

# LSP Servomotors

## Order Catalogue



**Series:**

LSP servomotors with optional planetary gear  
Stall torque: 0.18 to 18.5 Nm

**Order Catalogue: LSP Servomotors**

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Subject to technical change without notice.

The German version is the original of this Order Catalogue.

# LSP Servomotors

The following double-page spread sets out the contents of the Order Catalogue.

This catalogue contains key information relating to the power capabilities of LSP servomotors. Please take some time to familiarize yourself with it.

1



2



3

4

# Contents

Section 1 - Basic information

1

Section 2 - Overview of LSP servomotors

2

Section 3 - Motor and encoder cables

3

Section 4 - Appendix

4

# Table of contents

## Section 1: Basic information

Selection procedure .....	1-1
Ambient conditions and base configuration .....	1-2
Abbreviations and definitions .....	1-3
Declaration of conformity for LSP servomotors .....	1-4
Lifetime .....	1-5
Order code .....	1-7
Brakes option .....	1-9
Absolute value encoder option .....	1-11
Encoder system options .....	1-15
Overview of termination technique .....	1-16
Termination technique Y-Tec plug, standard Y17 .....	1-17
Mating plug for Y-Tec .....	1-18
Termination technique I-Tec plug, I17 and I23 plug (HIPERFACE DSL®) .....	1-19
Mating plug for I-Tec .....	1-20
Termination technique Plug M23, option W23 .....	1-21
Mating plug for W23 .....	1-22
General gear unit data .....	1-24
Option E04 planetary gear unit PLE40, LSP04 (Type-002, Type-004) .....	1-25
Option E06 planetary gear unit PLE60, LSP06 (Type-007, Type-015) .....	1-27
Option E08 planetary gear unit PLE80, LSP08 (Type-028, Type-035) .....	1-29
Option E10 planetary gear unit PLE120, LSP10 (Type-056, Type-075) .....	1-31
Option E10 planetary gear unit PLE120, LSP13 (Type-055, Type-091, Type-123, Type-185) .....	1-33

## Section 2: Overview of LSP servomotors

Motor type: LSP04-002 .....	2-3
Motor type: LSP04-004 .....	2-7
Motor type: LSP06-007, LSP06-015 .....	2-11
Motor type: LSP08-028 .....	2-15
Motor type: LSP08-035 .....	2-19
Motor type: LSP10-056, LSP10-075 .....	2-23
Motor type: LSP13-055, LSP13-091 .....	2-27
Motor type: LSP13-123, LSP13-185 .....	2-31

## Section 3: Motor and encoder cables

Ready-made motor cables for ServoOne junior .....	3-1
Ready-made encoder cables for ServoOne junior .....	3-2
Ready-made HIPERFACE DSL® cables .....	3-3
Ready-made motor cables for ServoOne CM .....	3-5
Ready-made encoder cables for the ServoOne CM .....	3-7

## Section 4: Appendix

Holding brake .....	4-2
---------------------	-----

# 1. Basic information

## Selection procedure

Basic information	To select the correct drive and motor, you need to know the specific speed and the load cycle of the drive task at hand.
 <b>1.</b>	Define supply voltage: 230 V to 400 V.
 <b>2.</b>	Define the construction windows.
 <b>3.</b>	Define maximum torque from the load cycle profile or by dimensioning via Servosoft.
 <b>4.</b>	Define the mean (effective) torque - see Engineering Guide.
 <b>5.</b>	Define the required motor or geared motor type: LSP ...
 <b>6.</b>	Select the motor on the relevant data page in line with the following criteria: Synchronous servomotor: $n_{\max} \leq 1.1 \cdot n_{\text{rated}}$ $M_{\text{eff}} \leq M_{\text{rated}}$
 <b>7.</b>	Define the required encoder system in line with requirements: resolver, absolute value encoder, pulses per revolution.
 <b>8.</b>	Complete motor or geared motor designation with all required options (type code).
 <b>9.</b>	Define the length of the required ready made power cable.
 <b>10.</b>	Define the required ready made encoder cable.
 <b>11.</b>	From the selection and order data, select the servo-controller for the chosen motor based on the standard overload conditions. Select the servo-controller according to the respective motor stall current/rated current.



## Ambient conditions and base configuration

Motor type	Permanent magnet excited 3-phase-current synchronous servomotor	
Ambient temperatures (in operation)	-10°C to +40°C	
Storage temperatures (not in operation)	-20°C to +70°C	
Humidity	<90% relative air humidity (non-condensing)	
Insulation class	F (= to 155°C) Δ T = 115 K	
Protection class	IP65 as standard (except A side, here IP21)	
Cooling	Convective (self-cooling)	
Bearing life	20,000 h under rated conditions (Mn)	
Temperature sensor	KTY	
Voltage gradient dU/dt	8 kV/μs	
Max. site altitude	4000 metres above sea level; above 1000 metres 2% derating per 100 m	
Accurate true running, coaxiality and axial run-out to DIN 42955	N (normal)	
Vibration severity to ISO 2373	Level N	
Detent torques	LSP04	2.5% ± 0.5 % of max. rated current
	LSP06	2.0% ± 0.5 % of max. rated current
	LSP08	1.5% ± 0.5 % of max. rated current
	LSP10	1.5% ± 0.5 % of max. rated current
	LSP13	1.5% ± 0.5 % of max. rated current
Coating	Baking enamel black, RAL 9005	
Magnet material	Neodymium-iron-boron (NdFeB)	
Shaft end	Cylindrical shaft end with/without feather key way	
Balance	Q 2.5	
Measuring systems	Resolver, SinCos® SEK/SEL37, SKS/SKM36, EKS/EKM36, SRS/SRM50	
Approbations	CE, UL insulation system HE-GM1 (E 238319) / ul E466041	

## Abbreviations and definitions

Abbreviation	Unit	Explanation
$f_n$	[Hz]	Rated frequency
$i$	[-]	Gear ratio (for geared motors)
$I_0$	[A]	Stall current (motor current at stall torque $M_0$ )
$I_n$	[A]	Rated current (rated current per phase)
$I_{max}$	[A]	Peak current (maximum permissible current per phase)
$J$	[kgcm <sup>2</sup> ]	Rotor moment of inertia (rotor moment of inertia relates to a motor without brake)
$J_G$	[kgcm <sup>2</sup> ]	Moment of inertia for geared motors
$K_E$	[V <sub>rms</sub> /1000min <sup>-1</sup> ]	EMF constant (induced voltage between two phases at 1000 rpm)
$K_T$	[Nm/A]	Torque constant at nominal point (quotient of rated torque $M_n$ and rated current $I_n$ )
$K_{T,0}$	[Nm/A]	Torque constant at standstill (quotient of stall torque $M_0$ and stall current $I_0$ )
$L_{pp}$	[mH]	Winding inductance (2 phases) at rated current $I_n$ [A]
$m$	[kg]	Ground (motor ground without brake)
$M_0$	[Nm]	Stall torque (stall torque in S1)
$M_n$	[Nm]	Rated torque (rated torque in S1)
$M_{max}$	[Nm]	Peak torque (maximum permissible short-time torque)
$n_n$	[min <sup>-1</sup> ]	Rated speed
$n_{max}$	[min <sup>-1</sup> ]	Maximum speed
$p$	[-]	Number of pole pairs
$P_n$	[W]	Rated power (mechanical rated power on the shaft)
$R_{pp}$	[Ω]	Winding resistance (2 phases, at a winding temperature of 20°C)
$T_{el}$	[min]	Electrical time constant
$T_{th}$	[min]	Thermal time constant
$U_n$	[V]	Controller rated voltage
$U_{DC}$	[V]	DC link voltage

# Declaration of conformity for LSP servomotors

## EG-Konformitätserklärung



*EC Declaration of Conformity*

Der Hersteller  
*The manufacturer* LTI DRIVES GmbH  
Gewerbestraße 5-9  
35633 Lahnau

erklärt hiermit, dass die folgenden Produkte  
*declares that the following products*

Produktbezeichnung: Servomotor  
*Product designation: Servomotor*

Produkttypen: LSMx, LSP  
*Product types: LSMx, LSP*

den Sicherheitsbestimmungen der nachstehenden EG-Richtlinie entsprechen:  
*comply with the essential requirements of the following EC Directive:*

2006/95/EG [Niederspannungsrichtlinie]  
*2006/95/EC [Low Voltage Directive]*

und dass folgende angeführten harmonisierten Normen angewandt wurden:  
*and that the following harmonised standards have been applied:*

EN 60034-1:2010  
Drehende elektrische Maschinen - Teil 1: Bemessung und Betriebsverhalten (IEC 60034-1:2010)  
*Rotating electrical machines - Part 1: Rating and performance (IEC 60034-1:2010)*

EN 60529:1991/A1:2000  
Schutzarten durch Gehäuse (IP-Code) (IEC 60529:1989+A1:1999)  
*Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989+A1:1999)*

Jahr der CE-Kennzeichnung / *Year of CE-marking:* 2011

Unterschrift / *signature*

Name / *name:*   
Stellung / *position:* Dr. Josef Wiesing  
Datum / *date:* Geschäftsführer / *Managing Director*  
13.04.2011

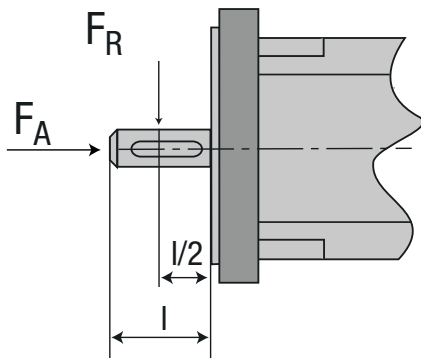
Dokument: 1175.0DK.0-00

## Permissible forces

### Maximum radial force $F_R$ [N]

Motor type	1000 rpm	2000 rpm	3000 rpm	4000 rpm	5000 rpm	6000 rpm	7000 rpm	8000 rpm	9000 rpm
LSP04-002	215	170	150	135	125	120	115	110	105
LSP04-004	235	185	160	150	135	130	125	120	115
LSP06-007	350	290	250	230	210	200	190	180	-
LSP06-015	390	310	270	250	230	220	205	195	-
LSP08-028	500	400	350	320	300	270	260	-	-
LSP08-035	520	410	360	320	300	280	265	-	-
LSP10-056	940	740	650	590	550	515	-	-	-
LSP10-075	970	770	680	615	570	540	-	-	-
LSP13-055	820	650	570	510	480	-	-	-	-
LSP13-091	860	680	590	640	500	-	-	-	-
LSP13-123	1100	900	790	710	660	-	-	-	-
LSP13-185	1200	960	840	760	700	-	-	-	-

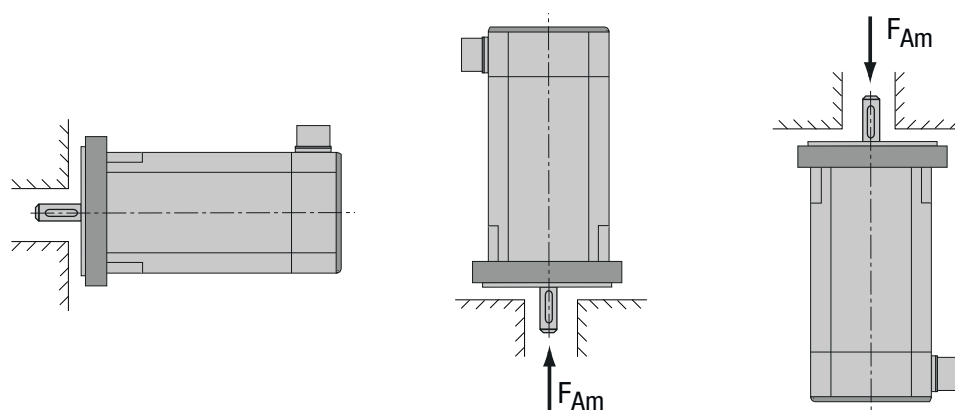
Table 3.1 Maximum axial force:  $F_A = 0.2 \times F_R$



The table indicates the maximum permissible lateral force (radial force  $F_R$ ) at the point of application  $l/2$  and the **maximum permissible axial force  $F_A$  ( $F_A = 0,2 \cdot F_R$ )** for a **service life of 20,000 h**. A lateral force not applied in the middle of the shaft end can simply be translated to allow for the changed lever ratios.

Either the permissible radial force or the axial force may act on the motor shaft! A one-off axial force of 40% of the radial force at standstill is permissible for motor installation.

## Technical data - Design



Design	B5	V1	V3
Shaft	Free shaft end	Free shaft end at bottom	Free shaft end at top
Attachment	Flange mounting Access from housing side	Flange mounting at bottom Access from housing side	Flange mounting at top Access from housing side



**NOTE:** With vertical mounting (V1) the permissible axial forces ( $F_A$ ) apply. With vertical upward mounting (V3) the permissible axial forces are reduced by the force due to weight of the rotor ( $F_G$ ).

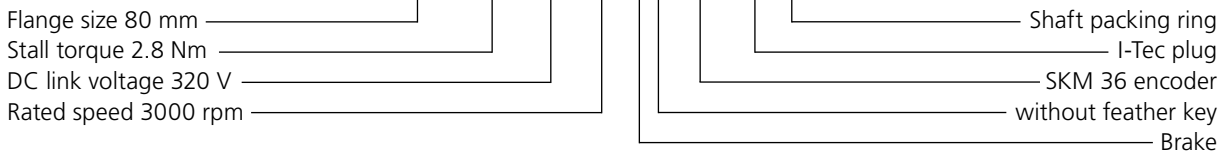
# Order code

1

LSP	08-	028-	320-	30-	B	O	H2M	Y17	E08	16
<b>LTI synchronous motor Series P</b>										
<b>Flange size</b>	40 mm → <b>04</b> 60 mm → <b>06</b> 80 mm → <b>08</b> 100 mm → <b>10</b> 130 mm → <b>13</b>									
<b>Stall torque</b>	0.2 Nm → <b>002</b> 0.4 Nm → <b>004</b> 0.7 Nm → <b>007</b> 1.5 Nm → <b>015</b> 2.8 Nm → <b>028</b> 3.5 Nm → <b>035</b> 5.6 Nm → <b>056</b> 7.5 Nm → <b>075</b> 5.5 Nm → <b>055</b> 9.1 Nm → <b>091</b> 12.3 Nm → <b>123</b> 18.5 Nm → <b>185</b>									
<b>DC link voltage</b>	48 V → <b>048</b> 320 V → <b>320</b> 560 V → <b>560</b>									
<b>Rated speed</b>	2000 rpm → <b>20</b> 3000 rpm → <b>30</b> 3600 rpm → <b>36</b> 5000 rpm → <b>50</b> 5500 rpm → <b>55</b> 6000 rpm → <b>60</b> 9000 rpm → <b>90</b>									
<b>Brake option</b>	Brake - <b>B</b> X XXX XXX XXXXX All motor types									
<b>Feather key option</b>	Feather key - <b>X P</b> XXX XXX XXXXX All motor types									
<b>Encoder system options</b>	Resolver - <b>X X R1P</b> XXX XXXXX All motor types SEK 3X - <b>X X H1S</b> XXX XXXXX All motor types EEK 37 - <b>X X D1S</b> XXX XXXXX All motor types SEL 3X - <b>XX H1M</b> XXX XXXXX All motor types EEL 37 - <b>XX D1M</b> XXX XXXXX All motor types SKS 36 - <b>X X H2S</b> XXX XXXXX LSP06, LSP08, LSP10, LSP13 EKS 36 - <b>X X D2S</b> XXX XXXXX LSP06, LSP08, LSP10, LSP13 SKM 36 - <b>XX H2M</b> XXX XXXXX LSP06, LSP08, LSP10, LSP13 EKM 36 - <b>XX D2M</b> XXX XXXXX LSP06, LSP08, LSP10, LSP13 SRS 50 - <b>X X H3S</b> XXX XXXXX LSP08, LSP10, LSP13 EFS 50 - <b>X X D3S</b> XXX XXXXX LSP08, LSP10, LSP13 SRM 50 - <b>XX H3M</b> XXX XXXXX LSP08, LSP10, LSP13 EFM 50 - <b>XX D3M</b> XXX XXXXX LSP08, LSP10, LSP13									
<b>Connection options</b>	Y-Tec angled KTY in the encoder plug - <b>X X XXX Y17</b> XXXXX All motor types I-Tec angled (one-cable interface) - <b>X X XXX I17</b> XXXXX All motor types M23 angled KTY in the encoder plug - <b>X X XXX W23</b> XXXXX LSP06, LSP08, LSP10, LSP13 M23 angled KTY in the motor plug - <b>X X XXX W2M</b> XXXXX LSP06, LSP08, LSP10, LSP13 Y-Tec KTY in the motor plug - <b>X X XXX Y1M</b> XXXXX All motor types I-Tec angled (one-cable interface) - <b>X X XXX I23</b> XXXXX All motor types (in preparation)									
<b>Drive option</b>	W → shaft packing ring All motor types without gear unit LSP04 → planetary gear unit PLE40 → <b>E04</b> LSP06 → planetary gear unit PLE60 → <b>E06</b> LSP08 → planetary gear unit PLE80 → <b>E08</b> LSP10 → planetary gear unit PLE120 → <b>E10</b> LSP13 → planetary gear unit PLE120 → <b>E10</b>									
<b>Gear ratio</b>	Gear ratio $i=16$ → <b>16</b> Possible gear ratios → <b>03, 04, 05, ..., 16, ..., 64</b> (see technical data in the section "PLE option")									

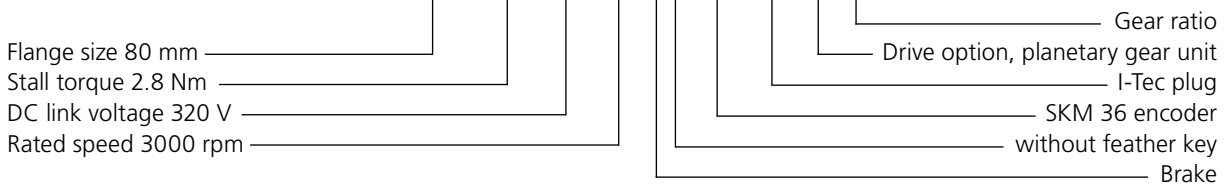
**Order code example for LSP servomotor:**

**LSP08-028-320-30-BOH2M I17 W**



**Order code example for LSP servomotor with planetary gear unit:**

**LSP08-028-320-30-BOH2M I17 E0816**



## Brakes option

### Technical data

The brakes are permanent magnet DC voltage no-load current brake units.  
The brakes are not service brakes. Switch on and off only at speed = 0.

Insulation class: F (155°)  
Max. speed: 10,000 rpm  
Supply voltage: 24 V DC +6% -10%

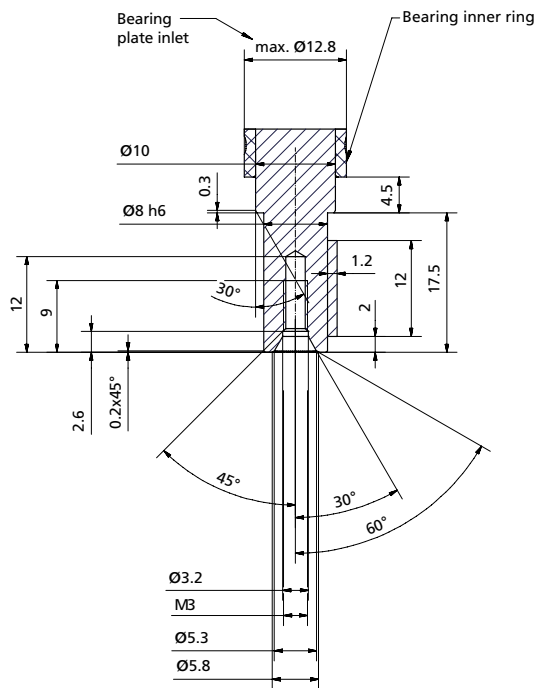
Technical data - Brake	LSP04-		LSP06-		LSP08-	
	002	004	007	015	028	035
Moment of inertia with Brake [kgm <sup>2</sup> ]	0.055 · 10 <sup>-4</sup>	0.079 · 10 <sup>-4</sup>	0.319 · 10 <sup>-4</sup>	0.512 · 10 <sup>-4</sup>	1.68 · 10 <sup>-4</sup>	2.20 · 10 <sup>-4</sup>
Braking torque, static [Nm]	0.4	0.4	2.0	2.0	4.5	4.5
Braking torque, dynamic [Nm]	0.3	0.3	1.7	1.7	3.8	3.8
Brake input power [W]	8	8	11	11	12	12
Brake voltage [V DC]	24	24	24	24	24	24
Brake input current [A]	0.33	0.33	0.46	0.46	0.50	0.50
Brake friction energy [kJ]	180	180	580	580	580	580
Brake disengagement time [ms]	10	10	25	25	35	35
Brake response delay [ms]	2	2	2	2	2	2
Closure time [ms]	6	6	10	10	15	15
Weight of motor with brake [kg]	0.66	0.85	1.8	2.35	3.85	4.5

Technical data - Brake	LSP10-		LSP13-			
	056	075	055	091	123	185
Moment of inertia with Brake [kgm <sup>2</sup> ]	5.63 · 10 <sup>-4</sup>	7.20 · 10 <sup>-4</sup>	10.5 · 10 <sup>-4</sup>	14.8 · 10 <sup>-4</sup>	23.1 · 10 <sup>-4</sup>	35.8 · 10 <sup>-4</sup>
Braking torque, static [Nm]	9.0	9.0	9.0	9.0	20	20
Braking torque, dynamic [Nm]	7.5	7.5	7.5	7.5	15	15
Brake input power [W]	18	18	18	18	24	24
Brake voltage [V DC]	24	24	24	24	24	24
Brake input current [A]	0.75	0.75	0.75	0.75	1.00	1.00
Brake friction energy [kJ]	890	890	890	890	1290	1290
Brake disengagement time [ms]	40	40	40	40	50	50
Brake response delay [ms]	2	2	2	2	3	3
Closure time [ms]	20	20	20	20	40	40
Weight of motor with brake [kg]	7.4	8.75	8.0	9.4	12.2	16.4

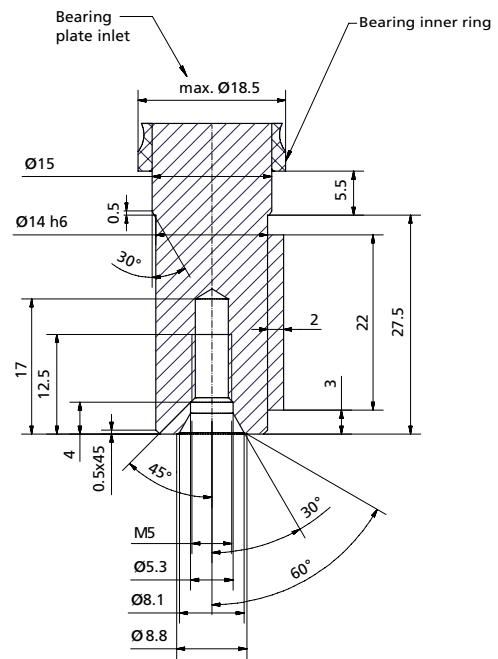
The motors must not be run against the closed brake. The motor brake is designed as a holding brake at standstill. An emergency stop of the running motor is permissible in exceptional circumstances. The number of emergency stops is limited by the moment of inertia of the overall system.



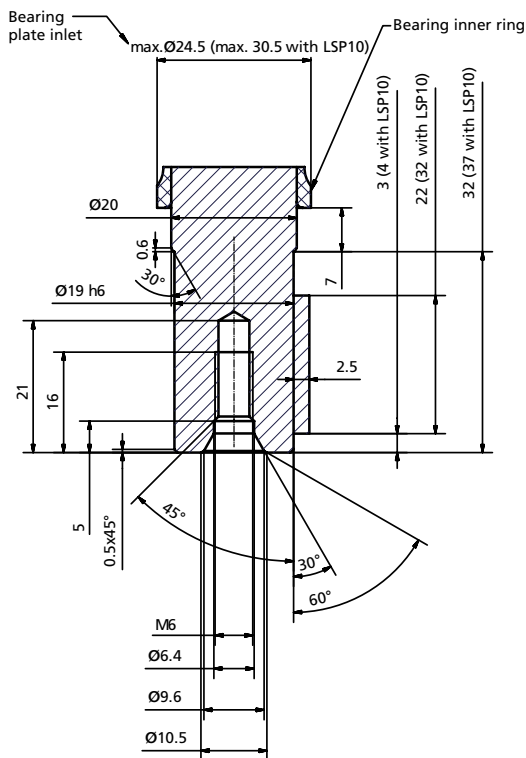
LSP04



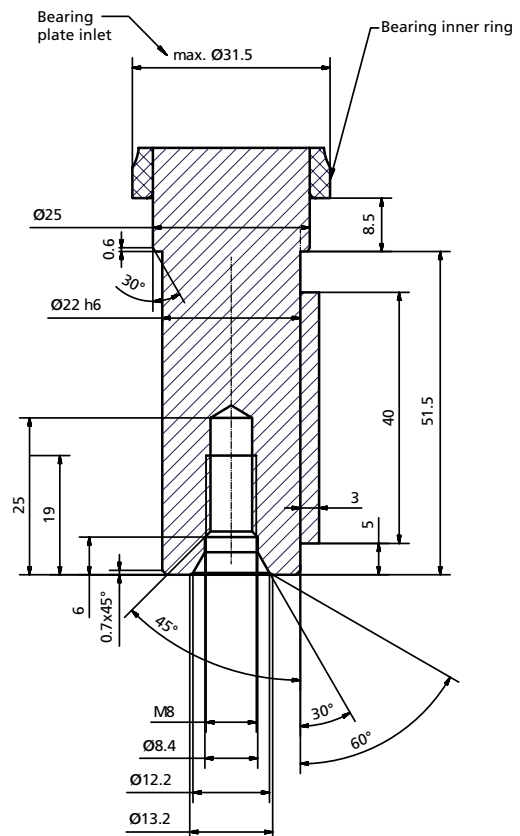
LSP06



LSP08 and LSP10



LSP13



## Absolute value encoder option

### Resolver

RE-15



**Technical data:**

- 1 sine/cosine period per revolution
- Resolution determined by the drive controller

### Capacitive systems

SEK/SEL37

*(single/multi-turn encoder)*



**Technical data:**

- 16 sine/cosine periods per revolution
- Absolute position with a resolution of 512 increments per revolution
- 4096 revolutions measurable (multi-turn)
- Electronic rating plate

EEK/EEL37

*(single/multi-turn encoder)*



**In preparation:**

- Encoder for one-cable interface (Hiperface DSL)

## Optical systems

SKS/SKM36  
*(single/multi-turn encoder)*



**Technical data:**

- 128 sine/cosine periods per revolution
- Absolute position with a resolution of 4,096 increments per revolution
- 4096 revolutions measurable (multi-turn)
- Electronic rating plate

EKS/EKM36  
*(single/multi-turn encoder)*



**Technical data:**

- Encoder for one-cable interface (Hiperface DSL)
- 18-bit resolution of position (128 sine/cosine periods per revolution - digitalized in encoder)
- 4096 revolutions measurable (multi-turn)
- Electronic rating plate

SRS/SRM50  
*(single/multi-turn encoder)*



**Technical data:**

- 1024 sine/cosine periods per revolution
- Absolute position with a resolution of 32,768 increments per revolution
- 4096 revolutions measurable (multi-turn)
- Electronic rating plate

EFS/EFM50  
*(single/multi-turn encoder)*



**In preparation:**

- Encoder for one-cable interface (Hiperface DSL)

Technical data to DIN 32878	Resolver RE-15	SEK/SEL37	EEK/EEL37 <sup>2)</sup>	SKS/SKM36	EKS/EKM36	SRS/SRM50	EPS/EFM50 <sup>2)</sup>
Rating plate identifier	R1P	H1S/H1M		H2S/H2M	D2S/D2M	H3S/H3M	
Number of sine/cosine periods per revolution	1	16		128	128	1,024	
Number of absolutely measurable revolutions	1	SEK 1 SEL 4.096		SKS 1 SKM 4.096	EKS 1 EKM 4,096	SRS 1 SRM 4.096	
Code type for absolute value	Analog	Binary		Binary	Binary	Binary	
Code curve <sup>1)</sup>	Rising	Rising		Rising	Rising	Rising	
Repetition accuracy	± 10 angle min.	± 288 angle sec.		± 80 angle sec.	± 80 angle sec.	± 45 angle sec.	
Absolute accuracy	± 11 angle min.	± 432 angle sec.		± 120 Angle sec.	± 120 Angle sec.	± 52 angle sec.	
Shock resistance	100 g/11 ms	100 g/10 ms		100 g/6 ms	100 g/6 ms	100 g/10 ms	
Vibration resistance	50 g/ 10 ... 500 Hz	50 g/ 10 ... 2000 Hz		50 g/ 10 ... 2000 Hz	50 g/ 10 ... 2000 Hz	50 g/ 10 ... 2000 Hz	
Operating voltage range	7 V	7 ... 12 V		7 ... 12 V	7 ... 12 V	7 ... 12 V	
Max. operating current without load	---	< 50 mA		60 mA	150 mA	80 mA	
Interface signals Process data cable = SIN, REFSIN, COS, REFCOS Parameter channel = RS 485	---	Analog, differential digital		Analog, differential digital	differential digital	Analog, differential digital	
Position resolution for positioning speed control when operating on ServoOne junior	14-bit	17-bit		21-bit	18-bit	24-bit	

1) With shaft rotating clockwise as viewed towards "A"

2) absolute value encoder in development

## Encoder selection help

Application	Resolver	Stegmann SEK37 Sin-Cos 16	Stegmann SKS36 Sin-Cos 128	Stegmann SRS50 Sin-Cos 1024
Handling	+	++	++	++
Robotics	+	++	++	++
Packaging	0	+	++	++
Machine tools	--	-	0	+
Printing machinery	--	-	0	+

"++" ... Very well suited

"+" ... Well suited

"0" ... Possibly suitable, verification required

"--" ... Mostly unsuitable (possibly usable)

"- -" ... Unsuitable

Space for notes

## Encoder system options

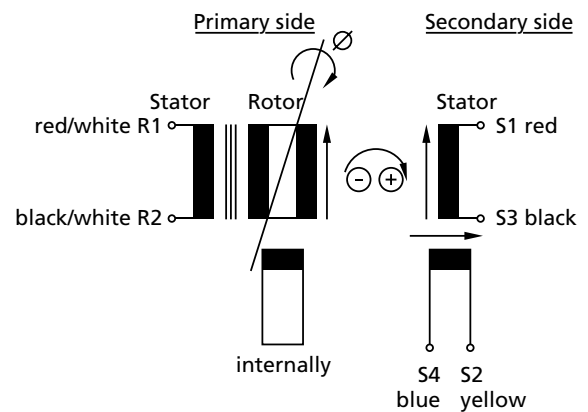
All LTi LSP motors are fitted with a resolver as standard. Various SinCos encoders with the Hiperface® interface can optionally be built on to the model series. For motors with these encoders the angle offset is written to the encoder memory.

