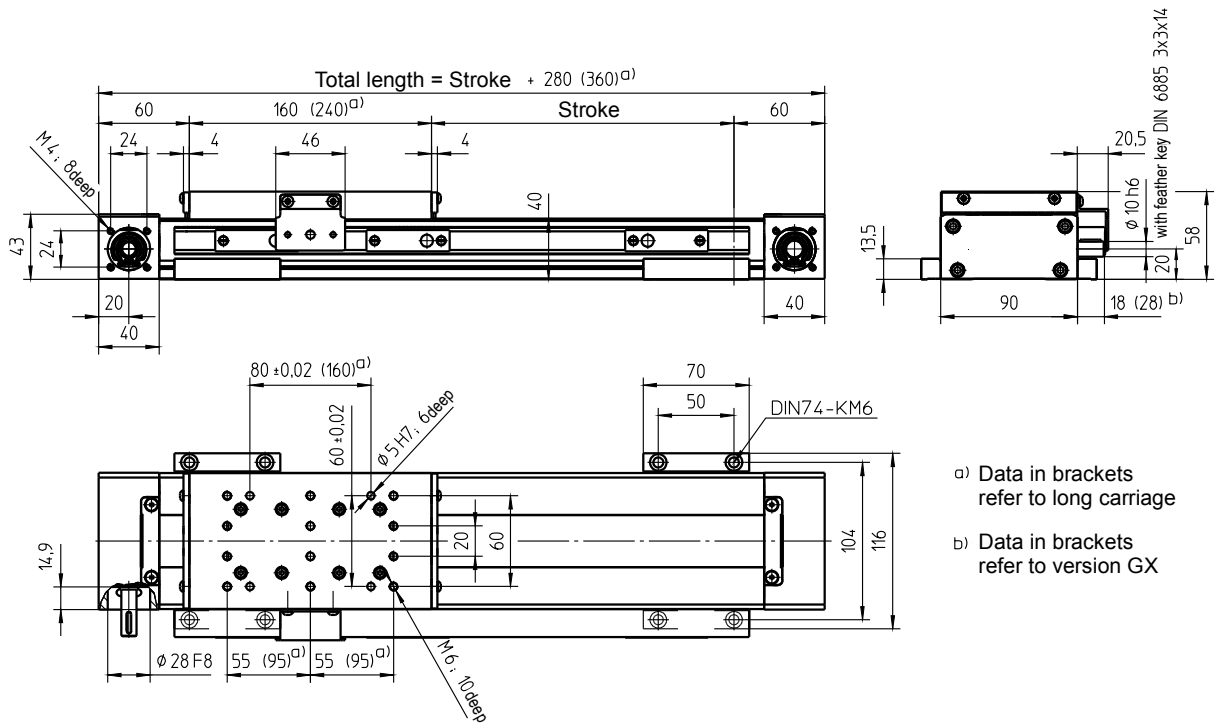


Chapter D

Compact Module

HSB-delta[®]

with toothed belt drive and roller guide (ZRS)

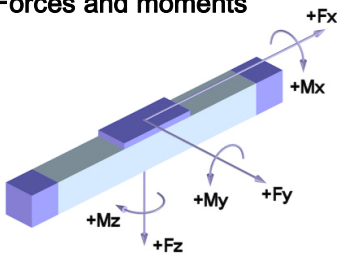


- a) Data in brackets refer to long carriage
- b) Data in brackets refer to version GX

Weights	ZRS
Basic length without stroke:	2.95 kg
100 mm stroke:	0.42 kg
Entire carriage 160 mm:	1.30 kg
Entire carriage 240 mm:	1.85 kg
Max. total length:	4000 mm

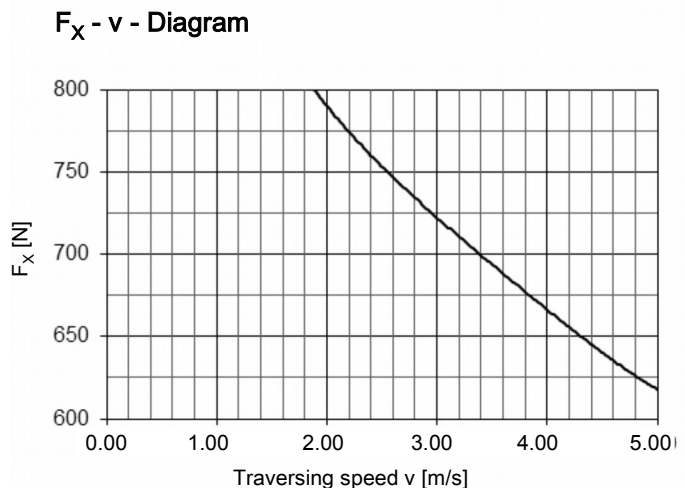
Technical Data	ZRS
Max. total speed:	5.00 m/s
Max. acceleration:	30 m/s ²
Repeat accuracy:	± 0.08 mm
Idle torque:	2.00 Nm
Moment of inertia:	4.65 · 10 ⁻⁴ kgm ²
Drive element:	Toothed belt 32 AT5-E
Stroke per revolution:	100 mm

Forces and moments



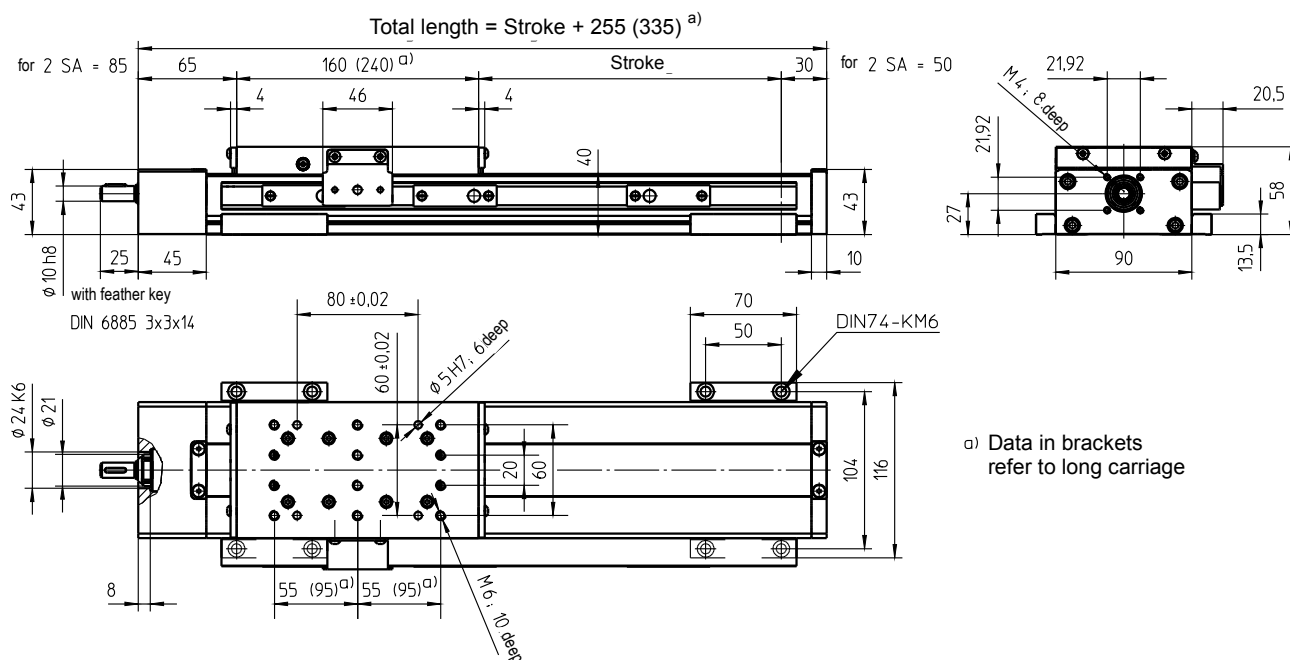
ZRS	
Forces	Dynamic [N]
F_x ^{d)}	800
F_y	500
F_z	1000
$-F_z$	1000
Moments	Dynamic [Nm]
M_x	60
M_y	80 (110)
M_z	80 (110)

^{d)} Maximum value (see diagram "F_x -v-Diagram")
Data in brackets refer to long carriage (240)



>> Note << Drive shaft is not changeable
Please define position, e.g. "AZ1"! (See Ordering Code)

with ball screw (KGT) and roller guide (SRS)



Weights

SRS

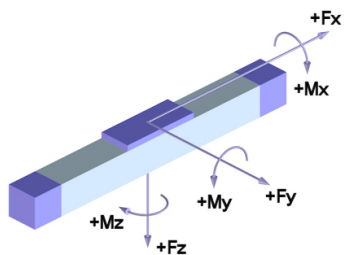
Basic length without stroke:	3.25 kg
100 mm stroke:	0.47 kg
Entire carriage 160 mm:	1.30 kg
Entire carriage 240 mm:	1.85 kg
Max. total length:	1500 mm

Technical Data

SRS

Max. total speed:	0.50 m/s
Max. acceleration:	20 m/s ²
Repeat accuracy:	± 0.03 mm (KGT)
Idle torque:	0.30 Nm

Forces and moments



SRS	
Forces	Dynamic [N]
F_x	1000
F_y	500
F_z	1000
$-F_z$	1000
Moments	Dynamic [Nm]
M_x	60
M_y	80 (110)
M_z	80 (110)

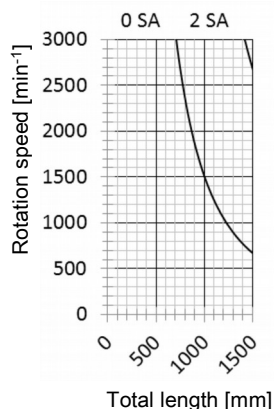
Data in brackets refer to long carriage (240)

