BlueLine Series 1

Closed timing belt feed axis

Feeds and shaft slides are also available in rust-proof designs!

- Aluminium profile with midget linear guide MLF 1
- Clearance-free feed with timing belt feed axis
  - timing belt with 3 mm pitch, width 15 mm
- Feed 2.4 m/s, at the most
- Shaft slide WS 1 L 126 x W 72 mm
- Repetitive accuracy less or equal ± 0.2 mm
- Limit and/or reference switch Accuracy < 0.1 mm
- Available in lengths up to 2.05 m
- Motor can be mounted on both sides due to an extended shaft end on the driving side
- Numerous combination possibilities due to additional special and angle profiles
- Integrated reference switch

BlueLine Series 1

Technical data

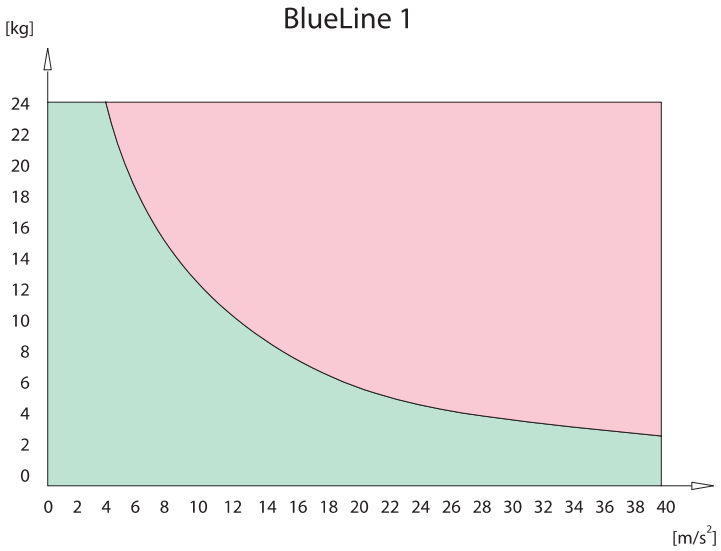
Belt version	HTD 3M, width 15 mm
Mass of slide	0.730 kg
Weight without drive module	1,000 mm ≙ 6.25 kg
Nominal mass of timing belt	0.0375 kg/m
Nominal weight of feed axis	0.440 kg/100 mm
Effective diameter of the synchronized pulleys	Ø 15.28 mm
Moment of inertia of the synchronized pulleys	$1.461 \cdot 10^{-6}$ kgm²
Feed per revolution	48 mm

Idle torques

Revolution [1/min]	Idle torque [Nm]
500	0.06
1,500	0.09
3,000	0.13

Load diagram

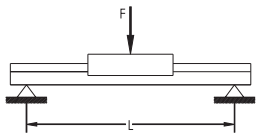
Permissible accelerated masses related to belt strength*



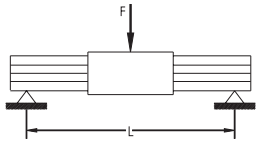
*At vertical assembly, the acceleration due to gravity (g = 9.81 m/s²) has to be taken into account

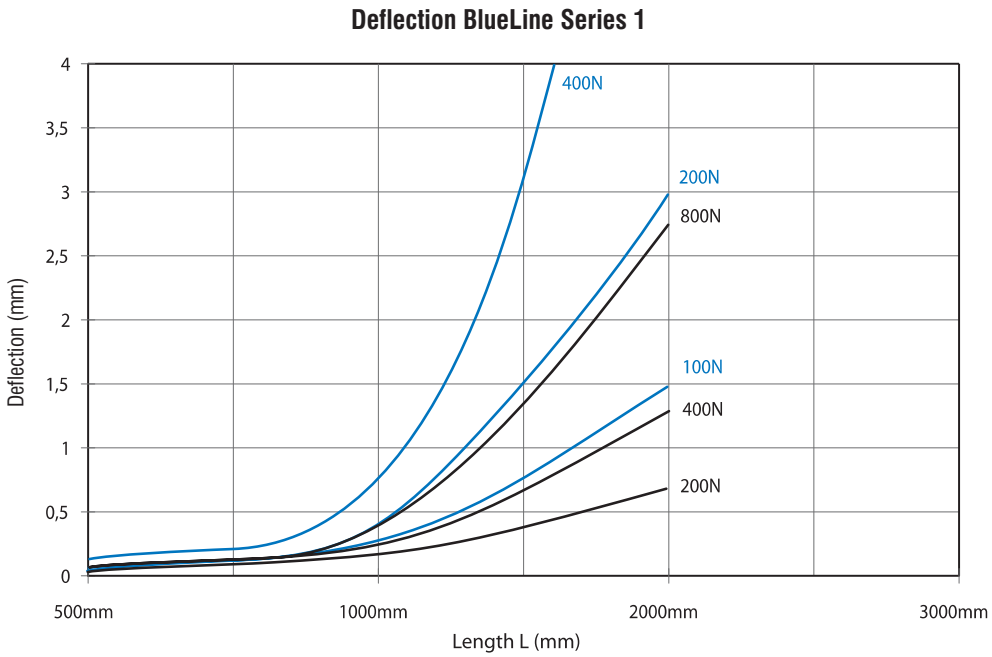
Deflection

Load - example 1



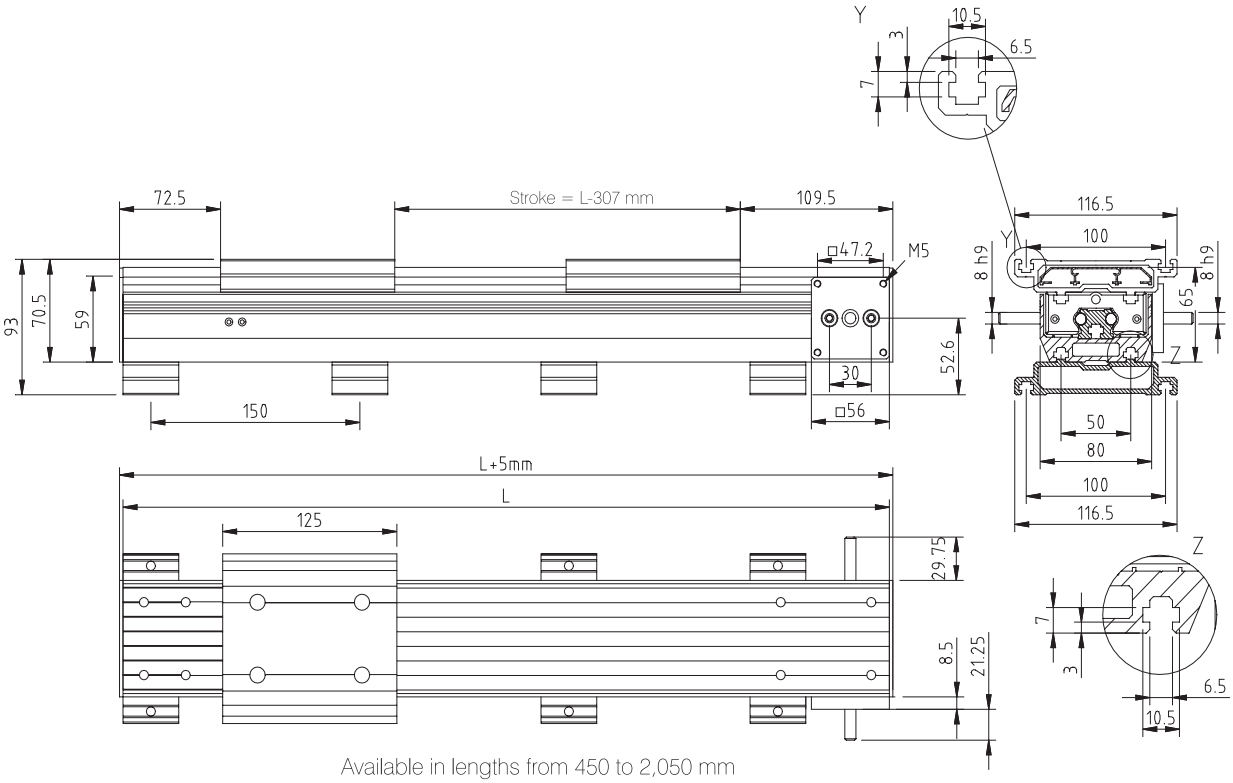
Load - example 2





BlueLine Series 1

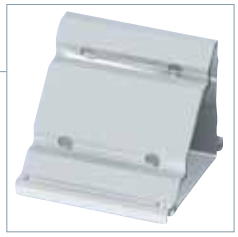
Timing Belt Feed Axis

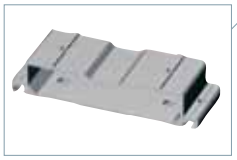


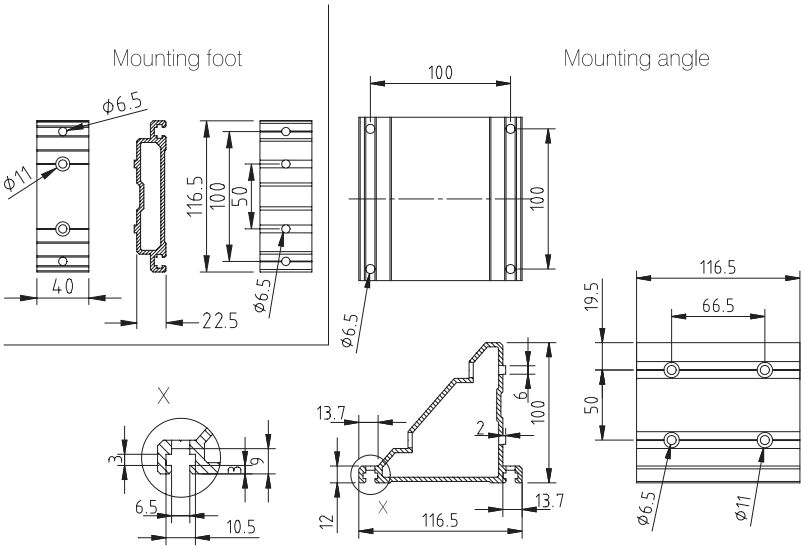
Available in lengths from 450 to 2,050 mm

BlueLine Series 1

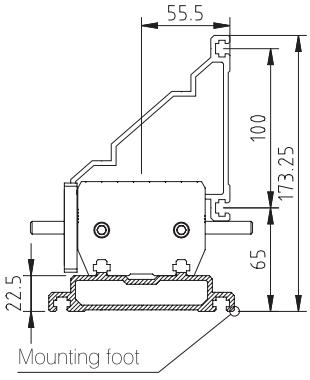
Mounting foot and mounting angle







Mounting angle as angle slide



BlueLine Series 1

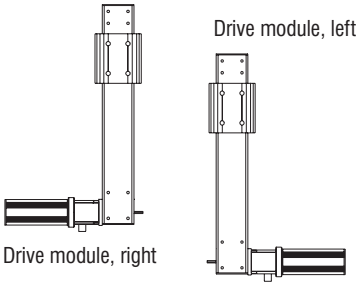
Drive Modules

DC servo motor MV 120

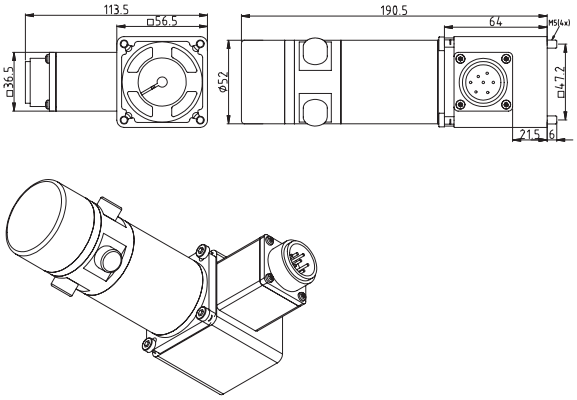
Nominal power.....120 W
Nominal speed.....3,000 rpm
Nominal torque.....38 Ncm
Current at nominal torque.....2.8 A
Nominal voltage.....65 V
Max. torque.....220 Ncm
Current at max. torque.....13 A
Ambient temperature.....0 - 40 °C

Stepping motor MS 160

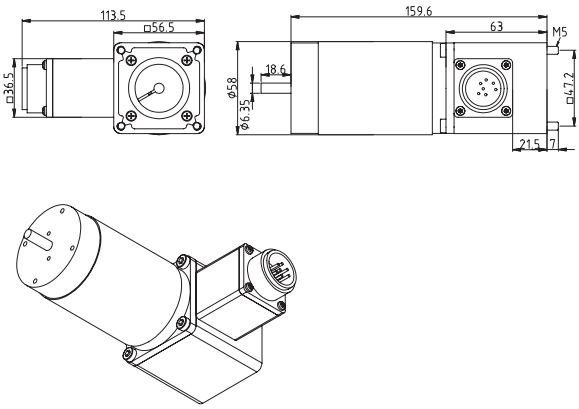
Holding torque – bipolar..... 160 Ncm
Stepping angle, full step..... 1.8 degree
half step..... 0.9 degree
Nominal voltage – bipolar..... 1.7 V
Resistance of winding..... 1.2 Ω
Inductance of winding..... 2.2 mH
Current of winding – bipolar....4.1 A