Overview of suitable encoders:

Motor type	Resolver	Absolute value encoder					
	Standard	SEK/SEL37 (34)	EEK/EEL37	SKS/SKM36	EKS/EKM36	SRS/SRM50	EFS/EFM50
LSP04	X	X	X				
LSP06	X	X	X	X	X		
LSP08	X	X	X	X	X	X	X
LSP10	X	X	X	X	X	X	X
LSP13	X	X	X	X	X	X	X

### Resolver circuit diagram:

Stability	
Working environment	IE 32 to EN 60721-3-3
Working temperatures	-55 °C – 155 °C
Vibration resistance to EN 60068-2-6 in the range	<500 m/s <sup>2</sup> 55 – 2000 Hz
Impact resistance at	<1000 m/s <sup>2</sup> 11 ms
Max. working speed	20,000 rpm



## Overview of termination technique

Motor type	Standard: Y-Tec plug	I-Tec plug	Optional in project business with ServoOne: M23 angled rotating plug
LSP04	X	X	
LSP06	X	X	X
LSP08	X	X	X
LSP10	X	X	X
LSP13	X	X	X

## Termination technique Y-Tec plug, standard Y17



### Power

Assignment	Function
A	U
B	V
C	W
Grounding	PE
1	KTY +*
2	KTY -*
3	Brake +*
4	Brake -*
5	-

\* depending on the selected option

### Resolver signal

Assignment	Function
1	cos+
2	cos -/refcos
3	sin +
4	sin -/refsin
5	R1 (ref +)
6	R2 (ref -)
7	-
8	-
9	Temp +*
10	Temp -*
11	-
12	-

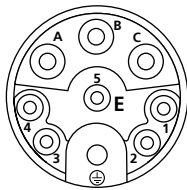
\* depending on the selected option

### Hiperface signal

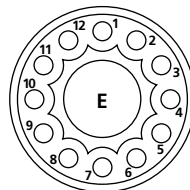
Assignment	Function
1	cos+
2	cos -/refcos
3	sin +
4	sin -/refsin
5	Data +
6	Data -
7	Us
8	GND
9	Temp +*
10	Temp -*
11	-
12	-

\* depending on the selected option

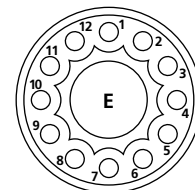
### Motor plug



Power plug, 9-pin  
9 x Ø 1 mm (3 + PE + 5)

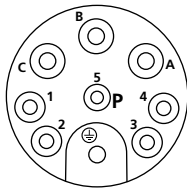


Signal plug, 12-pin  
12 x Ø 1 mm

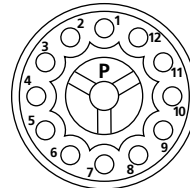


Signal plug, 12-pin  
12 x Ø 1 mm

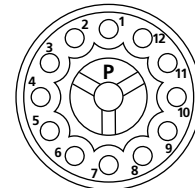
### Mating plug



Intercontec designation  
ESTB 202 NN00 13 0500 000  
(Cable clamping area  
10.5-12 mm)



Intercontec designation  
ESTB 002 NN00 11 0001 000  
(Cable clamping area  
7.5-10 mm)



Intercontec designation  
ESTB 002 NN00 11 0001 000  
(Cable clamping area  
7.5-10 mm)

View of plug-in side

View of plug-in side



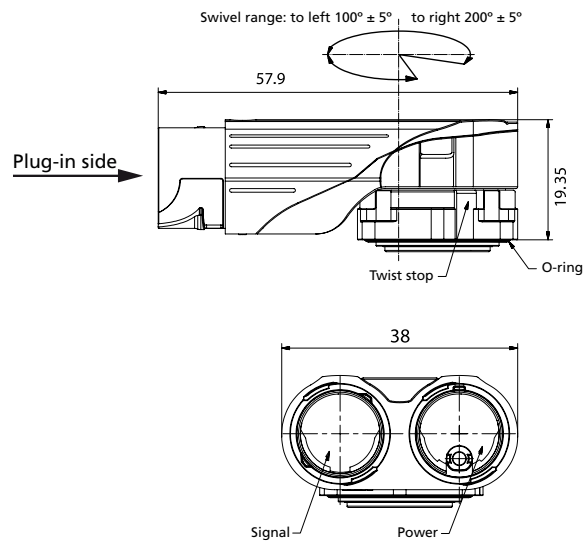
Mating plug for Y-Tec



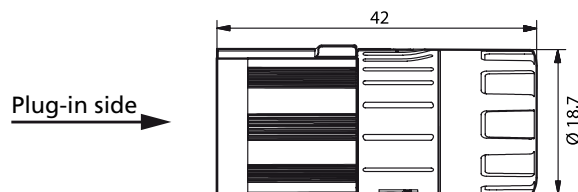
## Technical drawing

### Motor plug Y17

Rotating angled socket Y-Tec



### Mating plug Y17



## Termination technique I-Tec plug, I17 and I23 plug



### Motor plug, one-cable interface (HIPERFACE DSL®)

#### I17 plug

Assignment	Function
A	U
B	V
C	W
Grounding	PE
1	D+
2	D-
3	Brake +*
4	Brake -*
5	-

\* depending on the selected option

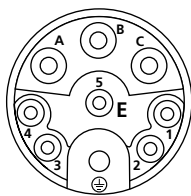
#### I23 plug

Assignment	Function
A	Brake +*
B	Brake -*
C	D+
D	D-
1	U
4	V
3	W
Grounding	PE

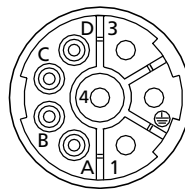
\* depending on the selected option

### Motor plug

View of plug-in side



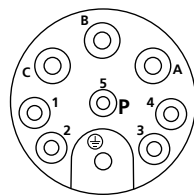
Power plug, 9-pin  
9 x Ø 1 mm (3 + PE + 5)



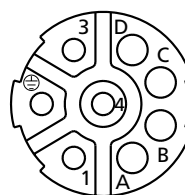
Power plug, 8-pin  
8 x Ø 2 mm (3 + PE) 4 x 1 mm

### Mating plug

View of plug-in side



Power plug, 9-pole socket  
ESTB 202 FR 0113 0500 000  
(Cable clamping area  
10.5-12 mm)



Intercontec designation  
BSTA 078 NN00 42 0100 000  
(Cable clamping area 9.5-14 mm)

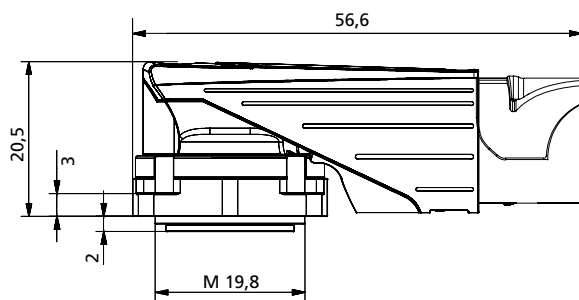
Mating plug for I-Tec



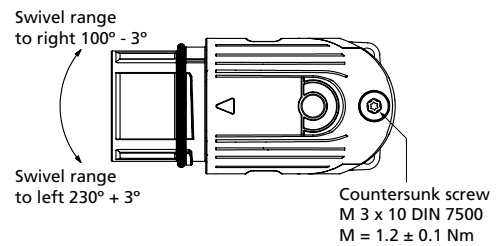
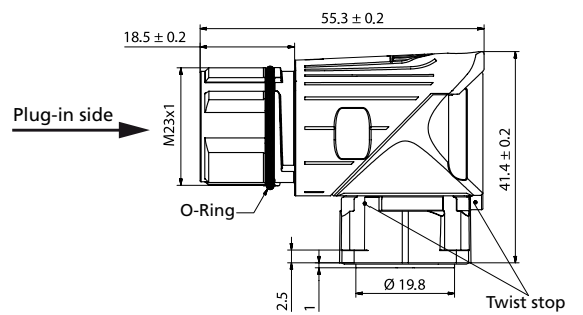
**Technical drawing**

**Motor plug I17**

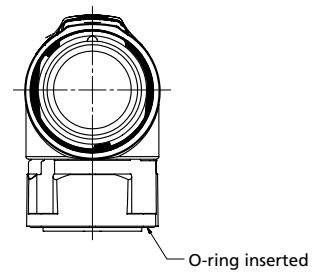
Rotating angled socket, I-Tec



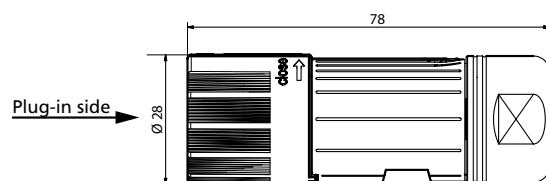
**Motor plug I23**



**Mating plug I17**



**Mating plug I23**



## Termination technique Plug M23, option W23



### Power

Assignment	Function
A	Brake +*
B	Brake -*
C	KTY +*
D	KTY -*
1	U
4	V
3	W
Grounding	PE

\* depending on the selected option

### Resolver signal

Assignment	Function
1	cos+
2	cos -/refcos
3	sin +
4	sin -/refsin
5	-
6	R1 (ref +)
7	R2 (ref -)
8	-
9	-
10	-
11	KTY +*
12	KTY -*

\* depending on the selected option

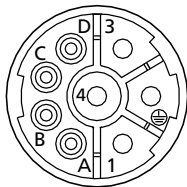
### Hiperface signal

Assignment	Function
1	cos+
2	cos -/refcos
3	sin +
4	sin -/refsin
5	-
6	-
7	GND
8	-
9	Us
10	Data +
11	Data
12	-
13	-
14	KTY +*
15	KTY -*
16	-
17	-

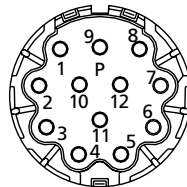
\* depending on the selected option

### Motor plug

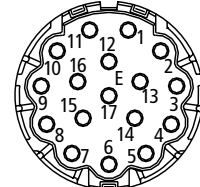
View of plug-in side



8-pin  
4 x Ø 2 mm (3 + PE) 4 x Ø 1 mm



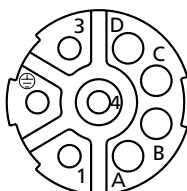
12-pin  
12 x Ø 1 mm, 0° coded



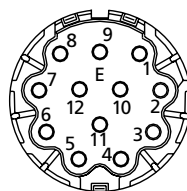
17-pin  
17 x Ø 1 mm, 0° coded

### Mating plug

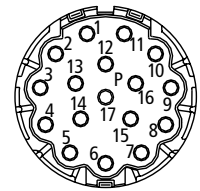
View of plug-in side



Intercontec designation  
BSTA 078 NN00 42 0100 000  
(Cable clamping area 9.5-14 mm)



Intercontec designation  
ASTA 013 NN00 41 0100 000  
(Cable clamping area 6-10 mm)



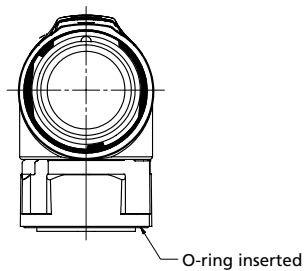
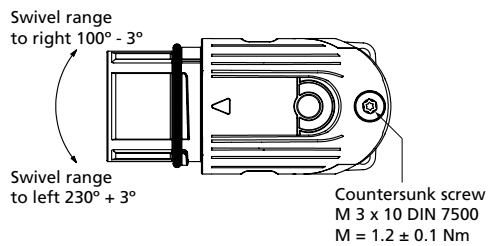
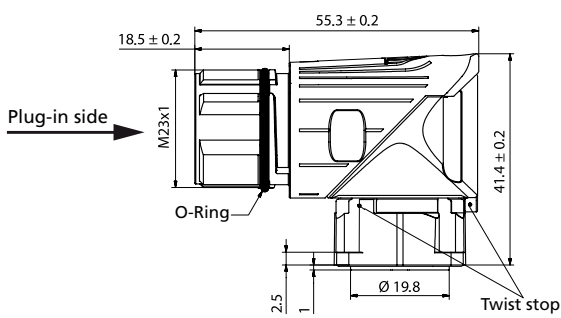
Intercontec designation  
ASTA 014 NN00 41 0100 000  
(Cable clamping area 6-10 mm)

## Mating plug for W23

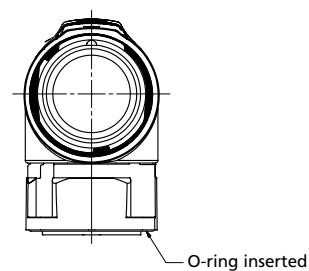
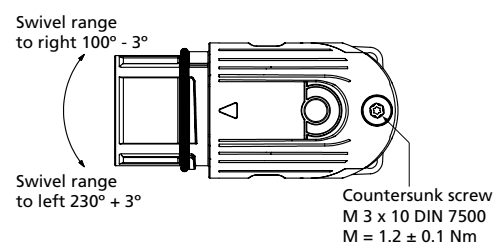
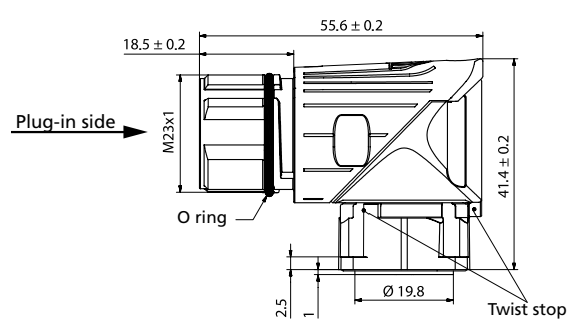


## Technical drawing

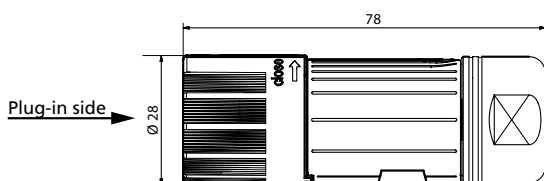
### Power - motor plug



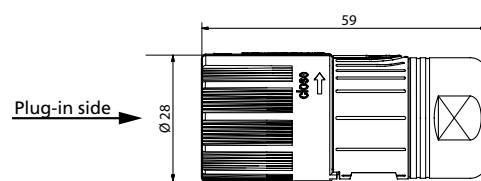
### Signal - motor plug



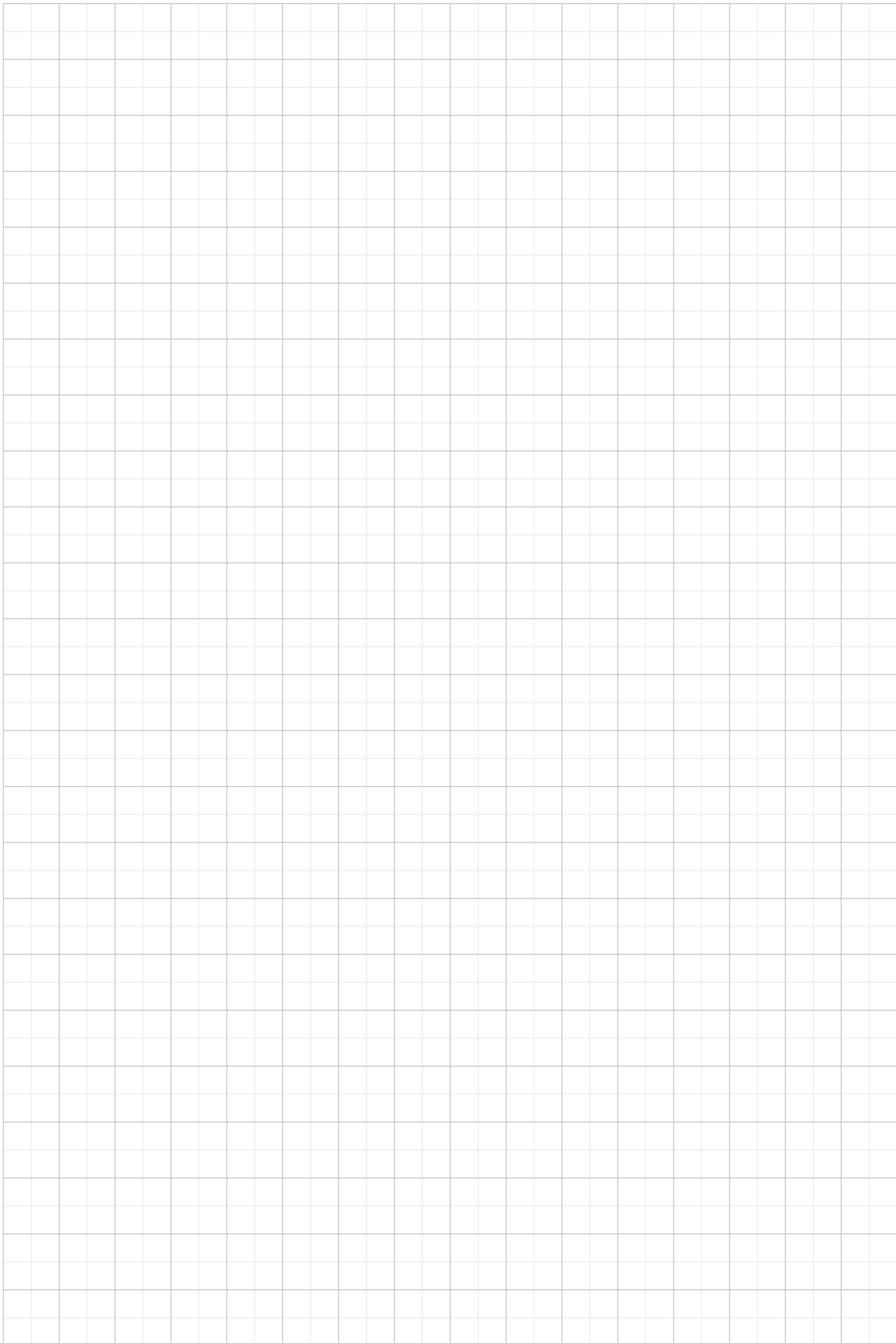
### Mating plug



### Mating plug

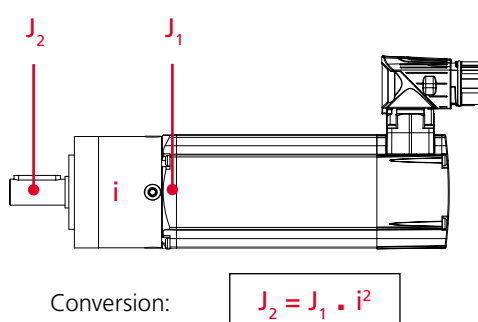


Space for notes



## General gear unit data

### Conversion of moments of inertia



- The moments of inertia given are relative to the motor shaft and the gear unit drive
- The moments of inertia given in this catalogue are relative to the gear unit and motor and, as applicable, the brake
- Designation:  $J_1$ , Unit: kgcm<sup>2</sup>
- In the catalogue,  $J_1$  is given

### Abbreviations and definitions

Abbreviation	Unit	Explanation
$i$	[-]	Gear unit gear ratio
$M_{G,n}$	[Nm]	Rated torque of the gear unit (rated torque in S1)
$M_{G,max}$	[Nm]	Maximum torque of the gear unit
$M_{max}$	[Nm]	Maximum torque of the motor
$n_n$	[min <sup>-1</sup> ]	Rated speed
$n_{out}$	[min <sup>-1</sup> ]	Drive shaft speed
$K_A$	[-]	Application factor
$J_1$	[kgcm <sup>2</sup> ]	Moment of inertia including gear unit, motor and, if applicable, brake
$\eta$	[-]	Efficiency factor



#### NOTE:

In the servo-controller of your application, limit the maximum motor torque to the maximum gear unit torque.

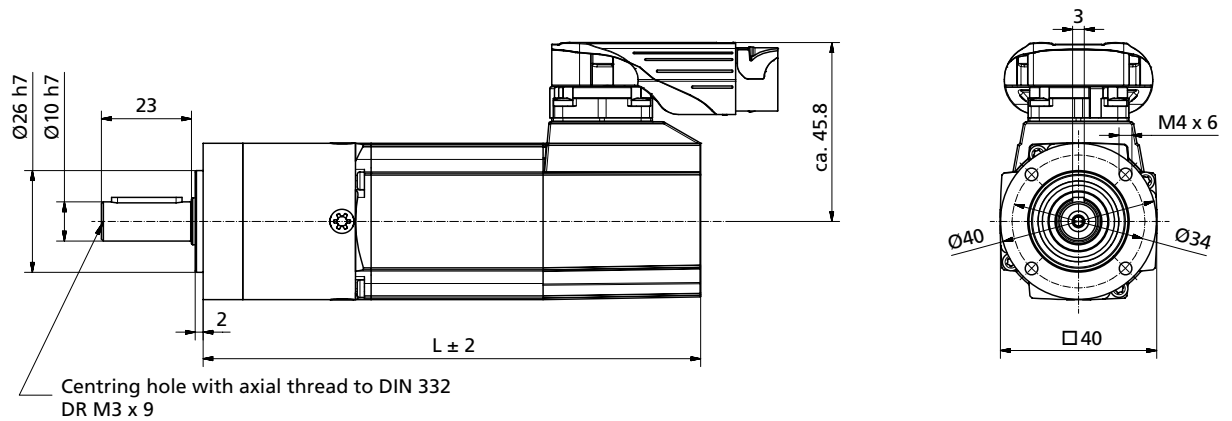
$$M_{G,max} \text{ (gear unit)} = M_{max} \text{ (motor)} \times i \times \eta$$

Option E04  
planetary gear unit PLE40

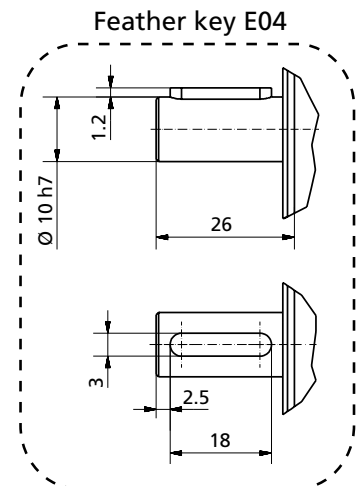
LSP04

*Type-002**Type-004*

### Dimensional drawing LSP04 with planetary gear unit



Motor type		Number of stages	L [mm]
LSP04-002 with E04	without brake	1	127.5
		2	140.5
	with brake	1	163
		2	176
LSP04-004 with E04	without brake	1	152.5
		2	165.5
	with brake	1	188
		2	201





## General technical data

Life	20000 h
Efficiency factor at rated load	1-stage: 96% / 2-stage: 94%
Min. operating temperature	-10 °C
Max. operating temperature	40 °C
Motor/gear unit protection class	IP65/IP54
Max. shaft speed	18000 min <sup>-1</sup>
Lubrication	Lubrication service life
Max. permissible axial load (at nout = 100 min <sup>-1</sup> )	200 N
Max. permissible radial load (at nout = 100 min <sup>-1</sup> )	200 N
Gear unit backlash	1-stage: ≤ 15 arcmin / 2-stage: ≤ 19 arcmin
Torsional stiffness	1-stage: 1 Nm/arcmin / 2-stage: 1.1 Nm/arcmin

## Moment of inertia<sup>2)</sup> - J<sub>1</sub> [kgcm<sup>2</sup>]

Gear unit E04				LSP04-002		LSP04-004	
Planetary gear unit (PLE40)							
Number of stages	Gear ratio i [-]	M <sub>G,η</sub> <sup>1)</sup> [Nm]*	M <sub>G,max</sub> <sup>1)</sup> [Nm]*	J <sub>1</sub> [kgcm <sup>2</sup> ] without brake	J <sub>1</sub> [kgcm <sup>2</sup> ] with brake	J <sub>1</sub> [kgcm <sup>2</sup> ] without brake	J <sub>1</sub> [kgcm <sup>2</sup> ] with brake
1	3	6	9.5	0.0637	0.0800	0.0871	0.1030
	4	8	12.5	0.0467	0.0630	0.0701	0.0864
	5	10	16	0.0447	0.0610	0.0681	0.0844
	7	8.5	13.5	0.0437	0.0600	0.0671	0.0834
	8	6	10	0.0427	0.0590	0.0661	0.0824
	10	5	8	0.0417	0.0580	0.0651	0.0814
2	9	16.5	26	0.0627	0.0790	0.0861	0.1020
	12	20	32	0.0617	0.0780	0.0851	0.1010
	15	18	29	0.0557	0.0720	0.0791	0.0954
	16	20	32	0.0467	0.0630	0.0701	0.0864
	20	20	32	0.0447	0.0610	0.0681	0.0844
	25	18	29	0.0447	0.0610	0.0681	0.0844
	32	20	32	0.0427	0.0590	0.0661	0.0824
	40	18	29	0.0417	0.0580	0.0651	0.0814
	64	7.5	12	0.0417	0.0580	0.0651	0.0814

Subject to technical change without notice. Date: 08/2014

- 1) The data indicated refer to a drive shaft speed of  $n_{out} = 100 \text{ min}^{-1}$  and an application factor of  $K_A = 1$ , as well as the S1 operation mode.
- 2) The moments of inertia incl. gear unit, motor (with and without brake) reference the motor drive shaft, also see Page 1-24.



