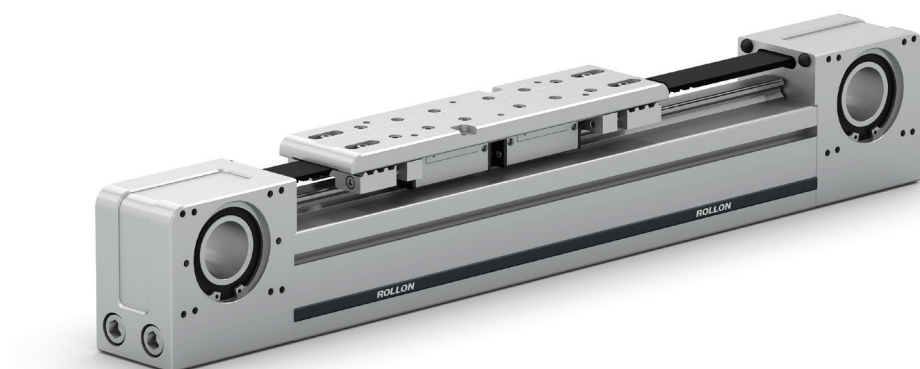


# E-SMART

Data sheet - rev. 1.2



# ACTUATORS AND SYSTEMS

## myRollon

myRollon is Rollon's **digital working platform** designed to simplify the selection and configuration of linear and rotary motion solutions. It enables users to identify the most suitable motion system based on their specific application requirements, enhancing design precision and efficiency.

By centralizing essential tools and resources in a unified environment, myRollon empowers users to access all necessary services and information — saving time and boosting productivity in search of high-performance motion solutions.

SCAN ME!



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- E-SMART

Ordering example: **L052R020003R**  
In order to create identification codes for Actuator Line, you can visit: <http://configureactuator.rollon.com>

## ► FEATURES AND ADVANTAGES

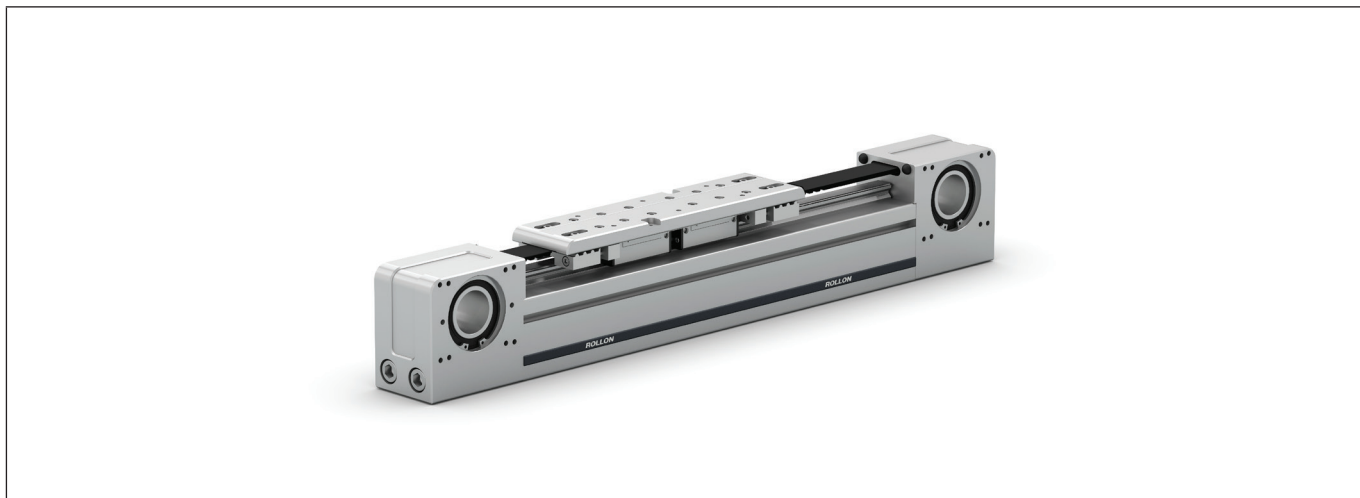


Fig.1

**The E-SMART linear actuators are designed to combine performance, strength and versatility.**

E-SMART features a self-supporting structure with a profile of extruded and anodized aluminium. Several sizes are available ranging from a width of 30 to 144 mm.

The carriage is made of machined anodized aluminium and is guided and supported by a recirculating ball guide system featuring one or more blocks.

The thrust force is transmitted by a steel reinforced, polyurethane belt with AT pitch, which helps ensuring high load transmission characteristics, compact size, low noise and smooth alternating motion.

E-SMART features two symmetrical heads designed to allow the highest freedom while sizing the application and mounting the gearbox. Therefore, it is possible to assemble the gearbox on both heads, on the right or left side, by means of a standard assembly kit. This feature is also useful when the unit is assembled to be part of a multi-axis system.

### Preferred areas of application

These units are designed to suit a wide range of uses in different technological sectors, particularly in environments that maintain a good level of cleanliness. They offer a good balance between performance, application versatility and cost efficiency. In addition, these actuators are ideal as parallel axes in a gantry system.

### Performance characteristics

- Available sizes: 30, 50, 80, 100, 144
- Max. operating speed.: 4 m/s
- Max. acceleration: 50 m/s<sup>2</sup>
- Repeatability: up to  $\pm 0.05$  mm
- Profile material: Aluminium
- Drive: Toothed belt AT pitch
- Guide: Recirculating ball bearings

### Standard accessories

- Shaft
- Synchronization kit
- Fixing system
- Sensors
- Gearbox assembly kit

## MAIN ADVANTAGES

### High dynamics

High dynamics, thanks to excellent acceleration and speed.

### Compactness

The compact design and available strokes help to ensure a coordinated and precise movement.

### High load capacity

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

### Versatility

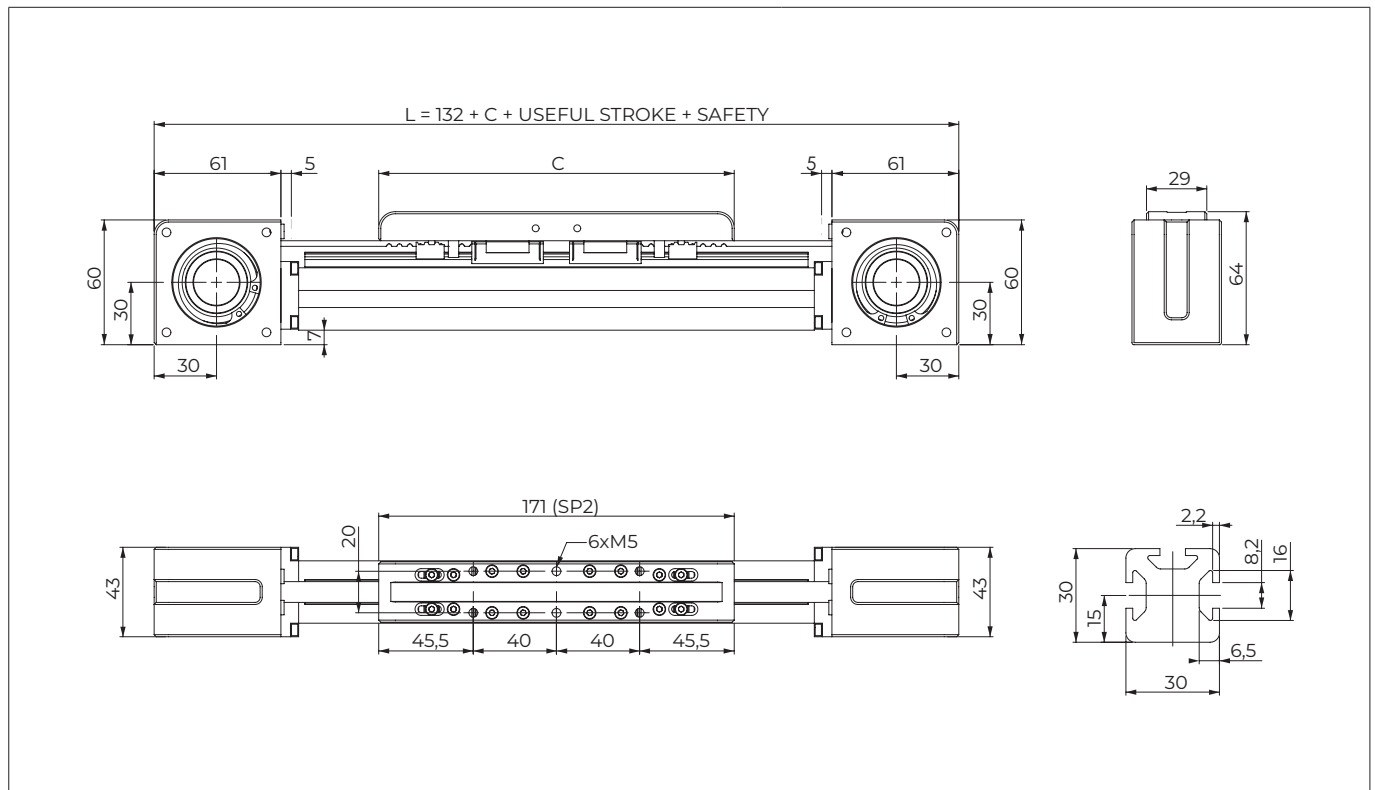
The driving head allows for assembly of the gearbox on either side of it.

### Low maintenance

The system helps ensure long maintenance intervals and consequently long life.