Drive module with DC servo motor MV 120



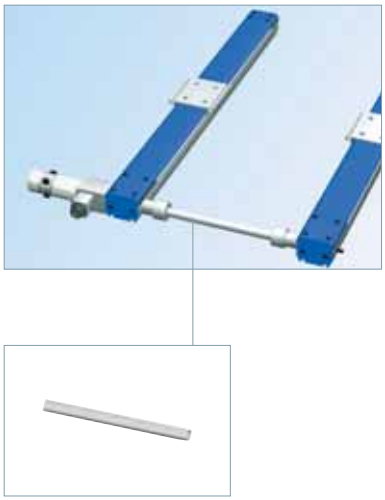
Drive module with stepping motor MS 160

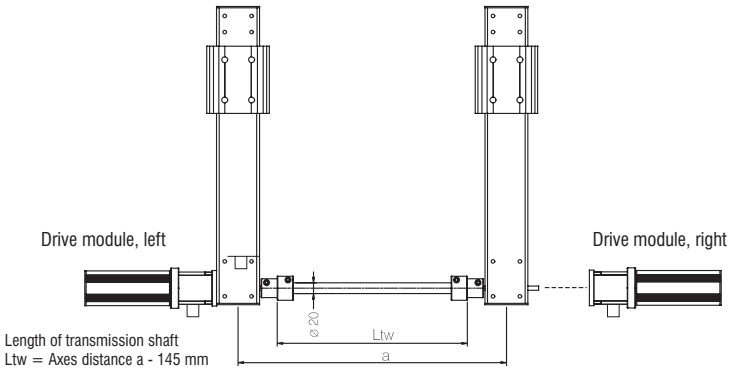


BlueLine Series 1

Connection of two timing belt feed axes

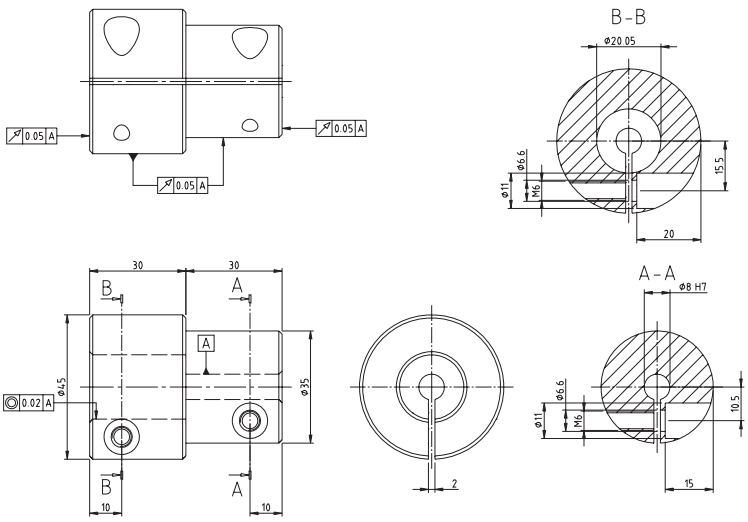
Transmission shaft





Connection of two timing belt feed axes

Coupling for transmission shaft



Moments of inertia

for coupling and transmission shaft

Coupling

$J_k = 4.258\ 10^{-5}\ kgm^2$

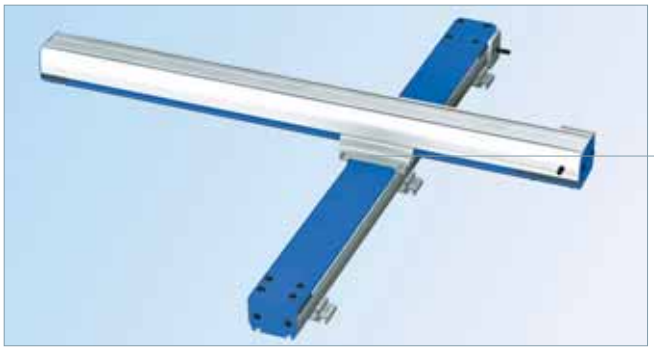
Transmission shaft (per 100 mm)

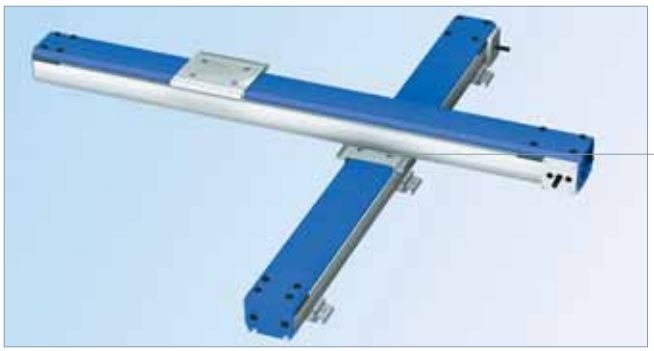
$J_{Trs} = 2.513\ 10^{-6}\ kgm^2/100\ mm$

BlueLine Series 1

Compound table construction

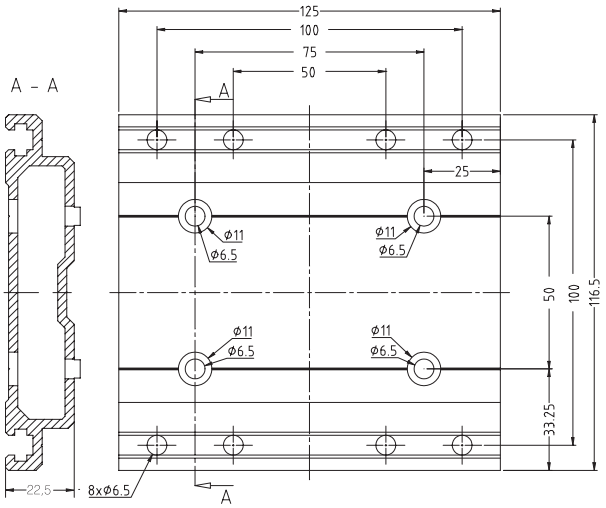
Connecting slides for compound tables





One of the timing belt feed axes has to be supplied with a connecting slide for compound tables in order to make the compound table construction possible.

The assembly takes place in the factory.



BlueLine Series 1

Order key

232 1XX XXXX

Motor
0 = without motor
1 = with stepping motor MS 160
2 = with DC servo motor MV 120

Driving side
0 = motor connection, right*
1 = motor connection, left*
* Motor flange for drive is mounted on the right resp. left side

Slide / connection
0 = with standard slide profile
1 = with connecting slides for compound tables
2 = with angle slide, right
3 = with angle slide, left

Basic profile lengths (mm)
450, 550 , 650, 750, 850, 950, 1,050, 1,150, 1,250, 1,350, 1,450, 1,550, 1,650, 1,750, 1,850, 1,950, 2,050
(e. g. 450 mm = 045
2,050 mm = 205)

Order samples

- without motor
- motor connection, left
- with standard slide pofile
- basic profile length 750 mm

Item no.: 232101 0075

- with stepping motor MS 160
- motor connection, left
- with standard slide profile
- basic profile length 750 mm

Item no.: 232111 0075

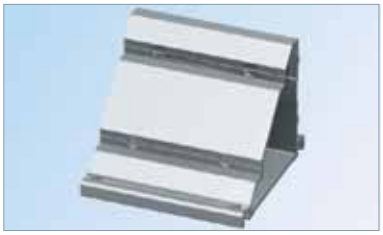
- with DC servo motor MV 120
- motor connection, left
- with angle slide, right
- basic profile length 750 mm

Item no.: 232121 2075

Accessory

Feet
- for BlueLine series 1
- 116.5 x 40 x 22.5 mm
- packing unit: 2 pieces

Item no.: 232199 0001



Angle slide as angle bracket
- for BlueLine series 1
- incl. fastening

Item no.: 232199 0002

Coupling for transmission shaft
- for BlueLine series 1
- packaging unit: 2 couplings

Item no.: 218050 0001

Transmission shaft Ø 20 mm
- for BlueLine-Serie 1

Length 1 m, item no.: 219001 0120
Length 2 m, item no.: 219001 0220

BlueLine Series 3

Closed timing belt feed axis

Feeds and shaft slides are also available in rust-proof designs!

- Aluminium profile with midget linear guide MLF 3
- Clearance-free feed with timing belt feed axis
  - timing belt with 5 mm pitch, width 25 mm
- Feed 5 m/s, at the most
- Shaft slide WS 3, L 176 x W 130 mm
- Repeatability less or equal ± 0.2 mm
- Limit and/or reference switch, accuracy < 0.1 mm
- Available in lengths up to 3 m
- Motor can be mounted on both sides due to an extended shaft end on the driving side
- Numerous combination possibilities due to additional special and angle profiles
- Integrated reference switch
- Option: special lengths (100 1/mm raster) upon request, max. 3,000 mm

BlueLine Series 3

Technical specifications

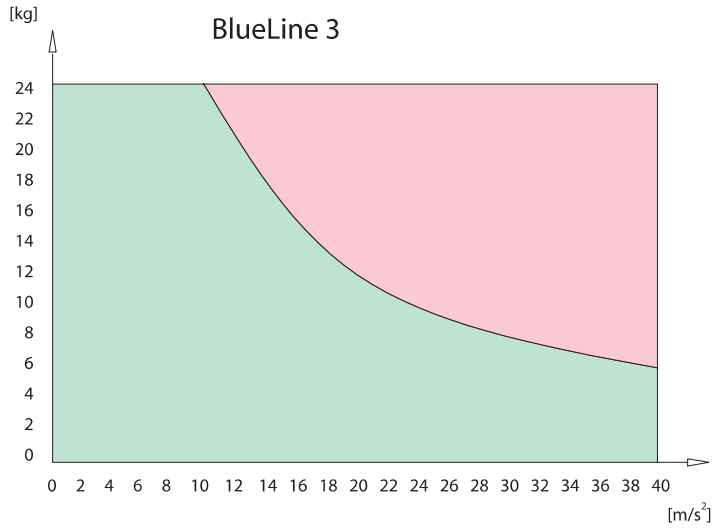
Belt version	HTD 5M, width 25 mm
Mass of slide	1.753 kg
Weight without drive module	1,000 mm ≙ 12 kg
Nominal mass of timing belt	0.09 kg/m
Nominal weight of feed axis	0.850 kg/100 mm
Effective diameter of the synchronized pulleys	Ø 22.28 mm
Moment of inertia of the synchronized pulleys	$8.542 \cdot 10^{-5}$ kgm²
Feed per revolution	70 mm

Idle torques

Revolution [1/min]	Idle torque [Nm]
500	0.16
1500	0.24
3000	0.36

Load diagram

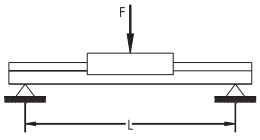
Permissible accelerated masses related to belt strength*



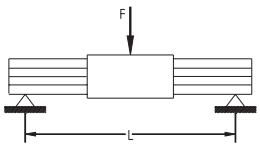
* At vertical assembly, the acceleration due to gravity (g = 9.81 m/s²) has to be taken into account