### NOTE:

In the servo-controller of your application, limit the maximum motor torque to the maximum gear unit torque.

$$M_{G,max} \text{ (gear unit)} = M_{max} \text{ (motor)} \times i \times \eta$$



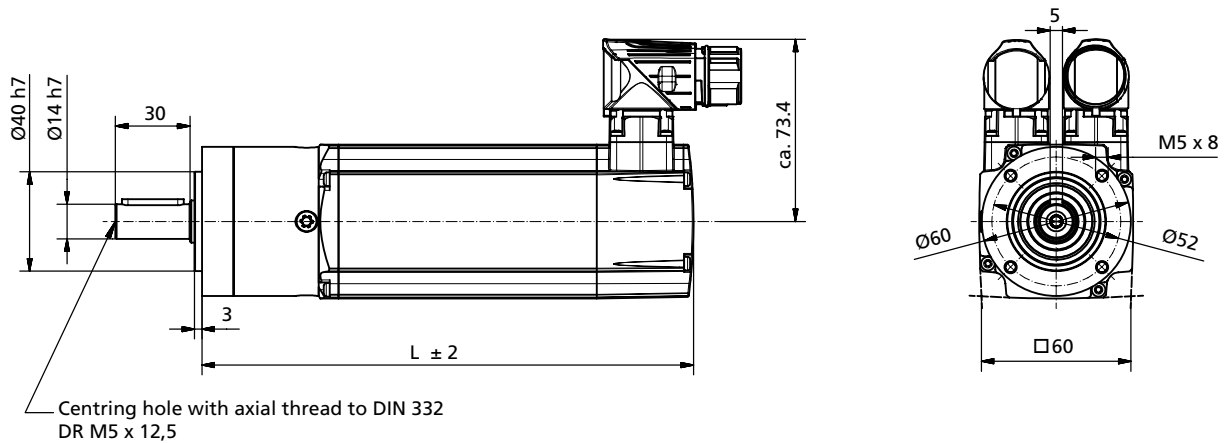
Option E06  
planetary gear unit PLE60

LSP06

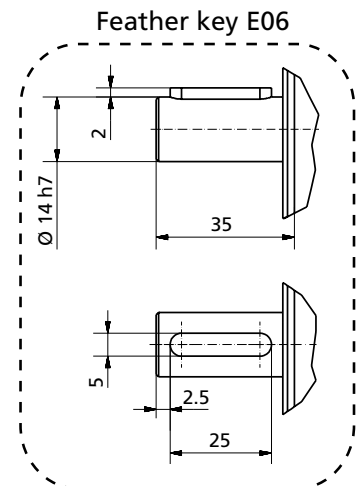
*Type-007*

*Type-015*

### Dimensional drawing LSP06 with planetary gear unit



Motor type		Number of stages	L [mm]
LSP06-007 with E06	without brake	1	168
		2	180.5
	with brake	1	202
		2	214.5
LSP06-015 with E06	without brake	1	198
		2	210.5
	with brake	1	232
		2	244.5



## General technical data

Life	20000 h
Efficiency factor at rated load	1-stage: 96% / 2-stage: 94%
Min. operating temperature	-10 °C
Max. operating temperature	40 °C
Motor/gear unit protection class	IP65/IP54
Max. shaft speed	13000 min <sup>-1</sup>
Lubrication	Lubrication service life
Max. permissible axial load (at n <sub>out</sub> = 100 min <sup>-1</sup> )	500 N
Max. permissible radial load (at n <sub>out</sub> = 100 min <sup>-1</sup> )	400 N
Gear unit backlash	1-stage: ≤ 10 arcmin / 2-stage: ≤ 12 arcmin
Torsional stiffness	1-stage: 2.3 Nm/arcmin / 2-stage: 2.5 Nm/arcmin

## Moment of inertia<sup>2)</sup> - J<sub>1</sub> [kgcm<sup>2</sup>]

Gear unit E06				LSP06-007		LSP06-015	
Planetary gear unit (PLE60)							
Number of stages	Gear ratio i [-]	M <sub>G,η</sub> <sup>1)</sup> [Nm]*	M <sub>G,max</sub> <sup>1)</sup> [Nm]*	J <sub>1</sub> [kgcm <sup>2</sup> ] without brake	J <sub>1</sub> [kgcm <sup>2</sup> ] with brake	J <sub>1</sub> [kgcm <sup>2</sup> ] without brake	J <sub>1</sub> [kgcm <sup>2</sup> ] with brake
1	3	17	27.5	0.333	0.432	0.516	0.615
	4	23	37	0.261	0.360	0.444	0.543
	5	29	46	0.250	0.349	0.433	0.532
	7	25	40	0.241	0.340	0.424	0.523
	8	18	29	0.239	0.338	0.422	0.521
	10	15	24	0.234	0.333	0.417	0.516
2	9	44	70	0.329	0.428	0.512	0.611
	12	44	70	0.325	0.424	0.508	0.607
	15	44	70	0.249	0.348	0.432	0.531
	16	44	70	0.256	0.355	0.439	0.538
	20	44	70	0.247	0.346	0.430	0.529
	25	40	64	0.249	0.348	0.432	0.531
	32	44	70	0.238	0.337	0.421	0.520
	40	40	64	0.238	0.337	0.421	0.520
64	18	29	0.238	0.337	0.421	0.520	

Subject to technical change without notice. Date: 08/2014

- 1) The data indicated refer to a drive shaft speed of  $n_{out} = 100 \text{ min}^{-1}$  and an application factor of  $K_A = 1$ , as well as the S1 operation mode.
- 2) The moments of inertia incl. gear unit, motor (with and without brake) reference the motor drive shaft, also see Page 1-24.



### NOTE:

In the servo-controller of your application, limit the maximum motor torque to the maximum gear unit torque.

$$M_{G,max} \text{ (gear unit)} = M_{max} \text{ (motor)} \times i \times \eta$$

Option E08  
planetary gear unit PLE80

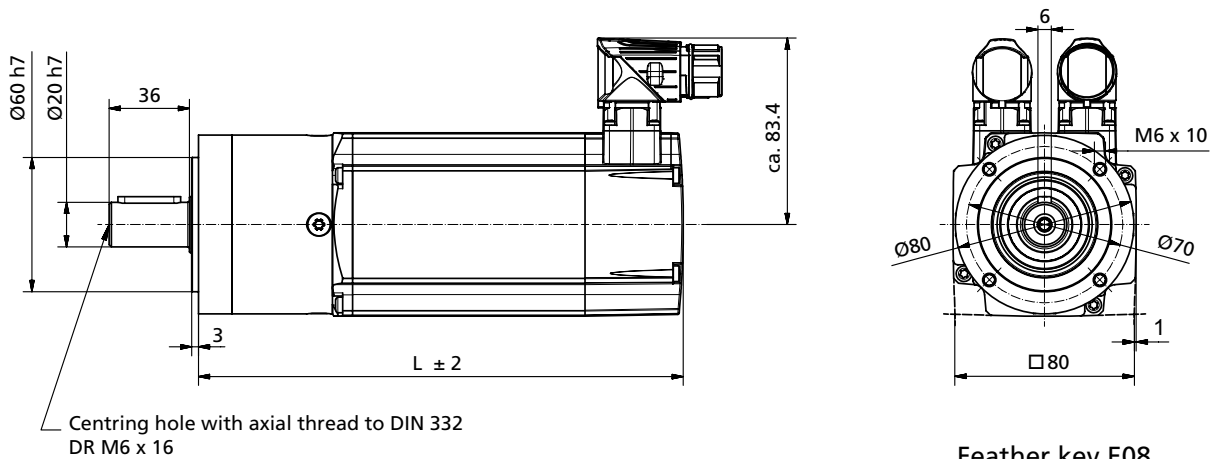
LSP08

*Type-028*

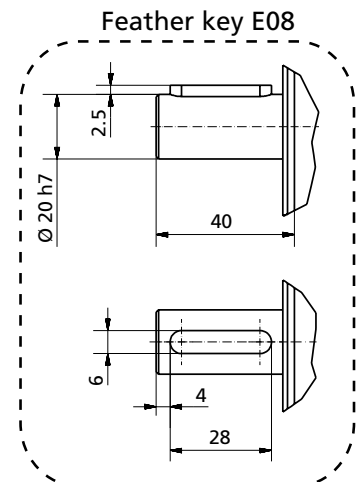
*Type-035*



### Dimensional drawing LSP08 with planetary gear unit



Motor type		Number of stages	L [mm]
LSP08-028 with E08	without brake	1	217
		2	234.5
	with brake	1	259
		2	276.5
LSP08-035 with E08	without brake	1	237
		2	254.5
	with brake	1	279
		2	296.5



## General technical data

Life	20000 h
Efficiency factor at rated load	1-stage: 96% / 2-stage: 94%
Min. operating temperature	-10 °C
Max. operating temperature	40 °C
Motor/gear unit protection class	IP65/IP54
Max. shaft speed	7000 min <sup>-1</sup>
Lubrication	Lubrication service life
Max. permissible axial load (at n <sub>out</sub> = 100 min <sup>-1</sup> )	1000 N
Max. permissible radial load (at n <sub>out</sub> = 100 min <sup>-1</sup> )	750 N
Gear unit backlash	1-stage: ≤ 7 arcmin / 2-stage: ≤ 9 arcmin
Torsional stiffness	1-stage: 6 Nm/arcmin / 2-stage: 6.5 Nm/arcmin

## Moment of inertia<sup>2)</sup> - J<sub>1</sub> [kgcm<sup>2</sup>]

Gear unit E08				LSP08-028		LSP08-035	
Planetary gear unit (PLE80)							
Number of stages	Gear ratio i [-]	M <sub>G,n</sub> <sup>1)</sup> [Nm]*	M <sub>G,max</sub> <sup>1)</sup> [Nm]*	J <sub>1</sub> [kgcm <sup>2</sup> ] without brake	J <sub>1</sub> [kgcm <sup>2</sup> ] with brake	J <sub>1</sub> [kgcm <sup>2</sup> ] without brake	J <sub>1</sub> [kgcm <sup>2</sup> ] with brake
1	3	39	62	2.08	2.36	2.60	2.87
	4	52	83	1.67	1.94	2.18	2.46
	5	65	104	1.62	1.89	2.13	2.41
	7	65	104	1.56	1.84	2.08	2.35
	8	50	80	1.57	1.85	2.09	2.36
	10	38	61	1.52	1.80	2.04	2.31
2	9	117	187	2.05	2.33	2.57	2.84
	12	120	192	2.03	2.31	2.55	2.82
	15	110	176	2.02	2.30	2.54	2.81
	16	120	192	1.65	1.92	2.16	2.44
	20	120	192	1.61	1.88	2.12	2.40
	25	110	176	1.61	1.88	2.12	2.40
	32	120	192	1.57	1.85	2.09	2.36
	40	110	176	1.57	1.85	2.09	2.36
	64	50	80	1.57	1.85	2.09	2.36

Subject to technical change without notice. Date: 08/2014

- 1) The data indicated refer to a drive shaft speed of  $n_{out} = 100 \text{ min}^{-1}$  and an application factor of  $K_A = 1$ , as well as the S1 operation mode.
- 2) The moments of inertia incl. gear unit, motor (with and without brake) reference the motor drive shaft, also see Page 1-24.



### NOTE:

In the servo-controller of your application, limit the maximum motor torque to the maximum gear unit torque.

$$M_{G,max} \text{ (gear unit)} = M_{max} \text{ (motor)} \times i \times \eta$$



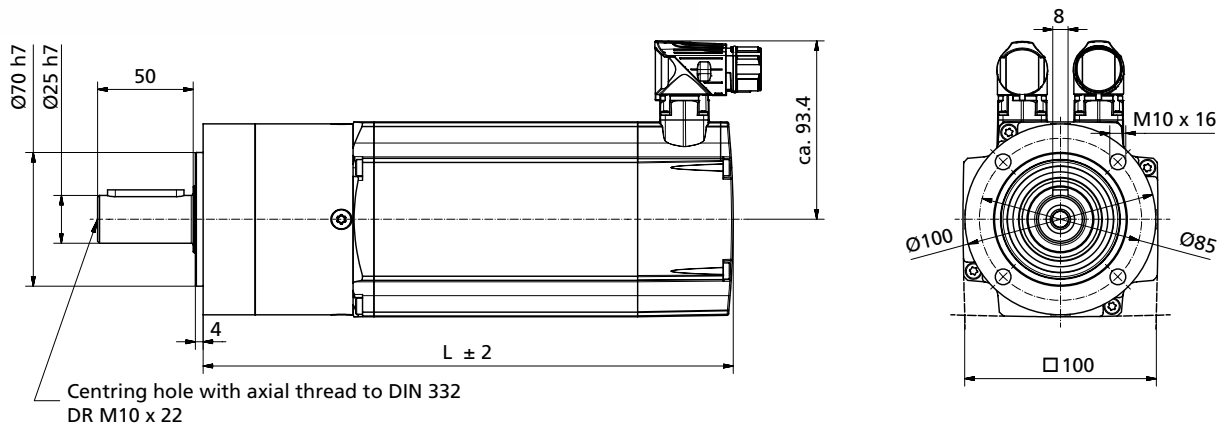
Option E10  
planetary gear unit PLE120

LSP10

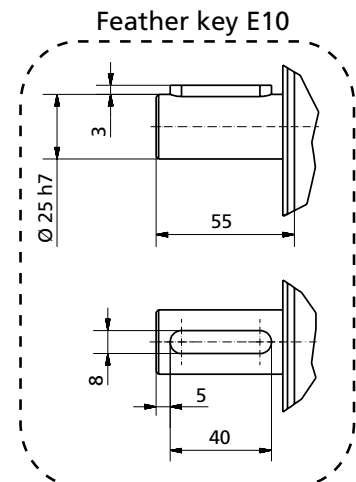
*Type-056*

*Type-075*

### Dimensional drawing LSP10 with planetary gear unit



Motor type		Number of stages	L [mm]
LSP10-056 with E10	without brake	1	277.5
		2	305.5
	with brake	1	319
		2	347
LSP10-075 with E10	without brake	1	302.5
		2	330.5
	with brake	1	344
		2	372



## General technical data

Life	20000 h
Efficiency factor at rated load	1-stage: 96% / 2-stage: 94%
Min. operating temperature	-10 °C
Max. operating temperature	40 °C
Motor/gear unit protection class	IP65/IP54
Max. shaft speed	5650 min <sup>-1</sup>
Lubrication	Lubrication service life
Max. permissible axial load (at nout = 100 min <sup>-1</sup> )	2100 N
Max. permissible radial load (at nout = 100 min <sup>-1</sup> )	1200 N
Gear unit backlash	1-stage: ≤ 7 arcmin / 2-stage: ≤ 9 arcmin
Torsional stiffness	1-stage: 12 Nm/arcmin / 2-stage: 13 Nm/arcmin

## Moment of inertia<sup>2)</sup> - J<sub>1</sub> [kgcm<sup>2</sup>]

Gear unit E10				LSP10-056		LSP10-075	
Planetary gear unit (PLE120)							
Number of stages	Gear ratio i [-]	M <sub>G,n</sub> <sup>1)</sup> [Nm]*	M <sub>G,max</sub> <sup>1)</sup> [Nm]*	J <sub>1</sub> [kgcm <sup>2</sup> ] without brake	J <sub>1</sub> [kgcm <sup>2</sup> ] with brake	J <sub>1</sub> [kgcm <sup>2</sup> ] without brake	J <sub>1</sub> [kgcm <sup>2</sup> ] with brake
1	3	72	115	6.54	7.33	8.02	8.80
	4	96	153.5	5.70	6.49	7.18	7.96
	5	120	192	5.44	6.23	6.92	7.70
	7	135	216	5.31	6.10	6.79	7.75
	8	120	192	5.22	6.01	6.70	7.48
	10	95	152	5.20	5.99	6.68	7.46
2	9	210	336	6.53	7.32	8.01	8.79
	12	260	416	6.47	7.26	7.95	8.73
	15	230	368	6.44	7.23	7.92	8.70
	16	260	416	5.66	6.45	7.14	7.92
	20	260	416	5.41	6.20	6.89	7.67
	25	230	368	5.40	6.19	6.88	7.66
	32	260	416	5.20	5.99	6.68	7.46
	40	230	368	5.20	5.99	6.68	7.46

Subject to technical change without notice. Date: 08/2014

- 1) The data indicated refer to a drive shaft speed of  $n_{out} = 100 \text{ min}^{-1}$  and an application factor of  $K_A = 1$ , as well as the S1 operation mode.
- 2) The moments of inertia incl. gear unit, motor (with and without brake) reference the motor drive shaft, also see Page 1-24 .



### NOTE:

In the servo-controller of your application, limit the maximum motor torque to the maximum gear unit torque.

$$M_{G,max} \text{ (gear unit)} = M_{max} \text{ (motor)} \times i \times \eta$$



Option E10  
planetary gear unit PLE120

LSP13

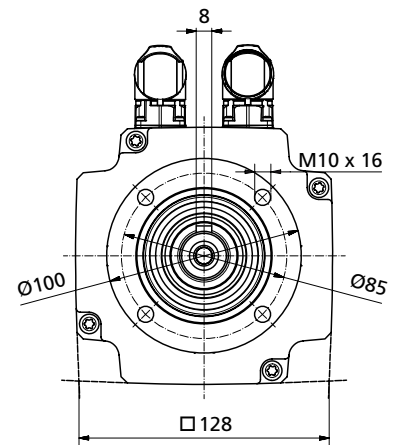
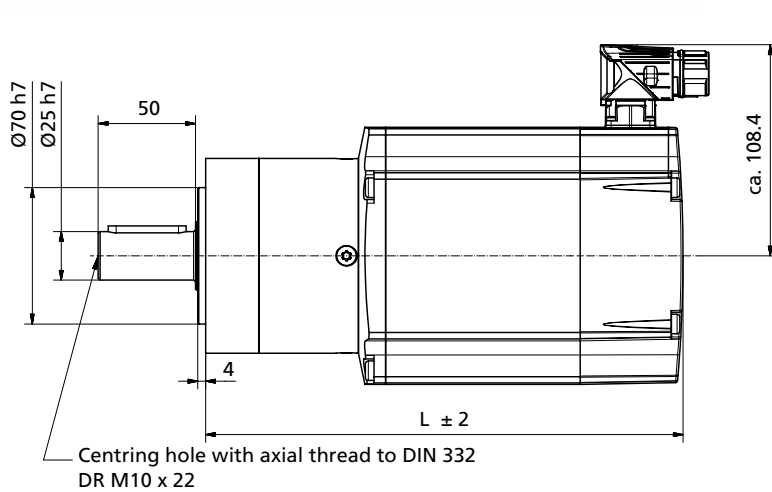
*Type-055*

*Type-091*

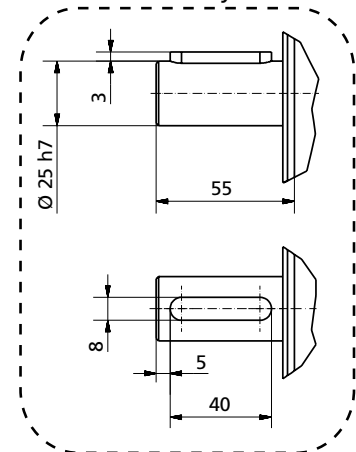
*Type-123*

*Type-185*

### Dimensional drawing LSP13 with planetary gear unit



#### Feather key E13



Motor type		Number of stages	L [mm]
LSP13-055 with E13	without brake	1	245.5
		2	273
	with brake	1	275.5
		2	303
LSP13-091 with E13	without brake	1	260.5
		2	288
	with brake	1	290.5
		2	318
LSP13-123 with E13	without brake	1	285.5
		2	313
	with brake	1	320.5
		2	348
LSP13-185 with E13	without brake	1	330.5
		2	358
	with brake	1	365.5
		2	393.5



## General technical data

Life	20000 h
Efficiency factor at rated load	1-stage: 96% / 2-stage: 94%
Min. operating temperature	-10 °C
Max. operating temperature	40 °C
Motor/gear unit protection class	IP65/IP54
Max. shaft speed	4400 min <sup>-1</sup>
Lubrication	Lubrication service life
Max. permissible axial load (at nout = 100 min <sup>-1</sup> )	2100 N
Max. permissible radial load (at nout = 100 min <sup>-1</sup> )	1200 N
Gear unit backlash	1-stage: ≤ 7 arcmin / 2-stage: ≤ 9 arcmin
Torsional stiffness	1-stage: 12 Nm/arcmin / 2-stage: 13 Nm/arcmin

## Moment of inertia<sup>2)</sup> - J<sub>1</sub> [kgcm<sup>2</sup>]

Gear unit E10				LSP13-055		LSP13-091	
Planetary gear unit (PLE120)							
Number of stages	Gear ratio i [-]	M <sub>G,n</sub> <sup>1)</sup> [Nm]*	M <sub>G,max</sub> <sup>1)</sup> [Nm]*	J <sub>1</sub> [kgcm <sup>2</sup> ] without brake	J <sub>1</sub> [kgcm <sup>2</sup> ] with brake	J <sub>1</sub> [kgcm <sup>2</sup> ] without brake	J <sub>1</sub> [kgcm <sup>2</sup> ] with brake
1	3	72	115	13.4	14.1	16.2	16.9
	4	96	153.5	12.6	13.3	15.4	16.1
	5	120	192	12.3	13.0	15.1	15.8
	7	135	216	12.2	12.9	15.0	15.7
	8	120	192	12.1	12.8	14.9	15.6
	10	95	152	12.1	12.8	14.9	15.6
2	9	210	336	13.4	14.1	16.2	16.9
	12	260	416	13.4	14.1	16.1	16.8
	15	230	368	13.3	14.0	16.1	16.8
	16	260	416	12.5	13.3	15.3	16.0
	20	260	416	12.3	13.0	15.1	15.8
	25	230	368	12.3	13.0	15.1	15.8
	32	260	416	12.1	12.8	14.9	15.6
	40	230	368	12.1	12.8	14.9	15.6

Subject to technical change without notice. Date: 08/2014

- 1) The data indicated refer to a drive shaft speed of  $n_{out} = 100 \text{ min}^{-1}$  and an application factor of  $K_A = 1$ , as well as the S1 operation mode.
- 2) The moments of inertia incl. gear unit, motor (with and without brake) reference the motor drive shaft, also see Page 1-24.



### NOTE:

In the servo-controller of your application, limit the maximum motor torque to the maximum gear unit torque.

$$M_{G,max} \text{ (gear unit)} = M_{max} \text{ (motor)} \times i \times \eta$$

## General technical data

Life	20000 h
Efficiency factor at rated load	1-stage: 96% / 2-stage: 94%
Min. operating temperature	-10 °C
Max. operating temperature	40 °C
Motor/gear unit protection class	IP65/IP54
Max. shaft speed	4400 min <sup>-1</sup>
Lubrication	Lubrication service life
Max. permissible axial load (at n <sub>out</sub> = 100 min <sup>-1</sup> )	2100 N
Max. permissible radial load (at n <sub>out</sub> = 100 min <sup>-1</sup> )	1200 N
Gear unit backlash	1-stage: ≤ 7 arcmin / 2-stage: ≤ 9 arcmin
Torsional stiffness	1-stage: 12 Nm/arcmin / 2-stage: 13 Nm/arcmin

## Moment of inertia<sup>2)</sup> - J<sub>1</sub> [kgcm<sup>2</sup>]

Gear unit E10				LSP13-123		LSP13-185	
Planetary gear unit (PLE120)							
Number of stages	Gear ratio i [-]	M <sub>G,n</sub> <sup>1)</sup> [Nm]*	M <sub>G,max</sub> <sup>1)</sup> [Nm]*	J <sub>1</sub> [kgcm <sup>2</sup> ] without brake	J <sub>1</sub> [kgcm <sup>2</sup> ] with brake	J <sub>1</sub> [kgcm <sup>2</sup> ] without brake	J <sub>1</sub> [kgcm <sup>2</sup> ] with brake
1	3	72	115	24.5	26.5	35.6	37.6
	4	96	153.5	23.7	25.7	34.8	36.7
	5	120	192	23.4	25.4	34.5	36.5
	7	135	216	23.3	25.3	34.4	36.4
	8	120	192	23.2	25.2	34.3	36.3
	10	95	152	23.2	25.2	34.3	36.2
2	9	210	336	24.5	26.5	35.6	37.6
	12	260	416	24.4	26.4	35.5	37.5
	15	230	368	24.4	26.4	35.5	37.5
	16	260	416	23.6	25.6	34.7	36.7
	20	260	416	23.4	25.4	34.5	36.5
	25	230	368	23.4	25.4	34.5	36.4
	32	260	416	23.2	25.2	34.3	36.2
	40	230	368	23.2	25.2	34.3	36.2

Subject to technical change without notice. Date: 08/2014

- 1) The data indicated refer to a drive shaft speed of n<sub>out</sub> = 100 min<sup>-1</sup> and an application factor of K<sub>A</sub> = 1, as well as the S1 operation mode.
- 2) The moments of inertia incl. gear unit, motor (with and without brake) reference the motor drive shaft, also see Page 1-24 .



### NOTE:

In the servo-controller of your application, limit the maximum motor torque to the maximum gear unit torque.

$$M_{G,max} \text{ (gear unit)} = M_{max} \text{ (motor)} \times i \times \eta$$

Space for notes

Space for notes

A large grid of graph paper for taking notes, consisting of 20 columns and 30 rows of small squares.

## 2. Overview of LSP servomotors



### Technical data

Type	Technical data 1)	U <sub>dc</sub> [V]	I <sub>0</sub> [A]	I <sub>n</sub> [A]	M <sub>0</sub> [Nm]	M <sub>n</sub> [Nm]	M <sub>max</sub> [Nm]	n <sub>n</sub> [1/min]	J [kg cm <sup>2</sup> ]	P <sub>n</sub> (S1) [W]
LSP04	LSP04-002	48	1.8	1.7	0.18	0.16	0.6	3000	0.03	50
		48	3.4	3.0	0.18	0.14	0.7	6000	0.03	85
		320	0.8	0.7	0.18	0.12	0.7	9000	0.03	110
	LSP04-004	48	3.5	3.3	0.35	0.32	1.3	3000	0.054	100
		48	6.3	5.7	0.35	0.28	1.3	6000	0.054	175
		320	1.6	1.2	0.35	0.21	1.4	9000	0.054	200
LSP06	LSP06-007	320	0.9	0.8	0.7	0.6	2.8	3000	0.22	200
		320	1.6	1.3	0.7	0.5	2.8	6000	0.22	325
	LSP06-015	320	1.8	1.5	1.5	1.2	6.0	3000	0.413	400
		320	3.3	2.2	1.5	0.9	6.0	6000	0.413	550
LSP08	LSP08-028	320	3.1	2.6	2.8	2.4	11.2	3000	1.4	750
		320	5.6	3.7	2.8	1.7	11.2	5500	1.4	1000
		560	1.8	1.6	2.8	2.3	11.2	3000	1.4	750
		560	3.3	2.2	2.8	1.7	11.2	5500	1.4	1000
	LSP08-035	320	3.9	3.7	3.5	3.2	14.0	3000	1.93	1000
		320	7.1	4.8	3.5	2.1	14.0	5500	1.93	1200
		560	2.2	2.1	3.5	3.2	14.0	3000	1.93	1000
		560	3.9	2.8	3.5	2.1	14.0	5500	1.93	1200
LSP10	LSP10-056	560	3.4	3.0	5.6	4.8	22.4	3000	4.84	1500
		560	5.4	3.7	5.6	3.4	22.4	5000	4.84	1800
	LSP10-075	560	4.6	4.1	7.5	6.4	30.0	3000	6.41	2000
		560	7.5	5.3	7.5	4.8	30.0	5000	6.41	2500
LSP13	LSP13-055	320	4.8	4.1	5.5	4.8	22.0	2000	9.82	1000
		320	8.2	6.0	5.5	4.0	22.0	3600	9.82	1500
		560	2.7	2.3	5.5	4.8	22.0	2000	9.82	1000
		560	4.7	3.4	5.5	4.0	22.0	3600	9.82	1500
	LSP13-091	560	4.4	3.4	9.1	7.2	36.4	2000	14.0	1500
		560	7.7	5.0	9.1	6.0	36.4	3600	14.0	2250
	LSP13-123	560	4.7	4.5	12.3	9.6	49.2	2000	21.1	2000
		560	10.3	6.7	12.3	8.0	49.2	3600	21.1	3000
	LSP13-185	560	8.4	6.5	18.5	14.4	74.0	2000	33.8	3000
		560	14.8	8.0	18.5	10.0	74.0	3600	33.8	3750

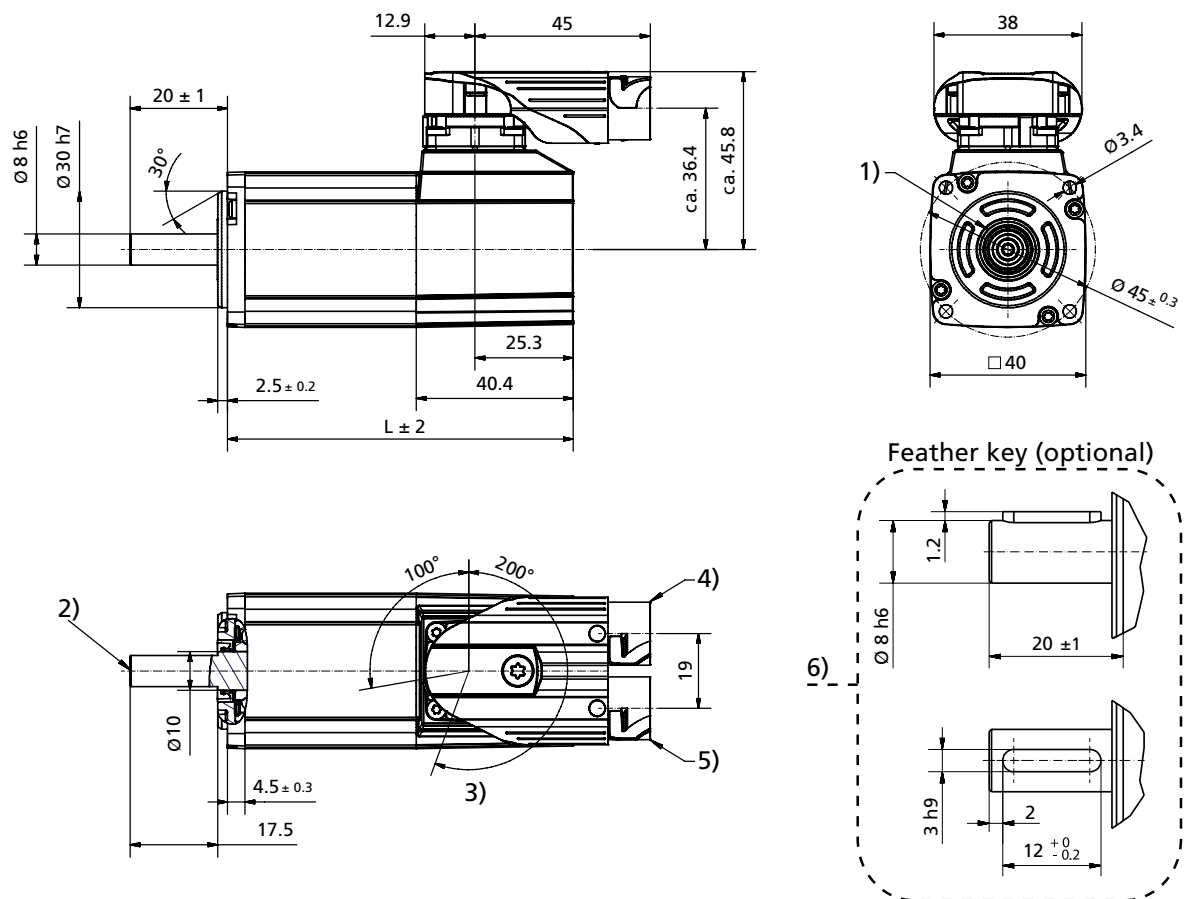
Table 4.2 Motor series data

1) All values with a tolerance of ± 5%



Motor type:  
LSP04-002

## Dimensional drawing



## Motor lengths

Motor type		L
LSP04-002	without brake	89 mm
LSP04-002	with brake	124 mm

## Key

- 1) Radial shaft packing ring (16x10x4)
- 2) Centring hole with axial thread to DIN 332 - DS M3 (M3x9)
- 3) Swivel range of Y-Tec plug from Intercontec
- 4) Power plug
- 5) Signal plug
- 6) Feather key (optional)

