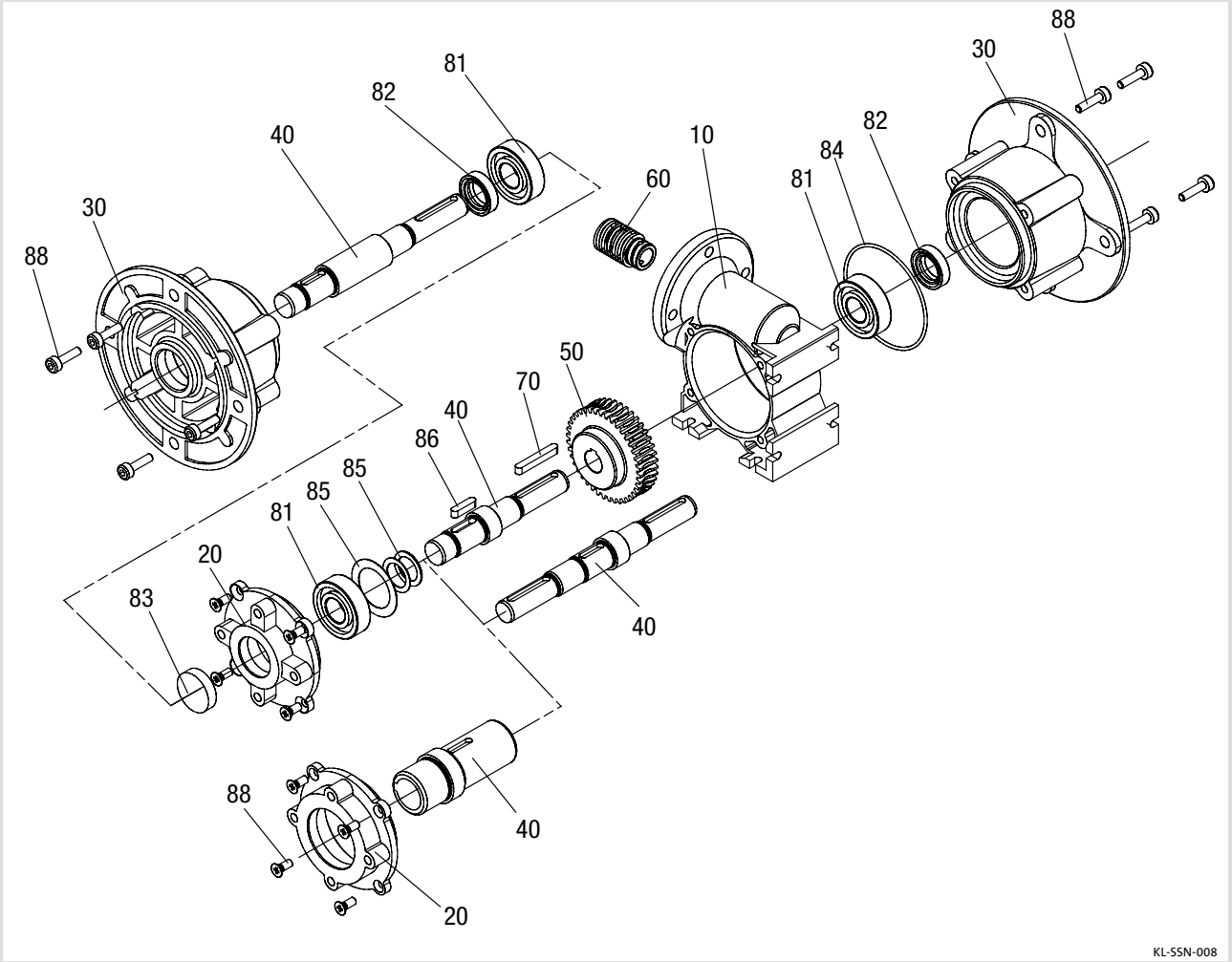
Pos.	Name	Pos.	Name
1.00	Armature shaft complete	5.18	Deep-groove ball bearing
2.00	Housing complete	5.19	Circlip
3.03	A - bearing shield	5.20	Circlip
4.00	B - bearing shield complete	5.21	Keyway
4.01	B - bearing shield	5.22	Keyway
4.02	Brush rocker	5.23	Circlip
4.08	Carbon brush	5.25	Spring washer
4.09	Screw	5.26	Spring washer
4.10	Nut	5.28	Screw
4.11	Lock washer	5.29	Screw
4.12	Deep-groove ball bearing	5.30	Screw
4.13	Circlip	5.31	Screw
4.15	Screw	5.32	Wire clamp
5.08	Tensioning belt	5.33	Screw
5.11	Fan blade	5.38	Gasket
5.12	Fan cover	5.40	Ball bearing compensating disc
5.13	Slide valve	5.41	Junction plate
5.14	Terminal box	5.43	Catch
5.15	Seal	6.45	Nameplate
5.16	Disc		
5.17	Screw		

