

LSE Series

Documentation

Version: 1.1
Date: 31 JAN 2006

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1 Introduction

This documentation is intended to provide users of linear direct drives with a broad information base for the project planning of synchronous linear motors of the LSE series.

The structure of this documentation follows the procedure applied in the project planning of linear direct drives. In addition, this documentation deals with characteristics in the use of linear motors, such as the design area, and important interfaces.

1.1 Application of linear direct drives

Due to the ever-increasing demands particularly with respect to speed, acceleration and accuracy of linear movements, conventional linear drive technology consisting of a rotating electrical motor and mechanical transfer elements is increasingly approaching its limits.

This is where linear direct drive technology starts and covers the increased demands based on its special characteristics. Combined with high-resolution direct linear measuring systems and high-performance controllers, linear direct drives offer the following decisive advantages compared to conventional solutions:

- Significantly higher speeds
- Significantly higher accelerations
- Significantly higher positioning accuracy without overshoot
- Direct power transmission
- Virtually maintenance-free and zero-backlash drive
- High static and dynamic load stiffness
- Control loop stability through perfect mass adaptation

1.2 Application areas of linear direct drives

The aforementioned advantages result in the following application areas, among others, for linear direct drives from today's point of view:

- Semiconductor industry
- Circuit-board processing
- Pick & place applications
- Printing industry
- Packaging industry
- Textile industry
- Plastics industry
- Machine-tool industry
- Component mounting and production technology

2 Legal and safety notes

2.1 Legal notes pertaining to the documentation

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- Notes in this documentation were ignored.
- The system was not used in accordance with the regulations.
- The system was
 - improperly assembled,
 - improperly connected,
 - improperly commissioned,
 - improperly operated,
 - improperly maintained or not maintained,
 - assembled, connected, commissioned, operated and or maintained by non-qualified or insufficiently qualified personnel,
 - overloaded,
- operated with
 - defective safety devices,
 - improperly mounted or not mounted safety devices,
 - nonfunctional safety and protective devices,
 - outside the specified environmental operating conditions.
- The system was modified without written approval from Baumüller Kamenz GmbH.
- The instructions concerning maintenance in the component descriptions were not observed.
- The parts that are subject to wear were inadequately monitored.
- A repair was improperly performed.
- The system was improperly combined with products from other manufacturers.
- The drive system was combined with defective and/or incorrectly documented products from other manufacturers.

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2.2 General safety notes

This documentation contains the required information for handling the product during commissioning and service. It is intended for technically qualified and specially trained personnel who is well acquainted with all warnings and maintenance measures.

The devices were manufactured according to the present state of the art and are operationally reliable. They can be installed and commissioned without risk and function without problems if it is assured that the notes in this documentation are observed.

The user is responsible for performing service and commissioning according to the safety regulations of applicable standards and all other relevant federal or local regulations concerning conductor dimensioning and protection, earthing arrangement, disconnecter, current protection, etc.

The user is liable for damages resulting from assembly or connection.

This chapters describes the dangers that may occur while working with the Baumüller drive system and its components. Dangers are identified by icons. All icons used in this documentation are listed and explained below.

How to protect yourself from individual dangers in each case is not explained in this chapter. This chapter deals exclusively with general protective measures. The specific protective measures are listed immediately following the note to a particular danger in the following chapters.

2.2.1 Meaning of caution notes

The notes are intended for your personal safety as well as the safety from damaging the described products or connected devices.

The symbols and terms used have the following meaning:



CAUTION

This symbol indicates potential dangers to machine, material and environment.



DANGER

This symbol indicates potential dangers to personnel. Serious or fatal injuries or considerable damage to property may result if the notes are not followed.



NOTE

This symbol identifies information to improve understanding of the machine processes. It refers to important information about the system or handling of the system.

2.2.2 Definition of "Qualified Personnel"

Baumüller-authorized electrical engineers and skilled electrical personnel from the customer or third parties who have been instructed in the installation and commissioning of Baumüller drive systems and are authorized to commission, ground to earth and characterise electrical circuits and devices according to the standards of safety-relevant specifications.

Qualified personnel has been trained or instructed according to locally applicable and valid standards of safety-relevant specifications in the maintenance and use of appropriate safety equipment.

2.2.3 Requirements of the operating personnel

Operating the drive system may only be performed by personnel who was trained, instructed and authorized.

Fault removal, maintenance, cleaning, service and replacement work may only be performed by trained personnel familiarized with the system. This personnel must be familiar with the operating instructions and follow them.

Commissioning and introduction may only be performed by qualified personnel.

2.2.4 Intended use

The drive system and its components must always be used in accordance with the intended use. Below you will find a compilation of some important information. The notes listed below should give you a sense of the intended use of the equipment. The notes listed below do not claim to be complete—you should observe all notes featured in this documentation.

Ensure that only qualified personnel is working on or with this drive system and its components.

Operate the drive system and its components only if it is/they are technically free from defects. In particular, observe the instructions and process guidelines by the manufacturer of other products and/or other components which you intend to connect, install and/or jointly commission in any other way with the products of this documentation. Improper connection can lead to malfunctions and uncontrollable interactions which may cause significant dangers and/or damages.

The drive system and its components are used properly if you observe all notes and information in this documentation and additionally, observe the corresponding documentations in case of combination with other products.

2.2.5 Improper use

The following list contains some examples of improper use. The information listed below should give you a sense of what constitutes an improper use of the drive system. However, we cannot list all possible improper uses in this space. Any use for which the information in this documentation was not followed is improper and, therefore, prohibited; this applies particularly to the following cases:

- Notes in this documentation were ignored.
- The drive system was not used in accordance with the regulations.
- The drive system was
 - improperly assembled,
 - improperly connected,
 - improperly commissioned,
 - improperly operated,
 - assembled, connected, commissioned, operated and or maintained by non-qualified or insufficiently qualified personnel,
 - improperly maintained or not maintained,
 - overloaded,
 - operated with
 - defective safety devices,
 - improperly mounted or missing safety devices,
 - nonfunctional safety and protective devices,
 - outside the specified environmental operating conditions.
- The drive system was modified without written approval from Baumüller Kamenz GmbH.
- The parts that are subject to wear were inadequately monitored.
- A repair was improperly performed.
- The instructions concerning maintenance in the component descriptions were not observed.
- The drive system was improperly combined with products from other manufacturers.
- The drive system was combined with defective and/or incorrectly documented products from other manufacturers.

2.3 Special safety notes



Electrical drives may only be used in applications that meet VDE guidelines.



During operation, an electrical potential is present at the motor terminals and motor windings. For this reason, these components must not be touched during operation! Measuring instruments may only be connected in de-energized condition!



Working on the motor terminals must not start without first verifying that neither potential nor voltage is present!



Direct or indirect contact of the moving or conducting linear part is only permissible in the de-energized state and with standing drive.



The operator is obligated to immediately report any changes that may occur to the machine.



It is absolutely prohibited to disassemble or shut down any protective devices.



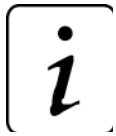
The machine must be shut down for disassembling protective devices during commissioning, repair and service measures. The safety devices must be reassembled immediately following the commissioning, service or repair measures.



After every work on the drive, the operator of the machine must inspect and accept the machine again and chronologically document it in the machine log (e.g. service log).



Unauthorized modifications and changes to the drive are not allowed.



The linear components are intended for commercial systems. They meet the standards of series DIN 0530 / EN 60034. Their use in a potentially explosive atmosphere is prohibited unless specifically intended for this purpose (observe any additional information). If a special case—the use in non-commercial systems—should make increased demands (e.g. protection against accidental contact from fingers of children), these requirements must be ensured on the system side during the installation.

The linear components are dimensioned for ambient air temperatures of 0 °C to +40 °C (water temperature at cooler entry +5 °C to +25 °C) and installation altitudes ≤ 1000 m above sea level.

The permissible basic relative humidity values are:

Installation inside between 20% and 75% for a temperature range of +5 °C to +40 °C;

Installation outside between 36% and 98% for a temperature range of +5 °C to +35 °C;

whereby the absolute humidity above 25 °C with installation outside must not exceed 23 g/m³ (corresponds to a relative humidity of 95% at 27 °C). Deviating information on the nameplate must be observed. The conditions at the installation site must meet all information listed on the nameplate.

Linear motors are components for installation in a machine in accordance with EC Machinery Directive 89/392/EC. Commissioning is prohibited until the conformity of the final product with this directive has been established (observe EN 60204-1).

Three-phase machines meet the requirements of Low-Voltage Directive 73/23/EC.

Operating electric motors according to their normal application must meet the protection requirements of EMC directive 89/336/EC. The proper installation (e.g. spatial separation of signal cables and power cables, shielded leads and cables, etc.) is the responsibility of the plant engineer. For systems with converters, the EMC information from the converter manufacturer must also be observed.

3 Operating principle, design and classification of the synchronous linear motors

3.1 Operating principle

The principal design of a synchronous linear motor can be viewed simplified as a rotary synchronous motor that is split radially along its axis of rotation and its winding flattened out (cf. Fig. 1). The primary section consisting of an iron core and a three-phase winding corresponds to the stator, and the secondary section consisting of the base steel body with bonded permanent magnets corresponds to the rotor.

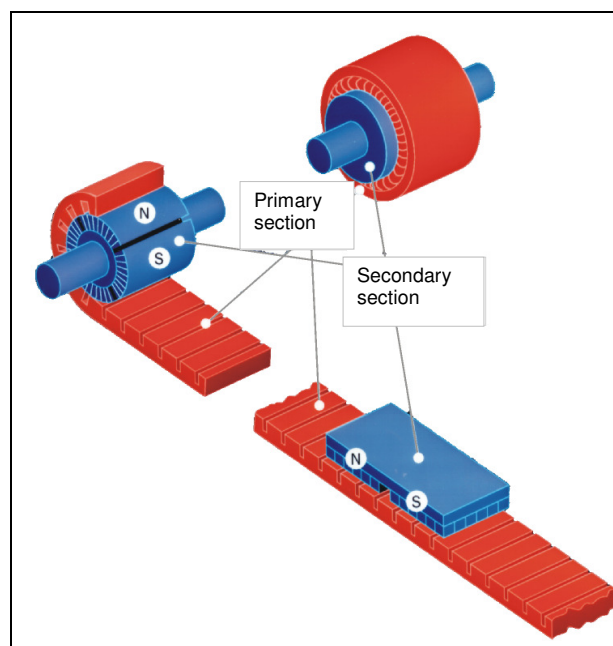


Figure 1: Design of a linear motor

The production of force of the synchronous linear motor corresponds to the torque production of the rotary synchronous motor.

There are two possible versions matched to the appropriate application. The primary section can be moved while the secondary section is fixed (short-stator principle) or the secondary section can be moved while the primary section is fixed (long-stator principle).

The synchronous linear motor offered by Baumüller is a so-called assembly kit motor, i.e. the motor components consisting of primary and secondary section are supplied as component parts and must be installed in the machine or system, completed with the additional components of a linear axis, by the user.

In general, a linear axis features the following components in addition to the primary and secondary sections:

- Linear guide
- Linear measuring system
- Energy chain
- Carriage construction
- Machine construction

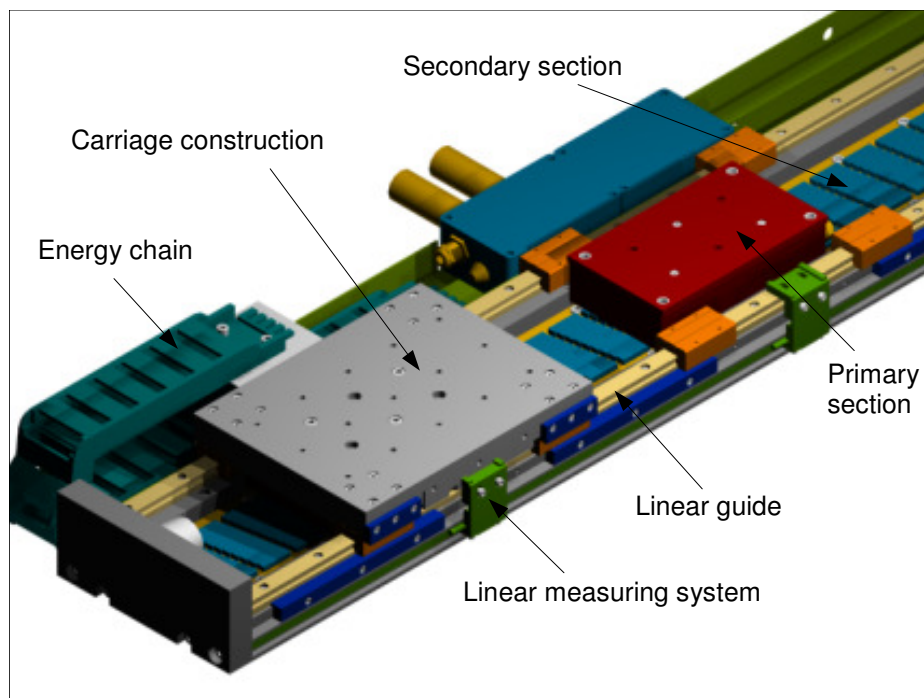


Figure 2: Design of a linear axis with 2 primary sections

Figure 2 shows the design of a linear axis fitted with two synchronous linear motors.

3.2 Motor designs

The synchronous linear motors offered by Baumüller were tested according to the current state of the art and show the following joint features:

- The LSE series can be used to implement feed forces between 70 N and 14,750 N and speeds up to 600 m/min depending on the selected size and the underlying winding design.
- The primary section of the LSE series is completely enclosed in a CFK cover.
- Type of protection primary part IP 65
- Type of protection secondary part up to IP 65
- Cable feeder with trailing capability
- No mechanical wear at motor components
- Protection of motor winding against thermal overload by means of integrated temperature sensors (KTY or thermo switch).

Two different designs of the primary section are available in the LSE series. A non-ventilated primary section and a primary section with integrated water-cooling.

3.2.1 Non-ventilated primary section

The design of the non-ventilated primary section is used particularly with machines or systems whose design does not require the use of liquid cooling or with machines that do not allow liquid cooling due to their application which, in turn, allows for smaller dimensions of the primary section with lower rated thrusts and identical maximum thrusts compared to the water-cooled design.

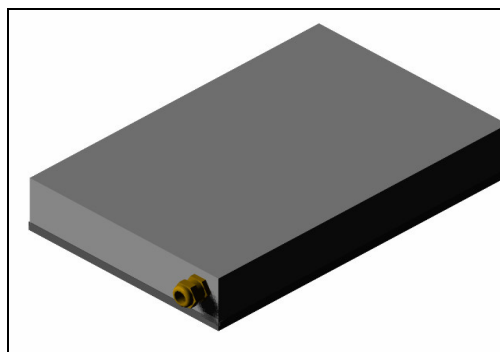


Figure 3: Non-ventilated primary section

This design of the primary section offers the options either mounting a precision liquid cooler or a cooling element with ventilator (forced ventilated) by attaching it to the back of the stator.

3.2.2 Primary section with integrated liquid cooling

Besides dissipating heat loss and ensuring effective feed force, the cooling system integrated in the primary section is also used to achieve a high temperature stability at the mounting surface to prevent negative thermal effects on the machine design.

This motor design is used primarily in applications that require high force densities or provide only limited mounting locations, such as machine tools or circuit board processing.

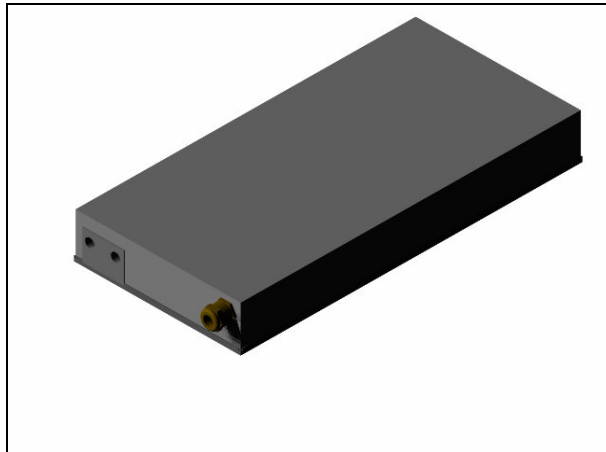


Figure 4: Primary section with water cooling

3.2.3 Secondary section

The segments of the secondary section consist of a galvanized base steel body, which serves as magnetic return, and the permanent magnets bonded to it. In order to minimize latch torques, the permanent magnets are skewed and bonded onto the base steel body. The mounting holes are located on the elongated outer edges of the secondary section.

The secondary sections are available in different lengths (144, 216, 288 and 576 mm).

While dimensioning the length of the secondary section, care should be taken to ensure that the length of the secondary section during full thrust development is at least equal to the combined length of the primary section, the required travel range and the width of the measuring sensor.



The magnetic tracks should only be handled by trained personnel. The magnetic tracks exhibit high magnetic field strengths in their surroundings and extremely strong attractive forces on iron and other magnetic parts. They must be handled with care to avoid damages. Danger of injury exists when handling the magnetic tracks due to the strong magnetic forces. For this reason, they should be moved individually while wearing proper protective gloves.



High field strengths in the vicinity of electronic equipment and measuring instruments can cause calibration changes or damages. In particular, the magnetic tracks should be kept at a safe distance (more than 2 m) from watches, computers, monitors, magnetic media (e.g. cheque cards, diskettes, audio and video tapes, etc.), pacemakers, metallic implants and hearing aids.



Exercise caution when handling tools made of magnetic material (screwdrivers, wrenches, etc.)! Magnetic tracks must not be opened!

3.3 Series and feed forces

The linear motor components from the identified modular concept, consisting of different frame sizes and lengths, can be combined according to the specific application case in order to cover the complete spectrum of feed forces.

The LSE 10 - series allows three different ways of cooling.

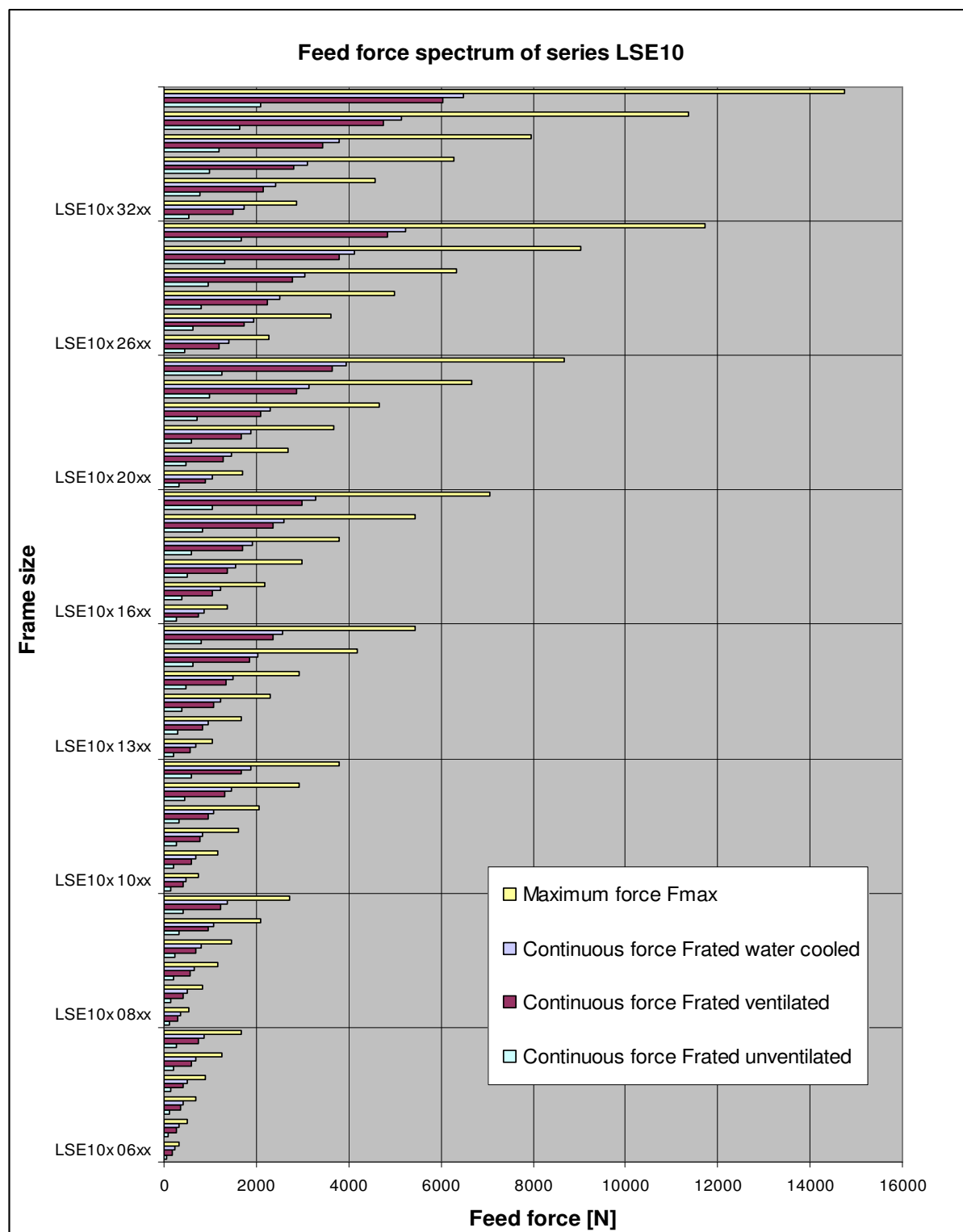


Figure 5: Complete feed force spectrum of series LSE10

The size of the primary and secondary sections is described in terms of the width of the core assembly or the width of the magnets. The individual sizes are again classified into different lengths of the primary section.

3.4 Type designations

The series designation LSE10 is a higher-level product designation of the synchronous linear motors and describes the complete linear motor unit consisting of primary and secondary section. Since the linear motors are a modular concept, the primary and secondary section must receive their own type code for unambiguous assignment.

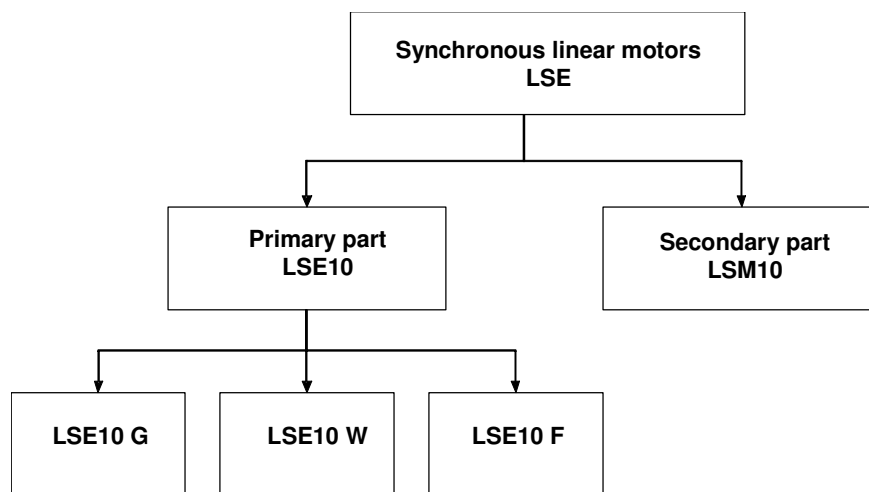


Figure 6: Breakdown of the type

The following figure is used as an example to explain the individual components of the type code.

Type code: LSE10W 2014		
<u>Explanation:</u>	L	= Linear motor
	S	= Synchronous
	E	= Iron core
	1	= Series
	0	= Development status
	W	= with water cooling (G = unventilated) (F = ventilated)
	20	= Stator width
	14	= Stator lenght

Figure 7: Type code of primary section

Type code: LSM10 2015		
<u>Explanation:</u>	L	= Linear motor
	S	= Synchronous
	M	= magnetic track
	1	= Series
	0	= Development status
	20	= Width of magnetic track
	15	= Length of magnetic track

Figure 8: Type code definition of magnetic track

4 Technical data

4.1 Explanations

This section provides an overview of the relevant technical motor data for all frame sizes and lengths of the LSE series. At this point it should be noted that the data sheets refer to a standard winding design; as soon as a winding adaptation is performed, particularly the speed and current values change.

The values presented in the tables refer to the following listed conditions, unless specified otherwise.

