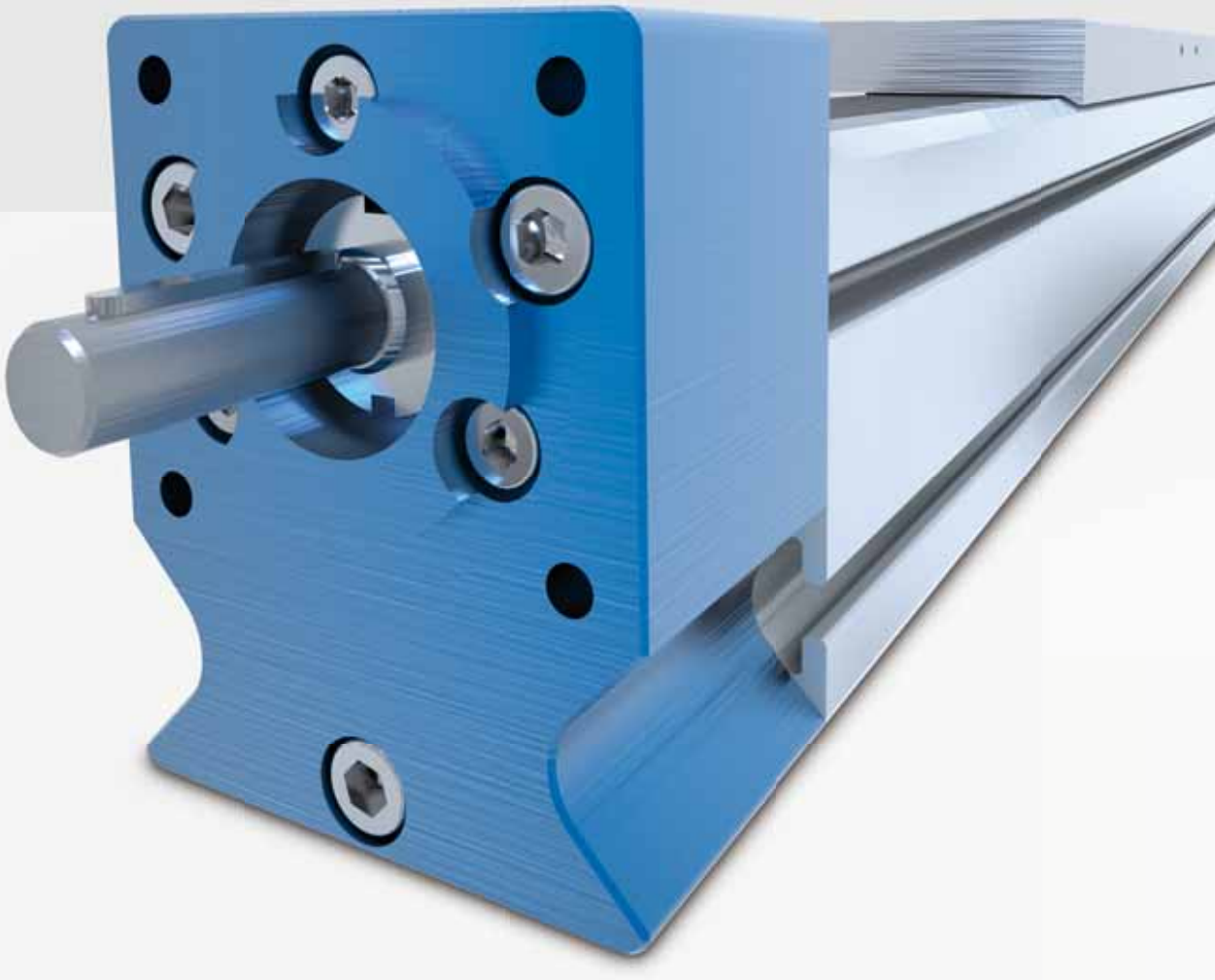
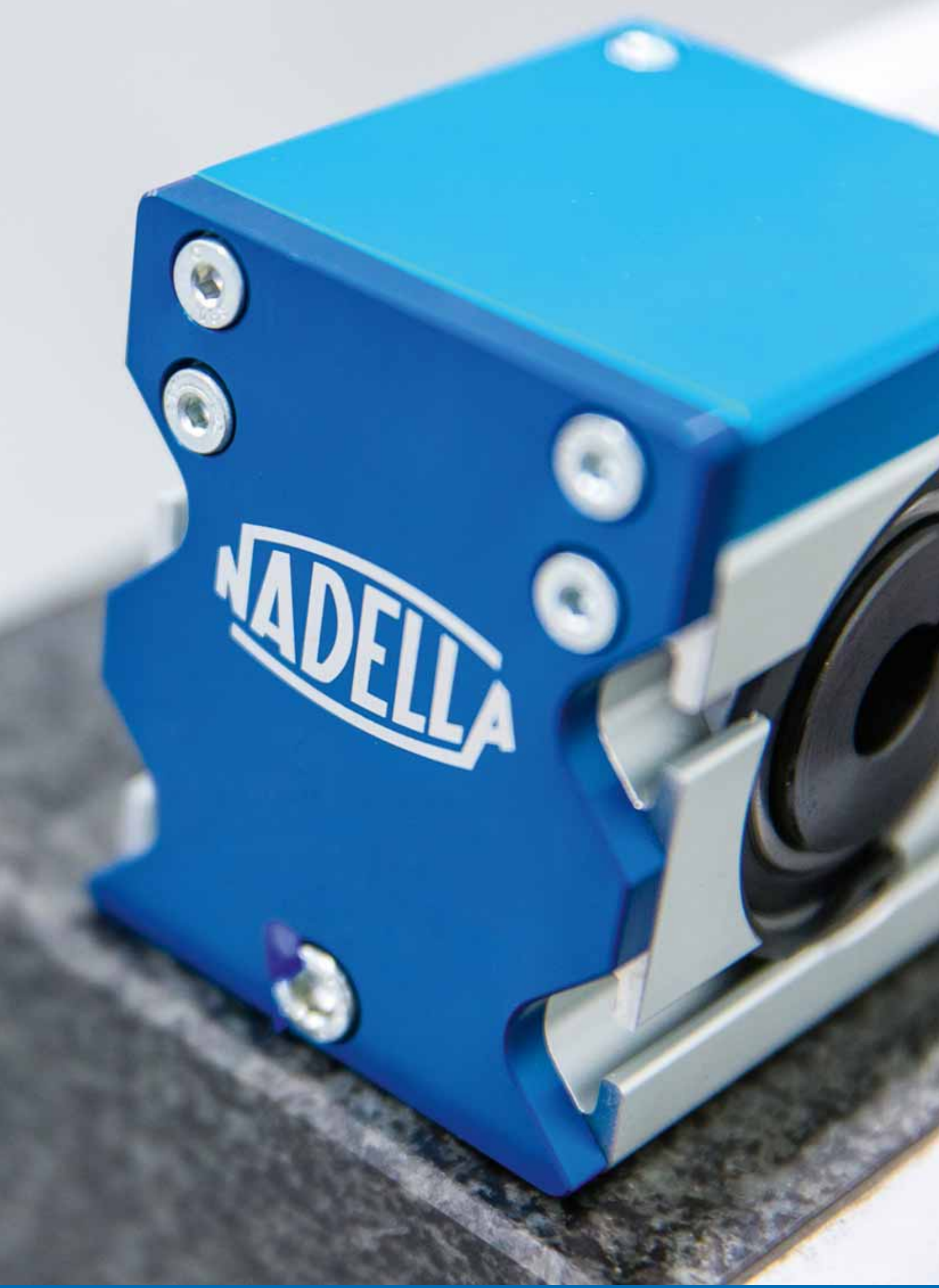
NADELLA

LINEAR MODULES




NADELLA

SUMMARY

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- Actuator with toothed belt drive and roller guide

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- Actuator with toothed belt drive and rail or roller guide

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- Type designation
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THE NADELLA COMPANY
THE SPECIALIST FOR MOTION TECHNOLOGY

NADELLA has developed over time from a supplier of rolling bearings, linear guide components and linear axes into an expert system partner for all areas of motion technology. Wherever innovative ideas, precision and reliability are required, developers and design engineers rely on products from NADELLA. Our customers now include renowned mechanical engineering, plant construction and automation engineering companies in Germany, Europe, Asia and the USA.

FULL SERVICE AND JUST IN TIME

We consider ourselves to be a full-service partner – from development of a product through production and all the way to logistics. Our established network guarantees efficient processes in all areas and throughout the value-added chain – all from a single source. Additionally, express deliveries or fast and inexpensive special treatment of catalogue parts is also possible. This also applies to small and medium quantities.

EXPERIENCE AND KNOW-HOW

Professional operations and application consultation are just a few of our distinguishing characteristics: Our consulting engineers collaborate closely with our customers' experts, actively contributing their specialist expertise, their experience and the technical possibilities. This results in custom solutions that set standards.

MAXIMUM QUALITY AND CERTIFIED ENVIRONMENTAL MANAGEMENT

Maximum quality is our top priority. That is why every process step is accompanied and regularly checked by expert employees. All companies and plants are certified according to DIN EN ISO 9001 or ISO/TS 16949, and their environmental management systems comply with DIN EN ISO 14001. We also have the latest measuring and testing equipment at our disposal to ensure that our high quality standards are met over the long term.

- CAQ system
- 3-D CNC measuring machines
- Force testing
- Radiographic inspection
- Microsection analysis
- Materials testing on metal and plastic

VDMA Mitglied Member

EQ ZERT ISO 9001 ZERTIFIZIERT

EQ ZERT ISO 14001 ZERTIFIZIERT

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WORLDWIDE NETWORK
FOR IDEAL SERVICE

MANY PATHS LEAD TO NADELLA – AND THEY ARE SHORT ANYWHERE IN THE WORLD.

Our customers' satisfaction is the basis for our success and growth. That is why we are at your service around the world and always keep your requirements in mind. We now possess a worldwide network of distributors in all important industrialised countries in Europe, Asia and the USA. This allows us to ensure customer-orientated consultation, delivery and service at all times.

NADELLA MAIN OFFICES

China
Germany
Italy
USA

DURBAL HEAD OFFICE

Germany

BRANCHES AND DISTRIBUTORS

Belgium
Brazil
Denmark
Finland
France
Great Britain
India
Korea
Netherlands
Norway
Austria
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Sweden
Switzerland
Singapore
Slovakia
Slovenia
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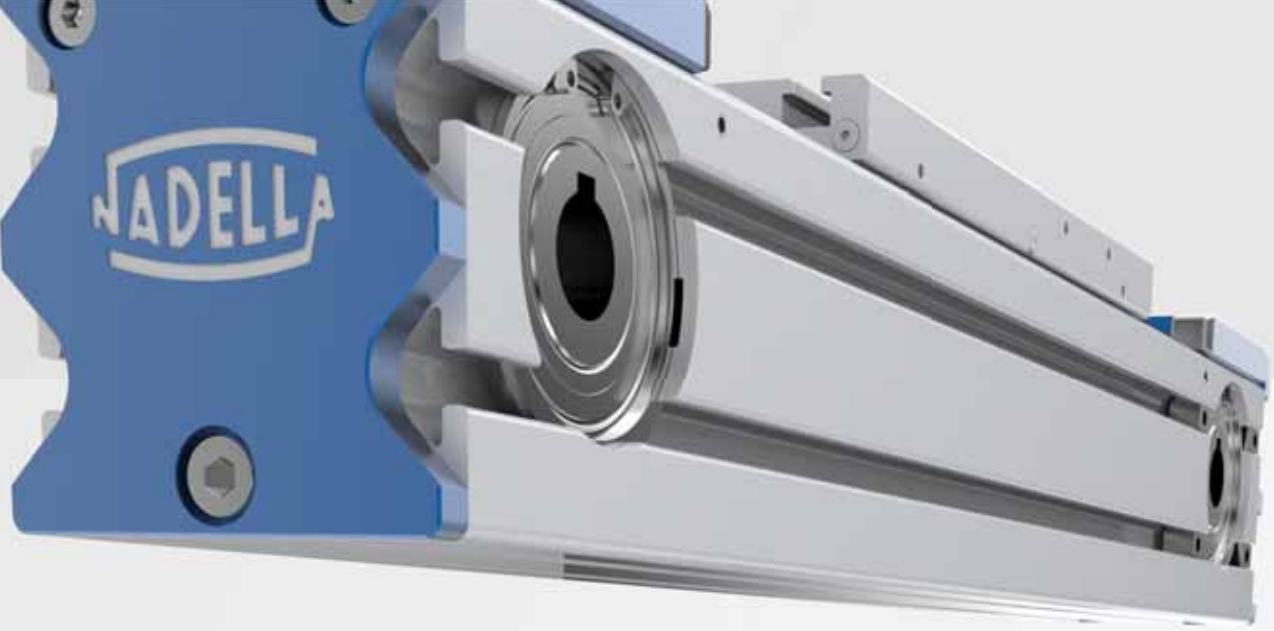
Taiwan
Czech Republic
Turkey
Hungary


NADELLA

PRODUCT OVERVIEW

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PAGE 10 2.1 BASIC-LINE AXN

PAGE 11 2.2 BASIC-LINE AXNP-Z

PAGE 12 2.3 BASIC-LINE AXNP-S

PRODUCT OVERVIEW

BASIC-LINE AXN

	AXN 45		AXN 65		AXN 80		AXN 100	
Profile cross section w x h (mm)	45 x 48		65 x 68.5		80 x 84		100 x 100	
Drive	Toothed belt		Toothed belt		Toothed belt		Toothed belt	
Feed rate (mm/U)	100		150		180		230	
Max. dynamic working load (N)	325		650		1450		2500	
Repeat accuracy (mm)	± 0.05		± 0.05		± 0.05		± 0.05	
Vmax. (m/s) up to	6		10		10		10	
Guide system	LR24		LR35		LR42		LR52 B 25	
Max. total length overall (m)[1)]	6		6		6 (8)		6 (8)	
Loads (N)	dyn.	stat.	dyn.	stat.	dyn.	stat.	dyn.	stat.
P_R (Roller guide LR)[2)]	570	1040	995	2400	1735	3000	2150	3200
P_R (Rail guide B)[2)]							6000	20000
P_L (Roller guide LR)[2)]	570	1040	995	2400	1735	3000	2150	3200
P_L (Rail guide B)[2)]							6000	20000
P_T (Roller guide LR)[2)]	1030	1810	1940	3200	2950	5250	4500	7000
P_T (Rail guide B)[2)]							6000	20000
Load moments (Nm)								
M_x (Roller guide LR)[2)]	8	15	20	40	36	62	75	110
M_x (Rail guide B)[2)]							75	225
M_y (Roller guide LR)[2)]	16	27	30	75	83	143	125	170
M_y (Rail guide B)[2)]							500	1650
M_z (Roller guide LR)[2)]	30	54	70	120	146	260	330	400
M_z (Rail guide B)[2)]							500	1650

[1)] In one part – longer version of 8 m upon request
[2)] Max. loads and dynamic working loads dependent on guide system

Basic-Line AXNP-Z

	AXNP 45-Z		AXNP 65-Z		AXNP 80-Z	
Profile cross section w x h (mm)	45 x 48		65 x 68.5		80 x 84	
Drive	Toothed belt		Toothed belt		Toothed belt	
Feed rate (mm/U)	100		150		180	
Max. dynamic working load (N)	325		650		1450	
Repeat accuracy (mm)	± 0.05		± 0.05		± 0.05	
Vmax. (m/s) up to	6		10		10	
Guide system	LR24 B 9		LR35 B 15		LR42 B 20	
Max. total length overall (m)[1)]	6		6		6	
Loads (N)	dyn.	stat.	dyn.	stat.	dyn.	stat.
P_R (Roller guide LR)[2)]	570	1040	995	2400	1735	3000
P_R (Rail guide B)[2)]	660	910	2750	9650	4300	15000
P_L (Roller guide LR)[2)]	570	1040	995	2400	1735	3000
P_L (Rail guide B)[2)]	660	910	2750	9650	4300	15000
P_T (Roller guide LR)[2)]	1030	1810	1940	3200	2950	5250
P_T (Rail guide B)[2)]	660	910	2750	9650	4300	15000
Load moments (Nm)						
M_x (Roller guide LR)[2)]	8	15	20	40	36	62
M_x (Rail guide B)[2)]	4,5	6	19	69	43	150
M_y (Roller guide LR)[2)]	16	27	30	75	83	143
M_y (Rail guide B)[2)]	18	25	95	345	205	730
M_z (Roller guide LR)[2)]	30	54	70	120	146	260
M_z (Rail guide B)[2)]	18	25	95	345	205	730

[1)] In one part – longer version of 8 m upon request
[2)] Max. loads and dynamic working loads dependent on guide system

PRODUCT OVERVIEW

BASIC-LINE AXNP-S

	AXNP 45-S		AXNP 65-S		AXNP 80-S	
Profile cross section w x h (mm)	45 x 60		65 x 85		80 x 102	
Drive	Ball screw		Ball screw		Ball screw	
Pitch (mm)	5 / 10		5 / 10 / 16		5 / 20	
Ball screw (mm)	Ø 12		Ø 16		Ø 20	
Max. dynamic working load (N)	3600		6500 – 12000		8000 – 17500	
Repeat accuracy (mm)	± 0.03		± 0.03		± 0.03	
Vmax. (m/s) up to	1		1.6		2	
Max. total length overall (m)[1)]	2		3		4	
Moment of inertia (kgcm²/m)	0.11		0.33		0.82	
Guide system	Rail guide B 9		Rail guide B 15		Rail guide B 20	
Loads	**dyn.**	**stat.**	**dyn.**	**stat.**	**dyn.**	**stat.**
P_R (N)[2)]	660	910	1400	3900	5400	15000
P_L (N)[2)]	660	910	1400	3900	5400	15000
P_T (N)[2)]	660	910	1400	3900	5400	15000
Load moments						
M_X (Nm)[2)]	5	6	10	30	54	150
M_Y (Nm)[2)]	20	25	65	185	420	1150
M_Z (Nm)[2)]	20	25	65	185	420	1150

[1)] *In one part – longer version of 8 m upon request*
[2)] *Max. loads and dynamic working loads dependent on guide system*

NOTES

NADELLA

BASIC-LINE
AXN

3

PAGE 16 – 17

3.1 PRODUCT DESCRIPTION
Setting, performances, characteristics, applications and combination examples

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3.2 AXN 45-Z
Linear module with toothed drive belt
- Roller guide
- Single, double or long carriage

PAGE 20 – 21

3.3 AXN 65-Z
Linear module with toothed drive belt
- Roller guide
- Single, double or long carriage

PAGE 22 – 23

3.4 AXN 80-Z
Linear module with toothed drive belt
- Roller guide
- Single, double or long carriage

PAGE 24 – 25

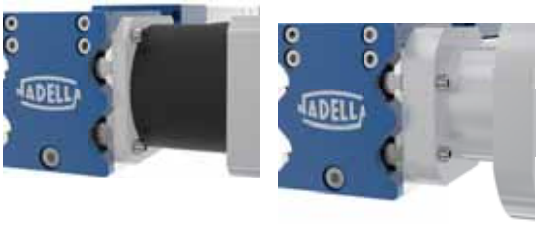
3.5 AXN 100-Z
Linear module with toothed drive belt
- Roller guide or recirculating ball guides
- Single, double or long carriage

BASIC-LINE AXN
PRODUCT DESCRIPTION

Basic-Line AXN stands for a maximum in performance and at the same time for a minimum in cost. Being equipped with toothed belt drive only, these modules are predestined for quick handling and positioning works. If single module or multi axes system: Depending on the customer‘s requirements various combinations are possible.

LIFETIME LUBRICATION

The bearings of the rollers and bearings of the pulleys are lubricated for life. At any movement the steel shafts or the roller guides are coated by a thin lubricant film, coming from an integrated system. For short-stroke use, strokes ≤ ½ length of carriage, please contact our Technical support. In case of high travel mileage and / or acceleration values it is possible to refill this system through lubricating nipples in the table plate. (Recommended lubricant: Klüber Lamora D220)

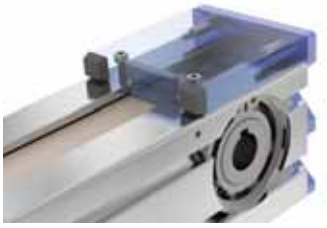


UNIVERSAL MOTOR CONNECTION

Economic and space-saving solution by direct gearbox connection. Drive end of the gear is equipped with hollow-shaft connection. Alternatively, almost all common flange motors can be connected with the corresponding motor adapters by metal bellow or elastormer claw couplings.

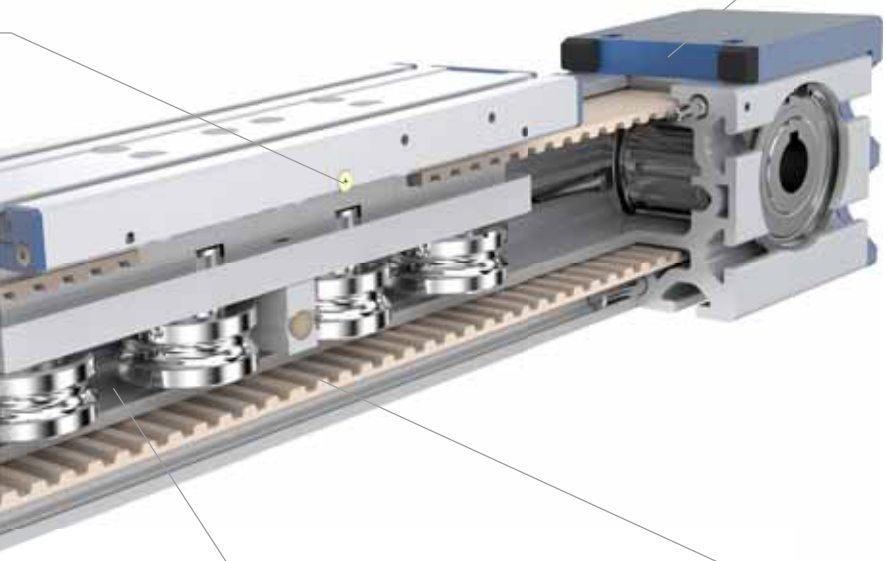
ASSEMBLY AND FIXATION OF THE ACTUATOR

By end-to-end slots on either side and at the bottom of the actuator profile a universal installation of the module at your device is possible. Slot nuts that can be swivelled in, fastening strips and connecting plates increase the mounting flexibility. The actuator itself as well as attachments can easily be screwed through two longitudinal slots in the table plates (AXN 45 with thread). Alternatively the Basic-Line can be equipped with additional tables (at fixed distance) or with long carriages. Depending on the applied load, the high stiffness of the profiles allows for a partly self-supporting use.



DIRT PROTECTION

The toothed belt integrated into the profile covers the actuator from the top and so prevents large dirt particles from penetrating into the actuator. Wiper brushes integrated in the drive head complete the protective measures against penetrating dirt. Optionally air purge connections are available, e. g. in case of extreme dust generation.