Drive element

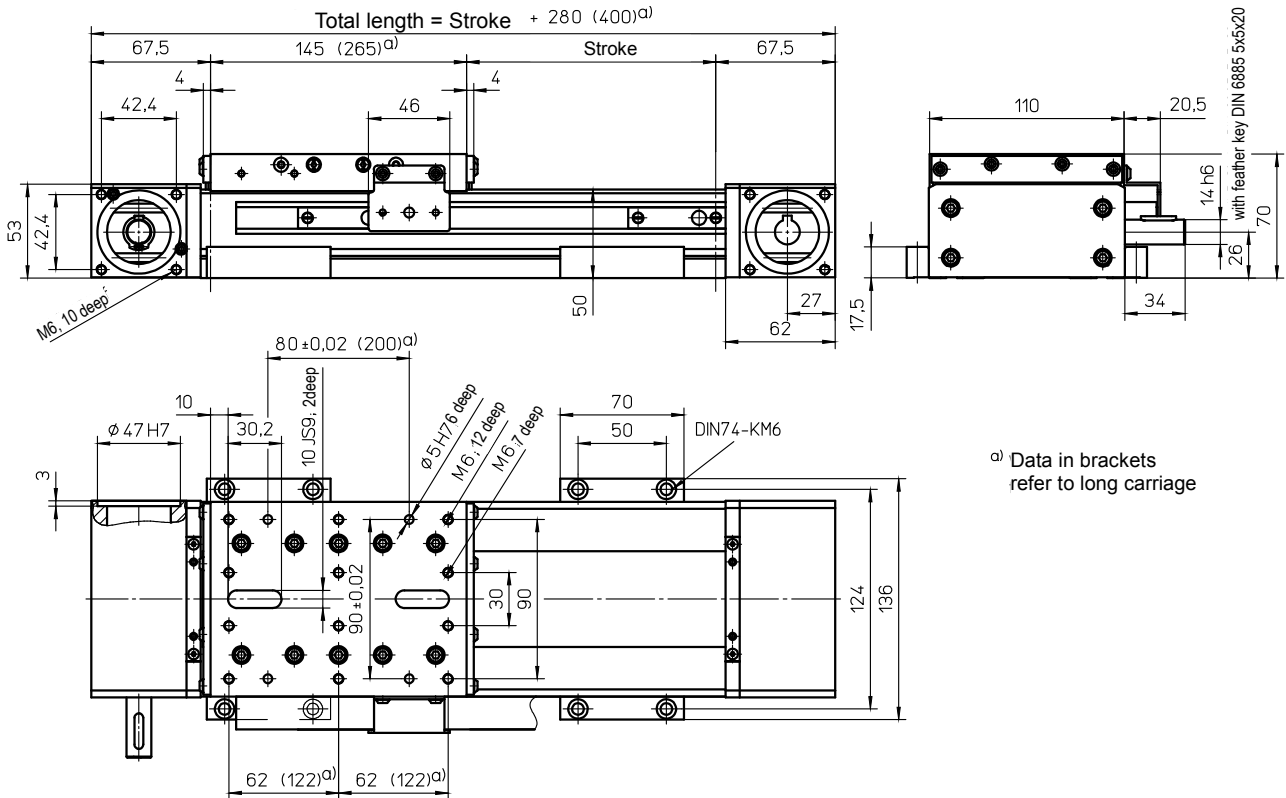
KGT

Max. rotation speed:	3000 min ⁻¹
Diameter:	12 mm
Pitch:	5 / 10 mm
Moment of inertia:	$1.20 \cdot 10^{-5} \text{ kgm}^2/\text{m}$

Spindle support (SA)



with toothed belt drive and double linear guide (ZSS)



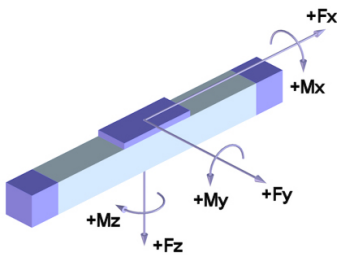
Weights ZSS

Basic length without stroke:	12.75 kg
100 mm stroke:	0.80 kg
Entire carriage 145 mm:	2.20 kg
Entire carriage 265 mm:	3.15 kg
Max. total length:	8100 mm

Technical Data ZSS

Max. total speed:	5.00 m/s
Max. acceleration:	40 m/s ²
Repeat accuracy:	± 0.08 mm
Idle torque:	2.0 Nm
Moment of inertia:	7.60 · 10 ⁻⁴ kgm ²
Drive element:	Toothed belt 50 AT5-E
Stroke per revolution:	110 mm

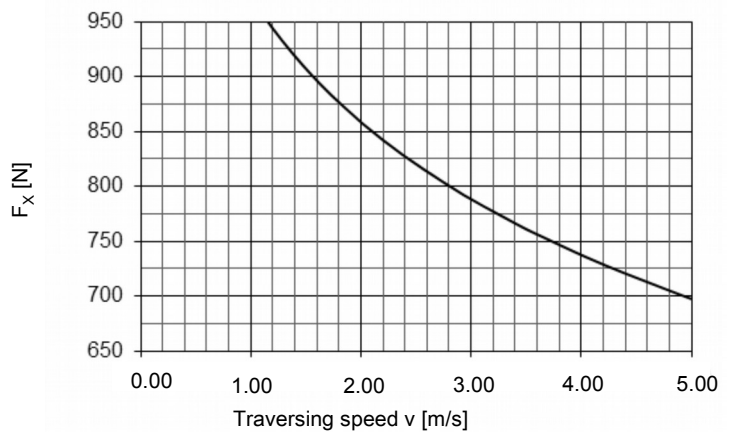
Forces and moments



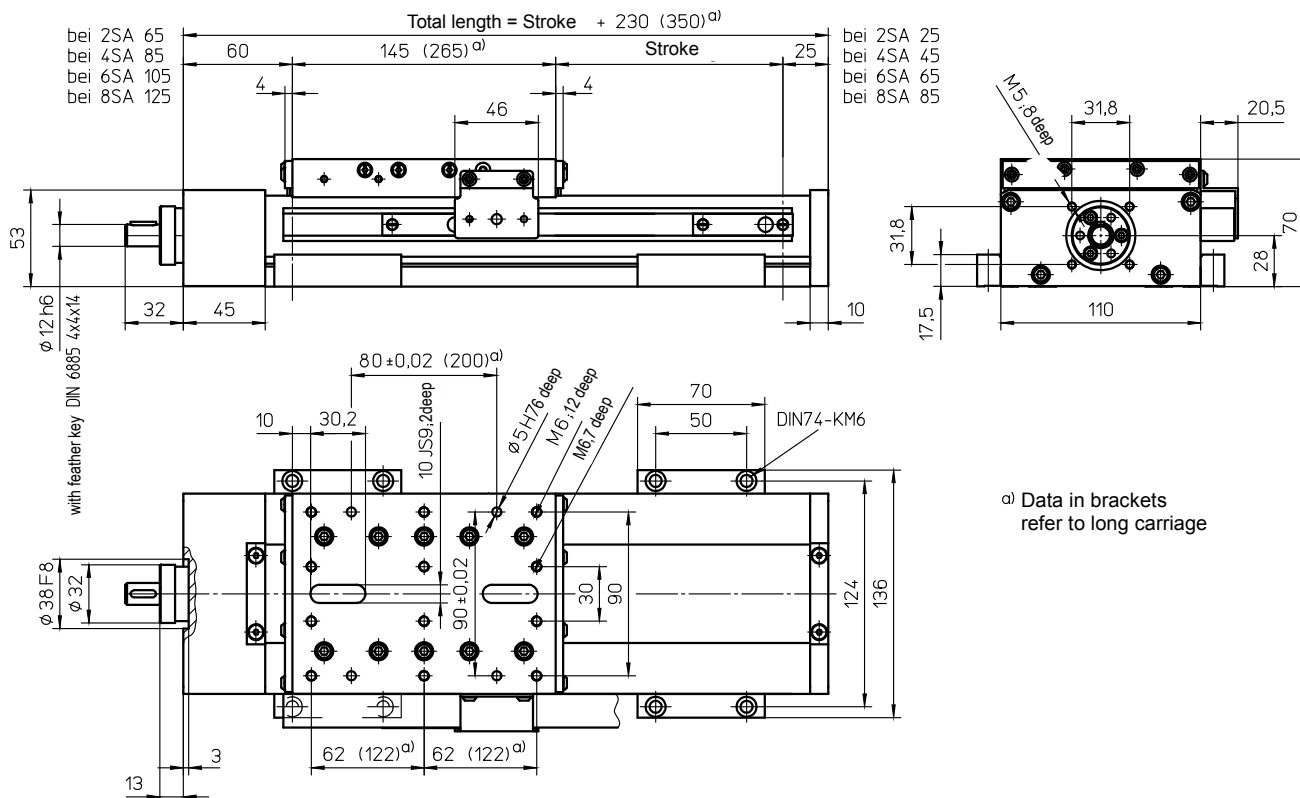
ZSS	
Forces	Dynamic [N]
F _x ^{d)}	950
F _y	1200
F _z	3000
-F _z	1500
Moments	Dynamic [Nm]
M _x	500
M _y	550 (1000)
M _z	550 (1000)

^{d)} Maximum value (see diagram "F_x-v-Diagram")
Data in brackets refer to long carriage (265)

F_x - v - Diagram



with ball screw (KGT) and double linear guide (SSS)



Weights

SSS

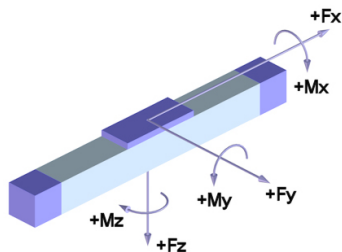
Basic length without stroke:	11.00 kg
100 mm stroke:	0.90 kg
Entire carriage 145 mm:	2.30 kg
Entire carriage 265 mm:	3.25 kg
Max. total length:	5600 mm

Technical Data

SSS

Max. total speed:	2.00 m/s
Max. acceleration:	20 m/s ²
Repeat accuracy:	± 0.03 mm (KGT)
Idle torque:	1.0 Nm

Forces and moments



SSS	
Forces	Dynamic [N]
F_x	2000
F_y	1200
F_z	3000
$-F_z$	1500
Moments	Dynamic [Nm]
M_x	500
M_y	550 (1100)
M_z	550 (1100)

