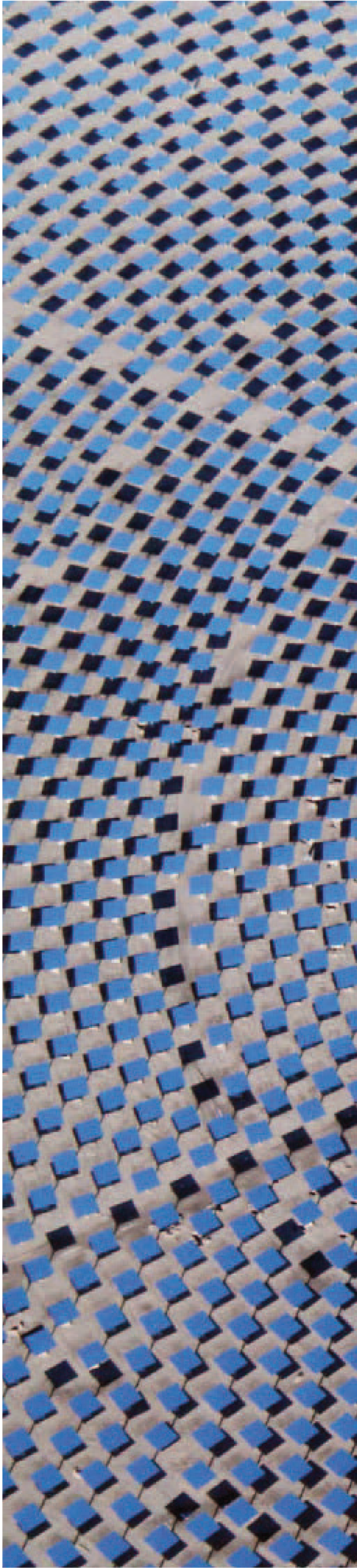
01
SCREW JACKS

“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.

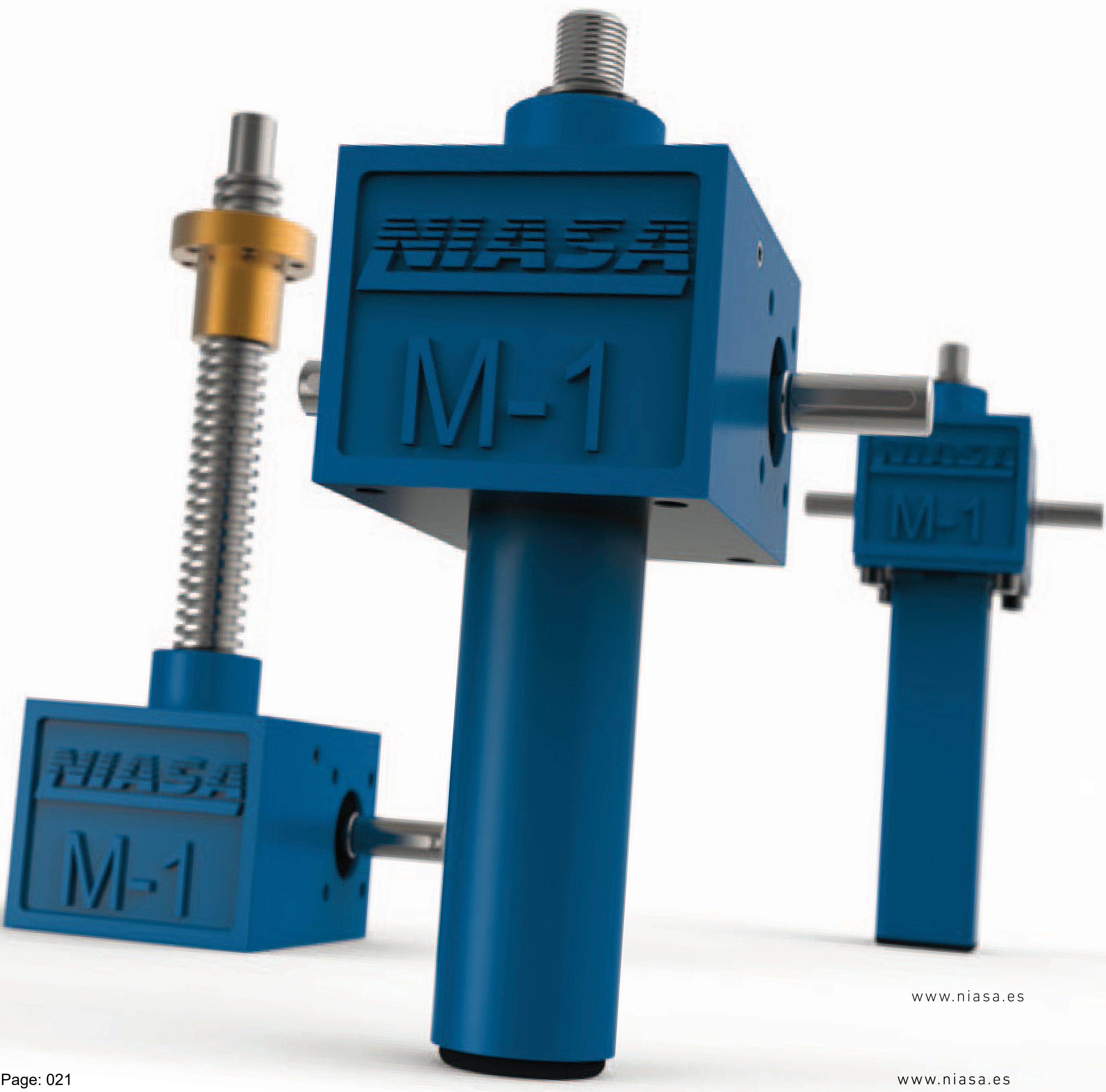
... Fastening accessories and elements, for optimal adaptation to the most varied systems that may be designed.

... 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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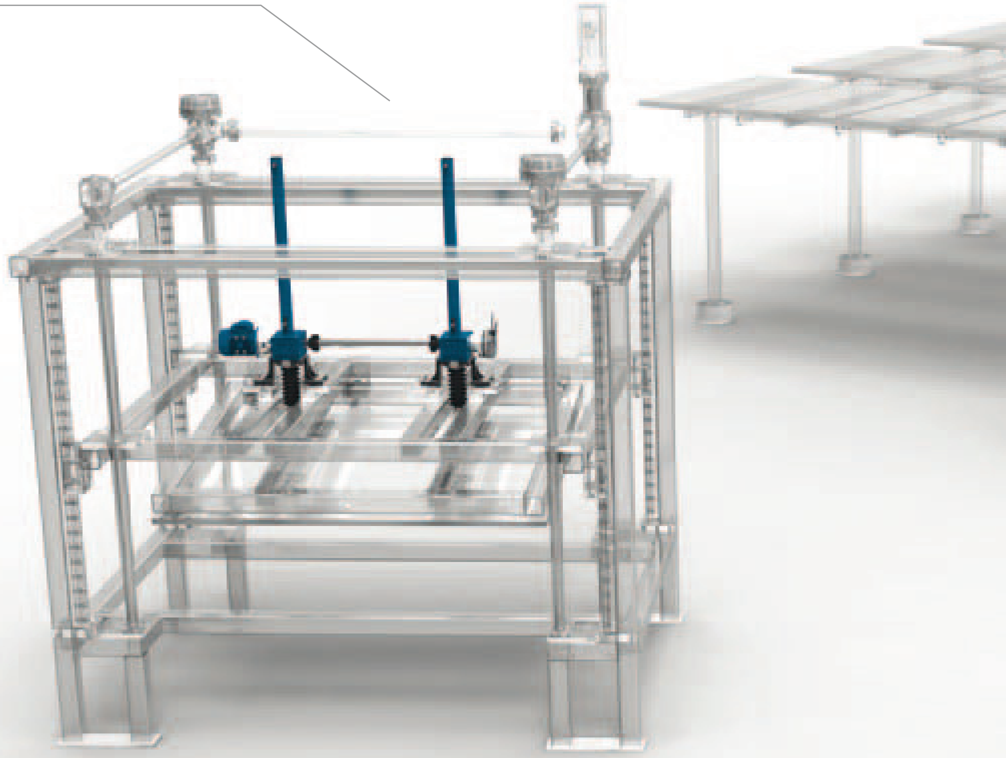
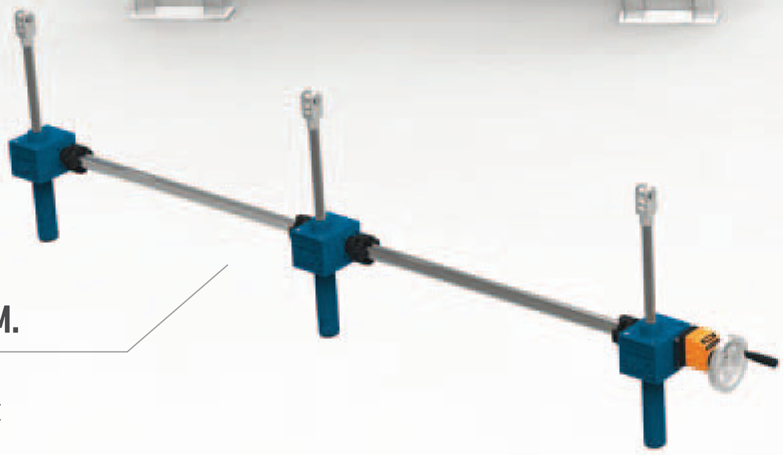
SCREW JACKS
APPLICATIONS

MACHINE TILTING SYSTEM

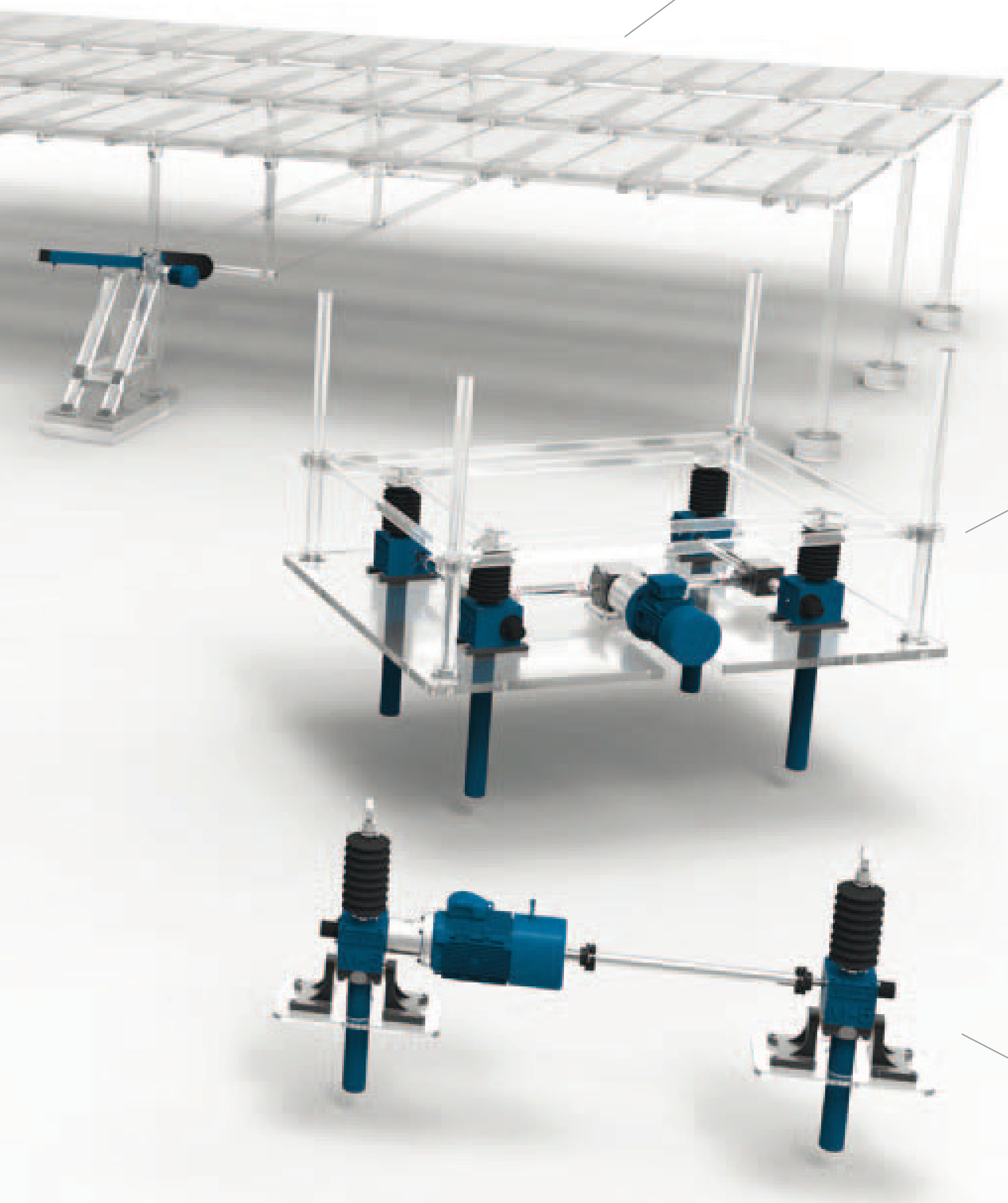
Set of two M4-N screw jacks made up of a three-phase motor drive system and joined together with a GX universal joint shaft. Tilt on the top of the gearbox with a ZKM joint adapter, SB tip supports, GKB series double clevis rod, FB protective bellow, inductive sensor and electro-magnetic brake.





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.

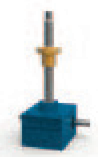
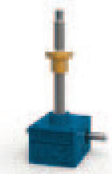
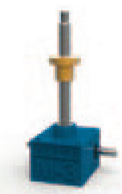
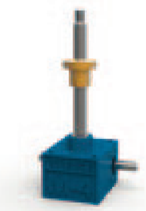
Set of four M5-N screw jacks made up of a three-phase motor drive system and joined together with EZ universal joint shafts and bevel gearboxes. LCM-series mounting feet underneath the box, BPS flange fastening on the screw, FB series protective bellow and PR series worm shaft protector.

TILTING ELEVATION SYSTEM

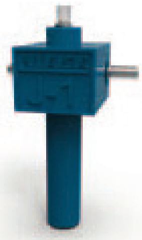
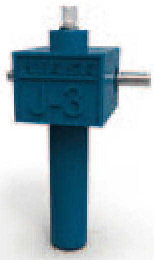
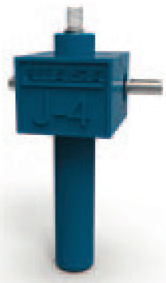
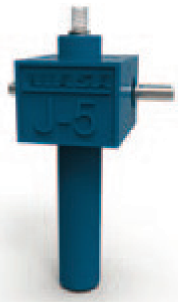
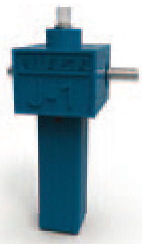
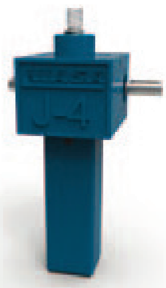
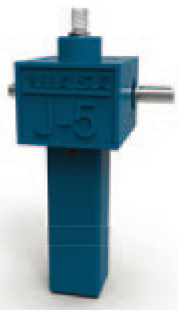
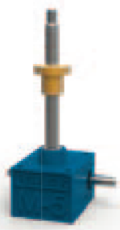
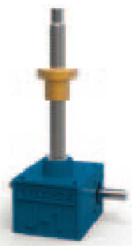
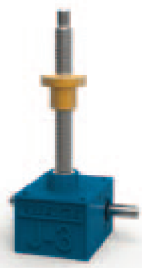
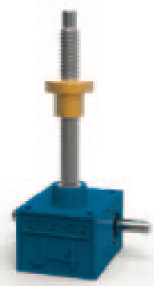
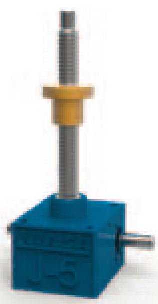
Set of two M5-N screw jacks made up of a dual-shaft three-phase motor drive system and joined together with GX universal joint shafts. Tilt underneath the gearbox with a ZKM joint adapter, SB tilt supports, clevis rod with GIR series ball joint on the screw, FB special protective bellow, and PR series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

