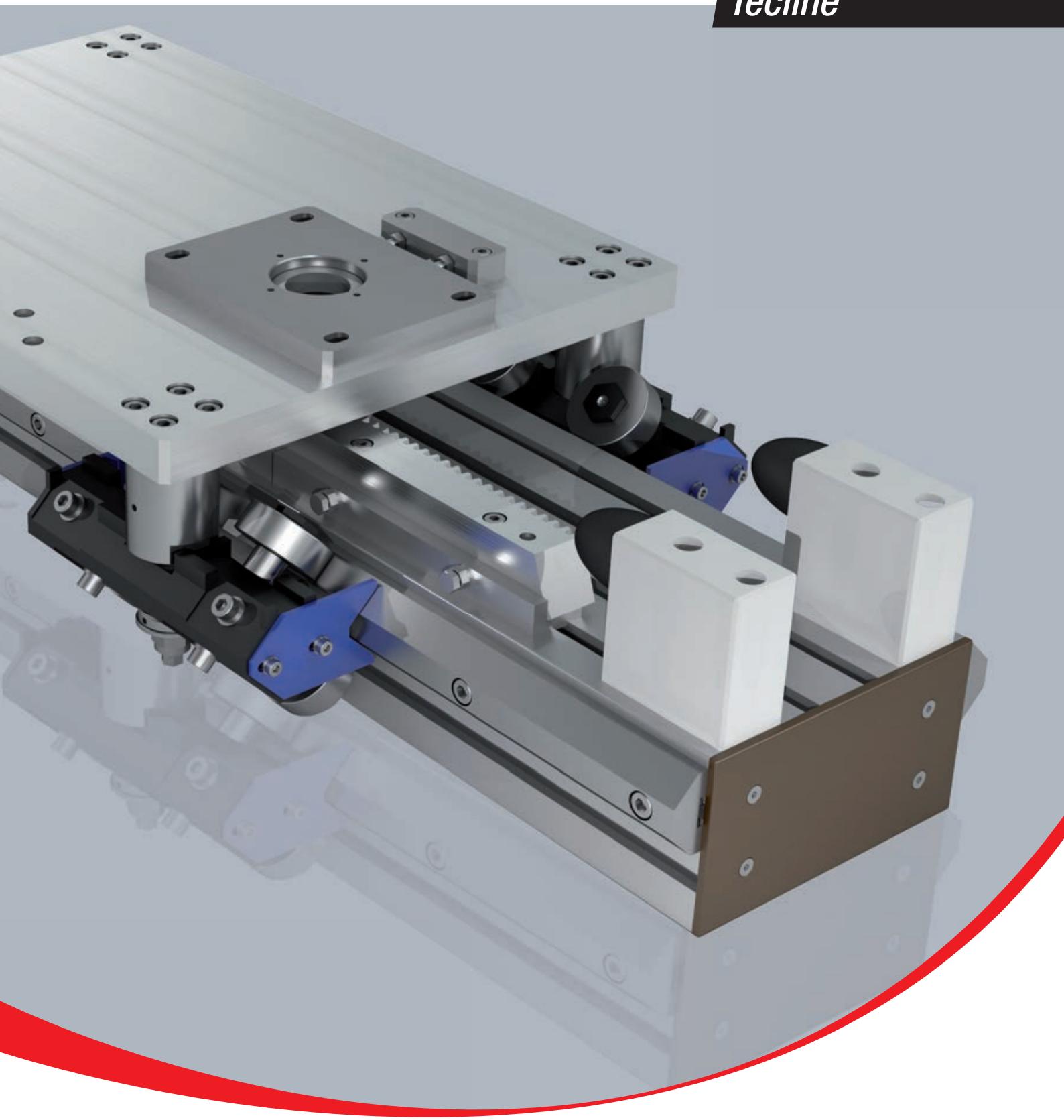
ROLLON®
BY TIMKEN

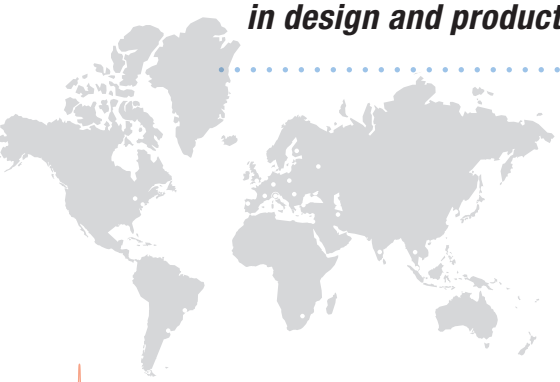
Tecline



We design and produce in order to support you

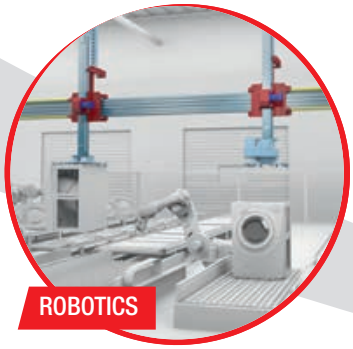
An international group for technology, a local support for service

Over 40 years of know how in design and production

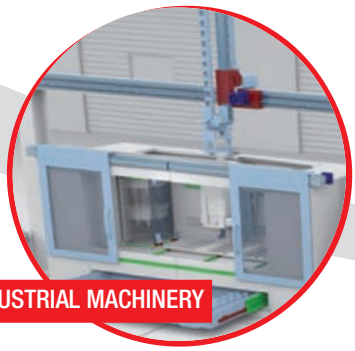


Values

Applications



ROBOTICS



INDUSTRIAL MACHINERY

LOGISTICS

RAILWAY

Collaboration

High level technical consulting

Cross competences in several industrial sectors for an effective problem-solving

Solutions

From a full range of standard products to customer specific solutions for best perfomance


INTERIORS AND ARCHITECTURE


MEDICAL


SPECIAL VEHICLES


AERONAUTICS

A complete range for linear motion which reaches every customer

Linear and curved guides with ball and roller bearings,
with hardened raceways, high load capacities, self-alignment and capable of working in dirty environments.

Linear Line

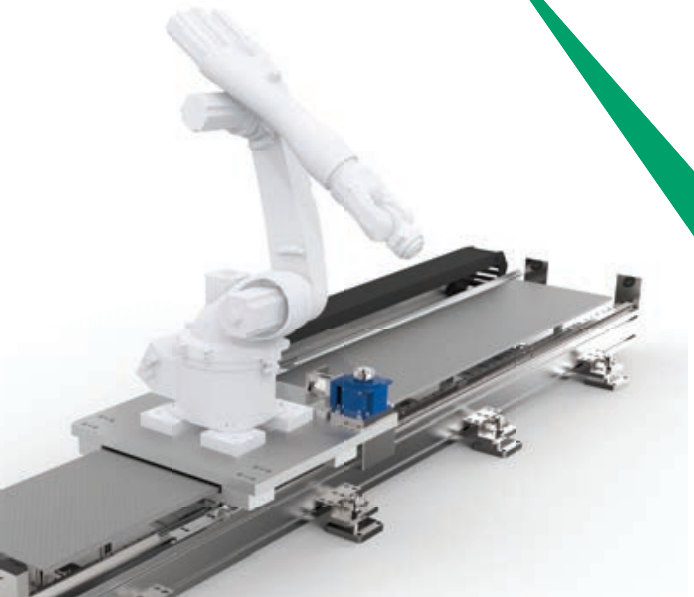
Telescopic Line

Telescopic guides with ball bearings,
with hardened raceways, high load capacities and high rigidity, resistant to shocks and vibrations. For partial, total or extension up to 200% of the length of the guide.

Actuator Line

Linear actuators with different drive and guide configurations,
available with belt, screw or rack and pinion drives to cover a wide range of precision and speed requirements. Guides with bearings or recirculating ball systems for varying load capacities and environments.

A global provider of solutions for applications for linear motion



Actuator System Line

Integrated actuators for industrial automation,
wide ranging solutions that span industrial sectors: from machinery servo systems to high precision assembly systems, packaging lines and high speed production lines. Evolved from Actuator Line series in order to meet the most demanding customer needs.

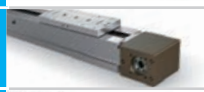
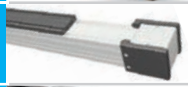
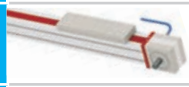
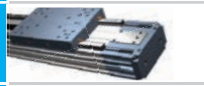
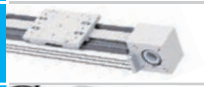
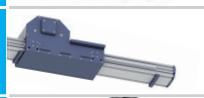
Tecline

1 PAR/PAS series

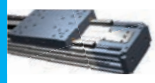
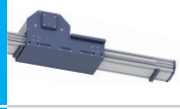
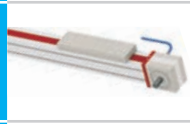
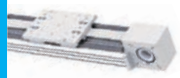
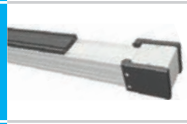
Pre-selection overview

Application Priority	Driving system	Section
Max. speed from 4 to 15 [m/s] Max. acceleration from 10 to 50 [m/s²] Stroke up to 10 m	 Belt	 Square  Rectangular Other section
High precision up to ± 0,005 [mm] Stroke up to 3.5 m	 Ball screw	 Square  Rectangular
Heavy loads up to 4.000 Kg Infinite stroke Multiple independent carriages	 Rack and pion	 Rectangular  Other section
Vertical mounting Profile moving	 Ω Belt	 Square  Rectangular  Rectangular  Other section

* Optimal reliability in dirty environments thanks to plastic compound coated rollers

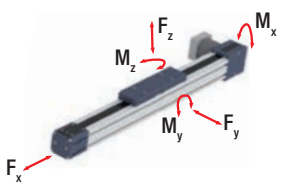
Protection	Rollon solution		
	Product Family		Product
Protected	Plus System		ELM
	Modline		MCR/MCH with protection
Semi-protected	Eco System		ECO
	Modline		MCR/MCH
	Uniline System		UNILINE
Open	Smart System		E-SMART
Protected with suction	Clean Room System		ONE
Protected	Plus System		ROBOT
Open	Smart System		R-SMART
	Modline		TCR/TCS
Open*	Speedy Rail A		SAB
Semi-protected	Precision System		TV
			TVS
			TT
			TH
Open	Tecline		PAS
			PAR
Open*	Speedy Rail A		SAR
Semi-protected	Smart System		S-SMART
Semi-protected	Plus System		SC
Open	Modline		ZCR/ZCH
Open*	Speedy Rail A		ZSY

Technical features overview

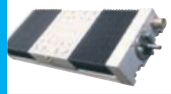
Reference			Section		Driving			Anticorrosion	Protection
Product Family		Product	Balls	Rollers	Toothed belt	Ball screw	Rack and pinion		
Plus System		ELM	●	●	●			●	Protected
		ROBOT	●	●	●			●	Protected
		SC	●		●			●	Semi-protected
Clean Room System		ONE	●		●			●	Protected with suctions
Smart System		E-SMART	●		●				
		R-SMART	●		●				
		S-SMART	●		●				Semi-protected
Eco System		ECO	●	●	●				Semi-protected
Uniline System		A/C/E/ED/H		●	●				Semi-protected
Modline		MCR MCH	●	●	●			●	Semi-protected
		TCR TCS	●	●	●			●	
		ZCR ZCH	●	●	●			●	
		ZMCH	●		●			●	

Reported data must be verified according to the application.
* Longer stroke is available for jointed version

Size	Max. load capacity per carriage [N]			Max. static moment per carriage [Nm]			Max. speed [m/s]	Max. acceleration [m/s²]	Repeatability accuracy [mm]	Max stroke (per system) [mm]	
	F_x	F_y	F_z	M_x	M_y	M_z					
50-65-80-110	4980	129400	129400	1392	11646	11646	5	50	± 0,05	6000*	PLS
100-130-160-220	9545	258800	258800	22257	28986	28986	5	50	± 0,05	6000*	
65-130-160	6682	153600	153600	13555	31104	31104	5	50	± 0,05	2500	
50-65-80-110	4980	104800	104800	1126	10532	10532	5	50	± 0,05	6000*	CRS
30-50-80-100	4980	130860	130860	1500	12039	12039	4	50	± 0,05	6000*	SS
120-160-220	9960	258800	258800	21998	28468	28468	4	50	± 0,05	6000*	
50-65-80	2523	51260	51260	520	3742	3742	4	50	± 0,05	2000	
60-80-100	4565	76800	76800	722	7603	7603	5	50	± 0,05	6000*	ES
40-55-75	19360	11000	17400	800,4	24917	18788	7	15	± 0,05	5700*	US
65-80-105	3984	51260	51260	520	5536	5536	5	50	± 0,1	10100*	ML
140-170 200-220-230 280- 360	9960	266400	266400	42624	61272	61272	5	50	± 0,1	11480	
60-90-100 170-220	7470	174480	174480	12388	35681	35681	4	25	± 0,1	2500	
105	4980	61120	61120	3591	10390	10390	3	25	± 0,1	2100	

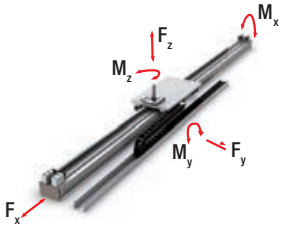


Technical features overview

Reference			Section		Driving			Anticorrosion	Protection
Product Family		Product	Balls	Rollers	Toothed belt	Ball screw	Rack and pinion		
Precision System		TH							Semi-protected
		TT							Semi-protected
		TV							Semi-protected
		TVS							Semi-protected
Tecline		PAR PAS							
Speedy Rail A		SAB							
		ZSY							
		SAR							

Reported data must be verified according to the application.
* Longer stroke is available for jointed version

	Size	Max. load capacity per carriage [N]			Max. static moment per carriage [Nm]			Max. speed [m/s]	Max. acceleration [m/s²]	Repeatability accuracy [mm]	Max stroke (per system) [mm]	
		F_x	F_y	F_z	M_x	M_y	M_z					
	70-90-110-145	32600	153600	153600	6682	5053	5053	2		± 0,005	1500	PS
	100-155-225-310	30500	230500	274500	30195	26625	22365	2,5		± 0,005	3000	
	60-80-110	11538	85000	85000	1080	2316	2316	2,5		± 0,01	3000	
	170-220	66300	258800	258800	19410	47360	47360	1	5	± 0,02	3500	
	118-140-170-200-220-230-280-360	10989	386400	386400	65688	150310	150310	4	10	± 0,05	10800*	TL
	60-120-180-250	4565	3620	3620	372	362	362	15	10	± 0,2	7150	SRA
	180	4980	2300	2600	188	806	713	8	8	± 0,2	6640	
	120-180-250	3598	3620	3620	372	453	453	3	10	± 0,15	7150*	



PAR/PAS series

PAR/PAS series description

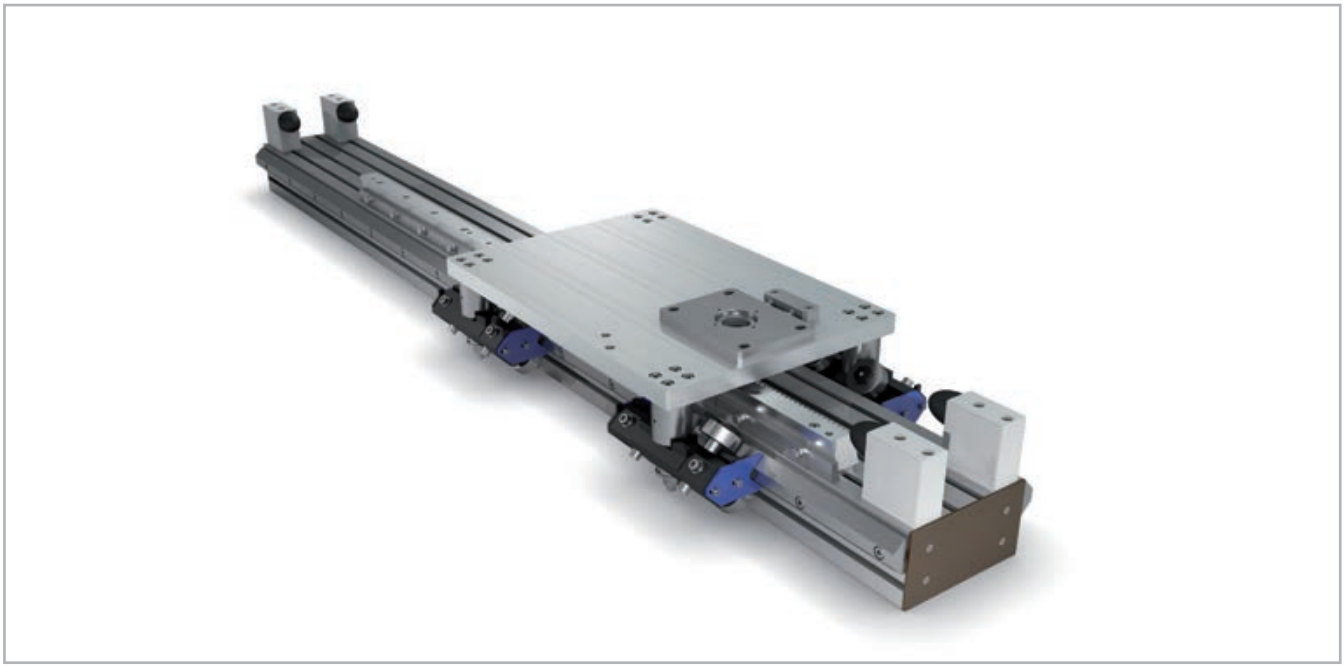


Fig. 1

Tecline products are linear actuators made of a self-supporting extruded aluminum with rack and pinion transmission designed for multi-axes solutions for several applications like pick and place, industrial machines feeding and logistics with loads up to 2.000 Kg.
PAR/PAS linear actuators are available with profiles of different sizes: 118 - 140 - 170 - 200 - 220 - 230 - 280 - 360 mm.

Some of the main advantages of PAR/PAS solutions are:

- Easy and quick assembly.
- High quality and competitive performances.
- Reduced and simplified maintenance.
- Wide range of integrated solutions.
- Possibility of customized solutions.
- Up to 10,8 m beams, high level torsional rigidity, precise shape. Longer lengths can be obtained with jointed versions.
- Precise machining of all profiles.

PAR

PAR series is defined by Prismatic Rails as linear motion components.

PAS

PAS series is defined by recirculating ball guides with cage as linear motion components.

The components

Extruded bodies

The PAR/PAS series is created using extruded and anodized Rollon profiles, made of hardened and tempered aluminum alloy tolerance according to UNI EN 755-9. Profiles are specifically designed by Rollon to create rigid and light structures, suitable for manufacturing linear transfer machines.

Rack and pinion drive

The PAR/PAS series is driven by a rack and pinion system, with hardened teeth, that allows long stroke up to 10,8 m. Longer lengths can be obtained with jointed versions. Racks with helical teeth, made of induction-hardened steel, are available with three different modules: M2, M3 and M4. PAR/PAS series axes are assembled with ground, KSD induction-hardened racks with pinions in high-performance tempered and surface-hardened steel (RD). High-performance KRD racks are available upon request (Rs>900 MPa). These are hardened and tempered, induction-hardened, and fully ground. With RD pinions and KRD racks, and with the help of continuous lubrication, speeds up to 5 m/s can be reached.

Carriage

The carriage of the PAR/PAS series linear units is made of anodized aluminum. Different lengths of the carriages are available according to the different sizes.

General data about aluminum used: AL 6060

Chemical composition [%]

Al	Mg	Si	Fe	Mn	Zn	Cu	Impurites
Remainder	0.35-0.60	0.30-0.60	0.30	0.10	0.10	0.10	0.05-0.15

Tab. 1

Physical characteristics

Density	Coeff. of elasticity	Coeff. of thermal expansion (20°-100°C)	Thermal conductivity (20°C)	Specific heat (0°-100°C)	Resistivity	Melting point
$\frac{kg}{dm^3}$	$\frac{kN}{mm^2}$	$\frac{10^{-6}}{K}$	$\frac{W}{m \cdot K}$	$\frac{J}{kg \cdot K}$	$\Omega \cdot m \cdot 10^{-9}$	°C
2.70	69	23	200	880-900	33	600-655

Tab. 2

Mechanical characteristics

Rm	Rp (02)	A	HB
$\frac{N}{mm^2}$	$\frac{N}{mm^2}$	%	—
205	165	10	60-80

Tab. 3

The linear motion system

The linear motion system has been designed to meet the load capacity, speed, and maximum acceleration conditions of a wide variety of applications.

PAR with Prismatic Rails

Prismatic Rails are made of specially treated high-carbon steel and provided with a permanent lubrication system. Thanks to this kind of solution PAR is specifically dedicated for dirty environments and high dynamics in automation.

- The Prismatic Rails with high load capacity are mounted in a dedicated seat on the aluminum body.
- The carriage is assembled with preload, that enables to withstand loading in the four main directions.
- Hardened and ground steel guide rails.
- Sliders have felts for self-lubrication.

The linear motion system described above offers:

- Suitable for dirty environments
- High speed and acceleration
- Maintenance free
- High load capacity
- Low friction
- Long life
- Low noise

PAS with recirculating ball guides with cage

The recirculating ball guides used for PAS have the cage system. The cage included has two purposes: it reduces the friction between the guide and the slider, increasing their service life, and allows lubrication refills to be performed more rarely. Due to the cage keeping the ball bearings apart, these units are regarded as permanently lubricated; considering the average life of handling devices, no maintenance is needed before 2000 Km.

The linear motion system described above offers:

- High permissible bending moments
- High accuracy of the movement
- High speed and acceleration
- High load capacity
- High rigidity
- Low friction
- Long life
- Low noise

PAR

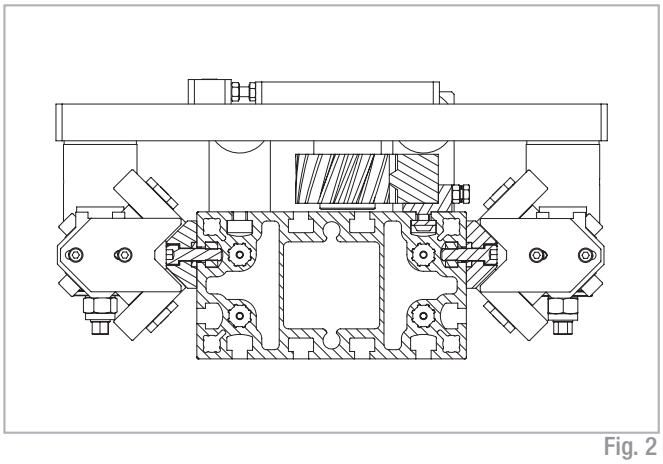


Fig. 2

PAS

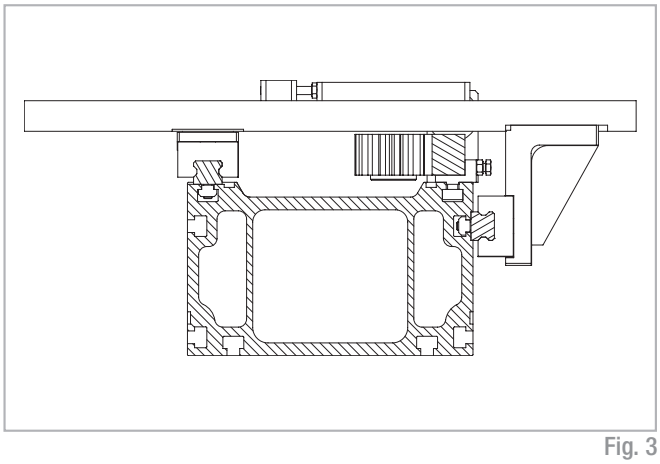
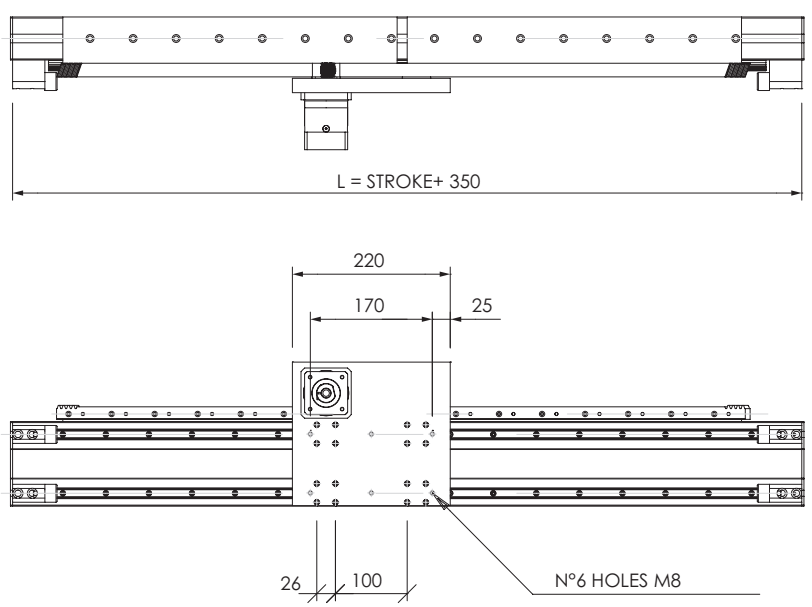


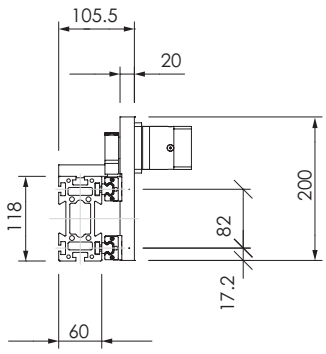
Fig. 3

PAS 118

30 Kg — PC — 80 Kg
High Cycle Rate — Low Cycle Rate

PAS 118 Dimension





See profile section at page TL-44

The length of the safety stroke is provided on request according to the customer's specific requirements.

Fig. 4

Technical data

	Type
	PAS 118
Max. useful stroke length [mm]*1	9550
Max. positioning repeatability [mm]*2	± 0.05
Max. speed [m/s]	4
Max. acceleration [m/s²]	5
Rack module	m 2
Pinion pitch diameter [mm]	38.2
Carriage displacement per pinion turn [mm]	120
Carriage weight [kg]	3.5
Zero travel weight [kg]	11
Weight for 100 mm useful stroke [kg]	1.9
Rail size [mm]	15

*1) It is possible to obtain longer stroke by means of special Rollon joints
*2) Positioning repeatability is dependent on the type of transmission used

Tab. 4

Moments of inertia of the aluminum body

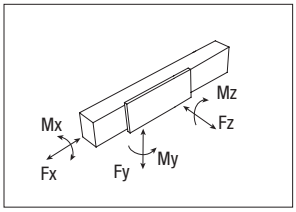
Type	I_x [mm⁴]	I_y [mm⁴]	I_p [10⁷ mm⁴]
PAS 118	4,322,574	1,011,437	5,334,011

Tab. 5

Rack specifications

Type	Type of rack	Rack module	Quality
PAS 118	Helical teeth hardened ground	m 2	Q6

Tab. 6



PAS 118 - Load capacity

Type	F_x [N]	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
PAS 118	1814	96800	45082	96800	3969	6098	6098

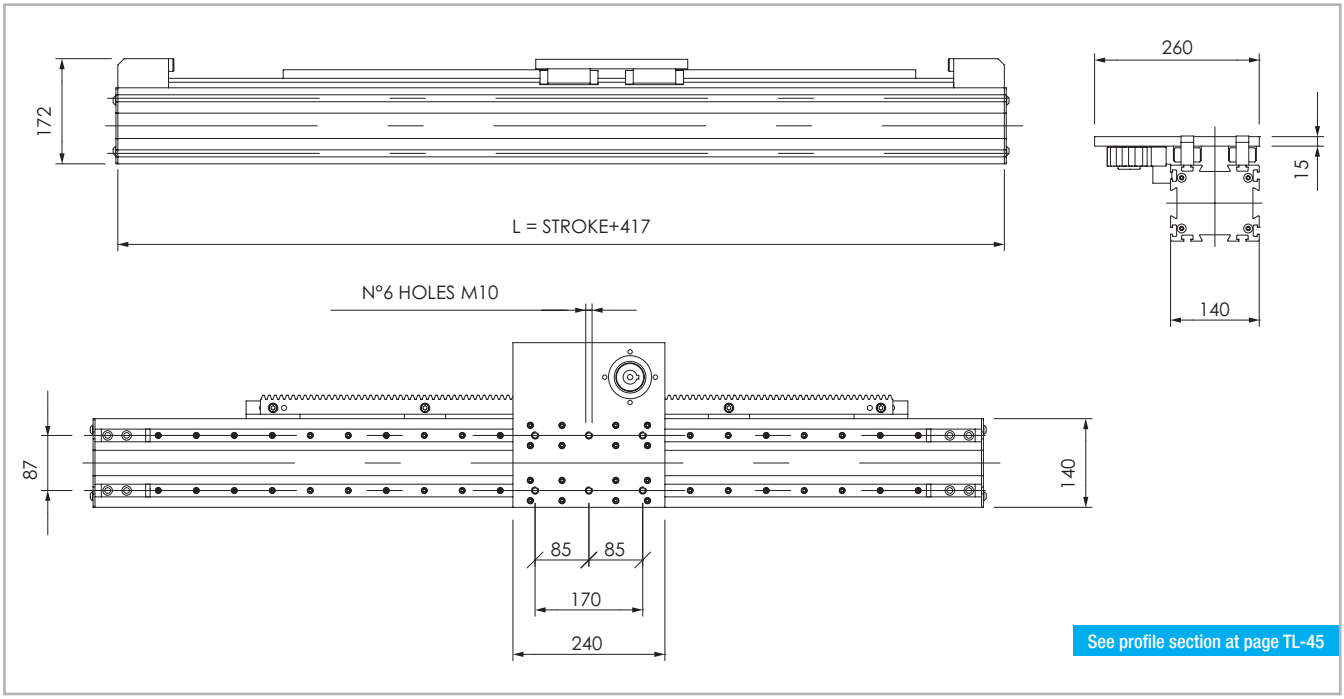
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 7

PAS 140

80 Kg — PC — 160 Kg
High Cycle Rate — Low Cycle Rate

PAS 140 Dimension



See profile section at page TL-45

The length of the safety stroke is provided on request according to the customer's specific requirements.