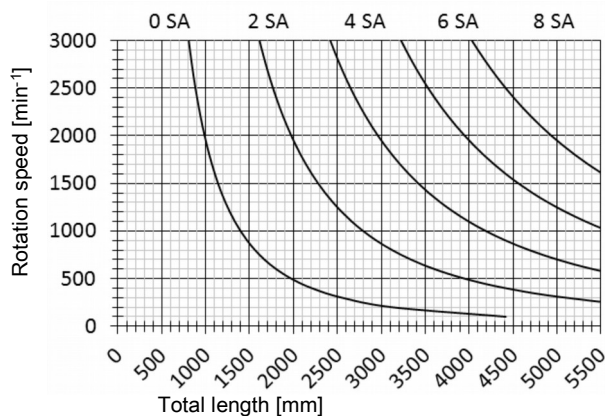
Data in brackets refer to long carriage (265)

Drive element

KGT

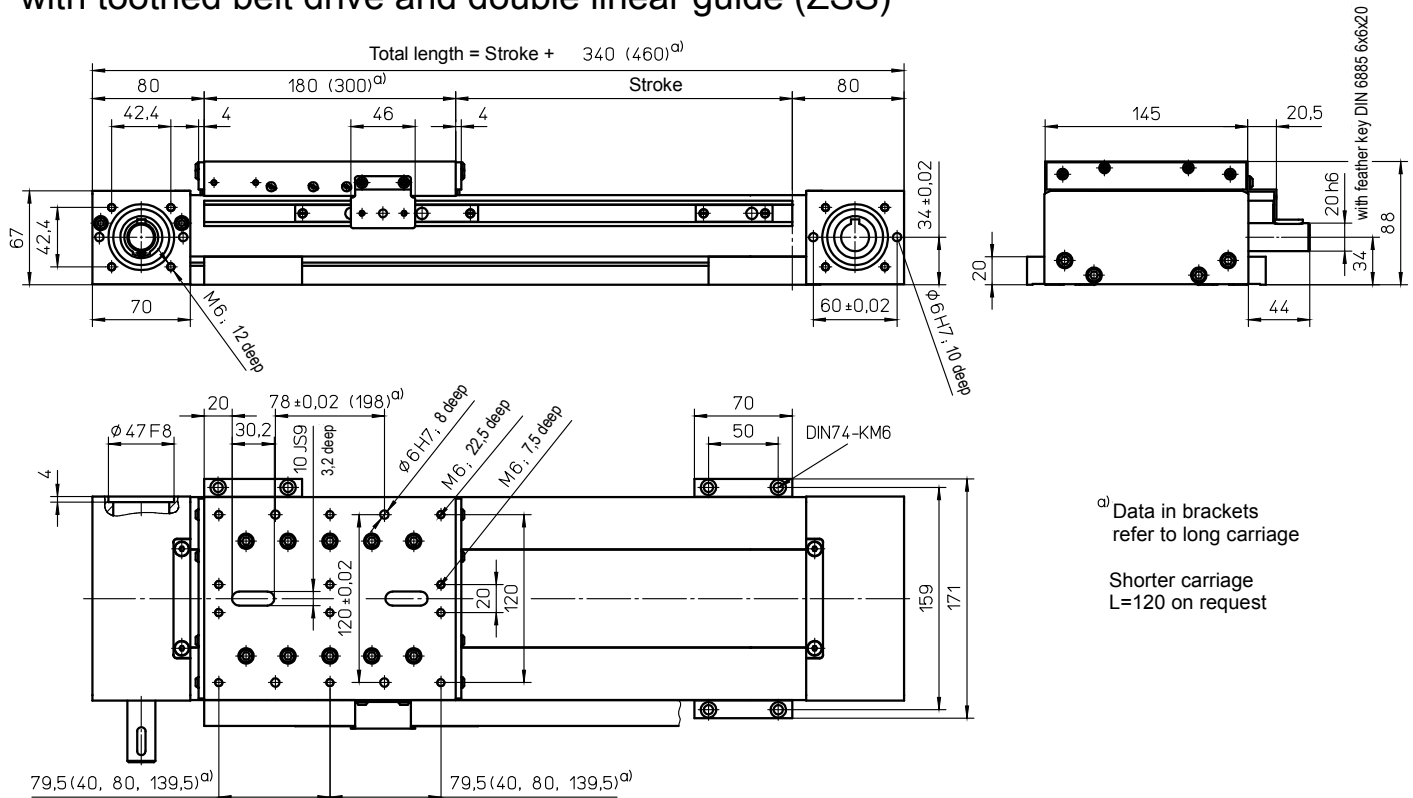
Max. rotation speed:	3000 min ⁻¹
Diameter:	16 mm
Pitch:	5 / 10 / 20 / 40 mm
Moment of inertia:	3.25 · 10 ⁻⁵ kgm ² /m

Spindle support (SA)



Special design: Spindle support with damping ring (extension of total length: 10 mm for every 2 SA)

with toothed belt drive and double linear guide (ZSS)



Weights

ZSS

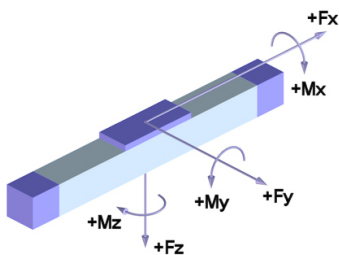
Basic length without stroke	13.80 kg
100 mm stroke:	1.30 kg
Entire carriage 180 mm:	4.50 kg
Entire carriage 300 mm:	6.10 kg
Max. total length:	8100 mm

Technical Data

ZSS

Max. total speed:	5.00 m/s
Max. acceleration:	40 m/s ²
Repeat accuracy:	± 0.08 mm
Idle torque:	3.00 Nm
Moment of inertia:	2.85 • 10 ⁻³ kgm ²
Drive element:	Toothed belt 60 AT5-E
Stroke per revolution:	150 mm

Forces and moments

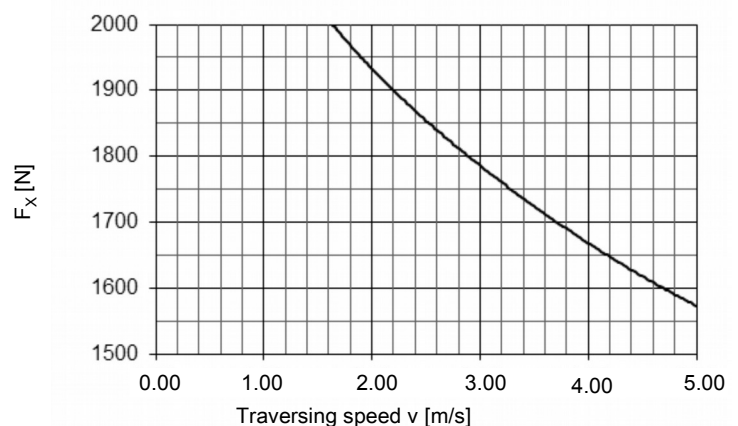


ZSS	
Forces	Dynamic [N]
F_x ^{d)}	2000
F_y	2500
F_z	5000
$-F_z$	3000
Moments	Dynamic [Nm]
M_x	800
M_y	1000 (1600)
M_z	1000 (1600)

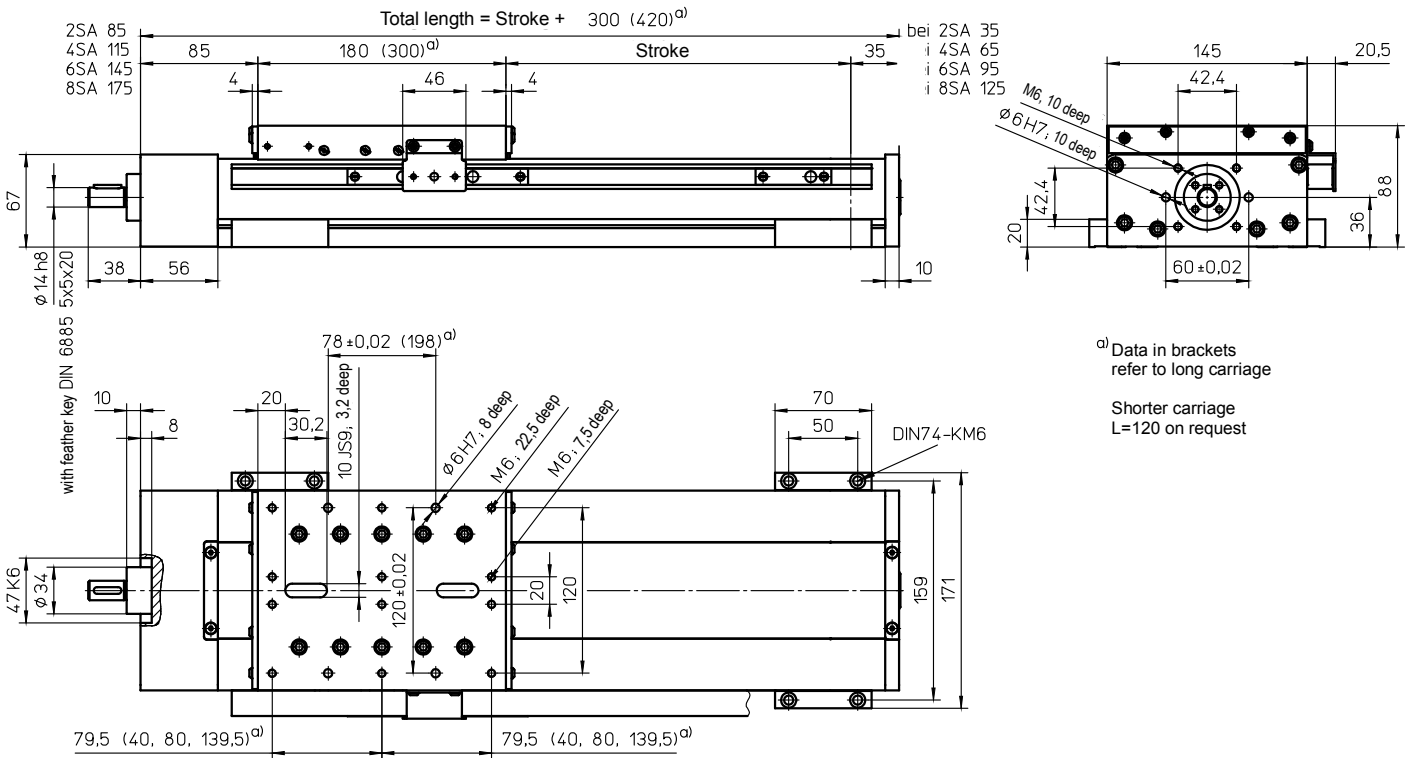
Data in brackets refer to long carriage (300)

