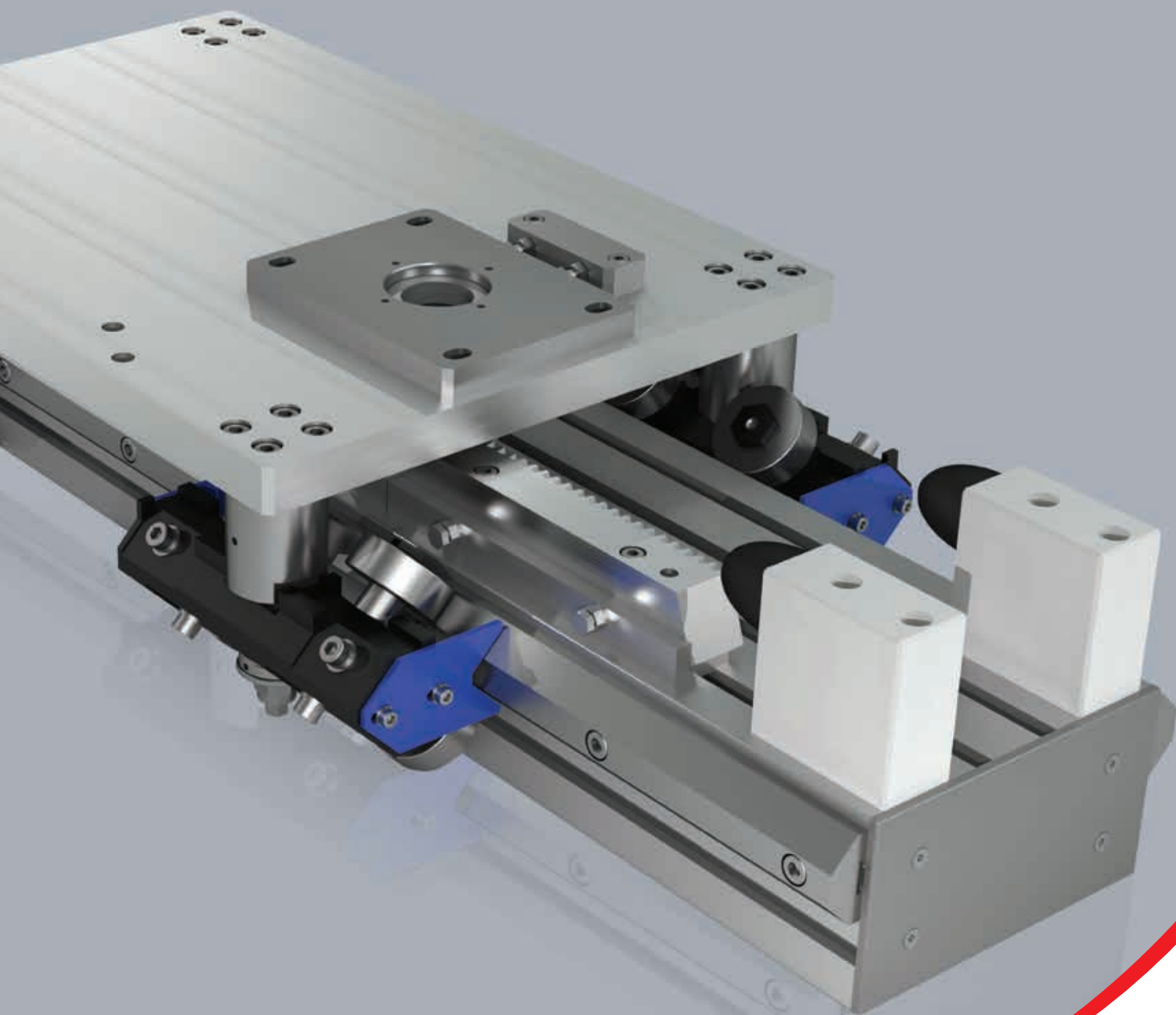


ROLLON®
BY TIMKEN




Tecline



www.motiontech.com.au

TO SUPPORT YOU, WE DESIGN AND PRODUCE

An industrialized process with various levels
of customization



For over 40 years, Rollon has adopted an approach entailing responsibility and ethics in the design and production of our linear motion solutions for different industrial sectors. The reliability of an international technology group has now been combined with the availability of a local support and service network



VALUES



PERFORMANCE

Rollon's goal is to help our clients become more competitive in their markets through technological solutions, design simplification, productivity, reliability, duration, and low maintenance.



ROBOTICS



INDUSTRIAL MACHINERY



LOGISTICS

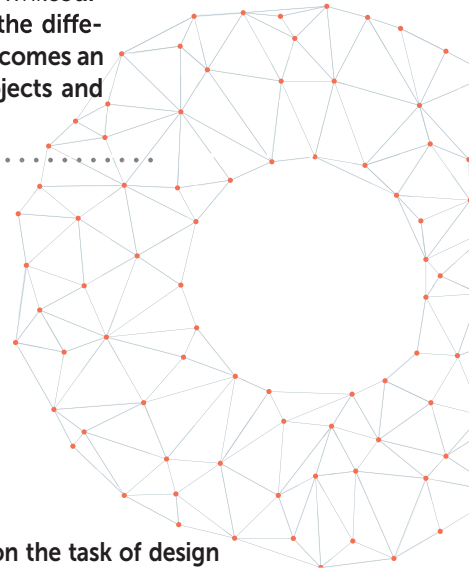


RAILWAY

COLLABORATION



High-level technical consulting and cross-competence allow us to identify the needs of our clients and transform them into guidelines for continuous exchange, while our strong specialization in the different industrial sectors becomes an factor in developing projects and innovative applications.



Rollon takes on the task of design and development of linear motion solutions, taking care of everything for our customers, so that they can concentrate on their core business. We offer everything from individual components to specifically designed, mechanically integrated systems: the quality of our applications is an expression of our technology and competence.

SOLUTIONS APPLICATIONS



INTERIORS AND ARCHITECTURE



MEDICAL



SPECIAL VEHICLES



AERONAUTICS



DIVERSIFIED LINEAR SOLUTIONS FOR EVERY APPLICATION REQUIREMENT

Linear and telescopic rails

Linear Line



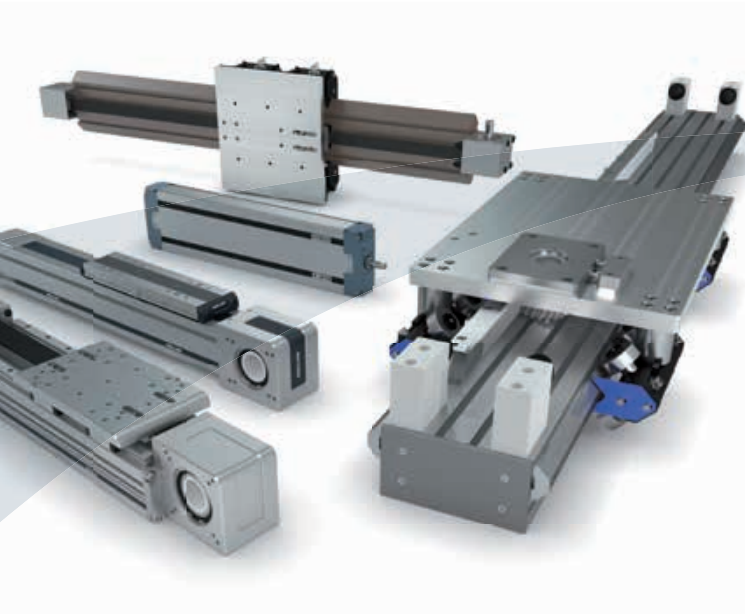
Linear and curved rails with ball and roller bearings, with hardened raceways, high load capacity, self-alignment, and capable of working in dirty environments.

Telescopic Line



Telescopic rails with ball and roller bearings, with hardened raceways, high load capacities, low bending, resistant to shocks and vibrations. For partial, total or extended extraction up to 200% of the length of the guide.

Linear actuators and automation systems



Actuator Line

Linear actuators with different rail configurations and transmissions, available with belt, screw, or rack and pinion drives for different needs in terms of precision and speed. Rails with bearings or ball recycle systems for different load capacities and critical environments.



Actuator System Line

Integrated actuators for industrial automation, used in applications in several industrial sectors: automated industrial machinery, precision assembly lines, packaging lines and high speed production lines. The Actuator Line evolves to satisfy the requests of our most discerning clients.

> **Tecline**



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PAR/PAS series



> PAR/PAS series description

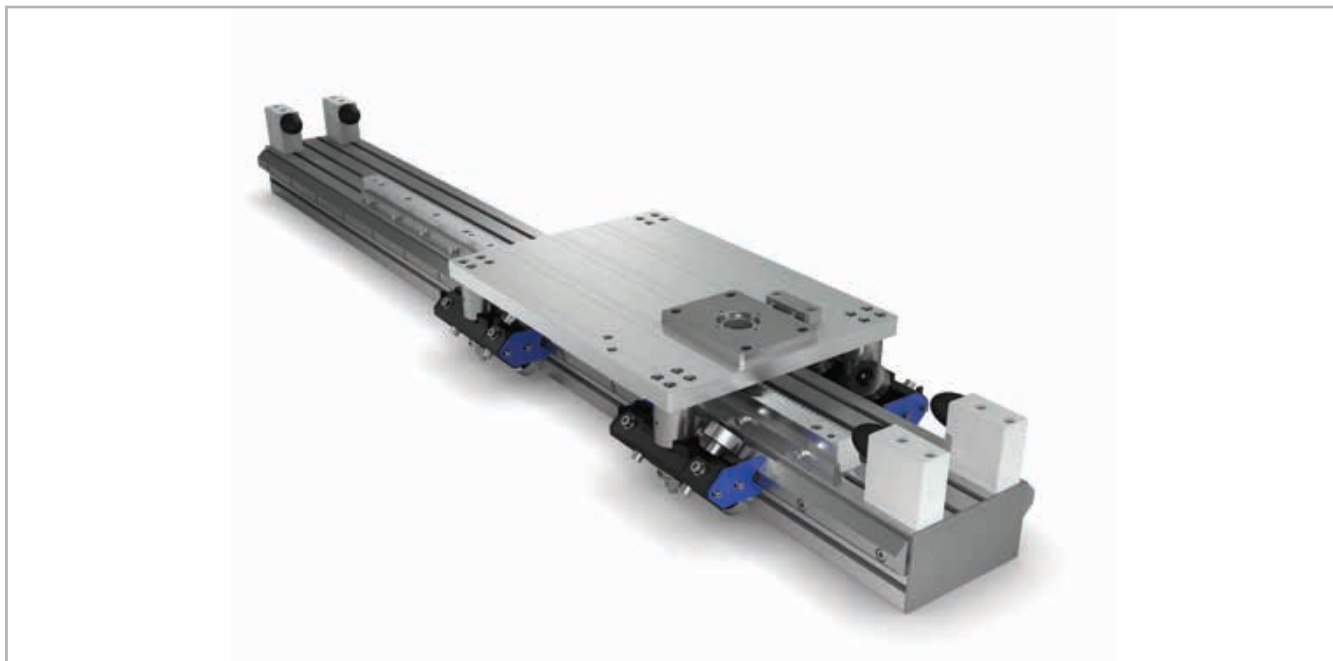


Fig. 1

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 ($R_s > 900$ 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	Impurities
Remaining	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
$\frac{\text{kg}}{\text{dm}^3}$	$\frac{\text{kN}}{\text{mm}^2}$	$\frac{10^{-6}}{\text{K}}$	$\frac{\text{W}}{\text{m} \cdot \text{K}}$	$\frac{\text{J}}{\text{kg} \cdot \text{K}}$	$\Omega \cdot \text{m} \cdot 10^{-9}$	°C
2.70	69	23	200	880-900	33	600-655

Tab. 2

Mechanical characteristics

Rm	Rp (02)	A	HB
$\frac{\text{N}}{\text{mm}^2}$	$\frac{\text{N}}{\text{mm}^2}$	%	—
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

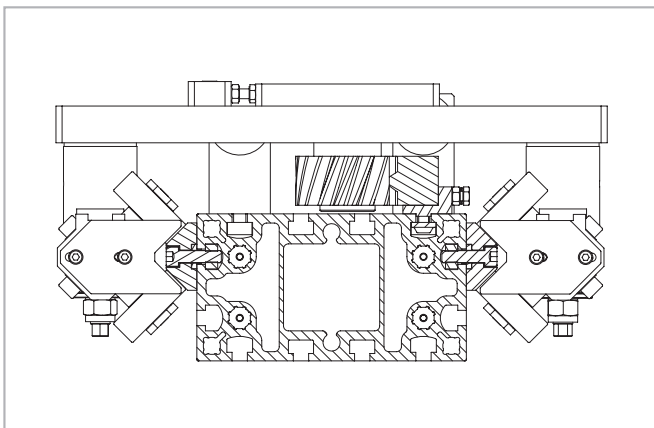


Fig. 2

PAS

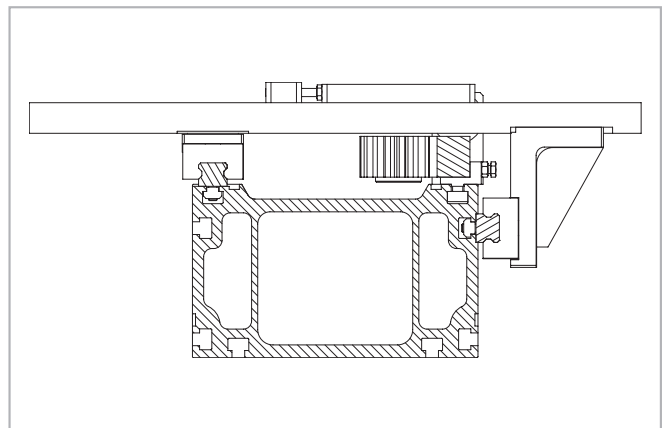
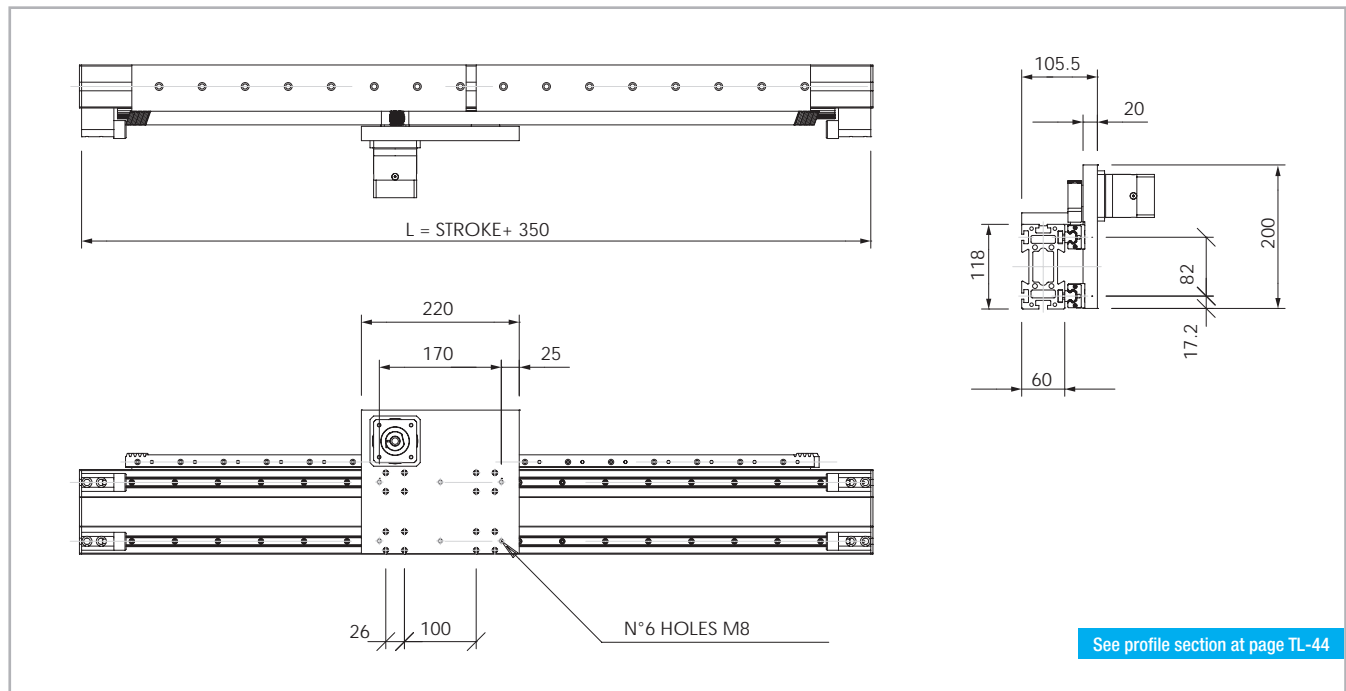


Fig. 3

> PAS 118

30 Kg 80 Kg
 High Cycle Rate Low Cycle Rate

PAS 118 Dimension



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/s ²]	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

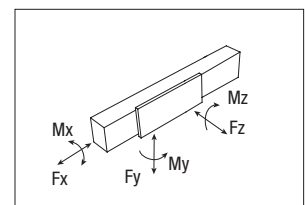
Type	I_x [10 ⁷ mm ⁴]	I_y [10 ⁷ mm ⁴]	I_p [10 ⁷ mm ⁴]
PAS 118	0.432	0.101	0.533

Tab. 5

Rack specifications

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

Tab. 6



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.
PAS 118	1814	96800	45082	96800	3969	6098

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

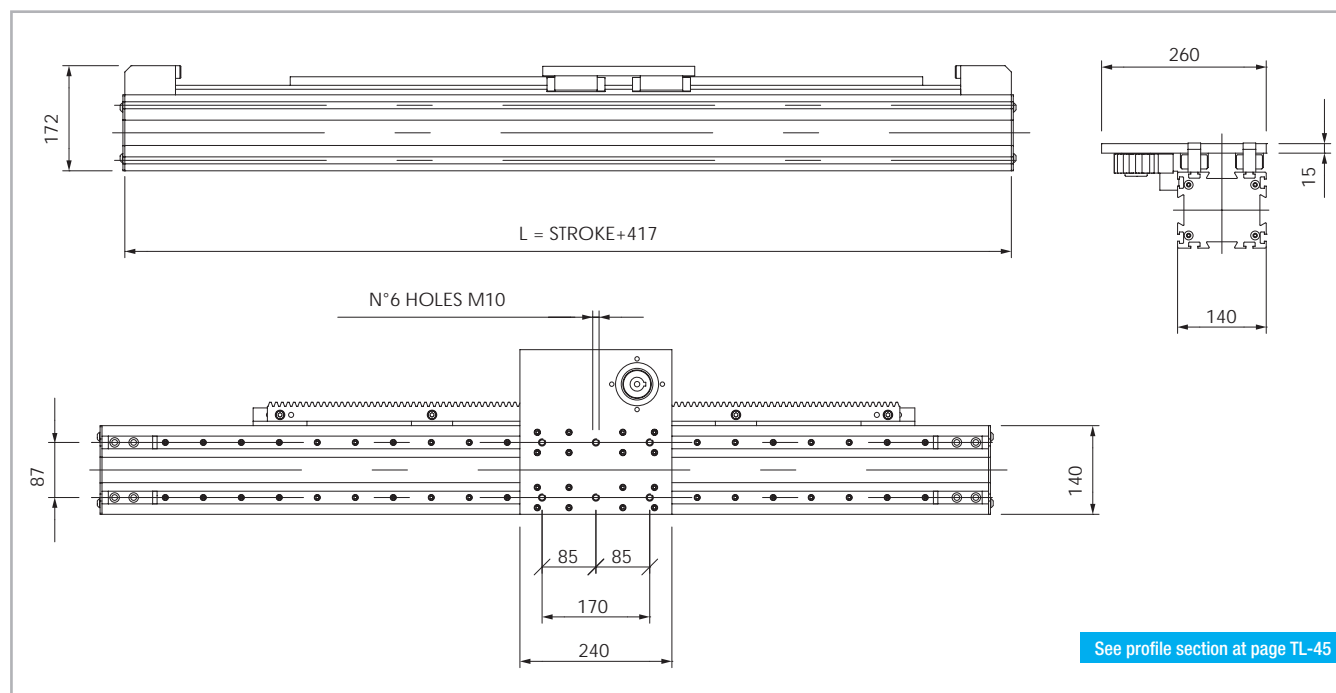
Tab. 7

> PAS 140

80 Kg 160 Kg

PC
High Cycle Rate Low Cycle Rate

PAS 140 Dimension



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

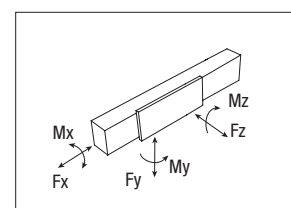
Type	I_x [10 ⁷ mm ⁴]	I_y [10 ⁷ mm ⁴]	I_z [10 ⁷ mm ⁴]
PAS 140	1.148	0.892	2.040

Tab. 9

Rack specifications

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

Tab. 10



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



Fig. 6

Moments of inertia of the aluminum body

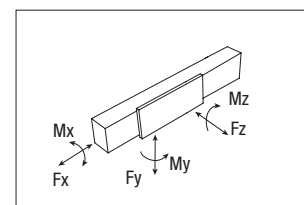
Type	I_x [10 ⁷ mm ⁴]	I_y [10 ⁷ mm ⁴]	I_p [10 ⁷ mm ⁴]
PAR 170	1.973	0.984	2.957

Tab. 13

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

Tab. 14

Tab. 12



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

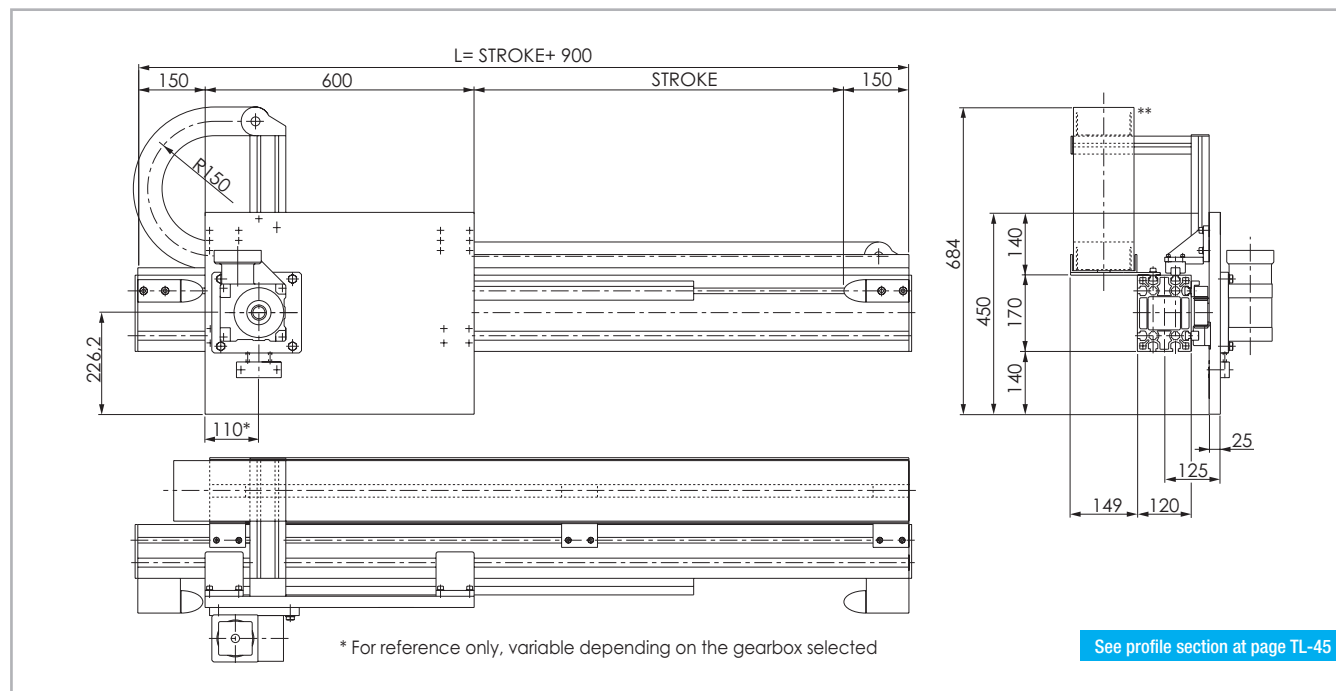
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 15

> PAS 170

80 Kg 250 Kg
 High Cycle Rate Low Cycle Rate

PAS 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. 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/s ²]	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

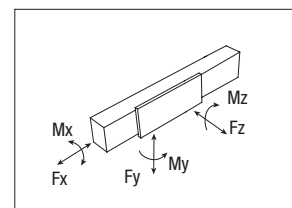
Type	I_x [10 ⁷ mm ⁴]	I_y [10 ⁷ mm ⁴]	I_z [10 ⁷ mm ⁴]
PAS 170	1.973	0.984	2.957

Tab. 17

Rack specifications

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

Tab. 18



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.
PAS 170	5714	153600	70798	153600	10368	39552

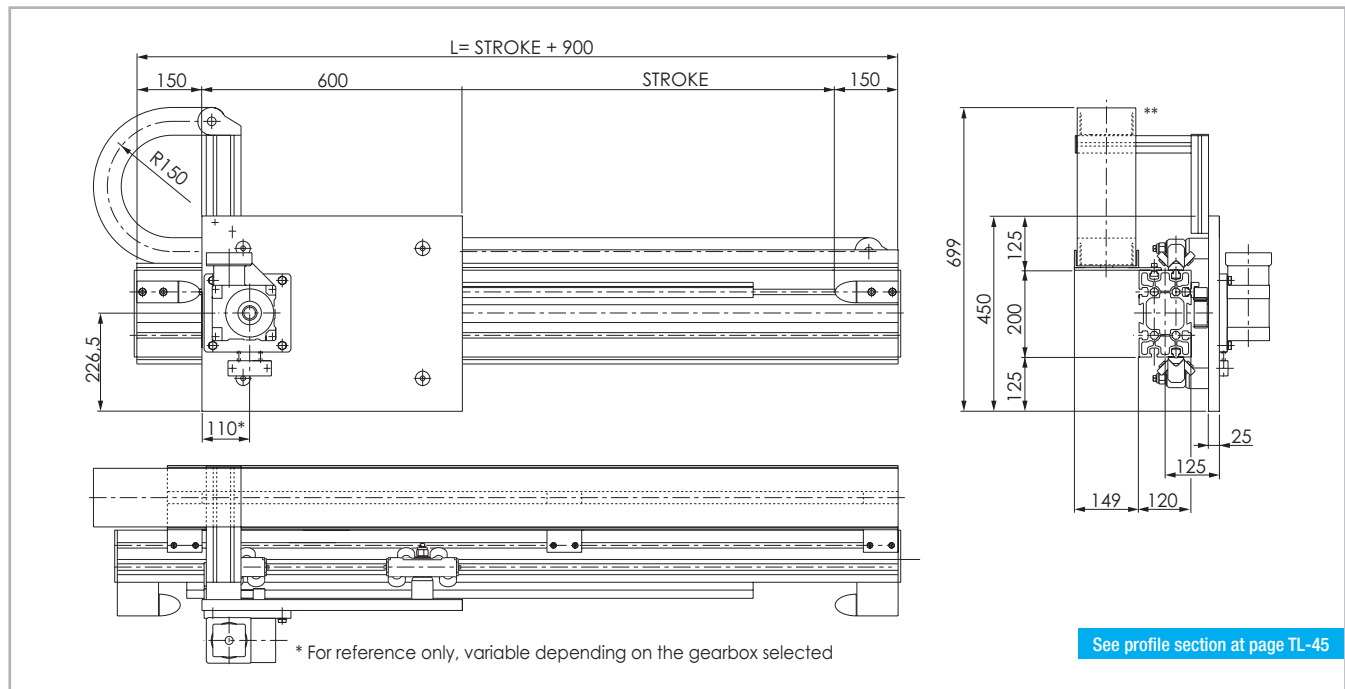
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 19

