

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 90°.
 - ...
- ... 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.



LINEAR ACTUATORS

F SERIES: STEEL TUBE | A SERIES: ALUMINUM TUBE

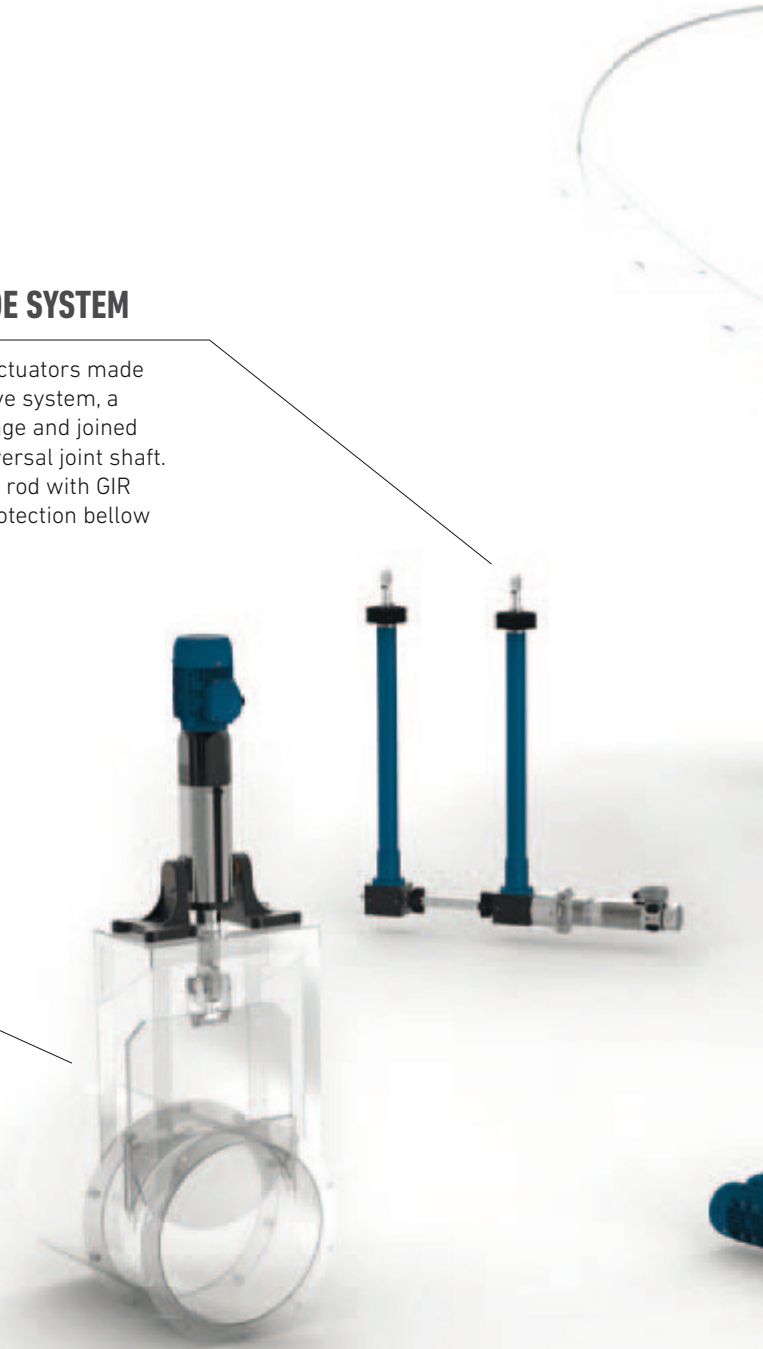
APPLICATIONS

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.



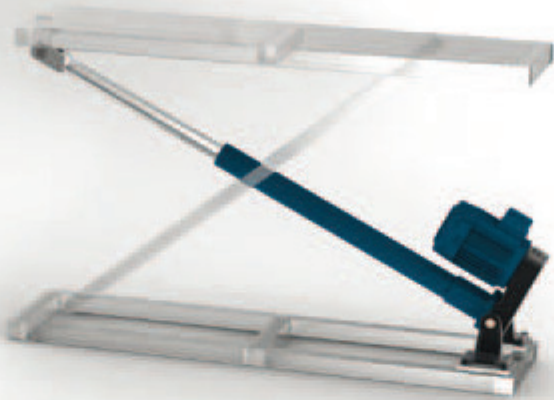


ANTENNA ORIENTATION SYSTEM

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.

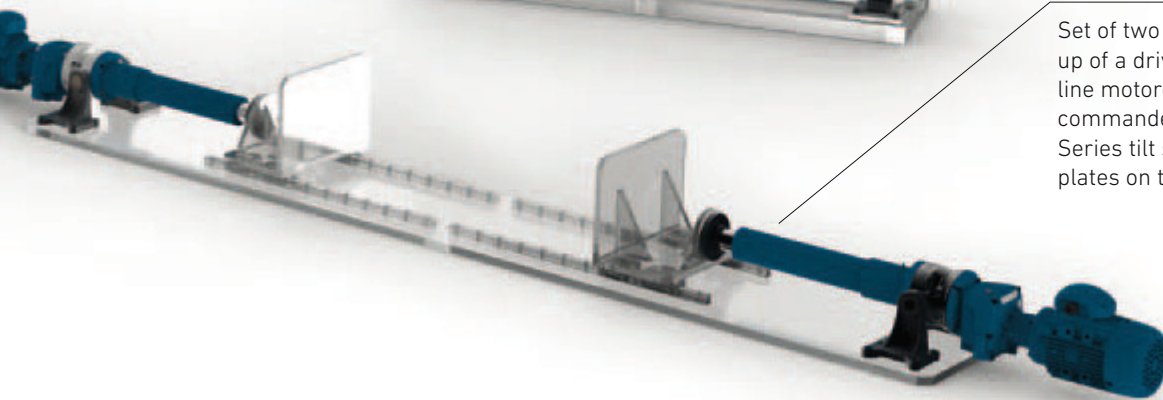


02



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.

F30 / A30
23.5 kN

F40 / A40
38 kN

F45
78 kN

F50
86 kN



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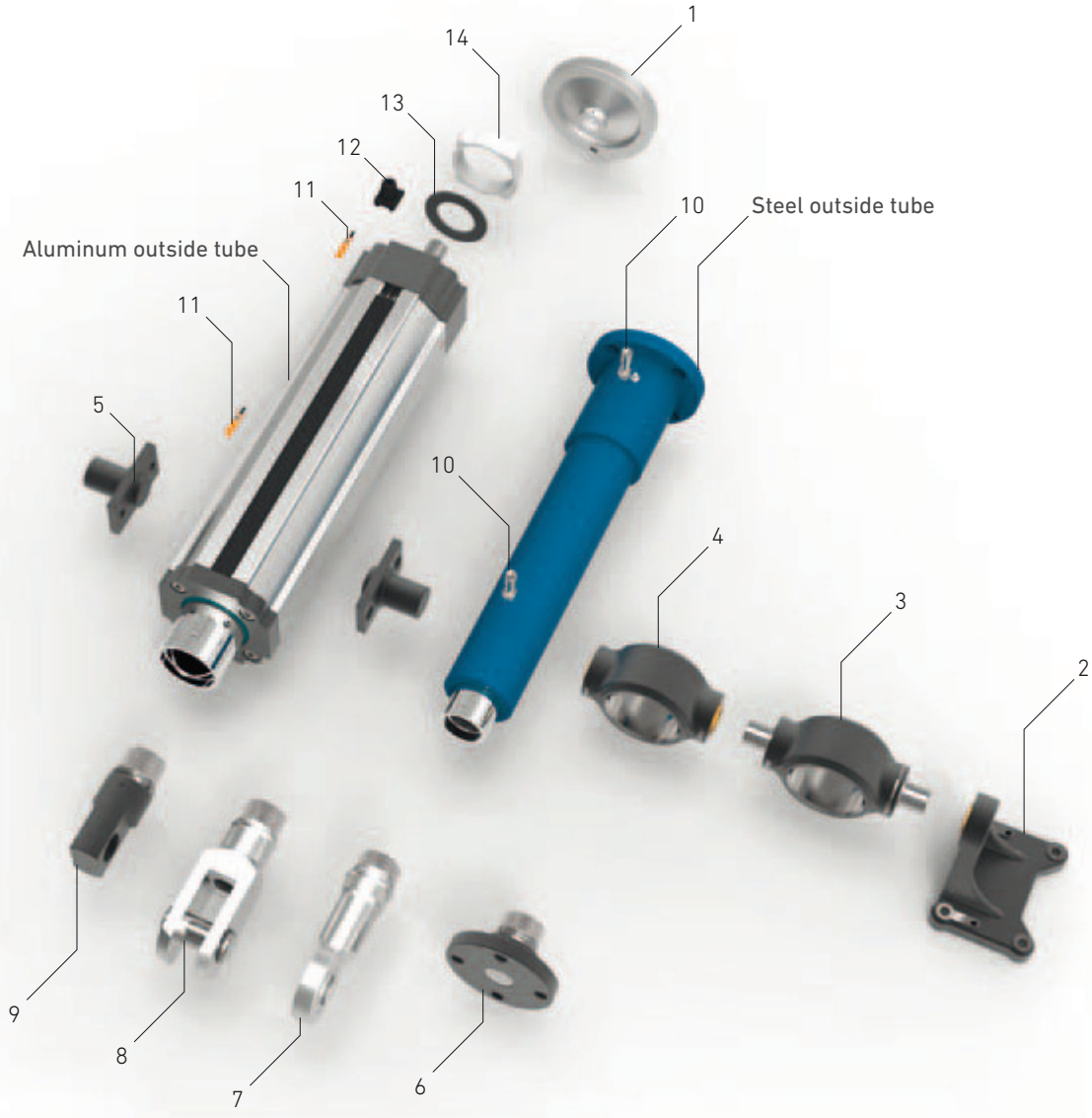