Fig. 5

Technical data

	Type
	PAS 140
Max. useful stroke length [mm]*1	7100
Max. positioning repeatability [mm]*2	± 0.05
Max. speed [m/s]	4
Max. acceleration [m/s^2]	5
Rack module	m 3
Pinion pitch diameter [mm]	63.66
Carriage displacement per pinion turn [mm]	200
Carriage weight [kg]	5
Zero travel weight [kg]	15
Weight for 100 mm useful stroke [kg]	2.6
Rail size [mm]	20

*1) It is possible to obtain longer stroke by means of special Rollon joints
*2) Positioning repeatability is dependent on the type of transmission used

Tab. 8

Moments of inertia of the aluminum body

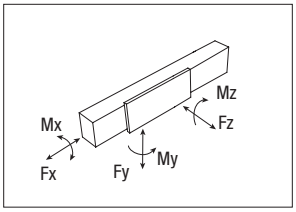
Type	I_x [mm^4]	I_y [mm^4]	I_p [10^7 mm^4]
PAS 140	11,482,500	8,919,600	20,402,100

Tab. 9

Rack specifications

Type	Type of rack	Rack module	Quality
PAS 140	Helical teeth hardened ground	m 3	Q6

Tab. 10



PAS 140 - Load capacity

Type	F_x [N]	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
PAS 140	5714	201200	89212	201200	8752	13581	13581

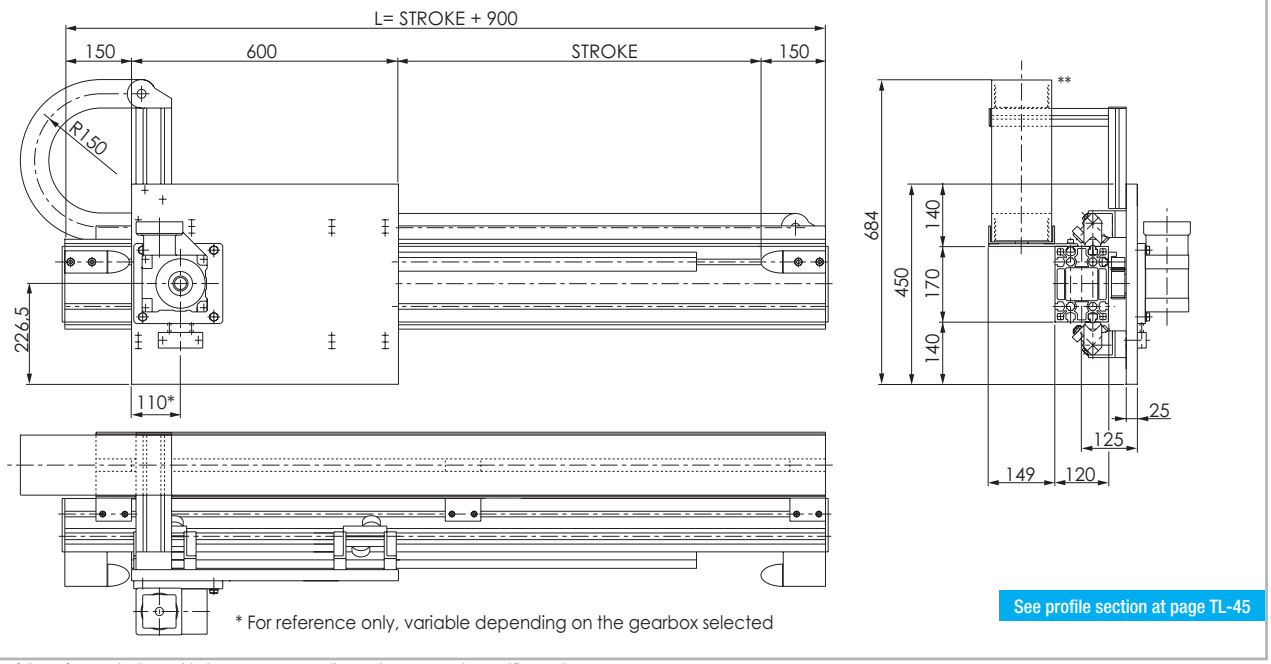
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 11

PAR 170

80 Kg — PC — 250 Kg
High Cycle Rate — Low Cycle Rate

PAR 170 Dimension



See profile section at page TL-45

The length of the safety stroke is provided on request according to the customer's specific requirements.
**Cable carrier offered as option

Fig. 6

Technical data

	Type
	PAR 170
Max. useful stroke length [mm]*1	11100
Max. positioning repeatability [mm]*2	± 0.05
Max. speed [m/s]	3.5
Max. acceleration [m/s²]	10
Rack module	m 3
Pinion pitch diameter [mm]	63.66 (89.13)
Carriage displacement per pinion turn [mm]	200 (280)
Carriage weight [kg]	29
Zero travel weight [kg]	59
Weight for 100 mm useful stroke [kg]	3.1
Rail size [mm]	35x16

*1) It is possible to obtain longer stroke by means of special Rollon joints
*2) Positioning repeatability is dependent on the type of transmission used

Tab. 12

Moments of inertia of the aluminum body

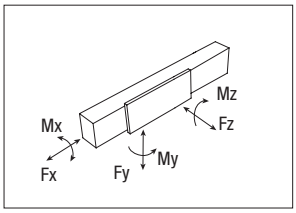
Type	I_x [mm⁴]	I_y [mm⁴]	I_p [10⁷ mm⁴]
PAR 170	19,734,283	9,835,781	29,570,064

Tab. 13

Rack specifications

Type	Type of rack	Rack module	Quality
PAR 170	Helical teeth hardened ground	m 3	Q6

Tab. 14



PAR 170 - Load capacity

Type	F_x [N]	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
PAR 170	5714	14142	65928	14142	1202	3076	3076

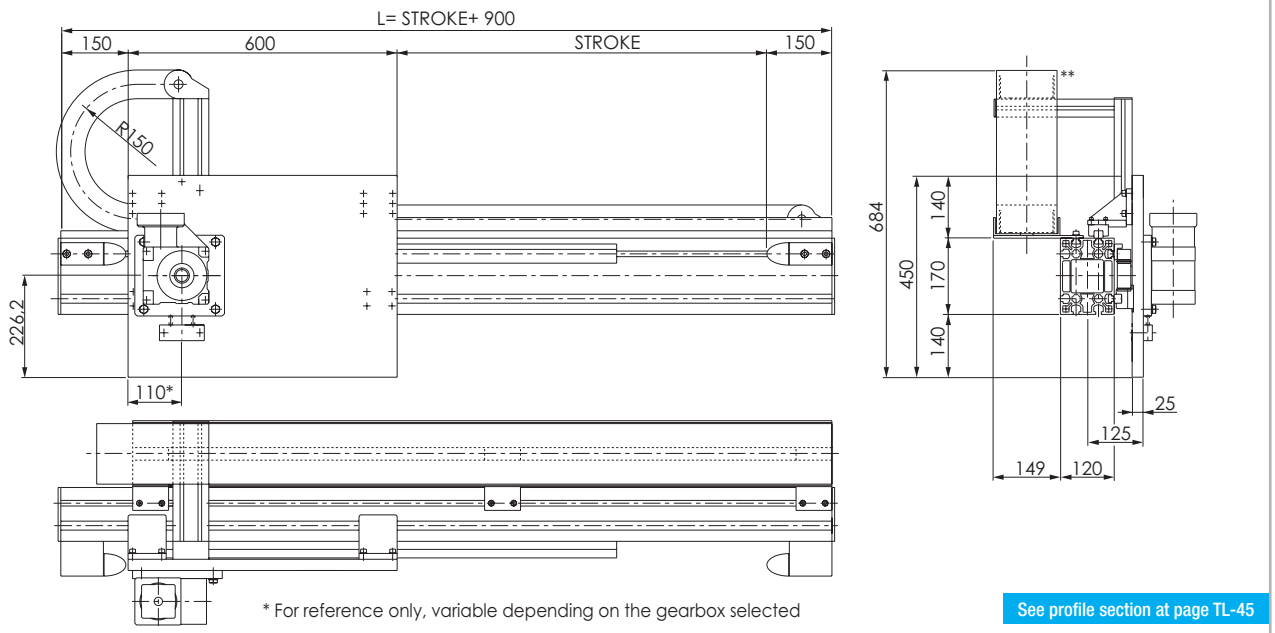
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 15

PAS 170

80 Kg — PC — 250 Kg
High Cycle Rate — Low Cycle Rate

PAS 170 Dimension



See profile section at page TL-45

The length of the safety stroke is provided on request according to the customer's specific requirements.
**Cable carrier offered as option

Fig. 7

Technical data

	Type
	PAS 170
Max. useful stroke length [mm]*1	11100
Max. positioning repeatability [mm]*2	± 0.05
Max. speed [m/s]	3.5
Max. acceleration [m/s²]	10
Rack module	m 3
Pinion pitch diameter [mm]	63.66 (89.13)
Carriage displacement per pinion turn [mm]	200 (280)
Carriage weight [kg]	29
Zero travel weight [kg]	57
Weight for 100 mm useful stroke [kg]	2.9
Rail size [mm]	20

*1) It is possible to obtain longer stroke by means of special Rollon joints
*2) Positioning repeatability is dependent on the type of transmission used

Tab. 16

Moments of inertia of the aluminum body

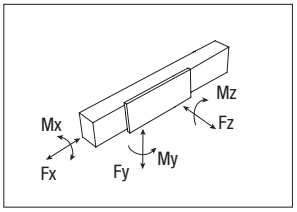
Type	I_x [mm⁴]	I_y [mm⁴]	I_p [10⁷ mm⁴]
PAS 170	19,734,283	9,835,781	29,570,064

Tab. 17

Rack specifications

Type	Type of rack	Rack module	Quality
PAS 170	Helical teeth hardened ground	m 3	Q6

Tab. 18



PAS 170 - Load capacity

Type	F_x [N]	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Stat.	DYN.	Stat.	Stat.	Stat.	Stat.
PAS 170	5714	153600	70798	153600	10368	39552	39552

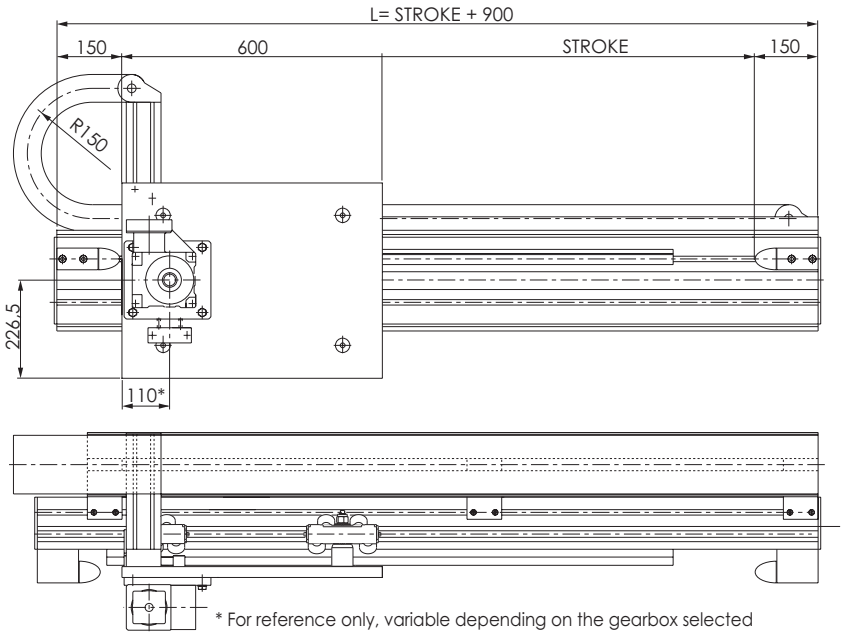
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 19

PAR 200

PC
100 Kg — 300 Kg
High Cycle Rate — Low Cycle Rate

PAR 200 Dimension



* For reference only, variable depending on the gearbox selected

See profile section at page TL-45

The length of the safety stroke is provided on request according to the customer's specific requirements.
**Cable carrier offered as option

Fig. 8

Technical data

	Type
	PAR 200
Max. useful stroke length [mm]*1	11100
Max. positioning repeatability [mm]*2	± 0.05
Max. speed [m/s]	3
Max. acceleration [m/s²]	7
Rack module	m 3
Pulley pitch diameter [mm]	63.66 (89,13)
Carriage displacement per pulley turn [mm]	200 (280)
Carriage weight [kg]	36
Zero travel weight [kg]	70
Weight for 100 mm useful stroke [kg]	3.5
Rail size [mm]	35x16

*1) It is possible to obtain longer stroke by means of special Rollon joints
*2) Positioning repeatability is dependent on the type of transmission used

Tab. 20

Moments of inertia of the aluminum body

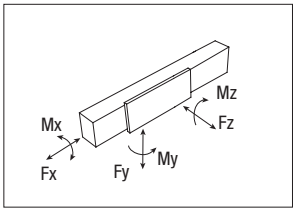
Type	I_x [mm⁴]	I_y [mm⁴]	I_p [10⁷ mm⁴]
PAR 200	32,697,979	12,893,004	45,860,983

Tab. 21

Rack specifications

Type	Type of rack	Rack module	Quality
PAR 200	Helical teeth hardened ground	m 3	Q6

Tab. 22



PAR 200 - Load capacity

Type	F_x [N]	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
PAR 200	5714	14142	65928	14142	1414	3536	3536

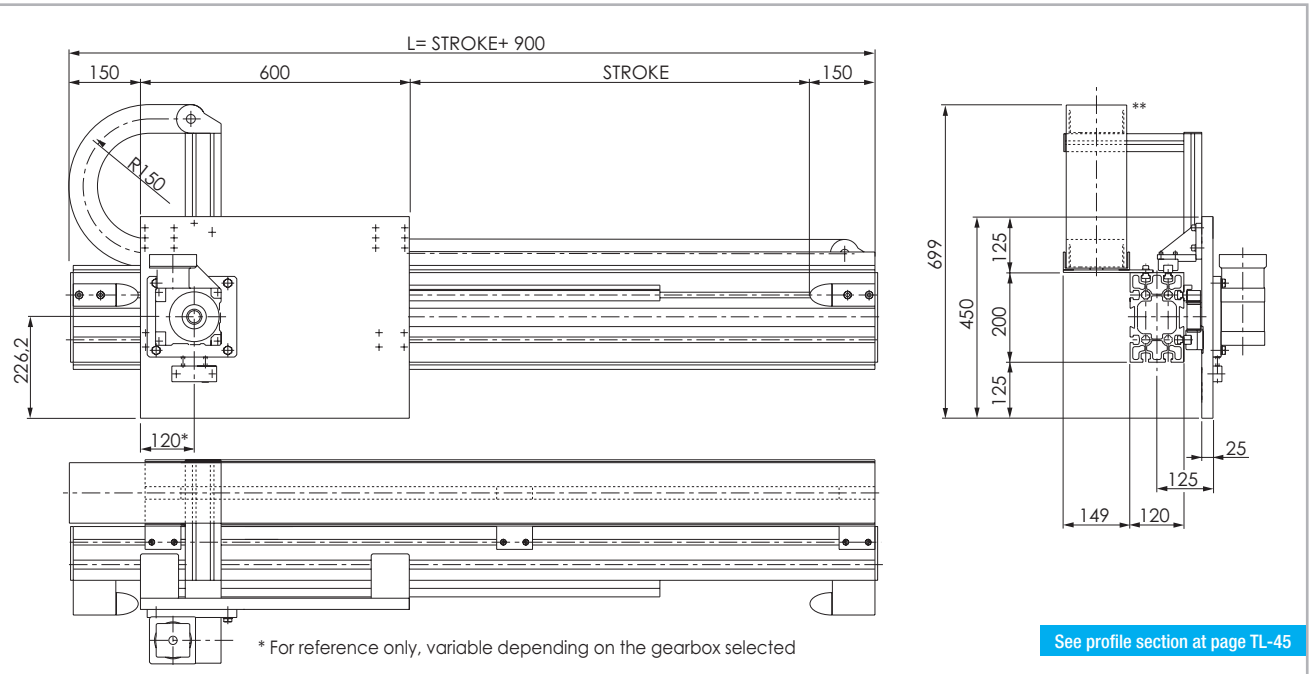
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 23

PAS 200

100 Kg — PC — 300 Kg
High Cycle Rate — Low Cycle Rate

PAS 200 Dimension



See profile section at page TL-45

The length of the safety stroke is provided on request according to the customer's specific requirements.
**Cable carrier offered as option

Fig. 9

Technical data

	Type
	PAS 200
Max. useful stroke length [mm]*1	11100
Max. positioning repeatability [mm]*2	± 0.05
Max. speed [m/s]	3
Max. acceleration [m/s^2]	7
Rack module	m 3
Pinion pitch diameter [mm]	63.66 (89,13)
Carriage displacement per pinion turn [mm]	200 (280)
Carriage weight [kg]	36
Zero travel weight [kg]	68
Weight for 100 mm useful stroke [kg]	3.3
Rail size [mm]	20

*1) It is possible to obtain longer stroke by means of special Rollon joints
*2) Positioning repeatability is dependent on the type of transmission used

Tab. 24

Moments of inertia of the aluminum body

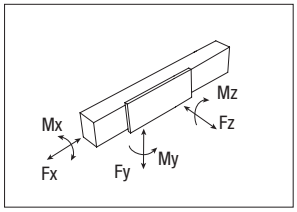
Type	I_x [mm^4]	I_y [mm^4]	I_p [10^7 mm^4]
PAS 200	32,697,979	12,893,004	45,860,983

Tab. 25

Rack specifications

Type	Type of rack	Rack module	Quality
PAS200	Helical teeth hardened ground	m 3	Q6

Tab. 26



PAS 200-20 - Load capacity

Type	F_x [N]	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
PAS 200	5714	153600	70798	153600	11520	39552	39552

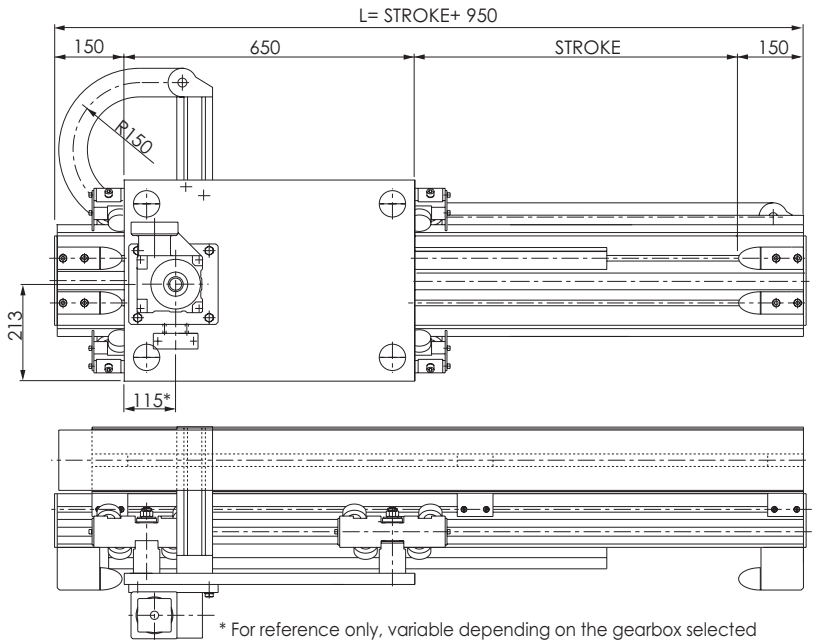
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 27

PAR 200P

100 Kg — PC — 400 Kg
High Cycle Rate — Low Cycle Rate

PAR 200P Dimension



See profile section at page TL-45

The length of the safety stroke is provided on request according to the customer's specific requirements.
**Cable carrier offered as option

Fig. 10

Technical data

	Type
	PAR 200P
Max. useful stroke length [mm]*1	11050
Max. positioning repeatability [mm]*2	± 0.05
Max. speed [m/s]	3
Max. acceleration [m/s²]	7
Rack module	m 4
Pinion pitch diameter [mm]	76.39 (106.1)
Carriage displacement per pinion turn [mm]	240 (333.33)
Carriage weight [kg]	48
Zero travel weight [kg]	96
Weight for 100 mm useful stroke [kg]	4.8
Rail size [mm]	55x25

*1) It is possible to obtain longer stroke by means of special Rollon joints
*2) Positioning repeatability is dependent on the type of transmission used

Tab. 28

Moments of inertia of the aluminum body

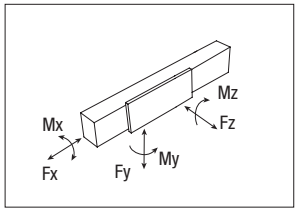
Type	I_x [mm⁴]	I_y [mm⁴]	I_p [10⁷ mm⁴]
PAR 200P	32,697,979	12,893,004	45,860,983

Tab. 29

Rack specifications

Type	Type of rack	Rack module	Quality
PAR 200P	Helical teeth hardened ground	m 4	Q6

Tab. 30



PAR 200P - Load capacity

Type	F_x [N]	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
PAR 200P	10989	24042	112593	24042	2404	6611	6611

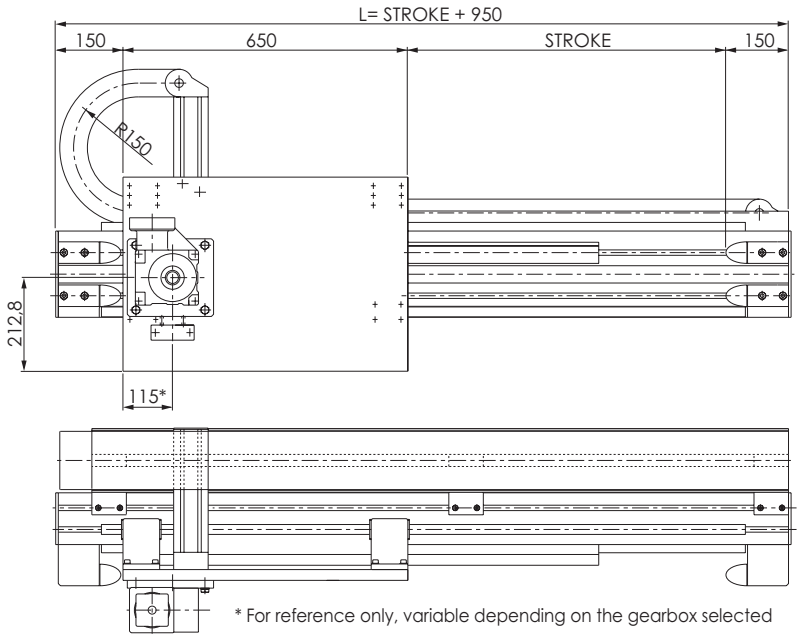
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 31

PAS 200P

100 Kg — PC — 400 Kg
High Cycle Rate — Low Cycle Rate

PAS 200P Dimension



* For reference only, variable depending on the gearbox selected

See profile section at page TL-45

The length of the safety stroke is provided on request according to the customer's specific requirements.
**Cable carrier offered as option

Fig. 11

Technical data

	Type
	PAS 200P
Max. useful stroke length [mm]*1	11050
Max. positioning repeatability [mm]*2	± 0.05
Max. speed [m/s]	3
Max. acceleration [m/s^2]	7
Rack module	m 4
Pinion pitch diameter [mm]	76.39 (106.1)
Carriage displacement per pinion turn [mm]	240 (333.33)
Carriage weight [kg]	38
Zero travel weight [kg]	80
Weight for 100 mm useful stroke [kg]	4.0
Rail size [mm]	25

*1) It is possible to obtain longer stroke by means of special Rollon joints
*2) Positioning repeatability is dependent on the type of transmission used

Tab. 32

Moments of inertia of the aluminum body

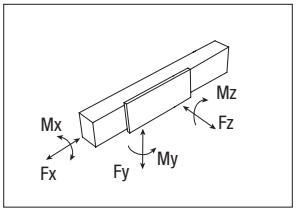
Type	I_x [mm^4]	I_y [mm^4]	I_p [10^7 mm^4]
PAS 200P	32,697,979	12,893,004	45,860,983

Tab. 33

Rack specifications

Type	Type of rack	Rack module	Quality
PAS 200P	Helical teeth hardened ground	m 4	Q6

Tab. 34



PAS 200P - Load capacity

Type	F_x [N]	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
PAS 200P	10989	258800	116833	258800	19410	73111	73111

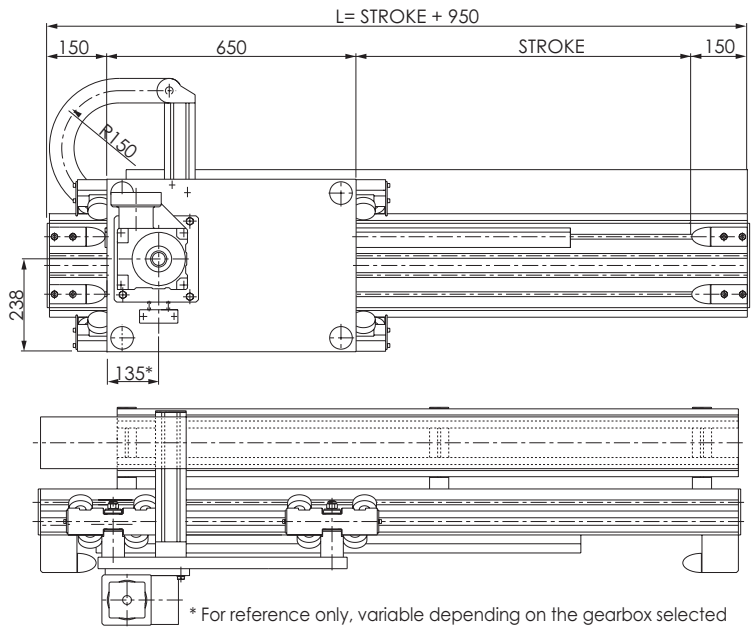
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 35

PAR 220

PC
250 Kg — 500 Kg
High Cycle Rate — Low Cycle Rate

PAR 220 Dimension



* For reference only, variable depending on the gearbox selected

See profile section at page TL-46

The length of the safety stroke is provided on request according to the customer's specific requirements.
**Cable carrier offered as option

Fig. 12

Technical data

	Type
	PAR 220
Max. useful stroke length [mm]*1	11050
Max. positioning repeatability [mm]*2	± 0.05
Max. speed [m/s]	3
Max. acceleration [m/s²]	6
Rack module	m 4
Pinion pitch diameter [mm]	76.39 (106.1)
Carriage displacement per pinion turn [mm]	240 (333.33)
Carriage weight [kg]	54
Zero travel weight [kg]	106
Weight for 100 mm useful stroke [kg]	5.2
Rail size [mm]	55x25

*1) It is possible to obtain longer stroke by means of special Rollon joints
*2) Positioning repeatability is dependent on the type of transmission used

Tab. 36

Moments of inertia of the aluminum body

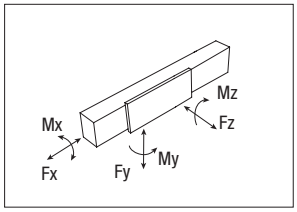
Type	I_x [mm⁴]	I_y [mm⁴]	I_p [10⁷ mm⁴]
PAR 220	46,248,422	15,591,381	61,839,803

Tab. 37

Rack specifications

Type	Type of rack	Rack module	Quality
PAR 220	Helical teeth hardened ground	m 4	Q6

Tab. 38



PAR 220 - Load capacity

Type	F_x [N]	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
PAR 220	10989	29981	149063	29981	3298	8425	8425

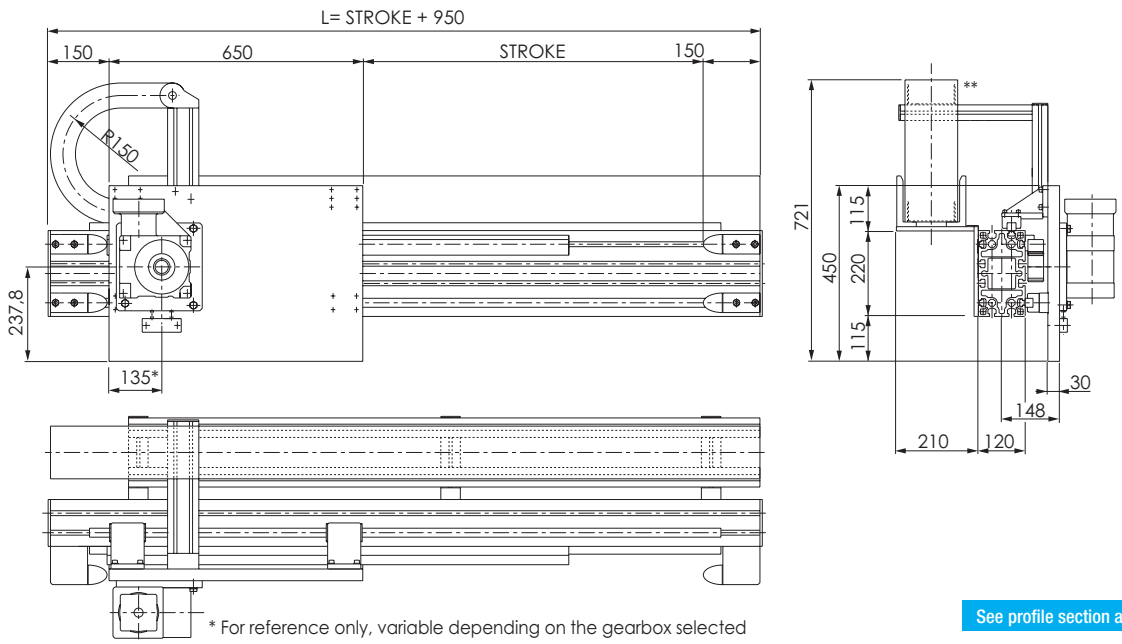
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 39

PAS 220

250 Kg — PC (High Cycle Rate / Low Cycle Rate) — 500 Kg

PAS 220 Dimension



See profile section at page TL-46

The length of the safety stroke is provided on request according to the customer's specific requirements.
**Cable carrier offered as option

Fig. 13

Technical data

	Type
	PAS 220
Max. useful stroke length [mm]*1	11050
Max. positioning repeatability [mm]*2	± 0.05
Max. speed [m/s]	3
Max. acceleration [m/s^2]	6
Rack module	m 4
Pinion pitch diameter [mm]	76.39 (106.1)
Carriage displacement per pinion turn [mm]	240 (333.33)
Carriage weight [kg]	44
Zero travel weight [kg]	99
Weight for 100 mm useful stroke [kg]	4.4
Rail size [mm]	25

*1) It is possible to obtain longer stroke by means of special Rollon joints
*2) Positioning repeatability is dependent on the type of transmission used

Tab. 40

Moments of inertia of the aluminum body

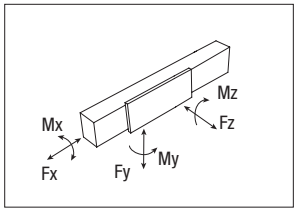
Type	I_x [mm^4]	I_y [mm^4]	I_p [10^7 mm^4]
PAS 220	46,248,422	15,591,381	61,839,803

Tab. 41

Rack specifications

Type	Type of rack	Rack module	Quality
PAS 220	Helical teeth hardened ground	m 4	Q6

Tab. 42



PAS 220 - Load capacity

Type	F_x [N]	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
PAS 220	10989	258800	116833	258800	23939	73111	73111

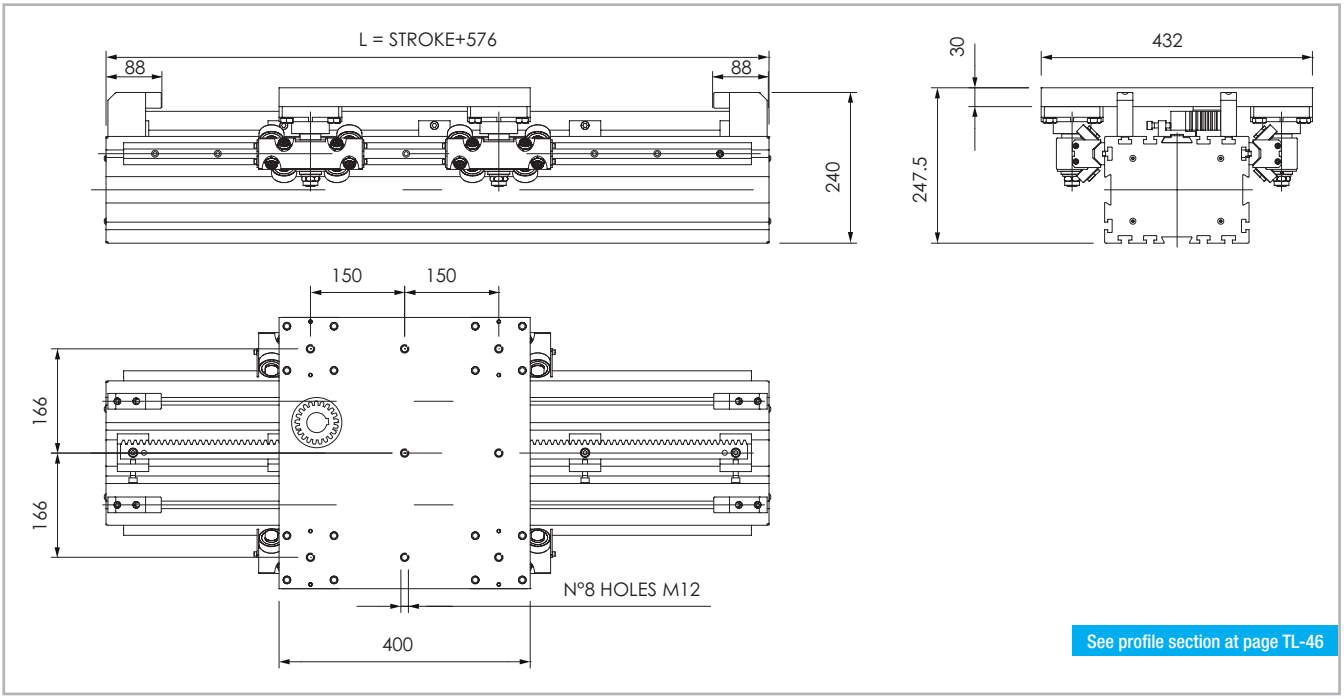
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 43

PAR 230

150 Kg — PC — 270 Kg
High Cycle Rate — Low Cycle Rate

PAR 230 Dimension



See profile section at page TL-46

The length of the safety stroke is provided on request according to the customer's specific requirements.

Fig. 14

Technical data

	Type
	PAR 230
Max. useful stroke length [mm]*1	11400
Max. positioning repeatability [mm]*2	± 0.05
Max. speed [m/s]	3
Max. acceleration [m/s²]	6
Rack module	m 3
Pinion pitch diameter [mm]	(89.13) 63.66
Carriage displacement per pinion turn [mm]	(280) 200
Carriage weight [kg]	25
Zero travel weight [kg]	50
Weight for 100 mm useful stroke [kg]	4
Rail size [mm]	35x16

*1) It is possible to obtain longer stroke by means of special Rollon joints
*2) Positioning repeatability is dependent on the type of transmission used

Tab. 44

Moments of inertia of the aluminum body

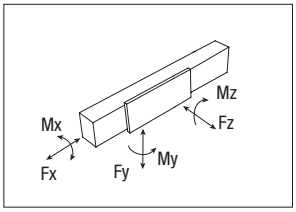
Type	I_x [mm⁴]	I_y [mm⁴]	I_p [10⁷ mm⁴]
PAR 230	65,009,000	37,783,000	102,792,000

Tab. 45

Rack specifications

Type	Type of rack	Rack module	Quality
PAR 230	Helical teeth hardened ground	m 3	Q6

Tab. 46



PAR 230 - Load capacity

Type	F_x [N]	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
PAR 230	5714	14142	65928	14142	1626	2121	2121

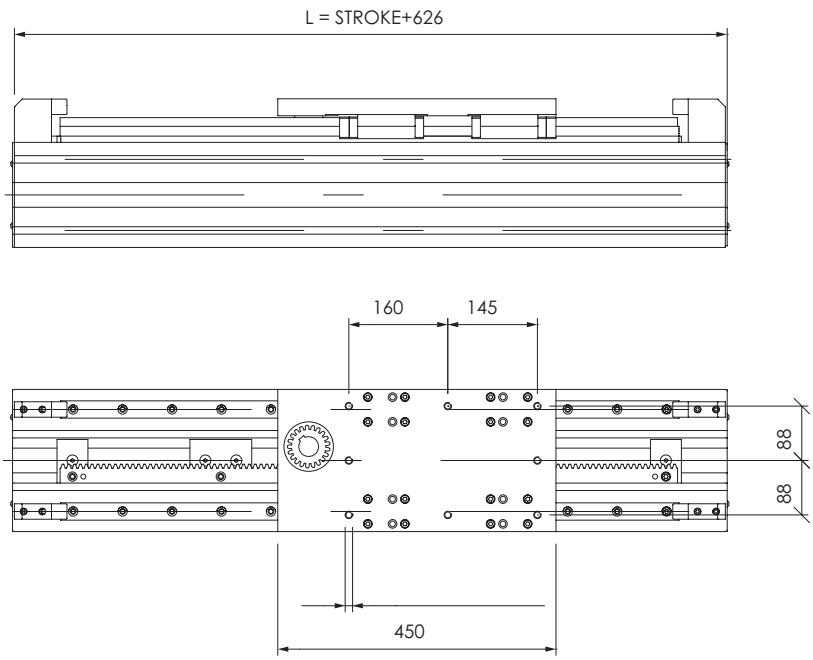
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 47

PAS 230

280 Kg — PC — 580 Kg
High Cycle Rate — Low Cycle Rate

PAS 230 Dimension



See profile section at page TL-46

The length of the safety stroke is provided on request according to the customer's specific requirements.

