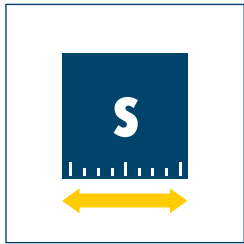
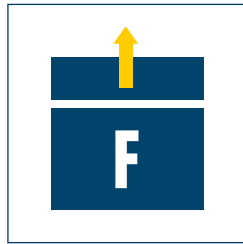


# System HSB Rack and Pinion Drive

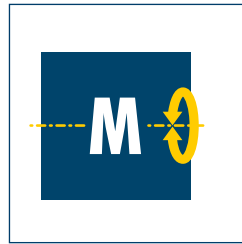
## Linear Axes · Rack and Pinion Drive



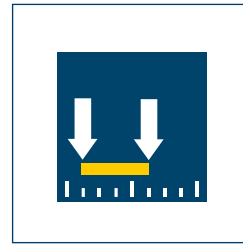
**Range of stroke**  
up to 5,400 mm



**Driving force**  
up to 4,500 N



**Moment load**  
up to 4,000 Nm



**Repeat accuracy**  
 $\pm 0.05$  mm



**Max. speed**  
Up to 1.5 m/s

## Application example



Line gantry for handling crankshafts

- 1** Toothed belt axis B 80-ZRS driving
- 2** Toothed belt axis B 80-ZRS synchronized
- 3** Connection shaft with claw coupling for synchronization
- 4** Servo motors with flange connection
- 5** Vertical axis with rack and pinion drive B 180-AZS
- 6** 2-finger parallel gripper, PGN plus 160

### Linear axis with rack and pinion drive

Boom module for which the motor is on the slide

### Area of application

Applications for which it is necessary to secure waste; for example, for vertical uses

### Your advantages and benefits

#### Reduced mass moved

due to stationary drive

#### Closed system

for maximum dirt resistance

#### Double profiled rail guide

for high moment load

#### Economical system

due to low maintenance and optimum size - performance ratio



### General information about the series

#### Drive

free from play, sturdy rack and pinion drive

#### Profile guide

Aluminum press-drawn section with plastic tape cover and double profiled rail guide

