

CAS•B Cantilever Axis

Lexium Linear Motion

Product manual

V1.01, 11.2009



Important information

This manual is part of the product.

Carefully read this manual and observe all instructions.

Keep this manual for future reference.

Hand this manual and all other pertinent product documentation over to all users of the product.

Carefully read and observe all safety instructions and the chapter "Before you begin - safety information".

Some products are not available in all countries.

For information on the availability of products, please consult the catalog.

Subject to technical modifications without notice.

All details provided are technical data which do not constitute warranted qualities.

Most of the product designations are registered trademarks of their respective owners, even if this is not explicitly indicated.

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Writing conventions and symbols

Work steps If work steps must be performed consecutively, this sequence of steps is represented as follows:

- Special prerequisites for the following work steps
- ▶ Step 1
- ◁ Specific response to this work step
- ▶ Step 2

If a response to a work step is indicated, this allows you to verify that the work step has been performed correctly.

Unless otherwise stated, the individual steps must be performed in the specified sequence.

Bulleted lists The items in bulleted lists are sorted alphanumerically or by priority. Bulleted lists are structured as follows:

- Item 1 of bulleted list
- Item 2 of bulleted list
 - Subitem for 2
 - Subitem for 2
- Item 3 of bulleted list

Making work easier Information on making work easier is highlighted by this symbol:



Sections highlighted this way provide supplementary information on making work easier.

SI units SI units are the original values. Converted units are shown in brackets behind the original value; they may be rounded.

Example:

Minimum conductor cross section: 1.5 mm² (AWG 14)

1 Introduction

1.1 Overview of product properties

The toothed belt axes excel with outstanding flexibility in terms of motor mounting as well as numerous options such as roller guide or recirculating ball bearing guide as well as cover strips. The toothed belt axes lend themselves for dynamic positioning of loads over short and long distances.

1.1.1 Product family

The linear axes product family consists of the following sizes:

- CAS41Bx (cross section axis body 40x40 mm)
- CAS42Bx (cross section axis body 60x60 mm)
- CAS43Bx (cross section axis body 80x80 mm)
- CAS44Bx (cross section axis body 110x110 mm)

The sizes differ in terms of outer dimensions, drive data, payload capacities and maximum stroke.

1.1.2 Features and options of the linear axis

The linear axis excels with the following features and options:

- Stroke length available precise to the millimeter
- Mounting thread with counterbores for locating dowels at the end plates for reproducible mounting of the payload
- Grease nipples at the side of the carriage for external lubrication
- Optional cover strip
- Motor mounting via compact coupling system

1.1.3 Characteristics of the linear guide

- | | |
|---|--|
| <i>Roller guide</i> | <ul style="list-style-type: none">• High speed• Smooth• Low-noise operation |
| <i>Recirculating ball bearing guide</i> | <ul style="list-style-type: none">• High acceleration• High load capacity• High accuracy |

1.1.4 Motor mounting

The motor or the gearbox are coupled by means of a preloaded elastomer coupling.

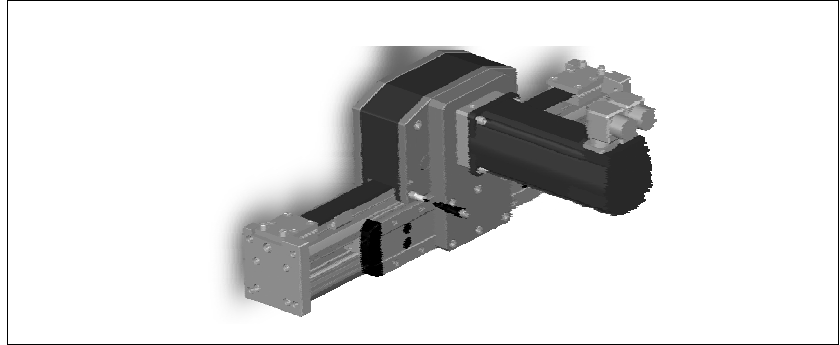


Figure 1.1 Motor mounting

1.2 Product overview

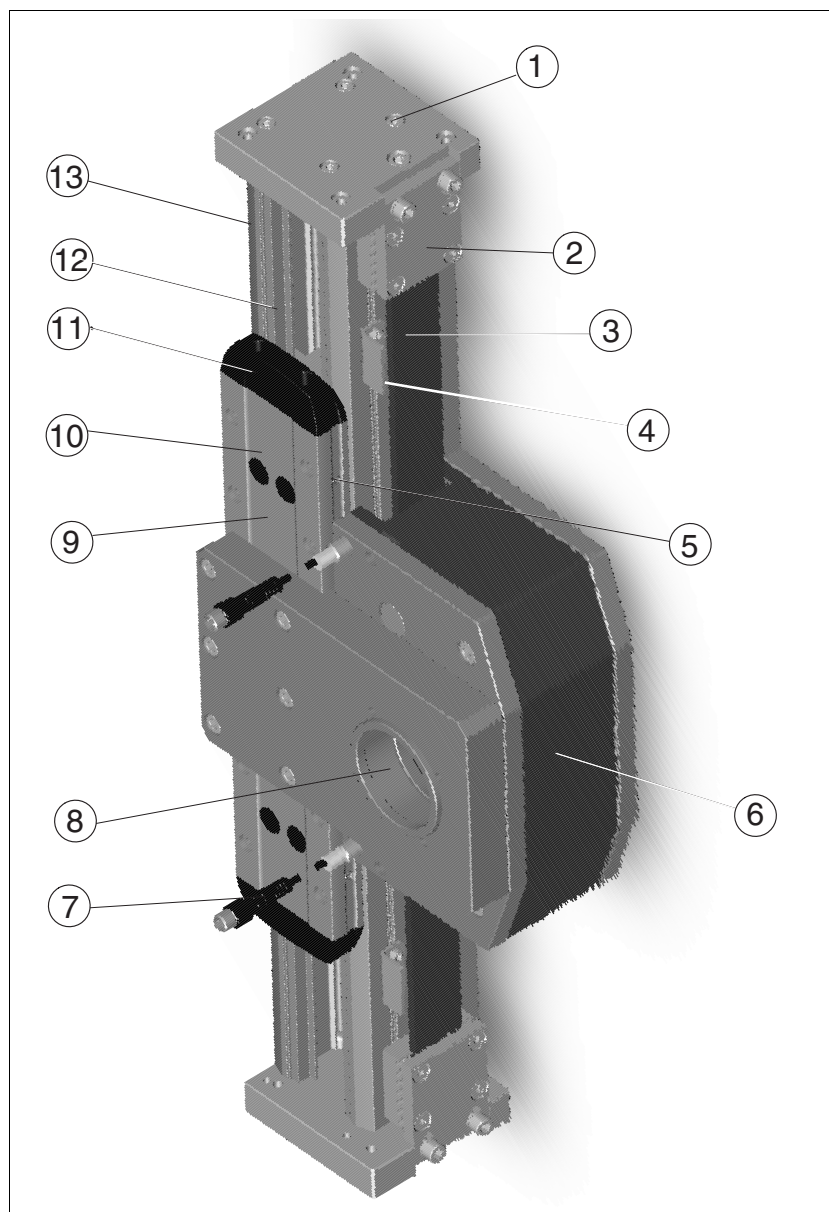


Figure 1.2 Product overview

- (1) Thread for fastening the payload
- (2) Belt tensioner
- (3) Toothed belt
- (4) Contact plate for sensors
- (5) Grease nipples, 2
- (6) Housing cover
- (7) Sensor with cable and connector
- (8) Hollow shaft for elastomer coupling or shaft extension
- (9) Carriage
- (10) Strip deflection
- (11) Rubber buffer
- (12) Cover strip
- (13) Axis body

1.3 Type code

Example	CAS	4	2	B	R	M	1000	A	3	N	R	/	2	3G	0	S9	3
Product CAS = Cantilever axes	CAS	4	2	B	R	M	1000	A	3	N	R	/	2	3G	0	S9	3
Product family 4 = Basic line	CAS	4	2	B	R	M	1000	A	3	N	R	/	2	3G	0	S9	3
Size (cross section axis body) 1 = 40; (40 x 40 mm) 2 = 60; (60 x 60 mm) 3 = 80; (80 x 80 mm) 4 = 110; (110 x 110 mm)	CAS	4	2	B	R	M	1000	A	3	N	R	/	2	3G	0	S9	3
Carriage drive element B = Toothed belt	CAS	4	2	B	R	M	1000	A	3	N	R	/	2	3G	0	S9	3
Guide type R = Roller guide (sizes 1, 2, 3) B = Recirculating ball bearing guide (sizes 2, 3, 4)	CAS	4	2	B	R	M	1000	A	3	N	R	/	2	3G	0	S9	3
Feed per revolution M = 84 mm for size 1, 155 mm for size 2, 205 mm for size 3, 266 mm for size 4,	CAS	4	2	B	R	M	1000	A	3	N	R	/	2	3G	0	S9	3
Stroke xxxx = in mm (maximum stroke per size see Technical Data)	CAS	4	2	B	R	M	1000	A	3	N	R	/	2	3G	0	S9	3
Limit switches ¹⁾ A = 2 x PNP sensors as normally closed contacts, not wired C = 2 x PNP sensors as normally open contacts, not wired E = 2 x NPN sensors as normally closed contacts, not wired G = 2 x NPN sensors as normally open contacts, not wired N = no sensors, no contact plates	CAS	4	2	B	R	M	1000	A	3	N	R	/	2	3G	0	S9	3
Carriage 3 = Type 3	CAS	4	2	B	R	M	1000	A	3	N	R	/	2	3G	0	S9	3
Options N = Without B = With cover strip (not corrosion-resistant) C = Corrosion-resistant, without cover strip A = Antistatic toothed belt, without cover strip C = Corrosion-resistant, antistatic toothed belt, without cover strip L = Antistatic toothed belt, with cover strip	CAS	4	2	B	R	M	1000	A	3	N	R	/	2	3G	0	S9	3
Axis drive interface R = With H = Without (hollow shaft)	CAS	4	2	B	R	M	1000	A	3	N	R	/	2	3G	0	S9	3

Example	CAS	4	2	B	R	M	1000	A	3	N	R	/	2	3G	0	S9	3
Gearbox / motor interface (see drawing 1 to x) 1 = With motor, without gearbox (select motor type) 2 = With motor, with gearbox (select motor/gearbox type) 3 = Without motor, with gearbox (select motor/gearbox type) 4 = Without motor, without gearbox (select motor/gearbox type) X = Without motor, without gearbox (without select motor/gearbox selection)	CAS	4	2	B	R	M	1000	A	3	N	R	/	2	3G	0	S9	3
Gearboxes 0G = Planetary gear - PLE 40 1G = Planetary gear - PLE 60 3G = Planetary gear - PLE 80 5G = Planetary gear - PLE 120 0A = Planetary gear - WPLE 40 1A = Planetary gear - WPLE 60 3A = Planetary gear - WPLE 80 5A = Planetary gear - WPLE 120 7G = Planetary gear - PLS 70 8G = Planetary gear - PLS 90 9G = Planetary gear - PLS 115 YY = Third-party gearbox without mounting by Schneider Electric (gearbox drawing required) ZZ = Third-party gearbox with mounting by Schneider Electric (gearbox must be provided) XX = No gearbox	CAS	4	2	B	R	M	1000	A	3	N	R	/	2	3G	0	S9	3
Mounting direction gearbox (with clamping hub mounting screw of adapter plate) 0 = 0 a'clock 3 = 3 a'clock 6 = 6 a'clock 9 = 9 a'clock X = No gearbox	CAS	4	2	B	R	M	1000	A	3	N	R	/	2	3G	0	S9	3

Example	CAS	4	2	B	R	M	1000	A	3	N	R	/	2	3G	0	S9	3
Motor / gearbox interface	CAS	4	2	B	R	M	1000	A	3	N	R	/	2	3G	0	S9	3
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 = Servo motors SER 36• / BRH 057																	
S9 = Servo motors SER 39• / BRH 085																	
S1 = Servo motors SER 311• / BRH 110																	
A6 = ILA..57 with servo motors																	
H5 = Servo motors BSH 055•																	
H7 = Servo motors BSH 0701 / BSH 0702 / BMH 0701 / BMH 0702																	
H8 = Servo motors BSH 0703 / BMH 0703																	
H1 = Servo motors BSH 1001 / BSH 1002 / BSH 1003; BMH 1001 / BMH 1002 / BMH 1003																	
H4 = Servo motors BSH 1004																	
H2 = Servo motors BSH 1401 / BSH 1402 / BSH 1403 / BSH 1404 / BMH 1401 / BMH 1402 / BMH 1403																	
YY = Third-party motor without mounting by Schneider Electric (motor drawing required)																	
ZZ = Third-party motor with mounting by Schneider Electric (motor drawing required; motor must be provided)																	
XX = No motor																	
Mounting direction motor with reference to power connection (with clamping hub mounting screw of adapter plate)	CAS	4	2	B	R	M	1000	A	3	N	R	/	2	3G	0	S9	3
0 = 0 a'clock																	
3 = 3 a'clock																	
6 = 6 a'clock																	
9 = 9 a'clock																	
X = No motor																	

1) With 100 mm cable with connector at one end, extension cables as accessories

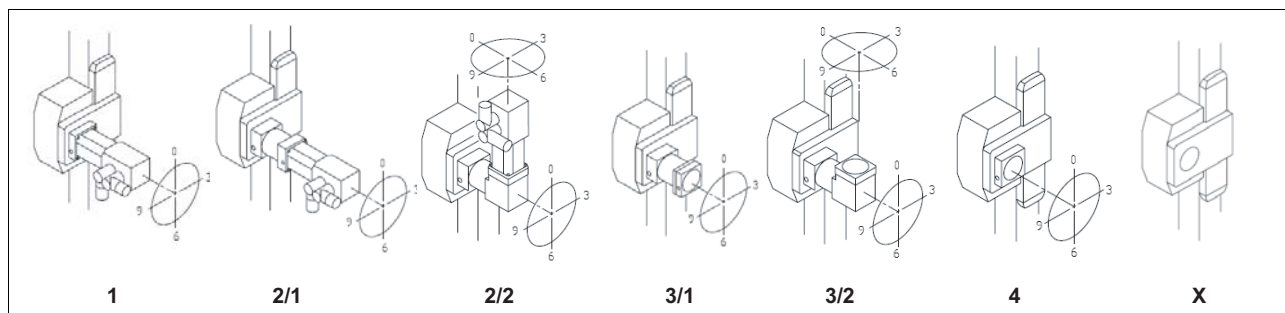


Figure 1.3 Mounting direction motor and gearbox



1.4 Documentation and literature references

Observe the information provided in the manuals of the motors and drives used.

Source manuals The latest versions of the manuals can be downloaded from the Internet at:

<http://www.schneider-electric.com>

1.5 Manufacturer's Declaration

<u>DECLARATION OF INCORPORATION</u>		 SCHNEIDER ELECTRIC MOTION DEUTSCHLAND GmbH Breslauer Str. 7 D-77933 Lahr
For partly completed machinery as per Machinery Directive 2006/42/EC		
We hereby declare that the product listed below in the version distributed by us is partly completed machinery and satisfies the provisions of the Directive by application of the following standards. The relevant technical documentation as per Annex VII, part B, has been compiled. Please observe the safety instructions in our technical documentation.		
Designation:	Cantilever axis with toothed belt drive	
Type:	CAS41x, CAS42x, CAS43x, CAS44x	
Product number:	73xx xxxx xxx	
Applied harmonized standards, especially	EN ISO 12100-1:2003-11 Safety of machinery Basic concepts, principles for design Part 1: Basic terminology, methodology EN ISO 12100-2:2003-11 Safety of machinery Basic concepts, principles for design Part 2: Technical principles and specifications	
Applied national standards and technical specifications, especially	Product documentation	
We undertake to transmit, in electronic form, in response to a request by the national authorities relevant information on the partly completed machinery.		
The partly completed machinery must not be put into service until the final machinery into which it is to be incorporated has been declared in conformity with the provisions of the Machinery Directive (2006/42/EC).		
Company stamp:	Schneider Electric Motion Deutschland GmbH Postfach 11 80 • D-77901 Lahr Breslauer Str. 7 • D-77933 Lahr	
Date/Signature:	10 November 2009	
Name/Department:	Wolfgang Brandstätter/Development	

2 Before you begin - safety information

2.1 Qualification of personnel

Only appropriately trained persons who are familiar with and understand the contents of this manual and all other pertinent product documentation are authorized to work on and with this product. In addition, these persons must have received safety training to recognize and avoid hazards involved. These persons must have sufficient technical training, knowledge and experience and be able to foresee and detect potential hazards that may be caused by using the product, by changing the settings and by the mechanical, electrical and electronic equipment of the entire system in which the product is used.

All persons working on and with the product must be fully familiar with all applicable standards, directives, and accident prevention regulations when performing such work.

2.2 Intended use

This product is a linear axis with mounted motor and intended for industrial use according to this manual.

The product may only be used in compliance with all applicable safety regulations and directives, the specified requirements and the technical data.

Prior to using the product, you must perform a risk assessment in view of the planned application. Based on the results, the appropriate safety measures must be implemented.

Since the product is used as a component in an entire system, you must ensure the safety of persons by means of the design of this entire system (for example, machine design).

Operate the product only with the specified cables and accessories. Use only genuine accessories and spare parts.

The product must NEVER be operated in explosive atmospheres (hazardous locations, Ex areas).

2.3 Basic information

WARNING

GREAT MASS OR FALLING PARTS

- Consider the mass of the axis when mounting it. It may be necessary to use a crane.
- Mount the axis in such a way (tightening torque, securing screws) that the axis and mounted parts cannot come loose even in the case of fast acceleration or continuous vibration.
- Note that vertically installed linear axes may lower unexpectedly.

Failure to follow these instructions can result in death, serious injury or equipment damage.

WARNING

LOSS OF CONTROL

- The designer of any control scheme must consider the potential failure modes of control paths and, for certain critical functions, provide a means to achieve a safe state during and after a path failure. Examples of critical control functions are EMERGENCY STOP, overtravel stop, power outage and restart.
- Separate or redundant control paths must be provided for critical functions.
- System control paths may include communication links. Consideration must be given to the implication of unanticipated transmission delays or failures of the link.
- Observe the accident prevention regulations and local safety guidelines.¹⁾
- Each implementation of the product must be individually and thoroughly tested for proper operation before being placed into service.

Failure to follow these instructions can result in death or serious injury.

1) For USA: Additional information, refer to NEMA ICS 1.1 (latest edition), Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control and to NEMA ICS 7.1 (latest edition), Safety Standards for Construction and Guide for Selection, Installation for Construction and Operation of Adjustable-Speed Drive Systems.

2.4 Hazard categories

Safety instructions to the user are highlighted by safety alert symbols in the manual. In addition, labels with symbols and/or instructions are attached to the product that alert you to potential hazards.

Depending on the seriousness of the hazard, the safety instructions are divided into 4 hazard categories.

DANGER

DANGER indicates an imminently hazardous situation, which, if not avoided, **will result** in death or serious injury.

WARNING

WARNING indicates a potentially hazardous situation, which, if not avoided, **can result** in death, serious injury, or equipment damage.

CAUTION

CAUTION indicates a potentially hazardous situation, which, if not avoided, **can result** in injury or equipment damage.

CAUTION

CAUTION used without the safety alert symbol, is used to address practices not related to personal injury (e.g. **can result** in equipment damage).

2.5 Standards and terminology

Technical terms, terminology and the corresponding descriptions in this manual are intended to use the terms or definitions of the pertinent standards.