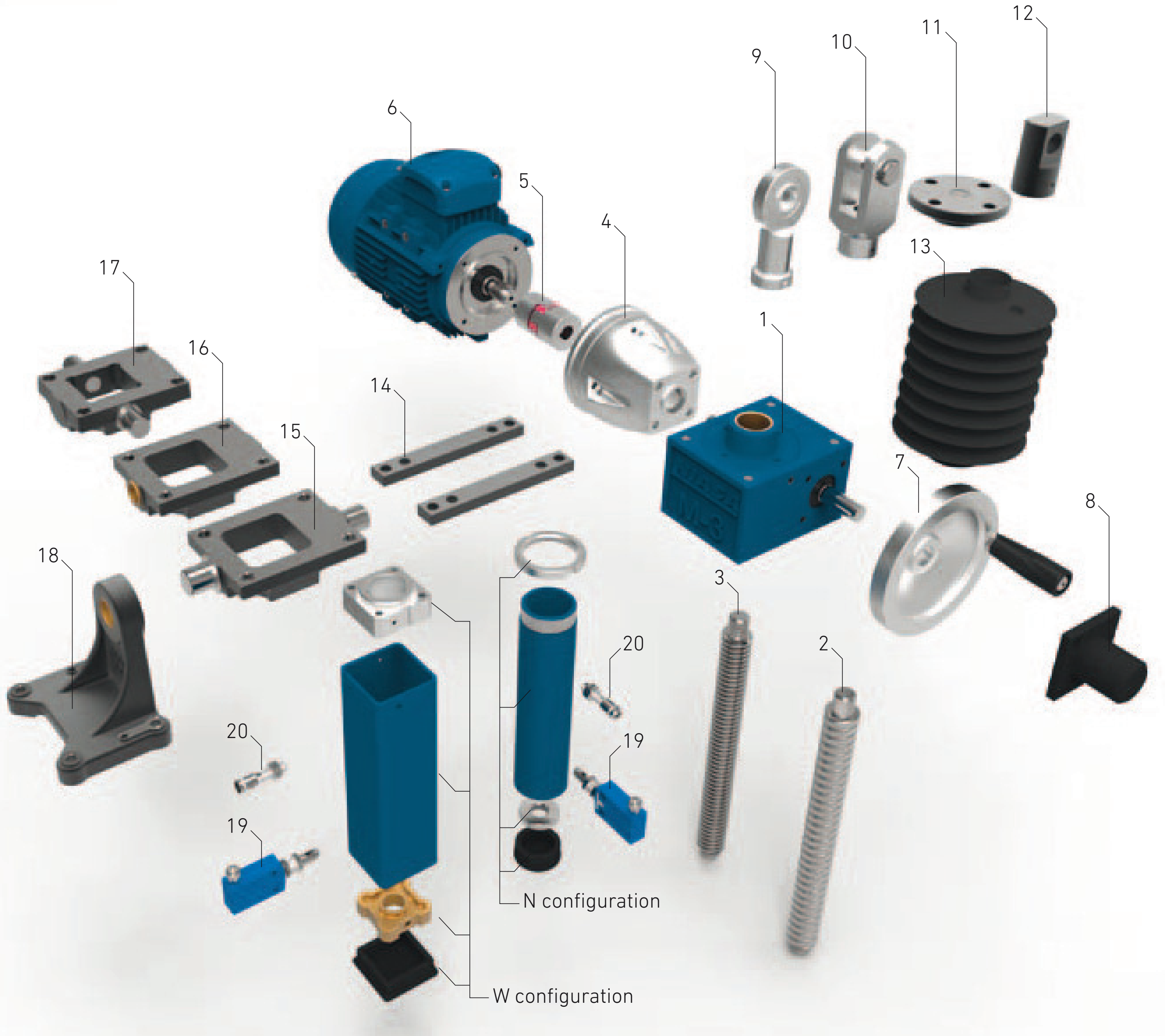
Up to	M1 5 kN	M2 10 kN	M3 25 kN	M4 50 kN
N The screw moves.	 page 28	 page 30	 page 32	 page 34
W The screw travels. With anti-rotation on the screw.	 page 28	 page 30	 page 32	 page 34
R The nut moves.	 page 29	 page 31	 page 33	 page 35

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

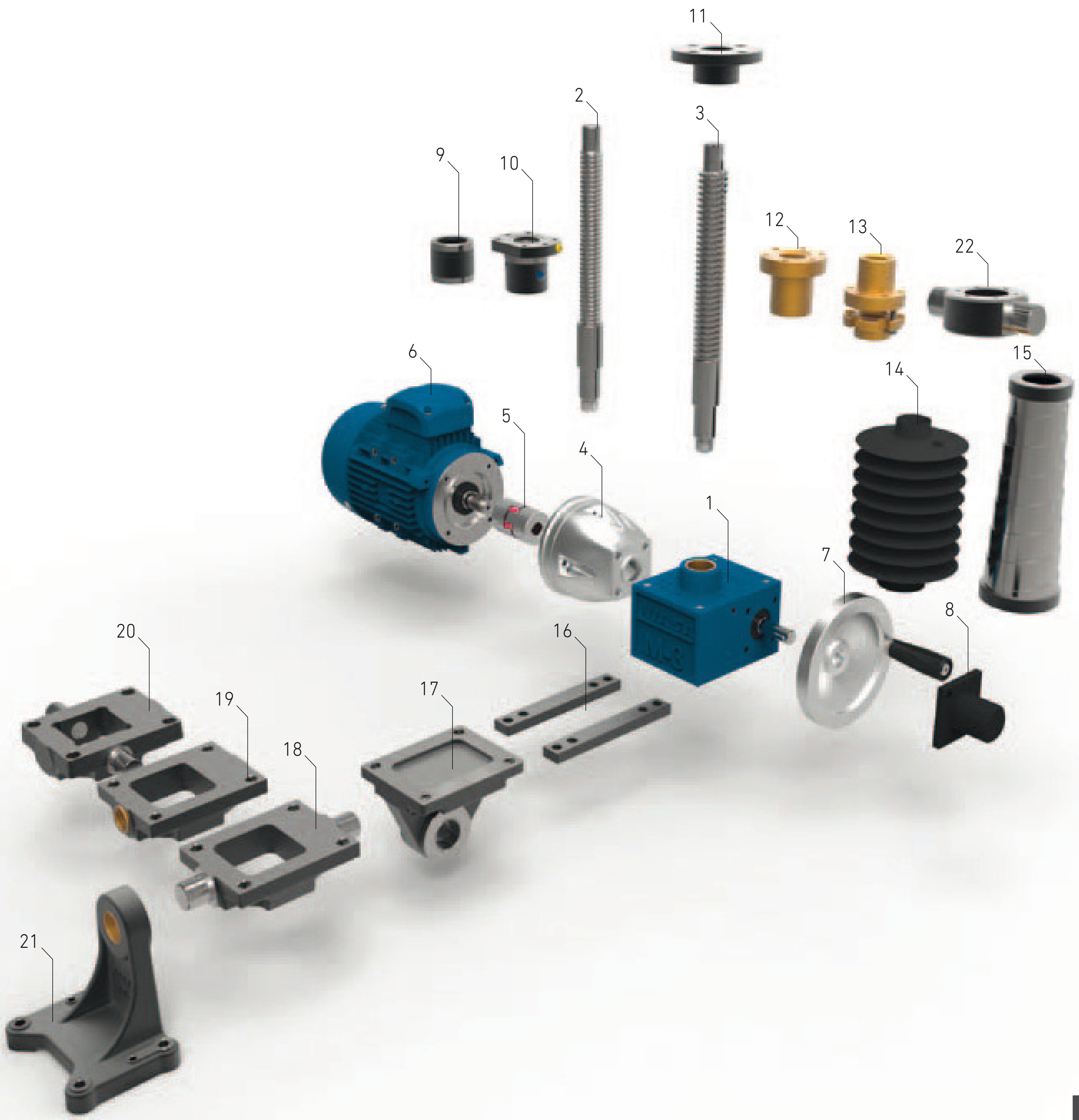
SCREW JACKS

GENERAL PRODUCT OVERVIEW



N/W

	Name	Page
01	M series box	24
02	Ball screw	28
03	Trapezoidal screw	28
04	Motor flange	
05	EK coupling	284
06	Motorization	312
07	Wheel with VE grip	300
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
13	FB protector bellow	301
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



R

	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
08	PR worm gear protector	304

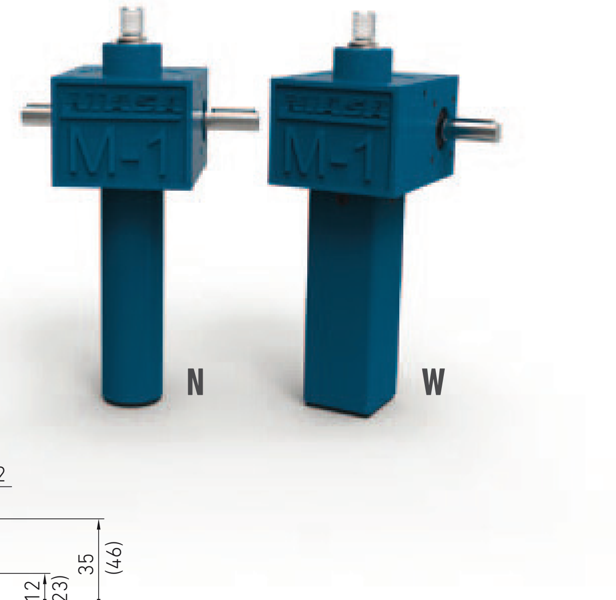
09	KGM nut	248
10	KGF nut	246
11	Flange with BPR bearing	279
12	EFM nut	258
13	EFM safety nut	258
14	FB protector bellow	301
15	SF protector bellow	302
16	LCM mounting feet	266

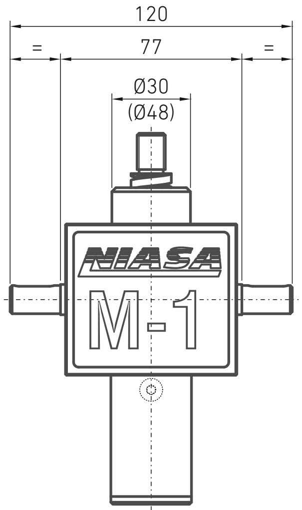
17	HFM ball joint	270
18	Flange with ZKM bolts	267
19	Flanges with ZKH bearings	268
20	Flange with ZKV 90° bolts	269
21	SB tilt supports	276
22	Flange with KAR bolts	275

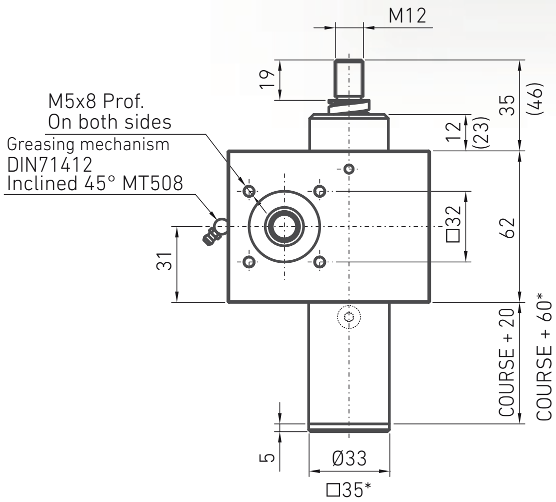
M1-N/W SCREW JACKS

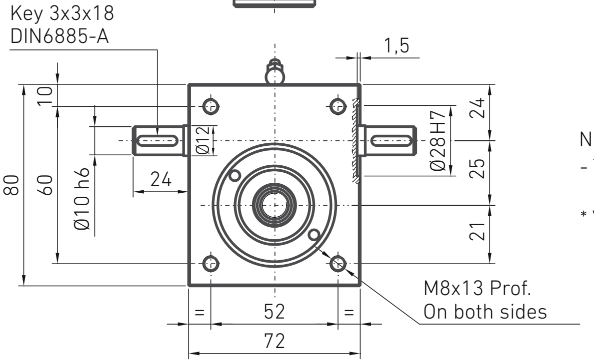
UP TO **5 kN** Tr TRAPEZ. KGS BALLS

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

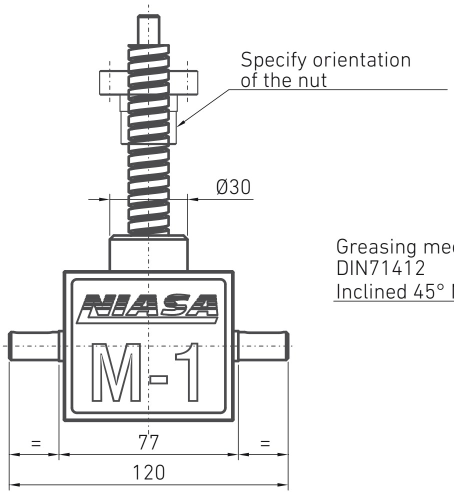
... Power required: P_D (kW) = 0.157 x M_D (Nm).
... All the data in the table correspond to an input speed of 1,500 rpm. For other speeds, please see the calculation chapter (page 47).
... Ensure that the dynamic load of the application does not surpass the critical values indicated, in order to avoid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

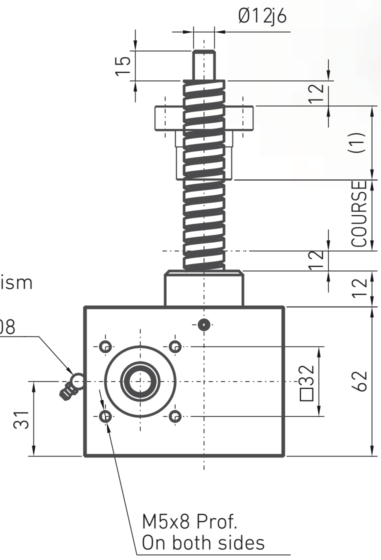
M1-R SCREW JACKS

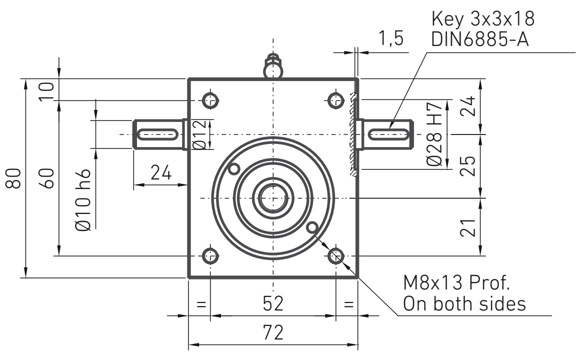
UP TO 5 kN

Tr TRAPEZ. KGS BALLS

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



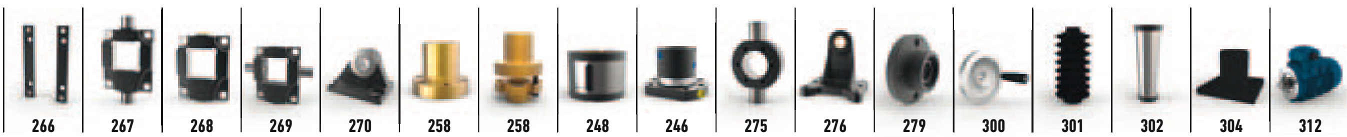




NOTES:
- (1) See nut dimensions in the corresponding chapter.

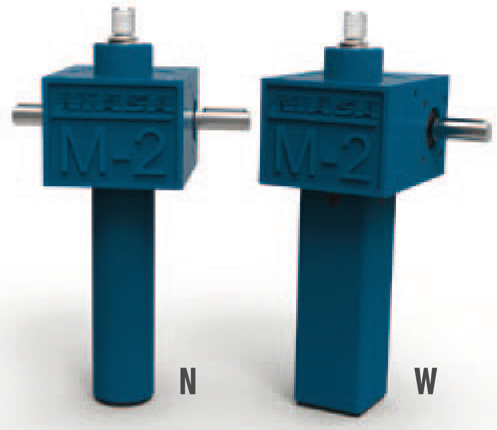
Screw diameter and pitch (mm)	Maximum axial strength (kN	Reduction		Travel (mm/revol. input)		Performance (%)		Drive torque, M_D (Nm)		Start-up torque, M_0 (Nm)		Weight stroke 0 (kg)	Approx. weight each 100mm of stroke (kg)
								F (kN), load to move in dynamic					
		S	H	S	H	S	H	S	H	S	H		
Tr 18x4	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).

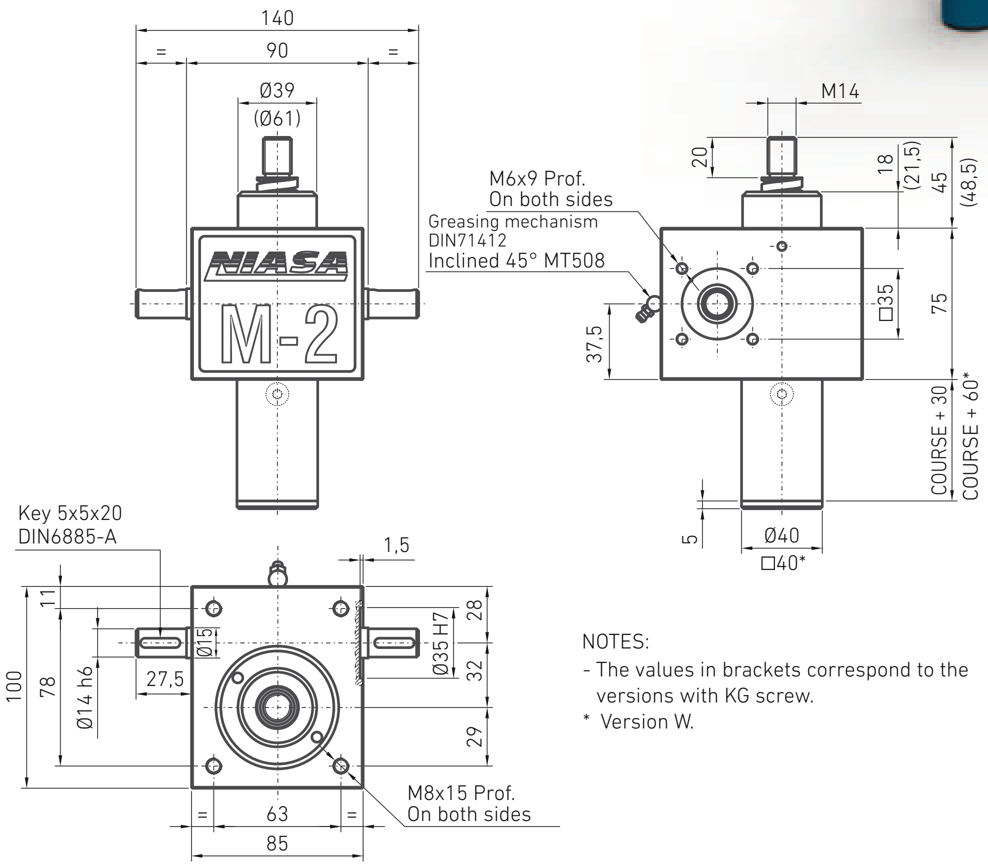


M2-N/W SCREW JACKS

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

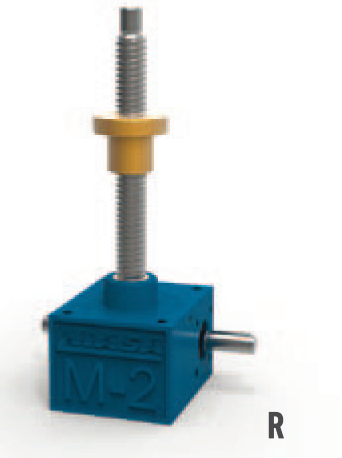
... Power required: P_D (kW) = 0.157x M_D (Nm).
... All the data in the table correspond to an input speed of 1,500 rpm. For other speeds, please see the calculation chapter (page 47).
... Ensure that the dynamic load of the application does not surpass the critical values indicated, in order to avoid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

