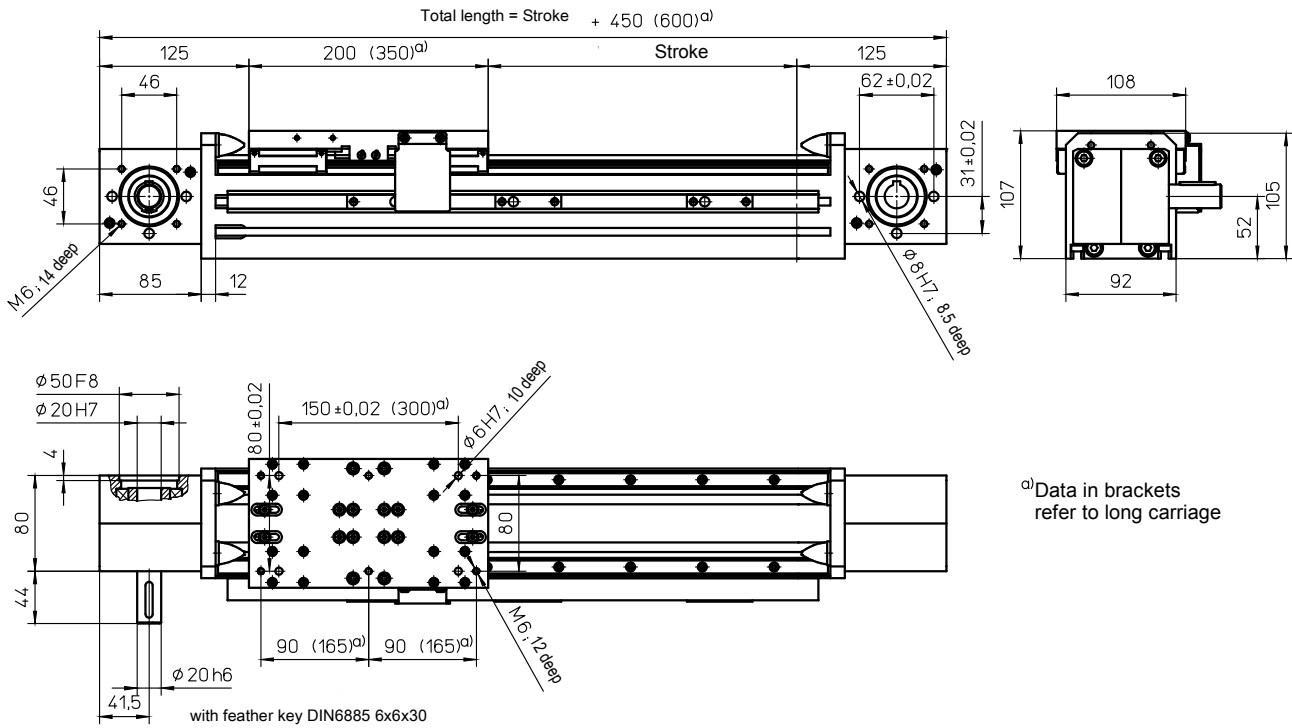


Chapter G

Portal Linear Drive

HSB-gamma[®]

with toothed belt drive and double linear guide (ZSS)



Weights

ZSS

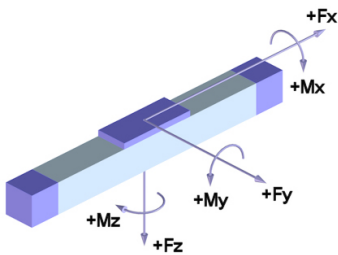
Basic length without stroke:	10.90 kg
100 mm stroke:	1.00 kg
Entire carriage 200 mm:	2.30 kg
Entire carriage 350 mm:	3.00 kg
Max. total length: (longer on request)	8100 mm

Technical Data

ZSS

Max. speed:	5.00 m/s
Max. acceleration:	60 m/s ²
Repeat accuracy:	± 0.08 mm
Idle torque:	3.20 Nm
Moment of inertia:	3.15 · 10 ⁻³ kgm ²
Drive element:	toothed belt 32 AT10
Stroke per revolution:	210 mm

Forces and moments

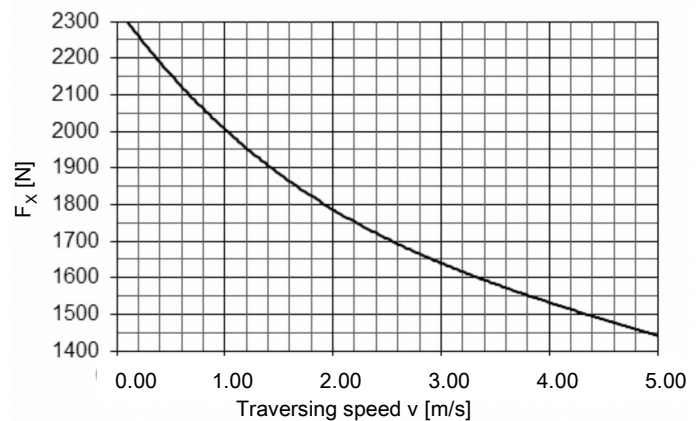


ZSS	
Forces	Dynamic [N]
$F_x^{c)}$	2300
F_y	2500
F_z	3000
Moments	dynamic [Nm]
M_x	500
M_y	1200 (2500)
M_z	1000 (2100)

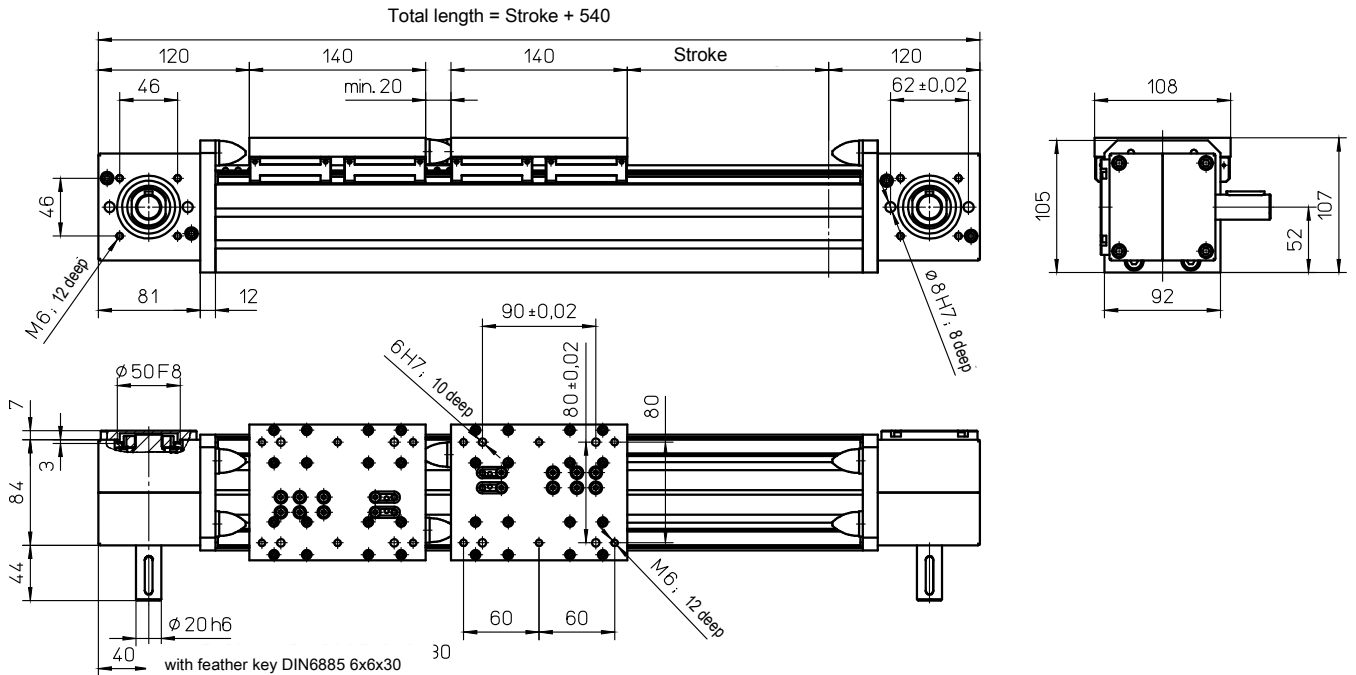
c) Maximum value (see diagram "F_x-v-Diagram")

Data in brackets refer to long carriage (350)

F_x - v - Diagram



With toothed belt drive and double linear guide a second independently travelling carriage (ZSSD)



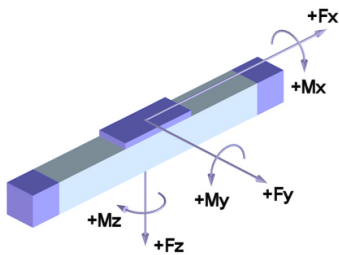
Weights ZSSD

Basic length without stroke:	11.50 kg
100 mm stroke:	1.00 kg
Entire carriage 140 mm:	1.90 kg
Max. total length:	8100 mm
(longer on request)	

Technical Data ZSSD

Max. speed:	5.00 m/s
Max. acceleration:	60 m/s ²
Repeat accuracy:	± 0.08 mm
Idle torque:	2.90 Nm
Moment of inertia:	2.20 · 10 ⁻³ kgm ²
Drive element:	2 x toothed belt 16 AT10
Stroke per revolution:	200 mm

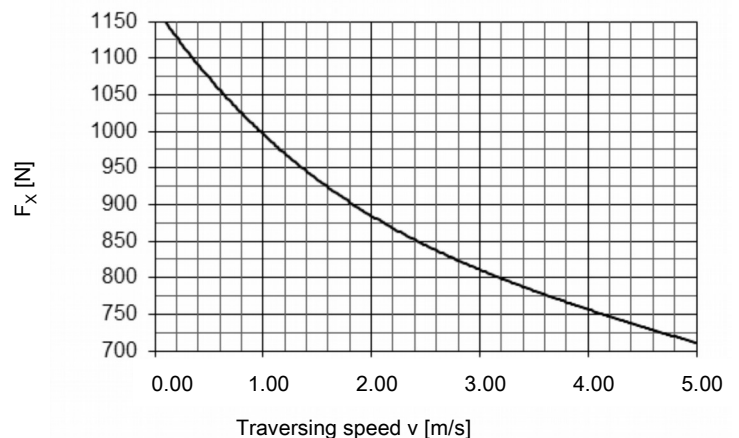
Forces and moments



ZSSD	
Forces	Dynamic [N]
$F_x^{c)}$	1150
F_y	2500
F_z	3000
Moments	Dynamic [Nm]
M_x	400
M_y	1000
M_z	800

^{c)} Maximum value (see diagram "F_x-v-Diagram")

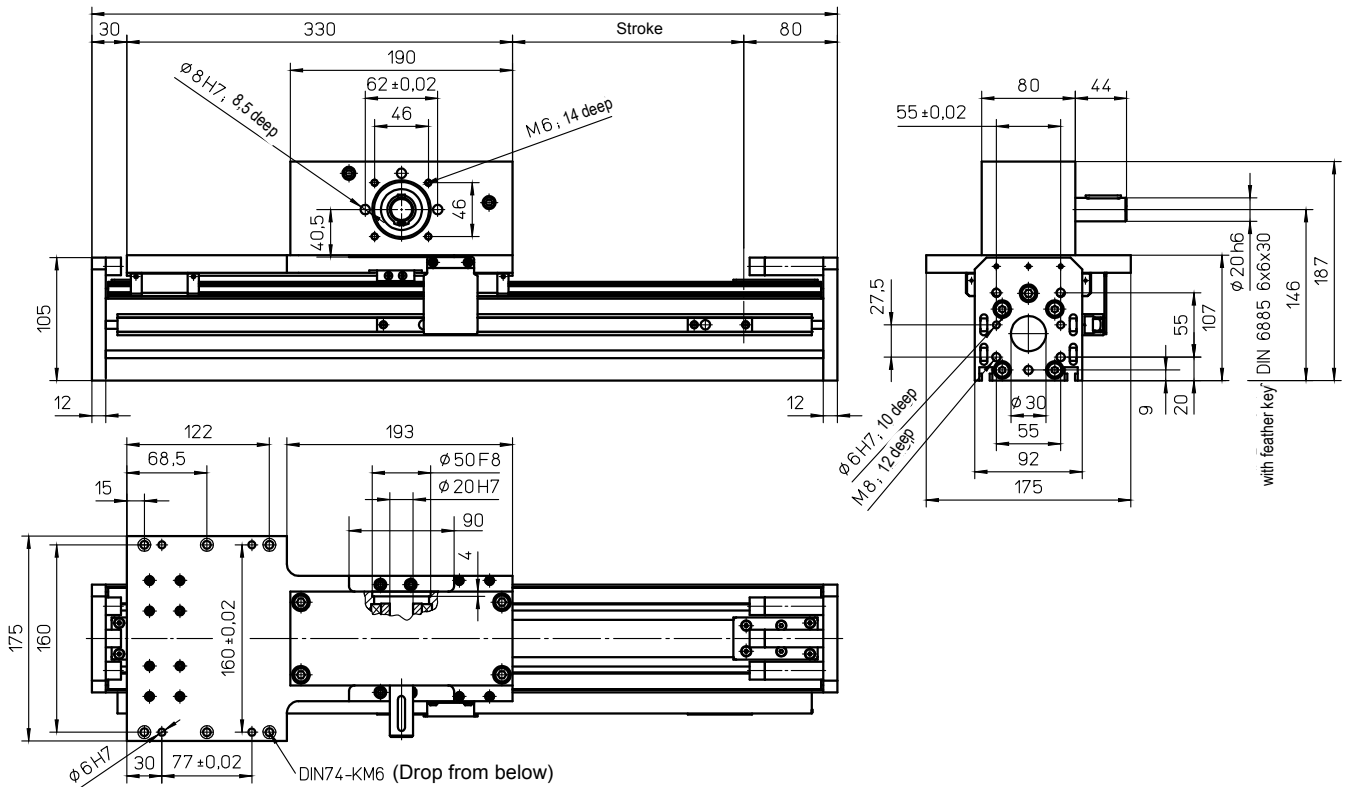
F_x - v - Diagram



These data apply to each carriage.

with toothed belt drive and double linear guide (ASH)

Total length = Stroke + 440



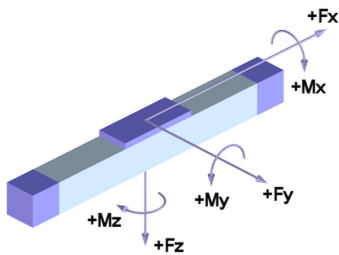
Weights

	ASH
Basic length without stroke:	11.00 kg
100 mm stroke:	1.00 kg
Entire carriage 330 mm:	6.55 kg
Max. total length: (longer on request)	8000 mm

Technical Data

	ASH
Max. speed:	5.00 m/s
Max. acceleration:	60 m/s ²
Repeat accuracy:	± 0.08 mm
Idle torque:	3.20 Nm
Moment of inertia: *	7.70 · 10 ⁻³ kgm ²
Drive element:	Toothed belt 32 AT10
Stroke per revolution:	210 mm

Forces and Moments

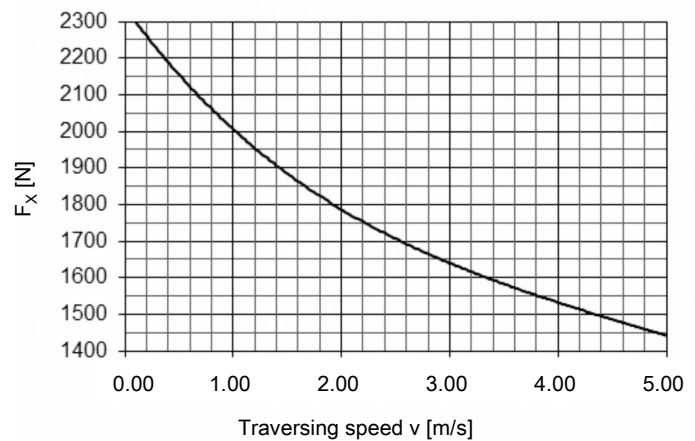


	ASH
Forces	Dynamic [N]
$F_x^{(c)}$	2300
F_y	2500
F_z	3000
Moments	Dynamic [Nm]
M_x	500
M_y	2300
M_z	1900

