

SC series



> SC series description



Fig. 53

SC

The SC series linear units are specifically designed for vertical motion in gantry applications, or in applications where the aluminum profile must move while the carriage remains fixed.

Available in three sizes: 65 mm, 130 mm and 160 mm, the SC linear actuator has a self-supporting structure made by a profile (square profile for SC 65) of extruded and anodized aluminum.

The SC is a stiff vertical system, guaranteed by the use of two parallel linear guides, four "maintenance-free" caged ball bearing blocks and a wide belt drive.

The SC Series has been designed for heavy loads and high cycle applications. It is specifically designed and configured to be compatible and assembled with the ROBOT Series actuators without the need for adaptor plates.

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. One of the two configurations shown on page PLS-48 can be used for fast, simple assembly of the SC series. 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	Impurities
Remainder	0.35-0.60	0.30-0.60	0.30	0.10	0.10	0.10	0.05-0.15

Tab. 108

Physical characteristics

Density	Coeff. of elasticity	Coeff. of thermal expansion (20°-100°C)	Thermal conductivity (20°C)	Specific heat (0°-100°C)	Resistivity	Melting point
$\frac{\text{kg}}{\text{dm}^3}$	$\frac{\text{kN}}{\text{mm}^2}$	$\frac{10^{-6}}{\text{K}}$	$\frac{\text{W}}{\text{m} \cdot \text{K}}$	$\frac{\text{J}}{\text{kg} \cdot \text{K}}$	$\Omega \cdot \text{m} \cdot 10^{-9}$	°C
2.7	69	23	200	880-900	33	600-655

Tab. 109

Mechanical characteristics

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

Tab. 110

> 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

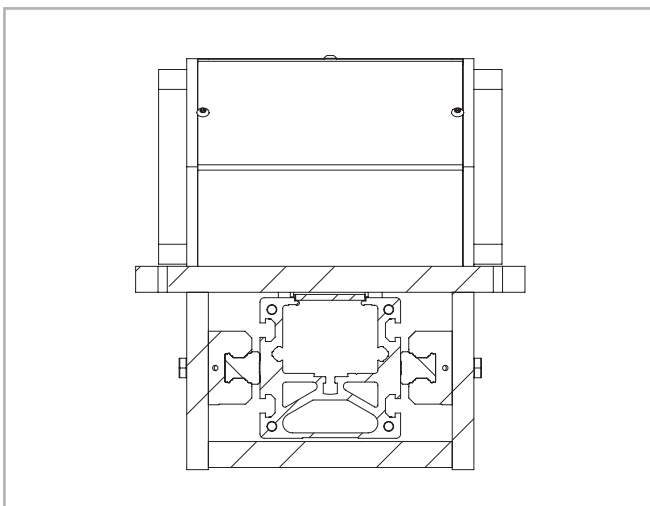
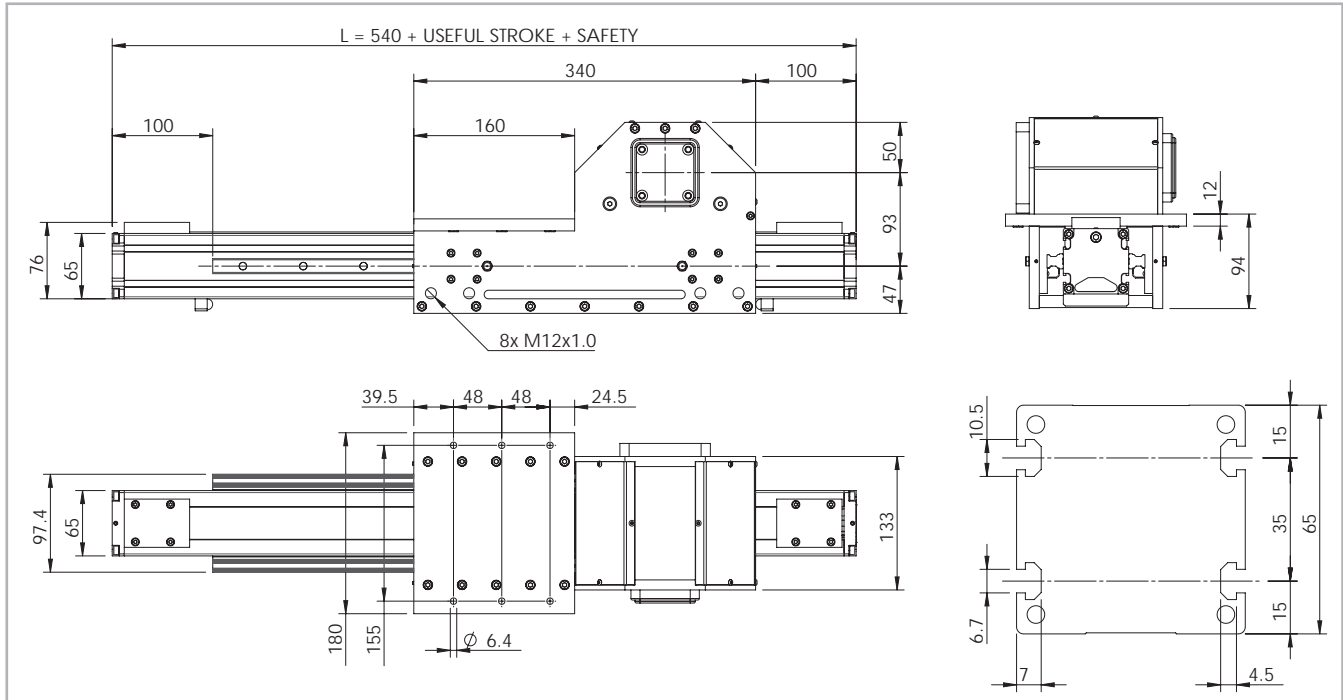


