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Captain Science Corporation

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**ZCH series****> ZCH series description**

Fig. 48

The ZCH series linear units are designed to meet the vertical motion requirements in gantry applications or where the aluminum profile must be moving and the carriage must be fixed. The self-supporting extruded and anodized aluminum structure is available in different sizes from 60 to 220 mm. Being a rigid system, it is ideal for a "Z" axis in a 3-axis system. In addition, the ZCH series has been specifically designed and configured to be easily assembled with the R-SMART, TCR/TCS series and ROBOT series.

**ZCH**

Features a dual recirculating ball guide system.

## > The components

### Extruded profile

The anodized aluminum extrusions used for the bodies of the Rollon ZCH series linear units were designed and manufactured in cooperation with a leading company in this field, to obtain the right combination of high mechanical strength and reduced weight. The anodized aluminum alloy 6060 used (see physical chemical characteristics below) was extruded with dimensional tolerances complying with EN 755-9 standards.

### Driving belt

The Rollon ZCH series linear units use steel reinforced polyurethane drive belts with AT pitch. This belt is ideal due to its high load transmission characteristics, compact size and low noise. Used in conjunction with a

backlash-free pulley, smooth alternating motion can be achieved. Optimization of the maximum belt width/body dimension ratio enables the following performance characteristics to be achieved:

- **High speed**
- **Low noise**
- **Low wear**

### Carriage

The carriage of the Rollon ZCH series linear units is made entirely of anodized aluminum. The dimensions vary depending on the type.

## > The linear motion system

The linear motion system has been designed to meet the load capacity, speed, and maximum acceleration conditions of a wide variety of applications.

### ZCH with recirculating ball guides:

- The ball bearing guides with high load capacity are mounted in a dedicated seat on the aluminum body.
- The carriage is assembled on preloaded ball bearing blocks that allow to withstand loading in the four main directions.
- The ball bearing carriages are also fitted with a retention cage that eliminates "steel-steel" contact between adjacent revolving parts and prevents misalignment.
- The blocks have seals on both sides.

### The linear motion system described above offers:

- High permissible bending moments
- High accuracy of the movement
- High speed and acceleration
- High load capacity
- High rigidity
- Low friction
- Long life
- Low noise

