

TAS4• Linear Table
Lexium Linear Motion
Product Manual
25.05.2009



1. Introduction	5
1.1 Device family.....	5
1.2 Components.....	5
2. Technical Data.....	6
3. Type Code.....	7
4. Dimensions sheets	8
4.1 TAS41SB	8
4.2 TAS42SB	9
4.3 TAS43SB	10
5. Curves.....	11
5.1 TAS41SB	11
5.2 TAS42SB	13
5.3 TAS43SB	15
6. Safety	17
6.1 Qualification of the personnel	17
6.2 Intended use	17
6.3 Safety notes	17
6.3.1 Symbol and notes explanation.....	18
7. Calculation of service life.....	19
8. Accuracy.....	20
8.1.1 Positioning accuracy.....	20
8.1.2 Repeatability	20
9. Installation	21
9.1 Ambient conditions.....	21
9.2 Unloading of the product.....	21
9.3 Packaging material disposal	22
9.4 Mechanical installation.....	22
9.4.1 Mounting position of the linear table	22
9.4.2 Quality of the mounting surface	22
9.4.3 Mounting of the linear tables.....	22
9.4.4 Linear table alignment	23
9.5 Electrical wiring	24
9.5.1 Motor wiring	24
9.5.2 Limit switch wiring.....	24
10. Commissioning.....	25
10.1 Preparation.....	25
10.2 Implementation	25
11. Operation.....	26
11.1 Basics.....	26
11.2 Function.....	26
12. Errors and diagnostics	27

13. Inspection.....	28
13.1 Inspection after collision	28
13.1.1 Ball screw and ball screw bearings.....	28
13.1.2 Guides	28
13.1.3 Coupling.....	28
13.1.4 Timing belt	28
14. Maintenance.....	29
14.1 General information.....	29
14.2 Lubrication.....	29
14.3 Cleaning	29
14.3.1	29
14.3.2 Cleaning of aluminum parts	30
14.3.3 Cleaning of bellows.....	30
15. Service / repair.....	31
15.1 Exchange of bellows	31
15.2 Limit switch exchange	32
15.3 Motor exchange.....	33
15.3.1 Straight mounted motor exchange.....	33
15.3.2 Belt gear motor exchange.....	34
15.4 Coupling exchange.....	35
15.5 Timing belt exchange	36
16. Accessories and spare parts.....	37
16.1 Accessories	37
16.1.1 Set of rail nuts – galvanized.....	37
16.1.2 Set of clamping profiles – aluminum anodized	37
16.1.3 Limit switch connectors.....	38
16.1.4 Limit switch cable with receptacle.....	38
16.2 Spare parts.....	39
16.2.1 Exploded view of a linear table TAS41SB	39
16.2.2 Exploded view of a linear table TAS42SB / TAS43SB	40
16.2.3 Exploded view of straight motor mounting.....	41
16.2.4 Exploded view of motor mounting with belt gear	41
16.2.5 Spare parts list TAS41SB	42
16.2.6 Spare part list TAS42SB	42
16.2.7 Spare part list TAS43SB	42

1. Introduction

This document contains important notes on safety, installation and maintenance for Schneider Electric linear tables. Please have this documentation readily available during the entire product service life. In case your manual is lost, you can reorder a new copy from Schneider Electric using the data printed on the type label of your product. Carefully read these instructions before installation and commissioning of the product. The notes and instructions in this documentation are the basis for safety of personnel, cost efficient operation and a long service life. The diagrams and drawings are only given as examples. Our products are subject to technical modification and ongoing development. The manufacturer reserves the right to make product modifications without advance notice.

1.1 Device family

The Schneider Electric linear table product group consists of the sizes:

TAS41SB (Profile width 100mm) – before LT-100

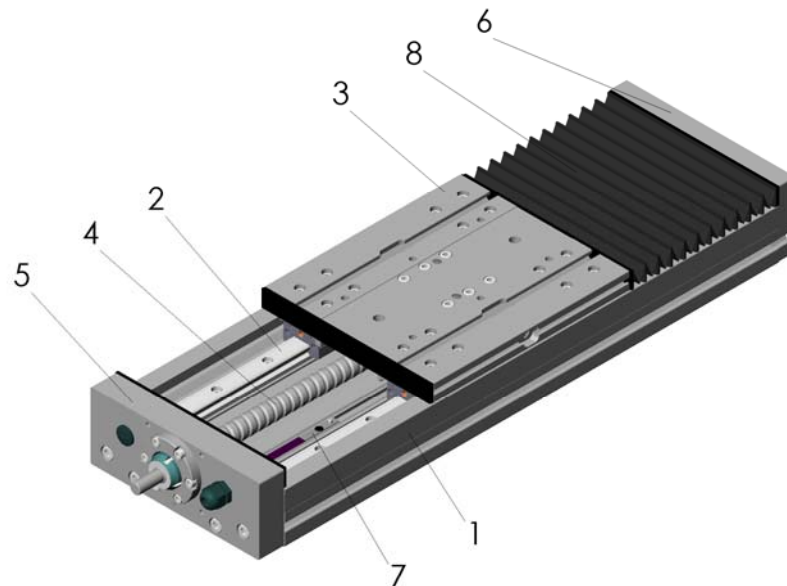
TAS42SB (Profile width 150mm) – before LT-150

TAS43SB (Profile width 200mm) – before LT-200

The sizes have different outer dimensions, pay loads and maximum strokes.

1.2 Components

Linear table design



1. Base profile
2. Recirculating ball bearing system
3. Carriage
4. Ball screw
5. Front plate with fixed screw bearing
6. End plate with loose screw bearing
7. Inductive limit switch
8. Bellows

2. Technical Data

Type designation portal axes		TAS41SB	TAS42SB	TAS43SB
Drive system		Ball Screw (P7 acc. DIN 69051 Teil3)	Ball Screw (P7 acc. DIN 69051 Teil3)	Ball Screw (P7 acc. DIN 69051 Teil3)
Typical payload	kg	20	80	150
Carriage type		Type 1	Type 1	Type 1
Carriage length	mm	120	180	230
Ball screw pitch	mm	2	5	5
Ball screw diameter	mm	12	16	20
Ball screw axial play	mm	0	0	0
Max. drive force F_{max} ³⁾	N	500	2200	2580
Max. ball screw speed	rpm	3000	3000	3000
Max. speed ²⁾	m/s	0,10	0,25	0,25
Max. acceleration ²⁾	m/s ²	10	10	10
Max. drive torque M_{max} ³⁾	Nm	0,4	2,2	2,7
No load breakaway torque 0-stroke axis	Nm	0,21	0,33	0,44
Moment of inertia 0-stroke axis (without / with belt gear)	kgcm ²	0,18 / 0,22	1,47 / 1,83	3,6 / 2,7
Moment of inertia per m stroke	kgcm ²	0,29	0,42	1,09
Moment of inertia per kg payload	kgcm ²	0,001	0,006	0,006
Max. force F_{dynmax} ³⁾	N	1720	2660	3550
Max. force F_{zdynmax} (+Fz / -Fz) ³⁾	N	2155 / 2155	6285 / 3140	8380 / 4190
Max. torque M_{dynmax} ³⁾	Nm	90	190	335
Max. torque M_{zdynmax} ³⁾	Nm	72	160	285
Max. torque M_{xdynmax} ³⁾	Nm	48	110	205
Mass of 0-stroke axis	kg	2,4	6,4	11,7
Mass of per m stroke	kg	8,4	13,7	20,4
Moving mass per carriage	kg	0,7	2,2	4,1
Max. stroke ¹⁾	mm	600	1000	1500
Min. stroke ²⁾	mm	7	9	11
Repeate accuracy ²⁾	mm	± 0,02	± 0,02	± 0,02
Diameter motor shaft	mm	6 ... 14	9 ... 20	12 ... 25
Profile cross section (W x H)	mm	100 x 50	150 x 70	200 x 80
Axial planar moment of inertia (Ix / Iy)	mm ⁴	111.840 / 1.511.700	363.230 / 5.885.270	654.170 / 15.702.590
Elasticity modul (aluminium)	N/mm ²	72000	72000	72000
Max. ambient temperature	°C	0 ... +50	0 ... +50	0 ... +50
Load ratings guide system (Cstat / Cdyn)	N	3530 / 4000	16500 / 14700	23400 / 19600
Load ratings ball screw (Cstat / Cdyn)	N	3200 / 2500	33000 / 11000	36700 / 12900
Lifetime reference value	km	5000	10000	10000

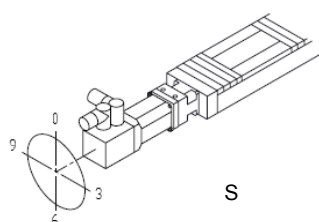
¹⁾ Longer stroke on request

²⁾ Load and stroke dependent

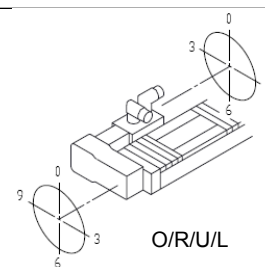
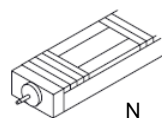
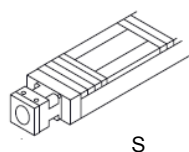
³⁾ The maximum permissible dynamic forces and torques decrease with increasing speed; see characteristic curves on the next pages

3. Type Code

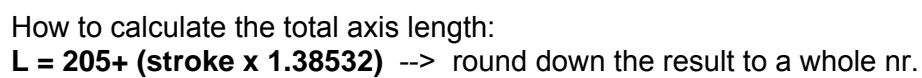
Example	TAS 4 2 S B B 0200 A 1 B S / 16 0
Product TAS = Linear table	TAS 4 2 S B B 0200 A 1 B S / 16 0
Product family 4 = basic line	TAS 4 2 S B B 0200 A 1 B S / 16 0
Size (cross-section of section) 1 = 100; (50 x 100 mm) 2 = 150; (70 x 150 mm) 3 = 200; (80 x 200 mm)	TAS 4 2 S B B 0200 A 1 B S / 16 0
Carriage drive element S = ball screw	TAS 4 2 S B B 0200 A 1 B S / 16 0
Type of guide B = two ball guides	TAS 4 2 S B B 0200 A 1 B S / 16 0
Feed per revolution A = 2 mm (size 1) B = 5 mm (sizes 1, 2 and 3) C = 10 mm (sizes 1, 2 and 3) D = 16 mm (size 2) E = 20 mm (size 3)	TAS 4 2 S B B 0200 A 1 B S / 16 0
Stroke xxxx = in mm (max. stroke per size see data sheet)	TAS 4 2 S B B 0200 A 1 B S / 16 0
Limit switches A = 2 x PNP sensors normally closed with 0,2 m cable incl. connector N = no	TAS 4 2 S B B 0200 A 1 B S / 16 0
Carriage 1 = type 1	TAS 4 2 S B B 0200 A 1 B S / 16 0
Options B = bellows	TAS 4 2 S B B 0200 A 1 B S / 16 0
Axis drive interface S = straight motor- or motor adapter attachment O = belt gear 0 o'clock, motor inside R = belt gear 3 o'clock, motor inside U = belt gear 6 o'clock, motor inside L = belt gear 9 o'clock, motor inside N = shaft journal (without coupling and motor)	TAS 4 2 S B B 0200 A 1 B S / 16 0
Motor interface (to the axis or the belt gear) V6 = stepper motors BRS 364 / BRS 366 V8 = stepper motors BRS 368 V9 = stepper motors BRS 397 / BRS 39A V0 = stepper motors BRS 39B V1 = stepper motors BRS 3AC / BRS 3AD I6 = ILS..571; ILS..572 with stepper motor I7 = ILS..573 with stepper motor I9 = ILS..851; ILS..852 with stepper motor I8 = ILS..853 with stepper motor E7 = DC-brushless ILExx66 S6 = servomotors SER 36* / BRH 057 S9 = servomotors SER 39* / BRH 058 S1 = servomotors SER 311* / BRH 110 A6 = ILA..57 with servo motor H6 = servomotors BSH 055* H7 = servomotors BSH 0701 / BSH 0702 / BMH 0701 / BMH 0702 H8 = servomotors BSH 0703 H1 = servomotors BSH 1001 / BSH 1002 / BSH 1003 BMH1001 / BMH 1002 / BMH 1003 H4 = servomotors BSH 1004 H2 = servomotors BSH 1401 / BSH 1402 / BSH 1403 / BSH 1404 BMH 1401 / BMH 1402 / BMH 1403 YY = third party motor without attachment by Schneider Electric Motion. (motor drawing requirement) ZZ = third party motor with attachment by Schneider Electric Motion (motor drawing requirement; provide motor) XX = without motor attachment	TAS 4 2 S B B 0200 A 1 B S / 16 0
Direction of the motor with the reference to the power connection (incl. the fixing screw of the adapterplate for the clamping hub) 0 = 0 o'clock 3 = 3 o'clock 6 = 6 o'clock 9 = 9 o'clock X = without motor attachment	TAS 4 2 S B B 0200 A 1 B S / 16 0