Fig. 15

Technical data

	Type
	PAS 230
Max. useful stroke length [mm]*1	11350
Max. positioning repeatability [mm]*2	± 0.05
Max. speed [m/s]	3
Max. acceleration [m/s^2]	5
Rack module	m 3
Pinion pitch diameter [mm]	63.66
Carriage displacement per pinion turn [mm]	200
Carriage weight [kg]	12.5
Zero travel weight [kg]	41
Weight for 100 mm useful stroke [kg]	4.35
Rail size [mm]	30

*1) It is possible to obtain longer stroke by means of special Rollon joints
*2) Positioning repeatability is dependent on the type of transmission used

Tab. 48

Moments of inertia of the aluminum body

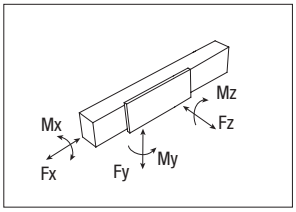
Type	I_x [mm^4]	I_y [mm^4]	I_p [10^7 mm^4]
PAS 230	65,009,000	37,783,000	102,792,000

Tab. 49

Rack specifications

Type	Type of rack	Rack module	Quality
PAS 230	Helical teeth hardened ground	m 3	Q6

Tab. 50



PAS 230 - Load capacity

Type	F_x [N]	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
PAS 230	5714	355200	172074	355200	29304	35520	35520

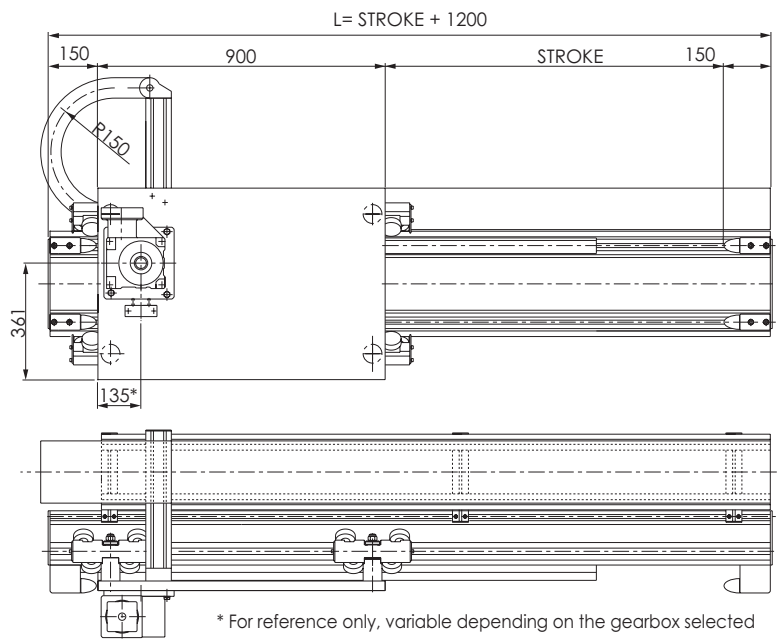
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 51

PAR 280

PC
300 Kg — 600 Kg
High Cycle Rate — Low Cycle Rate

PAR 280 Dimension



* For reference only, variable depending on the gearbox selected

See profile section at page TL-47

The length of the safety stroke is provided on request according to the customer's specific requirements.
**Cable carrier offered as option

Fig. 16

Technical data

	Type
	PAR 280
Max. useful stroke length [mm]*1	10800
Max. positioning repeatability [mm]*2	± 0.05
Max. speed [m/s]	3
Max. acceleration [m/s²]	4
Rack module	m 4
Pinion pitch diameter [mm]	76.39 (106.1)
Carriage displacement per pinion turn [mm]	240 (333.33)
Carriage weight [kg]	79
Zero travel weight [kg]	164
Weight for 100 mm useful stroke [kg]	6.6
Rail size [mm]	55x25

*1) It is possible to obtain longer stroke by means of special Rollon joints
*2) Positioning repeatability is dependent on the type of transmission used

Tab. 52

Moments of inertia of the aluminum body

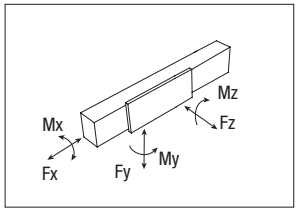
Type	I_x [mm⁴]	I_y [mm⁴]	I_p [10⁷ mm⁴]
PAR 280	126,456,800	48,292,512	174,749,312

Tab. 53

Rack specifications

Type	Type of rack	Rack module	Quality
PAR 280	Helical teeth hardened ground	m 4	Q6

Tab. 54



PAR 280 - Load capacity

Type	F_x [N]	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
PAR 280	10989	29981	149063	29981	4197	12307	12307

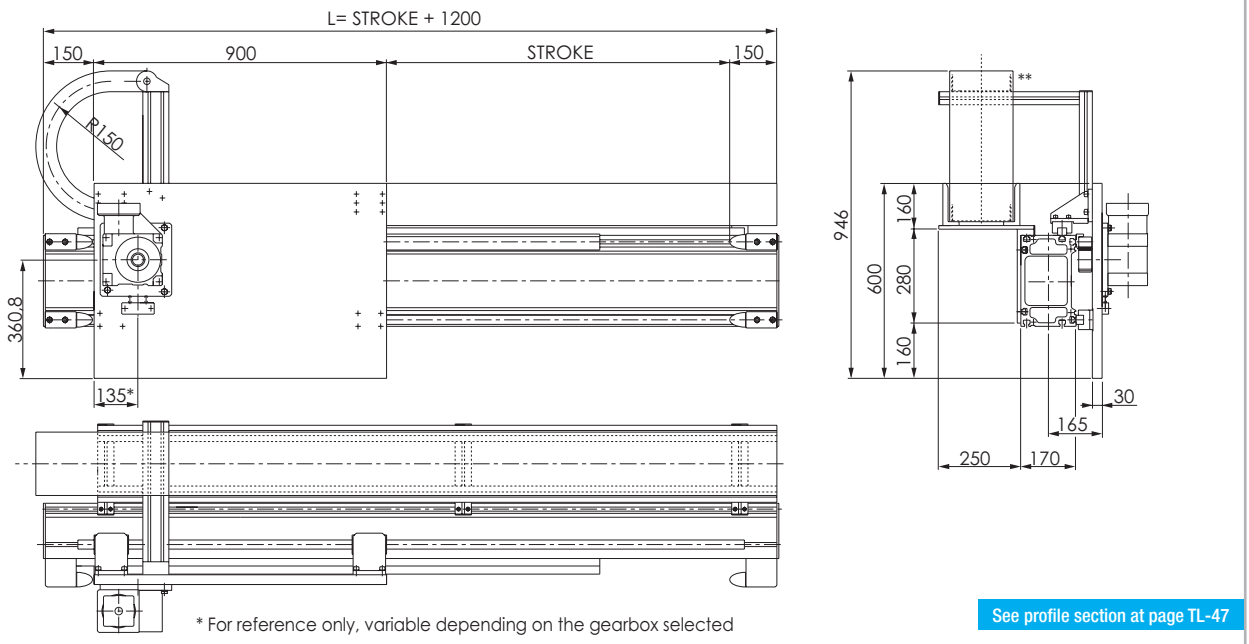
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 55

PAS 280

PC
300 Kg — 600 Kg
High Cycle Rate — Low Cycle Rate

PAS 280 Dimension



See profile section at page TL-47

The length of the safety stroke is provided on request according to the customer's specific requirements.
**Cable carrier offered as option

Fig. 17

Technical data

	Type
	PAS 280
Max. useful stroke length [mm]*1	10800
Max. positioning repeatability [mm]*2	± 0.05
Max. speed [m/s]	3
Max. acceleration [m/s^2]	5
Rack module	m 4
Pinion pitch diameter [mm]	76.39 (106.1)
Carriage displacement per pinion turn [mm]	240 (333.33)
Carriage weight [kg]	69
Zero travel weight [kg]	149
Weight for 100 mm useful stroke [kg]	6.0
Rail size [mm]	30

*1) It is possible to obtain longer stroke by means of special Rollon joints
*2) Positioning repeatability is dependent on the type of transmission used

Tab. 56

Moments of inertia of the aluminum body

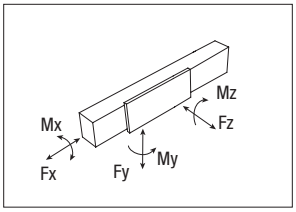
Type	I_x [mm^4]	I_y [mm^4]	I_p [10^7 mm^4]
PAS 280	126,456,800	48,292,512	174,749,312

Tab. 57

Rack specifications

Type	Type of rack	Rack module	Quality
PAS 280	Helical teeth hardened ground	m 4	Q6

Tab. 58



PAS 280 - Load capacity

Type	F_x [N]	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
PAS 280	10989	266400	142231	266400	34632	106560	106560

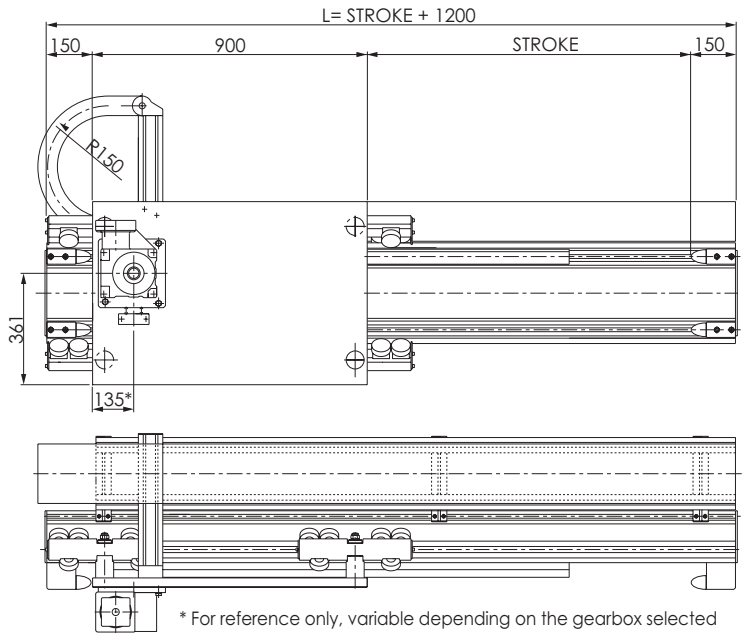
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 59

PAR 280P

PC
300 Kg — 800 Kg
High Cycle Rate — Low Cycle Rate

PAR 280P Dimension



* For reference only, variable depending on the gearbox selected

See profile section at page TL-47

The length of the safety stroke is provided on request according to the customer's specific requirements.
**Cable carrier offered as option

Fig. 18

Technical data

	Type
	PAR 280P
Max. useful stroke length [mm]*1	10800
Max. positioning repeatability [mm]*2	± 0.1
Max. speed [m/s]	2.5
Max. acceleration [m/s²]	2
Rack module	m 4
Pinion pitch diameter [mm]	76.39 (106.1)
Carriage displacement per pinion turn [mm]	240 (333.33)
Carriage weight [kg]	88
Zero travel weight [kg]	173
Weight for 100 mm useful stroke [kg]	6.6
Rail size [mm]	55x25

*1) It is possible to obtain longer stroke by means of special Rollon joints
*2) Positioning repeatability is dependent on the type of transmission used

Tab. 60

Moments of inertia of the aluminum body

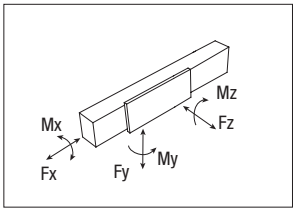
Type	I_x [mm⁴]	I_y [mm⁴]	I_p [10⁷ mm⁴]
PAR 280P	126,456,800	48,292,512	174,749,312

Tab. 61

Rack specifications

Type	Type of rack	Rack module	Quality
PAR 280P	Helical teeth hardened ground	m 4	Q6

Tab. 62



PAR 280P - Load capacity

Type	F_x [N]	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
PAR 280P	10989	29981	149063	29981	8395	11108	11108

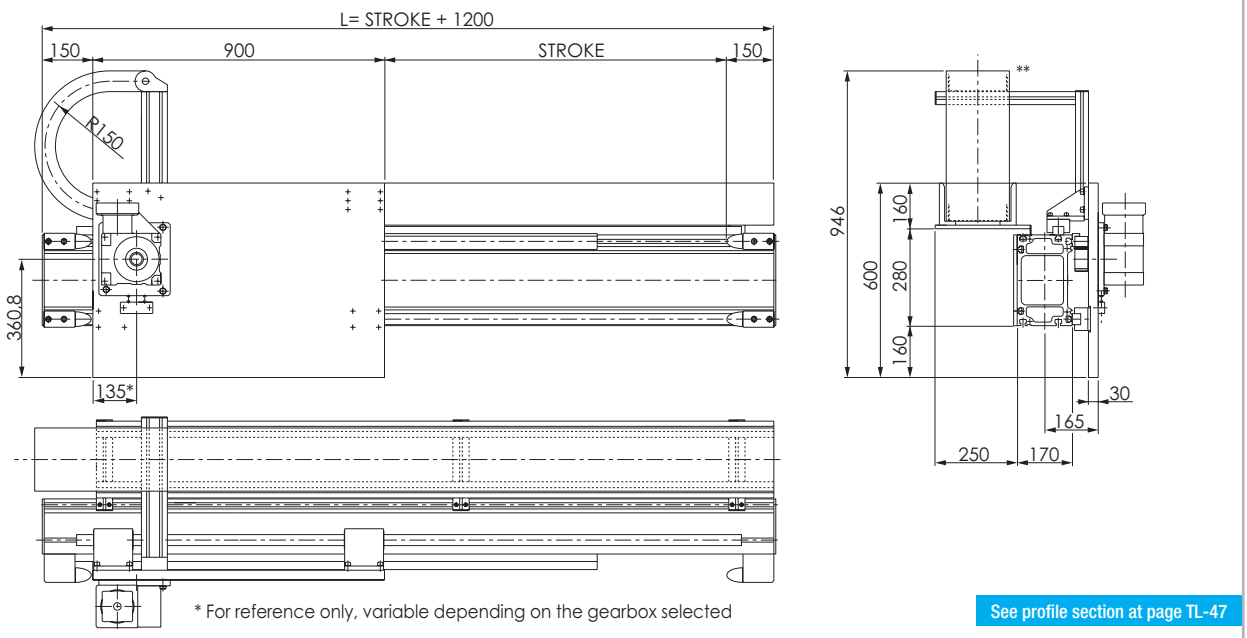
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 63

PAS 280P

PC
300 Kg — 800 Kg
High Cycle Rate — Low Cycle Rate

PAS 280P Dimension



* For reference only, variable depending on the gearbox selected

See profile section at page TL-47

The length of the safety stroke is provided on request according to the customer's specific requirements.
**Cable carrier offered as option

Fig. 19

Technical data

	Type
	PAS 280P
Max. useful stroke length [mm]*1	10800
Max. positioning repeatability [mm]*2	± 0.1
Max. speed [m/s]	2.5
Max. acceleration [m/s²]	2
Rack module	m 4
Pinion pitch diameter [mm]	76.39 (106.1)
Carriage displacement per pinion turn [mm]	240 (333.33)
Carriage weight [kg]	76
Zero travel weight [kg]	159
Weight for 100 mm useful stroke [kg]	6.4
Rail size [mm]	35

*1) It is possible to obtain longer stroke by means of special Rollon joints
*2) Positioning repeatability is dependent on the type of transmission used

Tab. 64

Moments of inertia of the aluminum body

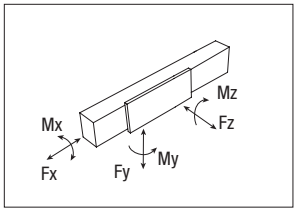
Type	I_x [mm⁴]	I_y [mm⁴]	I_p [10⁷ mm⁴]
PAS 280P	126,456,800	48,292,512	174,749,312

Tab. 65

Rack specifications

Type	Type of rack	Rack module	Quality
PAS 280P	Helical teeth hardened ground	m 4	Q6

Tab. 66



PAS 280P - Load capacity

Type	F_x [N]	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
PAS 280P	10989	386400	197790	386400	50232	150310	150310

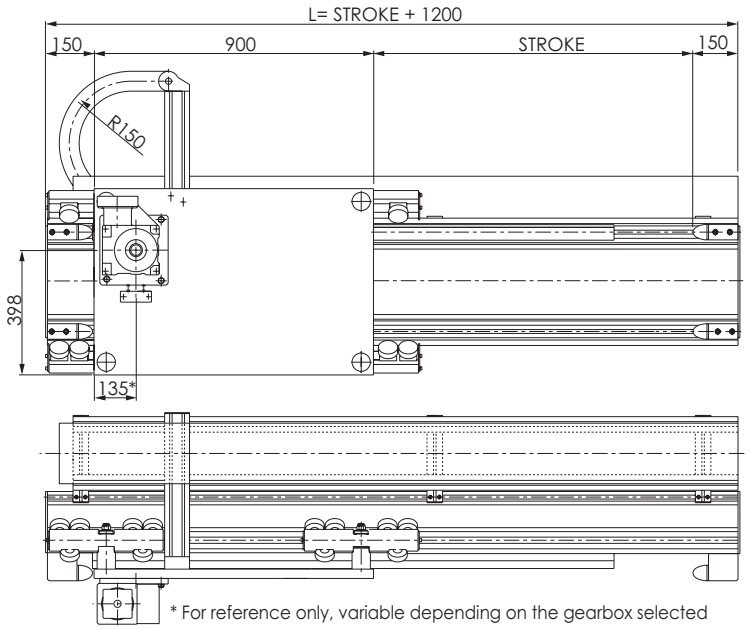
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 67

PAR 360

500 Kg — PC — 1000 Kg
High Cycle Rate — Low Cycle Rate

PAR 360 Dimension



See profile section at page TL-47

The length of the safety stroke is provided on request according to the customer's specific requirements.
**Cable carrier offered as option

Fig. 20

Technical data

	Type
	PAR 360
Max. useful stroke length [mm]*1	10800
Max. positioning repeatability [mm]*2	± 0.1
Max. speed [m/s]	2.5
Max. acceleration [m/s²]	2
Rack module	m 4
Pinion pitch diameter [mm]	76.39 (106.1)
Carriage displacement per pinion turn [mm]	240 (333.33)
Carriage weight [kg]	88
Zero travel weight [kg]	196
Weight for 100 mm useful stroke [kg]	8.5
Rail size [mm]	55x25

*1) It is possible to obtain longer stroke by means of special Rollon joints
*2) Positioning repeatability is dependent on the type of transmission used

Tab. 68

Moments of inertia of the aluminum body

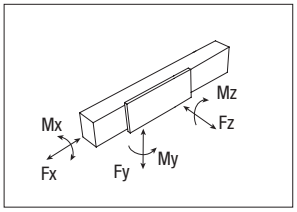
Type	I_x [mm⁴]	I_y [mm⁴]	I_p [10⁷ mm⁴]
PAR 360	317,212,806	103,285,258	420,498,064

Tab. 69

Rack specifications

Type	Type of rack	Rack module	Quality
PAR 360	Helical teeth hardened ground	m 4	Q6

Tab. 70



PAR 360 - Load capacity

Type	F_x [N]	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
PAR 360	10989	29981	149063	29981	10793	11108	11108

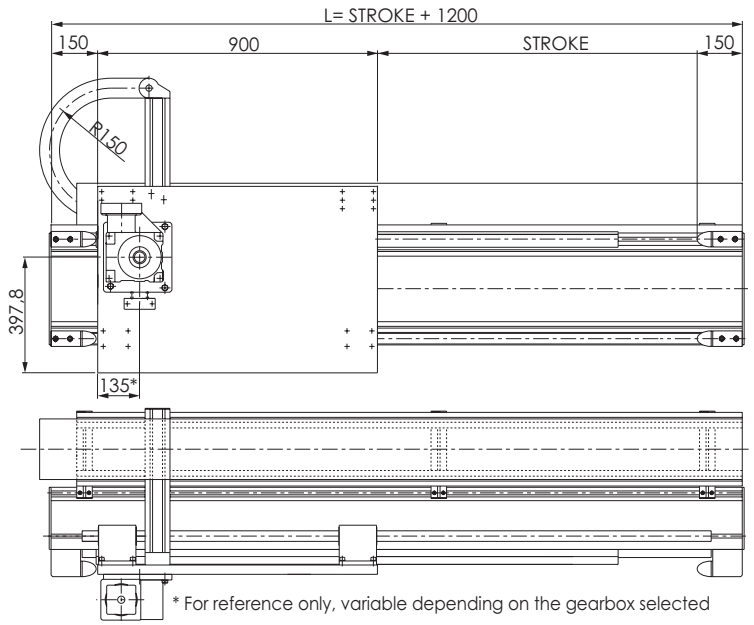
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 71

PAS 360

500 Kg — PC — 1000 Kg
High Cycle Rate — Low Cycle Rate

PAS 360 Dimension



* For reference only, variable depending on the gearbox selected

See profile section at page TL-47

The length of the safety stroke is provided on request according to the customer's specific requirements.
**Cable carrier offered as option

Fig. 21

Technical data

	Type
	PAS 360
Max. useful stroke length [mm]*1	10800
Max. positioning repeatability [mm]*2	± 0.1
Max. speed [m/s]	2.5
Max. acceleration [m/s²]	3
Rack module	m 4
Pinion pitch diameter [mm]	76.39 (106.1)
Carriage displacement per pinion turn [mm]	240 (333.33)
Carriage weight [kg]	76
Zero travel weight [kg]	182
Weight for 100 mm useful stroke [kg]	8.3
Rail size [mm]	35

*1) It is possible to obtain longer stroke by means of special Rollon joints
*2) Positioning repeatability is dependent on the type of transmission used

Tab. 72

Moments of inertia of the aluminum body

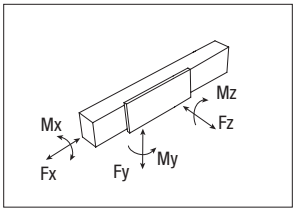
Type	I_x [mm⁴]	I_y [mm⁴]	I_p [10⁷ mm⁴]
PAS 360	317,212,806	103,285,258	420,498,064

Tab. 73

Rack specifications

Type	Type of rack	Rack module	Quality
PAS 360	Helical teeth hardened ground	m 4	Q6

Tab. 74



PAS 360 - Load capacity

Type	F_x [N]	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
PAS 360	10989	386400	197790	386400	65688	150310	150310

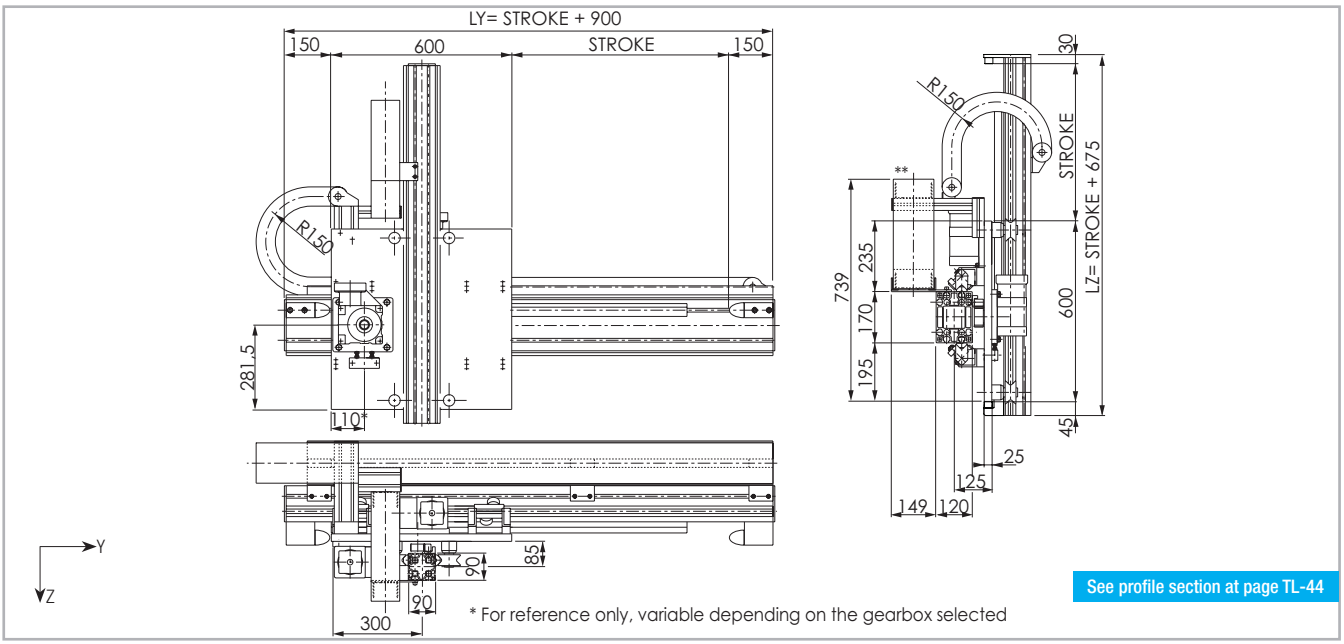
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 75

PAR 170/90

PC
25 Kg — 80 Kg
High Cycle Rate — Low Cycle Rate

PAR 170/90 Dimension



The length of the safety stroke is provided on request according to the customer's specific requirements.
**Cable carrier offered as option

Fig. 22

Technical data

	Axis	
	Y-axis	Z-axis
Max. useful stroke length [mm]	11100*1	2000
Max. positioning repeatability [mm]	± 0.05	± 0.20*2
Max. speed [m/s]	3.5	3.5
Max. acceleration [m/s²]	10	7
Rack module	m 3	m 2
Pinion pitch diameter [mm]	63.66 (89.13)	44.56 (63.66)
Carriage displacement per pinion turn [mm]	200 (280)	140 (200)
Carriage weight [kg]	44	
Zero travel weight [kg]	88	
Weight for 100 mm useful stroke [kg]	3.1	1.5
Rail size [mm]	35x16	28x11

*1) It is possible to obtain longer stroke by means of special Rollon joints
*2) Reference value considering a stroke of 1000 mm on Z-axis.

Tab. 76

Moments of inertia of the aluminum body

Axis	I_x [mm⁴]	I_y [mm⁴]	I_p [10⁷ mm⁴]
Y-axis	19,734,283	9,835,781	29,570,064
Z-axis	1,969,731	1,950,080	3,919,811

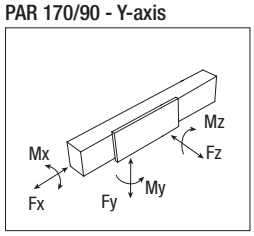
Tab. 77

Rack specifications

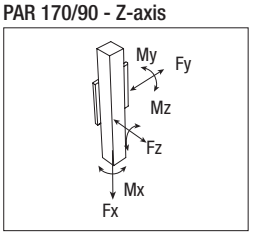
Axis	Type of rack	Rack module	Quality
Y-axis	Helical teeth hardened ground	m 3	Q6
Z-axis		m 2	

Tab. 78

PAR 170/90 - Y-axis



PAR 170/90 - Z-axis



PAR 170/90 - Load capacity

Axis	F_x [N]	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
Y-axis	5714	14142	65928	14142	1202	3076	3076
Z-axis	2902	2800	24216	2400	108	624	728

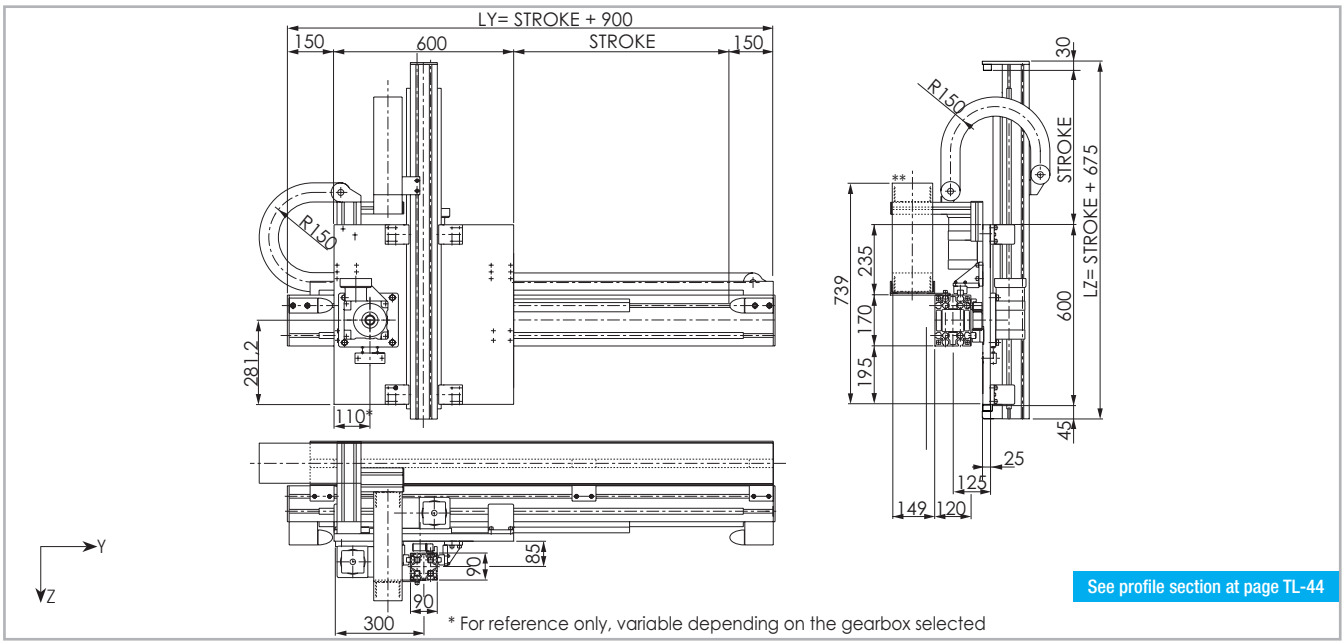
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 79

PAS 170/90

25 Kg — PC — 80 Kg
High Cycle Rate — Low Cycle Rate

PAS 170/90 Dimension



See profile section at page TL-44

The length of the safety stroke is provided on request according to the customer's specific requirements.
**Cable carrier offered as option

Fig. 23

Technical data

	Axis	
	Y-axis	Z-axis
Max. useful stroke length [mm]	11100*1	2000
Max. positioning repeatability [mm]	± 0.05	± 0.1*2
Max. speed [m/s]	3.5	3.5
Max. acceleration [m/s²]	10	7
Rack module	m 3	m 2
Pinion pitch diameter [mm]	63.66 (89.13)	44.56 (63.66)
Carriage displacement per pinion turn [mm]	200 (280)	140 (200)
Carriage weight [kg]	43	
Zero travel weight [kg]	89	
Weight for 100 mm useful stroke [kg]	2.9	1.4
Rail size [mm]	20	15

*1) It is possible to obtain longer stroke by means of special Rollon joints
*2) Reference value considering a stroke of 1000 mm on Z-axis.

Tab. 80

Moments of inertia of the aluminum body

Axis	I_x [mm⁴]	I_y [mm⁴]	I_p [10⁷ mm⁴]
Y-axis	19,734,283	9,835,781	29,570,064
Z-axis	1,969,731	1,950,080	3,919,811

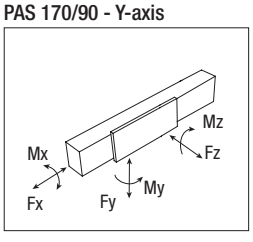
Tab. 81

Rack specifications

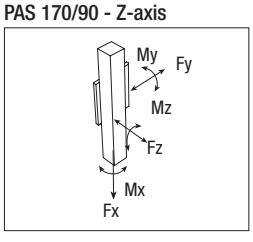
Axis	Type of rack	Rack module	Quality
Y-axis	Helical teeth hardened ground	m 3	Q6
Z-axis		m 2	

Tab. 82

PAS 170/90 - Y-axis



PAS 170/90 - Z-axis



PAS 170/90 - Load capacity

Axis	F_x [N]	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
Y-axis	5714	153600	70798	153600	10368	39552	39552
Z-axis	2902	96800	45082	96800	4356	25652	25652

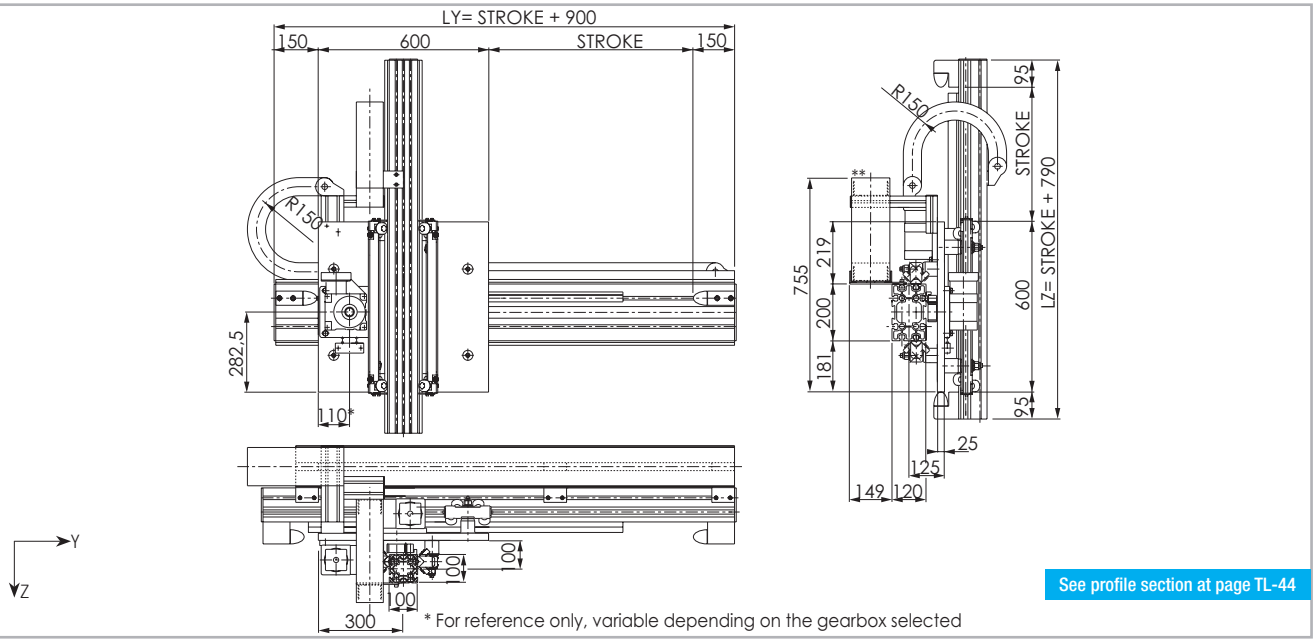
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 83

PAR 200/100

25 Kg — PC — 100 Kg
High Cycle Rate — Low Cycle Rate

PAR 200/100 Dimension



The length of the safety stroke is provided on request according to the customer's specific requirements.
**Cable carrier offered as option

Fig. 24

Technical data

	Axis	
	Y-axis	Z-axis
Max. useful stroke length [mm]	11100*1	2200
Max. positioning repeatability [mm]	± 0.05	± 0.25*2
Max. speed [m/s]	3	3
Max. acceleration [m/s²]	7	7
Rack module	m 3	m 3
Pinion pitch diameter [mm]	63.66 (89.13)	63.66 (89.13)
Carriage displacement per pinion turn [mm]	200 (280)	200 (280)
Carriage weight [kg]	54	
Zero travel weight [kg]	111	
Weight for 100 mm useful stroke [kg]	3.5	2.4
Rail size [mm]	35x16	35x16

*1) It is possible to obtain longer stroke by means of special Rollon joints
*2) Reference value considering a stroke of 1000 mm on Z-axis.

