

# bj·gear



## Actuator

With trapezoidal spindle or with belt drive

Customisation is our standard

## Customisation is our standard

BJ-Gear A/S is a leading company within developing, manufacturing and assembling of gearboxes, actuators, worm gear screw jacks, brakes and electromechanical cylinders.

We produce a wide range of standard gearboxes and actuators and supply motors, encoders, electromagnetic brakes and couplings etc. of recognised manufactures, making it possible to supply complete transmissionsolutions at short notice.

The flexible production machinery, along with our modular designed product range, allow very short and precise delivery times.

BJ-Gear A/S supplies reliable transmission solutions for industries such as healthcare, food processing and packaging, aerospace and defense, offshore and marine, the energy and environment sector and to many other business areas.

The combination of innovation, know-how, high-technological production facilities and our focus on customer requirements make us a competent partner.

## For linear motions, we supply two types of actuators:

Actuators based on a worm gear drive and actuators based on a belt drive.

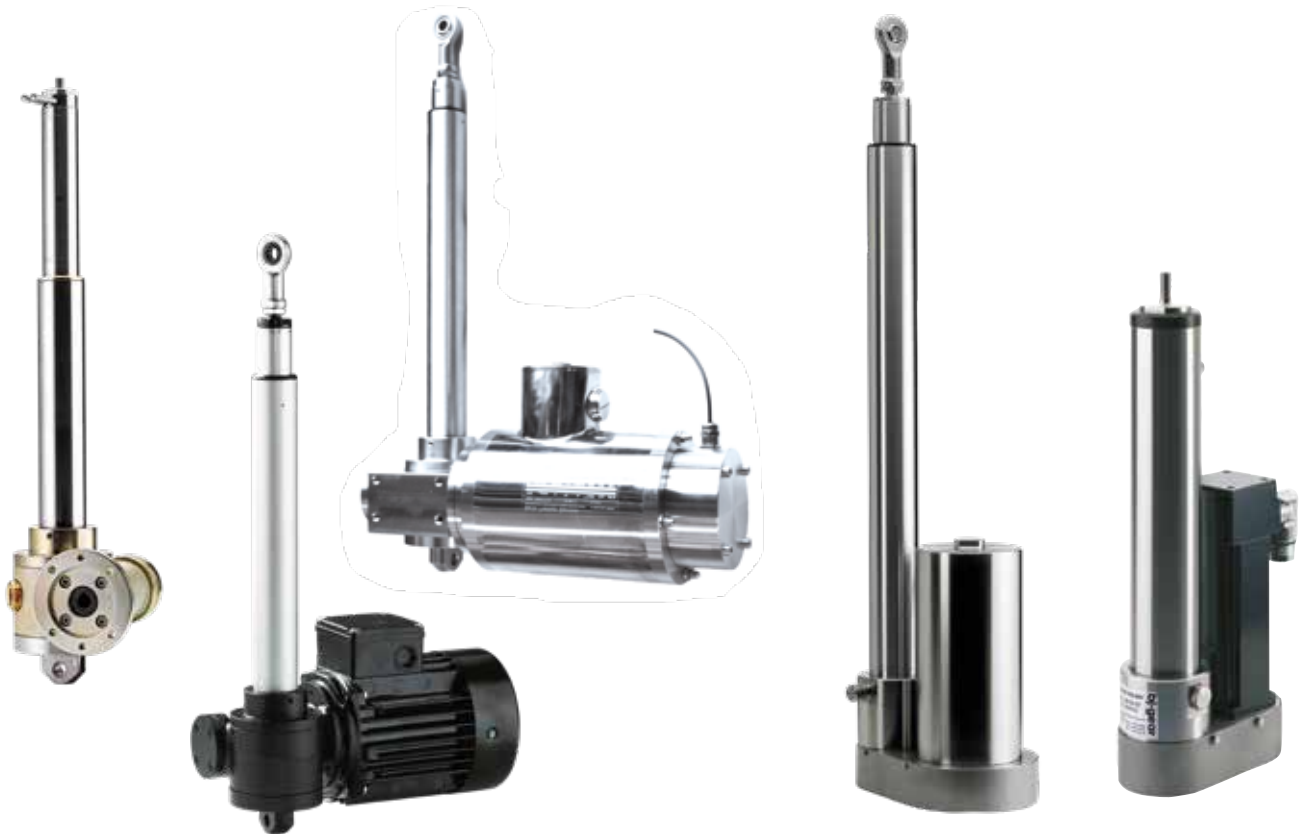
Actuators from BJ-Gear are very sturdy in terms of overload and operating environment. The design is compact, simple and its modular construction allows great flexibility. The modular design is also ideal if customisations are needed.