## COMPONENTS AND DIMENSIONS

### E-SMART 30 SP2



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

Fig.2

| Technical data                                    | SP2     |
|---------------------------------------------------|---------|
| Max. useful stroke length [mm]                    | 3700    |
| Max. positioning repeatability [mm] <sup>*)</sup> | ± 0.05  |
| Max. speed [m/s]                                  | 4.0     |
| Max. acceleration [m/s <sup>2</sup> ]             | 50      |
| Carriage weight [kg]                              | 0.27    |
| Zero travel weight [kg]                           | 1.88    |
| Weight for 100 mm useful stroke [kg]              | 0.35    |
| Rail size [mm]                                    | 12 mini |

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

Tab.1

| Driving belt and pulley data                       | SP2         |
|----------------------------------------------------|-------------|
| Belt type                                          | 10 AT 5     |
| Belt width [mm]                                    | 10          |
| Belt length [mm]                                   | 2 x L - 100 |
| Belt weight [kg/m]                                 | 0.03        |
| Pulley type                                        | Z 24        |
| Pulley pitch diameter [mm]                         | 38.20       |
| Carriage displacement per pulley turn [mm]         | 120         |
| Starting torque [Nm]                               | 0.15        |
| Moment of inertia of pulleys [kg·mm <sup>2</sup> ] | 58          |

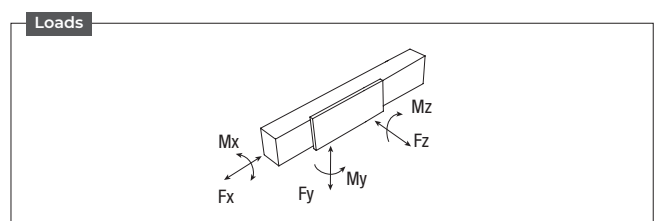
Tab.2

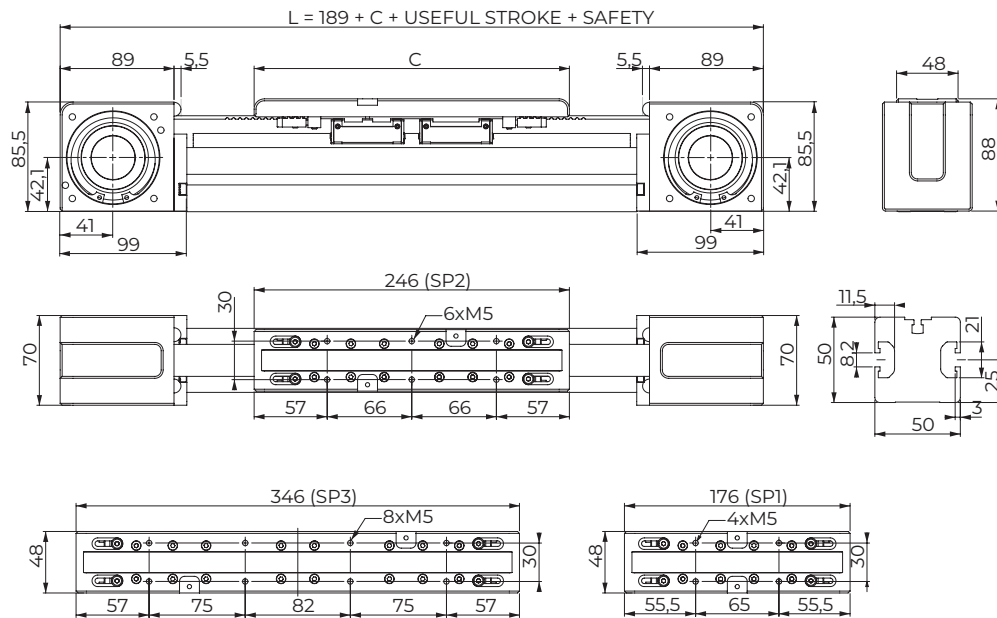
| Load capacity  | SP2  |
|----------------|------|
| Fx static [N]  | 385  |
| Fx dynamic [N] | 242  |
| Fy static [N]  | 7060 |
| Fy dynamic [N] | 6350 |
| Fz static [N]  | 7060 |
| Mx static [Nm] | 46.2 |
| My static [Nm] | 166  |
| Mz static [Nm] | 166  |

Fx in the table represents the maximum capacity of the toothed belt. For the application, the limit of transmittable torque of the shrink disk must be considered too (see pg. 15). See verification under static load and lifetime.

Tab.3

| Moments of inertia of the aluminum body |        |
|-----------------------------------------|--------|
| Ix [10 <sup>7</sup> mm <sup>4</sup> ]   | 0.0029 |
| Iy [10 <sup>7</sup> mm <sup>4</sup> ]   | 0.0029 |
| Jt [10 <sup>7</sup> mm <sup>4</sup> ]   | 0.0015 |



**■ E-SMART 50 SP1 - SP2 - SP3**


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

**Fig.3**

| Technical data                                    | SP1    | SP2    | SP3    |
|---------------------------------------------------|--------|--------|--------|
| Max. useful stroke length [mm] <sup>1)</sup>      | 6145   | 6075   | 5975   |
| Max. positioning repeatability [mm] <sup>2)</sup> | ± 0.05 | ± 0.05 | ± 0.05 |
| Max. speed [m/s]                                  | 4.0    | 4.0    | 4.0    |
| Max. acceleration [m/s <sup>2</sup> ]             | 50     | 50     | 50     |
| Carriage weight [kg]                              | 0.62   | 1.00   | 1.50   |
| Zero travel weight [kg]                           | 5.04   | 5.68   | 6.47   |
| Weight for 100 mm useful stroke [kg]              | 0.37   | 0.37   | 0.37   |
| Rail size [mm]                                    | 15     | 15     | 15     |

\*1) It is possible to obtain longer stroke by means of special Rollon joints.  
 \*2) Positioning repeatability is dependent on the type of transmission used.

**Tab.5**

| Driving belt and pulley data                       | SP1        | SP2         | SP3         |
|----------------------------------------------------|------------|-------------|-------------|
| Belt type                                          | 25 AT 5    | 25 AT 5     | 25 AT 5     |
| Belt width [mm]                                    | 25         | 25          | 25          |
| Belt length [mm]                                   | 2 x L - 60 | 2 x L - 125 | 2 x L - 225 |
| Belt weight [kg/m]                                 | 0.08       | 0.08        | 0.08        |
| Pulley type                                        | 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         |
| Starting torque [Nm]                               | 0.35       | 0.45        | 0.55        |
| Moment of inertia of pulleys [kg·mm <sup>2</sup> ] | 891        | 891         | 891         |

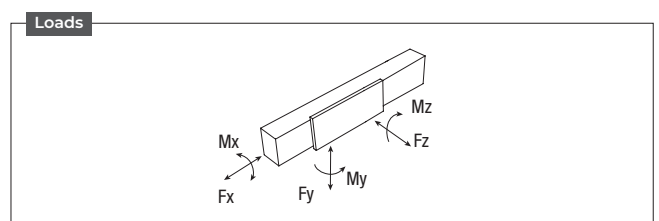
**Tab.6**

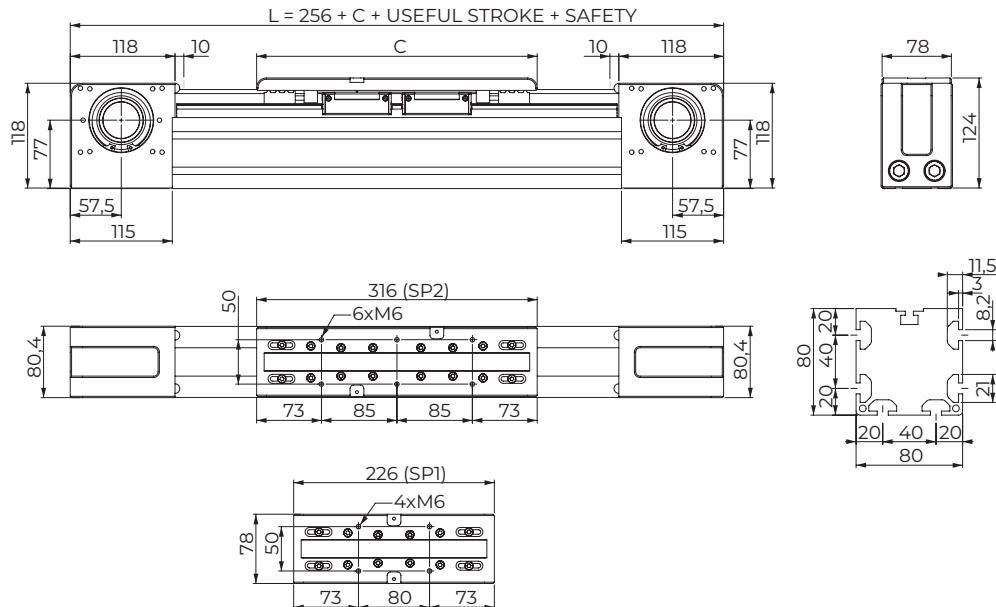
| Load capacity  | SP1   | SP2   | SP3   |
|----------------|-------|-------|-------|
| Fx static [N]  | 1050  | 1050  | 1050  |
| Fx dynamic [N] | 750   | 750   | 750   |
| Fy static [N]  | 12700 | 25400 | 38100 |
| Fy dynamic [N] | 9860  | 19720 | 29580 |
| Fz static [N]  | 12700 | 25400 | 38100 |
| Mx static [Nm] | 120   | 240   | 360   |
| My static [Nm] | 87    | 712   | 2146  |
| Mz static [Nm] | 87    | 712   | 2146  |

Fx in the table represents the maximum capacity of the toothed belt.  
 For the application, the limit of transmittable torque of the shrink disk must be considered too (see pg. 15). See verification under static load and lifetime.

**Tab.7**

| Moments of inertia of the aluminum body |       |
|-----------------------------------------|-------|
| Ix [10 <sup>7</sup> mm <sup>4</sup> ]   | 0.020 |
| Iy [10 <sup>7</sup> mm <sup>4</sup> ]   | 0.021 |
| Jt [10 <sup>7</sup> mm <sup>4</sup> ]   | 0.011 |

**Tab.8**


**■ E-SMART 80 SP1 - SP2**


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

**Fig.4**

| Technical data                                    | SP1    | SP2    |
|---------------------------------------------------|--------|--------|
| Max. useful stroke length [mm] <sup>1)</sup>      | 6060   | 5970   |
| Max. positioning repeatability [mm] <sup>2)</sup> | ± 0.05 | ± 0.05 |
| Max. speed [m/s]                                  | 4.0    | 4.0    |
| Max. acceleration [m/s <sup>2</sup> ]             | 50     | 50     |
| Carriage weight [kg]                              | 1.52   | 2.31   |
| Zero travel weight [kg]                           | 10.17  | 11.71  |
| Weight for 100 mm useful stroke [kg]              | 0.87   | 0.87   |
| Rail size [mm]                                    | 20     | 20     |

\*1) It is possible to obtain longer stroke by means of special Rollon joints.  
 \*2) Positioning repeatability is dependent on the type of transmission used.

