ROLLON®
BY TIMKEN

Plus System

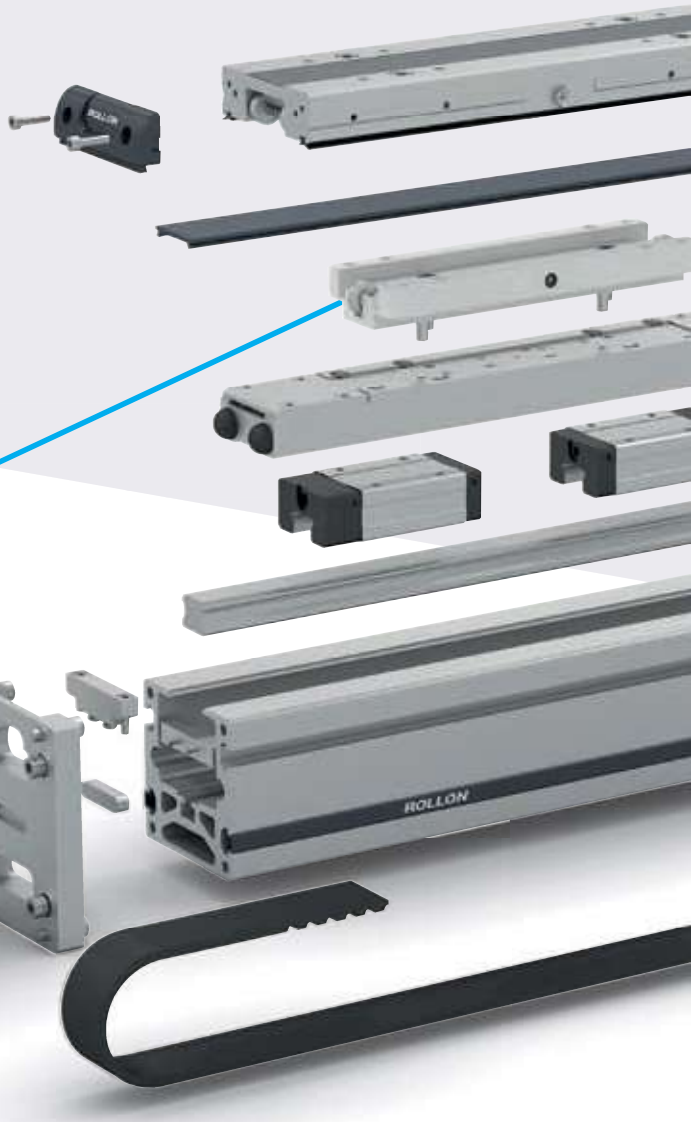
SC Series

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.

SC series

SC series description

Fig. 45

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.

