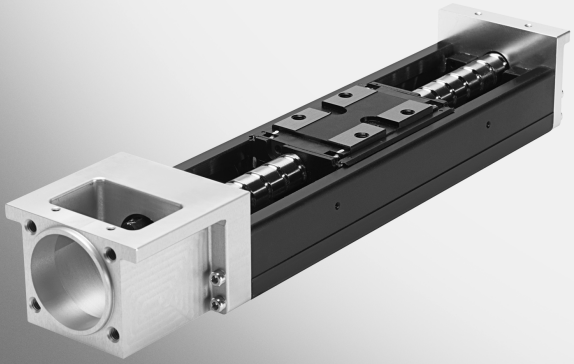
Electrical slide

EGSP / EGSK

FESTO

Operating instructions



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Translation of the original instructions

Identification of hazards and instructions on how to prevent them:

Danger
Immediate dangers which can lead to death or serious injuries

Warning
Hazards that can cause death or serious injuries

Caution
Hazards that can cause minor injuries

Other symbols:

Note
Material damage or loss of function

Recommendations, tips, references to other documentation

Essential or useful accessories

Information on environmentally sound usage

Text designations:

- Activities that may be carried out in any order

1. Activities that should be carried out in the order stated

– General lists

➔ Result of an action/References to more detailed information

Electrical slide EGSP / EGSK

Contents

1 Control elements and connections

For all available product documentation ➔ www.festo.com/pk

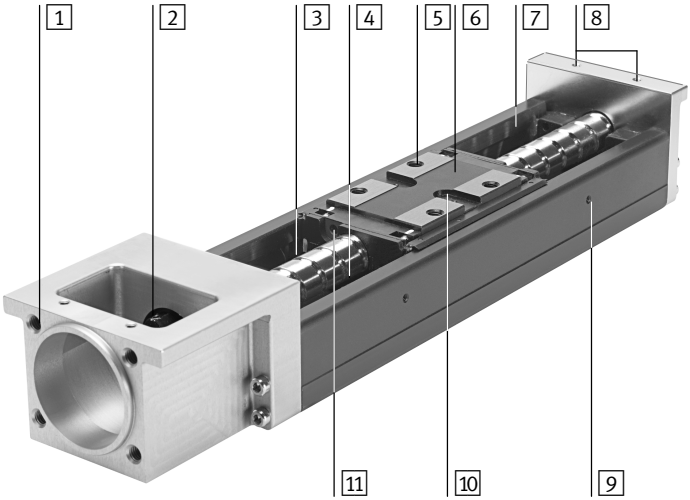


Fig. 1

1 Mounting thread for motor mounting kit (accessories)

2 Drive shaft

3 Recirculating ball bearing spindle

4 Mounting hole for direct mounting (in ground area base)

5 Mounting thread and centring holes for effective load

6 Slide

7 Base profile with integrated rolling guide

8 Mounting thread for cover (accessories)

9 Mounting thread for sensor rail (accessories)

10 Mounting thread for switch lug (accessories)

11 Lubricating point for recirculating ball bearing spindle and bearing guide:
- Grease nipple or lubrication hole (for EGSK)
- Lubrication hole (for EGSP)

2 Function and application

A rotating slide spindle converts a motor's rotation into linear motion. The slide [6] will then move backwards and forwards. The slide is bearing mounted. The slide's reference position may be queried by means of inductive proximity sensors and switch lugs in the sensor rail (➔ Chapter 10 "Accessories").

The EGSP and EGSK electrical slides are intended to be used for the precise positioning of effective loads.

Note
The EGSP/EGSK electrical slide does not have automatic locking: when input torque is not applied, the slide can be moved freely.
A latching function for the entire system can usually be achieved by the use of motors with an integrated holding brake or by other suitable measures such as, for example, clamping systems, motors with high gear ratios or automatically locking gear units. Which measure is appropriate to select basically depends on the application and the safety requirements.

- Select the corresponding Festo motor from our catalogue (➔ Catalogue Specifications, www.festo.com/catalogue and "PositioningDrives" sizing software ➔ www.festo.com).

  You will then be operating mated devices which are especially harmonised to each other.
- Note the maximum permitted values for forces and positioning times ➔ chapter on 12 "Technical data" and "Characteristic curves".