Axis Drive Interfaces:



4.1 TAS41SB



Motorbauvarianten / motor mounting versions

- Motoranbau gerade (standard) / motor mounting straight (standard)**
 - Schmierlippe - DIN 3405-D1-a - beidseitig / grease nipple - DIN 3405-D1-a - on both sides
 - Hub/2 stroke/2
 - L(Nachkommastellen abrunden) = 278 + (Hub x 1,21106)
L(round down decimal places) = 278 + (stroke x 1,21106)
 - mechanical interface
 - A →
- Motoranbau horizontal links / rechts / motor mounting horizontally left / right**
 - Kabelverschraubung M16 x 1,5 für Endschalterkabel / cable gland M16 x 1,5 for limit switch cables
 - (2x) Ø 10 H7/x10 tief / deep
 - B
- Motoranbau vertikal unten / motor mounting vertically bottom**
 - mechanische Schnittstelle

Einzelheit / detail B (1 : 2)

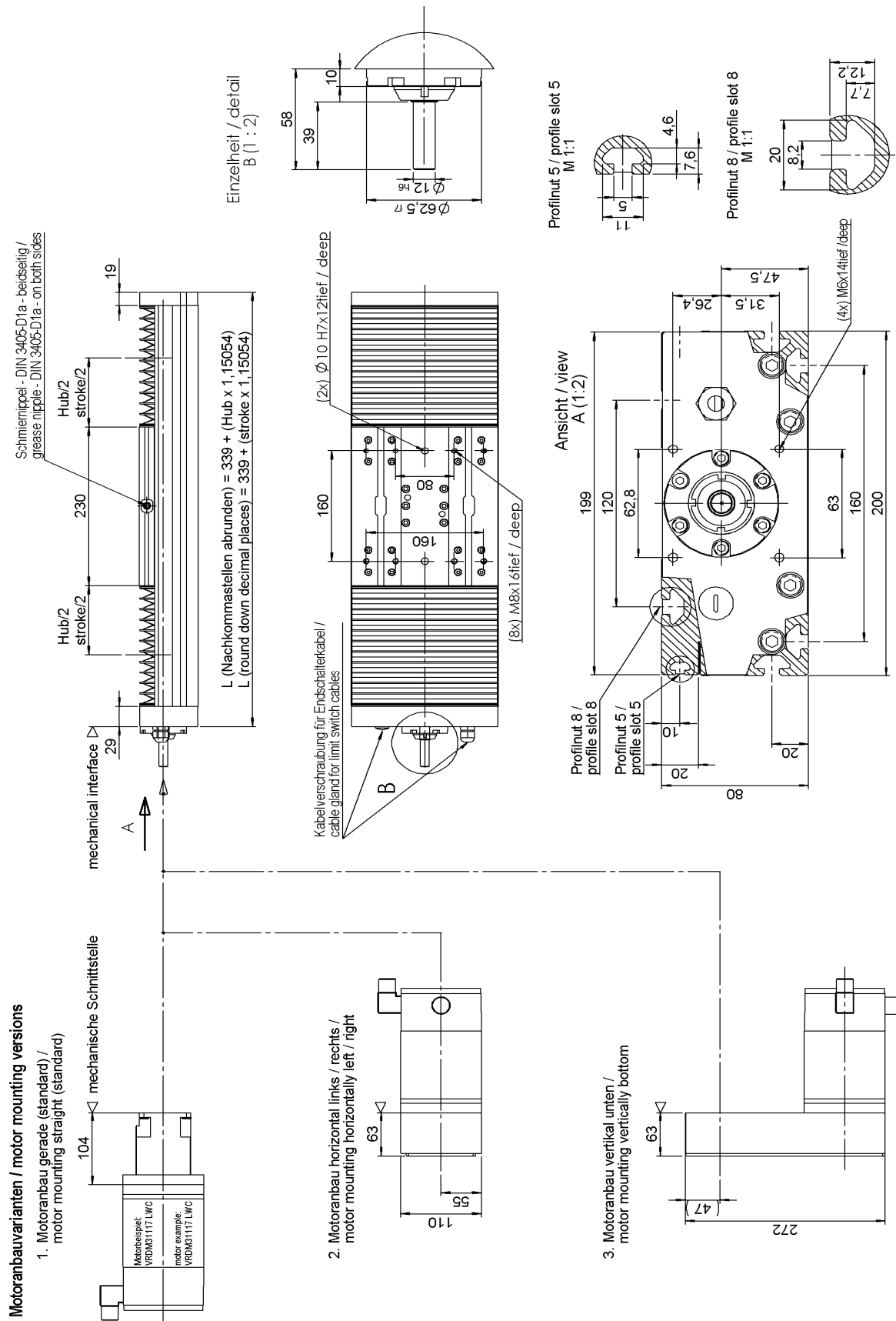
Ansicht / view A (1:2)

Profilnut 5 / profile slot 5 M 1:1

Profilnut 8 / profile slot 8 M 1:1

L = 245+ (stroke x 1.21106) --> round down the result to a whole nr.

4.3 TAS43SB

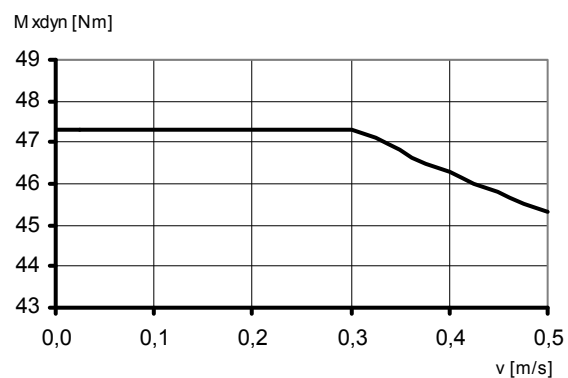
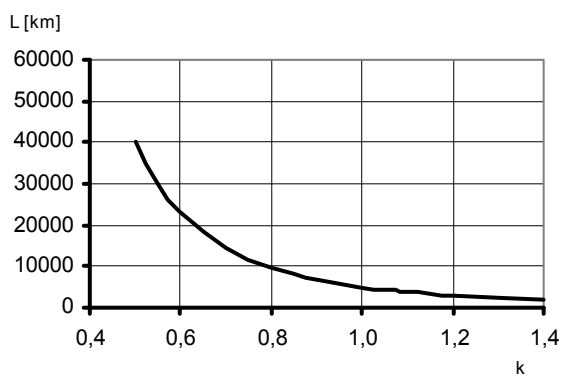
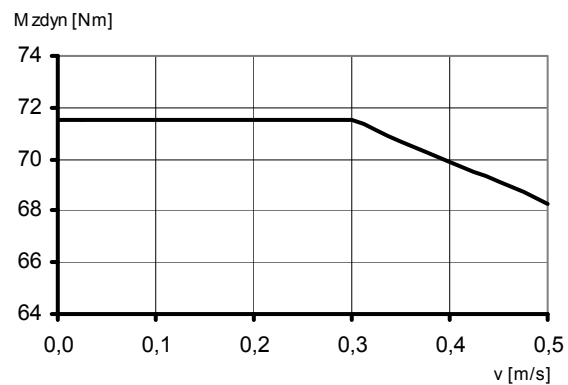
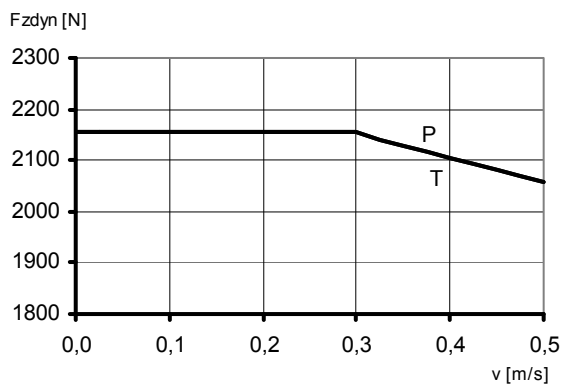
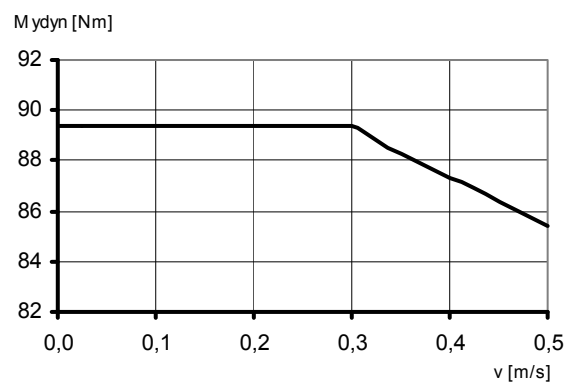
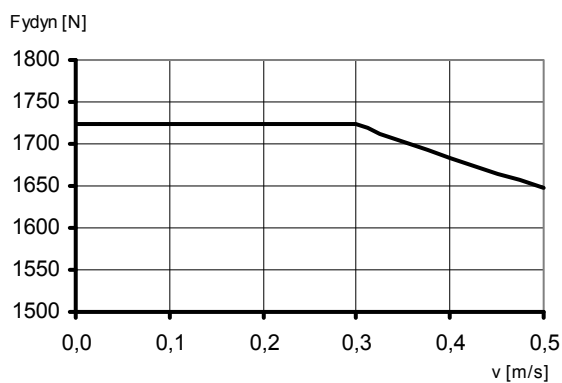
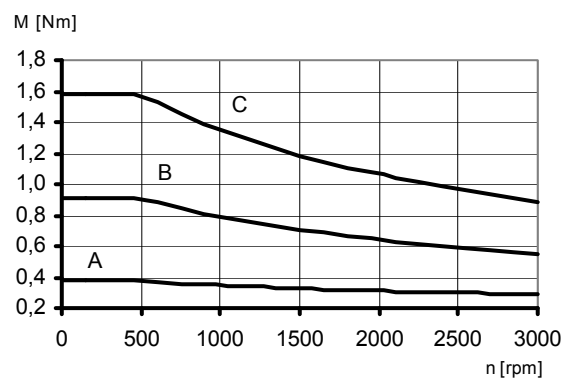
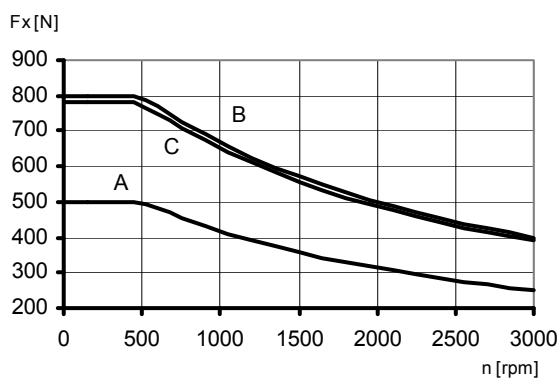


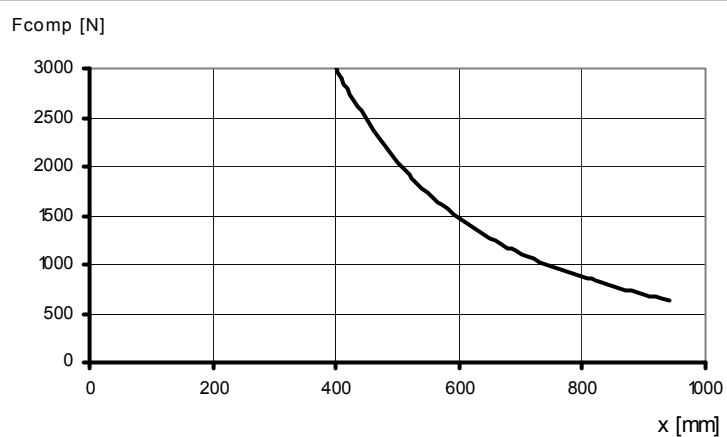
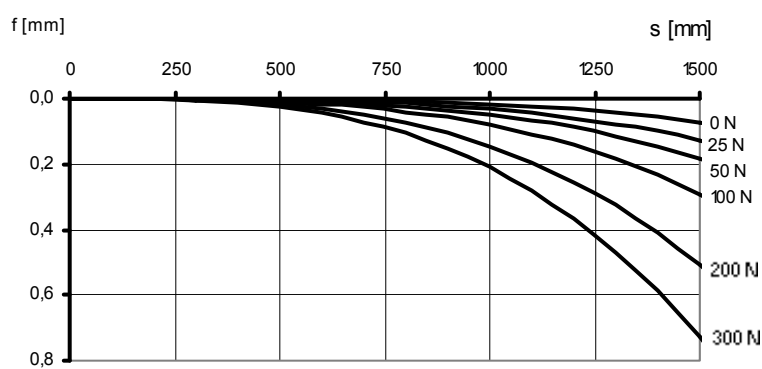
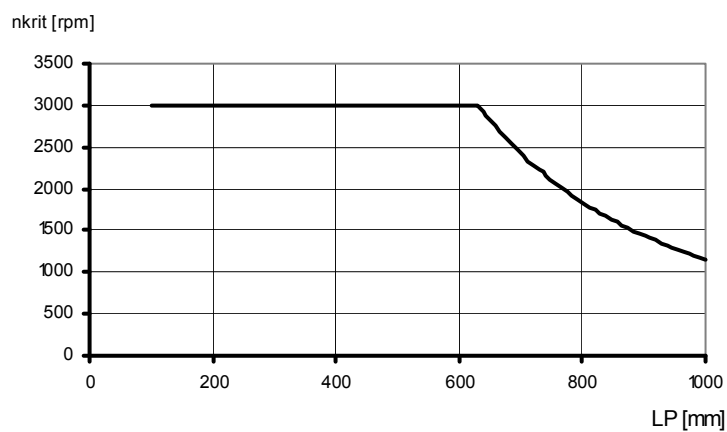
How to calculate the total axis length:

$L = 339 + (\text{stroke} \times 1.15054)$ --> round down the result to a whole nr.

