
THE WORLD
IS MOVEMENT
NIASA®

NIASA WORKS TO ENSURE THE MOVEMENT IS PERFECT

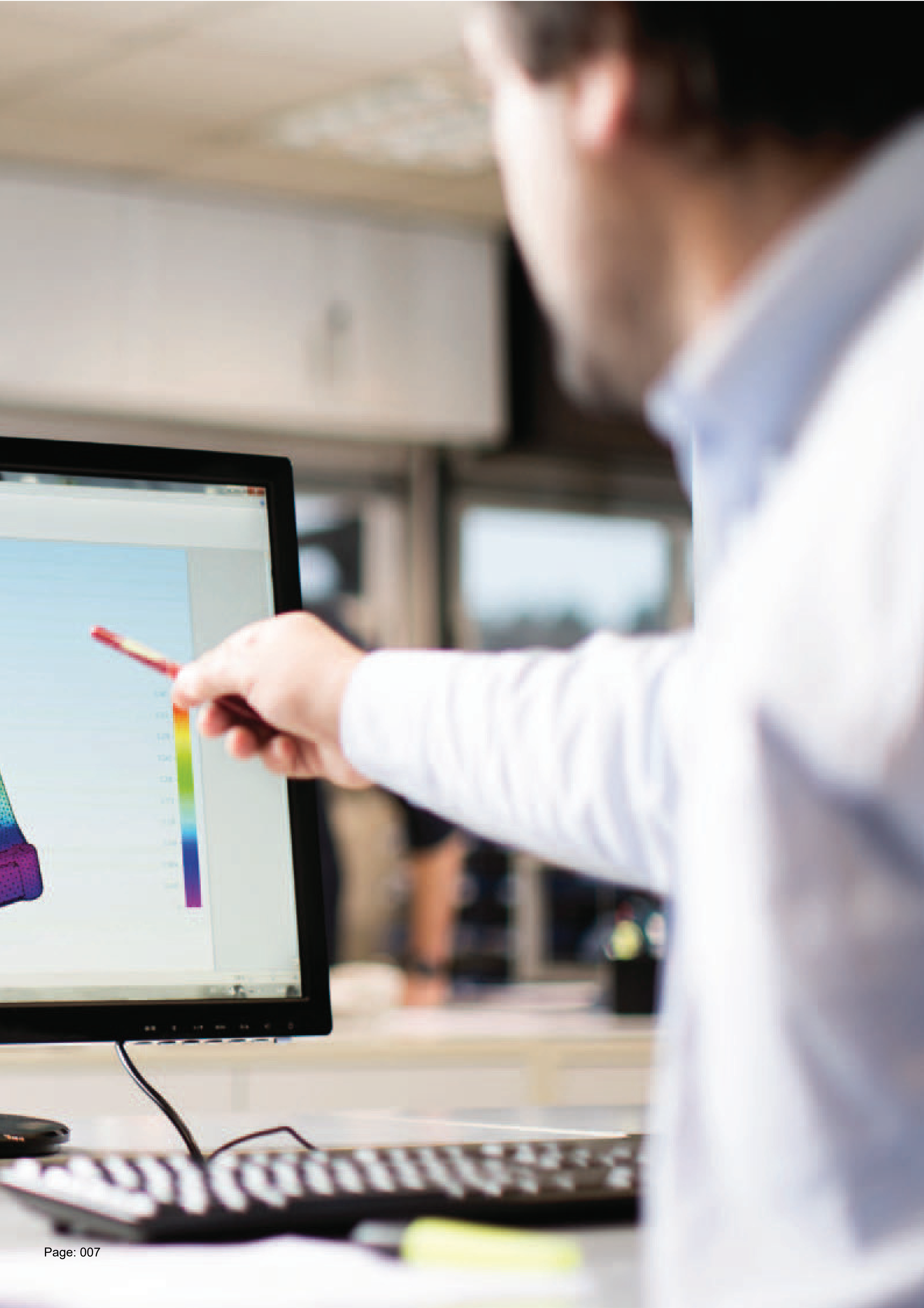
NIASA®

NIASA ADAPTS TO CUSTOMERS' REQUIREMENTS

Other companies manufacture the same products, but none of them are able to adapt to your requirements like NIASA can. NIASA's technical office works in a coordinated manner with the R&D+i department to understand your requirements in-depth and develop the most suitable product. But we don't stop there. NIASA creates the synergies required with each customer to provide value and offer the best customer service and follow up, throughout all stages of the process.

NIASA NEVER FAILS

NIASA likes to speak of “perfect” or “zero” in reference to its products. This means that there are no average terms, or whether it is perfect or not; the functional does not exist, only the optimal. And NIASA does not stop until it has guaranteed that all of its products meet these standards of excellence.



NIASA SPECIALISES IN LINEAR MOVEMENTS

For more than 30 years, NIASA has designed and manufactured linear units for integration in special and series machinery mainly aimed at process automation. The company’s primary objective is to offer unique, precise, fast, reliable and enduring products even though the system is in movement.


NIASA
NIASA
NIASA

NIASA IS RIGHT BESIDE ITS CUSTOMERS

NIASA is in the main markets on the five continents, which enables it to offer a global service to customers. It manufactures universal products, which are adapted to many and varied sectors, such as automation, aeronautics, railway, renewable energies and more.

NIASA BELIEVES IN THE VALUE OF IDEAS

NIASA believes in movement. Therefore, the company never sleeps. It is always thinking about how to progress, how to create better products, how to achieve the highest level of social responsibility, how to achieve respect for the environment, maintaining ethical principles... But it does not do this alone, it aims to achieve it with you.

CONTENTS

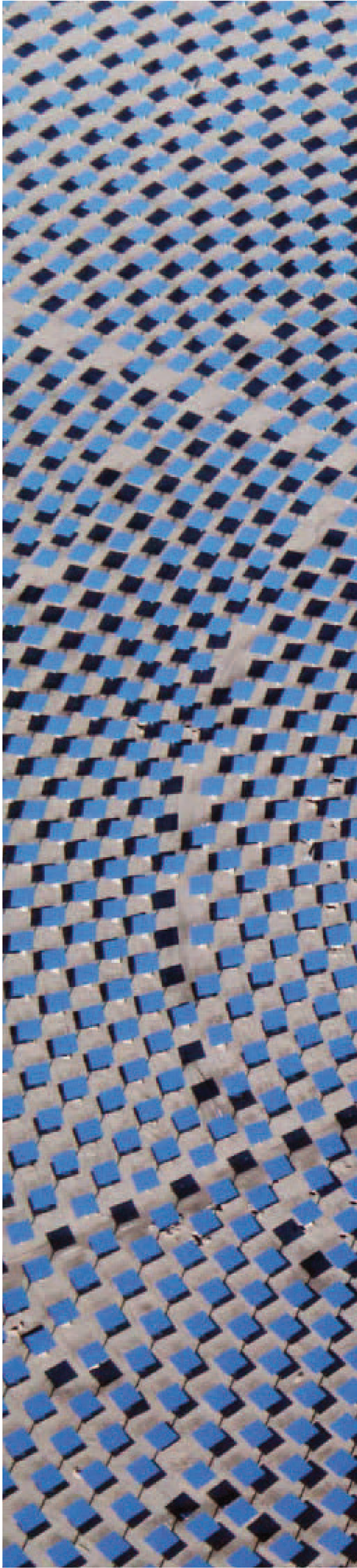
DESCRIPTION	LOAD CAPACITY	EXTERIOR TUBE	TORES SWITCH LIMIT RUN	PROTECTION AGAINST DUST/WATER
THE SCREW MOVES				
THE SCREW MOVES (IMMOBILISED)	5 TO 500 kN	STEEL	INDUCTIVE/ MECHANICAL	UP TO IP 54
THE NUT MOVES				
NO DRIVE	3.5 TO 86 kN			
IN LINE MOTOREDUCER	5.5 TO 86 kN			
PARALLEL DRIVE	3.5 TO 86 kN	STEEL / ALUMINUM	INDUCTIVE / MAGNETIC	UP TO IP 65
FOR DRIVE AT 90°	3.5 TO 23,5 kN			
MOTOREDUCER AT 90°	5.5 TO 86 kN			
IN LINE MOTOR	3.5 TO 86 kN			
F/A ACTUATOR WITH M/J GEARBOX	5 TO 250 kN	STEEL (ALUMINIUM OPTIONAL)	INDUCTIVE (MAGNETIC OPTIONAL)	UP TO IP 65
F/A ACTUATOR WITH HM/HJ GEARBOX	5 TO 250 kN	STEEL (ALUMINIUM OPTIONAL)	INDUCTIVE (MAGNETIC OPTIONAL)	UP TO IP 65
NO DRIVE	2.5 TO 45 kN			
IN LINE MOTOREDUCER	2.5 TO 45 kN			
PARALLEL DRIVE	2.5 TO 45 kN	NO EXTERIOR TUBE	NO DETECTORS	UP TO IP 54
FOR DRIVE AT 90°	2.5 TO 25 kN			
MOTOREDUCER AT 90°	2.5 TO 45 kN			
IN LINE MOTOR	2.5 TO 45 kN			
HOLE /SOLID SHAFTS	12 TO 770 Nm	-	-	UP TO IP 65
TRAPEZOIDAL AND BALL SCREWS AND NUTS	SEE SECTION	-	-	-
GEARBOX ACCESSORIES, FASTENING, DETECTION, PROTECTION, ETC.	-	-	-	-

01 SCREW JACKS

“THERE IS A DRIVING FORCE MORE POWERFUL THAN STEAM, ELECTRICITY AND ATOMIC ENERGY: THE WILL.”

ALBERT EINSTEIN
PHYSICIST

NIASA ACTUATORS IN THE TONOPAH THERMO-SOLAR PLANT, NEVADA, USA.



SCREW JACKS
INTRODUCTION

NIASA N/W/R Series screw jacks are a combination of a screw with a gearbox. There are three types of configurations that can be adapted to different requirements:

... **N**: The screw moves when the gearbox input shaft (worm shaft end) is activated. It includes a rounded screw protection tube on the back.

... **W**: The screw engages, as in configuration N but with the difference that the back protective tube is square section, which means it can be an anti-rotating screw.

... **R**: The screw does not move with the driving of the worm shaft, it only turns; it is the corresponding nut that moves along the screw.

In applications that so require, there is a possibility to protect the screw with a bellow (available in different materials), to protect it in the outside environment and make the screw jacks suitable for outdoor operations or environments with a certain atmospheric aggressiveness.

Screw jacks are often the most optimal technical and economical solution for applications that require lineal, precise and safe movement, for transfer and for elevation, mainly for medium-heavy loads and medium-low speeds.

Their main advantages against other systems, such as pneumatic or hydraulic cylinders, are the following:

... Greater movement and positioning precision.

... Greater safety, due to their irreversibility in many configurations (ask NIASA) and/or the incorporation of different braking devices.

... Superior energy efficiency, as their parts offer high/very high performance, especially with the ball screws, low transmission ratios and high speeds

... Easier and faster assembly, since hydraulic or pneumatic groups are not required, just an electric motor on the unit itself.

... Greater reliability and duration, and less maintenance, due to the mechanical robustness and construction simplicity.

... Modular design and the possibility of operating in multiple positions.

... Easier to obtain synchronised advance movements of several screw jacks, including under different loads.

... Lower size for the same load capacity.

... ...

The screw jacks also characterised for offering an extensive range of:

... Axial load capacities, from 5 kN up to 500 kN.

... Advance speeds, depending on the screw pitch and the gearbox, two possible gears are offered depending on the size of the screw jack, from 4:1 to 56:1.

... Trapezoidal and ball screws, depending on the performance required, precision of movement and positioning, etc.

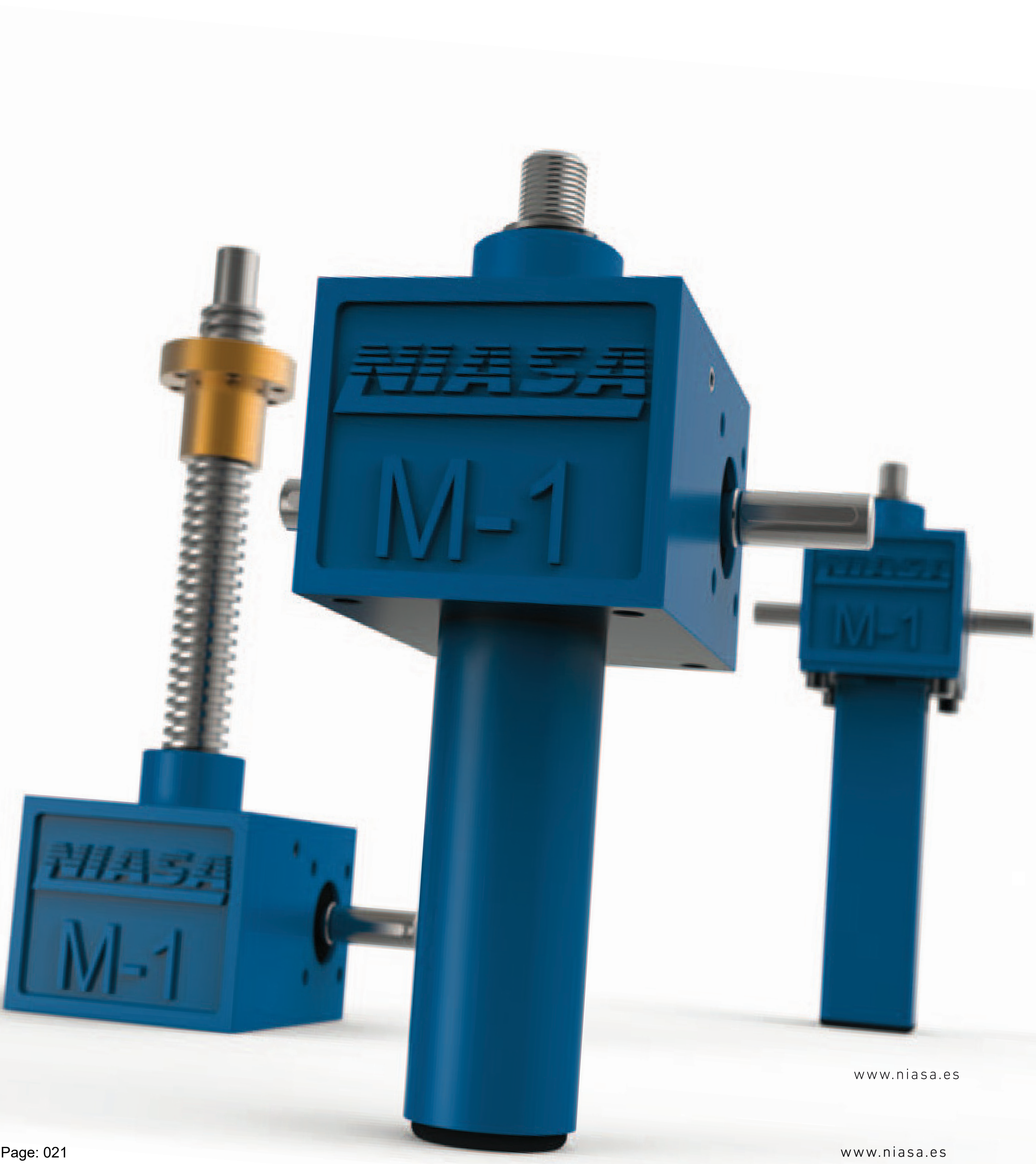
... Fastening accessories and elements, for optimal adaptation to the most varied systems that may be designed.

... Control and safety systems (mechanical/inductive limit switches, absolute/incremental encoders, etc.).

... Materials and surface coverings, depending on the environmental conditions in which the unit will be installed.

... ...

Please do not hesitate to contact NIASA if you require screw jacks (and their drive mechanisms) with specifications other than those covered in this chapter. The NIASA technical department will specifically develop the special units that best meet your requirements.



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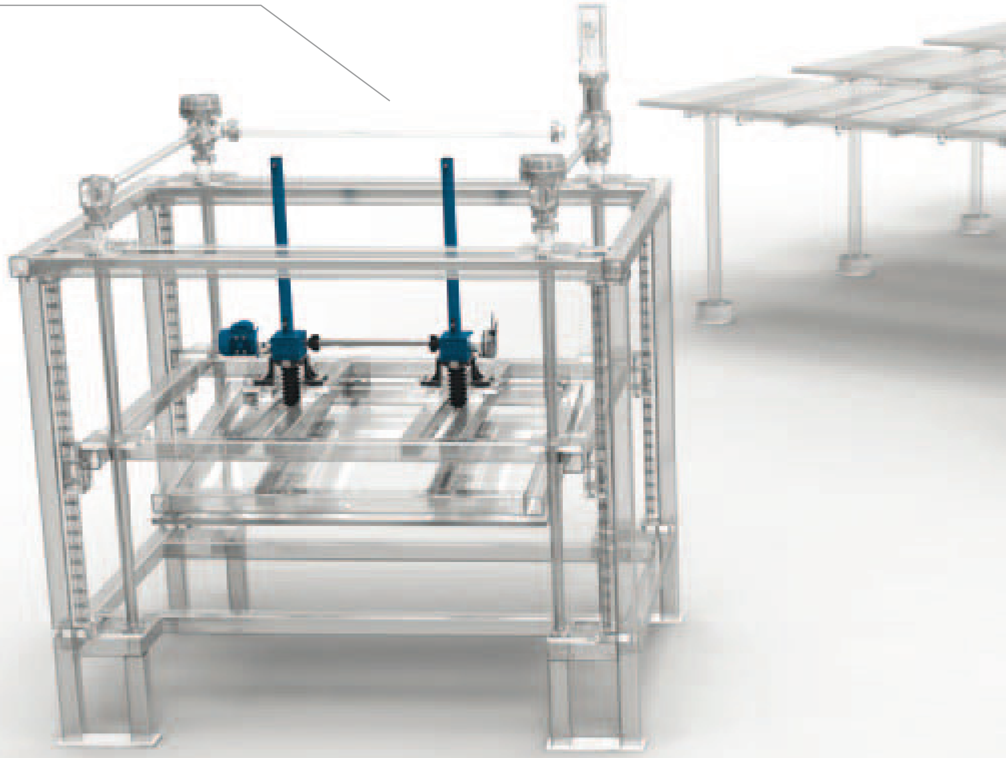
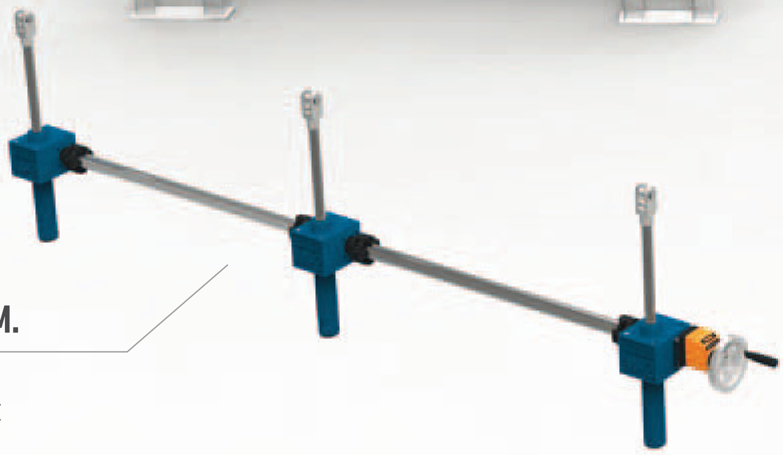
SCREW JACKS
APPLICATIONS

MACHINE TILTING SYSTEM

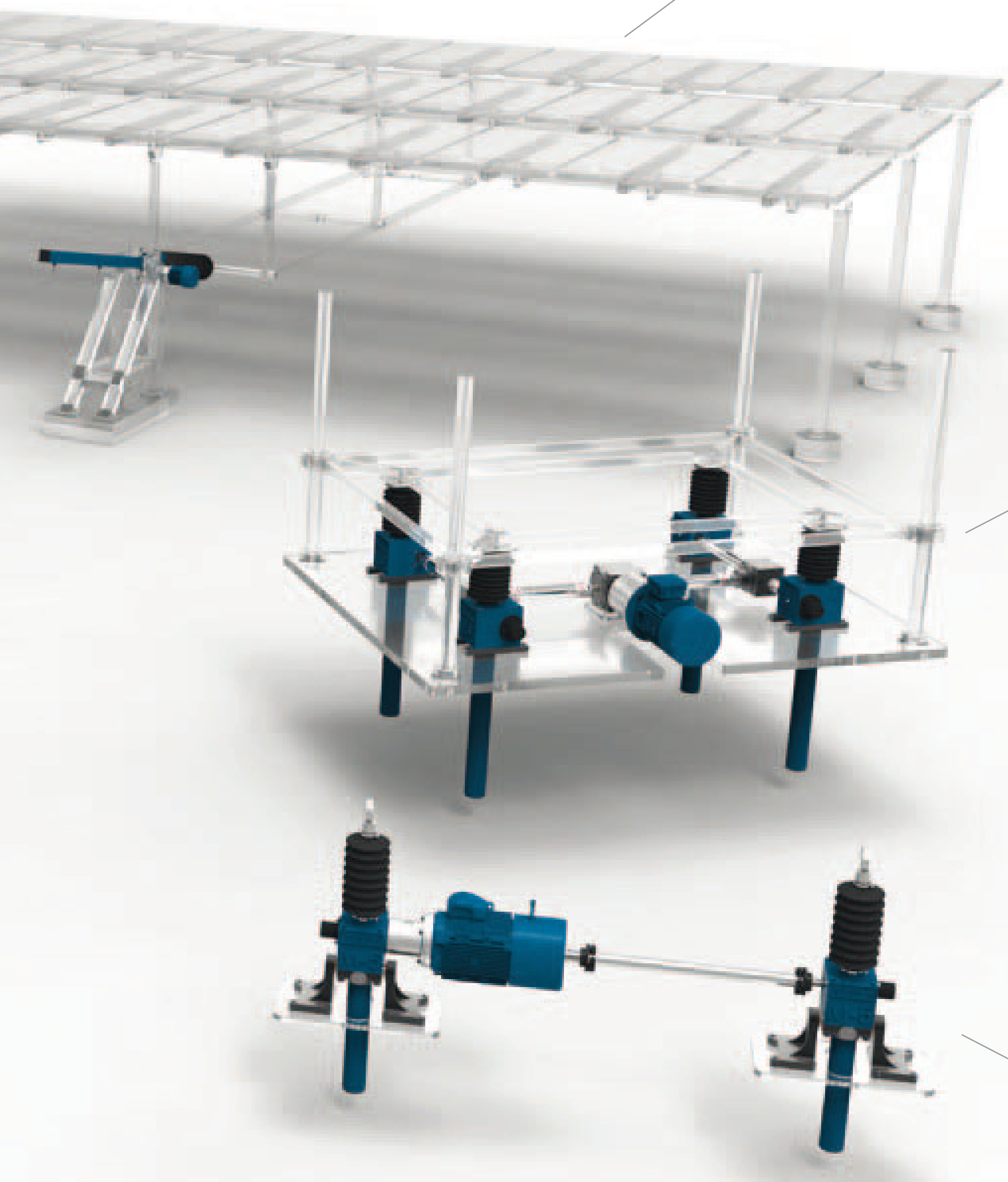
Set of two M4-N screw jacks made up of a three-phase motor drive system and joined together with a GX universal joint shaft. Tilt on the top of the gearbox with a ZKM joint adapter, SB tip supports, GKB series double clevis rod, FB protective bellow, inductive sensor and electro-magnetic brake.





MANUAL POSITIONING SYSTEM.

Set of three M2-N screw jacks made up of a manual drive system with a VE series wheel and joined together with GX universal joint shafts. LCM-series mounting feet underneath the box, GKB series double clevis rod, manual brake and analogue odometer.



PHOTOVOLTAIC INSTALLATION

M5-W screw jack with IPX protection for outdoor weather made up of a three-phase motor drive system, tilt underneath the gearbox with a ZKM joint adapter, clevis rod with GIR series ball joint on the screw, EPDM special protection bellow and inductive sensor.

PLATFORM ELEVATION SYSTEM.

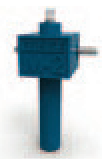
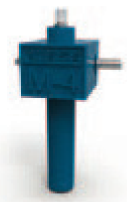
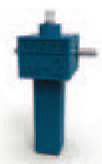
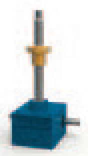
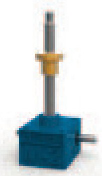
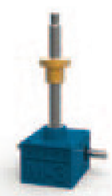
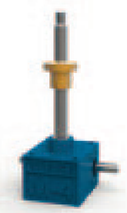
Set of four M5-N screw jacks made up of a three-phase motor drive system and joined together with EZ universal joint shafts and bevel gearboxes. LCM-series mounting feet underneath the box, BPS flange fastening on the screw, FB series protective bellow and PR series worm shaft protector.

TILTING ELEVATION SYSTEM

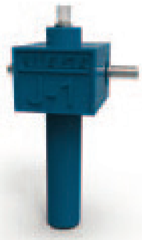
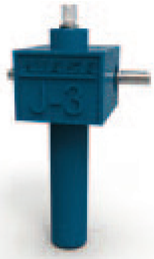
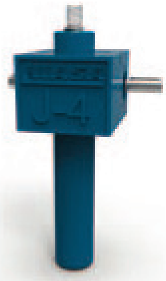
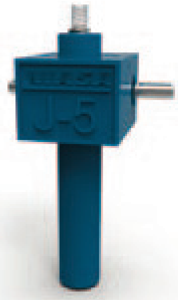
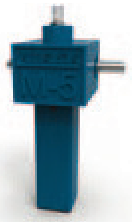
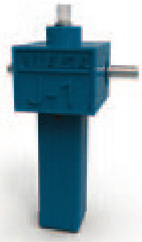
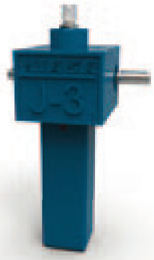
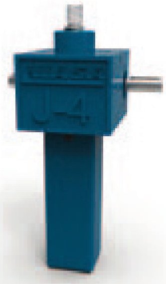
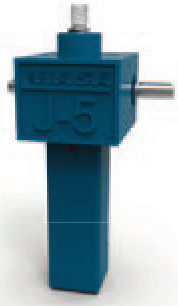
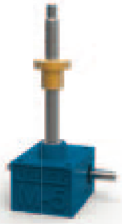
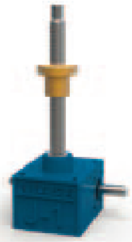
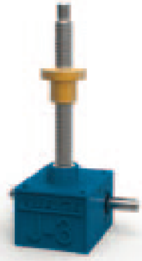
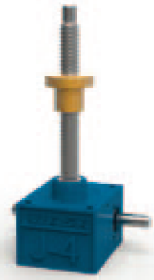
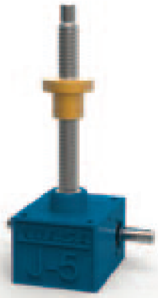
Set of two M5-N screw jacks made up of a dual-shaft three-phase motor drive system and joined together with GX universal joint shafts. Tilt underneath the gearbox with a ZKM joint adapter, SB tilt supports, clevis rod with GIR series ball joint on the screw, FB special protective bellow, and PR series worm shaft protector.

SCREW JACKS
SIZES

On all the sizes there are trapezoidal and screw drive options (see chapter 07 for further information), as well as normal speed (S) and reduced speed (H) gearboxes.

	M1	M2	M3	M4
Up to	**5 kN**	**10 kN**	**25 kN**	**50 kN**
N The screw moves.	 page 28	 page 30	 page 32	 page 34
W The screw travels. With anti-rotation on the screw.	 page 28	 page 30	 page 32	 page 34
R The nut moves.	 page 29	 page 31	 page 33	 page 35

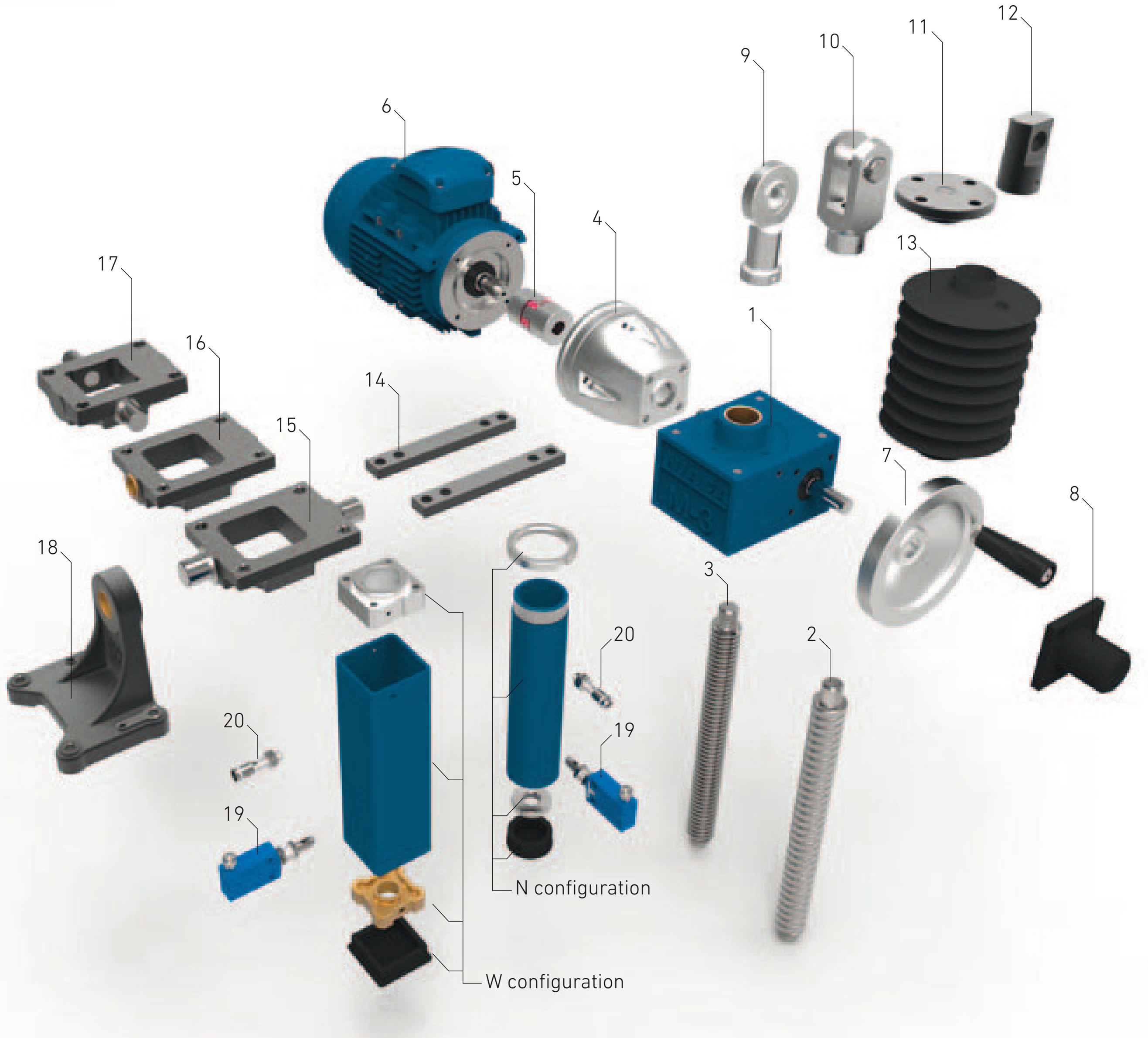
In addition to the standard range of screw jacks, NIASA can specifically develop the unit that best meets your application requirements. Contact NIASA.

M5 100 kN	J1 150 kN	J3 250 kN	J4 350 kN	J5 500 kN
 page 36	 page 38	 page 40	 page 42	 page 44
 page 36	 page 38	 page 40	 page 42	 page 44
 page 37	 page 39	 page 41	 page 43	 page 45

NIASA

SCREW JACKS

GENERAL PRODUCT OVERVIEW



N/W

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03	Trapezoidal screw	28
04	Motor flange	
05	EK coupling	284
06	Motorization	312
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08	PR worm gear protector	304
09	GIR clevis rod	282
10	GKB double clevis rod	281
11	BPS flange	278
12	GKS single clevis rod	280
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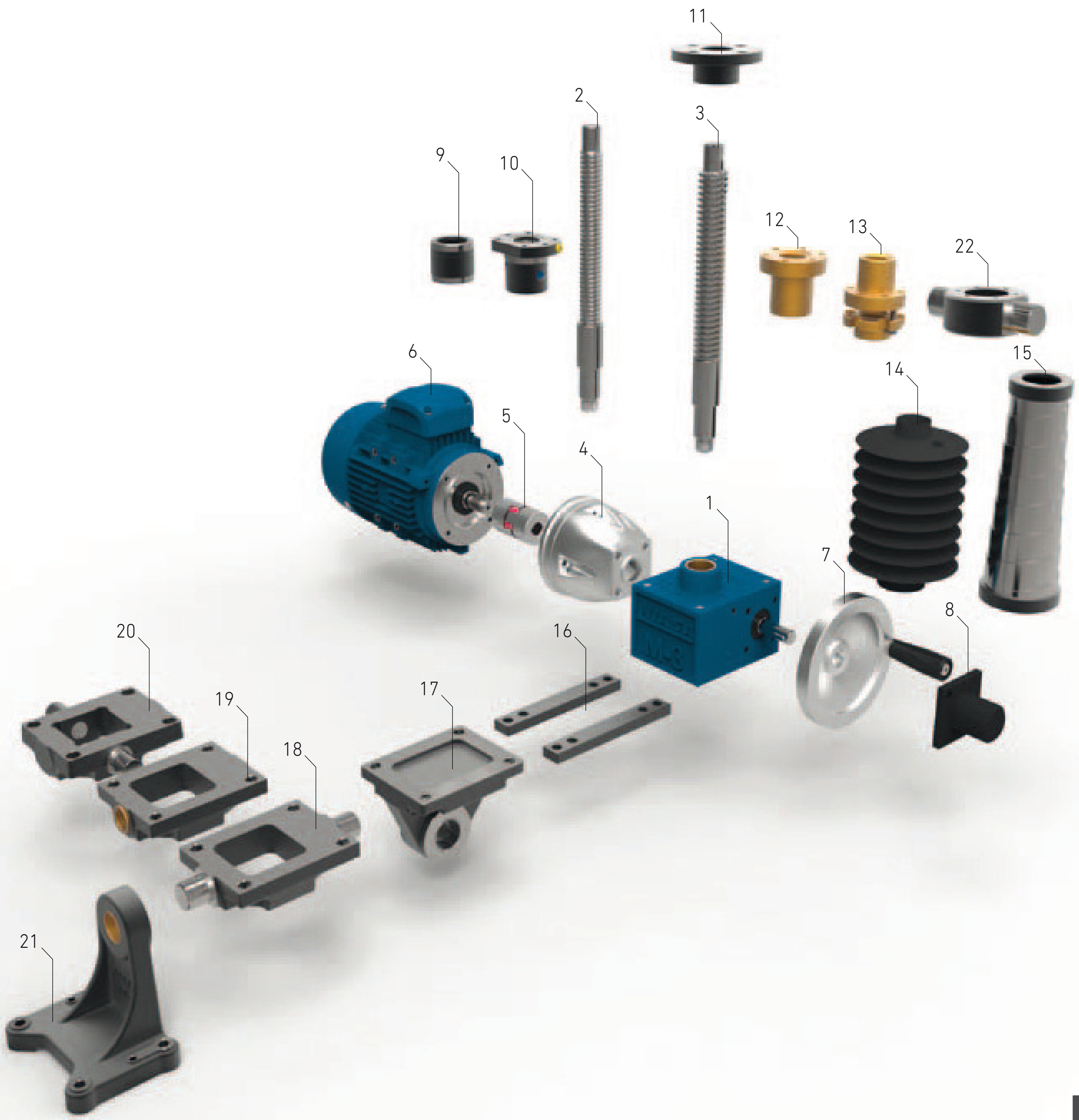
14	LCM mounting feet	266
15	Flange with ZKM bolts	267
16	Flanges with ZKH bearings	268
17	Flange with ZKV 90° bolts	269
18	SB tilt supports	276
19	FCM mechanical limit switch	307
20	FCI inductive limit switch	306



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Name		Page
01	M series box	24
02	Ball screw	29
03	Trapezoidal screw	29
04	Motor flange	
05	EK coupling	284
06	Motorization	312
07	Wheel with VE grip	300
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10	KGF nut	246
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13	EFM safety nut	258
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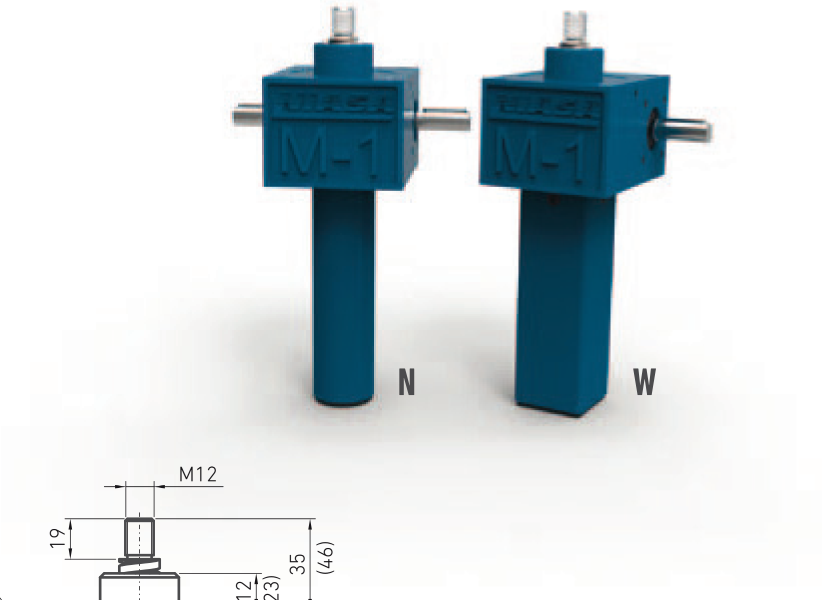
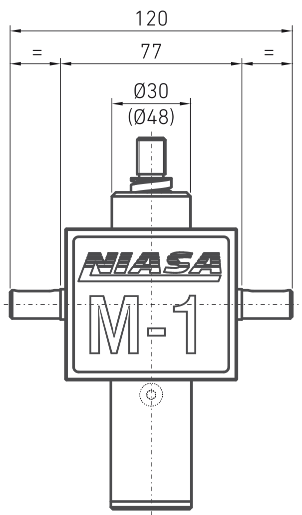
16	LCM mounting feet	266
17	HFM ball joint	270
18	Flange with ZKM bolts	267
19	Flanges with ZKH bearings	268
20	Flange with ZKV 90° bolts	269
21	SB tilt supports	276
22	Flange with KAR bolts	275

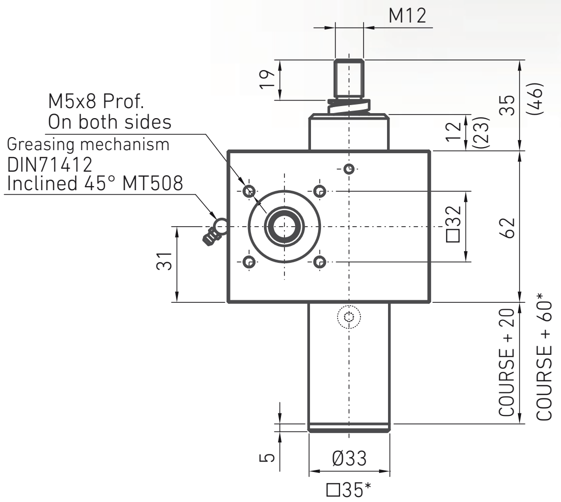
M1-N/W SCREW JACKS

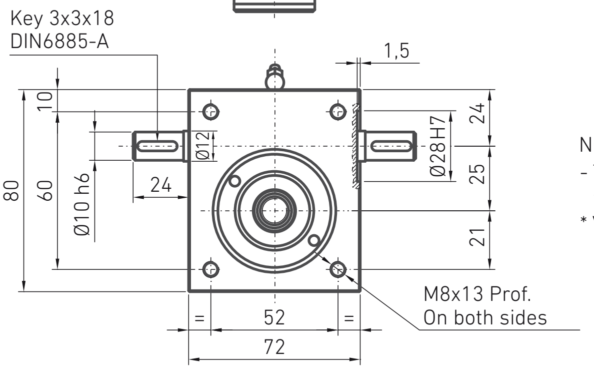
UP TO 5 kN Tr TRAPEZ. KGS BALLS

The screw sizes indicated correspond to the basic configurations. Other configurations may be ordered (size, type, etc.) on request.









NOTES:
- The values in brackets correspond to the versions with KG screw.

* Version W.

Screw diameter and pitch (mm)	Maximum axial strength (kN)	Reduction		Travel (mm/revol. input)		Performance (%)		Drive torque, M_D (Nm)		Start-up torque, M_0 (Nm)		Weight stroke 0 (kg)	Approx. weight each 100mm of stroke (kg)
								F (kN), load to move in dynamic					
		S	H	S	H	S	H	S	H	S	H		
Tr 18x4	5	4:1	16:1	1	0.25	36	28	(0.44xF)+0.08	(0.14xF)+0.06	0.66xF	0.27xF	1.2	0.26
KGS 1605	5	4:1	16:1	1.25	0.31	79	62	(0.25xF)+0.08	(0.08xF)+0.06	0.32xF	0.13xF	1.3	0.26

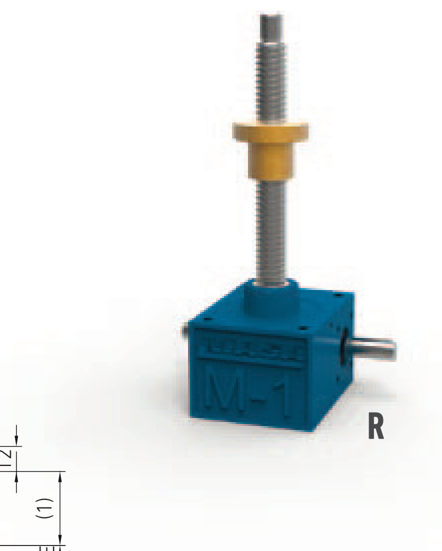
... Power required: P_D (kW) = 0.157 x M_D (Nm).
... All the data in the table correspond to an input speed of 1,500 rpm. For other speeds, please see the calculation chapter (page 47).
... Ensure that the dynamic load of the application does not surpass the critical values indicated, in order to avoid overheating of the unit and buckling and resonance of the screw. See calculations chapter (page 48).

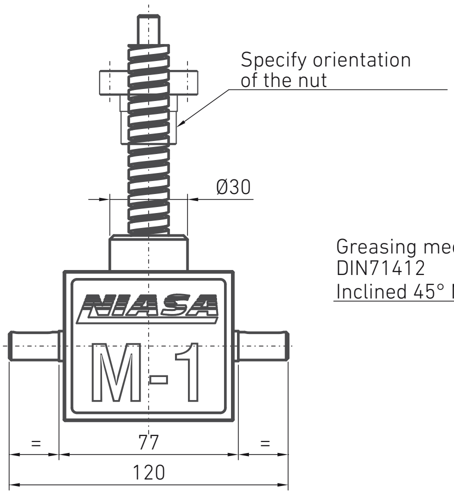
M1-R SCREW JACKS

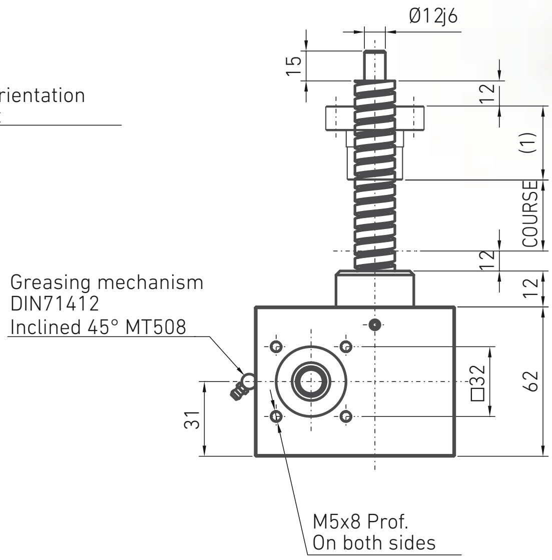
UP TO 5 kN

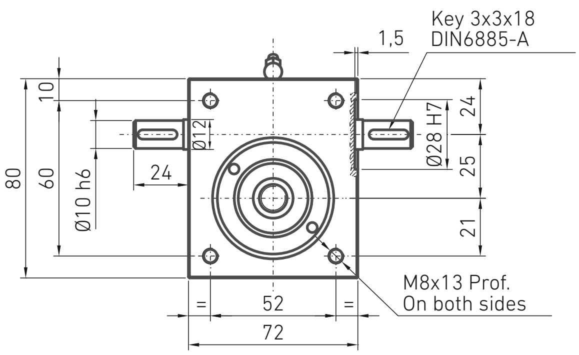
Tr TRAPEZ. KGS BALLS

The screw sizes indicated correspond to the basic configurations. Other configurations may be ordered (size, type, etc.) on request.





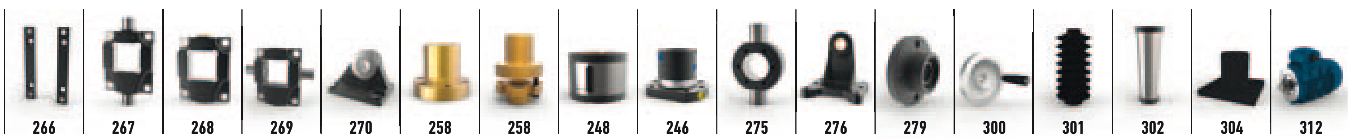




NOTES:
- (1) See nut dimensions in the corresponding chapter.

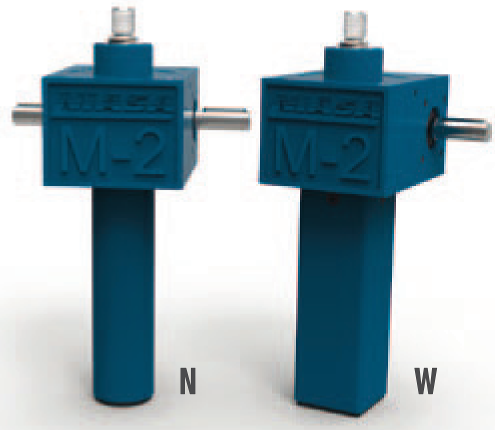
Screw diameter and pitch (mm)	Maximum axial strength (kN	Reduction		Travel (mm/revol. input)		Performance (%)		Drive torque, M_D (Nm)		Start-up torque, M_0 (Nm)		Weight stroke 0 (kg)	Approx. weight each 100mm of stroke (kg)
								F (kN), load to move in dynamic					
		S	H	S	H	S	H	S	H	S	H		
Tr 18x4	5	4:1	16:1	1	0.25	36	28	(0.44xF)+0.08	(0.14xF)+0.06	0.66xF	0.27xF	1.2	0.20
KGS 1605	5	4:1	16:1	1.25	0.31	79	62	(0.25xF)+0.08	(0.08xF)+0.06	0.32xF	0.13xF	1.3	0.20

... Power required: P_D (kW) = 0.157x M_D (Nm).
... All the data in the table correspond to an input speed of 1,500 rpm. For other speeds, please see the calculation chapter (page 47).
... Ensure that the dynamic load of the application does not surpass the critical values indicated, in order to avoid overheating of the unit and buckling and resonance of the screw. See calculations chapter (page 48).

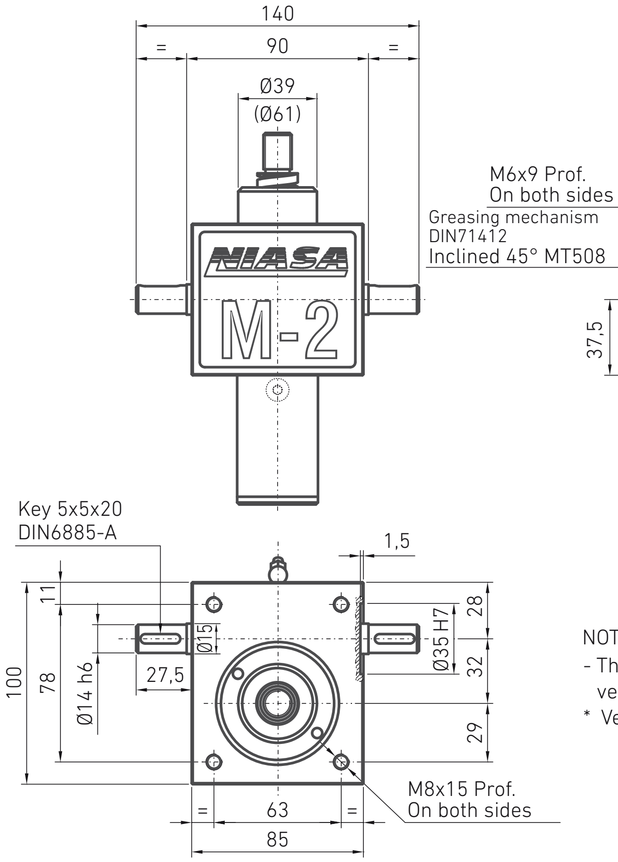


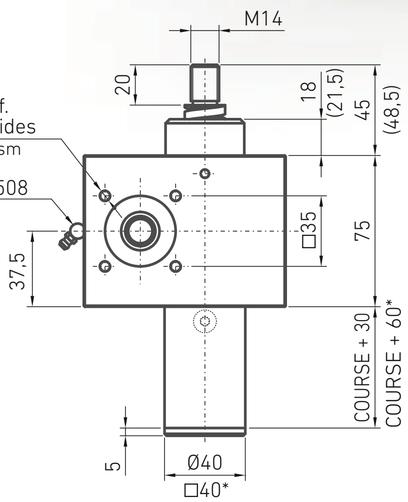
M2-N/W SCREW JACKS

UP TO **10 kN** Tr TRAPEZ. KGS BALLS



The screw sizes indicated correspond to the basic configurations. Other configurations may be ordered (size, type, etc.) on request.





NOTES:
- The values in brackets correspond to the versions with KG screw.
- * Version W.

Screw diameter and pitch (mm)	Maximum axial strength (kN)	Reduction		Travel (mm/revol. input)		Performance (%)		Drive torque, M_D (Nm)		Start-up torque, M_0 (Nm)		Weight stroke 0 (kg)	Approx. weight each 100mm of stroke (kg)
								F (kN), load to move in dynamic					
		S	H	S	H	S	H	S	H	S	H		
Tr 20x4	10	4:1	16:1	1	0.25	34	27	(0.47xF)+0.22	(0,15xF)+0.14	0.72xF	0.28xF	2.1	0.55
KGS 2005	10	4:1	16:1	1.25	0.31	80	64	(0.25xF)+0.22	(0.08xF)+0.14	0.32xF	0.12xF	2.3	0.55

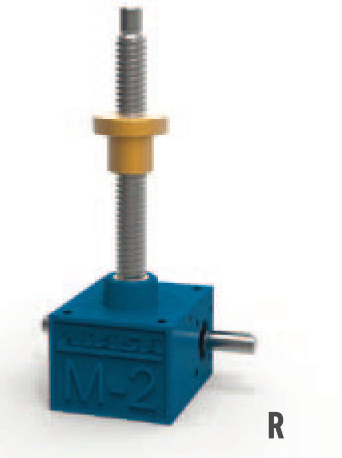
... Power required: P_D (kW) = 0.157x M_D (Nm).
... All the data in the table correspond to an input speed of 1,500 rpm. For other speeds, please see the calculation chapter (page 47).
... Ensure that the dynamic load of the application does not surpass the critical values indicated, in order to avoid overheating of the unit and buckling and resonance of the screw. See calculations chapter (page 48).

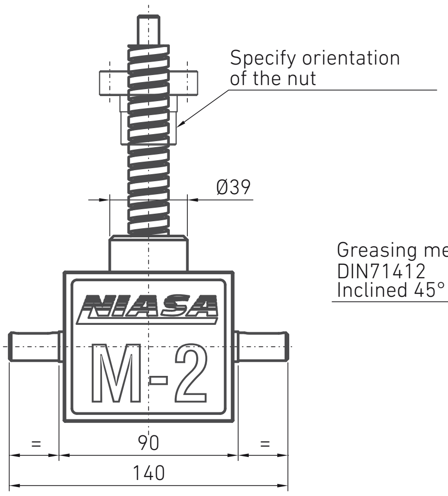
M2-R SCREW JACKS

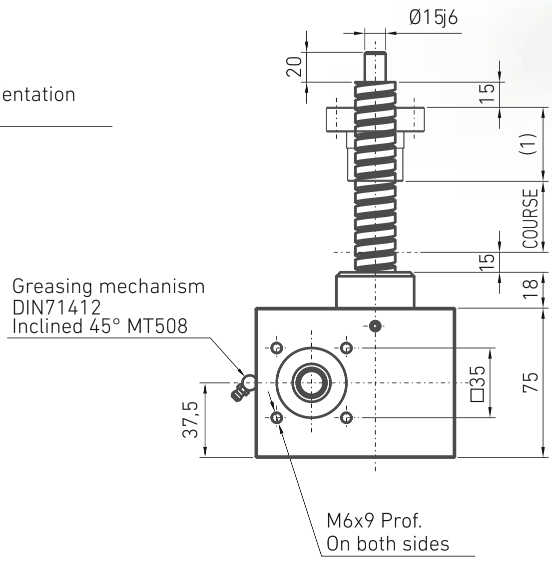
UP TO 10 kN

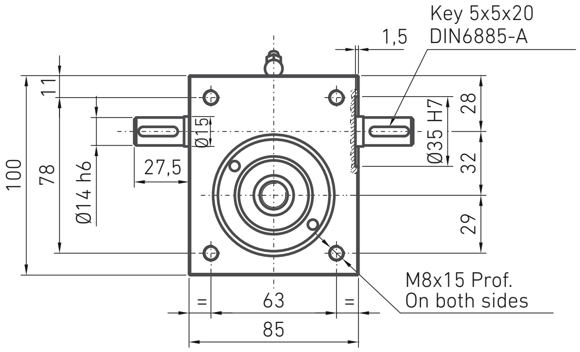
Tr TRAPEZ. KGS BALLS

The screw sizes indicated correspond to the basic configurations. Other configurations may be ordered (size, type, etc.) on request.





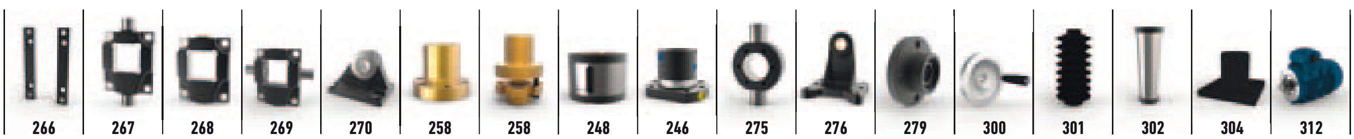




NOTES:
- (1) See nut dimensions in the corresponding chapter.

Screw diameter and pitch (mm)	Maximum axial strength (kN)	Reduction		Travel (mm/revol. input)		Performance (%)		Drive torque, M_D (Nm)		Start-up torque, M_0 (Nm)		Weight stroke 0 (kg)	Approx. weight each 100mm of stroke (kg)
								F (kN), load to move in dynamic					
		S	H	S	H	S	H	S	H	S	H		
Tr 20x4	10	4:1	16:1	1	0.25	34	27	(0.47xF)+0.22	(0,15xF)+0.14	0.72xF	0.28xF	2.1	0.42
KGS 2005	10	4:1	16:1	1.25	0.31	80	64	(0.25xF)+0.22	(0.08xF)+0.14	0.32xF	0.12xF	2.3	0.42

... Power required: P_D (kW) = 0.157x M_D (Nm).
... All the data in the table correspond to an input speed of 1,500 rpm. For other speeds, please see the calculation chapter (page 47).
... Ensure that the dynamic load of the application does not surpass the critical values indicated, in order to avoid overheating of the unit and buckling and resonance of the screw. See calculations chapter (page 48).



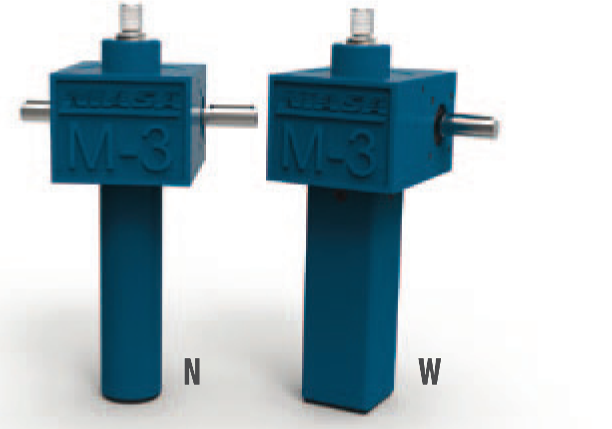
NIASA

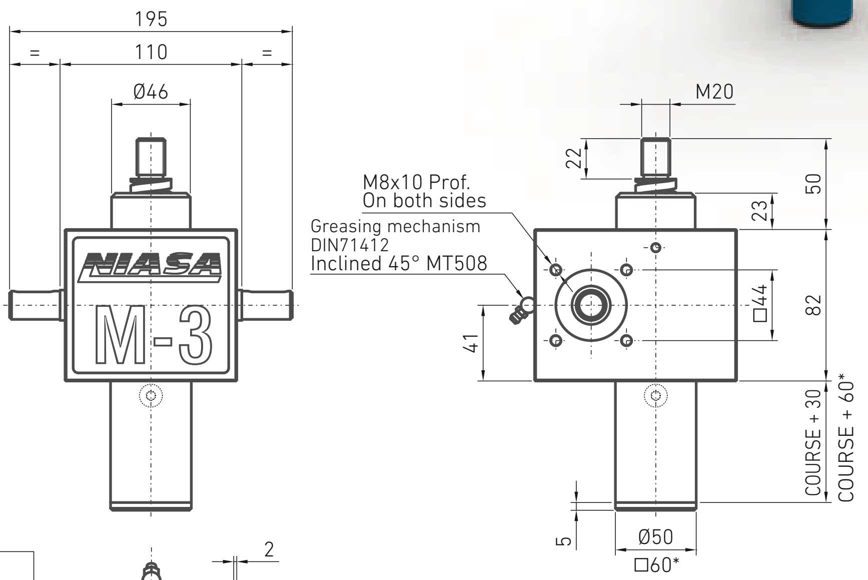
M3-N/W SCREW JACKS

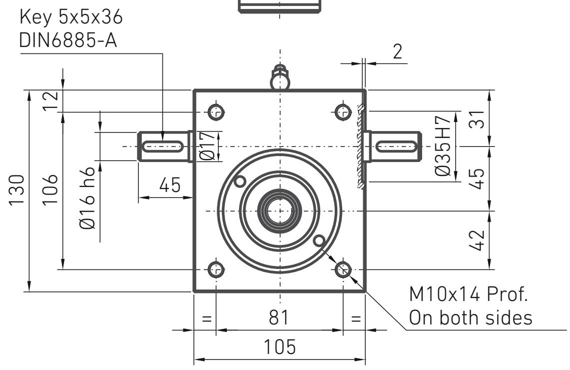
UP TO 25 kN

Tr TRAPEZ. KGS BALLS

The screw sizes indicated correspond to the basic configurations. Other configurations may be ordered (size, type, etc.) on request.







NOTES:

* Version W.

Screw diameter and pitch (mm)	Maximum axial strength (kN)	Reduction		Travel (mm/revol. input)		Performance (%)		Drive torque, M_D (Nm)		Start-up torque, M_0 (Nm)		Weight stroke 0 (kg)	Approx. weight each 100mm of stroke (kg)
								F (kN), load to move in dynamic					
		S	H	S	H	S	H	S	H	S	H		
Tr 30x6	25	6:1	24:1	1	0.25	34	27	(0.47xF)+0.3	(0,15xF)+0.24	0.72xF	0.31xF	6	1.68
KGS 2505	12	6:1	24:1	0.83	0.21	81	64	(0.16xF)+0.3	(0.05xF)+0.24	0.21xF	0.09xF	7	1.68

... Power required: P_D (kW) = 0.157x M_D (Nm).

... All the data in the table correspond to an input speed of 1,500 rpm. For other speeds, please see the calculation chapter (page 48).

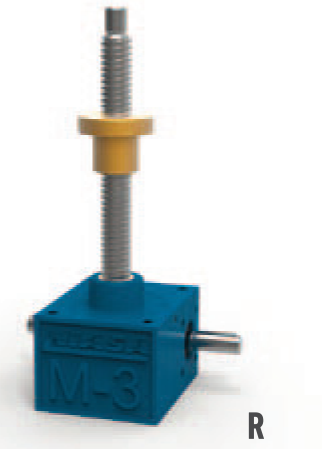
... Ensure that the dynamic load of the application does not surpass the critical values indicated, in order to avoid overheating of the unit and buckling and resonance of the screw. See calculations chapter (page 48).

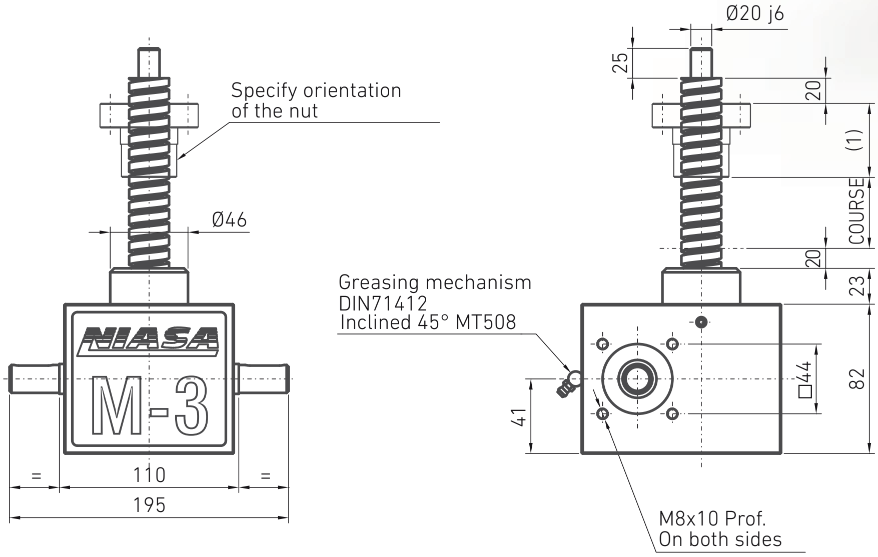
M3-R SCREW JACKS

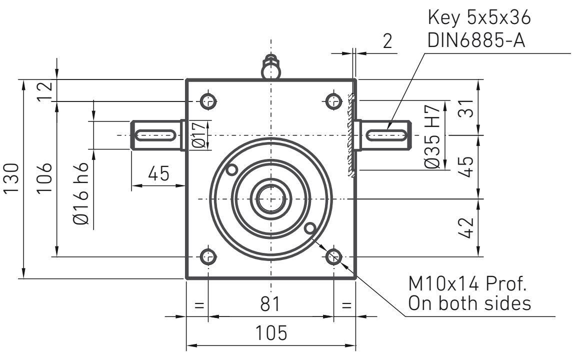
UP TO 25 kN

Tr TRAPEZ. KGS BALLS

The screw sizes indicated correspond to the basic configurations. Other configurations may be ordered (size, type, etc.) on request.



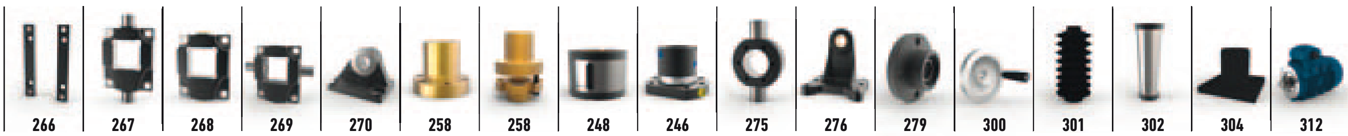




NOTES:
- (1) See nut dimensions in the corresponding chapter.

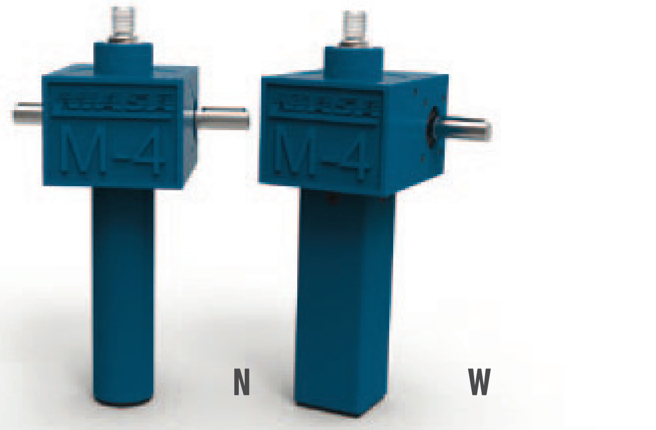
Screw diameter and pitch (mm)	Maximum axial strength (kN)	Reduction		Travel (mm/revol. input)		Performance (%)		Drive torque, M_D (Nm)		Start-up torque, M_0 (Nm)		Weight stroke 0 (kg)	Approx. weight each 100mm of stroke (kg)
								F (kN), load to move in dynamic					
		S	H	S	H	S	H	S	H	S	H		
Tr 30x6	25	6:1	24:1	1	0.25	34	27	(0.47xF)+0.3	(0,15xF)+0.24	0.72xF	0.31xF	6	1.14
KGS 2505	12	6:1	24:1	0.83	0.21	81	64	(0.16xF)+0.3	(0.05xF)+0.24	0.21xF	0.09xF	7	1.14

... Power required: P_D (kW) = 0.157x M_D (Nm).
... All the data in the table correspond to an input speed of 1,500 rpm. For other speeds, please see the calculation chapter (page 48).
... Ensure that the dynamic load of the application does not surpass the critical values indicated, in order to avoid overheating of the unit and buckling and resonance of the screw. See calculations chapter (page 48).

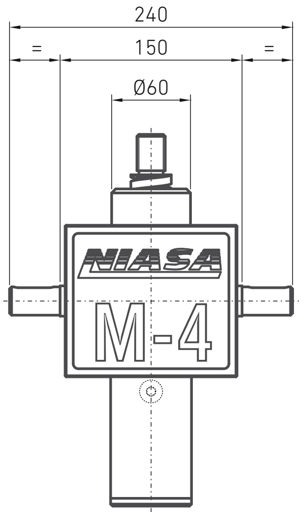


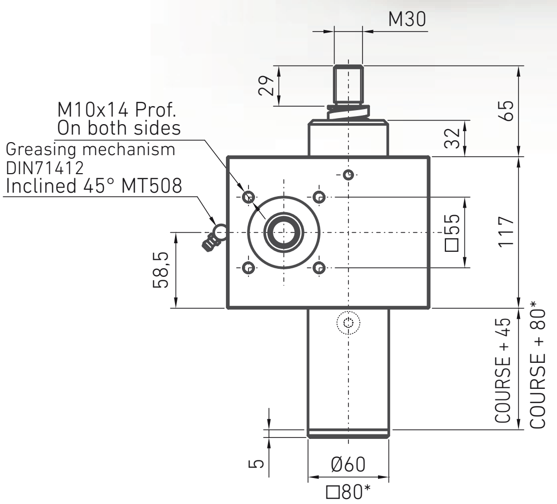
M4-N/W SCREW JACKS

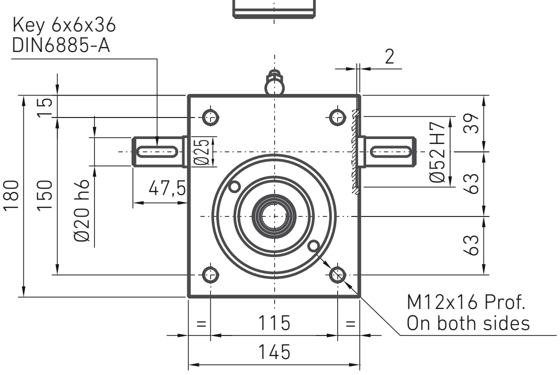
UP TO **50 kN** Tr TRAPEZ. KGS BALLS



The screw sizes indicated correspond to the basic configurations. Other configurations may be ordered (size, type, etc.) on request.







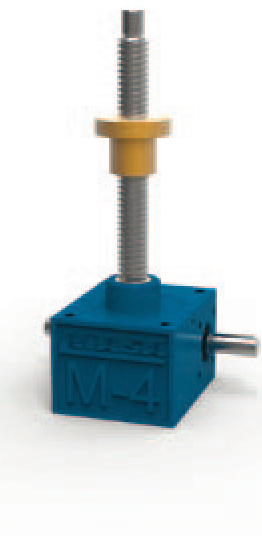
NOTES:
* Version W.

Screw diameter and pitch (mm)	Maximum axial strength (kN)	Reduction		Travel (mm/revol. input)		Performance (%)		Drive torque, M_D (Nm)		Start-up torque, M_0 (Nm)		Weight stroke 0 (kg)	Approx. weight each 100mm of stroke (kg)
								F (kN), load to move in dynamic					
		S	H	S	H	S	H	S	H	S	H		
Tr 40x7	50	7:1	28:1	1	0.25	32	26	(0.51xF)+0.7	(0,15xF)+0.5	0.84xF	0.33xF	17	2.65
KGS 4005	22	7:1	28:1	0.71	0.18	81	67	(0.14xF)+0.7	(0.04xF)+0.5	0.18xF	0.07xF	19	2.65
KGS 4010	42	7:1	28:1	1.43	0.36	81	67	(0.28xF)+0.7	(0.09xF)+0.5	0.37xF	0.15xF	19	2.65

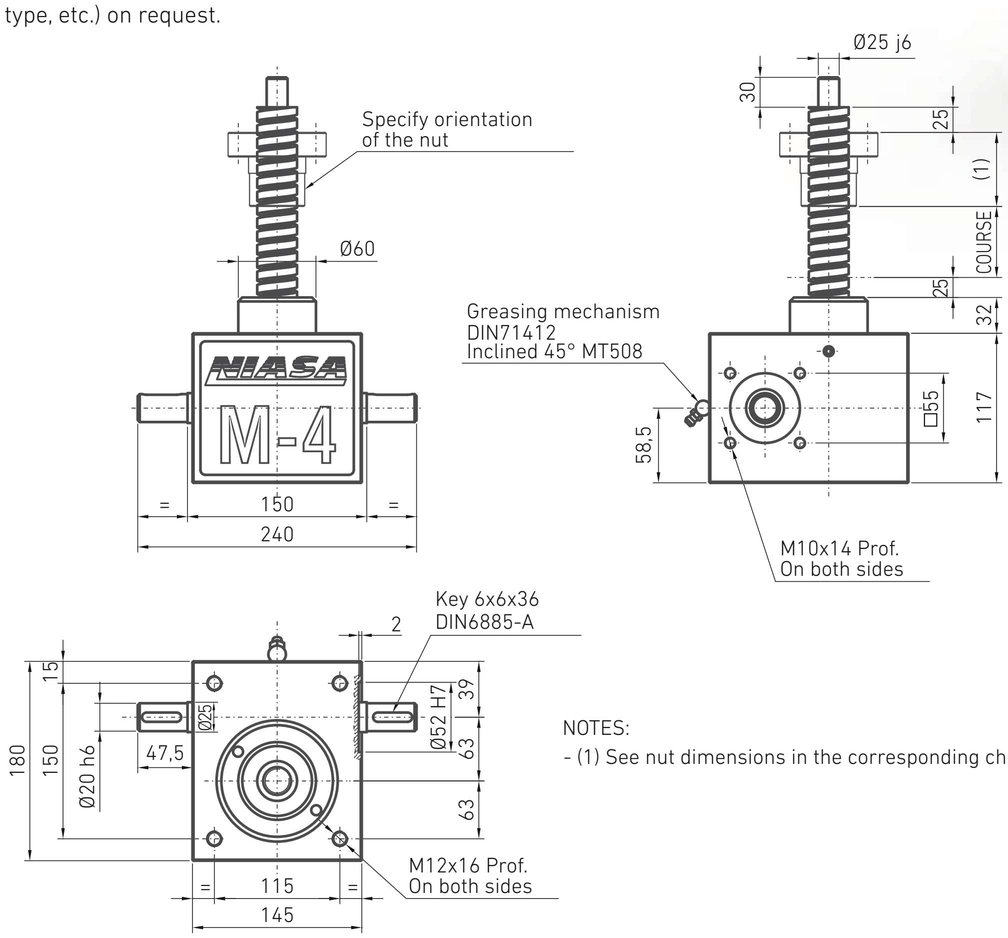
... Power required: P_D (kW) = 0.157x M_D (Nm).
... All the data in the table correspond to an input speed of 1,500 rpm. For other speeds, please see the calculation chapter (page 47).
... Ensure that the dynamic load of the application does not surpass the critical values indicated, in order to avoid overheating of the unit and buckling and resonance of the screw. See calculations chapter (page 48).

M4-R SCREW JACKS

UP TO 50 kN Tr TRAPEZ. KGS BALLS



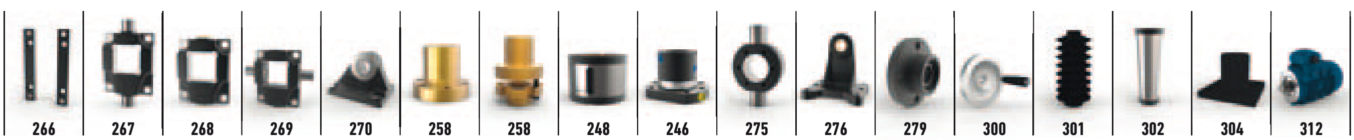
The screw sizes indicated correspond to the basic configurations. Other configurations may be ordered (size, type, etc.) on request.



NOTES:
- (1) See nut dimensions in the corresponding chapter.

Screw diameter and pitch (mm)	Maximum axial strength (kN)	Reduction		Travel (mm/revol. input)		Performance (%)		Drive torque, M_D (Nm)		Start-up torque, M_0 (Nm)		Weight stroke 0 (kg)	Approx. weight each 100mm of stroke (kg)
								F (kN), load to move in dynamic					
		S	H	S	H	S	H	S	H	S	H		
Tr 40x7	50	7:1	28:1	1	0.25	32	26	(0.51xF)+0.7	(0,15xF)+0.5	0.84xF	0.33xF	17	1.67
KGS 4005	22	7:1	28:1	0.71	0.18	81	67	(0.14xF)+0.7	(0.04xF)+0.5	0.18xF	0.07xF	19	1.67
KGS 4010	42	7:1	28:1	1.43	0.36	81	67	(0.28xF)+0.7	(0.09xF)+0.5	0.37xF	0.15xF	19	1.67

... Power required: P_D (kW) = 0.157x M_D (Nm).
... All the data in the table correspond to an input speed of 1,500 rpm. For other speeds, please see the calculation chapter (page 47).
... Ensure that the dynamic load of the application does not surpass the critical values indicated, in order to avoid overheating of the unit and buckling and resonance of the screw. See calculations chapter (page 48).

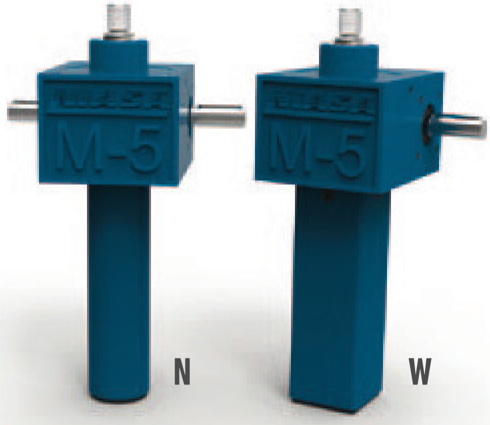


NIASA

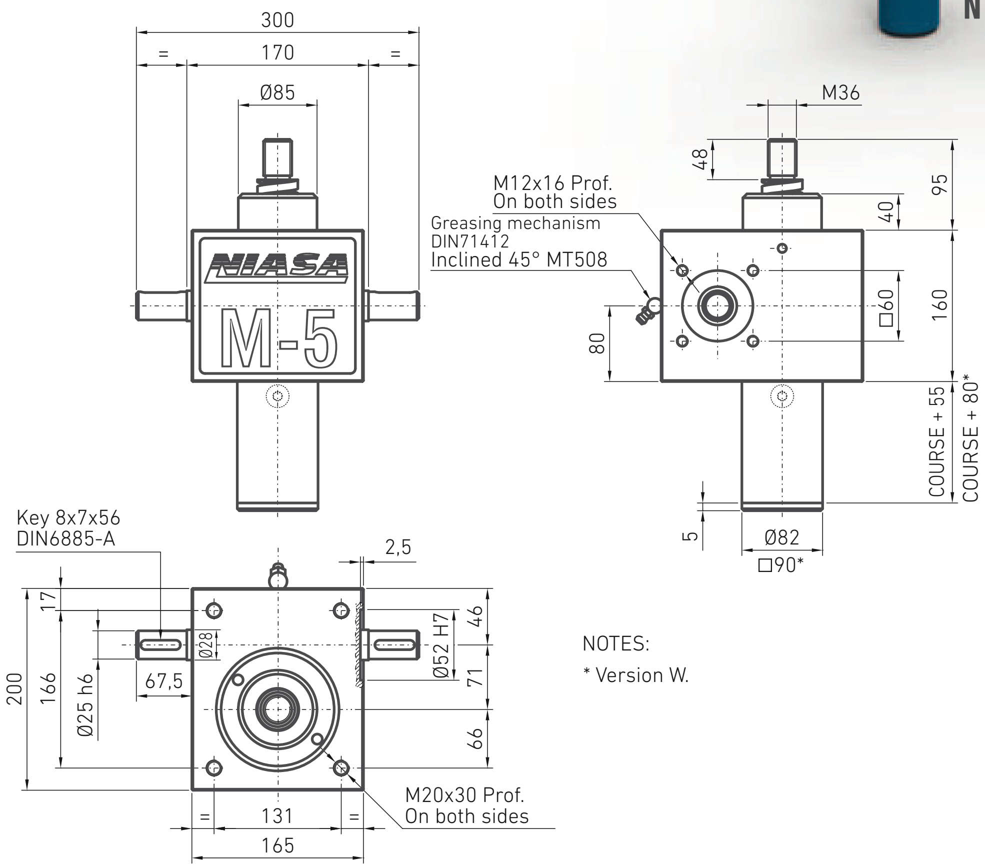
M5-N/W SCREW JACKS

UP TO 100 kN

Tr TRAPEZ. KGS BALLS



The screw sizes indicated correspond to the basic configurations. Other configurations may be ordered (size, type, etc.) on request.



NOTES:

* Version W.

Screw diameter and pitch (mm)	Maximum axial strength (kN)	Reduction		Travel (mm/ revol. input)		Performance (%)		Drive torque, M_D (Nm) F (kN), load to move in dynamic		Start-up torque, M_0 (Nm) F (kN), load to move in dynamic		Weight stroke 0 (kg)	Approx. weight each 100mm of stroke (kg)
		S	H	S	H	S	H	S	H	S	H		
Tr 55x9	100	9:1	36:1	1	0.25	30	24	(0.54xF)+1.68	(0.17xF)+1.02	0.88xF	0.36xF	32	4.12
KGS 5010	65	9:1	36:1	1.11	0.28	81	65	(0.22xF)+1.68	(0.07xF)+1.02	0.29xF	0.12xF	35	4.12

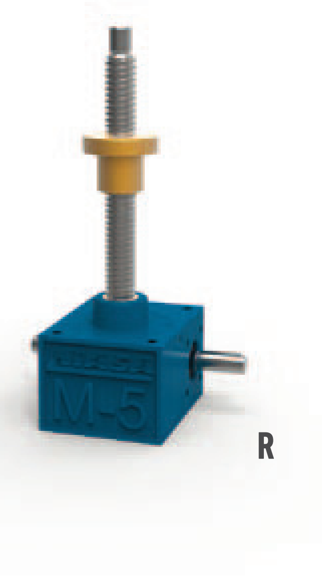
... Power required: P_D (kW) = 0.157x M_D (Nm).

... All the data in the table correspond to an input speed of 1,500 rpm. For other speeds, please see the calculation chapter (page 47).

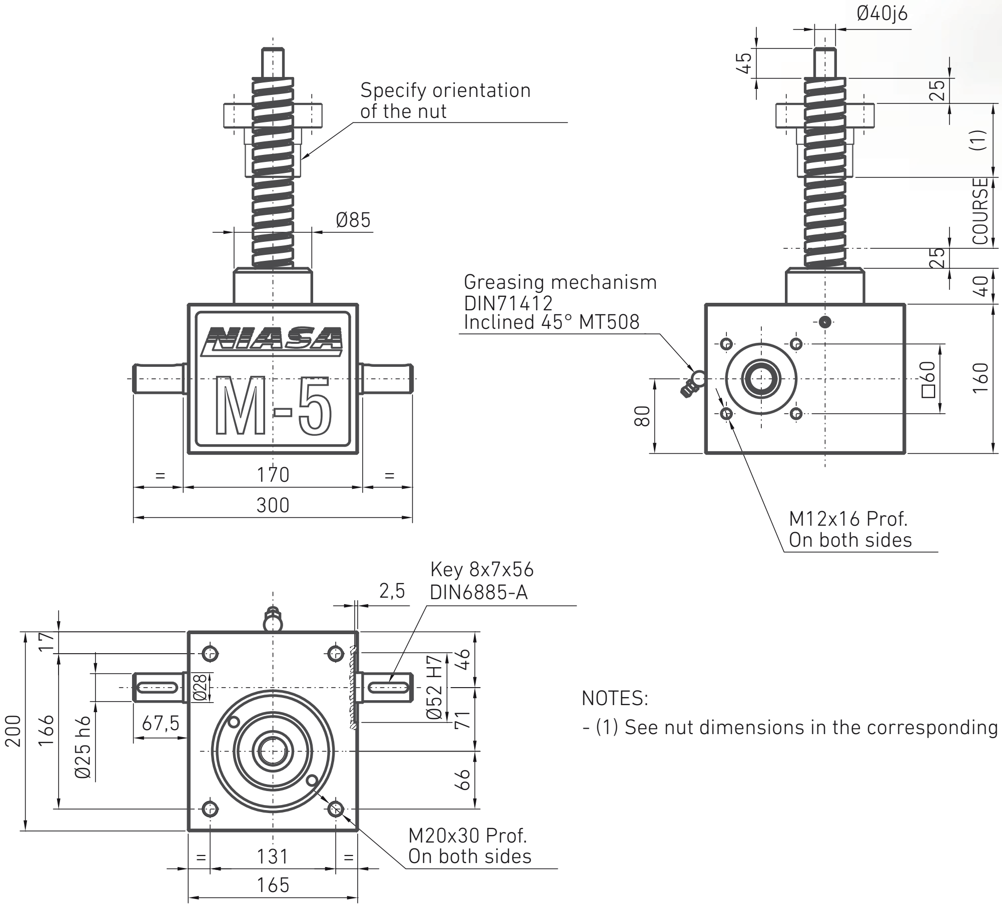
... Ensure that the dynamic load of the application does not surpass the critical values indicated, in order to avoid overheating of the unit and buckling and resonance of the screw. See calculations chapter (page 48).

M5-R SCREW JACKS

UP TO **100 kN** Tr TRAPEZ. KGS BALLS



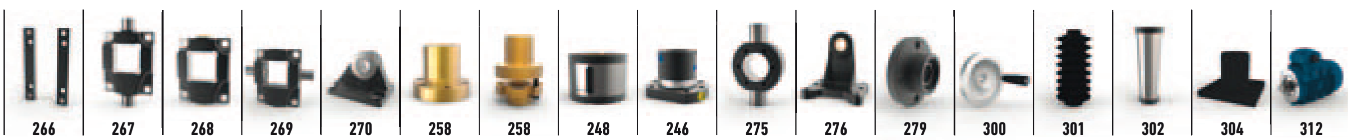
The screw sizes indicated correspond to the basic configurations. Other configurations may be ordered (size, type, etc.) on request.



NOTES:
- (1) See nut dimensions in the corresponding chapter.

Screw diameter and pitch (mm)	Maximum axial strength (kN)	Reduction		Travel (mm/revol. input)		Performance (%)		Drive torque, M_D (Nm) — F (kN), load to move in dynamic		Start-up torque, M_0 (Nm) — F (kN), load to move in dynamic		Weight stroke 0 (kg)	Approx. weight each 100mm of stroke (kg)
		S	H	S	H	S	H	S	H	S	H		
Tr 55x9	100	9:1	36:1	1	0.25	30	24	(0.54xF)+1.68	(0.17xF)+1.02	0.88xF	0.36xF	32	3.04
KGS 5010	65	9:1	36:1	1.11	0.28	81	65	(0.22xF)+1.68	(0.07xF)+1.02	0.29xF	0.12xF	35	3.04

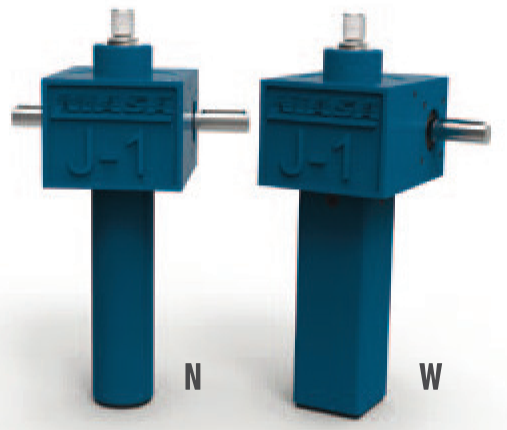
... Power required: P_D (kW) = 0.157x M_D (Nm).
... All the data in the table correspond to an input speed of 1,500 rpm. For other speeds, please see the calculation chapter (page 47).
... Ensure that the dynamic load of the application does not surpass the critical values indicated, in order to avoid overheating of the unit and buckling and resonance of the screw. See calculations chapter (page 48).



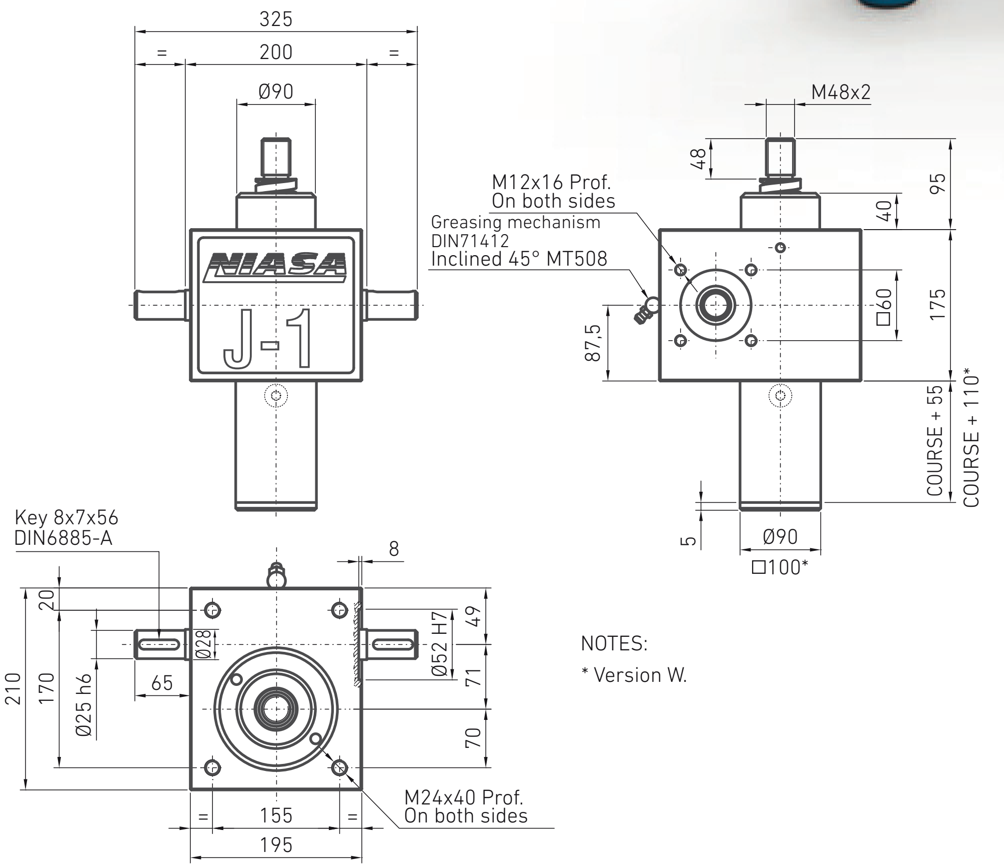
J1-N/W SCREW JACKS

UP TO 150 kN

Tr TRAPEZ. KGS BALLS



The screw sizes indicated correspond to the basic configurations. Other configurations may be ordered (size, type, etc.) on request.



NOTES:

* Version W.

Screw diameter and pitch (mm)	Maximum axial strength (kN)	Reduction		Travel (mm/revol. input)		Performance (%)		Drive torque, M_D (Nm)		Start-up torque, M_0 (Nm)		Weight stroke 0 (kg)	Approx. weight each 100mm of stroke (kg)
								F (kN), load to move in dynamic					
		S	H	S	H	S	H	S	H	S	H		
Tr 60x9	150	9:1	36:1	1	0.25	28	21	(0.57xF)+1.8	(0.19xF)+1.15	0.88xF	0.36xF	41	4.3

... Power required: P_D (kW) = 0.157x M_D (Nm).
... All the data in the table correspond to an input speed of 1,500 rpm. For other speeds, please see the calculation chapter (page 47).
... Ensure that the dynamic load of the application does not surpass the critical values indicated, in order to avoid overheating of the unit and buckling and resonance of the screw. See calculations chapter (page 48).

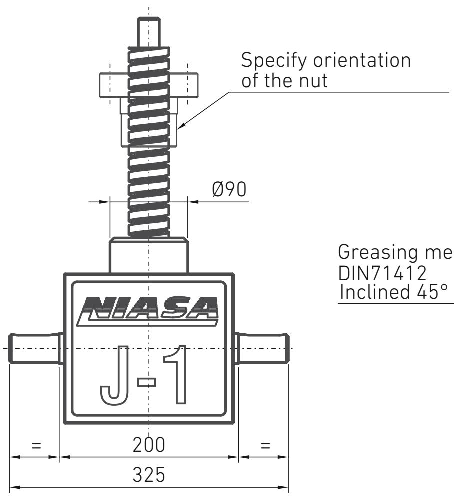
J1-R SCREW JACKS

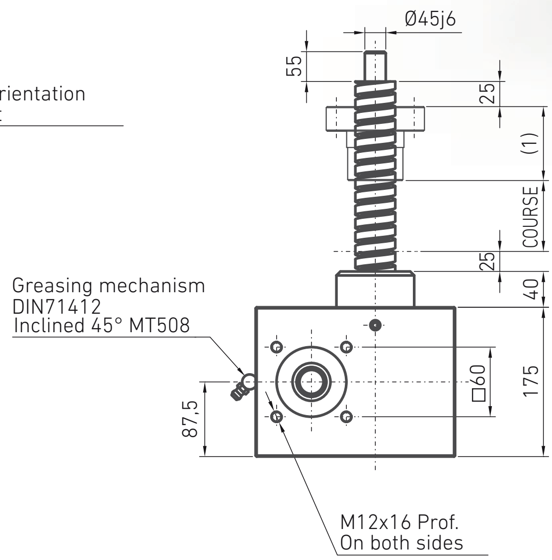
UP TO 150 kN

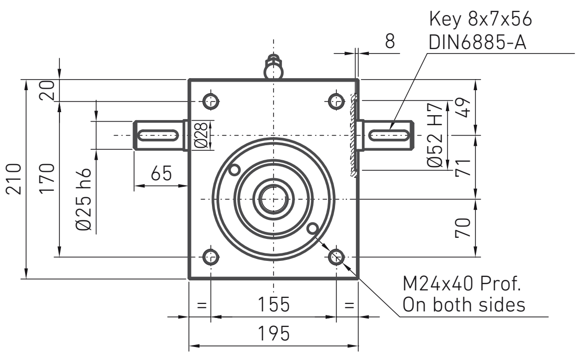
Tr TRAPEZ. KGS BALLS

The screw sizes indicated correspond to the basic configurations. Other configurations may be ordered (size, type, etc.) on request.

R



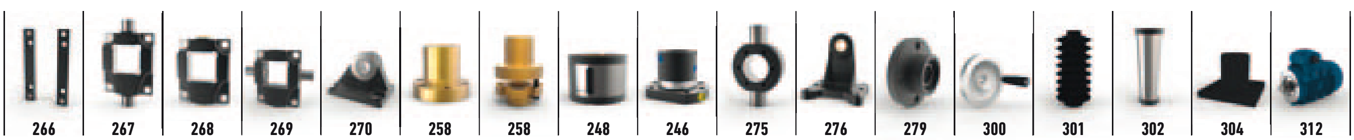




NOTES:
- (1) See nut dimensions in the corresponding chapter.

Screw diameter and pitch (mm)	Maximum axial strength (kN)	Reduction		Travel (mm/revol. input)		Performance (%)		Drive torque, M_D (Nm)		Start-up torque, M_O (Nm)		Weight stroke 0 (kg)	Approx. weight each 100mm of stroke (kg)
								F (kN), load to move in dynamic					
		S	H	S	H	S	H	S	H	S	H		
Tr 60x9	150	9:1	36:1	1	0.25	28	21	(0.57xF)+1.8	(0.19xF)+1.15	0.88xF	0.36xF	41	3.1

... Power required: P_D (kW) = 0.157x M_D (Nm).
... All the data in the table correspond to an input speed of 1,500 rpm. For other speeds, please see the calculation chapter (page 47).
... Ensure that the dynamic load of the application does not surpass the critical values indicated, in order to avoid overheating of the unit and buckling and resonance of the screw. See calculations chapter (page 48).

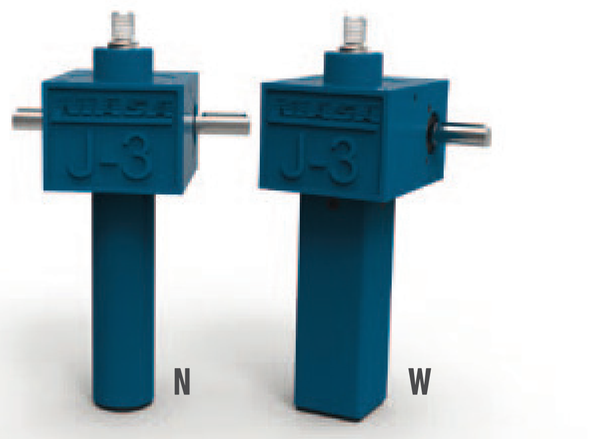


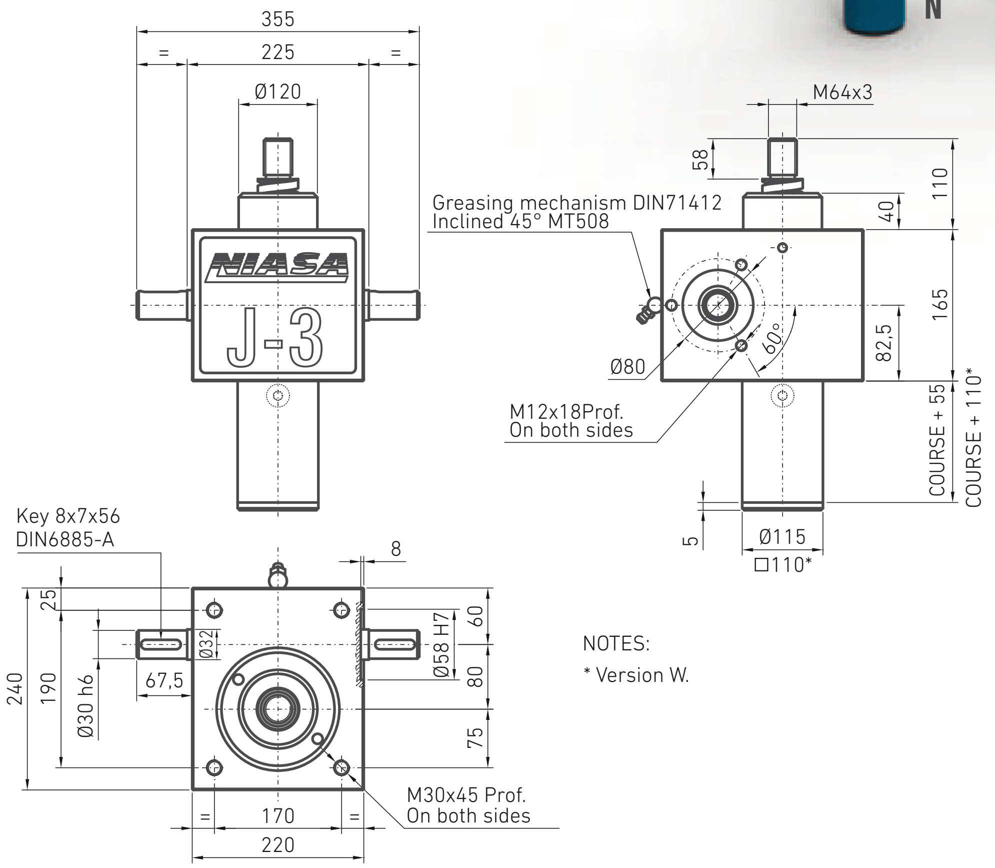
J3-N/W SCREW JACKS

UP TO 250 kN

Tr TRAPEZ. KGS BALLS

The screw sizes indicated correspond to the basic configurations. Other configurations may be ordered (size, type, etc.) on request.





NOTES:
* Version W.

Screw diameter and pitch (mm)	Maximum axial strength (kN)	Reduction		Travel (mm/revol. input)		Performance (%)		Drive torque, M_D (Nm)		Start-up torque, M_0 (Nm)		Weight stroke 0 (kg)	Approx. weight each 100mm of stroke (kg)
								F (kN), load to move in dynamic					
		S	H	S	H	S	H	S	H	S	H		
Tr 80x10	250	10:1	40:1	1	0.25	24	21	(0.65xF)+2.6	(0.19xF)+1.9	0.94xF	0.33xF	57	7.8
KGS 8010	78	10:1	40:1	1	0.25	81	69	(0.2xF)+2.6	(0.06xF)+1.9	0.22xF	0.08xF	63	7.8

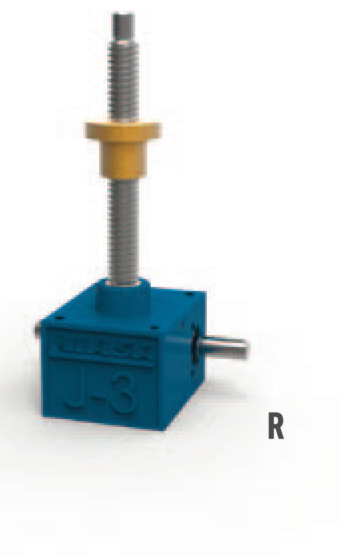
... Power required: P_D (kW) = 0.157x M_D (Nm).
... All the data in the table correspond to an input speed of 1,500 rpm. For other speeds, please see the calculation chapter (page 47).
... Ensure that the dynamic load of the application does not surpass the critical values indicated, in order to avoid overheating of the unit and buckling and resonance of the screw. See calculations chapter (page 48).

J3-R SCREW JACKS

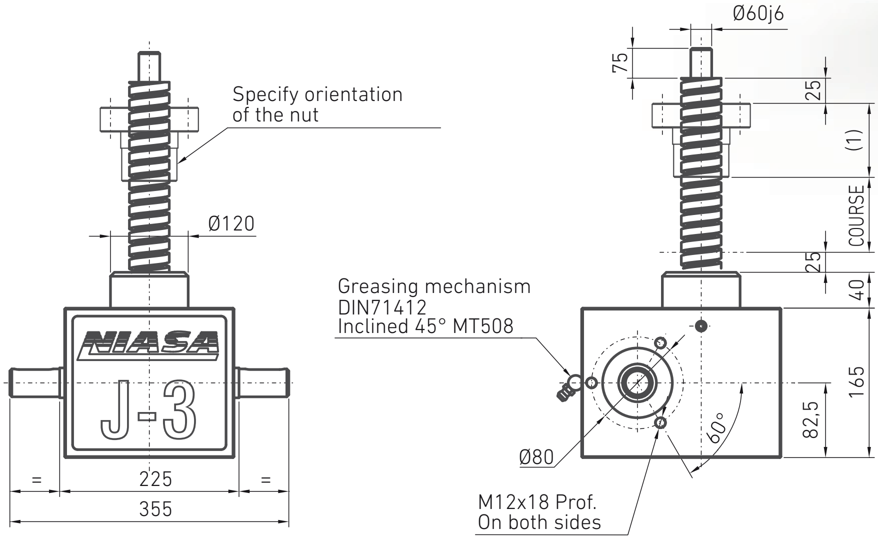
UP TO 250 kN

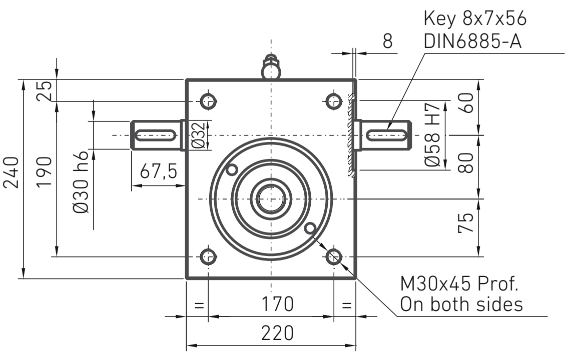
Tr TRAPEZ. KGS BALLS

The screw sizes indicated correspond to the basic configurations. Other configurations may be ordered (size, type, etc.) on request.



R

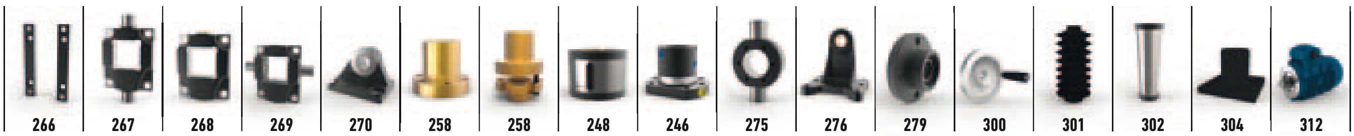




NOTES:
- (1) See nut dimensions in the corresponding chapter.

Screw diameter and pitch (mm)	Maximum axial strength (kN)	Reduction		Travel (mm/revol. input)		Performance (%)		Drive torque, M_D (Nm)		Start-up torque, M_0 (Nm)		Weight stroke 0 (kg)	Approx. weight each 100mm of stroke (kg)
								F (kN), load to move in dynamic					
		S	H	S	H	S	H	S	H	S	H		
Tr 80x10	250	10:1	40:1	1	0.25	24	21	(0.65xF)+2.6	(0.19xF)+1.9	0.94xF	0.33xF	57	6.13
KGS 8010	78	10:1	40:1	1	0.25	81	69	(0.2xF)+2.6	(0.06xF)+1.9	0.22xF	0.08xF	63	6.13

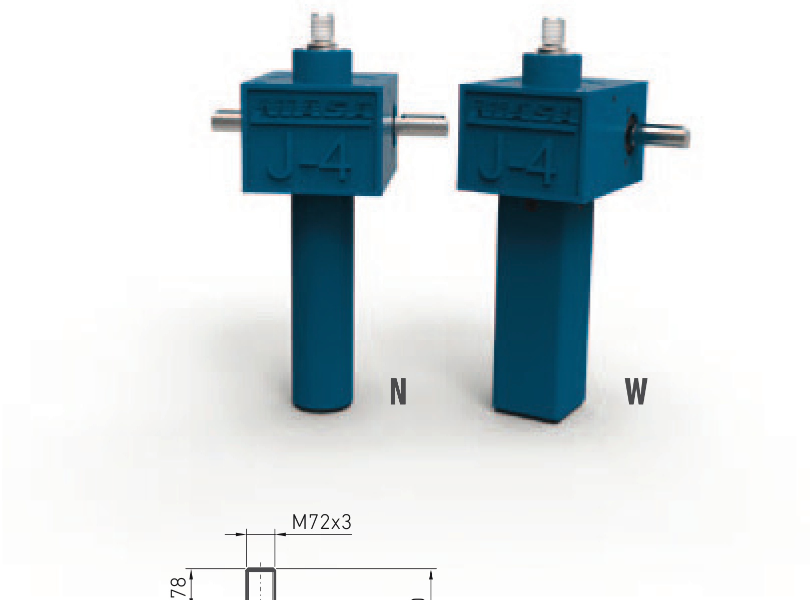
... Power required: P_D (kW) = 0.157x M_D (Nm).
... All the data in the table correspond to an input speed of 1,500 rpm. For other speeds, please see the calculation chapter (page 47).
... Ensure that the dynamic load of the application does not surpass the critical values indicated, in order to avoid overheating of the unit and buckling and resonance of the screw. See calculations chapter (page 48).

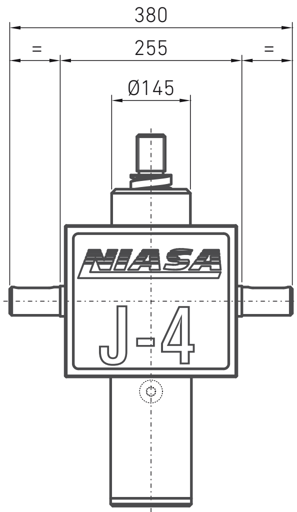


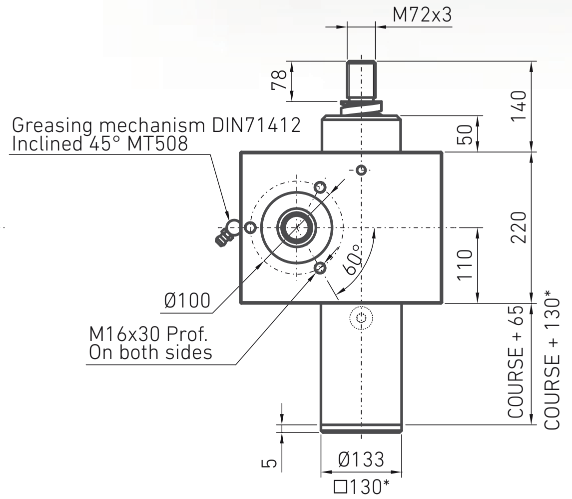
J4-N/W SCREW JACKS

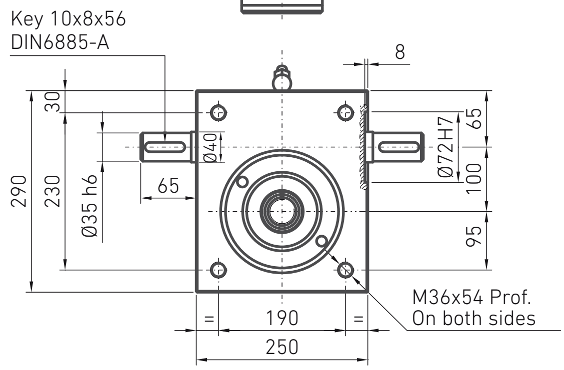
UP TO 350 kN Tr TRAPEZ. KGS BALLS

The screw sizes indicated correspond to the basic configurations. Other configurations may be ordered (size, type, etc.) on request. Consult versions with ball screw.









NOTES:

* Version W.

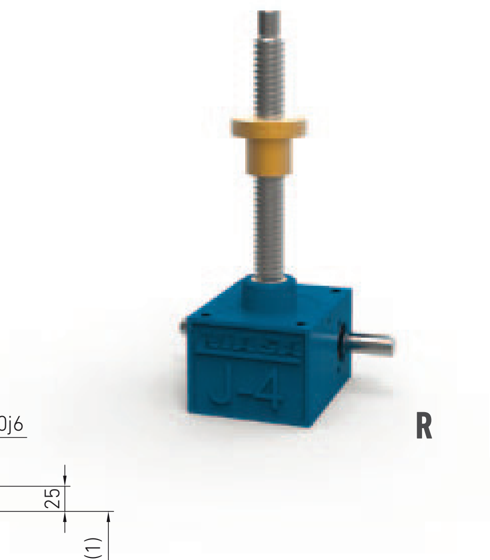
Screw diameter and pitch (mm)	Maximum axial strength (kN)	Reduction		Travel (mm/ revol. input)		Performance (%)		Drive torque, M_D (Nm)		Start-up torque, M_0 (Nm)		Weight stroke 0 (kg)	Approx. weight each 100mm of stroke (kg)
								F (kN), load to move in dynamic					
		S	H	S	H	S	H	S	H	S	H		
Tr 100x10	350	10:1	40:1	1	0.25	21	18	(0.77xF)+3.2	(0.22xF)+2.2	1.22xF	0.4xF	85	9.8

... Power required: P_D (kW) = 0.157x M_D (Nm).
... All the data in the table correspond to an input speed of 1,000 rpm. For other speeds, please see the calculation chapter (page 47).
... Ensure that the dynamic load of the application does not surpass the critical values indicated, in order to avoid overheating of the unit and buckling and resonance of the screw. See calculations chapter (page 48).

J4-R SCREW JACKS

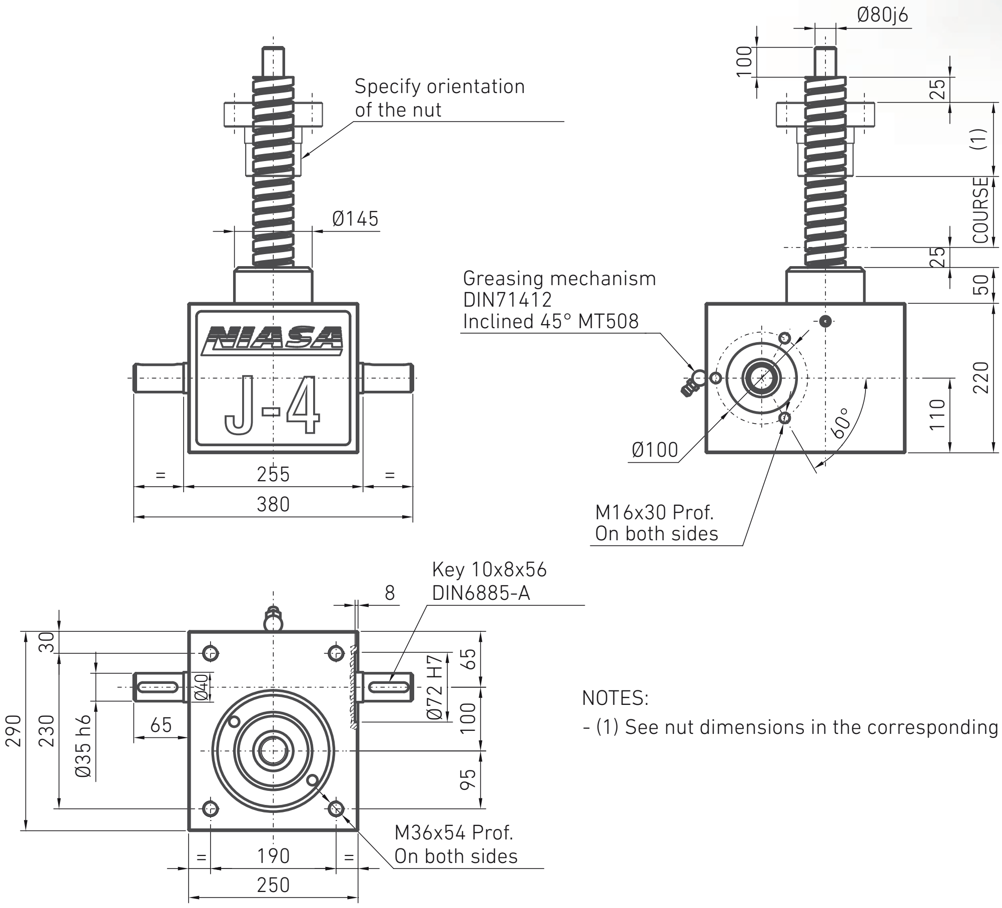
UP TO 350 kN

Tr TRAPEZ. KGS BALLS



R

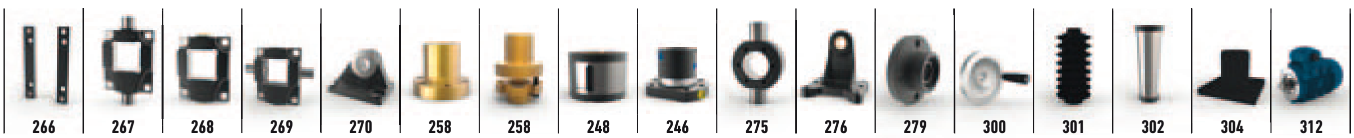
The screw sizes indicated correspond to the basic configurations. Other configurations may be ordered (size, type, etc.) on request. Consult versions with ball screw.



NOTES:
- (1) See nut dimensions in the corresponding chapter.