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LINEAR ACTUATORS

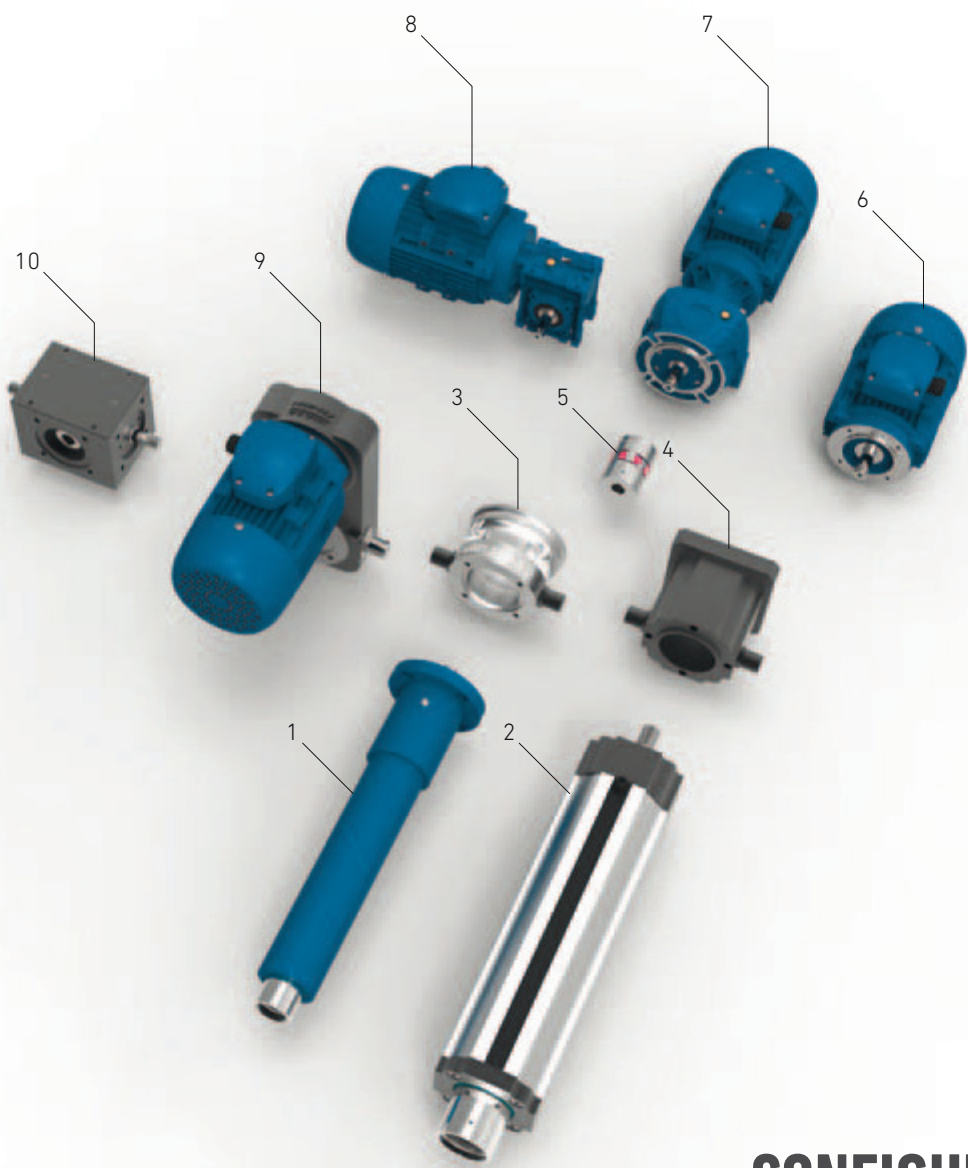
F SERIES: STEEL TUBE | A SERIES: ALUMINUM TUBE

GENERAL PRODUCT OVERVIEW



ACCESSORIES

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



CONFIGURATIONS

	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°					•	•				

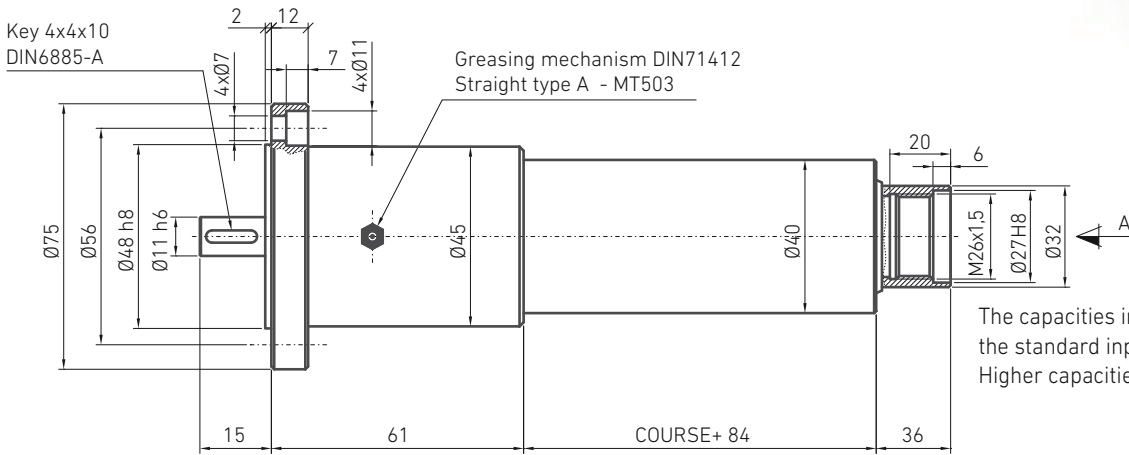
F16-M100 LINEAR ACTUATORS

UP TO

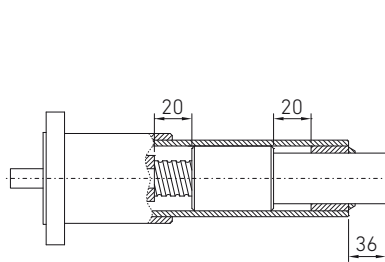
6 kN



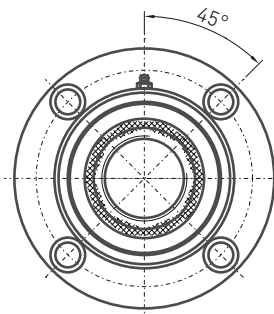
The capacities indicated correspond to the standard input shaft configurations. Higher capacities are available on request.



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 Q (kg)	Approx. weight each 100 mm of Stroke (kg)
Tr 16x4	3.5	4	40	$(1.59 \times F) + 0.38$	2	0.75
KGS 1605	6	5	81	$(0.98 \times F) + 0.25$	2	0.75

... Power required: P_D (kW) = $0,157 \times M_D$ (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).



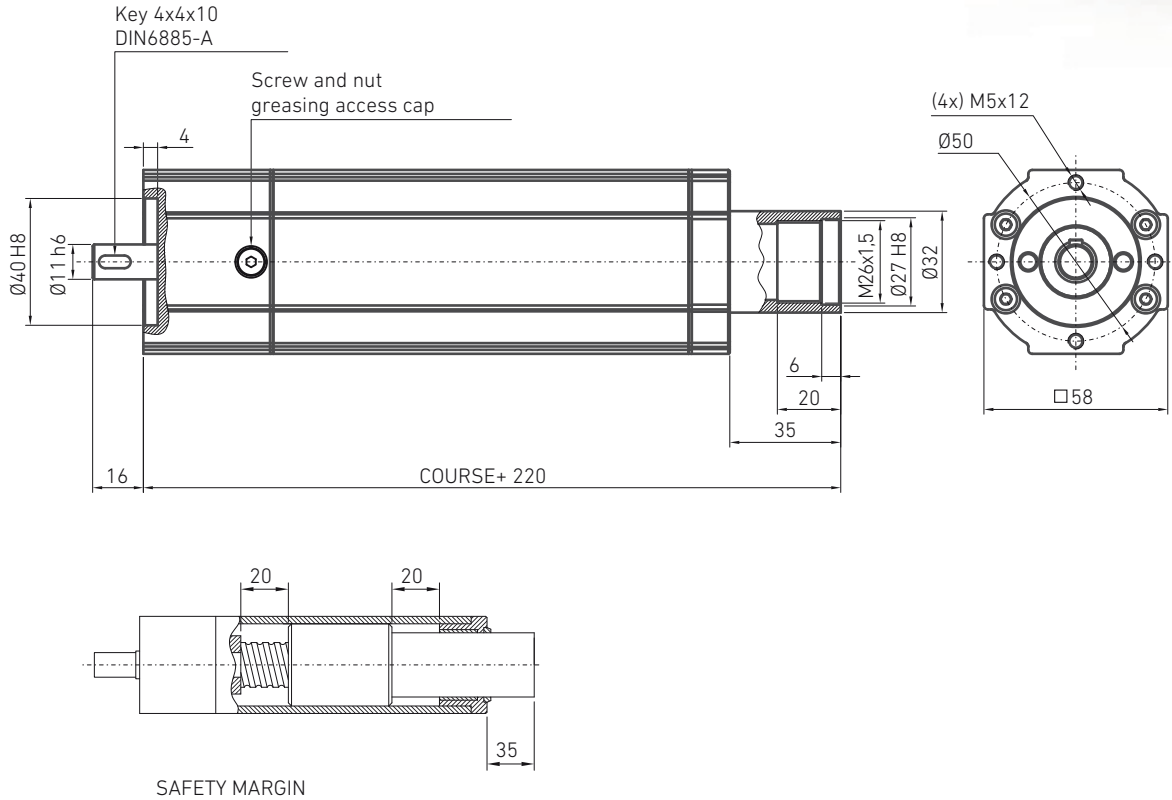
A16-M100 LINEAR ACTUATORS

UP TO

6 kN



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



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	$(1.59 \times F) + 0.38$	1.7	0.7
KGS 1605	6	5	81	$(0.98 \times F) + 0.25$	1.6	0.7

... Power required: P_D (kW) = $0,157 \times M_D$ (Nm).

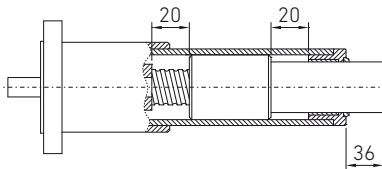
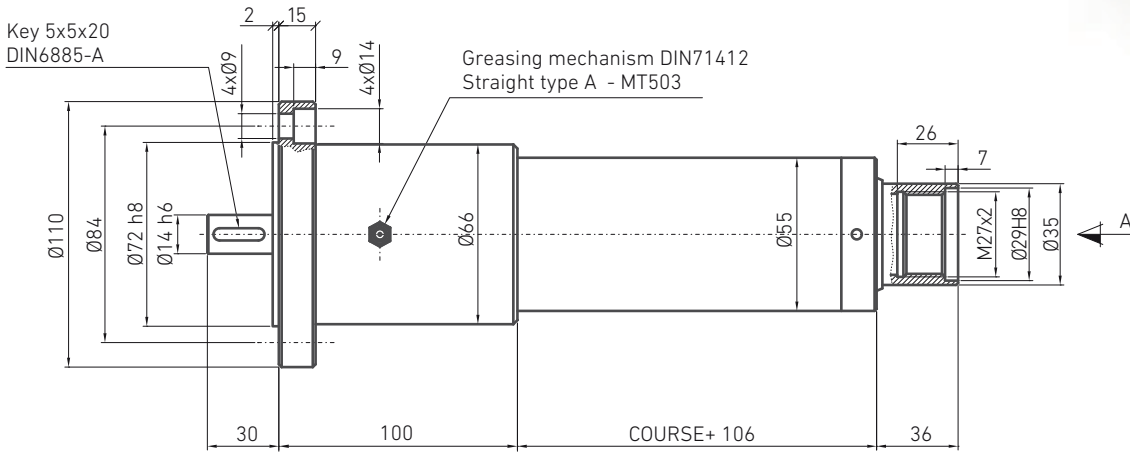
... Contact NIASA if the dynamic load exceeds the critical values indicated, in order to avoid over-heating, buckling and resonance of the unit. See calculations chapter at the end of the chapter (page 97).