3 Transport and storage

- Take the product's weight into account. It weights up to 16 kg.
- Ensure the following storage conditions:
  - Short storage times
  - Cool, dry, shaded, corrosion resistant storage locations.

4 Requirements for product use

Warning
Unexpectedly fast moveable masses can harm people or property (crushing).
- Apply power to the drive motor; at first limited to low speeds and torques.

Note
Malfunctions will occur if the device is incorrectly used.
- Be sure to always comply with the specifications in this chapter. In this way, the product will perform as intended.

- Compare the limit values specified in these operating instructions with those of your actual application (e.g. forces, torques, temperatures, masses, speeds).

  Operation of the product in compliance with the relevant safety regulations is contingent on adherence to the load limits.
- Take into consideration the ambient conditions at the location of use.

  Corrosive elements in the environment (e. g. ozone) will reduce the service life of the product.
- Please comply with trade association regulations and national and local safety laws and regulations.

- Remove transport packaging such as films and cardboard.
  The packaging is intended for recycling on the basis of its constituent materials (exception: oiled paper = other waste).
- Unauthorised product modification is not permitted.
- Note the warnings and instructions on the product and in the relevant operating instructions.
- Take the tolerance of the tightening torques into account. Unless otherwise specified, the tolerance is ±20 %.

5 Installation

Mechanical installation

- Do not modify the settings of screws and threaded pins if not directly requested to do so in these operating instructions.
- Mount the motor on the electrical slide in accordance with the assembly instructions for the motor mounting kit recommended in the catalogue.

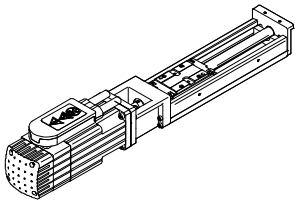


Fig. 2

When assembling in a vertical or sloping position:

Warning
Falling masses can cause personal injury and material damage (crushing). If there is a power failure or if the spindle nut breaks, the work mass will drop.

- Make sure that you use only motors with an integrated holding brake.
- Check whether external safety measures are necessary to prevent damage due to spindle nut fracture (e.g. toothed latches or moveable bolts).

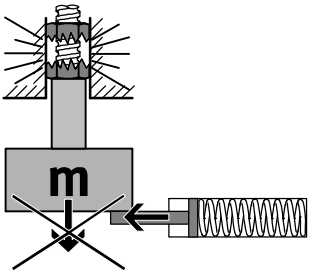


Fig. 3

Note

- Make sure that you mount the EGSP/EGSK using only the lower threaded holes [4] on the basic profile.

  The holes on the side are intended for fastening accessories (e. g. sensor rail).

- Make sure that the device is installed free of mechanical stress and sag (evenness of bearing surface ≤ 0.05% of stroke length).
- Position the EGSP/EGSK so that its control elements can be reached.

- Screw bolts into all the 4 mounting holes.
- Take care that the screwheads do not protrude above the countersinks.
- Tighten the mounting screws evenly. The tightening torque is summarised in the table below.

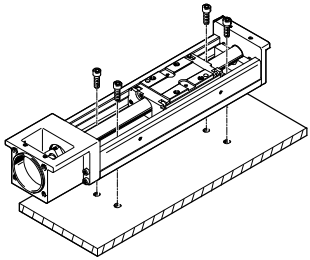


Fig. 4

EGSP/EGSK-...		15	20	26	33	46
Screw		M3 1)	M3	M4	M5	M6
Countersink depth	[mm]	2	3	4	5.4	6.5
Tightening torque	[Nm]	1.2	1.2	2.9	5.9	9.9
1) in accordance with DIN 6912 (flat head)						

Fig. 5

Installing the effective load

Note
If the steel slide becomes bent against a buckled effective load, the service life of the guide will be reduced.

- Make sure that the mounting surface of the effective load is even to within t ≤ 0.05 mm.

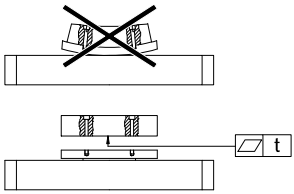


Fig. 6

- Place the effective load so that the pull-out torque from the force (parallel to the axis of motion) and lever arm remains low.

- Fasten the effective load with 4 screws (A) and, if necessary, to the slide with 2 centring elements (B). The screw-in depth must be less than the threaded holes.