In the area of drive systems, this includes, but is not limited to, terms such as "safety function", "safe state", "fault", "fault reset", "failure", "error", "error message", "warning", "warning message", etc.

Among others, these standards include:

- IEC 61800 series: "Adjustable speed electrical power drive systems"
- IEC 61800-7 series: "Adjustable speed electrical power drive systems - Part 7-1: Generic interface and use of profiles for power drive systems - Interface definition"
- IEC 61158 series: "Industrial communication networks - Fieldbus specifications"
- IEC 61784 series: "Industrial communication networks - Profiles"
- IEC 61508 series: "Functional safety of electrical/electronic/programmable electronic safety-related systems"

Also see the glossary at the end of this manual.

3 Technical Data

See chapter 9 "Glossary" for definitions and explanations of terms see chapter.

3.1 Ambient conditions

Ambient temperature during operation

Temperature	[°C]	0 ... +50
-------------	------	-----------

Ambient conditions transportation and storage

The environment during transport and storage must be dry and free from dust. The maximum vibration and shock load must be within the specified limits.

Temperature	[°C]	-25 ... +70
-------------	------	-------------

Relative humidity

The following relative humidity is permissible during operation:

Relative humidity		As per IEC 60721-3-3, class 3K3, no condensation
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Installation altitude

installation altitude for linear axis without motor	[m]	<1500
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Vacuum

Operation in vacuum is not permissible.

3.2 CAS41

Value pairs with / without cover strip are separated by "/".

Characteristics cantilever axis		CAS41BR
Drive element		Toothed belt 15HTD-3M
Guide type		Roller guide (W06)
Typical payload	[kg]	5
Carriage type		Type 3
Carriage length	[mm]	327 / 230
Feed constant	[mm/rev.]	84
Effective diameter toothed belt pulley	[mm]	26.738
Maximum feed force $F_{x_{max}}$ ¹⁾	[N]	250
Maximum velocity ²⁾	[m/s]	3
Maximum acceleration ²⁾	[m/s ²]	20
Maximum driving torque M_{max} ¹⁾	[Nm]	3.5
Breakaway torque 0 stroke axis	[Nm]	0.2
Moment of inertia 0 stroke axis	[kgcm ²]	2.4 / 1.9
Moment of inertia per 1 m of stroke	[kgcm ² /m]	4.0
Moment of inertia per 1 kg of payload	[kgcm ² /kg]	1.8
Maximum force $F_{y_{dynmax}}$ ¹⁾	[N]	930
Maximum force $F_{z_{dynmax}}$ ¹⁾	[N]	600
Maximum torque $M_{y_{dynmax}}$ ¹⁾	[Nm]	24
Maximum torque $M_{z_{dynmax}}$ ¹⁾	[Nm]	37
Max. torque $M_{x_{dynmax}}$ ¹⁾	[Nm]	7
Mass 0 stroke axis	[kg]	2.8 / 2.4
Mass per 1 m of stroke	[kg/m]	2.3
Moving mass cantilever	[kg]	1.1 / 0.9
Maximum working stroke ³⁾	[mm]	400
Minimum stroke ⁴⁾	[mm]	125
Repeatability ²⁾	[mm]	± 0.05
Diameter motor shaft	[mm]	6.35 ... 14
Cross section axis body (W x H)	[mm]	40 x 40
Axial area moment of inertia (I_x / I_y)	[mm ⁴]	76640 / 108930
Modulus of elasticity (aluminum) E	[N/mm ²]	72000
Maximum ambient temperature	[°C]	0 ... + 50
Load ratings linear guide (C_{stat} / C_{dyn})	[N]	2230 / 3950
Service life reference magnitude ⁵⁾	[km]	15000

1) The maximum permissible dynamic forces and torques decrease at increasing velocities (see characteristic curves)

2) Load- and stroke-dependent

3) Please inquire for greater stroke

4) Minimum stroke required for lubrication of the linear guide

5) Forces and torques relate to the service life reference magnitude

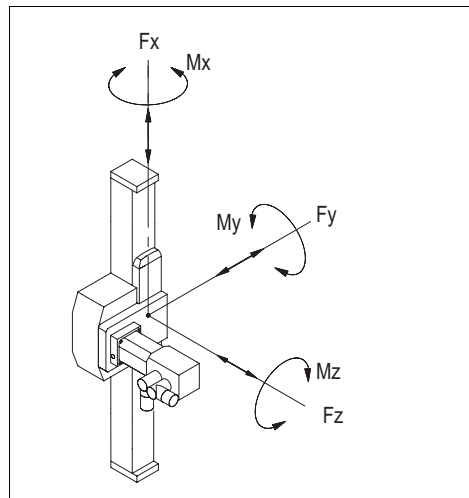
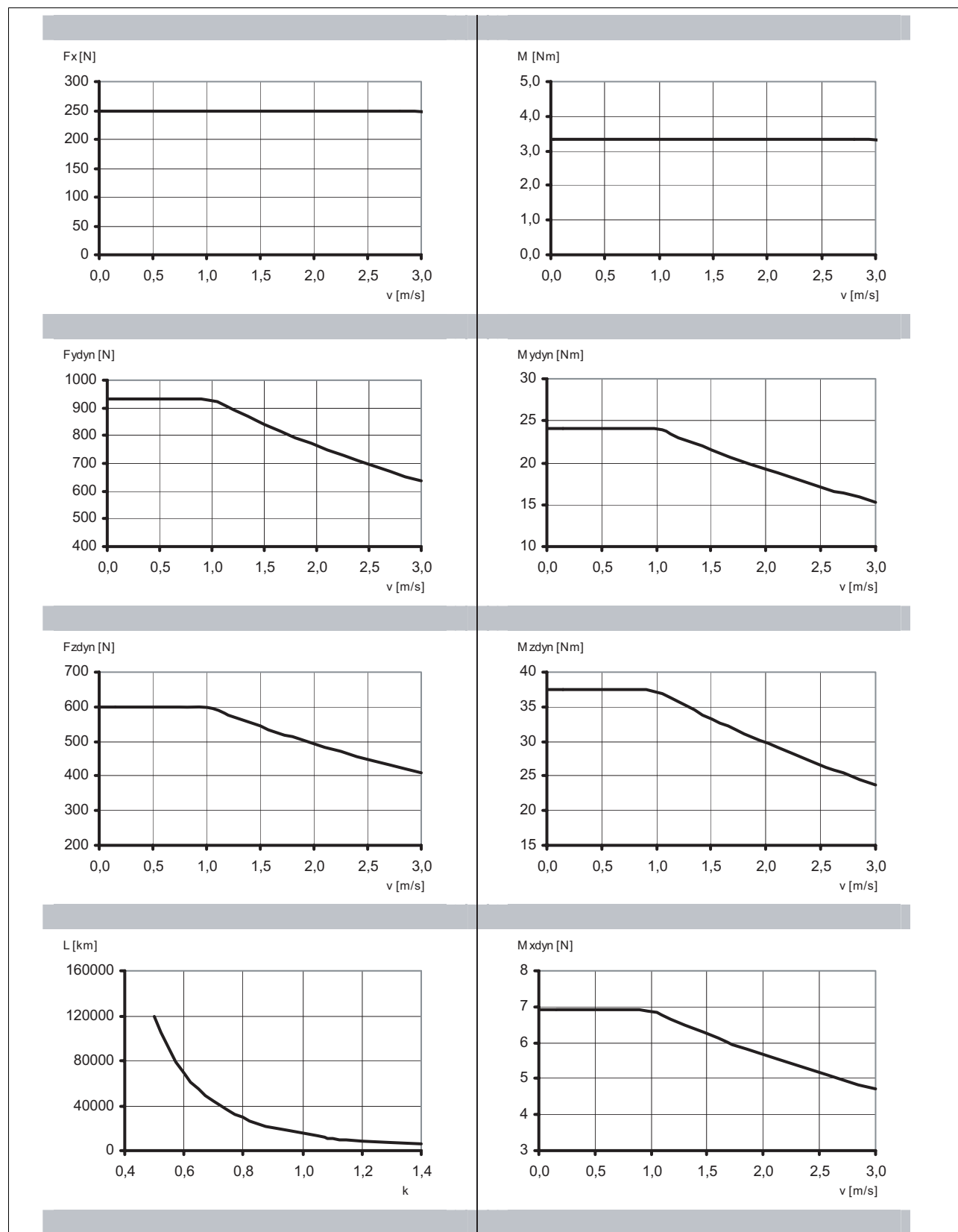


Figure 3.1 Forces and torques

Characteristic curves CAS41BR



Dimensional drawings CAS41BR

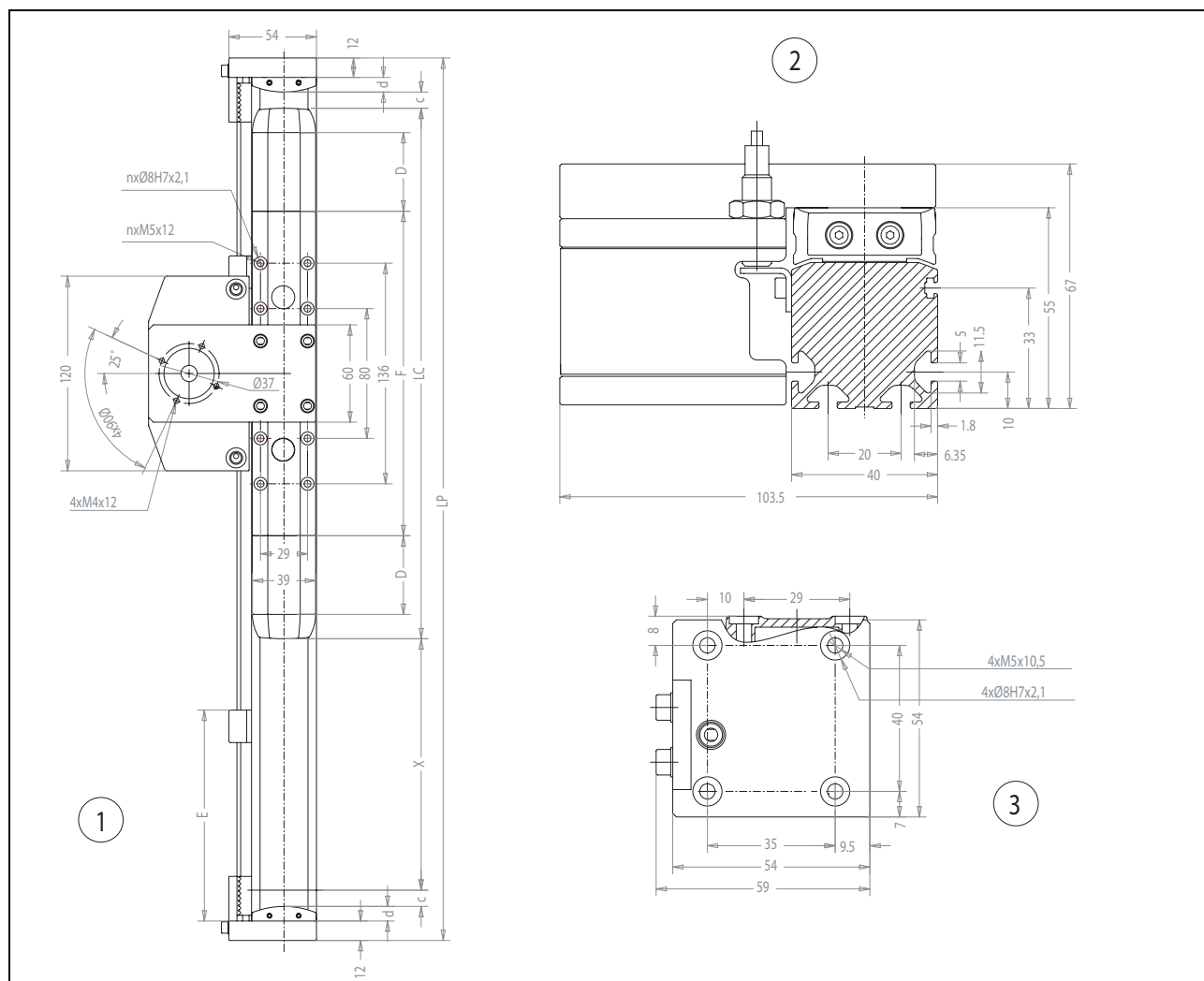


Figure 3.2 Dimensional drawings CAS41BR

- (1) Axis
(2) Section of axis
(3) Adapter plate for the load

Cover strip			No	Yes
Total length of axis	LP	[mm]	274 + X	389 + X
Stroke	X	[mm]	See characteristics	
Carriage length	LC	[mm]	230	327
Profile length of carriage	F	[mm]	200	
Number of tapped holes for mounting ¹⁾	n		8	
Position of contact plate	E	[mm]	73	130
Stroke reserve to mechanical stop ²⁾	c	[mm]	10	
Length of clamp fastener of cover strip	d	[mm]	-	9
Deflection of cover strip	D	[mm]	-	48.5

1) Prepared for locating rings (see Accessories)

2) The stroke reserve must be increased depending on the application factors load, acceleration and velocity. This reserve must be taken into account in terms of the total length.

3.3 CAS42

Value pairs with / without cover strip are separated by "/".

Characteristics cantilever axis		CAS42BR	CAS42BB
Drive element		Toothed belt 25HTD-5M	Toothed belt 25HTD-5M
Guide type		Roller guide (W06)	Recirculating ball bearing guide (SHS15V)
Typical payload	[kg]	8	15
Carriage type		Type 3	Type 3
Carriage length	[mm]	393 / 296	393 / 296
Feed constant	[mm/rev.]	155	155
Effective diameter toothed belt pulley	[mm]	49.338	49.338
Maximum feed force $F_{x_{max}}^{1)}$	[N]	650	650
Maximum velocity $^{2)}$	[m/s]	3	3
Maximum acceleration $^{2)}$	[m/s ²]	20	20
Maximum driving torque $M_{max}^{1)}$	[Nm]	16	16
Breakaway torque 0 stroke axis	[Nm]	1.0	1.6
Moment of inertia 0 stroke axis	[kgcm ²]	17.8 / 14.4	20.7 / 16.4
Moment of inertia per 1 m of stroke	[kgcm ² /m]	27.1	33.5
Moment of inertia per 1 kg of payload	[kgcm ² /kg]	6.1	6.1
Maximum force $F_{y_{dynmax}}^{1)}$	[N]	930	3540
Maximum force $F_{z_{dynmax}}^{1)}$	[N]	600	3540
Maximum torque $M_{y_{dynmax}}^{1)}$	[Nm]	29	250
Maximum torque $M_{z_{dynmax}}^{1)}$	[Nm]	45	250
Max. torque $M_{x_{dynmax}}^{1)}$	[Nm]	13	24
Mass 0 stroke axis	[kg]	7.4 / 6.6	7.9 / 7.1
Mass per 1 m of stroke	[kg/m]	4.5	5.5
Moving mass cantilever	[kg]	2.7 / 2.1	3.2 / 2.5
Maximum working stroke $^{3)}$	[mm]	600	600
Minimum stroke $^{4)}$	[mm]	130	9
Repeatability $^{2)}$	[mm]	± 0.05	± 0.05
Diameter motor shaft	[mm]	6.35 ... 20	6.35 ... 20
Cross section axis body (W x H)	[mm]	60 x 60	60 x 60
Axial area moment of inertia (I_x / I_y)	[mm ⁴]	435390 / 651610	435390 / 651610
Modulus of elasticity (aluminum) E	[N/mm ²]	72000	72000
Maximum ambient temperature	[°C]	0 ... + 50	0 ... + 50
Load ratings linear guide (C_{stat} / C_{dyn})	[N]	2230 / 3950	24200 / 14200
Service life reference magnitude $^{5)}$	[km]	15000	15000

1) The maximum permissible dynamic forces and torques decrease at increasing velocities (see characteristic curves).

2) Load- and stroke-dependent

3) Please inquire for greater stroke

4) Minimum stroke required for lubrication of the linear guide

5) Forces and torques relate to the service life reference magnitude

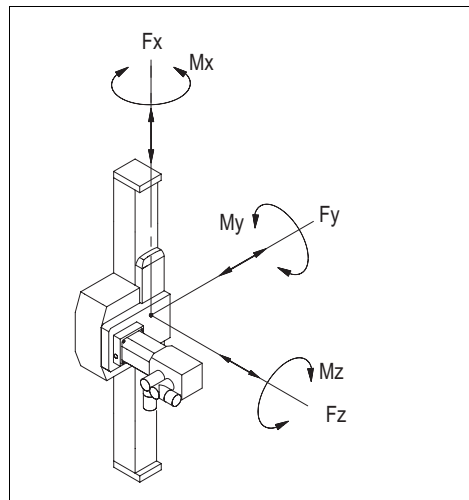
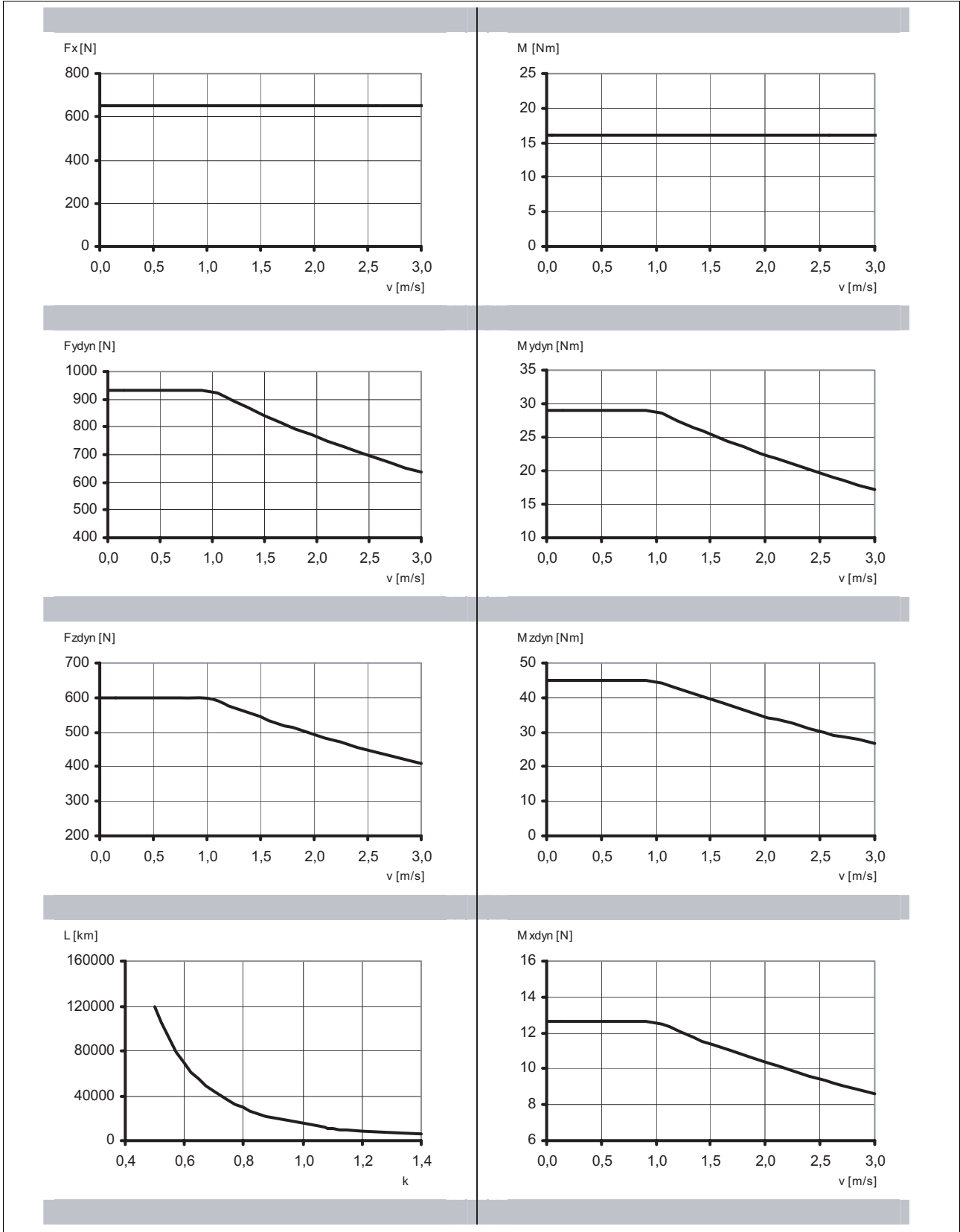