Compact module is available in two profile versions:
 Stop angle and position of guide support milled = Standard (Delta 145-C-ZSS)
 Unmachined = Alternative (Delta 145-C-ZSA)

F_x - v - Diagram



with ball screw (KGT) and double linear guide (SSS)



Weights

SSS

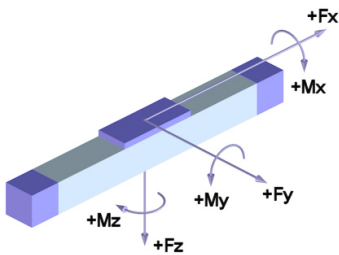
Basic length without stroke:	10.50 kg
100 mm stroke:	1.50 kg
Entire carriage 180 mm:	4.90 kg
Entire carriage 300 mm:	6.50 kg
Max. total length:	5600 mm

Technical Data

SSS

Max. total speed:	2.50 m/s
Max. acceleration:	20 m/s ²
Repeat accuracy:	± 0.03 mm (KGT)
Idle torque:	1.00 Nm

Forces and Moments



SSS	
Forces	Dynamic [N]
F_x	6000
F_y	2500
F_z	5000
$-F_z$	3000
Moments	Dynamic [Nm]
M_x	800
M_y	1000 (1600)
M_z	1000 (1600)

Data in brackets refer to long carriage (300)

Compact module is available in two profile versions:

Stop angle and position of guide support milled = Standard (Delta 145-C-SSS)

Unmachined = Standard (Delta 145-C-SSA)

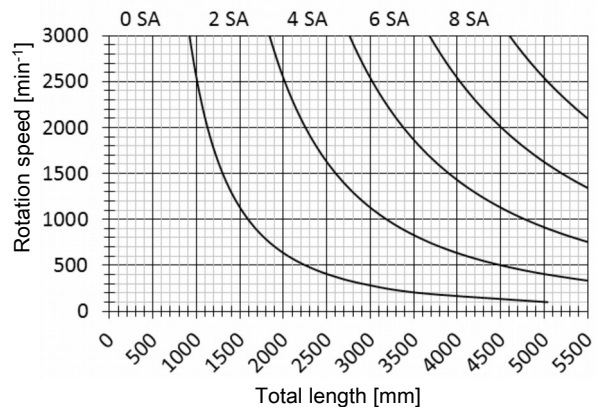
Special design: Spindle support with damping ring (extension of total length: 10 mm for every 2 SA)

Drive element

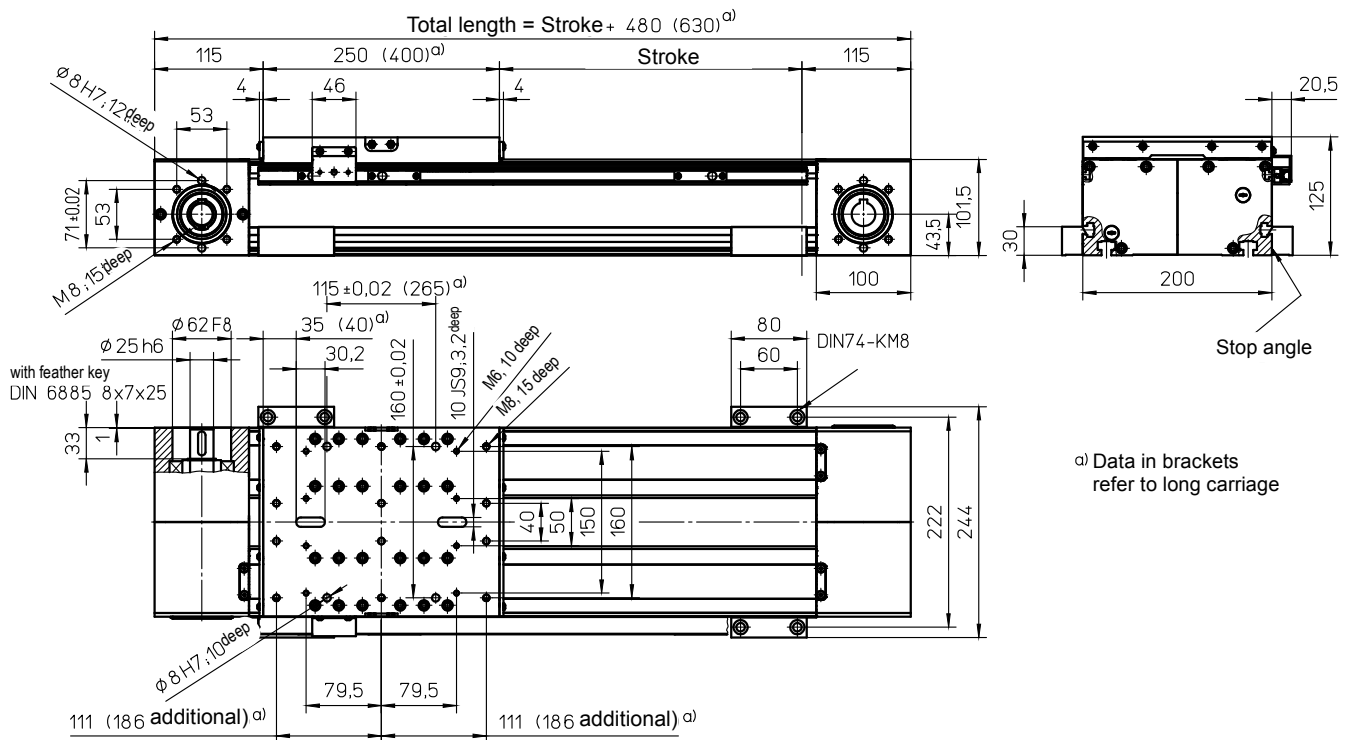
KGT

Max. rotation speed:	3000 min ⁻¹
Diameter:	20 mm
Pitch:	5 / 10 / 20 / 50 mm
Moment of inertia:	8.50 · 10 ⁻⁵ kgm ² /m

Spindle support SA



with toothed belt drive and double linear guide (ZSS)



Weights

ZSS

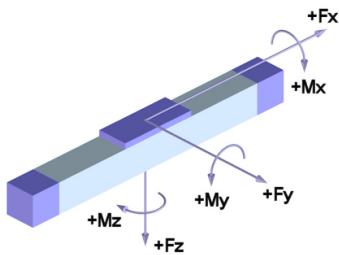
Basic length without stroke:	25.00 kg
100 mm stroke:	2.00 kg
Entire carriage 250 mm:	8.20 kg
Entire carriage 400 mm:	10.50 kg
Max. total length:	2000 mm

Technical Data

ZSS

Max. total speed:	5.00 m/s
Max. acceleration:	60 m/s ²
Repeat accuracy:	± 0.08 mm
Idle torque:	3.80 Nm
Moment of inertia:	1.20 · 10 ⁻² kgm ²
Drive element:	Toothed belt 75 AT10
Stroke per revolution:	220 mm

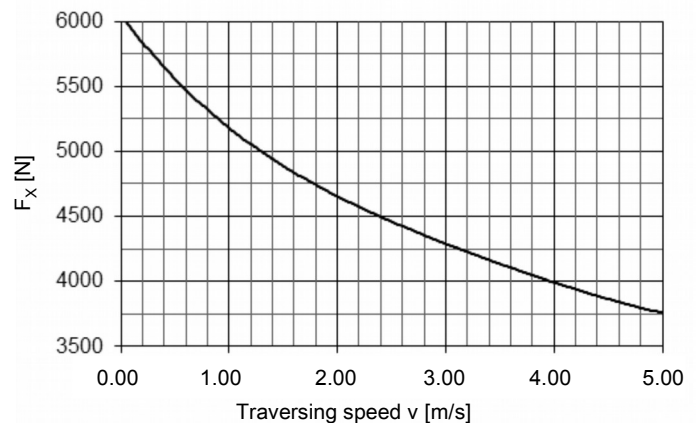
Forces and moments



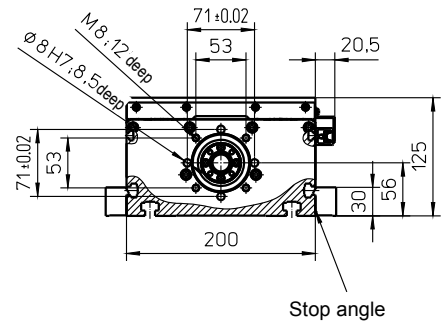
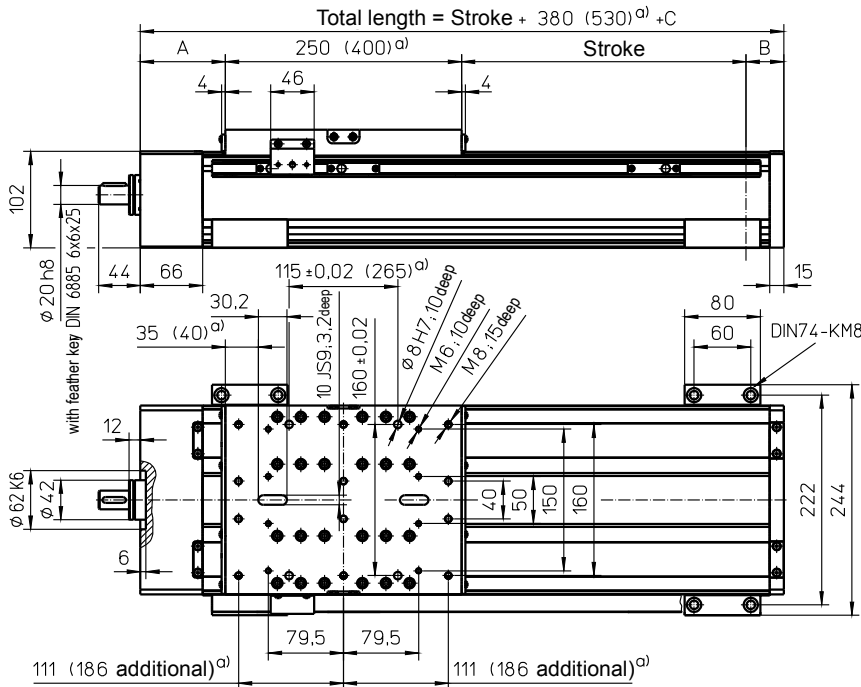
ZSS	
Forces	Dynamic [N]
F_x ^{d)}	6000
F_y	5000
F_z	8000
$-F_z$	5000
Moments	Dynamic [Nm]
M_x	3500
M_y	4300 (6000)
M_z	3200 (4500)