Tab. 84

Moments of inertia of the aluminum body

Axis	I_x [mm⁴]	I_y [mm⁴]	I_p [10⁷ mm⁴]
Y-axis	32,697,979	12,893,004	45,860,983
Z-axis	3,637,190	3,457,193	7,094,383

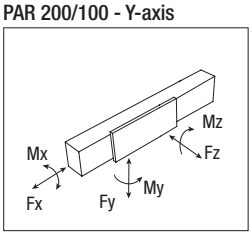
Tab. 85

Rack specifications

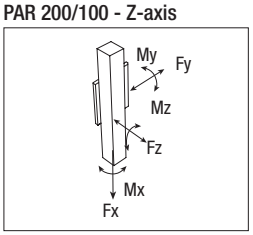
Axis	Type of rack	Rack module	Quality
Y-axis	Helical teeth hardened ground	m 3	Q6
Z-axis		m 3	

Tab. 86

PAR 200/100 - Y-axis



PAR 200/100 - Z-axis



PAR 200/100 - Load capacity

Axis	F_x [N]	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
Y-axis	5714	14142	65298	14142	1414	3536	3536
Z-axis	5714	7071	32964	7071	354	1867	1867

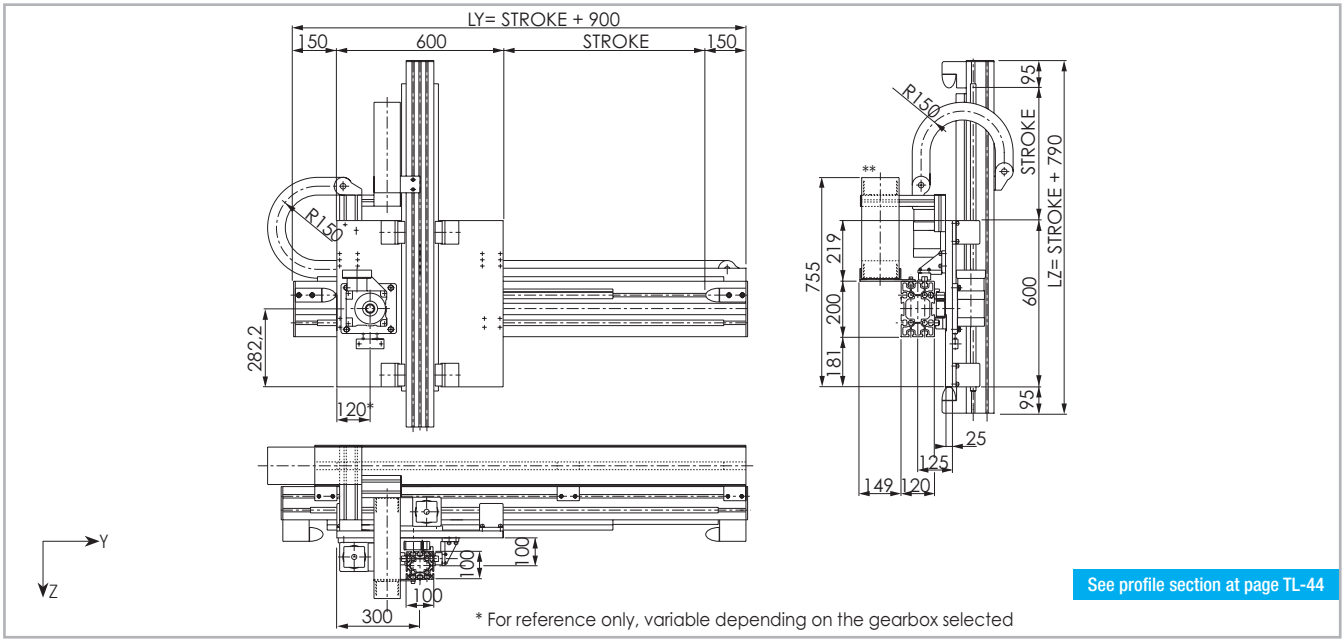
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 87

PAS 200/100

25 Kg — PC — 100 Kg
High Cycle Rate — Low Cycle Rate

PAS 200/100 Dimension



See profile section at page TL-44

The length of the safety stroke is provided on request according to the customer's specific requirements.
**Cable carrier offered as option

Fig. 25

Technical data

	Axis	
	Y-axis	Z-axis
Max. useful stroke length [mm]	11100*1	2200
Max. positioning repeatability [mm]	± 0.05	± 0.1*2
Max. speed [m/s]	3	3
Max. acceleration [m/s²]	7	7
Rack module	m 3	m 3
Pinion pitch diameter [mm]	63.66 (89.13)	63.66 (89.13)
Carriage displacement per pinion turn [mm]	200 (280)	200 (280)
Carriage weight [kg]	45	
Zero travel weight [kg]	100	
Weight for 100 mm useful stroke [kg]	3.3	2.1
Rail size [mm]	20	20

*1) It is possible to obtain longer stroke by means of special Rollon joints
*2) Reference value considering a stroke of 1000 mm on Z-axis.

Tab. 88

Moments of inertia of the aluminum body

Axis	I_x [mm⁴]	I_y [mm⁴]	I_p [10⁷ mm⁴]
Y-axis	32,697,979	12,893,004	45,860,983
Z-axis	3,637,190	3,457,193	7,094,383

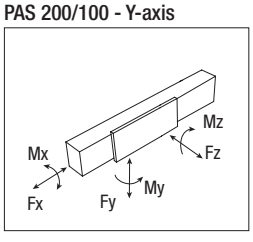
Tab. 89

Rack specifications

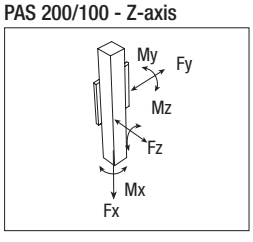
Axis	Type of rack	Rack module	Quality
Y-axis	Helical teeth hardened ground	m 3	Q6
Z-axis		m 3	

Tab. 90

PAS 200/100 - Y-axis



PAS 200/100 - Z-axis



PAS 200/100 - Load capacity

Axis	F_x [N]	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
Y-axis	5714	153600	70798	153600	11520	39552	39552
Z-axis	5714	153600	70798	153600	7680	40704	40704

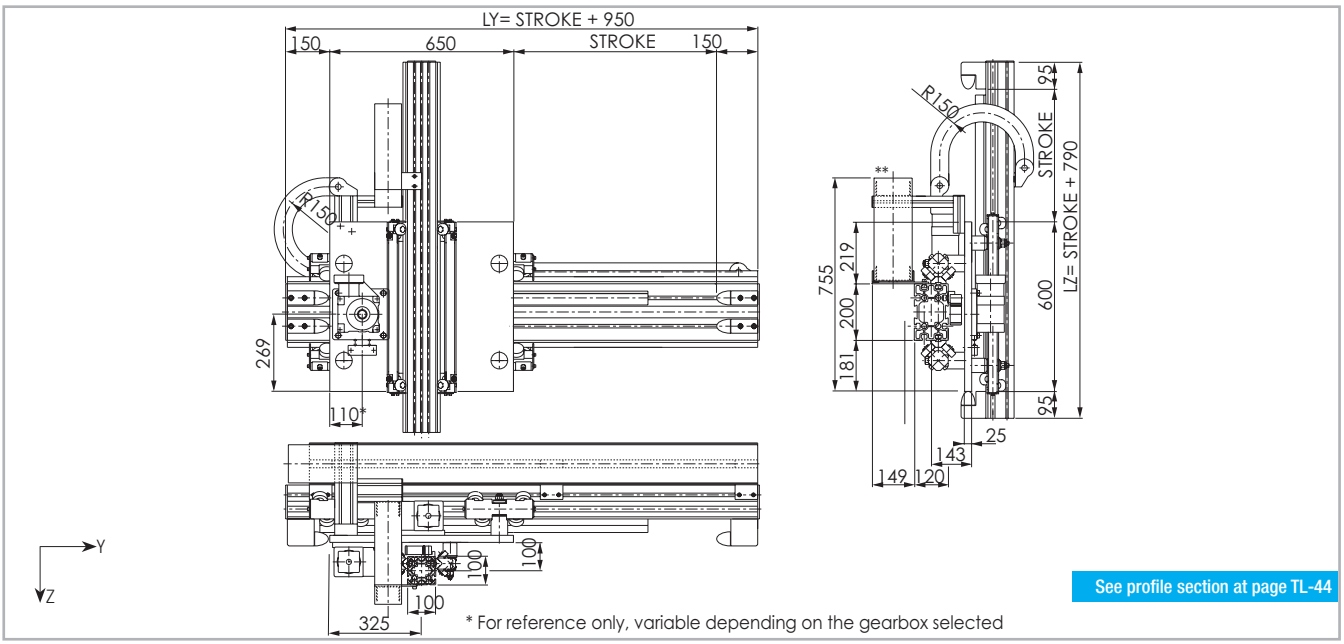
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 91

PAR 200/100P

25 Kg — PC — 100 Kg
High Cycle Rate — Low Cycle Rate

PAR 200/100 P Dimension



The length of the safety stroke is provided on request according to the customer's specific requirements.
**Cable carrier offered as option

Fig. 26

Technical data

	Axis	
	Y-axis	Z-axis
Max. useful stroke length [mm]	11050*1	2200
Max. positioning repeatability [mm]	± 0.05	± 0.25*2
Max. speed [m/s]	3	3
Max. acceleration [m/s²]	7	7
Rack module	m 4	m 3
Pinion pitch diameter [mm]	76.39 (106.1)	63.66 (89.13)
Carriage displacement per pinion turn [mm]	240 (333.33)	200 (280)
Carriage weight [kg]	69	
Zero travel weight [kg]	140	
Weight for 100 mm useful stroke [kg]	4.8	2.4
Rail size [mm]	55x25	35x16

*1) It is possible to obtain longer stroke by means of special Rollon joints
*2) Reference value considering a stroke of 1000 mm on Z-axis.

Tab. 92

Moments of inertia of the aluminum body

Axis	I_x [mm⁴]	I_y [mm⁴]	I_p [10⁷ mm⁴]
Y-axis	32,697,979	12,893,004	45,860,983
Z-axis	3,637,190	3,457,193	7,094,383

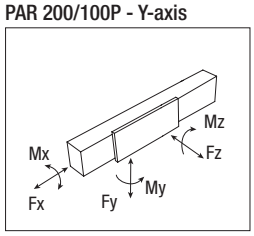
Tab. 93

Rack specifications

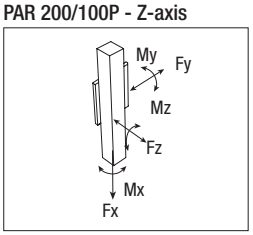
Axis	Type of rack	Rack module	Quality
Y-axis	Helical teeth hardened ground	m 4	Q6
Z-axis		m 3	

Tab. 94

PAR 200/100P - Y-axis



PAR 200/100P - Z-axis



PAR 200/100P - Load capacity

Axis	F_x [N]	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
Y-axis	10989	24042	112593	24042	2404	6611	6611
Z-axis	5714	7071	32964	7071	354	1867	1867

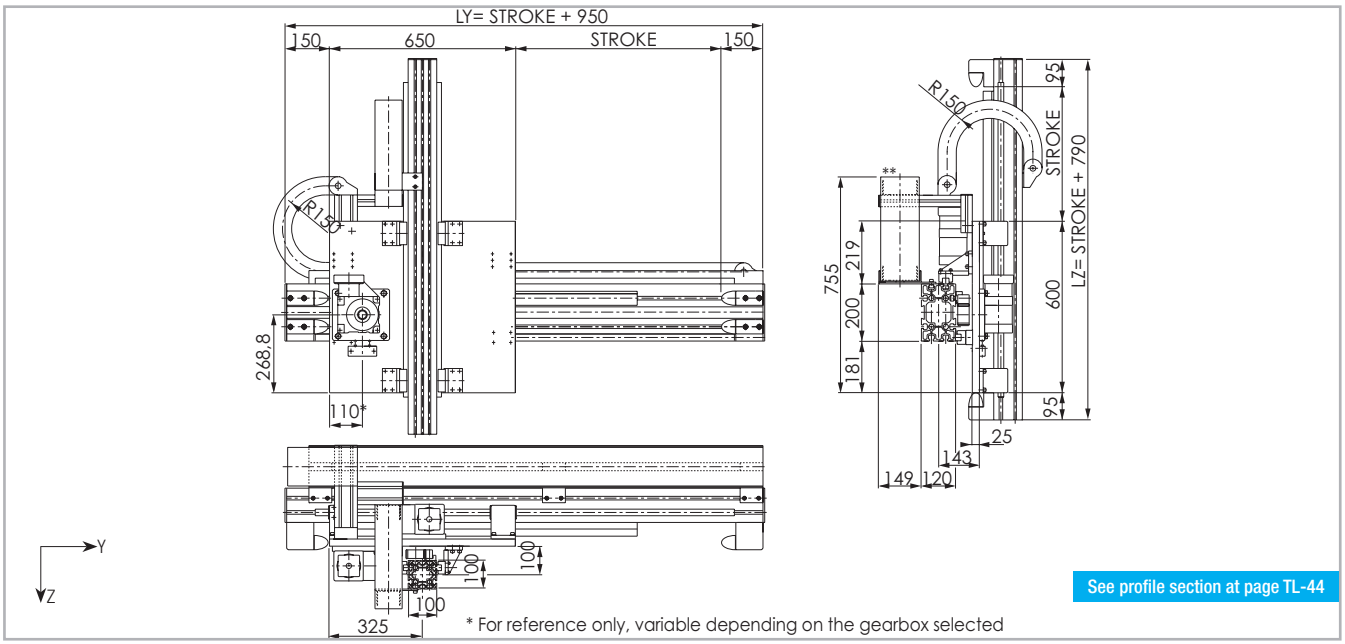
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 95

PAS 200/100P

25 Kg — PC — 100 Kg
High Cycle Rate — Low Cycle Rate

PAS 200/100P Dimension



See profile section at page TL-44

The length of the safety stroke is provided on request according to the customer's specific requirements.
**Cable carrier offered as option

Fig. 27

Technical data

	Axis	
	Y-axis	Z-axis
Max. useful stroke length [mm]	11050*1	2200
Max. positioning repeatability [mm]	± 0.05	± 0.1*2
Max. speed [m/s]	3	3
Max. acceleration [m/s²]	7	7
Rack module	m 4	m 3
Pinion pitch diameter [mm]	76.39 (106.1)	63.66 (89.13
Carriage displacement per pinion turn [mm]	240 (333.33)	200 (280)
Carriage weight [kg]	59	
Zero travel weight [kg]	121	
Weight for 100 mm useful stroke [kg]	4.0	2.1
Rail size [mm]	25	20

*1) It is possible to obtain longer stroke by means of special Rollon joints
*2) Reference value considering a stroke of 1000 mm on Z-axis.

Tab. 96

Moments of inertia of the aluminum body

Axis	I_x [mm⁴]	I_y [mm⁴]	I_p [10⁷ mm⁴]
Y-axis	32,697,979	12,893,004	45,860,983
Z-axis	3,637,190	3,457,193	7,094,383

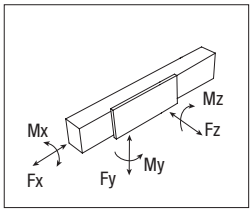
Tab. 97

Rack specifications

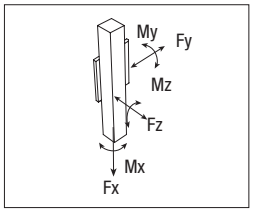
Axis	Type of rack	Rack module	Quality
Y-axis	Helical teeth hardened ground	m 4	Q6
Z-axis		m 3	

Tab. 98

PAS 200/100P - Y-axis



PAS 200/100P - Z-axis



PAS 200/100P - Load capacity

Axis	F_x [N]	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
Y-axis	10989	258800	116833	258800	19410	73111	73111
Z-axis	5714	153600	70798	153600	7680	40474	40474

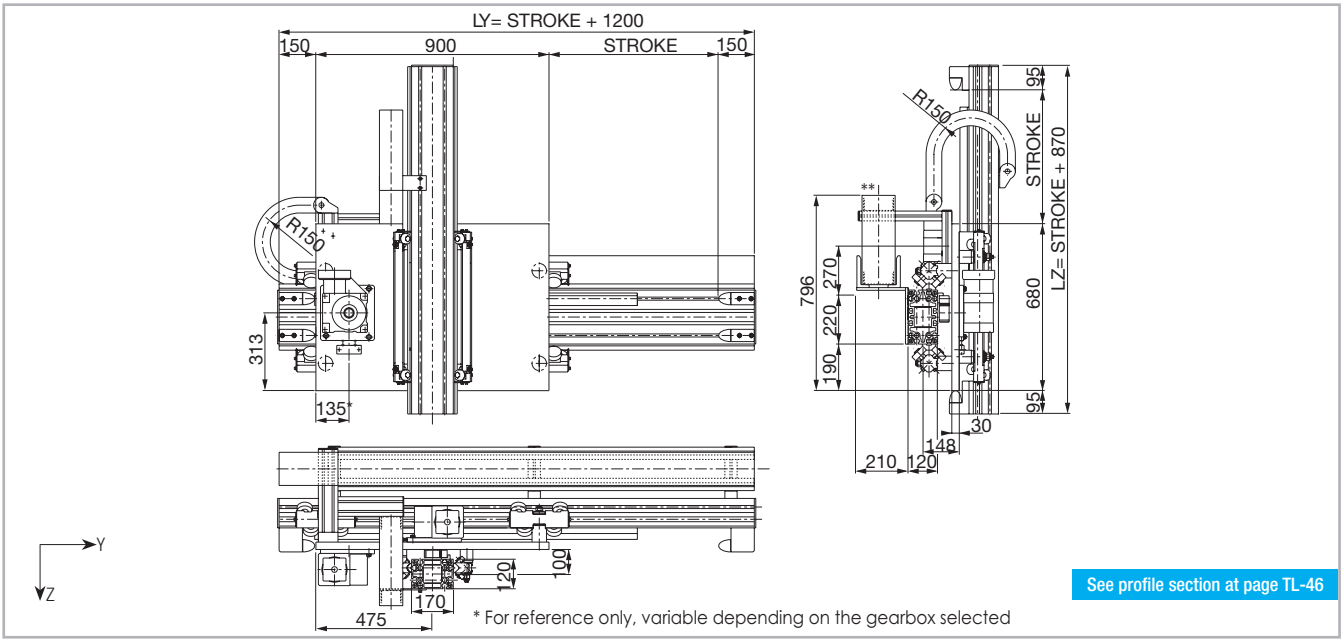
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 99

PAR 220/170

60 Kg — PC — 200 Kg
High Cycle Rate — Low Cycle Rate

PAR 220/170 Dimension



The length of the safety stroke is provided on request according to the customer's specific requirements.
**Cable carrier offered as option

Fig. 28

Technical data

	Axis	
	Y-axis	Z-axis
Max. useful stroke length [mm]	10800*1	2400
Max. positioning repeatability [mm]	± 0.05	± 0.25*2
Max. speed [m/s]	3	3
Max. acceleration [m/s²]	6	4
Rack module	m 4	m 3
Pinion pitch diameter [mm]	76.39 (106.1)	63.66 (89.13)
Carriage displacement per pinion turn [mm]	240 (333.33)	200 (280)
Carriage weight [kg]	98	
Zero travel weight [kg]	195	
Weight for 100 mm useful stroke [kg]	5.2	3.1
Rail size [mm]	55x25	35x16

*1) It is possible to obtain longer stroke by means of special Rollon joints
*2) Reference value considering a stroke of 1000 mm on Z-axis.

Tab. 100

Moments of inertia of the aluminum body

Axis	I_x [mm⁴]	I_y [mm⁴]	I_p [10⁷ mm⁴]
Y-axis	46,248,422	15,591,381	61,839,803
Z-axis	19,734,283	9,835,781	29,570,064

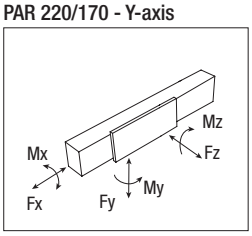
Tab. 101

Rack specifications

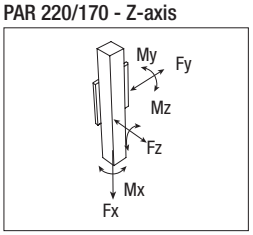
Axis	Type of rack	Rack module	Quality
Y-axis	Helical teeth hardened ground	m 4	Q6
Z-axis		m 3	

Tab. 102

PAR 220/170 - Y-axis



PAR 220/170 - Z-axis



PAR 220/170 - Load capacity

Axis	F_x [N]	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
Y-axis	10989	29981	149063	29981	3298	12307	12307
Z-axis	5714	7071	32964	7071	601	1867	1867

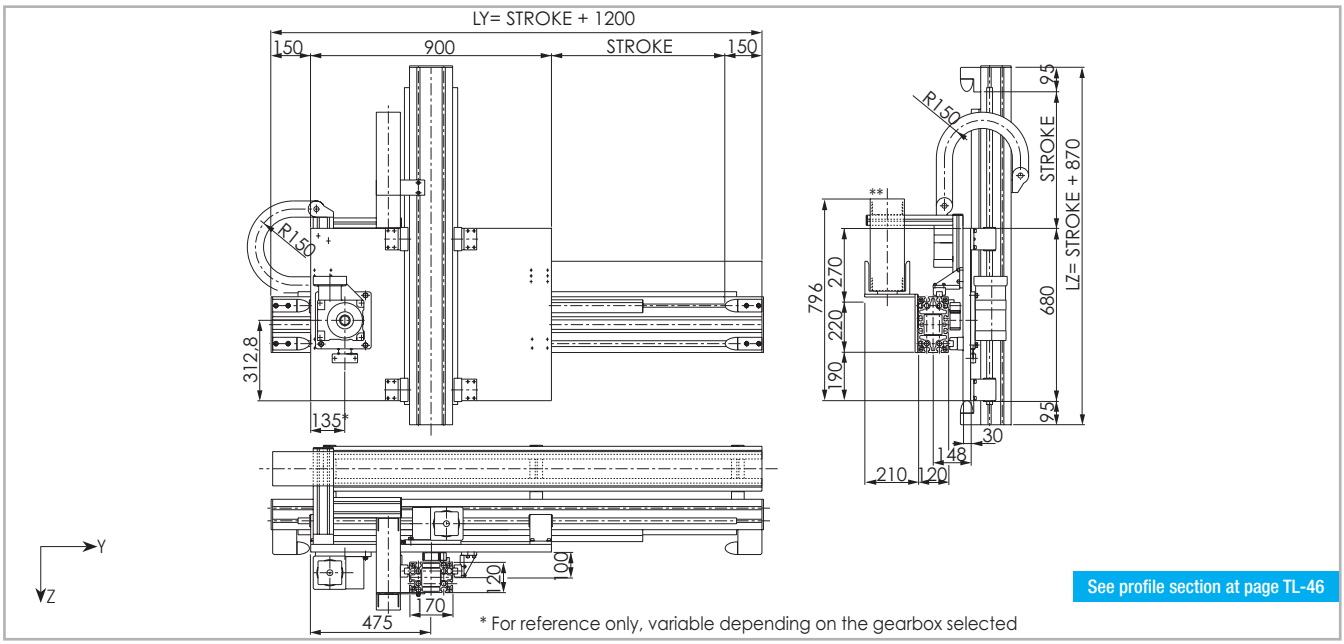
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 103

PAS 220/170

60 Kg — PC — 200 Kg
High Cycle Rate — Low Cycle Rate

PAS 220/170 Dimension



See profile section at page TL-46

The length of the safety stroke is provided on request according to the customer's specific requirements.
**Cable carrier offered as option

Fig. 29

Technical data

	Axis	
	Y-axis	Z-axis
Max. useful stroke length [mm]	10800*1	2400
Max. positioning repeatability [mm]	± 0.05	± 0.1*2
Max. speed [m/s]	3	3
Max. acceleration [m/s²]	6	4
Rack module	m 4	m 3
Pinion pitch diameter [mm]	76.39 (106.1)	63.66 (89.13)
Carriage displacement per pinion turn [mm]	240 (333.33)	200 (280)
Carriage weight [kg]	95	
Zero travel weight [kg]	176	
Weight for 100 mm useful stroke [kg]	4.4	2.9
Rail size [mm]	25	25

*1) It is possible to obtain longer stroke by means of special Rollon joints
*2) Reference value considering a stroke of 1000 mm on Z-axis.

Tab. 104

Moments of inertia of the aluminum body

Axis	I_x [mm⁴]	I_y [mm⁴]	I_p [10⁷ mm⁴]
Y-axis	46,248,422	15,591,381	61,839,803
Z-axis	19,734,283	9,835,781	29,570,064

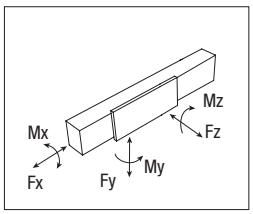
Tab. 105

Rack specifications

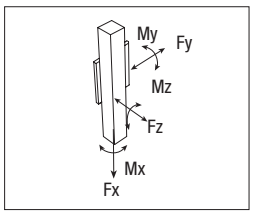
Axis	Type of rack	Rack module	Quality
Y-axis	Helical teeth hardened ground	m 4	Q6
Z-axis		m 3	

Tab. 106

PAS 220/170 - Y-axis



PAS 220/170 - Z-axis



PAS 220/170 - Load capacity

Axis	F_x [N]	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
Y-axis	10989	258800	116833	258800	23939	105461	105461
Z-axis	5714	258800	116833	258800	21998	76993	76993

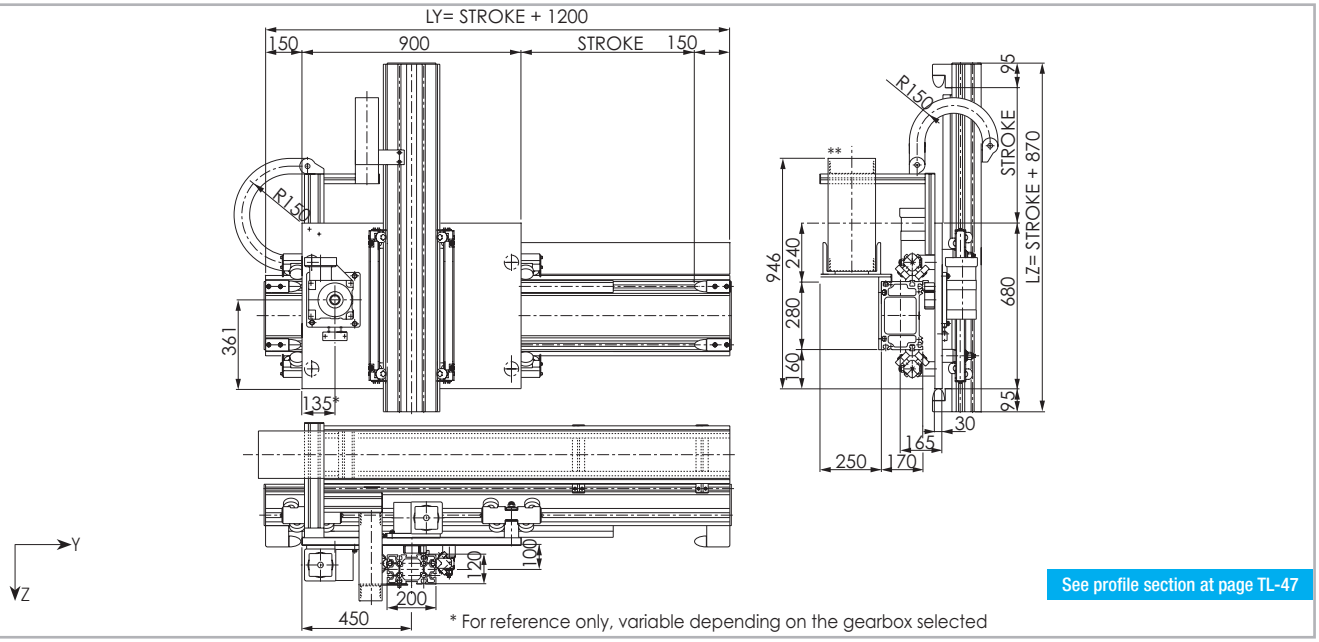
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 107

PAR 280/200

100 Kg — PC — 200 Kg
High Cycle Rate — Low Cycle Rate

PAR 280/200 Dimension



See profile section at page TL-47

The length of the safety stroke is provided on request according to the customer's specific requirements.
**Cable carrier offered as option

Fig. 30

Technical data

	Axis	
	Y-axis	Z-axis
Max. useful stroke length [mm]	10800*1	2600
Max. positioning repeatability [mm]	± 0.05	± 0.25*2
Max. speed [m/s]	3	3
Max. acceleration [m/s²]	4	4
Rack module	m 4	m 3
Pinion pitch diameter [mm]	76.39 (106.1)	63.66 (89.13)
Carriage displacement per pinion turn [mm]	240 (333.33)	200 (280)
Carriage weight [kg]	99	
Zero travel weight [kg]	220	
Weight for 100 mm useful stroke [kg]	6.6	3.5
Rail size [mm]	55x25	35x16

*1) It is possible to obtain longer stroke by means of special Rollon joints
*2) Reference value considering a stroke of 1000 mm on Z-axis.

Tab. 108

Moments of inertia of the aluminum body

Axis	I_x [mm⁴]	I_y [mm⁴]	I_p [10⁷ mm⁴]
Y-axis	126,456,800	48,292,512	174,749,312
Z-axis	32,697,979	12,893,004	45,860,983

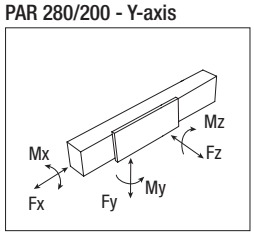
Tab. 109

Rack specifications

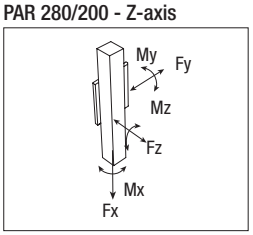
Axis	Type of rack	Rack module	Quality
Y-axis	Helical teeth hardened ground	m 4	Q6
Z-axis		m 3	

Tab. 110

PAR 280/200 - Y-axis



PAR 280/200 - Z-axis



PAR 280/200 - Load capacity

Axis	F_x [N]	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
Y-axis	10989	29981	149063	29981	4197	12307	12307
Z-axis	5714	7071	32964	7071	707	1867	1867

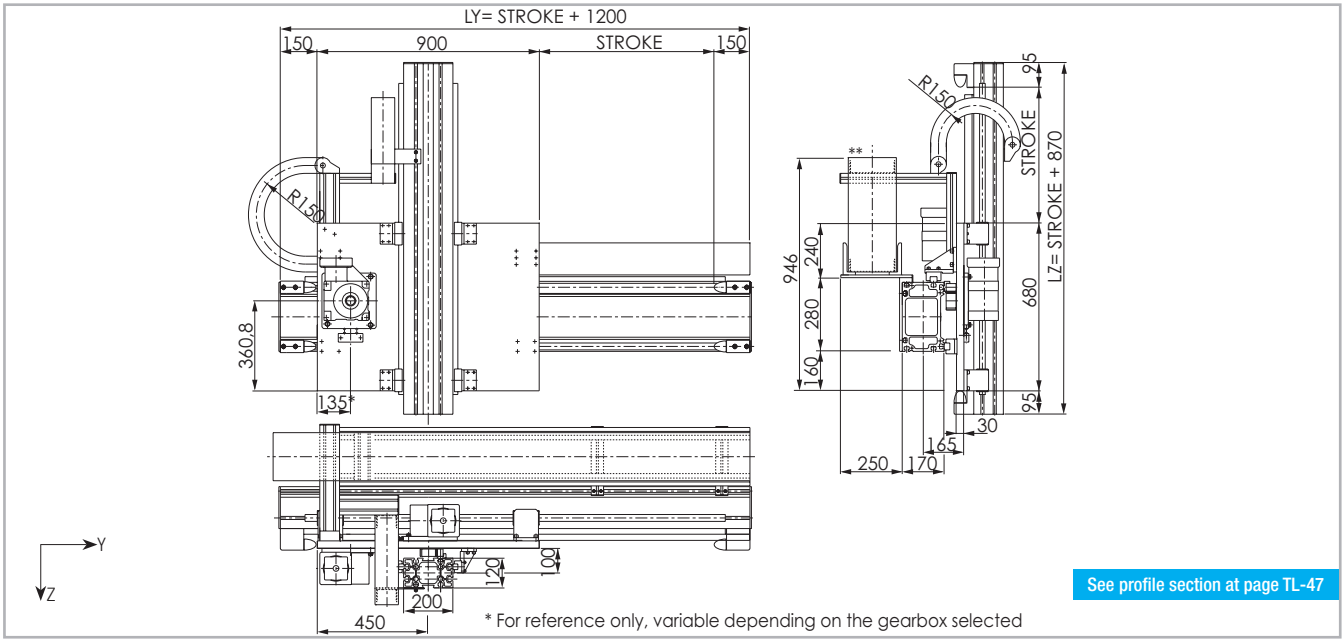
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 111

PAS 280/200

100 Kg — PC — 200 Kg
High Cycle Rate — Low Cycle Rate

PAS 280/200 Dimension



See profile section at page TL-47

The length of the safety stroke is provided on request according to the customer's specific requirements.
**Cable carrier offered as option

Fig. 31

Technical data

	Axis	
	Y-axis	Z-axis
Max. useful stroke length [mm]	10800*1	2600
Max. positioning repeatability [mm]	± 0.05	± 0.1*2
Max. speed [m/s]	3	3
Max. acceleration [m/s²]	4	4
Rack module	m 4	m 3
Pinion pitch diameter [mm]	76.39 (106.1)	63.66 (89.13)
Carriage displacement per pinion turn [mm]	240 (333.33)	200 (280)
Carriage weight [kg]	86	
Zero travel weight [kg]	202	
Weight for 100 mm useful stroke [kg]	6.0	3.4
Rail size [mm]	30	25

*1) It is possible to obtain longer stroke by means of special Rollon joints
*2) Reference value considering a stroke of 1000 mm on Z-axis.