Fig. 54

> SC 65 SP

SC 65 SP Dimensions



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

Fig. 55

Technical data

	Type
	SC 65 SP
Max. useful stroke length [mm]	1500
Max. positioning repeatability [mm]*1	± 0.05
Max. speed [m/s]	5.0
Max. acceleration [m/s ²]	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]	7.8
Zero travel weight [kg]	11.6
Weight for 100 mm useful stroke [kg]	0.7
Starting torque [Nm]	1.3
Rail size [mm]	15

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

Tab. 111

SC 65 SP - 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 65 SP	1344	883	96800	45082	96800	3775	11616	11616

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

Tab. 114

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]
SC 65	0.06	0.09	0.15

Tab. 112

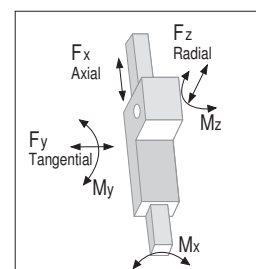
Driving belt

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 65	32 AT 5	32	0.105

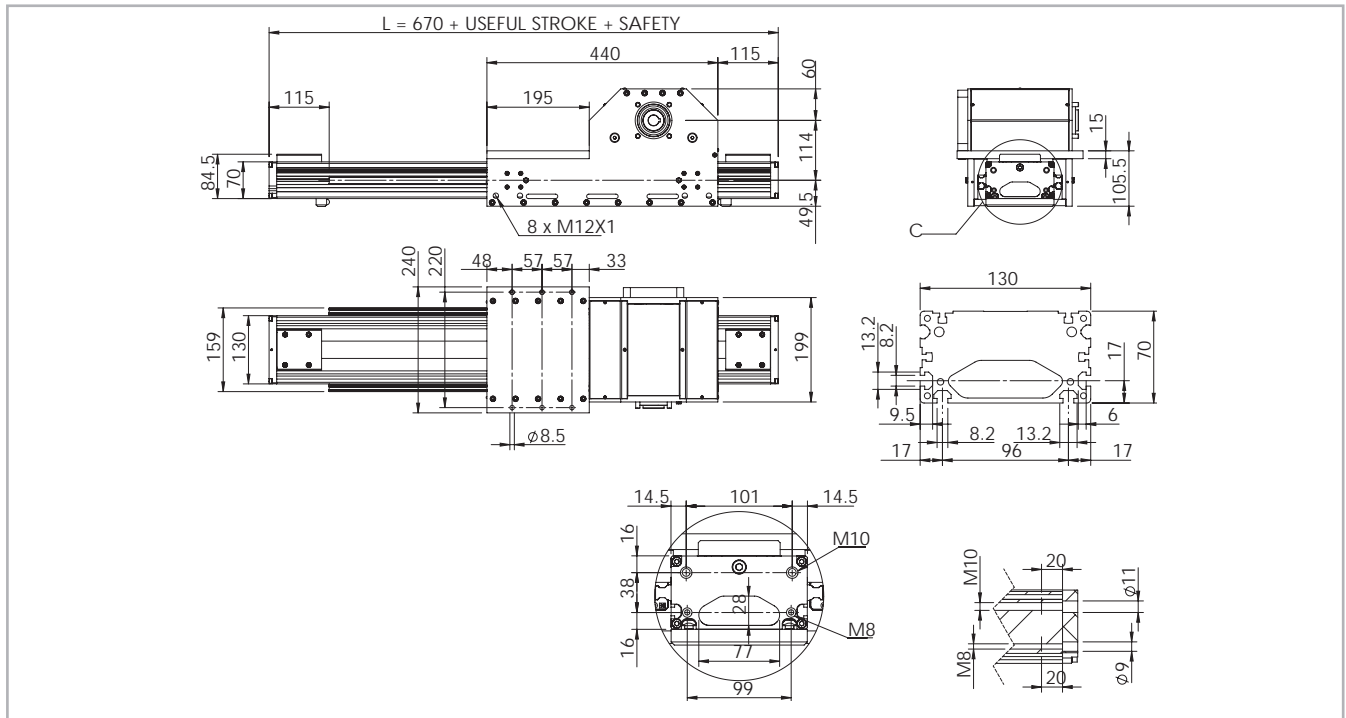
Tab. 113

Belt length (mm) = L + 85