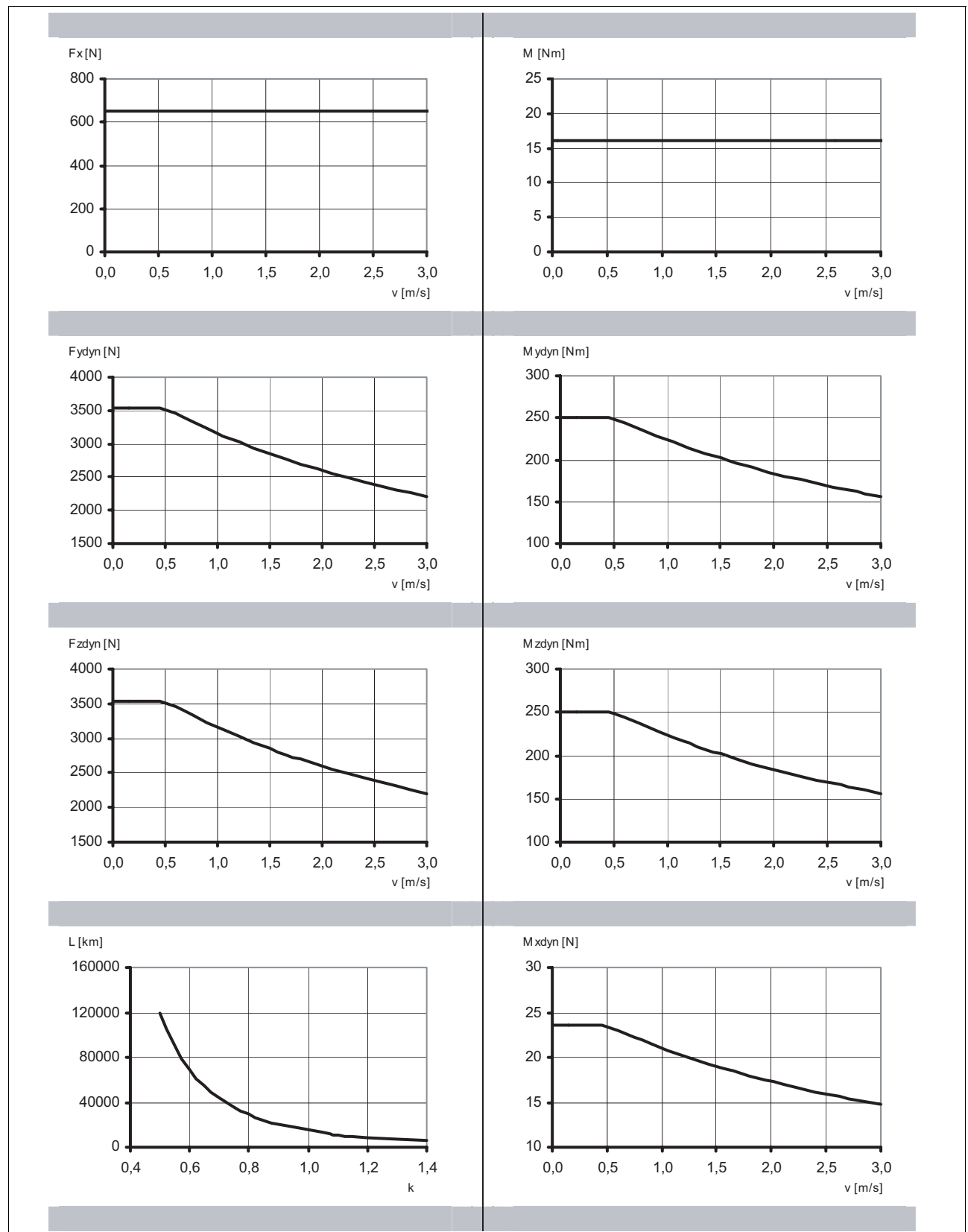
Figure 3.3 Forces and torques

Characteristic curves CAS42BR



0198441113785, V1.01, 11.2009

Characteristic curves CAS42BB



Dimensional drawings CAS42Bx

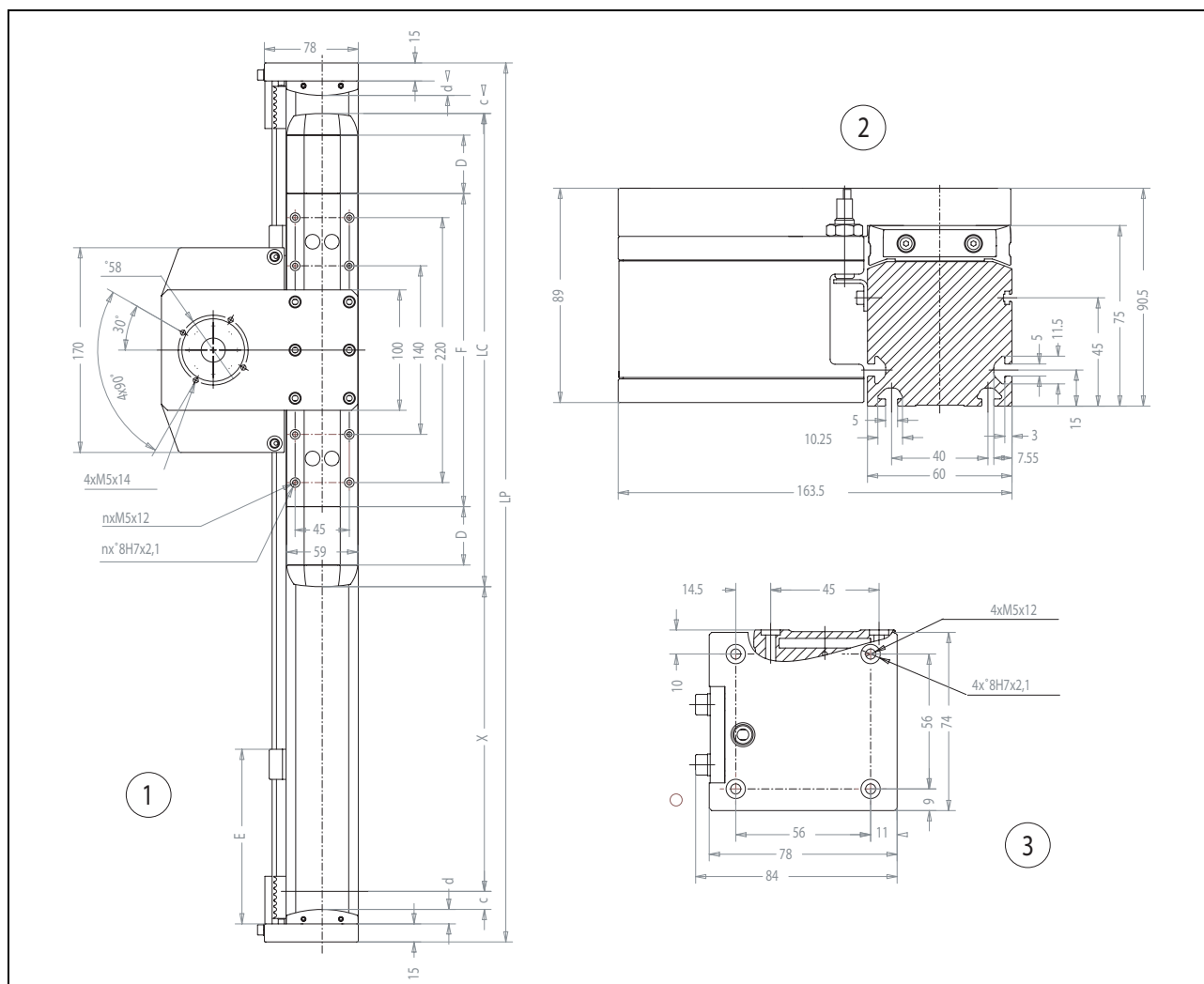


Figure 3.4 Dimensional drawings CAS42Bx

- (1) Axis
 (2) Section of axis
 (3) Adapter plate for the load

Cover strip			No	Yes
Total length of axis	LP	[mm]	356 + X	476 + X
Stroke	X	[mm]	See characteristics	
Carriage length	LC	[mm]	296	393
Profile length of carriage	F	[mm]	260	
Number of tapped holes for mounting ¹⁾	n		8	
Position of contact plate	E	[mm]	85	145
Stroke reserve to mechanical stop ²⁾	c	[mm]	15	
Length of clamp fastener of cover strip	d	[mm]	-	11.5
Deflection of cover strip	D	[mm]	-	48.5

1) Prepared for locating rings (see Accessories)

2) The stroke reserve must be increased depending on the application factors load, acceleration and velocity. The displacement distances must be taken into account in terms of the total length.

3.4 CAS43

Value pairs with / without cover strip are separated by "/".

Characteristics cantilever axis		CAS43BR	CAS43BB
Drive element		Toothed belt 30HTD-5M	Toothed belt 30HTD-5M
Guide type		Roller guide (W10)	Recirculating ball bearing guide (SHS20V)
Typical payload	[kg]	12	25
Carriage type		Type 3	Type 3
Carriage length	[mm]	484 / 364	484 / 364
Feed constant	[mm/rev.]	205	205
Effective diameter toothed belt pulley	[mm]	65.254	65.254
Maximum feed force $F_{x_{max}}^{1)}$	[N]	900	900
Maximum velocity $^{2)}$	[m/s]	3	3
Maximum acceleration $^{2)}$	[m/s ²]	20	20
Maximum driving torque $M_{max}^{1)}$	[Nm]	30	30
Breakaway torque 0 stroke axis	[Nm]	2.0	3.0
Moment of inertia 0 stroke axis	[kgcm ²]	65.8 / 52.6	74.7 / 59.1
Moment of inertia per 1 m of stroke	[kgcm ² /m]	83.9	100
Moment of inertia per 1 kg of payload	[kgcm ² /kg]	10.7	10.7
Maximum force $F_{y_{dynmax}}^{1)}$	[N]	2430	5550
Maximum force $F_{z_{dynmax}}^{1)}$	[N]	1430	5550
Maximum torque $M_{y_{dynmax}}^{1)}$	[Nm]	85	487
Maximum torque $M_{z_{dynmax}}^{1)}$	[Nm]	144	487
Max. torque $M_{x_{dynmax}}^{1)}$	[Nm]	40	53
Mass 0 stroke axis	[kg]	14.9 / 13.2	15.7 / 13.8
Mass per 1 m of stroke	[kg/m]	7.9	9.4
Moving mass cantilever	[kg]	5.8 / 4.6	6.7 / 5.2
Maximum working stroke $^{3)}$	[mm]	800	800
Minimum stroke $^{4)}$	[mm]	175	11
Repeatability $^{2)}$	[mm]	± 0.05	± 0.05
Diameter motor shaft	[mm]	12 ... 25	12 ... 25
Cross section axis body (W x H)	[mm]	80 x 80	80 x 80
Axial area moment of inertia (I_x / I_y)	[mm ⁴]	1285260 / 1867210	1285260 / 1867210
Modulus of elasticity (aluminum) E	[N/mm ²]	72000	72000
Maximum ambient temperature	[°C]	0 ... + 50	0 ... + 50
Load ratings linear guide (C_{stat} / C_{dyn})	[N]	4850 / 8500	38400 / 22300
Service life reference magnitude $^{5)}$	[km]	15000	15000

1) The maximum permissible dynamic forces and torques decrease at increasing velocities (see characteristic curves).

2) Load- and stroke-dependent

3) Please inquire for greater stroke

4) Minimum stroke required for lubrication of the linear guide

5) Forces and torques relate to the service life reference magnitude

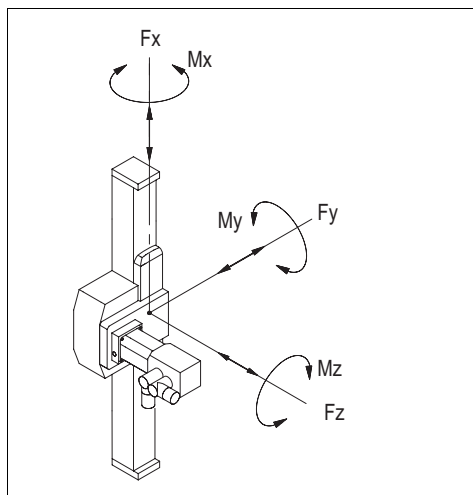
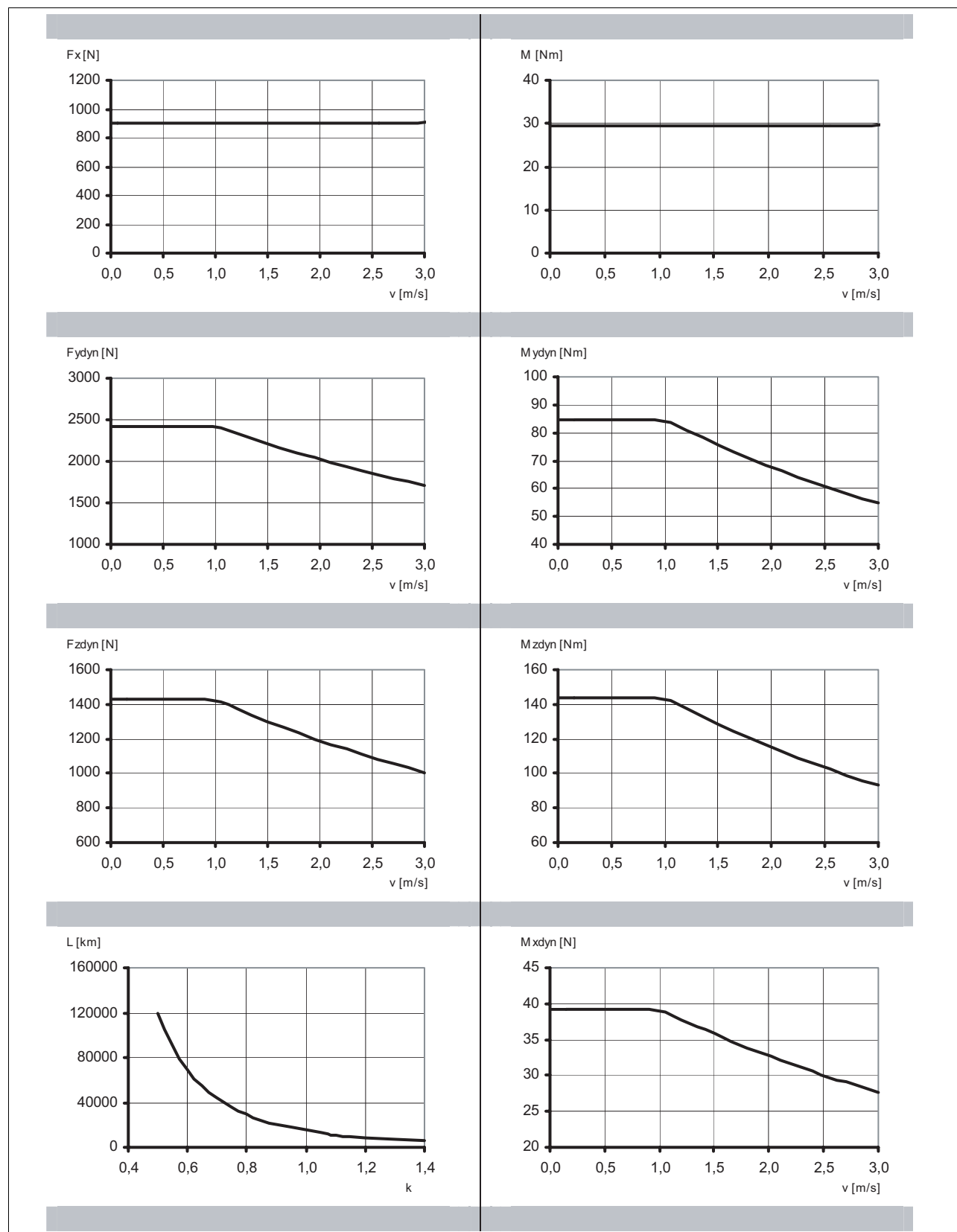
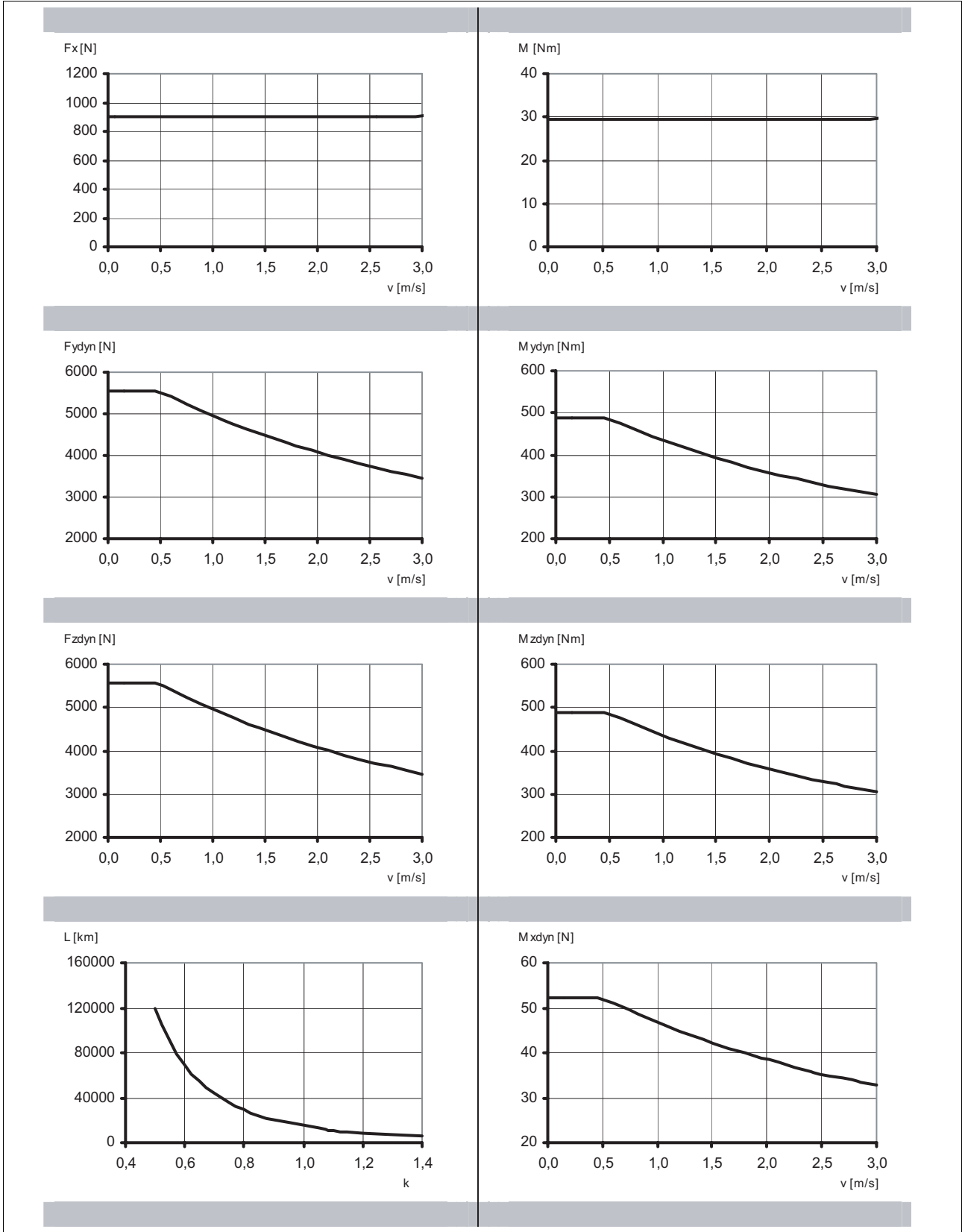