7.3.6 Motor type 13.12☐



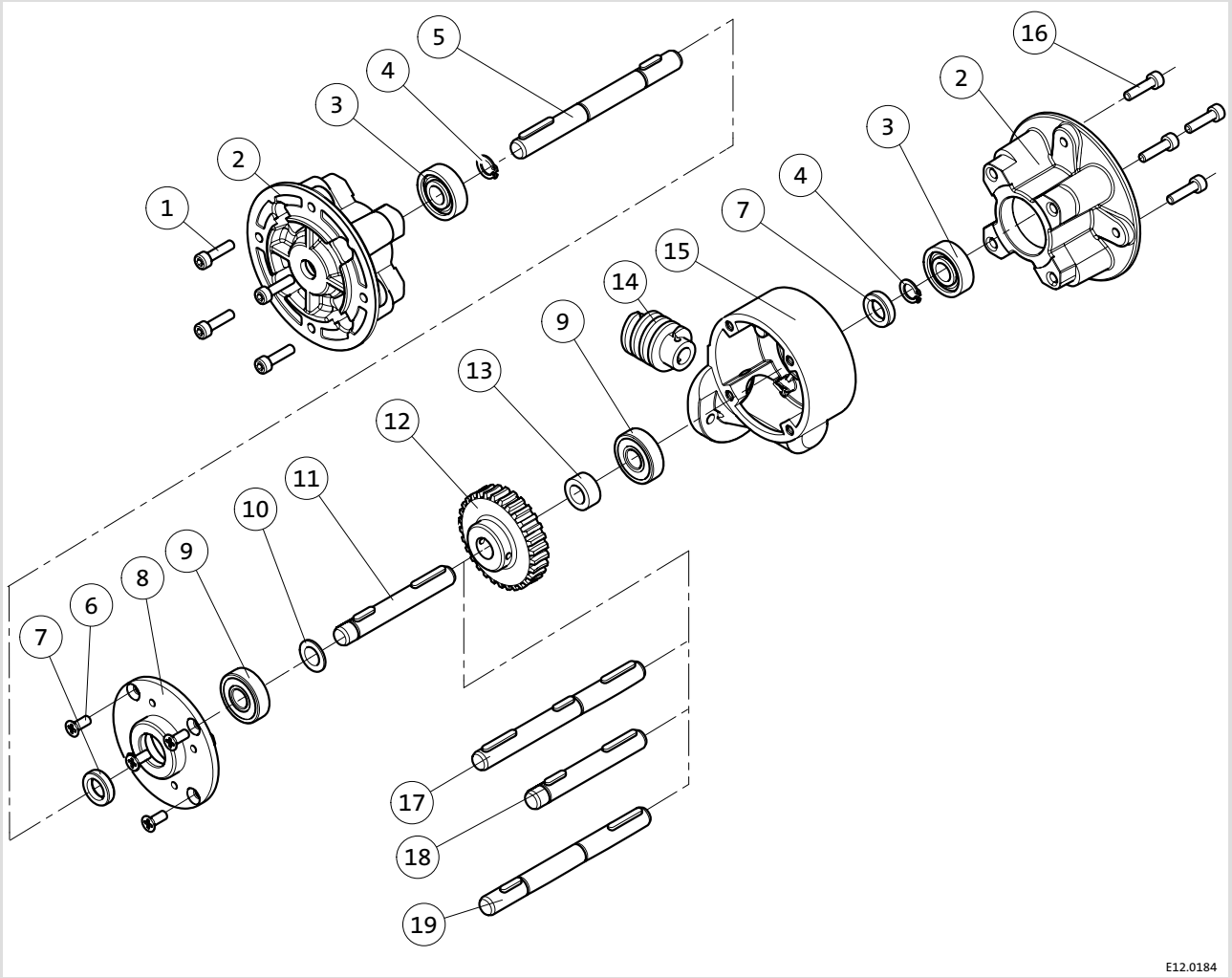
Pos.	Name	Pos.	Name
1.00	Armature shaft, complete	4.40	Screw
2.00	Steel casing, complete	4.41	Lock washer
3.03	A - bearing shield	4.42	Disc
4.00	B - bearing shield, complete	4.45	Junction plate
4.01	B - bearing shield	4.46	Screw
4.02	Brush rocker	4.47	Lock washer
4.03	Carbon brushes	4.48	Nut
4.04	Screw	4.50	Catch
4.05	Screw	5.05	Cover for carbon brush holders
4.06	Square nut	5.06	Seal
4.07	Lock washer	5.07	Screw
4.15	Screwed connection	5.15	Deep-groove ball bearing
4.18	Overtemperature protector switch	5.25	Circlip
4.20	Deep-groove ball bearing	5.27	Screw (glued)
4.21	Circlip	5.30	Stud
4.30	Seal	5.32	Lock washer
4.31	Bottom part of terminal box	5.33	Nut
4.32	Seal	5.40	Cover
4.33	Top cover of terminal box	5.50	Keyway
4.34	Screw	6.65	Nameplate
4.35	Lock washer	6.66	Indicating label
4.36	Screw	7.00	Mounting kit (loosely enclosed)
4.37	Serrated lock washer		