If higher speed and loads are needed, we have extensive experience in adapting or designing special solutions.

We are certified according to EN ISO 9001 and EN ISO 14001.

# Actuators

with trapezoidal spindle, ball screw or with belt drive



**Actuators with trapezoidal spindle or ball screw**

**Actuators with belt drive**

An electrical actuator is primarily used where an intermittent axial movement and positioning is needed. It is a good alternative to hydraulic and pneumatic cylinders due to the simple connection to electrical operational systems and to the hygienic benefits. Furthermore, you will achieve a steady speed all over the load range compared to hydraulics and pneumatics solutions. The dynamic tensile/compression force is up to 15 kN of standard products. Higher force can be achieved by customised solutions.

## **Actuators with trapezoidal spindle or ball screw**

This type of actuators are simple and of a sturdy construction. They are based on our worm gearboxes on which a set of cylindrical aluminum tubes and an inner threaded spindle are mounted. Using a ball screw it is possible to achieve

linear movements of up to approx. 6,500 mm/min. on standard products. Higher speed can be achieved by customised solutions.

## **Actuators with belt drive**

Our actuators based on toothed belt drive are of stainless steel and in a hygienic design. The principle is based on a ball screw spindle allowing linear speed of up to 1,250 mm/sec. and at a very high efficiency.

The optimum exploitation of an actuator is achieved when using a servomotor. The movement can thus be made by a controlled acceleration, a step movement and a precise positioning. The actuator can also be equipped with an AC or DC motor.

# Actuators

## with trapezoidal spindle or ball screw

### Fixing holes

The two fixing holes must be parallel. Fixing components must be suitably rigid and must be resistant to torsion of up to 20 Nm.

### Outer telescopic tube

Outer telescopic tube in anodised aluminium (standard) and stainless steel on request.

### Moveable limit sensors

Moveable limit sensors normally open (NO) or closed (NC). Balluff sensors (standard). Others on request.

### Inner telescopic tube

Inner telescopic tube in anodised aluminium (standard) and stainless steel on request.

### Markings

The inner telescopic tube has markings indicating the extreme positions of the actuator. There is excess play for a further 5-8 mm.

### Spindle

Trapezoidal spindle in steel (standard). Stainless steel on request. Ball screw spindle on request.