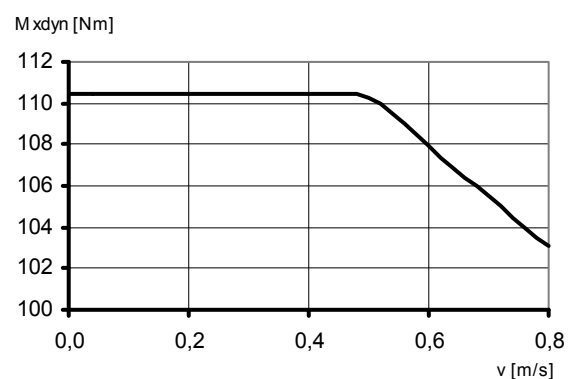
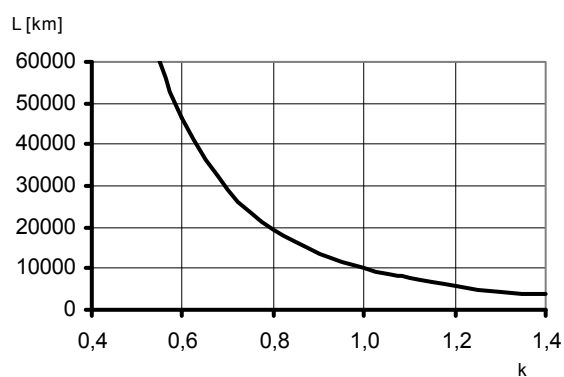
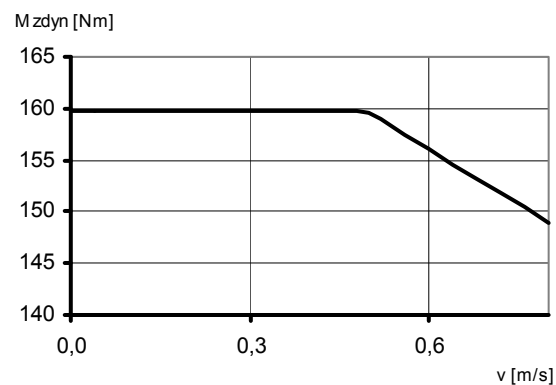
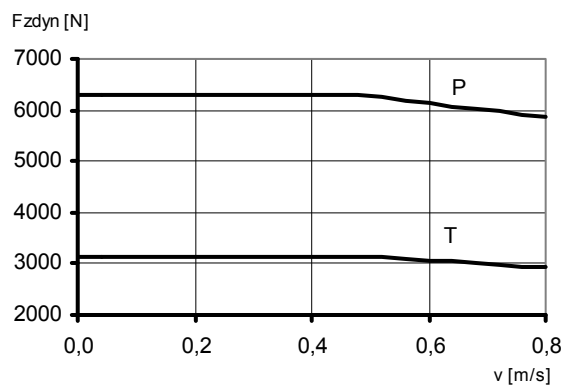
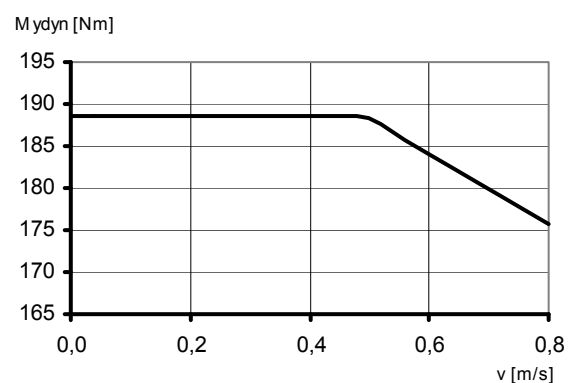
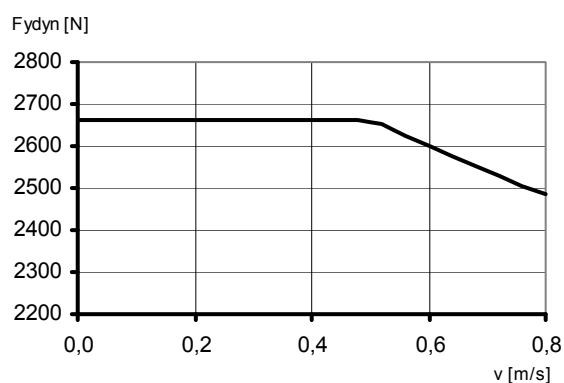
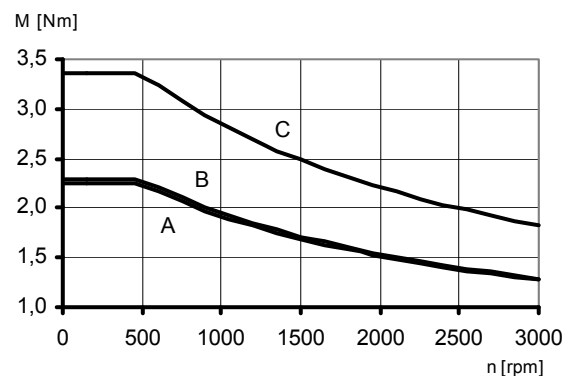
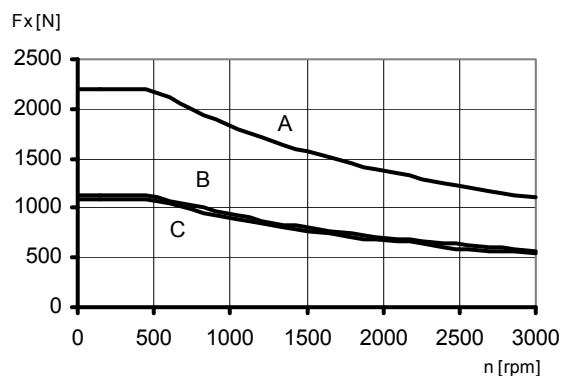
5. Curves

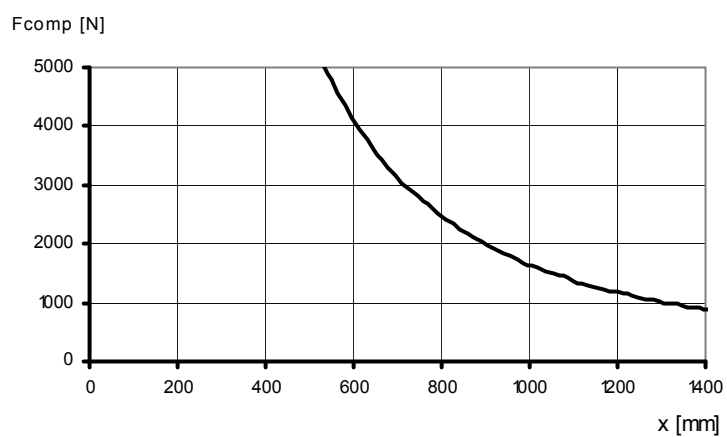
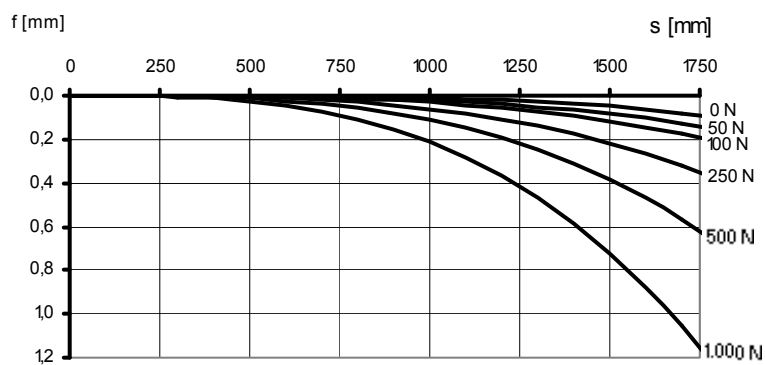
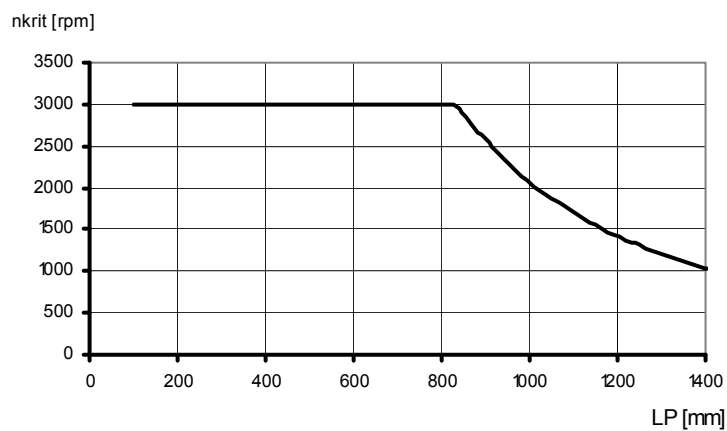
5.1 TAS41SB