Figure 3.5 Forces and torques

Characteristic curves CAS43BR



Characteristic curves CAS43BB



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Dimensional drawings CAS43Bx

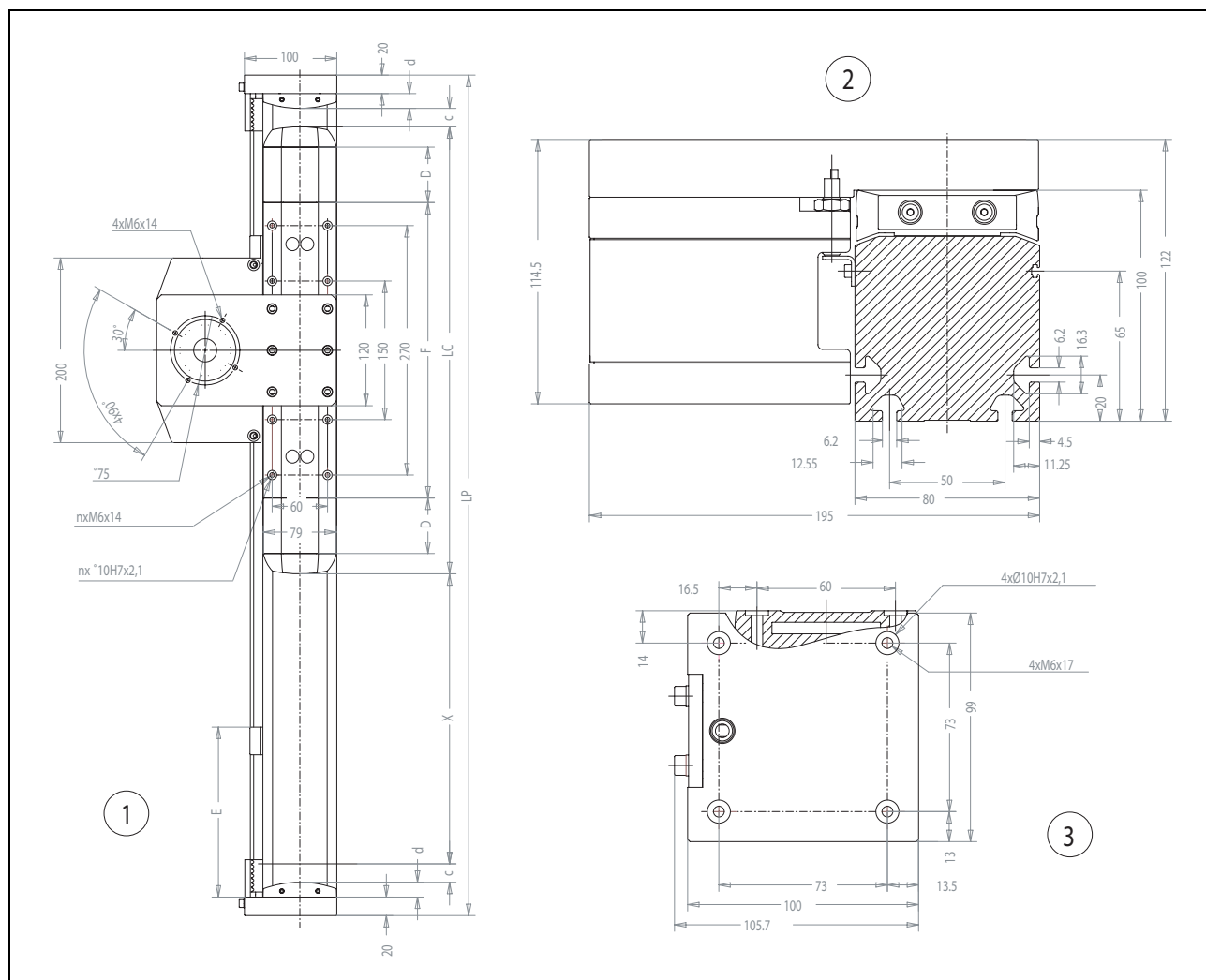


Figure 3.6 Dimensional drawings CAS43Bx

- (1) Axis
(2) Section of axis
(3) Adapter plate for the load

Cover strip			No	Yes
Total length of axis	LP	[mm]	444 + X	594 + X
Stroke	X	[mm]	See characteristics	
Carriage length	LC	[mm]	364	484
Profile length of carriage	F	[mm]	320	
Number of tapped holes for mounting ¹⁾	n		8	
Position of contact plate	E	[mm]	109	184
Stroke reserve to mechanical stop ²⁾	c	[mm]	20	
Length of clamp fastener of cover strip	d	[mm]	-	15
Deflection of cover strip	D	[mm]	-	60

1) Prepared for locating rings (see Accessories)

2) The stroke reserve must be increased depending on the application factors load, acceleration and velocity. The displacement distances must be taken into account in terms of the total length.

3.5 CAS44

Value pairs with / without cover strip are separated by "/".

Characteristics cantilever axis		CAS44BB
Drive element		Toothed belt 50HTD-8M
Guide type		Recirculating ball bearing guide (SHS25V)
Typical payload	[kg]	50
Carriage type		Type 3
Carriage length	[mm]	650 / 490
Feed constant	[mm/rev.]	264
Effective diameter toothed belt pulley	[mm]	84.034
Maximum feed force $F_{x_{max}}^{1)}$	[N]	2150
Maximum velocity $^{2)}$	[m/s]	3
Maximum acceleration $^{2)}$	[m/s ²]	20
Maximum driving torque $M_{max}^{1)}$	[Nm]	90
Breakaway torque 0 stroke axis	[Nm]	4.0
Moment of inertia 0 stroke axis	[kgcm ²]	299.9 / 239.3
Moment of inertia per 1 m of stroke	[kgcm ² /m]	292.1
Moment of inertia per 1 kg of payload	[kgcm ² /kg]	17.7
Maximum force $F_{y_{dynmax}}^{1)}$	[N]	7890
Maximum force $F_{z_{dynmax}}^{1)}$	[N]	7890
Maximum torque $M_{y_{dynmax}}^{1)}$	[Nm]	1021
Maximum torque $M_{z_{dynmax}}^{1)}$	[Nm]	1021
Max. torque $M_{x_{dynmax}}^{1)}$	[Nm]	85
Mass 0 stroke axis	[kg]	36.5 / 32.1
Mass per 1 m of stroke	[kg/m]	16.6
Moving mass cantilever	[kg]	15.9 / 12.5
Maximum working stroke $^{3)}$	[mm]	1200
Minimum stroke $^{4)}$	[mm]	13
Repeatability $^{2)}$	[mm]	± 0.05
Diameter motor shaft	[mm]	12 ... 32
Cross section axis body (W x H)	[mm]	110 x 110
Axial area moment of inertia (I_x / I_y)	[mm ⁴]	4713490 / 6624690
Modulus of elasticity (aluminum) E	[N/mm ²]	72000
Maximum ambient temperature	[°C]	0 ... + 50
Load ratings linear guide (C_{stat} / C_{dyn})	[N]	52400 / 31700
Service life reference magnitude $^{5)}$	[km]	15000

1) The maximum permissible dynamic forces and torques decrease at increasing velocities (see characteristic curves).

2) Load- and stroke-dependent

3) Please inquire for greater stroke

4) Minimum stroke required for lubrication of the linear guide

5) Forces and torques relate to the service life reference magnitude

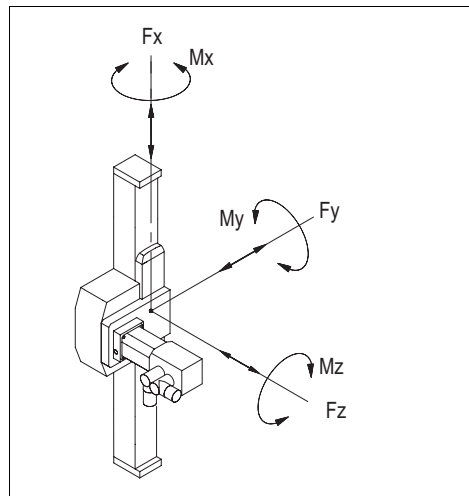
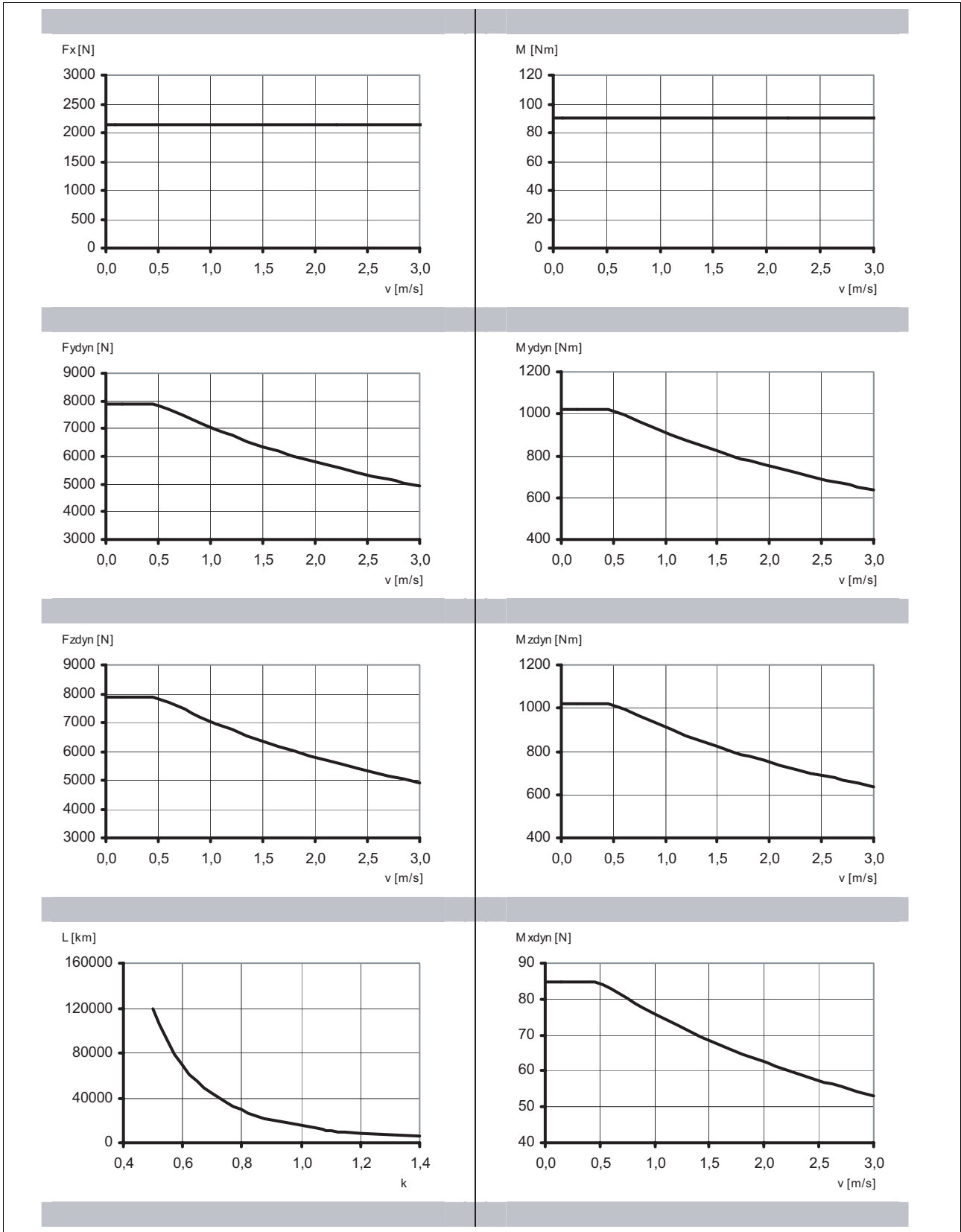


Figure 3.7 Forces and torques

Characteristic curves CAS44BB



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Dimensional drawings CAS44BB

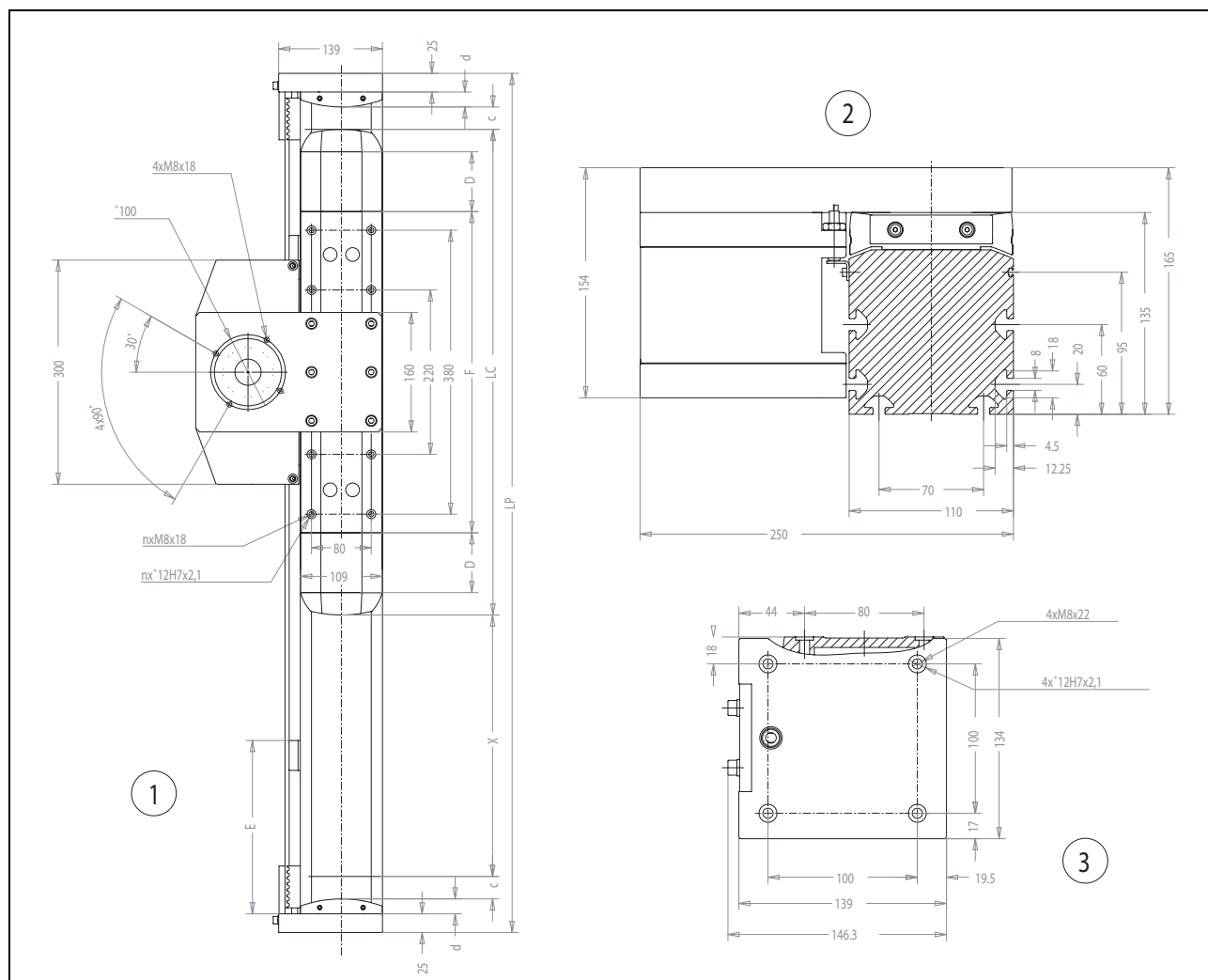


Figure 3.8 Dimensional drawings CAS44BB

- (1) Axis
 (2) Section of axis
 (3) Adapter plate for the load

Cover strip			No	Yes
Total length of axis	LP	[mm]	$600 + X$	$800 + X$
Stroke	X	[mm]	See characteristics	
Carriage length	LC	[mm]	490	650
Profile length of carriage	F	[mm]	430	
Number of tapped holes for mounting ¹⁾	n		8	
Position of contact plate	E	[mm]	142	232
Stroke reserve to mechanical stop ²⁾	c	[mm]	30	
Length of clamp fastener of cover strip	d	[mm]	-	20
Deflection of cover strip	D	[mm]	-	80

1) Prepared for locating rings (see Accessories)

2) The stroke reserve must be increased depending on the application factors load, acceleration and velocity. The displacement distances must be taken into account in terms of the total length.

3.6 Service life

The service life of the product is a function of the mean forces and torques that act in the system. If multiple forces and torques act simultaneously, use the following formula to calculate the load k .

$$\frac{F_y}{F_{y\max}} + \frac{F_z}{F_{z\max}} + \frac{M_x}{M_{x\max}} + \frac{M_y}{M_{y\max}} + \frac{M_z}{M_{z\max}} = k$$

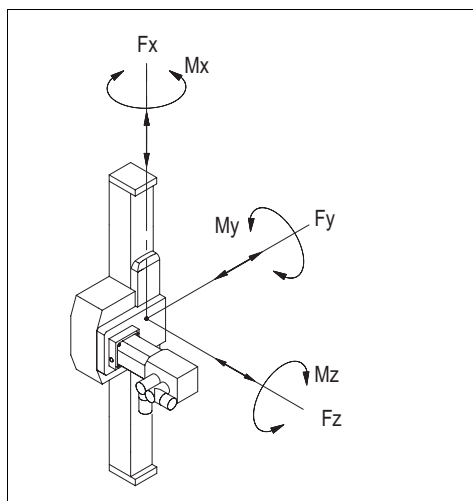


Figure 3.9 Forces and torques

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

The application-specific load values appear in the numerator.

The numerator contains the maximum permissible forces and torques. These forces and torques decrease at increasing velocities, see characteristic curves in chapter 3 "Technical Data".

3.7 Positioning accuracy and repeatability

Positioning accuracy and repeatability depend on temperature, load and velocity changes as well as the accuracy of the ball screw drive and the accuracy of the switching points of the sensors.

At steady temperature, speed and load, the repeatability amounts to ± 0.05 mm.

3.8 Stroke reserve

Stroke reserve	CAS41	CAS42	CAS43	CAS44
[mm]	10	15	25	40

Table 3.1 Distance between limit switch and mechanical stop

3.9 Motor

See the motor manual for details on the motor.