TOOTHED BELT

AT-type belt, reinforced with steel cords, allows transfer of large drag forces and guarantees a long liftime. The belt tension is located in the crosshead.

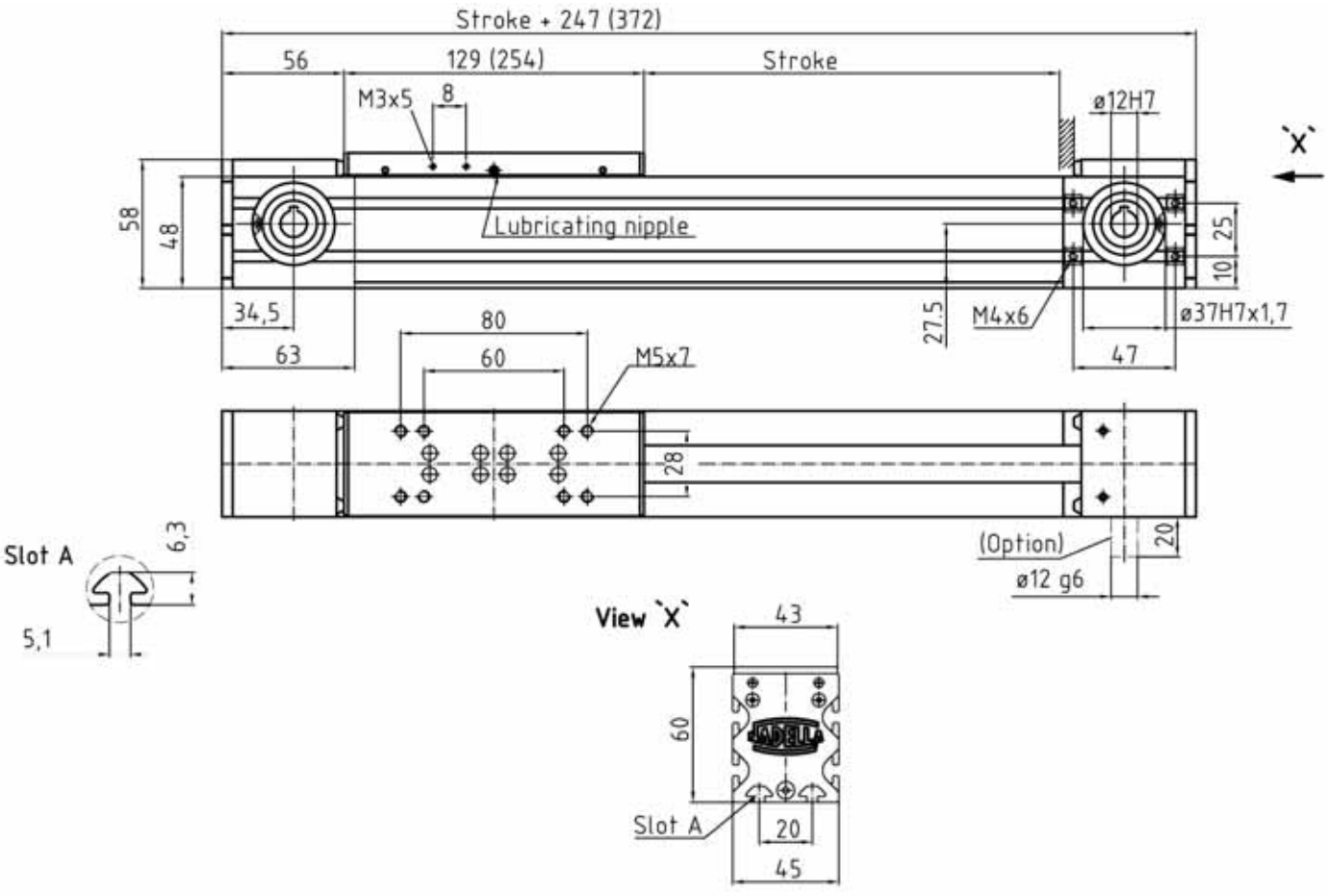
ROLLER GUIDE

The characteristic features of the roller guide are cost-saving, nearly maintenance free and concomitant with high-performance. Resistance to soiling and smooth running is achieved by rollers of large dimensions. The use of two eccentric bearings guarantees that the guides can optimal be pre-loaded and mounted completeley free of clearance. The dynamic working load is based on a nominal lifetime of 54.000 km.

BASIC-LINE AXN
AXN 45-Z

Actuator with toothed belt and roller guide.

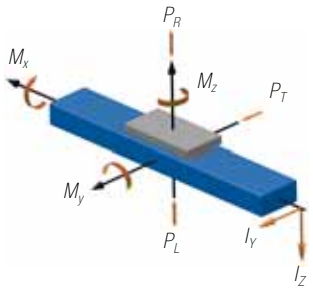
Rust-resistant version available.



Stroke calculation: using distance and safety overrun
Values in brackets for long carriage
Motor connection see chapter Drive adaption

LOADS AND LOAD MOMENTS*

	Roller guide LR 24.06	
Loads (N)	dyn.	stat.
P_R	570 (950)	1040 (2000)
P_L	570 (950)	1040 (2000)
P_T	1030 (1710)	1810 (3500)
Load moments (Nm)		
M_x	8 (14)	15 (30)
M_y	16 (45)	27 (90)
M_z	30 (80)	54 (170)



** The dynamic load of the guide system is based on a nominal liftetime of 54000 km*
Values in brackets for execution with long carriage (254 mm)

TECHNICAL DATA

Max. speed	max. 6 m/s
Repeating accuracy	± 0.05 mm/m
Actuation	Toothed belt 16 AT5
Max. dynamic working load	325 N
Feed rate per rotation	100 mm
Idle-running torque	0.2 – 0.3 Nm
Moment of inertia	0.383 kgcm^2
Max. length overall	6 m
Geometrical moment of inertia I_Y	21.7 cm^4
Geometrical moment of inertia I_Z	22.5 cm^4

MASS

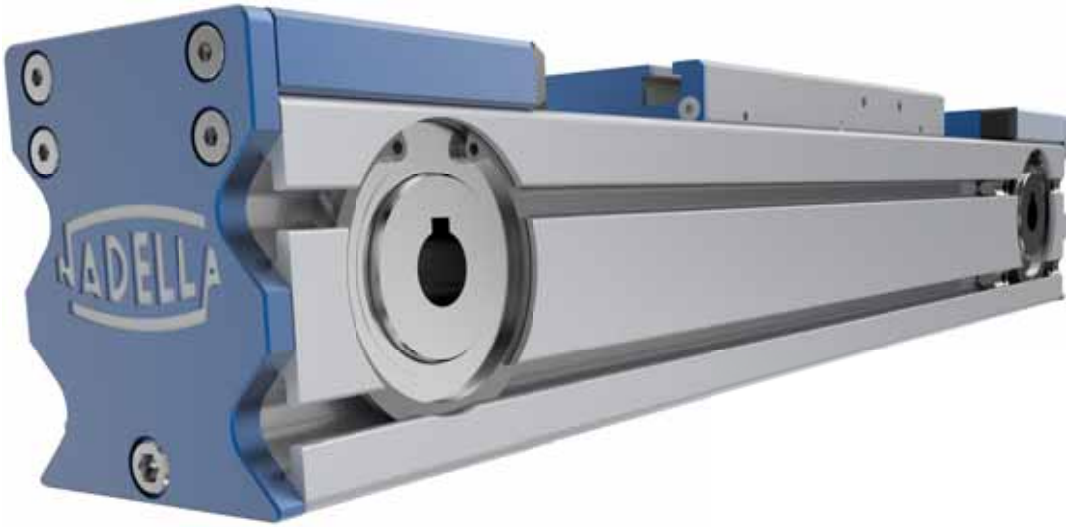
	Roller guide LR 24.06
Basic mass	1.8 kg
Mass per 100 mm stroke	0.3 kg
Slide mass	0.5 kg (1.0 kg)

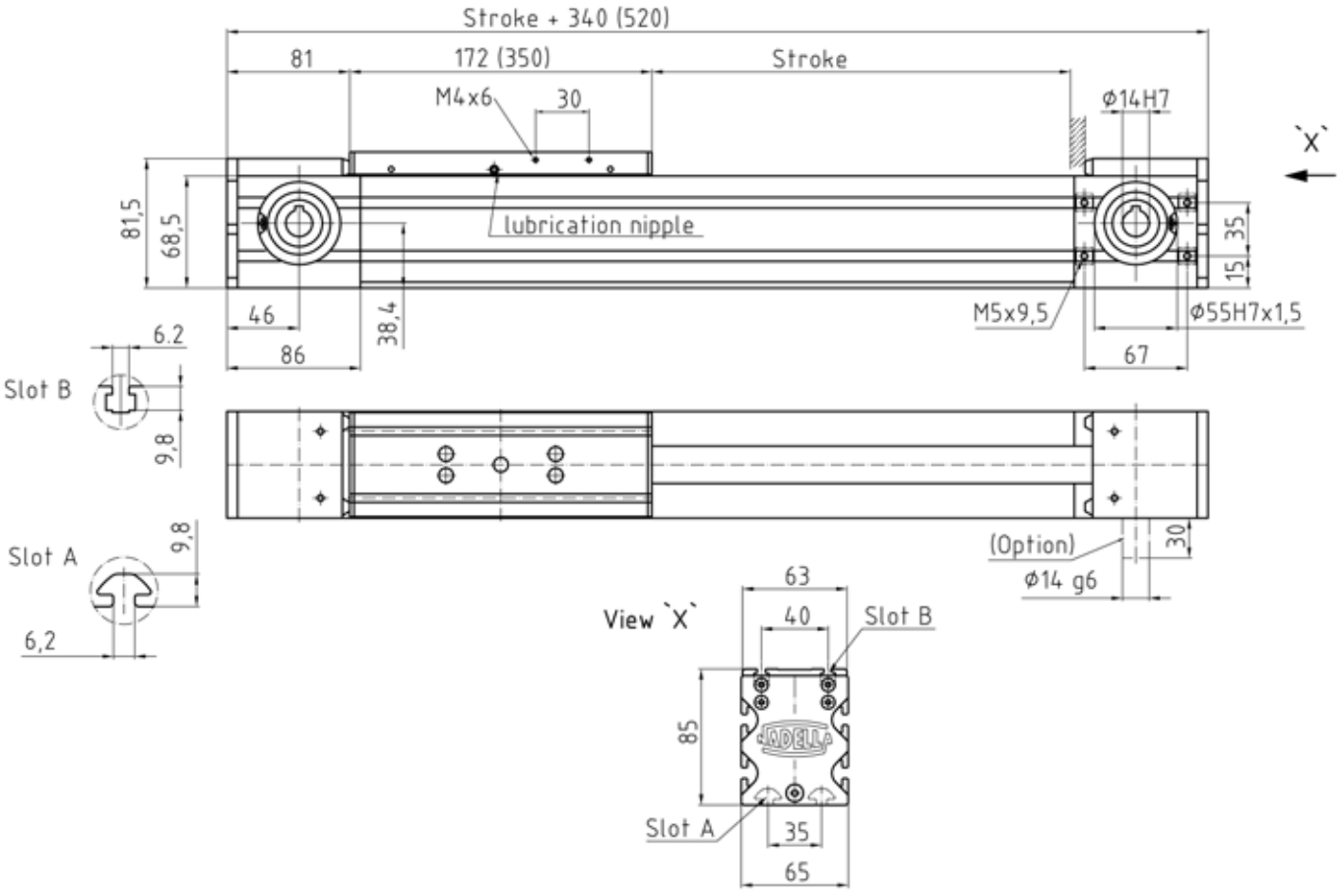
BASIC-LINE AXN
AXN 65-Z

Actuator with toothed belt and roller guide.

Rust-resistant version available.

NX

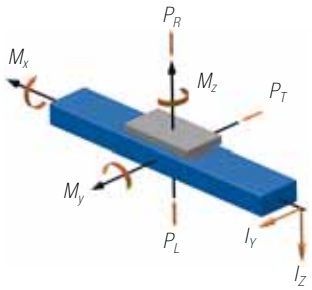




Stroke calculation: using distance and safety overrun
Values in brackets for long carriage
Motor connection see chapter Drive adaption

LOADS AND LOAD MOMENTS*

	Roller guide LR 35.10	
Loads (N)	dyn.	stat.
P_R	995 (1700)	2400 (4500)
P_L	995 (1700)	2400 (4500)
P_T	1940 (3500)	3200 (6500)
Load moments (Nm)		
M_x	20 (40)	40 (80)
M_y	30 (112)	75 (250)
M_z	70 (220)	120 (400)



** The dynamic load of the guide system is based on a nominal liftetime of 54000 km*
Values in brackets for execution with long carriage (350 mm)

TECHNICAL DATA

Max. speed	max. 10 m/s
Repeating accuracy	± 0.05 mm/m
Actuation	Toothed belt 32 AT5
Max. dynamic working load	650 N
Feed rate per rotation	150 mm
Idle-running torque	0.8 – 1.0 Nm
Moment of inertia	2.994 kgcm^2
Max. length overall	6 m (one-piece)[1)]
Geometrical moment of inertia I_y	80.2 cm^4
Geometrical moment of inertia I_z	89.2 cm^4

[1)] Major length upon request

MASS

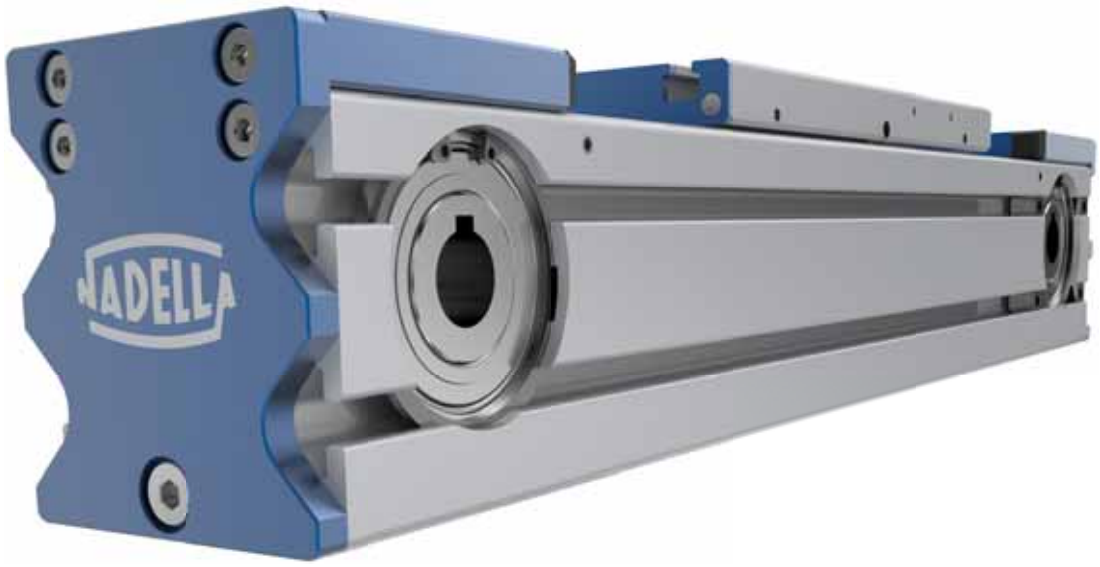
	Roller guide LR 35.10
Basic mass	4.8 kg
Mass per 100 mm stroke	0.6 kg
Slide mass	1.5 kg (3 kg)

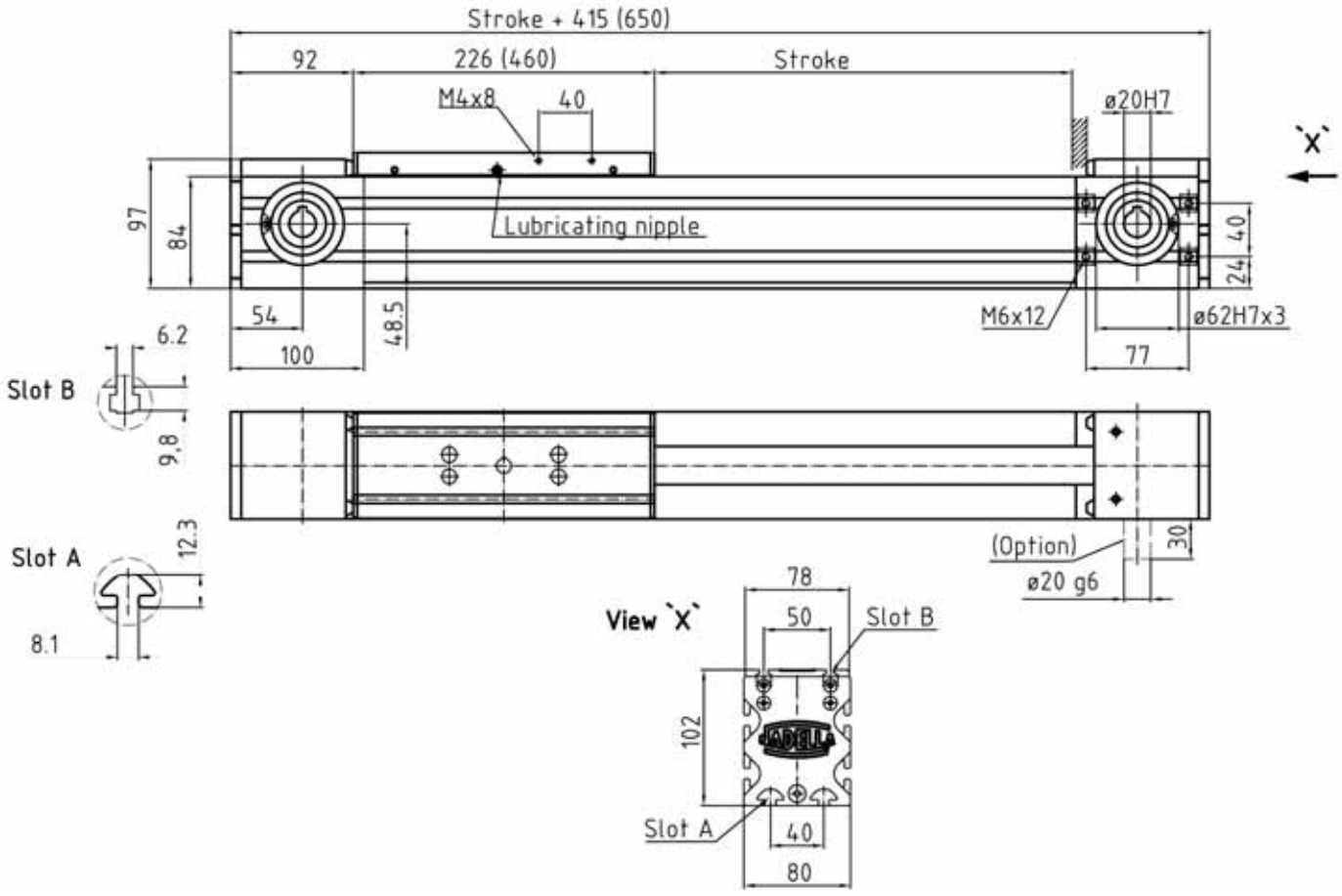
BASIC-LINE AXN
AXN 80-Z

Actuator with toothed belt and roller guide.

Rust-resistant version available.

NX

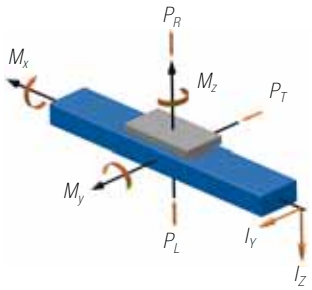




Stroke calculation: using distance and safety overrun
Values in brackets for long carriage
Motor connection see chapter Drive adaption

LOADS AND LOAD MOMENTS*

	Roller guide LR 42.10	
Loads (N)	dyn.	stat.
P_R	1735 (2950)	3000 (5100)
P_L	1735 (2950)	3000 (5100)
P_T	2950 (5000)	5250 (8900)
Load moments (Nm)		
M_x	36 (60)	62 (100)
M_y	83 (245)	143 (425)
M_z	146 (365)	260 (635)



** The dynamic load of the guide system is based on a nominal liftetime of 54000 km*
Values in brackets for execution with long carriage (460 mm)

TECHNICAL DATA

Max. speed	max. 10 m/s
Repeating accuracy	± 0.05 mm/m
Actuation	Toothed belt 32 AT10
Max. dynamic working load	1450 N
Feed rate per rotation	180 mm
Idle-running torque	1.0 – 1.2 Nm
Moment of inertia	5.237 kgcm^2
Max. length overall	6 m (one-piece)[1)]
Geometrical moment of inertia I_y	198.5 cm^4
Geometrical moment of inertia I_z	207.4 cm^4

[1)] Major length upon request, 8 m in one piece dependent on availability

MASS

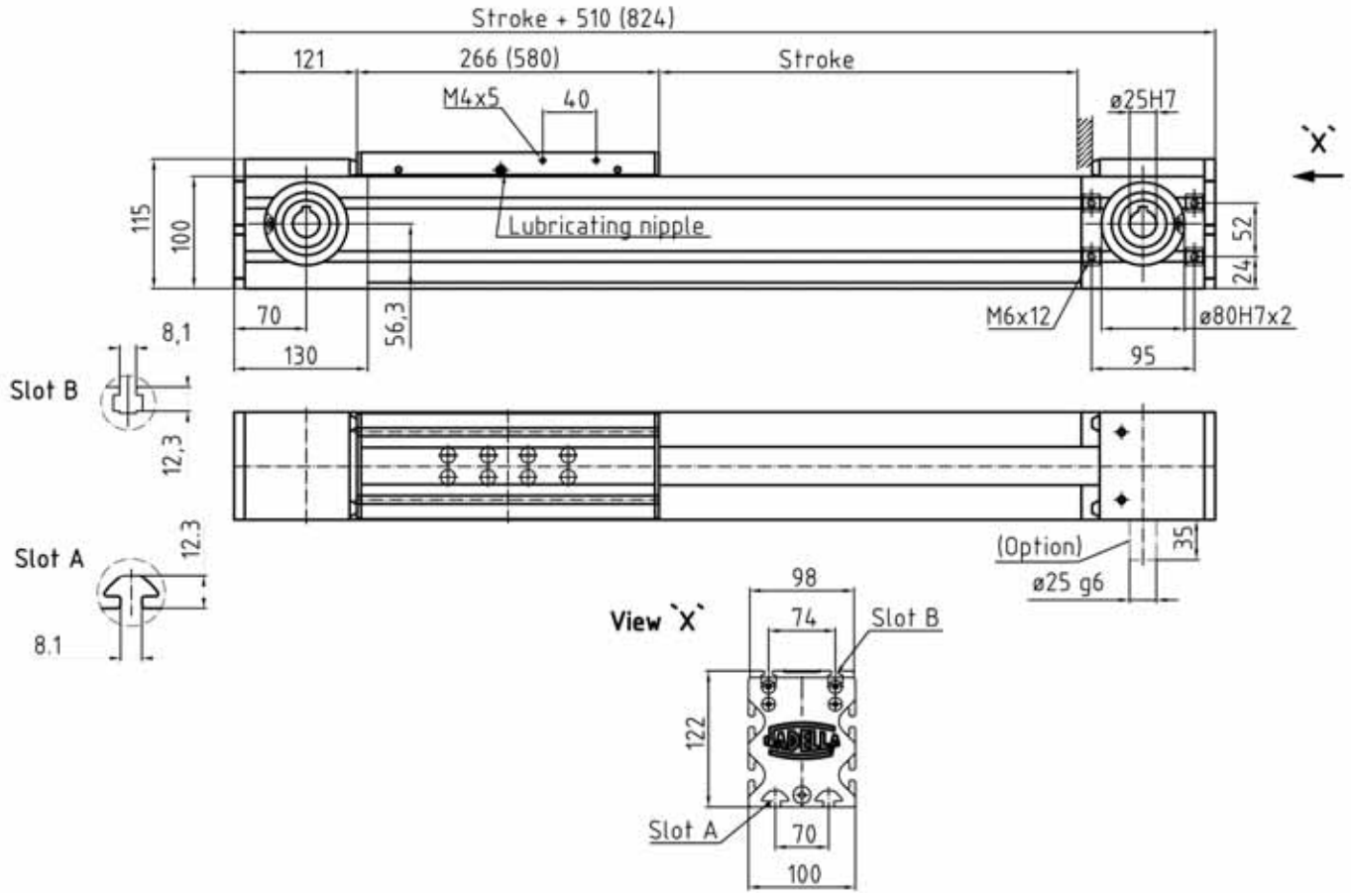
	Roller guide LR 42.10
Basic mass	8.5 kg
Mass per 100 mm stroke	0.9 kg
Slide mass	2.3 (4.6) kg

BASIC-LINE AXN
AXN 100-Z

Actuator with toothed belt and roller or rail guide.