> SC 130 SP

SC 130 SP Dimensions



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

Fig. 56

Technical data

	Type
	SC 130 SP
Max. useful stroke length [mm]	2000
Max. positioning repeatability [mm]*1	± 0.05
Max. speed [m/s]	5.0
Max. acceleration [m/s ²]	50
Type of belt	50 AT 10
Type of pulley	Z 20
Pulley pitch diameter [mm]	63.66
Carriage displacement per pulley turn [mm]	200
Carriage weight [kg]	13.5
Zero travel weight [kg]	23
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. 115

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]
SC 130	0.15	0.65	0.79

Tab. 116

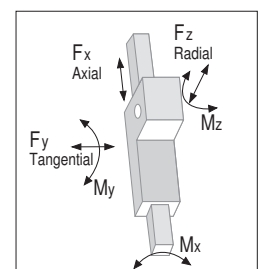
Driving belt

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. 117

Belt length (mm) = L + 101



SC 130 SP - Load capacity

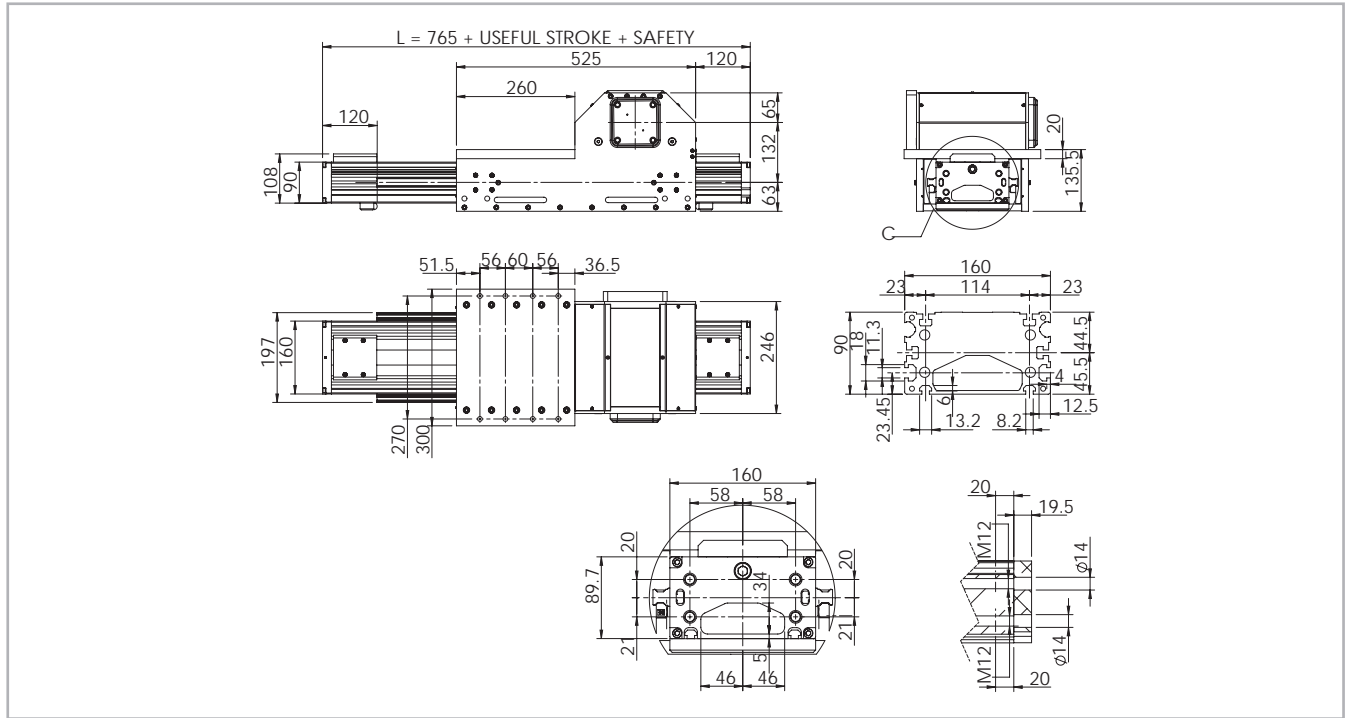
Type	F _x [N]		F _y [N]		F _z [N]	M _x [Nm]	M _y [Nm]	M _z [Nm]
	Stat.	Dyn.	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
SC 130 SP	3735	2160	96800	45082	96800	6921	16311	16311

