ROLLON®
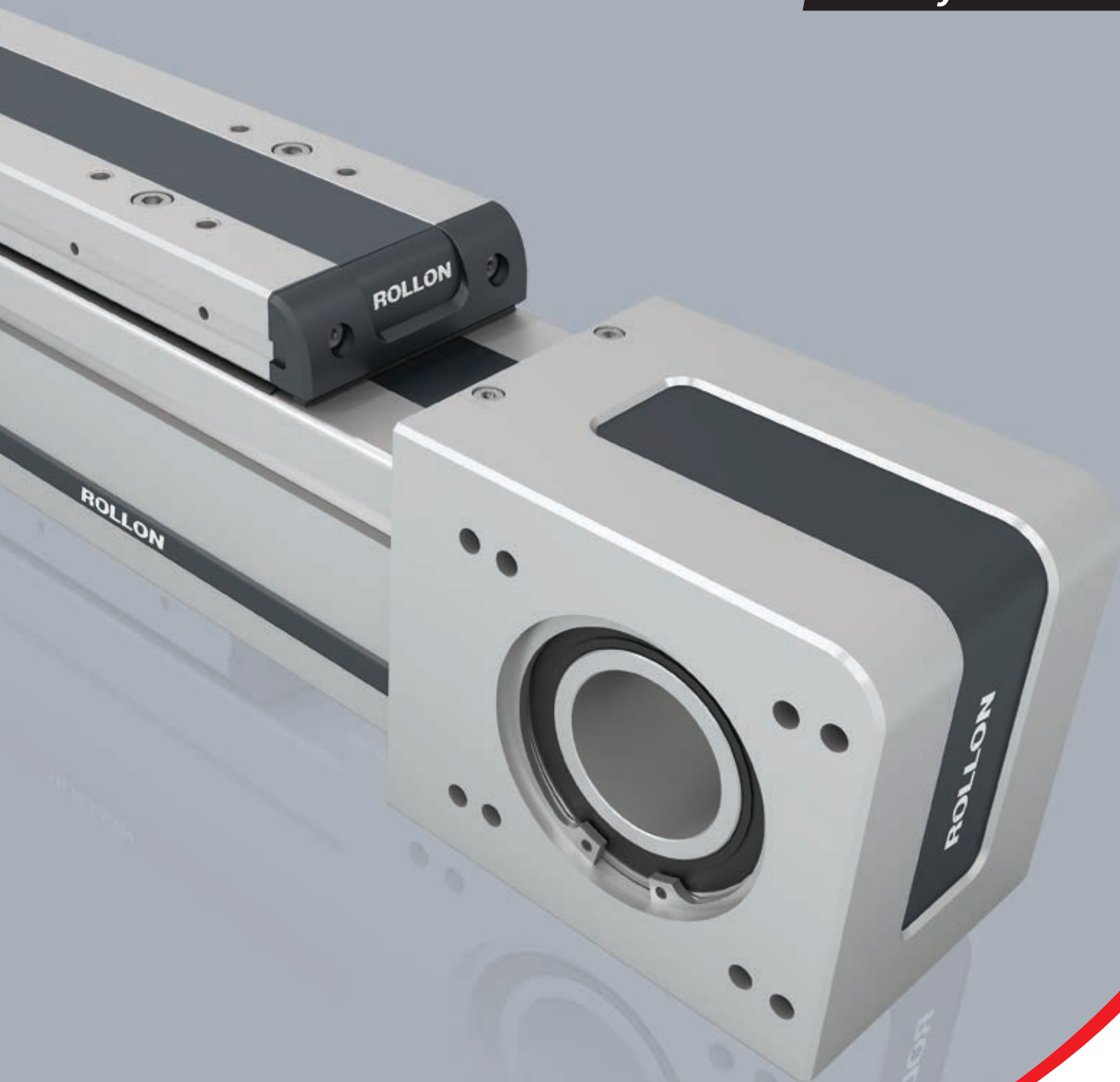
BY TIMKEN

NEW

New Plus System

It simplifies the project, improves the perfomance and reduces the application cost: **8 main advantages.**

- Avoid costs related to engineering, manufacturing and testing a self-made solution.
- Eliminate all potential risks related to reliability and lack of warranties with one trusted partner.
- Focus your efforts on your core business.

1

High protection for dirty environments

A dedicated polyurethane sealing strip ensures complete protection against dust, dirt and other contaminants.

Optional pressurization system further reduces the ingress of contaminants.

Side cover bands protect the grooves (2 supplied as standard).

2

Resistant to corrosion

Optional stainless steel elements for applications in corrosive environments and/or subject to frequent washdown.
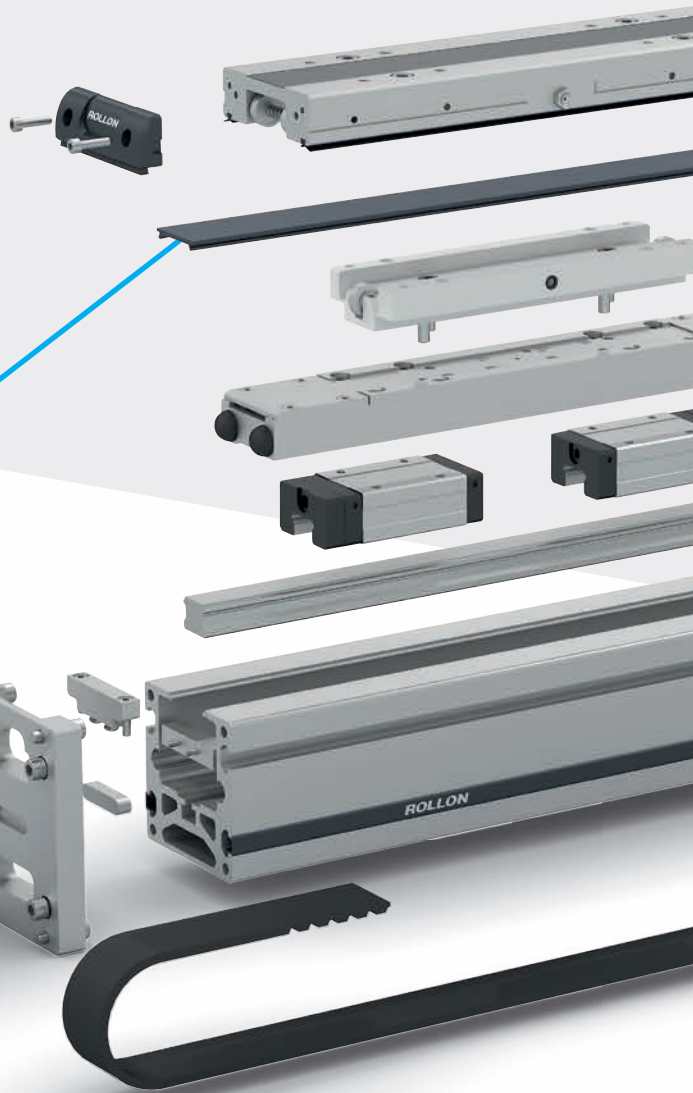
3

High versatility

The new re-designed driving head allows for assembly of the gearbox on either the left or the right side of the actuator, by means of a standard assembly kit.

4

High load capacity

Highly engineered combination of recirculating ball guides and aluminum profile, extruded with elaborate geometries, allows for high stiffness and load capacity.

New Plus System - SC

- Fixed carriage and movable profile for Z-Axes solutions, with omega belt driving system.

- Joinable extension to reach the desired length regardless of the stroke.

- Predisposition for assembling the clampling element.

- Monoblock and lightened driving head for greater precision, realiability and dynamics.

- Through passing profile protects the cables.

- Easy and fast assembly of accessories at the end of the arm improves productivity.
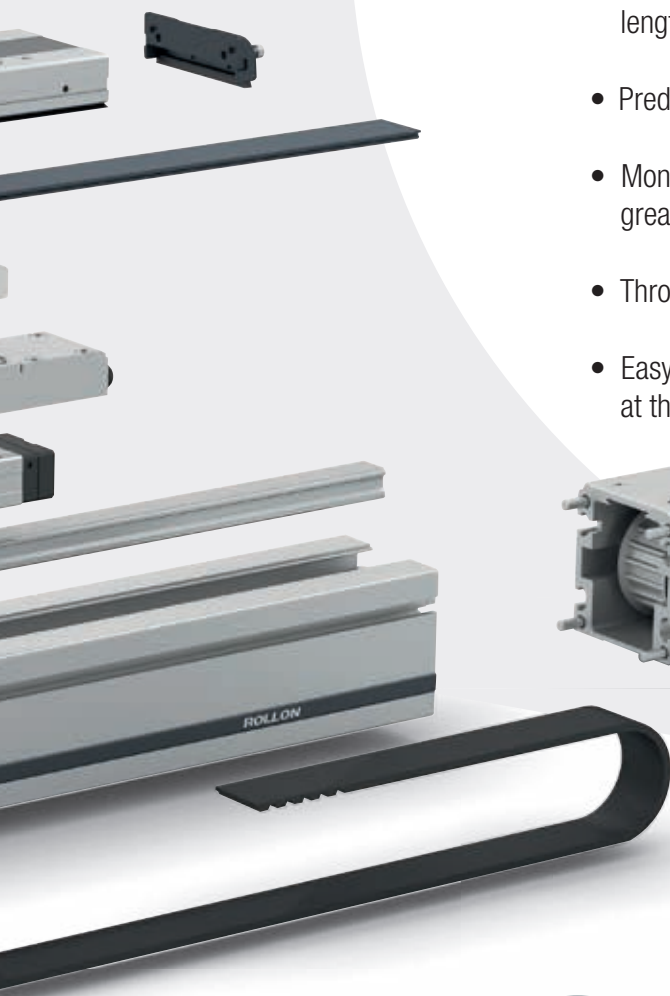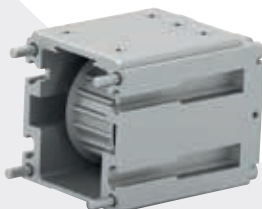
5
Low maintenance

Special lubrication tanks ensure continuous greasing of the ball raceways up to 5000 km.

6
High productivity

High quality design ensures high dynamics with stressful duty cycles: speed up to 5 m/s, acceleration up to 50 m/s².

7
Good repeatability accuracy

Up to ± 0.05 mm.

8
Ideal for multi-axes systems

A dedicated set of accessories allows easy assembly to achieve high performance X-Y-Z multiaxis systems.

ROBOT and SC series are designed to be compatible and assembled without the need for adapter plates.

ELM series ⌄

> ELM series description

Fig. 1

ELM

This is Rollon's highly versatile, premier line of completely enclosed belt driven linear actuators.

The ELM series linear units are available in four sizes: 50 - 65 - 80- 110 mm. They have a self-supporting structure with a robust profile of extruded and anodized aluminum. The thrust force is transmitted by a steel reinforced, polyurethane belt. The moving carriage is guided and supported by a linear guide system.

A polyurethane sealing strip ensures complete protection of the belt drive and linear guide system against dust, dirt and other contaminants. It avoids the fragility of other sealing systems such as stainless steel strips.

The components used for linear motion and accessories promote a "maintenance-free" system. The pulleys, bearings and drive shafts are among the most robust in the industry. The ELM is the best product for applications in very aggressive working environments that also require high speed duty cycles and position repeatability.

Corrosion resistant version

ELM linear actuators are available with stainless steel elements, for applications in harsh environments and/or subject to frequent washes.

They are constructed using extruded anodized 6060 and 6082 Anti-Corrosive Aluminum, which houses bearings, linear rails, nuts and bolts and components made of stainless steel preventing or delaying corrosion caused by humidity experienced in the environments where the linear units are used.

Special no-deposit surface treatments are combined with a food grade lubrication system to allow use in highly sensitive applications, such as the food and pharmaceutical industries where product contamination is prohibited.

- Internal stainless steel elements
- Anodized 6060 and 6082 Anti-Corrosive Aluminum Profile
- AISI 440 stainless steel linear rails
- Lubricated with organic food grade vegetable oils

The components

Extruded profile

The anodized 6060 aluminum alloy extrusion used for the profile of ELM series linear units are designed and manufactured by industry experts to optimize weight while maintaining mechanical strength. (see physical-chemical characteristics below).The dimensional tolerances comply with EN 755-9 standard.

Driving belt

ELM series linear units use steel reinforced polyurethane drive belts with AT pitch. This belt is ideal due to its high load transmission characteristics, compact size and low noise. Used in conjunction with a backlash-free pulley, smooth alternating motion can be achieved. Optimization of the maximum belt width/body dimension ratio enables the following performance characteristics to be achieved:

- **High speed**
- **Low noise**
- **Low wear**

Carriage

The carriage of the ELM series linear units are made of anodized aluminum. Each carriage has mounting holes fitted with stainless steel thread inserts. Rollon offers multiple carriages to accommodate a vast array of applications. The unique design of the carriage allows for the sealing strip to pass through it, as well as house brush seals to remove contaminates from the sealing strip.

Sealing strip

ELM series linear units are equipped with a polyurethane sealing strip to protect all of the internal components from dust, contaminates, and other foreign objects. The sealing strip runs the length of the body and is kept in position by micro-bearings located inside the carriage. This minimizes resistance as the strip passes through the carriage while providing maximum protection.

General data about aluminum used: AL 6060

Chemical composition [%]

Al	Mg	Si	Fe	Mn	Zn	Cu	Impurites
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
$\dfrac{kg}{dm^3}$	$\dfrac{kN}{mm^2}$	$\dfrac{10^{-6}}{K}$	$\dfrac{W}{m \cdot K}$	$\dfrac{J}{kg \cdot K}$	$\Omega \cdot m \cdot 10^{-9}$	°C
2.7	69	23	200	880-900	33	600-655

Tab. 2

Mechanical characteristics

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

Tab. 3

P
L
S

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.

ELM with ball bearing guides

- A ball bearing guide with high load capacity is mounted in a dedicated seat inside the body.
- The carriage is assembled on two pre-loaded ball bearing blocks.
- The two ball bearing blocks enable the carriage to withstand loading in the four main directions.
- The two blocks have seals on both sides and, if necessary, an additional scraper can be fitted for very dusty conditions.
- The ball bearing carriages are also fitted with a retention cage that eliminates "steel-steel" contact between adjacent revolving parts and prevents misalignment.
- Lubrication reservoirs (pockets) installed on the front of the ball bearing blocks supply the right amount of grease, thus promoting long maintenance interval.

The linear motion system described above offers:

- High speed and acceleration
- High load capacity
- High permissible bending moments
- Low friction
- Long life
- Maintenance free (depending on applications)
- Low noise

ELM section

Fig. 2

The new driving head

The new driving head is designed to allow high freedom while sizing the application and mounting the gearbox on the ELM series linear actuators. With the new head, it is possible to assembly the gearbox on either the right or the left side of the actuator by means of a standard assembly kit.

The assembly kit includes: shrink disk; adapter plate and fixing hardware; and can be ordered with the actuator. Different kits are available to accomodate gearboxes from the major brands on the market. For more information see pag. PLS-14.

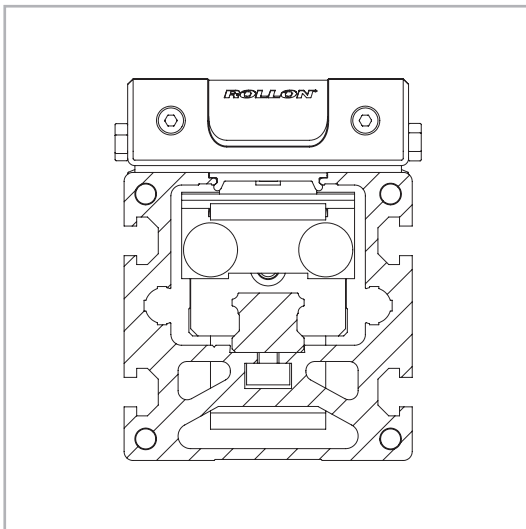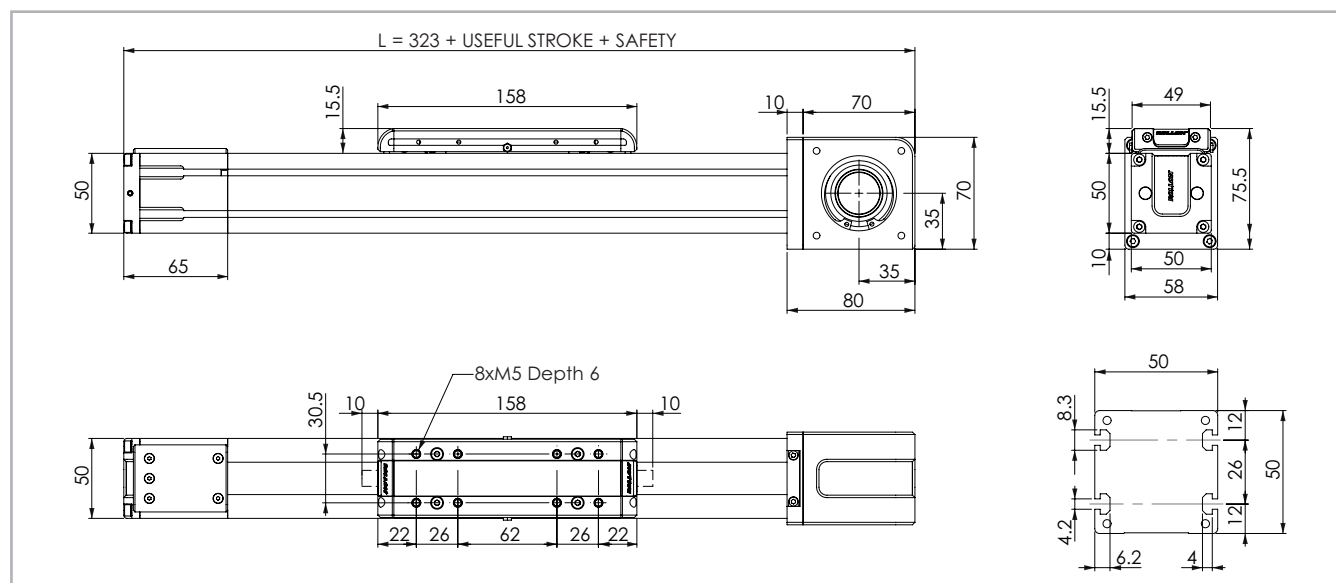The same logic is valid when mounting the shaft to connect two units in parallel.

ELM 50

ELM 50 Dimensions

L = 323 + USEFUL STROKE + SAFETY

8xM5 Depth 6

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

Fig. 3

Technical data

	Type
	ELM 50
Max. useful stroke length [mm]*1	6130
Max. positioning repeatability [mm]*2	± 0.05
Max. speed [m/s]	4.0
Max. acceleration [m/s²]	50
Type of belt	22 AT 5
Type of pulley	Z 23
Pulley pitch diameter [mm]	36.61
Carriage displacement per pulley turn [mm]	115
Carriage weight [kg]	0.4
Zero travel weight [kg]	1.8
Weight for 100 mm useful stroke [kg]	0.4
Starting torque [Nm]	0.4
Moment of inertia of pulleys [g·mm²]	30228
Rail size [mm]	12 mini

*1) It is possible to obtain strokes up to 9000 mm 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

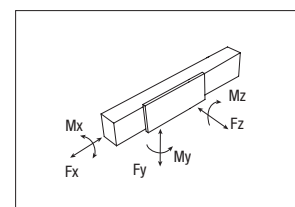| Type	I_x [10^7 mm^4]	I_y [10^7 mm^4]	I_p [10^7 mm^4]
ELM 50	0.025	0.031	0.056

Tab. 5

Driving belt

The driving belt is manufactured from a friction resistant polyurethane and with steel cords for high tensile stress resistance.

Type	Type of belt	Belt width [mm]	Weight [kg/m]
ELM 50	22 AT 5	22	0.072

Tab. 6

Belt length (mm) = 2 x L - 125

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.
ELM 50	809	508	7060	6350	7060	46.2	233	233

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

F_x in the table represents the maximum capacity of the toothed belt. For the application, the limit of transmittable torque of the shrink disk must be considered too (see page PLS-14).