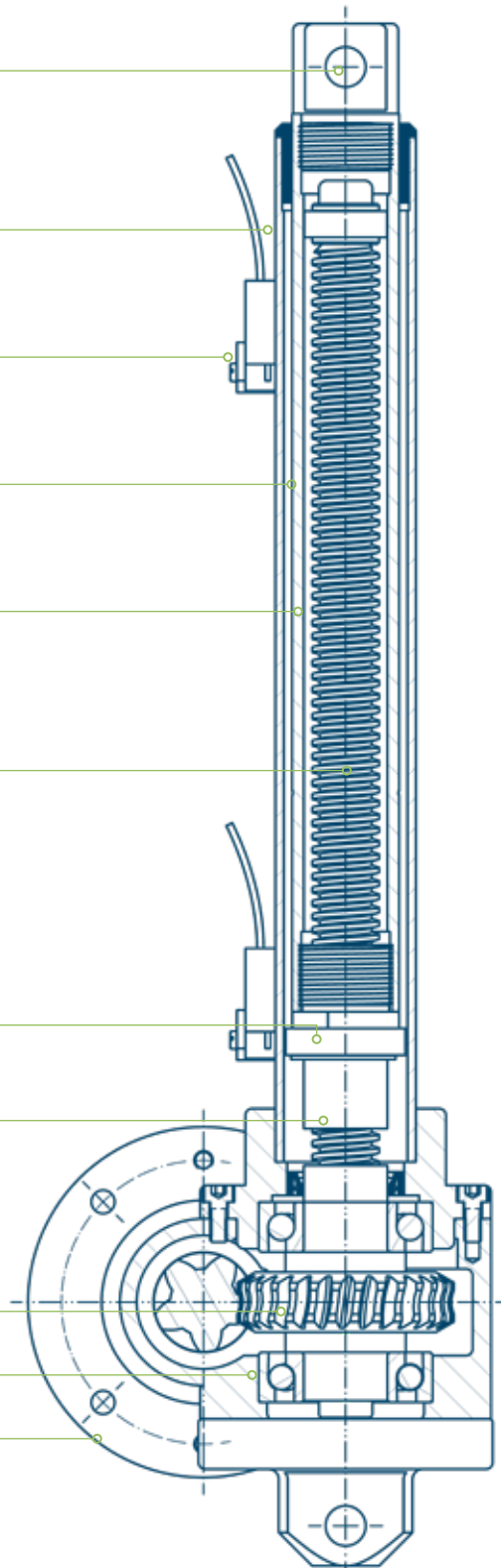
### Magnet for limit sensors

### Spindle nut

### Worm gear

### Angular contact ball bearing

### Motorflange, IEC-norm



# Limit sensors Balluff switching typ

Data for limit sensors Balluff switching type, normally open (NO) or normally closed (NC)	
Approvals / Conformity	CE / cULus
Enclosure type per IEC 60529	IP67
Assured switching field strength	2 [kA/m]
Connection type	Cable
Effective operation current I <sub>e</sub>	200 [mA]
Effective operating voltage U <sub>e</sub> DC	24 [V]
Electrical version	DC, direct current
Load capacitance max. (at U <sub>e</sub> )	1 [μF]
No-load current I <sub>o</sub> damped max.	15 [mA]
Max. no-load cur. I <sub>o</sub> undamped	10 [mA]
Operating voltage U <sub>B</sub> max DC	30 [V]
Operating voltage U <sub>B</sub> min DC	10 [V]
Rated insulation voltage U <sub>i</sub>	75 [DC]
Rated short circuit current	100 [A]
Rated switching field strength	1,2 [kA/m]
Ripple max (% of U <sub>e</sub> )	15
Turn-on delay t <sub>on</sub> max.	0.05 [ms]
Voltage drop static max.	3,1 [V]
Ambient temperature T <sub>a</sub> max.	85°C
Ambient temperature T <sub>a</sub> min.	-25°C
Housing material	LCP
Number of conductors	3

The sensor is functional again after the overload has been eliminated

## Type designation

4 42 1 A A 200 X 1 12 02 1 05 5 0 0

We believe that an unambiguous type designation of our actuators eases the communication. Therefore, throughout this brochure the position of each item in the type designation will be shown.

The number 4 indicates that it is an actuator.

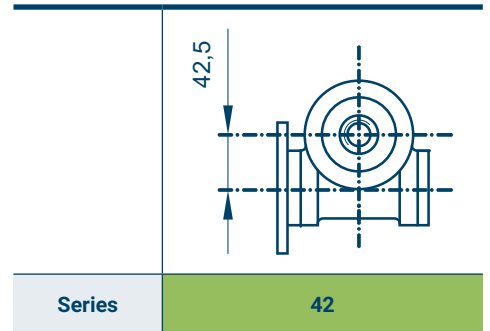
## Size of actuators

4 42 1 A A 200 X 1 12 02 1 05 5 0 0

The actuator is as standard made in size 42.



The individual sizes are numbered according to the centre distances between worm and worm wheel. A gearbox with a centre distance of 42.5 is designated Series 42 and is assigned number 42 on position no. 2 in the type designation.

If you are in need of another size please contact our Sales Department.