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

Tab. 118

> SC 160 SP

SC 160 SP Dimensions



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

Fig. 57

Technical data

	Type
	SC 160 SP
Max. useful stroke length [mm]	2500
Max. positioning repeatability [mm]*1	± 0.05
Max. speed [m/s]	5.0
Max. acceleration [m/s ²]	50
Type of belt	70 AT 10
Type of pulley	Z 25
Pulley pitch diameter [mm]	79.58
Carriage displacement per pulley turn [mm]	250
Carriage weight [kg]	32
Zero travel weight [kg]	48
Weight for 100 mm useful stroke [kg]	1.9
Starting torque [Nm]	6.1
Rail size [mm]	20

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

Tab. 119

SC 160 SP - 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 SP	6682	4428	153600	70798	153600	13555	31104	31104

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

Tab. 122

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]
SC 160	0.37	1.50	1.88

Tab. 120

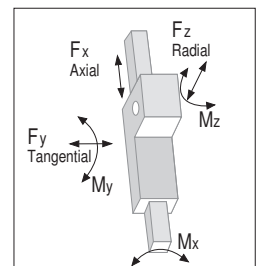
Driving belt

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. 121

Belt length (mm) = L + 121



> 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.

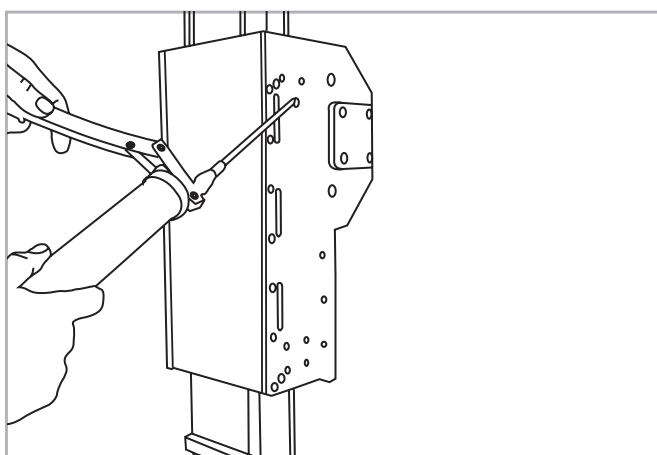


Fig. 58

- 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 environmental

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

Type	Unit: [cm ³]
SC 65	0.7
SC 130	0.7
SC 160	1.4

Tab. 123

conditions, lubrication should be carried out more frequently. Refer to Rollon for further advice.

> Planetary gears

Assembly to the right or to the left of the driving head

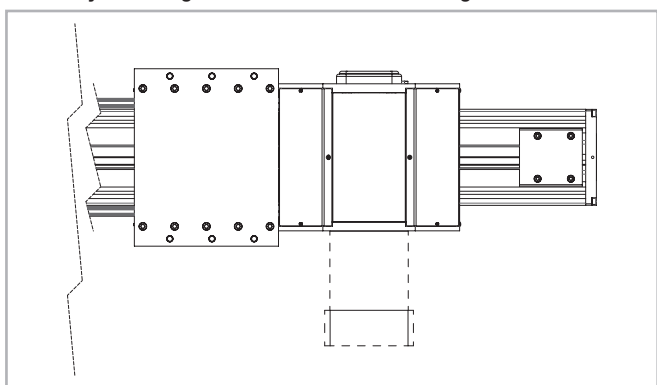


Fig. 59

Motion can be achieved with standard transmission types as follows:

- Planetary gears
- Worm gears
- Versions with simple shaft
- Versions with hollow shaft

Versions with planetary gears

Planetary gears are used for highly dynamic robot, automation and handling applications involving stressing cycles and with high level precision requirements. Standard models are available with a clearance ranging from 3' to 15' and with a reduction ratio from 1:3 to 1:1000. For assembly of non-standard planetary gear, contact our offices.