Tab. 7

▶ ELM 65

ELM 65 Dimensions
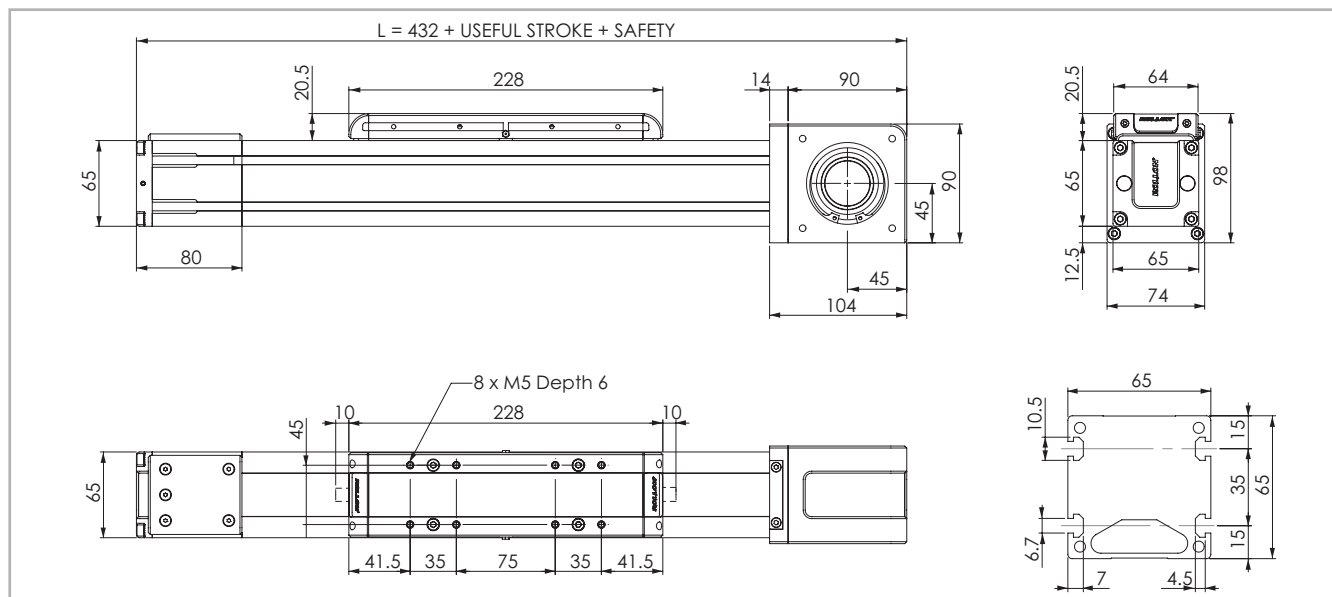
The length of the safety stroke is provided on request according to the customer's specific requirements.

Fig. 4

Technical data

	Type
	ELM 65
Max. useful stroke length [mm]*1	6060
Max. positioning repeatability [mm]*2	± 0.05
Max. speed [m/s]	5.0
Max. acceleration [m/s²]	50
Type of belt	32 AT 5
Type of pulley	Z 32
Pulley pitch diameter [mm]	50.93
Carriage displacement per pulley turn [mm]	160
Carriage weight [kg]	1.1
Zero travel weight [kg]	3.5
Weight for 100 mm useful stroke [kg]	0.6
Starting torque [Nm]	1.5
Moment of inertia of pulleys [g·mm²]	185496
Rail size [mm]	15

*1) It is possible to obtain strokes up to 11000 mm 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 mm⁴]	I_y [10^7 mm⁴]	I_p [10^7 mm⁴]
ELM 65	0.060	0.086	0.146

Tab. 9

Driving belt

The driving belt is manufactured from a friction resistant polyurethane and with steel cords for high tensile stress resistance.

Type	Type of belt	Belt width [mm]	Weight [kg/m]
ELM 65	32 AT 5	32	0.105

Tab. 10

Belt length (mm) = 2 x L - 175

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.
ELM 65	1344	883	48400	22541	48400	320	1376	1376

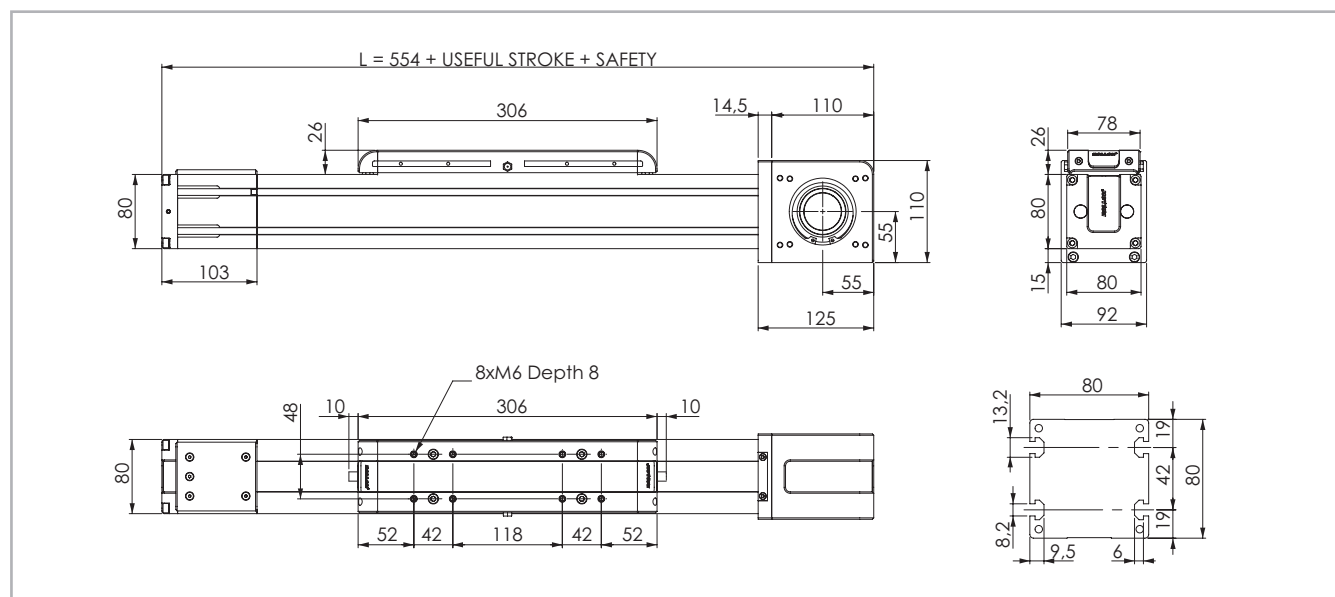See verification under static load and lifetime on page SL-2 and SL-3
F_x in the table represents the maximum capacity of the toothed belt. For the application, the limit of transmittable torque of the shrink disk must be considered too (see page PLS-14).

Tab. 11
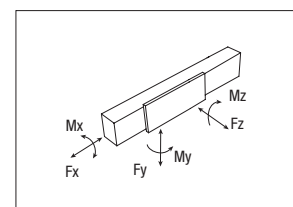
ELM 80

ELM 80 Dimensions

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

Fig. 5

Technical data

	Type
	ELM 80
Max. useful stroke length [mm]*1	5980
Max. positioning repeatability [mm]*2	± 0.05
Max. speed [m/s]	5.0
Max. acceleration [m/s²]	50
Type of belt	32 AT 10
Type of pulley	Z 19
Pulley pitch diameter [mm]	60.48
Carriage displacement per pulley turn [mm]	190
Carriage weight [kg]	2.7
Zero travel weight [kg]	10.5
Weight for 100 mm useful stroke [kg]	1.0
Starting torque [Nm]	2.2
Moment of inertia of pulleys [g·mm²]	400064
Rail size [mm]	20

*1) It is possible to obtain strokes up to 11000 mm by means of special Rollon joints
*2) Positioning repeatability is dependent on the type of transmission used

Tab. 12

Moments of inertia of the aluminum body

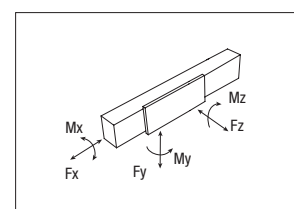| Type	I_x [10^7 mm⁴]	I_y [10^7 mm⁴]	I_p [10^7 mm⁴]
ELM 80	0.136	0.195	0.331

Tab. 13

Driving belt

The driving belt is manufactured from a friction resistant polyurethane and with steel cords for high tensile stress resistance.

Type	Type of belt	Belt width [mm]	Weight [kg/m]
ELM 80	32 AT 10	32	0.185

Tab. 14

Belt length (mm) = 2 x L - 230

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.
ELM 80	2258	1306	76800	35399	76800	722	5606	5606

See verification under static load and lifetime on page SL-2 and SL-3
F_x in the table represents the maximum capacity of the toothed belt. For the application, the limit of transmittable torque of the shrink disk must be considered too (see page PLS-14).

Tab. 15

▸ ELM 110

ELM 110 Dimensions

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

Fig. 6

Technical data

	Type
	ELM 110
Max. useful stroke length [mm]*1	5900
Max. positioning repeatability [mm]*2	± 0.05
Max. speed [m/s]	5.0
Max. acceleration [m/s²]	50
Type of belt	50 AT 10
Type of pulley	Z 27
Pulley pitch diameter [mm]	85.94
Carriage displacement per pulley turn [mm]	270
Carriage weight [kg]	5.6
Zero travel weight [kg]	22.5
Weight for 100 mm useful stroke [kg]	1.4
Starting torque [Nm]	3.5
Moment of inertia of pulleys [g·mm²]	$2.286 \cdot 10^6$
Rail size [mm]	25

Tab. 16

*1) It is possible to obtain strokes up to 11000 mm by means of special Rollon joints
*2) Positioning repeatability is dependent on the type of transmission used

Moments of inertia of the aluminum body

Type	I_x [10^7 mm⁴]	I_y [10^7 mm⁴]	I_p [10^7 mm⁴]
ELM 110	0.446	0.609	1.054

Tab. 17

Driving belt

The driving belt is manufactured from a friction resistant polyurethane and with steel cords for high tensile stress resistance.

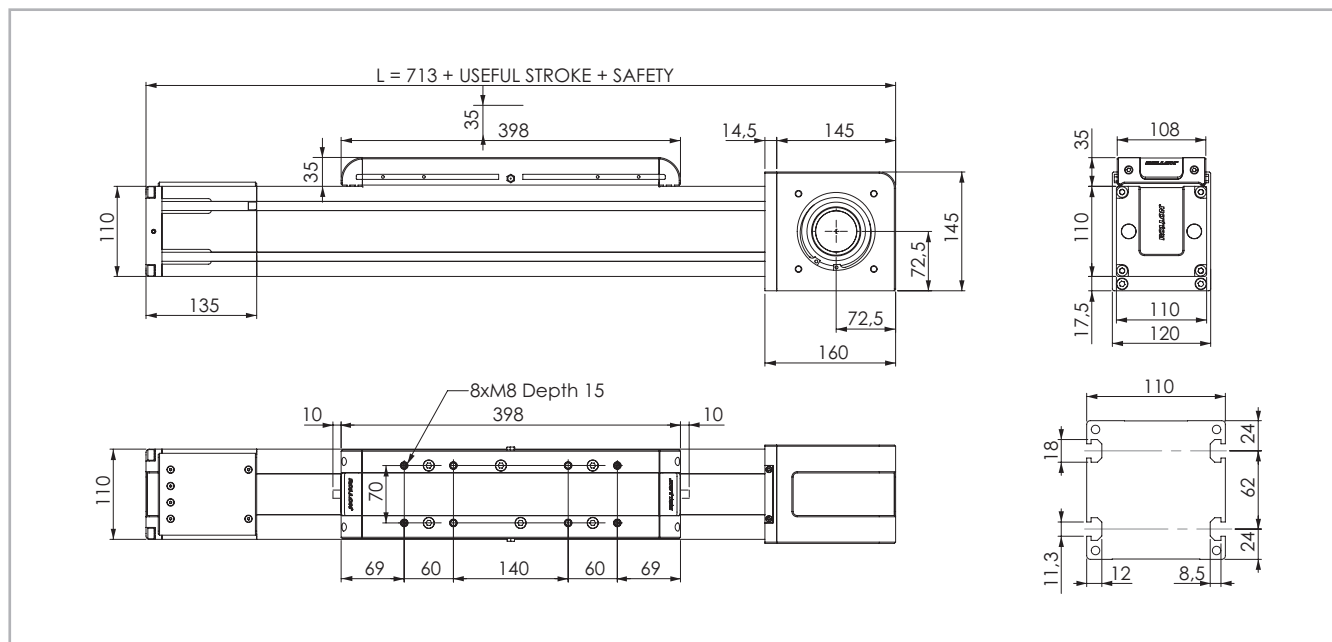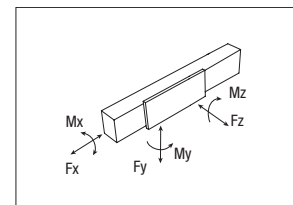| Type	Type of belt	Belt width [mm]	Weight [kg/m]
ELM 110	50 AT 10	50	0.290

Tab. 18

Belt length (mm) = 2 x L - 280

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.
ELM 110	4980	3300	129400	58416	129400	1392	11646	11646

See verification under static load and lifetime on page SL-2 and SL-3
F_x in the table represents the maximum capacity of the toothed belt. For the application, the limit of transmittable torque of the shrink disk must be considered too (see page PLS-14).

Tab. 19

> Lubrication

ELM Linear units are equipped with self lubricating linear ball guides. The ball bearing carriages are also fitted with a retention cage that eliminates "steel-steel" contact between adjacent revolving parts and prevents misalignment of these in the circuits.

Special lubrication reservoirs are mounted on the front plates of the linear blocks which continuously provide the necessary amount of grease to the ball raceways under load. These lubrication reservoirs also considerably reduce the frequency of lubrication of the module. This system guarantees a long interval between maintenances: every 5000 km or 1 year of use, based on the value reached first. If a longer service life is required or in case of high dynamic or high loaded applications please contact our offices for further verification.

Quantity of lubricant necessary for re-lubrication:

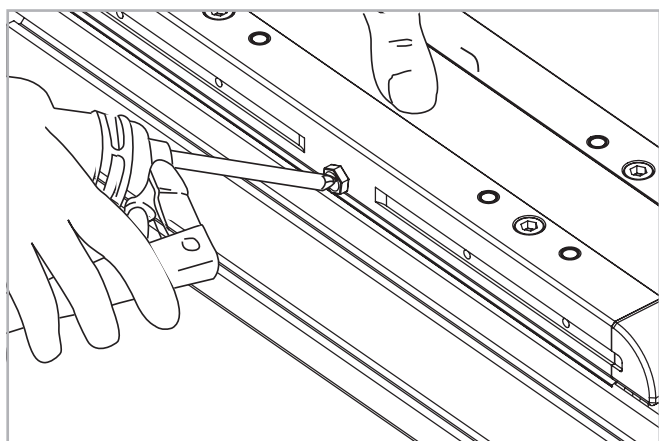| Type	Unit: [cm^3]
ELM 50	1
ELM 65	1.4
ELM 80	2.8
ELM 110	4.8

Tab. 20

Fig. 7

- Insert the tip of the grease gun in the specific grease blocks.
- For lubrication of linear units use lithium soap grease NLGI 2.
- For specially stressed applications or difficult enviromental conditions, lubrication should be carried out more frequently. Refer to Rollon for further advice.

> Simple shaft version

Simple shaft type AS
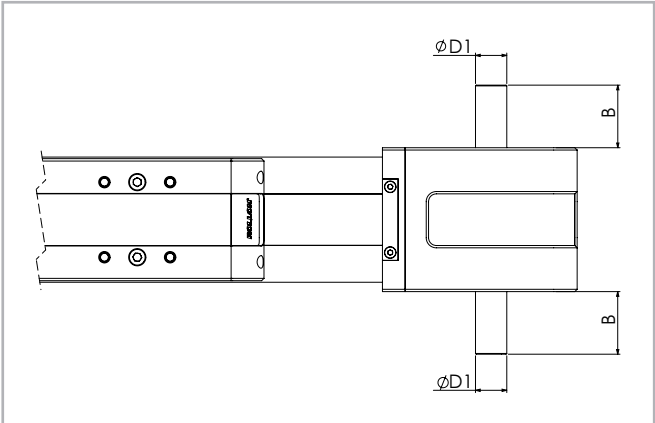
Fig. 8

Unit	Shaft type	B	D1
ELM 50	AS 12	25	12h7
ELM 65	AS 15	35	15h7
ELM 80	AS 20	40	20h7
ELM 110	AS 25	50	25h7

Tab. 21

Position of the simple shaft can be to the right, left, or both sides of the drive head.

Unit	Shaft type	B	D1	AS assembly kit code
ELM 50	AS 12	25	12h7	G002697
ELM 65	AS 15	35	15h7	G000851
ELM 80	AS 20	40	20h7	G002696
ELM 110	AS 25	50	25h7	G000649

Tab. 22

Simple shaft type AE 10 for encoder assembly + AS
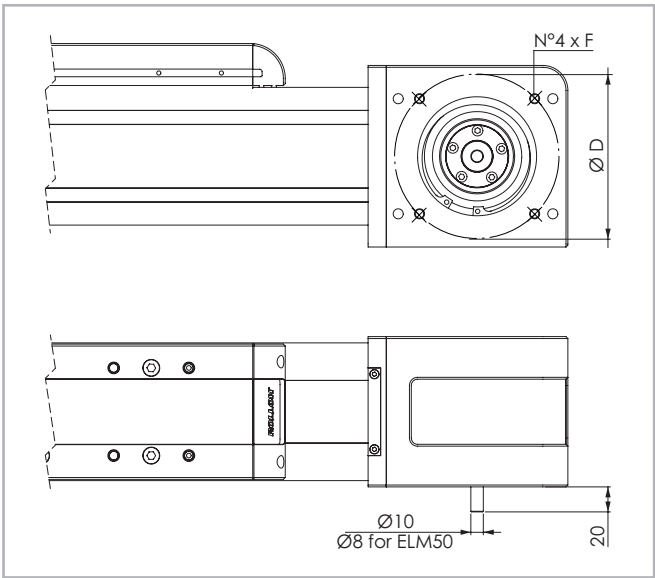
Fig. 9

Unit	Code kit AE	ØD	F
ELM 50	G002744	75	M5
ELM 65	G002592	96	M6
ELM 80	G002745	100	M6
ELM 110	G002370	130	M8

Tab. 23

Position of the simple shafts for encoder assembly to the right or to the left on the drive head.
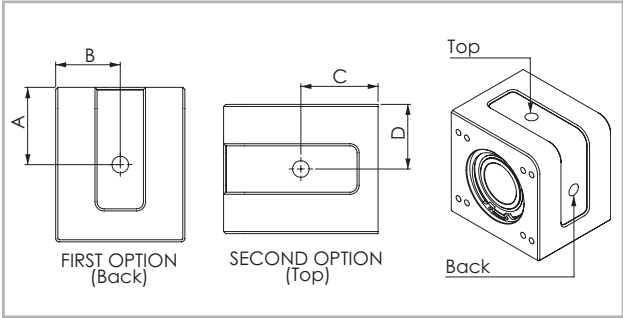
Air Hole

FIRST OPTION (Back)

SECOND OPTION (Top)

Top

Back

Fig. 10

Unit	First		Second	
	A	B	C	D
ELM 50	35	29	35	29
ELM 65	45	37	45	37
ELM 80	55	46	55	46
ELM 110	72.5	60	72.5	60