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

F_x - v - Diagram



with ball screw (KGT) and double linear guide (SSS)



ⓐ Data in brackets refers to long carriage

Quantity SA	Version M			Version MM		
	A	B	C	A	B	C
0	90	40	-	90	40	-
2						

"0 SA" applies for long carriage

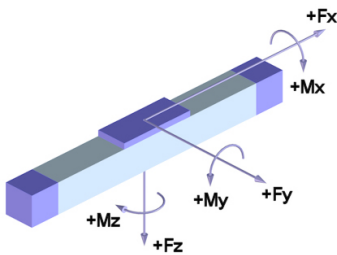
Weights

	SSS
Basic length without stroke:	22.00 kg
100 mm stroke:	2.60 kg
Entire carriage 250 mm:	8.40 kg
Entire carriage 400 mm:	11.00 kg
Max. total length:	2000 mm

Technical Data

	SSS
Max. total speed:	3.00 m/s
Max. acceleration:	20 m/s ²
Repeat accuracy:	± 0.03 mm (KGT)
Idle torque:	2.80 Nm

Forces and moments



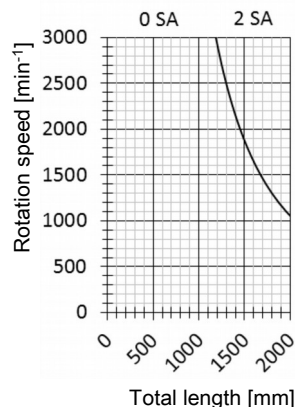
	SSS
Forces	Dynamic [N]
F_X	10000
F_Y	5000
F_Z	8000
-F_Z	5000
Moments	Dynamic [Nm]
M_X	3500
M_Y	4300 (6000)
M_Z	3200 (4500)

Data in brackets refer to long carriage (400)

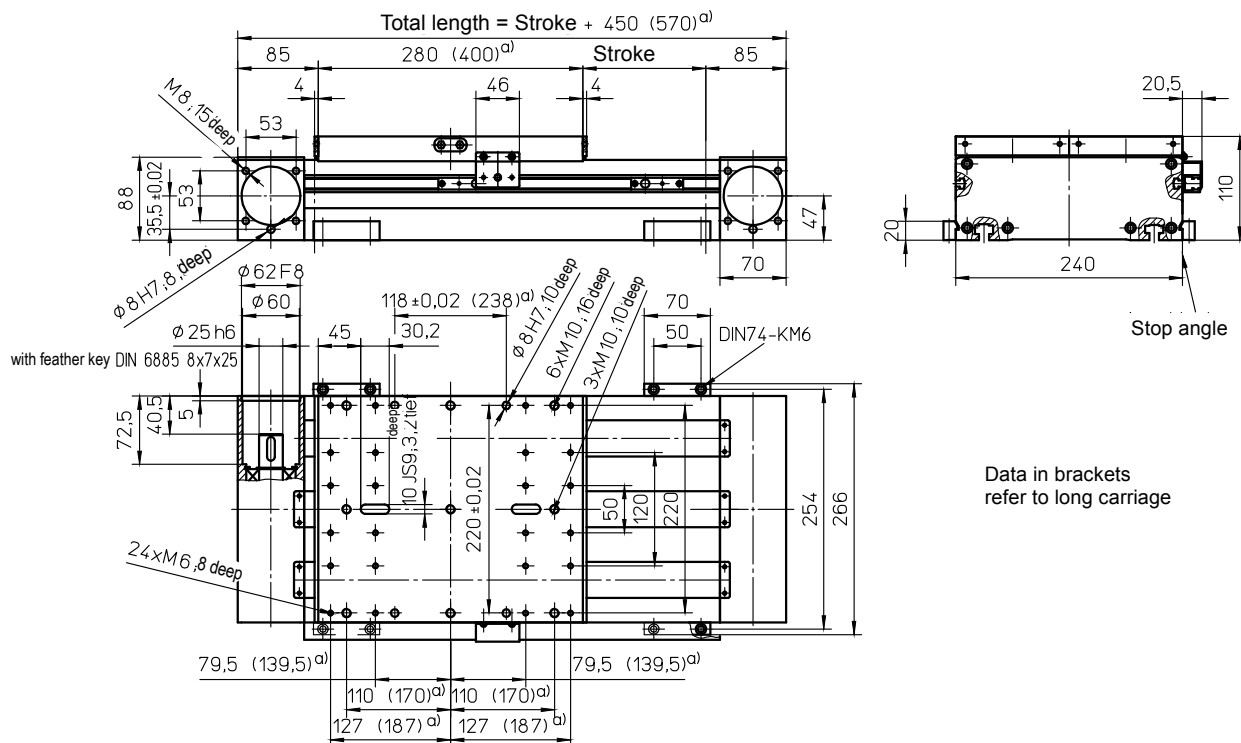
Drive element

	KGT
Max. rotation speed:	3000 min ⁻¹
Diameter:	32 mm
Pitch:	5 / 10 / 20 / 40 / 60 mm
Moment of inertia:	6.45 · 10 ⁻⁴ kgm ² /m

Spindle support (SA)



with toothed belt drive and double linear guide (ZSS)



Data in brackets refer to long carriage

Weights

ZSS

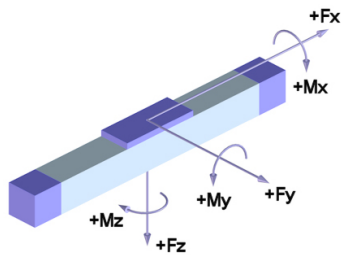
Basic length without stroke:	27.00 kg
100 mm stroke:	3.40 kg
Entire carriage 280 mm:	9.80 kg
Entire carriage 400 mm:	14.00 kg
Max. total length:	3000 mm

Technical Data

ZSS

Max. total speed:	5.00 m/s
Max. acceleration:	60 m/s ²
Repeat accuracy:	± 0.08 mm
Idle torque:	5.50 Nm
Moment of inertia:	2.00 · 10 ⁻² kgm ²
Drive element:	Toothed belt 50 AT10-E
Stroke per revolution:	150 mm

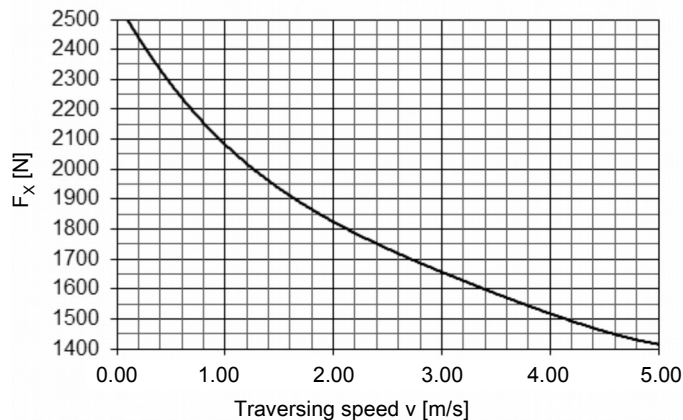
Forces and moments



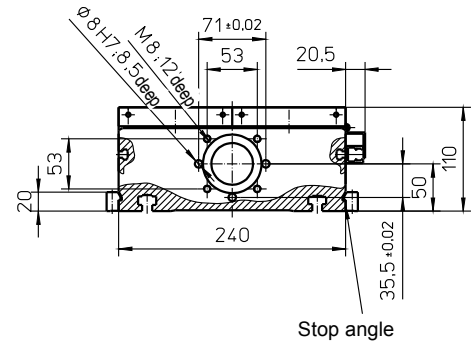
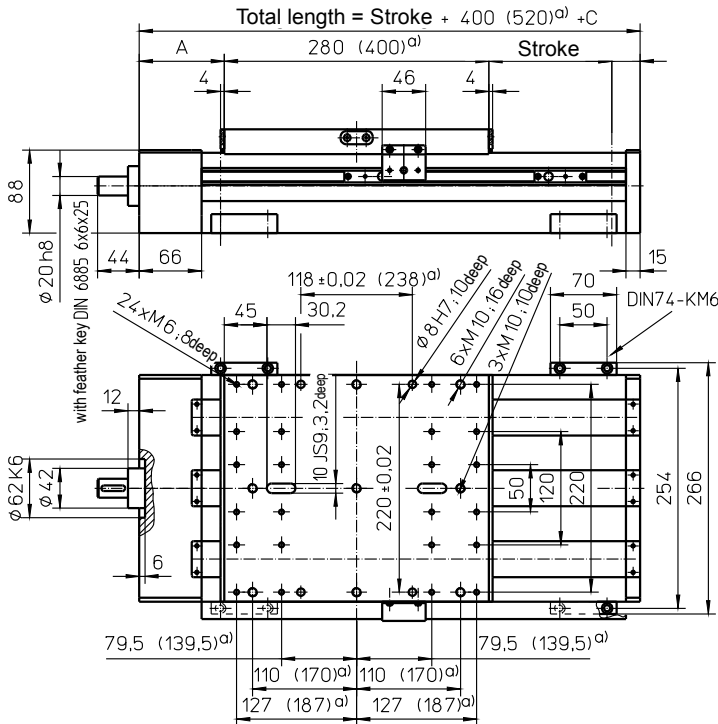
ZSS	
Forces	Dynamic [N]
$F_x^{d)}$	2500
F_y	6000
F_z	12000
$-F_z$	8000
Moments	Dynamic [Nm]
M_x	4500
M_y	6000 (8500)
M_z	4500 (6400)