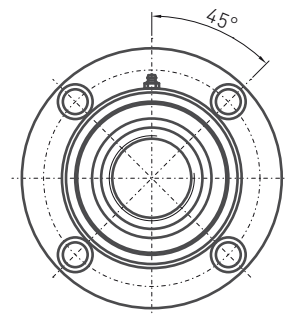
F20-M100 LINEAR ACTUATORS

UP TO **10.5 kN** **Tr** **KGS**
TRAPEZ. 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 Q (kg)	Approx. weight each 100 mm of Stroke (kg)
Tr 24x5	9.5	5	35	$(2.27 \times F) + 0.52$	3	1.7
KGS 2005	10.5	5	81	$(0.98 \times F) + 0.42$	3	1.25
KGS 2020	5.5	20	81	$(3.93 \times F) + 0.48$	3	1.25

... Power required: P_D (kW) = $0,157 \times M_D$ (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).



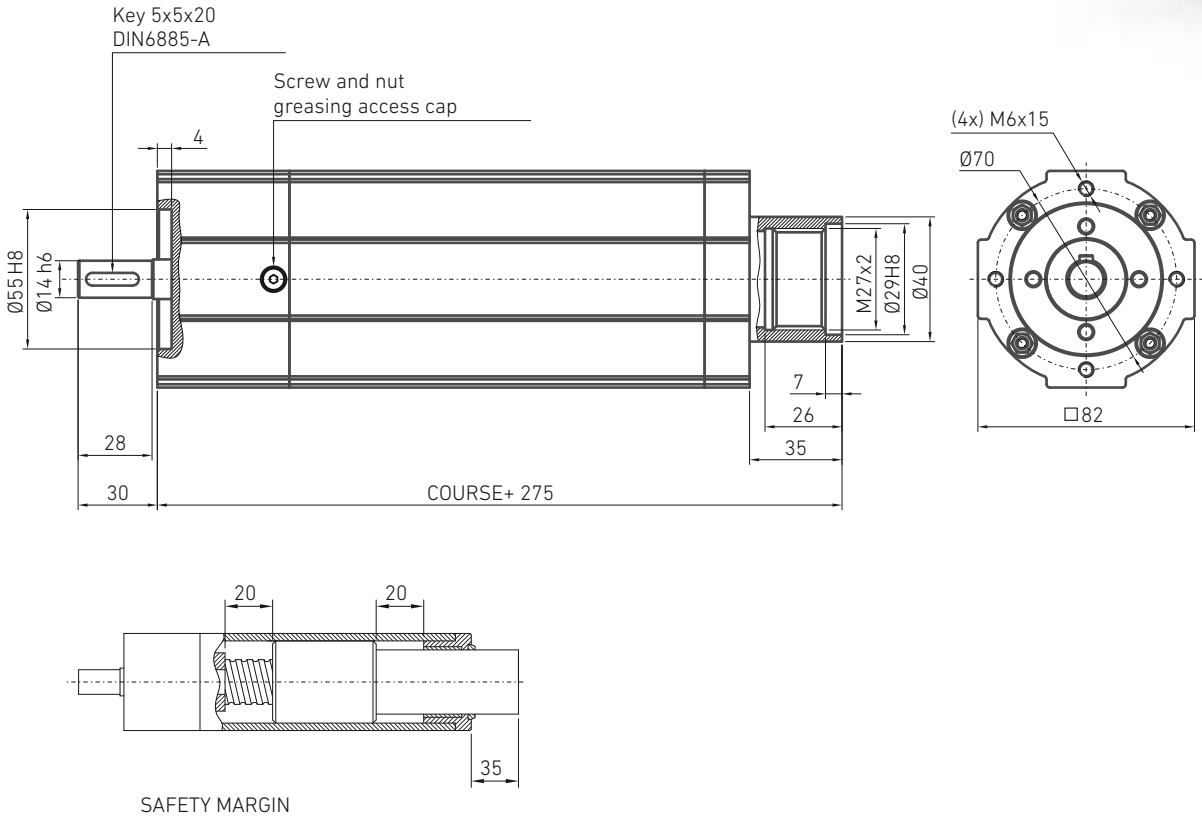
A20-M100 LINEAR ACTUATORS

UP TO

10.5 kN



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



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 Q (kg)	Approx. weight each 100 mm of Stroke (kg)
Tr 24x5	9.5	5	35	$(2.27 \times F) + 0.52$	3.85	1.25
KGS 2005	10.5	5	81	$(0.98 \times F) + 0.42$	3.65	1.15
KGS 2020	5.5	20	81	$(3.93 \times F) + 0.48$	3.65	1.15

... Power required: P_D (kW) = $0.157 \times M_D$ (Nm).

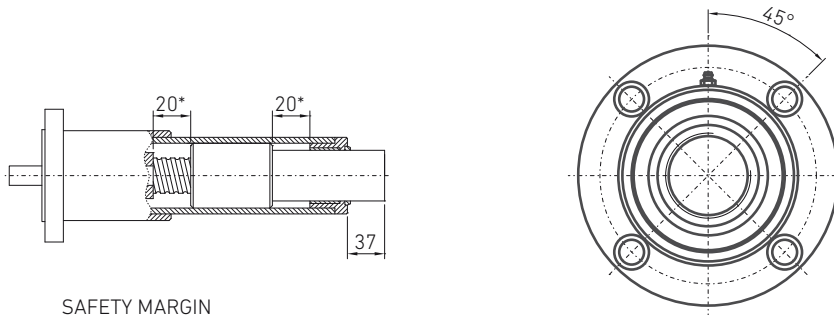
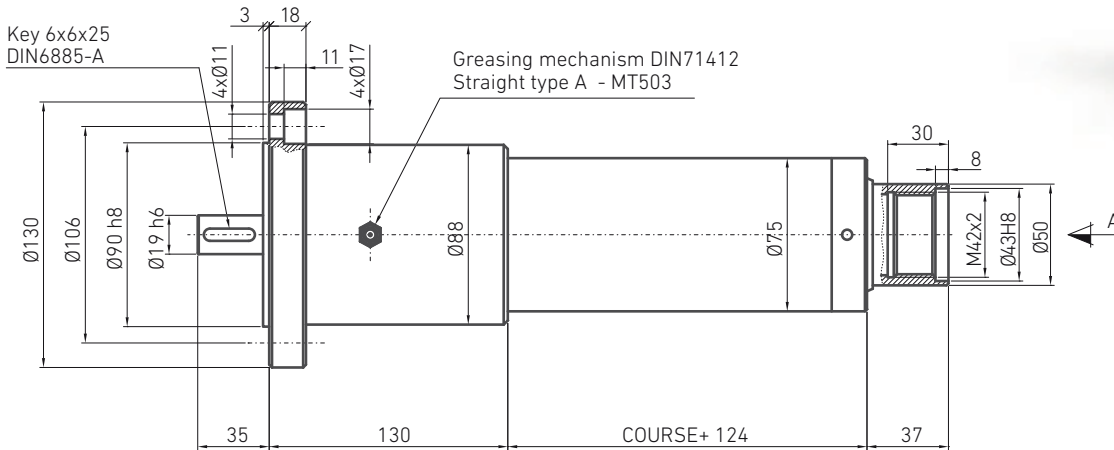
... Contact NIASA if the dynamic load exceeds the critical values indicated, in order to avoid over-heating, buckling and resonance of the unit. See calculations chapter at the end of the chapter (page 97).



F30-M100 LINEAR ACTUATORS

UP TO **23.5 kN** **Tr** **KGS BALLS**

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



SAFETY MARGIN

CHECKED BY -A-

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

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	$(3.08 \times F) + 1.6$	8	2.6
KGS 3205	21.5	5	81	$(0.98 \times F) + 1.3$	8	2.6
KGS 3210	23.5	10	81	$(1.96 \times F) + 1.3$	8	2.6
KGS 3220	12	20	81	$(3.93 \times F) + 1.3$	8	2.6
KGS 3240	6	40	81	$(7.86 \times F) + 1.3$	8	2.6

... Power required: P_D (kW) = $0,157 \times M_D$ (Nm).

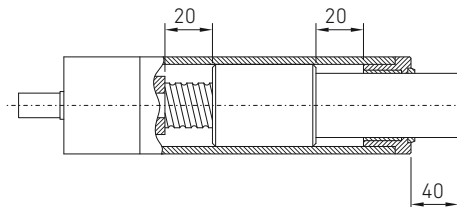
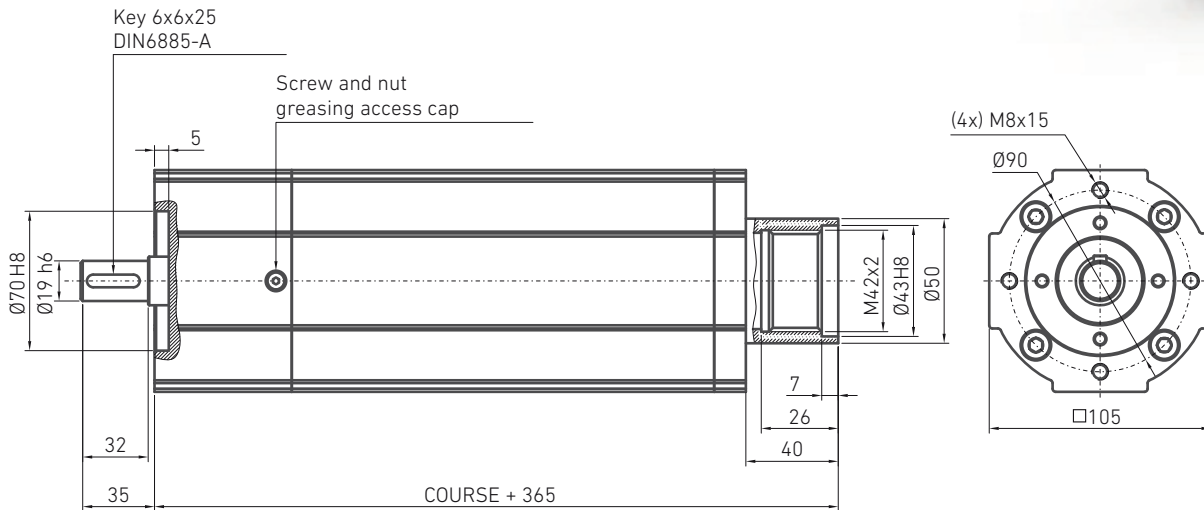
... Contact NIASA if the dynamic load exceeds the critical values indicated, in order to avoid over-heating, buckling and resonance of the unit. See calculations chapter at the end of the chapter (page 97).