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

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

Tab. 83

Mechanical characteristics

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

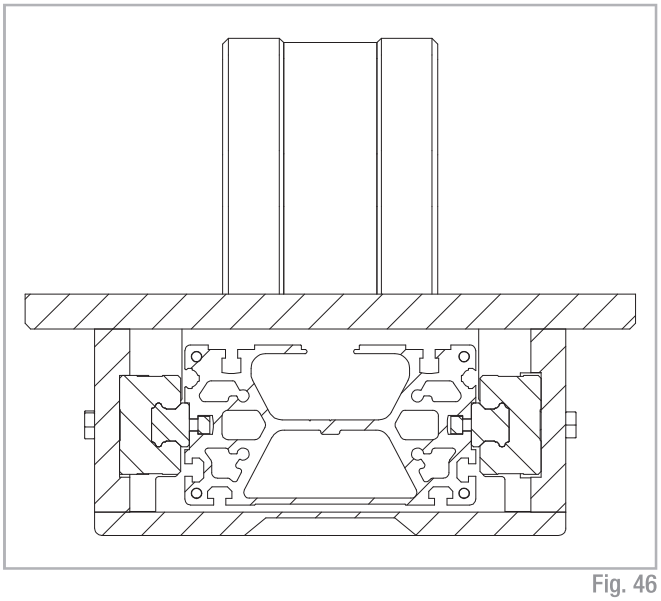


Fig. 46

The new driving head

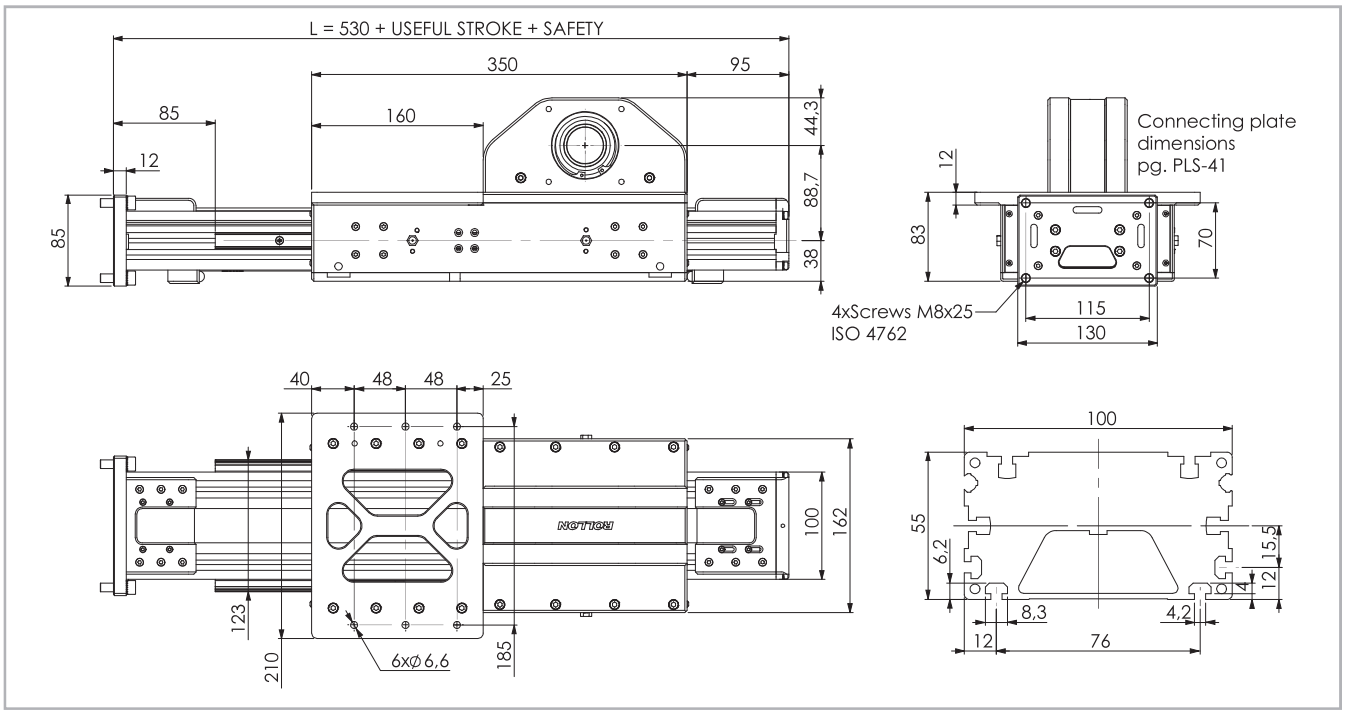
The new driving head is designed to allow high freedom while sizing the application and mounting the gearbox on the SC series linear actuators. With the new head, it is possible to assembly the gearbox on either the right or the left side of the actuator by means of a standard assembly kit.

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-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