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

F_x - v - Diagram



with ball screw (KGT) and double linear guide (SSS)



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

Quantity SA	M			MM		
	A	B	C	A	B	C
0	90	30	-	90	30	-
2	130	70	80	130	70	80

"0 SA" applies for long carriage

Weights

SSS

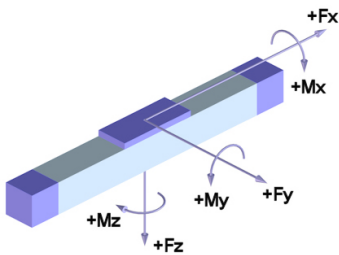
Basic length without stroke:	26.00 kg
100 mm stroke:	3.90 kg
Entire carriage 280 mm:	10.20 kg
Entire carriage 400 mm:	14.60 kg
Max. total length:	3000 mm

Technical Data

SSS

Max. total speed:	3.00 m/s
Max. acceleration:	20 m/s ²
Repeat accuracy:	± 0.03 mm (KGT)
Idle torque:	2.80 Nm

Forces and moments



SSS	
Forces	Dynamic [N]
F _x	12000
F _y	6000
F _z	12000
-F _z	8000
Moments	Dynamic [Nm]
M _x	4500
M _y	6000 (8500)
M _z	4500 (6400)

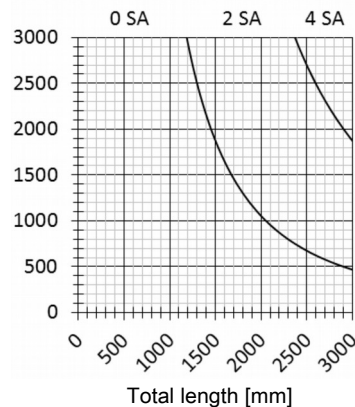
Data in brackets refer to long carriage (400)

Drive element

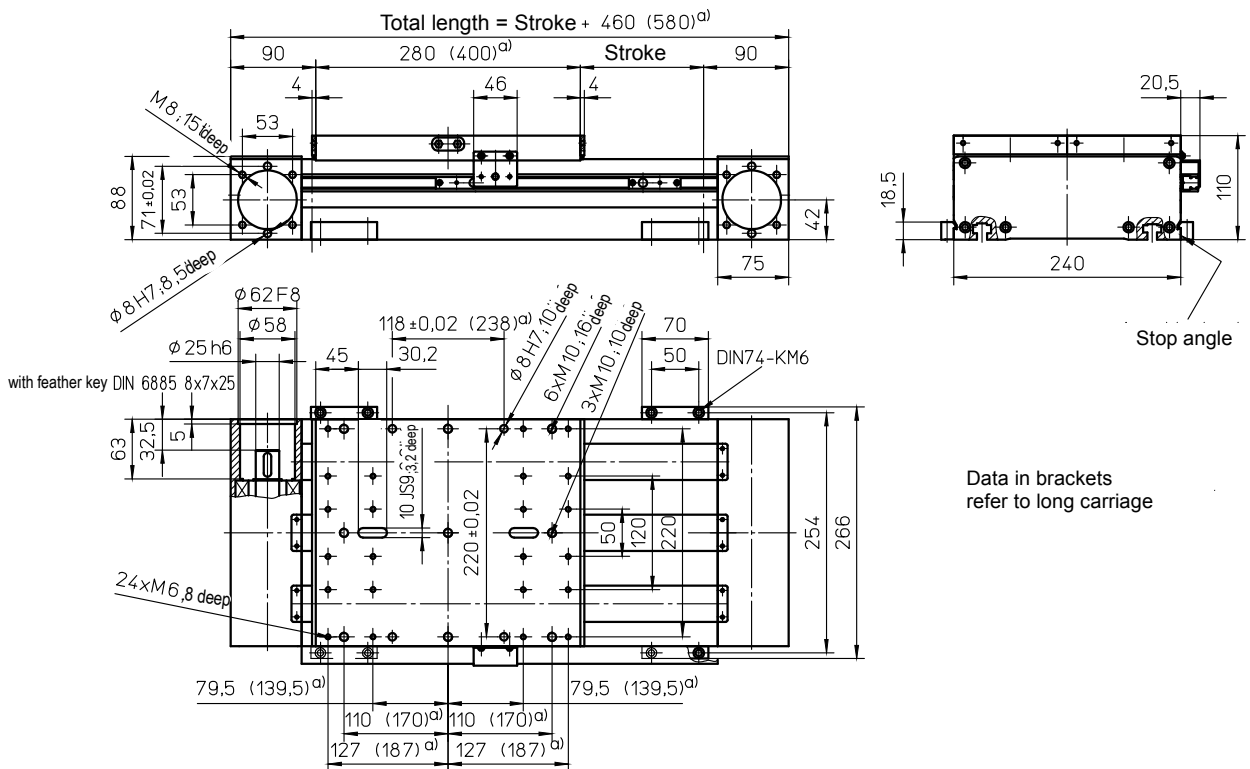
KGT

Max. rotation speed:	3000 min ⁻¹
Diameter:	32 mm
Pitch:	5 / 10 / 20 / 40 / 60 mm
Moment of inertia:	6.45 · 10 ⁻⁴ kgm ² /m

Spindle support (SA)



with toothed belt drive and double linear guide (ZSS)



Data in brackets refer to long carriage

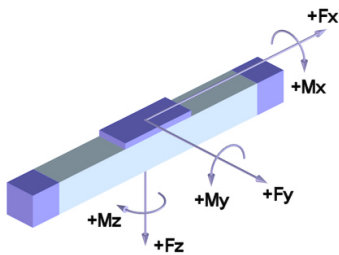
Weights ZSS

Basic length without stroke:	25.50 kg
100 mm stroke:	2.75 kg
Entire carriage 280 mm:	9.80 kg
Entire carriage 400 mm:	14.00 kg
Max. total length:	8000 mm

Technical Data ZSS

Max. total speed:	5.00 m/s
Max. acceleration:	60 m/s ²
Repeat accuracy:	± 0.08 mm
Idle torque:	5.50 Nm
Moment of inertia:	2.60 · 10 ⁻² kgm ²
Drive element:	Toothed belt 60 ATL10
Stroke per revolution:	180 mm

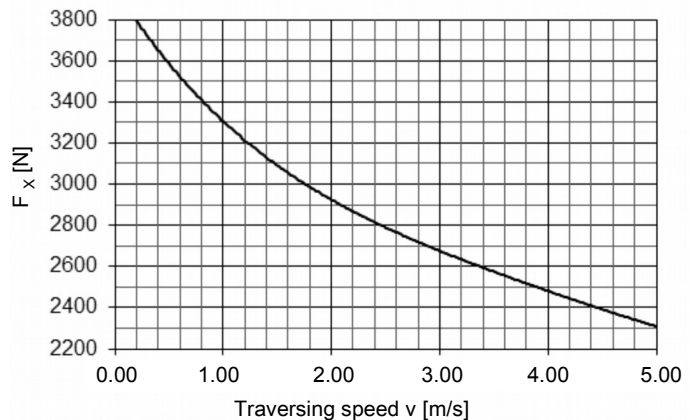
Forces and moments



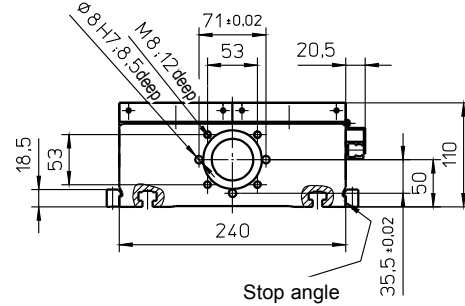
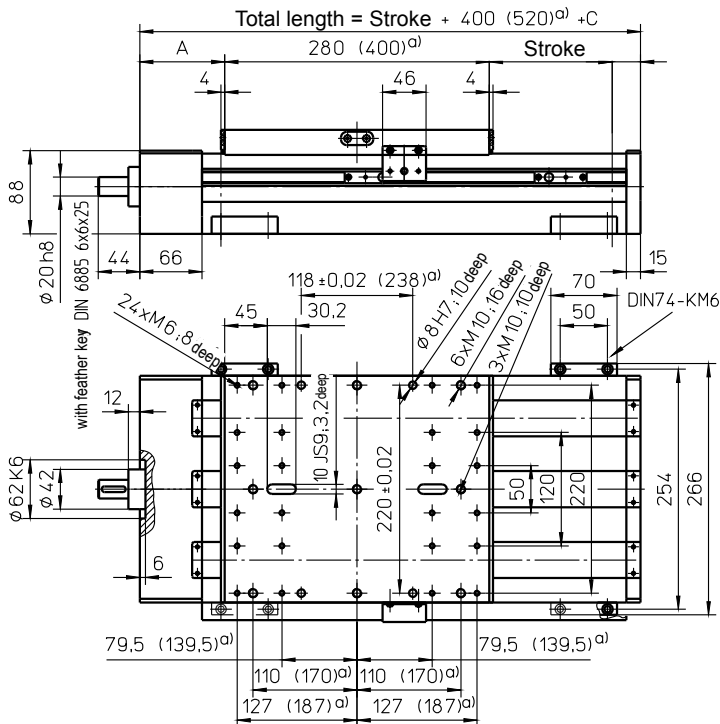
ZSS	
Forces	Dynamic [N]
F _x ^{d)}	3800
F _y	6000
F _z	12000
-F _z	8000
Moments	Dynamic [Nm]
M _x	4500
M _y	6000 (8500)
M _z	4500 (6400)

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

F_x - v - Diagram



with ball screw (KGT) and double linear guide (SSS)



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

Quantity SA	M			MM		
	A	B	C	A	B	C
0	90	30	-	90	30	-
2	130	70	80	130	70	80
4	170	110	120	170	110	120