### ZCH section

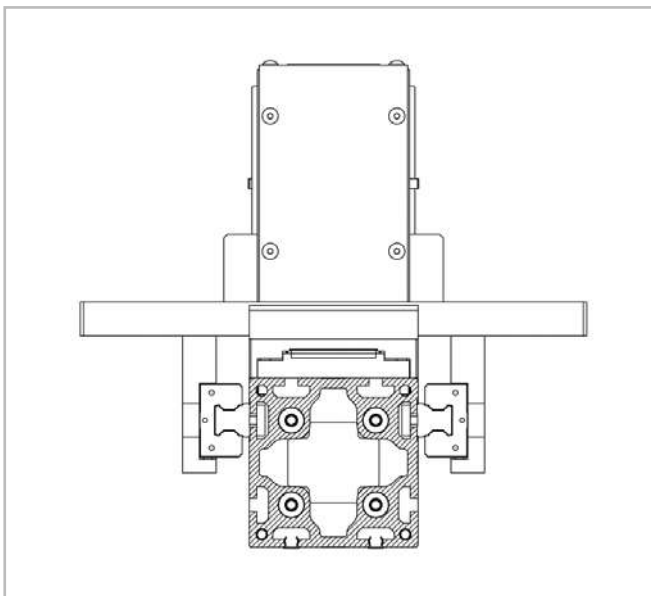
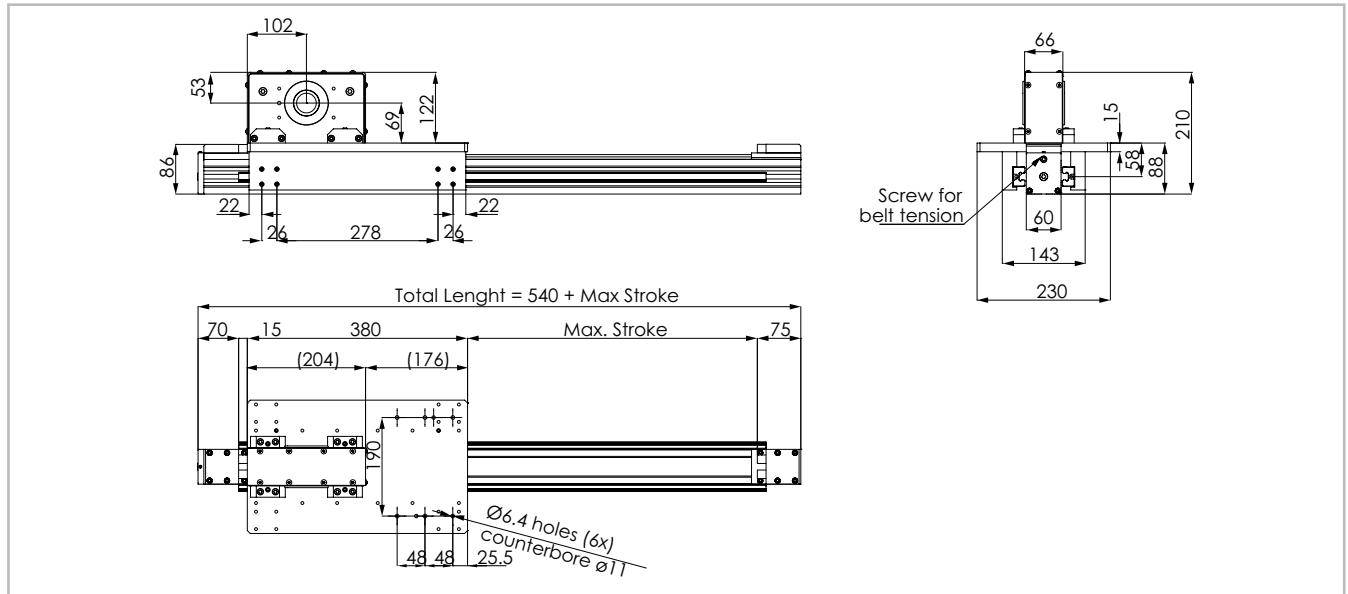


Fig. 49

> ZCH 60

ZCH 60 Dimension



The length of the safety stroke is provided on request according to the customer's specific requirements.

Fig. 50

Technical data

	Type
	ZCH 60
Max. useful stroke length [mm]	1500
Max. positioning repeatability [mm]*1	± 0.1
Max. speed [m/s]	4
Max. acceleration [m/s <sup>2</sup> ]	40
Type of belt	32 AT 10 HF
Type of pulley	Z 22
Pulley pitch diameter [mm]	70.03
Carriage displacement per pulley turn [mm]	220
Carriage weight [kg]	11.1
Zero travel weight [kg]	17
Weight for 100 mm useful stroke [kg]	1
Starting torque [Nm]	1.8
Rail size [mm]	15

\*1) Positioning repeatability is dependent on the type of transmission used

Tab. 101

Moments of inertia of the aluminum body

Type	$I_x$ [10 <sup>7</sup> mm <sup>4</sup> ]	$I_y$ [10 <sup>7</sup> mm <sup>4</sup> ]	$I_b$ [10 <sup>7</sup> mm <sup>4</sup> ]
ZCH 60	0.054	0.054	0.109

Tab. 102

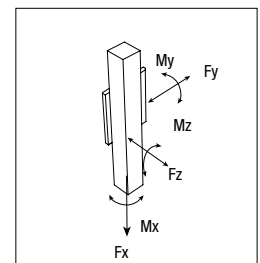
Driving belt

The driving belt is manufactured from a friction resistant polyurethane and with steel cords for high tensile stress resistance.