- Rated air gap (clear air gap according to the data sheet)
- Maximum motor winding temperature of 140 °C
- Water as coolant agent, maximum feed temperature 25 °C
- Air as coolant agent, maximum ambient temperature of 40 °C
- 540 V DC link voltage

4.2 LSE10 G series

4.2.1 LSE10 G 06XX

4.2.1.1 LSE10 G 0604

Technical data (Cat.) Linear motor



Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 0604
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	320
Maximum current	I_{MAX}	A	3,3
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	120
Attraction force	F_A	N	1094
Rated force	F_{rated}	N	70
Rated current	I_{rated}	A	0,6
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	250
Power dissipation at rated force	$P_{V,rated}$	W	29
Force constant	k_F	N/A	117
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	68
Motor constant at 20 °C	$k_{M,20}$	N/√W	15
Motor constant at 120 °C	$k_{M,120}$	N/√W	13
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	21,5
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	29,9
Electrical inductance of string	$L_{D,q}$	mH	112,6
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	2,2
Mass of secondary part	m_S	kg/m	3,6
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	5,3
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	3,4
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	0,6
Rated power	P_{rated}	kW	0,3
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	4
Protection class	-	-	IP 65

4.2.1.2 LSE10 G 0606

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 0606
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	510
Maximum current	I_{MAX}	A	5,5
Maximum velocity (at F_{max} and U_{rated})	$V_{MAX,FMAX}$	m/min	121
Attraction force	F_A	N	1641
Rated force	F_{rated}	N	100
Rated current	I_{rated}	A	0,9
Maximum velocity (at F_{rated} and U_{rated})	$V_{MAX,Frated}$	m/min	261
Power dissipation at rated force	$P_{V,rated}$	W	39
Force constant	k_F	N/A	114
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	66
Motor constant at 20 °C	$k_{M,20}$	N/√W	19
Motor constant at 120 °C	$k_{M,120}$	N/√W	16
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	12,3
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	17,1
Electrical inductance of string	$L_{D,q}$	mH	68,9
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	3,3
Mass of secondary part	m_S	kg/m	3,6
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	5,6
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	2,6
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	1,0
Rated power	P_{rated}	kW	0,4
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	$2p$	-	6
Protection class	-	-	IP 65

4.2.1.3 LSE10 G 0608

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 0608
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	700
Maximum current	I_{MAX}	A	7,8
Maximum velocity (at F_{max} and U_{rated})	$V_{MAX,FMAX}$	m/min	121
Attraction force	F_A	N	2188
Rated force	F_{rated}	N	125
Rated current	I_{rated}	A	1,1
Maximum velocity (at F_{rated} and U_{rated})	$V_{MAX,Frated}$	m/min	273
Power dissipation at rated force	$P_{V,rated}$	W	46
Force constant	k_F	N/A	110
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	63
Motor constant at 20 °C	$k_{M,20}$	N/√W	22
Motor constant at 120 °C	$k_{M,120}$	N/√W	18
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	8,4
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	11,7
Electrical inductance of string	$L_{D,q}$	mH	47,9
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	4,4
Mass of secondary part	m_S	kg/m	3,6
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	5,7
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	2,2
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	1,4
Rated power	P_{rated}	kW	0,6
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	8
Protection class	-	-	IP 65

4.2.1.4 LSE10 G 0610

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 0610
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	890
Maximum current	I_{MAX}	A	9,8
Maximum velocity (at F_{max} and U_{rated})	$V_{MAX,FMAX}$	m/min	120
Attraction force	F_A	N	2734
Rated force	F_{rated}	N	160
Rated current	I_{rated}	A	1,4
Maximum velocity (at F_{rated} and U_{rated})	$V_{MAX,Frated}$	m/min	271
Power dissipation at rated force	$P_{V,rated}$	W	59
Force constant	k_F	N/A	110
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	64
Motor constant at 20 °C	$k_{M,20}$	N/√W	25
Motor constant at 120 °C	$k_{M,120}$	N/√W	21
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	6,9
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	9,6
Electrical inductance of string	$L_{D,q}$	mH	37,9
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	5,5
Mass of secondary part	m_S	kg/m	3,6
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	5,5
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	1,7
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	1,8
Rated power	P_{rated}	kW	0,7
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	$2p$	-	10
Protection class	-	-	IP 65

4.2.1.5 LSE10 G 0614

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 0614
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	1270
Maximum current	I_{MAX}	A	13,9
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	119
Attraction force	F_A	N	3828
Rated force	F_{rated}	N	210
Rated current	I_{rated}	A	1,9
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	271
Power dissipation at rated force	$P_{V,rated}$	W	73
Force constant	k_F	N/A	111
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	64
Motor constant at 20 °C	$k_{M,20}$	N/√W	29
Motor constant at 120 °C	$k_{M,120}$	N/√W	25
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	4,9
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	6,8
Electrical inductance of string	$L_{D,q}$	mH	26,3
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	7,6
Mass of secondary part	m_S	kg/m	3,6
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	5,4
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	1,4
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	2,5
Rated power	P_{rated}	kW	1,0
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	$2p$	-	14
Protection class	-	-	IP 65

4.2.1.6 LSE10 G 0618

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 0618
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	1660
Maximum current	I_{MAX}	A	18,2
Maximum velocity (at F_{max} and U_{rated})	$V_{MAX,FMAX}$	m/min	118
Attraction force	F_A	N	4922
Rated force	F_{rated}	N	270
Rated current	I_{rated}	A	2,5
Maximum velocity (at F_{rated} and U_{rated})	$V_{MAX,Frated}$	m/min	273
Power dissipation at rated force	$P_{V,rated}$	W	93
Force constant	k_F	N/A	110
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	63
Motor constant at 20 °C	$k_{M,20}$	N/√W	33
Motor constant at 120 °C	$k_{M,120}$	N/√W	28
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	3,9
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	5,4
Electrical inductance of string	$L_{D,q}$	mH	20,1
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	9,8
Mass of secondary part	m_S	kg/m	3,6
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	5,2
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	1,1
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	3,3
Rated power	P_{rated}	kW	1,2
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	$2p$	-	18
Protection class	-	-	IP 65

4.2.2 LSE10 G 08XX

4.2.2.1 LSE10 G 0804

Technical data (Cat.) Linear motor



Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 0804
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	530
Maximum current	I_{MAX}	A	4,8
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	120
Attraction force	F_A	N	1804
Rated force	F_{rated}	N	110
Rated current	I_{rated}	A	0,8
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	221
Power dissipation at rated force	$P_{V,rated}$	W	32
Force constant	k_F	N/A	135
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	78
Motor constant at 20 °C	$k_{M,20}$	N/√W	23
Motor constant at 120 °C	$k_{M,120}$	N/√W	19
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	12,9
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	17,9
Electrical inductance of string	$L_{D,q}$	mH	87,5
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	3,1
Mass of secondary part	m_S	kg/m	5,1
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	6,8
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	3,1
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	1,1
Rated power	P_{rated}	kW	0,4
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	4
Protection class	-	-	IP 65

4.2.2.2 LSE10 G 0806

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 0806
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	840
Maximum current	I_{MAX}	A	7,8
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	118
Attraction force	F_A	N	2706
Rated force	F_{rated}	N	160
Rated current	I_{rated}	A	1,2
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	228
Power dissipation at rated force	$P_{V,rated}$	W	45
Force constant	k_F	N/A	132
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	76
Motor constant at 20 °C	$k_{M,20}$	N/√W	28
Motor constant at 120 °C	$k_{M,120}$	N/√W	24
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	7,4
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	10,3
Electrical inductance of string	$L_{D,q}$	mH	52,9
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	4,6
Mass of secondary part	m_S	kg/m	5,1
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	7,1
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	2,2
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	1,7
Rated power	P_{rated}	kW	0,6
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	$2p$	-	6
Protection class	-	-	IP 65

4.2.2.3 LSE10 G 0808

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 0808
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	1160
Maximum current	I_{MAX}	A	10,8
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	120
Attraction force	F_A	N	3608
Rated force	F_{rated}	N	210
Rated current	I_{rated}	A	1,6
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	231
Power dissipation at rated force	$P_{V,rated}$	W	57
Force constant	k_F	N/A	131
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	75
Motor constant at 20 °C	$k_{M,20}$	N/√W	33
Motor constant at 120 °C	$k_{M,120}$	N/√W	28
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	5,4
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	7,5
Electrical inductance of string	$L_{D,q}$	mH	38,8
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	6,1
Mass of secondary part	m_S	kg/m	5,1
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	7,2
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	1,8
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	2,3
Rated power	P_{rated}	kW	0,8
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	$2p$	-	8
Protection class	-	-	IP 65

4.2.2.4 LSE10 G 0810

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 0810
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	1470
Maximum current	I_{MAX}	A	13,7
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	118
Attraction force	F_A	N	4510
Rated force	F_{rated}	N	250
Rated current	I_{rated}	A	1,9
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	233
Power dissipation at rated force	$P_{V,rated}$	W	65
Force constant	k_F	N/A	130
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	75
Motor constant at 20 °C	$k_{M,20}$	N/√W	37
Motor constant at 120 °C	$k_{M,120}$	N/√W	31
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	4,2
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	5,9
Electrical inductance of string	$L_{D,q}$	mH	29,5
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	7,6
Mass of secondary part	m_S	kg/m	5,1
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	6,9
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	1,5
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	2,9
Rated power	P_{rated}	kW	1,0
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	$2p$	-	10
Protection class	-	-	IP 65

4.2.2.5 LSE10 G 0814

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 0814
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	2100
Maximum current	I_{MAX}	A	19,8
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	121
Attraction force	F_A	N	6314
Rated force	F_{rated}	N	340
Rated current	I_{rated}	A	2,7
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	237
Power dissipation at rated force	$P_{V,rated}$	W	85
Force constant	k_F	N/A	128
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	74
Motor constant at 20 °C	$k_{M,20}$	N/√W	44
Motor constant at 120 °C	$k_{M,120}$	N/√W	37
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	3,0
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	4,2
Electrical inductance of string	$L_{D,q}$	mH	20,9
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	10,6
Mass of secondary part	m_S	kg/m	5,1
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	6,9
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	1,2
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	4,2
Rated power	P_{rated}	kW	1,3
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	$2p$	-	14
Protection class	-	-	IP 65

4.2.2.6 LSE10 G 0818

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 0818
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	2730
Maximum current	I_{MAX}	A	25,5
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	117
Attraction force	F_A	N	8118
Rated force	F_{rated}	N	430
Rated current	I_{rated}	A	3,3
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	235
Power dissipation at rated force	$P_{V,rated}$	W	105
Force constant	k_F	N/A	130
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	75
Motor constant at 20 °C	$k_{M,20}$	N/√W	50
Motor constant at 120 °C	$k_{M,120}$	N/√W	42
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	2,5
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	3,4
Electrical inductance of string	$L_{D,q}$	mH	15,6
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	13,6
Mass of secondary part	m_S	kg/m	5,1
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	6,3
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	1,0
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	5,3
Rated power	P_{rated}	kW	1,7
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	$2p$	-	18
Protection class	-	-	IP 65

4.2.3 LSE10 G 10XX

4.2.3.1 LSE10 G 1004

Technical data (Cat.) Linear motor



Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 1004
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	740
Maximum current	I_{MAX}	A	6,2
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	120
Attraction force	F_A	N	2514
Rated force	F_{rated}	N	150
Rated current	I_{rated}	A	1,0
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	208
Power dissipation at rated force	$P_{V,rated}$	W	36
Force constant	k_F	N/A	145
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	84
Motor constant at 20 °C	$k_{M,20}$	N/√W	30
Motor constant at 120 °C	$k_{M,120}$	N/√W	25
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	8,5
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	11,8
Electrical inductance of string	$L_{D,q}$	mH	70,5
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	3,9
Mass of secondary part	m_S	kg/m	6,6
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	8,3
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	2,8
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	1,5
Rated power	P_{rated}	kW	0,5
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	4
Protection class	-	-	IP65

4.2.3.2 LSE10 G 1006

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 1006
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	1180
Maximum current	I_{MAX}	A	10,0
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	119
Attraction force	F_A	N	3771
Rated force	F_{rated}	N	220
Rated current	I_{rated}	A	1,5
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	213
Power dissipation at rated force	$P_{V,rated}$	W	51
Force constant	k_F	N/A	143
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	82
Motor constant at 20 °C	$k_{M,20}$	N/√W	36
Motor constant at 120 °C	$k_{M,120}$	N/√W	31
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	5,5
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	7,6
Electrical inductance of string	$L_{D,q}$	mH	43,4
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	5,9
Mass of secondary part	m_S	kg/m	6,6
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	7,9
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	2,0
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	2,3
Rated power	P_{rated}	kW	0,8
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	$2p$	-	6
Protection class	-	-	IP65

4.2.3.3 LSE10 G 1008

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 1008
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	1620
Maximum current	I_{MAX}	A	13,9
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	121
Attraction force	F_A	N	5028
Rated force	F_{rated}	N	280
Rated current	I_{rated}	A	2,0
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	217
Power dissipation at rated force	$P_{V,rated}$	W	62
Force constant	k_F	N/A	140
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	81
Motor constant at 20 °C	$k_{M,20}$	N/√W	42
Motor constant at 120 °C	$k_{M,120}$	N/√W	36
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	3,9
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	5,4
Electrical inductance of string	$L_{D,q}$	mH	31,8
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	7,8
Mass of secondary part	m_S	kg/m	6,6
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	8,2
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	1,6
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	3,3
Rated power	P_{rated}	kW	1,0
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	8
Protection class	-	-	IP65

4.2.3.4 LSE10 G 1010

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 1010
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	2060
Maximum current	I_{MAX}	A	17,9
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	121
Attraction force	F_A	N	6286
Rated force	F_{rated}	N	340
Rated current	I_{rated}	A	2,4
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	219
Power dissipation at rated force	$P_{V,rated}$	W	73
Force constant	k_F	N/A	139
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	80
Motor constant at 20 °C	$k_{M,20}$	N/√W	47
Motor constant at 120 °C	$k_{M,120}$	N/√W	40
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	3,1
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	4,3
Electrical inductance of string	$L_{D,q}$	mH	24,8
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	9,7
Mass of secondary part	m_S	kg/m	6,6
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	8,1
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	1,4
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	4,2
Rated power	P_{rated}	kW	1,2
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	$2p$	-	10
Protection class	-	-	IP65

4.2.3.5 LSE10 G 1014

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 1014
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	2930
Maximum current	I_{MAX}	A	25,5
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	120
Attraction force	F_A	N	8800
Rated force	F_{rated}	N	460
Rated current	I_{rated}	A	3,3
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	220
Power dissipation at rated force	$P_{V,rated}$	W	94
Force constant	k_F	N/A	139
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	80
Motor constant at 20 °C	$k_{M,20}$	N/√W	56
Motor constant at 120 °C	$k_{M,120}$	N/√W	47
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	2,2
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	3,1
Electrical inductance of string	$L_{D,q}$	mH	17,4
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	13,6
Mass of secondary part	m_S	kg/m	6,6
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	7,8
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	1,1
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	5,8
Rated power	P_{rated}	kW	1,7
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	$2p$	-	14
Protection class	-	-	IP65

4.2.3.6 LSE10 G 1018

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 1018
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	3810
Maximum current	I_{MAX}	A	33,1
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	119
Attraction force	F_A	N	11314
Rated force	F_{rated}	N	590
Rated current	I_{rated}	A	4,2
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	220
Power dissipation at rated force	$P_{V,rated}$	W	120
Force constant	k_F	N/A	139
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	80
Motor constant at 20 °C	$k_{M,20}$	N/√W	64
Motor constant at 120 °C	$k_{M,120}$	N/√W	54
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	1,8
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	2,5
Electrical inductance of string	$L_{D,q}$	mH	12,5
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	17,5
Mass of secondary part	m_S	kg/m	6,6
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	6,9
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	0,8
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	7,6
Rated power	P_{rated}	kW	2,2
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	$2p$	-	18
Protection class	-	-	IP65

4.2.4 LSE10 G 13XX

4.2.4.1 LSE10 G 1304

Technical data (Cat.) Linear motor



Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 1304
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	1060
Maximum current	I_{MAX}	A	8,3
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	120
Attraction force	F_A	N	3580
Rated force	F_{rated}	N	210
Rated current	I_{rated}	A	1,4
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	196
Power dissipation at rated force	$P_{V,rated}$	W	43
Force constant	k_F	N/A	155
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	90
Motor constant at 20 °C	$k_{M,20}$	N/√W	38
Motor constant at 120 °C	$k_{M,120}$	N/√W	32
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	6,2
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	8,6
Electrical inductance of string	$L_{D,q}$	mH	55,7
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	5,2
Mass of secondary part	m_S	kg/m	8,9
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	9,1
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	2,3
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	2,1
Rated power	P_{rated}	kW	0,7
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	4
Protection class	-	-	IP65

4.2.4.2 LSE10 G 1306

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 1306
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	1680
Maximum current	I_{MAX}	A	13,5
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	121
Attraction force	F_A	N	5369
Rated force	F_{rated}	N	300
Rated current	I_{rated}	A	2,0
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	203
Power dissipation at rated force	$P_{V,rated}$	W	57
Force constant	k_F	N/A	151
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	87
Motor constant at 20 °C	$k_{M,20}$	N/√W	47
Motor constant at 120 °C	$k_{M,120}$	N/√W	40
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	3,5
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	4,9
Electrical inductance of string	$L_{D,q}$	mH	34,5
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	7,8
Mass of secondary part	m_S	kg/m	8,9
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	9,8
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	1,8
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	3,4
Rated power	P_{rated}	kW	1,0
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	$2p$	-	6
Protection class	-	-	IP65

4.2.4.3 LSE10 G 1308

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 1308
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	2310
Maximum current	I_{MAX}	A	18,6
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	119
Attraction force	F_A	N	7159
Rated force	F_{rated}	N	390
Rated current	I_{rated}	A	2,6
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	205
Power dissipation at rated force	$P_{V,rated}$	W	72
Force constant	k_F	N/A	150
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	87
Motor constant at 20 °C	$k_{M,20}$	N/√W	54
Motor constant at 120 °C	$k_{M,120}$	N/√W	46
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	2,8
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	4,0
Electrical inductance of string	$L_{D,q}$	mH	24,2
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	10,4
Mass of secondary part	m_S	kg/m	8,9
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	8,5
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	1,4
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	4,6
Rated power	P_{rated}	kW	1,3
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	$2p$	-	8
Protection class	-	-	IP65

4.2.4.4 LSE10 G 1310

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 1310
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	2930
Maximum current	I_{MAX}	A	23,5
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	118
Attraction force	F_A	N	8949
Rated force	F_{rated}	N	470
Rated current	I_{rated}	A	3,1
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	204
Power dissipation at rated force	$P_{V,rated}$	W	84
Force constant	k_F	N/A	151
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	87
Motor constant at 20 °C	$k_{M,20}$	N/√W	61
Motor constant at 120 °C	$k_{M,120}$	N/√W	51
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	2,3
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	3,3
Electrical inductance of string	$L_{D,q}$	mH	19,2
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	12,9
Mass of secondary part	m_S	kg/m	8,9
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	8,2
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	1,2
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	5,8
Rated power	P_{rated}	kW	1,6
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	$2p$	-	10
Protection class	-	-	IP65

4.2.4.5 LSE10 G 1314

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 1314
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	4180
Maximum current	I_{MAX}	A	34,3
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	122
Attraction force	F_A	N	12529
Rated force	F_{rated}	N	640
Rated current	I_{rated}	A	4,4
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	210
Power dissipation at rated force	$P_{V,rated}$	W	110
Force constant	k_F	N/A	147
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	85
Motor constant at 20 °C	$k_{M,20}$	N/√W	72
Motor constant at 120 °C	$k_{M,120}$	N/√W	61
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	1,5
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	2,1
Electrical inductance of string	$L_{D,q}$	mH	13,6
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	18,1
Mass of secondary part	m_S	kg/m	8,9
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	9,2
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	0,9
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	8,5
Rated power	P_{rated}	kW	2,2
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	$2p$	-	14
Protection class	-	-	IP65

4.2.4.6 LSE10 G 1318

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 1318
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	5430
Maximum current	I_{MAX}	A	44,6
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	121
Attraction force	F_A	N	16108
Rated force	F_{rated}	N	810
Rated current	I_{rated}	A	5,5
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	210
Power dissipation at rated force	$P_{V,rated}$	W	137
Force constant	k_F	N/A	147
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	85
Motor constant at 20 °C	$k_{M,20}$	N/√W	82
Motor constant at 120 °C	$k_{M,120}$	N/√W	69
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	1,2
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	1,7
Electrical inductance of string	$L_{D,q}$	mH	10,5
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	23,2
Mass of secondary part	m_S	kg/m	8,9
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	8,8
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	0,7
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	10,9
Rated power	P_{rated}	kW	2,8
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	$2p$	-	18
Protection class	-	-	IP65

4.2.5 LSE10 G 16XX

4.2.5.1 LSE10 G 1604

Technical data (Cat.) Linear motor



Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 1604
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	1370
Maximum current	I_{MAX}	A	10,3
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	119
Attraction force	F_A	N	4645
Rated force	F_{rated}	N	270
Rated current	I_{rated}	A	1,7
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	188
Power dissipation at rated force	$P_{V,rated}$	W	50
Force constant	k_F	N/A	162
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	94
Motor constant at 20 °C	$k_{M,20}$	N/√W	45
Motor constant at 120 °C	$k_{M,120}$	N/√W	38
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	4,7
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	6,6
Electrical inductance of string	$L_{D,q}$	mH	45,4
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	6,5
Mass of secondary part	m_S	kg/m	11,2
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	9,6
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	2,0
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	2,7
Rated power	P_{rated}	kW	0,8
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	4
Protection class	-	-	IP65

4.2.5.2 LSE10 G 1606

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 1606
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	2180
Maximum current	I_{MAX}	A	16,8
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	120
Attraction force	F_A	N	6967
Rated force	F_{rated}	N	380
Rated current	I_{rated}	A	2,4
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	196
Power dissipation at rated force	$P_{V,rated}$	W	65
Force constant	k_F	N/A	157
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	91
Motor constant at 20 °C	$k_{M,20}$	N/√W	56
Motor constant at 120 °C	$k_{M,120}$	N/√W	47
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	3,0
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	4,2
Electrical inductance of string	$L_{D,q}$	mH	27,6
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	9,7
Mass of secondary part	m_S	kg/m	11,2
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	9,2
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	1,5
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	4,4
Rated power	P_{rated}	kW	1,2
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	$2p$	-	6
Protection class	-	-	IP65

4.2.5.3 LSE10 G 1608

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 1608
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	2990
Maximum current	I_{MAX}	A	23,5
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	122
Attraction force	F_A	N	9290
Rated force	F_{rated}	N	500
Rated current	I_{rated}	A	3,2
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	200
Power dissipation at rated force	$P_{V,rated}$	W	84
Force constant	k_F	N/A	154
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	89
Motor constant at 20 °C	$k_{M,20}$	N/√W	64
Motor constant at 120 °C	$k_{M,120}$	N/√W	55
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	2,2
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	3,0
Electrical inductance of string	$L_{D,q}$	mH	20,4
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	12,9
Mass of secondary part	m_S	kg/m	11,2
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	9,4
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	1,2
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	6,1
Rated power	P_{rated}	kW	1,7
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	$2p$	-	8
Protection class	-	-	IP65

4.2.5.4 LSE10 G 1610

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 1610
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	3800
Maximum current	I_{MAX}	A	29,8
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	120
Attraction force	F_A	N	11612
Rated force	F_{rated}	N	600
Rated current	I_{rated}	A	3,9
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	200
Power dissipation at rated force	$P_{V,rated}$	W	96
Force constant	k_F	N/A	154
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	89
Motor constant at 20 °C	$k_{M,20}$	N/√W	72
Motor constant at 120 °C	$k_{M,120}$	N/√W	61
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	1,6
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	2,2
Electrical inductance of string	$L_{D,q}$	mH	15,2
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	16,1
Mass of secondary part	m_S	kg/m	11,2
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	9,6
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	1,0
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	7,6
Rated power	P_{rated}	kW	2,0
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	10
Protection class	-	-	IP65

4.2.5.5 LSE10 G 1614

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 1614
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	5430
Maximum current	I_{MAX}	A	42,5
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	119
Attraction force	F_A	N	16257
Rated force	F_{rated}	N	830
Rated current	I_{rated}	A	5,4
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	201
Power dissipation at rated force	$P_{V,rated}$	W	130
Force constant	k_F	N/A	154
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	89
Motor constant at 20 °C	$k_{M,20}$	N/√W	86
Motor constant at 120 °C	$k_{M,120}$	N/√W	73
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	1,1
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	1,6
Electrical inductance of string	$L_{D,q}$	mH	10,4
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	22,5
Mass of secondary part	m_S	kg/m	11,2
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	9,1
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	0,8
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	10,8
Rated power	P_{rated}	kW	2,8
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	$2p$	-	14
Protection class	-	-	IP65

4.2.5.6 LSE10 G 1618

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 1618
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	7050
Maximum current	I_{MAX}	A	55,8
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	120
Attraction force	F_A	N	20902
Rated force	F_{rated}	N	1040
Rated current	I_{rated}	A	6,8
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	203
Power dissipation at rated force	$P_{V,rated}$	W	159
Force constant	k_F	N/A	152
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	88
Motor constant at 20 °C	$k_{M,20}$	N/√W	97
Motor constant at 120 °C	$k_{M,120}$	N/√W	82
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	0,9
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	1,2
Electrical inductance of string	$L_{D,q}$	mH	7,6
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	28,9
Mass of secondary part	m_S	kg/m	11,2
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	8,8
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	0,6
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	14,1
Rated power	P_{rated}	kW	3,5
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	$2p$	-	18
Protection class	-	-	IP 65

4.2.6 LSE10 G 20XX

4.2.6.1 LSE10 G 2004

Technical data (Cat.) Linear motor



Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 2004
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	1690
Maximum current	I_{MAX}	A	12,8
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	120
Attraction force	F_A	N	5169
Rated force	F_{rated}	N	330
Rated current	I_{rated}	A	2,1
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	190
Power dissipation at rated force	$P_{V,rated}$	W	59
Force constant	k_F	N/A	161
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	93
Motor constant at 20 °C	$k_{M,20}$	N/√W	51
Motor constant at 120 °C	$k_{M,120}$	N/√W	43
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	3,7
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	5,2
Electrical inductance of string	$L_{D,q}$	mH	39,0
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	8,3
Mass of secondary part	m_S	kg/m	17,5
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	10,5
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	1,7
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	3,4
Rated power	P_{rated}	kW	1,0
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 1 mm
Number of poles	2p	-	4
Protection class	-	-	IP65

4.2.6.2 LSE10 G 2006

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 2006
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	2690
Maximum current	I_{MAX}	A	20,8
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	119
Attraction force	F_A	N	7754
Rated force	F_{rated}	N	470
Rated current	I_{rated}	A	3,0
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	196
Power dissipation at rated force	$P_{V,rated}$	W	79
Force constant	k_F	N/A	157
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	90
Motor constant at 20 °C	$k_{M,20}$	N/√W	62
Motor constant at 120 °C	$k_{M,120}$	N/√W	53
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	2,4
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	3,3
Electrical inductance of string	$L_{D,q}$	mH	23,5
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	12,3
Mass of secondary part	m_S	kg/m	17,5
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	9,9
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	1,3
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	5,3
Rated power	P_{rated}	kW	1,5
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 1 mm
Number of poles	2p	-	6
Protection class	-	-	IP65

4.2.6.3 LSE10 G 2008

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 2008
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	3690
Maximum current	I_{MAX}	A	28,8
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	120
Attraction force	F_A	N	10338
Rated force	F_{rated}	N	600
Rated current	I_{rated}	A	3,9
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	199
Power dissipation at rated force	$P_{V,rated}$	W	96
Force constant	k_F	N/A	155
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	89
Motor constant at 20 °C	$k_{M,20}$	N/√W	72
Motor constant at 120 °C	$k_{M,120}$	N/√W	61
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	1,7
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	2,4
Electrical inductance of string	$L_{D,q}$	mH	16,6
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	16,3
Mass of secondary part	m_S	kg/m	17,5
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	9,7
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	1,0
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	7,4
Rated power	P_{rated}	kW	2,0
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 1 mm
Number of poles	$2p$	-	8
Protection class	-	-	IP65

4.2.6.4 LSE10 G 2010

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 2010
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	4680
Maximum current	I_{MAX}	A	37,2
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	122
Attraction force	F_A	N	12923
Rated force	F_{rated}	N	730
Rated current	I_{rated}	A	4,8
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	203
Power dissipation at rated force	$P_{V,rated}$	W	113
Force constant	k_F	N/A	152
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	88
Motor constant at 20 °C	$k_{M,20}$	N/√W	81
Motor constant at 120 °C	$k_{M,120}$	N/√W	69
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	1,2
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	1,7
Electrical inductance of string	$L_{D,q}$	mH	13,6
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	20,4
Mass of secondary part	m_S	kg/m	17,5
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	11,0
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	0,9
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	9,5
Rated power	P_{rated}	kW	2,5
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 1 mm
Number of poles	$2p$	-	10
Protection class	-	-	IP65