Screw diameter and pitch (mm)	Maximum axial strength (kN)	Reduction		Travel (mm/revol. input)		Performance (%)		Drive torque, M_D (Nm)		Start-up torque, M_0 (Nm)		Weight stroke 0 (kg)	Approx. weight each 100mm of stroke (kg)
								F (kN), load to move in dynamic					
		S	H	S	H	S	H	S	H	S	H		
Tr 100x10	350	10:1	40:1	1	0.25	21	18	(0.77xF)+3.2	(0.22xF)+2.2	1.22xF	0.4xF	85	7.9

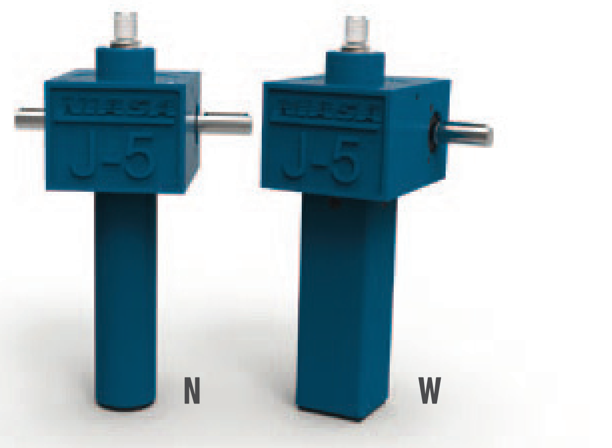
... Power required: P_D (kW) = 0.157x M_D (Nm).
... All the data in the table correspond to an input speed of 1,000 rpm. For other speeds, please see the calculation chapter (page 47).
... Ensure that the dynamic load of the application does not surpass the critical values indicated, in order to avoid overheating of the unit and buckling and resonance of the screw. See calculations chapter (page 48).



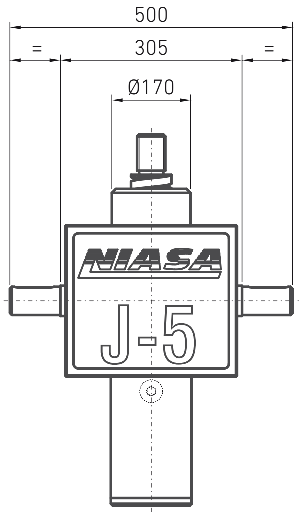
J5-N/W SCREW JACKS

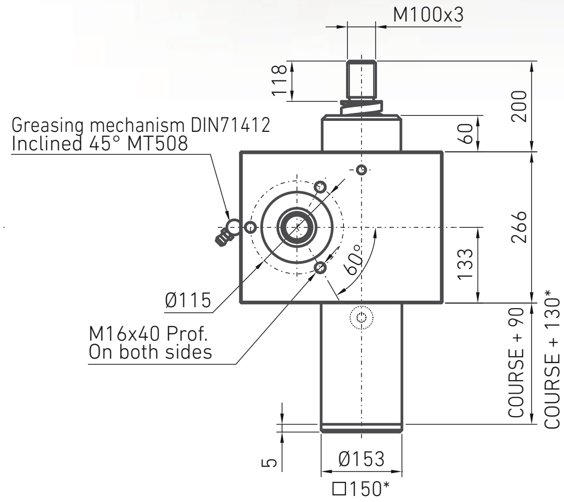
UP TO 500 kN

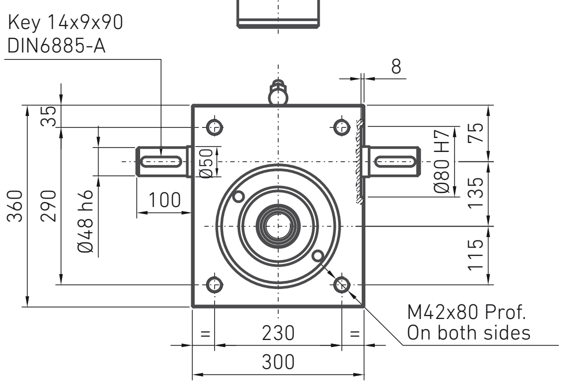
Tr TRAPEZ. KGS BALLS



The screw sizes indicated correspond to the basic configurations. Other configurations may be ordered (size, type, etc.) on request. Consult versions with ball screw.







NOTES:

* Version W.

Screw diameter and pitch (mm)	Maximum axial strength (kN)	Reduction		Travel (mm/revol. input)		Performance (%)		Drive torque, M_D (Nm)		Start-up torque, M_0 (Nm)		Weight stroke 0 (kg)	Approx. weight each 100mm of stroke (kg)
								F (kN), load to move in dynamic					
		S	H	S	H	S	H	S	H	S	H		
Tr 120x14	500	14:1	56:1	1	0.25	24	20	(0.67xF)+4	(0.2xF)+2.9	0.99xF	0.4xF	160	13.8

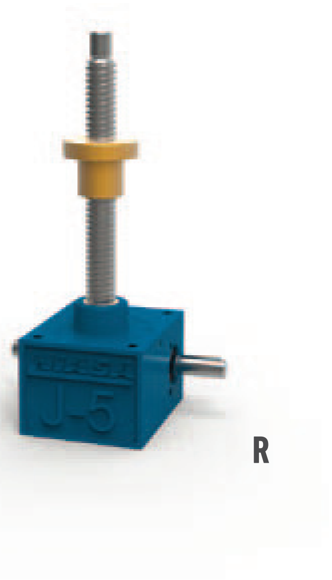
... Power required: P_D (kW) = 0.157x M_D (Nm).
... All the data in the table correspond to an input speed of 1,000 rpm. For other speeds, please see the calculation chapter (page 47).
... Ensure that the dynamic load of the application does not surpass the critical values indicated, in order to avoid overheating of the unit and buckling and resonance of the screw. See calculations chapter (page 48).

J5-R SCREW JACKS

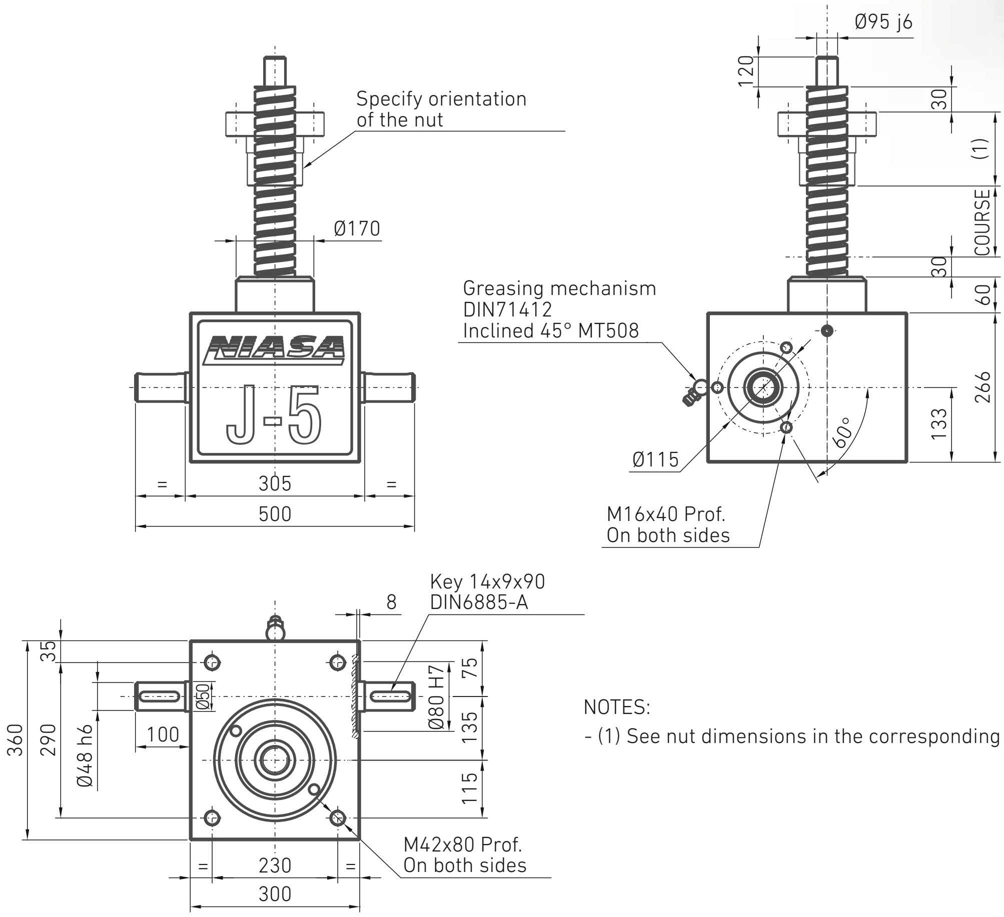
UP TO 500 kN

Tr TRAPEZ. KGS BALLS

The screw sizes indicated correspond to the basic configurations. Other configurations may be ordered (size, type, etc.) on request. Consult versions with ball screw.



R

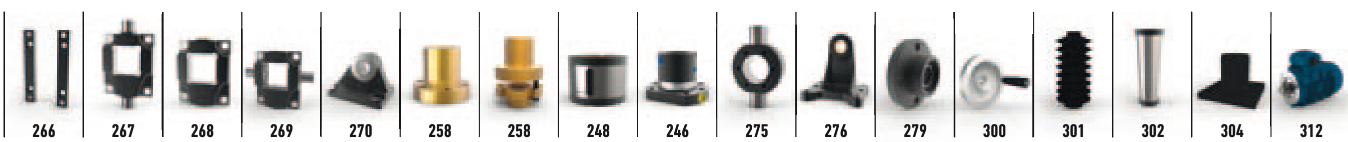


NOTES:

- (1) See nut dimensions in the corresponding chapter.

Screw diameter and pitch (mm)	Maximum axial strength (kN)	Reduction		Travel (mm/revol. input)		Performance (%)		Drive torque, M_D (Nm)		Start-up torque, M_0 (Nm)		Weight stroke 0 (kg)	Approx. weight each 100mm of stroke (kg)
								F (kN), load to move in dynamic					
		S	H	S	H	S	H	S	H	S	H		
Tr 120x14	500	14:1	56:1	1	0.25	24	20	(0.67xF)+4	(0.2xF)+2.9	0.99xF	0.4xF	160	11.5

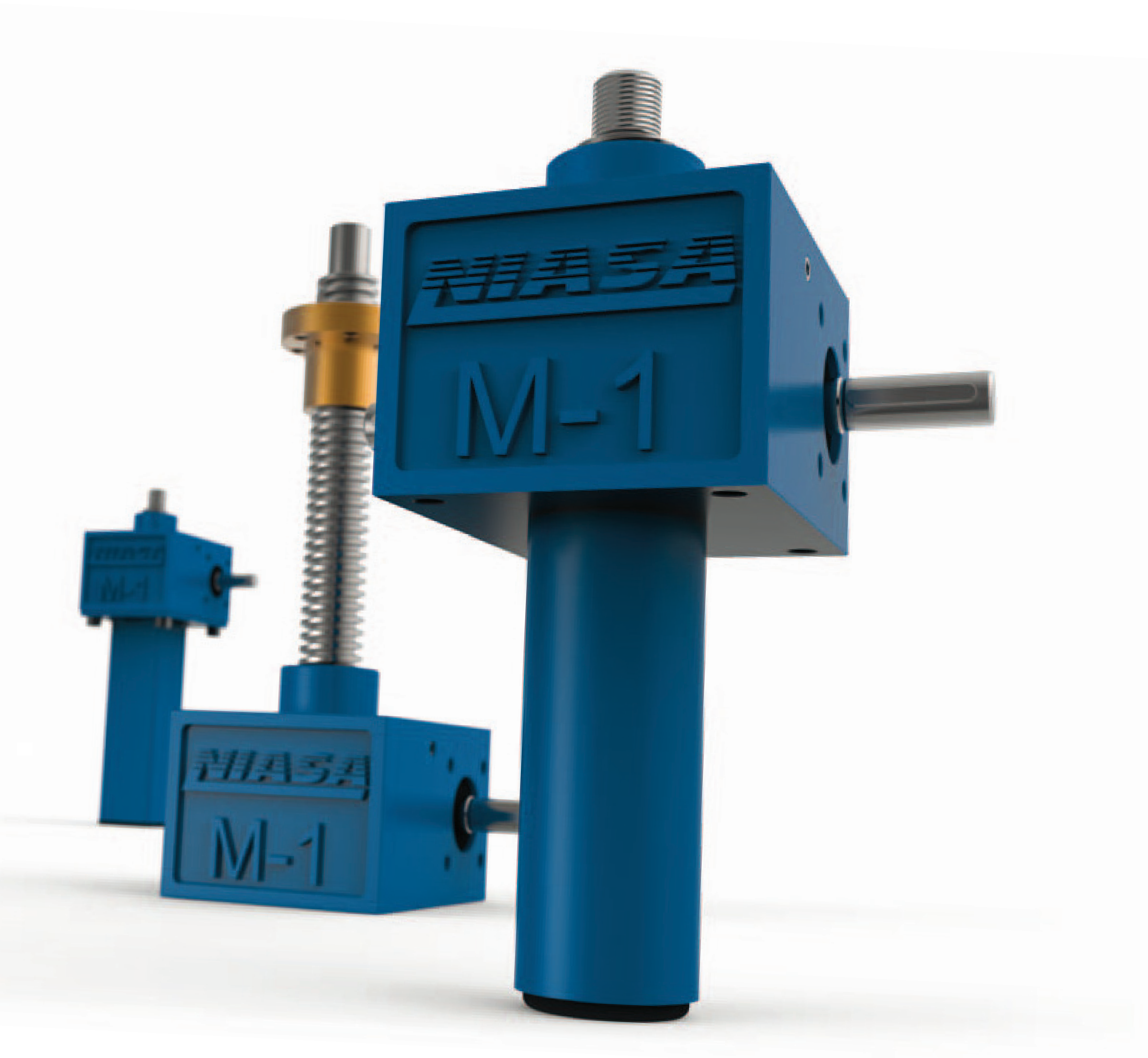
... Power required: P_D (kW) = 0.157x M_D (Nm).
... All the data in the table correspond to an input speed of 1,000 rpm. For other speeds, please see the calculation chapter (page 47).
... Ensure that the dynamic load of the application does not surpass the critical values indicated, in order to avoid overheating of the unit and buckling and resonance of the screw. See calculations chapter (page 48).

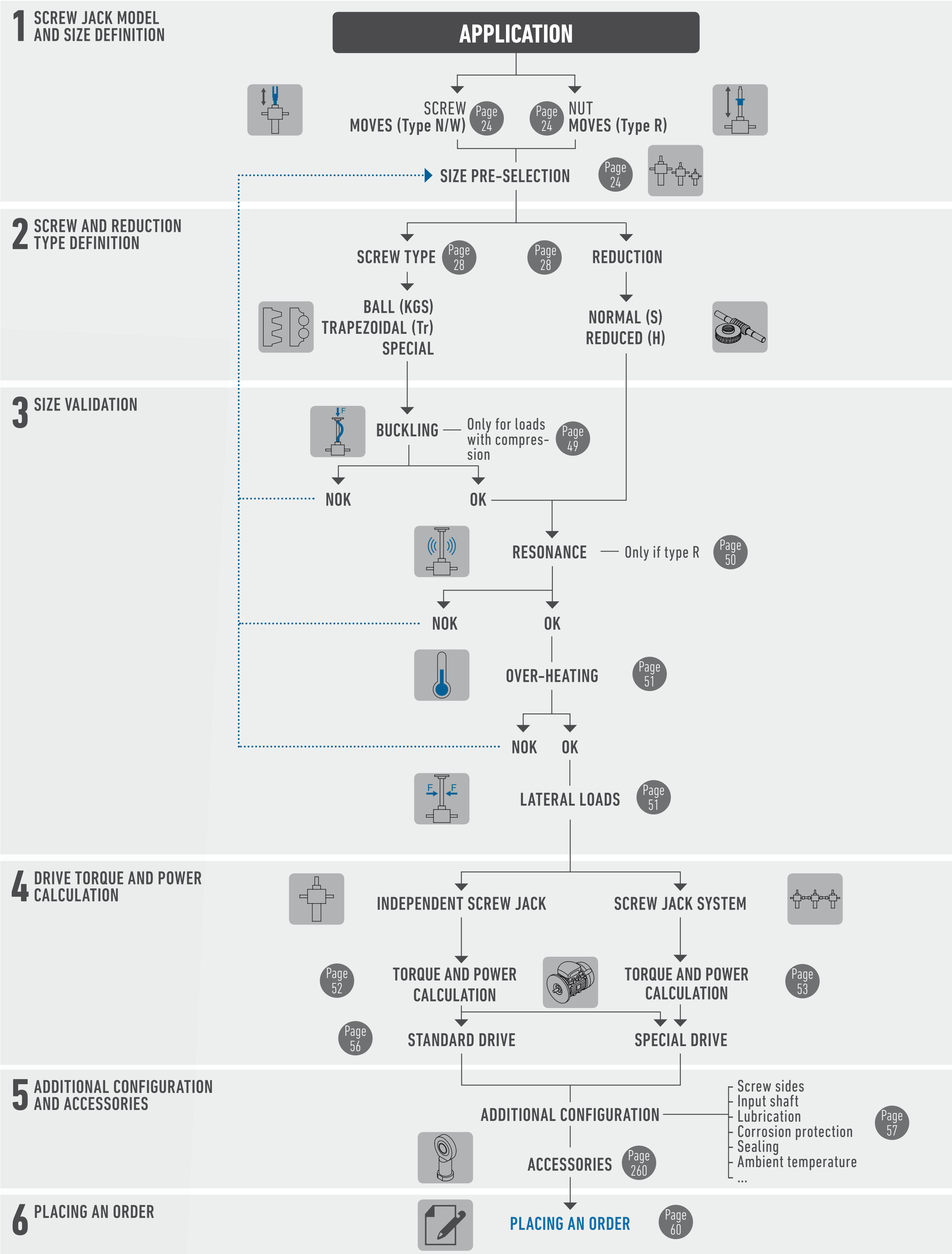


SCREW JACKS
PRODUCT SELECTION

To select the correct screw jack, please follow this flow diagram.

If you would like to know the expected service life of a unit for your application, please send the relevant data to the NIASA service department.

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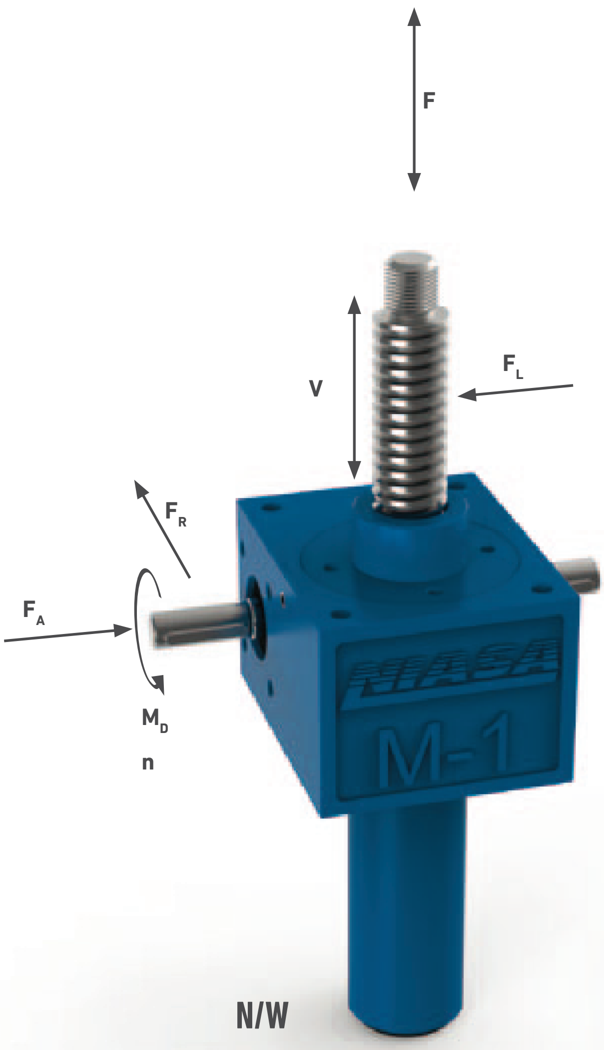
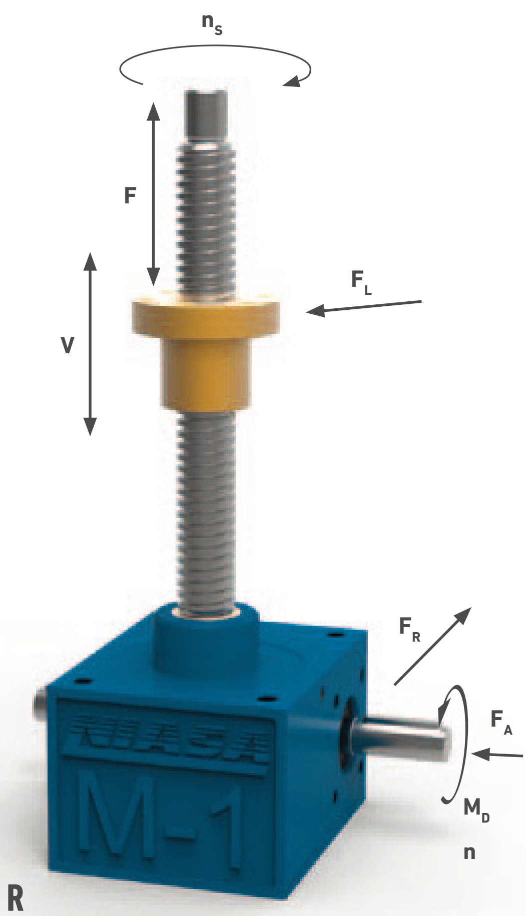
FORCE AND TORQUE ACTING ON A SCREW JACK

F Load to move at traction and/or compression.
F_L Lateral load on the screw.
V Travel speed of the screw or the nut.
F_A Axial load on the input shaft.
F_R Radial load on the input shaft.
M_D Torque on the input shaft.
n Speed on the input shaft.
n_S Screw turning speed.





SCREW JACKS

PRODUCT SELECTION

CRITICAL COMPRESSION BUCKLING LOAD OF A SCREW JACK

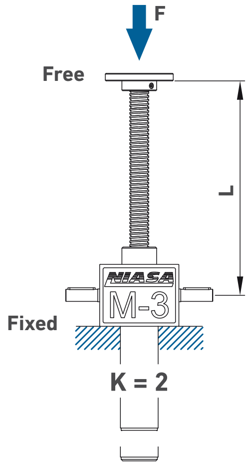
When there are compression loads on the screw, it may fail due to buckling, before reaching its static load capacity.

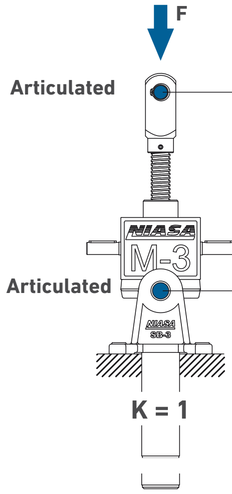
If the critical compression buckling load calculated is lower than the actual compression buckling load applied, a screw jack with a larger diameter screw must be selected and its suitability checked.

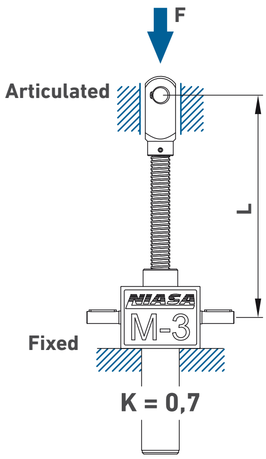
Check it using the following steps:

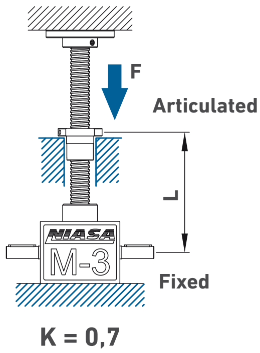
1. COMPRESSION BUCKLING LENGTH AND CORRECTOR FACTOR

Select the length L (mm) and the factor K, to be considered in the buckling critical load calculation. Do this based on the type of support on the sides of the screw jack, according to the figures shown on the right.









2. BUCKLING CRITICAL LOAD

$$F_{crit}\,(kN) = 33{,}91 \times \frac{d^4}{(K \times L)^2}$$

d Screw core diameter (mm).
L Buckling length (mm).
K Length corrector factor.

IMPORTANT

... In general, the load applied on the screw jack, including possible impacts, must not surpass the calculated value.

... The safety factor considered is 3; reconsider this if so considered opportune for the specific application. As a recommendation, when a hypothetical screw jack failure may involve injuries to people, multiply the critical load calculated by an additional factor of 0.6 (final safety factor, 5).

d - Screw core diameter (mm).

Trapezoidal screw (Tr)								
18x4	20x4	30x6	40x7	55x9	60x9	80x10	100x10	120x14
13	14.5	22.3	31.2	44	49	67.9	87.9	103.5

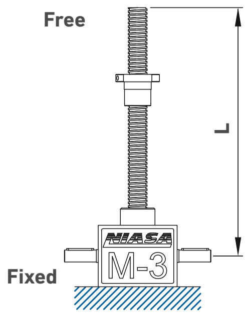
Ball screw (KGS)						
1605	2005	2505	4005	4010	5010	8010
12.9	16.9	21.9	36.9	34.1	44.1	74.1

CRITICAL RESONANCE SPEED OF A SCREW JACK

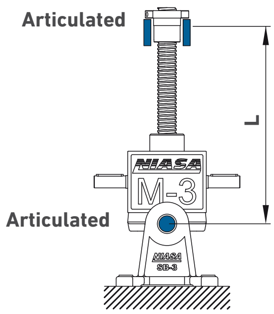
Applicable to the R version (the screw rotates and the nut moves).

With reduced diameter and long length screws, there is a risk of having considerable vibration on turning if this occurs at speeds close to the first vibration frequency (the second and highest correspond to very high speeds, at which the screws never work). In the worst cases, the screw may break and, additionally, the risk of collapse due to side buckling considerably increases.

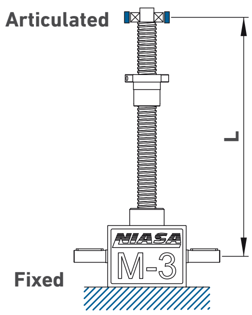
For these reasons, be sure that the screw jack screw works at considerably lower rotation speeds than resonance speeds. If not, select a screw of a larger diameter and/or reduce its turning speed and/or modify the screw jack end supports.



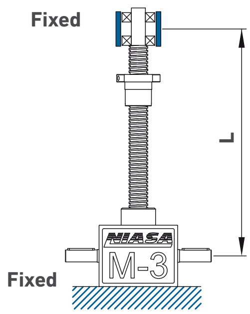
M = 0,34



M = 0,97



M = 1,51



M = 2,19

1. LENGTH, RESONANCE AND CORRECTOR FACTOR

Select the length L and the correction factor M to consider. Do this based on the types of supports on the sides of the screw jack, according to the figures shown on the right.

2. MAXIMUM ADMISSIBLE SPEED

$$n_{adm}\,(\text{rpm}) = M \times \frac{d}{L^2} \times 10^8$$

d Screw core diameter (mm).
L Length between supports (mm).
M Corrector factor according to supports.

IMPORTANT

... The safety factor considered is 1.25 (maximum admissible speed = 80% of the critical resonance speed).

d - Screw core diameter (mm)

Trapezoidal screw (Tr)								
18x4	20x4	30x6	40x7	55x9	60x9	80x10	100x10	120x14
13	14.5	22.3	31.2	44	49	67.9	87.9	103.5

Ball screw (KGS)						
1605	2005	2505	4005	4010	5010	8010
12.9	16.9	21.9	36.9	34.1	44.1	74.1

OVERHEATING OF A SCREW JACK

With the aim of avoiding overheating due to internal friction of the screw jacks, the axial strength and the advance speed must be controlled. To do this, check the unit selected with the following formula.

If it does not comply, choose a larger screw jack and/or reduce the load and/or reduce the speed.

For very small strokes, please contact the NIASA technical department.

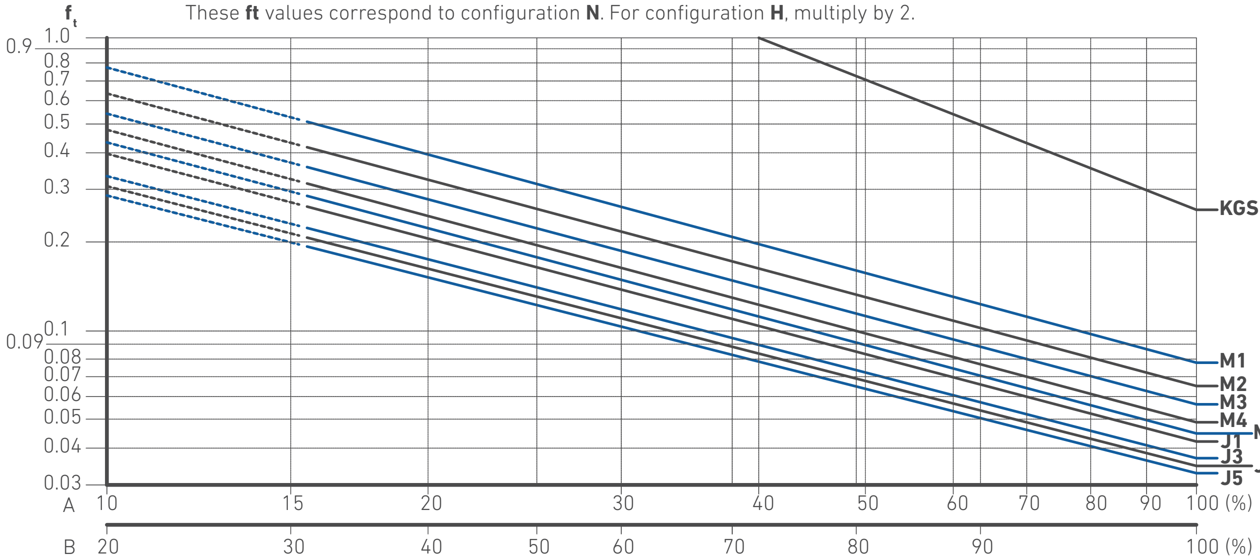
$$F \times V \leq F_{max} \times V_{max} \times f_t$$

F Axial strength on the screw (kN).
V Advance speed of the screw (mm/min).
$\mathbf{F_{max}}$ Axial load capacity of the screw jack (kN).
$\mathbf{f_t}$ Temperature factor, according to the diagram.

$\mathbf{V_{max}}$ $V_{max}\left(\frac{mm}{min}\right) = 1.500 \left(\frac{1}{min}\right) \times \text{advance} \left(\frac{mm}{rev}\right)$

For input speeds over 1,500 rpm, please contact the NIASA technical department.

These **ft** values correspond to configuration **N**. For configuration **H**, multiply by 2.



A: Table for 60 minute intervals at 20ºC.
B: Table for 10 minute intervals at 20ºC.

LATERAL LOAD OF A SCREW JACK

NIASA recommends that, if they exist, the lateral loads on the screw must be supported by guide systems designed for this purpose, in addition to the guide for the gearbox, so that the screw or the nut exclusively support axial traction/compression loads.

If there are side loads, the life of the screw jack will be notably reduced, as there will be premature wear of the screw and the nut, which is often the origin of faults.

IMPORTANT

... If it is essential that the screw jack is subject to lateral loads, please contact the NIASA design department for correct design of the unit.

... This includes the horizontal mountings, on which the screw can flex when subject to the action of its own weight.

DRIVE TORQUE AND POWER OF AN INDEPENDENT SCREW JACK

After pre-selecting the suitable screw jack for the application, select the drive motor, following the steps below.

1. DRIVE TORQUE

$$M_D\,(Nm) = \frac{F \times P}{2 \times \pi \times \eta_{DG} \times \eta_{DS} \times i} + M_I$$

F Load to elevate in dynamic (kN)
P Screw pitch (mm)
M_I Idle torque (Nm)
i Screw jack gearbox
η_{DG} Gearbox dynamic efficiency
η_{DS} Screw dynamic efficiency

2. POWER REQUIRED

$$P_D\,(kW) = \frac{M_D \times n}{9550}$$

M_D Drive torque (Nm)
n Screw jack input speed (rpm)

IMPORTANT

... In general, it is advisable to multiply the power value calculated for a safety coefficient of 1.3 to 1.5; or for small installations, a factor of 2.

... When the load to move is lower than 10% of the elevator's nominal load, consider that value for the previous calculations.

3. START-UP TORQUE

For loads between 25% and 100% of the screw jack's nominal value, calculate the start-up torque with this formula:

$$M_D\,(Nm) = \frac{F \times P}{2 \times \pi \times \eta_{SA} \times i}$$

η_{SA} Screw jack static efficiency (gearbox + screw)

IMPORTANT

... For loads under 25% of the screw jack's nominal value, select the start-up torque by multiplying the drive torque by 2.

η_{DG} Gearbox dynamic efficiency

rpm input	S version (normal speed)								
	M1	M2	M3	M4	M5	J1	J3	J4	J5
3,000	0.91	0.9	0.92	Non-standard					
1,500	0.88	0.89	0.9	0.9	0.9	0.9	0.9	Non-standard	
1,000	0.87	0.88	0.88	0.88	0.87	0.89	0.89	0.9	0.91
750	0.85	0.87	0.87	0.87	0.86	0.88	0.89	0.9	0.91
500	0.84	0.85	0.85	0.85	0.84	0.87	0.88	0.89	0.9
100	0.79	0.79	0.79	0.79	0.78	0.81	0.84	0.85	0.88

rpm input	H version (reduced speed)								
	M1	M2	M3	M4	M5	J1	J3	J4	J5
3,000	0.75	0.77	0.76	Non-standard					
1,500	0.69	0.71	0.71	0.74	0.72	0.68	0.77	Non-standard	
1,000	0.67	0.69	0.68	0.69	0.67	0.67	0.76	0.77	0.75
750	0.64	0.66	0.67	0.68	0.65	0.65	0.75	0.77	0.74
500	0.61	0.64	0.63	0.64	0.62	0.64	0.74	0.76	0.72
100	0.54	0.56	0.54	0.55	0.53	0.55	0.66	0.69	0.62

η_{DS} Screw dynamic efficiency

Trapezoidal screw (Tr)								
18x4	20x4	30x6	40x7	55x9	60x9	80x10	100x10	120x14
0.41	0.38	0.38	0.35	0.33	0.31	0.27	0.23	0.26

Ball screw (KGS)
0.9 (for all sizes)

M_I Idle Torque

S version (normal speed)								
M1	M2	M3	M4	M5	J1	J3	J4	J5
0.08	0.22	0.3	0.7	1.68	1.8	2.6	3.2	4

H version (reduced speed)								
M1	M2	M3	M4	M5	J1	J3	J4	J5
0.06	0.14	0.24	0.5	1.02	1.15	1.9	2.2	2.9

η_{SA} Screw jack static efficiency

	S version (normal speed)								
	M1	M2	M3	M4	M5	J1	J3	J4	J5
Trapez.	0.24	0.22	0.22	0.19	0.18	0.18	0.17	0.13	0.16
Balls	0.63	0.63	0.63	0.62	0.61	0.65	0.71	0.68	0.7

	H version (reduced speed)								
	M1	M2	M3	M4	M5	J1	J3	J4	J5
Trapez.	0.15	0.14	0.13	0.12	0.11	0.11	0.12	0.1	0.1
Balls	0.39	0.41	0.39	0.39	0.36	0.4	0.5	0.51	0.44

IMPORTANT

... The values indicated in the tables correspond to the lubrication conditions established by NIASA, for gearbox and screw, and will be reached after a small period of operation.

... In the case of low temperatures, these can be reduced considerably.

SCREW JACKS
PRODUCT SELECTION

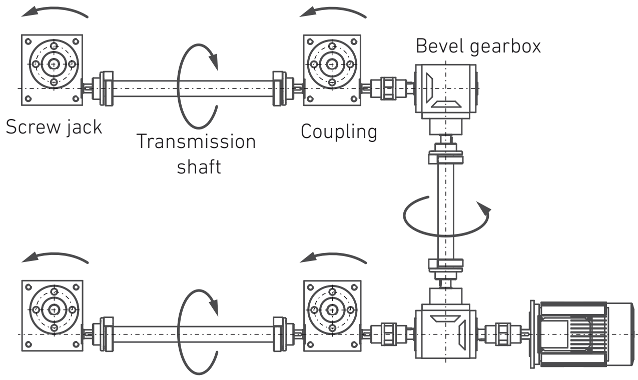
PLANNING INSTALLATIONS WITH SCREW JACKS

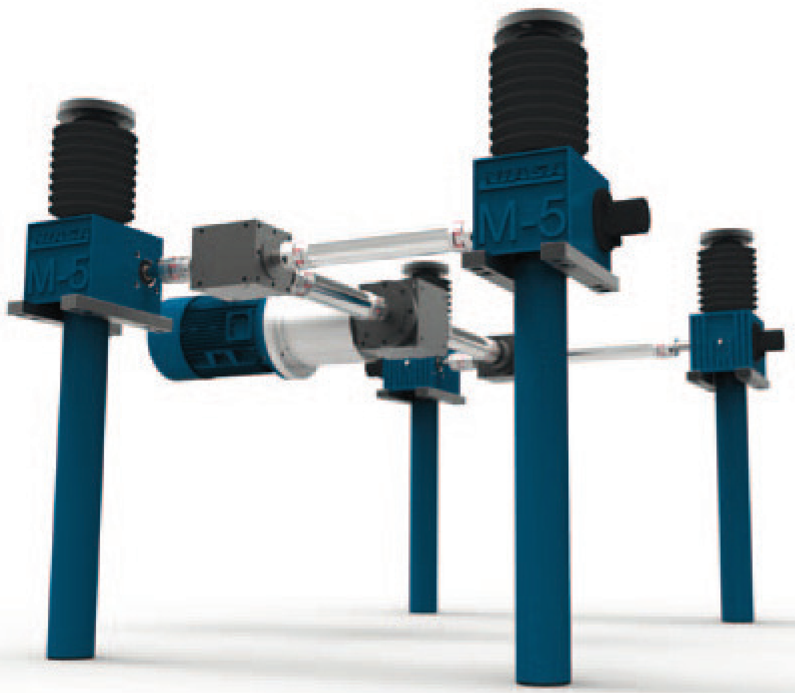
For the application of screw jacks in installations with several units, the following criteria must be taken into account:

1. Define the number, position and orientation of the screw jacks.
2. Select the drag components (couplings, transmission shafts, supports, bevel gearboxes, motors, etc.) taking the following recommendations into account:
   ... Ensure that the total load is distributed uniformly between all the installation's screw jacks.
   ... The lowest possible number of transmission parts is recommended.
   ... The transmission shafts should be as short as possible.
   ... Try to protect the overall installation with a safety torque limiter.
3. If during the design of the installation a problem arises in defining the turning sense of the different elements, it is advised to apply the following method:
   ... Indicate the orientation of the screw jack elements.
   ... Mark the screw turning sense on each screw jack to "lift".
   ... Show the position of the bevel gearboxes and the transmission shafts in a diagram.

Example:

Elevation system with four screw jacks and two bevel gearboxes.





DRIVE TORQUE OF A SCREW JACK SYSTEM

The drive torque of a system made up of several screw jacks connected to each other depends on the torque required for the individual drive of each one and the efficiency of the transmission parts that connect them.

To help the calculation, some frequent arrangements are shown for those for which the system's drive torque can be calculated approximately using the formula below.

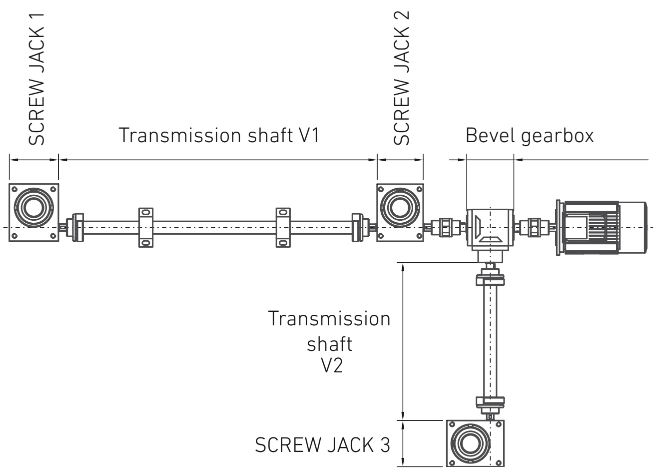
It is assumed that the load distribution is uniform between all the units and that they are all the same size.

$$M_{DS}\,(Nm) = M_D \times f_S$$

M_D Independent screw jack drive torque

f_S Factor, depending on system (see figures next page)

Example:



1. SYSTEM DRIVE TORQUE

$$M_{DS}\,(Nm) = \frac{M_{D1}}{\eta_{V1}} + M_{D2} + \left(\frac{M_{D3}}{\eta_{V2}} \times \frac{1}{\eta_k}\right)$$

$M_{D1}/M_{D2}/M_{D3}$	Screw jack drive torque 1 / 2 / 3 (Nm)
η_{V1}/η_{V2}	Gearbox efficiency V1 / V2 (0.90-0.95 approx.)
η_K	Distribution gearbox efficiency (0.90 approx.)

IMPORTANT

... In general, it is advisable to multiply the value calculated for a safety coefficient of 1.3 to 1.5; or for small installations, a factor of 2.

... When the load to move is lower than 10% of the elevator's nominal load, consider that value for the previous calculations.

2. SYSTEM START-UP TORQUE

For loads by screw jack between 25% and 100% of the screw jack's nominal value, calculate the start-up torque with this formula:

$$M_{DS}\,(Nm) = \frac{M_{DS}}{\eta_{SJ}}$$

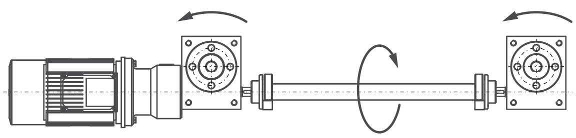
M_{DS} System drive torque (Nm)

η_{SJ} Elevator static efficiency

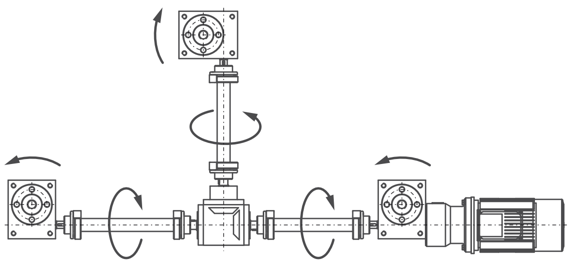
IMPORTANT

... For loads by elevator lower than 25% of its nominal value, multiply the system drive torque by 2.

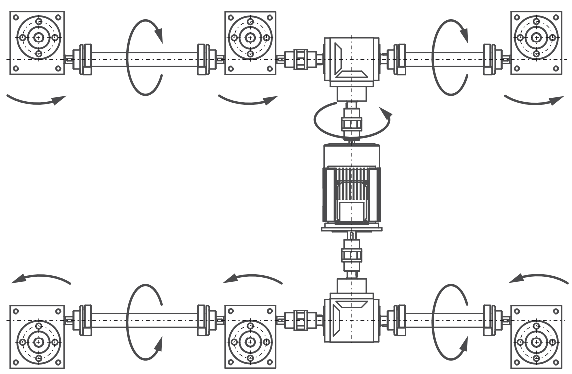
f_S = 2.1



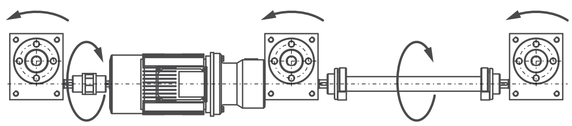
f_S = 3.34



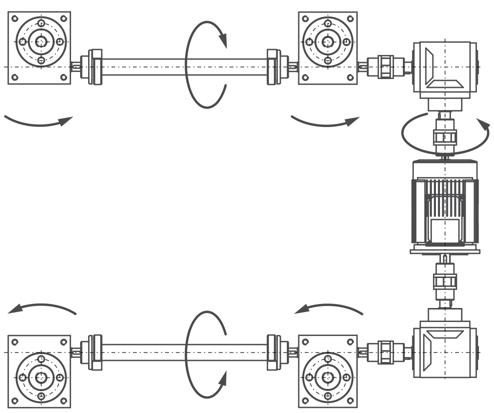
f_S = 6.8



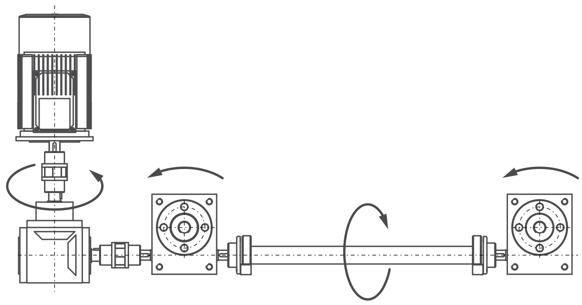
f_S = 3.1



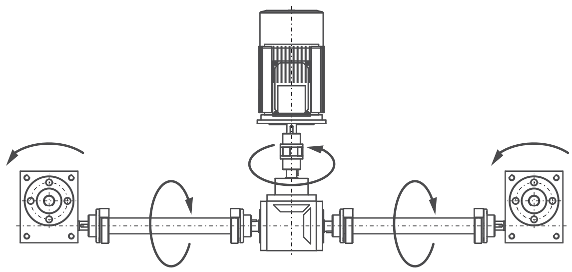
f_S = 4.4



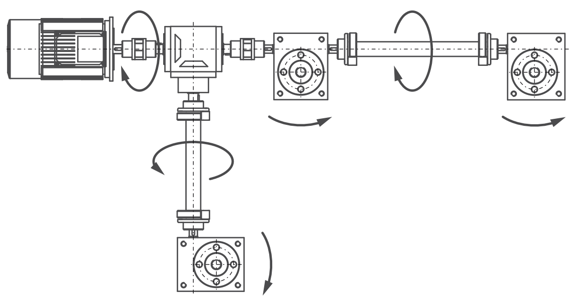
f_S = 2.25



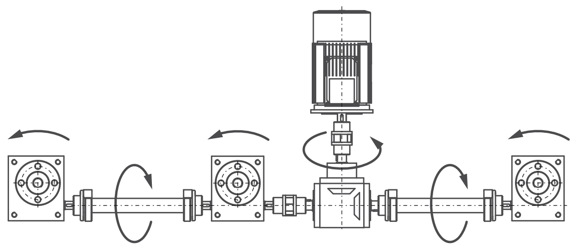
f_S = 2.25



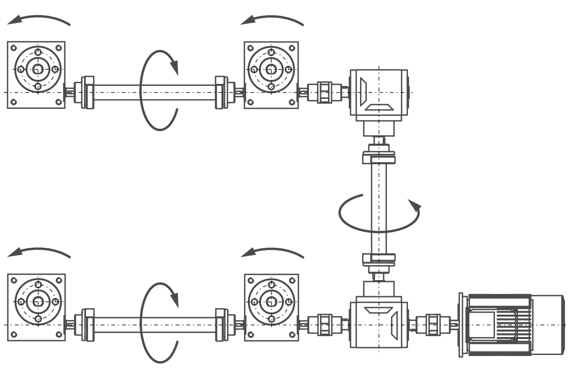
f_S = 3.27



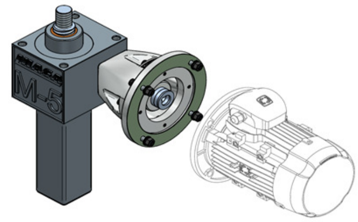
f_S = 3.35



f_S = 4.6



ACCESORIES



MOTOR BELL SMB

The standard drive of Screw jacks is made using asynchronous AC motors. The following table shows the available motor flanges (IEC type and size) for each screw jack size. For other types/sizes of motors, please contact NIASA. We can supply adapters for any kind of electrical motor (AC single phase, AC with integrated inverter, DC, BLDC, stepper, …).

> Ensure motor is not overdimensioned for the selected screw jack size. It may cause damage, or even breakage, of it. For powers higher than the indicated ones in the next table, contact NIASA.

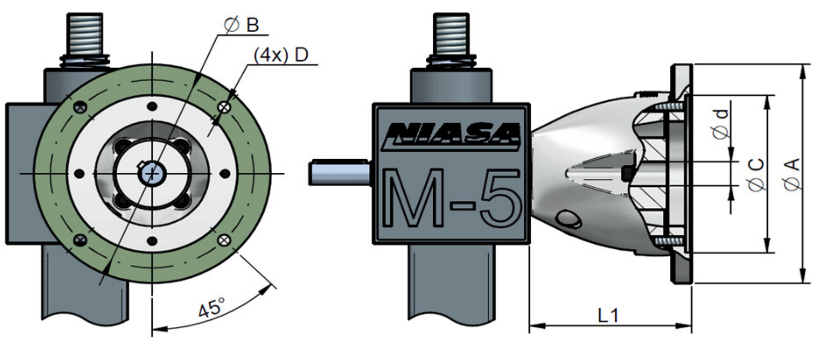
DIMENSIONS AND WEIGHTS

Screw jack size	Motor flange (IEC type & size)	Power (kW) Option A	Power (kW) Option B	Bell [1] ØA (mm)	ØB (mm)	ØC (mm)	D (mm)	Ød [2] (mm)	L_1 (mm)	Weight (kg)
M1	56 B5	0,06	0,09	120	100	80	Ø6,5	9	61	0,7
	63 B14B	0,12	0,18	120	100	80	Ø6,5	11	61	0,7
	71 B14B	0,25	0,37	140	115	95	Ø9	14	68	1
M2	63 B5	0,12	0,18	140	115	95	Ø9	11	76	1,1
	71 B14B	0,25	0,37	140	115	95	Ø9	14	76	1,1
	80 B14B	0,55	0,75	160	130	110	Ø9	19	84	1,4
M3	71 B5	0,25	0,37	160	130	110	Ø9	14	103	1,8
	80 B14B	0,55	0,75	160	130	110	Ø9	19	103	1,8
	90 B14B	1,1	1,5	160	130	110	Ø9	24	123	2,4
	100 B14A	2,2	3	160	130	110	Ø9	28	123	2,4
M4	71 B5	0,25	0,37	160	130	110	M8	14	128	2,7
	80 B5	0,55	0,75	200	165	130	Ø11	19	128	3,2
	90 B5	1,1	1,5	200	165	130	Ø11	24	128	3,7
	100 B14B	2,2	3	200	165	130	Ø11	28	128	3,7
	112 B14B	4		200	165	130	Ø11	28	128	3,5
M5	80 B5	0,55	0,75	200	165	130	M10	19	173	6,3
	90 B5	1,1	1,5	200	165	130	M10	24	173	6,3
	100 B5	2,2	3	250	215	180	Ø13,5	28	171	7,4
	112 B5	4		250	215	180	Ø13,5	28	171	7,4
	132 B14B	5,5	7,5	250	215	180	Ø13,5	38	171	7,4
J1	90 B5	1,1	1,5	200	165	130	M10	24	173	6,3
	100 B5	2,2	3	250	215	180	Ø13,5	28	171	7,5
	112 B5	4		250	215	180	Ø13,5	28	171	7,5
	132 B14B	5,5	7,5	250	215	180	Ø13,5	38	171	7,5
	160 B14A	11	15	250	215	180	Ø13,5	42	201	9,6
J3	90 B5	1,1	1,5	200	165	130	M10	24	194	7,4
	100 B5	2,2	3	250	215	180	Ø13,5	28	203	9,1
	112 B5	4		250	215	180	Ø13,5	28	203	9,1
	132 B14B	5,5	7,5	250	215	180	Ø13,5	38	203	9,1
	160 B14A	11	15	250	215	180	Ø13,5	42	203	10,3
	180 B5	18,5	22	350	300	250	Ø17,5	48	203	13,5

SMB - M3 - 71 B5 - IN

- **M3**: Screw jack size
- **71 B5**: Motor flange
- **IN**: Application
  - **IN** Indoor
  - **OU** Outdoor
  - **SP** Special category to ISO 12944

[1] It includes coupling and fasteners to fix motor
[2] Coupling key way according to DIN 6885



MATERIALS AND SURFACE TREATMENTS

	Indoor applications [1]	Outdoor applications [2]
Bell (aluminium):	Anodizing (8~12 πm)	Anodizing (15~20 πm)
Fastenings:	Black oxide coating	Stainless steel

[1] Approx. C2-Medium durability (ISO 12944).
[2] Approx. C3-Medium durability (ISO 12944).
Special coatings on request, until C5 (ISO 12944)

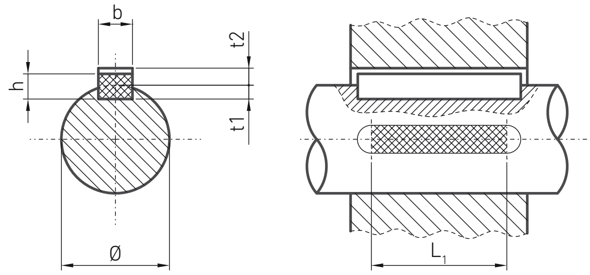
SCREW JACKS
PRODUCT SELECTION

MAXIMUM TRANSFERABLE TORQUE DEPENDING ON SHAFT/ PARALLEL COTTER PIN (DIN 6885)

The following table shows the maximum transferable torque for a shaft and its keys. It is considered that the shaft is subject exclusively to torsional forces.

IMPORTANT

... Never apply to the input shaft of a screw jack torques over those indicated for its shaft and keys (see plans in the sub-chapter “sizes”).



Shaft diameter Ø (mm)	Key dimensions			Maximum transferable torque, M_D (Nm) Key effective length, L_1 (mm)						
	b x h (mm)	t1 (mm)	t2 (mm)	10	16	20	28	40	50	70
8 – 10	3 x 3	1.8	1.4	5	9	12	-	-	-	-
10 – 12	4 x 4	2.5	1.8	9	13	17	-	-	-	-
12 – 17	5 x 5	3	2.3	15	24	30	42	-	-	-
17 – 22	6 x 6	3.5	2.8	25	40	50	70	100	-	-
22 – 30	8 x 7	4	3.3	39	63	78	109	157	195	-
30 – 38	10 x 8	5	3.3	50	82	102	143	204	255	357
38 – 44	12 x 8	5	3.3	62	98	123	173	247	308	432
44 – 50	14 x 9	5.5	3.8	82	132	164	230	330	412	575

Material: C45 (1.1191) according to EN 10083-1
Load type: Drive - Uniform /
Load - Light knocks
Assembly: tight
Cycles: >1,000,000
Safety factor: 1.5 - 2.5
IMPORTANT For other conditions, please contact the NIASA technical department

Screw jacks
LUBRICATION

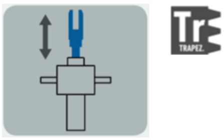
GEAR BOX LUBRICATION

When delivered the screw jacks gear boxes are ready to be operated. Complying with the next guidelines is essential to ensure that they will run properly along their life and will reach the expected one.

"W" GEAR BOX LUBRICATION

The bronze wheel of "W configuration - Trapezoidal screw" has several through radial holes, that allow the grease of the gear box to lubricate directly onto the screw thread when traveling across it. Thereby, the screw is greased too.

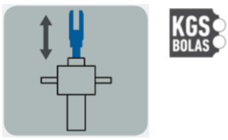
Because of this reason the gear box must be periodically re-filled with new grease. In general, at 25-50 service hours after the commisioning and then every 200-300



RE-GREASING [1]

> After commisioning: At 25-50 operation hours
> Periodically: Every 200-300 operation hours
(or 1 year, whichever comes first)

The ball screw of "W configuration gear box" does not take grease from it. In general, lubricating the gear box every 400-600 operation hours is enough.

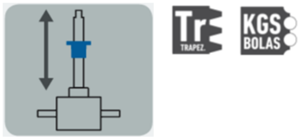


RE-GREASING [1]

> Every 400-600 operation hours
(or 2 years, whichever comes first)

"R" GEAR BOX LUBRICATION

The screw of "R configuration gear box" does not take grease from it. In general, lubricating the gear box every 400-600 operation hours is enough.



RE-GREASING [1]

> Every 400-600 operation hours
(or 2 years, whichever comes first)

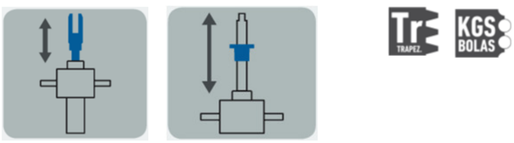
1)

These times must be varied, depending on the duty cycle, ambient temperature, speeds, loads, mounting position, etc. Begin with a high inspection frequency until knowing the real requirements for the application.

Avoid over-greasing the gear box. Pump grease only until it begins to get out through the sealing system between the gear box top cover and the screw. Excessive grease may cause an abnormal over-heating of the worm-gear.

CLEANING AND GREASE CHANGE

For both gear box configurations, "W" and "R", in general, every 800-1200 operation hours, we recommend an internal complete cleaning of it to remove old grease and re-lubricate with new one.



CLEANING AND GREASE CHANGE [1]

> Every 800-1200 operation hours
(or 5 years, whichever comes first)

1)

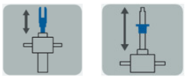
This time may vary, depending on the duty cycle, ambient temperature, speeds, loads, etc. Periodic grease analysis will determine if its change must be done sooner.

See our Instruction Manual (procedure, grease amount, etc) before carrying this operation out.

STANDARD GREASE

As standard, the screw jacks gear boxes are supplied with the following grease or an equivalent one. See on manufacturer Website for further information about it.

Zeller+Gmelin
Mineralöle · Druckfarben · Chemie



DIVINOL LITHOGREASE G421

High quality, semi-synthetic lithium complex soap grease

Colour / Appearance	yellow
Operating temperature range	-35°C - +160°C
NLGI-class / DIN 51 818	2
Base oil viscosity / 40°C / DIN 51 562	130 mm²/s
Dropping point / DIN ISO 2176	> 220 °C
Worked penetr. / 0,1 mm DIN ISO 2137	280-300
Water resistance / DIN 51807-1	Eval. level 1
Corrosion protec. (EMCOR-test) / DIN 51 802	0/0

Before using greases different to the previous one, ensure they have similar properties. Contact us in case of doubt.

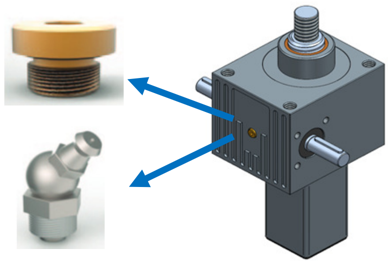
> Mix only compatible greases. Mixing non-compatible greases will lead to an ineffective lubrication, reducing the screw jack performances and could even damage the gear box.

GREASING POINTS

To re-grease the gear box, the screw jacks are supplied with a greasing plug of brass with O-ring (thread M 10∃1).

Optionally, it is replaced by a MT-506 / 45° / DIN 71412 grease nipple with a spring valve (max. pumping pressure 550 bars). It allows maintenance personnel to use a lubrication pump.

> The gear box greasing points must be always accesible while the screw jack is operating.



SPECIAL GREASES

For applications in extreme environmental conditions (very high or very low temperatures) or with special requirements (e.g. for food industry), let us know them and we will select the most suitable lubrication for the case.

HIGH PERFORMANCE GREASE

NEW

On request, we can offer you a new design of completely sealed gear boxes ("W" and "R" configurations). They incorporate a high performance fluid grease (see below its main data), with an excellent behaviour under demanding duty cycles. See on manufacturer Website for further information about it.

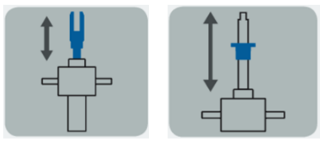
This innovative gear box desig does not require any re-greasing operation. It is advisable analizing the grease status every 800-1200 operation hours. Only if it showed degradation signs, remove the old grease and re-lubricate with new one, after an internal complete cleaning of the gear box.

Zeller+Gmelin
Mineralöle · Druckfarben · Chemie

DIVINOL LITHOGREASE 00

High grade, semi-synthetic lithium complex soap grease

Colour / Appearance	yellow
Operating temperature range	-30°C - +150°C
NLGI-class / DIN 51 818	00
Base oil viscosity /40°C / DIN 51 562	200 mm²/s
Dropping point / DIN ISO 2176	> 180 °C
Worked penetr. /0,1 mm DIN ISO 2137	415-430
Water resistance / DIN 51807-1	Eval. level 1
Corrosion protec. (EMCOR-test) / DIN 51 802	0/0



RE-GREASING

> No

CLEANING AND GREASE CHANGE,

ONLY IF GREASE WITH DEGRADATION SIGNS [1)]

> Analyze grease status every 800-1200 oper. hrs (or 5 years, whichever comes first)

> [1)] This time may vary, depending on the duty cycle, ambient temperature, speeds, loads, etc. Periodic grease analysis will determine if its change must be done sooner.
>
> See our Instruction Manual (procedure, grease amount, etc) before carrying this operation out.

Screw jacks

LUBRICATION

SCREW LUBRICATION

Screws should never run dry (nevertheless, if they are unprotected from a dirt environment, it is preferable not to keep a big amount of grease on them). The lubricant absence increases the heat generation, idle torque and eventually noise level, while reduces dramatically the service life. Comply with the next guidelines to ensure that they will run smoothly along their life and will reach the expected one.

Before greasing screws (no when re-greasing), it is advisable cleaning them carefully to remove the old grease and contamination particles.

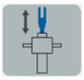
The lubrication frequency depends on the operating conditions. Consider the following ones only as an orientation. Begin with a high inspection frequency until knowing the real requirements for the application.

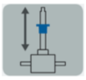
TRAPEZOIDAL SCREW (Tr) LUBRICATION: "W" AND "R" GEAR BOX CONFIGURATIONS

They must be always kept amply greased.

Re-grease the screw before commisioning, at 25-50 operation hours after it and then inspect the lubrication level periodically until determining the most adequate frequency for the application.

Clean of the old grease and lubricate with new one, when they notice it is dirty.





RE-GREASING

> **Before commisioning**
> **After commisioning: At 25-50 operation hours**
> **Periodically: When necessary to keep screw well lubricated**

CLEAN AND GREASING

> **Periodically: When necessary to keep screw clean (or 1 year, whichever comes first)**

When lubricating, use a brush or similar until getting a generous film of lubricant along the screw (with it completely extended), without areas with grease accumulations.

TRAPEZOIDAL SCREW (Tr) GREASE

We recommend to use the following grease (see on manufacturer Website for further information about it), but any roller bearing grease with no solid lubricants can be used.

Zeller+Gmelin
Mineralöle · Druckfarben · Chemie

DIVINOL LITHOGREASE G421

High quality, semi-synthetic lithium complex soap grease

Colour / Appearance	**yellow**
Operating temperature range	**-35°C - +160°C**
NLGI-class / DIN 51 818	**2**
Base oil viscosity / 40°C / DIN 51 562	**130 mm²/s**
Dropping point / DIN ISO 2176	**> 220 °C**
Worked penetr. / 0,1 mm DIN ISO 2137	**280-300**
Water resistance / DIN 51807-1	**Eval. level 1**
Corrosion protec. (EMCOR-test) / DIN 51 802	**0/0**

Do not mix greases with different saponification basis.

SPECIAL GREASES

For applications in extreme environmental conditions (very high or very low temperatures) or with special requirements (e.g. for food industry), let us know them and we will select the most suitable lubrication for the case (trapezoidal and ball screws).

BALL SCREW (KGS) LUBRICATION: GENERALITIES

They must be always kept with a thin film of lubricant.

In general, re-grease the screw every 200 operation hours. Inspect the lubrication level periodically until determining the most adequate frequency for the application.

Clean of the old grease and lubricate with new one, when they notice it is dirty.

RE-GREASING

> Periodically: Every 200 operation hours

CLEAN AND GREASING

> Periodically: When necessary to keep screw clean (or 1 year, whichever comes first)

BALL SCREW (KGS) LUBRICATION: GREASE

We recommend to use the following grease (see on manufacturer Website for further information about it), but any roller bearing grease with no solid lubricants could be used too.

> ⚠ Do not mix greases with different saponification basis.

ISOFLEX TOPAS L 152

Grease for roller bearings with synthetic base oil

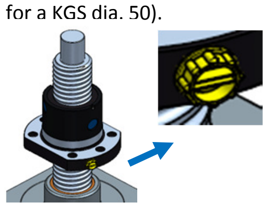
Colour	**beige**
Operating temperature range	**-50°C - +150°C**
Base oil viscosity /40°C / DIN 51 562	**100 mm²/s**
Dropping point / DIN ISO 2167	**>= 185 °C**
Worked penetr. / 0,1 mm DIN ISO 2137	**265-295**
Water resistance / DIN 51807-1	**<= 1-90**
Corrosion protec. (EMCOR-test) / DIN 51 802	**<= 1**

BALL SCREW (KGS) LUBRICATION: "W" GEAR BOX CONFIGURATION

When greasing/re-greasing, use a cloth soaked with grease until getting an uniform and thin film of lubricant along the screw (with it completely extended), without areas with grease accumulations.

BALL SCREW (KGS) LUBRICATION: "R" GEAR BOX CONFIGURATION

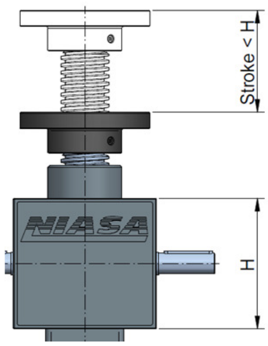
When greasing/re-greasing, do it with through the greasing point of the nut with approx. 1 ml grease per 10 mm screw diameter (e.g. 5 ml for a KGS dia. 50).



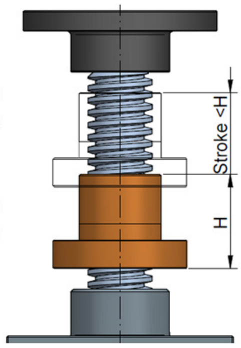
> ⚠ Do not over-grease the nut to avoid an excessive heating when running. Contact us for a precise estimation of grease amount.

LUBRICATION WHEN SHORT STROKES

When "W" configuration gear box, it is recommended not to select screw jacks which stroke is shorter than the gear box height, in order to ensure a right lubrication of the screw, doing periodically several complete strokes to grease it.



When "R" configuration ge
box, if stroke is shorter tha
the nut length, contact us
for a special design of its
lubrication system, in orde
to ensure a right lubricatio



> ⚠ Pay special attention to the lubrication of applications with short operation strokes (trapez. and ball screws).

PROTECTION AGAINST CORROSION, SEALING AND AMBIENT TEMPERATURE

PROTECTION AGAINST CORROSION

Select the environment in which the equipment will work, using the atmospheric corrosion categories classification established in the DIN EN ISO 12944-2 standard (protection against the corrosion of steel structures using painted systems). Also establish the durability required before carrying out the first maintenance of the exterior surfaces (durability does not imply a "time" guarantee).

If the corrosion category is higher than “C3” for your application and/or higher than “average” durability is required, please contact NIASA so that the technical department can select the surface protection system and select the most suitable components.

CORROSION CATEGORY		ENVIRONMENT	
		Outdoors	Indoors
C1	Very low		Buildings with heating and clean atmospheres.
C2	Low	Atmospheres with low levels of pollution. Rural areas.	Buildings with no heating and possible condensation.
C3	Medium	Urban and industrial atmospheres, with moderate SO_2 pollution. Coastal areas with low salinity.	Manufacturing plants with high humidity and some pollution.
C4	High	Industrial areas and coastal areas with moderate salinity.	Chemical and swimming pool industries.
C5-I	Very high (industrial)	Industrial areas with high humidity and aggressive atmosphere.	Buildings or areas with almost permanent condensation and high contamination.
C5-M	Very high (maritime)	Coastal and maritime areas with high salinity.	Buildings or areas with permanent condensation and high contamination.

DURABILITY		
LOW	L	2 to 5 years
MEDIUM	M	5 to 15 years
HIGH	H	More than 15 years

PROTECTION AGAINST THE INPUT OF SOLIDS AND LIQUIDS

NIASA screw jacks offer, as standard, an IP54 protection index to prevent solid and liquid particles from entering the inside, which may damage them or reduce their designed service life.

Use the following table, according to the DIN EN IEC 60529 standard, if the level of protection must be higher than that indicated. NIASA supplies, on request, specially designed units to withstand the most aggressive environments.

The protection levels are defined with a code made up of the letters “IP“ and two numbers “XY”.

LEVEL OF PROTECTION “IP”, AGAINST THE INPUT OF ...			
... solid particles: “X”		... liquids: “Y”	
	...		...
5	Protection against dust residues (the dust that may penetrate the inside does not imply incorrect operation of the equipment).	3	Protection against spray water (from angle up to 60° with vertical).
6	Total protection against the penetration of any kind of solid body (sealing).	4	Protection against water splashes (from any direction).
		5	Protection against water streams from any direction with hose.
		6	Protection against sporadic floods (example: tidal wave).
		...	...

AMBIENT TEMPERATURE

Contact NIASA if your unit will be installed in an environment that may reach temperatures below -20°C.

NIASA's technical department will prescribe the most suitable materials and sealing components for the specific conditions of the application. Also do this
if ambient temperatures over 40°C are expected.

SCREW JACKS
PRODUCT SELECTION

OPTIONAL CONFIGURATIONS

Optionally, NIASA may adapt your screw jack, modifying the different parts of it to your preferences.

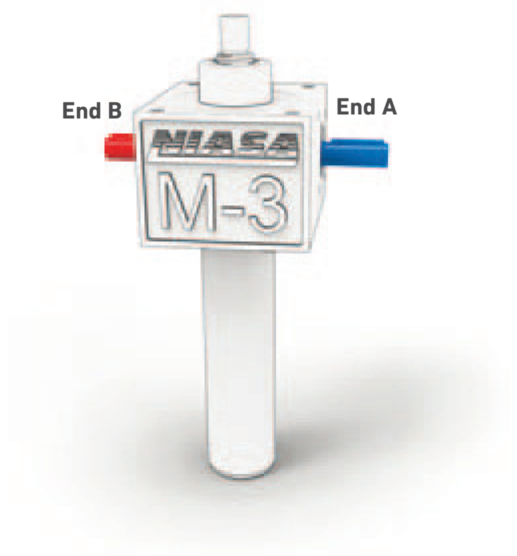
Some examples are shown below.
See sub-chapter "Placing an order".

Immobilizations

Configuration N with anti-rotating screw using a pin on the upper cover and a groove on the screw. This configuration is only available for trapezoidal screws and on small strokes. For further information please contact NIASA.

Worm gear

There is a possibility, at the customer's request, to supply the screw jacks with one of the sides of the worm shaft cut.

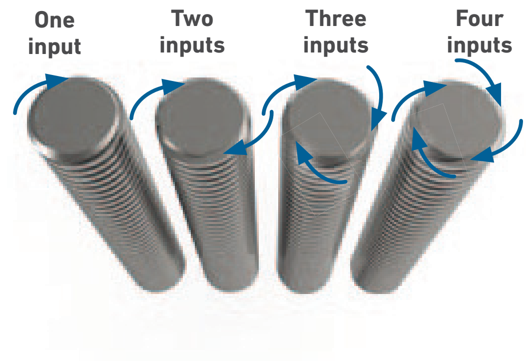


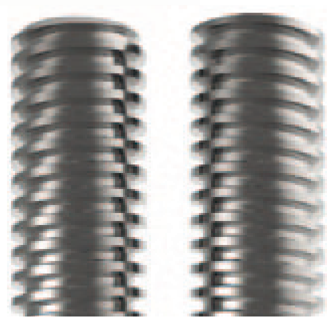
Screw end

O. With no end.
G. With standard thread.
Z. Standard cylindrical end.
S. Special end.

Special configurations

On request, screws with various inputs can be supplied to obtain higher, but eventually reversible, travel speeds. The screw jacks can also be supplied with left-thread screws.





SCREW JACKS
PLACING AN ORDER

01

SIZE
M1
M2
M3
M4
M5
J1
J3
J4
J5

02

CONFIGURATION
N Screw travel without immobilization
W Screw travel immobilized in rotation
R Nut travel

03

GEARBOX
S Normal speed
H Slow speed

04

EQUIPMENT GENERAL PROTECTION
IPS Standard IP protection level
IPS Special IP protection level

05

SCREW TYPE (DIAMETER x PITCH)
TRS Trapezoidal
TRX Trapezoidal stainless steel
KGS Ball

06

STROKE
0000 Equipment usable stroke in mm

07

SCREW END
Configuration R
Z Standard cylindrical end

Configuration N/W
G Standard threaded end

Configuration R/N/W
S Special end
0 With no end

08

SCREW FASTENING ACCESSORIES
Configuration N/W
BPS Flange
GKS Single fork
GKB Double fork
GIR Ball joint

Configuration R
BPR Screw flange with bearing

Configuration R/N/W
FES Special end fastening
000 No accessory

09

NUT TYPE (ONLY CONFIGURATION R)
With trapezoidal screw
EFM1 Single nut with flange
EFM2 Double nut
EFMS Nut with safety system

With ball screw
KGF1 Ball nut with flange
KGF2 Double ball nut with "preload system" flange
KGM1 Smooth ball nut
KGM2 Double ball nut with "preload system"
KGMF Ball nut with flange +smooth ball nut "preload system"

With trapezoidal or ball screw
0000 No nut

10

NUT ACCESSORY (ONLY CONFIGURATION R)
KAR Nut flange with trunnion mounts
KAS Special nut flange
000 No accessory on nut

11

BOX FASTENING ACCESSORY
Configuration R
HFM Gearbox fastening fork (only fastening possibility on the back)

R/N/W configurations
LCM Gearbox mounting feet
ZKM Flanges ZK gearbox fastening with bolts
ZKH Flanges ZK gearbox fastening with bearings
ZKV Flanges ZK gearbox fastening with 90° bolts
FMS Special box fastening
000 No accessory

Example	01	02	03	04	05	06	07	08	09	10	11
	M3	R	H	IPS	TRS3006	1000	Z	BPS	EFM01	KAR	LCM

12 GEARBOX ACCESSORY POSITION
01 Fastening on the top of the gearbox
02 Fastening underneath the gearbox

13 TIP ACCESSORY
SB With tip support
00 No tip support

14 LIMIT SWITCH ACCESSORY (ONLY N/W CONFIGURATIONS)
FCM Mechanical limit switches
FCI Inductive limit switches
FCG Magnetic limit switches
000 No limit switches

15 LIMIT SWITCH ASSEMBLY TYPE (ONLY APPLICABLE TO FCM/FCI)
FF Fixed limit switches
FR Adjustable limit switches

16 SCREW PROTECTION ACCESSORY
FB Bellow type protector
SF Spiral metallic protector
00 No protector

17 DRIVE ADAPTATION
MK Standard flange
MS Special adaptation
VE Wheel
00 No adaptation

18 DRIVE POSITION ON BOX
A Worm shaft side A
B Worm shaft side B

19 STANDARD MOTOR (ONLY IF MK DRIVE)
080 Group size
A Power-1 / **B** Power-2
0000 No motor
1111 Non-standard motor

20 WORM SHAFT END
A Side A end suppressed
B Side B end suppressed
0 Both sides maintained

21 WORM SHAFT PROTECTION ACCESSORY
PR With protector
00 No protector

22 LUBRICANT
GRA Standard lubricant
GRX Lubricant for low extreme temperatures
GRS Other lubricant

23 LUBRICATION ACCESSORIES
EMT Angled grease nipple (standard)
ETP Sealed lubrication cap
AGR Automatic lubricating accessory
000 No lubricating accessory

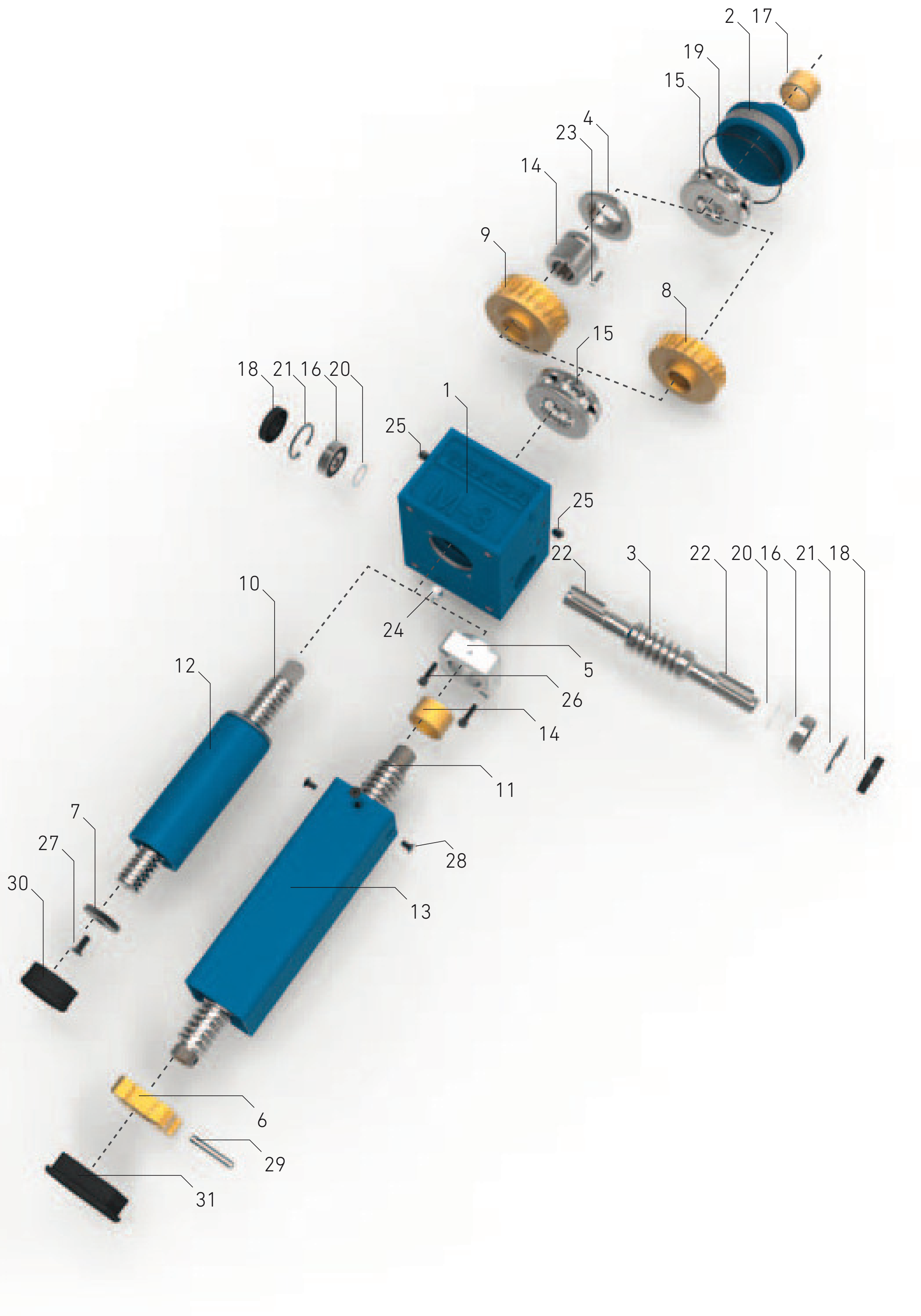
24 EQUIPMENT GENERAL COLOUR
RGG Graphite grey RAL7024 (standard)
RAZ Blue RAL5017
RGP Silver grey RAL9006
RSP Special colour indicated by the customer
CIP Only grey 411 priming
000 Not painted

12	13	14	15	16	17	18	19	20	21	22	23	24
02	SB	FCI	FF	FB	MK	A	GR080A	00	PR	GRA	AGR	RGG

SCREW JACKS

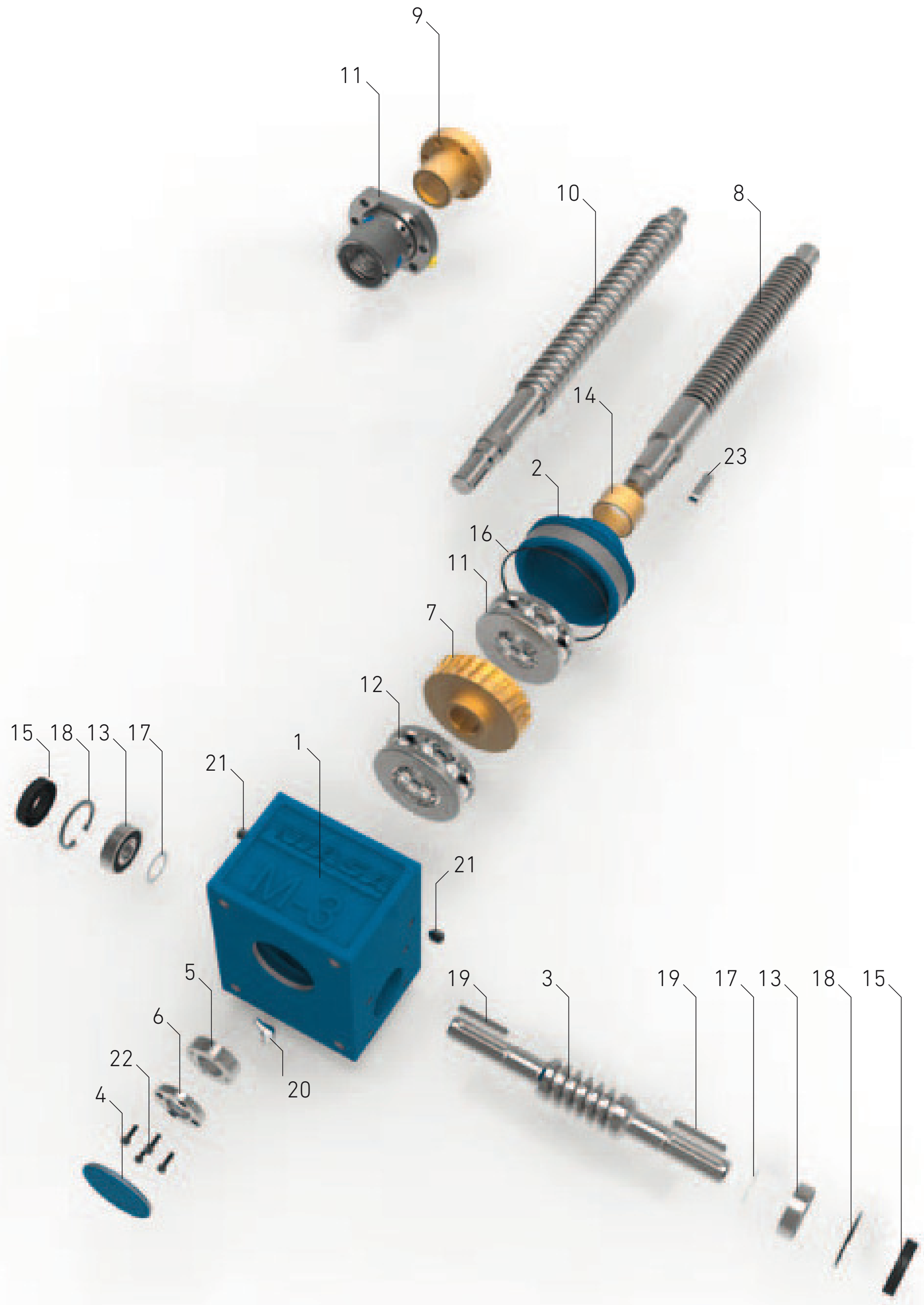
N / W CONFIGURATION DISASSEMBLED

	Name
01	M series box
02	Top cap
03	Worm gear
04	Ball worm shaft and wheel cover
05	Square tube support
06	Anti-turn buffer
07	N screw buffer washer
08	Trapezoidal worm shaft and wheel
09	Ball worm shaft and wheel
10	N screw
11	W screw
12	N round tube
13	W square tube
14	Ball nut
15	Axial bearing
16	Radial bearing
17	Anti-friction bushing
18	Seal
19	O-Ring
20	Adjustment washer
21	Inside circlip
22	Straight key
23	Straight key
24	Angled grease nipple
25	Stud with point
26	Allen screw
27	Allen screw
28	Allen screw
29	Elastic stud
30	N tube cap
31	W tube cap



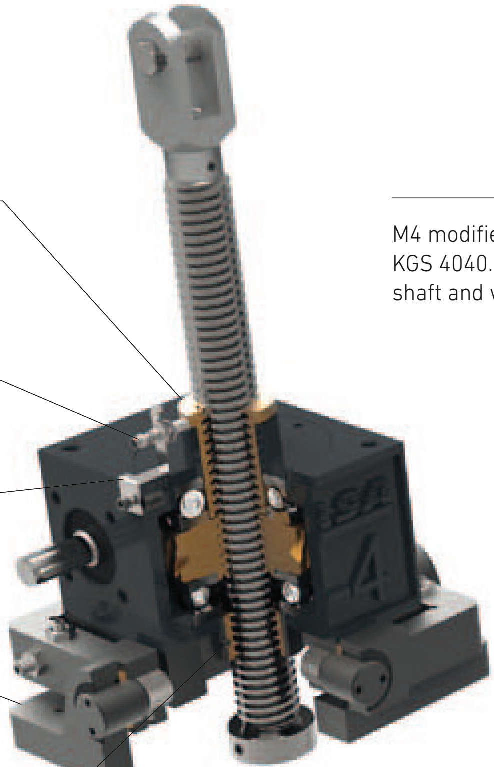
SCREW JACKS
R CONFIGURATION DISASSEMBLED

	Name
01	M series box
02	Top cap
03	Worm gear
04	Rear cap
05	Screw nut
06	Screw locknut
07	Worm wheel
08	Trapezoidal screw
09	Trapezoidal nut
10	Ball screw
11	Ball nut
12	Axial bearing
13	Radial bearing
14	Anti-friction bushing
15	Seal
16	O-Ring
17	Adjustment washer
18	Inside circlip
19	Straight key
20	Angled grease nipple
21	Stud with point
22	Allen screw
23	Straight key



SCREW JACKS
SPECIAL CONFIGURATIONS

If the standard product range does not meet your requirements, please contact NIASA for customizing to any unit. Most probably it will be adapted to your requirements.



Safety nut with wear control

Inductive proximity sensor

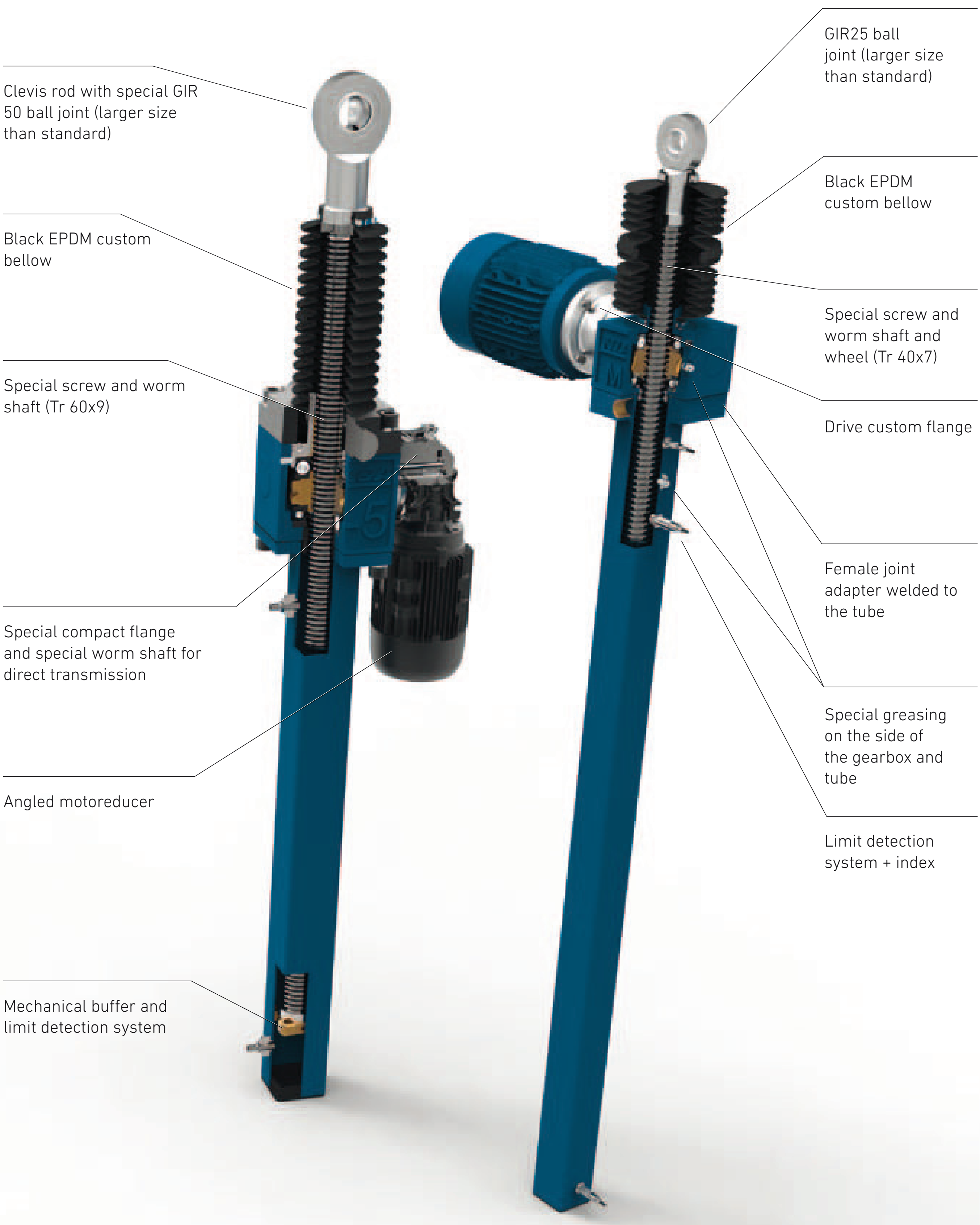
Inductive sensor support

ZKC series special tip fastening (cardan)

Screw guide support with self-lubricated bearing

N mechanical buffer

M4 modified to house screw KGS 4040. Special upper worm shaft and wheel and cap


Clevis rod with special GIR 50 ball joint (larger size than standard)
Black EPDM custom bellow
Special screw and worm shaft (Tr 60x9)
Special compact flange and special worm shaft for direct transmission
Angled motoreducer
Mechanical buffer and limit detection system
GIR25 ball joint (larger size than standard)
Black EPDM custom bellow
Special screw and worm shaft and wheel (Tr 40x7)
Drive custom flange
Female joint adapter welded to the tube
Special greasing on the side of the gearbox and tube
Limit detection system + index

02
LINEAR ACTUATORS

F series: Steel tube
A series: Aluminum tube

“WE ARE WHAT WE REPEATEDLY DO. EXCELLENCE, THEN, IS NOT AN ACT, BUT A HABIT.”

ARISTOTLE
PHILOSOPHY

LINEAR ACTUATORS

F SERIES: STEEL TUBE | A SERIES: ALUMINUM TUBE

INTRODUCTION

NIASA F/A Series linear actuators are electro-mechanical cylinders in which a round stem moves inside a second tube, of either steel or aluminum.

The lengthwise movement of the stem is achieved with the combination of an interior screw/nut which drags it, and an electrical motor that drives the screw/nut. The power transmission from the motor may be direct or by means of different gear solutions and toothed belts.

Against solutions with exposed screws, protecting them with an external stem means that the equipment is very highly sealed and can operate in the most aggressive conditions, with the presence of dust or liquid of almost any type in the environment. The stem provides an extraordinary capacity for buckle load against axial compression loads.

These types of actuators are the best solution in practically any application that requires precise and safe linear movement, whether it is for transfer or for elevation and regardless of the speed required. Their main advantages against other systems, such as pneumatic or hydraulic cylinders, are the following:

... Greater movement and positioning precision.

... Superior energy efficiency, as their parts offer high/very high performance, especially with the ball screws, low transmission ratios and high speeds

... Easier and faster assembly, since hydraulic or pneumatic groups are not required, just an electric motor mounted on the unit itself.

... Greater reliability and duration, and less maintenance, due to the mechanical robustness and construction simplicity.

... Lower size for the same load capacity.

... ...

The screw supports also characterize for offering an extensive range of:

... Axial load capacities, from 3.5 kN up to 86 kN.

... Stem advance speeds depending on the screw pitch and the transmission used.

... Trapezoidal and ball screws, depending on the performance required, precision of the desired movement and positioning, etc.

... Outer tube of steel or extruded aluminum profile. The latter is, in general, the lightest and enables immobilization in the stem's rotation and a magnetic sensor to be integrated.

... Fastening accessories and elements, for optimal adaptation to the most varied systems that may be designed.

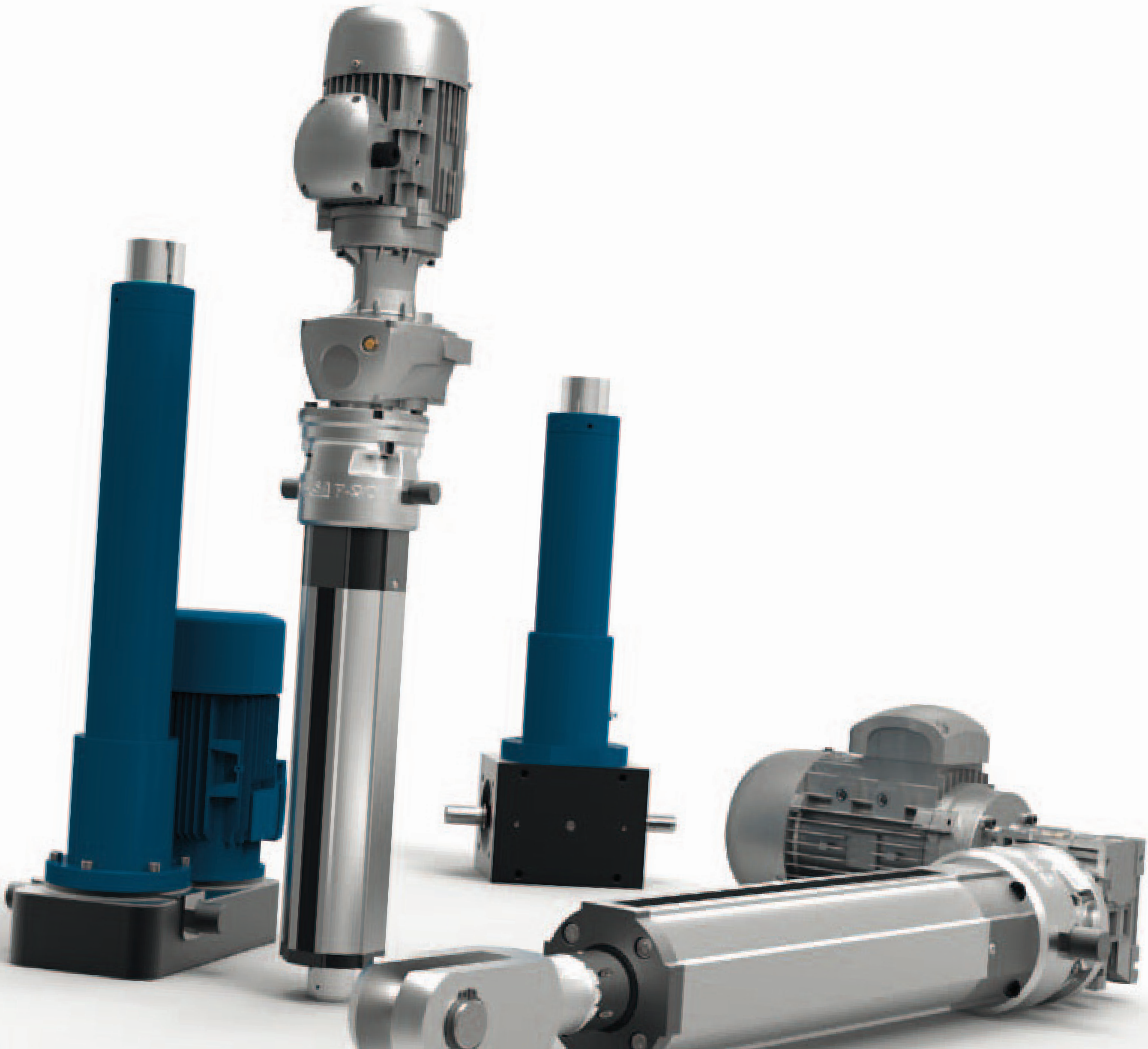
... Drives, with different reduction ratios and positions with respect to the cylinder, enable the best solution to be offered for any speed and configuration problem. Among these are the following as standard:

- In line Motors / Motoreducers.
- Motors / Motoreduc. in parallel with the toothed belt.
- Motors / Motoreducers at 90º.
- ...

... Control and safety systems (inductive/magnetic stroke limit switches, absolute/incremental encoders, etc.).

... Materials and surface coverings, depending on the environmental conditions in which the unit will be installed.

Please do not hesitate to contact NIASA if you require actuators (and their drive mechanisms) with specifications other than those covered in this chapter. The NIASA technical department will specifically develop the special units that best meet your requirements.



APPLICATIONS

VERTICAL DRIVE DE SYSTEM

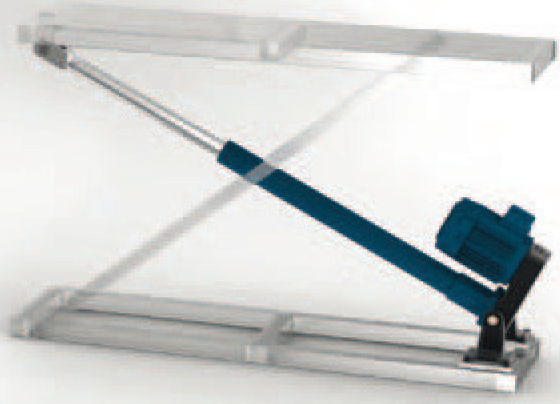
Set of two F30-M505 actuators made up of a servomotor drive system, a special drive union flange and joined together with a GX universal joint shaft. Inductive sensor, clevis rod with GIR Series ball joint and protection bellow for the FB Series stem.

SHUTTER SYSTEM

A30 Series actuator made up of a three-phase motor drive system, tilt on the outside with BA Series bolts, SB Series tilt support, clevis rod with GIR Series ball joint on the stem and integrated position magnetic sensor.

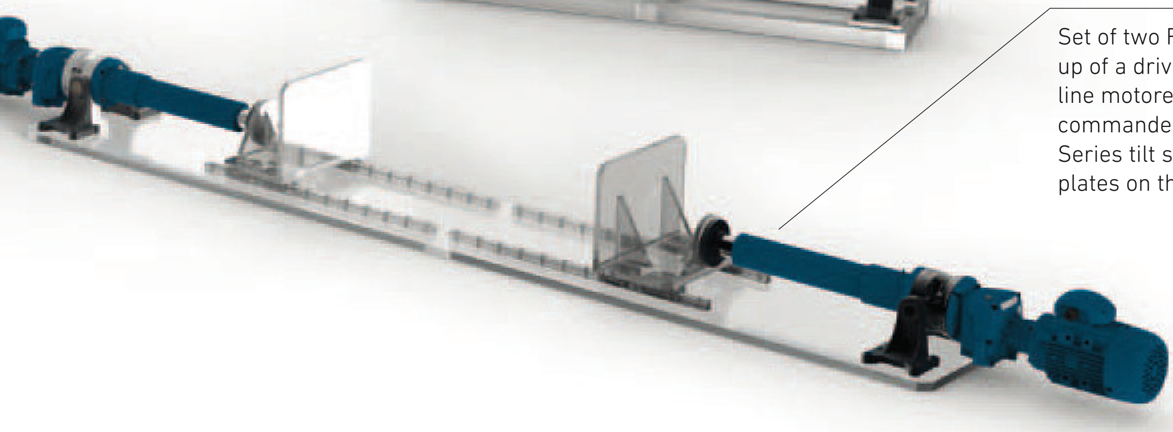
ANTENNA ORIENTATION SYSTEM

A40 Series actuator made up of a servomotor drive system, drive union flange, tilt on the outside with BA Series bolts, SB Series tilt support and GK Series single clevis rod on the stem.



SCISSOR LIFT

F45–M501 made up of a three-phase motor drive system, SB Series tilt supports and GKB Series double clevis rod on the stem.



HORIZONTAL DRIVE DE SYSTEM

Set of two F30-M205 actuators, made up of a drive system of a three-phase line motoreducer, independently commanded and fastened with SB Series tilt supports and BP Series plates on the stem.

LINEAR ACTUATORS

F SERIES: STEEL TUBE | A SERIES: ALUMINUM TUBE

SIZES

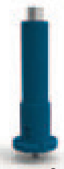
F SERIES: Steel outside tube.
SERIES A: Aluminum outside tube (stem anti-rotation and magnetic sensor optional).

For further information about M205/M501/M505/M605 A Series configurations, please contact NIASA.
There are trapezoidal and ball screw options on all sizes (see chapter 07 about screws for more details).

Up to	F16 / A16 6 kN	F20 / A20 10.5 kN
M100 Basic configuration	 page 78	 page 80
M205 In line motoreducer		 page 88
M501 Parallel drive	 page 90	 page 90
M505 For drive at 90°	 page 92	 page 92
M601 Motoreducer at 90°		 page 93
M605 In line motor	 page 94	 page 94

In addition to the standard range of F/A Series linear actuators, NIASA can specifically develop the unit that best meets your application requirements. Contact NIASA.

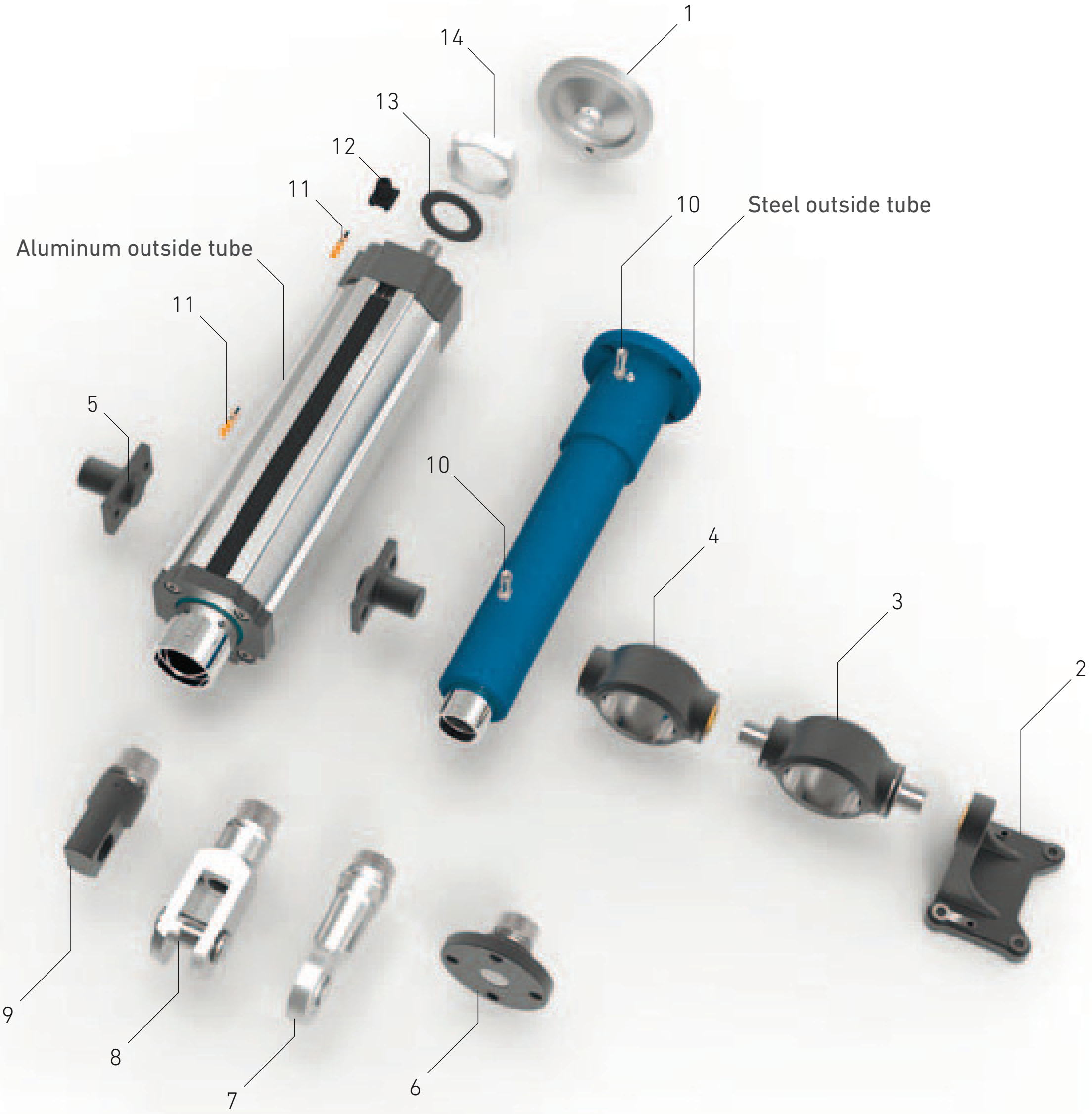
02

F30 / A30 23.5 kN	F40 / A40 38 kN	F45 78 kN	F50 86 kN
 page 82	 page 84	 page 86	 page 87
 page 88	 page 88	 page 88	 page 88
 page 90	 page 90	 page 90	 page 90
 page 92			
 page 93	 page 93	 page 93	 page 93
 page 94	 page 94	 page 94	 page 94

LINEAR ACTUATORS

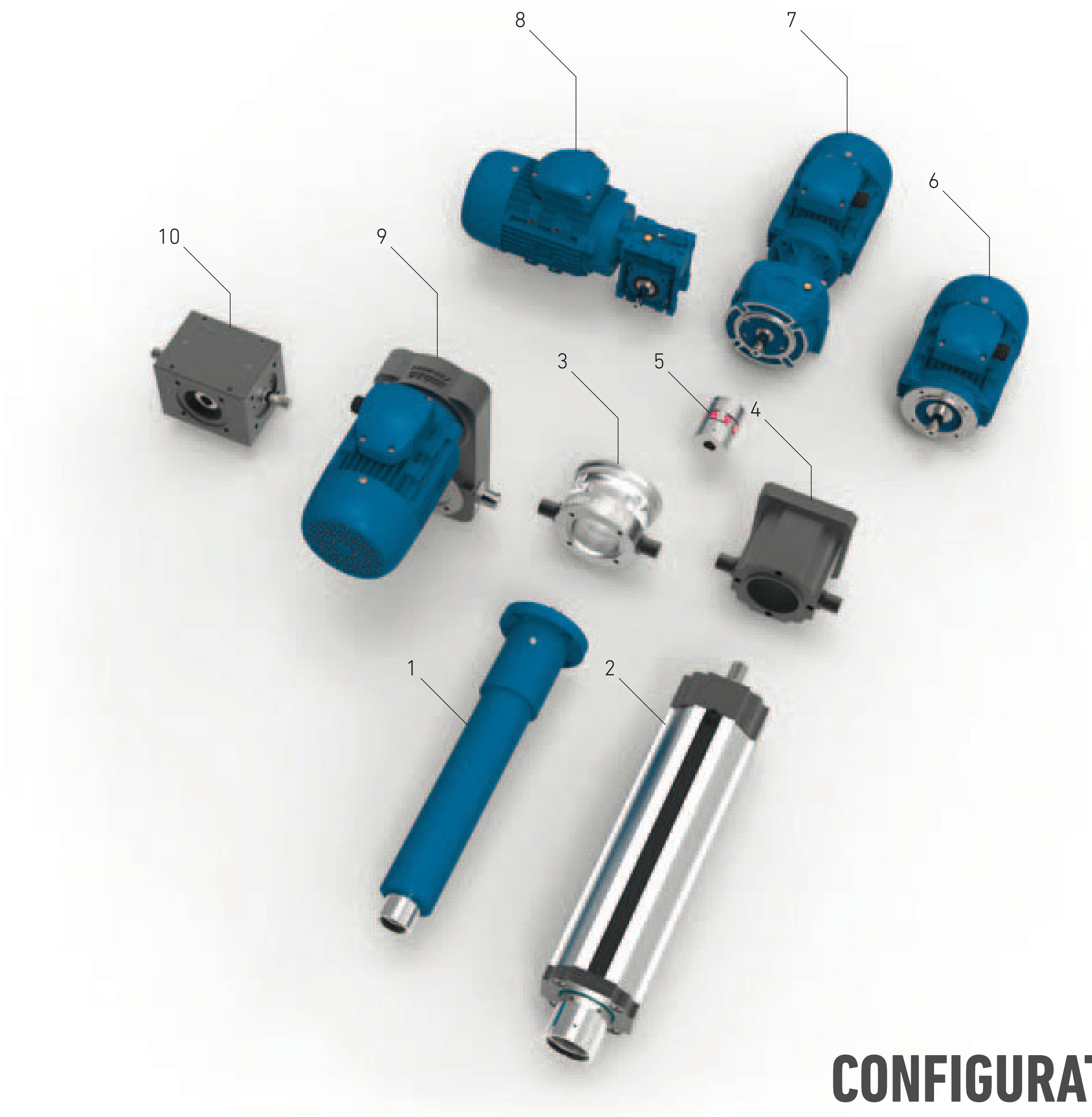
F SERIES: STEEL TUBE | A SERIES: ALUMINUM TUBE

GENERAL PRODUCT OVERVIEW



ACCESSORIES

	Name	Page
01	VE wheel	300
02	SB tilt support	276
03	BB flanges with bolts for steel tube	272
04	Flanges with bearings for BH steel tube	273
05	BB flanges with bolts for aluminum tube	274
06	BPS flange	278
07	GIR clevis rod	282
08	GKB double clevis rod	281
09	GK single clevis rod	280
10	Inductive limit switch FCI	307
11	FCG magnetic limit switch	308
12	Connection sensor input adapter	308
13	Position sensor magnet	308
14	Anti-rotation system	



CONFIGURATIONS

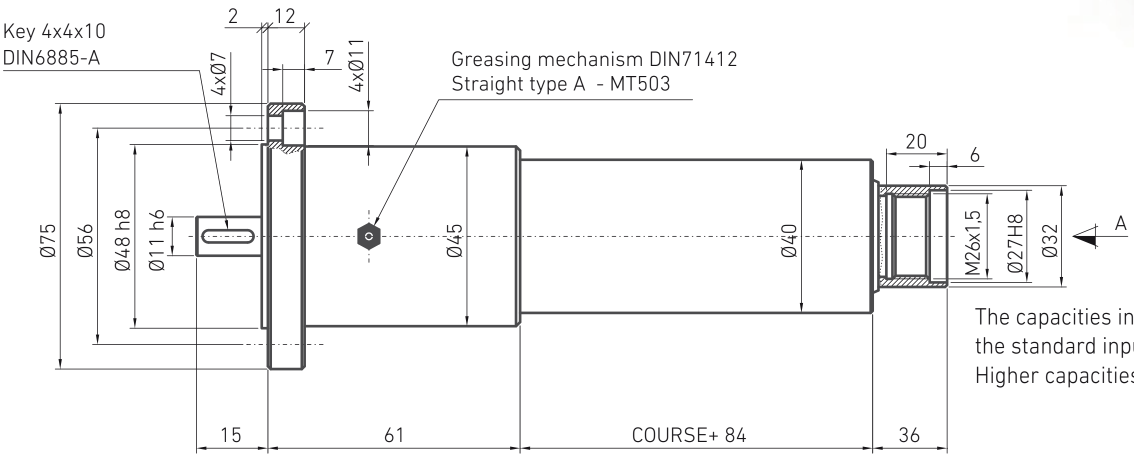
	Name	M205		M501		M505		M601		M605	
		F	A	F	A	F	A	F	A	F	A
01	F-M100 series linear actuator	•		•		•		•		•	
02	A-M100 series linear actuator		•		•		•		•		•
03	F flange	•						•		•	
04	Flange A		•						•		•
05	EK coupling	•	•					•	•	•	•
06	Motor									•	•
07	In line motoreducer	•	•								
08	Motoreducer at 90°							•	•		
09	Parallel drive			•	•						
10	Bevel gearbox at 90°					•	•				

F16-M100 LINEAR ACTUATORS

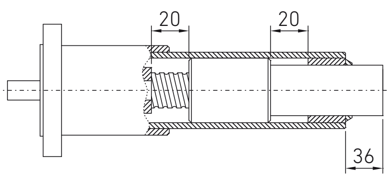
UP TO 6 kN

Tr TRAPEZ. KGS BALLS

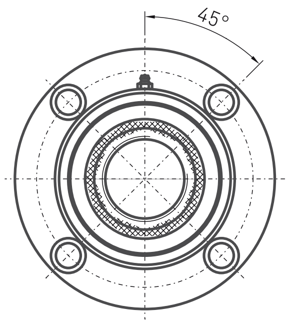
The capacities indicated correspond to
the standard input shaft configurations.
Higher capacities are available on request.



The capacities indicated correspond to
the standard input shaft configurations.
Higher capacities are available on request.



SAFETY MARGIN

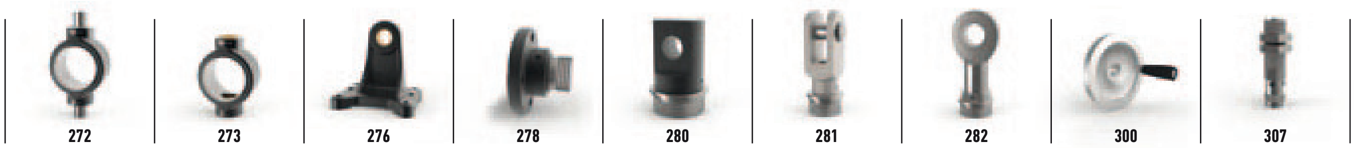


CHECKED BY -A-

Screw diameter and step (mm)	Maximum axial strength (kN)	Travel (mm/ revol. input)	Performance (%)	Drive torque, M_D (Nm) F (kN), load to move in dynamic	Stroke weight 0 (kg)	Approx. weight each 100 mm of Stroke (kg)
Tr 16x4	3.5	4	40	(1.59 x F) + 0.38	2	0.75
KGS 1605	6	5	81	(0.98 x F) + 0.25	2	0.75

... Power required: P_D (kW) = 0,157x M_D (Nm).