Rust-resistant version available.

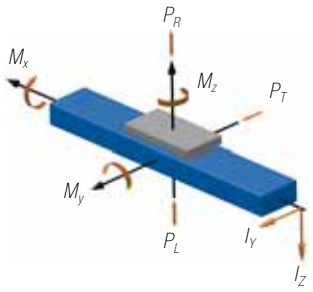
NX



Stroke calculation: using distance and safty overrun
Values in brackets for long carriage
Motor connection see chapter Drive adaption

LOADS AND LOAD MOMENTS*

	Roller guide LR 52.16		Rail guide B 25	
Loads (N)	dyn.	stat.	dyn.	stat.
P_R	2150 (3500)	3200 (7500)	6000 (8000)	20000 (30000)
P_L	2150 (3500)	3200 (7500)	6000 (8000)	20000 (30000)
P_T	4500 (7800)	7000 (13000)	6000 (8000)	20000 (30000)
Load moments (Nm)				
M_x	75 (125)	110 (340)	75 (90)	225 (800)
M_y	125 (425)	170 (850)	500 (600)	1650 (2300)
M_z	330 (430)	400 (1900)	500 (600)	1650 (2300)



** The dynamic load of the guide system is based on a nominal liftetime of 54000 km*
Values in brackets for execution with long carriage (580 mm)

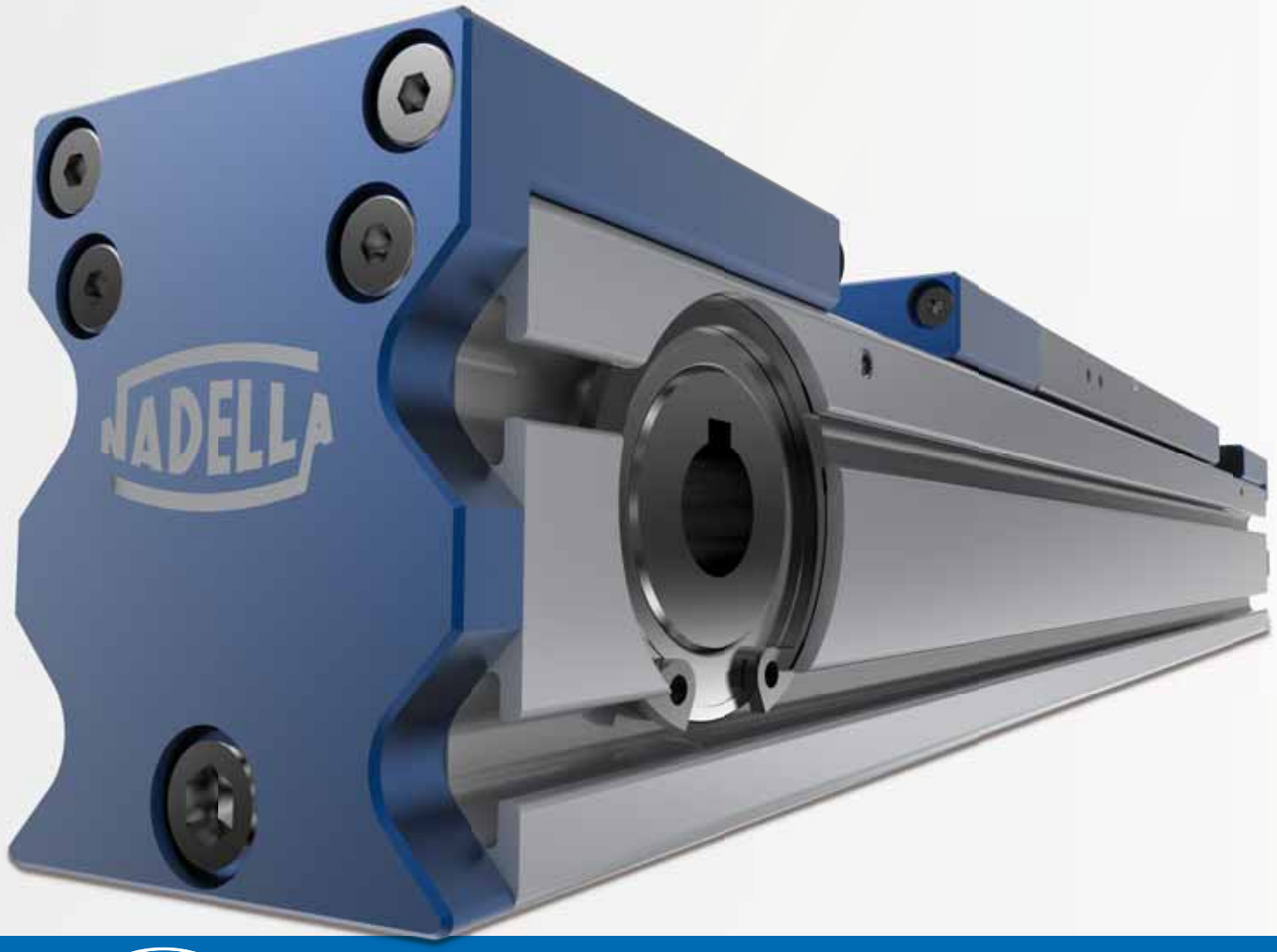
TECHNICAL DATA

Max. speed	max. 10 m/s (LR 52.16)
Repeating accuracy	± 0.05 mm/m
Actuation	Toothed belt 50 AT10
Max. dynamic working load	2500 N
Feed rate per rotation	230 mm
Idle-running torque	3 Nm
Moment of inertia	14 kgcm²
Max. length overall	6 m (8m)[1)]
Geometrical moment of inertia I_y	343 cm⁴
Geometrical moment of inertia I_z	465 cm⁴

[1)] Major length upon request, 8 m in one piece dependent on availability

MASS

	Roller guide LR 52.16	Rail guide B 25
Basic mass	16 kg	15.4 kg
Mass per 100 mm stroke	1.4 kg	1.4 kg
Slide mass	4.4 kg (6.4 kg)	3.8 kg (5.8 kg)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BASIC-LINE
AXNP-Z

4

PAGE 28 – 29

4.1 PRODUCT DESCRIPTION
Setting, performances, characteristics, applications and combination examples

PAGE 30 – 31

4.2 AXNP 45-Z
Linear module with toothed drive belt with or without cover band
- Roller guide or recirculating ball guide
- Single, double or long carriage

PAGE 32 – 33

4.3 AXNP 65-Z
Linear module with toothed drive belt with or without cover band
- Roller guide or recirculating ball guide
- Single, double or long carriage

PAGE 34 – 35

4.4 AXNP 80-Z
Linear module with toothed drive belt with or without cover band
- Roller guide or recirculating ball guide
- Single, double or long carriage

BASIC-LINE AXNP-Z
PRODUCT DESCRIPTION

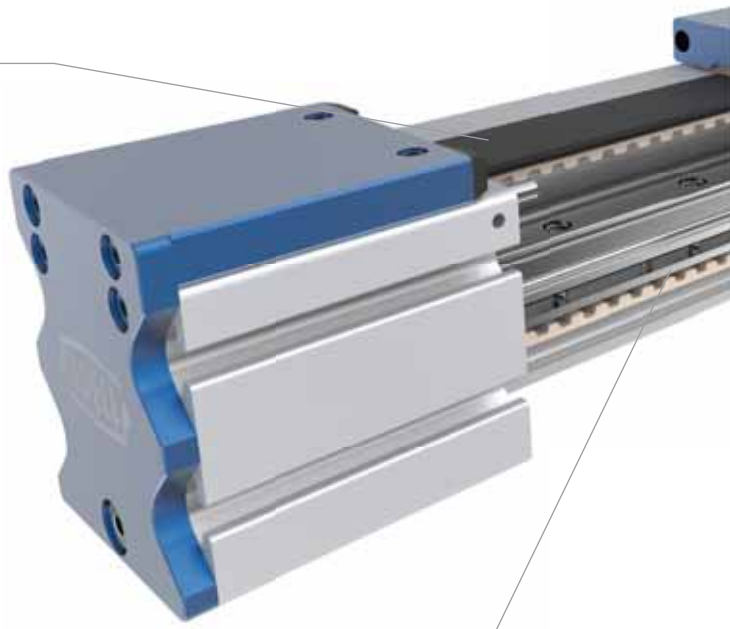
The new range of AXNP modules is a further development of our successful AXN modules with toothed drive belt. These units have been developed especially for quick handling and positioning functions. If individual or multi system – depending on customers' requirements various combinations are possible, even a combination with the AXN module range is possible.

UNIVERSAL MOTOR CONNECTION

Economic and space-saving solution by direct gearbox connection. Drive end of the gear is equipped with hollow-shaft connection. Alternatively, almost all common flange motors can be connected with the corresponding motor by metal bellow or elastomer claw couplings with the corresponding motor adapters.

DIRT PROTECTION

The actuator profile of the basic line modules AXNP contains a cover band which covers the profile completely on the upper side. Therefore, dirt particles can not enter into the actuator. In additon, wiper brushes integrated in the head covers prevent effectively larger dirt particles from penetrating into the profile. Of course all actuators can also be delivered without cover band.



ROLLER GUIDE

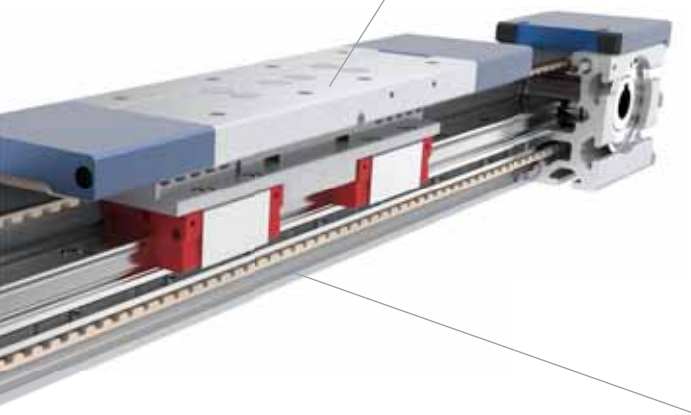
The characteristic features of the roller guide are cost-saving, nearly maintenance free and concomitant with high-performance. Resistance to soiling and smooth running is achieved by rollers of large dimensions. The use of two eccentric bearings guarantees that the guides can optimal be pre-loaded and mounted completeley free of clearance. The dynamic working load is based on a nominal lifetime of 54.000 km.

RAIL GUIDE

As an alternative, these actuators can also be equipped with recirculating ball guides or guides in caged-ball technology. The advantages of these rail guides are long lifetime, low noise, high accuracy and high loads. For a statically cycling of the guide systems the dynamic loads are relevant.

ASSEMBLY AND FIXATION OF THE ACTUATOR

By end-to-end slots at the bottom and on either side of the acutator profile a universal installation of the module is possible. Slot nuts that can be swivelled in, fastening strips and connecting plates increase the mounting flexibility. Attachments can simply be screwed through threads in the table plate. Alternatively Basic-Line can be equipped with additional table carriages (fixed distance) or with a long carriage. Depending on the applied load, the high stiffness of the profiles allows for a partly self-supporting use.



TOOTHED DRIVE BELT

AT-type belt, reinforced with steel cords, allows transfer of large drag forces and guarantees a long liftime. The belt tension is located in the crosshead.

LIFETIME LUBRICATION

The bearings of the rollers and bearings of the pulleys are lubricated for life. At any movement the steel shafts or the roller guides are coated by a thin lubricant film, coming from an integrated system. For short-stroke use, strokes ≤ ½ length of carriage, please contact our Technical support. In case of high travel mileage and / or acceleration values it is possible to refill this system through lubricating nipples in the table plate. Recommended lubricant: Klüber Lamora D220 (guide rollers), Klüber Microlube GL261 (guide rails).

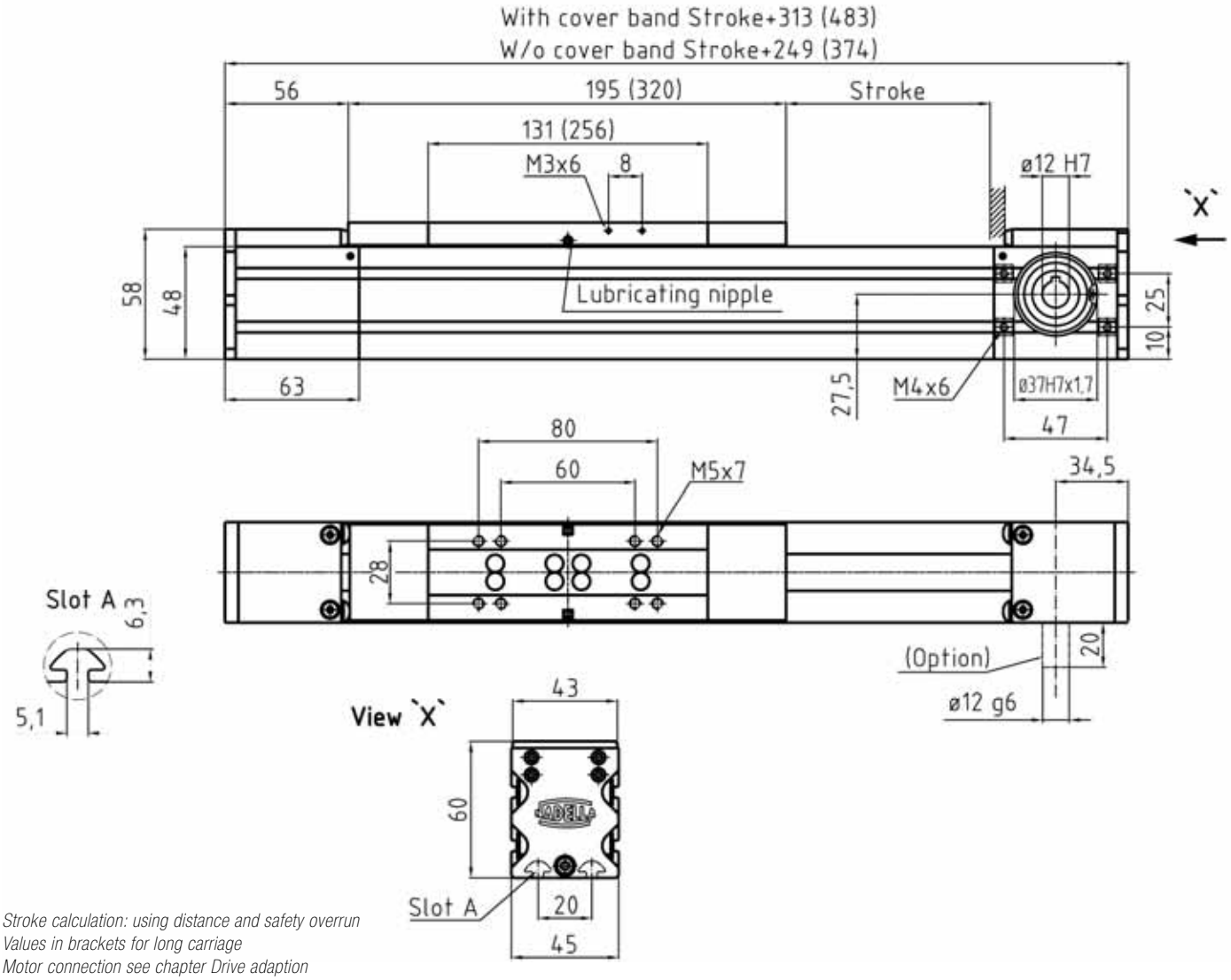
BASIC-LINE AXNP-Z

AXNP 45-Z

Actuator with toothed belt and roller or rail guide.

Rust-resistant version available.

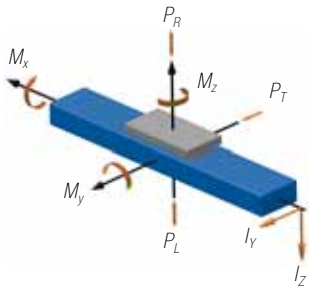
NX



Stroke calculation: using distance and safety overrun
Values in brackets for long carriage
Motor connection see chapter Drive adaption

LOADS AND LOAD MOMENTS*

	Roller guide LR 24.06		Rail guide B 9	
Loads (N)	dyn.	stat.	dyn.	stat.
P_R	570 (950)	1040 (2000)	660	910
P_L	570 (950)	1040 (2000)	660	910
P_T	1030 (1710)	1810 (3500)	660	910
Load moments (Nm)				
M_x	8 (14)	15 (30)	4.5	6
M_y	16 (45)	27 (90)	18	25
M_z	30 (80)	54 (170)	18	25



** The dynamic load of the guide system is based on a nominal liftetime of 54000 km*
Values in brackets for execution with long carriage. Long carriage with rail guide upon request

TECHNICAL DATA

Max. speed	max. 6 m/s (LR 24.06)
Repeating accuracy	± 0.05 mm/m
Actuation	Toothed belt 16 AT5
Max. dynamic working load	325 N
Feed rate per rotation	100 mm
Idle-running torque	0.2 – 0.3 Nm
Moment of inertia	0.383 kgcm²
Max. length overall	6 m
Geometrical moment of inertia I_Y	21.7 cm⁴
Geometrical moment of inertia I_Z	22.5 cm⁴

MASS

	Roller guide LR 24.06	Rail guide B 9
Basic mass	1.8 kg	1.8 kg
Mass per 100 mm stroke	0.3 kg	0.35 kg
Slide mass with cover band	0.55 kg (1.05 kg)	0.55 kg
Slide mass w/o cover band	0.5 kg (1.00 kg)	0.5 kg

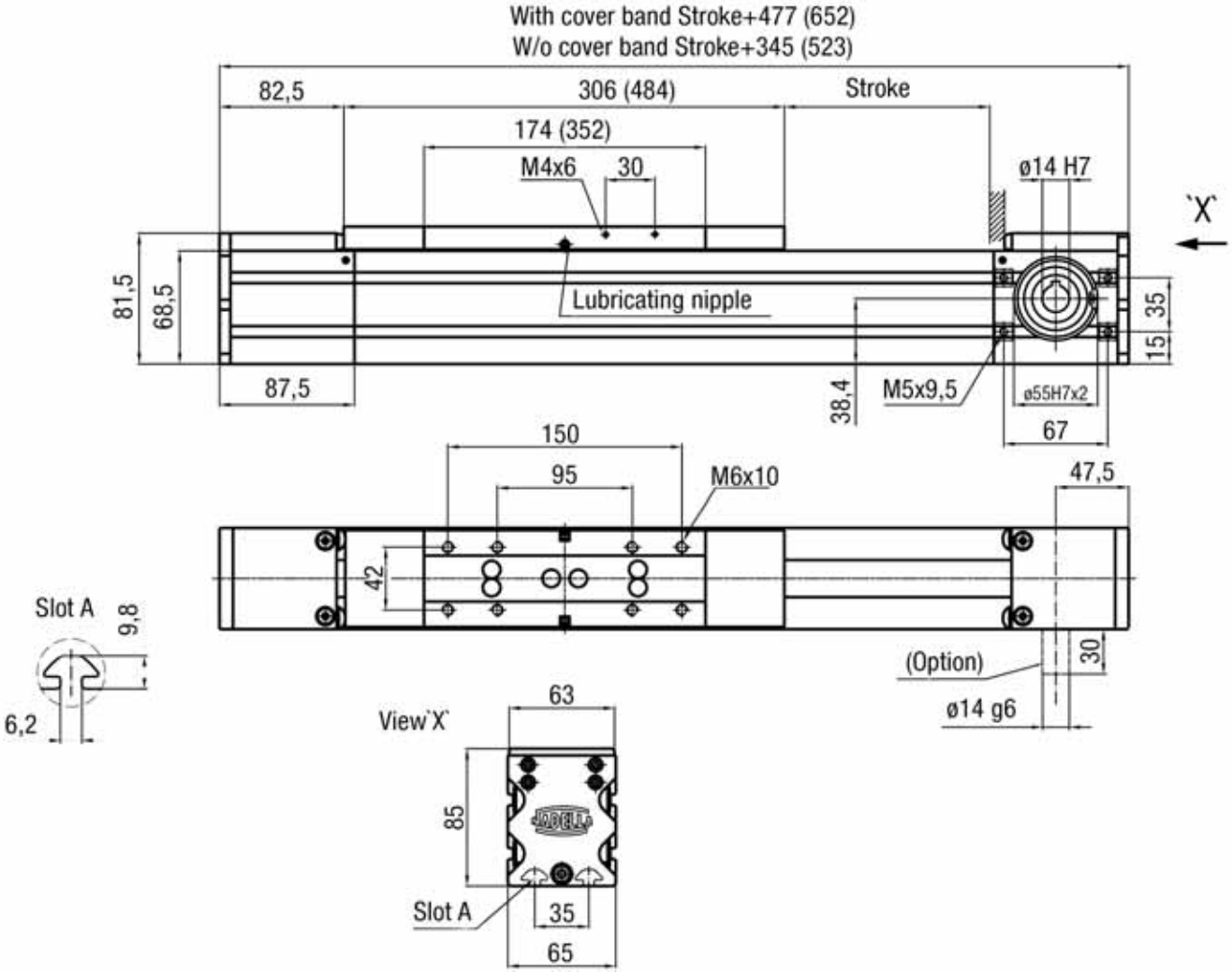
BASIC-LINE AXNP-Z

AXNP 65-Z

Actuator with toothed belt and roller or rail guide.