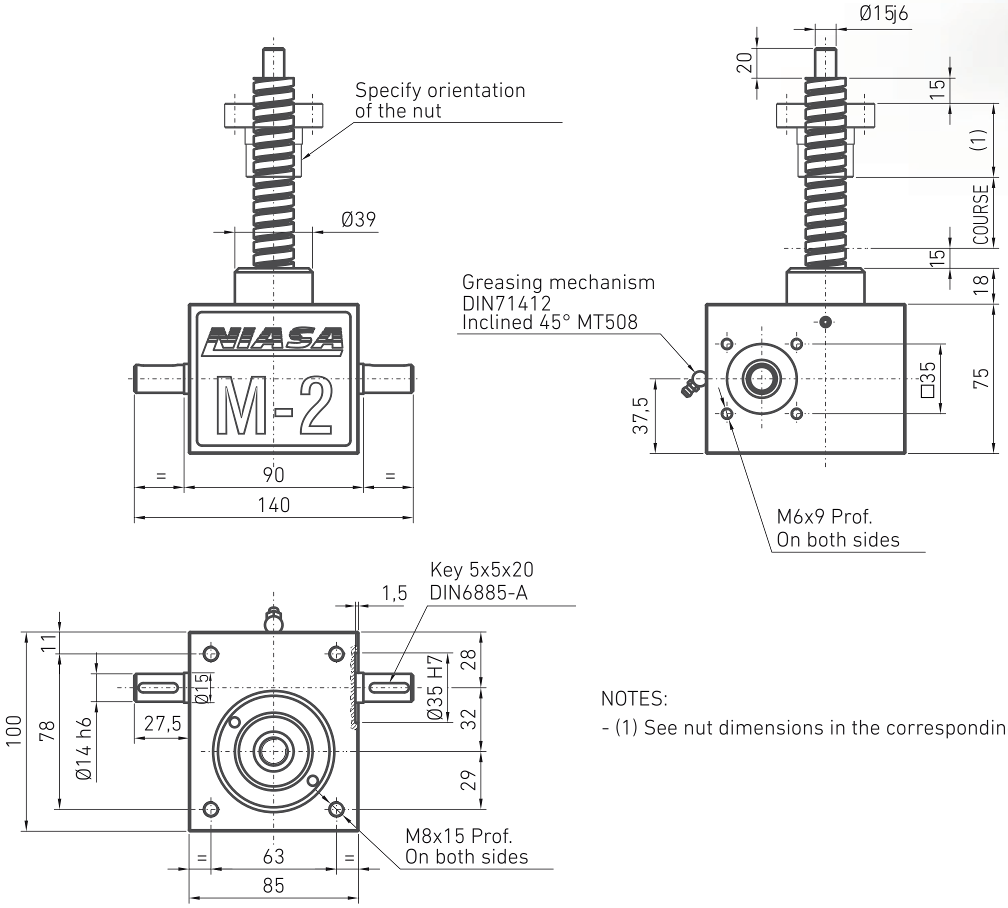
M2-R SCREW JACKS

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.

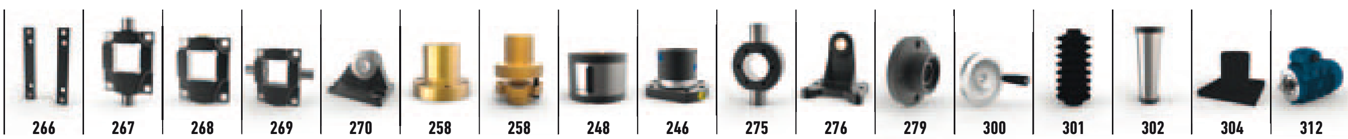




NOTES:
- (1) See nut dimensions in the corresponding chapter.

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

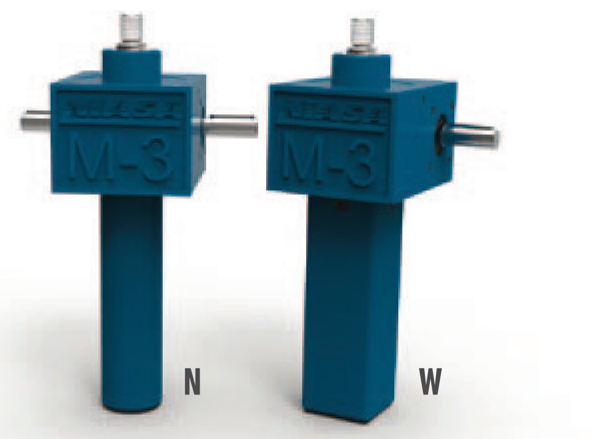
... Power required: P_D (kW) = 0.157x M_D (Nm).
... All the data in the table correspond to an input speed of 1,500 rpm. For other speeds, please see the calculation chapter (page 47).
... Ensure that the dynamic load of the application does not surpass the critical values indicated, in order to avoid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



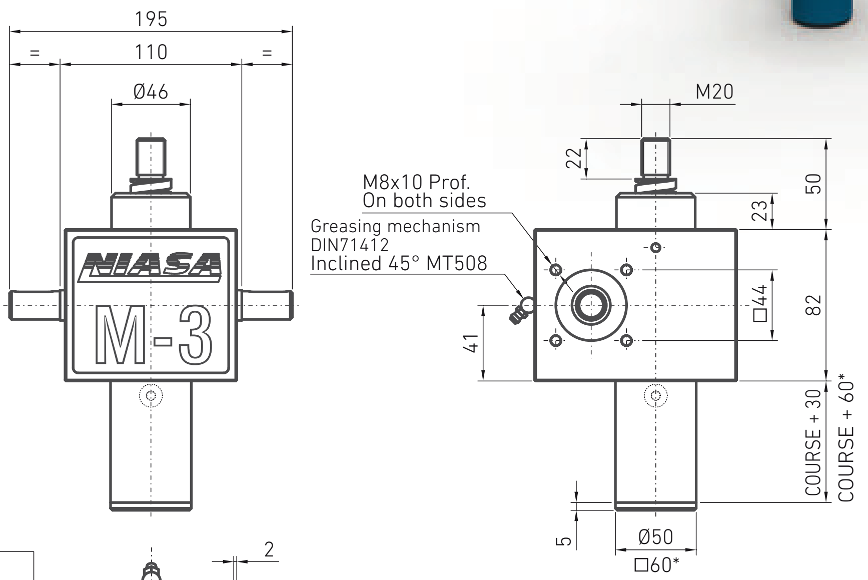
M3-N/W SCREW JACKS

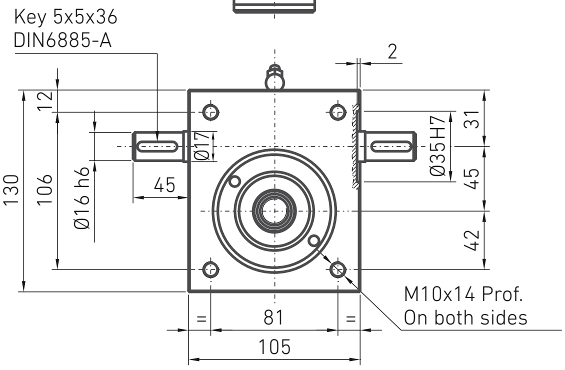
UP TO 25 kN

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.

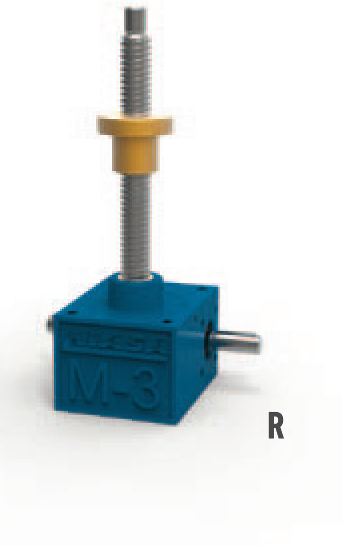
Screw diameter and pitch (mm)	Maximum axial strength (kN)	Reduction		Travel (mm/revol. input)		Performance (%)		Drive torque, M_D (Nm)		Start-up torque, M_0 (Nm)		Weight stroke 0 (kg)	Approx. weight each 100mm of stroke (kg)
								F (kN), load to move in dynamic					
		S	H	S	H	S	H	S	H	S	H		
Tr 30x6	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

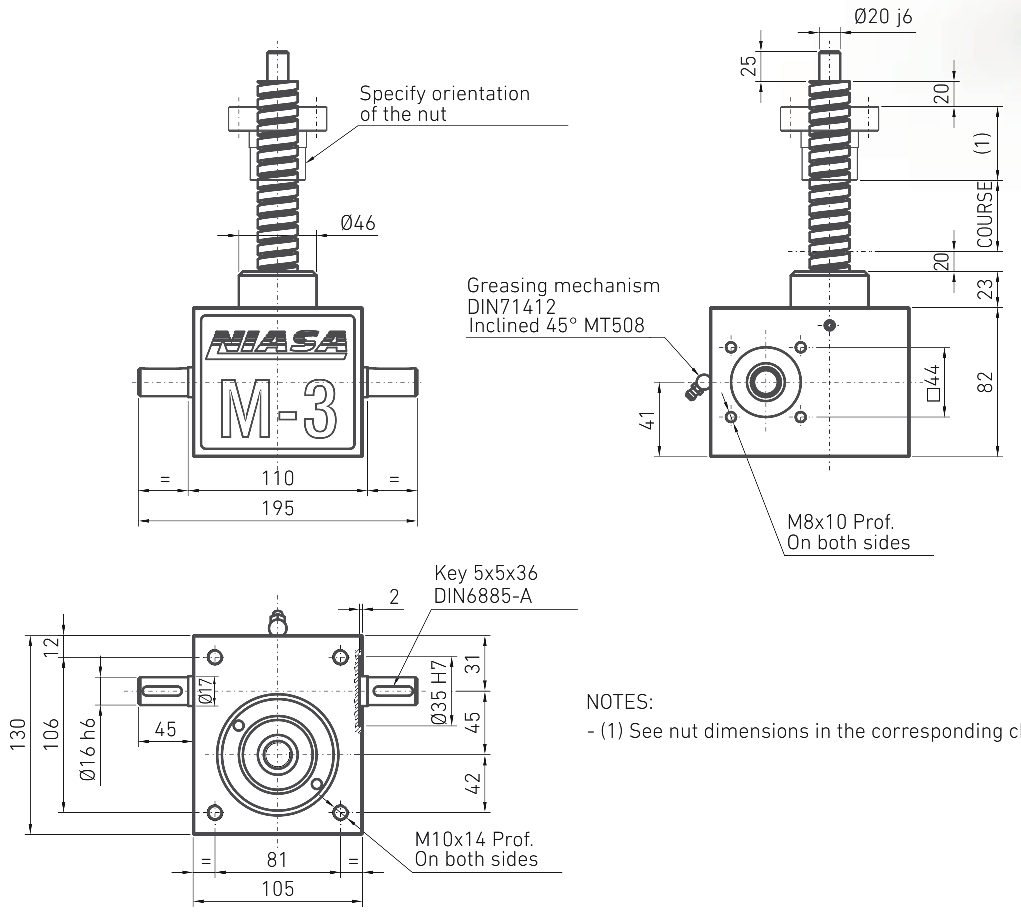
... Power required: P_D (kW) = 0.157x M_D (Nm).
... All the data in the table correspond to an input speed of 1,500 rpm. For other speeds, please see the calculation chapter (page 48).
... Ensure that the dynamic load of the application does not surpass the critical values indicated, in order to avoid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

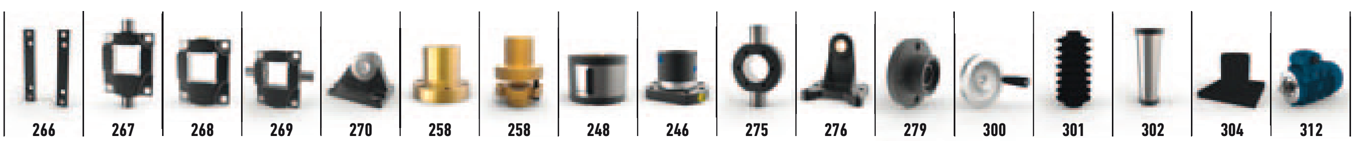




NOTES:
- (1) See nut dimensions in the corresponding chapter.

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

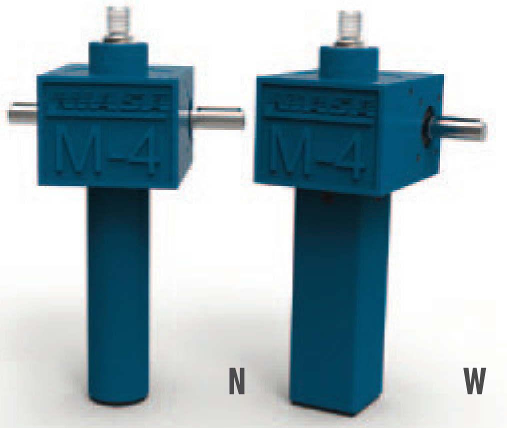
... Power required: P_D (kW) = 0.157x M_D (Nm).
... All the data in the table correspond to an input speed of 1,500 rpm. For other speeds, please see the calculation chapter (page 48).
... Ensure that the dynamic load of the application does not surpass the critical values indicated, in order to avoid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

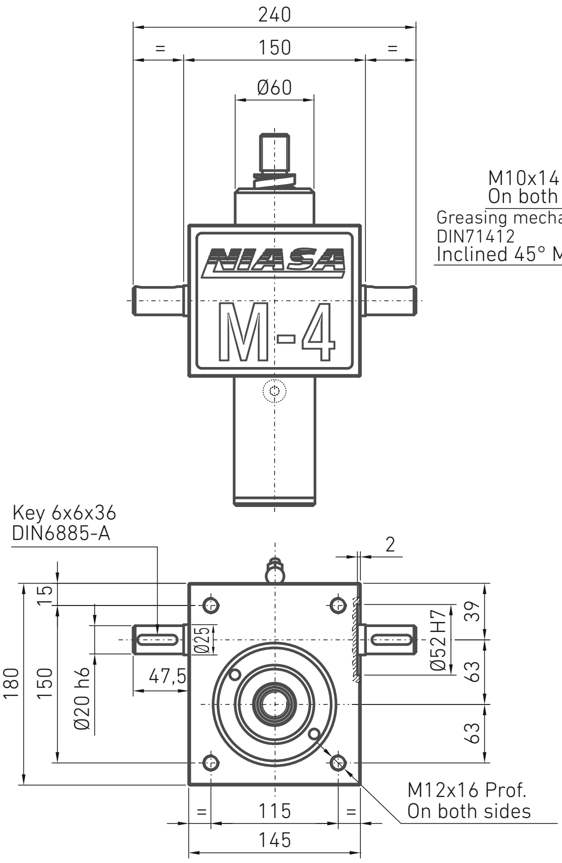


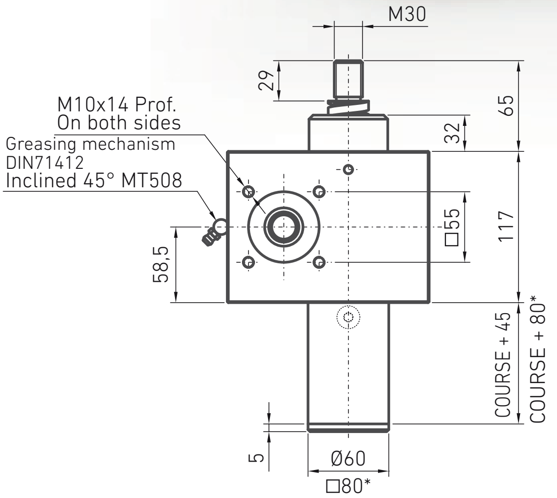
M4-N/W SCREW JACKS

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

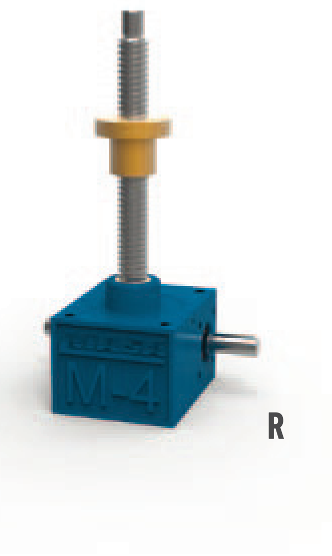
... Power required: P_D (kW) = 0.157x M_D (Nm).
... All the data in the table correspond to an input speed of 1,500 rpm. For other speeds, please see the calculation chapter (page 47).
... Ensure that the dynamic load of the application does not surpass the critical values indicated, in order to avoid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