#### Material

Natural anodized aluminum parts

#### Operating temperature

From 10°C to 80°C

#### Warranty

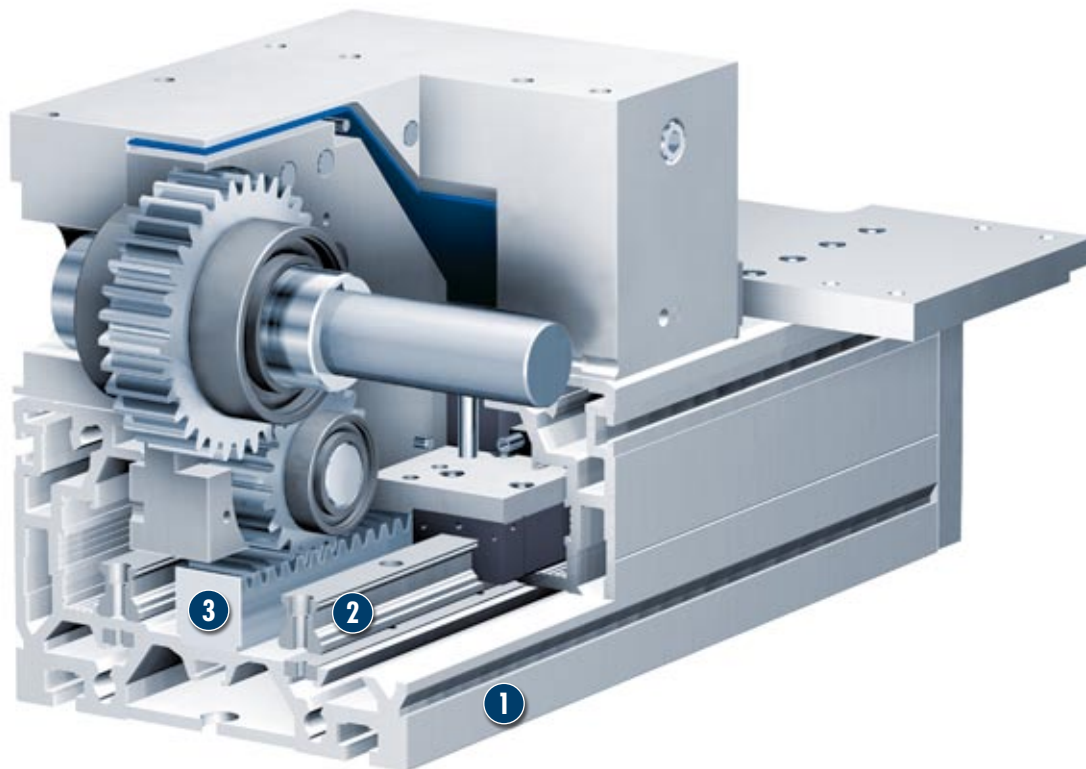
24 months

For production reasons, the colors may vary from those shown in the catalog.

# System HSB Rack and Pinion Drive

Linear Axes · Rack and Pinion Drive

## Sectional diagram of function



1 Axis body as the support profile

2 Profiled rail guide

3 Rack and pinion over pinion

## Description of function

The axis carriage is driven by a pinion on the rack and precisely guided by a double profiled rail guide. The covering tape runs through the axis carriage.

## Options and special information

The servo motor can be connected to the pinion shaft by a motor flange and a coupling.

① On request, SCHUNK can supply complete drive solutions including motor, gears, controller, and cables.

### Accessories

Accessories from SCHUNK – the suitable companion for the best functionality, reliability, and controlled production for all automation components.

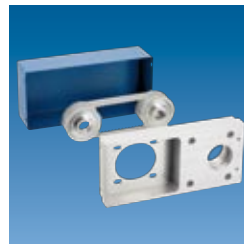
Motor flanges



Motors



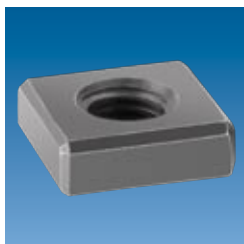
Angle belt drive



Bevel gear



T-nut



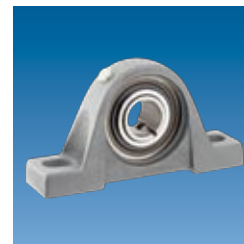
Mounting strips



Connection shafts



Pedestal bearing



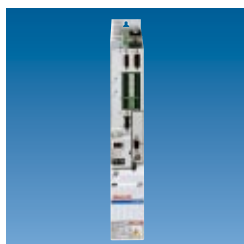
Inductive proximity switch



Mechanical roller switches



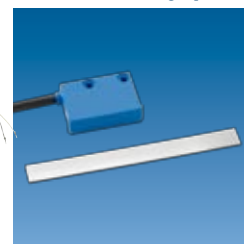
Drive controller



Cable set



Stroke measuring system



① Please see the side views at the end of the respective size for information concerning specific sizes, availability, designation, and ID numbers. Further information on pedestal bearings, connection shafts and bevel gears can be found in the "OPTIONS for System HSB" section of the catalog.

### General information about the series

#### Static and dynamic basic load ratings

An overview of the static and dynamic basic load ratings for the systems can be found in the "Technical data for installed guides" tables in the introduction to this chapter.

# System HSB Rack and Pinion Drive

## Linear Axes · Rack and Pinion Drive

### How to order - Rack and pinion drive

B 180 - AZ S - M 3 - 320 - 1000 - 1600 - AK - AZ1 - 1

#### Product series

#### Size (version)

#### Drive

A = Driven slide

Z = Rack and pinion drive

#### Guidance system

S = Rail guide

#### Drive version

Module = 3

#### Stroke per pinion revolution

#### Distance traveled

#### Overall length

#### Cover

AK = Cover tape

#### Accessories

BL3 = Mounting strip

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

E02 / E010 = Inductive limit switch, opener with 2m / 10 m cable attached

ES2 / ES10 = Inductive limit switch, closer with 2m / 10 m cable attached

NS (3) = T-nut M6

NS (6) = T-nut M10

RM 2 = T-nut M4

RM 6 = T-nut M10

AZ 1 = Short drive shaft, attachment side C

AZ 2 = Short drive shaft, attachment side D

AZ 6 = Long drive shaft, attachment side C and D

#### Special design

0 = Standard

1 = Special (specification in plain text)