## Housing material

4 42 1 A A 200 X 1 12 02 1 05 5 0 0

Type 1 housing. No support	Type S housing. Stainless steel
	
1	S

## Pipe material

4 42 1 A A 200 X 1 12 02 1 05 5 0 0

Aluminium	Stainless steel
	
A	S

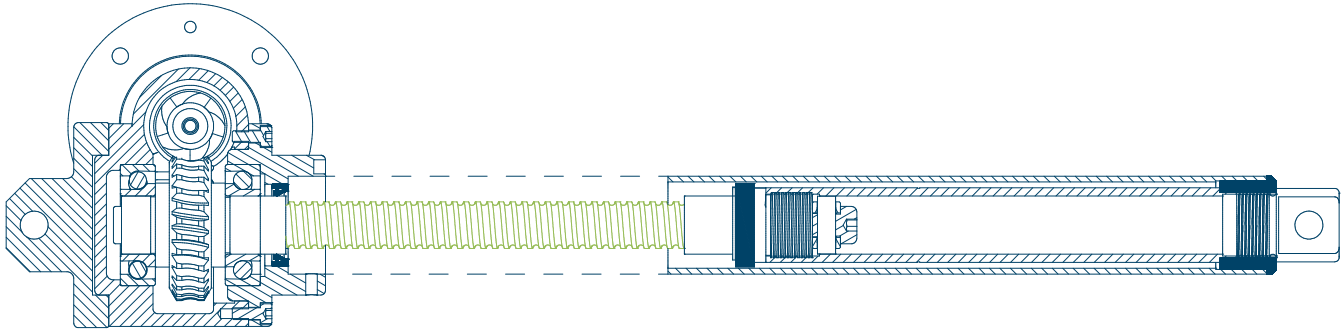


# Spindle material

4	42	1	A	A	200	X	1	12	02	1	05	5	0	0
---	----	---	---	---	-----	---	---	----	----	---	----	---	---	---

A: Steel C45 TR20 x 4

S: Stainless steel AISI316 TR20 x 4



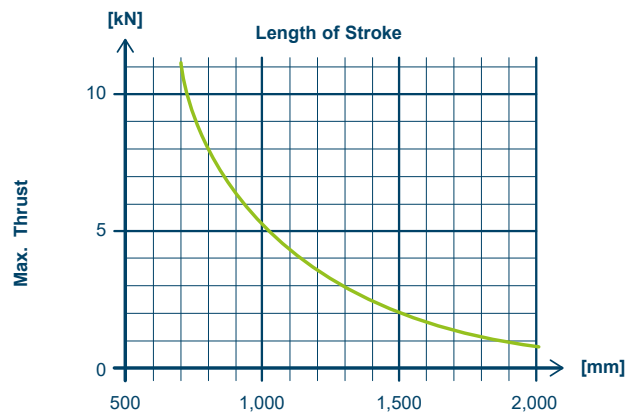
# Stroke length

4	42	1	A	A	200	X	1	12	02	1	05	5	0	0
---	----	---	---	---	-----	---	---	----	----	---	----	---	---	---

## Maximum permissible axial load of trapezoidal spindle (buckling load)

- Values apply for vertical mounted actuators (Thrust)
- Do not subject actuator to bending load
- Uncontrolled stops must be avoided, i.e. running against mechanical stop or gear housing must not occur

Standard lengths of stroke	
100	[mm]
200	[mm]
300	[mm]
400	[mm]
500	[mm]
600	[mm]
Other lengths on request	



# Table of effect

for actuators with trapezoidal spindle, TR20X4

Motor			Max, load [kN] / ED [%]								
		Gear ratio	5,4:1	7,5:1	10:1	15:1	20:1	30:1	40:1	50:1	62:1
[rpm]	[kW]	v [mm/min]	519	373	280	187	140	93	70	56	45
700	0,12		3,53/34	4,41/38	5,14/43	5,14/43	8,04/59	10,34/72	11,67/86 <sup>2</sup>		
	0,18*		5,39/22	6,67/26	8,14/27	8,14/27	12,65/35 <sup>2</sup>				
	0,25*		7,35/17	9,80/17	11,18/20 <sup>2</sup>	11,18/20 <sup>2</sup>					
	0,37*		11,28/12 <sup>2</sup>								
[rpm]	[kW]	v [mm/min]	677	480	360	240	180	120	90	72	58
900	0,12		2,84/32	3,62/36	4,31/40	5,59/47	6,47/55	8,82/63	9,80/80	10,78/90 <sup>2</sup>	11,57/100 <sup>2</sup>
	0,18		4,31/22	5,19/25	6,86/25	9,31/28	10,00/34	13,43/40 <sup>2</sup>			
	0,25		6,08/16	7,55/18	10,00/18	12,94/20 <sup>2</sup>					
	0,37*		9,12/10	11,37/13 <sup>2</sup>							
	0,55*		13,73/8 <sup>2</sup>								
[rpm]	[kW]	v [mm/min]	1,037	747	560	373	280	187	140	112	90
1400	0,12		1,71/34	2,20/38	2,84/39	3,92/43	4,31/52	5,98/60	6,86/72	7,35/88	8,04/88
	0,18		2,74/22	3,53/24	4,41/25	5,78/29	6,76/32	9,12/37	10,68/13	11,67/50 <sup>2</sup>	
	0,25		3,92/16	4,90/17	5,98/19	8,43/20	9,51/24	13,14/25 <sup>2</sup>			
	0,37		5,49/12	7,35/13	9,21/13	12,94/13 <sup>2</sup>					
	0,55*		8,63/10	11,32/9 <sup>2</sup>							
[rpm]	[kW]	v [mm/min]	2,074	1,493	1,12	747	560	373	280	224	181
2800	0,12		0,88/34	1,12/37	1,37/41	1,96/44	2,35/48	3,18/55	3,53/68	4,11/75	4,70/80
	0,18		1,32/23	1,76/23	2,15/26	2,94/28	3,72/30	4,90/34	5,39/41	6,27/45	7,06/50
	0,25		1,96/19	2,55/17	3,23/18	4,41/19	5,09/22	7,06/23	8,33/27	9,21/30	10,19/34
	0,37		3,04/11	4,02/12	4,70/13	6,37/14	8,43/14	10,78/16	12,74/16 <sup>2</sup>		
	0,55		4,60/8	6,08/9	7,15/10	10,10/10	12,94/10 <sup>2</sup>				