Type	Left	Right	Gear type
SC 65	4EA	4CA	MP 080
SC 130	4EA	4CA	MP 105
SC 160	4EA	4CA	MP 130

Tab. 124

> Simple shaft version

Simple shaft type AS

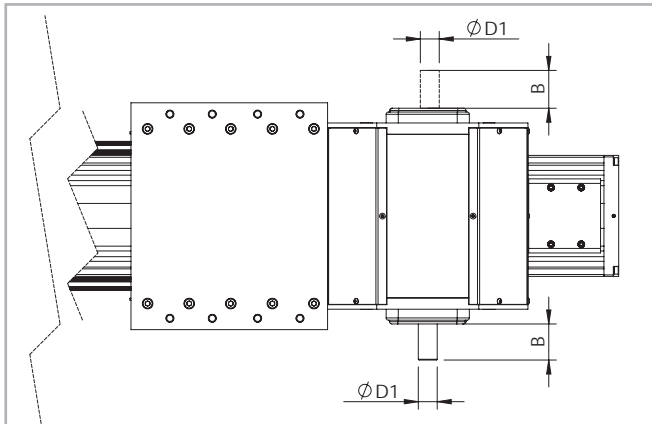


Fig. 60

Unit	Shaft type	B	D1
SC 65	AS 20	40	20h7
SC 130	AS 25	50	25h7
SC 160	AS 25	50	25h7

Tab. 125

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

Unit	Shaft type	Head code AS left	Head code AS right	Head code double AS
SC 65	AS 20	1EA	1CA	1AA
SC 130	AS 25	1EA	1CA	1AA
SC 160	AS 25	1EA	1CA	1AA

Tab. 126

> Hollow shafts

AC hollow shaft type

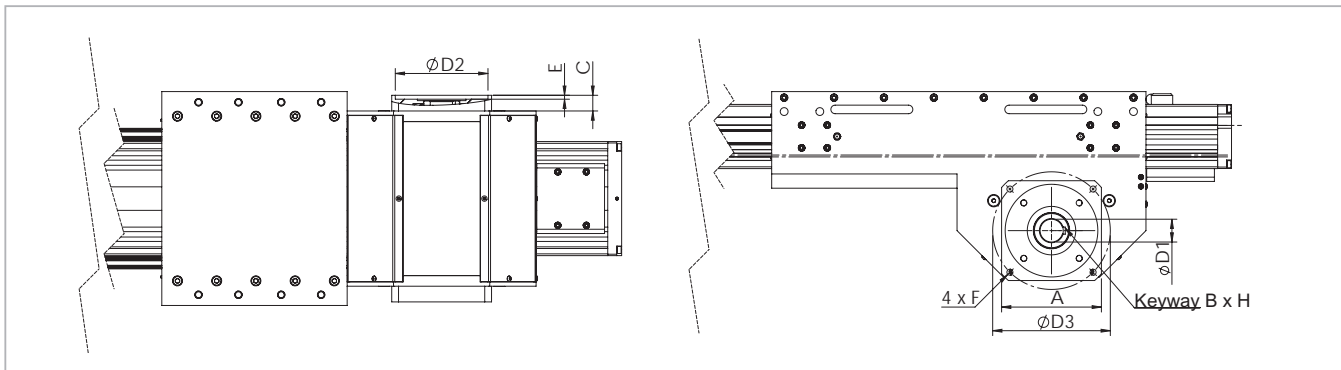


Fig. 61

Unit mm

Applicable to unit	Shaft type	D1	D2	D3	A	C	E	F	Keyway B x H	Head code
SC 65 SP	AC 19	19H7	80	100	90	13	3	M6	6 x 6	2AA
SC 65 SP	AC 20	20H7	80	100	90	13	3	M6	6 x 6	2BA
SC 130 SP	AC 20	20H7	80	100	115	19	4.5	M6	6 x 6	2AA
SC 130 SP	AC 25	25H7	110	130	115	19	4.5	M8	8 x 7	2BA
SC 160 SP	AC 32	32H7	130	165	140	22	5.5	M10	10 x 8	2AA

Tab. 127

An (optional) connection flange is required to fit the standard reduction units selected by Rollon. For further information contact our offices

> Accessories

Fixing by brackets

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. To install the SC series units, we recommend use of one of the two systems indicated below:

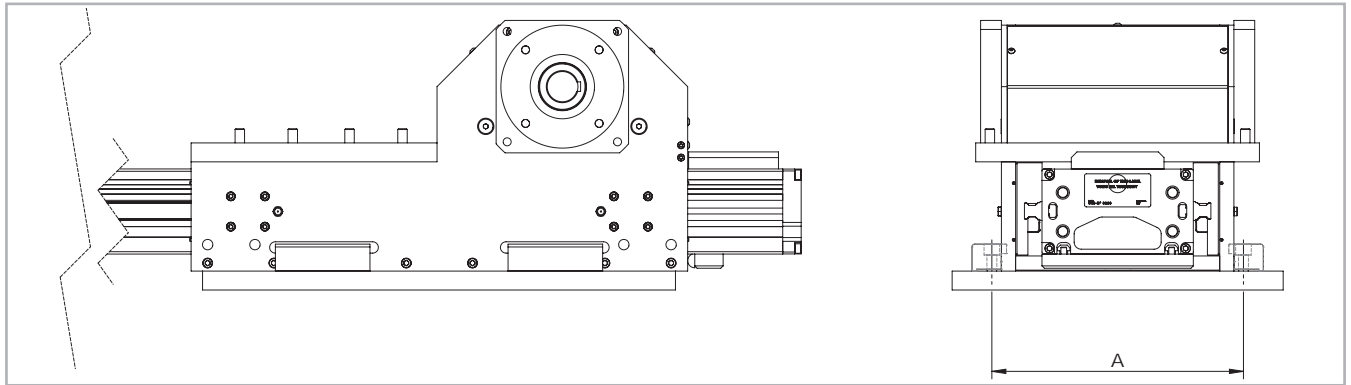


Fig. 62

Fixing brackets

Material: Anodized aluminum

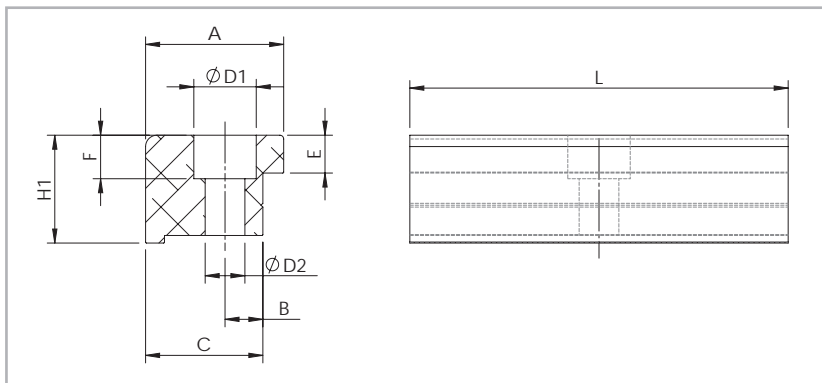


Fig. 63

Unit	A (mm)
SC 65 SP	147
SC 130 SP	213
SC 160 SP	266

Tab. 128

Unit	A	B	C	E	F	D1	D2	H1	L	Code
SC 65 SP	20	6	16	10	5.5	9.5	5.3	14	35	1001491
SC 130 SP	20	7	16	12.7	7	10.5	6.5	18.7	50	1001491
SC 160 SP	36.5	10	31	18.5	10.5	16.5	10.5	28.5	100	1001233