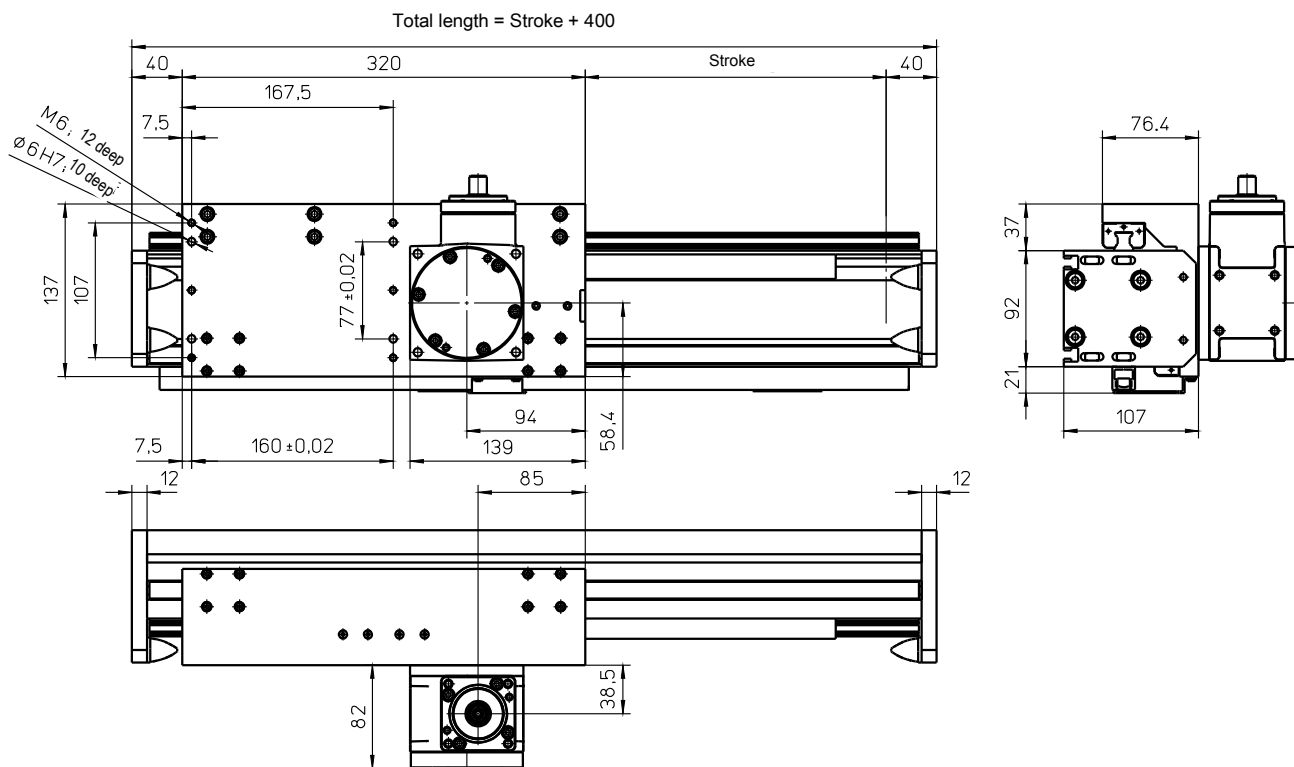
^{c)} Maximum value (see diagram "F_x-v-Diagram")

* (entire carriage traverses)

F_x - v - Diagram



with rack-and-pinion drive (helical) and double linear guide (AZSS)



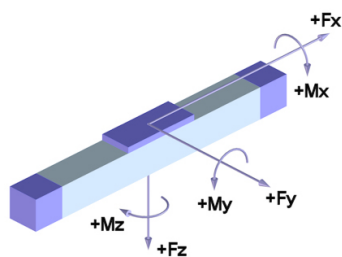
Weights

AZSS

Basic length without stroke:	14.85 kg*
100 mm stroke:	1.30 kg
Carriage 320 mm:	4.20 kg
Gear D55:	3.70 kg

Max. total length: 8000 mm
(longer on request)

Forces and Moments



AZSS-D55	
Forces	Dynamic [N]
F_x	1300-1800 **
F_y	3000
F_z	3000
Moments	Dynamic [Nm]
M_x	600
M_y	1800
M_z	1800

Technical Data

Max. speed:	3.20 m/s
Max. acceleration:	20 m/s ²
Repeat accuracy:	± 0.05 mm
Idle torque at drive pinion:	2.5 Nm
Rack and pinion:	Module 2 helical
Drive pinion:	Module 2, 18 teeth
Stroke per revolution:	120 mm
Servo-high-performance-gear:	MS-Graessner DynaGear D55
Ratios:	5 / 10 / 15

AZSS

D55	
Force F_x	Dynamic [N]
$i = 5:1$	1800
$i = 10:1$	
$i = 15:1$	1300

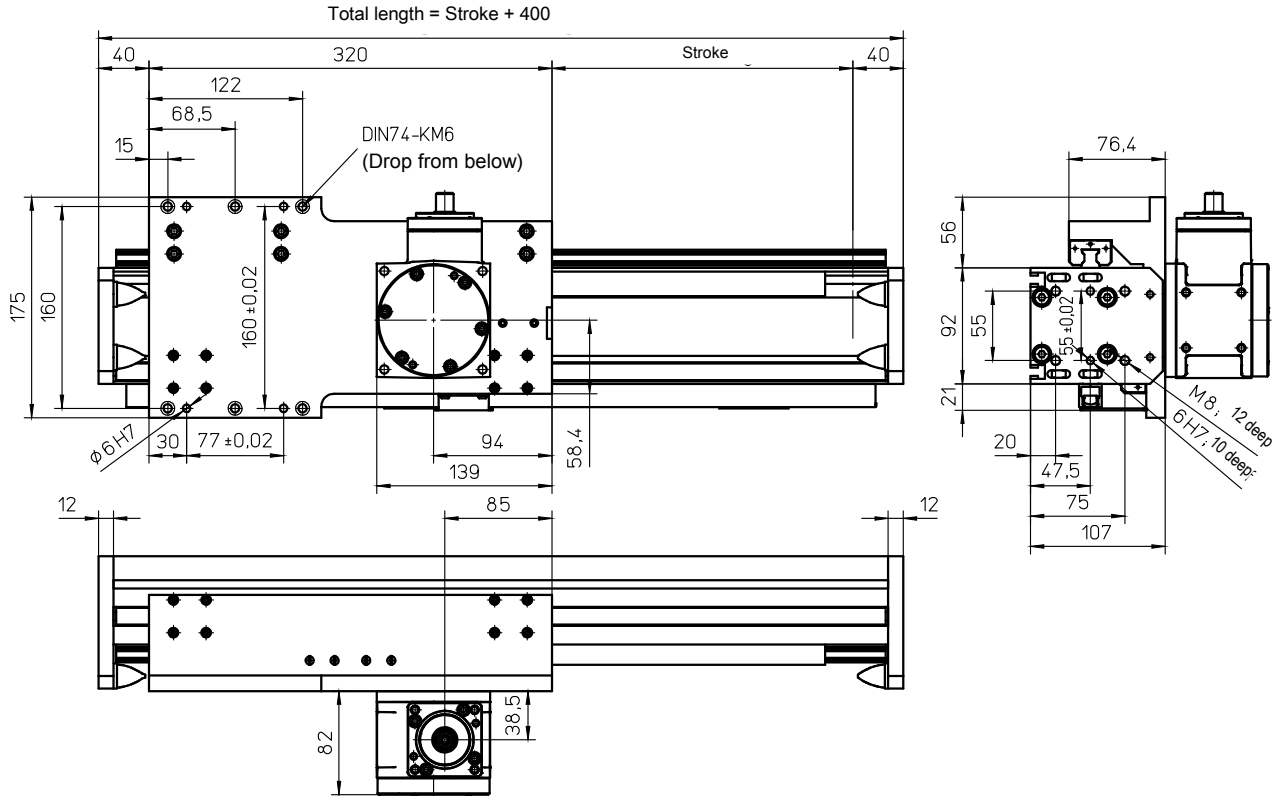
Efficiency of gears: > 96 %

The gears can be turned 90° or the entire carriage mirrored.

* inclusive gear

** depending on gear ratio (see table to right)

with rack-and-pinion drive (helical) and double linear guide (AZSH)



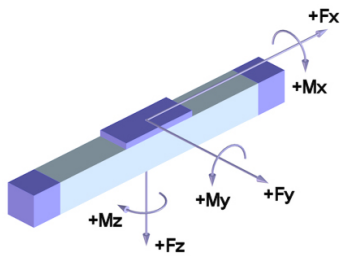
Weights

AZSH

Basic length without stroke:	15.00 kg*
100 mm stroke:	1.30 kg
Carriage 320 mm:	4.35 kg
Gear D55:	3.70 kg

Max. total length: 8000 mm
(longer on request)

Forces and Moments



AZSH-D55	
Forces	Dynamic [N]
F_x	1300-1800 **
F_y	3000
F_z	3000
Moments	Dynamic [Nm]
M_x	600
M_y	1800
M_z	1800

Technical Data

AZSH

Max. speed:	3.20 m/s
Max. acceleration:	20 m/s ²
Repeat accuracy:	± 0.05 mm
Idle torque at drive pinion:	2.5 Nm
Rack and pinion:	Modul 2 helical
Drive pinion:	Modul 2, 18 teeth
Stroke per revolution:	120 mm
Servo-high-performance-gear:	MS-Graessner DynaGear D55
Ratios:	5 / 10 / 15

D55	
Force F_x	Dynamic [N]
$i = 5:1$	1800
$i = 10:1$	
$i = 15:1$	1300

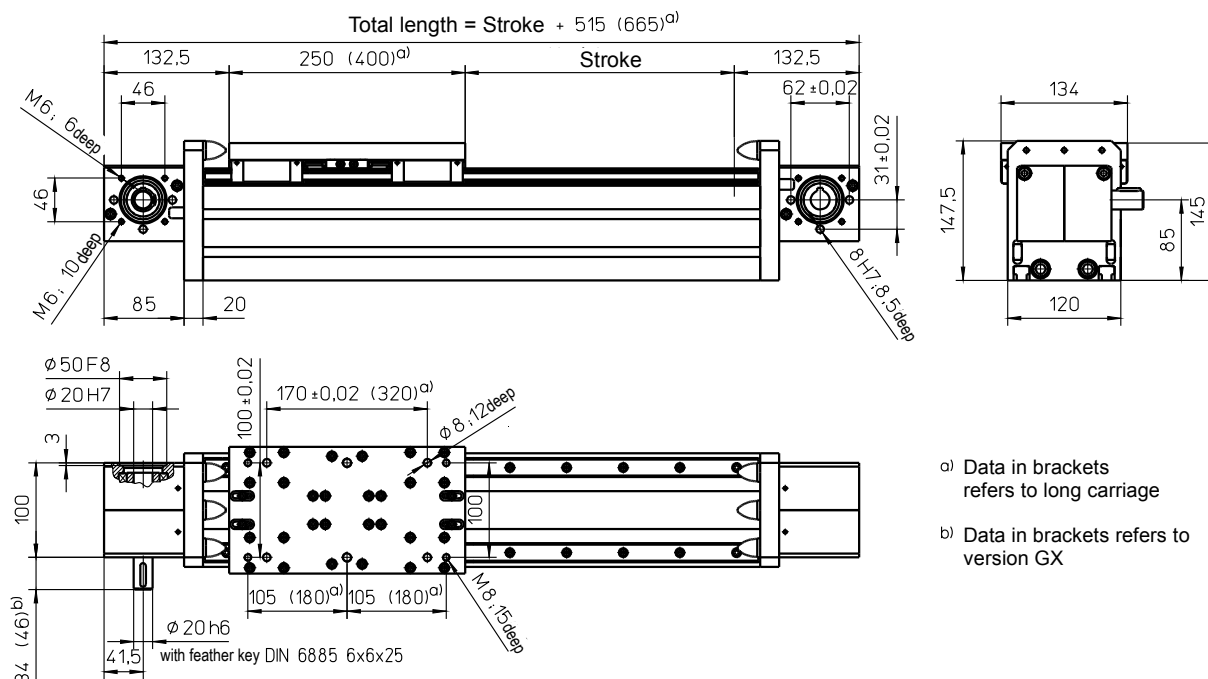
Efficiency of gears: > 96 %

The gears can be turned 90° or the entire carriage mirrored.

* inclusive gear

** depending on gear ratio (see table to right)

with toothed belt drive and double linear guide (ZSS)



^{a)} Data in brackets refers to long carriage
^{b)} Data in brackets refers to version GX

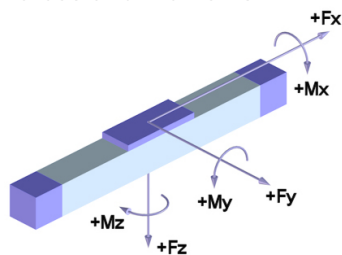
Weights ZSS

Basic length without stroke:	19.35 kg
100 mm stroke:	1.65 kg
Entire carriage 250 mm:	4.25 kg
Entire carriage 400 mm:	5.25 kg
Max. total length: (longer on request)	8200 mm

Technical Data ZSS

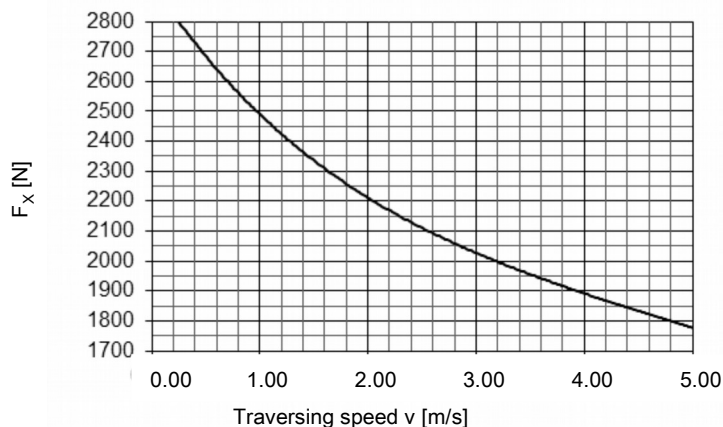
Max. speed:	5.00 m/s
Max. acceleration:	60 m/s ²
Repeat accuracy:	± 0.08 mm
Idle torque:	3.00 Nm
Moment of inertia:	4.90 · 10 ⁻³ kgm ²
Drive element:	Toothed belt 40 AT10-E
Stroke per revolution:	200 mm

Forces and moments



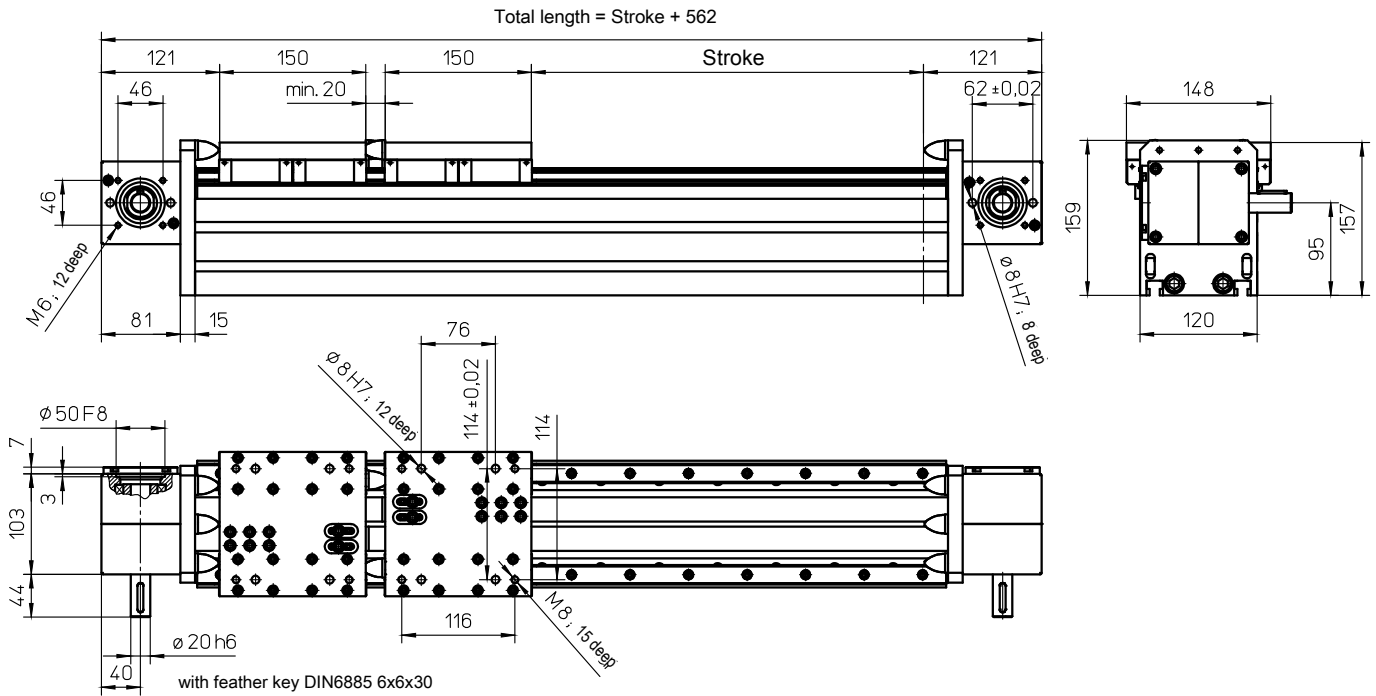
ZSS	
Forces	Dynamic [N]
F_x ^{c)}	2800
F_y	6000
F_z	8000
Moments	Dynamic [Nm]
M_x	1200
M_y	3000 (5000)
M_z	2500 (4200)

F_x - v - Diagram



^{c)} Maximum value (see diagram " F_x -v-Diagram")
 Data in brackets refers to long carriage (400)

with toothed belt drive and double linear guide and a second independently travelling carriage