7.3.7 Gearbox types SSN31 and SSN40



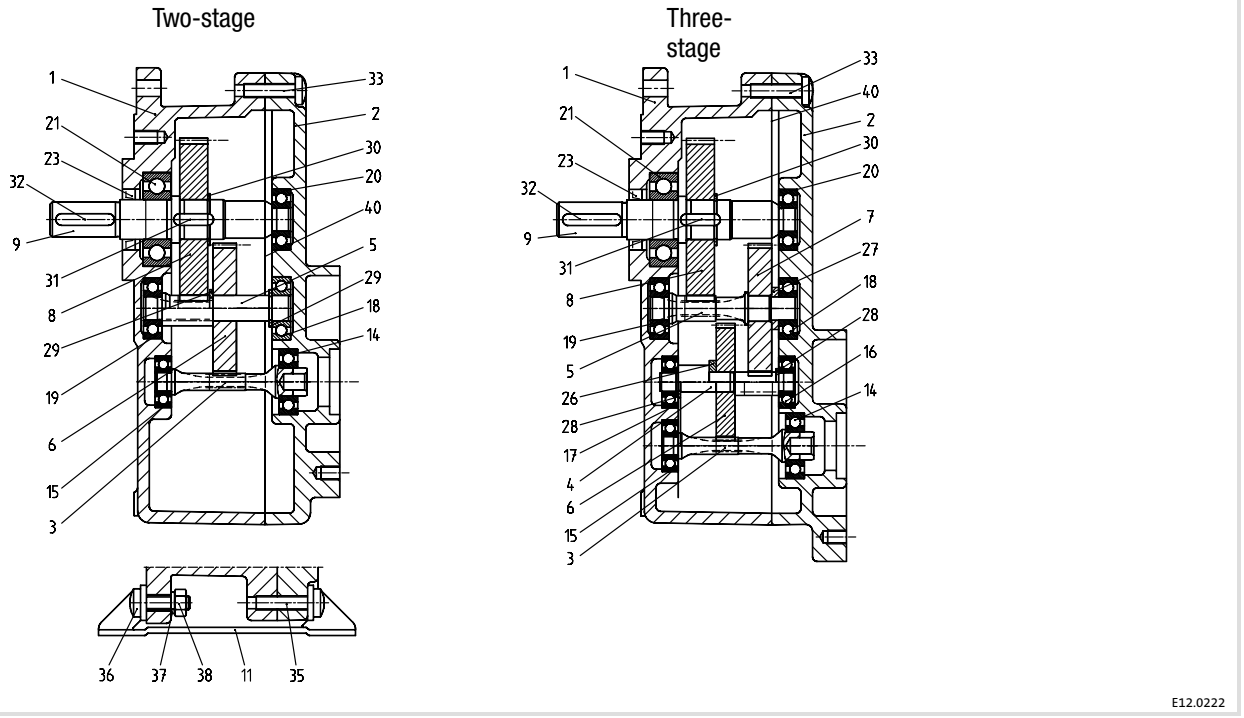
Pos.	Name	Pos.	Name
10	Housing with base	82	Shaft sealing ring
20	Cover for solid shaft or hollow shaft	83	Cover
30	Flange	84	O-ring
40	Solid shaft or hollow shaft	85	Shim rings
50	Worm	86	Keyway
60	Worm gear	88	Flat head screws
70	Keyway		Cheese head screws
81	Deep-groove ball bearing		