"0 SA" applies for long carriage

Weights

SSS

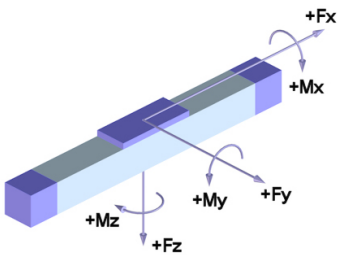
Basic length without stroke:	24.20 kg
100 mm stroke:	3.25 kg
Entire carriage 280 mm:	10.20 kg
Entire carriage 400 mm:	14.60 kg
Max. total length:	5800 mm

Technical Data

SSS

Max. total speed:	3.00 m/s
Max. acceleration:	20 m/s ²
Repeat accuracy:	± 0.03 mm (KGT)
Idle torque:	2.80 Nm

Forces and moments



SSS	
Forces	Dynamic [N]
F_X	12000
F_Y	6000
F_Z	12000
-F_Z	8000
Moments	Dynamic [Nm]
M_X	4500
M_Y	6000 (8500)
M_Z	4500 (6400)

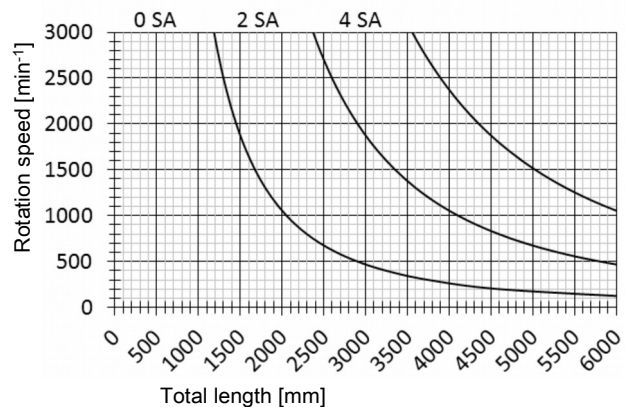
Data in brackets refer to long carriage (400)

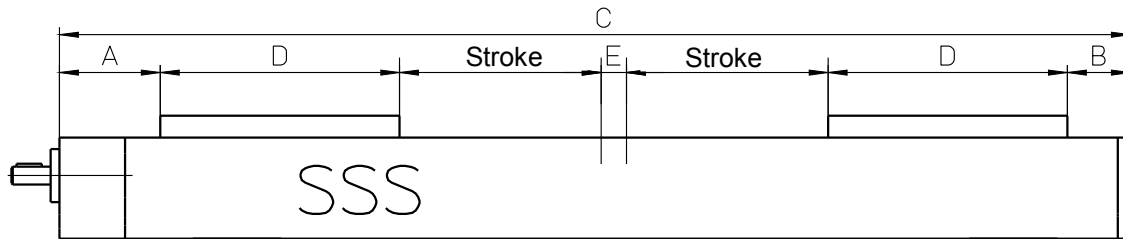
Drive element

KGT

Max. rotation speed:	3000 min ⁻¹
Diameter:	32 mm
Pitch:	5 / 10 / 20 / 40 / 60 mm
Moment of inertia:	6.45 · 10 ⁻⁴ kgm ² /m

Spindle support (SA)



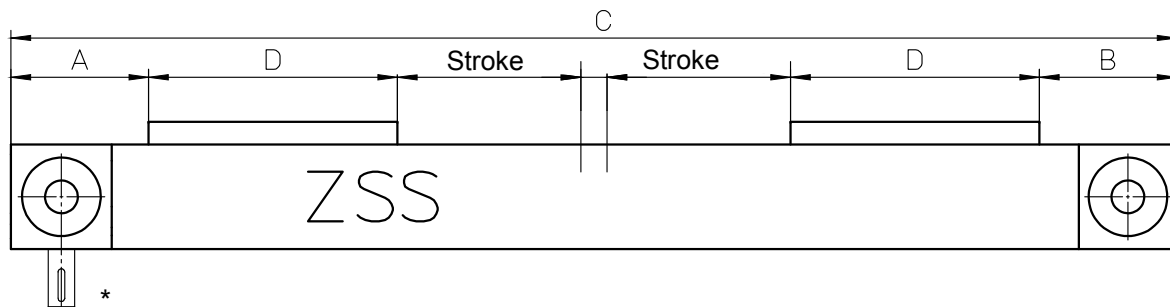


Unit size	A [mm]	B [mm]	Total length C [mm]	D [mm]	E [mm]	Screw drive *
Delta 110-C-SSS	60	25	2 x stroke + 375 (615) ^{a)} + E 80 mm extension for every 4 SA	145 (265) ^{a)}	min. 20 without SA	KGT 1605
Delta 145-C-SSS	85	35	2 x Verfahrweg + 480 (720) ^{a)} + E 120 mm extension for every 4 SA	180 (300) ^{a)}	min. 20 without SA	KGT 2005

For detailed measurements, see main dimensions sheet for respective size (version).

* Design only available with pitch 50

a) Data in brackets apply to long carriage

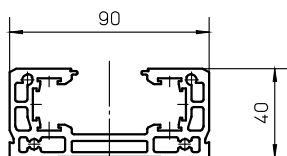


Unit size	A [mm]	B [mm]	Total length C [mm]	D [mm]	E [mm]
Delta 110-ZSS *	77,5	77,5	2 x stroke + 445 (685) ^{a)} + E	145 (265) ^{a)}	min. 20
Delta 145-ZSS on request	80	80	2 x stroke + 520 (760) ^{a)} + E	180 (300) ^{a)}	min. 25

For detailed measurements, see main dimensions sheet for respective size (version).

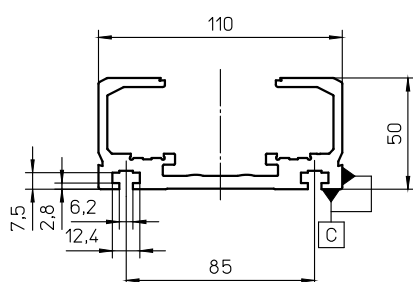
a) Data in brackets apply to long carriage

* Drive shaft downward



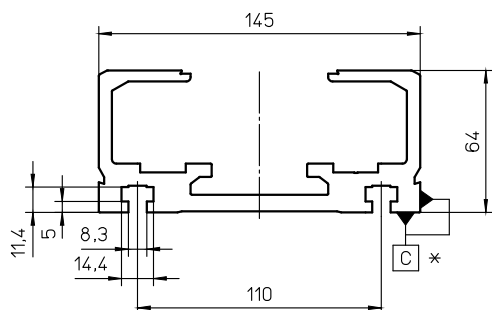
Profile Delta 90

Specific mass [kg/m]	3.36
Surface measure [mm ²]	1206
Geometrical moment of inertia I _y [mm ⁴]	223758
Geometrical moment of inertia I _z [mm ⁴]	1203307
Section modulus W _y [mm ³]	10038
Section modulus W _z [mm ³]	26740



Profil Delta 110-C


Specific mass [kg/m]	4,16
Surface measure [mm ²]	1540
Geometrical moment of inertia I _y [mm ⁴]	431083
Geometrical moment of inertia I _z [mm ⁴]	2400513
Section modulus W _y [mm ³]	13230
Section modulus W _z [mm ³]	43638

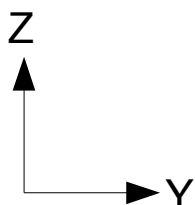


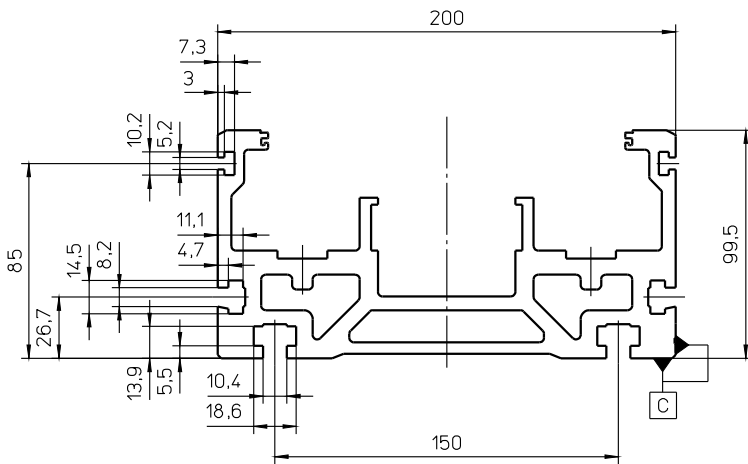
Profile Delta 145-C

Specific mass [kg/m]	7,6
Surface measure [mm ²]	2814
Geometrical moment of inertia I _y [mm ⁴]	1222896
Geometrical moment of inertia I _z [mm ⁴]	7494306
Section modulus W _y [mm ³]	29324
Section modulus W _z [mm ³]	103345

* Valid for version with machined profile.

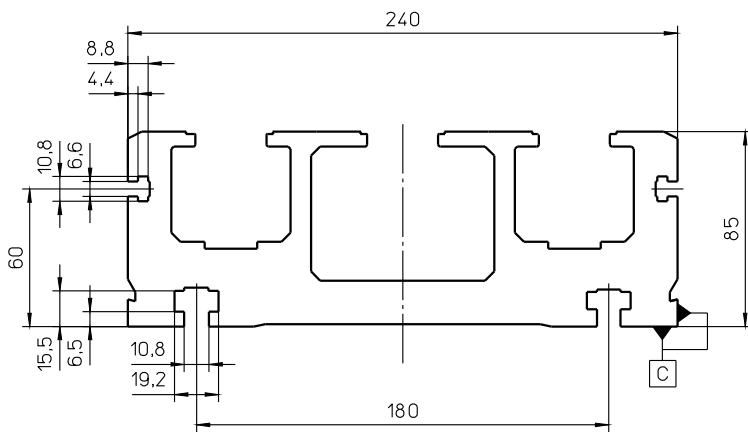
: Stop angle standard page C





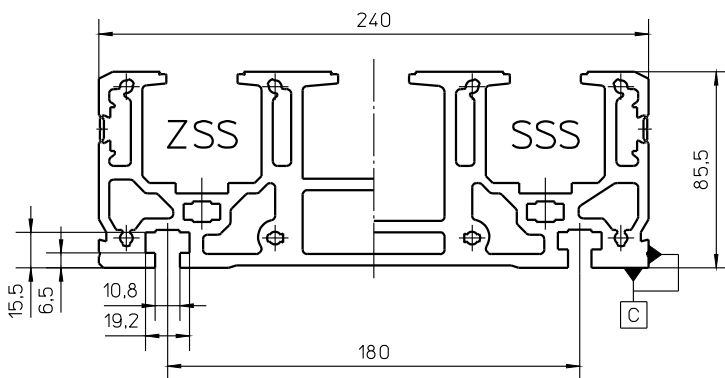
Profile Delta 200

Specific mass [kg/m]	15.41
Surface measure [mm ²]	5707
Geometrical moment of inertia I _y [mm ⁴]	3776635
Geometrical moment of inertia I _z [mm ⁴]	27552423
Section modulus W _y [mm ³]	57589
Section modulus W _z [mm ³]	274847