Rust-resistant version available.

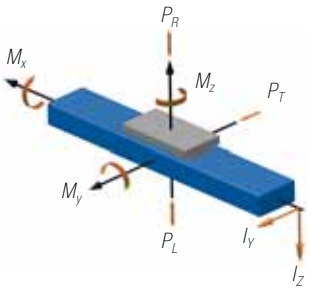
NX



Stroke calculation: using distance and safety overrun
Values in brackets for long carriage
Motor connection see chapter Drive adaption

LOADS AND LOAD MOMENTS*

	Roller guide LR 35.10		Rail guide B 15	
Loads (N)	dyn.	stat.	dyn.	stat.
P_R	995 (1700)	2400 (4500)	2750	9650
P_L	995 (1700)	2400 (4500)	2750	9650
P_T	1940 (3500)	3200 (6500)	2750	9650
Load moments (Nm)				
M_x	20 (40)	40 (80)	19	69
M_y	30 (112)	75 (250)	95	345
M_z	70 (220)	120 (400)	95	345



** The dynamic load of the guide system is based on a nominal liftetime of 54000 km*
Values in brackets for execution with long carriage. Long carriage with rail guide upon request

TECHNICAL DATA

Max. speed	max. 10 m/s (LR 35.10)
Repeating accuracy	± 0.05 mm/m
Actuation	Toothed belt 32 AT5
Max. dynamic working load	650 N
Feed rate per rotation	150 mm
Idle-running torque	0.8 – 1.0 Nm
Moment of inertia	2.994 kgcm²
Max. length overall	6 m (one-piece)[1)]
Geometrical moment of inertia I_Y	80.2 cm⁴
Geometrical moment of inertia I_Z	89.2 cm⁴

[1)] Major length upon request

MASS

	Roller guide LR 35.10	Rail guide B 15
Basic mass	4.8 kg	4.8 kg
Mass per 100 mm stroke	0.6 kg	0.7 kg
Slide mass with cover band	1.6 kg (3.2 kg)	1.7 kg
Slide mass w/o cover band	1.4 kg (3.00 kg)	1.5 kg

Values in brackets for execution with long carriage

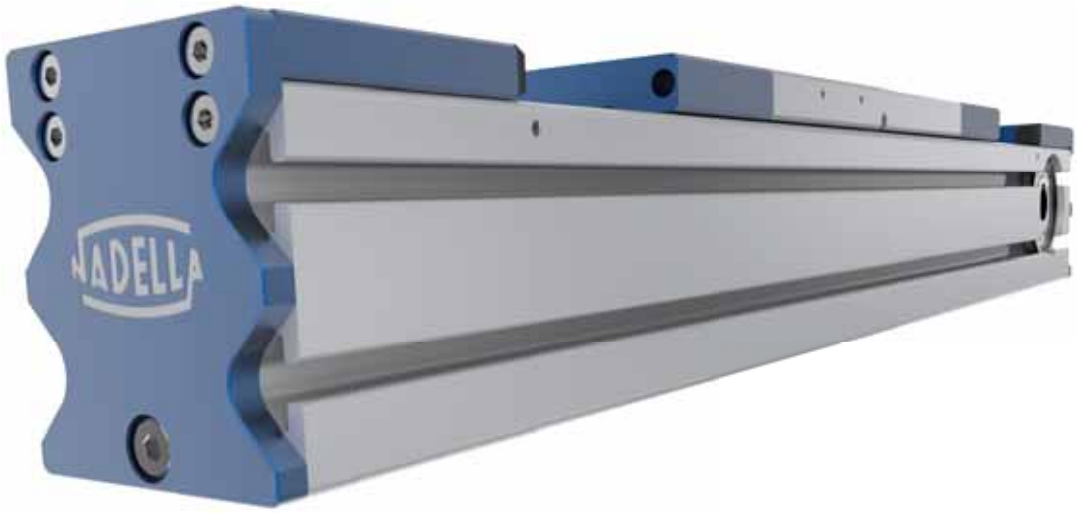
BASIC-LINE AXNP-Z

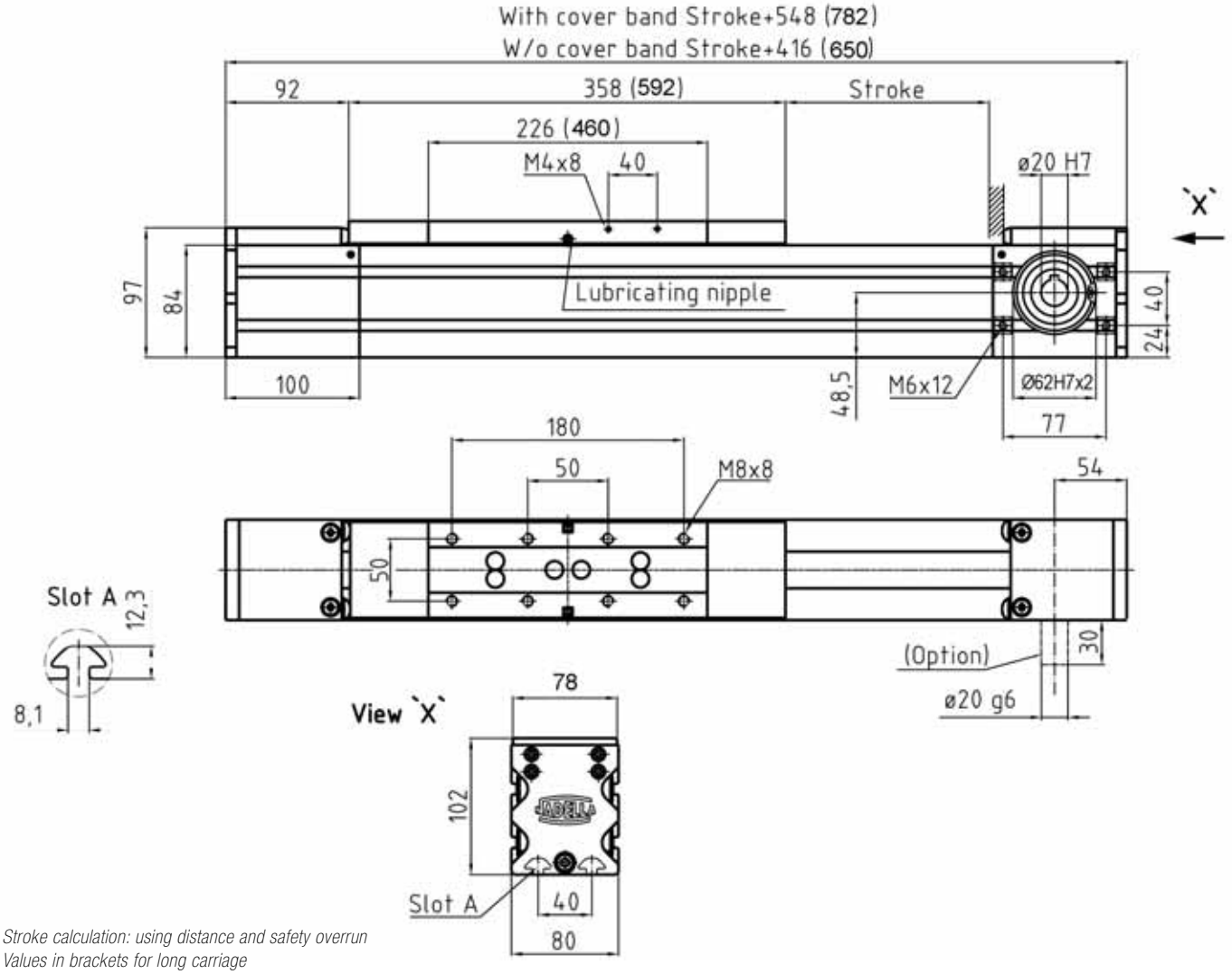
AXNP 80-Z

Actuator with toothed belt and roller or rail guide.

Rust-resistant version available.

NX

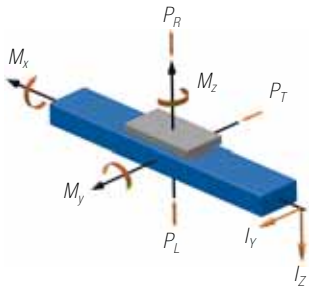




Stroke calculation: using distance and safety overrun
Values in brackets for long carriage
Motor connection see chapter Drive adaption

LOADS AND LOAD MOMENTS*

	Roller guide LR 42.10		Rail guide B 20	
Loads (N)	dyn.	stat.	dyn.	stat.
P_R	1735 (2950)	3000 (5100)	4300	15000
P_L	1735 (2950)	3000 (5100)	4300	15000
P_T	2950 (5000)	5250 (8900)	4300	15000
Load moments (Nm)				
M_x	36 (60)	62 (100)	43	150
M_y	83 (245)	143 (425)	205	730
M_z	146 (365)	260 (635)	205	730



** The dynamic load of the guide system is based on a nominal liftetime of 54000 km*
Values in brackets for execution with long carriage. Long carriage with rail guide upon request

TECHNICAL DATA

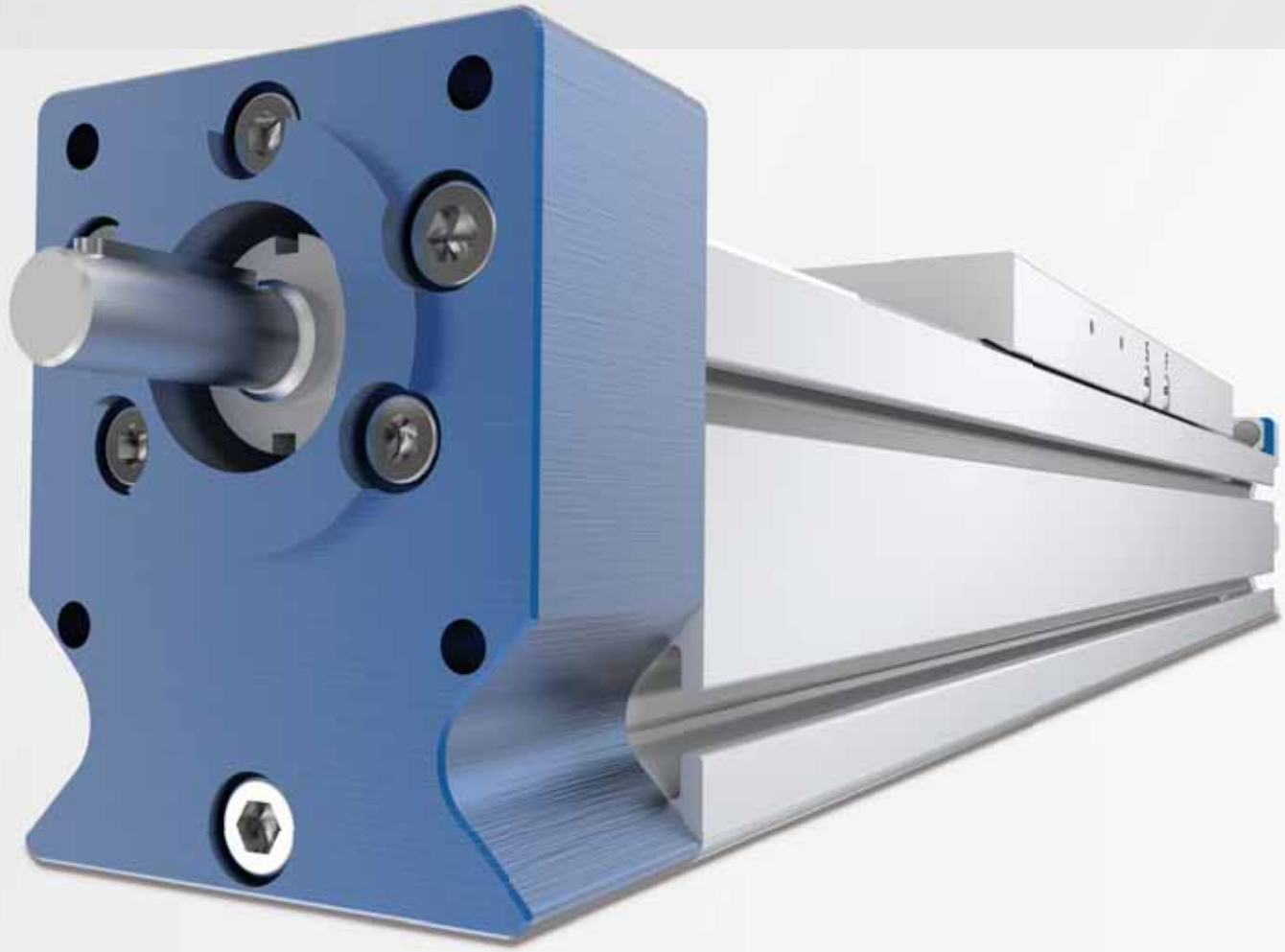
Max. speed	max. 10 m/s (LR 42.10)
Repeating accuracy	± 0.05 mm/m
Actuation	Toothed belt 32 AT10
Max. dynamic working load	1450 N
Feed rate per rotation	180 mm
Idle-running torque	1.0 – 1.2 Nm
Moment of inertia	5.237 kgcm²
Max. length overall	6 m (one-piece)[1)]
Geometrical moment of inertia I_Y	198.5 cm⁴
Geometrical moment of inertia I_Z	207.4 cm⁴

[1)] Major length upon request, 8 m in one piece dependent on availability

MASS

	Roller guide LR 42.10	Rail guide B 20
Basic mass	8.5 kg	8.5 kg
Mass per 100 mm stroke	1.00 kg	1.1 kg
Slide mass with cover band	3.2 kg (6.4 kg)	3.1 kg
Slide mass w/o cover band	2.7 kg (3.1 kg)	2.7 kg

Values in brackets for execution with long carriage



BASIC-LINE
AXNP-S

5

PAGE 38 – 39

5.1 PRODUCT DESCRIPTION
Setting, performances, characteristics, applications and combination examples

PAGE 40 – 41

5.2 AXNP 45-S
Linear module with spindle drive
- Rail guide
- Single or double carriage

PAGE 42 – 43

5.3 AXNP 65-S
Linear module with spindle drive
- Rail guide
- Single or double carriage

PAGE 44 – 45

5.4 AXNP 80-S
Linear module with spindle drive
- Rail guide
- Single or double carriage

BASIC-LINE AXNP-S
PRODUCT DESCRIPTION

The model range AXNP-S is a further development of our approved AXN / AXNP-Z series with toothed belt drive. The modules have been developed especially for handling and positioning, primarily for precise positioning and vertical applications. If individual module or multiple axis system - various combinations are possible.

DIRT PROTECTION

On the upper side the actuator is completely covered by a cover band which is clipped in the profile so that it prevents dirt particles from penetrating into the module. Wiper brushes integrated in the table plate as well as an overlapping of the table plate over the main profile minimize the gap additionally.

MOTOR CONNECTION

A motor can be mounted through a flange / coupling combination which is availabe for many motor types. If technically possible also special motors can be connected.

RAIL GUIDE

The AXNP-S series is equipped with high-quality ball rail systems. The advantages of these rail guides are long service life, low noise level, high guidance accuracy and high load values. For statically cycling of the guide systems the dynamic load rating is decisive for the dimensioning of the guide systems.

FIXATION OF THE ACTUATOR AND ATTACHEMENTS

By end-to-end slots at the bottom and on either side of the acutator profile a universal installation of the module is possible. Slot nuts that can be swivelled in, fastening strips and connecting plates increase the mounting flexibility. Attachments can simply be screwed through threads in the table plate. Alternatively the Basic-Line can be extended by an additional, non-driven carriage.

SCREW DRIVE

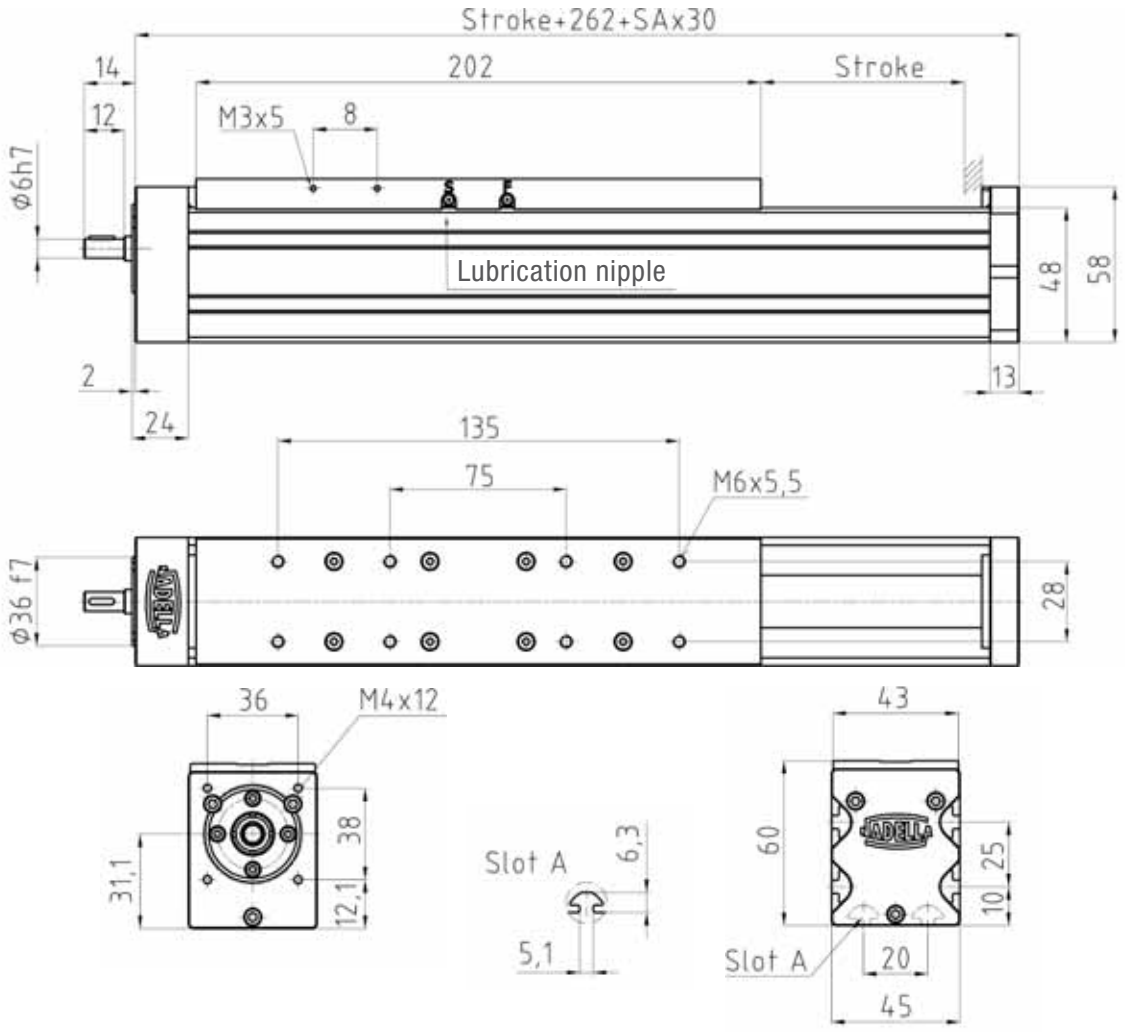
We use standard highly precise whirled ball screw drives. Due to the hard whirling technology a better surface quality can be reached compared to ground spindles. The spindles we use are in the accuracy range of 23 µm / 300 mm (IT5). To support the ball screw drive in case of larger strokes optionally spindle supports are available which prevent oscillations and thus allow higher speeds.

LUBRICATION

The bearings of the linear actuators are lubricated for life. The ball rail system and the ball screw drive can be re-lubricated through separate lubricating nipples at the carriage that are accessible from the outside. Especially in case of a high running performance and / or high acceleration values this is an advantage. For short-stroke use, strokes ≤ ½ length of carriage, please contact our Technical support. We recommend the lubricant Klüber Microlube GL261.

BASIC-LINE AXNP-S
AXNP 45-S

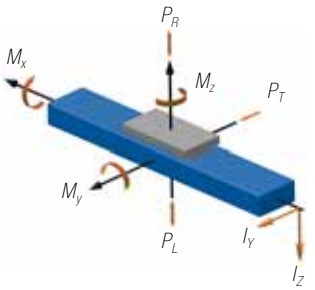
Linear actuator with ball screw drive and rail guide.