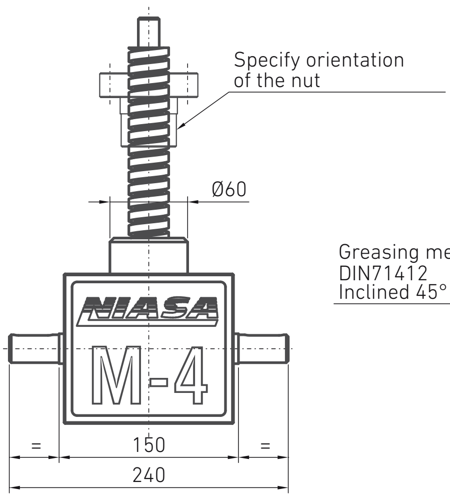
M4-R SCREW JACKS

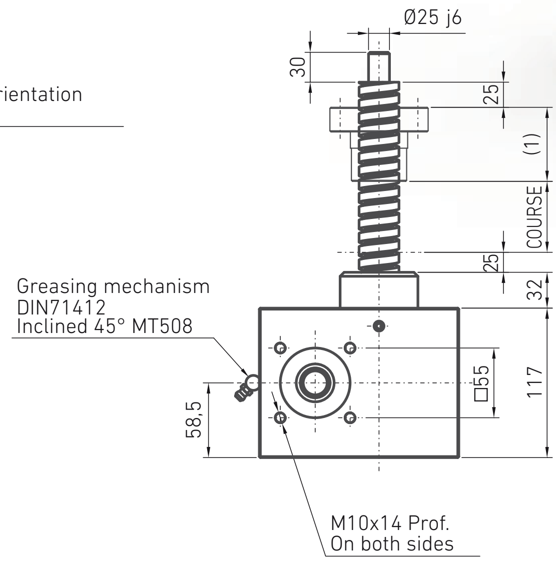
UP TO 50 kN

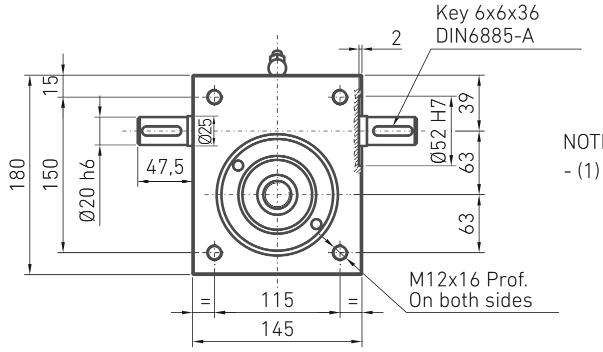
Tr TRAPEZ. KGS BALLS

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





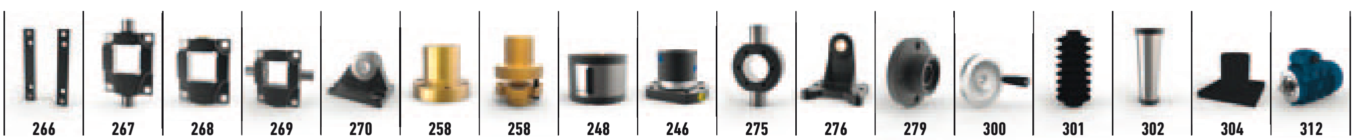




NOTES:
- (1) See nut dimensions in the corresponding chapter.

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

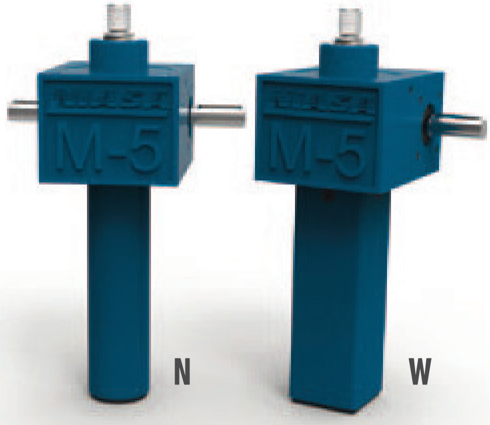
... Power required: P_D (kW) = 0.157x M_D (Nm).
... All the data in the table correspond to an input speed of 1,500 rpm. For other speeds, please see the calculation chapter (page 47).
... Ensure that the dynamic load of the application does not surpass the critical values indicated, in order to avoid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

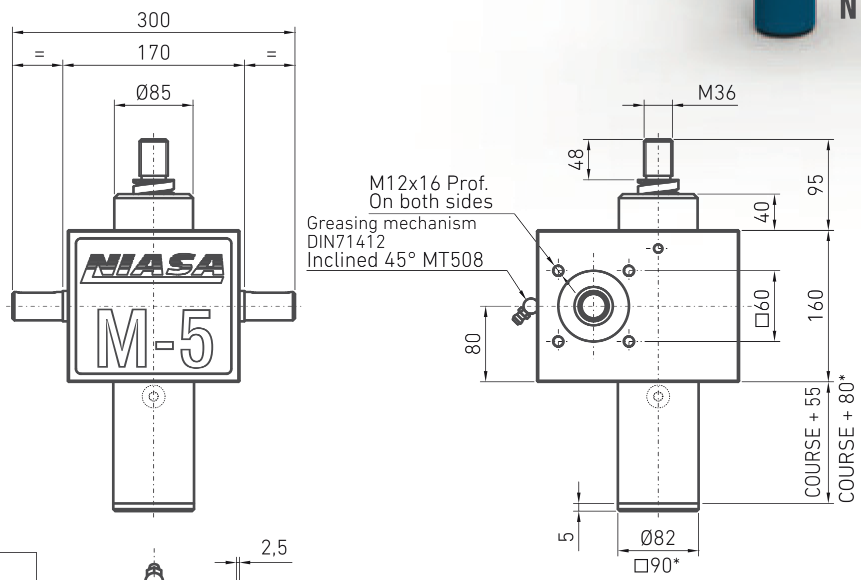


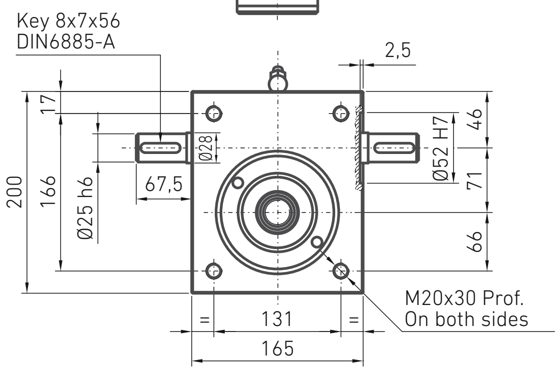
M5-N/W SCREW JACKS

UP TO 100 kN

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 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).

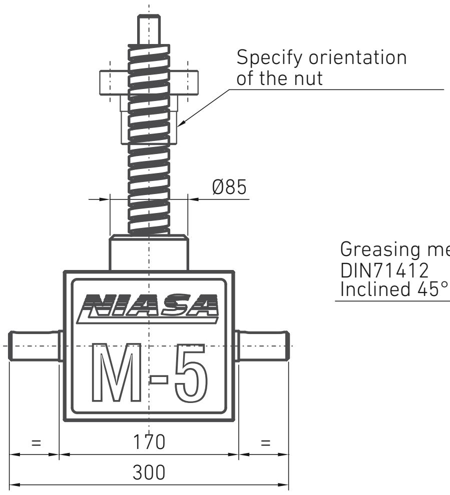
M5-R SCREW JACKS

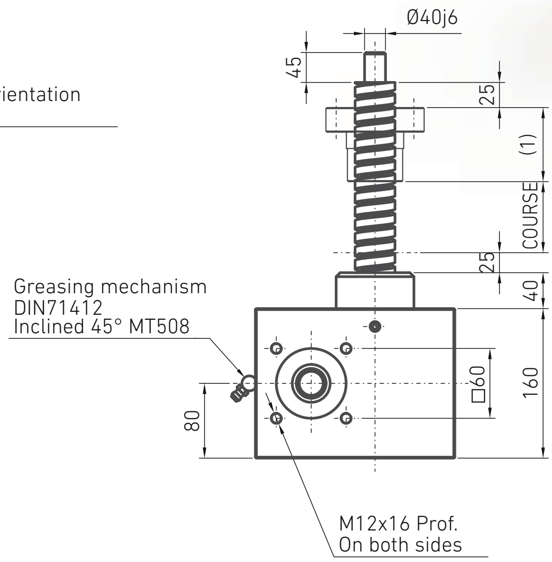
UP TO 100 kN

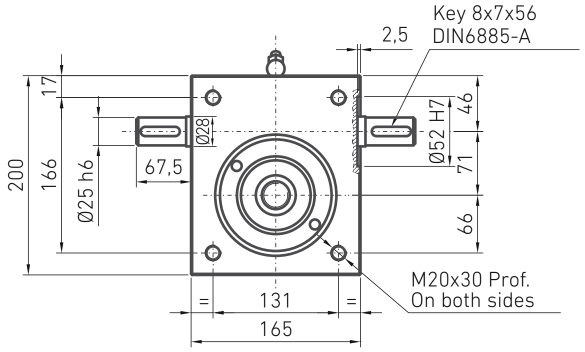
Tr TRAPEZ. KGS BALLS

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

R



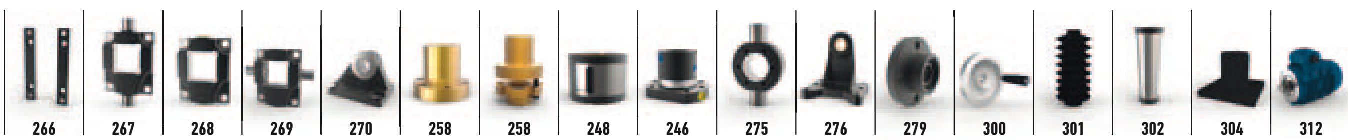




NOTES:
- (1) See nut dimensions in the corresponding chapter.

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 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

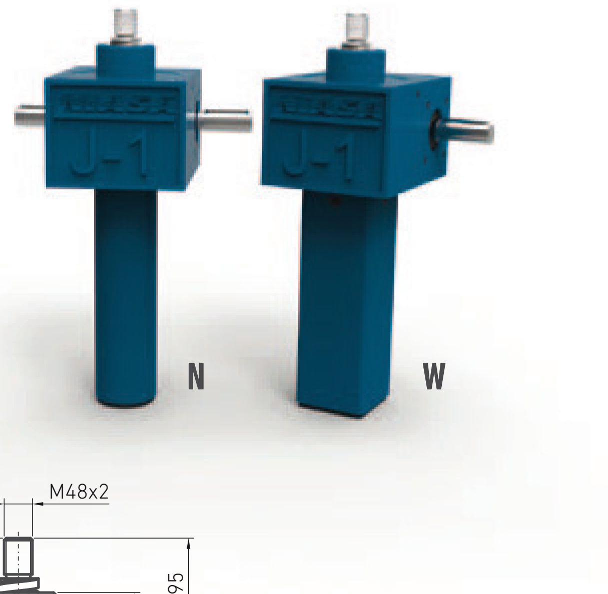
... Power required: P_D (kW) = 0.157x M_D (Nm).
... All the data in the table correspond to an input speed of 1,500 rpm. For other speeds, please see the calculation chapter (page 47).
... Ensure that the dynamic load of the application does not surpass the critical values indicated, in order to avoid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



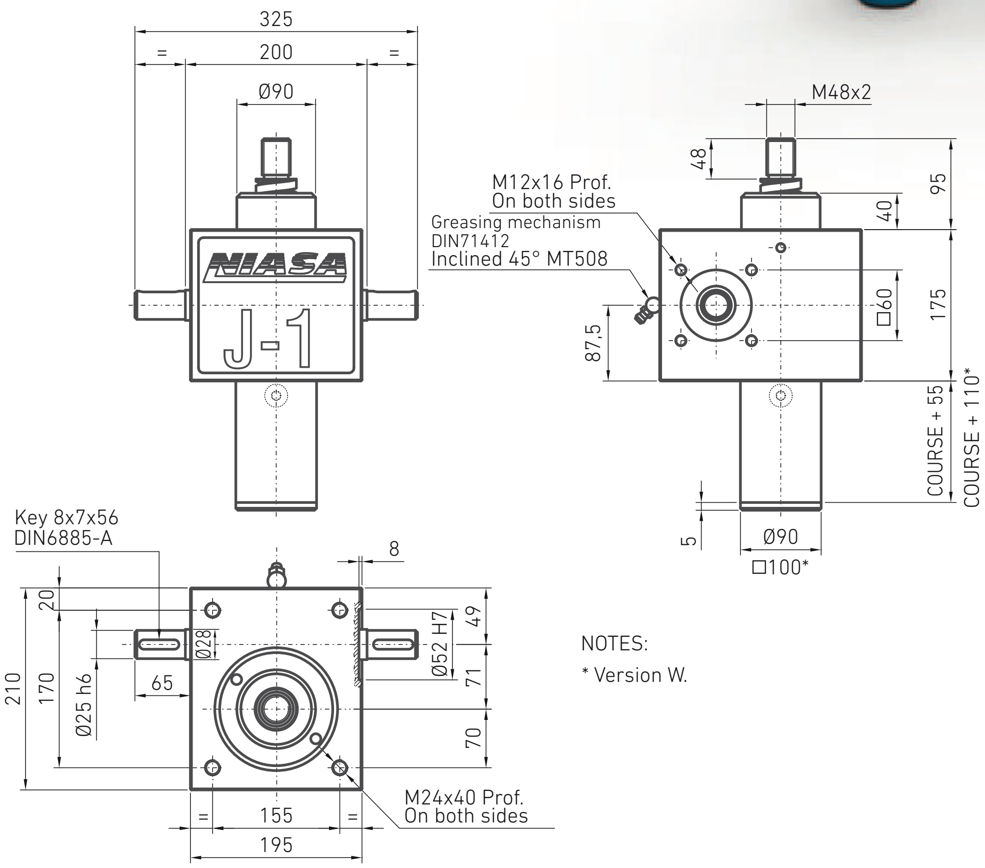
J1-N/W SCREW JACKS

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

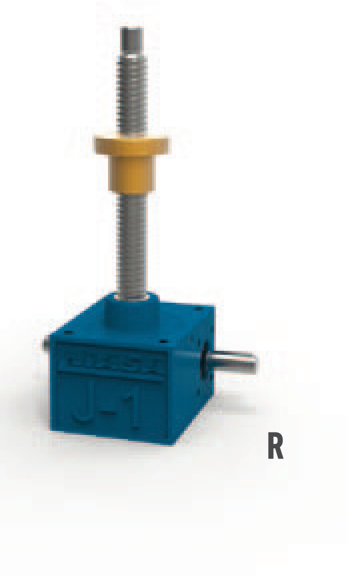
... Power required: P_D (kW) = 0.157x M_D (Nm).
... All the data in the table correspond to an input speed of 1,500 rpm. For other speeds, please see the calculation chapter (page 47).
... Ensure that the dynamic load of the application does not surpass the critical values indicated, in order to avoid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

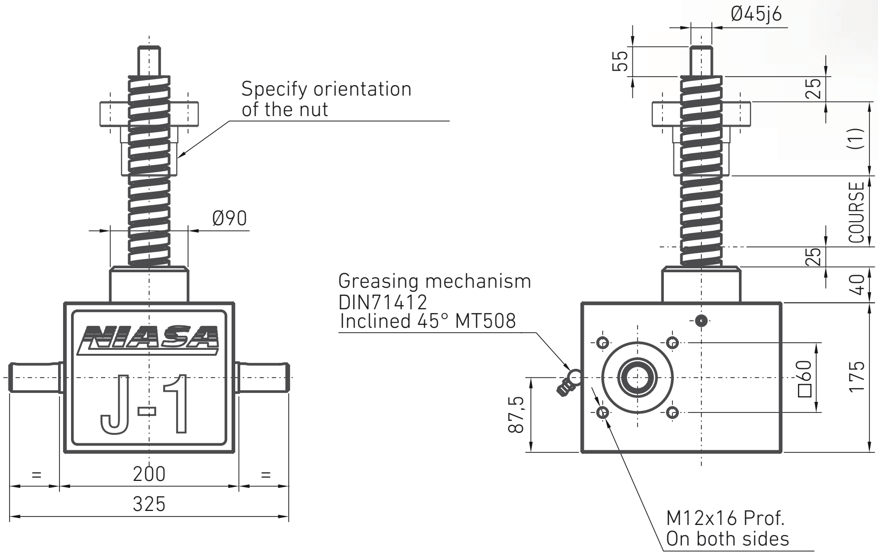
J1-R SCREW JACKS

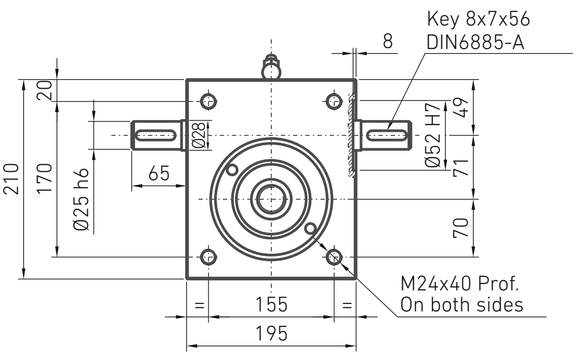
UP TO 150 kN

Tr TRAPEZ. KGS BALLS

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



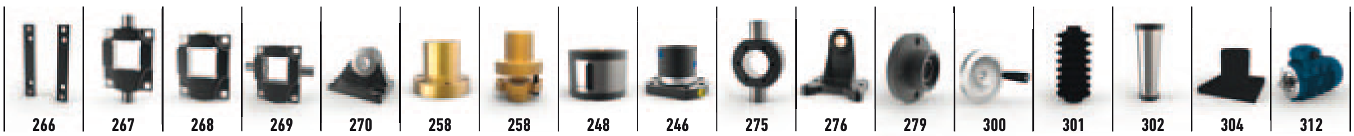




NOTES:
- (1) See nut dimensions in the corresponding chapter.