**Tab.9**

| Driving belt and pulley data                       | SP1         | SP2         |
|----------------------------------------------------|-------------|-------------|
| Belt type                                          | 32 AT 10    | 32 AT 10    |
| Belt width [mm]                                    | 32          | 32          |
| Belt length [mm]                                   | 2 x L - 135 | 2 x L - 225 |
| Belt weight [kg/m]                                 | 0.19        | 0.19        |
| Pulley type                                        | Z 21        | Z 21        |
| Pulley pitch diameter [mm]                         | 66.84       | 66.84       |
| Carriage displacement per pulley turn [mm]         | 210         | 210         |
| Starting torque [Nm]                               | 1.0         | 1.3         |
| Moment of inertia of pulleys [kg·mm <sup>2</sup> ] | 939         | 939         |

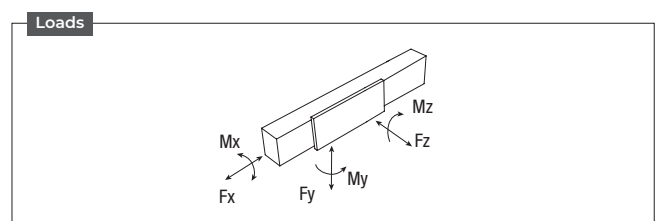
**Tab.10**

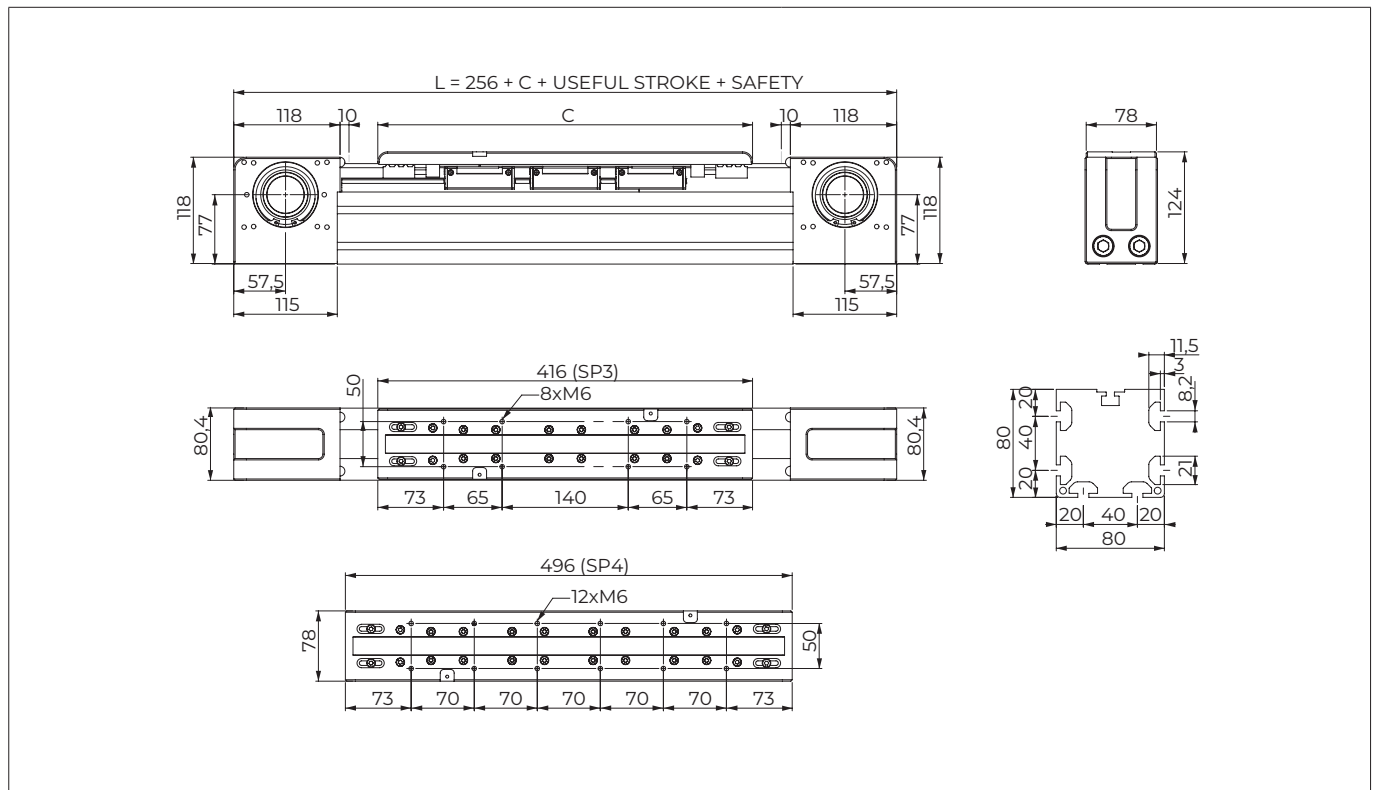
| Load capacity  | SP1   | SP2   |
|----------------|-------|-------|
| Fx static [N]  | 2523  | 2523  |
| Fx dynamic [N] | 1672  | 1672  |
| Fy static [N]  | 29800 | 59600 |
| Fy dynamic [N] | 23400 | 46800 |
| Fz static [N]  | 29800 | 59600 |
| Mx static [Nm] | 380   | 760   |
| My static [Nm] | 260   | 2178  |
| Mz static [Nm] | 260   | 2178  |

Fx in the table represents the maximum capacity of the toothed belt. For the application, the limit of transmittable torque of the shrink disk must be considered too (see pg. 15). See verification under static load and lifetime.

**Tab.11**

| Moments of inertia of the aluminum body |       |
|-----------------------------------------|-------|
| Ix [10 <sup>7</sup> mm <sup>4</sup> ]   | 0.143 |
| Iy [10 <sup>7</sup> mm <sup>4</sup> ]   | 0.137 |
| Jt [10 <sup>7</sup> mm <sup>4</sup> ]   | 0.084 |

**Tab.12**


**■ E-SMART 80 SP3 - SP4**


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

Fig.5

| Technical data                                    | SP3    | SP4    |
|---------------------------------------------------|--------|--------|
| Max. useful stroke length [mm] <sup>1)</sup>      | 5870   | 5970   |
| Max. positioning repeatability [mm] <sup>2)</sup> | ± 0.05 | ± 0.05 |
| Max. speed [m/s]                                  | 4.0    | 4.0    |
| Max. acceleration [m/s <sup>2</sup> ]             | 50     | 50     |
| Carriage weight [kg]                              | 3.13   | 3.89   |
| Zero travel weight [kg]                           | 13.39  | 14.80  |
| Weight for 100 mm useful stroke [kg]              | 0.87   | 0.87   |
| Rail size [mm]                                    | 20     | 20     |

\*1) It is possible to obtain longer stroke by means of special Rollon joints.  
 \*2) Positioning repeatability is dependent on the type of transmission used.

Tab.13

| Driving belt and pulley data                       | SP3         | SP4         |
|----------------------------------------------------|-------------|-------------|
| Belt type                                          | 32 AT 10    | 32 AT 10    |
| Belt width [mm]                                    | 32          | 32          |
| Belt length [mm]                                   | 2 x L - 325 | 2 x L - 405 |
| Belt weight [kg/m]                                 | 0.19        | 0.19        |
| Pulley type                                        | Z 21        | Z 21        |
| Pulley pitch diameter [mm]                         | 66.84       | 66.84       |
| Carriage displacement per pulley turn [mm]         | 210         | 210         |
| Starting torque [Nm]                               | 1.4         | 1.5         |
| Moment of inertia of pulleys [kg·mm <sup>2</sup> ] | 939         | 939         |

Tab.14

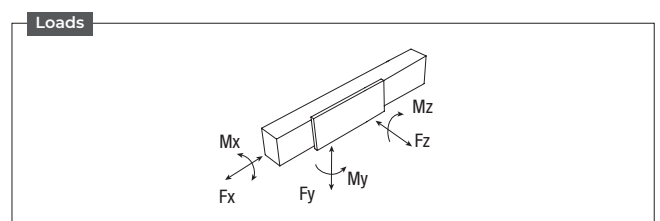
| Load capacity  | SP3   | SP4    |
|----------------|-------|--------|
| Fx static [N]  | 2523  | 2523   |
| Fx dynamic [N] | 1672  | 1672   |
| Fy static [N]  | 89400 | 119200 |
| Fy dynamic [N] | 70200 | 93600  |
| Fz static [N]  | 89400 | 119200 |
| Mx static [Nm] | 1140  | 1520   |
| My static [Nm] | 5662  | 8046   |
| Mz static [Nm] | 5662  | 8046   |