4.2.6.5 LSE10 G 2014

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 2014
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	6680
Maximum current	I_{MAX}	A	52,5
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	119
Attraction force	F_A	N	18092
Rated force	F_{rated}	N	1000
Rated current	I_{rated}	A	6,5
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	202
Power dissipation at rated force	$P_{V,rated}$	W	151
Force constant	k_F	N/A	153
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	89
Motor constant at 20 °C	$k_{M,20}$	N/√W	96
Motor constant at 120 °C	$k_{M,120}$	N/√W	81
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	1,0
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	1,4
Electrical inductance of string	$L_{D,q}$	mH	8,7
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	28,5
Mass of secondary part	m_S	kg/m	17,5
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	8,9
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	0,7
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	13,2
Rated power	P_{rated}	kW	3,4
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 1 mm
Number of poles	$2p$	-	14
Protection class	-	-	IP65

4.2.6.6 LSE10 G 2018

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 2018
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	8670
Maximum current	I_{MAX}	A	68,7
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	119
Attraction force	F_A	N	23261
Rated force	F_{rated}	N	1260
Rated current	I_{rated}	A	8,3
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	203
Power dissipation at rated force	$P_{V,rated}$	W	186
Force constant	k_F	N/A	152
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	88
Motor constant at 20 °C	$k_{M,20}$	N/√W	109
Motor constant at 120 °C	$k_{M,120}$	N/√W	92
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	0,8
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	1,1
Electrical inductance of string	$L_{D,q}$	mH	6,3
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	36,6
Mass of secondary part	m_S	kg/m	17,5
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	8,4
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	0,5
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	17,3
Rated power	P_{rated}	kW	4,3
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 1 mm
Number of poles	$2p$	-	18
Protection class	-	-	IP65

4.2.7 LSE10 G 26XX

4.2.7.1 LSE10 G 2604

Technical data (Cat.) Linear motor



Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 2604
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	2280
Maximum current	I_{MAX}	A	16,8
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	119
Attraction force	F_A	N	6980
Rated force	F_{rated}	N	450
Rated current	I_{rated}	A	2,7
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	187
Power dissipation at rated force	$P_{V,rated}$	W	75
Force constant	k_F	N/A	164
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	95
Motor constant at 20 °C	$k_{M,20}$	N/√W	61
Motor constant at 120 °C	$k_{M,120}$	N/√W	52
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	2,8
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	3,8
Electrical inductance of string	$L_{D,q}$	mH	33,4
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	10,8
Mass of secondary part	m_S	kg/m	22,8
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	12,1
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	1,3
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	4,5
Rated power	P_{rated}	kW	1,4
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 1 mm
Number of poles	2p	-	4
Protection class	-	-	IP65

4.2.7.2 LSE10 G 2606

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 2606
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	3630
Maximum current	I_{MAX}	A	27,0
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	118
Attraction force	F_A	N	10470
Rated force	F_{rated}	N	620
Rated current	I_{rated}	A	3,8
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	190
Power dissipation at rated force	$P_{V,rated}$	W	95
Force constant	k_F	N/A	162
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	94
Motor constant at 20 °C	$k_{M,20}$	N/√W	75
Motor constant at 120 °C	$k_{M,120}$	N/√W	64
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	1,7
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	2,3
Electrical inductance of string	$L_{D,q}$	mH	20,7
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	16,2
Mass of secondary part	m_S	kg/m	22,8
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	12,6
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	1,1
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	7,1
Rated power	P_{rated}	kW	2,0
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 1 mm
Number of poles	$2p$	-	6
Protection class	-	-	IP65

4.2.7.3 LSE10 G 2608

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 2608
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	4980
Maximum current	I_{MAX}	A	37,2
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	116
Attraction force	F_A	N	13961
Rated force	F_{rated}	N	800
Rated current	I_{rated}	A	4,9
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	191
Power dissipation at rated force	$P_{V,rated}$	W	117
Force constant	k_F	N/A	162
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	93
Motor constant at 20 °C	$k_{M,20}$	N/√W	87
Motor constant at 120 °C	$k_{M,120}$	N/√W	74
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	1,2
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	1,7
Electrical inductance of string	$L_{D,q}$	mH	14,3
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	21,5
Mass of secondary part	m_S	kg/m	22,8
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	11,8
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	0,9
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	9,7
Rated power	P_{rated}	kW	2,5
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 1 mm
Number of poles	2p	-	8
Protection class	-	-	IP65

4.2.7.4 LSE10 G 2610

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 2610
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	6330
Maximum current	I_{MAX}	A	47,0
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	114
Attraction force	F_A	N	17451
Rated force	F_{rated}	N	970
Rated current	I_{rated}	A	6,0
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	191
Power dissipation at rated force	$P_{V,rated}$	W	138
Force constant	k_F	N/A	162
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	94
Motor constant at 20 °C	$k_{M,20}$	N/√W	97
Motor constant at 120 °C	$k_{M,120}$	N/√W	83
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	1,1
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	1,5
Electrical inductance of string	$L_{D,q}$	mH	11,4
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	26,8
Mass of secondary part	m_S	kg/m	22,8
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	10,5
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	0,7
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	12,1
Rated power	P_{rated}	kW	3,1
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 1 mm
Number of poles	$2p$	-	10
Protection class	-	-	IP65

4.2.7.5 LSE10 G 2614

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 2614
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	9020
Maximum current	I_{MAX}	A	68,7
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	118
Attraction force	F_A	N	24431
Rated force	F_{rated}	N	1320
Rated current	I_{rated}	A	8,3
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	196
Power dissipation at rated force	$P_{V,rated}$	W	181
Force constant	k_F	N/A	158
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	91
Motor constant at 20 °C	$k_{M,20}$	N/√W	116
Motor constant at 120 °C	$k_{M,120}$	N/√W	98
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	0,7
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	1,0
Electrical inductance of string	$L_{D,q}$	mH	7,7
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	37,4
Mass of secondary part	m_S	kg/m	22,8
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	10,5
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	0,6
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	17,7
Rated power	P_{rated}	kW	4,3
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 1 mm
Number of poles	$2p$	-	14
Protection class	-	-	IP65

4.2.7.6 LSE10 G 2618

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 2618
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	11710
Maximum current	I_{MAX}	A	89,3
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	117
Attraction force	F_A	N	31411
Rated force	F_{rated}	N	1670
Rated current	I_{rated}	A	10,6
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	196
Power dissipation at rated force	$P_{V,rated}$	W	225
Force constant	k_F	N/A	158
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	91
Motor constant at 20 °C	$k_{M,20}$	N/√W	131
Motor constant at 120 °C	$k_{M,120}$	N/√W	111
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	0,5
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	0,7
Electrical inductance of string	$L_{D,q}$	mH	5,9
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	48,0
Mass of secondary part	m_S	kg/m	22,8
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	11,1
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	0,4
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	22,9
Rated power	P_{rated}	kW	5,5
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 1 mm
Number of poles	$2p$	-	18
Protection class	-	-	IP65

4.2.8 LSE10 G 32XX

4.2.8.1 LSE10 G 3204

Technical data (Cat.) Linear motor



Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 3204
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	2880
Maximum current	I_{MAX}	A	20,8
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	118
Attraction force	F_A	N	8791
Rated force	F_{rated}	N	550
Rated current	I_{rated}	A	3,3
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	183
Power dissipation at rated force	$P_{V,rated}$	W	86
Force constant	k_F	N/A	168
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	97
Motor constant at 20 °C	$k_{M,20}$	N/√W	70
Motor constant at 120 °C	$k_{M,120}$	N/√W	59
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	2,2
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	3,0
Electrical inductance of string	$L_{D,q}$	mH	26,9
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	13,4
Mass of secondary part	m_S	kg/m	28,0
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	12,4
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	1,2
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	5,7
Rated power	P_{rated}	kW	1,7
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 1 mm
Number of poles	$2p$	-	4
Protection class	-	-	IP65

4.2.8.2 LSE10 G 3206

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 3206
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	4580
Maximum current	I_{MAX}	A	34,3
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	122
Attraction force	F_A	N	13187
Rated force	F_{rated}	N	780
Rated current	I_{rated}	A	4,8
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	192
Power dissipation at rated force	$P_{V,rated}$	W	114
Force constant	k_F	N/A	161
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	93
Motor constant at 20 °C	$k_{M,20}$	N/√W	86
Motor constant at 120 °C	$k_{M,120}$	N/√W	73
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	1,3
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	1,8
Electrical inductance of string	$L_{D,q}$	mH	16,4
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	20,0
Mass of secondary part	m_S	kg/m	28,0
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	13,0
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	0,9
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	9,3
Rated power	P_{rated}	kW	2,5
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 1 mm
Number of poles	$2p$	-	6
Protection class	-	-	IP65

4.2.8.3 LSE10 G 3208

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 3208
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	6270
Maximum current	I_{MAX}	A	47,0
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	120
Attraction force	F_A	N	17583
Rated force	F_{rated}	N	1000
Rated current	I_{rated}	A	6,2
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	192
Power dissipation at rated force	$P_{V,rated}$	W	139
Force constant	k_F	N/A	161
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	93
Motor constant at 20 °C	$k_{M,20}$	N/√W	100
Motor constant at 120 °C	$k_{M,120}$	N/√W	85
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	1,0
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	1,4
Electrical inductance of string	$L_{D,q}$	mH	12,5
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	26,6
Mass of secondary part	m_S	kg/m	28,0
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	12,1
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	0,7
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	12,5
Rated power	P_{rated}	kW	3,2
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 1 mm
Number of poles	$2p$	-	8
Protection class	-	-	IP65

4.2.8.4 LSE10 G 3210

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 3210
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	7970
Maximum current	I_{MAX}	A	59,5
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	118
Attraction force	F_A	N	21979
Rated force	F_{rated}	N	1210
Rated current	I_{rated}	A	7,5
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	192
Power dissipation at rated force	$P_{V,rated}$	W	163
Force constant	k_F	N/A	162
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	93
Motor constant at 20 °C	$k_{M,20}$	N/√W	112
Motor constant at 120 °C	$k_{M,120}$	N/√W	95
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	0,8
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	1,1
Electrical inductance of string	$L_{D,q}$	mH	7,8
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	33,2
Mass of secondary part	m_S	kg/m	28,0
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	9,8
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	0,6
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	15,7
Rated power	P_{rated}	kW	3,9
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 1 mm
Number of poles	$2p$	-	10
Protection class	-	-	IP65

4.2.8.5 LSE10 G 3214

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 3214
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	11360
Maximum current	I_{MAX}	A	89,3
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	126
Attraction force	F_A	N	30770
Rated force	F_{rated}	N	1650
Rated current	I_{rated}	A	10,8
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	203
Power dissipation at rated force	$P_{V,rated}$	W	215
Force constant	k_F	N/A	153
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	89
Motor constant at 20 °C	$k_{M,20}$	N/√W	133
Motor constant at 120 °C	$k_{M,120}$	N/√W	113
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	0,5
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	0,7
Electrical inductance of string	$L_{D,q}$	mH	5,7
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	46,3
Mass of secondary part	m_S	kg/m	28,0
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	11,6
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	0,5
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	23,9
Rated power	P_{rated}	kW	5,6
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 1 mm
Number of poles	$2p$	-	14
Protection class	-	-	IP65

4.2.8.6 LSE10 G 3218

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10G 3218
Type of cooling primary part	-	-	geschlossen
Maximum force	F_{MAX}	N	14750
Maximum current	I_{MAX}	A	111,6
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	119
Attraction force	F_A	N	39561
Rated force	F_{rated}	N	2080
Rated current	I_{rated}	A	13,1
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	195
Power dissipation at rated force	$P_{V,rated}$	W	265
Force constant	k_F	N/A	159
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	92
Motor constant at 20 °C	$k_{M,20}$	N/√W	151
Motor constant at 120 °C	$k_{M,120}$	N/√W	128
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	0,4
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	0,6
Electrical inductance of string	$L_{D,q}$	mH	3,7
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	59,5
Mass of secondary part	m_S	kg/m	28,0
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T_{UMG}	°C	40
Electrical time constant	τ_{el}	ms	8,9
Thermal time constant	τ_{th}	min	40,0
Thermal resistance	R_{th}	°C/W	0,8
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	29,2
Rated power	P_{rated}	kW	6,8
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 1 mm
Number of poles	$2p$	-	18
Protection class	-	-	IP65

4.3 LSE10 W series

4.3.1 LSE10 W 06XX

4.3.1.1 LSE10 W 0604

Technical data (Cat.) Linear motor



Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 0604
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	320
Maximum current	I_{MAX}	A	3,3
Maximum velocity (at F_{max} and U_{rated})	$V_{MAX,FMAX}$	m/min	120
Attraction force	F_A	N	1094
Rated force	F_{rated}	N	225
Rated current	I_{rated}	A	1,9
Maximum velocity (at F_{rated} and U_{rated})	$V_{MAX,Frated}$	m/min	187
Power dissipation at rated force	$P_{V,rated}$	W	293
Force constant	k_F	N/A	118
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	68
Motor constant at 20 °C	$k_{M,20}$	N/√W	16
Motor constant at 120 °C	$k_{M,120}$	N/√W	13
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	21,5
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	29,9
Electrical inductance of string	$L_{D,q}$	mH	112,6
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	2,8
Mass of secondary part	m_S	kg/m	3,6
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	$10^5 Pa$	6
Maximum pressure drop	Δp	$10^5 Pa$	0,6
Electrical time constant	τ_{el}	ms	5,3
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,4
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	0,6
Rated power	P_{rated}	kW	0,7
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	$2p$	-	4
Protection class	-	-	IP65

4.3.1.2 LSE10 W 0606

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 0606
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	510
Maximum current	I_{MAX}	A	5,5
Maximum velocity (at F_{max} and U_{rated})	$V_{MAX,FMAX}$	m/min	121
Attraction force	F_A	N	1641
Rated force	F_{rated}	N	320
Rated current	I_{rated}	A	2,8
Maximum velocity (at F_{rated} and U_{rated})	$V_{MAX,Frated}$	m/min	201
Power dissipation at rated force	$P_{V,rated}$	W	392
Force constant	k_F	N/A	114
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	66
Motor constant at 20 °C	$k_{M,20}$	N/√W	19
Motor constant at 120 °C	$k_{M,120}$	N/√W	16
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	12,3
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	17,1
Electrical inductance of string	$L_{D,q}$	mH	68,9
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	4,2
Mass of secondary part	m_S	kg/m	3,6
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	$10^5 Pa$	6
Maximum pressure drop	Δp	$10^5 Pa$	0,6
Electrical time constant	τ_{el}	ms	5,6
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,3
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	1,0
Rated power	P_{rated}	kW	1,1
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	6
Protection class	-	-	IP65

4.3.1.3 LSE10 W 0608

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 0608
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	700
Maximum current	I_{MAX}	A	7,8
Maximum velocity (at F_{max} and U_{rated})	$V_{MAX,FMAX}$	m/min	121
Attraction force	F_A	N	2188
Rated force	F_{rated}	N	410
Rated current	I_{rated}	A	3,7
Maximum velocity (at F_{rated} and U_{rated})	$V_{MAX,Frated}$	m/min	214
Power dissipation at rated force	$P_{V,rated}$	W	481
Force constant	k_F	N/A	110
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	64
Motor constant at 20 °C	$k_{M,20}$	N/√W	22
Motor constant at 120 °C	$k_{M,120}$	N/√W	19
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	8,4
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	11,7
Electrical inductance of string	$L_{D,q}$	mH	47,9
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	5,6
Mass of secondary part	m_S	kg/m	3,6
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	10 ⁵ Pa	6
Maximum pressure drop	Δp	10 ⁵ Pa	0,6
Electrical time constant	τ_{el}	ms	5,7
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,2
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	1,4
Rated power	P_{rated}	kW	1,5
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	$2p$	-	8
Protection class	-	-	IP65

4.3.1.4 LSE10 W 0610

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 0610
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	890
Maximum current	I_{MAX}	A	9,8
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	120
Attraction force	F_A	N	2734
Rated force	F_{rated}	N	500
Rated current	I_{rated}	A	4,5
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	215
Power dissipation at rated force	$P_{V,rated}$	W	569
Force constant	k_F	N/A	111
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	64
Motor constant at 20 °C	$k_{M,20}$	N/√W	25
Motor constant at 120 °C	$k_{M,120}$	N/√W	21
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	6,9
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	9,6
Electrical inductance of string	$L_{D,q}$	mH	37,9
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	7,0
Mass of secondary part	m_S	kg/m	3,6
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	$10^5 Pa$	6
Maximum pressure drop	Δp	$10^5 Pa$	0,6
Electrical time constant	τ_{el}	ms	5,5
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,2
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	1,8
Rated power	P_{rated}	kW	1,8
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	10
Protection class	-	-	IP65

4.3.1.5 LSE10 W 0614

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 0614
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	1270
Maximum current	I_{MAX}	A	13,9
Maximum velocity (at F_{max} and U_{rated})	$V_{MAX,FMAX}$	m/min	119
Attraction force	F_A	N	3828
Rated force	F_{rated}	N	680
Rated current	I_{rated}	A	6,1
Maximum velocity (at F_{rated} and U_{rated})	$V_{MAX,Frated}$	m/min	217
Power dissipation at rated force	$P_{V,rated}$	W	748
Force constant	k_F	N/A	111
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	64
Motor constant at 20 °C	$k_{M,20}$	N/√W	29
Motor constant at 120 °C	$k_{M,120}$	N/√W	25
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	4,9
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	6,8
Electrical inductance of string	$L_{D,q}$	mH	26,3
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	9,8
Mass of secondary part	m_S	kg/m	3,6
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	10^5 Pa	6
Maximum pressure drop	Δp	10^5 Pa	0,6
Electrical time constant	τ_{el}	ms	5,4
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,2
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	2,5
Rated power	P_{rated}	kW	2,5
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	14
Protection class	-	-	IP65

4.3.1.6 LSE10 W 0618

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 0618
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	1660
Maximum current	I_{MAX}	A	18,2
Maximum velocity (at F_{max} and U_{rated})	$V_{MAX,FMAX}$	m/min	118
Attraction force	F_A	N	4922
Rated force	F_{rated}	N	870
Rated current	I_{rated}	A	7,9
Maximum velocity (at F_{rated} and U_{rated})	$V_{MAX,Frated}$	m/min	219
Power dissipation at rated force	$P_{V,rated}$	W	950
Force constant	k_F	N/A	111
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	64
Motor constant at 20 °C	$k_{M,20}$	N/√W	33
Motor constant at 120 °C	$k_{M,120}$	N/√W	28
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	3,9
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	5,4
Electrical inductance of string	$L_{D,q}$	mH	20,1
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	12,5
Mass of secondary part	m_S	kg/m	3,6
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	10^5 Pa	6
Maximum pressure drop	Δp	10^5 Pa	0,6
Electrical time constant	τ_{el}	ms	5,2
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,1
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	3,3
Rated power	P_{rated}	kW	3,2
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	$2p$	-	18
Protection class	-	-	IP65

4.3.2 LSE10 W 08XX

4.3.2.1 LSE10 W 0804

Technical data (Cat.) Linear motor



Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 0804
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	530
Maximum current	I_{MAX}	A	4,8
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	120
Attraction force	F_A	N	1804
Rated force	F_{rated}	N	360
Rated current	I_{rated}	A	2,6
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	173
Power dissipation at rated force	$P_{V,rated}$	W	336
Force constant	k_F	N/A	136
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	79
Motor constant at 20 °C	$k_{M,20}$	N/√W	23
Motor constant at 120 °C	$k_{M,120}$	N/√W	20
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	12,9
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	17,9
Electrical inductance of string	$L_{D,q}$	mH	87,5
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	3,8
Mass of secondary part	m_S	kg/m	5,1
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	10^5 Pa	6
Maximum pressure drop	Δp	10^5 Pa	0,6
Electrical time constant	τ_{el}	ms	6,8
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,3
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	1,1
Rated power	P_{rated}	kW	1,0
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	4
Protection class	-	-	IP65

4.3.2.2 LSE10 W 0806

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 0806
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	840
Maximum current	I_{MAX}	A	7,8
Maximum velocity (at F_{max} and U_{rated})	$V_{MAX,FMAX}$	m/min	118
Attraction force	F_A	N	2706
Rated force	F_{rated}	N	510
Rated current	I_{rated}	A	3,8
Maximum velocity (at F_{rated} and U_{rated})	$V_{MAX,Frated}$	m/min	183
Power dissipation at rated force	$P_{V,rated}$	W	446
Force constant	k_F	N/A	133
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	77
Motor constant at 20 °C	$k_{M,20}$	N/√W	28
Motor constant at 120 °C	$k_{M,120}$	N/√W	24
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	7,4
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	10,3
Electrical inductance of string	$L_{D,q}$	mH	52,9
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	5,7
Mass of secondary part	m_S	kg/m	5,1
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	$10^5 Pa$	6
Maximum pressure drop	Δp	$10^5 Pa$	0,6
Electrical time constant	τ_{el}	ms	7,1
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,3
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	1,7
Rated power	P_{rated}	kW	1,6
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	6
Protection class	-	-	IP65

4.3.2.3 LSE10 W 0808

Technical data (Cat.)

Linear motor



Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 0808
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	1160
Maximum current	I_{MAX}	A	10,8
Maximum velocity (at F_{max} and U_{rated})	$V_{MAX,FMAX}$	m/min	120
Attraction force	F_A	N	3608
Rated force	F_{rated}	N	650
Rated current	I_{rated}	A	4,9
Maximum velocity (at F_{rated} and U_{rated})	$V_{MAX,Frated}$	m/min	190
Power dissipation at rated force	$P_{V,rated}$	W	539
Force constant	k_F	N/A	131
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	76
Motor constant at 20 °C	$k_{M,20}$	N/√W	33
Motor constant at 120 °C	$k_{M,120}$	N/√W	28
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	5,4
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	7,5
Electrical inductance of string	$L_{D,q}$	mH	38,8
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	7,6
Mass of secondary part	m_S	kg/m	5,1
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	$10^5 Pa$	6
Maximum pressure drop	Δp	$10^5 Pa$	0,6
Electrical time constant	τ_{el}	ms	7,2
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,2
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	2,3
Rated power	P_{rated}	kW	2,1
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	8
Protection class	-	-	IP65

4.3.2.4 LSE10 W 0810

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 0810
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	1470
Maximum current	I_{MAX}	A	13,7
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	118
Attraction force	F_A	N	4510
Rated force	F_{rated}	N	800
Rated current	I_{rated}	A	6,1
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	192
Power dissipation at rated force	$P_{V,rated}$	W	651
Force constant	k_F	N/A	131
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	75
Motor constant at 20 °C	$k_{M,20}$	N/√W	37
Motor constant at 120 °C	$k_{M,120}$	N/√W	31
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	4,2
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	5,9
Electrical inductance of string	$L_{D,q}$	mH	29,5
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	9,5
Mass of secondary part	m_S	kg/m	5,1
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	$10^5 Pa$	6
Maximum pressure drop	Δp	$10^5 Pa$	0,6
Electrical time constant	τ_{el}	ms	6,9
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,2
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	2,9
Rated power	P_{rated}	kW	2,6
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	$2p$	-	10
Protection class	-	-	IP65

4.3.2.5 LSE10 W 0814

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 0814
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	2100
Maximum current	I_{MAX}	A	19,8
Maximum velocity (at F_{max} and U_{rated})	$V_{MAX,FMAX}$	m/min	121
Attraction force	F_A	N	6314
Rated force	F_{rated}	N	1090
Rated current	I_{rated}	A	8,4
Maximum velocity (at F_{rated} and U_{rated})	$V_{MAX,Frated}$	m/min	197
Power dissipation at rated force	$P_{V,rated}$	W	858
Force constant	k_F	N/A	129
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	75
Motor constant at 20 °C	$k_{M,20}$	N/√W	44
Motor constant at 120 °C	$k_{M,120}$	N/√W	37
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	3,0
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	4,2
Electrical inductance of string	$L_{D,q}$	mH	20,9
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	13,3
Mass of secondary part	m_S	kg/m	5,1
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	$10^5 Pa$	6
Maximum pressure drop	Δp	$10^5 Pa$	0,6
Electrical time constant	τ_{el}	ms	6,9
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,1
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	4,2
Rated power	P_{rated}	kW	3,6
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	14
Protection class	-	-	IP65

4.3.2.6 LSE10 W 0818

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 0818
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	2730
Maximum current	I_{MAX}	A	25,5
Maximum velocity (at F_{max} and U_{rated})	$V_{MAX,FMAX}$	m/min	117
Attraction force	F_A	N	8118
Rated force	F_{rated}	N	1380
Rated current	I_{rated}	A	10,6
Maximum velocity (at F_{rated} and U_{rated})	$V_{MAX,Frated}$	m/min	196
Power dissipation at rated force	$P_{V, rated}$	W	1068
Force constant	k_F	N/A	130
Voltage constant, phase to phase	$k_{E, phase\ to\ phase}$	Vs/m	75
Motor constant at 20 °C	$k_{M,20}$	N/√W	50
Motor constant at 120 °C	$k_{M,120}$	N/√W	42
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	2,5
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	3,4
Electrical inductance of string	$L_{D,q}$	mH	15,6
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	17,2
Mass of secondary part	m_S	kg/m	5,1
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	$10^5 Pa$	6
Maximum pressure drop	Δp	$10^5 Pa$	0,6
Electrical time constant	τ_{el}	ms	6,3
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,1
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	5,3
Rated power	P_{rated}	kW	4,5
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	18
Protection class	-	-	IP65

4.3.3 LSE10 W 10XX

4.3.3.1 LSE10 W 1004

Technical data (Cat.) Linear motor



Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 1004
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	740
Maximum current	I_{MAX}	A	6,2
Maximum velocity (at F_{max} and U_{rated})	$V_{MAX,FMAX}$	m/min	120
Attraction force	F_A	N	2514
Rated force	F_{rated}	N	490
Rated current	I_{rated}	A	3,4
Maximum velocity (at F_{rated} and U_{rated})	$V_{MAX,Frated}$	m/min	168
Power dissipation at rated force	$P_{V,rated}$	W	377
Force constant	k_F	N/A	146
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	84
Motor constant at 20 °C	$k_{M,20}$	N/√W	30
Motor constant at 120 °C	$k_{M,120}$	N/√W	25
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	8,5
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	11,8
Electrical inductance of string	$L_{D,q}$	mH	70,5
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	4,9
Mass of secondary part	m_S	kg/m	6,6
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	10^5 Pa	6
Maximum pressure drop	Δp	10^5 Pa	0,6
Electrical time constant	τ_{el}	ms	8,3
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,3
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	1,5
Rated power	P_{rated}	kW	1,4
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	$2p$	-	4
Protection class	-	-	IP65