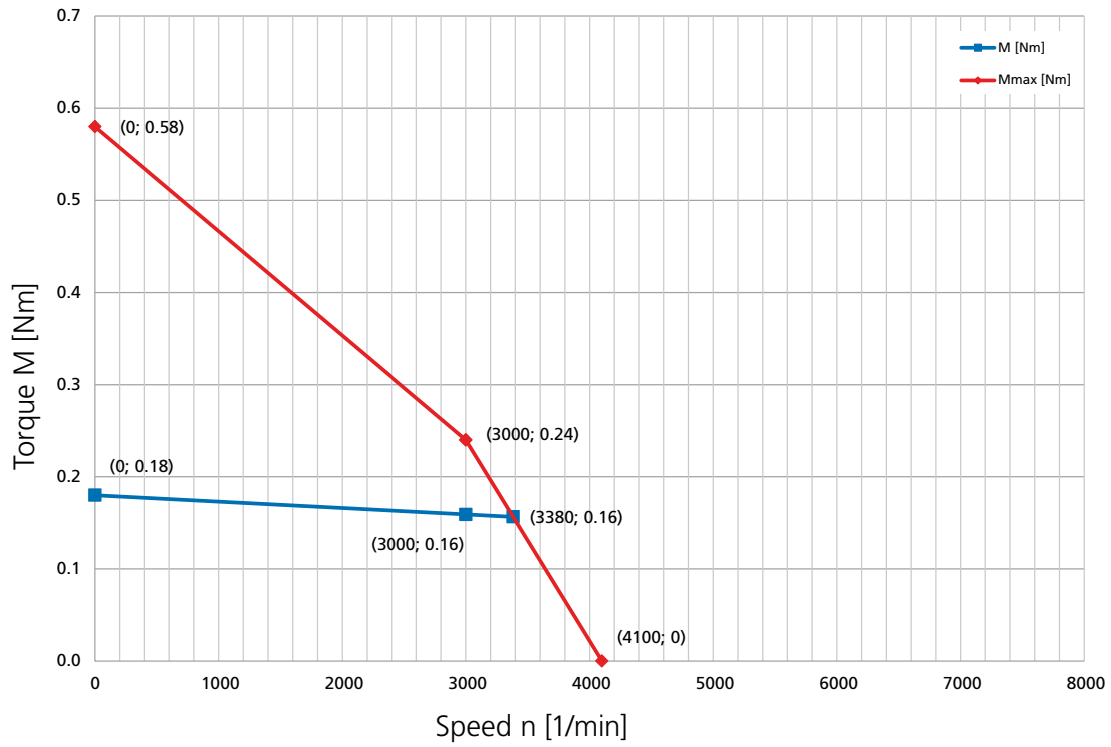
Technical data <sup>1)</sup>	Abbreviation	LSP04-002		
Rated speed [1/min]	<b>n<sub>n</sub></b>	3000	6000	9000
Rated frequency [Hz]	<b>f<sub>n</sub></b>	100	200	300
Number of pole pairs	<b>p</b>	2	2	2
Circuitry of the motor winding		Y	Y	Y
Controller DC link voltage [V]	<b>U<sub>DC</sub></b>	48	48	320
Controller rated voltage [V]	<b>U<sub>n</sub></b>	34	34	230
Rated power [W]	<b>P<sub>n</sub></b>	50	85	110
Rated torque [Nm]	<b>M<sub>n</sub></b>	0.16	0.14	0.12
Rated current per phase [A]	<b>I<sub>n</sub></b>	1.7	3.0	0.7
Stall torque [Nm]	<b>M<sub>0</sub></b>	0.18	0.18	0.18
Stall torque per phase [A]	<b>I<sub>0</sub></b>	1.8	3.4	0.8
Peak torque (maximum permissible torque [Nm])	<b>M<sub>max</sub></b>	0.6	0.7	0.7
Peak current (maximum permissible current per phase [A])	<b>I<sub>max</sub></b>	5.7	13.0	3.2
Maximum speed [1/min]	<b>n<sub>max</sub></b>	5210	8800	10000
Voltage constant [V/1000 min <sup>-1</sup> ]	<b>K<sub>E</sub></b>	6.2	3.3	13.5
Torque constant at nominal point [Nm/A]	<b>K<sub>T</sub></b>	0.10	0.05	0.22
Winding resistance (2 phases) at 20 °C [Ω]	<b>R<sub>pp</sub></b>	4.9	1.4	25.6
Winding inductance (2 phases) [mH]	<b>L<sub>pp</sub></b>	3.0	0.8	14.8
Electrical time constant [ms]	<b>T<sub>el</sub></b>	0.6	0.6	0.6
Thermal time constant [min]	<b>T<sub>th</sub></b>	15	15	15
Rotor moment of inertia [kg cm <sup>2</sup> ]	<b>J</b>	0.03	0.03	0.03
Weight of the motor [kg]	<b>m</b>	0.5	0.5	0.5

1) All values with a tolerance of ± 5%

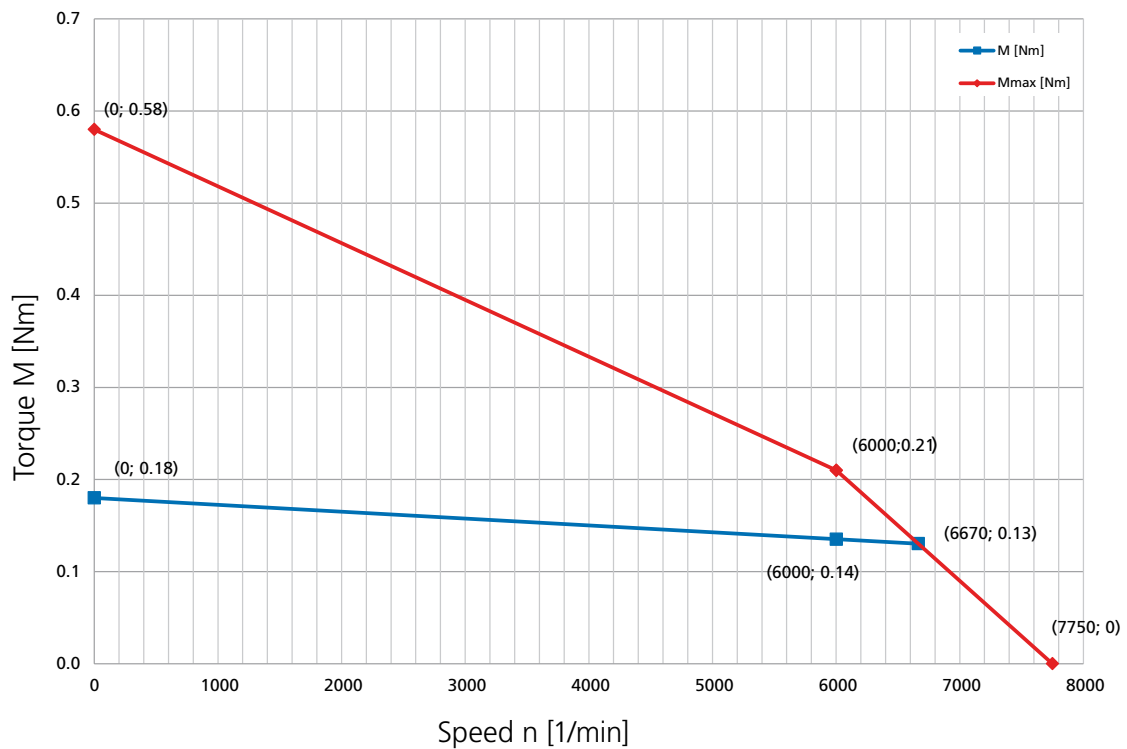
## Characteristics

The characteristic  $M_{\max}$  describes the maximum possible short-time torque at the corresponding speed.  
The characteristic  $M_n$  shows the thermally permissible rated torque.

### LSP04-002-048-30-[...]

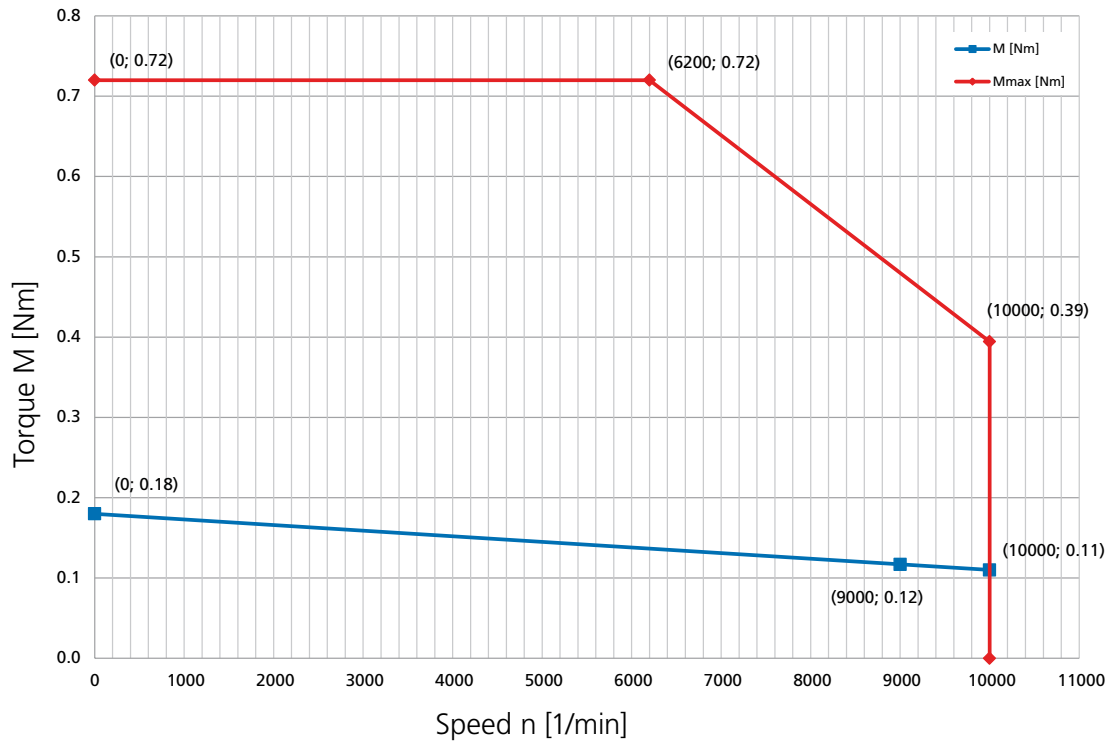


### LSP04-002-048-60-[...]





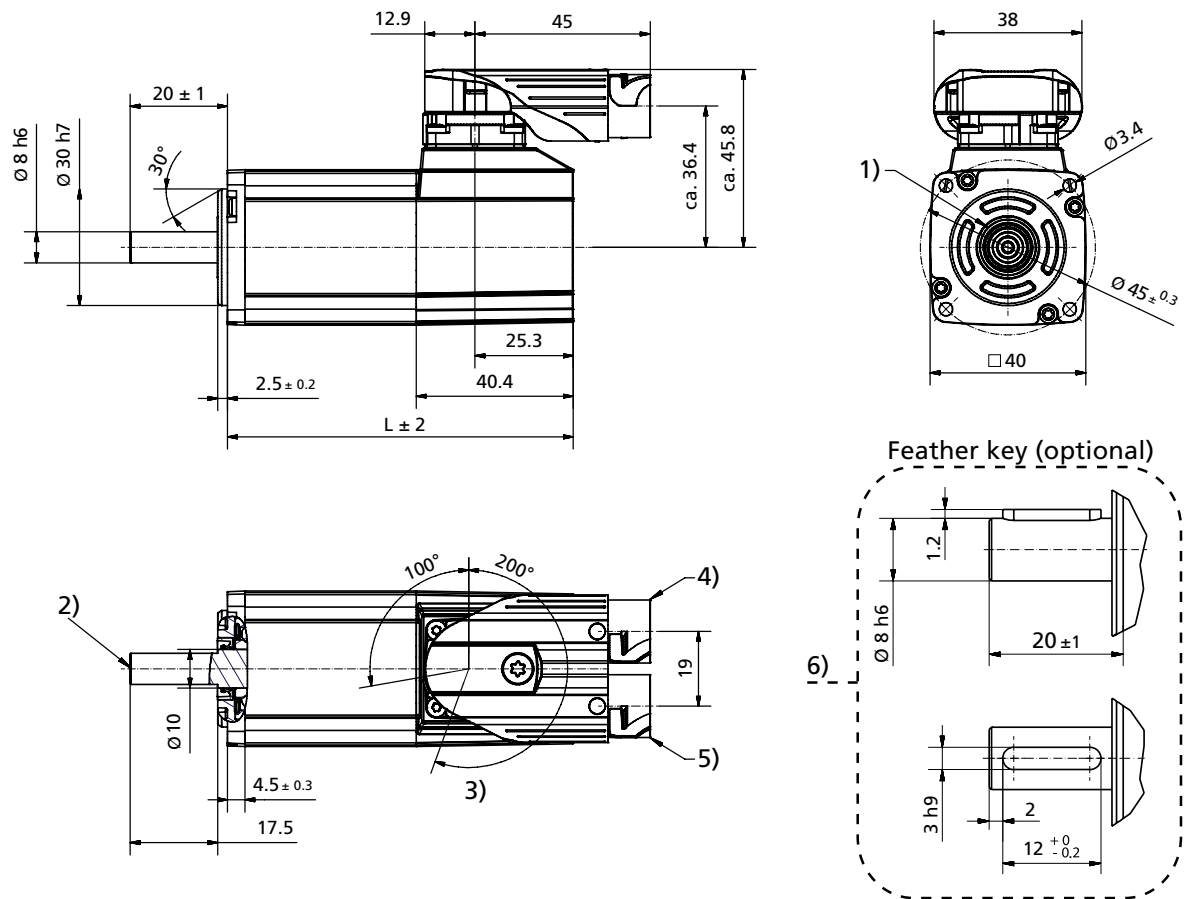
**LSP04-002-320-90-[...]**





Motor type:  
LSP04-004

## Dimensional drawing



## Motor lengths

Motor type		L
LSP04-004	without brake	114 mm
LSP04-004	with brake	149 mm

## Key

- 1) Radial shaft packing ring (16x10x4)
- 2) Centring hole with axial thread to DIN 332 - DS M3 (M3x9)
- 3) Swivel range of Y-Tec plug from Intercontec
- 4) Power plug
- 5) Signal plug
- 6) Feather key (optional)

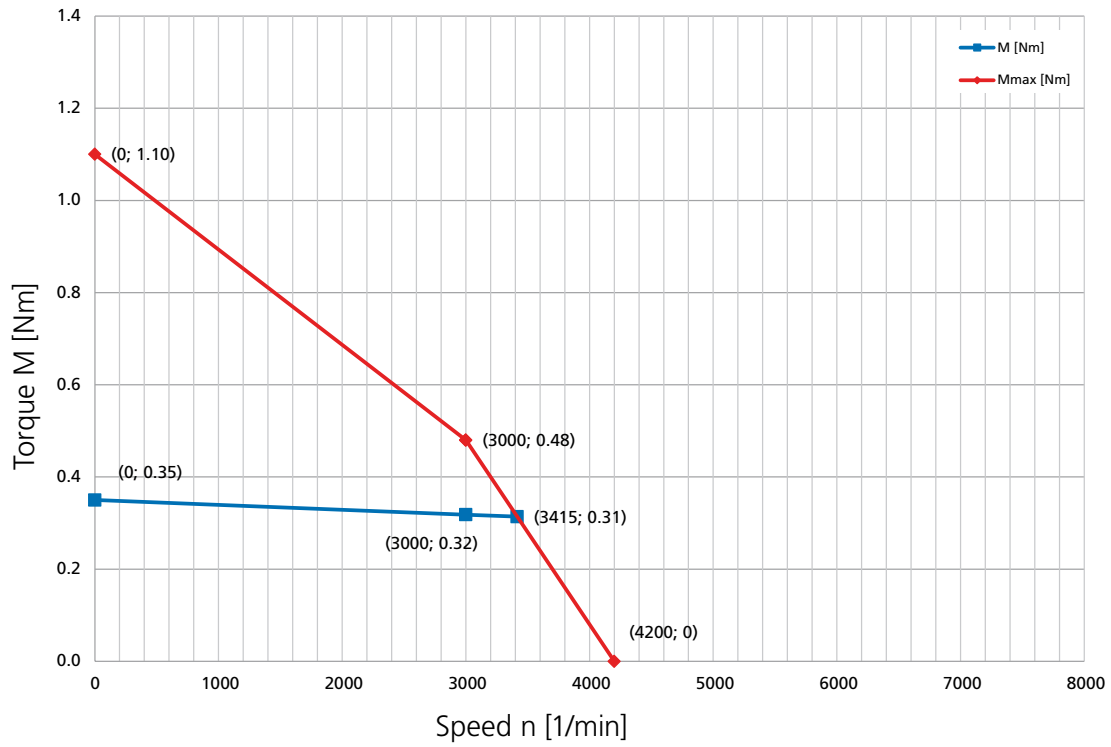
Technical data <sup>1)</sup>	Abbreviation	LSP04-004		
Rated speed [1/min]	<b>n<sub>n</sub></b>	3000	6000	9000
Rated frequency [Hz]	<b>f<sub>n</sub></b>	100	200	300
Number of pole pairs	<b>p</b>	2	2	2
Circuitry of the motor winding		Y	Y	Y
Controller DC link voltage [V]	<b>U<sub>DC</sub></b>	48	48	320
Controller rated voltage [V]	<b>U<sub>n</sub></b>	34	34	230
Rated power [W]	<b>P<sub>n</sub></b>	100	175	200
Rated torque [Nm]	<b>M<sub>n</sub></b>	0.32	0.28	0.21
Rated current per phase [A]	<b>I<sub>n</sub></b>	3.3	5.7	1.2
Stall torque [Nm]	<b>M<sub>0</sub></b>	0.35	0.35	0.35
Stall torque per phase [A]	<b>I<sub>0</sub></b>	3.5	6.3	1.6
Peak torque (maximum permissible torque [Nm])	<b>M<sub>max</sub></b>	1.3	1.3	1.4
Peak current (maximum permissible current per phase [A])	<b>I<sub>max</sub></b>	12.9	23.5	6.4
Maximum speed [1/min]	<b>n<sub>max</sub></b>	5280	9540	10000
Voltage constant [V/1000 min <sup>-1</sup> ]	<b>K<sub>E</sub></b>	6.1	3.4	13.2
Torque constant at nominal point [Nm/A]	<b>K<sub>T</sub></b>	0.10	0.06	0.22
Winding resistance (2 phases) at 20 °C [Ω]	<b>R<sub>pp</sub></b>	1.6	0.4	8.6
Winding inductance (2 phases) [mH]	<b>L<sub>pp</sub></b>	1.4	0.4	6.6
Electrical time constant [ms]	<b>T<sub>el</sub></b>	0.9	1.1	0.8
Thermal time constant [min]	<b>T<sub>th</sub></b>	15	15	15
Rotor moment of inertia [kg cm <sup>2</sup> ]	<b>J</b>	0.054	0.054	0.054
Weight of the motor [kg]	<b>m</b>	0.7	0.7	0.7

<sup>1)</sup> All values with a tolerance of ± 5%

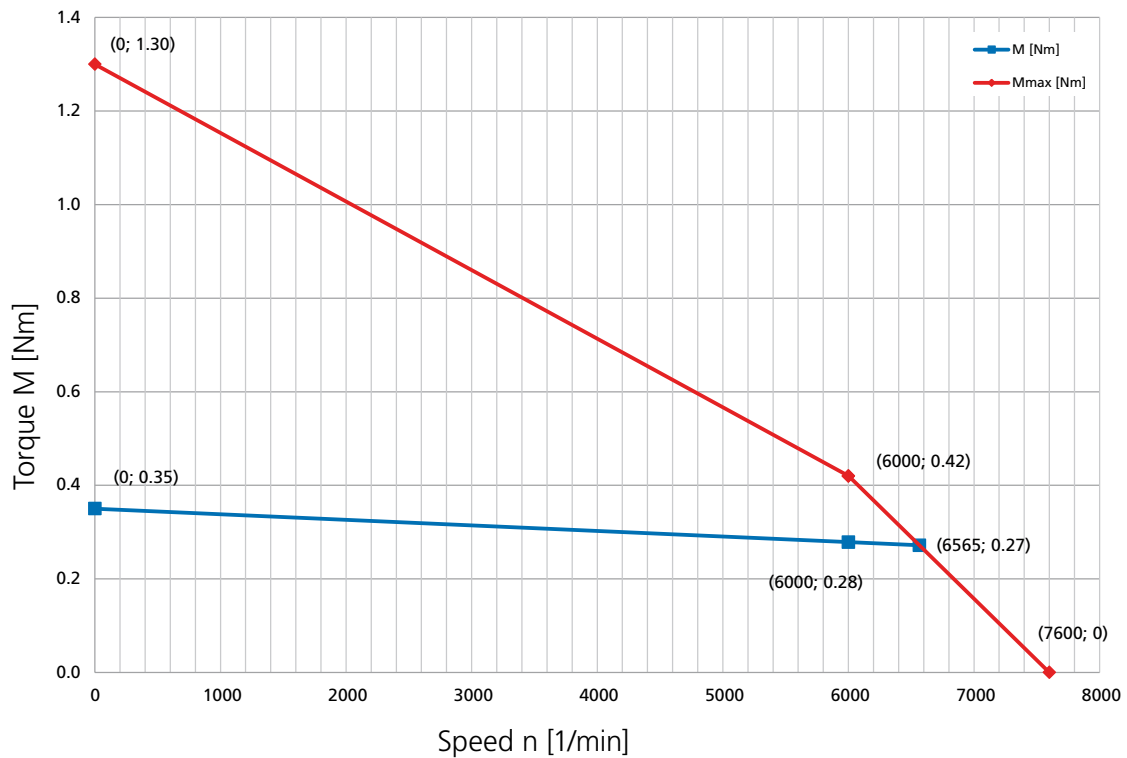
## Characteristics

The characteristic  $M_{\max}$  describes the maximum possible short-time torque at the corresponding speed.  
The characteristic  $M_n$  shows the thermally permissible rated torque.

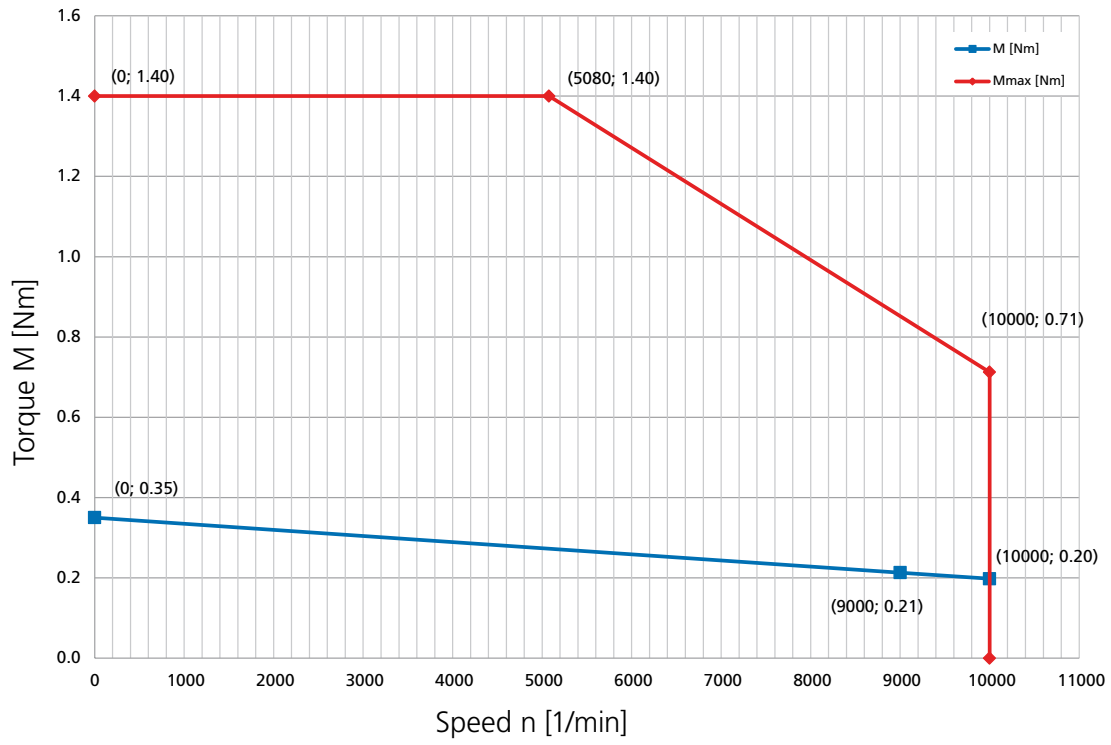
### LSP04-004-048-30-[...]



### LSP04-004-048-60-[...]



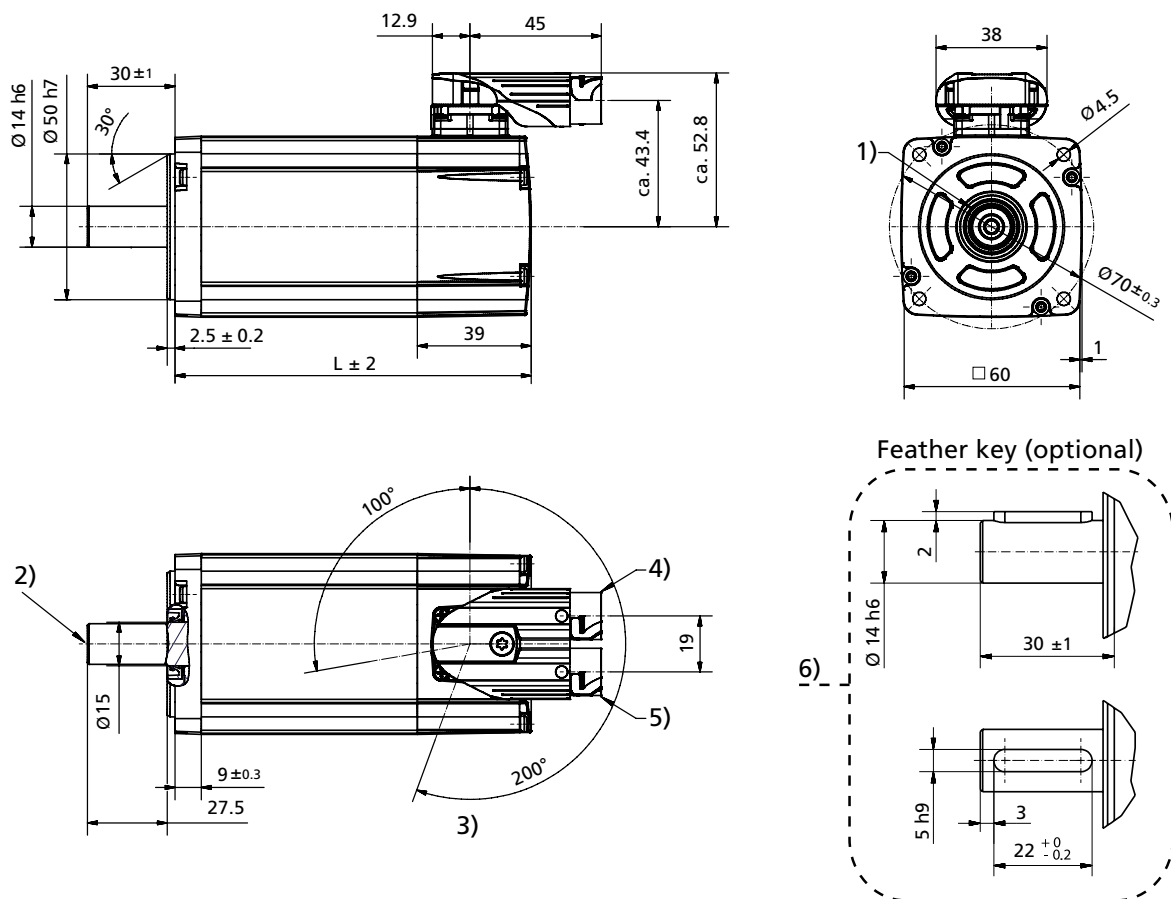
LSP04-004-320-90-[...]