Tab. 24

› Hollow shafts

Hollow shaft
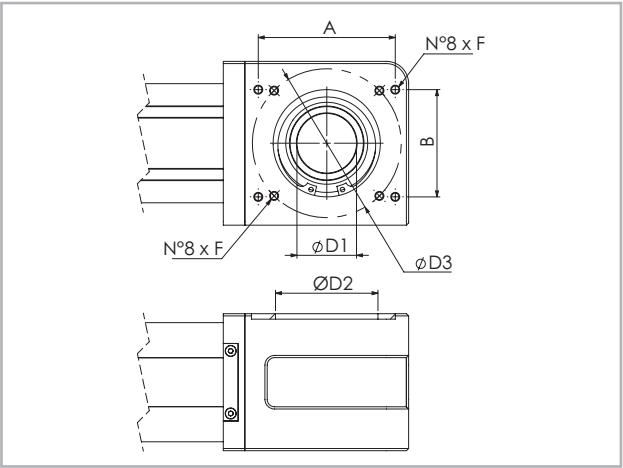
Fig. 11

Dimensions (mm)

Appliable to unit	Shaft type	D1	D2	D3	A	B	F
ELM 50	**FP 26**	26 H7	47	75	-	-	M5
ELM 65	**FP 34**	34 H7	62	96	-	-	M6
ELM 80	**FP 41**	41 H7	72	100	92	72	M6
ELM 110	**FP 50**	50 H7	95	130	108.9	108.9	M8

Tab. 25

P L S

> Linear units in parallel

Synchronization kit for use of ELM linear units in parallel

When movement consisting of two linear units in parallel is essential, a synchronization kit must be used. This consists of original Rollon lamina type precision joints complete with tapered splines and hollow aluminum drive shafts.
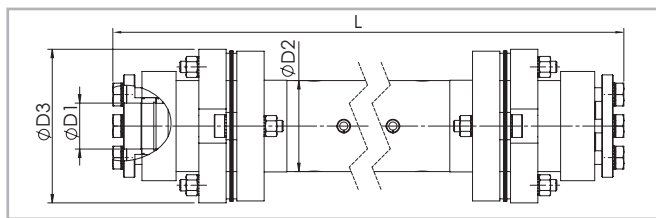
Moment of inertia [g·mm²] C1 + C2 · (X-Y)

	C1	C2	Y	Weight [Kg] D1+D2 · (X-Y)	
	[g·mm²]	[g·mm²]	[mm]	D1 [Kg]	D2 [Kg mm]
GK12P	61.456	69	166	0.308	0.00056
GK15P	906.928	464	210	2.28	0.00148
GK20P	1.014.968	464	250	2.48	0.00148
GK25P	5.525.250	4.708	356	6.24	0.0051

Tab. 26

Fig. 12

Fig. 13

Dimensions (mm)

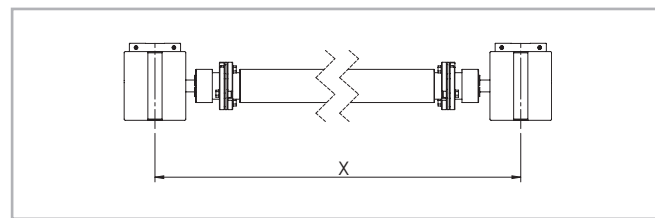| Appliable to unit	Shaft type	D1	D2	D3	Code	Formula for length calculation
ELM 50	AP 12	12	25	45	GK12P...1A	L= X-66 mm
ELM 65	AP 15	15	40	69.5	GK15P...1A	L= X-83 mm
ELM 80	AP 20	20	40	69.5	GK20P...1A	L= X-109 mm
ELM 110	AP 25	25	70	99	GK25P...1A	L= X-155 mm

Tab. 27

> Accessories

Fixing by brackets

The linear motion system used for the ELM series linear units enables them to support loads in any direction. They can therefore be installed in any position.

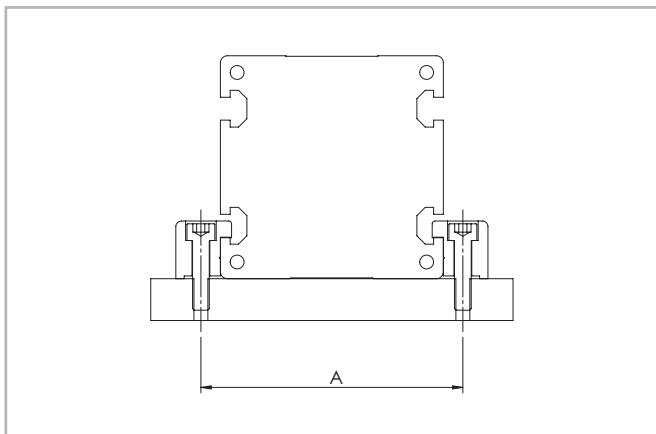To install the units, we recommend the use of the dedicated T-slots in the extruded bodies as shown below.

Fig. 14

PLS-12

Unit	A (mm)
ELM 50	62
ELM 65	77
ELM 80	94
ELM 110	130

Tab. 28

Warning:
Do not fix the linear units through the drive ends.

Fixing brackets
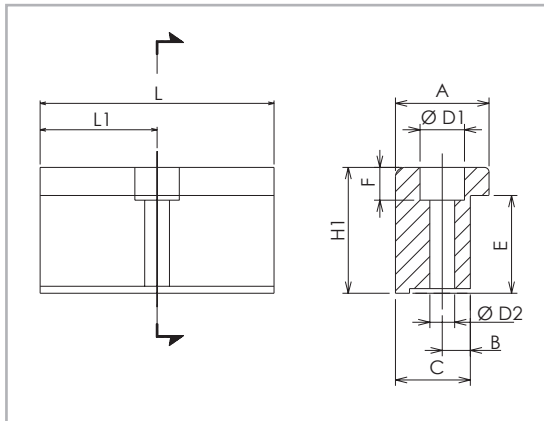
Fig. 15

Dimensions (mm)

Unit	A	H1	B	C	E	F	D1	D2	L	L1	Code
ELM 50	20	14	6	16	10	6	10	5.5	35	17.5	1000958
ELM 65	20	17.5	6	16	11.5	6	9.4	5.3	50	25	1001490
ELM 80	20	20.7	7	16	14.7	7	11	6.4	50	25	1001491
ELM 110	36.5	28.5	10	31	18.5	11.5	16.5	10.5	100	50	1001233

Tab. 29

Fixing bracket

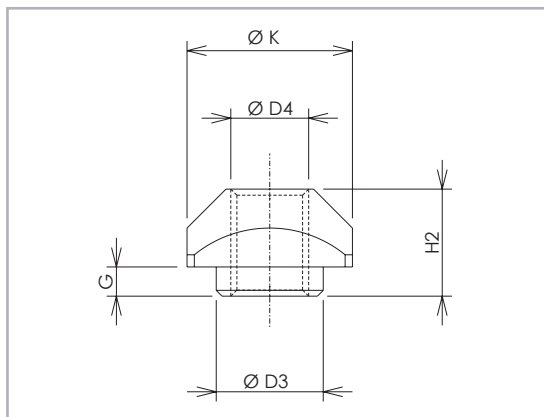Anodized aluminum block for fixing the linear units through the side T-slots of the body.

T-Nuts

Fig. 16

Dimensions (mm)

Unit	D3	D4	G	H2	K	Code
ELM 50	-	M4	-	3.4	8	1001046
ELM 65	6.7	M5	2.3	6.5	10	1000627
ELM 80	8	M6	3.3	8.3	13	1000043
ELM 110	11	M8	2.8	10.8	17	1000932

Tab. 30

T-nuts

Steel nuts to be used in the T-slots of the body.

Proximity ELM
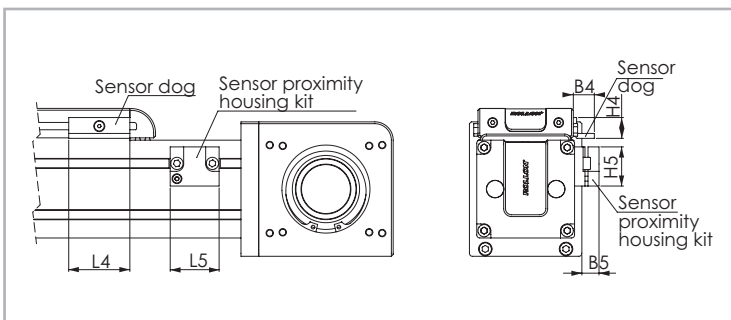
Fig. 17

Sensor proximity housing kit

Red anodized aluminum sensor holder, equipped with T-nuts for fixing onto the profile.

Sensor dog

L-shaped bracket in zinc-plated iron, mounted on the carriage and used for proximity switch operations.

Dimensions (mm)

Unit	B4	B5	L4	L5	H4	H5	For proximity	Sensor dog code	Sensor proximity housing kit code
ELM 50	9.5	14	25	29	11.9	22.5	Ø 8	G000268	G000211
ELM 65	17.2	20	50	40	17	32	Ø 12	G000267	G000212
ELM 80	17.2	20	50	40	17	32	Ø 12	G000267	G000209
ELM 110	17.2	20	50	40	17	32	Ø 12	G000267	G000210

Tab. 31
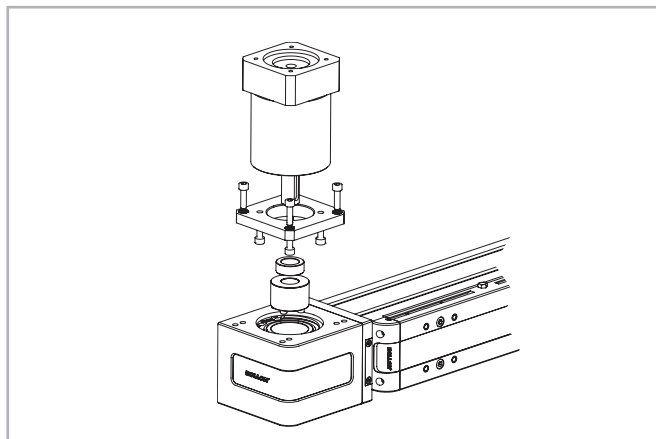
PLS

Gearbox assembly kit

Fig. 18

Single shrink disc

Fig. 19

Codes on the the table below refer to the gearbox assembly kit.
The kit includes: shrink disk; adapter plate; fixing hardware.

Codes on the table below refer to a shink disc ordered as single element.

Unit type	Gearbox type (not included)	Kit Code
ELM 50	MP060	G000566
	LC050; PE2; NP005S	G001444
ELM 65	MP080	G000529
	MPO6O; PLE060	G000531
	SW030	G000748
	PE3; NP015S; LC070	G000530
	P3	G001162
ELM 80	P3	G000824
	MP080	G000826
	LC090; MPV01; NP025S; PE4	G000827
	MP105	G000830
	PE3; NP015S; LC070	G001078
	SP075; PLN090	G000859
	SP060; PLN070	G000829
	SW040	G000866
ELM 110	MP130	G000482
	LC120; MPV02; NP035S; PE5; AE120	G000483
	LC090; NP025S; PE4; NP025S	G000525
	MP105	G000527
	SW050	G000717
	SP075; PLN090; P4; VRS075; AF075A	G000526

Tab. 32

Unit type	Hollow shaft [mm]	Shrink disc dxD [mm]	Transmittable torque* [Nm]	Shrink disc code
ELM 50	26	14x26	36	6005740
ELM 65	34	14x34	64	6005737
		16x34	73	6005738
		19x34	87	6005739
ELM 80	41	19x41	150	6005734
		22x41	174	6005735
		25x41	198	6005736
ELM 110	50	22x50	286	6005730
		25x50	324	6005731
		32x50	415	6005732

* Transmittable torque in the table represents the maximum capacity of the shrink disk. For the application, the limit of F_x must be considered too.

Tab. 33

For other gearbox type ask Rollon

Ordering key ⌄

> ### Identification codes for the ELM linear unit

E	06 05=50 06=65 08=80 11=110	1R	2000	1R	D	
					Multiple carriage	
				Linear motion system *see pg. PLS-4*		
			L = total length of the unit			
		Driving head code				
	Linear unit size *see from pg. PLS-5 to pg. PLS-8*					
ELM Series *see pg. PLS-2*						

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

[Configure Actuator]

ROBOT series ⌄

⯈ ROBOT series description

ROBOT

Fig. 20

ROBOT 2C - Double indepedent carriage

Fig. 21

ROBOT

The ROBOT series is particularly well-suited for heavy load applications where significant carriage pitch, yaw or roll moments are applied. As a robust, high load choice, the ROBOT Series is the linear actuator for the most demanding applications.

Available in four sizes from 100 mm to 220 mm, the ROBOT series linear units have a rigid structure made by a heavy rectangular cross-section of extruded and anodized aluminum. The thrust force is transmitted by a steel reinforced polyurethane. The carriage is running on two parallel linear guides with four self-lubricated "maintenance-free" caged ball bearing blocks, positioned to support the carriage and all incident loads and moments. A polyurethane sealing strip ensures complete protection of the driving belt against dirt, chips, liquids and other contaminants.

The ROBOT series is the clear choice for heavy, high-speed, fluctuating load and moment applications in aggressive environments where repeatable, maintenance-free industrial automation is required.

ROBOT 2C

For all sizes of the ROBOT series a 2C version with 2 independent carriages is also available. Each carriage is driven by its own belt. The driving head can accomodate two gearboxes, one on each side. This solution is ideal for pick & place application or loading and unloading machine.

Corrosion resistant version

ROBOT linear actuators are available with stainless steel elements, for applications in harsh environments and/or subject to frequent washes.

They are constructed using extruded anodized 6060 and 6082 Anti-Corrosive Aluminum, which houses bearings, linear rails, nuts and bolts and components made of stainless steel, preventing or delaying corrosion caused by humidity experienced in the environments where the linear units are used.

Special no-deposit surface treatments are combined with a food grade lubrication system to allow use in highly sensitive applications, such as the food and pharmaceutical industries where product contamination is prohibited.

- Internal stainless steel elements
- Anodized 6060 and 6082 Anti-Corrosive Aluminum Profile
- AISI 440 stainless steel linear rails
- Lubricated with organic food grade vegetable oils

The components

Extruded profile

The anodized 6060 aluminum alloy extrusion used for the profile of ROBOT series linear units are designed and manufactured by industry experts to optimize weight while maintaining mechanical strength. The dimensional tolerances comply with EN 755-9 standards. T-slots are provided in the side and bottom faces to facilitate mounting.

Driving belt

ROBOT series linear units use steel reinforced polyurethane drive belts with AT pitch. This belt is ideal due to its high load transmission characteristics, compact size and low noise. Used in conjunction with backlash-free pulleys, smooth alternating motion can be achieved. Optimization of the maximum belt width/body dimension ratio enables the following performance characteristics to be achieved:

- High speed
- Low noise
- Low wear

The provision of guidance for the belt within the body causes it to run central on the pulley, there by ensuring long service life.

Carriage

The carriage of the ROBOT series linear units are made of anodized aluminum. Each carriage has mounting holes fitted with stainless steel thread inserts. Rollon offers multiple carriages to accommodate a vast array of applications. The unique design of the carriage allows for the sealing strip to pass through it, as well as house brush seals to remove contaminates from the sealing strip.

Sealing strip

ROBOT series linear units are equipped with a polyurethane sealing strip to protect all of the internal components from dust, contaminants, and other foreign objects. The sealing strip runs the length of the body and is kept in position by micro-bearings located with in the carriage. This minimizes frictional resistance as the strip passes through the carriage while providing maximum protection.

General data about aluminum used: AL 6060

Chemical composition [%]

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

Tab. 34

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
$\dfrac{kg}{dm^3}$	$\dfrac{kN}{mm^2}$	$\dfrac{10^{-6}}{K}$	$\dfrac{W}{m \cdot K}$	$\dfrac{J}{kg \cdot K}$	$\Omega \cdot m \cdot 10^{-9}$	°C
2.7	69	23	200	880-900	33	600-655

Tab. 35

Mechanical characteristics

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

Tab. 36

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.

ROBOT with ball bearing guides

- Two ball bearing guides with high load capacity are mounted in two dedicated seats on the outer sides of the body.
- The carriage is assembled on four pre-loaded ball bearing blocks.
- The four ball row configuration enable the carriage to withstand loading in the four main directions.
- The four blocks have seals on both sides and, if necessary, an additional scraper can be fitted for very dusty conditions.
- The ball bearing carriages are also fitted with a retention cage that eliminates "steel-steel" contact between adjacent revolving parts and prevents misalignment.
- The lubrication reservoirs (pockets) fitted on the cages considerably decreases re-lubrication frequency. Lubrication reservoirs (pockets) installed on the front of the ball bearing blocks supply the right amount of grease, thus promoting long maintenance interval.

The linear motion system described above offers:

- High speed and acceleration
- High load capacity
- High bending permissible moments
- Low friction
- Long duration
- Maintenance free (dependent on application)
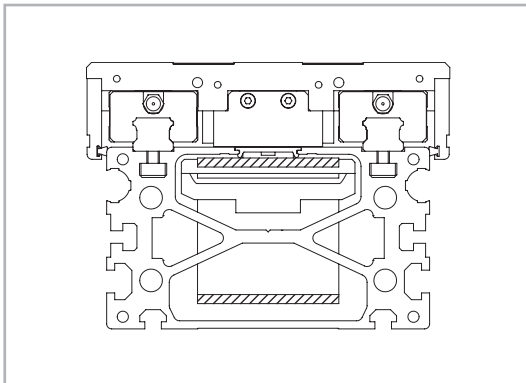- Low noise

ROBOT section

Fig. 22

The new driving head

The new driving head is designed to allow high freedom while sizing the application and mounting the gearbox on ROBOT series linear actuators. With the new head, it is possible to assembly the gearbox on either the right or the left side of the actuator by means of a standard assembly kit.

The assembly kit includes: shrink disk; adapter plate and fixing hardware; and can be ordered with the actuator. Different kits are available to accomodate gearboxes from the major brands on the market. For more information see pag. PLS-33.

The same logic is valid when mounting the shaft to connect two units in parallel.

The ROBOT-2C driving head can accomodate two gearboxes, one on each side, to control the two independent carriage. This distinctive feature requires that Rollon assembles the gearbox in-house prior the axis shipment. Please contact our Technical Department.

ROBOT 100

ROBOT 100 Dimensions
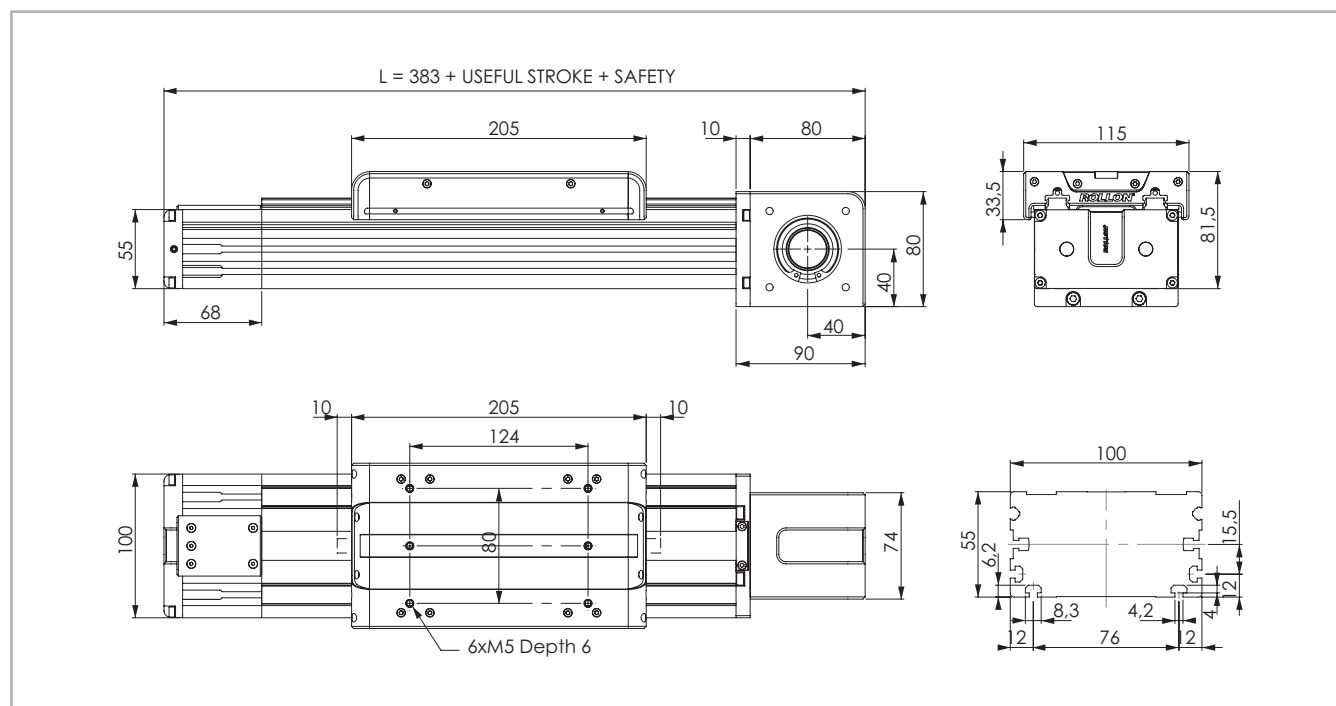
The length of the safety stroke is provided on request according to the customer's specific requirements.