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 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

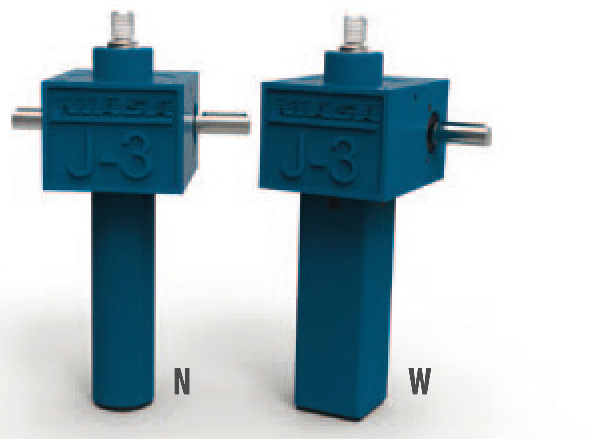
... Power required: P_D (kW) = 0.157x M_D (Nm).
... All the data in the table correspond to an input speed of 1,500 rpm. For other speeds, please see the calculation chapter (page 47).
... Ensure that the dynamic load of the application does not surpass the critical values indicated, in order to avoid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



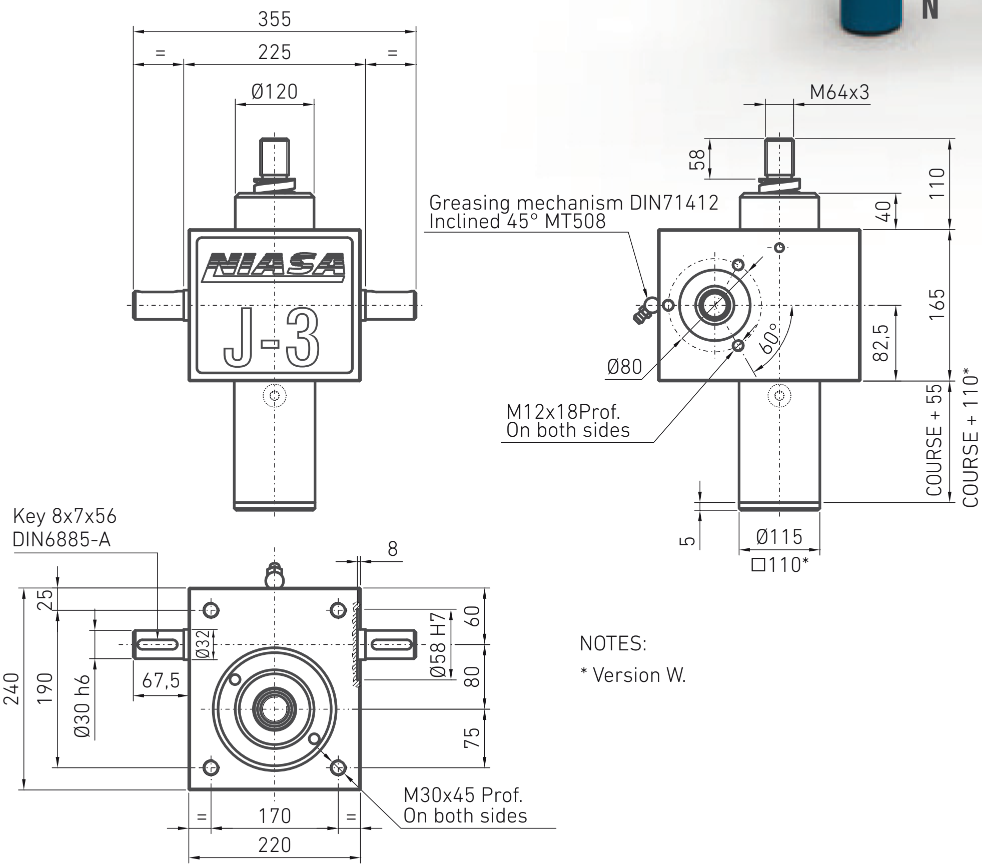
J3-N/W SCREW JACKS

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).

NIASA

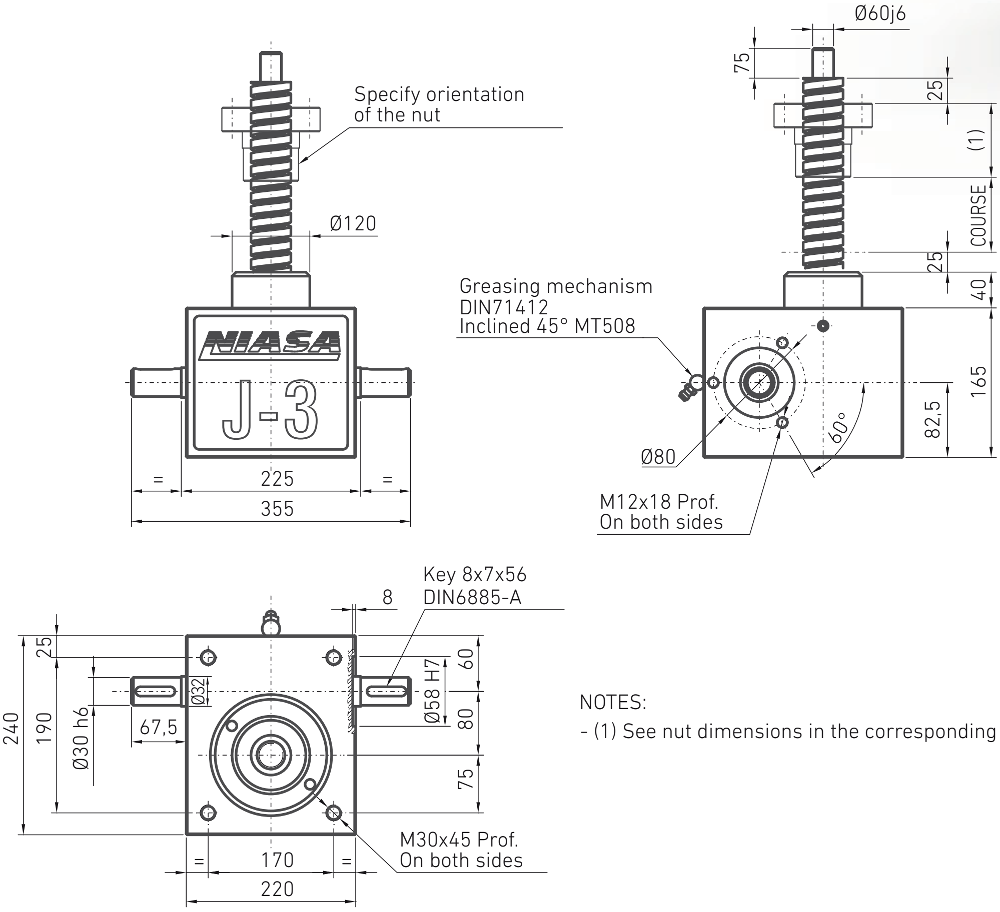
J3-R SCREW JACKS

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.

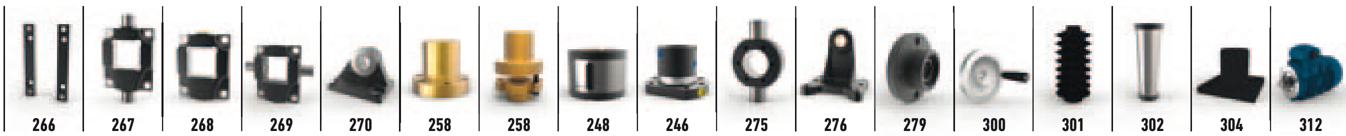
R



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).

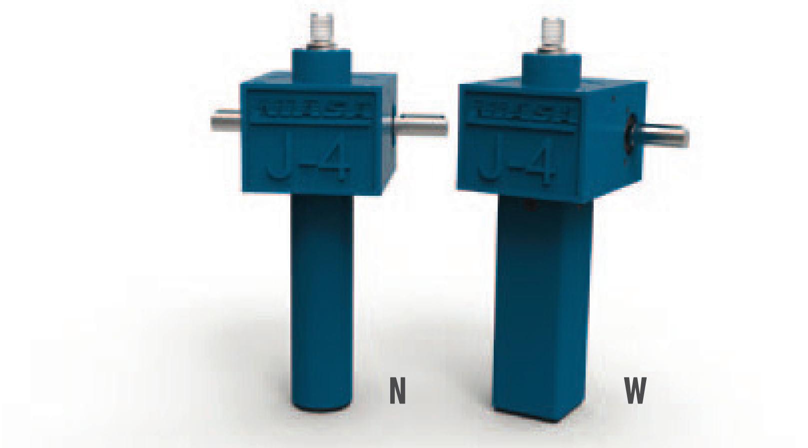


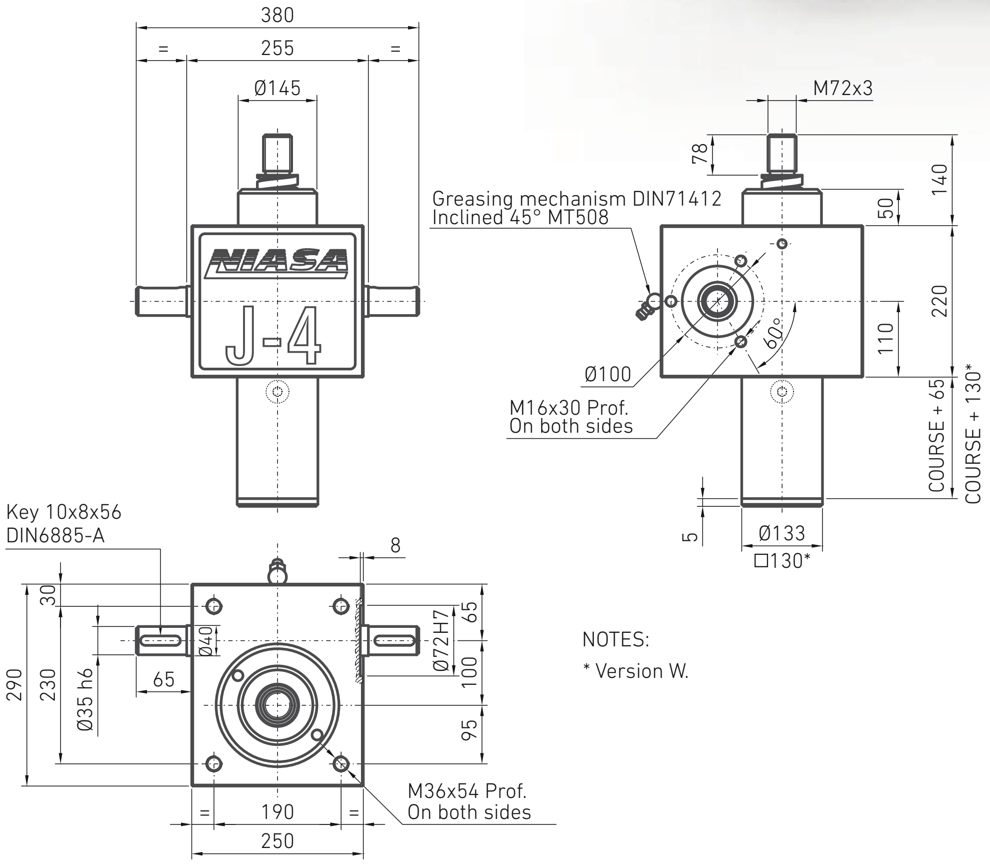
J4-N/W SCREW JACKS

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

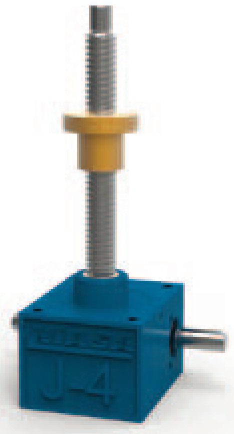
... Power required: P_D (kW) = 0.157x M_D (Nm).
... All the data in the table correspond to an input speed of 1,000 rpm. For other speeds, please see the calculation chapter (page 47).
... Ensure that the dynamic load of the application does not surpass the critical values indicated, in order to avoid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

J4-R SCREW JACKS

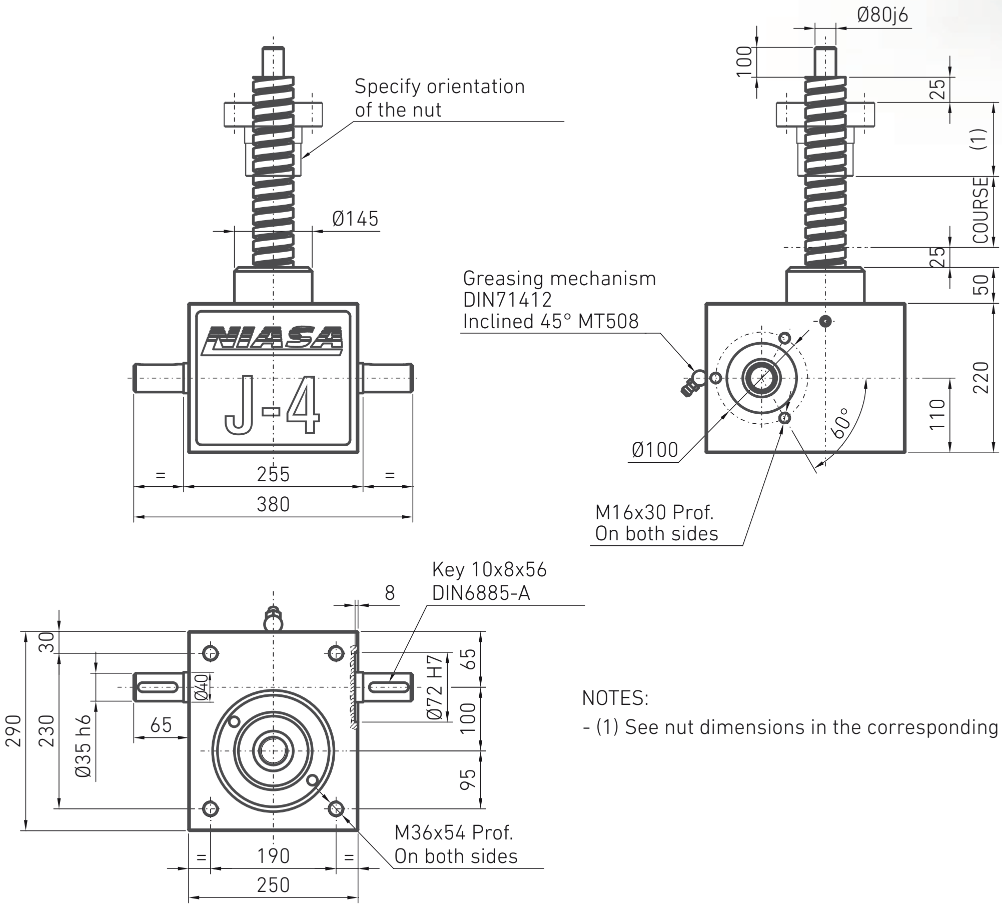
UP TO 350 kN

Tr TRAPEZ. KGS BALLS

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



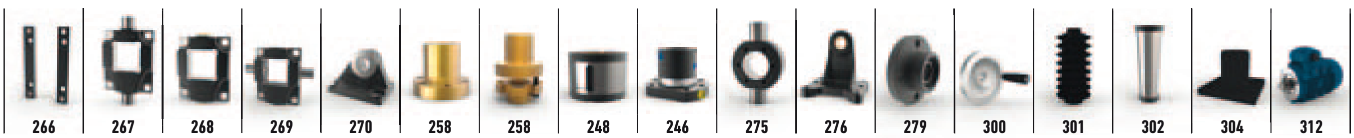
R



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 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).

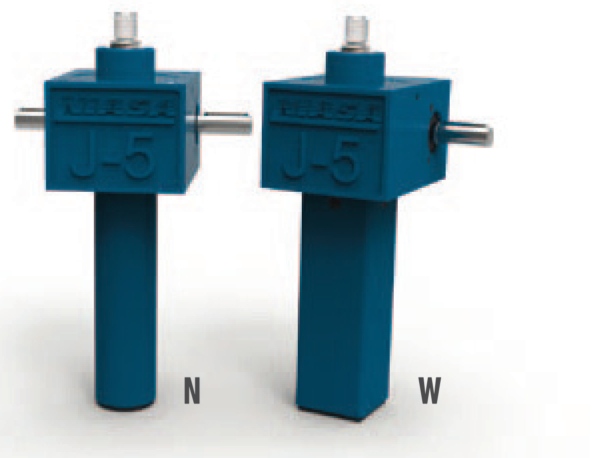


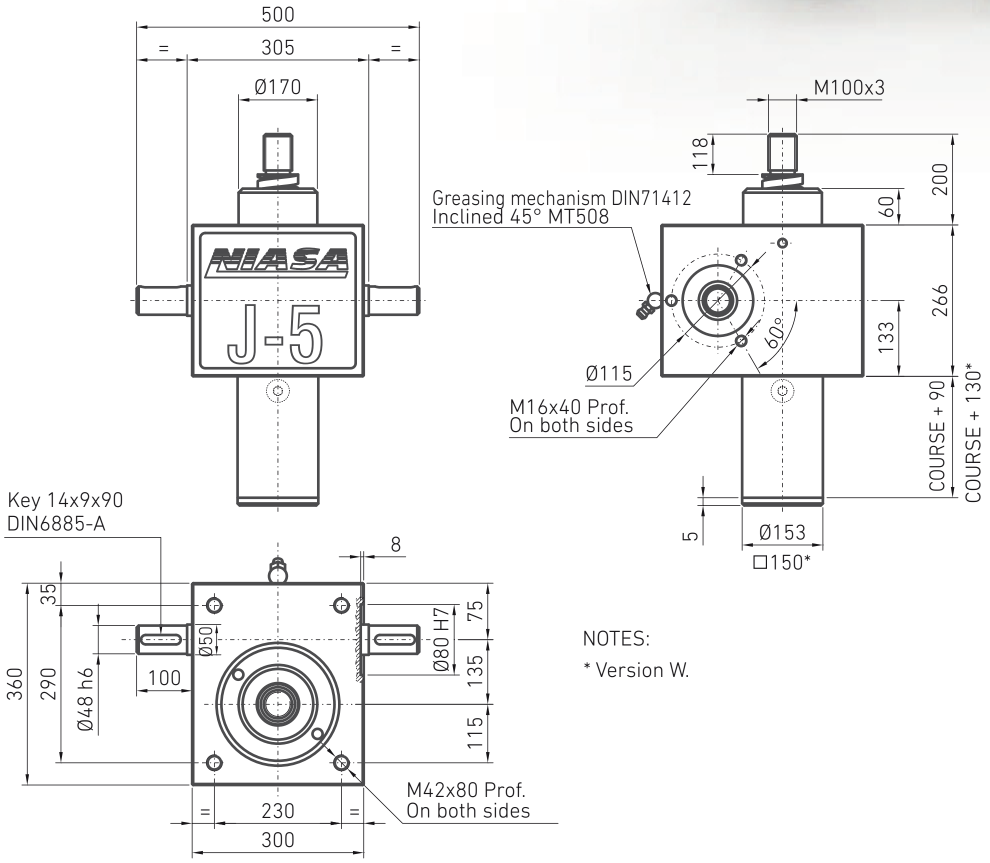
J5-N/W SCREW JACKS

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) — 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 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).