A30-M100 LINEAR ACTUATORS

UP TO **23.5 kN** **Tr** **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 Q (kg)	Approx. weight each 100 mm of Stroke (kg)
Tr 36x6	15	6	31	$(3.08 \times F) + 1.6$	8	2.3
KGS 3205	21.5	5	81	$(0.98 \times F) + 1.3$	8	2.1
KGS 3210	23.5	10	81	$(1.96 \times F) + 1.3$	8	2.1
KGS 3220	12	20	81	$(3.93 \times F) + 1.3$	8	2.1
KGS 3240	6	40	81	$(7.86 \times F) + 1.3$	8	2.1

... Power required: P_D (kW) = $0,157 \times M_D$ (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).



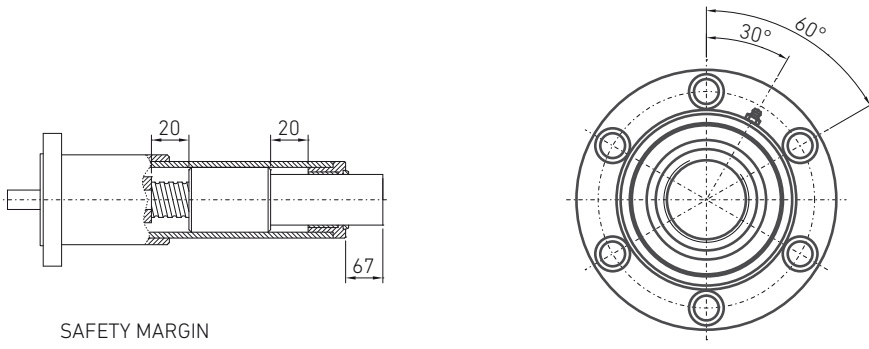
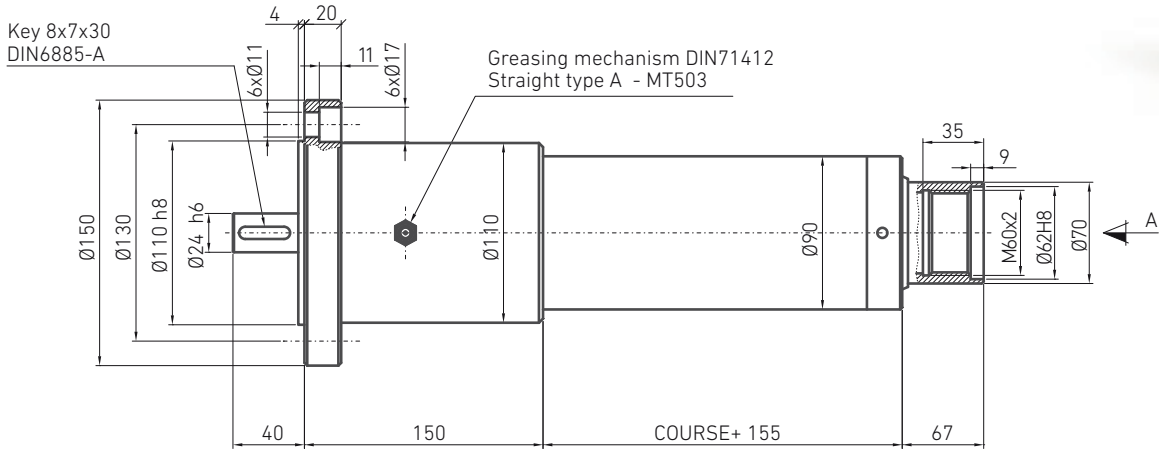
F40-M100 LINEAR ACTUATORS

UP TO

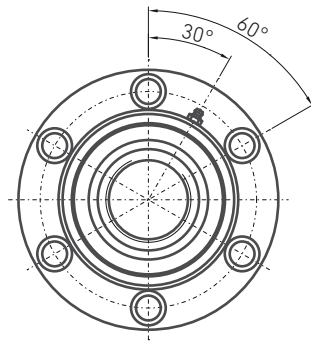
38 kN



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 Q (kg)	Approx. weight each 100 mm of Stroke (kg)
Tr 45x7	22	7	29	$(3.84 \times F) + 1.9$	17.1	4.9
KGS 4010	38	10	81	$(1.96 \times F) + 1.6$	16.8	4.2
KGS 4020	21.5	20	81	$(3.93 \times F) + 1.7$	16.8	4.2
KGS 4040	11	40	81	$(7.86 \times F) + 1.7$	16.8	4.2

... Power required: P_D (kW) = $0,157 \times M_D$ (Nm).

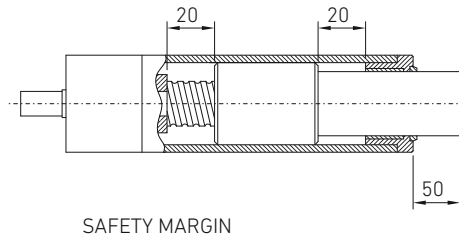
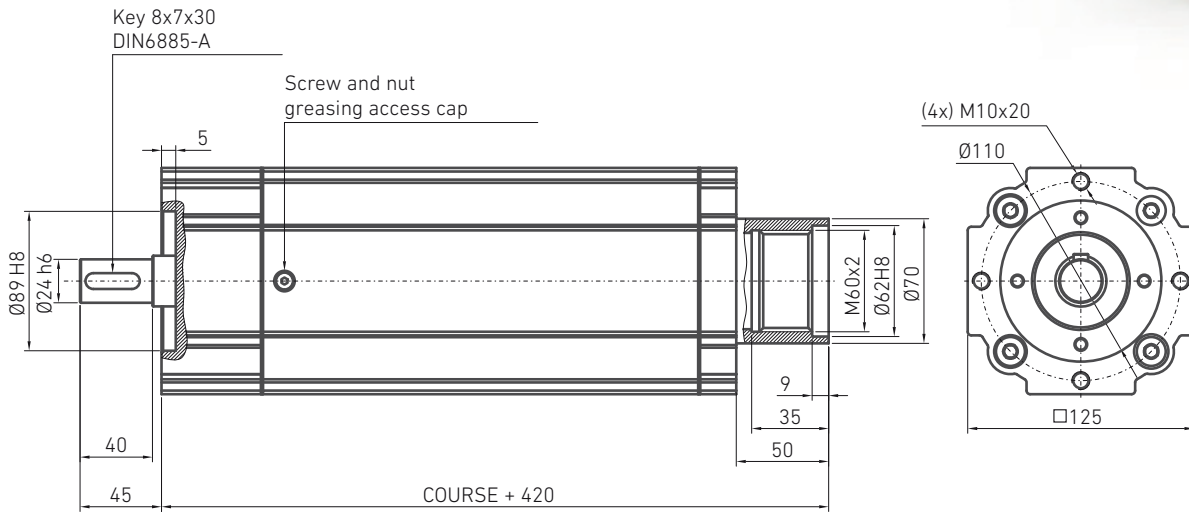
... Contact NIASA if the dynamic load exceeds the critical values indicated, in order to avoid over-heating, buckling and resonance of the unit. See calculations chapter at the end of the chapter (page 97).



A40-M100 LINEAR ACTUATORS

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

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



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	$(3.84 \times F) + 1.9$	17.1	3.45
KGS 4010	38	10	81	$(1.96 \times F) + 1.6$	16.8	3.3
KGS 4020	21.5	20	81	$(3.93 \times F) + 1.7$	16.8	3.3
KGS 4040	11	40	81	$(7.86 \times F) + 1.7$	16.8	3.3

... Power required: P_D (kW) = $0,157 \times M_D$ (Nm).

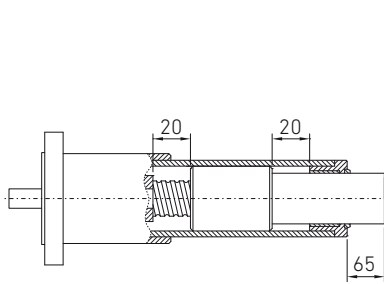
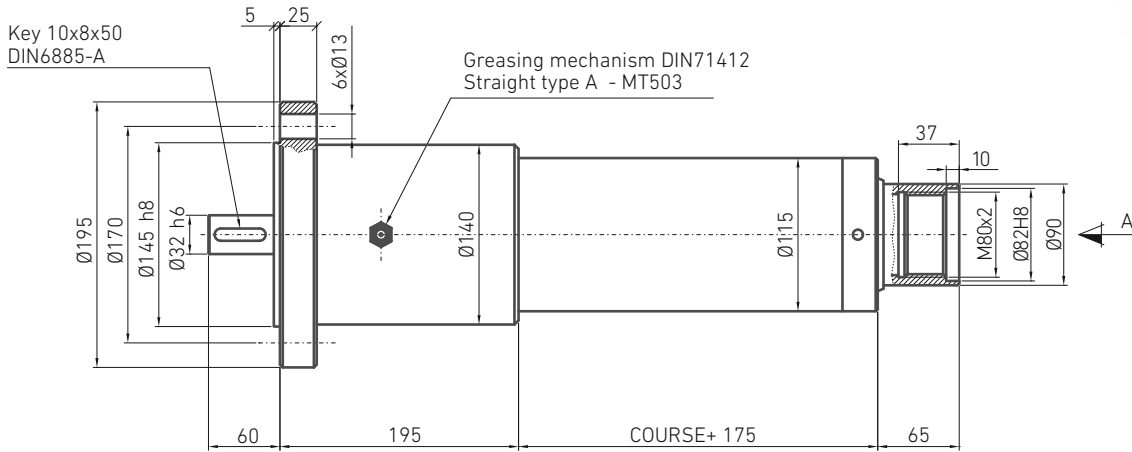
... Contact NIASA if the dynamic load exceeds the critical values indicated, in order to avoid over-heating, buckling and resonance of the unit. See calculations chapter at the end of the chapter (page 97).



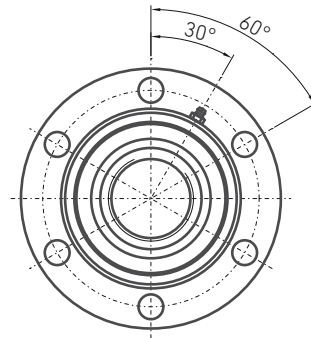
F45-M100 LINEAR ACTUATORS

UP TO **78 kN** **Tr** **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_0 (Nm) F (kN), load to move in dynamic	Stroke weight Q (kg)	Approx. weight each 100 mm of Stroke (kg)
Tr 50x8	47.5	8	30	$(4.24 \times F) + 2.1$	28.3	5.2
KGS 5010	78	10	81	$(1.96 \times F) + 1.7$	28.3	5.2

... Power required: P_0 (kW) = $0,157 \times M_0$ (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).