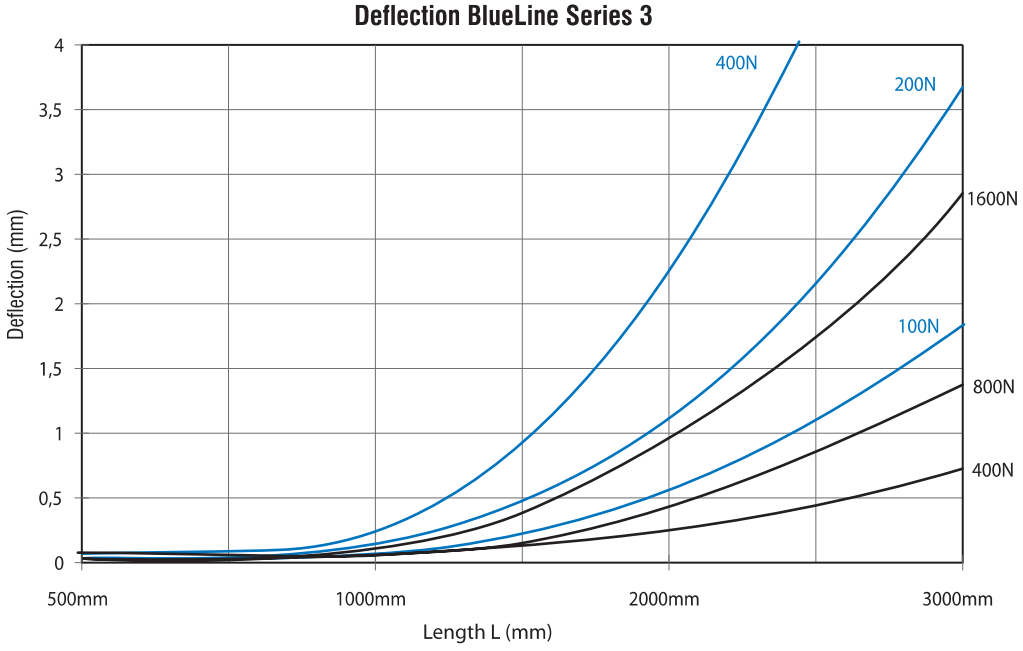
Deflection

Load - example 1



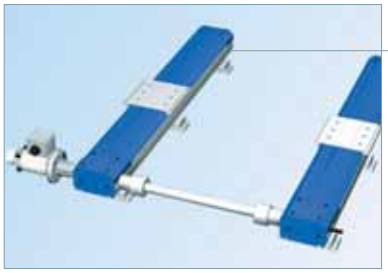
Load - example 2

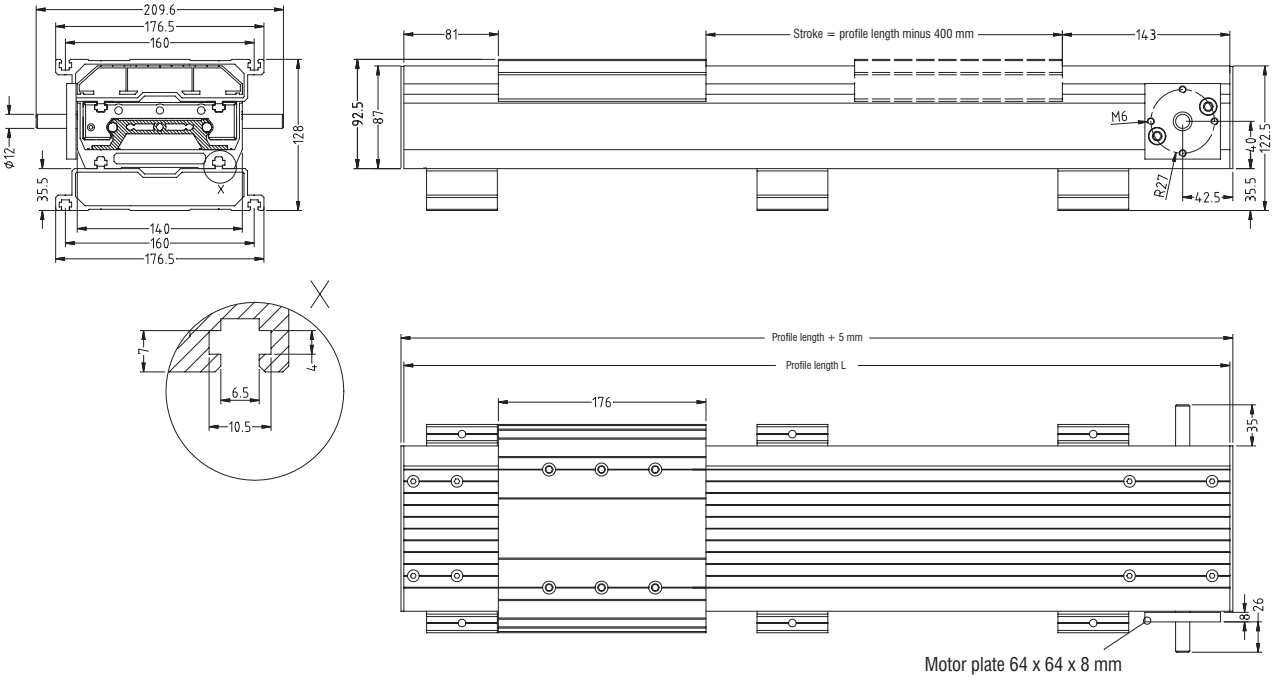




BlueLine Series 3

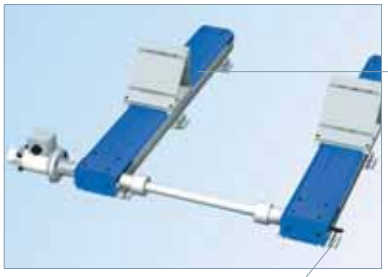
Timing Belt Feed Axis

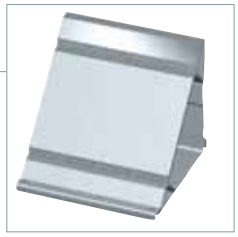




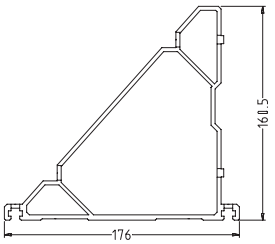
BlueLine Series 3

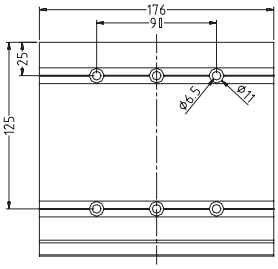
Mounting foot and mounting angle

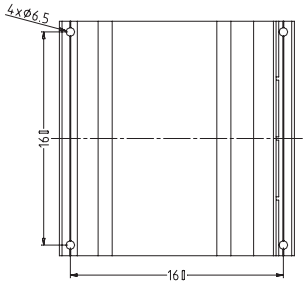




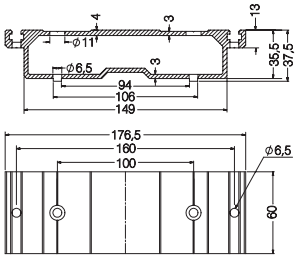
Mounting angle



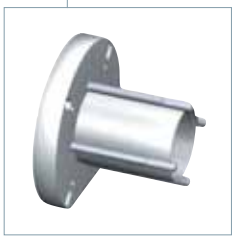


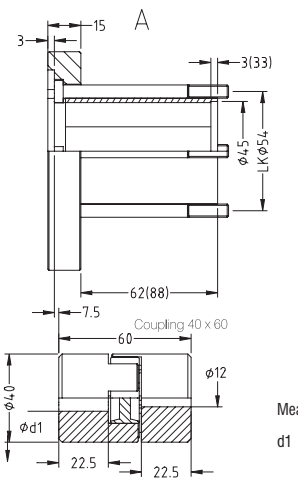


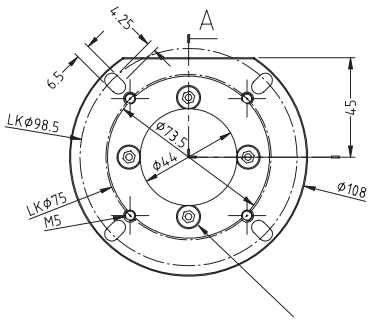
Mounting foot



Coupling casing set 2







4 clampinng bolts M6x75 (100)

Measures in brackets refer to dimensions with distance sleeve 2

d1 = motor shaft diameter 9.52 mm or 11 mm

BlueLine Series 3

Drive modules

Stepping motor MS 430 HT

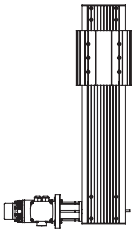
Holding torque – bipolar	600 Ncm
Stepping angle, full step	1.8 deg
half step	0.9 deg
Nominal voltage – bipolar	2.8 V
Resistance of winding	0.66 Ω
Inductance of winding	2.5 mH
Current of winding – bipolar	5.9 A

DC servo motor MV 330

Nominal power	330 W
Nominal speed	3,000 rpm
Nominal torque	100 Ncm
Current at nominal torque	6.5 A
Nominal voltage	65 V
Peak torque	539 Ncm
Current at peak torque	30 A
Ambient temperature	0 - 40 °C

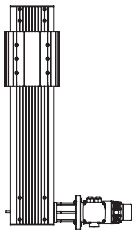
AC servo motor MY 073

Nominal power	830 W
Nominal speed	4,000 rpm
Nominal permanent torque	200 Ncm
Nominal permanent current	4.7 A
Voltage constant	26.3 V/1000
Moment of inertia of rotor	0.57 kgcm²

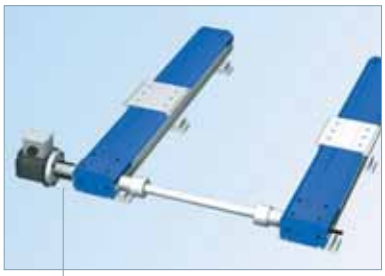


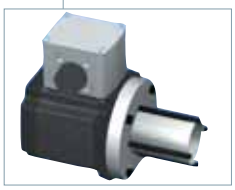
Drive module, left

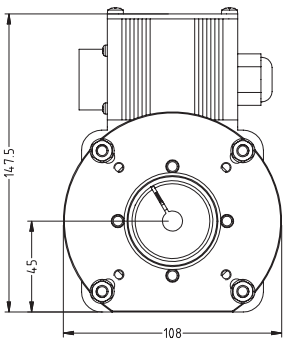
Drive module, right

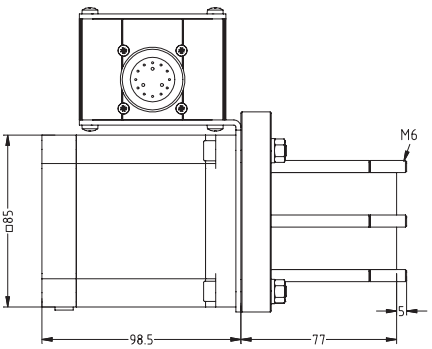


Drive module with stepping motor MS 430 HT



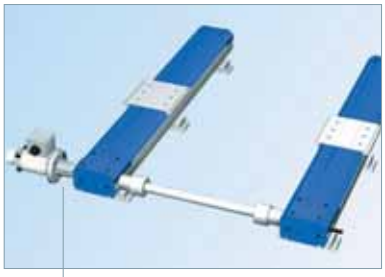


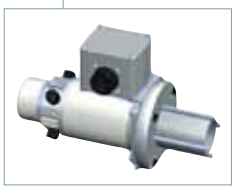


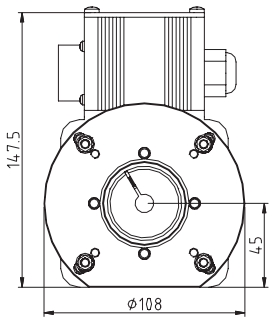


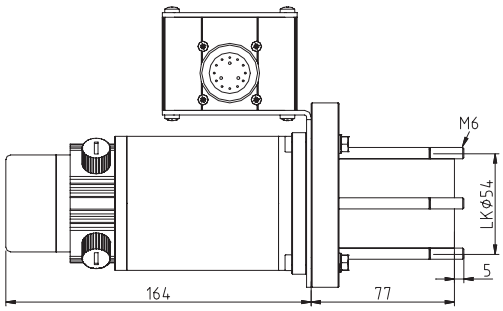
BlueLine Series 3

Drive module with DC servo motor MV 330

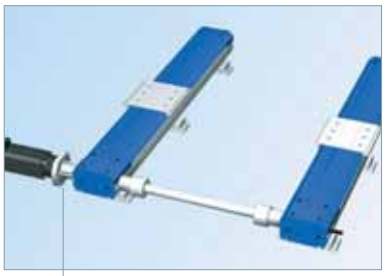


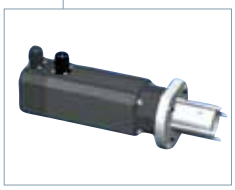


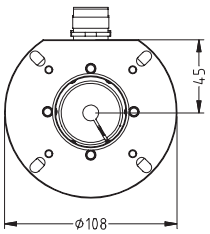


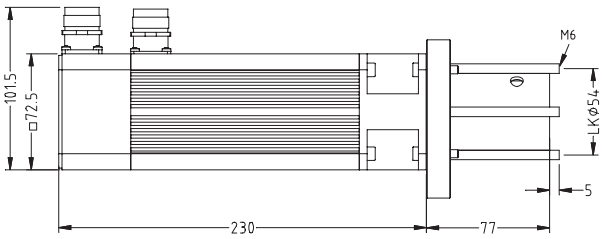


Drive module with AC servo motor MY 073







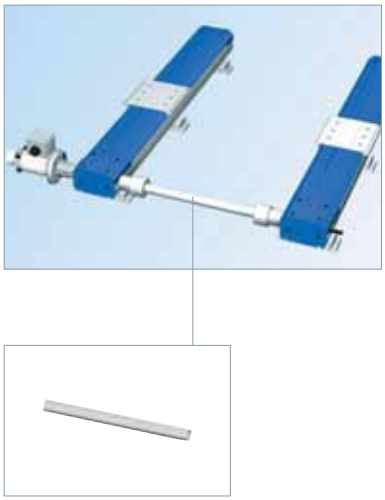


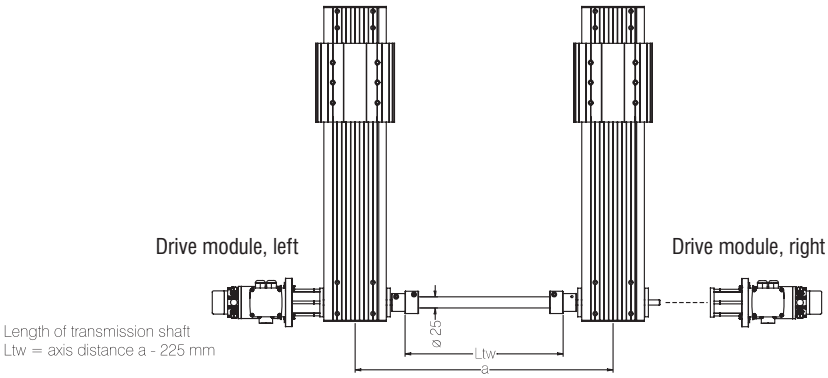
mechanics

BlueLine Series 3

Connection of two timing belt feed axes

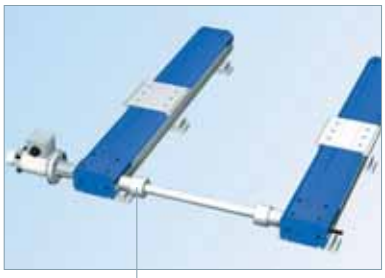
Transmission shaft

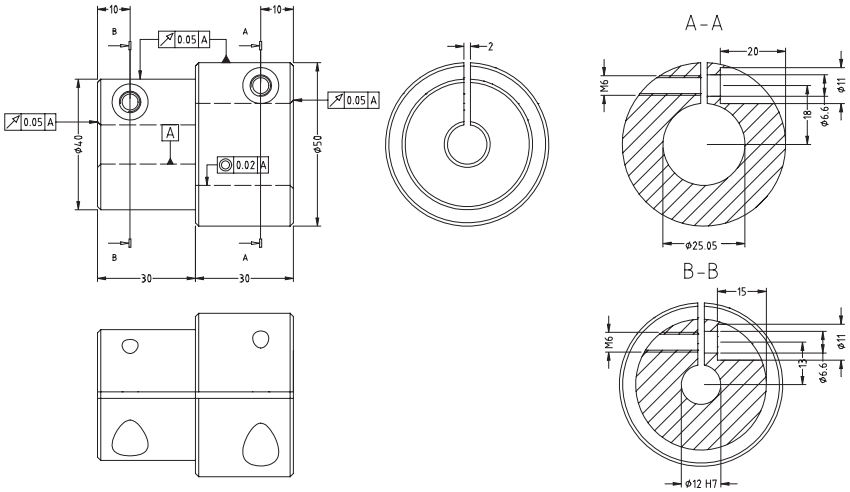




Connection of two timing belt feed axes

Coupling for transmission shaft





Moments of inertia

for coupling and transmission shaft

Coupling

$J_k = 6.643\ 10^{-5}\ kgm^2$

Transmission shaft (per 100 mm)

$J_{Trs} = 5.218\ 10^{-6}\ kgm^2/100\ mm$

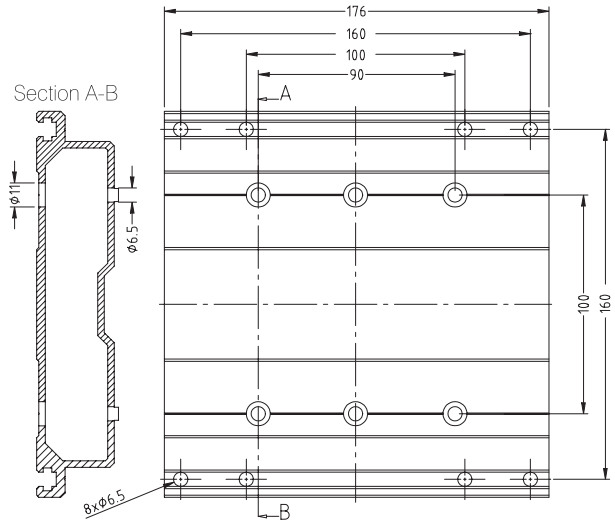
BlueLine Series 3

Compound table construction

Cross-table junction slide

One of the timing belt feed axes has to be supplied with a connecting slide for compound tables in order to make the compound table construction possible.

The assembly takes place in the factory.



BlueLine Series 3

Order key

232 30X XXXX

Driving side
0 = motor connection, right
1 = motor connection, left

Slide / connection
0 = with standard slide profile
1 = with connecting slides for compound tables

Basic profile lengths (mm)

800	(item no.: ..... .075)
1,100	(item no.: ..... .105)
1,200	(item no.: ..... .115)
1,600	(item no.: ..... .155)
2,100	(item no.: ..... .205)
2,600	(item no.: ..... .255)
2,900	(item no.: ..... .285)
3,000	(item no.: ..... .295)

Drives*		Drive on the right side	Drive on the left side
		Item no.	Item no.
Stepping motor	MS 430 HT	396085 0193	396085 0020
DC servo motor	MV 330	396104 0093	396104 0020
AC servo motor	MY 073	396573 0020	396573 0020

* Please, order the drive modules separately; use the above-stated item numbers for this purpose.
Do not forget to specify whether the delivery should take place with or without extension.
Regarding the AC servo motor MY 073, the driving side has to be stated separately.

Order samples

- with stepping motor MS 430 HT
- motor connection, left
- with standard slide profile
- basic profile length 800 mm

Item no.: 232301 0075 (feed)
Item no.: 396085 0020 (drive)

- with DC servo motor MV 330
- motor connection, left
- with angle bracket, right
- basic profile length 800 mm

Item no.: 232301 0075 (feed)
Item no.: 396104 0020 (drive)

- with AC servo motor MY 073
- motor connection, left
- with standard slide profile
- basic profile length 800 mm

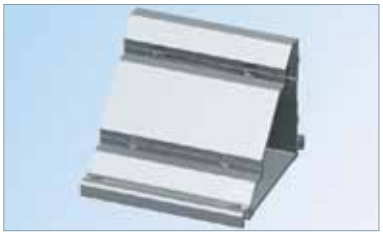
Item no.: 232301 0075 (feed)
item no.: 396573 0020 (drive)

BlueLine Series 3

Accessory

Feet
- for BlueLine series 3
- 176.5 x 60 x 35.5 mm,
- packing unit: 2 pieces

Item no.: **232399 0001**



Angle Brackets
- for BlueLine series 3
- incl. fastening

Item no.: **232399 0002**

Coupling for transmission shaft
- for BlueLine series 3
- packing unit: 2 couplings

Item no.: **218050 0002**

Transmission shaft Ø 25 mm
- for BlueLine series 3

Length 1 m, item no.: **219001 0125**

Length 2 m, item no.: **219001 0225**

Timing Belt Feed Axis ZF 1

Open timing belt feed axis

Feeds and shaft slides are also available in rust-proof designs!