4.3.3.2 LSE10 W 1006

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 1006
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	1180
Maximum current	I_{MAX}	A	10,0
Maximum velocity (at F_{max} and U_{rated})	$V_{MAX,FMAX}$	m/min	119
Attraction force	F_A	N	3771
Rated force	F_{rated}	N	690
Rated current	I_{rated}	A	4,8
Maximum velocity (at F_{rated} and U_{rated})	$V_{MAX,Frated}$	m/min	176
Power dissipation at rated force	$P_{V,rated}$	W	494
Force constant	k_F	N/A	143
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	83
Motor constant at 20 °C	$k_{M,20}$	N/√W	37
Motor constant at 120 °C	$k_{M,120}$	N/√W	31
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	5,5
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	7,6
Electrical inductance of string	$L_{D,q}$	mH	43,4
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	7,3
Mass of secondary part	m_S	kg/m	6,6
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	$10^5 Pa$	6
Maximum pressure drop	Δp	$10^5 Pa$	0,6
Electrical time constant	τ_{el}	ms	7,9
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,2
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	2,3
Rated power	P_{rated}	kW	2,0
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	6
Protection class	-	-	IP65

4.3.3.3 LSE10 W 1008

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 1008
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	1620
Maximum current	I_{MAX}	A	13,9
Maximum velocity (at F_{max} and U_{rated})	$V_{MAX,FMAX}$	m/min	121
Attraction force	F_A	N	5028
Rated force	F_{rated}	N	890
Rated current	I_{rated}	A	6,3
Maximum velocity (at F_{rated} and U_{rated})	$V_{MAX,Frated}$	m/min	182
Power dissipation at rated force	$P_{V,rated}$	W	612
Force constant	k_F	N/A	141
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	82
Motor constant at 20 °C	$k_{M,20}$	N/√W	42
Motor constant at 120 °C	$k_{M,120}$	N/√W	36
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	3,9
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	5,4
Electrical inductance of string	$L_{D,q}$	mH	31,8
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	9,7
Mass of secondary part	m_S	kg/m	6,6
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	$10^5 Pa$	6
Maximum pressure drop	Δp	$10^5 Pa$	0,6
Electrical time constant	τ_{el}	ms	8,2
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,2
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	3,3
Rated power	P_{rated}	kW	2,7
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	8
Protection class	-	-	IP65

4.3.3.4 LSE10 W 1010

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 1010
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	2060
Maximum current	I_{MAX}	A	17,9
Maximum velocity (at F_{max} and U_{rated})	$V_{MAX,FMAX}$	m/min	121
Attraction force	F_A	N	6286
Rated force	F_{rated}	N	1080
Rated current	I_{rated}	A	7,7
Maximum velocity (at F_{rated} and U_{rated})	$V_{MAX,Frated}$	m/min	185
Power dissipation at rated force	$P_{V,rated}$	W	719
Force constant	k_F	N/A	140
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	81
Motor constant at 20 °C	$k_{M,20}$	N/√W	48
Motor constant at 120 °C	$k_{M,120}$	N/√W	40
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	3,1
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	4,3
Electrical inductance of string	$L_{D,q}$	mH	24,8
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	12,1
Mass of secondary part	m_S	kg/m	6,6
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	$10^5 Pa$	6
Maximum pressure drop	Δp	$10^5 Pa$	0,6
Electrical time constant	τ_{el}	ms	8,1
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,2
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	4,2
Rated power	P_{rated}	kW	3,3
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	10
Protection class	-	-	IP65

4.3.3.5 LSE10 W 1014

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 1014
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	2930
Maximum current	I_{MAX}	A	25,5
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	120
Attraction force	F_A	N	8800
Rated force	F_{rated}	N	1480
Rated current	I_{rated}	A	10,6
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	187
Power dissipation at rated force	$P_{V,rated}$	W	959
Force constant	k_F	N/A	140
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	81
Motor constant at 20 °C	$k_{M,20}$	N/√W	56
Motor constant at 120 °C	$k_{M,120}$	N/√W	48
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	2,2
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	3,1
Electrical inductance of string	$L_{D,q}$	mH	17,4
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	16,9
Mass of secondary part	m_S	kg/m	6,6
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	10^5 Pa	6
Maximum pressure drop	Δp	10^5 Pa	0,6
Electrical time constant	τ_{el}	ms	7,8
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,1
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	5,8
Rated power	P_{rated}	kW	4,6
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	$2p$	-	14
Protection class	-	-	IP65

4.3.3.6 LSE10 W 1018

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 1018
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	3810
Maximum current	I_{MAX}	A	33,1
Maximum velocity (at F_{max} and U_{rated})	$V_{MAX,FMAX}$	m/min	119
Attraction force	F_A	N	11314
Rated force	F_{rated}	N	1870
Rated current	I_{rated}	A	13,3
Maximum velocity (at F_{rated} and U_{rated})	$V_{MAX,Frated}$	m/min	188
Power dissipation at rated force	$P_{V,rated}$	W	1188
Force constant	k_F	N/A	140
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	81
Motor constant at 20 °C	$k_{M,20}$	N/√W	64
Motor constant at 120 °C	$k_{M,120}$	N/√W	54
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	1,8
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	2,5
Electrical inductance of string	$L_{D,q}$	mH	12,5
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	21,8
Mass of secondary part	m_S	kg/m	6,6
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	$10^5 Pa$	6
Maximum pressure drop	Δp	$10^5 Pa$	0,6
Electrical time constant	τ_{el}	ms	6,9
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,1
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	7,6
Rated power	P_{rated}	kW	5,8
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	$2p$	-	18
Protection class	-	-	IP65

4.3.4 LSE10 W 13XX

4.3.4.1 LSE10 W 1304

Technical data (Cat.) Linear motor



Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 1304
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	1060
Maximum current	I_{MAX}	A	8,3
Maximum velocity (at F_{max} and U_{rated})	$V_{MAX,FMAX}$	m/min	120
Attraction force	F_A	N	3580
Rated force	F_{rated}	N	680
Rated current	I_{rated}	A	4,4
Maximum velocity (at F_{rated} and U_{rated})	$V_{MAX,Frated}$	m/min	162
Power dissipation at rated force	$P_{V,rated}$	W	439
Force constant	k_F	N/A	156
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	90
Motor constant at 20 °C	$k_{M,20}$	N/√W	38
Motor constant at 120 °C	$k_{M,120}$	N/√W	32
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	6,2
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	8,6
Electrical inductance of string	$L_{D,q}$	mH	55,7
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	6,4
Mass of secondary part	m_S	kg/m	8,9
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	10^5 Pa	6
Maximum pressure drop	Δp	10^5 Pa	0,6
Electrical time constant	τ_{el}	ms	9,1
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,3
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	2,1
Rated power	P_{rated}	kW	1,8
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	$2p$	-	4
Protection class	-	-	IP65

4.3.4.2 LSE10 W 1306

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 1306
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	1680
Maximum current	I_{MAX}	A	13,5
Maximum velocity (at F_{max} and U_{rated})	$V_{MAX,FMAX}$	m/min	121
Attraction force	F_A	N	5369
Rated force	F_{rated}	N	960
Rated current	I_{rated}	A	6,3
Maximum velocity (at F_{rated} and U_{rated})	$V_{MAX,Frated}$	m/min	171
Power dissipation at rated force	$P_{V,rated}$	W	578
Force constant	k_F	N/A	151
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	87
Motor constant at 20 °C	$k_{M,20}$	N/√W	47
Motor constant at 120 °C	$k_{M,120}$	N/√W	40
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	3,5
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	4,9
Electrical inductance of string	$L_{D,q}$	mH	34,5
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	9,6
Mass of secondary part	m_S	kg/m	8,9
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	$10^5 Pa$	6
Maximum pressure drop	Δp	$10^5 Pa$	0,6
Electrical time constant	τ_{el}	ms	9,8
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,2
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	3,4
Rated power	P_{rated}	kW	2,7
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	6
Protection class	-	-	IP65

4.3.4.3 LSE10 W 1308

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 1308
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	2310
Maximum current	I_{MAX}	A	18,6
Maximum velocity (at F_{max} and U_{rated})	$V_{MAX,FMAX}$	m/min	119
Attraction force	F_A	N	7159
Rated force	F_{rated}	N	1230
Rated current	I_{rated}	A	8,2
Maximum velocity (at F_{rated} and U_{rated})	$V_{MAX,Frated}$	m/min	174
Power dissipation at rated force	$P_{V,rated}$	W	708
Force constant	k_F	N/A	151
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	87
Motor constant at 20 °C	$k_{M,20}$	N/√W	55
Motor constant at 120 °C	$k_{M,120}$	N/√W	46
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	2,8
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	4,0
Electrical inductance of string	$L_{D,q}$	mH	24,2
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	12,8
Mass of secondary part	m_S	kg/m	8,9
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	$10^5 Pa$	6
Maximum pressure drop	Δp	$10^5 Pa$	0,6
Electrical time constant	τ_{el}	ms	8,5
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,2
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	4,6
Rated power	P_{rated}	kW	3,6
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	$2p$	-	8
Protection class	-	-	IP65

4.3.4.4 LSE10 W 1310

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 1310
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	2930
Maximum current	I_{MAX}	A	23,5
Maximum velocity (at F_{max} and U_{rated})	$V_{MAX,FMAX}$	m/min	118
Attraction force	F_A	N	8949
Rated force	F_{rated}	N	1500
Rated current	I_{rated}	A	9,9
Maximum velocity (at F_{rated} and U_{rated})	$V_{MAX,Frated}$	m/min	175
Power dissipation at rated force	$P_{V,rated}$	W	838
Force constant	k_F	N/A	152
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	88
Motor constant at 20 °C	$k_{M,20}$	N/√W	61
Motor constant at 120 °C	$k_{M,120}$	N/√W	52
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	2,3
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	3,3
Electrical inductance of string	$L_{D,q}$	mH	19,2
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	16,0
Mass of secondary part	m_S	kg/m	8,9
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	$10^5 Pa$	6
Maximum pressure drop	Δp	$10^5 Pa$	0,6
Electrical time constant	τ_{el}	ms	8,2
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,1
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	5,8
Rated power	P_{rated}	kW	4,4
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	$2p$	-	10
Protection class	-	-	IP65

4.3.4.5 LSE10 W 1314

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 1314
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	4180
Maximum current	I_{MAX}	A	34,3
Maximum velocity (at F_{max} and U_{rated})	$V_{MAX,FMAX}$	m/min	122
Attraction force	F_A	N	12529
Rated force	F_{rated}	N	2040
Rated current	I_{rated}	A	13,8
Maximum velocity (at F_{rated} and U_{rated})	$V_{MAX,Frated}$	m/min	181
Power dissipation at rated force	$P_{V,rated}$	W	1102
Force constant	k_F	N/A	148
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	85
Motor constant at 20 °C	$k_{M,20}$	N/√W	73
Motor constant at 120 °C	$k_{M,120}$	N/√W	61
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	1,5
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	2,1
Electrical inductance of string	$L_{D,q}$	mH	13,6
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	22,3
Mass of secondary part	m_S	kg/m	8,9
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	$10^5 Pa$	6
Maximum pressure drop	Δp	$10^5 Pa$	0,6
Electrical time constant	τ_{el}	ms	9,2
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,1
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	8,5
Rated power	P_{rated}	kW	6,2
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	14
Protection class	-	-	IP65

4.3.4.6 LSE10 W 1318

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 1318
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	5430
Maximum current	I_{MAX}	A	44,6
Maximum velocity (at F_{max} and U_{rated})	$V_{MAX,FMAX}$	m/min	121
Attraction force	F_A	N	16108
Rated force	F_{rated}	N	2580
Rated current	I_{rated}	A	17,5
Maximum velocity (at F_{rated} and U_{rated})	$V_{MAX,Frated}$	m/min	182
Power dissipation at rated force	$P_{V,rated}$	W	1367
Force constant	k_F	N/A	148
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	85
Motor constant at 20 °C	$k_{M,20}$	N/√W	82
Motor constant at 120 °C	$k_{M,120}$	N/√W	70
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	1,2
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	1,7
Electrical inductance of string	$L_{D,q}$	mH	10,5
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	28,7
Mass of secondary part	m_S	kg/m	8,9
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	$10^5 Pa$	6
Maximum pressure drop	Δp	$10^5 Pa$	0,6
Electrical time constant	τ_{el}	ms	8,8
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,1
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	10,9
Rated power	P_{rated}	kW	7,8
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	$2p$	-	18
Protection class	-	-	IP65

4.3.5 LSE10 W 16XX

4.3.5.1 LSE10 W 1604

Technical data (Cat.) Linear motor



Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 1604
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	1370
Maximum current	I_{MAX}	A	10,3
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	119
Attraction force	F_A	N	4645
Rated force	F_{rated}	N	870
Rated current	I_{rated}	A	5,3
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	157
Power dissipation at rated force	$P_{V,rated}$	W	505
Force constant	k_F	N/A	163
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	94
Motor constant at 20 °C	$k_{M,20}$	N/√W	46
Motor constant at 120 °C	$k_{M,120}$	N/√W	39
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	4,7
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	6,6
Electrical inductance of string	$L_{D,q}$	mH	45,4
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	8,0
Mass of secondary part	m_S	kg/m	11,2
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	10^5 Pa	6
Maximum pressure drop	Δp	10^5 Pa	0,6
Electrical time constant	τ_{el}	ms	9,6
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,2
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	2,7
Rated power	P_{rated}	kW	2,3
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	$2p$	-	4
Protection class	-	-	IP65

4.3.5.2 LSE10 W 1606

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 1606
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	2180
Maximum current	I_{MAX}	A	16,8
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	120
Attraction force	F_A	N	6967
Rated force	F_{rated}	N	1220
Rated current	I_{rated}	A	7,7
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	167
Power dissipation at rated force	$P_{V,rated}$	W	656
Force constant	k_F	N/A	158
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	91
Motor constant at 20 °C	$k_{M,20}$	N/√W	56
Motor constant at 120 °C	$k_{M,120}$	N/√W	48
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	3,0
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	4,2
Electrical inductance of string	$L_{D,q}$	mH	27,6
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	12,0
Mass of secondary part	m_S	kg/m	11,2
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	10 ⁵ Pa	6
Maximum pressure drop	Δp	10 ⁵ Pa	0,6
Electrical time constant	τ_{el}	ms	9,2
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,2
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	4,4
Rated power	P_{rated}	kW	3,4
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	6
Protection class	-	-	IP65

4.3.5.3 LSE10 W 1608

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 1608
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	2990
Maximum current	I_{MAX}	A	23,5
Maximum velocity (at F_{max} and U_{rated})	$V_{MAX,FMAX}$	m/min	122
Attraction force	F_A	N	9290
Rated force	F_{rated}	N	1560
Rated current	I_{rated}	A	10,1
Maximum velocity (at F_{rated} and U_{rated})	$V_{MAX,Frated}$	m/min	173
Power dissipation at rated force	$P_{V,rated}$	W	800
Force constant	k_F	N/A	155
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	89
Motor constant at 20 °C	$k_{M,20}$	N/√W	65
Motor constant at 120 °C	$k_{M,120}$	N/√W	55
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	2,2
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	3,0
Electrical inductance of string	$L_{D,q}$	mH	20,4
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	15,9
Mass of secondary part	m_S	kg/m	11,2
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	$10^5 Pa$	6
Maximum pressure drop	Δp	$10^5 Pa$	0,6
Electrical time constant	τ_{el}	ms	9,4
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,1
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	6,1
Rated power	P_{rated}	kW	4,5
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	8
Protection class	-	-	IP65

4.3.5.4 LSE10 W 1610

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 1610
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	3800
Maximum current	I_{MAX}	A	29,8
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	120
Attraction force	F_A	N	11612
Rated force	F_{rated}	N	1910
Rated current	I_{rated}	A	12,3
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	173
Power dissipation at rated force	$P_{V,rated}$	W	956
Force constant	k_F	N/A	155
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	90
Motor constant at 20 °C	$k_{M,20}$	N/√W	73
Motor constant at 120 °C	$k_{M,120}$	N/√W	62
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	1,6
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	2,2
Electrical inductance of string	$L_{D,q}$	mH	15,2
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	19,8
Mass of secondary part	m_S	kg/m	11,2
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	$10^5 Pa$	6
Maximum pressure drop	Δp	$10^5 Pa$	0,6
Electrical time constant	τ_{el}	ms	9,6
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,1
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	7,6
Rated power	P_{rated}	kW	5,5
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	10
Protection class	-	-	IP65

4.3.5.5 LSE10 W 1614

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 1614
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	5430
Maximum current	I_{MAX}	A	42,5
Maximum velocity (at F_{max} and U_{rated})	$V_{MAX,FMAX}$	m/min	119
Attraction force	F_A	N	16257
Rated force	F_{rated}	N	2600
Rated current	I_{rated}	A	16,8
Maximum velocity (at F_{rated} and U_{rated})	$V_{MAX,Frated}$	m/min	175
Power dissipation at rated force	$P_{V,rated}$	W	1259
Force constant	k_F	N/A	155
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	89
Motor constant at 20 °C	$k_{M,20}$	N/√W	86
Motor constant at 120 °C	$k_{M,120}$	N/√W	73
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	1,1
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	1,6
Electrical inductance of string	$L_{D,q}$	mH	10,4
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	27,7
Mass of secondary part	m_S	kg/m	11,2
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	$10^5 Pa$	6
Maximum pressure drop	Δp	$10^5 Pa$	0,6
Electrical time constant	τ_{el}	ms	9,1
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,1
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	10,8
Rated power	P_{rated}	kW	7,6
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	14
Protection class	-	-	IP65

4.3.5.6 LSE10 W 1618

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 1618
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	7050
Maximum current	I_{MAX}	A	55,8
Maximum velocity (at F_{max} and U_{rated})	$V_{MAX,FMAX}$	m/min	120
Attraction force	F_A	N	20902
Rated force	F_{rated}	N	3280
Rated current	I_{rated}	A	21,4
Maximum velocity (at F_{rated} and U_{rated})	$V_{MAX,Frated}$	m/min	178
Power dissipation at rated force	$P_{V,rated}$	W	1554
Force constant	k_F	N/A	153
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	89
Motor constant at 20 °C	$k_{M,20}$	N/√W	98
Motor constant at 120 °C	$k_{M,120}$	N/√W	83
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	0,9
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	1,2
Electrical inductance of string	$L_{D,q}$	mH	7,6
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	35,6
Mass of secondary part	m_S	kg/m	8,6
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	$10^5 Pa$	6
Maximum pressure drop	Δp	$10^5 Pa$	0,6
Electrical time constant	τ_{el}	ms	8,8
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,1
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	14,1
Rated power	P_{rated}	kW	9,7
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	$2p$	-	18
Protection class	-	-	IP65

4.3.6 LSE10 W 20XX

4.3.6.1 LSE10 W 2004

Technical data (Cat.) Linear motor



Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 2004
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	1690
Maximum current	I_{MAX}	A	12,8
Maximum velocity (at F_{max} and U_{rated})	$V_{MAX,FMAX}$	m/min	120
Attraction force	F_A	N	5169
Rated force	F_{rated}	N	1050
Rated current	I_{rated}	A	6,5
Maximum velocity (at F_{rated} and U_{rated})	$V_{MAX,Frated}$	m/min	160
Power dissipation at rated force	$P_{V,rated}$	W	586
Force constant	k_F	N/A	162
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	93
Motor constant at 20 °C	$k_{M,20}$	N/√W	51
Motor constant at 120 °C	$k_{M,120}$	N/√W	43
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	3,7
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	5,2
Electrical inductance of string	$L_{D,q}$	mH	39,0
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	10,1
Mass of secondary part	m_S	kg/m	17,5
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	10^5 Pa	6
Maximum pressure drop	Δp	10^5 Pa	0,6
Electrical time constant	τ_{el}	ms	10,5
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,2
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	3,4
Rated power	P_{rated}	kW	2,8
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 1 mm
Number of poles	$2p$	-	4
Protection class	-	-	IP65

4.3.6.2 LSE10 W 2006

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 2006
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	2690
Maximum current	I_{MAX}	A	20,8
Maximum velocity (at F_{max} and U_{rated})	$V_{MAX,FMAX}$	m/min	119
Attraction force	F_A	N	7754
Rated force	F_{rated}	N	1470
Rated current	I_{rated}	A	9,3
Maximum velocity (at F_{rated} and U_{rated})	$V_{MAX,Frated}$	m/min	168
Power dissipation at rated force	$P_{V,rated}$	W	759
Force constant	k_F	N/A	157
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	91
Motor constant at 20 °C	$k_{M,20}$	N/√W	63
Motor constant at 120 °C	$k_{M,120}$	N/√W	53
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	2,4
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	3,3
Electrical inductance of string	$L_{D,q}$	mH	23,5
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	15,1
Mass of secondary part	m_S	kg/m	17,5
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	$10^5 Pa$	6
Maximum pressure drop	Δp	$10^5 Pa$	0,6
Electrical time constant	τ_{el}	ms	9,9
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,2
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	5,3
Rated power	P_{rated}	kW	4,1
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 1 mm
Number of poles	$2p$	-	6
Protection class	-	-	IP65

4.3.6.3 LSE10 W 2008

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 2008
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	3690
Maximum current	I_{MAX}	A	28,8
Maximum velocity (at F_{max} and U_{rated})	$V_{MAX,FMAX}$	m/min	120
Attraction force	F_A	N	10338
Rated force	F_{rated}	N	1890
Rated current	I_{rated}	A	12,1
Maximum velocity (at F_{rated} and U_{rated})	$V_{MAX,Frated}$	m/min	173
Power dissipation at rated force	$P_{V,rated}$	W	936
Force constant	k_F	N/A	156
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	90
Motor constant at 20 °C	$k_{M,20}$	N/√W	73
Motor constant at 120 °C	$k_{M,120}$	N/√W	62
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	1,7
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	2,4
Electrical inductance of string	$L_{D,q}$	mH	16,6
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	20,0
Mass of secondary part	m_S	kg/m	17,5
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	$10^5 Pa$	6
Maximum pressure drop	Δp	$10^5 Pa$	0,6
Electrical time constant	τ_{el}	ms	9,7
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,1
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	7,4
Rated power	P_{rated}	kW	5,4
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 1 mm
Number of poles	2p	-	8
Protection class	-	-	IP65

4.3.6.4 LSE10 W 2010

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 2010
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	4680
Maximum current	I_{MAX}	A	37,2
Maximum velocity (at F_{max} and U_{rated})	$V_{MAX,FMAX}$	m/min	122
Attraction force	F_A	N	12923
Rated force	F_{rated}	N	2300
Rated current	I_{rated}	A	15,0
Maximum velocity (at F_{rated} and U_{rated})	$V_{MAX,Frated}$	m/min	177
Power dissipation at rated force	$P_{V,rated}$	W	1105
Force constant	k_F	N/A	153
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	88
Motor constant at 20 °C	$k_{M,20}$	N/√W	82
Motor constant at 120 °C	$k_{M,120}$	N/√W	69
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	1,2
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	1,7
Electrical inductance of string	$L_{D,q}$	mH	13,6
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	25,0
Mass of secondary part	m_S	kg/m	17,5
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	10^5 Pa	6
Maximum pressure drop	Δp	10^5 Pa	0,6
Electrical time constant	τ_{el}	ms	11,0
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,1
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	9,5
Rated power	P_{rated}	kW	6,8
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 1 mm
Number of poles	$2p$	-	10
Protection class	-	-	IP65

4.3.6.5 LSE10 W 2014

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 2014
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	6680
Maximum current	I_{MAX}	A	52,5
Maximum velocity (at F_{max} and U_{rated})	$V_{MAX,FMAX}$	m/min	119
Attraction force	F_A	N	18092
Rated force	F_{rated}	N	3130
Rated current	I_{rated}	A	20,3
Maximum velocity (at F_{rated} and U_{rated})	$V_{MAX,Frated}$	m/min	177
Power dissipation at rated force	$P_{V,rated}$	W	1454
Force constant	k_F	N/A	154
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	89
Motor constant at 20 °C	$k_{M,20}$	N/√W	97
Motor constant at 120 °C	$k_{M,120}$	N/√W	82
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	1,0
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	1,4
Electrical inductance of string	$L_{D,q}$	mH	8,7
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	34,9
Mass of secondary part	m_S	kg/m	17,5
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	$10^5 Pa$	6
Maximum pressure drop	Δp	$10^5 Pa$	0,6
Electrical time constant	τ_{el}	ms	8,9
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,1
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	13,2
Rated power	P_{rated}	kW	9,2
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 1 mm
Number of poles	$2p$	-	14
Protection class	-	-	IP65

4.3.6.6 LSE10 W 2018

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 2018
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	8670
Maximum current	I_{MAX}	A	68,7
Maximum velocity (at F_{max} and U_{rated})	$V_{MAX,FMAX}$	m/min	119
Attraction force	F_A	N	23261
Rated force	F_{rated}	N	3950
Rated current	I_{rated}	A	25,8
Maximum velocity (at F_{rated} and U_{rated})	$V_{MAX,Frated}$	m/min	179
Power dissipation at rated force	$P_{V,rated}$	W	1797
Force constant	k_F	N/A	153
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	89
Motor constant at 20 °C	$k_{M,20}$	N/√W	110
Motor constant at 120 °C	$k_{M,120}$	N/√W	93
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	0,8
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	1,1
Electrical inductance of string	$L_{D,q}$	mH	6,3
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	44,9
Mass of secondary part	m_S	kg/m	17,5
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	10 ⁵ Pa	6
Maximum pressure drop	Δp	10 ⁵ Pa	0,6
Electrical time constant	τ_{el}	ms	8,4
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,1
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	17,3
Rated power	P_{rated}	kW	11,8
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 1 mm
Number of poles	$2p$	-	18
Protection class	-	-	IP65

4.3.7 LSE10 W 26XX

4.3.7.1 LSE10 W 2604

Technical data (Cat.) Linear motor



Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 2604
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	2280
Maximum current	I_{MAX}	A	16,8
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	119
Attraction force	F_A	N	6980
Rated force	F_{rated}	N	1400
Rated current	I_{rated}	A	8,5
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	158
Power dissipation at rated force	$P_{V,rated}$	W	718
Force constant	k_F	N/A	165
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	95
Motor constant at 20 °C	$k_{M,20}$	N/√W	62
Motor constant at 120 °C	$k_{M,120}$	N/√W	52
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	2,8
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	3,8
Electrical inductance of string	$L_{D,q}$	mH	29,8
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	13,2
Mass of secondary part	m_S	kg/m	22,8
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	10^5 Pa	6
Maximum pressure drop	Δp	10^5 Pa	0,6
Electrical time constant	τ_{el}	ms	10,8
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,2
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	4,5
Rated power	P_{rated}	kW	3,7
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 1 mm
Number of poles	$2p$	-	4
Protection class	-	-	IP65

