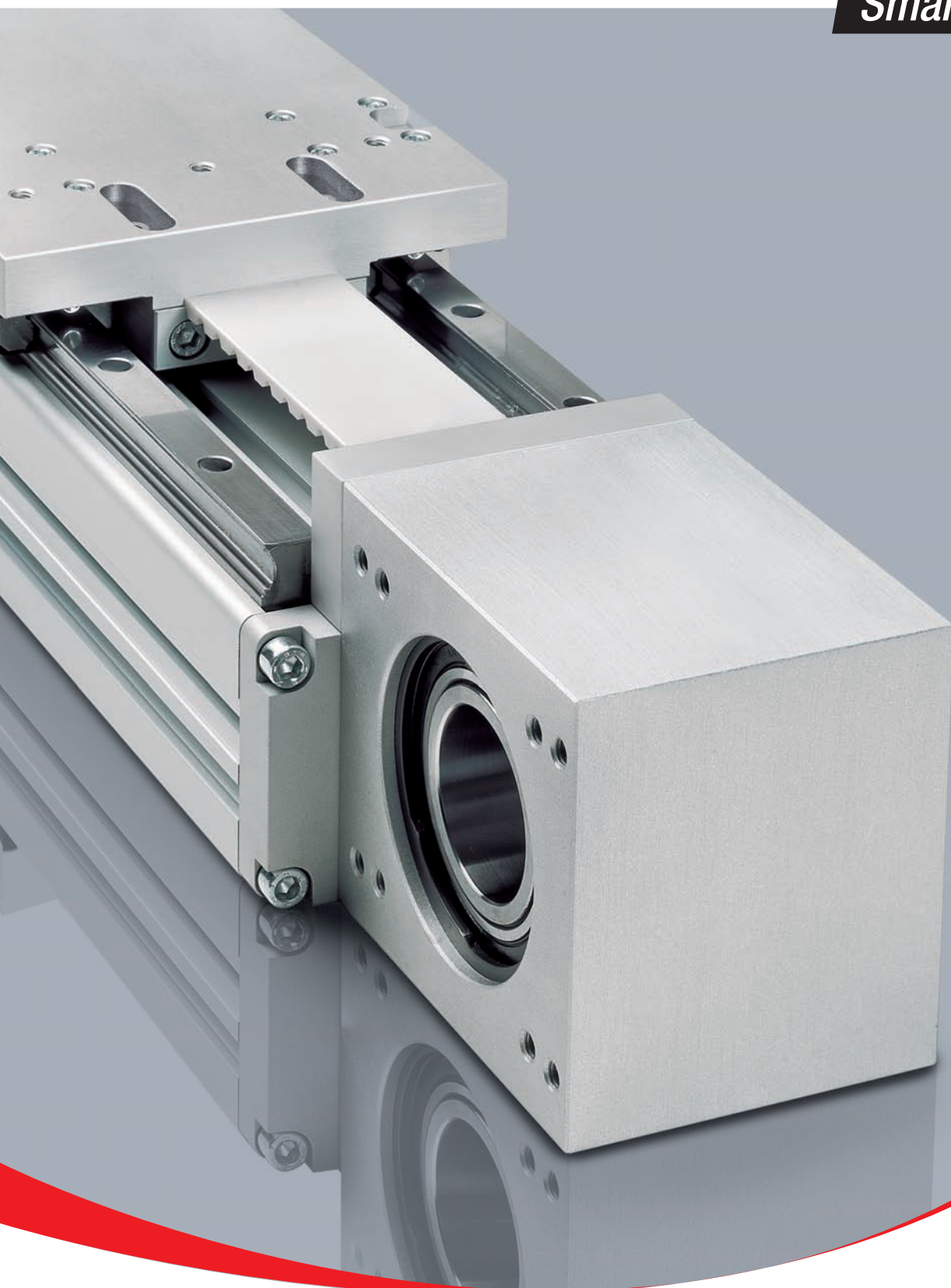# ROLLON®

L i n e a r E v o l u t i o n

When you move. We move

Rollon S.p.A. was founded in 1975 as a manufacturer of linear motion components. Today Rollon group is a leading name in the design, production, and sale of linear rails, telescopic rails, and actuators, with headquarters based in Italy and offices and distributors located throughout the world. Rollon products are used in many industries, providing creative and efficient solutions in a wide variety of applications.

Rollon solutions for linear motion

Linear Line

Telescopic Line

Actuator Line

Actuator System Line

Linear Line — Sys — Prismatic Rail

Hegra Rail

Actuator Line

Linear Rails

Rails with roller bearings
Rails with caged ball bearings
Rails with recirculating ball bearing

Telescopic Rails

Rails with partial/total extension
Heavy duty rails
Rails for automated and manual applications

Actuators

Belt driven actuators
Ball screw driven actuators
Rack and pinion actuators

Solutions for industrial automation

Multi-axis for pick and place
Telescopic actuators
Seventh axis for robots
Solutions for metal sheet handling

Core Competencies

> Full range of linear rails, telescopic rails and actuators
> Worldwide presence with branches and distributors
> Fast delivery all over the world
> Large technical know-how for applications

> Standard solutions

Wide range of products and sizes
Linear rails with roller and caged ball bearings
Heavy duty telescopic rails
Belt or ball screw driven linear actuators
Multi-axis systems

> Collaboration

International know-how in several industries
Project consultancy
Maximizing performance and cost optimization
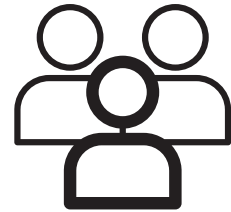
> Customization

Special products
Research and development of new solutions
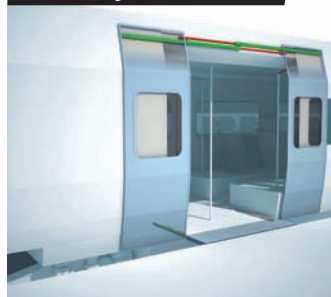Technologies dedicated to different sectors
Optimal surface trea

Applications

Aerospace

Railway

Logistics
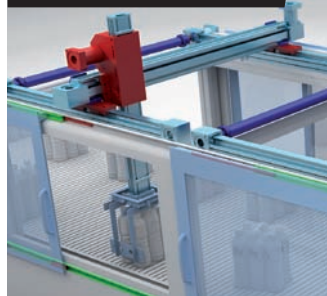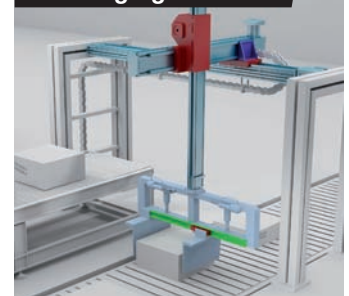
Industrial

Medical

Special Vehicles

Robotics

Packaging

▷ Smart System

Technical features overview

Reference		Section		Driving			Anticorrosion	Protection
Family	Product	Balls	Rollers	Toothed belt	Ball screw	Rack and pinion		
Plus System	ELM	●	●	●			●	●
Plus System	ROBOT	●	●	●			●	●
Plus System	SC	●		●			●	●
Clean Room System	ONE	●		●			●	●
Smart System	E-SMART	●		●				
Smart System	R-SMART	●		●				
Smart System	S-SMART	●		●				
Eco System	ECO	●	●	●				●
Uniline System	A/C/E/ED/H		●	●				●
Precision System	TH	●			●			●
Precision System	TT	●			●			●
Precision System	TV	●			●			●
Precision System	TK	●			●			●

Reported data must be verified according to the application. See verification under static load and lifetime on page SL-2 and SL-7
For a complete overview about technical data, please consult our catalogues at www.rollon.com.
* Longer stroke is available for jointed version

| Size	Max. load capacity per carriage [N]			Max. static moment per carriage [Nm]			Max. travel speed [m/s]	Max. acceleration [m/s²]	Repeatability accuracy [mm]	Max. travel or stroke (per system) [mm]	
	F_x	F_y	F_z	M_x	M_y	M_z					
50-65-80-110	4440	79000	79000	1180	7110	7110	5	50	± 0,05	6000*	P L S
100-130-160-220	8510	158000	158000	13588	17696	17696	5	50	± 0,05	6000*	
65-130-160	5957	86800	86800	6770	17577	17577	5	50	± 0,05	2500	
50-80-110	4440	92300	110760	1110	9968	8307	5	50	± 0,05	6000*	C R S
30-50-80-100	4440	87240	87240	1000	5527	5527	4	50	± 0,05	6000*	S S
120-160-220	8880	237000	237000	20145	30810	30810	4	50	± 0,05	6000*	
50-65-80	2250	51260	51260	520	3742	3742	4	50	± 0,05	2000	
60-80-100	4070	43400	43400	570	4297	4297	5	50	± 0,05	6000*	E S
40-55-75-100	1000	25000	17400	800,4	24917	15752	9	20	± 0,05	5700*	U S
90-110-145	27000	86800	86800	3776	2855	2855	2		± 0,005	1500	P S
100-155-225-310	58300	230580	274500	30195	26627	22366	2,5		± 0,005	3000	
60-80-110-140	58300	48400	48400	2251	3049	3049	2,5		± 0,01	4000	
40-60-80	12462	50764	50764	1507	622	622	1,48		± 0,003	810	
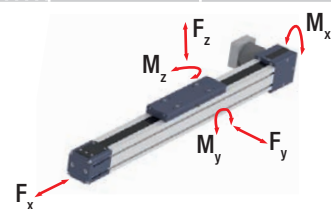
E-SMART series   ⌄

❯ E-SMART series description
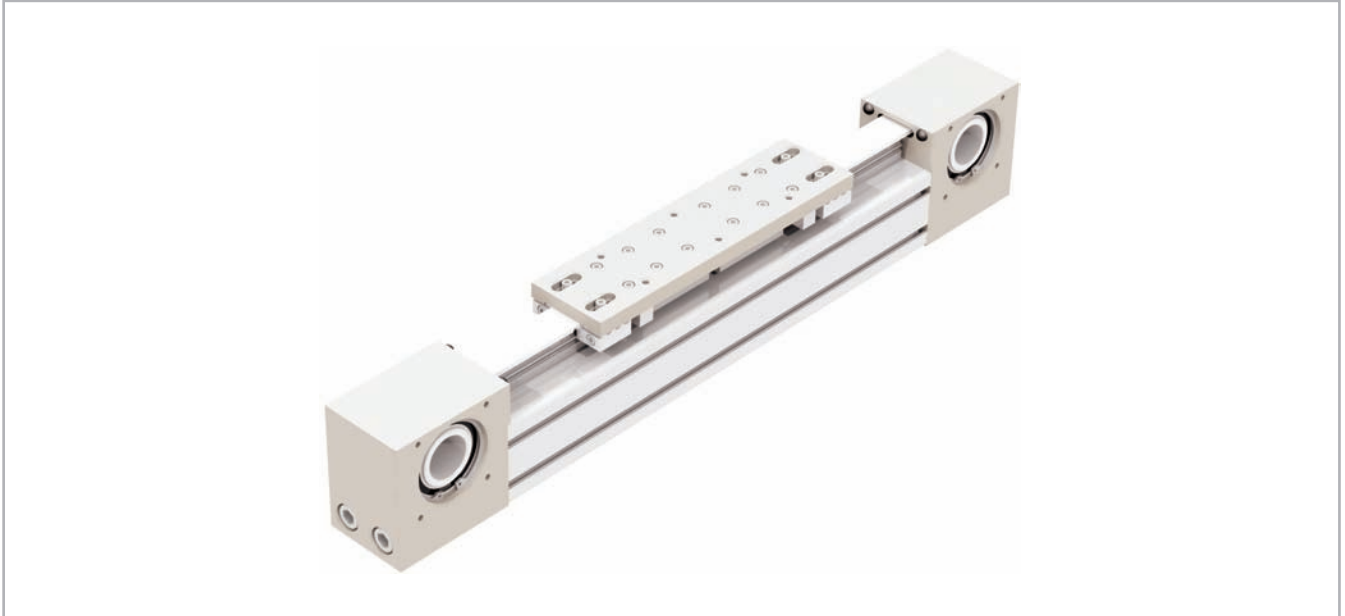
E-SMART

The E-SMART series linear units have an extruded and anodized aluminum self-supporting structure with a profile available in four sizes from 30 to 100mm. Transmission is achieved with a polyurethane steel reinforced driving belt. Also featured is a single rail with one or more recirculating ball bearing runner blocks.

The components

Extruded bodies

The anodized aluminum extrusions used for the bodies of the Rollon SMART series linear units were designed and manufactured in cooperation with a leading company in this field to obtain the right combination of high mechanical strength and reduced weight. The anodized aluminum alloy 6060 used (see physical chemical characteristics below for further information) was extruded with dimensional tolerances complying with EN 755-9 standards.

Driving belt

The Rollon SMART series linear units use steel reinforced polyurethane drive belts with AT pitch. This type of belt is ideal due to its high load trans-

mission 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 Rollon SMART series linear units is made entirely of machined anodized aluminum. The dimensions vary depending on the type. Rollon offers multiple carriages to accomodate a vast array of applications.

General data about aluminum used: AL 6060

Chemical composition [%]

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

Tab. 1

Physical characteristics

Density	Coeff. of elasticity	Coeff. of thermal expansion (20°-100°C)	Thermal conductivity (20°C)	Specific heat (0°-100°C)	Resistivity	Melting point
$\frac{kg}{dm^3}$	$\frac{kN}{mm^2}$	$\frac{10^{-6}}{K}$	$\frac{W}{m \cdot K}$	$\frac{J}{kg \cdot K}$	$\Omega \cdot m \cdot 10^{-9}$	°C
2.7	70	23.8	200	880-900	33	600-655

Tab. 2

Mechanical characteristics

Rm	Rp (02)	A	HB
$\frac{N}{mm^2}$	$\frac{N}{mm^2}$	%	__
250	200	10	75

Tab. 3

SS-3

> The linear motion system

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

Performance characteristics:

- The ball bearing guides with high load capacity are mounted in a dedicated seat on the aluminum body.
- The carriage of the linear unit is assembled on preloaded ball bearing blocks that enables the carriage to withstand loading in the four main directions.
- 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.
- The blocks have seals on both sides and, when necessary, an additional scraper can be fitted for very dusty conditions.

The linear motion system described above offers:

- High speed and acceleration
- High load capacity
- High permissible bending moments
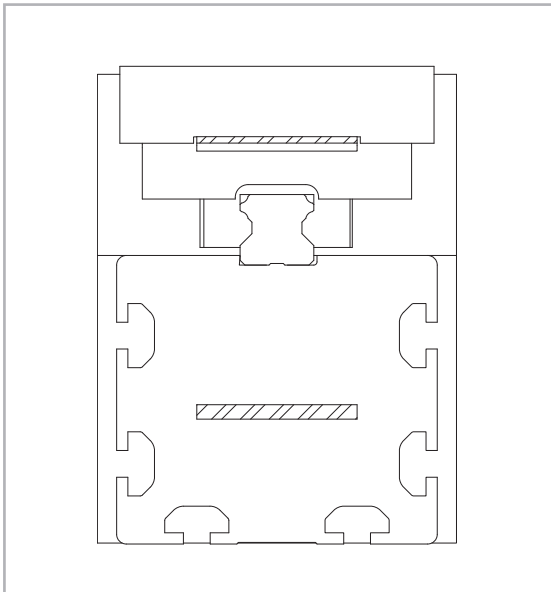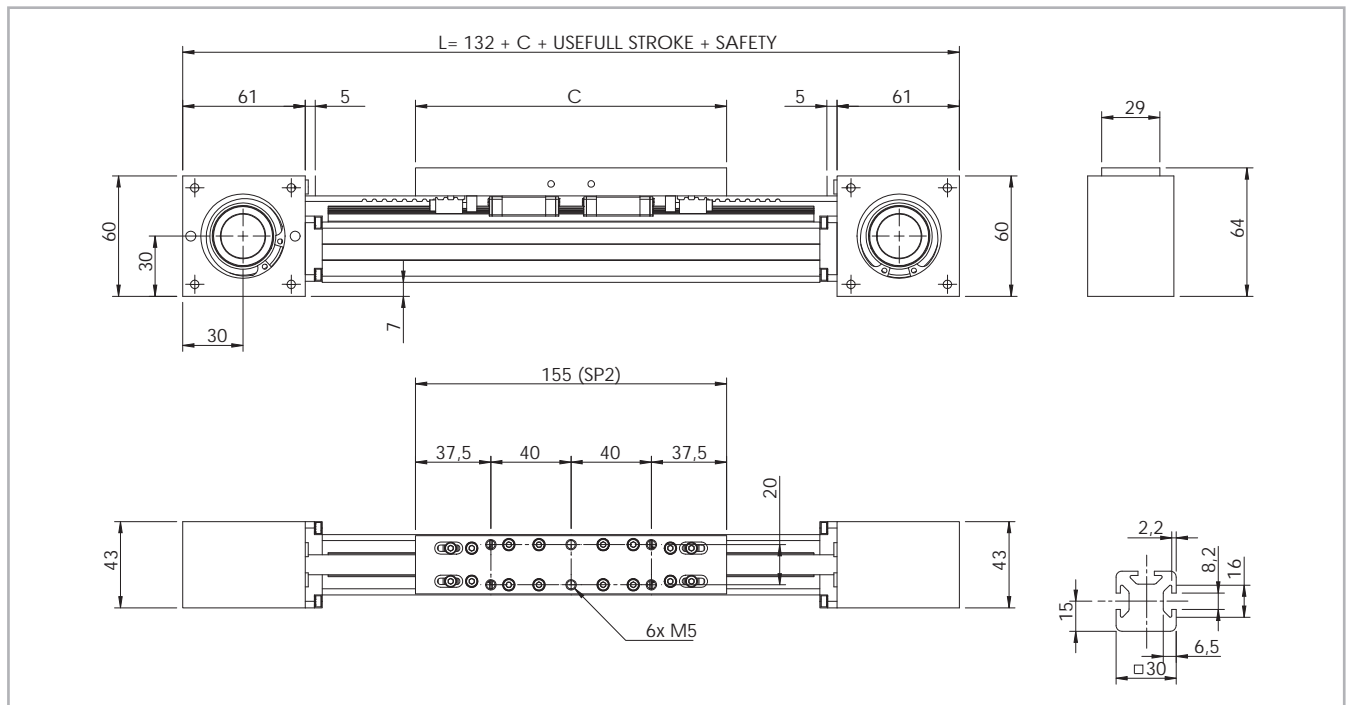- Low friction
- Long life
- Low noise