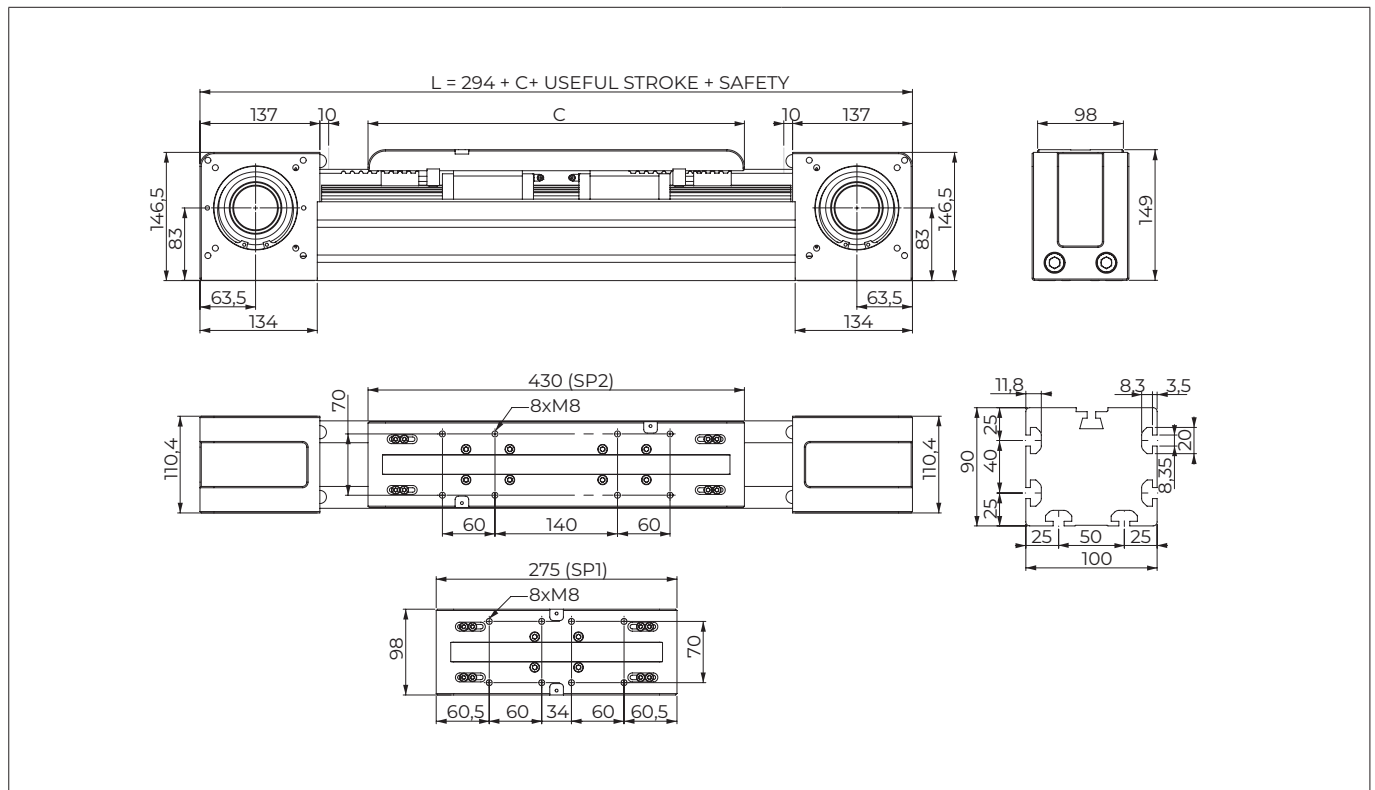
Fx in the table represents the maximum capacity of the toothed belt. For the application, the limit of transmittable torque of the shrink disk must be considered too (see pg. 15). See verification under static load and lifetime.

Tab.15

| Moments of inertia of the aluminum body |       |
|-----------------------------------------|-------|
| Ix [10 <sup>7</sup> mm <sup>4</sup> ]   | 0.143 |
| Iy [10 <sup>7</sup> mm <sup>4</sup> ]   | 0.137 |
| Jt [10 <sup>7</sup> mm <sup>4</sup> ]   | 0.084 |

Tab.16



**■ E-SMART 100 SP1 - SP2**


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

**Fig.6**

| Technical data                                    | SP1    | SP2    |
|---------------------------------------------------|--------|--------|
| Max. useful stroke length [mm] <sup>1)</sup>      | 6025   | 5870   |
| Max. positioning repeatability [mm] <sup>2)</sup> | ± 0.05 | ± 0.05 |
| Max. speed [m/s]                                  | 4.0    | 4.0    |
| Max. acceleration [m/s <sup>2</sup> ]             | 50     | 50     |
| Carriage weight [kg]                              | 3.22   | 5.19   |
| Zero travel weight [kg]                           | 19.40  | 23.17  |
| Weight for 100 mm useful stroke [kg]              | 1.19   | 1.19   |
| Rail size [mm]                                    | 25     | 25     |

\*1) It is possible to obtain longer stroke by means of special Rollon joints.  
 \*2) Positioning repeatability is dependent on the type of transmission used.

**Tab.17**

| Driving belt and pulley data                       | SP1         | SP2         |
|----------------------------------------------------|-------------|-------------|
| Belt type                                          | 50 AT 10    | 50 AT 10    |
| Belt width [mm]                                    | 50          | 50          |
| Belt length [mm]                                   | 2 x L - 120 | 2 x L - 275 |
| Belt weight [kg/m]                                 | 0.29        | 0.29        |
| Pulley type                                        | Z 27        | Z 27        |
| Pulley pitch diameter [mm]                         | 85.94       | 85.94       |
| Carriage displacement per pulley turn [mm]         | 270         | 270         |
| Starting torque [Nm]                               | 2.1         | 2.4         |
| Moment of inertia of pulleys [kg·mm <sup>2</sup> ] | 4035        | 4035        |

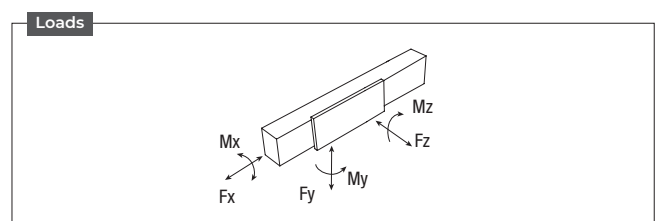
**Tab.18**

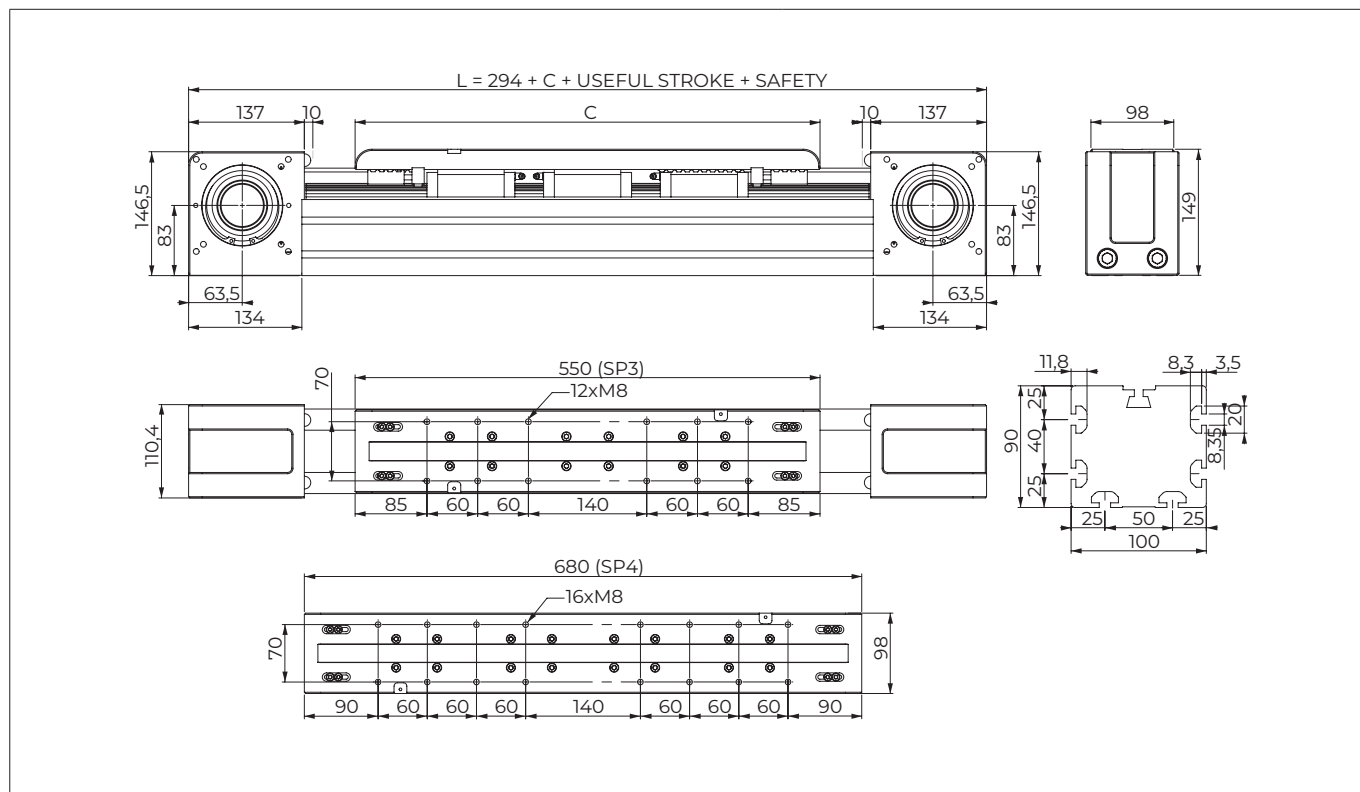
| Load capacity  | SP1   | SP2    |
|----------------|-------|--------|
| Fx static [N]  | 4980  | 4980   |
| Fx dynamic [N] | 3390  | 3390   |
| Fy static [N]  | 52500 | 105000 |
| Fy dynamic [N] | 37300 | 74600  |
| Fz static [N]  | 52500 | 105000 |
| Mx static [Nm] | 750   | 1500   |
| My static [Nm] | 740   | 8190   |
| Mz static [Nm] | 740   | 8190   |

Fx in the table represents the maximum capacity of the toothed belt. For the application, the limit of transmittable torque of the shrink disk must be considered too (see pg. 15). See verification under static load and lifetime.