... Contact NIASA if the dynamic load exceeds the critical values indicated, in order to avoid over-heating, buckling and resonance of the unit. See calculations chapter at the end of the chapter (page 97).

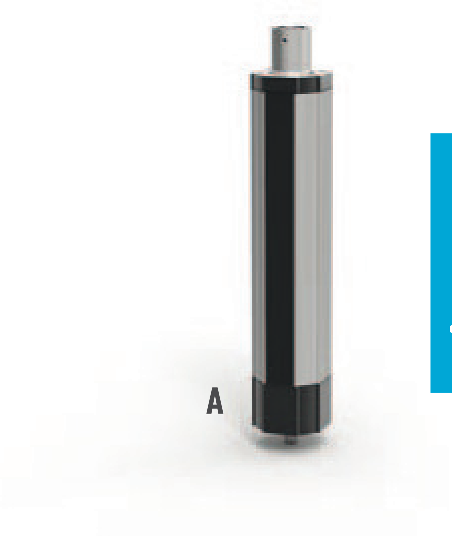


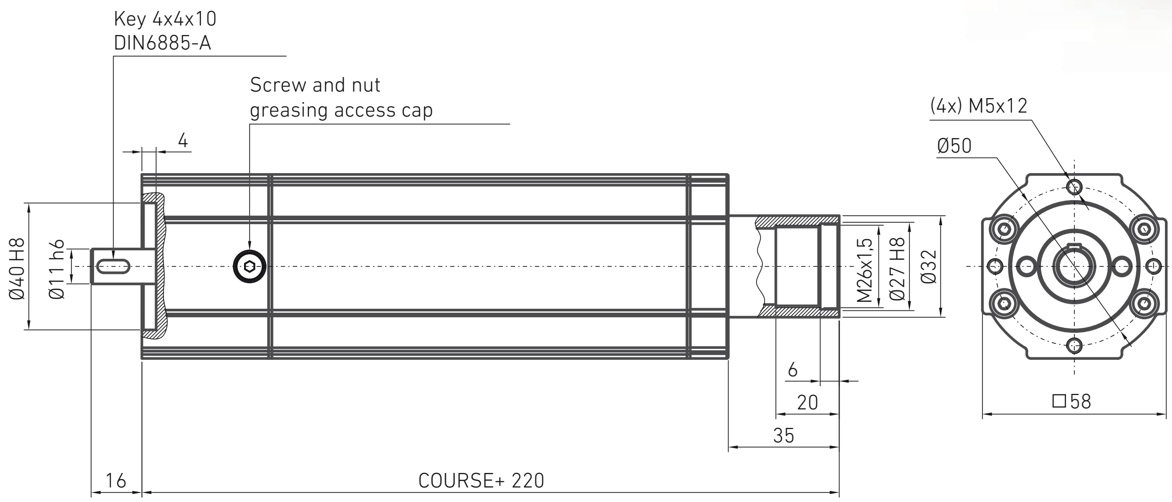
A16-M100 LINEAR ACTUATORS

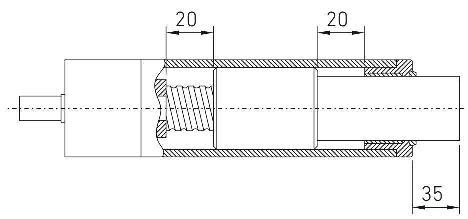
UP TO 6 kN

Tr TRAPEZ. KGS BALLS

The capacities indicated correspond to the standard input shaft configurations. Higher capacities are available on request.







SAFETY MARGIN

Screw diameter and step (mm)	Maximum axial strength (kN)	Travel (mm/ revol. input)	Performance (%)	Drive torque, M_D (Nm) F (kN), load to move in dynamic	Stroke weight 0 (kg)	Approx. weight each 100 mm of Stroke (kg)
Tr 16x4	3.5	4	40	(1.59 x F) + 0.38	1.7	0.7
KGS 1605	6	5	81	(0.98 x F) + 0.25	1.6	0.7

... Power required: P_D (kW) = 0,157x M_D (Nm).

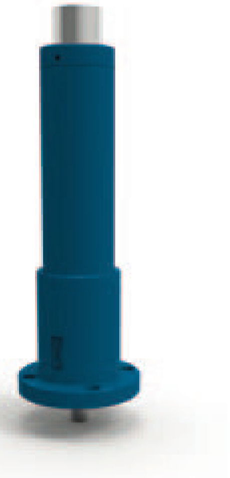
... Contact NIASA if the dynamic load exceeds the critical values indicated, in order to avoid over-heating, buckling and resonance of the unit. See calculations chapter at the end of the chapter (page 97).

F20-M100 LINEAR ACTUATORS

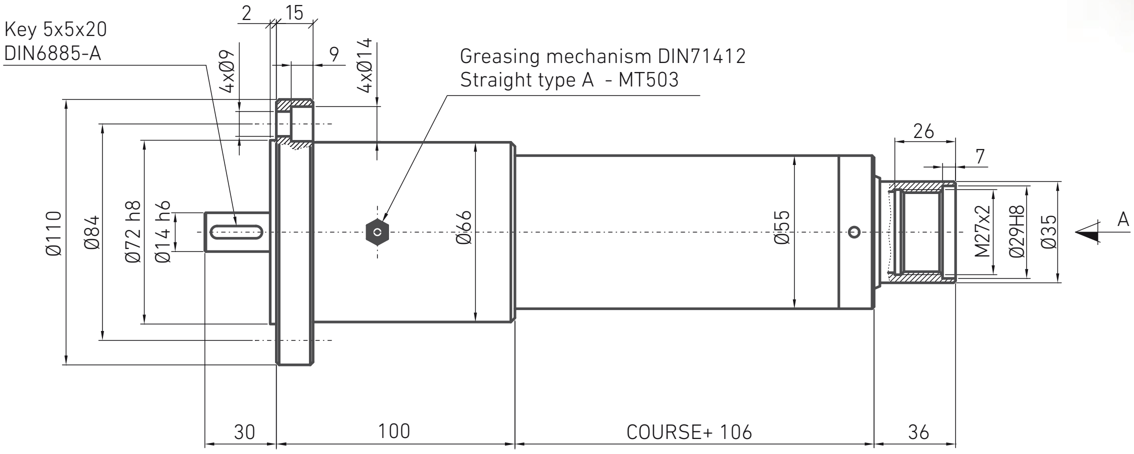
UP TO 10.5 kN

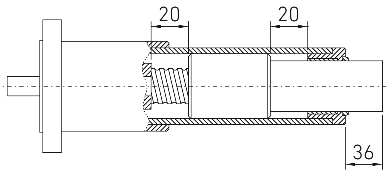
Tr TRAPEZ. KGS BALLS

The capacities indicated correspond to
the standard input shaft configurations.
Higher capacities are available on request.

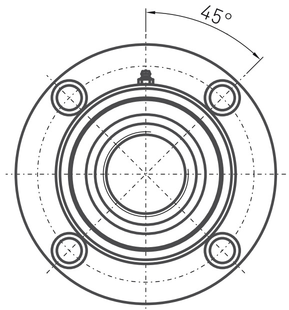


F





SAFETY MARGIN



CHECKED BY -A-

Screw diameter and step (mm)	Maximum axial strength (kN)	Travel (mm/ revol. input)	Performance (%)	Drive torque, M_D (Nm) F (kN), load to move in dynamic	Stroke weight 0 (kg)	Approx. weight each 100 mm of Stroke (kg)
Tr 24x5	9.5	5	35	(2.27 x F) + 0.52	3	1.7
KGS 2005	10.5	5	81	(0.98 x F) + 0.42	3	1.25
KGS 2020	5.5	20	81	(3.93 x F) + 0.48	3	1.25

... Power required: P_D (kW) = 0,157x M_D (Nm).

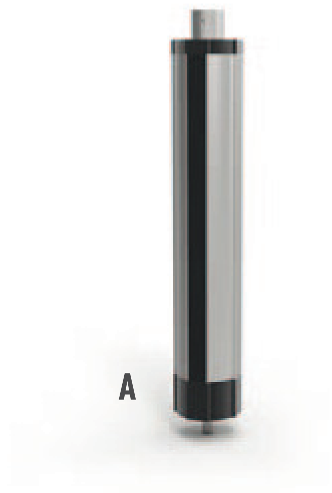
... Contact NIASA if the dynamic load exceeds the critical values indicated, in order to avoid over-heating, buckling and resonance of the unit. See calculations chapter at the end of the chapter (page 97).

272 273 276 278 280 281 282 300 307

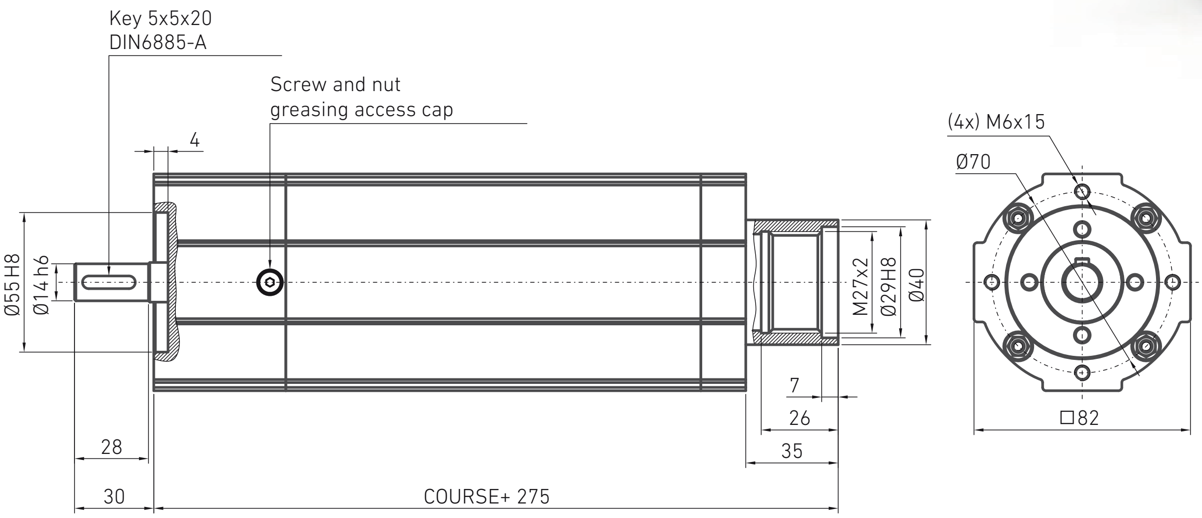
A20-M100 LINEAR ACTUATORS

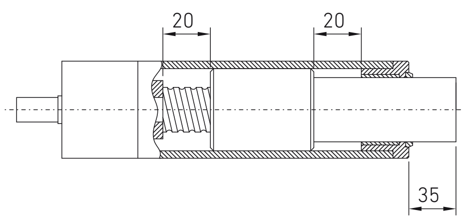
UP TO 10.5 kN

Tr TRAPEZ. KGS BALLS



The capacities indicated correspond to the standard input shaft configurations. Higher capacities are available on request.





SAFETY MARGIN

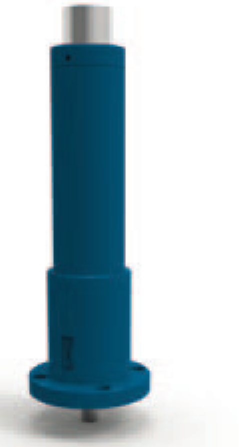
Screw diameter and step (mm)	Maximum axial strength (kN)	Travel (mm/ revol. input)	Performance (%)	Drive torque, M_D (Nm) F (kN), load to move in dynamic	Stroke weight 0 (kg)	Approx. weight each 100 mm of Stroke (kg)
Tr 24x5	9.5	5	35	(2.27 x F) + 0.52	3.85	1.25
KGS 2005	10.5	5	81	(0.98 x F) + 0.42	3.65	1.15
KGS 2020	5.5	20	81	(3.93 x F) + 0.48	3.65	1.15

... Power required: P_D (kW) = 0,157x M_D (Nm).

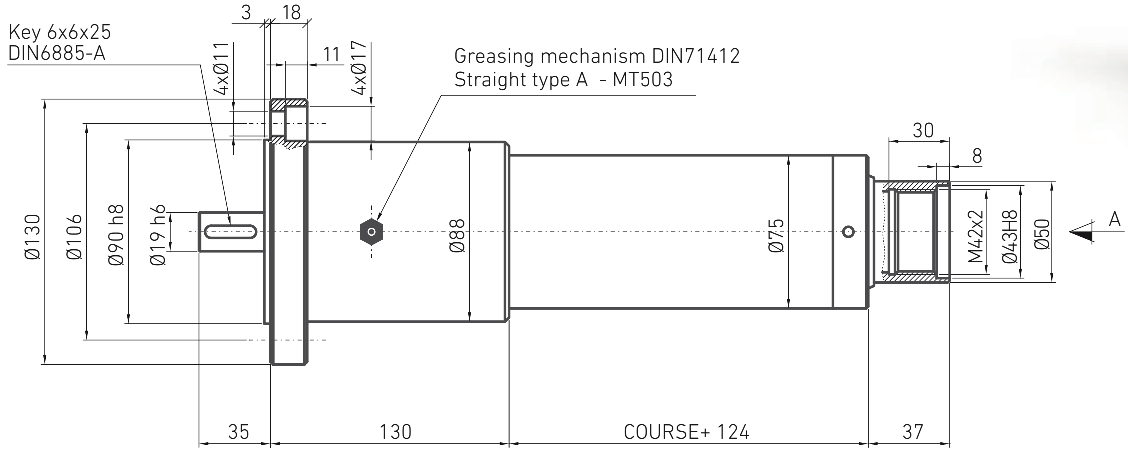
... Contact NIASA if the dynamic load exceeds the critical values indicated, in order to avoid over-heating, buckling and resonance of the unit. See **calculations chapter** at the end of the chapter (page 97).

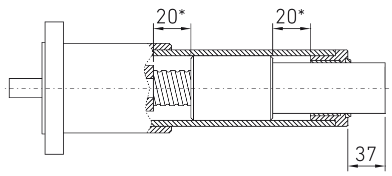
F30-M100 LINEAR ACTUATORS

UP TO 23.5 kN Tr TRAPEZ. KGS BALLS



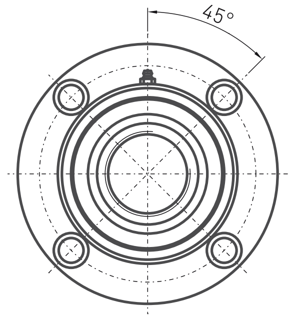
The capacities indicated correspond to
the standard input shaft configurations.
Higher capacities are available on request.





SAFETY MARGIN

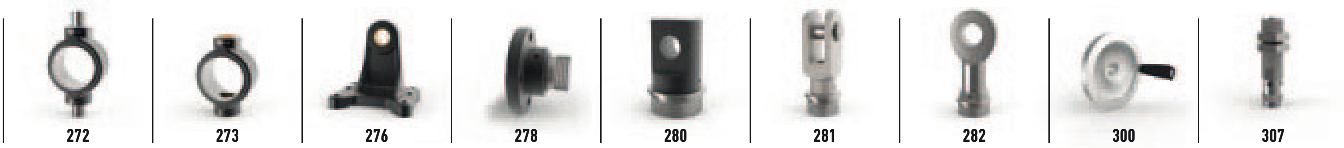
(*) If incorporating a KGM 3220 nut,
the safety margin is 15 mm.



CHECKED BY -A-

Screw diameter and step (mm)	Maximum axial strength (kN)	Travel (mm/ revol. input)	Performance (%)	Drive torque, M_D (Nm) F (kN), load to move in dynamic	Stroke weight 0 (kg)	Approx. weight each 100 mm of Stroke (kg)
Tr 36x6	15	6	31	(3.08 x F) + 1.6	8	2.6
KGS 3205	21.5	5	81	(0.98 x F) + 1.3	8	2.6
KGS 3210	23.5	10	81	(1.96 x F) + 1.3	8	2.6
KGS 3220	12	20	81	(3.93 x F) + 1.3	8	2.6
KGS 3240	6	40	81	(7.86 x F) + 1.3	8	2.6

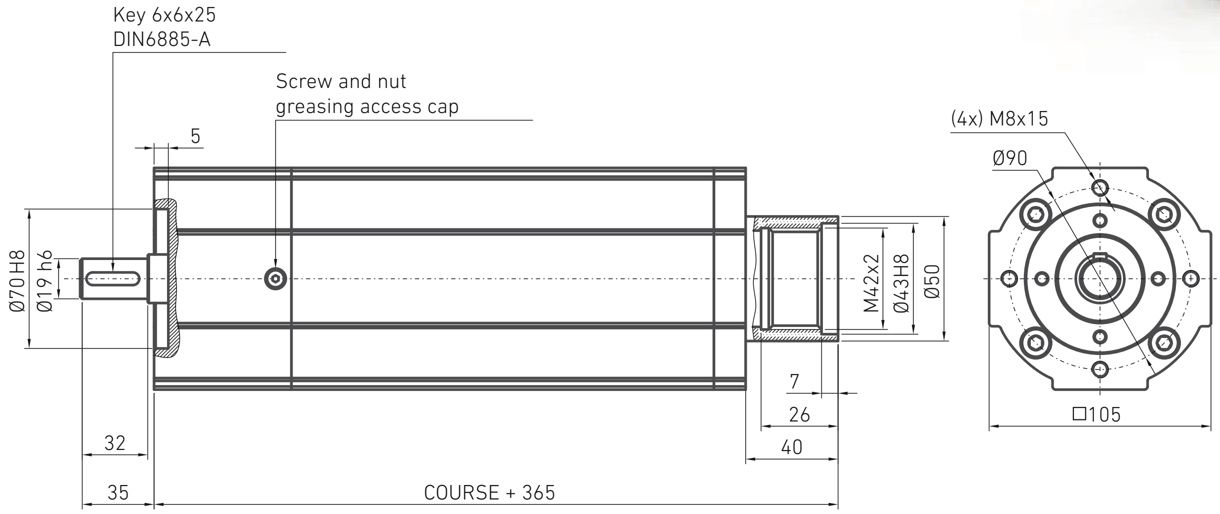
... Power required: P_D (kW) = 0,157x M_D (Nm).
... Contact NIASA if the dynamic load exceeds the critical values indicated, in order to avoid over-heating, buckling and resonance of the unit. See calculations chapter at the end of the chapter (page 97).

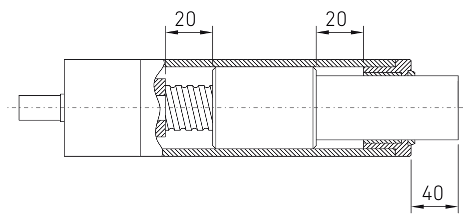


A30-M100 LINEAR ACTUATORS

UP TO 23.5 kN Tr TRAPEZ. KGS BALLS

The capacities indicated correspond to the standard input shaft configurations. Higher capacities are available on request.





SAFETY MARGIN

Screw diameter and step (mm)	Maximum axial strength (kN)	Travel (mm/ revol. input)	Performance (%)	Drive torque, M_D (Nm) F (kN), load to move in dynamic	Stroke weight 0 (kg)	Approx. weight each 100 mm of Stroke (kg)
Tr 36x6	15	6	31	(3.08 x F) + 1.6	8	2.3
KGS 3205	21.5	5	81	(0.98 x F) + 1.3	8	2.1
KGS 3210	23.5	10	81	(1.96 x F) + 1.3	8	2.1
KGS 3220	12	20	81	(3.93 x F) + 1.3	8	2.1
KGS 3240	6	40	81	(7.86 x F) + 1.3	8	2.1

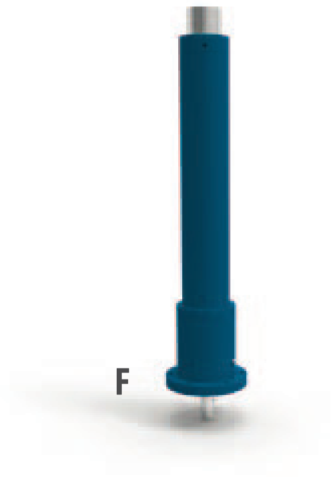
... Power required: P_D (kW) = 0,157x M_D (Nm).

... Contact NIASA if the dynamic load exceeds the critical values indicated, in order to avoid over-heating, buckling and resonance of the unit. See calculations chapter at the end of the chapter (page 97).

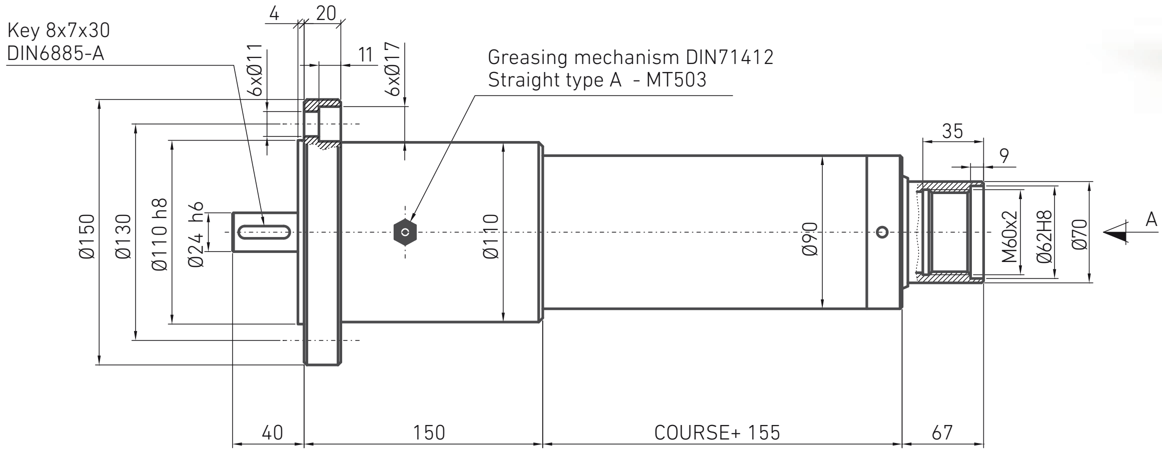
F40-M100 LINEAR ACTUATORS

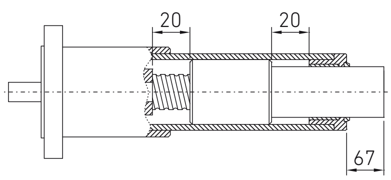
UP TO 38 kN

Tr TRAPEZ. KGS BALLS

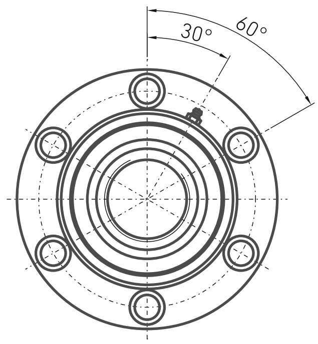


The capacities indicated correspond to the standard input shaft configurations. Higher capacities are available on request.





SAFETY MARGIN

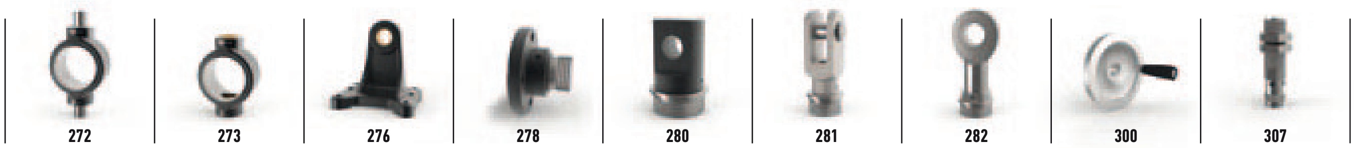


CHECKED BY -A-

Screw diameter and step (mm)	Maximum axial strength (kN)	Travel (mm/ revol. input)	Performance (%)	Drive torque, M_D (Nm) F (kN), load to move in dynamic	Stroke weight 0 (kg)	Approx. weight each 100 mm of Stroke (kg)
Tr 45x7	22	7	29	(3.84 x F) + 1.9	17.1	4.9
KGS 4010	38	10	81	(1.96 x F) + 1.6	16.8	4.2
KGS 4020	21.5	20	81	(3.93 x F) + 1.7	16.8	4.2
KGS 4040	11	40	81	(7.86 x F) + 1.7	16.8	4.2

... Power required: P_D (kW) = 0,157x M_D (Nm).

... Contact NIASA if the dynamic load exceeds the critical values indicated, in order to avoid over-heating, buckling and resonance of the unit. See calculations chapter at the end of the chapter (page 97).



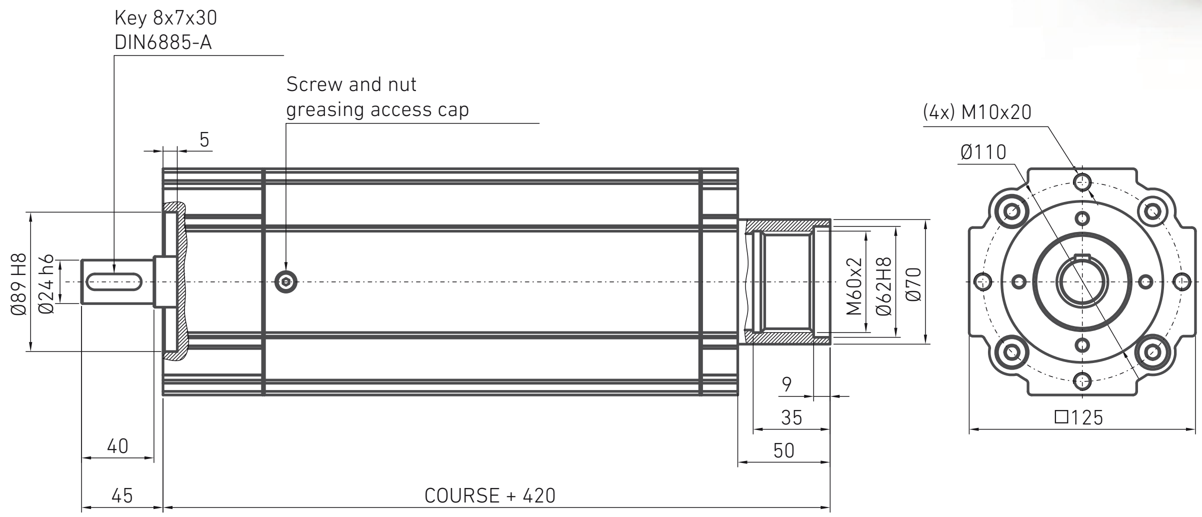
272 | 273 | 276 | 278 | 280 | 281 | 282 | 300 | 307

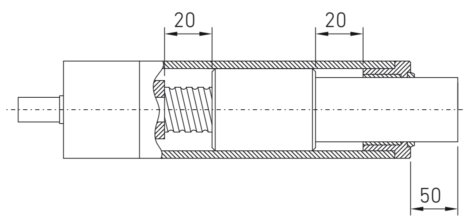
A40-M100 LINEAR ACTUATORS

UP TO **38 kN** Tr TRAPEZ. KGS BALLS

02

The capacities indicated correspond to the standard input shaft configurations. Higher capacities are available on request.





SAFETY MARGIN

Screw diameter and step (mm)	Maximum axial strength (kN)	Travel (mm/ revol. input)	Performance (%)	Drive torque, M_D (Nm) F (kN), load to move in dynamic	Stroke weight 0 (kg)	Approx. weight each 100 mm of Stroke (kg)
Tr 45x7	22	7	29	(3.84 x F) + 1.9	17.1	3.45
KGS 4010	38	10	81	(1.96 x F) + 1.6	16.8	3.3
KGS 4020	21.5	20	81	(3.93 x F) + 1.7	16.8	3.3
KGS 4040	11	40	81	(7.86 x F) + 1.7	16.8	3.3

... Power required: P_D (kW) = 0,157x M_D (Nm).

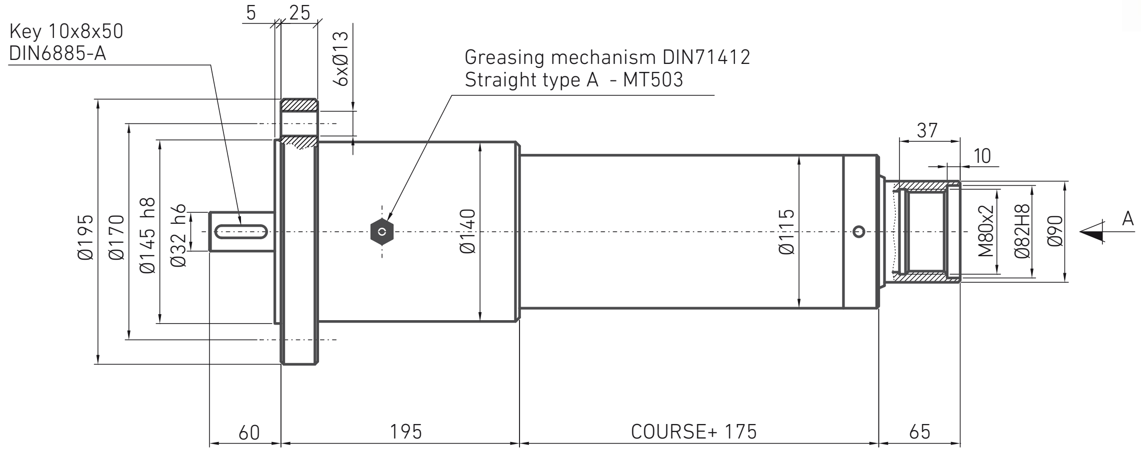
... Contact NIASA if the dynamic load exceeds the critical values indicated, in order to avoid over-heating, buckling and resonance of the unit. See calculations chapter at the end of the chapter (page 97).

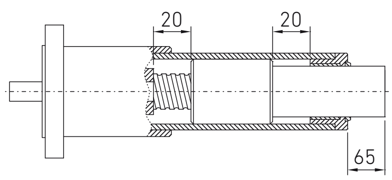
F45-M100 LINEAR ACTUATORS

UP TO 78 kN

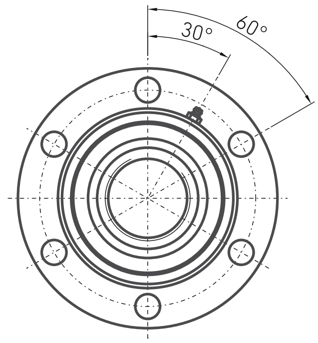
Tr TRAPEZ. KGS BALLS

The capacities indicated correspond to
the standard input shaft configurations.
Higher capacities are available on request.





SAFETY MARGIN



CHECKED BY -A-

Screw diameter and step (mm)	Maximum axial strength (kN)	Travel (mm/ revol. input)	Performance (%)	Drive torque, M_D (Nm) F (kN), load to move in dynamic	Stroke weight 0 (kg)	Approx. weight each 100 mm of Stroke (kg)
Tr 50x8	47.5	8	30	(4.24 x F) + 2.1	28.3	5.2
KGS 5010	78	10	81	(1.96 x F) + 1.7	28.3	5.2

... Power required: P_D (kW) = 0,157x M_D (Nm).

... Contact NIASA if the dynamic load exceeds the critical values indicated, in order to avoid over-heating, buckling and resonance of the unit. See calculations chapter at the end of the chapter (page 97).

272 | 273 | 276 | 278 | 280 | 281 | 282 | 300 | 307

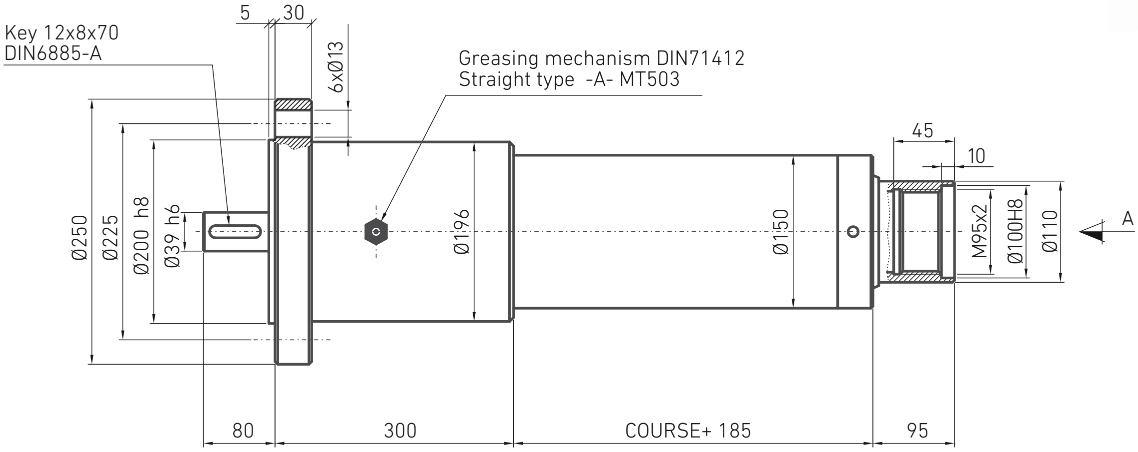
F50-M100 LINEAR ACTUATORS

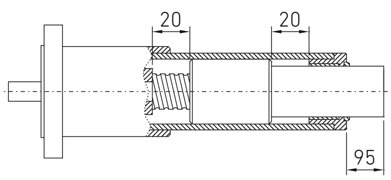
UP TO 86 kN

Tr TRAPEZ. KGS BALLS

02

The capacities indicated correspond to the standard input shaft configurations. Higher capacities are available on request.





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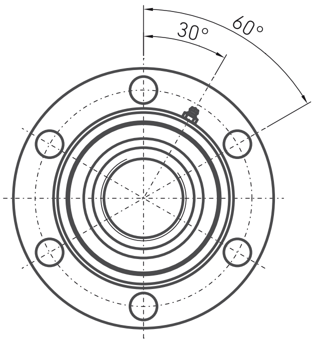
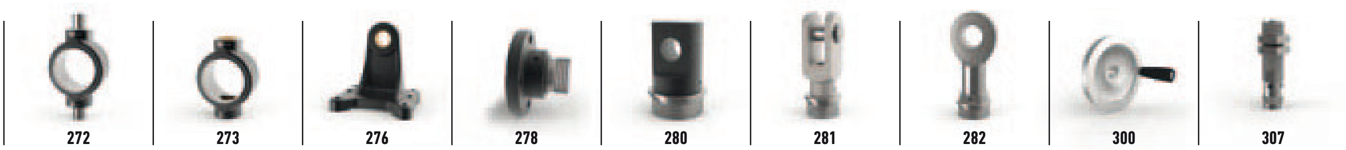


CHECKED BY -A-

Screw diameter and step (mm)	Maximum axial strength (kN)	Travel (mm/ revol. input)	Performance (%)	Drive torque, M_D (Nm) F (kN), load to move in dynamic	Stroke weight 0 (kg)	Approx. weight each 100 mm of Stroke (kg)
Tr 70x10	60.5	10	27	(5.89 x F) + 2.1	75	7.2
KGS 6310	86	10	81	(1.96 x F) + 1.5	77	8.1

... Power required: P_D (kW) = 0,157x M_D (Nm).

... Contact NIASA if the dynamic load exceeds the critical values indicated, in order to avoid over-heating, buckling and resonance of the unit. See calculations chapter at the end of the chapter (page 97).



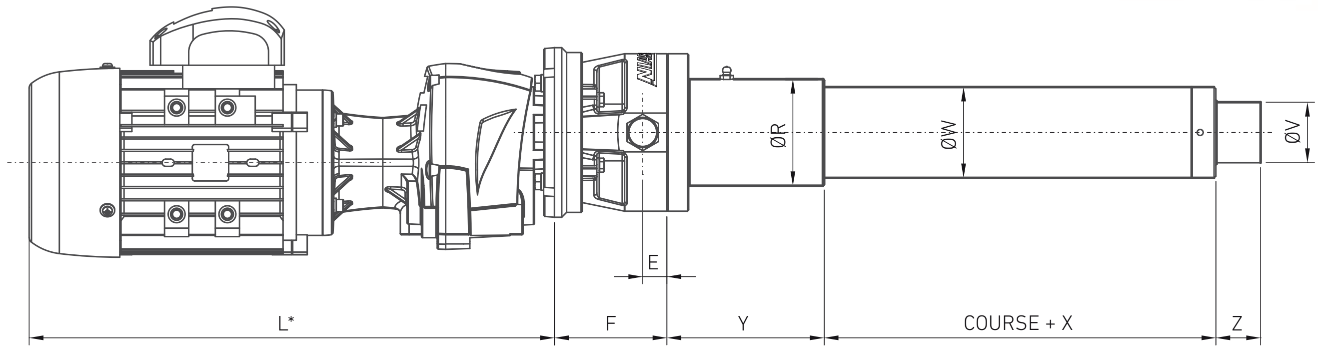
ES LINEAR ACTUATOR F/A – CONFIGURATION M205

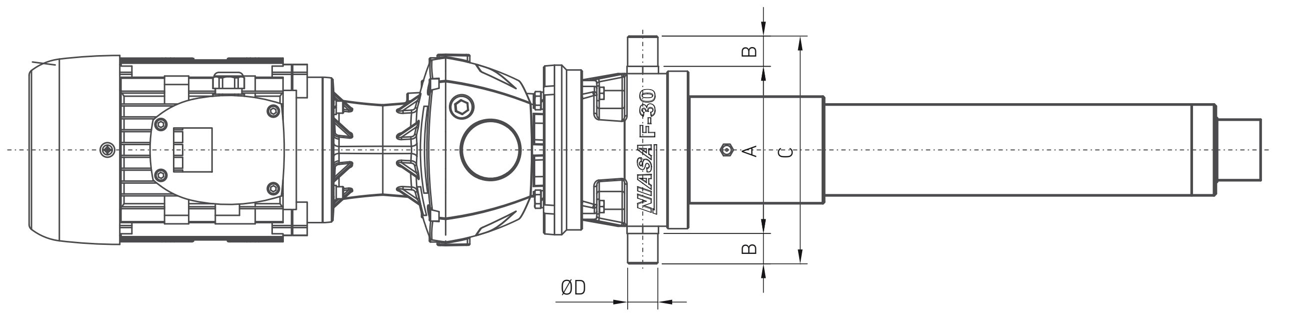
UP TO **86 kN**

Tr TRAPEZ. KGS BALLS

In line motoreducer

There is a large range of reductions available for the M205 configuration.





*Depends on the motoreducer selected and the manufacturer.
For further information, please contact the NIASA technical department.

	M205 configuration dimensions						M100 configuration general dimensions						
	A	B	C	ØD f8	E	F	X	Y	Z	ØV	ØW	ØR	More dimensions
F20	116	20	156	20	15	86	106	100	36	35	55	66	Page 80
F30	138	25	188	25	20	93	124	130	37	50	75	88	Page 82
F40	160	40	240	35	30	110	155	150	67	70	90	110	Page 84
F45	200	40	280	40	35	134	175	195	65	90	115	140	Page 86
F50	260	50	360	45	40	186	185	300	95	110	150	196	Page 87

... See calculations chapter (page 98) for calculating the drive and start-up torque, and the required power.

... Ensure that the dynamic load of the application does not surpass the critical values, in order to avoid overheating and buckling of the unit. Please contact NIASA

Maximum axial strength

	Screw diameter and pitch (mm)	Load (kN)
F20 /A20	Tr 24x5	9.5
	KGS 2005	10.5
	KGS 2020	5.5
F30 / A30	Tr 36x6	15
	KGS 3205	21.5
	KGS 3210	23.5
	KGS 3220	12
	KGS 3240	6
F40 / A40	Tr 45x7	22
	KGS 4010	38
	KGS 4020	21.5
	KGS 4040	11
F45	Tr 50x8	47.5
	KGS 5010	78
F50	Tr 70x10	60.5
	KGS 6310	86

Standard drives

The standard drives of the M205 F-configuration are implemented by means of in line reducers driven by Ac motors. The following table shows the powers available for each size actuator/reducer and the type of flange.

For another size or different type of drive, please contact NIASA. NIASA can supply alternating or stepper motors with sensors of any type, etc.

If using ball screws, the actuator is reversible. In general, it is always recommended using motors with brake. In most cases, standard brakes for each motor size are sufficient. This will ensure the stem does not loose position when it stops or if there are vibrations, etc.

<table>
<tr><th rowspan="5"></th><th rowspan="5">Ø Reducer input shaft</th><th rowspan="5" colspan="2">Flange reducer</th><th colspan="16">MOTOR GROUP</th></tr>
<tr><th colspan="2">56</th><th colspan="2">63</th><th colspan="2">71</th><th colspan="2">80</th><th colspan="2">90</th><th colspan="2">100</th><th>112</th><th colspan="2">132</th><th>160</th></tr>
<tr><th colspan="16">POWER (kW)</th></tr>
<tr><th>A</th><th>B</th><th>A</th><th>B</th><th>A</th><th>B</th><th>A</th><th>B</th><th>A</th><th>B</th><th>A</th><th>B</th><th>A</th><th>A</th><th>B</th><th>A</th></tr>
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<tr><td>F20 / A20</td><td>20</td><td>B5</td><td>Ø140</td><td colspan="2">•</td><td colspan="2">•</td><td colspan="2">•</td><td colspan="2">•</td><td colspan="2"></td><td colspan="2"></td><td></td><td></td><td></td><td></td></tr>
<tr><td>F30 / A30</td><td>20</td><td>B5</td><td>Ø140</td><td colspan="2"></td><td colspan="2">•</td><td colspan="2">•</td><td colspan="2">•</td><td colspan="2">•</td><td colspan="2"></td><td></td><td></td><td></td><td></td></tr>
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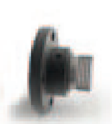
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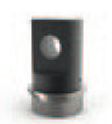
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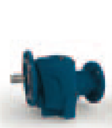
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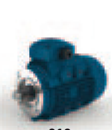
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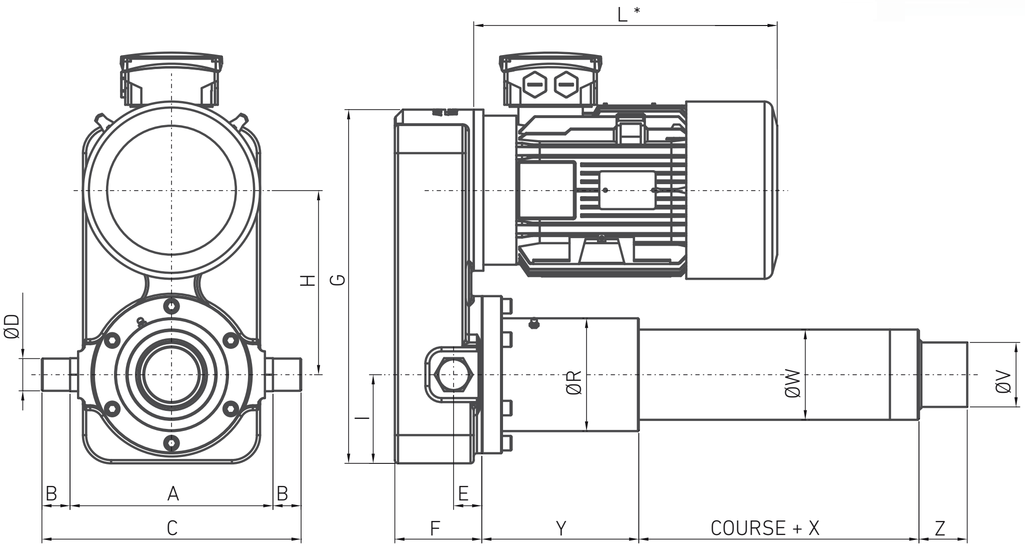
ES LINEAR ACTUATOR F/A – CONFIGURATION M501

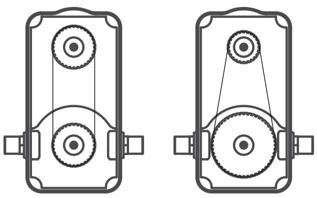
UP TO **86 kN** Tr TRAPEZ. KGS BALLS

Parallel drive

There is a possibility of mounting a coaxial motoreducer into the gearbox instead of the motor, or modifying the ratio between the pulleys, with the aim of achieving the desired transmission ratio.



Standard transmission ratio



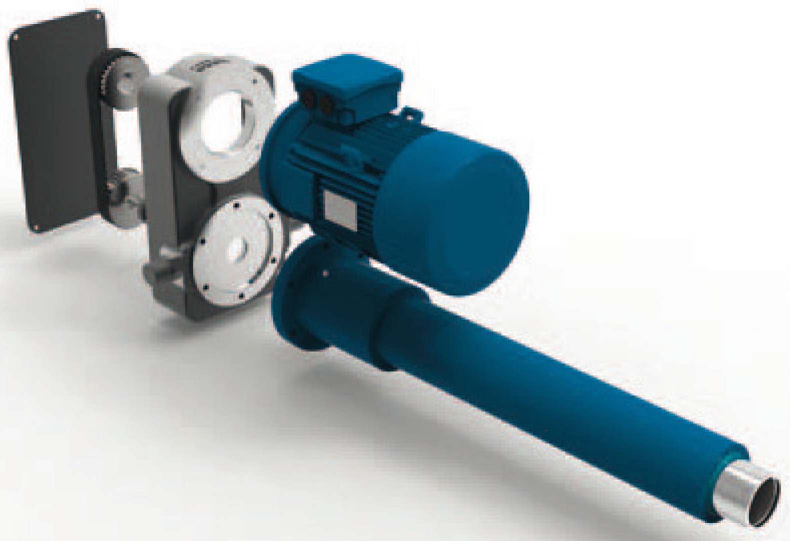
1:1 1:2

*Depends on the motor selected and the manufacturer.
For further information, please contact the NIASA technical department.

	M501 configuration dimensions									M100 configuration general dimensions						
	A	B	C	ØD f8	E	F	G	H	I	X	Y	Z	ØV	ØW	ØR	More dimensions
F16	134	15	164	15	12	45	200	100	50	84	61	36	32	40	45	Page 78
F20	148	20	188	20	15	55	250	130	60	106	100	36	35	55	66	Page 80
F30	178	25	228	25	20	65	300	160	70	124	130	37	50	75	88	Page 82
F40	227	40	307	35	30	85	356	180	90	155	150	67	70	90	110	Page 84
F45	252	40	332	40	35	108	440	230	110	175	195	65	90	115	140	Page 86
F50	336	50	436	45	40	138	560	280	150	185	300	95	110	150	196	Page 87

Maximum axial strength

	Screw diameter and pitch (mm)	Load (kN)
F16 / A16	Tr 16x4	3.5
	KGS 1605	6
F20 / A20	Tr 24x5	9.5
	KGS 2005	10.5
	KGS 2020	5.5
F30 / A30	Tr 36x6	15
	KGS 3205	21.5
	KGS 3210	23.5
	KGS 3220	12
	KGS 3240	6
F40 / A40	Tr 45x7	22
	KGS 4010	38
	KGS 4020	21.5
	KGS 4040	11
F45	Tr 50x8	47.5
	KGS 5010	78
F50	Tr 70x10	60.5
	KGS 6310	86



Standard drives

The standard drive of M501 F/A configuration linear actuators is implemented by means of Ac motors and aluminum pulleys with polyurethane toothed strap. The following table shows the powers available for each actuator size.

For another size or different type of drive, please contact NIASA. NIASA can supply other kind of motors with sensors of any type, etc.

If using ball screws, the actuator is reversible. In general, it is always advisable that the motors have brakes. In most cases, standard brakes for each motor size are sufficient. This will ensure the stem does not loose position when it stops or if there are vibrations, etc.

MOTOR GROUP	56	63	71	80	90	100	112	132	160
POWER (kW) A	0.06	0.12	0.25	0.55	1.1	2.2	4	5.5	11
POWER (kW) B	0.09	0.18	0.37	0.75	1.5	3		7.5	
F16 / A16	●	●	●						
F20 / A20		●	●	●					
F30 / A30			●	●	●				
F40 / A40				●	●	●	●		
F45					●	●	●	●	
F50						●	●	●	●

All the motors have B14 flange.


272

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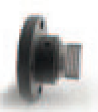
276

278

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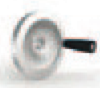
300

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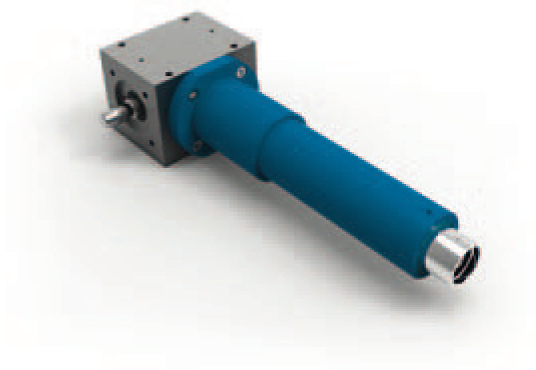
ES LINEAR ACTUATOR F/A - CONFIGURATION M505

UP TO 23.5 kN

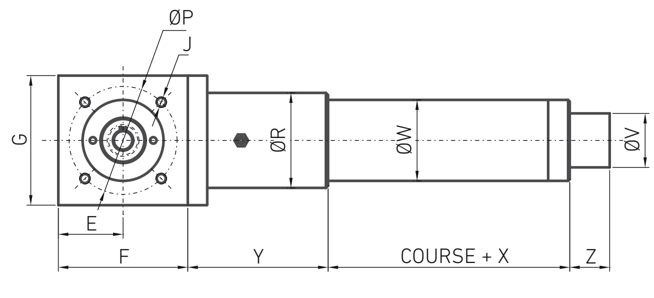
Tr TRAPEZ. KGS BALLS

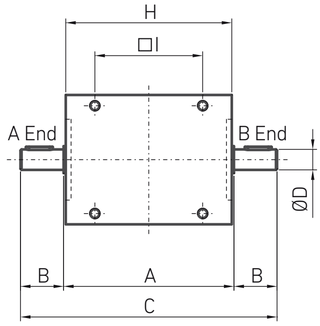


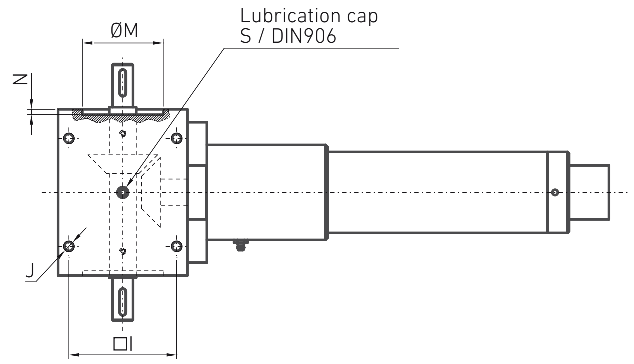
For drive at 90°

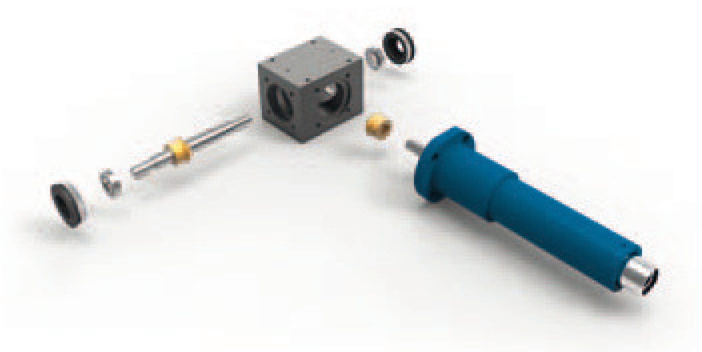
The transmission ratio of the bevel gearboxes with helical conical gears is 1:1.

There is a possibility, at the customer's request, of supplying the M505 configuration with one of the sides of the shaft cut (A, B).









	M505 configuration dimensions													
	A	B	C	ØD h6	E	F	G	H	I	ØM H7	N	ØP	K	J
F16	86	25	136	14	32.5	65	70	84	45	58	2	75	5x5x20	M6x10
F20	112.5	34	180.5	16	45	89	90	110	70	62	3	75	5x5x25	M8x14
F30	158	40	238	19	60	120	120	154	100	75	5	100	6x6x25	M10x18

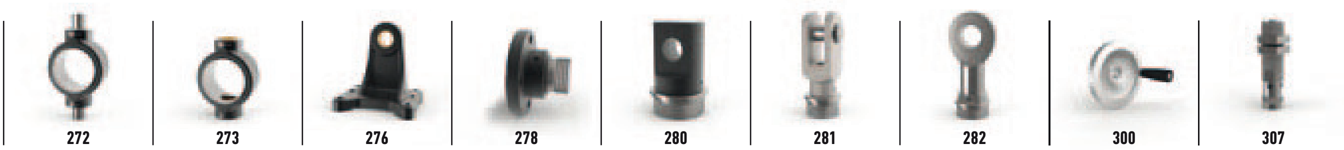
	M100 configuration general dimensions						
	X	Y	Z	ØV	ØW	ØR	More dimensions
F16	84	61	36	32	40	45	Page 78
F20	106	100	36	35	55	66	Page 80
F30	124	130	37	50	75	88	Page 82

Maximum axial strength

	Diameter and pitch screw (mm)	Load (kN)
F16 / A16	Tr 16x4	3.5
	KGS 1605	6
F20 / A20	Tr 24x5	9.5
	KGS 2005	10.5
	KGS 2020	5.5
F30 / A30	Tr 36x6	15
	KGS 3205	21.5
	KGS 3210	23.5
	KGS 3220	12
	KGS 3240	6

... Contact the NIASA technical department for the different drive possibilities.

... If using ball screws, the actuator is reversible. In general, it is always advisable that the motors have brakes. In most cases, standard brakes for each motor size are sufficient. This will ensure the stem does not loose position when it stops or if there are vibrations, etc.

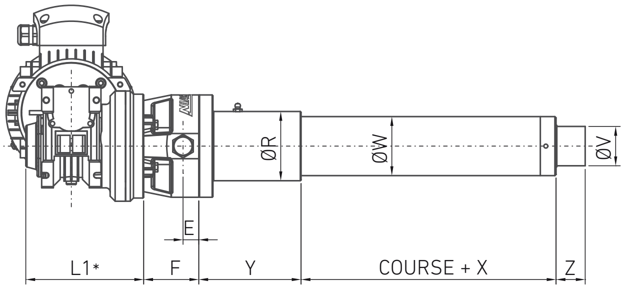


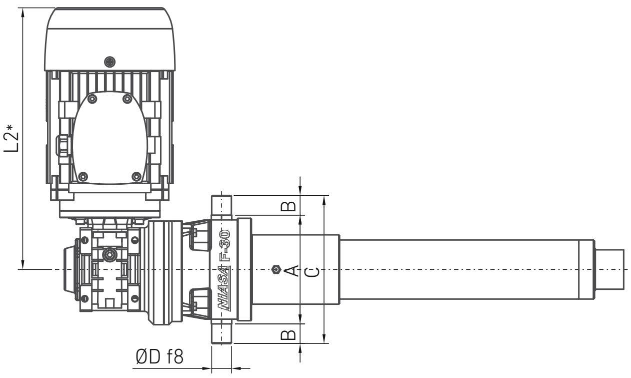
ES LINEAR ACTUATOR F/A – CONFIGURATION M601

UP TO **86 kN** Tr TRAPEZ. KGS BALLS

Motoreducer at 90°

There is a large range of reductions available for the M601 configuration.





*Depends on the motoreducer selected and the manufacturer.
For further information, please contact the NIASA technical department.

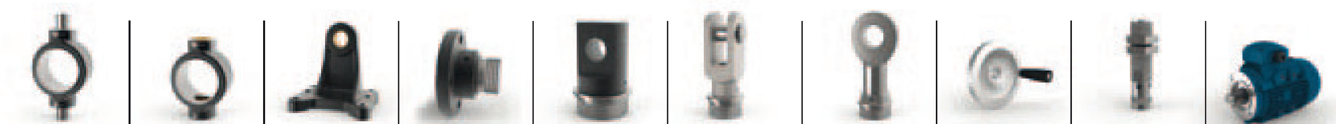
	M601 configuration dimensions						M100 configuration general dimensions						
	A	B	C	ØD f8	E	F	X	Y	Z	ØV	ØW	ØR	More dimensions
F20	116	20	156	20	15	55	106	100	36	35	55	66	Page 80
F30	138	25	188	25	20	70	124	130	37	50	75	88	Page 82
F40	160	40	240	35	30	75	155	150	67	70	90	110	Page 84
F45	200	40	280	40	35	105	175	195	65	90	115	140	Page 86
F50	260	50	360	45	40	130	185	300	95	110	150	196	Page 87

Maximum axial strength

	Diameter and pitch screw (mm)	Load (kN)
F20 / A20	Tr 24x5	9.5
	KGS 2005	10.5
	KGS 2020	5.5
F30 / A30	Tr 36x6	15
	KGS 3205	21.5
	KGS 3210	23.5
	KGS 3220	12
	KGS 3240	6
F40 / A40	Tr 45x7	22
	KGS 4010	38
	KGS 4020	21.5
	KGS 4040	11
F45	Tr 50x8	47.5
	KGS 5010	78
F50	Tr 70x10	60.5
	KGS 6310	86

... Contact the NIASA technical department for the different drive possibilities.

... If using ball screws, the actuator is reversible. In general, it is always advisable that the motors have brakes. In most cases, standard brakes for each motor size are sufficient. This will ensure the stem does not   when it stops or if there are vibrations, etc.



272 273 276 278 280 281 282 300 307 312

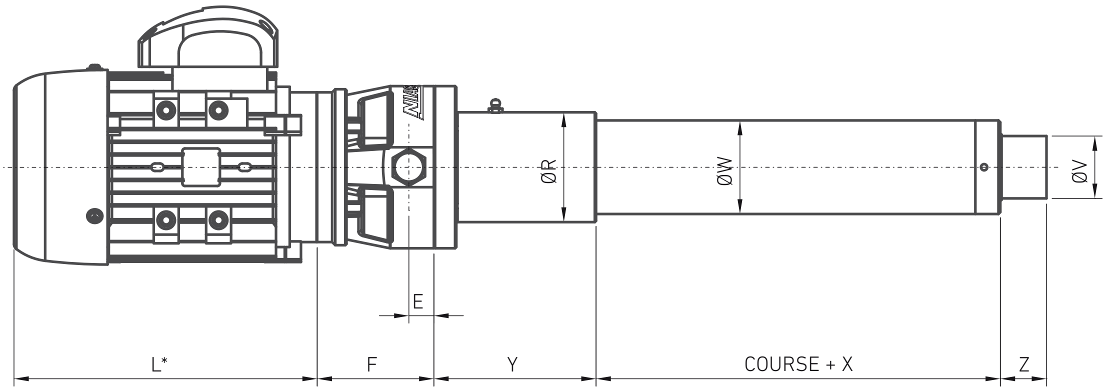
ES LINEAR ACTUATOR F/A - CONFIGURATION M605

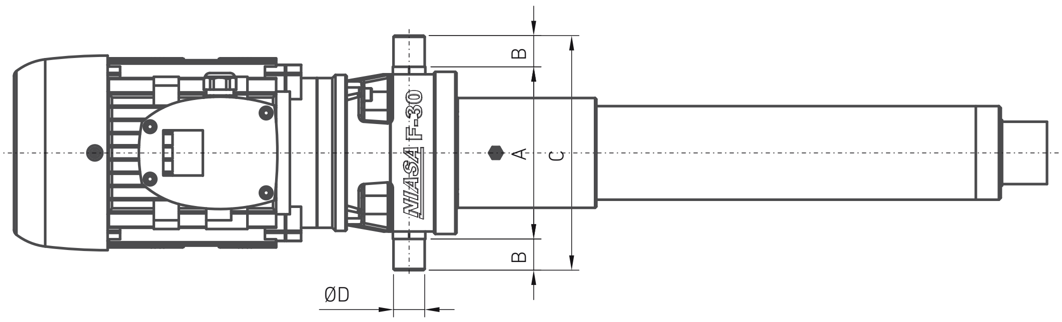
UP TO 86 kN

Tr TRAPEZ. KGS BALLS

In line motor

There is a large range of reductions available for the M605 configuration.





*Depends on the motor group selected and the manufacturer.
For further information, please contact the NIASA technical department

	M205 configuration dimensions					M100 configuration general dimensions						
	A	B	C	ØD f8	E	X	Y	Z	ØV	ØW	ØR	More dimensions
F16	82	15	112	15	12	84	61	36	32	40	45	Page 78
F20	116	20	156	20	15	106	100	36	35	55	66	Page 80
F30	138	25	188	25	20	124	130	37	50	75	88	Page 82
F40	160	40	240	35	30	155	150	67	70	90	110	Page 84
F45	200	40	280	40	35	175	195	65	90	115	140	Page 86
F50	260	50	360	45	40	185	300	95	110	150	196	Page 87

Maximum axial strength

	Diameter and pitch screw (mm)	Load (kN)
F16 / A16	Tr 16x4	3.5
	KGS 1605	6
F20 / A20	Tr 24x5	9.5
	KGS 2005	10.5
	KGS 2020	5.5
F30 / A30	Tr 36x6	15
	KGS 3205	21.5
	KGS 3210	23.5
	KGS 3220	12
	KGS 3240	6
F40 / A40	Tr 45x7	22
	KGS 4010	38
	KGS 4020	21.5
	KGS 4040	11
F45	Tr 50x8	47.5
	KGS 5010	78
F50	Tr 70x10	60.5
	KGS 6310	86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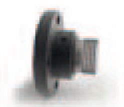
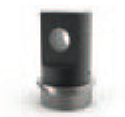

278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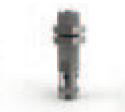
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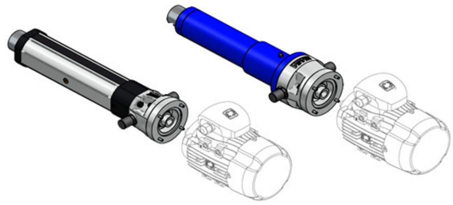
Linear actuators
ACCESORIES



MOTOR BELL AMB

The standard drive of Linear Actuators is made using asynchronous AC motors. The following table shows the available motor flanges (IEC type and size) for each actuators size. For other types/sizes of motors, please contact NIASA. We can supply adapters for any kind of electrical motor (AC single phase, AC with integrated inverter, DC, BLDC, stepper, …).

> ⚠ Ensure motor is not overdimensioned for the selected linear actuator size. It may cause damage, or even breakage, of it. For powers higher than the indicated ones in the next table, contact NIASA.

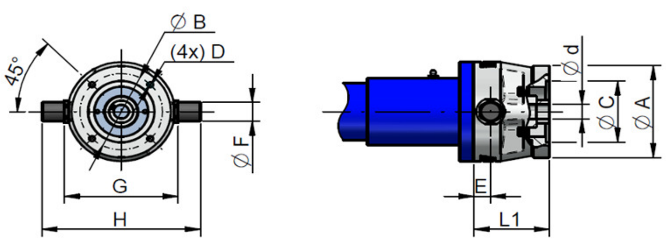
DIMENSIONS AND WEIGHTS

Linear actuat. size	Motor flange (IEC type & size)	Power (kW) Option A	Power (kW) Option B	Bell [1] ØA (mm)	ØB (mm)	ØC (mm)	D (mm)	Ød [2] (mm)	E (mm)	ØF f8 (mm)	G (mm) Type F	H (mm) Type F	G' (mm) Type A	H' (mm) Type A	L_1 (mm)	Weight (kg)
F16 A16	56 B14A	0,06	0,09	80	65	50	Ø5.5	9	12	15	82	118	85	121	48	0,5
	63 B14A	0,12	0,18	90	75	60	Ø5.5	11							50	0,5
	71 B14A	0,25	0,37	105	85	70	Ø6.5	14							57	0,7
F20 A20	63 B14A	0,12	0,18	90	75	60	Ø5.5	11	15	20	116	160	100	144	71	1,3
	71 B14A	0,25	0,37	105	85	70	Ø6.5	14							73	1,4
	80 B14A	0,55	0,75	120	100	80	Ø6.5	19							86	1,8
F30 A30	71 B14A	0,25	0,37	105	85	70	Ø6.5	14	20	25	138	192	125	179	81	2
	80 B14A	0,55	0,75	120	100	80	Ø6.5	19							91	2,3
	90 B14A	1,1	1,5	140	115	95	Ø8.5	24							101	2,7
F40 A40	80 B14A	0,55	0,75	130	100	80	Ø6.5	19	30	35	160	224	160	224	98	3,6
	90 B14A	1,1	1,5	140	115	95	Ø8.5	24							108	3,9
	100 B14A	2,2	3	160	130	110	Ø8.5	28							118	4,4
	112 B14A	4														
F45	90 B14A	1,1	1,5	160	115	95	Ø8.5	24	35	45	200	294	-	-	125	6,9
	100 B14A	2,2	3	160	115	95	Ø8.5	28							135	7,3
	112 B14A	4														
	132 B14A	5,5	7,5	200	165	130	Ø11	38							155	9,5
F50	100 B14A	2,2	3	200	130	110	Ø8.5	28	40	50	260	364	-	-	160	13,5
	112 B14A	4														
	132 B14A	5,5	7,5	200	165	130	Ø11	38							180	14,8
	160 B14A	11	15	250	215	180	Ø13	42							214	20,3

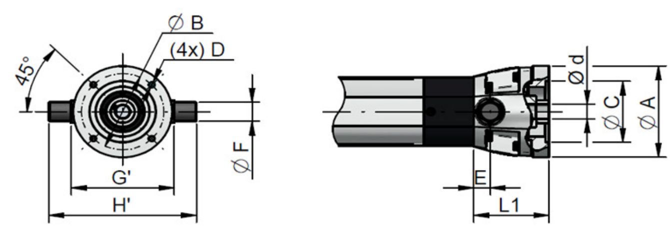
AMB - F30 - 71 B14A - 1 - IN

- **F30**: **Linear actuat. size**
- **71 B14A**: **Motor flange**
- **1**: **Trunnions**
  - **1** Yes
  - **0** No [3]
- **IN**: **Application**
  - **IN** Indoor
  - **OU** Outdoor
  - **SP** Special category to ISO 12944

[1] It includes coupling and fasteners to fix motor
[2] Coupling key way according to DIN 6885
[3] The motor bell is supplied with plastic cups to protect trunnions threaded holes



ACTUATOR TYPE F



ACTUATOR TYPE A

MATERIALS AND SURFACE TREATMENTS

	Indoor applications [1]	Outdoor applications [2]
Bell (aluminium):	Anodizing (8~12 πm)	Anodizing (15~20 πm)
Fastenings:	Black oxide coating	Stainless steel

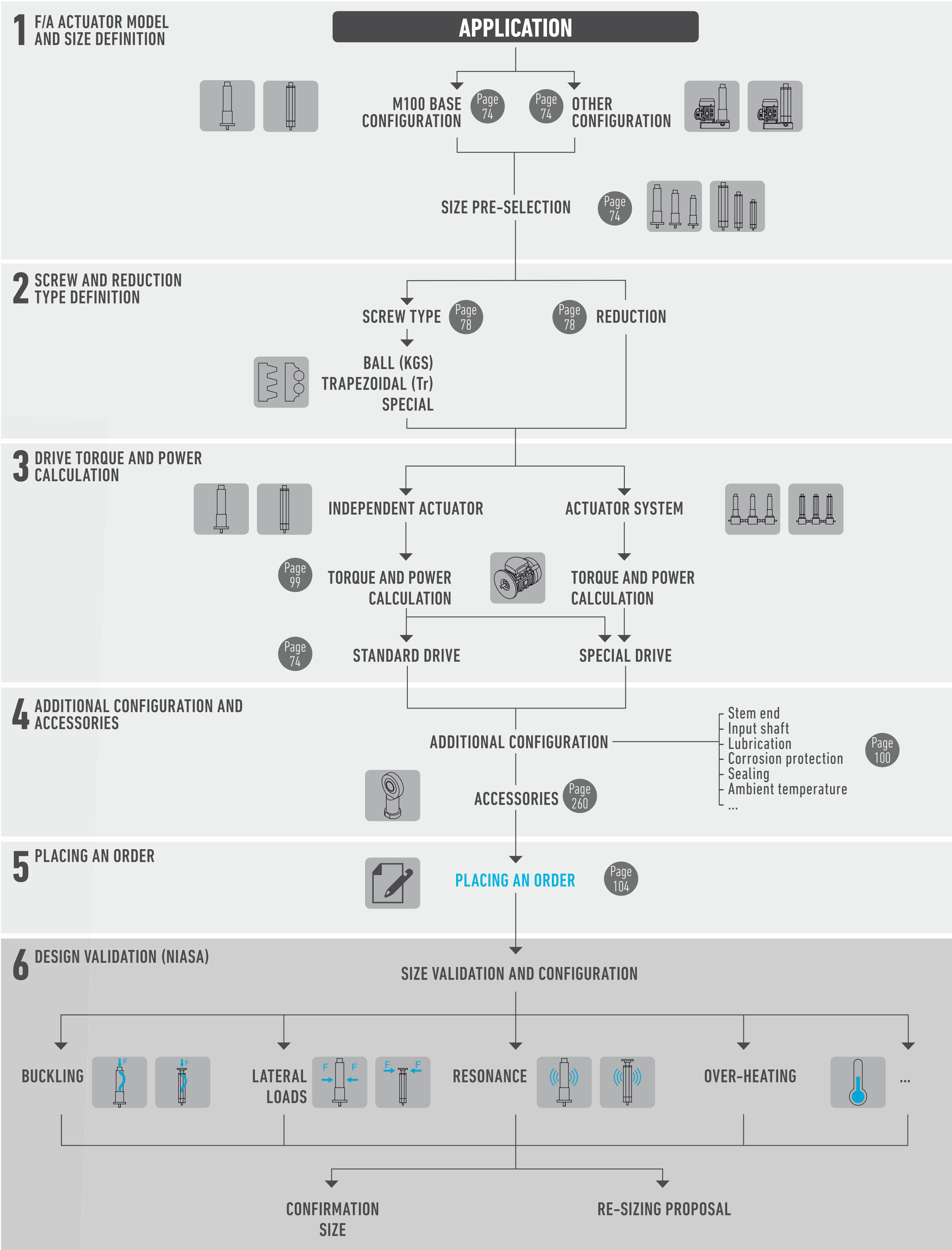
[1] Approx. C2-Medium durability (ISO 12944).
[2] Approx. C3-Medium durability (ISO 12944).
Special coatings on request, until C5 (ISO 12944)

LINEAR ACTUATORS
F SERIES: STEEL TUBE | A SERIES: ALUMINUM TUBE

PRODUCT SELECTION

To select the correct F/A Series linear actuator, please follow this flow diagram.

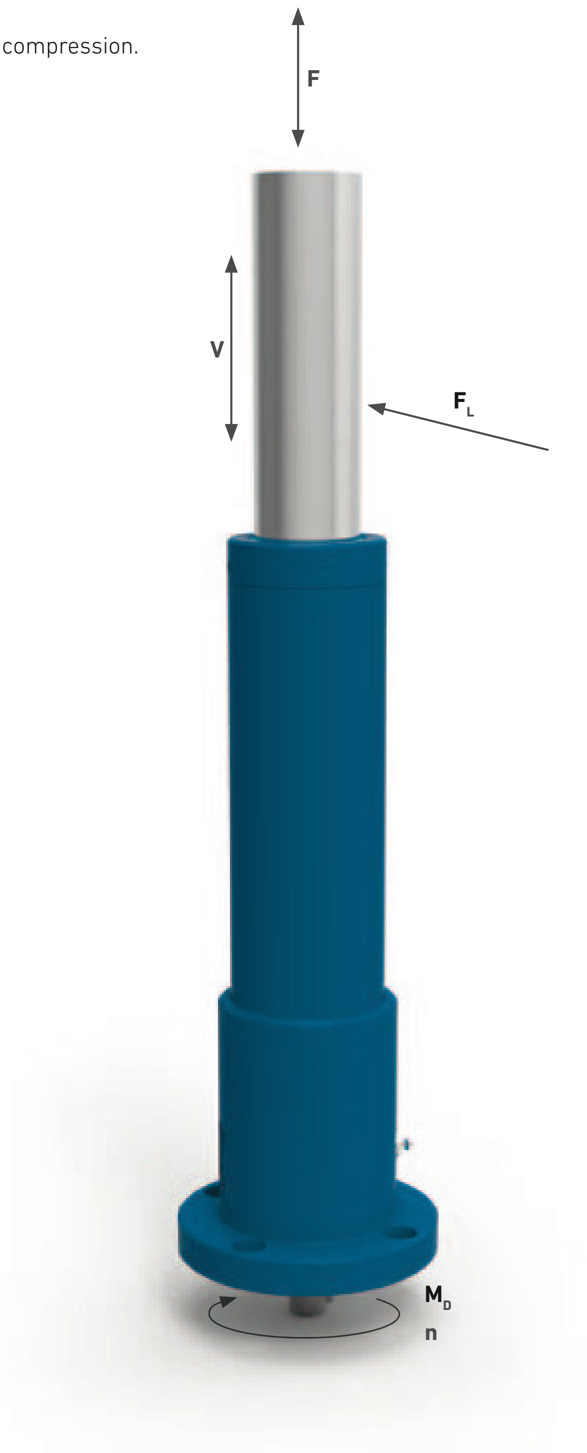
If you would like to know the expected service life of a unit for your application, please send the relevant data to the NIASA service department.


1 F/A ACTUATOR MODEL AND SIZE DEFINITION
APPLICATION
M100 BASE CONFIGURATION
Page 74
Page 74
OTHER CONFIGURATION
SIZE PRE-SELECTION
Page 74
2 SCREW AND REDUCTION TYPE DEFINITION
SCREW TYPE
Page 78
Page 78
REDUCTION
BALL (KGS)
TRAPEZOIDAL (Tr)
SPECIAL
3 DRIVE TORQUE AND POWER CALCULATION
INDEPENDENT ACTUATOR
ACTUATOR SYSTEM
Page 99
TORQUE AND POWER CALCULATION
TORQUE AND POWER CALCULATION
Page 74
STANDARD DRIVE
SPECIAL DRIVE
4 ADDITIONAL CONFIGURATION AND ACCESSORIES
ADDITIONAL CONFIGURATION
Stem end
Input shaft
Lubrication
Corrosion protection
Sealing
Ambient temperature
...
Page 100
ACCESSORIES
Page 260
5 PLACING AN ORDER
PLACING AN ORDER
Page 104
6 DESIGN VALIDATION (NIASA)
SIZE VALIDATION AND CONFIGURATION
BUCKLING
F
F
LATERAL LOADS
F F
F F
RESONANCE
OVER-HEATING
...
CONFIRMATION SIZE
RE-SIZING PROPOSAL

PRODUCT SELECTION

STRENGTH AND TORQUE ACTING ON AN F/A SERIES LINEAR ACTUATOR

F Load to move at traction and/or compression.
F_L Lateral load on the stem.
V Stem travel speed.
M_D Torque on the input shaft.
n Speed on the input shaft.



PRODUCT SELECTION

TORQUE AND POWER OF A LINEAR ACTUATOR

After pre-selecting the suitable linear actuator for the application, select the drive motor, following the steps below:

1. DRIVE TORQUE

$$M_D\,(Nm) = \left(\frac{F \times P}{2 \times \pi \times 0{,}9 \times \eta_{DS}} + M_i\right) \times \frac{1}{\eta_{DR} \times i_R}$$

- M_D Drive torque (kN)
- F Load to move in dynamic (kN)
- P Screw pitch (mm)
- M_i Idle torque (Nm)
- i_R Input reduction, see for configurations M205, M501, M505 and M601; i = 1 for M605 and M100
- **0.9** Cylinder dynamic efficiency
- η_{DS} Screw dynamic efficiency
- η_{DR} Reduction element dynamic efficiency:
  - M205: η_{DR} = 0,95 (coaxial reducer)
  - M501: η_{DR} = 0,97 (toothed strap)
  - M505: η_{DR} = 0,90 (90° bevel gearbox)
  - M601: η_{DR}, according to reduction (worm wheel and shaft)
  - M605 and M100 = 1, without reducer

2. A POWER REQUIRED

$$P_D\,(kW) = \frac{M_D \times n}{9550}$$

- M_D Drive torque (Nm)
- n Screw jack input speed (rpm)

IMPORTANT

... In general, it is advisable to multiply the power value calculated for a safety coefficient of 1.3 to 2; the smaller the installation the higher the coefficient

... When the load to move is lower than 10% of the elevator's nominal load, consider that value as the load to move.

3. START-UP TORQUE

In general, it must be calculated by multiplying the drive torque by two.

η_{DS} Screw dynamic efficiency

Trapezoidal screw (Tr)					
16 x 4	24 x 5	36 x 6	45 x 7	50 x 8	70 x 10
0.44	0.39	0.34	0.32	0.33	0.30

Ball screw (KGS)
0.9 (for all sizes)

M_i Idle Torque

F16 / A16		F20 / A20		F30 / A30	
Tr 16×4	0.38	Tr 24×5	0.52	Tr 36×6	1.6
KGS 1605	0.25	KGS 2005	0.42	KGS 3205	1.3
		KGS 2020	0.48	KGS 3210	1.3
				KGS 3220	1.3
				KGS 3240	1.3

F40 / A40		F45		F50	
Tr 45×7	1.9	Tr 50×8	2.1	Tr 70×10	2.1
KGS 4010	1.6	KGS 5010	1.7	KGS 6310	1.5
KGS 4020	1.7				
KGS 4040	1.7				

IMPORTANT

... The values indicated in the tables correspond to the lubrication conditions established by NIASA and will be reached after a small period of operation.

... In the case of low temperatures, these can be reduced considerably.

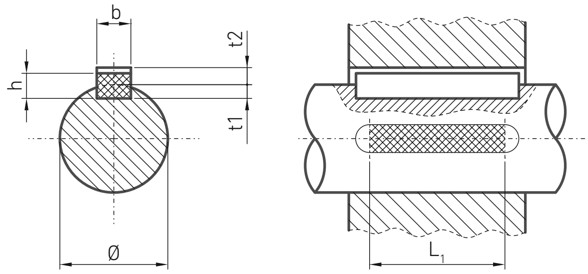
PRODUCT SELECTION

MAXIMUM TRANSFERABLE TORQUE ACCORDING TO SHAFT/ PARALLEL COTTER PIN (DIN 6885)

The following table shows the maximum transferrable torque of a shaft and its keys. It is considered that the shaft is subject exclusively to torsional forces.

IMPORTANT

... Never subject the input of a screw jack to torque over that indicated for its shaft and keys (see plans in the chapter "sizes", page 74).



Shaft diameter Ø (mm)	Key dimensions			Maximum transferrable torque, M_D (Nm) Key effective length, L_1 (mm)							
	b x h (mm)	t1 (mm)	t2 (mm)	10	16	20	28	40	50	70	100
8 – 10	3 x 3	1.8	1.4	5	9	12	-	-	-	-	-
10 – 12	4 x 4	2.5	1.8	9	13	17	-	-	-	-	-
12 – 17	5 x 5	3	2.3	15	24	30	42	-	-	-	-
17 – 22	6 x 6	3.5	2.8	25	40	50	70	100	-	-	-
22 – 30	8 x 7	4	3.3	39	63	78	109	157	195	-	-
30 – 38	10 x 8	5	3.3	50	82	102	143	204	255	357	-
38 – 44	12 x 8	5	3.3	62	98	123	173	247	308	432	-

Material: C45 (1.1191) according to EN 10083-1
Load type: Drive - Uniform /
Load - Light knocks
Assembly: tight
Cycles: >1,000,000
Safety factor: 1.5 - 2.5
IMPORTANT For other conditions, please contact the NIASA technical department

PRODUCT SELECTION

LUBRICATION

The lineal actuator is supplied with G421 DIVINOL LITHOGREASE for all applications with trapezoidal screws and L152 KLUBER ISOFLEX TOPAS class 2, DIN51818 for ball screws. For high speeds it is recommended to choose class 1 and heavy loads class 3.

A change of grease type may affect the correct operation of the equipment.

Specifications

A complete cleaning and change of grease is recommended

Lithium compound semi-synthetic grease DIVINOL LITHOGREASE G421	
Working temperature	-35 to +160°C
Density at 15°C	0.9 kg/dm^3
Cinematic viscosity (s/DIN 51 562)	130 mm^2/s at 40°C 15 mm^2/s at 100°C
Dropping point (s/DIN ISO 2176)	>220°C
Water resistance (s/DIN 51 807/T1)	Level 1

Synthetic hydrocarbon grease with lithium soap KLUBER ISOFLEX TOPAS L152	
Working temperature	-50 to +150°C
Density at 20°C	0.9 kg/dm^3
Cinematic viscosity (s/DIN 51 562)	100 mm^2/s at 40°C 14.5 mm^2/s at 100°C
Dropping point (s/DIN ISO 2176)	>185°C
Water resistance (s/DIN 51 807/T1)	Level 1

A complete cleaning and change of grease is recommended after five years.
The greasing interval...
For further information, please contact the NIASA technical department.

The greasing interval depends on the type of work and its cycle. Under normal conditions it is recommended to lubricate every 800 - 2,000 hours of operation. It is important to avoid over-lubricating.

A group lubricator is recommended for automatic lubrication, which feeds the lubrication point. Depending on the type of group lubricator, the lubrication may last up to two years.

NIASA supplies its actuators with the following type of hydraulic lubricating mechanism:

... Straight lubricator DIN 71412 type A (Actuator F).

... Brass cap with O-ring (Actuator A).

... As a greasing nozzle for the nipples, the 515/G – 516/G hydraulic connector is recommended.
For its protection and conservation, the use of plastic caps is advised.

There is a possibility to supply F Series actuators with a brass lubrication cap with an O-ring, and vice versa for A Series. See the lubrication chapter in accessories.

PRODUCT SELECTION

PROTECTION AGAINST CORROSION, SEALING AND AMBIENT TEMPERATURE

PROTECTION AGAINST CORROSION

Select the environment in which the equipment will work, using the atmospheric corrosion categories classification established in the DIN EN ISO 12944-2 standard (protection against the corrosion of steel structures using painted systems). Also establish the durability required before carrying out the first maintenance of the exterior surfaces (durability does not imply a "time" guarantee).

If the corrosion category is higher than “C3” for your application and/or higher than “average” durability is required, please contact NIASA so that the technical department can select the surface protection system and select the most suitable components.

CORROSION CATEGORY		ENVIRONMENT	
		Outdoors	Indoors
C1	Very low		Buildings with heating and clean atmospheres.
C2	Low	Atmospheres with low levels of pollution. Rural areas.	Buildings with no heating and possible condensation.
C3	Medium	Urban and industrial atmospheres, with moderate SO_2 pollution. Coastal areas with low salinity.	Manufacturing plants with high humidity and some pollution.
C4	High	Industrial areas and coastal areas with moderate salinity.	Chemical and swimming pool industries.
C5-I	Very high (industrial)	Industrial areas with high humidity and aggressive atmosphere.	Buildings or areas with almost permanent condensation and high contamination.
C5-M	Very high (maritime)	Coastal and maritime areas with high salinity.	Buildings or areas with permanent condensation and high contamination.

DURABILITY		
LOW	L	2 to 5 years
MEDIUM	M	5 to 15 years
HIGH	H	More than 15 years

PROTECTION AGAINST THE INPUT OF SOLIDS AND LIQUIDS

NIASA actuators offer, as standard, an IP65 protection index to prevent solid and liquid particles from entering the inside, which may damage them or reduce their designed service life.

Use the following table, according to the DIN EN IEC 60529 standard, if the level of protection must be higher than that indicated. NIASA supplies, on request, specially designed units to withstand the most aggressive environments.

The protection levels are defined with a code made up of the letters “IP“ and two numbers “XY”.

LEVEL OF PROTECTION “IP”, AGAINST THE INPUT OF ...			
... solid particles: “X”		... liquids: “Y”	
	...		...
5	Protection against dust residues (the dust that may penetrate the inside does not imply incorrect operation of the equipment).	3	Protection against spray water (from angle up to 60° with vertical).
6	Total protection against the penetration of any kind of solid body (sealing).	4	Protection against water splashes (from any direction).
		5	Protection against water streams from any direction with hose.
		6	Protection against sporadic floods (example: tidal wave).
		...	...

AMBIENT TEMPERATURE

Contact NIASA if your unit will be installed in an environment that may reach temperatures below -20°C and/or above +40°C.

NIASA's technical department will prescribe the most suitable materials and sealing components for the specific conditions of the application.

PRODUCT SELECTION

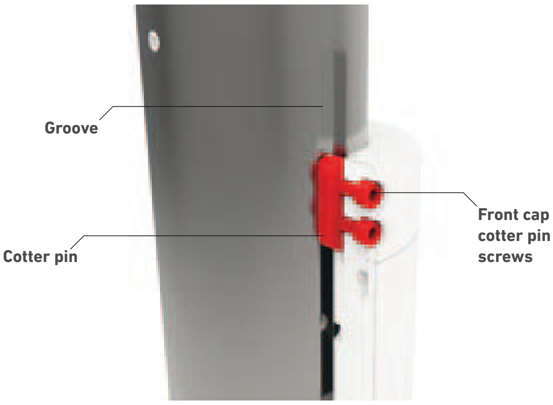
OPTIONAL CONFIGURATIONS

Optionally, NIASA may adapt your F/A actuator, modifying the different parts of it to your preferences.

Some examples are shown below.
See sub-section “Placing an order”.

Immobilizations

The F Series electro-mechanical actuators, on request, can be supplied with the immobilized stem in rotation. This is achieved by mounting a key on the upper cap and machining a groove along the stem.

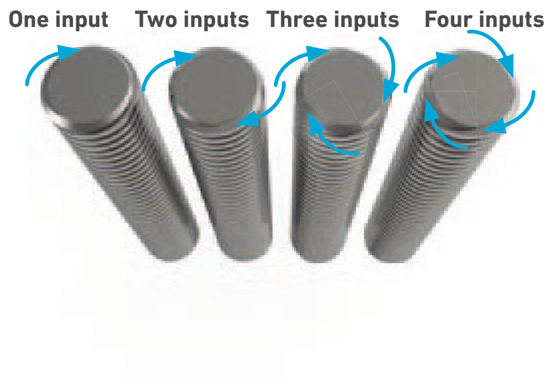


With this configuration, the scraper for the stem cannot be mounted on the front cap. To avoid the possible entry of particles or liquid through the stem, it is recommended to mount a bellow to protect it.

For further information, please contact the NIASA technical department.

Special configurations

At the customer's request, the linear actuators can be supplied with a screw of several inputs so that higher speeds can be obtained.



LINEAR ACTUATORS

F SERIES: STEEL TUBE | A SERIES: ALUMINUM TUBE

ORDER DESIGNATION

01

SIZE

F16 / A16
F20 / A20
F30 / A30
F40 / A40
F45
F50

02

CONFIGURATION

M100 Base
M205 In line motoreducer
M501 Parallel drive
M505 For drive at 90º
M601 Motoreducer at 90º
M605 In line motor

03

REDUCTION

Configuration M501
01 Reduction 1:1
02 Reduction 1:2
SR Special reduction

Configuration M205/M601
SR To be defined

Other configurations
00 No reduction

04

EQUIPMENT GENERAL PROTECTION

IPS Standard IP protection level
IPX Special IP protection level

05

SCREW TYPE (DIAMETER x PITCH)

TRS Trapezoidal
KGS Ball

06

STROKE

0000 Equipment usable stroke in mm

07

IMMOBILISATION IN ROTATION

00 No immobilization
01 Immobilized

Example	01	02	03	04	05
	F30	M205	SR	IPS	KGS3205

02

08

STEM FASTENING ACCESSORY

BPS Flange
GKS Single rod
GKB Double rod
GIR Ball joint
FES Special end fastening
000 No accessory

09

EXTERIOR TUBE FASTENING ACCESSORY

Actuator F
BB Trunnion mount with tipper studs
BH Trunnion mount with bearings

Actuator A
BA Trunnion mount

F/A Actuator
00 No accessory

10

TILT ACCESSORY

SB With tilt support
00 No tilt support

11

LIMIT SWITCH ACCESSORY

Actuator F
FCI Inductive limit switches
FCR Inductive limit switches with regulation

Actuator A
FCG Magnetic limit switches

F/A Actuator
000 No limit switches

12

STEM PROTECTION ACCESSORY

Actuator F
FB Bellow type protector

F/A Actuator
00 No protector

13

DRIVE ADAPTATION

Configuration M100/M505
VE Wheel
00 No adaptation

Configuration M205/M501/M601/M605
MK Default adaptation corresponding to configuration
MS Special adaptation
00 No adaptation

14

MOTOR (ONLY IF CONFIGURATION M205/M501/M605)

MK drive adaptation
080 Group size
A Power-1 / **B** Power-2

MS drive adaptation
1111 Non-standard drive

Both adaptations
0000 Without drive

15

LUBRICANT

GRA Standard lubricant
GRX Lubricant for low extreme temperatures
GRS Other lubricant

16

LUBRICATION ACCESSORIES

ERT Straight lubricator (standard F Series)
ETP Sealed lubrication cap (standard A Series)
AGR Automatic lubricating accessory
000 Other lubricating accessory

17

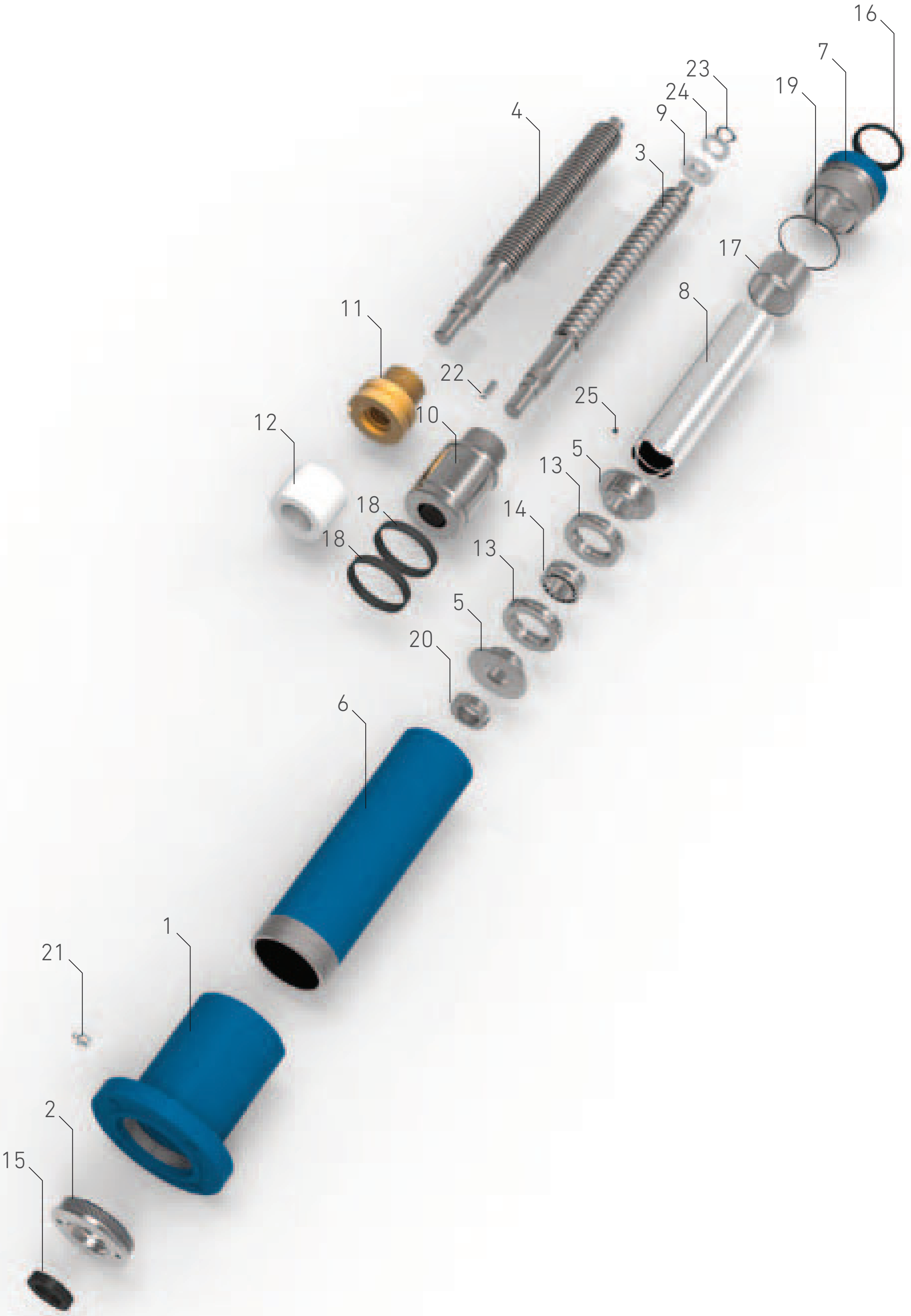
EQUIPMENT GENERAL COLOUR

RAZ Blue RAL5017 (standard F Series)
RGG Graphite grey RAL7024
RGP Silver grey RAL9006
RSP Special colour indicated by the customer
CIP Only grey 411 priming
000 Not painted (standard A Series)

06	07	08	09	10	11	12	13	14	15	16	17
0300	00	BPS	00	SB	FCI	FB	MK	GR080A	GRA	ERT	RAZ

F SERIES DISASSEMBLED

	Name
01	Body
02	Back cap
03	Ball screw
04	Trapezoidal screw
05	Bearing-holder disc
06	Exterior tube
07	Front cap
08	Stem
09	Front support
10	Ball nut
11	Trapezoidal nut
12	Supplement bushing
13	Axial bearing
14	Radial bearing
15	Seal
16	Scraper
17	Bearing
18	Guide ring
19	O-Ring
20	Grooved nut
21	Straight lubrication nipple
22	Straight key
23	Exterior circlip
24	Flat washer
25	Flat stud

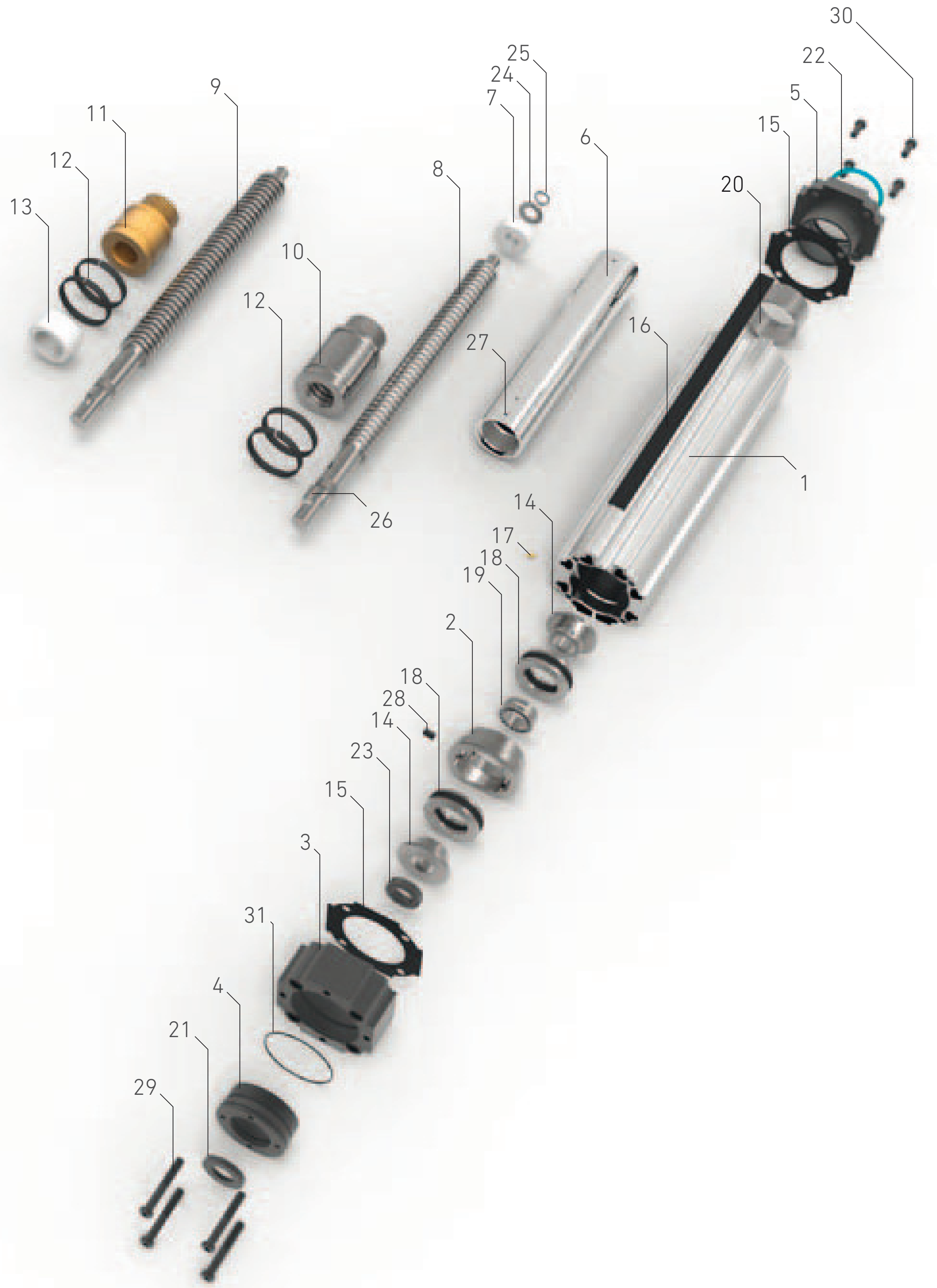


LINEAR ACTUATORS

F SERIES: STEEL TUBE | A SERIES: ALUMINUM TUBE

A SERIES DISASSEMBLED

	Name
01	Exterior tube
02	Axial package support body
03	Posterior end carriage
04	Back cap
05	Front cap
06	Stem
07	Front support
08	Ball screw
09	Trapezoidal screw
10	Ball nut
11	Trapezoidal nut
12	Guide ring
13	Supplement bushing
14	Bearing-holder disc
15	Sealed joint
16	Profile closure band
17	Lubrication cap
18	Axial bearing
19	Radial bearing
20	Bearing
21	Seal
22	Scraper
23	Grooved nut
24	Flat washer
25	Exterior circlip
26	Straight key
27	Flat stud
28	Straight stud
29	Allen screw
30	Allen screw
31	O-Ring



LINEAR ACTUATORS

F SERIES: STEEL TUBE | A SERIES: ALUMINUM TUBE

SPECIAL CONFIGURATIONS

If the standard product range does not meet your requirements, please contact NIASA for modification to any unit. With complete safety, it will be adapted to your requirements.

Special trunnion mounts adapted to the customer's requirement.

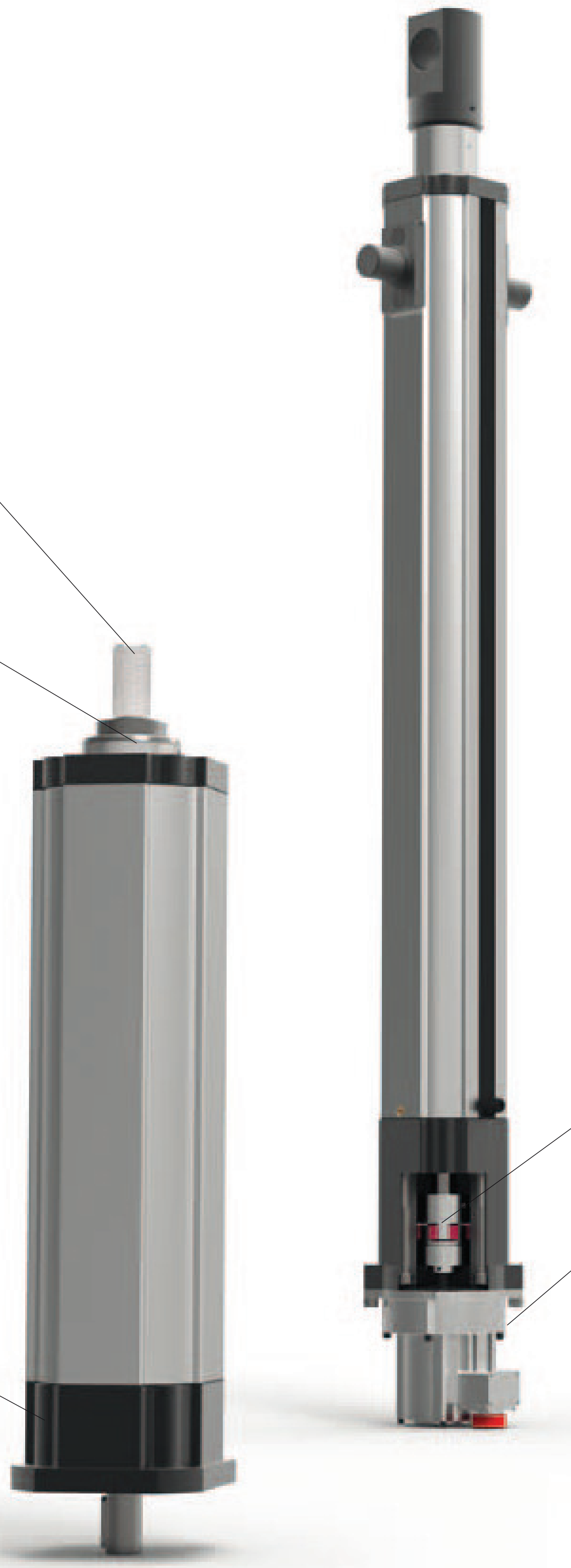
Special flange for hydraulic motor

Modified body for mounting aluminum extrusion profile with magnetic sensor.

Special flange adapted for coupling with a torque limiter

Special size stem union adapted to customer's accessory

Compact unit, just 5 mm of safety margin in both directions



Special flange for coupling with a torque limiter

Special flange adapted to NEMA type servomotor

Flange adapted to motor flange defined by the customer.

03
LINEAR ACTUATORS WITH INTEGRATED REDUCTION AND CUBIC GEARBOX

FM Series: Steel tube
AM Series: Aluminum tube

“SUSTAINABILITY IS INDUSTRIALISED ECOLOGY.”

DAVID GARCÍA
HOME-THERME

NIASA ACTUATORS IN THE TONOPAH THERMO-SOLAR PLANT, NEVADA, USA.

© Solar Reserve


SOLARRESERVE

LINEAR ACTUATORS

WITH INTEGRATED REDUCTION AND CUBIC GEARBOX. FM SERIES: STEEL TUBE | AM SERIES: ALUMINUM TUBE

INTRODUCTION

NIASA FM/AM Series electro-mechanical actuators combine the sleeve and stem system of the F/A Series linear actuators with the gearbox of the screw jacks, thus obtaining the most interesting features of both types of product.

This way, the FM/AM Series electro-mechanical actuators become the optimal technical solution for applications that require the movement specifications of a screw jack, with the additional advantage of being able to work under the most demanding environmental conditions.

Their main advantages against other systems, such as pneumatic or hydraulic cylinders, are the following:

... Greater movement and positioning precision.

... Greater safety, due to its irreversibility in many configurations (ask NIASA) and/or the incorporation of different braking devices.

... Superior energy efficiency, as their parts offer high/very high performance, especially with the ball screws, low transmission ratios and high speeds.

... Easier and faster assembly, since hydraulic or pneumatic groups are not required, just an electric motor on the unit itself.

... Greater reliability and duration, and less maintenance, due to the mechanical robustness and construction simplicity.

... Modular design and the possibility to operate in multiple positions.

... Easier to obtain synchronized advance movements of several actuators, including under different loads.

... Lower size for the same load capacity.

... ...

The screw supports also characterized for offering an extensive range of:

... Axial load capacities, from 5 kN up to 250 kN.

... Advance speeds; depending on the screw pitch and the gearbox, two possible reductions are offered depending on the size of the actuator, from 4:1 to 40:1.

... Trapezoidal and ball screws, depending on the performance required, precision of movement and positioning, etc.

... Fastening accessories and elements, for optimal adaptation to the most varied systems that may be designed.

... Control and safety systems (mechanical/inductive limit switches, absolute/incremental encoders, etc.).

... Materials and surface coverings, depending on the environmental conditions in which the unit will be installed.

... Two types of external sleeve for the stem:

· Steel round tube.

· Aluminum extrusion profile (magnetic sensors, anti-rotation system).

... ...

Please do not hesitate to contact NIASA if you require FM/AM actuators (and their drive mechanisms) with specifications other than those covered in this chapter. The NIASA technical department will specifically develop the special units that best meet your requirements.

03

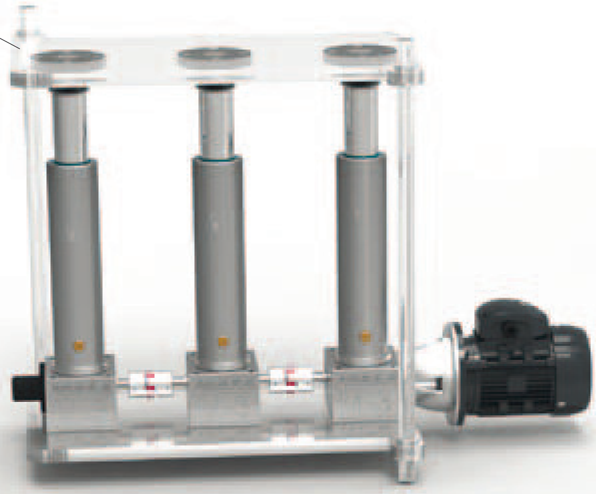
LINEAR ACTUATORS

WITH INTEGRATED REDUCTION AND CUBIC GEARBOX. FM SERIES: STEEL TUBE | AM SERIES: ALUMINUM TUBE

APPLICATIONS

PRESS TYPE SYSTEM

Three FM3 Series actuators made up of a three-phase motor drive system, MK Series drive union flange, with MK Series drive, transmission between equipment using MK series coupling, BP Series fastening flanges on the stem and PR Series protector on the worm shaft.



THREE SHAFT SCREW JACK SYSTEM

Three FM3 series actuators made up of a double-shaft, three-phase drive system, transmission between units with EZ series joint shafts, FCI series inductive sensor with a position encoding system underneath the gearbox, bevel gearbox with encoder adapted and GIR series ball with joint fastening on the stem.

CONVEYOR BELT ELEVATION SYSTEM

Two FJ1 Series actuators made up of a three-phase drive system with brake, MK Series drive union flange, transmission between units with EZ Series joint shafts, support structure with protection for the transmission shaft, GIR series ball joint on the stem and HFM Series gearbox fastening.

ELEVATION SYSTEM WITH INTEGRATED MAGNETIC SENSOR.

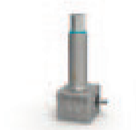
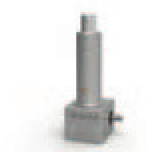
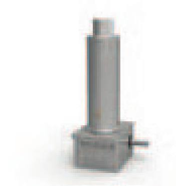
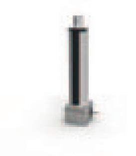
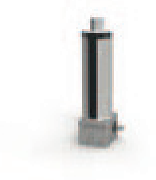
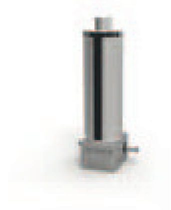
Two AM2 Series actuators made up of a three-phase motor drive system, drive union flange, transmission between units with EZ Series joint shafts, exterior aluminum tube with anti-turning system and an FCG Series integrated magnetic sensor, tilt fastening on the BA Series tube, GKB Series ball joint fastening on the stem.

LINEAR ACTUATORS

WITH INTEGRATED REDUCTION AND CUBIC GEARBOX. FM SERIES: STEEL TUBE | AM SERIES: ALUMINUM TUBE

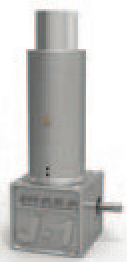
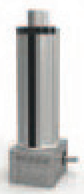
SIZES

There are trapezoidal and ball screw options on all the sizes (see chapter on screws for further information), as well as normal speed (S) and slow speed (H) gearboxes.

Up to	M1 5 kN	M2 10 kN	M3 25 kN
F Steel exterior tube	 page 122	 page 123	 page 124
A Aluminum exterior tube With anti-rotation on the stem (optional) With magnetic sensor integrated on the aluminum tube (optional)	 page 122	 page 123	 page 124

In addition to the standard range of linear actuators, NIASA can specifically develop the unit that best meets your application requirements. Contact NIASA.

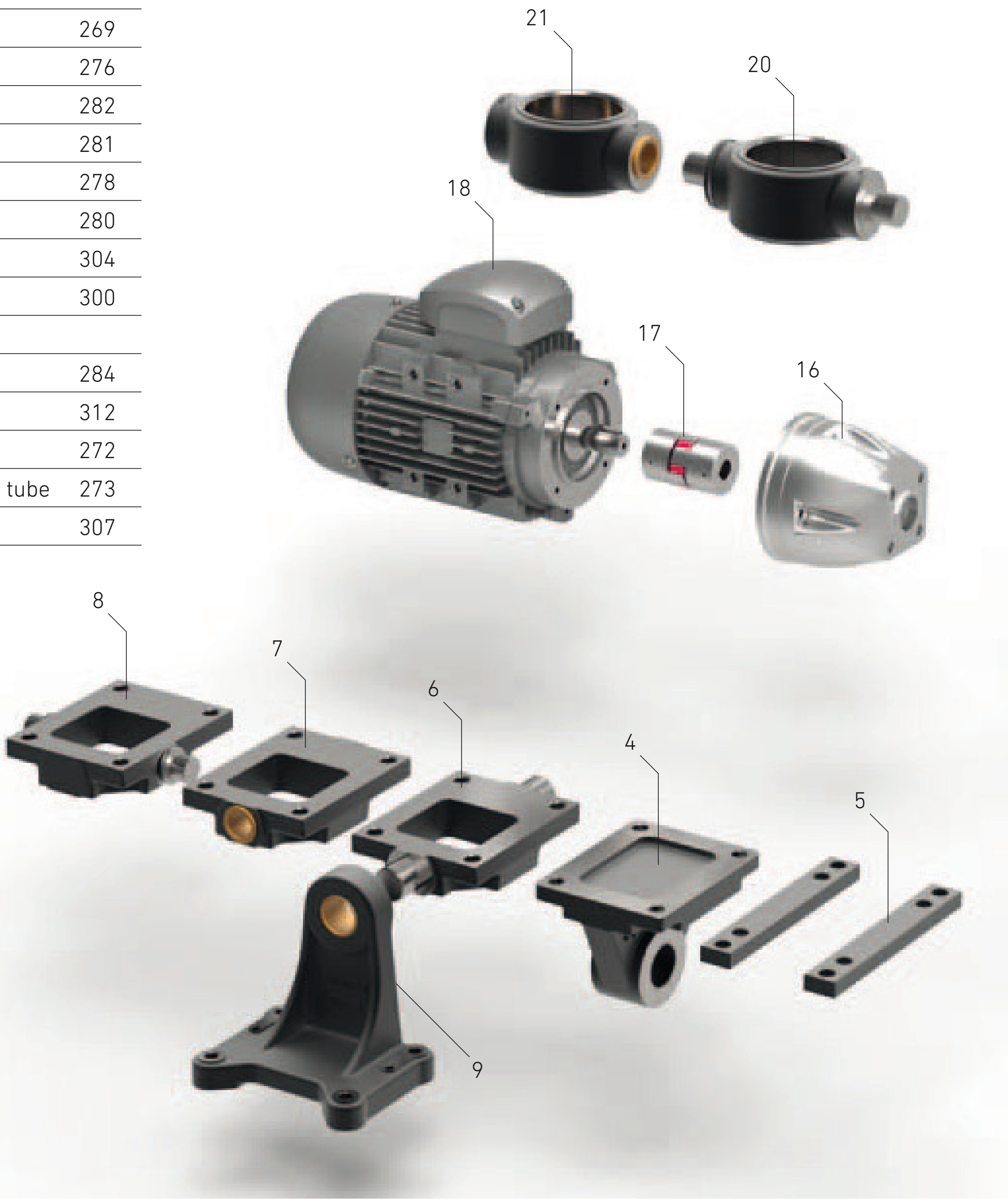
IMPORTANT All the technical data included in this chapter correspond to the configuration with steel tube and to the aluminum tube configuration.
For further information about the latter, please contact the NIASA technical department.