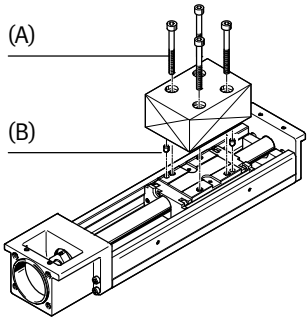


Fig. 7

EGSP/EGSK-...		**15**	**20**	**26**	**33**	**46**
Screw	(A)	M3	M3	M4	M5	M6
Max. screw-in depth						
– EGSK	[mm]	4	4.5	6.5	8	12
– EGSP	[mm]	–	3	4	6	9
Tightening torque	[Nm]	1.2	1.2	2.9	5.9	9.9
Centring sleeve/pin	(B)	ZBH-5	ZBS-2	ZBS-5	ZBS-4	ZBS-5

For mass geometries with projection in the longitudinal direction of the slide:

- Make sure that the effective load does not strike the motor.

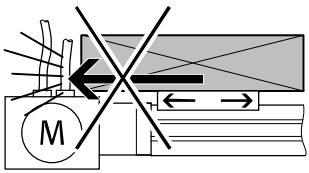


Fig. 8

Electrical installation

To protect the end positions against uncontrolled overtravel:

- Check whether additional hardware proximity switches are necessary.

If inductive proximity sensors are used as hardware proximity switches:

- Use proximity switches with normally-closed function.
  If the proximity switch cable is ruptured, the normally-closed function prevents the EGSP/EGSK from passing the end position.
- Avoid external influence caused by strong magnetic fields or ferrite parts in the vicinity of the proximity switches (at least 10 mm space).

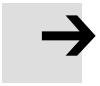
If proximity sensors are used as reference switches:

- Use the “Sensor Rail” kit with switch lugs and sensor profile (➔ catalogue specifications, www.festo.com/catalogue).
- Use the inductive proximity switch of type SIES-8M, according to the input of the control used.

To prevent contamination:

- Use the slot covers from our catalogue.

Circuitry installation



Note
If used in safety-relevant applications, additional measures are necessary. In Europe, for example, the standards in the EC machinery directive must be observed.

Without additional measures in accordance with statutory minimum requirements, the product is not suitable for use in safety-related sections of control systems.

6 Commissioning

Warning
Moveable masses can cause personal injury and material damage (crushing).

- Make sure that:
  – nobody can place his/her hand in the path of the moving components (e.g. by means of a protective screen),
  – there are no objects in the positioning range.

  It should not be possible to touch the EGSP/EGSK until the mass has come to rest.

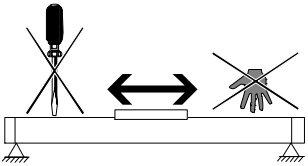


Fig. 9

Note
Incorrect default values of the braking ramp in STOP conditions (e. g. EMERGENCY STOP and quick stop) result in overloading of the linear axis and can damage it or drastically reduce its service life.

- Check the settings of all the brake ramps in your controller or the higher-level controller (delay values and jolting).
- Taking the travel speed, moveable load and mounting position into account, make sure that the delay values (brake delay and delay times) are set in such a way that the maximum drive torque or feed force of the linear axis used is not exceeded.
- Use the “PositioningDrives” sizing software to design the linear axis ➔ www.festo.com.

Note
Stair-step acceleration profiles (without damping) cause high points in the propulsion, which can lead to drive overload. In addition, positions outside the permissible range may occur as a result of overswing effects. A jolt-limited acceleration specification reduces vibrations in the entire system and has a positive effect on stress in the mechanical system.

- Check which controller settings may be adapted (e. g. jolt limitation and smoothing the acceleration profile).

1. Check travel	2. Reference run (homing)	3. Test run
Determining the approach direction of the motor	Comparing the real situation with the image in the controller	Checking the overall behaviour

Fig. 10: Definitions

1. Start a **check travel** and limit it to low dynamic response.
   In spite of equal control, motors of the same design sometimes turn in the opposite direction due to the circuitry.
   The EGSP/EGSK has a clockwise-rotating spindle: When the drive shaft is rotated clockwise, the slide moves in the direction of the motor.
2. Start **reference travel** in accordance with the operating instructions for your motor drive system, limited to low dynamic response up to the reference switch.
3. Start a **test run** and limit it to low dynamic response.
4. Check whether the EGSP/EGSK fulfils the following conditions:
   – The slide must be able to move through the complete intended positioning cycle.
   – The slide must stop as soon as it reaches a limit switch.
5. If the proximity switches do not respond: ➔ chapter 11 “Eliminating faults” and the operating instructions for the proximity switches.