> PAR 200

100 Kg 300 Kg
 High Cycle Rate Low Cycle Rate

PAR 200 Dimension



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/s ²]	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

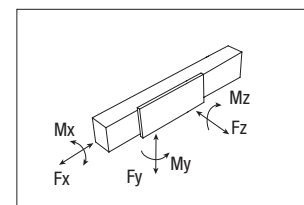
Type	I_x [10 ⁷ mm ⁴]	I_y [10 ⁷ mm ⁴]	I_p [10 ⁷ mm ⁴]
PAR 200	3.270	1.289	4.586

Tab. 21

Rack specifications

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

Tab. 22



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.	Dyn.	Stat.	Stat.	Dyn.	Stat.	Stat.	Dyn.	Stat.	Stat.	Dyn.	Stat.	Stat.	Dyn.
PAR 200	5714	14142	65928	14142	14142	65928	14142	14142	65928	1414	1414	65928	3536	3536	65928	3536	3536	65928

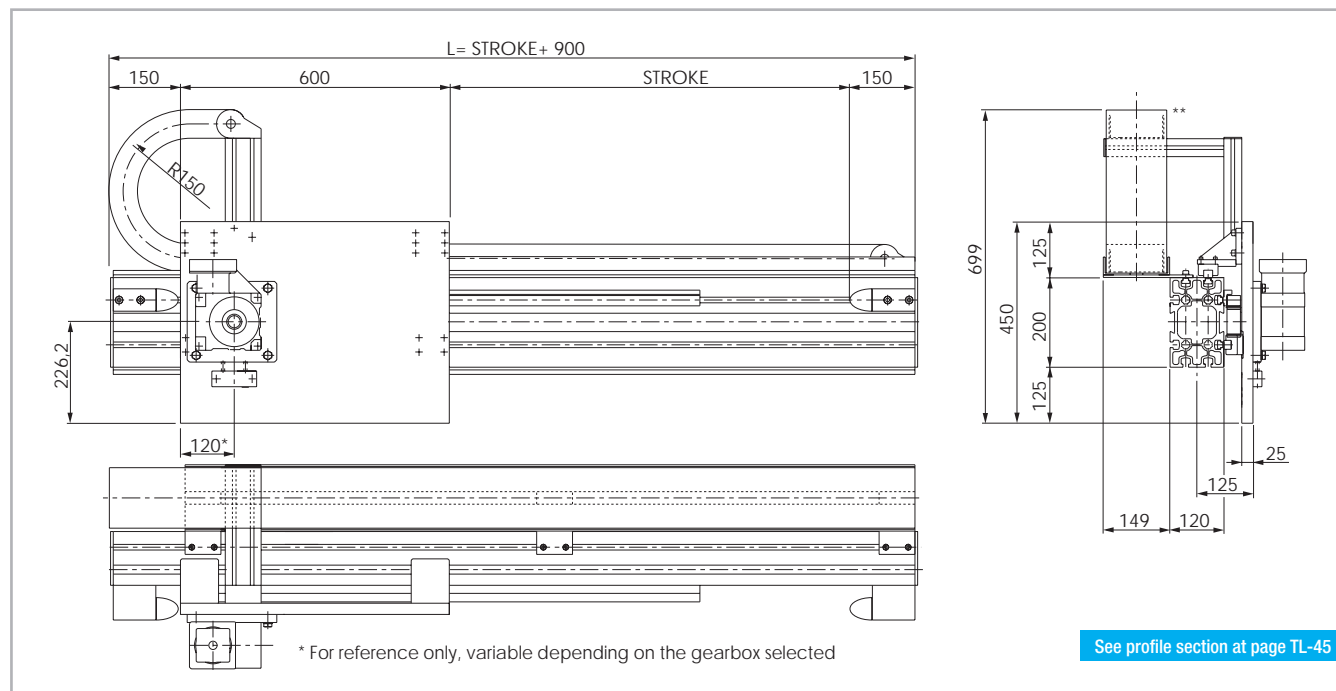
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 23

> PAS 200

100 Kg PC 300 Kg
 High Cycle Rate Low Cycle Rate

PAS 200 Dimension



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

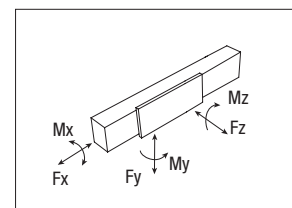
Type	I_x [10 ⁷ mm ⁴]	I_y [10 ⁷ mm ⁴]	I_z [10 ⁷ mm ⁴]
PAS 200	3.270	1.289	4.586

Tab. 25

Rack specifications

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

Tab. 26



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

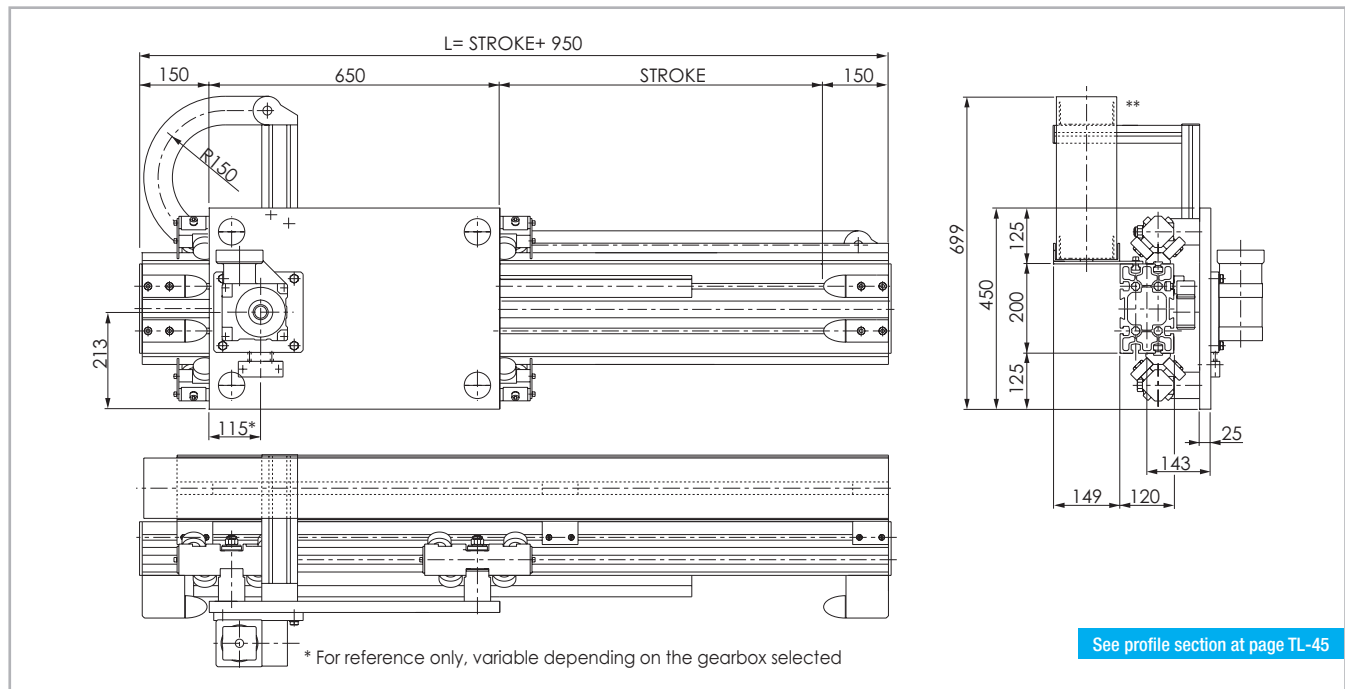
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 27

PAR 200P

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

PAR 200P Dimension



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/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]	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

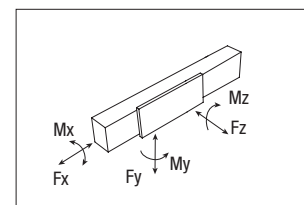
Type	I_x [10 ⁷ mm ⁴]	I_y [10 ⁷ mm ⁴]	I_p [10 ⁷ mm ⁴]
PAR 200P	3.270	1.289	4.586

Tab. 29

Rack specifications

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

Tab. 30



Load capacity

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

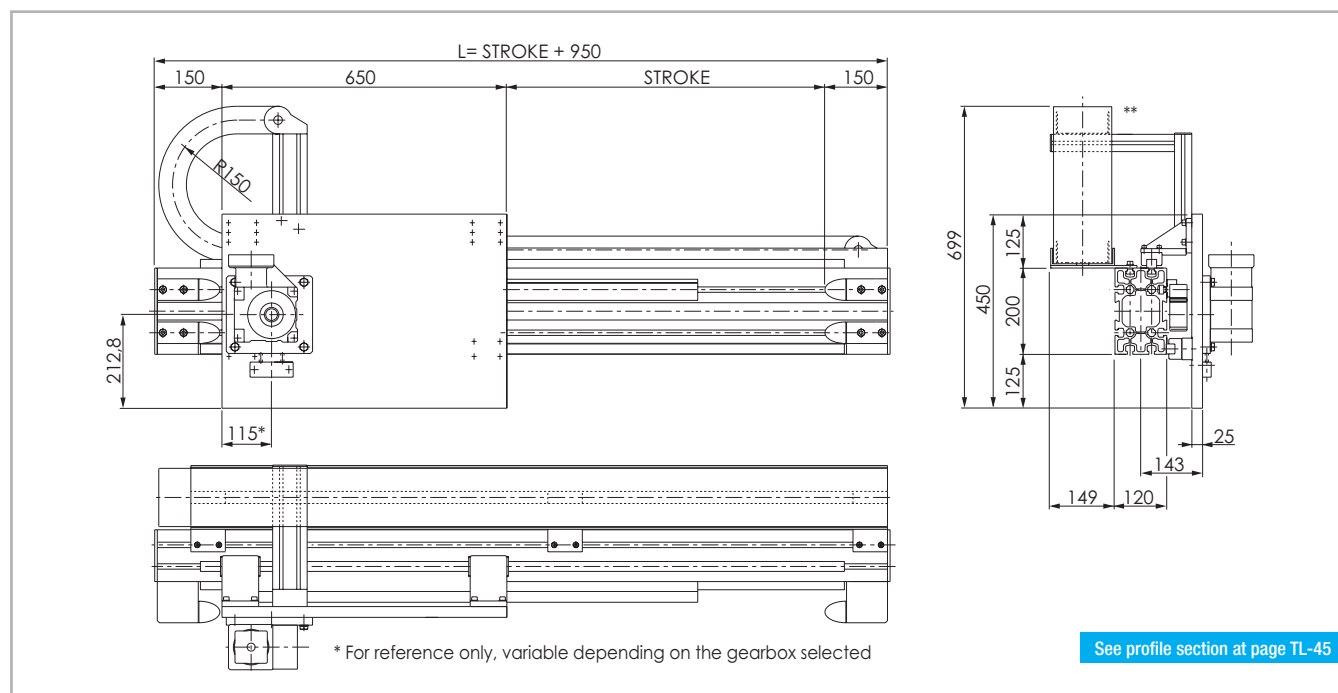
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 31

PAS 200P

100 Kg 400 Kg
 High Cycle Rate Low Cycle Rate

PAS 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. 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

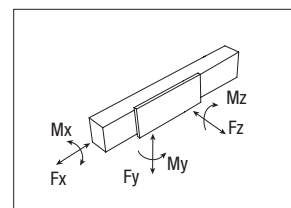
Type	I_x [10 ⁷ mm ⁴]	I_y [10 ⁷ mm ⁴]	I_b [10 ⁷ mm ⁴]
PAS 200P	3.270	1.289	4.586

Tab. 33

Rack specifications

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

Tab. 34



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.
PAS 200P	10989	258800	116833	258800	19410	73111

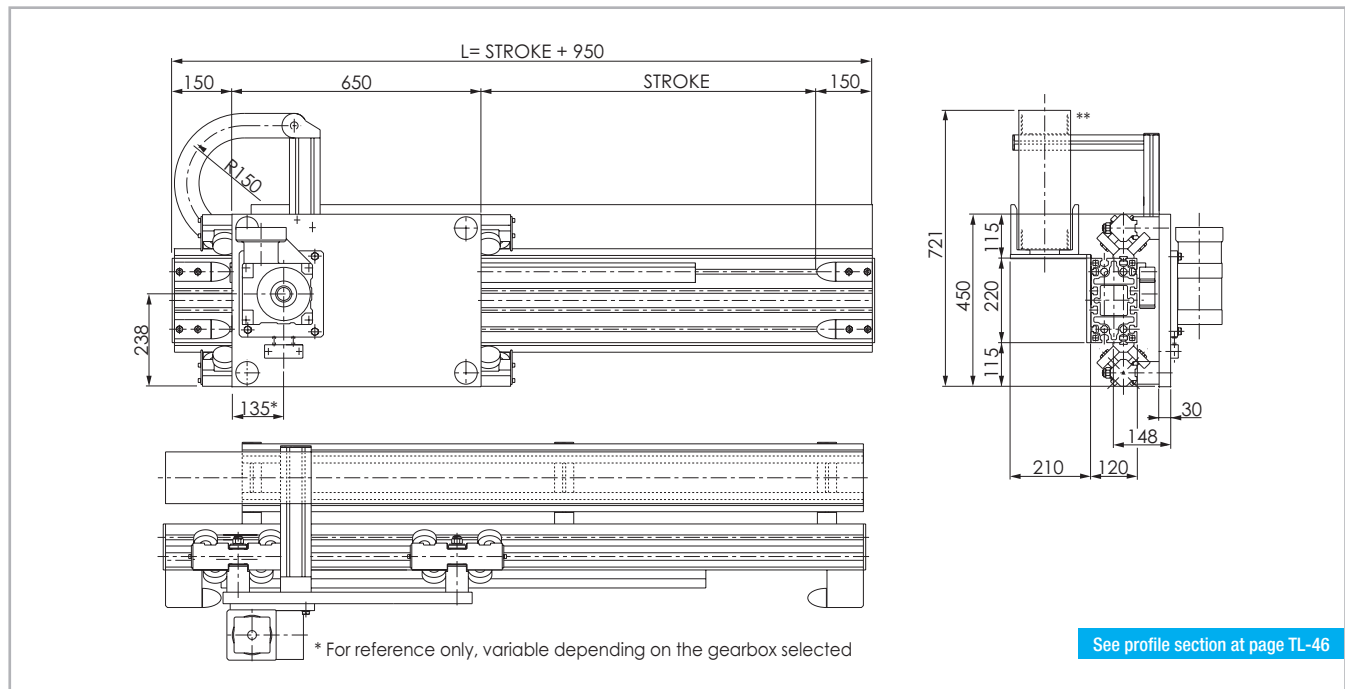
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 35

PAR 220

250 Kg 500 Kg
 High Cycle Rate Low Cycle Rate

PAR 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. 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/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]	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

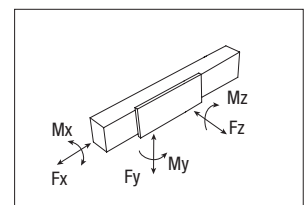
Type	I_x [10 ⁷ mm ⁴]	I_y [10 ⁷ mm ⁴]	I_p [10 ⁷ mm ⁴]
PAR 220	4.625	1.559	6.184

Tab. 37

Rack specifications

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

Tab. 38



Load capacity

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

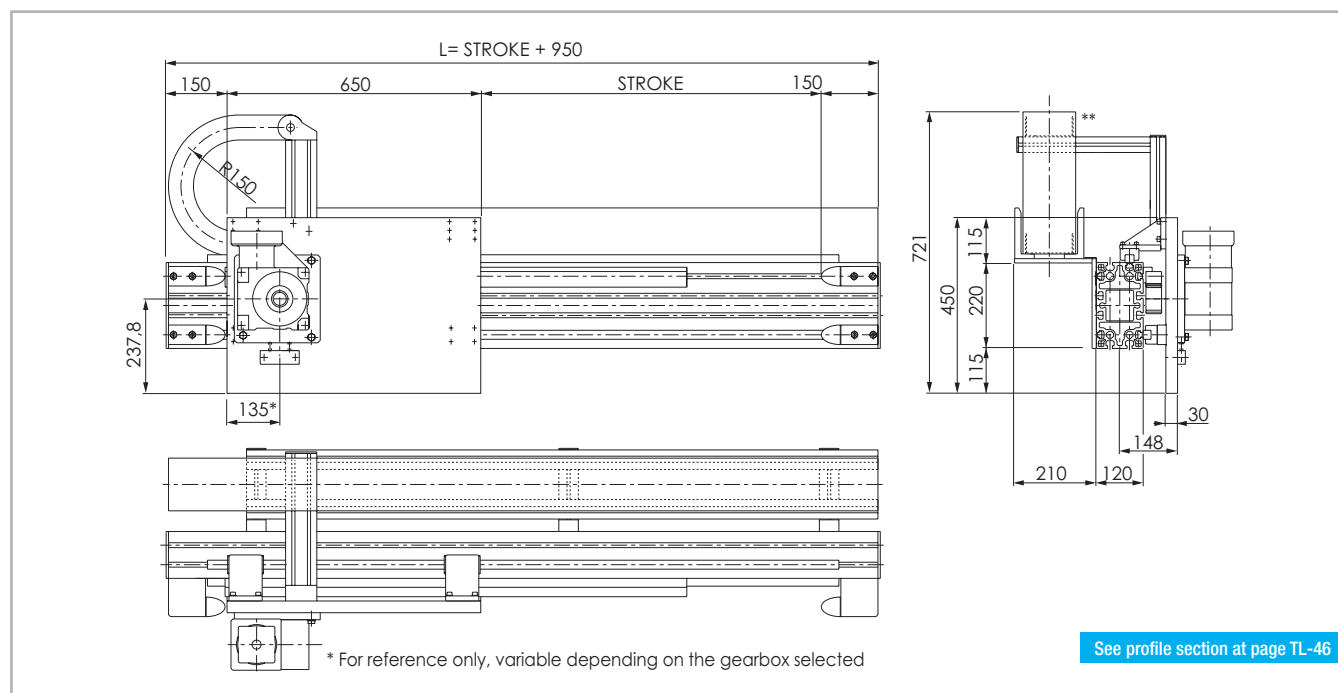
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 39

PAS 220

250 Kg 500 Kg
 High Cycle Rate Low Cycle Rate

PAS 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. 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

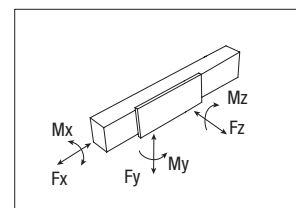
Type	I_x [10 ⁷ mm ⁴]	I_y [10 ⁷ mm ⁴]	I_b [10 ⁷ mm ⁴]
PAS 220	4.625	1.559	6.184

Tab. 41

Rack specifications

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

Tab. 42



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

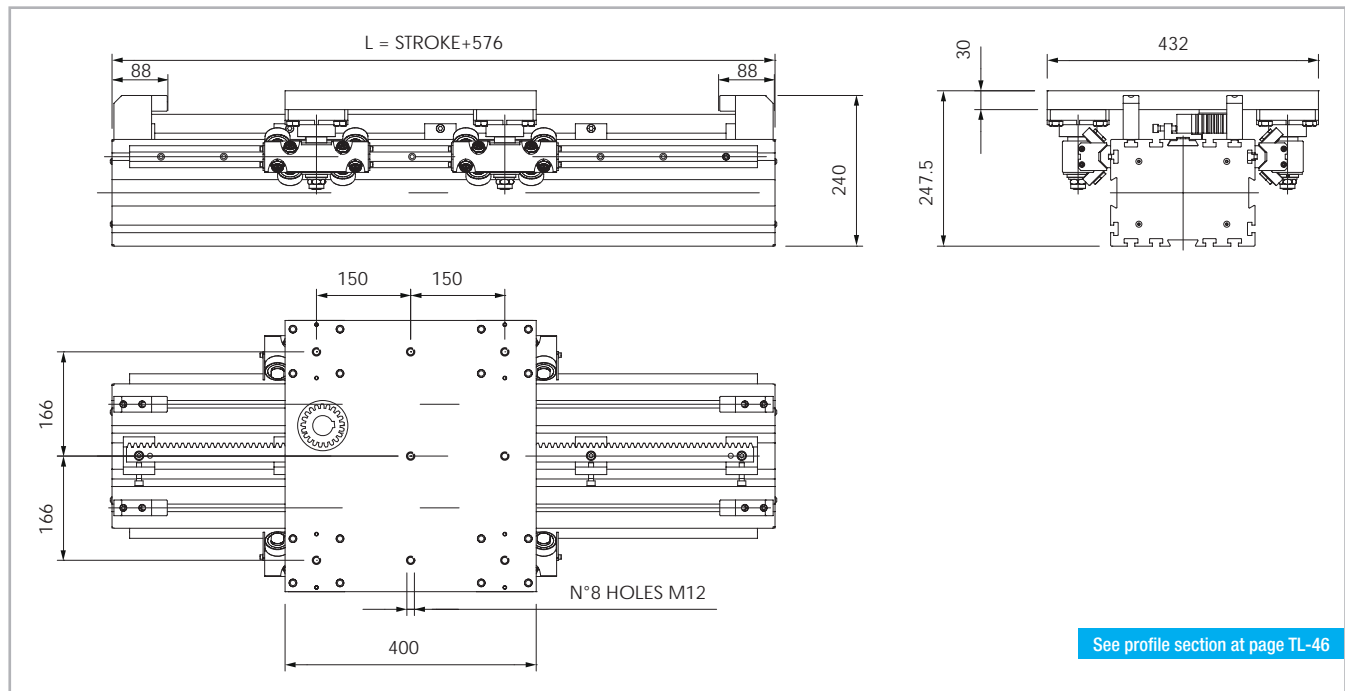
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 43

> PAR 230

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

PAR 230 Dimension



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/s ²]	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

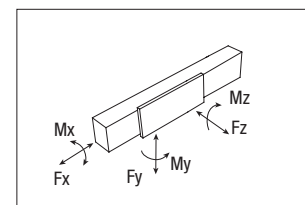
Type	I_x [10 ⁷ mm ⁴]	I_y [10 ⁷ mm ⁴]	I_p [10 ⁷ mm ⁴]
PAR 230	6.501	3.778	10.279

Tab. 45

Rack specifications

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

Tab. 46



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

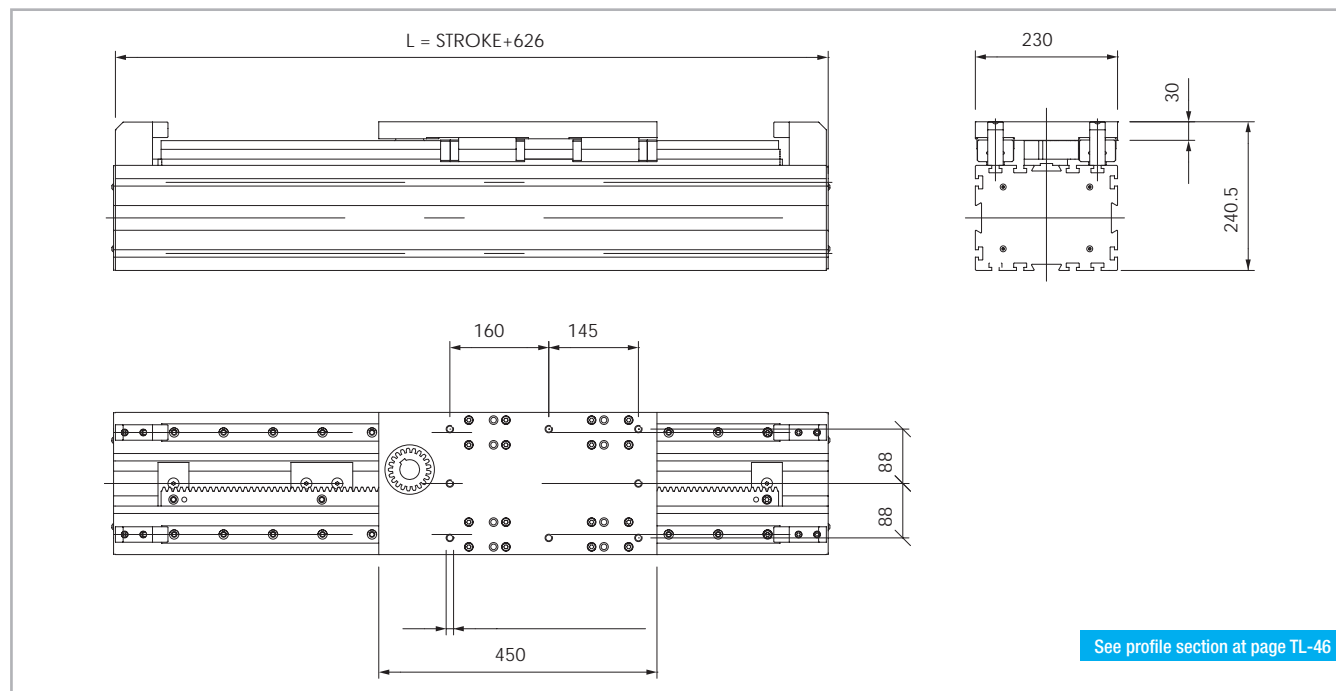
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 47

> PAS 230

280 Kg 580 Kg
 High Cycle Rate Low Cycle Rate

PAS 230 Dimension



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

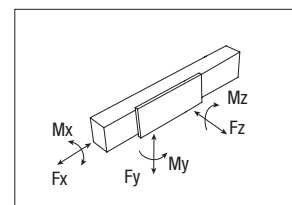
Type	I_x [10 ⁷ mm ⁴]	I_y [10 ⁷ mm ⁴]	I_b [10 ⁷ mm ⁴]
PAS 230	6.501	3.778	10.279

Tab. 49

Rack specifications

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

Tab. 50



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

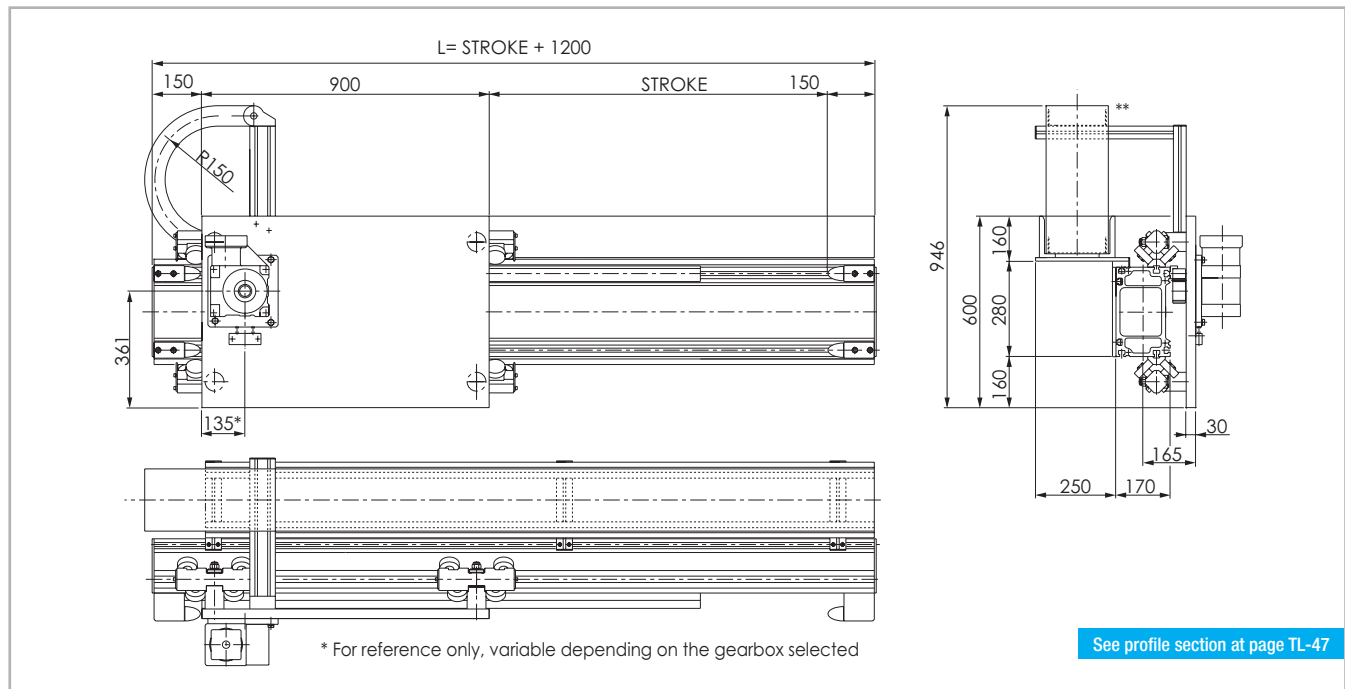
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 51