Weights

ZSSD

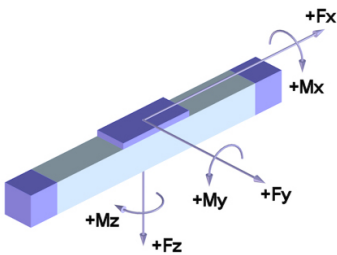
Basic length without stroke:	19.40 kg
100 mm stroke:	1.90 kg
Entire carriage 150 mm:	3.40 kg
Max. total length: (longer on request)	8200 mm

Technical Data

ZSSD

Max. speed:	5.00 m/s
Max. acceleration:	60 m/s ²
Repeat accuracy:	± 0,08 mm
Idle torque:	3.00 Nm
Moment of inertia:	3.90 • 10 ⁻³ kgm ²
Drive element:	2 x Toothed belt 25 ATL10
Stroke per revolution:	200 mm

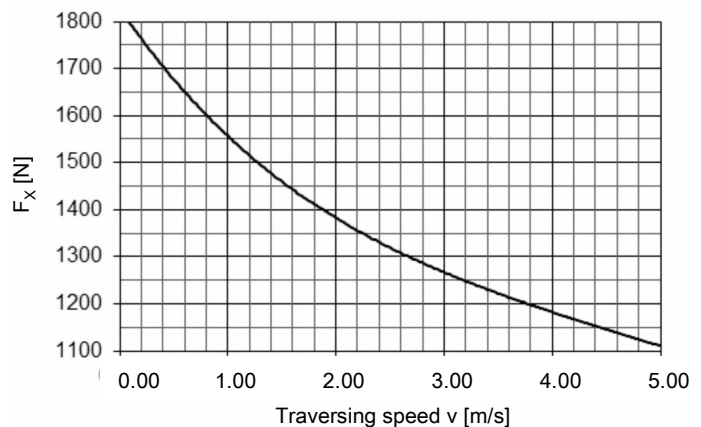
Forces and moments



ZSSD	
Forces	Dynamic [N]
$F_x^{c)}$	1800
F_y	6000
F_z	8000
Moments	Dynamic [Nm]
M_x	1200
M_y	1300
M_z	1100

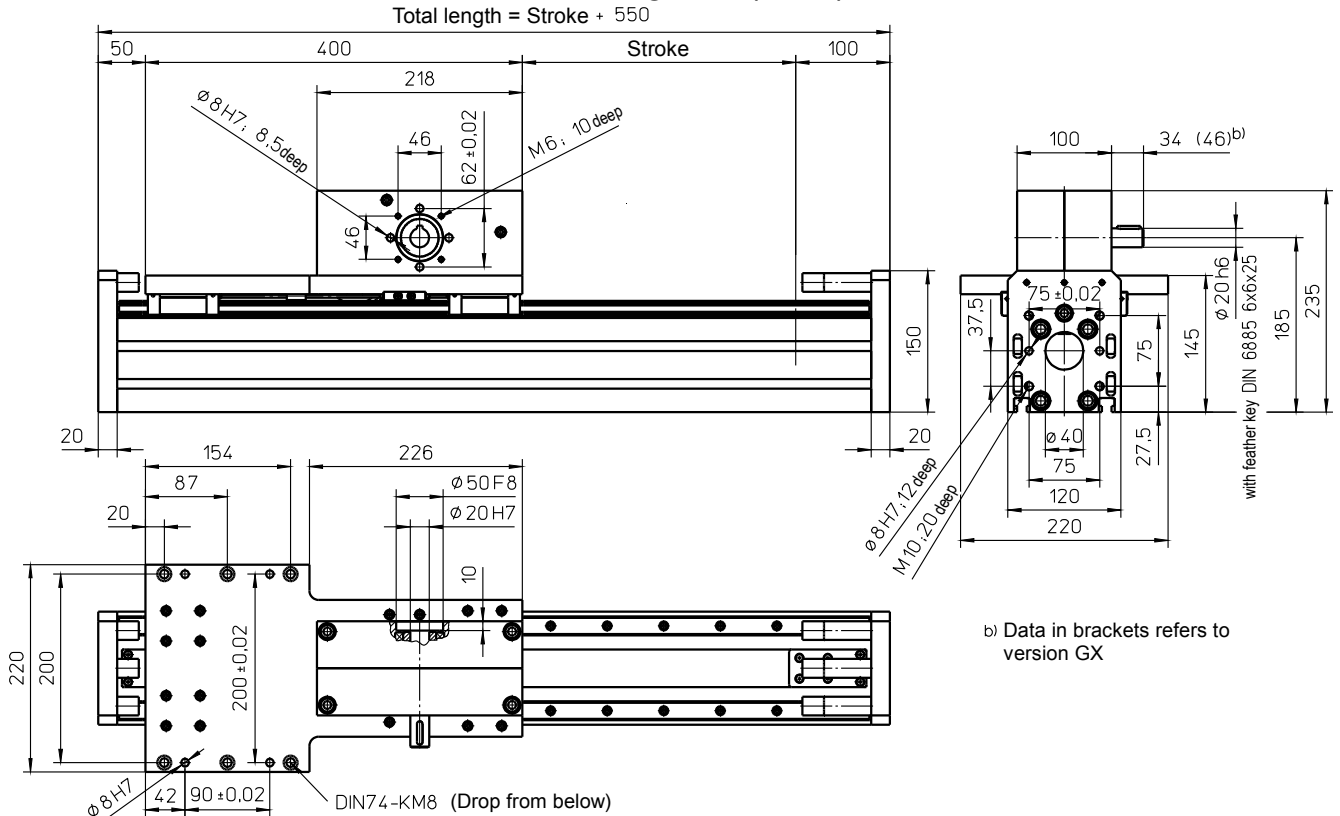
^{c)} Maximum value (see diagram "F_x-v-Diagram")

F_x - v - Diagram



These data apply to each carriage.

with toothed belt drive and double linear guide (ASH)



Weights

ASH

Basic length without stroke:	21.35 kg
100 mm stroke:	1.65 kg
Entire carriage 400 mm:	10.25 kg

Max. total length: 8000 mm
(longer on request)

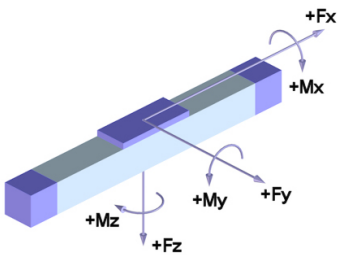
Technical Data

ASH

Max. speed:	5.00 m/s
Max. acceleration:	60 m/s ²
Repeat accuracy:	± 0.08 mm
Idle torque:	3.60 Nm
Moment of inertia: [*]	1.57 · 10 ⁻² kgm ²
Drive element:	Toothed belt 40 AT10-E
Stroke per revolution:	240 mm

^{*} (entire carriage traverse)

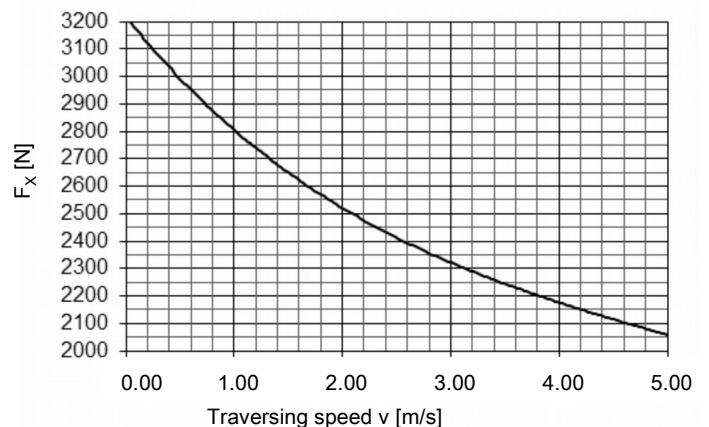
Forces and moments



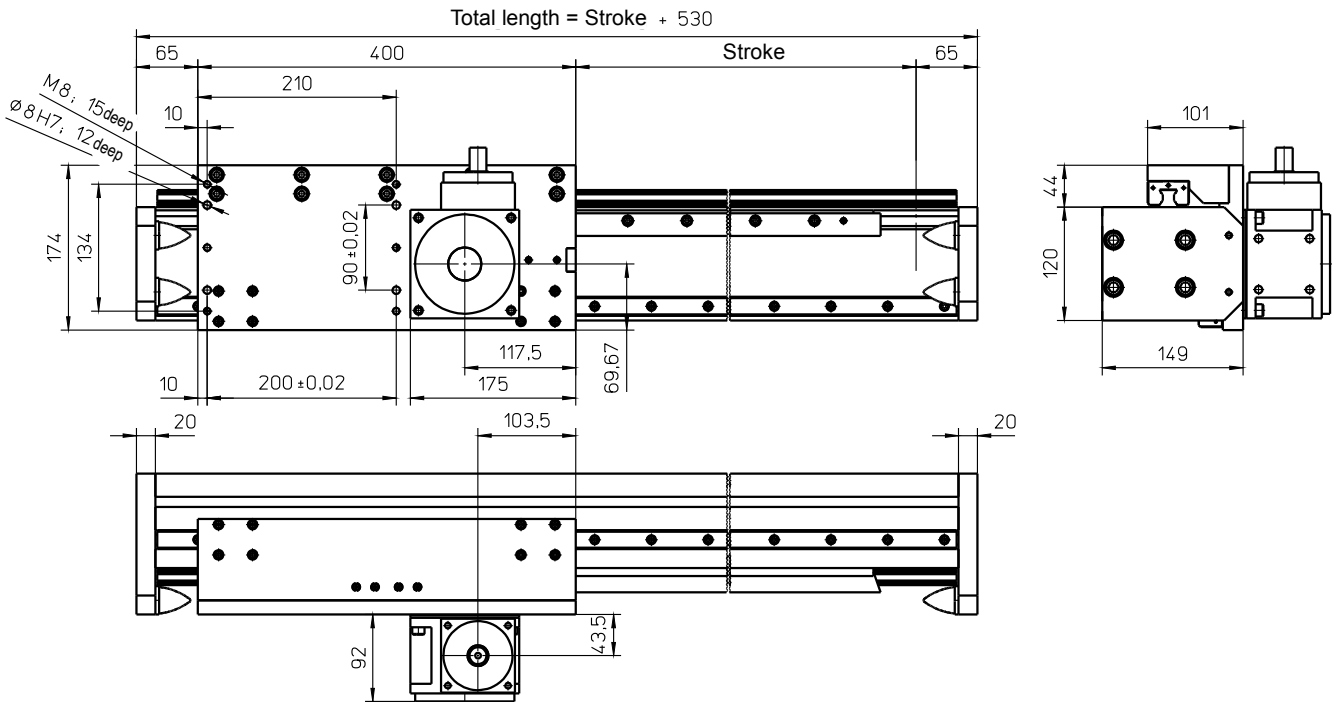
ASH	
Forces	Dynamic [N]
F_x ^{c)}	3200
F_y	6000
F_z	8000
Moments	Dynamic [Nm]
M_x	1200
M_y	5000
M_z	4200

^{c)} Maximum value (see diagram "F_x-v-Diagram")

F_x - v - Diagram



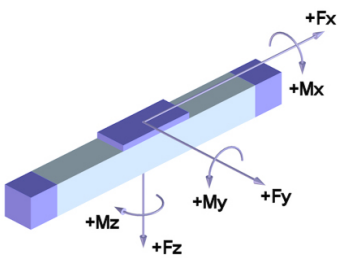
with rack-and-pinion drive (helical) and double linear guide (AZSS)



Weights

	AZSS
Basic length without stroke:	25.85 kg*
100 mm stroke:	2.10 kg
Carriage 400 mm:	8.20 kg
Gear D75:	6.30 kg
Max. total length: (longer on request)	8000 mm

Forces and moments



AZSS-D75	
Forces	Dynamic [N]
F_x	1500-2200 **
F_y	8000
F_z	8000
Moments	Dynamic [Nm]
M_x	1500
M_y	4000
M_z	4000

Technical Data

	AZSS
Max. speed:	5.00 m/s
Max. acceleration:	20 m/s ²
Repeat accuracy:	± 0.05 mm
Idle torque at drive pinion:	4.80 Nm
Rack and pinion:	Module 2 helical
Drive pinion:	Module 2, 30 teeth
Stroke per revolution:	200 mm
Servo-high-performance-gear:	MS-Graessner DynaGear D75
Ratios:	5 / 10 / 15

D75	
Load F_x	Dynamic [N]
$i = 5:1$	2200
$i = 10:1$	
$i = 15:1$	1500

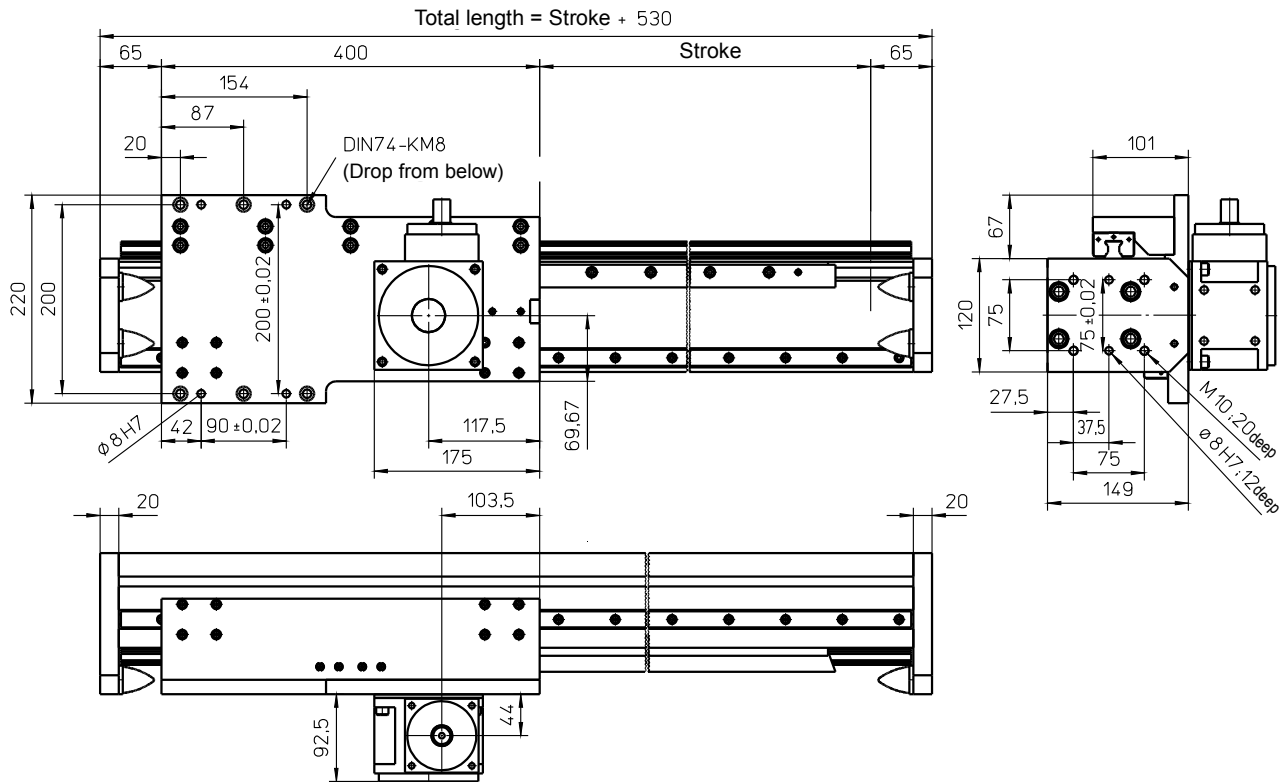
Efficiency of gears: > 96 %

The gears can be turned 90° or the entire carriage mirrored.