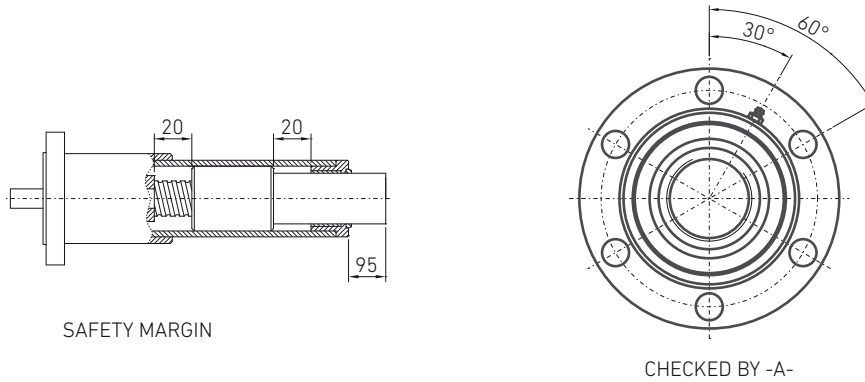
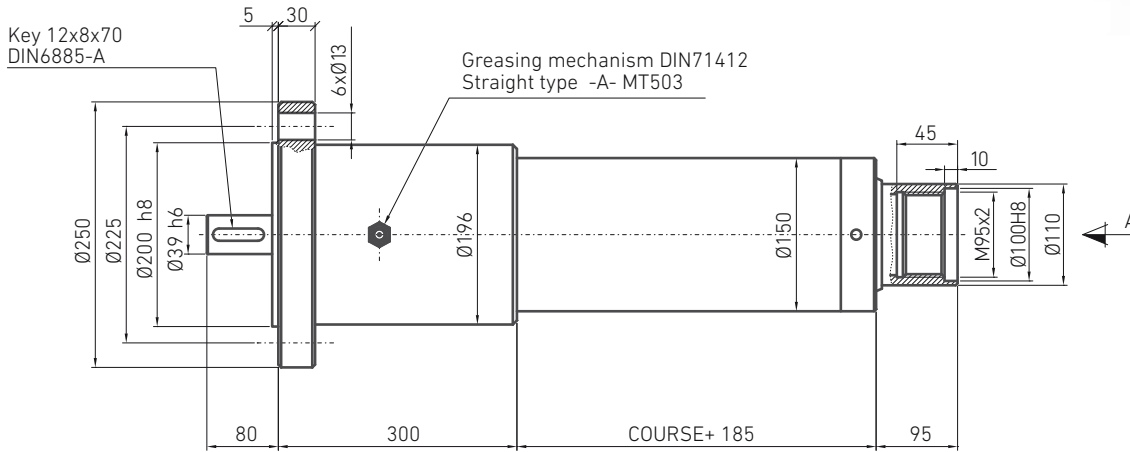
F50-M100 LINEAR ACTUATORS

UP TO

86 kN



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



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	$(5.89 \times F) + 2.1$	75	7.2
KGS 6310	86	10	81	$(1.96 \times F) + 1.5$	77	8.1

... Power required: P_D (kW) = $0,157 \times M_D$ (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

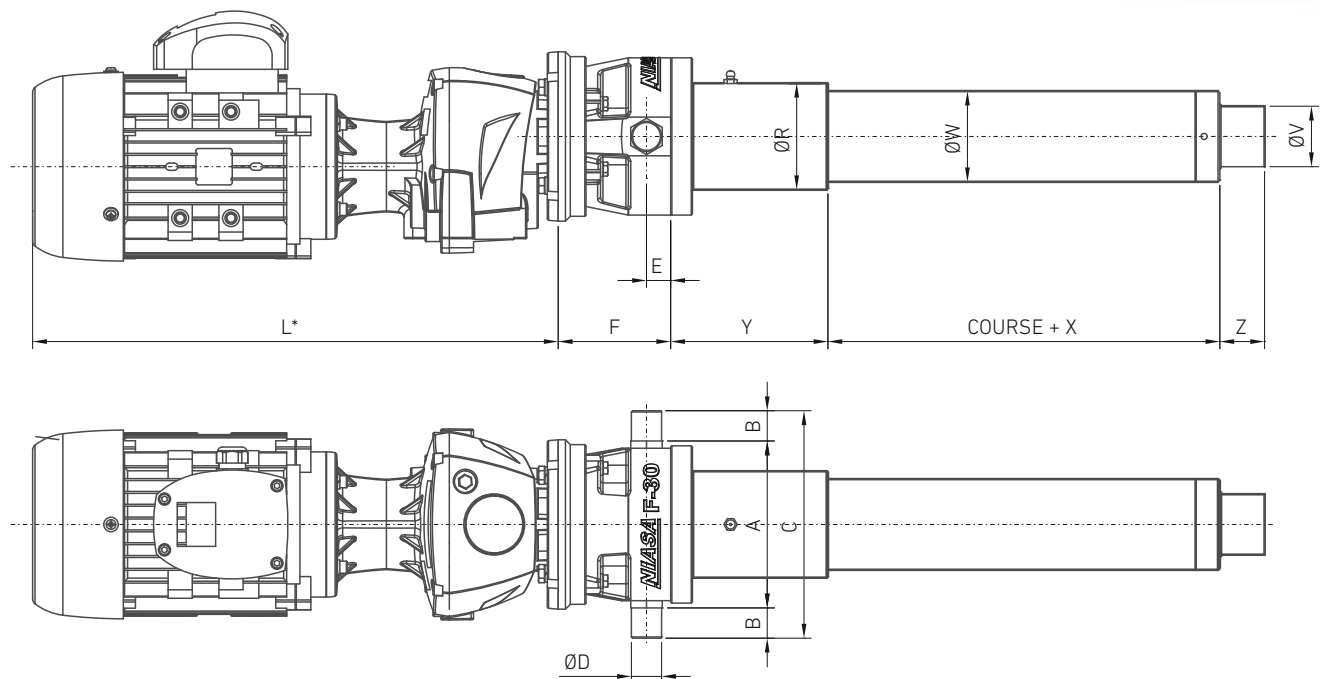
UP TO

86 kN



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.

	Ø Reducer input shaft	Flange reducer	MOTOR GROUP																		
			56			63		71		80		90		100		112		132		160	
			POWER (kW)																		
			A	B	A	B	A	B	A	B	A	B	A	B	A	A	B	A			
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						
F20 / A20	20	B5 Ø140	•	•	•	•															
F30 / A30	20	B5 Ø140		•	•	•	•														
F40 / A40	25	B5 Ø160			•	•	•	•	•	•											
F45	30	B5 Ø200					•	•	•	•	•	•	•	•	•						
F50	40	B5 Ø250							•	•	•	•	•	•	•	•					



ES LINEAR ACTUATOR F/A - CONFIGURATION M501

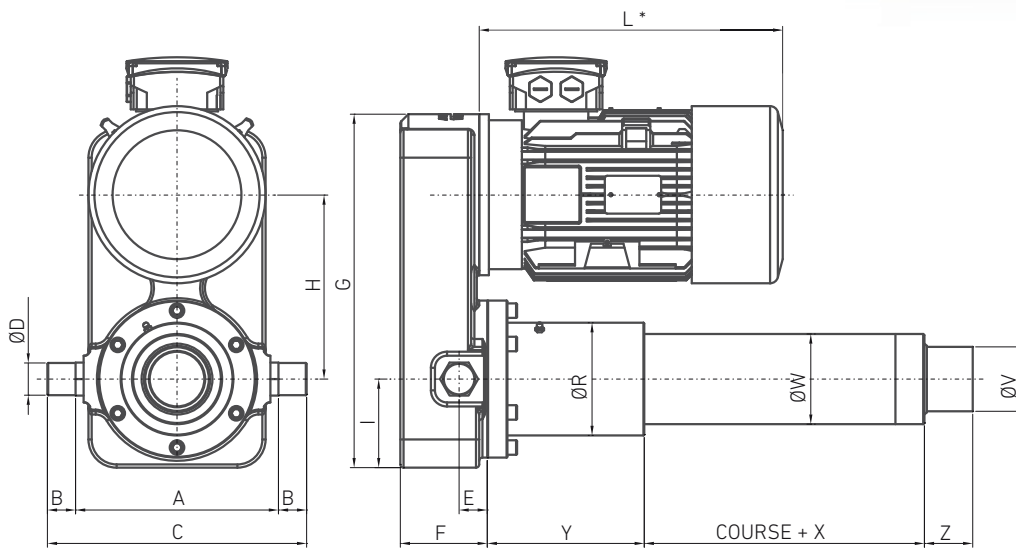
UP TO

86 kN

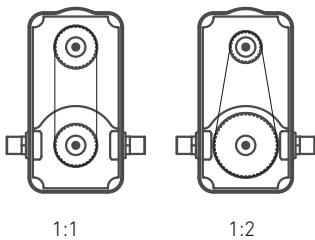


Parallel drive

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

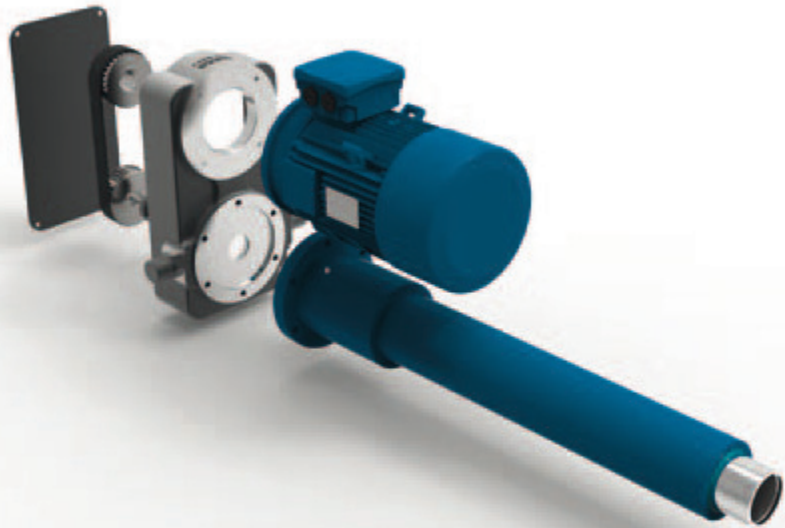
1:2

*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.

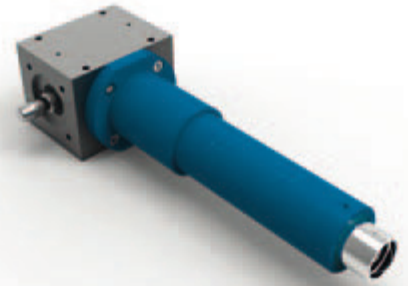
	MOTOR GROUP																
	56		63		71		80		90		100		112		132		160
	POWER (kW)																
	A	B	A	B	A	B	A	B	A	B	A	B	A	A	B	A	
	0.06	0.09	0.12	0.18	0.25	0.37	0.55	0.75	1.1	1.5	2.2	3	4	5.5	7.5	11	
F16 / A16	•		•		•												
F20 / A20			•		•		•										
F30 / A30					•		•		•								
F40 / A40		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

All the motors have B14 flange.