Tab. 112

Moments of inertia of the aluminum body

Axis	I_x [mm⁴]	I_y [mm⁴]	I_p [10⁷ mm⁴]
Y-axis	126,456,800	48,292,512	174,749,312
Z-axis	32,697,979	12,893,004	45,860,983

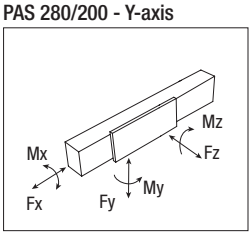
Tab. 113

Rack specifications

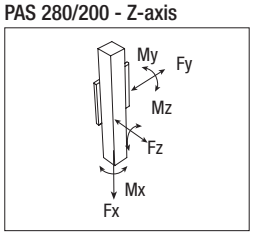
Axis	Type of rack	Rack module	Quality
Y-axis	Helical teeth hardened ground	m 4	Q6
Z-axis		m 3	

Tab. 114

PAS 280/200 - Y-axis



PAS 280/200 - Z-axis



PAS 280/200 - Load capacity

Axis	F_x [N]	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
Y-axis	10989	266400	142231	266400	34632	105228	105228
Z-axis	5714	258800	116833	258800	25880	76993	76993

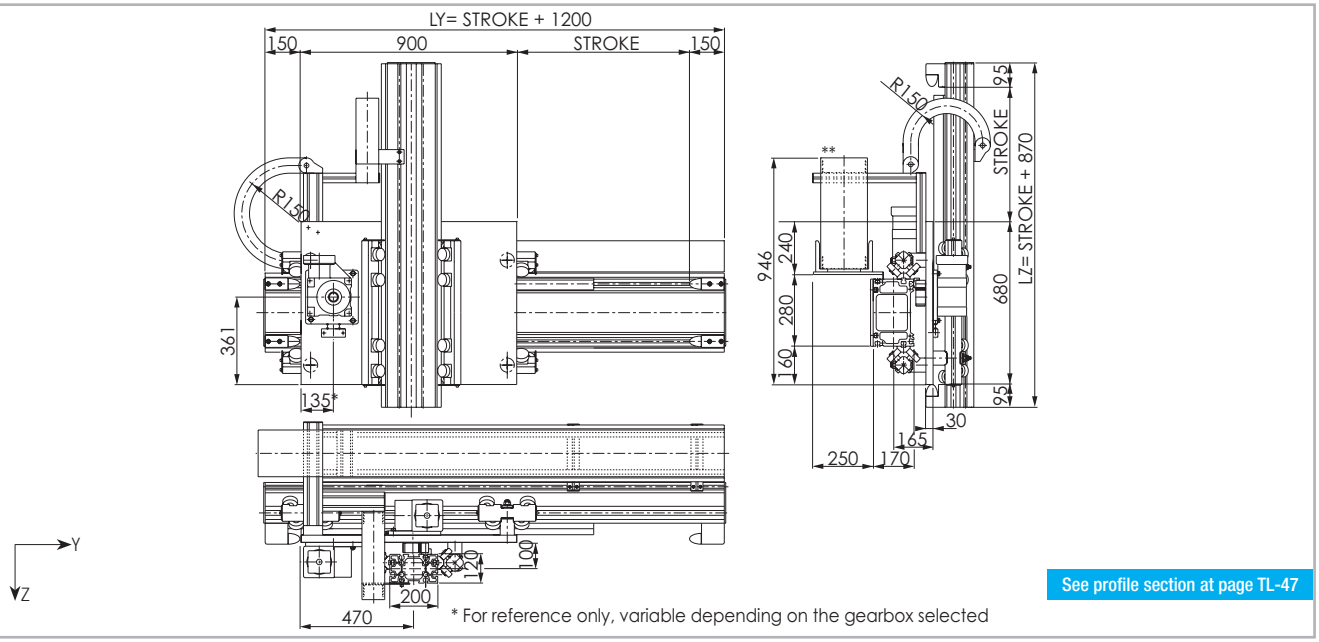
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 115

PAR 280/200P

100 Kg — PC — 400 Kg
High Cycle Rate — Low Cycle Rate

PAR 280/200P Dimension



The length of the safety stroke is provided on request according to the customer's specific requirements.
**Cable carrier offered as option

Fig. 32

Technical data

	Axis	
	Y-axis	Z-axis
Max. useful stroke length [mm]	10800*1	2600
Max. positioning repeatability [mm]	± 0.05	± 0.25*2
Max. speed [m/s]	3	2
Max. acceleration [m/s²]	4	3
Rack module	m 4	m 4
Pinion pitch diameter [mm]	76.39 (106.1)	76.39 (106.1)
Carriage displacement per pinion turn [mm]	240 (333.33)	240 (333.33)
Carriage weight [kg]	112	
Zero travel weight [kg]	244	
Weight for 100 mm useful stroke [kg]	6.6	4.8
Rail size [mm]	55x25	55x25

*1) It is possible to obtain longer stroke by means of special Rollon joints
*2) Reference value considering a stroke of 1000 mm on Z-axis.

Tab. 116

Moments of inertia of the aluminum body

Axis	I_x [mm⁴]	I_y [mm⁴]	I_p [10⁷ mm⁴]
Y-axis	126,456,800	48,292,512	174,749,312
Z-axis	32,697,979	12,893,004	45,860,983

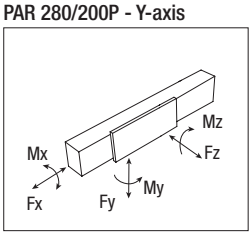
Tab. 117

Rack specifications

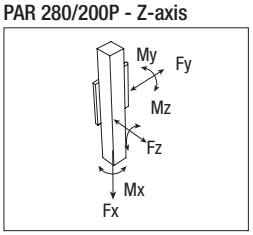
Axis	Type of rack	Rack module	Quality
Y-axis	Helical teeth hardened ground	m 4	Q6
Z-axis		m 4	

Tab. 118

PAR 280/200P - Y-axis



PAR 280/200P - Z-axis



PAR 280/200P - Load capacity

Axis	F_x [N]	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
Y-axis	10989	29981	149063	29981	4197	12307	12307
Z-axis	10989	24042	112593	24042	2404	4568	4568

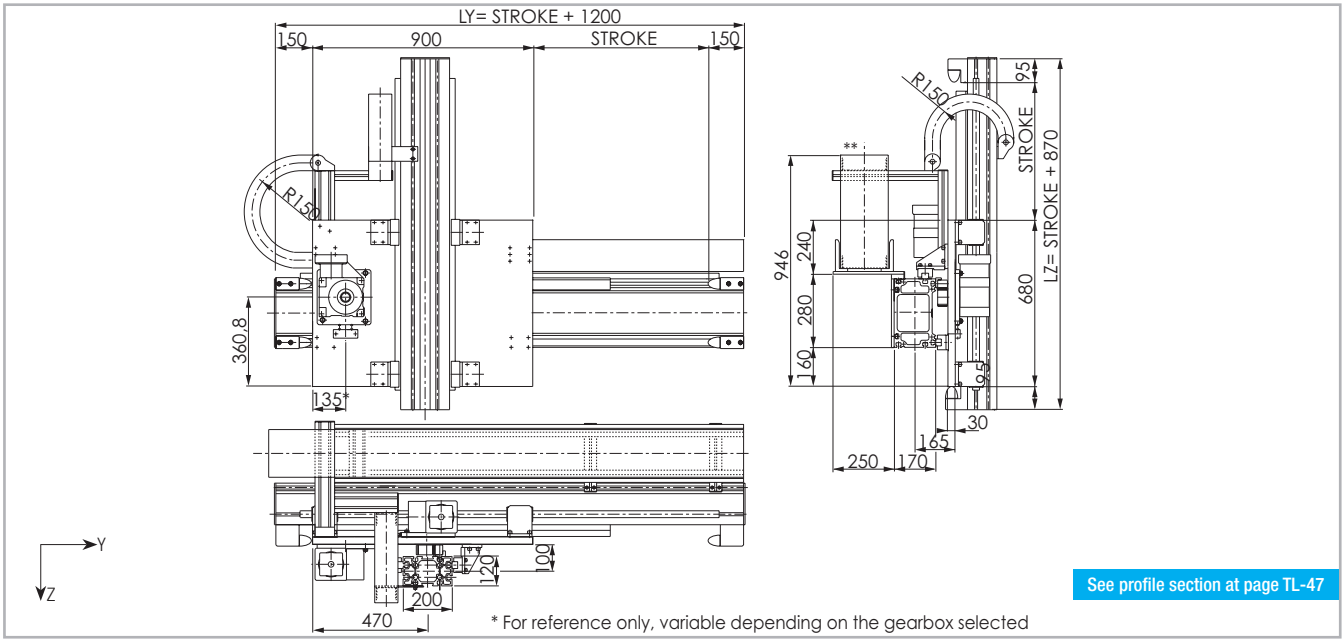
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 119

PAS 280/200P

100 Kg — PC — 400 Kg
High Cycle Rate — Low Cycle Rate

PAS 280/200P Dimension



See profile section at page TL-47

The length of the safety stroke is provided on request according to the customer's specific requirements.
**Cable carrier offered as option

Fig. 33

Technical data

	Axis	
	Y-axis	Z-axis
Max. useful stroke length [mm]	10800*1	2600
Max. positioning repeatability [mm]	± 0.05	± 0.1*2
Max. speed [m/s]	3	2
Max. acceleration [m/s²]	4	3
Rack module	m 4	m 4
Pinion pitch diameter [mm]	76.39 (106.1)	76.39 (106.1)
Carriage displacement per pinion turn [mm]	240 (333.33)	240 (333.33)
Carriage weight [kg]	105	
Zero travel weight [kg]	217	
Weight for 100 mm useful stroke [kg]	6.0	3.9
Rail size [mm]	30	25

*1) It is possible to obtain longer stroke by means of special Rollon joints
*2) Reference value considering a stroke of 1000 mm on Z-axis.

Tab. 120

Moments of inertia of the aluminum body

Axis	I_x [mm⁴]	I_y [mm⁴]	I_p [10⁷ mm⁴]
Y-axis	126,456,800	48,292,512	174,749,312
Z-axis	32,697,979	12,893,004	45,860,983

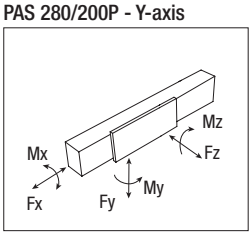
Tab. 121

Rack specifications

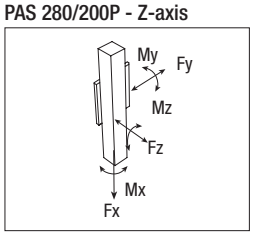
Axis	Type of rack	Rack module	Quality
Y-axis	Helical teeth hardened ground	m 4	Q6
Z-axis		m 4	

Tab. 122

PAS 280/200P - Y-axis



PAS 280/200P - Z-axis



PAS 280/200P - Load capacity

Axis	F_x [N]	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
Y-axis	10989	266400	142231	266400	34632	105228	105228
Z-axis	10989	258800	116833	258800	25880	76993	76993

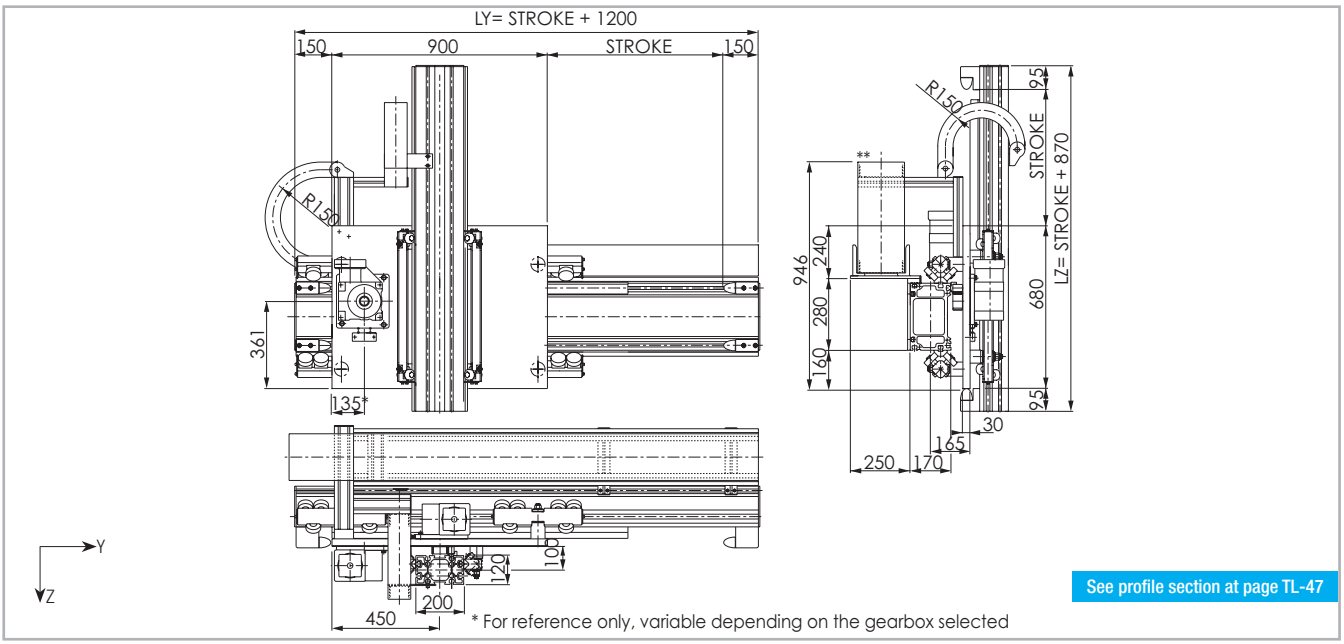
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 123

PAR 280/200E

100 Kg — PC — 300 Kg
High Cycle Rate — Low Cycle Rate

PAR 280/200E Dimension



See profile section at page TL-47

The length of the safety stroke is provided on request according to the customer's specific requirements.
**Cable carrier offered as option

Fig. 34

Technical data

	Axis	
	Y-axis	Z-axis
Max. useful stroke length [mm]	10800*1	2600
Max. positioning repeatability [mm]	± 0.1	± 0.25*2
Max. speed [m/s]	2.5	2
Max. acceleration [m/s²]	2.5	3
Rack module	m 4	m 3
Pinion pitch diameter [mm]	76.39 (106.1)	63.66 (89.13)
Carriage displacement per pinion turn [mm]	240 (333.33)	200 (280)
Carriage weight [kg]	111	
Zero travel weight [kg]	232	
Weight for 100 mm useful stroke [kg]	6.6	3.5
Rail size [mm]	55x25	35x16

*1) It is possible to obtain longer stroke by means of special Rollon joints
*2) Reference value considering a stroke of 1000 mm on Z-axis.

Tab. 124

Moments of inertia of the aluminum body

Axis	I_x [mm⁴]	I_y [mm⁴]	I_p [10⁷ mm⁴]
Y-axis	126,456,800	48,292,512	174,749,312
Z-axis	32,697,979	12,893,004	45,860,983

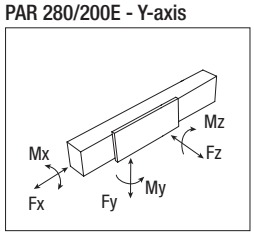
Tab. 125

Rack specifications

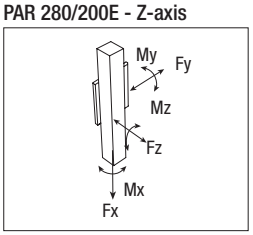
Axis	Type of rack	Rack module	Quality
Y-axis	Helical teeth hardened ground	m 4	Q6
Z-axis		m 3	

Tab. 126

PAR 280/200E - Y-axis



PAR 280/200E - Z-axis



PAR 280/200E - Load capacity

Axis	F_x [N]	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
Y-axis	10989	29981	149063	29981	8395	11108	11108
Z-axis	5714	7071	32964	7071	707	1867	1867

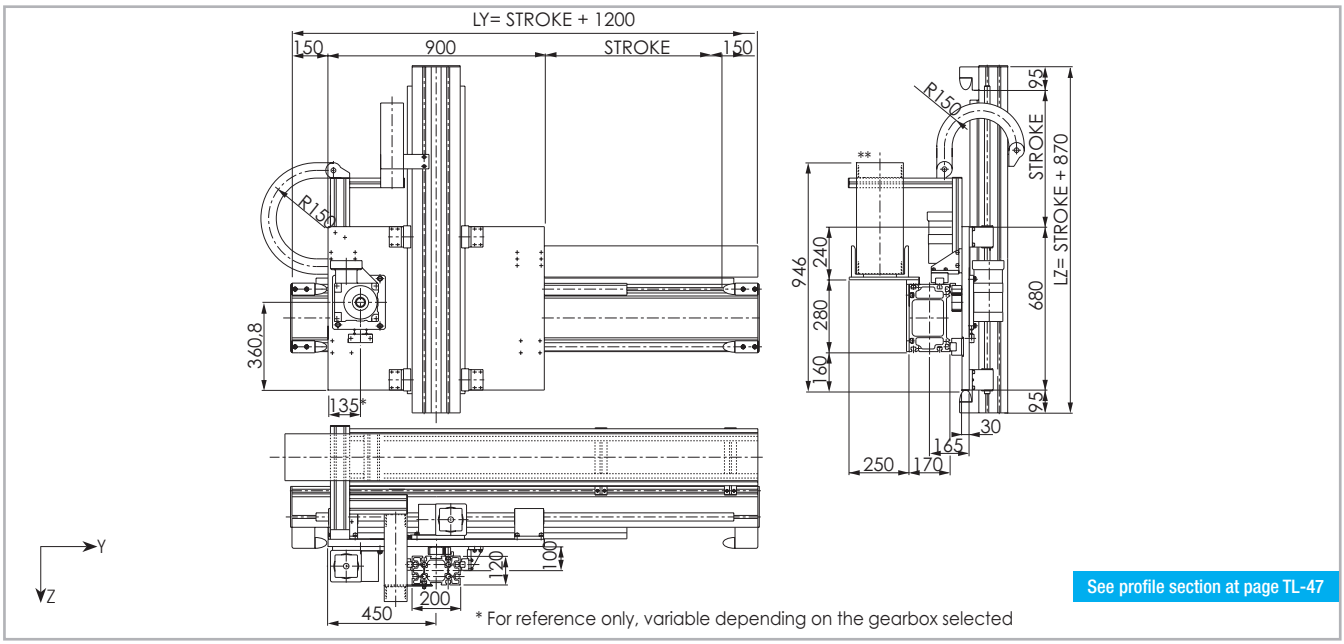
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 127

PAS 280/200E

100 Kg — PC — 300 Kg
High Cycle Rate — Low Cycle Rate

PAS 280/200E Dimension



See profile section at page TL-47

The length of the safety stroke is provided on request according to the customer's specific requirements.
**Cable carrier offered as option

Fig. 35

Technical data

	Axis	
	Y-axis	Z-axis
Max. useful stroke length [mm]	10800*1	2600
Max. positioning repeatability [mm]	± 0.1	± 0.1*2
Max. speed [m/s]	2.5	2
Max. acceleration [m/s²]	2.5	3
Rack module	m 4	m 3
Pinion pitch diameter [mm]	76.39 (106.1)	63.66 (89.13)
Carriage displacement per pinion turn [mm]	240 (333.33)	200 (280)
Carriage weight [kg]	102	
Zero travel weight [kg]	220	
Weight for 100 mm useful stroke [kg]	6.4	3.4
Rail size [mm]	35	25

*1) It is possible to obtain longer stroke by means of special Rollon joints
*2) Reference value considering a stroke of 1000 mm on Z-axis.

Tab. 128

Moments of inertia of the aluminum body

Axis	I_x [mm⁴]	I_y [mm⁴]	I_p [10⁷ mm⁴]
Y-axis	126,456,800	48,292,512	174,749,312
Z-axis	32,697,979	12,893,004	45,860,983

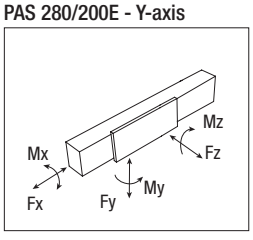
Tab. 129

Rack specifications

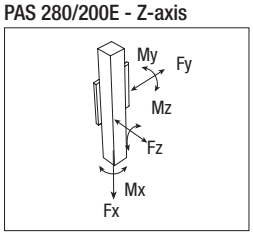
Axis	Type of rack	Rack module	Quality
Y-axis	Helical teeth hardened ground	m 4	Q6
Z-axis		m 3	

Tab. 130

PAS 280/200E - Y-axis



PAS 280/200E - Z-axis



PAS 280/200E - Load capacity

Axis	F_x [N]	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
Y-axis	10989	386400	197790	386400	50232	150310	150310
Z-axis	5714	258800	116833	258800	25880	76993	76993

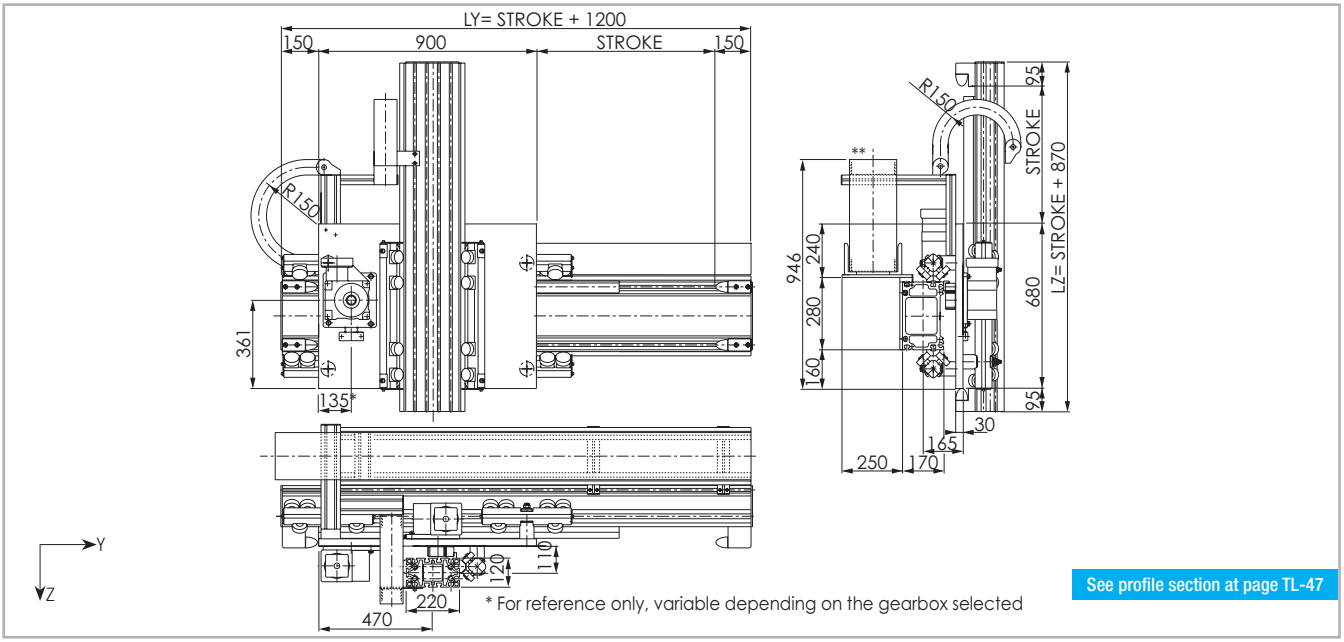
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 131

PAR 280/220

250 Kg — PC — 600 Kg
High Cycle Rate — Low Cycle Rate

PAR 280/220 Dimension



The length of the safety stroke is provided on request according to the customer's specific requirements.
**Cable carrier offered as option

Fig. 36

Technical data

	Axis	
	Y-axis	Z-axis
Max. useful stroke length [mm]	10800*1	2800
Max. positioning repeatability [mm]	± 0.1	± 0.25*2
Max. speed [m/s]	2	2
Max. acceleration [m/s²]	2	2
Rack module	m 4	m 4
Pinion pitch diameter [mm]	76.39 (106.1)	76.39 (106.1)
Carriage displacement per pinion turn [mm]	240 (333.33)	240 (333.33)
Carriage weight [kg]	122	
Zero travel weight [kg]	260	
Weight for 100 mm useful stroke [kg]	6.6	5.2
Rail size [mm]	55x25	55x25

*1) It is possible to obtain longer stroke by means of special Rollon joints
*2) Reference value considering a stroke of 1000 mm on Z-axis.

Tab. 132

Moments of inertia of the aluminum body

Axis	I_x [mm⁴]	I_y [mm⁴]	I_p [10⁷ mm⁴]
Y-axis	126,456,800	48,292,512	174,749,312
Z-axis	46,248,422	15,591,381	61,839,803

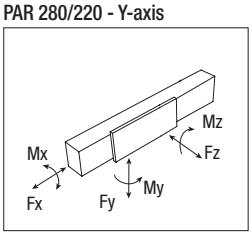
Tab. 133

Rack specifications

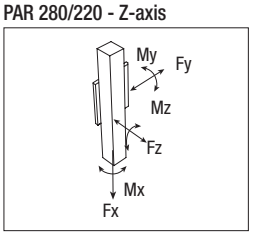
Axis	Type of rack	Rack module	Quality
Y-axis	Helical teeth hardened ground	m 4	Q6
Z-axis		m 4	

Tab. 134

PAR 280/220 - Y-axis



PAR 280/220 - Z-axis



PAR 280/220 - Load capacity

Axis	F_x [N]	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
Y-axis	10989	29981	149063	29981	8395	12307	12307
Z-axis	10989	24042	112593	24042	3298	4568	4568

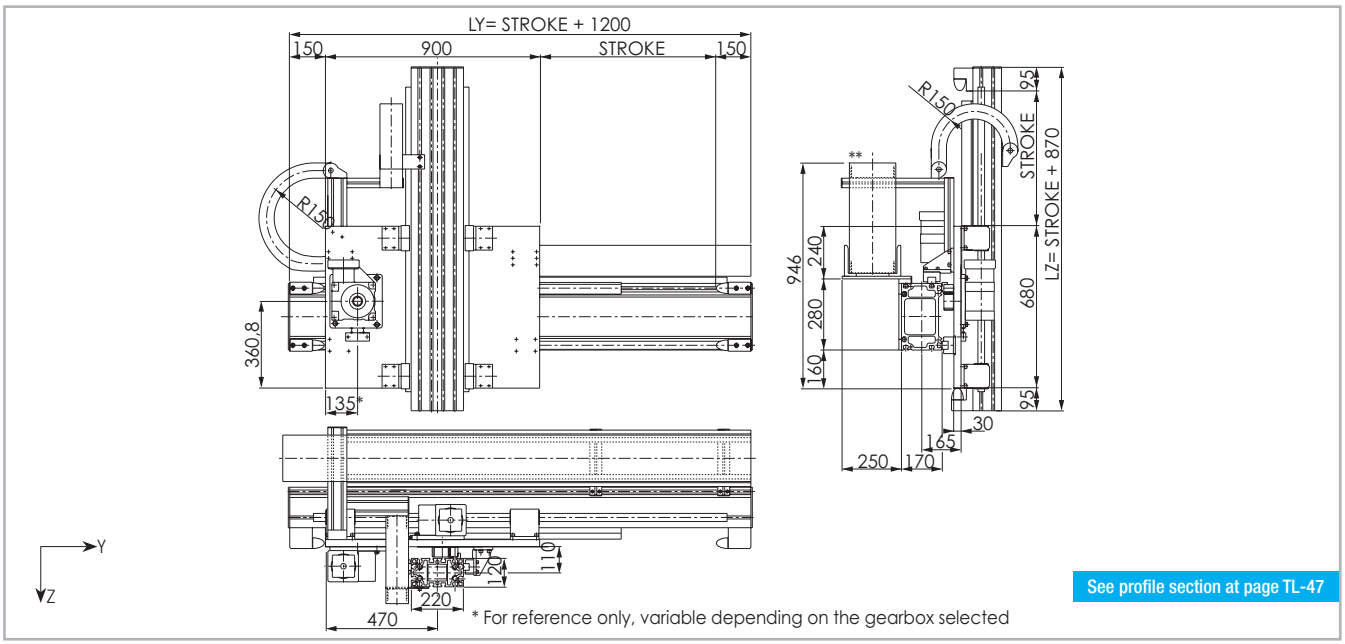
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 135

PAS 280/220

250 Kg — PC — 600 Kg
High Cycle Rate — Low Cycle Rate

PAS 280/220 Dimension



See profile section at page TL-47

The length of the safety stroke is provided on request according to the customer's specific requirements.
**Cable carrier offered as option

Fig. 37

Technical data

	Axis	
	Y-axis	Z-axis
Max. useful stroke length [mm]	10800*1	2800
Max. positioning repeatability [mm]	± 0.1	± 0.15*2
Max. speed [m/s]	2	2
Max. acceleration [m/s²]	2	2
Rack module	m 4	m 4
Pinion pitch diameter [mm]	76.39 (106.1)	76.39 (106.1)
Carriage displacement per pinion turn [mm]	240 (333.33)	240 (333.33)
Carriage weight [kg]	102	
Zero travel weight [kg]	234	
Weight for 100 mm useful stroke [kg]	6.4	4.6
Rail size [mm]	35	30

*1) It is possible to obtain longer stroke by means of special Rollon joints
*2) Reference value considering a stroke of 1000 mm on Z-axis.

Tab. 136

Moments of inertia of the aluminum body

Axis	I_x [mm⁴]	I_y [mm⁴]	I_p [10⁷ mm⁴]
Y-axis	126,456,800	48,292,512	174,749,312
Z-axis	46,248,422	15,591,381	61,839,803

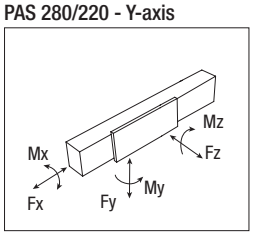
Tab. 137

Rack specifications

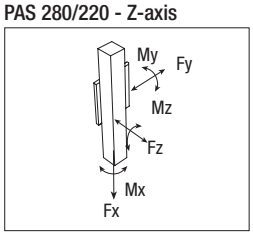
Axis	Type of rack	Rack module	Quality
Y-axis	Helical teeth hardened ground	m 4	Q6
Z-axis		m 4	

Tab. 138

PAS 280/220 - Y-axis



PAS 280/220 - Z-axis



PAS 280/220 - Load capacity

Axis	F_x [N]	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Stat.	Dyn	Stat.	Stat.	Stat.	Stat.
Y-axis	10989	386400	197790	386400	50232	150310	150310
Z-axis	10989	266400	142231	266400	29304	77256	77256

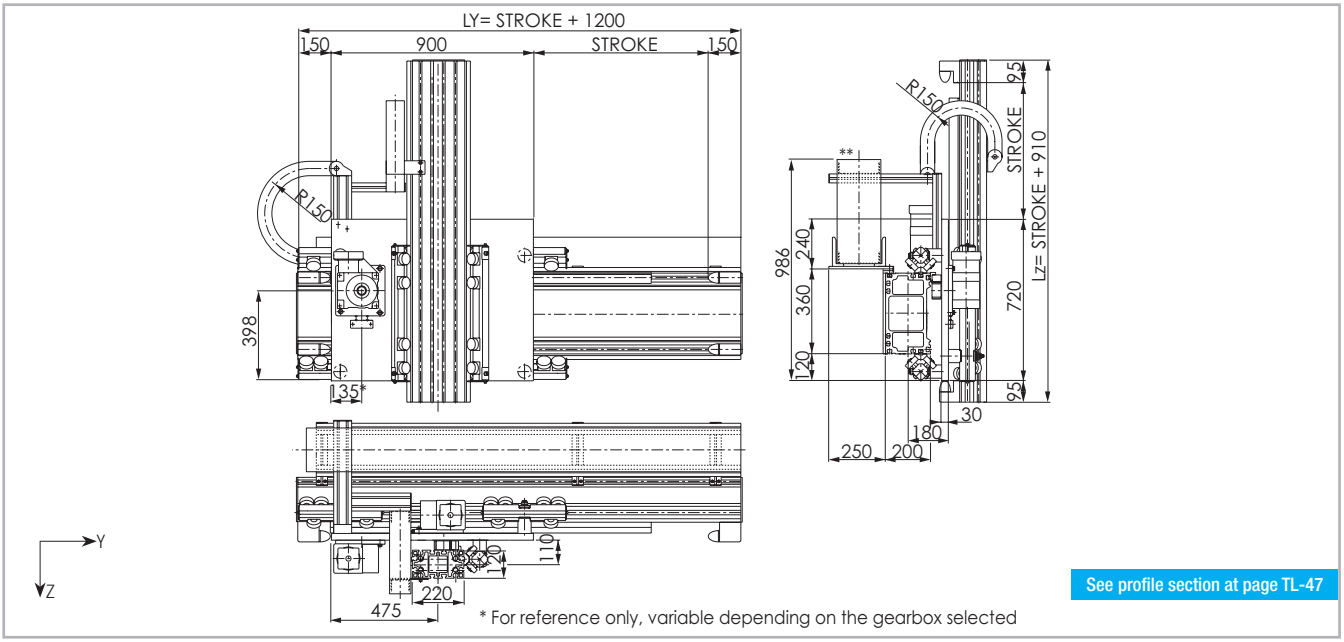
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 139

PAR 360/220

300 Kg — PC — 600 Kg
High Cycle Rate — Low Cycle Rate

PAR 360/220 Dimension



See profile section at page TL-47

The length of the safety stroke is provided on request according to the customer's specific requirements.
**Cable carrier offered as option

Fig. 38

Technical data

	Axis	
	Y-axis	Z-axis
Max. useful stroke length [mm]	10800*1	2800
Max. positioning repeatability [mm]	± 0.1	± 0.25*2
Max. speed [m/s]	2.5	2
Max. acceleration [m/s²]	2	2
Rack module	m 4	m 4
Pinion pitch diameter [mm]	76.39 (106.1)	76.39 (106.1)
Carriage displacement per pinion turn [mm]	240 (333.33)	240 (333.33)
Carriage weight [kg]	122	
Zero travel weight [kg]	283	
Weight for 100 mm useful stroke [kg]	8.5	5.2
Rail size [mm]	55x25	55x25

*1) It is possible to obtain longer stroke by means of special Rollon joints
*2) Reference value considering a stroke of 1000 mm on Z-axis.