7 Operation

Warning
Moveable masses can cause personal injury and material damage.

- Make sure that:
  – nobody can place his/her hand in the path of the moving components (e.g. by means of a protective screen),
  – there are no foreign objects in the positioning range.
  It should not be possible to touch the EGSP/EGSK until the mass has come to rest.

If the motor turns in the wrong direction:

Note
When the motor is removed (e.g. turning the motor) the reference position is lost.

- Start a reference run as detailed in the chapter 6 “Commissioning”, in order to reference the new positioning cycle.

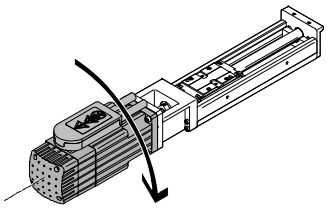


Fig. 11

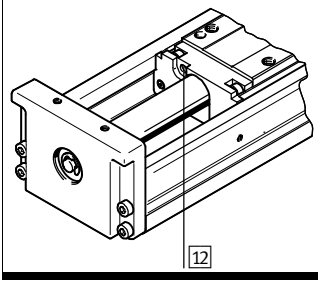
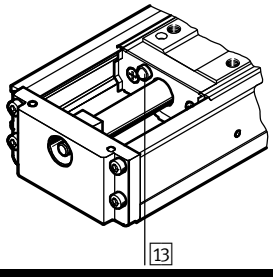
8 Service and maintenance

Warning
Controller signals can cause the EGSP/EGSK to make unintentional movements.

- Switch off the controller before performing any work on the EGSP/EGSK and secure the controller against unintended restart.

On cleaning and maintenance:

- If necessary, clean the exterior of the EGSP/EGSK with a soft cloth.
  Cleaning agents: any gentle agent.
- Grease the recirculating ball bearing spindle and bearings guide in accordance with the stated running performance or at all lubricating points, every 6 months at the latest (grease ➔ chapter 10 “Accessories”).
  For that purpose, there are lubrication holes 12 or grease nipples 13 available:

EGSP/EGSK	EGSK
	

Lubrication point on slide		EGSK					EGSP			
		15	20	26	33	46	20	26	33	46
In the direction of the drive cover		12 1)	13 2)	13 2)	–		–			
In the direction of the end cap		12 1)	–		13 2)	13 3)	12 1)			
Lubrication interval in revolutions		1 x 10^8					2 x 10^8			
Lubrication interval in km	**1P**	100					200			
	2P	200					400			
	6P	600					1200			
	10P	1000					2000			
	20P	2000					4000			

1) Lubrication hole for grease gun with LUB-1 needle-point nozzle
2) D3.5 grease nipple for grease gun with LUB-1-KU grease adapter
3) D6.5 grease nipple for grease gun with LUB-1-KE grease adapter

Fig. 12

Note
The lubrication intervals depend on the product load.
- Halve the lubricating intervals in the following cases:
- ☐ Speeds › 1 m/s
- ☐ Acceleration › 10 m/s^2
- ☐ Ambient temperatures in the vicinity of 40°C
- ☐ Frequent, short stroke movements (‹ 2x carriage length)
- ☐ Travel profile corresponds to triangular operation (frequent accelerating and braking)
- ☐ Dusty and contaminated environment

9 Disassembly and repairs

- Information on spare parts and aids can be found under: www.festo.com/spareparts

10 Accessories

Note
- Please select the appropriate accessories from our catalogue www.festo.com/catalogue

Designation	Part number/type [1)]
Grease gun with needle point nozzle	647 958/LUB-1
– Grease adapter for D3.5 grease nipple	744 166/LUB-1-KU
– Grease adapter for D6.5 grease nipple	744 167/LUB-1-KE
Roller bearing grease	LUB-KC1 from Festo
1) See spare parts catalogue at www.festo.com/spareparts	