Fig. 23

Technical data

	Type
	ROBOT 100
Max. useful stroke length [mm]	6100
Max. positioning repeatability [mm]*1	± 0.05
Max. speed [m/s]	4.0
Max. acceleration [m/s²]	50
Type of belt	32 AT 5
Type of pulley	Z 23
Pulley pitch diameter [mm]	36.61
Carriage displacement per pulley turn [mm]	115
Carriage weight [kg]	2.4
Zero travel weight [kg]	4.5
Weight for 100 mm useful stroke [kg]	0.8
Starting torque [Nm]	1.3
Moment of inertia of pulleys [g·mm²]	40004
Rail size [mm]	15 mini

*1) Positioning repeatability is dependent on the type of transmission used

Tab. 37

Moments of inertia of the aluminum body

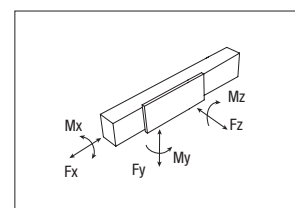| Type	I_x [10^7 mm⁴]	I_y [10^7 mm⁴]	I_p [10^7 mm⁴]
ROBOT 100	0.05	0.23	0.28

Tab. 38

Driving belt

The driving belt is manufactured from a friction resistant polyurethane and with steel cords for high tensile stress resistance.

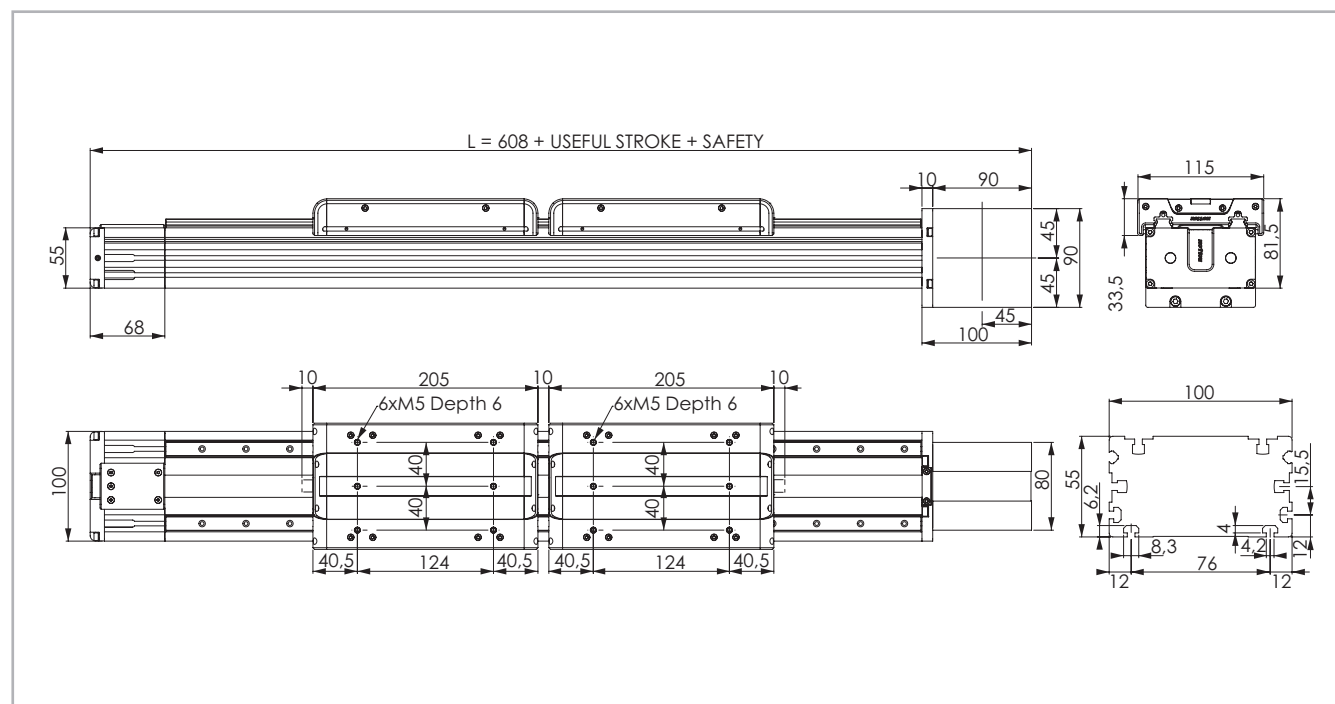| Type	Type of belt	Belt width [mm]	Weight [kg/m]
ROBOT 100	32 AT 5	32	0.105

Tab. 39

Belt length (mm) = 2 x L - 105

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.
ROBOT 100	1176	739	22800	21144	22800	775	1322	1322

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

F_x in the table represents the maximum capacity of the toothed belt. For the application, the limit of transmittable torque of the shrink disk must be considered too (see page PLS-33).

Tab. 40

ROBOT 100 2C (Double independent carriage)

ROBOT 100 2C Dimensions

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

Fig. 24

Technical data

	Type
	ROBOT 100 2C
Max. useful stroke length [mm]	5885
Max. positioning repeatability [mm]*1	± 0.05
Max. speed [m/s]	4.0
Max. acceleration [m/s²]	50
Type of belt	16 AT 5
Type of pulley	Z 23
Pulley pitch diameter [mm]	36.61
Carriage displacement per pulley turn [mm]	115
Carriage weight [kg]	2.4
Zero travel weight [kg]	8.0
Weight for 100 mm useful stroke [kg]	0.8
Starting torque [Nm]	1.3
Moment of inertia of pulleys [g·mm²]	16220
Rail size [mm]	15 mini

*1) Positioning repeatability is dependent on the type of transmission used

Tab. 41

Moments of inertia of the aluminum body

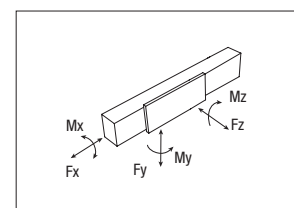| Type	I_x [10^7 mm⁴]	I_y [10^7 mm⁴]	I_p [10^7 mm⁴]
ROBOT 100 2C	0.05	0.23	0.28

Tab. 42

Driving belt

The driving belt is manufactured from a friction resistant polyurethane and with steel cords for high tensile stress resistance.

Type	Type of belt	Belt width [mm]	Weight [kg/m]
ROBOT 100 2C	16 AT 5	16	0.05

Tab. 43

Belt length (mm) = 2 x L - 95
Two belts for each actuator.

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.
ROBOT 100 2C	588	370	22800	21144	22800	775	1322	1322

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

F_x in the table represents the maximum capacity of the toothed belt. For the application, the limit of transmittable torque of the shrink disk must be considered too (see page PLS-33).
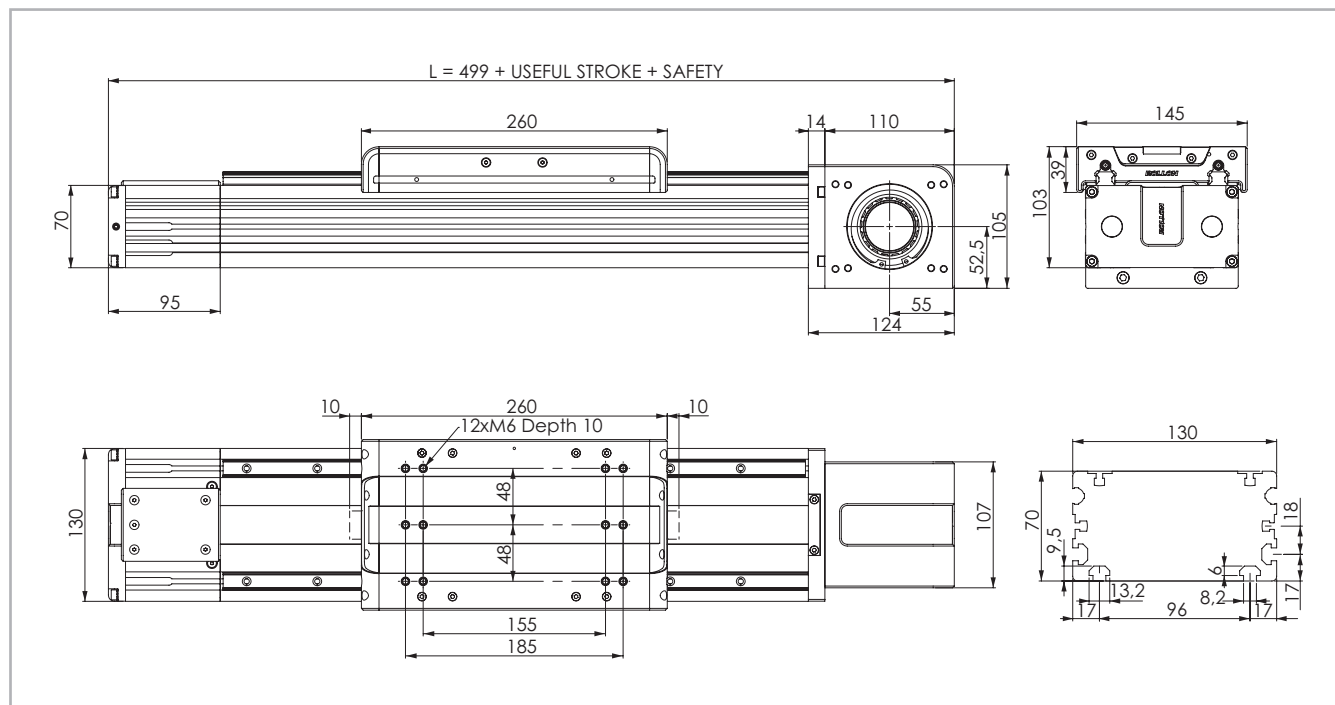
Tab. 44

ROBOT 130

ROBOT 130 Dimensions

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

Fig. 25

Technical data

	Type
	ROBOT 130
Max. useful stroke length [mm]*1	6050
Max. positioning repeatability [mm]*2	± 0.05
Max. speed [m/s]	5.0
Max. acceleration [m/s²]	50
Type of belt	50 AT 10
Type of pulley	Z 17
Pulley pitch diameter [mm]	54.11
Carriage displacement per pulley turn [mm]	170
Carriage weight [kg]	2.8
Zero travel weight [kg]	9.1
Weight for 100 mm useful stroke [kg]	1.2
Starting torque [Nm]	2.7
Moment of inertia of pulleys [g·mm²]	360659
Rail size [mm]	15

Tab. 45

*1) It is possible to obtain strokes up to 11000 mm by means of special Rollon joints
*2) Positioning repeatability is dependent on the type of transmission used

Moments of inertia of the aluminum body

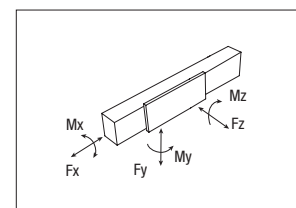| Type	I_x [10^7 mm⁴]	I_y [10^7 mm⁴]	I_p [10^7 mm⁴]
ROBOT 130	0.15	0.65	0.79

Tab. 46

Driving belt

The driving belt is manufactured from a friction resistant polyurethane and with steel cords for high tensile stress resistance.

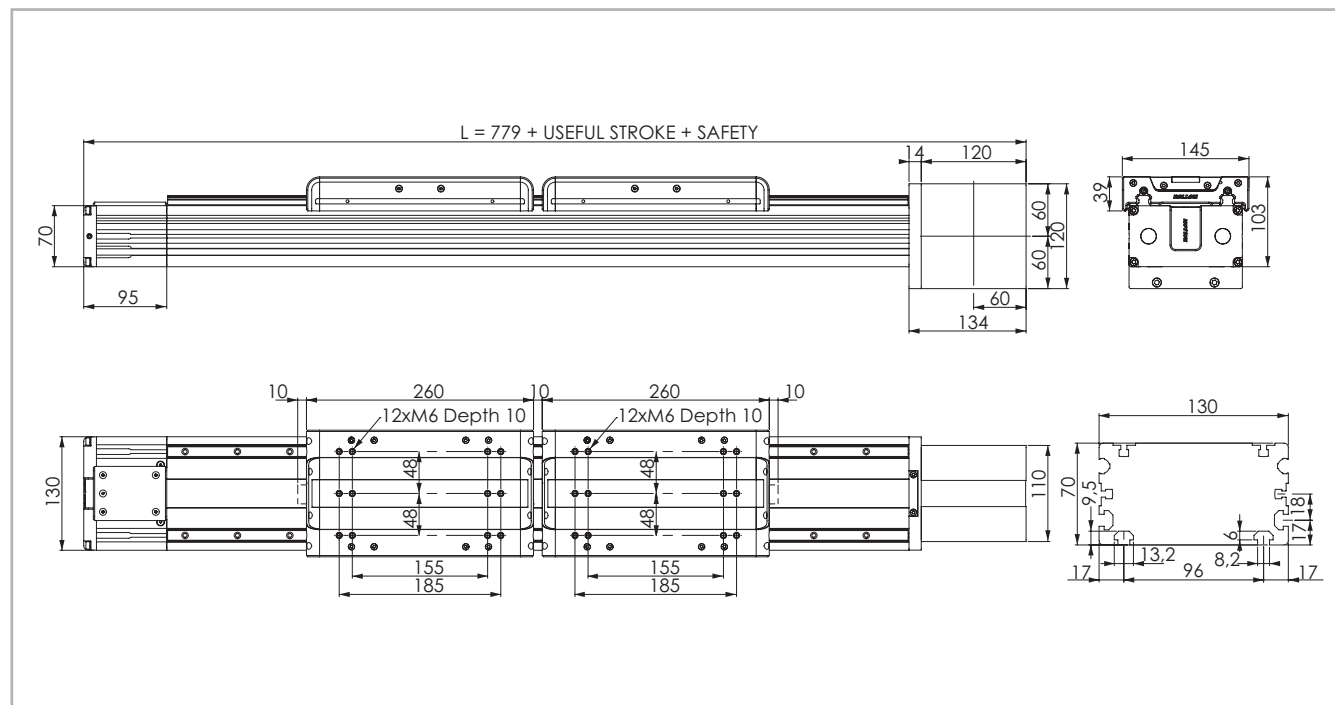| Type	Type of belt	Belt width [mm]	Weight [kg/m]
ROBOT 130	50 AT 10	50	0.29

Tab. 47

Belt length (mm) = 2 x L - 80

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.
ROBOT 130	3112	1725	96800	45082	96800	4646	6340	6340

Tab. 48

See verification under static load and lifetime on page SL-2 and SL-3
F_x in the table represents the maximum capacity of the toothed belt. For the application, the limit of transmittable torque of the shrink disk must be considered too (see page PLS-33).

> ROBOT 130 2C (Double independent carriage)

ROBOT 130 2C Dimensions

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

Fig. 26

Technical data

	Type
	ROBOT 130 2C
Max. useful stroke length [mm]*1	5780
Max. positioning repeatability [mm]*2	± 0.05
Max. speed [m/s]	5.0
Max. acceleration [m/s²]	50
Type of belt	25 AT 10
Type of pulley	Z 17
Pulley pitch diameter [mm]	54.11
Carriage displacement per pulley turn [mm]	170
Carriage weight [kg]	2.8
Zero travel weight [kg]	14.9
Weight for 100 mm useful stroke [kg]	1.2
Starting torque [Nm]	2.7
Moment of inertia of pulleys [g·mm²]	196200
Rail size [mm]	15

Tab. 49

*1) It is possible to obtain strokes up to 11000 mm by means of special Rollon joints
*2) Positioning repeatability is dependent on the type of transmission used

Moments of inertia of the aluminum body

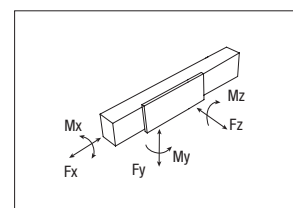| Type	I_x [10^7 mm⁴]	I_y [10^7 mm⁴]	I_p [10^7 mm⁴]
ROBOT 130 2C	0.15	0.65	0.79

Tab. 50

Driving belt

The driving belt is manufactured from a friction resistant polyurethane and with steel cords for high tensile stress resistance.

Type	Type of belt	Belt width [mm]	Weight [kg/m]
ROBOT 130 2C	25 AT 10	25	0.16

Tab. 51

Belt length (mm) = 2 x L - 70
Two belts for each actuator.

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.
ROBOT 130 2C	1556	862	96800	45082	96800	4646	6340	6340

See verification under static load and lifetime on page SL-2 and SL-3
F_x in the table represents the maximum capacity of the toothed belt. For the application, the limit of transmittable torque of the shrink disk must be considered too (see page PLS-33).
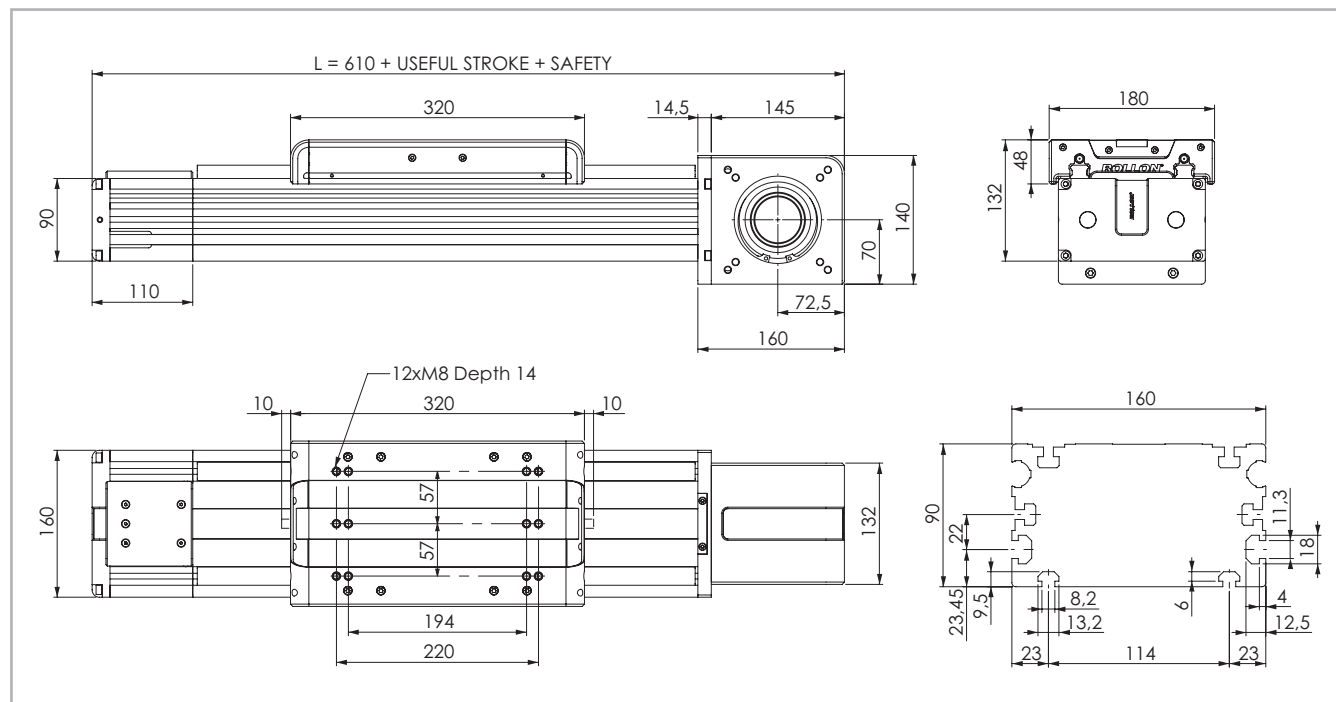
Tab. 52

ROBOT 160

ROBOT 160 Dimensions

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

Fig. 27

Technical data

	Type
	ROBOT 160
Max. useful stroke length [mm]*1	6000
Max. positioning repeatability [mm]*2	± 0.05
Max. speed [m/s]	5.0
Max. acceleration [m/s²]	50
Type of belt	70 AT 10
Type of pulley	Z 22
Pulley pitch diameter [mm]	70.03
Carriage displacement per pulley turn [mm]	220
Carriage weight [kg]	5.3
Zero travel weight [kg]	21
Weight for 100 mm useful stroke [kg]	1.9
Starting torque [Nm]	4.5
Moment of inertia of pulleys [g·mm²]	$1.303 \cdot 10^6$
Rail size [mm]	20

*1) It is possible to obtain strokes up to 11000 mm by means of special Rollon joints
*2) Positioning repeatability is dependent on the type of transmission used

Tab. 53

Moments of inertia of the aluminum body

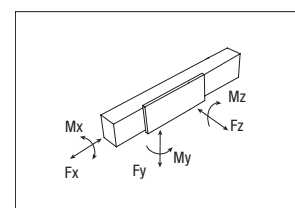| Type	I_x [10^7 mm⁴]	I_y [10^7 mm⁴]	I_p [10^7 mm⁴]
ROBOT 160	0.37	1.51	1.88

Tab. 54

Driving belt

The driving belt is manufactured from a friction resistant polyurethane and with steel cords for high tensile stress resistance.