> PAR 280

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

PAR 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. 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/s ²]	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

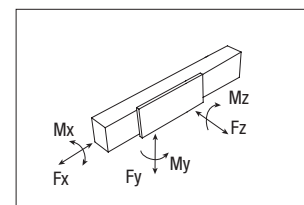
Type	I_x [10 ⁷ mm ⁴]	I_y [10 ⁷ mm ⁴]	I_p [10 ⁷ mm ⁴]
PAR 280	12.646	4.829	17.475

Tab. 53

Rack specifications

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

Tab. 54



Load capacity

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

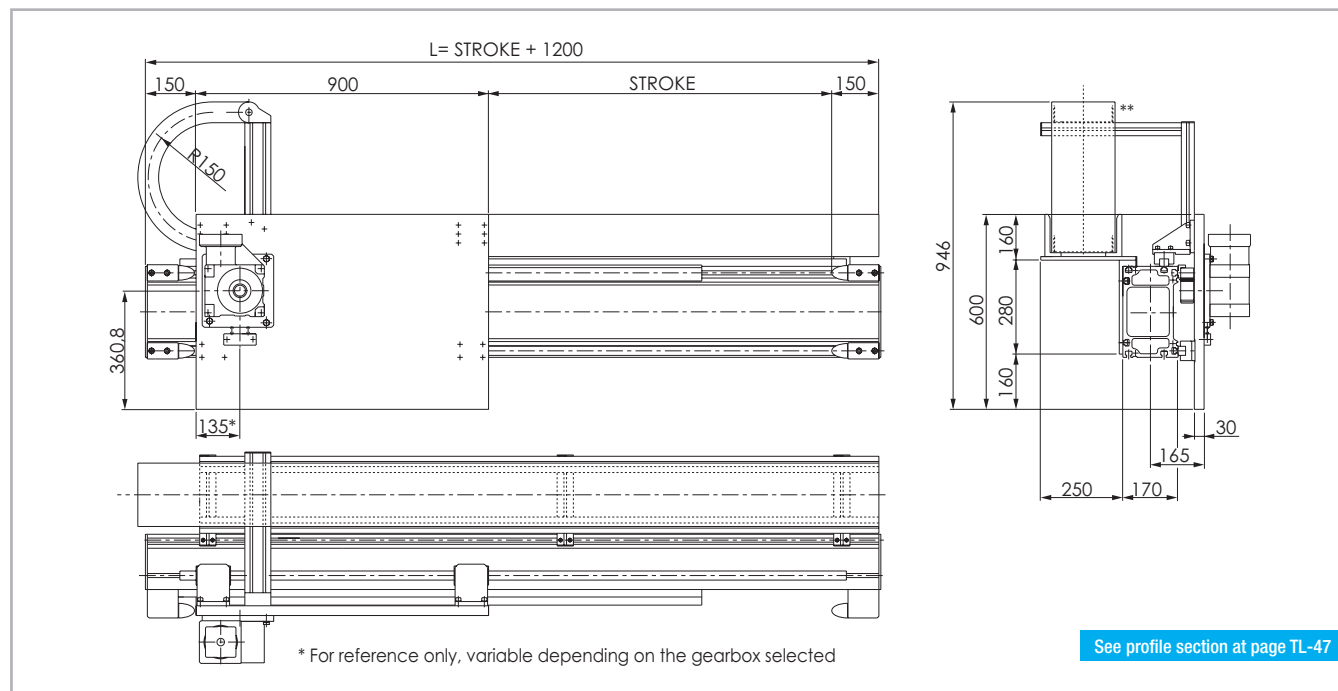
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 55

PAS 280

300 Kg 600 Kg
 High Cycle Rate Low Cycle Rate

PAS 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. 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

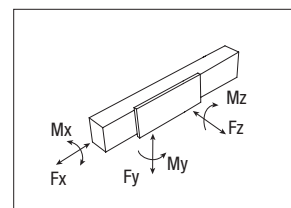
Type	I_x [10 ⁷ mm ⁴]	I_y [10 ⁷ mm ⁴]	I_z [10 ⁷ mm ⁴]
PAS 280	12.646	4.829	17.475

Tab. 57

Rack specifications

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

Tab. 58



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

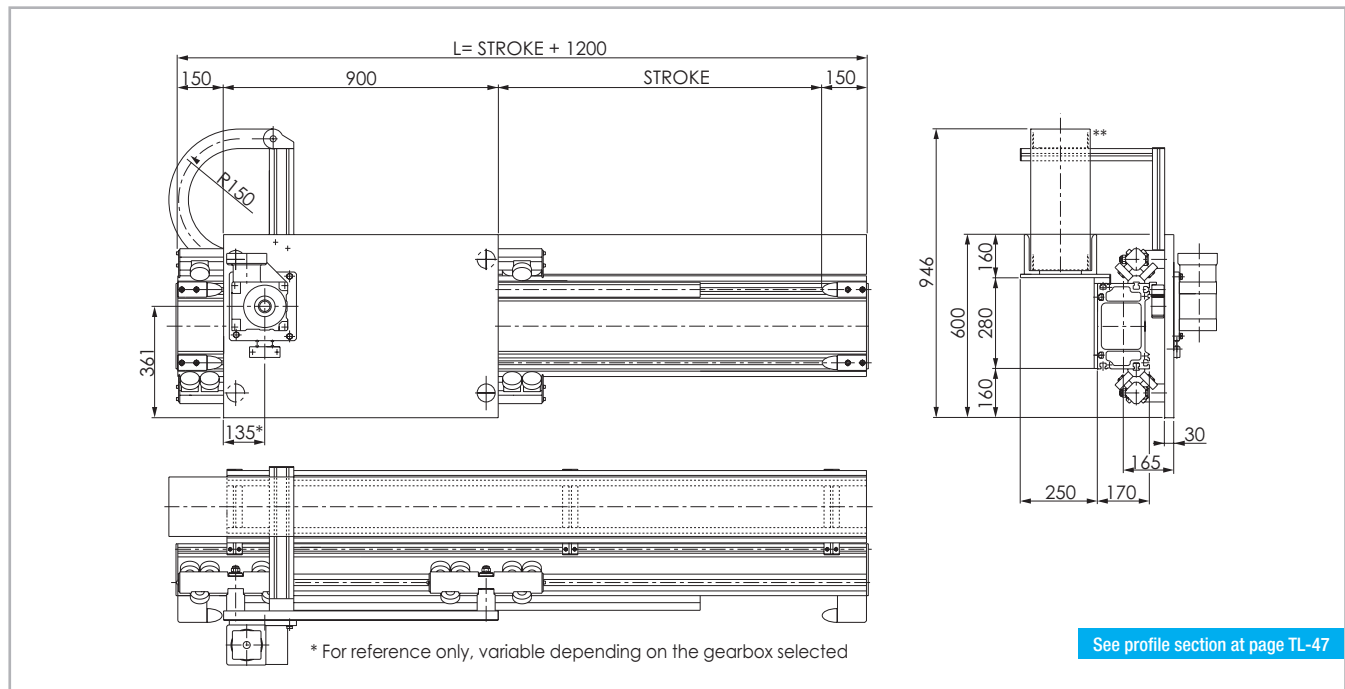
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 59

> PAR 280P

300 Kg 800 Kg
 High Cycle Rate Low Cycle Rate

PAR 280P Dimension



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/s ²]	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

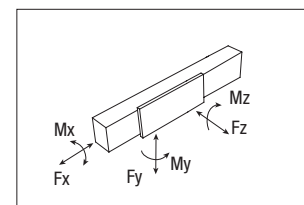
Type	I_x [10 ⁷ mm ⁴]	I_y [10 ⁷ mm ⁴]	I_p [10 ⁷ mm ⁴]
PAR 280P	12.646	4.829	17.475

Tab. 61

Rack specifications

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

Tab. 62



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.
PAR 280P	10989	29981	149063	29981	8395	11108

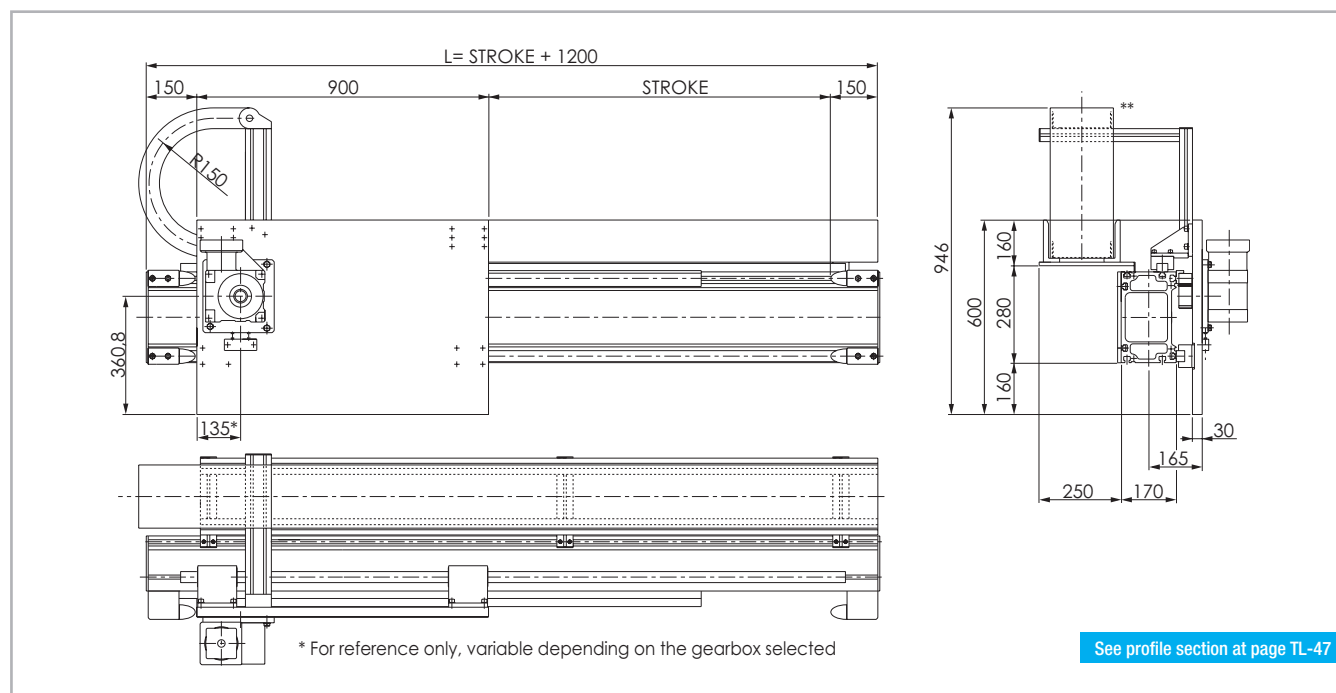
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 63

> PAS 280P

300 Kg 800 Kg
 High Cycle Rate Low Cycle Rate

PAS 280P Dimension



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/s ²]	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

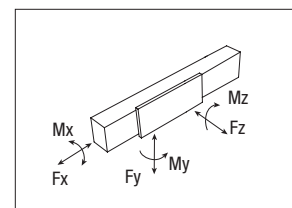
Type	I_x [10 ⁷ mm ⁴]	I_y [10 ⁷ mm ⁴]	I_b [10 ⁷ mm ⁴]
PAS 280P	12.646	4.829	17.475

Tab. 65

Rack specifications

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

Tab. 66



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

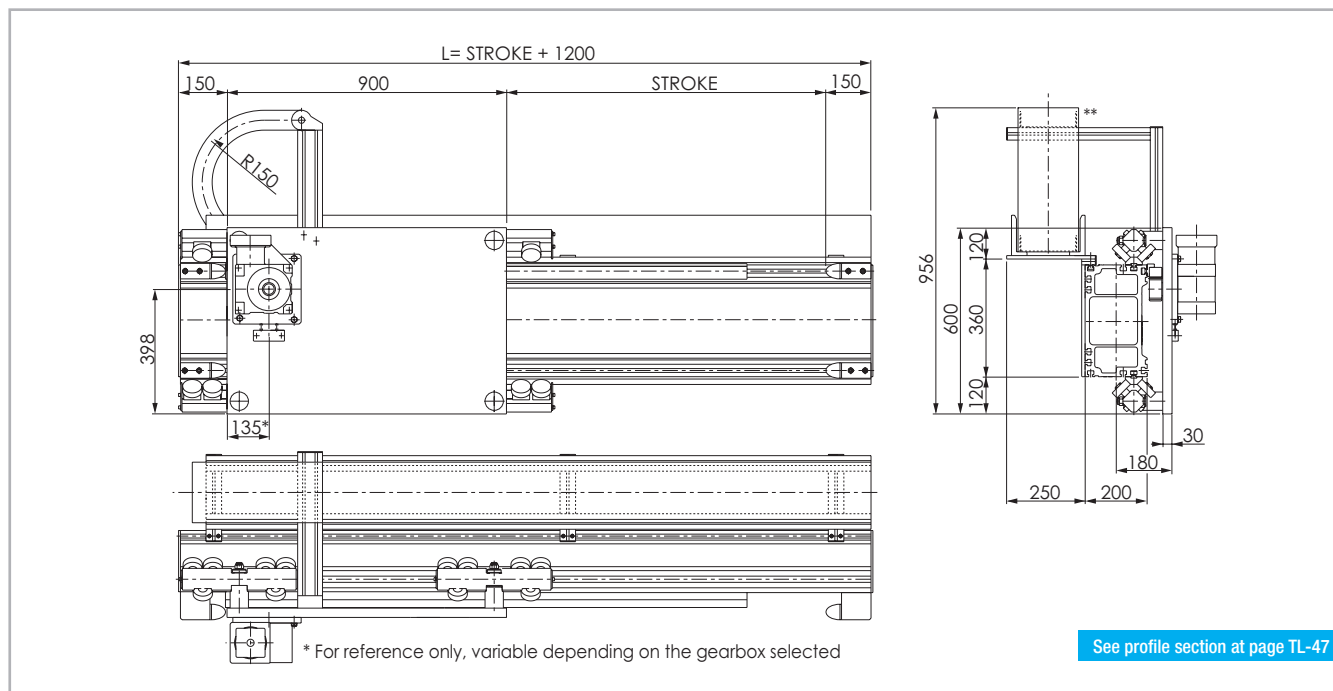
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 67

PAR 360

500 Kg 1000 Kg
 High Cycle Rate Low Cycle Rate

PAR 360 Dimension



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/s ²]	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

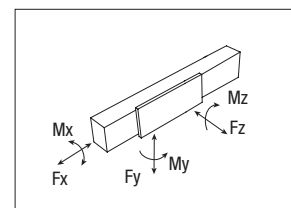
Type	I_x [10 ⁷ mm ⁴]	I_y [10 ⁷ mm ⁴]	I_p [10 ⁷ mm ⁴]
PAR 360	31.721	10.329	42.050

Tab. 69

Rack specifications

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

Tab. 70



Load capacity

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

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

Tab. 71

PAS 360

PAS 360 Dimension

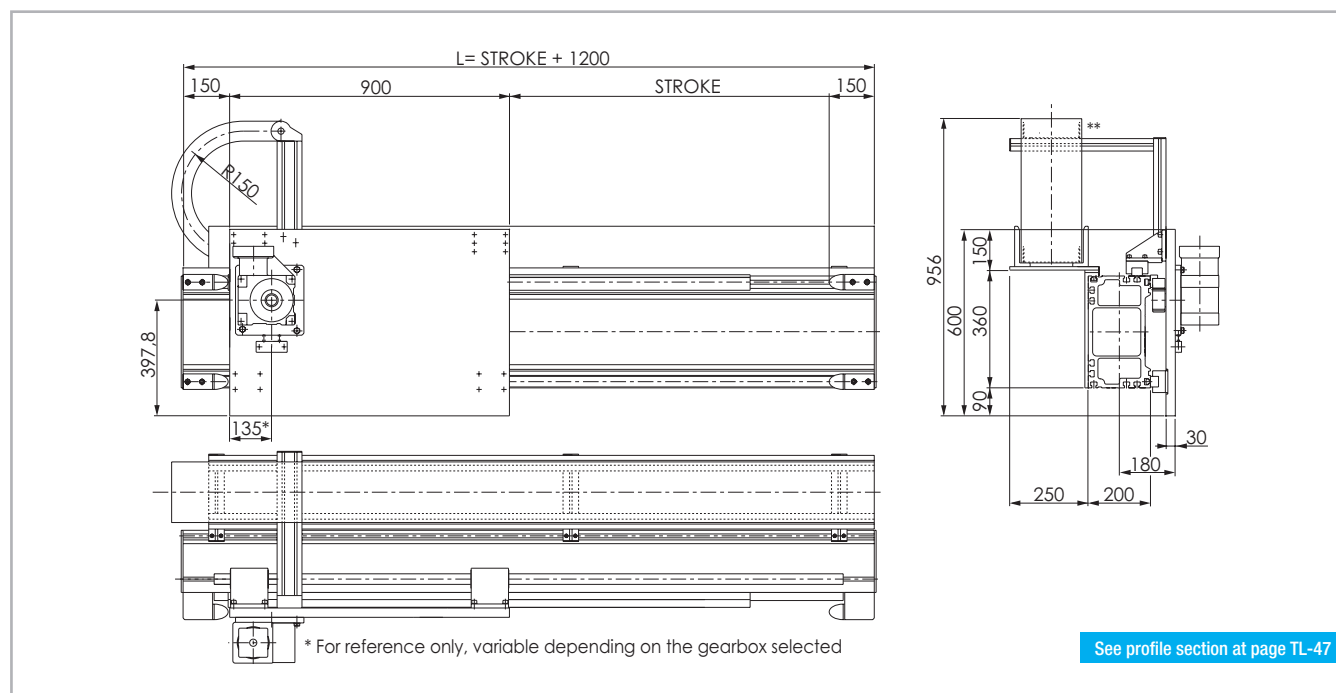


Fig. 21

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

**Cable carrier offered as option

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

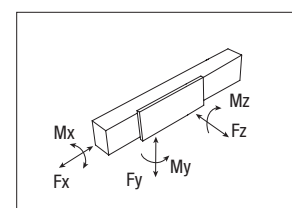
Type	I_x [10 ⁷ mm ⁴]	I_y [10 ⁷ mm ⁴]	I_p [10 ⁷ mm ⁴]
PAS 360	31.721	10.329	42.050

Tab. 73

Rack specifications

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

Tab. 74



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

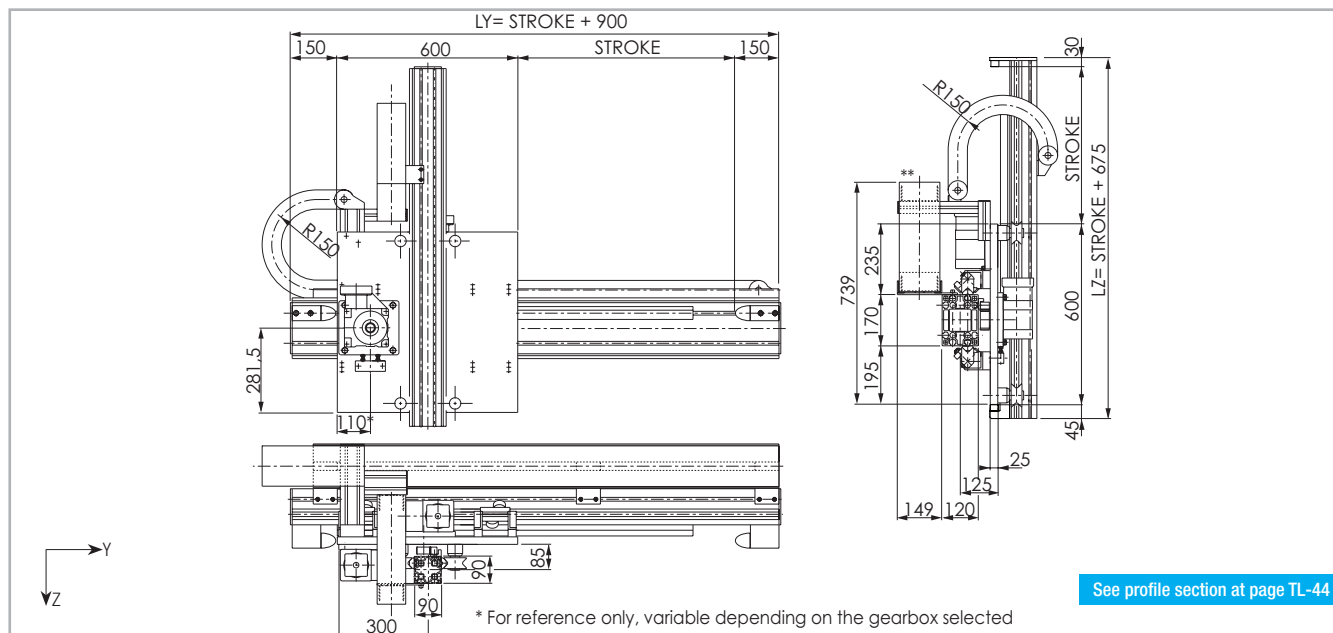
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 75

PAR 170/90

25 Kg PC 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 [10 ⁷ mm ⁴]	I_y [10 ⁷ mm ⁴]	I_p [10 ⁷ mm ⁴]
Y-axis	1.973	0.984	2.957
Z-axis	0.197	0.195	0.392

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

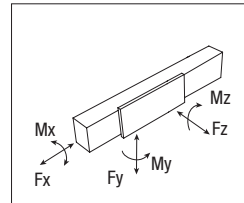
Load capacity

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

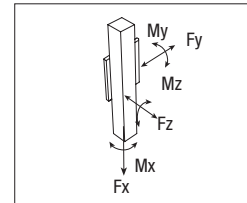
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 79

PAR 170/90 - Y-axis



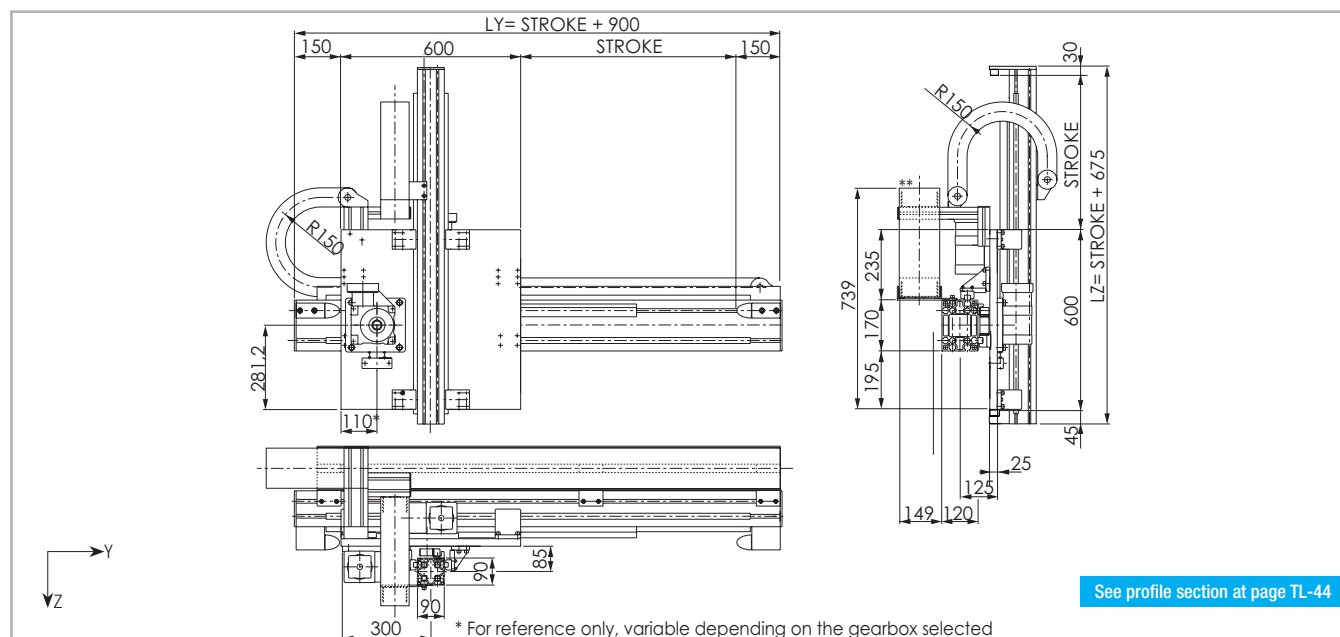
PAR 170/90 - Z-axis



> PAS 170/90

25 Kg PC 80 Kg
High Cycle Rate Low Cycle Rate

PAS 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. 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/s ²]	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 [10 ⁷ mm ⁴]	I_y [10 ⁷ mm ⁴]	I_d [10 ⁷ mm ⁴]
Y-axis	1.973	0.984	2.957
Z-axis	0.197	0.195	0.392

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

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

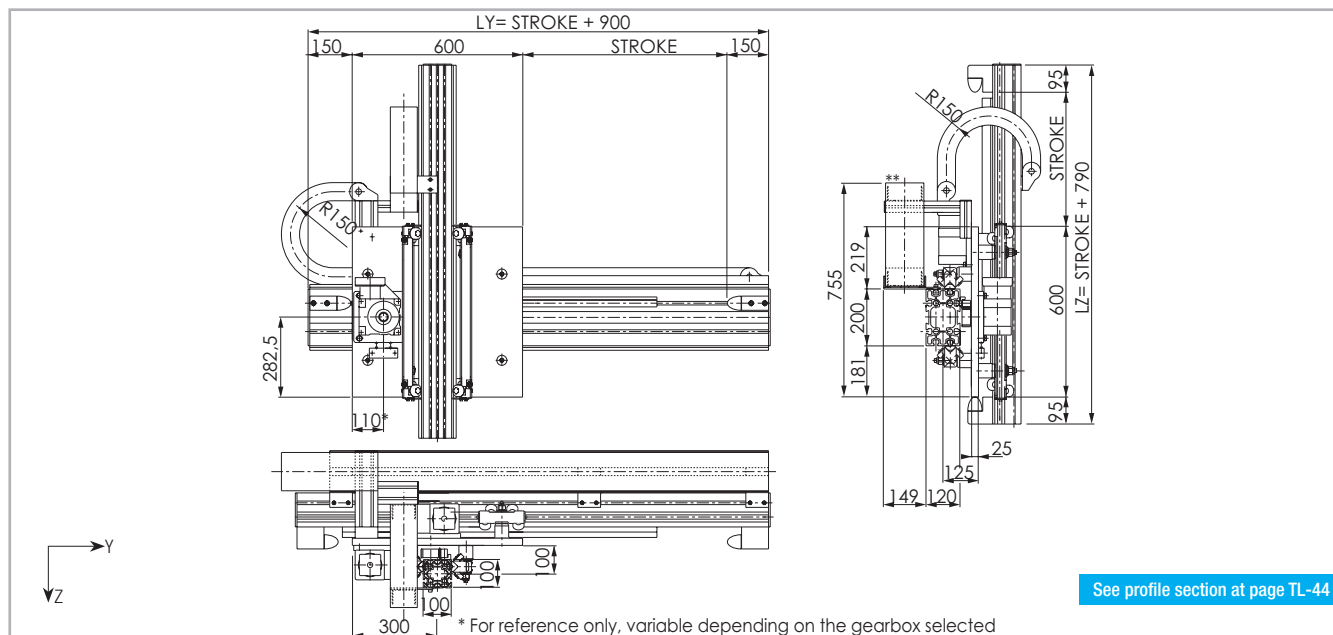
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 83