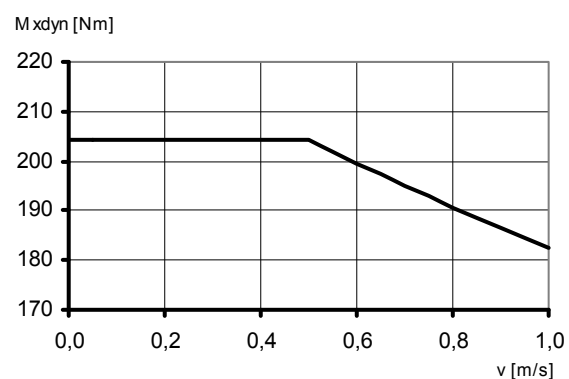
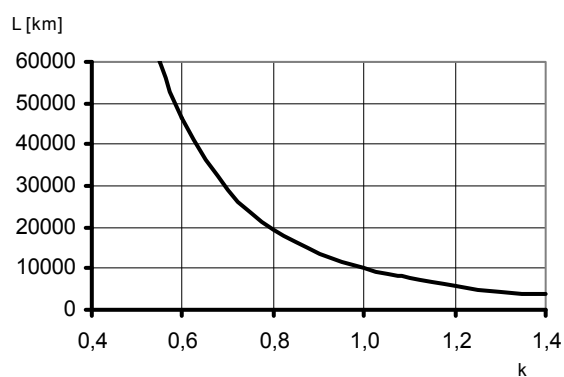
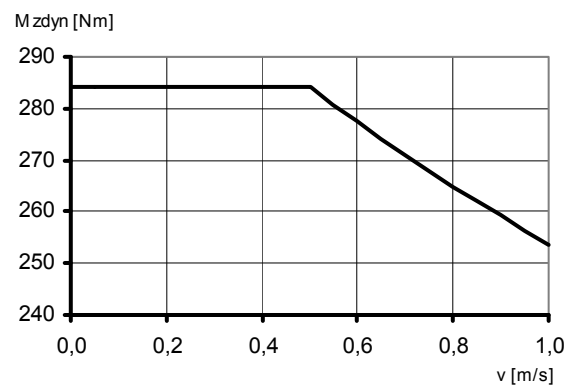
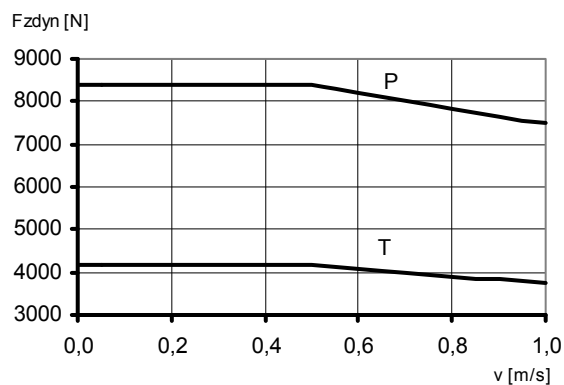
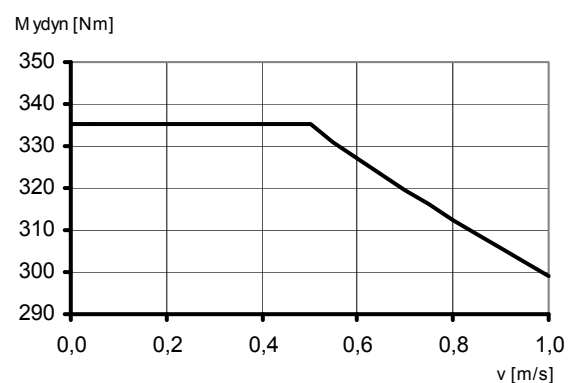
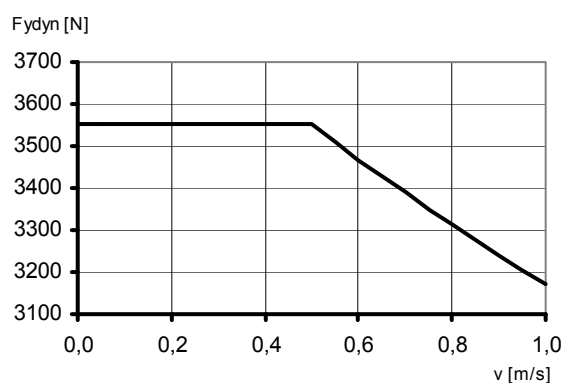
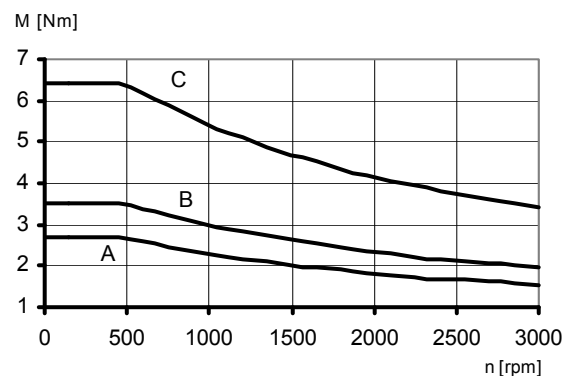
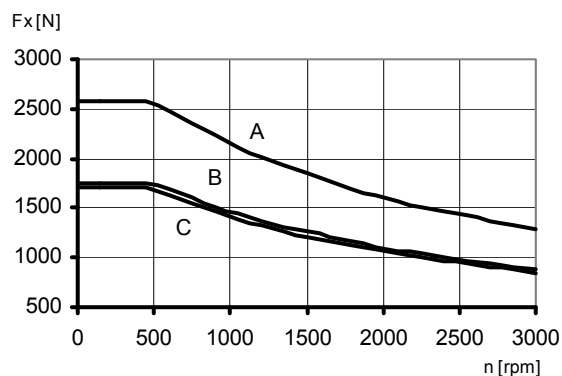


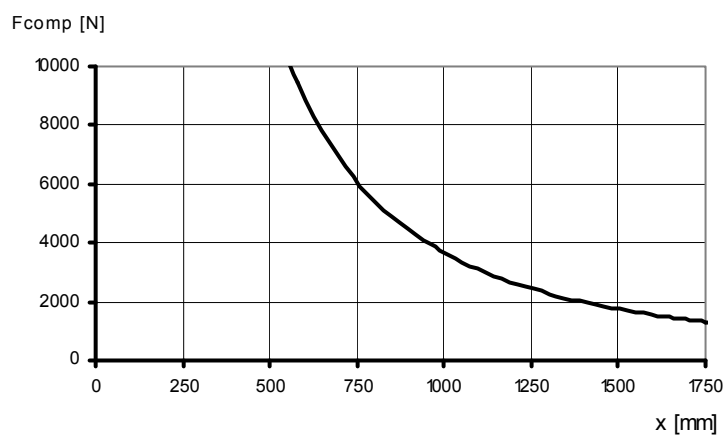
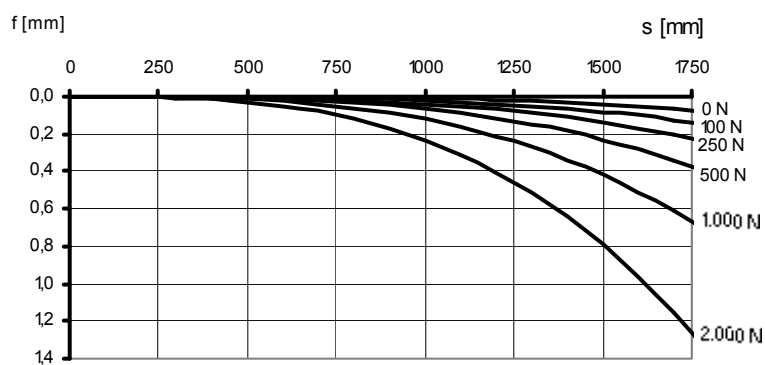
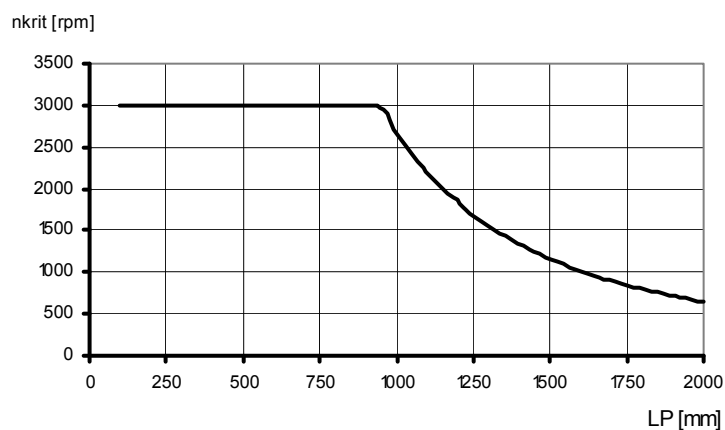
5.2 TAS42SB





5.3 TAS43SB





6. Safety

6.1 Qualification of the personnel

Qualified personnel are persons who, by technical training, knowledge and experience, are able to assess the work to be done and to recognize and avoid possible dangers. Qualified personnel must be familiar with the current standards, regulations, and accident prevention regulations, which have to be observed when working with linear tables.

According to the EC-machine directives the operator is obliged to instruct the personnel who are responsible for installation, dismantling, commissioning, operation, maintenance and repair.

The operator is obliged to check the entire machine or system after a repair or failure corrective action.

6.2 Intended use

The Schneider Electric linear tables described in this documentation are designed for system application in the industrial automation and are not understood as independently operating devices. Before operation and use of the linear tables, the operator must read all accompanying product documentations, as well as apply all relevant safety standards. Additional safety technology such as safety devices, barriers and emergency-stop systems that are not described in this documentation might be required to safely operate the linear table in a machine or system.

Linear tables are used for example to:

- move high loads
- generate high feed forces
- perform exact movements
- position with high precision

in processes such as: feeding, picking, pressing, tensioning, positioning, moving, etc.

Any use apart from this is not considered as intended use. Schneider Electric is not liable for incurred damages. The respective operator takes the risk.

6.3 Safety notes

Our products are designed and manufactured according to state of the art technology. Unauthorized product modifications are prohibited. We exclude and decline any liability for personal injuries and damage to property, caused by modifications not authorized by the manufacturer in writing.





The operator has to take effective counter measures for DANGERS of our products to persons or property that emerge after installation.

Our instructions and notes must be observed for installation and operation. Furthermore all general safety technology directives do apply, as well as the accident prevention directives and the EC directives.

6.3.1 Symbol and notes explanation

The following special notes can appear anywhere in this documentation or on the product, to

- warn of potential DANGERS
- make aware of important notes

 DANGER	Danger indicates an immediate risky situation that can lead to death or serious personal injury if not observed.
 DANGER	Danger indicates an immediate electrical danger, that can lead to death or serious injury if not observed
 WARNING	Warning indicates a potentially risky situation that can lead to serious personal injury or minor personal injury if not observed.
CAUTION	Caution – used without the safety alarm symbol, indicates a potentially risky situation, that can lead to minor personal injury or damage to the unit or system if not observed.
 NOTE	Note gives important product and product handling information, or informs about additional information in the manual.

7. Calculation of service life

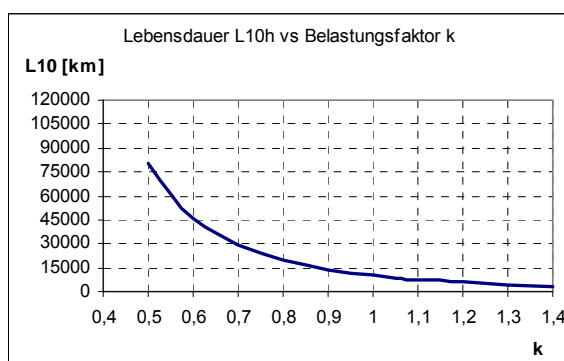
Please consult the product data sheets (see *Chapter 4*) for mechanical data on our linear tables

The external forces and torques listed in the product data sheet are maximum values for each specific part of the load. A maximum value must only be a single load and can't be combined with additional loads. If multiple loads are present at the same time (e.g. M_x and M_y , F_y and M_z) the entire complex load can be approximately estimated with the following formula:

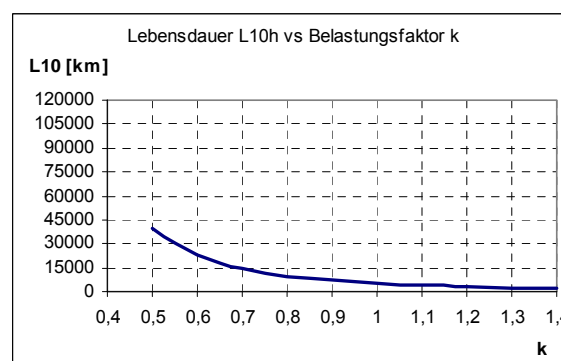
$$\frac{F_y}{F_{y_{dynmax.}}} + \frac{F_z}{F_{z_{dynmax.}}} + \frac{M_x}{M_{x_{dynmax.}}} + \frac{M_y}{M_{y_{dynmax.}}} + \frac{M_z}{M_{z_{dynmax.}}} = k = \text{load factor}$$

Please note that the maximum permissible dynamic forces and torques (in the denominator) decrease with increasing speed. Refer to the characteristic curves on the previous pages. The application specific values appear in the numerator.

The service life of the axis (in km) can be approximated using the load factor and the service life-load characteristics curve.



Service life load curve
TAS42SB and TAS43SB



Service life load curve
TAS41SB

8. Accuracy

8.1.1 Positioning accuracy

The positioning accuracy describes the positioning deviation of the linear unit that is allowed for a positioning move to a set position.

The positioning accuracy is influenced by the following factors:

- The mechanics – manufacturing tolerances, ball screw, pitch, ..
- The drive – motor resolution, closed loop circuit, ...
- The motion profile – steep deceleration ramps, high speed,..
- Heat – environmental heat, internal friction heat

8.1.2 Repeatability

The repeatability describes the positioning deviation of the linear unit that is allowed for repeat positioning moves to the same position.

The repeatability is influenced by the following factors:

- Load change
- External temperature changes
- Internal temperature changes, at continuous operation the ball screw heats up through friction and expands
- Change of the motion profile (deceleration ramp, speed, ..)
- Accuracy of the trigger position of the inductive limit switch (signal evaluation)

9. Installation

9.1 Ambient conditions

The products were designed for operation under *normal* ambient conditions.




Ambient temperature:	- 10°C+ 40°C
Humidity:	≤75% relative humidity annual average / 95% relative humidity on 30 days no condensation.
Storage and transport temperature:	- 25 + 70°C
Vacuum:	not intended (special limit switches required!)