Fig. 13

11 Troubleshooting

Fault	Possible cause	Remedy
Squeaking noises, vibrations or rough operating behaviour	The coupling is fitted too tight	Comply with permissible coupling distances (➔ Motor mounting kit assembly instructions)
	Distortions	Install EGSP/EGSK without distortion (observe levelness of bearing surface/effective load: ➔ chapter 5 “Mechanical installation”)
	Contamination/Grease supply exhausted	Clean and grease EGSP/EGSK (➔ see chapter 8 “Service and Maintenance”)
	Bending-critical speed exceeded	Reduce positioning speed
	Incorrect controller settings	Modify control parameters (only with servo motors)
Slide does not move	Stress too high	– Reduce load mass – Reduce positioning speed
	Coupling hub slipping	Check coupling fitting
	Foreign matter blocking slide	– Remove foreign matter – Use cover (➔ chapter on 10 “Accessories”)
Slide travels beyond the end position	Proximity sensor does not switch	Check the proximity switches, connections and controller

Fig. 14

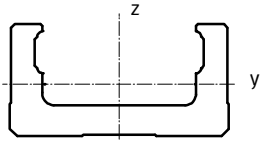
12 Technical data

General data

EGSP/EGSK-...			15	20	26	33	46
Constructional design			Electromechanical linear axis				
Spindle			Recirculating ball bearing spindle				
Guide			Recirculating ball bearing guide				
Installation position			Any				
Ambient temperature		[°C]	0 ... +40				
Storage temperature		[°C] [°C]	–20 ... +80 –10 ... +50 (for EGSP-20/26)				
Repetition accuracy							
	–	[mm]	–	± 0.01			
	H	[mm]	± 0.004	± 0.005			
	P	[mm]	± 0.003				
Reversing backlash							
	–	[mm]	–	≤ 0.02			
	H	[mm]	≤ 0.01			≤ 0.02	
	P	[mm]	≤ 0.002	≤ 0.003			
Max. permitted relative humidity		[%]	95 (non-condensing)				
Note on materials			Contains PWIS (paint-wetting impairment substances)				
Materials							
– Cover			Aluminium				
– Profile, slide			Steel				
– Buffer			Ethylene vinyl acetate copolymer				

Fig. 15

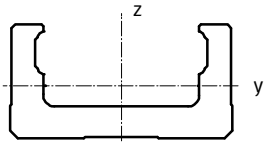
EGSK Technical Data

EGSK-...			15		20		26		33		46	
			1P	2P	1P	6P	2P	6P	6P	10P	10P	20P
Max. feed force Fx	–/H [1]	[N]	36	19	69	72	116	116	150	148	264	192
	P [2]	[N]	57	31	110	133	184	184	239	183	392	343
Max. driving torque	–/H [1]	[Ncm]	0.6	0.6	1.1	6.9	3.7	11	14	24	42	61
	P [2]	[Ncm]	0.9	1.0	1.8	13	5.9	18	23	29	62	109
Max. speed [3]	–/H	[mm/s]	160	330	190	790	280	590	470	790	520	1050
	P	[mm/s]	160	330	190	1100	280	830	660	1100	740	1480
Max. acceleration		[m/s^2]	10						20			
Feed constant [4]		[mm/ rev.]	1	2	1	6	2	6	6	10	10	20
Planar mass moment of inertia												
– Iy		[mm^4]	908		6 100		17 000		62 000		240 000	
– Iz		[mm^4]	14 200		62 000		150 000		380 000		1 500 000	
Weight												
– For 0 mm stroke [5]		[kg]	0.16		0.38		0.78		1.38		5.17	
– per 100 mm stroke		[kg]	0.12		0.27		0.42		0.63		1.27	

1) Loads are based on service life specification of 5 x 10^8 revolutions (for accuracy class –/H)
2) Loads are based on service life specification of 1.25 x 10^8 revolutions (for accuracy class P)
3) Reduced speeds for sizes 33 and 46 with long strokes ➔ “Characteristics” chapter
4) Nominal value, varying on the basis of component tolerances
(–/H: max. ± 0.06 mm / 300 mm stroke; P: ± 0.02 mm / 300 mm stroke)
5) Version with standard slide and no additional slide