4 Installation

⚠ WARNING

GREAT MASS OR FALLING PARTS

- Consider the mass of the axis when mounting it. It may be necessary to use a crane.
- Mount the axis in such a way (tightening torque, securing screws) that the axis and mounted parts cannot come loose even in the case of fast acceleration or continuous vibration.
- Note that vertically installed linear axes may lower unexpectedly.

Failure to follow these instructions can result in death, serious injury or equipment damage.

⚠ WARNING

MOTOR WITHOUT BRAKING EFFECT

If power outage or errors cause the power stage to be switched off, the motor is no longer decelerated in a controlled way and may cause damage.

- Verify the mechanical situation.
- If necessary, use a cushioned mechanical stop or a suitable holding brake.

Failure to follow these instructions can result in death, serious injury or equipment damage.

⚠ CAUTION

HOT SURFACES

Depending on the operation, the surface may heat up to more than 100°C (212°F).

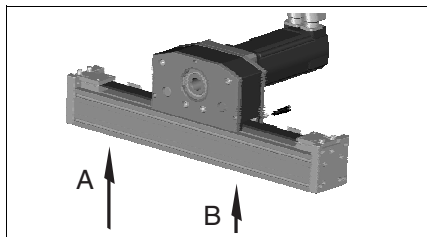
- Do not allow contact with the hot surfaces.
- Do not allow flammable or heat-sensitive parts in the immediate vicinity.
- Consider the measures for heat dissipation described.
- Check the temperature during test runs.

Failure to follow these instructions can result in injury or equipment damage.

4.1 Preparing installation

The linear axis is a precision product and must be handled with care. Shocks and impacts may damage the guides. They may lead to reduced running accuracy and reduced service life.

Transport the product in its packaging as close as possible to the installation site. Do not remove the packaging until the product is at the installation site.



The linear axis may only be lifted at points A and B (see figure). The distance between the end block and point A and between the end block and point B should be $\frac{1}{4}$ of the total length of the linear axis. If an axis with a mounted motor is lifted, points A and B are to be moved to balance the load. The motor must not be used to lift the load. Support the motor when lifting the axis.

4.2 Mechanical installation

Accessibility for servicing When mounting the linear axis, the motor and the sensors, keep in mind that they may have to be accessed for servicing.

Mounting position The linear axis can be installed in any position.

4.2.1 Standard tightening torques

Special tightening torques are applicable for mounting sensors and elastomer couplings; these tightening torques are listed in the appropriate chapters.

The following, generally applicable tightening torques apply to mounting the payload, fastening slot nuts and adjusting contact plates with hex socket screws.

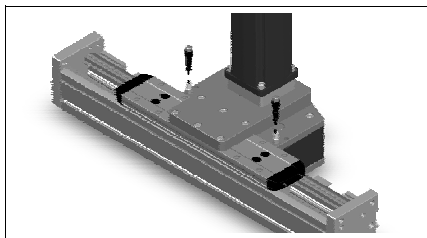
Thread	Wrench size [mm]	$M_{Amax.}[Nm]$
M3	2.5	1.1
M4	3	2.5
M5	4	5
M6	5	8.5
M8	6	21
M10	8	42
M12	10	70

Table 4.1 Standard tightening torques for screws, ISO 4762 - 8.8

4.2.2 Mounting the linear axis



Unless otherwise specified, the standard tightening torques indicated on page 44 apply.



Carriage

A mounting surface with threads is located at the top of the carriage for mounting the linear axis.

Each thread is provided with a counterbore for a locating dowel. See chapter 7 "Accessories and spare parts" for suitable locating dowels.

Carriage		CAS41	CAS42	CAS43	CAS44
Thread		M5	M5	M6	M8
Depth	[mm]	10	10	12	16
Diameter counterbore for locating dowel	[mm]	8	8	10	12

Table 4.2 Carriage

4.2.3 Adjustment of the contact plate

2 contact plates for sensors are provided at the carriage.

Special tightening torques

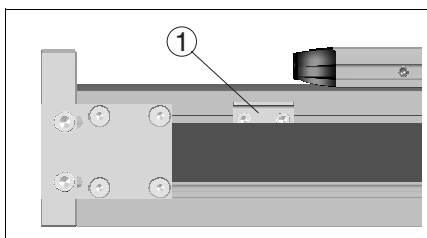
Contact plate		CAS41	CAS42	CAS43	CAS44
Screw ISO 4762 - 8.8		M3 x 4	M3 x 4	M3 x 4	M3 x 4
Wrench size	[mm]	2.5	2.5	2.5	2.5
Tightening torque	[Nm]	0.6	0.6	0.6	0.6

Table 4.3 Tightening torques contact plate

Before mounting

You need a set of Allen keys and a torque wrench with hexagon socket.

Procedure



- ▶ Loosen the two M3 screws at the contact plate (1) until the contact plate can be moved.
 - ▶ Slide the contact plate to the desired position along the T groove.
 - ▶ Tighten the screws with the tightening torque specified in Table 4.3.
- If the tightening torque is too high, this will destroy the thread of the fastening nut.

4.2.4 Mounting and adjusting the sensors

⚠ WARNING

LOSS OF CONTROL

If unsuitable sensors are installed, ground faults or line interruptions will be detected as an On state and will cause a failure of the function.

- If possible, use normally closed contacts as limit switches so that a wire break can be signaled as an error.

Failure to follow these instructions can result in death, serious injury or equipment damage.

2 fastening threads for mounting of sensors are located at the side plate of the carriage.



Unless otherwise specified, the standard tightening torques indicated on page 44 apply.

Before mounting

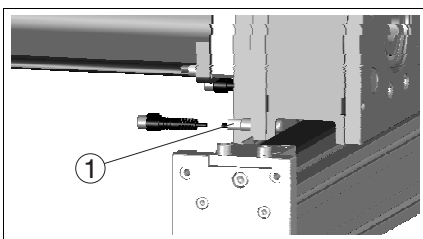
See chapter 7 "Accessories and spare parts" for suitable sensors.

You need a set of Allen keys, a set of open end wrenches and a feeler gauge.

- ▶ Clean all parts you will use.
- ▶ Check all parts for damage; repair damages.
- ▶ Check the sensor for correct type and function.
- ▶ Verify that your controller and your interface are suitable for the sensor.

Procedure

Since the sensor operates inductively, it must have a specific distance from the contact plate. This so-called "switching distance" amounts to 0.5 ± 0.1 mm.



- ▶ Move the axis body until the contact plate is above the fastening thread at the side plate (1).

- ▶ Screw the sensor into the fastening thread until the switching distance is obtained.

Measure the distance using a feeler gauge.

- ▶ Tighten the screw for holding the sensor with a tightening torque of 2 Nm.

4.2.5 Mounting the motor or the gearbox

The motor or the gearbox are coupled by means of a preloaded elastomer coupling.

The motor or the gearbox can be mounted in different arrangements (turned in increments of $4 \times 90^\circ$).



Unless otherwise specified, the standard tightening torques indicated on page 44 apply.

Special tightening torques

Expanding hub		CAS41	CAS42	CAS43	CAS44
Screw ISO 4762 - 8.8		M4 x 16	M6 x 18	M8 x 30	M10 x 60
Wrench size	[mm]	3	5	6	8
Tightening torque	[Nm]	2.9	10	25	49

Table 4.4 Tightening torques expanding hub

Clamping hub		CAS41	CAS42	CAS43	CAS44
Screw ISO 4762 - 10.9		M3 x 10	M6 x 16	M6 x 20	M8 x 25
Wrench size	[mm]	2.5	5	5	6
Tightening torque	[Nm]	1.9	14	14	35
Mounting dimension	[mm]	8	12	14	14

Table 4.5 Tightening torques and mounting dimensions clamping hub

Before mounting

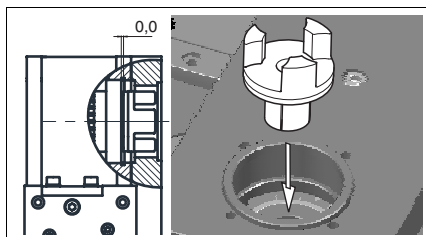
See chapter 7 "Accessories and spare parts" for suitable elastomer couplings (expanding hubs, elastomer spiders, clamping hubs).

You need a set of Allen keys and a torque wrench with hexagon socket.

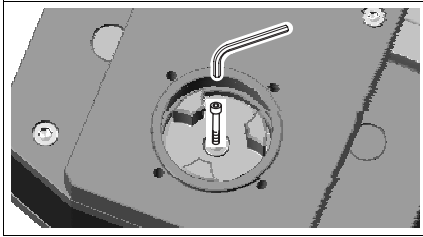
- Clean all parts you will use.
- Check all parts for damage; repair damages.

NOTE: Polluted or damaged parts may cause run-out which has an adverse effect on the service life of the elastomer coupling and the linear axis.

Mounting the elastomer coupling

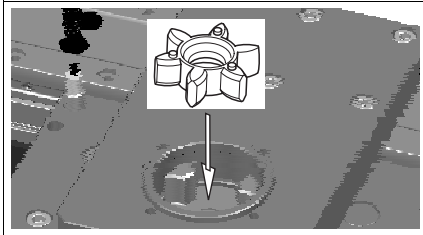


- Push the expanding hub into the hollow shaft of the toothed belt pulley until the expanding hub has even contact.



- ▶ Tighten the screw of the expanding shaft with the tightening torque specified in Table 4.4.

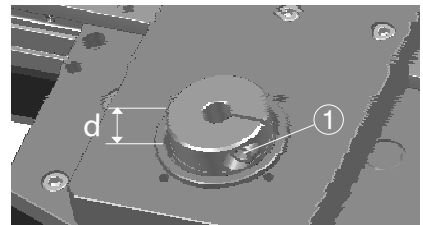
If the end block is in the end position, the toothed belt pulley does not turn along.



- ▶ Fit the elastomer spider onto the expanding hub.

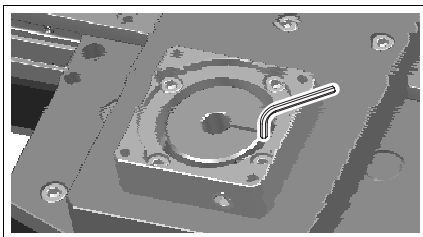
Slightly greasing the elastomer spider or the hub facilitates the fitting process. Use only mineral oil based lubricants without additives or silicon based lubricants.

NOTE: If the elastomer spider can be fitted too easily (without preloading), it must be replaced.



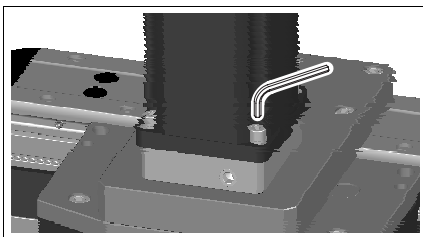
- ▶ Fit the second clamping hub. Note the installation dimension d measured to the collar, as per Table 4.5.

Check the orientation of the clamping screw (1), preferably upwards. The clamping screw is tightened at a later point in time through the hole in the motor adapter plate.

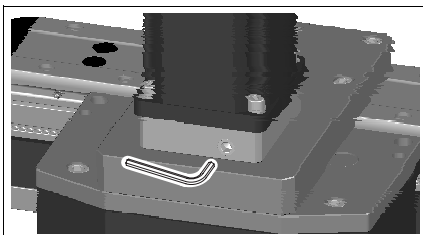


- ▶ Fit the motor adapter plate with even contact. Verify correct position of the hole at the side so that you can tighten the clamping hub screw through the hole.
- ▶ Tighten the 4 screws.

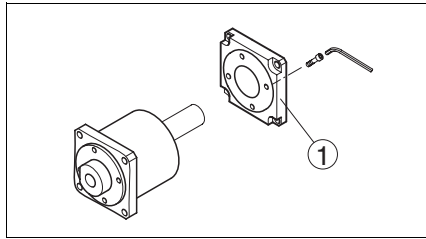
Motor mounting only



- ▶ Fit the motor so it has even contact. Secure the motor to keep it from falling down. If possible, position the linear axis in such a way that the motor is vertically upwards during mounting.
- ▶ If the motor has a parallel keyway, align the keyway and the slot of the clamping hub to avoid run-out.
- ▶ Tighten the 4 screws with the washers.

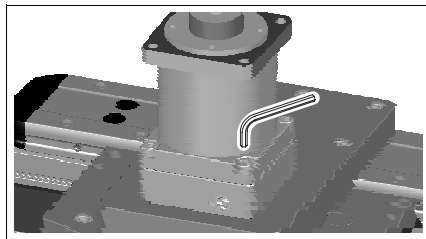


- ▶ Remove the screw plug in the hole at the side of the motor adapter plate.
- ▶ Tighten the screw of the clamping hub through the hole with the tightening torque specified in Table 4.5.
- ▶ Close the hole with the screw plug.

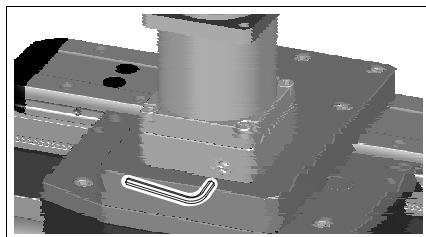
Gearbox mounting only

A flange plate (1) is required if the gearbox does not have its own flange.

- ▶ Mount the flange plate to the gearbox with the 4 screws. Verify that the flange plate has even contact.



- ▶ Place the gearbox onto the motor adapted plate with even contact. Secure the gearbox to keep it from falling down.
- ▶ If the gearbox has a parallel keyway, align the keyway and the slot of the clamping hub to avoid run-out.
- ▶ Tighten the 4 screws.



- ▶ Remove the screw plug in the hole at the side of the motor adapter plate.
- ▶ Tighten the screw of the clamping hub through the hole with the tightening torque specified in Table 4.5.
- ▶ Close the hole with the screw plug.



Please refer to the gearbox manual for mounting a motor to the gearbox.

4.2.6 Mounting a shaft extension

A shaft extension can be used to couple a motor or an encoder.

Special tightening torques

Shaft extension		CAS41	CAS42	CAS43	CAS44
Screw ISO 4762 - 8.8		M4 x 16	M6 x 18	M8 x 30	M10 x 60
Wrench size	[mm]	3	5	6	8
Tightening torque	[Nm]	2.9	10	25	49

Table 4.6 Tightening torques shaft extension

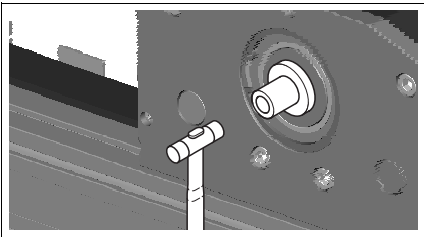
Before mounting

See chapter 7 "Accessories and spare parts" for suitable shaft extensions.

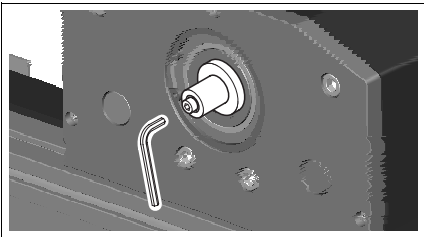
You need a set of Allen keys and a torque wrench with hexagon socket.

- ▶ Clean all parts you will use.
- ▶ Check all parts for damage; repair damages.

Procedure



- Slide the shaft extension into the hollow shaft on the end block until it has even contact with the pulley.
The fit of approx. 2 mm may require slight taps on the shaft extension with a dead blow hammer (not on the screw head).

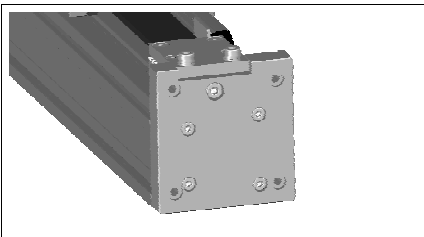


- Tighten the screw with the tightening torque specified in Table 4.6.
If the end block is in the end position, the toothed belt pulley does not turn along.

4.2.7 Mounting the payload



Unless otherwise specified, the standard tightening torques indicated on page 44 apply.



End plate

Mounting threads in the end plates allow you to fasten the payload.
For reproducible mounting of the payload, each thread is provided with a counterbore for a locating dowel. See chapter 7 "Accessories and spare parts" for suitable locating dowels.

End plate		CAS41	CAS42	CAS43	CAS44
Thread		M5	M5	M6	M8
Depth	[mm]	10	10	12	16
Diameter counterbore for locating dowel	[mm]	8	8	10	12

Table 4.7 End plate

4.3 Electrical installation

4.3.1 Connecting the sensors

The sensors are equipped with an M8 x 1 connector.

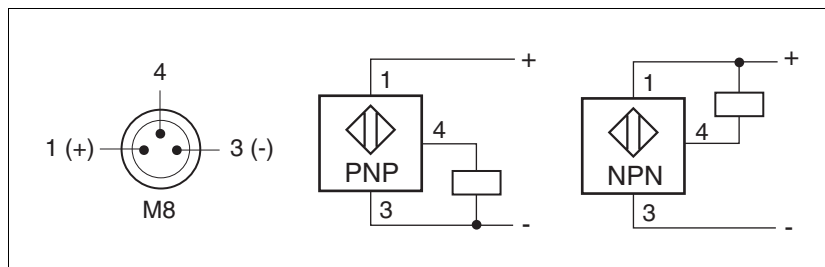


Figure 4.1 Connection assignment sensors

Pin	Description	Color
1	PELV supply voltage (+)	BN (brown)
3	PELV supply voltage (-)	BU (blue)
4	Output	BK (black)

The cable length is 100 mm. Extension cables are available in various lengths as accessories, see chapter 7 "Accessories and spare parts".

4.3.2 Motor connection

See the motor manual for details on connecting the motor.

4.4 Checking installation

Verify that you have correctly installed the product after having performed the above steps.

- Verify correct mounting and cabling of the product. In particular, check the mains connection and the 24V connection.

Check the following:

- Did you connect all protective ground conductors?
- Do you use correct fuses?
- Are any live cable ends exposed?
- Did you properly install and connect all cables and connectors?
- Did you properly install the sensors?
- Do the sensors function as required?
- Is it possible to freely move the carriage with the contact plate for the sensors along the entire travel length?

5 Commissioning

WARNING

UNEXPECTED MOVEMENT

When the axis is operated for the first time, there is a risk of unexpected movements caused by possible wiring errors or unsuitable parameters.

- Verify that the axis is properly fastened so it cannot come loose even in the case of fast acceleration.
- Note that vertically installed linear axes may lower unexpectedly.
- Verify that a functioning button for EMERGENCY STOP is within reach.
- Verify that the system is free and ready for the movement before switching it on.
- Run initial tests at reduced velocity.

Failure to follow these instructions can result in death, serious injury or equipment damage.

5.1 Commissioning procedure



You must also re-commission an already configured product if you want to use it under changed operating conditions.

- ▶ For commissioning, note the information provided in the manual of the motor used and the manual of the drive used.
- ▶ Verify that the actual loads conform to the required and engineering data prior to operating the product.
- ▶ Verify the function of the sensors. The integrated LED must indicate the switching state correctly.
- ▶ Check the distance between the sensors and the mechanical stops. The movement must be stopped by the sensors before the carriage reaches a mechanical stop.
- ▶ Verify that the sensors are positioned in such a way that the movement of the carriage is stopped in both directions by a sensor.
- ▶ Perform initial tests at reduced velocity. During these tests, verify that the controller responds correctly to the sensors in both directions of movement.
- ▶ Perform a test under realistic conditions.