Stroke calculation: effective stroke + safety overrun
SA = number of spindle support sets
For motor connection see chapter drive adaption
Lubrication: S = ball screw; F = rail guide

LOADS AND LOAD MOMENTS*

	Rail guide B 9	
Loads (N)	dyn.	stat.
P_R	660	910
P_L	660	910
P_T	660	910
Load moments (Nm)		
M_x	5	6
M_y	20	25
M_z	20	25



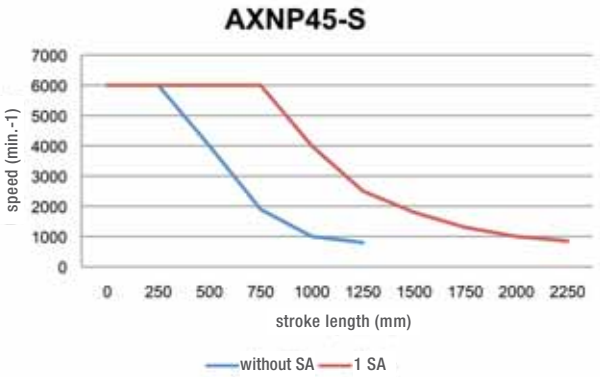
** The dynamic load of the guide system is based on a nominal lifetime of 54000 km*

TECHNICAL DATA

Max. speed	1 m/s
Repeating accuracy	± 0.03 mm
Actuation	Ball screw Ø 12 mm
Max. dynamic working load	3600 N
Pitch	5 / 10 mm
Idle-running torque	0.4 Nm
Moment of inertia	0.11 kgcm²/m
Max. length overall	2 m
Geometrical moment of inertia I_Y	20.3 cm⁴
Geometrical moment of inertia I_Z	21.7 cm⁴

MASS

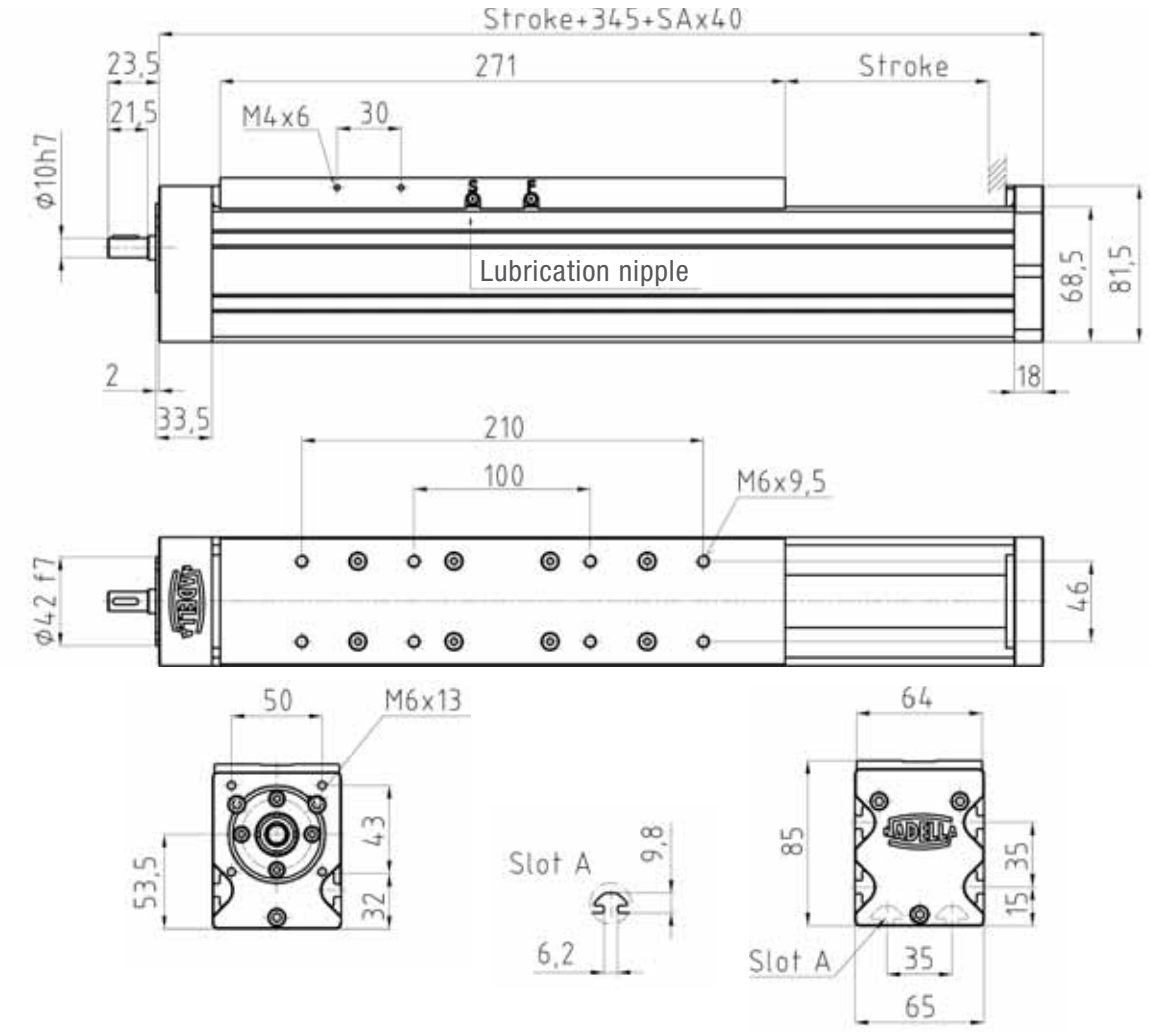
	Rail guide B 9
Basic mass	1.6 kg
Mass per 100 mm stroke	0.4 kg
Slide mass	0.45 kg



SA = 1 set of spindle support

BASIC-LINE AXNP-S
AXNP 65-S

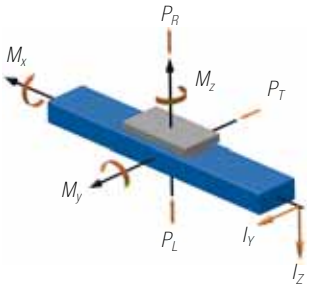
Linear actuator with ball screw drive and rail guide.



Stroke calculation: effective stroke + safety overrun
SA = number of spindle support sets
For motor connection see chapter drive adaption
Lubrication: S = ball screw; F = rail guide

LOADS AND LOAD MOMENTS*

	Rail guide B 15	
Loads (N)	dyn.	stat.
P_R	1400	3900
P_L	1400	3900
P_T	1400	3900
Load moments (Nm)		
M_x	10	30
M_y	65	185
M_z	65	185



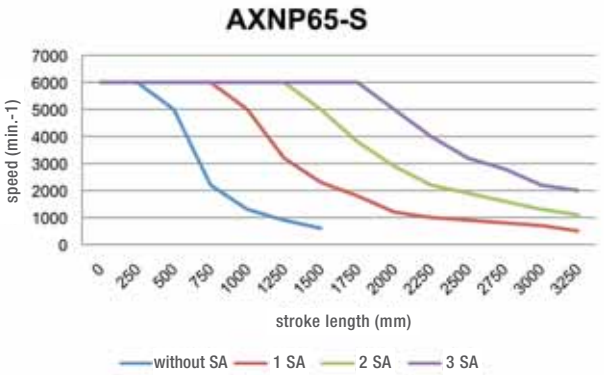
** The dynamic load of the guide system is based on a nominal lifetime of 54000 km*

TECHNICAL DATA

Max. speed	1.6 m/s
Repeating accuracy	± 0.03 mm
Actuation	Ball screw Ø 16 mm
Max. dynamic working load	6500 – 12000 N
Pitch	5 / 10 / 16 mm
Idle-running torque	0.5 Nm
Moment of inertia	0.33 kgcm²/m
Max. length overall	3 m
Geometrical moment of inertia I_Y	76.3 cm⁴
Geometrical moment of inertia I_Z	87.3 cm⁴

MASS

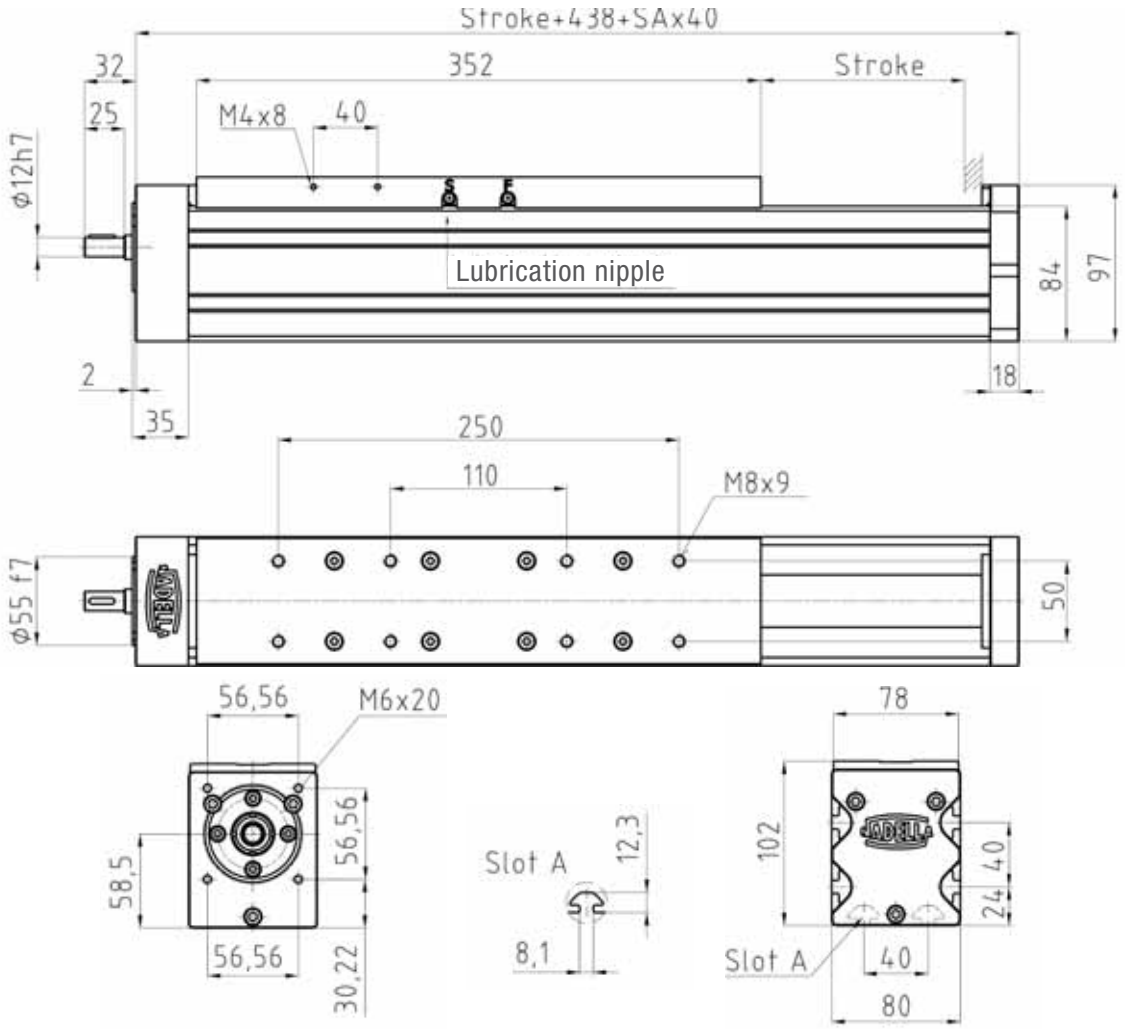
	Rail guide B 15
Basic mass	4.6 kg
Mass per 100 mm stroke	0.8 kg
Slide mass	1.4 kg



SA = 1 set of spindle support

BASIC-LINE AXNP-S
AXNP 80-S

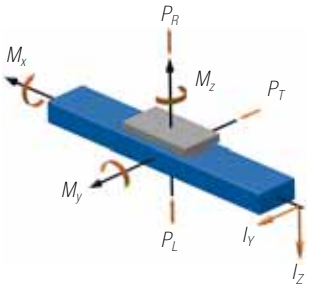
Linear actuator with ball screw drive and rail guide.



Stroke calculation: effective stroke + safety overrun
SA = number of spindle support sets
For motor connection see chapter drive adaption
Lubrication: S = ball screw; F = rail guide

LOADS AND LOAD MOMENTS*

	Rail guide B 20	
Loads (N)	dyn.	stat.
P_R	5400	15000
P_L	5400	15000
P_T	5400	15000
Load moments (Nm)		
M_x	54	150
M_y	420	1150
M_z	420	1150



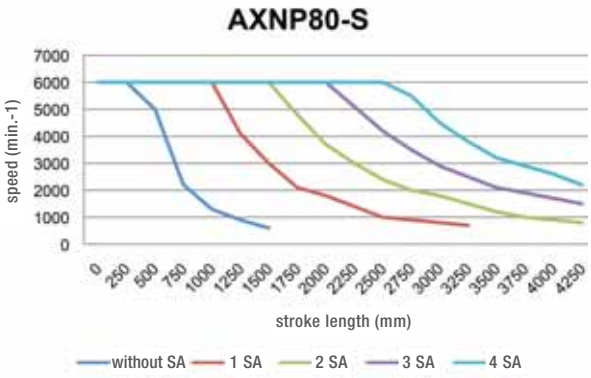
** The dynamic load of the guide system is based on a nominal lifetime of 54000 km*

TECHNICAL DATA

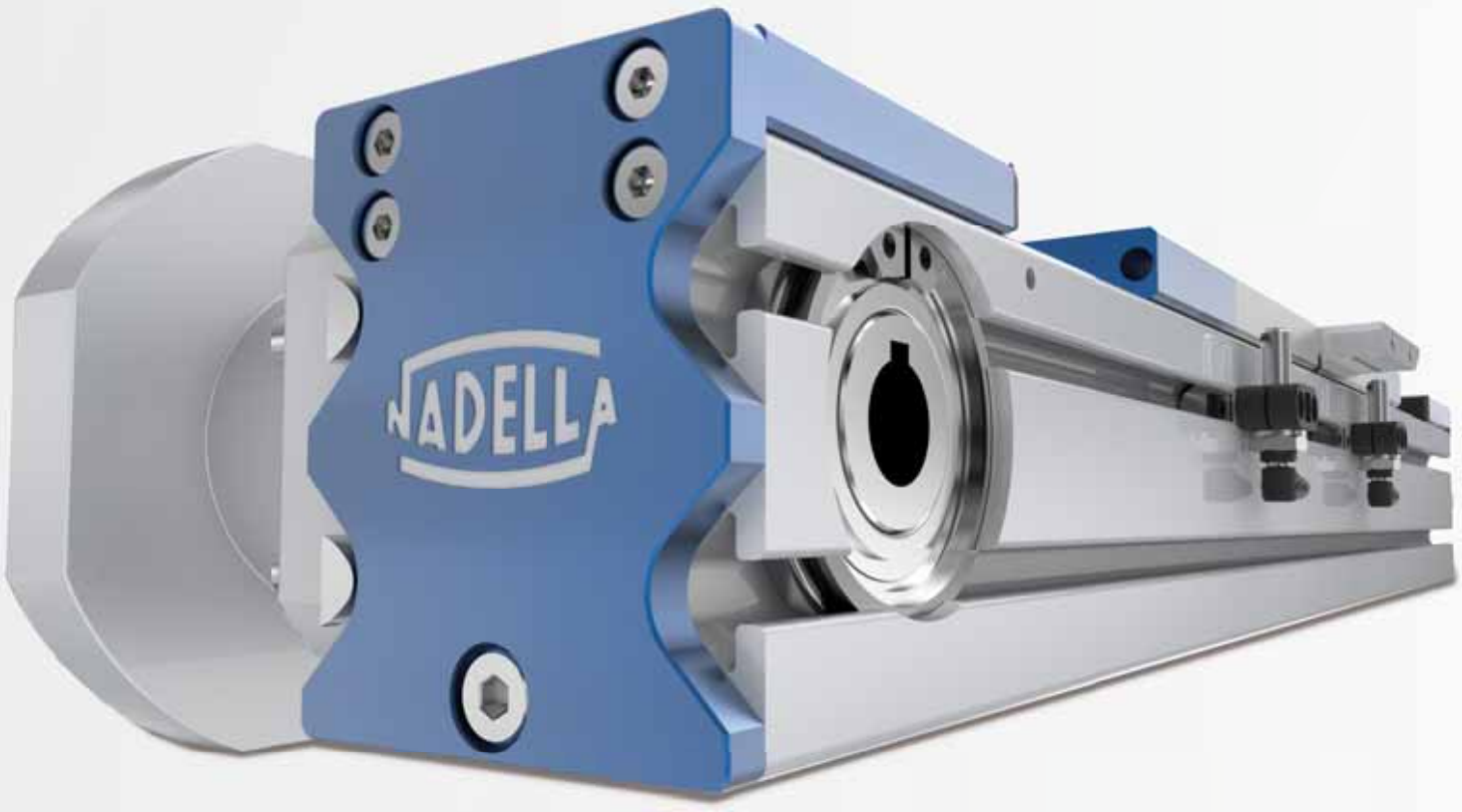
Max. speed	2 m/s
Repeating accuracy	± 0.03 mm
Actuation	Ball screw Ø 20 mm
Max. dynamic working load	8000 – 17500 N
Pitch	5 / 20 mm
Idle-running torque	0.6 Nm
Moment of inertia	0.82 kgcm²/m
Max. length overall	4 m
Geometrical moment of inertia I_Y	193.5 cm⁴
Geometrical moment of inertia I_Z	207.1 cm⁴

MASS

	Rail guide B 20
Basic mass	8.6 kg
Mass per 100 mm stroke	1.2 kg
Slide mass	2.7 kg



SA = 1 set of spindle support


NADELLA

DRIVE ADAPTION / REFERENCE SWITCH

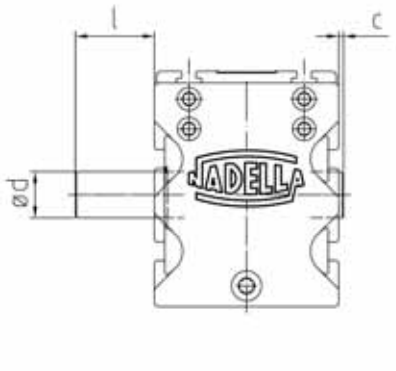
6

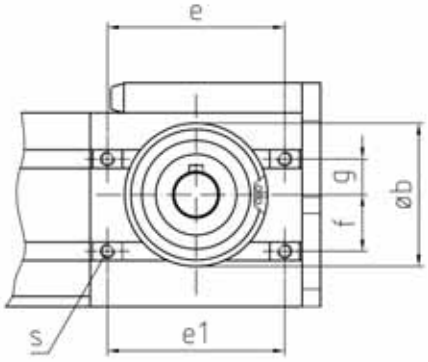
PAGE 48	6.1 FREE SHAFT EXTENSION
PAGE 49	6.2 DIRECT GEARBOX CONNECTION
PAGE 50 – 51	6.3 GEAR / MOTOR ADAPTION WITH COUPLING
PAGE 52 – 53	6.4 DRIVE CONNECTING SHAFT VBW AND DRIVE CONNECTION VBR WITH PARTIALLY INTEGRATED COUPLING KL RESP. KR AT THE AXIS (DIRECT CONNECTION FOR GEARBOX)
PAGE 54 – 55	6.5 INDUCTIVE END / REFERENCE SWITCH • Inductive switches

DRIVE ADAPTION
FREE SHAFT EXTENSION

6.1

Optional drive shafts on one or both sides for drive connection e.g. with gearbox.





Type	a	b H7	c[1)]	d H6	d_2	e1[2)] min.	e	f	g	l	s
AXN(P) 45-Z	28.5	37 x 1.7	0	12	0	37	47	17.5	7.5	20	M4 x 6
AXN(P) 65-Z	40	55 x 1.5	0	14	0	56	67	23.4	11.6	30	M5 x 9.5
AXN(P) 80-Z	46	62 x 3	0	20	0	68	77	24.5	15.5	30	M6 x 12
AXN 100-Z	60	80 x 2	0	25	0	95	80	32.3	19.7	35	M6 x 12

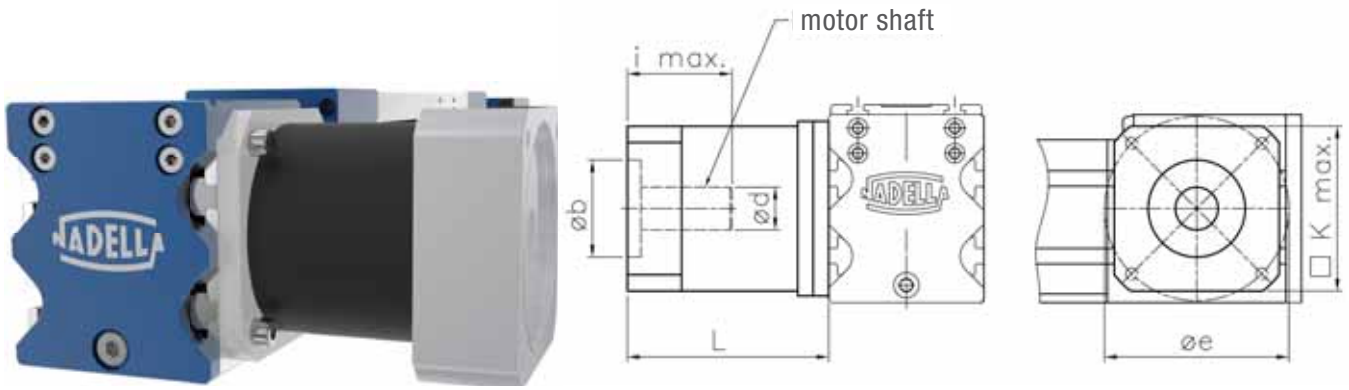
[1)] „0" = Shaft snag on the opposite side is almost flush with outer edge of profile
[2)] Only lower profile nut with type AXN(P)

Example Order Code
WL = shaft left
WR = shaft right
AXNP45-Z **WL***12-LR24-500-749-00*

DIRECT GEARBOX CONNECTION

6.2

Space-saving drive connection with adapter plate and standard gear. Advantages are improvement of space and cost reduction due to removal of clutch and clutch bell. The drive is connected with the actuator via adapter plate. Power transmission to be effected by fitted key.



GEAR DATA

Actuator type	AXN(P) 45-Z	AXN(P) 65-Z	AXN(P) 80-Z	AXN 100-Z
Gear type	PLE 40	PLE 60	PLE 80	PLE 120
Gear ratio[1)]	3, 4, 5, 8			
Max. output torque T (Nm)	5	15	40[4)]	90[4)]
Max. medium rotary speed at 50 % T (min^{-1})	5000	4500	4000	3350
Circumferential backlash (arcmin)[2)]	< 15	< 12	< 8	< 8
Moment of inertia ($kgcm^2$)[3)]	0.031 – 0.017	0.135 – 0.065	0.77 – 0.39	2.63 – 1.32
Weight (kg)	0.35	0.9	2.1	6

[1)] Other gear ratio upon request
[2)] Restricted circumferential backlash
[3)] Depending on gear ratio
[4)] reduced when using VBR

DIMENSIONS

Actuator type	Gear type	e[5)] (mm)	Motor type	b[5)] (mm)	max. weight of motor (kg)	d	i max. (mm)	K max.[6)] (mm)	L[7)] (mm)
AXN(P)45-Z	PLE 40	any	B5 / B14	any	2	4 / 5 / 6 / 6.35 / 8 / 9 / 11	25	40 x 40	74
AXN(P)65-Z	PLE 60	any	B5 / B14	any	3.5	6 / 6.35 / 8 / 9 / 9.525 / 10 / 11 / 12 / 14 / 16 / 19	23	60 x 60	77.5
AXN(P)80-Z	PLE 80	any	B5 / B14	any	9	9.525 / 10 / 11 / 12 12.7 / 14 / 16 / 19 / 22 / 24	30	90 x 90	106
AXN100-Z	PLE 120	any	B5 / B14	any	16.5	11 / 12.7 / 14 / 15.87 / 16 / 19 / 22 / 24 / 28 / 32 / 35	40	115 x 115	134.5

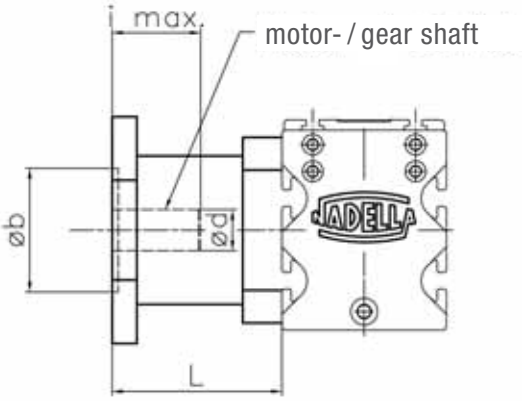
[5)] Within flange dimensions
[6)] Max. dimenison, next higher ones on request (e. g.: PLE 40 with flange dimensions 60 x 60 mm)
[7)] Length of motor flange included

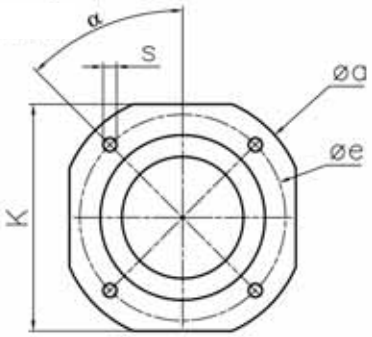
Example Order Code
i3 =, gear left
AXNP45-Z **PL3***-LR24-500-794-00*

DRIVE ADAPTION
GEAR / MOTOR ADAPTION WITH COUPLING

Gear / motor adaption through standardized mounting combinations with coupling, coupling bell and adapter flange.