7.3.8 Gearbox type SSN25



Pos.	Name	Pos.	Name
1	DIN912hexagon socket screw	12	Spring pin, DIN 7344
2	Flange	13	Worm
3	2 RS DIN625deep-groove ball bearing	14	Socket
4	DIN471 circlip	15	Worm gear
5	Shaft design 2, type B14	16	Housing with bore hole
6	DIN965 flat head screw		Housing
7	Rotary shaft seal		Housing for driving flange
8	Cover with bore hole	17	DIN912hexagon socket screw
9	DIN625 deep-groove ball bearing	18	Shaft design 3, type B13
10	Disc	19	Shaft design 1, type B13
11	Shaft design 2, type B13	20	Shaft design 1, type B14

7.3.9 Gearbox type 12.130



Pos.	Name	Pos.	Name
1	Housing	21	Deep-groove ball bearing
2	Cover	23	Shaft sealing ring
3	Pinion shaft	25	Cylinder bolt
4	Pinion shaft	26	Shim ring
5	Pinion shaft	27	Shim ring
6	Gear	28	Circlip
7	Gear	29	Circlip
8	Gear	30	Circlip
9	Shaft	31	Keyway
11	Base	32	Keyway
14	Deep-groove ball bearing	33	Thread-cutting screw
15	Deep-groove ball bearing	36	Oval head screw
16	Deep-groove ball bearing	37	Spring washer
17	Deep-groove ball bearing	38	Hexagon head cap screw
18	Deep-groove ball bearing	40	Seal
19	Deep-groove ball bearing		
20	Deep-groove ball bearing		

7.3.10 Gearbox type SPL

Delivery of spare parts on request

7.4 Spare parts order

For ordering spare parts, the following information is required:

Spare part for motor	Spare part for gearbox
● Piece number required ● Position no. and designation from the spare parts list (chap. 7.3) ● Information from the nameplate (📖 3) – Commission no. – Type – Manufacturing date – Where applicable, variants – Where applicable, ID no.	● Piece number required ● Position no. and designation from the spare parts list (chap. 7.3) ● Information from the nameplate (📖 3) – Commission no. – Type – Manufacturing date – Gear reduction – Where applicable, ID no.