E-SMART section

Fig. 2

E-SMART 30 SP2

E-SMART 30 Dimensions

L= 132 + C + USEFULL STROKE + SAFETY

155 (SP2)

6x M5

□30

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

Fig. 3

Technical data

	Type
	E-SMART 30 SP2
Max. useful stroke length [mm]	3700
Max. positioning repeatability [mm]*[1]	± 0.05
Max. speed [m/s]	4.0
Max. acceleration [m/s²]	50
Type of belt	10 AT 5
Type of pulley	Z 24
Pulley pitch diameter [mm]	38.2
Carriage displacement per pulley turn [mm]	120
Carriage weight [kg]	0.28
Zero travel weight [kg]	1.83
Weight for 100 mm useful stroke [kg]	0.16
Starting torque [Nm]	0.15
Moment of inertia of pulleys [g · mm²]	57.630

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

Tab. 4

Moments of inertia of the aluminum body

Type	I_x [10^7 mm⁴]	I_y [10^7 mm⁴]	I_p [10^7 mm⁴]
E-SMART 30 SP2	0.003	0.003	0.007

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]
E-SMART 30 SP2	10 AT 5	10	0.033

Tab. 6

Belt length (mm) = 2 x L - 100 (SP2)

E-SMART 30 - Load capacity

Type	F_x [N]		F_y [N]		F_z [N]		M_x [Nm]		M_y [Nm]		M_z [Nm]	
	Stat.	Dyn.	Stat.	Dyn	Stat.	Dyn	Stat.	Dyn	Stat.	Dyn	Stat.	Dyn
E-SMART 30 SP2	385	242	6930	4616	6930	4616	43	29	132	88	132	88

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

Tab. 7

E-SMART 50 SP1 - SP2 - SP3

E-SMART 50 Dimensions

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

Fig. 4

Technical data

	Type		
	E-SMART 50 SP1	E-SMART 50 SP2	E-SMART 50 SP3
Max. useful stroke length [mm]*1	6120	6050	5950
Max. positioning repeatability [mm]*2	± 0.05	± 0.05	± 0.05
Max. speed [m/s]	4.0	4.0	4.0
Max. acceleration [m/s²]	50	50	50
Type of belt	25 AT 5	25 AT 5	25 AT 5
Type of pulley	Z 40	Z 40	Z 40
Pulley pitch diameter [mm]	63.66	63.66	63.66
Carriage displacement per pulley turn [mm]	200	200	200
Carriage weight [kg]	0.54	0.85	1.21
Zero travel weight [kg]	4.89	5.4	6.16
Weight for 100 mm useful stroke [kg]	0.34	0.34	0.34
Starting torque [Nm]	0.35	0.345	0.55
Moment of inertia of pulleys [g · mm²]	891.270	891.270	891.270

*1) It is possible to obtain stroke up to 11.270 (SP1), 11.200 (SP2), 11.100 (SP3) by means of special Rollon joints. Tab. 8
*2) Positioning repeatability is dependent on the type of transmission used.

Moments of inertia of the aluminum body

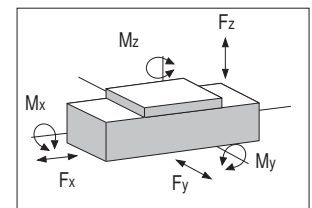| Type	I_x [10^7 mm⁴]	I_y [10^7 mm⁴]	I_p [10^7 mm⁴]
E-SMART 50 SP	0.021	0.020	0.041

Tab. 9

Driving belt

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

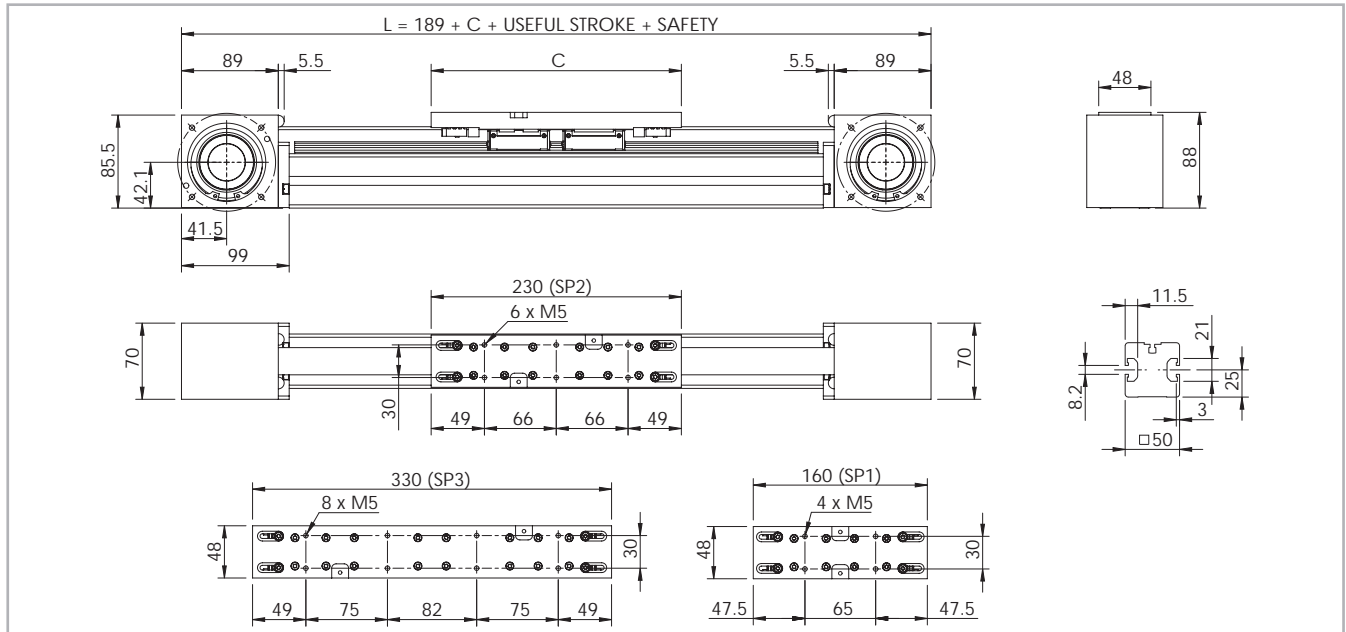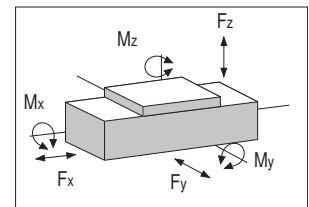| Type	Type of belt	Belt width [mm]	Weight [kg/m]
E-SMART 50 SP	25 AT 5	25	0.080

Tab. 10

Belt length (mm) = 2 x L - 60 (SP1)
2 x L - 125 (SP2)
2 x L - 225 (SP3)

E-SMART 50 - 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.	Dyn	Stat.	Dyn	Stat.	Dyn	Stat.	Dyn
E-SMART 50 SP1	1050	750	15280	9945	15280	9945	120	78	90	59	90	59
E-SMART 50 SP2	1050	750	30560	19890	30560	19890	240	156	856	557	856	557
E-SMART 50 SP3	1050	750	45840	29835	45840	29835	360	234	2582	1681	2582	1681

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

Tab. 11

E-SMART 80 SP1 - SP2

E-SMART 80 Dimensions
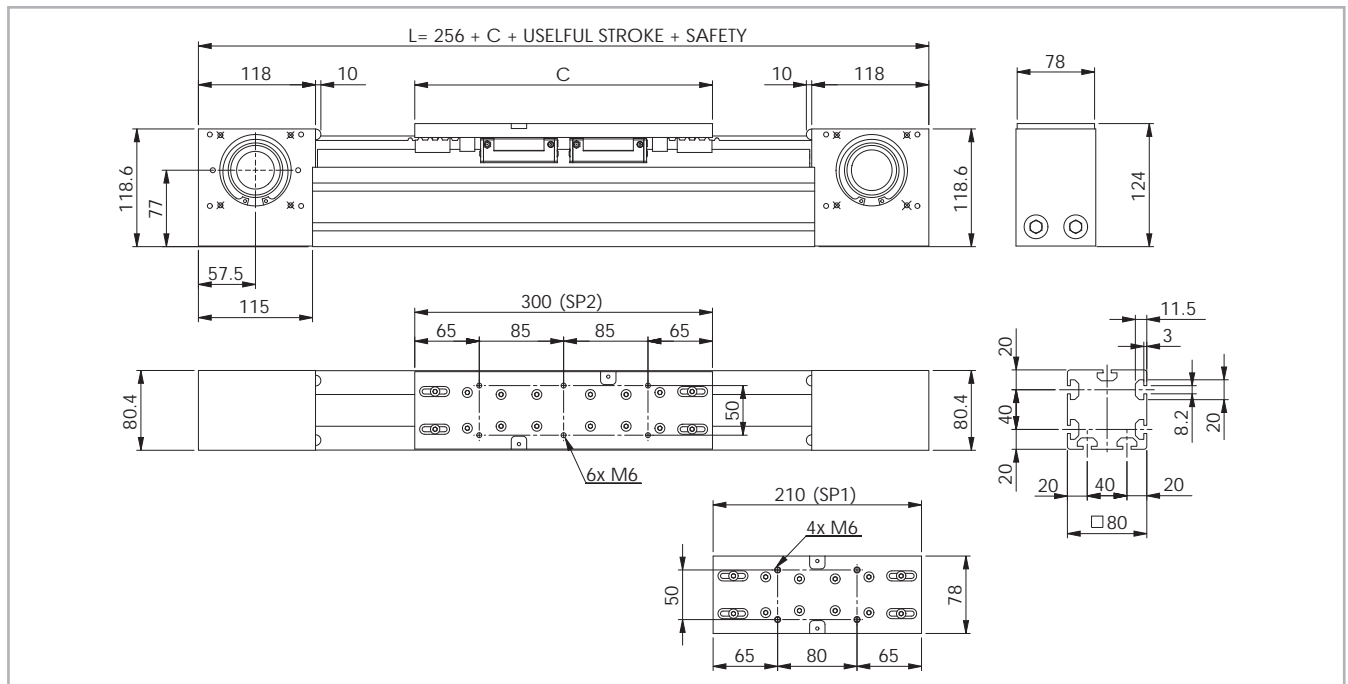
L= 256 + C + USELFUL STROKE + SAFETY

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

Fig. 5

Technical data

	Type	
	E-SMART 80 SP1	E-SMART 80 SP2
Max. useful stroke length [mm]*1	6060	5970
Max. positioning repeatability [mm]*2	± 0.05	± 0.05
Max. speed [m/s]	4.0	4.0
Max. acceleration [m/s²]	50	50
Type of belt	32 AT 10	32 AT 10
Type of pulley	Z 21	Z 21
Pulley pitch diameter [mm]	66,84	66,84
Carriage displacement per pulley turn [mm]	210	210
Carriage weight [kg]	1.34	1.97
Zero travel weight [kg]	9.94	11.31
Weight for 100 mm useful stroke [kg]	0.76	0.76
Starting torque [Nm]	0.95	1.3
Moment of inertia of pulleys [g · mm²]	938.860	938.860

Tab. 12

*1) It is possible to obtain stroke up to 11.190 (SP1), 11.100 (SP2) 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]
E-SMART 80 SP	0.143	0.137	0.280

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]
E-SMART 80 SP	32 AT 10	32	0.186

Tab. 14

Belt length (mm) = 2 x L - 135 (SP1)
2 x L - 225 (SP2)

E-SMART 80 - Load capacity

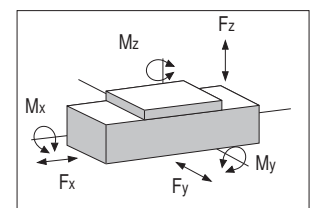| Type	F_x [N]		F_y [N]		F_z [N]		M_x [Nm]		M_y [Nm]		M_z [Nm]	
	Stat.	Dyn.	Stat.	Dyn	Stat.	Dyn	Stat.	Dyn	Stat.	Dyn	Stat.	Dyn
E-SMART 80 SP1	2250	1459	25630	18318	25630	18318	260	186	190	136	190	136
E-SMART 80 SP2	2250	1459	51260	36637	51260	36637	520	372	1874	1339	1874	1339

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

Tab. 15

› E-SMART 80 SP3 - SP4

E-SMART 80 Dimensions

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

Fig. 6

Technical data

	Type	
	E-SMART 80 SP3	E-SMART 80 SP4
Max. useful stroke length [mm]*1	5870	5790
Max. positioning repeatability [mm]*2	± 0.05	± 0.05
Max. speed [m/s]	4.0	4.0
Max. acceleration [m/s²]	50	50
Type of belt	32 AT 10	32 AT 10
Type of pulley	Z 21	Z 21
Pulley pitch diameter [mm]	66,84	66,84
Carriage displacement per pulley turn [mm]	210	210
Carriage weight [kg]	2.63	3.23
Zero travel weight [kg]	12.83	14.06
Weight for 100 mm useful stroke [kg]	0.76	0.76
Starting torque [Nm]	1.4	1.52
Moment of inertia of pulleys [g · mm²]	938.860	938.860

*1) It is possible to obtain stroke up to 11.000 (SP3), 10.920 (SP4) by means of special Rollon joints.
*2) Positioning repeatability is dependent on the type of transmission used.

Tab. 16

Moments of inertia of the aluminum body

Type	I_x [10^7 mm⁴]	I_y [10^7 mm⁴]	I_p [10^7 mm⁴]
E-SMART 80 SP	0.143	0.137	0.280

Tab. 17

Driving belt

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

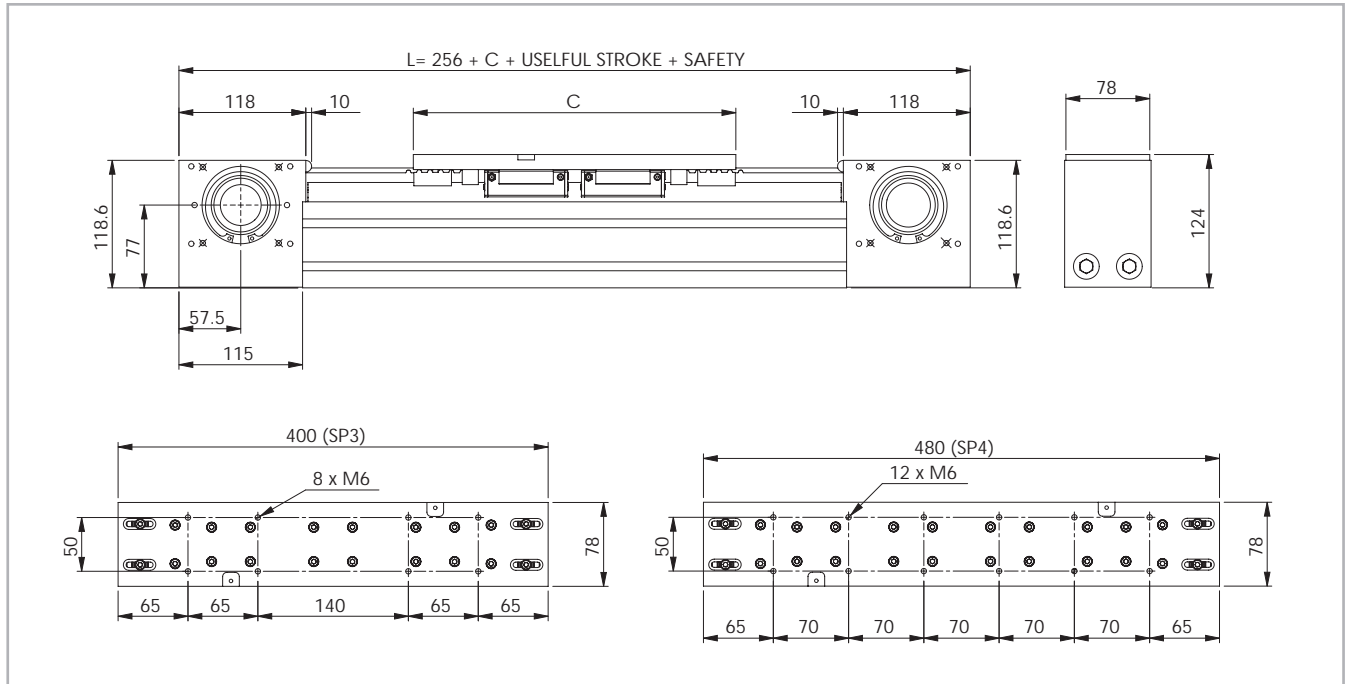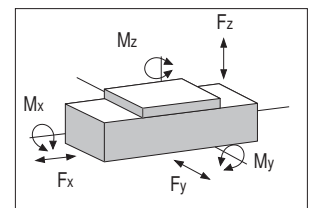| Type	Type of belt	Belt width [mm]	Weight [kg/m]
E-SMART 80 SP	32 AT 10	32	0.186

Tab. 18

Belt length (mm) = 2 x L - 325 (SP3)
 2 x L - 405 (SP4)

E-SMART 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.	Dyn	Stat.	Dyn	Stat.	Dyn	Stat.	Dyn
E-SMART 80 SP3	2250	1459	76890	54956	76890	54956	780	557	4870	3481	4870	3481
E-SMART 80 SP4	2250	1459	102520	73274	102520	73274	1040	743	7689	5496	7689	5496

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

Tab. 19

E-SMART 100 SP1 - SP2

E-SMART 100 Dimensions

L = 294 + C + USEFUL STROKE + SAFETY

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

Fig. 7

Technical data

	Type	
	E-SMART 100 SP1	E-SMART 100 SP2
Max. useful stroke length [mm]*1	6025	5870
Max. positioning repeatability [mm]*2	± 0.05	± 0.05
Max. speed [m/s]	4.0	4.0
Max. acceleration [m/s²]	50	50
Type of belt	50 AT 10	50 AT 10
Type of pulley	Z 27	Z 27
Pulley pitch diameter [mm]	85.94	85.94
Carriage displacement per pulley turn [mm]	270	270
Carriage weight [kg]	2.72	4.42
Zero travel weight [kg]	18.86	22.38
Weight for 100 mm useful stroke [kg]	1.3	1.3
Starting torque [Nm]	2.1	2.4
Moment of inertia of pulleys [g · mm²]	4.035.390	4.035.390

*1) It is possible to obtain stroke up to 11.155 (SP1), 11.000 (SP2) by means of special Rollon joints.
*2) Positioning repeatability is dependent on the type of transmission used.