Motor type:  
LSP06-007, LSP06-015

## Dimensional drawing



## Motor lengths

Motor type		L
LSP06-007	without brake	122 mm
LSP06-007	with brake	156 mm
LSP06-015	without brake	152 mm
LSP06-015	with brake	186 mm

## Key

- 1) Radial shaft packing ring (24x15x5)
- 2) Centring hole with axial thread to DIN 332 - DS M5 (M5x12.5)
- 3) Swivel range of Y-Tec plug from Intercontec
- 4) Power plug
- 5) Signal plug
- 6) Feather key (optional)

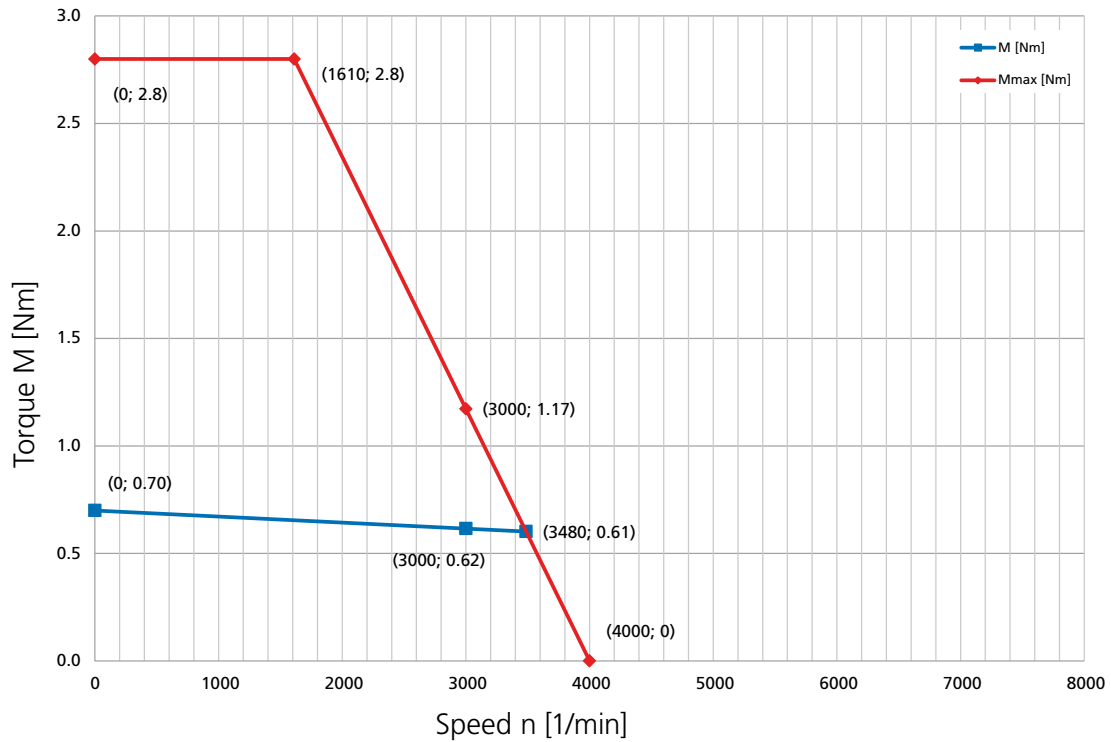
Technical data <sup>1)</sup>	Abbreviation	LSP06-007		LSP06-015	
Rated speed [1/min]	<b>n<sub>n</sub></b>	3000	6000	3000	6000
Rated frequency [Hz]	<b>f<sub>n</sub></b>	150	300	150	300
Number of pole pairs	<b>p</b>	3	3	3	3
Circuitry of the motor winding		Y	Y	Y	Y
Controller DC link voltage [V]	<b>U<sub>DC</sub></b>	320	320	320	320
Controller rated voltage [V]	<b>U<sub>n</sub></b>	230	230	230	230
Rated power [W]	<b>P<sub>n</sub></b>	200	325	400	550
Rated torque [Nm]	<b>M<sub>n</sub></b>	0.6	0.5	1.2	0.9
Rated current per phase [A]	<b>I<sub>n</sub></b>	0.8	1.3	1.5	2.2
Stall torque [Nm]	<b>M<sub>0</sub></b>	0.7	0.7	1.5	1.5
Stall torque per phase [A]	<b>I<sub>0</sub></b>	0.9	1.6	1.8	3.3
Peak torque (maximum permissible torque [Nm])	<b>M<sub>max</sub></b>	2.8	2.8	6.0	6.0
Peak current (maximum permissible current per phase [A])	<b>I<sub>max</sub></b>	3.6	6.4	7.2	13.2
Maximum speed [1/min]	<b>n<sub>max</sub></b>	4400	8060	4220	7825
Voltage constant [V/1000 min <sup>-1</sup> ]	<b>K<sub>E</sub></b>	49.6	27.1	51.7	27.9
Torque constant at nominal point [Nm/A]	<b>K<sub>T</sub></b>	0.82	0.45	0.86	0.46
Winding resistance (2 phases) at 20 °C [Ω]	<b>R<sub>pp</sub></b>	26.4	8.0	9.8	3.0
Winding inductance (2 phases) [mH]	<b>L<sub>pp</sub></b>	37.6	11.0	18.6	5.4
Electrical time constant [ms]	<b>T<sub>el</sub></b>	1.4	1.4	1.9	1.8
Thermal time constant [min]	<b>T<sub>th</sub></b>	25	25	25	25
Rotor moment of inertia [kg cm <sup>2</sup> ]	<b>J</b>	0.22	0.22	0.413	0.413
Weight of the motor [kg]	<b>m</b>	1.45	1.45	2.0	2.0

<sup>1)</sup> All values with a tolerance of ± 5%

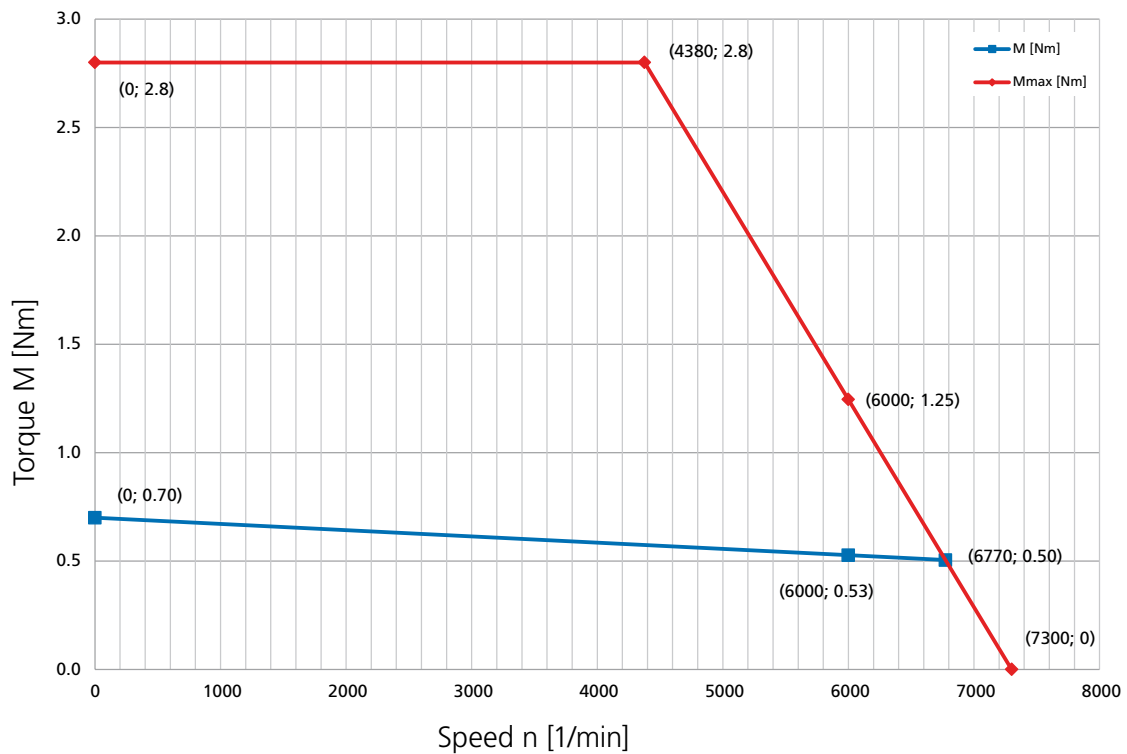
## Characteristics

The characteristic  $M_{\max}$  describes the maximum possible short-time torque at the corresponding speed.  
The characteristic  $M_n$  shows the thermally permissible rated torque.

### LSP06-007-320-30-[...]

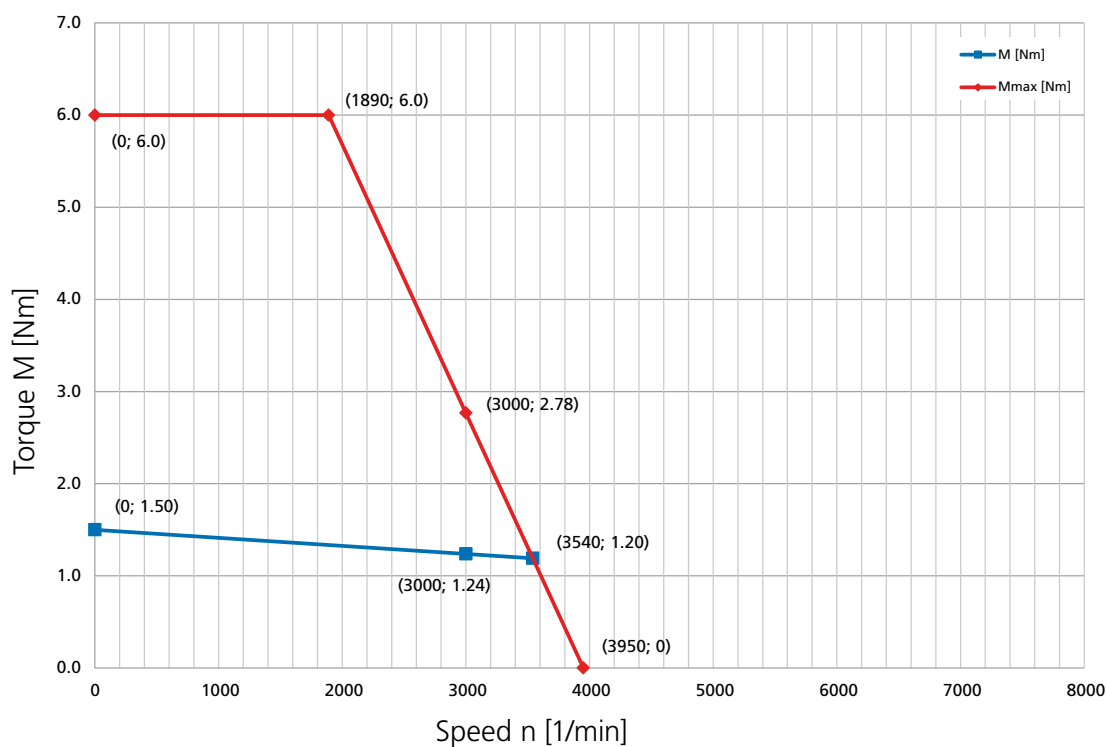


### LSP06-007-320-60-[...]

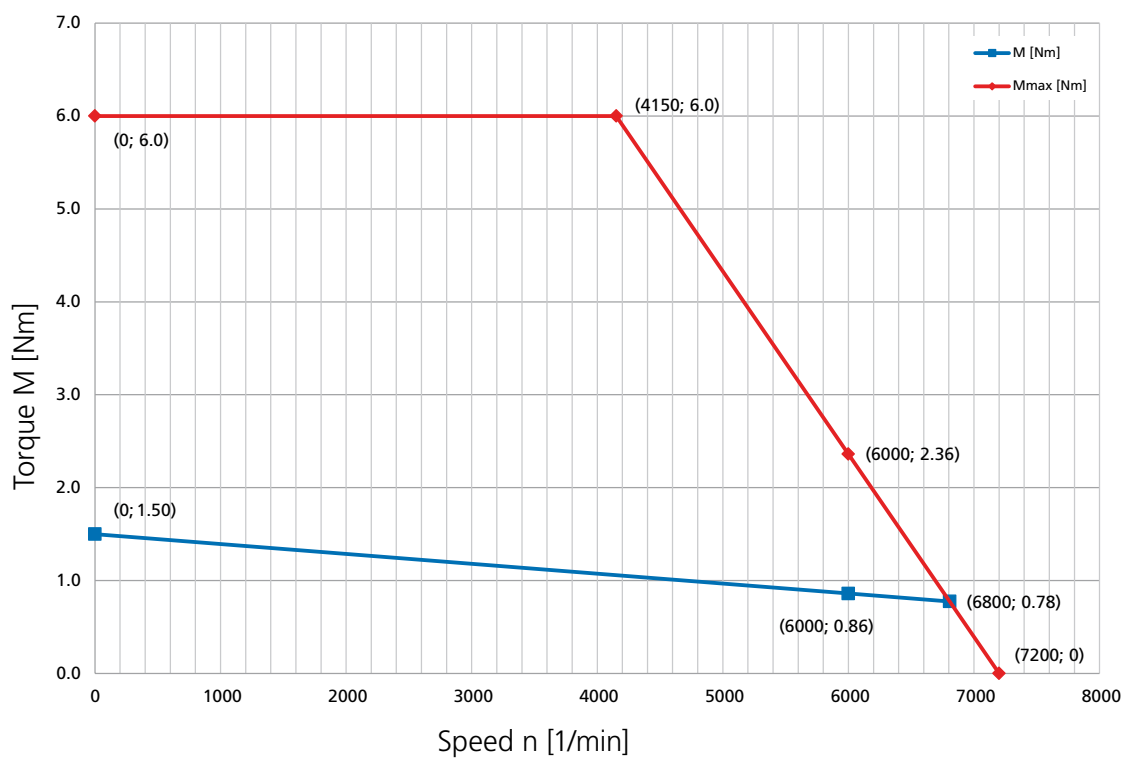




### LSP06-015-320-30-[...]



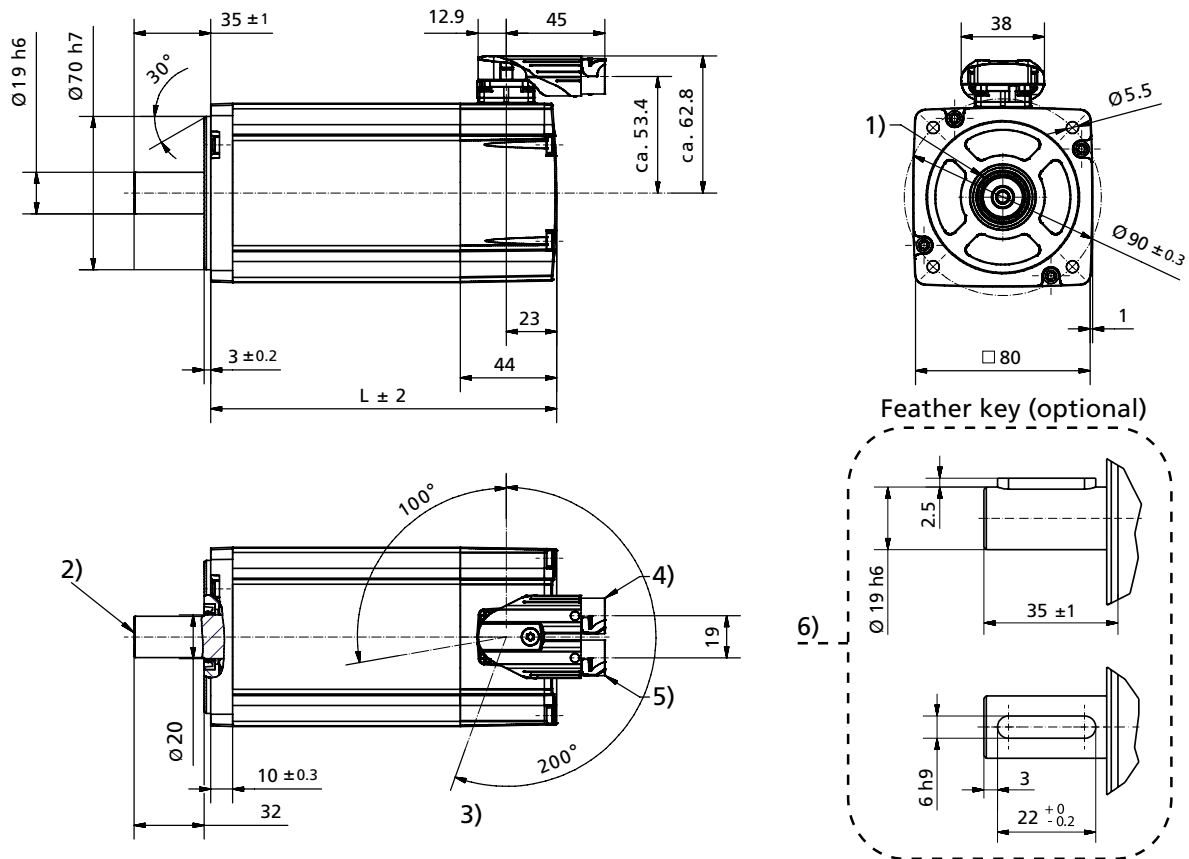
### LSP06-015-320-60-[...]





Motor type:  
LSP08-028

## Dimensional drawing



## Motor lengths

Motor type		L
LSP08-028	without brake	158 mm
LSP08-028	with brake	200 mm

## Key

- 1) Radial shaft packing ring (30x20x5)
- 2) Centring hole with axial thread to DIN 332 - DS M6 (M6x16)
- 3) Swivel range of Y-Tec plug from Intercontec
- 4) Power plug
- 5) Signal plug
- 6) Feather key (optional)

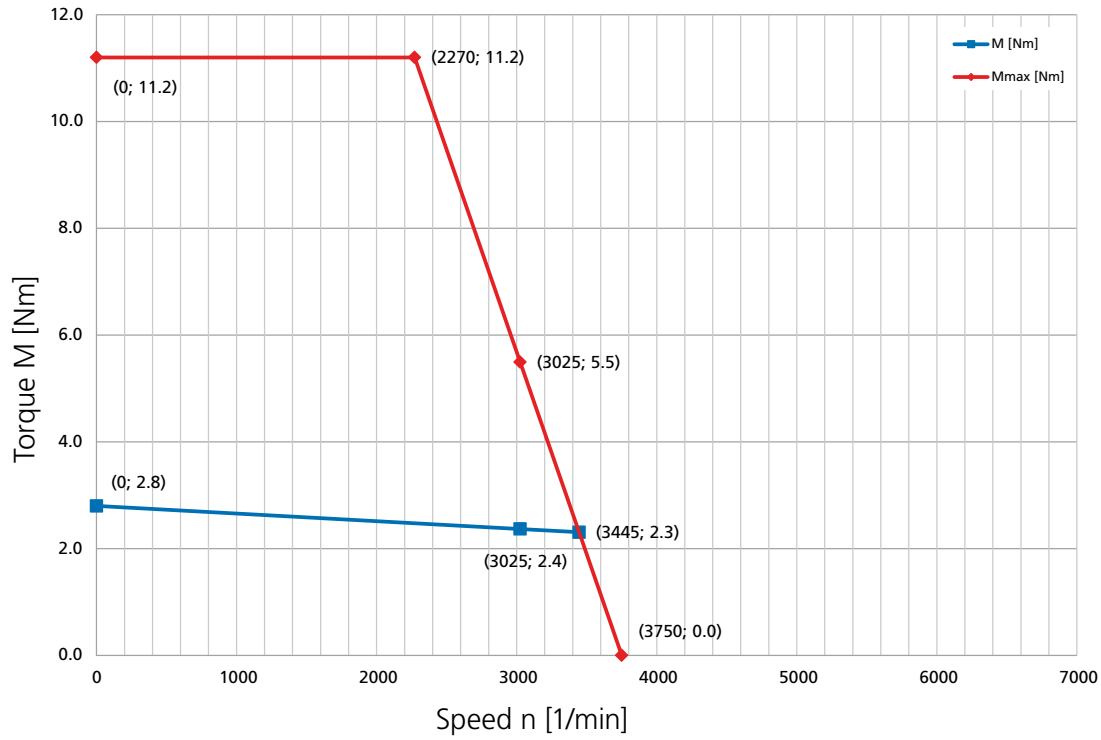
Technical data <sup>1)</sup>	Abbreviation	LSP08-028			
Rated speed [1/min]	<b>n<sub>n</sub></b>	3000	5500	3000	5500
Rated frequency [Hz]	<b>f<sub>n</sub></b>	150	275	150	275
Number of pole pairs	<b>p</b>	3	3	3	3
Circuitry of the motor winding		Y	Y	Y	Y
Controller DC link voltage [V]	<b>U<sub>DC</sub></b>	320	320	560	560
Controller rated voltage [V]	<b>U<sub>n</sub></b>	230	230	400	400
Rated power [W]	<b>P<sub>n</sub></b>	750	1000	750	1000
Rated torque [Nm]	<b>M<sub>n</sub></b>	2.4	1.7	2.3	1.7
Rated current per phase [A]	<b>I<sub>n</sub></b>	2.6	3.7	1.6	2.2
Stall torque [Nm]	<b>M<sub>0</sub></b>	2.8	2.8	2.8	2.8
Stall torque per phase [A]	<b>I<sub>0</sub></b>	3.1	5.6	1.8	3.3
Peak torque (maximum permissible torque [Nm])	<b>M<sub>max</sub></b>	11.2	11.2	11.2	11.2
Peak current (maximum permissible current per phase [A])	<b>I<sub>max</sub></b>	12.4	22.4	7.2	13.2
Maximum speed [1/min]	<b>n<sub>max</sub></b>	4020	7110	3980	7000
Voltage constant [V/1000 min <sup>-1</sup> ]	<b>K<sub>E</sub></b>	54.3	30.7	95.3	54.3
Torque constant at nominal point [Nm/A]	<b>K<sub>T</sub></b>	0.9	0.51	1.58	0.9
Winding resistance (2 phases) at 20 °C [Ω]	<b>R<sub>pp</sub></b>	4.6	14.2	1.6	4.6
Winding inductance (2 phases) [mH]	<b>L<sub>pp</sub></b>	11.8	3.8	36.2	11.8
Electrical time constant [ms]	<b>T<sub>el</sub></b>	2.6	2.4	2.5	2.6
Thermal time constant [min]	<b>T<sub>th</sub></b>	30	30	30	30
Rotor moment of inertia [kg cm <sup>2</sup> ]	<b>J</b>	1.4	1.4	1.4	1.4
Weight of the motor [kg]	<b>m</b>	3.2	3.2	3.2	3.2

<sup>1)</sup> All values with a tolerance of ± 5%

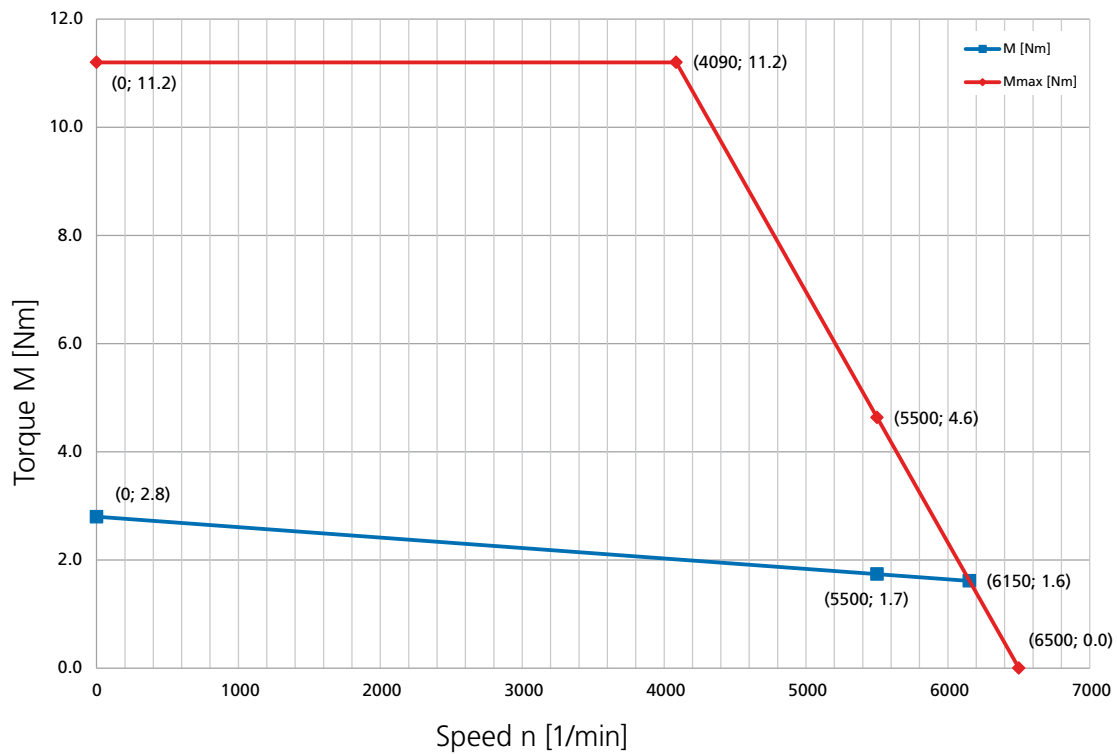
## Characteristics

The characteristic  $M_{\max}$  describes the maximum possible short-time torque at the corresponding speed.  
The characteristic  $M_n$  shows the thermally permissible rated torque.

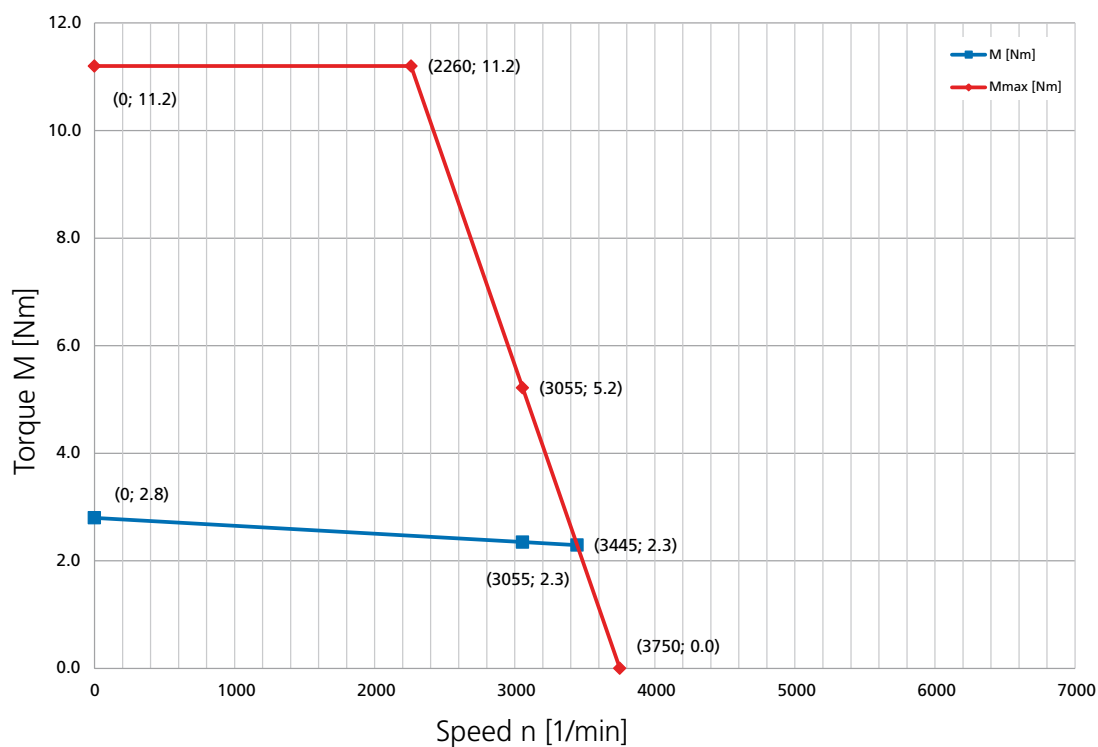
### LSP08-028-320-30-[...]