* inclusive gear

** depending on gear ratio (see table to right)

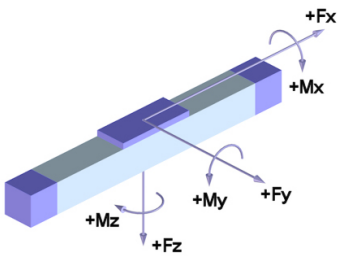
with rack-and-pinion drive (helical) and double linear guide (AZSH)



Weights

	AZSH
Basic length without stroke:	26.10 kg*
100 mm stroke:	2.10 kg
Carriage 400 mm:	8.45 kg
Gear D75:	6.30 kg
Max. total length: (longer on request)	8000 mm

Forces and moments



AZSH-D75	
Forces	Dynamic [N]
F_x	1500-2200 **
F_y	8000
F_z	8000
Moments	Dynamic [Nm]
M_x	1500
M_y	4000
M_z	4000

Technical Data

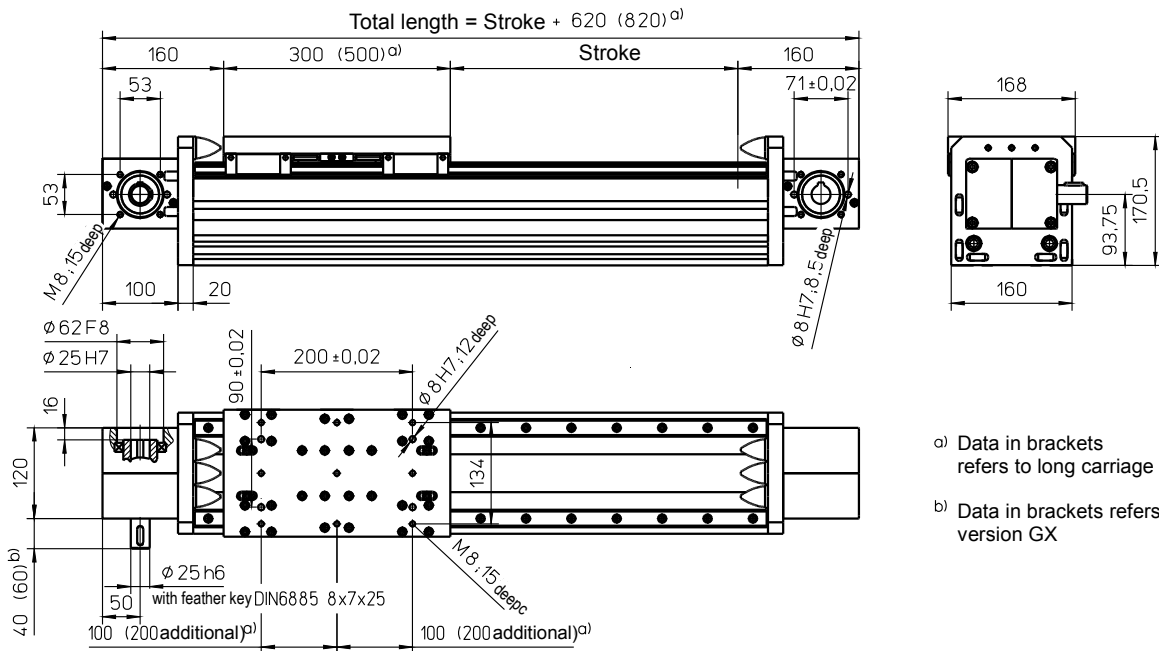
	AZSH
Max. speed:	5.00 m/s
Max. acceleration:	20 m/s ²
Repeat accuracy:	± 0.05 mm
Idle torque at drive pinion:	4.80 Nm
Rack and pinion:	Module 2 helical
Drive pinion:	Module 2, 30 teeth
Stroke per revolution:	200 mm
Servo-high-performance-gear:	MS-Graessner DynaGear D75
Ratios:	5 / 10 / 15

D75	
Load F_x	Dynamic [N]
$i = 5:1$	2200
$i = 10:1$	
$i = 15:1$	1500

Efficiency of gears: > 96 %

The gears can be turned 90° or the entire carriage mirrored.

with toothed belt drive and double linear guide (ZSS)



- a) Data in brackets refers to long carriage
- b) Data in brackets refers to version GX

Weights

ZSS

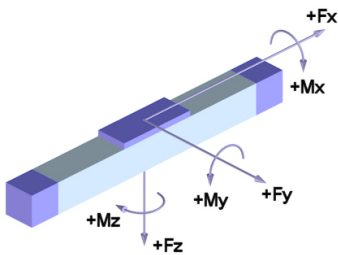
Basic length without stroke:	26.50 kg
100 mm stroke:	2.42 kg
Entire carriage 300 mm:	7.60 kg
Entire carriage 500 mm:	9.80 kg
Max. total length: (longer on request)	8200 mm

Technical Data

ZSS

Max. speed:	5.00 m/s
Max. acceleration:	60 m/s ²
Repeat accuracy:	± 0.08 mm
Idle torque:	4.00 Nm
Moment of inertia:	1.80 · 10 ⁻² kgm ²
Drive element:	Toothed belt 50 ATL10
Stroke per revolution:	240 mm

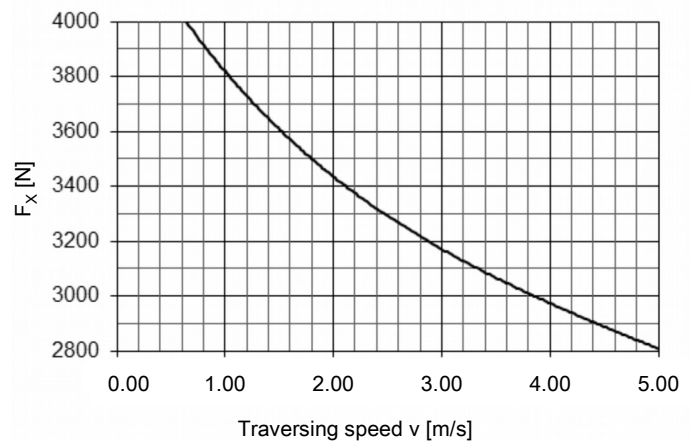
Forces and moments



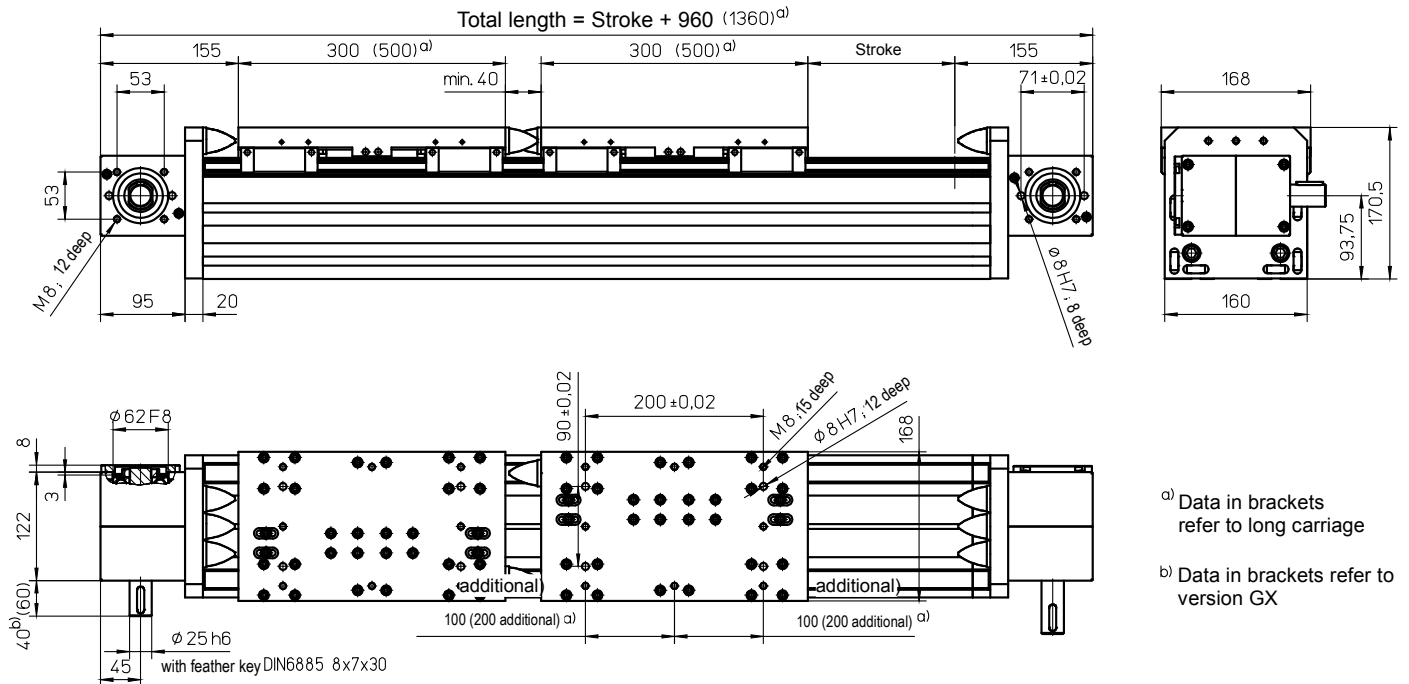
ZSS	
Forces	Dynamic [N]
F_x ^{c)}	4000
F_y	10000
F_z	16000
Moments	Dynamic [Nm]
M_x	1800
M_y	5000 (8000)
M_z	4000 (7000)

^{c)} Maximum value (see diagram "F_x-v-Diagram")
Data in brackets refers to long carriage (500)

F_x - v - Diagram



with toothed belt drive and double linear guide and a second independently travelling carriage (ZSSD)



^{a)} Data in brackets refer to long carriage

^{b)} Data in brackets refer to version GX

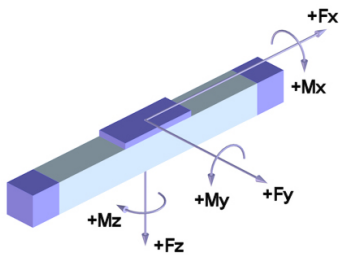
Weights ZSSD

Basic length without stroke:	39.80 kg
100 mm stroke:	2.50 kg
Entire carriage 300 mm:	7.00 kg
Entire carriage 500 mm:	9.20 kg
Max. total length:	8200 mm
(longer on request)	

Technical Data ZSSD

Max. speed:	5.00 m/s
Max. acceleration:	60 m/s ²
Repeat accuracy:	± 0.08 mm
Idle torque:	4,00 Nm
Moment of inertia:	8.75 · 10 ⁻³ kgm ²
Drive element:	2 x Toothed belt 32 AT10
Stroke per revolution:	210 mm

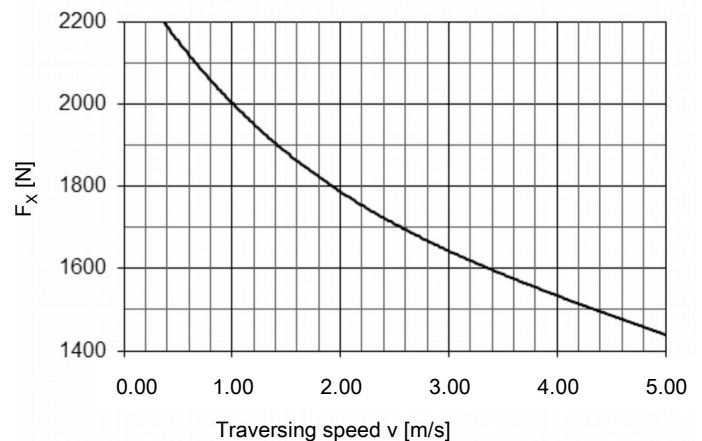
Forces and moments



ZSSD	
Forces	Dynamic [N]
F_x^{c)}	2200
F_y	10000
F_z	16000
Moments	Dynamic [Nm]
M_x	1800
M_y	5000 (8000)
M_z	4000 (7000)

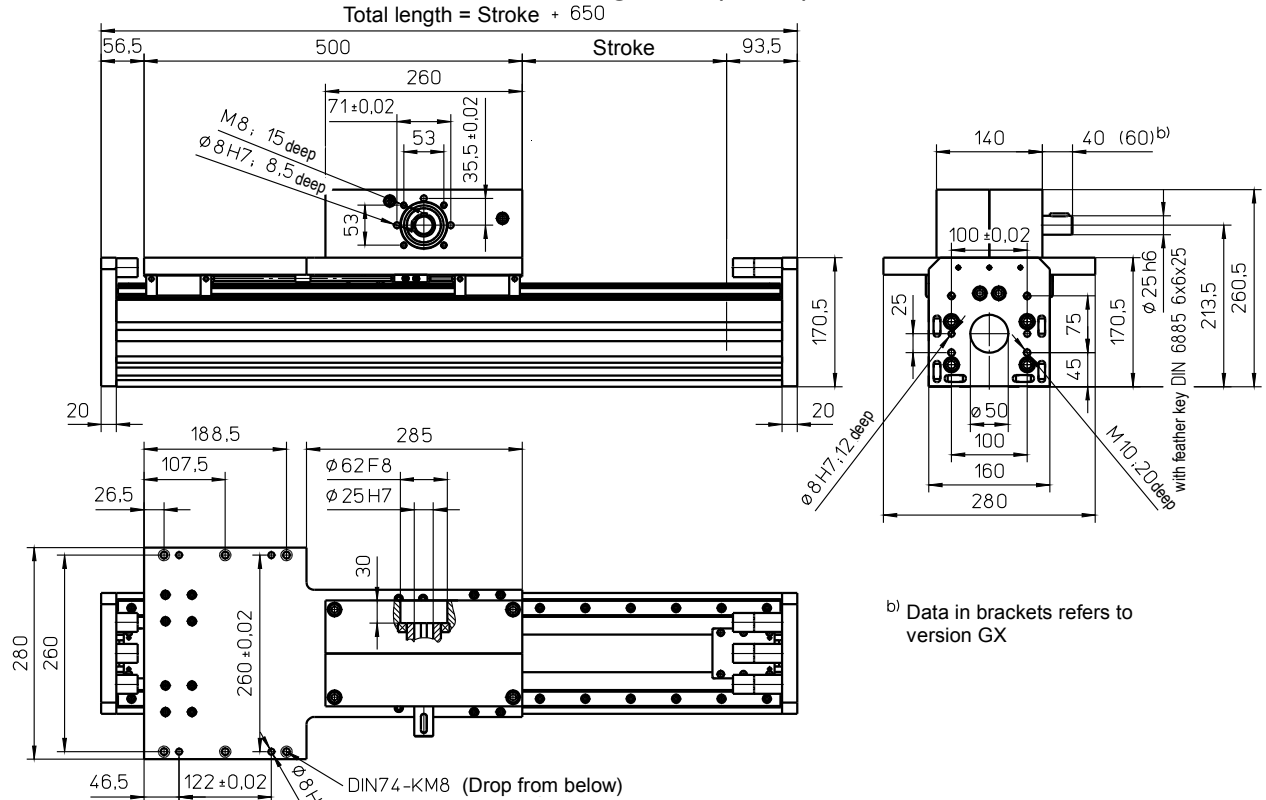
^{c)} Maximum value (see diagram „F_x-v-Diagram“) Data in brackets refers to long carriage (500)

F_x - v - Diagram



These data apply to each carriage.

with toothed belt drive and double linear guide (ASH)



Weights

ASH

Basic length without stroke:	36.50 kg
100 mm stroke:	2.42 kg
Entire carriage 500 mm:	16.60 kg

Max. total length: 8000 mm
(longer on request)

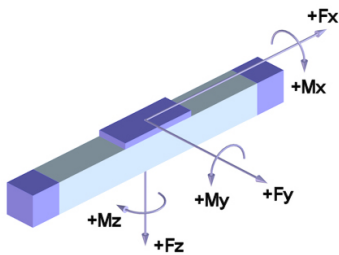
Technical Data

ASH

Max. speed:	5.00 m/s
Max. acceleration:	60 m/s ²
Repeat accuracy:	± 0.08 mm
Idle torque:	4.00 Nm
Moment of inertia:*	2.57 · 10 ⁻² kgm ²
Drive element:	Toothed belt 50 AT10-E
Stroke per revolution:	240 mm

* (entire carriage traverses)

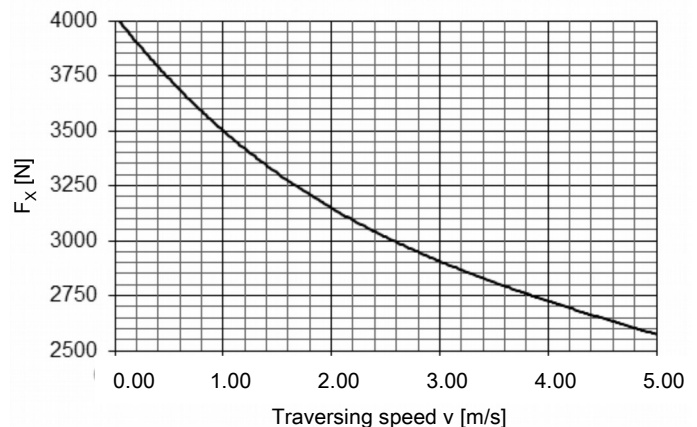
Forces and moments



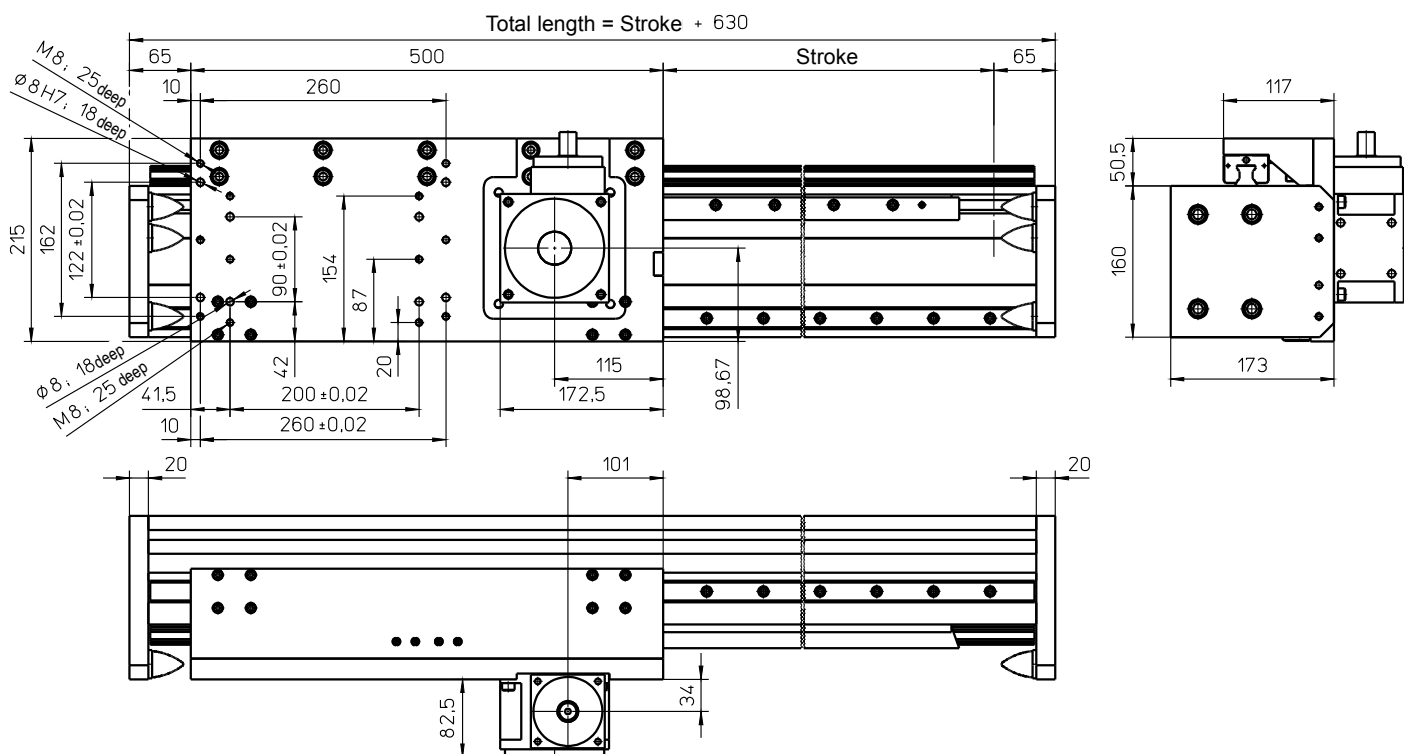
ASH	
Forces	Dynamic [N]
F_x ^{c)}	4000
F_y	10000
F_z	16000
Moments	Dynamic [Nm]
M_x	1800
M_y	8000
M_z	7000