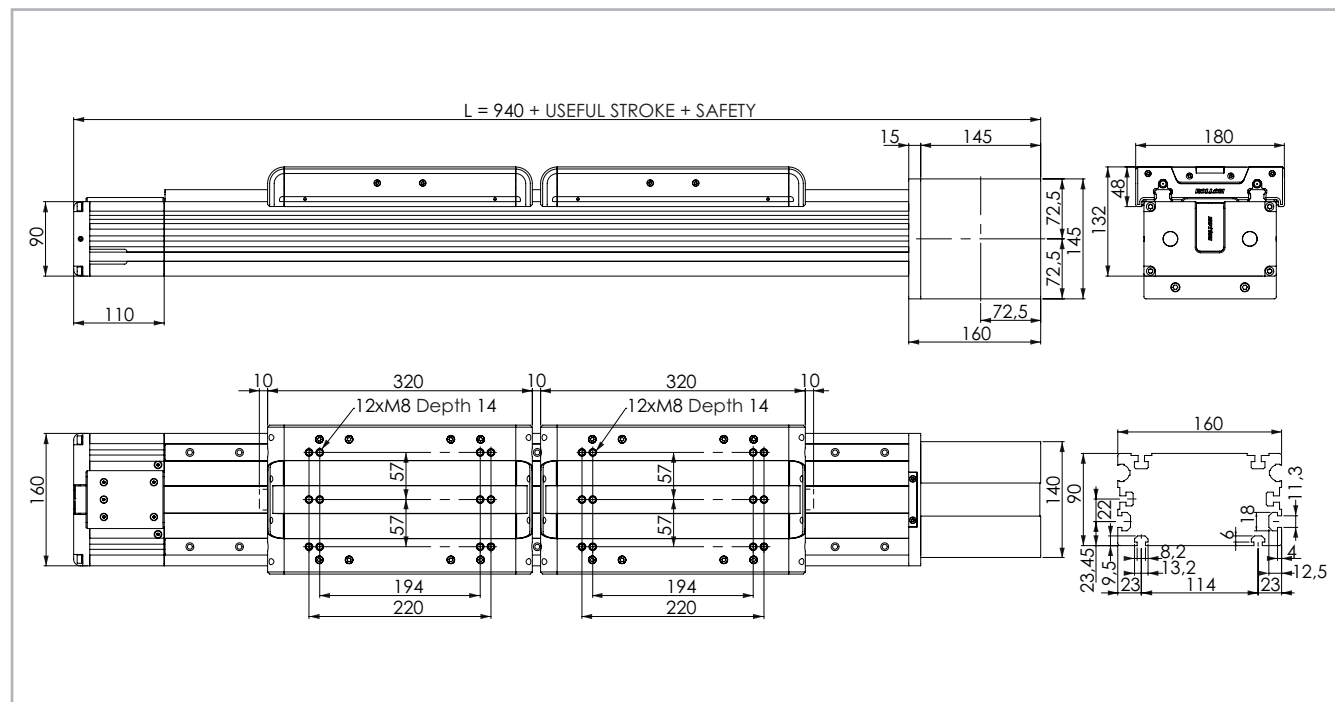| Type	Type of belt	Belt width [mm]	Weight [kg/m]
ROBOT 160	70 AT 10	70	0.41

Tab. 55

Belt length (mm) = 2 x L - 120

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.
ROBOT 160	5229	3024	153600	70798	153600	8755	12211	12211

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

F_x in the table represents the maximum capacity of the toothed belt. For the application, the limit of transmittable torque of the shrink disk must be considered too (see page PLS-33).

Tab. 56

> ROBOT 160 2C (Double independent carriage)

ROBOT 160 2C Dimensions

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

Fig. 28

Technical data

	Type
	ROBOT 160 2C
Max. useful stroke length [mm]*1	5670
Max. positioning repeatability [mm]*2	± 0.05
Max. speed [m/s]	5.0
Max. acceleration [m/s²]	50
Type of belt	32 AT 10
Type of pulley	Z 19
Pulley pitch diameter [mm]	60.48
Carriage displacement per pulley turn [mm]	190
Carriage weight [kg]	5.3
Zero travel weight [kg]	30
Weight for 100 mm useful stroke [kg]	1.9
Starting torque [Nm]	4.5
Moment of inertia of pulleys [g·mm²]	210300
Rail size [mm]	20

*1) It is possible to obtain strokes up to 11000 mm by means of special Rollon joints
*2) Positioning repeatability is dependent on the type of transmission used

Tab. 57

Moments of inertia of the aluminum body

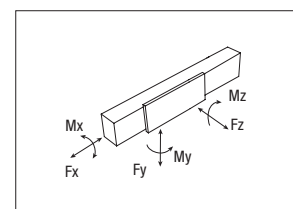| Type	I_x [10^7 mm⁴]	I_y [10^7 mm⁴]	I_p [10^7 mm⁴]
ROBOT 160 2C	0.37	1.51	1.88

Tab. 58

Driving belt

The driving belt is manufactured from a friction resistant polyurethane and with steel cords for high tensile stress resistance.

Type	Type of belt	Belt width [mm]	Weight [kg/m]
ROBOT 160 2C	32 AT 10	32	0.185

Tab. 59

Belt length (mm) = 2 x L - 120
Two belts for each actuator.

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.
ROBOT 160 2C	2258	1306	153600	70798	153600	8755	12211	12211

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

F_x in the table represents the maximum capacity of the toothed belt. For the application, the limit of transmittable torque of the shrink disk must be considered too (see page PLS-33).

Tab. 60

ROBOT 220

ROBOT 220 Dimensions
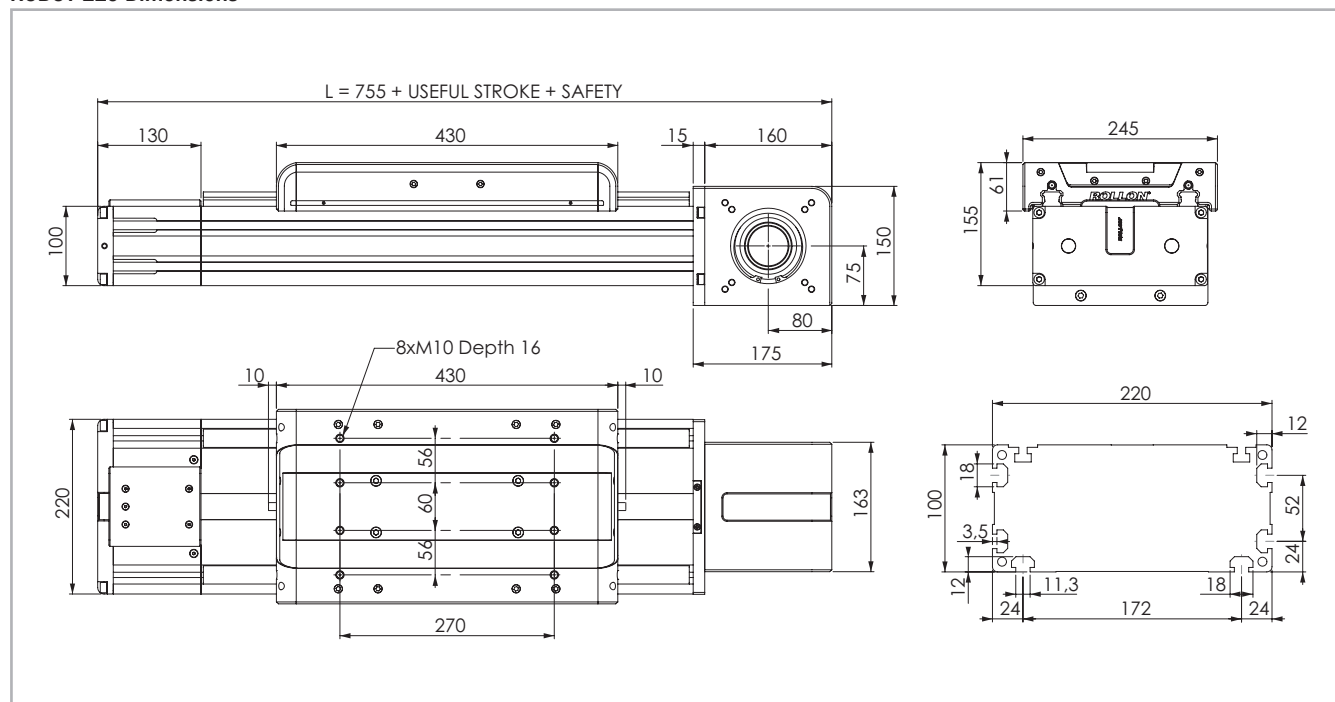
The length of the safety stroke is provided on request according to the customer's specific requirements.

Fig. 29

Technical data

	Type
	ROBOT 220
Max. useful stroke length [mm]*1	5900
Max. positioning repeatability [mm]*2	± 0.05
Max. speed [m/s]	5.0
Max. acceleration [m/s²]	50
Type of belt	100 AT 10
Type of pulley	Z 25
Pulley pitch diameter [mm]	79.58
Carriage displacement per pulley turn [mm]	250
Carriage weight [kg]	14.4
Zero travel weight [kg]	41
Weight for 100 mm useful stroke [kg]	2.5
Starting torque [Nm]	6.4
Moment of inertia of each pulley [g·mm²]	$3.687 \cdot 10^6$
Rail size [mm]	25

*1) It is possible to obtain strokes up to 11000 mm by means of special Rollon joints
*2) Positioning repeatability is dependent on the type of transmission used

Tab. 61

Moments of inertia of the aluminum body

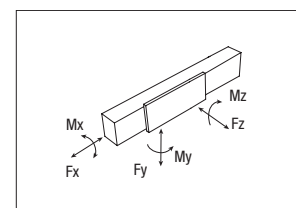| Type	I_x [10^7 mm⁴]	I_y [10^7 mm⁴]	I_p [10^7 mm⁴]
ROBOT 220	0.65	3.26	3.92

Tab. 62

Driving belt

The driving belt is manufactured from a friction resistant polyurethane and with steel cords for high tensile stress resistance.

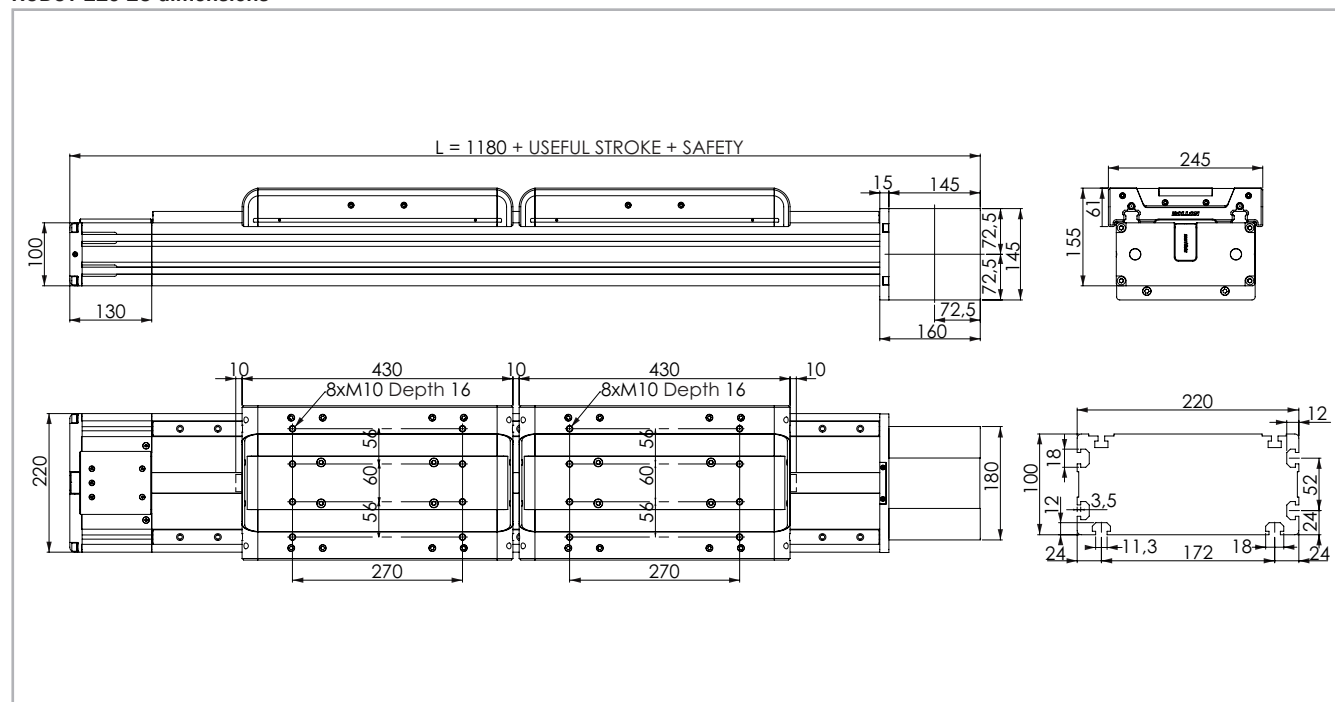| Type	Type of belt	Belt width [mm]	Weight [kg/m]
ROBOT 220	100 AT 10	100	0.58

Tab. 63

Belt length (mm) = 2 x L - 120

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.
ROBOT 220	9545	6325	258800	116833	258800	22257	28986	28986

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

Tab. 64

F_x in the table represents the maximum capacity of the toothed belt. For the application, the limit of transmittable torque of the shrink disk must be considered too (see page PLS-33).

> ROBOT 220 2C (Double independent carriage)

ROBOT 220 2C dimensions

L = 1180 + USEFUL STROKE + SAFETY

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

Fig. 30

Technical data

	Type
	ROBOT 220 2C
Max. useful stroke length [mm]*1	5460
Max. positioning repeatability [mm]*2	± 0.05
Max. speed [m/s]	5.0
Max. acceleration [m/s²]	50
Type of belt	40 AT 10
Type of pulley	Z 25
Pulley pitch diameter [mm]	79.58
Carriage displacement per pulley turn [mm]	250
Carriage weight [kg]	13.3
Zero travel weight [kg]	46
Weight for 100 mm useful stroke [kg]	2.5
Starting torque [Nm]	6.4
Moment of inertia of each pulley [g·mm²]	$2.026 \cdot 10^6$
Rail size [mm]	25

Tab. 65

*1) It is possible to obtain strokes up to 11000 mm by means of special Rollon joints
*2) Positioning repeatability is dependent on the type of transmission used

Moments of inertia of the aluminum body

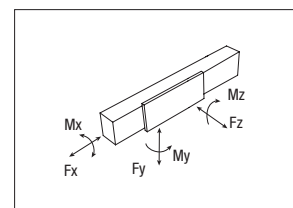| Type	I_x [10^7 mm⁴]	I_y [10^7 mm⁴]	I_p [10^7 mm⁴]
ROBOT 220 2C	0.65	3.26	3.92

Tab. 66

Driving belt

The driving belt is manufactured from a friction resistant polyurethane and with steel cords for high tensile stress resistance.

Type	Type of belt	Belt width [mm]	Weight [kg/m]
ROBOT 220 2C	40 AT 10	40	0.23

Tab. 67

Belt length (mm) = 2 x L - 135
Two belts for each actuator.

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.
ROBOT 220 2C	3818	2530	258800	116833	258800	22257	28986	28986

See verification under static load and lifetime on page SL-2 and SL-3
F_x in the table represents the maximum capacity of the toothed belt. For the application, the limit of transmittable torque of the shrink disk must be considered too (see page PLS-33).

Tab. 68

⟩ Lubrication

ROBOT Linear units are equipped with self lubricating linear ball guides. The ball bearing carriages are also fitted with a retention cage that eliminates "steel-steel" contact between adjacent revolving parts and prevents misalignment of these in the circuits.

Special lubrication reservoirs are mounted on the front plates of the linear blocks which continuously provide the necessary amount of grease to the ball raceways under load. These lubrication reservoirs also considerably reduce the frequency of lubrication of the module. This system guarantees a long interval between maintenances: every 5000 km or 1 year of use, based on the value reached first. If a longer service life is required or in case of high dynamic or high loaded applications please contact our offices for further verification.

Fig. 31

Quantity of lubricant necessary for re-lubrication of each block:

Type	Unit: [cm^3]
ROBOT 100	0.7
ROBOT 130	0.7
ROBOT 160	1.4
ROBOT 220	2.4

Tab. 69

- ■ Insert grease gun in the specific grease nipples.
- ■ Type of lubricant: Lithium soap grease of class NLGI 2.
- ■ For specially stressed applications or difficult environemental conditions, lubrication should be carried out more frequently.
  Apply to Rollon for further advice.
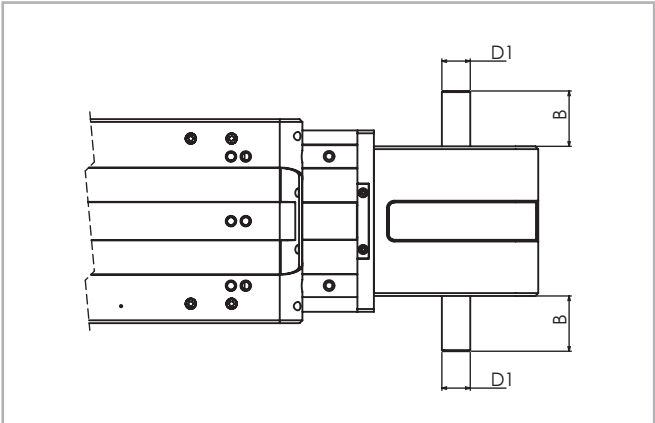
› Simple shaft version

Simple shaft type AS

Fig. 32

Unit	Shaft type	B	D1
ROBOT 100	AS 15	35	15h7
ROBOT 130	AS 20	40	20h7
ROBOT 160	AS 25	50	25h7
ROBOT 220	AS 25	50	25h7

Tab. 70

Position of the simple shaft can be to the right, left, or both sides of the drive head.