Tab. 20

Moments of inertia of the aluminum body

Type	I_x [10^7 mm⁴]	I_y [10^7 mm⁴]	I_p [10^7 mm⁴]
E-SMART 100 SP	0.247	0.316	0.536

Tab. 21

Driving belt

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

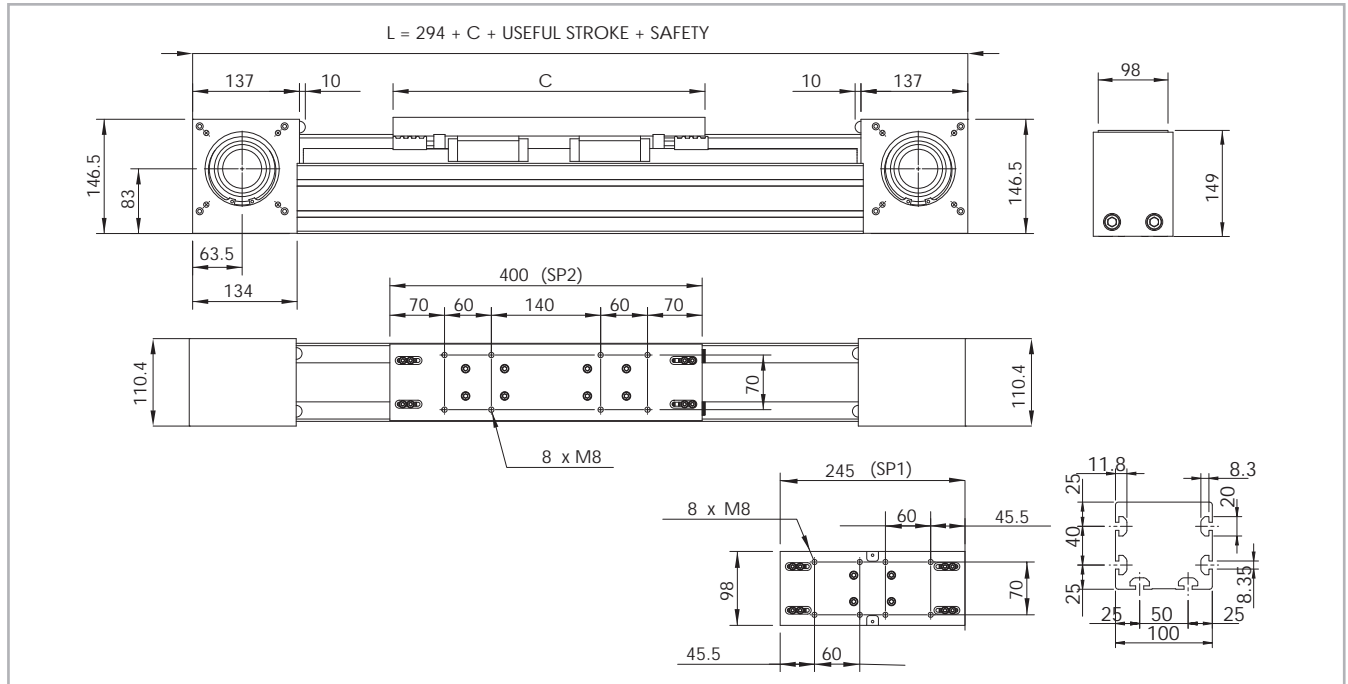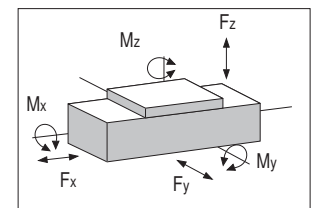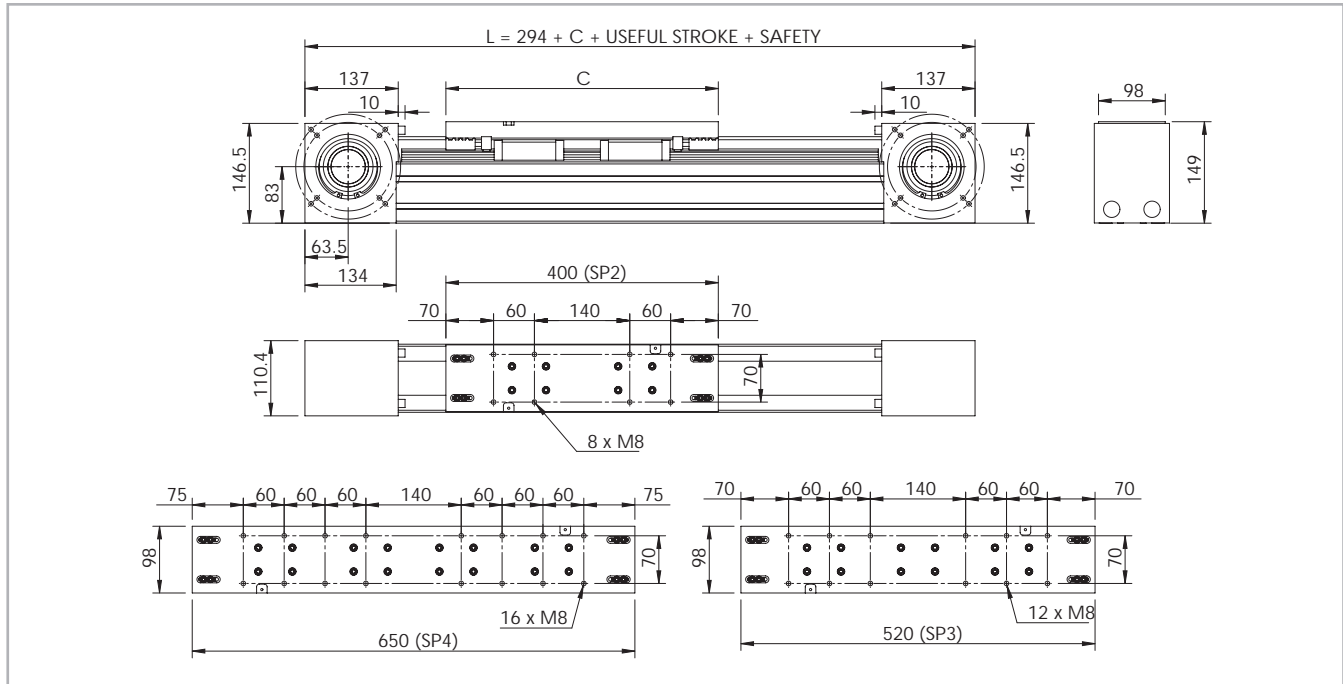| Type	Type of belt	Belt width [mm]	Weight [kg/m]
E-SMART 100 SP	50 AT 10	50	0.290

Tab. 22

Belt length (mm) = 2 x L - 120 (SP1)
2 x L - 275 (SP2)

E-SMART 100 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.	Dyn	Stat.	Dyn	Stat.	Dyn	Stat.	Dyn
E-SMART 100 SP1	4440	3060	43620	31192	43620	31192	500	358	450	322	450	322
E-SMART 100 SP2	4440	3060	87240	62385	87240	62385	1000	715	5527	3952	5527	3952

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

Tab. 23

⟩ E-SMART 100 SP3 - SP4

E-SMART 100 Dimensions

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

Fig. 8

Technical data

	Type	
	E-SMART 100 SP3	E-SMART 100 SP4
Max. useful stroke length [mm]*1	5790	5620
Max. positioning repeatability [mm]*2	± 0.05	± 0.05
Max. speed [m/s]	4.0	4.0
Max. acceleration [m/s²]	50	50
Type of belt	50 AT 10	50 AT 10
Type of pulley	Z 27	Z 27
Pulley pitch diameter [mm]	85.94	85.94
Carriage displacement per pulley turn [mm]	270	270
Carriage weight [kg]	5.85	7.34
Zero travel weight [kg]	25.22	28.25
Weight for 100 mm useful stroke [kg]	1.3	1.3
Starting torque [Nm]	2.6	2.8
Moment of inertia of pulleys [g · mm²]	4.035.390	4.035.390

*1) It is possible to obtain stroke up to 10.880 (SP3), 10.750 (SP4) by means of special Rollon joints.
*2) Positioning repeatability is dependent on the type of transmission used.

Tab. 24

Moments of inertia of the aluminum body

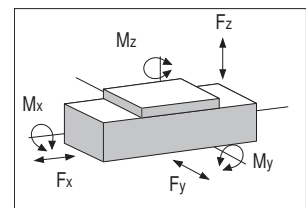| Type	I_x [10^7 mm⁴]	I_y [10^7 mm⁴]	I_p [10^7 mm⁴]
E-SMART 100 SP	0.247	0.316	0.536

Tab. 25

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]
E-SMART 100 SP	50 AT 10	50	0.290

Tab. 26

Belt length (mm) = 2 x L - 395 (SP3)
2 x L - 252 (SP4)

E-SMART 100 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.	Dyn	Stat.	Dyn	Stat.	Dyn	Stat.	Dyn
E-SMART 100 SP3	4440	3060	130860	93577	130860	93577	1500	1073	12039	8609	12039	8609
E-SMART 100 SP4	4440	3060	174480	124770	174480	124770	2000	1430	19416	13884	19416	13884

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

Tab. 27

▶ Lubrication

SP linear units with ball bearing guides

The ball bearing carriages of the SP versions are fitted with a retention cage that eliminates "steel-steel" contact between adjacent revolving parts and prevents misalignment of these in the circuits.

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.

E-SMART

Fig. 9

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

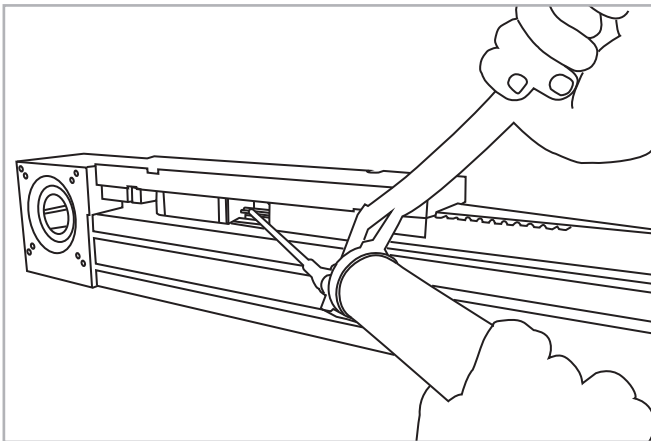| Type	Unit [g]
E-SMART 30	1
E-SMART 50	1
E-SMART 80	2-3
E-SMART 100	5-6

Tab. 28

- Insert the tip of the grease gun into the specific grease blocks.
- Type of lubricant: Lithium soap grease of class NLGI 2.
- For specially stressed applications or hostile environmental conditions, lubrication should be applied out more frequently.
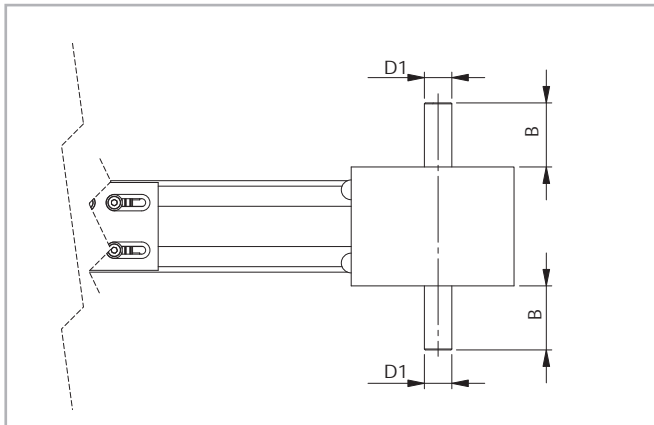 Contact Rollon for further advice

Simple shafts

AS type simple shafts

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

Fig. 10

This head configuration is obtained by utilizing an assembly kit delivered as a separate accessory item.

Shaft can be installed on the left or right side of the drive head as decided by the customer.

Units (mm)

Applicable to unit	Shaft type	B	D1	AS assembly kit code
E-SMART 30	AS 12	25	12h7	G000348
E-SMART 50	AS 15	35	15h7	G000851
E-SMART 80	AS 20	36.5	20h7	G000828
E-SMART 100	AS 25	50	25h7	G000649

Tab. 29

Hollow shaft

Hollow shaft type FP - Standard supply
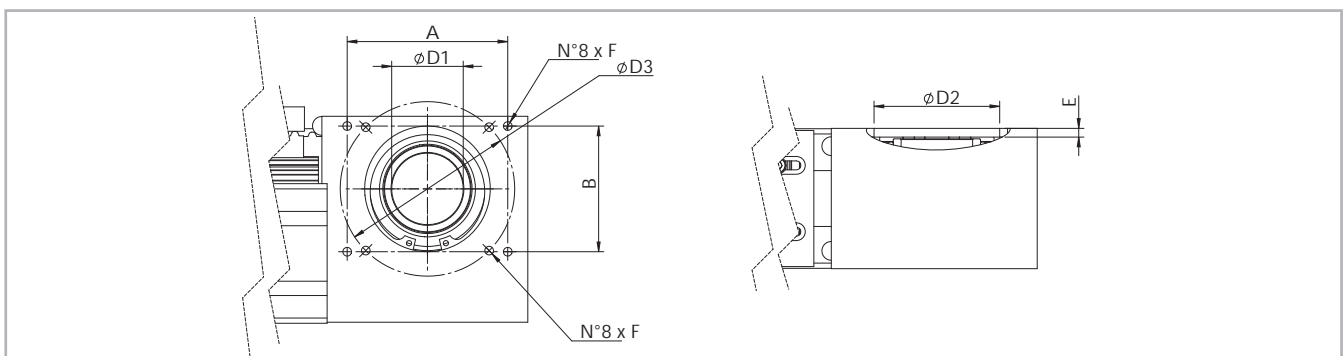
Fig. 11

Units (mm)

Applicable to unit	Shaft type	D1	D2	D3	E	F	A x B	Drive head code
E-SMART 30	FP 22	22H7	42J6	68	3	M5	-	2T
E-SMART 50	FP 34	34H7	72J6	90	3.5	M6	-	2T
E-SMART 80	FP 41	41H7	72J6	100	5	M6	92x72	2Z
E-SMART 100	FP 50	50H7	95J6	130	3.5	M8	109x109	2Y

Tab. 30

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

Linear units in parallel

Synchronization kit for use of SMART 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.
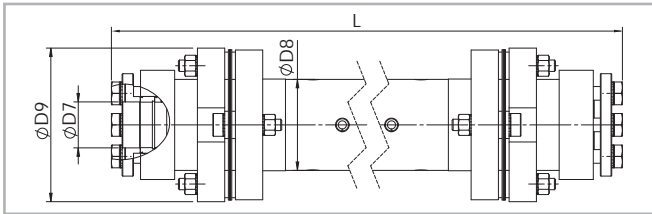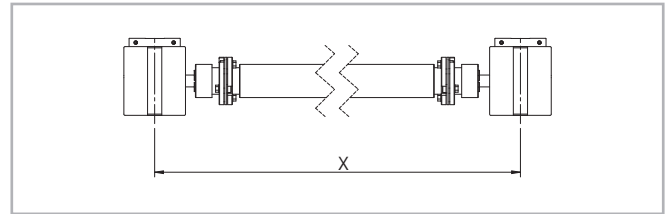

Fig. 12

Fig. 13

Dimensions (mm)

Applicable to unit	Shaft type	D7	D8	D9	Code	Formula for length calculation
E-SMART 30	AP 12	12	25	45	GK12P...1A	L= X-51 [mm]
E-SMART 50	AP 15	15	40	69.5	GK15P...1A	L= X-79 [mm]
E-SMART 80	AP 20	20	40	69.5	GK20P...1A	L= X-97 [mm]
E-SMART 100	AP 25	25	70	99	GK25P...1A	L= X-145 [mm]

Tab. 31

Accessories

Fixing by brackets

The ball bearing guide linear drive system of Rollon SMART System series linear units enables them to support loads in any direction.

They can therefore be installed in any position.