Type	Type of belt	Belt width [mm]	Weight per meter [kg/m]
ZCH 60	32 AT 10 HF	32	0.185

Tab. 103

Belt length (mm) = L + 190



Load capacity

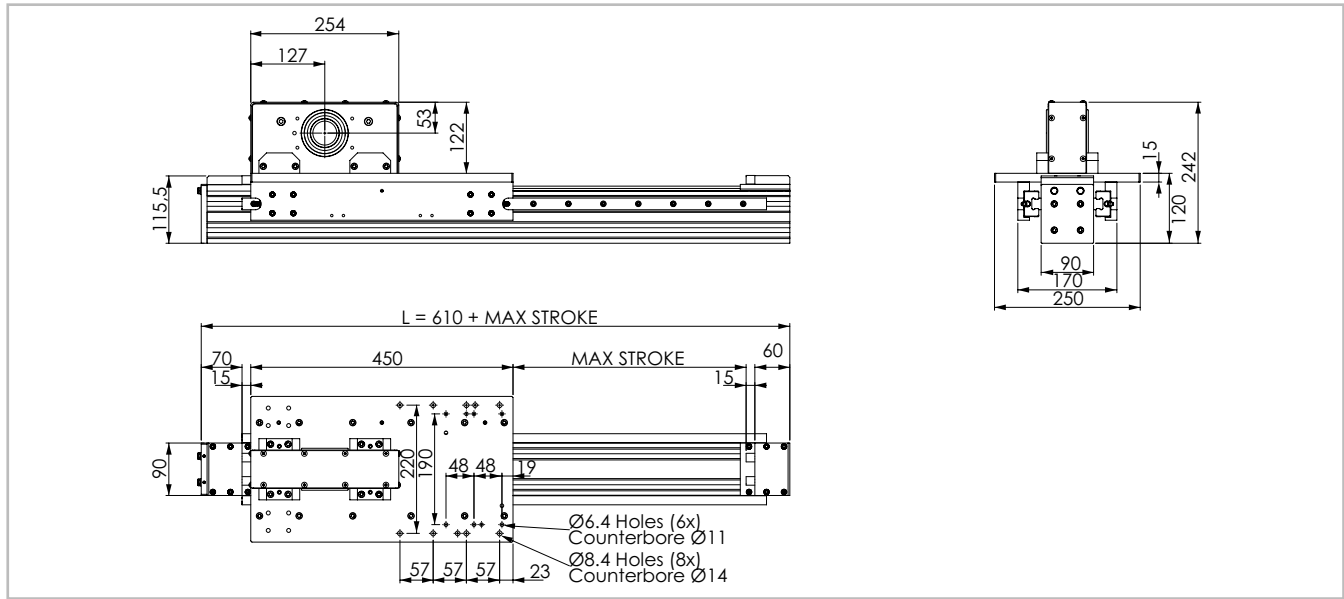
Type	$F_x$ [N]		$F_y$ [N]		$F_z$ [N]	$M_x$ [Nm]	$M_y$ [Nm]	$M_z$ [Nm]
	Stat.	Dyn.	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
ZCH 60	2656	1760	50800	39440	50800	1836	5944	5944

See verification under static load and lifetime on page SL-2 and SL-3

Tab. 104

> ZCH 90

ZCH 90 Dimension



The length of the safety stroke is provided on request according to the customer's specific requirements.

Fig. 51

Technical data

	Type
	ZCH 90
Max. useful stroke length [mm]	2000
Max. positioning repeatability [mm]*1	± 0.1
Max. speed [m/s]	4
Max. acceleration [m/s <sup>2</sup> ]	20
Type of belt	32 AT 10 HF
Type of pulley	Z 22
Pulley pitch diameter [mm]	70.03
Carriage displacement per pulley turn [mm]	220
Carriage weight [kg]	12.8
Zero travel weight [kg]	24
Weight for 100 mm useful stroke [kg]	1.4
Starting torque [Nm]	1.8
Rail size [mm]	20

\*1) Positioning repeatability is dependent on the type of transmission used

Tab. 105

Moments of inertia of the aluminum body

Type	$I_x$ [10 <sup>7</sup> mm <sup>4</sup> ]	$I_y$ [10 <sup>7</sup> mm <sup>4</sup> ]	$I_p$ [10 <sup>7</sup> mm <sup>4</sup> ]
ZCH 90	0.253	0.253	0.507

Tab. 106

Driving belt

The driving belt is manufactured from a friction resistant polyurethane and with steel cords for high tensile stress resistance.