- Aluminium profile with midget linear guide MLF 2
- Clearance-free feed with timing belt feed axis
  - timing belt with 3 mm pitch, width 9 mm
- Feed per revolution: 60 mm
- Repeatability less or equal ± 0.2 mm
- Feed 1.5 m/s, at the most
- Limit and/or reference switch accuracy< 0.1 mm (with drive modules)
- Option:
  special lengths (100 1/mm raster) upon request, max. 6,000 mm

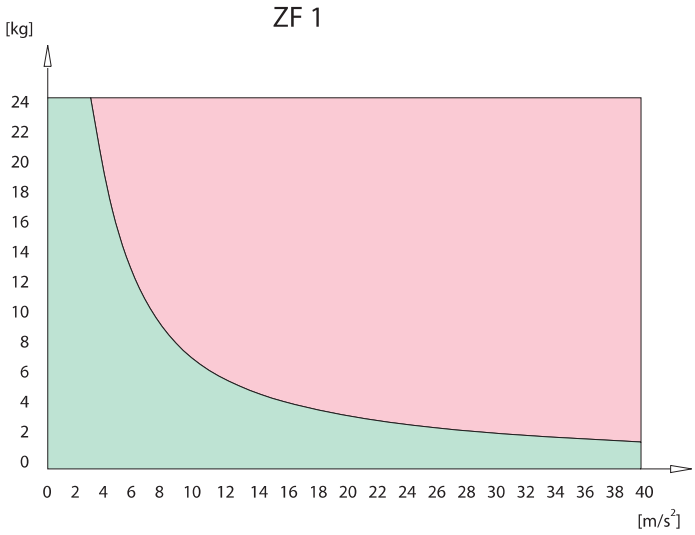
Timing Belt Feed Axis ZF 1

Technical specifications

Belt version	HTD 3M, width 9 mm
Weight of slide	0.430 kg
Weight without drive module	1000 mm ≙ 3 kg
Nominal mass of timing belt	0.0225 kg/m
Weight of carriage	1.03 kg
Nominal weight of guide	0.200 kg/100 mm
Effective diameter of the synchronized pulleys	Ø 19.10 mm
Moment of inertia of the synchronized pulleys	$5.585 \cdot 10^{-7}$ kgm²
Feed per revolution	60 mm

Load diagram

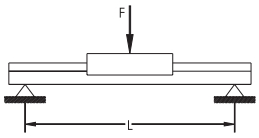
Permissible accelerated masses related to belt strength*



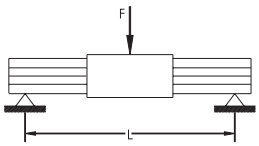
* At vertical assembly, the acceleration due to gravity (g = 9.81 m/s²) has to be taken into account

Deflection

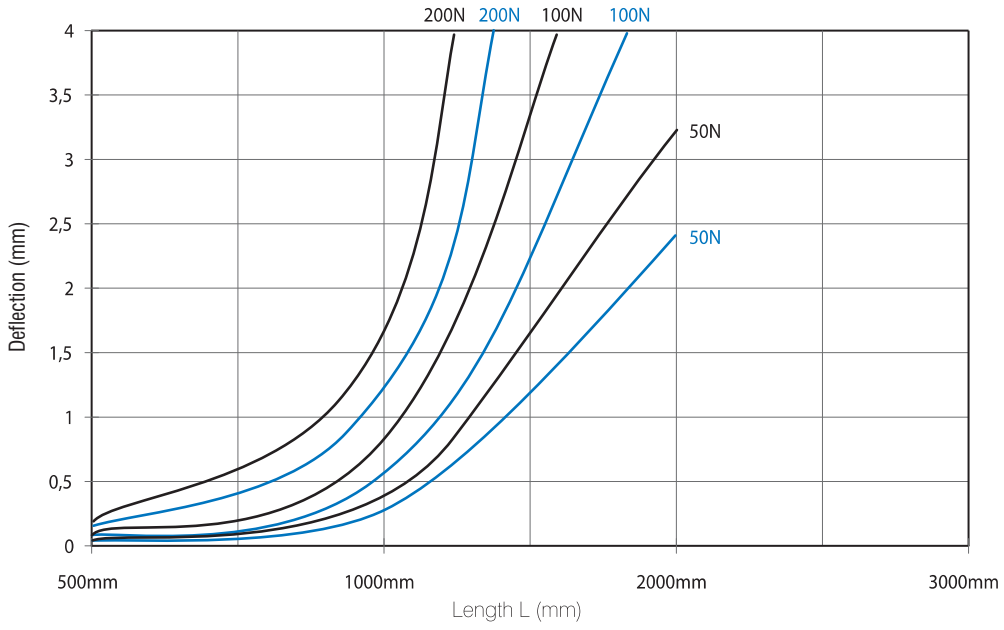
Load - example 1



Load - example 2



Deflection Timing Belt Feed Axis ZF 1

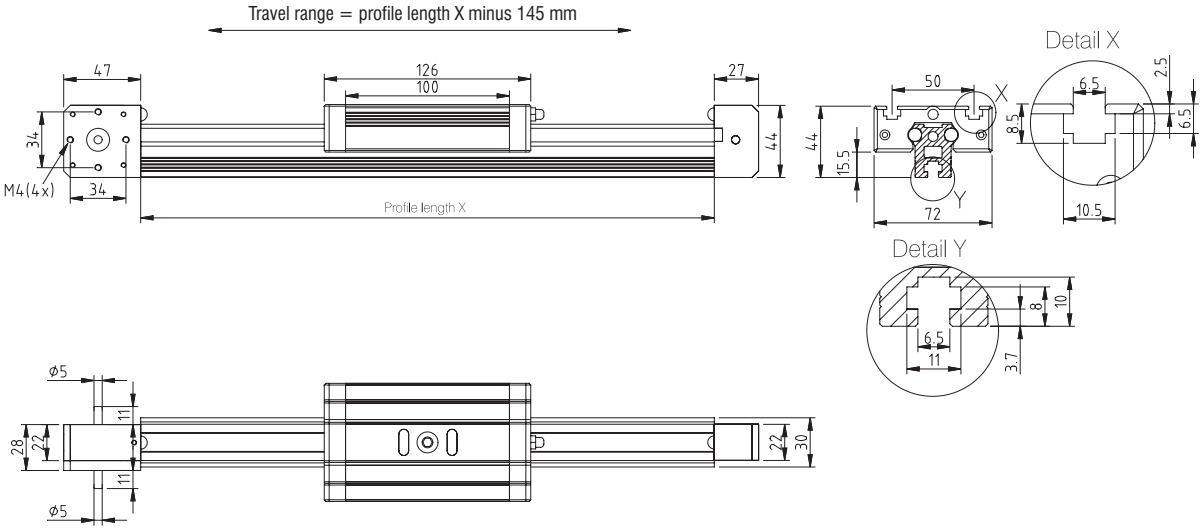


Timing Belt Feed Axis ZF 1

Timing belt feed axis

without motor

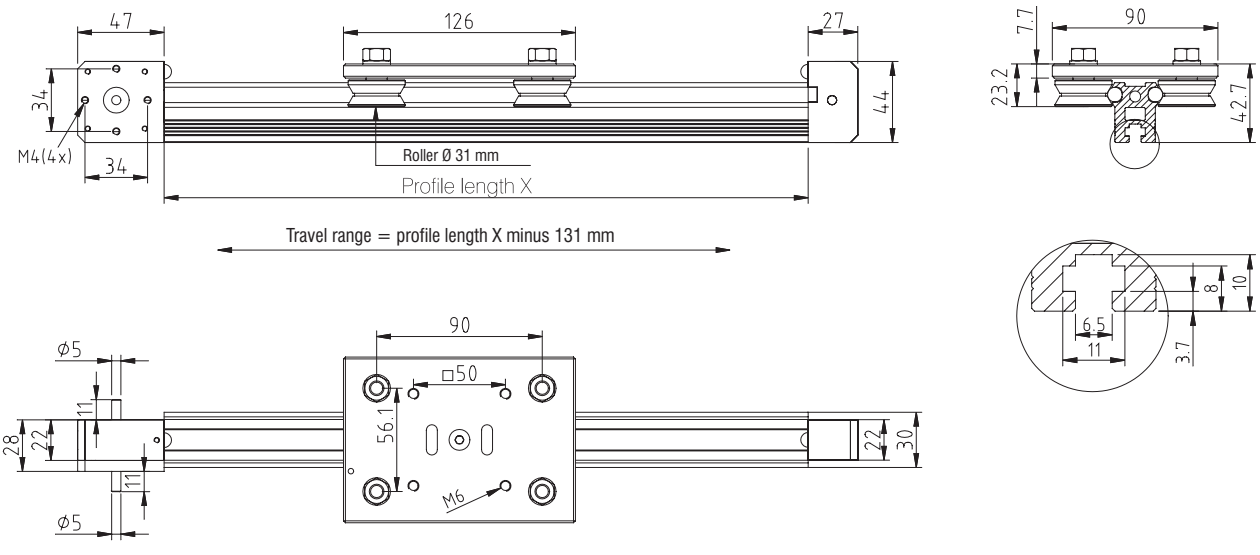
with shaft slide



Timing belt feed axis

without motor

with carriage



Timing Belt Feed Axis ZF 1

Drive modules

Stepping motor MS 050 HT

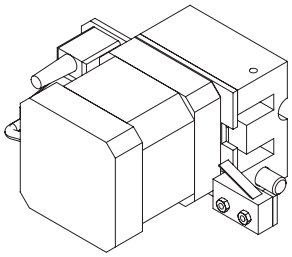
Holding torque - bipolar..... 50 Ncm
Stepping angle, full step..... 1.8 deg
Stepping angle, half step.....0.9 deg
Nominal voltage – bipolar .....3.2 V
Resistance of winding..... 1.1 Ω
Inductance of winding.....1.85 mH
Current of winding - bipolar.....1.8 A

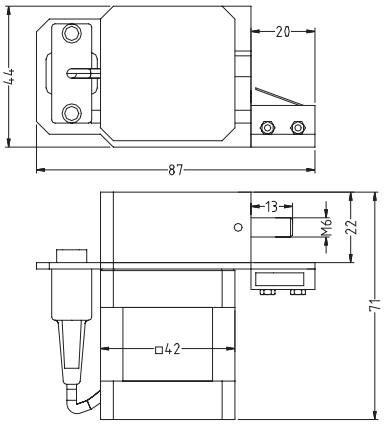
Stepping motor MS 160

Holding torque – bipolar.....160 Ncm
Stepping angle, full step..... 1.8 deg
Stepping angle, half step.....0.9 deg
Nominal voltage – bipolar.....1.7 V
Resistance of winding..... 1.2 Ω
Inductance of winding.....2.2 mH
Current of winding - bipolar.....4.1 A

Drive module with stepping motor MS 050 HT (ratio 1:1)

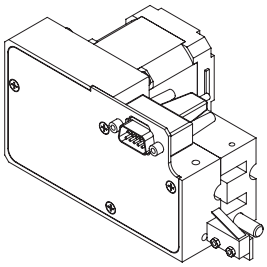
Feed: 60 mm/revolution

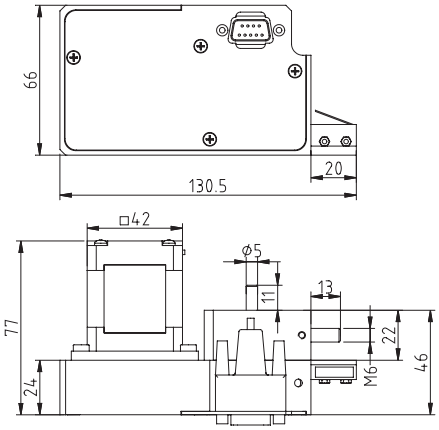




Drive module with stepping motor MS 050 HT (ratio 2:1)

Feed: 30 mm/revolution



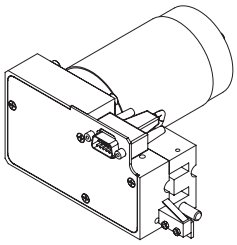


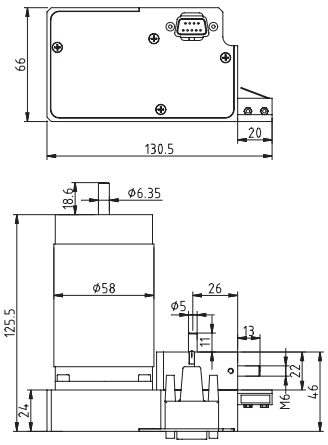
Timing Belt Feed Axis ZF 1

Drive module with stepping motor MS 160 (ratio 2:1)

Feed: 30 mm/revolution *

* upon request: gear ratio 1:1, 60 mm/revolution





Timing Belt Feed Axis ZF 1

Order key

232 005 XXXX

Drives, slides, carriages			Profile lengths MLF 2 (mm)
0 = stepping motor MS 050 HT	(ratio 1:1)	with shaft slide	298, 398, 498, 598, 675,
1 = stepping motor MS 050 HT	(ratio 1:1)	with carriage	698, 798, 998, 1498, 1798,
2 = stepping motor MS 050 HT	(ratio 2:1)	with shaft slide	1998, 2498, 2998
3 = stepping motor MS 050 HT	(ratio 2:1)	with carriage	(e. g. 398 mm = 040
4 = stepping motor MS 160	(ratio 2:1)	with shaft slide	675 mm = 068)
5 = stepping motor MS 160	(ratio 2:1)	with carriage	
6 = DC servo motor MV 120	(ratio 1:1)	with shaft slide	Options: up to 6,000 mm
7 = stepping motor MS 135 HT	(ratio 2:1)	with shaft slide	
8 = without motor		with shaft slide	
9 = without motor		with carriage	
Y = stepping motor MS 160, motor on the right side	(ratio 1:1)	with shaft slide	
Z = stepping motor MS 160 motor on the left side	(ratio 1:1)	with shaft slide	

Order samples

- with stepping motor MS 050 HT*
- ratio 1:1
- with shaft slide
- profile length 675 mm

Item no.: 232005 0068

- with stepping motor MS 050 HT*
- ratio 2:1
- with shaft slide
- profile length 675 mm

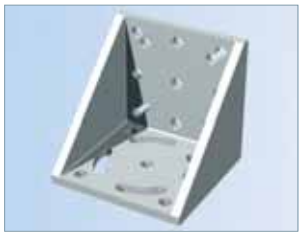
Item no.: 232005 2068

- with stepping motor MS 160*
- ratio 2:1
- with shaft slide
- profile length 675 mm

Item no.: 232005 4068

* Set-up of motor according to picture

Accessory



Angle brackets
- for ZF 1

Item no.: 204110 0010

Coupling 20/30
- for ZF 1
- 1 packaging unit = 1 coupling

Item no.: 218001 5080

Limit switch set
- Option: second limit switch
- for ZF1

Item no.: 632125 0002

Timing Belt Feed Axis ZF 2

Open timing belt feed axis

Feeds and shaft slides are also available in rust-proof designs!