4.3.7.2 LSE10 W 2606

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 2606
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	3630
Maximum current	I_{MAX}	A	27,0
Maximum velocity (at F_{max} and U_{rated})	$V_{MAX,FMAX}$	m/min	118
Attraction force	F_A	N	10470
Rated force	F_{rated}	N	1950
Rated current	I_{rated}	A	11,9
Maximum velocity (at F_{rated} and U_{rated})	$V_{MAX,Frated}$	m/min	164
Power dissipation at rated force	$P_{V,rated}$	W	921
Force constant	k_F	N/A	163
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	94
Motor constant at 20 °C	$k_{M,20}$	N/√W	76
Motor constant at 120 °C	$k_{M,120}$	N/√W	64
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	1,7
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	2,3
Electrical inductance of string	$L_{D,q}$	mH	18,4
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	19,7
Mass of secondary part	m_S	kg/m	22,8
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	10^5 Pa	6
Maximum pressure drop	Δp	10^5 Pa	0,6
Electrical time constant	τ_{el}	ms	11,1
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,1
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	7,1
Rated power	P_{rated}	kW	5,3
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 1 mm
Number of poles	$2p$	-	6
Protection class	-	-	IP65

4.3.7.3 LSE10 W 2608

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 2608
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	4980
Maximum current	I_{MAX}	A	37,2
Maximum velocity (at F_{max} and U_{rated})	$V_{MAX,FMAX}$	m/min	116
Attraction force	F_A	N	13961
Rated force	F_{rated}	N	2500
Rated current	I_{rated}	A	15,4
Maximum velocity (at F_{rated} and U_{rated})	$V_{MAX,Frated}$	m/min	167
Power dissipation at rated force	$P_{V,rated}$	W	1129
Force constant	k_F	N/A	163
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	94
Motor constant at 20 °C	$k_{M,20}$	N/√W	88
Motor constant at 120 °C	$k_{M,120}$	N/√W	74
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	1,2
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	1,7
Electrical inductance of string	$L_{D,q}$	mH	13,1
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	26,2
Mass of secondary part	m_S	kg/m	22,8
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	$10^5 Pa$	6
Maximum pressure drop	Δp	$10^5 Pa$	0,6
Electrical time constant	τ_{el}	ms	10,9
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,1
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	9,7
Rated power	P_{rated}	kW	6,9
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 1 mm
Number of poles	2p	-	8
Protection class	-	-	IP65

4.3.7.4 LSE10 W 2610

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 2610
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	6330
Maximum current	I_{MAX}	A	47,0
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	114
Attraction force	F_A	N	17451
Rated force	F_{rated}	N	3050
Rated current	I_{rated}	A	18,7
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	167
Power dissipation at rated force	$P_{V,rated}$	W	1340
Force constant	k_F	N/A	164
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	94
Motor constant at 20 °C	$k_{M,20}$	N/√W	98
Motor constant at 120 °C	$k_{M,120}$	N/√W	83
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	1,1
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	1,5
Electrical inductance of string	$L_{D,q}$	mH	10,3
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	32,7
Mass of secondary part	m_S	kg/m	22,8
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	$10^5 Pa$	6
Maximum pressure drop	Δp	$10^5 Pa$	0,6
Electrical time constant	τ_{el}	ms	9,4
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,1
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	12,1
Rated power	P_{rated}	kW	8,5
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 1 mm
Number of poles	2p	-	10
Protection class	-	-	IP65

4.3.7.5 LSE10 W 2614

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 2614
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	9020
Maximum current	I_{MAX}	A	68,7
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	118
Attraction force	F_A	N	24431
Rated force	F_{rated}	N	4140
Rated current	I_{rated}	A	26,0
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	173
Power dissipation at rated force	$P_{V,rated}$	W	1755
Force constant	k_F	N/A	159
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	92
Motor constant at 20 °C	$k_{M,20}$	N/√W	117
Motor constant at 120 °C	$k_{M,120}$	N/√W	99
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	0,7
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	1,0
Electrical inductance of string	$L_{D,q}$	mH	6,6
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	45,7
Mass of secondary part	m_S	kg/m	22,8
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	$10^5 Pa$	6
Maximum pressure drop	Δp	$10^5 Pa$	0,6
Electrical time constant	τ_{el}	ms	8,9
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,1
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	17,7
Rated power	P_{rated}	kW	11,9
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 1 mm
Number of poles	2p	-	14
Protection class	-	-	IP65

4.3.7.6 LSE10 W 2618

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 2618
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	11710
Maximum current	I_{MAX}	A	89,3
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	117
Attraction force	F_A	N	31411
Rated force	F_{rated}	N	5220
Rated current	I_{rated}	A	32,8
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	174
Power dissipation at rated force	$P_{V,rated}$	W	2164
Force constant	k_F	N/A	159
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	92
Motor constant at 20 °C	$k_{M,20}$	N/√W	132
Motor constant at 120 °C	$k_{M,120}$	N/√W	112
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	0,5
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	0,7
Electrical inductance of string	$L_{D,q}$	mH	4,8
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	58,7
Mass of secondary part	m_S	kg/m	22,8
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	$10^5 Pa$	6
Maximum pressure drop	Δp	$10^5 Pa$	0,6
Electrical time constant	τ_{el}	ms	9,0
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,1
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	22,9
Rated power	P_{rated}	kW	15,1
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 1 mm
Number of poles	2p	-	18
Protection class	-	-	IP65

4.3.8 LSE10 W 32XX

4.3.8.1 LSE10 W 3204

Technical data (Cat.) Linear motor



Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 3204
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	2880
Maximum current	I_{MAX}	A	20,8
Maximum velocity (at F_{max} and U_{rated})	$V_{MAX,FMAX}$	m/min	118
Attraction force	F_A	N	8791
Rated force	F_{rated}	N	1740
Rated current	I_{rated}	A	10,3
Maximum velocity (at F_{rated} and U_{rated})	$V_{MAX,Frated}$	m/min	156
Power dissipation at rated force	$P_{V,rated}$	W	843
Force constant	k_F	N/A	169
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	97
Motor constant at 20 °C	$k_{M,20}$	N/√W	71
Motor constant at 120 °C	$k_{M,120}$	N/√W	60
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	2,2
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	3,0
Electrical inductance of string	$L_{D,q}$	mH	23,3
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	16,4
Mass of secondary part	m_S	kg/m	28,0
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	$10^5 Pa$	6
Maximum pressure drop	Δp	$10^5 Pa$	0,6
Electrical time constant	τ_{el}	ms	10,7
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,1
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	5,7
Rated power	P_{rated}	kW	4,5
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 1 mm
Number of poles	$2p$	-	4
Protection class	-	-	IP65

4.3.8.2 LSE10 W 3206

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 3206
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	4580
Maximum current	I_{MAX}	A	34,3
Maximum velocity (at F_{max} and U_{rated})	$V_{MAX,FMAX}$	m/min	122
Attraction force	F_A	N	13187
Rated force	F_{rated}	N	2430
Rated current	I_{rated}	A	15,0
Maximum velocity (at F_{rated} and U_{rated})	$V_{MAX,Frated}$	m/min	167
Power dissipation at rated force	$P_{V,rated}$	W	1087
Force constant	k_F	N/A	162
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	94
Motor constant at 20 °C	$k_{M,20}$	N/√W	87
Motor constant at 120 °C	$k_{M,120}$	N/√W	74
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	1,3
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	1,8
Electrical inductance of string	$L_{D,q}$	mH	15,2
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	24,4
Mass of secondary part	m_S	kg/m	28,0
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	$10^5 Pa$	6
Maximum pressure drop	Δp	$10^5 Pa$	0,6
Electrical time constant	τ_{el}	ms	12,1
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,1
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	9,3
Rated power	P_{rated}	kW	6,8
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 1 mm
Number of poles	2p	-	6
Protection class	-	-	IP65

4.3.8.3 LSE10 W 3208

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 3208
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	6270
Maximum current	I_{MAX}	A	47,0
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	120
Attraction force	F_A	N	17583
Rated force	F_{rated}	N	3110
Rated current	I_{rated}	A	19,2
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	169
Power dissipation at rated force	$P_{V,rated}$	W	1327
Force constant	k_F	N/A	162
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	94
Motor constant at 20 °C	$k_{M,20}$	N/√W	101
Motor constant at 120 °C	$k_{M,120}$	N/√W	85
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	1,0
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	1,4
Electrical inductance of string	$L_{D,q}$	mH	10,1
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	32,4
Mass of secondary part	m_S	kg/m	28,0
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	$10^5 Pa$	6
Maximum pressure drop	Δp	$10^5 Pa$	0,6
Electrical time constant	τ_{el}	ms	9,8
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,1
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	12,5
Rated power	P_{rated}	kW	8,7
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 1 mm
Number of poles	2p	-	8
Protection class	-	-	IP65

4.3.8.4 LSE10 W 3210

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 3210
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	7970
Maximum current	I_{MAX}	A	59,5
Maximum velocity (at F_{max} and U_{rated})	$V_{MAX,FMAX}$	m/min	118
Attraction force	F_A	N	21979
Rated force	F_{rated}	N	3790
Rated current	I_{rated}	A	23,3
Maximum velocity (at F_{rated} and U_{rated})	$V_{MAX,Frated}$	m/min	169
Power dissipation at rated force	$P_{V,rated}$	W	1571
Force constant	k_F	N/A	163
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	94
Motor constant at 20 °C	$k_{M,20}$	N/√W	113
Motor constant at 120 °C	$k_{M,120}$	N/√W	96
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	0,8
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	1,1
Electrical inductance of string	$L_{D,q}$	mH	7,8
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	40,4
Mass of secondary part	m_S	kg/m	28,0
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	$10^5 Pa$	6
Maximum pressure drop	Δp	$10^5 Pa$	0,6
Electrical time constant	τ_{el}	ms	9,8
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,1
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	15,7
Rated power	P_{rated}	kW	10,7
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 1 mm
Number of poles	2p	-	10
Protection class	-	-	IP65

4.3.8.5 LSE10 W 3214

Technical data (Cat.)

Linear motor



Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 3214
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	11360
Maximum current	I_{MAX}	A	89,3
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	126
Attraction force	F_A	N	30770
Rated force	F_{rated}	N	5130
Rated current	I_{rated}	A	33,2
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	181
Power dissipation at rated force	$P_{V,rated}$	W	2047
Force constant	k_F	N/A	154
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	89
Motor constant at 20 °C	$k_{M,20}$	N/√W	134
Motor constant at 120 °C	$k_{M,120}$	N/√W	113
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	0,5
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	0,7
Electrical inductance of string	$L_{D,q}$	mH	5,7
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	56,5
Mass of secondary part	m_S	kg/m	28,0
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	$10^5 Pa$	6
Maximum pressure drop	Δp	$10^5 Pa$	0,6
Electrical time constant	τ_{el}	ms	11,6
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,1
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	23,9
Rated power	P_{rated}	kW	15,4
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 1 mm
Number of poles	2p	-	14
Protection class	-	-	IP65

4.3.8.6 LSE10 W 3218

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10W 3218
Type of cooling primary part	-	-	wassergekühlt
Maximum force	F_{MAX}	N	14750
Maximum current	I_{MAX}	A	111,6
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	119
Attraction force	F_A	N	39561
Rated force	F_{rated}	N	6480
Rated current	I_{rated}	A	40,4
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	174
Power dissipation at rated force	$P_{V,rated}$	W	2533
Force constant	k_F	N/A	160
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	93
Motor constant at 20 °C	$k_{M,20}$	N/√W	152
Motor constant at 120 °C	$k_{M,120}$	N/√W	129
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	0,4
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	0,6
Electrical inductance of string	$L_{D,q}$	mH	3,7
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	72,6
Mass of secondary part	m_S	kg/m	28,0
Pole pitch	τ_P	mm	36
Maximum inlet temperature	T	°C	25
Minimum water flow	V_{MIN}	l/min	2,5
Temperatur difference inlet- outlet	$\Delta T_{inlet-outlet}$	°C	10
Maximum inlet pressure	p_{MAX}	$10^5 Pa$	6
Maximum pressure drop	Δp	$10^5 Pa$	0,6
Electrical time constant	τ_{el}	ms	8,9
Thermal time constant	τ_{th}	min	5,0
Thermal resistance	R_{th}	°C/W	0,0
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	29,2
Rated power	P_{rated}	kW	18,8
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 1 mm
Number of poles	2p	-	18
Protection class	-	-	IP 65

4.4 LSE10 F series

4.4.1 LSE10 F 06XX

4.4.1.1 LSE10 F 0604

Technical data (Cat.) Linear motor



Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10F 0604
Type of cooling primary part	-	-	Fremdbelüftung
Maximum force	F_{MAX}	N	320
Maximum current	I_{MAX}	A	3,3
Maximum velocity (at F_{max} and U_{rated})	$V_{MAX,FMAX}$	m/min	120
Attraction force	F_A	N	1094
Rated force	F_{rated}	N	180
Rated current	I_{rated}	A	1,5
Maximum velocity (at F_{rated} and U_{rated})	$V_{MAX,Frated}$	m/min	205
Power dissipation at rated force	$P_{V,rated}$	W	188
Force constant	k_F	N/A	118
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	68
Motor constant at 20 °C	$k_{M,20}$	N/√W	15
Motor constant at 120 °C	$k_{M,120}$	N/√W	13
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	21,5
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	29,9
Electrical inductance of string	$L_{D,q}$	mH	112,6
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	2,2
Mass of secondary part	m_S	kg/m	3,6
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T	°C	40
DC - axial flow fan serie 610	type		614NHH
Dimensions	volume	mm ³	Ø 60 * 25
Power consumption	P	watt	3
Volume flow	V	m ³ / h	56
Electrical time constant	τ_{el}	ms	5,3
Thermal time constant	τ_{th}	min	12,0
Thermal resistance	R_{th}	°C/W	0,5
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	0,6
Rated power	P_{rated}	kW	0,6
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	4
Protection class	-	-	IP 65

4.4.1.2 LSE10 F 0606

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10F 0606
Type of cooling primary part	-	-	Fremdbelüftung
Maximum force	F_{MAX}	N	510
Maximum current	I_{MAX}	A	5,5
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	121
Attraction force	F_A	N	1641
Rated force	F_{rated}	N	265
Rated current	I_{rated}	A	2,3
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	216
Power dissipation at rated force	$P_{V,rated}$	W	269
Force constant	k_F	N/A	114
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	66
Motor constant at 20 °C	$k_{M,20}$	N/√W	19
Motor constant at 120 °C	$k_{M,120}$	N/√W	16
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	12,3
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	17,1
Electrical inductance of string	$L_{D,q}$	mH	68,9
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	3,3
Mass of secondary part	m_S	kg/m	3,6
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T	°C	40
DC - axial flow fan serie 610	type		614NHH
Dimensions	volume	mm ³	Ø 60 * 25
Power consumption	P	watt	3
Volume flow	V	m ³ / h	56
Electrical time constant	τ_{el}	ms	5,6
Thermal time constant	τ_{th}	min	12,0
Thermal resistance	R_{th}	°C/W	0,4
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	1,0
Rated power	P_{rated}	kW	1,0
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	6
Protection class	-	-	IP 65

4.4.1.3 LSE10 F 0608

Technical data (Cat.)

Linear motor



Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10F 0608
Type of cooling primary part	-	-	Fremdbelüftung
Maximum force	F_{MAX}	N	700
Maximum current	I_{MAX}	A	7,8
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	121
Attraction force	F_A	N	2188
Rated force	F_{rated}	N	350
Rated current	I_{rated}	A	3,2
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	226
Power dissipation at rated force	$P_{V,rated}$	W	351
Force constant	k_F	N/A	110
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	64
Motor constant at 20 °C	$k_{M,20}$	N/√W	22
Motor constant at 120 °C	$k_{M,120}$	N/√W	19
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	8,4
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	11,7
Electrical inductance of string	$L_{D,q}$	mH	47,9
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	4,4
Mass of secondary part	m_S	kg/m	3,6
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T	°C	40
DC - axial flow fan serie 610	type		614NHH
Dimensions	volume	mm ³	Ø 60 * 25
Power consumption	P	watt	3
Volume flow	V	m ³ / h	56
Electrical time constant	τ_{el}	ms	5,7
Thermal time constant	τ_{th}	min	12,0
Thermal resistance	R_{th}	°C/W	0,3
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	1,4
Rated power	P_{rated}	kW	1,3
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	8
Protection class	-	-	IP 65

4.4.1.4 LSE10 F 0610

Technical data (Cat.)

Linear motor



Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10F 0610
Type of cooling primary part	-	-	Fremdbelüftung
Maximum force	F_{MAX}	N	890
Maximum current	I_{MAX}	A	9,8
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	120
Attraction force	F_A	N	2734
Rated force	F_{rated}	N	430
Rated current	I_{rated}	A	3,9
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	226
Power dissipation at rated force	$P_{V,rated}$	W	421
Force constant	k_F	N/A	111
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	64
Motor constant at 20 °C	$k_{M,20}$	N/√W	25
Motor constant at 120 °C	$k_{M,120}$	N/√W	21
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	6,9
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	9,6
Electrical inductance of string	$L_{D,q}$	mH	37,9
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	5,5
Mass of secondary part	m_S	kg/m	3,6
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T	°C	40
DC - axial flow fan serie 610	type		614NHH
Dimensions	volume	mm ³	Ø 60 * 25
Power consumption	P	watt	3
Volume flow	V	m ³ / h	56
Electrical time constant	τ_{el}	ms	5,5
Thermal time constant	τ_{th}	min	12,0
Thermal resistance	R_{th}	°C/W	0,2
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	1,8
Rated power	P_{rated}	kW	1,6
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	10
Protection class	-	-	IP 65

4.4.1.5 LSE10 F 0614

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10F 0614
Type of cooling primary part	-	-	Fremdbelüftung
Maximum force	F_{MAX}	N	1270
Maximum current	I_{MAX}	A	13,9
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	119
Attraction force	F_A	N	3828
Rated force	F_{rated}	N	595
Rated current	I_{rated}	A	5,3
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	227
Power dissipation at rated force	$P_{V,rated}$	W	573
Force constant	k_F	N/A	111
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	64
Motor constant at 20 °C	$k_{M,20}$	N/√W	29
Motor constant at 120 °C	$k_{M,120}$	N/√W	25
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	4,9
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	6,8
Electrical inductance of string	$L_{D,q}$	mH	26,3
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	7,6
Mass of secondary part	m_S	kg/m	3,6
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T	°C	40
DC - axial flow fan serie 610	type		614NHH
Dimensions	volume	mm ³	Ø 60 * 25
Power consumption	P	watt	3
Volume flow	V	m ³ / h	56
Electrical time constant	τ_{el}	ms	5,4
Thermal time constant	τ_{th}	min	12,0
Thermal resistance	R_{th}	°C/W	0,2
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	2,5
Rated power	P_{rated}	kW	2,3
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	14
Protection class	-	-	IP 65

4.4.1.6 LSE10 F 0618

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10F 0618
Type of cooling primary part	-	-	Fremdbelüftung
Maximum force	F_{MAX}	N	1660
Maximum current	I_{MAX}	A	18,2
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	118
Attraction force	F_A	N	4922
Rated force	F_{rated}	N	760
Rated current	I_{rated}	A	6,9
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	229
Power dissipation at rated force	$P_{V,rated}$	W	725
Force constant	k_F	N/A	111
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	64
Motor constant at 20 °C	$k_{M,20}$	N/√W	33
Motor constant at 120 °C	$k_{M,120}$	N/√W	28
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	3,9
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	5,4
Electrical inductance of string	$L_{D,q}$	mH	20,1
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	9,8
Mass of secondary part	m_S	kg/m	3,6
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T	°C	40
DC - axial flow fan serie 610	type		614NHH
Dimensions	volume	mm ³	Ø 60 * 25
Power consumption	P	watt	3
Volume flow	V	m ³ / h	56
Electrical time constant	τ_{el}	ms	5,2
Thermal time constant	τ_{th}	min	12,0
Thermal resistance	R_{th}	°C/W	0,1
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	3,3
Rated power	P_{rated}	kW	2,9
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	18
Protection class	-	-	IP 65

4.4.2 LSE10 F 08XX

4.4.2.1 LSE10 F 0804

Technical data (Cat.) Linear motor



Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10F 0804
Type of cooling primary part	-	-	Fremdbelüftung
Maximum force	F_{MAX}	N	530
Maximum current	I_{MAX}	A	4,8
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	120
Attraction force	F_A	N	1804
Rated force	F_{rated}	N	300
Rated current	I_{rated}	A	2,2
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	185
Power dissipation at rated force	$P_{V,rated}$	W	233
Force constant	k_F	N/A	136
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	79
Motor constant at 20 °C	$k_{M,20}$	N/√W	23
Motor constant at 120 °C	$k_{M,120}$	N/√W	20
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	12,9
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	17,9
Electrical inductance of string	$L_{D,q}$	mH	87,5
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	3,1
Mass of secondary part	m_S	kg/m	5,1
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T	°C	40
DC - axial flow fan serie 610	type		8314H
Dimensions	volume	mm ³	Ø 80 * 32
Power consumption	P	watt	6
Volume flow	V	m ³ / h	80
Electrical time constant	τ_{el}	ms	6,8
Thermal time constant	τ_{th}	min	12,0
Thermal resistance	R_{th}	°C/W	0,4
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	1,1
Rated power	P_{rated}	kW	0,9
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	4
Protection class	-	-	IP 65

4.4.2.2 LSE10 F 0806

Technische Daten (Kat.)
Linearmotor


Motorparameter	Symbol	Einheit	Wert
Motortyp	-	-	LSE10F 0806
Kühlart Primärteil	-	-	Fremdbelüftung
Spitzenschubkraft	F_{MAX}	N	840
Spitzenstrom	I_{MAX}	A	7,8
max. Geschwindigkeit bei F_{max} und Bemessungsspannung	$V_{MAX,FMAX}$	m/min	118
Anziehungskraft	F_A	N	2706
Bemessungsschubkraft	F_N	N	430
Bemessungsstrom	I_N	A	3,2
max. Geschwindigkeit bei F_N und Bemessungsspannung	$V_{MAX,FN}$	m/min	193
Verlustleistung	$P_{V,N}$	W	317
Schubkraftkonstante	k_F	N/A	133
Spannungskonstante	$k_{E,verkettet}$	Vs/m	77
Motorkonstante, kalt	$k_{M,20}$	N/√W	28
Motorkonstante, 120 °C	$k_{M,120}$	N/√W	24
Strangwiderstand bei 20 °C	$R_{str,20}$	Ω	7,4
Strangwiderstand bei 120 °C	$R_{str,120}$	Ω	10,3
Stranginduktivität	$L_{D,q}$	mH	52,9
Max. zul. mittlere Wicklungstemperatur	$T_{Wicklung,MAX}$	°C	140
Masse Primärteil	m_P	kg	4,6
Masse Sekundärteil	m_S	kg/m	5,1
Polteilung	τ_P	mm	36
Umgebungstemperatur	T_{Raum}	°C	40
DC - Axiallüfter Serie 8300	Typ		8314H
Abmessungen	Volumen	mm ³	Ø 80 * 32
Leistungsaufnahme	P_{auf}	Watt	6
Volumenstrom	V	m ³ / h	80
Elektrische Zeitkonstante	τ_{el}	ms	7,1
Thermische Zeitkonstante	τ_{th}	min	12,0
Thermischer Widerstand	R_{th}	°C/W	0,3
Bemessungsspannung, 3~	U_N	V	380
Cogging Schubkraft	F_C / F_N	%	± 3,5
Spitzenleistung	P_{peak}	kW	1,7
Bemessungsleistung	P_N	kW	1,4
lichter Luftspalt	δ_{licht}	mm	licht. 0,6 mm
Polzahl	2p	-	6
Schutzart	-	-	IP 65

4.4.2.3 LSE10 F 0808

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10F 0808
Type of cooling primary part	-	-	Fremdbelüftung
Maximum force	F_{MAX}	N	1160
Maximum current	I_{MAX}	A	10,8
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	120
Attraction force	F_A	N	3608
Rated force	F_{rated}	N	560
Rated current	I_{rated}	A	4,3
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	198
Power dissipation at rated force	$P_{V,rated}$	W	401
Force constant	k_F	N/A	131
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	76
Motor constant at 20 °C	$k_{M,20}$	N/√W	33
Motor constant at 120 °C	$k_{M,120}$	N/√W	28
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	5,4
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	7,5
Electrical inductance of string	$L_{D,q}$	mH	38,8
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	6,1
Mass of secondary part	m_S	kg/m	5,1
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T	°C	40
DC - axial flow fan serie 610	type		8314H
Dimensions	volume	mm ³	Ø 80 * 32
Power consumption	P	watt	6
Volume flow	V	m ³ / h	80
Electrical time constant	τ_{el}	ms	7,2
Thermal time constant	τ_{th}	min	12,0
Thermal resistance	R_{th}	°C/W	0,2
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	2,3
Rated power	P_{rated}	kW	1,8
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	8
Protection class	-	-	IP 65

4.4.2.4 LSE10 F 0810

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10F 0810
Type of cooling primary part	-	-	Fremdbelüftung
Maximum force	F_{MAX}	N	1470
Maximum current	I_{MAX}	A	13,7
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	118
Attraction force	F_A	N	4510
Rated force	F_{rated}	N	700
Rated current	I_{rated}	A	5,4
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	199
Power dissipation at rated force	$P_{V,rated}$	W	499
Force constant	k_F	N/A	131
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	75
Motor constant at 20 °C	$k_{M,20}$	N/√W	37
Motor constant at 120 °C	$k_{M,120}$	N/√W	31
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	4,2
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	5,9
Electrical inductance of string	$L_{D,q}$	mH	29,5
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	7,6
Mass of secondary part	m_S	kg/m	5,1
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T	°C	40
DC - axial flow fan serie 610	type		8314H
Dimensions	volume	mm ³	Ø 80 * 32
Power consumption	P	watt	6
Volume flow	V	m ³ / h	80
Electrical time constant	τ_{el}	ms	6,9
Thermal time constant	τ_{th}	min	12,0
Thermal resistance	R_{th}	°C/W	0,2
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	2,9
Rated power	P_{rated}	kW	2,3
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	10
Protection class	-	-	IP 65

4.4.2.5 LSE10 F 0814

Technical data (Cat.)