M4 50 kN	M5 100 kN	J1 150 kN	J3 250 kN
 page 125	 page 126	 page 127	 page 128
 page 125			

LINEAR ACTUATORS

WITH INTEGRATED REDUCTION AND CUBIC GEARBOX. FM SERIES: STEEL TUBE | AM SERIES: ALUMINUM TUBE

GENERAL PRODUCT OVERVIEW

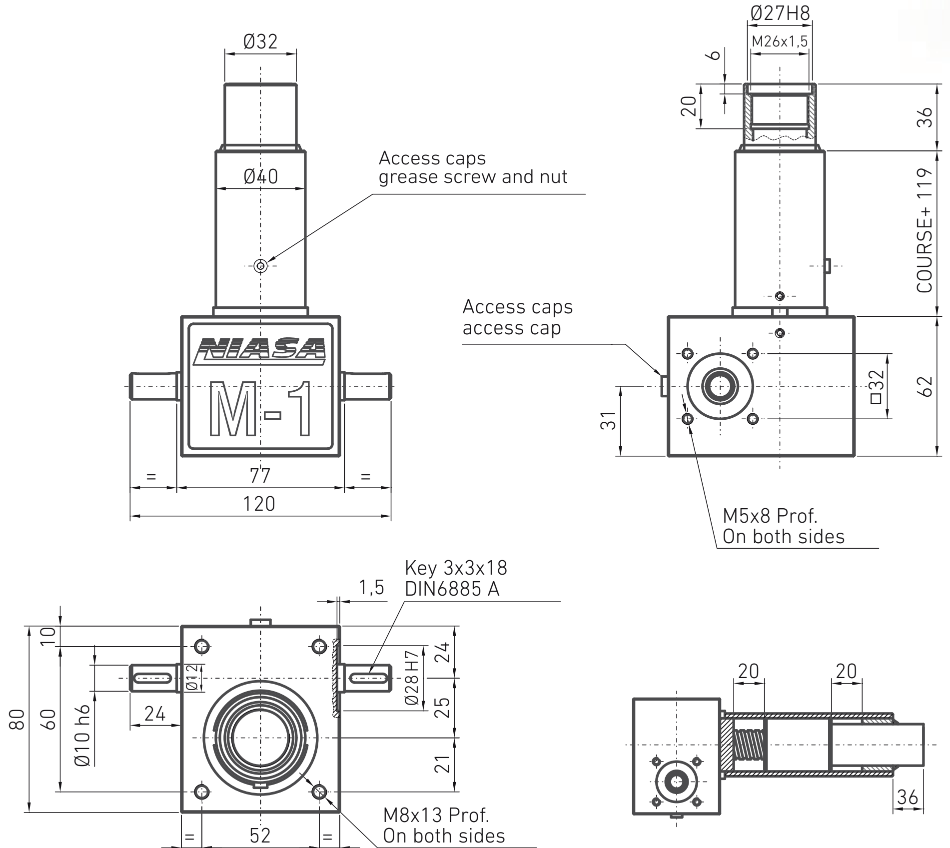



13
12
11
10
3
2
Steel exterior tube
Aluminium exterior tube
22
24
24
25
22
25
1
15
14
26
27
28

03

FM1/AM1 LINEAR ACTUATOR

UP TO 5 kN Tr TRAPEZ. KGS BALLS



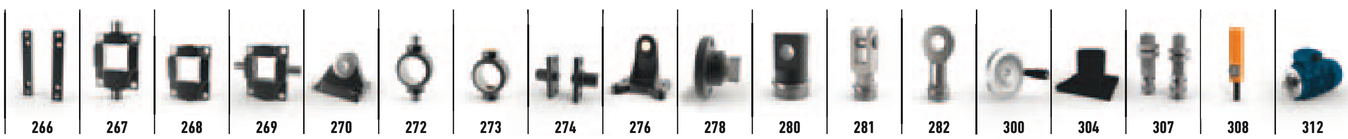
SAFETY MARGIN

Diameter and step screw (mm)	Maximum axial strength (kN)	Reduction		Advance (mm/revol. input)		Performance (%)		Drive torque, M_D (Nm)		Start-up torque, M_0 (Nm)		Weight stroke 0 (kg)	Approx. weight each 100 mm of stroke (kg)
								F (kN), load to move in dynamic					
		S	H	S	H	S	H	S	H	S	H		
Tr 16x4	5	4:1	16:1	1.00	0.25	35	27	(0,46xF)+0.17	(0,15xF)+0.08	0.80xF	0.34xF	1.8	0.5
KGS 1605	5	4:1	16:1	1.25	0.31	71	56	(0.28xF)+0.14	(0.09xF)+0.08	0.39xF	0.16xF	1.8	0.5

... Power required: P_D (kW) = 0,157x M_D (Nm).

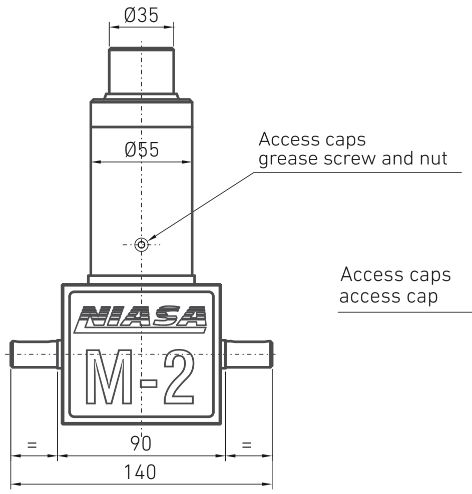
... All the data in the table correspond to an input speed of 1,500 rpm. For other speeds, please see the calculation chapter (page 130).

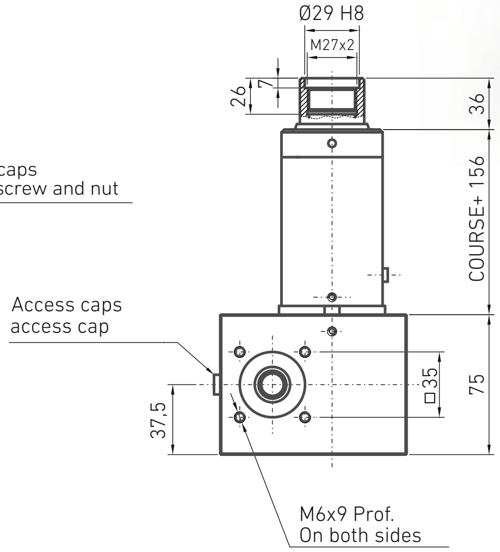
Ensure that the application's dynamic load does not exceed the critical values indicated, in order to avoid overheating of the unit and buckling and resonance. See calculations chapter (page 130).

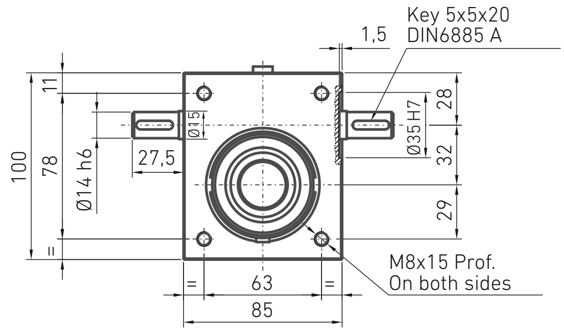


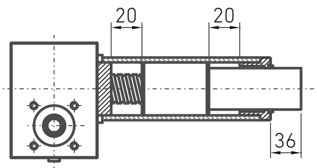
FM2/AM2 LINEAR ACTUATOR

UP TO 10 kN Tr TRAPEZ. KGS BALLS









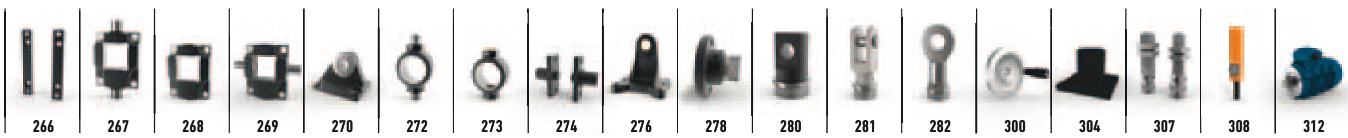
SAFETY MARGIN

Diameter and step screw (mm)	Maximum axial strength (kN)	Reduction		Advance (mm/revol. input)		Performance (%)		Drive torque M_D (Nm)		Start-up torque, M_0 (Nm)		Weight stroke 0 (kg)	Approx. weight each 100 mm of stroke (kg)
								F (kN), load to move in dynamic					
		S	H	S	H	S	H	S	H	S	H		
Tr 24x5	10	4:1	16:1	1.25	0.31	0.31	0.25	(0.64xF)+0.35	(0.20xF)+0.17	1.11xF	0.43xF	4.6	1
KGS 2005	10	4:1	16:1	1.25	0.31	0.72	0.58	(0.28xF)+0.33	(0.09xF)+0.17	0.39xF	0.15xF	4.6	1
KGS 2020	7.5	4:1	16:1	5.00	1.25	0.72	0.58	(1.10xF)+0.33	(0.35xF)+0.17	1.55xF	0.6xF	4.6	1

... Power required: P_D (kW) = 0,157x M_D (Nm).

... All the data in the table correspond to an input speed of 1,500 rpm. For other speeds, please see the calculation chapter (page 130).

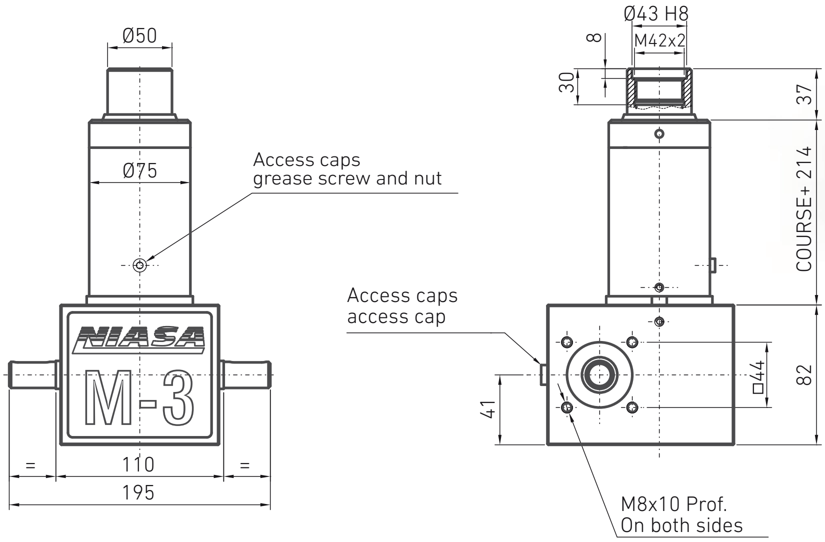
... Ensure that the application's dynamic load does not exceed the critical values indicated, in order to avoid overheating of the unit and buckling and resonance. See calculations chapter (page 130).

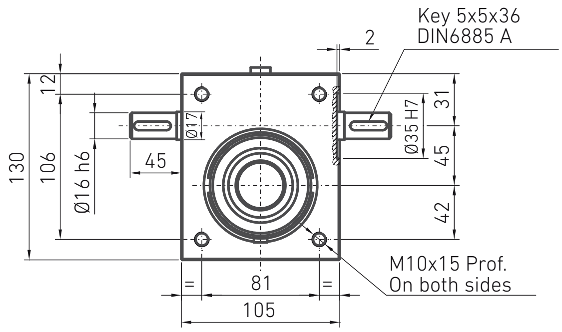


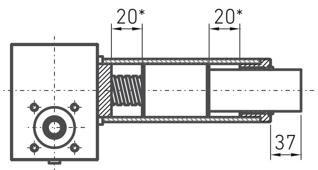
FM3/AM3 LINEAR ACTUATOR

UP TO 25 kN

Tr TRAPEZ. KGS BALLS







SAFETY MARGIN
(*) If incorporating a KGM 3220 nut,
Safety margin is 15 mm.

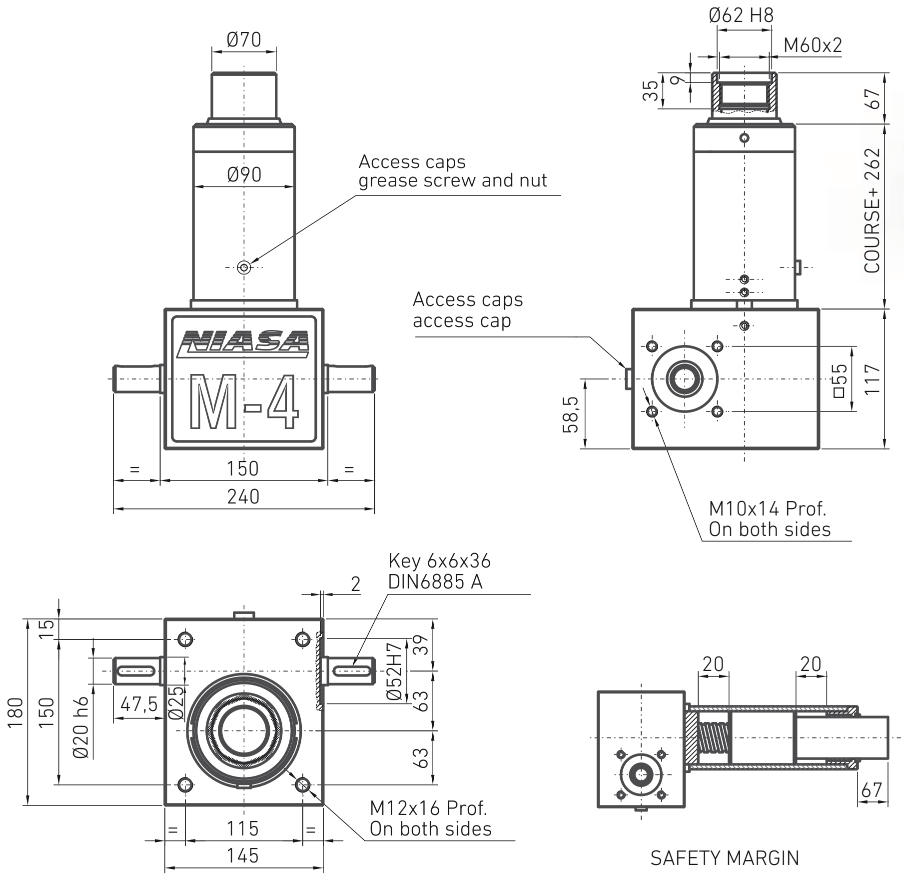
Diameter and step screw (mm)	Maximum axial strength (kN)	Reduction		Advance (mm/revol. input)		Performance (%)		Drive torque M_D (Nm) F (kN), load to move in dynamic		Start-up torque, M_0 (Nm) F (kN), load to move in dynamic		Weight stroke 0 (kg)	Approx. weight each 100 mm of stroke (kg)
		S	H	S	H	S	H	S	H	S	H		
Tr 36x6	25	6:1	24:1	1.00	0.25	0.28	0.22	(0.58xF)+0.57	(0.18xF)+0.31	1.04xF	0.4xF	12	2.1
KGS 3205	20	6:1	24:1	0.83	0.21	0.73	0.58	(0.18xF)+0.52	(0.06xF)+0.29	0.26xF	0.11xF	12	2.1
KGS 3210	25	6:1	24:1	1.67	0.42	0.73	0.58	(0.36xF)+0.52	(0.12xF)+0.29	0.52xF	0.21xF	12	2.1
KGS 3220	20	6:1	24:1	3.33	0.83	0.73	0.58	(0.73xF)+0.52	(0.23xF)+0.29	1.03xF	0.42xF	12	2.1
KGS 3240	10	6:1	24:1	6.67	1.67	0.73	0.58	(1.46xF)+0.52	(0.46xF)+0.29	2.07xF	0.84xF	12	2.1

... Power required: P_D (kW) = 0,157x M_D (Nm).
... All the data in the table correspond to an input speed of 1,500 rpm. For other speeds, please see the calculation chapter (page 130).
... Ensure that the application's dynamic load does not exceed the critical values indicated, in order to avoid overheating of the unit and buckling and resonance. See calculations chapter (page 130).

FM4/AM4 LINEAR ACTUATOR

UP TO 50 kN

Tr TRAPEZ. KGS BALLS

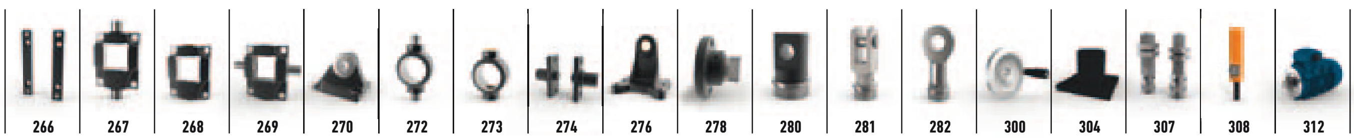


Diameter and step screw (mm)	Maximum axial strength (kN)	Reduction		Advance (mm/revol. input)		Performance (%)		Drive torque, M_D (Nm)		Start-up torque, M_0 (Nm)		Weight stroke 0 (kg)	Approx. weight each 100 mm of stroke (kg)
								F (kN), load to move in dynamic					
		S	H	S	H	S	H	S	H	S	H		
Tr 45x7	50	7:1	28:1	1.00	0.25	0.26	0.21	(0.61xF)+0.97	(0.19xF)+0.57	1.18xF	0.44xF	27.3	3.3
KGS 4010	42	7:1	28:1	1.43	0.36	0.73	0.60	(0.31xF)+0.93	(0.09xF)+0.56	0.45xF	0.18xF	27.3	3.3
KGS 4020	37	7:1	28:1	2.86	0.71	0.73	0.60	(0.62xF)+0.93	(0.19xF)+0.56	0.9xF	0.36xF	27.3	3.3
KGS 4040	35	7:1	28:1	5.71	1.43	0.73	0.60	(1.25xF)+0.93	(0.38xF)+0.56	1.8xF	0.72xF	27.3	3.3

... Power required: P_D (kW) = 0,157x M_D (Nm).

... All the data in the table correspond to an input speed of 1,500 rpm. For other speeds, please see the calculation chapter (page 130).

... Ensure that the application's dynamic load does not exceed the critical values indicated, in order to avoid overheating of the unit and buckling and resonance. See calculations chapter (page 130).

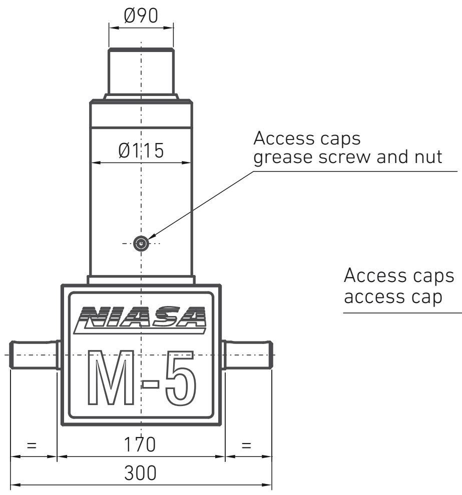


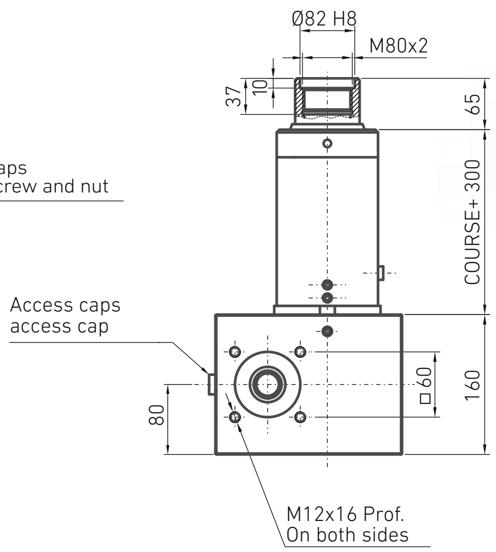
FM5 LINEAR ACTUATOR

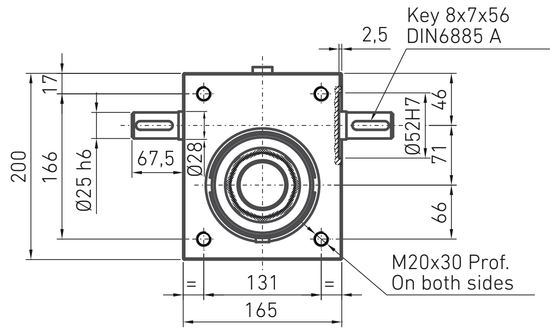
UP TO 100 kN

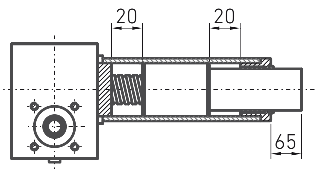
Tr TRAPEZ. KGS BALLS

The capacity indicated corresponds to the basic configuration. There is a possibility for higher capacities on request.









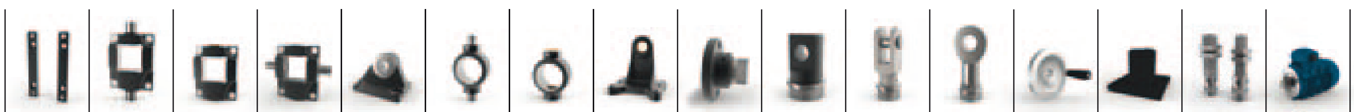
SAFETY MARGIN

Diameter and step screw (mm)	Maximum axial strength (kN)	Reduction		Advance (mm/revol. input)		Performance (%)		Drive torque, M_D (Nm) F (kN), load to move in dynamic		Start-up torque, M_0 (Nm) F (kN), load to move in dynamic		Weight stroke 0 (kg)	Approx. weight each 100 mm of stroke (kg)
		S	H	S	H	S	H	S	H	S	H		
Tr 50x8	100	9:1	36:1	0.89	0.22	0.27	0.21	(0.53xF)+1.91	(0.17xF)+1.08	0.98xF	0.39xF	45.2	4.9
KGS 5010	65	9:1	36:1	1.11	0.28	0.73	0.58	(0.24xF)+1.87	(0.08xF)+1.07	0.36xF	0.15xF	45.2	4.9

... Power required: P_D (kW) = 0,157x M_D (Nm).

... All the data in the table correspond to an input speed of 1,500 rpm. For other speeds, please see the calculation chapter (page 130).

... Ensure that the application's dynamic load does not exceed the critical values indicated, in order to avoid overheating of the unit and buckling and resonance. See calculations chapter (page 130).



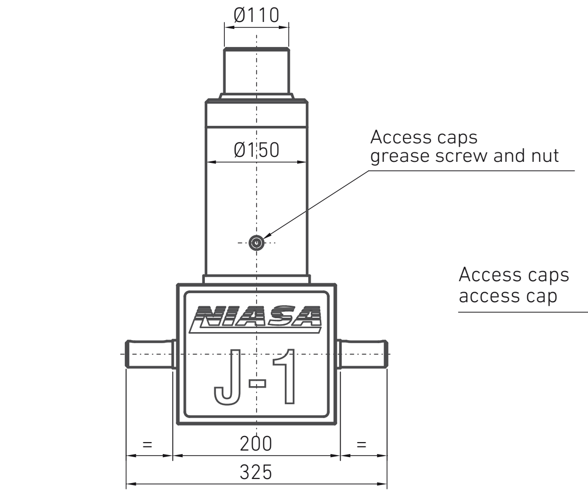
266 267 268 269 270 272 273 276 278 280 281 282 300 304 307 312

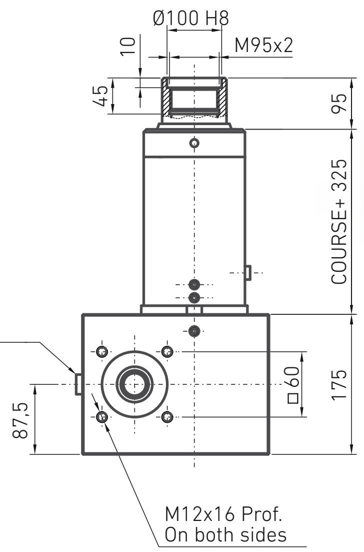
FJ1 LINEAR ACTUATOR

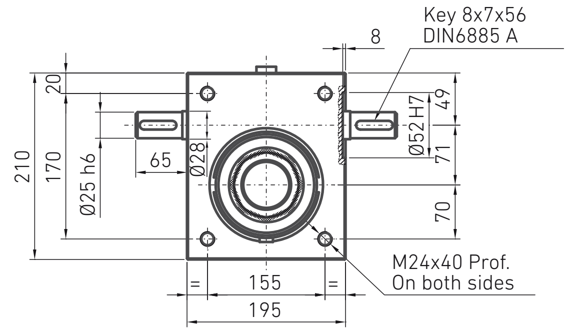
UP TO 150 kN

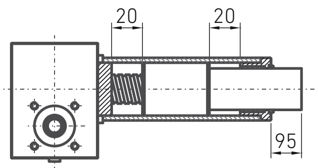
Tr TRAPEZ. KGS BALLS

The capacity indicated corresponds to the basic configuration. There is a possibility for higher capacities on request.









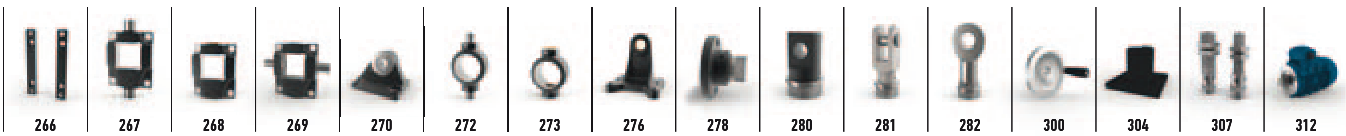
SAFETY MARGIN

Diameter and step screw (mm)	Maximum axial strength (kN)	Reduction		Advance (mm/revol. input)		Performance (%)		Drive torque, M_D (Nm)		Start-up torque, M_0 (Nm)		Weight stroke 0 (kg)	Approx. weight each 100 mm of stroke (kg)
								F (kN), load to move in dynamic					
		S	H	S	H	S	H	S	H	S	H		
Tr 70x10	150	9:1	36:1	1.11	0.28	0.24	0.18	(0.73xF)+2.3	(0.24xF)+1.21	1.31xF	0.49xF	84.8	9
KGS 6310	65	9:1	36:1	1.11	0.28	0.73	0.55	(0.24xF)+1.97	(0.08xF)+1.19	0.33xF	0.14xF	86.8	9

... Power required: P_D (kW) = 0,157x M_D (Nm).

... All the data in the table correspond to an input speed of 1,500 rpm. For other speeds, please see the calculation chapter (page 130).

... Ensure that the application's dynamic load does not exceed the critical values indicated, in order to avoid overheating of the unit and buckling and resonance. See calculations chapter (page 130).

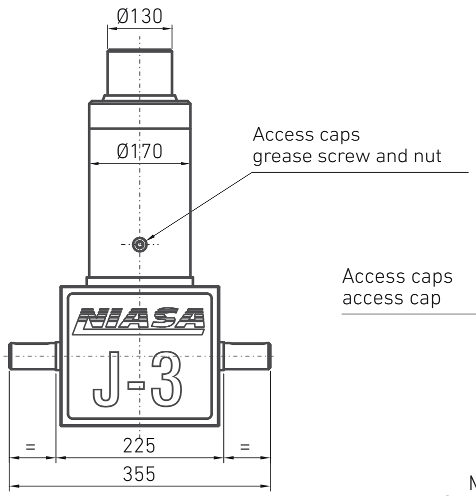


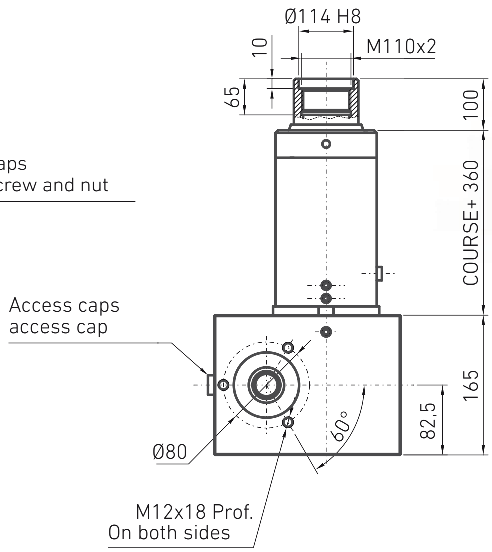
FJ3 LINEAR ACTUATOR

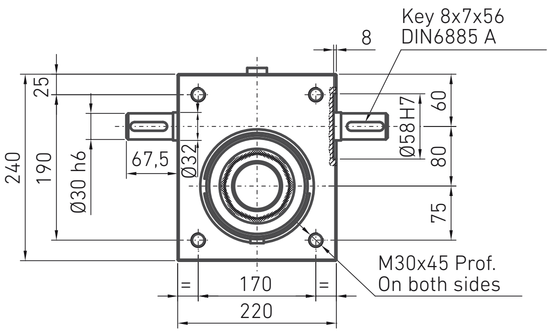
UP TO 250 kN

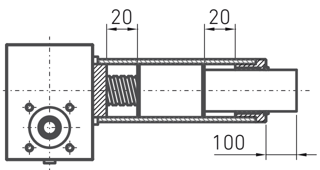
Tr TRAPEZ. KGS BALLS

Contact versions with ball screw.









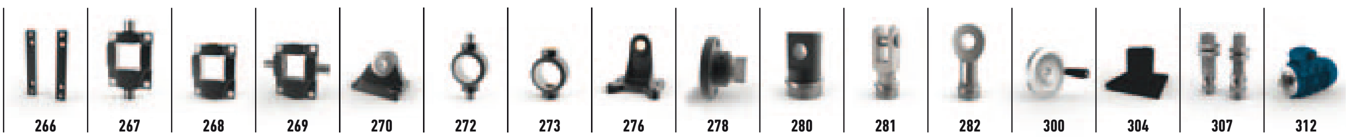
SAFETY MARGIN

Diameter and step screw (mm)	Maximum axial strength (kN)	Reduction		Advance (mm/revol. input)		Performance (%)		Drive torque, M_D (Nm) / F (kN), load to move in dynamic		Start-up torque, M_0 (Nm) / F (kN), load to move in dynamic		Weight stroke 0 (kg)	Approx. weight each 100 mm of stroke (kg)
		S	H	S	H	S	H	S	H	S	H		
Tr 80x10	250	10:1	40:1	1.00	0.25	0.22	0.19	(0.73xF)+2.81	(0.21xF)+1.95	1.18xF	0.4xF	100	14

... Power required: P_D (kW) = 0,157x M_D (Nm).

... All the data in the table correspond to an input speed of 1,500 rpm. For other speeds, please see the calculation chapter (page 130).

... Ensure that the application's dynamic load does not exceed the critical values indicated, in order to avoid overheating of the unit and buckling and resonance. See calculations chapter (page 130).



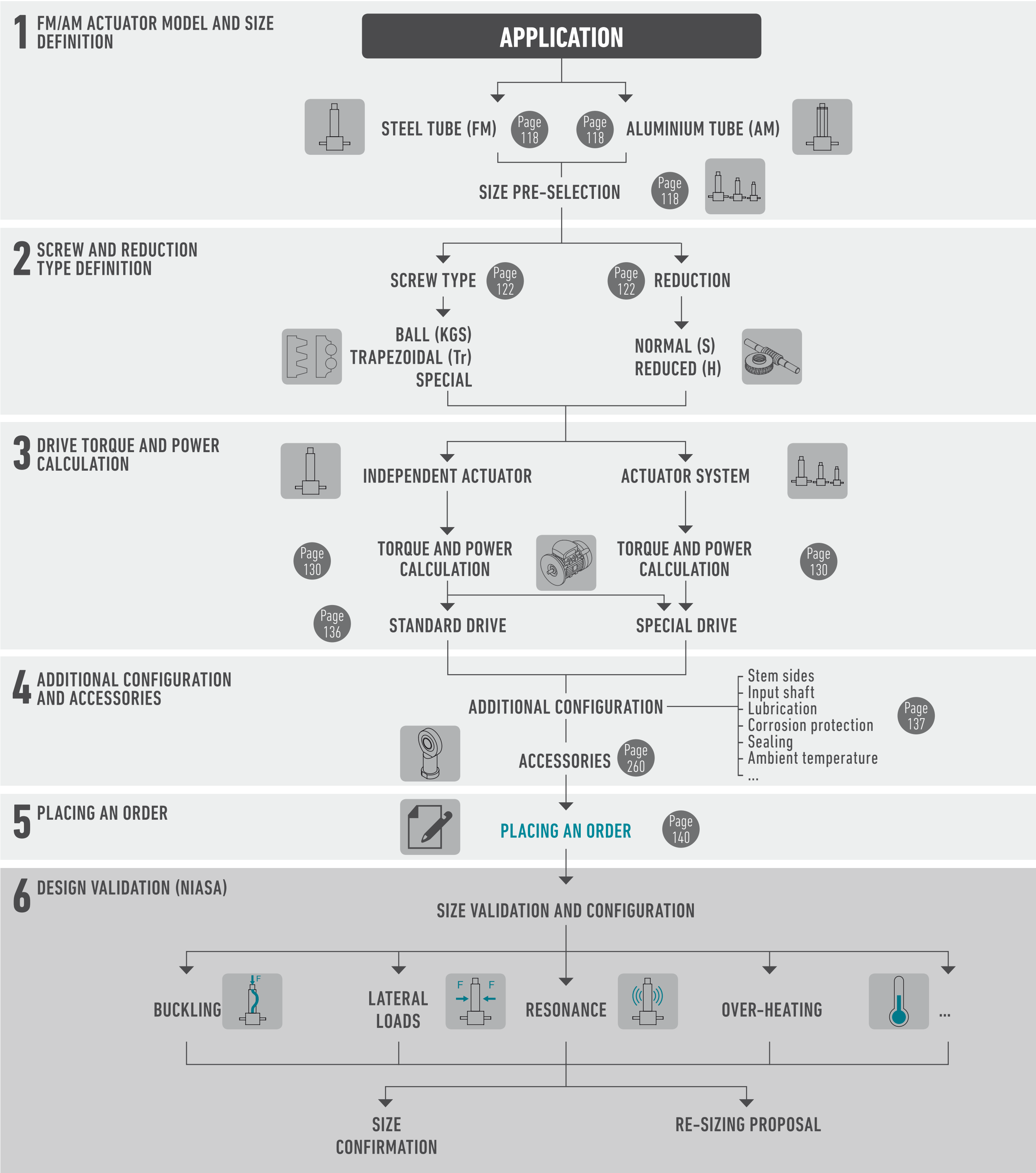
LINEAR ACTUATORS

WITH INTEGRATED REDUCTION AND CUBIC GEARBOX. FM SERIES: STEEL TUBE | AM SERIES: ALUMINUM TUBE

PRODUCT SELECTION

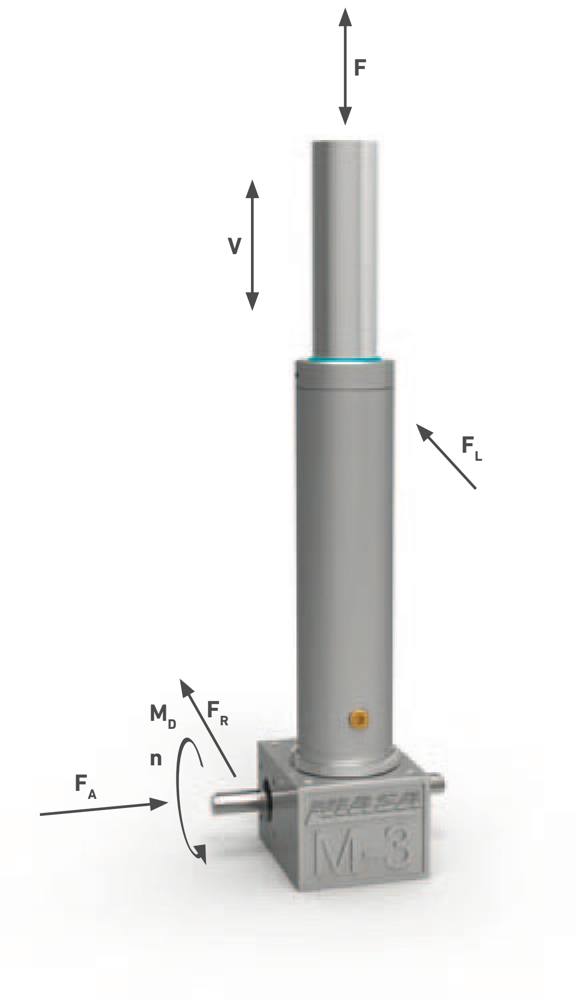
To select the correct FM/AM Series linear actuator, please follow this flow diagram.

If you would like to know the expected service life of a unit for your application, please send the relevant data to the NIASA service department.



FORCE AND TORQUE ACTING ON AN FM /AM SERIES ACTUATOR

F Load to move at traction and/or compression.
F_L Lateral load on the stem.
V Stem travel speed.
F_A Axial load on the input shaft.
F_R Radial load on the input shaft.
M_D Torque on the input shaft.
n Speed on the input shaft.



TORQUE AND POWER OF A LINEAR ACTUATOR INDEPENDENT FM/AM SERIES

After pre-selecting the suitable FM/AM Series linear actuator for the application, select the drive motor following the steps below:

1. DRIVE TORQUE

$$M_D\,(Nm) = \frac{F \times P}{2 \times \pi \times 0.9 \times \eta_{DG} \times \eta_{DS} \times i} + M_i$$

M_D Drive torque (kN)
F Load to move in dynamic (kN)
P Screw pitch (mm)
M_i Idle torque (Nm)
i Actuator reduction
0.9 Cylinder dynamic efficiency
η_{DG} Gearbox dynamic efficiency
η_{DS} Screw dynamic efficiency

2. POWER REQUIRED

$$P_D\,(kW) = \frac{M_D \times n}{9550}$$

M_D Drive torque (Nm)
n Screw jack input speed (rpm)

IMPORTANT

... In general, it is advisable to multiply the power value calculated for a safety coefficient of 1.3 to 2; the smaller the installation the higher the coefficient

... When the load to move is lower than 10% of the elevator's nominal load, consider that value as the load to move.

3. START-UP TORQUE

For loads between 25% and 100% of the actuator's nominal value, calculate the start-up torque with this formula:

$$M_0\,(Nm) = \frac{F \times P}{2 \times \pi \times 0.9 \times \eta_{SA} \times i}$$

η_{SA} Actuator static efficiency (gearbox + screw)

IMPORTANT

... For loads under 25% of the actuator's nominal value, select the start-up torque by multiplying the drive torque by 2.

η_{DG} Gearbox dynamic efficiency

S gearbox version (normal speed)

input rpm	FM1/ AM1	FM2/ AM2	FM3/ AM3	FM4/ AM4	FM5	FJ1	FJ3
3,000	0.91	0.90	0.92	Non-standard			
1,500	0.88	0.89	0.90	0.90	0.90	0.90	0.90
1000	0.87	0.88	0.88	0.88	0.87	0.89	0.89
750	0.85	0.87	0.87	0.87	0.86	0.88	0.89
500	0.84	0.85	0.85	0.85	0.84	0.87	0.88
100	0.79	0.79	0.79	0.79	0.78	0.81	0.84

H gearbox version (slow speed)

input rpm	FM1/ AM1	FM2/ AM2	FM3/ AM3	FM4/ AM4	FM5	FJ1	FJ3
3,000	0.75	0.77	0.76	Non-standard			
1,500	0.69	0.71	0.71	0.74	0.72	0.68	0.77
1000	0.67	0.69	0.68	0.69	0.67	0.67	0.76
750	0.64	0.66	0.67	0.68	0.65	0.65	0.75
500	0.61	0.64	0.63	0.64	0.62	0.64	0.74
100	0.54	0.56	0.54	0.55	0.53	0.55	0.66

η_{DS} Screw dynamic efficiency

Trapezoidal screw (Tr)						
16x4	24x5	36x6	45x7	50x8	70x10	80x10
0.44	0.39	0.34	0.32	0.33	0.30	0.27

Ball screw (KGS)
0.9 (for all sizes)

M_I Idle Torque

S gearbox version (normal speed)

	FM1/ AM1	FM2/ AM2	FM3/ AM3	FM4/ AM4	FM5	FJ1	FJ3
Trapezoidal	0.17	0.35	0.57	0.97	1.91	2.03	2.81
Balls	0.14	0.33	0.52	0.93	1.87	1.97	2.75

H gearbox version (slow speed)

	FM1/ AM1	FM2/ AM2	FM3/ AM3	FM4/ AM4	FM5	FJ1	FJ3
Trapezoidal	0.08	0.17	0.31	0.57	1.08	1.21	1.95
Balls	0.08	0.17	0.29	0.56	1.07	1.19	1.94

η_{SA} Actuator static efficiency

S gearbox version (normal speed)

	FM1/ AM1	FM2/ AM2	FM3/ AM3	FM4/ AM4	FM5	FJ1	FJ3
Trapezoidal	0.22	0.20	0.17	0.15	0.16	0.15	0.15
Balls	0.57	0.57	0.57	0.56	0.55	0.59	0.64

H gearbox version (slow speed)

	FM1/ AM1	FM2/ AM2	FM3/ AM3	FM4/ AM4	FM5	FJ1	FJ3
Trapezoidal	0.13	0.13	0.11	0.10	0.10	0.10	0.11
Balls	0.35	0.37	0.35	0.35	0.32	0.36	0.45

IMPORTANT

... The values indicated in the tables correspond to the lubrication conditions established by NIASA, for gearbox and screw, and will be reached after a small period of operation.

... In the case of low temperatures, these can be reduced considerably.

LINEAR ACTUATORS

WITH INTEGRATED REDUCTION AND CUBIC GEARBOX. FM SERIES: STEEL TUBE | AM SERIES: ALUMINUM TUBE

PRODUCT SELECTION

DESIGNING INSTALLATIONS WITH FM/AM SERIES LINEAR ACTUATORS

For the application of FM/AM Series linear actuators in installations with several units, the following criteria must be taken into account:

1. Define the number, position and orientation of the equipment.

2. Select the drag components (couplings, transmission shafts, supports, bevel gearboxes, motors, etc.) taking the following recommendations into account:

... Ensure that the total load is distributed uniformly between all the installation's actuators.

... The lowest possible number of transmission parts is recommended.

... The transmission shafts should be as short as possible.

... Try to protect the overall installation with a safety torque limiter.

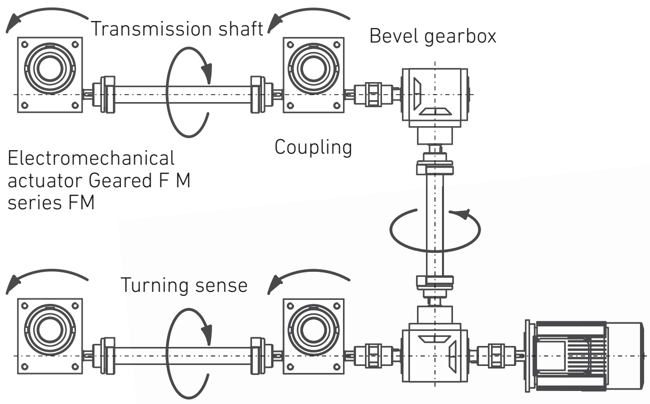
3. If a problem arises during the design of the installation in defining the turning sense of the different elements, it is advisable to apply the following method:

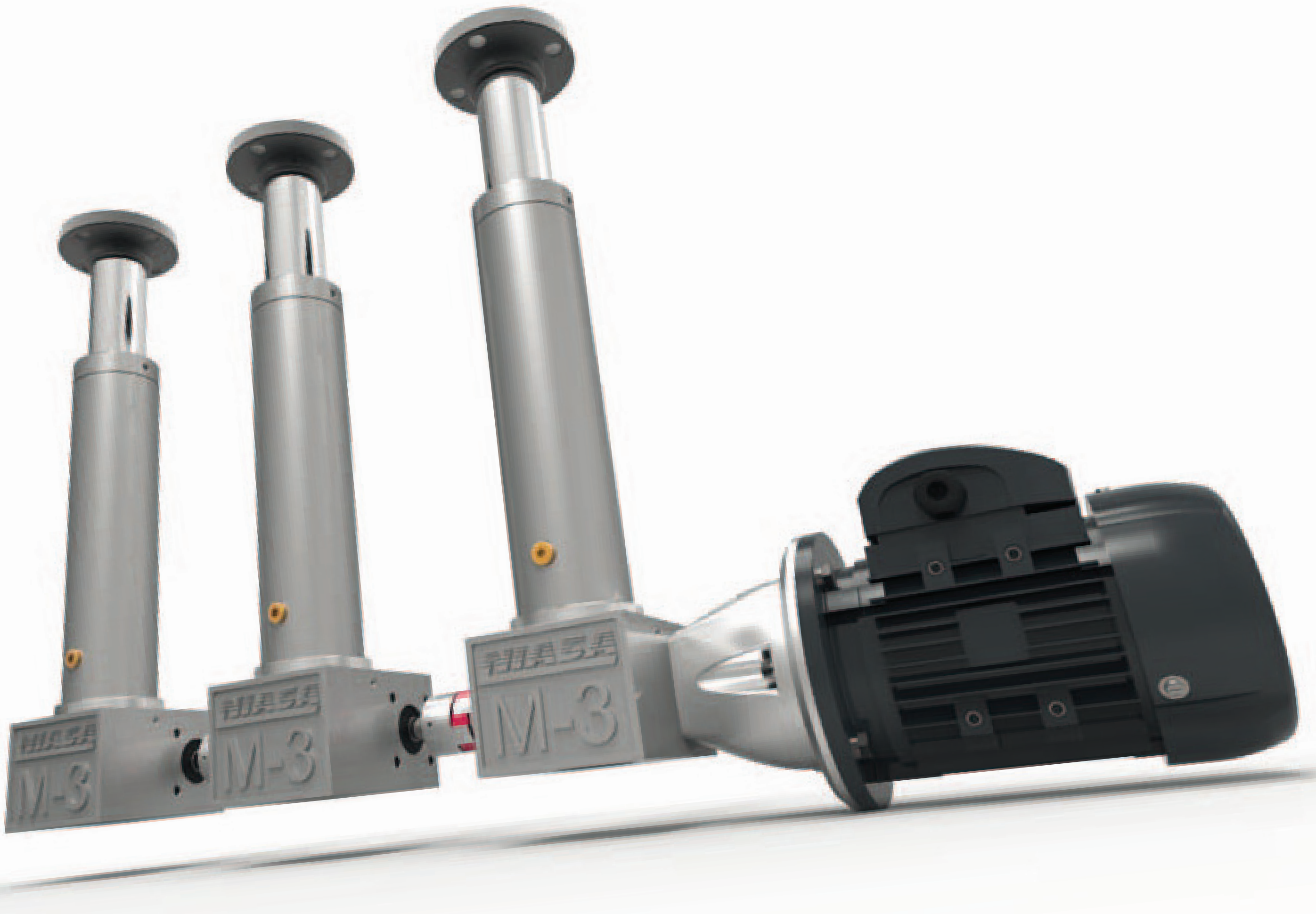
... Indicate the orientation of the actuator elements.

... Mark the screw turning sense on each actuator to “lift”.

... Show the position of the bevel gearboxes and the transmission shafts in a diagram.

Example:
Elevation system with four FM linear actuators and two bevel gearboxes.

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LINEAR ACTUATORS

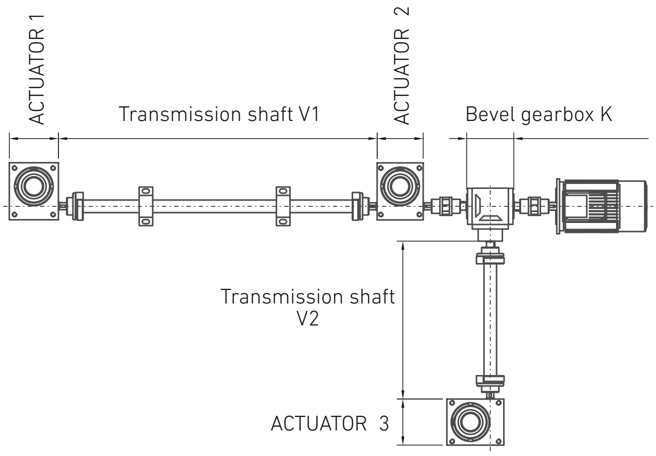
WITH INTEGRATED REDUCTION AND CUBIC GEARBOX. FM SERIES: STEEL TUBE | AM SERIES: ALUMINUM TUBE

PRODUCT SELECTION

DRIVE TORQUE OF AN FM/AM SERIES LINEAR ACTUATOR SYSTEM

The drive torque of a system made up of several FM/AM Series linear actuators connected to each other depends on the torque required for the individual drive of each one and the efficiency of the transmission parts that connect them.

Example:



1. SYSTEM DRIVE TORQUE

$$M_{DS}\ (Nm) = \frac{M_{D1}}{\eta_{V1}} + M_{D2} + \left(\frac{M_{D3}}{\eta_{V2}} \times \frac{1}{\eta_k}\right)$$

$M_{D1}/M_{D2}/M_{D3}$	Actuator drive torque 1 / 2 / 3 (Nm)
η_{V1}/η_{V2}	Gearbox efficiency V1/V2 (0.90-0.95 approx.)
η_K	Bevel gearbox efficiency (0.90 approx.)

IMPORTANT

... In general, it is advisable to multiply the value calculated for a safety coefficient of 1.3 to 1.5; or for small installations, a factor of 2.

... When the load to move is lower than 10% of the elevator's nominal load, consider that value for the previous calculations.

To help the calculation, some frequent arrangements are shown for those for which the system's drive torque can be calculated approximately using the following formula.

It is assumed that the load distribution is uniform between all the units and that they are all the same size.

$$M_{DS}\ (Nm) = M_D + f_S$$

M_D Independent elevator drive torque

f_S Factor, according to system (see figures next page)

2.SYSTEM START-UP TORQUE

For loads by screw jack between 25% and 100% of the screw jack's nominal value, calculate the start-up torque with this formula:

$$M_{DS}\ (Nm) = \frac{M_{DS}}{\eta_{SA}}$$

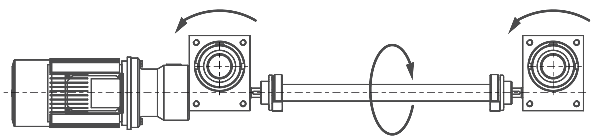
M_{DS} System drive torque (Nm)

η_{SJ} Elevator static efficiency

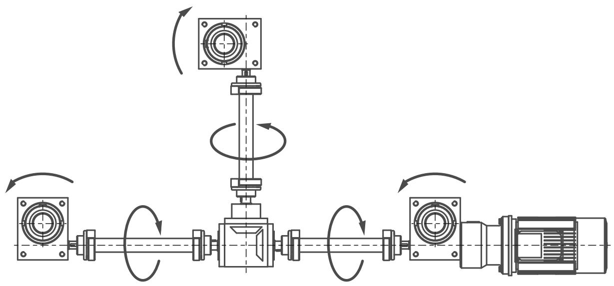
IMPORTANT

... For loads by elevator lower than 25% of its nominal value, multiply the system drive torque by 2.

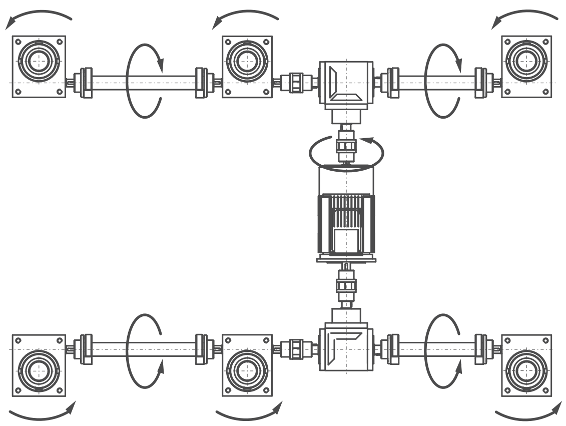
$f_S = 2.1$



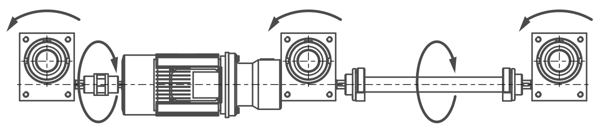
$f_S = 3.34$



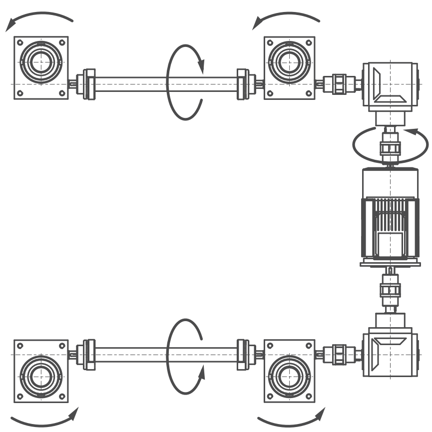
$f_S = 6.8$



$f_S = 3.1$



$f_S = 4.4$



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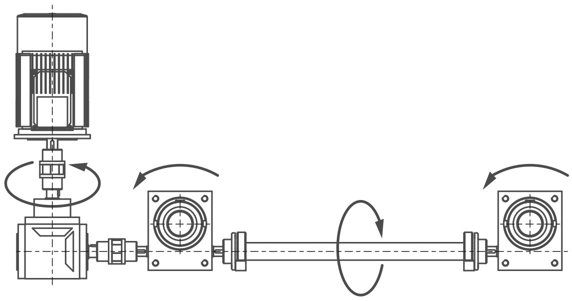

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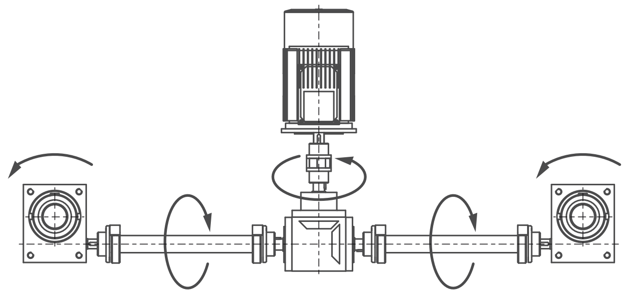

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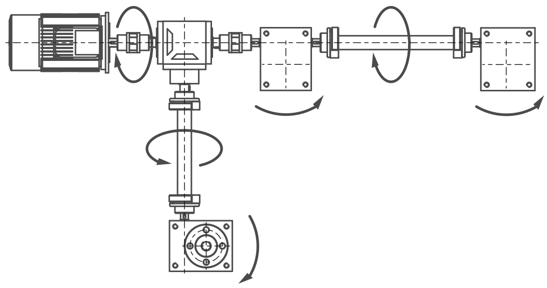

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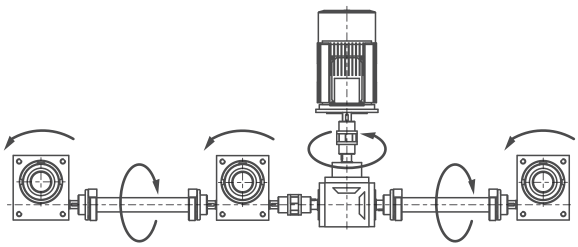
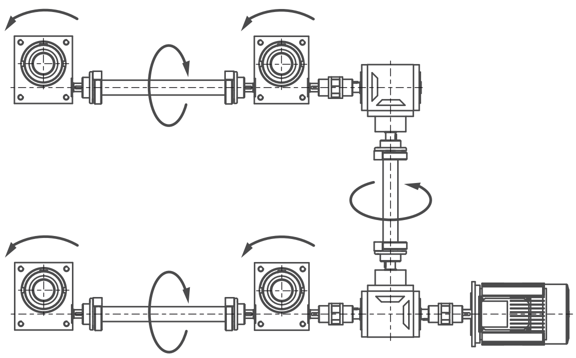


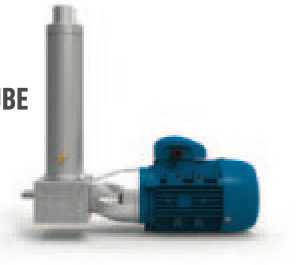
$f_S = 4.6$



NIASA

LINEAR ACTUATORS

WITH INTEGRATED REDUCTION AND CUBIC GEARBOX. FM SERIES: STEEL TUBE | AM SERIES: ALUMINUM TUBE



PRODUCT SELECTION

STANDARD DRIVE

The standard drive of the FM/AM Series linear actuators is made using Ac motors.

The following table shows the powers available for each actuator size and the type of flange on the motor, in addition to the length of its fastening flange to the gearbox.

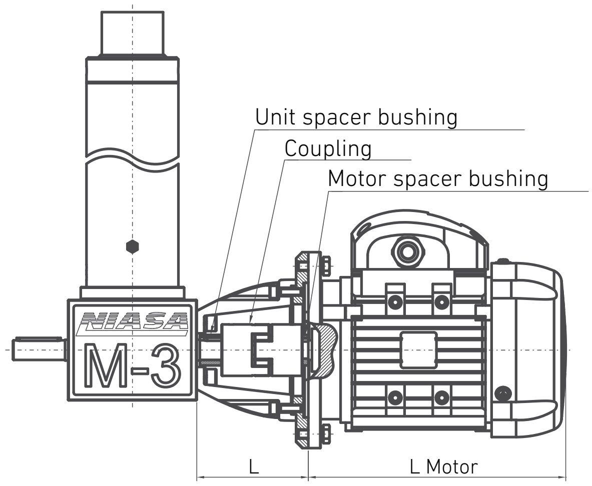
For another size or different type of drive, please contact NIASA. NIASA can supply alternating or stepper motors with sensors of any type, etc.

		MOTOR GROUP																		
		56		63		71		80		90		100		112	132		160		180	
	Motor flange	POWER (kW)																		
		A	B	A	B	A	B	A	B	A	B	A	B	A	A	B	A	B	A	B
		0.06	0.09	0.12	0.18	0.25	0.37	0.55	0.75	1.1	1.5	2.2	3	4	5.5	7.5	11	15	18.5	22
FM1 / AM1	L	57		60		67														
	Motor flange	B14		B14		B14														
FM2 / AM2	L			63		70		83												
	Motor flange			B14		B14		B14												
FM3 / AM3	L					91		101		113		123								
	Motor flange					B5		B14		B14		B14								
FM4 / AM4	L					91		101		113		123								
	Motor flange					B5		B5		B14		B14								
FM5	L							125		135		145			167		201			
	Motor flange							B5		B5		B14			B14		B14			
FJ1	L											145			165		199			
	Motor flange											B14			B14		B14			
FJ3	L									135		145			167		201		203	
	Motor flange									B5		B5			B5		B5		B5	

For asynchronous motor specifications, see the motorization chapter (page 312).

If using ball screws (or trapezoidal screws with more than one input), together with the normal speed gearboxes (S) the FM/AM linear actuator may be reversible. Contact the NIASA technical department for the most suitable brake selection for your application.

In general, it is always advisable that the motors incorporate a brake, standard brakes are sufficient for each motor size in most cases. This will ensure the screw does not loose position when it stops or if there are vibrations, etc.



LINEAR ACTUATORS

WITH INTEGRATED REDUCTION AND CUBIC GEARBOX. FM SERIES: STEEL TUBE | AM SERIES: ALUMINUM TUBE

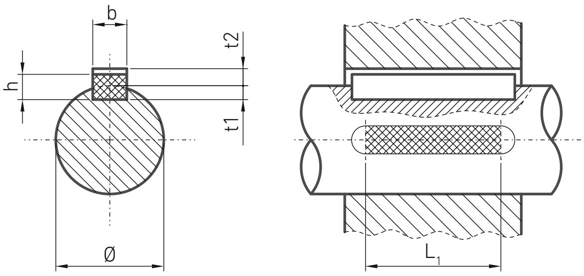
PRODUCT SELECTION

MAXIMUM TRANSFERABLE TORQUE ACCORDING TO SHAFT/ PARALLEL COTTER PIN (DIN 6885)

The following table shows the maximum transferrable torque for a shaft and its keys. It is considered that the shaft is subject exclusively to torsional forces.

IMPORTANT

... Never subject the input of an FM Series actuator to torque over that indicated for its shaft
and keys (see plans in the sub-chapter "sizes", page 118).



Shaft diameter Ø (mm)	Key dimensions			Maximum transferrable torque, M_D (Nm) / Effective key length, L_1 (mm)						
	b x h (mm)	t1 (mm)	t2 (mm)	10	16	20	28	40	50	70
8 – 10	3 x 3	1.8	1.4	5	9	12	-	-	-	-
10 – 12	4 x 4	2.5	1.8	9	13	17	-	-	-	-
12 – 17	5 x 5	3	2.3	15	24	30	42	-	-	-
17 – 22	6 x 6	3.5	2.8	25	40	50	70	100	-	-
22 – 30	8 x 7	4	3.3	39	63	78	109	157	195	-
30 – 38	10 x 8	5	3.3	50	82	102	143	204	255	357

Material: C45 (1.1191) according to EN 10083-1
Load type: Drive - Uniform /
Load - Slight knocks
Assembly: tight
Cycles: >1,000,000
Safety factor: 1.5 - 2.5
IMPORTANT For other conditions,
please contact the NIASA technical department.

LUBRICATION

NIASA FM/AM Series linear actuators are supplied lubricated with DIVINOL LITHOGREASE G421 type grease.
This is a semi-synthetic grease with a lithium compound with the following specifications,.

Specifications

G421 DIVINOL LITHOGREASE	
Working temperature	-35 to +160°C
Density at 15°C	0.9 kg/dm³
Cinematic viscosity (s/DIN 51 562)	130 mm²/s at 40°C 15 mm²/s at 100°C
Dropping point (s/DIN ISO 2176)	>220°C
Water resistance (s/DIN 51 807/T1)	Level 1

For further information, please contact the NIASA technical department.

NIASA supplies its FM/AM Series actuators with a brass lubrication cap with O-ring, on the gearbox and on the tube, to ensure it is sealed.

A change of grease type may affect the correct operation of the actuator.

There is a possibility of supplying FM/AM Series actuators with an angled grease nipple at 45° DIN 71412 type B for the gearbox, and a straight grease nipple
DIN 71412 type A for the tube.

A complete cleaning and change of grease is recommended after five years.

The greasing interval depends on the type of work and its cycle. It is advisable to lubricate from 30 to 50 hours after start-up and approximately every six months.
It is important to avoid over-lubricating.

A group lubricator is recommended for automatic lubrication of the units. Depending on the type of group lubricator, the lubrication may last up to two years. See lubrication chapter in accessories.

PROTECTION AGAINST CORROSION, SEALING AND AMBIENT TEMPERATURE

PROTECTION AGAINST CORROSION

Select the environment in which the equipment will work, using the atmospheric corrosion categories classification established in the DIN EN ISO 12944-2 standard (protection against the corrosion of steel structures using painted systems). Also establish the durability required before carrying out the first maintenance of the exterior surfaces (durability does not imply a "time" guarantee).

If the corrosion category is higher than “C3” for your application and/or higher than “average” durability is required, please contact NIASA so that the technical department can select the surface protection system and select the most suitable components.

CORROSION CATEGORY		ENVIRONMENT	
		Outdoors	Indoors
C1	Very low		Buildings with heating and clean atmospheres.
C2	Low	Atmospheres with low levels of pollution. Rural areas.	Buildings with no heating and possible condensation.
C3	Medium	Urban and industrial atmospheres, with moderate SO_2 pollution. Coastal areas with low salinity.	Manufacturing plants with high humidity and some pollution.
C4	High	Industrial areas and coastal areas with moderate salinity.	Chemical and swimming pool industries.
C5-I	Very high (industrial)	Industrial areas with high humidity and aggressive atmosphere.	Buildings or areas with almost permanent condensation and high contamination.
C5-M	Very high (maritime)	Coastal and maritime areas with high salinity.	Buildings or areas with permanent condensation and high contamination.

DURABILITY		
LOW	L	2 to 5 years
MEDIUM	M	5 to 15 years
HIGH	H	More than 15 years

PROTECTION AGAINST THE INPUT OF SOLIDS AND LIQUIDS

NIASA actuators offer, as standard, an IP65 protection index to prevent solid and liquid particles from entering the inside, which may damage them or reduce their designed service life.

Use the following table, according to the DIN EN IEC 60529 standard, if the level of protection must be higher than that indicated. NIASA supplies, on request, specially designed units to withstand the most aggressive environments.

The protection levels are defined with a code made up of the letters “IP” and two numbers “XY”.

LEVEL OF PROTECTION “IP”, AGAINST THE INPUT OF ...			
... solid particles: “X”		... liquids: “Y”	
	...		...
5	Protection against dust residues (the dust that may penetrate the inside does not imply incorrect operation of the equipment).	3	Protection against spray water (from angle up to 60° with vertical).
6	Total protection against the penetration of any kind of solid body (sealing).	4	Protection against water splashes (from any direction).
		5	Protection against water streams from any direction with hose.
		6	Protection against sporadic floods (example: tidal wave).
		...	...

AMBIENT TEMPERATURE

Contact NIASA if your unit will be installed in an environment that may reach temperatures below -20°C and/or above +40°C.

NIASA's technical department will prescribe the most suitable materials and sealing components for the specific conditions of the application.

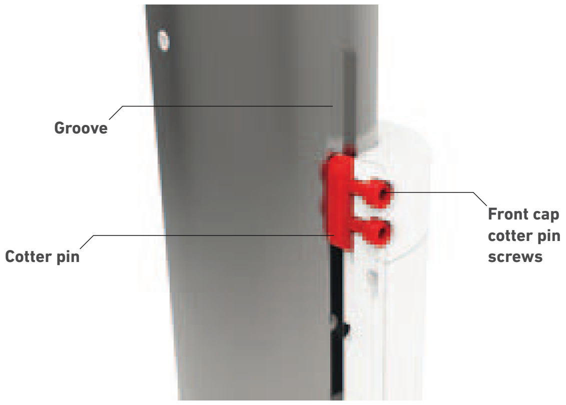
OPTIONAL CONFIGURATIONS

Optionally, NIASA may adapt your FM/AM linear actuator, modifying the different parts of it to your preferences.

Some examples are shown below.
See sub-chapter "Placing an order".

Immobilizations

The FM Series electro-mechanical actuators, on request, can be supplied with the immobilized stem in rotation. This is achieved by mounting a key on the upper cap and machining a groove along the stem.

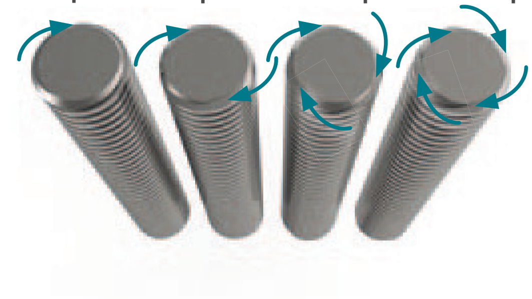


With this configuration, the scraper for the stem cannot be mounted on the front cap. To avoid the possible input of particles or liquid through the stem, it is recommended to mount a bellow to protect it.

For further information, please contact the NIASA technical department.

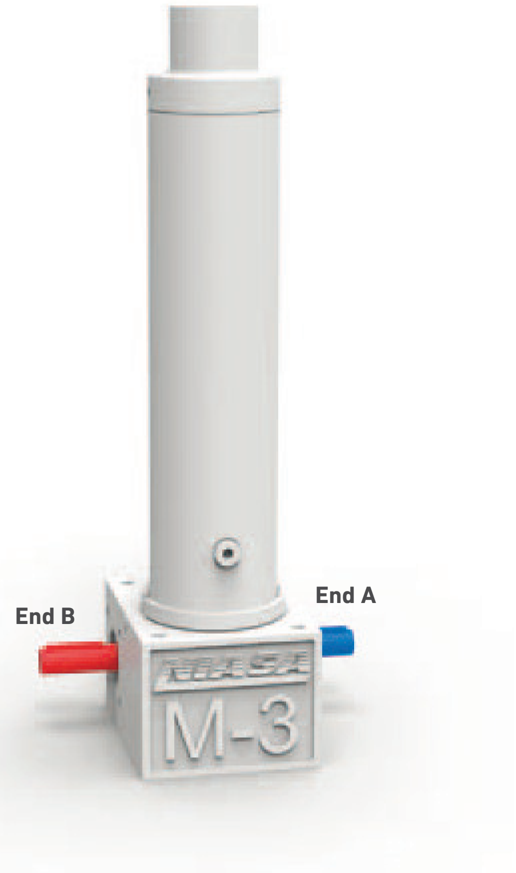
Special configurations

At the customer's request, the FM/AM Series linear actuators can be supplied with a screw of several inputs so that higher speeds can be obtained.



Worm gear

At the customer's request, the FM/AM linear actuators can be supplied with one of the sides of the worm shaft cut.



03

LINEAR ACTUATORS

WITH INTEGRATED REDUCTION AND CUBIC GEARBOX. FM SERIES: STEEL TUBE | AM SERIES: ALUMINUM TUBE

PLACING AN ORDER

01 **SIZE**
FM1/AM1
FM2/AM2
FM3/AM3
FM4/AM4
FM5
FJ1
FJ3

02 **GEARBOX**
S Normal speed
H Slow speed

03 **EQUIPMENT GENERAL PROTECTION**
IPS Standard IP protection level
IPX Special IP protection level

04 **SCREW TYPE (DIAMETER x PITCH)**
TRS Steel trapezoidal screw
KGS Ball screw

05 **STROKE**
0000 Equipment usable stroke in mm

06 **IMMOBILISATION IN ROTATION**
00 No immobilization
01 Immobilized

07 **STEM FASTENING ACCESSORY**
BPS Screw flange
GKS Single rod
GKB Double rod
GIR Ball joint
FES Special end fastening
000 No accessory

08 **BOX FASTENING ACCESSORY**
Always on the back of the box
HFM Gearbox fastening rod
LCM Gearbox mounting feet
ZKM ZK gearbox fastening with bolts
ZKH ZK gearbox fastening with bearings
ZKV ZK gearbox fastening with 90° bolts
FMS Special gearbox fastening
000 No accessory

09 **EXTERIOR TUBE FASTENING ACCESSORY**
Exterior tube configuration F
BB Trunnion mount with studs
BH Trunnion mount with ball bearings

Exterior tube configuration A
BA Trunnion mount with studs

All models
FS Special fastening
00 No accessory

10 **tilt ACCESSORY**
SB With tilt support
00 No tilt support

11 **LIMIT SWITCH ACCESSORY**
Exterior tube configuration F
FCI Inductive limit switches
FCR Inductive limit switches with regulation

Exterior tube configuration A
FCG Magnetic limit switches

All models
000 No limit switches

Example	01	02	03	04	05	06	07	08	09	10	11
	FM3	H	IPS	TRS3606	1000	00	BPS	HFM	00	00	FCI

12 STEM PROTECTION ACCESSORY

Exterior tube configuration F

FB Bellow type protector

00 No protector

13 DRIVE ADAPTATION

MK Standard flange

MS Special drive union

VE Wheel

00 No adaptation

14 DRIVE POSITION ON GEARBOX

A Worm shaft side A

B Worm shaft side B

15 STANDARD MOTOR

MK drive adaptation

080 Group size

A Power-1 / **B** Power-2

MS drive adaptation

1111 Non-standard drive

Both adaptations

0000 Without drive

16 WORM SHAFT END

A Side A end suppressed

B Side B end suppressed

0 Both sides maintained

17 WORM SHAFT PROTECTION ACCESSORY

PR With protector

00 No protector

18 LUBRICANT

GRA Standard lubricant

GRX Lubricant for low extreme temperatures

GRS Other lubricant

19 LUBRICATION ACCESSORIES

ETP Sealed lubrication cap (standard)

EMT Angled lubricator on gearbox or straight on tube

AGR Automatic lubricating accessory

000 No lubricating accessory

20 EQUIPMENT GENERAL COLOUR

With type A configuration, only the gearbox is painted

RGG Graphite grey RAL7024 (standard)

RAZ Blue RAL5017

RGP Silver grey RAL9006

RSP Special colour indicated by the customer

CIP Only grey 411 priming

000 Not painted

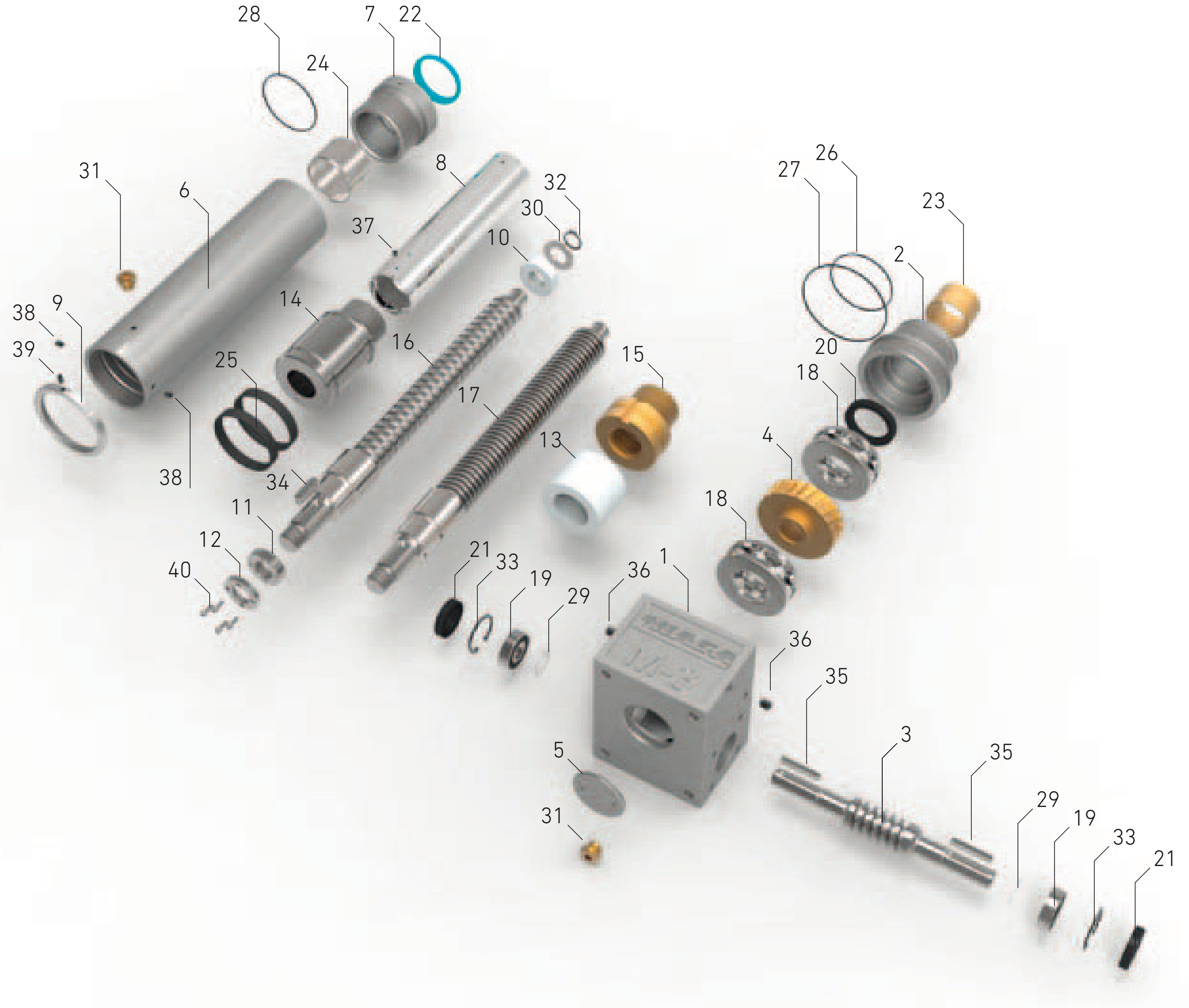
12	13	14	15	16	17	18	19	20
FB	MK	A	GR080A	B	00	GRA	AGR	RGG

LINEAR ACTUATORS

WITH INTEGRATED REDUCTION AND CUBIC GEARBOX. FM SERIES: STEEL TUBE | AM SERIES: ALUMINUM TUBE

DISASSEMBLY

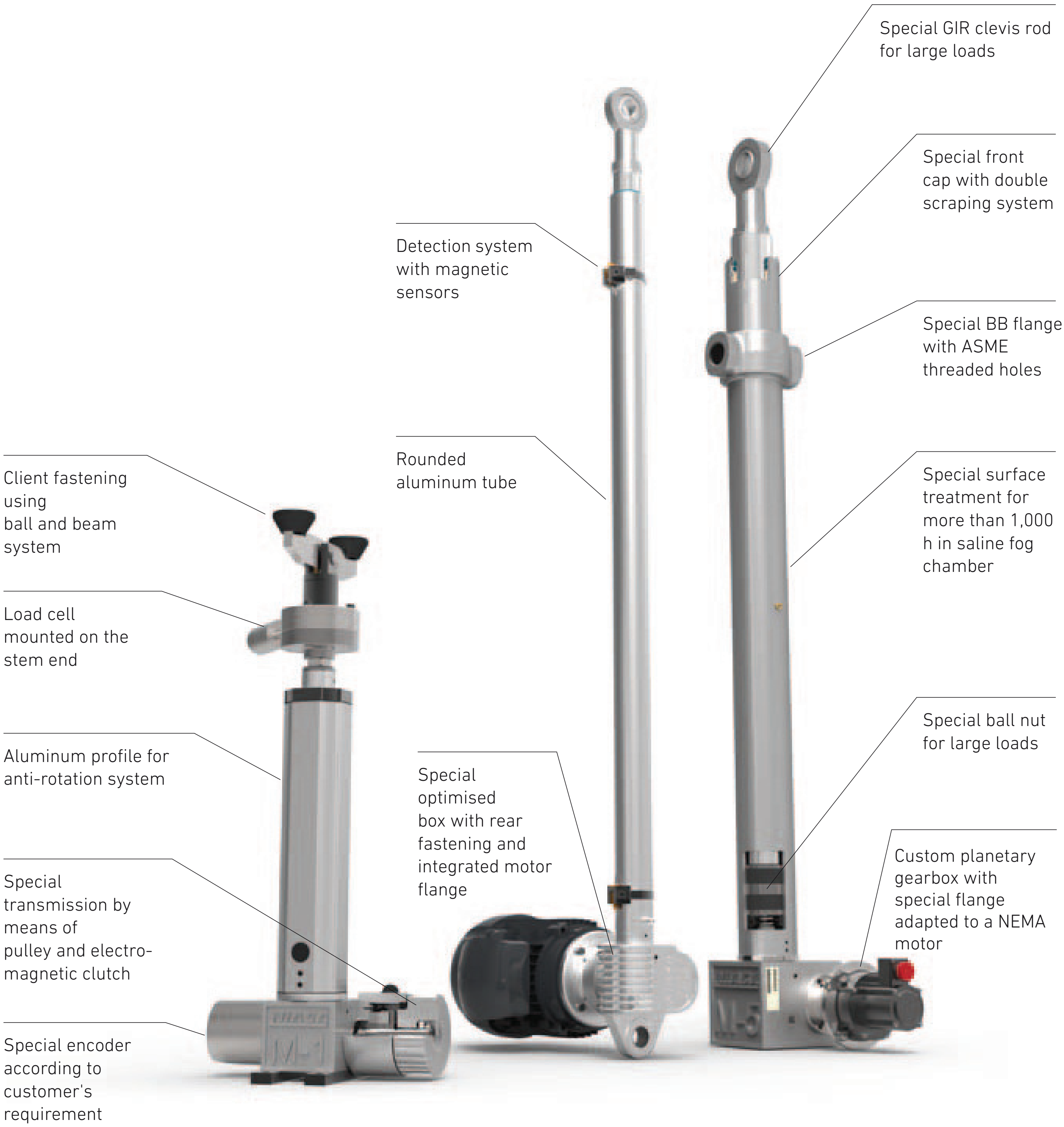
	Name
01	M series box
02	Top cap
03	Worm gear
04	Worm wheel
05	Lower cap
06	Exterior tube
07	Front cap
08	Stem
09	Tube position nut
10	Front support
11	Lock nut
12	Lock nut
13	Supplement bushing
14	Ball nut
15	Trapezoidal nut
16	Ball screw
17	Trapezoidal screw
18	Axial bearing
19	Radial bearing
20	Seal
21	Seal
22	Scraper
23	Bearing
24	Bearing
25	Guide ring
26	O-Ring
27	O-Ring
28	O-Ring
29	Adjustment washer
30	Flat washer
31	Brass lubrication cap
32	Exterior Circlip
33	Inside circlip
34	Straight key
35	Straight key
36	Stud with point
37	Flat stud
38	Stud with point
39	Flat stud
40	Allen screw



LINEAR ACTUATORS

WITH INTEGRATED REDUCTION AND CUBIC GEARBOX. FM SERIES: STEEL TUBE | AM SERIES: ALUMINUM TUBE

SPECIAL CONFIGURATIONS

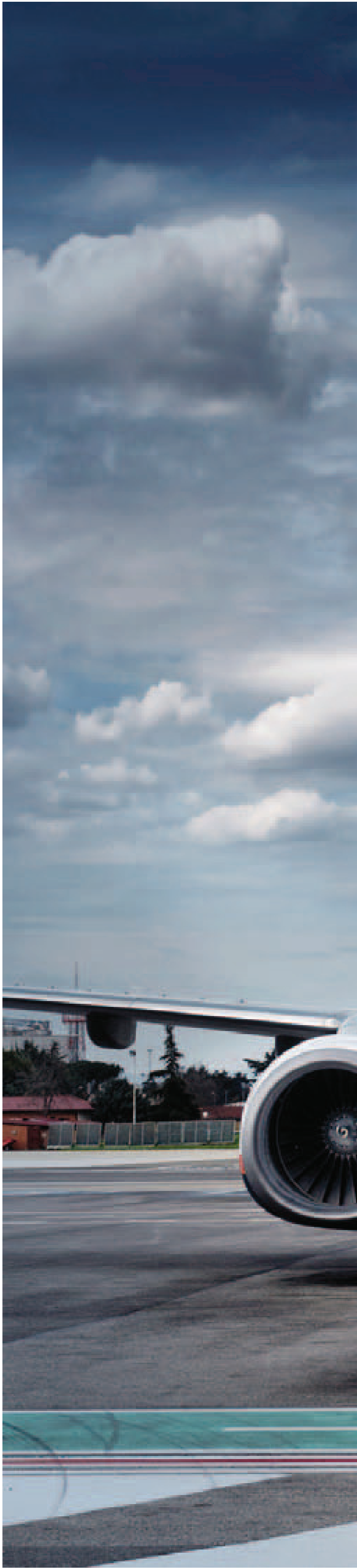


04
LINEAR ACTUATORS WITH INTEGRATED REDUCTION AND COMPACT GEARBOX

FHM Series: Steel tube
AHM Series: Aluminum tube

“WE HAVE A STRATEGIC PLAN. IT'S CALLED DOING THINGS.”

HERB KELLEHER
SOUTHWEST AIRLINES



LINEAR ACTUATORS

WITH INTEGRATED REDUCTION AND COMPACT GEARBOX. FHM SERIES: STEEL TUBE | AHM SERIES: ALUMINUM TUBE

INTRODUCTION

NIASA FHM/AHM Series electro-mechanical actuators have evolved from the FM/AM Series, aimed at specific requirements in the solar energy generation sector (photovoltaic, thermo-solar, etc.). They can also be used in any other kind of application with demanding environmental conditions.

The gearbox is round and not cubic, and the input shaft offers the possibility to connect directly to any type of drive. Additionally, the D variant includes a second reduction, thus avoiding the use of reducers in solar tracking or similar applications, where very slow advance speeds are required.

Their main advantages against other systems, such as pneumatic or hydraulic cylinders, are the following:

- Greater movement and positioning precision.
- Greater safety, due to their irreversibility in many configurations (ask NIASA) and/or the incorporation of different braking devices.
- Superior energy efficiency, as their parts offer high/very high performance, especially with the ball screws, low transmission ratios and high speeds.
- Easier and faster assembly, since hydraulic or pneumatic groups are not required, just an electric motor on the unit itself.
- Greater reliability and duration, and less maintenance, due to the mechanical robustness and construction simplicity.
- Possibility to operate in multiple positions.
- Lower size for the same load capacity.
- ...

The screw supports also characterized for offering an extensive range of:

- Axial load capacities, from 5 kN up to 250 kN.
- Advance speeds, depending on the screw pitch and gearbox. Three possible reductions per actuator size are offered, from 4:1 up to 160:1.
- Trapezoidal and ball screws, depending on the performance required, precision of movement and positioning, etc.
- Fastening accessories and elements, for optimal adaptation.
- Control and safety systems (mechanical/inductive limit switches, absolute/incremental encoders, etc.).
- Materials and surface coverings, depending on the environmental conditions in which the unit will be installed.
- Two types of external sleeve for the stem
  - Steel round tube.
  - Aluminum extrusion profile.
  - ...

Please do not hesitate to contact NIASA if you require FHM/AHM actuators (and their drive mechanisms) with specifications other than those covered in this chapter. The NIASA technical department will specifically develop the special units that best meet your requirements.

04

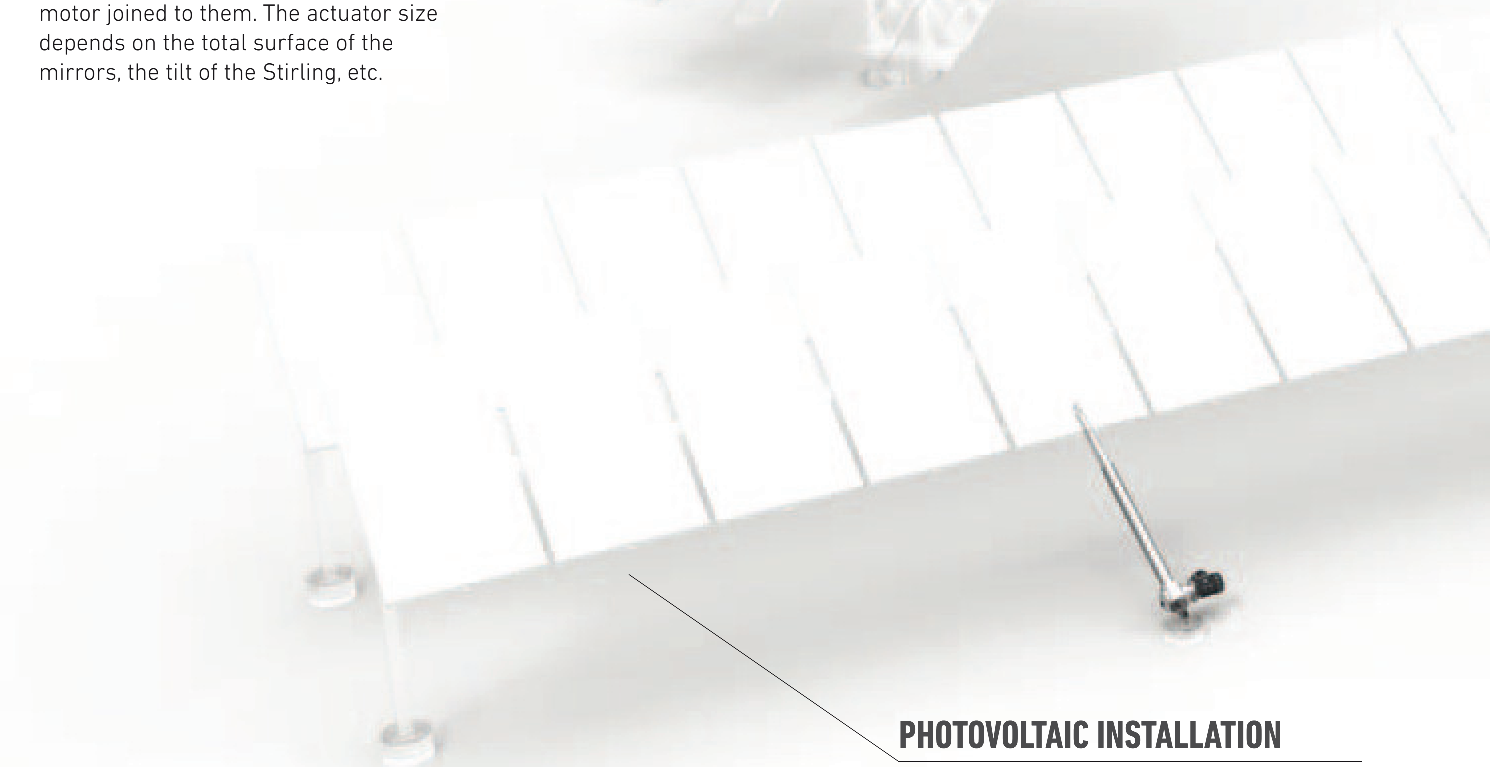
LINEAR ACTUATORS

WITH INTEGRATED REDUCTION AND COMPACT GEARBOX. FHM SERIES: STEEL TUBE | AHM SERIES: ALUMINUM TUBE

APPLICATIONS

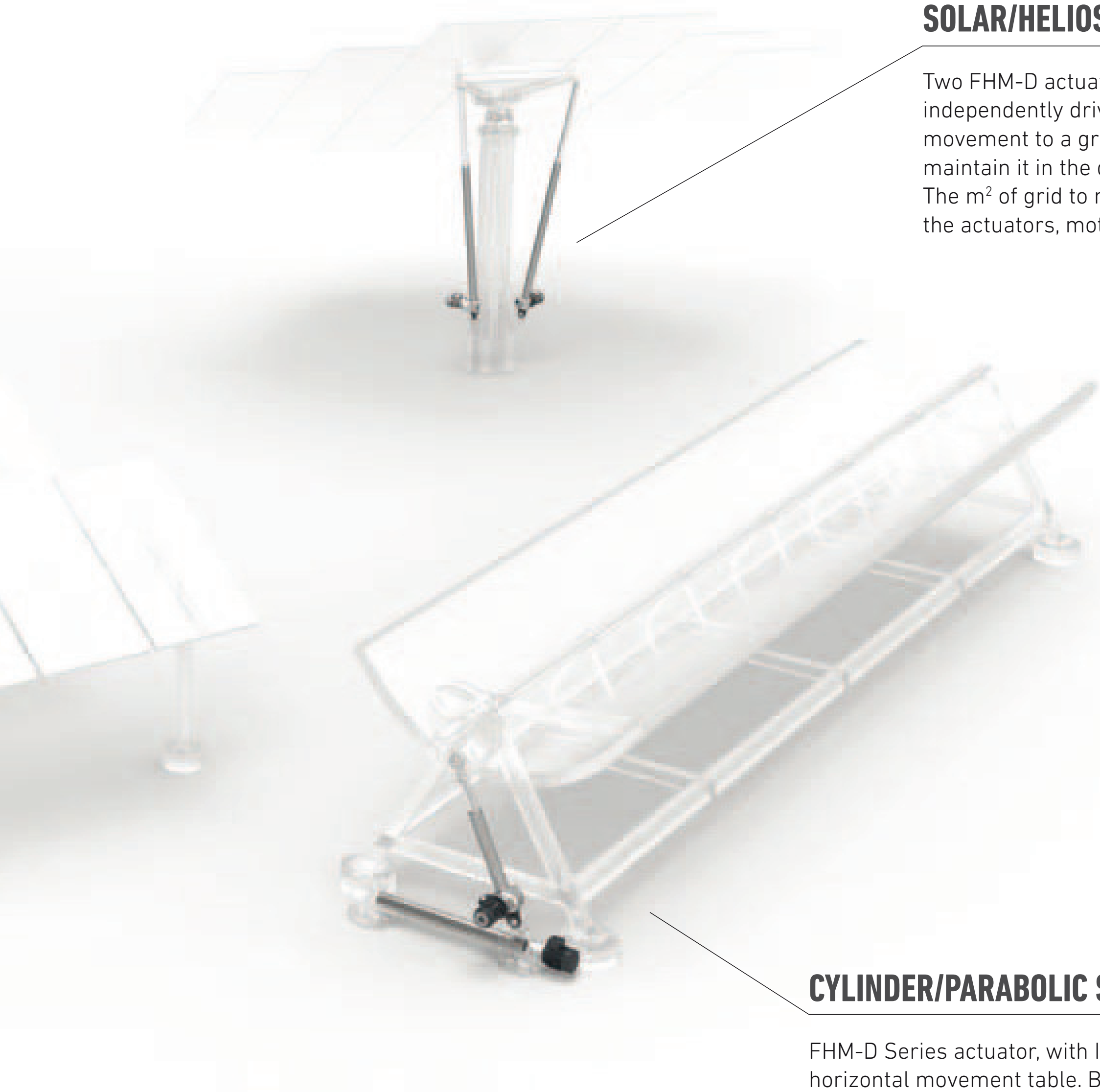
STIRLING TRACKER

FHM-D Series actuator, with IPX protection, that produces the zenithal orientation movement of a parabolic mirror grid, whose purpose is to concentrate the Sun's rays on a Stirling motor joined to them. The actuator size depends on the total surface of the mirrors, the tilt of the Stirling, etc.



PHOTOVOLTAIC INSTALLATION

FHM-D Series actuator that enables zenithal movement on one or more horizontal or polar photovoltaic panel grids. The number and size of the grids to move depends on the size of the actuator, motorization, etc.



SOLAR/HELIOSTAT TRACKER 2 SHAFTS

Two FHM-D actuators, with IPX protection, independently driven, provide azimuth and zenithal movement to a grid of panels or mirrors, to maintain it in the desired orientation at all times. The m^2 of grid to move will depend on the size of the actuators, motorization, etc.

04

CYLINDER/PARABOLIC SOLAR CONCENTRATION

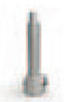
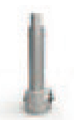
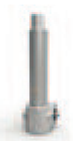
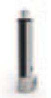
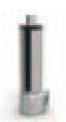
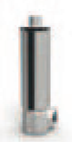
FHM-D Series actuator, with IPX protection, placed on a horizontal movement table. Both actuators combined change the angle of parabolic trough's orientation to concentrate the solar energy on the central conduit where the fluid to be heated circulates.

LINEAR ACTUATORS

WITH INTEGRATED REDUCTION AND COMPACT GEARBOX. FHM SERIES: STEEL TUBE | AHM SERIES: ALUMINUM TUBE

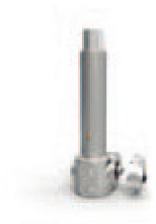
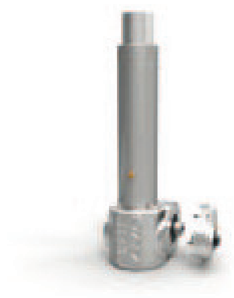
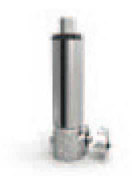
SIZES

On all the sizes there are trapezoidal and ball screw options (see chapter on screws for further information), as well as normal speed (S) and slow speed (H) gearboxes. A third reduction with super slow speed (D) is also available from size HM4.

Up to	HM1 5 kN	HM2 10 kN	HM3 25 kN
F Steel exterior tube	 page 156	 page 157	 page 158
A Aluminum exterior tube With anti-corrosion on the stem (optional) With magnetic sensor integrated on the aluminum tube (optional)	 page 156	 page 157	 page 158

In addition to the standard range of HM Series linear actuators, NIASA can specifically develop the unit that best meets your application requirements. Contact NIASA.

IMPORTANT All the technical data included in this chapter correspond to the configuration with steel tube and to the aluminum tube configuration.
For further information, please contact the NIASA technical department.

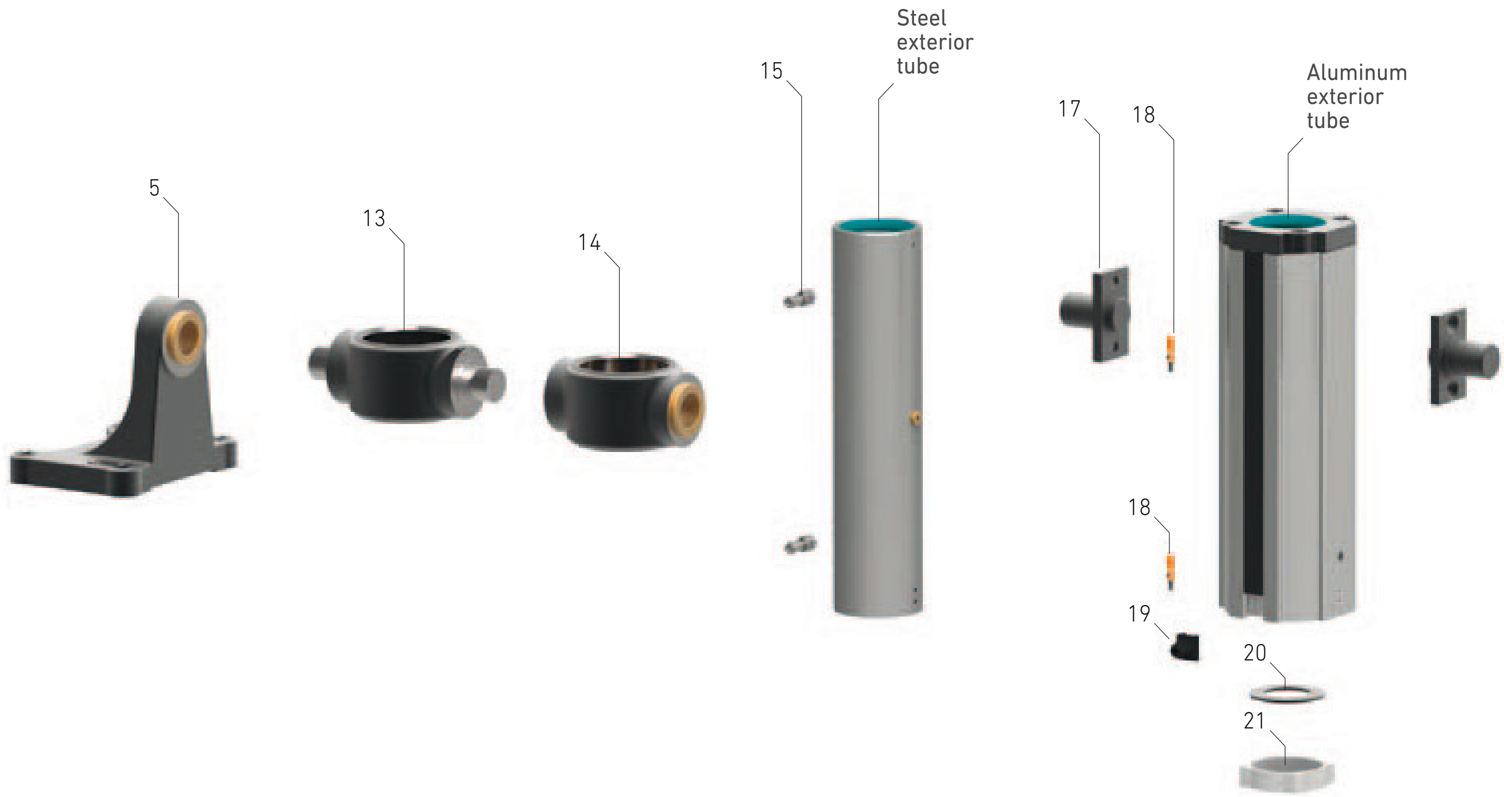
HM4 50 kN	HM5 100 kN	HJ1 150 kN	HJ3 250 kN
 page 159	 page 160	 page 161	 page 162
 page 159			

NIASA

LINEAR ACTUATORS

WITH INTEGRATED REDUCTION AND COMPACT GEARBOX. FHM SERIES: STEEL TUBE | AHM SERIES: ALUMINUM TUBE

GENERAL PRODUCT OVERVIEW



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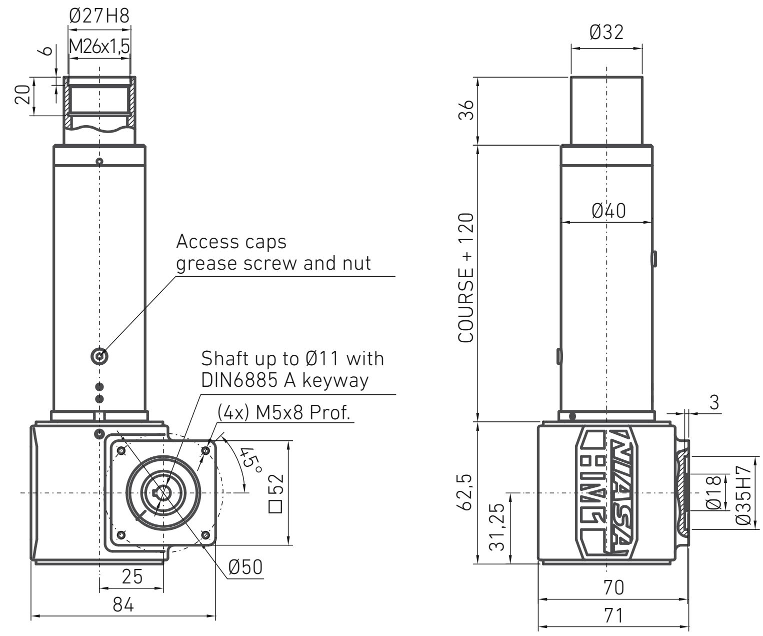
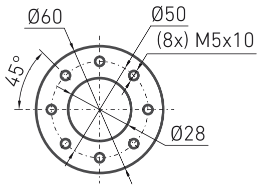
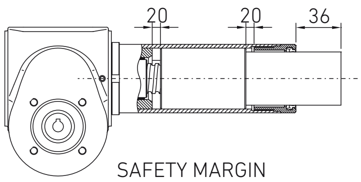
FHM1/AHM1 LINEAR ACTUATOR

UP TO **5 kN** Tr TRAPEZ. KGS BALLS





LOWER GEARBOX FASTENING



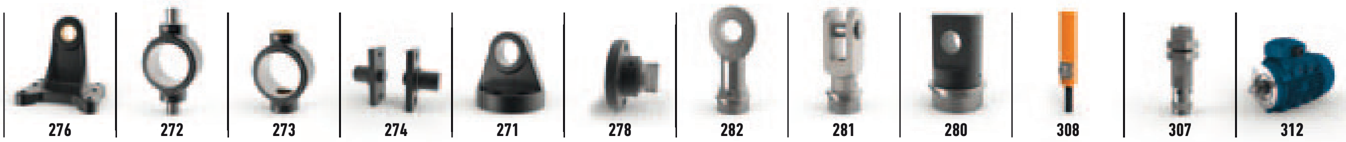
SAFETY MARGIN

Screw diameter and step (mm)	Maximum axial strength (kN)	Reduction		Travel (mm/revol. input)		Performance (%)		Drive torque, M_D (Nm)		Start-up torque, M_0 (Nm)		Weight stroke 0 (kg)	Approx. weight each 100mm of stroke (kg)
								F (kN), load to move in dynamic					
		S	H	S	H	S	H	S	H	S	H		
Tr 16x4	5	4:1	16:1	1.00	0.25	35	27	(0.46 x F) + 0.17	(0.15 x F) + 0.08	0.80 x F	0.34 x F	1.9	0.5
KGS 1605	5	4:1	16:1	1.25	0.31	71	56	(0.28 x F) + 0.14	(0.09 x F) + 0.08	0.39 x F	0.16 x F	1.9	0.5

... Power required: P_D (kW) = 0,157x M_D (Nm).

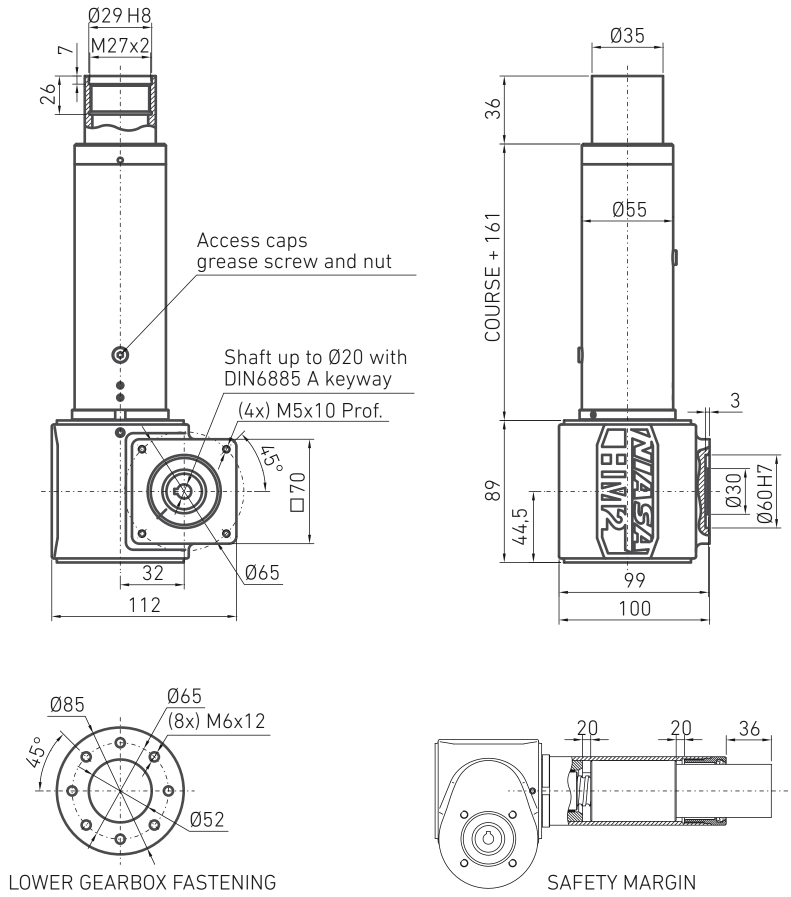
... All the data in the table correspond to an input speed of 1,500 rpm. For other speeds, please see the calculation chapter (page 166).

... Ensure that the dynamic load of the application does not surpass the critical values indicated, in order to avoid overheating of the unit and buckling and resonance of the screw. See calculations chapter (page 166).



FHM2/AHM2 LINEAR ACTUATOR

UP TO **10 kN** Tr TRAPEZ. KGS BALLS

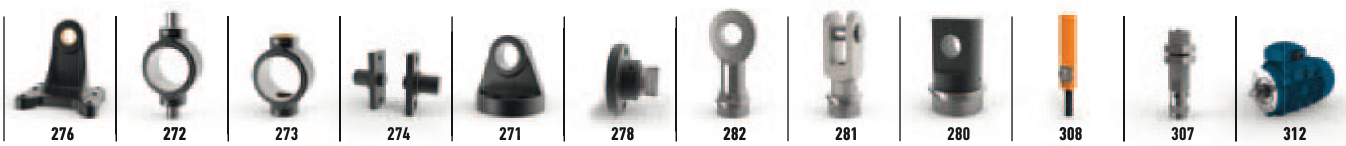


Screw diameter and step (mm)	Maximum axial strength (kN)	Reduction		Travel (mm/revol. input)		Performance (%)		Drive torque, M_D (Nm)		Start-up torque, M_0 (Nm)		Weight stroke 0 (kg)	Approx. weight each 100mm of stroke (kg)
								F (kN), load to move in dynamic					
		S	H	S	H	S	H	S	H	S	H		
Tr 24x5	10	4:1	16:1	1.25	0.31	31	25	(0.64 x F) + 0.35	(0.20 x F) + 0.17	1.11 x F	0.43 x F	4.7	1
KGS 2005	10	4:1	16:1	1.25	0.31	72	58	(0.28 x F) + 0.32	(0.09 x F) + 0.17	0.39 x F	0.15 x F	4.7	1
KGS 2020	7.5	4:1	16:1	5.00	1.25	72	58	(1.10 x F) + 0.34	(0.35 x F) + 0.17	1.55 x F	0.60 x F	4.7	1

... Power required: P_D (kW) = 0,157x M_D (Nm).

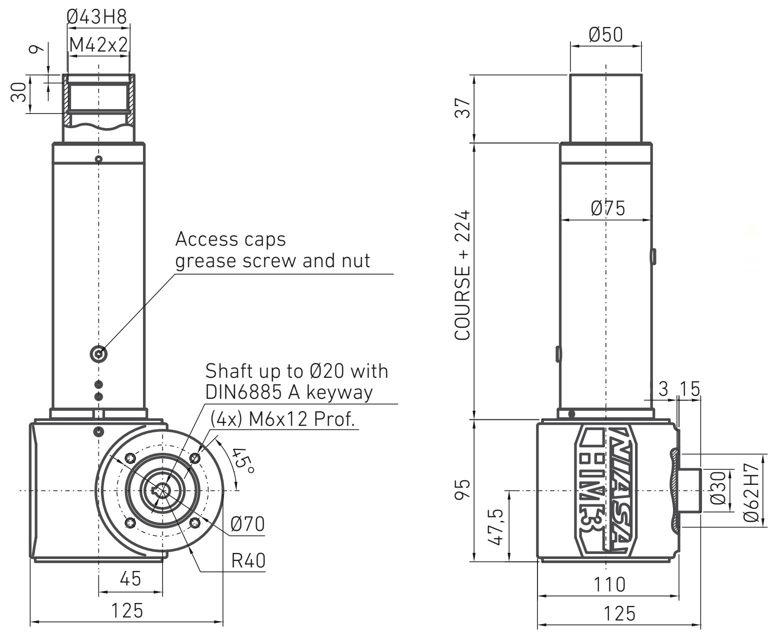
... All the data in the table correspond to an input speed of 1,500 rpm. For other speeds, please see the calculation chapter (page 166).

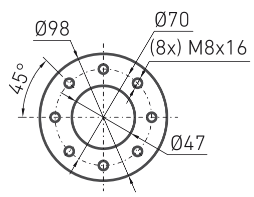
... Ensure that the dynamic load of the application does not surpass the critical values indicated, in order to avoid overheating of the unit and buckling and resonance of the screw. See calculations chapter (page 166).



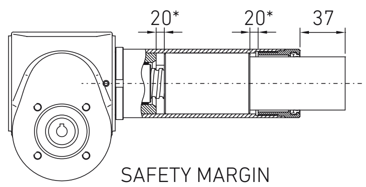
FHM3/AHM3 LINEAR ACTUATOR

UP TO 25 kN





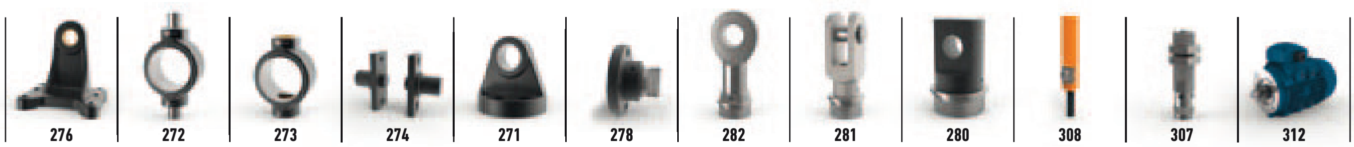
LOWER GEARBOX FASTENING



SAFETY MARGIN
(*) If incorporating a KGM 3220 nut, the safety margin is 15 mm.

Screw diameter and step (mm)	Maximum axial strength (kN)	Reduction		Travel (mm/revol. input)		Performance (%)		Drive torque, M_D (Nm)		Start-up torque, M_0 (Nm)		Weight stroke 0 (kg)	Approx. weight each 100mm of stroke (kg)
								F (kN), load to move in dynamic					
		S	H	S	H	S	H	S	H	S	H		
Tr 36x6	25	6:1	24:1	1.00	0.25	28	22	(0.58 x F) + 0.57	(0.18 x F) + 0.31	1.04 x F	0.40 x F	11.5	2.1
KGS 3205	20	6:1	24:1	0.83	0.21	73	58	(0.18 x F) + 0.52	(0.06 x F) + 0.29	0.26 x F	0.11 x F	11.5	2.1
KGS 3210	25	6:1	24:1	1.67	0.42	73	58	(0.36 x F) + 0.52	(0.12 x F) + 0.29	0.52 x F	0.21 x F	11.5	2.1
KGS 3220	20	6:1	24:1	3.33	0.83	73	58	(0.73 x F) + 0.52	(0.23 x F) + 0.29	1.03 x F	0.42 x F	11.5	2.1
KGS 3240	10	6:1	24:1	6.67	1.67	73	58	(1.46 x F) + 0.52	(0.46 x F) + 0.29	2.07 x F	0.84 x F	11.5	2.1

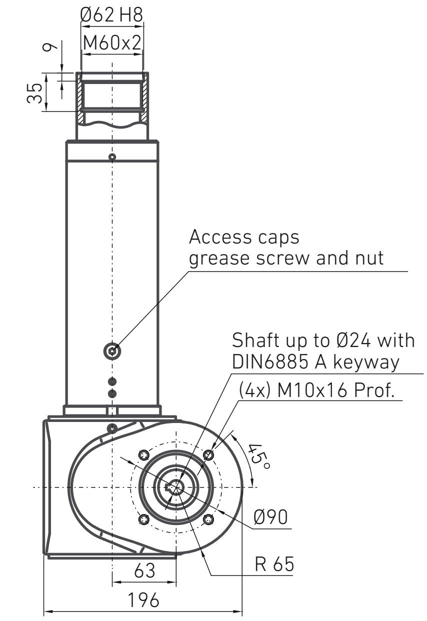
... Power required: P_D (kW) = 0,157x M_D (Nm).
... All the data in the table correspond to an input speed of 1,500 rpm. For other speeds, please see the calculation chapter (page 166).
... Ensure that the dynamic load of the application does not surpass the critical values indicated, in order to avoid overheating of the unit and buckling and resonance of the screw. See calculations chapter (page 166).

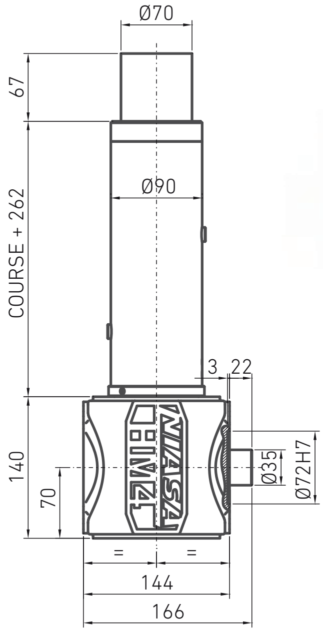


FHM4/AHM4 LINEAR ACTUATOR

UP TO 50 kN

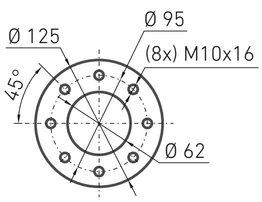
Tr TRAPEZ. KGS BALLS



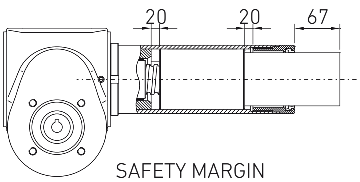


NOTE:

See dimensions of the D configuration at the end of this chapter.