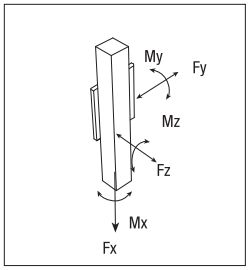
Driving belt

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

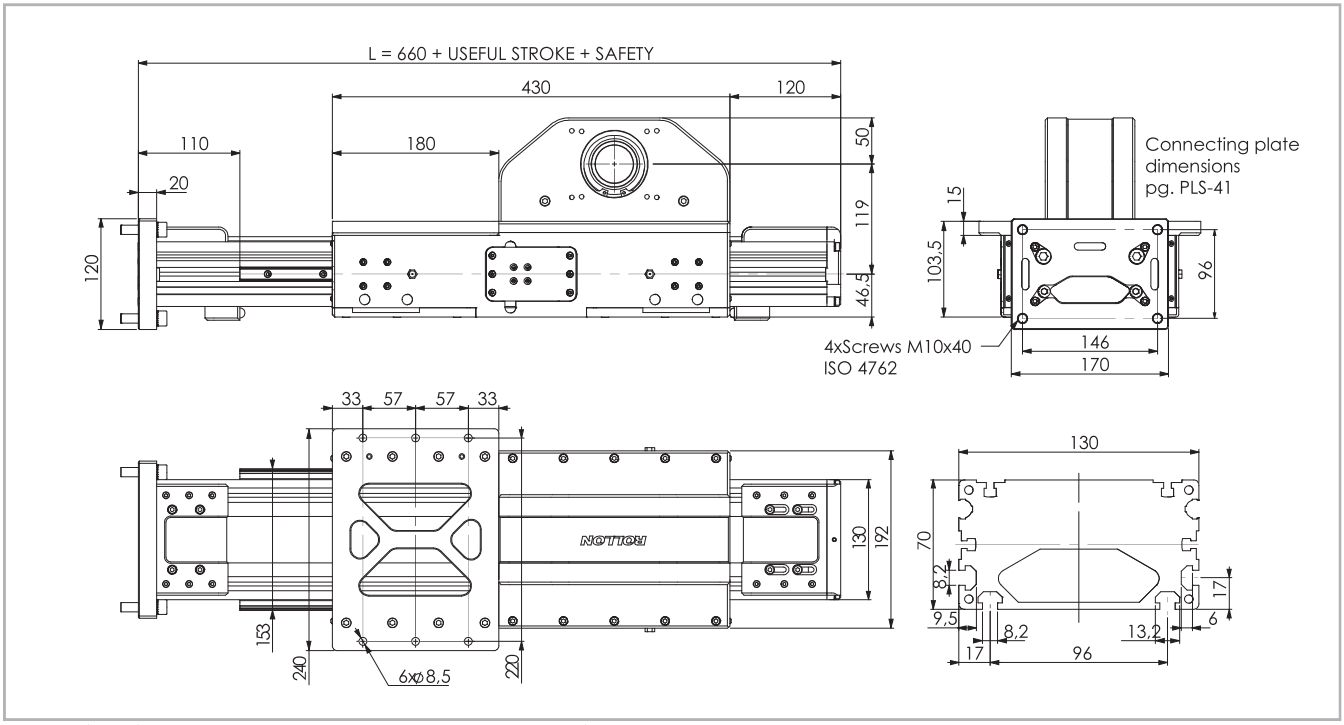
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 88

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).

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 [10^7 mm⁴]	I_y [10^7 mm⁴]	I_p [10^7 mm⁴]
SC 130	0.15	0.65	0.79