PAR 200/100

25 Kg 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 [10 ⁷ mm ⁴]	I_y [10 ⁷ mm ⁴]	I_d [10 ⁷ mm ⁴]
Y-axis	3.270	1.289	4.586
Z-axis	0.364	0.346	0.709

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

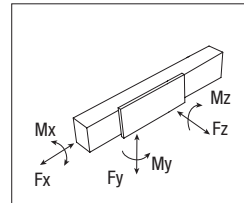
Load capacity

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.
Y-axis	5714	14142	65298	1414	3536	3536
Z-axis	5714	7071	32964	354	1867	1867

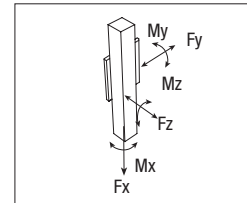
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 87

PAR 200/100 - Y-axis



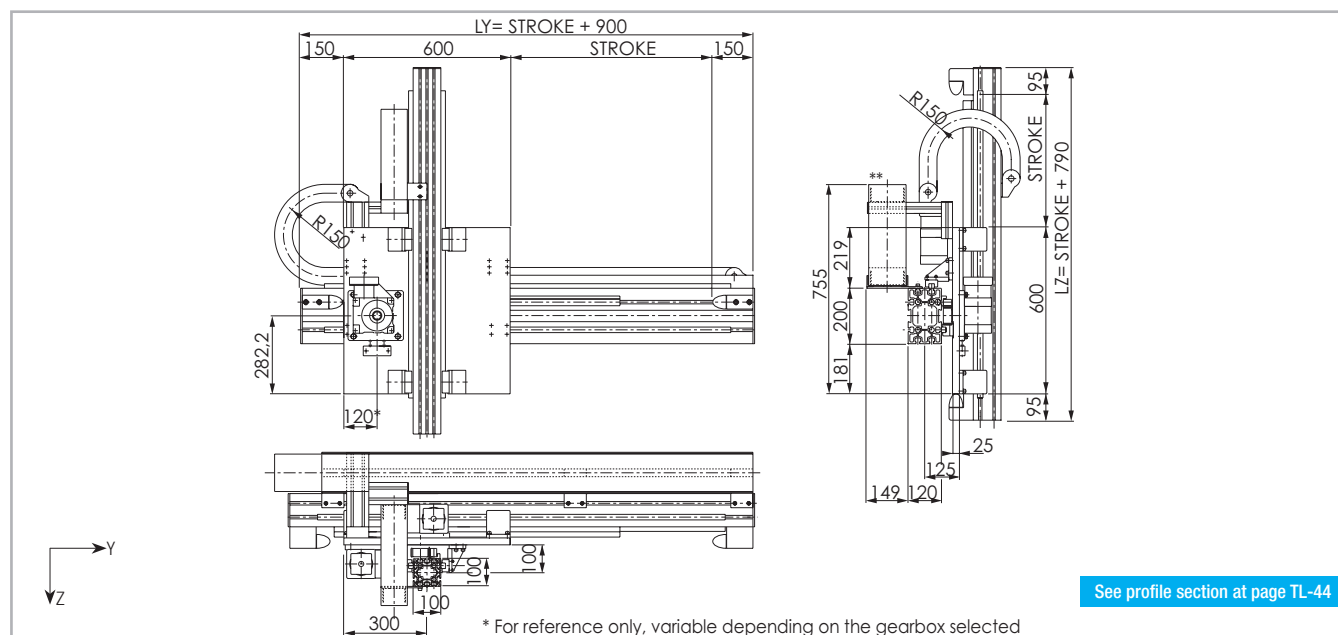
PAR 200/100 - Z-axis



> PAS 200/100

25 Kg 100 Kg
 High Cycle Rate Low Cycle Rate

PAS 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. 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/s ²]	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 [10 ⁷ mm ⁴]	I_y [10 ⁷ mm ⁴]	I_z [10 ⁷ mm ⁴]
Y-axis	3.270	1.289	4.586
Z-axis	0.364	0.346	0.709

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

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

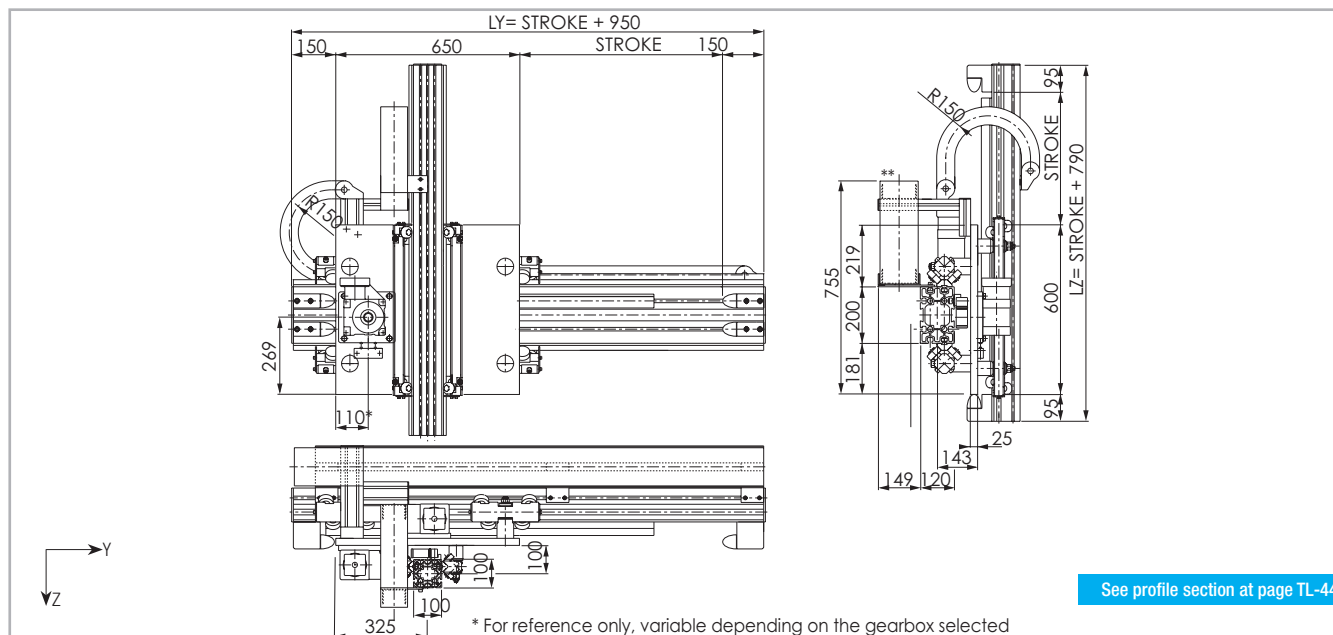
Tab. 91

> PAR 200/100P

25 Kg 100 Kg

PC
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/s ²]	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 [10 ⁷ mm ⁴]	I_y [10 ⁷ mm ⁴]	I_z [10 ⁷ mm ⁴]
Y-axis	3.270	1.289	4.586
Z-axis	0.364	0.346	0.709

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

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.
Y-axis	10989	24042	112593	2404	6611	6611
Z-axis	5714	7071	32964	354	1867	1867

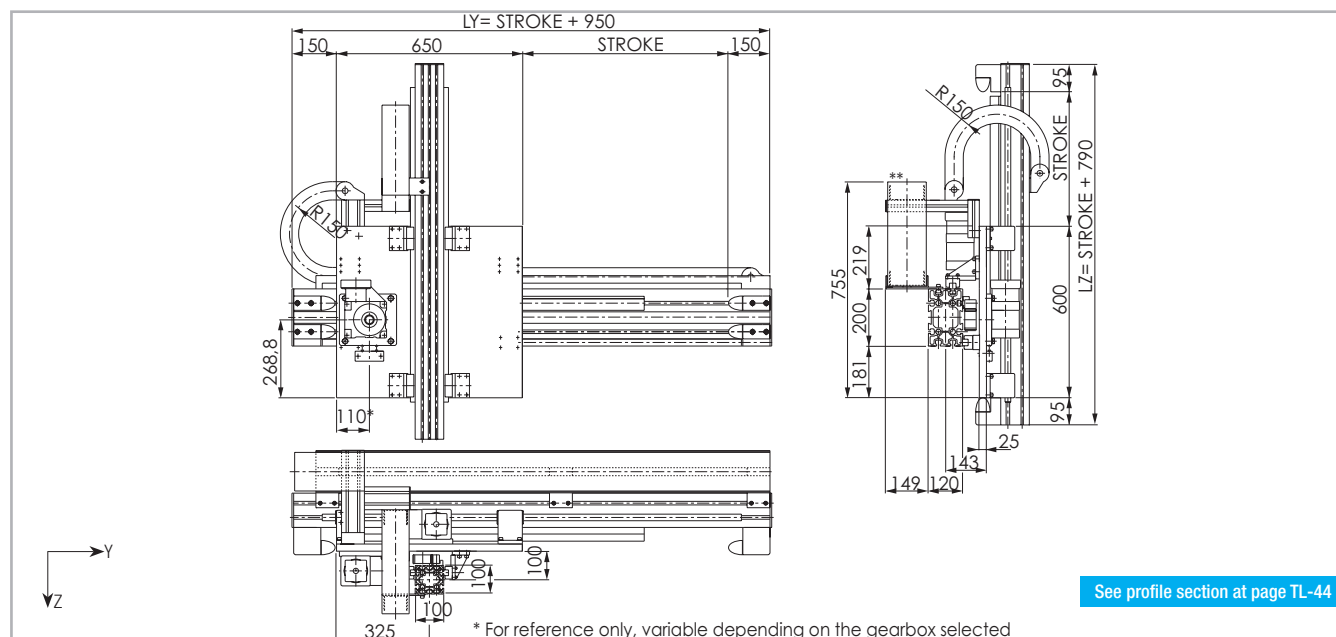
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 95

> PAS 200/100P

25 Kg PC 100 Kg
 High Cycle Rate Low Cycle Rate

PAS 200/100P Dimension



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/s ²]	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 [10 ⁷ mm ⁴]	I_y [10 ⁷ mm ⁴]	I_z [10 ⁷ mm ⁴]
Y-axis	3.270	1.289	4.586
Z-axis	0.364	0.346	0.709

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

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

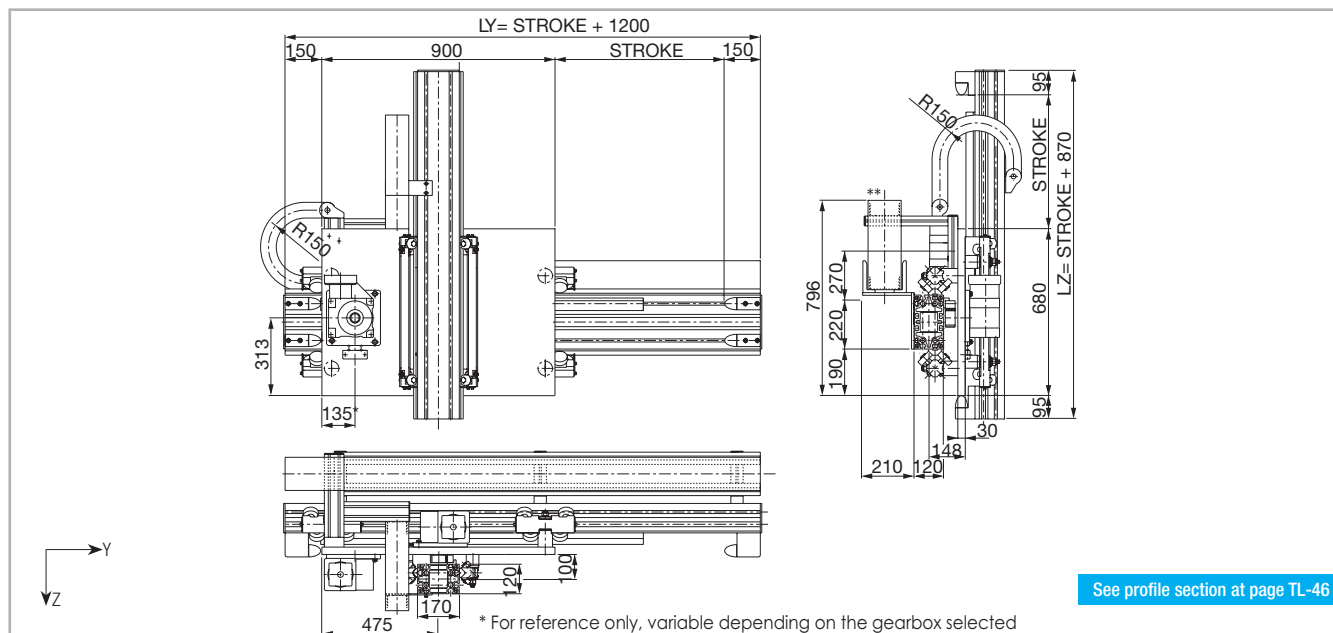
Tab. 99

> PAR 220/170

60 Kg 200 Kg

PC
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/s ²]	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 [10 ⁷ mm ⁴]	I_y [10 ⁷ mm ⁴]	I_p [10 ⁷ mm ⁴]
Y-axis	4.625	1.559	6.184
Z-axis	1.973	0.984	2.957

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

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

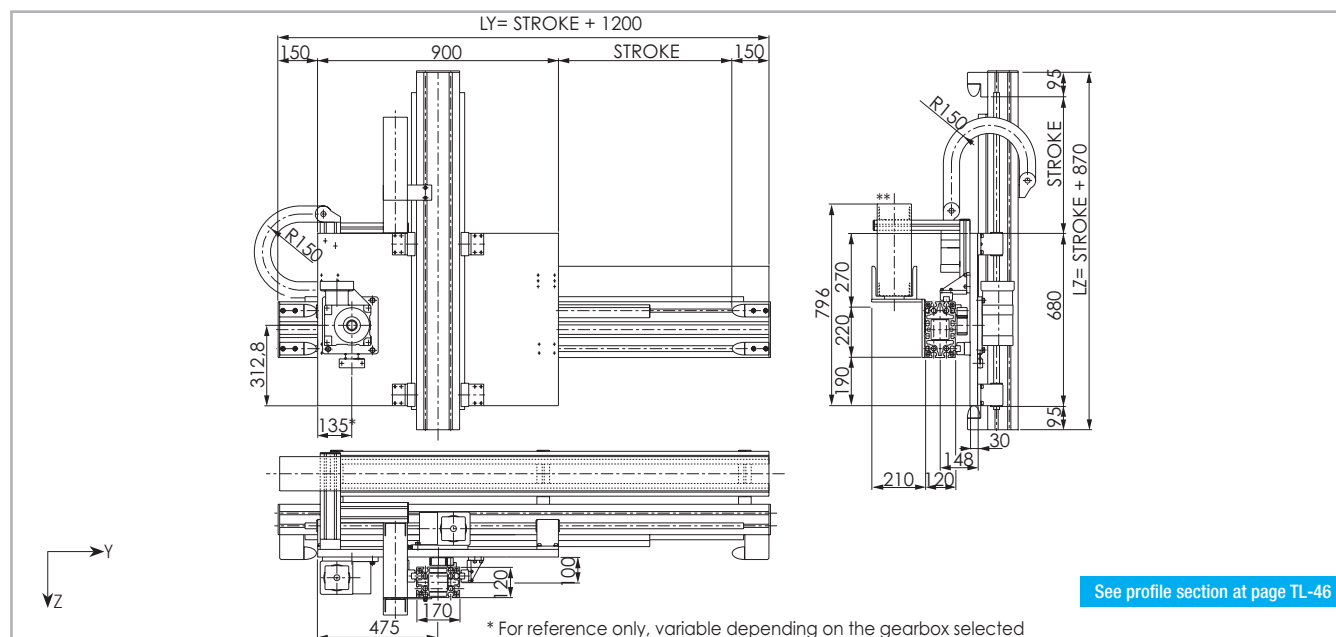
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 103

> PAS 220/170

60 Kg 200 Kg
High Cycle Rate Low Cycle Rate

PAS 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. 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/s ²]	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 [10 ⁷ mm ⁴]	I_y [10 ⁷ mm ⁴]	I_z [10 ⁷ mm ⁴]
Y-axis	4.625	1.559	6.184
Z-axis	1.973	0.984	2.957

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

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

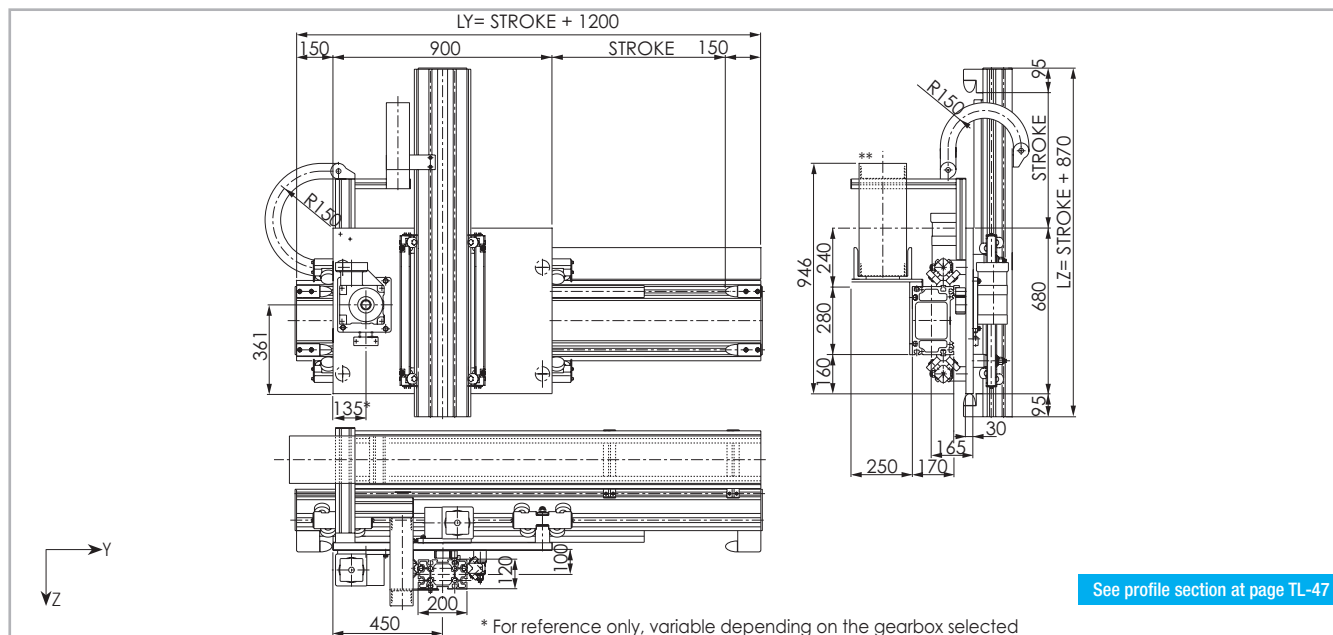
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 107

PAR 280/200

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

PAR 280/200 Dimension



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 [10 ⁷ mm ⁴]	I_y [10 ⁷ mm ⁴]	I_p [10 ⁷ mm ⁴]
Y-axis	12.646	4.829	17.475
Z-axis	3.270	1.289	4.586

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

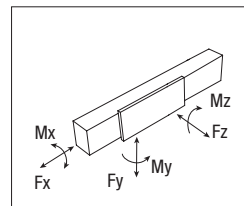
Load capacity

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

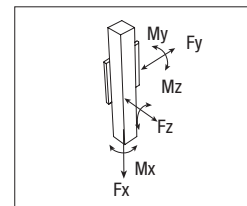
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 111

PAR 280/200 - Y-axis



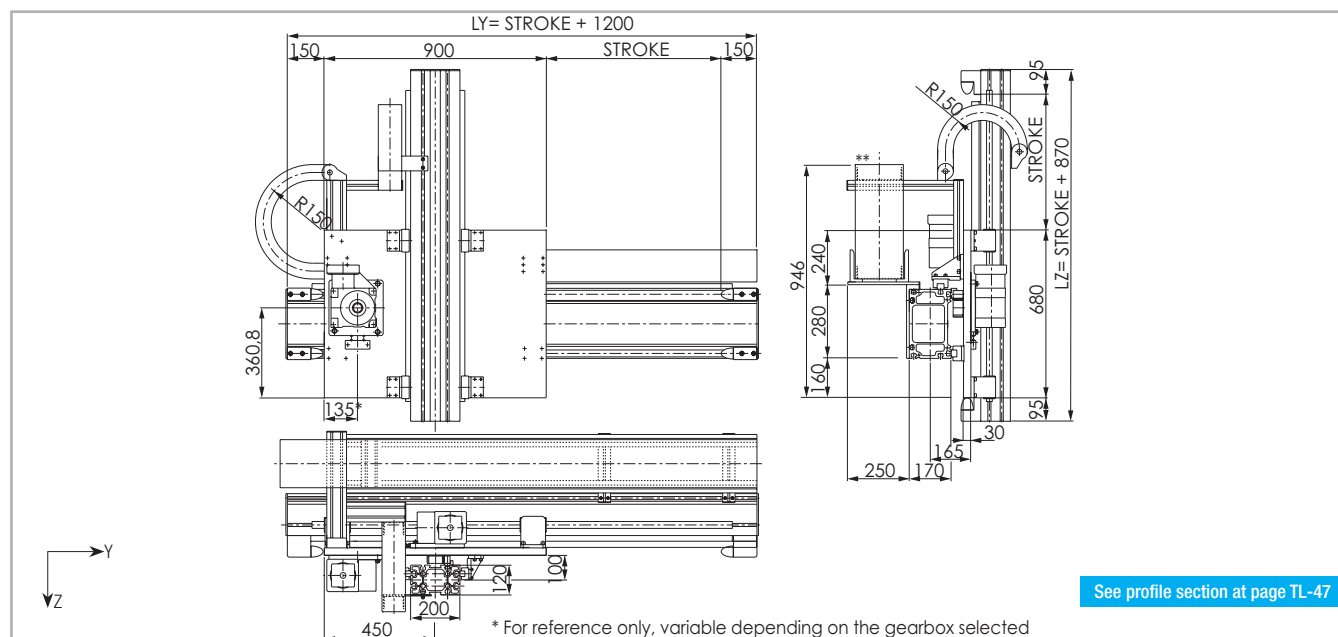
PAR 280/200 - Z-axis



> PAS 280/200

100 Kg PC 200 Kg
 High Cycle Rate Low Cycle Rate

PAS 280/200 Dimension



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/s ²]	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 [10 ⁷ mm ⁴]	I_y [10 ⁷ mm ⁴]	I_z [10 ⁷ mm ⁴]
Y-axis	12.646	4.829	17.475
Z-axis	3.270	1.289	4.586

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

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

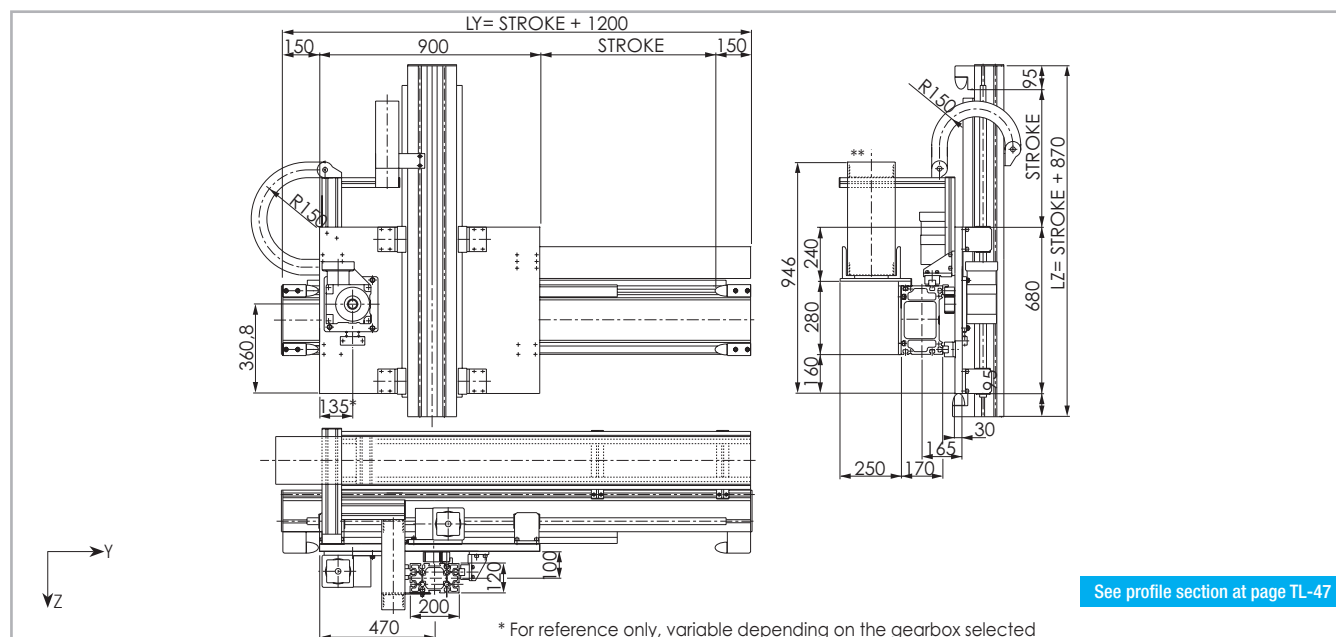
Tab. 115

TL-34

PAS 280/200P

100 Kg PC 400 Kg
 High Cycle Rate Low Cycle Rate

PAS 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

See profile section at page TL-47

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/s ²]	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 [10 ⁷ mm ⁴]	I_y [10 ⁷ mm ⁴]	I_d [10 ⁷ mm ⁴]
Y-axis	12.646	4.829	17.475
Z-axis	3.270	1.289	4.586

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

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



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/s ²]	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

Tab. 124

*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.