LOWER GEARBOX FASTENING



SAFETY MARGIN

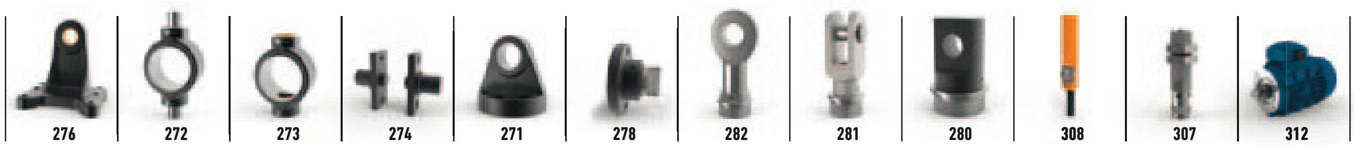
Screw diameter and pitch (mm)	Maximum axial strength (kN)	Reduction			Travel (mm/revol. input)		
		S	H	D	S	H	D
Tr 45x7	50	7:1	28:1	84:1	1.00	0.25	0.08
KGS 4010	42	7:1	28:1	84:1	1.43	0.36	0.12
KGS 4020	37	7:1	28:1	84:1	2.86	0.71	0.24
KGS 4040	35	7:1	28:1	84:1	5.71	1.43	0.48

Screw diameter and step (mm)	Performance (%)			Drive torque, M_D (Nm)			Start-up torque, M_0 (Nm)			Weight stroke 0 (kg)	Approx. weight each 100 mm of stroke (kg)	DR accessory weight (kg)
				F (kN), load to move in dynamic								
	S	H	D	S	H	D	S	H	D			
Tr 45x7	26	21	18	(0.61 x F) + 0.97	(0.19 x F) + 0.57	(0.076 x F) + 0.19	1.18 x F	0.44 x F	0.155 x F	26	3.3	2.5
KGS 4010	73	60	49	(0.31 x F) + 0.93	(0.09 x F) + 0.56	(0.038 x F) + 0.19	0.45 x F	0.18 x F	0.063 x F	26	3.3	2.5
KGS 4020	73	60	49	(0.62 x F) + 0.94	(0.19 x F) + 0.56	(0.077 x F) + 0.19	0.90 x F	0.36 x F	0.127 x F	26	3.3	2.5
KGS 4040	73	60	49	(1.25 x F) + 0.94	(0.38 x F) + 0.56	(0.154 x F) + 0.19	1.80 x F	0.72 x F	0.253 x F	26	3.3	2.5

... Power required: P_D (kW) = 0,157x M_D (Nm).

... All the data in the table correspond to an input speed of 1,500 rpm. For other speeds, please see the calculation chapter (page 166).

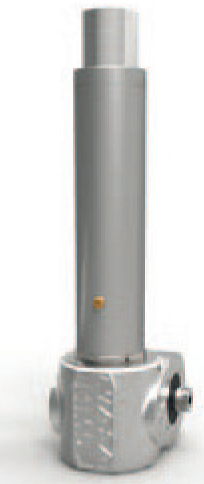
... Ensure that the dynamic load of the application does not surpass the critical values indicated, in order to avoid overheating of the unit and buckling and resonance of the screw. See calculations chapter (page 166).

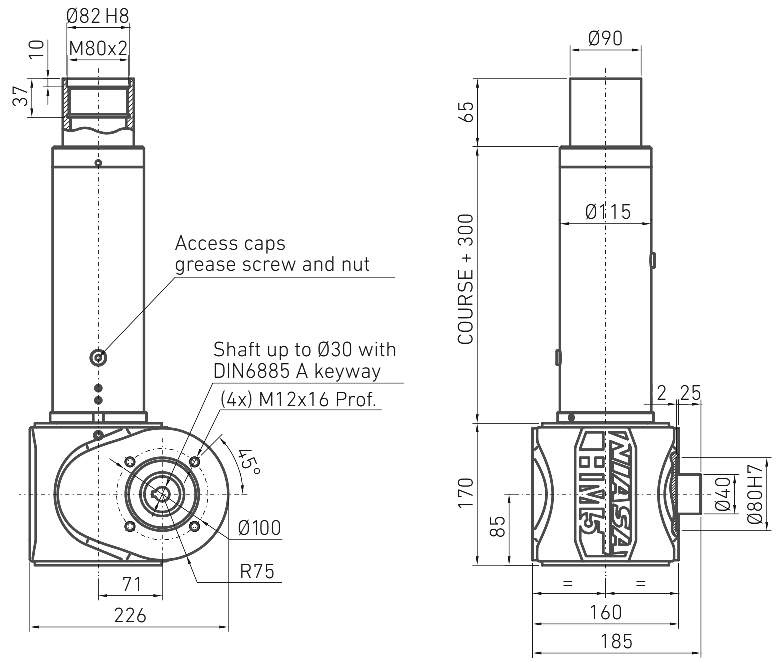


FHM5 ACTUATOR

UP TO 100 kN

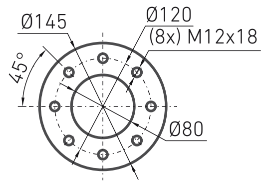
The capacity indicated corresponds to the basic configuration.
Higher capacities are available on request.



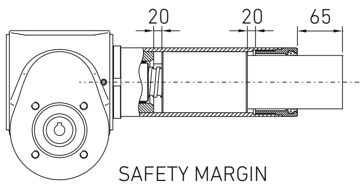


NOTE:

See dimensions of the D configuration at the end of this chapter.



LOWER GEARBOX FASTENING



SAFETY MARGIN

Screw diameter and pitch (mm)	Maximum axial strength (kN)	Reduction			Travel (mm/revol. input)		
		S	H	D	S	H	D
Tr 50x8	100	9:1	36:1	108:1	0.89	0.22	0.07
KGS 5010	65	9:1	36:1	108:1	1.11	0.28	0.09

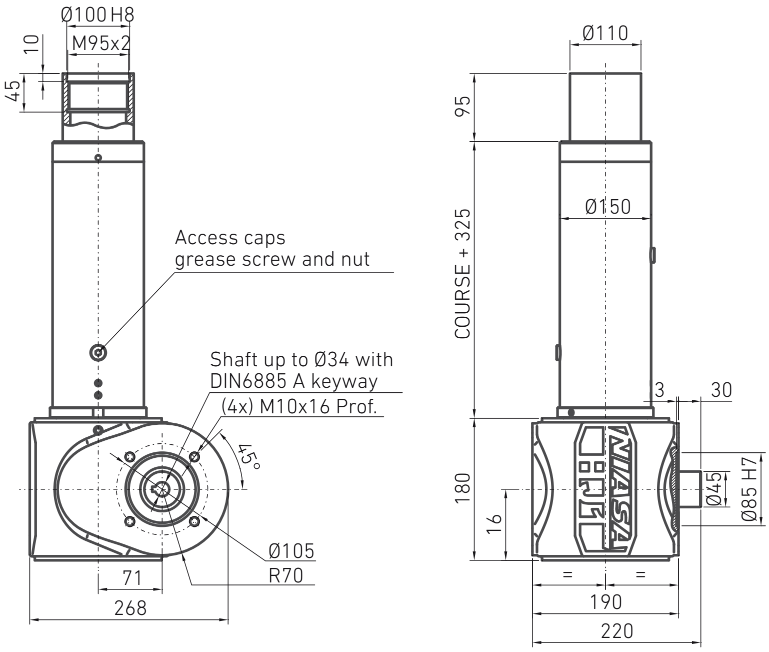
Screw diameter and step (mm)	Performance (%)			Drive torque, M_D (Nm)			Start-up torque, M_0 (Nm)			Weight stroke 0 (kg)	Approx. weight each 100 mm of stroke (kg)	DR accessory weight (kg)
				F (kN), load to move in dynamic								
	S	H	D	S	H	D	S	H	D			
Tr 50x8	27	21	17	(0.53 x F) + 1.91	(0.17 x F) + 1.08	(0.067 x F) + 0.36	0.98 x F	0.39 x F	0.138 x F	40.2	4.9	3
KGS 5010	73	58	48	(0.24 x F) + 1.87	(0.08 x F) + 1.07	(0.031 x F) + 0.36	0.36 x F	0.15 x F	0.054 x F	40.2	4.9	3

... Power required: P_D (kW) = 0,157x M_D (Nm).
... All the data in the table correspond to an input speed of 1,500 rpm. For other speeds, please see the calculation chapter (page 166).
... Ensure that the dynamic load of the application does not surpass the critical values indicated, in order to avoid overheating of the unit and buckling and resonance of the screw. See calculations chapter (page 166).

FHJ1 ACTUATOR

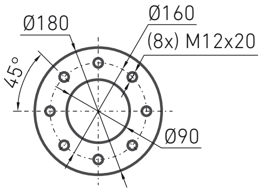
UP TO 150 kN Tr TRAPEZ. KGS BALLS

The capacity indicated corresponds to the basic configuration.
Higher capacities are available on request.

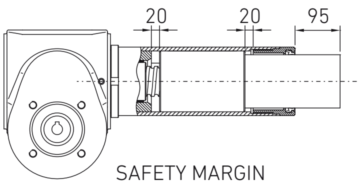


NOTE:

See dimensions of the D configuration at the end of this chapter.



LOWER GEARBOX FASTENING

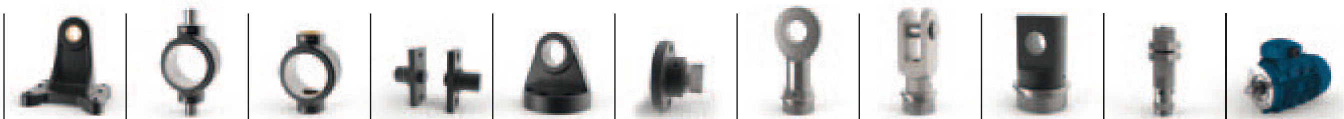


SAFETY MARGIN

Screw diameter and pitch (mm)	Maximum axial strength (kN)	Reduction			Travel (mm/revol. input)		
		S	H	D	S	H	D
Tr 70x10	150	9:1	36:1	108:1	1.11	0.28	0.09
KGS 6310	65	9:1	36:1	108:1	1.11	0.28	0.09

Screw diameter and step (mm)	Performance (%)			Drive torque, M_D (Nm)			Start-up torque, M_0 (Nm)			Weight stroke 0 (kg)	Approx. weight each 100 mm of stroke (kg)	DR accessory weight (kg)
				F (kN), load to move in dynamic								
	S	H	D	S	H	D	S	H	D			
Tr 70x10	24	18	16	(0.73 x F) + 2.03	(0.24 x F) + 1.21	(0.09 x F) + 0.4	1.31 x F	0.49 x F	0.172 x F	79.5	9	3.8
KGS 6310	73	55	49	(0.24 x F) + 1.97	(0.08 x F) + 1.19	(0.03 x F) + 0.4	0.33 x F	0.14 x F	0.048 x F	81.5	9	3.8

... Power required: P_D (kW) = 0,157x M_D (Nm).
... All the data in the table correspond to an input speed of 1,500 rpm. For other speeds, please see the calculation chapter (page 166).
... Ensure that the dynamic load of the application does not surpass the critical values indicated, in order to avoid overheating of the unit and buckling and resonance of the screw. See calculations chapter (page 166).

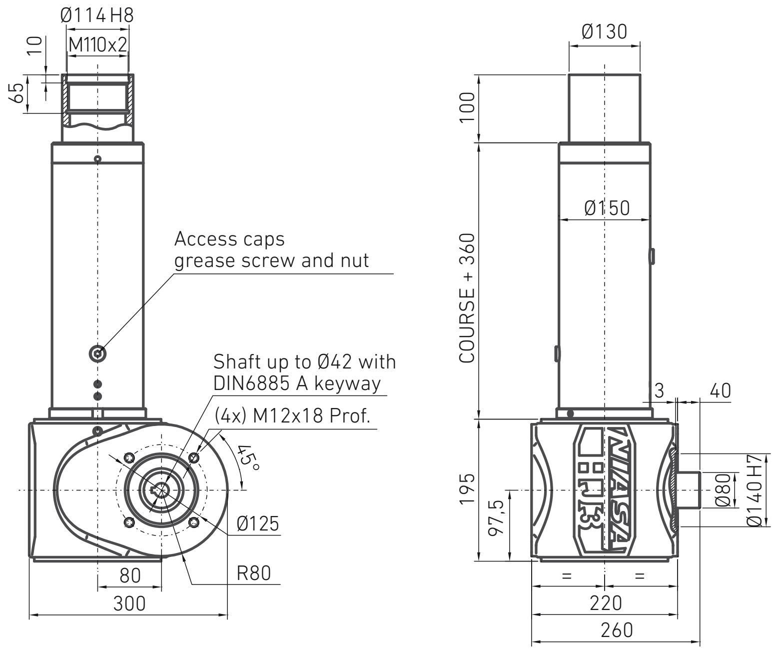


276 | 272 | 273 | 274 | 271 | 278 | 282 | 281 | 280 | 307 | 312

FHJ3 ACTUATOR

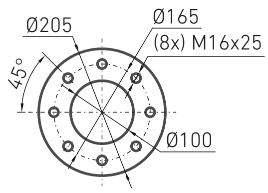
UP TO 250 kN

Contact versions with ball screw. The capacity indicated corresponds to the basic configuration. Higher capacities are available on request.

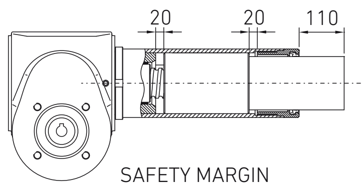


NOTE:

See dimensions of the D configuration at the end of this chapter.



LOWER GEARBOX FASTENING



SAFETY MARGIN

Screw diameter and pitch (mm)	Maximum axial strength (kN)	Reduction			Travel (mm/revol. input)		
		S	H	D	S	H	D
Tr 80x10	250	10:1	40:1	160:1	1.00	0.25	0.06
KGS 8010	80	10:1	40:1	160:1	1.00	0.25	0.06

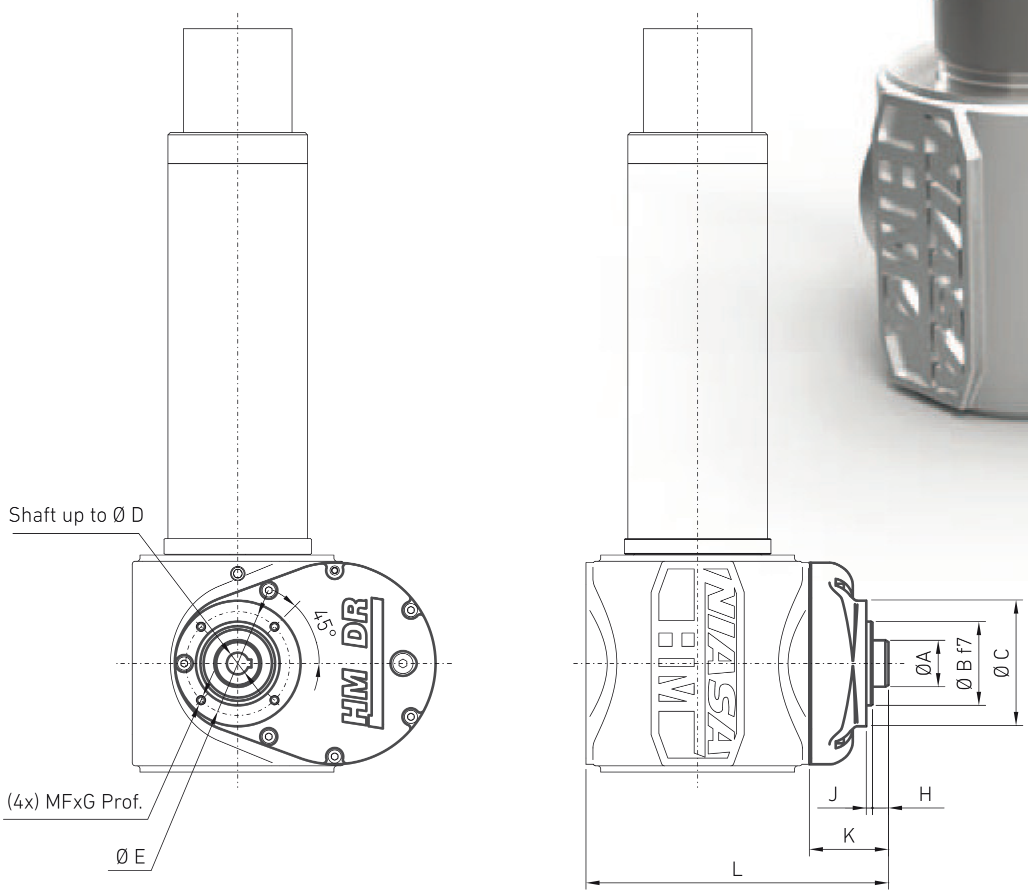
Screw diameter and step (mm)	Performance (%)			Drive torque, M_D (Nm)			Start-up torque, M_0 (Nm)			Weight stroke 0 (kg)	Approx. weight each 100 mm of stroke (kg)	DR accessory weight (kg)
				F (kN), load to move in dynamic								
	S	H	D	S	H	D	S	H	D			
Tr 80x10	22	19	17	(0.73 x F) + 2.81	(0.21 x F) + 1.95	(0.058 x F) + 0.49	1.18 x F	0.40 x F	0.106 x F	109.5	14	5

... Power required: P_D (kW) = 0,157x M_D (Nm).
... All the data in the table correspond to an input speed of 1,500 rpm. For other speeds, please see the calculation chapter (page 166).
... Ensure that the dynamic load of the application does not surpass the critical values indicated, in order to avoid overheating of the unit and buckling and resonance of the screw. See calculations chapter (page 166).

NIASA

D REDUCTION

FHM4 / FHM5
FHJ1 / FHJ3
AHM4



	ø A	ø B	ø C	ø D	ø E	M FxG	H	J	K	L
HM4	30	54	81	22	67	M 6x12	10	4	51	195
HM5	40	72	110	28	90	M 6x12	15	4	60	220
HJ1	50	85	130	38	105	M 8x16	15	4	104	294
HJ3	65	115	150	50	130	M 10x18	18	6	107	305

LINEAR ACTUATORS

WITH INTEGRATED REDUCTION AND COMPACT GEARBOX. FHM SERIES: STEEL TUBE | AHM SERIES: ALUMINUM TUBE

PRODUCT SELECTION

To select the correct HM Series linear actuator, please follow this flow diagram.

If you would like to know the expected service life of a unit for your application, please send the relevant data to the NIASA service department.

1 FHM/AHM ACTUATOR MODEL AND SIZE DEFINITION

APPLICATION

- STEEL TUBE (FHM) Page 152
- ALUMINIUM TUBE (AHM) Page 152

SIZE PRE-SELECTION Page 152

2 SCREW AND REDUCTION TYPE DEFINITION

SCREW TYPE Page 156

- BALL (KGS)
- TRAPEZOIDAL (Tr)
- SPECIAL

REDUCTION Page 156

- NORMAL (S)
- SLOW (H)
- SUPER SLOW(D)

3 DRIVE TORQUE AND POWER CALCULATION

TORQUE AND POWER CALCULATION Page 166

- STANDARD DRIVE
- SPECIAL DRIVE

4 ADDITIONAL CONFIGURATION AND ACCESSORIES

ADDITIONAL CONFIGURATION Page 168

- Stem end
- Input shaft
- Lubrication
- Corrosion protection
- Sealing
- Ambient temperature
- ....

ACCESSORIES Page 260

5 PLACING AN ORDER

PLACING AN ORDER Page 171

6 DESIGN VALIDATION (NIASA)

SIZE AND CONFIGURATION VALIDATION

- BUCKLING
- LATERAL LOADS
- RESONANCE
- OVER-HEATING
- ...

SIZE CONFIGURATION

RE-SIZING PROPOSAL

04

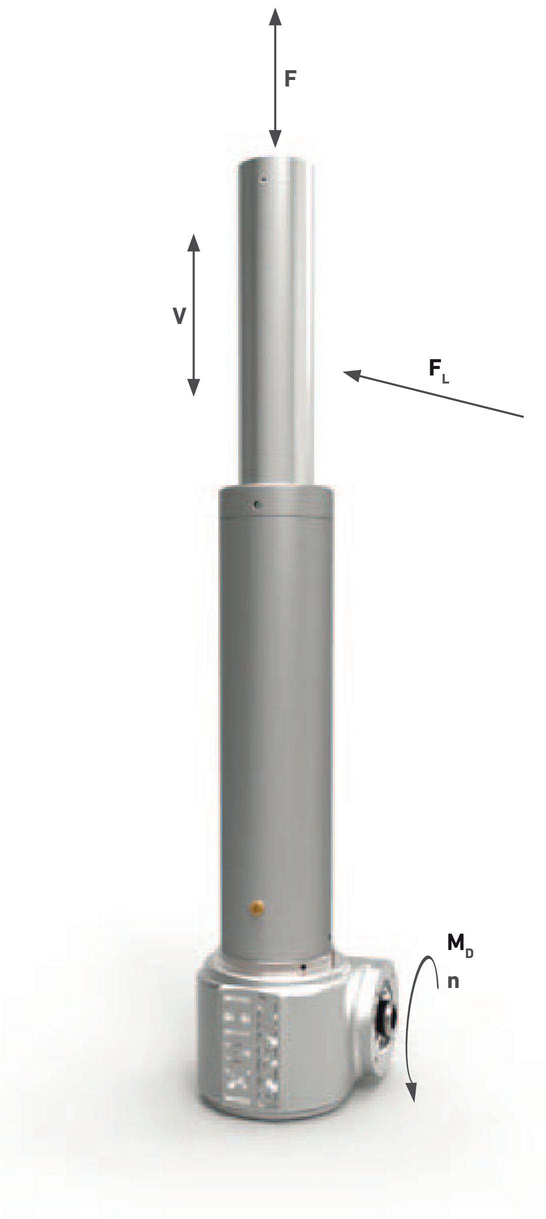
LINEAR ACTUATORS

WITH INTEGRATED REDUCTION AND COMPACT GEARBOX. FHM SERIES: STEEL TUBE | AHM SERIES: ALUMINUM TUBE

PRODUCT SELECTION

STRENGTH AND TORQUE ACTING ON AN HM SERIES LINEAR ACTUATOR

F Load to move at traction and/or compression.
F_L Lateral load on the stem.
V Stem advance speed.
M_D Torque on the input shaft.
n Speed on the input shaft.



TORQUE AND POWER OF A LINEAR ACTUATOR HM SERIES LINEAR

After pre-selecting the suitable HM Series linear actuator for the application, select the drive motor following the steps below:

1. DRIVE TORQUE

$$M_D\,(Nm) = \frac{F \times P}{2 \times \pi \times 0{,}9 \times \eta_{DG} \times \eta_{DS} \times i} + M_I$$

F Load to move in dynamic (kN)
P Screw pitch (mm)
M_I Drive idle torque (Nm)
i Actuator reduction
0.9 Cylinder dynamic efficiency
η_{DG} Gearbox dynamic efficiency
η_{DS} Screw dynamic efficiency

2. POWER REQUIRED

$$P_D\,(kW) = \frac{M_D \times n}{9550}$$

M_D Drive torque (Nm)
n Screw jack input speed (rpm)

IMPORTANT

... In general, it is advisable to multiply the power value calculated for a safety coefficient of 1.3 to 2; the smaller the installation the higher the coefficient

... When the load to move is lower than 10% of the elevator's nominal load, consider that value as the load to move.

3. START-UP TORQUE

For loads between 25% and 100% of the actuator's nominal value, calculate the start-up torque with this formula:

$$M_0\,(Nm) = \frac{F \times P}{2 \times \pi \times 0.9 \times \eta_{SA} \times i}$$

η_{SA} Actuator static efficiency (gearbox + stem)

IMPORTANT

... For loads under 25% of the actuator's nominal value, select the start-up torque by multiplying the drive torque by 2.

η_{DG} Gearbox dynamic efficiency

input rpm	FHM1/AHM1		FHM2/AHM2		FHM3/AHM3		FHM4/AHM4			FHM5			FHJ1			FHJ3		
	S	H	S	H	S	H	S	H	D	S	H	D	S	H	D	S	H	D
3,000	0.91	0.75	0.90	0.77	0.92	0.76	Non-standard											
1,500	0.88	0.69	0.89	0.71	0.90	0.71	0.90	0.74	0.61	0.90	0.72	0.59	0.90	0.68	0.61	0.90	0.77	0.68
1000	0.87	0.67	0.88	0.69	0.88	0.68	0.88	0.69	0.57	0.87	0.67	0.55	0.89	0.67	0.57	0.89	0.76	0.66
750	0.85	0.64	0.87	0.66	0.87	0.67	0.87	0.68	0.55	0.86	0.65	0.54	0.88	0.65	0.55	0.89	0.75	0.64
500	0.84	0.61	0.85	0.64	0.85	0.63	0.85	0.64	0.53	0.84	0.62	0.51	0.87	0.64	0.53	0.88	0.74	0.63
100	0.79	0.54	0.79	0.56	0.79	0.54	0.79	0.55	0.51	0.78	0.53	0.49	0.81	0.55	0.51	0.84	0.66	0.61

η_{DS} Screw dynamic efficiency

Trapezoidal screw (Tr)						
16x4	24x5	36x6	45x7	50x8	70x10	80x10
0.44	0.39	0.34	0.32	0.33	0.30	0.27

Ball screw (KGS)
0.9 (for all sizes)

M_I Idle Torque (F/A)

S gearbox version (normal speed)

	HM1	HM2	HM3	HM4	HM5	HJ1	HJ3
Trapezoidal	0.17	0.35	0.57	0.97	1.91	2.03	2.81
Balls	0.14	0.33	0.52	0.93	1.87	1.97	2.75

H gearbox version (slow speed)

	HM1	HM2	HM3	HM4	HM5	HJ1	HJ3
Trapezoidal	0.08	0.17	0.31	0.57	1.08	1.21	1.95
Balls	0.08	0.17	0.29	0.56	1.07	1.19	1.94

D gearbox version (super-slow speed)

	HM1	HM2	HM3	HM4	HM5	HJ1	HJ3
Trapezoidal				0.19	0.36	0.40	0.49
Balls				0.19	0.36	0.40	0.48

η_{SA} Actuator static efficiency (F/A)

S gearbox box version (normal speed)

	HM1	HM2	HM3	HM4	HM5	HJ1	HJ3
Trapezoidal	0.22	0.20	0.17	0.15	0.16	0.15	0.15
Balls	0.57	0.57	0.57	0.56	0.55	0.59	0.64

H gearbox version (slow speed)

	HM1	HM2	HM3	HM4	HM5	HJ1	HJ3
Trapezoidal	0.13	0.13	0.11	0.10	0.10	0.10	0.11
Balls	0.35	0.37	0.35	0.35	0.32	0.36	0.45

D gearbox version (super-slow speed)

	HM1	HM2	HM3	HM4	HM5	HJ1	HJ3
Trapezoidal				0.10	0.10	0.10	0.10
Balls				0.33	0.30	0.34	0.43

IMPORTANT

... The values indicated in the tables correspond to the lubrication conditions established by NIASA, for gearbox and screw, and will be reached after a small period of operation.

... In the case of low temperatures, these can be reduced considerably.

LINEAR ACTUATORS

WITH INTEGRATED REDUCTION AND COMPACT GEARBOX. FHM SERIES: STEEL TUBE | AHM SERIES: ALUMINUM TUBE

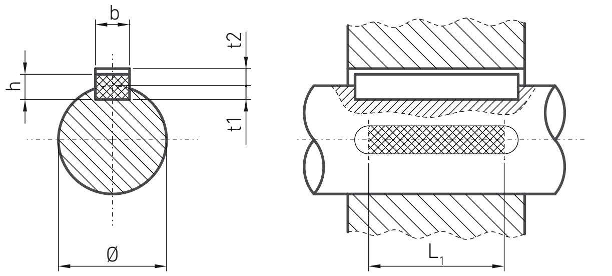
PRODUCT SELECTION

MAXIMUM TRANSFERABLE TORQUE ACCORDING TO SHAFT/ PARALLEL COTTER PIN (DIN 6885)

The following table shows the maximum transferrable torque for a shaft and its keys. It is considered that the shaft is subject exclusively to torsional forces.

IMPORTANT

... Never subject the input of a screw jack to torque over that indicated for its shaft and keys (see plans in the chapter "sizes", page 152).



Shaft diameter Ø (mm)	Key dimensions			Maximum transferrable torque, M_D (Nm) Key effective length, L_1 (mm)						
	b x h (mm)	t1 (mm)	t2 (mm)	10	16	20	28	40	50	70
8 – 10	3 x 3	1.8	1.4	5	9	12	-	-	-	-
10 – 12	4 x 4	2.5	1.8	9	13	17	-	-	-	-
12 – 17	5 x 5	3	2.3	15	24	30	42	-	-	-
17 – 22	6 x 6	3.5	2.8	25	40	50	70	100	-	-
22 – 30	8 x 7	4	3.3	39	63	78	109	157	195	-
30 – 38	10 x 8	5	3.3	50	82	102	143	204	255	357
38 – 44	12 x 8	5	3.3	62	98	123	173	247	308	432
44 – 50	14 x 9	5.5	3.8	82	132	164	230	330	412	575

Material: C45 (1.1191) according to EN 10083-1
Load type: Drive - Uniform /
Load - Light knocks
Assembly: tight
Cycles: >1,000,000
Safety factor: 1.5 - 2.5
IMPORTANT For other conditions, please contact the NIASA technical department

LUBRICATION

NIASA HM Series linear actuators are supplied lubricated with DIVINOL LITHOGREASE G421 type grease. This is a semi-synthetic grease with a lithium compound with the following specifications.

A change of grease type may affect the correct operation of the actuator.

Specifications

G421 DIVINOL LITHOGREASE	
Working temperature	-35 to +160°C
Density at 15°C	0.9 kg/dm^3
Cinematic viscosity (s/DIN 51 562)	130 mm^2/s at 40°C 15 mm^2/s at 100°C
Dropping point (s/DIN ISO 2176)	>220°C
Water resistance (s/DIN 51 807/T1)	Level 1

For further information, please contact the NIASA technical department.

NIASA supplies its HM Series actuators with a brass lubrication cap with O-ring, on the gearbox and on the tube, to ensure it is sealed.

There is a possibility to supply HM Series actuators with a grease nipple angled at 45° DIN 71412 type B for the gearbox, and a straight grease nipple DIN 71412 type A for the tube.

A complete cleaning and change of grease is recommended after five years.

The greasing interval depends on the type of work and its cycle. It is advisable to lubricate from 30 to 50 hours after start-up and approximately every six months.
It is important to avoid over-lubricating.

A group lubricator is recommended for automatic lubrication of the units. Depending on the type of group lubricator, the lubrication may last up to two years.
See lubrication chapter in accessories.

PRODUCT SELECTION

PROTECTION AGAINST CORROSION, SEALING AND AMBIENT TEMPERATURE

PROTECTION AGAINST CORROSION

Select the environment in which the equipment will work, using the atmospheric corrosion categories classification established in the DIN EN ISO 12944-2 standard (protection against the corrosion of steel structures using painted systems). Also establish the durability required before carrying out the first maintenance of the exterior surfaces (durability does not imply a "time" guarantee).

If the corrosion category is higher than “C3” for your application and/or higher than “average” durability is required, please contact NIASA so that the technical department can select the surface protection system and select the most suitable components.

CORROSION CATEGORY		ENVIRONMENT	
		Outdoors	Indoors
C1	Very low		Buildings with heating and clean atmospheres.
C2	Low	Atmospheres with low levels of pollution. Rural areas.	Buildings with no heating and possible condensation.
C3	Medium	Urban and industrial atmospheres, with moderate SO_2 pollution. Coastal areas with low salinity.	Manufacturing plants with high humidity and some pollution.
C4	High	Industrial areas and coastal areas with moderate salinity.	Chemical and swimming pool industries.
C5-I	Very high (industrial)	Industrial areas with high humidity and aggressive atmosphere.	Buildings or areas with almost permanent condensation and high contamination.
C5-M	Very high (maritime)	Coastal and maritime areas with high salinity.	Buildings or areas with permanent condensation and high contamination.

DURABILITY		
LOW	L	2 to 5 years
MEDIUM	M	5 to 15 years
HIGH	H	More than 15 years

PROTECTION AGAINST THE INPUT OF SOLIDS AND LIQUIDS

NIASA actuators offer, as standard, an IP65 protection index to prevent solid and liquid particles from entering the inside, which may damage them or reduce their designed service life.

Use the following table, according to the DIN EN IEC 60529 standard, if the level of protection must be higher than that indicated. NIASA supplies, on request, specially designed units to withstand the most aggressive environments.

The protection levels are defined with a code made up of the letters “IP“ and two numbers “XY”.

LEVEL OF PROTECTION “IP”, AGAINST THE INPUT OF ...			
... solid particles: “X”		... liquids: “Y”	
	...		...
5	Protection against dust residues (the dust that may penetrate the inside does not imply incorrect operation of the equipment).	3	Protection against spray water (from angle up to 60° with vertical).
6	Total protection against the penetration of any kind of solid body (sealing).	4	Protection against water splashes (from any direction).
		5	Protection against water streams from any direction with hose.
		6	Protection against sporadic floods (example: tidal wave).
		...	...

AMBIENT TEMPERATURE

Contact NIASA if your unit will be installed in an environment that may reach temperatures below -20°C and/or above +40°C.

NIASA's technical department will prescribe the most suitable materials and sealing components for the specific conditions of the application.

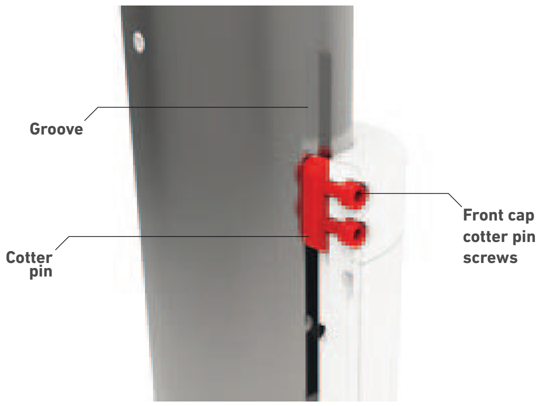
OPTIONAL CONFIGURATIONS

Optionally, NIASA may adapt your HM linear actuator, modifying the different parts of it to your preferences.

Some examples are shown below.
See sub-chapter "Placing an order".

Immobilizations

The FM Series electro-mechanical actuators, on request, can be supplied with the immobilized stem in rotation. This is achieved by mounting a key on the upper cap and machining a groove along the stem.

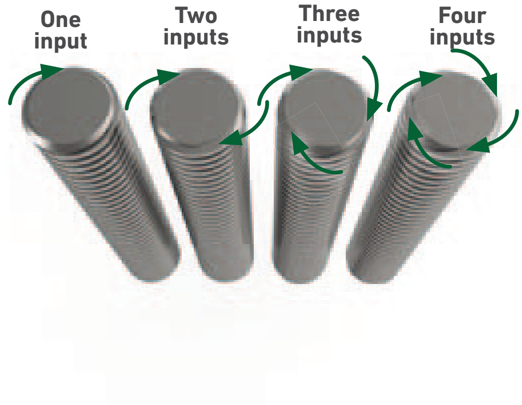


With this configuration, the scraper for the stem cannot be mounted on the front cap. To avoid the possible input of particles or liquid through the stem, it is recommended to mount a bellow to protect it.

For further information, please contact the NIASA technical department.

Special configurations

At the customer's request, the linear actuators can be supplied with a screw of several inputs so that higher speeds can be obtained.



NIASA

LINEAR ACTUATORS

WITH INTEGRATED REDUCTION AND COMPACT GEARBOX. FHM SERIES: STEEL TUBE | AHM SERIES: ALUMINUM TUBE

PLACING AN ORDER

01 SIZE
FHM1 / AHM1
FHM2 / AHM2
FHM3 / AHM3
FHM4 / AHM4
FHM5
FHJ1
FHJ3

02 GEARBOX
All sizes
S Normal speed
H Reduced speed

Only sizes HM4 / HM5 / HJ1 / HJ3
D Super-slow speed

03 EQUIPMENT GENERAL PROTECTION
IPS Standard IP protection level
IPX Special IP protection level

04 SCREW TYPE (DIAMETER x PITCH)
TRS Steel trapezoidal screw
KGS Ball screw

05 STROKE
0000 Equipment usable stroke in mm

06 IMMOBILISATION IN ROTATION
00 No immobilization
01 Immobilized

07 STEM FASTENING ACCESSORY
BPS Screw flange
GKS Single rod
GKB Double rod
GIR Clevis rod
FES Special end fastening
000 No accessory

08 GEARBOX FASTENING ACCESSORY
Always on the back of the gearbox
HFR Gearbox fastening rod
FMS Special gearbox fastening
000 No accessory

09 EXTERIOR TUBE FASTENING ACCESSORY
Exterior tube configurationF
BB Trunnion mount with studs
BH Trunnion mount with ball bearings

Exterior tube configuration A
BA Trunnion mount with studs

All models
FS Special fastening
00 No accessory

10 TIP ACCESSORY
SB With tip support
00 No tip support

11 LIMIT SWITCH ACCESSORY
Exterior tube configuration F
FCI Inductive limit switches
FCR Inductive limit switches with regulation

Exterior tube configuration A
FCG Magnetic limit switches

All models
000 No limit switches

12 STEM PROTECTION ACCESSORY
Exterior tube configuration F
FB Bellow type protector
00 No protector

13 DRIVE ADAPTATION
MB Adaptation flange
00 No adaptation

14 STANDARD MOTOR
MK drive adaptation
080 Group size
A Power-1 / **B** Power-2

MS drive adaptation
1111 Non-standard drive

Both adaptations
0000 Without drive

15 LUBRICANT
GRA Standard lubricant
GRX Lubricant for low extreme temperatures
GRS Other lubricant

16 LUBRICATION ACCESSORIES
ETP Sealed lubrication cap (standard)
EMT Angled lubricator on gearbox or straight on tube
AGR Automatic lubricating accessory
000 No lubricating accessory

17 EQUIPMENT GENERAL COLOUR
With type A configuration, only the gearbox is painted
RGG Graphite grey RAL7024 (standard)
RAZ Blue RAL5017
RGP Silver grey RAL9006
RSP Special colour indicated by the customer
CIP Only grey 411 priming
000 Not painted

Example	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17
	HM3	H	IPS	TRS3606	1000	00	BPS	HFR	00	00	FCI	FB	MB	GR080A	GRA	AGR	RGG

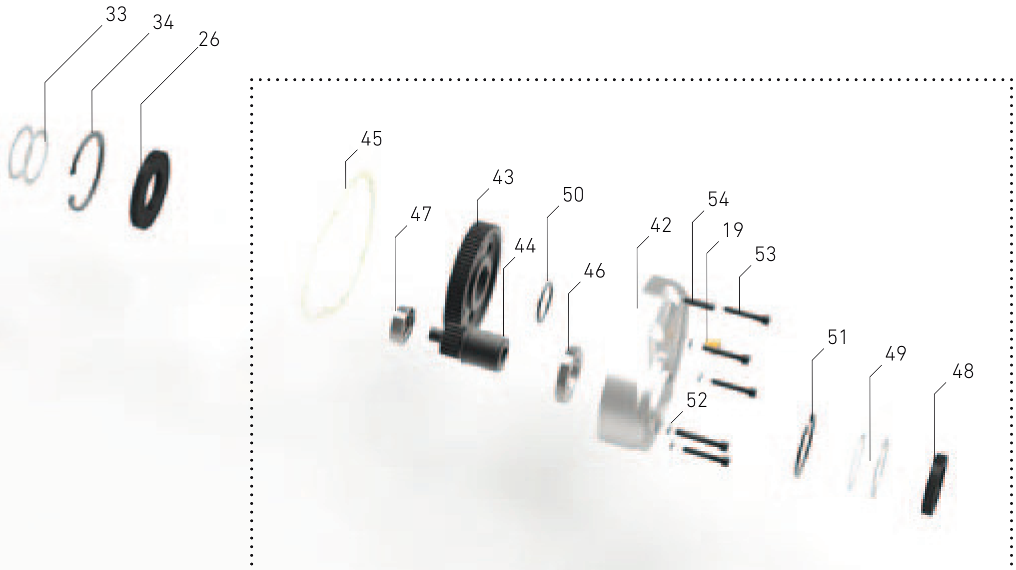
04

LINEAR ACTUATORS

WITH INTEGRATED REDUCTION AND COMPACT GEARBOX. FHM SERIES: STEEL TUBE | AHM SERIES: ALUMINUM TUBE

DISASSEMBLY

	Name
01	HM series gearbox
02	Top cap
03	Front cap
04	Exterior tube
05	Stem
06	Worm gear
07	Worm wheel
08	Ball screw
09	Trapezoidal screw
10	Ball nut
11	Trapezoidal nut
12	Guide ring
13	Supplement nut bushing
14	Front support
15	Screw support ring
16	Nut
17	Locknut
18	Tube position nut
19	Lubrication cap
20	Axial bearing
21	Radial bearing
22	Radial bearing
23	Bearing
24	Bearing
25	Double lip radial seal ring
26	Double lip radial seal ring
27	Obturator
28	Obturator
29	Dual-effect scraper
30	O-Ring
31	O-Ring
32	O-Ring
33	Adjustment washer
34	Inside circlip
35	Allen screw
36	Straight key
37	Straight key
38	Stud with point
39	Stud with point
40	Stud with point
41	Flat stud



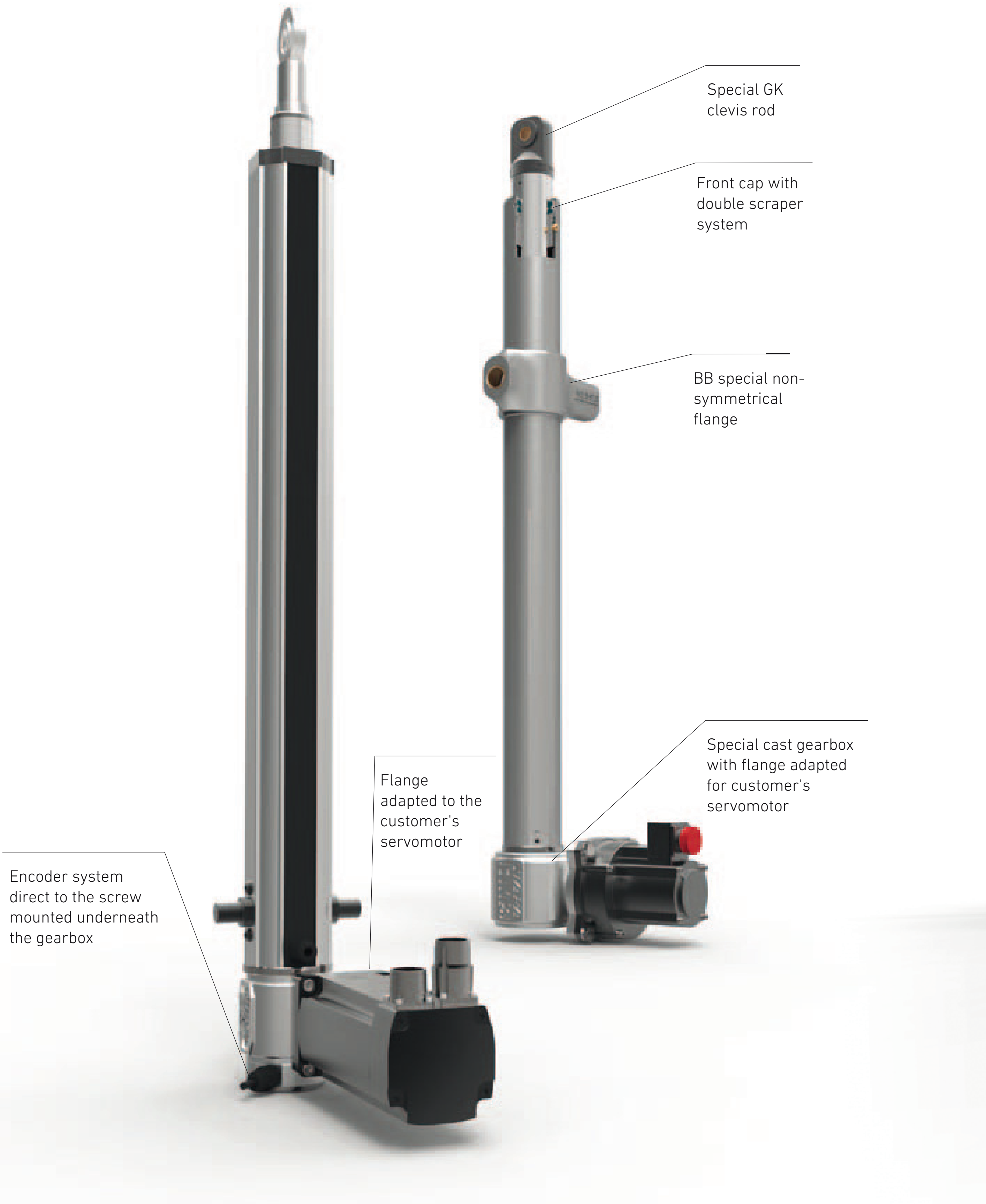
D reduction components

	D reduction designation
42	Cap
43	Wheel
44	Pinion
45	Sealed joint
46	Radial bearing
47	Radial bearing
48	Double lip seal ring
49	Adjustment washer
50	Exterior circlip
51	Inside circlip
52	Grower washer
53	Allen screw
54	Extraction thread stud

LINEAR ACTUATORS

WITH INTEGRATED REDUCTION AND COMPACT GEARBOX. FHM SERIES: STEEL TUBE | AHM SERIES: ALUMINUM TUBE

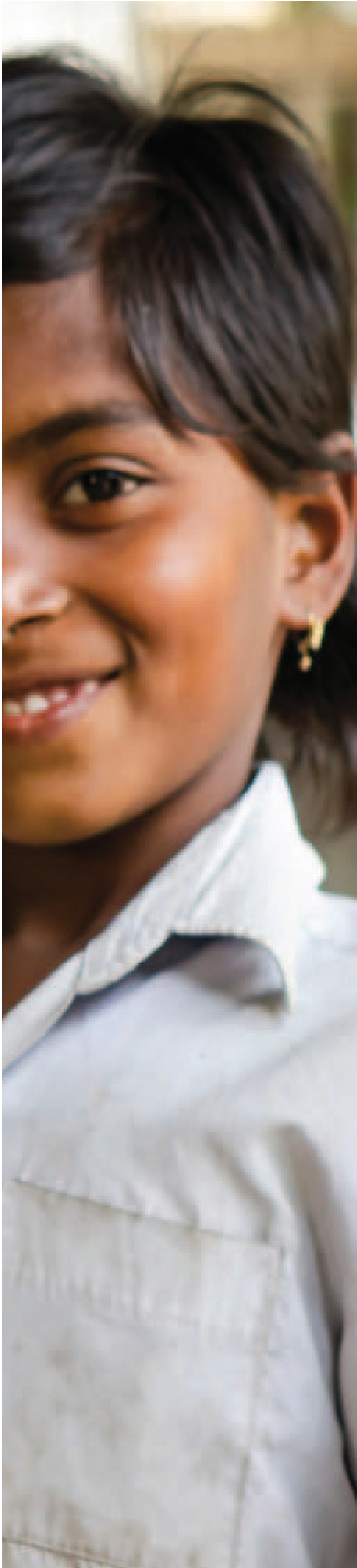
SPECIAL CONFIGURATIONS



05
SCREW SUPPORTS

“IF YOU WANT A CREATIVE TEAM, GIVE THEM ENOUGH TIME TO PLAY.”

JOHN CLEESE
MEMBER OF MONTY PYTHON.



SCREW SUPPORTS
INTRODUCTION

NIASA SH Series screw supports are a simple and economical solution for mounting a screw on a support and fastening it to any part of a machine. The turn of the screw moves its corresponding nut and with this the desired part of the machine moves (carriages, tables, etc.).

The screw supports are motorized in a very simple way, by motors or motoreducers in different configurations and with different speeds. The power transmission from the motor may be direct or by means of different gear solutions and toothed belts.

Against other systems with pneumatic or hydraulic drives, their main advantages are:

... Greater movement and positioning precision.

... Superior energy efficiency, as their parts offer high/very high performance, especially with the ball screws, low transmission ratios and high speeds.

... Easier and faster assembly, since hydraulic or pneumatic groups are not required, just an electric motor mounted on the unit itself.

... Greater reliability and duration, and less maintenance, due to the mechanical robustness and construction simplicity.

... Lower size for the same load capacity.

... ...

They are also also characterized for offering an extensive range of:

... Axial load capacities, from 2.5 kN up to 45 kN.

... Nut advance speeds depend on the screw pitch and the transmission used.

... Trapezoidal and ball screws, depending on the performance required, precision of the desired movement and positioning, etc.

... Fastening accessories and elements, for optimal adaptation to the most varied systems that may be designed.

... Drives, with different reduction ratios and positions, which enables the best solution to be offered for any speed and configuration problem. Among these are the following as standard:

· Motors / In line motoreducers.

· Motors / Motoreduc. in parallel with the toothed belt.

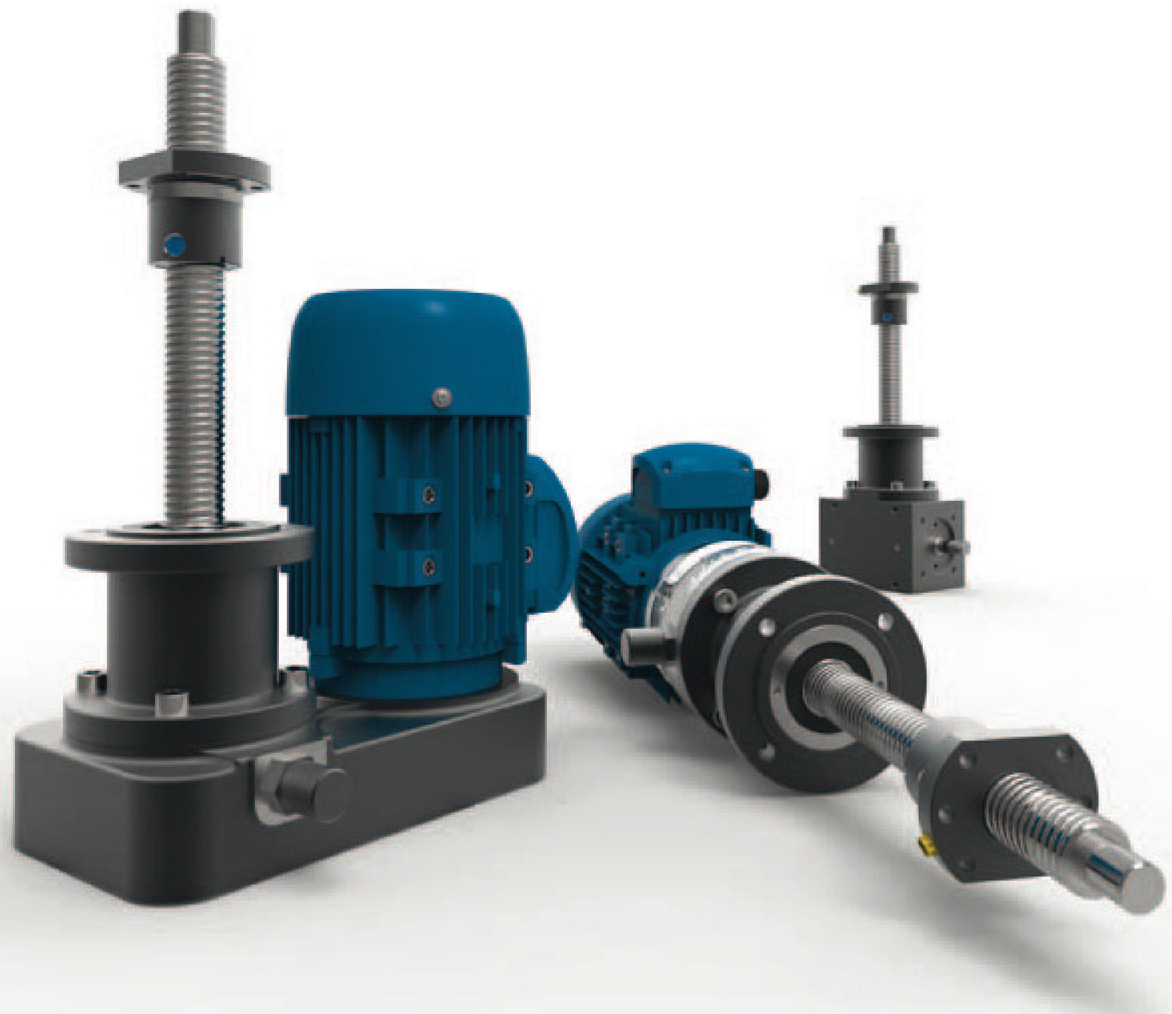
· Motors / Motoreducers at 90º.

· ...

... Materials and surface coverings, depending on the environmental conditions in which the unit will be installed.

... ...

Please do not hesitate to contact NIASA if you require screw supports (and their drive mechanisms) with specifications other than those covered in this chapter. The NIASA technical department will specifically develop the special units that best meet your requirements.



05

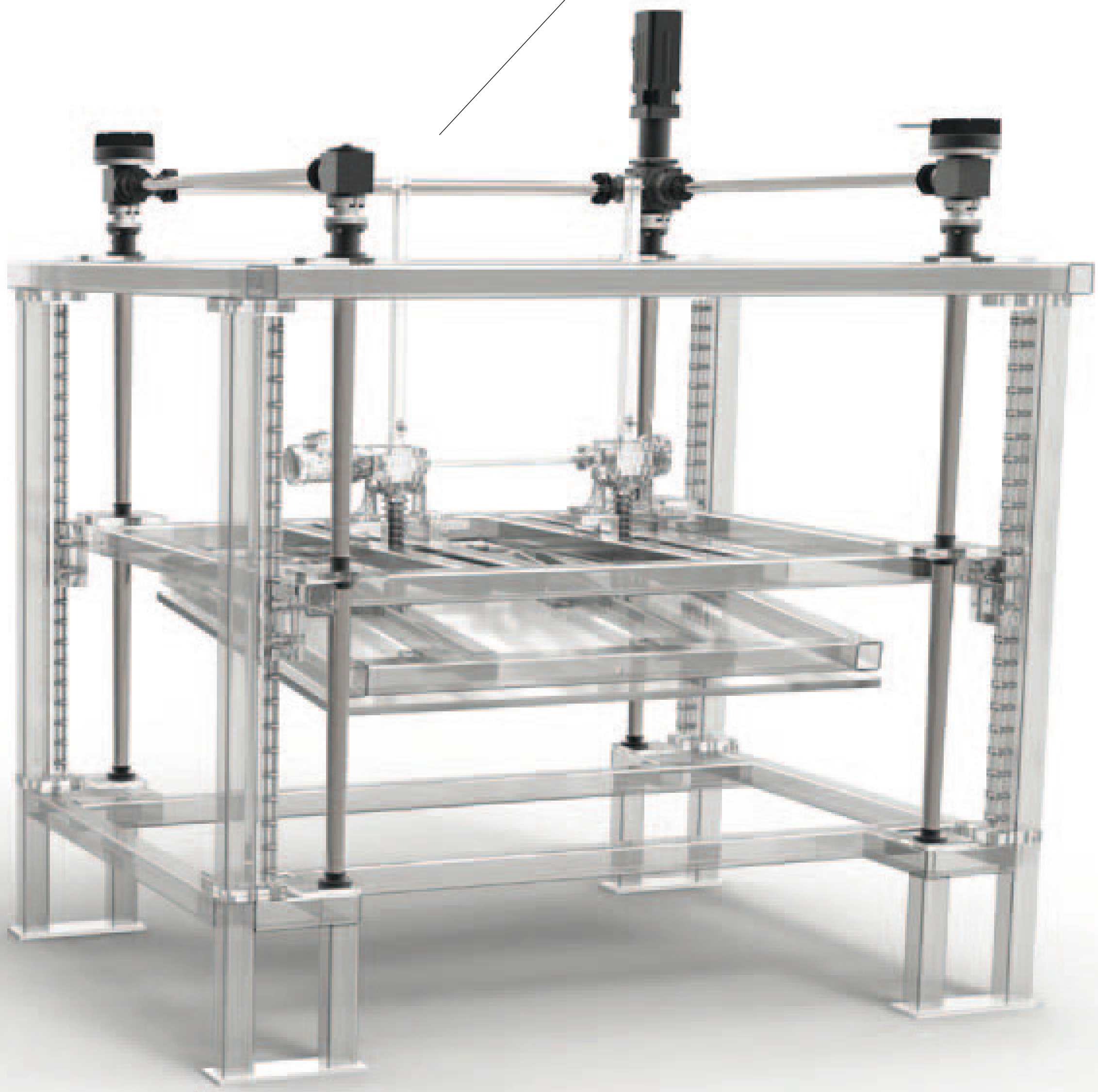
SCREW SUPPORTS
APPLICATIONS

DOOR OPENING/ CLOSING SYSTEMS

SH20 Series screw support made up of a three-phase motor drive system, drive union flange, left-right screw with KGF double ball nut and SP bearing supports.

MACHINE TILTING SYSTEM

Set of four SH30 Series screw supports made up of a servomotor drive system and joined together with GX transmission shaft and bevel gearboxes. Screw fastening with BPS flanges, KGF ball nuts, SF Series spiral screw protectors and two electro-magnetic brakes.

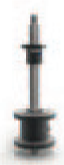


05

SCREW SUPPORTS
SIZES

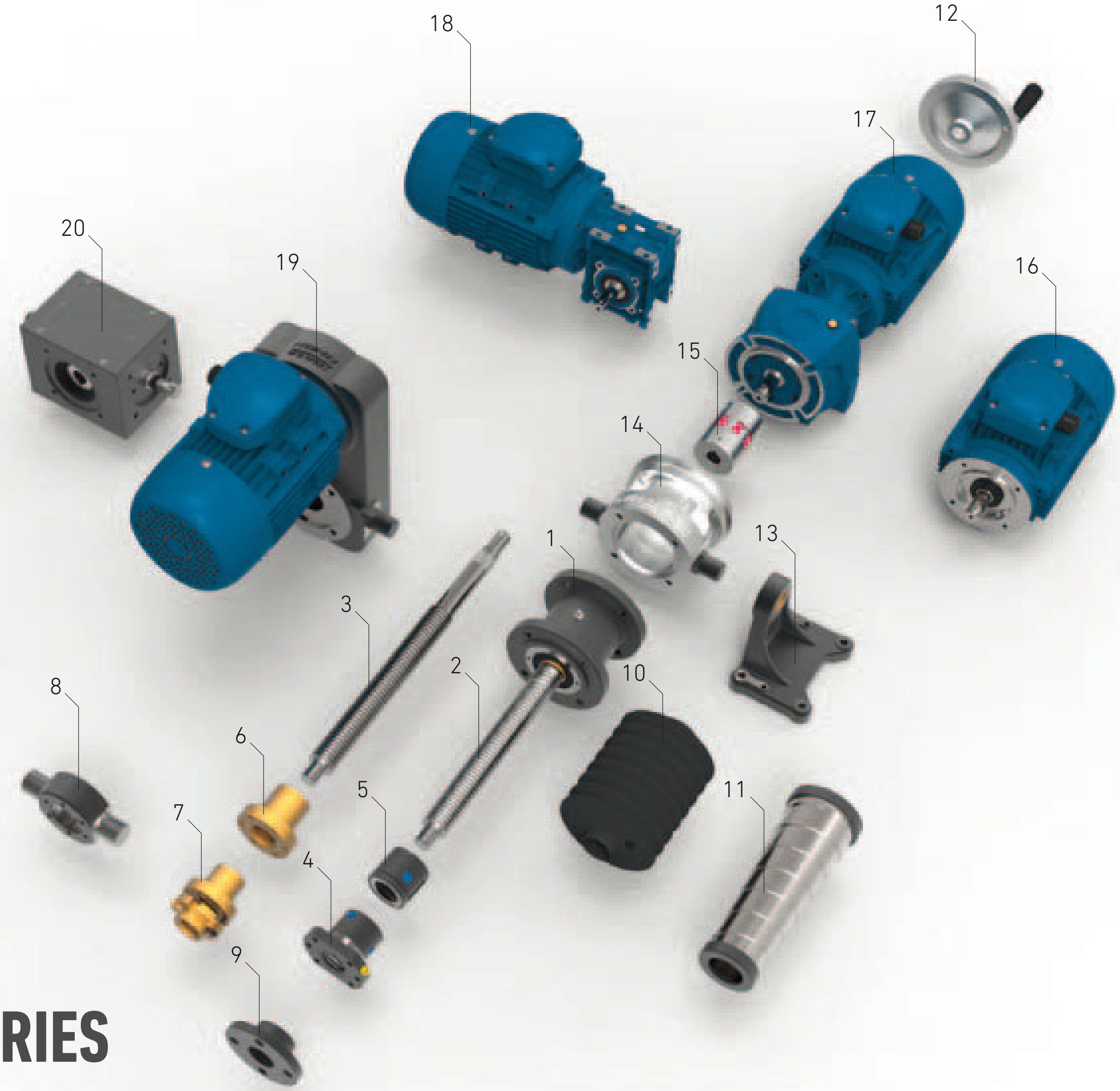
For further information about M205/M501/M505/M601/M605 configurations, please contact NIASA.

There are trapezoidal and ball screw options on all sizes (see the chapter about screws for more details).

Up to	**SH20** 12.5 kN	**SH30** 25 kN	**SH40** 45 kN
M100 Basic configuration	 page 186	 page 187	 page 188
M205 In line motoreducer	 page 185	 page 185	 page 185
M501 Parallel drive	 page 185	 page 185	 page 185
M505 For drive at 90°	 page 185	 page 185	 page 185
M601 Motoreducer at 90°	 page 185	 page 185	 page 185
M605 In line motor	 page 185	 page 185	 page 185

In addition to the standard range of screw supports, NIASA can specifically develop the unit that best meets your application requirements. Contact NIASA.

SCREW SUPPORTS
GENERAL PRODUCT OVERVIEW



ACCESSORIES

	Name	Page
01	Body	184
02	Ball screw	186
03	Trapezoidal screw	186
04	KGF nut	246
05	KGM nut	248
06	EFM nut	258
07	EFM safety nut	258
08	KAR flange	275
09	BPR flange	279
10	FB protector bellow	301
11	SF protector bellow	302
12	VE wheel	300
13	SB tip support	276

CONFIGURATIONS

	Name	M205	M501	M505	M601	M605
14	F flange	•			•	•
15	EK coupling	•			•	•
16	Motor					•
17	In line motoreducer	•				
18	Motoreducer at 90°				•	
19	Parallel drive		•			
20	90° bevel gearbox			•		

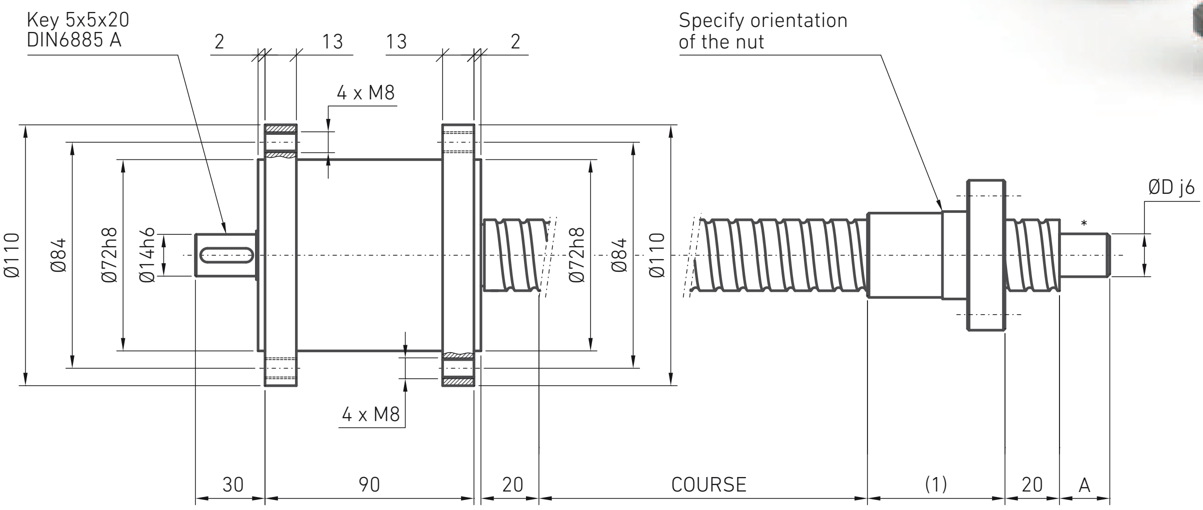
NIASA

SH20 SCREW SUPPORTS

UP TO 12.5 kN

Tr TRAPEZ. KGS BALLS

The capacities indicated correspond to
the standard input shaft configurations.
Higher capacities are available on request.



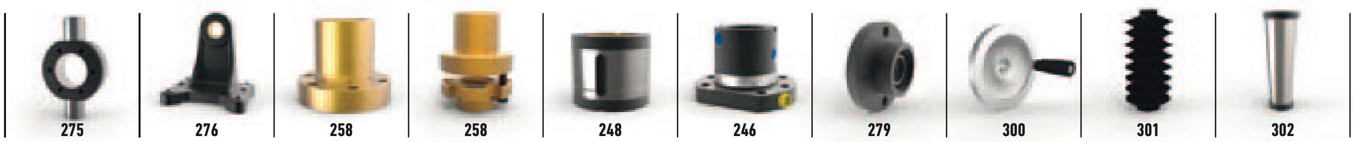
NOTES: (1) See nut dimensions in the corresponding chapter.

Screw diameter and step (mm)	A	øD	Maximum axial strength (kN)	Advance (mm/revol. input)	Performance (%)	Drive torque, M_D (Nm) F (kN), load to move in dynamic	Stroke weight 0 without nut (kg)	Approx. weight each 100 mm of stroke without nut (kg)
Tr 20x4	20	15	12.5	4	36	(1.76xF)+0.5	1.6	0.2
Tr 24x5	20	15	10.2	5	37	(2.15xF)+0.5	1.6	0.29
Tr 30x6	25	20	8.3	6	36	(2.65xF)+0.5	1.6	0.45
KGS 2005	20	15	10.5	5	86	(0.93xF)+0.4	1.6	0.22
KGS 2020	20	15	5.9	20	86	(3.72xF)+0.4	1.6	0.2
KGS 2050	20	15	2.4	50	86	(9.31xF)+0.4	1.6	0.33
KGS 2505	20	15	12.3	5	86	(0.93xF)+0.4	1.6	0.34
KGS 2510	20	15	11.9	10	86	(1.86xF)+0.4	1.6	0.33
KGS 2525	20	15	4.7	25	86	(4.65xF)+0.4	1.6	0.33
KGS 2550	20	15	2.4	50	86	(9.31xF)+0.4	1.6	0.34
KGS 3205	25	20	21.5	5	86	(0.93xF)+0.4	1.6	0.39
KGS 3210	25	20	11.9	10	86	(1.86xF)+0.4	1.6	0.56
KGS 3220	25	20	5.9	20	86	(3.72xF)+0.4	1.6	0.57
KGS 3240	25	20	3.0	40	86	(7.45xF)+0.4	1.6	0.57

... Power required: P_D (kW) = 0,157x M_D (Nm).

... Contact NIASA to ensure the dynamic load does not exceed the critical values indicated, in order to avoid buckling and resonance of the unit. See calculations chapter at the end of the chapter (page 190)."

... The maximum axial force values correspond to the standard NIASA nuts. In some cases they may be increased by using larger, pre-loaded, etc. nuts. Please contact NIASA.

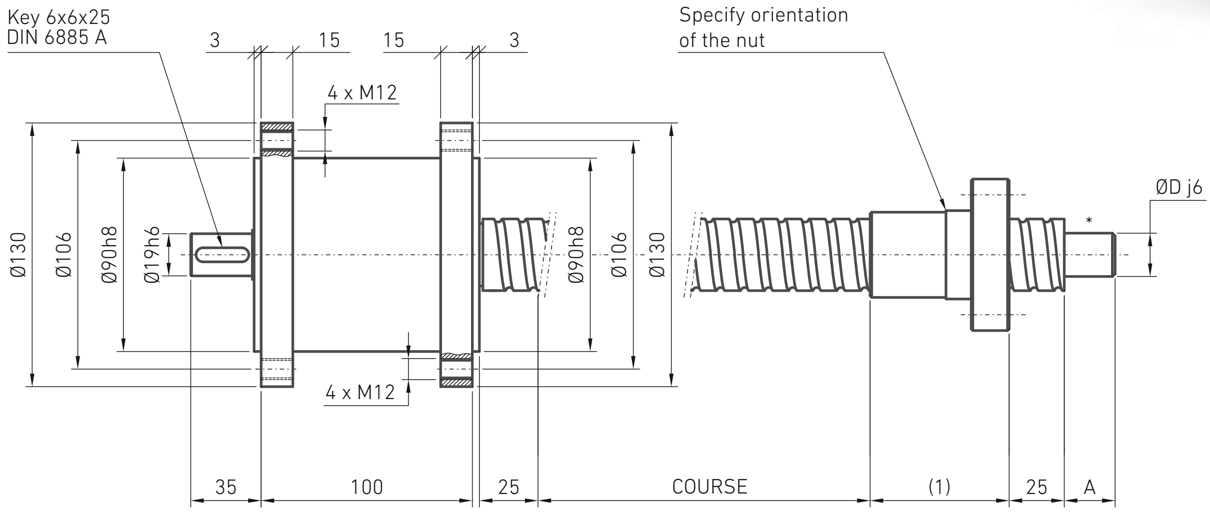


SH30 SCREW SUPPORTS

UP TO 25 kN

Tr TRAPEZ. KGS BALLS

The capacities indicated correspond to
the standard input shaft configurations.
Higher capacities are available on request.



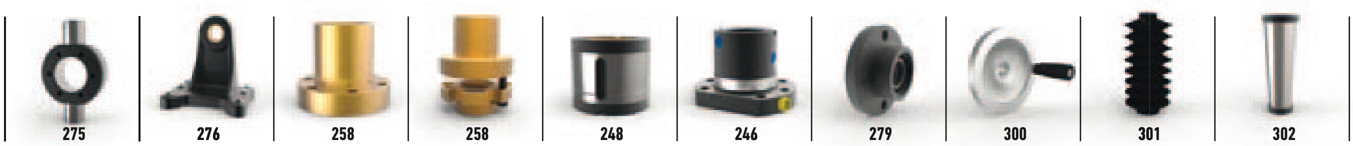
NOTES: (1) See nut dimensions in the corresponding chapter.

Screw diameter and step (mm)	A	øD	Maximum axial strength (kN)	Travel (mm/ revol. input)	Performance (%)	Drive torque, M_D (Nm) F (kN), load to move in dynamic	Stroke weight 0 (kg)	Approx. weight each 100 mm of stroke (kg)
Tr 36x6	25	20	15.5	6	32	(2.96xF)+1.6	2.9	0.67
Tr 40x7	30	25	13.7	7	33	(3.35xF)+1.6	2.9	0.82
KGS 3205	25	20	21.5	5	86	(0.93xF)+1.3	2.9	0.39
KGS 3210	25	20	24.8	10	86	(1.86xF)+1.3	2.9	0.56
KGS 3220	25	20	12.4	20	86	(3.72xF)+1.3	2.9	0.57
KGS 3240	25	20	6.2	40	86	(7.45xF)+1.3	2.9	0.57
KGS 4005	30	25	23.8	5	86	(0.93xF)+1.3	2.9	0.9
KGS 4010	30	25	24.8	10	86	(1.86xF)+1.3	2.9	0.84
KGS 4020	30	25	12.4	20	86	(3.72xF)+1.3	2.9	0.9
KGS 4040	30	25	6.2	40	86	(7.45xF)+1.3	2.9	0.84

... Power required: P_D (kW) = 0,157x M_D (Nm).

... Contact NIASA to ensure the dynamic load does not exceed the critical values indicated, in order to avoid buckling and resonance of the unit. See calculations chapter at the end of the chapter (page 190)."

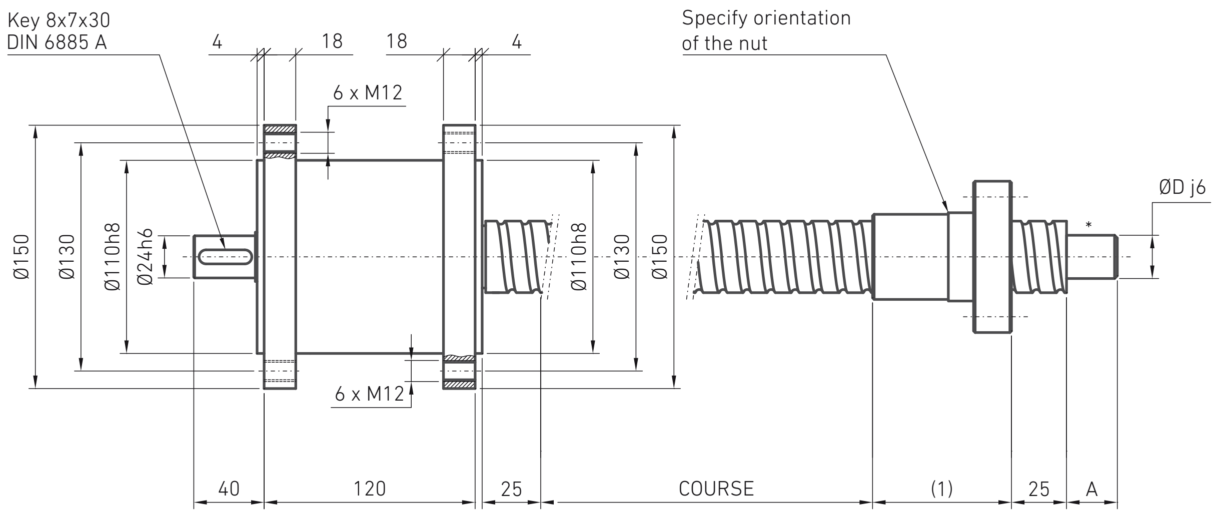
... The maximum axial force values correspond to the standard NIASA nuts. In some cases they may be increased by using larger, pre-loaded, etc. nuts. Please contact NIASA.



SH40 SCREW SUPPORTS

UP TO 45 kN

The capacities indicated correspond to
the standard input shaft configurations.
Higher capacities are available on request.



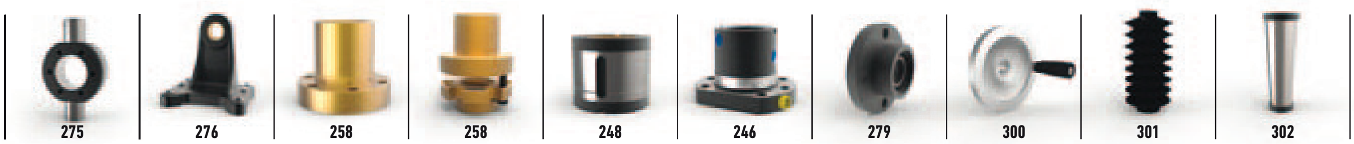
NOTES: (1) See nut dimensions in the corresponding chapter.

Screw diameter and step (mm)	A	øD	Maximum axial strength (kN)	Travel (mm/ revol. input)	Performance (%)	Drive torque, M_D (Nm) F (kN), load to move in dynamic	Stroke weight 0 (kg)	Approx. weight each 100 mm of stroke (kg)
Tr 50x8	40	35	20.6	8	31	(4.06xF)+1.9	5.1	1.31
Tr 60x9	55	45	17.2	9	29	(4.86xF)+1.9	5.1	1.9
KGS 5010	40	35	45.2	10	86	(1.86xF)+1.6	5.1	1.35
KGS 5020	40	35	22.6	20	86	(3.72xF)+1.6	5.1	1.35
KGS 6310	55	45	45.2	10	86	(1.86xF)+1.6	5.1	2.21
KGS 6320	55	45	22.6	20	86	(3.72xF)+1.6	5.1	2.21

... Power required: P_D (kW) = 0,157x M_D (Nm).

... Contact NIASA to ensure the dynamic load does not exceed the critical values indicated, in order to avoid over-heating, buckling and resonance of the unit. See calculations chapter at the end of the chapter (page 190)."

... The maximum axial force values correspond to the standard NIASA nuts. In some cases they may be increased by using larger, pre-loaded, etc. nuts. Please contact NIASA.

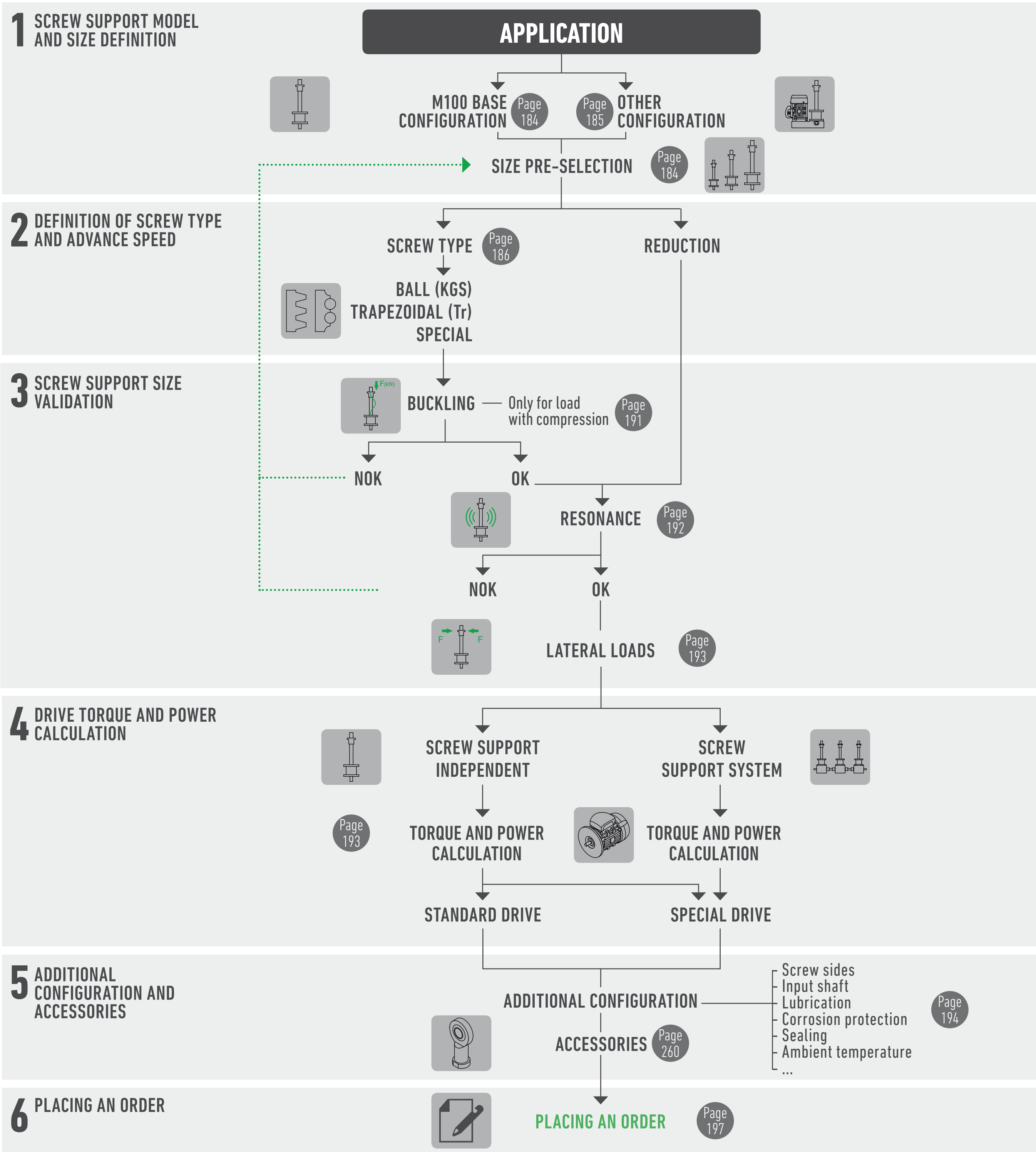


SCREW SUPPORTS

PRODUCT SELECTION

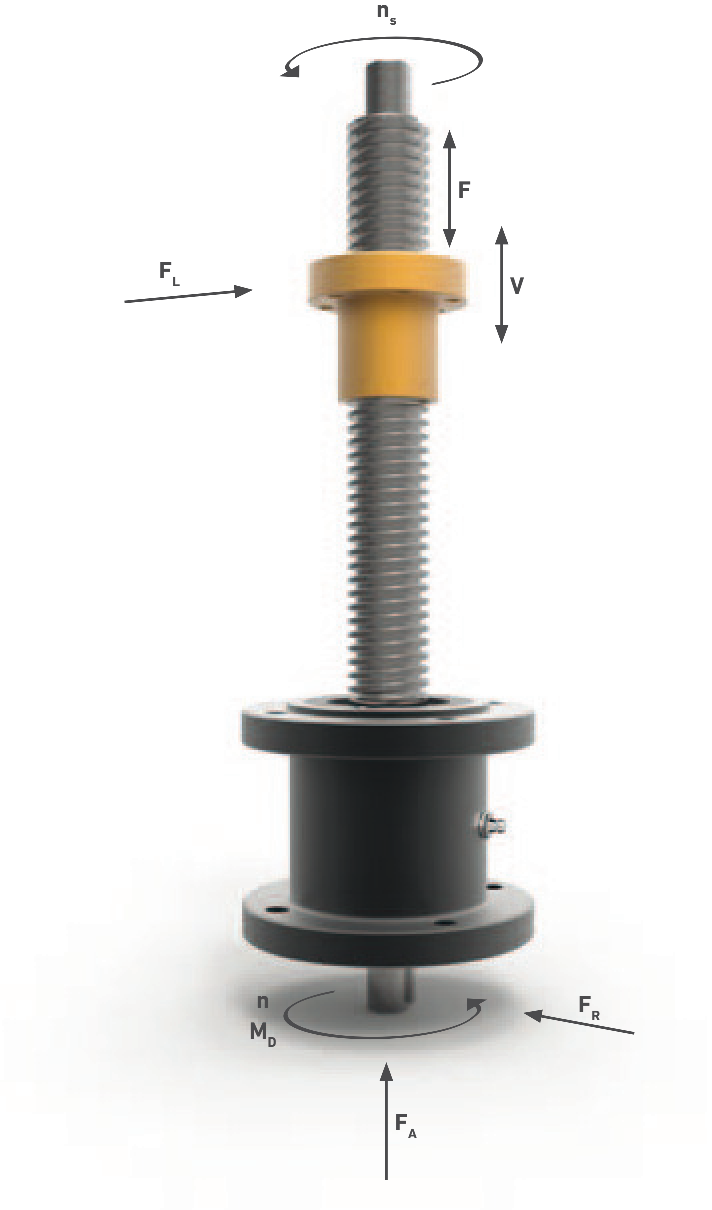
To select the correct screw support, please follow this flow diagram.

If you would like to know the expected service life of a unit for your application, please send the relevant data to the NIASA service department.



FORCE AND TORQUE ACTING ON A SCREW SUPPORT

F Load elevation at traction and/or compression.
F_L Lateral load on the nut.
V Movement speed of the nut.
F_A Axial load on the input shaft.
F_R Radial load on the input shaft.
M_D Torque on the input shaft.
n Speed on the input shaft.
n_s Screw turning speed.



SCREW SUPPORTS
PRODUCT SELECTION

CRITICAL COMPRESSION BUCKLING LOAD OF A SCREW SUPPORT

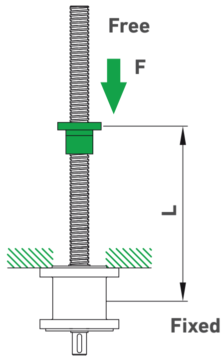
When there are compression loads on the screw, it may fail due to buckling, before reaching its static load capacity.

If the critical compression buckling load calculated is lower than the actual compression buckling load applied, select a larger screw support and check its suitability.

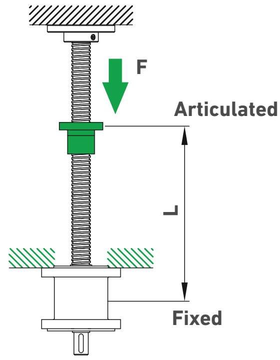
Check it using the following steps:

1. COMPRESSION BUCKLING LENGTH AND CORRECTOR FACTOR

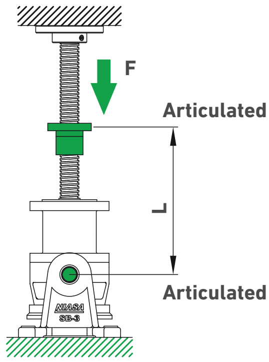
Select the length L (mm) and the factor K, to be considered in the buckling critical load calculation. Do this based on the type of support on the sides of the screw support, according to the figures shown on the right.



K = 2



K = 0,7



K = 1

2. BUCKLING CRITICAL LOAD

$$F_{crit}\,(kN) = 33.91 \times \frac{d^4}{(K \times L)^2}$$

d Screw core diameter (mm).
L Buckling length (mm).
K Length corrector factor.

IMPORTANT

... In general, the load applied on the screw support, including possible impacts, must not surpass the calculated value.

... The safety factor considered is 3; reconsider this if so considered opportune for the specific application. As a recommendation, when a hypothetical screw support failure may involve injuries to people, multiply the critical load calculated by an additional factor of 0.6 (final safety factor, 5).

d - Screw core diameter (mm).

Trapezoidal screw (Tr)						
20×4	24×5	30×6	36×6	40×7	50×8	60×9
14.5	18.2	22.3	28.7	31.2	40.7	49

Ball screw (KGS)																		
2005	2020	2050	2505	2510	2525	2550	3205	3210	3220	3240	4005	4010	4020	4040	5010	5020	6310	6320
16.9	16.9	16.5	21.9	21.9	21.9	21.9	28.9	27.3	27.9	28.3	36.9	44.1	35.9	36.3	44.1	44.1	57.1	57.1

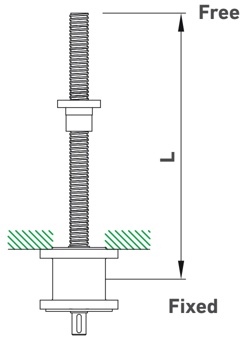
SCREW SUPPORTS

PRODUCT SELECTION

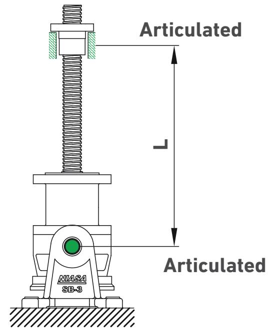
CRITICAL RESONANCE SPEED OF A SCREW SUPPORT

With reduced diameter and long length screws, there is a risk that there will be considerable vibration on turning if this occurs at speeds close to the first vibration frequency (the second and highest correspond to very high speeds, at which the screws never work). In the worst cases, the screw may break and, additionally, the risk of collapse due to side buckling considerably increases.

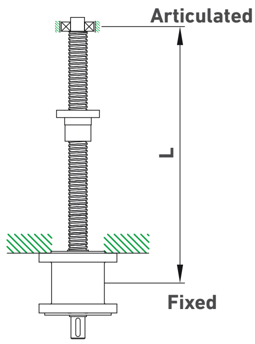
For these reasons, it must be checked that the screw support works at lower rotation speeds than resonance speeds. If not, select a screw of a larger diameter and/or reduce its turning speed and/or modify the screw jack end supports.



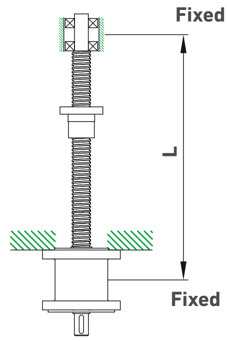
M = 0,34



M = 0,97



M = 1,51



M = 2,19

1. LENGTH, RESONANCE AND CORRECTOR FACTOR

Select the length L and the correction factor M to consider. Do this based on the types of supports on the sides of the screw support, according to the figures shown on the right.

2. MAXIMUM ADMISSIBLE SPEED

$$n_{adm}\,(\text{rpm}) = M \times \frac{d}{L^2} \times 10^8$$

d Screw core diameter (mm).
L Length between supports (mm).
M Corrector factor according to supports.

IMPORTANT

... The safety factor considered is 1.25 (maximum admissible speed = 80% of the critical resonance speed).

d - Screw core diameter (mm)

Trapezoidal screw (Tr)						
20×4	24×5	30×6	36×6	40×7	50×8	60×9
14.5	18.2	22.3	28.7	31.2	40.7	49

Husillo a bolas (KGS)																		
2005	2020	2050	2505	2510	2525	2550	3205	3210	3220	3240	4005	4010	4020	4040	5010	5020	6310	6320
16,9	16,9	16,5	21,9	21,9	21,9	21,9	28,9	27,3	27,9	28,3	36,9	44,1	35,9	36,3	44,1	44,1	57,1	57,1

SCREW SUPPORTS

PRODUCT SELECTION

LATERAL LOAD OF A SCREW SUPPORT

If they exist, the lateral loads are supported by guide systems designed for this purpose, in addition to the guide from the body of the screw support itself, so that the screw or the nut exclusively support axial traction/compression loads.

If there are side loads, the life of the screw support will be notably reduced, as there will be premature wear of the screw and the nut, which is also often the origin of faults.

IMPORTANT

... If it is essential that the screw support is subject to lateral loads, please contact the NIASA design department for a correct design of the unit.

... This includes the horizontal mountings, on which the screw can flex when subject to the action of its own weight.

DRIVE TORQUE AND POWER OF AN INDEPENDENT SCREW SUPPORT

After pre-selecting the suitable screw support for the application, select the drive motor, following the steps below.

1. DRIVE TORQUE

$$M_D\,(N\,m) = \left(\frac{F \times P}{2 \times \pi \times 0{,}95 \times \eta_{DS}} + M_I\right) \times \frac{1}{\eta_{DR} \times i_R}$$

M_I Drive torque (Nm)
F Load to elevate in dynamic (kN)
P Screw pitch (mm)
M_I Idle torque (Nm)
i_R Input reduction, see for configurations M205, M501, M505 y M601; i = 1 for M605 and M100-FXX
0,95 Body dynamic efficiency
η_{DS} Screw dynamic efficiency
η_{DR} Reduction element dynamic efficiency:
- M205: η_{DR}= 0.95 (coaxial reducer)
- M501: η_{DR} = 0.97 (toothed belt)
- M505: η_{DR} = 0,90 (reducer 90º)
- M601: η_{DR}, depending on reduc. (worm wheel and shaft)
- M605 and M100-FXX: η_{DR}= 1, no reducer

2. POWER REQUIRED

$$P_D\,(kW) = \frac{M_D \times n}{9550}$$

M_D Drive torque (Nm)
n Input velocity to the screw support (rpm)

IMPORTANT

... In general, it is advisable to multiply the power value calculated for a safety coefficient of 1.3 to 2; the smaller the installation the higher the coefficient

... When the load to move is lower than 10% of the elevator's nominal load, consider that value as the load to move.

3. START-UP TORQUE

To calculate the start-up torque, multiply the drive torque by 2.

η_{DS} Screw dynamic efficiency

Trapezoidal screw (Tr)						
20×4	24x5	30×6	36x6	40×7	50×8	60x9
0.38	0.39	0.38	0.34	0.35	0.33	0.31

Ball screw (KGS)
0.9 (for all sizes)

M_I Idle Torque

	SH20	SH30	SH40
Trapezoidal	0.5	1.6	1.9
Balls	0.4	1.3	1.6

IMPORTANT

... The values indicated in the tables correspond to the lubrication conditions established by NIASA, for body and screw, and will be reached after a small period of operation.

... In the case of low temperatures, these can be reduced considerably.

SCREW SUPPORTS

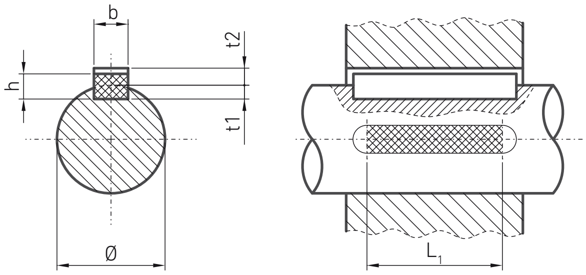
PRODUCT SELECTION

MAXIMUM TRANSFERABLE TORQUE ACCORDING TO SHAFT/ PARALLEL COTTER PIN (DIN 6885)

The following table shows the maximum transferrable torque for a shaft and its keys. It is considered that the shaft is subject exclusively to torsional forces.

IMPORTANT

- … Never subject the input of a screw support to torque over that indicated for its shaft and keys (see plans in the sub-chapter "sizes").



Shaft diameter Ø (mm)	Key dimensions			Maximum transferrable torque, M_D (Nm) Key effective length, L_1 (mm)					
	b x h (mm)	t1 (mm)	t2 (mm)	10	16	20	28	40	50
8 – 10	3 x 3	1.8	1.4	5	9	12	-	-	-
10 – 12	4 x 4	2.5	1.8	9	13	17	-	-	-
12 – 17	5 x 5	3	2.3	15	24	30	42	-	-
17 – 22	6 x 6	3.5	2.8	25	40	50	70	100	-
22 – 30	8 x 7	4	3.3	39	63	78	109	157	195

Material: C45 (1.1191) according to EN 10083-1
Load type: Drive - Uniform /
Load - Light knocks
Assembly: tight
Cycles: >1,000,000
Safety factor: 1.5 - 2.5
IMPORTANT For other conditions, please contact the NIASA technical department

LUBRICATION

The screw support is supplied with class 2, KLUBER ISOFLEX TOPAS L152 lubricant, according to DIN 51818. For high speeds it is better to choose class 1 and heavy loads class 3.

A change of grease type may affect the correct operation of the unit.

Specifications

Synthetic hydrocarbon grease with lithium soap KLUBER ISOFLEX TOPAS L152	
Working temperature	-50 to +150°C
Density at 20°C	0.9 kg/dm^3
Cinematic viscosity (s/DIN 51 562)	100 mm^2/s at 40°C 15 mm^2/s at 100°C
Dropping point (s/DIN ISO 2176)	>185°C
Water resistance (s/DIN 51 807/T1)	Level 1

For further information, please contact the NIASA technical department.

A complete cleaning and grease change is recommended after five years.

The greasing interval depends on the type of work and its cycle. It is advisable to lubricate from 30 to 50 hours after start-up and approximately every six months.
It is important to avoid over-lubricating.

A group lubricator is recommended for automatic lubrication of the units. Depending on the type of group lubricator, the lubrication may last up to two years.

See lubrication chapter in accessories.

NIASA supplies its screw supports with the following type of hydraulic greasing mechanism:

- … Straight greasing nipple DIN 71412 type B.
- … As a greasing nozzle for the nipples, the 515/G – 516/G hydraulic connector is recommended. For its protection and conservation, the use of plastic caps is advised.

The spring screw supports can also be supplied with a brass greasing cap with O-ring.

NIASA

SCREW SUPPORTS

PRODUCT SELECTION

PROTECTION AGAINST CORROSION, SEALING AND AMBIENT TEMPERA-TURE

PROTECTION AGAINST CORROSION

Select the environment in which the equipment will work, using the atmospheric corrosion categories classification established in the DIN EN ISO 12944-2 standard (protection against the corrosion of steel structures using painted systems). Also establish the durability required before carrying out the first maintenance of the exterior surfaces (durability does not imply a "time" guarantee).

If the corrosion category is higher than “C3” for your application and/or higher than “average” durability is required, please contact NIASA so that the technical department can select the surface protection system and select the most suitable components.

CORROSION CATEGORY		ENVIRONMENT	
		Outdoors	Indoors
C1	Very low		Buildings with heating and clean atmospheres.
C2	Low	Atmospheres with low levels of pollution. Rural areas.	Buildings with no heating and possible condensation.
C3	Medium	Urban and industrial atmospheres, with moderate SO_2 pollution. Coastal areas with low salinity.	Manufacturing plants with high humidity and some pollution.
C4	High	Industrial areas and coastal areas with moderate salinity.	Chemical and swimming pool industries.
C5-I	Very high (industrial)	Industrial areas with high humidity and aggressive atmosphere.	Buildings or areas with almost permanent condensation and high contamination.
C5-M	Very high (maritime)	Coastal and maritime areas with high salinity.	Buildings or areas with permanent condensation and high contamination.

DURABILITY		
LOW	L	2 to 5 years
MEDIUM	M	5 to 15 years
HIGH	H	More than 15 years

PROTECTION AGAINST THE INPUT OF SOLIDS AND LIQUIDS

NIASA screw supports offer, as standard, an IP54 protection index to prevent solid and liquid particles from entering the inside, which may damage them or reduce their designed service life.

Use the following table, according to the DIN EN IEC 60529 standard, if the level of protection must be higher than that indicated. NIASA supplies, on request, specially designed units to withstand the most aggressive environments.

The protection levels are defined with a code made up of the letters “IP“ and two numbers “XY”.

LEVEL OF PROTECTION “IP”, AGAINST THE INPUT OF ...			
... solid particles: “X”		... liquids: “Y”	
	...		...
5	Protection against dust residues (the dust that may penetrate the inside does not imply incorrect operation of the equipment).	3	Protection against spray water (from angle up to 60° with vertical).
6	Total protection against the penetration of any kind of solid body (sealing).	4	Protection against water splashes (from any direction).
		5	Protection against water streams from any direction with hose.
		6	Protection against sporadic floods (example: tidal wave).
		...	...

AMBIENT TEMPERATURE

Contact NIASA if your unit will be installed in an environment that may reach temperatures below -20°C and/or above +40°C.

NIASA's technical department will prescribe the most suitable materials and sealing components for the specific conditions of the application.

05

SCREW SUPPORTS
PRODUCT SELECTION

OPTIONAL CONFIGURATIONS

Optionally, NIASA may adapt your screw support, modifying the different parts of it to your preferences.

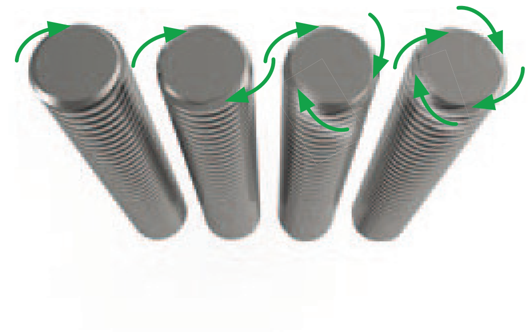
Some examples are shown below.
See sub-chapter “Placing an order”.

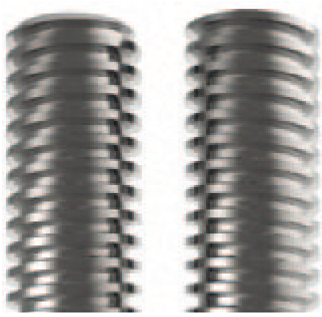
Screw end

O. With no end.
Z. Standard cylindrical end.
S. Special end.

Special configurations

On request, screws with various inputs can be supplied to obtain higher, but eventually reversible, travel speeds. The screw supports can also be supplied with left-thread screws.





SCREW SUPPORTS

PLACING AN ORDER

01 **SIZE**
SH20
SH30
SH40

02 **CONFIGURATION**
M100 Base
M205 In line motoreducer
M501 Parallel drive
M505 For drive at 90º
M601 Motoreducer at 90º
M605 In line motor

03 **GEARBOX**
Configuration M501
01 Reduction 1:1
02 Reduction 1:2
SR Special reduction

Configuration M205/M601
SR To be defined

Other configurations
00 No reduction

04 **EQUIPMENT GENERAL PROTECTION**
IPS Standard IP protection level
IPX Special IP protection level

05 **SCREW TYPE (DIAMETER x PITCH)**
TRS Trapezoidal
KGS Ball

06 **SCREW TYPE**
With trapezoidal screw
EFM1 Single nut with flange
EFM2 Double nut
EFMS Nut with safety system

With ball screw
KGF1 Ball nut with flange
KGF2 Double ball nut with "preload system" flange
KGM1 Smooth ball nut
KGM2 Double ball nut with "preload system"
KGMF Ball nut with flange +smooth ball nut "preload system"

With trapezoidal or ball screw
0000 No nut

07 **STROKE**
0000 Equipment usable stroke in mm

08 **SCREW END**
Z Standard cylindrical end
S Special end
0 With no end

09 **SCREW FASTENING ACCESSORY**
BPR Screw flange with bearing
FES Special end fastening
000 No accessory

10 **NUT ACCESSORIES**
KAR Nut flange with trunnion mounts
KAS Special nut flange
000 No accessory on nut

11 **SCREW PROTECTION ACCESSORY**
FB Bellow type protector
SF Spiral metallic protector
00 No protector

12 **DRIVE ADAPTATION**
Configuration M100/M505
00 No adaptation
VE Wheel

Configuration M205/M501/M601/M605
MK Default adaptation corresponding to configuration
MS Special adaptation
00 No adaptation

13 **MOTOR (IF CONFIGURATION M205/M501/M605)**
MK **drive adaptation**
080 Group size
A Power-1 / **B** Power-2

MS drive adaptation
1111 Non-standard drive

Both adaptations
0000 Without drive

14 **LUBRICANT**
GRA Standard lubricant
GRX Lubricant for low extreme temperatures
GRS Other lubricant

15 **LUBRICATION ACCESSORIES**
ERT Straight lubricator (standard)
ETP Sealed lubrication cap
AGR Automatic lubricating accessory
000 Other lubricating accessory

16 **EQUIPMENT GENERAL COLOUR**
RAN Anodized black
RSP Special colour indicated by the customer
000 Not painted

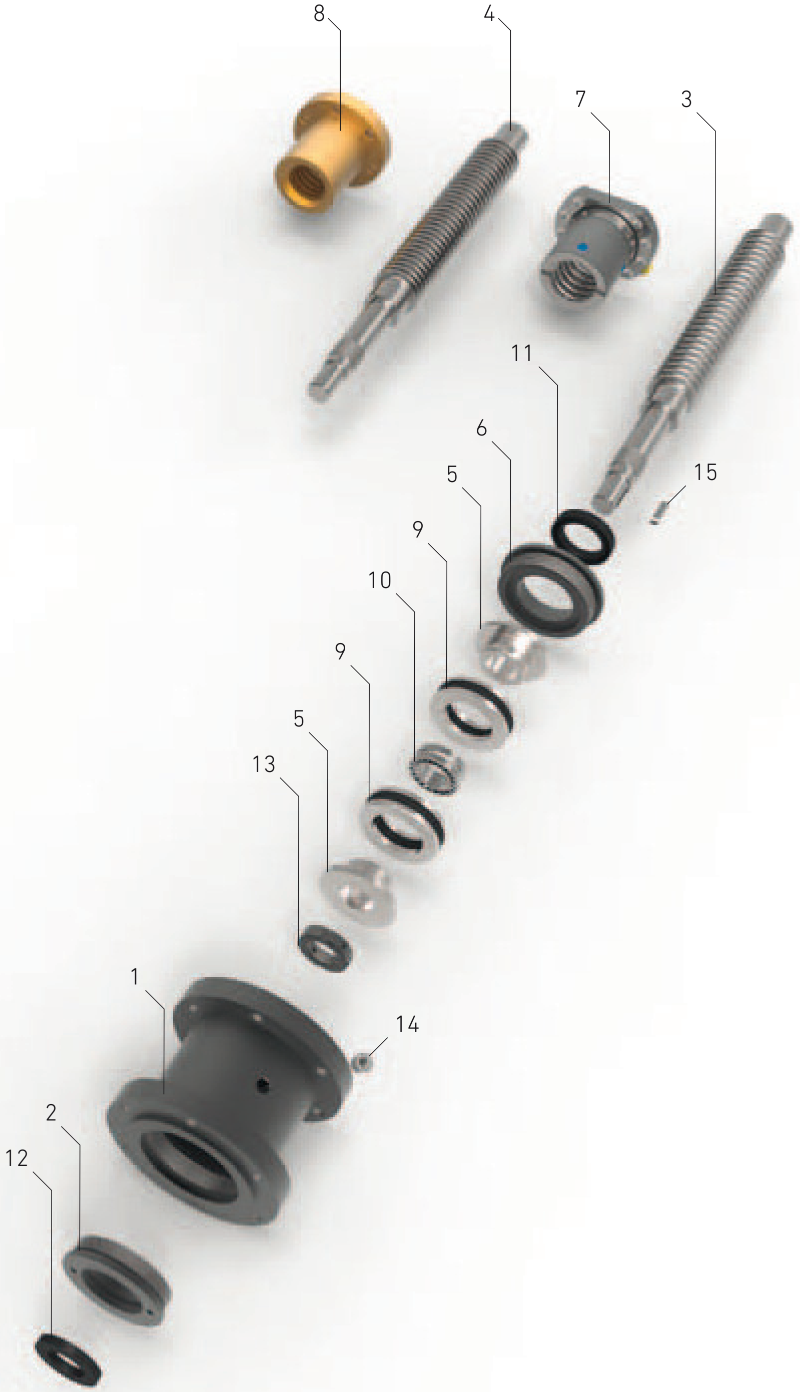
Example	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
	SH30	M205	00	IPS	KGS3205	EFM01	0300	Z	BPR	KAR	FB	MK	GR071A	GRA	ERT	RAZ

05

NIASA

SCREW SUPPORTS

ASSEMBLY



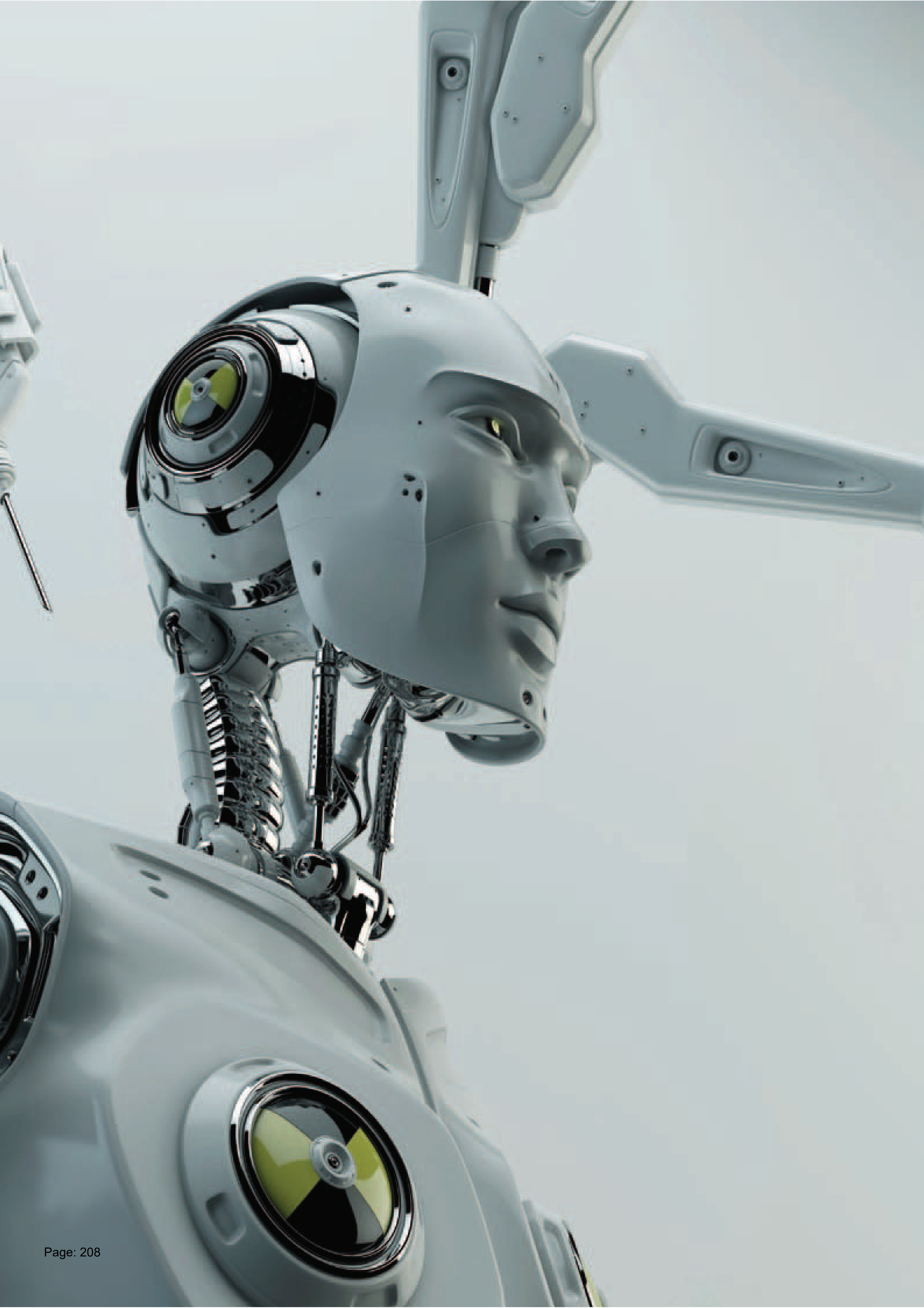
	Name
01	Body
02	Back cap
03	Ball screw
04	Trapezoidal screw
05	Bearing-holder disc
06	Front cap
07	Ball nut
08	Trapezoidal nut
09	Axial bearing
10	Radial bearing
11	Seal
12	Seal
13	Grooved nut
14	Straight lubrication nipple
15	Straight key

SCREW SUPPORTS
SPECIAL CONFIGURATIONS

06
BEVEL GEARBOXES

“CHARACTER ROBOTS CAN CREATE ROBOTS WITH EMPATHY.”

DAVID HANSON
ROBOTICS AND ARTIFICIAL INTELLIGENCE DESIGNER AND RESEARCHER



NIASA

Bevel gearboxes
ACCESORIES

BEVEL GEARBOX BG

GENERAL INFORMATION

NIASA bevel gearboxes are encased in robust cast metal housings and have hardened bevel gears pairs with spiral toothing and amply dimensioned rolling bearings. Spiral bevel gears have the significant benefit of very favourable meshing characteristics (high contact ratio). They are therefore especially well suited for operation under high load factors and when the highest smoothness of running and a high degree of trans-mission precision are required.

The curved teeth are more resistant to distortion than are straight or helical teeth. A further benefit is their relative insensitivity to elastic distortion of wheels, shafts and bearings. The gearboxes are thus able to transmit extreme shock loads. A total of ten different standard versions are available, with further variations as multi-shaft gear-boxes. All gearboxes may be installed in any mounting position and may have mounting holes on all sides.

Transmission ratios

Transmission ratios of 1 - 1.5 - 2 - 3 - 4 - 5 and 6:1 are available as standard. All transmission ratios are mathematically precise. The gears can be used for gearing down and gearing up. Special transmission ratios are available. Please contact us for details.

Efficiency

NIASA bevel gearboxes are 94 - 98 % efficient, depending on rpm, mounting position, sealing and type of lubrication.

The efficiency level refers to the nominal power output from the transmission. In certain mounting positions, the bevel gears are completely immersed in the lubricant. In this case, churning loss in larger gearboxes and at high circumferential velocities of the wheels can be considerable and **NIASA** should be consulted.

In general, it should be noted that starting efficiency is always lower than operating efficiency. The resulting increased breakaway torque should be taken into consideration when determining the driving power required.

Low-backlash version

For standard bevel gearbox units have – depending on gear size and ratio – a backlash of 10 to 30 angular minutes. Neverthless all **NIASA bevel gearboxes** can be supplied in a low-backlash version.

When the drive shaft is locked, tooth backlash on the slowly-running shaft is measured on a 100 mm lever arm with a measuring force of 3% of the rated torque and then is given as a torsion angle.

The following values can be set with standard gear sets:

Design S1: i = 1:1 to 2:1 < 6 angular minutes
Design S2: i = 3:1 to 6:1 < 10 angular minutes

Tighter values can be obtained from specially selected gears (Design S0). Consult us for detailed information.

Mounting Side

To indicate clearly the positions of different gearbox features, the sides of the gearbox are numbered 1 to 6.

All six sides of the gearbox are machined and can be used as mounting surfaces. The flanges and neck flanges are fitted with threaded holes as standard equipment. The following ordering options are available:

Code
a: only in the flange surfaces
b: on all gearbox sides without flanges
c: on all gearbox sides with flange/neck flange

Preferred rotational direction

NIASA bevel gearboxes can normally be run in either rotational direction. The spiral direction of the gear set and the rotational direction used are key factors termining the forces evolved within the unit. In most instances permissible torque transmission can be maximized by using the gear pairing such that the driving gear rotates in the same direction as the spiralling. This arrangement creates a more favourable contact point which reduces gear distortion. This also reduces noise from the gear pairing by 1-2 that the axial forces caused by the spiral meshing push the gears apart. In The pinion gear always has a left-handed spiral; accordingly, the large gear has a right-handed spiral.

Shaft seals

NIASA bevel gearboxes are supplied with oil-tight shaft seals as standard equipment. Shaft seals with dust lips (Model AS) can be included on the input and output shafts as an option on request to protect against water and dust.

If extreme operating environments or high gearbox temperatures are expected, bevel gears can be supplied with optional FKM shaft seals (from VITON). Special seals are available for extremely corrosive operating environments. In such cases, please consult us and provide detailed information on the application in question.

Corrosion-resistant bevel gearboxes

NIASA corrosion-resistant bevel gearboxes are outstanding for applications in which drive units are exposed to corrosive substances. Nickel- plated housing components and stainless-steel shafts are provided in these versions as standard equipment. The shaft seals are selected in accordance with the individual application at hand.

NIASA bevel gearboxes are also available in full stainless steel versions if required for extreme applications. Please enquire for further information.

Anti-Corrosion Surface Protection

NIASA bevel gears are supplied with a primer coat only as standard equipment. Surface-protected versions are available as options for special operating environments:

i: normal environmental conditions
relative humid. less than 60 % (std equipment)
ii: low corrosive emission levels in environment
relative humidity less than 90 %
iii: medium corrosive emission levels in environment
relative humidity less than 100 %
iv: corrosivity category > C3
as defined in DIN ISO 12944-2

Environ-ment	Coating thickness (µm)	Coating thickness
i	10 - 40	1 ∃ primer (2-component wash primer / priming by zinc phosphating)
ii	40 - 60	1 ∃ spray primer (1 x 2-component covering lacquer)
iii	60 - 90	2 ∃ spray primer (1 x 2-component covering lacquer)
iv	> 100	suited for your individual (application, please enquire)

Lubrication

NIASA bevel gearboxes are supplied oil-filled and are maintenance-free under normal operating conditions. With extreme requirements or increased demands on durability we recommend to change the oil after approx. 15,000 hours of operation.