ES LINEAR ACTUATOR F/A - CONFIGURATION M505

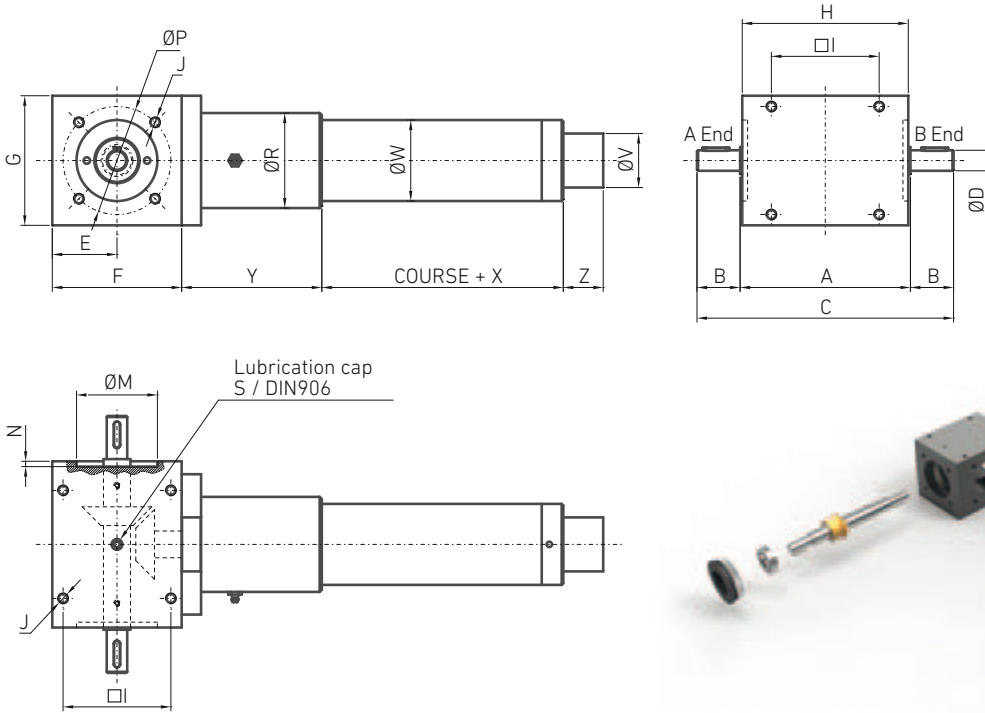
UP TO **23.5 kN** **Tr** **KGS BALLS**



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
	Tr 24x5	9.5
F20 / A20	KGS 2005	10.5
	KGS 2020	5.5
	Tr 36x6	15
F30 / A30	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 lose position when it stops or if there are vibrations, etc.



ES LINEAR ACTUATOR F/A - CONFIGURATION M601

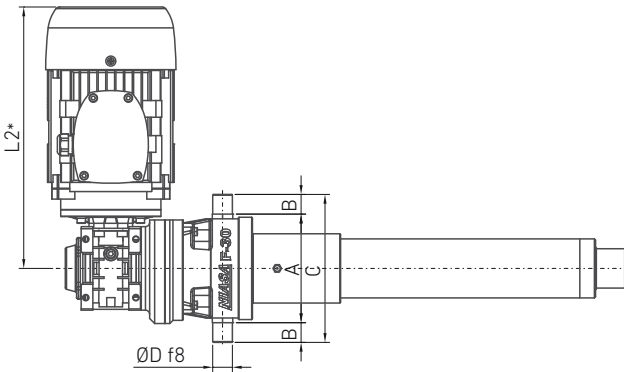
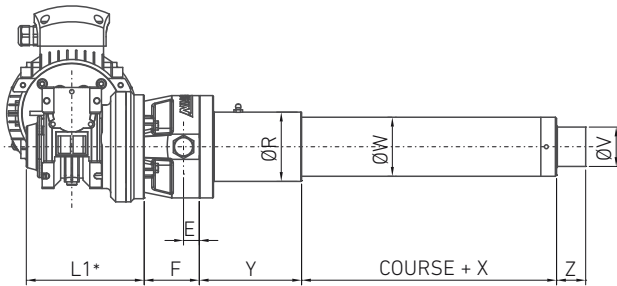
UP TO

86 kN



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.

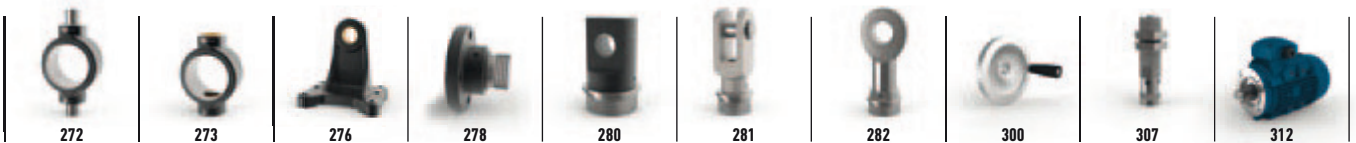
	M601 configuration dimensions						M100 configuration general dimensions						
	A	B	C	ØD f8	E	F	X	Y	Z	ØV	ØW	ØR	More dimensions
F20	116	20	156	20	15	55	106	100	36	35	55	66	Page 80
F30	138	25	188	25	20	70	124	130	37	50	75	88	Page 82
F40	160	40	240	35	30	75	155	150	67	70	90	110	Page 84
F45	200	40	280	40	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
F40 / A40	Tr 45x7	22
	KGS 4010	38
	KGS 4020	21.5
F45	KGS 4040	11
	Tr 50x8	47.5
F50	KGS 5010	78
	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.



ES LINEAR ACTUATOR F/A - CONFIGURATION M605

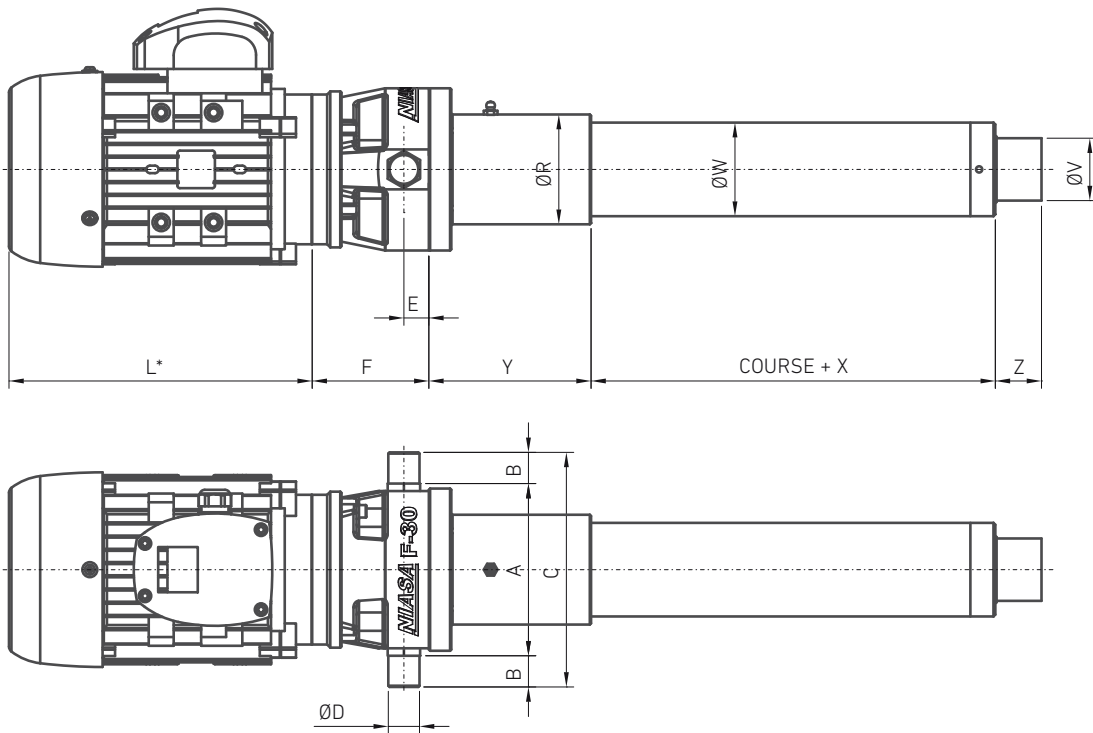
UP TO

86 kN



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

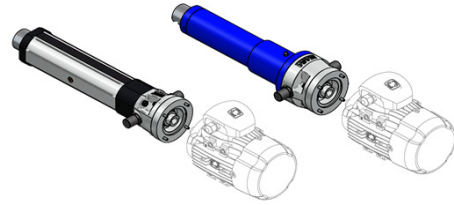
	M205 configuration dimensions					M100 configuration general dimensions						
	A	B	C	ØD f8	E	X	Y	Z	ØV	ØW	ØR	More dimensions
F16	82	15	112	15	12	84	61	36	32	40	45	Page 78
F20	116	20	156	20	15	106	100	36	35	55	66	Page 80
F30	138	25	188	25	20	124	130	37	50	75	88	Page 82
F40	160	40	240	35	30	155	150	67	70	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
F30 / A30	KGS 2020	5.5
	Tr 36x6	15
	KGS 3205	21.5
F40 / A40	KGS 3210	23.5
	KGS 3220	12
	KGS 3240	6
F45	Tr 45x7	22
	KGS 4010	38
	KGS 4020	21.5
F50	KGS 4040	11
	Tr 50x8	47.5
	KGS 5010	78
	Tr 70x10	60.5
	KGS 6310	86



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

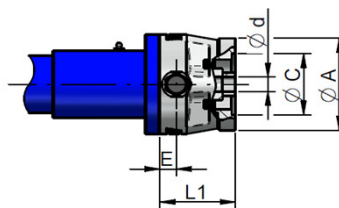
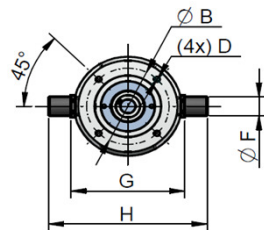
Linear actuat. size Motor flange Trunnions Application

1 Yes 0 No ³⁾ IN Indoor OU Outdoor SP Special category to ISO 12944

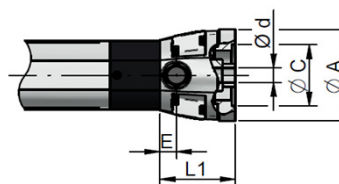
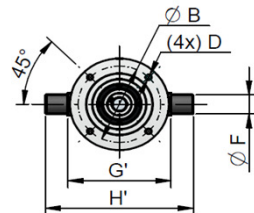
¹⁾ It includes coupling and fasteners to fix motor

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 µm)	Anodizing (15~20 µm)	¹⁾ Approx. C2-Medium durability (ISO 12944).
Fastenings:	Black oxide coating	Stainless steel	²⁾ Approx. C3-Medium durability (ISO 12944). Special coatings on request, until C5 (ISO 12944)