^{c)} Maximum value (see diagram "F_x-v-Diagram")

F_x - v - Diagram



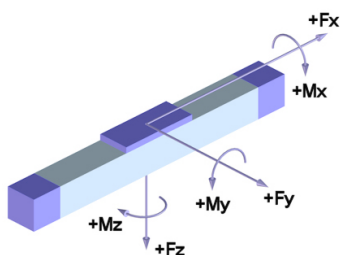
with rack-and-pinion drive (helical) and double linear guide (AZSS)



Weights

	AZSS
Basic length without stroke:	33.25 kg*
100 mm stroke:	3.00 kg
Carriage 500 mm:	13.90 kg
Gears D75 / D90:	6.30 / 10.50 kg
Max. total length: (longer on request)	8000 mm

Forces and moments



	AZSS-D75	AZSS-D90
Forces	Dynamic [N]	
F_x	1500-2200 **	3000-4000 **
F_y	12000	
F_z	12000	
Moments	Dynamic [Nm]	
M_x	2500	
M_y	7000	
M_z	7000	

Technical Data

	AZSS
Max. speed:	5.00 m/s (D75) / 4.50 m/s (D90)
Max. acceleration:	20 m/s ²
Repeat accuracy:	± 0.05 mm
Idle torque at drive pinion:	5.80 Nm
Rack and pinion:	Module 2 helical
Drive pinion:	Module 2, 30 teeth
Stroke per revolution:	200 mm
Servo-high-performance-gear:	MS-Graessner DynaGear D75 / D 90
Ratios:	5 / 10 / 15

	D75	D90
Load F_x	Dynamic [N]	
$i = 5:1$	2200	4000
$i = 10:1$		
$i = 15:1$	1500	3000

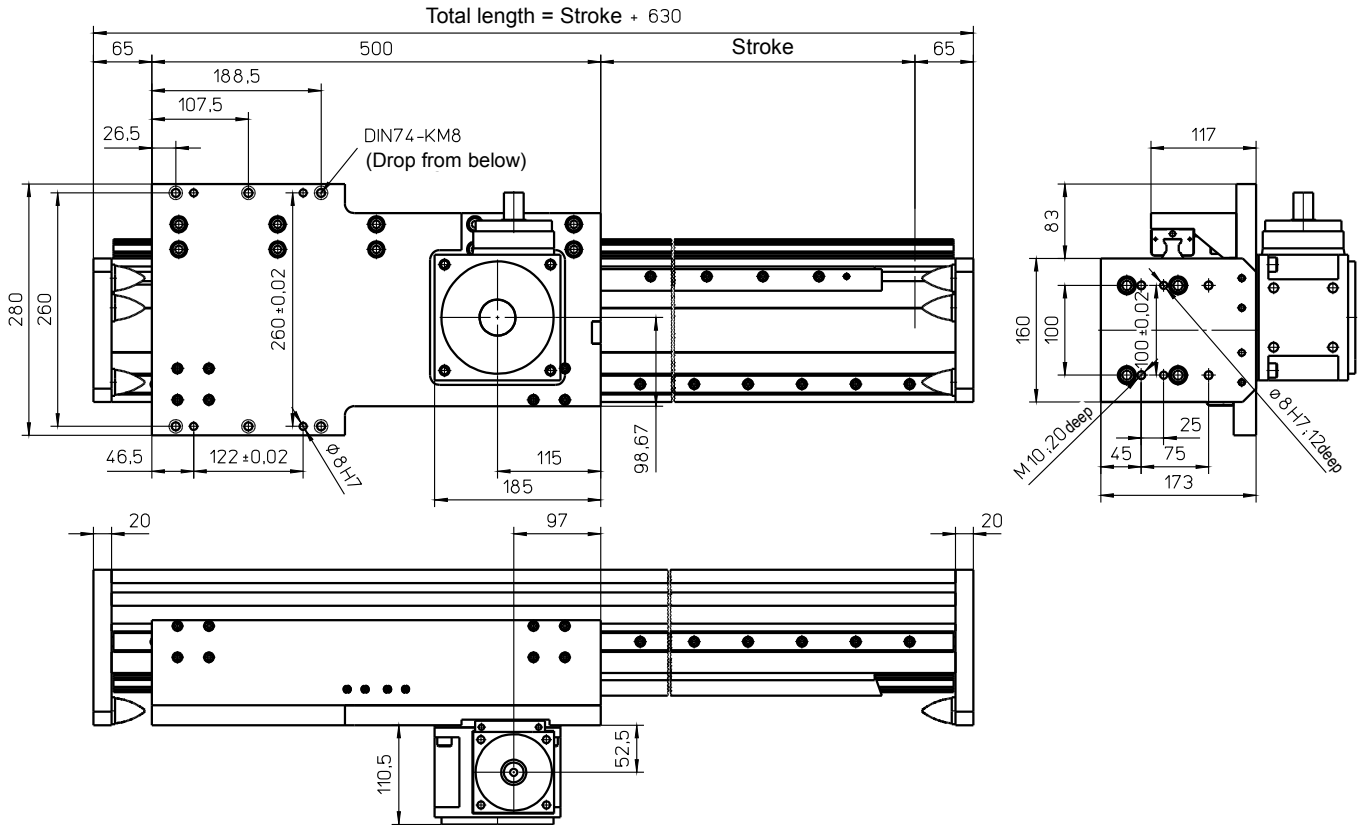
Preferred gear: D75
Efficiency of gears: > 96 %

The gears can be turned 90° or the entire carriage mirrored.

* inclusive standard gear

** depending on gear ratio (see table to right)

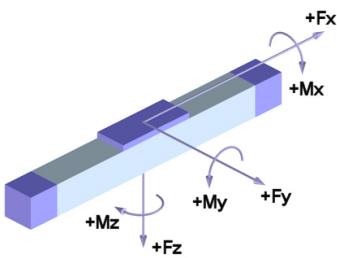
with rack-and-pinion drive (helical) and double linear guide (AZSH)



Weights

	AZSH
Basic length without stroke:	34.05 kg*
100 mm stroke:	3.00 kg
Carriage 500 mm:	14.70 kg
Gears D75 / D90:	6.30 / 10.50 kg
Max. total length: (longer on request)	8000 mm

Forces and moments



	AZSH-D75	AZSH-D90
Forces	Dynamic [N]	
F_x	1500-2200 **	3000-4000 **
F_y	12000	
F_z	12000	
Moments	Dynamic [Nm]	
M_x	2500	
M_y	7000	
M_z	7000	

Technical Data

	AZSH
Max. speed:	5.00 m/s (D75) / 4.50 m/s (D90)
Max. acceleration:	20 m/s ²
Repeat accuracy:	± 0.05 mm
Idle torque at drive pinion:	5.80 Nm
Rack and pinion:	Module 2 helical
Drive pinion:	Module 2, 30 teeth
Stroke per revolution:	200 mm
Servo-high-performance-gear:	MS-Graessner DynaGear D75 / D 90
Ratios:	5 / 10 / 15

	D75	D90
Load F_x	Dynamic [N]	
$i = 5:1$	2200	4000
$i = 10:1$		
$i = 15:1$	1500	3000

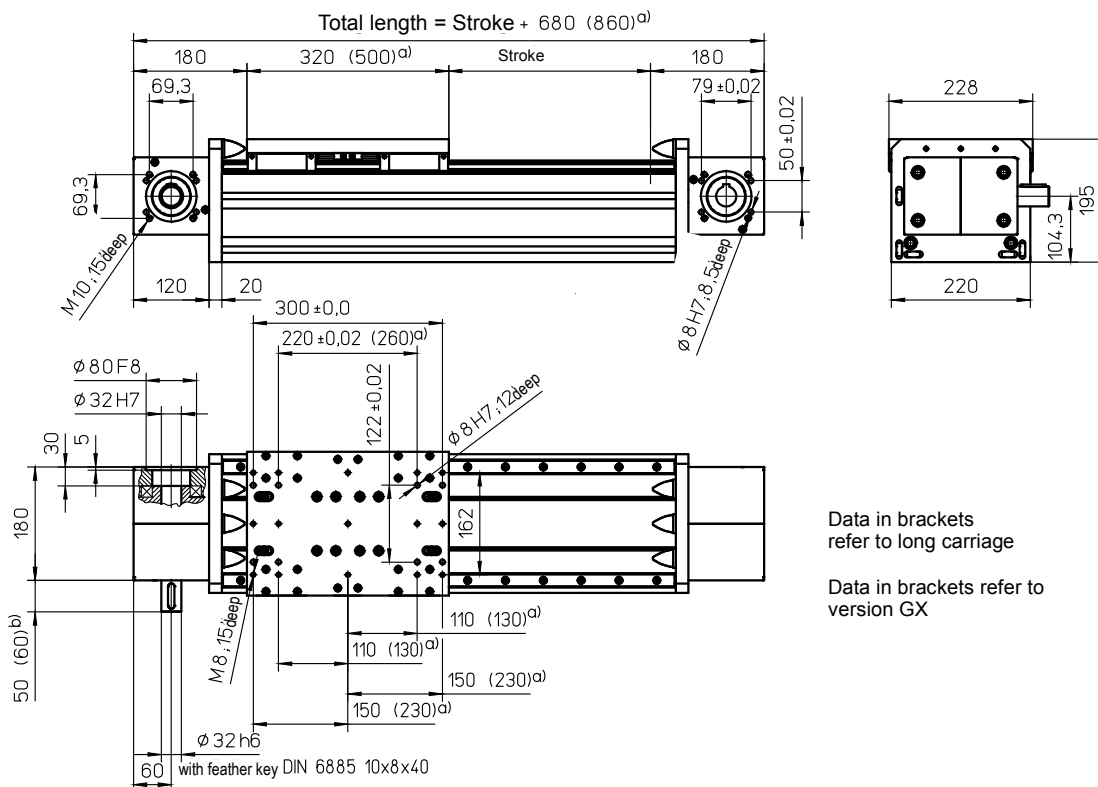
Preferred gear: D90
Efficiency of gears: > 96 %

The gears can be turned 90° or the entire carriage mirrored.

* inclusive standard gear

** depending on gear ratio (see table to right)

with toothed belt drive and double linear guide (ZSS)



Weights

ZSS

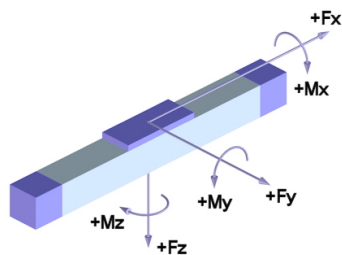
Basic length without stroke:	45.00 kg
100 mm stroke:	3.62 kg
Entire carriage 320 mm:	10.50 kg
Entire carriage 500 mm:	13.20 kg
Max. total length: (longer on request)	12200 mm

Technical Data

ZSS

Max. speed:	5.00 m/s
Max. acceleration:	60 m/s ²
Repeat accuracy:	± 0.08 mm
Idle torque:	7.00 Nm
Moment of inertia:	3.30 · 10 ⁻² kgm ²
Drive element:	Toothed belt 75 ATL10
Stroke per revolution:	320 mm

Forces and moments

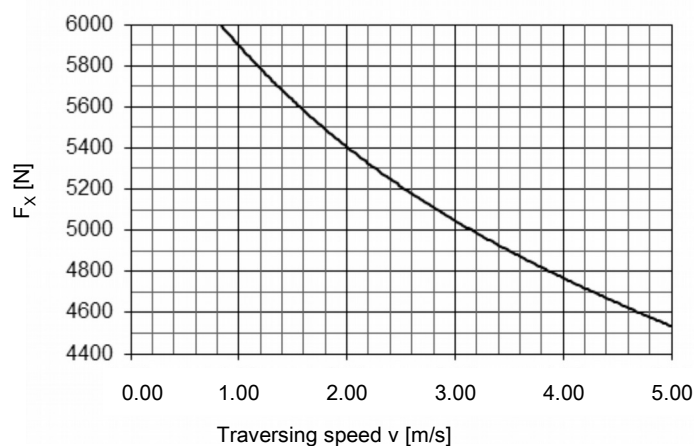


ZSS	
Forces	Dynamic [N]
F_x ^{c)}	6000
F_y	12000
F_z	20000
Moments	Dynamic [Nm]
M_x	2500
M_y	8000 (12000)
M_z	6500 (10000)

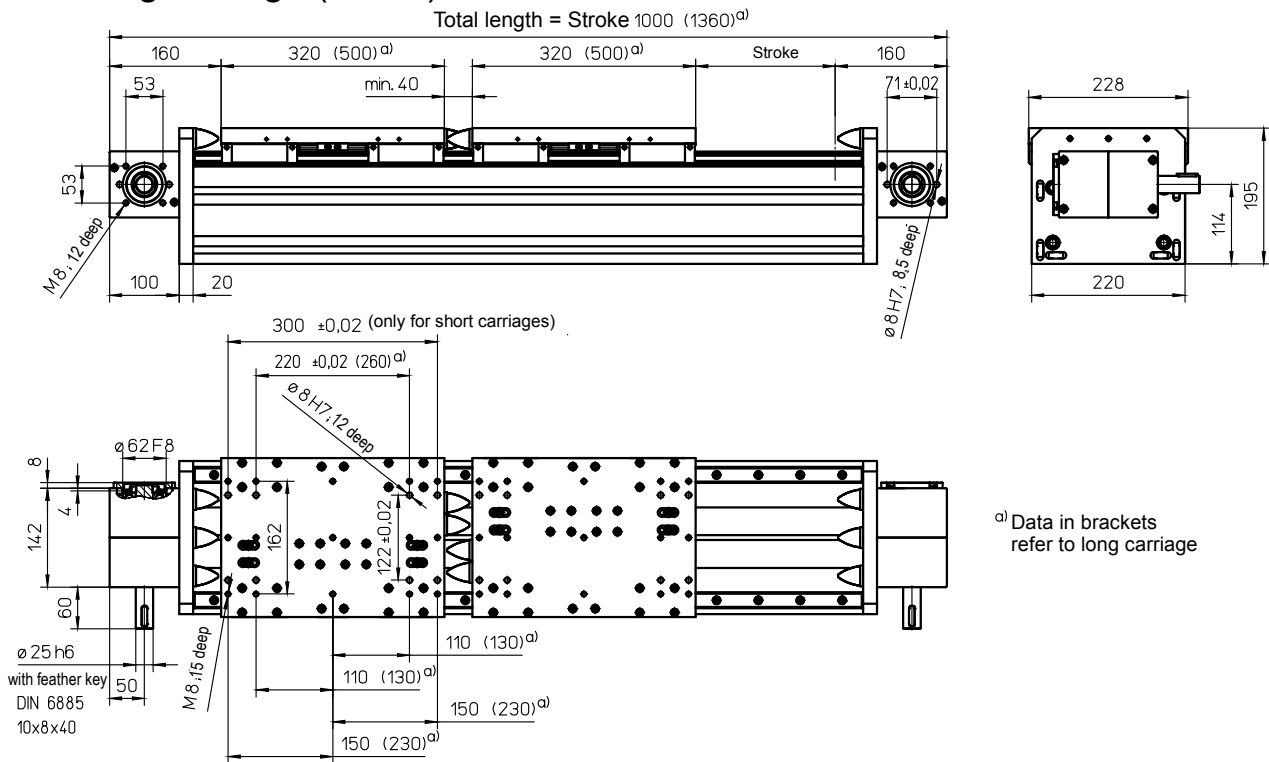
^{c)} Maximum value (see diagram "F_x-v-Diagram")