Moments of inertia of the aluminum body

Axis	I_x [10 ⁷ mm ⁴]	I_y [10 ⁷ mm ⁴]	I_p [10 ⁷ mm ⁴]
Y-axis	12.646	4.829	17.475
Z-axis	3.270	1.289	4.586

Tab. 125

Rack specifications

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

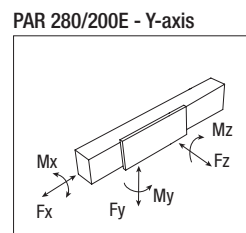
Tab. 126

Load capacity

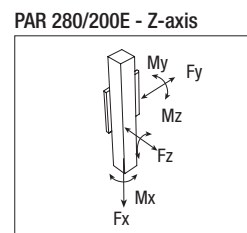
Axis	F _x [N]	F _y [N]		F _z [N]	M _x [Nm]	M _y [Nm]	M _z [Nm]
	Stat.	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
Y-axis	10989	29981	149063	29981	8395	11108	11108
Z-axis	5714	7071	32964	7071	707	1867	1867

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

Tab. 127



PAR 280/200E - Y-axis

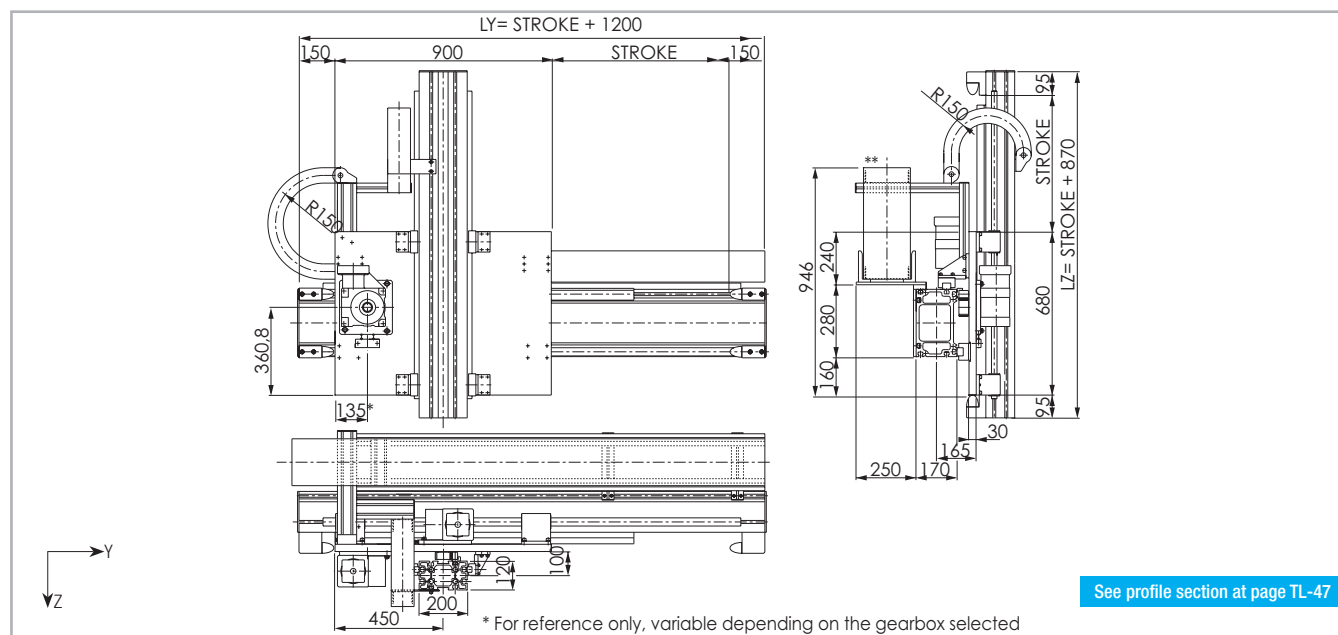


PAR 280/200E - Z-axis

> 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/s ²]	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 [10 ⁷ mm ⁴]	I_y [10 ⁷ mm ⁴]	I_z [10 ⁷ mm ⁴]
Y-axis	12.646	4.829	17.475
Z-axis	3.270	1.289	4.586

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

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

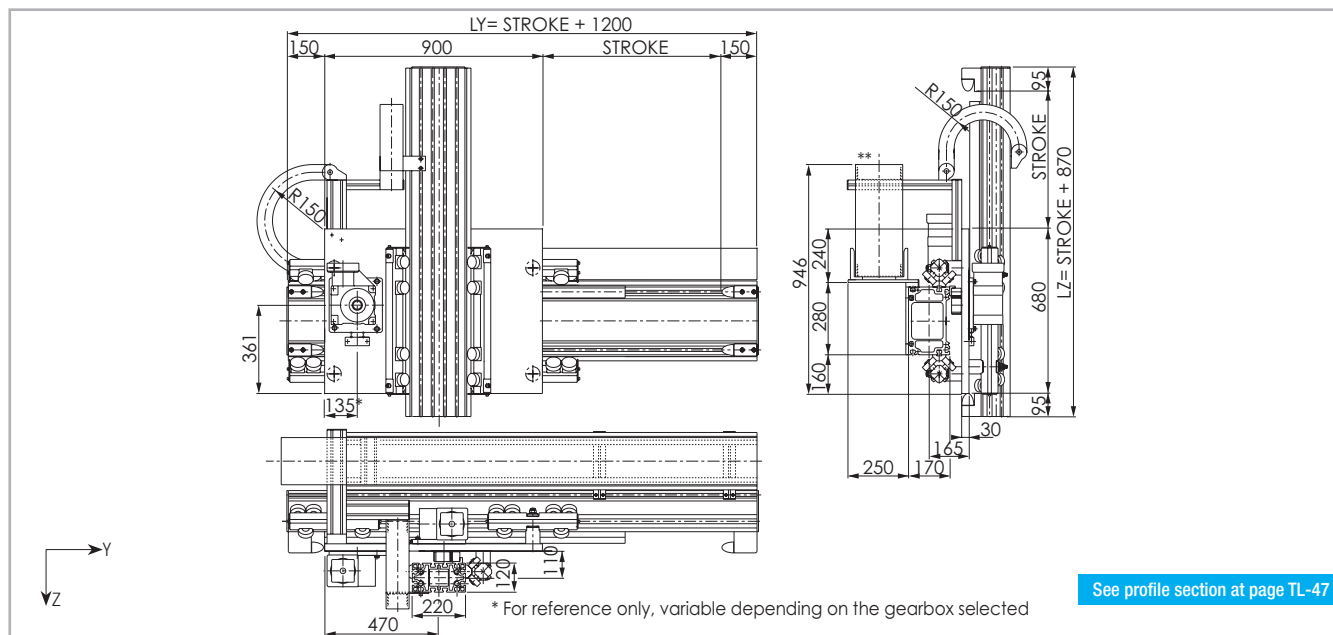
See verification under static load and lifetime on page SL-2 and SL-3

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 [10 ⁷ mm ⁴]	I_y [10 ⁷ mm ⁴]	I_p [10 ⁷ mm ⁴]
Y-axis	12.646	4.829	17.475
Z-axis	4.625	1.559	6.184

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

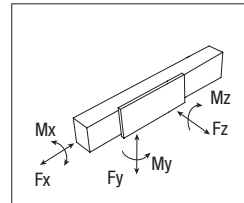
Load capacity

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.
Y-axis	10989	29981	149063	29981	8395	12307
Z-axis	10989	24042	112593	24042	3298	4568

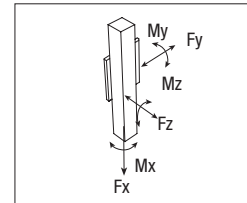
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 135

PAR 280/220 - Y-axis



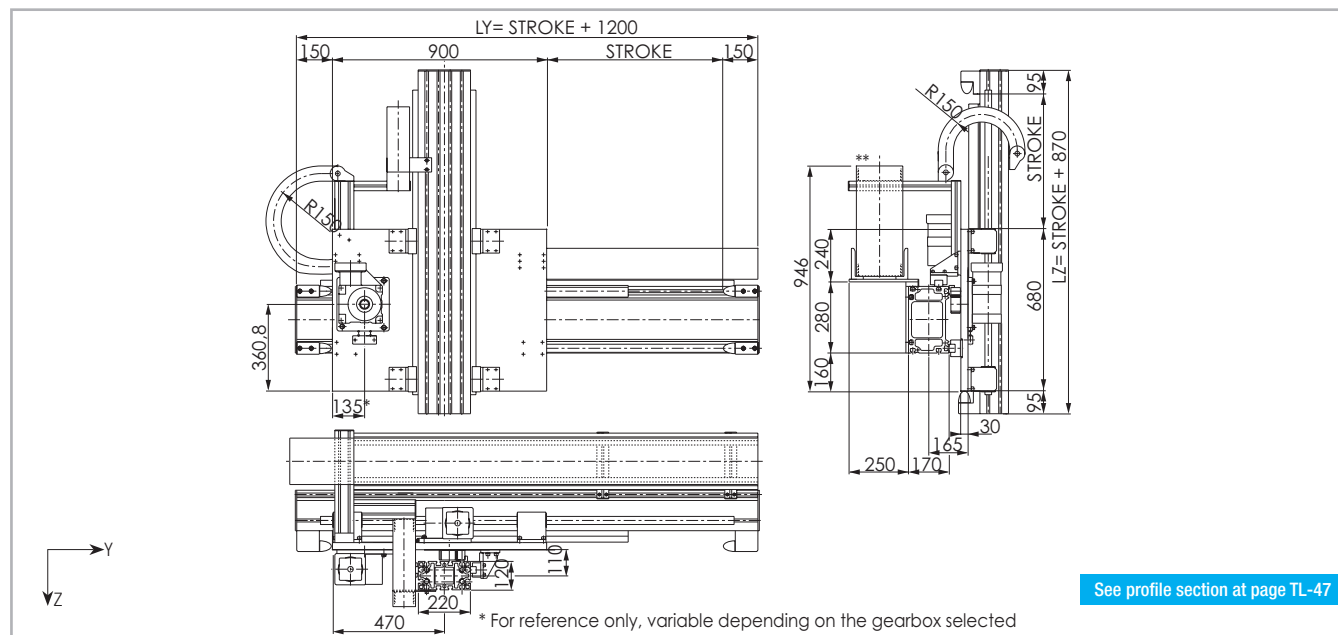
PAR 280/220 - Z-axis



PAS 280/220

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

PAS 280/220 Dimension



**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

*2) Reference value considering a stroke of 1000 mm on Z-axis

*2) Reference value considering a stroke of 1000 mm on Z-axis.

Tab. 136

Moments of inertia of the aluminum body

Axis	I_x [10 ⁷ mm ⁴]	I_y [10 ⁷ mm ⁴]	I_p [10 ⁷ mm ⁴]
Y-axis	12.646	4.829	17.475
Z-axis	4.625	1.559	6.184

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

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

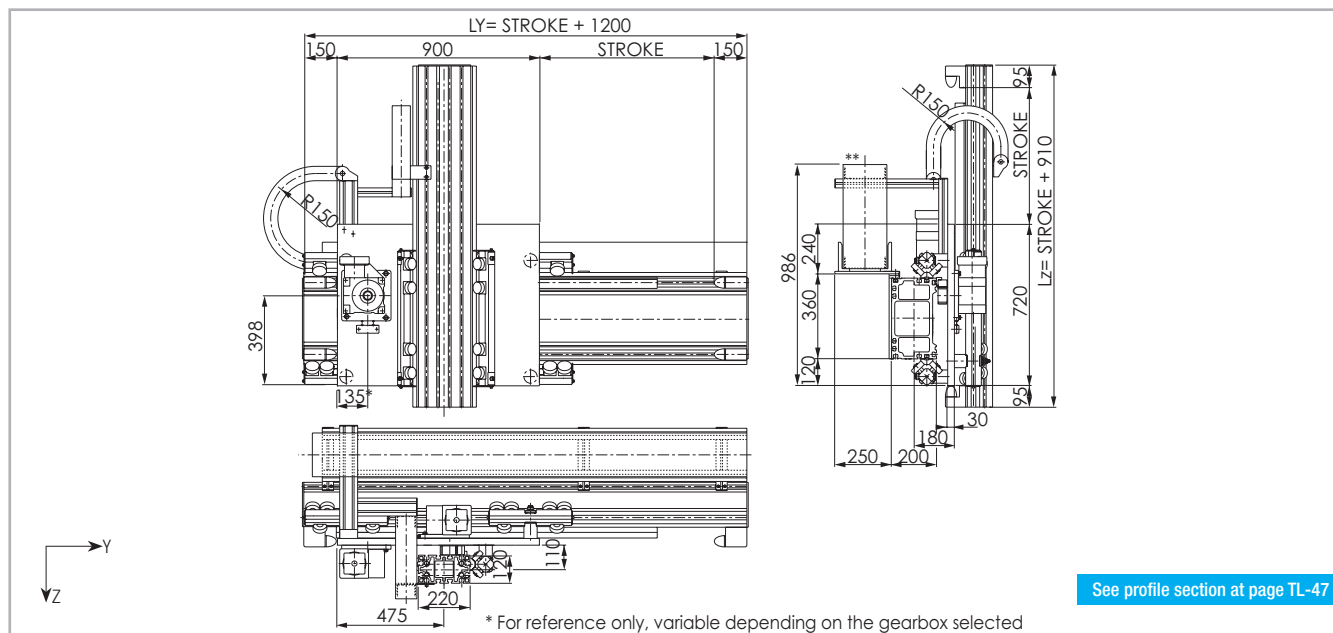
Tab. 139

T
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> PAR 360/220

300 Kg PC 600 Kg
 High Cycle Rate Low Cycle Rate

PAR 360/220 Dimension



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

**Cable carrier offered as option

Fig. 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/s ²]	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 [10 ⁷ mm ⁴]	I_y [10 ⁷ mm ⁴]	I_p [10 ⁷ mm ⁴]
Y-axis	31.721	10.329	42.050
Z-axis	4.625	1.559	6.184

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

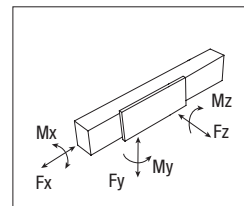
Load capacity

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

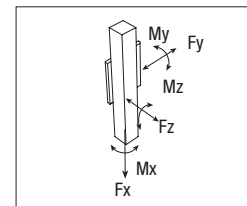
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 143

PAR 360/220 - Y-axis



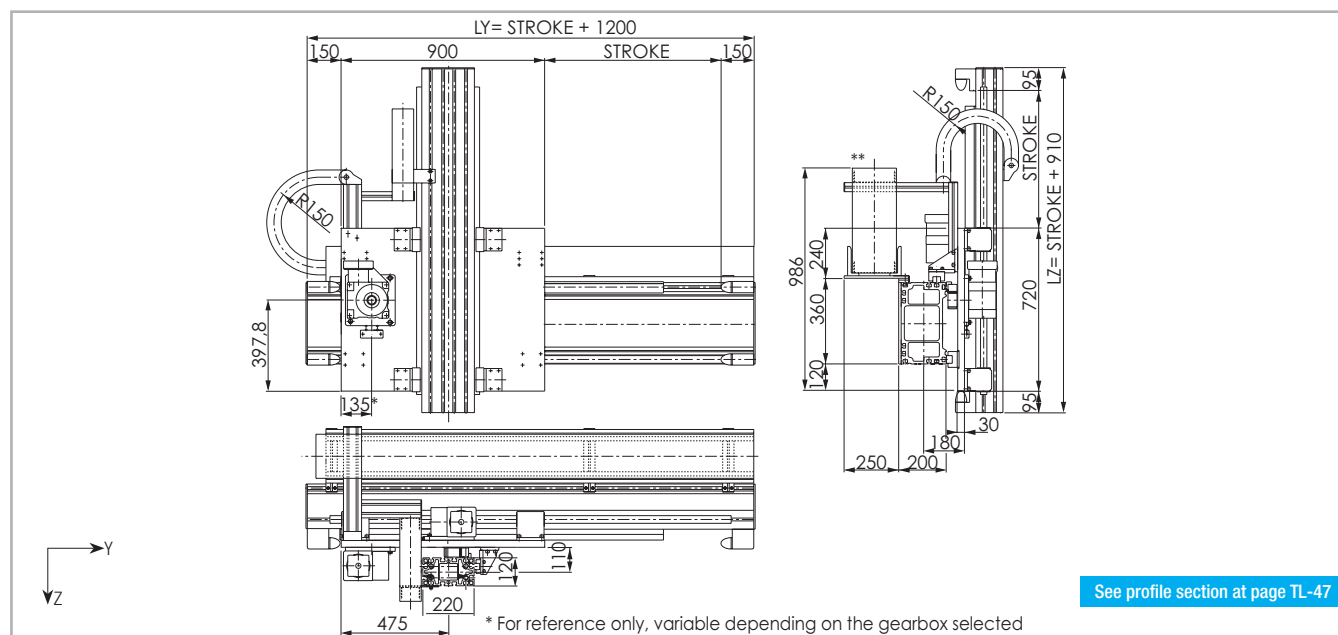
PAR 360/220 - Z-axis



> PAS 360/220

300 Kg PC 600 Kg
 High Cycle Rate Low Cycle Rate

PAS 360/220 Dimension



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

**Cable carrier offered as option

Fig. 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/s ²]	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 [10 ⁷ mm ⁴]	I_y [10 ⁷ mm ⁴]	I_z [10 ⁷ mm ⁴]
Y-axis	31.721	10.329	42.050
Z-axis	4.625	1.559	6.184

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

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

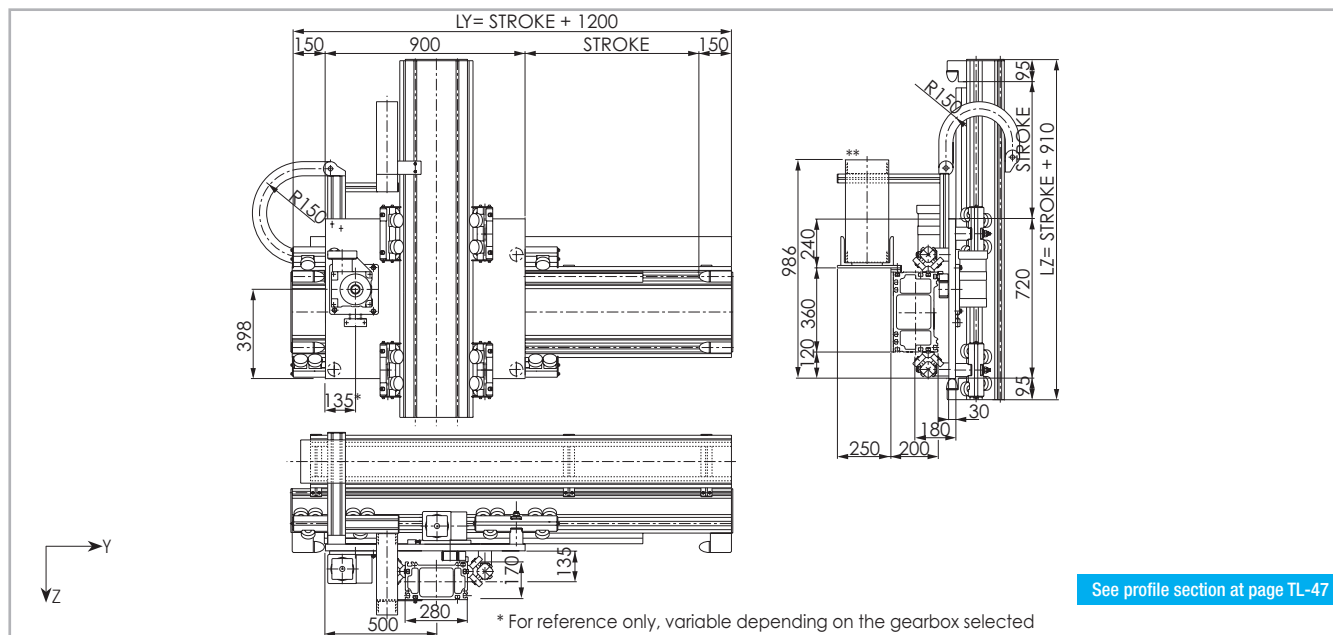
See verification under static load and lifetime on page SL-2 and SL-3

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/s ²]	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 [10 ⁷ mm ⁴]	I_y [10 ⁷ mm ⁴]	I_p [10 ⁷ mm ⁴]
Y-axis	31.721	10.329	42.050
Z-axis	12.646	4.829	17.475

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

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

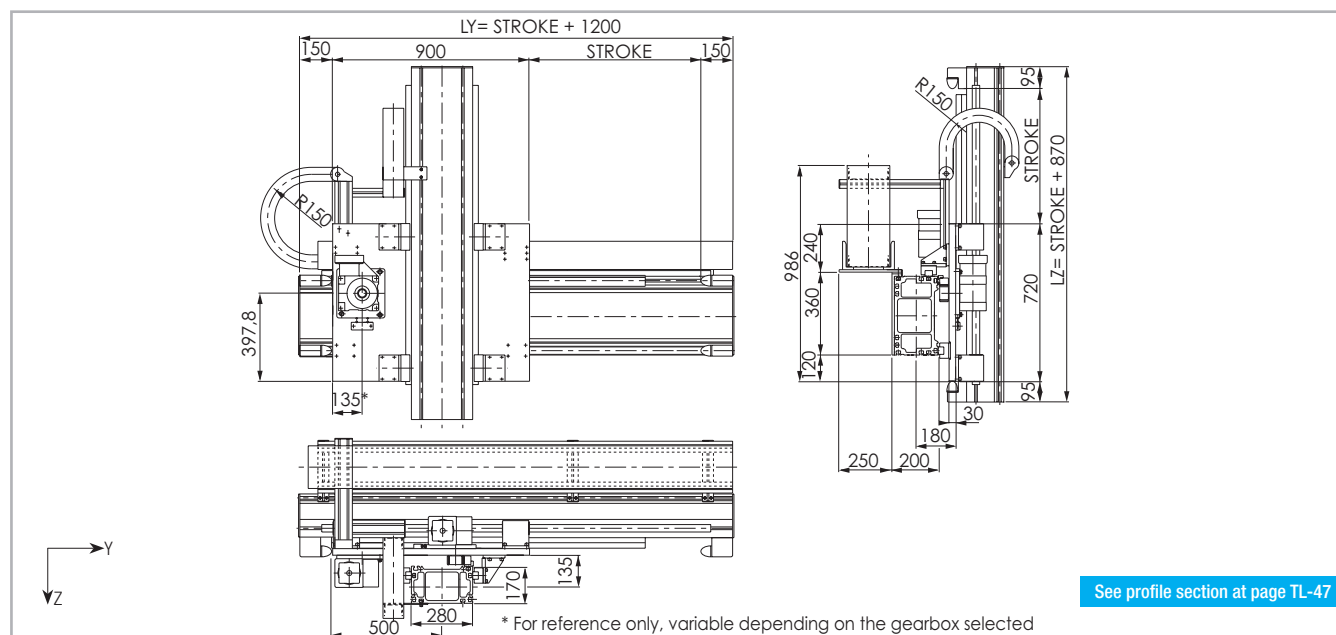
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 151

> PAS 360/280

400 Kg PC 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/s ²]	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 [10 ⁷ mm ⁴]	I_y [10 ⁷ mm ⁴]	I_z [10 ⁷ mm ⁴]
Y-axis	31.721	10.329	42.050
Z-axis	12.646	4.829	17.475

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

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

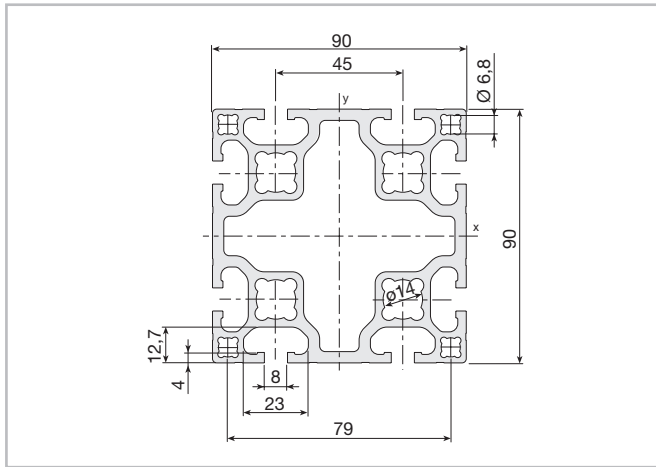


Fig. 42

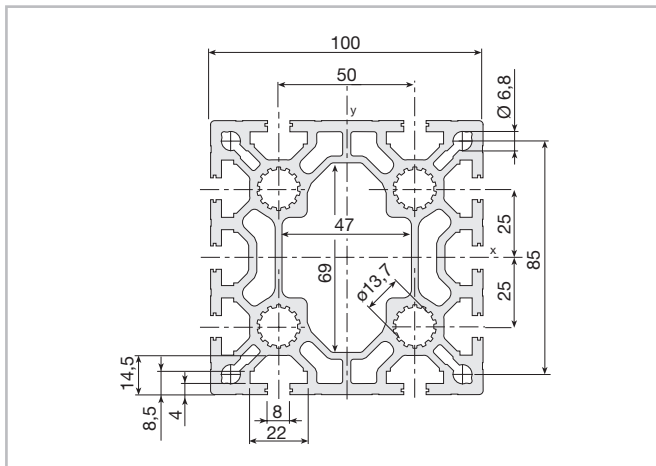


Fig. 43

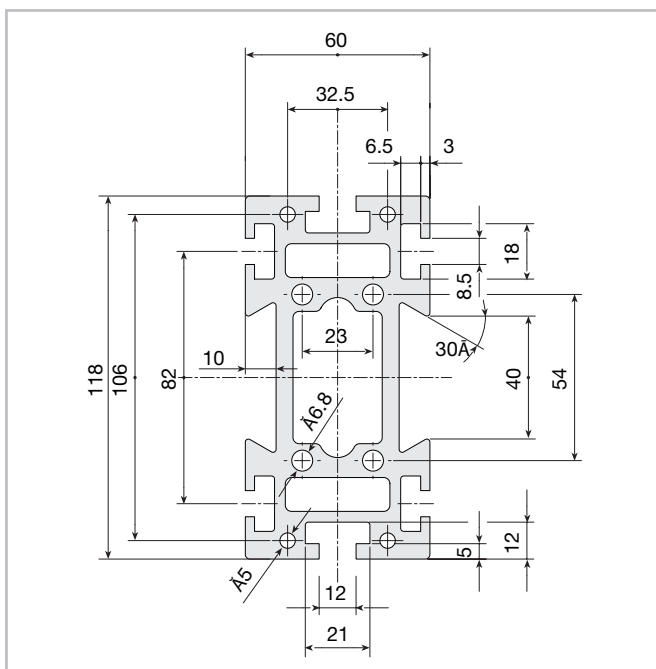


Fig. 44



Profile 90X90

Weight [Kg/m]	6
Max. length [mm]	6000
Moment of inertia Ix [10 ⁷ mm ⁴]	0.197
Moment of inertia Iy [10 ⁷ mm ⁴]	0.195
Polar moment of inertia Ip [10 ⁷ mm ⁴]	0.392
Bending section modulus Wx [mm ³]	45040
Bending section modulus Wy [mm ³]	45040

Tab. 156



Profile 100x100

Weight [Kg/m]	9.5
Max. length [mm]	6000
Moment of inertia Ix [10 ⁷ mm ⁴]	0.364
Moment of inertia Iy [10 ⁷ mm ⁴]	0.346
Polar moment of inertia Ip [10 ⁷ mm ⁴]	0.709
Bending section modulus Wx [mm ³]	76000
Bending section modulus Wy [mm ³]	73000

Tab. 157

Profile 118x60

Weight [Kg/m]	7.89
Max. length [mm]	10000
Moment of inertia Ix [10 ⁷ mm ⁴]	0.432
Moment of inertia Iy [10 ⁷ mm ⁴]	0.101
Polar moment of inertia Ip [10 ⁷ mm ⁴]	0.533
Bending section modulus Wx [mm ³]	73263
Bending section modulus Wy [mm ³]	33714