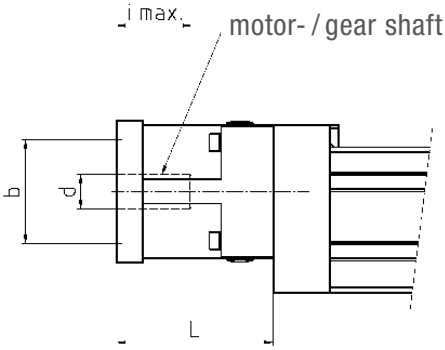
AXN(P)

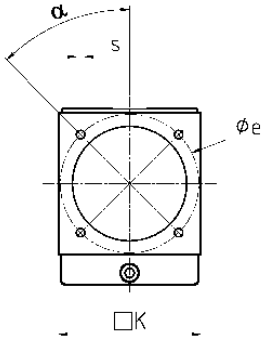




Example Order Code left side
AXNP45-Z **MKL***-LR24-500-794-00*

AXNP-S





Example Order Code
AXNP45-S **MK***-B-100-326-00*

AXN(P)

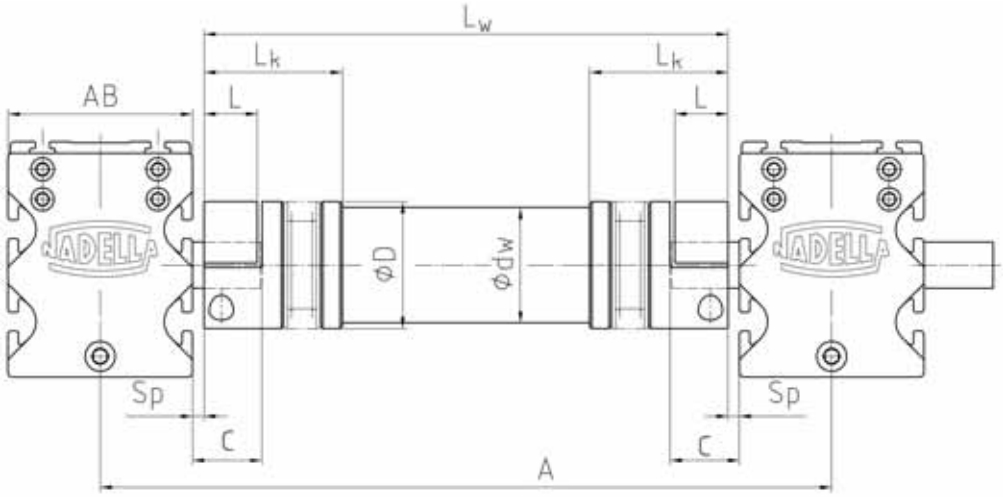
Actuator	Code	Design	e	α	s	b	d	i	K	a	L
			min. – max.			min. – max.		max.	max.		
AXN(P) 45-Z	I	B5	45 – 65	0°	4 x M5 x 15	36 – 55	6 – 16	35	75	100	57
	II	B5	45 – 90	45°	4 x M5 x 15	36 – 70	6 – 16	35	75	100	57
	III	B14	50 – 63	0°	4 x Ø 5.5	36 – 55	6 – 16	35	75	100	57
	IV	B14	50 – 86	45°	4 x Ø 5.5	36 – 72	6 – 16	35	75	100	57
AXN(P) 65-Z	I	B5	65 – 110	0°	4 x M5 x 18	52 – 100	8 – 28	40	90	120	72.5
	II	B5	65 – 110	45°	4 x M5 x 18	52 – 100	8 – 28	40	90	120	72.5
	III	B14	68 – 110	0°	4 x Ø 5.5	52 – 100	8 – 28	40	90	120	72.5
	IV	B14	68 – 110	45°	4 x Ø 5.5	52 – 100	8 – 28	40	90	120	72.5
AXN(P) 80-Z	I	B5	75 – 110	0°	4 x M6 x 12	60 – 95	12 – 32	45	120	130	77
	II	B5	75 – 120	45°	4 x M6 x 12	60 – 105	12 – 32	45	120	130	77
	III	B14	80 – 105	0°	4 x Ø 6.6	60 – 95	12 – 32	45	120	130	77
	IV	B14	80 – 115	45°	4 x Ø 6.6	60 – 105	12 – 32	45	120	130	77
AXN 100	I	B5	75 – 108	0°	4 x M6 x 16	60 – 96	12 – 32	45	120	150	98.5
	II	B5	75 – 138	45°	4 x M6 x 16	60 – 115	12 – 32	45	120	150	98.5
	III	B14	82 – 110	0°	4 x Ø 6.6	60 – 100	12 – 32	45	120	150	98.5
	IV	B14	82 – 140	45°	4 x Ø 6.6	60 – 115	12 – 32	45	120	150	98.5

AXNP-S

Actuator	Code	Design	e	α	S	b	d	i	K	L
			min. – max.			min. – max.	min. – max.	max.	max.	
AXNP 45-S	I	B5	44 – 53	0°	4 x M5 x 12	35 – 45	4 – 16	34	60	60
	II	B5	50 – 70	45°	4 x M5 x 12	35 – 58	4 – 16	34	60	60
	III	B14	54 – 70	45°	4 x Ø 5.5	35 – 58	4 – 16	34	60	60
AXNP 65-S	I	B5	55 – 95	0°	4 x M6 x 15	48 – 85	8 – 25	40	105	90
	II	B5	60 – 120	45°	4 x M6 x 15	48 – 100	8 – 25	40	105	90
	III	B14	66 – 95	0°	4 x Ø 6.6	48 – 85	8 – 25	40	105	90
	IV	B14	66 – 120	45°	4 x Ø 6.6	48 – 100	8 – 25	40	105	90
AXNP 80-S	I	B5	68 – 102	0°	4 x M8 x 20	60 – 92	12 – 32	40	115	100
	II	B5	75 – 125	45°	4 x M8 x 20	60 – 112	12 – 32	40	115	100
	III	B14	90 – 100	0°	4 x Ø 9	60 – 90	12 – 32	40	115	100
	IV	B14	80 – 125	45°	4 x Ø 9	60 – 112	12 – 32	40	115	100

DRIVE ADAPTION
DRIVE CONNECTING SHAFT VBW

The actuators can be mounted in parallel. Power transmission by special connecting shaft with integrated metal bellows coupling.

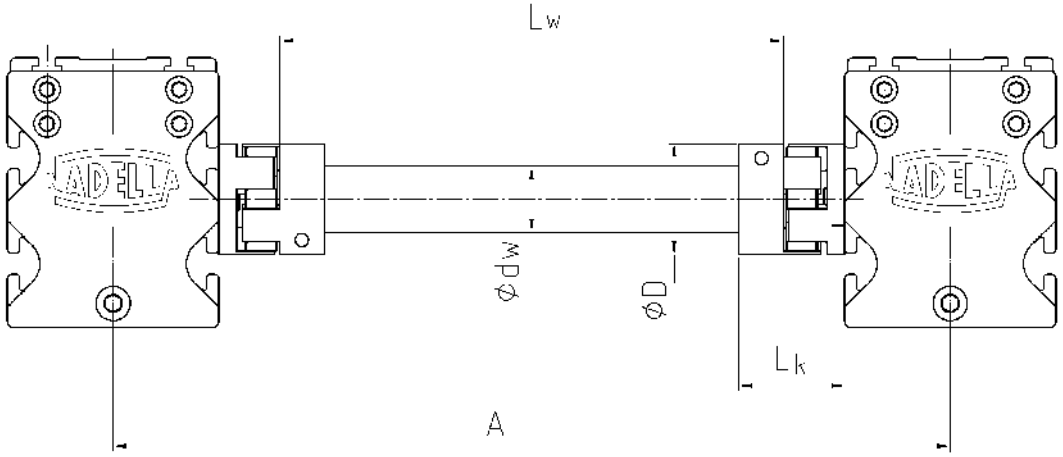


Description	T_{KN} (Nm)	A min.[1]	C	Sp.[1]	Sp min.[2]	L	L_W[3]	D	d_W	L_K	A_B
AXN(P) 45-VBW	10	162	20	8.5	1	10	A-62	40	35	39.5	45
AXN(P) 65-VBW	10 30	202 221	30 30	18.5 13	1.5 2	10 15	A-102 A-91	40 55	35 50	39.5 52	65 65
AXN(P) 80-VBW	30 60	236 258	30 30	13 9	2 2.5	15 19	A-106 A-98	55 66	50 60	52 64	80 80
AXN 100-VBW	60 75	288 283	35 35	14 4	2.5 2.5	19 31	A-128 A-108	66 57	60 50	64 63	100 100

[1] Can be removed without dismantling the actuator
[2] Dismantling of the shaft only when dismantling at least one actuator
*[3] Calculation L_W = A – (2*AB/2) – (2*Sp)*

Order Example for AXN(P) 65-Z:
A = 1000 mm; TkN = 30: **AXN(P) 65-VBW30-909**

DRIVE CONNECTION VBR WITH PARTIALLY INTEGRATED COUPLING KL RESP. KR AT THE AXIS (DIRECT CONNECTION FOR GEARBOX)



Description	T_{KN} (Nm)	A min.[1)]	L_W[1)]	d_W	D	Lk
AXN(P) 45-VBR	9	105	A – 67	12 x 2	25.2	19
AXN(P) 65-VBR	17	173	A – 107	22 x 2	42	38
AXN(P) 80-VBR	21	181	A – 114	25 x 3	42	34.5
AXN 100-VBR	75	219	A – 143	30 x 4	56	41.5

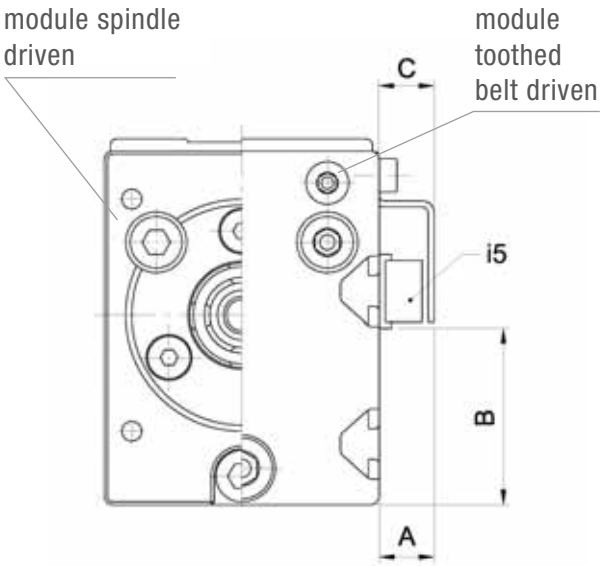
[1)] Can be removed without dismantling the actuator

Order Example for AXN(P) 65-Z:
A = 1000 mm; TkN = 17: **AXN(P) 65-VBR17-893**

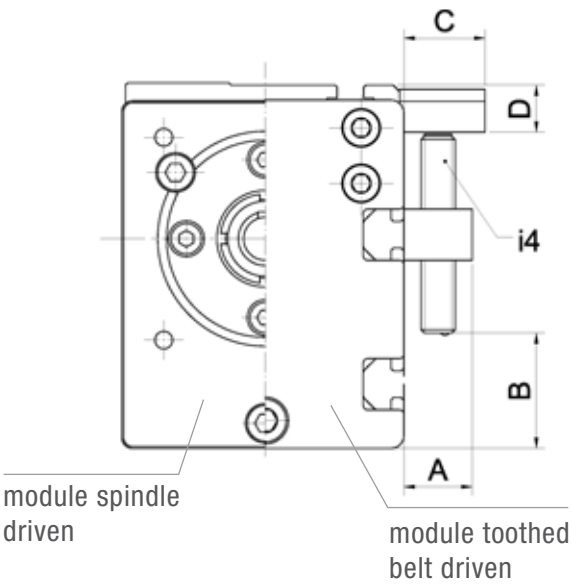
END / REFERENCE SWITCH
INDUCTIVE SWITCHES

As an alternative to mechanical switches inductive switches make it possible to monitor positions or to control the end position. They are supplied as set consisting of two switches, lug, fastening units or single initiator. Depending on the application you can order NCC or NOC, break or make contacts. The plug-in connecting lines of the inductive switches are very easy to maintain.

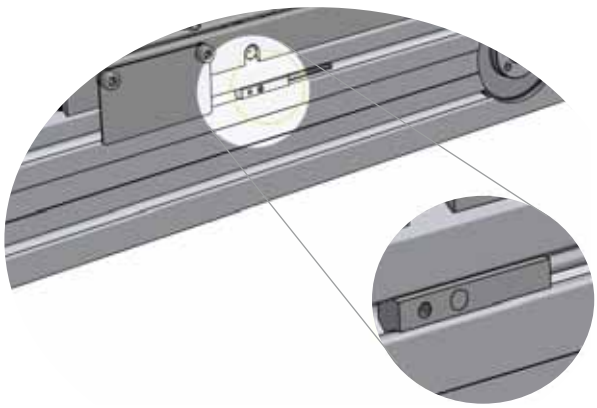
INDUCTIVE PROXIMITY SWITCH
AXN 45-Z / AXNP 45-Z / AXNP 45-S



INDUCTIVE PROXIMITY SWITCH
AXN 65 / 80 / 100-Z / AXNP 65 / 80-Z / AXNP 65-S



INDUCTIVE SWITCHES INTEGRATED IN SLOT NUT



These inductive switches are the most compact version of switches. These switches are flush with the surface profile and therefore you will have almost no interfering edge.

	Switch	Mounting dimensions (mm)			
	Type	A	B[1)]	C	D
AXN(P) 45-Z	i5	9	29	9	–
AXN(P) 65-Z	i4	16	27	19	11
AXN(P) 80-Z	i4	16	44	19	11
AXN 100-Z	i4	16	64	19	11
AXNP 45-S	i5	9	29	9	–
AXNP 65-S	i4	16	27	19	11
AXNP 80-S	i4	16	44	19	11

[1)] Ca. values depending on switch position without cable connection

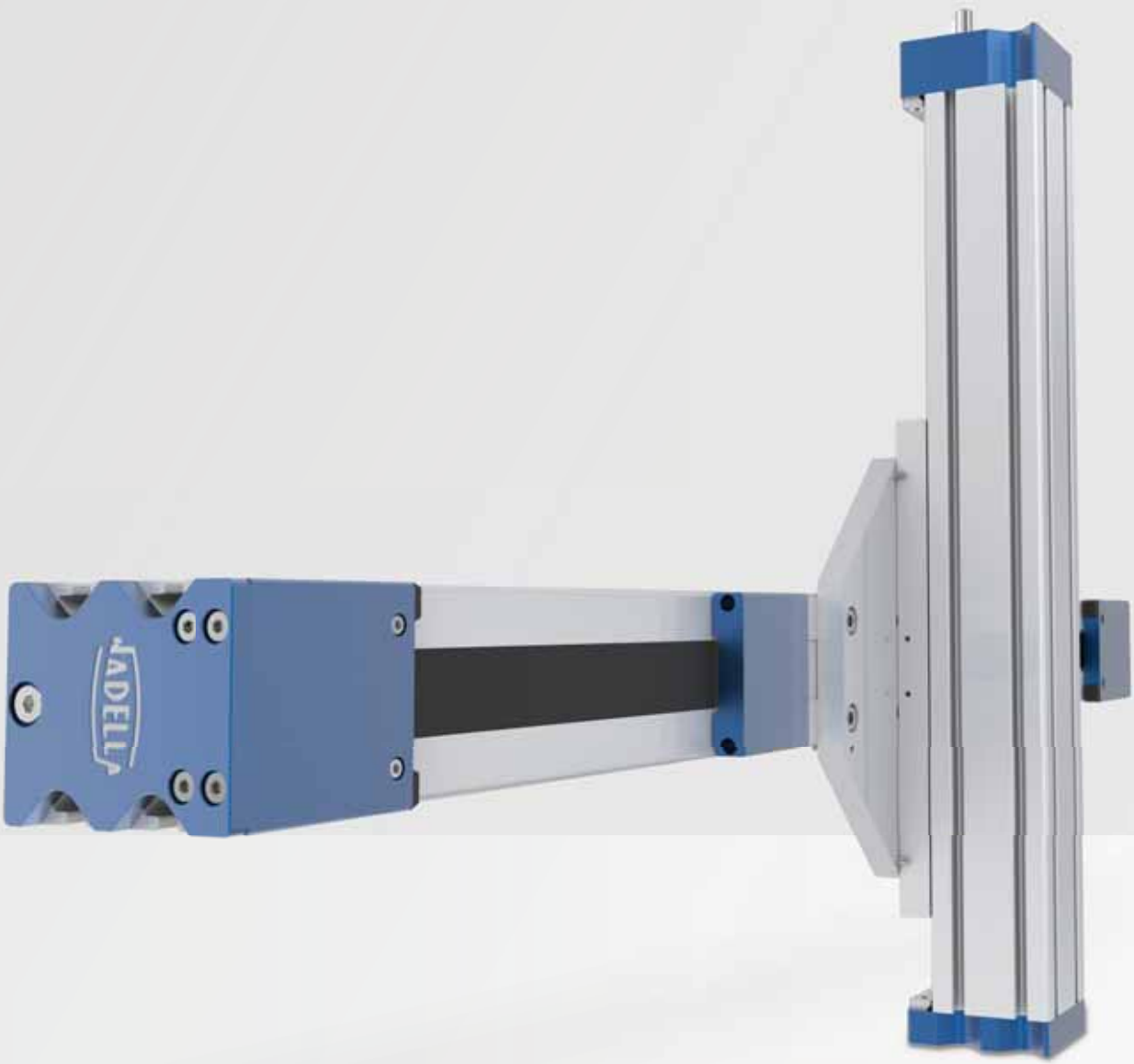
TECHNICAL DATA

	Connected voltage	max. load current	Switching precision	Cable length[2)]	Protection class
Switch i4 NPN / PNP[3)] opening / closing contact AXN(P) 65-Z / AXN(P) 80-Z / AXN 100-Z AXNP 65-S / AXNP 80-S	10 … 30 V DC	200 mA	≤ 10 % of sensing distance	5 m	IP 67
Switch i5 NPN / PNP[3)] opening / closing contact AXN(P) 45-Z / AXNP 45-S	10 … 30 V DC	100 mA	≤ 10 % of sensing distance	3 m	IP 67
Switch i6 (integrated in slot nut) PNP opening contact AXNP 65-S	10 … 30 V DC	100 mA	≤ 10 % of sensing distance	2 m	IP 67
Switch i7 (integrated in slot nut) PNP opening contact AXNP 80-S	10 … 30 V DC	200 mA	≤ 10 % of sensing distance	10 m	IP 67

[2)] Longer cable length on request (please indicate desired cable length in the order)
[3)] NPN / PNP-NC (normally closed) or NPN / PNP-NO (normally open)

Example Order Code
2pcs. limit witch limit switch NC (normally open),switch cam, fastening elements **i4-NC set complete**

1 limit switch NO (normally closed), fastening elements **i4-NO set single**


NADELLA

FASTENING AND JOINING ELEMENTS

PAGE 58 — 7.1 SLOT NUTS

PAGE 59 — 7.2 FASTENING SHOULDER

PAGE 60 – 61 — 7.3 DIRECT CONNECTION
- AXN / AXNP-Z
- AXNP-Z / AXNP-S

PAGE 62 – 63 — 7.4 PORTAL CONNECTION
- AXN / AXNP-Z
- AXNP-Z / AXNP-S

PAGE 64 – 67 — 7.5 CROSS CONNECTION
- AXN / AXNP-Z
- AXNP-Z/AXNP-S

PAGE 68 – 69 — 7.6 COVERS
- Cover for profile slots AXN / AXNP / AXNP-S
- Covering plates for AXN/AXNP-Z/AXNP-S

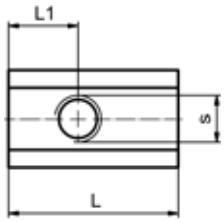
PAGE 70 — 7.7 ASSEMBLY EXAMPLES

FASTENING AND JOINING ELEMENTS
SLOT NUTS

TYPE E (SWIVEL-MOUNTED)
- Standard slot nut
- Can be swivelled in any position
- Fixed by spring ball
- Steel zinc coated

TYPE S (NOT SWIVELLING)
- Slot nut for heavy loads
- Slide-in at end of profile
- Fixation with elastic balls (up to nut slot 8.2)
- Steel zinc coated

TYPE T (DIN – SLOT NUT, NOT SWIVELLING)
- Slot nut for heavy loads
- Installed on demand
- Steel black finished
- Without fixing



Actuator	Nut slot-	s	Design	L (mm)	L1[1] (mm)	TA (Nm)	max. tensile force (N)
AXN(P) 45-Z	5 St-	M3 M4 M5	E	12	3 4 4	1.5	500
AXN(P) 65-Z **AXN 80-table**	6 St-	M4 M5 M6	E	17	5 5 5,5	4.0 8.0[2]	1750
AXN(P) 80-profile **AXN 100-Z**	8 St-	M5 M6 M8	E	22	9	8.0[2] 14.0[2]	2500 3500
AXN(P) 80-Z **AXN 100-Z**	DIN 508	M6	T	13	6.5		
AXNP 45-S	5 St-	M3 M4 M5	E/S	12	3 4 4	1.5	500
AXNP 65-S	6 St-	M4 M5 M6	E/S	17	5 5 5,5	4	1750
AXNP 80-S	8 St-	M5 M6 M8	E/S	22	9	8.0[2]	2500
AXNP 80-S	DIN 508	M6	T	13	6.5	10.0[2]	3000

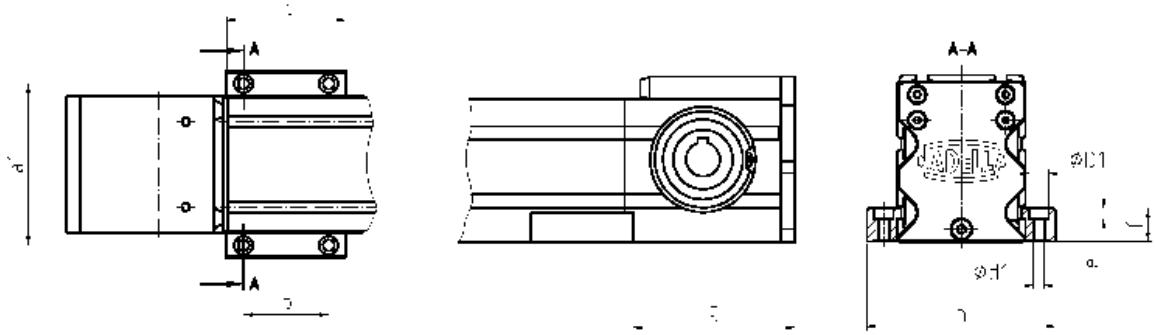
[1] Max. values, different dimensions possible
[2] Strength category 10.9 is necessary by using the max. clamping torque

All combinations of actuators and nut slots in the dimension field are possible – Order Example: **AXN(P) 65-Z 6St M5 E**

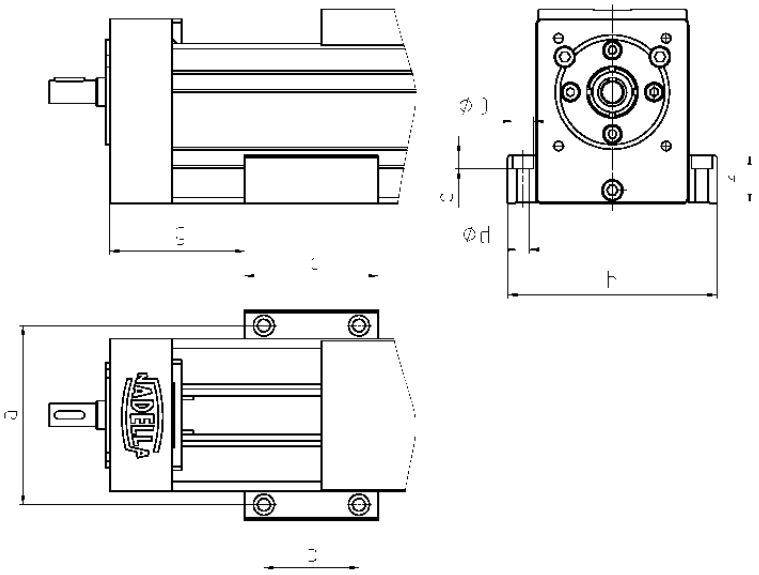
FASTENING SHOULDER

Easy fixation of actuator by top-side screw connection. For module combinations with fastening shoulder please see chapter „direct connection“.