- Aluminium profile with midget linear guide MLF 5
- Clearance-free feed with timing belt feed axis
  - timing belt with 5 mm pitch, width 25 mm
- Feed 5 m/s, at the most
- Shaft slide WS 3
  L 176 x W 130 mm
- Feed per revolution: 70 mm
- Repeatability less or equal ± 0.2 mm
- Limit and/or reference switch, accuracy < 0.1 mm
- available in lengths up to 6,000 mm
- at direct drives, motor modules can be flange-mounted on the right or left side
- Options:
  Special lengths (100 1/mm raster) upon request, max. 6,000 mm
- Available also as direct drive with
  - drive module with stepping motor MS 430 HT*
  - drive module with DC servo motor MV 330*
  - drive module with AC servo motor MY 073*

  * in connection with motor mounting plate, item no.: 232199 0004
- Limit switch with connecting cable
  (only integrated in connection with drive module)

Timing Belt Feed Axis ZF 2

Technical data

Belt version..... HTD 5M, width 25 mm
Weight of slide.....0.430 kg
Weight without drive module.....1,000 mm ≙ 7.9 kg
Nominal mass of timing belt.....0.09 kg/m
Weight of slide.....2.03 kg

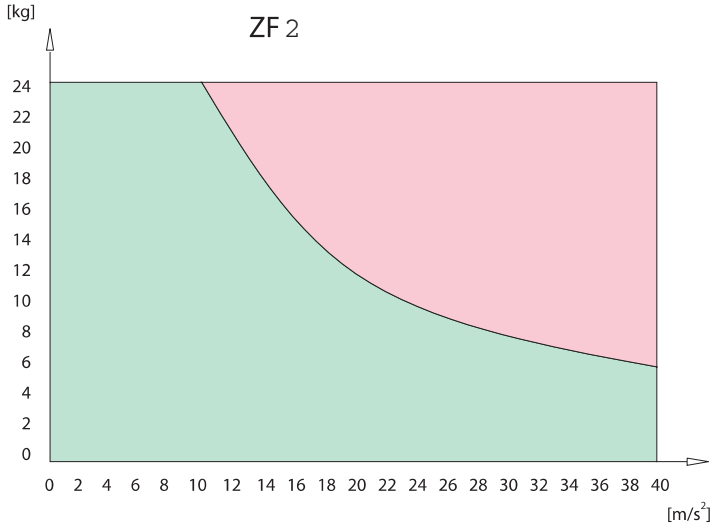
Nominal weight of guide.....0.472 kg/100 mm
Effective diameter of the synchronized pulleys..Ø 22.28 mm
Moment of inertia of the synchronized pulleys..$5.58 \cdot 10^{-6}$ kgm²
Feed per revolution.....70 mm

Idle torques

Speed [1/min]	Idle torque [Nm]
500	0,16
1500	0,24
3000	0,36

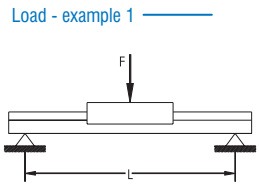
Load diagramm

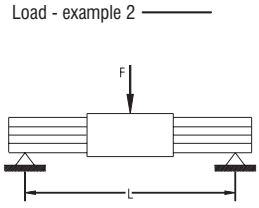
Permissible accelerated masses related to belt strength*



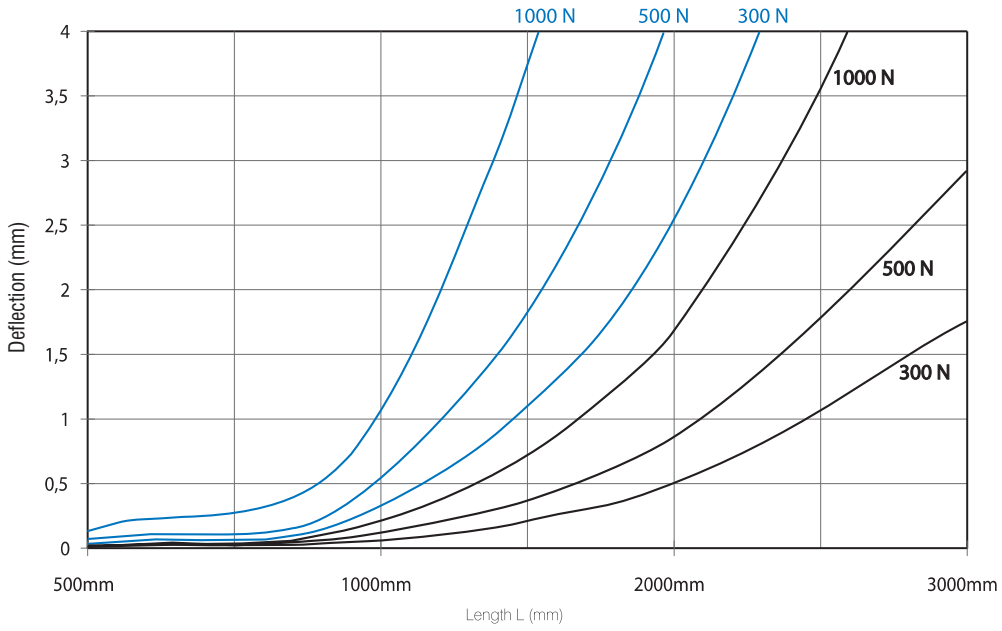
* At vertical assembly, the acceleration due to gravity (g = 9.81 m/s²) has to be taken into account

Deflection





Deflection Timing Belt Feed Axis ZF 2



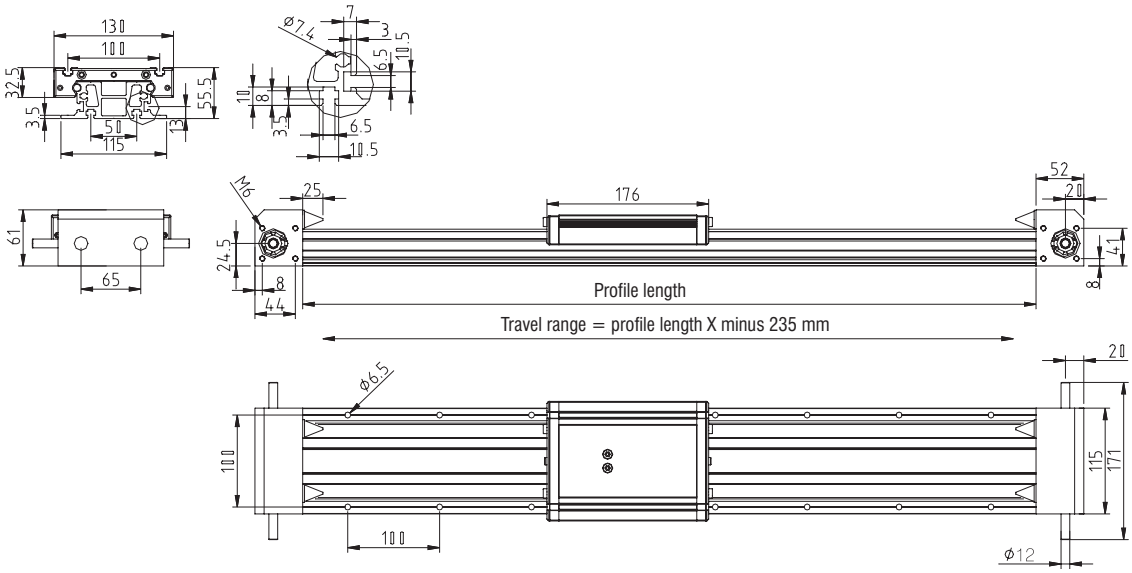
mechanics

Timing Belt Feed Axis ZF 2

Timing belt feed axis

without motor

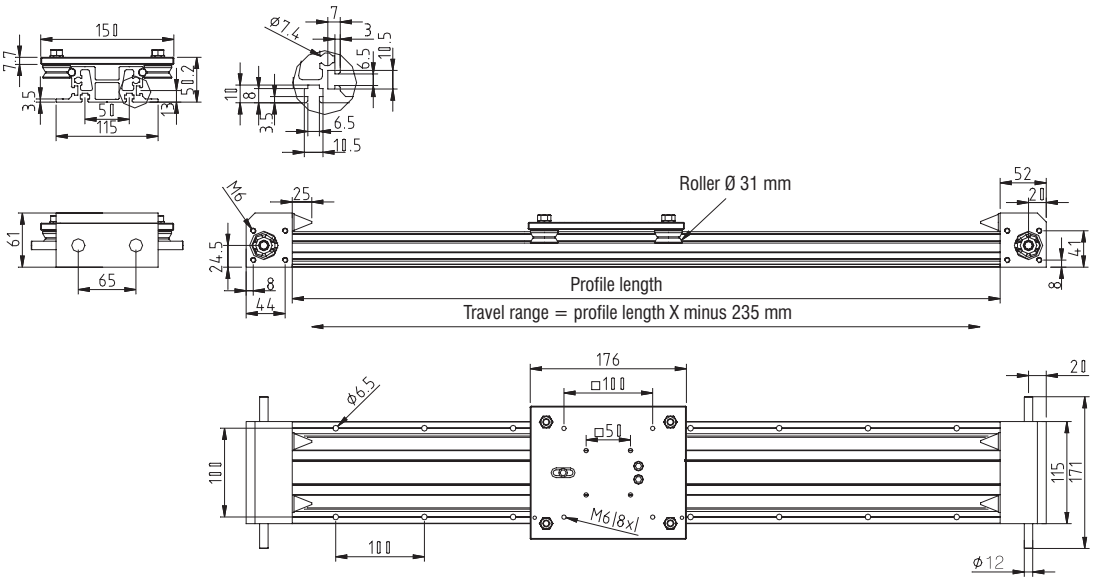
with shaft slide



Timing belt feed axis

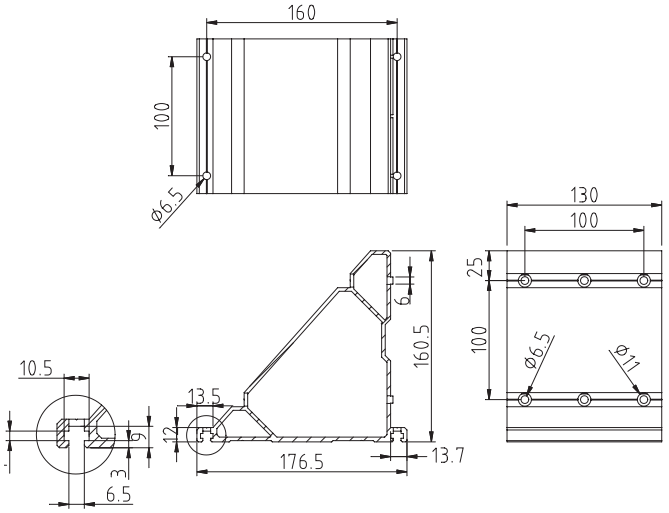
without motor

with carriage

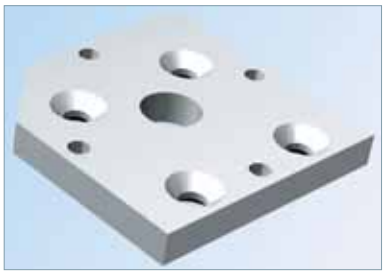


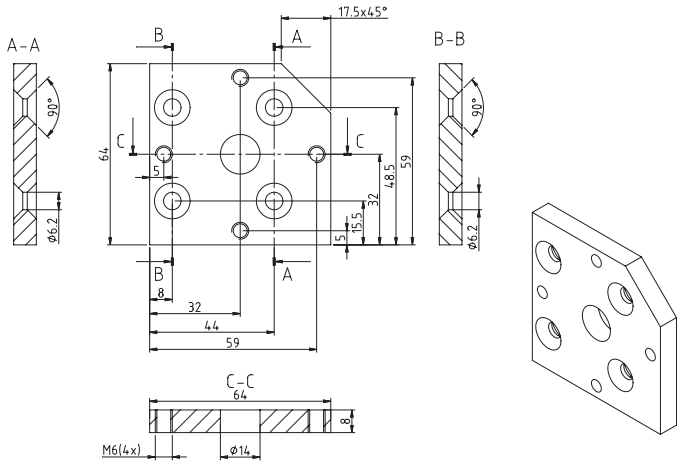
Timing Belt Feed Axis ZF 2

Mounting angle

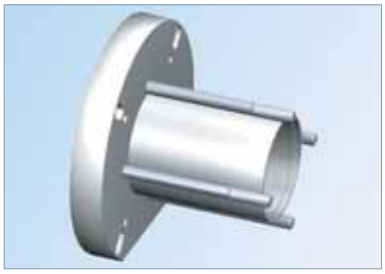


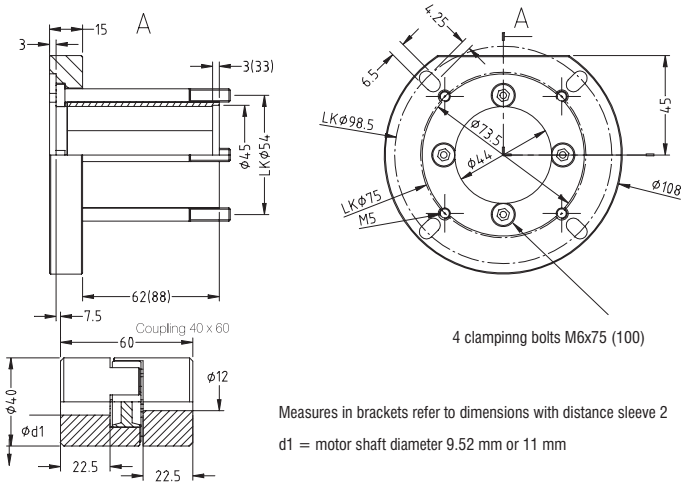
Motor mounting plate (option)





Coupling casing set 2





4 clampinng bolts M6x75 (100)

Measures in brackets refer to dimensions with distance sleeve 2

d1 = motor shaft diameter 9.52 mm or 11 mm

mechanics

Timing Belt Feed Axis ZF 2

Drive modules

Stepping motor MS 430 HT

Holding torque – bipolar.....600 Ncm
Stepping angle, full step.....1.8 deg
half step.....0.9 deg
Nominal voltage – bipolar.....2.8 V
Resistance of winding..... 0.66 Ω
Inductance of winding.....2.5 mH
Current of winding – bipolar....5.9 A