**Tab.19**

| Moments of inertia of the aluminum body |       |
|-----------------------------------------|-------|
| Ix [10 <sup>7</sup> mm <sup>4</sup> ]   | 0.248 |
| Iy [10 <sup>7</sup> mm <sup>4</sup> ]   | 0.317 |
| Jt [10 <sup>7</sup> mm <sup>4</sup> ]   | 0.165 |

**Tab.20**


**■ E-SMART 100 SP3 - SP4**


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

Fig.7

| Technical data                                    | SP3    | SP4    |
|---------------------------------------------------|--------|--------|
| Max. useful stroke length [mm] <sup>1)</sup>      | 5750   | 5620   |
| Max. positioning repeatability [mm] <sup>2)</sup> | ± 0.05 | ± 0.05 |
| Max. speed [m/s]                                  | 4.0    | 4.0    |
| Max. acceleration [m/s <sup>2</sup> ]             | 50     | 50     |
| Carriage weight [kg]                              | 6.94   | 8.76   |
| Zero travel weight [kg]                           | 26.27  | 29.57  |
| Weight for 100 mm useful stroke [kg]              | 1.19   | 1.19   |
| Rail size [mm]                                    | 25     | 25     |

\*1) It is possible to obtain longer stroke by means of special Rollon joints.  
 \*2) Positioning repeatability is dependent on the type of transmission used.

Tab.21

| Driving belt and pulley data                       | SP3         | SP4         |
|----------------------------------------------------|-------------|-------------|
| Belt type                                          | 50 AT 10    | 50 AT 10    |
| Belt width [mm]                                    | 50          | 50          |
| Belt length [mm]                                   | 2 x L - 395 | 2 x L - 526 |
| Belt weight [kg/m]                                 | 0.29        | 0.29        |
| Pulley type                                        | Z 27        | Z 27        |
| Pulley pitch diameter [mm]                         | 85.94       | 85.94       |
| Carriage displacement per pulley turn [mm]         | 270         | 270         |
| Starting torque [Nm]                               | 2.6         | 2.8         |
| Moment of inertia of pulleys [kg·mm <sup>2</sup> ] | 4035        | 4035        |

Tab.22

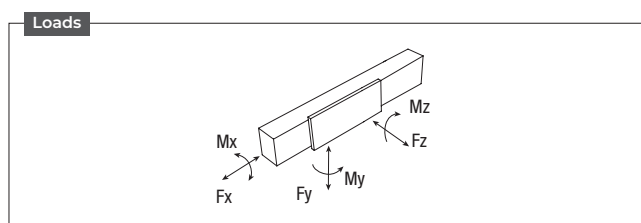
| Load capacity  | SP3    | SP4    |
|----------------|--------|--------|
| Fx static [N]  | 4980   | 4980   |
| Fx dynamic [N] | 3390   | 3390   |
| Fy static [N]  | 157500 | 210000 |
| Fy dynamic [N] | 111900 | 149200 |
| Fz static [N]  | 157500 | 210000 |
| Mx static [Nm] | 2250   | 3000   |
| My static [Nm] | 14490  | 21315  |
| Mz static [Nm] | 14490  | 21315  |

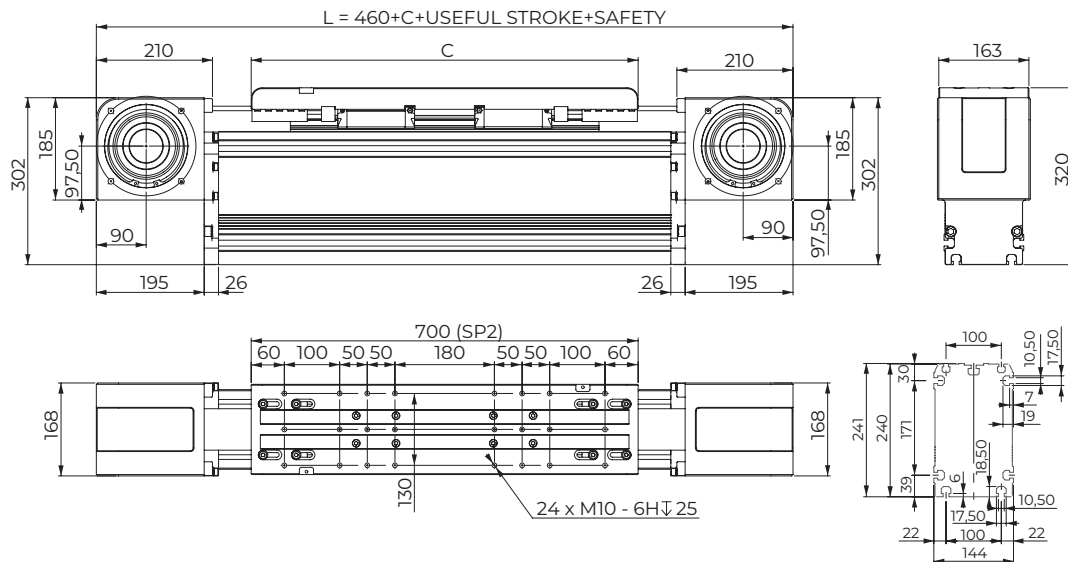
Fx in the table represents the maximum capacity of the toothed belt. For the application, the limit of transmittable torque of the shrink disk must be considered too (see pg. 15). See verification under static load and lifetime.

Tab.23

| Moments of inertia of the aluminum body |       |
|-----------------------------------------|-------|
| Ix [10 <sup>7</sup> mm <sup>4</sup> ]   | 0.248 |
| Iy [10 <sup>7</sup> mm <sup>4</sup> ]   | 0.317 |
| Jt [10 <sup>7</sup> mm <sup>4</sup> ]   | 0.165 |

Tab.24



**■ E-SMART 144 - SP2**


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

**Fig.8**

| Technical data                                    | SP2   |
|---------------------------------------------------|-------|
| Max.useful stroke length [mm]                     | 11200 |
| Max. positioning repeatability [mm] <sup>*)</sup> | ± 0.1 |
| Max. speed [m/s]                                  | 4.0   |
| Max. acceleration [m/s <sup>2</sup> ]             | 50    |
| Carriage weight [kg]                              | 16.70 |
| Zero travel weight [kg]                           | 83.53 |
| Weight for 100 mm useful stroke [kg]              | 3.48  |
| Rail size [mm]                                    | 35    |

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

**Tab.25**

| Driving belt and pulley data                       | SP2         |
|----------------------------------------------------|-------------|
| Belt type                                          | 75 AT 20    |
| Belt width [mm]                                    | 75          |
| Belt length [mm]                                   | 2 x L - 350 |
| Belt weight [kg/m]                                 | 0.72        |
| Pulley type                                        | Z 22        |
| Pulley pitch diameter [mm]                         | 140.06      |
| Carriage displacement per pulley turn [mm]         | 440         |
| Starting torque [Nm]                               | 4.8         |
| Moment of inertia of pulleys [kg·mm <sup>2</sup> ] | 43005       |

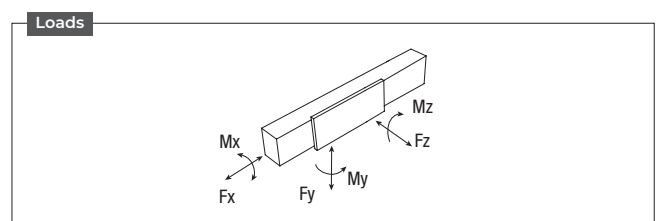
**Tab.26**

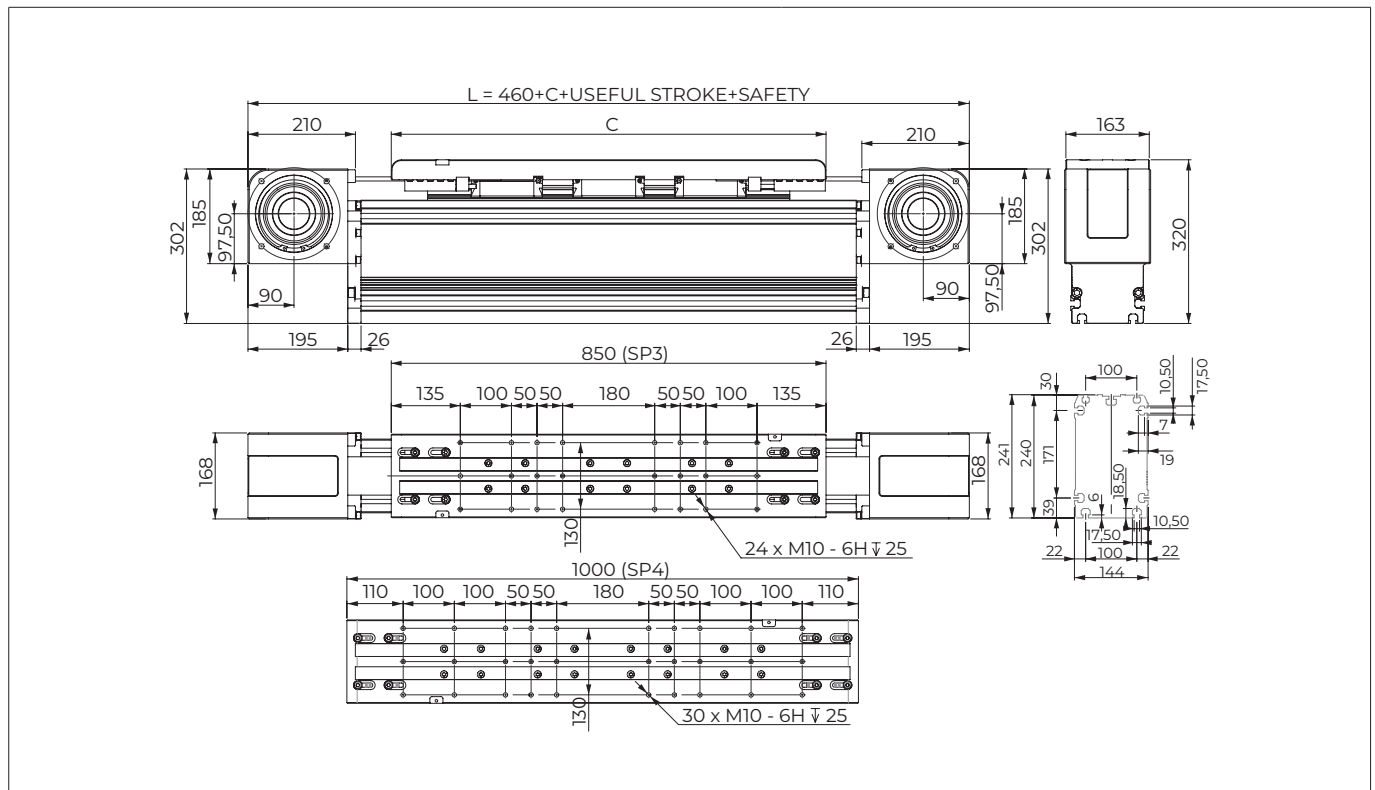
| Load capacity  | SP2    |
|----------------|--------|
| Fx static [N]  | 11025  |
| Fx dynamic [N] | 8025   |
| Fy static [N]  | 232000 |
| Fy dynamic [N] | 133400 |
| Fz static [N]  | 232000 |
| Mx static [Nm] | 5000   |
| My static [Nm] | 28768  |
| Mz static [Nm] | 28768  |