Data in brackets refer to long carriage (500)

F_x - v - Diagram



with toothed belt drive and double linear guide and a second independently travelling carriage (ZSSD)



Weights

ZSSD

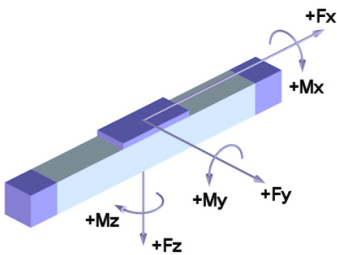
Basic length without stroke	57.50 kg
100 mm stroke:	3.60 kg
Entire carriage 320 mm:	9.30 kg
Entire carriage 500 mm:	11.90 kg
Max. total length: (longer on request)	12200 mm

Technical Data

ZSSD

Max. speed:	5.00 m/s
Max. acceleration:	60 m/s ²
Repeat accuracy:	± 0,08 mm
Idle torque:	5.25 Nm
Moment of inertia:	1,55 · 10 ⁻² kgm ²
Drive element:	2 x Zahnriemen 40 AT10
Stroke per revolution:	240 mm

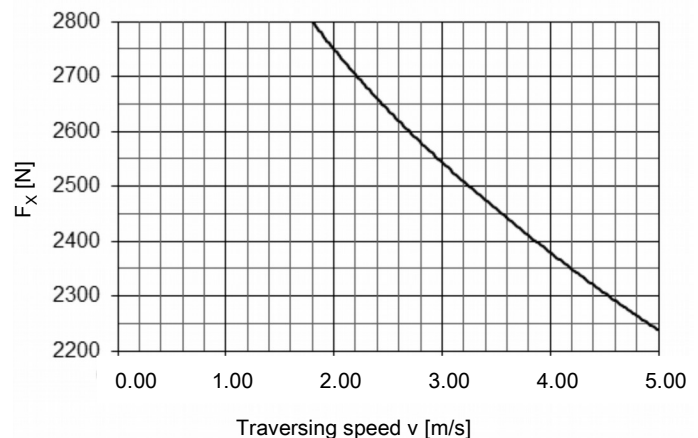
Forces and moments



ZSSD	
Forces	Dynamic [N]
F_x ^{c)}	2800
F_y	12000
F_z	20000
Moments	Dynamic [Nm]
M_x	2500
M_y	8000 (12000)
M_z	6500 (10000)

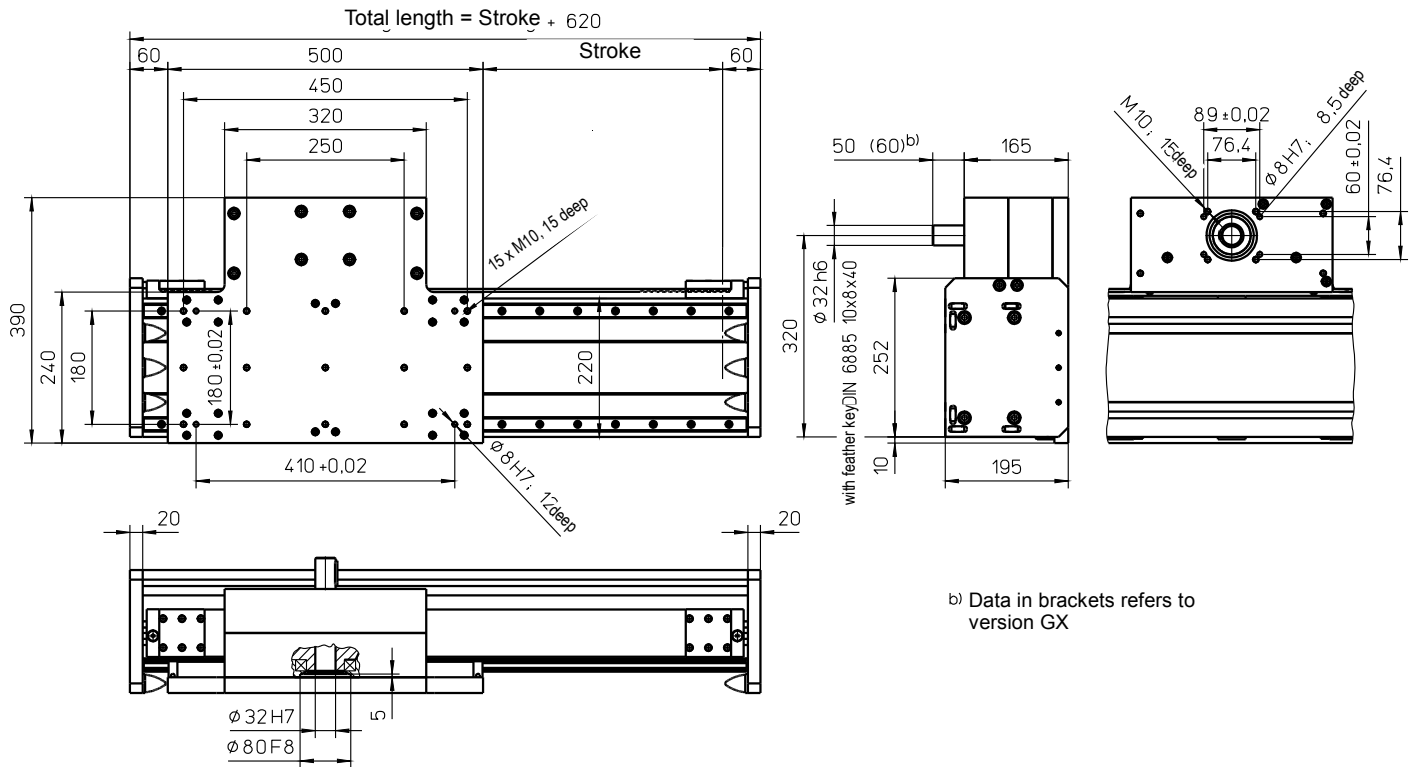
^{c)} Maximum value (see diagram "F_x-v-Diagram")
Data in brackets refers to long carriage (500)

F_x - v - Diagram



These data apply to each carriage.

with toothed belt drive and double linear guide (ASS)



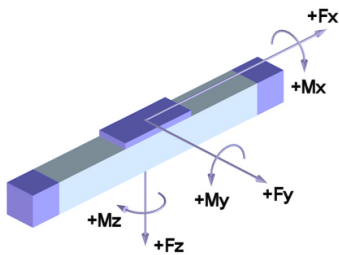
Weights

	ASS
Basic length without stroke:	61.00 kg
100 mm stroke:	3.60 kg
Entire carriage 500 mm:	31.70 kg
Max. total length: (longer on request)	12000 mm

Technical Data

	ASS
Max. speed:	5.00 m/s
Max. acceleration:	60 m/s ²
Repeat accuracy:	± 0.08 mm
Idle torque:	8.83 Nm
Moment of inertia: *	3.75 · 10 ⁻² kgm ²
Drive element:	Toothed belt 75 AT10-E
Stroke per revolution:	320 mm

Forces and moments

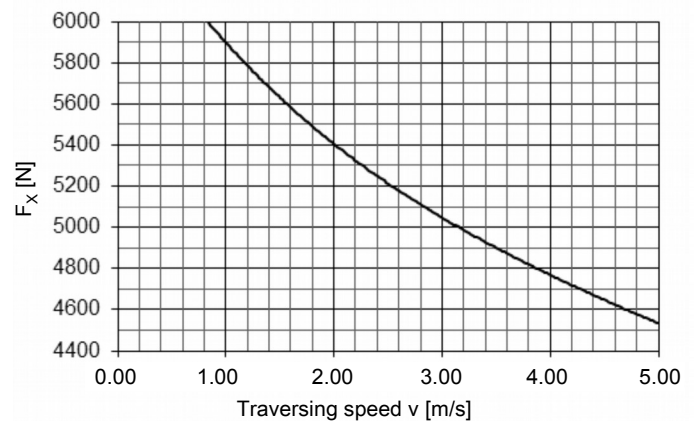


* (entire carriage traverses)

	ASS
Forces	Dynamic [N]
F_x ^{c)}	6000
F_y	12000
F_z	20000
Moments	Dynamic [Nm]
M_x	2500
M_y	12000
M_z	10000

^{c)} Maximum value (see diagram "F_x-v-Diagram")

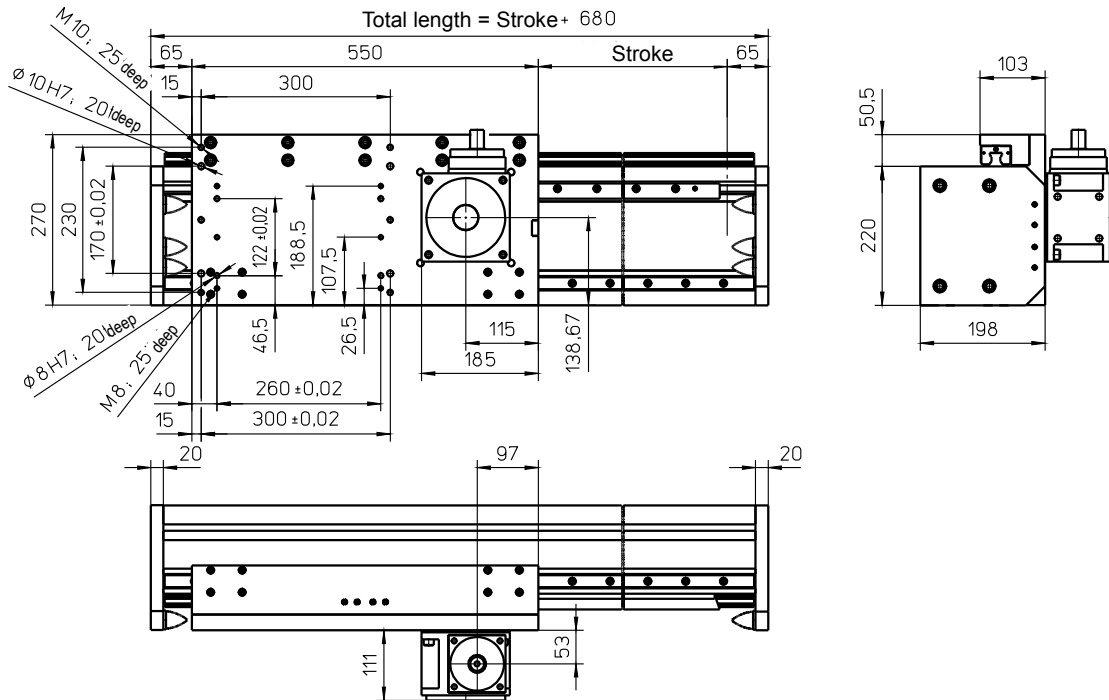
F_x - v - Diagram



Note:

Only insert linear drive with drive housing facing upwards if you have a horizontal installation position.

with rack-and-pinion drive module 2 (helical)
and double linear guide (AZSS)



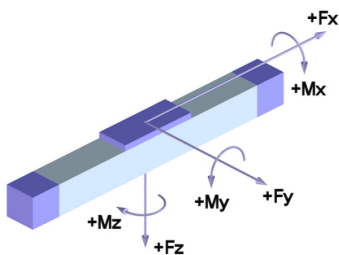
Weights

AZSS

Basic length without stroke:	46.60 kg*
100 mm stroke:	4.10 kg
Carriage 550 mm:	18.10 kg
Gears D90 / D115:	10.35 / 16.70 kg

Max. total length: 12000 mm
(longer on request)

Forces and moments



	AZSS-D90	AZSS-D115
Forces	Dynamic [N]	
F_x	3000-4000 **	5000-6000 **
F_y	20000	
F_z	20000	
Moments	Dynamic [Nm]	
M_x	4000	
M_y	8000	
M_z	8000	

Technical Data

AZSS

Max. speed:	4.50 m/s (D90) / 4.00 m/s (D115)
Max. acceleration:	20 m/s ²
Repeat accuracy:	± 0.05 mm
Idle torque at drive pinion:	7.2 Nm
Rack and pinion:	Module 2 helical
Drive pinion:	Module 2, 30 teeth
Stroke per revolution:	200 mm
Servo-high-performance-gear:	MS-Graessner DynaGear D90 / D115
Ratios:	5 / 10 / 15

	D90	D115
Load F_x	Dynamic [N]	
$i = 5:1$	4000	6000
$i = 10:1$		
$i = 15:1$	3000	5000

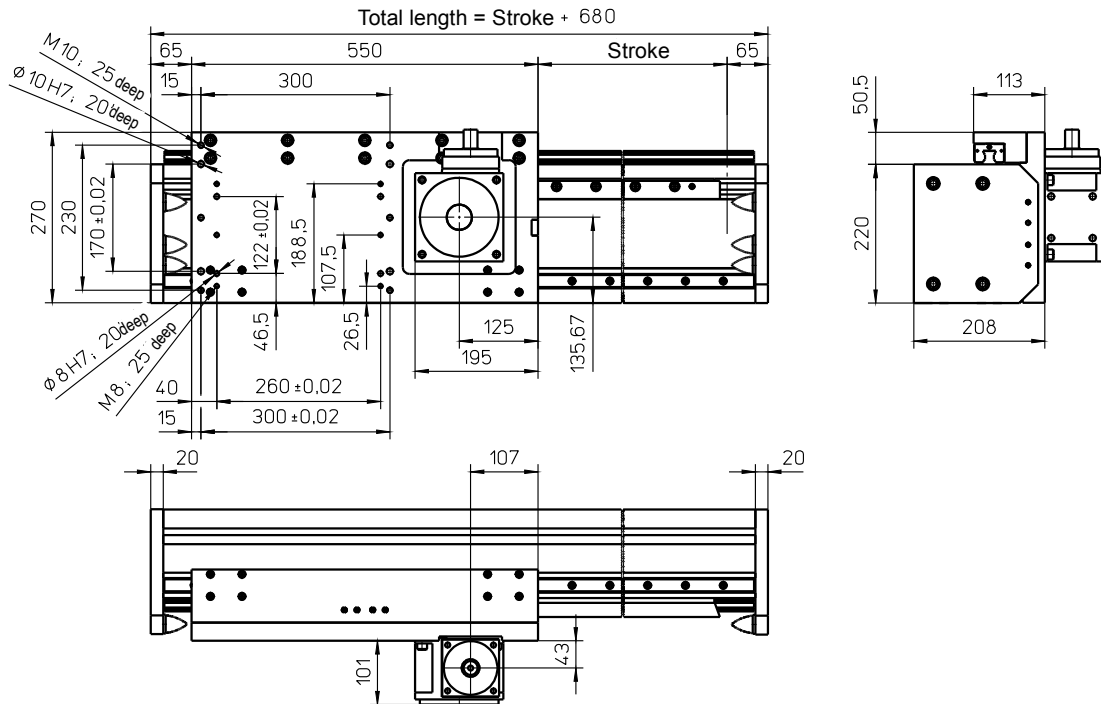
Preferred gear: D90
Efficiency of gears: > 96 %

The gears can be turned 90° or the entire carriage mirrored.