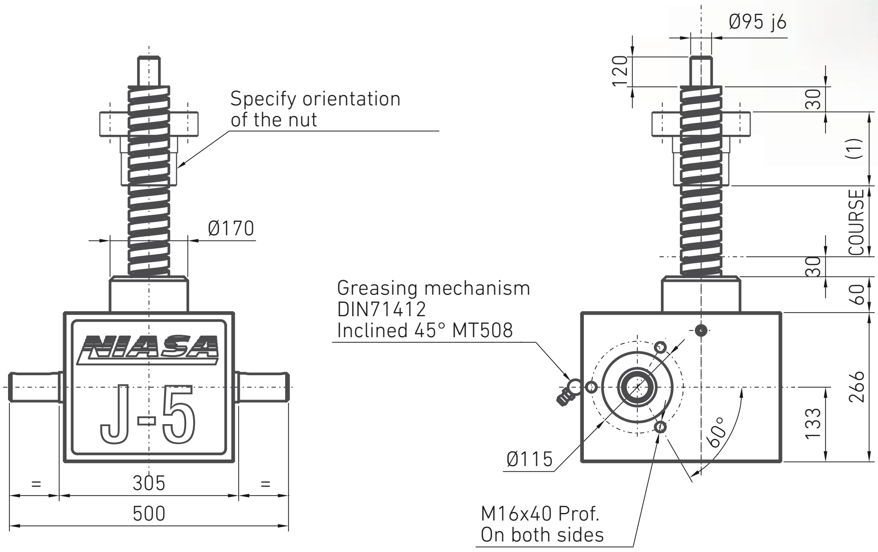
J5-R SCREW JACKS

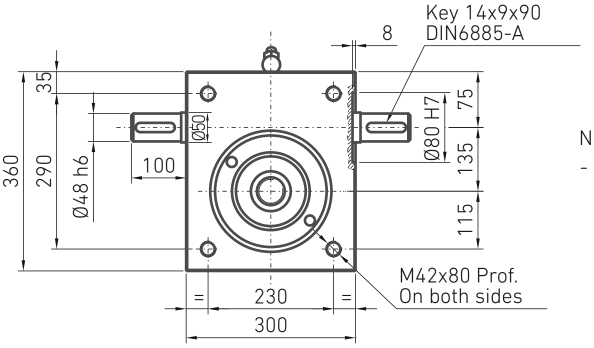
UP TO 500 kN

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

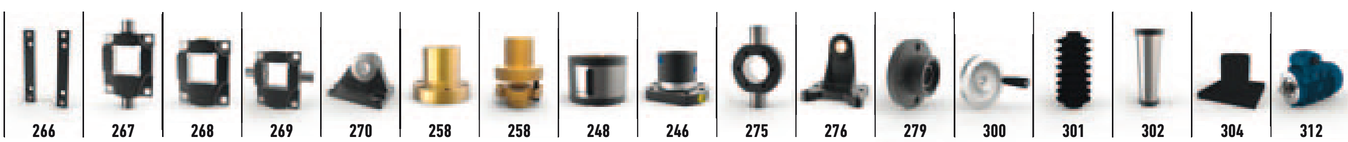




NOTES:
- (1) See nut dimensions in the corresponding chapter.

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

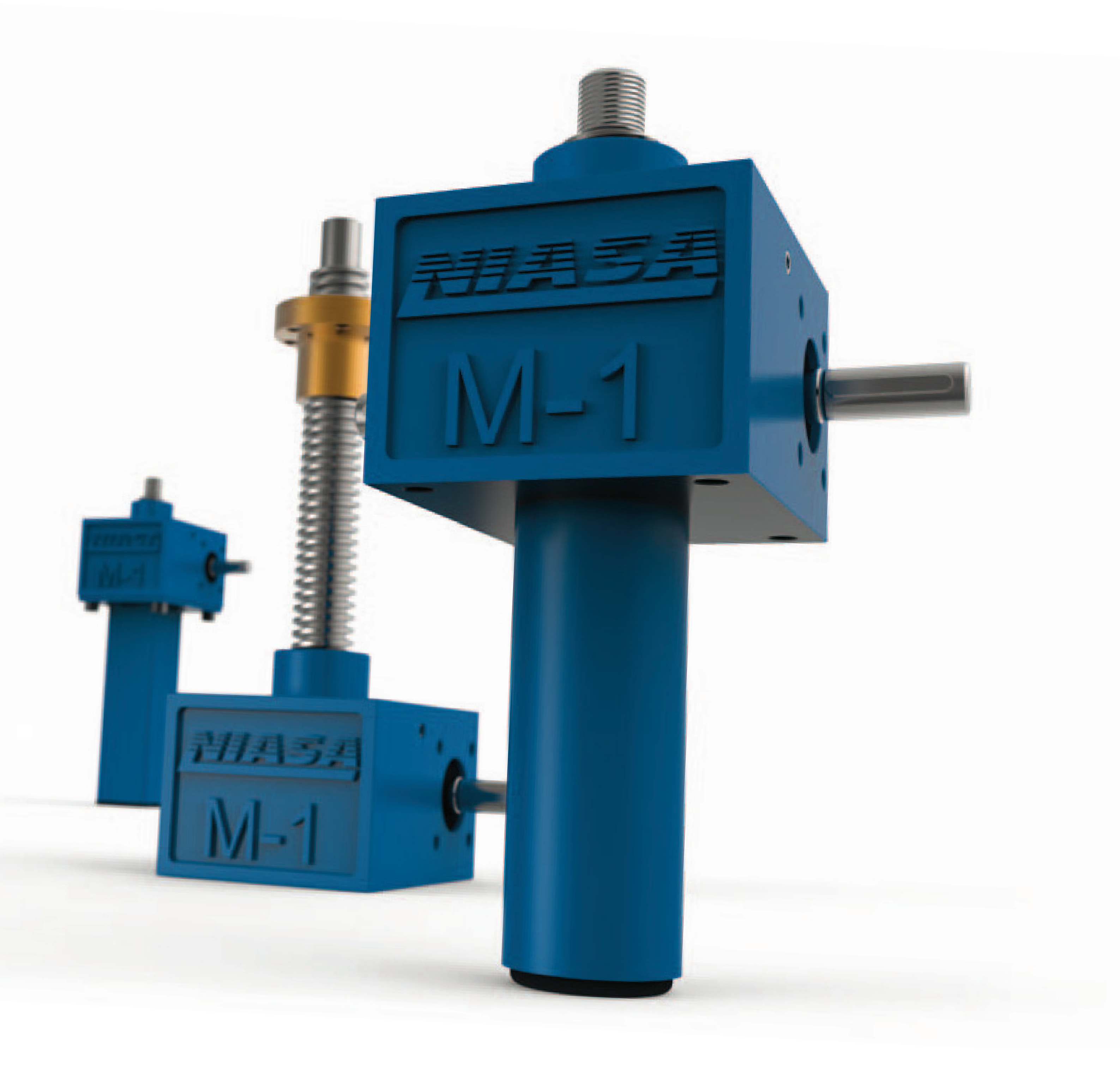
... Power required: P_D (kW) = 0.157x M_D (Nm).
... All the data in the table correspond to an input speed of 1,000 rpm. For other speeds, please see the calculation chapter (page 47).
... Ensure that the dynamic load of the application does not surpass the critical values indicated, in order to avoid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

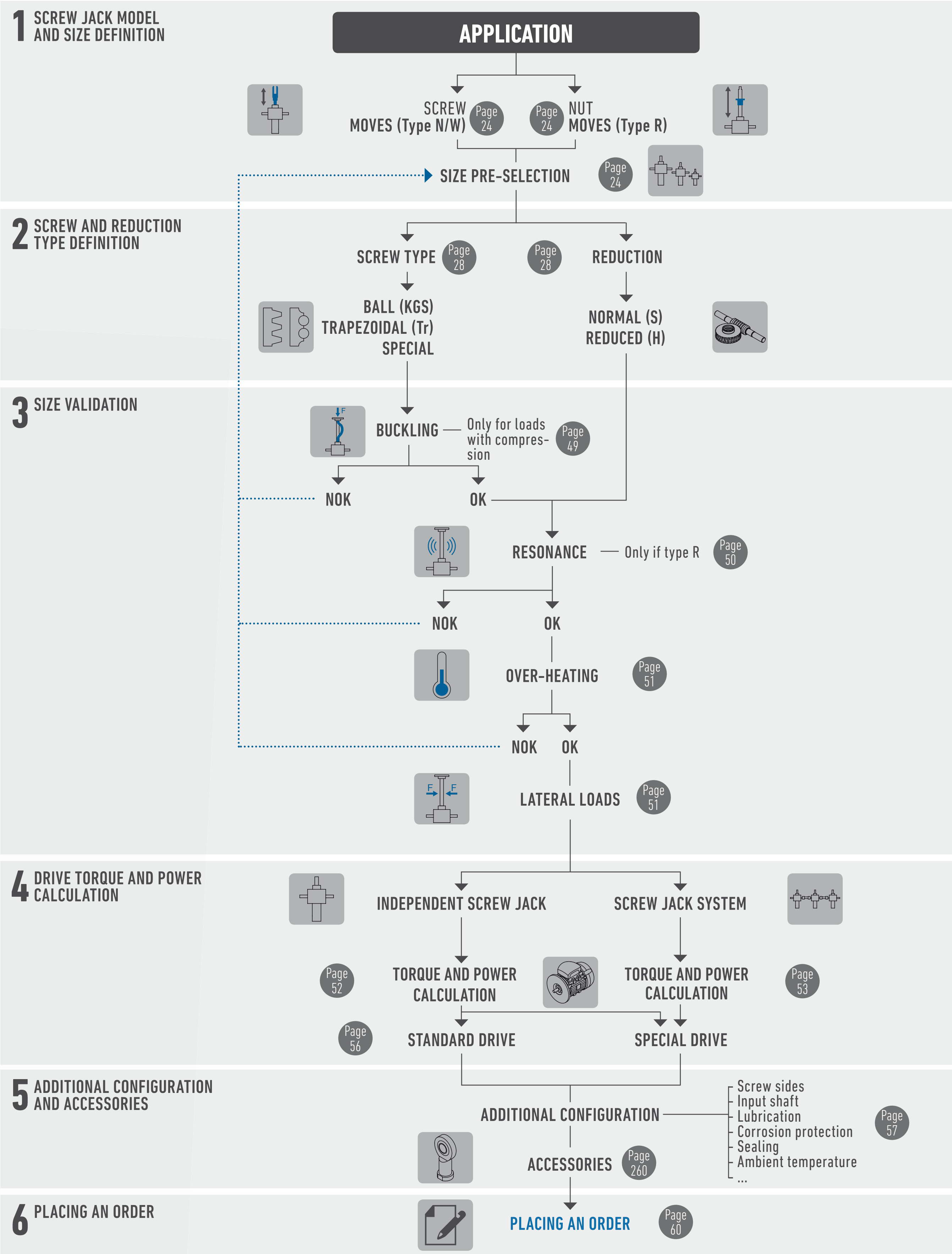


SCREW JACKS
PRODUCT SELECTION

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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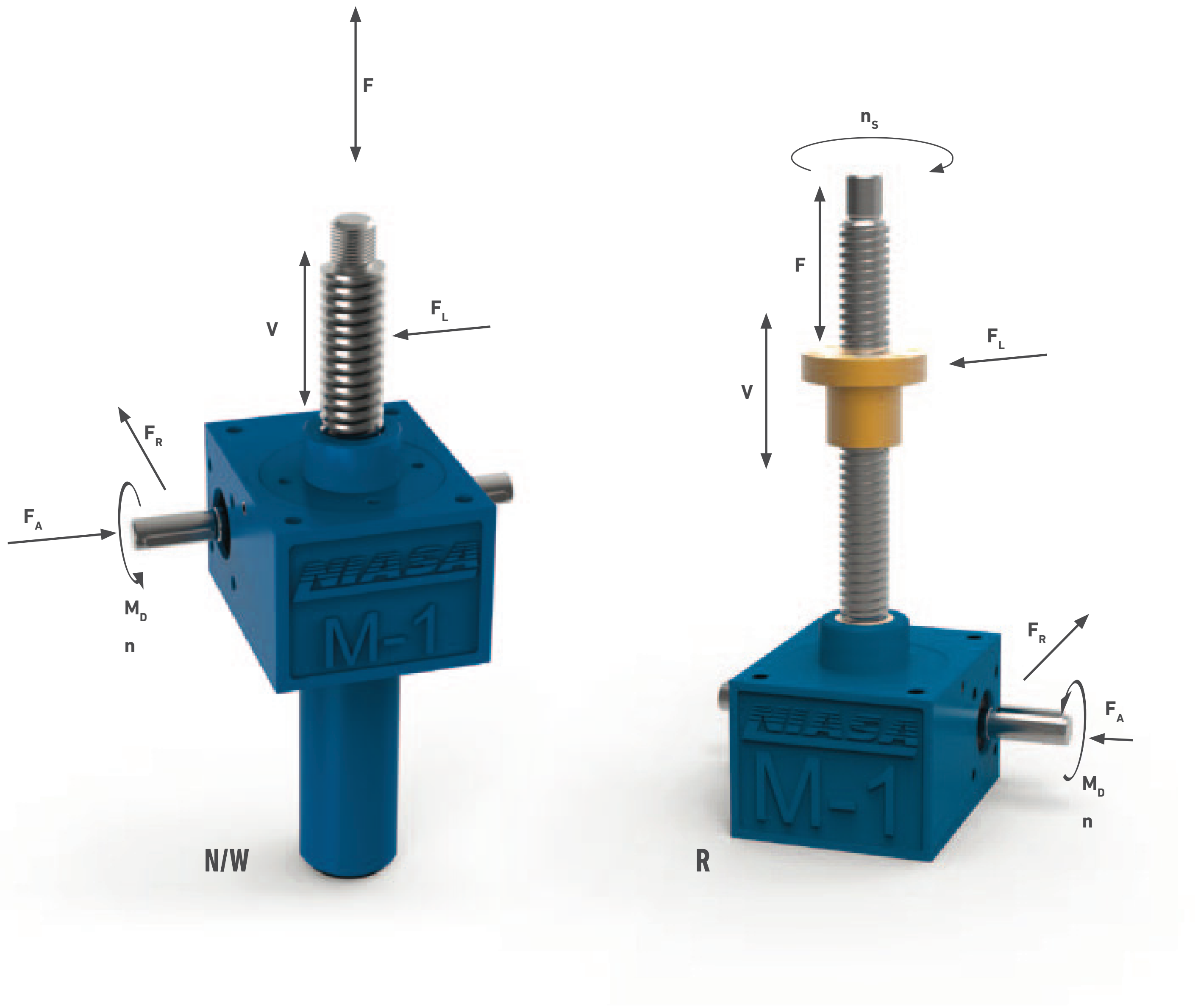
FORCE AND TORQUE ACTING ON A SCREW JACK

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.



CRITICAL COMPRESSION BUCKLING LOAD OF A SCREW JACK

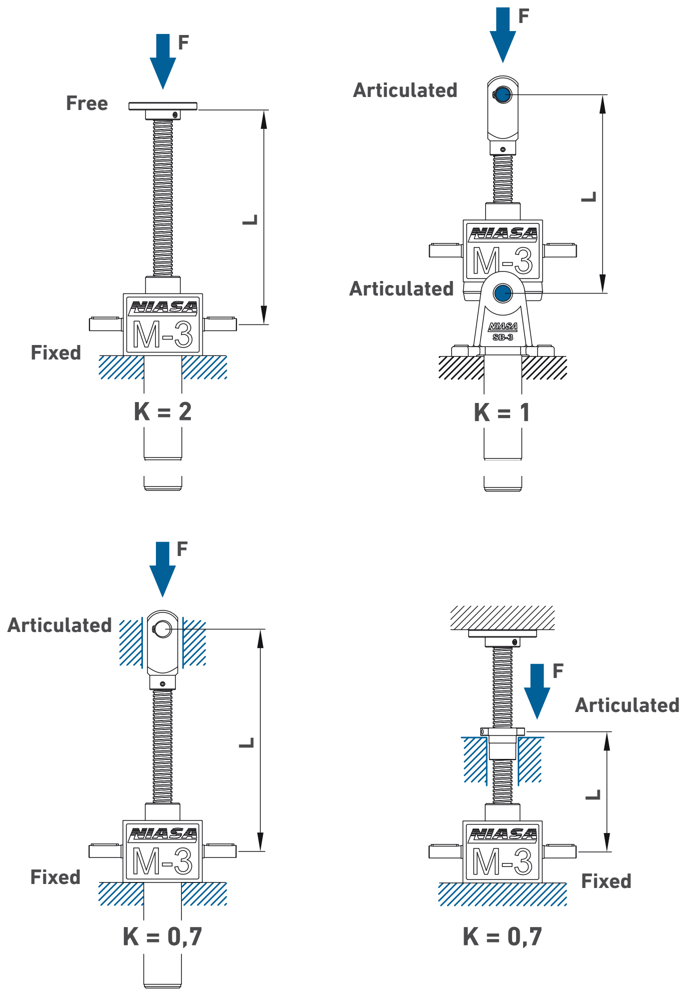
When there are compression loads on the screw, it may fail due to buckling, before reaching its static load capacity.