Fx in the table represents the maximum capacity of the toothed belt. For the application, the limit of transmittable torque of the shrink disk must be considered too (see pg. 15). See verification under static load and lifetime.

**Tab.27**

| Moments of inertia of the aluminum body |      |
|-----------------------------------------|------|
| Ix [10 <sup>7</sup> mm <sup>4</sup> ]   | 6.82 |
| Iy [10 <sup>7</sup> mm <sup>4</sup> ]   | 2.55 |
| Jt [10 <sup>7</sup> mm <sup>4</sup> ]   | 3.98 |

**Tab.28**


**■ E-SMART 144 SP3 - SP4**


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

**Fig.9**

| Technical data                                    | SP3   | SP4    |
|---------------------------------------------------|-------|--------|
| Max. useful stroke length [mm]                    | 11050 | 10900  |
| Max. positioning repeatability [mm] <sup>*)</sup> | ± 0.1 | ± 0.1  |
| Max. speed [m/s]                                  | 4.0   | 4.0    |
| Max. acceleration [m/s <sup>2</sup> ]             | 50    | 50     |
| Carriage weight [kg]                              | 20.80 | 25.00  |
| Zero travel weight [kg]                           | 91.62 | 101.94 |
| Weight for 100 mm useful stroke [kg]              | 3.48  | 3.48   |
| Rail size [mm]                                    | 35    | 35     |

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

**Tab.29**

| Driving belt and pulley data                       | SP3         | SP4         |
|----------------------------------------------------|-------------|-------------|
| Belt type                                          | 75 AT 20    | 75 AT 20    |
| Belt width [mm]                                    | 75          | 75          |
| Belt length [mm]                                   | 2 x L - 500 | 2 x L - 650 |
| Belt weight [kg/m]                                 | 0.72        | 0.72        |
| Pulley type                                        | Z 22        | Z 22        |
| Pulley pitch diameter [mm]                         | 140.06      | 140.06      |
| Carriage displacement per pulley turn [mm]         | 440         | 440         |
| Starting torque [Nm]                               | 5.2         | 5.6         |
| Moment of inertia of pulleys [kg·mm <sup>2</sup> ] | 43005       | 43005       |

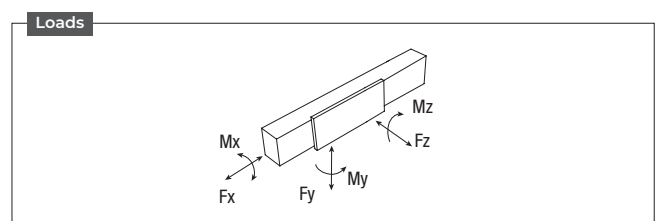
**Tab.30**

| Load capacity  | SP3    | SP4    |
|----------------|--------|--------|
| Fx static [N]  | 11025  | 11025  |
| Fx dynamic [N] | 8025   | 8025   |
| Fy static [N]  | 348000 | 464000 |
| Fy dynamic [N] | 200100 | 266800 |
| Fz static [N]  | 348000 | 464000 |
| Mx static [Nm] | 7500   | 10000  |
| My static [Nm] | 46168  | 63684  |
| Mz static [Nm] | 46168  | 63684  |

Fx in the table represents the maximum capacity of the toothed belt. For the application, the limit of transmittable torque of the shrink disk must be considered too (see pg. 15). See verification under static load and lifetime.

**Tab.31**

| Moments of inertia of the aluminum body |      |
|-----------------------------------------|------|
| Ix [10 <sup>7</sup> mm <sup>4</sup> ]   | 6.82 |
| Iy [10 <sup>7</sup> mm <sup>4</sup> ]   | 2.55 |
| Jt [10 <sup>7</sup> mm <sup>4</sup> ]   | 3.98 |

**Tab.32**


## ► ACCESSORIES

### ■ Simple shaft type AS

| Type         | Shaft type | B [mm] | D1 [mm] | 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              |
| E-SMART 144* | AS 32      | 50     | 32h7    | G004773              |

\*The shaft for E-SMART 144 features a key 10x8 L=45 mm.

Tab.33

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.

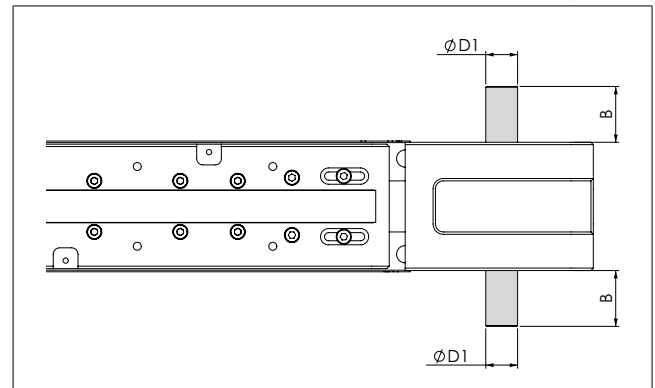


Fig.10

### ■ Hollow shaft type AC - Standard supply

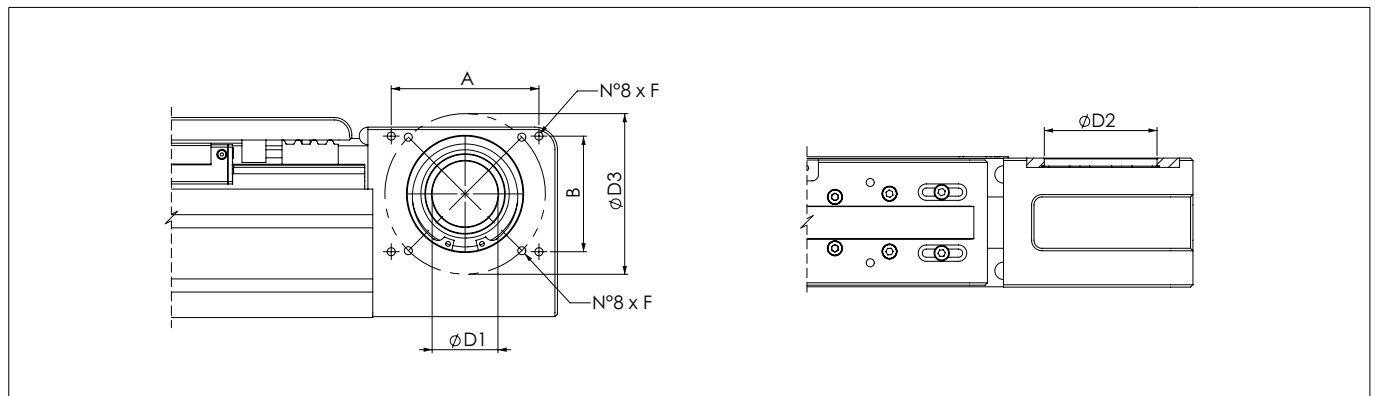


Fig.11

| Type        | Shaft type | D1 [mm] | D2 [mm] | D3 [mm] | F   | A x B   | Drive head code |
|-------------|------------|---------|---------|---------|-----|---------|-----------------|
| E-SMART 30  | AC 22      | 22H7    | 42      | 68      | M5  | -       | 2R              |
| E-SMART 50  | AC 34      | 34H7    | 72      | 90      | M6  | -       | 2R              |
| E-SMART 80  | AC 41      | 41H7    | 72      | 100     | M6  | 92x72   | 2R              |
| E-SMART 100 | AC 50      | 50H7    | 95      | 130     | M8  | 109x109 | 2R              |
| E-SMART 144 | AC 60      | 60H7    | 150     | 180     | M12 | -       | 2R              |

Tab.34

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

### ■ Synchronization kit

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.

| Type  | Moment of inertia [kg·mm²]<br>C1 + C2 · (X-Y) |               | Y<br>[mm] | Weight [kg]<br>D1 + D2 · (X-Y) |               |
|-------|-----------------------------------------------|---------------|-----------|--------------------------------|---------------|
|       | C1<br>[kg·mm²]                                | C2<br>[kg·mm] |           | D1<br>[kg]                     | D2<br>[kg/mm] |
| GK12P | 61                                            | 0.07          | 166       | 0.31                           | 0.00056       |
| GK15P | 907                                           | 0.46          | 210       | 2.28                           | 0.00148       |
| GK20P | 1015                                          | 0.46          | 250       | 2.48                           | 0.00148       |
| GK25P | 5524                                          | 4.71          | 356       | 6.24                           | 0.00510       |
| GK32P | 37008                                         | 11.03         | 367       | 15.44                          | 0.00679       |