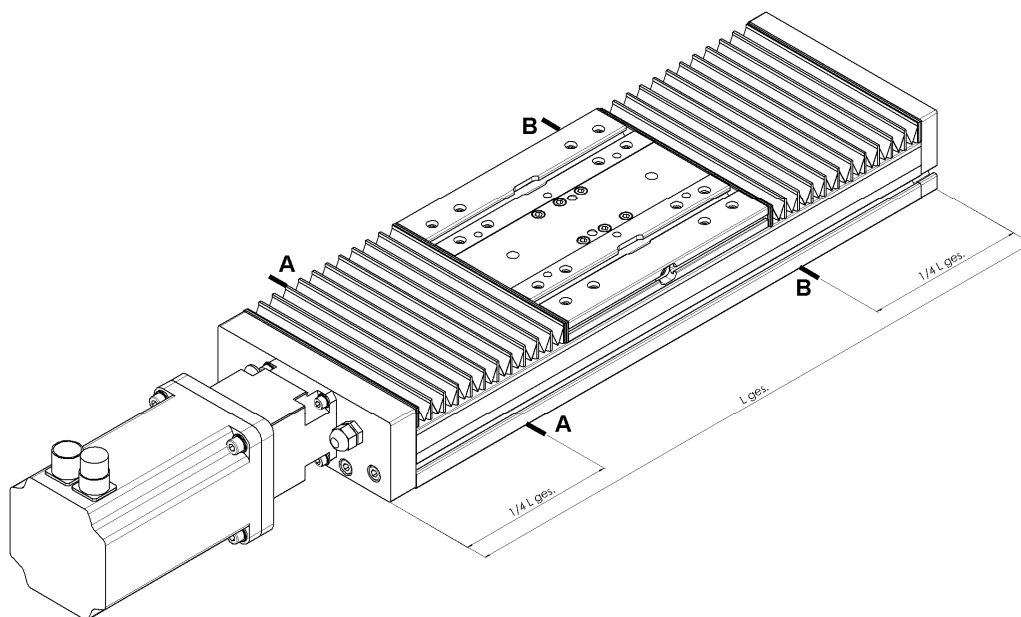
9.2 Unloading of the product

Linear tables are precision products and must be handled with care for this reason. Shocks and impacts to the carriage can destroy the ball screw guides, noise development and / or inaccuracies in the guides can be the consequence. Shocks and impacts to the ball screw cause eccentricity deviation.

We recommend that you bring the linear table in its packaging as close a possible to the installation location and to unpack it there.

After the packaging material is removed, the linear tables may only be lifted up in the designated area A and B (see graphic). The distance from the end plate and front plate is each approximately $\frac{1}{4}$ of the total length of the linear table. The contact areas must be corrected to achieve a balanced load when lifting the linear tables. This is especially true for linear tables with mounted motors.

 DANGER	Do not step under suspended/hanging loads.
 WARNING	Secure the linear table against sliding and tilting while lifting or during transport
 NOTE	Defects caused by handling errors are excluded from any warranty claims.



9.3 Packaging material disposal

Dispose the packaging material according to your local legal rules.

9.4 Mechanical installation

9.4.1 Mounting position of the linear table

Schneider Electric linear tables can be mounted in each position (horizontal, vertical, tilted,...).

In case that the linear table is **not mounted horizontally**, the load is not only carried by the guiding system but also by the ball screw. The ball screw is guided in a pre-tensioned fixed bearing at the motor side and in a loose bearing on the opposite side. This means, that the linear table must be mounted with the **motor facing up**, to stress the ball screw with tensional load only and not with buckling load!

9.4.2 Quality of the mounting surface

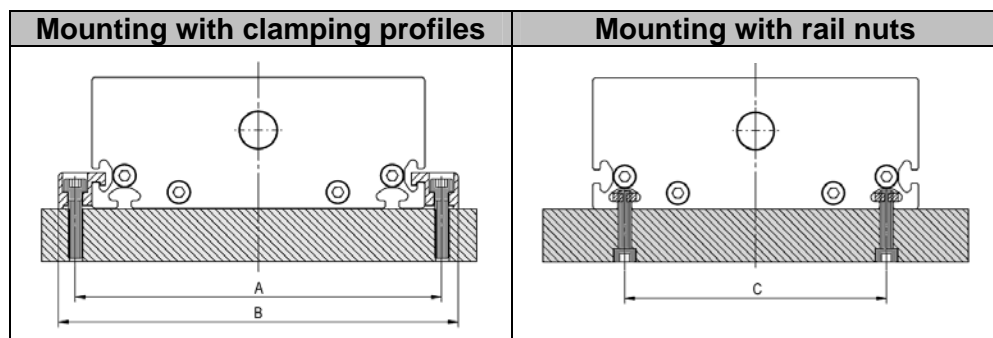
The run off tolerance of the linear tables depends of the quality of the mounting surface, which must be **clean** manufactured and **even**.

The listed linear table - run off tolerance can only be reached if the evenness of the mounting surface varies a maximum of 0,02mm / 300 mm

Further information can be found in our product data sheets (see *Chapter 4*)

9.4.3 Mounting of the linear tables

The base of the linear tables consists of an extruded aluminum-precision profile. T-slots are located on three sides of the profile. The T-slots offer ideal mounting and integration possibilities. The linear tables can either be mounted from above with clamping profiles on the sides - or from below with rail nuts.



Drilled hole distance

	TAS41SB	TAS42SB	TAS43SB
A mm	114	170	220
B mm	128	190	240
C mm	66	110	160

Number of mounting elements per side for normal requirements

	TAS41SB	TAS42SB	TAS42SB
Clamping profiles	3 per 500 mm	4 per 1000 mm	4 per 1000 mm
Rail nuts	6 per 500 mm	8 per 1000 mm	8 per 1000mm

For higher loads or run off tolerance requirements, the distance between the clamping profiles or the rail nuts must be shorter.

**NOTE**

A selection of matching rail nuts and clamping profiles are available as accessories (see *Chapter 16 Accessories and Spare parts*)

9.4.4 Linear table alignment

Depending on the requirements, the side run off tolerance of the linear tables can be aligned. For this, first only slightly tighten the mounting screws of the linear table clamping profile or rail nuts. Deviations over the entire stroke length are measured with a dial gauge by moving the carriage parallel to the reference surface. By individually tightening the mounting screws, the deviations can be corrected and consequently the linear table can be aligned.

9.5 Electrical wiring

9.5.1 Motor wiring

If you received your linear table complete with a Schneider Electric motor, please wire the motor according to the enclosed data sheet.

Please also note the supplementary data sheets:

- Safety notes on motors
- Notes on motor mounting and encoder connection

The current documents are available from your local Schneider Electric sales office or as a download at:

<http://www.berger-lahr.com>



NOTE

Matching motor cables and encoder cables in a variety of lengths are available as accessories. More information is available in the catalog "Accessories for Twin Line"

9.5.2 Limit switch wiring

The cable ends of the mounted inductive limit switches are routed to the outside through a strain relief at the front plate. The limit switches either have a plug M8 x 1 or an open cable end. The contacts of the plugs are clamped and can simply be disconnected without special tools.

The plug pin out is marked according to the limit switch cable conductors (brown/black/blue). The free cable length at the plug exit is 200mm. At the open cable end, the free cable length is independent of the stroke, but at least 3000mm or 8000mm. The limit switches are coded as follows at the cable end:



- Negative limit switch (motor side): -
- Positive limit switch: +
- Reference switch:

Ref

Wiring diagram PNP/NC (normally closed)	Wiring diagram PNP/NO (normally open)
br = brown sw = black bl = blue	br = brown sw = black bl = blue




NOTE

Extension cables with receptacle are available in a variety of lengths as accessories. (see Chapter 16 *Accessories and Spareparts*)

10. Commissioning

10.1 Preparation

 DANGER	Commissioning of the linear tables is only allowed after safety check was performed.
---	--

Check the following list items before the initial commissioning:

- Are all mechanical parts securely mounted?
- Are electrical connections correctly wired?
- Is the system in its home position?
- Do the limit switches function properly?
- Rotation of the motor (→ movement direction of the carriage)
- Are all objects removed from the working area of the linear table?
- Is a collision of the carriage with external objects impossible?
- Are all present persons on the outside of the DANGER zone?
- Is additional safety equipment (Emergency stop, guarding ...) active and functional?

10.2 Implementation


Please note that the maximum torque of servo motors is significantly higher than the nominal torque. The maximum torque of the motors must not exceed the permissible torque of the linear table. If necessary the maximum torque must be limited.

Set the speed low for the first movements. Because of the high feed forces that the linear table generates in combination with the servo motor, it is likely that the ball screw is damaged at a collision.

Run the entire motion profile multiple times with low speed to guarantee a safe operation.

11. Operation

11.1 Basics

 NOTE	For a safe and reliable continuous operation it is mandatory to keep the projected technical parameters and to follow the maintenance intervals.
---	--

Schneider Electric linear tables are designed for continuous operation applications.

The service life must be calculated individually based on the application.

Before operating the linear table, please check again if the actual occurring loads match the required and projected data.

Contact your local Schneider Electric sales person if the load (forces, acceleration, speed, feed force, ..) was increased, so that the application can be checked again.

11.2 Function

Schneider Electric linear tables are made of high-strength aluminum precision profile. High forces and torques are possible by selection and placement of the ball screw guides. The movement of the carriage is transmitted via a ball screw. This allows for precise and stiff movements and to achieve high feed forces with high positioning accuracy and repeatability.

The ball screw is not self-locking. For safety technology reasons an additional brake is required for self-locking functionality.

The ball screw pitch has effects on:

- The torque → high pitch – high torque
- The speed → high pitch – higher speed
- The pitch → high pitch – higher inaccuracy
- The self-locking → high pitch – less self-locking

The linear tables are manufactured customized for stroke.

The stroke is the distance that the carriage moves between the trigger points of the negative and positive limit switches. Beyond that, there is a safety distance – S, that is available to compress the bellows.

The safety distances vary depending on the stroke and total length of the linear table:

TAS41SB: 7 - 10 mm


TAS42SB: 12 - 15 mm

TAS43SB: 17 - 20 mm

12. Errors and diagnostics

Occurred fault / error	Possible cause	Rectification
The carriage moves past the limit switch	Limit switch is defective Controller fault	Exchange limit switch - Chapter 15.2 Eliminate fault
Motor load increases; controller shuts down due to overload.	Guide or/and ball screw jammed, or tight due to lack of lubrication.	Schneider Electric service is required
Noise and vibrations while operating the linear table at high speeds.	Ball screw speed too high Lack of lubrication (if noise develops) Ball screw eccentric deviation error due to shock or impact.	Reduce speed. Reapply lubricant – Chapter 14.2 Ball screw must be exchanged. Schneider Electric service is required
Run out errors and noise of the guides.	Lack of lubrication Shock or impact to the carriage. Guides damaged	Reapply lubricant – Chapter 14.2 Guides must be exchanged. Schneider Electric service is required
Carriage has play and positioning is inaccurate.	Backlash in ball screw or in the guides - after a crash - due to lack of lubrication	Schneider Electric service is required

13. Inspection

 DANGER	The power to all electrical device components must be disconnected before the beginning of inspection work.
---	---


13.1 Inspection after collision

Strong shocks or impacts as a result of a carriage collision - or hard placement or acceleration of objects on the carriage can damage or destroy components of the linear table.

Therefore check the drive train and the guide system after a *Crash* for possible damage.


13.1.1 Ball screw and ball screw bearings

- Check the ball screw by placing a dial gauge at the carriage and then move the carriage manually.
Axial play means ball screw damage.
- Visually inspect the ball screw for damage. Please note the instructions under Chapter 14.1 Exchange of bellows.
 - Check the linear table at commissioning for unusual noises, vibrations and vertical run-out, as well as heat development.

 NOTE	Immediately contact your local Schneider Electric sales office when damages of the ball screw and its bearings are detected.
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13.1.2 Guides

- Visually inspect the linear tables guides for damage. Please note the instructions under Chapter 14.1 Exchange of bellows.
- Check the run off tolerance of the linear tables by using a dial gauge and moving the carriage in relation to the reference surface.
 - Check the linear table at commissioning for unusual noises and heat development.

 NOTE	Immediately contact your local Schneider Electric sales office when damages of the guiding system are detected.
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13.1.3 Coupling

- Visually inspect the coupling for damage, e.g. break. Follow the instructions under Chapter 14.4 Coupling Exchange

The coupling must be replaced if damaged or broken.


13.1.4 Timing belt

- Visually inspect the timing belt for defects such as tooth deformation and side wear caused by friction. For this remove the housing of the timing belt gear. Follow the instructions under Chapter 14.5 Timing belt exchange.

The timing belt must be replaced if damaged.