DC servo motor MV 330

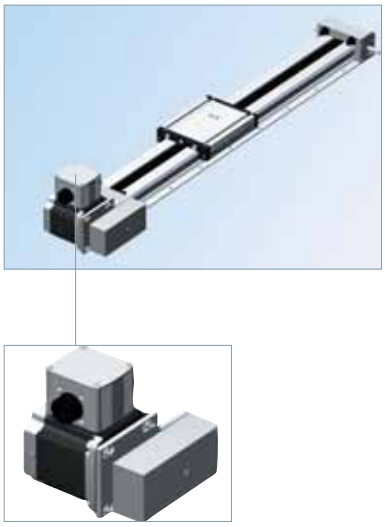
Nominal power.....330 W
Nominal speed.....3,000 rpm
Nominal torque.....100 Ncm
Current at nominal torque.....6.5 A
Nominal voltage.....65 V
Peak torque.....539 Ncm
Current at peak torque..... 30 A
Ambient temperature.....0 - 40 °C

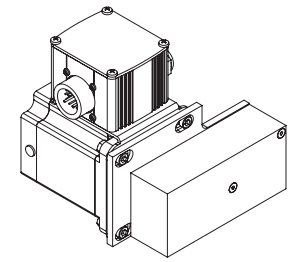
AC servo motor MY 054

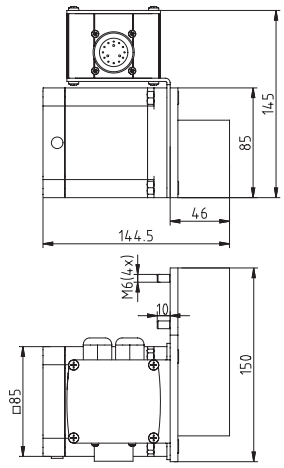
Nominal power.....500 W
Nominal speed.....6,000 rpm
Nominal permanent torque..... 100 Ncm
Nominal permanent current..... 3.2 A
Voltage constant.....20.0 V/1,000
Moment of inertia of rotor.....0.45 kgcm²

Drive module with stepping motor MS 430 HT

(reduction 2:1)
Feed: 35 mm/revolution





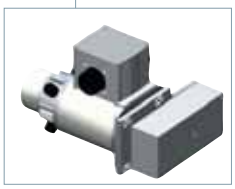


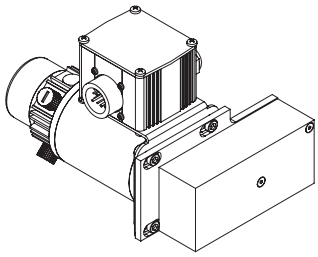
Timing Belt Feed Axis ZF 2

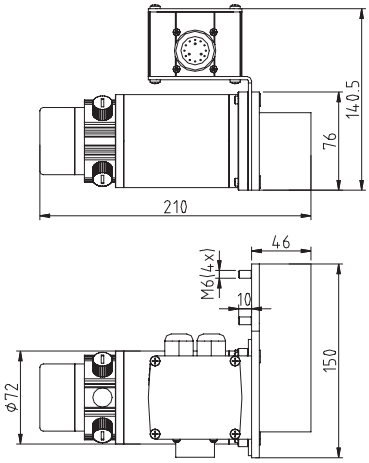
Drive module with DC servo motor MV 330

(reduction 2:1)

Feed: 35 mm/revolution



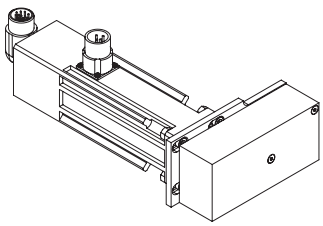


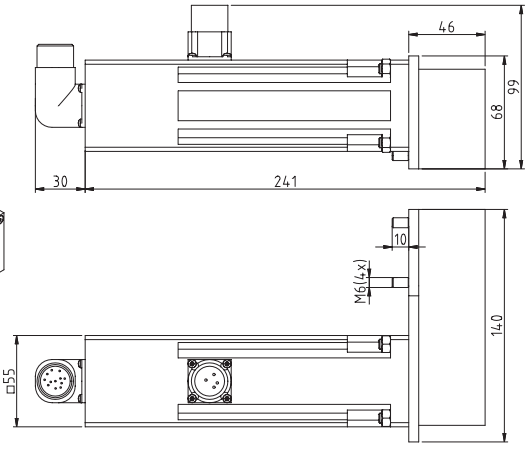


Drive module with AC servo motor MY 054

(reduction 2:1)

Feed: 35 mm/revolution





mechanics

Timing Belt Feed Axis ZF 2

Order key

232 002 XXXX

Drives/slides, carriage

0 =	Stepping motor MS 430 HT	(ratio 2:1)	with shaft slide
1 =	Stepping motor MS 430 HT	(ratio 2:1)	with carriage
2 =	DC servo motor MV 330	(ratio 2:1)	with shaft slide
3 =	DC servo motor MV 330	(ratio 2:1)	with carriage
4 =	DC servo motor MY 054	(ratio 2:1)	with shaft slide
5 =	AC servo motor MY 054	(ratio 2:1)	with carriage
8 =	Without motor		with shaft slide
9 =	Without motor		with carriage

Profile lengths (mm)

698, 998, 1,498, 1,998, 2,498, 2,998

(e. g. 698 mm = 070
1,498 mm = 150)

Option: up to 6,000 mm

Order samples

- With stepping motor MS 430 HT
- Ratio 2:1
- With shaft slide
- Profile length 698 mm

Item no.: 232002 0070

- With DC servo motor MV 330
- Ratio 2:1
- With shaft slide
- Profile length 698 mm

Item no.: 232002 2070

- with AC servo motor MY 054
- Ratio 2:1
- With shaft slide
- Profile length 698 mm

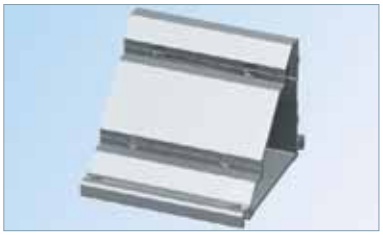
Item no.: 232000 4070

Timing Belt Feed Axis ZF 2

Accessory

Motor mounting plate
- for ZF 2
- incl. fastening
- for direct drive, see drive modules

Item no.: **232199 0004**



Angle brackets
- for ZF 2
- incl. fastening

Item no.: **232199 0005**

Coupling for transmission shaft
- for ZF 2
- packaging unit = 2 couplings

Item no.: **218050 0002**

Transmission shaft Ø 25 mm
- for ZF 2

Length 1 m, item no.: **219001 0125**

Length 2 m, item no.: **219001 0225**

Timing Belt Feed Axis ZF 2

Open timing belt feed axis

Feeds and shaft slides are also available in rust-proof designs!

- Aluminium profile with midget linear guide MLF 4
- Clearance-free feed with timing belt feed axis
  - timing belt with 5 mm pitch, width 25 mm
- Feed 5 m/s, at the most
- Shaft slide WS 3
  L 176 x W 130 mm
- Feed per revolution: 70 mm or 150 mm
- Repeatability
  lower or equal ± 0.2 mm
- Limit and/orreference switch, accuracy < 0.1 mm
- Available in lengths up to 6,000 mm
- Motor modules can be flange-mounted on the right or left side
- Option:
  - special lengths (100 1/mm raster) upon request, max. 6,000 mm
  - limit switch with connecting cable (only integrated in connection with drive module)

Timing Belt Feed Axis ZF 3

Technical data

Belt version	HTD 5M, width 25 mm
Weight of slide	0.940 kg
Weight without drive module	1,000 mm ≙ 10.5 kg
Nominal mass of timing belt	0.09 kg/m
Weight of slide	2.03 kg
Nominal weight of guide	0.472 kg/100 mm
Feed per revolution	70 mm
Effective diameter of the synchronized pulleys	
Feed 70 mm/revolution	22.28 mm
Feed 150 mm/revolution	47.75 mm
Moment of inertia of the synchronized pulleys	
Feed 70 mm/revolution	5.58 x 10^{-6} kgm^2
Feed 150 mm/revolution	1.796 x 10^{-4} kgm^2

Idle torques

70 mm/revolution

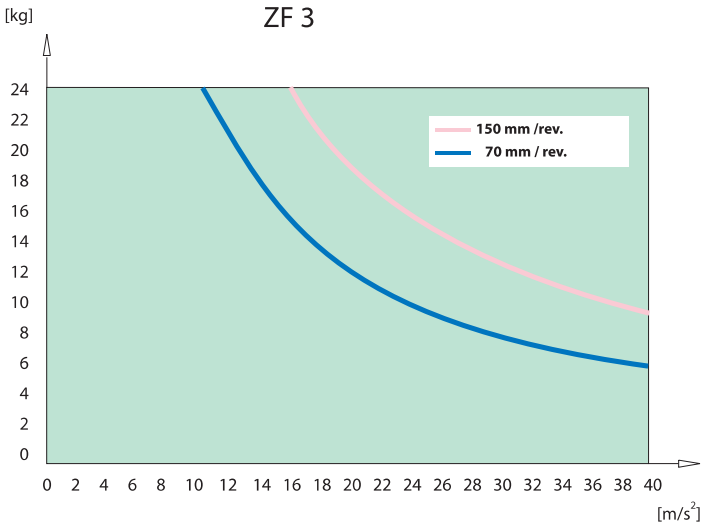
Revolution [1/min]	Idle torque [Nm]
500	0.16
1,500	0.24
3,000	0.36

150 mm/revolution

Speed [1/min]	No-load torque [Nm]
500	0.60
1,500	0.70
3,000	0.80

Load diagram

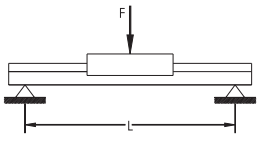
Permissible accelerated masses related to belt strength*



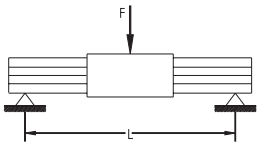
* At vertical assembly, the acceleration due to gravity (g = 9.81 m/s^2) has to be taken into account