Tab. 90

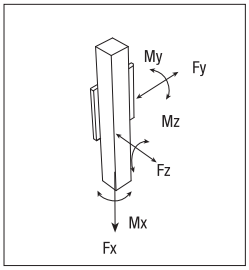
Driving belt

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

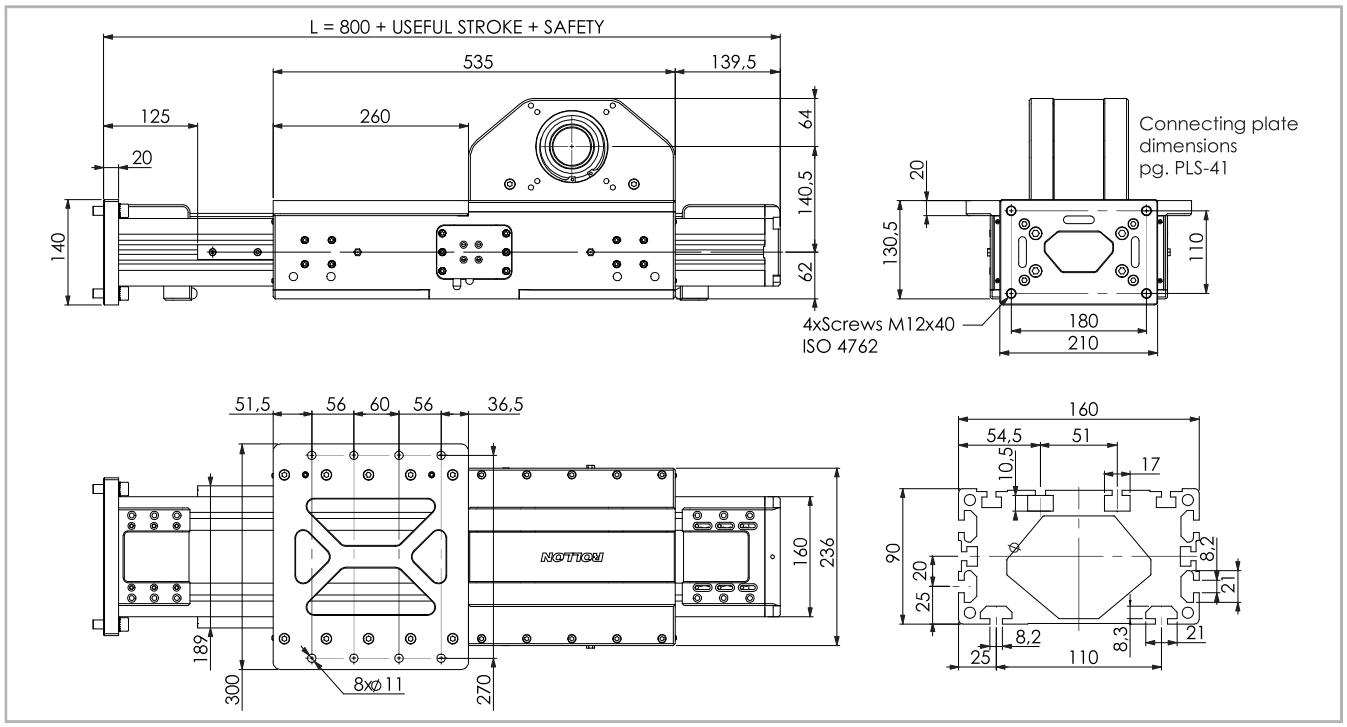
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 92

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).

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

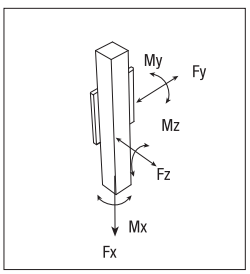
Driving belt

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

Tab. 96

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).

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.

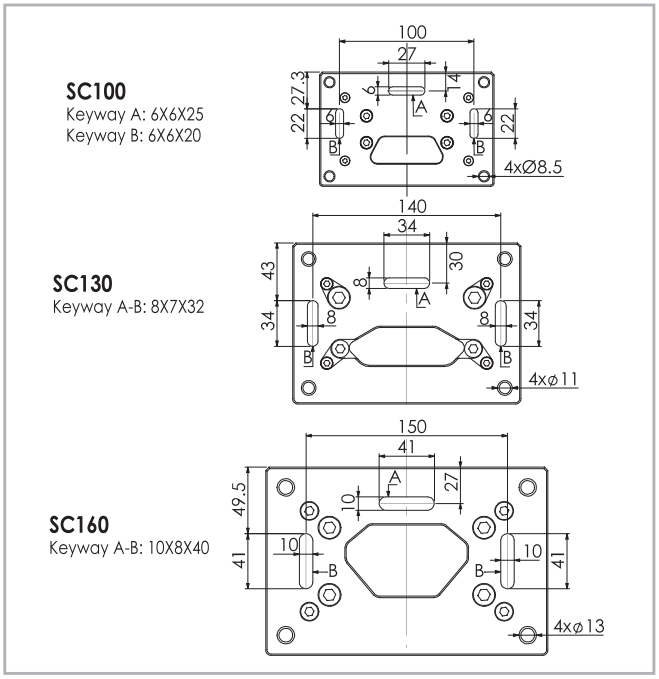


Fig. 50

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.