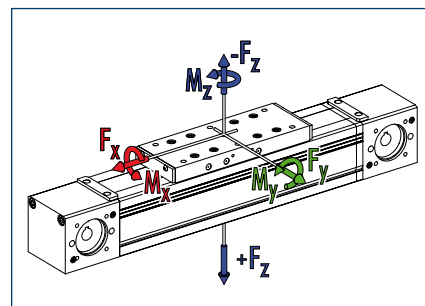
#### Additional accessories (separate item)

MGK = Motor flange and coupling (from dimension sheet)

### Advantages of profiled rail guide

- High load bearing capacity
- Long lifetime
- High precision

### Loads and load torques



Load		Dynamic
<span style="color: red;">■</span> $F_x^{**}$	[N]	4500
<span style="color: green;">■</span> $F_y$	[N]	8000
<span style="color: blue;">■</span> $F_z$	[N]	16000
<span style="color: blue;">■</span> $-F_z$	[N]	8000
Load torques		Dynamic
<span style="color: red;">■</span> $M_x$	[Nm]	2000
<span style="color: green;">■</span> $M_y$	[Nm]	4000
<span style="color: blue;">■</span> $M_z$	[Nm]	2000
<span style="color: blue;">■</span> $M_{z_{max}}$	[Nm]	239.5