Order example of a set of carbon brushes for a GN motor type 13.531.55.3.5.0

Lenze D - 32696 Extertal Germany CE	
GN 13.530.65.1.2.0	
0628 Nr. 00746690	
0,25 KW 3.000 1/min.	
Feld 200 V 0,2 A Imax. A	
Anker 180 V 2 A F 1 IP 54	
I.Cl F 00154654	
2 items	
Carbon brushes	
Pos.no.:	4.03
Order no.:	746690
Type:	13.530.55.1.2.0
Manufacturing date:	06.28

8 Troubleshooting and fault elimination

- If faults during operation of the drive system occur:
  - First check possible error causes by means of the following table.
  - Also observe the corresponding chapters in the Operating Instructions of the other drive system components.
- If the fault cannot be eliminated by one of the measures itemised, please notify the Lenze service.

Fault	Possible cause	Remedy
Motor does not start	Voltage supply interrupted	Check electrical connection (chapter 5)
	Resisting moment of the load too great	Check load and, if required, reduce it (check application)
	Brake does not release	Check electrical connection
		Check air gap "$s_{Lü}$" (see Operating Instructions of brake)
		Check duct of the solenoid coil
	Drive blocks	Check components with regard to free movement, possibly remove contaminants from the motor or gearbox
Surface temperature > 95°C	Overload of the drive	Check load and, if required, reduce it
	Heat dissipation impeded by deposits	Clean surface of the drives
Motor suddenly stops and does not start again	Overtemperature protector switch interrupts voltage supply	Reduce load, let motor cool down (clean, see above)
Running noises	Contaminants inside the motor	Cleaning of the interior, possibly repair by manufacturer
	Bearing failures	Mounting of new deep-groove ball bearings (chapter 7.1), possibly repair by manufacturer
Motor does not rotate, gearbox output is not running	Input pinion or worm gear is missing	Subsequently mount pinion or worm gear (chapter 5.5)
	Wheel-hub connection defective (overload)	Check connection and, if required, redowel; if required, reduce load
	Toothing worn out	Repair by manufacturer or supplier
Irregular running, motor stops	Carbon brushes worn out	Replace brush set (chapter 7.1.2)
	Carbon brushes are stuck, wear debris in the guides	Cleaning of the interior (chapter 7.1.2 et seqq.)
Running noises	Carbon brushes are not run in	Support the running-in by means of sanding chalk
	Contaminants inside the motor	Cleaning of the interior, possibly repair by manufacturer
	Bearing failures	Repair by manufacturer
Speed increase	(Partial) demagnetisation of the magnet segments	Repair by manufacturer

9 Disposal

9.1 Motor

Item	Material
A - bearing shield	Aluminium (partly pressure die casting, partly zinc pressure die casting for motor type 13.12□.35)
B - bearing shield	Aluminium - pressure die casting (zinc pressure die casting for motor type 13.12□.35)
● Stator: – Housing – Housing 13.71□, 13.12□ – Laminated core – Winding – Isolation – Terminal box – Panel – Terminal board – Control wires – Tube – Seals – Brush rocker – Carbon holder – Carbon brushes – Tensioning belt – Collector	 – Aluminium pressure die casting – Steel – Dynamo sheet metal – Enamel-insulated copper wire – Polyamide, epoxy resin, paper – Aluminium pressure die casting – Glass-fiber reinforced polyamide – Polyester – Copper with EVA or PTFE coating – Soft PVC – NBR or paper – Glass-fiber reinforced polyester – Brass – Carbon, graphite, copper, possibly synthetic resin – Steel – Copper, steel, pheno resin
● Rotor – Shaft – Laminated core – Squirrel cage	 – Steel – Dynamo sheet metal – Aluminium or silumin (AlSi12)
● Steel coat – Magnet segments	– Steel – Strontium ferrite
Bearings, discs, screws	Steel

9.2 Gearbox

Item	Material
SSN31, SSN40 and 12.130 SPL42 - SPL120	Aluminium Steel
Cover	Aluminium
Flange SSN25, SSN31, SSN40	Aluminium
Shaft	Steel
Gearing parts	Steel (worm gears: bronze)
Bearings, discs, screws	Steel
B-sided built-on accessories	See corresponding Operating Instructions

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