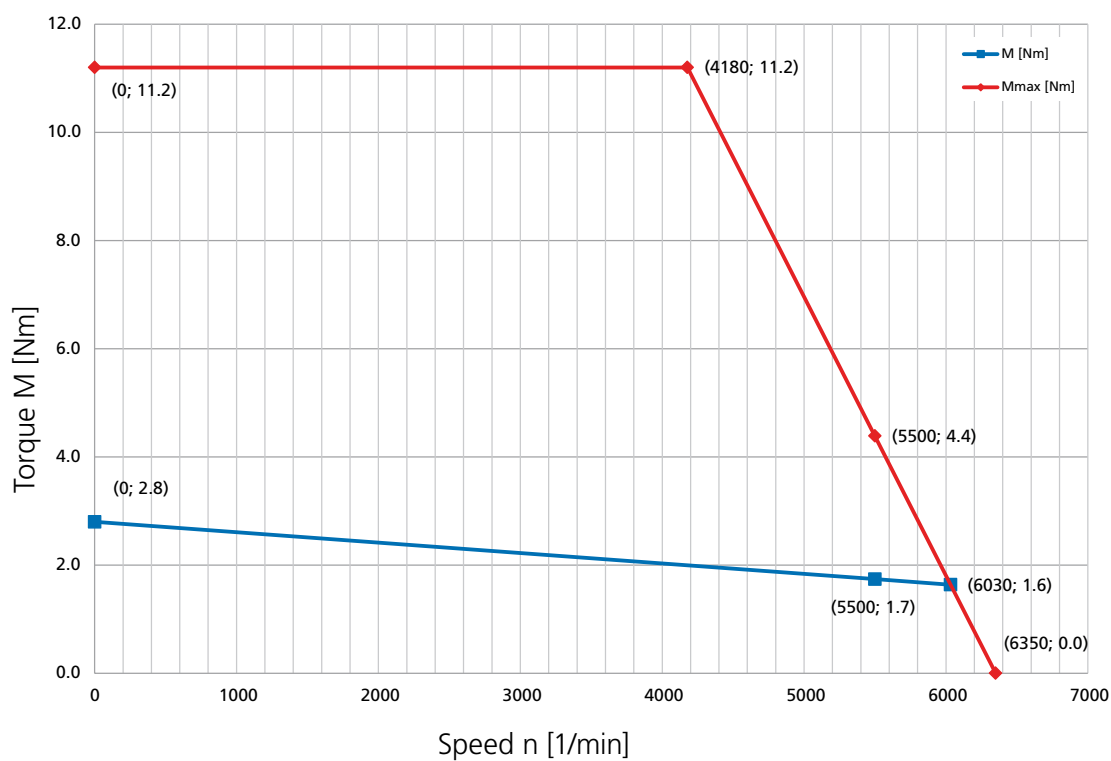
### LSP08-028-320-55-[...]



**LSP08-028-560-30-[...]**



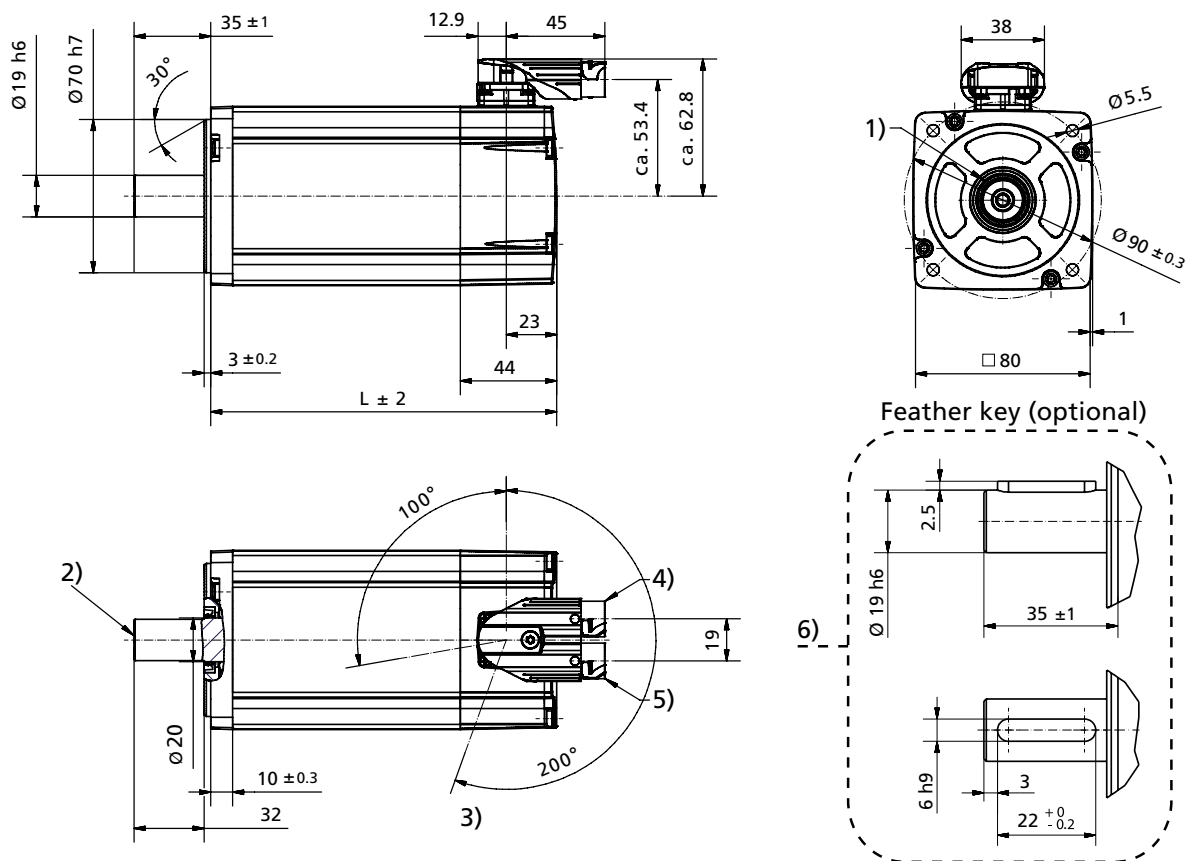
**LSP08-028-560-55-[...]**





Motor type:  
LSP08-035

## Dimensional drawing



## Motor lengths

Motor type		L
LSP08-035	without brake	178 mm
LSP08-035	with brake	220 mm

## Key

- 1) Radial shaft packing ring (30x20x5)
- 2) Centring hole with axial thread to DIN 332 - DS M3 (M6x16)
- 3) Swivel range of Y-Tec plug from Intercontec
- 4) Power plug
- 5) Signal plug
- 6) Feather key (optional)

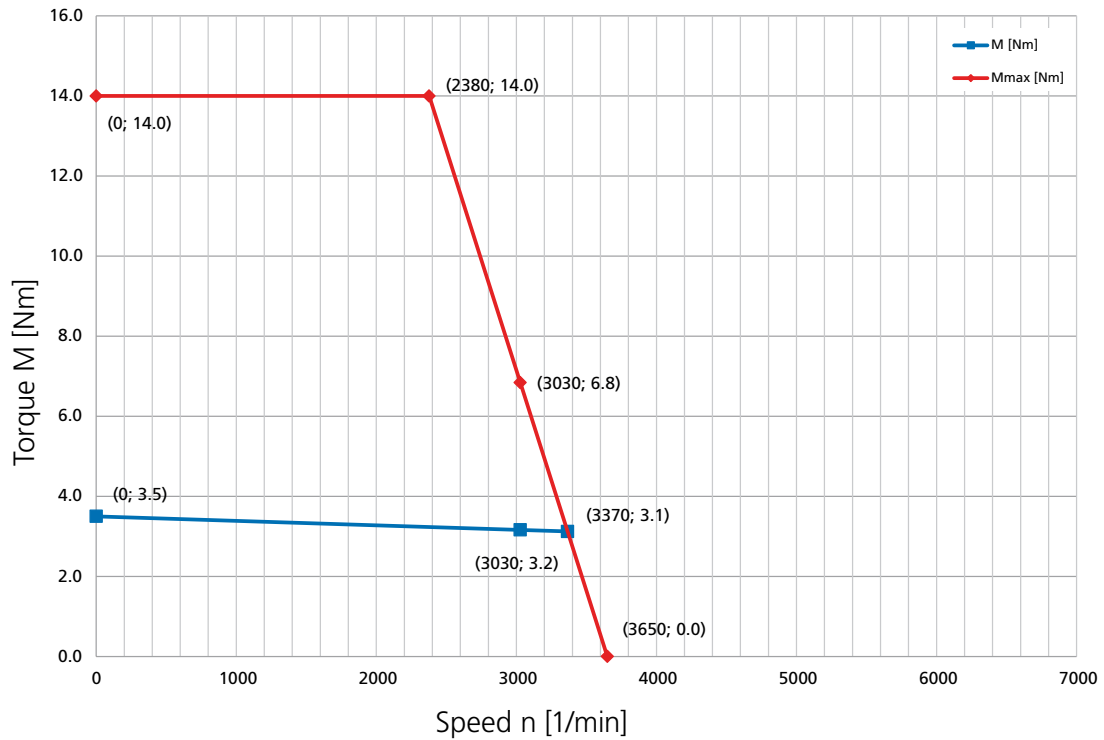
Technical data <sup>1)</sup>	Abbreviation	LSP08-035			
Rated speed [1/min]	<b>n<sub>n</sub></b>	3000	5500	3000	5500
Rated frequency [Hz]	<b>f<sub>n</sub></b>	150	275	150	275
Number of pole pairs	<b>p</b>	3	3	3	3
Circuitry of the motor winding		Y	Y	Y	Y
Controller DC link voltage [V]	<b>U<sub>DC</sub></b>	320	320	560	560
Controller rated voltage [V]	<b>U<sub>n</sub></b>	230	230	400	400
Rated power [W]	<b>P<sub>n</sub></b>	1000	1200	1000	1200
Rated torque [Nm]	<b>M<sub>n</sub></b>	3.2	2.1	3.2	2.1
Rated current per phase [A]	<b>I<sub>n</sub></b>	3.7	4.8	2.1	2.8
Stall torque [Nm]	<b>M<sub>0</sub></b>	3.5	3.5	3.5	3.5
Stall torque per phase [A]	<b>I<sub>0</sub></b>	3.9	7.1	2.2	3.9
Peak torque (maximum permissible torque [Nm])	<b>M<sub>max</sub></b>	14.0	14.0	14.0	14.0
Peak current (maximum permissible current per phase [A])	<b>I<sub>max</sub></b>	15.6	28.4	8.8	15.6
Maximum speed [1/min]	<b>n<sub>max</sub></b>	3970	7180	3890	6900
Voltage constant [V/1000 min <sup>-1</sup> ]	<b>K<sub>E</sub></b>	55.0	30.4	97.5	55.0
Torque constant at nominal point [Nm/A]	<b>K<sub>T</sub></b>	0.91	0.5	1.61	0.91
Winding resistance (2 phases) at 20 °C [Ω]	<b>R<sub>pp</sub></b>	2.8	0.8	9.0	2.8
Winding inductance (2 phases) [mH]	<b>L<sub>pp</sub></b>	8.4	2.6	26.0	8.4
Electrical time constant [ms]	<b>T<sub>el</sub></b>	3.0	3.3	2.9	3.0
Thermal time constant [min]	<b>T<sub>th</sub></b>	30	30	30	30
Rotor moment of inertia [kg cm <sup>2</sup> ]	<b>J</b>	1.93	1.93	1.93	1.93
Weight of the motor [kg]	<b>m</b>	3.85	3.85	3.85	3.85

<sup>1)</sup> All values with a tolerance of ± 5%

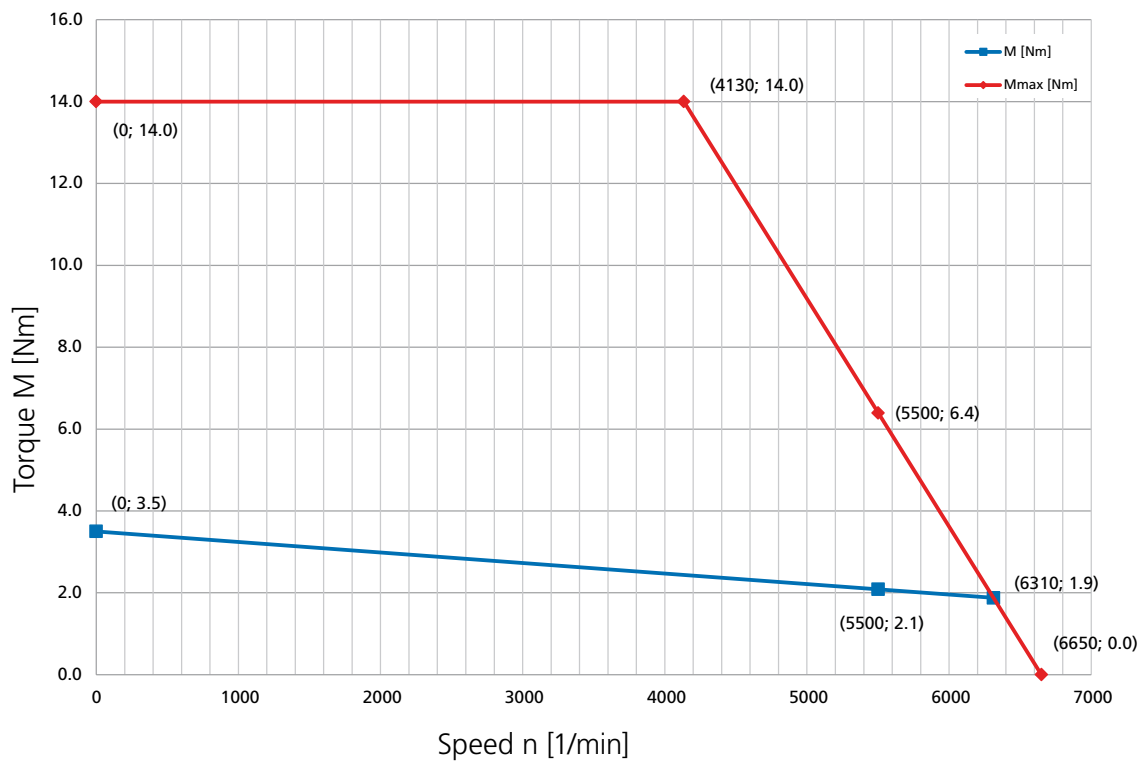
## Characteristics

The characteristic  $M_{\max}$  describes the maximum possible short-time torque at the corresponding speed.  
The characteristic  $M_n$  shows the thermally permissible rated torque.

### LSP08-035-320-30-[...]

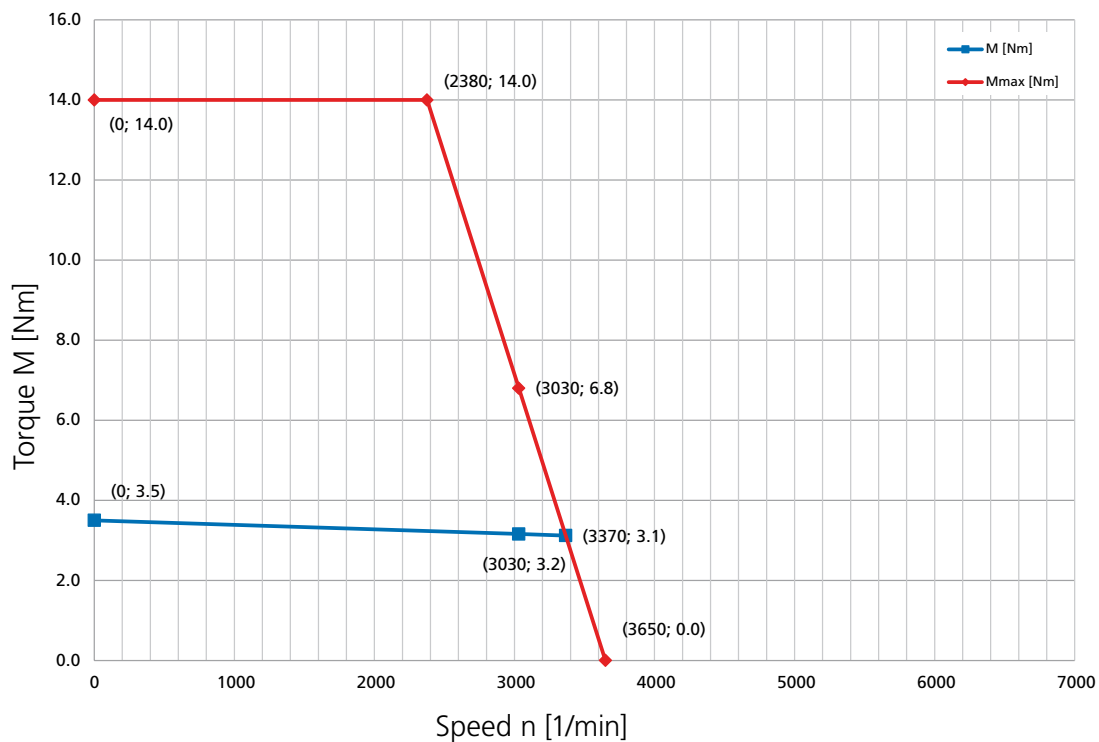


### LSP08-035-320-55-[...]

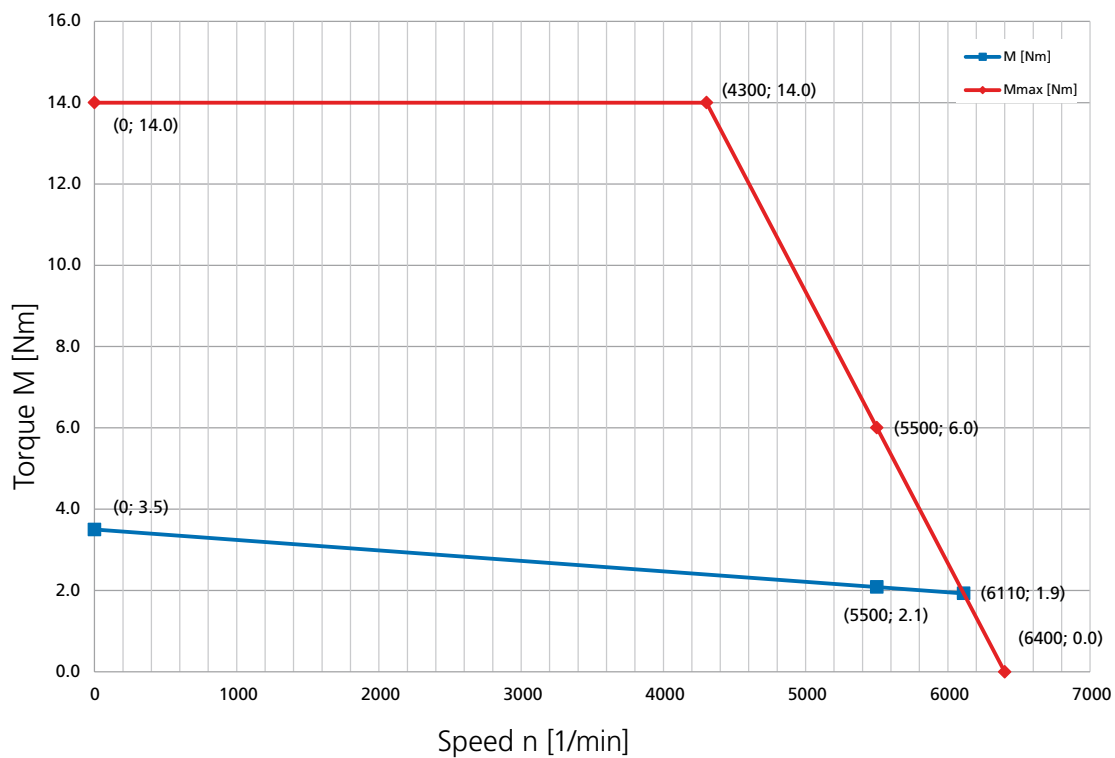




LSP08-035-560-30-[...]



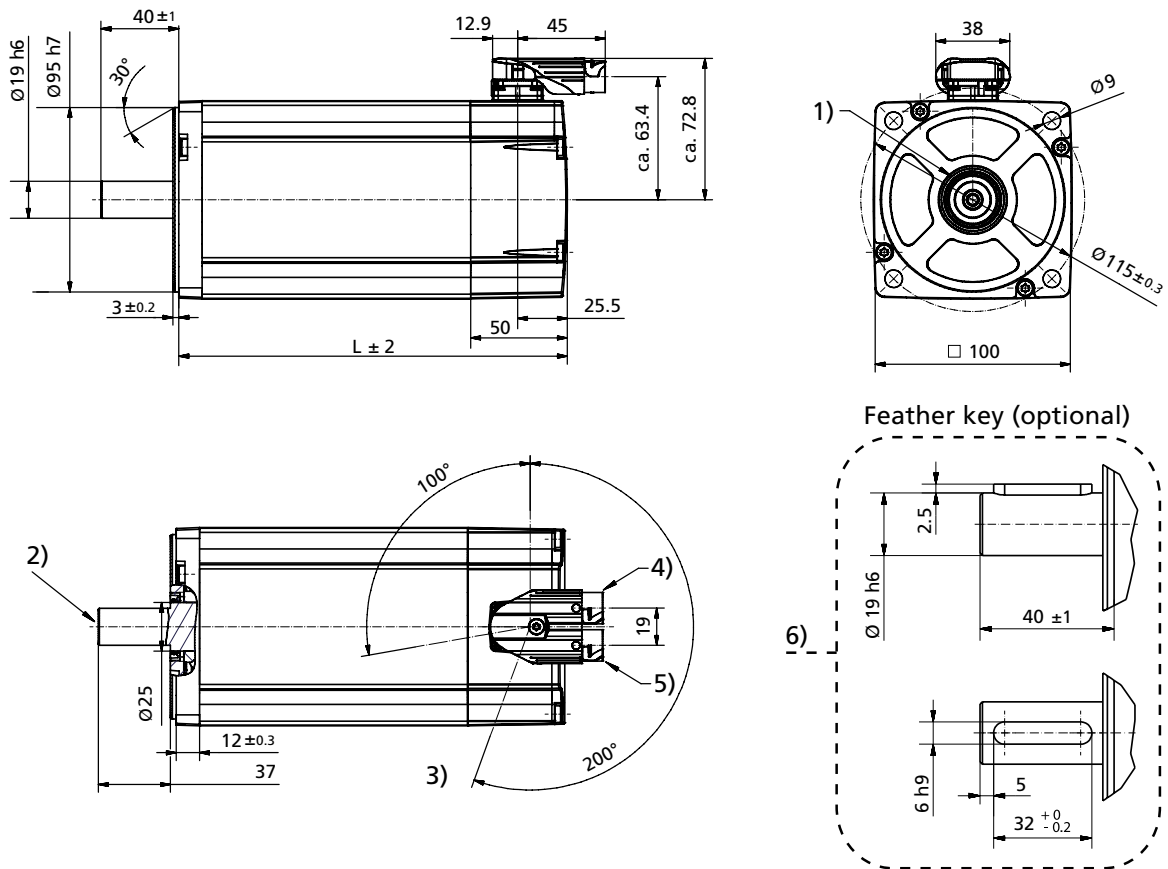
LSP08-035-560-55-[...]





Motor type:  
LSP10-056, LSP10-075

## Dimensional drawing



## Motor lengths

Motor type		L
LSP10-056	without brake	200 mm
LSP10-056	with brake	242 mm
LSP10-075	without brake	225 mm
LSP10-075	with brake	267 mm

## Key

- 1) Radial shaft packing ring (35x25x5)
- 2) Centring hole with axial thread to DIN 332 - DS M6 (M6x16)
- 3) Swivel range of Y-Tec plug from Intercontec
- 4) Power plug
- 5) Signal plug
- 6) Feather key (optional)

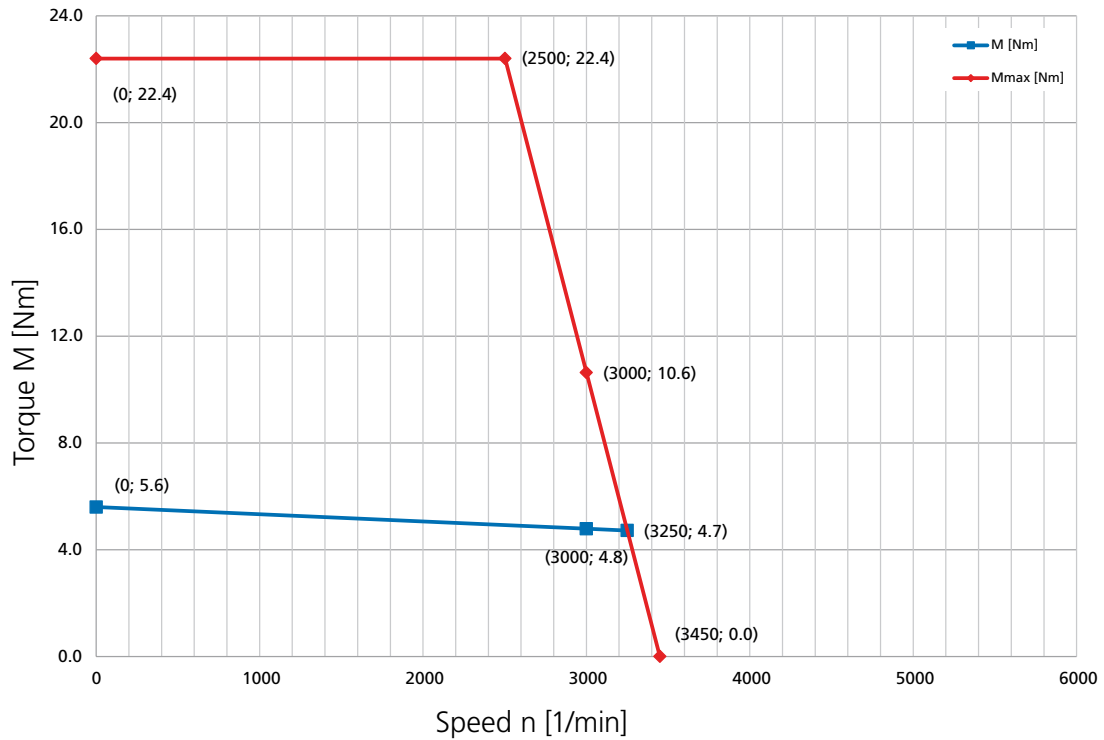
Technical data <sup>1)</sup>	Abbreviation	LSP10-056		LSP10-075	
Rated speed [1/min]	<b>n<sub>n</sub></b>	3000	5000	3000	5000
Rated frequency [Hz]	<b>f<sub>n</sub></b>	150	250	150	250
Number of pole pairs	<b>p</b>	3	3	3	3
Circuitry of the motor winding		Y	Y	Y	Y
Controller DC link voltage [V]	<b>U<sub>DC</sub></b>	560	560	560	560
Controller rated voltage [V]	<b>U<sub>n</sub></b>	400	400	400	400
Rated power [W]	<b>P<sub>n</sub></b>	1500	1800	2000	2500
Rated torque [Nm]	<b>M<sub>n</sub></b>	4.8	3.4	6.4	4.8
Rated current per phase [A]	<b>I<sub>n</sub></b>	3.0	3.7	4.1	5.3
Stall torque [Nm]	<b>M<sub>0</sub></b>	5.6	5.6	7.5	7.5
Stall torque per phase [A]	<b>I<sub>0</sub></b>	3.4	5.4	4.6	7.5
Peak torque (maximum permissible torque [Nm])	<b>M<sub>max</sub></b>	22.4	22.4	30.0	30.0
Peak current (maximum permissible current per phase [A])	<b>I<sub>max</sub></b>	13.6	21.6	18.4	30.0
Maximum speed [1/min]	<b>n<sub>max</sub></b>	3710	6010	3740	6150
Voltage constant [V/1000 min <sup>-1</sup> ]	<b>K<sub>E</sub></b>	102.2	63.2	101.4	61.7
Torque constant at nominal point [Nm/A]	<b>K<sub>T</sub></b>	1.69	1.05	1.68	1.02
Winding resistance (2 phases) at 20 °C [Ω]	<b>R<sub>pp</sub></b>	4.6	1.8	3.2	1.4
Winding inductance (2 phases) [mH]	<b>L<sub>pp</sub></b>	19.8	7.4	15.0	5.6
Electrical time constant [ms]	<b>T<sub>el</sub></b>	4.3	3.1	4.7	4.0
Thermal time constant [min]	<b>T<sub>th</sub></b>	30	30	35	35
Rotor moment of inertia [kg cm <sup>2</sup> ]	<b>J</b>	4.84	4.84	6.41	6.41
Weight of the motor [kg]	<b>m</b>	6.4	6.4	7.75	7.75

<sup>1)</sup> All values with a tolerance of ± 5%

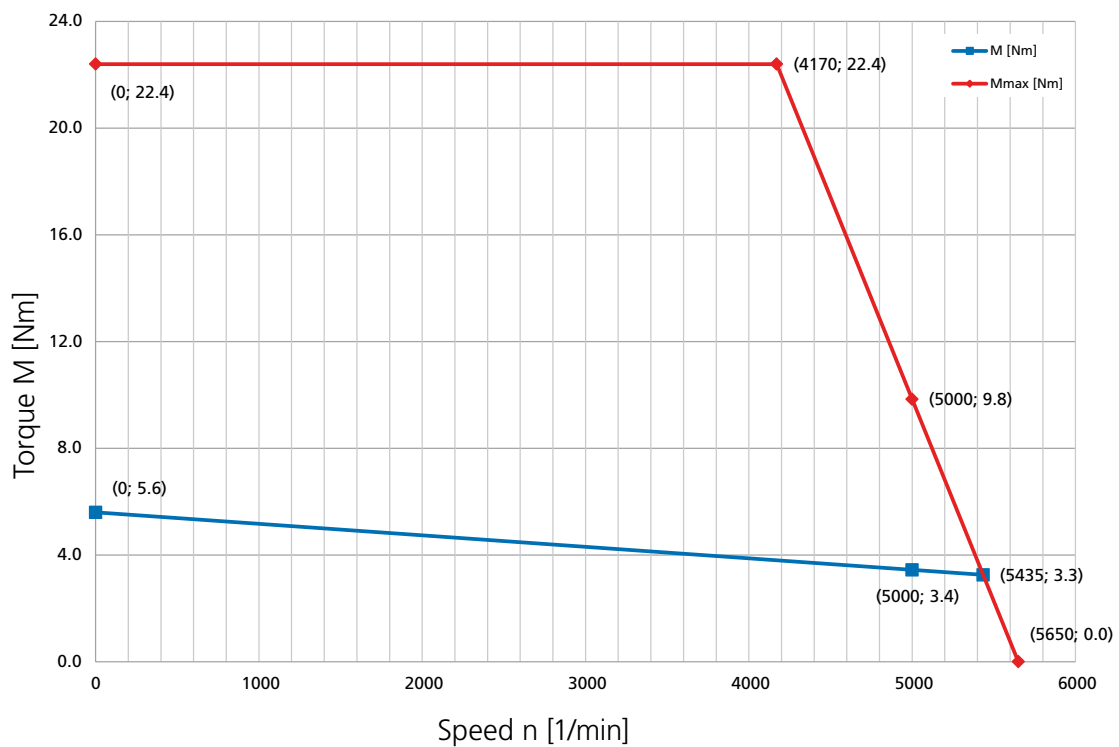
## Characteristics

The characteristic  $M_{\max}$  describes the maximum possible short-time torque at the corresponding speed.  
The characteristic  $M_n$  shows the thermally permissible rated torque.