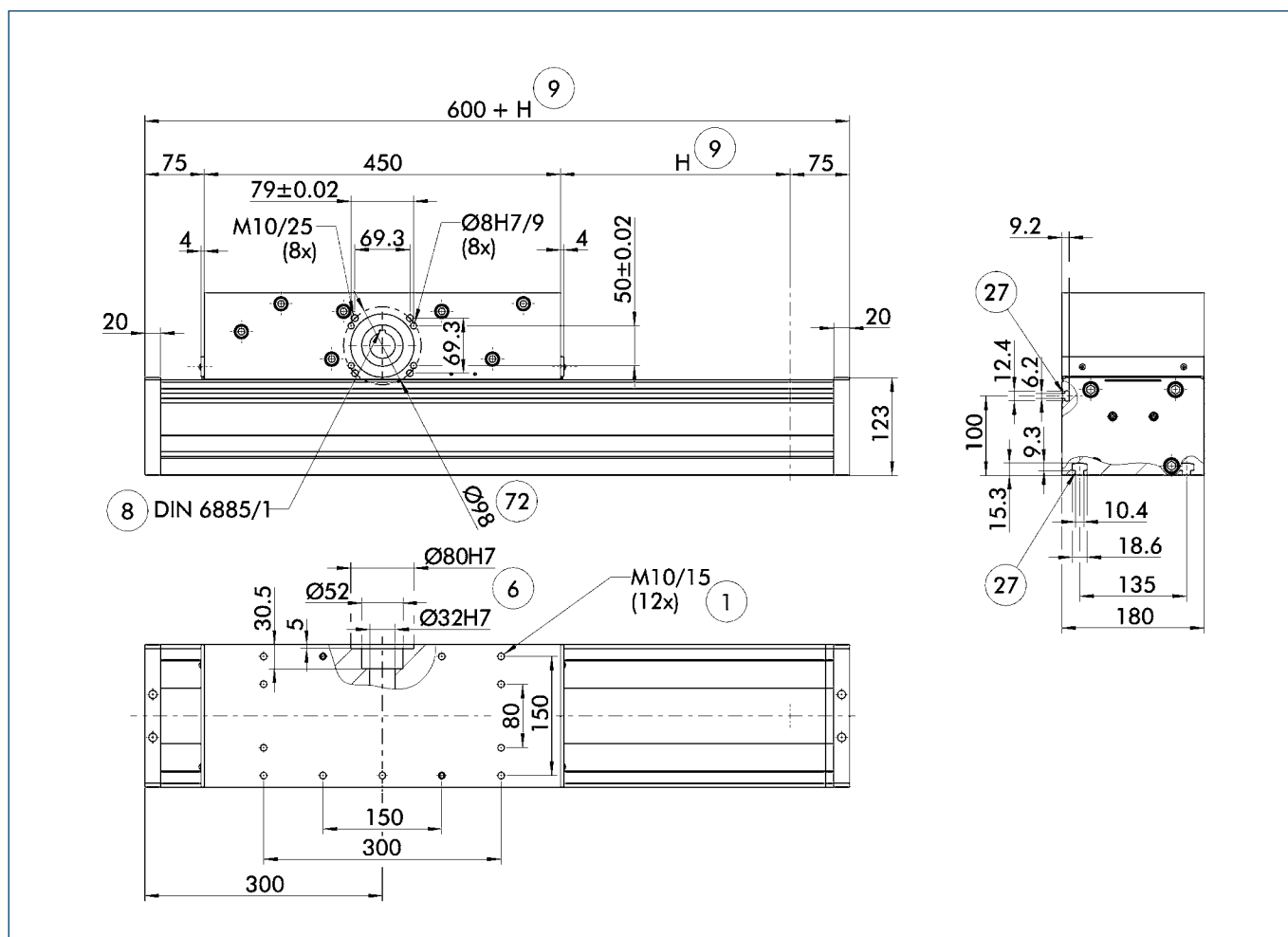
\*\* Maximum value = Depending on speed

① Values in brackets relate to the long slide.

### Technical data

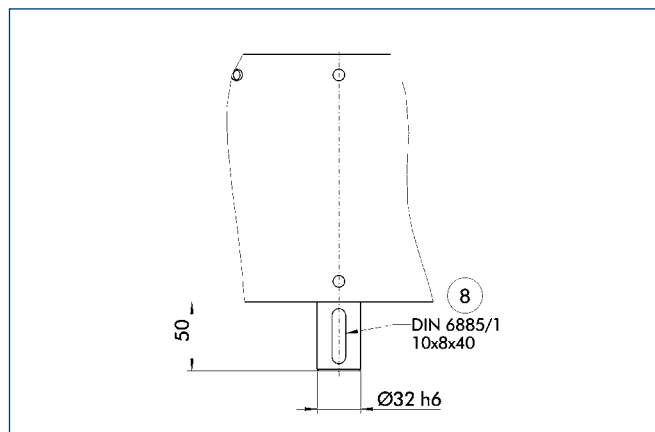
Designation		B 180-AZSS
Max. travel speed	[m/s]	1.5
Repeat accuracy	[mm]	± 0.05
Max. acceleration	[m/s <sup>2</sup> ]	5
Idle torque	[Nm]	10.0
<b>Drive</b>		
Drive element	Rack	m=3; L=999
Travel per revolution	[mm]	320,4425
Maximum stroke	[mm]	5400
Max. total length	[mm]	6000
Moment of inertia	[kgm <sup>2</sup> ]	0.105
<b>Weights</b>		
Basic without travel	[kg]	56.0
Travel per 100 mm	[kg]	2.9
Slide drive 450 mm	[kg]	37.2

### Main views



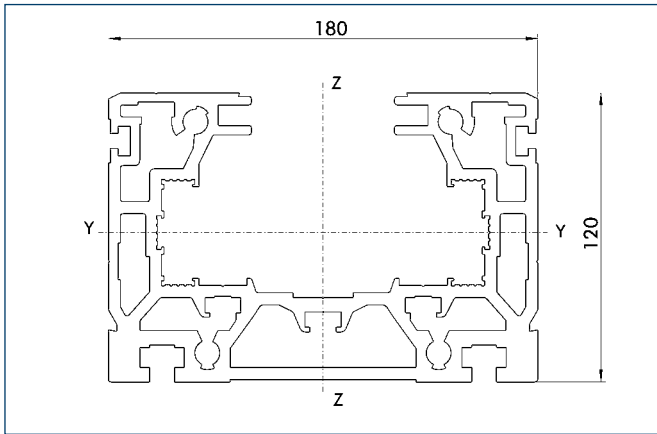
- ① Linear unit connection
- ⑥ Drive connection
- ⑧ Feather key DIN 6885
- ⑨ Useful stroke
- ⑲ Mounting groove for T-nuts
- ⑳ Bolt pitch circle