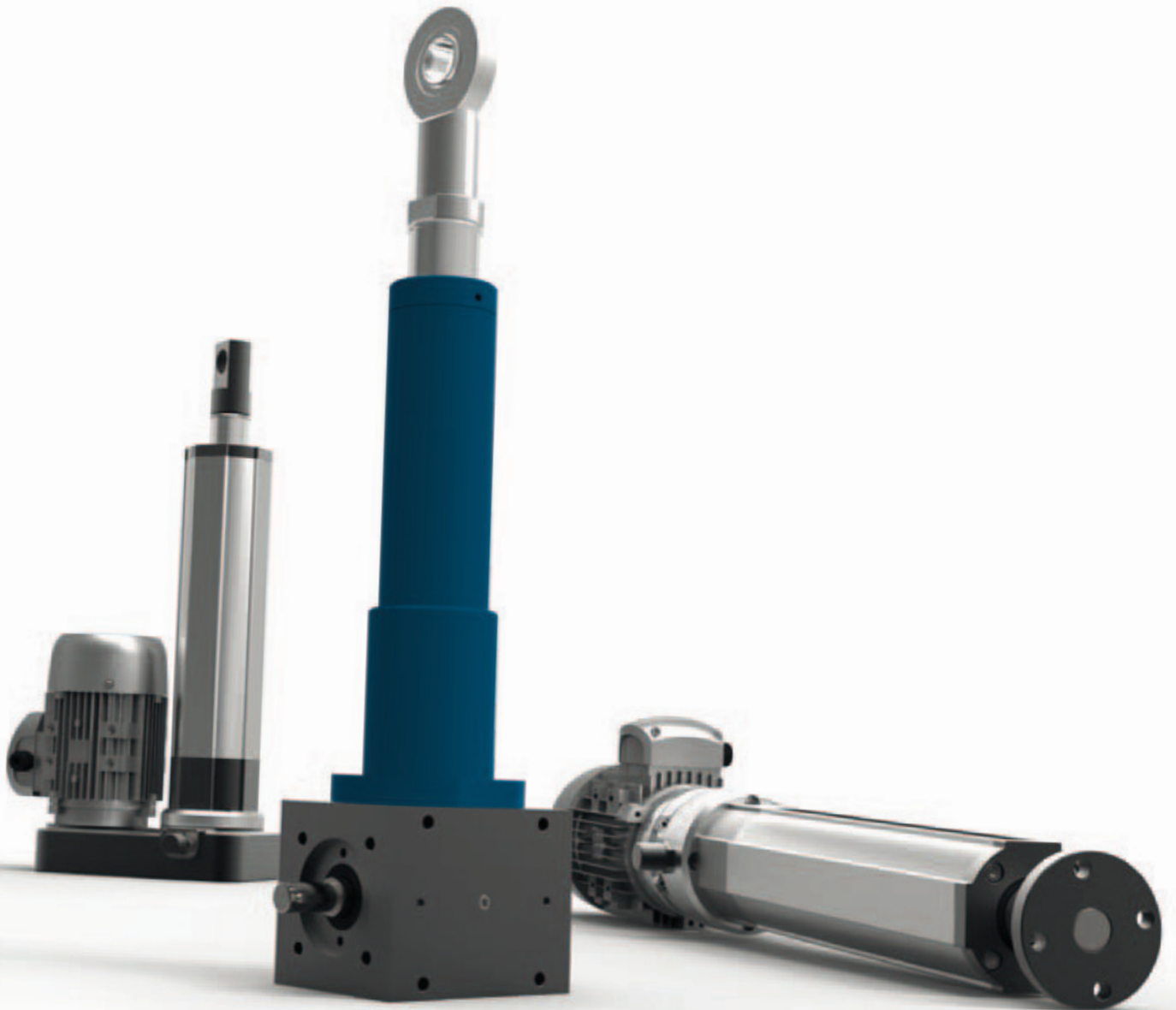
LINEAR ACTUATORS

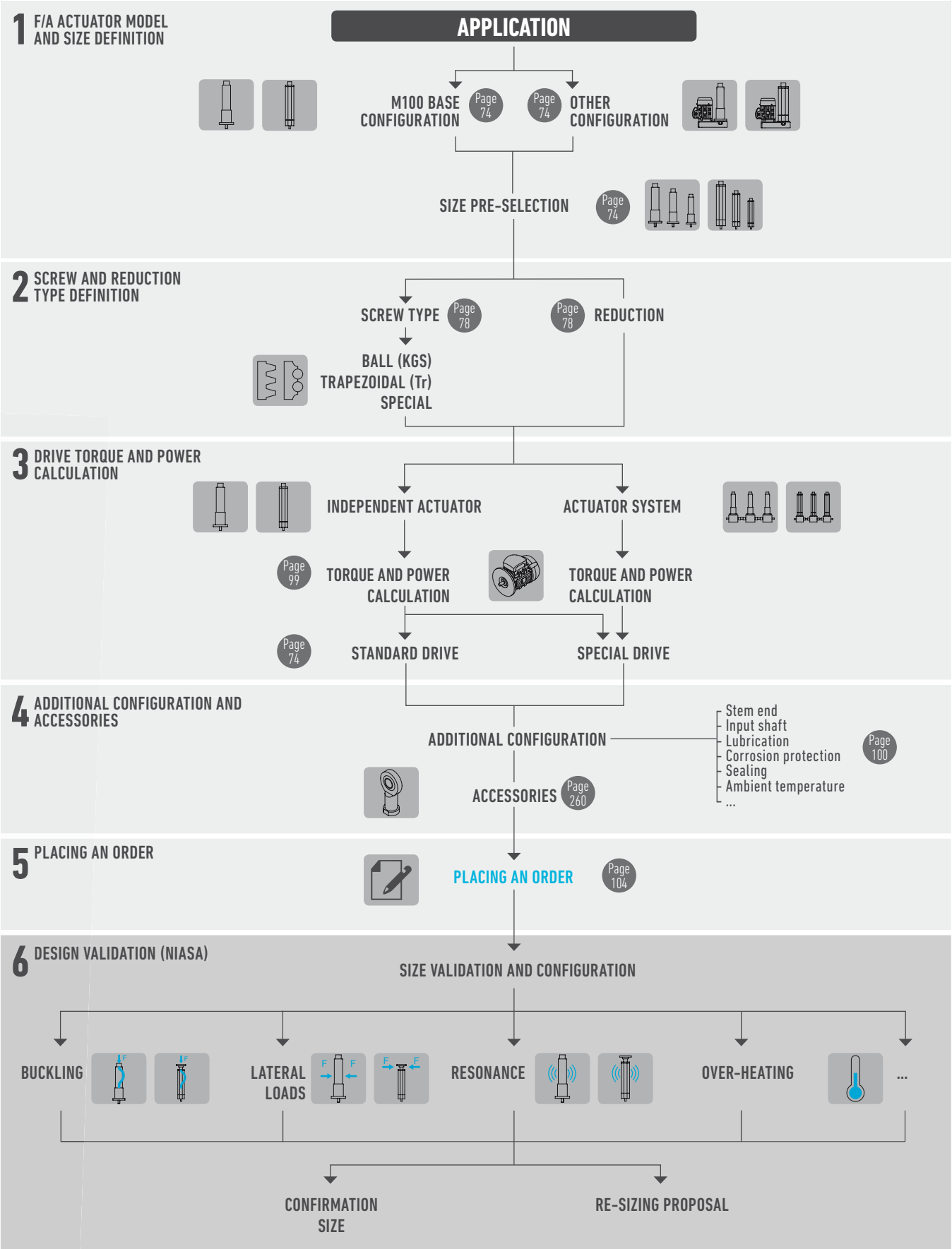
F SERIES: STEEL TUBE | A SERIES: ALUMINUM TUBE

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.





LINEAR ACTUATORS

F SERIES: STEEL TUBE | A SERIES: ALUMINUM TUBE

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.



LINEAR ACTUATORS

F SERIES: STEEL TUBE | A SERIES: ALUMINUM TUBE

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

$$M_d \text{ (Nm)} = \left(\frac{F \times P}{2 \times \pi \times 0,9 \times \eta_{ds}} + M_i \right) \times \frac{1}{\eta_{dr} \times i_r}$$

- 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

$$P_d \text{ (kW)} = \frac{M_d \times n}{9550}$$

- 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 16x4	0.38	Tr 24x5	0.52	Tr 36x6	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 45x7	1.9	Tr 50x8	2.1	Tr 70x10	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.



LINEAR ACTUATORS

F SERIES: STEEL TUBE | A SERIES: ALUMINUM TUBE

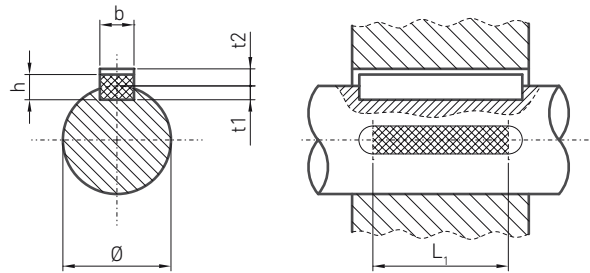
PRODUCT SELECTION

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.

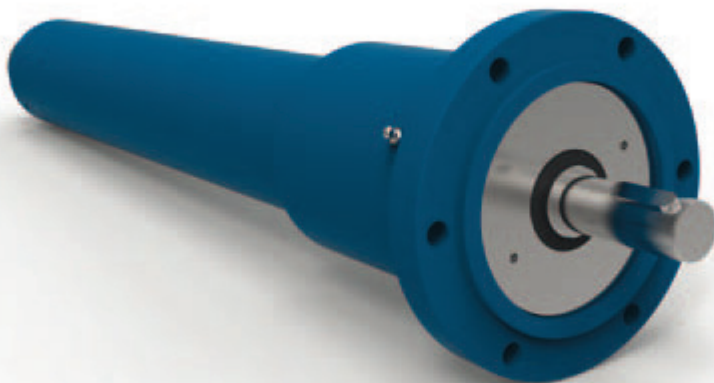
IMPORTANT

... 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_p (Nm)							
	b x h (mm)	t1 (mm)	t2 (mm)	Key effective length, L_1 (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



LINEAR ACTUATORS

F SERIES: STEEL TUBE | A SERIES: ALUMINUM TUBE

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.



LINEAR ACTUATORS

F SERIES: STEEL TUBE | A SERIES: ALUMINUM TUBE

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.

LINEAR ACTUATORS

F SERIES: STEEL TUBE | A SERIES: ALUMINUM TUBE

PRODUCT SELECTION

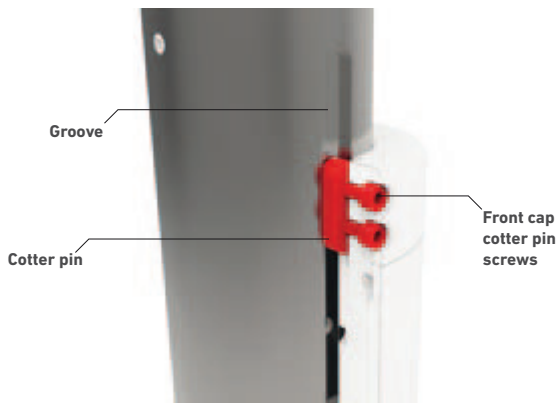
OPTIONAL CONFIGURATIONS

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.