Tab.35

| Type        | Shaft type | D1<br>[mm] | D2<br>[mm] | D3<br>[mm] | Code       | Formula for length calculation<br>[mm] |
|-------------|------------|------------|------------|------------|------------|----------------------------------------|
| E-SMART 30  | AP 12      | 12         | 25         | 45         | GK12P...1A | L = X - 51                             |
| E-SMART 50  | AP 15      | 15         | 40         | 69.5       | GK15P...1A | L = X - 79                             |
| E-SMART 80  | AP 20      | 20         | 40         | 69.5       | GK20P...1A | L = X - 97                             |
| E-SMART 100 | AP 25      | 25         | 70         | 99         | GK25P...1A | L = X - 145                            |
| E-SMART 144 | AP 32      | 32         | 90         | 155        | GK32P...1A | L = X - 197                            |

Tab.36

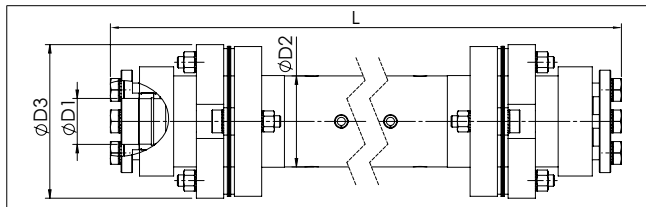


Fig.12

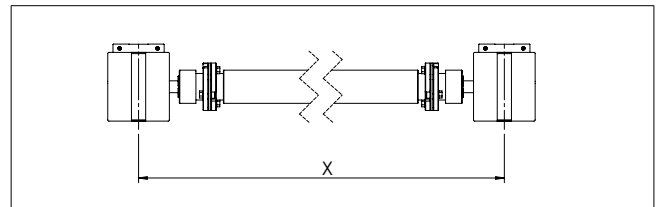


Fig.13

### ■ Fixing systems

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

| Type        | A<br>[mm] | B<br>[mm] |
|-------------|-----------|-----------|
| E-SMART 30  | 42        | -         |
| E-SMART 50  | 62        | -         |
| E-SMART 80  | 92        | 40        |
| E-SMART 100 | 120       | 50        |
| E-SMART 144 | 180       | 100       |

Tab.37

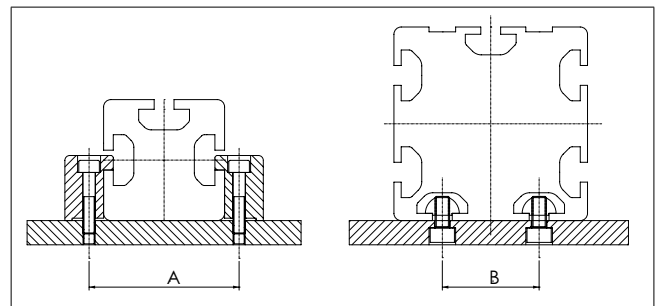


Fig.14

### Fixing systems for 144 profile

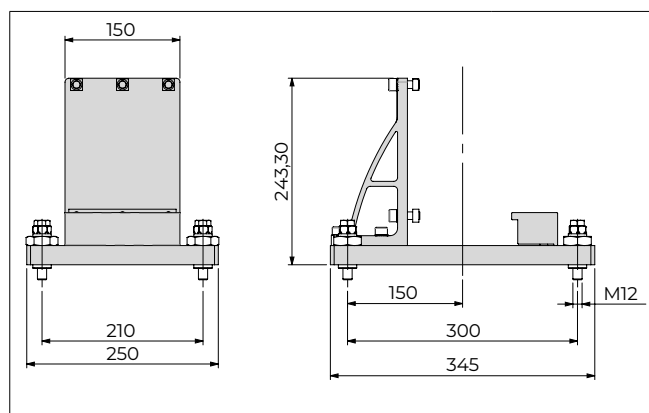


Fig.15

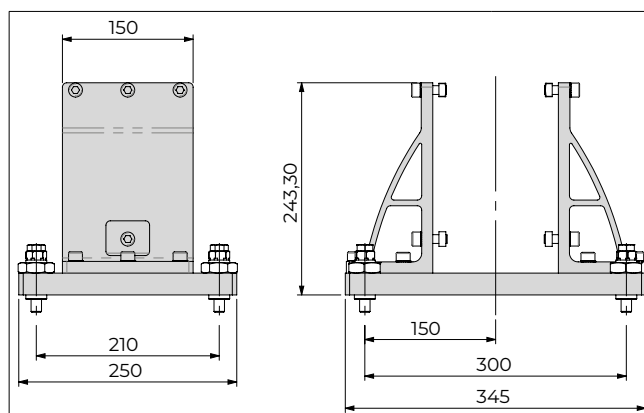


Fig.16

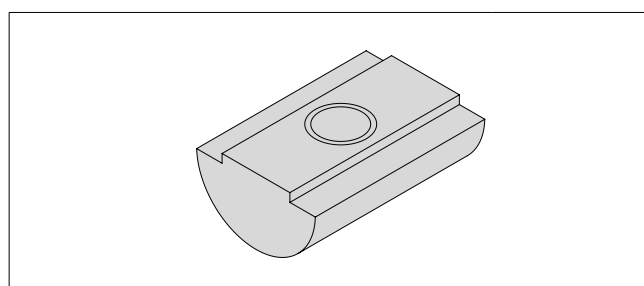
| Type        | Code    | Height adjustment [mm] |
|-------------|---------|------------------------|
| E-SMART 144 | G004673 | 8                      |
|             | G004675 | 8                      |

Tab.38

### Threaded inserts

| Type        | Hole | Length [mm] | Code        |
|-------------|------|-------------|-------------|
| E-SMART 30  | M5   | 20          | 6000436     |
| E-SMART 50  | M6   | 20          | 6000437     |
| E-SMART 80  | M6   | 20          | 6000437     |
| E-SMART 100 | M6   | 20          | 6000437     |
| E-SMART 144 | M8   | 16          | 1000942     |
|             | M10  | 16          | 814.1015.81 |

Tab.39



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

Fig.17

### Fixing brackets

| Type        | C [mm] | H [mm] | L [mm] | D [mm] | Code    |
|-------------|--------|--------|--------|--------|---------|
| 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 |
| E-SMART 144 | 52     | 43     | 150    | M10    | 1020597 |

Tab.40

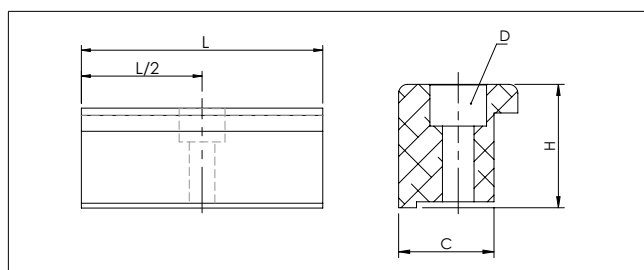


Fig.18

■ Sensors

Inductive proximity sensor holder is made of aluminum and features “T” nuts for fixing on the axis profile. The sensor dog is a stell plate mounted on the carriage and used for proximity operation. The inductive proximity sensor is not supplied by Rollon.

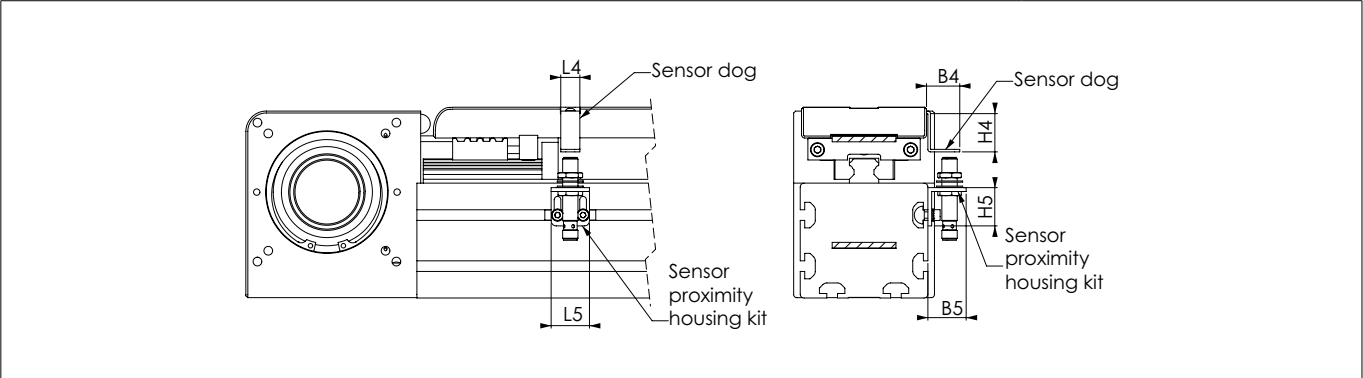
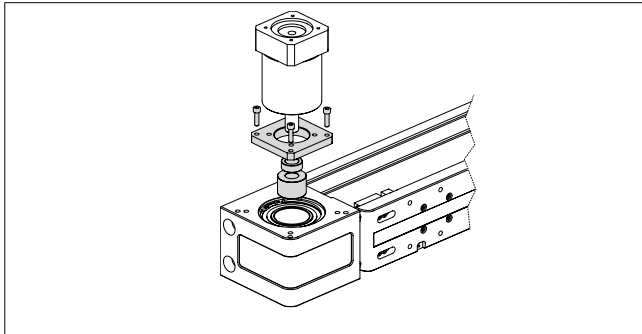


Fig.19

| Type        | B4<br>[mm] | B5<br>[mm] | L4<br>[mm] | L5<br>[mm] | H4<br>[mm] | H5<br>[mm] | Proximity<br>diameter | Sensor dog<br>code | Sensor proximity<br>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                      |
| E-SMART 144 | 31         | 50         | 25         | 45         | 52         | 50         | Ø 12                  | G004652            | G004653                      |

Tab.41

### ■ Adapter flange for gearbox assembly



Assembly kit includes: shrink disc; adapter plate; fixing hardware.