\* Not IEC-standard. <sup>2</sup> Note max. 10.78 [kN].

## Drainage hole

4	42	1	A	A	200	X	1	12	02	1	05	5	0	0
---	----	---	---	---	-----	---	---	----	----	---	----	---	---	---

No drain hole	Drain hole 0°	Drain hole 90°	Drain hole 180°	Drain hole 270°
				
X	0	3	6	9



# Position


4 42 1 A A 200 X 1 12 02 1 05 5 0 0

Position 1 - right	Position 2 - left
	
1	2


# D-side

4 42 1 A A 200 X 1 12 02 1 05 5 0 0

Motor flange		
IEC norm (B14)	Motor flange [BCD]	42
No flange		00
56	65	10
63	75	11
71	85	12
	OMM	18







Couplings housing		
IEC norm (B14)	Coupling house [BCD]	42
71	85	42
80	100	43
90	115	-



# Inputshaft

4 42 1 A A 200 X 1 12 02 1 05 5 0 0

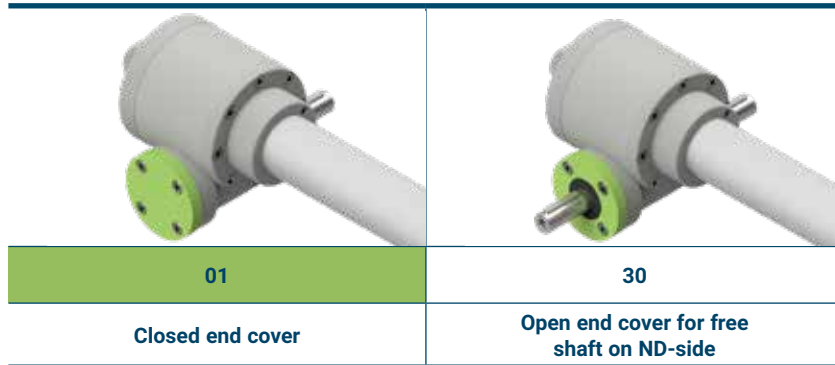
Series 42		
<b>Hollow input shaft</b>		
Ø11	01	
Ø14	02	
<b>Hollow input shaft and free shaft on ND-side</b>		
Ø9	-	
Ø11	21	
Ø14	22	
<b>Free input shaft</b>		
Ø15x40 mm	40	
<b>Free input shaft and free shaft on ND-side</b>		
Ø15x40 mm + Ø15x38 mm	50	

# Motor size and power

Standard motors	Size 63	Size 71	Size 80	Size 90
Motor Power [kW] for 700 min <sup>-1</sup>	0,06	0,09	0,18	0,37
	-	0,12	0,25	0,55
	-	-	-	-
Motor Power [kW] for 900 min <sup>-1</sup>	0,12	0,18	0,37	0,75
	-	0,25	0,55	1,1
	-	-	-	-
Motor Power [kW] for 1400 min <sup>-1</sup>	0,12	0,25	0,55	1,1
	0,18	0,37	0,75	1,5
	-	-	-	-
Motor Power [kW] for 2800 min <sup>-1</sup>	0,18	0,37	0,75	1,5
	0,25	0,55	1,1	2,2
	-	-	-	-

# Choice of ND side (None Drive)

4 42 1 A A 200 X 1 12 02 1 05 5 0 0



If you are in need of a cover for brake, flange for encoder or other special designs please contact our Sales Department.