Linear motor



Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10F 0814
Type of cooling primary part	-	-	Fremdbelüftung
Maximum force	F_{MAX}	N	2100
Maximum current	I_{MAX}	A	19,8
Maximum velocity (at F_{max} and U_{rated})	$V_{MAX,FMAX}$	m/min	121
Attraction force	F_A	N	6314
Rated force	F_{rated}	N	960
Rated current	I_{rated}	A	7,4
Maximum velocity (at F_{rated} and U_{rated})	$V_{MAX,Frated}$	m/min	204
Power dissipation at rated force	$P_{V,rated}$	W	666
Force constant	k_F	N/A	129
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	74
Motor constant at 20 °C	$k_{M,20}$	N/√W	44
Motor constant at 120 °C	$k_{M,120}$	N/√W	37
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	3,0
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	4,2
Electrical inductance of string	$L_{D,q}$	mH	20,9
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	10,6
Mass of secondary part	m_S	kg/m	5,1
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T	°C	40
DC - axial flow fan serie 610	type		8314H
Dimensions	volume	mm ³	Ø 80 * 32
Power consumption	P	watt	6
Volume flow	V	m ³ / h	80
Electrical time constant	τ_{el}	ms	6,9
Thermal time constant	τ_{th}	min	12,0
Thermal resistance	R_{th}	°C/W	0,2
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	4,2
Rated power	P_{rated}	kW	3,3
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	14
Protection class	-	-	IP 65

4.4.2.6 LSE10 F 0818

Technical data (Cat.)

Linear motor



Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10F 0818
Type of cooling primary part	-	-	Fremdbelüftung
Maximum force	F_{MAX}	N	2730
Maximum current	I_{MAX}	A	25,5
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	117
Attraction force	F_A	N	8118
Rated force	F_{rated}	N	1230
Rated current	I_{rated}	A	9,4
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	202
Power dissipation at rated force	$P_{V,rated}$	W	849
Force constant	k_F	N/A	130
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	75
Motor constant at 20 °C	$k_{M,20}$	N/√W	50
Motor constant at 120 °C	$k_{M,120}$	N/√W	42
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	2,5
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	3,4
Electrical inductance of string	$L_{D,q}$	mH	15,6
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	13,6
Mass of secondary part	m_S	kg/m	5,1
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T	°C	40
DC - axial flow fan serie 610	type		8314H
Dimensions	volume	mm ³	Ø 80 * 32
Power consumption	P	watt	6
Volume flow	V	m ³ / h	80
Electrical time constant	τ_{el}	ms	6,3
Thermal time constant	τ_{th}	min	12,0
Thermal resistance	R_{th}	°C/W	0,1
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	5,3
Rated power	P_{rated}	kW	4,1
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	18
Protection class	-	-	IP 65

4.4.3 LSE10 F 10XX

4.4.3.1 LSE10 F 1004

Technical data (Cat.) Linear motor



Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10F 1004
Type of cooling primary part	-	-	Fremdbelüftung
Maximum force	F_{MAX}	N	740
Maximum current	I_{MAX}	A	6,2
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	120
Attraction force	F_A	N	2514
Rated force	F_{rated}	N	410
Rated current	I_{rated}	A	2,8
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	177
Power dissipation at rated force	$P_{V,rated}$	W	264
Force constant	k_F	N/A	146
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	84
Motor constant at 20 °C	$k_{M,20}$	N/√W	30
Motor constant at 120 °C	$k_{M,120}$	N/√W	25
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	8,5
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	11,8
Electrical inductance of string	$L_{D,q}$	mH	70,5
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	3,9
Mass of secondary part	m_S	kg/m	6,6
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T	°C	40
DC - axial flow fan serie 610	type		3314 H
Dimensions	volume	mm ³	Ø 92 * 32
Power consumption	P	watt	5
Volume flow	V	m ³ / h	107
Electrical time constant	τ_{el}	ms	8,3
Thermal time constant	τ_{th}	min	12,0
Thermal resistance	R_{th}	°C/W	0,4
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	1,5
Rated power	P_{rated}	kW	1,2
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	4
Protection class	-	-	IP 65

4.4.3.2 LSE10 F 1006

Technical data (Cat.)

Linear motor



Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10F 1006
Type of cooling primary part	-	-	Fremdbelüftung
Maximum force	F_{MAX}	N	1180
Maximum current	I_{MAX}	A	10,0
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	119
Attraction force	F_A	N	3771,4
Rated force	F_{rated}	N	590
Rated current	I_{rated}	A	4,1
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	184
Power dissipation at rated force	$P_{V,rated}$	W	362
Force constant	k_F	N/A	143
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	83
Motor constant at 20 °C	$k_{M,20}$	N/√W	37
Motor constant at 120 °C	$k_{M,120}$	N/√W	31
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	5,5
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	7,6
Electrical inductance of string	$L_{D,q}$	mH	43,4
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	5,9
Mass of secondary part	m_S	kg/m	6,6
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T	°C	40
DC - axial flow fan serie 610	type		3314 H
Dimensions	volume	mm ³	Ø 92 * 32
Power consumption	P	watt	5
Volume flow	V	m ³ / h	107
Electrical time constant	τ_{el}	ms	7,9
Thermal time constant	τ_{th}	min	12,0
Thermal resistance	R_{th}	°C/W	0,3
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	2,3
Rated power	P_{rated}	kW	1,8
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	6
Protection class	-	-	IP 65

4.4.3.3 LSE10 F 1008

Technical data (Cat.)

Linear motor



Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10F 1008
Type of cooling primary part	-	-	Fremdbelüftung
Maximum force	F_{MAX}	N	1620
Maximum current	I_{MAX}	A	13,9
Maximum velocity (at F_{max} and U_{rated})	$V_{MAX,FMAX}$	m/min	121
Attraction force	F_A	N	5028
Rated force	F_{rated}	N	770
Rated current	I_{rated}	A	5,5
Maximum velocity (at F_{rated} and U_{rated})	$V_{MAX,Frated}$	m/min	189
Power dissipation at rated force	$P_{V,rated}$	W	459
Force constant	k_F	N/A	141
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	82
Motor constant at 20 °C	$k_{M,20}$	N/√W	42
Motor constant at 120 °C	$k_{M,120}$	N/√W	36
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	3,9
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	5,4
Electrical inductance of string	$L_{D,q}$	mH	31,8
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	7,8
Mass of secondary part	m_S	kg/m	6,6
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T	°C	40
DC - axial flow fan serie 610	type		3314 H
Dimensions	volume	mm ³	Ø 92 * 32
Power consumption	P	watt	5
Volume flow	V	m ³ / h	107
Electrical time constant	τ_{el}	ms	8,2
Thermal time constant	τ_{th}	min	12,0
Thermal resistance	R_{th}	°C/W	0,2
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	3,3
Rated power	P_{rated}	kW	2,4
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	$2p$	-	8
Protection class	-	-	IP 65

4.4.3.4 LSE10 F 1010

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10F 1010
Type of cooling primary part	-	-	Fremdbelüftung
Maximum force	F_{MAX}	N	2060
Maximum current	I_{MAX}	A	17,9
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	121
Attraction force	F_A	N	6286
Rated force	F_{rated}	N	950
Rated current	I_{rated}	A	6,8
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	191
Power dissipation at rated force	$P_{V,rated}$	W	556
Force constant	k_F	N/A	140
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	81
Motor constant at 20 °C	$k_{M,20}$	N/√W	48
Motor constant at 120 °C	$k_{M,120}$	N/√W	40
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	3,1
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	4,3
Electrical inductance of string	$L_{D,q}$	mH	24,8
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	9,7
Mass of secondary part	m_S	kg/m	6,6
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T	°C	40
DC - axial flow fan serie 610	type		3314 H
Dimensions	volume	mm ³	Ø 92 * 32
Power consumption	P	watt	5
Volume flow	V	m ³ / h	107
Electrical time constant	τ_{el}	ms	8,1
Thermal time constant	τ_{th}	min	12,0
Thermal resistance	R_{th}	°C/W	0,2
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	4,2
Rated power	P_{rated}	kW	3,0
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	10
Protection class	-	-	IP 65

4.4.3.5 LSE10 F 1014

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10F 1014
Type of cooling primary part	-	-	Fremdbelüftung
Maximum force	F_{MAX}	N	2930
Maximum current	I_{MAX}	A	25,5
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	120
Attraction force	F_A	N	8800
Rated force	F_{rated}	N	1320
Rated current	I_{rated}	A	9,4
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	192
Power dissipation at rated force	$P_{V,rated}$	W	764
Force constant	k_F	N/A	140
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	81
Motor constant at 20 °C	$k_{M,20}$	N/√W	56
Motor constant at 120 °C	$k_{M,120}$	N/√W	48
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	2,2
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	3,1
Electrical inductance of string	$L_{D,q}$	mH	17,4
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	13,6
Mass of secondary part	m_S	kg/m	6,6
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T	°C	40
DC - axial flow fan serie 610	type		3314 H
Dimensions	volume	mm ³	Ø 92 * 32
Power consumption	P	watt	5
Volume flow	V	m ³ / h	107
Electrical time constant	τ_{el}	ms	7,8
Thermal time constant	τ_{th}	min	12,0
Thermal resistance	R_{th}	°C/W	0,1
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	5,8
Rated power	P_{rated}	kW	4,2
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	14
Protection class	-	-	IP 65

4.4.3.6 LSE10 F 1018

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10F 1018
Type of cooling primary part	-	-	Fremdbelüftung
Maximum force	F_{MAX}	N	3810
Maximum current	I_{MAX}	A	33,1
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	119
Attraction force	F_A	N	11314
Rated force	F_{rated}	N	1680
Rated current	I_{rated}	A	12,0
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	192
Power dissipation at rated force	$P_{V,rated}$	W	959
Force constant	k_F	N/A	140
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	81
Motor constant at 20 °C	$k_{M,20}$	N/√W	64
Motor constant at 120 °C	$k_{M,120}$	N/√W	54
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	1,8
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	2,5
Electrical inductance of string	$L_{D,q}$	mH	12,5
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	17,5
Mass of secondary part	m_S	kg/m	6,6
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T	°C	40
DC - axial flow fan serie 610	type		3314 H
Dimensions	volume	mm ³	Ø 92 * 32
Power consumption	P	watt	5
Volume flow	V	m ³ / h	107
Electrical time constant	τ_{el}	ms	6,9
Thermal time constant	τ_{th}	min	12,0
Thermal resistance	R_{th}	°C/W	0,1
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	7,6
Rated power	P_{rated}	kW	5,4
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	18
Protection class	-	-	IP 65

4.4.4 LSE10 F 13XX

4.4.4.1 LSE10 F 1304

Technical data (Cat.) Linear motor



Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10F 1304
Type of cooling primary part	-	-	Fremdbelüftung
Maximum force	F_{MAX}	N	1060
Maximum current	I_{MAX}	A	8,3
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	120
Attraction force	F_A	N	3580
Rated force	F_{rated}	N	580
Rated current	I_{rated}	A	3,7
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	169
Power dissipation at rated force	$P_{V,rated}$	W	319
Force constant	k_F	N/A	156
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	90
Motor constant at 20 °C	$k_{M,20}$	N/√W	38
Motor constant at 120 °C	$k_{M,120}$	N/√W	32
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	6,2
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	8,6
Electrical inductance of string	$L_{D,q}$	mH	55,7
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	5,2
Mass of secondary part	m_S	kg/m	8,9
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T	°C	40
DC - axial flow fan serie 610	type		4112NHH
Dimensions	volume	mm ³	Ø 119 * 38
Power consumption	P	watt	16
Volume flow	V	m ³ / h	270
Electrical time constant	τ_{el}	ms	9,1
Thermal time constant	τ_{th}	min	12,0
Thermal resistance	R_{th}	°C/W	0,3
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	2,1
Rated power	P_{rated}	kW	1,6
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	$2p$	-	4
Protection class	-	-	IP 65

4.4.4.2 LSE10 F 1306

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10F 1306
Type of cooling primary part	-	-	Fremdbelüftung
Maximum force	F_{MAX}	N	1680
Maximum current	I_{MAX}	A	13,5
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	121
Attraction force	F_A	N	5369
Rated force	F_{rated}	N	830
Rated current	I_{rated}	A	5,5
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	178
Power dissipation at rated force	$P_{V,rated}$	W	432
Force constant	k_F	N/A	151
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	87
Motor constant at 20 °C	$k_{M,20}$	N/√W	47
Motor constant at 120 °C	$k_{M,120}$	N/√W	40
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	3,5
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	4,9
Electrical inductance of string	$L_{D,q}$	mH	34,5
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	7,8
Mass of secondary part	m_S	kg/m	8,9
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T	°C	40
DC - axial flow fan serie 610	type		4112NHH
Dimensions	volume	mm ³	Ø 119 * 38
Power consumption	P	watt	16
Volume flow	V	m ³ / h	270
Electrical time constant	τ_{el}	ms	9,8
Thermal time constant	τ_{th}	min	12,0
Thermal resistance	R_{th}	°C/W	0,2
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	3,4
Rated power	P_{rated}	kW	2,5
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	6
Protection class	-	-	IP 65

4.4.4.3 LSE10 F 1308

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10F 1308
Type of cooling primary part	-	-	Fremdbelüftung
Maximum force	F_{MAX}	N	2310
Maximum current	I_{MAX}	A	18,6
Maximum velocity (at F_{max} and U_{rated})	$V_{MAX,FMAX}$	m/min	119
Attraction force	F_A	N	7159
Rated force	F_{rated}	N	1080
Rated current	I_{rated}	A	7,2
Maximum velocity (at F_{rated} and U_{rated})	$V_{MAX,Frated}$	m/min	180
Power dissipation at rated force	$P_{V,rated}$	W	546
Force constant	k_F	N/A	151
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	87
Motor constant at 20 °C	$k_{M,20}$	N/√W	55
Motor constant at 120 °C	$k_{M,120}$	N/√W	46
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	2,8
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	4,0
Electrical inductance of string	$L_{D,q}$	mH	24,2
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	10,4
Mass of secondary part	m_S	kg/m	8,9
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T	°C	40
DC - axial flow fan serie 610	type		4112NHH
Dimensions	volume	mm ³	Ø 119 * 38
Power consumption	P	watt	16
Volume flow	V	m ³ / h	270
Electrical time constant	τ_{el}	ms	8,5
Thermal time constant	τ_{th}	min	12,0
Thermal resistance	R_{th}	°C/W	0,2
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	4,6
Rated power	P_{rated}	kW	3,2
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	$2p$	-	8
Protection class	-	-	IP 65

4.4.4.4 LSE10 F 1310

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10F 1310
Type of cooling primary part	-	-	Fremdbelüftung
Maximum force	F_{MAX}	N	2930
Maximum current	I_{MAX}	A	23,5
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	118
Attraction force	F_A	N	8949
Rated force	F_{rated}	N	1340
Rated current	I_{rated}	A	8,8
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	179
Power dissipation at rated force	$P_{V,rated}$	W	669
Force constant	k_F	N/A	152
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	88
Motor constant at 20 °C	$k_{M,20}$	N/√W	61
Motor constant at 120 °C	$k_{M,120}$	N/√W	52
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	2,3
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	3,3
Electrical inductance of string	$L_{D,q}$	mH	19,2
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	12,9
Mass of secondary part	m_S	kg/m	8,9
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T	°C	40
DC - axial flow fan serie 610	type		4112NHH
Dimensions	volume	mm ³	Ø 119 * 38
Power consumption	P	watt	16
Volume flow	V	m ³ / h	270
Electrical time constant	τ_{el}	ms	8,2
Thermal time constant	τ_{th}	min	12,0
Thermal resistance	R_{th}	°C/W	0,1
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	5,8
Rated power	P_{rated}	kW	4,0
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	10
Protection class	-	-	IP 65

4.4.4.5 LSE10 F 1314

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10F 1314
Type of cooling primary part	-	-	Fremdbelüftung
Maximum force	F_{MAX}	N	4180
Maximum current	I_{MAX}	A	34,3
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	122
Attraction force	F_A	N	12529
Rated force	F_{rated}	N	1840
Rated current	I_{rated}	A	12,4
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	185
Power dissipation at rated force	$P_{V,rated}$	W	897
Force constant	k_F	N/A	148
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	85
Motor constant at 20 °C	$k_{M,20}$	N/√W	72
Motor constant at 120 °C	$k_{M,120}$	N/√W	61
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	1,5
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	2,1
Electrical inductance of string	$L_{D,q}$	mH	13,6
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	18,1
Mass of secondary part	m_S	kg/m	8,9
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T	°C	40
DC - axial flow fan serie 610	type		4112NHH
Dimensions	volume	mm ³	Ø 119 * 38
Power consumption	P	watt	16
Volume flow	V	m ³ / h	270
Electrical time constant	τ_{el}	ms	9,2
Thermal time constant	τ_{th}	min	12,0
Thermal resistance	R_{th}	°C/W	0,1
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	8,5
Rated power	P_{rated}	kW	5,7
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	14
Protection class	-	-	IP 65

4.4.4.6 LSE10 F 1318

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10F 1318
Type of cooling primary part	-	-	Fremdbelüftung
Maximum force	F_{MAX}	N	5430
Maximum current	I_{MAX}	A	44,6
Maximum velocity (at F_{max} and U_{rated})	$V_{MAX,FMAX}$	m/min	121
Attraction force	F_A	N	16108
Rated force	F_{rated}	N	2350
Rated current	I_{rated}	A	15,9
Maximum velocity (at F_{rated} and U_{rated})	$V_{MAX,Frated}$	m/min	186
Power dissipation at rated force	$P_{V,rated}$	W	1135
Force constant	k_F	N/A	148
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	85
Motor constant at 20 °C	$k_{M,20}$	N/√W	82
Motor constant at 120 °C	$k_{M,120}$	N/√W	70
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	1,2
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	1,7
Electrical inductance of string	$L_{D,q}$	mH	10,5
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	23,2
Mass of secondary part	m_S	kg/m	8,9
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T	°C	40
DC - axial flow fan serie 610	type		4112NHH
Dimensions	volume	mm ³	Ø119 * 38
Power consumption	P	watt	16
Volume flow	V	m ³ / h	270
Electrical time constant	τ_{el}	ms	8,8
Thermal time constant	τ_{th}	min	12,0
Thermal resistance	R_{th}	°C/W	0,1
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	10,9
Rated power	P_{rated}	kW	7,3
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	18
Protection class	-	-	IP 65

4.4.5 LSE10 F 16XX

4.4.5.1 LSE10 F 1604

Technical data (Cat.) Linear motor



Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10F 1604
Type of cooling primary part	-	-	Fremdbelüftung
Maximum force	F_{MAX}	N	1370
Maximum current	I_{MAX}	A	10,3
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	119
Attraction force	F_A	N	4645
Rated force	F_{rated}	N	735
Rated current	I_{rated}	A	4,5
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	164
Power dissipation at rated force	$P_{V,rated}$	W	361
Force constant	k_F	N/A	163
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	94
Motor constant at 20 °C	$k_{M,20}$	N/√W	46
Motor constant at 120 °C	$k_{M,120}$	N/√W	39
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	4,7
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	6,6
Electrical inductance of string	$L_{D,q}$	mH	45,4
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	6,5
Mass of secondary part	m_S	kg/m	11,2
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T	°C	40
DC - axial flow fan serie 610	type		7114 NH
Dimensions	volume	mm ³	Ø150 * 38
Power consumption	P	watt	19
Volume flow	V	m ³ / h	420
Electrical time constant	τ_{el}	ms	9,6
Thermal time constant	τ_{th}	min	12,0
Thermal resistance	R_{th}	°C/W	0,3
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	2,7
Rated power	P_{rated}	kW	2,0
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	4
Protection class	-	-	IP 65

4.4.5.2 LSE10 F 1606

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10F 1606
Type of cooling primary part	-	-	Fremdbelüftung
Maximum force	F_{MAX}	N	2180
Maximum current	I_{MAX}	A	16,8
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	120
Attraction force	F_A	N	6967
Rated force	F_{rated}	N	1060
Rated current	I_{rated}	A	6,7
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	173
Power dissipation at rated force	$P_{V,rated}$	W	496
Force constant	k_F	N/A	158
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	91
Motor constant at 20 °C	$k_{M,20}$	N/√W	56
Motor constant at 120 °C	$k_{M,120}$	N/√W	48
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	3,0
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	4,2
Electrical inductance of string	$L_{D,q}$	mH	27,6
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	9,7
Mass of secondary part	m_S	kg/m	8,6
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T	°C	40
DC - axial flow fan serie 610	type		7114 NH
Dimensions	volume	mm ³	Ø150 * 38
Power consumption	P	watt	19
Volume flow	V	m ³ / h	420
Electrical time constant	τ_{el}	ms	9,2
Thermal time constant	τ_{th}	min	12,0
Thermal resistance	R_{th}	°C/W	0,2
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	4,4
Rated power	P_{rated}	kW	3,1
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	6
Protection class	-	-	IP 65

4.4.5.3 LSE10 F 1608

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10F 1608
Type of cooling primary part	-	-	Fremdbelüftung
Maximum force	F_{MAX}	N	2990
Maximum current	I_{MAX}	A	23,5
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	122
Attraction force	F_A	N	9290
Rated force	F_{rated}	N	1380
Rated current	I_{rated}	A	8,9
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	177
Power dissipation at rated force	$P_{V,rated}$	W	626
Force constant	k_F	N/A	155
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	89
Motor constant at 20 °C	$k_{M,20}$	N/√W	65
Motor constant at 120 °C	$k_{M,120}$	N/√W	55
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	2,2
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	3,0
Electrical inductance of string	$L_{D,q}$	mH	20,4
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	12,9
Mass of secondary part	m_S	kg/m	11,2
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T	°C	40
DC - axial flow fan serie 610	type		7114 NH
Dimensions	volume	mm ³	Ø150 * 38
Power consumption	P	watt	19
Volume flow	V	m ³ / h	420
Electrical time constant	τ_{el}	ms	9,4
Thermal time constant	τ_{th}	min	12,0
Thermal resistance	R_{th}	°C/W	0,2
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	6,1
Rated power	P_{rated}	kW	4,1
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	8
Protection class	-	-	IP 65

4.4.5.4 LSE10 F 1610

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10F 1610
Type of cooling primary part	-	-	Fremdbelüftung
Maximum force	F_{MAX}	N	3800
Maximum current	I_{MAX}	A	29,8
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	120
Attraction force	F_A	N	11612
Rated force	F_{rated}	N	1700
Rated current	I_{rated}	A	10,9
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	178
Power dissipation at rated force	$P_{V,rated}$	W	758
Force constant	k_F	N/A	155
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	90
Motor constant at 20 °C	$k_{M,20}$	N/√W	73
Motor constant at 120 °C	$k_{M,120}$	N/√W	62
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	1,6
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	2,2
Electrical inductance of string	$L_{D,q}$	mH	15,2
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	16,1
Mass of secondary part	m_S	kg/m	11,2
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T	°C	40
DC - axial flow fan serie 610	type		7114 NH
Dimensions	volume	mm ³	Ø150 * 38
Power consumption	P	watt	19
Volume flow	V	m ³ / h	420
Electrical time constant	τ_{el}	ms	9,6
Thermal time constant	τ_{th}	min	12,0
Thermal resistance	R_{th}	°C/W	0,1
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	7,6
Rated power	P_{rated}	kW	5,0
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	10
Protection class	-	-	IP 65

4.4.5.5 LSE10 F 1614

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10F 1614
Type of cooling primary part	-	-	Fremdbelüftung
Maximum force	F_{MAX}	N	5430
Maximum current	I_{MAX}	A	42,5
Maximum velocity (at F_{max} and U_{rated})	$v_{MAX,FMAX}$	m/min	119
Attraction force	F_A	N	16257
Rated force	F_{rated}	N	2350
Rated current	I_{rated}	A	15,2
Maximum velocity (at F_{rated} and U_{rated})	$v_{MAX,Frated}$	m/min	179
Power dissipation at rated force	$P_{V,rated}$	W	1029
Force constant	k_F	N/A	155
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	89
Motor constant at 20 °C	$k_{M,20}$	N/√W	86
Motor constant at 120 °C	$k_{M,120}$	N/√W	73
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	1,1
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	1,6
Electrical inductance of string	$L_{D,q}$	mH	10,4
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	22,5
Mass of secondary part	m_S	kg/m	8,6
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T	°C	40
DC - axial flow fan serie 610	type		7114 NH
Dimensions	volume	mm ³	Ø150 * 38
Power consumption	P	watt	19
Volume flow	V	m ³ / h	420
Electrical time constant	τ_{el}	ms	9,1
Thermal time constant	τ_{th}	min	12,0
Thermal resistance	R_{th}	°C/W	0,1
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	10,8
Rated power	P_{rated}	kW	7,0
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	14
Protection class	-	-	IP 65

4.4.5.6 LSE10 F 1618

Technical data (Cat.)
Linear motor


Power supply voltage 3 AC 400 V, Converter with unregulated input

Motor data	Symbol	Unit	Value
Type of motor	-	-	LSE10F 1618
Type of cooling primary part	-	-	Fremdbelüftung
Maximum force	F_{MAX}	N	7050
Maximum current	I_{MAX}	A	55,8
Maximum velocity (at F_{max} and U_{rated})	$V_{MAX,FMAX}$	m/min	120
Attraction force	F_A	N	20902
Rated force	F_{rated}	N	3000
Rated current	I_{rated}	A	19,6
Maximum velocity (at F_{rated} and U_{rated})	$V_{MAX,Frated}$	m/min	181
Power dissipation at rated force	$P_{V,rated}$	W	1301
Force constant	k_F	N/A	153
Voltage constant, phase to phase	$k_{E,phase\ to\ phase}$	Vs/m	89
Motor constant at 20 °C	$k_{M,20}$	N/√W	98
Motor constant at 120 °C	$k_{M,120}$	N/√W	83
Electrical resistance of string at 20 °C	$R_{str,20}$	Ω	0,9
Electrical resistance of string at 120 °C	$R_{str,120}$	Ω	1,2
Electrical inductance of string	$L_{D,q}$	mH	7,6
Maximum middle temperatur of coil	$T_{Coil,MAX}$	°C	140
Mass of primary part	m_P	kg	28,9
Mass of secondary part	m_S	kg/m	11,2
Pole pitch	τ_P	mm	36
Maximum ambient air temperature	T	°C	40
DC - axial flow fan serie 610	type		7114 NH
Dimensions	volume	mm ³	Ø150 * 38
Power consumption	P	watt	19
Volume flow	V	m ³ / h	420
Electrical time constant	τ_{el}	ms	8,8
Thermal time constant	τ_{th}	min	12,0
Thermal resistance	R_{th}	°C/W	0,1
Rated voltage	U_{rated}	V	380
Cogging/ Rated force	F_C / F_{rated}	%	± 3,5
Peak power	P_{peak}	kW	14,1
Rated power	P_{rated}	kW	9,1
Clear air gap between primary and secondary part	δ_{licht}	mm	licht. 0,6 mm
Number of poles	2p	-	18
Protection class	-	-	IP 65

5 Dimensioning guideline for linear motors

Dimensioning a linear direct drive requires to first determine the mechanical parameters, such as the moving mass and the required travel distance or the cycle times, and the kinematic requirements, such as maximum speed and maximum acceleration.