The peripheral speed of the bevel gearboxes, the power that is to be transferred, and the operating conditions are crucial for the choice of the lubricant. Consult us for further information. Modern synthetic high-tech lubricants are available for choice. For transmission application in the Pharma or Foodstuffs industry, proven lubricants with NSF release (USDA-H1) can be selected.

NIASA bevel gearboxes are lubricated for a lifetime. The amount of lubricant has been internally determined for each assembly position. Naturally, biological-degradable oils or lubricants for extreme operating conditions can be supplied. For this purpose please contact us.

Also under normal operating conditions the transmission temperature can rise to over 50 °C because of the small convection surface. If the transmission exceeds this temperature during use the included aeration filter must be fitted in order to avoid overpressure in the transmission and thus a leakage. Sufficient fresh air supply must be ensured.

If the unit is intended for use under extreme ambient conditions (dust, moisture, etc.) please consult us. With intermittent operation or other operating conditions in which a rise in temperature of the transmission to over 50 °C is not expected, the aeration hole is not required.

For certain lubrication types, the gearbox is supplied with a vent filter. Let us know your application and will determine the best lubricant and eventual filter and its location.

Long-term storage version

NIASA bevel gearboxes can be supplied in an optional version suitable for long-term storage. In this version, they receive a special preservative treatment and are supplied in airtight packaging which must not be opened until the unit is to be used. Consult us for more information.

Bevel gearboxes
ACCESORIES

BEVEL GEARBOX **BG**

SELECTION CRITERIA

The permissible nominal input power ratings P1N and the nominal output torques T2N given in the tables are valid only for shock-free operation, ten hours operation per day and ten start-ups per hour, with an input power of 2.5 times the rated power being permitted during start-up. The thermal nominal power ratings P1Nt and output torque ratings T2Nt apply for an ambient temperature of 20 °C and 100% operating time. The maximum output torques T2max may be reached frequently for brief loading peaks, but may not be exceeded.

The required input power or output torque must be calculated on the basis of the operating factors for the determination of the gearbox size.

Mechanical	Thermal
P1m = P1xf1xf2xf3	**P1t = P1xf3xf4xf5**
T2m = T2xf1xf2xf3	**T2t = T2xf3xf4xf5**

The formulae take account of the mechanical and thermal effects. The following conditions apply for selection of gearbox size:

P1m<P1N P1t<P1Nt ; T2m<T2N T2t<T2N

The values given in the specification tables apply for lubrication by synthetic oils, based on an oil temperature of 95 °C. Determination of the thermal limit is not necessary if special measures are used (eg. an oil cooler) to ensure that the permissible oil temperature is never exceeded.

The permissible torques may be exceeded in special cases, eg. very short running times or static loading only. Please consult us for detailed information.

Exploitation of the maximum output torques T2max may make a press fit on the output shaft necessary, as the normal feather key connection is not always adequate.

The efficiency data given in the specification tables relate to the permissible rated loading of the transmissions and are guide values for fully run-in gearboxes running at operational temperature with standard seals.

Please refer to us for further details such as additional loads, start-up and operating efficiencies, low backlash or increased friction from special seals.

NIASA bevel gearboxes are designed for a service life of 12,000 operating hours when using the appropriate factors in selection. The prerequisite for this service life is correct installation and commissioning and proper servicing in accordance with the operating instructions for our bevel gears.

Operational factor f1

Driving motor	Load group	Operating hours / day			
		< 0,5	3	10	24
Electro motor	a	0,8	0,9	1	1,25
Hydraulic motor	b	0,9	1	1,25	1,5
Turbine	c	1	1,25	1,5	1,75

a: Low loading/shock-free
Filling machines, elevators, light screw conveyors, light conveyor belts, blowers, small agitators, control machines, assembly lines, auxiliary drives for machine tools, centrifuges, packaging machinery.

b: Medium loading/light shocks
Reel winders, agitators, plate conveyors, calenders, lifts, mixers, balancing machines, heavy-duty conveyor belts, sheet metal bending machines, road-building machinery, planing machines, shears, extruders, main drives for machine tools, kneading machines, weaving looms, light table rollers.

c: Heavy load/heavy shocks
Excavators, heavy-duty mixers, presses, muller mixers, rolling mills, heavy-duty table rollers, cold reduction mills, stone crushers, eccentric presses, cutter heads, folding machines, rubber belt conveyors (batch loads), bark peeling drums, run ning gears, punching presses, piston pumps, rotary furnaces, mills, plate filters.

Start-up factor f2

A prerequisite for application of the start-up factor is that the start-up torque (or braking torque) of the driving machine does not exceed 2.5 times the rated torque of the transmission:
T1A < 2.5 x T1N = 9550 x P1N / n1

Start-ups / h	up to 10	10-60	60-500	500-1500
f2	1	1,1	1,2	1,3

Lubrication factor f3

The lubrication factor must be taken into consideration when mineral oil is used since the efficiency, service life and permissible oil temperature depend to a great extent on the quality of the oil used.

	Sinthetic oil	Mineral oil
f3	1	1,1

Temperature factor f4

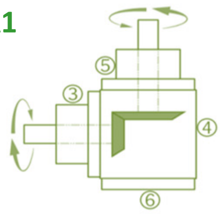
Ambient temp. °C	10	20	30	40	50
f4	0,9	1	1,15	1,4	1,7

Operating time per hour factor f5

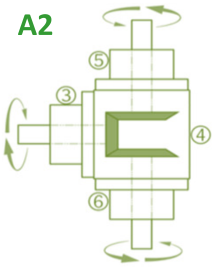
ED in %	100	80	60	40	20
f5	1	0,95	0,86	0,75	0,56

MODELS AND ROTATIONAL DIRECTIONS

A1

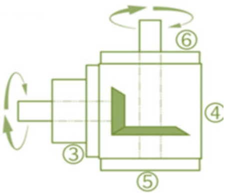


A2

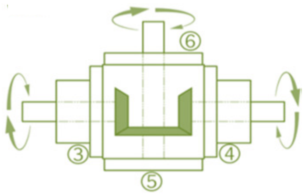


They have shafts with single bearings. The input and output sides are symmetrical at transmission ratios between 1:1 and 2:1.

B1

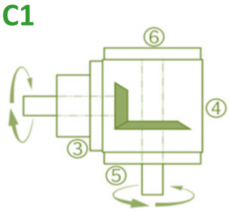


B2



The output shaft has bearings on both sides and extends out away from the side where its bevel gearbox is located. In this design the shafts have the same direction of rotation.

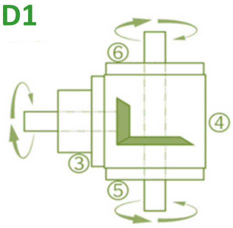
C1



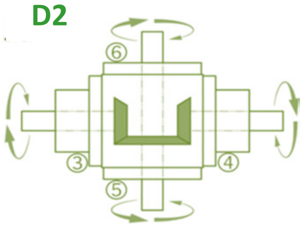
C2

The output shaft has bearings on both sides and extends out to the side where its bevel gearbox is located. In this design the shafts have opposing directions of rotation.

D1

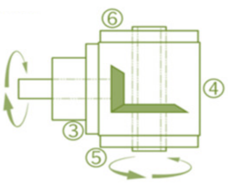


D2

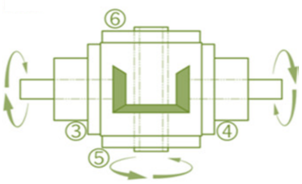


They have a straight-through output shaft. If units are intended for arrangement in series, they can be supplied with reinforced straight-through shafts and bearings.

E1



E2



They have a straight-through hollow shaft. The following options are available:
- without keyway, - with spline profile, - with polygonal profile.

Bevel gearboxes
ACCESORIES

BEVEL GEARBOX **BG**

SIZE SELECTION

i	n1 (rpm)	n2 (rpm)		BEVEL GEARBOX SIZE								
				BG-065	BG-090	BG-120	BG-140	BG-160	BG-200	BG-230	BG-260	BG-350
1:1 - 6:1			P1Nt	1,60	3,80	6,20	10,00	15,00	26,00	34,00	42,00	90,00
1:1	3000	3000	P1N	3,31	8,93	21,82	39,68					
			T2N	10,00	27,00	66,00	120,00					
	2400	2400	P1N	2,65	7,41	18,52	37,03	57,67				
			T2N	10,00	28,00	70,00	140,00	218,00				
	1500	1500	P1N	1,82	5,29	13,56	26,78	42,99	74,40	87,63	157,07	267,84
			T2N	11,00	32,00	82,00	162,00	260,00	450,00	530,00	950,00	1620,00
	1000	1000	P1N	1,32	3,75	10,14	20,28	31,96	56,21	71,65	115,73	210,53
			T2N	12,00	34,00	92,00	184,00	290,00	510,00	650,00	1050,00	1910,00
	750	750	P1N	1,07	3,06	8,51	16,20	25,63	45,88	60,76	96,72	195,92
			T2N	13,00	37,00	103,00	196,00	310,00	555,00	735,00	1170,00	2370,00
	500	500	P1N	0,83	2,20	6,34	11,46	18,19	34,17	45,19	72,75	155,41
			T2N	15,00	40,00	115,00	208,00	330,00	620,00	820,00	1320,00	2820,00
	250	250	P1N	0,47	1,21	3,39	5,92	9,64	19,56	26,73	42,44	94,52
			T2N	17,00	44,00	123,00	215,00	350,00	710,00	970,00	1540,00	3440,00
	50	50	P1N	0,10	0,28	0,72	1,21	2,09	4,13	7,00	9,64	24,47
			T2N	18,00	50,00	130,00	220,00	380,00	750,00	1270,00	1750,00	4440,00
			T2max	**25,00**	**105,00**	**220,00**	**430,00**	**660,00**	**1090,00**	**1500,00**	**2310,00**	**5400,00**
1,5:1	3000	2000	P1N	2,20	5,51	13,45	24,91	40,78	72,75	99,20	189,58	
			T2N	10,00	25,00	61,00	113,00	185,00	330,00	450,00	860,00	
	2400	1600	P1N	1,76	4,59	11,46	22,22	36,15	63,49	91,35	158,72	
			T2N	10,00	26,00	65,00	126,00	205,00	360,00	518,00	900,00	
	1500	1000	P1N	1,21	3,20	8,60	17,08	27,78	48,17	72,20	104,71	206,19
			T2N	11,00	29,00	78,00	155,00	252,00	437,00	655,00	950,00	1870,00
	1000	666,7	P1N	0,88	2,35	6,32	12,87	20,59	37,13	56,21	77,19	188,55
			T2N	12,00	32,00	86,00	175,00	280,00	505,00	765,00	1050,00	2560,00
	750	500	P1N	0,72	1,93	5,18	10,47	16,26	30,31	45,47	64,48	141,42
			T2N	13,00	35,00	94,00	190,00	295,00	550,00	825,00	1170,00	2560,00
	500	333,3	P1N	0,55	1,36	3,85	7,34	11,56	22,57	33,79	47,72	112,63
			T2N	15,00	37,00	105,00	200,00	315,00	615,00	920,00	1300,00	3070,00
	250	166,7	P1N	0,31	0,74	1,99	3,76	6,07	12,70	20,57	27,43	67,11
			T2N	17,00	40,00	108,00	204,00	330,00	690,00	1120,00	1490,00	3650,00
	50	33,3	P1N	0,07	0,16	0,41	0,76	1,29	2,73	4,89	6,18	16,34
			T2N	18,00	45,00	113,00	210,00	355,00	750,00	1330,00	1700,00	4500,00
			T2max	**25,00**	**80,00**	**169,00**	**358,00**	**650,00**	**980,00**	**1400,00**	**2100,00**	**5200,00**
2:1	3000	1500	P1N	1,65	3,80	9,26	16,53	28,11	51,25	87,63	133,92	
			T2N	10,00	23,00	56,00	100,00	170,00	310,00	530,00	810,00	
	2400	1200	P1N	1,32	3,17	8,07	14,68	25,53	45,24	80,02	112,43	
			T2N	10,00	24,00	61,00	111,00	193,00	342,00	605,00	850,00	
	1500	750	P1N	0,91	2,23	6,03	11,41	20,25	35,13	59,11	78,53	200,06
			T2N	11,00	27,00	73,00	138,00	245,00	425,00	715,00	950,00	2420,00
	1000	500	P1N	0,66	1,71	4,46	8,38	14,88	27,56	45,19	57,87	155,41
			T2N	12,00	31,00	81,00	152,00	270,00	500,00	820,00	1050,00	2820,00
	750	375	P1N	0,54	1,32	3,55	6,86	11,57	22,32	36,79	48,36	129,37
			T2N	13,00	32,00	86,00	166,00	280,00	540,00	890,00	1170,00	3130,00
	500	250	P1N	0,41	0,94	2,54	4,96	8,27	16,81	26,73	35,27	94,52
			T2N	15,00	34,00	92,00	180,00	300,00	610,00	970,00	1280,00	3430,00
	250	125	P1N	0,23	0,50	1,35	2,62	4,41	9,37	16,88	20,12	54,15
			T2N	17,00	36,00	98,00	190,00	320,00	680,00	1225,00	1460,00	3930,00
	50	25	P1N	0,05	0,10	0,29	0,55	0,98	2,07	3,66	4,55	12,79
			T2N	18,00	37,00	107,00	200,00	355,00	750,00	1330,00	1650,00	4640,00
			T2max	**25,00**	**80,00**	**169,00**	**320,00**	**650,00**	**980,00**	**1400,00**	**2100,00**	**5000,00**
3:1	3000	1000	P1N	1,10	2,54	6,39	12,12	20,94	46,29	44,09	85,97	
			T2N	10,00	23,00	58,00	110,00	190,00	420,00	400,00	780,00	
	2400	800	P1N	0,88	2,12	5,56	11,46	17,81	39,24	39,68	72,39	160,48
			T2N	10,00	24,00	63,00	130,00	202,00	445,00	450,00	821,00	1820,00
	1500	500	P1N	0,61	1,49	4,08	8,05	12,68	28,38	29,76	49,60	122,35
			T2N	11,00	27,00	74,00	146,00	230,00	515,00	540,00	900,00	2220,00
	1000	333,3	P1N	0,44	1,14	3,01	5,87	8,99	20,37	23,33	36,34	96,26
			T2N	12,00	31,00	82,00	160,00	245,00	555,00	635,00	990,00	2620,00
	750	250	P1N	0,33	0,88	2,40	4,60	6,89	15,98	19,29	28,93	81,29
			T2N	12,00	32,00	87,00	167,00	250,00	580,00	700,00	1050,00	2950,00
	500	166,7	P1N	0,24	0,63	1,66	3,20	4,79	11,04	14,07	20,43	59,34
			T2N	13,00	34,00	90,00	174,00	260,00	600,00	765,00	1110,00	3230,00
	250	83,3	P1N	0,12	0,33	0,87	1,62	2,56	5,76	7,58	11,16	34,26
			T2N	13,00	36,00	95,00	177,00	280,00	630,00	825,00	1220,00	3730,00
	50	16,7	P1N	0,03	0,07	0,21	0,34	0,57	1,29	1,63	2,55	7,79
			T2N	14,00	37,00	110,00	180,00	305,00	690,00	870,00	1360,00	4240,00
			T2max	**23,00**	**70,00**	**155,00**	**280,00**	**457,00**	**910,00**	**1300,00**	**1940,00**	**4500,00**

i	n1 (rpm)	n2 (rpm)		BG-065	BG-090	BG-120	BG-140	BG-160	BG-200	BG-230	BG-260	BG-350
				BEVEL GEARBOX SIZE								
1:1 - 6:1			P1Nt	1,60	3,80	6,20	10,00	15,00	26,00	34,00	42,00	90,00
4:1	3000	750	P1N		1,90	4,96	8,51	14,88	28,93	36,37	57,87	
			T2N		23,00	60,00	103,00	180,00	350,00	440,00	700,00	
	2400	600	P1N		1,65	4,43	7,34	13,23	26,45	32,74	51,58	113,75
			T2N		25,00	67,00	111,00	200,00	400,00	495,00	780,00	1720,00
	1500	375	P1N		1,12	3,06	4,96	9,09	18,81	24,80	37,20	78,95
			T2N		27,00	74,00	120,00	220,00	455,00	600,00	900,00	1910,00
	1000	250	P1N		0,85	2,18	3,75	6,61	13,36	18,60	28,93	58,14
			T2N		31,00	79,00	136,00	240,00	485,00	675,00	1050,00	2110,00
	750	187,5	P1N		0,66	1,69	3,06	5,17	10,54	15,19	22,73	47,95
			T2N		32,00	82,00	148,00	250,00	510,00	735,00	1100,00	2320,00
	500	125	P1N		0,47	1,16	2,12	3,58	7,23	10,95	16,26	34,72
			T2N		34,00	84,00	154,00	260,00	525,00	795,00	1180,00	2520,00
	250	62,5	P1N		0,25	0,60	1,12	1,86	3,79	5,99	8,61	19,43
			T2N		36,00	87,00	162,00	270,00	550,00	870,00	1250,00	2820,00
	50	12,5	P1N		0,05	0,12	0,23	0,39	0,80	1,35	1,82	4,17
			T2N		37,00	90,00	170,00	280,00	580,00	980,00	1320,00	3030,00
			T2max		**70,00**	**155,00**	**280,00**	**422,00**	**860,00**	**1300,00**	**1940,00**	**3500,00**
5:1	3000	600	P1N		1,52	3,97	6,61	11,90	19,84	33,73	46,29	
			T2N		23,00	60,00	100,00	180,00	300,00	510,00	700,00	
	2400	480	P1N		1,32	3,44	5,56	10,48	17,99	29,10	40,21	78,83
			T2N		25,00	65,00	105,00	198,00	340,00	550,00	760,00	1490,00
	1500	300	P1N		0,89	2,38	3,80	7,11	12,57	21,00	29,10	56,54
			T2N		27,00	72,00	115,00	215,00	380,00	635,00	880,00	1710,00
	1000	200	P1N		0,68	1,76	2,73	4,96	9,26	15,76	21,82	42,33
			T2N		31,00	80,00	124,00	225,00	420,00	715,00	990,00	1920,00
	750	150	P1N		0,53	1,42	2,15	3,97	7,27	12,73	18,19	35,88
			T2N		32,00	86,00	130,00	240,00	440,00	770,00	1100,00	2170,00
	500	100	P1N		0,37	0,98	1,50	2,76	5,18	9,15	13,23	26,67
			T2N		34,00	89,00	136,00	250,00	470,00	830,00	1200,00	2420,00
	250	50	P1N		0,20	0,51	0,79	1,49	2,78	5,07	7,11	16,09
			T2N		36,00	92,00	143,00	270,00	505,00	920,00	1290,00	2920,00
	50	10	P1N		0,04	0,10	0,17	0,32	0,58	1,09	1,47	3,56
			T2N		37,00	95,00	150,00	290,00	525,00	990,00	1330,00	3230,00
			T2max		**60,00**	**140,00**	**250,00**	**420,00**	**860,00**	**1200,00**	**1910,00**	**3500,00**
6:1	3000	500	P1N		1,25	2,95	5,18	7,09	11,45	20,17	27,27	
			T2N		23,00	54,00	94,00	129,00	208,00	366,00	495,00	
	2400	400	P1N		1,09	2,53	4,58	5,98	9,60	18,08	23,12	56,88
			T2N		25,00	57,00	104,00	136,00	218,00	410,00	524,00	1290,00
	1500	250	P1N		0,74	1,75	2,95	3,95	6,54	13,50	16,36	41,61
			T2N		27,00	64,00	107,00	143,00	237,00	490,00	594,00	1510,00
	1000	166,7	P1N		0,53	1,22	2,06	3,01	4,74	9,92	12,93	31,41
			T2N		29,00	66,00	112,00	164,00	258,00	540,00	702,00	1710,00
	750	125	P1N		0,40	0,94	1,61	2,43	3,98	7,78	10,91	24,25
			T2N		29,00	68,00	117,00	176,00	289,00	565,00	792,00	1760,00
	500	83,3	P1N		0,27	0,63	1,09	1,72	2,79	5,42	8,06	16,72
			T2N		29,00	69,00	119,00	187,00	304,00	590,00	878,00	1820,00
	250	41,7	P1N		0,14	0,33	0,56	0,92	1,44	2,82	4,35	9,28
			T2N		30,00	71,00	121,00	199,00	311,00	610,00	940,00	2020,00
	50	8,3	P1N		0,03	0,06	0,11	0,18	0,28	0,57	0,87	1,95
			T2N		33,00	66,00	120,00	197,00	306,00	625,00	951,00	2120,00
			T2max		**50,00**	**120,00**	**200,00**	**350,00**	**625,00**	**1000,00**	**1730,00**	**2300,00**

TERMS

i	Transmission ratio
n1	Speed of faster-running shaft (rpm)
n2	Speed of slower-running shaft (rpm)
P1N	Permissible rated input power, mechanical (kW)
P1Nt	Permissible rated input power, thermal (kW)
T2N	Permissible rated output torque, mechanical (Nm)
T2max	Maximum permissible output torque (Nm)

Bevel gearboxes

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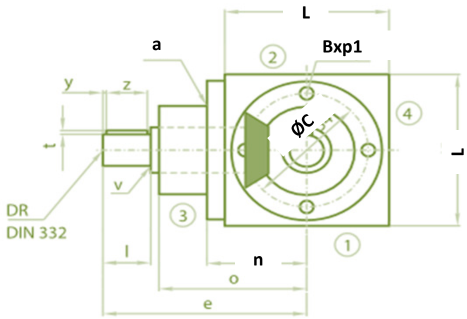
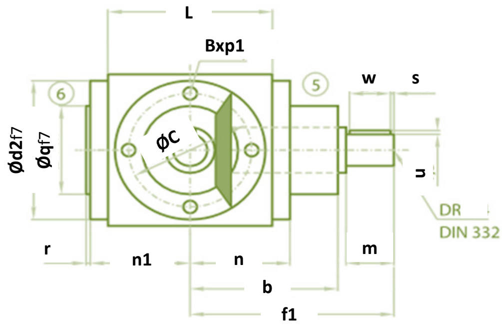
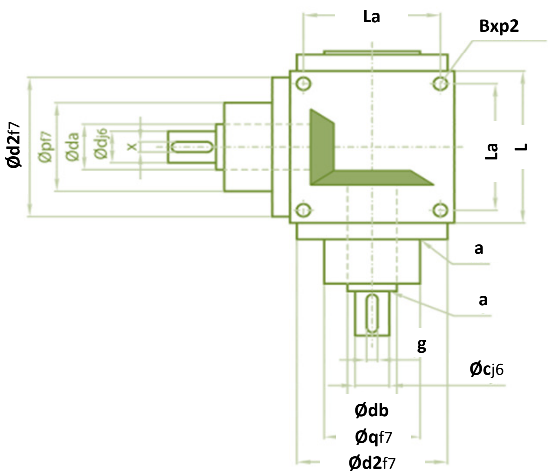
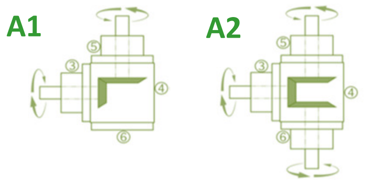
BEVEL GEARBOX BG

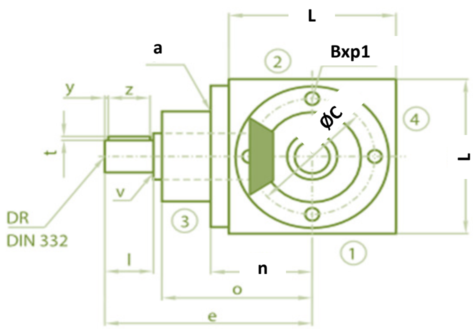
DIMENSIONS: BG-065 / BG-090 / BG-120 / BG-140

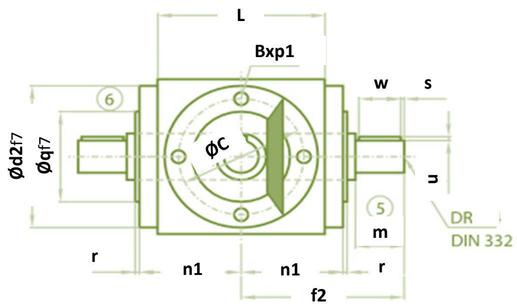


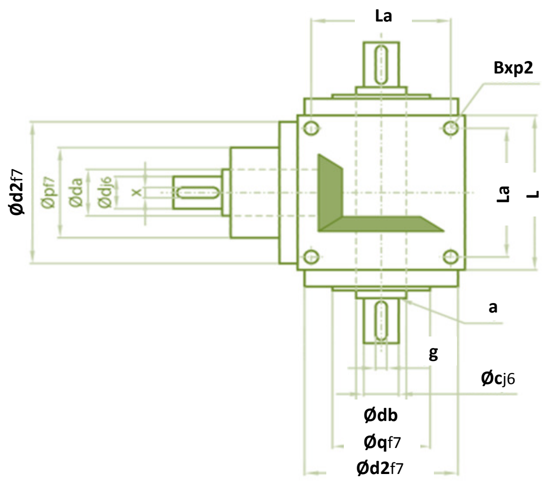


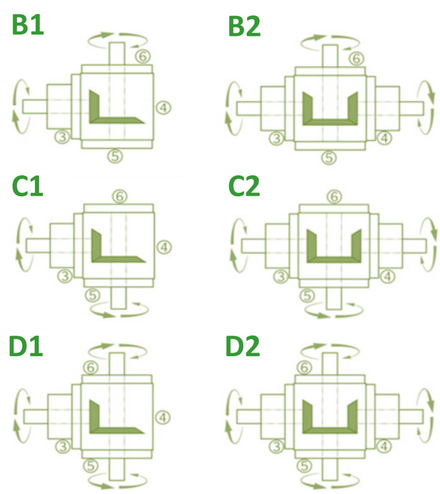




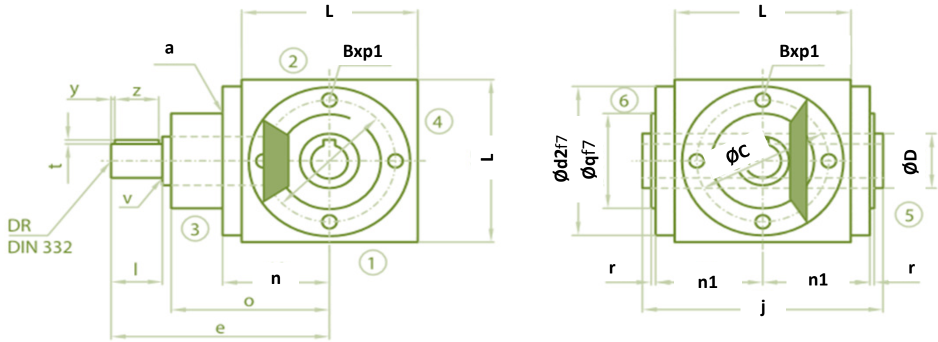




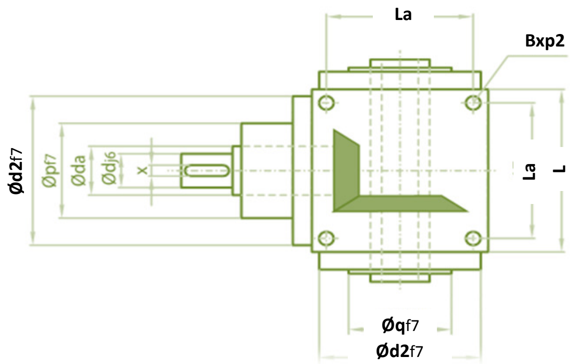


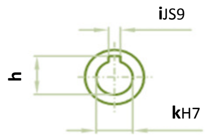


Page

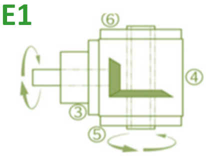


Standard





E1



E2

Size > / Ratio >>>	BG-065		BG-090				BG-120				BG-140			
	i=1:1- i=2:1	i=3:1	i=1:1- i=2:1	i=3:1	i=4:1	i=5:1 i=6:1	i=1:1- i=2:1	i=3:1	i=4:1	i=5:1 i=6:1	i=1:1- i=2:1	i=3:1	i=4:1	i=5:1 i=6:1
a	0,5		1				1				1,5			
b	72		85				115				128			
B	M6		M8				M10				M10			
c	12		18				25				32			
C	54		75											
d	12	12	18	12	12	12	25	20	20	15	32	28	24	24
D	20		30				40				50			
d2	64		89				119				135			
da	17	17	25	20	20	20	30	25	25	20	40	40	40	40
db	17		30				30				40			
DR	M4	M4	M6	M4	M4	M4	M10	M6	M6	M5	M12	M10	M8	M8
e	100	100	122	122	132	132	162	162	172	162	180	180	195	195
f1	100		122				162				180			
f2	72		95				122				137			
g	4		6				8				10			
h	13,8		20,8				28,3				35,3			
i	4		6				8				10			
j	92		124				160				180			
k	12		18				25				32			
l	26		35				45				50			
L	65		90				120				140			
La	45		70				100				110			
m	26		35				45				50			
n	42		55				75				85			
n1	42		55				72				82			
o	72	72	85	85	95	95	115	115	125	125	128	128	143	143
p	44	44	60	60	60	60	80	80	80	70	90	90	85	85
p1	9,5		10				12				12			
p2	12		14				16				20			
q	44		60				80				90			
r	2		2				3				3			
s	3		3				4				3			
t	1,5	1,5	2,5	1,5	1,5	1,5	3	2,5	2,5	2	3	3	3	3
u	1,5		2,5				3				3			
v	0,5	0,5	1	0,5	0,5	0,5	1	1	1	0,5	1,5	1	1	1
w	20		28				36				45			
x	4	4	6	4	4	4	8	6	6	5	10	8	8	8
y	3	3	3	3	3	3	4	4	4	4	3	3	3	3
z	20	20	28	28	28	28	36	36	36	28	45	45	45	45

Bevel gearboxes

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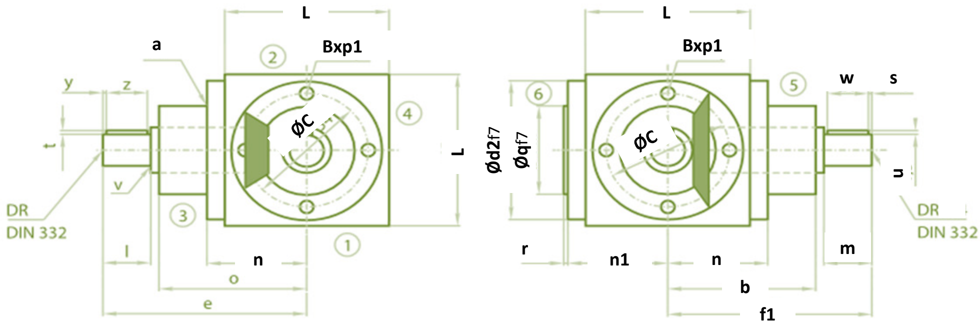
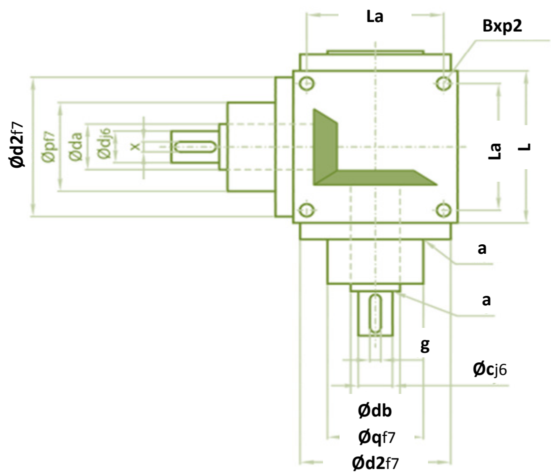
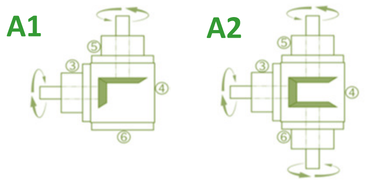
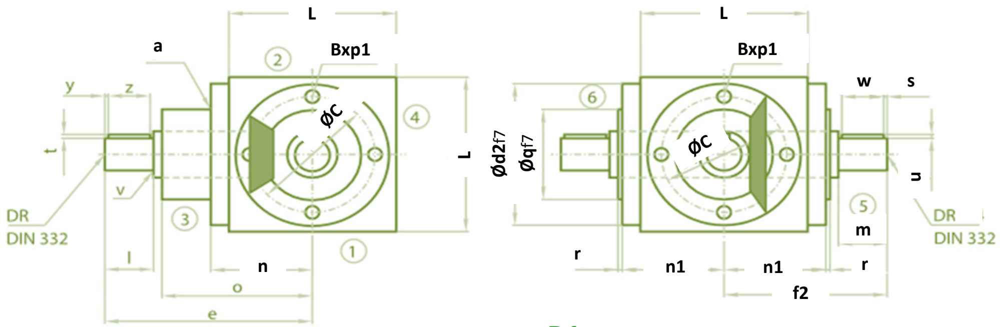
BEVEL GEARBOX BG

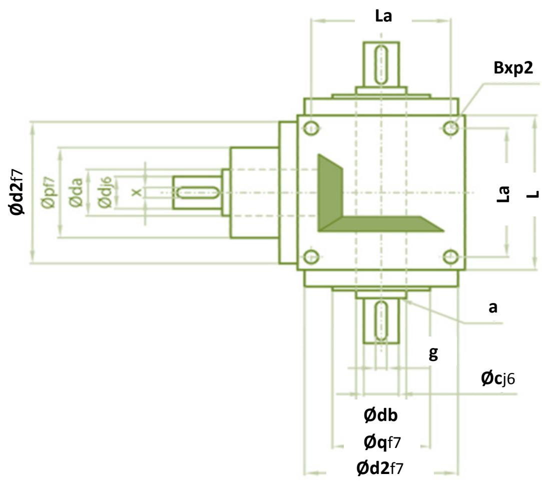
DIMENSIONS: BG-160 / BG-200 / BG-230

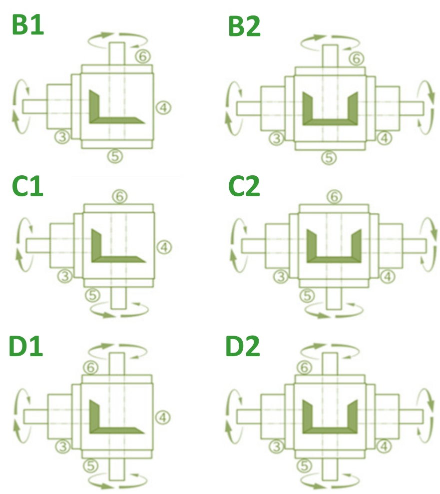


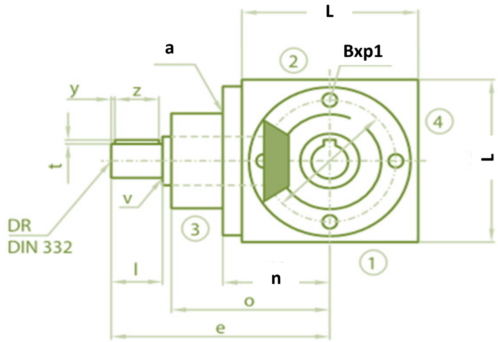


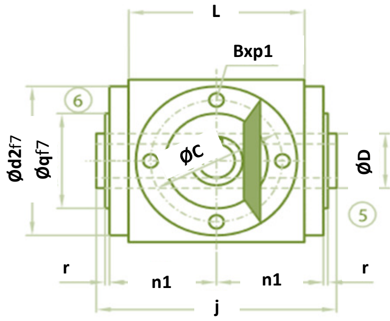




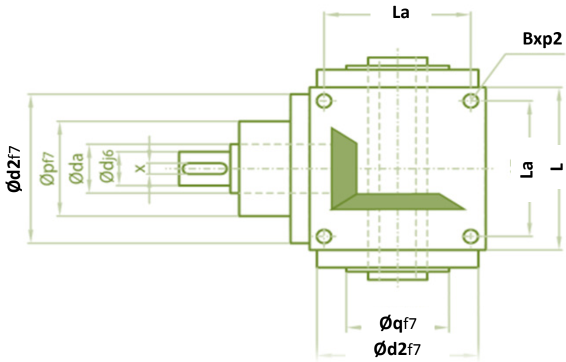


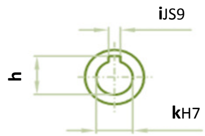




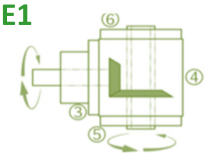


Standard





E1



E2

Size > Ratio >>>	BG-160 i=1:1-i=2:1	BG-160 i=3:1	BG-160 i=4:1	BG-160 i=5:1 i=6:1	BG-200 i=1:1-i=2:1	BG-200 i=3:1	BG-200 i=4:1	BG-200 i=5:1 i=6:1	BG-230 i=1:1-i=2:1	BG-230 i=3:1	BG-230 i=4:1	BG-230 i=5:1 i=6:1
a	2				3				5			
b	150				190				213			
B	M12				M12				M16			
c	35				42				55			
C	135				175				200			
d	35	28	24	24	42	35	35	28	55	40	40	35
D	55				70				80			
d2	159				199				225			
da	40	40	40	25	55	40	40	30	60	50	50	45
db	40				55				60			
DR	M12	M10	M8	M8	M16	M12	M12	M10	M20	M16	M16	M16
e	212	212	232	232	273	261	261	261	305	310	310	300
f1	212				273				305			
f2	160				203				230			
g	10				12				16			
h	38,3				45,3				59,3			
i	10				12				16			
j	206				250				285			
k	35				42				55			
l	60	60	60	60	80	68	68	68	90	80	80	70
L	160				200				230			
La	120				160				180			
m	60				80				90			
n	95				120				135			
n1	95				117				132			
o	150	150	170	170	190	190	190	190	213	228	228	228
p	110	100	100	100	120	120	120	110	150	140	140	140
p1	15				20				20			
p2	24				24				20			
q	110				120				149			
r	3				3				4			
s	5				5				5			
t	3	3	3	3	3	3	3	3	2,5	3	3	3
u	3				3				4			
v	1,5	1	1	0,5	2	1	1		1	1	1	1
w	50				70				80			
x	10	8	8	8	12	10	10	8	16	12	12	10
y	5	5	5	5	5	3	3	3	5	5	0	3
z	50	50	50	50	70	63	63	63	80	70	70	63

Bevel gearboxes

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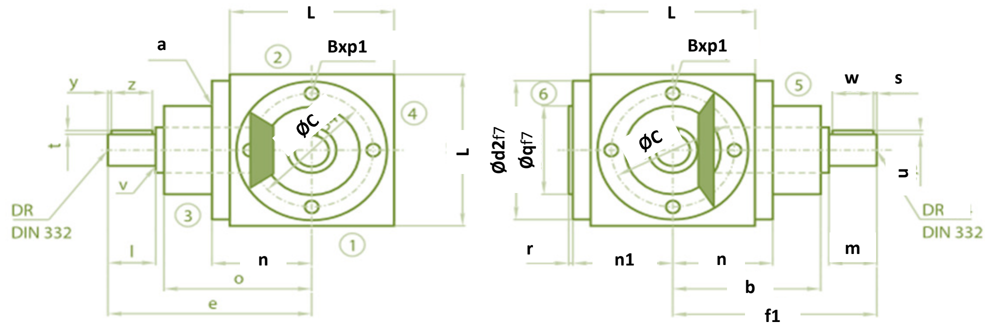
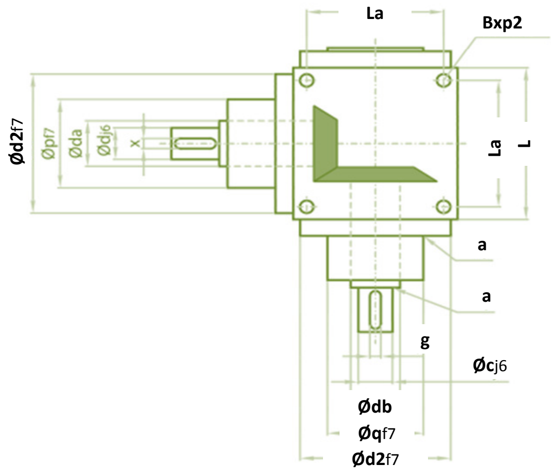
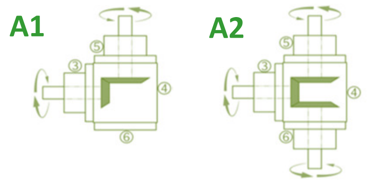
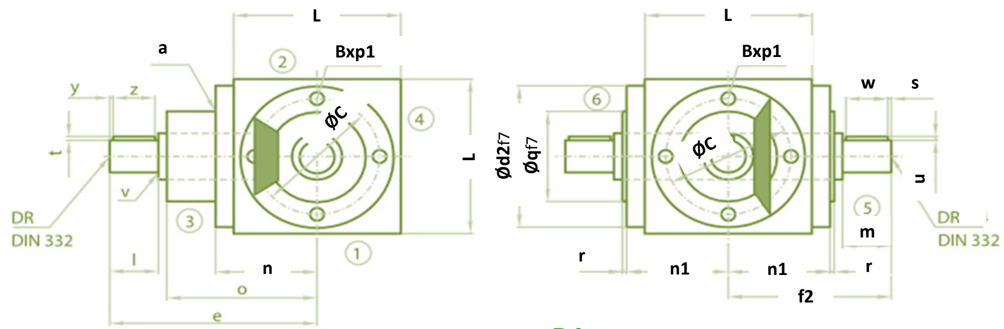
BEVEL GEARBOX BG

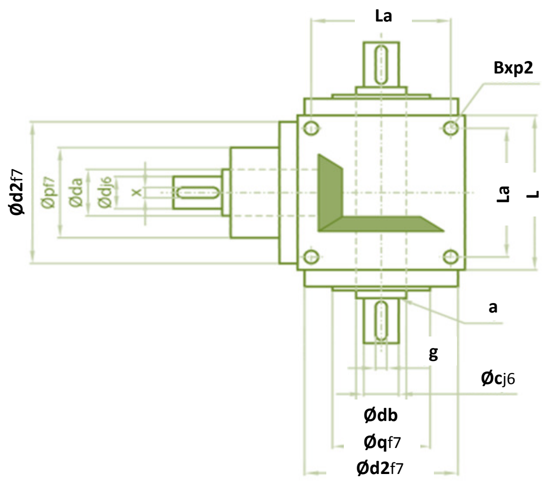
DIMENSIONS: BG-260 / BG-350

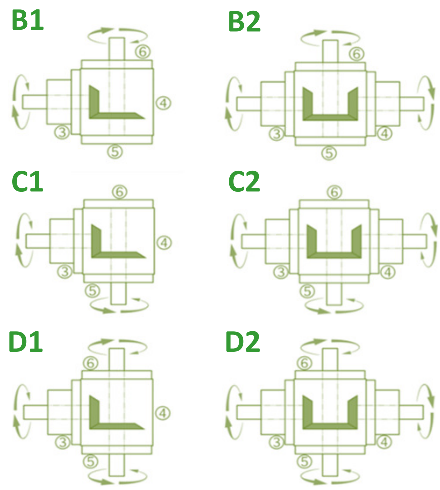


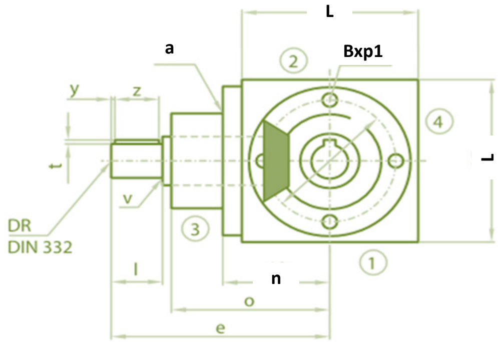


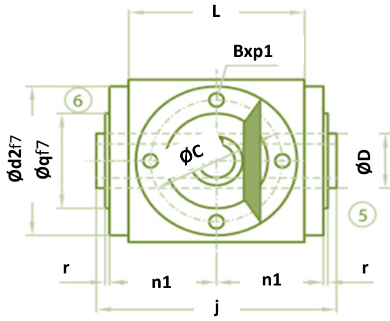




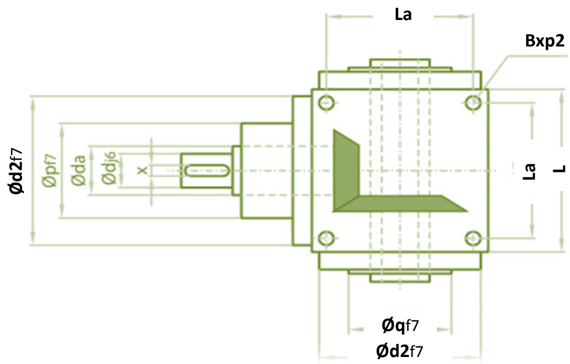


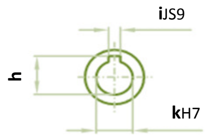




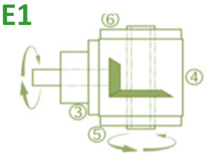


Standard

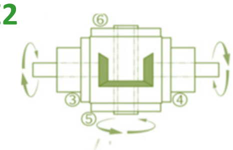




E1



E2



Size >	BG-260				BG-350			
Ratio >>>	i=1:1- i=2:1	i=3:1	i=4:1	i=5:1 i=6:1	i=1:1- i=2:1	i=3:1	i=4:1	i=5:1 i=6:1
a	5							
b	265				395			
B	M160				M20			
c	60				80			
C	230				305			
d	60	45	45	45	80	65	65	55
D	80				105			
d2	255				345			
da	65	65	65	65	90	90	90	72
db	65				90			
DR	M20		M16		M20	M20	M20	M20
e	380	360	360	360	570	540	540	510
f1	380				570			
f2	268				410			
g	18				22			
h	64,4				85,4			
i	18				22			
j								
k	60				80			
l	110	90	90	90	170	140	140	110
L	260				350			
La	220				285			
m	110				170			
n	150				198			
n1	150				205			
o	265		265		395	395	395	395
p	160	160	160	160	250	250	250	250
p1	20				26			
p2	32				26			
q	160				250			
r	4				20			
s	5				5			
t	4	3,5	3,5	3,5	5	4	4	4
u	4				5			
v	1	1,5	1,5	1,5	1,5	1,5	1,5	1,5
w	100				160			
x	18	14	14	14	22	18	18	16
y	5	5	5	5	5	7,5	7,5	10
z	100	8	8	80	160	125	125	90

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Bevel gearboxes

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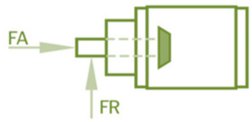
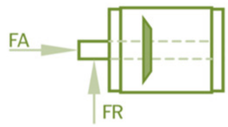
BEVEL GEARBOX BG

RADIAL FORCES (N)

The permissible radial loads given in the tables are valid centrally between the shaft ends for the speeds and torques listed. The more unfavourable direction of loading was assumed in calculating these values. Higher radial loads are permissible if the direction of stress application and of radial rotation are carefully calculated. Please, consult us on this.



Axial forces FA can be absorbed without further supplementary calculation up to a level of approx. 50 % of the permissible radial forces. If the axial forces exceed these values by a significant margin or if simultaneous FR and FA forces occur, please consult us.



Bevel gear box size	T2 (Nm)	n1 (rpm) 3000	1000	500	250	100	50	n2 (rpm) 3000	1000	500	250	100	50
BG-065	< 12	180	250	300	350	450	550	300	400	500	650	750	900
	> 12	150	210	250	290	380	460	250	330	420	540	630	750
BG-090	< 30	300	400	470	580	700	800	500	660	800	950	1250	1500
	> 30	250	330	390	490	590	670	420	550	670	790	1040	1250
BG-120	< 80	470	620	720	900	1150	1400	750	1000	1250	1500	1900	2200
	> 80	390	520	600	750	960	1170	630	830	1040	1250	1580	1830
BG-140	< 140	700	870	1150	1370	1700	2000	1300	1700	2000	2500	3000	3800
	> 140	590	730	960	1140	1420	1670	1083	1420	1670	2080	2500	3170
BG-160	< 220	1200	1600	1900	2200	2850	3300	2000	2800	3300	4000	5000	6500
	> 220	1000	1340	1590	1840	2380	2750	1670	2340	2750	3340	4170	5420
BG-200	< 500	2200	1700	3200	3900	5000	6200	3200	4300	5000	6500	8000	10000
	> 500	1840	1420	2670	3250	4170	5170	2670	3580	4170	5420	6670	8330
BG-230	< 750	4600	5150	7200	9450	11250	13100	5850	8650	10500	12250	15000	19000
	> 750	3830	4290	6000	7870	9370	10920	4870	7210	8750	10210	12500	15830
BG-260	< 950	7000	8600	11200	15000	17500	20000	8500	13000	16000	18000	22000	28000
	> 950	5830	7170	9330	12500	14580	16670	7080	10830	13330	15000	18330	23330
BG-350	< 2400	14500	15000	17500	22500	27500	33000	17500	18100	21100	26150	34200	40200
	> 2400	12000	12500	14500	18700	23000	27500	14500	15080	17580	21790	28500	33500

WEIGHTS (kg)

Bevel gearbox Size	Model	Weight
BG-065	A1	2,30
	A2	2,70
	B1 / C1	2,20
	D1	2,30
	B2 / C2	2,60
	D2	2,70
	E1	2,10
	E2	2,50
BG-090	A1	5,10
	A2	6,30
	B1 / C1	5,40
	D1	5,50
	B2 / C2	6,90
	D2	7,00
	E1	5,00
	E2	6,50
BG-120	A1	12,60
	A2	15,00
	B1 / C1	12,30
	D1	12,50
	B2 / C2	14,70
	D2	14,90
	E1	12,00
	E2	14,40

Bevel gearbox Size	Model	Weight
BG-140	A1	19,00
	A2	23,00
	B1 / C1	18,50
	D1	19,00
	B2 / C2	22,70
	D2	23,20
	E1	18,00
	E2	22,20
BG-160	A1	28,50
	A2	35,00
	B1 / C1	28,00
	D1	28,50
	B2 / C2	34,50
	D2	35,00
	E1	27,00
	E2	34,00
BG-200	A1	52
	A2	60
	B1 / C1	48
	D1	50
	B2 / C2	58
	D2	60
	E1	48
	E2	58

Bevel gearbox Size	Model	Weight
BG-230	A1	79
	A2	97
	B1 / C1	76
	D1	78
	B2 / C2	100
	D2	102
	E1	71
	E2	95
BG-260	A1	85
	A2	105
	B1 / C1	85
	D1	88
	B2 / C2	109
	D2	112
	E1	82
	E2	106
BG-350	A1	269
	A2	340
	B1 / C1	280
	D1	287
	B2 / C2	372
	D2	379
	E1	259
	E2	351

MOMENTS OF INERTIA J ($kgcm^2$)

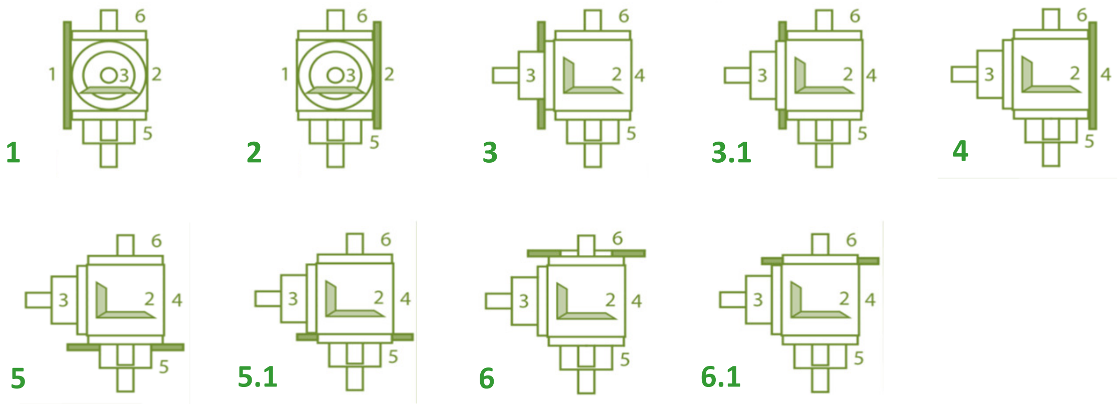
Reduced to the input shaft (n1).

Bevel gearbox		Transmission ratios						
Size	Model	1:1	1,5:1	2:1	3:1	4:1	5:1	6:1
BG-065	A1	0,3888	0,2406	0,1839	0,1036			
	A2	0,5832	0,3270	0,2325	0,1252			
	B1 / C1	0,4231	0,3111	0,2330	0,1001			
	D1	0,4330	0,3155	0,2355	0,1012			
	B2 / C2	0,6175	0,4653	0,3683	0,1821			
	D2	0,6274	0,4697	0,3708	0,1832			
	E1	0,4754	0,3634	0,2853	0,1524			
	E2	0,6698	0,5176	0,4206	0,2344			
BG-090	A1	2,5590	1,4822	1,1437	0,8884	0,3631	0,3248	0,3062
	A2	3,8385	2,0508	1,4636	1,0305	0,4430	0,3760	0,3418
	B1 / C1	3,3543	2,1833	1,3652	1,0465	0,4607	0,3933	0,3502
	D1	3,3827	2,1959	1,3723	1,0496	0,4625	0,3945	0,3510
	B2 / C2	4,6338	3,0968	2,1890	1,7927	0,7438	0,6669	0,6209
	D2	4,6622	3,1094	2,1961	1,7958	0,7456	0,6681	0,6217
	E1	3,2507	2,1372	1,3393	1,0350	0,4542	0,3892	0,3473
	E2	4,5302	3,0507	2,1631	1,7812	0,7373	0,6628	0,6180
BG-120	A1	10,4976	4,8409	3,6465	2,3159	1,2164	0,7516	0,6766
	A2	15,7464	7,1737	4,9587	2,8991	1,5444	0,9615	0,8224
	B1 / C1	15,3022	7,4441	4,9747	3,0123	1,6729	1,0593	0,8982
	D1	15,5996	7,5762	5,0490	3,0453	1,6915	1,0712	0,9065
	B2 / C2	20,5510	9,9522	7,3090	4,7450	2,5612	1,6009	1,4290
	D2	20,8484	10,0843	7,3833	4,7780	2,5798	1,6128	1,4373
	E1	15,1939	7,3959	4,9476	3,0003	1,6661	1,0550	0,8952
	E2	20,4427	9,9040	7,2819	4,7330	2,5544	1,5966	1,4260
BG-140	A1	26,2670	11,8569	8,6762	6,4356	1,8432	1,5320	1,3708
	A2	39,4005	17,6940	11,9596	7,8949	2,6641	2,0574	1,7356
	B1 / C1	36,0994	18,7513	12,2785	7,9547	2,6978	2,2113	1,8426
	D1	37,0815	19,1878	12,5241	8,0639	2,7592	2,2506	1,8698
	B2 / C2	49,2329	24,7711	17,6713	12,9310	3,7202	3,2180	2,8486
	D2	50,2150	25,2076	17,9169	13,0402	3,7816	3,2573	2,8758
	E1	32,6630	17,2240	11,4194	7,5729	2,4830	2,0739	1,7471
	E2	45,7965	23,2438	16,8122	12,5492	3,5054	3,0806	2,7531
BG-160	A1	29,6710	19,6374	12,3589	8,9516	6,4348	2,2733	2,0901
	A2	44,5065	26,2309	16,0678	10,6000	7,3620	2,8667	2,5022
	B1 / C1	31,5527	32,0243	20,1006	12,0803	8,4198	3,6887	2,9407
	D1	32,5820	32,4818	20,3579	12,1947	8,4841	3,7299	2,9693
	B2 / C2	46,3882	45,0681	28,7506	19,3835	13,9274	5,3686	4,6187
	D2	47,4175	45,5256	29,0079	19,4979	13,9917	5,4098	4,6473
	E1	34,3851	33,1416	20,6658	12,3315	8,5611	3,7791	3,0048
	E2	49,2206	46,1854	29,3158	19,6347	14,0687	5,4590	4,6828
BG-200	A1	121,2522	57,6950	36,3095	18,8322	14,2651	6,1470	5,3881
	A2	181,8783	84,6400	51,4661	25,5685	18,0543	8,5721	7,0721
	B1 / C1	174,7000	103,5829	71,6215	34,1931	22,7181	12,8770	10,0616
	D1	177,8173	104,9684	72,4008	34,5395	22,9130	13,0016	10,1482
	B2 / C2	235,3261	134,3330	92,7745	46,2891	33,1941	16,5990	13,7656
	D2	238,4434	135,7185	93,5538	46,6355	33,3890	16,7236	13,8522
	E1	201,3904	109,0276	76,4341	35,2209	23,3588	13,8070	10,7075
	E2	262,0165	139,7777	97,5871	47,3169	33,8348	17,5290	14,4115
BG-230		Upon request						
BG-260	A1	814,2000	305,9333	194,2750	85,0833	46,7738	37,2840	31,8083
	A2	1221,3000	486,8667	296,0500	130,3167	72,2175	53,5680	43,1167
	B1 / C1	827,4400	168,2622	281,3350	117,2211	66,6638	50,0136	40,7039
	D1	841,8500	383,5556	284,9375	52,2667	67,5644	50,5900	41,1042
	B2 / C2	1234,5400	293,2622	373,8350	157,0711	87,9938	71,0136	61,2039
	D2	1248,9500	508,5556	377,4375	92,1167	88,8944	71,5900	61,6042
	E1	828,6900	413,2622	287,8975	120,1100	68,2888	51,0536	41,4261
	E2	1235,7900	538,2622	380,3975	159,9600	89,6188	72,0536	61,9261
BG-350		Upon request						

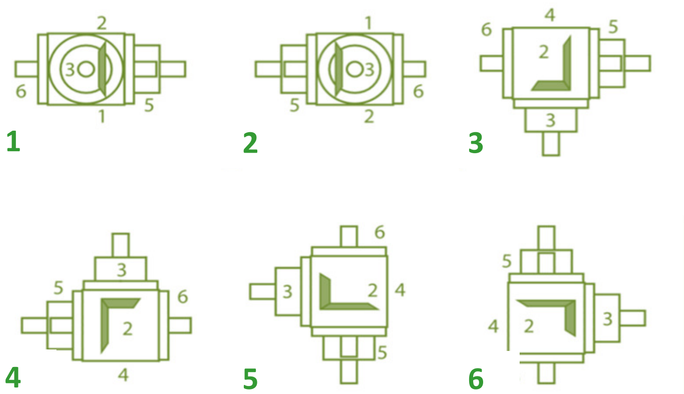
Bevel gearboxes
ACCESORIES

BEVEL GEARBOX BG

MOUNTING SIDE

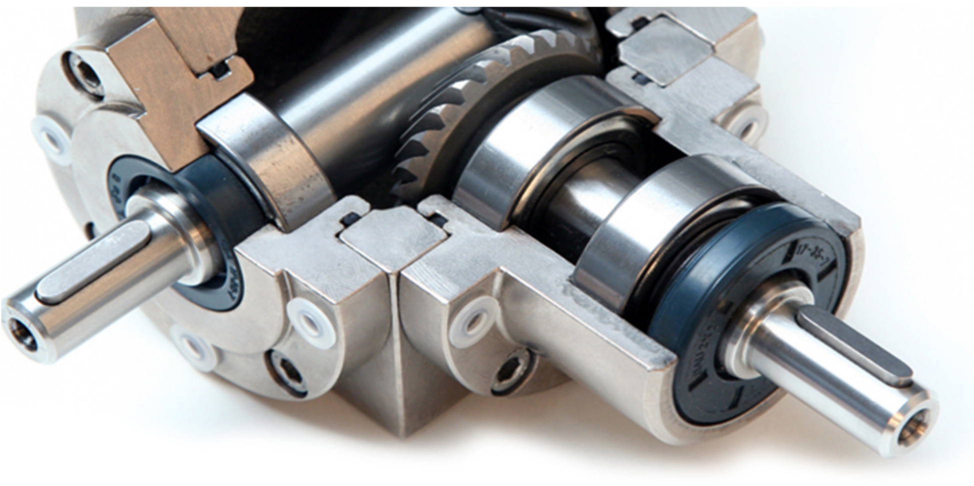


MOUNTING CONFIGURATION (Downward-facing side)



ORDER DESIGNATION

	Type	Size	Ratio	Model	Mount. side	Mount. config.	n2 max	Design
e.g. →	BG	065	1:1	A1	1	1	500	0000
	BG NIASA Bevel gearboxes				*9: Universal*	*9: Universal*		*0000: Standard design*

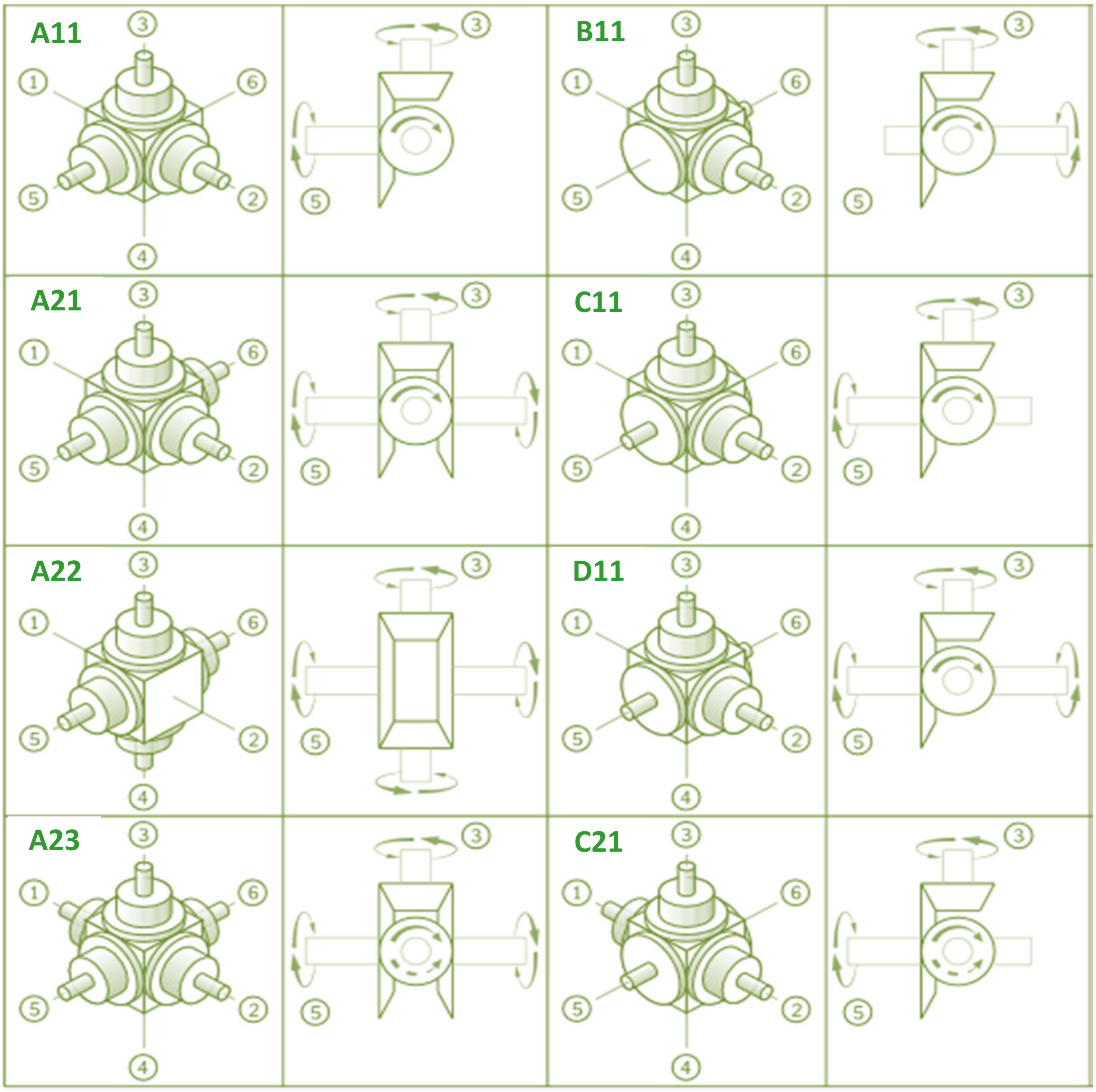


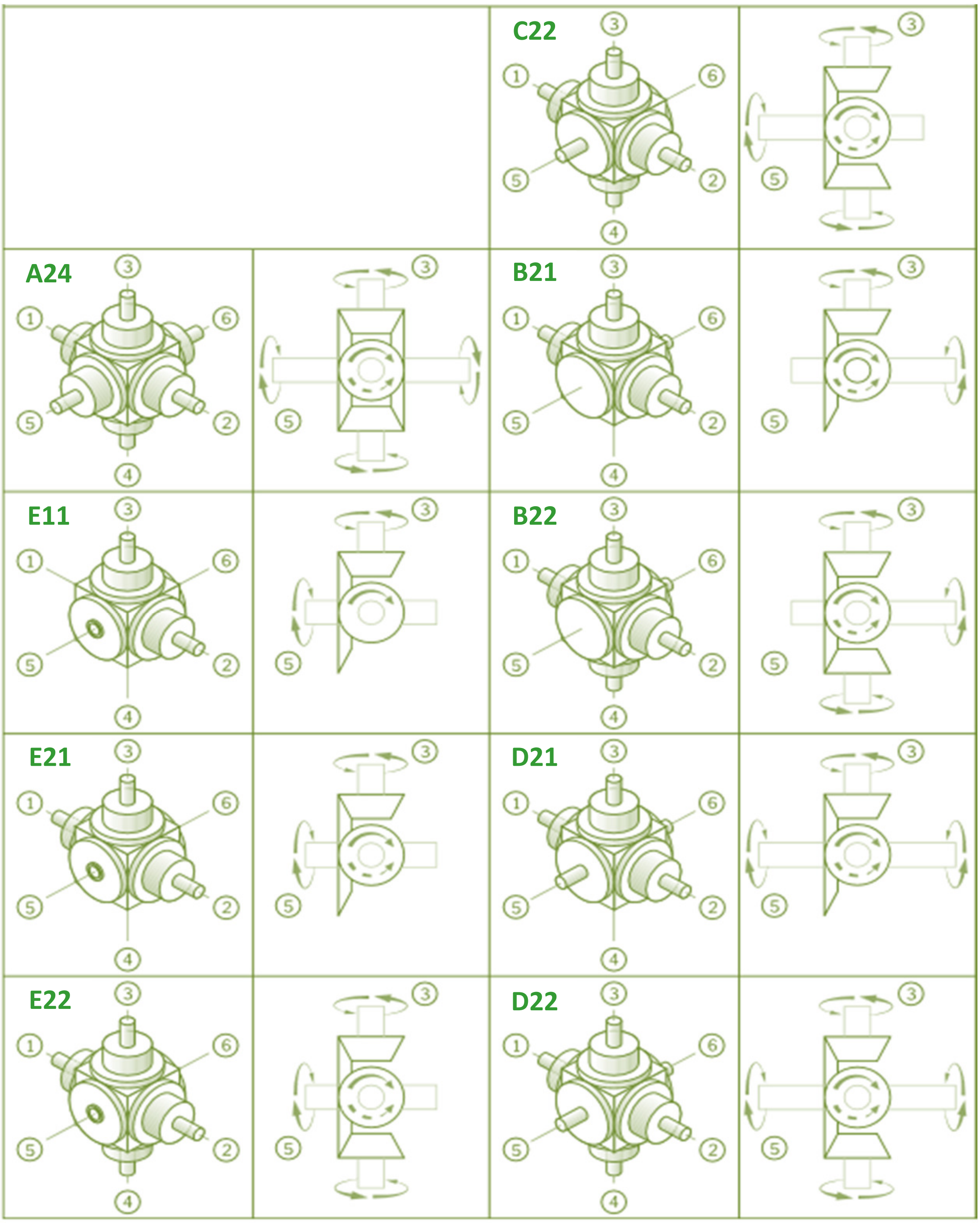
Bevel gearboxes
ACCESORIES

BEVEL GEARBOX BG

MULTISHAFT BEVEL GEARBOXES

The modular construction of **NIASA bevel gearboxes** makes it possible to produce a wide range of design variants. The dimensions are the same as those of the standard versions. With the exception of i=1:1, all transmission ratios are available. (Exception: model A22 is also available in i=1:1)

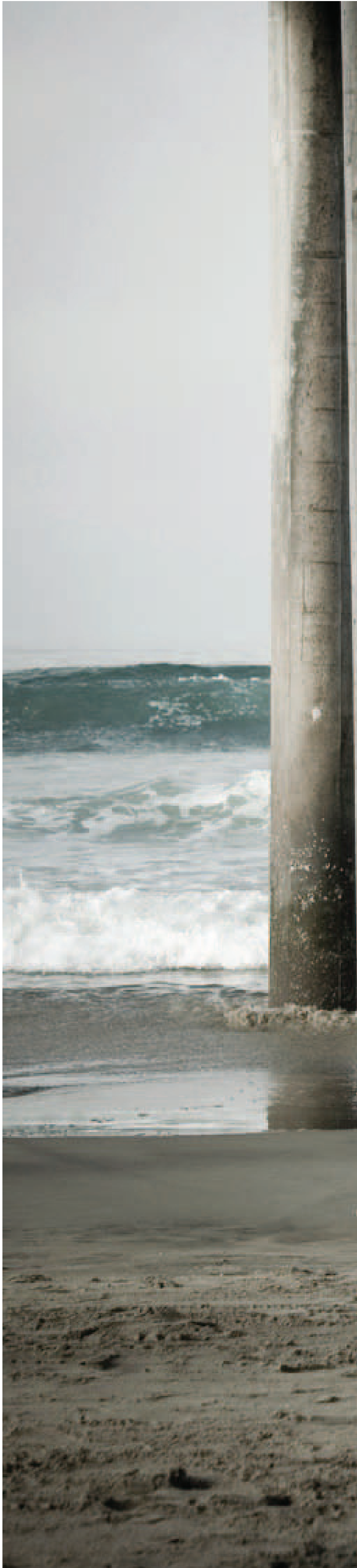



C22
A24
B21
E11
B22
E21
D21
E22
D22
1
2
3
4
5
6

07
SCREWS AND NUTS

“ONE MILIMETRE IN THE MANUFACTURING OF A SURF BOARD IS THE DIFFERENCE BETWEEN RIDING THE WAVE OR SINKING TO THE BOTTOM.”

TAJ BURROW
WORLD SURF CHAMPION 2006



SCREWS AND NUTS

INTRODUCTION

Screws transform a rotation movement into a transfer and vice versa; the latter depends on the type of screw and its dimensions.

NIASA offers an extensive range of screws for all types of applications, within sectors as varied as tool machining, aeronautics, transport and handling industry, renewable energies, etc. In this section you will find the most suitable screw for practically any requirement, regardless of size, load, speed, precision, efficiency, etc. requirements.

NIASA quality standards guarantee the highest levels of reliability on the entire range of screws and nuts.

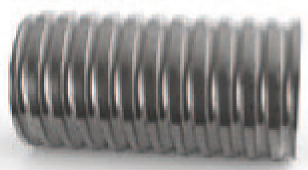
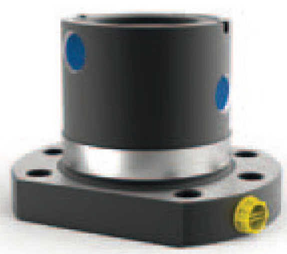
NIASA supplies trapezoidal as well as ball screws. The benefits of ball screws over trapezoidal screws are the following:

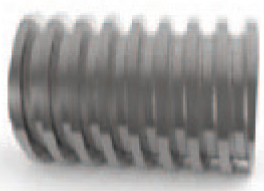
- ... Greater positioning precision.
- ... Longer useful life.
- ... Greater efficiency.
- ... Possibility of working at higher speeds.
- ... Lower heat generation.
- ... No slipping or gripping effects.

Trapezoidal screws are usually the most economical and their features suit numerous application requirements.

07

SCREWS AND NUTS
GENERAL PRODUCT OVERVIEW

Ball screw **KGS**	Nut according to DIN 69051 **KGF-D**
 page 232	 page 234

Trapezoidal screw **TR**	Nut **EFM**
 page 250	 page 252

Nut
according to NIASA standard
KGF-N

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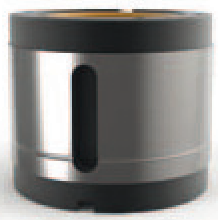
Nut
according to DIN 69051
KGM-D



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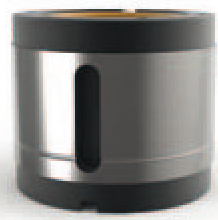
Nut
according to NIASA standard
KGM-N



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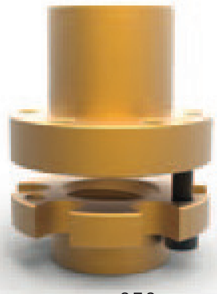
Safety nut
EFMS



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Nut
LRM

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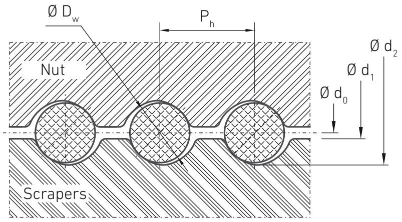
ROLLED BALL SCREWS

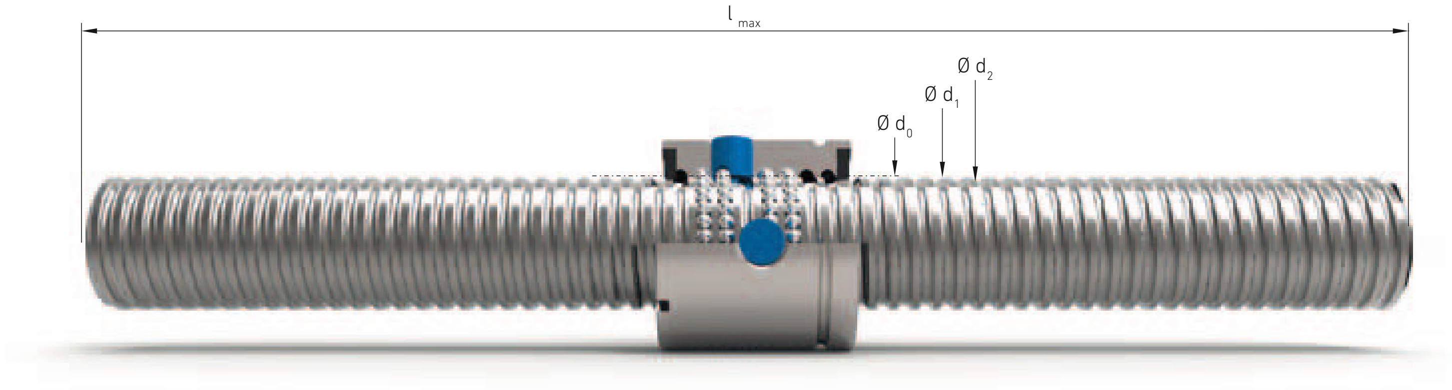
Cold pressed with no stock removal, with thermal treatment and polishing. Please ask NIASA about the supply of machined screws with stock removal and tempered, with tolerance class up to P0, and also for stainless materials.

NIASA manufactures screws with their sides machined according to your requirements. Please also ask if any thermal treatment is required.

Out of stock there are also many other screw diameters/pitches available, also with left thread. Also for several types of nuts (with threaded body, etc).

Standard material	Min. elastic limit	Min. resistance to breakage	Approx. surface hardness
	R_e (N/mm^2)	R_m (N/mm^2)	
Cf53 / 42CrMo4	610	380	60 HRC





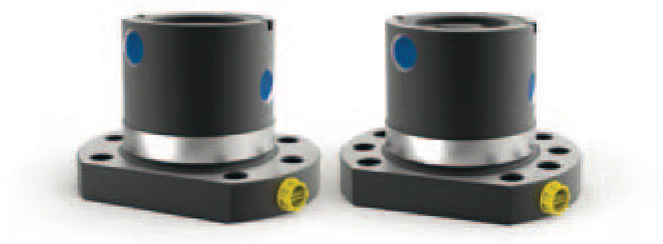
d_0 Nominal diameter (mm)	P_h Pitch (mm)	Thread entries	D_w Ball diameter (mm)	Standard tolerance class	d_1h11 Exterior diameter (mm)	d_2 Interior thread diameter (mm)	l_{max} Maximum length approx. (mm)	M Weight (kg/m)	a Transversal section area (mm²)	i Axial inertia moment (mm⁴)	Ip Polar inertia moment (mm⁴)	Nut type Available in stock			
												KGF		KGM	
												D	N	D	N
16	5	1	3,500	T7	15,55	12,88	6000	1,38	1,75E+02	2,22E+03	4,93E+03	•	•	•	
16	10	2	3,000	T7	15,35	12,89	6000	1,26	1,60E+02	1,69E+03	4,17E+03	•		•	
20	5	1	3,500	T7	19,50	16,87	6000	2,21	2,82E+02	5,85E+03	1,27E+04	•	•	•	•
20	20	4	3,500	T7	19,50	16,87	6000	2,03	2,59E+02	5,41E+03	1,08E+04		•		•
20	50	5	3,500	T7	19,10	16,40	6000	2,05	2,62E+02	5,53E+03	1,11E+04		•		•
25	5	1	3,500	T7	24,60	21,90	6000	3,32	4,23E+02	1,42E+04	2,85E+04	•	•	•	•
25	10	2	3,500	T7	24,60	21,92	6000	3,34	4,25E+02	1,27E+04	2,90E+04	•		•	
25	20	4	3,500	T7	24,60	21,92	6000	3,32	4,23E+02	1,44E+04	2,88E+04	•		•	
25	25	5	3,500	T7	24,60	21,92	6000	3,32	4,23E+02	1,44E+04	2,88E+04	•		•	
25	50	5	3,500	T7	24,15	21,47	6000	3,37	4,29E+02	1,48E+04	2,95E+04	•		•	
32	5	1	3,500	T7	31,50	28,87	6000	5,90	7,52E+02	4,29E+04	9,01E+04	•	•	•	•
32	10	1	7,144	T7	32,74	27,33	6000	5,57	7,10E+02	3,98E+04	8,03E+04	•	•		•
32	20	2	5,000	T7	31,70	27,81	6000	5,67	7,22E+02	3,63E+04	8,38E+04	•			•
32	32	4	3,969	T7	31,30	28,33	6000	5,74	7,31E+02	4,28E+04	8,56E+04	•			
32	40	4	3,500	T7	30,90	28,26	6000	5,63	7,17E+02	4,10E+04	8,21E+04		•		•
40	5	1	3,500	T7	39,53	36,90	6000	9,03	1,15E+03	1,05E+05	2,11E+05	•	•	•	•
40	10	1	7,144	T7	39,62	34,28	6000	8,43	1,07E+03	9,11E+04	1,83E+05	•	•	•	
40	20	2	5,000	T7	39,70	35,81	6000	9,05	1,15E+03	9,52E+04	2,13E+05	•		•	
40	40	4	3,500	T7	38,95	36,24	6000	9,02	1,15E+03	1,05E+05	2,11E+05	•		•	
50	10	1	7,144	T7	49,60	44,11	6000	13,53	1,72E+03	2,35E+05	4,73E+05	•	•	•	•
50	20	2	7,144	T7	49,50	43,99	6000	13,46	1,71E+03	2,05E+05	4,72E+05	•			•
63	10	1	7,144	T7	62,60	57,15	6000	22,07	2,81E+03	6,25E+05	1,26E+06	•	•	•	•
63	20	2	7,144	T7	62,70	57,16	6000	22,06	2,81E+03	5,70E+05	1,26E+06	•		•	
80	10	1	7,144	T7	79,65[1]	74,20	6000	36,43	4,64E+03	1,71E+06	3,43E+06		•		•

... [1] h12

07

NUT WITH KGF-D FLANGE

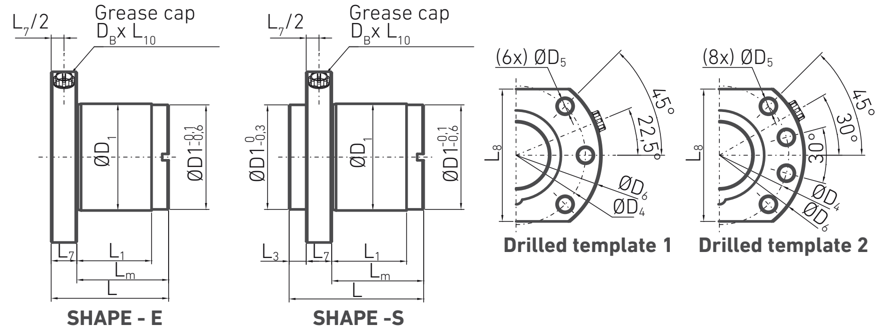
KGS BALLS



Dimensions according to DIN 69051

Out of stock there are also many other screw diameters/pitches available, also with left thread. Also for several types of nuts (with threaded body, etc).

Safety screws can also be supplied in combination with standard screws.



	Standard material	Min. elastic limit R_e (N/mm^2)	Min. resistance to breakage R_m (N/mm^2)	Approx. hardness treatment
Nut	16MnCr5 / 100Cr6	800	600	60 HRC Temple
Scraper	PPN 7190 TV 40 / NBR 33			
Ball	100 Cr6			64 HRC

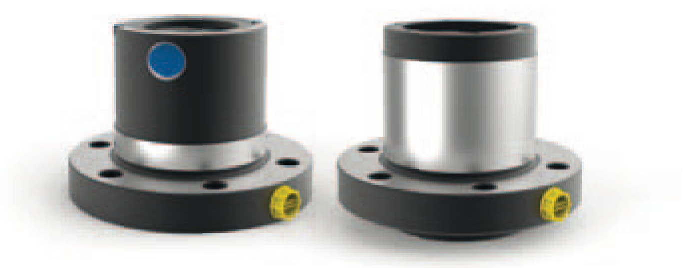
d_0 Nominal diameter (mm)	P_h Pitch (mm)	Nut shape	Drilled template	Thread entries	D_w Ball diameter (mm)	D_1 g6 (mm)	D_4 (mm)	D_5 (mm)	D_6 h13 (mm)	L (mm)	L_m (mm)	L_1 (mm)	L_3 (mm)	L_7 h13 (mm)	L_8 h13 (mm)	D_B (mm)	L_B (mm)	L_{10} (mm)	Axial backlash nominal (mm)	Loaded ball turns	C_{am} Modified dynamic load capacity (kN)	C_{0am} Modified static load capacity (kN)
16	5	E	1	1	3,500	28	38	5,5	48	42	32	10	0	10	40	M6x1	5	10	0,041	3	9,3	13,1
16	10	E	1	2	3,000	28	38	5,5	48	55	45	10	0	10	40	M6x1	5	10	0,041	6	15,4	26,5
20	5	E	1	1	3,500	36	47	6,6	58	42	32	10	0	10	44	M6x1	5	10	0,035	3	10,5	16,6
25	5	E	1	1	3,500	40	51	6,6	62	42	32	10	0	10	48	M6x1	5	10	0,041	3	12,3	22,5
25	10	E	1	2	3,500	40	51	6,6	62	55	45	16	0	10	48	M6x1	5	10	0,041	3	13,2	25,3
25	20	S	1	4	3,500	40	51	6,6	62	35	14,5	4	10,5	10	48	M6x1	5	8	0,041	4	13	23,3
25	25	S	1	5	3,500	40	51	6,6	62	35	17	9	8	10	–[2]	M6x1	5	8	0,041	5	16,7	32,2
25	50	S	1	5	3,500	40	51	6,6	62	58	38	10	10	10	48	M6x1	5	8	0,041	5	15,4	31,7
32	5	E	1	1	3,500	50	65	9	80	55	43	10	0	12	62	M6x1	6	10	0,041	5	21,5	49,3
32	10	E	1	1	7,144	53[1]	65	9	80	69	57	16	0	12	62	M8x1	6	10	0,084	3	33,4	54,5
32	20	E	1	2	5,000	53[1]	65	9	80	80	68	16	0	12	62	M6x1	6	10	0,059	4	29,7	59,8
40	5	E	2	1	3,500	63	78	9	93	57	43	10	0	14	70	M6x1	7	10	0,041	5	23,8	63,1
40	10	E	2	1	7,144	63	78	9	93	71	57	16	0	14	70	M8x1	7	10	0,084	3	38	69,1
40	20	E	2	2	5,000	63	78	9	93	80	66	16	0	14	70	M8x1	7	10	0,059	4	33,3	76,1
40	40	S	2	4	3,500	63	78	9	93	85	63,5	16	7,5	14	–[2]	M8x1	7	10	0,041	8	35	101,9
50	10	E	2	1	7,144	75	93	11	110	95	79	16	0	16	85	M8x1	8	10	0,084	5	68,7	155,8
50	20	E	2	2	7,144	85[1]	103[1]	11	125	95	77	22	0	18	95	M8x1	9	10	0,084	4	60	136,3
63	10	E	2	1	7,144	90	108	11	125	97	79	16	0	18	95	M8x1	9	10	0,084	5	76	197
63	20	E	2	2	7,144	95	115	13,5	135	99	79	25	0	20	100	M8x1	10	10	0,084	4	78,4	171,3

... [1] Its dimensions are not consistent with DIN 69051 / [2] Rounded flange

NIASA

NUT WITH KGF-N FLANGE

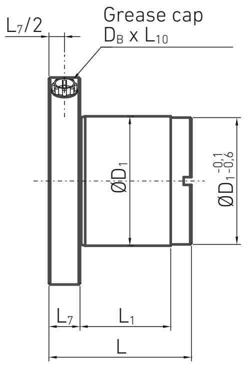
KGS BALLS



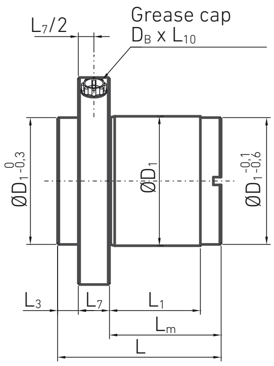
Dimensions according to NIASA standard

Out of stock there are also many other screw diameters/pitches available, also with left thread. Also for several types of nuts (with threaded body, etc).

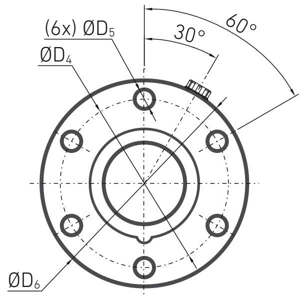
Safety screws can also be supplied in combination with standard screws.



SHAPE - E



SHAPE - S



Drilled template 4

	Standard material	Min. elastic limit R_e (N/mm^2)	Min. resistance to breakage R_m (N/mm^2)	Approx. hardness treatment
Nut	16MnCr5 / 100Cr6	800	600	60 HRC Temple
Scraper	PPN 7190 TV 40 / NBR 33			
Ball	100 Cr6			64 HRC

d_0 Nominal diameter (mm)	P_h Pitch (mm)	Nut shape	Drilled template	Thread entries	D_w Ball diameter (mm)	D_1 g6 (mm)	D_4 (mm)	D_5 (mm)	D_6 h13 (mm)	L (mm)	L_m (mm)	L_1 (mm)	L_3 (mm)	L_7 h13 (mm)	L_8 h13 (mm)	D_B (mm)	L_B (mm)	L_{10} (mm)	Axial backlash nominal (mm)	Loaded ball turns	C_{am} Modified dynamic load capacity (kN)	C_{adm} Modified static load capacity (kN)
16	5	E	4	1	3,500	28	38	5,5	48	44	32	8	0	12	-[1)]	M6x1	6	8	0,041	3	9,3	13,1
20	5	E	4	1	3,500	32	45	7	55	44	32	8	0	12	-[1)]	M6x1	6	8	0,041	3	10,5	16,6
20	20	S	4	4	3,500	35	50	7	62	30	12	4	8	10	-[1)]	M6x1	5	8	0,041	4	11,6	18,4
20	50	S	4	5	3,500	35	50	7	62	56	37	10	9	10	-[1)]	M6x1	5	8	0,041	5	13	24,6
25	5	E	4	1	3,500	38	50	7	62	46	32	8	0	14	-[1)]	M6x1	7	8	0,041	3	12,3	22,5
32	5	E	4	1	3,500	45	58	7	70	49	43	10	0	16	-[1)]	M6x1	8	8	0,041	5	21,5	49,3
32	10	E	4	1	7,144	53	68	7	80	73	57	10	0	16	-[1)]	M8x1	8	8	0,084	3	33,4	54,5
32	40	S	4	4	3,500	53	68	7	80	45	21.5	14	7.5	16	-[1)]	M6x1	8	10	0,041	4	14,9	32,4
40	5	E	4	1	3,500	53	68	7	80	59	43	10	0	16	-[1)]	M6x1	8	8	0,041	5	23,8	63,1
40	10	E	4	1	7,144	63	78	9	95	73	57	10	0	16	-[1)]	M8x1	8	8	0,084	3	38	69,1
50	10	E	4	1	7,144	72	90	11	110	97	79	10	0	18	-[1)]	M8x1	9	8	0,084	5	68,7	155,8
63	10	E	4	1	7,144	85	105	11	125	99	79	10	0	20	-[1)]	M8x1	10	8	0,084	5	76	197
80	10	E	4	1	7,144	105	125	14	145	101	79	10	0	22	-[1)]	M8x1	11	8	0,084	5	86,25	262,41

... [1)] Rounded flange

07

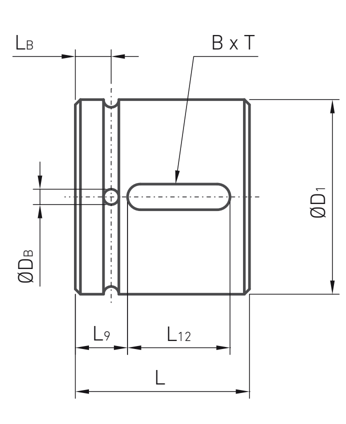
KGM-D CYLINDRICAL NUT

KGS BALLS

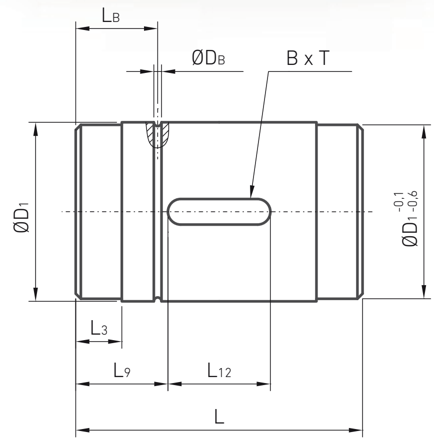
Dimensions according to DIN 69051

Out of stock there are also many other screw diameters/pitches available, also with left thread. Also for several types of nuts (with threaded body, etc).

Safety screws can also be supplied in combination with standard screws.



SHAPE - E



SHAPE - S

	Standard material	Min. elastic limit R_e (N/mm²)	Min. resistance to breakage R_m (N/mm²)	Approx. hardness treatment
Nut	16MnCr5 / 100Cr6	800	600	60 HRC Temple
Scraper	PPN 7190 TV 40 / NBR 33			
Ball	100 Cr6			64 HRC

d_0 Nominal diameter (mm)	P_h Pitch (mm)	Nut shape	Thread entries	D_w Ball diameter (mm)	$D_1 g6$ D (mm)	L (mm)	L_3 (mm)	D_B (mm)	L_B (mm)	L_9 (mm)	L_{12} (mm)	B P9 (mm)	T (mm)	Nominal axial backlash (mm)	Loaded ball turns	C_{am} Modified dynamic load capacity (kN)	C_{0am} Modified static load capacity (kN)
16	5	E	1	3,500	28	34	-	3	7	7	20	5	2	0,041	3	9,3	13,1
16	10	E	2	3,000	28	50	-	3	7	15	20	5	2	0,035	6	15,4	26,5
20	5	E[1)]	1	3,500	36	34	-	3	7	7	20	5	2	0,041	3	10,5	16,6
25	5	E	1	3,500	40	34	-	3	7	7	20	5	2	0,041	3	12,3	22,5
25	10	E	2	3,500	40	45	-	3	7,5	12,5	20	5	2	0,041	3	13,2	25,3
25	20	S	4	3,500	40	35	10,5	1,5	14	11,5	12	5	3	0,041	4	13	23,3
25	25	S	5	3,500	40	35	8	1,5	11,5	11	13	5	3	0,041	5	16,7	32,2
25	50	S	5	3,500	40	58	10	1,5	17	19	20	5	3	0,041	5	15,4	31,7
32	5	E	1	3,500	50	45	-	3	7,5	8	30	6	2,5	0,041	5	21,5	49,3
40	5	E	1	3,500	63	45	-	3	7,5	8	30	6	2,5	0,041	5	23,8	63,1
40	10	E	1	7,144	63	60	-	4	10	15	30	6	2,5	0,084	3	38	69,1
40	20	E	2	5,000	63	70	-	3	7,5	20	30	6	2,5	0,059	4	33,3	76,1
40	40	S	4	3,500	63	85	7,5	1,5	15	27,5	30	6	3,5	0,041	8	35	101,9
50	10	E	1	7,144	75	82	-	4	11	23	36	6	2,5	0,084	5	68,7	155,8
63	10	E	1	7,144	90	82	-	4	11	23	36	6	2,5	0,084	5	76	197
63	20	E	2	7,144	95	82	-	4	10	23	36	6	2,5	0,084	4	78,4	171,3

... [1)] Lubrication orifice in any position on the circumference

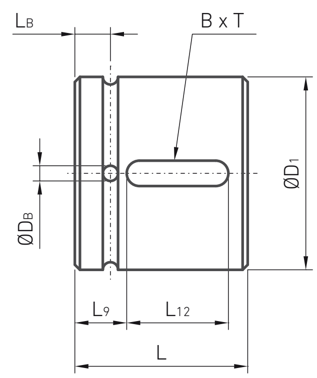
KGM-D CYLINDRICAL NUT

KGS BALLS

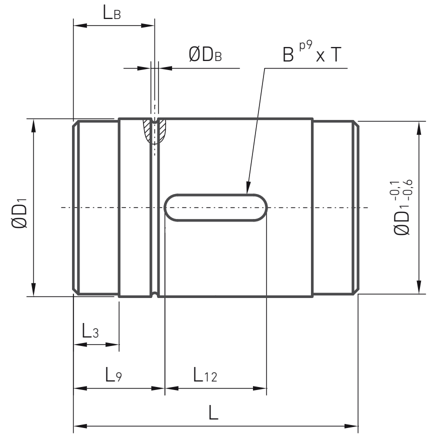
Dimensions according to NIASA standard

Out of stock there are also many other screw diameters/pitches available, also with left thread. Also for several types of nuts (with threaded body, etc).

Safety screws can also be supplied in combination with standard screws.



SHAPE - E



SHAPE - S

	Standard material	Min. elastic limit R_e (N/mm²)	Min. resistance to breakage R_m (N/mm²)	Approx. hardness treatment
Nut	16MnCr5 / 100Cr6	800	600	60 HRC Temple
Scraper	PPN 7190 TV 40 / NBR 33			
Ball	100 Cr6			64 HRC

d_0 Nominal diameter (mm)	P_h Pitch (mm)	Nut shape	Thread entries	D_w Ball diameter (mm)	D_1g6 Ball diameter (mm)	L (mm)	L_3 (mm)	D_B (mm)	L_B (mm)	L_9 (mm)	L_{12} (mm)	B P9 (mm)	T(mm)	Nominal axial backlash (mm)	Loaded ball turns	C_{am} Modified dynamic load capacity (kN)	C_{a0m} Modified static load capacity (kN)
20	5	E	1	3,500	32	34	-	3	7	7	20	5	2	0,041	3	10,5	16,6
20	20	S	4	3,500	35	30	8	1,5	11,5	9	12	5	3	0,041	4	11,6	18,4
20	50	S	5	3,500	35	56	9	1,5	16	18	20	5	3	0,041	5	13	24,6
25	5	E	1	3,500	38	34	-	3	7	7	20	5	2	0,041	3	12,3	22,5
32	5	E	1	3,500	45	45	-	3	7,5	8	30	6	2,5	0,041	5	21,5	49,3
32	10	E	1	7,144	53	60	-	4	10	15	30	6	2,5	0,084	3	33,4	54,5
32	20	E	2	5,000	53	70	-	3	7,5	20	30	6	2,5	0,059	4	29,7	59,8
32	40	S	4	3,500	53	45	7,5	1,5	13	10	25	6	4	0,041	4	14,9	32,4
40	5	E	1	3,500	53	45	-	3	7,5	8	30	6	2,5	0,041	5	23,8	63,1
50	10	E	1	7,144	72	82	-	4	11	23	36	6	2,5	0,084	5	68,7	155,8
50	20	E	2	7,144	85	82	-	4	10	23	36	6	2,5	0,084	4	60	136,3
63	10	E	1	7,144	85	82	-	4	11	23	36	6	2,5	0,084	5	76	197
80	10	E	1	7,144	105	82	-	4	11	23	36	8	3	0,084	5	86,3	262,4

07

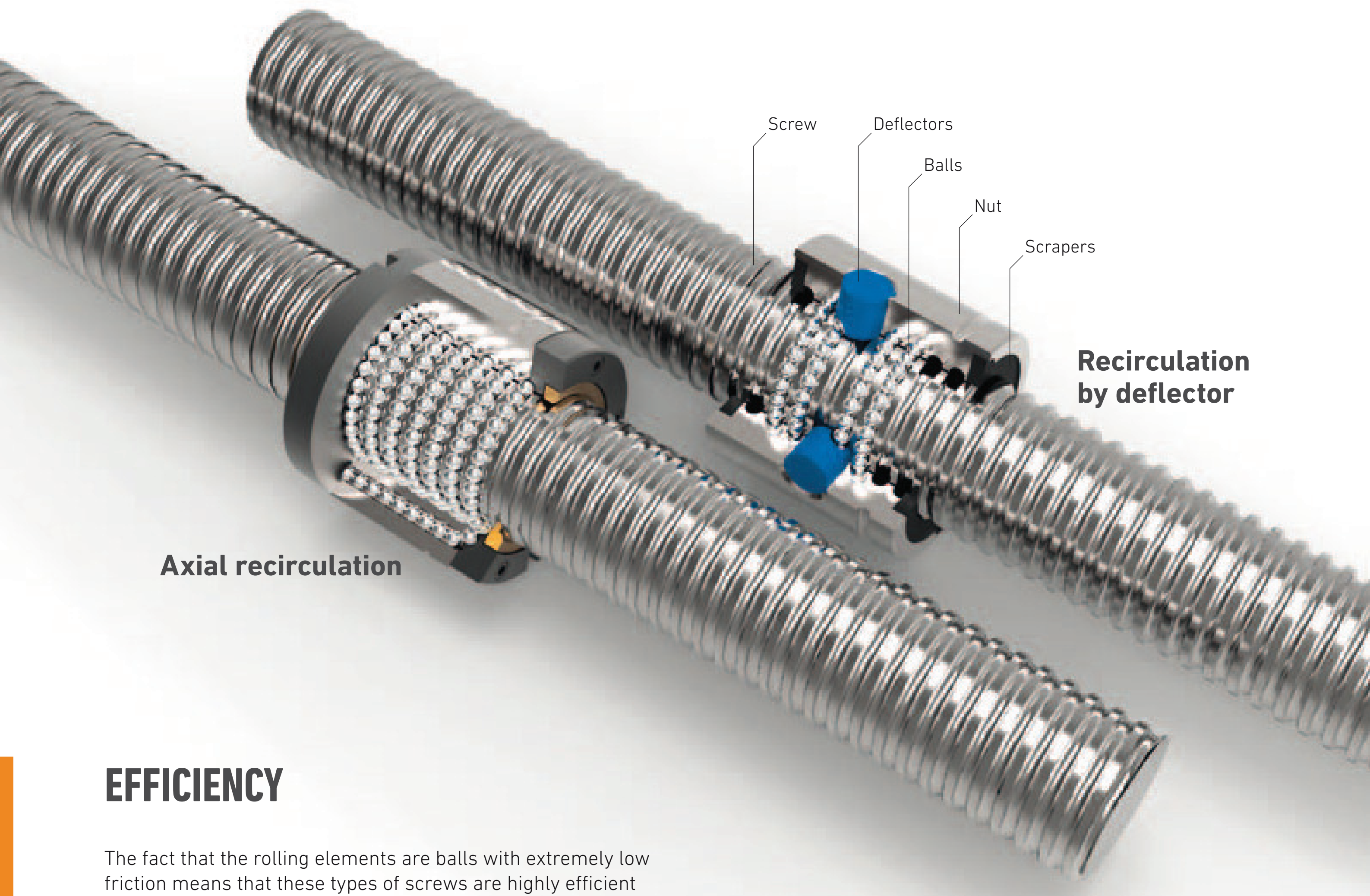
NIASA

BALL SCREW
TECHNICAL SPECIFICATIONS

PARTS AND RECIRCULATION

The systems with ball screws are basically made up of the screw itself, a nut and a series of balls that roll between both elements, re-circulating through the nut. Protectors (scrapers) on their sides avoid the possible input of foreign bodies or aggressive products to the inside of the nut.

The geometric precision of the return is essential so that the rolling of the balls occurs with minimal friction. For short pitches, returns by radial deflector are often used, on which each circuit is independent and makes a complete turn. For long pitches, interior axial returns are usually used, where there is a single circuit of several turns to resend the balls from one end of the nut to the other. In both cases the nuts are compact, with no projections to the exterior.



EFFICIENCY

The fact that the rolling elements are balls with extremely low friction means that these types of screws are highly efficient (up to 98% in some cases).

SPEED

The reduced friction level of the balls means that the turning speed, in ideal conditions, can be 3,000 rpm, or 4,000 rpm for occasional peaks.

REVERSIBILITY

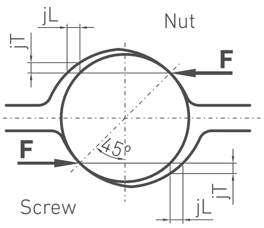
As opposed to what occurs with some trapezoidal screws, the ball screws are always reversible (no self-locking nuts). It is therefore necessary to use brake or retention elements, especially if mounted in a vertical position.

ASSEMBLY POSITION

The screw can be mounted in any position, paying special care to the possible lateral loads that are not supported by the screw itself, but by guide elements designed for this purpose.

THREAD PROFILE

NIASA screws and ball nuts are symmetric gothic arch (ogival arch), and the load angle is 45º. This design means that the roller is extremely smooth (optimal efficiency), and at the same time the axial (jL) and radial (jT) clearances are equalised and minimised between the parties. High rigidity of the set is achieved and the load capacity is maximised.

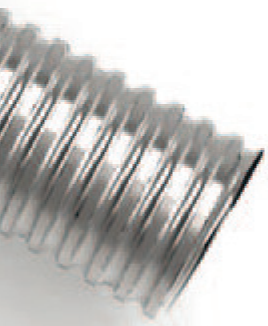


SERVICE TEMPERATURE

In general, the ambient operating temperature of the screws and ball nuts must be between -30ºC and +80ºC, with the exceptional possibility of working at higher temperatures (contact NIASA).

REPETITIVENESS

The repetitiveness of a ball screw refers to its capacity to return to a certain position, after having previously achieved it in identical conditions. This is dependent on the load, speed, acceleration, etc. It is defined in VDI/DGQ 3441, the currently widely accepted standard for checking and validating tool machines (contact NIASA).



BALL SCREW
TECHNICAL SPECIFICATIONS

PRE-LOADED NUTS

The level of precision in the positioning can be increased, at the same time as reducing backlash, by pre-loading the balls of a pair of nuts. Pre-loading also increases rigidity in the nut area.

The standard value of the pre-load is 10% of the dynamic load and it is recommended not to surpass one third of the dynamic load value. The customer is advised to indicate the pre-load value depending on the type of application.

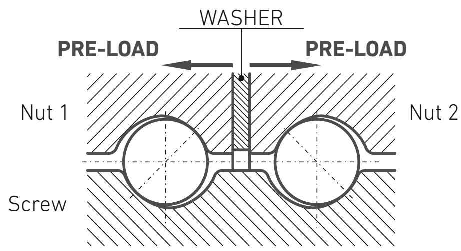
The pre-load can be obtained by separating or joining the balls from the pair of nuts. In the first case the screw will have traction when a washer is fitted between the nuts, therefore with an eventual increase in temperature, and the consequent lengthening of the screw, will reduce the value of the initial pre-load.

The nuts are joined in the pre-load at compression, therefore a possible temperature increase means that the pre-load will increase.

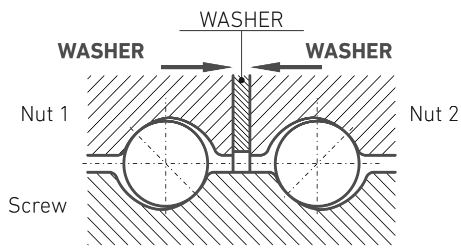
In any case, the pre-load washers are supplied divided into two parts, with the aim of making adjustment possible without taking the nuts off the screw.

In certain cases it may be advisable to carry out the pre-load based on making the balls larger having these four points of contact, instead of the two shown in the figures. The rolling elements in this option must be analysed.

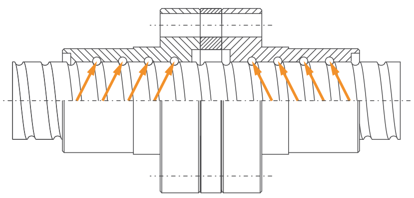
Please contact the NIASA technical department if you would like to work with units without backlash or with lower than normal backlash.



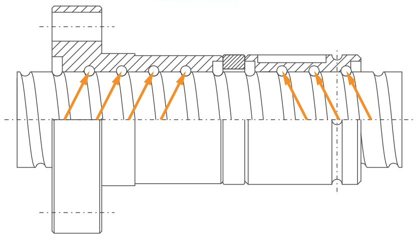
PRE-LOAD AT TRACTION << 0 >>
Large washer, increase the pre-load



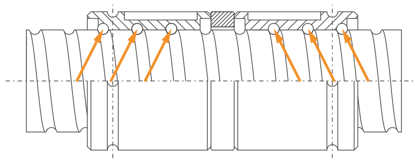
PRE-LOAD AT TRACTION << 0 >>
Large washer, increase the pre-load



Preload with two nuts with KGF flange



Preload with a nut with KGF flange and with a KGM cylindrical screw



Preload with two KGM cylindrical screws

READJUST THE PRELOAD

To readjust the preload of a pair of nuts, follow the procedure below:

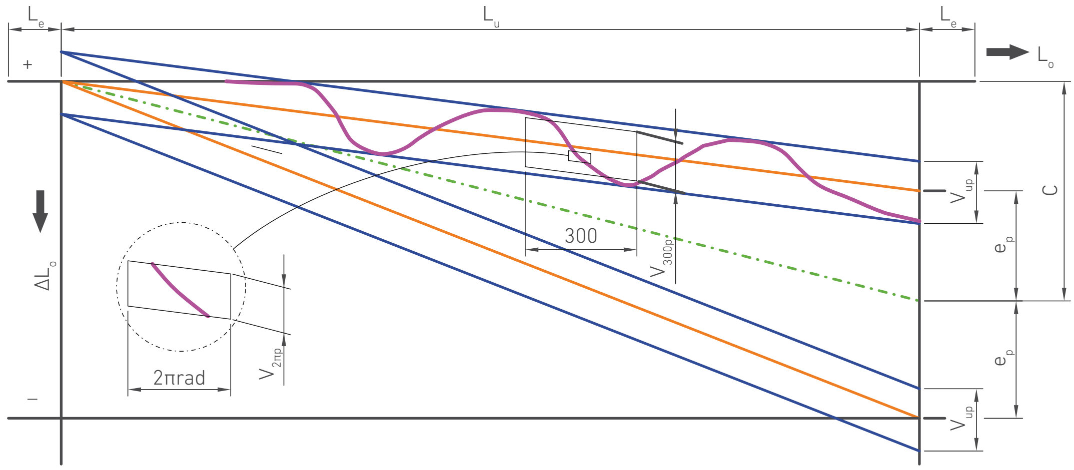
1. Separate the two nuts and remove the two halves of the washers.
2. Place gauges on three points (at approx. 120º) between the nuts, until the keyways of both are aligned.
3. Measure the turning torque of the nuts and change the gauges until the desired value is obtained.
4. Machine the washers with the thickness of the gauges defined at the previous point.

07

TOLERANCE CLASSES AND PERMISSIBLE DEVIATIONS

NIASA offers screws and nuts with the following tolerance classes, based on the maximum admissible error in the unit's positioning.

Tolerance class	Permissible positioning variation of a 300 mm movement (v_{300p})	Typical applications
P1 (non-standard)	6 μm	Positioning
P3	12 μm	
P4	18 μm	
P5 / T5	23 μm	Transport
T7	52 μm	



L_u Useful working length.
L_e Excess of length.
L_0 Nominal distance.
ΔL_0 Movement deviation.
V_{300p} Permissible movement variation in 300 mm.
V_{300p} Permissible movement variation in one turn.
C Movement compensation.
e_p Limit deviation.
V_{up} Permissible variation.

Based on the tolerance level (v_{300p}) and the useful working length (L_u), the following table covers the deviation limit (e_p) and the permissible variation (v_{up}).

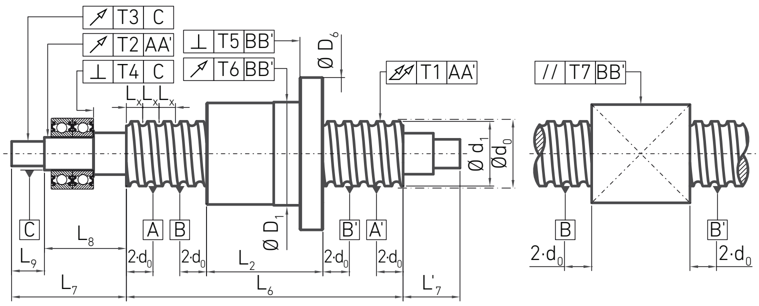
	Lu (mm)	>	0	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500
		≤	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000
P1	e_p	Microns (μm)	6	7	8	9	10	11	13	15	18	22	26	32	39	48	60	76	94	115
	v_{up}		6	6	7	7	8	9	10	11	13	15	17	21	27	33	40	50	61	76
P3	e_p		12	13	15	16	18	21	24	29	35	41	50	62	76	92	115	140	175	220
	v_{up}		12	12	13	14	16	17	19	22	25	29	34	41	49	61	75	92	113	140
P4	e_p		18	18	20	22	25	28	33	39	46	55	68	84	102	125	159	199	240	290
	v_{up}		18	19	20	21	23	26	29	33	38	44	52	56	68	83	101	124	152	189
P5	e_p		23	25	27	32	36	40	47	55	65	78	96	115	140	170	210	270	330	410
	v_{up}		23	25	26	29	31	34	39	44	51	59	69	82	99	119	142	174	213	265

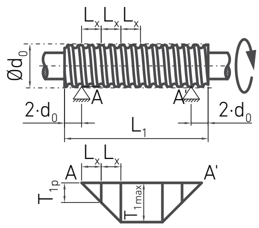
![NIASA]

BALL SCREW
TECHNICAL SPECIFICATIONS

GEOMETRIC TOLERANCES

Below are the geometric tolerances of NIASA screws. Take them into consideration when designing the sets into which they will be integrated.



CLASS	DESCRIPTION	L_x (mm)				TOLERANCE CLASS			
						1	3	5	7
		>	≤	>	≤	Permissible deviation T_p (µm)			
T_1	Distance to select the straightness clamp. 	6	12	-	80				
		12	25	-	160				
		25	50	-	315	20	25	32	40
		50	100	-	630				
		100	200	-	1250				
		$T_{1max.}$ for $L_1 / d_0 \leq 40$				40	50	64	80
		$T_{1max.}$ for $40 < L_1 / d_0 \leq 60$				60	75	96	120
		$T_{1max.}$ for $60 < L_1 / d_0 \leq 80$				100	125	160	200
		$T_{1max.}$ for $80 < L_1 / d_0 \leq 100$				160	200	256	320
T_2	Concentricity according to d_0 y L_8. The higher of the values is applied.	d_0 (mm)		L_8 (mm)		Permissible deviation T_p (µm)			
		>	≤	>	≤				
		-	32	-	80	10	12	20	32
		-	63	80	160	12	16	20	40
		63	125	160	250	16	20	25	50
		125	-	250	400	20	25	32	63
		-	-	400	630	25	32	40	80
		-	-	630	-	32	40	50	100
T_3	Concentricity according to d_0 y L_9. The higher of the values is applied.	d_0 (mm)		L_9 (mm)		Permissible deviation T_p (µm)			
		>	≤	>	≤				
		-	32	-	80	5	6	8	10
		32	63	80	160	6	8	10	12
		63	125	160	250	8	10	12	16
		125	-	250	400	10	12	16	20
		-	-	400	-	-	16	20	25
T_4	Axial jump (perpendicularity)	6	63	-	-	3	4	5	6
		63	125	-	-	4	5	6	8
		125	200	-	-	-	6	8	10
T_5; T_6	Axial and radial jump only for pre-loaded nuts or nuts with no backlash.	D_1; D_6				Permissible deviation T_p (µm)			
		>		≤					
		16		32		10	12	16	20
		32		63		12	16	20	25
		63		125		16	20	25	32
		125		250		20	25	32	40
		250		500		-	32	40	50
T_7	Nut parallelism	Each 100mm of movement				Permissible deviation T_p (µm)			
						10	18	22	32

07

BALL SCREW
TECHNICAL SPECIFICATIONS

LUBRICATION

Correct lubrication of the ball screws is essential so that they do not deteriorate prematurely, and so that they function smoothly and with the expected efficiency. It also ensures that the idle torque is as expected and ensures correct evacuation of the heat generated in the bearing.