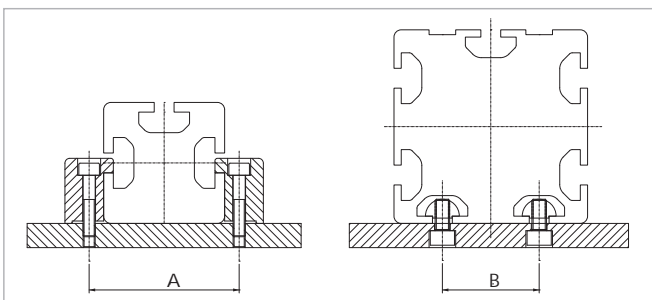To install the SMART System series units, we recommend use of one of the systems indicated below:

Fig. 14

Dimensions (mm)

	A	B
E-SMART 30	42	-
E-SMART 50	62	-
E-SMART 80	92	40
E-SMART 100	120	50

Tab. 32

Fixing brackets
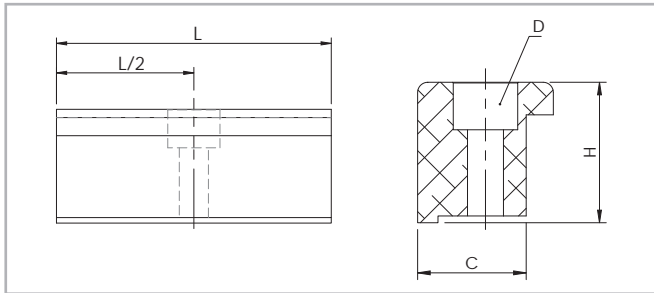
Fig. 15

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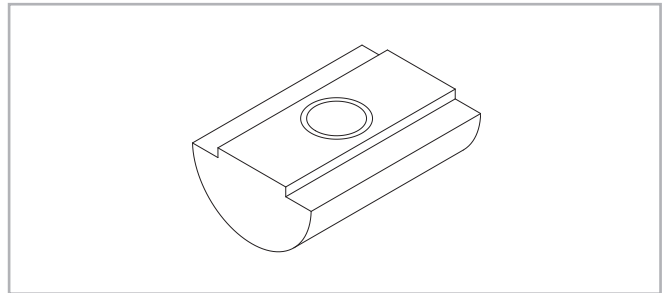
Steel nuts to be used in the slots of the body.

Fig. 16

Dimensions (mm)

	C	H	L	D	Cod. Rollon
E-SMART 30	16	17.5	50	M5	1001490
E-SMART 50	16	26.9	50	M5	1000097
E-SMART 80	16	20.7	50	M5	1000111
E-SMART 100	31	28.5	100	M10	1002377

Tab. 33

Units (mm)

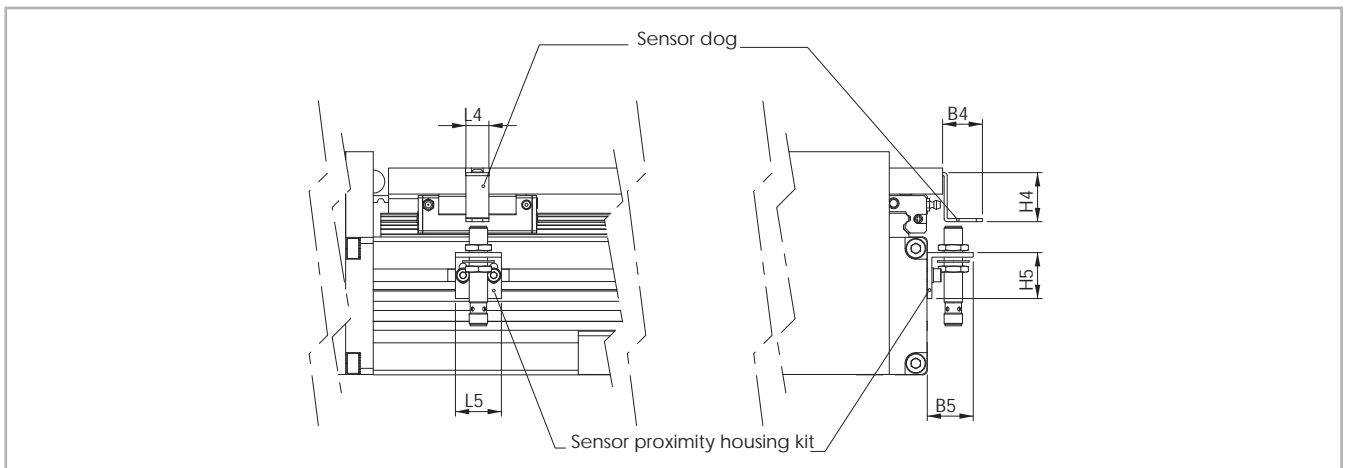|	Hole	Length	Cod. Rollon
E-SMART 30	M5	20	6000436
E-SMART 50	M6	20	6000437
E-SMART 80	M6	20	6000437
E-SMART 100	M6	20	6000437

Tab. 34

Proximity

Fig. 17

Sensor proximity housing kit

Aluminum block equipped with T-nuts for fixing

Sensor dog

Iron plate mounted on the carriage used for the proximity operation

Units (mm)

	B4	B5	L4	L5	H4	H5	For proximity	Sensor dog code	Sensor proximity kit code
E-SMART 30	30	30	30	30	15	30	Ø 8	G000847	G000901
E-SMART 50	26	30	15	30	32	30	Ø 8	G000833	G000838
E-SMART 80	26	30	15	30	32	30	Ø 8	G000833	G000838
E-SMART 100	26	30	15	30	32	30	Ø 8	G000833	G000838

Tab. 35

Adapter flange for gearbox assembly
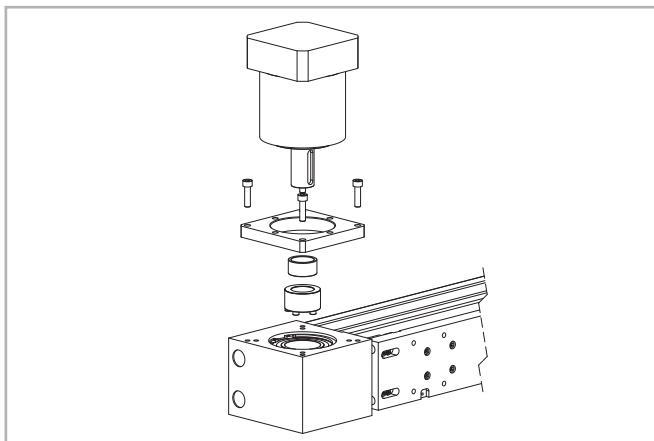

Fig. 18
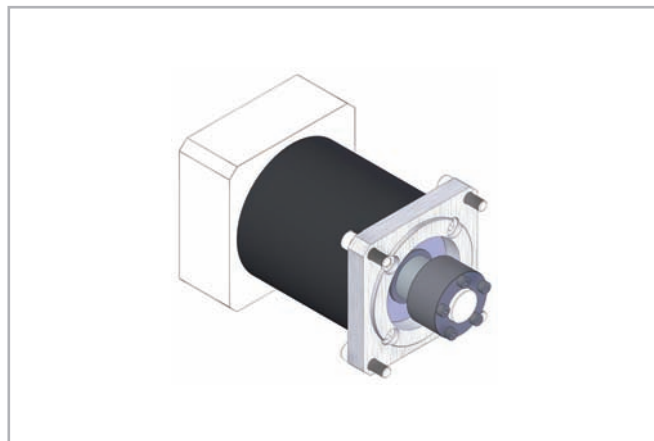

Fig. 19

Assembly kit includes: shrink disk; adapter plate; fixing hardware

Unit type	Gearbox type (not included)	Kit Code
E-SMART 30	MP053	G000356
	LCO50; LPO50; PE2	G000357
	SW030	G000383
E-SMART 50	MP060; PLE60	G000852
	LCO70; MPV00; LPO70; PE3	G000853
	SW040	G000854
E-SMART 80	P3	G000824
	MP080	G000826
	LCO90; MPV01; LPO90; PE4	G000827
	MP105	G000830
	PE3; LP070	G001078
	SPO75; PLN090	G000859
	SP060; PLN070	G000829
	SW040	G000866
	SW050	G000895
E-SMART 100	MP130	G000482
	LC120; MPV02; LP120; PE5	G000483
	LCO90	G000525
	MP105	G000527
	SW050	G000717

Tab. 36

For other gearbox type ask Rollon

Ordering key ⌄

› Identification codes for the E-SMART linear unit

L	10 03 = 30 05 = 50 08 = 80 10 = 100	2Y	02000	2A	
				Type (30) 2S=SP2	
				Type (50-80) 1T=SP1 - 2T=SP2 - 3T=SP3 - 4T=SP4	
				Type (100) 1A=SP1 - 2A=SP2 - 3A=SP3 - 4A=SP4	
			L=total length of the unit		
		Drive head code *see pg. SS-12*			
	Linear unit type *see from pg. SS-5 to pg. SS-10*				
Linear unit series E-SMART *see pg. SS-2*					

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

R-SMART series ⌄

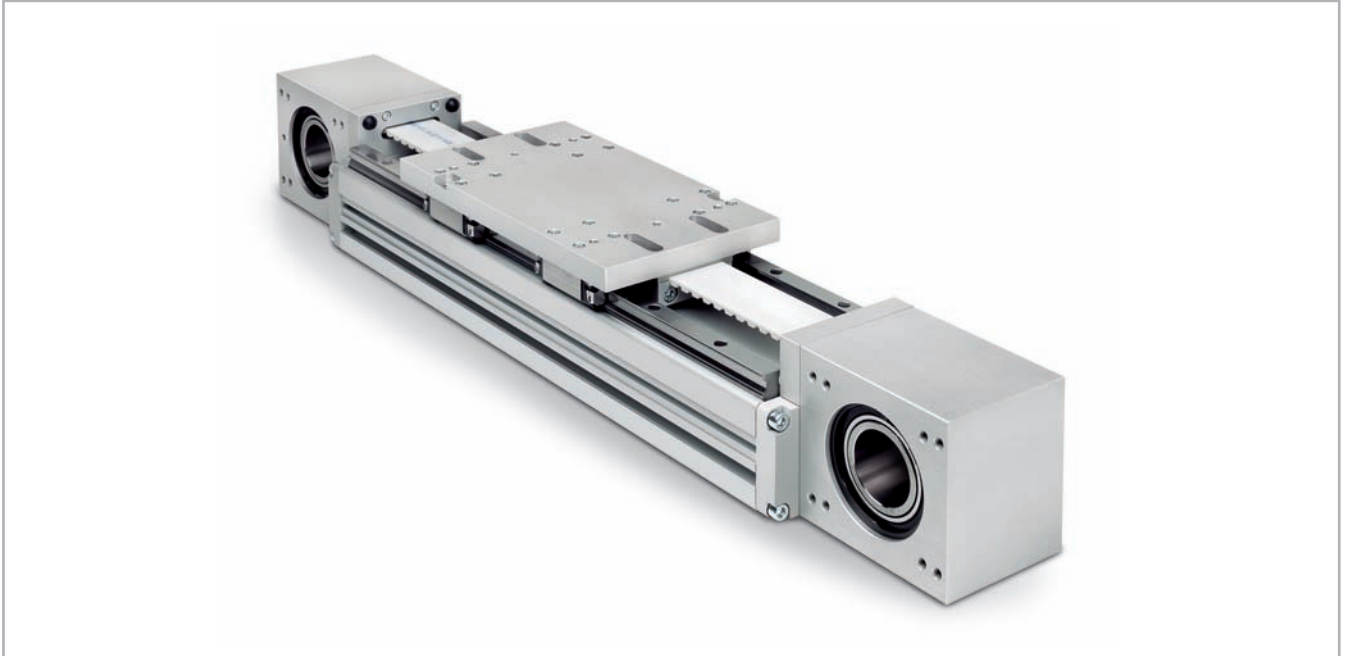### ▶ R-SMART series description

Fig. 20

R-SMART

The R-SMART series linear units are particularly suitable for: heavy loads, pulling and pushing very heavy weights, demanding work cycles, possible cantilever or gantry mounting, and operation in industrial automated lines.

The extruded and anodized aluminum self-supporting structure with a rectangular section is available in three sizes ranging from 120 to 220 mm. Transmission is achieved with a polyurethane steel reinforced driving belt. Also featured is a dual rail system with four or more recirculating ball bearing runner blocks. Multiple sliders are available to further improve load capacity.

These units are best used in applications requiring very heavy loads in extremely confined spaces, and where machines cannot be stopped to carry out ordinary system maintenance.

> The components

Extruded bodies

The anodized aluminum extrusions used for the bodies of the Rollon SMART series linear units were designed and manufactured in cooperation with a leading company in this field to obtain the right combination of high mechanical strength and reduced weight. The anodized aluminum alloy 6060 used (see physical chemical characteristics below for further information) was extruded with dimensional tolerances complying with EN 755-9 standards.

sion 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

Driving belt

The Rollon SMART series linear units use steel reinforced polyurethane drive belts with AT pitch. This belt is ideal due to its high load transmis-

Carriage

The carriage of the Rollon SMART series linear units is made entirely of machined anodized aluminum. The dimensions vary depending on the type. Rollon offers multiple carriages to accomodate a vast array of applications.

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. 37

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	70	23.8	200	880-900	33	600-655

Tab. 38

Mechanical characteristics

Rm	Rp (02)	A	HB
$\dfrac{N}{mm^2}$	$\dfrac{N}{mm^2}$	%	—
250	200	10	75

Tab. 39

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. Rollon SMART series systems feature a linear motion system with ball bearing guides:

Performance characteristics:
- The ball bearing guides with high load capacity are mounted in a dedicated seat on the aluminum body.
- The carriage of the linear unit is assembled on preloaded ball bearing blocks that enables the carriage to withstand loading in the four main directions.
- 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.
- The blocks have seals on both sides and, when necessary, an additional scraper can be fitted for very dusty conditions.

The linear motion system described above offers:
- High speed and acceleration
- High load capacity
- High permissible bending moments
- Low friction
- Long life
- Low noise
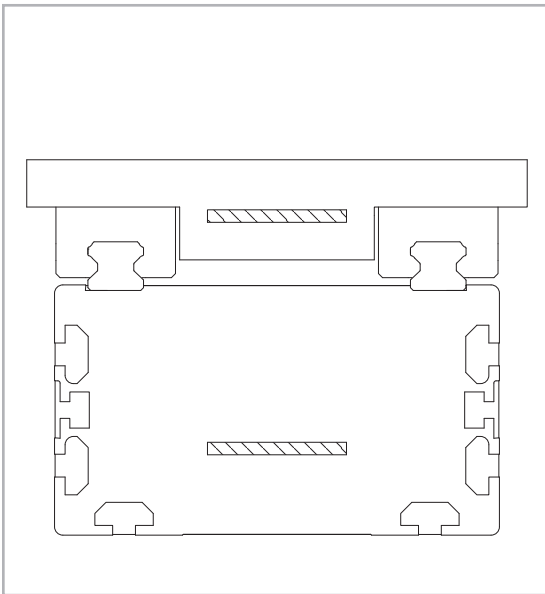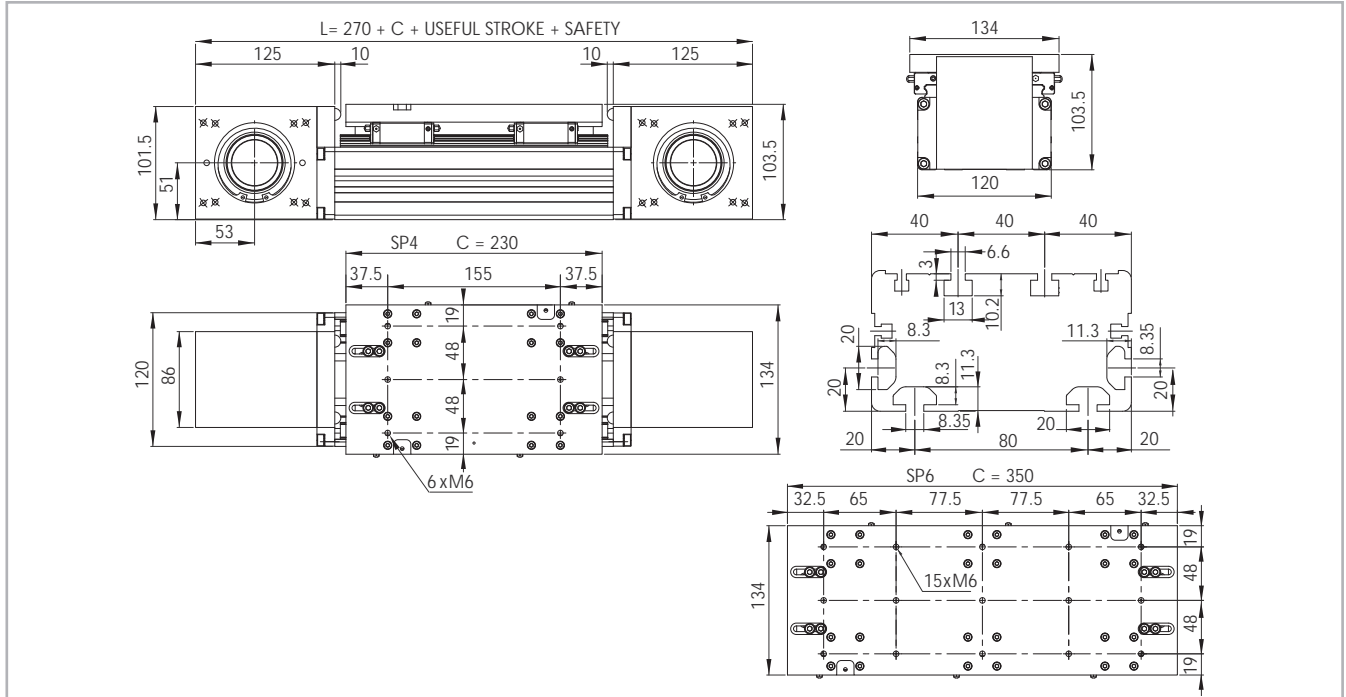
R-SMART section

Fig. 21

R-SMART 120 SP4 - SP6

R-SMART 120 Dimensions

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

Fig. 22

Technical data

	Type	
	R-SMART 120 SP4	R-SMART 120 SP6
Max. useful stroke length [mm]*1	6050	5930
Max. positioning repeatability [mm]*2	± 0.05	± 0.05
Max. speed [m/s]	4.0	4.0
Max. acceleration [m/s²]	50	50
Type of belt	40 AT 10	40 AT 10
Type of pulley	Z 21	Z 21
Pulley pitch diameter [mm]	66.84	66.84
Carriage displacement per pulley turn [mm]	210	210
Carriage weight [kg]	3	4
Zero travel weight [kg]	12.9	15
Weight for 100 mm useful stroke [kg]	0.9	0.9
Starting torque [Nm]	1.95	2.3
Moment of inertia of pulleys [g · mm²]	1.054.300	1.054.300

*1) It is possible to obtain stroke up to 11.200 (SP4), 11.080 (SP6) by means of special Rollon joints.
*2) Positioning repeatability is dependent on the type of transmission used.