14. Maintenance

14.1 General information

 DANGER	The power to all electrical device components must be disconnected before the beginning of maintenance work.
---	--

In general Schneider Electric linear tables require low maintenance. Because of their enclosed design, they are resistant to penetrating dirt and foreign objects. The used guides and drive elements are sealed and protected by bellows from the outside environment.

14.2 Lubrication

Lubricant is continuously consumed during operating of the linear tables. Periodical lubrication intervals are prerequisite for reliable operation. Insufficient lubrication - or a wrong lubricant increase the wear and tear and reduce the service life. The following factors influence the lubrication intervals:

- Extreme operating temperatures
- High ball screw speeds
- High loads
- High vibration stress
- Permanent small strokes

Schneider Electric Linear tables are equipped with a central lubrication unit, designed for a grease type lubricant, initially applied by the manufacturer. A central lubrication point is located at both ends of the carriage. Both, the ball screw and the guide system can be lubricated at one grease nipple location, depending on the accessibility. Under normal operating conditions and every 400 operating hours the table should be lubricated with 2 – 3 stokes from a common grease gun (grease nipple size DIN3405 – D6). We recommend Klüberplex BEM 34-132 as a lubricant. When using other lubricants we recommend the following minimum requirements according to DIN:


Lubricant	DIN-Type	DIN-Number	Remark
Grease	KP HC 2N-30	51502 / 51825	Calcium soap grease

14.3 Cleaning

14.3.1 General

The external parts are manufactured out of high-strength aluminum alloys that are anodized to protect the surface. The guide and drive elements are sealed from the outside through bellows in the best possible way.

To facilitate continuous functionality and reliability of operation, the linear table and its parts should be inspected periodically and cleaned if necessary.

 NOTE	<ul style="list-style-type: none"> - Do not use compressed air for cleaning - Vacuum coarse debris and dirt particles from the surface - Treat the surface only with a damp, soft and lint free cleaning cloth.
---	---

14.3.2 Cleaning of aluminum parts

The anodized surface is limited resistant against alkaline detergents. Please use exclusively neutral detergents for cleaning.

14.3.3 Cleaning of bellows



The bellows are non-sealing covers over the mechanics of the linear tables. They consist of polyester fabric coated with polyurethane on both sides and are resistant to humidity, emulsion, oil, mechanical wears as well as limited to chemicals. Excessive pollution can impair the bellows in their functionality or damage them.

- Remove large particles and dirt regularly from the surface of the bellows.
- Check the bellows regularly from damages.
 - Assure before and while in operation, that the bellows can be compressed unhindered.

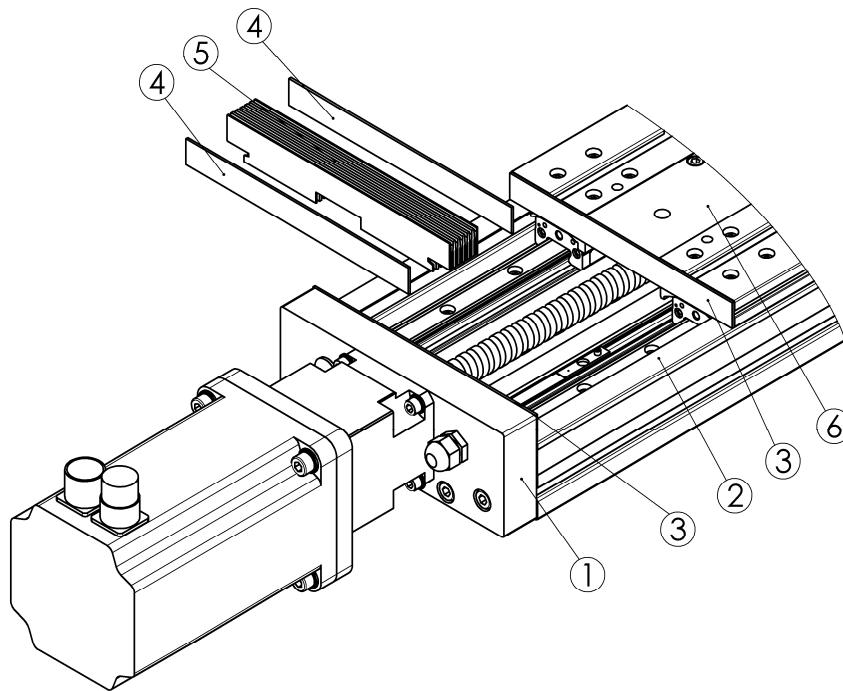
**NOTE**

The bellows are only limited resistant against alkaline detergents. We recommend to use exclusively neutral detergents for cleaning. Damaged bellows must be replaced immediately.

15. Service / repair

 DANGER	Only authorized professional personnel must conduct the exchange of defective parts.
 DANGER	Power to all electrical components of the device must be safely disconnected before any service work is carried out.

15.1 Exchange of bellows

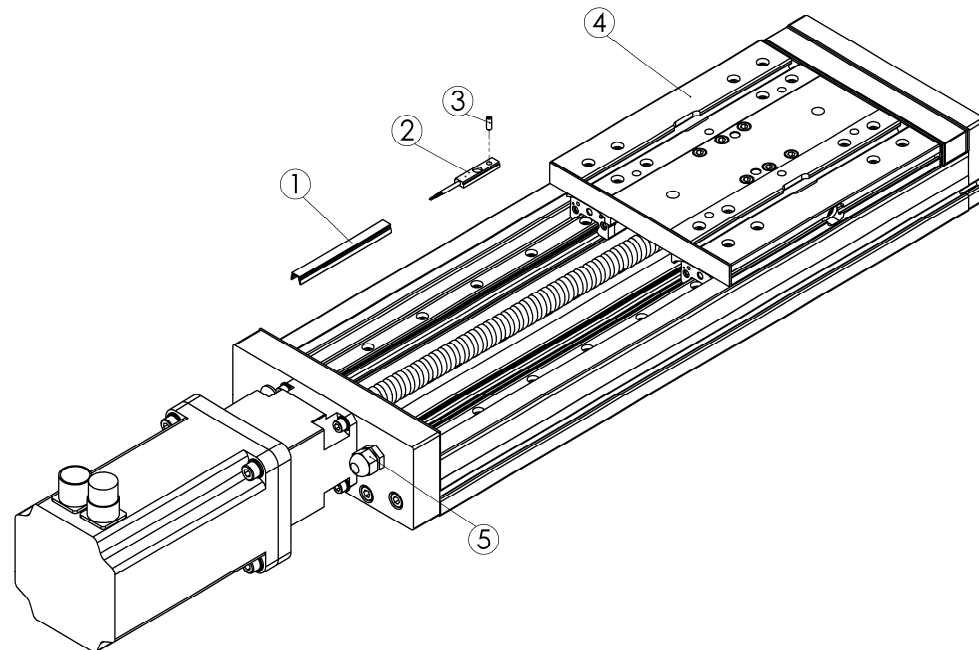


In general the used bellows are maintenance free. However, if an exchange is necessary it must be carried out (order must be kept) as follows:

- Move carriage (6) of the linear table over to the opposite end position.
- Loosen the adhesive tapes (4) of the bellows (5) from the textile-coated tapes (3) of the carriage (6) and the front plate (1).
- Manually compress the bellows (5) to solid length.
- Rotate bellows (5) in the compressed state across the base profile (2) until the guide notches in the support frame of the bellows (5) are bare.
- Remove the bellows (5) from the base profile (2).
- Remove textile-coated tapes (3) from the front plate (1) and the front surface of the carriage (6).
- Clean adhesive surfaces of the front plate (1) and the carriage (6). Adhesive surface must be free of oil.
- Place the new textile-coated tapes (3) according to the previous location on the inside of the front plate (1) and on the front surface of the carriage (6).
- Use bellows (5) of the same count.
- Press adhesive tapes (4) of the bellows (5) on to the textile-coated tapes of the front plate (1) and the carriage (6).
- Check bellows for proper run in the base profile. The bellows must not be moved jerkily.

15.2 Limit switch exchange

The limit switches are mounted protected in the T-slots on the inside of the base profile. The limit switch cables are covered in the groove with a plastic profile. The cable ends exit at the front plate via a strain relief. The switching points of the limit switches are adjusted for that the carriage travel to the end position is $\frac{1}{2}$ stroke from the center of the linear table.



- Move carriage (4) to the opposite end position of the limit switch (2).
- Disconnect electrical connection of the limit switch (2) from the drive control.
- Remove bellows (see Chapter 15.1 Exchange of bellows)
- Remove plastic cover (1) of the limit switch cables from the groove.
- Mark position of the limit switch (2) at the base profile.
- Loosen attachment screw (3) of the limit switch (2) and remove completely from the limit switch housing
- Tilt limit switch (2) and swivel out of the base profile groove.
- Loosen strain relief (5) at the front plate.
- Pull limit switch cable out of the strain relief (5).
- Remove limit switch (2).
- Route cable of the new limit switch (2) through the strain relief (5) to the outside.
- Tilt limit switch (2) and insert into the groove of the base profile.
- Mount limit switch (2) in the previously marked position with attachment screw (3).
- Route limit switch cable in the groove to the front plate.
- Pull extra cable through the strain relief (5).
- Tighten strain relief (5).
- Cover limit switch cable in the groove again with the plastic profile (1).
- Mount bellows (see Chapter 15.1 Exchange of bellows)
- Reestablish electrical connection of the limit switch (2) to the drive control.
- Check function of the new limit switch.

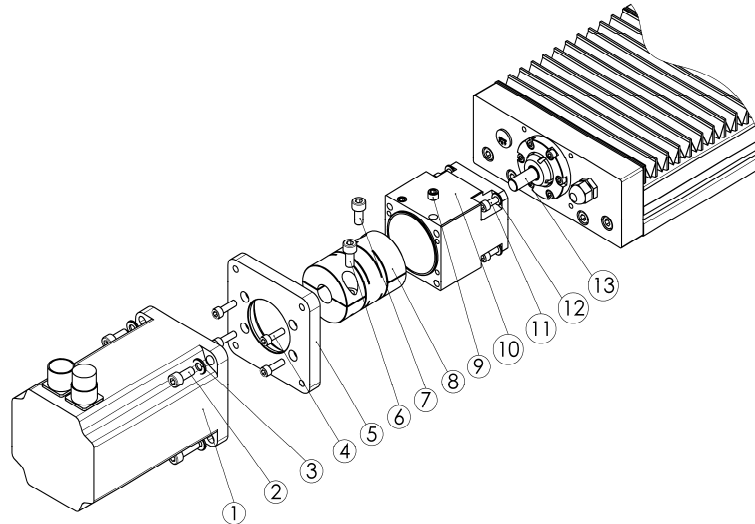
15.3 Motor exchange



DANGER

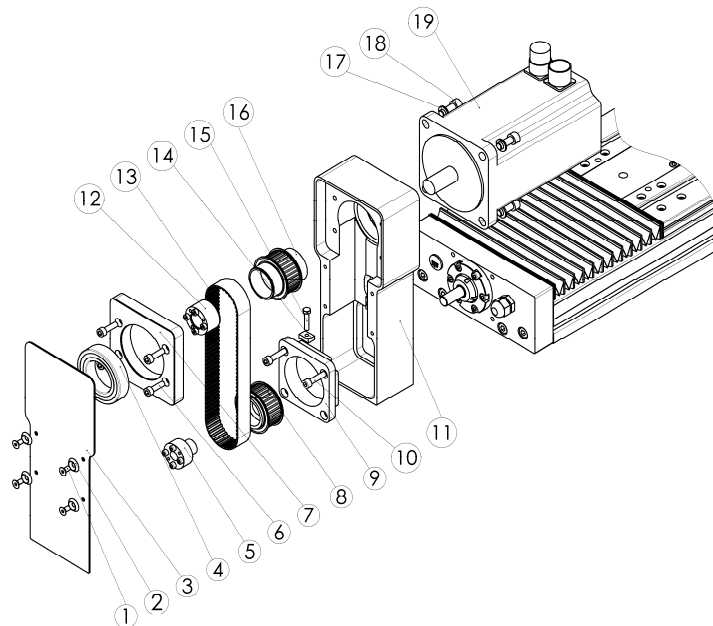
The ball screw of the linear table is not self-locking. In a vertically mounted system the carriage of the linear table must be secured from falling before repair work is started!