Tab. 158

Load bearing profiles

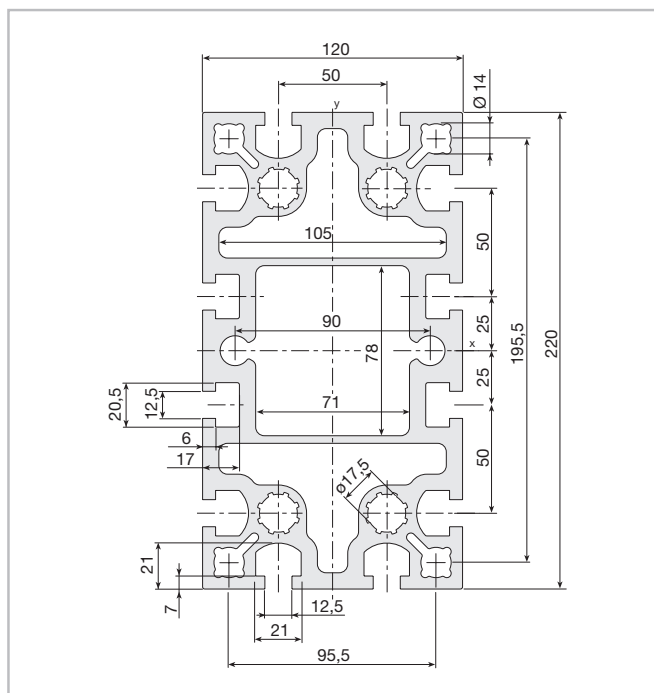
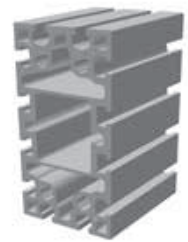


Fig. 48



LOGYCA (120x220)

Weight [Kg/m]	25
Max. length [mm]	12000
Moment of inertia Ix [10^7 mm ⁴]	4.625
Moment of inertia Iy [10^7 mm ⁴]	1.559
Polar moment of inertia Ip [10^7 mm ⁴]	6.184
Bending section modulus Wx [mm ³]	423182
Bending section modulus Wy [mm ³]	260833

Tab. 162

Load bearing profiles

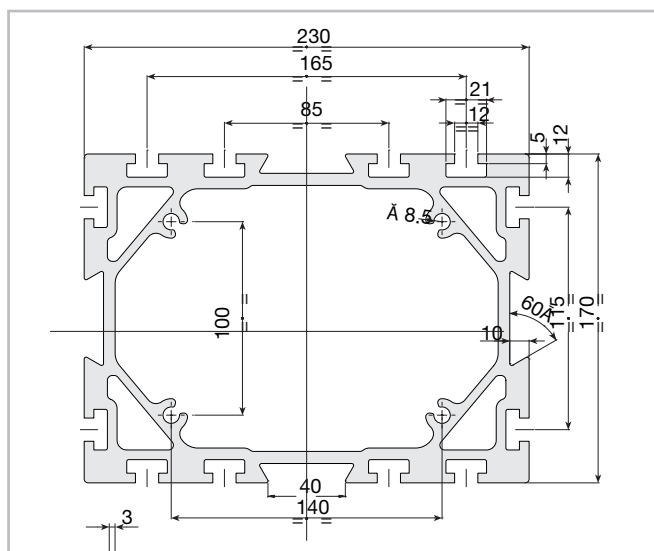


Fig. 49

Profile 230x170

Weight [Kg/m]	25.5
Max. length [mm]	12000
Moment of inertia Ix [10 ⁷ mm ⁴]	4.625
Moment of inertia Iy [10 ⁷ mm ⁴]	1.559
Polar moment of inertia Ip [10 ⁷ mm ⁴]	6.184
Bending section modulus Wx [mm ³]	564284
Bending section modulus Wy [mm ³]	444500

* Not anodized

Tab. 163

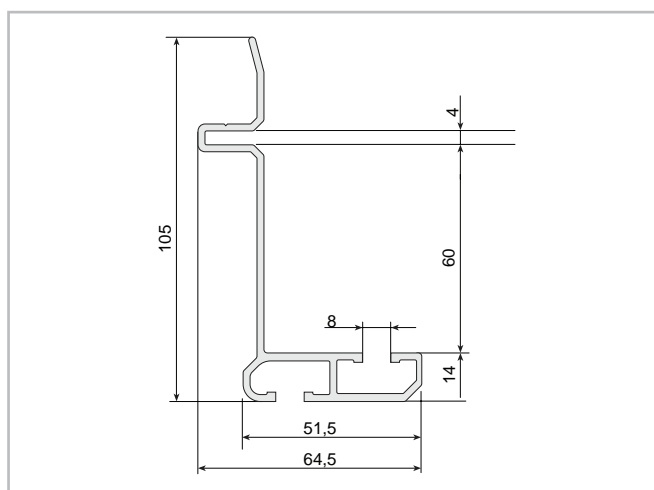


Fig. 50



7400568 energy chain support profile

Weight [kg/m]	1.3
Available length [Mm]	6

Tab. 164

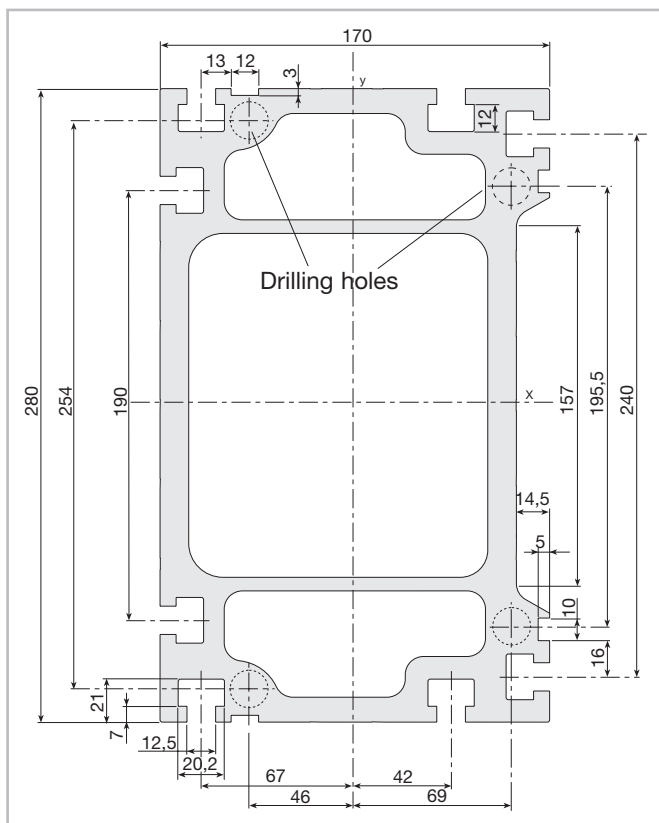


Fig. 51

**PRATYCA (170x280)**

Weight [Kg/m]	40
Max. length [mm]	12000
Moment of inertia I_x [10^7 mm^4]	12.646
Moment of inertia I_y [10^7 mm^4]	4.829
Polar moment of inertia I_p [10^7 mm^4]	17.475
Bending section modulus W_x [mm^3]	957790
Bending section modulus W_y [mm^3]	591620

* Not anodized

Tab. 165

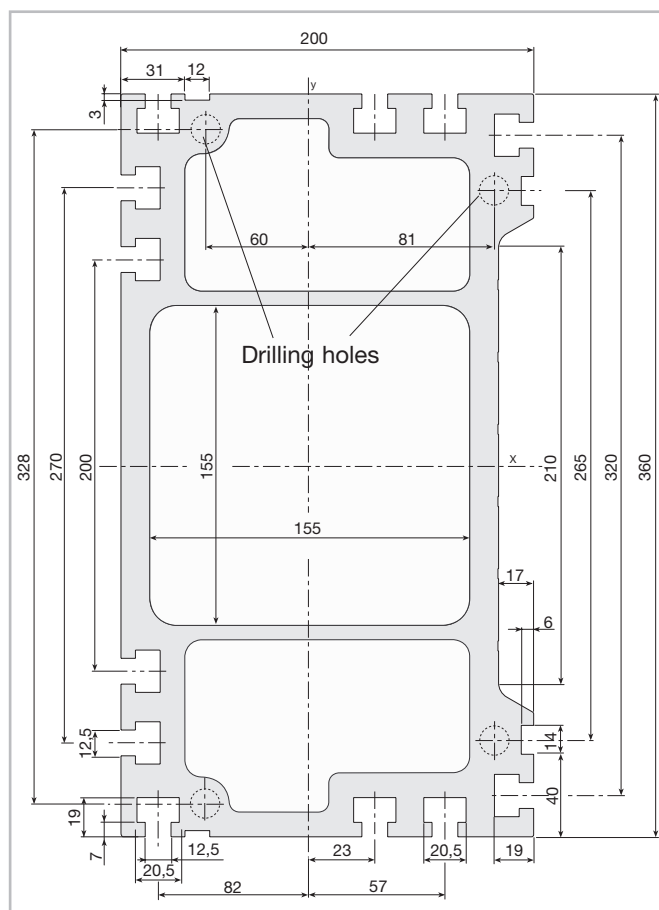
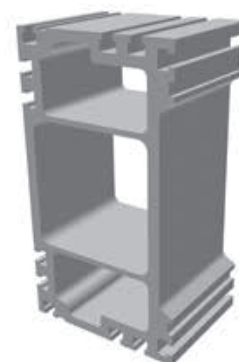
Load bearing profiles

Fig. 52

**SOLYDA (200x360)**

Weight [Kg/m]	60
Max. length [mm]	12000
Moment of inertia I_x [10^7 mm^4]	31.721
Moment of inertia I_y [10^7 mm^4]	10.329
Polar moment of inertia I_p [10^7 mm^4]	42.050
Bending section modulus W_x [mm^3]	1770500
Bending section modulus W_y [mm^3]	1035300

* 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.

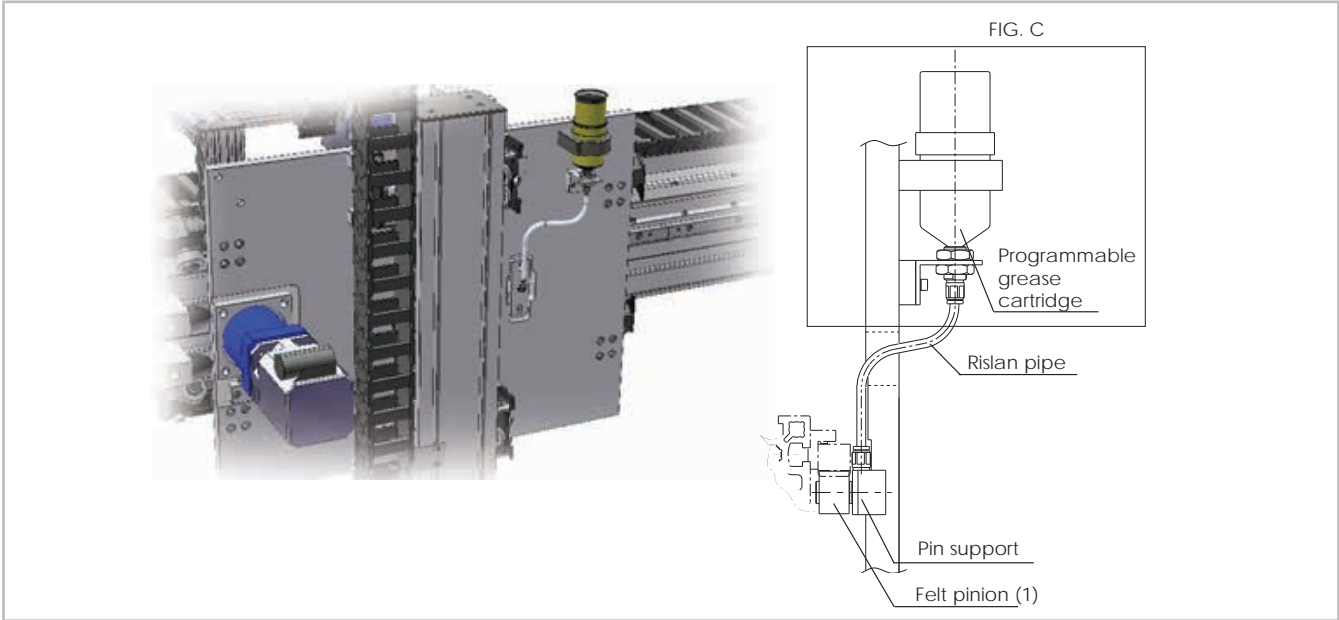


Fig. 53

1 - Spares

Specification	Code
Programmable grease cartridge (125 ml) [b]	101.0744
m2 - helical tooth felt pinion [1]	101.1079
m3 - helical tooth felt pinion [1]	701.0059
m4 - helical tooth 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 = $A \times B \times C = 1.575$

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.

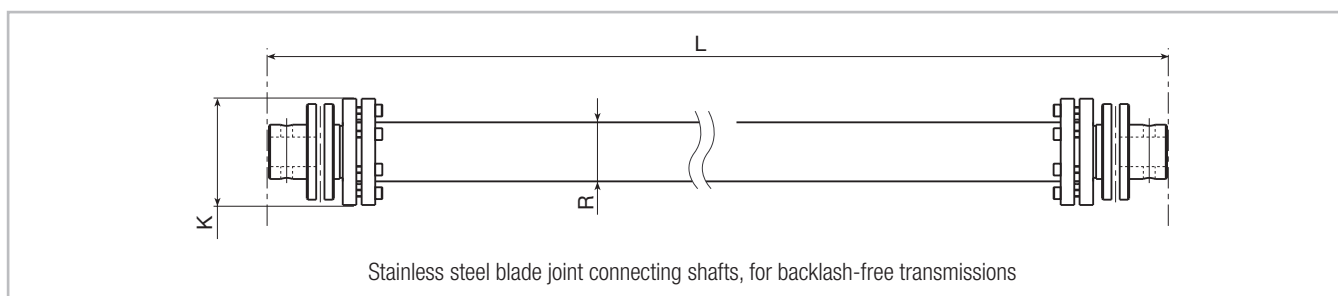
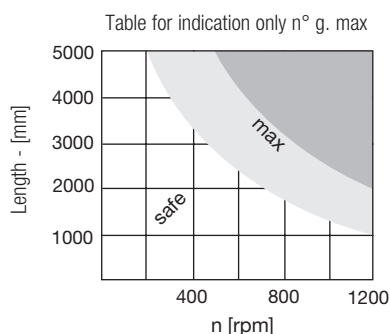


Fig. 54

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.

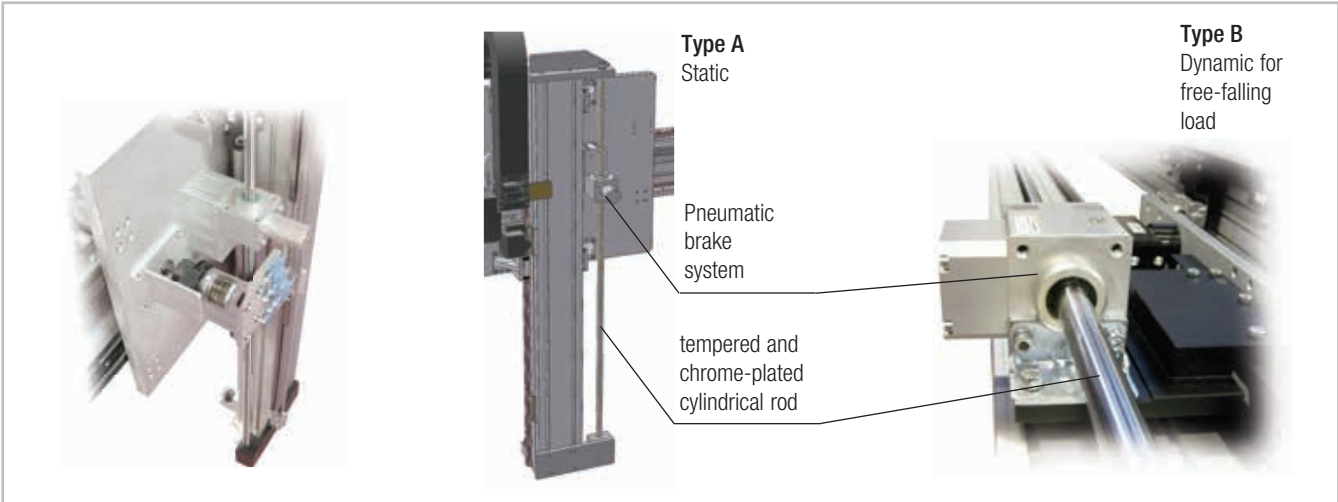


Fig. 55

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.

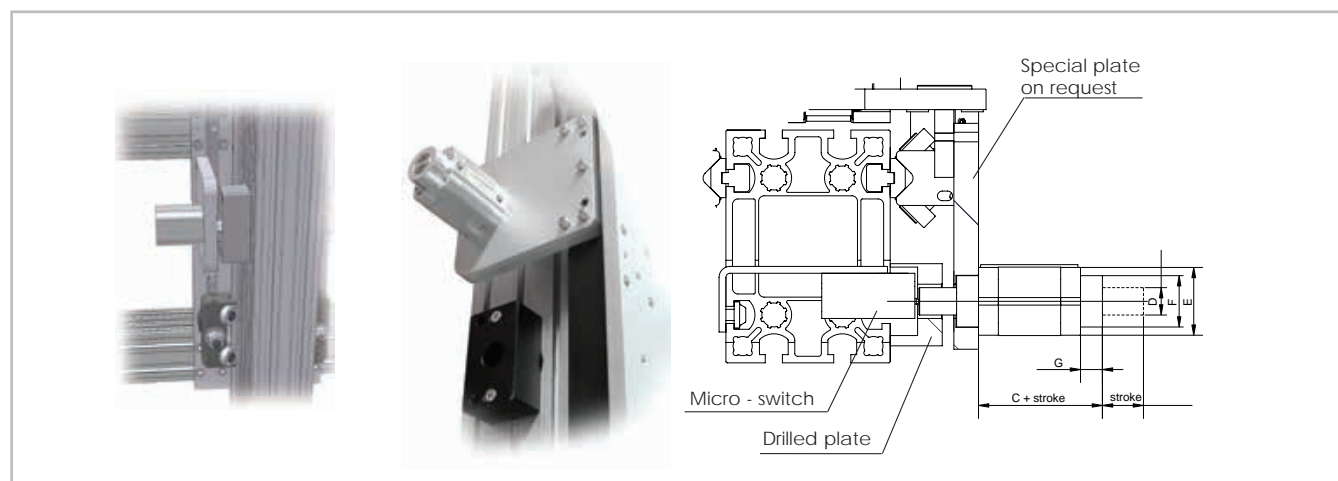


Fig. 56

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: aluminum alloy (Rs=310 N/mm²).

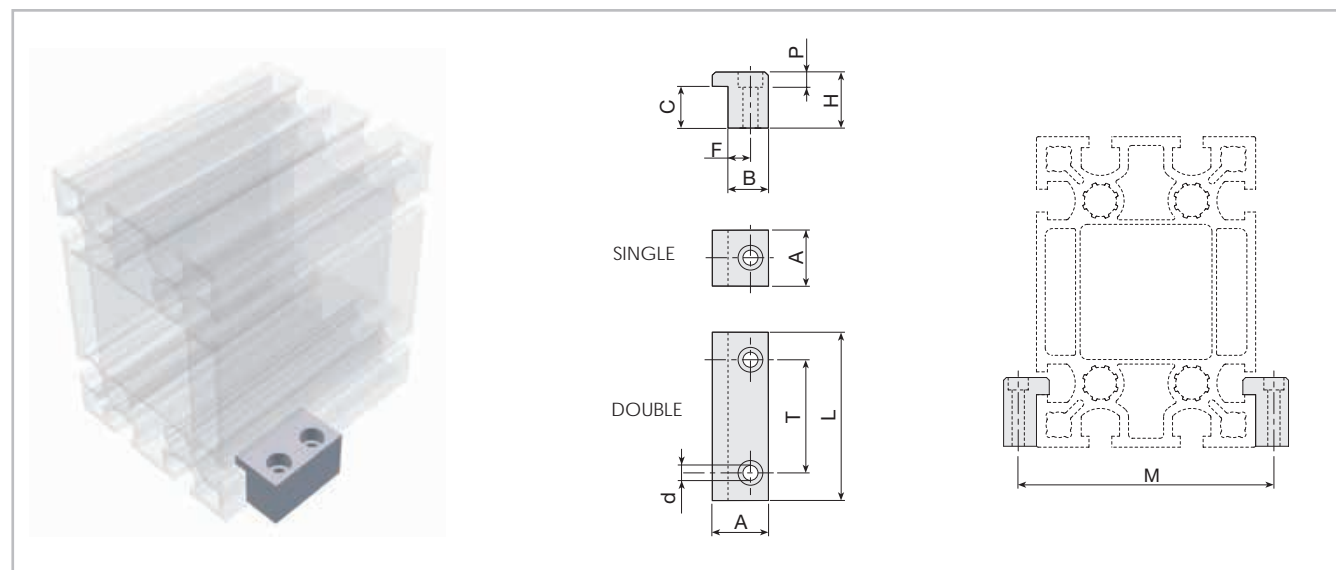


Fig. 57

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	-	-
SOLYDA horizontal	30	90	50	11	20	11	11.3	14	25	388	415.0768	415.0763
SOLYDA vertical*	30	90	50	11	25	11	13.5	14	25	228	-	-

* For vertical orientation of cross section this profile has asymmetric position of the T-Slots. Contact Rollon Technical department

Tab. 176

> L-shaped brackets

Threaded hole bracket

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

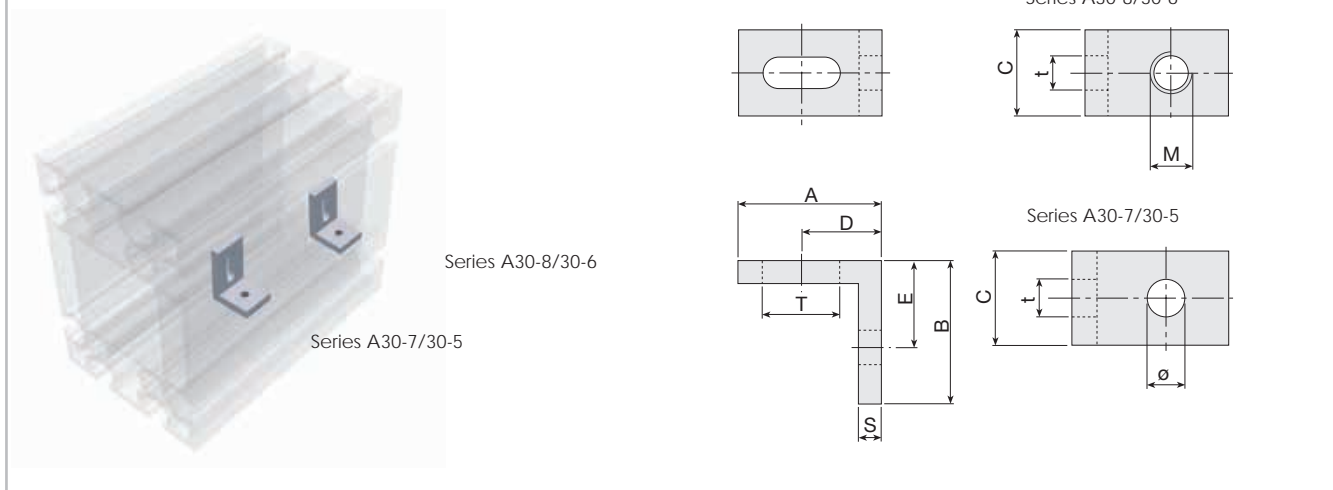


Fig. 58

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

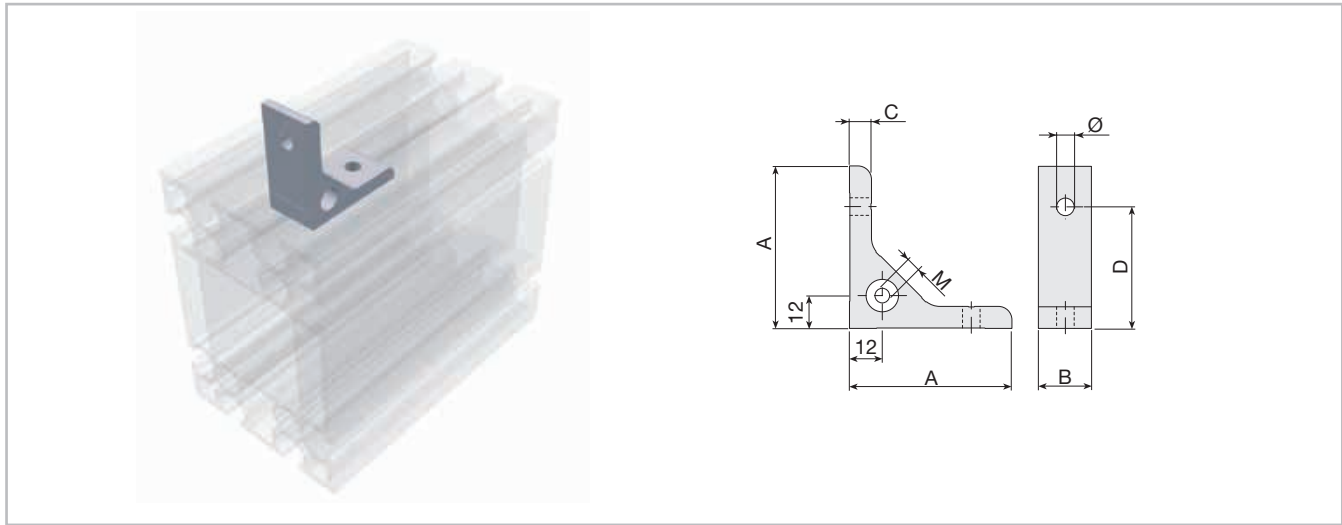


Fig. 59

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.

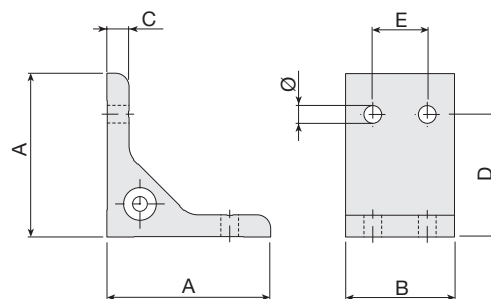


Fig. 60

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.