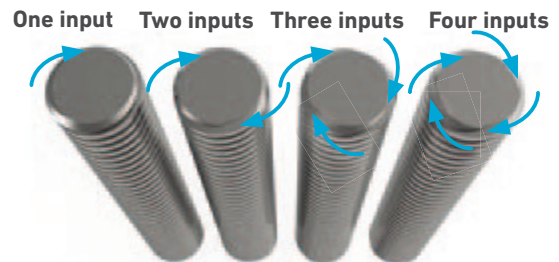
With this configuration, the scraper for the stem cannot be mounted on the front cap. To avoid the possible entry of particles or liquid through the stem, it is recommended to mount a bellow to protect it.

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 90°
- M601 Motoreducer at 90°
- 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

08	<p>STEM FASTENING ACCESSORY</p> <p>BPS Flange GKS Single rod GKB Double rod GIR Ball joint FES Special end fastening 000 No accessory</p>
09	<p>EXTERIOR TUBE FASTENING ACCESSORY</p> <p>Actuator F BB Trunnion mount with tipper studs BH Trunnion mount with bearings</p> <p>Actuator A BA Trunnion mount</p> <p>F/A Actuator 00 No accessory</p>
10	<p>TILT ACCESSORY</p> <p>SB With tilt support 00 No tilt support</p>
11	<p>LIMIT SWITCH ACCESSORY</p> <p>Actuator F FCI Inductive limit switches FCR Inductive limit switches with regulation</p> <p>Actuator A FCG Magnetic limit switches</p> <p>F/A Actuator 000 No limit switches</p>
12	<p>STEM PROTECTION ACCESSORY</p> <p>Actuator F FB Bellow type protector</p> <p>F/A Actuator 00 No protector</p>
13	<p>DRIVE ADAPTATION</p> <p>Configuration M100/M505 VE Wheel 00 No adaptation</p> <p>Configuration M205/M501/M601/M605 MK Default adaptation corresponding to configuration MS Special adaptation 00 No adaptation</p>
14	<p>MOTOR (ONLY IF CONFIGURATION M205/M501/M605)</p> <p>MK drive adaptation 080 Group size A Power-1 / B Power-2</p> <p>MS drive adaptation 1111 Non-standard drive</p> <p>Both adaptations 0000 Without drive</p>
15	<p>LUBRICANT</p> <p>GRA Standard lubricant GRX Lubricant for low extreme temperatures GRS Other lubricant</p>
16	<p>LUBRICATION ACCESSORIES</p> <p>ERT Straight lubricator (standard F Series) ETP Sealed lubrication cap (standard A Series) AGR Automatic lubricating accessory 000 Other lubricating accessory</p>
17	<p>EQUIPMENT GENERAL COLOUR</p> <p>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)</p>

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

LINEAR ACTUATORS

F SERIES: STEEL TUBE | A SERIES: ALUMINUM TUBE

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

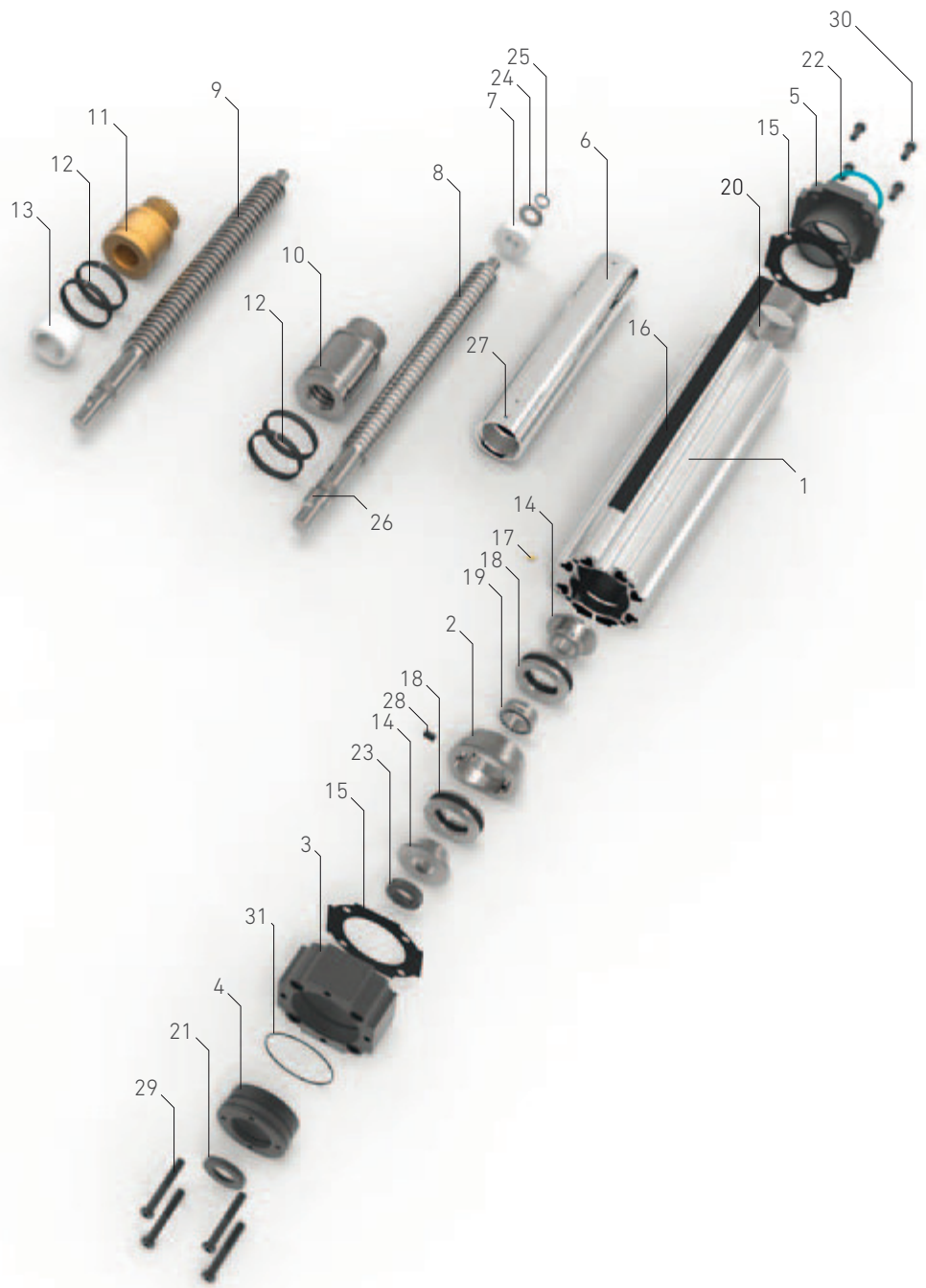


LINEAR ACTUATORS

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

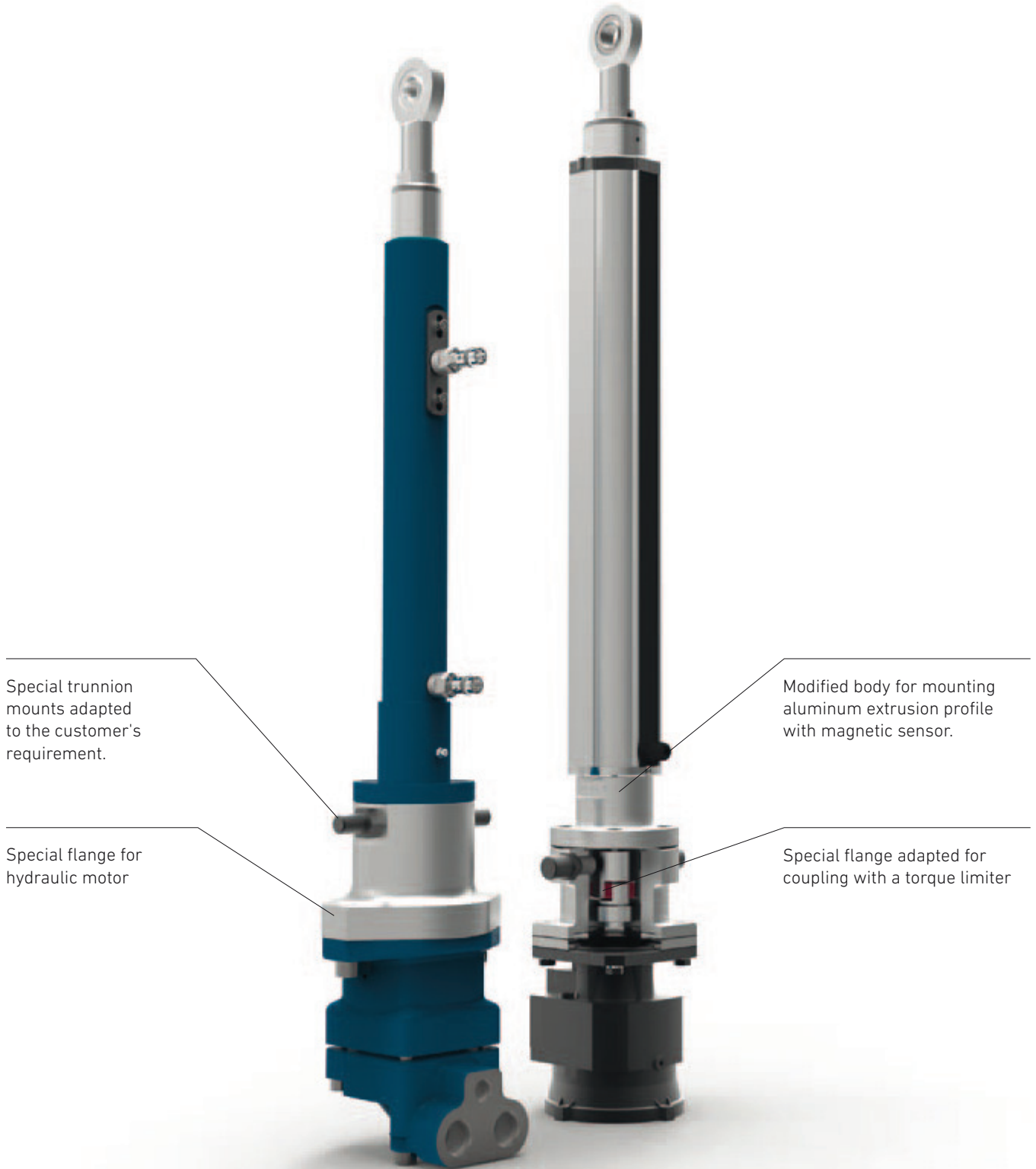


LINEAR ACTUATORS

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 size stem union adapted to customer's accessory

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

Flange adapted to motor flange defined by the customer.

Special flange for coupling with a torque limiter

Special flange adapted to NEMA type servomotor