# Gearing

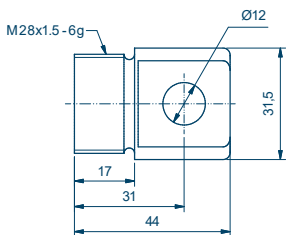
4 42 1 A A 200 X 1 12 02 1 05 5 0 0

42											
Gear ratio $n_2$ [rpm]	5,4:1	7,5:1	10:1	15:1	20:1	25:1	30:1	40:1	50:1	62:1	75:1
Ratio code	05	07	10	15	20	25	30	40	50	60	75

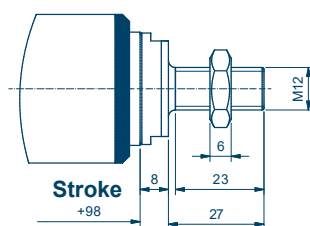
# Connections

4 42 1 A A 200 X 1 12 02 1 05 5 0 0

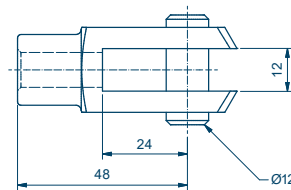
1	External thread	M12
2	Fork joint	12x24
3	Joint bearing	Ø12
5	Nipple (standard), stainless steel	Ø12
6	External thread, stainless	M12
7	Joint bearing, stainless steel	12x24



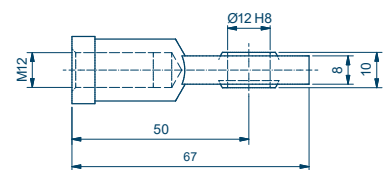
Nipple standard



External thread



Fork Joint



Joint bearing

# Oils/lubricants

4 42 1 A A 200 X 1 12 02 1 05 5 0 0

		Application	Viscosity ISO VG	Oil
0	Fully synthetic gear oil, standard	Normal load and ambient temp. -25°C to +40°C	220	Klübersynth GH 6 - 220
1	Fully synthetic gear oil	Heavy load and ambient temp. -20°C to > +40°C	460	Klübersynth GH 6 - 460
2	Fully synthetic gear oil	Heavy load and ambient temp. -20°C to > +40°C	680	Klübersynth GH 6 - 680
3	Liquid grease	Normal load and ambient temp. -40°C to > +40°C	1200	Klübersynth GE 46 - 1200
4	Special lubricating oil for food and pharmaceutical industries	Normal load and ambient temp. -20°C to +40°C	460	Klübersynth UH1 6 - 460

Indication of ambient temperature is only indicative.  
Do not mix synthetic oils with mineral oils. All data is based on synthetic oils.