Tab. 40

Moments of inertia of the aluminum body

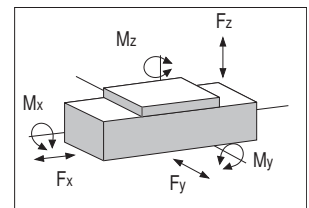| Type	I_x [10^7 mm⁴]	I_y [10^7 mm⁴]	I_p [10^7 mm⁴]
R-SMART 120 SP	0.108	0.367	0.475

Tab. 41

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]
R-SMART 120 SP	40 AT 10	40	0.23

Tab. 42

Belt length (mm) = 2 x L - 115 (SP4)
2 x L - 235 (SP6)

R-SMART 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.	Dyn	Stat.	Dyn	Stat.	Dyn	Stat.	Dyn
R-SMART 120 SP4	2812	1824	48400	29120	48400	29120	2226	1340	3122	1878	3122	1878
R-SMART 120 SP6	2812	1824	72600	43680	72600	43680	3340	2009	5953	3582	5953	3582

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

Tab. 43

R-SMART 160 SP4 - SP6

R-SMART 160 Dimensions

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

Fig. 23

Technical data

	Type	
	R-SMART 160 SP4	R-SMART 160 SP6
Max. useful stroke length [mm]*[1]	6000	5880
Max. positioning repeatability [mm]*[2]	± 0.05	± 0.05
Max. speed [m/s]	4.0	4.0
Max. acceleration [m/s²]	50	50
Type of belt	50 AT 10	50 AT 10
Type of pulley	Z 27	Z 27
Pulley pitch diameter [mm]	85.94	85.94
Carriage displacement per pulley turn [mm]	270	270
Carriage weight [kg]	5.4	7.5
Zero travel weight [kg]	24.4	27.9
Weight for 100 mm useful stroke [kg]	1.75	1.75
Starting torque [Nm]	3.4	3.95
Moment of inertia of pulleys [g · mm²]	4.035.390	4.035.390

Tab. 44

*1) It is possible to obtain stroke up to 11.200 (SP4), 11.080 (SP6) by means of special Rollon joints
*2) The positioning repeatability depends upon the type of transmission used

Moments of inertia of the aluminum body

Type	I_x [10⁷ mm⁴]	I_y [10⁷ mm⁴]	I_p [10⁷ mm⁴]
R-SMART 160 SP	0.383	1.313	1.696

Tab. 45

Driving belt

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

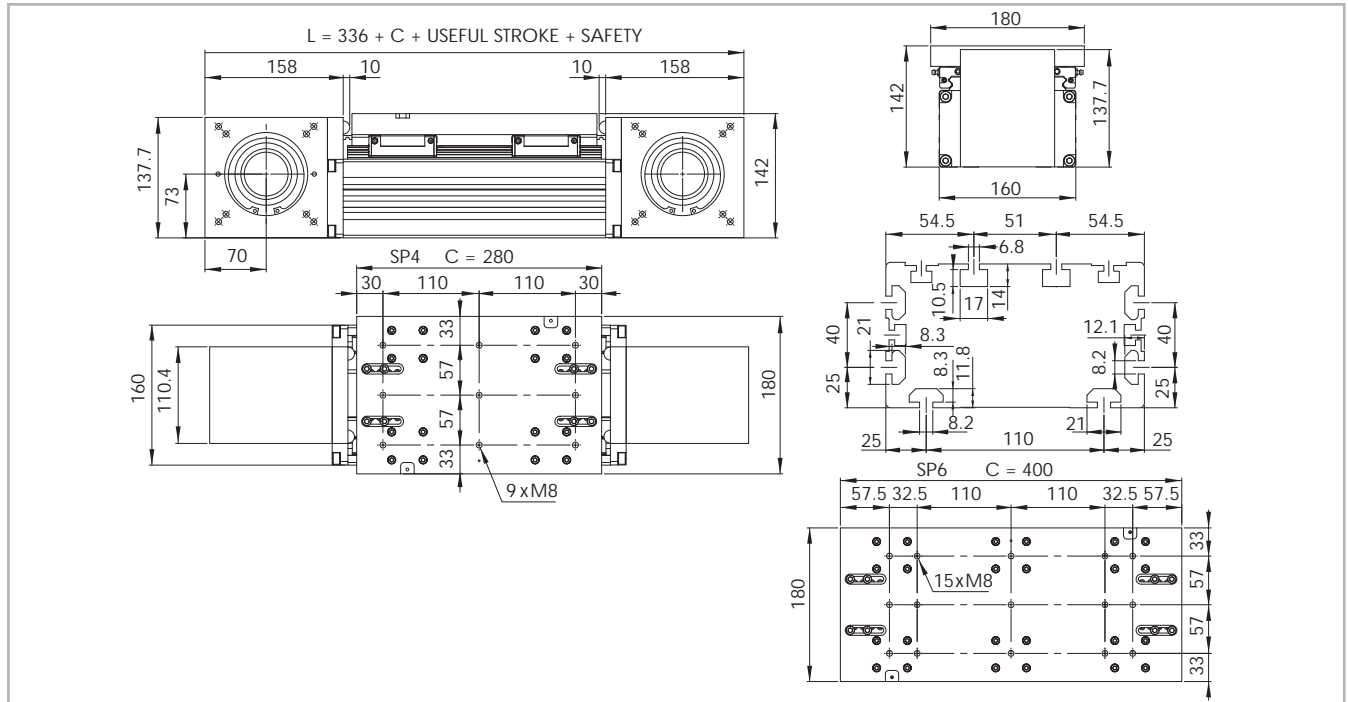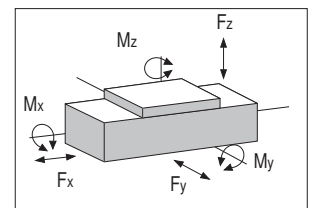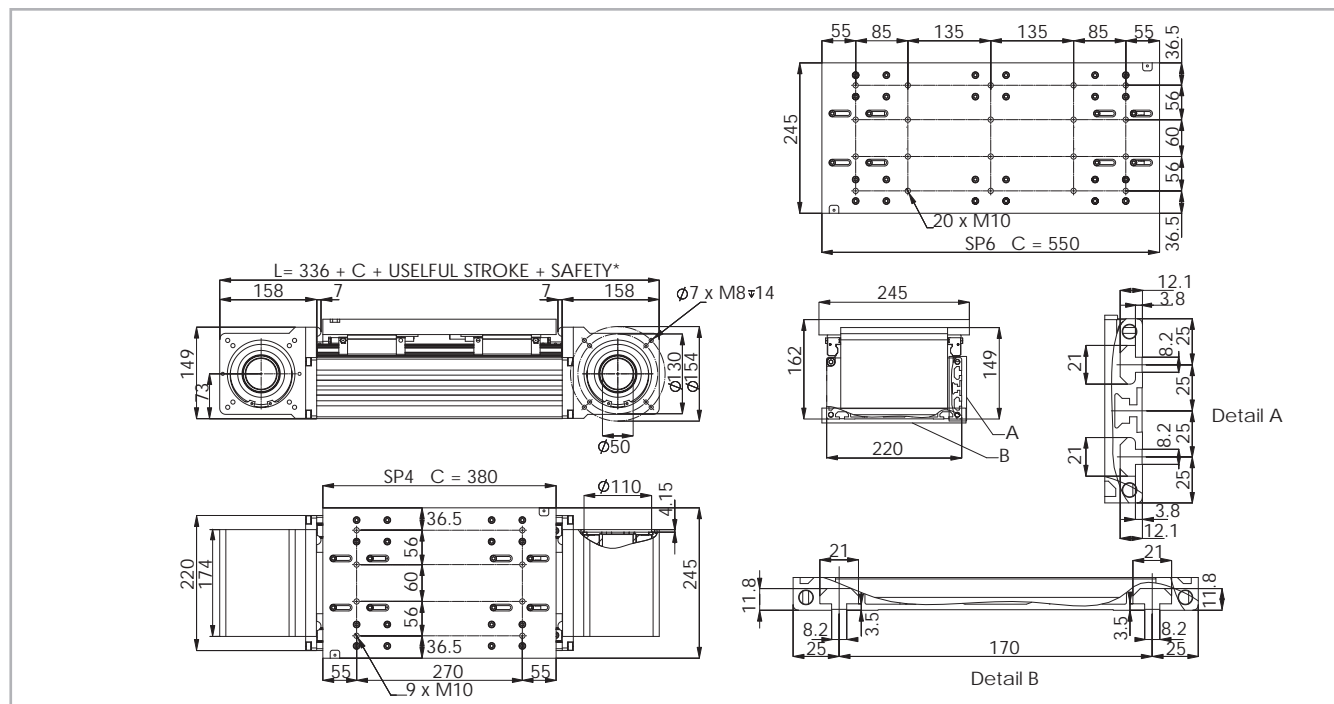| Type	Type of belt	Belt width [mm]	Weight [kg/m]
R-SMART 160 SP	50 AT 10	50	0.29

Tab. 46

Belt length (mm) = 2 x L - 150 (SP4)
2 x L - 270 (SP6)

R-SMART 160 SP4 - R-SMART 160 SP6 - 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.	Dyn	Stat.	Dyn	Stat.	Dyn	Stat.	Dyn
R-SMART 160 SP4	4440	3060	86800	69600	86800	69600	5034	4037	7118	5707	7118	5707
R-SMART 160 SP6	4440	3060	130200	104400	130200	104400	7552	6055	12109	9709	12109	9709

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

Tab. 47

R-SMART 220 SP4- SP6

R-SMART 220 Dimensions

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

Fig. 24

Technical data

	Type	
	R-SMART 220 SP4	R-SMART 220 SP6
Max. useful stroke length [mm]*1	5900	5730
Max. positioning repeatability [mm]*2	± 0.05	± 0.05
Max. speed [m/s]	4.0	4.0
Max. acceleration [m/s²]	50	50
Type of belt	100 AT 10	100 AT 10
Type of pulley	Z 32	Z 32
Pulley pitch diameter [mm]	101.86	101.86
Carriage displacement per pulley turn [mm]	320	320
Carriage weight [kg]	12.1	16.95
Zero travel weight [kg]	41.13	49.93
Weight for 100 mm useful stroke [kg]	2.45	2.45
Starting torque [Nm]	4.3	7
Moment of inertia of pulleys [g · mm²]	12.529.220	12.529.220

*1) It is possible to obtain stroke up to 11.100 (SP4), 10.930 (SP6) by means of special Rollon joints.
*2) Positioning repeatability is dependent on the type of transmission used.

Tab. 48

Moments of inertia of the aluminum body

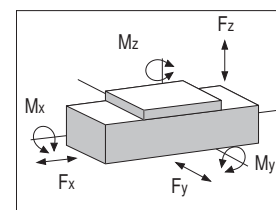| Type	I_x [10^7 mm⁴]	I_y [10^7 mm⁴]	I_p [10^7 mm⁴]
R-SMART 220 SP	0.663	3.658	4.321

Tab. 49

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]
R-SMART 220 SP	100 AT 10	100	0.58

Tab. 50

Belt length (mm) = 2 x L - 130 (SP4)
2 x L - 300 (SP6)

R-SMART 220 SP4 - R-SMART 220 SP6 - 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.	Dyn	Stat.	Dyn	Stat.	Dyn	Stat.	Dyn
R-SMART 220 SP4	8880	6360	158000	110000	158000	110000	13430	9350	17380	12100	17380	12100
R-SMART 220 SP6	8880	6360	237000	165000	237000	165000	20145	14025	30810	21450	30810	21450

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

Tab. 51

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.

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.

R-SMART

Fig. 25

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

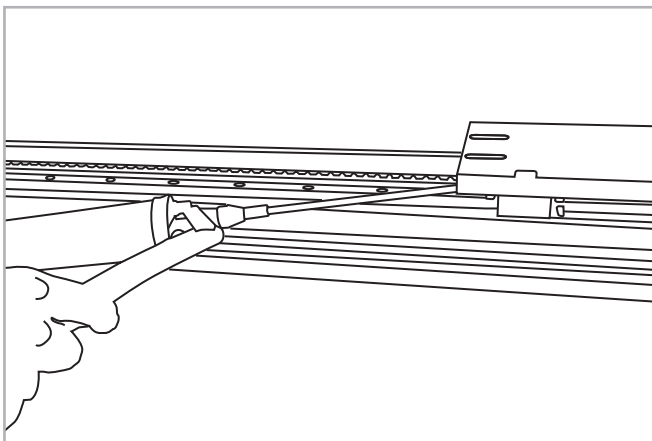| Type	Quantity of Grease (g)
R-SMART 120	1
R-SMART 160	2-3
R-SMART 220	5-6

Tab. 52

- Insert the tip of the grease gun into the specific grease blocks.
- Type of lubricant: Lithium soap grease of class NLGI 2.
- For specially stressed applications or hostile environmental conditions, lubrication should be applied out more frequently.
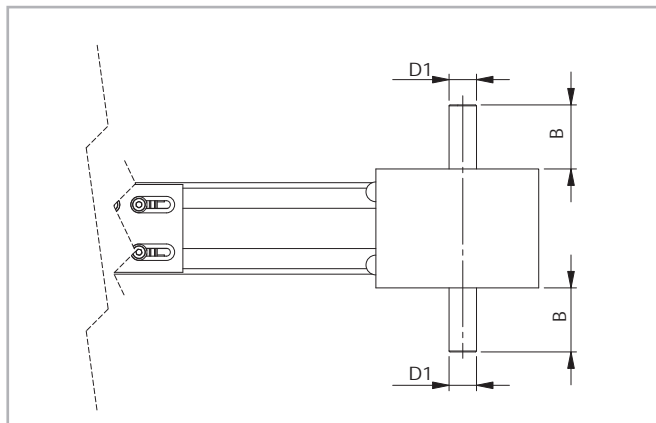 Contact Rollon for further advice

▷ Simple shafts

AS type simple shafts

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

Fig. 26

This head configuration is obtained by utilizing an assembly kit delivered as a separate accessory item.

Shaft can be installed on the left or right side of the drive head as decided by the customer.

Units (mm)

Applicable to unit	Shaft type	B	D1	AS assembly kit code
R-SMART 120	AS 20	36	20h7	G000828
R-SMART 160	AS 25	50	25h7	G000649
R-SMART 220	AS 25	50	25h7	G000649

Tab. 53

▷ Hollow shaft

Hollow shaft type FP - Standard supply
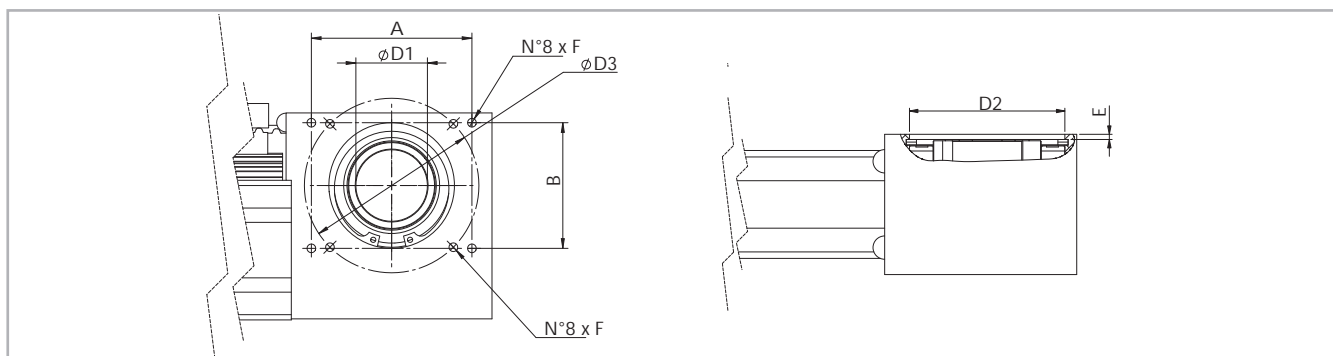
Fig. 27

Units (mm)

Applicable to unit	Shaft type	D1	D2	D3	E	F	A x B	Drive head code
R-SMART 120	FP 41	41H7	72J6	100	3.5	M6	92x72	2Y
R-SMART 160	FP 50	50H7	95J6	130	3.5	M8	109x109	2Y
R-SMART 220	FP 50	50H7	110J6	130	4	M8	109x109	2Y

Tab. 54

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 system of Rollon SMART System series linear units enables them to support loads in any direction. They can therefore be installed in any position.