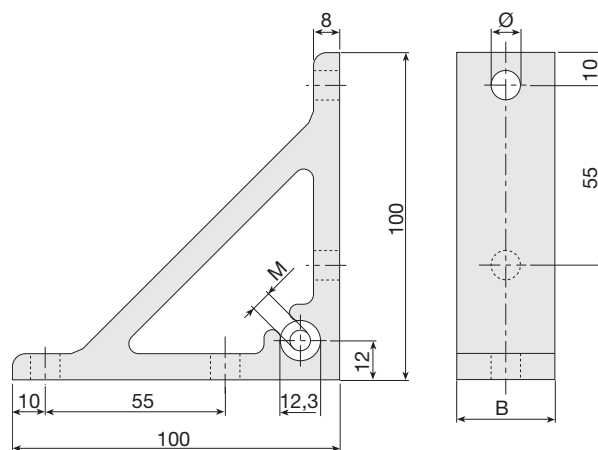
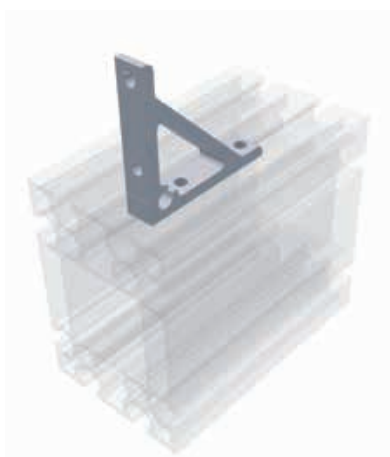


Fig. 61

	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

Bracket for assembly - Large side (Ø12.5 - Ø20) Aluminum

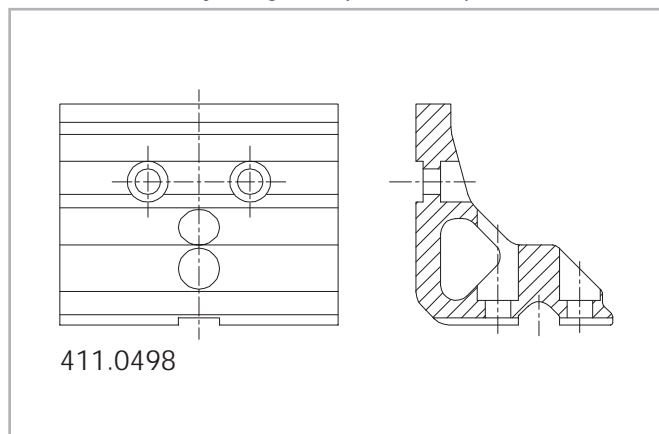


Fig. 62

Bracket for assembly - Large side (Ø12.5 - Ø20) Aluminum

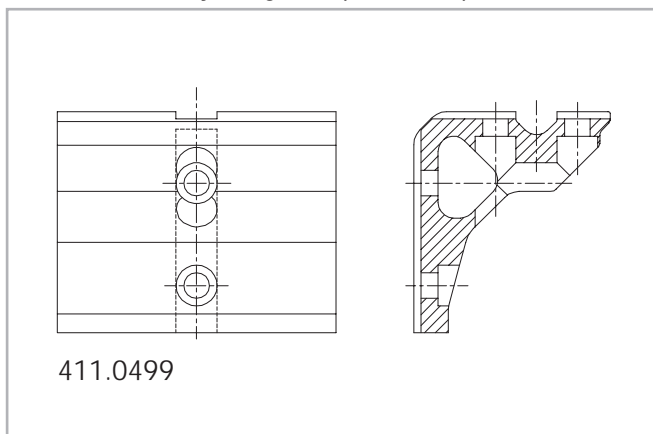


Fig. 63

Bracket for assembly - Short side (Ø12.5 - Ø20) Aluminum

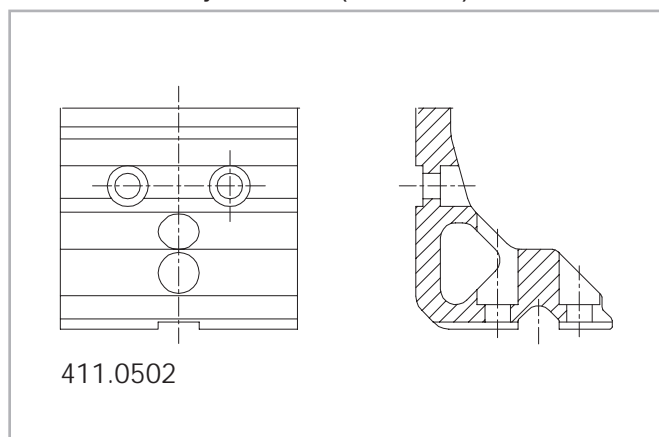


Fig. 64

Bracket for assembly - Short side (Ø12.5 - Ø20) Aluminum

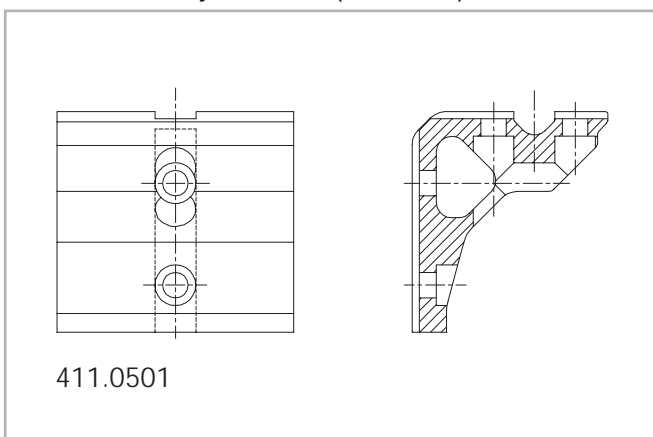


Fig. 65

Joining bracket - Bracket 75x75x38 - Aluminum

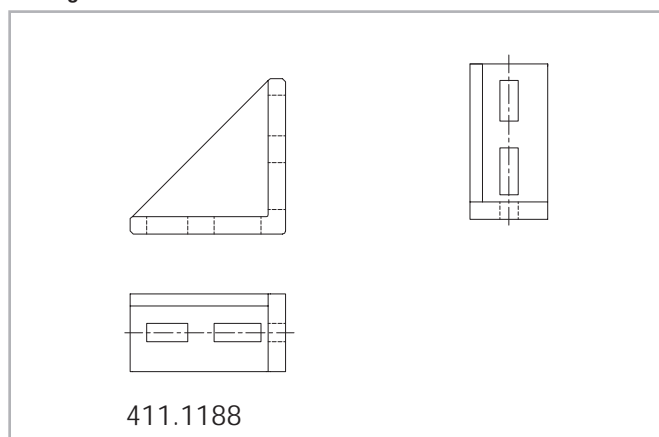


Fig. 66

Joining bracket - Bracket 75x75x38 - Aluminum

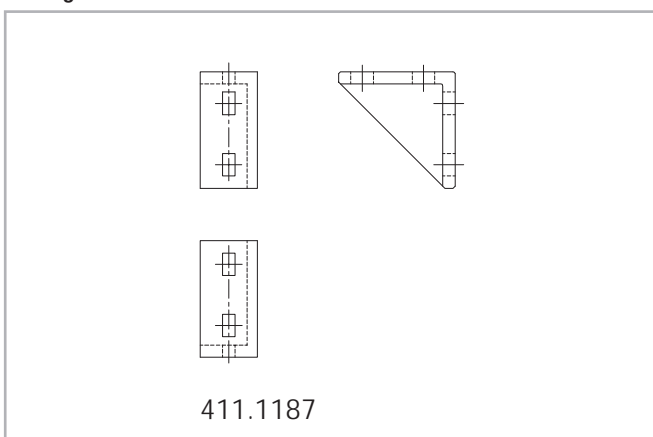


Fig. 67

> End caps for profile

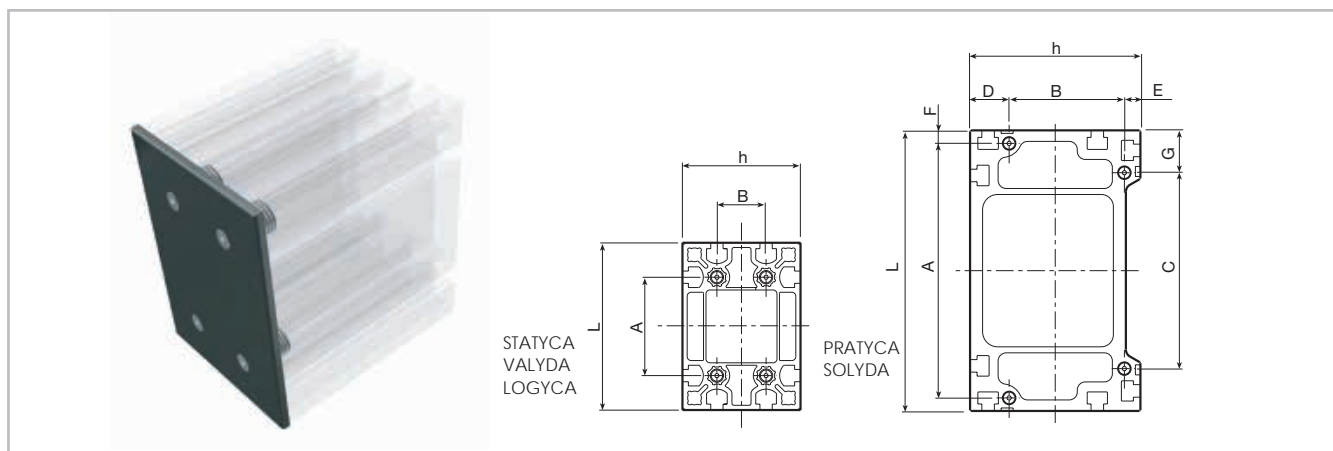


Fig. 68

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

indicated 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

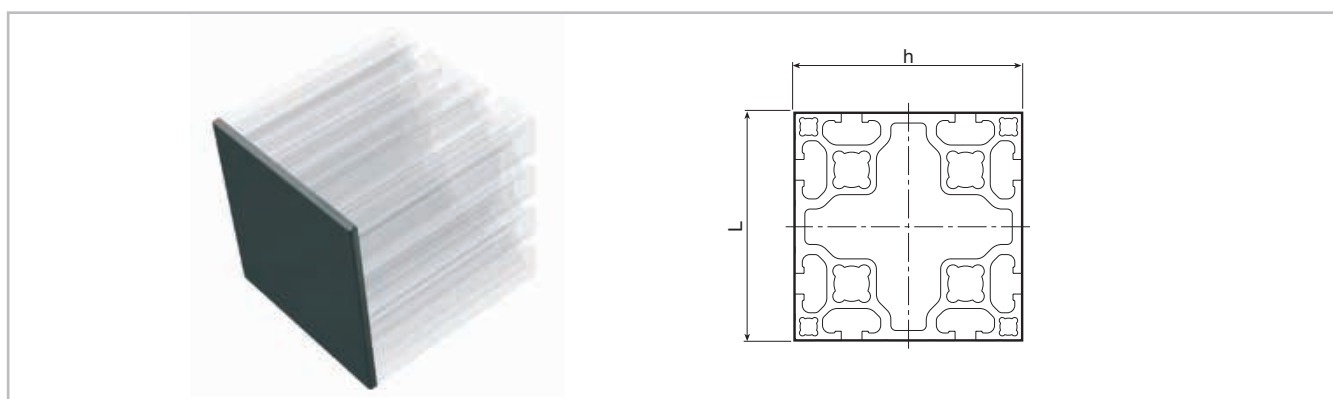


Fig. 69

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 30/45/50/60/90

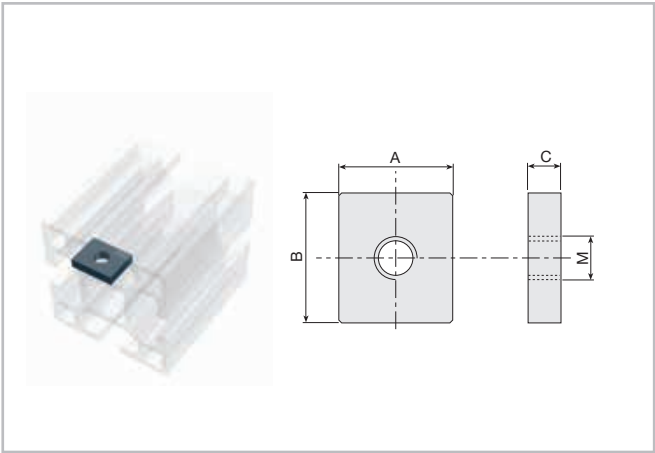


Fig. 70

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 **100x100, STATYCA, VALYDA, LOGYCA, PRATYCA and SOLYDA.**

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



Fig. 72

Square nuts

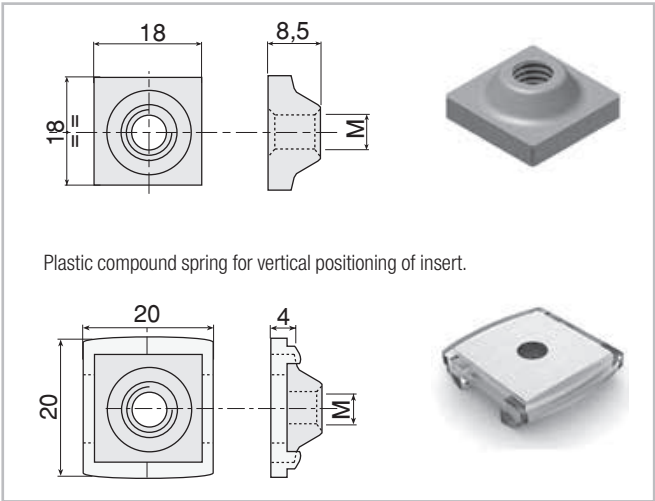


Fig. 71

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 LOGYCA-PRATYCA-SOLYDA profiles

Frontally insertable alignment plates

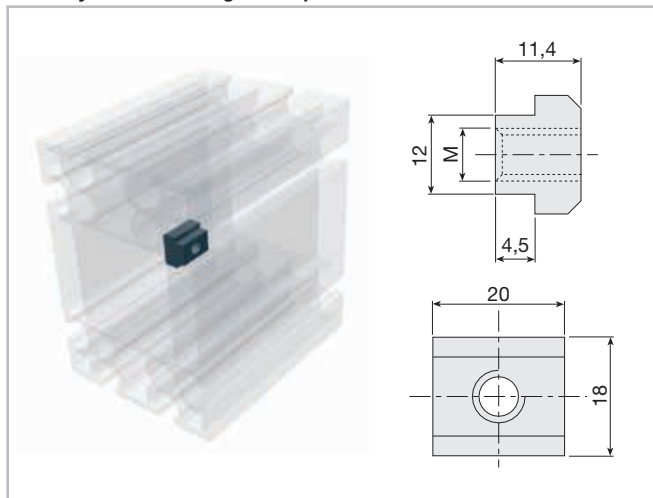


Fig. 73

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

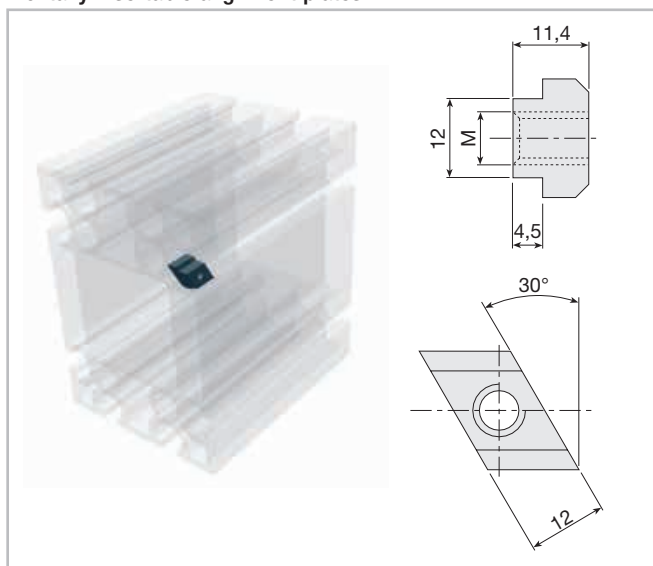


Fig. 74

Material: galvanised steel.

Thread	Code
M5	215.1771
M6	215.1772
M8	215.1773
M10	215.2125

Tab. 187

Threaded inserts

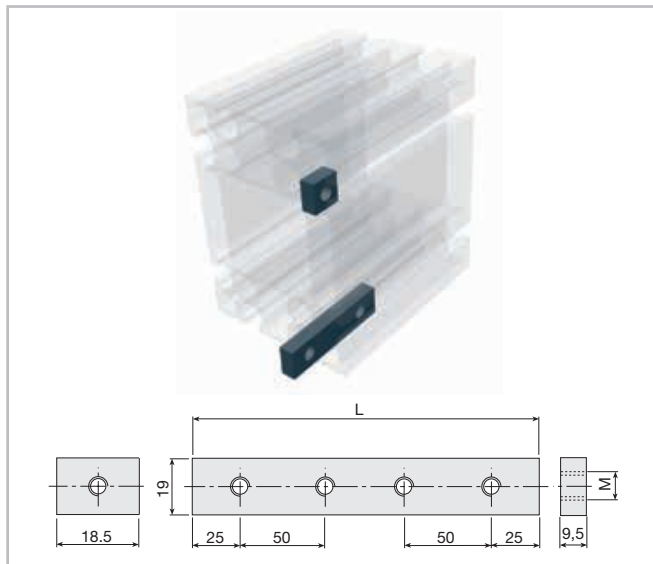


Fig. 75

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

> Threaded inserts for 118x60, 140x20, 230x170 profiles

Quick front insert nuts for 118x60 profile (long side)

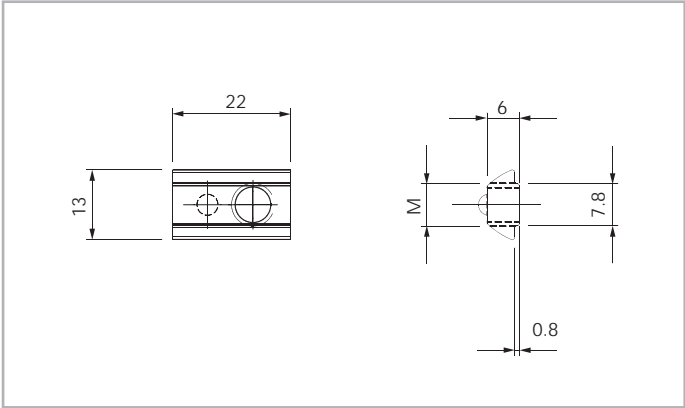


Fig. 76

Material: zinc-plated steel

Thread	Code
M5	4111355
M6	4111356

Tab. 189

Quick front insert nuts for 118x60 profile (long side)

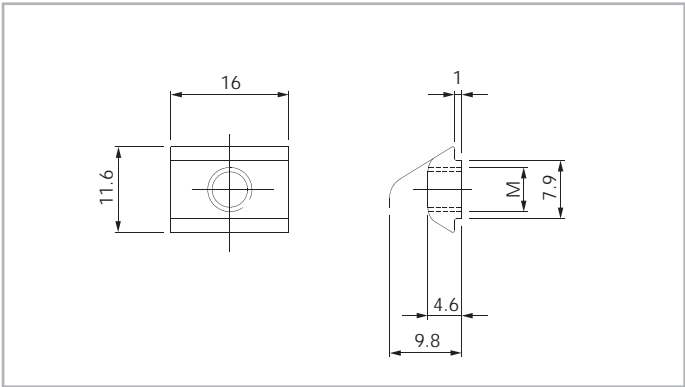


Fig. 77

Material: zinc-plated steel

Thread	Code
M4	4111357
M5	4111358
M6	4111359

Tab. 190

Threaded inserts for 118x60 profile (long side)

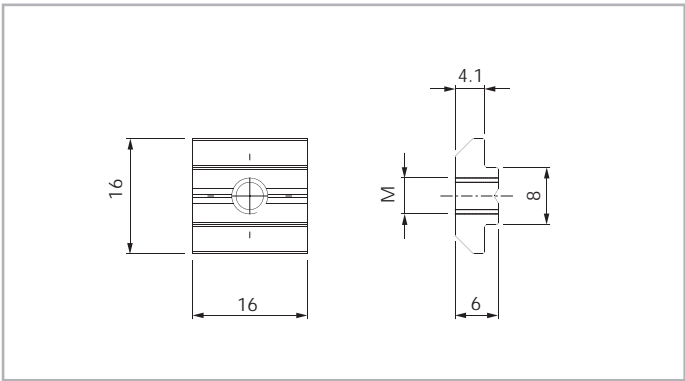


Fig. 78

Material: zinc-plated steel

Thread	Code
M5	4111361
M6	4111362
M8	4111363

Tab. 194

Inserts for 140x120 profile

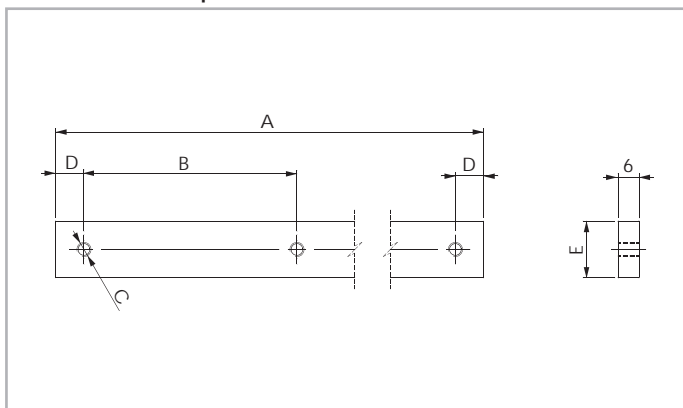


Fig. 79

Material: zinc-plated steel

A	B	C	D	E	Holes	Code
496	60	M4	8	16	9	4112534
496	60	M5	8	16	9	4112533
496	60	M6	8	16	9	4113633

Tab. 192

Inserts for profiles 118x60 (short side only) - 140x120 - 230x170

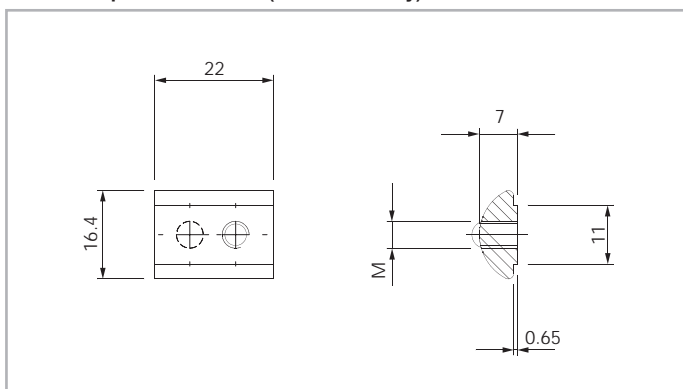


Fig. 80

Material: burnished steel

Thread	Holes	Code
M4*	1	4111360
M5*	1	4111351
M6*	1	4111352
M8*	1	4111353

* Quick front insert on PAS118 (short side) and PAS 230 only

Tab. 193

Inserts for profiles 118x60 (short side only) - 230x170

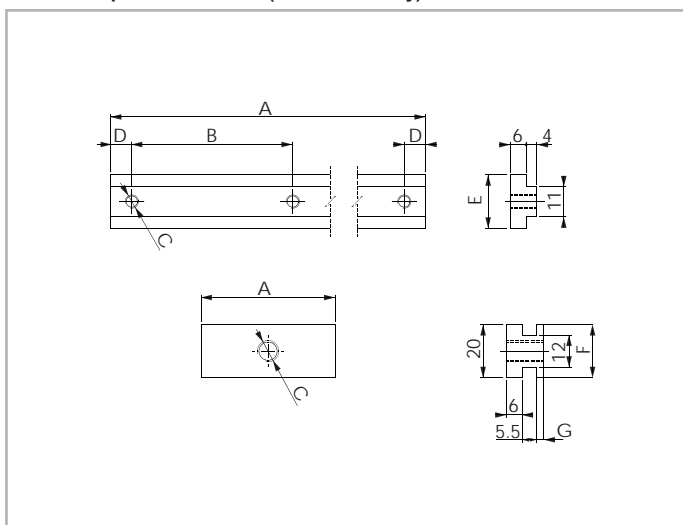


Fig. 81

Material: burnished steel

A	B	C	D	E	Holes	Code
20	-	M5	10	20	1	4112540
20	-	M6	10	20	1	4112541
20	-	M8	10	20	1	4112542
20	-	M10	10	20	1	4112543
496	60	M5	8	20	9	4112544
496	60	M6	8	20	9	4112545
496	60	M8	8	20	7	4112546

Tab. 194

A	B	C	F	G	Holes	Code
20	-	M6	8	2	1	4112547
20	-	M8	20	2.5	1	4112548
20	-	M10	20	3	1	4112549

Tab. 195

> Dovetail inserts for VALYDA profiles

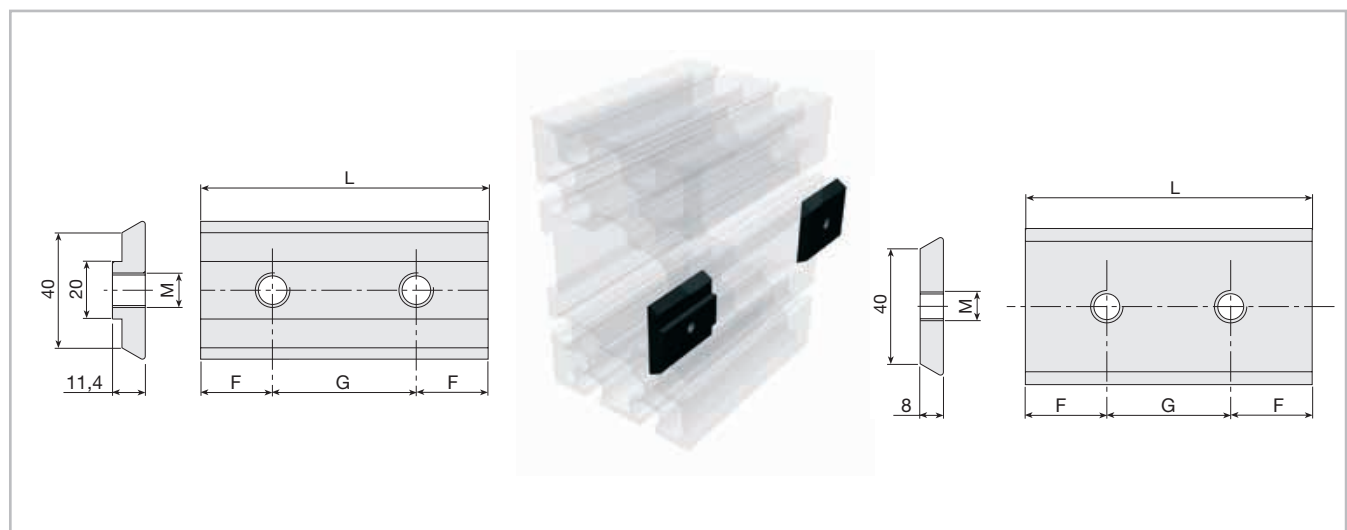


Fig. 82

Material: burnished C40.
Important: inserts must be inserted into the longitudinal slots before assembling.
Special sizes are available upon request.