6 Diagnostics and troubleshooting

6.1 Troubleshooting

Problem	Cause	Troubleshooting
Sensor overtraveled	Sensor	Adjust or replace sensors, see page 57
	Controller	Check controller
Motor load increases, controller switches off because of overload.	Guides under mechanical tension or excessive friction caused by poor lubrication.	Contact service
Noise and vibrations at high velocities	Velocity too high	Reduce velocity
	Poor lubrication (in the case of noise)	Lubricate, see page 85
Running inaccuracy and noise of the guides	Poor lubrication	Lubricate, see page 85
	Damage to the guides, for example by shock or impact on the carriage	Replace guides, contact service
Carriage has backlash and positions inaccurately	Play in guides after a collision or poor lubrication	Contact service

6.2 Inspection

Components of the linear axis may be damaged or destroyed as a result of a collision.

- ▶ After a collision, inspect the drive elements, the linear guide and the elastomer coupling for damage according to the instructions in the following chapters.

6.2.1 Toothed belt

- ▶ Perform a visual inspection of the toothed belt for damage to the teeth and abrasion at the sides. To do so, remove the toothed belt as described in chapter 6.3.6 "Replacing the toothed belt".

NOTE: A damaged toothed belt must be replaced.

6.2.2 Linear guide

The linear guide consists of:

- the roller guide and the guide rods (CAS4•BR).
- the guide carriage and the recirculating ball bearing guide (CAS4•BB).
- ▶ Perform a visual inspection of the linear guide for damage. To do so, remove the toothed belt as described in chapter 6.3.6 "Replacing the toothed belt".



A damaged linear guide must be replaced. Contact your local sales office.

6.2.3 Elastomer coupling

- ▶ Perform a visual inspection of the elastomer coupling for damage. To do so, remove the motor or the gearbox as described in chapter 6.3.2 "Replacing the motor or the gearbox".

NOTE: A damaged elastomer coupling must be replaced. See chapter 6.3.2 "Replacing the motor or the gearbox" for the procedure.

6.3 Replacing parts

Only replace the parts described. Any other parts may only be replaced by technicians trained by the manufacturer.

To replace the entire axis, install the new axis as per see chapter 4 "Installation".

Adjust and check the linear axis as per chapter 5 "Commissioning" after replacing parts.

6.3.1 Replacing a sensor

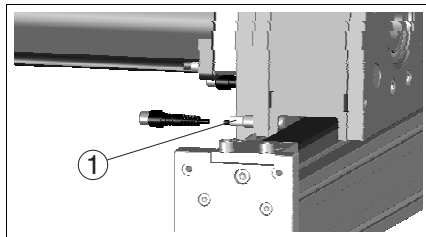


Unless otherwise specified, the standard tightening torques indicated on page 44 apply.

Prerequisites

See chapter 7 "Accessories and spare parts" for suitable spare parts. You need a set of open end wrenches and a feeler gauge.

Procedure



- ▶ Remove the nut holding the sensor.
- ▶ Unscrew the sensor from the fastening thread.
- ▶ Mount the new sensor as described on page 46.

6.3.2 Replacing the motor or the gearbox

⚠ WARNING**GREAT MASS OR FALLING PARTS**

- In the case of a vertically installed linear axis, secure the moving parts to keep them from falling down.
- Mount the product in such a way (tightening torque, securing screws) that the axis and mounted parts cannot come loose even in the case of fast acceleration or continuous vibration.
- Note that vertically installed linear axes may lower unexpectedly.

Failure to follow these instructions can result in death, serious injury or equipment damage.

⚠ WARNING**GREAT MASS OR FALLING PARTS**

- Consider the mass of the axis when mounting it. It may be necessary to use a crane.
- Mount the axis in such a way (tightening torque, securing screws) that the axis and mounted parts cannot come loose even in the case of fast acceleration or continuous vibration.
- Note that vertically installed linear axes may lower unexpectedly.

Failure to follow these instructions can result in death, serious injury or equipment damage.

The motor or the gearbox are coupled by means of a preloaded elastomer coupling.

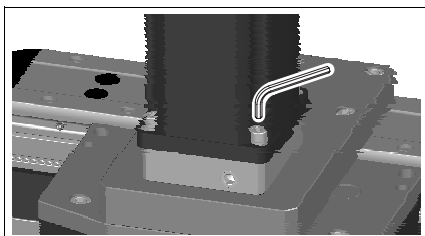


Unless otherwise specified, the standard tightening torques indicated on page 44 apply.

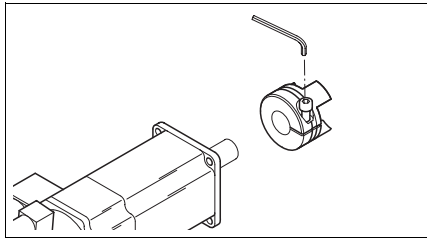
Prerequisites

See chapter 7 "Accessories and spare parts" for suitable spare parts.

You need a set of Allen keys and a torque wrench with hexagon socket.

Dismounting, motor only

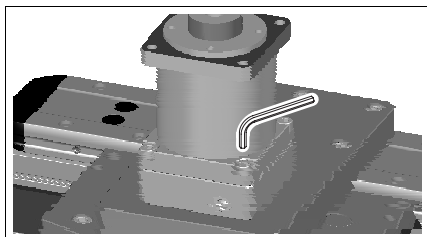
- ▶ Secure the motor to keep it from falling down.
- ▶ Remove the 4 screws and washers at the motor.
- ▶ Pull the motor and the clamping hub off of the motor adapter plate. This requires a greater force of up to 450 N.



Dismounting, gearbox only

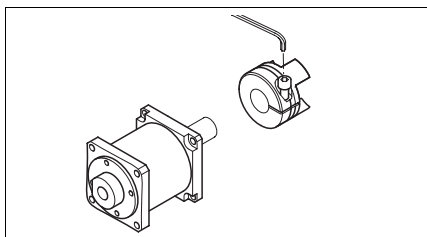


See the gearbox manual for details on removing a motor from the gearbox.

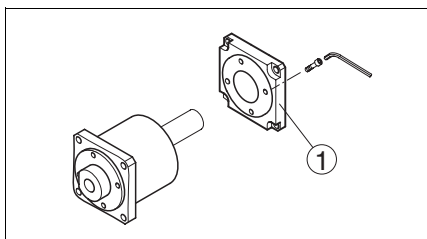


- ▶ Remove the 4 screws at the gearbox flange.
- ▶ Pull the gearbox and the clamping hub off of the motor adapter plate.

This requires a greater force of up to 450 N.



- ▶ Loosen the clamping screw at the clamping hub.
- ▶ Pull the clamping hub off the gearbox shaft.



If the gearbox does not have its own flange, the flange plate (1) must also be dismantled.

- ▶ Remove the 4 screws at the flange plate.
- ▶ Remove the flange plate.

Mounting

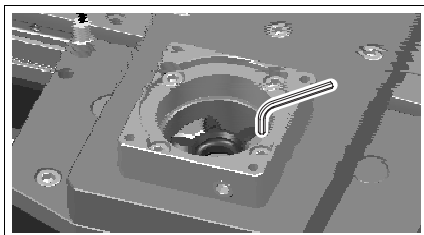
- ▶ Mount the motor or the gearbox as described on page 47.

NOTE: If the new motor or the new gearbox has shaft dimensions different from the old motor or gearbox, you must use a suitable new elastomer coupling. See chapter 6.3.3 "Replacing the elastomer coupling" for details on replacing an elastomer coupling.

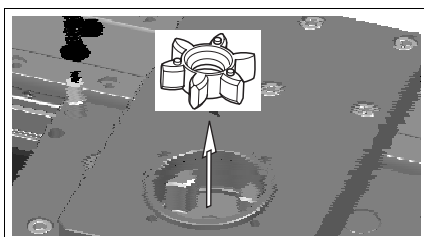
6.3.3 Replacing the elastomer coupling

Prerequisites See chapter 7 "Accessories and spare parts" for suitable spare parts.
You need a set of Allen keys and a torque wrench with hexagon socket and a dead blow hammer.

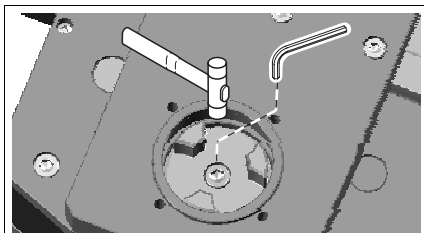
Procedure ▶ Remove the motor or the gearbox as described in chapter 6.3.2 "Replacing the motor or the gearbox".



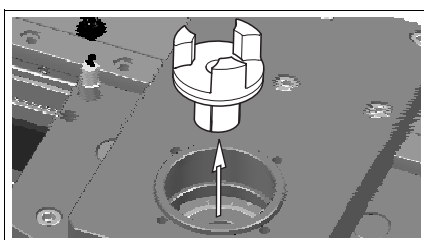
- ▶ Remove the 4 screws at the motor adapter plate.
- ▶ Remove the motor adapter plate.



- ▶ Pull the elastomer spider off of the expanding hub.



- ▶ Loosen the screw of the expanding hub.
If the end block is in the end position, the toothed belt pulley does not turn along.
- ▶ Tap the screw head lightly with a dead blow hammer so the cone comes loose. The expanding hub is now loose and be removed.



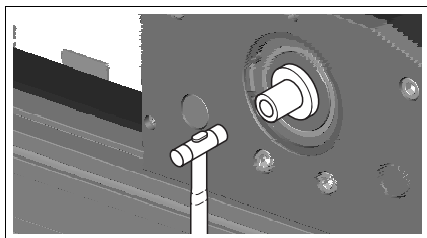
- ▶ Pull the expanding hub out of the hollow shaft of the toothed belt pulley.

- ▶ Mount the elastomer coupling as well as the motor or the gearbox as described on page 47.

6.3.4 Replacing the shaft extension

Prerequisites See chapter 7 "Accessories and spare parts" for suitable spare parts.
You need a set of Allen keys and a torque wrench with hexagon socket and a dead blow hammer.

Procedure



- ▶ Loosen the screw at the shaft extension.
If the end block is in the end position, the toothed belt pulley does not turn along.
- ▶ Tap the screw head lightly with a dead blow hammer so the cone comes loose.
- ▶ Pull the shaft extension out of the end block.
This requires a greater force.
- ▶ Mount the shaft extension as described on page 49.

6.3.5 Replacing the cover strip (and the strip deflection)

⚠ WARNING**SHARP EDGES**

The cover strip has sharp edges. When the cover strip is cut to length, the edges may be particularly sharp.

- Wear protective gloves.

Failure to follow these instructions can result in death, serious injury or equipment damage.

When the cover strip is worn, it is recommended that the two strip deflections be replaced at the same time (deflection unit with brush).

Unless otherwise specified, the standard tightening torques indicated on page 44 apply.



Special tightening torques

Clamp fastener for cover strip		CAS41	CAS42	CAS43	CAS44
Screw ISO 4762 - 8.8		M3 x 8	M4 x 8	M5 x 10	M6 x 14
Wrench size	[mm]	2.5	3	4	5
Tightening torque	[Nm]	0.6	1.0	1.5	3

Table 6.1 Tightening torque clamp fastener for cover strip

Clamping plate		CAS41	CAS42	CAS43	CAS44
Set screw DIN 913 - 45H		M3 x 10	M4 x 10	M5 x 16	M6 x 20
Wrench size	[mm]	2.5	3	4	5
Tightening torque	[Nm]	0.2	0.3	0.4	0.5

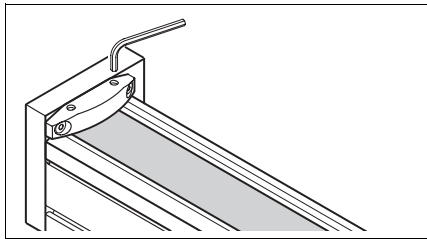
Table 6.2 Tightening torque clamping plate

Prerequisites

See chapter 7 "Accessories and spare parts" for suitable spare parts.

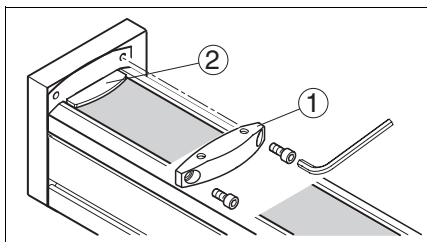
You need a set of Allen keys and a torque wrench with hexagon socket and a pair of tin snips.

Procedure Carry out the following steps on both ends of the carriage / linear axis.

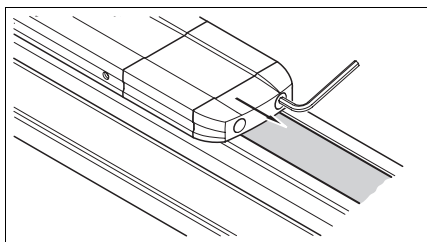


2 set screws at the clamp fastener of the cover strip clamp fixate the clamping plate below it and thus the cover strip.

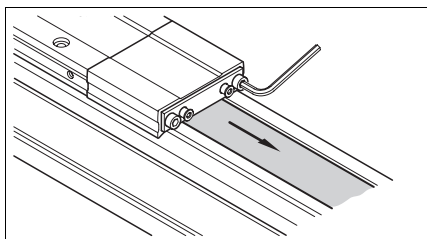
- Loosen the two set screws.



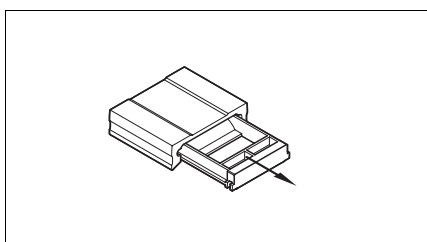
- Remove the clamp fastener of the cover strip (1). To do so, loosen the two screws.
Keep the screws and the clamping plate (2) from falling down.



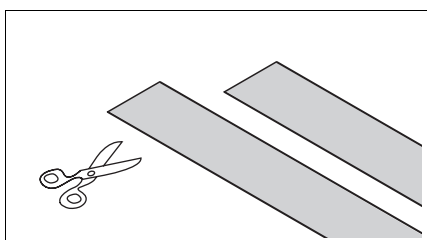
- Remove the rubber buffer at the strip deflection. To do so, loosen the two screws.



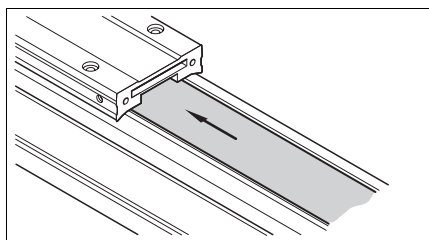
- Remove the holding plate together with the strip deflection. To do so, loosen the two screws.
- Pull out the entire cover strip.



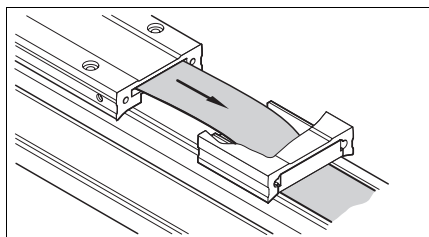
- Remove the plastic unit from the housing of the strip deflection.
- Insert the new plastic unit into the housing of the strip deflection.



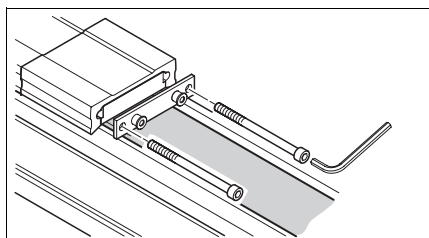
- Cut the new cover strip to the same length as the old cover strip with the tin snips.



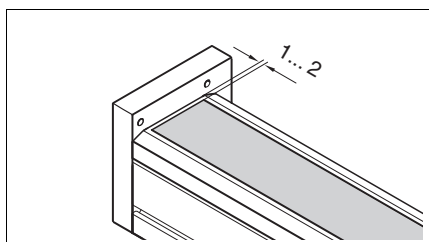
- ▶ Guide the new cover strip through the guide channel inside the carriage.



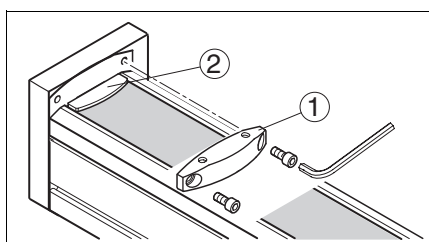
- ▶ Guide the new cover strip through the strip deflections.



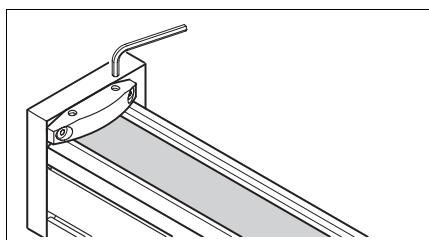
- ▶ Place the holding plate for mounting the rubber buffer into position at the strip deflection.
- ▶ Screw the strip deflection into place.
When doing so, align the strip deflection and the carriage.



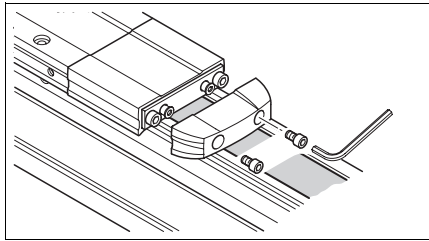
- ▶ Place the cover strip over the entire length of the axis body.
Align the cover strip symmetrically so that the distance to the two end blocks amounts to 1 ... 2 mm.
- Verify that the cover strip has even contact with the magnetic strips.



- ▶ Fit the clamping plate (2) into place.
- ▶ Screw the cover strip clamp (1) into place with the tightening torque specified in Table 6.1.



- ▶ Tighten the two set screws for holding the clamping plate with the tightening torque specified in Table 6.2.



- Mount the rubber buffer with the two screws and the washers.

Test movements

- Run initial tests at reduced velocity.
Verify proper function of the cover strip.

6.3.6 Replacing the toothed belt

⚠ WARNING**GREAT MASS OR FALLING PARTS**

- In the case of a vertically installed linear axis, secure the moving parts to keep them from falling down.
- Mount the product in such a way (tightening torque, securing screws) that the axis and mounted parts cannot come loose even in the case of fast acceleration or continuous vibration.
- Note that vertically installed linear axes may lower unexpectedly.

Failure to follow these instructions can result in death, serious injury or equipment damage.



Unless otherwise specified, the standard tightening torques indicated on page 44 apply.

Special tightening torques

Clamping plate		CAS41	CAS42	CAS43	CAS44
Screw ISO 7991 - 8.8		M4 x 12	M4 x 16	M5 x 16	M6 x 25
Wrench size	[mm]	2.5	2.5	3	4.5
Tightening torque	[Nm]	1.0	1.5	2.0	3.0

Table 6.3 Tightening torque clamping plate

Housing		CAS41	CAS42	CAS43	CAS44
Screw ISO 7991 - 8.8		M3 x 5	M3 x 5	M4 x 8	M4 x 8
Wrench size	[mm]	2.5	2.5	3	3
Tightening torque	[Nm]	0.6	1.0	2.0	2.0

Table 6.4 Tightening torque housing

- Prerequisites** See chapter 7 "Accessories and spare parts" for suitable spare parts.
You need a set of Allen keys and a torque wrench with hexagon socket and medium strength threadlocker.
To adjust the belt tension, you need a caliper (distance measurement) or a belt tensiometer (vibration measurement).
- Distance measurement** Distance measurement measures the position of the belt tensioner. This method is used to tension the toothed belt as described in "Procedure".
- Vibration measurement** To restore the precise factory-adjusted belt tension, you must use a belt tension meter for vibration measurement.