To install the SMART System series units, we recommend use of one of the systems indicated below:
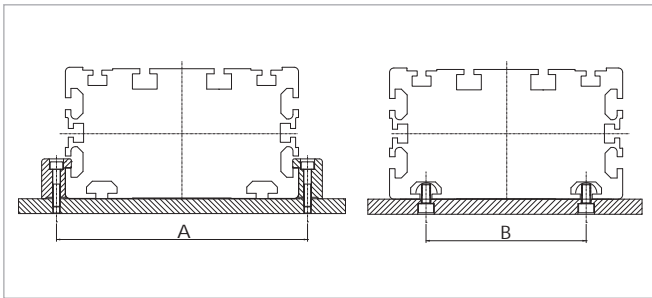

Fig. 28

Units (mm)

	A	B
R-SMART 120	132	80
R-SMART 160	180	110
R-SMART 220	240	170

Tab. 55

Fixing brackets
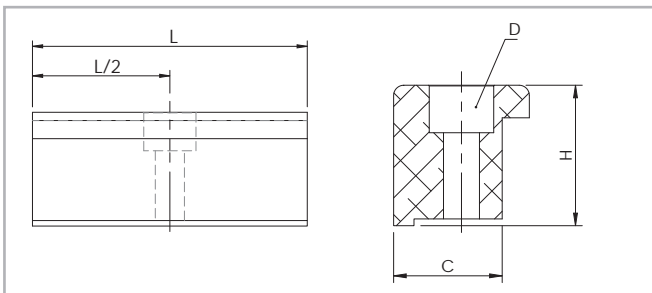
Fig. 29

Dimensions (mm)

	C	H	L	D	Code Rollon
R-SMART 120	16	20.7	50	M5	1000111
R-SMART 160	31	28.5	100	M10	1002377
R-SMART 220	31	28.5	100	M10	1002377

Tab. 56

T-nuts
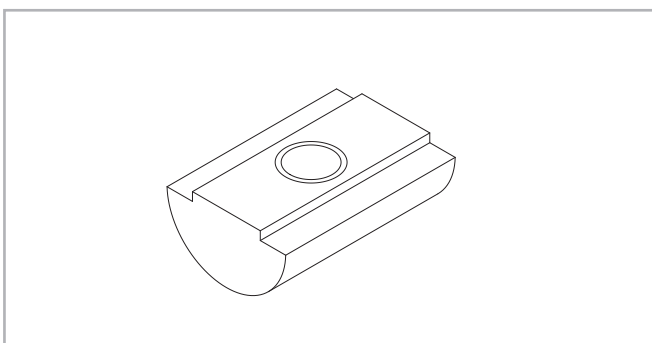
Steel nuts to be used in the slots of the body.   Fig. 30

Units (mm)

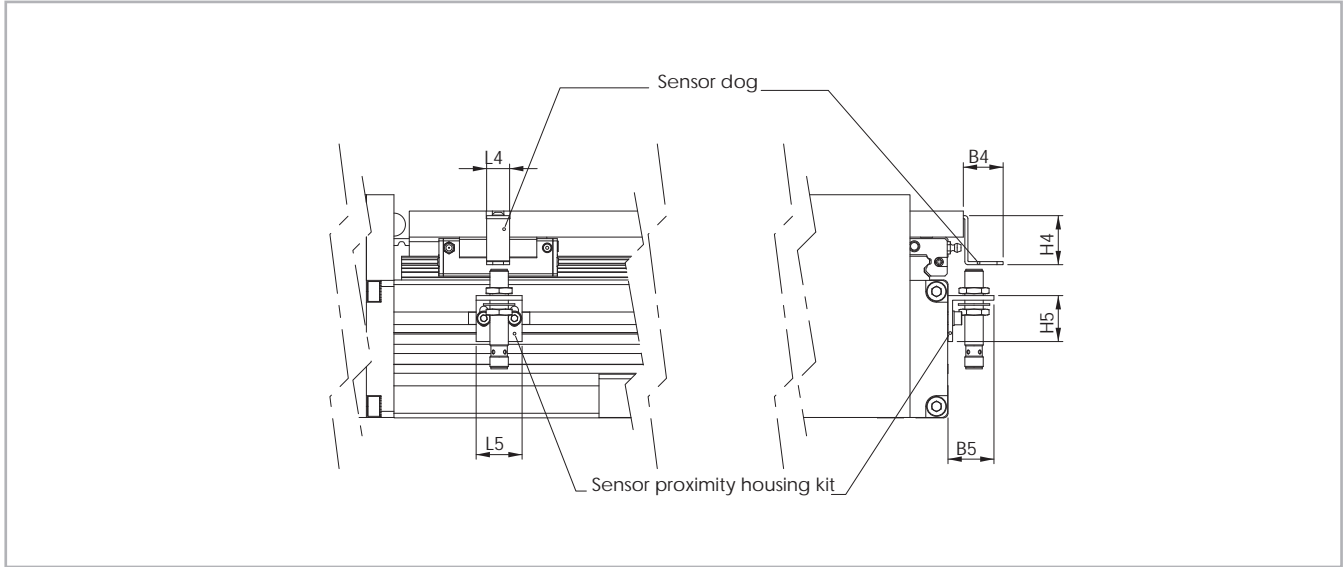|	Hole	Length	Code Rollon
R-SMART 120	M6	20	6000437
R-SMART 160	M6	20	6000437
R-SMART 160	M8	20	6001544
R-SMART 220	M6	20	6000437
R-SMART 220	M8	20	6001544

Tab. 57

Proximity

Fig. 31

Sensor proximity housing kit

Aluminum block equipped with T-nuts for fixing

Sensor dog

Iron plate mounted on the carriage used for the proximity operation

Units (mm)

	B4	B5	L4	L5	H4	H5	For proximity	Sensor dog	Sensor proximity housing kit
R-SMART 120	26	30	15	30	32	30	Ø 8/12	G000833	G000844
R-SMART 160	26	30	15	30	32	30	Ø 8/12	G000833	G000838
R-SMART 220	26	30	15	30	32	30	Ø 8/12	G000833	G000838

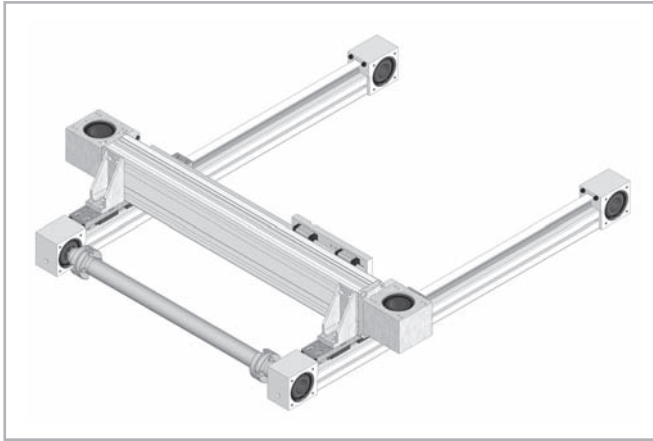Tab. 58

Assembly kits

Fig. 32

Fig. 33

For the direct assembly of R-SMART linear units on other types of actuators Rollon offers dedicated assembly kits. The table below shows the allowed combinations as well as the assembly kit codes.

Kit		Code	X No rail at each end (mm)
	R-SMART 120 on E-SMART 50	G000899	60
	R-SMART 120 on E-SMART 80	G000863	90
	R-SMART 160 on E-SMART 80	G000902	90
	R-SMART 160 on E-SMART 100	G000903	110
	R-SMART 220 on E-SMART 100	G001207	110

Tab. 59

S
S

Adapter flange for gearbox assembly
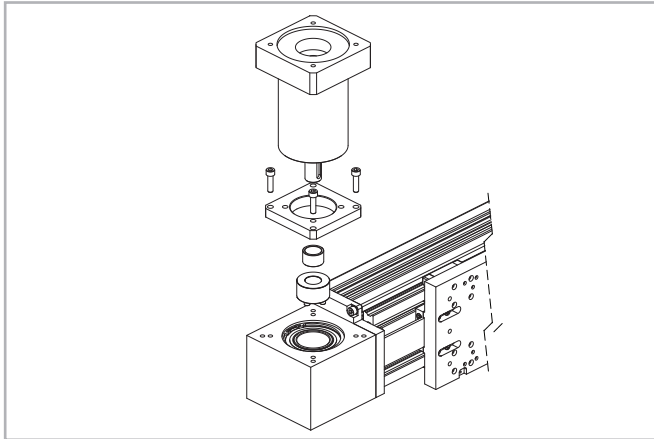

Fig. 34
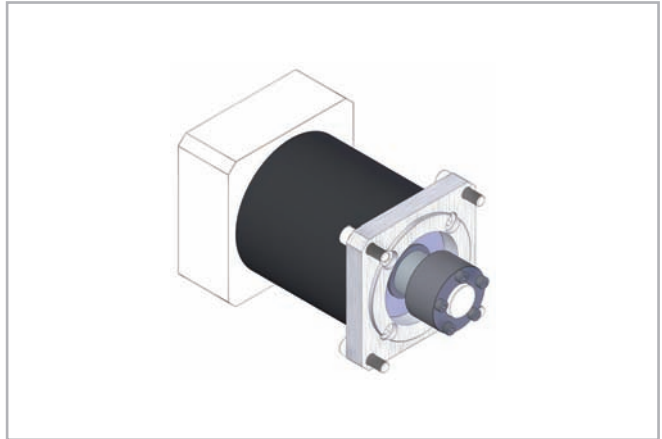

Fig. 35

Assembly kit includes: shrink disk; adapter plate; fixing hardware

Unit type	Gearbox type (not included)	Kit Code
R-SMART 120	P3	G000824
	MP080	G000826
	LC90; MPV01; LP090; PE4	G000827
	MP105	G000830
	PE3; LP070	G001078
	SP060; PLN070	G000829
	SP070; PLN090	G000859
	SW040	G000866
R-SMART 160	MP130	G000482
	LC120; MPV02; LP120; PE5	G000483
	LC090; LP090	G000525
	MP105	G000527
	SP075; PLN090	G000526
	SW050	G000717
R-SMART 220	MP130	G001045
	MP105	G001047
	LC120; MPV02; LP120; PE5	G001049

Tab. 60

For other gearbox type ask Rollon S.p.A.

Ordering key ⌄

▸ Identification codes for the R-SMART linear unit

D	12 12=120 16=160 22=220	2Y	02000	4A	
				Type (120-160-220) 4A=SP4 6A=SP6	
			L=total length of the unit		
		Drive head code *see pg. SS-24*			
	Linear unit type *see from pg. SS-20 to pg. SS-22*				
Linear unit series R-SMART *see pg. SS-17*					

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

S-SMART series ⌄

› S-SMART series description

Fig. 36

S-SMART

The S-SMART series linear units were designed to meet the vertical motion requirements in gantry applications or for applications where the aluminum profile must be moving and the carriage must be fixed.

The self-supporting extruded and anodized aluminum structure is available in three sizes. Since it is a rigid system, it is ideal for a "Z" axis in a 3-axis system by using a linear guide rail.

In addition, the S-SMART series has been specifically designed and configured to be easily assembled with the R-SMART series by using a simple bracket.

The components

Extruded profile

The anodized aluminum extrusions used for the bodies of the Rollon SMART series linear units were designed and manufactured in cooperation with a leading company in this field to obtain the right combination of high mechanical strength and reduced weight. The anodized aluminum alloy 6060 used (see physical chemical characteristics below for further information) was extruded with dimensional tolerances complying with EN 755-9 standards.

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**

Driving belt

The Rollon SMART series linear units use steel reinforced polyurethane drive belts with AT pitch. This belt is ideal due to its high load transmission

Carriage

The carriage of the Rollon SMART series linear units is made entirely of anodized aluminum. The dimensions vary depending on the type.

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. 61

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	70	23.8	200	880-900	33	600-655

Tab. 62

Mechanical characteristics

Rm	Rp (02)	A	HB
$\dfrac{N}{mm^2}$	$\dfrac{N}{mm^2}$	%	—
250	200	10	75

Tab. 63

► 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. Rollon SMART System series systems feature a linear motion system with ball bearing guides:

Performance characteristics:
- The ball bearing guides with high load capacity are mounted in a dedicated seat on the aluminum body.
- The carriage of the linear unit is assembled on pre-loaded ball bearing blocks that enables the carriage to withstand loading in the four main directions.
- 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.
- The blocks have seals on both sides and, when necessary, an additional scraper can be fitted for very dusty conditions.

The linear motion system described above offers:
- High speed and acceleration
- High load capacity
- High permissible bending moments
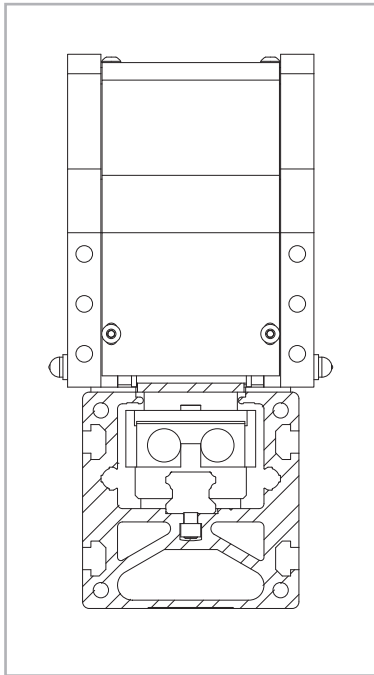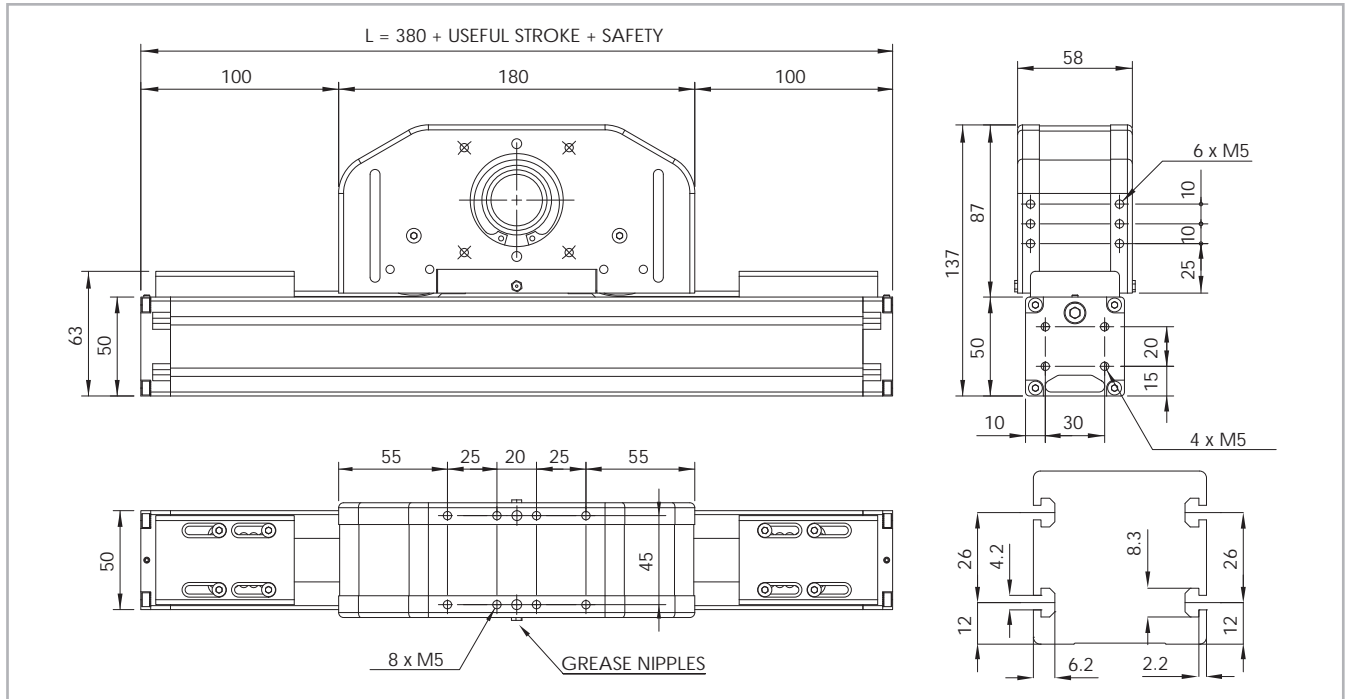- Low friction
- Long life
- Low noise

S-SMART section

Fig. 37

S-SMART 50 SP

S-SMART 50 SP Dimensions

L = 380 + USEFUL STROKE + SAFETY

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

Fig. 38

Technical data

	Type
	S-SMART 50 SP
Max. useful stroke length [mm]	1000
Max. positioning repeatability [mm]*1	± 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]	2
Zero travel weight [kg]	5.7
Weight for 100 mm useful stroke [kg]	0.4
Starting torque [Nm]	0.25

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

Tab. 64

Moments of inertia of the aluminum body

Type	I_x [10^7 mm⁴]	I_y [10^7 mm⁴]	I_p [10^7 mm⁴]
S-SMART 50 SP	0.025	0.031	0.056

Tab. 65

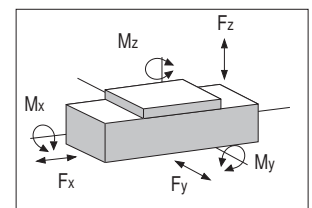### Driving belt

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]
S-SMART 50 SP	22 AT 5	22	0.072

Tab. 66

Belt length (mm) = L + 30

S-SMART 50 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.	Dyn	Stat.	Dyn	Stat.	Dyn	Stat.	Dyn
S-SMART 50 SP	809	508	6930	4616	6930	4616	43	29	229	152	229	152