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

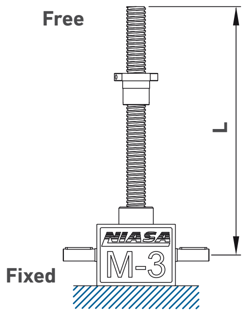
SCREW JACKS
PRODUCT SELECTION

CRITICAL RESONANCE SPEED OF A SCREW JACK

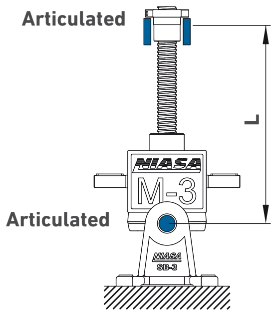
Applicable to the R version (the screw rotates and the nut moves).

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.

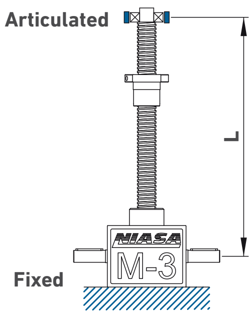
For these reasons, be sure that the screw jack screw works at considerably lower rotation speeds than resonance speeds. If not, select a screw of a larger diameter and/or reduce its turning speed and/or modify the screw jack end supports.



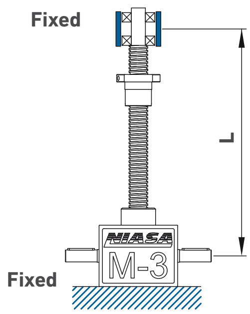
M = 0,34



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

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

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.

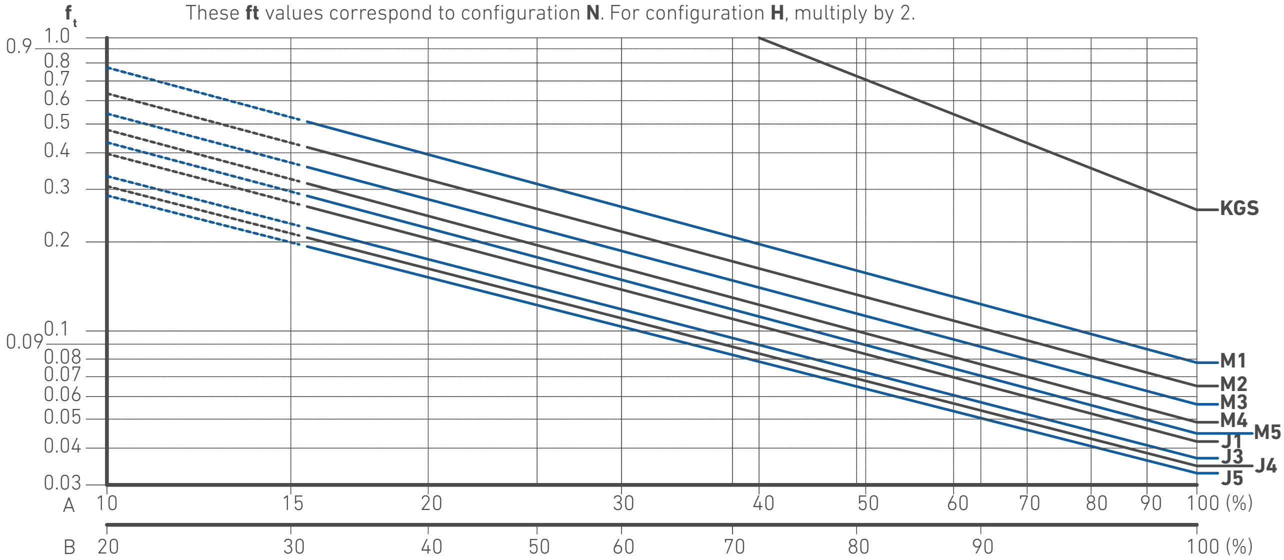
$$F \times V \leq F_{max} \times V_{max} \times f_t$$

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

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.

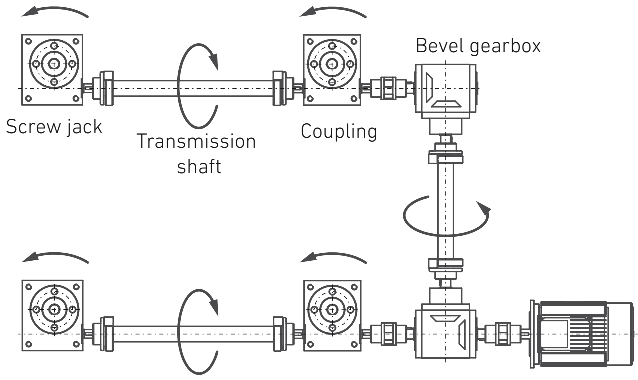
PLANNING INSTALLATIONS WITH SCREW JACKS

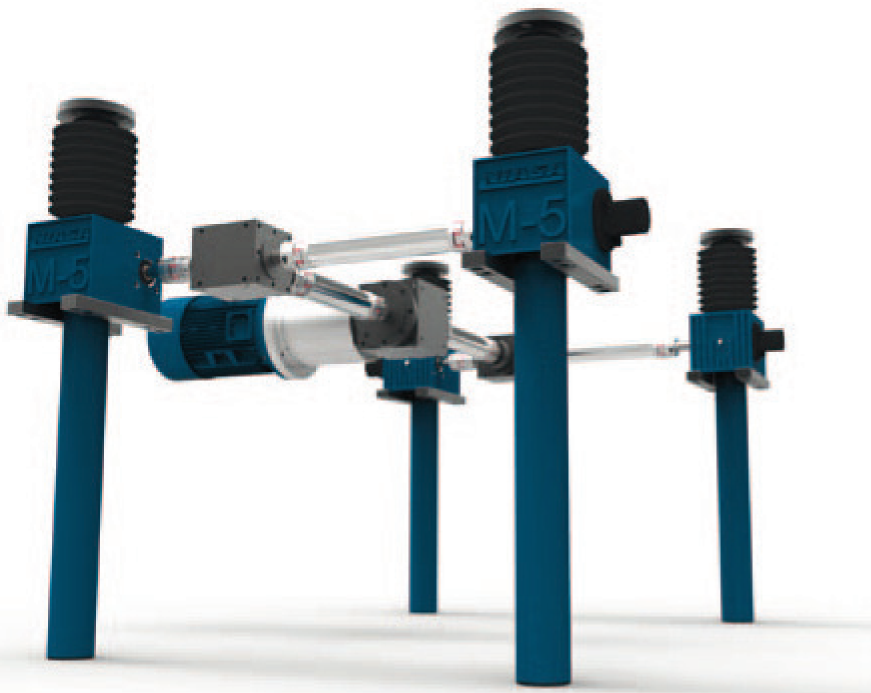
For the application of screw jacks in installations with several units, the following criteria must be taken into account:

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.

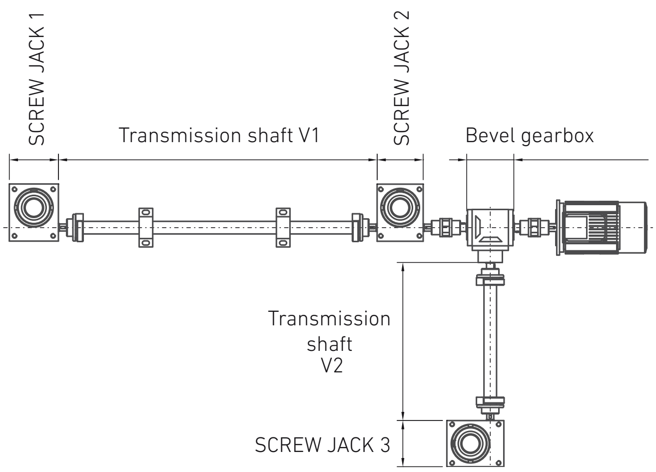




DRIVE TORQUE OF A SCREW JACK SYSTEM

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.

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.

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)

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:

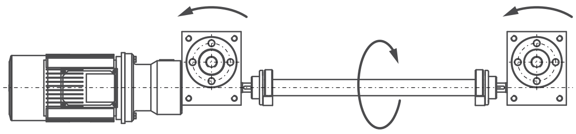
$$M_{DS}\,(Nm) = \frac{M_{DS}}{\eta_{SJ}}$$

M_{DS} System drive torque (Nm)
η_{SJ} Elevator static efficiency

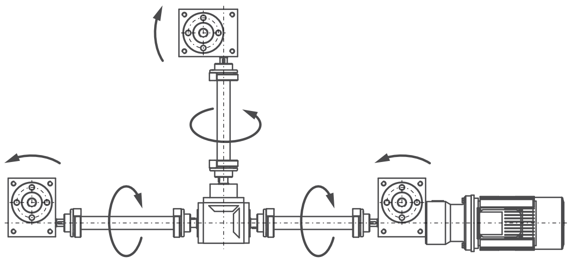
IMPORTANT

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

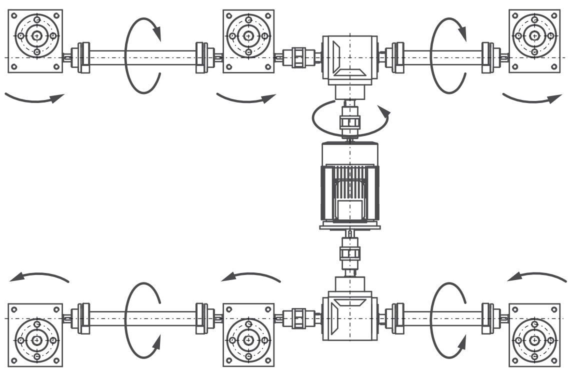
$f_S = 2.1$



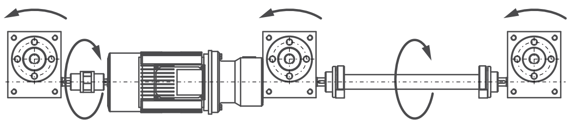
$f_S = 3.34$



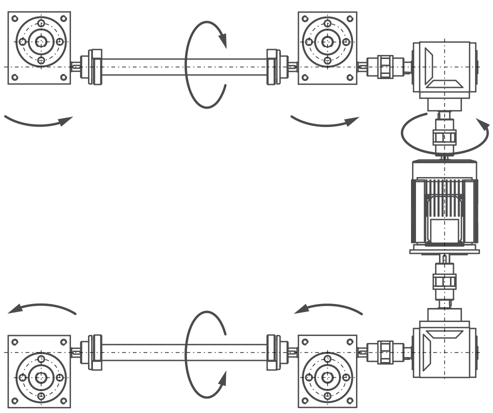
$f_S = 6.8$



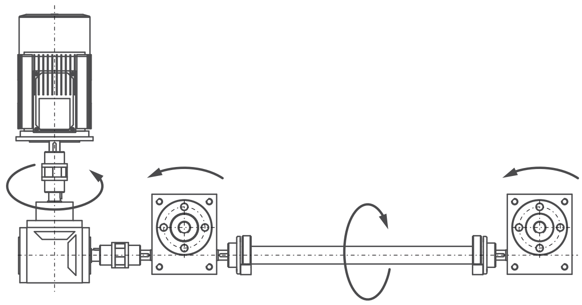
$f_S = 3.1$



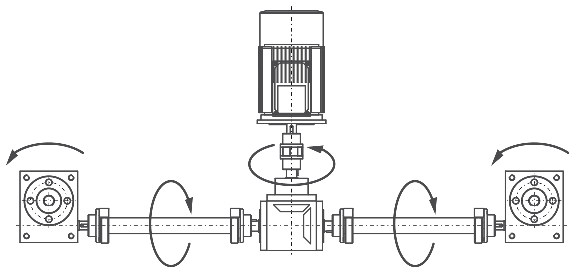
$f_S = 4.4$



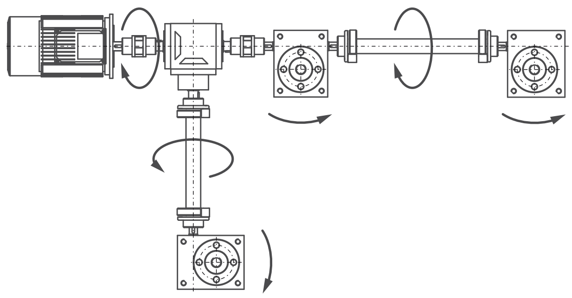
$f_S = 2.25$



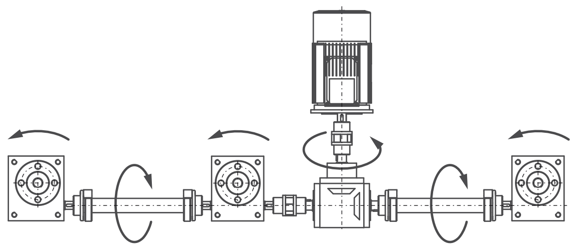
$f_S = 2.25$



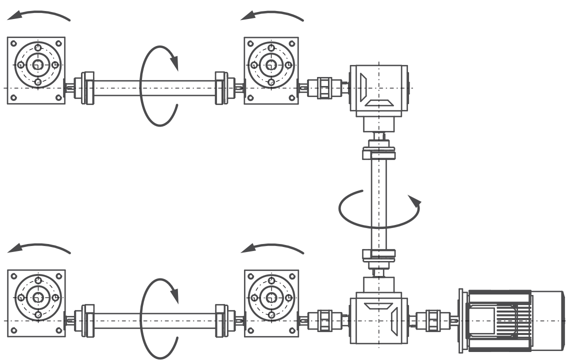
$f_S = 3.27$



$f_S = 3.35$

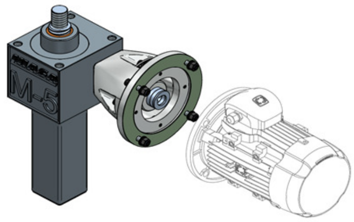


$f_S = 4.6$



Screw jacks

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.

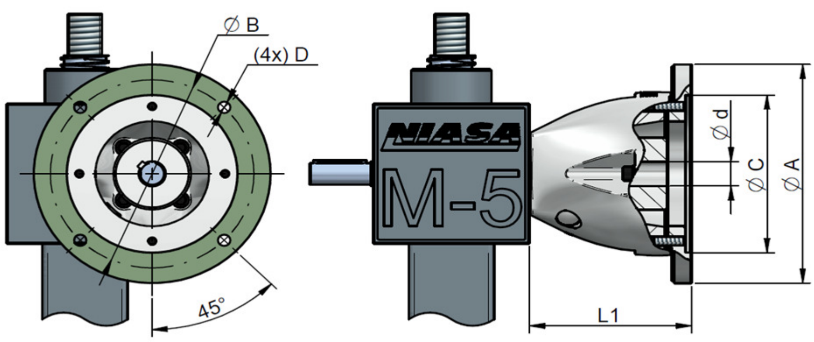
DIMENSIONS AND WEIGHTS

Screw jack size	Motor flange (IEC type & size)	Power (kW) Option		Bell [1]						
		A	B	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

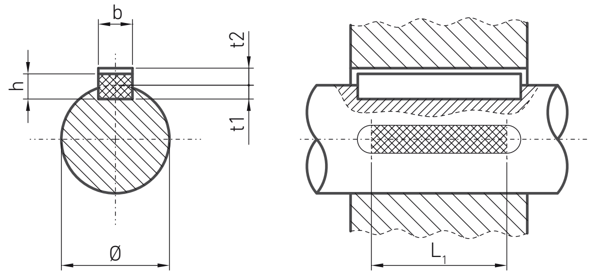
[1] Approx. C2-Medium durability (ISO 12944).
[2] Approx. C3-Medium durability (ISO 12944).
Special coatings on request, until C5 (ISO 12944)

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

LUBRICATION

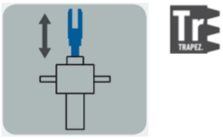
GEAR BOX LUBRICATION

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.

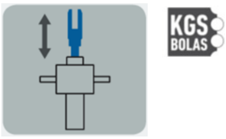
Because of this reason the gear box must be periodically re-filled with new grease. In general, at 25-50 service hours after the commisioning and then every 200-300



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.

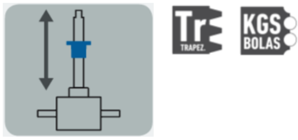


RE-GREASING [1]

> 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)

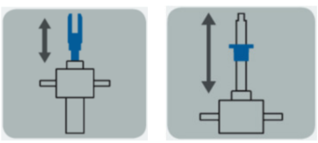
1)

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)

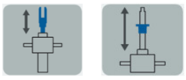
This time may vary, depending on the duty cycle, ambient temperature, speeds, loads, etc. Periodic grease analysis will determine if its change must be done sooner.

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.

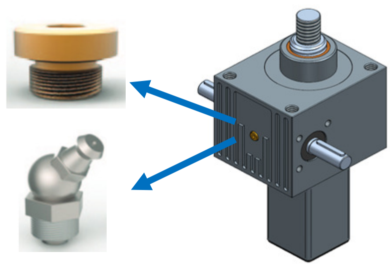
> Mix only compatible greases. Mixing non-compatible greases will lead to an ineffective lubrication, reducing the screw jack performances and could even damage the gear box.

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.