Based on this information, it is now possible to compute the data required for the selection of the linear motor. Essentially, the values to be calculated for this purpose consist of friction force, acceleration force, maximum force and effective force. The calculated values can then be used to select the suitable linear motor.

The following dimensioning guideline is intended to support the user in the dimensioning of linear motors.

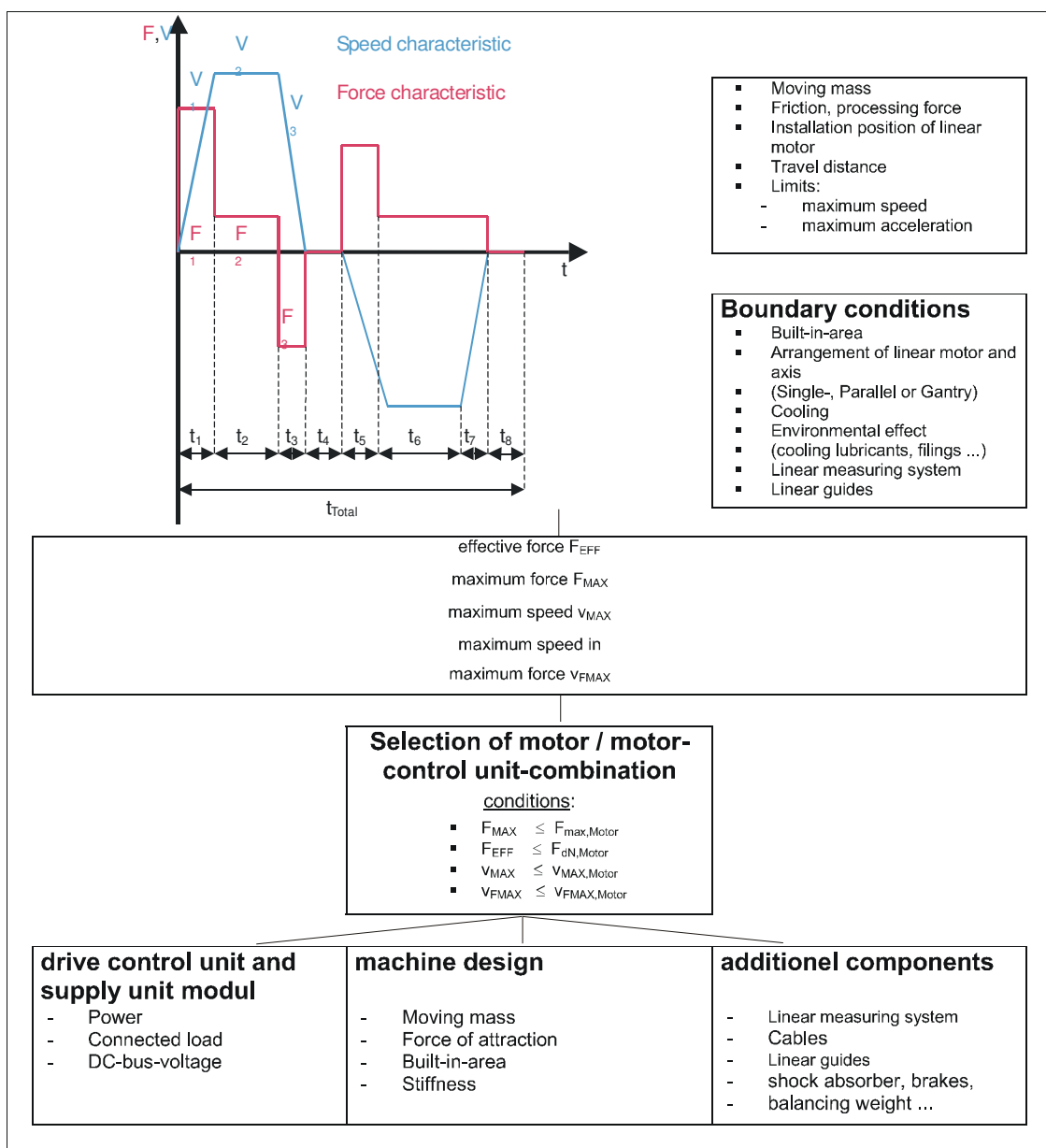


Figure 9: Dimensioning guideline

5.1 Determining the mechanical peripheral conditions

5.1.1 Moving mass

The moving mass (m_g) is comprised of the mechanical construction to be moved and the mass of the motor section—primary or secondary section—to be moved. It should be noted here that all built-on components to be moved, such as covers, cables and energy chains, must be taken into account.

5.1.2 Weight

The actual effective weight (F_g) depends on the following three factors:

- moving mass
- mounting position of the axis compared to the plane
- balancing weight, if available

$$F_g = m_g * g * \sin \alpha * (1 - \frac{x}{100}) \quad g = 9.81 \frac{m}{s^2} ; x := \text{percentage of counterbalancing}$$

If a balancing weight is used, it should be noted that the weight may not be completely compensated by the balancing weight—these circumstances are accounted for in the above formula through the factor x as the percentage of counterbalancing—or that additional friction forces occur.

5.1.3 Friction force

The friction force F_F acts against the direction of movement and is calculated as follows for the linear motor:

$$F_F = \mu * (m_g * g + F_{attr.}) + F_{add'l} \quad \mu = \text{friction coefficient}; F_{attr.} = \text{force of attraction}$$

$$F_{add'l} = \text{friction forces due to built-on components}$$

The corresponding information from the respective manufacturer is required to determine the friction coefficient and the additional friction forces. The forces of attraction are located on the technical data sheets in chapter 4.

5.2 Formula-specific fundamentals

This chapter presents the formulas and speed characteristics that are required for motor dimensioning.

5.2.1 Equations of motion

The universally valid equations of motion in reference to time listed below are applied to determine the required data for motor dimensioning and selection.

Speed:

$$\underline{v(t) = \dot{s}(t)}$$

Acceleration:

$$\underline{a(t) = \ddot{s}(t)}$$

Force:

$$F(t) = \ddot{s} * m + F_p(t) \quad F_p = \text{processing force [N]}$$

5.2.2 Feed forces

Determining the feed forces required for the application is accomplished through calculation with the following formula.

Acceleration force:

$$F_{\text{accel.}} = m_g \cdot a \quad F_{\text{accel.}} = \text{acceleration force [N]}; a = \text{acceleration [m/s}^2\text{]}$$

Weight:

$$F_g = m_g * g * \sin \alpha * (1 - \frac{x}{100}) \quad g = 9,81 \frac{m}{s^2}; x := \text{percentage of counterbalancing}$$

Friction force:

$$F_F = \mu * (m_g * g + F_{attr.}) + F_{add'l}$$

μ = friction coefficient; $F_{attr.}$ = force of attraction
 $F_{add'l}$ = additional friction forces due to built-on components

Maximum force:

$$F_{\max} = F_{\text{accel.}} + F_F + F_G + F_P$$

Effective force:

$$F_{\text{eff.}} = \sqrt{\frac{F_1^2 * \Delta t_1 + F_2^2 * \Delta t_2 + \dots}{\Delta t_{\text{total}}}} = \sqrt{\frac{\sum (F_i^2 * t_i)}{\sum t_i}}$$

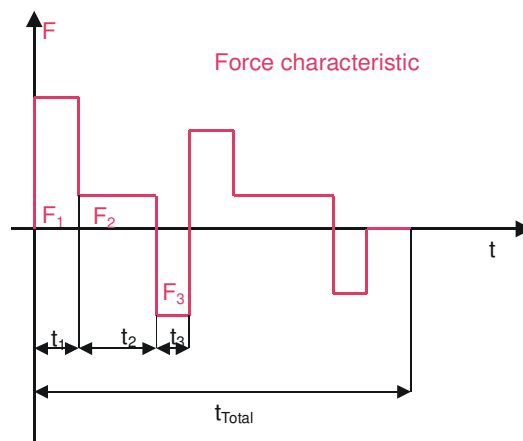


Figure 10: Force characteristic

Figure 11 shows a typical force characteristic. The force equations for the individual time segments t_1 through t_8 are set up based on these characteristics.

[t_1] positive acceleration:	$F = F_{\text{Accel.}} + F_F + F_G$
[t_2] constant speed:	$F = F_F + F_G$
[t_3] negative acceleration:	$F = - F_{\text{accel.}} + F_F + F_G$
[t_4] pause interval:	$F = F_G$
[t_5] positive acceleration:	$F = F_{\text{accel.}} + F_F - F_G$
[t_6] constant speed:	$F = F_F + F_G$
[t_7] negative acceleration:	$F = - F_{\text{accel.}} + F_F - F_G$
[t_8] pause interval:	$F = F_G$

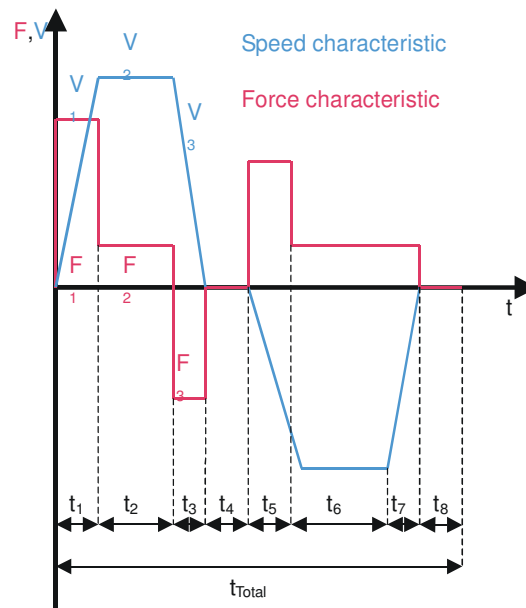


Figure 11: Speed and force characteristic

5.2.3 Trapezoidal speed

The trapezoidal speed characteristic is typical for most applications. It is characterised by an initial acceleration phase, followed by a range of constant speed and, finally, a uniform braking phase.

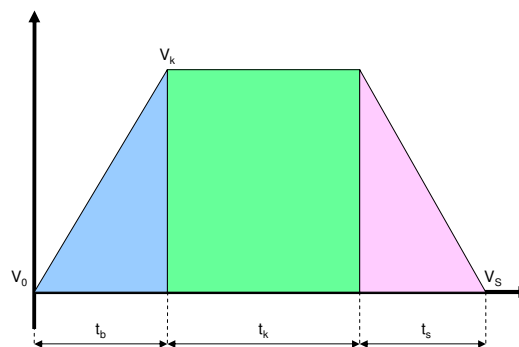


Figure 12: Trapezoidal speed characteristic

The following equations of motion arise for the calculation of the trapezoidal speed characteristic shown in Figure 12:

I. Acceleration phase:Acceleration:

$$a = \frac{2 * s_b}{t_b^2} = \frac{V_k}{t_b} = \frac{V_K^2}{2 * s_b} \quad ; s_b = \text{distance covered within the acceleration phase [m]}$$

Maximum speed:

$$V_K = \sqrt{2 * a * s_b} = a * t_b = \frac{2 * s_b}{t_b}$$

Distance:

$$s_b = \frac{V_K}{2} * t_b = \frac{a * t_b^2}{2} = \frac{V_K^2}{2 * a}$$

Time:

$$t_b = \frac{V_K}{a} = \sqrt{\frac{2 * s_b}{a}} = \frac{2 * s_b}{V_K}$$

II. Constant speedDistance:

$$s_k = V_k * t_k$$

Time:

$$t_k = \frac{s_k}{V_k}$$

Speed:

$$V_k = \frac{s_k}{t_k}$$

III. Braking phase:

Speed:

$$V_k = a * t_s = \sqrt{2 * a * s_s} = \frac{2 * s_s}{t_s}$$

Distance:

$$s_s = \frac{V_k}{2} * t_s = \frac{a * t_s^2}{2} = \frac{V_k^2}{2 * a}$$

Time:

$$t_s = \frac{V_k}{a} = \frac{2 * s_s}{V_k} = \sqrt{\frac{2 * s_s}{a}}$$

5.2.4 Triangular speed

In contrast to the trapezoidal speed characteristic, the triangular speed characteristic distinguishes itself by not featuring a range with a constant speed, i.e. the acceleration phase is immediately followed by the braking phase. Based on the properties described, this type of speed characteristic is found particularly in short-stroke movements.

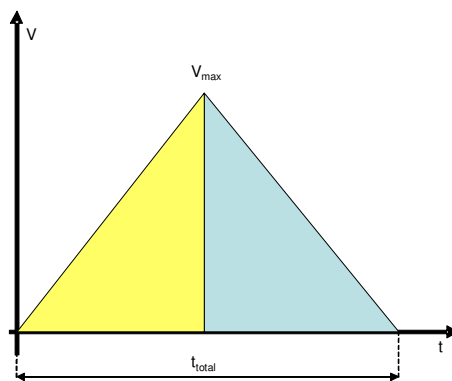


Figure 13: Triangular speed characteristic

Formulas for the triangular speed characteristic:Speed:

$$V_{\max} = \sqrt{a * s_{ges.}} = \frac{2 * s_{ges.}}{t_{ges.}} = \frac{a * t_{ges.}^2}{2}$$

Distance:

$$s_{ges.} = \frac{V_{\max} * t_{ges.}}{2} = \frac{V_{\max}^2}{4 * a} = \frac{a * t_{ges.}^2}{4}$$

Time:

$$t_{ges.} = \frac{2 * V_{\max}}{a} = \sqrt{\frac{4 * s_{ges.}}{a}} = \frac{4 * s_{ges.}}{V_{\max}}$$

Acceleration:

$$a = \frac{2 * V_{\max}}{t_{ges.}} = \frac{V_{\max}^2}{s_{ges.}} = \frac{4 * s_{ges.}}{t_{ges.}^2}$$

5.3 Determining the drive power**5.3.1 Continuous power**

In order to determine the power of the mains connection, the continuous and maximum power of the linear drive must be determined.

The required continuous power of the linear drive is comprised of the electrical continuous dissipation loss and mechanical power.

Linearantriebs setzt sich aus der elektrischen und mechanischen Leistung zusammen.

Continuous power:

$$P_{cont.} = P_{electr.} + P_{mech.}$$

Electrical dissipation loss:

$$P_{electr.} = \left(\frac{F_{eff.}}{F_{rated}} \right)^2 * P_{loss} \quad \text{with } F_{eff.} \leq F_{rated}$$

Mechanical power:

$$P_{mech.} = F_{eff.} * V_{rated}$$

5.3.2 Maximum power

The maximum power is comprised of the mechanical and electrical maximum dissipation loss. The maximum power is required by the motor, particularly during the acceleration and braking phase.

The maximum power is calculated using the following equations:

Maximum power:

$$P_{max.} = P_{max.mech.} + P_{max.electr.}$$

Mechanical maximum power:

$$P_{max.mech.} = F_{max.} * V_{max.}$$

Electrical maximum dissipation loss:

$$P_{max.electr.} = \left(\frac{F_{Max.}}{F_{rated}} \right)^2 * P_{loss}$$

5.3.3 Cooling power

The required cooling power corresponds virtually to the electrical continuous dissipation loss of the motor. It is calculated using the following formula.

Cooling power:

$$P_{cool.} = \left(\frac{F_{eff.}}{F_{rated}} \right)^2 * P_{loss} \approx P_{electr.} \quad \text{with } F_{eff.} \leq F_{rated}$$

5.3.4 Regenerative power

The regenerative power during the braking phase tends to play a secondary role for the linear motor as compared to the rotary motor, since the linear speed of the linear motor is generally significantly lower than the peripheral speed of a rotary servomotor.

The regenerative power from the energy balance during the braking operation is calculated approximately to dimension regenerative supply units or braking resistors.

Regenerative power:

$$P_{regen.} = \frac{m_g * V_{max.}^2}{t_s} - V_{max.} * F_F - 3 * m_g * R_{12} * \left(\frac{a_{max.}}{k_F} \right)^2$$

A negative regenerative power indicates that the motor must be supplied with energy during the braking phase.

5.4 Installation site and altitude

The technical motor data related to continuous operation (S1) at rated speed listed in chapter 4 are met under the following conditions:

Ambient temperature: +0 °C to +40 °C

Altitude: up to 1000 m above sea level

For deviating conditions, the correcting factors k_1 and k_2 is used to calculate the resulting deviations.

Ambient temperature	40 °C	45 °C	50 °C	55 °C	60 °C
Correction k_1	1	1.05	1.1	1.16	1.24
Altitude above sea level	up to 1,000 m	up to 2,000 m	up to 3,000 m	up to 4,000 m	up to 5,000 m
Correction k_2	1	1.06	1.17	1.3	1.55

A power correction is not necessary if the ambient temperature decreases by approximately 10 °C per 1,000 m of increase in altitude starting at an installation altitude of 1,000 m.

At ambient temperatures above 40 °C and with enclosed installation of motors, the manufacturer should be consulted since mechanical modifications may be necessary.

The use of aggressive, caustic, abrasive media and/or media dissolving plastic requires separate mechanical measures.

It must be ensured that the secondary section of the linear motor is not located directly in the chip area of the machine or that appropriate protective measures, such as strippers or bellows, are used.

The effective vibrational severity of 4.5 mm/s (measured according to DIN 45665) across the complete speed range must not be exceeded at the installation site.

5.5 Calculation example

The principle procedure in dimensioning a linear drive is demonstrated using the example of a pick & place axis with a triangular speed characteristic.

Specifications for the load cycle:

Carriage weight:	$m_s = 3 \text{ kg}$
Maximum speed:	$V_{\max.} = 6.2 \text{ m/s}$
Axis arrangement:	horizontal with moving magnetic track
Mechanical load expenditure through built-on components:	
	$F_{\text{add'l}} = 200 \text{ N}$
Processing force:	$F_p = 0 \text{ N}$
Interval period $[t_1]$:	0.05 s (acceleration phase)
Interval period $[t_2]$:	0.00 s
Interval period $[t_3]$:	0.05 s (braking phase)
Interval period $[t_4]$:	0.02 s (pause interval)
Interval period $[t_5]$:	0.05 s (acceleration phase)
Interval period $[t_6]$:	0.00 s
Interval period $[t_7]$:	0.05 s (braking phase)
Interval period $[t_8]$:	0.02 s (pause interval)
Friction coefficient μ of linear guides:	0.04

Cycle representation:

Cycle no.	Positioning time	Maximum speed	Calculated stroke length	Notes
1	0.1 s	6.2 m/s	0.31 m	Partial transport from start position
2	0.1 s	6.2 m/s	-0.31 m	Return to original position

The total moving weight must be taken into account in the dimensioning of the linear drive; that is, the weight of the moving linear motor components, which is the secondary section in

this application example, must be taken into account in the total weight. In addition, the force of attraction between primary and secondary section is required for calculating the friction force. First, a preliminary selection of the linear motor components is made on the basis of the present data; this selection should be checked after dimensioning.

The following data is obtained for the selected motor type LSE10 W 2014:

Weight primary part: $m_p = 34,9 \text{ kg}$
 Weight secondary part:: $m_{\text{Sec.}} = 10 \text{ kg}$
 Force of attraction: $F_{\text{Attr.}} = 18.092 \text{ N}$

Calculation procedure:

Moving mass: $m_g = m_s + m_{\text{Sek.}}$
 $m_g = 3 \text{ kg} + 10 \text{ kg}$
 $m_g = 13 \text{ kg}$

Weight: $F_G = 0 \text{ N}$,since the application uses a horizontal axis.

Friction force: $F_R = \mu * (m_g * g + F_{\text{Anz.}}) + F_{\text{Zus.}}$
 $F_R = 0,04 (13 \text{ kg} * 9,81 \text{ m/s}^2 + 18.092 \text{ N}) + 200 \text{ N}$
 $F_R = 929 \text{ N}$

Acceleration: $a = \frac{2 * V_{\text{max.}}}{t_{\text{ges.}}}$
 $a = \frac{2 * 6,2 \frac{\text{m}}{\text{s}}}{0,1 \text{ s}}$
 $a = 124 \text{ m/s}^2$

Acceleration force: $F_{\text{Beschl.}} = m_g * a$
 $F_{\text{Beschl.}} = 13 \text{ kg} * 124 \text{ m/s}^2$
 $F_{\text{Beschl.}} = 1.612 \text{ N}$

Maximum force:

$$F_{\max.} = F_{\text{Beschl.}} + F_R + F_G + F_B$$

$$F_{\max.} = 1.612 \text{ N} + 929 \text{ N} + 0 \text{ N} + 0 \text{ N}$$

$$F_{\max.} = \mathbf{2.541 \text{ N}}$$

Cycle time:

$$t_{\text{ges.}} = t_1 + t_2 + t_3 + t_4 + t_5 + t_6 + t_7 + t_8$$

$$t_{\text{ges.}} = 0,05\text{s} + 0\text{s} + 0,05\text{s} + 0,02\text{s} + 0,05\text{s} + 0\text{s} + 0,05\text{s} + 0,02\text{s}$$

$$t_{\text{ges.}} = \mathbf{0,24\text{s}}$$

Effective force:[t₁] positive acceleration:

$$F = F_{\text{accel.}} + F_f = 1.612 \text{ N} + 929 \text{ N} = \mathbf{2.541 \text{ N}}$$

[t₂] constant speed:

$$F = \mathbf{0 \text{ N}}$$

[t₃] negative acceleration:

$$F = -F_{\text{accel.}} + F_f = -1.612 \text{ N} + 929 \text{ N} = \mathbf{-683 \text{ N}}$$

[t₄] pause interval:

$$F = \mathbf{0 \text{ N}}$$

[t₅] positive acceleration:

$$F = F_{\text{accel.}} + F_f = 1.612 \text{ N} + 929 \text{ N} = \mathbf{2.541 \text{ N}}$$

[t₆] constant speed:

$$F = \mathbf{0 \text{ N}}$$

[t₇] negative acceleration:

$$F = -F_{\text{accel.}} + F_f = -1.612 \text{ N} + 929 \text{ N} = \mathbf{-683 \text{ N}}$$

[t₈] pause interval:

$$F = \mathbf{0 \text{ N}}$$

$$F_{\text{eff.}} = \sqrt{\frac{\sum (F_i^2 * t_i)}{t_{\text{total}}}} = \sqrt{\frac{(2.541\text{N})^2 * 0,05\text{s} + (-683\text{N})^2 * 0,05\text{s} + (2.541\text{N})^2 * 0,05\text{s} + (-683\text{N})^2 * 0,05\text{s}}{0,24\text{s}}}$$

$$F_{\text{eff.}} = \mathbf{1.699 \text{ N}}$$

Determining the drive power:Continuous power:

Electrical dissipation loss:

$$P_{\text{elektr.}} = \left(\frac{F_{\text{eff.}}}{F_{\text{rated}}} \right)^2 * P_{\text{loss}} = \left(\frac{1.699\text{N}}{3.130\text{N}} \right)^2 * 1454\text{W}$$

$$P_{\text{electr.}} = \mathbf{428 \text{ W}}$$

Mechanical power:

$$P_{\text{mech.}} = F_{\text{eff.}} * V_{\text{rated}} = 1.699 \text{ N} * 6,2 \text{ m/s}$$

$$P_{\text{mech.}} = \mathbf{10.534 \text{ W}}$$

Continuous power:

$$P_{\text{cont.}} = P_{\text{electr.}} + P_{\text{mech.}} = 10.534 \text{ W} + 428 \text{ W}$$

$$P_{\text{cont.}} = \mathbf{10.962 \text{ W}}$$

Maximum power:

Max. electrical dissipation loss:

$$P_{\max.\text{electr.}} = \left(\frac{F_{\max.}}{F_{\text{rated}}} \right)^2 * P_{\text{loss}}$$

$$P_{\max.\text{electr.}} = \left(\frac{2.541\text{N}}{3.130\text{N}} \right)^2 * 1454\text{W}$$

$$\mathbf{P_{\max.\text{electr.}} = 958 \text{ W}}$$

Max. mechanical power:

$$P_{\max.\text{mech.}} = F_{\max.} * V_{\text{Rated}} = 2.541 \text{ N} * 6,2 \text{ m/s}$$

$$\mathbf{P_{\max.\text{mech.}} = 15.754 \text{ W}}$$

Maximum power:

$$P_{\max.\text{cont.}} = P_{\text{mech.}} + P_{\text{electr.}} = 15.754 \text{ W} + 958 \text{ W}$$

$$\mathbf{P_{\max.\text{cont.}} = 16.712 \text{ W}}$$

Cooling power:

Cooling power:

$$P_{\text{cool.}} = \left(\frac{F_{\text{eff}}}{F_{\text{rated}}} \right)^2 * P_{\text{loss}} = \left(\frac{1.699\text{N}}{3.130\text{N}} \right)^2 * 1454\text{N}$$

$$\mathbf{P_{\text{cool}} = 428 \text{ W}}$$

Determining the segments of the secondary section:

The actual required total travel distance is determined by using the required travel distance and the length of the primary section. The number and length of the individual segments of the secondary section are selected based on the determined total travel distance. For this application, the travel distance measures 310 mm at a primary section length of 554 mm so that the total travel distance must measure at least 864 mm.

6 Application and design information

6.1 Function-related requirements of the machine design

Based on the significantly higher speeds, accelerations and position accuracy that can be implemented with linear direct drive technology compared to conventional solutions, higher requirements are imposed upon the machine design.

At first glance, this requirement results in a contradictory objective particularly for the carriage design since the moving weight must be minimised while increasing the rigidity at the same time.

This objective can be achieved by utilising materials which have a lower specific weight in comparison to steel. Together with design changes, this allows for reducing the weight of the carriage design while increasing the rigidity at the same time.

Besides the rigidity of the individual mechanical components, the achievable control performance of a machine is also determined by the weight and the resonant frequency resulting from it.

To avoid excitations of vibrations, the mechanical natural frequencies of the machine design should be as high as possible. To obtain a control performance that is still satisfactory, the lowest natural frequency occurring in the axis should not be less than 300 Hz.