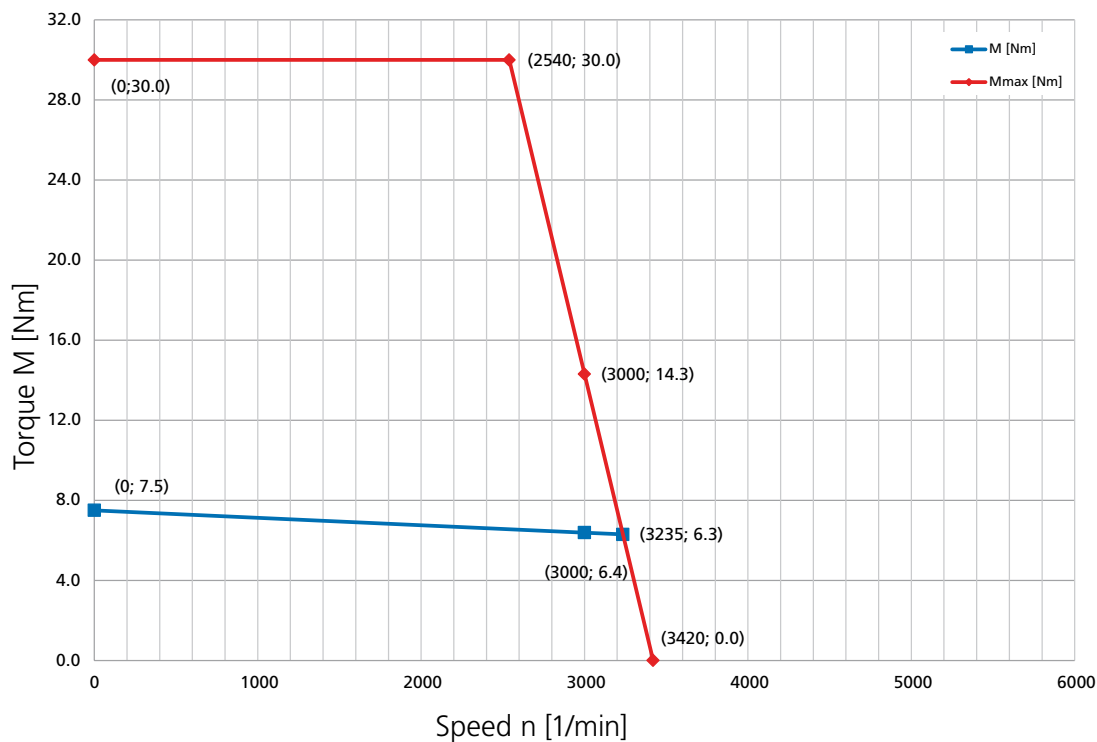
### LSP10-056-560-30-[...]



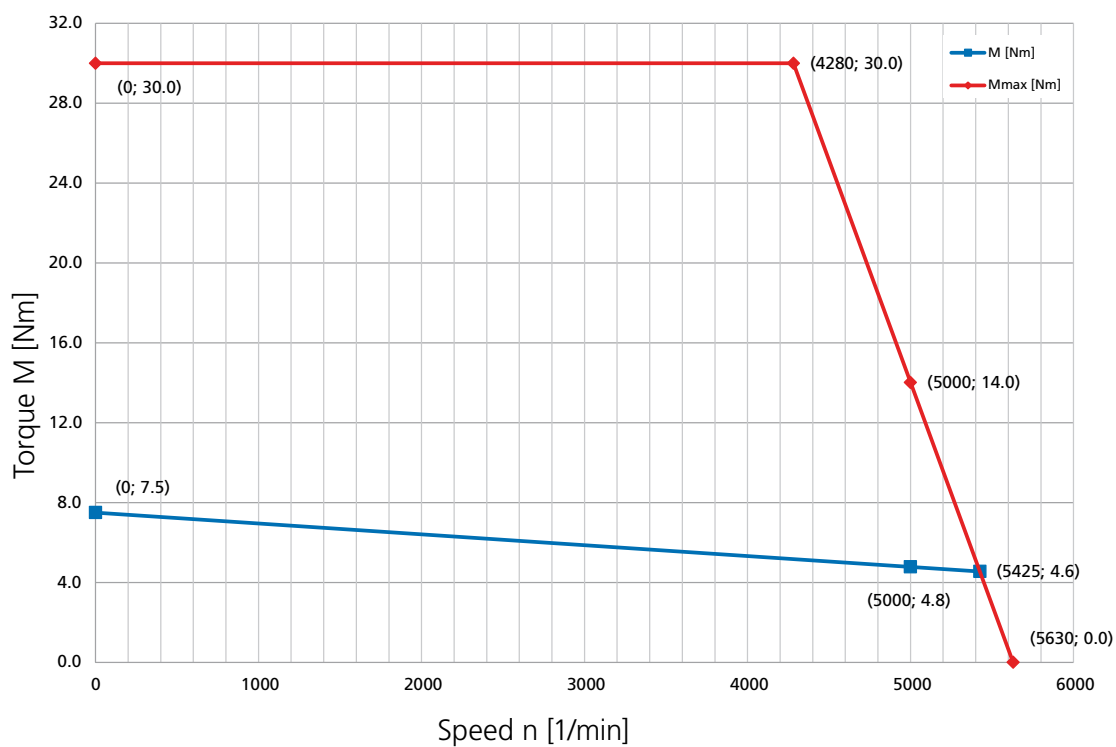
### LSP10-056-560-50-[...]



**LSP10-075-560-30-[...]**



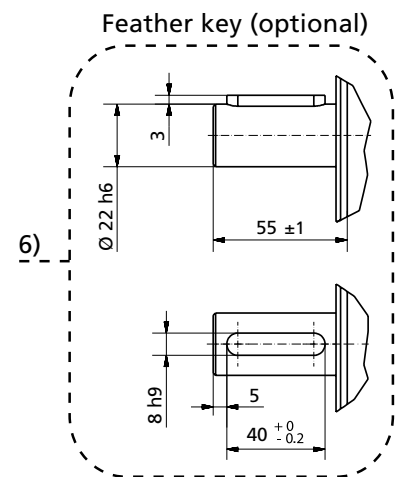
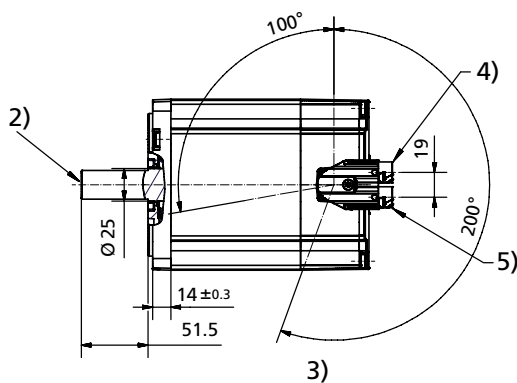
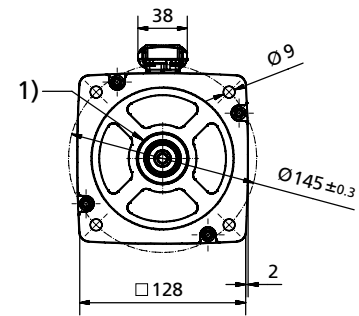
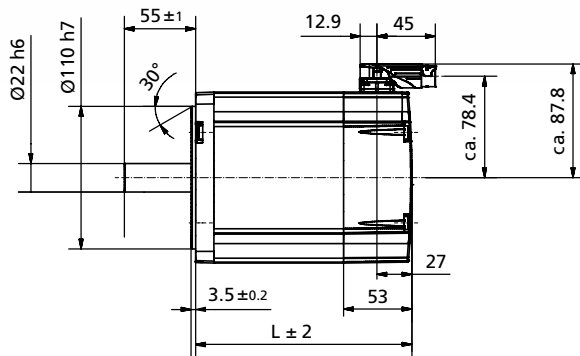
**LSP10-075-560-50-[...]**





Motor type:  
LSP13-055, LSP13-091

## Dimensional drawing



## Motor lengths

Motor type		L
LSP13-055	without brake	167 mm
LSP13-055	with brake	197 mm
LSP13-091	without brake	182 mm
LSP13-091	with brake	212 mm

## Key

- 1) Radial shaft packing ring (40x25x5)
- 2) Centring hole with axial thread to DIN 332 - DS M8 (M8x19)
- 3) Swivel range of Y-Tec plug from Intercontec
- 4) Power plug
- 5) Signal plug
- 6) Feather key (optional)

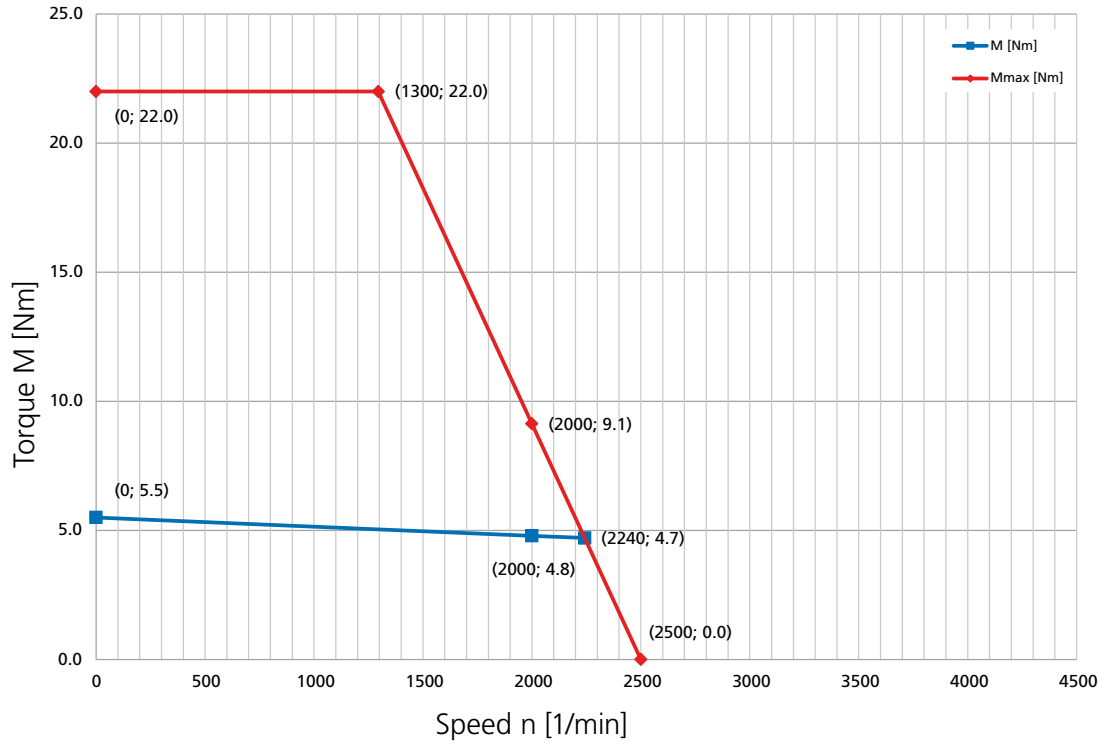
Technical data <sup>1)</sup>	Abbreviation	LSP13-055				LSP13-091	
Rated speed [1/min]	<b>n<sub>n</sub></b>	2000	3600	2000	3600	2000	3600
Rated frequency [Hz]	<b>f<sub>n</sub></b>	100	180	100	180	100	180
Number of pole pairs	<b>p</b>	3	3	3	3	3	3
Circuitry of the motor winding		Y	Y	Y	Y	Y	Y
Controller DC link voltage [V]	<b>U<sub>DC</sub></b>	320	320	560	560	560	560
Controller rated voltage [V]	<b>U<sub>n</sub></b>	230	230	400	400	400	400
Rated power [W]	<b>P<sub>n</sub></b>	1000	1500	1000	1500	1500	2250
Rated torque [Nm]	<b>M<sub>n</sub></b>	4.8	4.0	4.8	4.0	7.2	6.0
Rated current per phase [A]	<b>I<sub>n</sub></b>	4.1	6.0	2.3	3.4	3.4	5.0
Stall torque [Nm]	<b>M<sub>0</sub></b>	5.5	5.5	5.5	5.5	9.1	9.1
Stall torque per phase [A]	<b>I<sub>0</sub></b>	4.8	8.2	2.7	4.7	4.4	7.7
Peak torque (maximum permissible torque [Nm])	<b>M<sub>max</sub></b>	22.0	22.0	22.0	22.0	36.4	36.4
Peak current (maximum permissible current per phase [A])	<b>I<sub>max</sub></b>	19.0	32.8	10.8	18.8	17.6	30.8
Maximum speed [1/min]	<b>n<sub>max</sub></b>	2500	4400	2450	4350	2400	4300
Voltage constant [V/1000 min <sup>-1</sup> ]	<b>K<sub>E</sub></b>	89	49	158	85	158	86
Torque constant at nominal point [Nm/A]	<b>K<sub>T</sub></b>	1.47	0.81	2.62	1.41	2.62	1.42
Winding resistance (2 phases) at 20 °C [Ω]	<b>R<sub>pp</sub></b>	4.0	1.2	12.0	4.0	6.8	2.2
Winding inductance (2 phases) [mH]	<b>L<sub>pp</sub></b>	15.0	5.0	47.8	15.0	32.2	10.4
Electrical time constant [ms]	<b>T<sub>el</sub></b>	3.9	3.9	4.2	4.2	4.9	4.9
Thermal time constant [min]	<b>T<sub>th</sub></b>	35	35	35	35	42	42
Rotor moment of inertia [kg cm <sup>2</sup> ]	<b>J</b>	9.82	9.82	9.82	9.82	14.0	14.0
Weight of the motor [kg]	<b>m</b>	7.0	7.0	7.0	7.0	8.6	8.6

<sup>1)</sup> All values with a tolerance of ± 5%

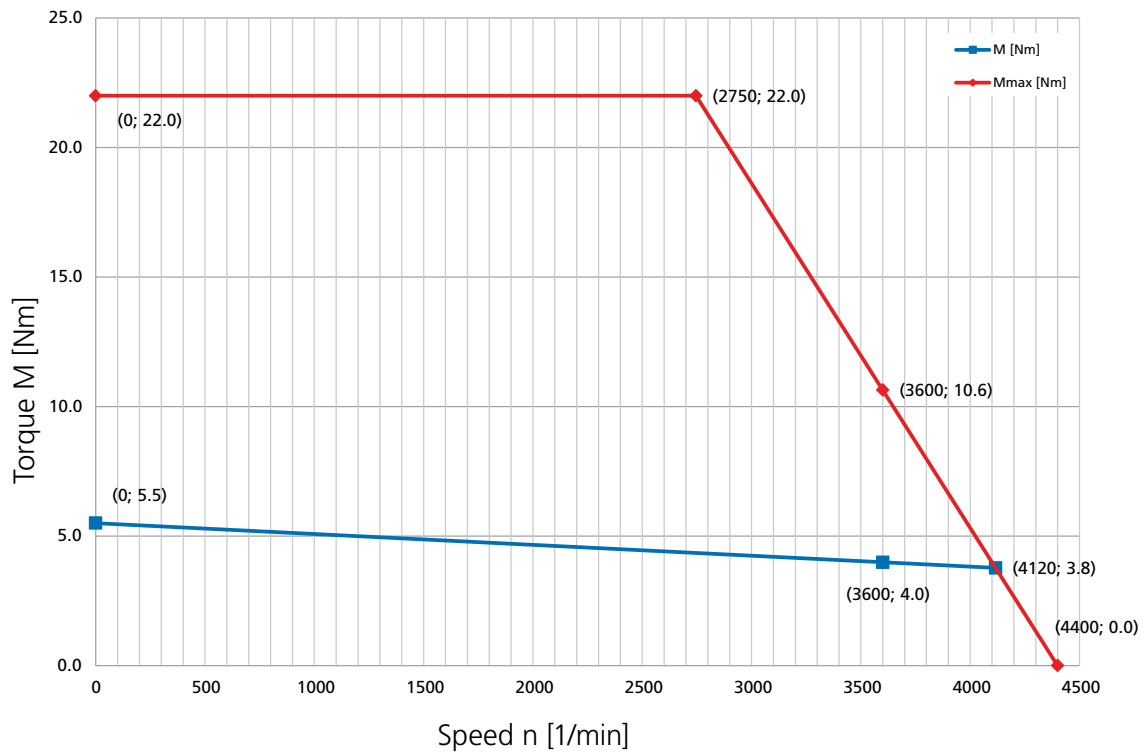
## Characteristics

The characteristic  $M_{\max}$  describes the maximum possible short-time torque at the corresponding speed.  
The characteristic  $M_n$  shows the thermally permissible rated torque.

### LSP13-055-320/560-20-[...]

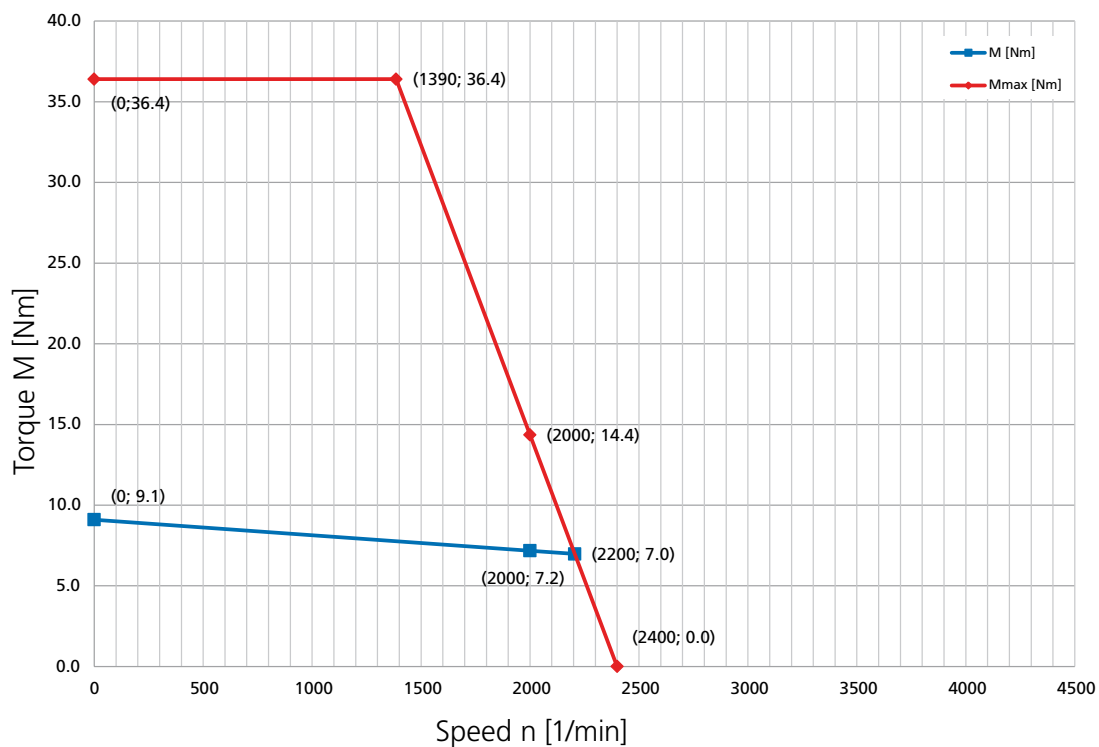


### LSP13-055-320/560-36-[...]

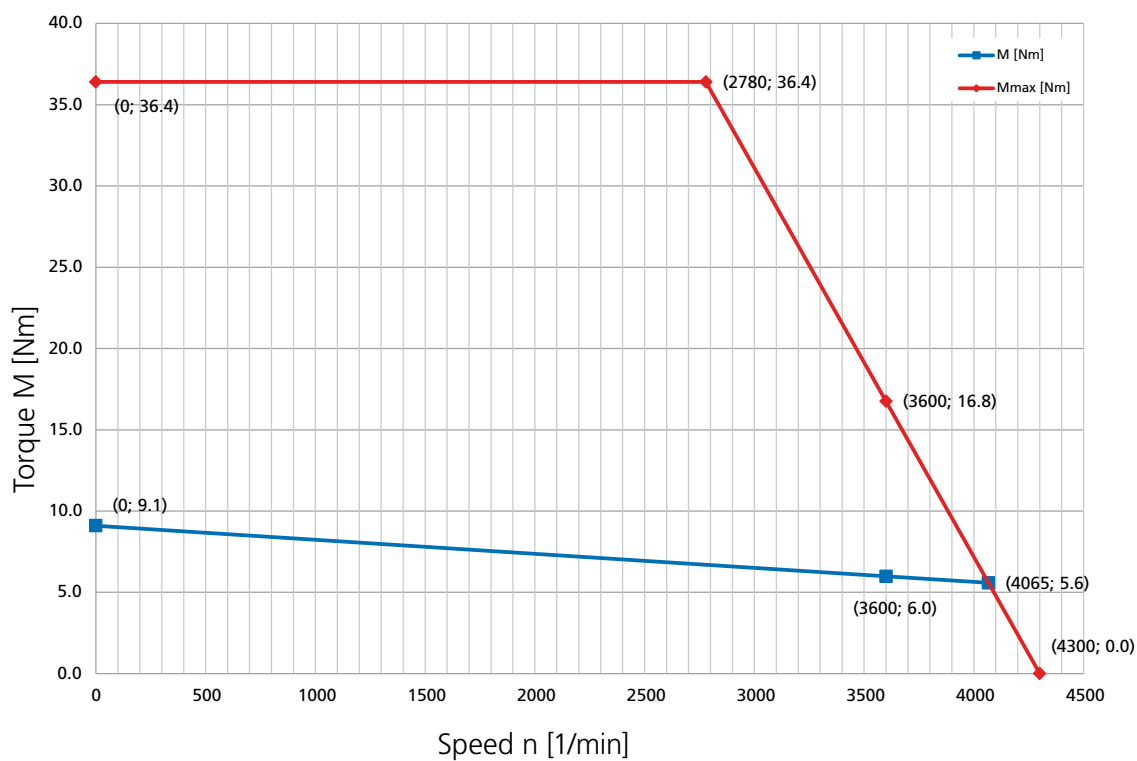




**LSP13-091-560-20-[...]**



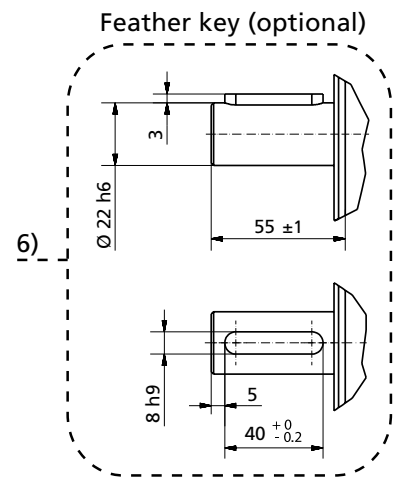
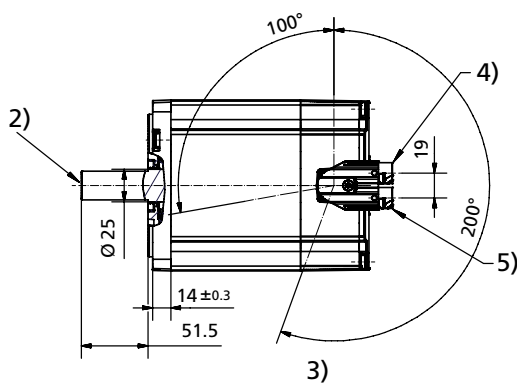
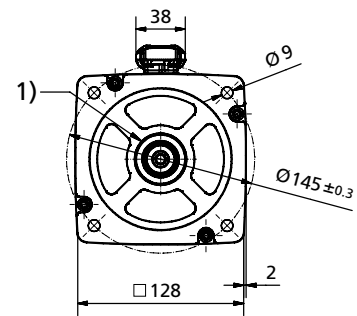
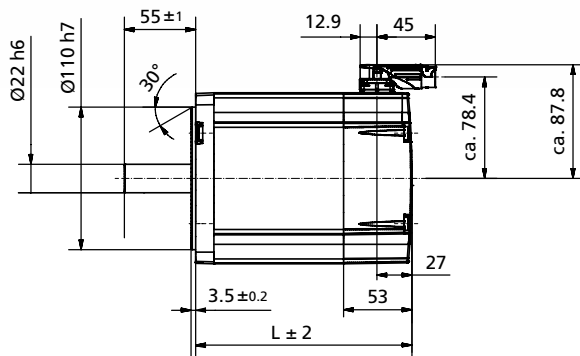
**LSP13-091-560-36-[...]**





Motor type:  
LSP13-123, LSP13-185

## Dimensional drawing



## Motor lengths

Motor type		L
LSP13-123	without brake	207 mm
LSP13-123	with brake	242 mm
LSP13-185	without brake	252 mm
LSP13-185	with brake	287 mm

## Key

- 1) Radial shaft packing ring (40x25x5)
- 2) Centring hole with axial thread to DIN 332 - DS M8 (M8x19)
- 3) Swivel range of Y-Tec plug from Intercontec
- 4) Power plug
- 5) Signal plug
- 6) Feather key (optional)