15.3.1 Straight mounted motor exchange



- Remove sealant screw (9) from the housing of the coupling (10).
- Loosen attachment screw (6) of the coupling (8). It might be necessary to rotate the ball screw to line up the attachment screw and the service hole.
- Secure motor (1) from falling and remove mounting screws (2) including the washers (3).
- Carefully pull motor (1) in axial direction out of the coupling (8) and the motor adapter plate (5) without jamming it.
- Clean flange and shaft of the new motor and remove damages.
- Insert new motor (1) back in to the motor adapter plate (5) as well as the hole of the coupling (8). Then mount the motor (1) with the washers (3) and screws (2) to the motor adapter plate (5).
- Tighten attachment screw (6) of the coupling (8). (see table: Torque for couplings)
- Close hole in the housing of the coupling (10) with sealant screw (9)

15.3.2 .Belt gear motor exchange



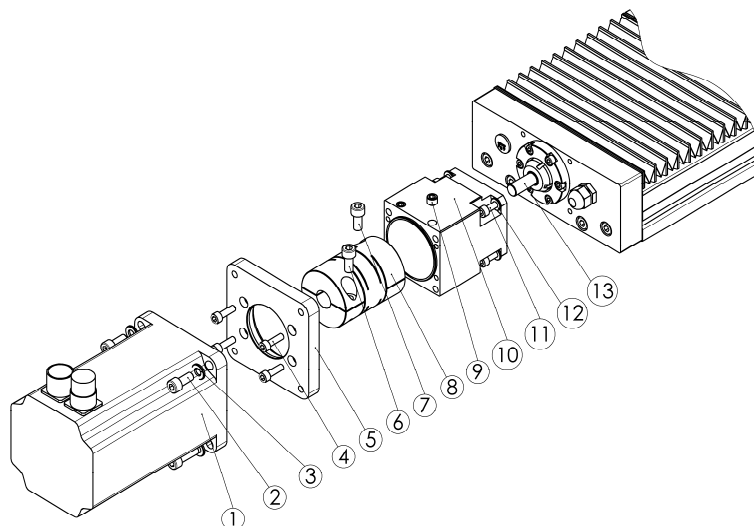
- Loose and remove screws (1) including the washers (2)
- Remove cover (3) of the timing belt gear.
- Loosen screws (10) of the tension plate (9).
- Relax timing belt (13) by loosening the tensioning screw (15).
- Remove screws (6) of the counter bearing plate (7).
- Press counter bearing plate (6) including counter bearing (4) with 2 screws (6) from the pulley (16).
- Secure motor (19) from falling and remove mounting screws (18) including washers (17).
- Pull motor (19) with attached pulley (16) by tilting it out of the timing belt (13) as well as the belt gear housing (11).
- Measure and note or mark axial mounting position of the pulley (16) in relation to the motor (19) flange.
- Loosen screws of the tensioning element (12) and remove pulley (16) from the motor (19) shaft.
- Clean flange and shaft of the new motor and remove damages.
- Slide pulley (16) with tensioning element (12) on to motor shaft (19) and resume former mounting position.
- Tension screws of the tensioning element (12). (see table: Torques for tensioning elements)
- Insert motor (19) with pulley (16) into belt gear housing (11) and mount timing belt (13) on pulley (16).
- Mount motor (19) with the washers (17) and screws (18) at the belt gear housing (11).
- Slide counter-bearing plate (7) with counter bearing (4) onto pulley (16) and mount with the screws (6) mount.
- To eliminate belt slack, slightly move belt gear in tensioning direction.
- Attach tensioning screw (15) to tension plate (9).
- Tension timing belt (13) by tightening the tensioning screw (15). (for tensioning distance see table timing belt pre tensioning)
- Tighten screws (10) of the tension plate (9).
- Mount cover (3) of the timing belt gears with screws (1) as well as the washers (2).

Timing belt pre tensioning

Normally the timing belt is maintenance free. The timing belts are correctly pre tensioned at the Schneider Electric factory to 30% of the maximum operating force. Only with a special belt tension measuring device the belt tension can be adjusted optimally. Measuring the pre tensioning distance and counting the tensioning screw revolutions can achieve a setting sufficient for practical use

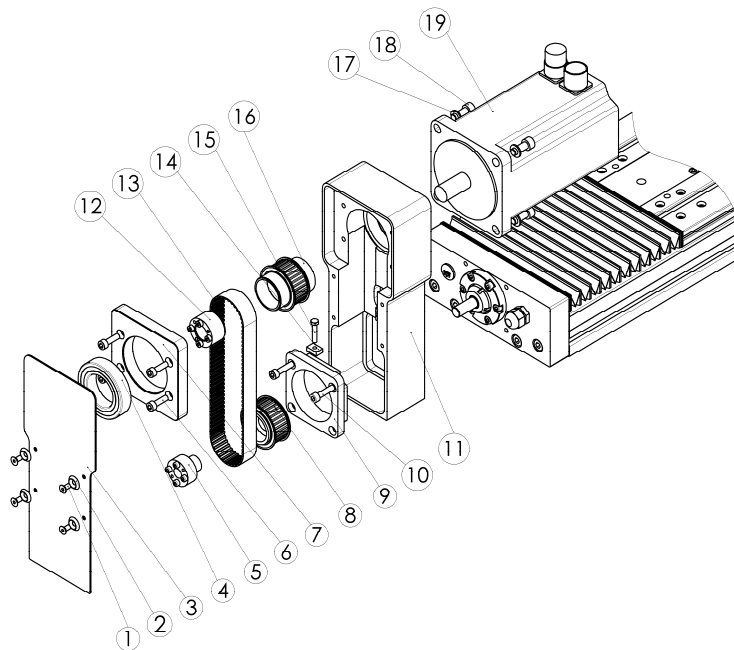
Size	TAS41SB	TAS42SB	TAS43SB
Pre-tensioning force per span (F_v)	60	85	150
Pre-tensioning distance (mm)	0,1	0,1	0,2
Screw revolutions	1/8	1/8	1/4

15.4 Coupling exchange



- Remove motor as described in Chapter 15.3.1.
- Remove screws (4) and take off motor adapter plate (5).
- Remove screws (11) including washers (12) and take off housing of the coupling (10).
- Loosen second attachment screw (7) of the coupling (8) and pull coupling off the linear table ball screw stud (13).
- Slide the new, cleaned coupling (8) to the stop of the linear table ball screw stud (13).
- Tighten attachment screw (7) of the coupling (8) again. (see table: Torques for couplings Chapter 15.3.1)
- Place back and mount housing of the coupling (10) with screws (11) and washers (12).
- Align coupling (8) in the housing of the coupling (10) until the attachment screw (6) lines up with the hole in the housing of the coupling (10).
- Place back motor adapter plate (5) on housing of the coupling (10) and mount with screws (4).
- Mount motor back as described in Chapter 15.3.1.

15.5 Timing belt exchange



- Remove motor as described in Chapter 15.3.2.
- Exchange timing belt (13).
- Mount motor again as described in Chapter 15.3.2.

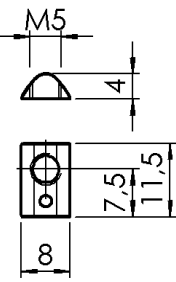
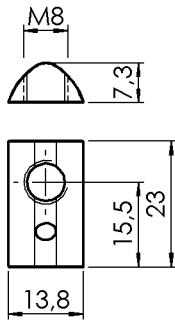
16. Accessories and spare parts

16.1 Accessories

The following accessories are available for all LT device family linear tables.

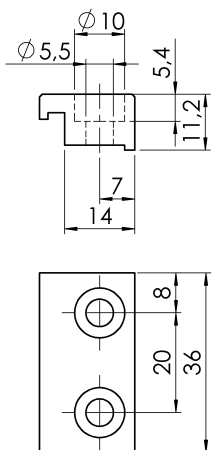
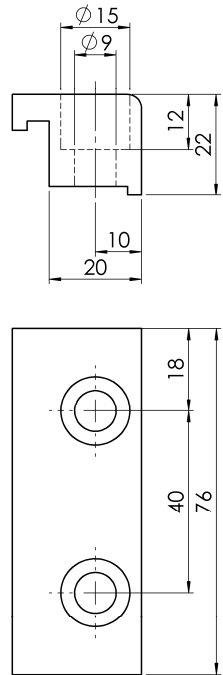
16.1.1 Set of rail nuts – galvanized

A set is comprised of 20 pieces rail nuts

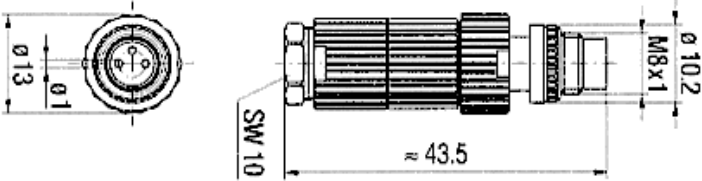
Designation	Designation
Rail nut set St 5-20	Rail nut set St 8-20
	
Order number	Order number
74080490001	74080490002

16.1.2 Set of clamping profiles – aluminum anodized

A set is comprised of 10 clamping profiles

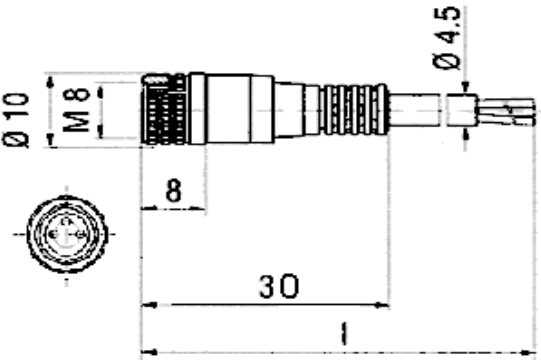
Designation	Designation
Clamping profile set Al 5-10	Clamping profile set Al 8-10
	
Order number	Order number
74080490003	74080490004

16.1.3 Limit switch connectors

Designation	
Limit switch connector - 3 pole	
	
Order number	
74080490005	

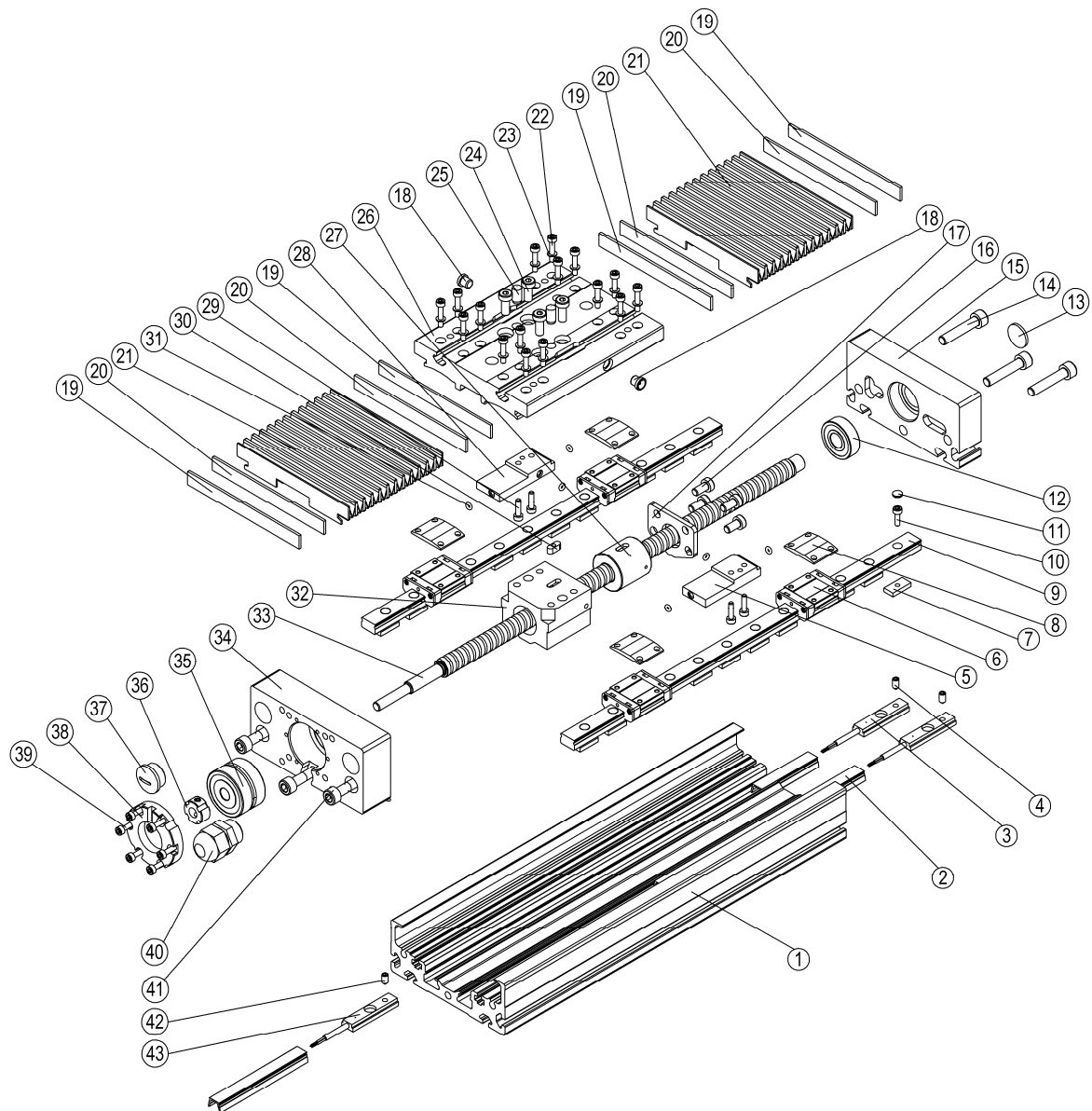
16.1.4 Limit switch cable with receptacle

Limit switch cables are available with 5m and 10m cable length, the opposite cable end is open.