Deflection

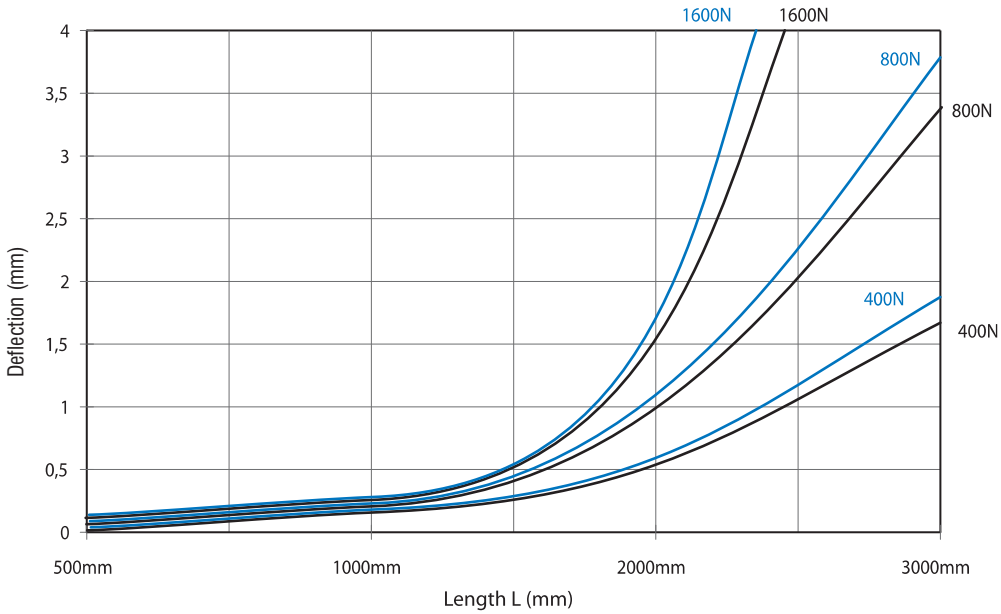
Load - example 1



Load - example 2



Deflection Timing Belt Feed Axis ZF 3



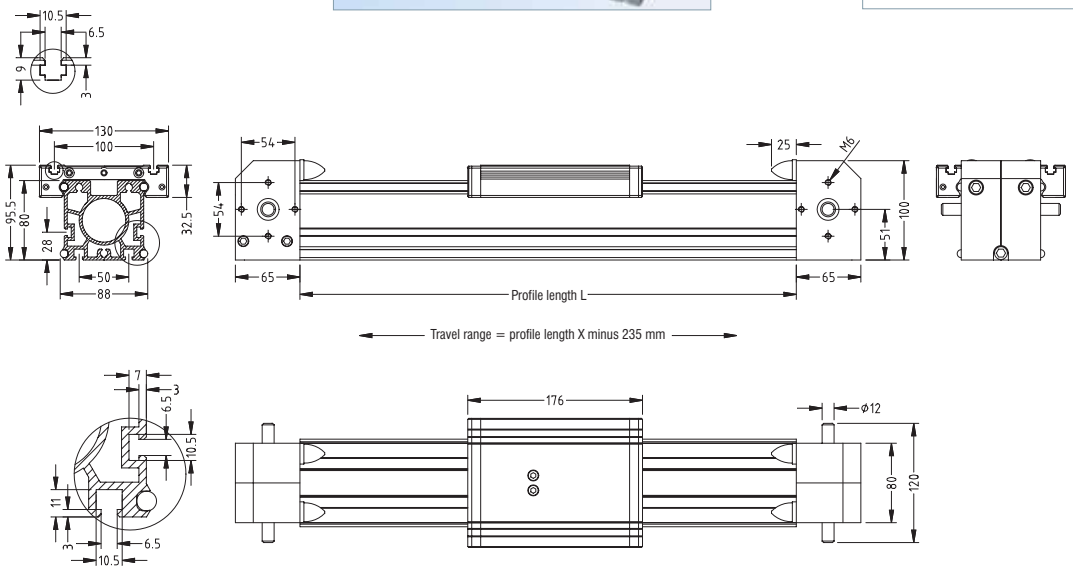
mechanics

Timing Belt Feed Axis ZF 3

Timing belt feed axis

with shaft slide

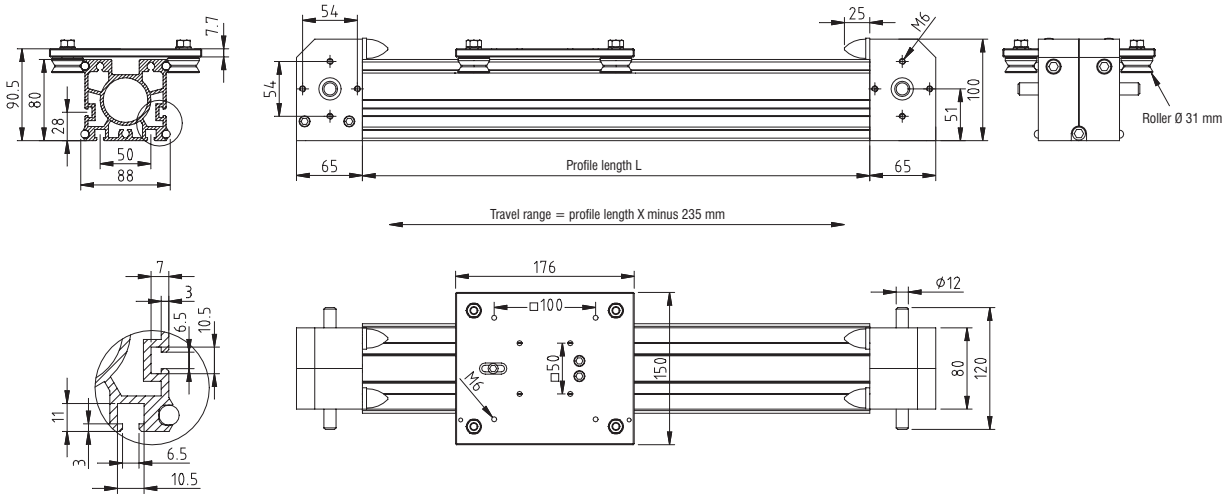
Feed: 150 mm/revolution



Timing belt feed axis

with carriage

Feed: 150 mm/revolution

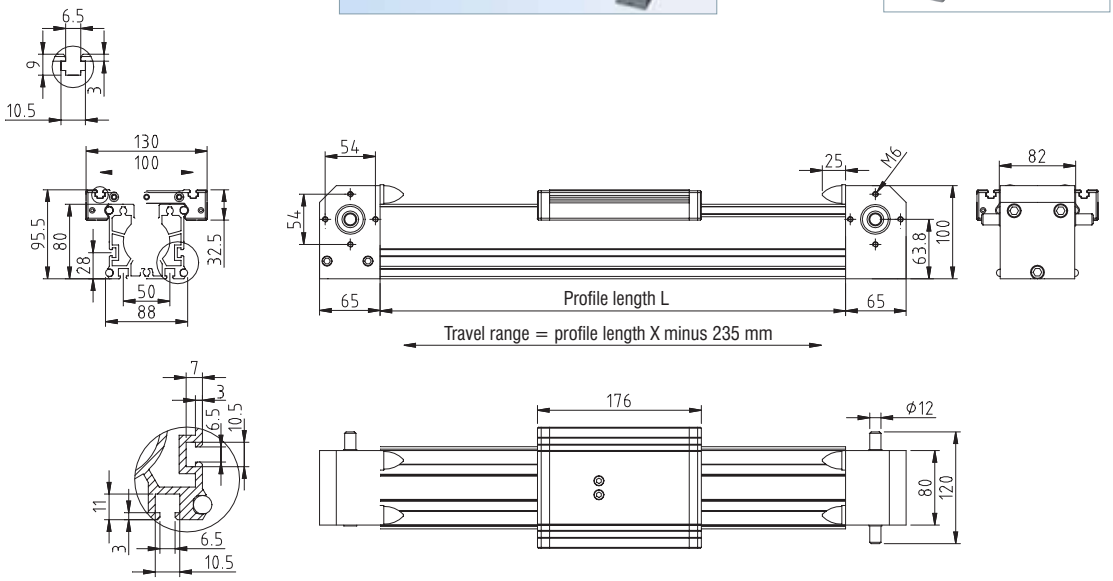


Timing Belt Feed Axis ZF 3

Timing belt feed axis

with shaft slide

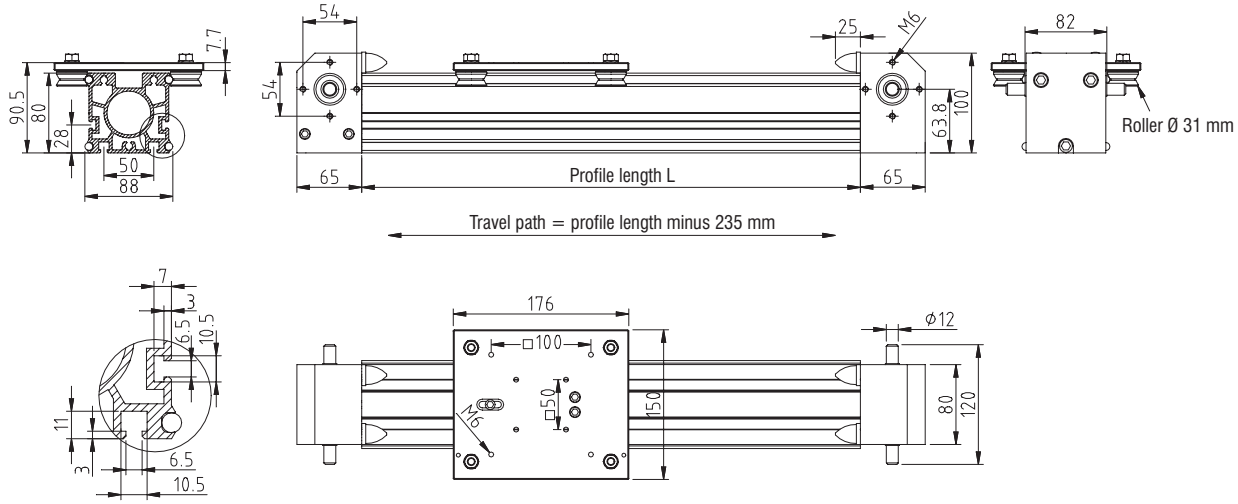
Feed: 70 mm/revolution



Timing belt feed axis

with carriage

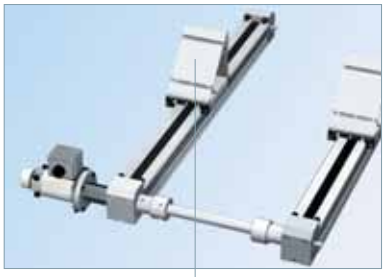
Feed: 70 mm/revolution

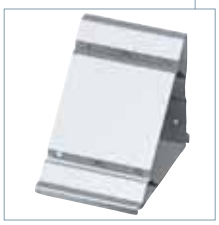


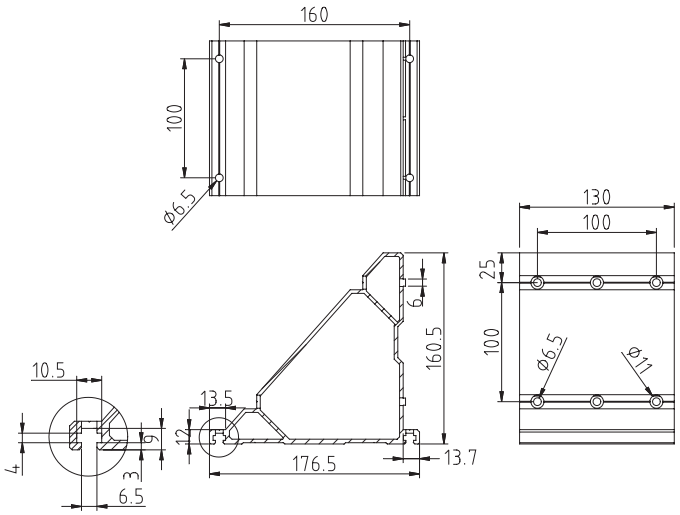
mechanics

Timing Belt Feed Axis ZF 3

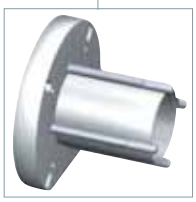
Mounting angle

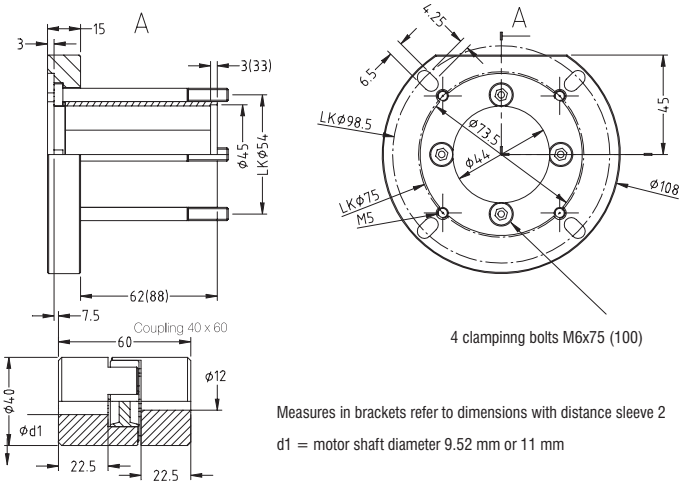






Coupling casing set 2



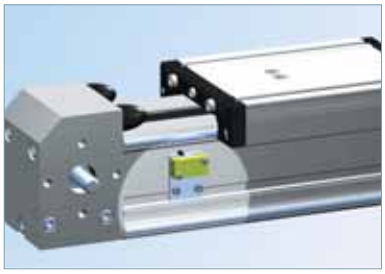


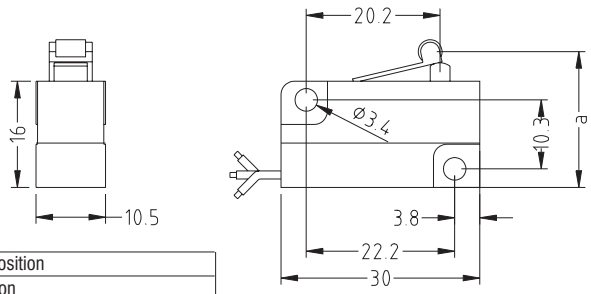
4 clampinng bolts M6x75 (100)

Measures in brackets refer to dimensions with distance sleeve 2

d1 = motor shaft diameter 9.52 mm or 11 mm

Limit switch





Dimensions a (mm)	Actuator position
21.9 ± 0.3	Rest position
20.7 ± 0.4	Switching point
21.0 ± 0.4	Back-switch point
18.9 ± max.	End position (minimum measure)

Timing Belt Feed Axis ZF 3

Drive modules

Stepping motor MS 430 HT

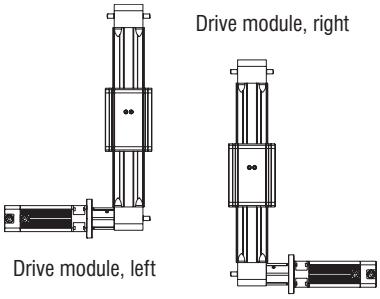
Holding torque – bipolar..... 600 Ncm
Stepping angle, full step..... 1.8 degree
Stepping angle, half-step.....0.9 degree
Nominal voltage – bipolar.....2.8 V
Resistance of winding..... 0.66 Ω
Winding inductivity.....2.5 mH
Current of winding – bipolar....5.9 A

DC servo motor MV 330

Nominal power.....330 W
Nominal speed.....3,000 rpm
Nominal torque.....100 Ncm
Current at nominal torque.....6.5 A
Nominal voltage.....65 V
Peak torque.....539 Ncm
Current at peak torque..... 30 A
Ambient temperature.....0 - 40 °C

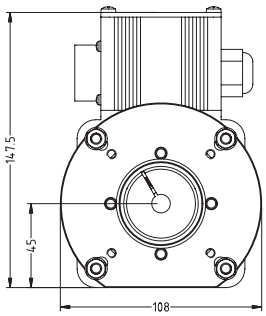
AC servo motor MY 073

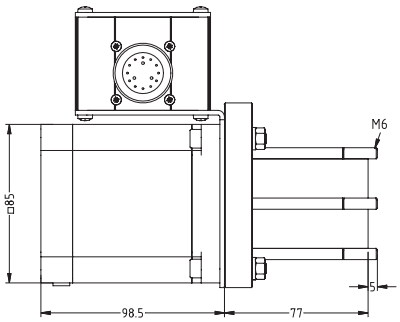
Nominal power.....830 W
Nominal speed.....4,000 rpm
Nominal permanent torque..... 200 Ncm
Nominal permanent current..... 4.7 A
Voltage constant.....26.3 V/1,000
Moment of inertia of rotor.....0.57 kgcm²



Drive module with stepper motor MS-430 HT

Feed: 70 mm / rev.

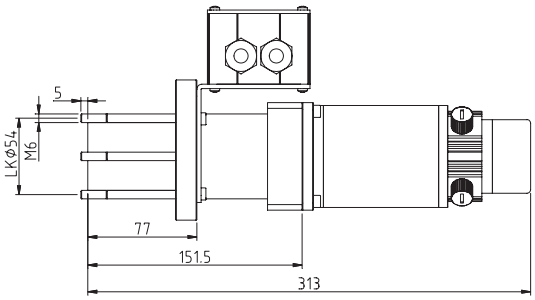


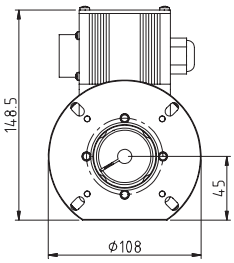


Timing Belt Feed Axis ZF 3

Drive module with DC servo motor MV 330

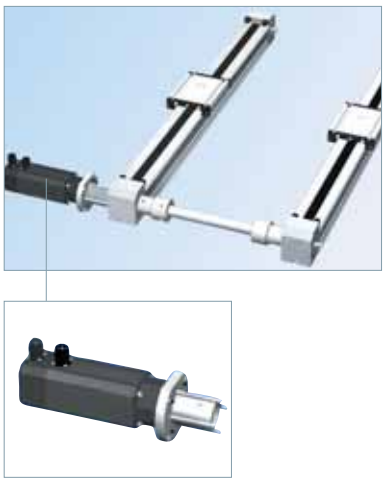
Feed: 70 mm/revolution

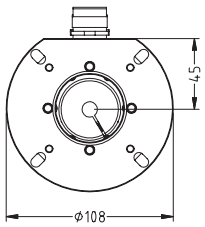


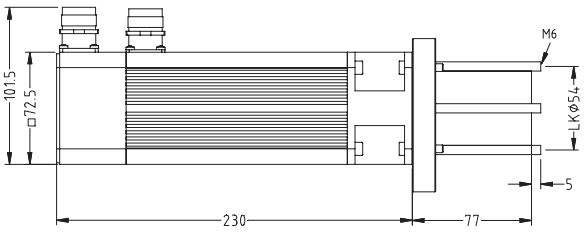


Drive module with AC servo motor MY 073

Feed: 70 mm/revolution

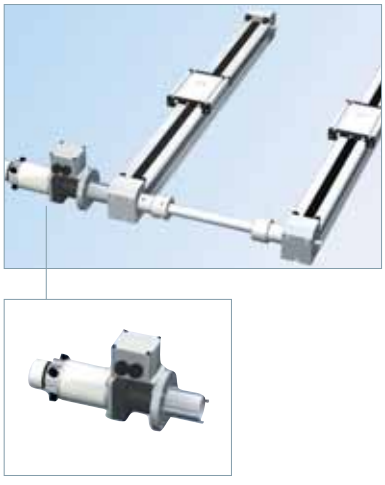


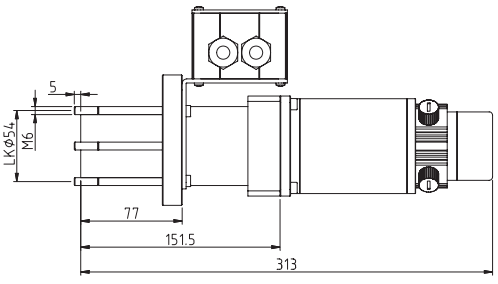


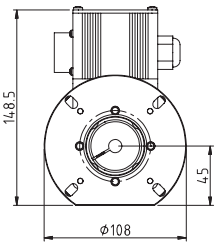


Drive module with DC servo motor MV 330 (reduction 3:1)