### Drive journal connection dimensions



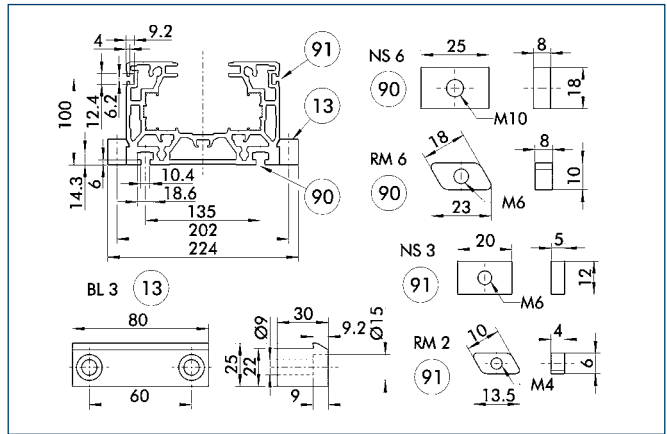
- ⑧ Feather key

### Profile AZSS



Specific mass	[kg/m]	15.49
Planar dimension	[mm <sup>2</sup> ]	5736
Planar moment of inertia I <sub>y</sub>	[mm <sup>4</sup> ]	9236448
Planar moment of inertia I <sub>z</sub>	[mm <sup>4</sup> ]	23586987
Load torque W <sub>y</sub>	[mm <sup>3</sup> ]	134968
Load torque W <sub>z</sub>	[mm <sup>3</sup> ]	261545

### Mounting

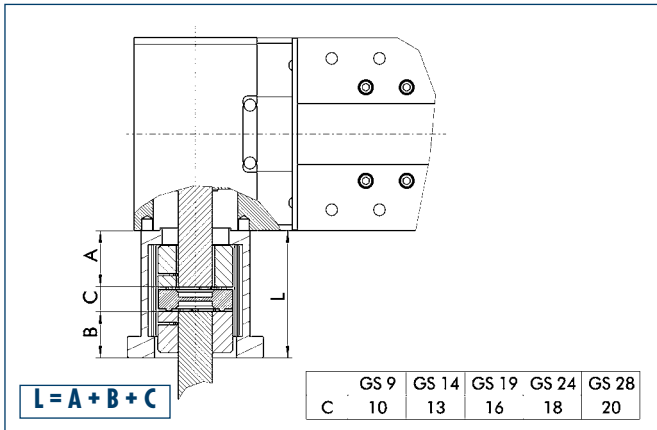


- ⑬ Mounting strip
- ⑨⑩ T-nut on base side
- ⑨① Side T-nut

The profile can be secured either using T-nuts or mounting strips.

Designation	Order designation	ID no.
T-nut	NS3	0331406
T-nut	NS6	0331409
T-nut	RM2	0331425
T-nut	RM6	0331427
Mounting strip	BL3	0331402