* inclusive standard gear

** depending on gear ratio (see table to right)

with rack-and-pinion drive module 3 (helical)
and double linear guide (AZSS)

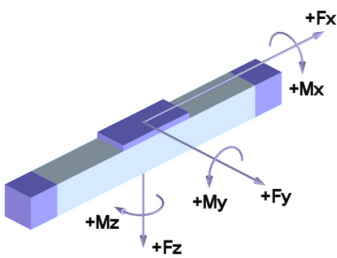


Weights

AZSS

Basic length without stroke:	49.50 kg*
100 mm stroke:	4.30 kg
Carriage 550 mm:	20.40 kg
Gears D90 / D115:	10.35 / 16.65 kg
Max. total length: (longer on request)	12000 mm

Forces and moments



	AZSS-D90	AZSS-D115
Forces	Dynamic [N]	
F_x	3000-4000 **	5000-7500 **
F_y	20000	
F_z	20000	
Moments	Dynamic [Nm]	
M_x	4000	
M_y	8000	
M_z	8000	

Technical Data

AZSS

Max. speed:	4.50 m/s (D90) / 4.00 m/s (D115)
Max. acceleration:	20 m/s ²
Repeat accuracy:	± 0.05 mm
Idle torque at drive pinion:	7.20 Nm
Rack and pinion:	Module 3 helical
Drive pinion:	Module 3, 20 teeth
Stroke per revolution:	200 mm
Servo-high-performance-gear:	MS-Graessner DynaGear D90 / D115
Ratios:	5 / 10 / 15

	D90	D115
Load F_x	Dynamic [N]	
$i = 5:1$	4000	7500
$i = 10:1$		
$i = 15:1$	3000	5000

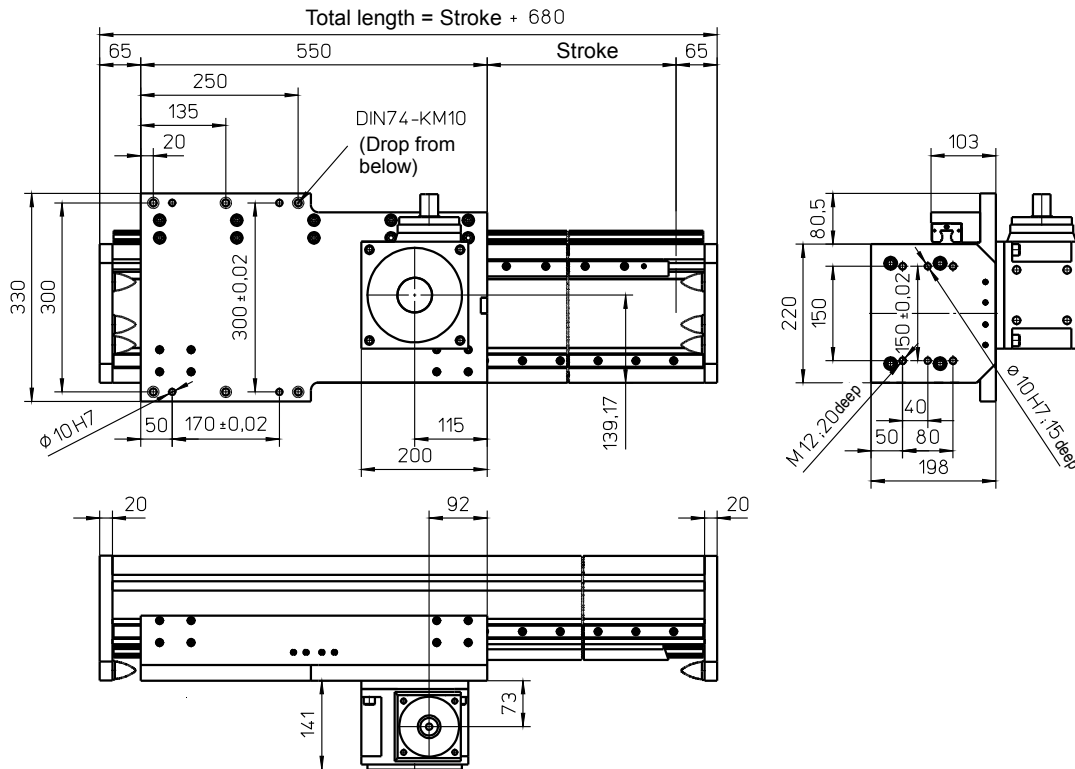
Preferred gear: D90
Efficiency of gears: > 96 %

The gears can be turned 90° or the entire carriage mirrored.

* inclusive standard gear

** depending on gear ratio (see table to right)

with rack-and-pinion drive module 2 (helical)
and double linear guide (AZSH)

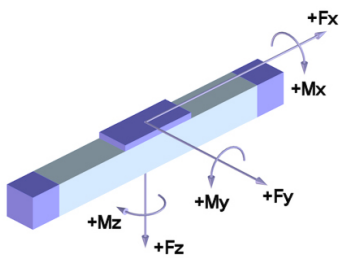


Weights

	AZSH
Basic length without stroke:	47.60 kg*
100 mm stroke:	4.10 kg
Carriage 550 mm:	19.10 kg
Gears D90 / D115:	10.35 / 16.70 kg

Max. total length: 12000 mm
(longer on request)

Forces and moments



	AZSH-D90	AZSH-D115
Forces	Dynamic [N]	
F_x	3000-4000 **	5000-6000 **
F_y	20000	
F_z	20000	
Moments	Dynamic [Nm]	
M_x	4000	
M_y	8000	
M_z	8000	

Technical Data

	AZSH
Max. speed:	4.50 m/s (D90) / 4.00 m/s (D115)
Max. acceleration:	20 m/s ²
Repeat accuracy:	± 0.05 mm
Idle torque at drive pinion:	7.20 Nm
Rack and pinion:	Module 2 helical
Drive pinion:	Module 2, 30 teeth
Stroke per revolution:	200 mm
Servo-high-performance-gear:	MS-Graessner DynaGear D90 / D115
Ratios:	5 / 10 / 15

	D90	D115
Load F_x	Dynamic [N]	
$i = 5:1$	4000	6000
$i = 10:1$		
$i = 15:1$	3000	5000

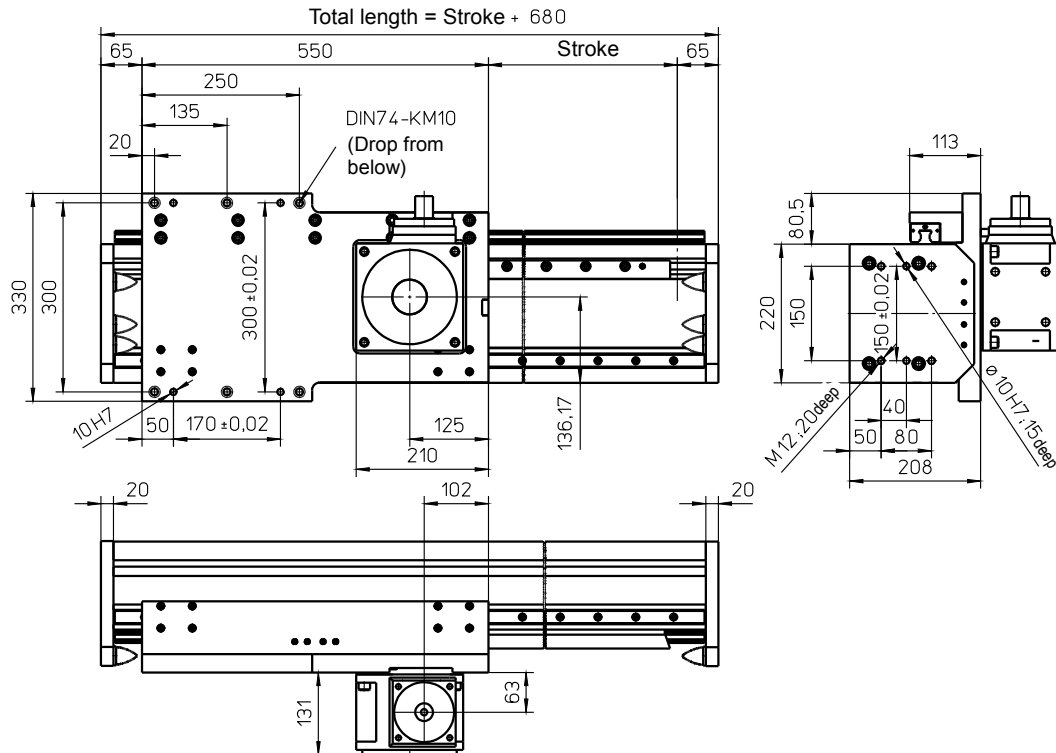
Preferred gear: D115
Efficiency of gears: > 96 %

The gears can be turned 90° or the entire carriage mirrored.

* inclusive standard gear

** depending on gear ratio (see table to right)

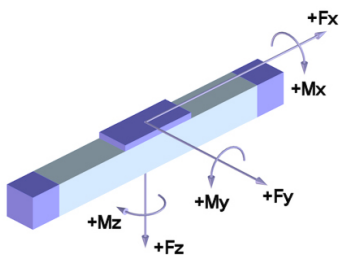
with rack-and-pinion drive module 3 (helical)
and double linear guide (AZSH)



Weights

	AZSH
Basic length without stroke:	50.70 kg*
100 mm stroke:	4.30 kg
Carriage 550 mm:	21.60 kg
Gears D90 / D115:	10.35 / 16.65 kg
Max. total length: (longer on request)	12000 mm

Forces and moments



	AZSH-D90	AZSH-D115
Forces	Dynamic [N]	
F_x	3000-4000 **	5000-7500 **
F_y	20000	
F_z	20000	
Moments	Dynamic [Nm]	
M_x	4000	
M_y	8000	
M_z	8000	

Technical Data

	AZSH
Max. speed:	4.50 m/s (D90) / 4.00 m/s (D115)
Max. acceleration:	20 m/s ²
Repeat accuracy:	± 0.05 mm
Idle torque at drive pinion:	7.20 Nm
Rack and pinion:	Module 3 helical
Drive pinion:	Module 3, 20 teeth
Stroke per revolution:	200 mm
Servo-high-performance-gear:	MS-Graessner DynaGear D90 / D115
Ratios:	5 / 10 / 15

	D90	D115
Load F_x	Dynamic [N]	
$i = 5:1$	4000	7500
$i = 10:1$		
$i = 15:1$	3000	5000

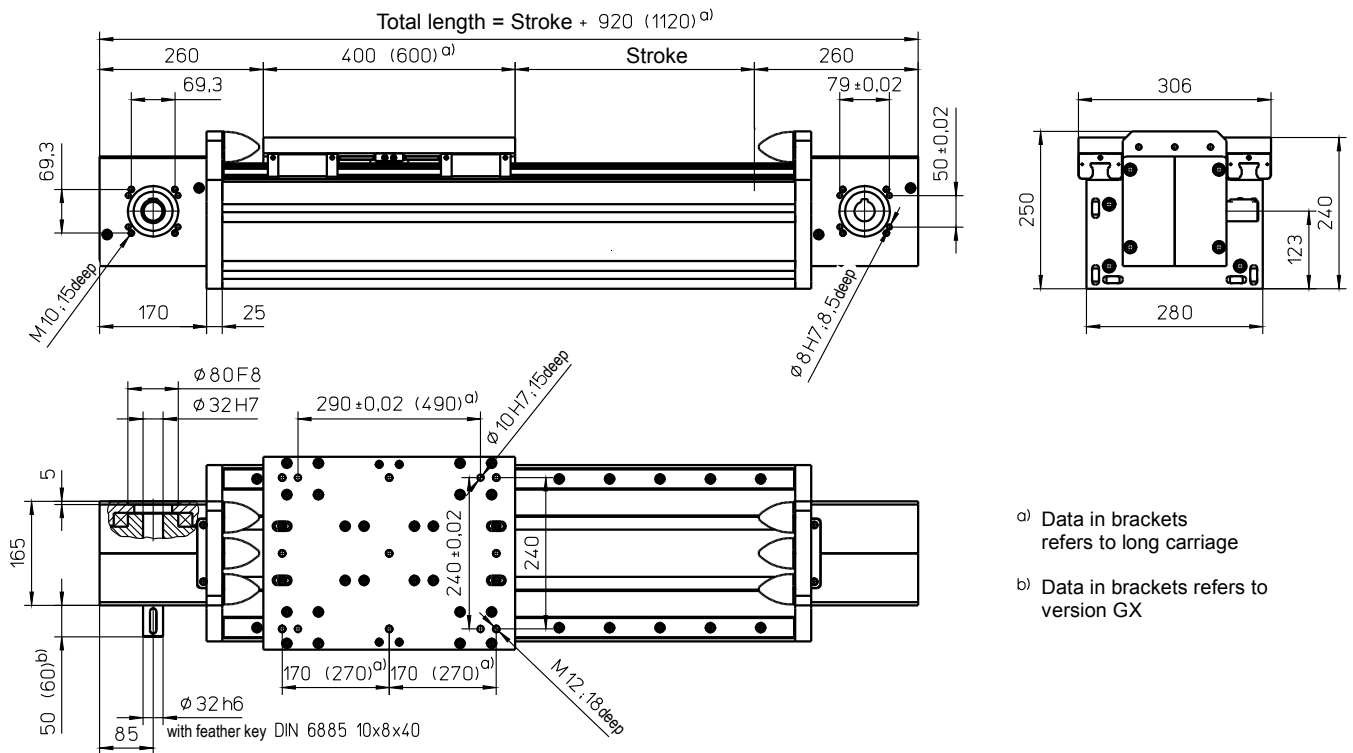
Preferred gear: D115
Efficiency of gears: > 96 %

The gears can be turned 90° or the entire carriage mirrored.

* inclusive standard gear

** depending on gear ratio (see table to right)

with toothed belt drive and double linear guide (ZSS)



a) Data in brackets refers to long carriage

b) Data in brackets refers to version GX

Weights

ZSS

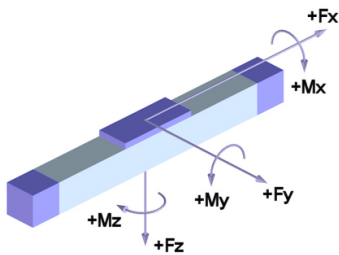
Basic length without stroke:	86.80 kg
100 mm stroke:	5.35 kg
Entire carriage 400 mm:	19.20 kg
Entire carriage 600 mm:	23.80 kg
Max. total length: (longer on request)	10200 mm

Technical Data

ZSS

Max. speed:	5.00 m/s
Max. acceleration:	60 m/s ²
Repeat accuracy:	± 0.08 mm
Idle torque:	11.00 Nm
Moment of inertia:	0.12 kgm ²
Drive element:	Toothed belt 75 ATS15
Stroke per revolution:	450 mm

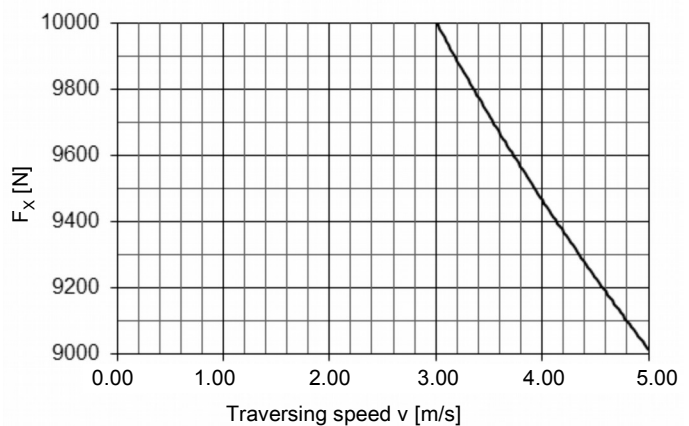
Forces and moments



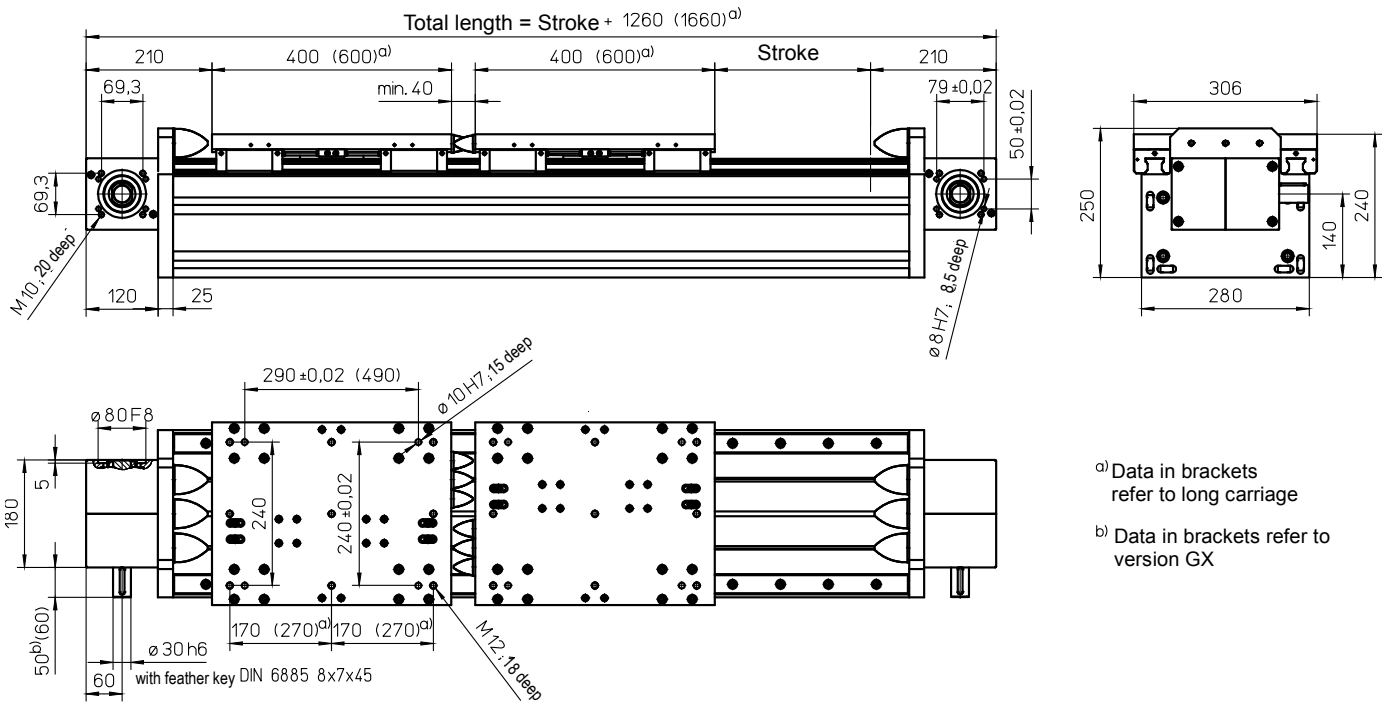
ZSS	
Forces	Dynamic [N]
F_x ^{c)}	10000
F_y	20000
F_z	30000
Moments	Dynamic [Nm]
M_x	4000
M_y	15000 (25000)
M_z	12000 (20000)