Tab. 140

Moments of inertia of the aluminum body

Axis	I_x [mm⁴]	I_y [mm⁴]	I_p [10⁷ mm⁴]
Y-axis	317,212,806	103,285,258	420,498,064
Z-axis	46,248,422	15,591,381	61,839,803

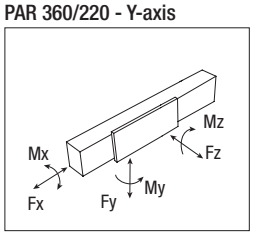
Tab. 141

Rack specifications

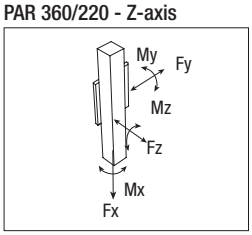
Axis	Type of rack	Rack module	Quality
Y-axis	Helical teeth hardened ground	m 4	Q6
Z-axis		m 4	

Tab. 142

PAR 360/220 - Y-axis



PAR 360/220 - Z-axis



PAR 360/220- Load capacity

Axis	F_x [N]	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
Y-axis	10989	29981	149063	29981	10793	11108	11108
Z-axis	10989	24042	112593	24042	3298	4568	4568

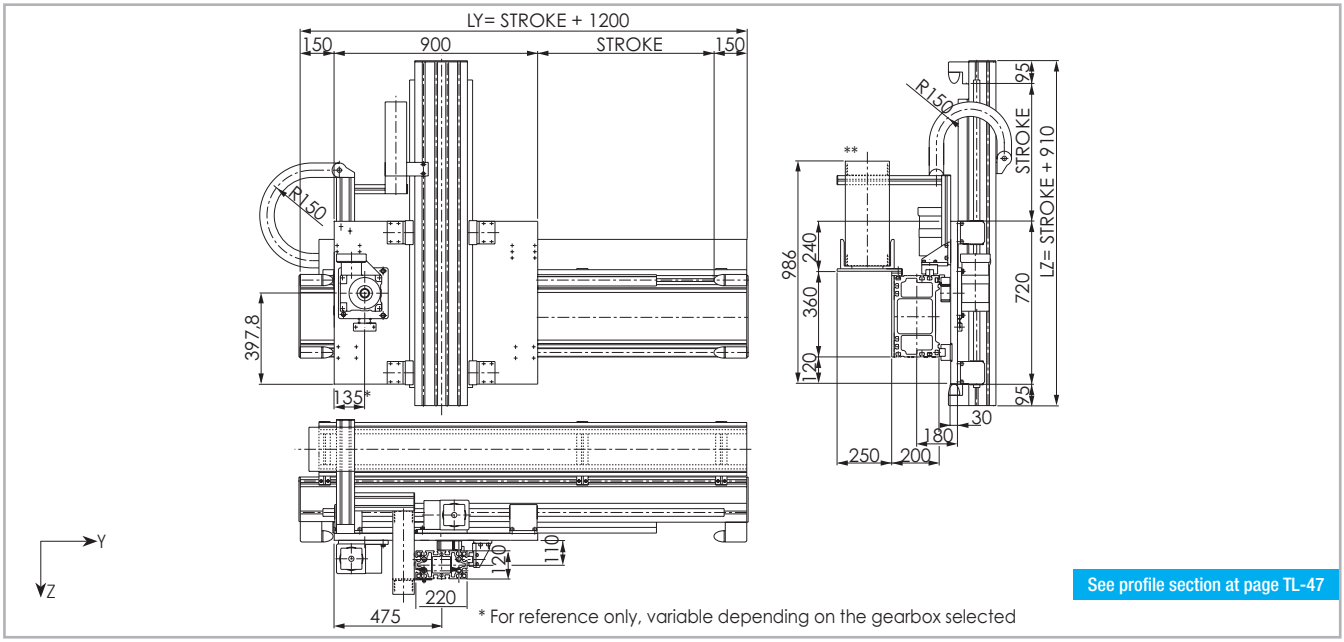
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 143

PAS 360/220

300 Kg — PC — 600 Kg
High Cycle Rate — Low Cycle Rate

PAS 360/220 Dimension



See profile section at page TL-47

The length of the safety stroke is provided on request according to the customer's specific requirements.
**Cable carrier offered as option

Fig. 39

Technical data

	Axis	
	Y-axis	Z-axis
Max. useful stroke length [mm]	10800*1	2800
Max. positioning repeatability [mm]	± 0.1	± 0.15*2
Max. speed [m/s]	2.5	2
Max. acceleration [m/s²]	2	2
Rack module	m 4	m 4
Pinion pitch diameter [mm]	76.39 (106.1)	76.39 (106.1)
Carriage displacement per pinion turn [mm]	240 (333.33)	240 (333.33)
Carriage weight [kg]	102	
Zero travel weight [kg]	260	
Weight for 100 mm useful stroke [kg]	8.3	4.6
Rail size [mm]	35	30

*1) It is possible to obtain longer stroke by means of special Rollon joints
*2) Reference value considering a stroke of 1000 mm on Z-axis.

Tab. 144

Moments of inertia of the aluminum body

Axis	I_x [mm⁴]	I_y [mm⁴]	I_p [10⁷ mm⁴]
Y-axis	317,212,806	103,285,258	420,498,064
Z-axis	46,248,422	15,591,381	61,839,803

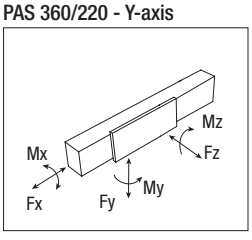
Tab. 145

Rack specifications

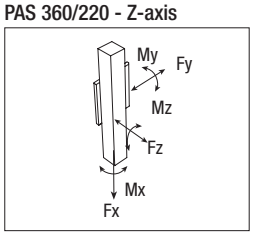
Axis	Type of rack	Rack module	Quality
Y-axis	Helical teeth hardened ground	m 4	Q6
Z-axis		m 4	

Tab. 146

PAS 360/220 - Y-axis



PAS 360/220 - Z-axis



PAS 360/220 - Load capacity

Axis	F_x [N]	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
Y-axis	10989	386400	197790	386400	65688	150310	150310
Z-axis	10989	266400	142231	266400	29304	82584	82584

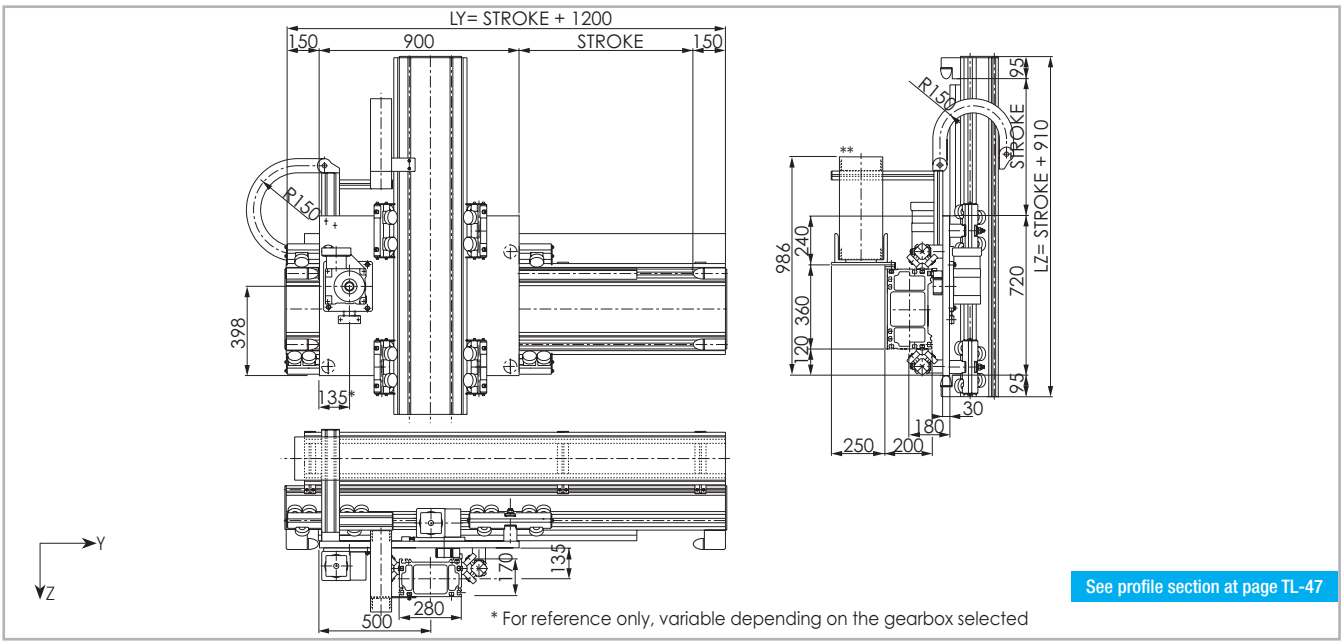
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 147

PAR 360/280

400 Kg — PC — 800 Kg
High Cycle Rate — Low Cycle Rate

PAR 360/280 Dimension



The length of the safety stroke is provided on request according to the customer's specific requirements.
**Cable carrier offered as option

Fig. 40

Technical data

	Axis	
	Y-axis	Z-axis
Max. useful stroke length [mm]	10800*1	3000
Max. positioning repeatability [mm]	± 0.1	± 0.25*2
Max. speed [m/s]	2	2
Max. acceleration [m/s²]	2	2
Rack module	m 4	m 4
Pinion pitch diameter [mm]	76.39 (106.1)	76.39 (106.1)
Carriage displacement per pinion turn [mm]	240 (333.33)	240 (333.33)
Carriage weight [kg]	122	
Zero travel weight [kg]	300	
Weight for 100 mm useful stroke [kg]	8.5	6.6
Rail size [mm]	55x25	55x25

*1) It is possible to obtain longer stroke by means of special Rollon joints
*2) Reference value considering a stroke of 1000 mm on Z-axis.

Tab. 148

Moments of inertia of the aluminum body

Axis	I_x [mm⁴]	I_y [mm⁴]	I_p [10⁷ mm⁴]
Y-axis	317,212,806	103,285,258	420,498,064
Z-axis	126,456,800	48,292,512	174,749,312

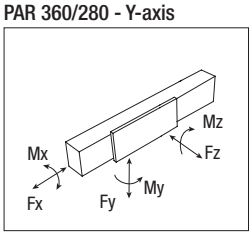
Tab. 149

Rack specifications

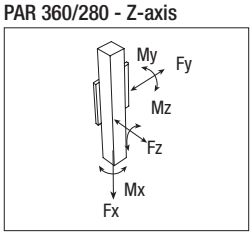
Axis	Type of rack	Rack module	Quality
Y-axis	Helical teeth hardened ground	m 4	Q6
Z-axis		m 4	

Tab. 150

PAR 360/280 - Y-axis



PAR 360/280 - Z-axis



PAR 360/280 - Load capacity

Axis	F_x [N]	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
Y-axis	10989	29981	149063	29981	10793	11108	11108
Z-axis	10989	29981	149063	29981	4197	9189	9189

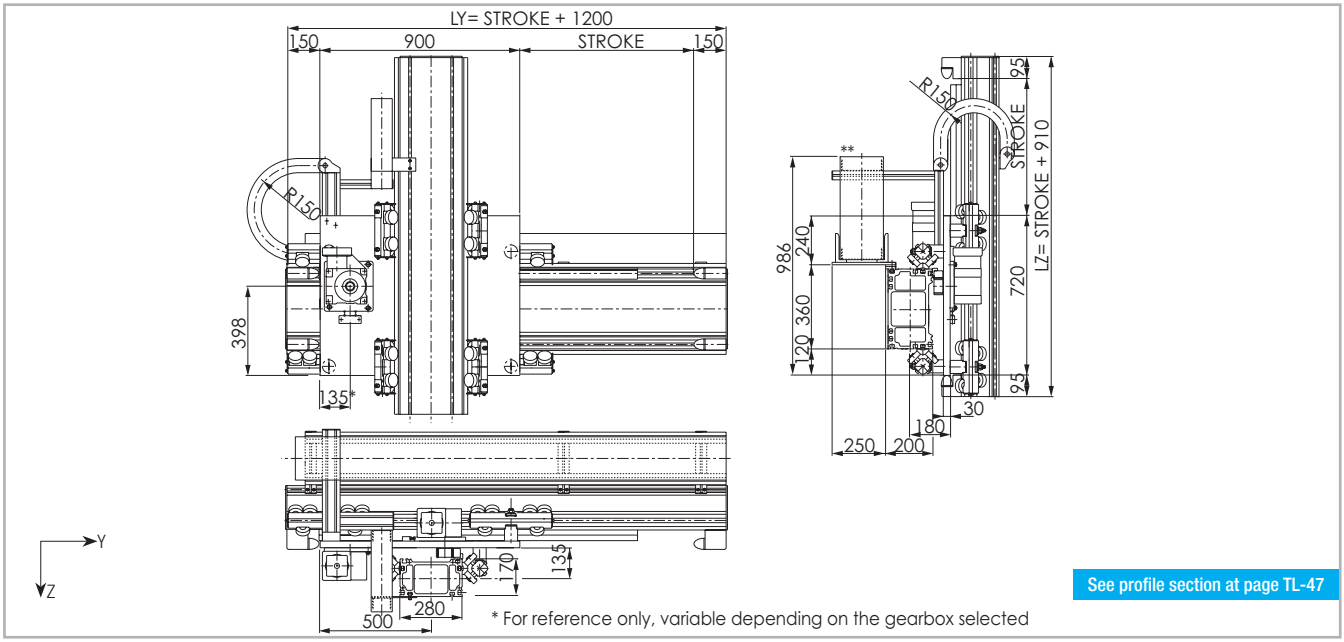
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 151

PAS 360/280

PC
400 Kg — 800 Kg
High Cycle Rate — Low Cycle Rate

PAS 360/280 Dimension



See profile section at page TL-47

The length of the safety stroke is provided on request according to the customer's specific requirements.
**Cable carrier offered as option

Fig. 41

Technical data

	Axis	
	Y-axis	Z-axis
Max. useful stroke length [mm]	10800*1	3000
Max. positioning repeatability [mm]	± 0.1	± 0.15*2
Max. speed [m/s]	2	2
Max. acceleration [m/s²]	2	2
Rack module	m 4	m 4
Pinion pitch diameter [mm]	76.39 (106.1)	76.39 (106.1)
Carriage displacement per pinion turn [mm]	240 (333.33)	240 (333.33)
Carriage weight [kg]	102	
Zero travel weight [kg]	275	
Weight for 100 mm useful stroke [kg]	8.3	6.4
Rail size [mm]	35	35

*1) It is possible to obtain longer stroke by means of special Rollon joints
*2) Reference value considering a stroke of 1000 mm on Z-axis.

Tab. 152

Moments of inertia of the aluminum body

Axis	I_x [mm⁴]	I_y [mm⁴]	I_p [10⁷ mm⁴]
Y-axis	317,212,806	103,285,258	420,498,064
Z-axis	126,456,800	48,292,512	174,749,312

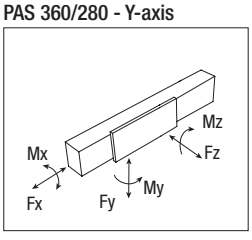
Tab. 153

Rack specifications

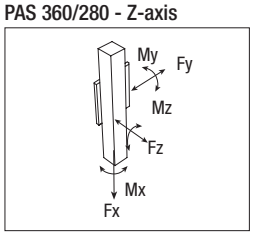
Axis	Type of rack	Rack module	Quality
Y-axis	Helical teeth hardened ground	m 4	Q6
Z-axis		m 4	

Tab. 154

PAS 360/280 - Y-axis



PAS 360/280 - Z-axis



PAS 360/280 - Load capacity

Axis	F_x [N]	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
Y-axis	10989	386400	197790	386400	65688	150310	150310
Z-axis	10989	386400	197790	386400	54096	115534	115534

See verification under static load and lifetime on page SL-2 and SL-3

Tab. 155

Profile specifications

Medium profiles

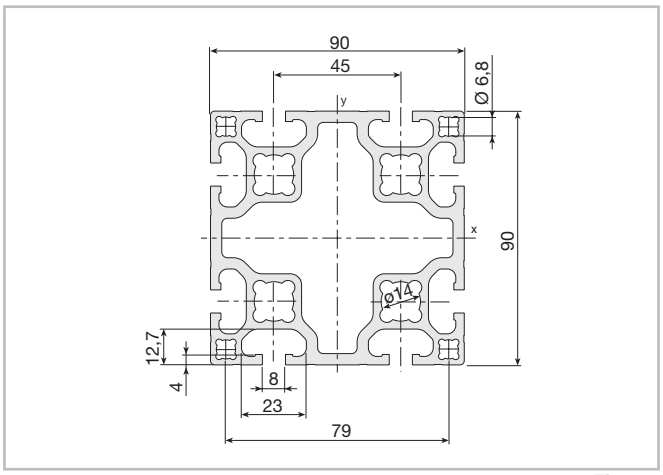


Fig. 42

Profile 90X90		
Weight	6	Kg/m
Max. length	6	m
Moment of inertia Ix	19,734,283	mm^4
Moment of inertia Iy	9,835,781	mm^4
Polar moment of inertia Ip	29,570,064	mm^4
Bending section modulus Wx	45,040	mm^3
Bending section modulus Wy	45,040	mm^3

Tab. 156

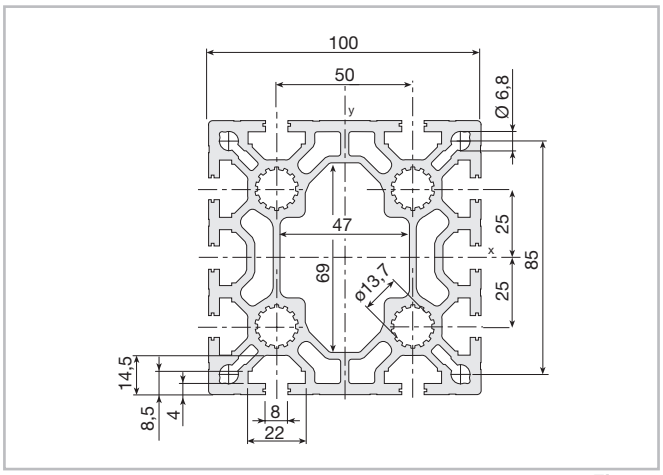
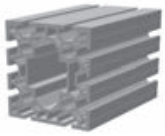


Fig. 43



Profile 100x100		
Weight	9,5	Kg/m
Max. length	6	m
Moment of inertia Ix	32,697,979	mm^4
Moment of inertia Iy	12,893,004	mm^4
Polar moment of inertia Ip	45,860,983	mm^4
Bending section modulus Wx	76,000	mm^3
Bending section modulus Wy	73,000	mm^3

Tab. 157

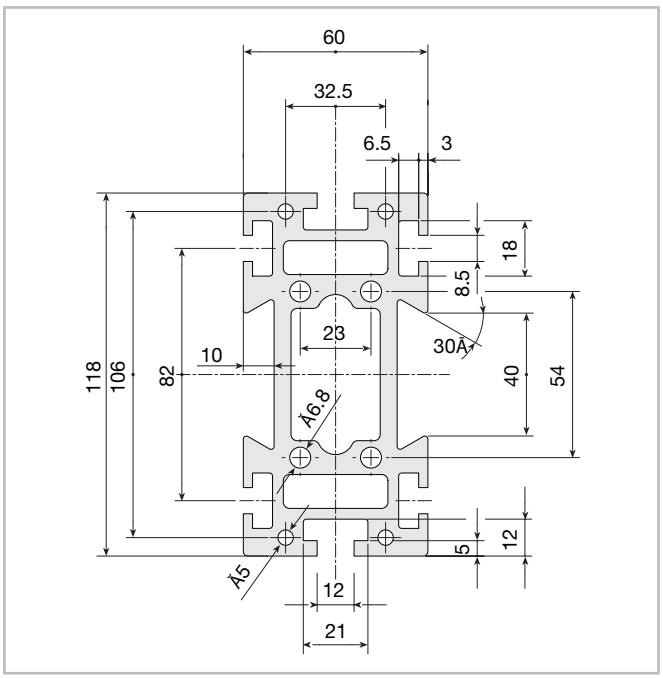


Fig. 44

Profile 118x60		
Weight	7,89	Kg/m
Max. length	10	m
Moment of inertia Ix	4,322,574	mm^4
Moment of inertia Iy	1,011,437	mm^4
Polar moment of inertia Ip	5,334,011	mm^4
Bending section modulus Wx	73,263	mm^3
Bending section modulus Wy	33,714	mm^3

Tab. 158

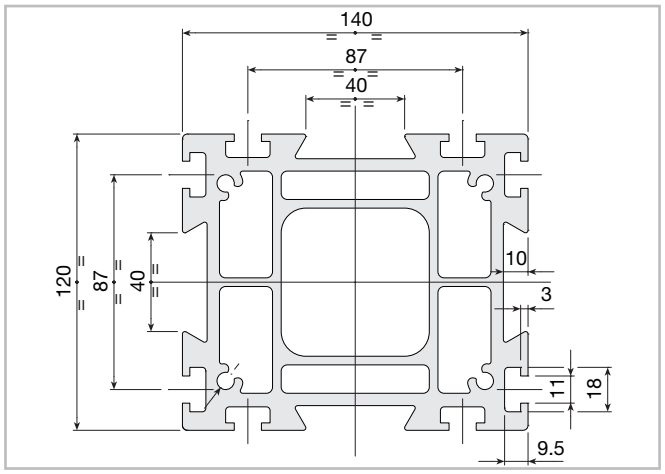


Fig. 45

Profile 140x120		
Weight	14,6	Kg/m
Max. length	10	m
Moment of inertia Ix	11,482,355	mm^4
Moment of inertia Iy	8,919,490	mm^4
Polar moment of inertia Ip	20,402,100	mm^4
Bending section modulus Wx	191,372	mm^3
Bending section modulus Wy	127,421	mm^3

Tab. 159

Load bearing profiles

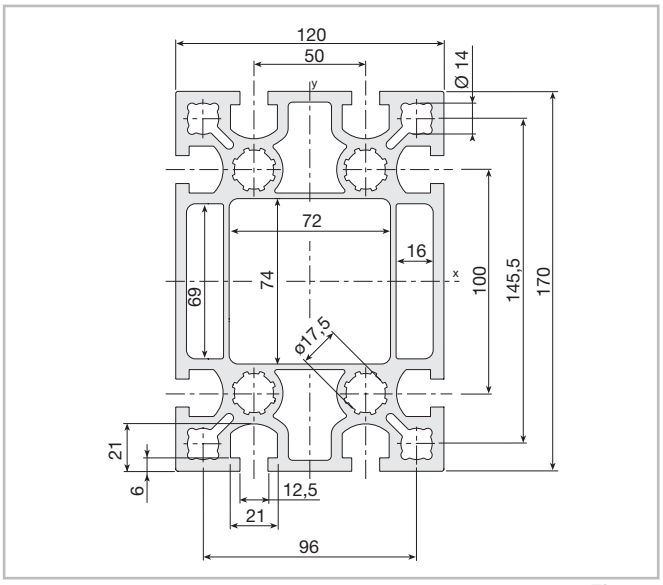
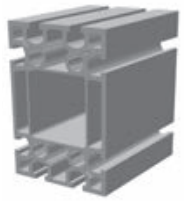


Fig. 46



STATYCA (120x170)		
Weight	17	Kg/m
Max, length	12	m
Moment of inertia Ix	19,734,283	mm^4
Moment of inertia Iy	9,835,781	mm^4
Polar moment of inertia Ip	8,460,000	mm^4
Bending section modulus Wx	232,168	mm^3
Bending section modulus Wy	163,929	mm^3

Tab. 160

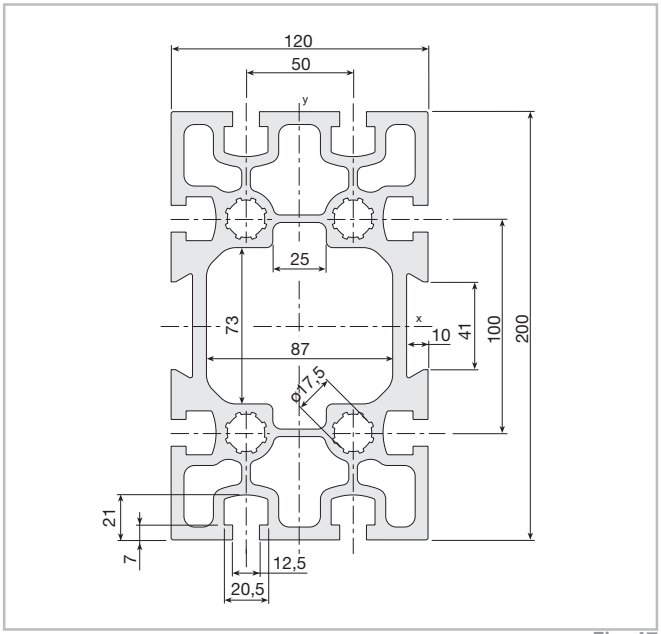
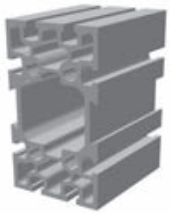


Fig. 47



VALYDA (120x200)		
Weight	21	Kg/m
Max, length	12	m
Moment of inertia Ix	32,697,979	mm^4
Moment of inertia Iy	12,893,004	mm^4
Polar moment of inertia Ip	10,500,000	mm^4
Bending section modulus Wx	326,979	mm^3
Bending section modulus Wy	214,883	mm^3

Tab. 161

Load bearing profiles

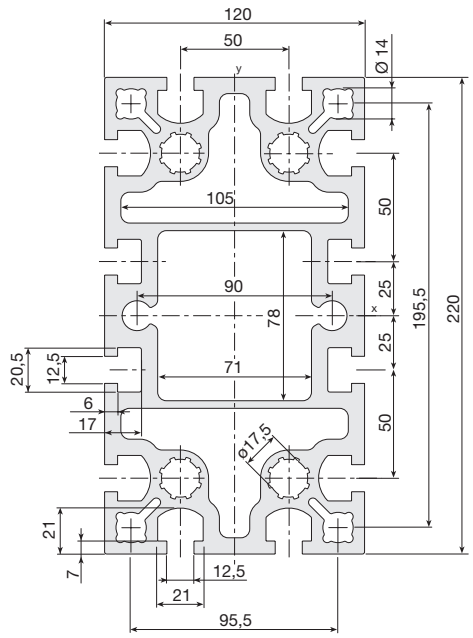
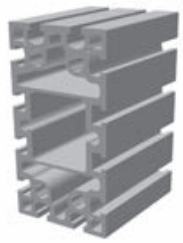


Fig. 48



LOGYCA (120x220)		
Weight	25	Kg/m
Max. length	12	m
Moment of inertia Ix	46,248,422	mm^4
Moment of inertia Iy	15,591,381	mm^4
Polar moment of inertia Ip	61,839,803	mm^4
Bending section modulus Wx	423,182	mm^3
Bending section modulus Wy	260,833	mm^3

Tab. 162

Load bearing profiles

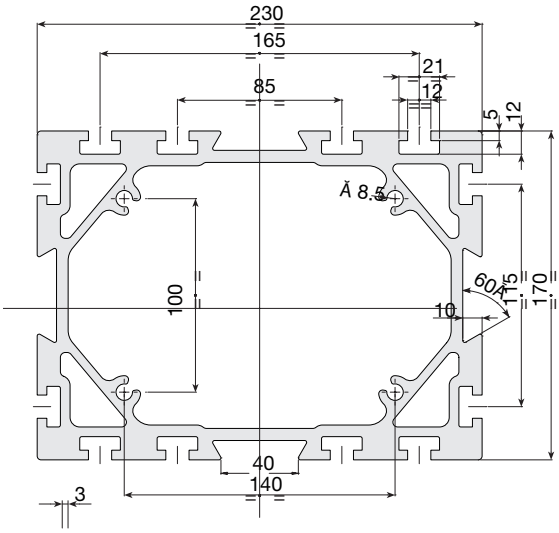


Fig. 49

Profile 230x170		
Weight	25,5	Kg/m
Max. length*	12	m
Moment of inertia Ix	65,007,642	mm^4
Moment of inertia Iy	37,783,535	mm^4
Polar moment of inertia Ip	102,792,000	mm^4
Bending section modulus Wx	564,284	mm^3
Bending section modulus Wy	444,500	mm^3

* Not anodized

Tab. 163

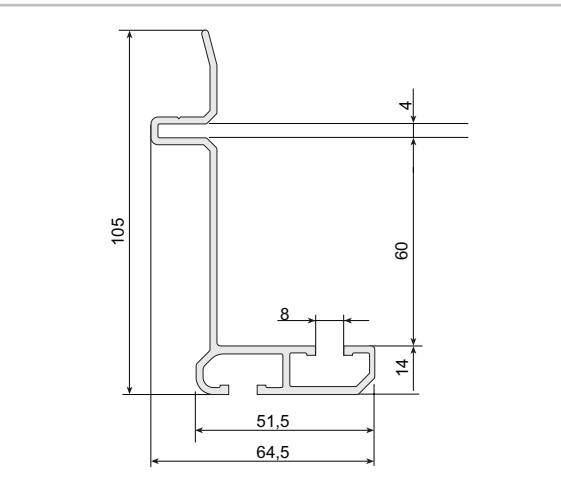


Fig. 50

7400568 energy chain support profile		
Weight	1,3	Kg/m
Available length	6	m

Tab. 164

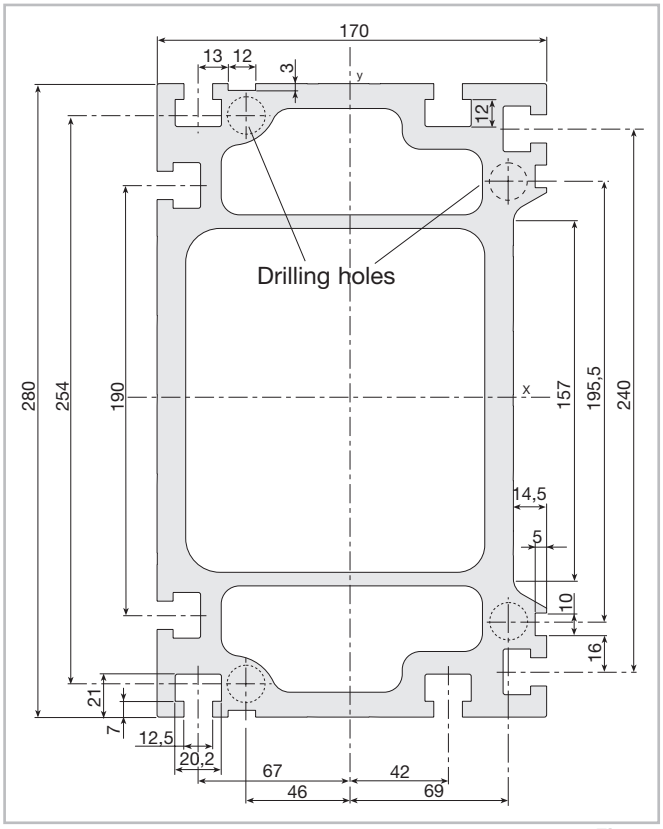


Fig. 51

PRATYCA (170x280)		
Weight	40	Kg/m
Max. length*	12	m
Moment of inertia Ix	126,456,800	mm^4
Moment of inertia Iy	48,292,512	mm^4
Polar moment of inertia Ip	174,749,312	mm^4
Bending section modulus Wx	957,790	mm^3
Bending section modulus Wy	591,620	mm^3

* Not anodized

Tab. 165

T
L

Load bearing profiles

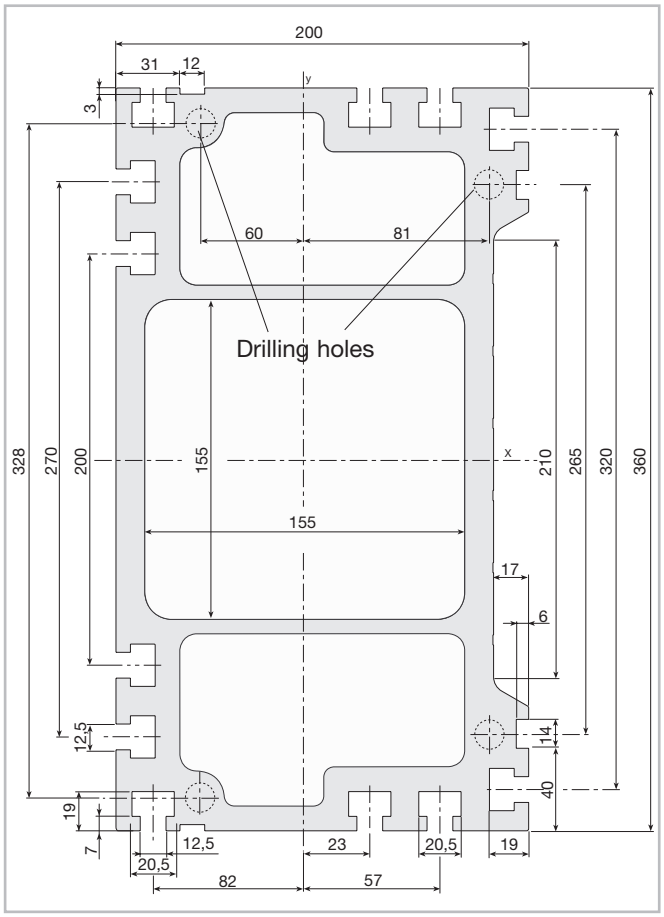
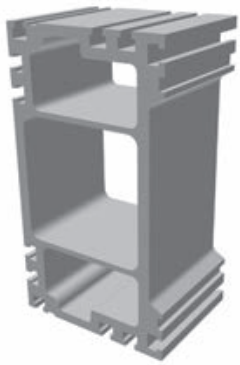


Fig. 52



SOLYDA (200X360)		
Weight	60	Kg/m
Max. length*	12	m
Moment of inertia Ix	317,212,806	mm^4
Moment of inertia Iy	103,285,258	mm^4
Polar moment of inertia Ip	420,498,064	mm^4
Bending section modulus Wx	1,770,500	mm^3
Bending section modulus Wy	1,035,300	mm^3

* Not anodized

Tab. 166

Accessory

Programmable automatic rack lubrication

Grease is delivered by means of a programmable cartridge (average life: ca. 1 year) (a). The grease is spread evenly on the racks through a felt pinion (1). You will need one kit per driven carriage.