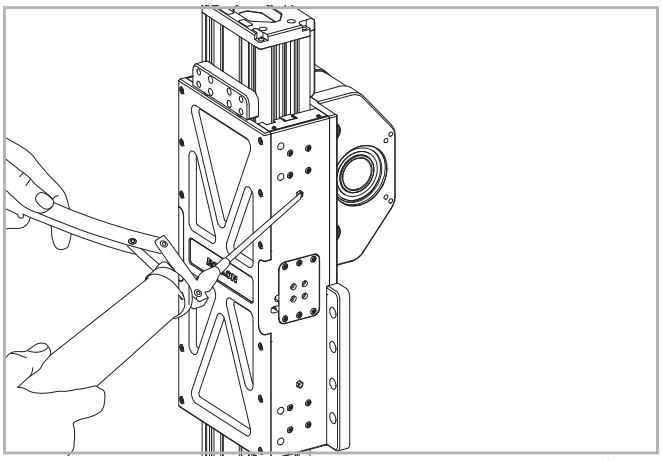


Fig. 51

- 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

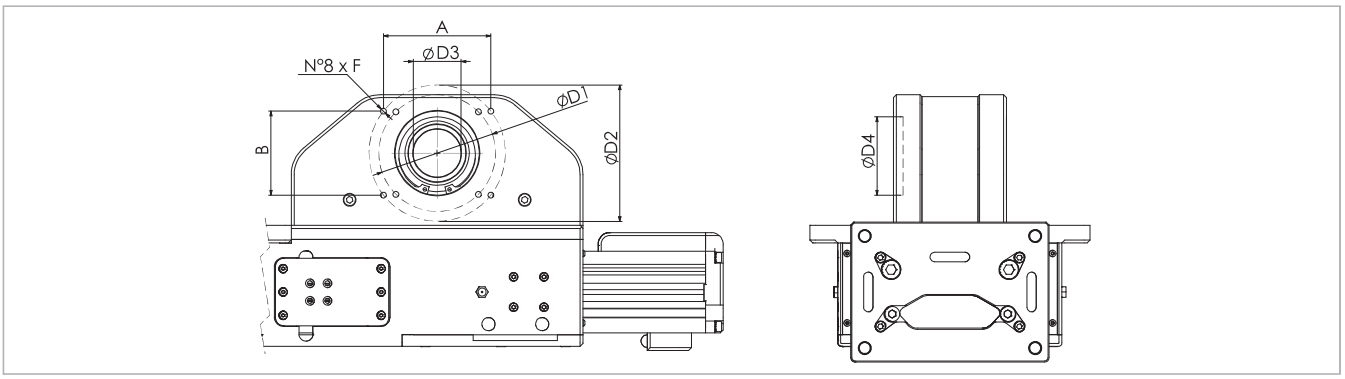


Fig. 52

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.