Type	Type of belt	Belt width [mm]	Weight per meter [kg/m]
ZCH 90	32 AT 10 HF	32	0.185

Tab. 107

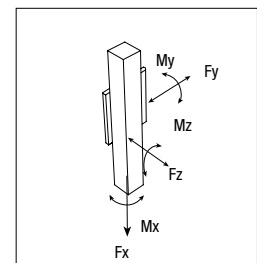
Belt length (mm) = L + 190

Load capacity

Type	$F_x$ [N]		$F_y$ [N]		$F_z$ [N]	$M_x$ [Nm]	$M_y$ [Nm]	$M_z$ [Nm]
	Stat.	Dyn.	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
ZCH 90	2656	1760	110800	88800	110800	6136	16842	16842

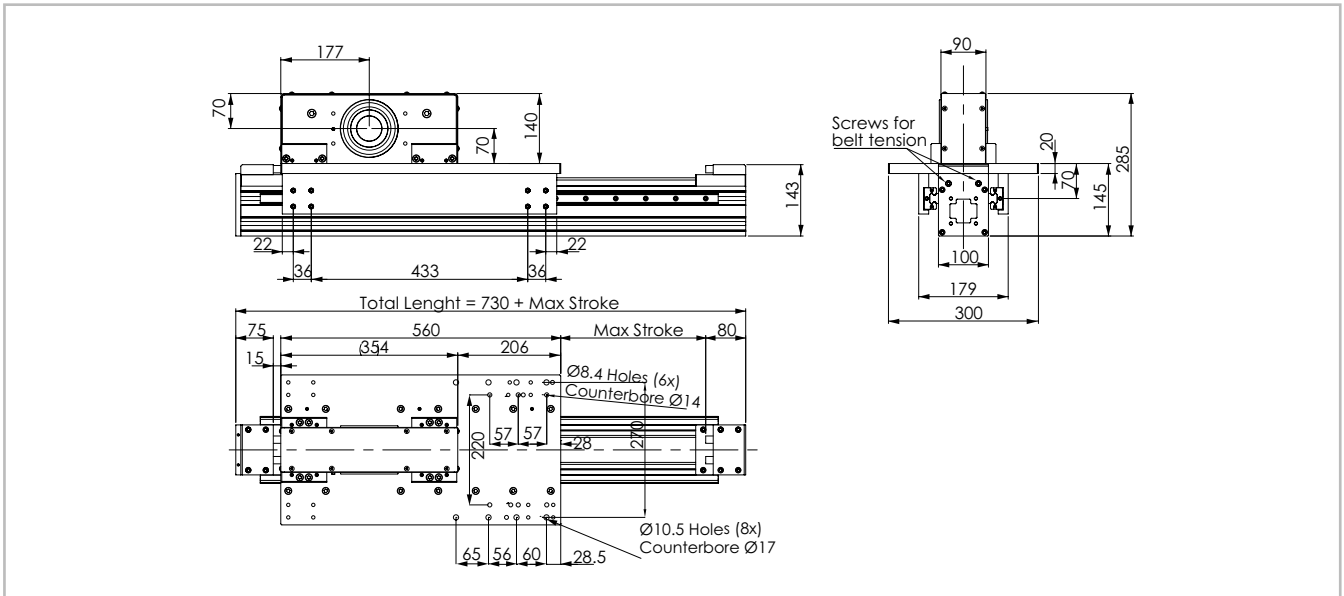
See verification under static load and lifetime on page SL-2 and SL-3

Tab. 108



> ZCH 100

ZCH 100 Dimension



The length of the safety stroke is provided on request according to the customer's specific requirements.

Fig. 52

Technical data

	Type
	ZCH 100
Max. useful stroke length [mm]	2100
Max. positioning repeatability [mm]*1	± 0.1
Max. speed [m/s]	4
Max. acceleration [m/s <sup>2</sup> ]	25
Type of belt	50 AT 10 HPF
Type of pulley	Z 30
Pulley pitch diameter [mm]	95.49
Carriage displacement per pulley turn [mm]	300
Carriage weight [kg]	25.1
Zero travel weight [kg]	41
Weight for 100 mm useful stroke [kg]	1.8
Starting torque [Nm]	4.5
Rail size [mm]	20