^{c)} Maximum value (see diagram "F_x-v-Diagram")
Data in brackets refers to long carriage (600)

F_x - v - Diagram



with toothed belt drive and double linear guide and a second independently travelling carriage (ZSSD)

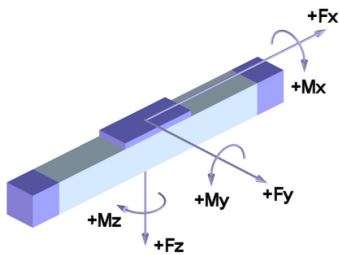


a) Data in brackets refer to long carriage
 b) Data in brackets refer to version GX

Weights	ZSSD
Basic length without stroke:	135.00 kg
100 mm stroke:	5.50 kg
Entire carriage 400 mm:	18.00 kg
Entire carriage 600 mm:	22.55 kg
Max. total length: (longer on request)	10200 mm

Technical Data	ZSSD
Max. speed:	5.00 m/s
Max. acceleration:	60 m/s ²
Repeat accuracy:	± 0,08 mm
Idle torque:	11.00 Nm
Moment of inertia:	4.50 · 10 ⁻² kgm ²
Drive element:	2 x Zahnriemen 50 ATL 10
Stroke per revolution:	300 mm

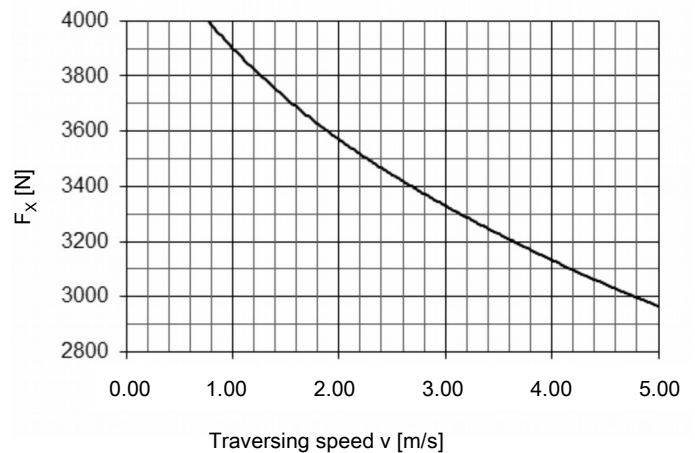
Forces and moments



ZSSD	
Forces	Dynamic [N]
F_x^{c)}	4000
F_y	20000
F_z	30000
Moments	Dynamic [Nm]
M_x	4000
M_y	15000 (25000)
M_z	12000 (20000)

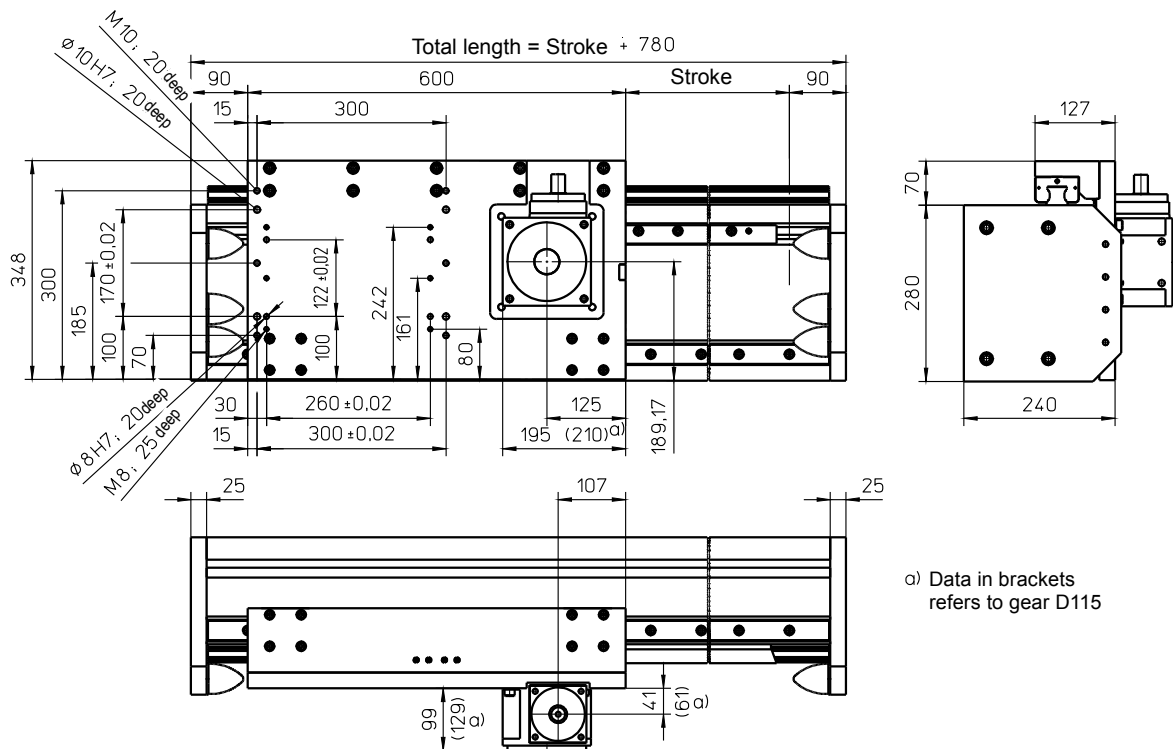
c) Maximum value (see diagram "F_x-v-Diagram")
 Data in brackets refers to long carriage (600)

F_x - v - Diagram



These data apply to each carriage.

with rack-and-pinion drive (helical) and double linear guide (AZSS)



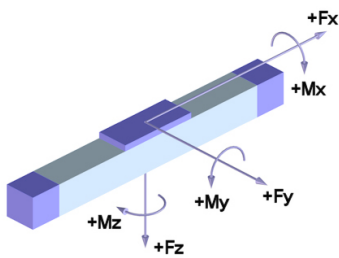
Weights

AZSS

Basic length without stroke:	78.85 kg*
100 mm stroke:	6.15 kg
Carriage drive 600 mm:	27.80 kg
Gears D90 / D115:	10.35 / 16.65 kg

Max. total length: 10000 mm
(longer on request)

Forces and moments



	AZSS-D90	AZSS-D115
Forces	Dynamic [N]	
F_x	3000-4000 **	5000-7500 **
F_y	25000	
F_z	25000	
Moments	Dynamic [Nm]	
M_x	8000	
M_y	16000	
M_z	16000	

The gears can be turned 90° or the entire carriage mirrored.

* inclusive standard gear

** depending on gear ratio (see table to right)

Technical Data

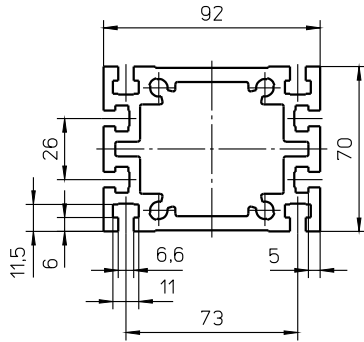
AZSS

Max. speed:	4.50 m/s (D90) / 4.00 m/s (D115)
Max. acceleration:	20 m/s ²
Repeat accuracy:	± 0.05 mm
Idle torque at drive pinion:	8.60 Nm
Rack and pinion:	Module 3 helical
Drive pinion:	Module 3, 20 teeth
Stroke per revolution:	200 mm
Servo-high-performance-gear:	MS-Graessner DynaGear D90 / D115
Ratios:	5 / 10 / 15

	D90	D115
Load F_x	Dynamic [N]	
$i = 5:1$	4000	7500
$i = 10:1$		
$i = 15:1$	3000	5000

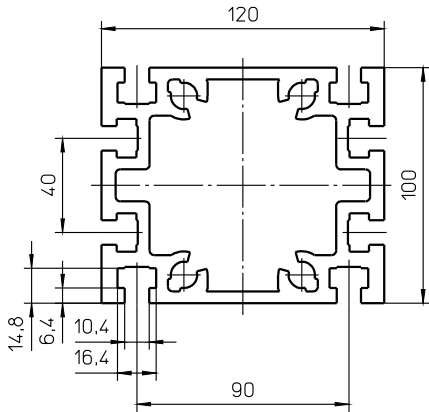
Preferred gear: D90

Efficiency of gears: > 96 %



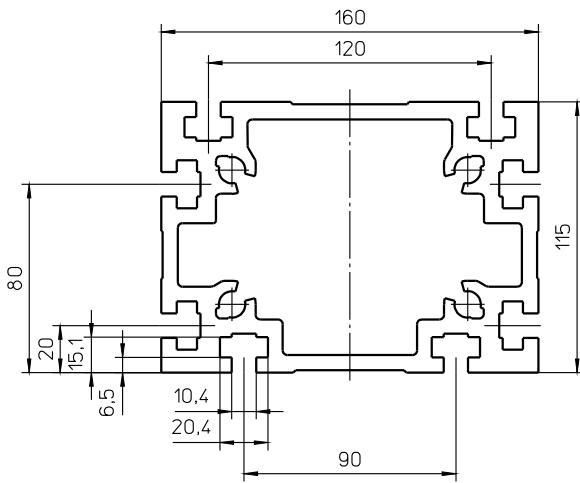
Profile Gamma 90

Specific mass [kg/m]	6,1
Surface measure [mm ²]	2260
Geometrical moment of inertia I _y [mm ⁴]	1373211
Geometrical moment of inertia I _z [mm ⁴]	2297416
Section modulus W _y [mm ³]	39234
Section modulus W _z [mm ³]	49943



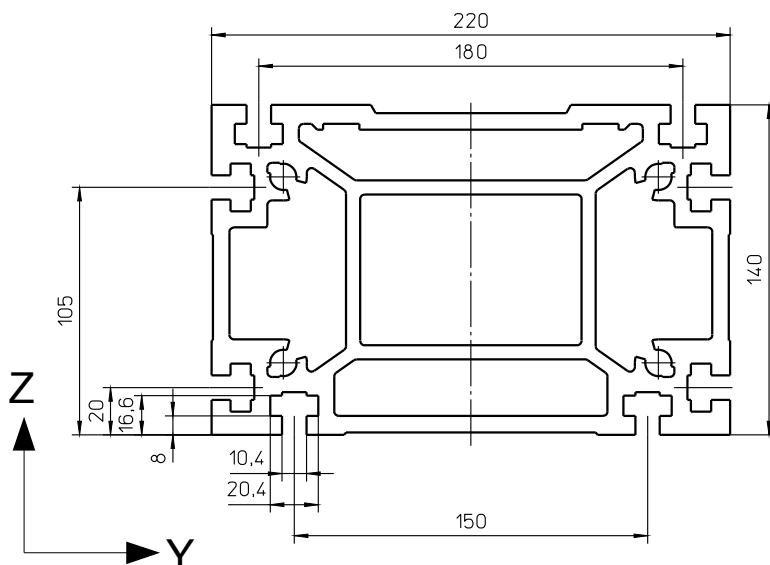
Profile Gamma 120

Specific mass [kg/m]	10.1
Surface measure [mm ²]	3707
Geometrical moment of inertia I _y [mm ⁴]	4636416
Geometrical moment of inertia I _z [mm ⁴]	6696292
Section modulus W _y [mm ³]	92728
Section modulus W _z [mm ³]	111605



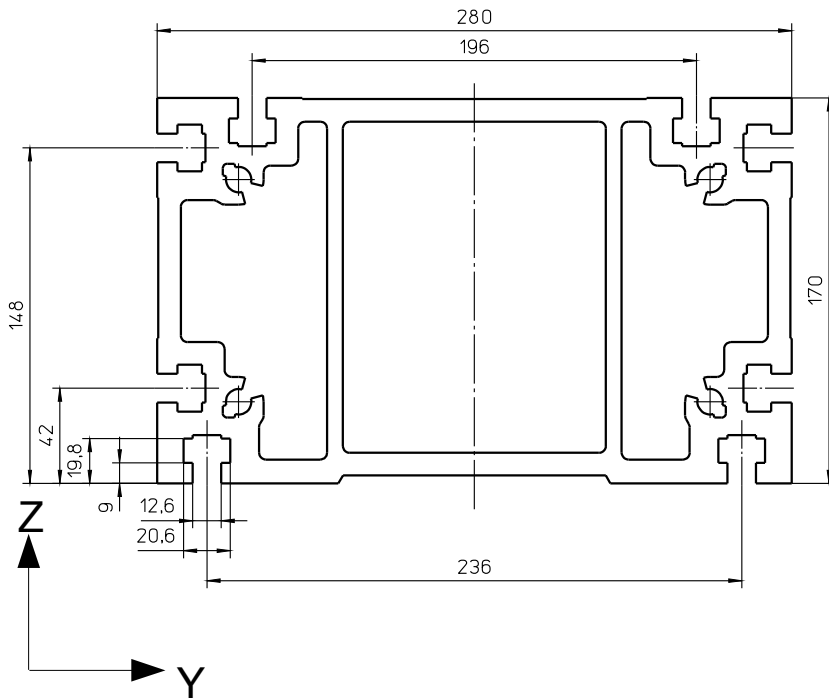
Profile Gamma 160

Specific mass [kg/m]	15.56
Surface measure [mm ²]	5762
Geometrical moment of inertia I _y [mm ⁴]	9556948
Geometrical moment of inertia I _z [mm ⁴]	18711836
Section modulus W _y [mm ³]	166293
Section modulus W _z [mm ³]	237513



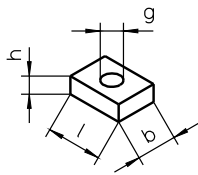
Profile Gamma 220

Specific mass [kg/m]	26.85
Surface measure [mm ²]	9943
Geometrical moment of inertia I _y [mm ⁴]	22915643
Geometrical moment of inertia I _z [mm ⁴]	53513785
Section modulus W _y [mm ³]	332220
Section modulus W _z [mm ³]	495927



Profile Gamma 280

Specific mass [kg/m]	37
Surface measure [mm ²]	13701
Geometrical moment of inertia I _y [mm ⁴]	52207330
Geometrical moment of inertia I _z [mm ⁴]	131653724
Section modulus W _y [mm ³]	609007
Section modulus W _z [mm ³]	940384



Portal Linear drive	NS	ID No.	l [mm]	b [mm]	h [mm]	g
Gamma 90	21	22955	20	10	5	M6
	18	23951	20	16	8	M5
Gamma 120	19	23950	20	16	8	M6
	20	23949	20	16	8	M8
Gamma 160	6	10561	25	18	8	M10
	15	19211	25	18	8	M8
Gamma 220	6	10561	25	18	8	M10
	15	19211	25	18	8	M8
Gamma 280	6	10561	25	18	8	M10
	15	19211	25	18	8	M8
	17	19722	30	20	10	M12

Example: **Gamma 160-ZSS-50 ATL10-240-1000-1620-AZ1-1**

Product _____

Unit size _____

Drive _____

Z = Toothed belt drive

0 = Without drive

A = Powered carriage

Guide system _____

S = Rail guide

0 = Without guide

Model _____

S = Standard (Horizontal)

SD = Standard double (Horizontal)

H = Lifting axis (Vertical)

Drive specifications _____

Width and type of toothed belt

Stroke per revolution _____

Stroke _____

Total length _____

Accessories _____

EMS / EMB = Mechanical limit switch (S = Siemens, B = Balluff) fitted

EO2 / EO10 = Inductive limit switch NC with 2m / 10m cable fitted

ES2 / ES10 = Inductive limit switch NO with 2m / 10m cable fitted

NS ⑤ , ⑥ , ⑰ = Sliding block ⑤ , ⑥ , ⑰ (see Table on **page G27**)

AZ1 = Drive shaft short, mounting side **C**

AZ2 = Drive shaft short, mounting side **D**

AZ6 = Drive shaft long, mounting side **C** and **D**

Further arrangements for drive shaft, see **page Z1**

Special design _____

0 = Standard

1 = Special (add specification description)

Further accessories (separate position)

MGK = Motor mounting and coupling (according to dimension sheet)

Example: **Gamma 160-AZSS-M2-200-1000-1630-NS-1**

Product _____
 Unit size _____
 Drive _____
 AZ = Rack-and-pinion drive
 Guide system _____
 S = Rail guide
 Model _____
 S = Standard (Horizontal)
 H = Lifting axis (Vertical)
 Drive specifications _____
 Drive pinion module (M2 / M3)
 Stroke per revolution _____
 Stroke _____
 Total length _____

Accessories

- EMS / EMB = Mechanical limit switch (S = Siemens, B = Balluff) fitted
- EO2 / EO10 = Inductive limit switch NC with 2m / 10m cable fitted
- ES2 / ES10 = Inductive limit switch NO with 2m / 10m cable fitted
- NS ⑤ , ⑥ , ⑰ = Sliding block ⑤ , ⑥ , ⑰ (see Table on page G27)

Special design

- 0 = Standard
- 1 = Special (add specification description)

Additional information

Gear size and ratio (D55 to D115 / i = 5 to i = 15)
 Gear mounting (for example XD)

Gear mounting