# Quantities of oil and lubricants

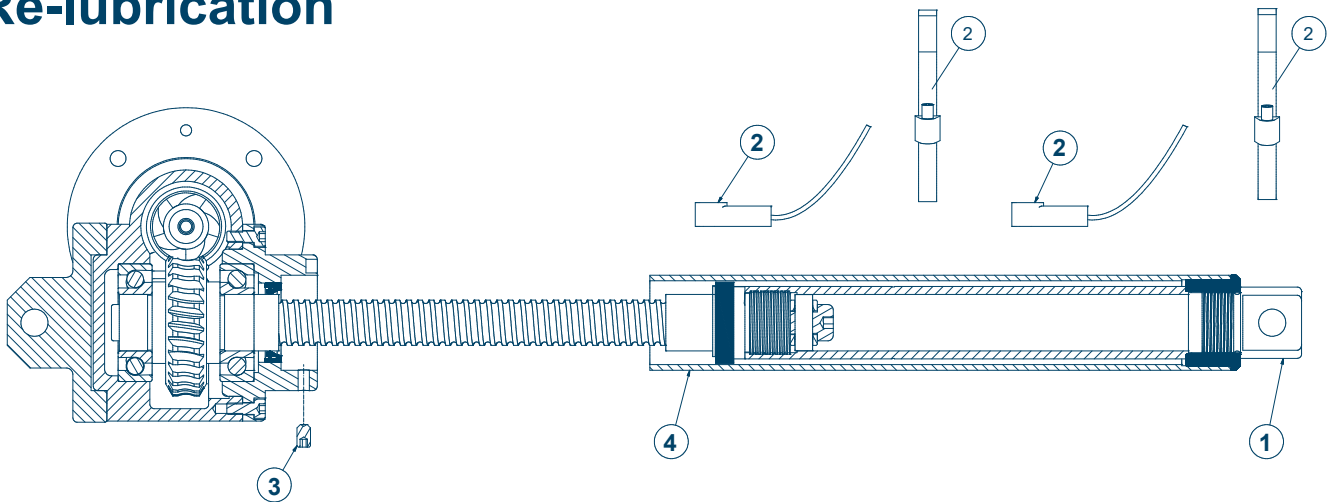
Series 42
0,06 litres

# Finish

4 42 1 A A 200 X 1 12 02 1 05 5 0 0

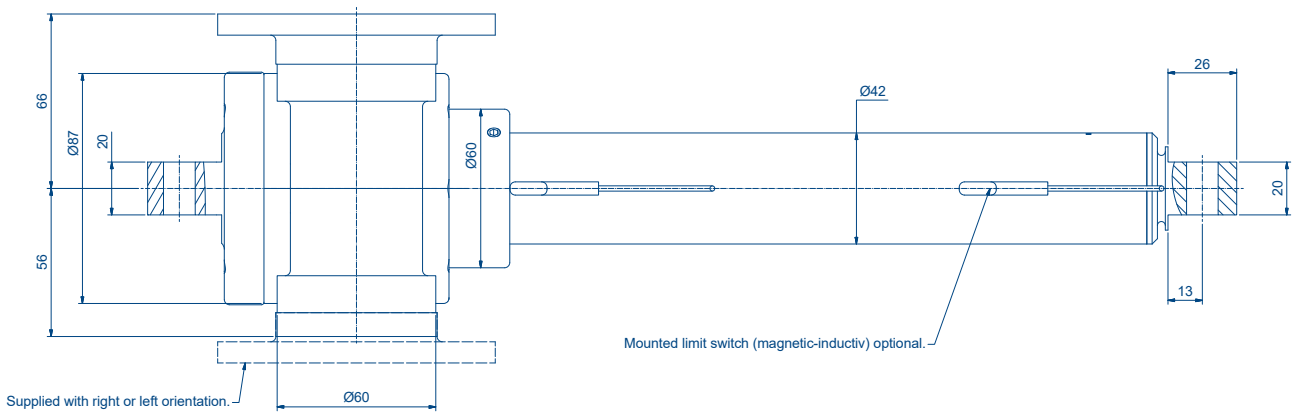
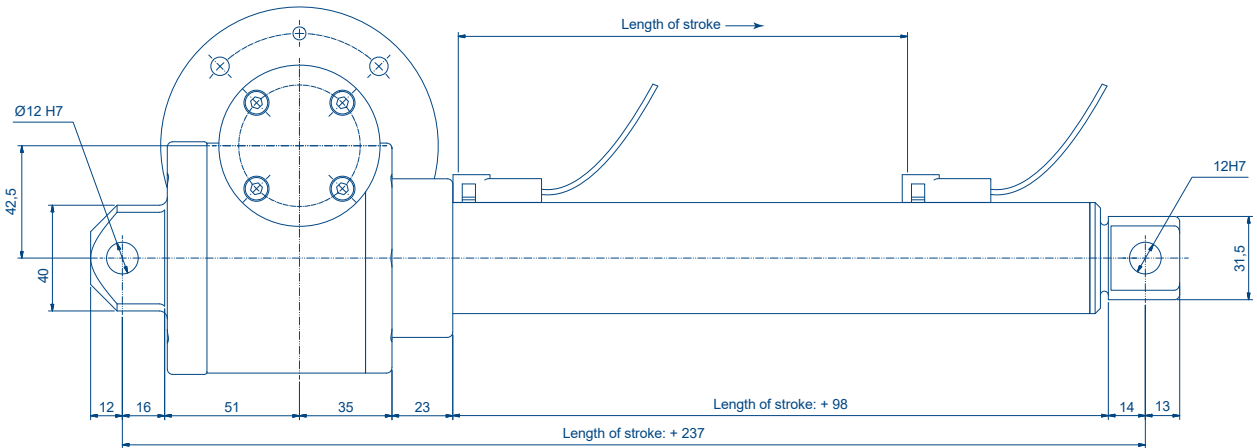
0	Painted mat-black, standard	RAL 9005
1	No treatment	
2	Primed	
3	Corrosion resistant surface treatment	Chromated
9	Customer specified	

# Re-lubrication



1. Bring actuator to a full stroke without overload
2. Remove limit stops
3. Loosen stop screw
4. Unscrew outer tube to expose spindle for lubrication

# Drawings



# Actuators

## with belt drive

Our actuator based on toothed belt drive is made of stainless steel and in a hygienic wash-down design which makes it ideal for the food, process, medical industry etc. Due to the ball screw, the linear speed can reach up to 1,250 mm/s at a very high efficiency.