6.2 Forces of attraction and feed forces

6.2.1 Forces of attraction between primary and secondary section

As a result of their assembly in the built-in condition, linear motors with iron generate a constantly effective force of attraction between primary and secondary section.

These forces of attraction must be taken into account in dimensioning the mechanical design and specifically in the design of the control system and the carriage design.

The design of the control system and the carriage construction must be carried out in such a way that deformations of the machine design or the linear guide can be ruled out. This ensures that the air gap distance between primary and secondary section does not change in the built-in state.

6.2.2 Effects of the air gap distance on feed forces and forces of attraction

Reducing the air gap distance between primary and secondary section increases the forces of attraction and feed forces.

The relationship between air gap distance and the forces of attraction and feed forces is shown in the following diagram.

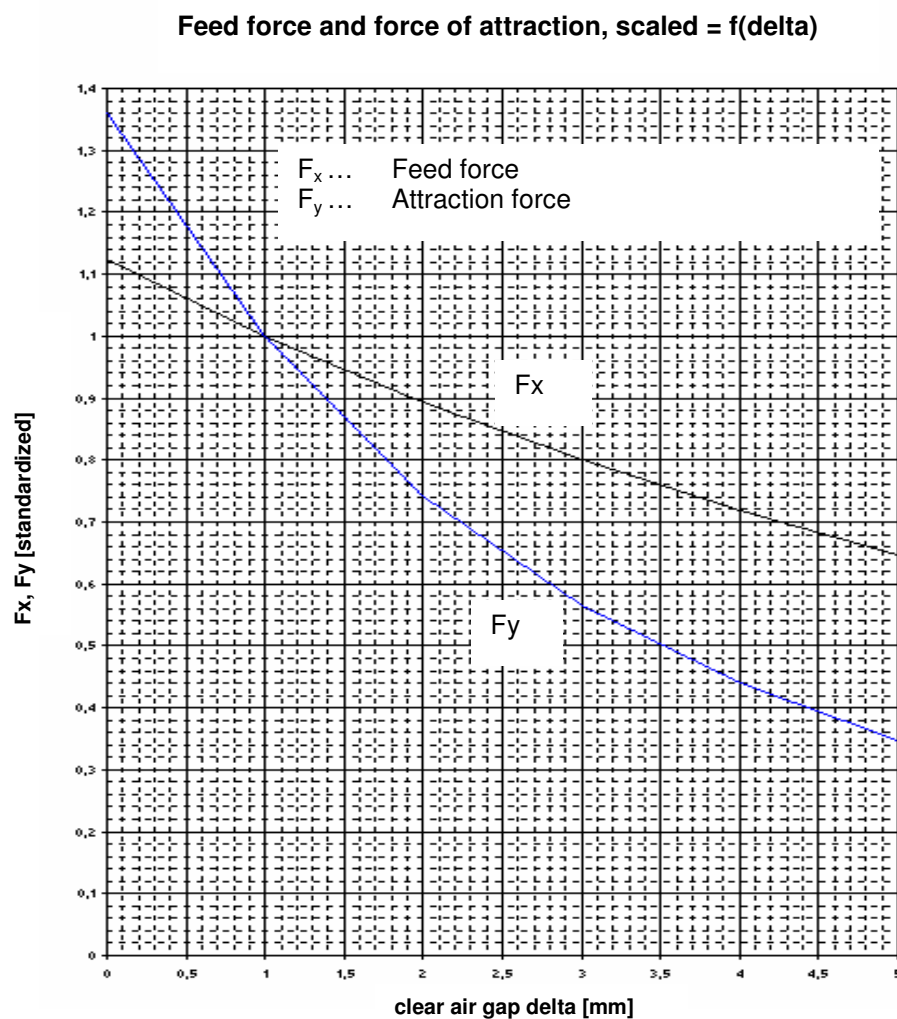


Figure 14: Dependence of force of attraction and feed force on air gap distance

6.2.3 Reduced overlap between primary and secondary section

Due to travels into the limit area, it is possible that the primary section travels beyond the secondary section or the secondary section travels beyond the primary section, resulting in a reduced overlap of the linear motor components.

This reduced overlap leads to lower feed forces and forces of attraction.

Depending upon the total length of the primary section, the force reduction occurs only after a certain reduction of overlap, in general starting at 5% with respect to the length of the primary section. Outside of this limit area, the force reduction is calculated virtually linear to the reduced overlap area.

In this context it should be noted that the partial overlap of primary and secondary section results in an increased current consumption by the motor which may result in instabilities of the control loop. For this reason, the linear system must be designed so that no reduced overlap occurs during continuous operation.

6.3 Arrangement of linear motor components

The linear motor components can be arranged in several possible ways. This documentation deals with the single arrangement, several primary sections on one secondary section, vertical axes and the gantry arrangement.

6.3.1 Single arrangement

The single arrangement based on the short-stator or long-stator principle is the most widely used arrangement. This arrangement consists of one primary and secondary section each.

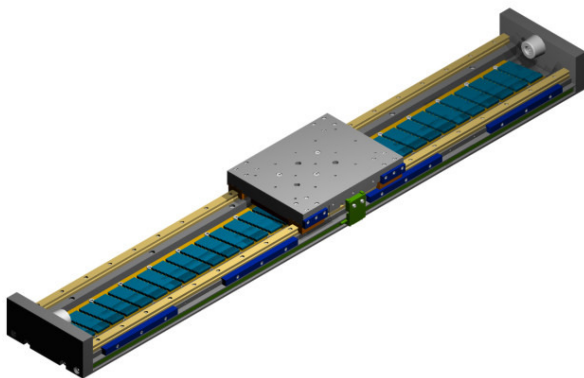


Figure 15: Linear axis in single arrangement

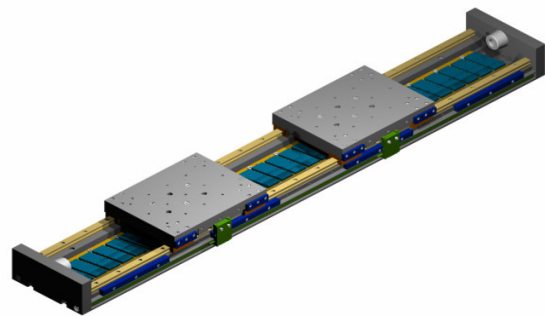


Figure 16: Two primary sections on one secondary section unit

6.3.2 Several primary sections on one or several secondary sections

Two versions are distinguished: two or several primary sections independent from each other on one secondary section (Figure 16) and two or several primary sections mechanically coupled to each other on one or several secondary sections (Figure 18).

The control of several independent primary sections on one secondary section requires one drive controller and one sensor head for each primary section.

The mechanical coupling of several primary sections offers the decisive advantage that the individual feed forces are added. The control of this type of arrangement is carried out by one drive controller sufficiently dimensioned for all primary sections and one linear measuring system. If several primary sections are operated with one drive controller and one linear measuring system, the setup is also referred to as parallel arrangement.

If a parallel arrangement is used, it must be ensured that only identical primary and secondary sections are used.

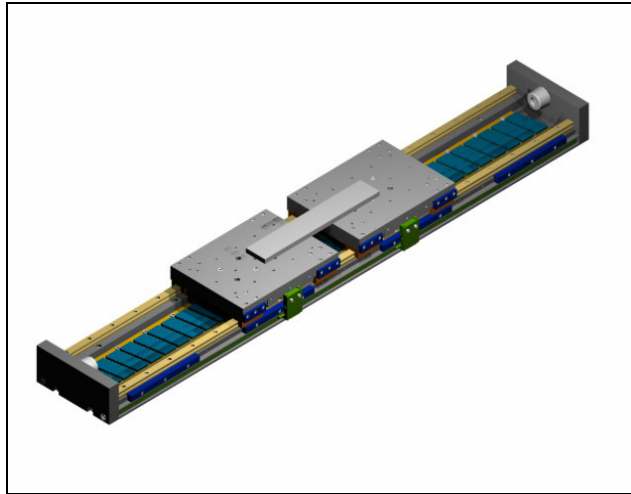


Figure 17: Arrangement with coupled primary sections

6.3.3 Gantry arrangement

A gantry arrangement exists as soon as two primary and secondary sections each are operated with two drive controllers and two linear measuring systems each due to the missing or insufficient mechanical coupling.

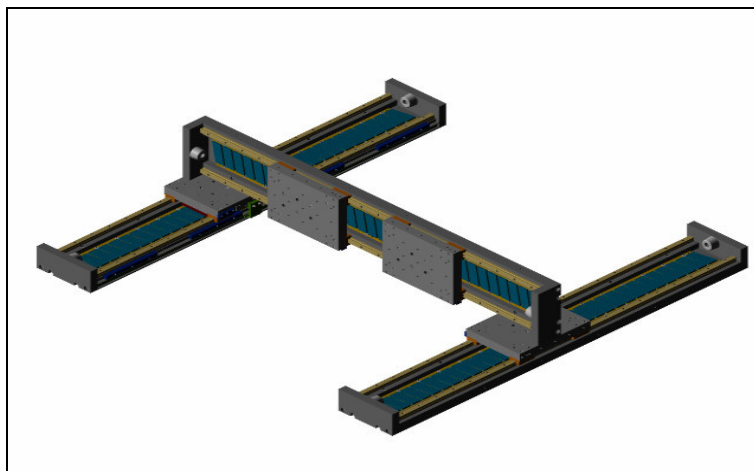


Figure 18: Gantry arrangement

6.3.4 Vertical axes

If linear motors are used in vertical axes, it must be observed that the linear motor is not self-locking in the deenergized state, i.e. the linear motor must be secured against giving way through the use of a brake system or a counterbalance. If a balancing weight is used, it must be taken into account that it must also be accelerated for accelerations $> 1 \text{ g}$.

6.4 Coolant agent

The coolant agent must meet the following requirements:

- Clear water free from suspended matter and dirt
- Anti-corrosion agent added
- Water hardness 8 to 14 dH°
- pH range from 6.5 to 7.5
- Deionized and demineralized water (sodium chloride content < 100 ppm [=0.01%])

6.5 Linear measuring systems

Linear measuring systems are employed to detect the position and speed for a linear axis. The speeds and positioning accuracies that can be implemented impose highest demands particularly on the linear measuring system and its mechanical coupling. This allows implementing accuracies of up to 2 µm using currently available linear measuring systems.

On principle, two types of construction are differentiated based on the design of the measuring system: the open and the enclosed system. Increasingly, a third variety could be seen in recent times in which the linear measuring system is directly integrated in the linear guide.

Due to the lack of friction, the open measuring system can achieve high traversing speeds and accuracies, among others, through seal lips. In contrast is the lack of protection against contamination, chippings, dust, etc. and the more difficult assembly and alignment of the measuring system. For this reason, the open measuring systems were primarily used in the semiconductor industry, for measuring equipment or with machines and systems that do not require the use of coolant agents or oils.

Inherent in the type of construction, the enclosed design allows for high protection against contaminations, chippings, etc. Due to the friction resulting from seal lips, the enclosed design only allows implementing speeds of up to approx. 2-4 m/s. On the basis of the high degree of protection against contamination and coolant agent or oils, the enclosed design is primarily used with machining equipment.

The design in which the linear measuring system is directly integrated in the control system offers two important advantages over the other two versions. Not only does this create an

increased assembly expenditure with significantly smaller space requirements, but the linear measuring system is also largely unaffected by contaminations and magnetic fields.

The incremental and the absolute measuring principles have increasingly gained acceptance. These two measuring principles can be further differentiated into optical and magnetic types according to the type of measurement.

The advantages of the incremental measuring system are in principle the unlimited travel distance and the high speeds. The disadvantage, on the other hand, is the detection of the pole position using a drive-internal procedure which is required following every switch-on. The maximum available motor power is only available after the successful detection of the pole position. The detection of the pole position requires moving the primary section.

The absolute linear measuring system features two significant advantages: on the one hand, a detection of the pole position is only required during initial commissioning, on the other hand, a machine referencing is not required. It follows from this that the maximum available motor power is present immediately after switch-on. The disadvantage is the limited travel distance of approx. 4 m .

The selection can be made from the type of construction and measuring principles listed above, depending upon the operating conditions and the specified requirements. The following criteria are used for the selection:

- Required travel distance
- Maximum speed reached
- Required accuracy
- Operating conditions (chippings, coolant agent, etc.)

During the assembly of the linear measuring system, ensure that the measuring system is not mounted to vibrating machine parts.

6.6 Mechanical brake systems and retaining devices

For vertical axes (cf. chapter 6.3.4), mechanical brake systems or retaining devices are required to secure the primary section in the deenergized state. The following systems could be used for this purpose:

- External mechanical, electric or electromagnetic brake elements
- Balancing weights
- Terminal elements at the linear guides

6.7 Linear guides

The linear guide systems for linear motors must be dimensioned so that they can absorb the forces of attraction, feed force and, if necessary, the porcessing forces occuring between the primary and secondary section.

The selection of the linear guide system is made based on the following criteria:

- Good running properties at high speeds and accelerations
- High accuracies without overshoot
- Backlash-free
- Small friction coefficient

Depending upon the specific application, linear guide systems with recirculating roller bearings, slideway or ball groove guides are used.

6.8 Limit position damper

Since uncontrolled movements of the active component, e.g. in the case of mains failure, cannot be ruled out completely for a linear axis, energy-absorbing limit position dampers should be installed to avoid damages to the machine and to the linear motor components.

Dimensioning the limit position dampers must take into account that a maximum delay of 250 m/s² is not exceeded. Exceeding the maximum delay can lead to detachment of the primary section.

6.9 Stripper

If the linear axis is used in a curring machine, a stripper can on principle be attached directly on the secondary section. If a stripper is used, the following points should in essence be taken into account:

- Mounting the stripper at the primary section is not allowed. It should be mounted onto the carriage construction.
- Ferromagnetic chippings in the immediate environment of the secondary section are attracted.
- The stripper width should be virtually identical to the width of the secondary section.

6.10 Axis cover systems

Due to the high acceleration, speed and accuracy of linear drives and the protection of motor components against foreign bodies, oils and lubricants, the following axis cover systems can be employed:

- Bellows
- Telescopic steel covers

7 Handling and inspection of linear motor components

7.1 Determining the linear motor components on the nameplate

On the primary section, the nameplate is attached to the front side which does not have a power or coolant connection. The nameplate of the primary section is designed as follows:

BAUMÜLLER 3~ Linear-Motor LSE10G 0604					
P_n [kW]	0,3	P_{max} [kW]	0,6	U_{zk} [V]	540
I_n [A]	0,6	I_{max} [A]	3,3	m [kg]	2,2
F_n [N]	70	F_{max} [N]	320		
$v(F_n)$ [m/s]	4,17	$v(F_{max})$ [m/s]	2,00		
Isol.-Kl.	F	IP	65	VDE	0530
	KTY 84	Schaltart	Y	Rechtsdrehfeld	⊗
	±140°	Serien-Nr.	505015395		

Figure 19: Nameplate of primary section

The nameplate allows for a unique definition of the primary section.

On the secondary section, the type designation and serial number is applied to the elongated outside edge, which starts with a north pole, and is structured as follows:

LSM10-1060 Serien-Nr. 50202033	 BAUMÜLLER Baumüller Kamenz GmbH Nordstraße 57 D-01917 Kamenz ++49 (0)3578 / 3406-0
--	--



Figure 20: Nameplate of secondary section

Independent of the specific length, the secondary section is always designed so that the magnetic north pole—identified by **N**—is located at the front face and the magnetic south pole—identified by **S**—is located at the opposing end.

7.2 Packing and transport

Every linear component from Baumüller is packed prior to shipping so that damage during transport can basically be ruled out.



Danger in handling secondary sections

Observe and comply with safety and warning notes in accordance with the information sheet accompanying the secondary sections.

7.3 Storage

The permissible storage or transport temperature is -20 to +60 °C. During transport it must be ensured that the linear components are not exposed to large temperature variations.

If the primary and secondary sections are not stored in their original packaging, it must be ensured during storage that they may only be stored completely flat on a level surface.



Damage of linear motor components through improper handling during storage and transport:

- Observe the permissible temperature range during transport.
- Use original packaging for storage.

7.4 Inspecting the linear motor components

The linear motor components from Baumüller undergo the following mechanical and electrical inspections before shipment:

Mechanical inspection:

- Design and fit (DIN 7157)
- Surface condition (DIN ISO 1302)
- Form and positional tolerance (DIN ISO 1101)
- Thread inspection (DIN 13 Teil 20)
- Checking cooling system for leaks, if necessary

Electrical inspection:

- Insulation resistance test (EN 60204-1)
- High-voltage test (VDE 0530)
- Test of compliance of electrical characteristic values



An improperly conducted high-voltage test can lead to the destruction of the linear motor components.

8 Assembly of linear motor components

The following requirements must be met before starting the assembly of the primary and secondary section:

- The machine design must meet the requirements particularly with respect to static and dynamic rigidities, feed forces and forces of attraction.
- Compliance of all required mounting dimensions is ensured.
- Compliance of safety notes and danger notices is ensured.
- The installation is carried out by trained personnel.

8.1 Procedure for assembly of linear motor components

Several options exist for the assembly of linear motor components, such as installation with the use of appropriate devices or initially a partial installation of segments of the secondary sections.

In the context of this documentation, the procedure outlined deals with initial installation of a part of the secondary section, followed by mounting the primary section to the carriage construction using the open area above the secondary section. Next, the assembled primary section is moved across the previously installed segments of the secondary section, and the remaining segments of the secondary section are assembled.

8.2 Assembly of the segments of the secondary section

Using the mounting screws, the secondary section is non-positively screwed to the machine base at the elongated outside edges of the secondary section.

Stainless steel screws (A2, A4) should be used for mounting the secondary section due to the superior magnetic and thermal characteristics.



If ferromagnetic parts are handled in the environment of the unpacked secondary sections, the magnetic surface of the secondary section should be covered by a wooden board or another non-magnetic material.



During the installation, the primary section must be secured against uncontrolled movements.



During the assembly of the segments of the secondary section, it must be ensured that the pole markings N and S of all secondary sections point into the same direction.

8.3 Assembly of the primary section

The primary section is non-positively screwed onto the carriage construction using the threaded holes at the back of the primary section.

Stainless steel screws (A2, A4) should be used as mounting screws due to the superior magnetic and thermal characteristics.



The maximum length of thread engagement must be taken into account in the selection of the mounting screws (cf. drawing documentations). Screws that are too long may damage the primary section.



Before screwing the primary section onto the carriage construction it must be ensured that the two contact surfaces are free of grease and oil.

8.4 Installation of the liquid cooling for series LSE1W

The liquid cooling is connected via a standard quick-release lock directly at the primary section.

9 Commissioning



The movement of the primary part in case of right rotation field and fixed secondary part is in direction line connector.

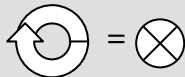
Right rotation field exist for following clamping layout:

→ U1 at L1

→ V1 at L2

→ W1 at L3

The movement of the primary part is described on the label with following symbol:



The symbol means:

Right rotation field exist for movement of the primary part in direction line connector.

The cross symbolizes the view at the end of a arrow.

The label is located on this front, where no line connector is placed.

On principle, the Baumüller controller features a data set that is prepared for operating a linear motor. Based on the customer-specific design of the primary section and the measuring system used, the data set must be updated at commissioning to the application-specific data.

The following must be observed (parameter numbers :V-controller / bmaXX):

- The controller parameters are dependent upon the specific application only.
- In the power section, $I_{\text{limit}} = I_{\text{max}}$ of the primary section is entered for P116 / P1241.
- $I_d = 0$ must be entered for P260 / P66 since this is a servomotor.
- I_{rated} of the motor must be entered in P261 / P54 based on the data sheet.
- The encoder parameters depend on the resolution of the linear measuring system.
The number of pulses per revolution (P024, P227 / P152, P162) is calculated from the double pole pitch divided by the resolution of the measuring system.

Example: An encoder from Numerik Jena with a sine period of 20 µm provides
2 x 36 mm / 20 µm = 3,600 pulses per revolution.

- If the resulting number of pulses per revolution is greater than 32,767, bit 5 must be set for parameter 226 and a number of pulses per revolution divided by 8 must be entered in parameter 024/227.

The last point also obtains for bmaXX – controller and is adjusted at WinBASS encoder sites.

The modified data is subsequently saved in the boot data set.

Note: Determining the position of rest and referencing for a drive without absolute position encoder must be carried out anew at every switch-on!

9.1 Determining the position of rest

In the operating mode “Determine position of rest,” the reference between magnetic track (corresponds to the rotor for rotary motors) and encoder is established. Two procedures are available depending upon the type of encoder.

The methods obtain for V- und bmaXX- controller.

9.1.1 Sine/cosine or square-wave incremental encoder

Chose “Referencing angle of rest” from the “*Operating mode*” menu item and select the “*Method 0*” mode.

It must be ensured that the carriage is freely movable; the drive can subsequently be enabled. Observe that the software “Enable” occurs first, followed by the hardware “Enable.” The carriage moves to the position of rest.

Next, block the pulse enable, select *Blocking* in the program and execute *Save* in the *Data management* menu. Use *Field angle calculation* under the *Motor model* module to check whether the position of rest was determined.

Every time the drive is switched on again, the *Referencing angle of rest “operating mode”* must be executed using method 2 (carriage movable for approx. +/- 2 mm).

9.1.2 Absolute encoder

Chose “*Referencing angle of rest*” from the “*Operating mode*” menu item and select the “*Method 0*” mode.

It must be ensured that the carriage is freely movable; the drive can subsequently be enabled. Observe that the software “Enable” occurs first, followed by the hardware “Enable.” The carriage moves to the position of rest.

Next, block the pulse enable, select *Blocking* in the program and execute *Save* in the *Data management* menu. Use *Field angle calculation* under the *Motor model* module to check whether the position of rest was determined.

The next time the drive is switched on, *Referencing angle of rest* is no longer executed!!!

9.2 Referencing the drive without reference sensor

The drive can also be referenced without using a reference sensor by performing the following steps:

Select *Reference travel* from the “*Operating mode*” menu.

Next, proceed based on the description **Technology modules positioning and synchronous operation (TMPS)**, item 2.6 or manual V- / bmaXX controller. Select the *Meth - 3* mode.

Accept the value in *Reference point* or specify your own value. Next, place the carriage in a defined position (e.g. limit position).

Execute referencing with *RStart* (controller and pulse enable must be active at the drive). At this time, the carriage does not move. The current position is accepted as reference position. After the “*Reference travel completed*” message appears, press *Stop* and deactivate hardware enable. The operating modes Positioning or Manual operation can now be carried out.

Do not forget to save the data according to item 2.9!

The linear axis can also be retrofitted with a reference sensor which must be connected to a digital input. The programming of these inputs is described under item 2.6.3 (TMPS) or in the manual accompanying the V controller/bmaXX. The *Meth - 4* or *Meth - 5* mode must be selected for referencing. Observe pages 35 through 48 (TMPS) for this purpose.

After executing the two activities Position of rest and Determine reference point, the application-specific operating mode can be activated, such as positioning mode.

9.3 Positioning mode

Positionings can be started in several ways; the most important ones are listed below:

- Using WinBASS and selecting the positioning sets 1 or 2.
- Selection of positioning sets using digital inputs programmed accordingly, see item 2.10 (TMPS) or manual bmaXX controller
- Writing the relevant parameters via fieldbus (e.g. CANopen)

The TMPS or bmaXX manual features a detailed description of the procedure for the *Positioning* operating mode.

The described procedure of commissioning in the last section also obtains for drives from other manufactures.

10 Maintenance and disposal of motor components

10.1 Maintenance of motor components

The motor components are maintenance-free. But it cannot be ruled out that damages to the motor components may result from external influences during operation. For this reason, the motor components should be checked accordingly in the context of the maintenance intervals for the system or the machine.

In essence, the inspection of the motor components or the complete control system covers the following items:

- Foreign bodies in the air gap between primary and secondary section
- Damages to primary and secondary section, particularly grinding marks
- Power cable feeder
- Linear measuring system
- Guide system
- Visual inspection of cooling water connections for leaks

10.2 Disposal

The linear motor components consist of materials such as steel, copper, insulation material, permanent magnets and cast resin. For disposal purposes, the motor must be disassembled accordingly, and the individual materials must be disposed of separately.

11 Linear drive project planning sheet

Baumüller Kamenz GmbH
 Nordstrasse 57
 01917 Kamenz
 Telefon: +49 (0)3578 / 3406-0
 Telefax: +49 (0)3578 / 3406-50



Date: _____

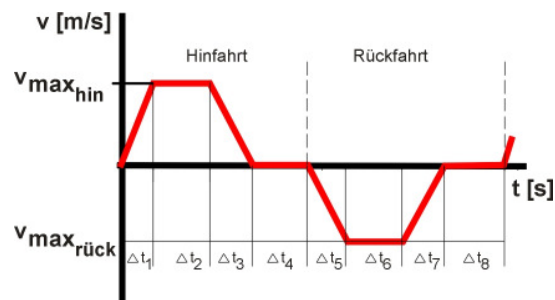
SIZING REQUEST FOR LINEAR MOTORS

Address:

Title: Mrs. ☐ Mr. ☐ Company: * _____ Street: * _____ Country: _____ Code: _____ Phone: * _____ Email: _____	Name: * _____ Dept: _____ Nr.: * _____ City: * _____ Fax: * _____
--	---

Project: Which function should be fulfilled? *components ☐complete axis ☐**Technical data:**

Forward acceleration: Δt_1 [s] = _____
 Travel (time): Δt_2 [s] = _____
 Deceleration (to rest): Δt_3 [s] = _____
 Rest (time): Δt_4 [s] = _____
 Backward acceleration: Δt_5 [s] = _____
 Travel (time): Δt_6 [s] = _____
 Deceleration (to rest): Δt_7 [s] = _____
 Rest (time): Δt_8 [s] = _____



Payload * [kg] = _____	Mass of carriage [kg] = _____
Handling force [N] = _____	_____
Length of travel * [mm] = _____	Length of carriage [mm] = _____
velocity* [m/s]: v_max,forward = _____	v_max, backward = _____ max. acceleration [m/s²] = _____

Control: velocity ☐ position ☐ force ☐
 Position accuracy* [mm]: _____ Measurement:* incremental ☐ absolut ☐

Electrical connection plug ☐ open cable end ☐ terminal box ☐
 Motion direction:* horizontal ☐ vertical ☐ angular [°] _____

Balance weight ? (vertical movement) available ☐ not available ☐

Friction coefficient (depending on guiding system): _____

Type of protection: IP _____

Number of required drives:* _____

Cooling:* unventilated ☐ water cooled ☐ ventilated ☐

Conditions of mounting: * (in particular cooling plate primary part)

Comments: * special environmental factors, purity requirements, explosion protection, ...