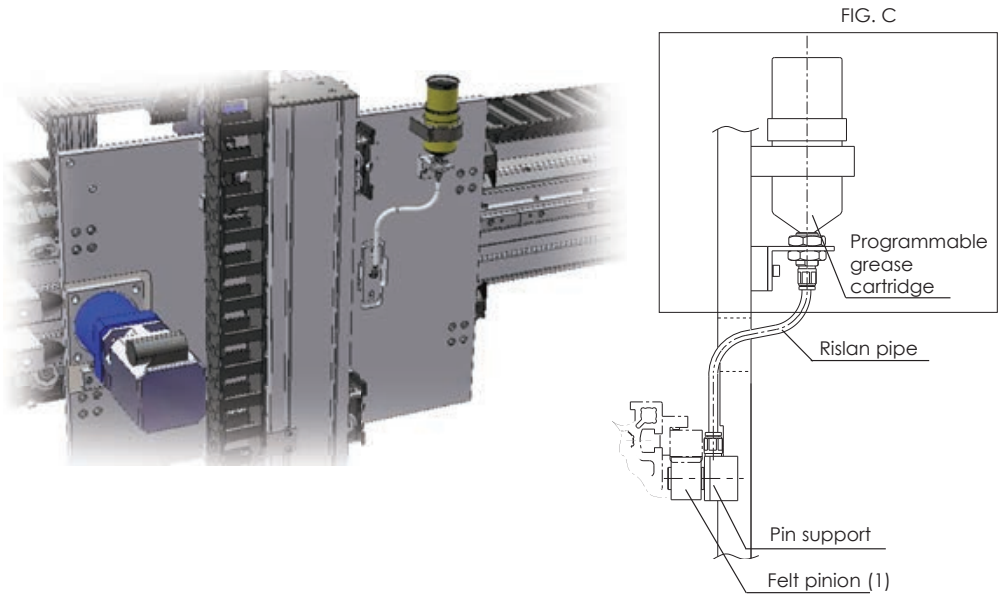


Fig. 53

1 - Spares

Specification	Code
Programmable grease cartridge (125 ml) [b]	101.0744
m2 - helical toolth felt pinion [1]	101.1079
m3 - helical toolth felt pinion [1]	701.0059
m4 - helical toolth felt pinion [1]	116.0051

Tab. 167

2 - Lubrication assembly kit

Specification (see figure C)	Code
Lubrication assembly kit (no felt pinion, nonriscan pipe)	736.0332

Tab. 168

Table for selecting maximum operating torque

Pinion / Racks - Helical tooth

Module	Z [n°]	Øp [mm]	KSD [Nm]	KRD [Nm]
2	21	44,56	150	200
	30	63.66	205	265
3	20	63.66	400	500
	28	89.13	500	650
4	18	76,39	880	1000
	25	106.1	1150	1500

Tab. 169

With lubrication guaranteed under ideal load conditions, dynamics, (1 m/s) with rigid pinion support [Nm].

Example of simplified calculation

To obtain the working torque value, divide the maximum operating torque (Tab. 1) by the safety factor (Tab. 2). Intermediate values can be adjusted according to the application.

Motion (A) = High shock 1.75

Speed (B) = Low 1

Lubrication (C) = Constant 0.9

Rack = module 3 KSD

Pinion = Øp 63.66 (400 Nm)

Safety factor = A x B x C = 1.575

Maximum transmissible torque = Maximum torque 400 / Safety factor 1,575 ≤ 254 N

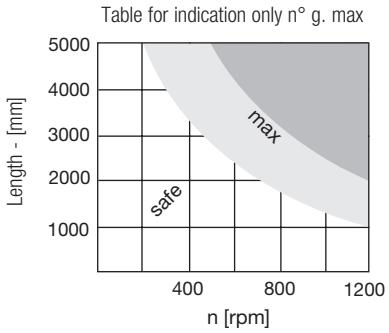
For heavy-duty applications, please ask our technical dept. to carry out the appropriate checks.

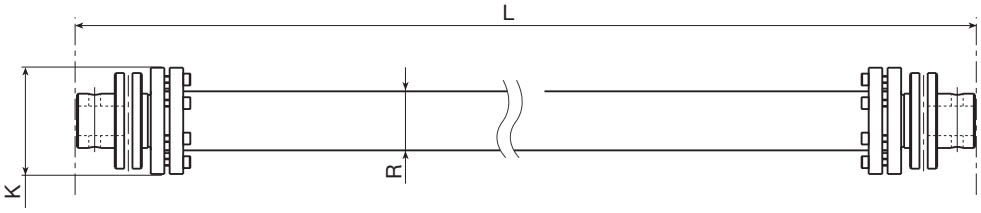
Motion (A)	Speed (B)	Lubrication (C)	Safety fac. (AxBxC)
Low shock 1.25	Low 1	Constant 0.9	1.13
Medium shock 1.5	Medium 1.25	Daily 1.2	2.25
High shock 1.75	High 1.5	Monthly 2.5	6.56

Tab. 170

Connections shafts

The Tecline range includes a series of hollow shafts for connecting the pinions on the systems. We can supply standard connections, according to your application requirements. The complete kit includes all the components needed to make the connection, with shrink-discs and crop down sizes of pins for insertion into the pinions.





Stainless steel blade joint connecting shafts, for backlash-free transmissions

Fig. 54

R(*)	K	L_{max}	MTwork [Nm]	Mom. of inertia [kgm²]	Code L
50	81	6.300	35	$0.0092 + 0.66 \times L. \times 10^{-6}$	436.0291
50	93	6.300	70	$0.0161 + 1.34 \times L. \times 10^{-6}$	436.0245
70	104	6.400	100	$0.0293 + 2.93 \times L. \times 10^{-6}$	436.0282
80	126	6.400	190	$0.0793 + 4.5 \times L. \times 10^{-6}$	436.0292
90	143	6.500	300	$0.1456 + 6.53 \times L. \times 10^{-6}$	436.0986

(*) R: Shaft material and diameter are selected in accordance with required speed, centre-distance L, torque and accuracy.

Tab. 171

Anti-drop safety device with pneumatic brake system

Anti-drop safety devices, available in a range of sizes, are supplied according to the type of application. For instance, they can act as a mechanical stop to block the free-falling load at any stroke point, or as a lock in static conditions at any position.

Two-way blocking occurs following an unexpected pressure drop.

A mechanical safety release system is available on request (patented).

The kit includes: braking device and rod with relative supports, micro-switch. Solenoid valve available upon request.

Operating pressure 3-6 Bar.

With no pressure = locked.

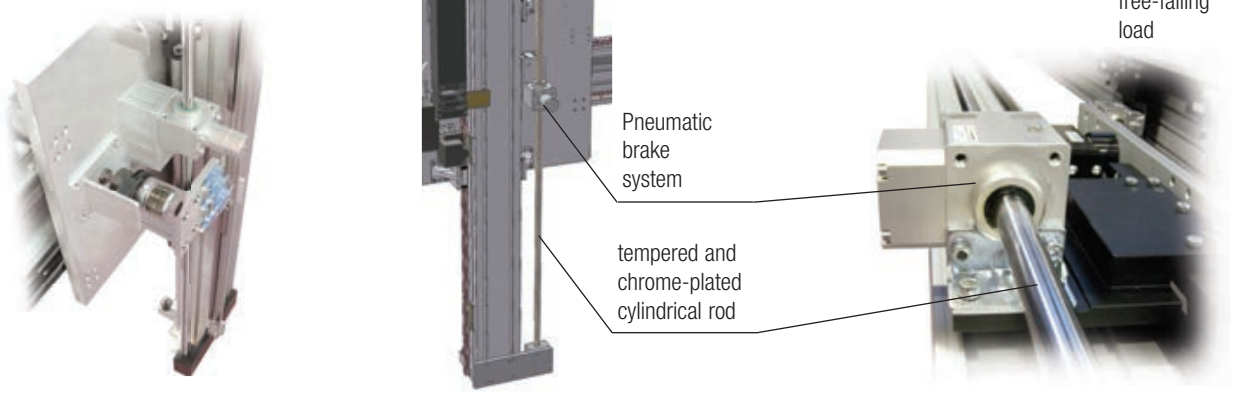


Fig. 55

1- Static rod blocking device

Type	Code	Rod blocking force [N]	Stroke [mm]
A	236.0018	/ 1.200	/ ...
A	236.0018	/ 1.900	/ ...
A	236.0018	/ 3.000	/ ...
A	236.0018	/ 5.400	/ ...
A	236.0018	/ 7.500	/ ...
A	236.0018	/ 12.000	/ ...

Tab. 172

1- Dynamic rod blocking device

Type	Code	Rod blocking force [N]	Stroke [mm]
B	236.0019	/ 3.200	/ ...
B	236.0019	/ 5.400	/ ...
B	236.0019	/ 7.500	/ ...
B	236.0019	/ 12.000	/ ...

Tab. 173

Emergency brake for free-falling load

Safety lock-pin (stopper cylinder)

Lock-pins are available in two sizes to block the vertical axes in the safety position to allow horizontal movements during maintenance. The safety lock-pins comprise the use of the through rod. Select the size according to the load. The kit includes: drilled plate for rod, stopper cylinder, micro-switch and 2 magnetic gearboxes. Max. operating pressure: 10 bar.

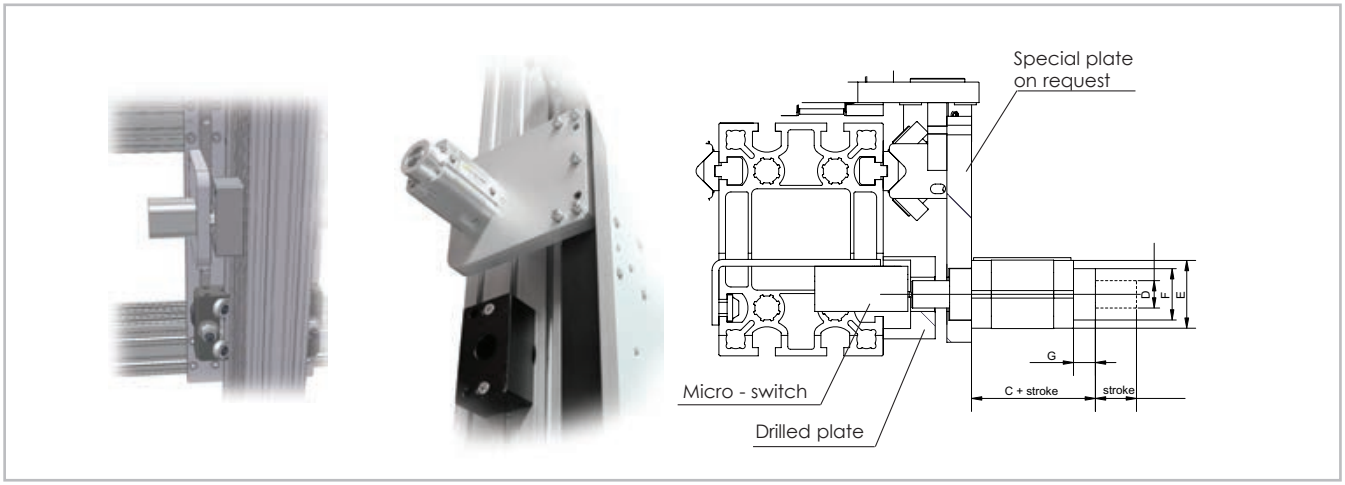


Fig. 56

1- Safety lock-pin

ØD Rod	Stroke	C	E	F	G	Kit Code
20	20	60.5	50	38	16	236.0021
32	30	-	-	-	-	236.0022

Tab. 174

2- Accessory: drilled plate for rod

ØD Rod	Base	Width	Thickness
20	60	100	39
32	60	100	39

Tab. 175

Profile anchor brackets

Material: alluminum alloy (Rs=310 N/mm²).

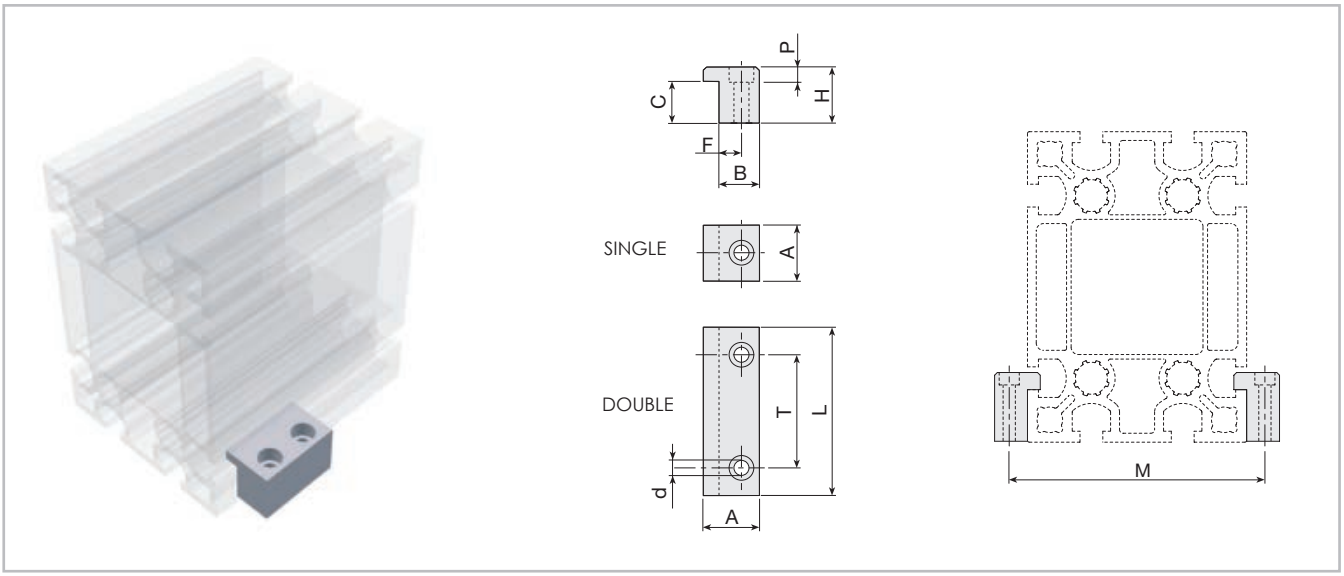


Fig. 57

Profile	A	L	T	d	H	P	C	F	B	M	Single code	Double code
Profile 90x90	30	50	25	9	25	9.5	18	12	22	69/114	415.0772	415.0773
Profile 100x100	25	50	25	6.7	27	6.8	20.6	10	18	120	415.0769	415.0764
STATYCA	30	90	50	11	40	11	28.3	14	25	198	415.0767	415.0762
VALYDA horizontal	30	90	50	11	40	11	28.3	14	25	228	415.0767	415.0762
VALYDA vertical	30	90	50	11	50	11	43.1	14	25	148	215.0042	215.0041
LOGYCA	30	90	50	11	40	11	28.3	14	25	248	415.0767	415.0762
PRATYCA horizontal	30	90	50	11	20	11	11.3	14	25	308	415.0768	416.0763
PRATYCA vertical	30	90	50	11	25	11	13.5	14	25	198	-	915.1174
SOLYDA horizontal	30	90	50	11	20	11	11.3	14	25	308	415.0768	415.0763
SOLYDA vertical	30	90	50	11	25	11	13.5	14	25	198	-	915.1174

Tab. 176

L-shaped brackets

Threaded hole bracket

Threaded hole bracket for mounting additional equipment.
Material: 6060 natural anodized aluminum alloy.

Series A30-8/30-6

Series A30-7/30-5

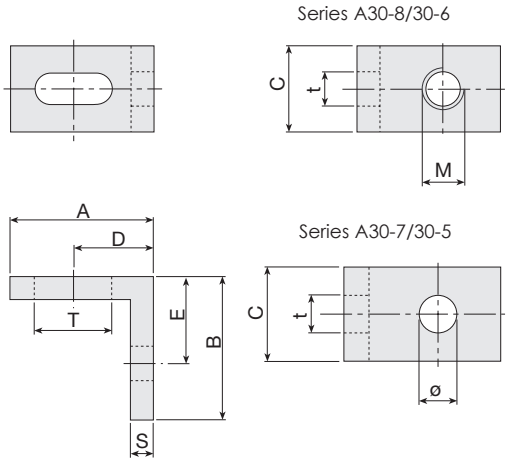


Fig. 58

A	B	C	D	E	S	Txt	M	Code	Ø	Code
45	45	20	25	25	5	16 x 6.5	M6	A30-86	6	A30-76
35	25	20	19	15	5	20 x 6.5	M4	A30-64	4	A30-54
35	25	20	19	15	5	20 x 6.5	M5	A30-65	5	A30-55
35	25	20	19	15	5	20 x 6.5	M6	A30-66	6	A30-56
25	25	15	14	15	4	13.5 x 5.5	M3	B30-63	3	B30-53
25	25	15	14	15	4	13.5 x 5.5	M4	B30-64	4	B30-54
25	25	15	14	15	4	13.5 x 5.5	M5	B30-65	5	B30-55
25	25	15	14	15	4	13.5 x 5.5	M6	B30-66	6	B30-56

Tab. 177

Bracket for mounting additional equipment

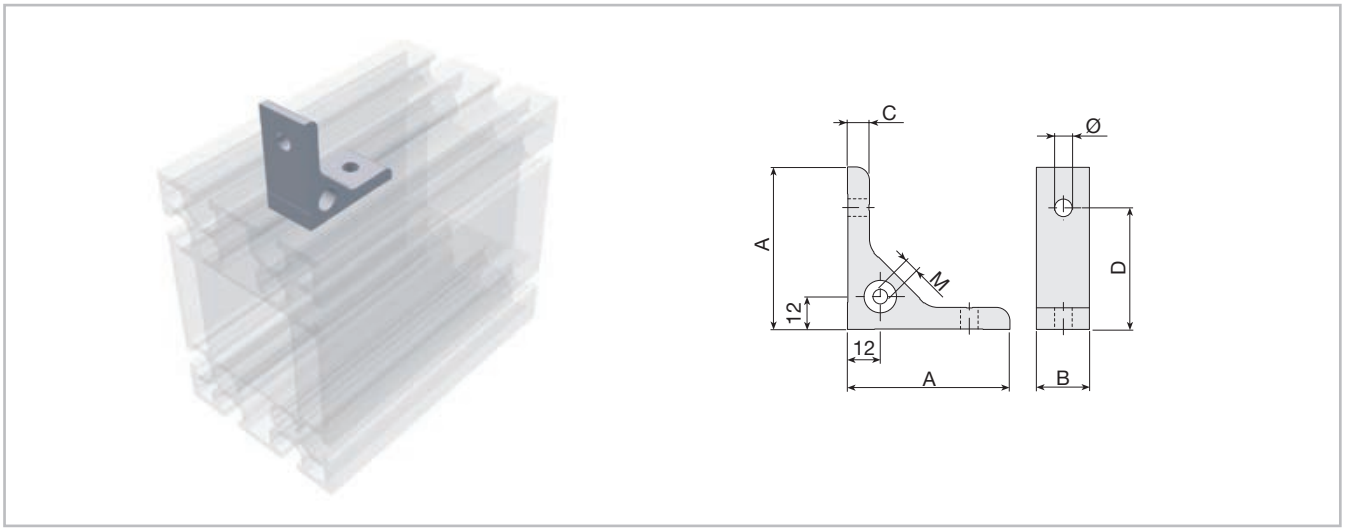


Fig. 59

L-shaped bracket for mounting additional equipment and improving the rigidity of frames made with profiles.
Material: 6060 natural anodized aluminum alloy.

A	B	C	D	E	Ø	M	Code
60	20	8	45	-	6.5	-	B30-10
60	20	8	45	-	6.5	M6	B30-20
60	30	8	45	-	9	-	A30-10
60	30	8	45	-	9	M6	A30-20
38	30	8	25	-	9	-	A30-00
31	20	6	20	-	6.5	-	C30-00

Tab. 178

Bracket for mounting additional profiles

Material: 6060 natural anodized aluminum alloy.

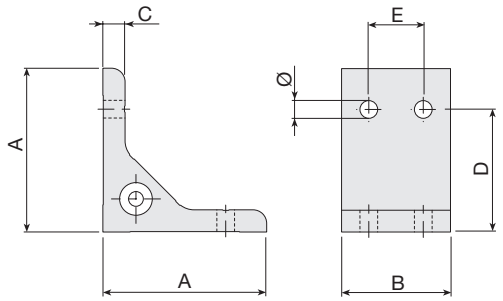


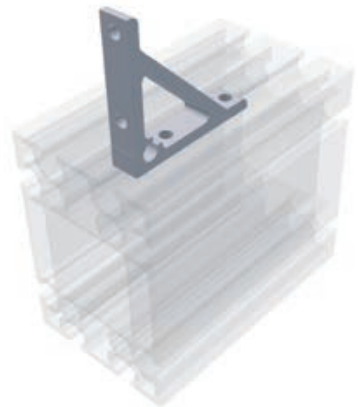
Fig. 60

A	B	C	D	E	Ø	M	Code
38	80	8	25	50	9	-	A30-02
31	60	6	20	40	6.5	-	C30-02

Tab. 179

Bracket for mounting additional profiles

Material: 6060 natural anodized aluminum alloy.



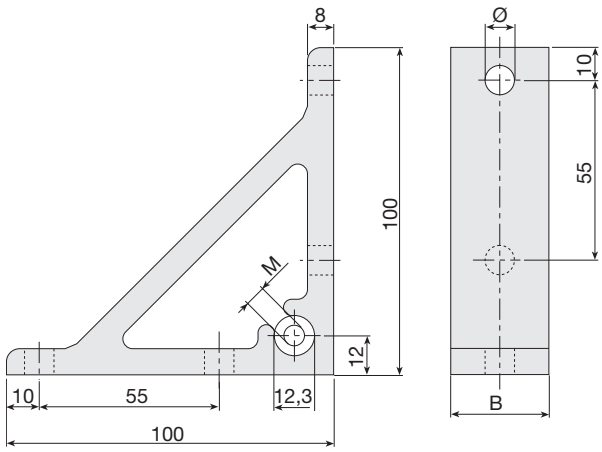


Fig. 61

	B	Ø	M	Code
Without bushing	30	9	-	A30-30
Without bushing	20	6.5	-	B30-30
With bushing	30	9	M6	A30-40
With bushing	20	6.5	M6	B30-40

Tab. 180

End caps for profile

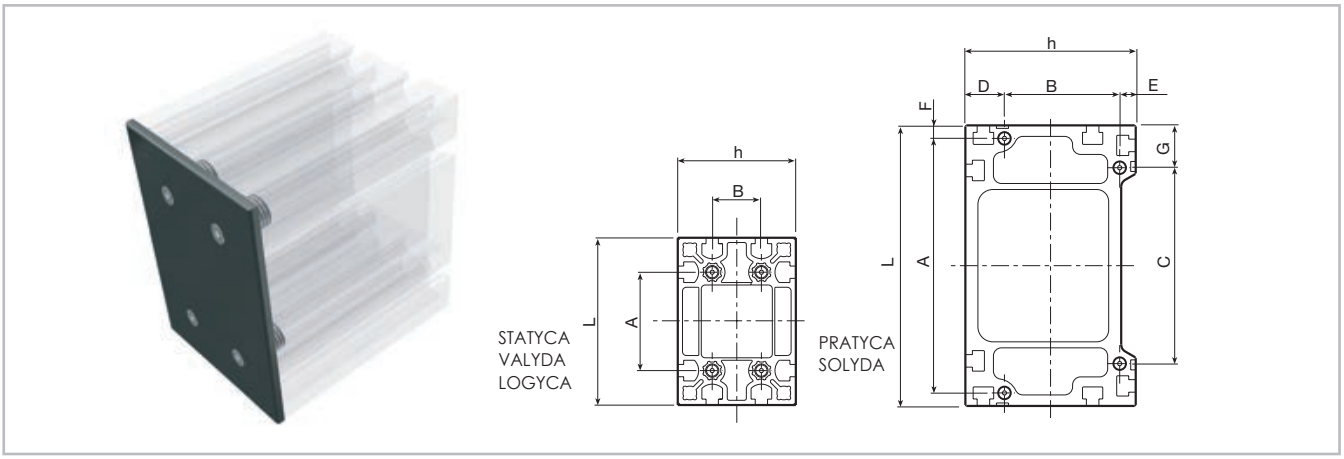


Fig. 62

The end caps for STATYCA, VALYDA, and LOGYCA (supplied with 4 bushings 207.1892 thr. M20/6) are fixed to the profiles using the 4 holes provided in the centre that must be M20 threaded. PRATYCA and SOLYDA profiles must instead be M6 drilled and threaded as in the areas indicted in the drawing (in this case the end caps are supplied without any bushings). Please specify whether profiles will require end caps.
Material: black polyethylene, 6 mm thick. End caps in 6 mm-thick aluminum alloy are available upon request.

Bearing profile	L	h	A	B	C	D	Code
202.1753 -STATYCA	170	120	100	50	-	-	212.1774
202.1146 - VALYDA	200	120	100	50	-	-	212.1704
202.2184 - LOGYCA	220	120	150	50	-	-	212.2279
202.1147 - PRATYCA	280	170	254	115	195.5	39	212.1705
202.0342 - SOLYDA	360	200	328	141	265	40	212.1706

Tab. 181

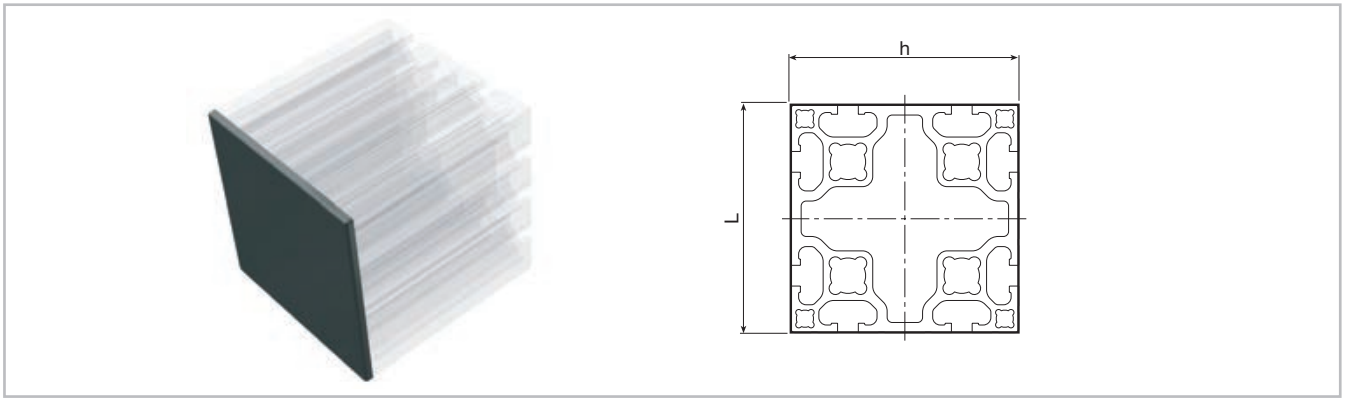


Fig. 63

The end caps for small and medium profiles have no screws or bushes and are fitted simply by exerting moderate pressure on the end of the profile.
Material: black polyethylene, approx. 5 mm thick.

Profile	L	h	Code
Profile 90x90	90	90	E40-40
Profile 100x100	100	100	A40-50

Tab. 182

Threaded inserts for small and medium profiles

Inserts for base profiles 30/45/50/60

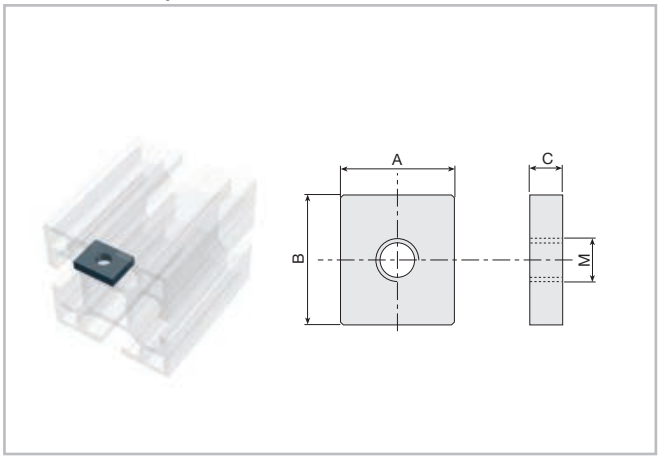


Fig. 64

Material: galvanised steel.
Important: inserts must be inserted into the longitudinal slots before assembling.

Thread	A-B-C Code	Thread	A-B-C Code
M3	B32-30	M4	A32-40
M4	B32-40	M5	A32-50
M5	B32-50	M6	A32-60
M6	B32-60	M8	A32-80
Spring	211.1077	Spring	211.1061

Tab. 183

Also suitable for profiles **STATYCA, VALYDA, LOGYCA, PRATYCA and SOLYDA**.
Material: galvanised steel.
Important: inserts must be inserted into the longitudinal slots before assembling.

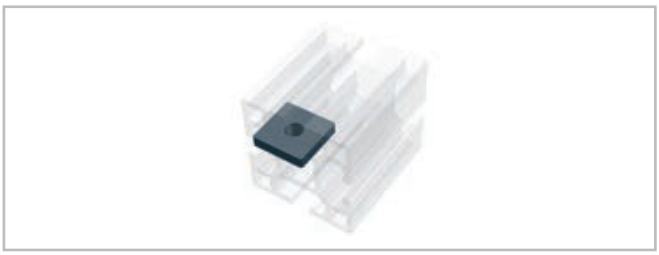


Fig. 45

Square nuts

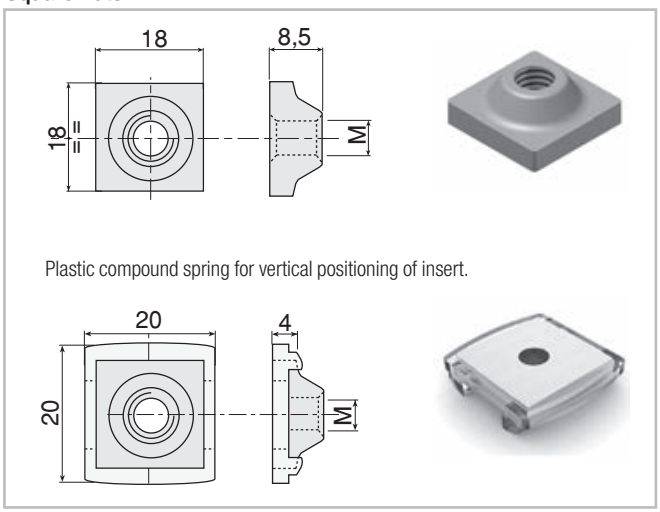


Fig. 65

Thread	Code 18x18	Code 20x20
M4	209.0031	209.0023
M5	209.0032	209.0019
M6	209.0033	209.1202
M8	209.0034	209.0467

Tab. 184

Spring	Code
Suitable for all inserts 18x18	101.0732

Tab. 185

Threaded inserts for load-bearing profiles

Frontally insertable alignment plates

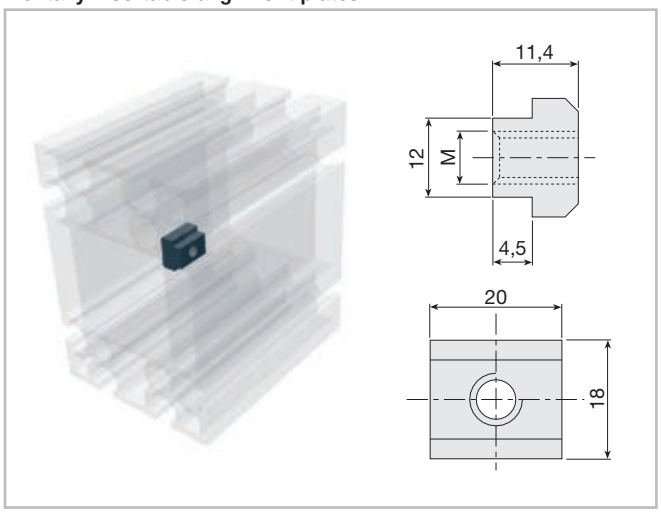


Fig. 66

Material: galvanised steel.
Important: inserts must be inserted into the longitudinal slots before assembling.