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

Tab. 67

S-SMART 65 SP

S-SMART 65 SP Dimensions
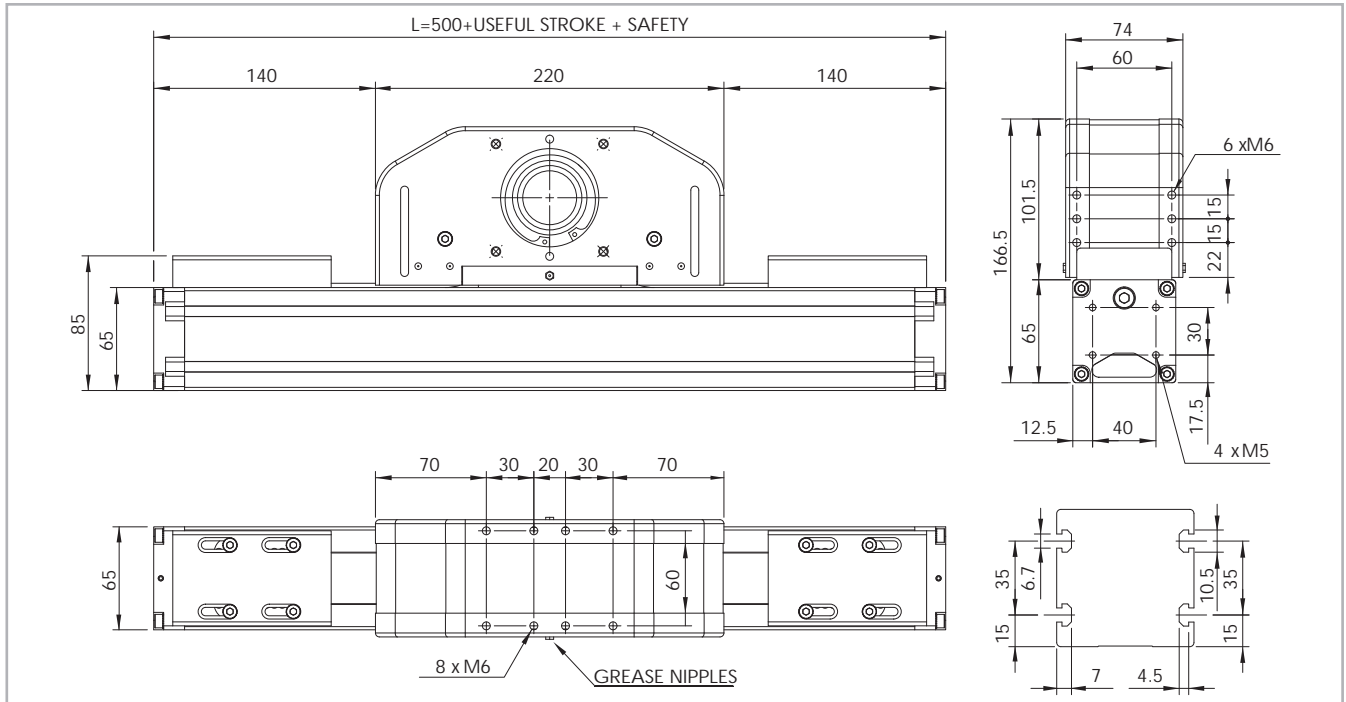
* The length of the safety stroke is provided on request according to the customer's specific requirements.

Fig. 39

Technical data

	Type
	S-SMART 65 SP
Max. useful stroke length [mm]	1500
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 32
Pulley pitch diameter [mm]	50.93
Carriage displacement per pulley turn [mm]	160
Carriage weight [kg]	3.6
Zero travel weight [kg]	7.3
Weight for 100 mm useful stroke [kg]	0.6
Starting torque [Nm]	0.60

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

Tab. 68

Moments of inertia of the aluminum body

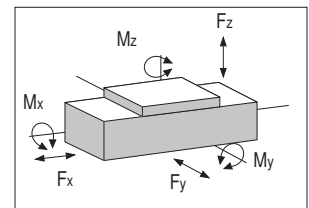| Type	I_x [10^7 mm⁴]	I_y [10^7 mm⁴]	I_p [10^7 mm⁴]
S-SMART 65 SP	0.060	0.086	0.146

Tab. 69

Driving belt

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

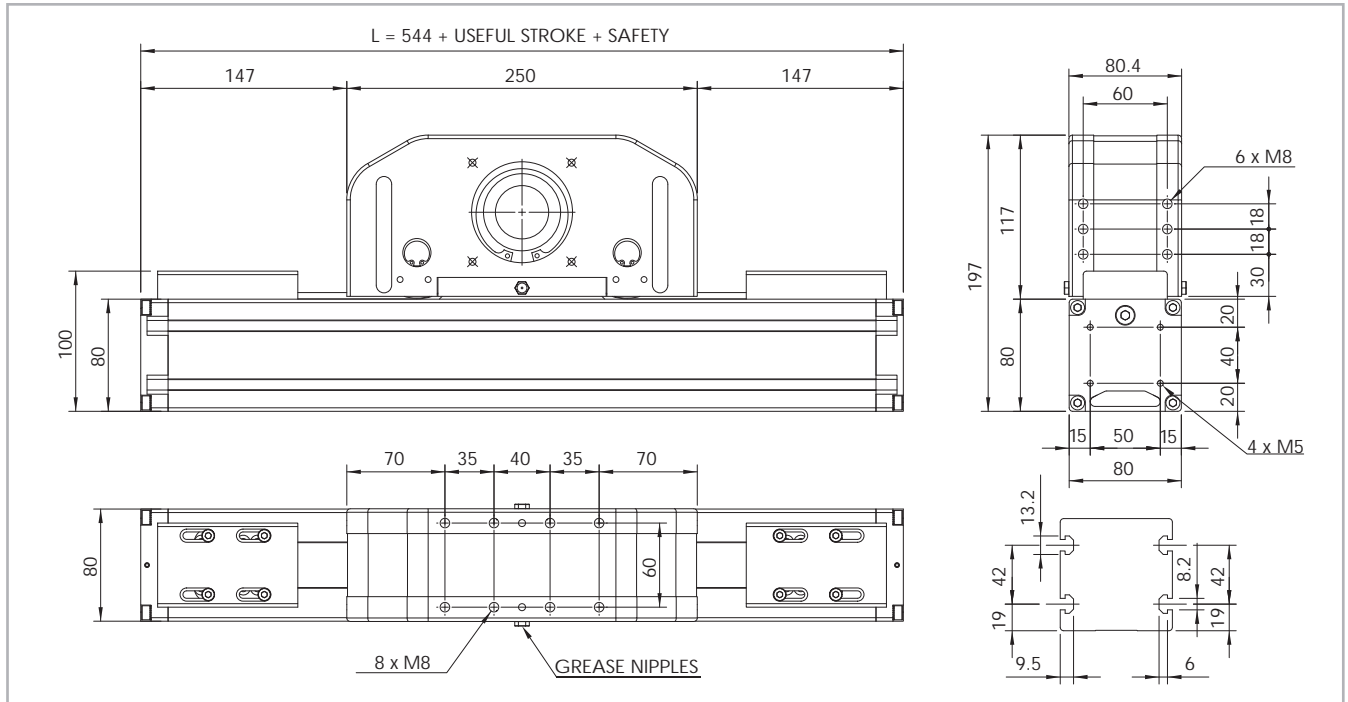| Type	Type of belt	Belt width [mm]	Weight [kg/m]
S-SMART 65 SP	32 AT 5	32	0.105

Tab. 70

Belt length (mm) = L + 35

S-SMART 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.	Dyn	Stat.	Dyn	Stat.	Dyn	Stat.	Dyn
S-SMART 65 SP	1344	922	30560	19890	30560	19890	240	156	985	641	985	641

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

Tab. 71

S-SMART 80 SP

S-SMART 80 SP Dimensions

L = 544 + USEFUL STROKE + SAFETY

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

Fig. 40

Technical data

	Type
	S-SMART 80 SP
Max. useful stroke length [mm]	2000
Max. positioning repeatability [mm]*1	± 0.05
Max. speed [m/s]	4.0
Max. acceleration [m/s²]	50
Type of belt	32 AT 10
Type of pulley	Z 21
Pulley pitch diameter [mm]	66.85
Carriage displacement per pulley turn [mm]	210
Carriage weight [kg]	6.3
Zero travel weight [kg]	12.6
Weight for 100 mm useful stroke [kg]	1
Starting torque [Nm]	1.65

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

Tab. 72

Moments of inertia of the aluminum body

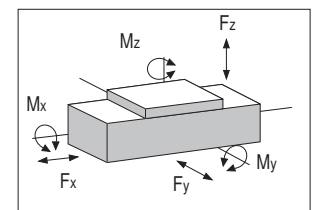| Type	I_x [10^7 mm^4]	I_y [10^7 mm^4]	I_p [10^7 mm^4]
S-SMART 80 SP	0.136	0.195	0.331

Tab. 73

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]
S-SMART 80 SP	32 AT 10	32	0.186

Tab. 74

Belt length (mm) = L + 50

S-SMART 80 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.	Dyn	Stat.	Dyn	Stat.	Dyn	Stat.	Dyn
S-SMART 80 SP	2250	1459	51260	36637	51260	36637	520	372	3742	2675	3742	2675

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

Tab. 75

> Lubrication

SP linear units with ball bearing guides

The ball bearing carriages of the SP versions are fitted with a retention cage that eliminates "steel-steel" contact between adjacent revolving parts and prevents misalignment of these in the circuits.

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.

S-SMART

Fig. 41

Quantity of lubricant necessary for re-lubrication:

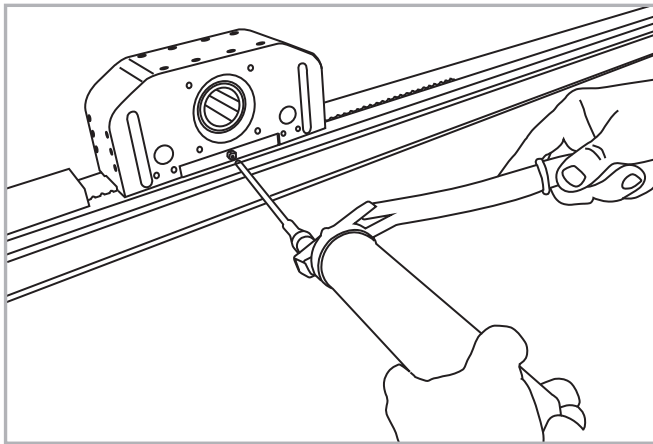| Type	Quantity of Grease (g)
S-SMART 50	2
S-SMART 65	2
S-SMART 80	5-6

Tab. 76

- Insert the tip of the grease gun into the specific grease blocks.
- Type of lubricant: Lithium soap grease of class NLGI 2.
- For specially stressed applications or hostile environmental conditions, lubrication should be applied out more frequently.
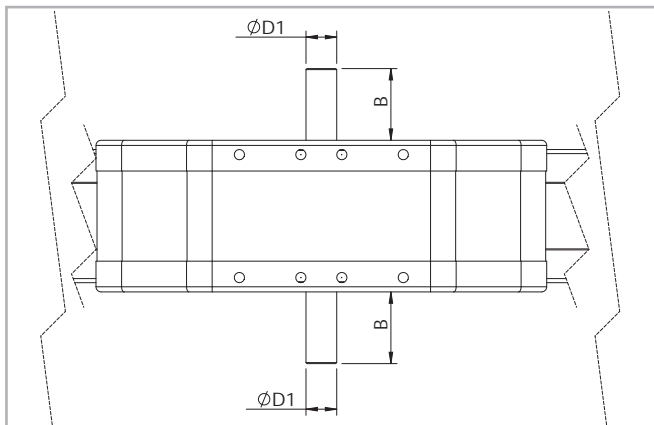 Contact Rollon for further advice

⟩ Simple shafts

AS type simple shafts

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

Fig. 42

This head configuration is obtained by utilizing an assembly kit delivered as a separate accessory item.
Shaft can be installed on the left or right side of the drive head as decided by the customer.

Units (mm)

Applicable to unit	Shaft type	B	D1	AS Assembly kit code
S-SMART 50	**AS 12**	26	12h7	G000652
S-SMART 65	**AS 15**	35	15h7	G000851
S-SMART 80	**AS 20**	40	20h7	G000828

Tab. 77

⟩ Hollow shaft

Hollow shaft type FP - Standard supply
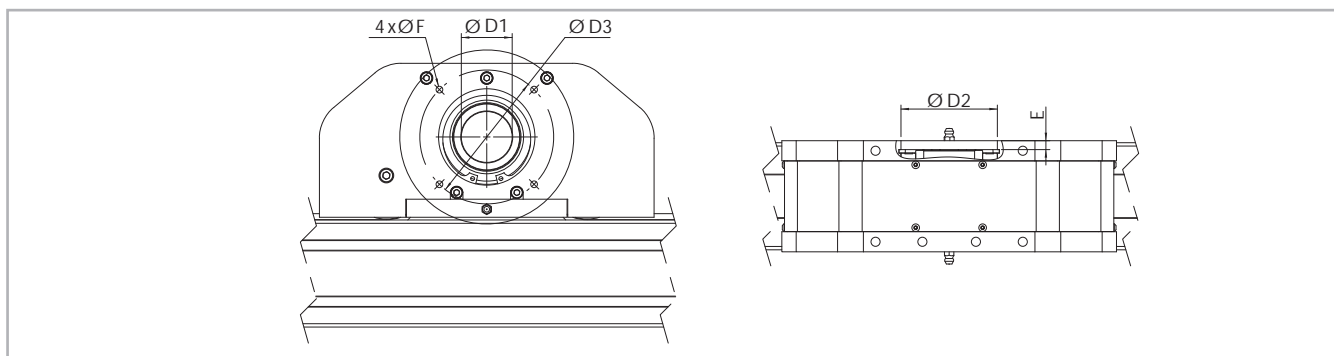
Fig. 43

Units (mm)

Applicable to unit	Shaft type	D1	D2	D3	E	F	Drive head code
S-SMART 50	**FP 26**	26H7	47J6	75	2.5	M5	2YA
S-SMART 65	**FP 34**	34H7	62J6	96	2.5	M6	2YA
S-SMART 80	**FP 41**	41H7	72J6	100	5	M6	2ZA

Tab. 78

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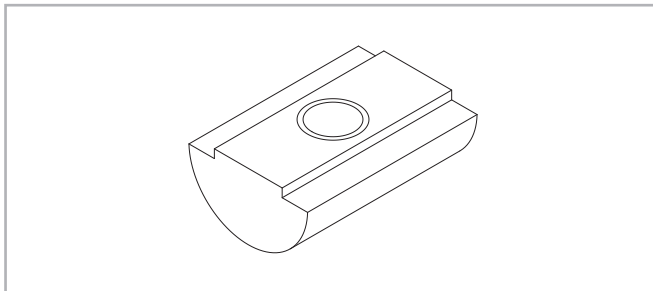For further information contact our offices.

S
S

> Accessories

The ball bearing guide linear drive system of Rollon SMART System series linear units enables them to support loads in any direction. They can therefore be installed in any position.

To install the SMART System series units, we recommend use of one of the systems indicated below:

T-nuts

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

Fig. 44

Units (mm)

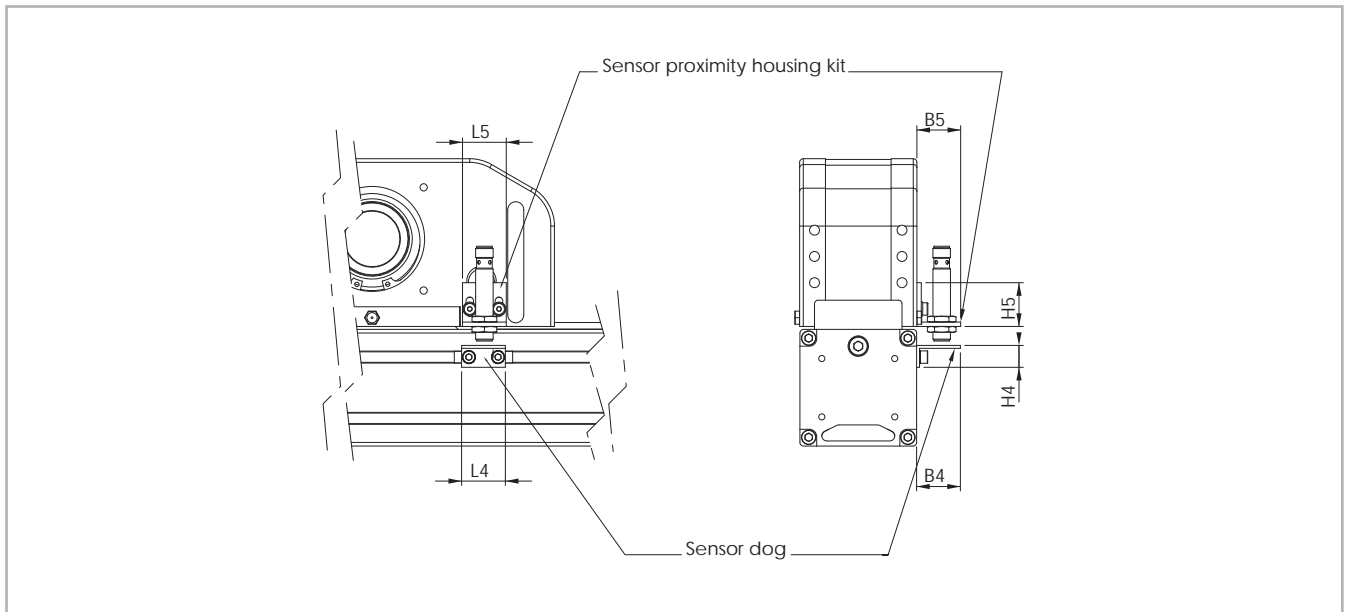|	Hole	Length	Code Rollon
S-SMART 50	M4	8	1001046
S-SMART 65	M5	10	1000627
S-SMART 80	M6	13	1000043

Tab. 79

Proximity

Fig. 45

Proximity switch holder

Aluminum block equipped with T-nuts for fixing

Proximity switch runner

Iron plate mounted on the carriage used for the proximity operation

Units (mm)

	B4	B5	L4	L5	H4	H5	For proximity	Sensor dog code	Sensor proximity housing code
S-SMART 50	30	30	30	30	15	30	Ø 8/12	G000835	G000834
S-SMART 65	30	30	30	30	15	30	Ø 8/12	G000836	G000834
S-SMART 80	30	30	30	30	15	30	Ø 8/12	G000837	G000834

Tab. 80

Assembly kits
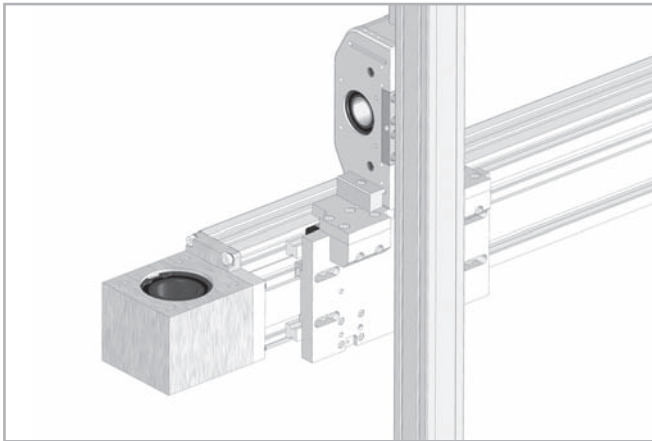
Fig. 46
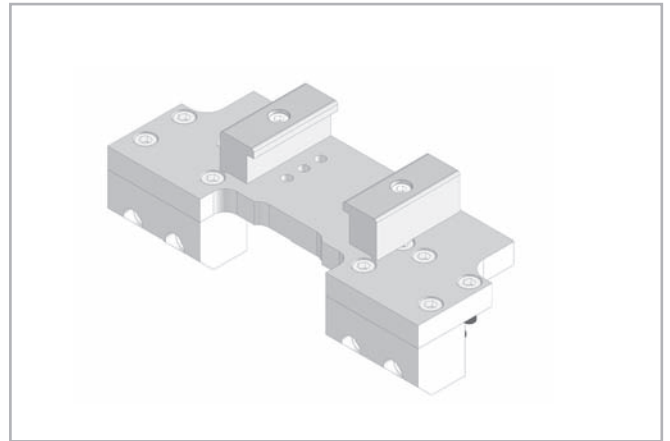
Fig. 47

While ordering two units for Y-Z assembly key has to be specified that they work together in order to drill the trolleys for the assembly of the kit.