The dynamic force is up to 15 kN. The optimum utilization of the actuator is achieved when using a servomotor making a very high acceleration, step motion and precise control of the movement possible. The actuator can also be supplied with an AC or DC motor.

**Connection**

The two fixing holes must be parallel. Fixing components must be suitably rigid and must be resistant to torsion of up to 20 Nm.

**Outer telescopic tube**

Outer telescopic tube in stainless steel.

**Inner telescopic tube**

Inner telescopic tube in stainless steel.

**Ball screw spindle**

Ball screw spindle in steel.

**Ball screw nut**

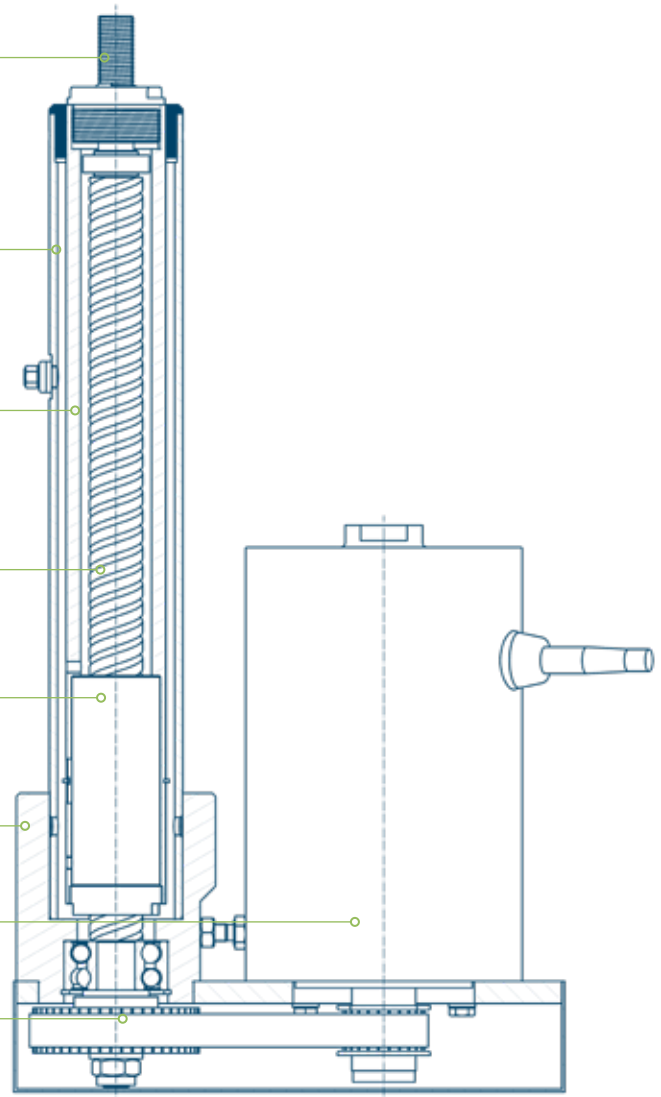
**Motor cabin**

Motor cabin in stainless steel.

**Motor**

AC - DC - Servo.

**Pully belt drive**



# Technical specifications

## Features:

- Stainless steel in hygienic wash-down design
- Easy and simple to incorporate
- Compact and modular design
- Very high-speed and smooth movements
- 25 mm ball screw spindle, pitch 5 - 25 mm
- Sturdy and reliable
- Repeatable
- Low backlash
- High efficiency
- AC, DC or servo motors
- Lubrication grease for the food industry on request
- Short delivery time
- Competitive prices
- Custom design

The actuator based on toothed belt drive has the following performance parameters:

- Dynamic force up to 15 kN
- Linear speed up to 1,250 mm/s

These performance parameters make the actuator a very attractive alternative to movements carried out by pneumatic or hydraulic cylinders.

The design is characterized by its easy and sturdy structure and the modular design gives an extremely large flexibility as to choice of stroke length, mounting possibilities, connections, grease types including food grade grease.

If requested our actuator can be customized for specific needs.



# bj·gear

Customisation is our standard



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