F	G	L	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. 196

F	G	L	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. 197

Reader system with magnetic scale and sensor

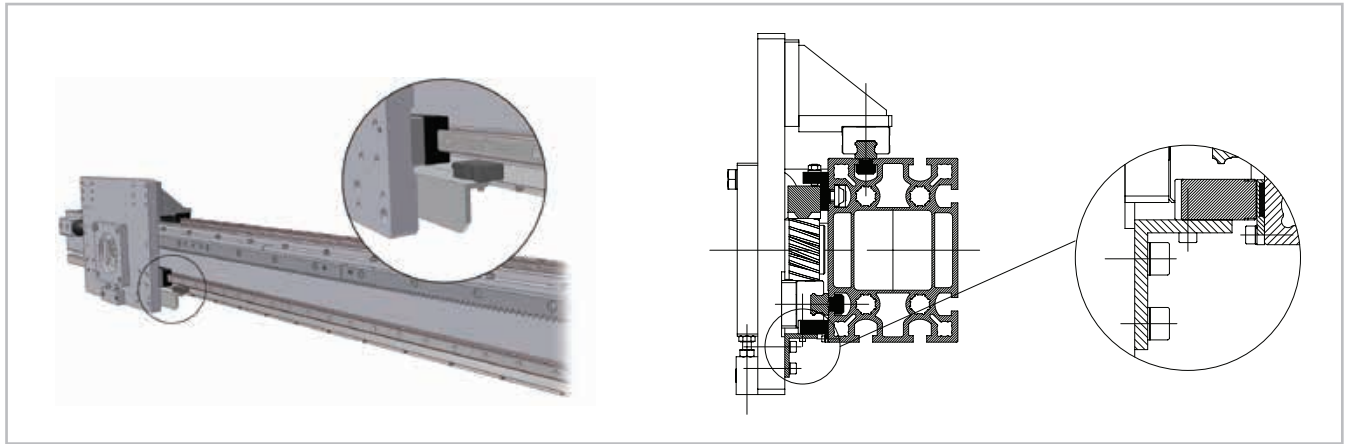


Fig. 83

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 = $4 \div 10$ m/s (according to type)

> Dovetail inserts for profiles 118x60 (long side only) - 140x120 - 230x170

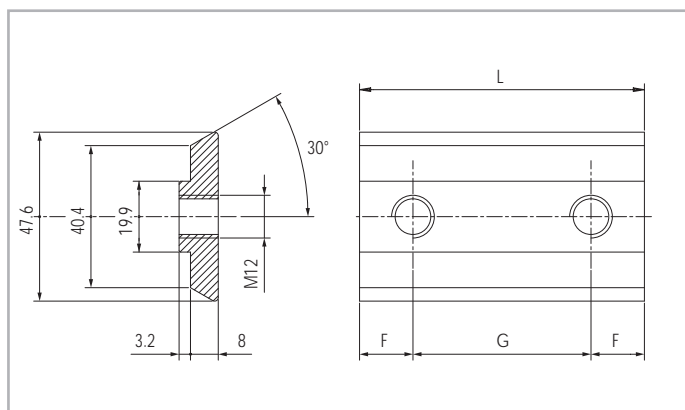


Fig. 84

Material: burnished steel.

Holes	F	G	L	Code N.
1	25	/	50	411.0745
2	15	40	70	411.0503
2	25	50	100	411.0469
3	25	50	150	411.0588
2	25	150	200	411.0472
6	25	50	300	411.0470

Tab. 198

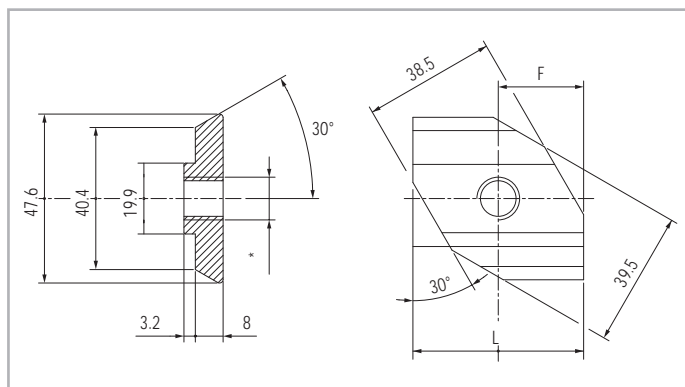


Fig. 85

411.1178

* M10 dovetail-quick front-insertion version

411.0845

* M12 dovetail-quick front-insertion version

Dovetail clamps with M8 threaded holes

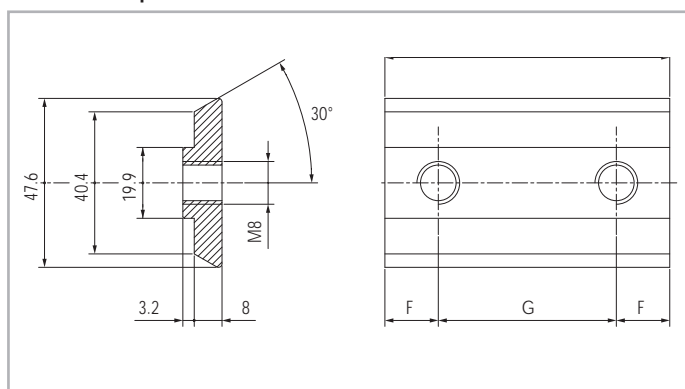


Fig. 86

Material: burnished steel.

Holes	F	G	L	Code N.
2	15	20	50	411.0675
1	25	/	50	411.1111
2	25	50	100	411.1112
3	25	50	150	411.1113
6	25	50	300	411.0970

Tab. 199

Dovetail clamps with M10 threaded holes

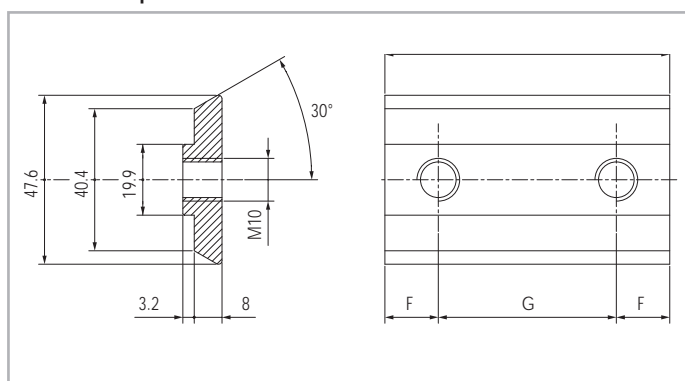


Fig. 87

Material: burnished steel.

Holes	F	G	L	Code N.
1	25	/	50	411.1117
2	25	50	100	411.1119
3	25	50	150	411.1120

Tab. 200

Steel dovetail without step

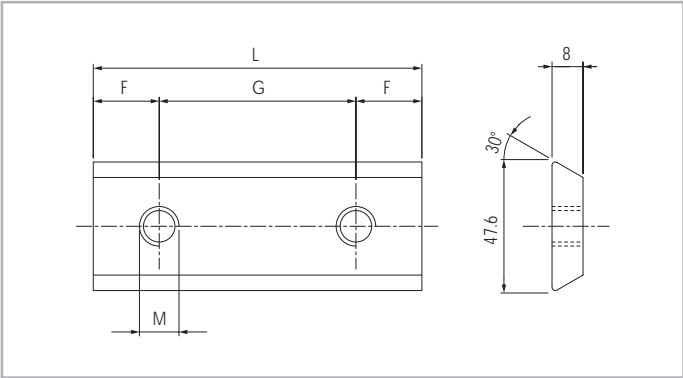


Fig. 88

Holes	F	G	L	M	Code N.
2	15	20	50	M8	411.1675
1	25	/	50	M10	411.1186
1	25	/	50	M12	411.1185
3	25	50	150	M12	411.0888

Tab. 201

Steel dovetail quick front insertion without step

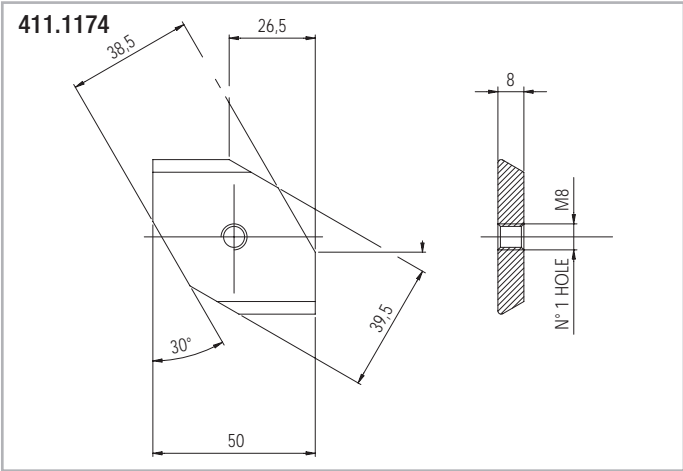


Fig. 89

> Preliminary selection table (1-2-3 axes)

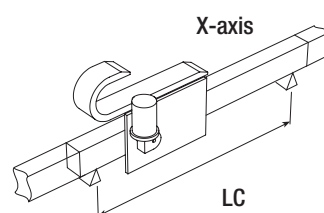
These tables are useful for making a preliminary selection with load applied in a central position with respect to the plate or profile axis.

Z-axis length is < 1600 mm.

Deflection is computed assuming continuous beams having the same span and concentrated static loads.

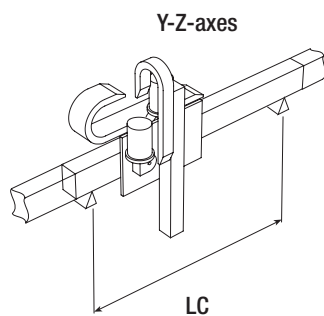
In the following table, select the appropriate X axes according to the load.

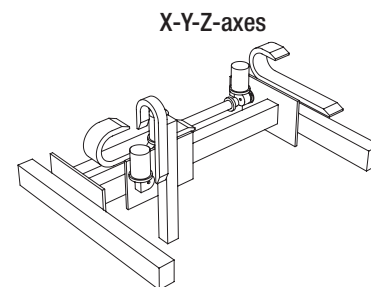
	PA	170	200	200P	220	280	280P	360	LC
Max load capacity [kg.]	Deflection								
	50	1.4				↑			5000
	100	1.8				↑			5000
	200	2.7	1.8			↑			5000
	300		2.3	2.7		↑			5000
	400			3.3	2.8	↑			5000
	500				2.8	1.8			5000
	600	←				2	2		6000
	800						2.5	1.8	6000
	1000							2.1	7000



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

	PA	170/90	200/100	200/100P	220/170	280/200	280/200E	280/200P	280/220	360/220	360/280	LC
Max load capacity [kg.]	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					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



[illegible]

Example: Selection of a 3 axis gantry with roller guides

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

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

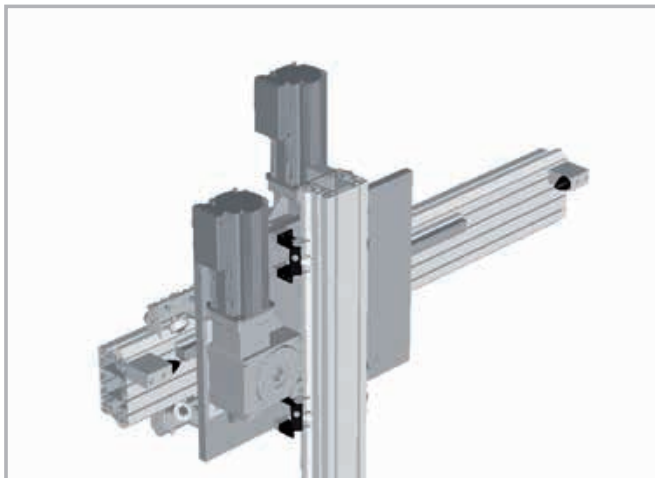
Chosen composition: n°1 PA 280/200P + n° 2 PA 280

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.

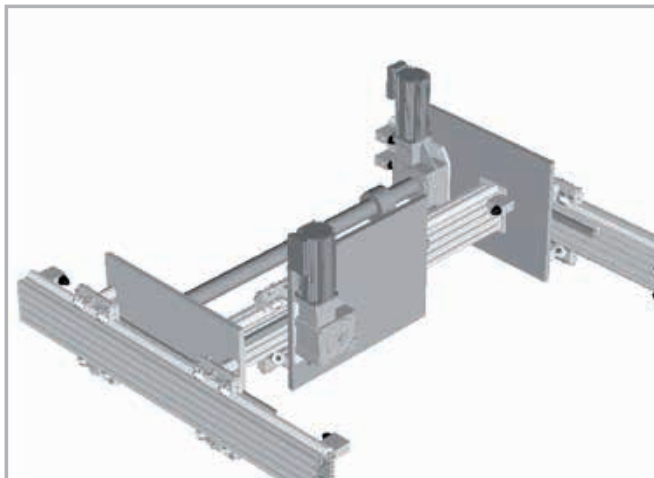
Multiaxis systems



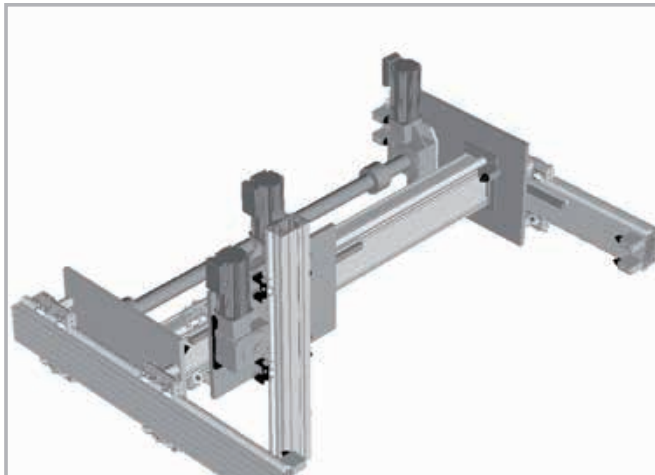
1 - Two axis Y-Z system



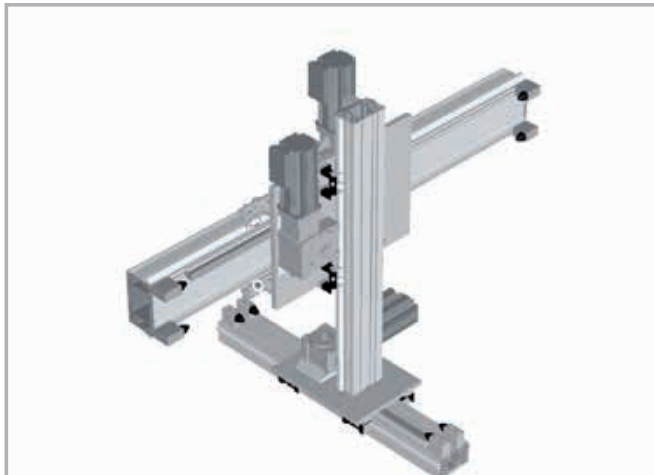
2 - Two axis Y-X system



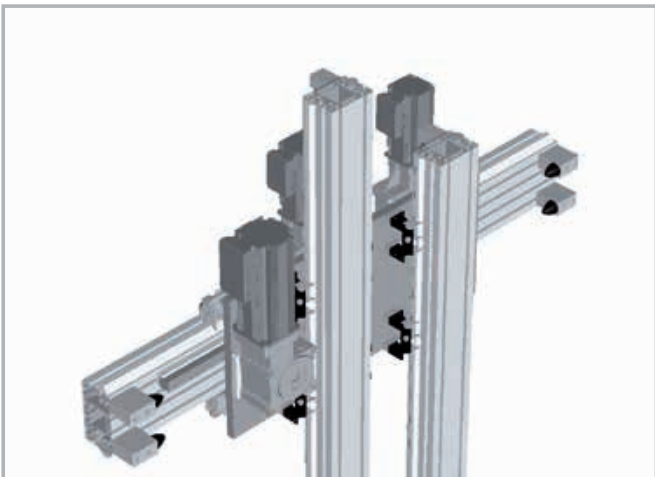
3 - Three axis X-Y-Z system



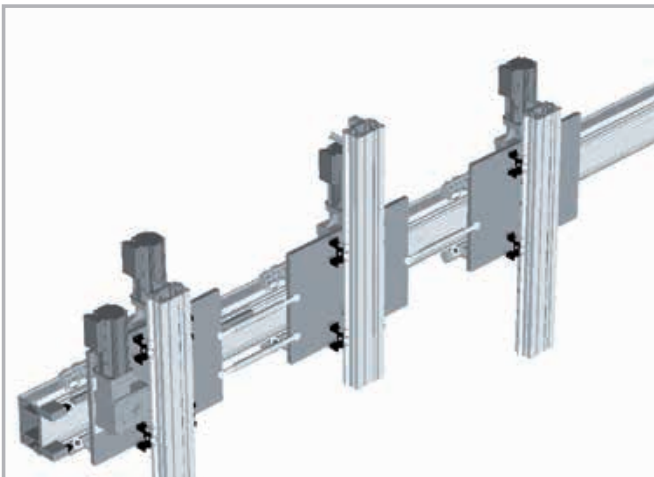
4 - Three Axis X-Y-Z system



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 and 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	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 .

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

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:

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

L_{km} = theoretical service life (km)
 $Fz\text{-dyn}$ = 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; ($\alpha < 5\text{m/s}^2$) clean operating conditions; low speeds ($<1 \text{ m/s}$)	1.5 - 2
Slight vibrations; medium speeds; (1-2 m/s) and medium-high frequency of the changes in direction ($5\text{m/s}^2 < \alpha < 10 \text{ m/s}^2$)	2 - 3
Shocks and vibrations; high speeds ($>2 \text{ m/s}$) and high-frequency changes in direction; ($\alpha > 10\text{m/s}^2$) 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 and 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 .

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

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

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:



Fig. 10

Type	M_{ymin} [Nm]	M_{zmin} [Nm]	S_{min} [mm]	ΔS	K
A40L	22	61	240	10	74
A55L	82	239	310		110
A75L	287	852	440		155
C55L	213	39	310		130
C75L	674	116	440		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 $M_{y \min}$ and $M_{z \min}$ 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 = allowed moment (Nm)
$M_y = \left(\frac{L_n}{L_{\min}} \right) \cdot M_{y \min}$	M_z = allowed moment (Nm)
$M_z = \left(\frac{L_n}{L_{\min}} \right) \cdot M_{z \min}$	$M_{y \min}$ = 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:

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

Warnings and legal notes



Before incorporating the partly completed machinery, we recommend consulting this chapter carefully, in addition to the assembly manual supplied with the individual modules.



The information contained in this chapter and in the manuals for the individual modules, is provided by highly qualified and certified personnel, possessing adequate competence in incorporating the partly completed machinery.



Precaution in installation and handling operations. Significantly heavy equipment.



When handling the axis or system of axes, always make sure that the support or anchoring surfaces do not leave room for bending.



In order to stabilize the axis or system of axes, before handling it is mandatory to securely block the mobile parts. When moving axes with vertical translation (Z AXES) or combination systems (horizontal X and/or more than one vertical Z), it is mandatory to use the vertical movement to put all of the axes at the corresponding lower limit switch.



Do not overload. Do not subject to torsion stress.



Do not leave exposed to atmospheric agents.



Before mounting the motor on the gearbox, it is advisable to perform a pre-test of the motor itself, without connection to the gear unit. The testing of this component was not carried out by the manufacturer of the machine. It will therefore be the responsibility of the customer of Rollon to perform the testing of the same, in order to verify its correct operation.



The manufacturer cannot be considered responsible for any consequences derived from improper use or any use other than the purpose the axis or system of axes was designed for, or derived from failure to comply, during incorporation phases, with the rules of Good Technique and with what is indicated in this manual.



Avoid damage. Do not operate with inadequate tools



Warning: moving parts. Do not leave objects on the axis



Special installations: check the depth of the threads on moving elements



Make sure that the system has been installed on a level floor surface.



In use, accurately comply with the specific performance values declared in the catalog or, in particular cases, the load and dynamic performance characteristics requested in the phase prior to design.



For modules or parts of modular systems with vertical movement (Z axis), it is mandatory to mount self-braking motors to neutralize the risk of the axis dropping.



The images in this manual are to be considered merely an indication and not binding; therefore, the supply received could be different from the images contained in this manual, and Rollon S.p.A. has deemed it useful to insert only one example.



Systems supplied by Rollon S.p.A. were not designed/envisaged to operate in ATEX environments.

> Residual risks

- Mechanical risks due to the presence of moving elements (X, Y axes).
- Risk of fire resulting from the flammability of the belts used on the axes, for temperatures in excess of 250 °C in contact with the flame.
- The risk of the Z axis dropping during handling and installation operations on the partly completed machinery, before commissioning.
- Risk of the Z axis dropping during maintenance operations in the case of a drop in the electrical power supply voltage.
- Crushing hazard near moving parts with divergent and convergent motion.
- Shearing hazard near moving parts with divergent and convergent motion.
- Cutting and abrasion hazards.

> Basic components



The Partly Completed Machinery shown in this catalog is to be considered a mere supply of simple Cartesian axes and their accessories agreed when the contract is stipulated with the client. The following are therefore to be considered excluded from the contract:

1. Assembly on the client's premises (direct or final)
2. Commissioning on the client's premises (direct or final)
3. Testing on the client's premises (direct or final)

It is therefore understood that the aforementioned operations in points 1., 2., and 3. are not chargeable to Rollon.

Rollon is the supplier of Partly Completed Machinery, the (direct or final) client is responsible for testing and safely checking all equipment which, by definition, cannot be theoretically tested or checked at our facilities where the only movement possible is manual movement (for example: motors or reduction gears, cartesian axes movements that are not manually operated, safety brakes, stopper cylinders, mechanical or induction sensors, decelerators, mechanical limit switches, pneumatic cylinders, etc.). The partly completed machine must not be commissioned until the final machine, in which it is to be incorporated, has been declared compliant, if necessary, with the instructions in Machinery Directive 2006/42/CE.

> Instructions of an environmental nature

Rollon operates with respect for the environment, in order to limit environmental impact. The following is a list of some instructions of an environmental nature for correct management of our supplies. Our products are mainly composed of:

Material	Details of the supply
Aluminum alloys	Profiles, plates, various details
Steel with various composition	Screws, racks and pinions, and rails
Plastic	PA6 – Chains PVC – Covers and sliding block scrapers
Rubber of various types	Plugs, seals
Lubrication of various types	Used for the lubrication of sliding rails and bearings
Rust proof protection	Rust proof protection oil
Wood, polyethylene, cardboard	Transport packaging

At the end of the product's life cycle, it is therefore possible to recover the various elements, in compliance with current regulations on waste issues.

> Safety warnings for handling and transport

- The manufacturer has paid the utmost attention to packaging to minimize risks related to shipping, handling and transport.
- Transport can be facilitated by shipping certain components dismantled and appropriately protected and packaged.
- Handling (loading and unloading) must be carried out in compliance with information directly provided on the machine, on the packing and in the user manuals.
- Personnel authorized to lift and handle the machine and its components shall possess acquired and acknowledged skills and experience in the specific sector, besides having full control of the lifting devices used.
- During transport and/or storage, temperature shall remain within the allowed limits to avoid irreversible damage to electric and electronic components.
- Handling and transport must be carried out with vehicles presenting adequate loading capacity, and the machines shall be anchored to the established points indicated on the axes.
- DO NOT attempt to bypass handling methods and the established lifting points in any way.
- During handling and if required by the conditions, make use of one or more assistants to receive adequate warnings.
- If the machine has to be moved with vehicles, ensure that they are adequate for the purpose, and perform loading and unloading without risks for the operator and for people directly involved in the process.
- Before transferring the device onto the vehicle, ensure that both the machine and its components are adequately secured, and that their profile does not exceed the maximum bulk allowed. Place the necessary warning signs, if necessary.
- DO NOT perform handling with an inadequate visual field and when there are obstacles along the route to the final location.
- DO NOT allow people to either transit or linger within the range of action when lifting and handling loads.
- Download the axes just near the established location and store them in an environment protected against atmospheric agents.
- Failure to comply with the information provided might entail risks for the safety and health of people, and can cause economic loss.
- The Installation Manager must have the project to organize and monitor all operative phases.
- The Installation Manager shall ensure that the lifting devices and equipment defined during the contract phase are available.
- The Manager of the established location and the Installation Manager shall implement a "safety plan" in compliance with the legislation in force for the workplace.
- The "safety plan" shall take into account all surrounding work-related activities and the perimeter spaces indicated in the project for the established location.
- Mark and delimit the established location to prevent unauthorized personnel from accessing the installation area.
- The installation site must have adequate environmental conditions (lighting, ventilation, etc.).
- Installation site temperature must be within the maximum and minimum range allowed.
- Ensure that the installation site is protected against atmospheric agents, does not contain corrosive substances and is free of the risk of explosion and/or fire.
- Installation in environments presenting a risk of explosion and/or of fire must ONLY be carried out if the machine has been DECLARED COMPLIANT for such use.
- Check that the established location has been correctly fitted out, as defined during the contract phase and based on indications in the relative project.
- The established location must be fitted out in advance to carry out complete installation in compliance with the defined methods and schedule.

> Note

- Evaluate in advance whether the machine must interact with other production units, and that integration can be implemented correctly, in compliance with standards and without risks.
- The manager shall assign installation and assembly interventions ONLY to authorized technicians with acknowledged know-how.
- State of the art connections to power sources (electric, pneumatic, etc.) must be ensured, in compliance with relevant regulatory and legislative requirements.
- "State of the art" connection, alignment and leveling are essential to avoid additional interventions and to ensure correct machine function.
- Upon completion of the connections, run a general check to ascertain that all interventions have been correctly carried out and compliance with requirements.
- Failure to comply with the information provided might entail risks for the safety and health of people, and can cause economic loss.

> Transport

- Transport, also based on the final destination, can be done with different vehicles.
- Perform transport with suitable devices that have adequate loading capacity.
- Ensure that the machine and its components are adequately anchored to the vehicle.

> Handling and lifting

- Correctly connect the lifting devices to the established points on the packages and/or on the dismantled parts.
- Before handling, read the instructions, especially safety instructions, provided in the installation manual, on the packages and/or on the dismantled parts.
- DO NOT attempt, in any way, to bypass handling methods and the established lifting, moving and handling points of each package and/or dismantled part.
- Slowly lift the package to the minimum necessary height and move it with the utmost caution to avoid dangerous oscillations.
- DO NOT perform handling with an inadequate visual field and when there are obstacles along the route to reach the final location.
- DO NOT allow people to either transit or linger within the range of action when lifting and handling loads.
- Do not stack packages to avoid damaging them, and reduce the risk of sudden and dangerous movements.
- In case of prolonged storage, regularly ensure that there are no variations in the storage conditions of the packages.

> Check axis integrity after shipment

Every shipment is accompanied by a document ("Packing list") with the list and description of the axes.

- Upon receipt check that the material received corresponds to specifications in the delivery note.
- Check that packaging is perfectly intact and, for shipments without packaging, check that each axis is intact.
- In case of damages or missing parts, contact the manufacturer to define the relevant procedures.

Data sheet



General data:

Date: Inquiry N°:

Address:

Contact:

Company:

Zip Code:

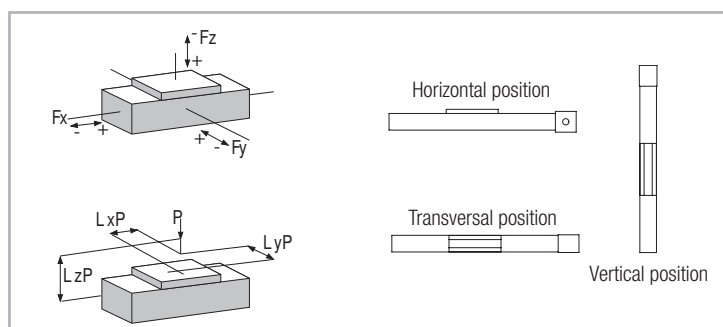
Phone:

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			
	Y-Direction	LyP			
	Z-Direction	LzP			
Additional force	Direction (+/-)	Fx (Fy, Fz)			
Position of force	X-Direction	Lx Fx (Fy, Fz)			
	Y-Direction	Ly Fx (Fy, Fz)			
	Z-Direction	Lz Fx (Fy, Fz)			
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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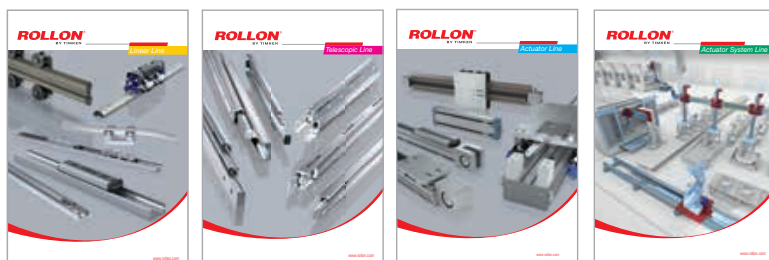


24/22-30 Northumberland Road
Caringbah NSW 2229 Australia
Phone: (02) 9524 4782

sales@motiontech.com.au
www.motiontech.com.au

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