Unit	Shaft type	B	D1	AS assembly kit code
ROBOT 100	AS 15	35	15H7	G002695
ROBOT 130	AS 20	40	20H7	G002696
ROBOT 160	AS 25	50	25H7	G000649
ROBOT 220	AS 25	50	25H7	G000649

Tab. 71

Simple shaft type AE 10 for encoder assembly + AS
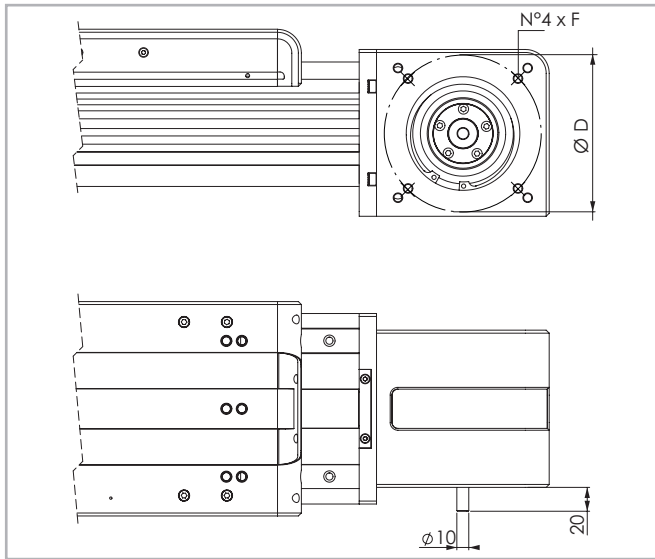
Fig. 33

Unit	Code kit AE	ØD	F
ROBOT 100	G002746	75	M6
ROBOT 130	G002745	100	M6
ROBOT 160	G002370	130	M8
ROBOT 220	G002370	130	M8

Tab. 72

Position of the simple shafts for encoder assembly to the right or to the left on the driving head.

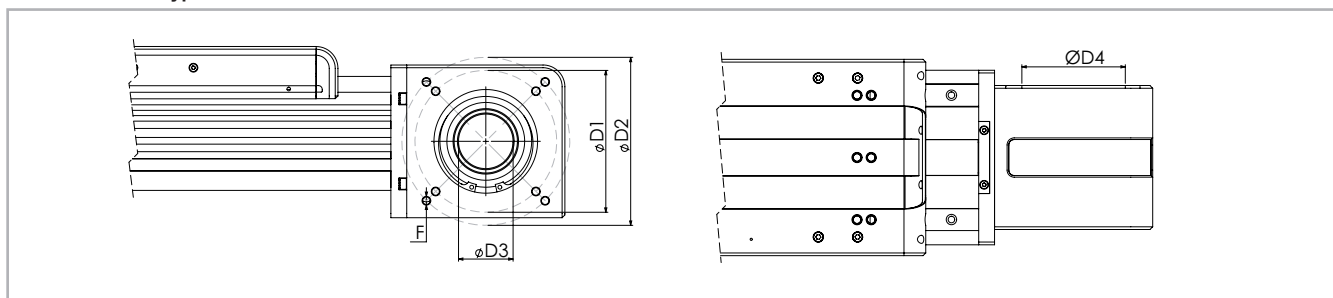## › Hollow shafts

AC hollow shaft type

Fig. 34

Unit mm

Appliable to unit	Shaft type	D1	D2	D3	D4	F
ROBOT 100	AC26	75	-	26 H8	47	M5
ROBOT 130	AC41	100	72x92	41 H8	72	M6
ROBOT 160	AC50	130	154	50 H8	95	M8
ROBOT 220	AC50	130	154	50 H8	95	M8

Tab. 73

› Accessories

Fixing by brackets

The linear motion systems used for the Rollon series ROBOT linear units enable support of loads in any direction. They can therefore be installed in any position.

To install the units, we recommend the use of the dedicated T-slots in the extruded bodies as shown below.
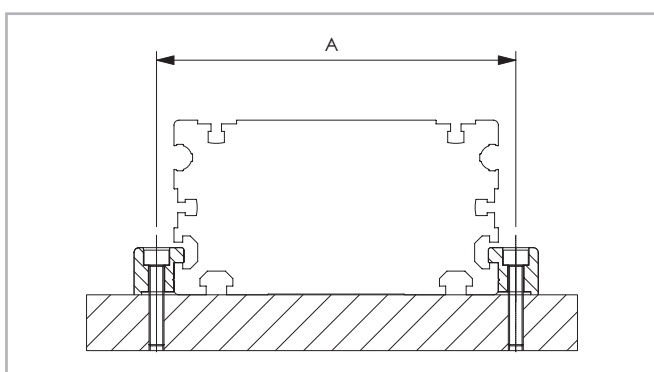
Fig. 35

Unit	A (mm)
ROBOT 100	112
ROBOT 130	144
ROBOT 160	180
ROBOT 220	240

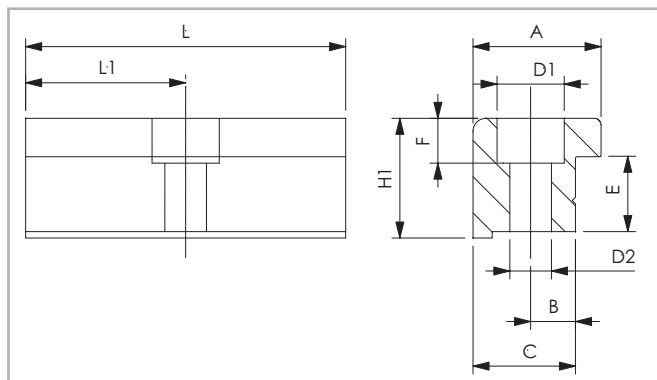Tab. 74

Fixing brackets

Fig. 36

Anodised aluminum block for fixing the linear units through the side T-slots of the body.
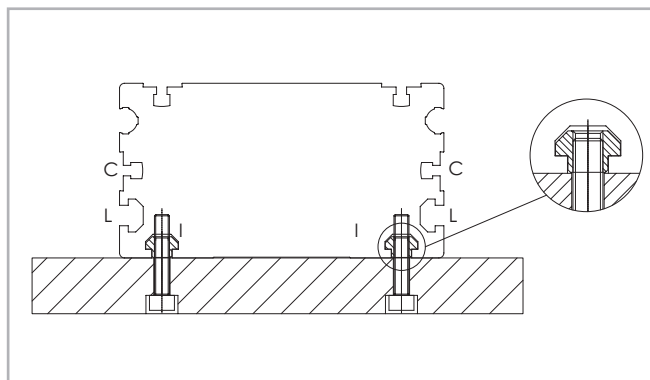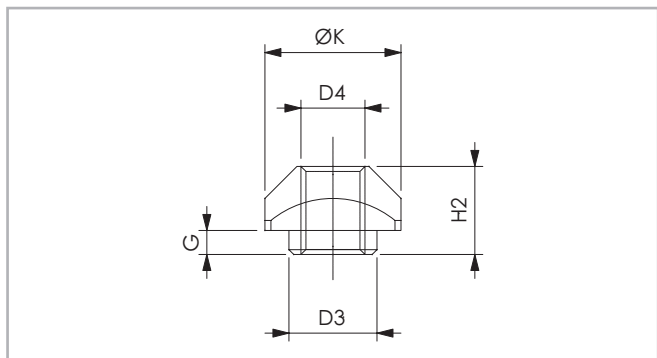
Fixing by T-nuts

Fig. 37

Warning:
Do not fix the linear units through the drive ends.

Dimensions (mm)

Unit	A	B	C	E	F	D1	D2	H1	L	L1	Code
ROBOT 100	20	6	16	10	5.5	9.5	5.3	14	35	17.5	1000958
ROBOT 130	20	7	16	12.7	7	10.5	6.5	18.7	50	25	1001061
ROBOT 160	36.5	10	31	18.5	10.5	16.5	10.5	28.5	100	50	1001233
ROBOT 220	36.5	10	31	18.5	10.5	16.5	10.5	28.5	100	50	1001233

Tab. 75

T-nuts

L=Side / C=Central / I=Lower - see fig. 37

Fig. 38

Steel nuts to be used in the slots of the body.

Dimensions (mm)

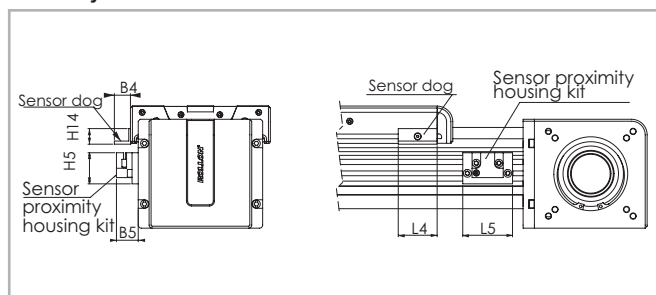| Unit		D3	D4	G	H2	K	Code
ROBOT 100	L-I	-	M4	-	3.4	8	1001046
ROBOT 130	C	-	M3	-	4	6	1001097
ROBOT 130	L-I	8	M6	3.3	8.3	13	1000043
ROBOT 160	C	-	M6	-	5.8	13	1000910
ROBOT 160	I	8	M6	3.3	8.3	13	1000043
ROBOT 160	L	11	M8	2.8	10.8	17	1000932
ROBOT 220	L-I	11	M8	2.8	10.8	17	1000932

Tab. 76

PLS-30

Proximity ROBOT

Fig. 39

Sensor proximity housing kit
Red anodized aluminum sensor holder, equipped with T-nuts for fixing into the body slots.

Sensor dog
L-shaped bracket in zinc-plated iron, mounted on the carriage and used for proximity switch operations.

Dimensions (mm)

Unit	B4	B5	L4	L5	H4	H5	For proximity	Sensor dog code	Sensor proximity housing kit code
ROBOT 100	9.5	20	25	45	12	25	Ø 8	G000268	G000092
ROBOT 130	21	28	50	60	20	40	Ø 12	G000269	G000126
ROBOT 160	21	28	50	64	20	40	Ø 12	G000269	G000123
ROBOT 220	21	28	50	70	20	40	Ø 12	G000269	G000207

Tab. 77

Warning:
If a bellow is used, it is not possible to assemble the proximity switch holders to the aluminum body.

Protections
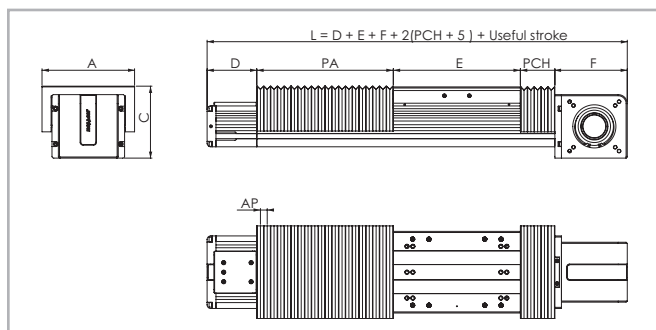

L = D + E + F + 2(PCH + 5) + Useful stroke

Fig. 40

Standard protections
The Rollon series ROBOT linear units are equipped with a polyurethane sealing strip to protect all parts inside the body against dust and foreign matter. The sealing strip runs the length of the body and is kept in position by micro-bearings located within the carriage. This ensures very low frictional resistance as it passes through the carriage.

Protection of ball bearing guides
The four ball bearing blocks have seals on both sides and, where necessary, an additional scraper can be fitted for very dusty conditions.

Special protection
To use these linear units in very critical environments, they can be fitted with a bellows system in addition to the standard protection. The bellows is fixed to the carriage and the ends of the body with Velcro tape for easy assembly and disassembly.
The total length (L) of the linear unit will vary:
See Fig. 40.

Dimensions (mm)

Unit	A	C	D	E	F
ROBOT 130	174	103	95	230	135
ROBOT 160	204	131.5	110	280	160
ROBOT 220	275	149.5	130	380	160

Tab. 78

Standard material: Thermally welded nylon coated with polyurethane
Materials on demand: Nylon coated with PVC, fiberglass, stainless steel
Warning: The use of bellows does not allow the assembly of the proximity switch holders to the aluminum body.

Assembly kits

Fig. 41

Fig. 42

For the direct assembly of Robot linear units on other types of actuators Rollon offers dedicated assembly kits (brackets) in order to fix those brackets the ends of the actuator must be free of rails. The table below gives the codes of the assembly kit. The allowed combination of assembly as well as the length without rails at each end.

Kit	Code	X No rail at each end (mm)
ROBOT 100 - ELM 65	G000205	75
ROBOT 100 - ROBOT 130	G000201*	155
ROBOT 100 - ECO 80	G000203	90
ROBOT 100 - E-SMART 50	G000642	60
ROBOT 130 - ELM 65	G000196	75
ROBOT 130 - ELM 80	G000195	90
ROBOT 130 - ROBOT 130	G000197*	155
ROBOT 130 - ROBOT 160	G000197*	190
ROBOT 160 - ELM 80	G000204	90
ROBOT 160 - ELM 110	G000452	120
ROBOT 160 - ROBOT 160	G000202*	190
ROBOT 160 - ROBOT 220	G000202*	255
ROBOT 220 - ELM 110	G000199	120

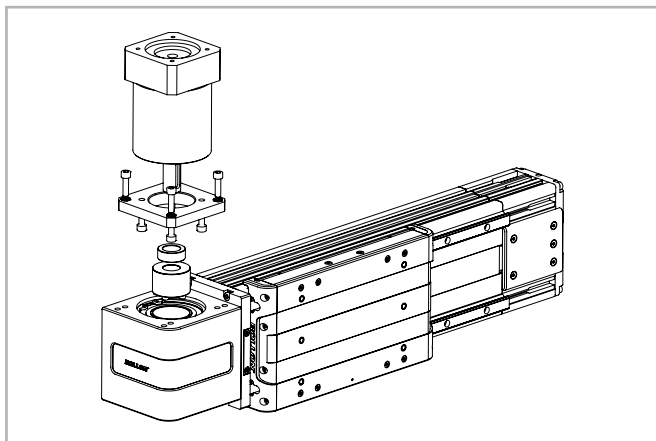* Additional fixing holes are requested on the robot plate

Tab. 79

Gearbox assembly kit

Fig. 43

Codes on the the table below refer to the gearbox assembly kit.
The kit includes: shrink disk; adapter plate; fixing hardware.

Single shrink disc

Fig. 44

Codes on the table below refer to a shink disc ordered as single element.

Unit type	Gearbox type (not included)	Kit Code
ROBOT 100	MP060	G000566
	LC050; PE2; NP005S	G001444
ROBOT 130	P3	G000824
	MP080	G000826
	LC090; MPV01; NP025S; PE4	G000827
	MP105	G000830
	PE3; NP015S; LC070	G001078
	SP075; PLN090	G000859
	SP060; PLN070	G000829
	SW040	G000866
ROBOT 160	AB115	G000481
	MP130	G000482
	LC120; MPV02; NP035S; PE5; AE120	G000483
	LC090, NP025S, PE, NP025S	G000525
	SP+075, PLN090, P4, VRS075, AF075A	G000526
	PSF5; NPS35; SP+100	G000657
	MP105	G000527
ROBOT 220	AB115	G000481
	MP130	G000482
	LC120; MPV02; NP035S; PE5; AE120	G000483
	LC090, NP025S, PE4, NP025S	G000525
	SP+075, PLN090, P4, VRS075, AF075A	G000526
	PSF5; NPS35; SP+100	G000657
	MP105	G000527

Tab. 80

For other gearbox type ask Rollon

Unit type	Hollow shaft [mm]	Shrink disc dxD [mm]	Transmittable torque* [Nm]	Shrink disc code
ROBOT 100	26	14x26	36	6005740
ROBOT 130	41	16x41	101	6005733
		19x41	150	6005734
		22x41	174	6005735
		25x41	198	6005736
ROBOT 160 ROBOT 220	50	22x50	286	6005730
		25x50	324	6005731
		32x50	415	6005732

* Transmittable torque in the table represents the maximum capacity of the shrink disc. For the application, the limit of F_x must be considered too. Tab. 81

Ordering key ⌄

> **Identification codes for the ROBOT linear unit**

R	13	1R	2000	1R	-075	D		
	10=100							
	13=130							
	16=160					Multiple carriage		
	22=220				ROBOT	075 ROBOT 130 - ELM 65	090 ROBOT 130 - ELM 80	
					on ELM	075 ROBOT 100 - ELM 65	120 ROBOT 130 - ELM 110	
						120 ROBOT 130 - ELM 110	*see pg. PLS-32*	
				Linear motion system *see pg. PLS-18*				
			L = total length of the unit					
		Driving head code						
	Linear unit size *see from pg. PLS-19 to pg. PLS-26*							
Linear unit serie ROBOT *see pg. PLS-16*								

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

Configure Actuator

SC series ⌄

> SC series description

Fig. 45

This unit is also designed and configured to be compatible and assembled with the ROBOT series actuators without the need for adapter plates, to create high performance multi-axes systems easily and quickly.

Corrosion resistant version

All Plus System series of linear actuators are available with stainless steel elements, for applications in harsh environments and/or subject to frequent washes.

The Plus System linear units are constructed using extruded anodized 6060 and 6082 Anti-Corrosive Aluminum, which houses bearings, linear rails, nuts and bolts and components, all of which are made of low carbon SS AISI 303 and 404C steel, to prevent or delay corrosion caused by humidity experienced in the environments where the linear units are used.

Special no-deposit surface treatments are combined with a food grade lubrication system to allow use in highly sensitive applications, such as the food and pharmaceutical industries where product contamination is prohibited.

- Internal stainless steel elements
- Anodized 6060 and 6082 Anti-Corrosive Aluminum Profile
- Very low carbon SS AISI 303 and 404C steel linear rails, nuts and bolts and components
- Lubricated with organic food grade vegetable oils

SC

The SC series linear unit is specifically designed for vertical motion in gantry applications, or in applications where the aluminum profile must move while the carriage remains fixed. It is available in three sizes: 100, 130 and 160 mm.

SC is a rigid vertical system, ideal for heavy loads and high cycle applications, thanks to the engineered combination of a self-supporting extruded and anodized aluminum profile and two parallel recirculating ball guides with four low maintenance ball bearing blocks.

The connecting plate at end of the arm allows simple and fast switch of the accessories, reducing downtime and improving the system productivity. It can also accomodate a special extension system (available as optional) which is useful for reaching lengths longer than the maximum stroke and to make the system modular. The extension is fast and easy to assemble and center with precision on the connecting plate, thanks to self-centering keys.

▸ The components

Extruded profile

The anodized aluminum extrusions used for the profile of the Rollon SC series linear units were designed and manufactured by industry experts to optimize weight while maintaining mechanical strength. The anodized aluminum alloy 6060 used (see physical-chemical characteristics below) was extruded with dimensional tolerances complying with EN 755-9 standards.

Side slots are provided for fast, trouble-free mounting of accessories (proximity switch runner, etc.). Power cables and/or air hoses (gripper, etc.) can be passed inside the body.

Driving belt

The Rollon SC series linear units use steel reinforced polyurethane drive belt with AT pitch. This belt is ideal due to its high load transmission characteristics, compact size and low noise. Used in conjunction with a backlash-free pulley, smooth alternating motion can be achieved.

Optimization of the maximum belt width/body dimension ratio enables the following performance characteristics to be achieved:

- **High speed**
- **Low noise**
- **Low wear**

Carriage

The carriage is an enveloping structure that houses the entire linear motion system consisting of a drive pulley and two driven pulleys. The external parts are made of anodized aluminum. Dimensions vary according to type. The carriage is designed to allow the assembly of the SC and ROBOT actuators without the need for adapter plates, to create multi-axes systems easily (see page PLS-48). The carriage also houses brush seals to remove contaminants from the system.

General data about aluminum used: AL 6060

Chemical composition [%]

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

Tab. 82

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
$\dfrac{kg}{dm^3}$	$\dfrac{kN}{mm^2}$	$\dfrac{10^{-6}}{K}$	$\dfrac{W}{m \cdot K}$	$\dfrac{J}{kg \cdot K}$	$\Omega \cdot m \cdot 10^{-9}$	°C
2.7	69	23	200	880-900	33	600-655

Tab. 83

Mechanical characteristics

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

Tab. 84

▶ 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.