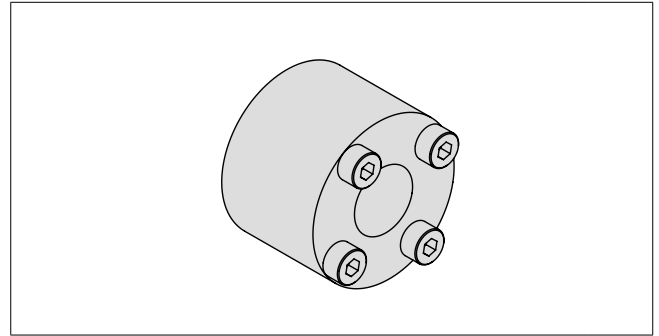
**Fig.20**

| Type               | Gearbox type<br>(not included) | Kit Code |
|--------------------|--------------------------------|----------|
| <b>E-SMART 30</b>  | MP053                          | G000356  |
|                    | LC050; NP005; PE2              | G000357  |
|                    | SW030                          | G000383  |
| <b>E-SMART 50</b>  | MP060; PLE60; CP015            | G000852  |
|                    | LC070; MPV00; NP015; PE3       | G000853  |
|                    | SW040                          | G000854  |
| <b>E-SMART 80</b>  | P3                             | G000824  |
|                    | MP080                          | G000826  |
|                    | LC090; MPV01; NP025; PE4       | G000827  |
|                    | MP105                          | G000830  |
|                    | PE3; NP015; LC070              | G001078  |
|                    | SP075; PLN090                  | G000859  |
|                    | SP060; PLN070                  | G000829  |
|                    | SW040                          | G000866  |
|                    | SW050                          | G000895  |
|                    | CP025                          | G001643  |
| <b>E-SMART 100</b> | CP035                          | G004732  |
|                    | MP130                          | G000482  |
|                    | LC120; MPV02; NP035; PE5       | G000483  |
|                    | LC090; PE4; NP025              | G000525  |
|                    | MP105                          | G000527  |
|                    | SW050                          | G000717  |
|                    | CP025                          | G004733  |
|                    | CP035                          | G001058  |
|                    | SP075                          | G000526  |
|                    | SP100                          | G000657  |
| <b>E-SMART 144</b> | MP105                          | G004678  |
|                    | MP130                          | G004677  |
|                    | LC120; LP120; PE5; NP035       | G004679  |
|                    | SP100                          | G004680  |
|                    | NP045                          | G004681  |
|                    | CP035                          | G004751  |
|                    | CP045                          | G004745  |
|                    | SP140                          | G004738  |

For other gearbox type ask Rollon

**Tab.42**

### ■ Single shrink disc



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

**Fig.21**

| Type               | Hollow shaft<br>[mm] | Shrink disc<br>dxD [mm] | Transmittable<br>torque*<br>[Nm] | Shrink disc<br>code |
|--------------------|----------------------|-------------------------|----------------------------------|---------------------|
| <b>E-SMART 30</b>  | 22                   | 12x22                   | 29                               | 6000791             |
| <b>E-SMART 50</b>  | 34                   | 14x34                   | 64                               | 6005737             |
|                    |                      | 16x34                   | 73                               | 6005738             |
|                    |                      | 19x34                   | 87                               | 6005739             |
| <b>E-SMART 80</b>  | 41                   | 19x41                   | 150                              | 6005734             |
|                    |                      | 22x41                   | 174                              | 6005735             |
|                    |                      | 25x41                   | 198                              | 6005736             |
| <b>E-SMART 100</b> | 50                   | 22x50                   | 286                              | 6005730             |
|                    |                      | 25x50                   | 324                              | 6005731             |
|                    |                      | 32x50                   | 415                              | 6005732             |
| <b>E-SMART 144</b> | 60                   | 22x60                   | 343                              | 6005298             |
|                    |                      | 25x60                   | 389                              | 6005299             |
|                    |                      | 32x60                   | 498                              | 6005300             |
|                    |                      | 40x60                   | 623                              | 6005301             |

\* Transmittable torque in the table represents the maximum capacity of the shrink disc.  
For the application, the limit of  $F_r$  must be considered too.

**Tab. 43**

## ► USE AND MAINTENANCE

### ■ Lubrication

The recirculating ball guide system guarantees a long interval between maintenances: every 2000km 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.

- 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

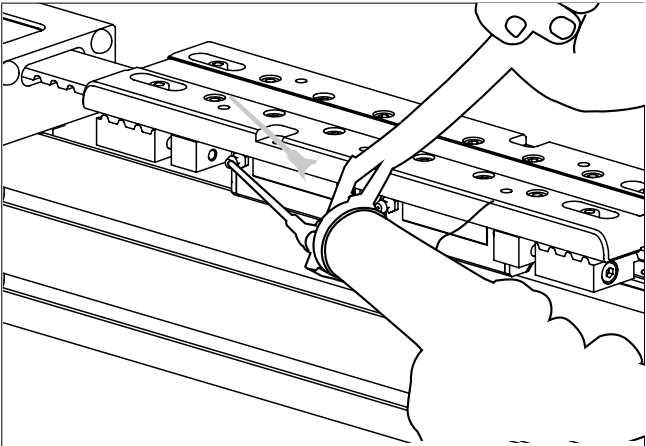


Fig. 22

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

| Type        | Quantity [cm <sup>3</sup> ] |
|-------------|-----------------------------|
| E-SMART 30  | 0.5                         |
| E-SMART 50  | 0.7                         |
| E-SMART 80  | 1.4                         |
| E-SMART 100 | 2.4                         |
| E-SMART 144 | 4.8                         |

Tab.44

## ► SERVICE LIFE

### ■ Calculation of the service life

The dynamic load rating C is a conventional quantity used for calculating the service life. This load corresponds to a nominal service life of 100 km. The calculated service life, dynamic load rating and equivalent load are linked by the following formula:

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

$L_{km}$  = theoretical service life (km)

$Fz\text{-dyn}$  = dynamic load rating (N)

$P_{eq}$  = acting equivalent load (N)

$f_i$  = service factor (see Tab.2)

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**

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

**For CI and CE types**

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

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.

### ■ Belt safety factor referred to the dynamic $F_x$

| Impact and vibrations            | Speed / acceleration | Orientation | 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             |

### ■ Service factor $f_i$

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

## ► WARNING AND LEGAL NOTES



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



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



Precaution in installation and handling operations. Significantly heavy equipment.



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



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



Do not overload. Do not subject to torsion stress.



Do not leave exposed to atmospheric agents.



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



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



Avoid damage. Do not operate with inadequate tools



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



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



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



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



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



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



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

### ■ Residual risks

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

## ■ Basic components



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

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

It is therefore understood that the aforementioned operations in points 1., 2., and 3. are not chargeable to Rollon. Rollon is the supplier of Partly Completed Machinery, the (direct or final) client is responsible for testing and safely checking all equipment which, by definition, cannot be theoretically tested or checked at our facilities where the only movement possible is manual movement (for example: motors or reduction gears, cartesian axes movements that are not manually operated, safety brakes, stopper cylinders, mechanical or induction sensors, decelerators, mechanical limit switches, pneumatic cylinders, etc.). The partly completed machine must not be commissioned until the final machine, in which it is to be incorporated, has been declared compliant, if necessary, with the instructions in Machinery Directive 2006/42/CE.

## ■ Instructions of an environmental nature

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

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

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

## ■ Safety warnings for handling and transport

- The manufacturer has paid the utmost attention to packaging to minimize risks related to shipping, handling and transport.
- Transport can be facilitated by shipping certain components dismantled and appropriately protected and packaged.
- Handling (loading and unloading) must be carried out in compliance with information directly provided on the machine, on the packing and in the user manuals.
- Personnel authorized to lift and handle the machine and its components shall possess acquired and acknowledged skills and experience in the specific sector, besides having full control of the lifting devices used.
- During transport and/or storage, temperature shall remain within the allowed limits to avoid irreversible damage to electric and electronic components.
- Handling and transport must be carried out with vehicles presenting adequate loading capacity, and the machines shall be anchored to the established points indicated on the axes.
- DO NOT attempt to bypass handling methods and the established lifting points in any way.
- During handling and if required by the conditions, make use of one or more assistants to receive adequate warnings.
- If the machine has to be moved with vehicles, ensure that they are adequate for the purpose, and perform loading and unloading without risks for the operator and for people directly involved in the process.
- Before transferring the device onto the vehicle, ensure that both the machine and its components are adequately secured, and that their profile does not exceed the maximum bulk allowed. Place the necessary warning signs, if necessary.
- DO NOT perform handling with an inadequate visual field and when there are obstacles along the route to the final location.
- DO NOT allow people to either transit or linger within the range of action when lifting and handling loads.
- Download the axes just near the established location and store them in an environment protected against atmospheric agents.
- Failure to comply with the information provided might entail risks for the safety and health of people, and can cause economic loss.
- The Installation Manager must have the project to organize and monitor all operative phases.
- The Installation Manager shall ensure that the lifting devices and equipment defined during the contract phase are available.

- The Manager of the established location and the Installation Manager shall implement a “safety plan” in compliance with the legislation in force for the workplace.
- The “safety plan” shall take into account all surrounding work-related activities and the perimeter spaces indicated in the project for the established location.
- Mark and delimit the established location to prevent unauthorized personnel from accessing the installation area.
- The installation site must have adequate environmental conditions (lighting, ventilation, etc.).
- Installation site temperature must be within the maximum and minimum range allowed.
- Ensure that the installation site is protected against atmospheric agents, does not contain corrosive substances and is free of the risk of explosion and/or fire.
- Installation in environments presenting a risk of explosion and/or of fire must ONLY be carried out if the machine has been DECLARED COMPLIANT for such use.
- Check that the established location has been correctly fitted out, as defined during the contract phase and based on indications in the relative project.
- The established location must be fitted out in advance to carry out complete installation in compliance with the defined methods and schedule.

#### ■ Note

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

#### ■ Transport

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

#### ■ Handling and lifting

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

#### ■ Check axis integrity after shipment

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

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



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