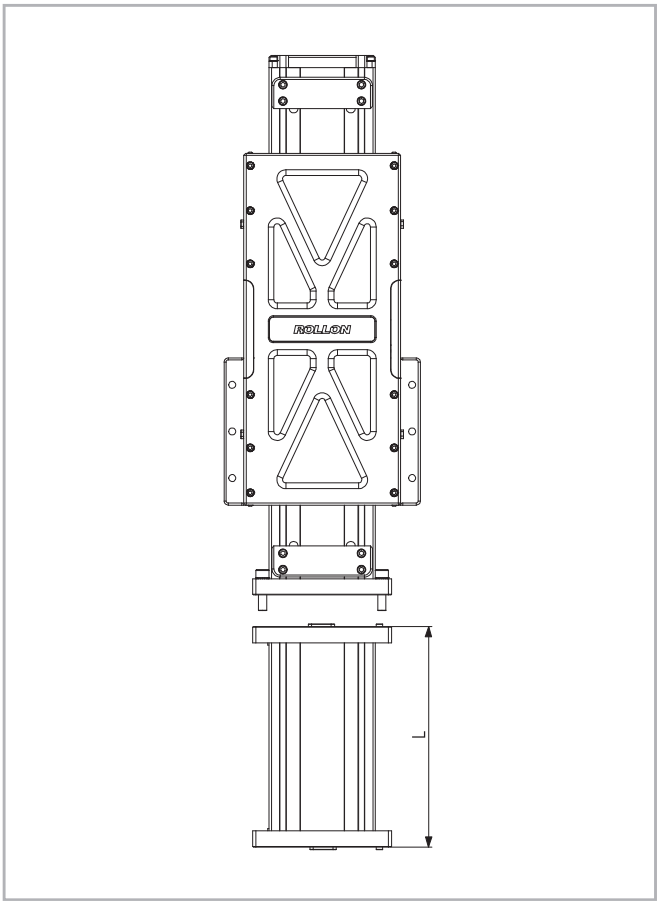


Fig. 53

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

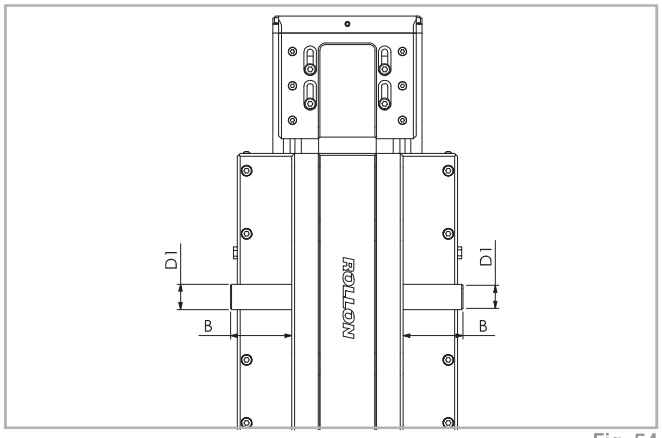


Fig. 54

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

Pneumatic clamping elements

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.

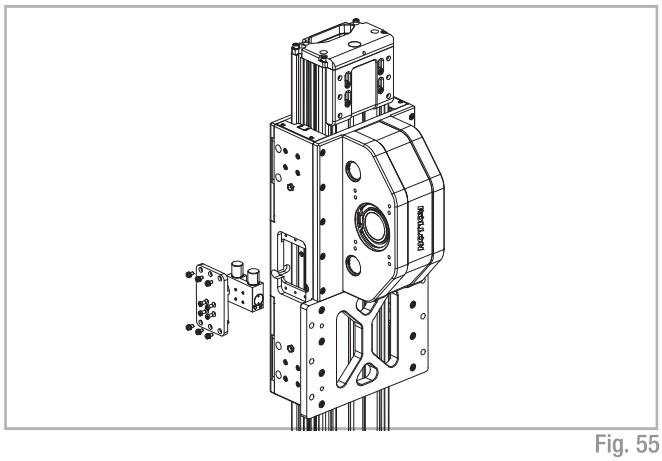


Fig. 55

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.