Profile Delta 240

Specific mass [kg/m]	27.2
Surface measure [mm ²]	10074
Geometrical moment of inertia I _y [mm ⁴]	6382473
Geometrical moment of inertia I _z [mm ⁴]	61720897
Section modulus W _y [mm ³]	119554
Section modulus W _z [mm ³]	511233



Profil Delta 240-C

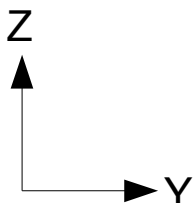
ZSS

Specific mass [kg/m]	18,5
Surface measure [mm ²]	6849
Geometrical moment of inertia I _y [mm ⁴]	4852964
Geometrical moment of inertia I _z [mm ⁴]	38448444
Section modulus W _y [mm ³]	97499
Section modulus W _z [mm ³]	320403

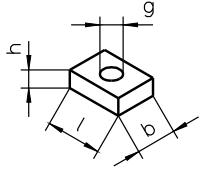
SSS

Specific mass [kg/m]	18,8
Surface measure [mm ²]	6962
Geometrical moment of inertia I _y [mm ⁴]	4985287
Geometrical moment of inertia I _z [mm ⁴]	39550055
Section modulus W _y [mm ³]	98152
Section modulus W _z [mm ³]	329583

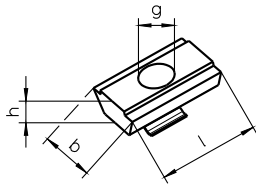
: Stop angle standard page C



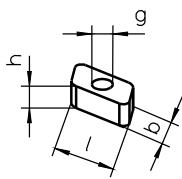
NS 1 - 4 / 6



NS 4.1 / 10

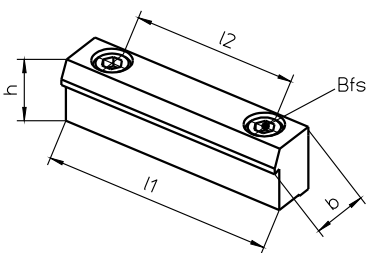


RM 2 / 4 / 6



Linear drive	Page	NS	ID No.	l [mm]	b [mm]	h [mm]	g
Delta 110-C	E	21	27352	18	12	4,5	M5
		RM2	15370	10	6	4	M4
Delta 145-C	E	4	10559	18	14	6	M8
		4.1	16552	20	13	6	M8
		10	16499	20	13	6	M6
		RM4	15371	13	8	6	M5
Delta 200	E	6	10561	25	18	8	M10
		RM6	15372	18	10	8	M6
	C 1nd D below	4	10559	18	14	6	M8
		4.1	16552	20	13	6	M8
		10	16499	20	13	6	M6
	C and D above	1	10556	12	10	4	M4
		2	10557	16	10	4	M5
Delta 240	E	6	10561	25	18	8	M10
		RM6	15372	18	10	8	M6
	C and D	1	10556	12	10	4	M4
		2	10557	16	10	4	M5
Delta 240-C	E	RM2	15370	10	6	4	M4
		6	10561	25	18	8	M10
Delta 110-C	E	RM6	15372	18	10	8	M6
		21	27352	18	12	4,5	M5
		RM2	15370	10	6	4	M4

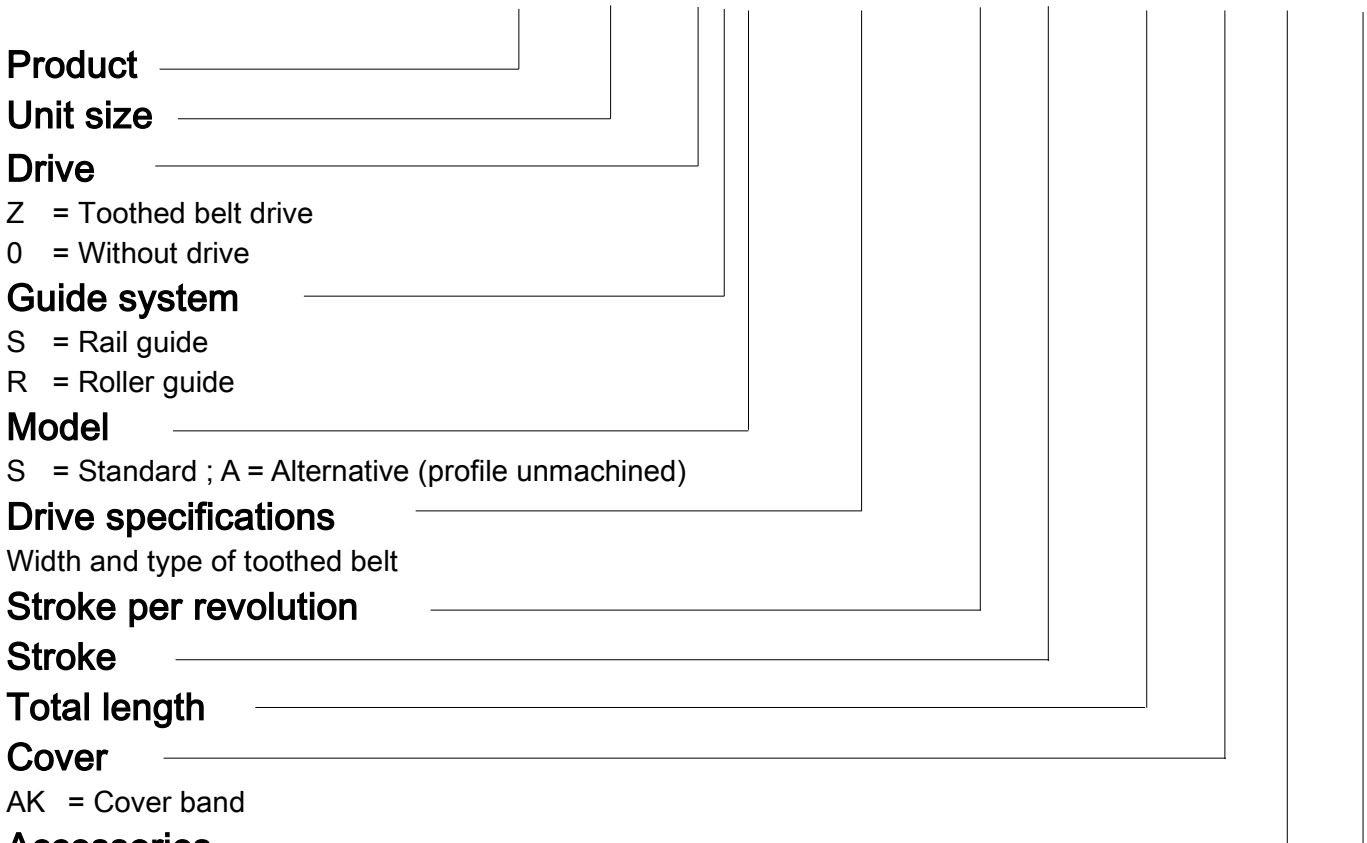
BL 1 - 4 / 8 / 10



Linear drive	BL	ID No.	l1 [mm]	l2 [mm]	b [mm]	h [mm]	Bfs
Delta 90	8	18447	70	50	15	13.5	M6
Delta 110-C	1	13224	49	30	15	17.5	M6
	1	10552	70	50	15	17.5	M6
Delta 145-C	2	10553	70	50	15	20	M6
Delta 200	3	10554	80	60	25	30	M8
Delta 240	4	10555	70	50	16	20	M6
Delta 240-C	10	17326	70	50	15	18.5	M6

* For further information on pages C - E, see catalogue page Z1
 Bfs = Mounting screw DIN 912 / ISO 4762

Example: **Delta 145-C-ZSS-50 AT5-E-110-1000-1340-AK-AZ1-1**



Z = Toothed belt drive

0 = Without drive

Guide system

S = Rail guide

R = Roller guide

Model

S = Standard ; A = Alternative (profile unmachined)

Drive specifications

Width and type of toothed belt

Stroke per revolution

Stroke

Total length

Cover

AK = Cover band

Accessories

BL = Mounting bracket

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 1 .. 21 = Sliding block ① .. ⑩ (see Table on **page D16**)

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

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

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

AZX = Integrated drive shaft (standard, not Delta 110-C and 145-C)

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)

URT = Deflection belt drive (according to dimension sheet)

Example: Delta 145-C-SSS-M-2510-1000-1360-2SA-2ES2-0

Product _____

Unit size _____

Drive _____

S = Spindle

0 = Without drive

Guide system _____

S = Rail guide

R = Roller guide

Model _____

S = Standard ; A = Alternative (profile unmachined)

Type of drive _____

M = Single nut (ball screw)

MM = Double nut (ball screw)

(TR = Trapezoidal screw - optional)

Drive specifications _____

Diameter and pitch (ball screw)

(Diameter x pitch (trapezoidal screw) - optional)

Stroke _____

Total length _____

Spindle support (SA) _____

(quantity)

Accessories _____

BL = Mounting bracket

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 ① .. ⑩ = Sliding block ① .. ⑩ (see Table on **page D16**)

Special design _____

0 = Standard

1 = Special (add specification description)

Further accessories (separate position)

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

URT = Deflection belt drive (according to dimension sheet)

For mounting of limit switches and lubrication points, see **page Z1**

Cover band comes as standard for screw drive

Further drives available on request:

MK or TK (= single nut made of plastic), KK (= double nut made of plastic)