Tab. 129

Direct fixing

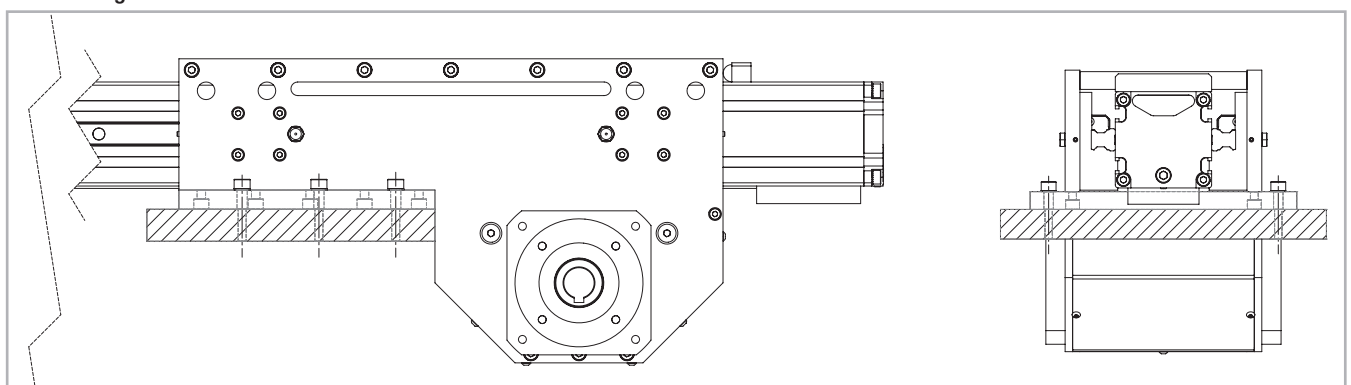


Fig. 64
PLS-39

T-nuts

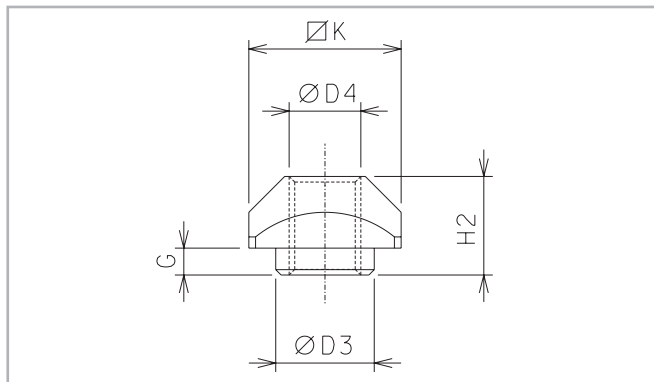


Fig. 65

Steel nuts to be used in the slots of the body

Fixing by T-nuts

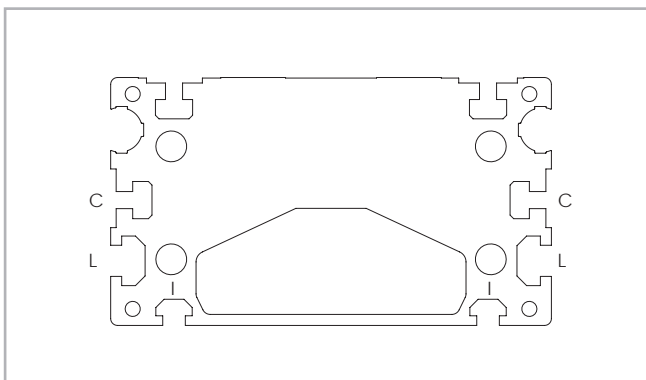


Fig. 66

Warning:

Do not fix the linear units through the drive ends.

Unit	Slot	D3	D4	G	H2	K	Code
SC 65	L	6.7	M5	2.3	6.5	10	1000627
SC 130	L-I	8	M6	3.3	8.3	13	1000043
SC 130	C	-	M3	-	4	6	1001097
SC 160	I	8	M6	3.3	8.3	13	1000043
SC 160	L	11	M8	2.8	10.8	17	1000932
SC 160	C	-	M6	-	5.8	13	1000910

L = Side - I = Lower - C=Central

Tab. 130

Proximity

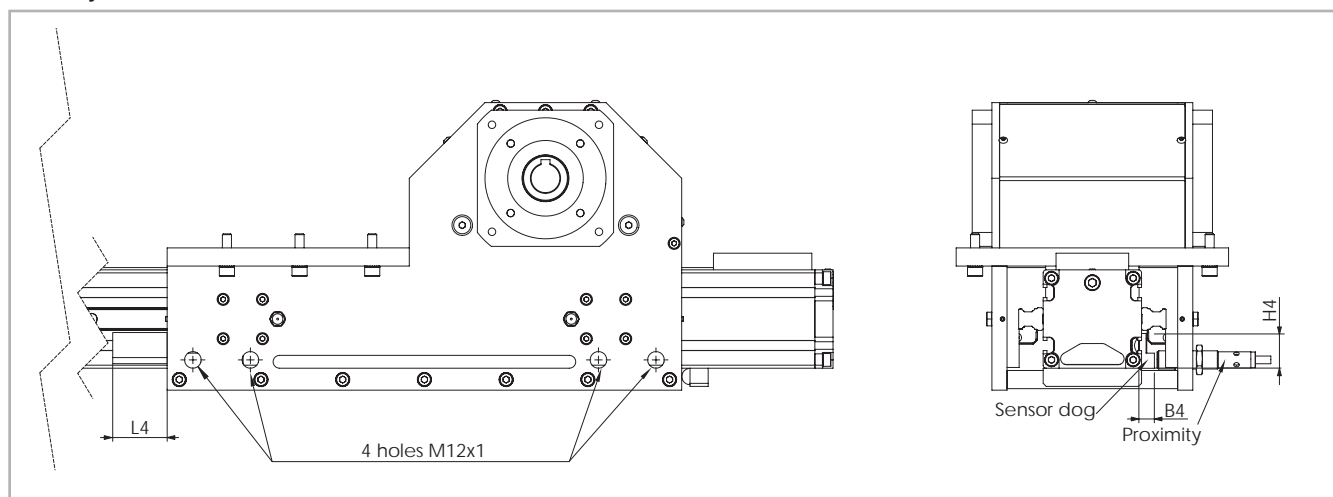


Fig. 67

Fitting of the proximity switch

Proximity switches can be mounted on four 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 65	8.5	23	50	G001997
SC 130	8.4	25	50	G001862
SC 160	10	27	50	G000272