Feed: 150 mm/revolution



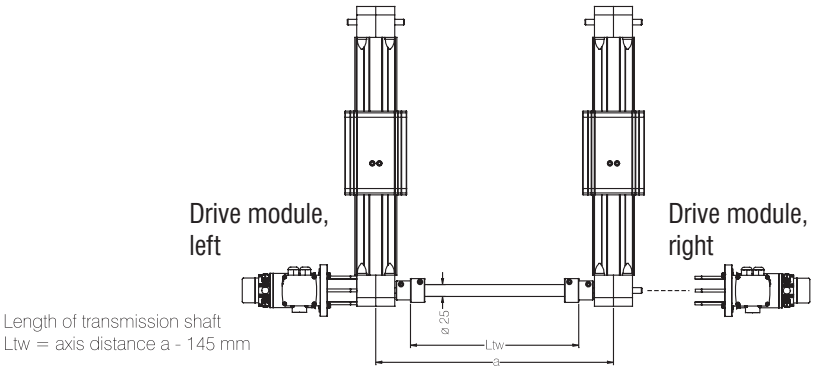




Timing Belt Feed Axis ZF 3

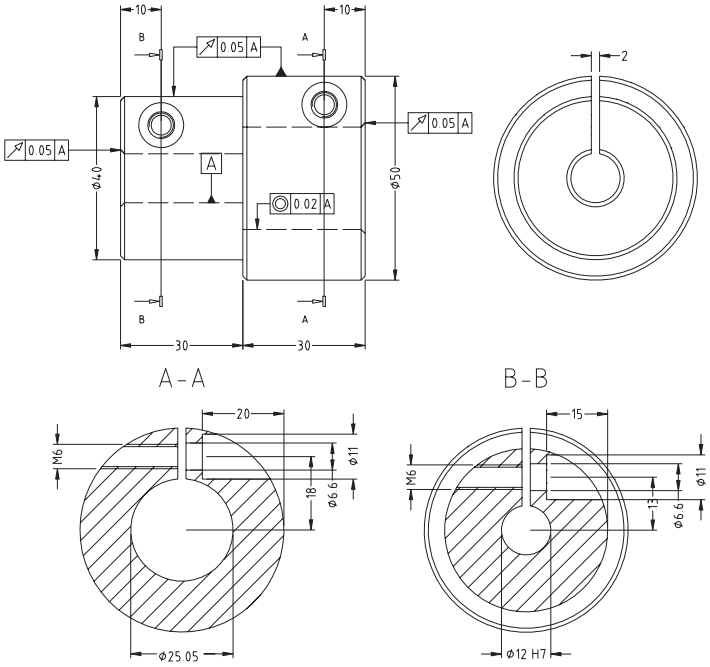
Connection of two timing belt feed axes

Transmission shaft



Connection of two timing belt feed axes

Coupling for transmission shaft



Moments of inertia

for coupling and transmission shaft

Coupling

$J_k = 6.643\ 10^{-5}\ kgm^2$

Transmission shaft (per 100 mm)

$J_{Trs} = 5.218\ 10^{-6}\ kgm^2/100\ mm$

mechanics

Timing Belt Feed Axis ZF 3

Order key

23200 X X XXX

Feed
6 = 150 mm/revolution
7 = 70 mm/revolution

Slide, carriages
0 = with shaft slide
1 = with carriage

Profile lengths (mm)
698; 998; 1,498; 1,998; 2,498; 2,998
(e. g. 698 mm = 070
1,498 mm = 150)

Drives *

		Drive on the right side Item no.	Drive on the left side Item no.
Stepping motor	MS 430 HT	396085 0193	396085 0020
DC servo motor	MV 330	396104 0093	396104 0020
DC servo motor	MV 330 (ratio 3:1)	396134 0093	396134 0020
AC servo motor	MY 073	396573 0020	396573 0020

* Please, order the drive modules separately; use the above-stated item numbers for this purpose. Do not forget to specify whether the delivery should take place with or without extension. Regarding the AC servo motor MY 073, the driving side has to be stated separately.

Order samples

- with stepping motor MS 430 HT
- feed 70 mm/revolution
- motor connection, left
- with shaft slide
- basic profile length 698 mm

Item no.: **232007 0070** (feed)
item no.: **396085 0020** (drive)

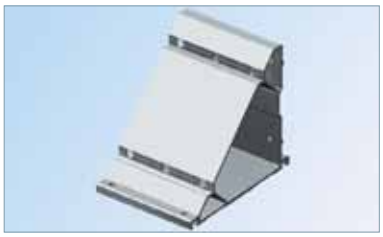
- with DC servo motor MV 330
- feed 70 mm/revolution
- motor connection, left
- with shaft slide
- basic profile length 698 mm

Item no.: **232007 0070** (feed)
item no.: **396104 0020** (drive)

- with AC servo motor MY 073
- feed 70 mm/revolution
- motor connection, left
- with shaft slide
- basic profile length 698 mm

Item no.: **232007 0070** (feed)
item no.: **396573 0020** (drive)

Accessory



Angle brackets
- for ZF 3
- incl. fastening

Item no.: **232199 0005**

Coupling for transmission shaft
- for ZF 3
- packaging unit: 2 couplings

Item no.: **218050 0002**

Transmission shaft Ø 25 mm
- for ZF 3

Length 1 m, item no.: **219001 0125**
Length 2 m, item no.: **219001 0225**

Drive Dimensioning

Calculation of the drive torques

Basically, the necessary drive torque consists of "load moment", "acceleration torque" and "idle torque".

Definitions

M_A [Nm]	Necessary drive torque
M_{Last} [Nm]	Moment resulting from the different loads
M_{Leer} [Nm]*	Idle torque
M_{rot} [Nm]	Rotatory acceleration torque
M_{trans} [Nm]	Translatory acceleration torque
F_x [N]	Feed force
F_a [N]	G force
g [m/s²]	Gravity = 9.81
V_{max} [m/s]*	Maximum traverse speed
m [kg]	Total mass to be moved
a [m/s²]	Acceleration
d_0 [mm]*	Effective diameter of the synchronized pulley
P [kW]	Drive capacity
J_{syn} [kgm²]*	Moment of inertia of the synchronized pulleys
n_{max} [1/min]	Maximum speed
μ	Friction factor = 0.1
[kg/m]*	Specific mass of timing belt
i	Transmission ratio

m = transport mass
+mass of the slide
+mass of the timing belt

Mass of the timing belt =

$$\frac{\text{Specific mass} \cdot 2 \cdot \text{Length of feed profile}}{1000}$$

* The particulars are stated on the respective data sheets.

Feed force F_x

$$F_x = m \cdot g \cdot \mu$$

G force F_a

$$F_a = m \cdot a$$

At vertical operation, the gravity g has to be added to the mass acceleration a. (g = 9,81 m/s²).

Drive capacity P

$$P = \frac{M_A \cdot n_{max} \cdot 2 \cdot \pi}{2 \cdot 1000}$$

Resulting moment M_{Last}

$$M_{Last} = \frac{F_x \cdot d_0}{2 \cdot 1000}$$

Translatory acceleration torque M_{trans}

$$M_{Trans} = \frac{F_a \cdot d_0}{2 \cdot 1000}$$

Rotary acceleration torque M_{rot}

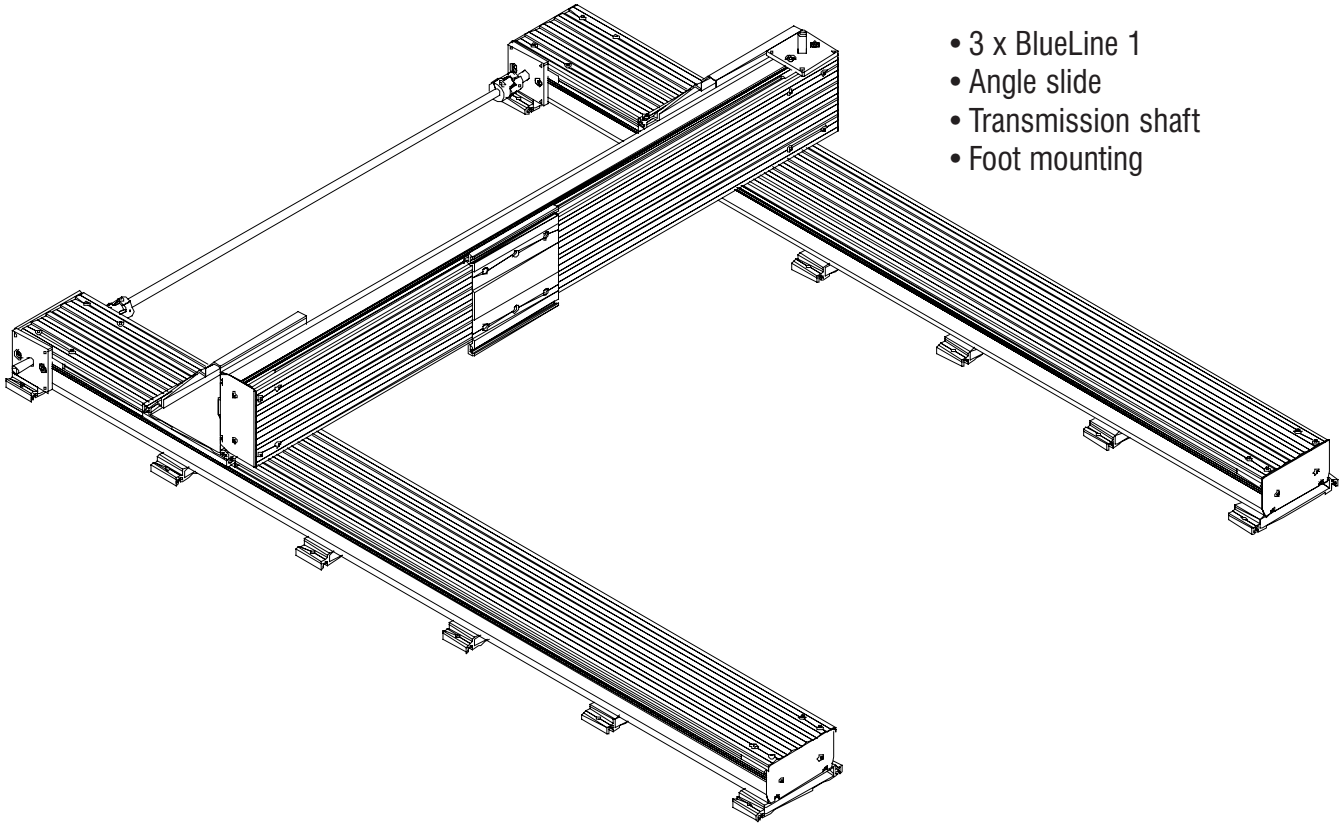
$$M_{rot} = J_{syn} \cdot \frac{n_{max} \cdot 2 \cdot \pi \cdot a}{60 \cdot V_{max}}$$

$$\mathbf{M_A = M_{Last} + M_{trans} + M_{rot} + M_{leer}}$$

Application Samples

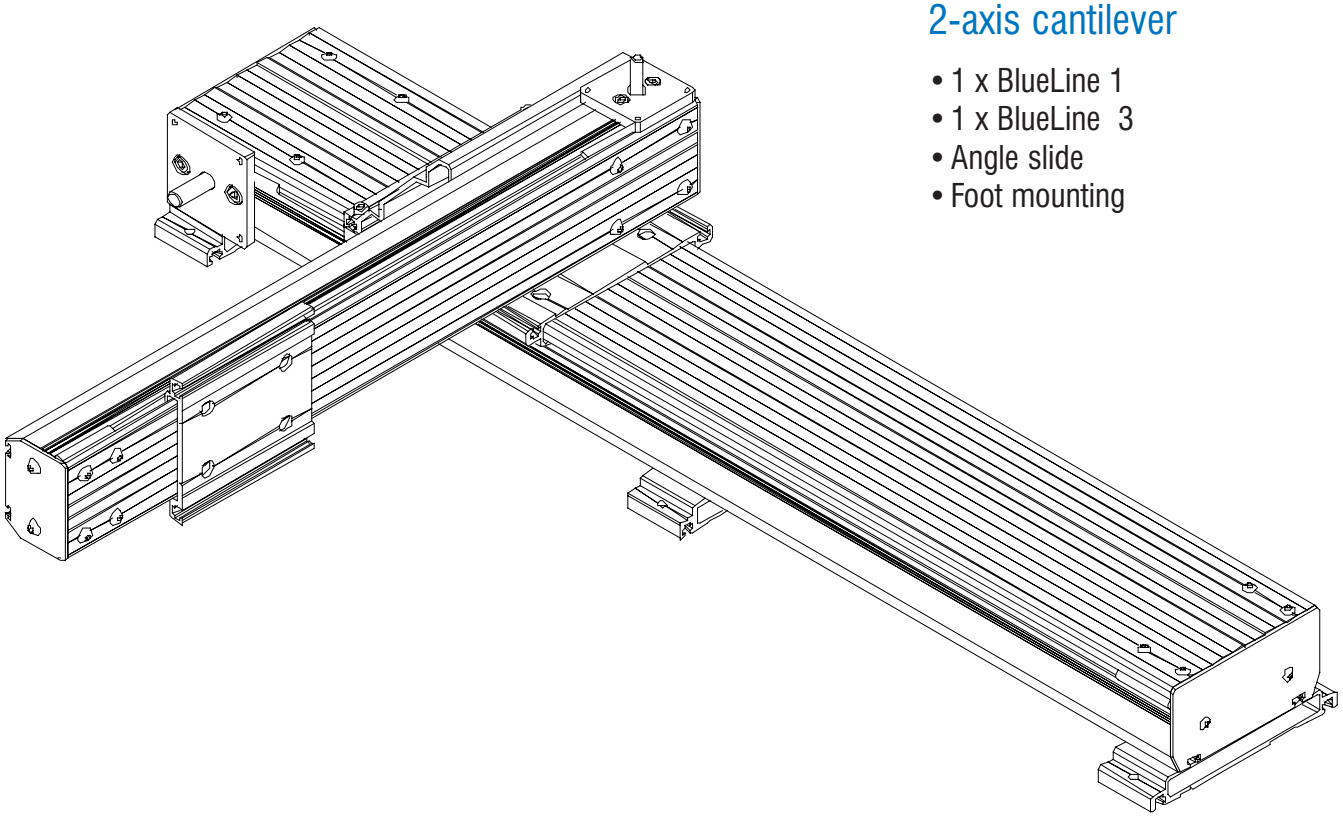
2-axis H-construction

- 3 x BlueLine 1
- Angle slide
- Transmission shaft
- Foot mounting



2-axis cantilever

- 1 x BlueLine 1
- 1 x BlueLine 3
- Angle slide
- Foot mounting



Application Samples

Compound table ZF 1

- 2 x ZF 1