Thread	Code
M5	215.1768
M6	215.1769
M8	215.1770
M10	215.2124

Tab. 186

Frontally insertable alignment plates

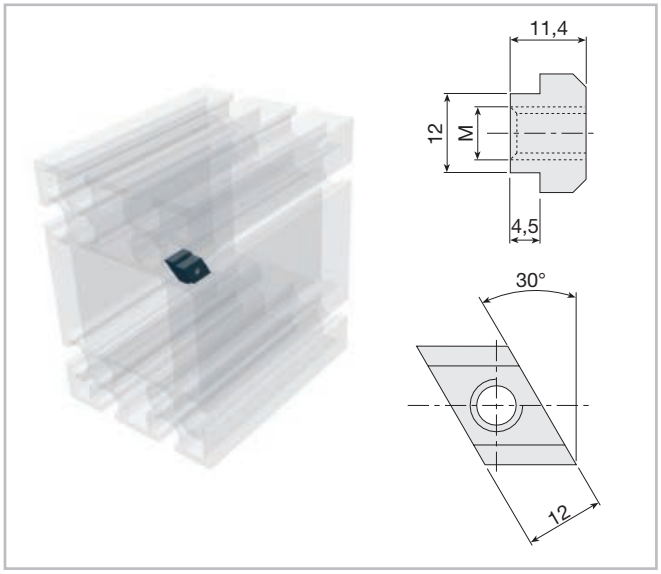


Fig. 67

Material: galvanised steel.

Thread	Code
M5	215.1771
M6	215.1772
M8	215.1773
M10	215.2125

Tab. 187

Threaded inserts

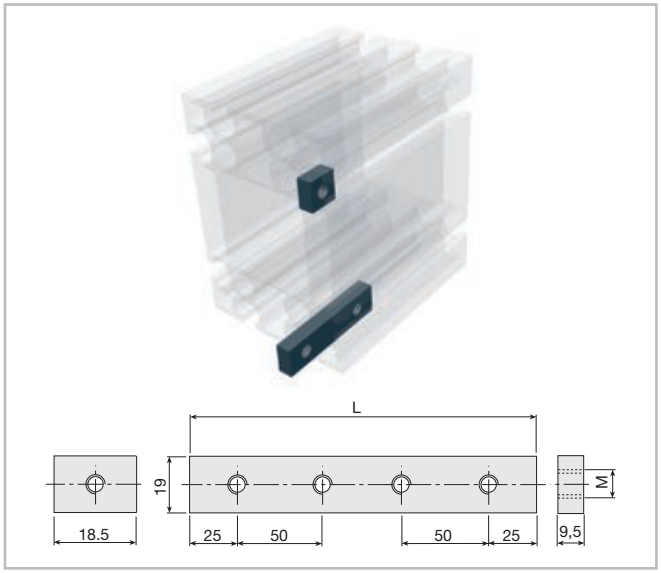


Fig. 68

Also suitable for base-50 profiles, except A32-91 insert.
Material: galvanised steel.

Thread	N. holes	L	Code
M10	1	40	215.0477
M12	1	40	209.1281
M10	1	20	209.1277
M10	2	80	209.1776
M10	3	150	209.1777
M10	4	200	209.1778
M10	5	250	209.1779
M10	6	300	209.1780
M10	7	350	209.1781

Tab. 188

Dovetail inserts for VALYDA profile

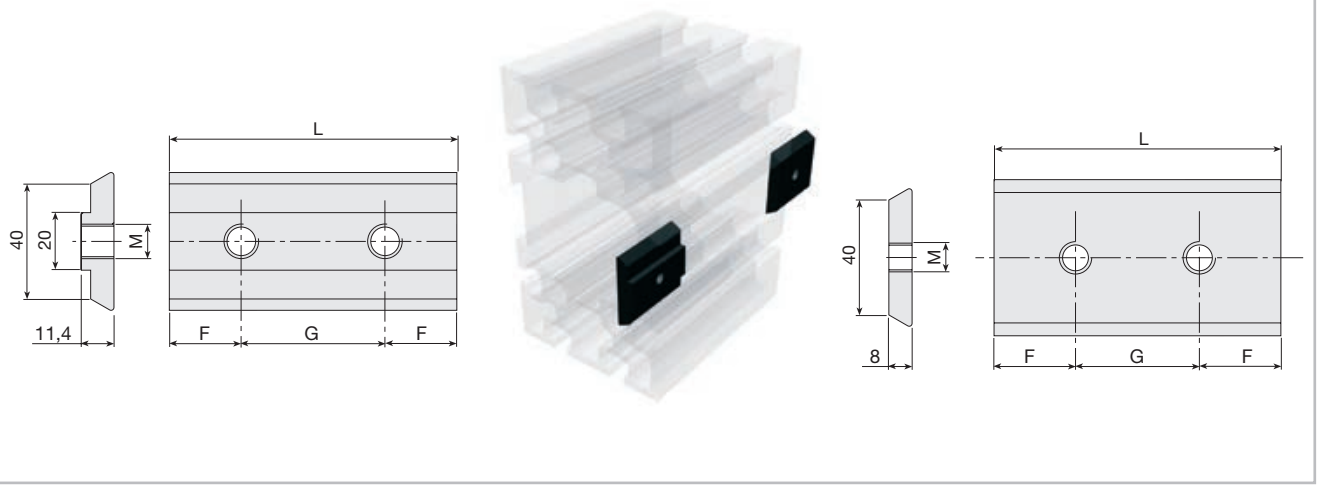


Fig. 69

Material: burnished C40.

Important: inserts must be inserted into the longitudinal slots before assembling.

Special sizes are available upon request.

F	G	L	N. holes	M8	M10
25	-	50	1	214.0388	214.0394
25	50	100	2	214.0389	214.0395
25	50	200	4	214.0391	214.0398
25	50	300	6	214.0393	214.0400

Tab. 189

F	G	L	N. holes	M10
25	-	50	1	214.0430
25	50	100	2	214.0431
25	50	200	4	214.0433
25	50	300	6	214.0435

Tab. 190

Reader system with magnetic scale and sensor

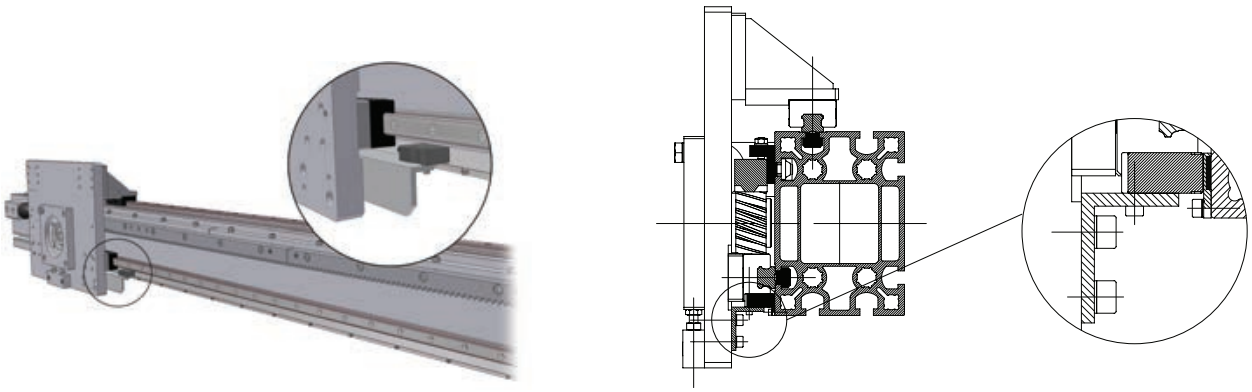


Fig. 70

The magnetic scale is applied to the body of the module using a supporting and protective profile.

Precision from ± 0.015 to ± 0,05 mm

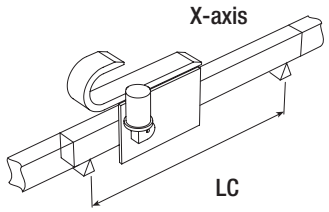
Max. speed = 4 ÷ 10 m/s (according to type)

Preliminary selection table (1-2-3 axes)

These tables are useful for making a preliminary selection with load applied in a central position with respect to the plate or profile axis.
Z-axis length is < 1,600 mm.
Deflection is computed assuming continuous beams having the same span and concentrated static loads.

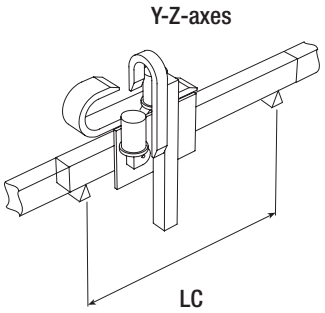
In the following table, select the appropriate X axes according to the load.

Max load capacity [kg.]	PA	170	200	200P	220	280	280P	360	LC
		Deflection							
	50	1.4							5000
	100	1.8							5000
	200	2.7	1.8						5000
	300		2.3	2.7					5000
	400			3.3	2.8				5000
	500				2.8	1.8			5000
	600					2	2		6000
	800						2.5	1.8	6000
	1000							2.1	7000



In the following table, select the appropriate Y-Z axes according to the load.

Max load capacity [kg.]	PA	170/90	200/100	200/100P	220/170	280/200	280/200E	280/200P	280/220	360/220	360/280	LC
		Deflection										
	50	1.9										5000
	100	2.4	1.7	2	1.6							5000
	200				2.2	0.8	0.8					5000
	300					1.6	1.6	1.6				5000
	400							1.9	2	0.9		5000
	500								2.2	1		5000
	600								2.5	1.2	1.2	6000
	800										2.2	6000

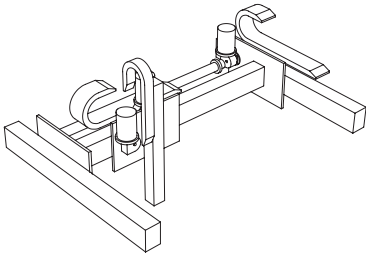


In the following table, select the appropriate X and Y-Z axes according to the load.

		Y-Z-axes									
	PA	170/90	200/100	200/100P	220/170	280/200	280/200E	280/200P	280/220	360/220	360/280
PA	load [kg]	100	100	100	200	200	300	400	600	600	700
X-axis 2X	(200)										
3X	(300)										
4X	(400)										
5X	(500)										
6X	(600)										
8X	(800)										
10X	(1000)										

NB: The choice of X axis is based upon the actual load, the supporting points, max. deflection and the total weight of the Y-Z axes.

X-Y-Z-axes



Example: Selection of a 3 axis gantry with roller guides

DATA: Total working load 300 kg, X axis stroke: 5,000 mm, Y-axis stroke: 4,000 mm, Z-axis stroke: 2,000 mm, support points: 2

By analysing the table of Y-Z axes based on the working load (Pc), profile length (Ly) and deflection, the selection falls on one PA 280/200E (load 300 kg.) system.

Check: $P_{eff} = P_{max}$ - (Lz - 1600)/1000•q_z = 300-(2870-1600)/1000•35 = 255,55 kg. < di 300 kg (not sufficient).

Therefore select the larger size PA 280/200P (max. load capacity 400 kg.)

M_{toty+z} PA 280/200P = M_{base}+(q_y• strokeQ_y+q_z• strokeQ_z)/1000+Pc = 244+(66•4,000+48•2,000)/1,000+300 = 904 kg.

P_{totx} = M_{tot} PA 280/200P (Y+Z)•0.66 = 596.6 kg.

Lx = strokex + 1,200 = 5,000+1,200 = 6,200 mm

By analyzing the table of X axes based on the load (P_{totx}) profile length (Lx) and deflection, it is possible to select 2 linear axes PA 280

Chosen composition: n°1 PA 280/200P + n° 2 PA 280

Perform a final analysis by computing the deflection based on the actual size of the spans.
Our technical dept. is at your complete disposal to help you examine the most suitable applications for your requirements and help you with motor and drive sizing for the whole project.

Ordering key

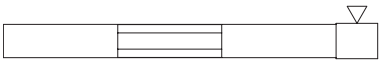
Identification codes for the PAR/PAS linear unit

PAR PAS	220	170	5000	700
				Z-axis stroke
			Y-axis stroke	
		Z-axis profile		
	Y-axis profile			
PAR/PAS Series *see pg. TL-3*				

In order to create identification codes for Actuator Line, you can visit: **http://configureactuator.rollon.com**

Configure Actuator

Left / right orientation

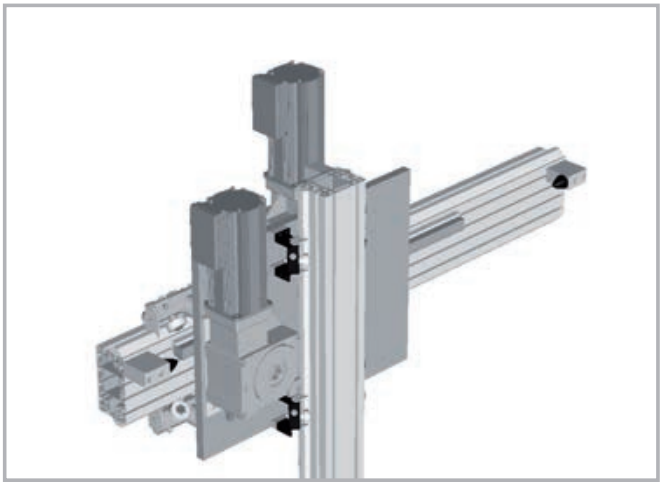


Right

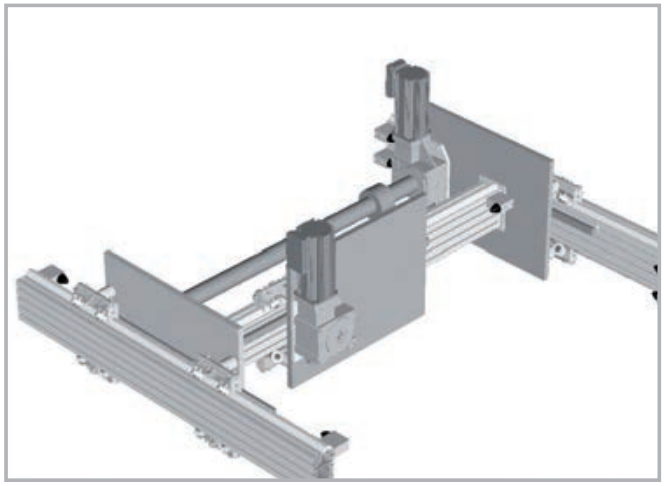
Left

Multiaxis systems

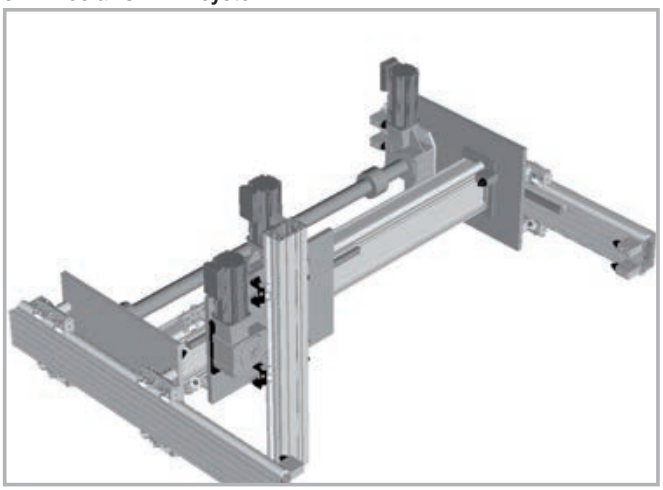
1 - Two axis Y-Z system



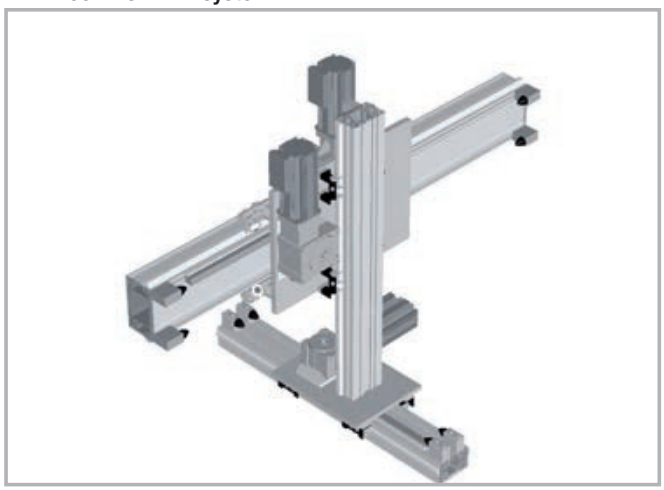
2 - Two axis Y-X system



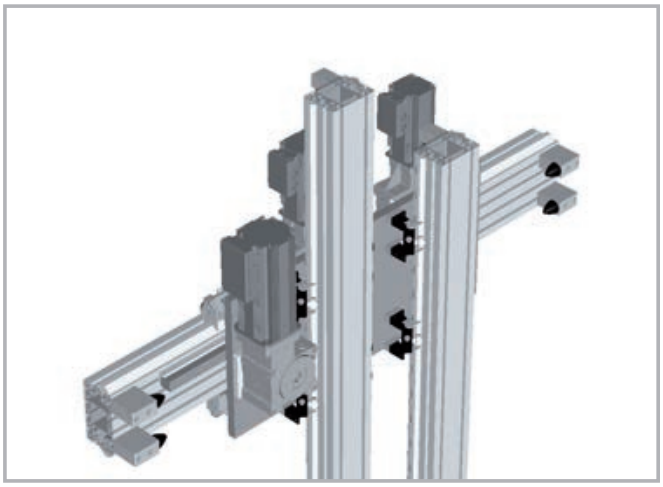
3 - Three axis X-Y-Z system



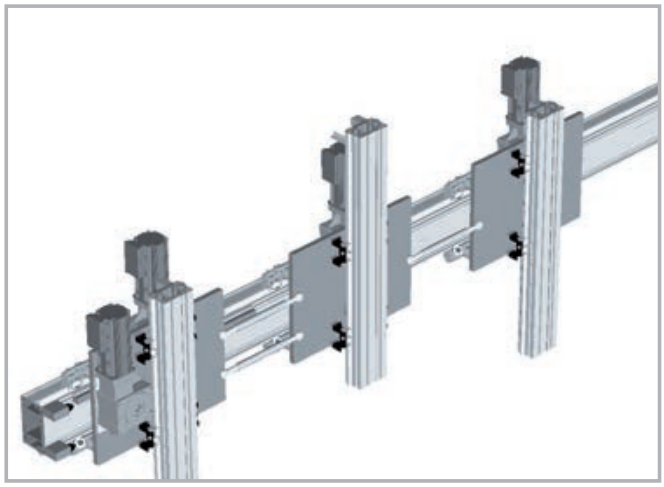
4 - Three Axis X-Y-Z system



5 - Two axis Y-Z system



6 - Two axis Y-Z system



Static load and service life

Static load

In the static load test, the radial load rating F_y, the axial load rating F_z, and the moments M_x, M_y und M_z indicate the maximum allowed load values. Higher loads will impair the running characteristics. To check the static load, a safety factor S_0 is used, which accounts for the special conditions of the application defined in more detail in the table below:

All load capacity values refer to the actuator well fixed to a rigid structure. For cantilever applications the deflection of the actuator profile must be taken in account.

Safety factor S_0

No shocks or vibrations, smooth and low-frequency change in direction High mounting accuracy, no elastic deformations, clean environment	2 - 3
Normal assembly conditions	3 - 5
Shocks and vibrations, high-frequency changes in direction, substantial elastic deformations	5 - 7

Fig. 1

The ratio of the actual to the maximum allowed load must not be higher than the reciprocal value of the assumed safety factor S_0.

$$\frac{P_{fy}}{F_y} \leq \frac{1}{S_0} \qquad \frac{P_{fz}}{F_z} \leq \frac{1}{S_0} \qquad \frac{M_1}{M_x} \leq \frac{1}{S_0} \qquad \frac{M_2}{M_y} \leq \frac{1}{S_0} \qquad \frac{M_3}{M_z} \leq \frac{1}{S_0}$$

Fig. 2

The above formulae only apply to a one load case. If one or more of the forces described are acting simultaneously, the following calculation must be carried out:

$$\frac{P_{fy}}{F_y} + \frac{P_{fz}}{F_z} + \frac{M_1}{M_x} + \frac{M_2}{M_y} + \frac{M_3}{M_z} \leq \frac{1}{S_0}$$

P_{fy} = acting load (y direction) (N)
F_y = static load rating (y direction) (N)
P_{fz} = acting load (z direction) (N)
F_z = static load rating (z direction) (N)
M_1, M_2, M_3 = external moments (Nm)
M_x, M_y, M_z = maximum allowed moments in the different load directions (Nm)

Fig. 3

The safety factor S_0 can be at the lower limit given if the acting forces can be determined with sufficient accuracy. If shocks and vibrations act on the system, the higher value should be selected. In dynamic applications, higher safeties are required. For further information, please contact our Application Engineering Department.

Belt safety factor referred to the dynamic F_x

Impact and vibrations	Speed / acceleration	Orietation	Safety Factor
No impacts and/or vibrations	Low	horizontal	1.4
		vertical	1.8
Light impacts and/or vibrations	Medium	horizontal	1.7
		vertical	2.2
Strong impacts and/or vibrations	High	horizontal	2.2
		vertical	3

Tab. 1

Service life

Calculation of the service life

The dynamic load rating C is a conventional quantity used for calculating the service life. This load corresponds to a nominal service life of 100 km.

The calculated service life, dynamic load rating and equivalent load are linked by the following formula:

$$L_{km} = 100\ km \cdot \left(\frac{Fz\text{-}dyn}{P_{eq}} \cdot \frac{1}{f_i}\right)^3$$

L_{km} = theoretical service life (km)
Fz-dyn = dynamic load rating (N)
P_{eq} = acting equivalent load (N)
f_i = service factor (see tab. 2)

Fig. 4

The effective equivalent load P_{eq} is the sum of the forces and moments acting simultaneously on a slider. If these different load components are known, P is obtained from the following equation:

For SP types

$$P_{eq} = P_{fy} + P_{fz} + \left(\frac{M_1}{M_x} + \frac{M_2}{M_y} + \frac{M_3}{M_z}\right) \cdot F_y$$

Fig. 5

For CI and CE types

$$P_{eq} = P_{fy} + \left(\frac{P_{fz}}{F_z} + \frac{M_1}{M_x} + \frac{M_2}{M_y} + \frac{M_3}{M_z}\right) \cdot F_y$$

Fig. 6

The external constants are assumed to be constant over time. Short-term loads that do not exceed the maximum load ratings have no relevant effect on the service life and can therefore be neglected in the calculation.

Service factor f_i

f_i	
no shocks or vibrations, smooth and low-frequency changes in direction; ($\alpha < 5m/s^2$) clean operating conditions; low speeds (<1 m/s)	1.5 - 2
Slight vibrations; medium speeds; (1-2 m/s) and medium-high frequency of the changes in direction ($5m/s^2 < \alpha < 10\ m/s^2$)	2 - 3
Shocks and vibrations; high speeds (>2 m/s) and high-frequency changes in direction; ($\alpha > 10m/s^2$) high contamination, very short stroke	> 3

Tab. 2

Speedy Rail A Lifetime

The rated lifetime for SRA actuators is 80,000 Km.

Static load and service life Uniline

Static load

In the static load test, the radial load rating F_y, the axial load rating F_z, and the moments M_x, M_y und M_z indicate the maximum allowed load values. Higher loads will impair the running characteristics. To check the static load, a safety factor S_0 is used, which accounts for the special conditions of the application defined in more detail in the table below:

Safety factor S_0

No shocks or vibrations, smooth and low-frequency change in direction High mounting accuracy, no elastic deformations, clean environment	1 - 1.5
Normal assembly conditions	1.5 - 2
Shocks and vibrations, high-frequency changes in direction, substantial elastic deformations	2 - 3.5

Fig. 7

The ratio of the actual to the maximum allowed load must not be higher than the reciprocal value of the assumed safety factor S_0.

$$\frac{P_{fy}}{F_y} \leq \frac{1}{S_0} \qquad \frac{P_{fz}}{F_z} \leq \frac{1}{S_0} \qquad \frac{M_1}{M_x} \leq \frac{1}{S_0} \qquad \frac{M_2}{M_y} \leq \frac{1}{S_0} \qquad \frac{M_3}{M_z} \leq \frac{1}{S_0}$$

Fig. 8

The above formulae apply to a one load case. If one or more of the forces described are acting simultaneously, the following test must be carried out:

$$\frac{P_{fy}}{F_y} + \frac{P_{fz}}{F_z} + \frac{M_1}{M_x} + \frac{M_2}{M_y} + \frac{M_3}{M_z} \leq \frac{1}{S_0}$$

P_{fy} = acting load (y direction) (N)
F_y = static load rating (y direction) (N)
P_{fz} = acting load (z direction) (N)
F_z = static load rating (z direction) (N)
M_1, M_2, M_3 = external moments (Nm)
M_x, M_y, M_z = maximum allowed moments in the different load directions (Nm)

Fig. 9

The safety factor S_0 can be at the lower limit given if the acting forces can be determined with sufficient accuracy. If shocks and vibrations act on the system, the higher value should be selected. In dynamic applications, higher safeties are required. For further information, please contact our Application Engineering Department.

Calculation formulae

Moments M_y and M_z for linear units with long slider plate

The allowed loads for the moments M_y and M_z depend on the length of the slider plate. The allowed moments M_{zn} and M_{yn} for each slider plate length are calculated by the following formulae:

$$S_n = S_{min} + n \cdot \Delta S$$

$$M_{zn} = \left(1 + \frac{S_n - S_{min}}{K}\right) \cdot M_{z\,min}$$

$$M_{yn} = \left(1 + \frac{S_n - S_{min}}{K}\right) \cdot M_{y\,min}$$

M_{zn} = allowed moment (Nm)
$M_{z\,min}$ = minimum values (Nm)
M_{yn} = allowed moment (Nm)
$M_{y\,min}$ = minimum values (Nm)
S_n = length of the slider plate (mm)
S_{min} = minimum length of the slider plate (mm)
ΔS = factor of the change in slider length
K = constant

Fig. 10

Type	$M_{y\,min}$ [Nm]	$M_{z\,min}$ [Nm]	S_{min} [mm]	ΔS	K
A40L	22	61	240		74
A55L	82	239	310		110
A75L	287	852	440		155
C55L	213	39	310		130
C75L	674	116	440	10	155
E55L	165	239	310		110
E75L	575	852	440		155
ED75L (M_z)	1174	852	440		155
ED75L (M_y)	1174	852	440		270

Tab. 3

Moments M_y and M_z for linear units with two slider plates

The allowed loads for the moments M_y and M_z are related to the value of the distance between the centers of the sliders. The allowed moments M_{yn} and M_{zn} for each distance between the centers of the sliders are calculated by the following formulae:

$$L_n = L_{min} + n \cdot \Delta L$$

$$M_y = \left(\frac{L_n}{L_{min}}\right) \cdot M_{y\,min}$$

$$M_z = \left(\frac{L_n}{L_{min}}\right) \cdot M_{z\,min}$$

M_y = allowed moment (Nm)
M_z = allowed moment (Nm)
$M_{y\,min}$ = minimum values (Nm)
$M_{z\,min}$ = minimum values (Nm)
L_n = distance between the centers of the sliders (mm)
L_{min} = minimum value for the distance between the centers of the sliders (mm)
ΔL = factor of the change in slider length

Fig. 11

Type	$M_{y\,min}$ [Nm]	$M_{z\,min}$ [Nm]	L_{min} [mm]	ΔL
A40D	70	193	235	5
A55D	225	652	300	5
A75D	771	2288	416	8
C55D	492	90	300	5
C75D	1809	312	416	8
E55D	450	652	300	5
E75D	1543	2288	416	8
ED75D	3619	2288	416	8

Tab. 4

Service life

Calculation of the service life

The dynamic load rating C is a conventional quantity used for calculating the service life. This load corresponds to a nominal service life of 100 km. The corresponding values for each liner unit are listed in Table 45 shown below. The calculated service life, dynamic load rating and equivalent load are linked by the following formula:

$$L_{km} = 100\ km \cdot \left(\frac{C}{P} \cdot \frac{f_c}{f_i} \cdot f_h\right)^3$$

L_{km} = theoretical service life (km)
C = dynamic load rating (N)
P = acting equivalent load (N)
f_i = service factor (see tab. 5)
f_C = contact factor (see tab. 6)
f_h = stroke factor (see fig. 13)

Fig. 12

The effective equivalent load P is the sum of the forces and moments acting simultaneously on a slider. If these different load components are known, P is obtained from the following equation:

$$P = P_{fy} + \left(\frac{P_{fz}}{F_Z} + \frac{M_1}{M_x} + \frac{M_2}{M_y} + \frac{M_3}{M_z}\right) \cdot F_y$$

Fig. 13

The external constants are assumed to be constant over time. Short-term loads that do not exceed the maximum load ratings have no relevant effect on the service life and can therefore be neglected in the calculation.

Service factor f_i

f_i	
No shocks or vibrations, smooth and low-frequency changes in direction; clean operating conditions; low speeds (<1 m/s)	1 - 1.5
Slight vibrations; medium speeds; (1-2,5 m/s) and medium-high frequency of the changes in direction	1.5 - 2
Shocks and vibrations; high speeds (>2.5 m/s) and high-frequency changes in direction; high contamination	2 - 3.5

Tab. 5

Contact factor f_c

f_c	
Standard slider	1
Long slider	0.8
Double slider	0.8

Tab. 6

Stroke factor f_h

The stroke factor f_h accounts for the higher stress on the raceways and rollers when short strokes are carried out at the same total run distance. The following diagram shows the corresponding values (for strokes above 1 m, f_h remains 1):

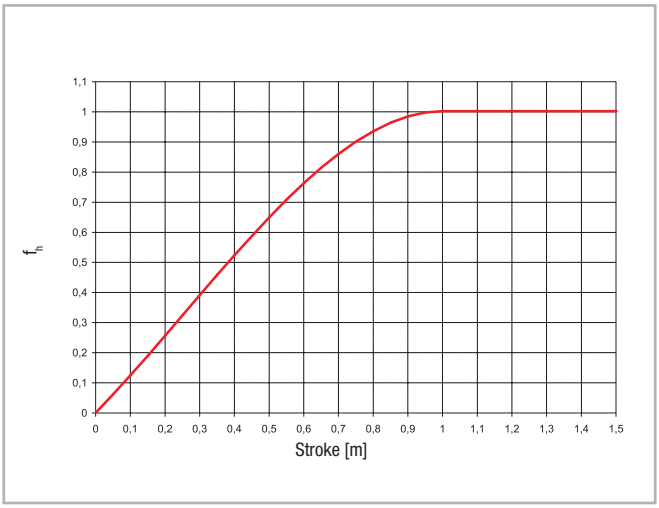


Fig. 14

Determination of the motor torque

The torque C_m required at the drive head of the linear axis is calculated by the following formula:

$$C_m = C_v + \left(F \cdot \frac{D_p}{2}\right)$$

C_m = torque of the motor (Nm)
C_v = starting torque (Nm)
F = force acting on the toothed belt (N)
D_p = pitch diameter of pulley (m)

Fig. 15

Data sheet

General data: Date: ..... Inquiry N°: .....

Address: ..... Contact: .....

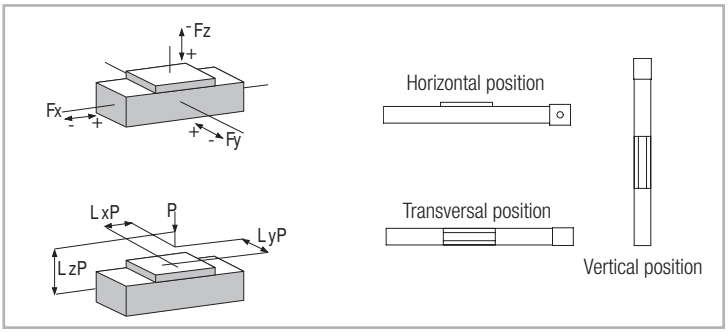
Company: ..... Zip Code: .....

Phone: ..... Fax: .....

E-Mail: .....

Technical data:

				X axis	Y axis	Z axis
Useful stroke (Including safety overtravel)		S	[mm]			
Load to be translated		P	[kg]			
Location of Load in the	X-Direction	LxP	[mm]			
	Y-Direction	LyP	[mm]			
	Z-Direction	LzP	[mm]			
Additional force	Direction (+/-)	Fx (Fy, Fz)	[N]			
Position of force	X-Direction	Lx Fx (Fy, Fz)	[mm]			
	Y-Direction	Ly Fx (Fy, Fz)	[mm]			
	Z-Direction	Lz Fx (Fy, Fz)	[mm]			
Assembly position (Horizontal/Vertical/Transversal						
Max. speed		V	[m/s]			
Max. acceleration		a	[m/s^2]			
Positioning repeatability		Δs	[mm]			
Required life		L	yrs			



Attention: Please enclose drawing, sketches and sheet of the duty cycle

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