### Motor flange schematic diagram



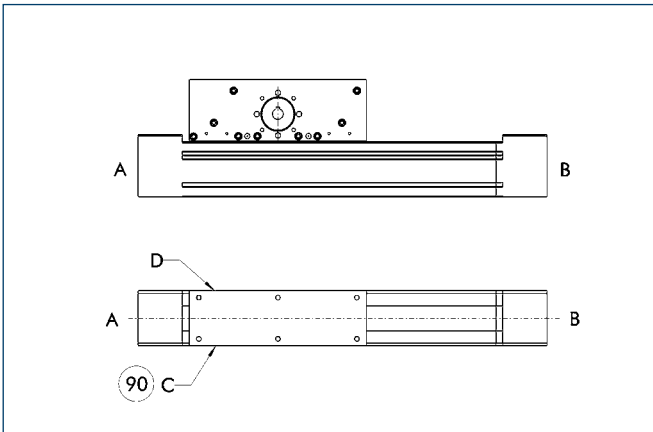
The table shows the relevant dimension **C** of the standard couplings. For dimension **A** refer to drive journal connection dimensions, for dimension **B** refer to corresponding motor dimension sheet, dimension **L** may differ in individual cases.

Different drive solutions can be attached to our axes. SCHUNK can supply you with the right motor flange and coupling for your drive.

① Because of the different thermal behavior of motors, we recommend that the drive solution is tested by the motor manufacturer.



### Limit switch position



90 Limit switch standard position

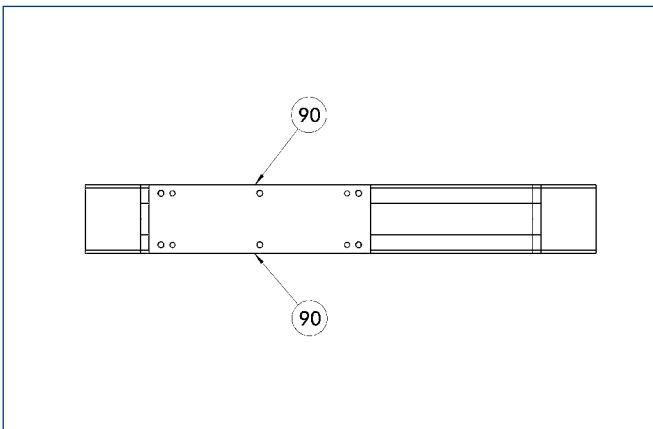
Two E02 switches are used as limit switches and an RS2 as the reference switch as standard.

ⓘ The positions and dimensions of limit switches, switching lugs, and mounting components may vary depending on the application and the selected limit switches. Please contact us for assistance.

### Limit switch selection

Designation	Order designation	ID no.
Inductive limit switch, opener, 2 m cable	E02	0331410
Inductive limit switch, opener, 10 m cable	E010	0331412
Inductive limit switch, closer, 2 m cable	ES2	0331411
Inductive limit switch, closer, 10 m cable	ES10	0331413
Mechanical limit switch (Siemens), opener	EMS	0331414
Mechanical limit switch (Balluff), opener	EMB	0331415

### Lubrication connections



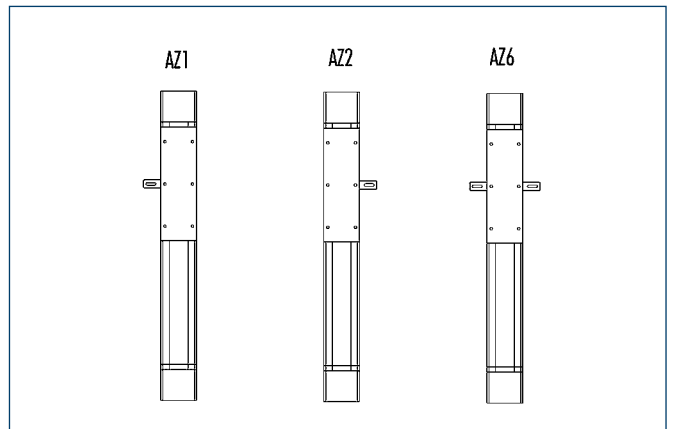
90 Standard lubrication connection

#### Standard connection

Lubrication nipple M8x1

If the lubrication connection has a different seat, this must be defined in the order text.

### Drive shafts



Depending on the axis application, the drive shaft seat may need to be defined in the order text. Particularly with axis combinations and mechanical synchronization, multiple drive shafts - some of them continuous shafts - are required.

More detailed information on pedestal bearings, connection shafts and bevel gears can be found in the "OPTIONS for System HSB" section of the catalog.