Fig. 16

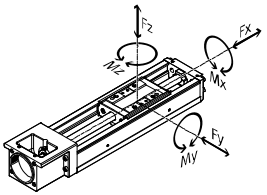
EGSP Technical Data

EGSP-...			20		26		33			46	
			1P	6P	2P	6P	6P	10P	20P	10P	20P
Max. feed force Fx	–/H [1]	[N]	69	72	168	164	370	227	165	365	267
	P [2]	[N]	87	112	212	212	466	286	208	460	337
Max. driving torque	–/H [1]	[Ncm]	1.1	6.9	5.3	16	35	36	53	58	85
	P [2]	[Ncm]	1.4	11	6.7	20	45	46	66	73	107
Max. speed [3]		[mm/s]	100	600	200	600	600	1000	2000	1000	2000
Max. acceleration		[m/s²]	10				20				
Feed constant [4]		[mm/rev.]	1	6	2	6	6	10	20	10	20
Planar mass moment of inertia											
– Iy		[mm⁴]	6 000		16 600		53 500			205 000	
– Iz		[mm⁴]	61 400		148 000		352 000			1 450 000	
Weight											
– For 0 mm stroke [5]		[kg]	0.38		0.78		1.38			3.60	
– per 100 mm stroke		[kg]	0.27		0.42		0.72			1.40	

1) Loads are based on service life specification of 5 x 10^8 revolutions (for accuracy class –/H)
2) Loads are based on service life specification of 2.5 x 10^8 revolutions (for accuracy class P)
3) Reduced speeds for sizes 33 and 46 with long strokes ➔ “Characteristics” chapter
4) Nominal value, varying on the basis of component tolerances
(–/H: max. ± 0.06 mm / 300 mm stroke; P: ± 0.02 mm / 300 mm stroke)
5) Version with standard slide and no additional slide

Fig. 17

Maximum permissible force and torque load (standard slide)



$$\frac{|Mx|}{Mx_{max}} + \frac{|My|}{My_{max}} + \frac{|Mz|}{Mz_{max}} + \frac{|Fy|}{Fy_{max}} + \frac{|Fz|}{Fz_{max}} \leq 1$$

and $|Fx| \leq Fx_{max}$, $|Fy| \leq Fy_{max}$

and $|Mx| \leq Mx_{max}$, $|My| \leq My_{max}$, $|Mz| \leq Mz_{max}$

EGSK-...			**15**		**20**		**26**		**33**		**46**	
			1P	**2P**	**1P**	**6P**	**2P**	**6P**	**6P**	**10P**	**10P**	**20P**
Max. force (Fy = Fz)	–/H [1]	[N]	747	593	1389	764	2223	1541	2469	2083	4919	3904
	P [2]	[N]	1185	941	2204	1213	3528	2446	3920	3306	7809	6198
Max. torque Mx	–/H [1]	[Nm]	8.2	6.5	18.1	9.9	37.8	26.2	50.1	42.2	145	115
	P [2]	[Nm]	13.0	10.3	28.7	15.8	60.0	41.6	79.5	67.1	231	183
Max. torque My = Mz	–/H [1]	[Nm]	2.3	1.9	5.8	3.2	12.9	8.9	16.4	13.8	48.7	38.7
	P [2]	[Nm]	3.7	2.9	9.2	5.1	20.4	14.1	26.0	21.9	77.3	61.4

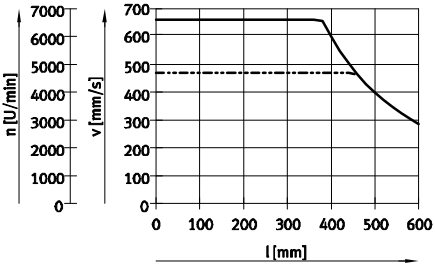
EGSP-...			**20**		**26**		**33**			**46**	
			1P	**6P**	**2P**	**6P**	**6P**	**10P**	**20P**	**10P**	**20P**
Max. force (Fy = Fz)	–/H [1]	[N]	2325	1279	3991	2767	3619	3052	2422	7092	5629
	P [3]	[N]	2929	1612	5028	3486	4559	3845	3052	8935	7092
Max. torque Mx	–/H [1]	[Nm]	28.8	15.9	64.7	44.8	71.7	60.4	48	205	163
	P [3]	[Nm]	36.3	20	81.5	56.5	90.3	76.1	60.4	258	205
Max. torque My = Mz	–/H [1]	[Nm]	9.9	5.5	25.1	17.4	25.5	21.5	17.1	74.6	59.2
	P [3]	[Nm]	12.5	6.9	31.6	21.9	32.1	27.1	21.5	94.0	74.6