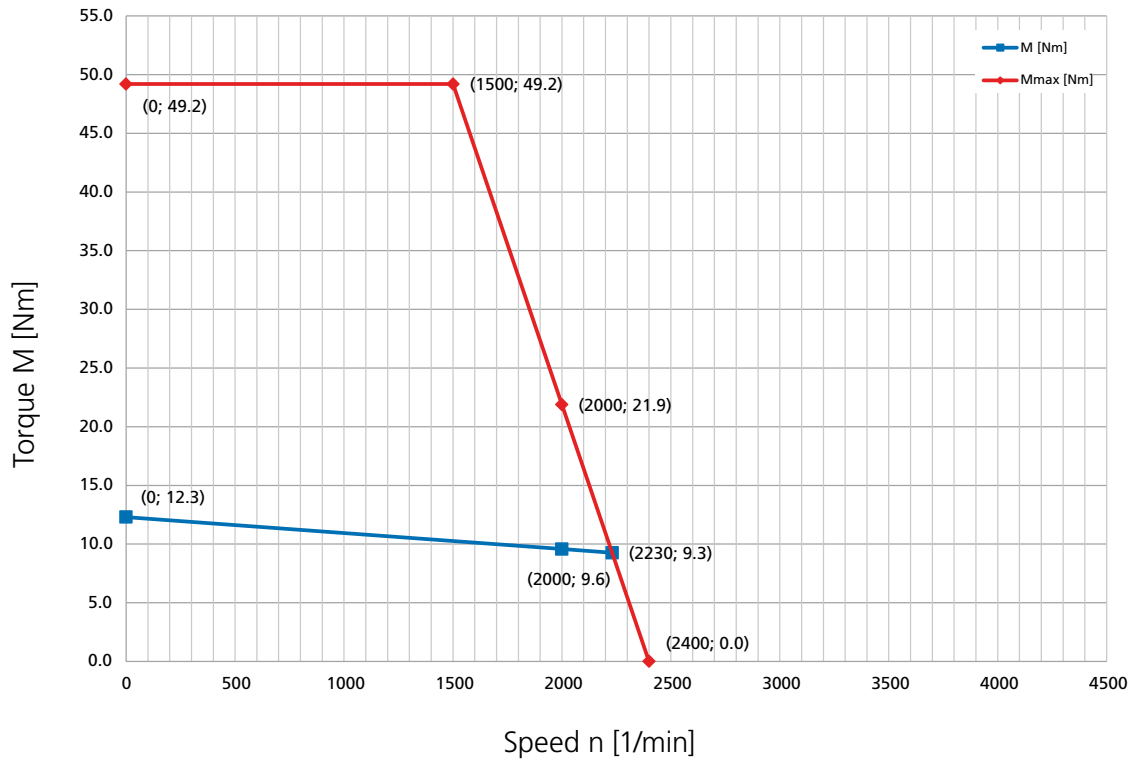
Technical data <sup>1)</sup>	Abbreviation	LSP13-123		LSP13-185	
Rated speed [1/min]	<b>n<sub>n</sub></b>	2000	3600	2000	3600
Rated frequency [Hz]	<b>f<sub>n</sub></b>	100	180	100	180
Number of pole pairs	<b>p</b>	3	3	3	3
Circuitry of the motor winding		Y	Y	Y	Y
Controller DC link voltage [V]	<b>U<sub>DC</sub></b>	560	560	560	560
Controller rated voltage [V]	<b>U<sub>n</sub></b>	400	400	400	400
Rated power [W]	<b>P<sub>n</sub></b>	2000	3000	3000	3750
Rated torque [Nm]	<b>M<sub>n</sub></b>	9.6	8.0	14.4	10.0
Rated current per phase [A]	<b>I<sub>n</sub></b>	4.5	6.7	6.5	8.0
Stall torque [Nm]	<b>M<sub>0</sub></b>	12.3	12.3	18.5	18.5
Stall torque per phase [A]	<b>I<sub>0</sub></b>	4.7	10.3	8.4	14.8
Peak torque (maximum permissible torque [Nm])	<b>M<sub>max</sub></b>	49.2	49.2	74.0	74.0
Peak current (maximum permissible current per phase [A])	<b>I<sub>max</sub></b>	18.8	41.2	33.6	59.2
Maximum speed [1/min]	<b>n<sub>max</sub></b>	2400	4300	2300	4100
Voltage constant [V/1000 min <sup>-1</sup> ]	<b>K<sub>E</sub></b>	158	85	160	88
Torque constant at nominal point [Nm/A]	<b>K<sub>T</sub></b>	2.62	1.41	2.65	1.46
Winding resistance (2 phases) at 20 °C [Ω]	<b>R<sub>pp</sub></b>	3.8	1.2	2.0	0.6
Winding inductance (2 phases) [mH]	<b>L<sub>pp</sub></b>	21.2	6.6	13.2	4.2
Electrical time constant [ms]	<b>T<sub>el</sub></b>	5.4	5.4	5.4	5.4
Thermal time constant [min]	<b>T<sub>th</sub></b>	49	49	49	49
Rotor moment of inertia [kg cm <sup>2</sup> ]	<b>J</b>	21.1	21.1	33.8	33.8
Weight of the motor [kg]	<b>m</b>	10.7	10.7	14.8	14.8

<sup>1)</sup> All values with a tolerance of ± 5%

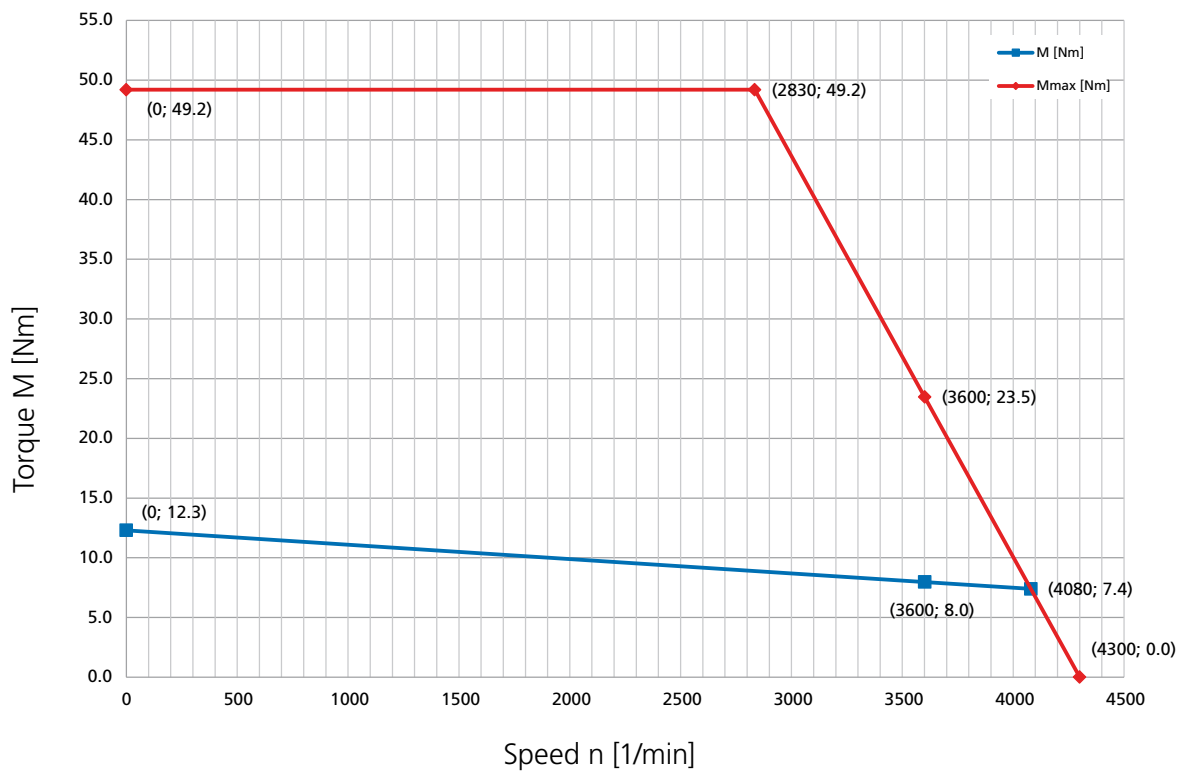
## Characteristics

The characteristic  $M_{max}$  describes the maximum possible short-time torque at the corresponding speed.  
The characteristic  $M_n$  shows the thermally permissible rated torque.

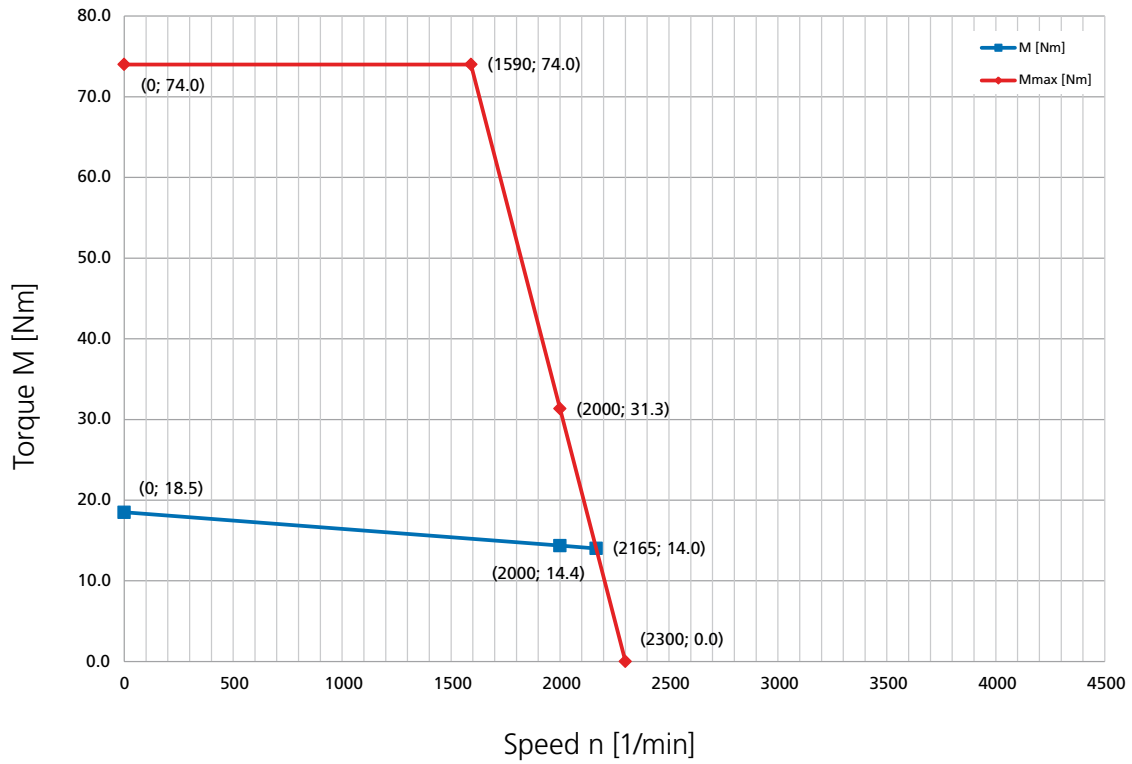
### LSP13-123-560-20-[...]



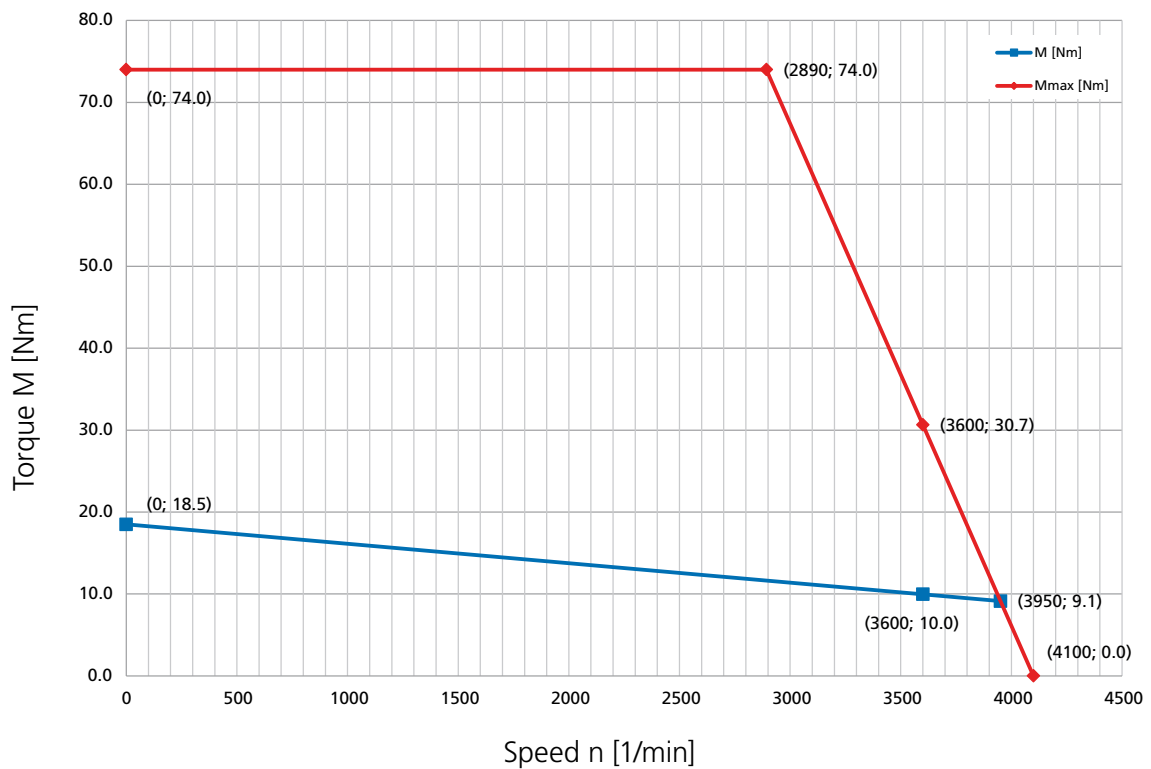
### LSP13-123-560-36-[...]



**LSP13-185-560-20-[...]**



**LSP13-185-560-36-[...]**



### 3. Motor and encoder cables

#### Ready-made motor cables for ServoOne junior



#### Order code

KMx - KS - 005 - XXX	
<b>Ready-made cable</b>	ServoOne junior Y 17 with brake → <b>6</b> ServoOne junior Y 17 without brake → <b>8</b>
<b>Capable for energy chains</b>	
<b>Cable length</b>	2 m → <b>002</b> 3 m → <b>003</b> 5 m → <b>005</b> 8 m → <b>008</b> 10 m → <b>010</b> 15 m → <b>015</b> 20 m → <b>020</b>
<b>Motor cable</b>	to I <sub>0</sub> = 16 A

#### Technical data

		KM6-KSXXX	KM8-KSXXX
Motor type		Motors up to I <sub>0</sub> = 16 A with plug-in power connection	Motors up to I <sub>0</sub> = 16 A with plug-in power connection
Minimum bend radius	with fixed layout	90 mm	90 mm
	with flexible layout	120 mm	120 mm
Temperature range		-30 ... +80 °C	-30 ... +80 °C
Cable diameter approx.		12 mm	12 mm
Cable cross-section		4G1.5 + 2 x 2 x 0.75 mm <sup>2</sup>	4G1.5 + 2 x 2 x 0.75 mm <sup>2</sup>
Material of outer sheath		PUR	PUR
Resistance		Resistant to oil, hydrolysis and microbic attack (VDE 0472)	
Wiring		1 = U 2 = V 3 = W ye/gn = PE 7 = Brake + 8 = Brake -	1 = U 2 = V 3 = W ye/gn = PE
Approval		UL AWM 80 °C - 600 V/1000 V; CSA AWM 80 °C - 600 V/1000 V FT1	

## Ready-made encoder cables for ServoOne junior



### Order code

K RY3 - KS - XXX	
Ready-made cable	
Encoder system	Resolver cable → <b>KRY3</b> Hiperface encoder cable → <b>KGH5</b>
Capable for energy chains	
Cable length	2 m → <b>002</b> 3 m → <b>003</b> 5 m → <b>005</b> 8 m → <b>008</b> 10 m → <b>010</b> 15 m → <b>015</b> 20 m → <b>020</b>

### Technical data

	KRY3-KSXXX	KGH5-KSXXX
Controller type	ServoOne junior	ServoOne junior
Motors with encoder system	Resolver	HXX Hiperface encoder
Controller-end assignment (sub-D connector)	1 = SIN+ (S2)      6 = REF+ (R1) 2 = SIN- (S4)      7 = REF- (R2) 3 = COS+ (S1)      8 = COS- (S3) 4 = n.c.              9 = Temp- (PTC-) 5 = Temp+ (PTC+)	1 = REFCOS          9 = Temp+ (PTC+) 2 = COS+            10 = Temp- (PTC-) 3 = 7 - 12 V DC      11 = SIN+ 4 = DATA+          12 = Jumper to pin 7 5 = DATA-           13 = n.c. 6 = REFSIN          14 = n.c. 7 = Jumper to pin 12 15 = n.c. 8 = GND
Minimum bend radius	90 mm	100 mm
Temperature range	with fixed layout with flexible layout	-35 ... +85 °C -35 ... +85 °C
Cable diameter approx.	8.8 mm	
Festoon-compatible	Yes	
Material of outer sheath	PUR	
Resistance	Resistant to oil, hydrolysis and microbic attack (VDE 0472)	
Approvals	UL AWM 80 °C - 600 V/1000 V; CSA AWM 80 °C - 600 V/1000 V FT1	

## Ready-made HIPERFACE DSL® cables



### Order code

KM13 - 3PHBD - I17 - 10A KS 001	
<b>Ready-made motor cable</b>	
<b>Cable configuration</b>	<b>3PHBD</b> → 3-phase + earth + brake + HIPERFACE DSL®
<b>Connector</b>	<b>I17</b> → I17 connector, motor side
<b>Rated current</b>	<b>10A</b> → Cable cross-section 1 mm <sup>2</sup>
<b>Additional option</b>	<b>KS</b> → Capable for energy chains
<b>Cable length</b>	<b>001</b> → 1 m <b>010</b> → 10 m <b>030</b> → 30 m available cable lengths: 1 m, 2 m, 3 m, 4 m, 5 m, 6 m, 7 m, 8 m, 9 m, 10 m, 15 m, 20 m, 25 m, 30 m



## Technical data

Cable type/order designation		KM13-3PHBD-I17-10A-KSxxx <sup>1)</sup>	
Cable length		1 m to max. 30 m	
Number of poles		9	
Wiring		1 = U	1 mm <sup>2</sup>
		2 = V	1 mm <sup>2</sup>
		3 = W	1 mm <sup>2</sup>
		ye/gn = PE	1 mm <sup>2</sup>
		5 = Brake +	0.75 mm <sup>2</sup>
		6 = Brake –	0.75 mm <sup>2</sup>
		blue = Hiperface DSL +	AWG22
		white = Hiperface DSL –	AWG22
Temperature range when in motion		-20 °C to +80 °C	
Temperature range when stationary		-40 °C to +80 °C	
Protection class		connected IP 66/67	
Rated voltage	Signal plug Power plug Cable	63 V AC/DC max. 630 V AC/DC max. 1000V AC (UL)	
Rated current	Signal plug Power plug Cable	3.6 A I <sub>max.</sub> 14 A I <sub>max.</sub> 10 A I <sub>rated</sub>	
Pollution severity		3, as per EN 61984 Sec. 6.19.2.2	
Overvoltage category		III, as per EN 61984 Sec. 6.19.2.2	
Maximum site altitude		Max. 2000 m, as per EN 61984 Sec. 6.19.2.2	
RoHS compliant		Yes	
Oil resistance of outer material		HD 22.10 Appendix A, DIN EN 60811-2-1	
flame retardant		as per IEC 60332-1-2, UL758 cable flame test	
Halogen-free		Yes	
Silicone-free		Yes	
CFC-free		Yes	
Capable for energy chains		Yes	
Bending radius	fixed layout Multiple movements	5 x D 7 x D	
Diameter D		11.6 mm	
Approval		UL758 (AWM) style 21223 (sheath) and style 10492 (lead)	
Weight		0.215 kg/m	

## Ready-made motor cables for ServoOne CM



### Order code

KM14 - 3PHBD - I17 - 10A - KS 001	
<b>Ready-made motor cable</b>	
<b>Cable configuration</b>	<b>3PHBT</b> → 3-phase + earth + brake + Thermo <b>3PHBD</b> → 3-phase + earth + brake + HIPERFACE DSL®
<b>Connector</b>	<b>M23</b> → M23 connector <b>I17</b> → I17 connector (HIPERFACE DSL®-Cable) <b>M40</b> → M40 connector
<b>Rated current</b>	<b>5A</b> → Cable cross-section 0.5 mm <sup>2</sup> <b>10A</b> → Cable cross-section 1 mm <sup>2</sup> <b>16A</b> → Cable cross-section 1.5 mm <sup>2</sup> <b>24A</b> → Cable cross-section 2.5 mm <sup>2</sup> <b>35A</b> → Cable cross-section 4 mm <sup>2</sup>
<b>Additional option</b>	<b>KS</b> → Capable for energy chains
<b>Cable length</b>	<b>001</b> → 1 m <b>010</b> → 10 m <b>030</b> → 30 m  available cable length: 1 m, 2 m, 3 m, 4 m, 5 m, 6 m, 7 m, 8 m, 9 m, 10 m, 15 m, 20 m, 25 m, 30 m

You will find further information on the ready-made motor cables in the LSx servomotor catalogues and in the operation manual for the ServoOne CM axis controller.

## Selection procedure „Motor cables for the ServoOne CM“

motor			cable		axis controller	
type	connector size	connector code and temperature sensor	encoder code	type designation of the motor cable	ServoOne CM standard version	ServoOne CM optional design
LSP	M17	Y1M	Rxx, Hxx	KM14-3PHBT-I17-xxA-KSxxx	yes	SOCM-x.xxx.1xxx.x SOCM-x.xxx.2xxx.x
			I17	Dxx	KM14-3PHBD-I17-xxA-KSxxx	no
LSN LSH LST	M23	S1 to S7 TxM	xR, G3, G5, G6.xy, G12xy	KM14-3PHBT-M23-xxA-KSxxx	yes	SOCM-x.xxx.1xxx.x SOCM-x.xxx.2xxx.x
			S1 to S7	G7.xy	KM14-3PHBD-M23-xxA-KSxxx	no
LSN LSH LST	M40	S1 to S7 TxM	xR, G3, G5, G6.xy, G12xy	KM14-3PHBT-M40-xxA-KSxxx	yes	SOCM-x.xxx.1xxx.x SOCM-x.xxx.2xxx.x
			S1 to S7	G7.xy	KM14-3PHBD-M40-xxA-KSxxx	no

## Ready-made encoder cables for the ServoOne CM



Example illustration

### Order code

	<b>KE14 - R - I17 - KS 010</b>
Ready-made encoder cable	
Encoder type	<b>R</b> → Resolver <b>H</b> → HIPERFACE DSL® <b>E</b> → EnDat/SSI
Connector	<b>M23</b> → M23 connector <b>I17</b> → I17 connector
Additional option	<b>KS</b> → Capable for energy chains
Cable length	<b>001</b> → 1 m <b>010</b> → 10 m <b>030</b> → 30 m available cable length: 1 m, 2 m, 3 m, 4 m, 5 m, 6 m, 7 m, 8 m, 9 m, 10 m, 15 m, 20 m, 25 m, 30 m

You will find further information on the ready-made encoder cables in the LSx servomotor catalogues and in the operation manual for the ServoOne CM axis controller.

## Selection procedure „Encoder cables for the ServoOne CM“

motor			cable		axis controller	
type	connector size	connector code and temperature sensor	encoder code	type designation of the encoder cable	ServoOne CM standard version	ServoOne CM optional design
LSP	M17	Y1M	R <sub>xx</sub>	KE14-R-117-KS <sub>xxx</sub>	yes	SOCM-x.xxx.1xxx.x SOCM-x.xxx.2xxx.x
			H <sub>xx</sub>	KE14-H-117-KS <sub>xxx</sub>	yes	SOCM-x.xxx.1xxx.x SOCM-x.xxx.2xxx.x
LSN LSH LST	M23	S1 to S7 TxM	xR	KE14-R-M23-KS <sub>xxx</sub>	yes	SOCM-x.xxx.1xxx.x SOCM-x.xxx.2xxx.x
			G6.xy	KE14-H-M23-KS <sub>xxx</sub>	yes	SOCM-x.xxx.1xxx.x SOCM-x.xxx.2xxx.x
			G3, G5, G12.xy	KE14-E-M23-KS <sub>xxx</sub>	yes	SOCM-x.xxx.1xxx.x SOCM-x.xxx.2xxx.x

Space for notes

A large grid of graph paper for taking notes, consisting of 20 columns and 30 rows of small squares.

## 4. Appendix

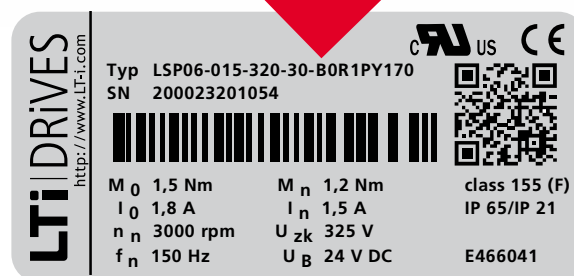
### Holding brake



The backlash-free, permanent-field single-disc holding brake works on the closed circuit principle, meaning that current needs to be applied to the brake to release it.

For optimum holding torque and lowest possible circumferential backlash, on all LSP motors the holding brake is attached directly behind the flange (on the drive side).

The holding brake is always activated and deactivated at standstill. When the holding brake is deployed as an emergency stop brake, you need to pay attention to the maximum permissible friction (WR).



An LSP servomotor with holding brake is identifiable by the name plate.

Example:

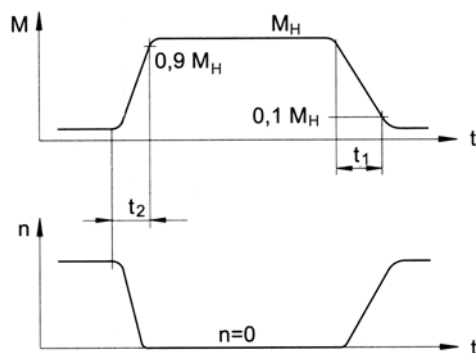
**LSP06-015-320-30-B0R1PY170**



**NOTE:** When the holding brake is deployed as an emergency stop brake, the braking torque may be substantially lower than the holding torque.

#### Holding brake response times

If DC-side switching takes place between the rectifier and coil, an extremely short run-on is attained. For drives requiring precise braking, in particular for lifting gear, DC-side switching of the brake is essential.



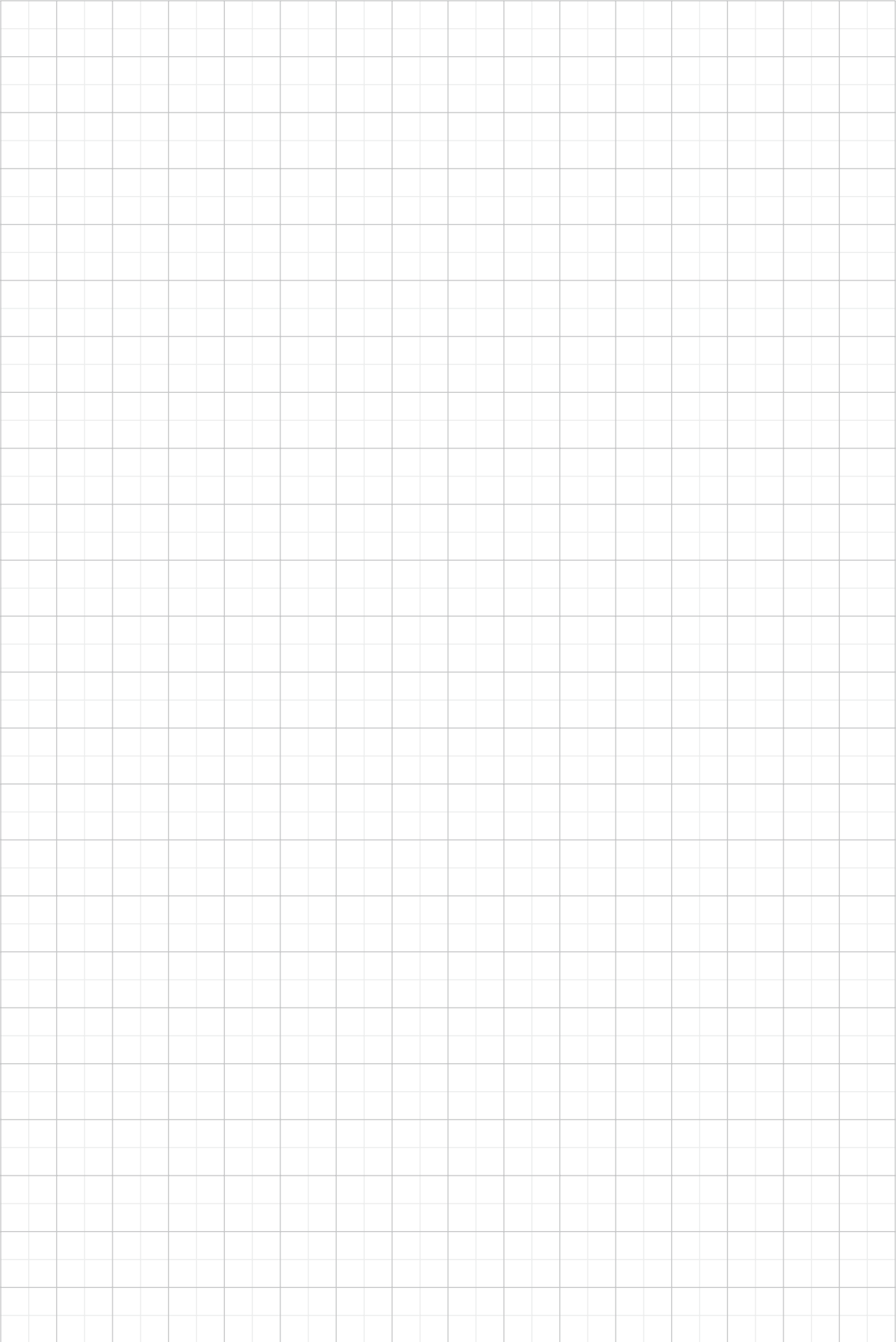
Letter	Meaning
M	Braking torque
M <sub>H</sub>	Holding torque of spring-operated brake
N	Speed
t	Time
t <sub>1</sub>	Switch-on time
t <sub>2</sub>	Switch-off time

Space for notes

A large grid of graph paper for taking notes, consisting of 20 columns and 30 rows of small squares.



Space for notes



Space for notes

A large grid of graph paper for taking notes, consisting of 20 columns and 30 rows of small squares.





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without notice.**

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*We should nevertheless point out that this document cannot always be updated in line with ongoing technical developments in our products.*

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Order Catalogue: LSP Servomotors

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