CL oils can be used as CLP type mixes with EP additives. The viscosity depends on the circumferential speed of the screw and the operating temperature. The oil flow required depends on speed, and is usually between 0.3 and 0.5 cm^3/h for each turn of the nut balls. In applications in which the nut is in a horizontal position and bathed in oil, it is sufficient that its level reaches half the height of the lower ball.

The VG ISO viscosity demanded for each case is obtained from the images below, knowing the screw's nominal diameter, turning speed and working temperature.

When grease is used as a lubricant instead of oil, the time between lubrications can be increased. The useful life of the screw can only be guaranteed if an automatic greasing system replaces the loss of grease on the nut when it moves with respect to the screw, even when it has radial seal rings to minimise it.

The time between two consecutive lubrications is related to the turning speed of the screw, its operating temperature, the load it is subject to, its assembly position, etc. For non-extreme conditions, NIASA recommends that no more than 100 operating hours or two years between lubrications.

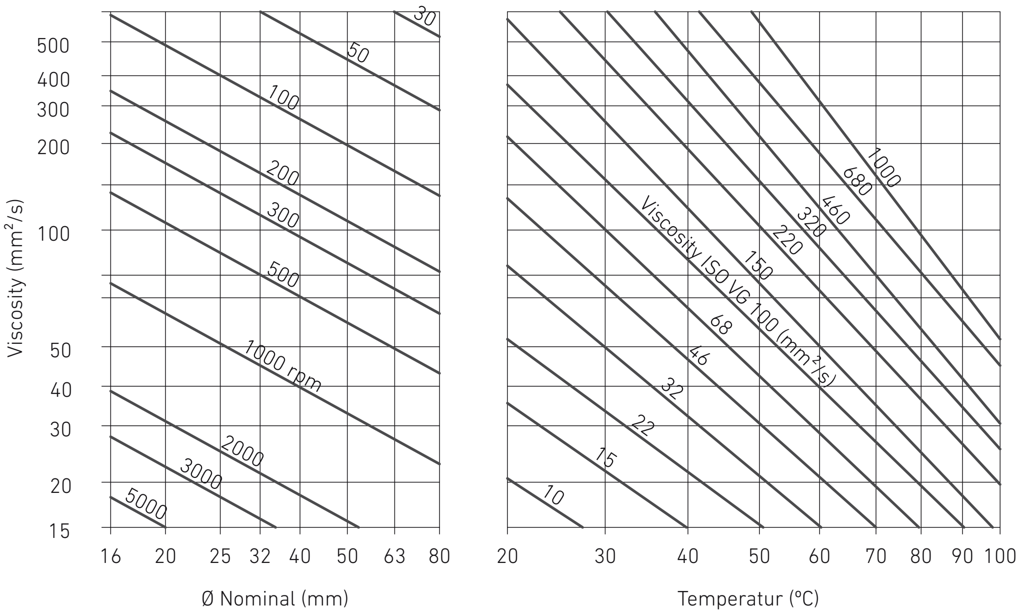
Use grease tips according to the table below.

Ambient temperature -20ºC to 120ºC *	Grease S/DIN 51825
Normal conditions	K2K-20
Very high speeds	K1K-20
Very heavy loads or low speeds	KP2K-20

* Contact NIASA for other values

As general criteria, do not mix lubricants with different saponification and/or viscosity bases.

Do not excessively lubricate. As a general rule, only fill half of the available space and ensure that possible excesses can be evacuated.



STORAGE AND INSTALLATION

As standard, ball screws are supplied by NIASA lubricated with oil, protected with an anti-oxidant paper wrapping and covered with adhesive plastic tape, completely sealed.

As they are precision elements, they must be handled with great care and stored in clean and dry places, supported on several points along their length and in their original packaging until the time they are installed.

When transporting the ball screws to their final destination, sharp movements and positions with false support must be avoided, which may cause deformations due to flexion under their own weight.

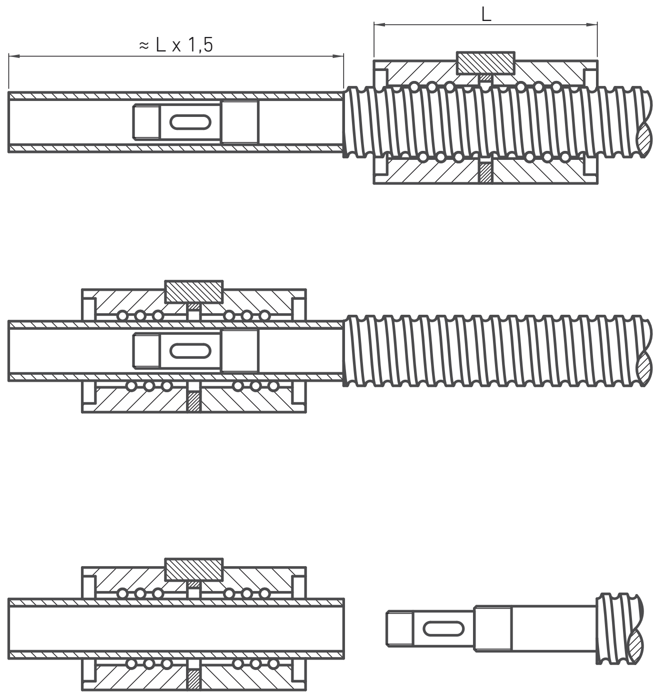
The housings for the assembly of the nuts, or any other element (rollers, bearings, etc.) must be perfectly free from dust, paint or any other impurity. It is essential that the screws are assembled with roller, bearing, etc. supports perfectly perpendicular and aligned between each other.

Finally, apply the loads in the most central and uniform manner as possible on the screw or nut. If lateral loads need to be applied, please contact the NIASA technical department.

SCREW DISASSEMBLY

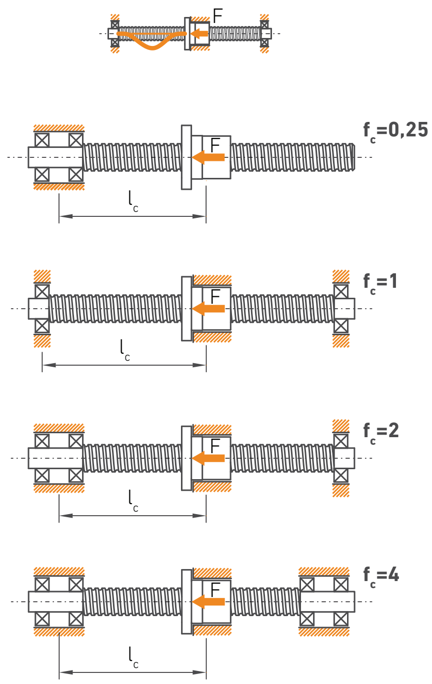
When the nuts need to be removed from the screw, do this with an extraction tube, following the pitches provided below:

1. Machine a tube longer than the screws, with its hole fitted to the screw's terminal and with an exterior diameter equal to that on the base of the thread.
2. Place the tube on the end of the screw and unthread the nuts until they come off the screw and are mounted on the tube.
3. Immobilise the nuts on the tube with adhesive tape or another means so that they do not fall off.
4. Remove the package thus formed by the tube and the nuts.
5. Follow the procedure in reverse to replace the nuts on the screw, paying special attention to the nut protectors when beginning the threading on the screw.



BALL SCREW
CALCULATIONS

BUCKLING CRITICAL LOAD



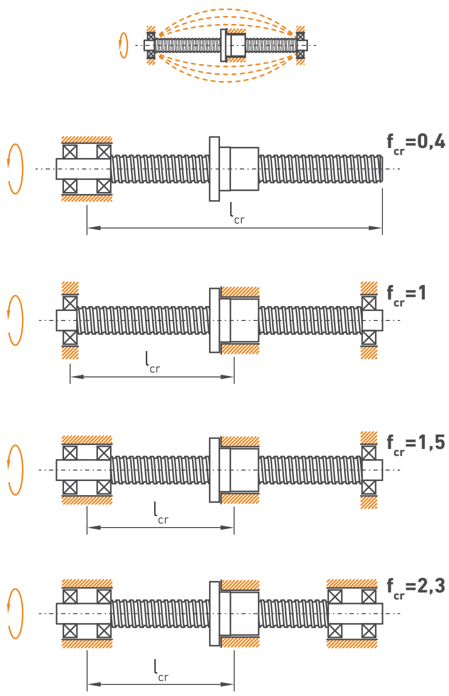
$$F \leq 0.8 \times f_c \times \frac{101.7 \times d^4}{l_c^{\,2}}$$

With safety factor: 1.25

F Force applied (kN)
f_c Correction factor, depending on the type of support on the sides of the screw. See figures
$d \approx (2.d_0 - D_w)/2$
- **d_0** Nominal diameter of the screw (mm)
- **D_w** Diameter of the ball (mm)

l_c Buckling length (mm). See figures

RESONANCE CRITICAL SPEED



$$n \leq 0.8 \times f_{cr} \times \frac{1.2 \times 10^8 \times d}{l_{cr}^{\,2}}$$

With safety factor: 1.25

n Application speed (rpm)
f_{cr} Correction factor, depending on the type of support on the sides of the screw. See figures
$d \approx (2.d_0 - D_w)/2$
- **d_0** Nominal diameter of the screw (mm)
- **D_w** Diameter of the ball (mm)

l_{cr} Resonance length (mm). See figures

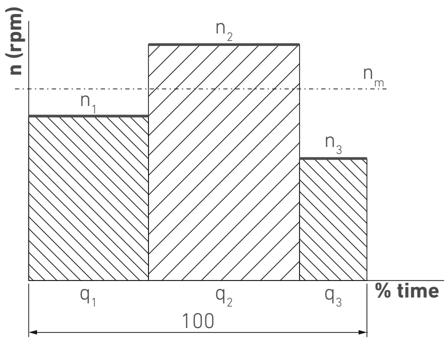
LIMIT SPEED

$n \times d_0 \leq 140{,}000$	For tolerance classes P1, P3, P4, P5, T5
$n \times d_0 \leq 100{,}000$	For T7 tolerance classes

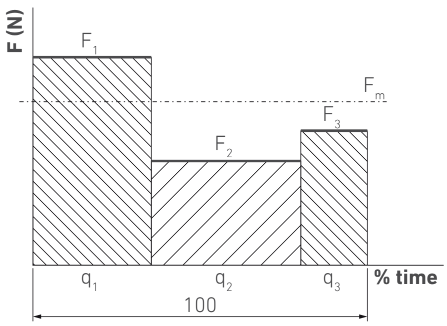
n Application speed (rpm)

d_0 Nominal diameter of the screw (mm). See screw data table

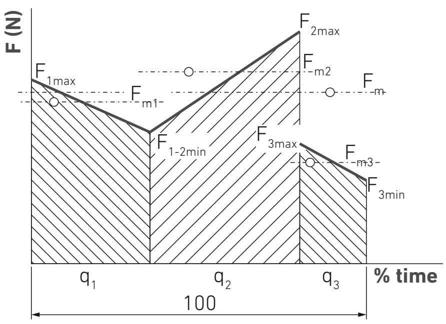
SERVICE TIME



$$n_m\,(rpm) = \sum_{i=1}^{i=n} n_i \times \frac{q_i}{100}$$



$$F_m(kN) = \left(\sum_{i=1}^{i=n} F_i^3 \times \frac{n_i}{n_m} \times \frac{q_i}{100}\right)^{1/3}$$



$$F_m(kN) = \left(\sum_{i=1}^{i=n} F_{mi}^3 \times \frac{n_i}{n_m} \times \frac{q_i}{100}\right)^{1/3}$$

$$L_{10} \leq \left(\frac{C_{am}}{F_m}\right)^3 \times 10^6$$

L_{10} Service time (revolutions)
C_{am} Modified nominal dynamic load (kN)
F_m Equivalent applied load (kN)

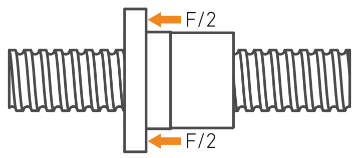
$$L_{h10} = \frac{L_{10}}{n_m \times 60}$$

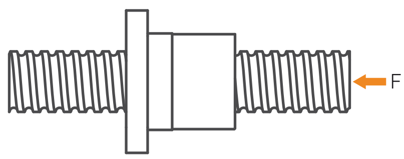
L_{h10} Service time (hours)
n_m Equivalent application speed (rpm)

The above service times refer to the useful life achieved by 90% of a sufficient group of identical ball screws, before the first evident signs of material fatigue appear on any of the bearing elements.

INSTALLATION

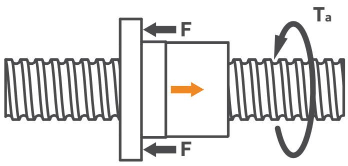
Apply the loads in the most central and uniform manner possible on the screw or nut. If lateral loads need to be applied, please contact the NIASA technical department.



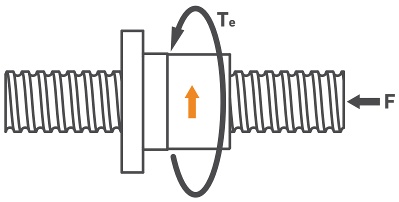


BALL SCREW
CALCULATIONS

PERFORMANCE (EFFICIENCY)



$$\eta = 0{,}95 \times f_l \times \frac{\tan \varphi}{\tan(\varphi - \rho'')}$$



$$\eta' = 0{,}95 \times f_l \times \frac{\tan(\varphi - \rho'')}{\tan \varphi}$$

η Performance when turning torque is converted into axial load on the screw

η' Performance when axial load is converted into turning torque on the screw

0.95 Reduction factor to cover variations due to speed, temperature and lubrication differences

f_l Reduction factor if the load applied (F) is less than 50% of the modified nominal dynamic load (C_{am}).

F/C_{am}	f_l
0,4	0,99
0,3	0,98
0,2	0,97
0,1	0,96

$$\varphi = \text{atan}\,[P_h/(d_o \times \pi)]$$

P_h Nominal pitch of the screw. See screw data table

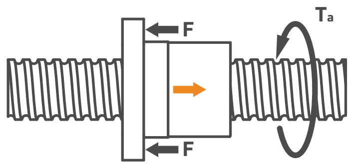
d_o Nominal diameter of the screw (mm). See screw data table

ρ" Friction angle

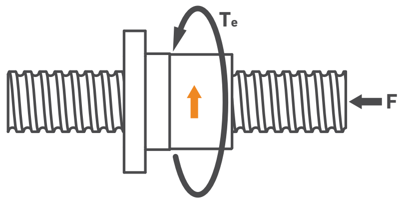
0,23° For tolerance classes P1, P3, P4 y P5

0,34 For tolerance classes T5 and T7

DRIVE AND RETENTION TORQUE



$$T_a = \frac{F \times P_h}{2 \times \pi \times \eta}$$



$$T_e = \frac{F \times P_h \times \eta'}{2 \times \pi}$$

T_a Drive torque(Nm) when turning torque is converted into axial load on the screw

T_e Retention torque (Nm) when axial load is converted into turning torque on the screw

F Force applied (kN)

P_h Nominal pitch of the screw. See screw data table

η Performance when turning torque is converted into axial load on the screw

η' Performance when axial load is converted into torque on the screw

Add to the above the torque required for the acceleration/deceleration of the set if the acceleration/deceleration values are important (applications with high speeds that change in short times).

$$T_{rot} = J_{rot} \times \alpha_0$$

T_{rot} Acceleration/deceleration torque (Nm)

J_{rot} Moment of rotation inertia of the screw (kgm^2)

α_o Angular acceleration (s^{-2})

BALL SCREW
CALCULATIONS

DRIVE POWER

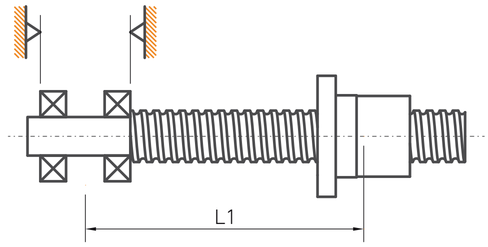
$$P_a = \frac{T_a \times n}{9550}$$

P_a Drive power (kW)
T_a Drive torque (Nm)
n Application speed (rpm)

Please contact the NIASA technical department for detailed motor sizing (motor/brake).

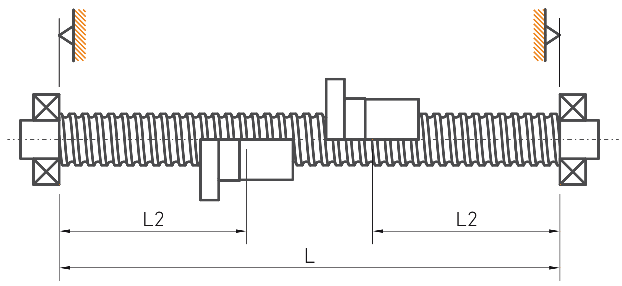
RIGIDITY

Support bearings on one end



$$R_{s1} = \frac{\pi \times d^2 \times E}{4 \times L_1 \times 10^6}$$

Support bearings on both sides



$$R_{s2} = \frac{\pi \times d^2 \times E}{4 \times L_2 \times 10^6} \times \frac{L}{L - L_2}$$

R_{s1} Axial rigidity of the screw (kN/µm), with bearings fixed on one end
R_{s2} Axial rigidity of the screw (kN/µm), with bearings on both sides
$d \approx (2.d_0 - D_w)/2$
d_0 Nominal diameter of the screw (mm)
D_w Diameter of the ball (mm)
E Steel elastic module (210,000 N/mm2)
L / L1 / L2 Length (mm), according to figures. Always take L2≤L/2; Rs2 as minimum when L2=L/2

$$\frac{1}{R_{tot}} = \frac{1}{R_s} + \frac{1}{R_{nu,ar}}$$

R_{tot} Axial rigidity of the screw+nut (kN/µm)
R_s Axial rigidity of the screw (kN/µm)
$R_{nu,r}$ Axial rigidity of the nut (kN/µm). Please ask NIASA for values

The deformations of the nuts are small as they are very compact elements, often negligible against deformations of the screw.

ROLLED TRAPEZOIDAL SCREWS

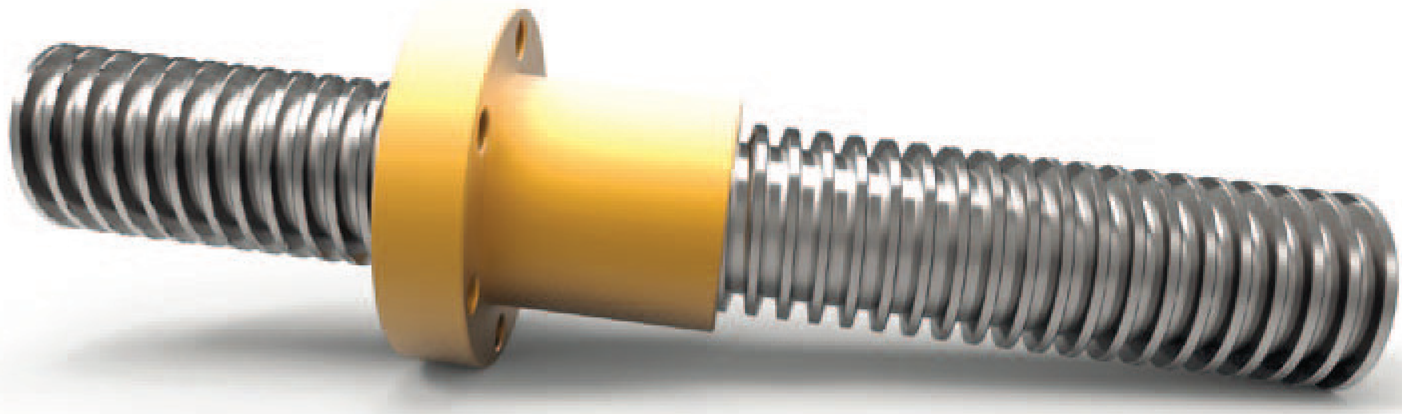
NIASA trapezoidal screws are usually obtained using a cold deformation lamination process, in which the fires on the teeth are shaped without cutting. Against others obtained by machining with stock removal, they have the following advantages:

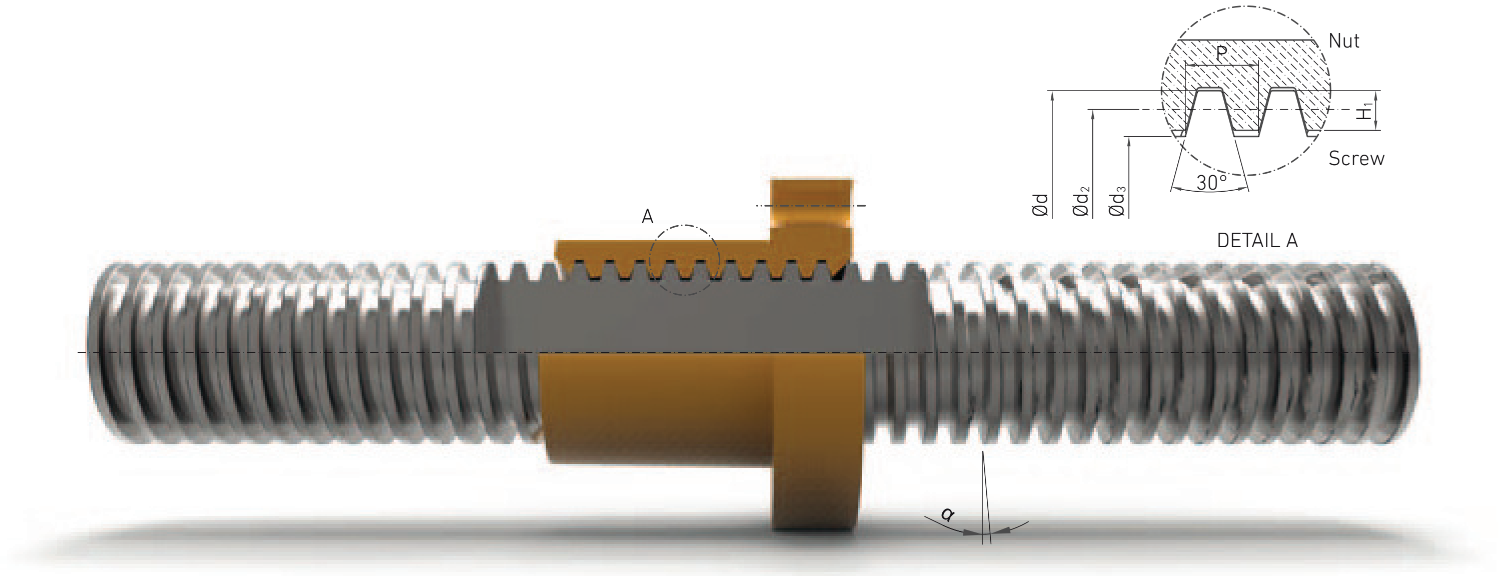
... High resistance to fatigue.
... Higher resistance to wear.
... More polished thread flanks.
... Higher resistance to corrosion.
... More precise profile.

NIASA manufactures screws with their sides machined according to your requirements. Please also ask if any thermal treatment is required.

The maximum standard length is 3,000 mm and its precision is 100 µm/300 mm; for higher values, please contact NIASA. Out of stock NIASA has many other screw diameters/pitches, also with left thread, and also in other materials (AISI 304, AISI 316, etc). Nuts can also be supplied in plastic materials, with threaded body, etc.

Standard Material	Approx. surface hardness
1.0401 (C15 SH) / F1110	500 Brinell





Ext. diam. (mm) x Pitch (mm)	d_o (mm)	$d_{2,min}$ (mm)	$d_{2,max}$ (mm)	d_3	H_1	Thread angle α[1]	Performance η[2]	Weight (kg/m)	Inertia moment (mm^4)	Module section (cm^3)	Mass inertia moment J_{rot} ($kg.m^2/m$)
Tr 16x4	16	13,640	13,905	10,80	2	5°11'	0,46	1,21	0,067	0,124	$2{,}96 \cdot 10^{-5}$
Tr 18x4	18	15,640	15,905	12,80	2	4°32'	0,43	1,58	0,132	0,206	$5{,}05 \cdot 10^{-5}$
Tr 20x4	20	17,640	17,905	14,80	2	4°2'	0,40	2,00	0,236	0,318	$8{,}10 \cdot 10^{-5}$
Tr 22x5	22	19,114	19,394	15,50	2.5	4°39'	0,43	2,34	0,283	0,366	$1{,}11 \cdot 10^{-4}$
Tr 24x5	24	21,094	21,394	17,50	2.5	4°14'	0,41	2,85	0,460	0,526	$1{,}65 \cdot 10^{-4}$
Tr 26x5	26	23,094	23,394	19,50	2.5	3°52'	0,39	3,40	0,710	0,728	$2{,}35 \cdot 10^{-4}$
Tr 28x5	28	25,094	25,394	21,50	2.5	3°34'	0,37	4,01	1,050	0,976	$3{,}26 \cdot 10^{-4}$
Tr 30x6	30	26,547	26,882	21,90	3	4°2'	0,40	4,50	1,130	1,030	$4{,}10 \cdot 10^{-4}$
Tr 32x6	32	28,547	28,882	23,90	3	3°46'	0,38	5,19	1,600	1,340	$5{,}45 \cdot 10^{-4}$
Tr 36x6	36	32,547	32,882	27,90	3	3°18'	0,35	6,71	2,970	2,130	$9{,}10 \cdot 10^{-4}$
Tr 40x7	40	36,020	36,375	30,50	3.5	3°29'	0,37	8,21	4,250	2,790	$1{,}37 \cdot 10^{-3}$
Tr 44x7	44	40,020	40,275	34,50	3.5	3°8'	0,34	10,10	6,950	4,030	$2{,}10 \cdot 10^{-3}$
Tr 48x8	48	43,468	43,868	37,80	4	3°18'	0,35	12,00	10,000	5,300	$2{,}90 \cdot 10^{-3}$
Tr 50x8	50	45,468	45,868	39,30	4	3°10'	0,34	13,10	11,700	5,960	$3{,}40 \cdot 10^{-3}$
Tr 60x9	60	54,935	55,360	48,15	4.5	2°57'	0,33	19,00	26,400	11,000	$7{,}30 \cdot 10^{-3}$
Tr 70x10	70	64,425	64,850	57,00	5	2°48'	0,32	26,00	51,800	18,200	$1{,}40 \cdot 10^{-2}$
Tr 80x10	80	74,425	74,850	67,00	5	2°25'	0,29	34,70	98,900	29,500	$2{,}40 \cdot 10^{-2}$

[1] Pitch angle on the pitch diameter.

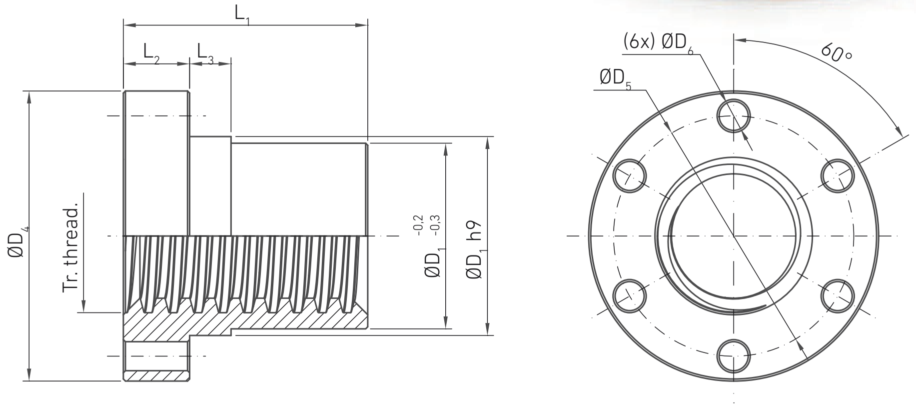
[2] Theoretical efficiency on transforming a turning movement into an axial transfer of the screw, with friction coefficient μ = 0.1. For other cases, contact the corresponding calculation section.

NIASA

BRONZE NUT WITH EFM FLANGE

Tr TRAPEZ.

Out of stock NIASA has many other screw diameters/pitches, also with left thread, and also in other materials (AISI 304, AISI 316, etc). Nuts can also be supplied in plastic materials, with threaded body, etc.

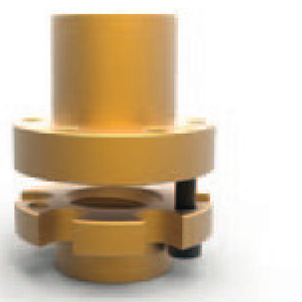


Standard Material	Elastic limit 0.2% $R_{p0.2}$ (N/mm²)	Min. resistance to breakage R_m (N/mm²)	Elongation to breakage A5 min.	Approx. (HB 10/1000)	Density (kg/dm³)	Module of elasticity (N/mm²)	Max. cinematic pressure Pc (N/mm².m/min)
G-CuSn 12 (G Bz 12)	150	280-350	5%	100-110	8.8	90000	400

For screw	D_1 (mm)	D_4 (mm)	D_5 (mm)	D_6 (mm)	L_1	L_2	L_3	Weight (kg)	Surface support A_s (mm²)
Tr 16x4	28	48	38	6	44	12	8	0,25	670
Tr 18x4	28	48	38	6	44	12	8	0,25	770
Tr 20x4	32	55	45	7	44	12	8	0,30	870
Tr 24x5	32	55	45	7	44	12	8	0,30	1040
Tr 30x6	38	62	50	7	46	14	8	0,40	1370
Tr 36x6	45	70	58	7	59	16	10	0,60	2140
Tr 40x7	63	95	78	9	73	16	10	1,70	2930
Tr 50x8	72	110	90	11	97	18	10	2,60	4900
Tr 60x9	85	125	105	11	99	20	10	3,70	6040
Tr 70x10	95	180	140	17	100	30	16	7,80	8250
Tr 80x10	105	190	150	17	110	30	16	8,90	10890

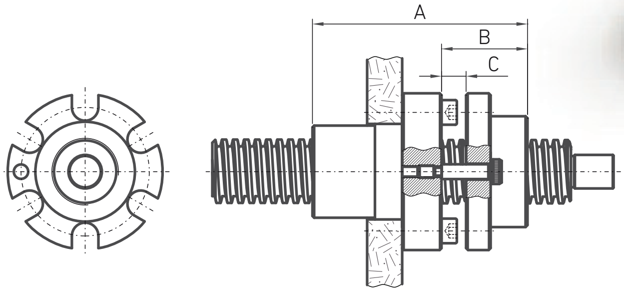
BRONZE SAFETY NUT WITH EFMS FLANGE

Tr TRAPEZ.



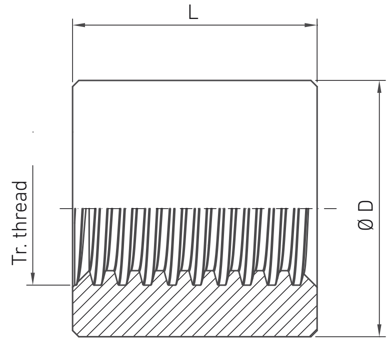
Nut applicable to R Series screw jacks and SH screw supports. The same standard material as the EFM type flange.

	A	B	C	Guide screw ISO 7379
Tr 18 x 4	69	25	8	M5
Tr 20 x 4	69	25	8	M5
Tr 30 x 6	78	32	10	M5
Tr 36 x 6	94	35	10	M5
Tr 40 x 7	108	35	10	M6
Tr 50 x 8	132	35	10	M8
Tr 55 x 9	132	35	10	M8
Tr 60 x 9	144	45	15	M8
Tr 70 x 10	155	55	15	M10



LRM TYPE CYLINDRICAL BRONZE NUT

Out of stock NIASA has many other screw diameters/pitches, also with left thread, and also in other materials (AISI 304, AISI 316, etc). Nuts can also be supplied in plastic materials, with threaded body, etc.



Standard Material	Elastic limit 0.2% $R_{p0.2}$ (N/mm^2)	Min. resistance to breakage R_m (N/mm^2)	Elongation to breakage A5 min.	Approx. (HB 10/1000)	Density (kg/dm^3)	Module of elasticity (N/mm^2)	Max. cinematic pressure Pc (N/mm^2.m/min)
G-CuSn 12 (G bz 12)	150	280-350	5%	100-110	8.8	90000	400

For screw	Ø D (mm)	L (mm)	Weight (kg)	Support surface A_s (mm^2)
Tr 16x4	36	32	0.25	490
Tr 18x4	40	36	0.34	630
Tr 20x4	45	40	0.48	790
Tr 22x5	45	40	0.46	850
Tr 24x5	50	48	0.69	1130
Tr 26x5	50	48	0.58	1240
Tr 28x5	60	60	1.2	1680
Tr 30x6	60	60	1.2	1780
Tr 32x6	60	60	1.2	1910
Tr 36x6	75	72	2.2	2610
Tr 40x7	80	80	2.8	3210
Tr 44x7	80	80	2.6	3560
Tr 48x8	90	100	4.3	4840
Tr 50x8	90	100	4.2	5060
Tr 60x9	100	120	5.7	7320
Tr 70x10	110	140	7.6	10000
Tr 80x10	120	160	9.7	13200

TRAPEZOIDAL SCREWS
TECHNICAL SPECIFICATIONS

PARTS

The systems with trapezoidal screws are made up of simply the screw itself and a nut that moves along it.

These systems are less sensitive to the input of dirtiness than those based on ball bearings. Therefore they usually do not include protectors on the sides of the nut, except in the case of very high turning speeds. Please contact NIASA if this is the case.

EFFICIENCY

The efficiency of the trapezoidal screws basically depends on the geometry of the screw (diameter and pitch) and the friction coefficient between the screw and the nut. It is therefore essential that the lubrication conditions are those indicated so that the losses due to friction do not surpass the established values.

For the most usual sizes and with standard lubrication conditions, in general, the efficiency of these types of systems is 30% to 40%.

SPEED

The turning speed of a trapezoidal screw is limited in its maximum value by the lower of the following:

... Critical resonance speed of the column.

... Critical velocity of the nut/screw to avoid premature wear on the nut. This depends on the specifications of the materials of both elements, on the contact surface between them and the load applied.

REVERSIBILITY

Opposite to what happens with ball screws, the trapezoidal screws are not always reversible. Only those with a helix angle with a larger thread than the friction angle are reversible (or not self-locking). The efficiency for converting axial force on the screw on turning torque is always less than that corresponding to the transformation of the turning torque on axial force.

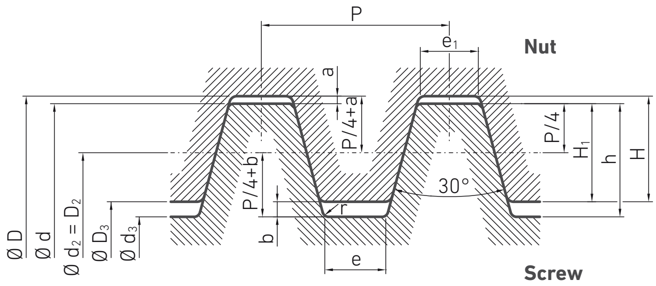
However, especially on vertical assemblies, it is in any case advisable to incorporate motors with brakes that avoid small movements in the case of vibrations and that stop the movement without excessive slipping from the inertia of the set.

ASSEMBLY POSITION

The screw can be mounted in any position, paying special care to the possible lateral loads that are not supported by the screw, but by guide systems designed for this purpose.

THREAD PROFILE

NIASA screws and nuts have metric ISO trapezoidal thread according to DIN 103 (screw tolerance: 7e on the flanks and 4h on the exterior diameter; nut tolerance: 7H).



Pitch (mm)	**2**	**3 - 4**	**5 - 12**	**13 - 26**
a and **r** (mm)	0,5	0,25		0,5
b (mm)	0,3	0,5	0,75	1,5

$$H_1 = \frac{P}{2}$$

$$h = H1 + b = \frac{P}{2} + b$$

$$H = H1 + a = \frac{P}{2} + a$$

$$D = d + 2a$$

$$d_3 = d - 2h = d - (P + 2b)$$

$$D_3 = D - 2H = D - (P + 2a)$$

$$d_2 = D_2 = d - 2\frac{P}{4} = d - \frac{P}{2}$$

$$e = e_1 = 0{,}634P - 0{,}536h$$

SERVICE TEMPERATURE

The maximum admissible working ambient temperature depends on the friction conditions between the nut and the screw. That is, the materials of both and the lubrication conditions.

In general, it is recommended not to operate in environments with temperatures over 100ºC. Please contact NIASA about this.

PRECISION AND STRAIGHTNESS.

The usual precision of NIASA trapezoidal screws varies according to their nominal diameter and the thread pitch, which is usually 100 µm for each 300 mm of length.

LUBRICATION

The greases recommended for the trapezoidal screws and nuts are the same as the usual greases for roller bearings. Oils are not normally used.

Before greasing, perfectly clean the surface of the screw to leave it free from any kind of impurity. The time between two consecutive greasings depends on the application conditions (temperature, velocity and load).

STORAGE AND INSTALLATION

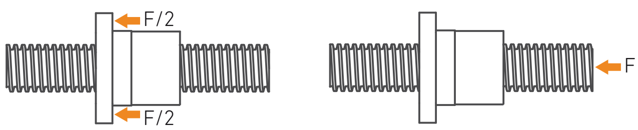
As standard, trapezoidal screws are supplied by NIASA lightly lubricated and protected with a completely sealed plastic film.

As they are precision elements, they must be handled with great care and stored in clean and dry places, supported on several points along their length and in their original packaging until the time they are installed.

When transporting the trapezoidal screws to their final destination, sharp movements and positions with false supports must be avoided, which may cause deformations due to flexion under their own weight.

The housings for the assembly of the nuts, or any other element (rollers, bearings, etc.) must be perfectly free from dust, paint or any other impurity. It is essential that the screws are assembled with roller, bearing, etc. supports perfectly perpendicular and aligned between each other.

Finally, apply the loads in the most central and uniform manner as possible on the screw or nut. If lateral loads need to be applied, please contact the NIASA technical department.



TRAPEZOIDAL SCREWS
CALCULATIONS

NUT AND SCREW SIZE PRE-SELECTION

Calculation process:

1.

$$A_s = \frac{F}{P_p}$$

A_s Support area required (mm^2)
F Force applied (N)
P_p Maximum permissible pressure (5 N/mm^2, for sets with movement)

2. Select a nut size with an "A_s" higher than that calculated.

MAXIMUM ADVANCE SPEED

Calculation process:

1.

$$V_{sp} = \frac{P_c}{P_p}$$

v_{sp} Maximum permissible sliding speed (m/min)
P_c Cinematic precision (N/mm^2.m/min). See table
P_p Maximum permissible pressure (5 N/mm^2)

Material	P_c (N/mm^2.m/min)
G-CuSn 7 ZnPb (Rg 7)	300
G-CuSn 12 (G Bz 12)	400

2.

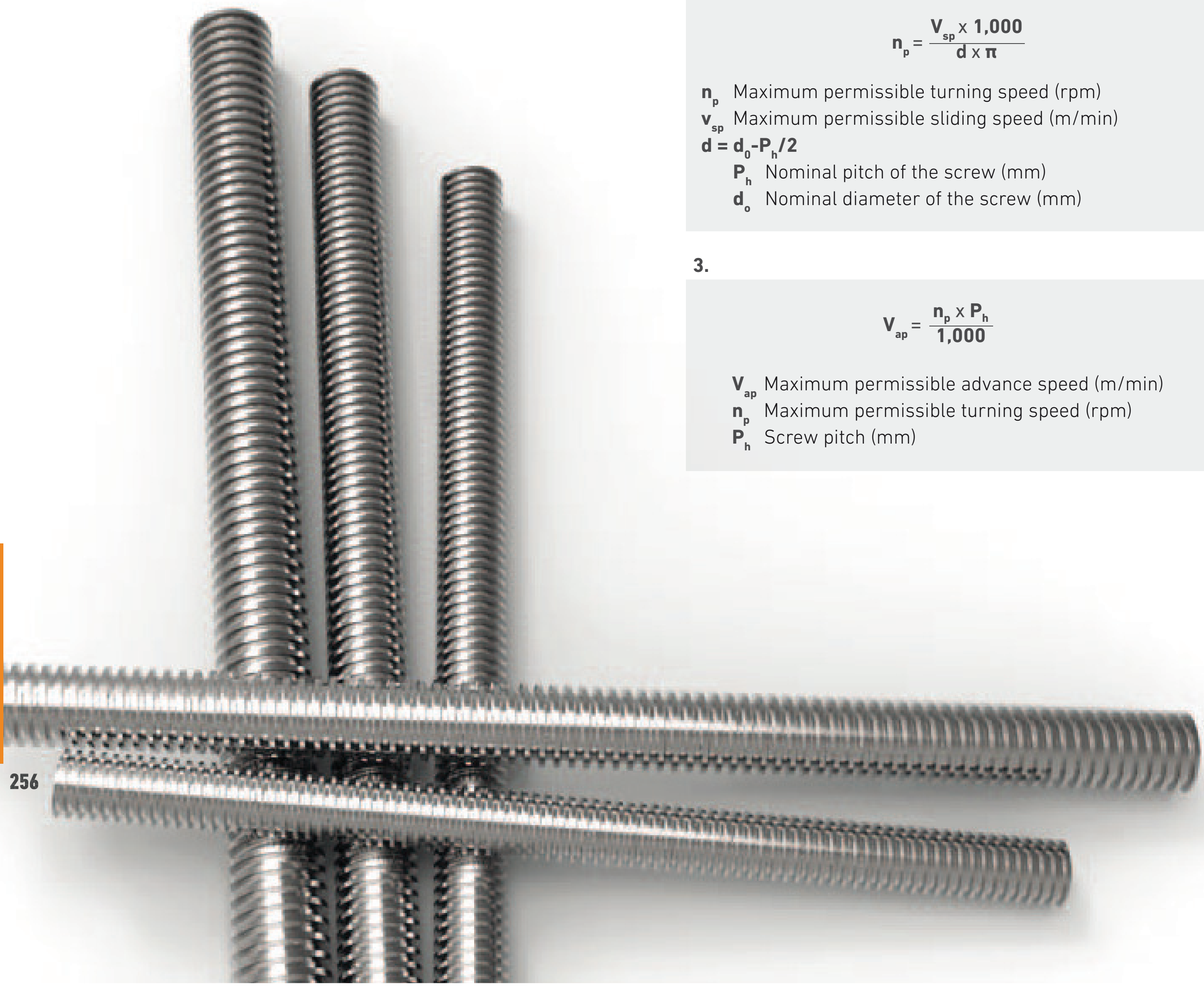
$$n_p = \frac{V_{sp} \times 1{,}000}{d \times \pi}$$

n_p Maximum permissible turning speed (rpm)
v_{sp} Maximum permissible sliding speed (m/min)
$d = d_0 - P_h/2$
P_h Nominal pitch of the screw (mm)
d_o Nominal diameter of the screw (mm)

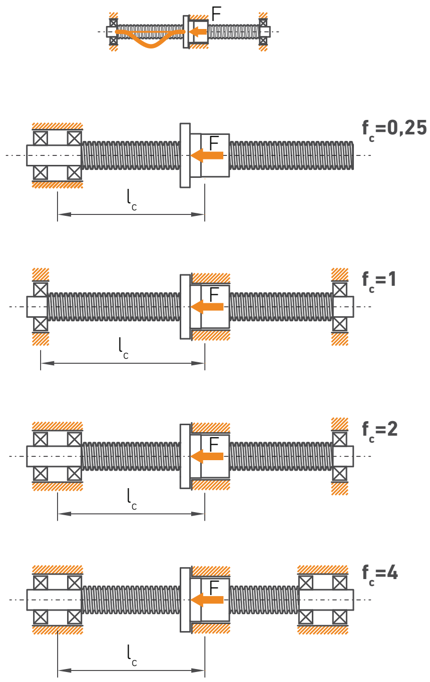
3.

$$V_{ap} = \frac{n_p \times P_h}{1{,}000}$$

V_{ap} Maximum permissible advance speed (m/min)
n_p Maximum permissible turning speed (rpm)
P_h Screw pitch (mm)



BUCKLING CRITICAL LOAD

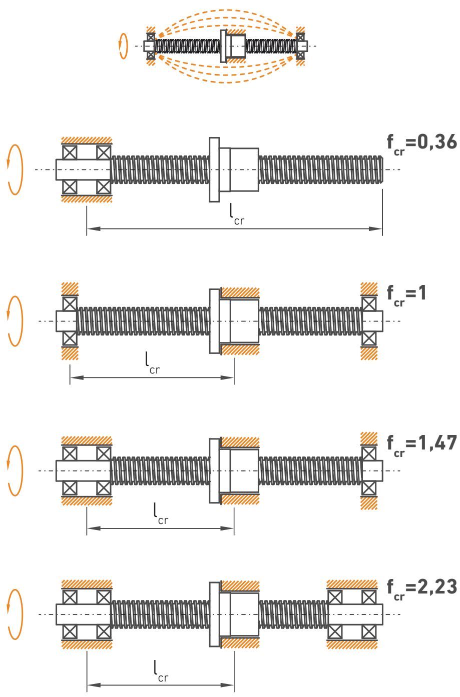


$$F \le 0.8 \times f_c \times \frac{101.7 \times d_3^4}{l_c^2}$$

With safety factor: 1.25

- **F** Force applied (kN)
- **f_c** Correction factor, depending on the type of support on the sides of the screw. See figures
- **d_3** Screw core diameter (mm)
- **l_c** Buckling length (mm). See figures

RESONANCE CRITICAL SPEED



$$n \le 0.8 \times f_{cr} \times \frac{1.2 \times 10^8 \times d_3}{l_{cr}^2}$$

With safety factor: 1.25

- **n** Application speed (rpm)
- **f_{cr}** Correction factor, depending on the type of support on the sides of the screw. See figures
- **d_3** Screw core diameter (mm)
- **l_{cr}** Resonance length (mm). See figures

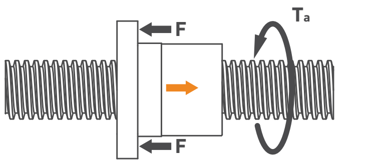
SERVICE TIME

Periodically check the axial clearance between the screw and the nut. On screws with single-input threads, the nut must be replaced before the value of this set surpasses 25%of the pitch.

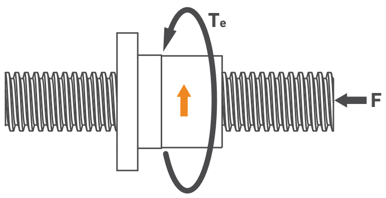
NIASA has tools that help manual measurement of the axial clearance, including automatic detection systems.

TRAPEZOIDAL SCREWS
CALCULATIONS

PERFORMANCE (EFFICIENCY)



$$\eta = \frac{\tan \alpha}{\tan(\alpha + \rho')}$$



$$\eta' = \frac{\tan(\alpha - \rho')}{\tan \alpha} = 0.7 \times \eta$$

- **η** Performance when turning torque is converted into axial load on the screw
- **η'** Performance when axial load is converted into turning torque on the screw

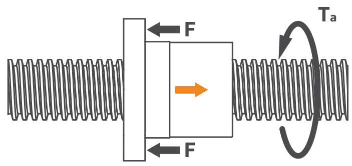
$\alpha = \text{atan}\,[P_h/(d_2 \cdot \pi)]$

- **P_h** Nominal pitch of the screw. See screw data table
- **d_2** Diameter pitch of the screw (mm). See data table screw

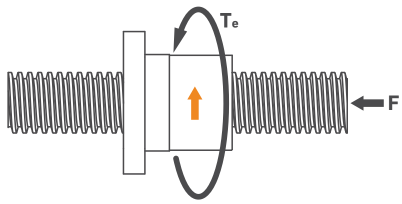
ρ' Friction angle (for ISO trapezoidal thread):
$\rho' = \text{atan}\,(\mu \times 1.07)$

μ Friction coefficient for bronze nuts			
On start-up		In movement	
Dry		Lubricated	
0.3	0.1	0.1	0.04

DRIVE TORQUE AND RETENTION



$$T_a = \frac{F \times P_h}{2 \times \pi \times \eta}$$



$$T_e = \frac{F \times P_h \times \eta'}{2 \times \pi}$$

- **T_a** Drive torque(Nm) when turning torque is converted into axial load on the screw
- **T_e** Retention torque (Nm) when axial load is converted into turning torque on the screw
- **F** Force applied (kN)
- **P_h** Nominal pitch of the screw
- **η** Performance when turning torque is converted into axial load on the screw
- **η'** Performance when axial load is converted into turning torque on the screw

Add to the above the torque required for the acceleration/deceleration of the set if the acceleration/deceleration values are important (applications with high speeds that change in short times).

$$T_{rot} = J_{rot} \times \alpha_0$$

- **T_{rot}** Acceleration/deceleration torque (Nm)
- **J_{rot}** Screw rotation inertia moment (kgm^2)
- **α_0** Angular acceleration (s^{-2})

DRIVE POWER

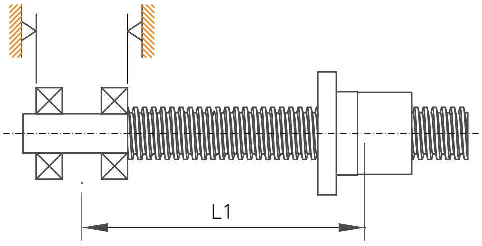
$$P_a = \frac{T_a \times n}{9550}$$

P_a Drive power (kW)
T_a Drive torque (Nm)
n Application speed (rpm)

Please contact the NIASA technical department for detailed motor sizing (motor/brake).

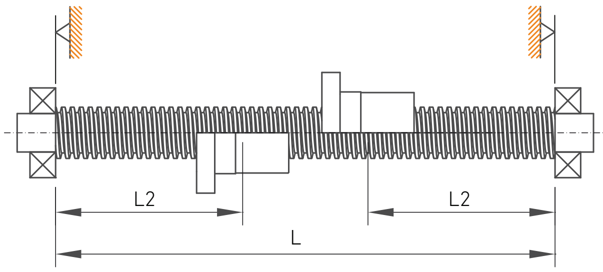
RIGIDITY

Support bearings on one end



$$R_{S1} = \frac{\pi \times d_3^2 \times E}{4 \times L_1 \times 10^6}$$

Support bearings on both sides



$$R_{S2} = \frac{\pi \times d_3^2 \times E}{4 \times L_2 \times 10^6} \times \frac{L}{L - L_2}$$

R_{s1} Axial rigidity of the screw (kN/μm), with bearings fixed on one end
R_{s2} Axial rigidity of the screw (kN/μm), with bearings on both sides
d_3 Screw core diameter (mm)
E Steel elastic module (210,000 N/mm^2)
L / L1 / L2 Length (mm), according to figures. Always take $L_2 \leq L/2$; R_{s2} as minimum when L2=L/2

$$\frac{1}{R_{tot}} = \frac{1}{R_s} + \frac{1}{R_{nu,ar}}$$

R_{tot} Axial rigidity of the screw+nut (kN/μm)
R_s Axial rigidity of the screw (kN/μm)
$R_{nu,r}$ Axial rigidity of the nut (kN/μm). Ask NIASA for their values

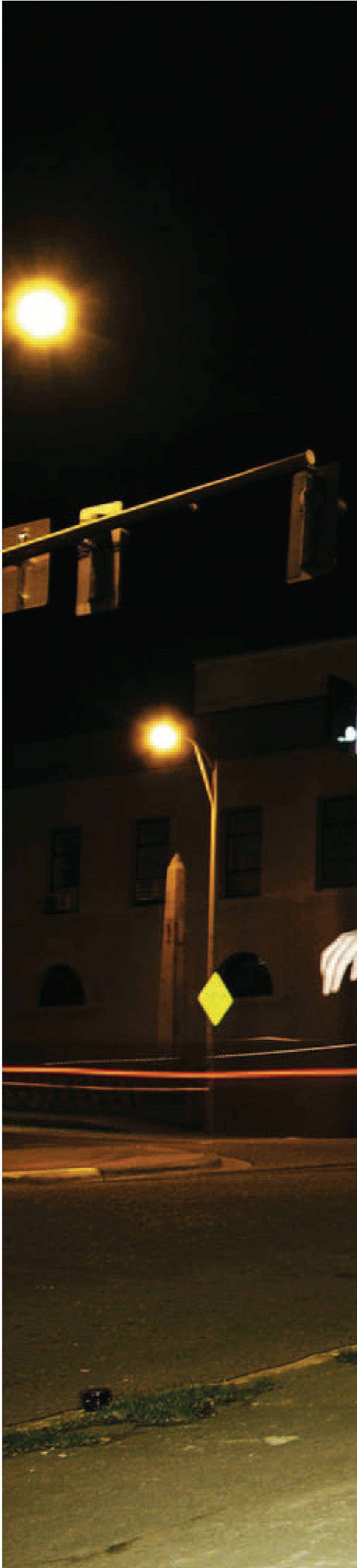
The deformations of the nuts are small as they are very compact elements, often negligible against deformations of the screws.

07

08
ACCESSORIES

"IF SOMEONE COPIED ME TODAY, TOMORROW HE WOULD BE OBSOLETE BECAUSE I WOULD HAVE ALREADY REINVENTED MYSELF."

ANONYMOUS



ACCESSORIES

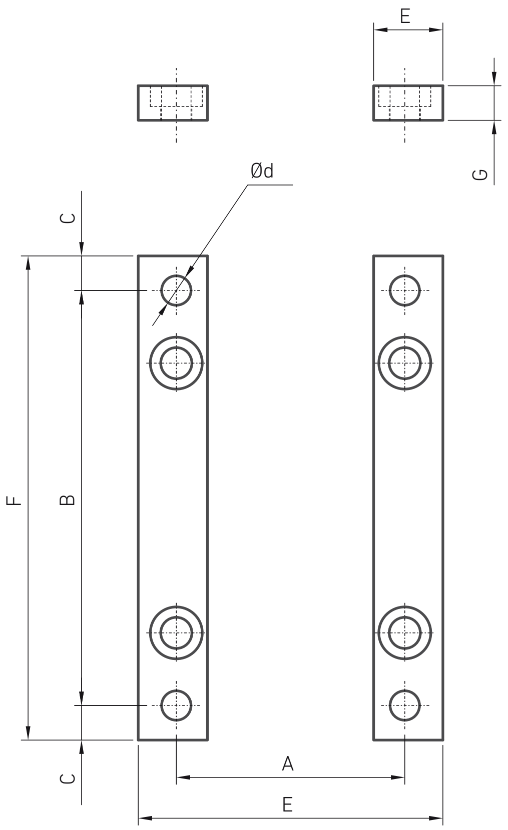
ÍNDICE

08

M SERIES BOX FASTENING ACCESSORIES

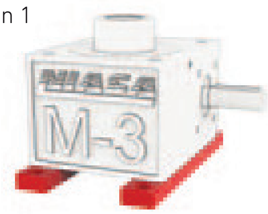
LCM RULES

	Applicable to	
LCM-1	M1	FM1 / AM1
LCM-2	M2	FM2 / AM2
LCM-3	M3	FM3 / AM3
LCM-4	M4	FM4 / AM4
LCM-5	M5	FM5
LCM-6	J1	FJ1
LCM-7	J3	FJ3
LCM-8	J4	
LCM-9	J5	



Assembly position

Position 1



Position 2

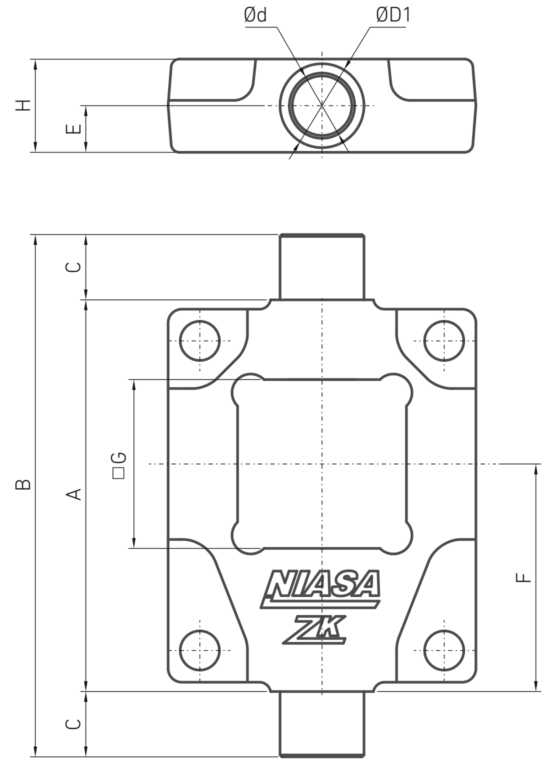
	A	B	C	Ød	D	E	F	G	Weight (kg)
LCM-1	52	100	10	8.5	72	20	120	10	0.3
LCM-2	63	120	10	8.5	85	20	140	10	0.4
LCM-3	81	150	10	11	105	24	170	12	0.8
LCM-4	115	204	13	13.5	145	30	230	16	1.7
LCM-5	131	236	17	22	171	40	270	25	3.9
LCM-6	155	250	20	26	205	50	290	30	5.8
LCM-7	170	290	25	32	230	65	340	40	10
LCM-8	190	350	30	39	270	80	410	50	20.8
LCM-9	230	430	35	45	330	100	500	60	34.4

... Material: C45.
... Standard treatment: Bronze-plated.
... Special treatment: Zinc-plated (15-20 µm) + heat treated paint (60-80 µm).

M SERIES BOX FASTENING ACCESSORIES

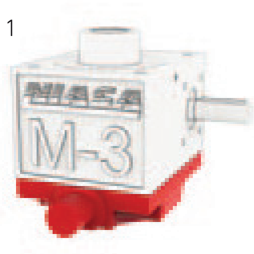
FLANGE WITH ZKM BOLTS

	Applicable to	
ZKM-1	M1	FM1 / AM1
ZKM-2	M2	FM2 / AM2
ZKM-3	M3	FM3 / AM3
ZKM-4	M4	FM4 / AM4
ZKM-5	M5	FM5
ZKM-6	J1	FJ1
ZKM-7	J3	FJ3
ZKM-8	J4	
ZKM-9	J5	

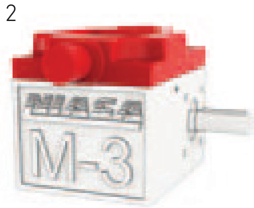


Assembly position

Position 1



Position 2



	A	B	C	Ød f8	ØD1	E	F	□G	H	Weight (kg)
ZKM-1	84	118	15	15	22	10	51	35.5	20	0.6
ZKM-2	106	146	20	20	28	12.5	63	40.5	25	1.2
ZKM-3	138	188	25	25	35	15	80	60.5	30	2.1
ZKM-4	190	270	40	35	45	20	107	80.5	40	5.5
ZKM-5	210	290	40	45	55	25	122	90.5	50	8.7
ZKM-6	220	320	50	50	70	30	125	101	60	12.8
ZKM-7	250	370	60	70	90	40	145	111	80	23.2
ZKM-8	300	440	70	80	100	45	170	131	90	36.7
ZKM-9	370	530	80	90	110	50	215	151	100	61.8

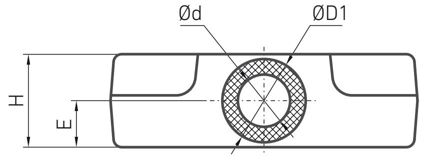
... Material: S355.
... Standard treatment: Bronze-plated.
... Special treatment: Zinc-plated (15-20 µm) + heat treated paint (60-80 µm).

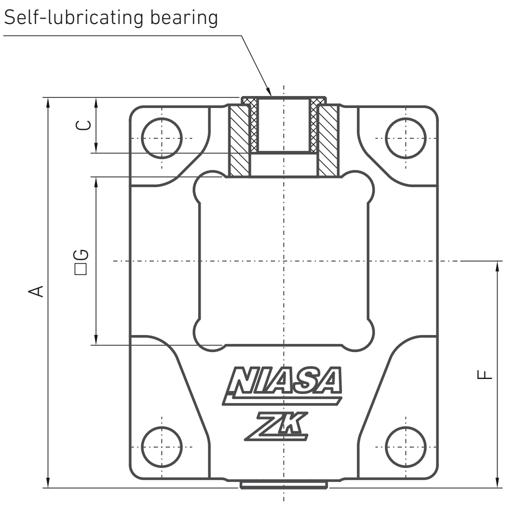
NOTE: On screw jacks with W configuration the flange can be welded to the square tube.

M SERIES BOX FASTENING ACCESSORIES

FLANGE WITH ZKH BEARINGS

	Applicable to	
ZKH-1	M1	FM1 / AM1
ZKH-2	M2	FM2 / AM2
ZKH-3	M3	FM3 / AM3
ZKH-4	M4	FM4 / AM4
ZKH-5	M5	FM5
ZKH-6	J1	FJ1
ZKH-7	J3	FJ3
ZKH-8	J4	
ZKH-9	J5	





Assembly position

Position 1

Position 2

	A	C	Ød	ØD1	E	F	□G	H	Weight (kg)
ZKH-1	84	15	12 E10	18	10	51	35.5	20	0.5
ZKH-2	106	20	15 E10	23	12.5	63	40.5	25	1
ZKH-3	138	25	20 G8	28	15	80	60.5	30	1.75
ZKH-4	190	25	25 G8	35	20	107	80.5	40	4.7
ZKH-5	210	30	30 G8	46	25	122	90.5	50	7.5
ZKH-6	220	32	40 G8	52	30	125	101	60	10.6
ZKH-7	250	50	50 G8	62	40	145	111	80	17.8
ZKH-8	300	50	60 G8	80	45	170	131	90	27.7
ZKH-9	370	60	70 G8	85	50	215	151	100	48.5

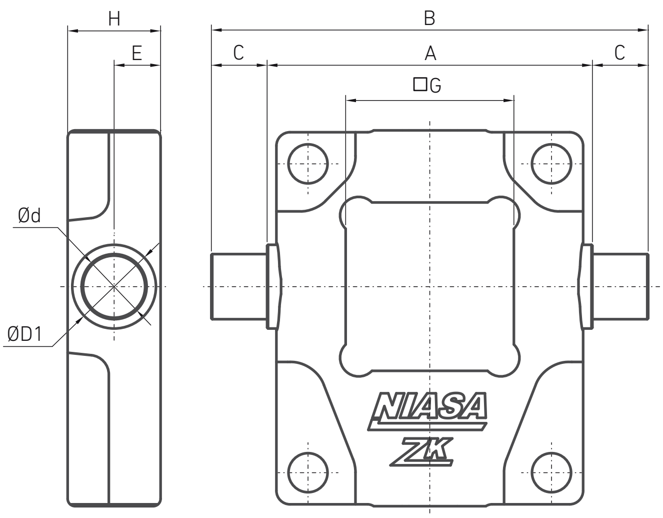
... Bearing material for sizes ZKH1 and ZKH2: High-performance polymer.
... Bearing material for sizes ZKH3 to ZKH9: Bronze.
... Material of the body: S355.
... Standard treatment: Bronze-plated.
... Special treatment: Zinc-plated (15-20 µm) + heat treated paint (60-80 µm).

NOTE: On screw jacks with W configuration the flange can be welded to the square tube.

M SERIES BOX FASTENING ACCESSORIES

FLANGE WITH ZKV 90º BOLTS

	Applicable to	
ZKV-1	M1	FM1 / AM1
ZKV-2	M2	FM2 / AM2
ZKV-3	M3	FM3 / AM3
ZKV-4	M4	FM4 / AM4
ZKV-5	M5	FM5
ZKV-6	J1	FJ1
ZKV-7	J3	FJ3
ZKV-8	J4	
ZKV-9	J5	



Assembly position

Position 1

Position 2

	A	B	C	Ød f8	ØD1	E	□G	H	Weight (kg)
ZKV-1	76	110	17	15	19	10	35.5	20	0.6
ZKV-2	91	125	17	15	22	12.5	40.5	25	1.2
ZKV-3	113	153	20	20	28	15	60.5	30	2.1
ZKV-4	155	205	25	25	35	20	80.5	40	5.5
ZKV-5	175	255	40	35	45	25	90.5	50	8.7
ZKV-6	205	285	40	45	55	30	101	60	13
ZKV-7	230	330	50	50	70	40	111	80	21.5
ZKV-8	260	380	60	70	90	45	131	90	35.5
ZKV-9	310	450	70	80	100	50	151	100	61

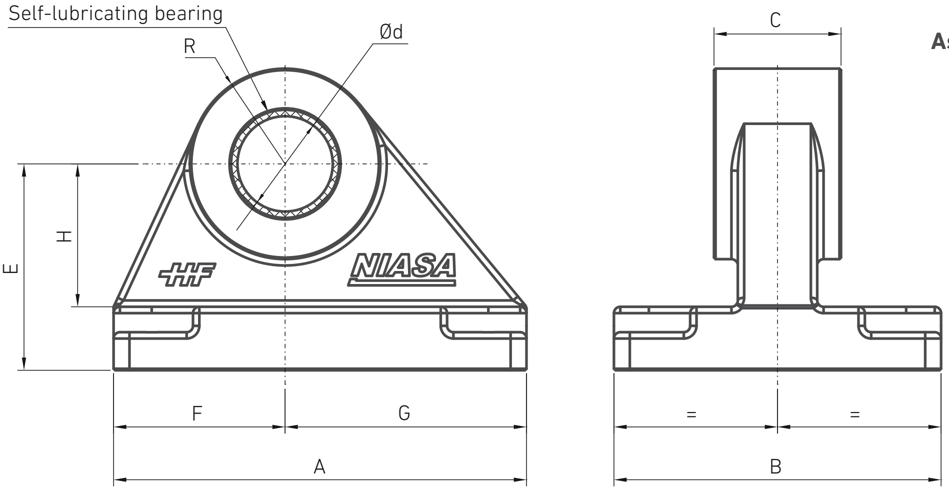
... Material: S355.
... Standard treatment: Bronze-plated.
... Special treatment: Zinc-plated (15-20 µm) + heat treated paint (60-80 µm).

NOTE: On screw jacks with W configuration the flange can be welded to the square tube.

M SERIES BOX FASTENING ACCESSORIES

HFM CLEVIS ROD

	Applicable to	
HFM-1	M1-R	FM1 / AM1
HFM-2	M2-R	FM2 / AM2
HFM-3	M3-R	FM3 / AM3
HFM-4	M4-R	FM4 / AM4
HFM-5	M5-R	FM5
HFM-6	J1-R	FJ1
HFM-7	J3-R	FJ3



Assembly position

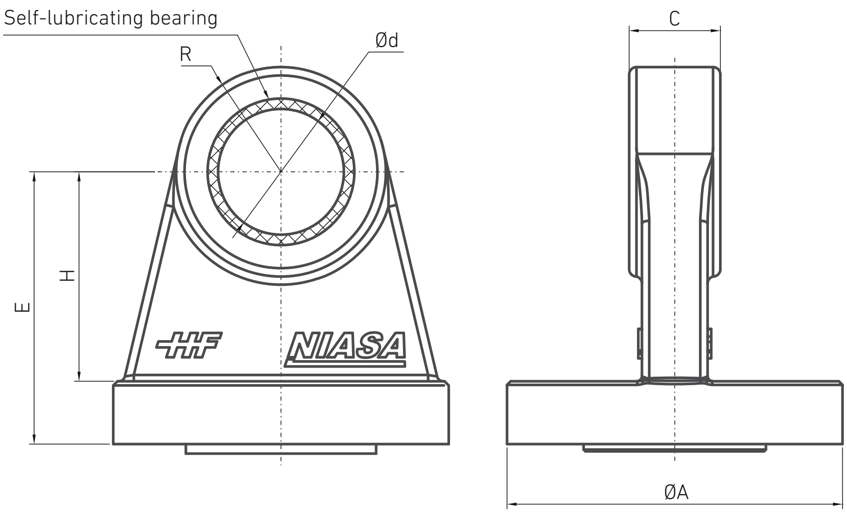
	A	B	C b12	Ød		E	F	G	H	R	Weight (kg)
HFM-1	80	70	25	15	+0,124 +0,04	40	31	49	25	18	0.5
HFM-2	100	83	30	20	+0,124 +0,04	50	40	60	35	22.5	0.7
HFM-3	130	103	40	30	+0,085 -0,010	65	54	76	45	30	3.8
HFM-4	180	143	50	45	+0,105 -0,010	85	78	102	60	45	9
HFM-5	200	163	50	50	+0,110 -0,010	120	83	117	85	60	16.5
HFM-6	210	193	60	60	+0,110 -0,010	150	90	120	100	65	25
HFM-7	240	218	70	70	+0,105 -0,010	170	100	140	110	75	37

... Standard material HFM-1 and HFM-2: Aluminum L-2560 EN AC 43000-T6.
... Standard material HFM-3 to HFM-7: S355 steel.
... Standard treatment HFM-1 and HFM-2: Anodised.
... Standard treatment HFM-3 to HFM-7: Bronze-plated.
... Special treatment HFM-3 to HFM-7: Zinc-plated (15-20 µm) + heat treated paint (60-80 µm).

HM SERIES BOX FASTENING ACCESSORIES

HFR CLEVIS ROD

	Applicable to
HFR-1	FHM1 / AHM1
HFR-2	FHM2 / AHM2
HFR-3	FHM3 / AHM3
HFR-4	FHM4 / AHM4
HFR-5	FHM5
HFR-6	FHJ1
HFR-7	FHJ3



Assembly position

Position 1

Position 2

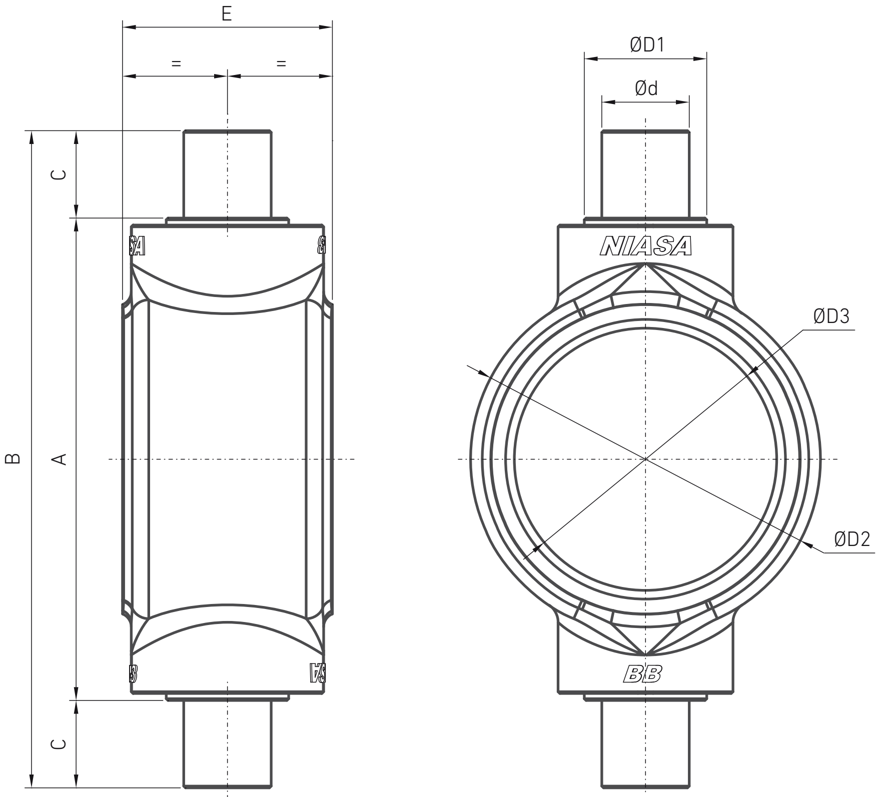
	Ø A	C b12	Ød		E	H	R	Weight (kg)
HFR-1	58	25	15	+0,124 +0,04	40	28	18	0.35
HFR-2	80	30	20	+0,124 +0,04	50	35	22.5	0.5
HFR-3	92	40	30	+0,085 -0,010	65	47	30	1.6
HFR-4	125	50	45	+0,105 -0,010	85	60	42.5	5.3
HFR-5	145	50	50	+0,110 -0,010	120	85	50	9
HFR-6	155	60	60	+0,110 -0,010	150	110	65	13
HFR-7	200	70	70	+0,105 -0,010	160	110	75	24.5

... Standard material HFr-1 and HFR-2: Aluminum L-2560 EN AC 43000-T6.
... Standard material HFR-3 to HFR-7: S355 steel.
... Standard treatment HFR-1 and HFR-2: Anodised.
... Standard treatment HFR-3 to HFR-7: Bronze-plated.
... Special treatment HFR-3 to HFR-7: Zinc-plated (15-20 µm) + heat treated paint (60-80 µm).

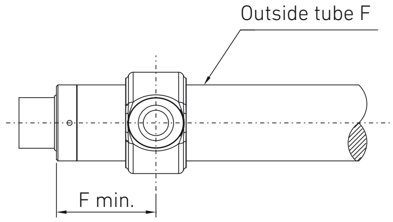
EXTERIOR TUBE F FASTENING ACCESSORIES

FLANGE WITH BB BOLTS

	Applicable to		
BB-1	F16	FM1	FHM1
BB-2	F20	FM2	FHM2
BB-3	F30	FM3	FHM3
BB-4	F40	FM4	FHM4
BB-5	F45	FM5	FHM5
BB-6	F50	FJ1	FHJ1
BB-7	FJ3		FHJ3



Assembly position



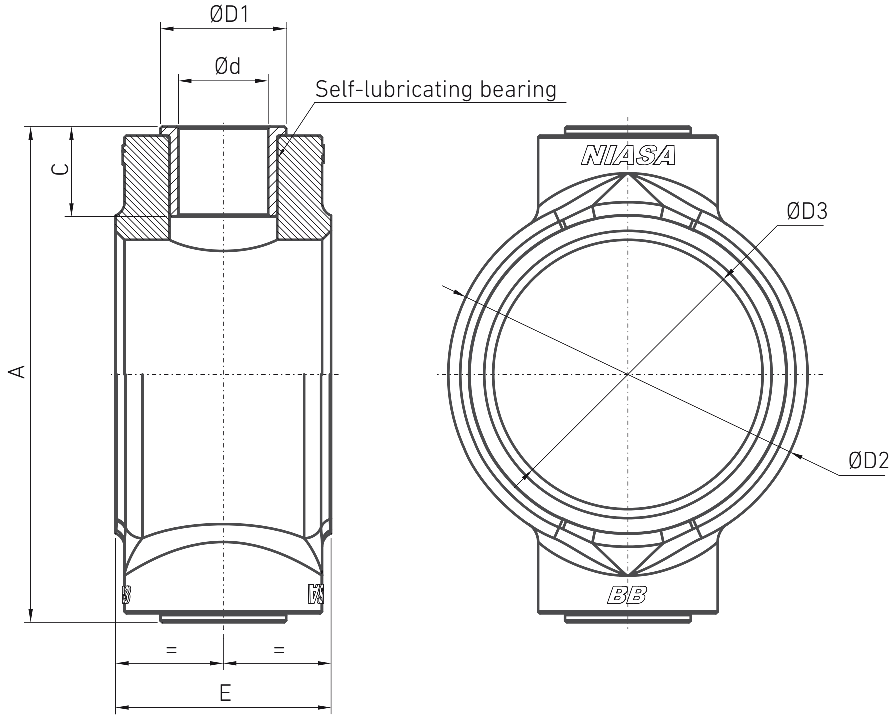
	A	B	C	Ød f8	ØD1	ØD2	ØD3	E	F	Weight (kg)
BB-1	82	106	15	15	20	55	40	30	55	0.3
BB-2	116	146	20	20	25	78	55	42	85	0.91
BB-3	138	188	25	25	40	100	75	60	110	1.92
BB-4	160	220	40	35	45	118	90	80	115	3.6
BB-5	200	280	40	45	55	150	115	95	140	4
BB-6	260	350	50	50	60	195	150	108	150	12
BB-7	335	455	60	70	80	265	200	138	190	26.5

... Standard material: S355.
... Special treatment: Zinc-plated (15-20 µm) + heat treated paint (60-80 µm).

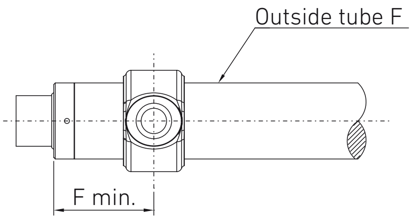
EXTERIOR TUBE F FASTENING ACCESSORIES

FLANGE WITH BH BEARINGS

	Applicable to		
BH-1	F16	FM1	FHM1
BH-2	F20	FM2	FHM2
BH-3	F30	FM3	FHM3
BH-4	F40	FM4	FHM4
BH-5	F45	FM5	FHM5
BH-6	F50	FJ1	FHJ1
BH-7	FJ3		FHJ3



Assembly position



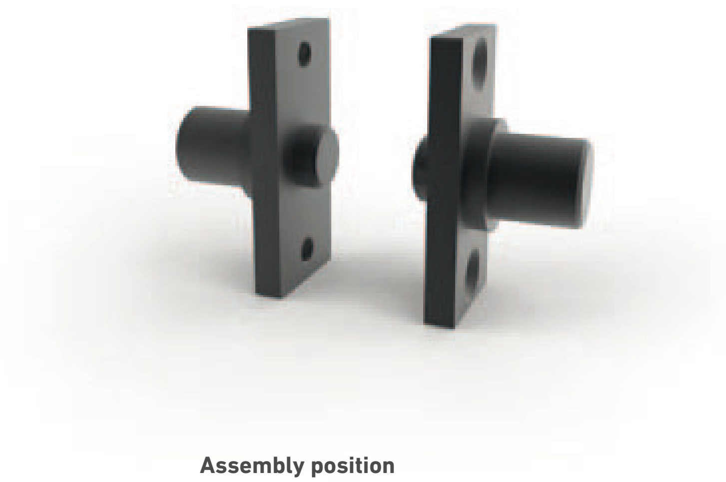
	A	C	Ø d	D1	D2	D3	E	F	Weight (kg)
BH-1	82	15	15 E10	20	55	40	30	55	0.4
BH-2	116	20	20 E10	25	78	55	42	85	1.2
BH-3	138	25	25 G8	40	100	75	60	110	2.4
BH-4	160	30	35 G8	45	118	90	80	115	4.6
BH-5	200	40	45 G8	55	150	115	95	140	8
BH-6	260	50	50 G8	60	195	150	108	150	15.2
BH-7	335	60	70 G8	80	240	170	138	185	34.8

... Standard material: S355.
... Special treatment: Zinc-plated (15-20 µm) + heat treated paint (60-80 µm).

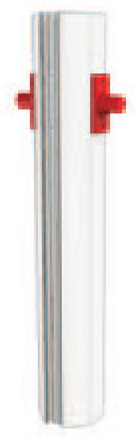
EXTERIOR TUBE A FASTENING ACCESSORIES

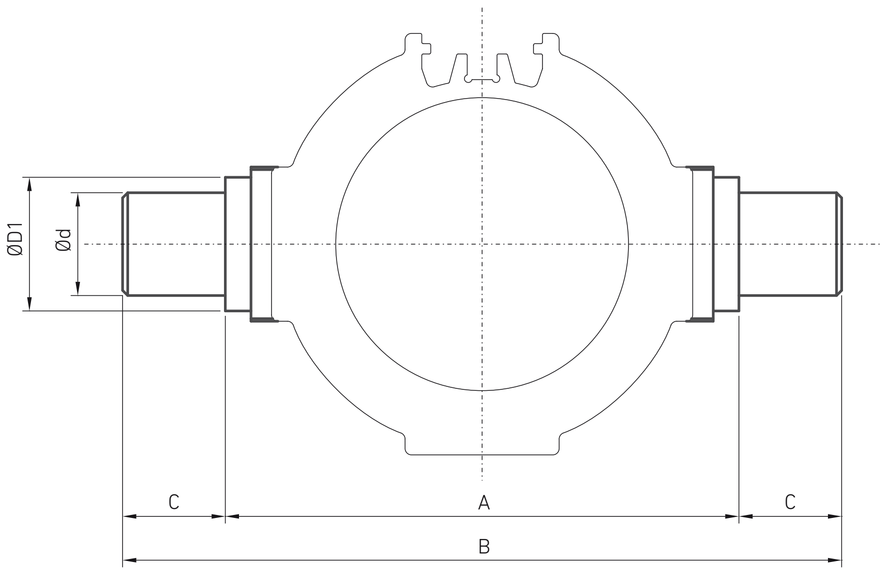
FLANGE WITH BA BOLTS

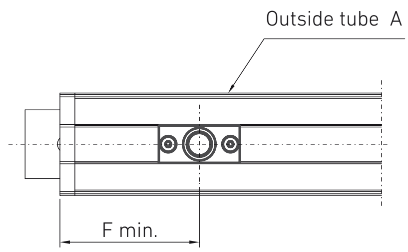
	Applicable to		
BA-1	A16	AFM1	AHM1
BA-2	A20	AFM2	AHM2
BA-3	A30	AFM3	AHM3
BA-4	A40	AFM4	AHM4



Assembly position







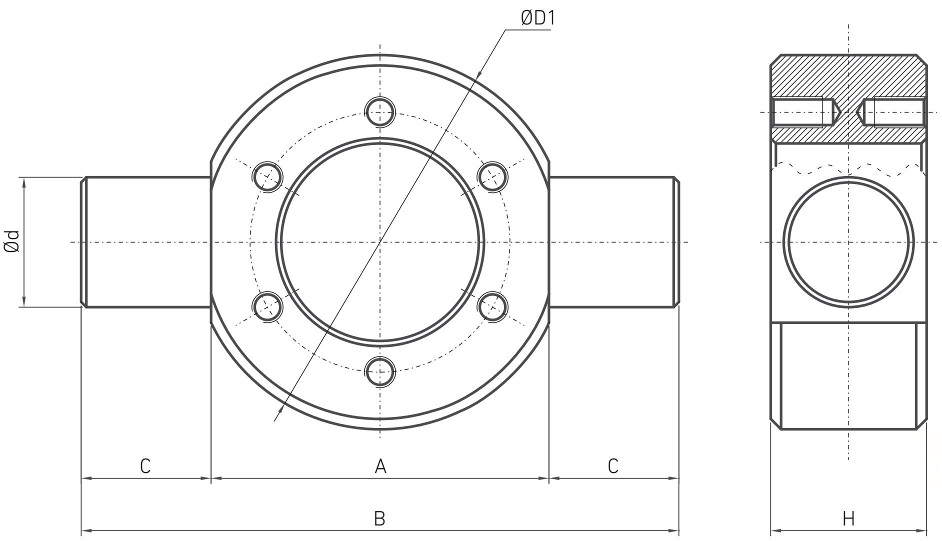
	A	B	C	Ød f8	ØD1	F	Weight (kg)
BA-1	70	110	20	15	22	90	0.2
BA-2	100	140	20	20	26	115	0.4
BA-3	125	175	25	25	40	110	0.8
BA-4	145	225	40	35	50	130	1.2

... Standard material: C45.
... Standard treatment: Bronze-plated.
... Special treatment: Zinc-plated (15-20 µm) + heat treated paint (60-80 µm).

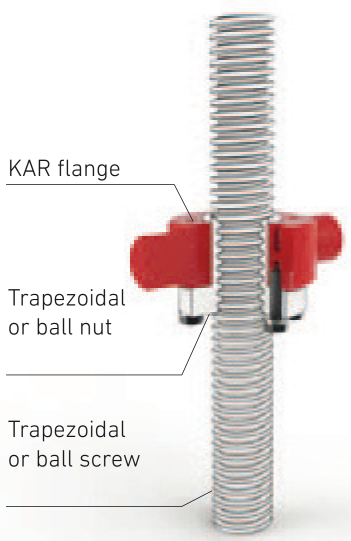
NUT FASTENING ACCESSORIES

FLANGE WITH KAR BOLTS

	Applicable to EFM nut			Applicable to KGF nut				
KAR-1	Tr 16x4	Tr 18x4		KGF-N-D 1605	KGF-D 1610			
KAR-2	Tr 20x4	Tr 24x5	Tr25x5	KGF-N-D 2005				
KAR-3	Tr 28x5	Tr 30x7		KGF-N-D 2505	KGF-D 2510	KGF-D 2520	KGF-D 2525	KGF-D 2550
KAR-4	Tr 36x6			KGF-N-D 3205	KGF-N-D 3210	KGF-D 3220	KGF-N 3240	KGF-N 4005
KAR-5	Tr 40x7			KGF-D 4005	KGF-N-D 4010	KGF-D 4020	KGF-D 4040	
KAR-6	Tr 50x8	Tr 55x9		KGF-N-D 5010				
KAR-7	Tr 60x9			KGF-D 5020	KGF-N-D 6310			
KAR-8	Tr 70x10			KGF-N 6320	KGF-N 8010			



Assembly position



	A	B	C	Ød f8	ØD1	H	Weight (kg)
KAR-1	55	85	15	15	58	20	0.35
KAR-2	60	100	20	20	66	25	0.57
KAR-3	65	115	25	25	72	30	0.82
KAR-4	85	165	40	35	94	40	2.2
KAR-5	105	185	40	45	118	50	3.9
KAR-6	120	220	50	50	133	60	5.8
KAR-7	135	255	60	70	163	80	11.9
KAR-8	155	295	70	80	183	90	18.5

... Standard material: S355.
... Standard treatment: Bronze-plated.
... Special treatment: Zinc-plated (15-20 µm) + heat treated paint (60-80 µm).

SUPPORT ACCESSORIES
SB TILT SUPPORT

	Applicable to					
	ZK flange			B flange with bolts		F/A and SH flange
SB-1	ZKM1	ZKV1	ZKV2	BB1	BA1	M205/M501/M601/M605 (F16)
SB-2	ZKM2	ZKV3		BB2	BA2	M205/M501/M601/M605 (F20 and SH20)
SB-3	ZKM3	ZKV4		BB3	BA3	M205/M501/M601/M605 (F30 and SH30)
SB-4	ZKM4	ZKV5		BB4	BA4	M205/M501/M601/M605 (F40 and SH40)
SB-5	ZKM5	ZKV6		BB5		M205/M501/M601/M605 (F45)
SB-6	ZKM6	ZKV7		BB6		M205/M501/M601/M605 (F50)
SB-7	ZKM7	ZKV8		BB7		
SB-8	ZKM8	ZKV9				
SB-9	ZKM9					

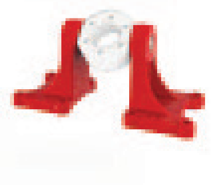
Assembly examples

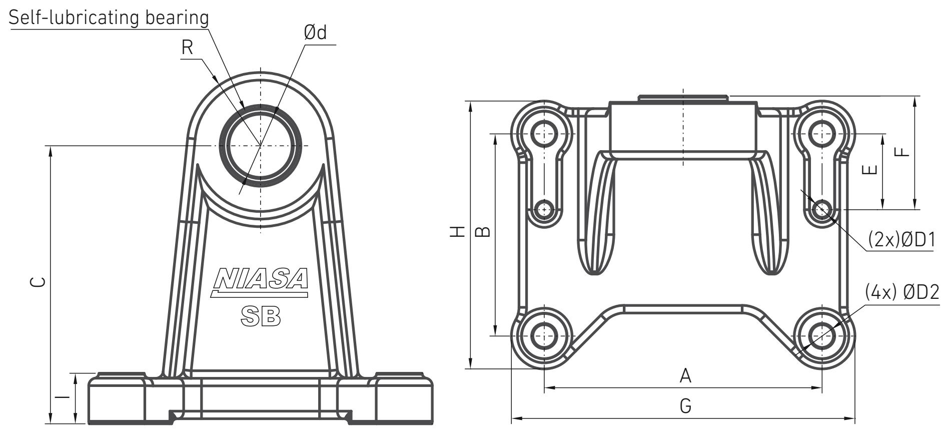
Example 1

Example 2

Example 3

Example 4



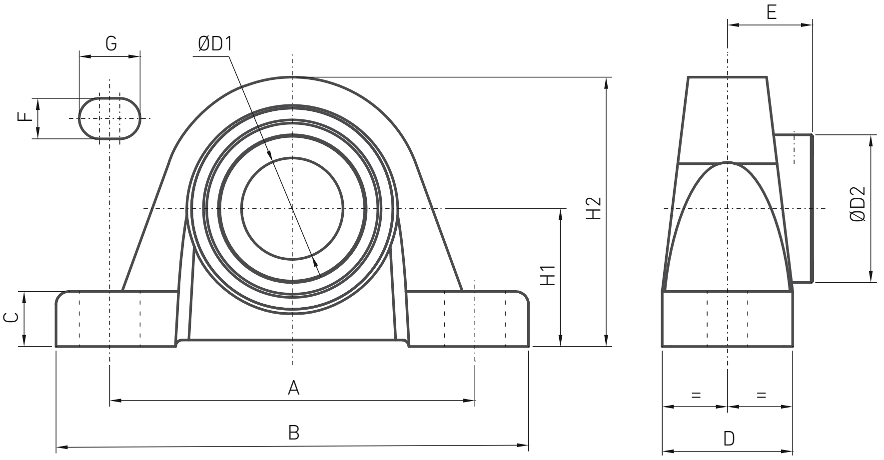


	A	B	C	Ød	ØD2	ØD1 H7	E	F	G	H	I	R	Weight (kg)
SB-1	60	45	65	15 E10	7	5	15	26	80	65	12	17.5	0.25
SB-2	80	60	85	20 E10	9	6	20	31.5	100	80	15	22.5	0.5
SB-3	110	80	110	25 G8	9	6	30	45	136	106	20	29	2.5
SB-4	170	120	150	35 G8	11	8	37	60	206	153	30	40	8.15
SB-5	190	130	160	45 G8	13	10	45	69	230	190	30	46.5	11
SB-6	210	150	175	50 G8	13	10	50	75	250	210	35	55	14.7
SB-7	230	170	200	70 G8	21	12	50	80	280	220	35	70	18.2
SB-8	250	190	240	80 G8	25	16	65	100	310	250	40	75	30
SB-9	280	220	285	90 G8	25	16	60	110	344	284	50	80	46

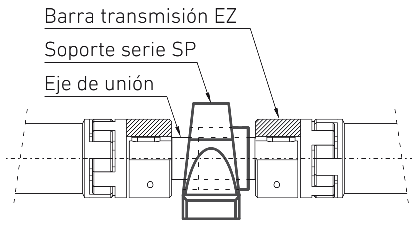
... Standard bearing material on SB1 and SB2 models: High-performance polymer.
... Standard bearing material on SB3 to SB9 models: Bronze.
... Standard material of the body on SB1 and SB2 models: Aluminum L-2560 EN AC 43000-T6.
... Standard material of the body on SB3 to SB9 models: Casting GGG 50 DIN.
... Standard treatment of the body on SB1 and SB2 models: Anodised.
... Standard treatment of the body on SB3 to SB9 models: Bronze-plated.
... Special treatment of the body only on SB3 to SB9 models: Zinc-plated (15-20 μm) + heat treated paint (60-80 μm).

SUPPORT ACCESSORIES

SUPPORT FOR SP TRANSMISSION BARS



Assembly position

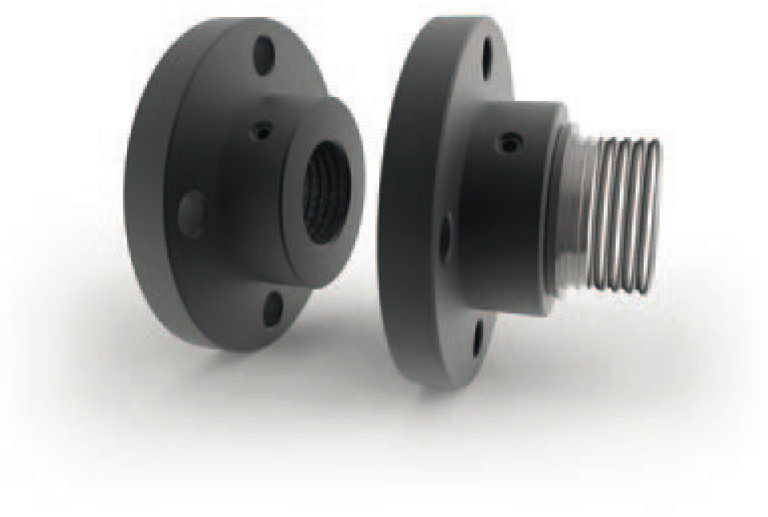


	ØD1	ØD2	A	B	C	D	E	F	G	H1	H2	C_r (N) Radial dynamic load capacity	C_{0r} (N) Radial static load capacity	Weight (kg)
SP-15	15	28	95	125	10	30	22.1	11	19	30.2	57	9,800	4,750	0.46
SP-20	20	33	97	130	14.5	32	23.5	11	19	33.3	64	12,800	6,600	0.64
SP-25	25	37.5	103	130	14.5	36	23.5	11	19	36.5	70	14,000	7,800	0.55
SP-30	30	44	118	158	17	40	26.8	14	22	42.9	82	19,500	11,300	1.04
SP-35	35	51	126	163	19	45	29.5	14	21	47.6	93	25,500	15,300	1.53
SP-40	40	58	138	179	19	48	32.7	14	26	49.2	99	32,500	19,800	1.71
SP-45	45	63	150	192	21.5	48	32.8	14	29	54	107	32,500	20,400	2.09
SP-50	50	69	158	200	21.5	54	32.8	18	23	57.2	115	35,000	23,200	2.47
SP-55	55	76	176	222	22.5	60	36.4	18	30	63.5	124.5	43,500	29,000	2.79
SP-60	60	84	190	240	25	60	39.76	18	28	69.9	140	52,000	36,000	4.35

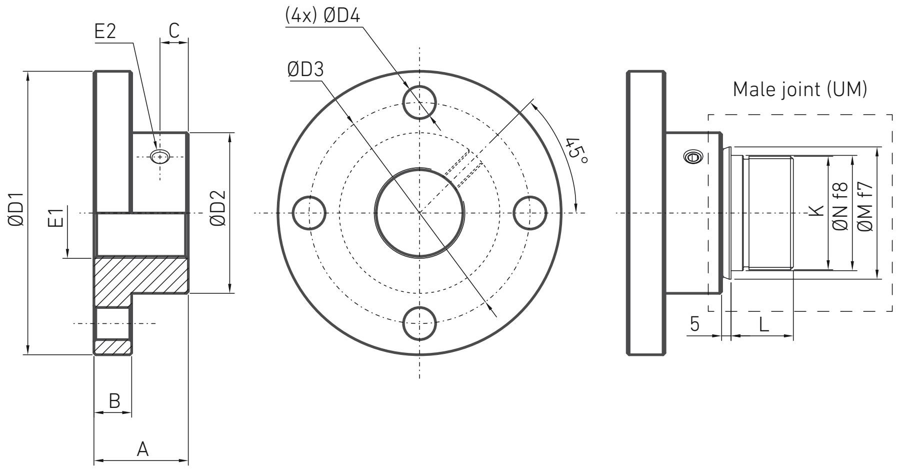
... Standard material: Grey casting.
... Standard treatment: Painted.

SCREW/STEM ACCESSORIES

BPS FLANGE



	Applicable to				
	No male joint	With male joint (UM)			
BPS-1	M1-N-W				
BPS-2	M2-N-W	F16	A16	FM1/AM1	FHM1/AHM1
BPS-3	M3-N-W	F20	A20	FM2/AM2	FHM2/AHM2
BPS-4	M4-N-W	F30	A30	FM3/AM3	FHM3/AHM3
BPS-5	M5-N-W	F40	A40	FM4/AM4	FHM4/AHM4
BPS-6	J1-N-W	F45		FM5	FHM5
BPS-7		F50		FJ1	FHJ1
BPS-8	J3-N-W				
BPS-9	J4-N-W			FJ3	FHJ3
BPS-10	J5-N-W				



Assembly position

Screw assembly

Stem assembly

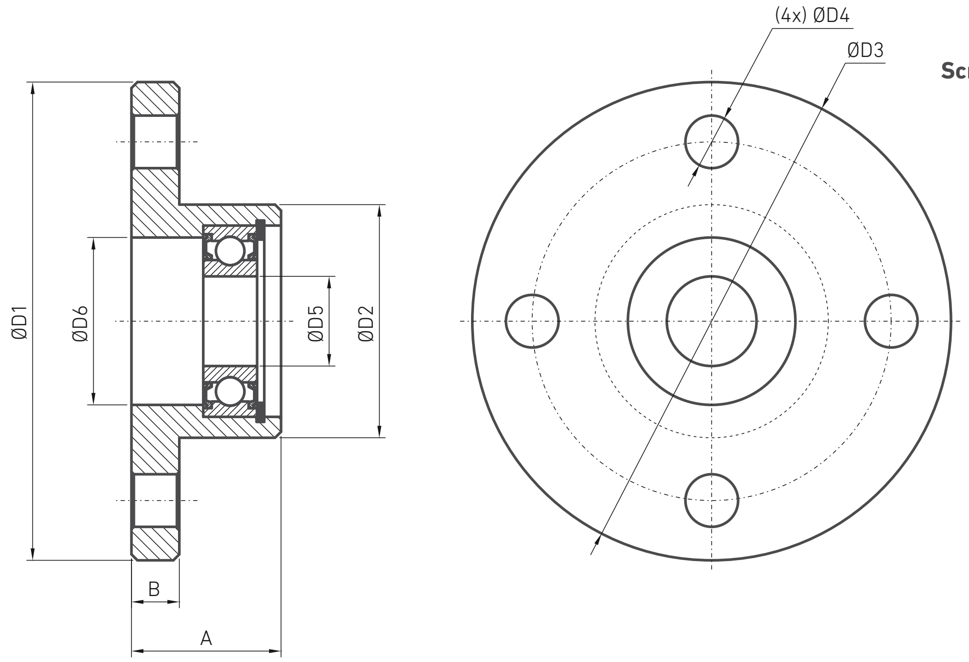
	A	B	C	ØD1	ØD2	ØD3	ØD4	E1	E2	K	L	ØM f7	ØN f8	BPS weight (kg)	BPS + UM weight (kg)
BPS-1	20	7	6.5	65	29	48	9	M12	M5					0.2	
BPS-2	21	8	6.5	80	39	60	11	M14	M6	M26x1.5	17	32	27	0.3	0.45
BPS-3	23	10	6.5	90	46	67	11	M20	M8	M27x2	24	35	29	0.6	0.8
BPS-4	30	15	7.5	110	60	85	13	M30	M8	M42x2	27	50	43	1.2	1.7
BPS-5	50	20	15	150	85	117	17	M36	M10	M60x2	33	70	62	4.8	6.1
BPS-6	50	25	12.5	170	90	130	21	M48x2	M10	M80x2	34	90	82	5	7
BPS-7	60	30	15	200	105	155	25	M56x2	M10	M95x2	40	110	100	7.7	10.5
BPS-8	60	30	15	220	120	170	25	M64x3	M12					9.8	
BPS-9	80	40	20	260	145	205	32	M72x3	M12	M110x2	65	130	114	18.4	25.4
BPS-10	120	40	40	310	170	240	38	M100x3	M12					29.6	

... Standard material: C45.
... Standard treatment: Bronze-plated.
... Special treatment: Zinc-plated (15-20 µm) + heat treated paint (60-80 µm).

SCREW/STEM ACCESSORIES

BPR FLANGE

	Applicable to	
BPR-1	M1-R	
BPR-2	M2-R	SH20
BPR-3	M3-R	SH30
BPR-4	M4-R	SH40
BPR-5	M5-R	



Screw assembly position

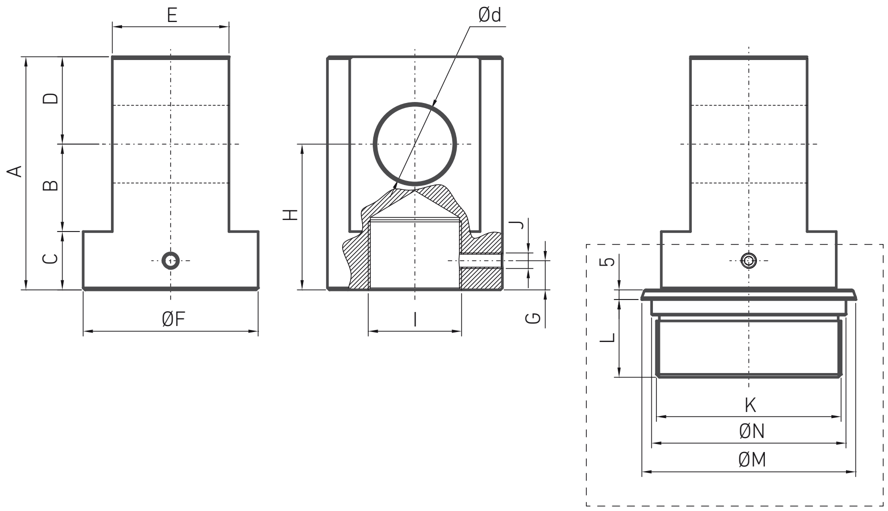
	A	B	ØD1	ØD2	ØD3	ØD4	ØD5 H7	ØD6	Weight (kg)
BPR-1	20	7	65	29	48	9	12	20	0.2
BPR-2	25	8	80	39	60	11	15	28	0.3
BPR-3	30	10	90	46	67	11	20	32	0.6
BPR-4	35	15	110	60	85	13	25	42	1.2
BPR-5	55	20	150	85	117	17	40	60	4.8

... Standard material: C45.
... Standard treatment: Bronze-plated.
... Special treatment: Zinc-plated (15-20 µm) + heat treated paint (60-80 µm).

SCREW/STEM ACCESSORIES

GKS CLEVIS ROD

	Applicable to				
	No male joint	With male joint (UM)			
GKS-1	J1-N-W				
GKS-2		F40	A40	FM4/AM4	FHM4/AHM4
GKS-3		F45		FM5	FHM5
GKS-4		F50		FJ1	FHJ1
GKS-5	J3-N-W				
GKS-6	J4-N-W			FJ3	FHJ3
GKS-7	J5-N-W				

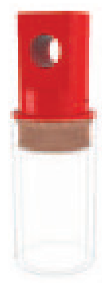


Male joint (UM)

Assembly position

Screw assembly

Stem assembly



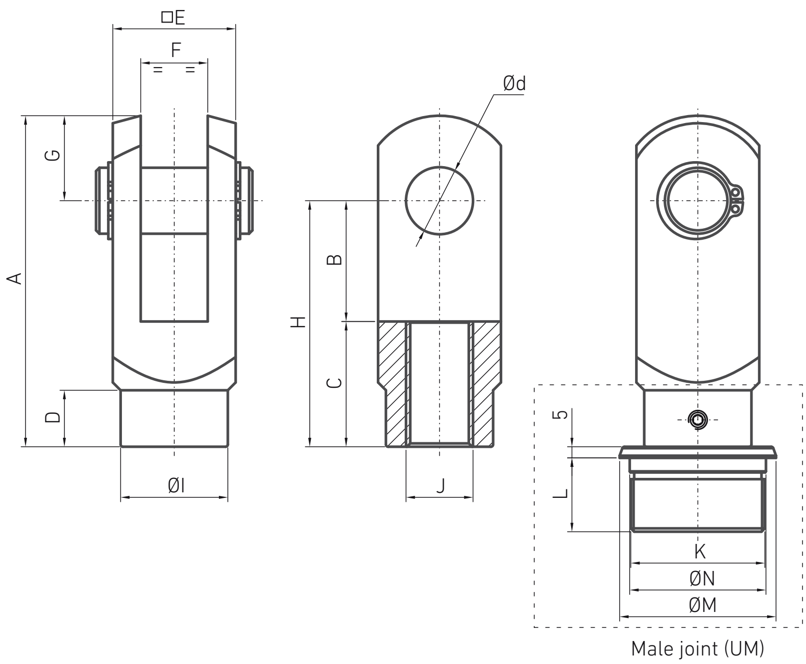
	Ød H8	A	B	C	D	E b12	ØF	G	H	I	J	K	L	ØM f7	ØN f8	GKS weight (kg)	GKS + UM weight (kg)
GKS-1	40	120	45	30	45	60	90	15	75	M48x2	M8					4.8	
GKS-2	45	120	50	30	40	60	80	15	80	M42x3	M8	M60X2	33	70	62	5.2	6.5
GKS-3	50	135	50	40	45	65	90	20	90	M45x3	M8	M80x2	34	90	82	5.8	7.8
GKS-4	60	150	60	40	50	70	100	20	100	M52x3	M10	M95x2	40	110	100	7	9.8
GKS-5	60	155	60	45	45	80	120	22	105	M64x3	M10					8	
GKS-6	80	220	85	50	75	110	145	25	135	M72x3	M12	M110x2	65	130	124	22.5	29.5
GKS-7	90	300	100	100	100	120	170	30	200	M100x3	M14					31.5	

... Standard material: C45.
... Standard treatment: Bronze-plated.
... Treatment: Zinc-plated (15-20 µm) + heat treated paint (60-80 µm).

SCREW/STEM ACCESSORIES

GKB DOUBLE CLEVIS ROD

	Applicable to				
	No male joint	With male joint (UM)			
GKB-1	M1-N-W				
GKB-2	M2-N-W				
GKB-3		F16	A16	FM1/AM1	FHM1/AHM1
GKB-4	M3-N-W	F20	A20	FM2/AM2	FHM2/AHM2
GKB-5		F30	A30	FM3/AM3	FHM3/AHM3
GKB-6	M4-N-W				
GKB-7	M5-N-W	F40	A40	FM4/AM4	FHM4/AHM4
GKB-8		F45		FM5	FHM5
GKB-9	J1-N-W	F50		FJ1	FHJ1



Assembly position

Screw assembly

Stem assembly

	Ød H9	A	B	C	D	□E	F B12	G	H	ØI	J	K	L	ØM ƒ7	ØN ƒ8	GKB weight (kg)	GKB + UM weight (kg)
GKB-1	12	62	24	22	18	24	12	16	48	20	M12					0.12	
GKB-2	14	72	28	28	22.5	27	14	16	56	24	M14					0.18	
GKB-3	16	83	32	32	24	32	16	19	64	30	M16x1.5	M26x1.5	17	32	27	0.4	0.55
GKB-4	20	105	40	40	30	40	20	25	80	34	M20	M27x2	24	35	29	0.55	0.75
GKB-5	30	148	54	56	40	55	30	38	110	48	M27x2	M42x2	27	50	43	1.44	1.95
GKB-6	30	148	60	56	40	60	30	38	120	48	M30					1.65	
GKB-7	35	188	72	72	54	70	35	44	144	60	M36					2.93	
GKB-8	40	232	84	84	63.5	85	40	64	168	70	M42x2	M60x2	33	70	62	5.34	6.64
GKB-9	50	265	96	96	73	96	50	73	192	82	M48x2	M80x2	34	90	82	7.86	9.86

... Standard material: C45.
... Standard treatment: Zinc-plated (15-20µm).
... Special treatment: Zinc-plated (15-20 µm) + heat treated paint (60-80 µm).

SCREW/STEM ACCESSORIES

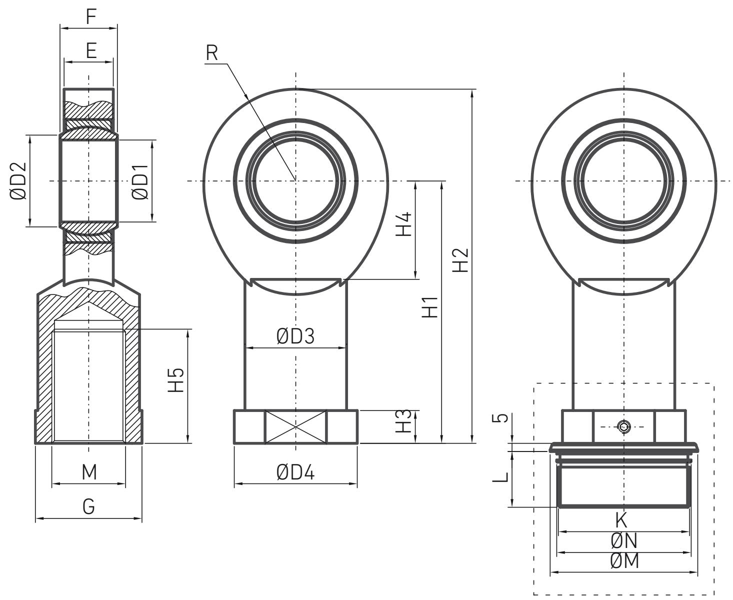
CLEVIS ROD WITH GIR BALL JOINT

Assembly position

Screw assembly

Stem assembly

	Applicable to				
	No male joint	With male joint (UM)			
GIR-12	M1-N-W				
GIR-15	M2-N-W	F16	A16	FM1/AM1	FHM1/AHM1
GIR-20	M3-N-W	F20	A20	FM2/AM2	FHM2/AHM2
GIR-30	M4-N-W	F30	A30	FM3/AM3	FHM3/AHM3
GIR-35	M5-N-W				
GIR-45	J1-N-W	F40	A40	FM4/AM4	FHM4/AHM4
GIR-50		F45		FM5	FHM5
GIR-60	J3-N-W	F50		FJ1	FHJ1
GIR-70				FJ3	FHJ3



	ØD1	ØD2	ØD3	ØD4	R	H1	H2	H3	H4	H5	E	F	G	M	K	L	ØM f7	ØN f8	GIR weight (kg)	GIR + UM weight (kg)
GIR-12	12 $^{0}_{-0,008}$	15	17.5	22	17	50	67	7	17.5	23	8	10 $^{0}_{-0,12}$	19	M12					0.096	
GIR-15	15 $^{0}_{-0,008}$	18.4	21	26	20	61	81	8	20	30	10	12 $^{0}_{-0,12}$	22	M14	M26x1.5	17	32	27	0.18	0.34
GIR-20	20 $^{0}_{-0,010}$	24.1	27.5	35	26.5	77	103.5	10	27.5	40	13	16 $^{0}_{-0,12}$	32	M20x1.5	M27x2	24	35	29	0.39	0.59
GIR-30	30 $^{0}_{-0,012}$	34.2	40	50	36.5	110	146.5	15	37	56	19	22 $^{0}_{-0,12}$	41	M30x2	M42x2	27	50	43	1.02	1.42
GIR-35	35 $^{0}_{-0,012}$	39.7	47	58	41	125	166	15	42	60	21	25 $^{0}_{-0,12}$	50	M36x3					1.46	
GIR-45	45 $^{0}_{-0,012}$	50.7	62	70	51	145	196	18	52	65	27	32 $^{0}_{-0,12}$	62	M42x3	M60x2	33	70	62	2.65	3.95
GIR-50	50 $^{0}_{-0,012}$	56	68	75	56	160	216	20	59	68	30	35 $^{0}_{-0,12}$	68	M45x3	M80x2	34	90	82	3.53	5.53
GIR-60	60 $^{0}_{-0,015}$	66.8	78	88	67.5	175	242.5	20	75	70	37	44 $^{0}_{-0,15}$	78	M52x3	M95x2	40	110	100	5.55	8.35
GIR-70	70 $^{0}_{-0,015}$	77.8	85	98	81	200	280	20	87	80	42	49 $^{0}_{-0,15}$	85	M56x4	M110x2	65	130	114	8.4	15.4

... Standard material: C 45.
... Standard treatment: Zinc-plated (15-20µm).
... Special treatment: Zinc-plated (15-20 µm) + heat treated paint (60-80 µm).

08

TRANSMISSION ACCESSORIES

ALUMINIUM COUPLING WITH EK ELASTOMER

ASSEMBLY WITH KEY

0.5 – 2,150 Nm.

FEATURES

- ... Pressure-fitting design.
- ... Adaptable to the customer's size specifications.
- ... Reduced play (keyway).

MATERIAL

- ... Hubs: up to size 450 high-resistance aluminum, size 800 steel.
- ... Elastomer: Thermally stable and wear-resistant TPU

DESIGN

Two concentrically machined hubs with curved grips (concave), keyway and studs. The elastomer is fitted at pressure for reduced play.
Standard versions electrically insulated.

OPTIONAL

Conical holes for Fanuc motors and other types of shafts of the same type are available.

NOTES ABOUT THE SPECIFICATIONS OF THE MACHINED-PRE-HOLE (D_v)OF THE COUPLING

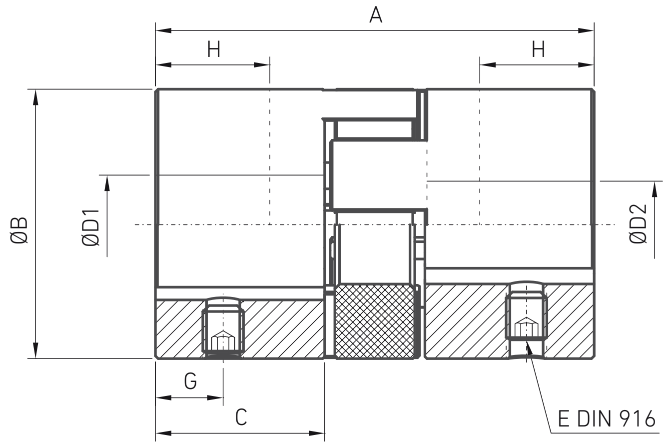
The pre-machined hole of the hubs (D_v) can be adapted to the customer's requirements. They come with a small pre-machined hole and with no stud.