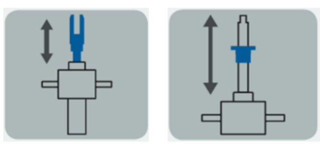
This innovative gear box desig does not require any re-greasing operation. It is advisable analizing the grease status every 800-1200 operation hours. Only if it showed degradation signs, remove the old grease and re-lubricate with new one, after an internal complete cleaning of the gear box.

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.

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.

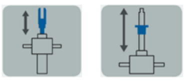
The lubrication frequency depends on the operating conditions. Consider the following ones only as an orientation. Begin with a high inspection frequency until knowing the real requirements for the application.

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

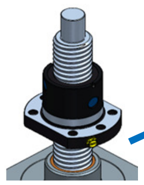
Colour	**beige**
Operating temperature range	**-50°C - +150°C**
Base oil viscosity /40°C / DIN 51 562	**100 mm²/s**
Dropping point / DIN ISO 2167	**>= 185 °C**
Worked penetr. / 0,1 mm DIN ISO 2137	**265-295**
Water resistance / DIN 51807-1	**<= 1-90**
Corrosion protec. (EMCOR-test) / DIN 51 802	**<=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

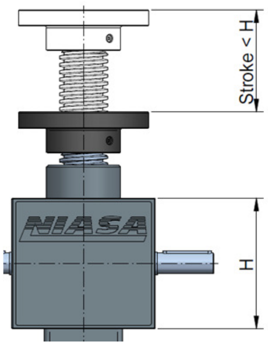
When greasing/re-greasing, do it with through the greasing point of the nut with approx. 1 ml grease per 10 mm screw diameter (e.g. 5 ml for a KGS dia. 50).



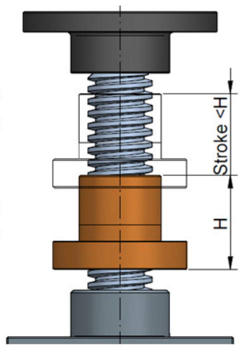
Do not over-grease the nut to avoid an excessive heating when running. Contact us for a precise estimation of grease amount.

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.

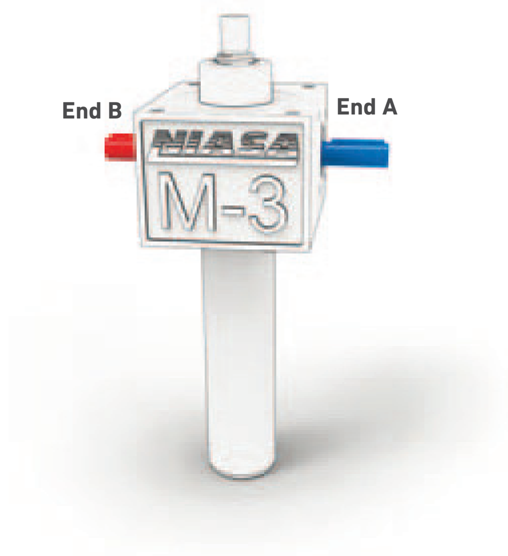
Some examples are shown below.
See sub-chapter "Placing an order".

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.

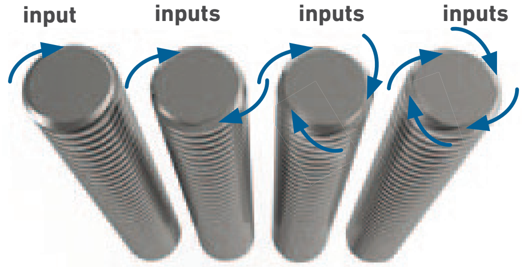


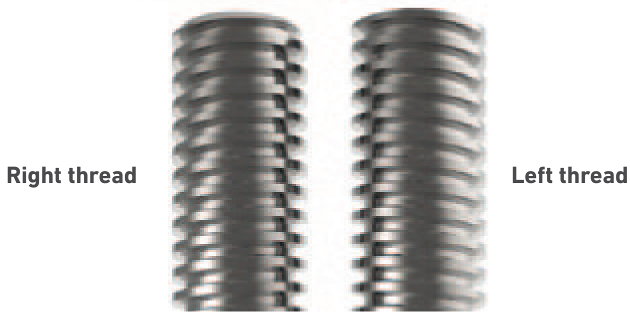
Screw end

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.





NIASA

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

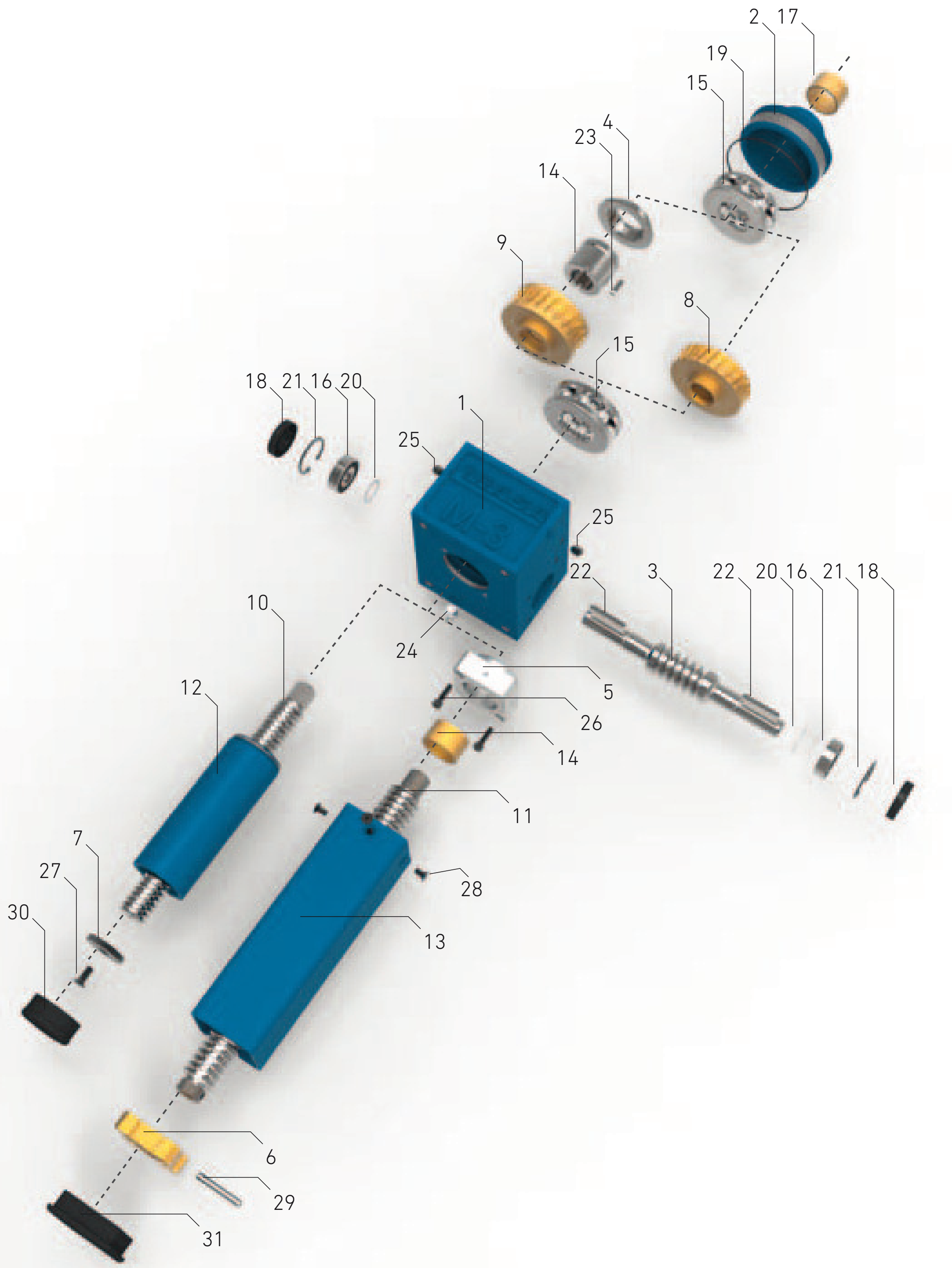
24 **EQUIPMENT GENERAL COLOUR**
RGG Graphite grey RAL7024 (standard)
RAZ Blue RAL5017
RGP Silver grey RAL9006
RSP Special colour indicated by the customer
CIP Only grey 411 priming
000 Not painted

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

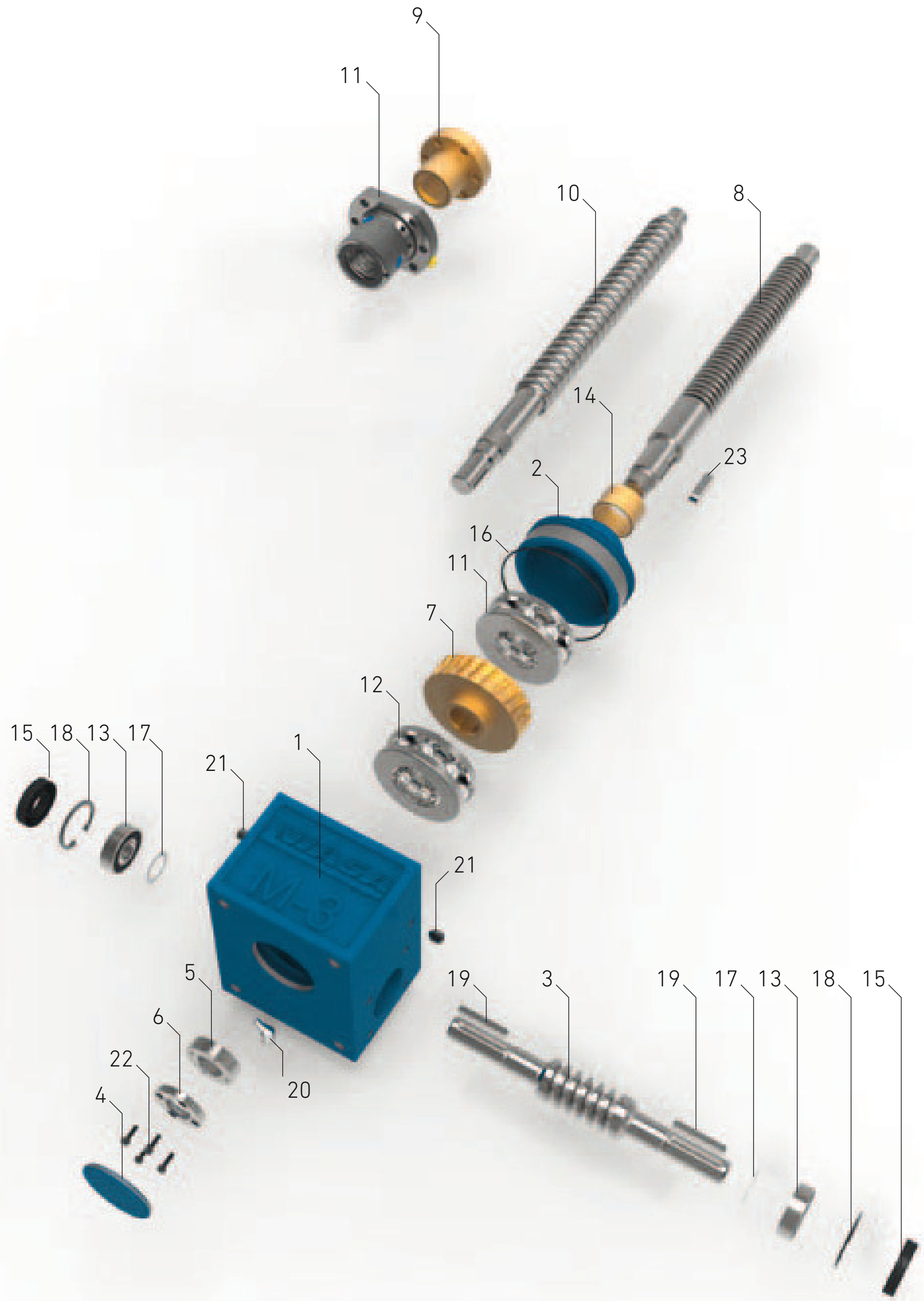
	Name
01	M series box
02	Top cap
03	Worm gear
04	Ball worm shaft and wheel cover
05	Square tube support
06	Anti-turn buffer
07	N screw buffer washer
08	Trapezoidal worm shaft and wheel
09	Ball worm shaft and wheel
10	N screw
11	W screw
12	N round tube
13	W square tube
14	Ball nut
15	Axial bearing
16	Radial 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

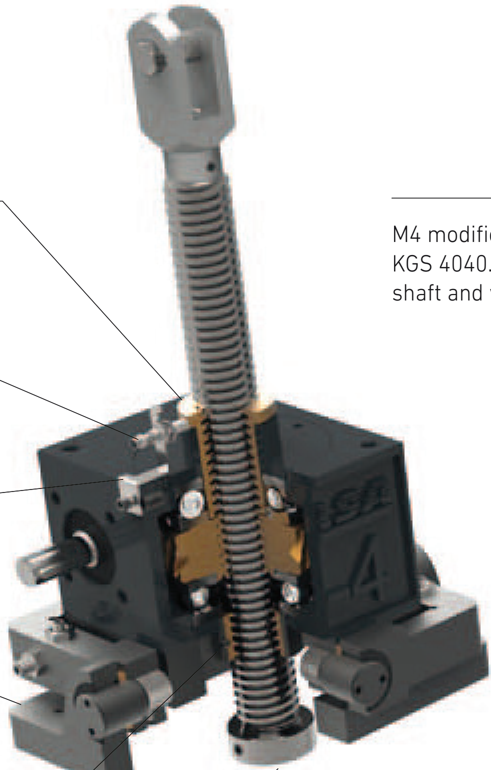
R CONFIGURATION DISASSEMBLED

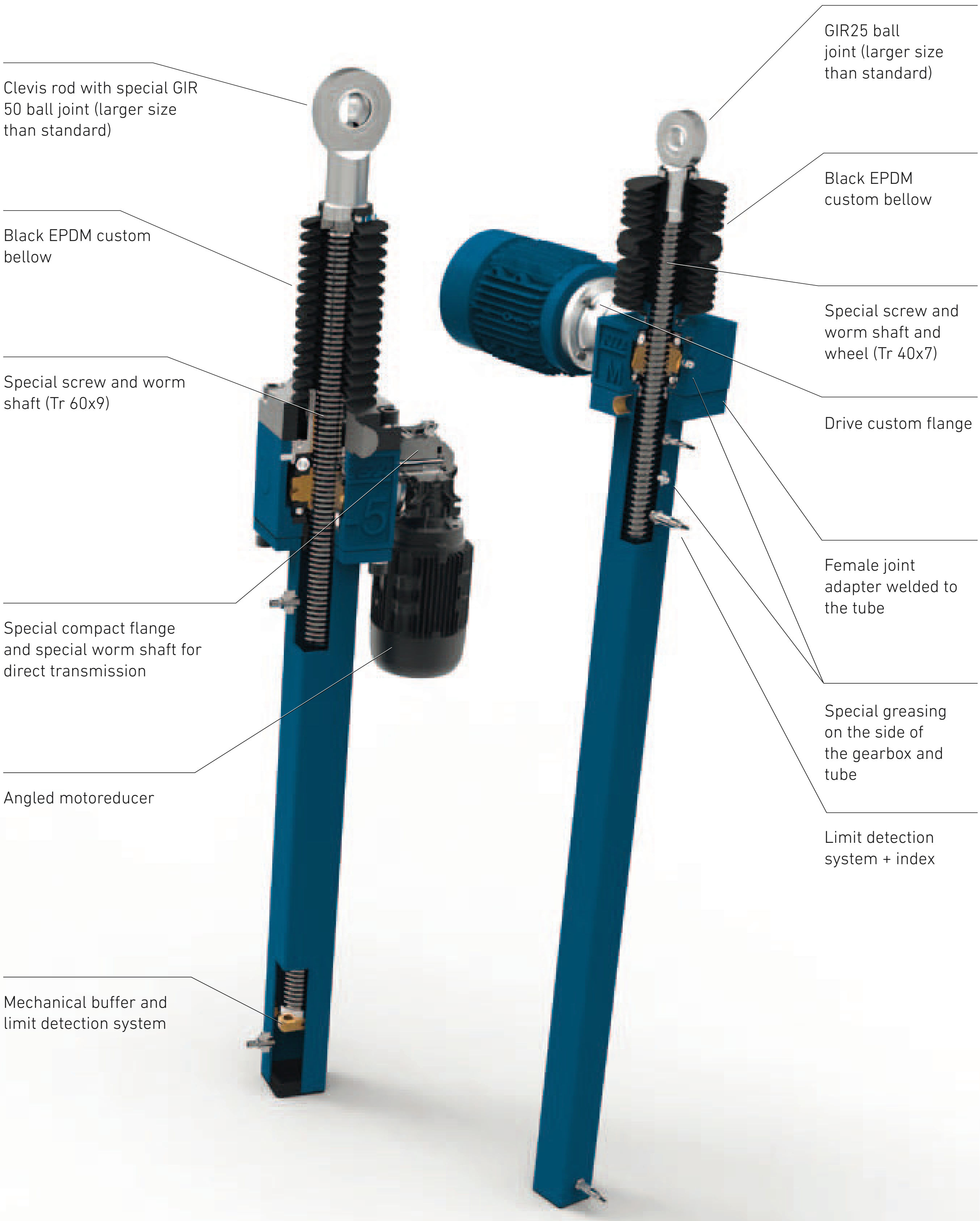
	Name
01	M series box
02	Top cap
03	Worm gear
04	Rear cap
05	Screw nut
06	Screw locknut
07	Worm wheel
08	Trapezoidal screw
09	Trapezoidal nut
10	Ball screw
11	Ball nut
12	Axial bearing
13	Radial bearing
14	Anti-friction bushing
15	Seal
16	O-Ring
17	Adjustment washer
18	Inside circlip
19	Straight key
20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




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