SC series with ball bearing guides

- Two ball bearing guides with high load capacity are mounted in two dedicated seats on the outer sides of the aluminum body.
- The carriage of the linear unit is assembled on four pre-loaded ball bearing blocks with plastic retention cages.
- The four ball row configuration enables the carriage to withstand loading in the four main directions.
- The four blocks have seals on both sides and, where necessary, an additional scraper can be fitted for very dusty conditions.
- Lubrication reservoirs (pockets) installed on the front of the ball bearing blocks supply the right amount of grease, thus promoting long maintenance intervals.

The linear motion system described above offers:
- High speed and acceleration
- High load capacity
- High permissible bending moments
- Low friction
- Long life
- Low noise
- Free maintenance (dependent on application)

SC section

Fig. 46

▶ The new driving head

The new driving head is designed to allow high freedom while sizing the application and mounting the gearbox on the SC series linear actuators.

The assembly kit includes: shrink disk; adapter plate and fixing hardware; and can be ordered with the actuator. Different kits are available to accomodate gearboxes from the major brands on the market. For more information see pag. PLS-45.

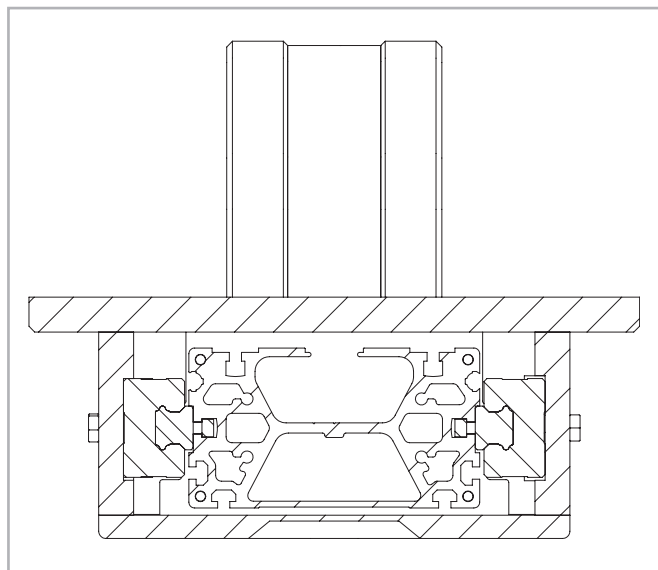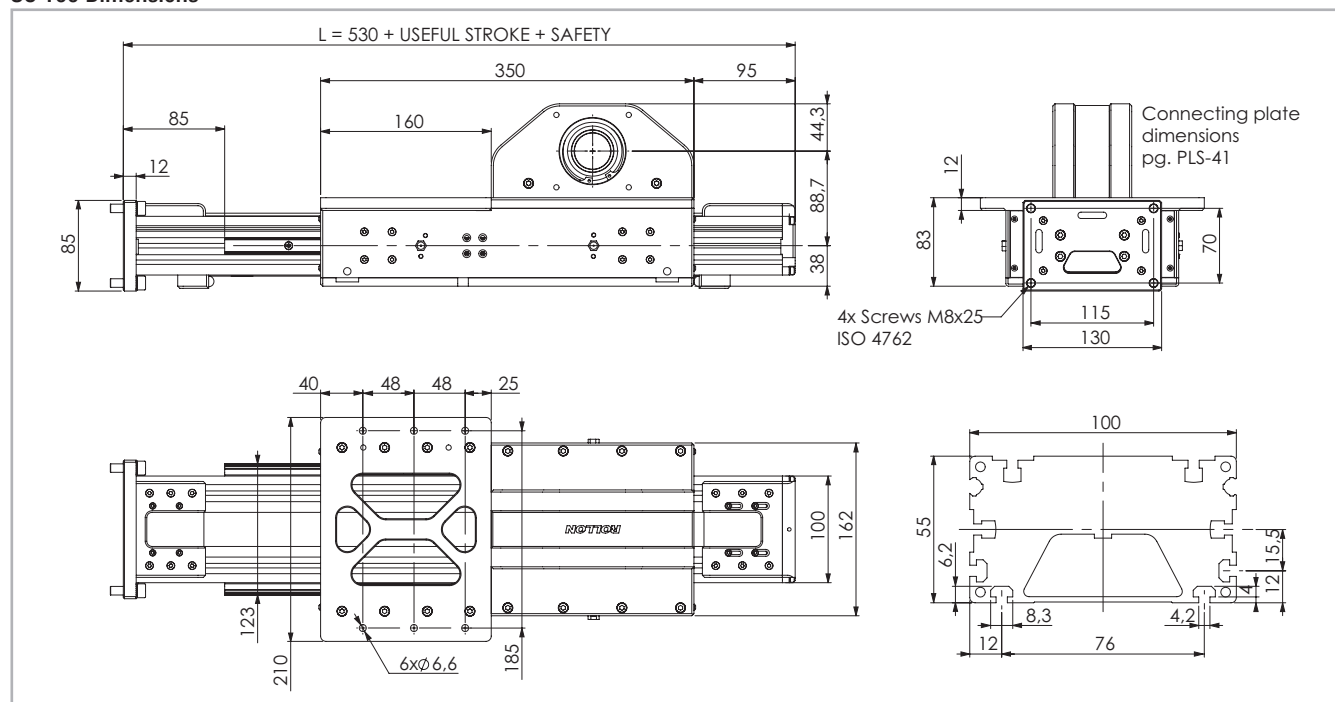The same logic is valid when mounting the shaft to connect two units in parallel.

SC 100

SC 100 Dimensions

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

Fig. 47

Technical data

	Type
	SC 100
Max. useful stroke length [mm]	1500
Max. positioning repeatability [mm]*1	± 0.05
Max. speed [m/s]	5.0
Max. acceleration [m/s²]	50
Type of belt	32 AT 5
Type of pulley	Z 32
Pulley pitch diameter [mm]	50.93
Carriage displacement per pulley turn [mm]	160
Carriage weight [kg]	8.1
Zero travel weight [kg]	13
Weight for 100 mm useful stroke [kg]	0.9
Starting torque [Nm]	1.3
Rail size [mm]	15

*1) Positioning repeatability is dependent on the type of transmission used

Tab. 85

Moments of inertia of the aluminum body

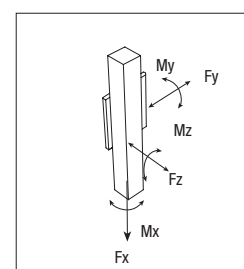| Type	I_x [10^7 mm⁴]	I_y [10^7 mm⁴]	I_p [10^7 mm⁴]
SC 100	0.05	0.23	0.28

Tab. 86

Driving belt

The driving belt is manufactured from a friction resistant polyurethane and with steel cords for high tensile stress resistance.

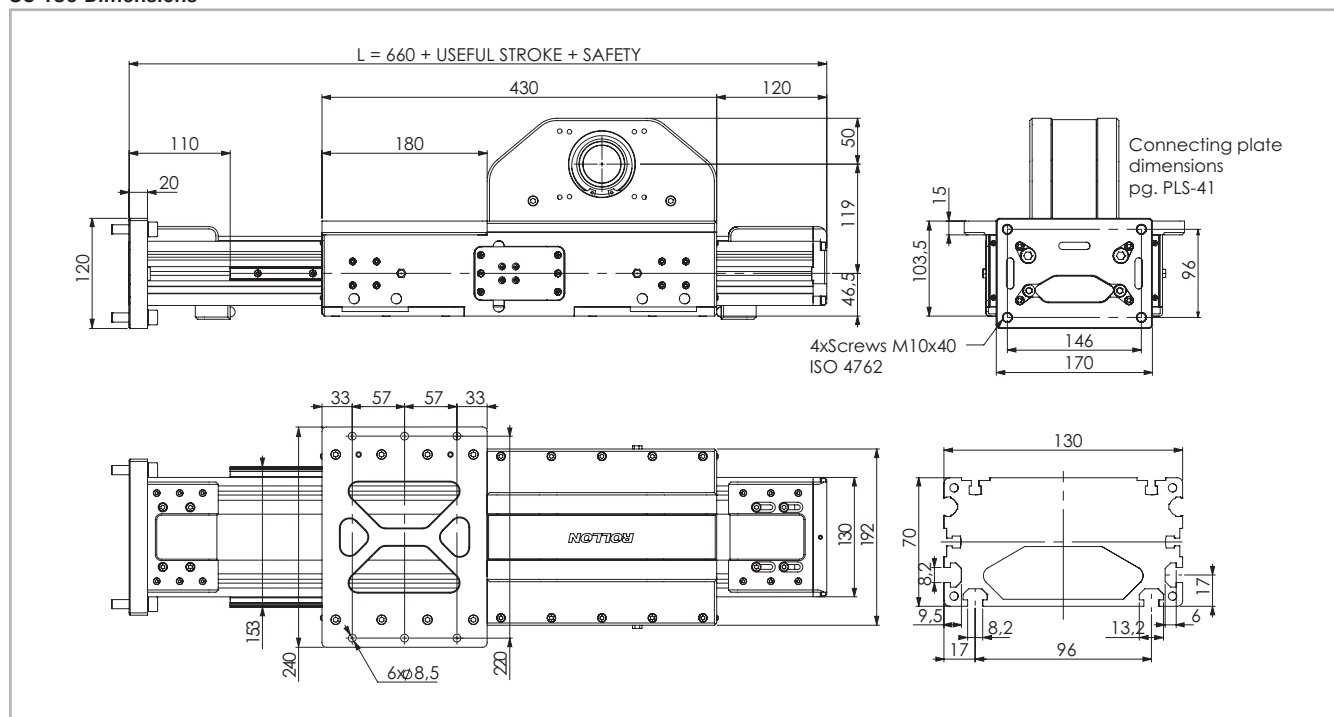| Type	Type of belt	Belt width [mm]	Weight [kg/m]
SC 100	32 AT 5	32	0.105

Tab. 87

Belt length (mm) = L + 77

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.
SC 100	1080	883	96800	45082	96800	5469	11713	11713

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

F_x in the table represents the maximum capacity of the toothed belt. For the application, the limit of transmittable torque of the shrink disk must be considered too (see page PLS-45).

Tab. 88

SC 130

SC 130 Dimensions

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

Fig. 48

Technical data

	Type
	SC 130
Max. useful stroke length [mm]	2000
Max. positioning repeatability [mm]*1	± 0.05
Max. speed [m/s]	5.0
Max. acceleration [m/s²]	50
Type of belt	50 AT 10
Type of pulley	Z 21
Pulley pitch diameter [mm]	66.84
Carriage displacement per pulley turn [mm]	210
Carriage weight [kg]	13.8
Zero travel weight [kg]	23.6
Weight for 100 mm useful stroke [kg]	1.4
Starting torque [Nm]	3
Rail size [mm]	15

*1) Positioning repeatability is dependent on the type of transmission used

Tab. 89

Moments of inertia of the aluminum body

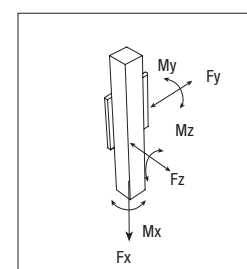| Type	I_x [10⁷ mm⁴]	I_y [10⁷ mm⁴]	I_p [10⁷ mm⁴]
SC 130	0.15	0.65	0.79

Tab. 90

Driving belt

The driving belt is manufactured from a friction resistant polyurethane and with steel cords for high tensile stress resistance.

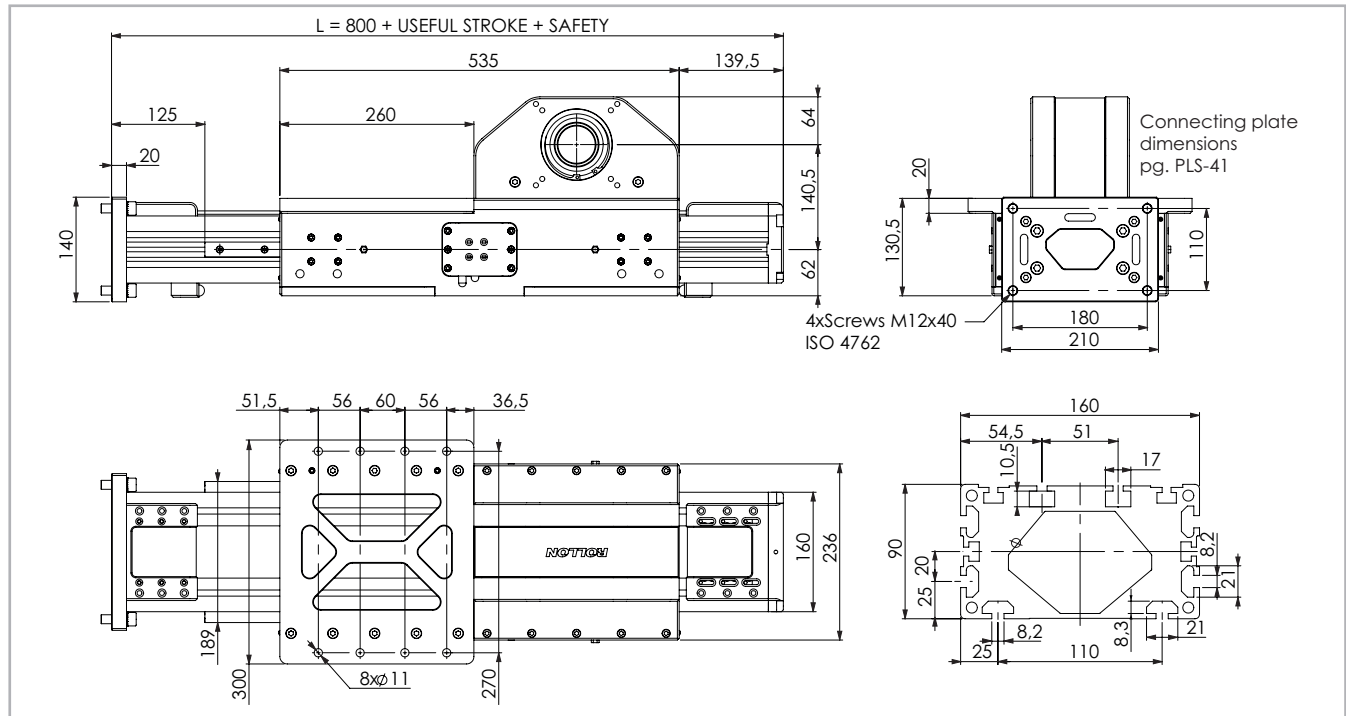| Type	Type of belt	Belt width [mm]	Weight [kg/m]
SC 130	50 AT 10	50	0.209

Tab. 91

Belt length (mm) = L + 115

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.
SC 130	3943	2446	96800	45082	96800	6921	16311	16311

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

F_x in the table represents the maximum capacity of the toothed belt. For the application, the limit of transmittable torque of the shrink disk must be considered too (see page PLS-45).

Tab. 92

> SC 160

SC 160 Dimensions

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

Fig. 49

Technical data

	Type
	SC 160
Max. useful stroke length [mm]	2500
Max. positioning repeatability [mm]*1	± 0.05
Max. speed [m/s]	5.0
Max. acceleration [m/s²]	50
Type of belt	70 AT 10
Type of pulley	Z 22
Pulley pitch diameter [mm]	70.03
Carriage displacement per pulley turn [mm]	220
Carriage weight [kg]	24.9
Zero travel weight [kg]	39.9
Weight for 100 mm useful stroke [kg]	1.8
Starting torque [Nm]	6.1
Rail size [mm]	20

*1) Positioning repeatability is dependent on the type of transmission used

Tab. 93

Moments of inertia of the aluminum body

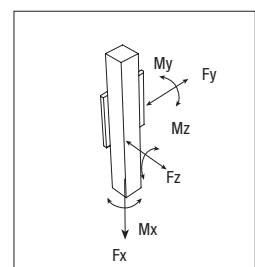| Type	I_x [10^7 mm⁴]	I_y [10^7 mm⁴]	I_p [10^7 mm⁴]
SC 160	0.383	1.313	1.696

Tab. 94

Driving belt

The driving belt is manufactured from a friction resistant polyurethane and with steel cords for high tensile stress resistance.

Type	Type of belt	Belt width [mm]	Weight [kg/m]
SC 160	70 AT 10	70	0.407

Tab. 95

Belt length (mm) = L + 106

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.
SC 160	5810	3605	153600	70798	153600	13555	31872	31872

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

F_x in the table represents the maximum capacity of the toothed belt. For the application, the limit of transmittable torque of the shrink disk must be considered too (see page PLS-45).

Tab. 96

❯ End-of-arm connecting plate

The connecting plate at end of the arm allows simple and fast switch of the accessories, reducing downtime and improving the system productivity. It can also accomodate a special extension system (available as optional) which is useful for reaching lengths longer than the maximum stroke and to make the system modular. The extension is fast and easy to assemble and center with precision on the connecting plate, thanks to self-centering keys.

SC100
Keyway A: 6X6X25
Keyway B: 6X6X20

SC130
Keyway A-B: 8X7X32

SC160
Keyway A-B: 10X8X40

Fig. 50

❯ Lubrication

SP linear units with ball bearing guides

SP Linear units are equipped with self lubricating linear ball guides. The ball bearing carriages of the SP versions are also fitted with a retention cage that eliminates "steel-steel" contact between adjacent revolving parts and prevents misalignment of these in the circuits.