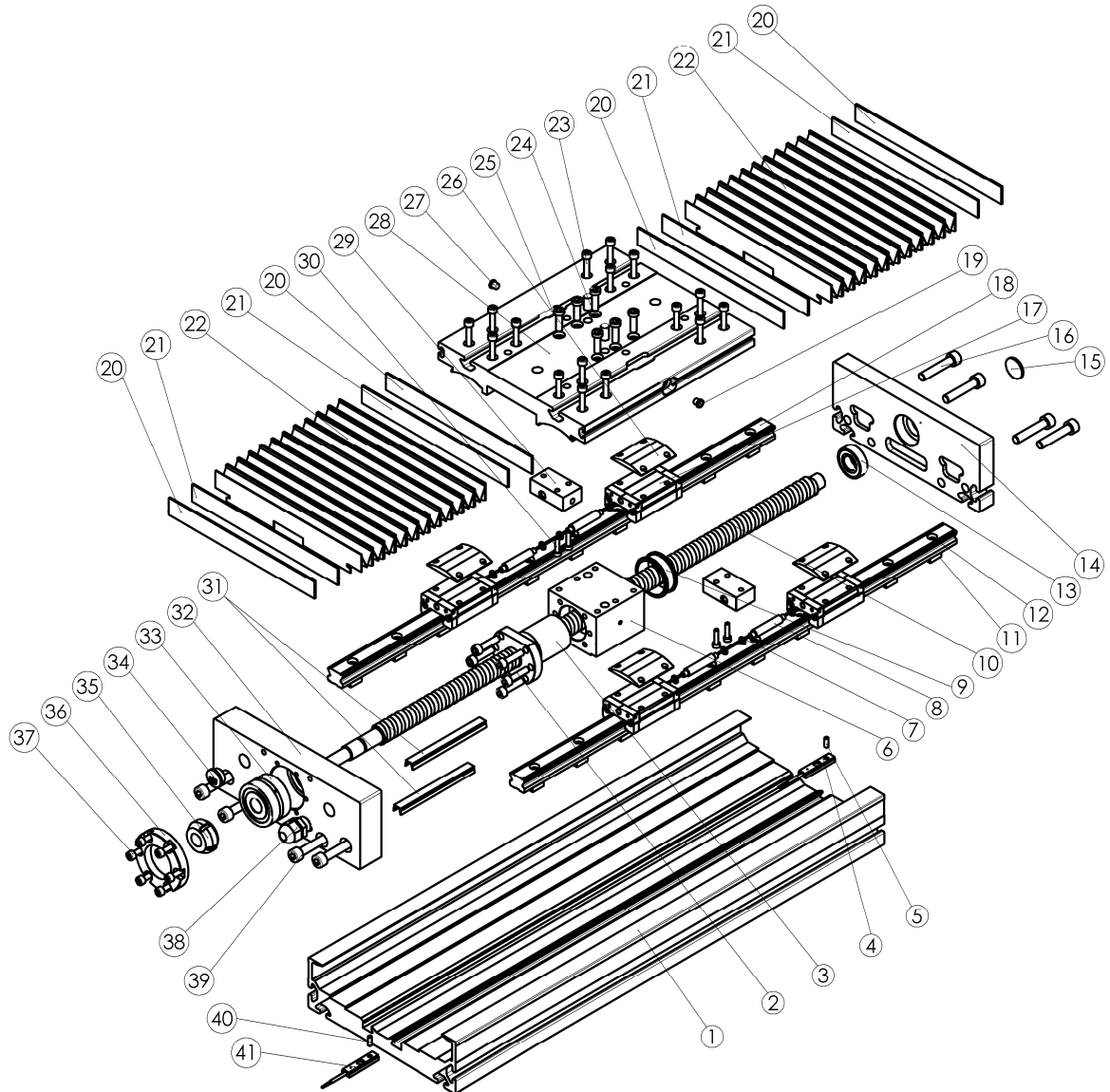
Designation	Designation
Limit switch cable – 3-pole - 5m	Limit switch cable – 3-pole - 10m
	
Order number	Order number
74080490006	74080490007

16.2 Spare parts

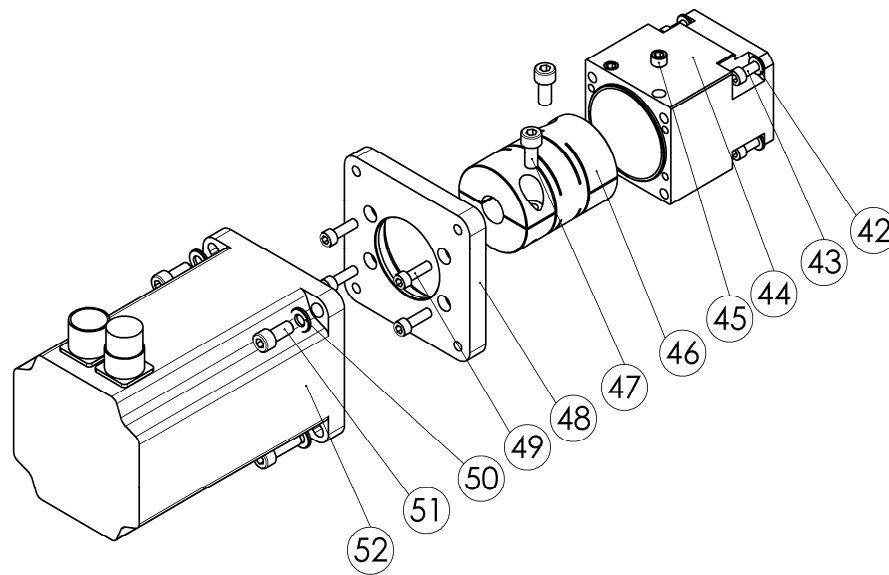
16.2.1 Exploded view of a linear table TAS41SB with position numbering of all parts



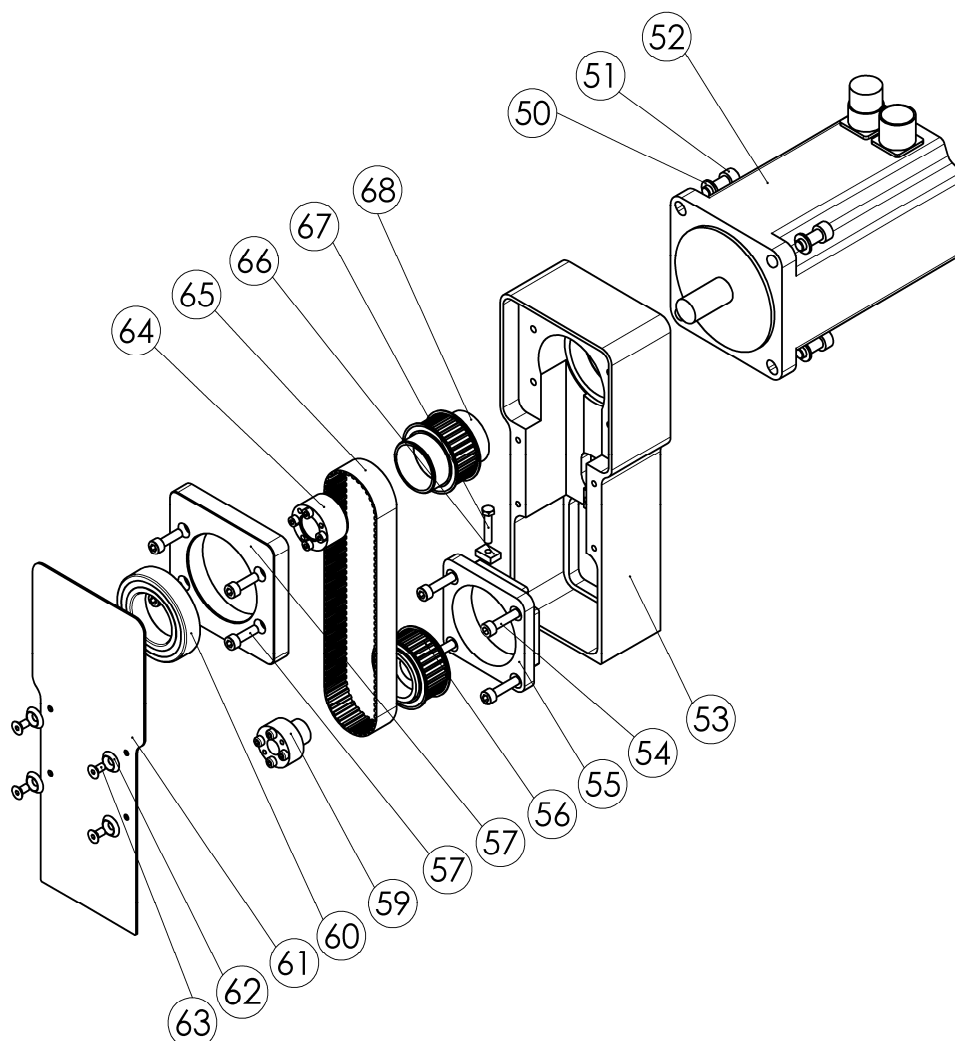
16.2.2 Exploded view of a linear table TAS42SB / TAS43SB
with position numbering of all parts



16.2.3 Exploded view of straight motor mounting
with position numbering of all parts



16.2.4 Exploded view of motor mounting with belt gear
with position numbering of all parts



16.2.5 Spare parts list TAS41SB

Pos.	Designation	Unit	Order number
	Bellows TAS41SB set is comprised of :	Amount of bellows / Piece	
21	1 x Bellows TAS41SB		
20	2 x Adhesive tape TAS41SB		
19	2 x Textile coated tape TAS41SB		
42	Limit switch - PNP/NC - 5m Cable	Piece	0000052060001
42	Limit switch - PNP/NC - 10m Cable	Piece	0000052060003
42	Limit switch - PNP/NC - Plug	Piece	0077040004600
3	Limit switch - PNP/NO - 10m Cable	Piece	0000052060057
3	Limit switch - PNP/NO - Plug	Piece	0077040005100
46	Coupling Ø8mm	Piece	0000033550064
46	Coupling Ø9mm	Piece	0000033550065
65	Timing belt	Piece	0000033550049

16.2.6 Spare part list TAS42SB

Pos.	Designation	Unit	Order number
	Bellows TAS42SB set is comprised of :	Amount of bellows / Piece	
22	1 x Bellows TAS42SB		
21	2 x Adhesive tape TAS42SB		
20	2 x Textile coated tape TAS42SB		
41	Limit switch - PNP/NC - 5m Cable	Piece	0000052060001
41	Limit switch - PNP/NC - 10m Cable	Piece	0000052060003
41	Limit switch - PNP/NC - Plug	Piece	0077040004600
41	Limit switch - PNP/NO - 10m Cable	Piece	0000052060057
41	Limit switch - PNP/NO - Plug	Piece	0077040005100
46	Coupling Ø12mm	Piece	0000033550064
46	Coupling Ø14mm	Piece	0000033550065
65	Timing belt	Piece	0000033550070

16.2.7 Spare part list TAS43SB

Pos.	Designation	Unit	Order number
	Bellows TAS43SB set is comprised of :	Amount of bellows / Piece	
22	1 x Bellows TAS43SB		
21	2 x Adhesive tape TAS43SB		
20	2 x Textile coated tape TAS43SB		
41	Limit switch - PNP/NC - 5m Cable	Piece	0000052060001
41	Limit switch - PNP/NC - 10m Cable	Piece	0000052060003
41	Limit switch - PNP/NC - Plug	Piece	0077040004600
41	Limit switch - PNP/NO - 10m Cable	Piece	0000052060057
41	Limit switch - PNP/NO - Plug	Piece	0077040005100
46	Coupling Ø19mm	Piece	0000033550064
65	Timing belt	Piece	0000033550071