AXN(P)



AXNP-S



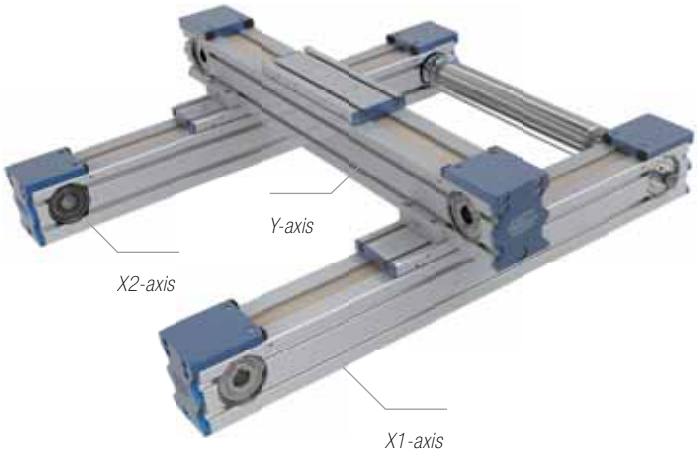
Actuator		a1	a2	b	c	d1	D1	e1	d2	D2	e2	f	g[1]	h
AXN(P) 45-Z/S	Bfl. Bk4[2] Bfl. B44	60	–	– 28	20 41	5.5	10	5	–	–	–	11	68	74
AXN(P) 65-Z/S	Bfl. B64 Bfl. Bk6[2] Bfl. B66	80	–	28 – 40	41 20 60	5.5	10	11	–	–	–	17	95	97
AXN(P) 80-Z/S	Bfl. B86 Bfl. Bk8[2] Bfl. B88	95	–	40 – 50	60 25 70	6.6	11	18	–	–	–	25	105	111
AXN 100-Z	Bfl. B1010	114	–	74	95	6.6	11	18	–	–	–	25	110	130

[1] For drive belt actuators also depending on drive adapter
[2] Short execution with one countersink

Order Example: **AXN 65-Bfl. B64**

FASTENING AND JOINING ELEMENTS
DIRECT CONNECTION AXN / AXNP-Z

Cost-efficient solution for simple standard connections.
A direct connecting set including 2 fastening shoulders and corresponding fastening screws is needed for each connection of X- and Y-axis.



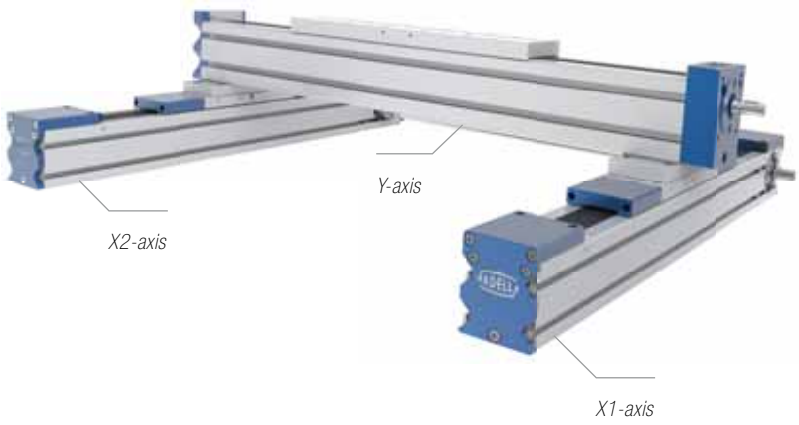
DIRECT CONNECTION SET

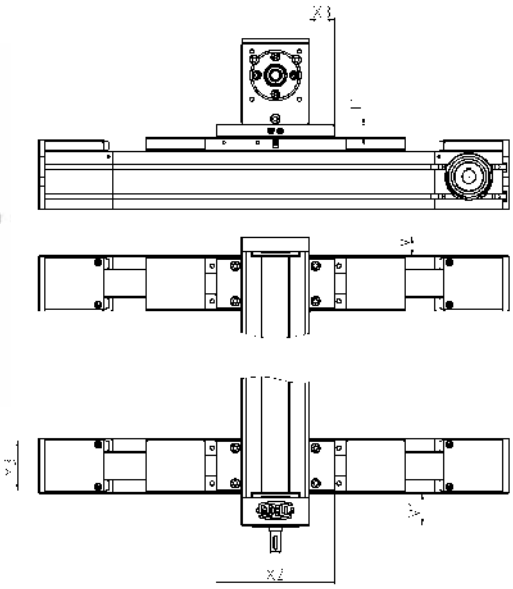
X-axis \ Y-axis	AXN 45-Z	AXNP 45-Z	AXN 65-Z	AXNP 65-Z	AXN 80-Z	AXNP 80-Z	AXN 100-Z
AXN 45-Z	D44		D46				
AXNP 45-Z		DP44		DP46			
AXN 65-Z			D66		D68		
AXNP 65-Z				DP66		DP68	
AXN 80-Z					D88		D810
AXNP 80-Z						DP88	
AXN 100-Z							D1010

Example Order Code
DP44

DIRECT CONNECTION AXN(P)-Z / AXNP-S

Cost-efficient solution for simple standard connections.
A direct connecting set including 2 fastening shoulders and corresponding fastening screws is needed for each connection of X- and Y-axis.





DIRECT CONNECTION SET

X-axis \ Y-axis	AXNP 45-S	AXNP 65-S	AXNP 80-S
AXN 45-Z	D44	D64	
AXNP 45-Z	DP44	DP46	
AXN 65-Z		D66	D68
AXNP 65-Z		DP66	DP68
AXN 80-Z			D88
AXNP 80-Z			DP88

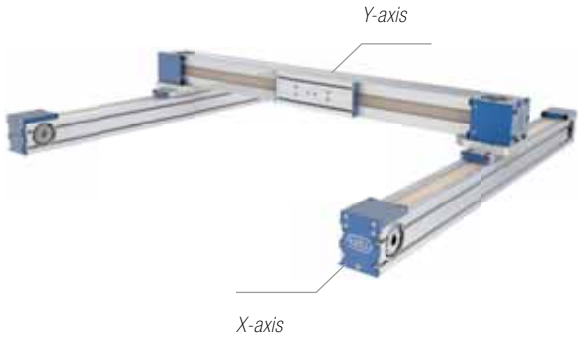
X1- / X2-axis	Y-axis	T1 (mm)	V (mm)	V1 (mm)	X2 (mm)	X3 (mm)	Y3 (mm)	Direct connecting set
AXN 45-Z	AXNP 45-S	11	13	22	74	14,5	45	D44
AXN 45-Z	AXNP 65-S	17	18	31,5	97	16	65	D64
AXNP 45-Z	AXNP 45-S	13	13	20	100	27,5	45	DP44
AXNP 45-Z	AXNP 65-S	13	18	31,5	100	17,5	45	DP46
AXN 65-Z	AXNP 65-S	17	18	31,5	97	16	65	D66
AXN 65-Z	AXNP 80-S	25	18	33	111	15,5	80	D68
AXNP 65-Z	AXNP 65-S	15	18	31,5	140	37,5	65	DP66
AXNP 65-Z	AXNP 80-S	15	23	38	140	30	65	DP68
AXN 80-Z	AXNP 80-S	25	18	33	111	15,5	80	D88
AXNP 80-Z	AXNP 80-S	15	18	33	200	60	80	DP88

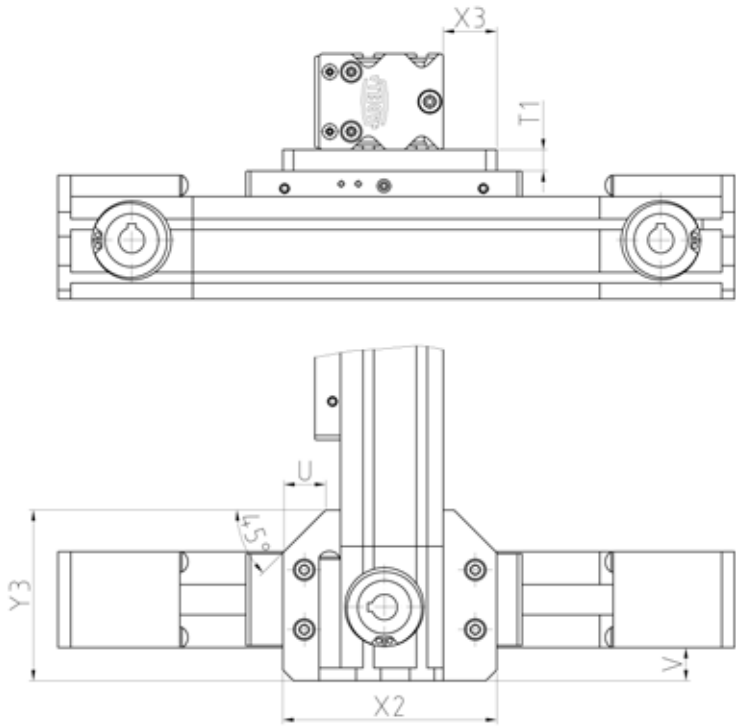
Example Order Code
D68

Further direct connections on request

FASTENING AND JOINING ELEMENTS
PORTAL CONNECTION AXN / AXNP-Z

Connection plate for „table-profile-connections“.
With our portal connection plates, workable and cost saving portals can be realized.
Especially for use with big cross hub or bigger mass, very stiff constructions are possible.





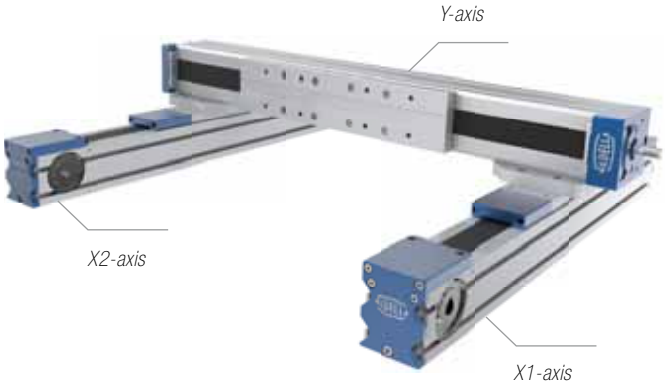
X-axis	Y-axis	T1 (mm)	U (mm)	V (mm)	X2 (mm)	X3 (mm)	Y3 (mm)	Portal connection
AXN 45-Z	AXNP 45-Z	10	27	15.5	100	27.5	80	T44
AXNP 45-Z	AXNP 45-Z	10	27	27	100	27,5	80	T44
AXN 45-Z	AXNP 65-Z	12	20	23,5	100	17,5	104	T46
AXNP 45-Z	AXNP 65-Z	12	20	23.5	100	17.5	104	PT46
AXN 65-Z	AXNP 65-Z	12	25	13.5	130	32.5	104	T66
AXNP 65-Z	AXNP 65-Z	12	25	13,5	130	32,5	104	PT66
AXN 65-Z	AXNP 80-Z	15	24	21,5	120	16	117	T68
AXNP 65-Z	AXNP 80-Z	15	24	21.5	120	16	117	PT68
AXN 80-Z	AXNP 80-Z	15	24	14	200	56	117	T88
AXNP 80-Z	AXNP 80-Z	15	24	14	200	56	117	PT88
AXN 80-Z	AXN 100-Z	15	45	25	180	40	155	T810
AXNP 80-Z	AXN 100-Z	15	45	25	180	40	155	PT810
AXN 100-Z	AXN 100-Z	15	45	20	190	45	160	T1010

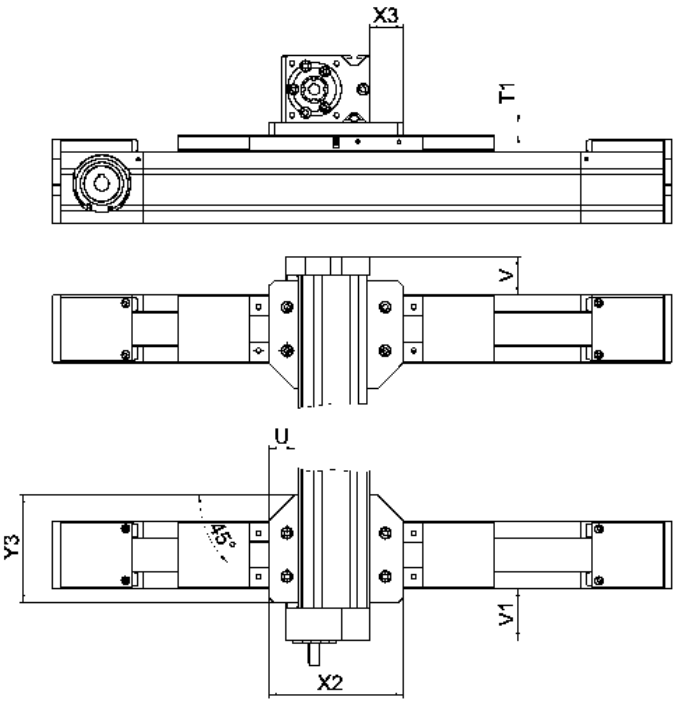
Example Order Code
PT66

PORTAL CONNECTION AXN(P)-Z / AXNP-S

7.4

Connection plate for „table-profile-connections“.
With our portal connection plates, workable and cost saving portals can be realized.
Especially for use with big cross hub or bigger mass, very stiff constructions are possible.





PORTAL CONNECTING SET

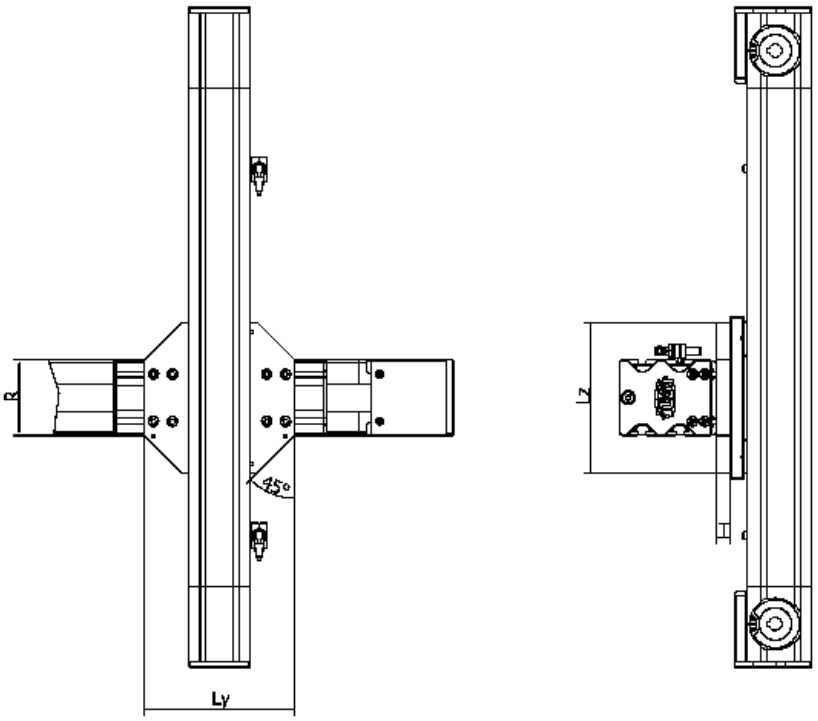
X-axis	Y-axis			
		AXNP 45-S	AXNP 65-S	AXNP 80-S
	AXN 45-Z	T44	T46	
	AXNP 45-Z	PT44	PT46	
	AXN 65-Z		T66	T68
	AXNP 65-Z		PT66	PT68
	AXN 80-Z			T88
	AXNP 80-Z			PT88

X1 / X2-axis	Y-axis	T1 (mm)	U (mm)	V (mm)	V1 (mm)	X2 (mm)	X3 (mm)	Y3 (mm)	Portal connecting set
AXN 45-Z	AXNP 45-S	10	27	27	26	100	27,5	80	T44
AXNP 45-Z	AXNP 45-S	10	27	27	36	100	27.5	80	T44
AXN 45-Z	AXNP 65-S	12	20	42,5	56	100	17,5	104	T46
AXNP 45-Z	AXNP 65-S	12	20	42.5	56	100	17.5	104	PT46
AXN 65-Z	AXNP 65-S	12	25	37	50,5	130	32,5	104	T66
AXNP 65-Z	AXNP 65-S	12	25	37	50.5	130	32.5	104	PT66
AXN 65-Z	AXNP 80-S	15	24	43	58	120	16	117	T68
AXNP 65-Z	AXNP 80-S	15	24	43	58	120	16	117	PT68
AXN 80-Z	AXNP 80-S	15	24	36,5	51,5	200	56	117	T88
AXNP 80-Z	AXNP 80-S	15	24	36.5	51.5	200	56	117	PT88

Example Order Code
T68
Further portal connections on request

FASTENING AND JOINING ELEMENTS
CROSS CONNECTION AXN / AXNP-Z

Cross connections by standardized adapter plates for Y-Z axis connections.
Carriage of Z-axis will be connected to the carriage of Y-axis via adapter plate. Advantage: the complete Z-axis profile can be moved.



Centre of actuator = centre of carriage plate
Adjustment using cylinder pins or stop angle

CROSS CONNECTION SET

Y-axis \ Z-axis	AXN 45-Z	AXNP 45-Z	AXN 65-Z	AXNP 65-Z	AXN 80-Z	AXNP 80-Z	AXN 100-Z
AXN 45-Z	K44		K64				
AXNP 45-Z		PK44		PK64			
AXN 65-Z	K64		K66		K88		
AXNP 65-Z		PK64		PK66		PK86	
AXN 80-Z			K86		K88		K108
AXNP 80-Z				PK86		PK88	
AXN 100-Z							K1010

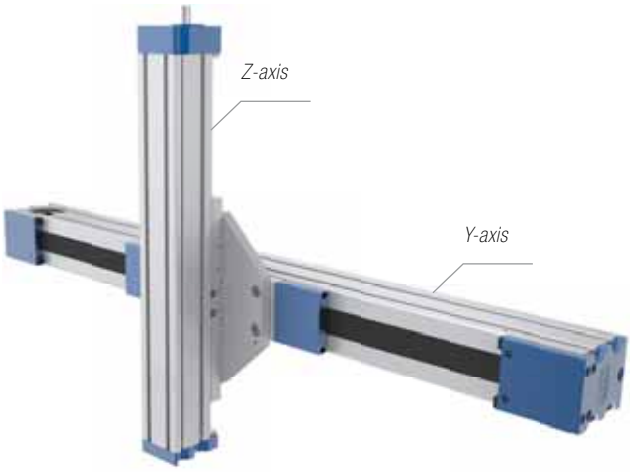
TOOTHED BELT / TOOTHED BELT

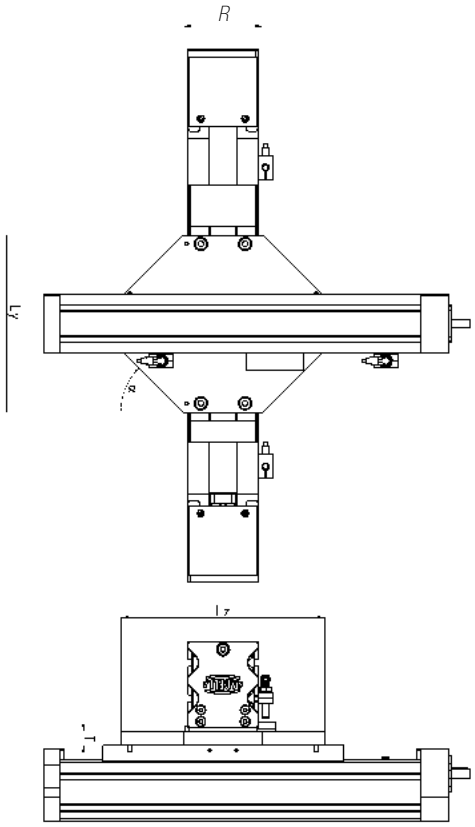
Y-axis	Z-axis	Ly (mm)	Lz (mm)	R (mm)	T (mm)	α (°)	Cross connection set
AXN 45-Z	AXN 45-Z	100	100	65	10	45	K44
AXNP 45-Z	AXNP 45-Z	100	100	50	10	45	PK44
AXN 45-Z	AXN 65-Z	100	100	50	10	45	K64
AXNP 45-Z	AXNP 65-Z	125	125	69	10	45	PK64
AXN 65-Z	AXN 45-Z	100	100	65	10	45	K64
AXNP 65-Z	AXNP 45-Z	125	125	69	10	45	PK64
AXN 65-Z	AXN 65-Z	140	140	65	12	45	K66
AXNP 65-Z	AXNP 65-Z	140	140	65	12	45	PK66
AXN 65-Z	AXN 80-Z	160	160	80	15	45	K86
AXNP 65-Z	AXNP 80-Z	160	160	80	15	45	PK86
AXN 80-Z	AXN 65-Z	160	160	80	15	45	K86
AXNP 80-Z	AXNP 65-Z	160	160	80	15	45	PK86
AXN 80-Z	AXN 80-Z	160	220	80	15	45	K88
AXNP 80-Z	AXNP 80-Z	200	200	80	15	45	PK88
AXN 80-Z	AXN 100-Z	220	220	110	15	45	K108
AXN 100-Z	AXN 100-Z	230	230	100	15	45	K1010

Example Order Code
PK64

FASTENING AND JOINING ELEMENTS
CROSS CONNECTION AXNP-Z / AXNP-S

Cross connections by standardized adapter plates for Y-Z axis connections.
Carriage of Z-axis will be connected to the carriage of Y-axis via adapter plate. Advantage: the complete Z-axis profile can be moved.