Special lubrication reservoirs are mounted on the front plates of the linear blocks which continuously provide the necessary amount of grease to the ball raceways under load. These lubrication reservoirs also considerably reduce the frequency of lubrication of the module. This system guarantees a long interval between maintenances: SP version: every 5000 km or 1 year of use, based on the value reached first. If a longer service life is required or in case of high dynamic or high loaded applications please contact our offices for further verification.
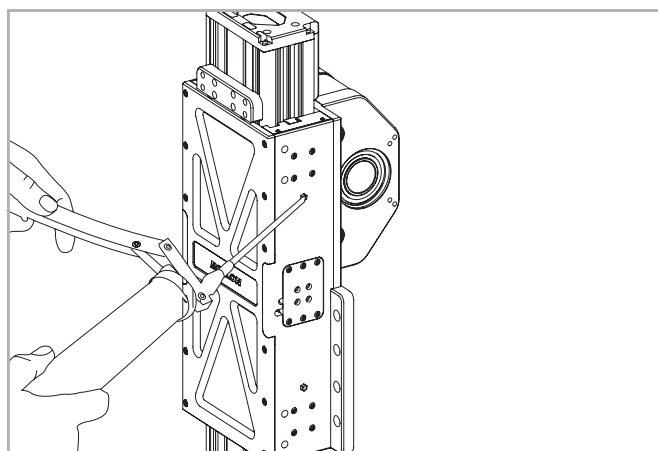

Fig. 51

- ■ Insert the tip of the grease gun in the specific grease blocks.
- ■ For lubrication of linear units use lithium soap grease NLGI 2.
- ■ For specially stressed applications or difficult enviromental conditions, lubrication should be carried out more frequently. Refer to Rollon for further advice.
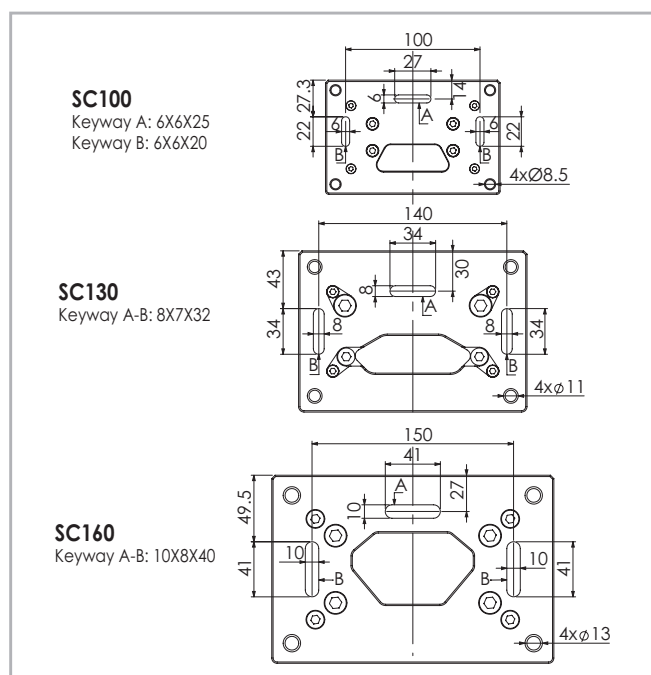
Quantity of lubricant necessary for re-lubrication of each block:

Type	Unit: [cm³]
SC 100	0.7
SC 130	0.7
SC 160	1.4

Tab. 97

❯ Hollow shafts

Hollow shaft type AC - Standard supply
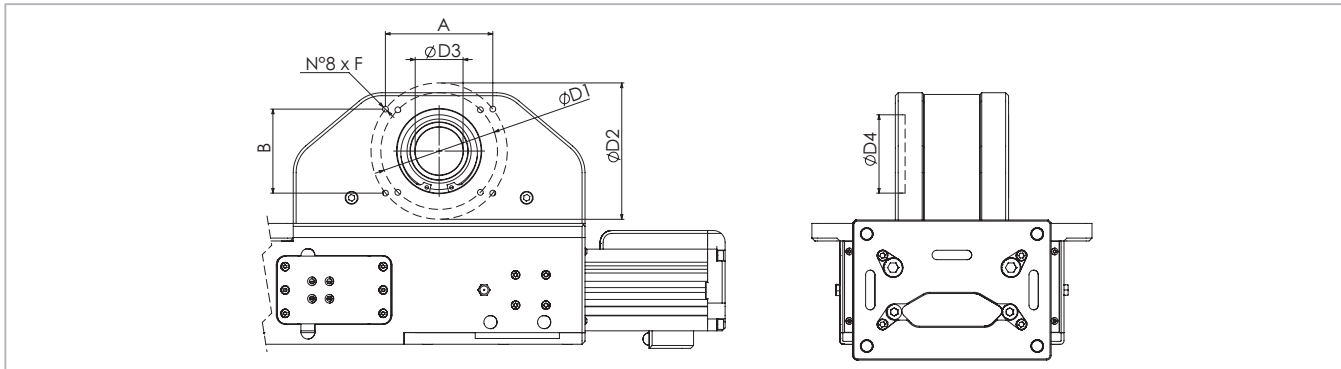
Fig. 52

Appliable to unit	Shaft type	D3	D1	D2	A x B	D4	F
SC 100	AC 34	34 H8	-	96	-	62	M6
SC 130	AC 41	41 H8	100	-	92 x 72	72	M6
SC 160	AC 50	50 H8	130	154	-	95	M8

Tab. 98

❯ Arm extension

The extension system allows to optimize and unify the stroke of the vertical axis, expecially when part of a multi-axis system, and to reach lengths longer than the maximum stroke. Thanks to dedicated connecting plates, it is easy to assemble and center with precision.

Upon delivery, Rollon provides the extension and the self-centering keys to properly connect it the main axis body. Screws to connect the accessories at the end of the extension must be bought separately.

The dimensions of the connecting plate at the end of the extension are the same of the plate at the end of the axis arm, as shown on pg. PLS-41.

Fig. 53

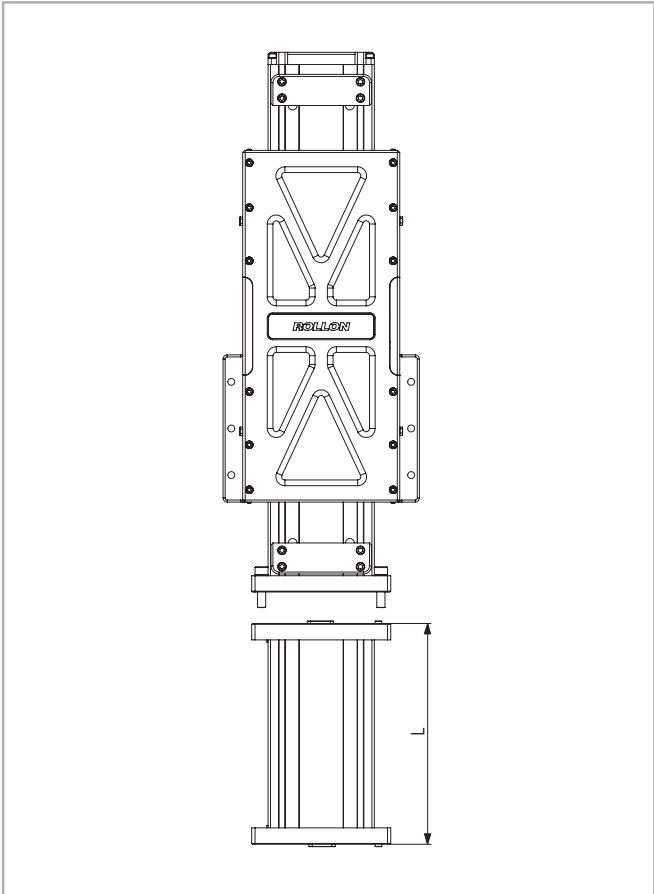| Appliable to unit	L min. [mm]	L max [mm]
SC 100	60	1000
SC 130	100	1000
SC 160	100	1000

Tab. 99

> Accessories

Simple shaft type AS

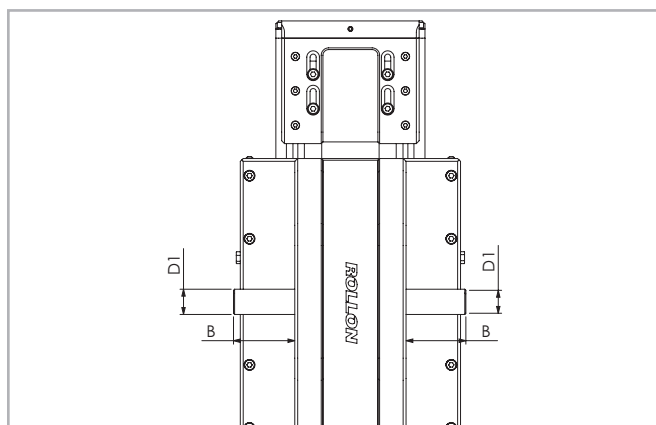Fig. 54

Position of the simple shaft can be to the left or right of the drive head.

Unit	Shaft type	B	D1	AS assembly KIT code
SC 100	AS 20	40	20h7	G003372
SC 130	AS 25	50	25h7	G003375
SC 160	AS 25	50	25h7	G000649

Tab. 100

Dedicated pneumatic clamping elements are available for every size of the SC linear units. The slots for installation are located on the left and right side of the carriage, one per side.

The clamp kit provided by Rollon includes: clamp, fixing screws and air port. It must be ordered separetely from the actuator using the code on Tab. 101. For size 100 the clamp must be requested on order and the actuator can be delivered only with the clamp assembled by Rollon. For size 130 and 160 Rollon can assemble the kit on the actuator if the unit is ordered with the head code 1RZ (see Ordering Key pg. PLS-47), otherwise the kit can be delivered as separate item and assembled later.

To properly function, the system must be connected to air pressure supply (6 bars). When the air supply is cut, the clamping elements close on the two rails with the total clamping force shown in the table below.
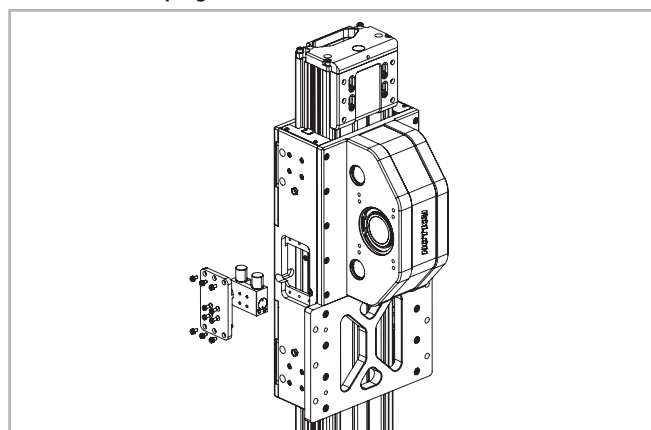
Pneumatic clamping elements

Fig. 55

Unit	Item code	Clamping force [N]
SC 100	G003495	800
SC 130	G003495	800
SC 160	G003496	1200

Tab. 101

T-nuts
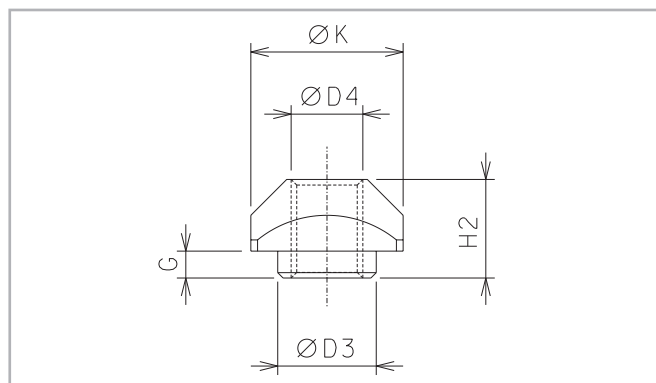
Fig. 56

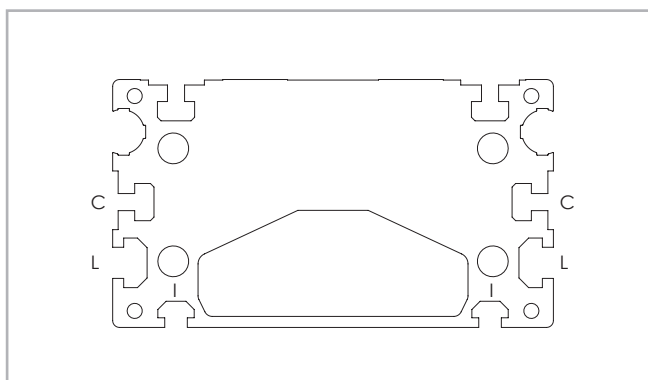Steel nuts to be used in the slots of the body

Fixing by T-nuts

Fig. 57

Unit	Slot	D3	D4	G	H2	K	Code
SC 100	L-I	-	M4	-	3.4	8	1001046
SC 130	L-I	8	M6	3.3	8.3	13	1000043
SC 130	C	-	M3	-	4	6	1001097
SC 160	L-I	-	M6	-	-	-	6000437
SC 160	L-1	-	M8	-	-	-	6001544

L = Side - **I** = Lower - **C**=Central
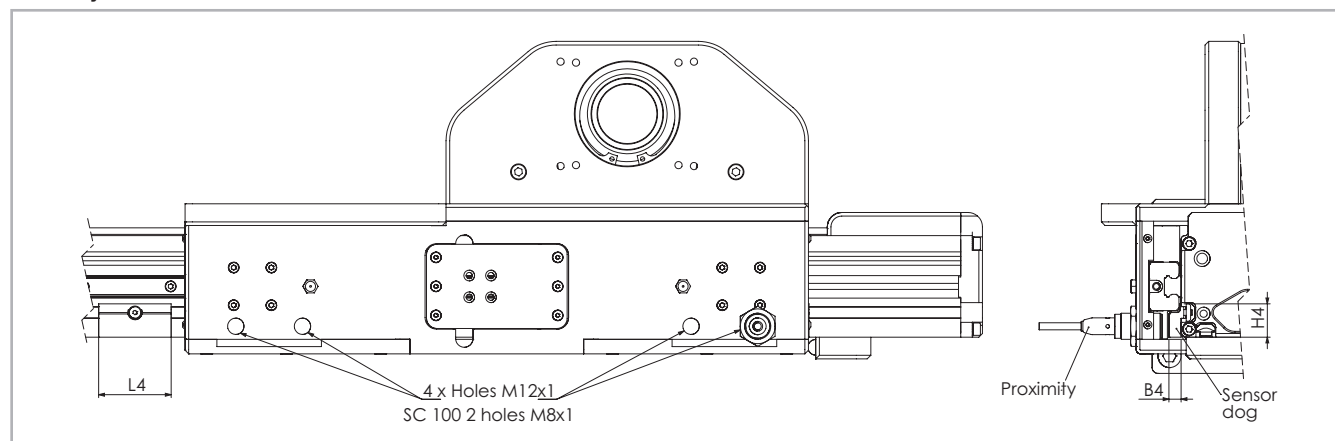
Tab. 102

Proximity

Fig. 58

Fitting of the proximity switch

Proximity switches can be mounted on threaded mounting holes that are positioned on the sides of the carriage. Do not over-torque the switches during installation as this can cause interference with the proximity switch runner and damage the sensor.

Sensor dog

L-shaped bracket in zinc-plated iron, mounted on the carriage and used for proximity switch operations.

Unit	B4	H4	L4	Sensor dog Code
SC 100	8.5	23	50	G003346
SC 130	8.4	25	50	G001862
SC 160	10	27	50	G003459

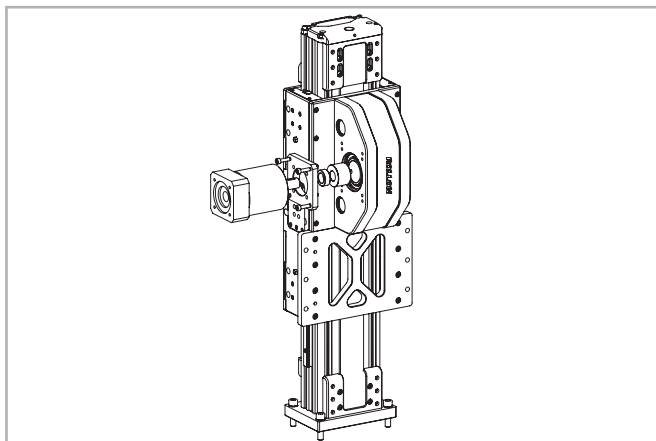Tab. 103

Gearbox assembly kit

Fig. 59

Single shrink disc

Fig. 60

Codes on the the table below refer to the gearbox assembly kit.
The kit includes: shrink disk; adapter plate; fixing hardware.

Codes on the table below refer to a shink disc ordered as single element.

Unit type	Gearbox type (not included)	Kit Code
SC100	MP080	G000529
	PE3; LP070; LC070	G000530
	MP060; PLE060	G000531
	SW030	G000748
	P3	G001162
SC130	P3	G000824
	MP080	G000826
	LC090; MPV01; NP025S; PE4	G000827
	PE3; NP015S; LC070	G001078
	SP075; PLN090	G000859
	SP060; PLN070	G000829
	SW040	G000866
SC160	AB115	G000481
	MP130	G000482
	LC120; MPV02; NP035S; PE5	G000483
	LC090; PE4; NP025S	G000525
	SP075; PLN090;P4	G000526
	MP105	G000527
	PSF5;NPS35;SP+100	G000657

Tab. 104

Unit type	Hollow shaft [mm]	Shrink disc dxD [mm]	Transmittable torque* [Nm]	Shrink disc code
SC100	34	14x34	64	6005737
		16x34	73	6005738
		19x34	87	6005739
SC130	41	16x41	101	6005733
		19x41	150	6005734
		22x41	174	6005735
		25x41	198	6005736
SC160	50	25x50	286	6005730
		25x50	324	6005731
		32x50	415	6005732

* Transmittable torque in the table represents the maximum capacity of the shrink disk. For the application, the limit of F_x must be considered too.

Tab. 105

For other gearbox type ask Rollon

> Installation option

The ball bearing guide linear drive systems of Rollon SC series linear units
enable support of loads in any direction. They can therefore be installed in
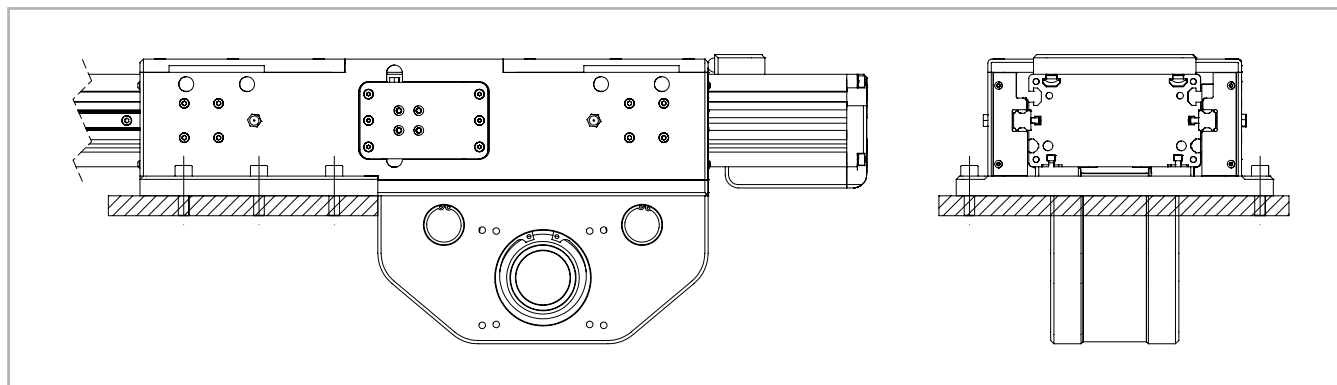any position. even horizontally as per the figure below

Direct fixing

Fig. 61

Ordering key ⌄

> ## Identification codes for the SC linear unit

S	13 10=100 13=130 16=160	1RA	1RZ	2000	1R	
					Linear motion system *see pg. PLS-37*	
				L = total length of the unit		
			Driving head: version for pneumatic clamping			
		Driving head: standard version				
	Linear unit size *see from pg. PLS-38 to pg. PLS-40*					
Linear unit series SC *see pg. PLS-35*						

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

[Configure Actuator]

Multiaxis systems ⌄

Rollon now offers a set of fittings including brackets and cross plates, to enable multiaxis units to be built. The SC series is also pre-engineered to facilitate direct connection with the units of the ROBOT series. In addition to standard elements, Rollon also provides plates for special applications.

Application examples:

Two axis - X-Y system

A

Three axis - 2X-Y-Z system

C

A - Linear units: X Axis - 2 ELM 80, Y Axis - 1 ROBOT 160
  Connection part: 2 kits of fixing brackets for ROBOT 160 on to the carrieages of ELM 80.

C - Linear units: X Axis - 2 ELM 65, Y Axis - 1 ROBOT 130, Z Axis - 1 SC 100
  Connection part: 2 kits of fixing brackets for ROBOT 130 on to the carrieages of ELM 65. The SC 100 unit is directly assembled on to the ROBOT 130 unit without further elements.
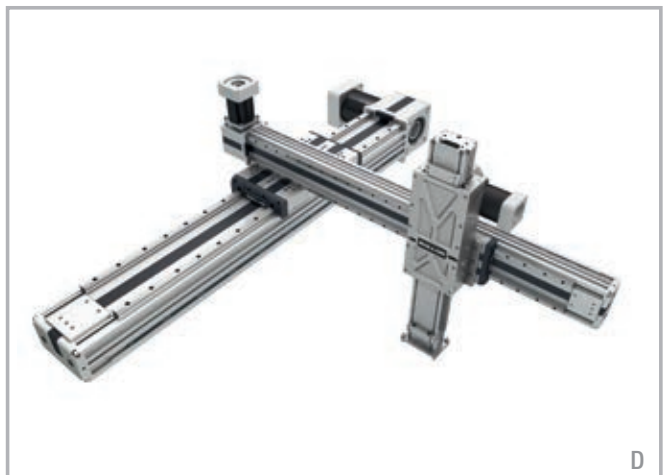
Two axis - Y-Z system

B

Three axis - X-Y-Z system

D

B - Linear Axis: Y Axis - ROBOT 220, Z Axis - SC 160
  Connection part: None
  The SC 160 unit is directly assembled on to the ROBOT 220 unit without further elements

D - Linear units: X axis - ROBOT 220, Y axis - ROBOT 130, Z axis - SC 100
  Connection part: 1 kit of fixing brackets for ROBOT 130 unit to the carriage of the ROBOT 220 unit. The SC 100 unit is directly assembled on to the ROBOT 130 unit without further elements.