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

Tab. 101

T-nuts

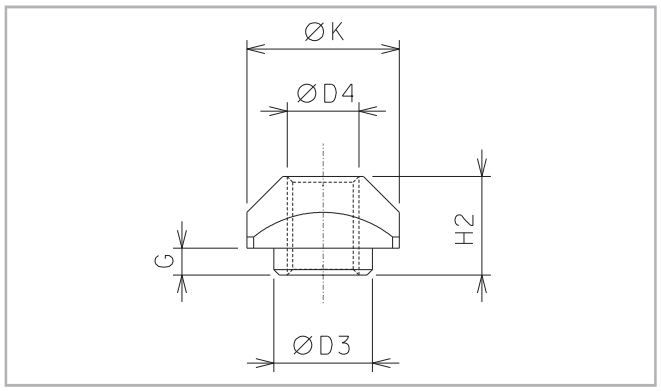


Fig. 56

Steel nuts to be used in the slots of the body

Fixing by T-nuts

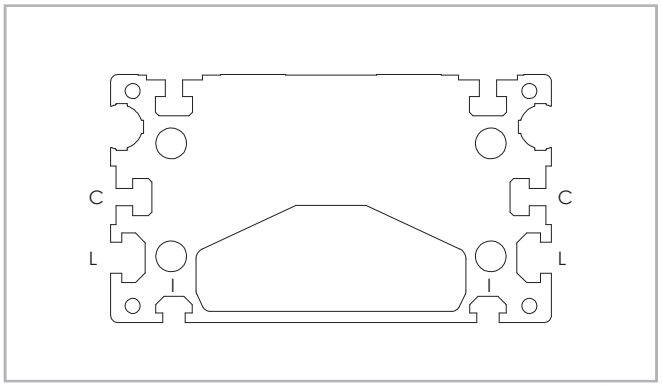


Fig. 57

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

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

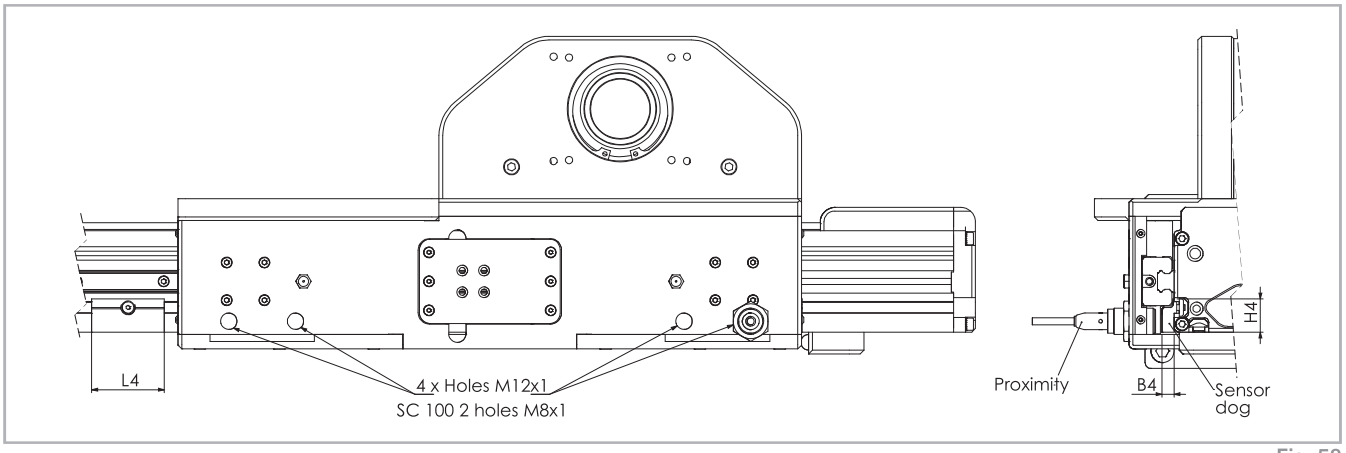


Fig. 58

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

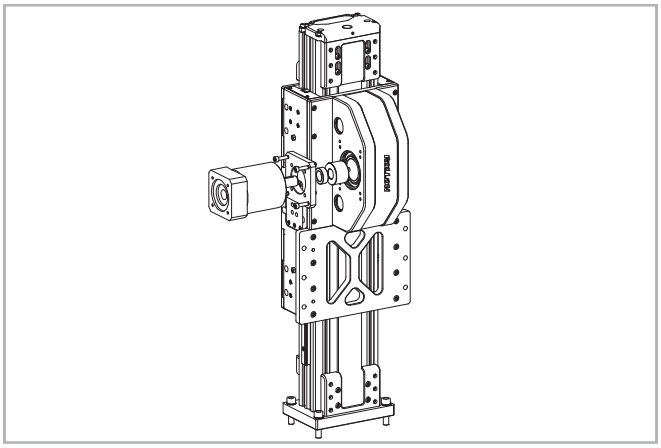


Fig. 59

Single shrink disc

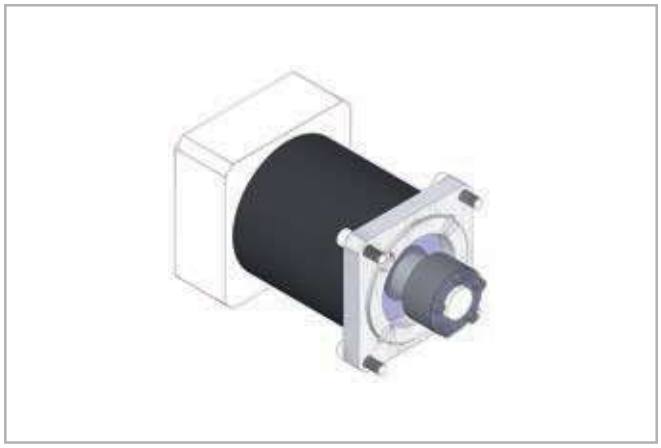


Fig. 60

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

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

For other gearbox type ask Rollon

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

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

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

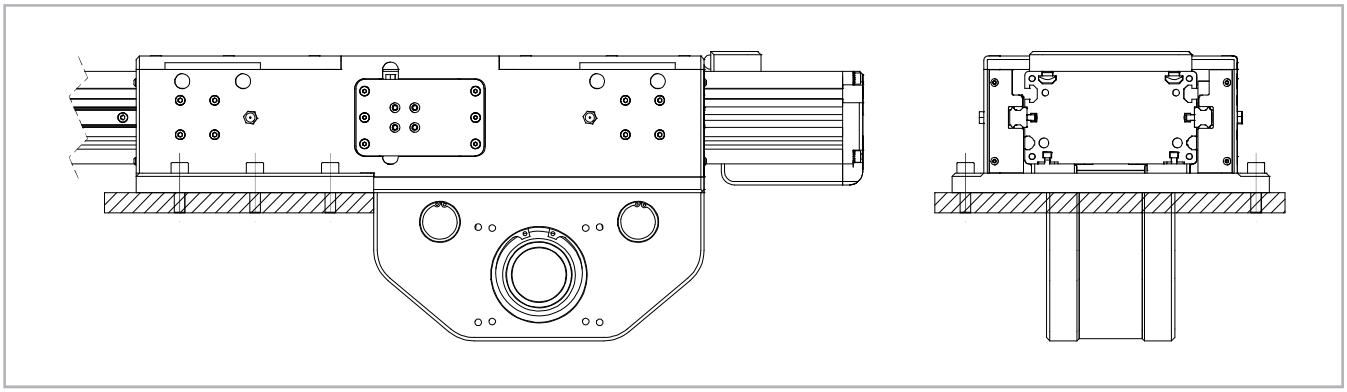


Fig. 61

Ordering key

Identification codes for the SC linear unit

S	13 10=100 13=130 16=160	1RA	2000	1R	
				Linear motion system *see pg. PLS-37*	
			L = total length of the unit		