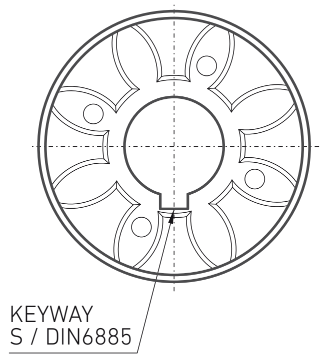
For precision applications, a concentricity tolerance of 0.03 is recommended for smooth operation. The hub can be cut to a length of no more than the H dimension.

Holes < Ø6 mm are made without keyway.

NOTES

- ... For couplings with nominal torque up to 25,000 Nm
  please ask NIASA.
- ... For further information about torsional rigidities, critical speeds, etc., please ask NIASA.





* Stud size	
Ø D_{1-2}	E
- 10	M3
> 10 - 12	M4
> 12 - 30	M5
> 30 - 58	M8
> 58 - 95	M10
> 95 - 130	M12
> 130 - 170	M16
> 130 - 170	M16

Size		2	5	10	20	60	150	300	450	800
Elastomer type		A / B / C	A / B / C	A / B / C	A / B / C	A / B / C	A / B / C	A / B / C	A / B / C	A / B / C
Nominal torque (Nm)	T_{KN}	2 / 2.4 / 0.5	9 / 12 / 2	12.5 / 16 / 4	17 / 21 / 6	60 / 75 / 20	160 / 200 / 42	325 / 405 / 84	530 / 660 / 95	950 / 1,100 / 240
Maximum torque (Nm)	T_{Kmax}	4 / 4.8 / 1	18 / 24 / 4	25 / 32 / 6	34 / 42 / 12	120 / 150 / 35	320 / 400 / 85	650 / 810 / 170	1,060 / 1,350 / 190	1,900 / 2,150 / 400
Total length (mm)	A	20	34	35	66	78	90	114	126	162
Exterior diameter (mm)	B	15	25	32	42	56	66.5	82	102	136.5
Pivot length (mm)	C	6.5	12	12	25	30	35	45	50	65
Pre-hole diameter (mm)	D_v	3	4	6	7	9	14	18	22	29
Interior hole range H7 (mm)	D_{1-2}	3 - 9	6 - 15	6 -18	8 - 25	12 - 32	19 - 38	20 - 45	28 - 60	32 - 80
Interior elastomer diameter (mm)	D_E	6.2	10.2	14.2	19.2	26.2	29.2	36.2	46.2	60.5
Studs (DIN 916)	E	See table (Depends on the Ø of the hole)*								
Stud distances (mm)	G	3	5	6	9	11	12	15	17	30
Possible length to cut (mm)	H	4	6	6	19	22	26	32	37	43
Inertia moment by hub (10^{-3} kgm^2)	J_1/J_2	0.0001	0.001	0.003	0.02	0.06	0.1	0.4	1.1	12
Approximate weight (kg)		0.008	0.03	0.08	0.15	0.35	0.6	1.1	1.7	11
Standard speed (min^{-1})		15.000	15.000	13.000	15.500	11.000	10.000	9.000	8.000	4.000
Balanced speed (10^{-3} min^{-1})		60 / 67 / 45	57 / 65 / 43	53 / 63 / 40	45 / 60 / 35	31 / 31 / 25	22 / 26 / 18	22 / 26 / 16	16 / 17 / 12	13 / 13 / 8

For information about shaft misalignment, torsional rigidity and other details about the elastomer inserts, please see the corresponding chapter.

Placing an order

Model	Size	Elastomer type	Hole D_1 H7	Hole D_2 H7	XX
EK	60	A	19	25	Special requirements

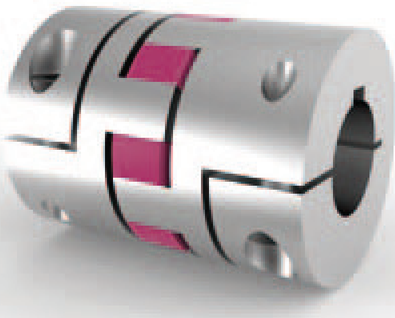
For custom specifications, please indicate the special requirements in the box XX.

For example: XX= Anodized aluminum, stainless steel, special hole tolerance, DIN / ANSI keyways, s/flat holes, Fine balanced (25,000 rpm), ISO G2.5 fine balanced (30,000 rpm), etc.

NIASA

TRANSMISSION ACCESSORIES

ALUMINIUM-PAINTED COUPLING WITH PK ELASTOMER



STANDARD VERSION
WITH FASTENING HUB

6 – 2,150 Nm.

FEATURES

... Easy assembly.
... High concentricity assembly.
... Vibration absorption.

MATERIAL

... Hubs: up to size 450 high-resistance aluminum, size 800 steel.
... Elastomer: Thermally stable and wear-resistant TPU

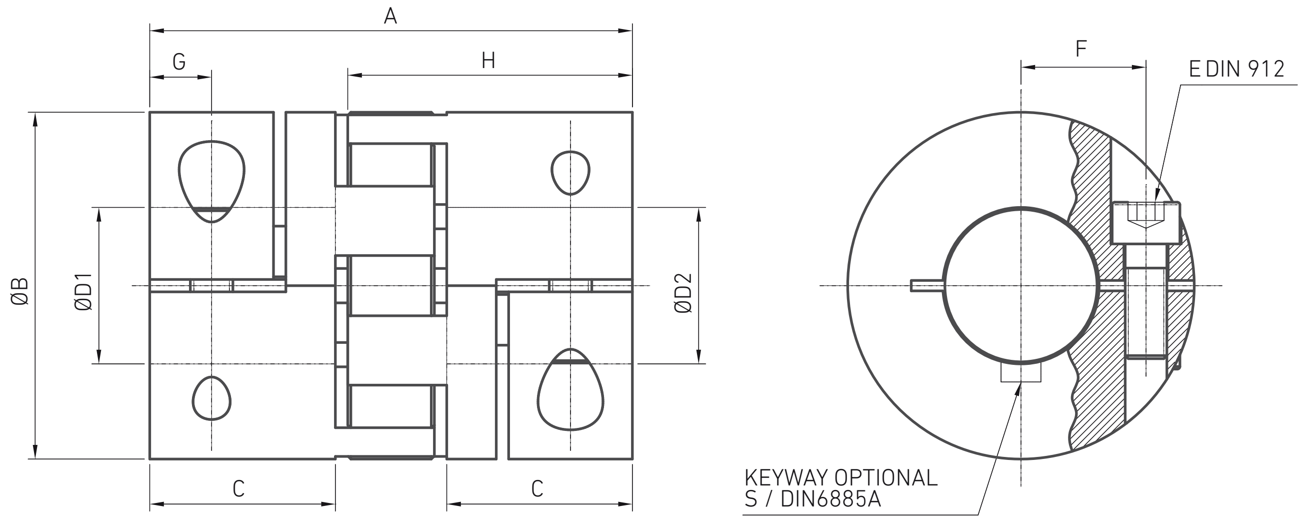
DESIGN

Two concentrically machined hubs with curved grips (concave) and fastening screws.

The elastomer is fitted at pressure for reduced play.

Standard versions electrically insulated.

Note: For further information about torsional rigidities, critical speeds, etc., please ask NIASA.



Size		20			60			150			300			450			800		
Elastomer type		A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Nominal torque (Nm)	T_{KN}	17	21	6	60	75	20	160	200	42	325	405	84	530	660	95	950	1,100	240
Maximum torque (Nm)	T_{Kmax}	34	42	12	120	150	35	320	400	85	650	810	170	1,060	1,350	190	1,900	2,150	400
Total length (mm)	A	66			78			90			114			126			162		
Exterior diameter (mm)	B	42			56			66.5			82			102			136.5		
Exterior diameter with the head of the screw (mm)	B_s	44.5			57			68			85			105			139		
Pivot length (mm)	C	25			30			35			45			50			65		
Interior hole range H7 (mm)	D_{1-2}	8 - 25			12 - 32			19 - 38			20 - 45			28 - 60			32 - 80		
Interior elastomer diameter (mm)	D	19.2			26.2			29.2			36.2			46.2			60.5		
Fastening screw (ISO 4762 / DIN912)	E	M5			M6			M8			M10			M12			M16		
Fastening torque of the fastening screw (Nm)		8			15			35			70			120			290		
Distance between the centres (mm)	F	15.5			21			24			29			38			50.5		
Screw distance (mm)	G	8.5			10			12			15			17.5			23		
Inertia moment by hub (10^{-3} kgm^2)	J_1/J_2	0.016			0.05			0.13			0.4			0.9			9.5		
Approximate weight (kg)		0.15			0.35			0.6			1.1			1.7			10		
Standard speed (min^{-1})		12.500			11.000			10.000			9.000			8.000			4.000		
Balanced speed (10^{-3} min^{-1})		45	60	35	31	31	25	22	26	18	22	26	16	16	17	12	13	13	8

For information about shaft misalignment, torsional rigidity and other details about the elastomer inserts, please see the corresponding chapter.

The maximum torque transferrable by the fastening flange depends on the diameter of the hole.

Size	Ø8	Ø16	Ø19	Ø25	Ø30	Ø32	Ø35	Ø45	Ø50	Ø55	Ø60	Ø65	Ø70	Ø75	Ø80
20	20	35	45	60											
60		50	80	100	110	120									
150			120	160	180	200	220								
300			200	230	300	350	380	420							
450					420	480	510	600	660	750	850				
800							700	750	800	835	865	900	925	950	1,000

Possibility to transfer more torque with keyways.

Placing an order

Model	Size	Elastomer type	Hole D_1 H7	Hole D_2 H7	XX
PK	60	A	19	25	Special requirements

For personalised specifications, enter XX in the box at the end of the order for special requirements:
For example: XX= Anodized aluminum, stainless steel, special hole tolerance, DIN / ANSI keyways, s/flat holes, fine balanced (25,000 rpm), ISO G2.5 fine balanced (30,000 rpm), etc.

TRANSMISSION ACCESSORIES

ALUMINIUM-PAINTED COUPLING WITH BK BELLOW

WITH FASTENING HUB

2 – 500 Nm.

FEATURES

... Easy assembly.
... Lightweight and low inertia moment.
... Economical design.

MATERIAL

... Bellow: High-grade stainless steel.
... Hubs: see table.

DESIGN

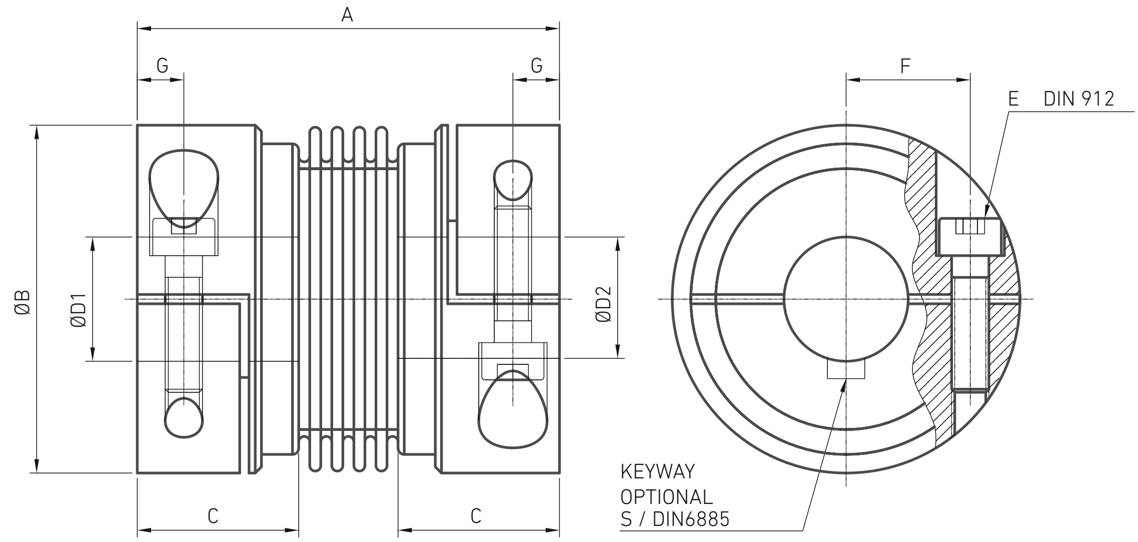
Two hubs with fastening flange fitted concentrically to a flexible bellow and fastening screws.

Accepts slight overloads of up to 1.5 x the nominal torque.

Optional

Fastening system with self-opening for opening the hole for loosening the fastening screw during installation and extraction.

Note: For further information about torsional rigidities, critical speeds, etc., please ask NIASA.



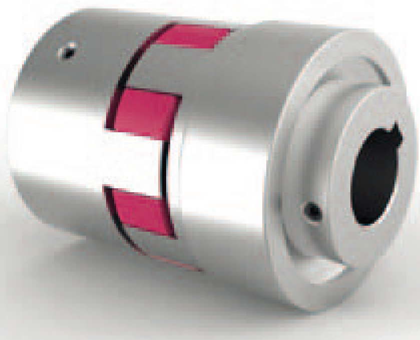
Size		2	4.5	10	15	30	60	80	150	300	500
Nominal torque (Nm)	T_{KN}	2	4.5	10	15	30	60	80	150	300	500
Total length (mm)	A^{-2}	30	40	44	58	68	79	92	92	109	114
Exterior diameter (mm)	B	25	32	40	49	56	66	82	82	110	123
Adjustment length (mm)	C	10.5	13	13	21.5	26	28	32.5	32.5	41	42.5
Interior hole range H7 (mm)	D_{1-2}	4 - 12.7	6 - 16	6 - 24	8 - 28	10 - 32	14 - 35	16 - 42	19 - 42	24 - 60	35 - 62
Fastening screw (ISO 4762 / DIN912)	E	M3	M4	M4	M5	M6	M8	M10	M10	M12	M16
Fastening torque of the fastening screw (Nm)		2.3	4	4.5	8	15	40	70	85	120	200
Distance between the centres (mm)	F	8	11	14	17	20	23	27	27	39	41
Screw distance (mm)	G	4	5	5	6.5	7.5	9.5	11	11	13	17
Inertia moment (10^{-3} kgm^2)	J_1/J_2	0.002	0.007	0.016	0.065	0.12	0.3	0.75	1.8 0.8	7.5 3.1	11.7 4.9
Hub material		Alumi-num Op. steel	Alumi-num Op. steel	Alumi-num Op. steel	Alumi-num Op. steel	Alumi-num Op. steel	Alumi-num Op. steel	Alumi-num Op. steel	Steel Op. alum.	Steel Op. alum.	Steel Op. alum.
Approximate weight (kg)		0.02	0.05	0.06	0.16	0.25	0.4	0.7	1.7 0.75	3.8 1.6	4.9 2.1
Torsional rigidity (103 Nm/rad)	C_T	1.5	7	9	23	31	72	80	141	157	290
Axial ± (mm)	Max. value	0.5	1	1	1	1	1.5	2	2	2	2.5
Lateral ± (mm)		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Angular ± (grades)		1	1	1	1	1	1	1	1	1	1
Spring axial rigidity (N/mm)	C_a	8	35	30	30	50	67	44	77	112	72
Spring lateral rigidity (N/mm)	C_r	50	350	320	315	366	679	590	960	2,940	1,450

Placing an order

Model	Size	Elastomer type	Hole D_1 H7	Hole D_2 H7	XX
BK	60	A	19	25	Special requirements

For personalised specifications, enter XX in the box at the end of the order for special requirements:
For example: XX= Anodized aluminum hubs, stainless steel hubs, special hole tolerance, DIN / ANSI keyways, s/flat holes, fine balanced (25,000 rpm), etc.

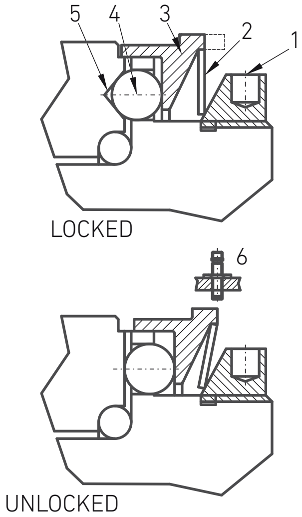
ALUMINIUM COUPLING WITH ELASTOMER AND ES TORQUE LIMITER



GENERAL SPECIFICATIONS

NIASA safety couplings work as a clutch by retaining balls pressed by spring. They protect the drive system (motors, gears, screws, etc.) from damage that may be caused by collisions and other types of machine overloads.

- The torque is transmitted by means of very hard balls (4) pressed on to conical locking mechanisms (5).
- The balls are pressed in the conical housings with a spring washer (2) through the commutator plate (3).
- The disconnecting torque can be adjusted at any time using the torque adjustment nut (1).
- The balls input their locking mechanisms, moving the commutator plate and the spring washer system back, disconnecting the input from the input.
- The movement of the commutator plate can be used by a proximity sensor (6) to send a stop signal.



OPERATING SYSTEM

Automatic re-engage:

In this design the spring washer continues applying a residual load after disconnection.

This load is sufficient to re-engage the coupling automatically once the torque has dropped from the calibrated value.

Single position: Re-engaging only occurs in the original position maintaining the synchronicity of the shafts.

Multi-position: Re-engaging occurs in multiple angular intervals. As standard at 60º (30º, 45º, 90º, 120º, as optional) .

Note: Re-engaging only occurs at low speeds.

ASSEMBLY WITH KEY AND ELASTOMER FOR DIRECT DRIVE

1 – 150 Nm.

MATERIAL

- Hubs: up to size 450 high-resistance aluminum.
- Clutch system: High-resistance steel, balls made from hard steel.
- Elastomer: Thermally stable and wear-resistant TPU

DESIGN

Two concentrically machined hubs with curved grips (concave), keyway and studs. The elastomer is fitted at pressure for reduced play.

Vibration absorption.

Standard versions electrically insulated.

The clutch system is integrated in one of the hubs. All the couplings have multi-position functioning according to the pre-load given, to the ball locking system.

WEAR

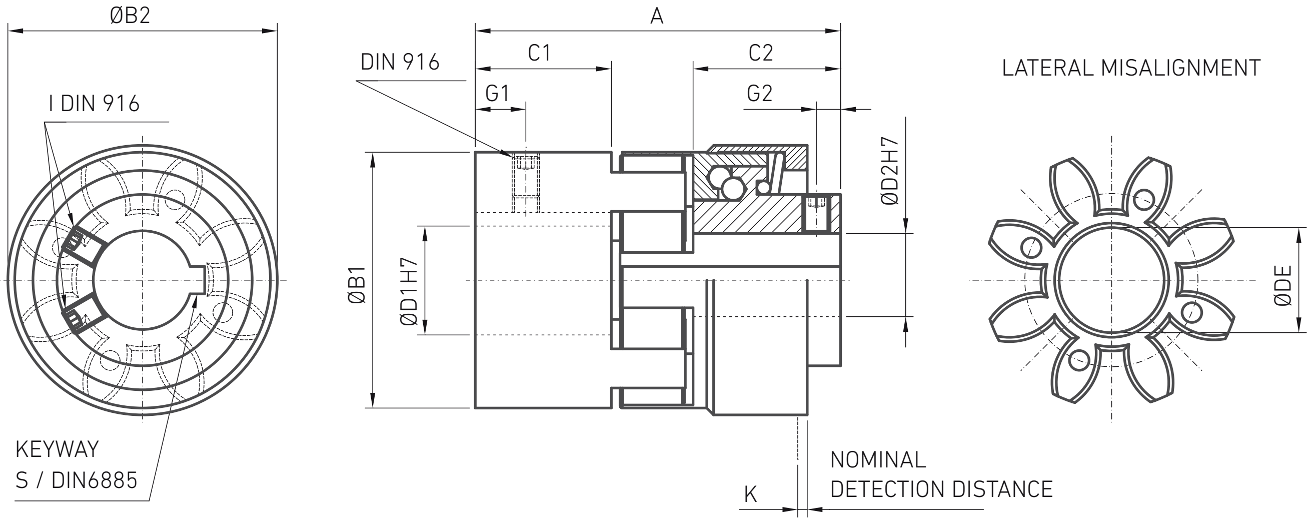
Negligible below 200 rpm. Contact NIASA for high speed applications.

DISCONNECTION TORQUE ADJUSTMENT

The ES coupling is different to other safety couplings, the disconnection torque is permanent and tamper-proof.

Holes < Ø6 mm are made without keyway.

Note: For further information about torsional rigidities, critical speeds, etc., please ask NIASA.



* Stud size	
Ø D_{1-2}	E
- 10	M3
> 10 - 12	M4
> 12 - 30	M5
> 30 - 58	M8
> 58 - 95	M10

Size		5		10		20		60		150	
Elastomer type		A	B	A	B	A	B	A	B	A	B
Nominal torque (Nm)	T_{Kn}	9	12	12.5	16	17	21	60	75	160	200
Torque adjustment from - to (Nm)	T_{Kn}	1 - 6		1 - 12		3 - 19		5 - 60		20 - 150	
Total length (mm)	A	34		45		64		80		90	
Exterior diameter (mm)	B_1	25		32		42		56		66.5	
Exterior diameter (mm)	B_2	29		32		46		59		75	
Pivot length (mm)	C_1	12.5		12		25		30		35	
Pivot length (mm)	C_2	11.5		20		22		31		35	
Interior hole range H7 (mm)	D_1	6 - 15		6 - 18		8 - 25		12 - 32		19 - 38	
Interior hole range H7 (mm)	D_2	6 - 10		6 -12		8 - 19		12 - 24		19 - 32	
Interior elastomer diameter (mm)	D_E	10.2		14.2		19.2		26.2		29.2	
Studs (DIN 916)	E	See table (Depends on the Ø of the hole)*									
Stud distance (mm)	G_1	5		6		9		11		12	
Stud distance (mm)	G_2	2.5		3.5		4		4		4	
Inertia moment (10^{-3} kgm^2)	J_1/J_2	0.001		0.002		0.08		0.15		0.5	
Approximate weight (kg)		0.05		0.15		0.2		0.5		1	
Action distance (min^{-1})	K	0.6		0.6		0.7		1.1		1.4	

For information about shaft misalignment, torsional rigidity and other details about the elastomer inserts, please see the corresponding chapter.

Placing an order

Model	Size	Elastomer type	Hole D_1 H7	Hole D_2 H7	XX
ES	60	A	19	25	Special requirements

For personalised specifications, enter XX in the box at the end of the order for special requirements:
For example: XX= Anodized aluminum, stainless steel, special hole tolerance, DIN / ANSI keyways, s/flat holes, Fine balanced (25,000 rpm), ISO G2.5 fine balanced (30,000 rpm), etc.

TRANSMISSION ACCESSORIES

STEEL COUPLING WITH RA ELASTOMER

ASSEMBLY WITH KEY

7.5 – 4,500 Nm.

FEATURES

- Pressure-fitting design.
- Two types of hubs (short and long) to adapt to the customer's requirements.
- Reduced play (keyway).

MATERIAL

- Hubs: up to size 28 steel, from size 38 GG25 casting.
- Elastomer: Thermally stable and wear-resistant TPU

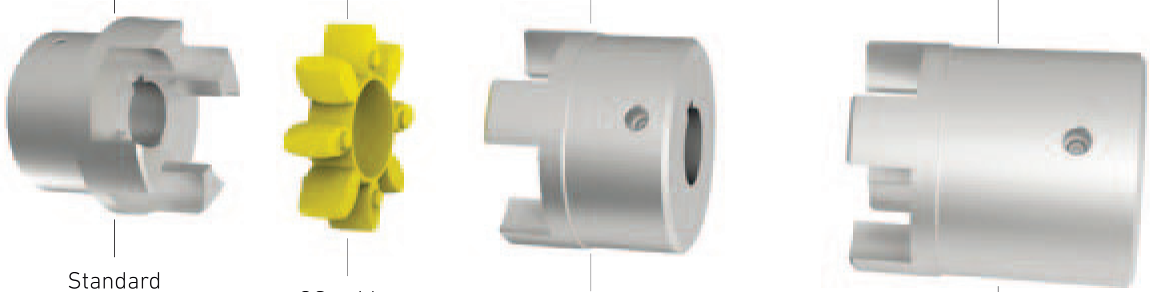
DESIGN

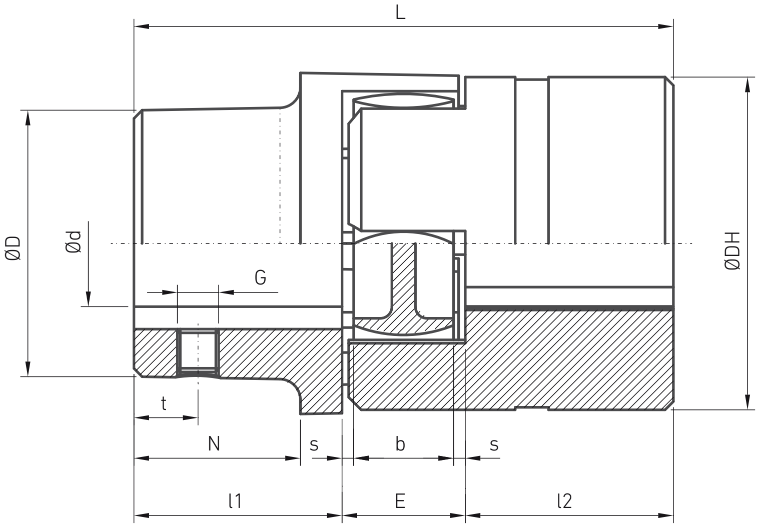
Two concentrically machined hubs with curved grips (concave), keyway and studs.

The elastomer is fitted at pressure for reduced play.

Since the hubs do not have pre-hole there is no limitation in terms of the minimum diameter of the shaft for any size.

Note: For further information about torsional rigidities, critical speeds, etc., please ask NIASA.





RA Series elastic coupling

Size	Component	"Spider (part 2) Nominal torque [Nm]"			DIMENSIONS [mm]											
					"Hole d (min-max)"	General						Spec. Steel		Thread for screws		
		92 Sh A	98 Sh A	64 Sh D		L	l1 ; l2	E	b	s	D_H	D;D_1	N	G	t	TA (Nm)
14	1a	7.5	12.5	16	0-16	35	11	13	10	1.5	30	30	-	M4	5	1.5
	1b					50	18.5									
19	1a	10	17	21	0-25	66	25	16	12	2	40	40	-	M5	10	2
	1b					90	37									
24	1a	35	60	75	0-35	78	30	18	14	2	55	55	-	M5	10	2
	1b					118	50									
28	1a	95	160	200	0-40	90	35	20	15	2.5	65	65	-	M8	15	10
	1b					140	60									
Casting EN-GJL-250 (GG25)																
38	1	190	325	405	12-40	114	45	24	18	3	80	66	37	M8	15	10
	1a				38-48							78				
	1b				12-48	164	70						62			
42	1	265	450	560	14-45	126	50	26	20	3	95	75	40	M8	20	10
	1a				42-55							94				
	1b				14-55	176	75						65			
48	1	310	525	655	15-52	140	56	28	21	3.5	105	85	45	M8	20	10
	1a				48-62							104				
	1b				15-62	188	80						69			
55	1	410	685	825	20-60	160	65	30	22	4	120	98	52	M10	20	17
	1a				55-74							118				
	1b				20-74	210	90						120			
65	1	625	940	1,175	22-70	185	75	35	26	4.5	135	115	61	M10	20	17
	1a				65-80							135				
	1b				22-80	235	100									
75	1	1,280	1,920	2,400	30-80	210	85	40	30	5	160	135	69	M10	25	17
	1a				75-95							160				
	1b				30-95	260	110									
90	1	2,400	3,600	4,500	40-97	245	100	45	34	5.5	200	160	81	M12	30	40
	1a				90-110							200				
	1b				40-110	295	125									

Placing an order

Coupling size	Material	Spider hardness (Shore A)	Hub type	Hole	Hub type	Hole
RA-19	St	92	1a	ø20	1a	ø15

08

TRANSMISSION ACCESSORIES

TRANSMISSION SHAFT PAINTED IN ALUMINIUM WITH EZ ELASTOMER

WITH TOTALLY DIVIDED FASTENING HUB

12.5 – 2,150 Nm.

FEATURES

... Easy assembly and disassembly.
... Standard lengths up to 4 m.
... Does not require intermediate bearing supports.

MATERIAL

... Hubs: up to size 450 high-resistance aluminum, size 800 steel.

... Intermediate tube: up to size 450 high resistance aluminum 800 steel, optionally CKF tube on request.

... Elastomer: Thermally stable and wear-resistant TPU

DESIGN

Two concentrically machined hubs with curved grips (concave) and fastening screws. The elastomer is fitted at pressure for zero play, absorption of vibratios and the standard versions are electrically insulated. The intermediate precision tube has great lateral straightness and rigidity.

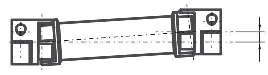
INSTALLATION

The total length (A) is selected correctly by means of the distance between the sides of both shafts (P) plus 2x the size (O).

For transmission shafts up to 25,000 Nm please ask NIASA.

Note: For further information about torsional rigidities, critical speeds, etc., please ask NIASA.

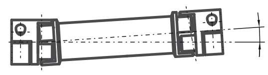
Lateral misalignment



$\Delta Kr_{max} = \tan \Delta_{Kw/2}\, AB$ (m)

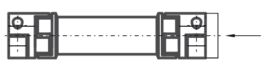
AB = A - 2 x N

Angular misalignment



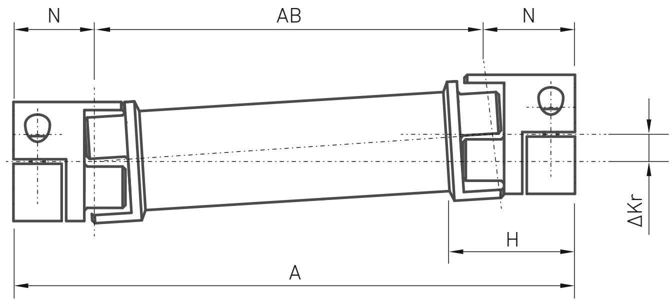
ΔKW_{max} = ca. 2°

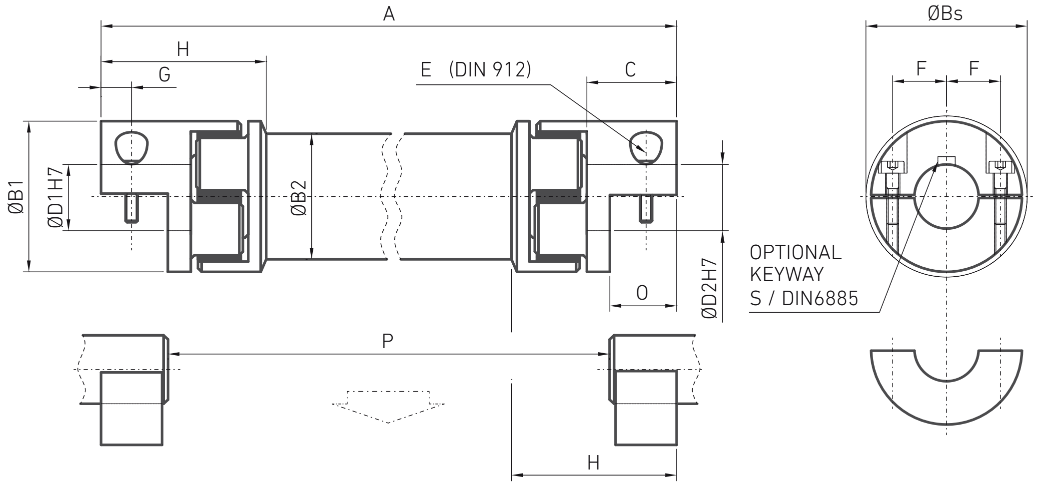
Axial misalignment



Δ Ka = see table

	Max. axial misalignment Δ Ka (mm)
10	2
20	4
60	4
150	4
300	4
450	4
800	4





SIZE		10		20		60		150		300		450		800	
Elastomer type		A	B	A	B	A	B	A	B	A	B	A	B	A	B
Nominal torque (Nm)	T_{KN}	12.5	16	17	21	60	75	160	200	325	405	530	660	950	1,100
Maximum torque (Nm)	T_{Kmax}	25	32	34	42	120	150	320	400	650	810	1,060	1,350	1,900	2,150
Total length (mm)	A	95 - 4,000		130 - 4,000		175 - 4,000		200 - 4,000		245 - 4,000		280 - 4,000		320 - 4,000	
Exterior diameter (mm)	B_1	32		42		56		66.5		82		102		136.5	
Exterior diameter of the tube (mm)	B_2	28		35		50		60		76		90		120	
Exterior diameter with the head of the screw (mm)	B_S	32		44.5		57		68		85		105		139	
Pivot length (mm)	C	20		25		40		47		55		65		79	
Interior hole range H7 (mm)	$D_{1/2}$	5-16		8-25		14-32		19-36		19-45		24-60		35-80	
Interior elastomer diameter (mm)	D_E	14.2		19.2		26.2		29.2		36.2		46.2		60.5	
Fastening screw (ISO 4762 / DIN912)	E	4xM4		4xM5		4xM6		4xM8		4xM10		4xM12		4xM16	
Fastening torque of the fastening screw (Nm)	E	4		8		15		35		70		120		290	
Distance between the centres (mm)	F	10.5		15.5		21		24		29		38		50.5	
Screw distance (mm)	G	7.5		8.5		15		17.5		20		25		30	
Length of the sides (mm)	H	34		46		63		73		86		99		125	
Inertia moment by hub (10^{-3} kgm^2)	J^1/J^2	0.01		0.02		0.15		0.21		1.02		2.3		17	
Inertia moment of the tube by metre (10^{-3} kgm^2)	J^3	0.075		0.183		0.66		1.18		2.48		10.6		38	
Combined dynamic torsional rigidity of the elastomers (Nm/rad)	C_{TdynE}	270	825	1,270	2,220	3,970	5,950	6,700	14,650	11,850	20,200	27,700	40,600	41,300	90,000
Torsional rigidity of the tube by metre (Nm/rad)	C_{TZWR}	321		1,530		6,632		11,810		20,230		65,340		392,800	
Average value of the shaft (mm)	N	26		33		49		57		67		78		94	
Assembly length (mm)	O	16.6		18.6		32		37		42		52		62	

For information about shaft misalignment, torsional rigidity and other details about the elastomer inserts, please see the corresponding chapter.

The maximum torque transferrable by the fastening flange depends on the diameter of the hole.

SIZE	Ø6	Ø8	Ø16	Ø19	Ø25	Ø30	Ø32	Ø35	Ø45	Ø50	Ø55	Ø60	Ø65	Ø70	Ø75	Ø80
10	6	12	32													
20		30	40	50	65											
60			65	120	150	180	200									
150				180	240	270	300	330								
300				300	340	450	520	570	630							
450						630	720	770	900	1,120	1,180	1,350				
800								1,050	1,125	1,200	1,300	1,400	1,450	1,500	1,550	1,600

Possibility to transfer more torque with keyways.

Placing an order

Model	Size	Total length	Elastomer type	Hole D_1 H7	Hole D_1 H7	XX
EZ	60	1,200	A	19	25	Special requirements

For personalised specifications, enter XX in the box at the end of the order for special requirements:
For example: XX= Anodized aluminum, stainless steel, special hole tolerance, DIN / ANSI keyways, s/flat holes, Fine balanced (25,000 rpm), ISO G2.5 fine balanced (30,000 rpm), etc.

TRANSMISSION ACCESSORIES

ELASTOMERS FOR COUPLINGS EK-PK-ES-EZ

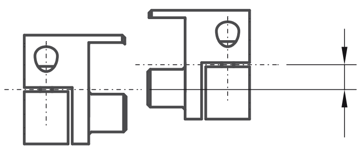
FUNCTION

The joining element in the couplings (with the exception of the couplings with metallic spring) is the elastomer insert. This transfers the torque with no play or vibratios and defines the specifications of the entire transfer system.

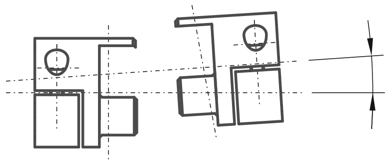
The play is eliminated by means of the elastomer housing at pressure in the hubs. The coupling system can be optimised to the specifications of the most suitable torsion by varying the Shore hardness of the elastomer.

MISALIGNMENT SHAFTS

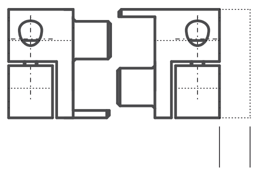
Lateral misalignment



Angular Misalignment



Axial misalignment



Elastomer types	Hardness (Shore)	Colour	Material	Relative absorption (μ)	Temperature range	Specifications
A	98 Sh A	Red	TPU	0.4 - 0.5	-30ºC up to +100ºC	High absorption
B	64 Sh D	Green	TPU	0.3 - 0.45	-30ºC up to +120ºC	High resistance to torsion
C	80 Sh A	Yellow	TPU	0.3 - 0.4	-30ºC up to +100ºC	Very high absorption
D*	65 Sh D	Black	TPU	0.3 - 0.45	-30ºC up to +70ºC	Electrical conductivity
E	64 Sh D	Beige	Hytrel	0.3 - 0.45	-50ºC up to +150ºC	Resistant to temperature

* The electrical conductivity of the elastomer material is to prevent electrostatic loads of the coupling system, and to reduce the risk of sparks while working. The ATEX technical data sheet is available on request.

The relative absorption values have been defined at 10 Hz y +20ºC

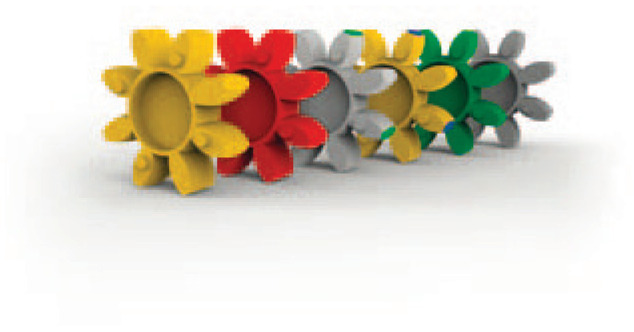
Size		2			5			10			20			60		
Elastomer type		A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Static torsional rigidity (Nm/rad)	C_T	50	115	17	150	350	53	260	600	90	1,140	2,500	520	3,290	9,750	1,400
Dynamic torsional rigidity (Nm/rad)	C_{Tdyn}	100	230	35	300	700	106	541	1,650	224	2,540	4,440	876	7,940	11,900	2,072
Lateral (mm)	Max. max.	0.08	0.06	0.2	0.08	0.06	0.2	0.1	0.08	0.22	0.1	0.08	0.25	0.12	0.1	0.25
Angular (grades)		1	0.8	1.2	1	0.8	1.2	1	0.8	1.2	1	0.8	1.2	1	0.8	1.2
Axial (mm)			±1			±1			±1			±2			±2	

Size		150			300			450			800		
Elastomer type		A	B	C	A	B	C	A	B	C	A	B	C
Static torsional rigidity (Nm/rad)	C_T	4,970	10,600	2,000	12,400	18,000	3,000	15,100	27,000	4,120	41,300	66,080	10,320
Dynamic torsional rigidity (Nm/rad)	C_{Tdyn}	13,400	29,300	3,590	23,700	40,400	6,090	55,400	81,200	11,600	82,600	180,150	28,600
Lateral (mm)	Max. max.	0.15	0.12	0.3	0.18	0.14	0.35	0.2	0.18	0.35	0.25	0.2	0.4
Angular (grades)		1	0.8	1.2	1	0.8	1.2	1	0.8	1.2	1	0.8	1.2
Axial (mm)			±2			±2			±2			±2	

Static torsional rigidity at 50% T_{KN}
Dynamic torsional rigidity at T_{KN}

TRANSMISSION ACCESSORIES

ELASTOMERS FOR RA COUPLINGS



Standard spider						
Elastomer type	Hardness (Shore)	Colour	Material	Permanent temperature (˚C)		Typical applications
				Continuous temperature	Max. transitory temperature	
A	92 Sh A	yellow	polyurethane	- 40 to + 90	- 50 a + 120	- For any general application: engineering and hydraulics - Applications with medium elasticity
B	95/98 Sh A	red	polyurethane	- 30 a + 90	- 40 a + 120	- Good torque transmission with excellent absorption properties.
C	64 Sh D-F	natural white with green mark	polyurethane	-30 to +110	-30 to +130	- I.C. Motors - High hygroscopy, resistant to hydrolysis. - Critical speeds.
Special spiders on request						
D	94 Sh A-T	yellow with blue mark	polyurethane	- 50 a + 110	- 60 a + 130	- High dynamic load - High hygroscopy - Resistant to hydrolysis.
E	64 Sh D-H	green	Hytrel	- 50 a + 110	- 60 a + 150	- High load transmission, high torsional rigidity - Resistant to chemical agents.
F	Polyamide	-	PA	-50 a +110	-30 a +150	- High torsional rigidity - High ambient temperature - Resistant to chemical agents.
G	PEEK	Light grey	PEEK	up to +180 (ATEX version up to +160)	Up to +250	- High torsional rigidity - Very high ambient temperature - Resistant to chemical agents. - Resistant to hydrolysis.

Size		14			19			24			28		
Elastomer type		A	B	C	A	B	C	A	B	C	A	B	C
Torsion angle ° (kN)	ø	6.4	6.4	4.5	3.2	3.2	2.5	3.2	3.2	2.5	3.2	3.2	2.5
Max. torsion angle ° (kN)	ø	10	10	7	5	5	3.6	5	5	3.6	5	5	3.6
Dynamic torsional rigidity (Nm/rad)	C_{dyn}	380	560	760	1,280	2,920	5,350	4,860	9,930	15,110	10,900	26,770	27,520
Absorption power at 30° (kW)	W	-	-	9	4.8	4.8	7.2	6.6	6.6	9.9	8.4	8.4	12.6

Size		38			42			48			55		
Elastomer type		A	B	C	A	B	C	A	B	C	A	B	C
Torsion angle ° (kN)	ø	3.2	3.2	2.5	3.2	3.2	2.5	3.2	3.2	2.5	3.2	3.2	2.5
Max. torsion angle ° (kN)	ø	5	5	3.6	5	5	3.6	5	5	3.6	5	5	3.6
Dynamic torsional rigidity (Nm/rad)	C_{dyn}	21,050	48,570	70,150	23,740	54,500	79,860	36,700	652,900	95,510	50,720	94,970	107,920
Absorption power at 30° (kW)	W	10.2	10.2	15.3	12	12	18	13.8	13.8	20.7	15.6	15.6	23.4

Size		65			75			90		
Elastomer type		A	B	C	A	B	C	A	B	C
Torsion angle ° (kN)	ø	3.2	3.2	2.5	3.2	3.2	2.5	3.2	3.2	2.5
Max. torsion angle ° (kN)	ø	5	5	3.6	5	5	3.6	5	5	3.6
Dynamic torsional rigidity (Nm/rad)	C_{dyn}	97,130	129,510	151,090	113,320	197,500	248,220	190,090	312,200	674,520
Absorption power at 30° (kW)	W	18	18	27	21.6	21.6	32.4	30	30	45

TRANSMISSION ACCESSORIES

GX TRANSMISSION SHAFT

STEEL TUBE WITH PLASTIC FLECTOR

10 – 550 Nm

FEATURES

- ... Simple, compact and plain.
- ... Low weight and inertia.
- ... High performance, allows high speeds, large input shafts and tamper proof.
- ... The torque is transferred completely free from play.
- ... Maintenance-free.
- ... Efficient evacuation of the heat generated in Contact with the air.
- ... Easy rotation and disassembly, axial displacement is not necessary.
- ... Undesired forces on the shafts or bearings are not generated in the torque transfer.

MATERIAL

- ... Hubs: Bronze plated steel, special material: Zinc-plated steel.
- ... Tube: Steel.
- ... Special tube: Zinc-plated steel.
- ... Elastomer: Hard plastic compound resistant to stress.

DESIGN

It is a simple transmission system made up of a tube, joined to two precision-machined terminals, by means of rigid torsional plastic flectors. This joint is made by combining axial and radial fastening screws guaranteeing high fastening. The plastic flector is very rigid under torsion but with elasticity in the axial and angular sense to absorb misalignments. Can also support temperatures over 150ºC.

INSTALLATION

The total length (A) is the distance between the sides of the shafts to be joined. The total length of the bar is selected by the distance (A) plus 2x the size of the terminals (D)

GX SERIES TRANSMISSION SHAFT

The GX series elastic transmission shafts are suitable for connecting the drive shafts of several screw jacks or HM actuators together, or with other drive units. They absorb noise, vibratios, knocks, and allow angular misalignments with no need for maintenance. Its central part can be removed in radial direction without axial displacement of the adjoining parts. In general, auxiliary supports are not necessary except on very large gearboxes.

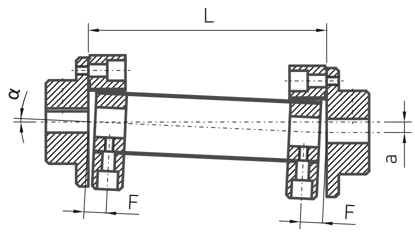
ANGULAR MISALIGNMENT

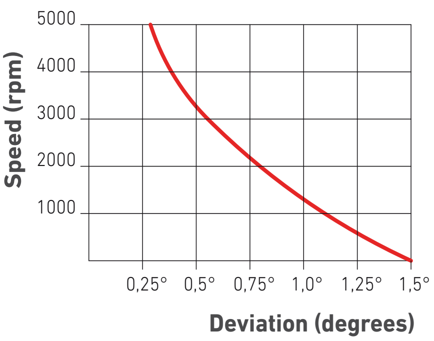
a= tan α x(L - 2xF)

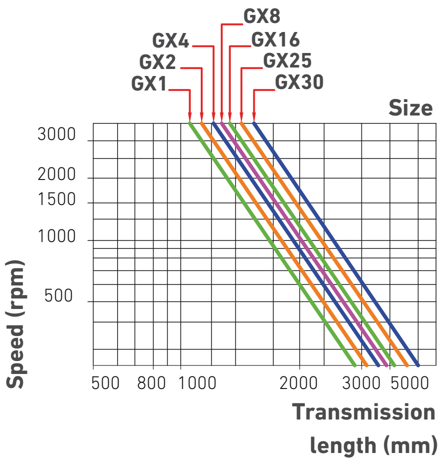
a= Radial misalignment

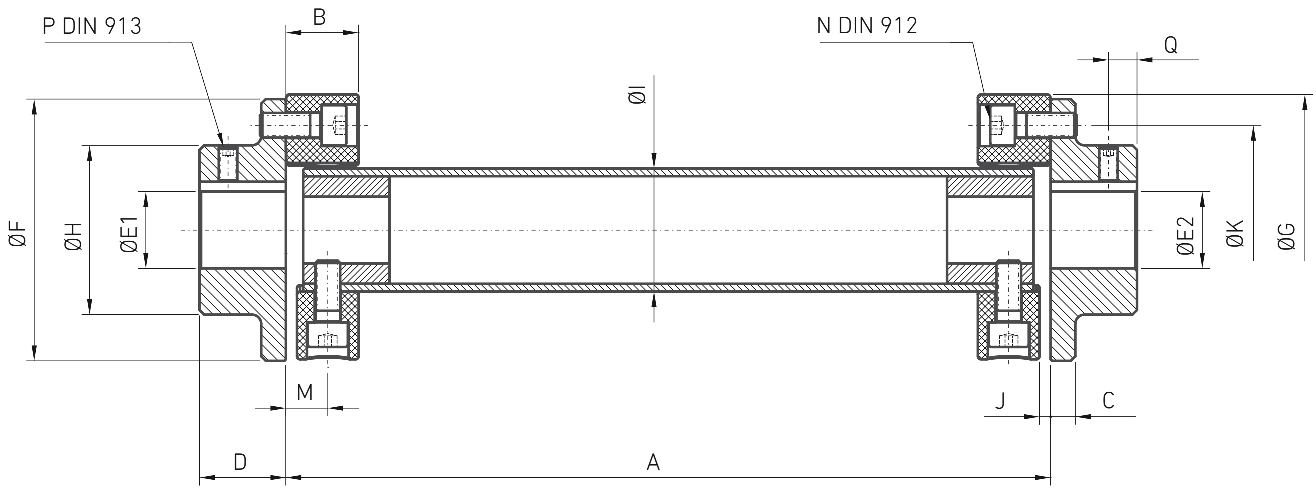
L= Central chapter length

F= Size "F" of table 1









* STUD SIZE	
Ø E_{1-2}	P
- 10	M3
> 10 - 12	M4
> 12 - 30	M5
> 30 - 58	M8
> 58 - 95	M10
> 95 - 100	M12

SIZE		1	2	4	8	16	25	30
Nominal torque (Nm)	T_{KN}	10	30	60	120	240	370	550
Maximum torque (Nm)	T_{Kmax}	25	60	120	280	560	800	1,400
Maximum revolutions (min^{-1})	n_{max}	10,000	10,000	8,000	7,000	6,000	5,000	4,500
Total length (mm)	A	50-6,000	60-6,000	60-6,000	85-6,000	100-6,000	110-6,000	135-6,000
Flector width (mm)	B	18	24	25	30	35	40	50
Terminal plate width (mm)	C	7	8	8	10	12	14	16
Terminal width (mm)	D	24	28	30	42	50	55	66
Interior hole range H7 (mm)	E_1/E_2	8-25	12-38	15-45	18-55	20-70	20-85	25-100
Exterior diameter of the terminal (mm)	F	56	85	100	120	150	170	200
Exterior diameter of the flector (mm)	G	57	88	100	125	155	175	205
Terminal pivot length (mm)	H	36	55	65	80	100	115	140
Diameter of the tube (mm)	I	30	40	45	60	70	85	100
Clearance between the terminal and flector (mm)	J	1	4	2.5	3	3	3	5
Flector-terminal fastening screw positions (mm)	K	44/2x180°	68/2x180°	80/3x120°	100/3x120°	125/3x120°	140/3x120°	165/3x120°
Clearance between the terminal and flector (mm)	L	1	4	2.5	3	3	3	5
Flector-tube fastening screw position (mm)	M	12	14	14.5	17	21	23	30
Fastening screw metric	N	M6	M8	M8	M10	M12	M14	M16
Stud	P	*Depends on the diameter of shaft E						
Stud position	Q	8.5	10	10	15	18	20	25

For torque transmission of up to 110 Nm two flectors in tandem can be fitted. To do this, please Contact NIASA.

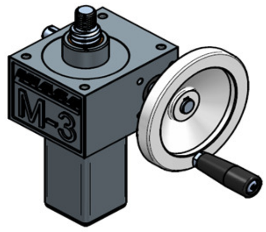
Placing an order

Model	Size	Total length	Hole E_1 H7	Hole E_2 H7	XX
GX	1	1,200	19	25	Special requirements

For personalised specifications, enter XX in the box at the end of the order for special requirements:
For example: XX= Zinc-plated steel, stainless steel, special hole tolerance, DIN / ANSI keyways, s/flat holes, double flector, etc.

Drive accesories

ACCESORIES



HANDWHEEL VE

DIMENSIONS AND WEIGHTS

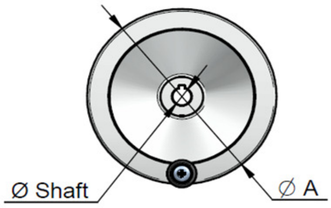
Ø Shaft (mm)	ØA (mm)	B (mm)	L (mm)	Weight (kg)	ØA (mm)	B mm)	L (mm)	Weight (kg)	ØA (mm)	B (mm)	L (mm)	Weight (kg)
10	80	26	75	1,23	100	30	79	1,31				
11	80	26	75	1,23	100	30	76	1,31				
14	125	33	102	2,31	140	36	105	2,36	160	39	108	2.57
16	125	33	102	2.30	140	36	105	2,35	160	39	108	2.56
19	160	39	108	2,48	200	45	126	5,24				
20	160	39	108	2,48	200	45	126	5,24				
24	250	51	140	6,27								
25	250	51	140	6,27								

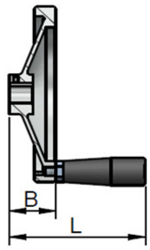
VE - 080 - 10 - IN

080: **Ø A**
10: **Shaft Ø**
IN: **Application**

IN Indoor [1]
OU Outdoor [2]
SP Special [3]

It includes set screw





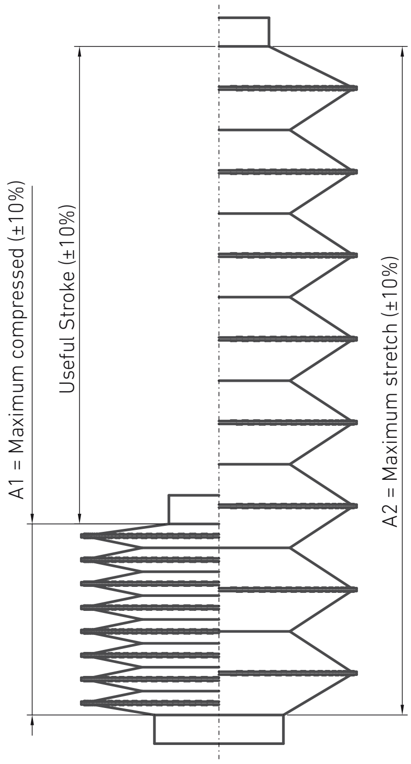
MATERIALS AND SURFACE TREATMENTS [3]

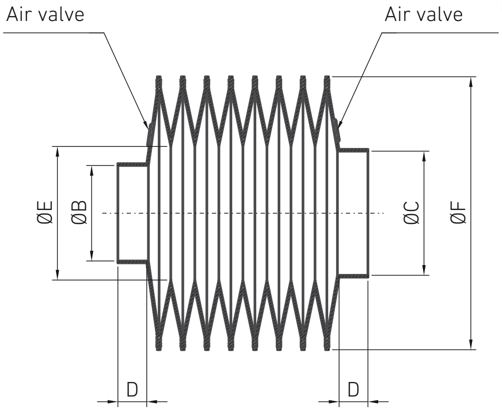
	Indoor applications [1]	Outdoor applications [2]
Wheel :	Aluminium	Aluminium
Handle:	Polyamide/Burnished steel	Polyamide/Stainless steel
Set screw:	Black oxide coating	Stainless steel

[1] Approx. C2-Medium durability (ISO 12944).
[2] Approx. C3-Medium durability (ISO 12944).
[3] Special coatings on request, until C5 (ISO 12944)

PROTECTION ACCESSORIES

FB CIRCULAR FABRIC SPRING





	Stroke up to	A1	A2	B	C	D	E	F
		Maximum covered	Maximum stretched	Ø Neck	Ø Neck	Neck length	Ø Interior	Ø Exterior
		General sizes in mm						
M1-N-W	350	50	400	48	29	15	65	105
	795	105	900					
M2-N-W	350	50	400	61	29	15	75	115
	795	105	900					
M3-N-W	540	60	600	46	46	20	80	130
	1,355	145	1,500					
	1,990	210	2,200					
M4-N-W	540	60	600	60	60	20	90	140
	1,355	145	1,500					
	1,990	210	2,200					
M5-N-W	540	60	600	85	85	20	100	160
	1,355	145	1,500					
	1,990	210	2,200					
J1-N-W	540	60	600	90	90	20	110	180
	1,355	145	1,500					
	1,990	210	2,200					
J3-N-W	540	60	600	120	120	20	130	210
	1,355	145	1,500					
	1,990	210	2,200					
J4-N-W	540	60	600	145	145	20	160	240
	1,355	145	1,500					
	1,990	210	2,200					
J5-N-W	540	60	600	170	170	20	180	280
	1,355	145	1,500					
	1,990	210	2,200					

... Material: Polyester fabric stitched and thermo-sealed with PVC on both sides.
... Note: For longer strokes and other materials, please ask NIASA.

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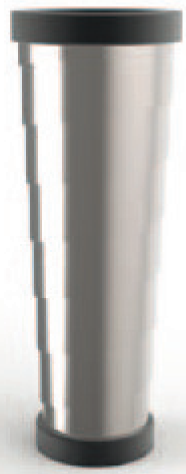
PROTECTION ACCESSORIES

SF SPIRAL METALLIC SPRING PROTECTOR

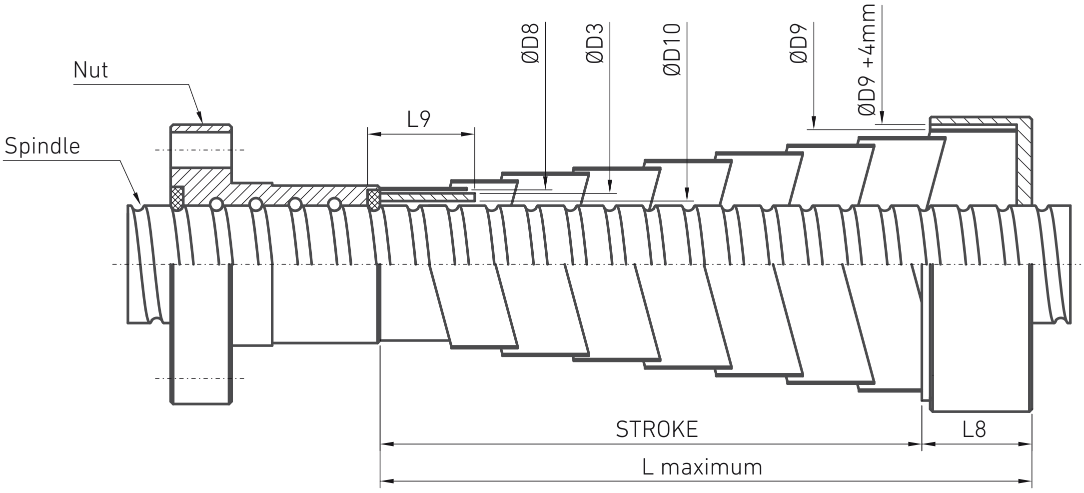


KGS 1605 - KGS1610			
D_3 = 22 mm			
D_{10} = 16.8 mm			
L_9 = 20 mm			
Size D_8/Stroke/L_8	LV[(1)]	LH[(2)]	ØD_9
SF 25/100/20	100	60	35
SF 25/150/20	150	110	38
SF 25/200/20	200	160	40
SF 25/250/20	250	210	44
SF 25/300/30	300	240	43
SF 25/350/30	350	290	46
SF 25/400/30	400	340	49
SF 25/450/40	450	370	48
SF 25/500/40	500	420	51

KGS 2005 - KGS 2020 (KGS2505)			
D_3 = 26 (31) mm			
D_{10} = 20.8 (25.8) mm			
L_9 = 28 (28) mm			
Size D_8/Stroke/L_8	LV[(1)]	LH[(2)]	ØD_9
SF 30/150/30	150	90	39
SF 30/250/30	250	190	44
SF 30/350/30	350	290	49
SF 30/450/40	450	370	53
SF 30/550/40	550	470	58
SF 30/650/50	650	550	55
SF 30/750/50	750	650	59

KGS 3205 - KGS 3240			
D_3 = 38 mm			
D_{10} = 33 mm			
L_9 = 35 mm			
Size D_8/Stroke/L_8	LV[(1)]	LH[(2)]	ØD_9
SF 40/150/30	150	90	51
SF 40/250/30	250	190	56
SF 40/350/30	350	290	60
SF 40/450/40	450	370	63
SF 40/550/40	550	470	68
SF 40/350/50	350	250	55
SF 40/450/50	450	350	58
SF 40/550/50	550	450	61
SF 40/650/50	650	550	65
SF 40/750/50	750	650	69
SF 40/450/60	450	330	55
SF 40/550/60	550	430	58
SF 40/650/60	650	530	62
SF 40/750/60	750	630	66
SF 40/900/60	900	780	70
SF 40/650/75	650	500	62
SF 40/750/75	750	600	66
SF 40/900/75	900	750	72
SF 40/1100/75	1,100	950	78
SF 40/1300/75	1,300	1,150	84
SF 40/1500/75	1,500	-	90
SF 40/1000/100	1,000	800	66
SF 40/1200/100	1,200	1,000	70
SF 40/1500/100	1,500	1,300	78
SF 40/1800/100	1,800	-	82
SF 40/1800/120	1,800	1,560	82
SF 40/2000/120	2,000	1.z760	86
SF 40/2200/120	2,200	-	91

KGS 4005 - KGS 3210			
D_3 = 46 (44) mm			
D_{10} = 41 (34) mm			
L_9 = 45 (45) mm			
Size D_8/Stroke/L_8	LV[(1)]	LH[(2)]	ØD_9
SF 50/150/30	150	90	63
SF 50/250/30	250	190	68
SF 50/250/50	250	150	62
SF 50/350/50	350	250	66
SF 50/450/50	450	350	70
SF 50/550/50	550	450	73
SF 50/550/60	550	430	68
SF 50/650/60	650	530	72
SF 50/750/60	750	630	76
SF 50/750/75	750	600	78
SF 50/900/75	900	750	84
SF 50/1100/75	1,100	950	90
SF 50/1100/100	1,100	900	75
SF 50/1300/100	1,300	1,100	79
SF 50/1500/100	1,500	1,300	83
SF 50/1700/120	1,700	1,460	91
SF 50/1800/120	1,800	-	94
SF 50/1900/120	1,900	1,660	95
SF 50/2100/120	2,100	1,860	100
SF 50/2300/120	2,300	-	105
SF 50/2500/120	2,500	-	111
SF 50/2800/120	2,800	-	118
SF 50/2800/150	2,800	2,500	118
SF 50/3000/150	3,000	-	123
SF 50/3000/180	3,000	2,640	123
SF 50/3250/180	3,250	-	128
SF 50/3250/200	3,250	2,850	128
SF 50/3500/200	3,500	-	134



KGS 4010 - KGS 4040			
D_3 = 52 mm			
D_{10} = 41 mm			
L_9 = 50 mm			
Size D_8/Stroke/L_8	LV[1]	LH[2]	ØD_9
SF 55/150/30	150	90	68
SF 55/250/30	250	190	73
SF 55/250/50	250	150	66
SF 55/350/50	350	250	71
SF 55/450/50	450	350	74
SF 55/550/50	550	450	77
SF 55/550/60	550	430	75
SF 55/650/60	650	530	79
SF 55/750/60	750	630	83
SF 55/750/75	750	600	83
SF 55/900/75	900	750	89
SF 55/1100/75	1,100	950	94
SF 55/1100/100	1,100	900	83
SF 55/1300/100	1,300	1,100	87
SF 55/1500/100	1,500	1,300	94
SF 55/1800/100	1,800	-	102
SF 55/1700/120	1,700	1,460	96
SF 55/1900/120	1,900	1,660	100
SF 55/2100/120	2,100	1,860	105
SF 55/2300/120	2,300	2,060	110
SF 55/2500/120	2,500	-	116
SF 55/2800/120	2,800	-	123
SF 55/2800/150	2,800	2,500	121
SF 55/3000/150	3,000	-	126
SF 55/3000/180	3,000	2,640	126
SF 55/3250/180	3,250	2,850	130
SF 55/3250/200	3,250	-	130
SF 55/3500/200	3,250	-	137

KGS 5010 - KGS 5020			
D_3 = 62 mm			
D_{10} = 51.2 mm			
L_9 = 55 mm			
Size D_8/Stroke/L_8	LV[1]	LH[2]	ØD_9
SF 65/250/30	150	90	68
SF 65/250/50	250	190	73
SF 65/350/50	250	150	66
SF 65/450/50	350	250	71
SF 65/550/60	450	350	74
SF 65/650/60	550	450	77
SF 65/750/60	550	430	75
SF 65/750/75	650	530	79
SF 65/900/75	750	630	83
SF 65/1100/75	750	600	83
SF 65/1100/100	900	750	89
SF 65/1300/100	1,100	950	94
SF 65/1500/100	1,100	900	83
SF 65/1700/120	1,300	1,100	87
SF 65/1800/100	1,500	1,300	94
SF 65/1900/120	1,800	-	102
SF 65/2100/120	1,700	1,460	96
SF 65/2300/120	1,900	1,660	100
SF 65/2500/100	2,100	1,860	105
SF 65/2800/120	2,300	2,060	110
	2,500	-	116
SF 65/3000/120	2,800	-	123
SF 65/3000/180	2,800	2,500	121
SF 65/3250/180	3,000	-	126
SF 65/3250/200	3,000	2,640	126
SF 65/3500/200	3,250	2,850	130

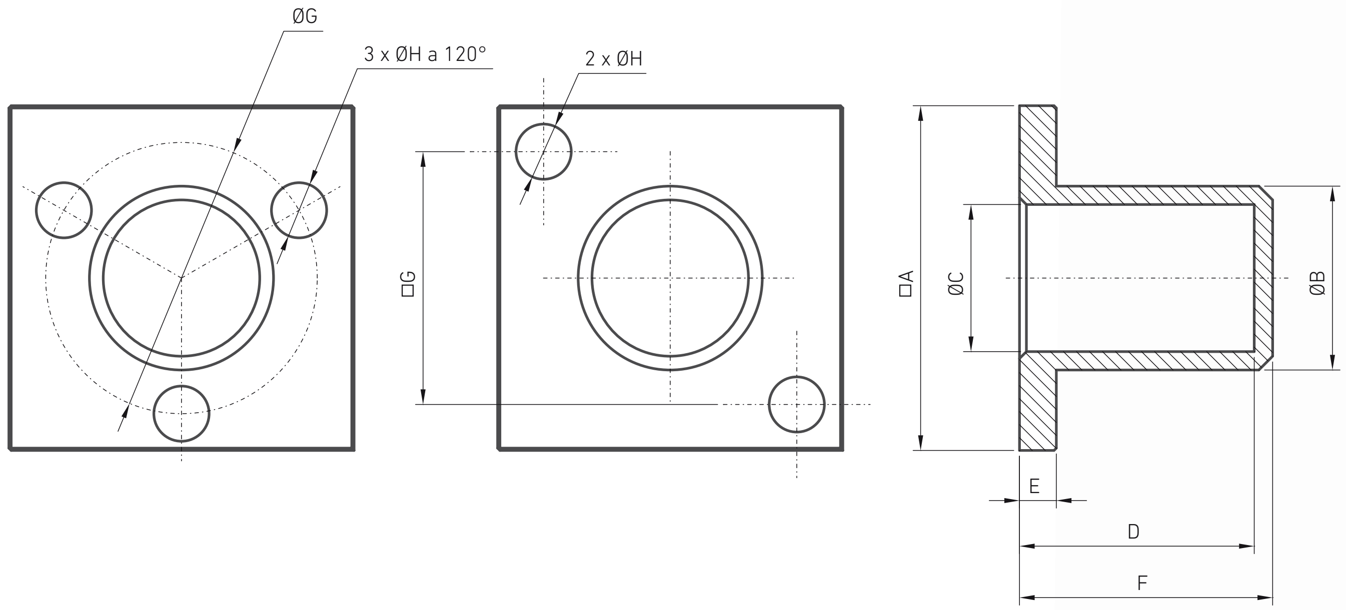
KGS 6310			
D_3 = 74 mm			
D_{10} = 63.2 mm			
L_9 = 65 mm			
Size D_8/Stroke/L_8	LV[1]	LH[2]	ØD_9
SF 75/250/30	250	190	99
SF 75/350/50	350	250	94
SF 75/450/50	450	350	101
SF 75/550/60	550	430	99
SF 75/650/60	650	530	103
SF 75/750/60	750	630	108
SF 75/650/75	650	500	99
SF 75/900/75	-	750	111
SF 75/1100/100	1,100	-	108
SF 75/1300/100	1,300	1,100	112
SF 75/1500/120	1,500	1,260	115
SF 75/1700/100	1,700	-	126
SF 75/1800/120	1,800	1,560	122
SF 75/2000/120	2,000	1,760	127
SF 75/2200/120	2,200	-	132
SF 75/2000/100	2,000	2,100	135
SF 75/2400/120	2,400	-	141
SF 75/2800/150	2,800	2,440	145
SF 75/2800/120	2,800	-	142
SF 75/3000/180	3,000	-	148
SF 75/3250/180	3,250	-	156
SF 75/3250/200	3,250	2,850	148
SF 75/3500/200	3,500	-	158

[1] LV = Vertical installation.
[2] LH = Horizontal installation.

PROTECTION ACCESSORIES

PR WORM GEAR PROTECTOR

	Applicable to	
PR-1	M1	FM1/AM1
PR-2	M2	FM2/AM2
PR-3	M3	FM3/AM3
PR-4	M4	FM4/AM4
PR-5	M5-J1	FM5-FJ1
PR-6	J3	FJ3
PR-7	J4	
PR-8	J5	



	□A	ØB	ØC	D	E	F	G	ØH
PR-1	47	30	21	27	8	31	□32	7
PR-2	50	28	22	29	5	32	□35	6.5
PR-3	63	38	28	47	8	50	□44	10.5
PR-4	75	40	32	51	8	55	□55	12
PR-5	82	50	40	70	8	75	□60	14
PR-6	100	55	45	72	10	77	Ø80	14
PR-7	127	60	50	70	10	75	Ø100	18
PR-8	140	70	60	105	10	110	Ø115	18

... Material: POM (Polyoxymethylene)

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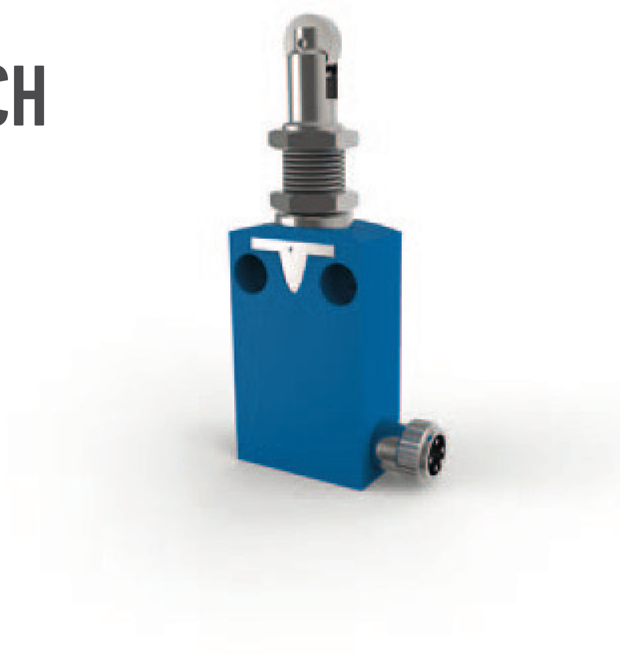
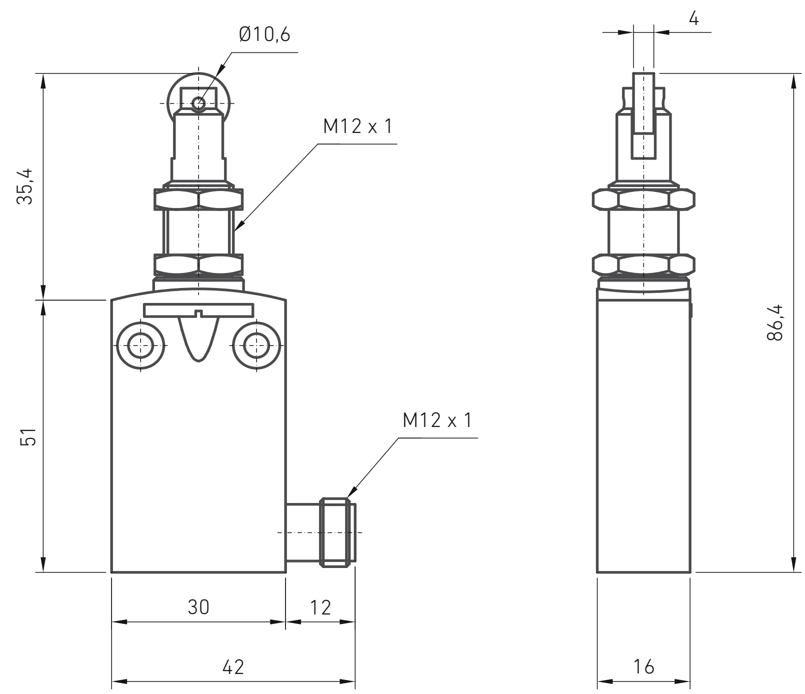
DETECTION ACCESSORIES

FCM MECHANICAL LIMIT SWITCH



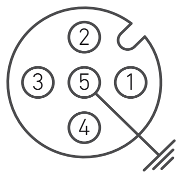
	Applicable to
FCM with M12x1 connector	M1-N-W
	M2-N-W
	M3-N-W
	M4-N-W
	M5-N-W
	J1-N-W
	J3-N-W
	J4-N-W
	J5-N-W

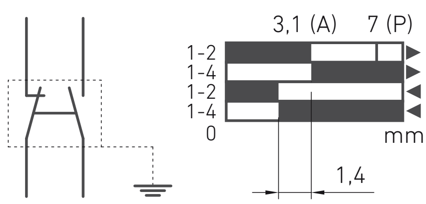


M12x1 connector specifications

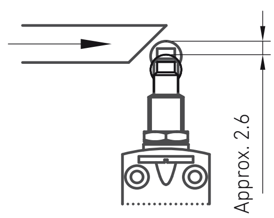
5 Pin model
Snap switch PNP_NC + NA bipolar input

4 A - 60 V
1-2 = NC
3-4 = NA
5 = ⏚





Roller-type switching end

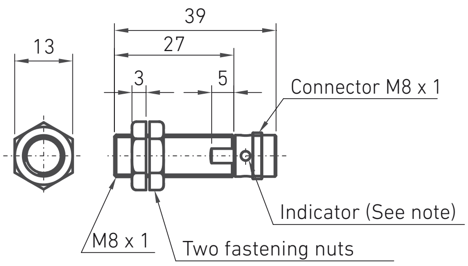


DETECTION ACCESSORIES

FCI INDUCTIVE LIMIT SWITCH

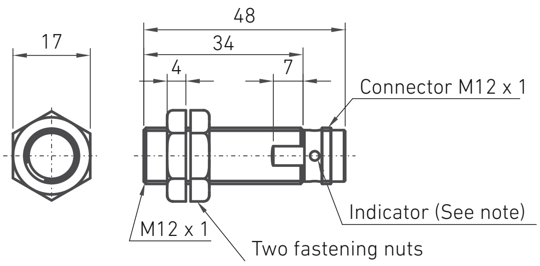
	Applicable to			
FCI M8x1 with M8x1 connector	M1-N-W	F16	FM1	FHM1
	M2-N-W	F20	FM2	FHM2
	M3-N-W	F30	FM3	FHM3
		F40	FM4	FHM4
		F45	FM5	FHM5
		F50	FJ1	FHJ1
			FJ3	FHJ3
FCI M12x1 with M12x1 connector	M4-N-W			
	M5-N-W			
	J1-N-W			
	J3-N-W			
	J4-N-W			
	J5-N-W			

M8x1 inductive detector with M8x1 connector



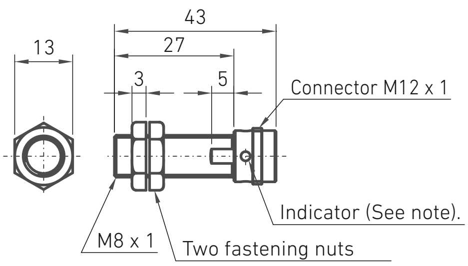
Note: Operation indicator (yellow LED, 4x90°)

Inductive detector M12x1 with connector M12x1



Note: Operation indicator (yellow LED, 4x90°)

Inductive detector M8x1 with connector M12x1 (optional)

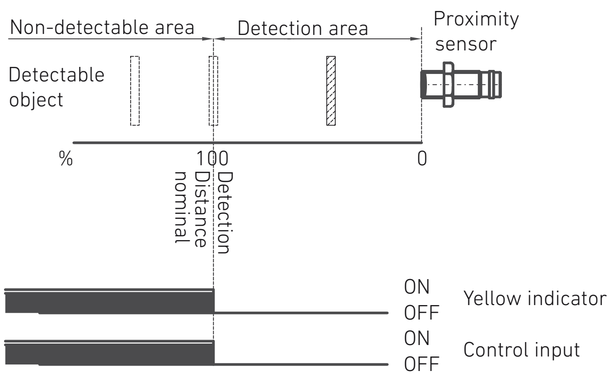


Note: Operation indicator (yellow LED, 4x90°)

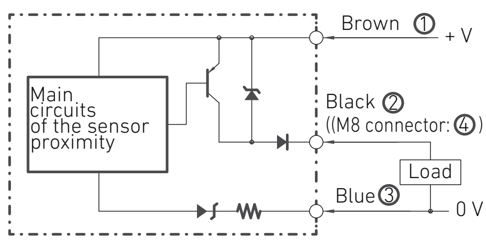
Connector specifications

CC Model 3-wire
PNP-NC input

Operating diagram



Input circuit



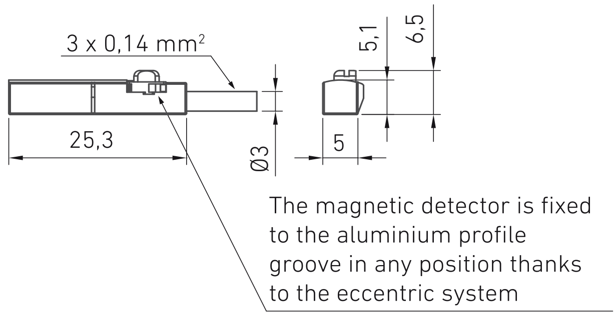
M8 connector

M12 connector
Pin 2 is not used

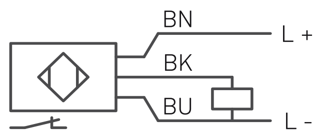
DETECTION ACCESSORIES

FCG MAGNETIC SENSOR

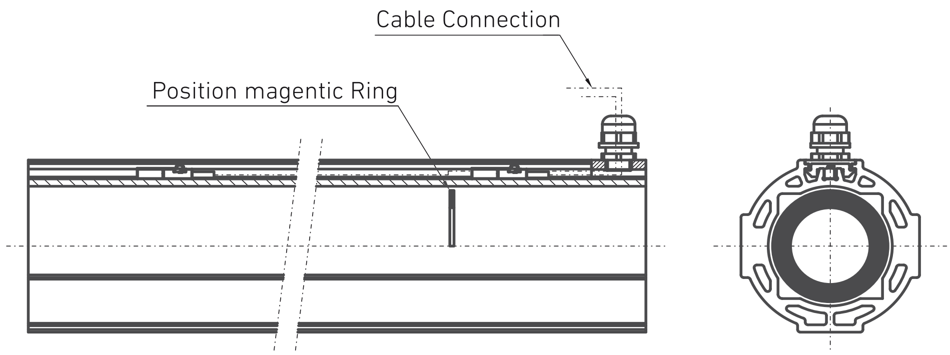
	Applicable to		
T5 PNP NC magnetic sensor	A16	AM1	AHM1
	A20	AM2	AHM2
	A30	AM3	AHM3
	A40	AM4	AHM4

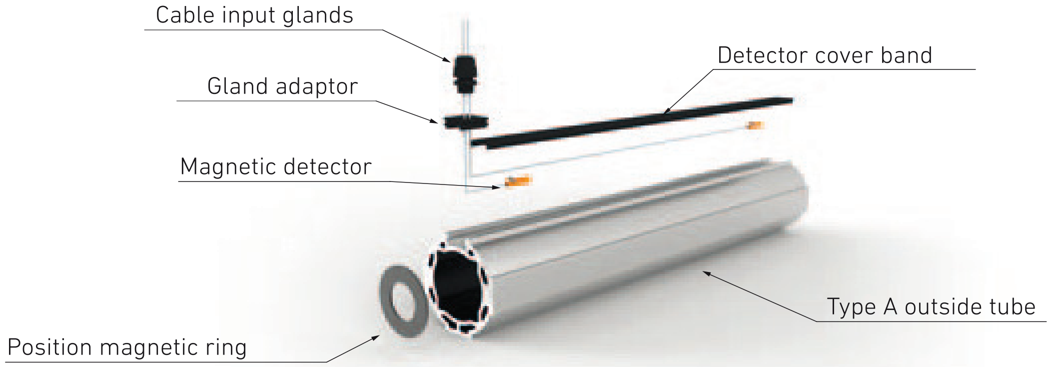


Connecting:



Power supply: PNP DC
Power supply voltage: 10...30 V DC
Consumption: < 10 mA
Input function: Normally closed
Input current: 100 mA
Protection class: III
Protection level: IP65 / IP67
Ambient temperature: 25 to +85ºC
Switching state: Yellow LED





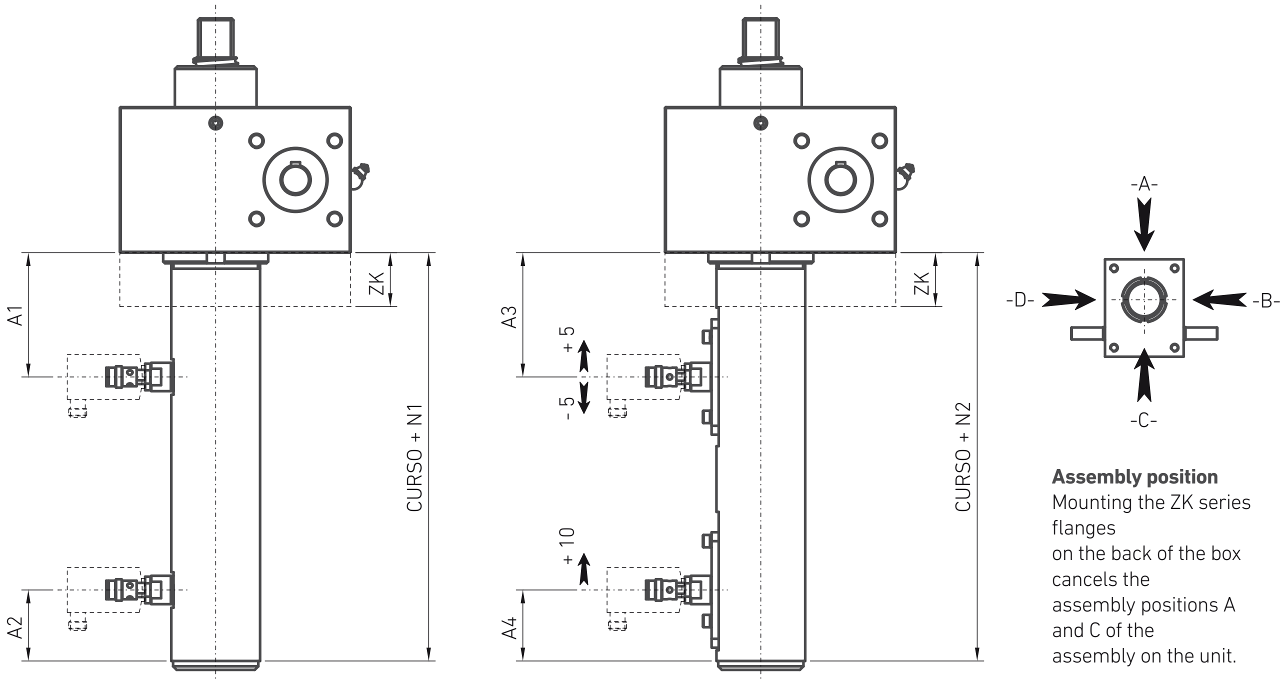
DETECTION ACCESSORIES

FCM/FCI ASSEMBLY POSITION

N CONFIGURATION SCREW JACKS

	Applicable to
FCI M8x1 with M8x1 connector	M1-N-W
	M2-N-W
	M3-N-W
FCI M12x1 with M12x1 connector	M4-N-W
	M5-N-W
	J1-N-W
	J3-N-W
	J4-N-W
	J5-N-W

The mechanical limit is the same for all sizes (see page 306.)



FCM/FCI - Fijo

FCM/FCI - Regulable

Assembly position
Mounting the ZK series flanges on the back of the box cancels the assembly positions A and C of the assembly on the unit.

	FCM/FCI fixed					FCM/FCI adjustable					ZK
	A1		A2	N1		A3		A4	N2		
	No ZK	With ZK		No ZK	With ZK	No ZK	With ZK		No ZK	With ZK	
M1	25	35	25	65	75	50	65	35	100	115	20
M2	25	40	25	65	80	50	70	35	100	120	25
M3	25	45	25	65	85	50	75	35	100	125	30
M4	40	65	40	100	125	60	85	40	120	145	40
M5	40	75	40	105	140	60	100	40	125	165	50
J1	40	85	40	105	150	60	110	40	125	175	60
J3	40	105	40	105	170	60	130	40	125	195	80
J4	40	115	40	105	180	60	140	40	125	205	90
J5	40	140	40	105	205	60	160	40	125	225	100

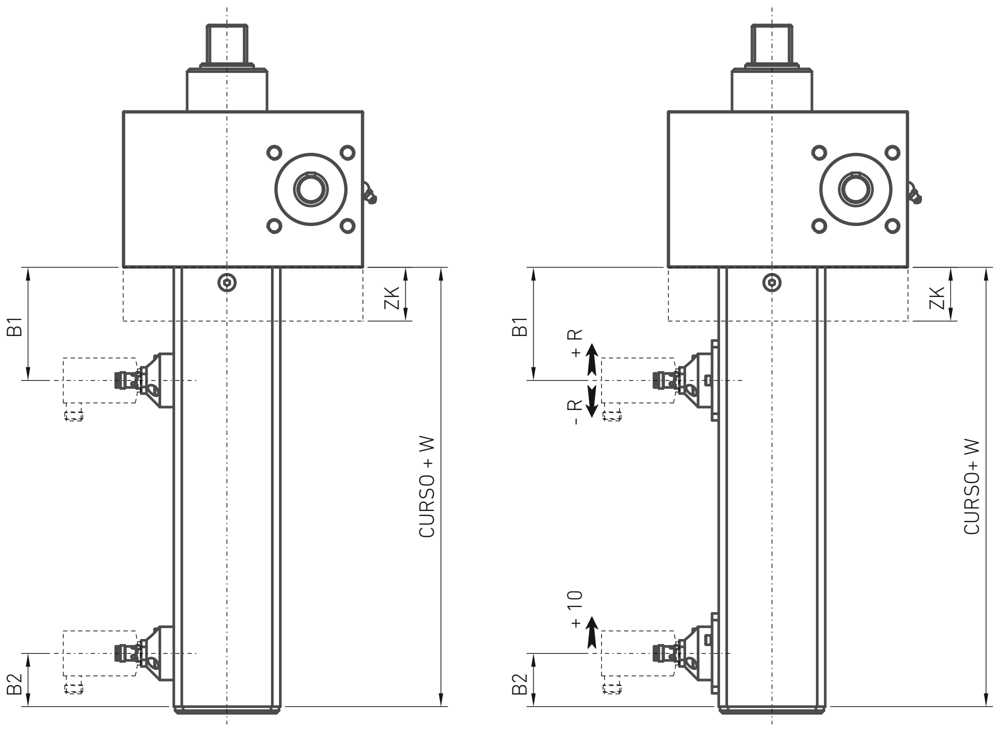
DETECTION ACCESSORIES

FCM/FCI ASSEMBLY POSITION

W CONFIGURATION SCREW JACKS

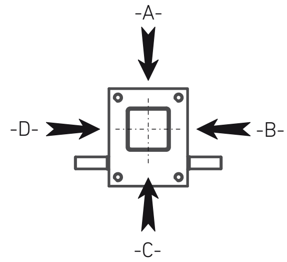
	Applicable to
FCI M8x1 with M8x1 connector	M1-N-W
	M2-N-W
	M3-N-W
FCI M12x1 with M12x1 connector	M4-N-W
	M5-N-W
	J1-N-W
	J3-N-W
	J4-N-W
	J5-N-W

The mechanical limit is the same for all sizes (see page 306.)



FCM/FCI - Fijo

FCM/FCI - Regulable



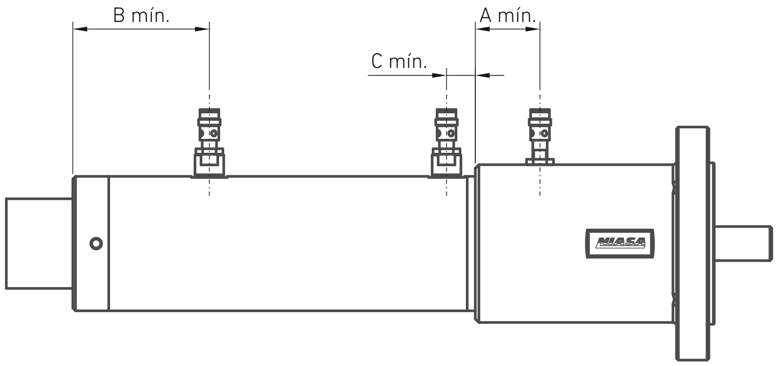
Assembly position
Mounting the ZK series flanges on the back of the box cancels the assembly positions A and C of the assembly on the unit.

Unit	B1		B2	R	W		ZK
	No ZK	With ZK			No ZK	With ZK	
M1	40	60	30	± 5	85	105	20
M2	40	65	30	± 5	90	115	25
M3	40	70	30	± 5	90	120	30
M4	50	90	40	± 10	115	155	40
M5	50	100	40	± 10	120	170	50
J1	60	110	40	± 10	135	185	60
J3	60	130	40	± 10	140	210	80
J4	70	140	40	± 10	155	225	90
J5	70	150	40	± 10	160	240	100

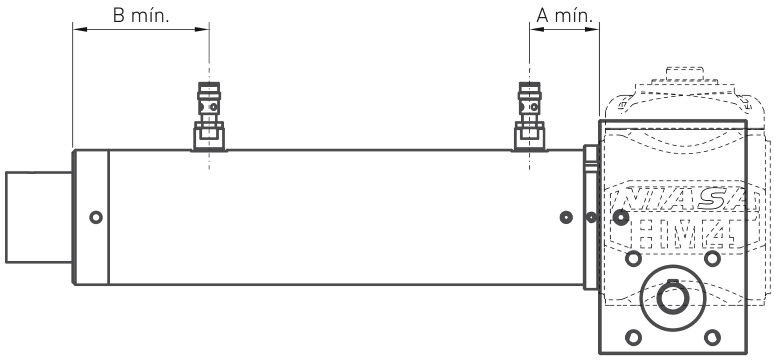
DETECTION ACCESSORIES

FCI/FCM ASSEMBLY POSITION

F LINEAR ACTUATORS



FHM LINEAR ACTUATORS



Notes:
- Elevations not corresponding with the immobilised stem in rotation.
- At the customer's request, the sensor "B" can have ± 5 mm adjustment.

F SERIES LINEAR ACTUATORS

Unit	Screw type	Sizes (mm)			
		A	B	C	Sensor type
F16	Tr	-	69	15	M8x1 M12x1
	KGS	-	80.5	5.5	
F20	Tr	-	61	12	M8x1
	KGS	10		-	
F30	Tr	-	76 / 71*	11.5	M8x1
	KGS	36 / 41*		-	
F40	Tr	-	71	36	M8x1
	KGS	34		-	
F45	Tr	-	91	31	M8x1
	KGS	21.5		-	
F50	Tr	-	91	36	M8x1
	KGS	54		-	

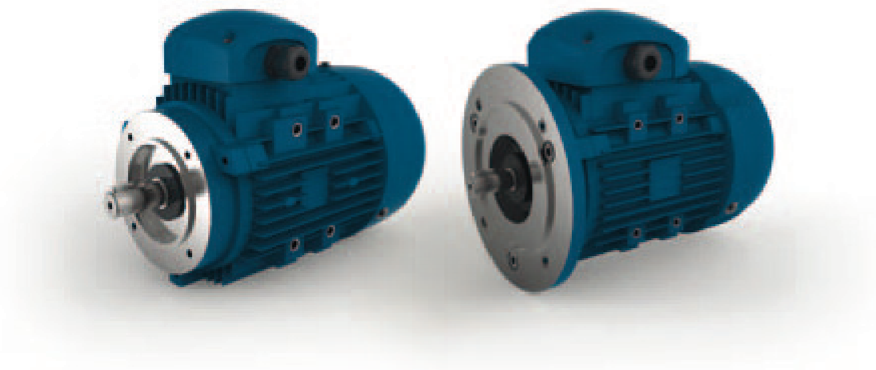
(*) In the case that a KGM 3220 nut is installed on the unit.

FM/FHM SERIES LINEAR ACTUATORS

Unit	Screw type	Sizes (mm)		
		A	B	Sensor type
FM1 / FHM1	Tr	50.5	69	M8x1 M12x1
	KGS	41	80.5	
FM2 / FHM2	Tr	62.5	61	M8x1
	KGS	40.5		
FM3 / FHM3	Tr	101	76 / 71(*)	M8x1
	KGS	53,5/48,5*		
FM4 / FHM4	Tr	142.5	71	M8x1
	KGS	72.5		
FM5 / FHM5	Tr	166	91	M8x1
	KGS	72.5		
FJ1 / FHJ1	Tr	180	91	M8x1
	KGS	84		
FJ3 / FHJ3	Tr	184	104	M8x1
	KGS	94		

DRIVE ACCESSORIES

STANDARD MOTORS (ASYNCHRONOUS)



Motors with aluminum cast chassis up to group 132 and iron cast from group 160 onwards according to the IEC72-1 standard.

EFFICIENCY

IE1 standard motor efficiency in motors up to 0.55 kW according to the IEC 60034 T30 standard.
IE2 high efficiency motors in motors from 0.75 kW according to the IEC 60034 T30 standard.
Motors can optionally be supplied with Premium IE3 efficiency from 0.75 kW.

SPEED

4 poles (1,500 rpm).

Optionally, 2 poles (3,000 rpm), 6 poles (1,000 rpm), 8 poles (750 rpm) and 12 poles (500 rpm).

VOLTAGE AND FREQUENCY

Standard: 230/400v and 50/60 Hz.

TERMINAL BOX

Position A (Top). Gland position 1 (Right input).

Other positions B, D for terminal box and 2, 3, 4 optionally for gland input.

CONNECTING

Changing the position of the terminal plate connectors can switch the coil from the stator to the spider / triangle (Y / Δ). The start-up in spider/triangle is not suitable for screw jack systems, given that higher torque is required from start-up.

The turning sense of the motor can easily be inverted by changing the two network lines.

PROTECTION LEVELS

Standard: IP 55.

Optionally: IP 56, 65, 66, 68.

COOLING

IC411 (Closed machine. Ventilated chassis smooth or with wings. External ventilator, mounted on the shaft).

Optionally: IC01, IC410, IC416A, IC416R, IC418.

SERVICE FACTOR

Standard: S1.
Optionally: S2, S3, S4, S5, S6, S7, S8, S9, S10

COILED INSULATION

Standard: Class F.
Optionally: Class B, Class H.

BEARINGS

Standard assembly and greasing for 25,000 hours.
Optionally: Reinforced bearings and special assemblies.

PAINT

Standard, according to the CEI 60721.2.1 standard.

... 1 layer of epoxy primer 30/40 μm.

... 1 layer of polyurethane finish 20/30 μm.

Optionally: More layers of epoxy and polyurethane can be added, with higher micronage for corrosive environments.

FREQUENCY CONVERTER

In the case of screw jacks in large installations, the use of a frequency converter is recommended, for a start-up ramp and uniform braking. This reduces noise to a minimum in the start-up and increases the useful life of the screw jack.

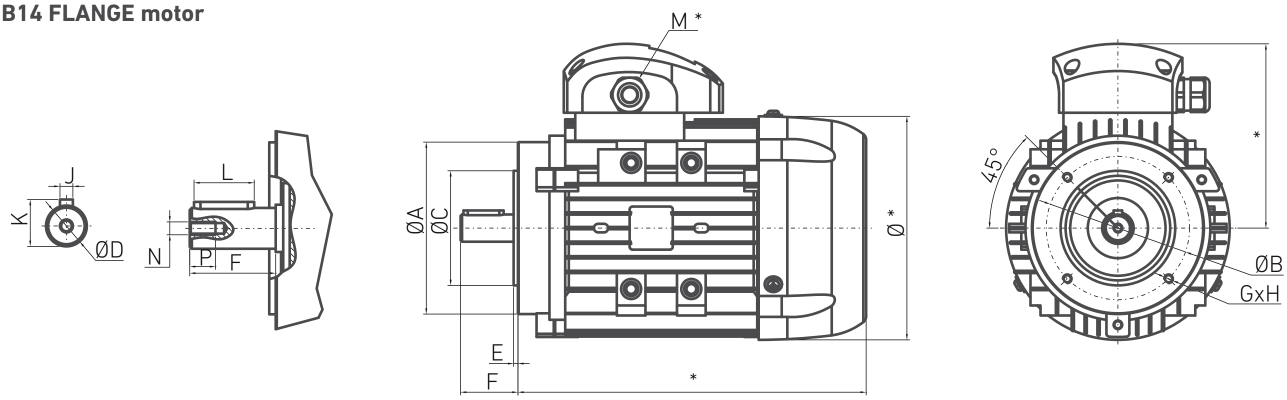
If a motor/brake is used with a frequency converter, the brake must be fed with a separate control cable through the converter.

BRAKE MOTOR

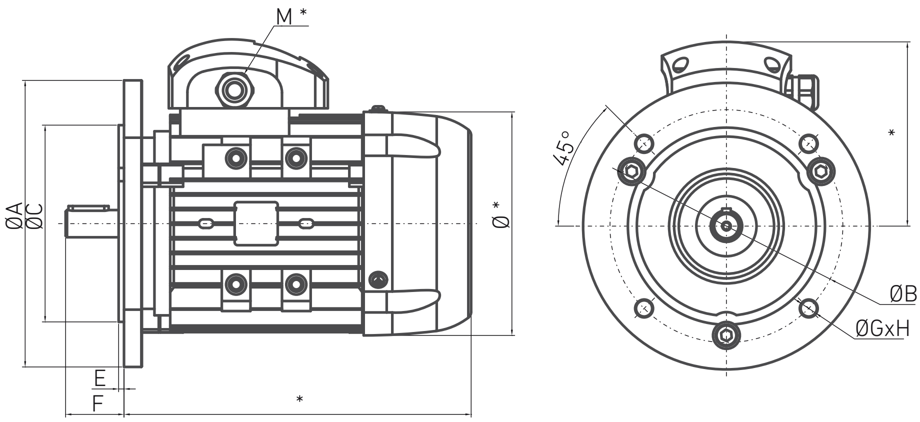
To reduce inertia to the minimum in an installation, or in the case of ball or trapezoidal screws with more than one input, a brake must be used on the motor.

For further information about the different options, please ask NIASA.

B14 FLANGE motor



B5 FLANGE motor



Motor group size table

		ØA	ØB	ØC	ØD	E	F	G	H	J	K	L	N	P
56	B14	80	65	50	9	2.5	20	M5	11	3	10.4	15	M4	12
	B5	120	100	80		3		Ø7	8					
63	B14	90	75	60	11	2.5	23	M5	11	4	12.8	15	M4	12
	B5	140	115	95		3		Ø10	10					
71	B14	105	85	70	14	3	30	M6	11	5	16.3	20	M5	12
	B5	160	130	110		3		Ø10	10					
80	B14	120	100	80	19	3	40	M6	11	6	21.8	28	M6	16
	B5	200	165	130		3.5		Ø12	10					
90	B14	140	115	95	24	3	50	M8	11	8	27.3	40	M8	19
	B5	200	165	130		3.5		Ø12	10					
100	B14	160	130	110	28	3.5	60	M8	11	8	31.3	50	M10	22
	B5	250	215	180		4		Ø15	13					
112	B14	160	130	110	28	3.5	60	M8	11	8	31.3	50	M10	22
	B5	250	215	180		4		Ø15	13					
132	B14	200	165	130	38	3.5	80	M10	11	10	41.3	70	M12	28
	B5	300	265	230		4		Ø15	13					
160	B14	250	215	180	42	4	110	M12	11	12	45.3	100	M16	36
	B5	350	300	250		5		Ø19	13					
180	B5	350	300	250	48	5	110	Ø19	11	14	52.8	100	M16	36

(*) The elevations vary depending on power, manufacturer and accessories of the motor.
For further information please Contact NIASA.

DRIVE ACCESSORIES

COAXIAL REDUCER

Reducers with aluminum alloy casting up to size 23-30, depending on manufacturers and iron casting for other sizes.

GEARS

Class 6 precision cuts according to DIN 3962 for optimising noise and performance levels. With thermal cementation treatment to ensure minimum wear.

REDUCTIONS

Extensive range of reductions, depending on models, on all the sizes for adapting to the customer's requirements.

PROTECTION LEVEL

Standard: IP 55.

Optionally: IP 56, 65, 66, 68.

LUBRICATION

By default, the reducers are supplied with ISO VG220 EP mineral oil for 5,000 hours of operation at temperatures between -10°C and +40°C according to ISO 6743.

Optionally: They can be supplied with other types of oils to support temperatures from -30°C to +60°C and up to 25,000 hours.

BEARINGS

Over-sized and with standard greasing for 25,000 hours.

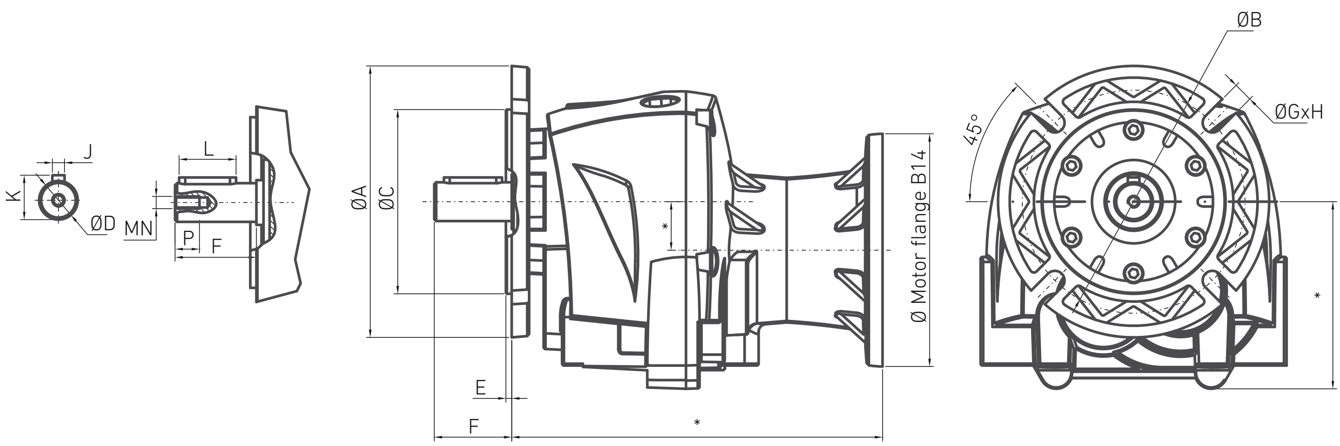
PAINT

According to the CEI 60721.2.1 standard.

1 layer of primer epoxy 30/40 µm.

1 layer of polyurethane finish 20/30 µm.

Optionally: More layers of epoxy and polyurethane can be added, with higher micronage for corrosive environments.



Coaxial reducer size table

	Ø A	Ø B	Ø C	ØD	E	F	ØG	H	J	K	L	N	P
20	140	115	95	20	3	40	9	10	6	22.5	30	M8	19
25	160	130	110	25	3.5	50	11	12	8	28	40	M8	19
30	200	165	130	30	3.5	60	11	12	8	33	50	M10	22
40	250	215	180	40	4	80	14	15	12	43	70	M12	28

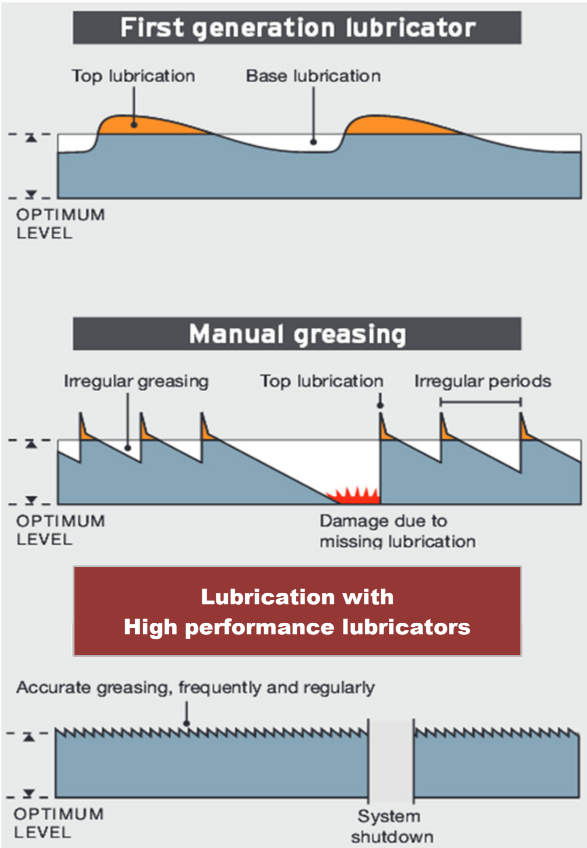
(*) The elevations vary depending on the manufacturer, reductions and coaxial reducer accessories.
For further information please Contact NIASA.

AUTOMATIC LUBRICATION SYSTEMS ALS

ADVANTAGES AND FEATURES

Automatic lubricators are specially recommend. for applic. with heavy duty cycles.

Below you can find the advantages they provide compared with manual lubrication, together with their main general features:



ECONOMICAL
> Long-term protection of equipment.
> Increased reliability.
> Cartridge change in less than 60 seconds.
> Accurate lubrication.
> Reduced maintenance costs.
> Increased profitability.

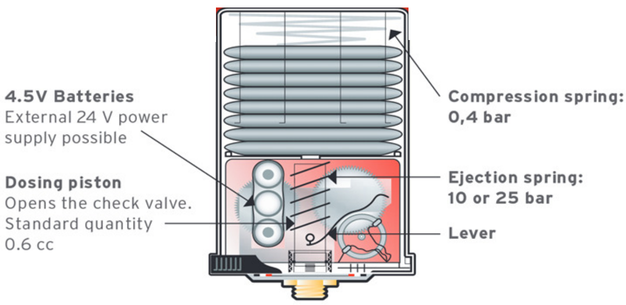
SAFE
> Remote installation for difficult or dangerous access points. Any installation positition.
> Reduced downtime for lubrication.
> Easy to use.
> Instant verification offered by transparent housing and check function.

ECOLOGICAL
> Reusable.
> Wide range of low cost replacement cartridges and battery power packs.
> Unlimited refills.
> Reduced environmental impact.
> Reduced lubricant consumption and improved protection of production

PUMP

This kind of lubricators has got a powerful and efficient pump:

> Dosing pump with adjustable output.
> Lubricant ejection pressure from 10 to 25 bar.
> High-performance pump able to pump lubricants at extreme temperatures and with high viscosity.



MEMORY

The lubricators incorporate a smart setting memory:

> The memo system adjusts the lubricant discharge frequency, by selecting or combining coloured screwable parts or rings).
> The discharge frequency is set for each lubrication point once for all, but it can be adapted on demand at any time.

SINGLE POINT LUBRICATORS (Coloured screwable part)

SINGLE & MULTIPLE POINT LUBRICATORS (Coloured ring)

LUBRICATORS RANGE

SINGLE POINT LUBRICATOR. TECHNICAL SPECIFICATIONS

	SP-0	SP-1	SP-2
Cartridge volume	120 cc	240 cc	
Settings	12 or 24 months	6 or 12 months	1, 3, 6 or 12 months
Maximum stroke pressure	10 bar		
Batteries	4,5 V DC Alkaline battery		
Remote installation	Up to 2 metres at 0 °C — Ø8 mm tubing		
Lubricants	Oil & Grease (up to NLGI#2, oil base up to 1500 mm2/s)		
Operating temperature	-15°C to 50°C 1)		
Connections	G1/4		
Dimensions	115 ∃ Ø101 mm	147 ∃ Ø101 mm	
Protection level	IP 66		
Certificaction	CE		

	SP-0		SP-1/SP-2		SP-2	
Memory adjustments / Coloured screwable part	white	red	white	red	green	yellow
Adjustments (y= year / m= month)	2 years	1 year	1 year	6 months	3 months	1 month
Average daily output	0,15 cc	0,3 cc	0,6 cc	1,2 cc	2,4 cc	7,2 cc

1) Batteries and lubricat adapted for low temperatures

SINGLE & MULTI POINT LUBRICATOR. TECHNICAL SPECIFICATIONS

	MP-1	MP-2	MP-3
Cartridge volume	240 cc or 480 cc		
Output settings	7 main and several additional ones		Unlimited by PLC
Maximum stroke pressure	25 bar		
Batteries / Power supply	4.5 V DC Alkal. batt.	External 24 V DC	
Remote installation	Up to 8 metres / single point — Ø8 mm tubing		
Lubricants	Oil & Grease (up to NLGI#2 with oil base up to 1500 mm2/s)		
Operating temperature	-15°C to 50°C 1)		
Connections	G1/4		
Control detector	Progressive distributor for 4, 6 and 8 outputs		
Dimensions	240 cc: 147 ∃ Ø101 mm / 480 cc: 228 ∃ Ø101 mm		
Protection level	IP 66		
Certification	CE		

	MP-1 / MP-2 / MP-3						
Memory adjustments / Coloured ring	OOO	OO	OO	O	OO	O	O
Daily ejecution	24	12	4	2	1,5	1	0,5
Daily output in cc	15,1	7,6	2,5	1,3	1	0,6	0,3
Months to empty 240 cc	0,5	1	3	6	8	12	24 2)
Months to empty 480 cc	1	2	6	12	16	24 2)	-

1) Batteries and lubricat adapted for low temperatures
2) Only with MP-2

Standard NIASA automatic lubricators: SINGLE POINT SP-1 & SINGLE OR MULTIPLE POINT MP-1 / 240 cc.
Rest of models, on request.

Battery set must be replaced when changing grease cartridge.
Contact us for further technical information and User guide.

Automatic lubrication accesories

LUBRICATION

AUTOMATIC LUBRICATION SYSTEMS ALS

ACCESORIES

ADAPTERS / FITTINGS / PIPES

Accesory	Specification
Push in G1/4 *(Female)* to Ø8	Quick fitting
Push in G1/8 *(Male)* to Ø8	Quick fitting
Elbow fitting G1/8 *(Male)* to Ø8	Quick elbow fitting
Ø8-Ø6 Pipe 5 m	Transparent connecting hose
Fitting M6x1 *(Male)* to G1/8 *(Female)*	Adapter
Fitting M8x1 (Male) to G1/8 *(Female)*	Adapter
Fitting M10x1 (Male) to G1/8 *(Female)*	Adapter


EXTENSION KIT

Accesory	Specification
Single point fixture kit	Fixing kit 1 outlet, fitting and bracket and 2 push-in G1/8 *(Male)*

SPLITTER KIT 2 OUTLETS

Accesory	Specification
Kit splitter grease 2 outlets	Splitter 2 outlets (grease), bracket and 2 elbow fitting G1/8 -ø 8mm (ready to install the choosen lubricator on it)

DISTRIBUTOR KIT 4 / 6 / 8 OUTLETS

Accesory	Specification
Distributor kit 4 outlets	Installation kit for DB, distributor block, bracket and 2 push-in G1/8 per outlet (ready to install the choosen lubricator on it)
Distributor kit 6 outlets	Installation kit for DB, distributor block, bracket and 2 push-in G1/8 per outlet (ready to install the choosen lubricator on it)
Distributor kit 8 outlets	Installation kit for DB, distributor block, bracket and 2 push-in G1/8 per outlet (ready to install the choosen lubricator on it)


ACCESORIES

TRANSPARENT HOUSING FOR REFILL

Accesory	**Specification**
Kit 120 cc	Transparent housing, locking ring, compres. plate, spring, battery seal 240 cc
Kit 240 cc	Transparent housing, locking ring, compres. plate, spring, battery seal 240 cc
Kit 480 cc	Transparent housing, locking ring, compres. plate, spring, battery seal 480 cc
Special housing 240 cc	Transparent housing in polyamide for UV and aggressive environment 240 cc

PROTECTION COVER

Accesory	**Specification**
Protection cover 240 cc	Protection against water and dust 240 cc
Protection cover 480 cc	Protection against water and dust 480 cc

CONSUMABLES

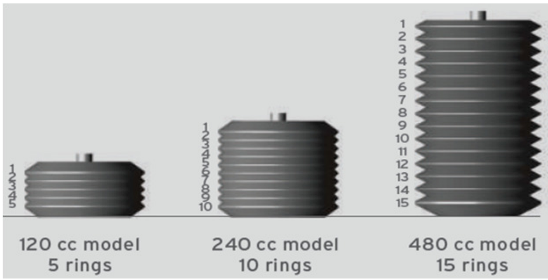
Consumable

Battery set

Grease cartridge 120 cc
- DIVINOL LITHOGREASE G421 (or equivalent)
- DIVINOL LITHOGREASE 00 (or equivalent)
- ISOFLEX TOPAS L 152 (or equivalent)

Grease cartridge 240 cc
- DIVINOL LITHOGREASE G421 (or equivalent)
- DIVINOL LITHOGREASE 00 (or equivalent)
- ISOFLEX TOPAS L 152 (or equivalent)

Grease cartridge 480 cc
- DIVINOL LITHOGREASE G421 (or equivalent)
- DIVINOL LITHOGREASE 00 (or equivalent)
- ISOFLEX TOPAS L 152 (or equivalent)



Lubricators are supplied without grease and battery set (SP and MP-1 models). Order them separately.

OVER AND ABOVE THE PARTS OF THE MACHINES, IN TERMS OF INNOVATION OR THE PERFECT MOVEMENT, IT IS ALWAYS THE PEOPLE WHO MAKE IT POSSIBLE.

NIASA TEAM


NIASA


NIASA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