CROSS CONNECTION SET

		Z-axis		
		AXNP 45-S	AXNP 65-S	AXNP 80-S
Y-axis	AXNP 45-Z	PSK44		
	AXNP 65-Z	PSK64	PSK66	
	AXNP 80-Z	PSK84	PSK86	PSK88

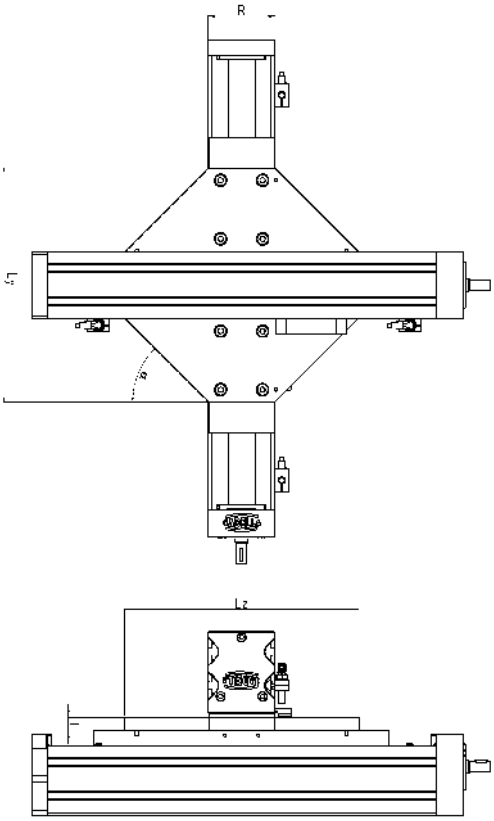
TOOTHED BELT / BALL SCREW

Y-axis	Z-axis	Ly (mm)	Lz (mm)	R (mm)	T (mm)	α (°)	Cross connection set
AXNP 45-Z	AXNP 45-S	100	150	90	10	45	PSK44
AXNP 65-Z	AXNP 45-S	180	160	50	12	45	PSK64
AXNP 65-Z	AXNP 65-S	170	230	120	12	45	PSK66
AXNP 80-Z	AXNP 45-S	210	160	80	15	45	PSK84
AXNP 80-Z	AXNP 65-S	200	230	90	15	45	PSK86
AXNP 80-Z	AXNP 80-S	210	280	140	15	45	PSK88

Example Order Code
PSK64

CROSS CONNECTION AXNP-S / AXNP-S 7.5

Cross connections by standardized adapter plates for Y-Z axis connections.
Carriage of Z-axis will be connected to the carriage of Y-axis via adapter plate. Advantage: the complete Z-axis profile can be moved.



CROSS CONNECTION SET

	Z-axis		
	AXNP 45-S	AXNP 65-S	AXNP 80-S
AXNP 45-S	SK44	SK64	
AXNP 65-S	SK64	SK66	SK86
AXNP 80-S		SK86	SK88

BALL SCREW / BALL SCREW

Y-axis	Z-axis	Ly (mm)	Lz (mm)	R (mm)	T (mm)	α (°)	Cross connection set
AXNP 45-S	AXNP 45-S	155	155	43	12	45	SK44
AXNP 45-S	AXNP 65-S	240	155	64	12	60	SK64
AXNP 65-S	AXNP 65-S	240	240	64	12	45	SK66
AXNP 65-S	AXNP 80-S	280	240	78	15	50	SK86
AXNP 80-S	AXNP 80-S	280	280	78	15	45	SK88

Example Order Code
SK66

Centre of actuator = centre of carriage plate
Adjustment using cylinder pins or stop angle

COVERS

COVER FOR PROFILE SLOTS AXN/AXNP-Z/AXNP-S

For any application used in visual range or with increasing dirt, the profile slots can be covered by corresponding covers in aluminium or plastic material. Therefore no dirt particles can enter the t-slots which guarantees good dirt protection for the actuator.

COVER PROFILE AL
Colour: silver-coloured

COVER PROFILE PP
Colour: black

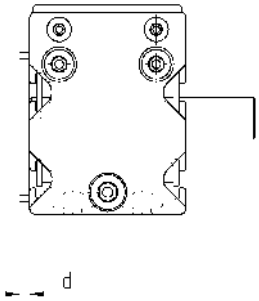
Modul type	Size	Designation	Material
AXN(P) 45-Z	Nut 5	Cover profile 5 PP	Polypropylene black
AXN(P) 65-Z	Nut 6	Cover profile 6 Al Cover profile 6 PP	Silver-coloured Polypropylene black
AXN(P) 80-Z / AXN 100-Z	Nut 8	Cover profile 8 Al Cover profile 8 PP	Silver-coloured Polypropylene black
AXNP 45-S	Nut 5	Cover profile 5 PP	Polypropylene black
AXNP 65-S	Nut 6	Cover profile 6 Al Cover profile 6 PP	Silver-coloured Polypropylene black
AXNP 80-S	Nut 8	Cover profile 8 Al Cover profile 8 PP	Silver-coloured Polypropylene black

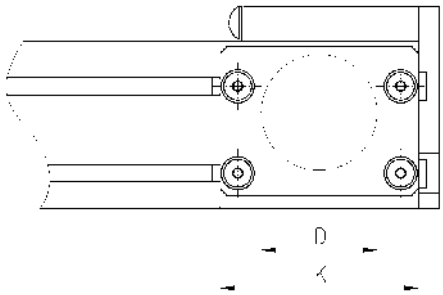
Example Order Code
profile 8PP

COVERING PLATES FOR AXN / AXNP-Z

7.6

Special plates for the free driving sides protect bearings and bevels against penetrating dirt and prevent potential risk of accident.





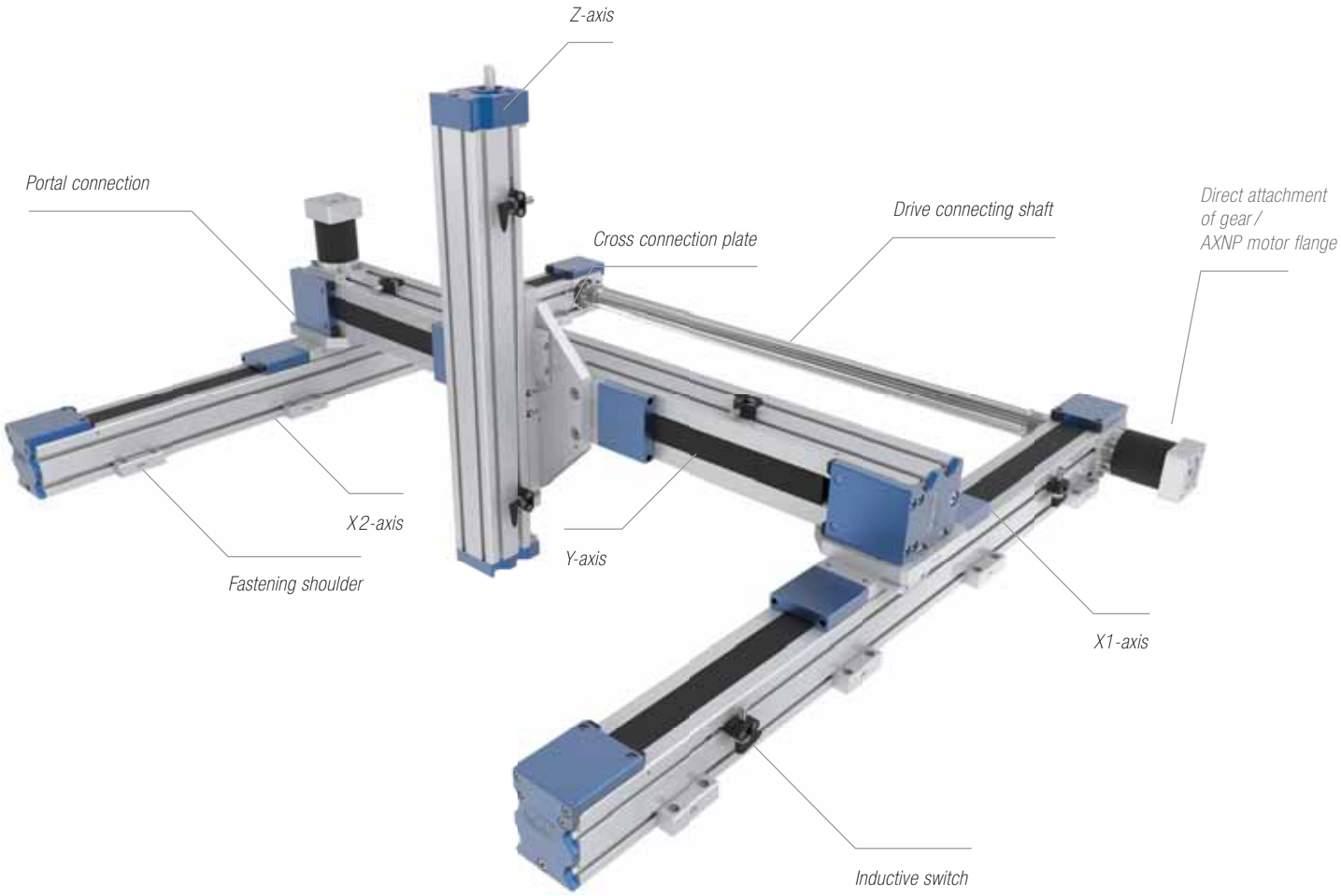
Axis	Ø D (mm)	□ K (mm)	Overlap d (mm)	Type
AXN(P) 45-Z	–	56.5 x 43	3	AXN 45-Plate
AXN(P) 65-Z	–	78 x 58	3	AXN 65-Plate
AXN(P) 80-Z	62	–	0	AXN 80-Plate
AXN 100-Z	–	110 x 85	4	AXN 100-Plate

Example Order Code
AXN 65-Plate

ASSEMBLY EXAMPLES
COMBINATIONS WITH AXN / AXNP-Z

7.7

Matched to the individual requirement, well thought-out, excellent performance, low cost. Actuators and connecting elements for customer specific package solutions, available as individual axes with pre-mounted connecting elements or completely assembled as „integrated system“ (please consider the transport dimensions). Upon agreement and depending on the application we also supply special solutions.



NOTES

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Nr.055

TECHNICAL INFORMATION

8

PAGE 74 – 75 — 8.1 ACTUATOR SELECTION

PAGE 76 – 77 — 8.2 CALCULATION BASIS

PAGE 78 — 8.3 ORDERING CODE
- Codes for AXN / AXNP

PAGE 79 – 80 — 8.4 APPLICATION FORM

TECHNICAL INFORMATION
ACTUATOR SELECTION

DRIVE – TOOTHED BELT DRIVE Z OR SPINDLE DRIVE S

Application	horizontal vertical	-Z -S
Travel length	short* medium* long*	-S -S or -Z -Z
Travel speed	low* medium* high*	-S -S or -Z -Z
Precision	low* high*	-Z -S

GUIDE SELECTION – ROLLER GUIDE LR OR RAIL GUIDE B

Application	horizontal vertical	-LR or -B -LR or -B
Mass	low to medium* medium to high*	-LR or -B -B or parallel guide
Overhanging mass or transverse moment		-B or parallel guide
Dynamic	low to medium* medium to high*	-LR or -B -B

CARRIAGE SIZE – SINGLE / TWIN CARRIAGE OR LONG CARRIAGE

MASS

The mass to be moved should be well fastened on the carriage and not have large overhangs. The centre of gravity of the mass should be approximately in the middle of the carriage mounting surface. Alternatives for longer screw-on surfaces are long standard carriages or double carriages which can also be fitted with larger distances.

OVERHANGING OR WIDE MASSES

If the mass to be moved is very wide or has an overhanging centre of gravity it is recommended to use two parallel actuator units (maybe driven by a connecting shaft).

** The specifications short, medium, long or low, medium, high are to be understood in the ratio 1 / 3, 2 / 3 and 3 / 3 of the technical performance data indicated in the catalogue for respective actuator types and sizes.*

ACTUATOR SIZE AND TYPE

The actuator size is mainly determined by the mass to be moved (weight and volume). This mass should be easy to mount and therefore should have a certain guide size and carriage mounting surface which also is decisive for the actuator size (see product overview in the catalogue).

The second selection criteria for the actuator is the moving dynamic of the mass. The resulting forces (e.g. driving forces, moments, centrifugal forces, etc.) must be absorbed by the toothed belt and by the guide. Based on the synoptical table in the catalogue possible actuator types and sizes can be specified.

To make the right choice the technical data indicated in the catalogue such as admissible loads and load moments should only be used by one third as the combination of forces and moments can significantly affect the lifetime.

Further selection criteria for the actuator type are space requirements and the travel length of the linear actuator. It may be recommendable to replace larger single actuators by smaller parallel actuators and vice-versa. In case of large effective strokes, it may be necessary to use large actuators also for small loads.

The above are only rough guidelines for the selection of an actuator which can also be completely different depending on the application and the existing realities or on the customer‘s personal wishes.

In case of combined actuators such as X-Y systems or X-Y-Z systems a gantry structure with two parallel basic actuators should always be given preference to a boom system with only one basic actuator. For the design of combined systems the actuator on which the mass to be moved will be mounted should always be viewed at first.

We shall be pleased to assist you with the design and selection of the right modules for your application.
Please send us information about your application and technical data. (See also application form at the end of the catalogue)

TECHNICAL INFORMATION
CALCULATION BASIS

GENERAL
All data refer to the respective standard type of the linear module. A special design or temperatures above 80 °C can considerably affect these values.

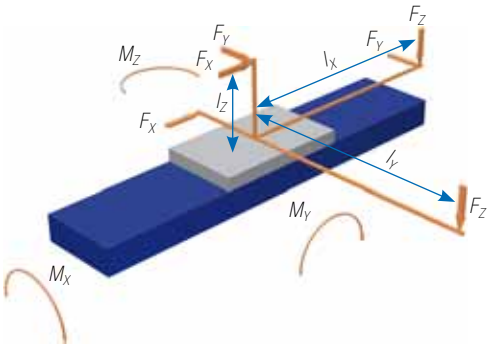
TECHNICAL DATA, LOADS AND LOAD MOMENTS
The values indicated are maximum possible individual sizes. Combined loads (e. g. forces and moments from different directions) reduce these maximum values and can have a negative effect on precision. If linear actuators are not fully supported, in addition a deflection or torsion test may become necessary.

REPEAT ACCURACY
The repeat accuracy defines that under the same conditions within the given tolerances the mechanical linear module will reach again a position already approached before.

STROKE LENGTH
The stroke length indicated in the order code corresponds to the maximum possible travel distance. Accelerating and stopping distances or a possible safety overflow must be taken into consideration for design.

SPEEDS
The theoretical travel speed results from the screw pitch or in case of a toothed belt actuator from the stroke per turn of the pinion, the gear ratio of a possible gear and a motor speed. To determine the actually possible travel speed the specific conditions, the mass to be moved, acceleration, motor output and the admissible drive torque of the selected actuator as well as the efficiency have to be considered.

OPERATING CHARACTERISTICS AND PRODUCTION TOLERANCES
Differences in running performance and noise development with identical units cannot be completely excluded, not even by our high production standard with small production tolerances. Our extruded profiles are manufactured according to DIN EN 12020-2. Especially with reference to straightness and torsion these fixed tolerances mostly are clearly underrun. The exact adjustment of the linear units and / or mounting to precisely machined surfaces increase the guiding accuracy. A possible deflection of partially supported actuators mainly depends on the inherent rigidity, the load, the self-supporting length and the rigidity of the adjacent construction.



DRIVE – TOOTHED BELT DRIVE Z OR SPINDLE DRIVE S

$F_X = m \cdot a$

$F_Y = m \cdot a$

$F_Z = m \cdot (g + a)$

Additional moment loading with an eccentric centre of gravity or lever arm

$M_X = F_Y \cdot l_Z$ or $F_Z \cdot l_Y$

$M_Y = F_X \cdot l_Z$ or $F_Z \cdot l_X$

$M_Z = F_X \cdot l_Y$ or $F_Y \cdot l_X$

F = Load (N)
m = Mass (kg)

a = Acceleration (m/sec²)
g = acceleration of gravity (9.81 m/sec²)

lx, ly, lz = Distance of force application point in direction x, y, z, indicated in m

In most applications there are force combinations. The resulting total forces always must be smaller than the respective admissible values.

DRIVE SIZING (ESTIMATE)

$M_A = M_{Last} + M_{Leer}$

For toothed drive

$$M_{Last} = \frac{F_X \cdot p}{2 \cdot \pi \cdot 1000}$$

For screw drive

$$M_{Last} = \frac{F_X \cdot p}{2 \cdot \pi \cdot \square \cdot 1000}$$

M_A = Necessary drive torque (Nm)
M_{Last} = Load torque (Nm)
M_{Leer} = Idle torque (Nm) – see data sheets

F_X = Feed force (N)
p = Stroke/revolution (mm) for toothed drive belt
screw pitch (mm) for screw drive

□ = For ball screw approx. 0.9

FEED FORCE FOR HORIZONTAL OPERATION

$F_X = m \cdot g \cdot \mu + m \cdot a$

μ = Friction coefficient for rail guide 0.02 for roller guide 0.05

FEED FORCE FOR VERTICAL OPERATION

$F_X = m \cdot (g + a)$

ADMISSIBLE DRIVE TORQUES

The maximum acceleration also depends on the maximum admissible drive torque of the respective actuator. Example: calculation for toothed belt actuator AXN80-Z:

$$M_{Azul} = \text{belt traction} \cdot \text{pinion radius} = \frac{1450N \cdot 180\ mm}{2 \cdot \pi \cdot 1000} = 41.5\ Nm$$

TECHNICAL INFORMATION
ODERING CODE

8.3

CODES FOR AXN / AXNP

ORDERING EXAMPLE

AXN 65 - Z HW 14 - LR 35 - 1000 - 1340 - 00

Type designation
AXN ...
AXNP ...

Drive configuration
Z: Belt drive
S: Ball screw
T: Trapezoid thread spindle
O: No drive

Drive configuration
With belt drive

HW:	Hollow shaft
WL (WR):	Driveshaft left (right)
WD:	Driveshaft both sides
KL (KR):	Partially integrated coupling on one side left (right)
PL (PR):	Planetary gear left (right) (please refer page „direct gearbox connection“ for gearbox type)
PLK (PR) = 0:	Without gearbox PLE
MKL (MKR):	Motor flange with coupling left (right)

With spindle drive

W:	Free drive shaft
MK:	Motor flange with coupling

Characteristic of the shaft / coupling

With belt drive
- Diameter of shaft or hollow shaft (HW, WL, WR, WD)
- Diameter of coupling holes (KL,KR, MKL, MKR)
- Gear ratio (PL, PR)
- For type PLK or PRK only the gear ratio is indicated

With spindle drive
Spindle diameter and pitch

Options
This number will be given by NADELLA. It shows special marks or special design which are noted in clear text.

00	No options
01	Spindle support 1SA
02	Spindle support 2SA
03	Spindle support 3SA
04	Spindle support 4SA
10	Cover band
12	Slot covers
13	Covering plate
22	Twin carriage
23	Long carriage
32	Reinforced spindle bearing
33	Double spindle nut
34	Preloaded spindle nut
35	With caged ball technology
66	Pulleys syncronized two modules
76	Exterior parts corrosion resistant
77	Stainless version (NX)
88	Profile with junction
99	According to drawing

More than one option possible

Overall length
(Stroke + length surcharge according to data given in this catalogue)

Stroke

Size of guide system
Subject to catalogue

Reference variable

LR:	Linear guide system
B:	Ball circulating guide according to DIN 645

INFORMATION

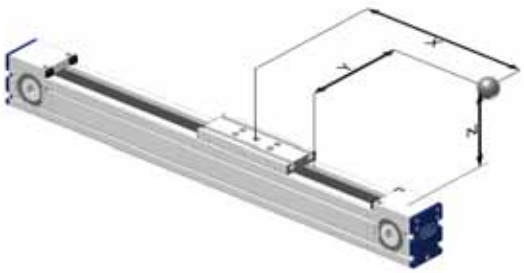
When ordering a version with motor adaptation, please always include the dimension sheets of the motor or gear unit to be mounted.

APPLICATION FORM
PART 1

	Date
Company	Phone
Contact	Fax
Street	eMail
Address	Project designation

APPLICATION PARAMETER

Coordinate	X	Y	Z
Single axis / parallel axis (distance in mm)			
Installation position: horizontal (hor); vertikal (ver) or wall fastening (wa)			
Stroke (mm)			
Effective stroke ≤ ½ carriage length	Yes ☐	No ☐	
Speed v (m/s)			
Acceleration a (m/s²)			
Traverse time (s)			
Cycle time (s)			
Repeating accuracy (± mm)			
Required lifetime (h)			
Actual load (kg)			
External loads (N)			
Center coordinate load X (mm)			
Center coordinate load Y (mm)			
Center coordinate load Z (mm)			
Center coordinate force X (mm)			
Center coordinate force Y (mm)			
Center coordinate force Z (mm)			



INFORMATION For higher loads or charges please send your drawing attached.

APPLICATION FORM
PART 2

8.4

Conditions of use (dust, splash water, abrasive media)
Corrosion resistance
Drive adaption for existing gear

FITTINGS LEFT

Gear ☐ Switch ☐

FITTINGS RIGHT

Gear ☐ Switch ☐

ATTACHMENTS

Connecting shaft for distance (mm) *(please indicate distance of actuators)*		
Planetary gear (Type: ratio) *(e. g.: PLE80 : 8)*	Pieces	Type
Inductive switch (opening / closing contact)	Pieces	Type
Slot nuts	Pieces	Type
Fastening shoulder	Pieces	Type
Cover profile (2m length)	Pieces	Type
Cover plate	Yes ☐	No ☐
Corrosion resistant version	Yes ☐	No ☐

NOTES

NOTES

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