Tab. 131

Protections

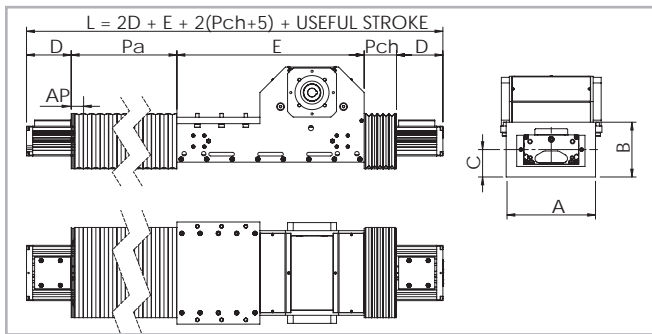


Fig. 68

Protection of ball bearing guides

The four ball bearing blocks have seals on both sides and an additional scraper can be fitted for very dusty conditions.

Special protection

For use in hostile conditions, the SC can be fitted with a bellows system in addition to the standard protection. The bellows is fixed to the carriage and drive ends with hook and loop fasteners for ease of assembly and disassembly.

The total length (L) of the linear unit will vary:

See Fig. 68.

Dimensions (mm)

Unit	A	B	C	D	E
SC 65	135	109	54,5	100	340
SC 130	212	130	64	115	440
SC 160	248	150	73	120	525

Tab. 132

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.

Ordering key

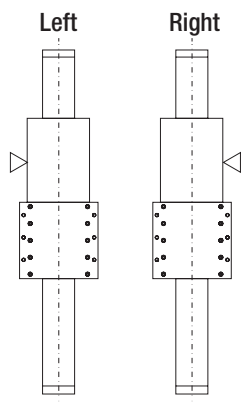
> **Identification codes for the SC linear unit**

S	13	1 CA	2000	1A	Linear motion system <i>see pg. PLS-42</i>
	06=65			1A=SP	
	13=130				
	16=160				
				L = total length of the unit	
				Driving head code <i>see pg. PLS-47</i>	
				Linear unit size <i>see from pg. PLS-43 to pg. PLS-45</i>	
				Linear unit series SC <i>see pg. PLS-40</i>	

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



Left / right orientation



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:

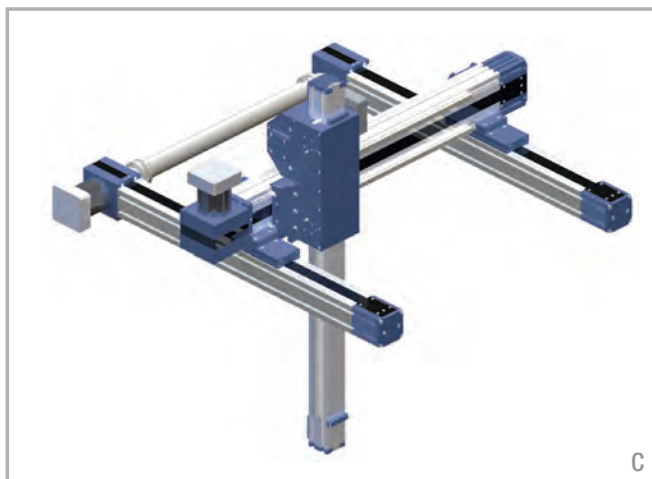
Two axis - X-Y system



A

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 carriages of ELM 80 SP...

Three axis - X-Y-Z system



C

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 carriages of ELM 65 SP... The SC 65 unit is directly assembled on to the ROBOT 130 SP... unit without further elements.

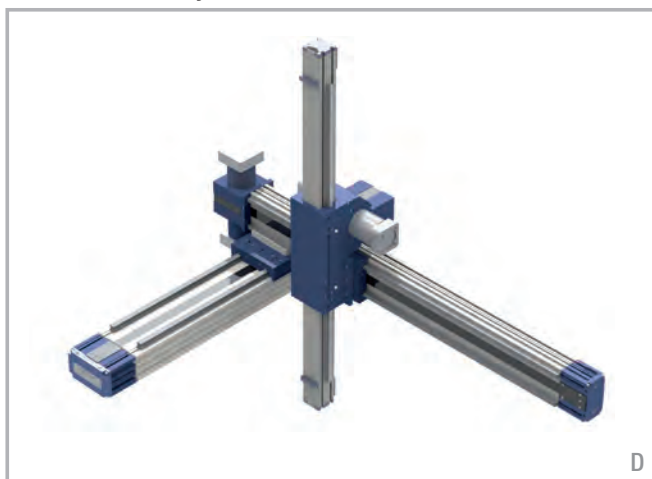
Two axis - Y-Z system



B

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

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.