		Driving head code			
	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

Previously, customers wishing to build multiaxis units have had to design, draw and manufacture all the elements necessary to assemble two or more axis. 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 - Linear units: X axis: 2 ELM 80 SP... Y axis: 1 ROBOT 160 SP...
Connection part: 2 kits of fixing brackets for ROBOT 160 SP... on to the carrieages of ELM 80 SP...

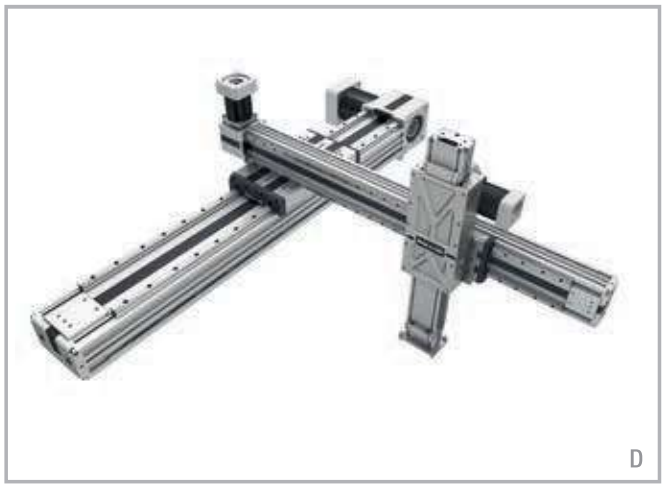
Three axis - X-Y-Z system

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

Two axis - Y-Z system

B - Linear units: X axis: 1 ROBOT 220 SP... Z axis: 1 SC 160
Connection part: None
The SC 160 unit is directly assembled on to the ROBOT 220 SP... unit without further elements

Three axis - X-Y-Z system



D - Linear units: X axis: 1 ROBOT 220 SP... Y axis: 1 ROBOT 130 SP... Z axis: SC 65
Connection part: 1 kit of fixing brackets for ROBOT 130 SP... unit to the carriage of the ROBOT 220 SP... unit. The SC 65 unit is directly assembled on to the ROBOT 130 SP... unit without further elements.