Fig. 18 1) Loads are based on service life specification of 5×10^8 revolutions
2) Loads are based on service life specification of 1.25×10^8 revolutions
3) Loads are based on service life specification of 1.25×10^8 revolutions

Characteristic curves

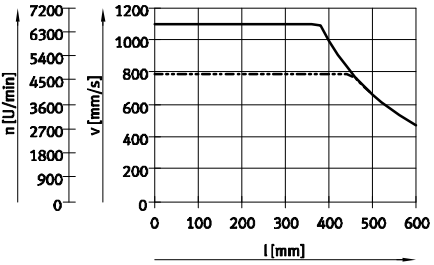
Speed v, rotational speed depending on the working stroke l

EGSK-33-...-6P



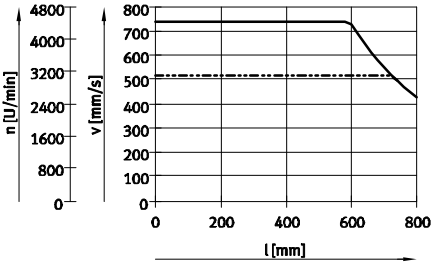
EGSK-33...-6P-P
EGSK-33...-6P(-H)

EGSK-33-...-10P



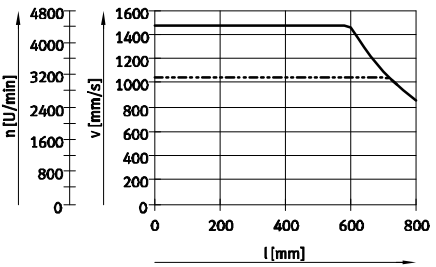
EGSK-33-...-10P-P
EGSK-33-...-10P(-H)

EGSK-46-...-10P



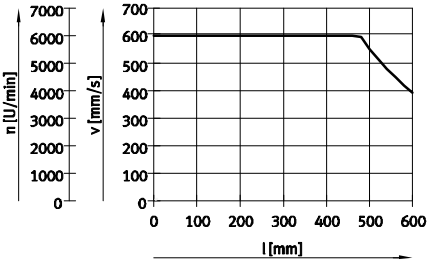
EGSK-46-...-10P-P
EGSK-46-...-10P(-H)

EGSK-46-...-20P

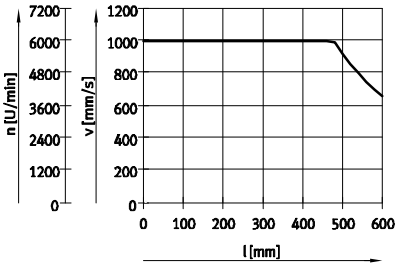


EGSK-46-...-20P-P
EGSK-46-...-20P(-H)

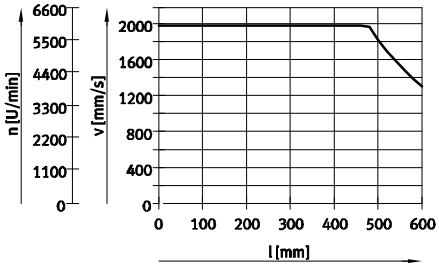
EGSP-33-...-6P



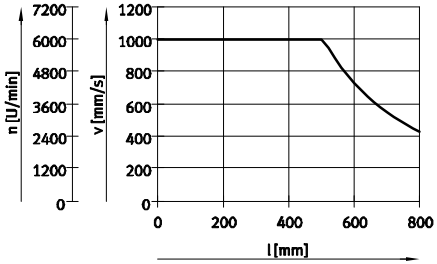
EGSP-33-...-10P



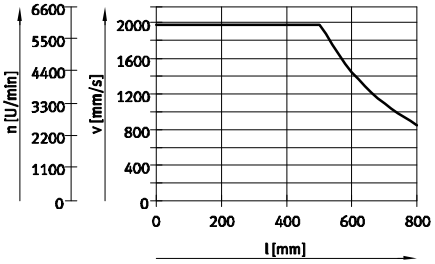
EGSP-33-...-20P



EGSP-46-...-10P



EGSP-46-...-20P



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