Toothed belt		CAS41	CAS42	CAS43	CAS44
Width / pitch		15HTD-3M	25HTD-5M	30HTD-5M	50HTD-8M
Density Z_M	kg/m	0.032	0.096	0.118	0.311
Belt tension F_V	N	145 ... 180	570 ... 710	670 ... 870	1915 ... 2400

Table 6.5 Factory-adjusted belt tension

The factory-adjusted belt tension is shown in Table 6.5. The measured tension values F_V depend on the density of the toothed belt Z_M and a selectable measuring distance A . The measuring distance A is measured from the inner side of the end plate to the center of the deflection pulley.



Contact your local sales office if you have questions concerning the vibration measurement.

Notes on belt tension

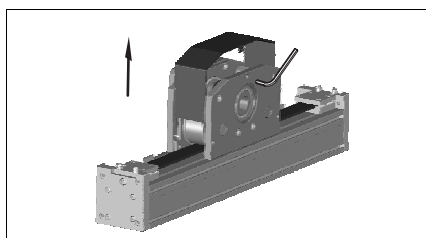
Note the following information on tensioning the belt:

- The belt tension must be so high that the belt is still tensioned under maximum operating load.
- If the tension is not high enough, this may lead to jumping. If the belt tension is too high, this increases the load on the bearings and reduces the service life.
- During the first hours of operation, the belt tension decreases. It may be necessary to re-tension the toothed belt.
- Due to pitch and rigidity tolerances of the toothed belt, the newly adjusted belt tension may differ from the originally adjusted belt tension.

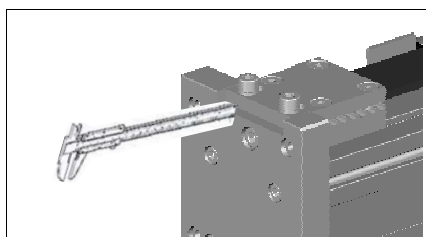
Procedure

- Move the linear axis into the center position (electrically).
- It must be possible to freely turn the toothed belt pulley. Therefore, dismount the motor or the gearbox as described on page 58.

NOTE: Perform the steps described below at both ends of the linear axis.

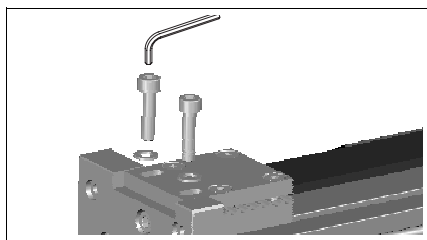


- Remove the 5 screws for the housing cover.
If necessary, use magnetic tools.
- Remove the housing cover.

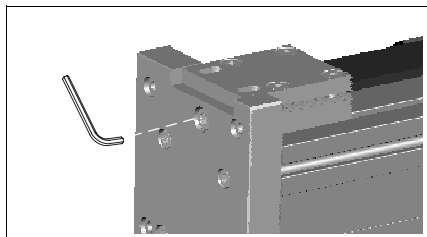


Perform the following step for tensioning with distance measurement only at the accessible end of the linear axis.

- Measure the position of the belt tensioner with a caliper prior to releasing the belt tension.
The end plate serves as the end stop. The belt tensioner is the measuring point.
- Record the measured value.

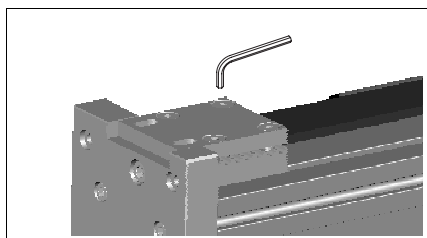


- ▶ Remove the two screws at the clamping plate.
This requires a greater torque due to the threadlocker.

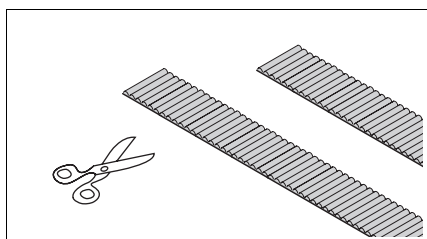


Perform the following step only at the accessible end of the linear axis.

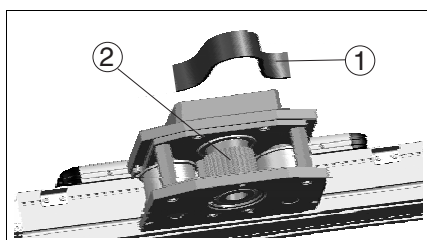
- ▶ Loosen the tensioning screw at the belt tensioner (2 ... 3 turns) to release the belt tension.



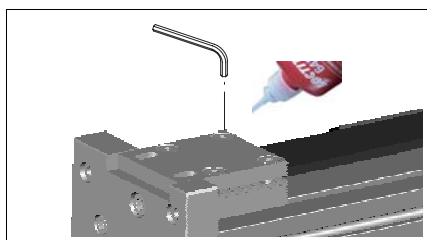
- ▶ Remove the 4 screws at the clamping plate.
This requires a greater torque due to the threadlocker.
- ▶ Remove the clamping plate.
- ▶ Remove the toothed belt from the linear axis.



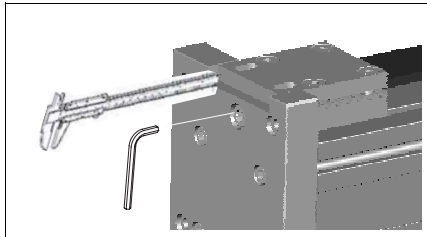
- ▶ Place the new and the old toothed belts next to each other. Align the teeth with each other.
- ▶ Cut the new toothed belt to the same length (number of teeth) as the old toothed belt.



- ▶ Guide the ends of the new toothed belt (1) below the deflection pulleys to the left and the right of the toothed belt pulley (2).
The teeth must point down.

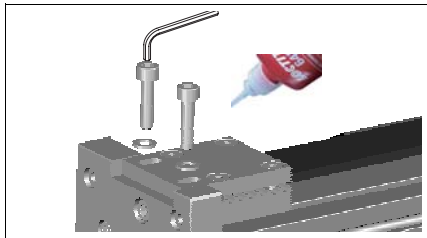


- ▶ Place the toothed belt symmetrically over the 7 teeth of the profile.
- ▶ Fit the clamping plate over the toothed belt.
- ▶ Apply a thin layer of medium strength threadlocker to the the screws for fixating the clamping plate.
- ▶ Tighten the screws with the tightening torque specified in Table 6.3.

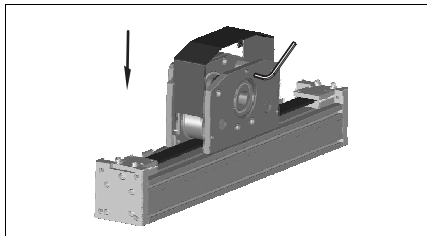


Perform the following step for tensioning with distance measurement only at the accessible end of the linear axis.

- ▶ Tension the toothed belt via the tensioning screw of the belt tensioner to the recorded measured value.



- ▶ Apply a thin layer of medium strength threadlocker to the the screws.
- ▶ Tighten the screws.



- ▶ Mount the housing cover with the 5 screws.
- ▶ Apply a thin layer of medium strength threadlocker to the the screws.
- ▶ Tighten the screws with the tightening torque specified in Table 6.4.

- ▶ Mount the motor or the gearbox as described on page 47.

Test movements

- ▶ Run initial tests at reduced velocity.
Verify proper function of the toothed belt.
- ▶ Note the information provided in section "Notes on belt tension" in this chapter.

6.3.7 Replacing the toothed belt pulley

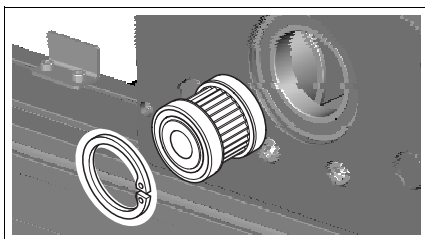
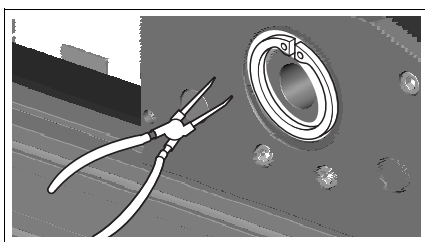


Unless otherwise specified, the standard tightening torques indicated on page 44 apply.

Prerequisites See chapter 7 "Accessories and spare parts" for suitable spare parts.
You need a set of Allen keys and a pair of circlip pliers.

Procedure

- ▶ Dismount the motor / gearbox (page 58) and the elastomer coupling (page 60) or the shaft extension (page 61).
- ▶ Remove the toothed belt as described on page 66.
- ▶ Remove the circlip at the rear of the end block with the circlip pliers.



- ▶ Remove the pulley with the bearing as a unit.
 - ▶ Clean both bearing seats in the end block.
 - ▶ Fit the new pulley with the bearing.
 - ▶ Mount the circlip.
-
- ▶ Mount the toothed belt as described on page 66.
 - ▶ If applicable, mount the shaft extension as described on page 49.
 - ▶ If applicable, mount the motor as described on page 47.

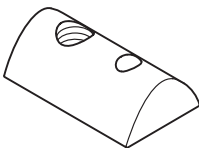
7 Accessories and spare parts



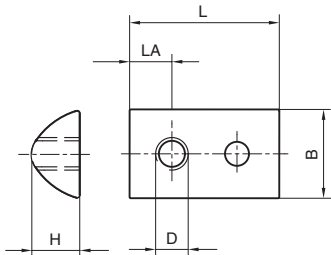
Contact your local sales office if order numbers are missing or if you have questions.

7.1 Slot nuts

Order data


	Description			Order no.
	The slot nuts are inserted into the T-slots of the axis body to fasten the axis or parts of the axis. 10 piece	For axis ...	Slot nut type	
		CAS41 / CAS42	5 pieces M5	VW33MF010T5N5
		CAS43	6 pieces M6	VW33MF010T6N6
		CAS44	8 pieces M6	VW33MF010T8N6
			8 pieces M8	VW33MF010T8N8

Dimensional drawings

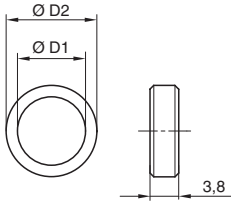
	For axis ...	Slot nut type	B	D	H	L	LA
			mm	mm	mm	mm	mm
	CAS41 / CAS42	5 pieces M5	8	5	4	11.5	4
	CAS43	6 pieces M6	10.6	6	6.4	17	5.5
	CAS44	8 pieces M6	13.8	6	7.3	23	6.5
		8 pieces M8	13.8	8	7.3	23	7.5

7.2 Locating dowels

Order data

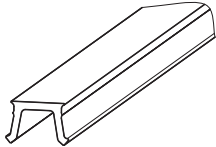
	Description		Order no.
	For precise and reproducible mounting of the payload, the locating dowels are inserted into the holes at the carriage. 20 piece	For axis	
		CAS41 / CAS42	VW33MF020LD01
		CAS43	VW33MF020LD02
		CAS44	VW33MF020LD03

Dimensional drawings

	For axis ...		D1	D2
			mm	mm
	CAS41 / CAS42		5.5	8 h6
	CAS43		6.6	10 h6
	CAS44		9	12 h6

7.3 T slot covers

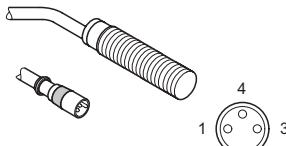
Order data

	Description			Order no.
	Length 2 m 5 pieces	For axis ...	T slot size	
		CAS41	5	VW33MC05A05
		CAS42	5	VW33MC05B05
		CAS43	6	VW33MC05A06
		CAS44	8	VW33MC05A08

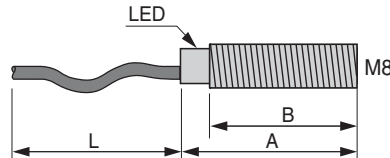
7.4 Sensors and additional parts

7.4.1 Sensors

Order data

	Description		Order no.
	With signal state indicator, 100 mm cable and 3-pin M8 circular connector, suitable for all axes 1 piece	PNP, normally closed contact	XS508B1PBP01M8
		PNP, normally open contact	XS508B1PAP01M8
		NPN, normally closed contact	XS508B1NBP01M8
		NPN, normally open contact	XS508B1NAP01M8

Dimensional drawings

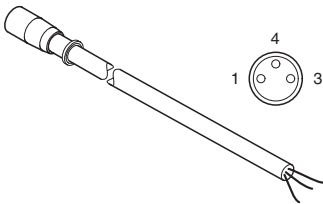
	Total length	Thread length	Cable length
	A	B	L
	[mm]	[mm]	[mm]
	33	25	100
See chapter 4.3.1 "Connecting the sensors" for the connection assignment.			

Technical data

Design		Cylindrical thread M8 x 1
Approvals		CE
Electrical connection (PUR cable with M8 connector)	[m]	0.10
Nominal switching distance S_n (in the case of steel)	[mm]	1.5
Hysteresis		1 to 15% of the real switching distance
Degree of protection as per IEC 60529		IP67
Temperature (storage)	[°C]	-40 ... +85
Temperature (operation)	[°C]	-25 ... +70
Housing material		Nickel-plated brass
Cable material		PUR, 3 x 0.12 mm ² , length 10 cm
Function indicator output		Yellow LED
Function indicator supply voltage		No
Supply voltage (PELV)	[V _{dc}]	12 ... 24 with reverse polarity protection
Supply voltage (including residual ripple)	[V _{dc}]	10 ... 36
Switching current (overload and short-circuit protection)	[mA]	< 200
Voltage drop, output conducting	[V]	< 2
No-load current	[mA]	< 10
Maximum switching frequency	[Hz]	5000
Switch-on time	[ms]	< 0.1
Switch-off time	[ms]	< 0.1

7.4.2 Sensor extension cable

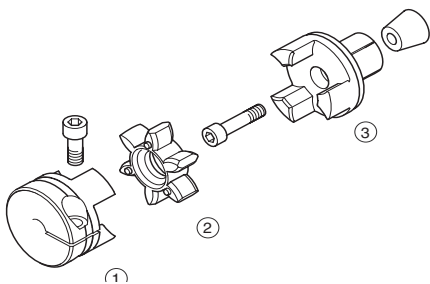
Order data

	Description		Order no.
	Suitable for drag chain applications; sensor side end 3-pin M8 circular connector, second cable end open 1 piece	5 m	VW32SBCBGA050
		10 m	VW32SBCBGA100
		20 m	VW32SBCBGA200

7.5 Coupling assemblies

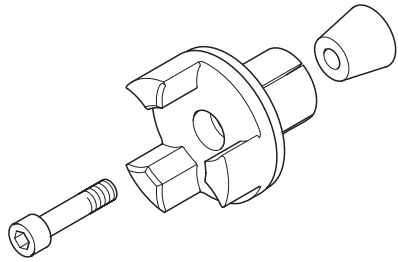


Note the maximum torque of the linear axis. The couplings can transmit a greater torque than the linear axis can accept.

 Coupling assembly (1) Clamping hub (2) Elastomer spider (3) Expanding hub	Coupling assemblies are required to mount motors to axes.
	<p>A coupling assembly consists of the following components:</p> <ul style="list-style-type: none">• 1 expanding hub for the axis end• 1 clamping hub for the motor end• 1 elastomer spider, as a decoupling element between the hubs• 2 screws

7.5.1 Expanding hubs

Order data

	Description		Order no.
	Expanding hub for the axis end 1 piece	For axis ...	
		CAS41	SPM3MFSC10A14
		CAS42	SPM3MFSC20A20
		CAS43	SPM3MFSC25A30
		CAS44	SPM3MFSC35A36

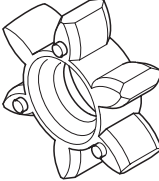
Dimensional drawings

Technical drawing of an expanding hub assembly. The drawing shows a cross-section of the hub with dimensions labeled: A (total length), B (hub length), C (nut length), F (flange thickness), E (ISO 4762 screw), D1 (inner diameter), and D2 (outer diameter).

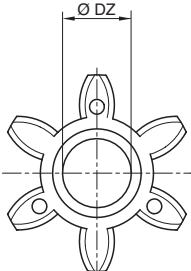
	Moment of inertia	Maximum torque	Screw ISO 4762	Wrench size	Tightening torque		Installation length		Expanding hub h9		
For axis	J	M _{max}	E			A	B	C	D1	D2	F
...	kgcm ²	Nm		mm	Nm	mm					
CAS41	0.009	7.7	M4	3	2.9	16	14	7	10	25	5
CAS42	0.09	35.7	M6	5	10	22	20	8	20	40	8
CAS43	0.32	82	M8	6	25	24	30	12	25	55	8
CAS44	0.77	182	M10	8	49	25.5	36	13	35	65	8

7.5.2 Elastomer spiders

Order data

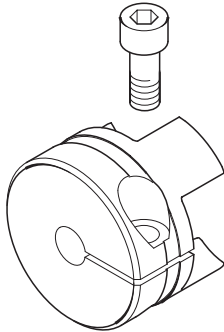
	Description		Order no.
	Decoupling element between the hubs 1 piece	For axis ...	
		CAS41	SPM3MFR09A018
		CAS42	SPM3MFR14A034
		CAS43	SPM3MFR20A120
		CAS44	SPM3MFR25A320

Dimensional drawings

		Shore hardness	Maximum torque	Nominal torque	Moment of inertia	Diameter
	For axis ...		M_{\max}	M_N	J	DZ
			Nm	Nm	kgcm ²	mm
	CAS41	98 Sh A	18	7	0.001	9
	CAS42	98 Sh A	34	17	0.013	14
	CAS43	98 Sh A	120	60	0.067	20
	CAS44	98 Sh A	320	160	0.15	25

7.5.3 Clamping hubs

Order data

	Description			Order no.
	Clamping hub			
	1 piece			
	For axis ...	D1 (mm) ¹⁾ Please inquire for other diameters	M _{max} (Nm) Maximum torque that can be trans- mitted	
	CAS41	6.35	6.8	SPM3MFCC06A06
		8	7.4	SPM3MFCC08A06
		9	7.8	SPM3MFCC09A06
		10	9.7	SPM3MFCC10A06
		11	10.7	SPM3MFCC11A06
		12	11.6	SPM3MFCC12A06
		14	12.2	SPM3MFCC14A06
	CAS42	6.35	32.5	SPM3MFCC06A07
		8	35	SPM3MFCC08A07
		9	36	SPM3MFCC09A07
		10	41	SPM3MFCC10A07
		11	45	SPM3MFCC11A07
		12	50	SPM3MFCC12A07
		14	53	SPM3MFCC14A07
		16	55	SPM3MFCC16A07
		19	58	SPM3MFCC19A07
		20	60	SPM3MFCC20A07
	CAS43	12	49	SPM3MFCC12A08
		14	54	SPM3MFCC14A08
		19	75	SPM3MFCC19A08
		20 ¹⁾	76	SPM3MFCC20A08
		22	78	SPM3MFCC22A08
		24	85	SPM3MFCC24A08
		25	98	SPM3MFCC25A08
	CAS44	12	108	SPM3MFCC12A09
		14	111	SPM3MFCC14A09
		19	128	SPM3MFCC19A09
		20	138	SPM3MFCC20A09
		22	154	SPM3MFCC22A09
		24	158	SPM3MFCC24A09
25 ¹⁾		160	SPM3MFCC25A09	