Actuator combination Y-Z	Kit Code
S-SMART 50 on E-SMART 50	G000647
S-SMART 50 on R-SMART 120	G000910
S-SMART 65 on E-SMART 50	G000654
S-SMART 65 on E-SMART 80	G000677
S-SMART 65 on R-SMART 120	G000911
S-SMART 65 on R-SMART 160	G000912
S-SMART 80 on E-SMART 80	G000653
S-SMART 80 on E-SMART 100	G000688
S-SMART 80 on R-SMART 120	G000990
S-SMART 80 on R-SMART 160	G000913

Tab. 81

Adapter flange for gearbox assembly
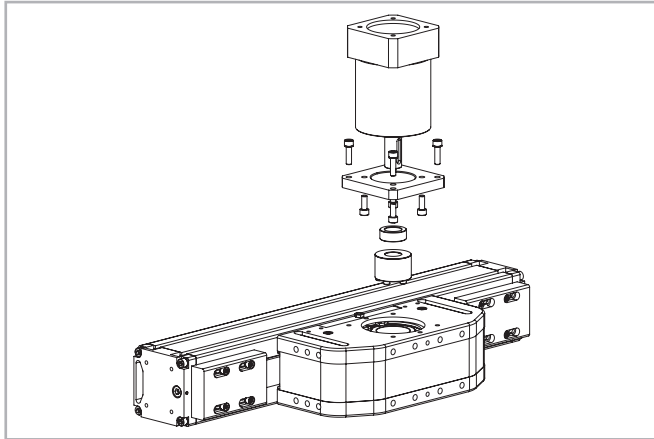
Fig. 48
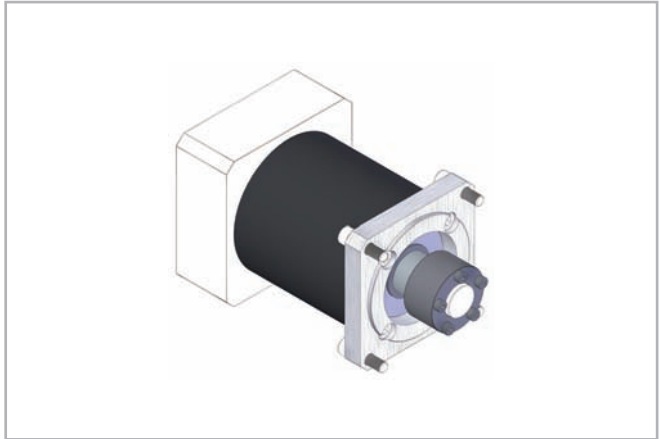
Fig. 49

Assembly kit includes: shrink disk; adapter plate; fixing hardware

Unit	Gearbox type (not included)	Kit Code
S-SMART 50	MP060	G000566
	PE2; LP050	G001444
S-SMART 65	MP080	G000529
	LC070	G000530
	MP060; PLE060	G000531
	SW030	G000748
	PE3; LP070	G000530
S-SMART 80	P3	G000824
	MP080	G000826
	LC090; MPV01; LP090; PE4	G000827
	PLE080	G000884
	SP060; PLN070	G000829
	SW040	G000866
	SW050	G000895

Tab. 82

For other gearbox type ask Rollon S.p.A.

Ordering key ⌄

▷ Identification codes for the S-SMART linear unit

F	08 05 = 50 06 = 65 08 = 80	2ZA	1300	1A 1A=SP	
				Linear motion system *see pg. SS-31*	
			L=total length of the unit		
		Drive head code *see pg. SS-36*			
	Linear unit type *see from pg. SS-32 to pg. SS-34*				
Linear unit series S-SMART *see pg. SS-29*					

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

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 axes. Rollon now offers a set of components, including brackets and plates, to enable multiaxis units to be built.

In addition to the standard elements, Rollon can supply plates for special applications.

Application examples:

One axis system

A

A - X Axis: E-SMART

Two axis Y-Z system

C

C - Linear units: Y Axis 2 E-SMART - Z Axis 1 S-SMART
   Connection kit:
   Connection plate Kit for S-SMART (Z axis) on 2 E-SMART (Y axis)

Two parallel axis system

B

B - Linear units: 2 E-SMART
   Connection kit: Parallel Kit

Three axis - X-Y-Z system

D

D - Linear units: X Axis 2 E-SMART - Y Axis 2 E-SMART - Z Axis 1 S-SMART
   Connection kit: 2 fixing brackets Kit for 2 E-SMART (X axis) on 2 E-SMART (Y axis). Connection plate Kit for S-SMART (Z axis) on 2 E-SMART (Y axis). Parallel Kit

Two axis Y-Z system

E

Three axis X-Y-Z system

F

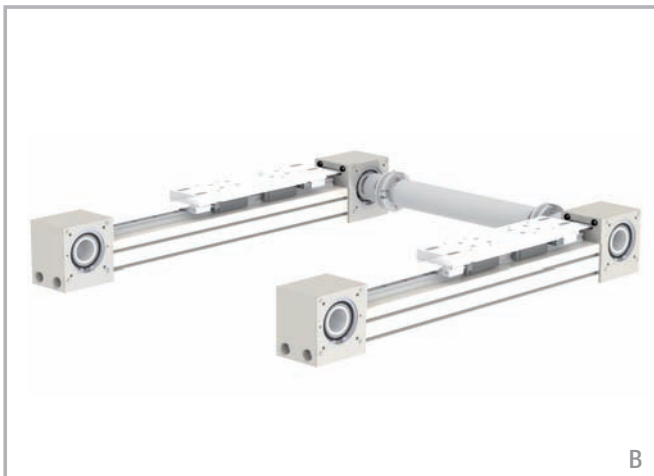**E** - Linear units: Y Axis 1 R-SMART - Z Axis 1 S-SMART
Connection kit: Connection plate Kit for S-SMART (Z axis) on R-SMART (Y axis).

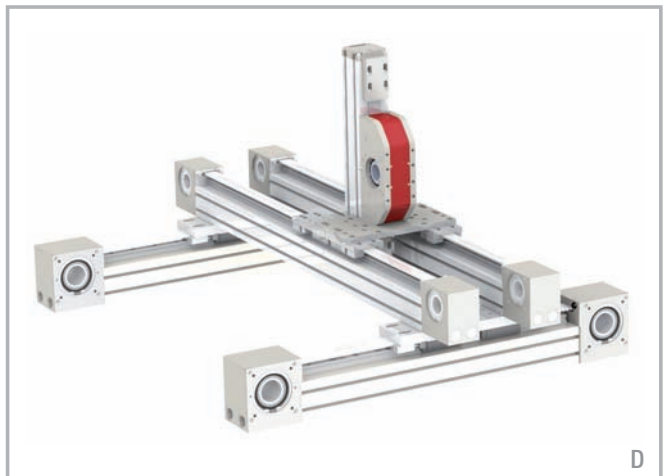**F** - Linear units: X Axis 2 E-SMART - Y Axis 1 R-SMART - Z Axis 1 S-SMART
Connection kit: 2 fixing brackets Kit for 2 R-SMART (Y axis) on 2 E-SMART (X axis). Connection plate Kit for S-SMART (Z axis) on 2 R-SMART (Y axis). Parallel Kit

S
S

Static load and service life Plus-Clean Room-Smart-Eco-Precision ▽

> Static load

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

Safety factor S_0

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

Fig. 1

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

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

Fig. 2

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

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

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

Fig. 3

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

Belt safety factor referred to the dynamic F_x

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

Tab. 1

Service life

Calculation of the service life

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

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

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

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

Fig. 4

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

For SP types

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

Fig. 5

For CI and CE types

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

Fig. 6

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

Service factor f_i

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

Tab. 2

Static load and service life Uniline $\vee$

Static load

In the static load test, the radial load rating C_{0rad}, the axial load rating C_{0ax}, and the moments M_x, M_y und M_z indicate the maximum allowed load values. Higher loads will impair the running characteristics. To check the static load, a safety factor S_0 is used, which accounts for the special conditions of the application defined in more detail in the table below:

Safety factor S_0

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

Fig. 7

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

$$\frac{P_{0rad}}{C_{0rad}} \leq \frac{1}{S_0} \qquad \frac{P_{0ax}}{C_{0ax}} \leq \frac{1}{S_0} \qquad \frac{M_1}{M_x} \leq \frac{1}{S_0} \qquad \frac{M_2}{M_y} \leq \frac{1}{S_0} \qquad \frac{M_3}{M_z} \leq \frac{1}{S_0}$$

Fig. 8

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

$$\frac{P_{0rad}}{C_{0rad}} + \frac{P_{0ax}}{C_{0ax}} + \frac{M_1}{M_x} + \frac{M_2}{M_y} + \frac{M_3}{M_z} \leq \frac{1}{S_0}$$

P_{0rad} = acting radial load (N)
C_{0rad} = allowed radial load (N)
P_{0ax} = acting axial load (N)
C_{0ax} = allowed axial load (N)
M_1, M_2, M_3 = external moments (Nm)
M_x, M_y, M_z = maximum allowed moments
in the different load directions (Nm)

Fig. 9

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

▷ Calculation formulae

Moments M_y and M_z for linear units with long slider plate

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

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

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

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

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

Fig. 10

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

Tab. 3

Moments M_y and M_z for linear units with two slider plates

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

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

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

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

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

Fig. 11

Type	$M_{y\,min}$ [Nm]	$M_{z\,min}$ [Nm]	L_{min} [mm]	ΔL
A40D	70	193	235	5
A55D	225	652	300	5
A75D	771	2288	416	8
A100D	2851	4950	396	50
C55D	492	90	300	5
C75D	1809	312	416	8
E55D	450	652	300	5
E75D	1543	2288	416	8
ED75D	3619	2288	416	8

Tab. 4

› Service life

Calculation of the service life

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

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

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

Fig. 12

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

$$P = P_r + \left(\frac{P_a}{C_{0ax}} + \frac{M_1}{M_x} + \frac{M_2}{M_y} + \frac{M_3}{M_z} \right) \cdot C_{0rad}$$

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

Service factor f_i

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

Contact factor f_c

f_c	
Standard slider	1
Long slider	0.8
Double slider	0.8

Stroke factor f_h

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

> Determination of the motor torque

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

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

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

Notes

Data sheet ⌄

General data:

Date: .... Inquiry N°: ....

Address: ....

Contact: ....

Company: ....

Date: ....

Phone: ....

Fax: ....

Technical data:

			X axis	Y axis	Z axis
Useful stroke (Including safety overtravel)		S	[mm]			
Load to be translated		P	[kg]			
Location of Load in the	X-Direction	LxP	[mm]			
	Y-Direction	LyP	[mm]			
	Z-Direction	LzP	[mm]			
Additional force	Direction (+/-)	Fx (Fy, Fz)	[N]			
Position of force	X-Direction	Lx Fx (Fy, Fz)	[mm]			
	Y-Direction	Ly Fx (Fy, Fz)	[mm]			
	Z-Direction	Lz Fx (Fy, Fz)	[mm]			
Assembly position (Horizontal/Vertical/Transversal						
Max. speed		V	[m/s]			
Max. acceleration		a	[m/s²]			
Positioning repeatability		Δs	[mm]			
Required life		L	yrs			

Horizontal position

Transversal position

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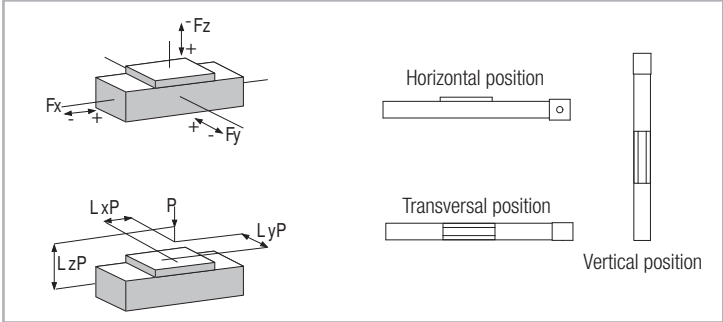
Attention: Please enclose drawing, sketches and sheet of the duty cycle

ROLLON®
LinearEvolution

Rollon Branches & Rep. Offices
Distributors

ROLLON S.p.A. - ITALY ⌄

Via Trieste 26
I-20871 Vimercate (MB)
Phone: (+39) 039 62 59 1
www.rollon.it - infocom@rollon.it

Branches:

ROLLON GmbH - GERMANY ⌄

Bonner Strasse 317-319
D-40589 Düsseldorf
Phone: (+49) 211 95 747 0
www.rollon.de - info@rollon.de

ROLLON S.A.R.L. - FRANCE ⌄

Les Jardins d'Eole, 2 allée des Séquoias
F-69760 Limonest
Phone: (+33) (0) 4 74 71 93 30
www.rollon.fr - infocom@rollon.fr

ROLLON Ltd - CHINA ⌄

No. 16 Jin Wen Road,
China, Shanghai, 201323
Phone: +86 21 5811 8288
www.rollon.cn.com - info@rollon.cn.com

ROLLON - JAPAN ⌄

3F Shiodome Building, 1-2-20 Kaigan, Minato-ku,
Tokyo 105-0022 Japan
Phone +81 3 6721 8487
www.rollon.jp - info@rollon.jp

ROLLON B.V. - NETHERLANDS ⌄

Ringbaan Zuid 8
6905 DB Zevenaar
Phone: (+31) 316 581 999
www.rollon.nl - info@rollon.nl

ROLLON Corporation - USA ⌄

101 Bilby Road. Suite B
Hackettstown, NJ 07840
Phone: (+1) 973 300 5492
www.rolloncorp.com - info@rolloncorp.com

ROLLON India Pvt. Ltd. - INDIA ⌄

1st floor, Regus Gem Business Centre, 26/1
Hosur Road, Bommanahalli, Bangalore 560068
Phone: (+91) 80 67027066
www.rollonindia.in - info@rollonindia.in

Rep. Offices:

ROLLON S.p.A. - RUSSIA ⌄

117105, Moscow, Varshavskoye
shosse 17, building 1
Phone: +7 (495) 508-10-70
www.rollon.ru - info@rollon.ru

ROLLON Ltd - UK ⌄

The Works 6 West Street Olney
Buckinghamshire, United Kingdom, MK46 5 HR
Phone: +44 (0) 1234964024
www.rollon.uk.com - info@rollon.uk.com

Regional Manager:

ROLLON - SOUTH AMERICA ⌄

R. Joaquim Floriano, 397, 2o. andar
Itaim Bibi - 04534-011, São Paulo, BRASIL
Phone: +55 (11) 3198 3645
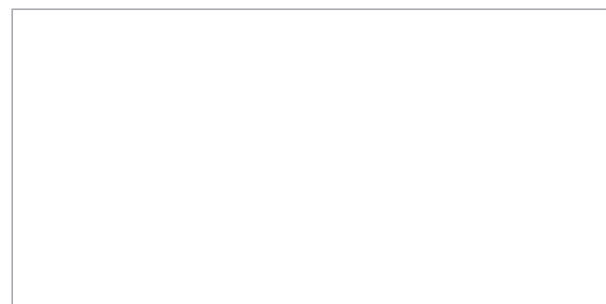www.rollonbrasil.com.br - info@rollonbrasil.com

---

Consult the other ranges of products

Distributor

All addresses of our global sales partners can also be found at www.rollon.com

ALT1_GC_EN_07/17