1) See dimensional drawings

Dimensional drawings

		Moment of inertia	Screw ISO 4762	Wrench size	Tightening torque	Hub length	Bore depth H7	Distance between centers	Inside diameter		Outside diameter	
	For axis ...	J	E			A	B	C	D1	D2	DK	F
		kgcm ²		mm	Nm	mm						
	CAS41	0.015	M3	2.5	1.9	22	11	5	¹⁾	25	25.8	8
	CAS42	0.15	M6	5	14	31	17	8	¹⁾	40	45	14
	CAS43	0.55	M6	5	14	36	20	10	¹⁾	55	57.5	20
	CAS44	1.22	M8	6	35	39	21	9	¹⁾	65	73	25

1) See order data

7.6 Shaft extension

Order data

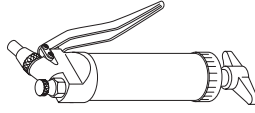
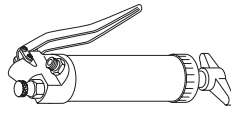


	Description	Order no.
	Components such as a motor or an encoder can be coupled to the shaft extension.	
	1 piece	
	For axis ...	
	CAS41	VW33MF1S12A12
	CAS42	VW33MF1S27A20
	CAS43	VW33MF1S32A25
	CAS44	VW33MF1S37A32

Dimensional drawings

		Mass	Maximum radial force	Moment of inertia	Maximum torque	Screw ISO 4762	Wrench size	Tightening torque	Shaft length	Collar length	Shaft extension diameter H7	Diameter
	For axis ...	m	F_R	J	M_{max}	E			A	B	D1	D2
		kg	N	kgcm ²	Nm		mm	Nm		mm		
	CAS41	0.012	230	0.002	7.7	M4	3	2.9	12	5.5	12	17
	CAS42	0.073	400	0.05	35.7	M6	5	10	27	7	20	35
	CAS43	0.148	700	0.16	82	M8	6	25	32	7.5	25	45
	CAS44	0.311	1300	0.54	182	M10	8	49	37	9	32	55

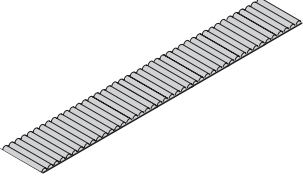
7.7 Grease guns

Order data

Designation	Description	Order no.
Single-hand high-pressure grease gun 	With nozzle for the lubrication of the linear axes with recirculating ball bearing guide. Suitable nozzle type D. Volume: 120 cm ³ ; delivery volume: 0.5 cm ³ /stroke	VW33MAP01
Single-hand high-pressure oil gun 	With nozzle for the lubrication of the linear axes with roller guide. Suitable nozzle type D. Volume: 120 cm ³ ; delivery volume: 0.5 cm ³ /stroke	VW33MAP02
Nozzle type D6 90° 	For grease nipple type D6; nipple 90°, Ø 6 mm; length 20 mm; with M4 pointed nozzle 90° lateral	VW33MAT01
Nozzle type D6 20° 	For grease nipple type D6; nipple 20°, Ø 6 mm; length 20 mm; with M4 pointed nozzle 20° angled	VW33MAT02

7.8 Toothed belt

Order data

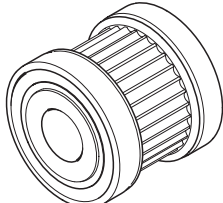
	Description			Order no.
	For axis ...	Length (m)		
	CAS41	1.5		SPM3MAS15L015
		3		SPM3MAS15L030
		10		SPM3MAS15L100
		1.5	Antistatic	SPM3MAA15L015
		3	Antistatic	SPM3MAA15L030
		10	Antistatic	SPM3MAA15L100
	CAS42	1.5		SPM3MAS25L015
		3		SPM3MAS25L030
		10		SPM3MAS25L100
		1.5	Antistatic	SPM3MAA25L015
		3	Antistatic	SPM3MAA25L030
		10	Antistatic	SPM3MAA25L100
	CAS43	1.5		SPM3MAS30L015
		3		SPM3MAS30L030
		10		SPM3MAS30L100
		1.5	Antistatic	SPM3MAA30L015
		3	Antistatic	SPM3MAA30L030
		10	Antistatic	SPM3MAA30L100
	CAS44	1.5		SPM3MAS50L015
		3		SPM3MAS50L030
		10		SPM3MAS50L100
		1.5	Antistatic	SPM3MAA50L015
		3	Antistatic	SPM3MAA50L030
		10	Antistatic	SPM3MAA50L100

Technical data

Toothed belt	For axis ...	Width	Pitch	Density	Specific spring constant	Belt tension F_V
		[mm]	[mm]	[kg/m]	[N]	[N]
15HTD-3M	CAS41	15	3	0.032	0.145×10^6	145 ... 180
25HTD-5M	CAS42	25	5	0.096	0.572×10^6	570 ... 710
30HTD-5M	CAS43	30	5	0.118	0.672×10^6	670 ... 870
50HTD-8M	CAS44	50	8	0.311	1.917×10^6	1915 ... 2400

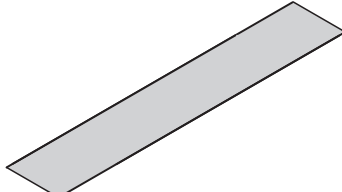
7.9 Toothed belt pulleys

Order data

	Description			Order no.
	Toothed belt pulley with bearing	For axis ...		
		CAS41		SPM3MAW5S084
			Corrosion-resistant	SPM3MAW5C084
		CAS42		SPM3MAW6S155
			Corrosion-resistant	SPM3MAW6C155
		CAS43		SPM3MAW7S205
			Corrosion-resistant	SPM3MAW7C205
		CAS44		SPM3MAW8S264
			Corrosion-resistant	SPM3MAW8C264

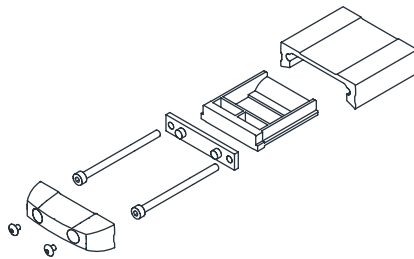
7.10 Cover strips

Order data

	Description				Order no.
	For axis ...	Width (mm)	Height (mm)	Length (m)	
	CAS41	22	0.15	3	SPM3MAC22L030
				6	SPM3MAC22L060
	CAS42	36	0.15	3	SPM3MAC36L030
				6	SPM3MAC36L060
	CAS43	45	0.15	3	SPM3MAC45L030
				6	SPM3MAC45L060
	CAS44	65	0.15	3	SPM3MAC65L030
				6	SPM3MAC65L060

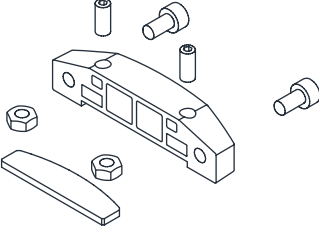
7.11 Strip deflection

Order data

	Description		Order no.
	Kit with 1 strip deflection 1 deflection unit with brush 1 holding plate 1 rubber buffers 4 screws	For axis ...	
		CAS41	SPM3MAC1D0041
		CAS42	SPM3MAC2D0042
		CAS43	SPM3MAC3D0043
		CAS44	SPM3MAC4D0044

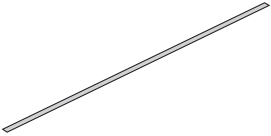
7.12 Clamp fastener for cover strip

Order data

	Description		Order no.
	Kit with 1 clamp fastener for cover strip 1 clamping plate 2 screws 2 set screws 2 nuts	For axis ...	
		CAS41	SPM3MAC1F041
		CAS42	SPM3MAC1F042
		CAS43	SPM3MAC1F043
		CAS44	SPM3MAC1F044

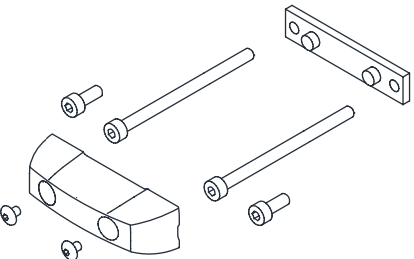
7.13 Magnetic strips

Order data

	Description				Order no.
	2 piece				
	For axis ...	Width (mm)	Height (mm)	Length (m)	
	CAS41	2.5	1	1.5	SPM3MAW1S215
				3	SPM3MAW1S230
				6	SPM3MAW1S260
	CAS42	4.0	1	1.5	SPM3MAW1S415
				3	SPM3MAW1S430
				6	SPM3MAW1S460
	CAS43 / CAS44	6.0	1	1.5	SPM3MAW1S615
				3	SPM3MAW1S630
				6	SPM3MAW1S660

7.14 Rubber buffer

Order data

	Description		Order no.
	Kit with 2 rubber buffers 2 holding plates 12 screws	For axis ...	
		CAS41	SPM3MAC1B041
		CAS42	SPM3MAC2B042
		CAS43	SPM3MAC3B043
		CAS44	SPM3MAC4B044

8 Service, maintenance and disposal

⚠ DANGER

ELECTRIC SHOCK

High voltages at the motor connection may occur unexpectedly.

- Verify that no voltage is present (this includes the DC bus) prior to taking up work on the drive system.
- AC voltage can couple voltage to unused conductors in the motor cable. Insulate both ends of unused conductors in the motor cable.
- The motor generates voltage when the shaft is rotated. Prior to performing any type of work on the drive system, block the motor shaft to prevent rotation.

Failure to follow these instructions will result in death or serious injury.

⚠ WARNING

GREAT MASS OR FALLING PARTS

- Consider the mass of the axis when mounting it. It may be necessary to use a crane.
- Mount the axis in such a way (tightening torque, securing screws) that the axis and mounted parts cannot come loose even in the case of fast acceleration or continuous vibration.
- Note that vertically installed linear axes may lower unexpectedly.

Failure to follow these instructions can result in death, serious injury or equipment damage.

8.1 Service address

If you cannot resolve an error yourself please contact your sales office. Have the following details available:

- Nameplate (type, identification number, serial number, DOM, ...)
- Type of error (such as LED flash code or error number)
- Previous and concomitant circumstances
- Your own assumptions concerning the cause of the error

Also include this information if you return the product for inspection or repair.



If you have any questions please contact your sales office. Your sales office staff will be happy to give you the name of a customer service office in your area.

<http://www.schneider-electric.com>

8.2 Maintenance

The maintenance intervals for cleaning and lubrication must be adhered to.

- ▶ Include the maintenance intervals in your maintenance schedule.

8.2.1 Cleaning

Due to its design, the product is not susceptible to the ingress of contaminants and external objects. The guide is located inside the axis body and it is covered.

The product must be inspected and cleaned at regular intervals.

- ▶ Do not use compressed air for cleaning.
- ▶ Remove large particles and dirt from the surface at regular intervals.
- ▶ The anodized surface only has a limited resistance to alkaline cleaning agents. Therefore, use only neutral cleaning agents for cleaning.
- ▶ Use only damp, soft and lint-free cleaning cloths to wipe the surface.

Cover strip The cover strip is teflon-coated. The friction causes abrasion on the cover strip.

- ▶ Remove abrasion products at regular intervals.

8.2.2 Lubrication

CAUTION

DAMAGE DUE TO WRONG LUBRICANT

Wrong lubricants may damage the product.

- Use the correct type of lubricant (grease, oil) as required by the linear guide of the linear axis.
- Note the type code.

Failure to follow these instructions can result in equipment damage.

Lubricant is consumed continuously during operation of the linear axis. Therefore, regular re-lubrication is indispensable.

The lubrication system is not completely tight. Therefore, small amounts of lubricants may escape after relubrication.

Insufficient lubrication or incorrect lubricants increase wear and reduce the service life. The following factors influence the lubrication intervals:

- Dust and dirt particles
- High operating temperatures
- Heavy loads
- Heavy vibration
- Permanent short-distance positioning

8.2.3 Lubricating CAS4•BR

The linear axis CAS4•BR is lubricated with oil from an external reservoir. This reservoir is factory-prefilled. The carriage features 2 grease nipples at each side for relubrication. The guide rods of the rollers are lubricated and cleaned by oil-soaked lubrication elements.

The lubrication interval depends on the load, the velocity, the cycle time and the ambient conditions. The following recommended values apply to lubrication intervals:

- 2500 km operational performance

Size	Lubricant	Relubrication volume	Strokes
CAS41	Lamora D 220	1.25 cm ³	2 1/4
CAS42	Lamora D 220	3 cm ³	6
CAS43	Lamora D 220	4.25 cm ³	8 1/4

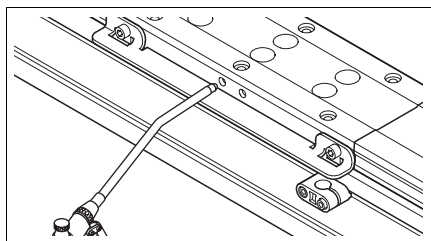
See chapter 7 "Accessories and spare parts" for grease guns, nozzles and lubricants.

Notes on greasing

When applying the lubricant, you must not exceed a maximum flow rate. Therefore, the minimum injection time of 5 seconds per grease gun stroke must be adhered to.

Wait for at least 10 seconds between the strokes of the oil gun to allow the oil to penetrate the lubrication elements.

Procedure



- Inject the correct type and volume of oil into the two grease nipples at one side of the carriage.

8.2.4 Lubricating CAS4•BB

The linear axis CASxxBB is lubricated with grease from an external reservoir. This reservoir is factory-prefilled. The carriage features 2 grease nipples at each side for relubrication.

The lubrication interval depends on the load, the velocity, the cycle time and the ambient conditions. The following recommended values apply to lubrication intervals:

- 5000 km operational performance

Size	Lubricant	Relubrication volume	Strokes
CAS42	Microlube GL 261	0.3 cm ³	1/4
CAS43	Microlube GL 261	0.6 cm ³	1 1/4
CAS44	Microlube GL 261	1.0 cm ³	2

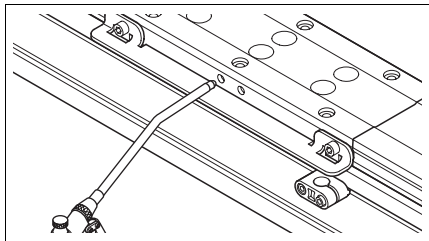
See chapter 7 "Accessories and spare parts" for grease guns, nozzles and lubricants.

Notes on greasing

When applying the lubricant, you must not exceed a maximum flow rate. Therefore, the minimum injection time of 3 seconds per grease gun stroke must be adhered to.

The carriage must be moved between strokes of the grease gun to allow the grease to distribute evenly in the lubricant reservoirs.

Procedure



- Inject the correct type and volume of grease into the two grease nipples at one side of the carriage.

8.3 Shipping, storage, disposal

Note the ambient conditions on page 21.

Shipping

The product must be protected against shocks during transportation. If possible, use the original packaging for shipping.

Storage

The product may only be stored in spaces where the specified permissible ambient conditions for room temperature and humidity are met. Protect the product from dust and dirt.

Disposal

The product consists of various materials that can be recycled and must be disposed of separately. Dispose of the product in accordance with local regulations.

9 Glossary

9.1 Terms and Abbreviations

	See chapter 2.5 "Standards and terminology" for information on the pertinent standards on which many terms are based. Some terms and abbreviations may have specific meanings with regard to the standards.
<i>Axis body</i>	The axis body is a high-strength, torsion-resistant aluminum precision profile. The axis body is a high-strength, torsion-resistant aluminum precision profile.
<i>Breakaway torque</i>	The breakaway torque describes the driving torque required to overcome the static friction and that initiates the transition to sliding friction.
<i>Cantilever axis</i>	In the case of a cantilever axis, the carriage is stationary while the axis body moves. Portal axes work the other way round.
<i>Drive element</i>	The drive element of the linear axis consists of the toothed belt and the toothed belt pulley.
<i>Error</i>	Discrepancy between a computed, observed or measured value or condition and the specified or theoretically correct value or condition.
<i>Error class</i>	Classification of errors into groups. The different error classes allow for specific responses to errors, for example by severity.
<i>Fatal error</i>	In the case of fatal error, the product is no longer able to control the motor so that the power stage must be immediately disabled.
<i>Fault</i>	Fault is a state that can be caused by an error. Further information can be found in the pertinent standards such as IEC 61800-7, ODVA Common Industrial Protocol (CIP).
<i>Fault reset</i>	A function used to restore the drive to an operational state after a detected error is cleared by removing the cause of the error so that the error is no longer active.
<i>Feed per revolution</i>	The feed per revolution is the distance the carriage covers per motor revolution.
<i>Linear guide</i>	The linear guide consists of: <ul style="list-style-type: none"> • the roller guide and the guide rods (CAS4•BR). • the guide carriage and the recirculating ball bearing guide (CAS4•BB).
<i>Load torque</i>	The permissible load torques are calculated based on the service life of the carriage guide. If the load torque exceeds the specified values, the service life of the axis will be reduced.
<i>Modulus of elasticity</i>	The modulus of elasticity is used to describe the tendency of a material to deform along an axis when opposing forces are applied along this axis; it is the ratio of tensile strain and tensile stress. The higher the value, the stiffer the material.
<i>Mounting position</i>	The linear axes can be installed in any desired position. However, all external forces and torques must be within the ranges of permissible values.

<i>Portal axis</i>	Generic term for driven axes and support axes. In the case of a portal axis, the axis body is stationary while the carriage moves. Cantilever axes work the other way round.
<i>Positioning accuracy</i>	Positioning accuracy is the tolerance between the specified position and actual position.
<i>Recirculating ball bearing</i>	The axis body absorbs the forces and torques applied at the carriage via the recirculating ball bearing guide. The recirculating ball bearing guide can absorb high forces and torques.
<i>Repeatability</i>	Repeatability is the accuracy with which it is possible to move to a previous position again under the same conditions.
<i>Roller guide</i>	The axis body absorbs the forces and torques applied at the carriage via the roller guide.
<i>Running accuracy</i>	Due to the manufacturing process, the extruded aluminium profiles have a certain tolerance in terms of straightness and twist. The tolerances are specified in EN 12020-2. To reach the desired running accuracy, the linear axis must be mounted on a precision-machined surface.
<i>Self-locking</i>	The product is not self-locking. This means that motors with a holding brake, a separate holding brake or suitable weight compensation for the linear axis must be used, particularly so if axes are vertically mounted.
<i>Sensor</i>	Inductive proximity switches are used as sensors for limit switches or reference switches. These switches are not a safety function.
<i>Service life</i>	The service life is the distance in kilometers before the first signs of material fatigue can be seen on the guides, the drive elements and the bearings. Service life specifications (kilometers covered) relate to the nominal values specified in the data sheet. If the nominal values are exceeded, the service life decreases accordingly.
<i>Stiffness</i>	The stiffness is a function of the capacity to move and hold a part to be positioned to/at the correct position even under varying loads.
<i>Stroke reserve</i>	The stroke reserve is the distance between a limit switch and the mechanical stop.
<i>Stroke</i>	Stroke is the maximum travel of the carriage between the switching points of the limit switches.
<i>Support axis</i>	A support axis has linear guides, but no drive elements. A support axis carries loads that are applied asymmetrically to the carriage and improves the stability and service life of the system.
<i>Warning</i>	If the term is used outside the context of safety instructions, a warning alerts to a potential problem that was detected by a monitoring function. A warning is not an error and does not cause a transition of the operating state.

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