\*1) Positioning repeatability is dependent on the type of transmission used

Tab. 109

Load capacity

Type	F <sub>x</sub> [N]		F <sub>y</sub> [N]		F <sub>z</sub> [N]	M <sub>x</sub> [Nm]	M <sub>y</sub> [Nm]	M <sub>z</sub> [Nm]
	Stat.	Dyn.	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
ZCH 100	4980	3480	110800	88800	110800	6690	22326	22326

See verification under static load and lifetime on page SL-2 and SL-3

Tab. 112

Moments of inertia of the aluminum body

Type	I <sub>x</sub> [10 <sup>7</sup> mm <sup>4</sup> ]	I <sub>y</sub> [10 <sup>7</sup> mm <sup>4</sup> ]	I <sub>b</sub> [10 <sup>7</sup> mm <sup>4</sup> ]
ZCH 100	0.443	0.443	0.886

Tab. 110

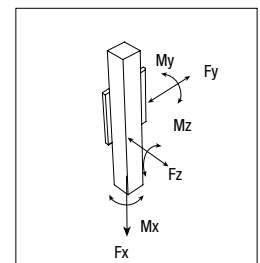
Driving belt

The driving belt is manufactured from a friction resistant polyurethane and with steel cords for high tensile stress resistance.

Type	Type of belt	Belt width [mm]	Weight per meter [kg/m]
ZCH 100	50 AT 10 HPF	50	0.290

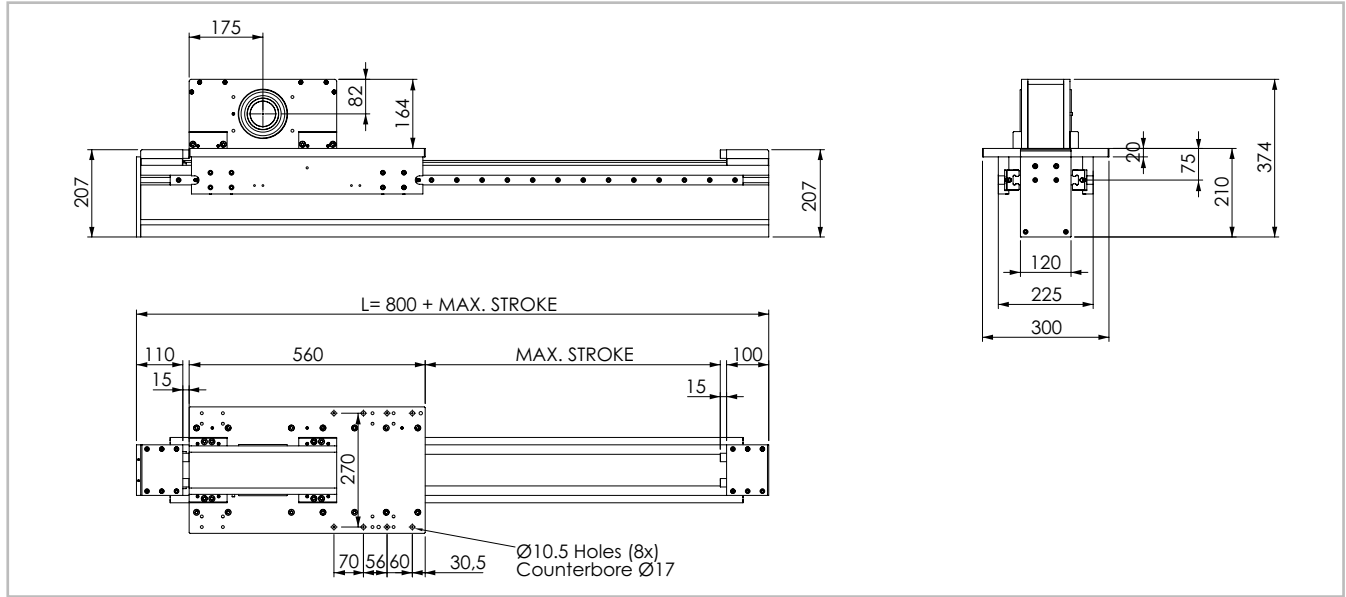
Tab. 111

Belt length (mm) = L + 250



> ZCH 170

ZCH 170 Dimension



The length of the safety stroke is provided on request according to the customer's specific requirements.

Fig.53

Technical data

	Type
	ZCH 170
Max. useful stroke length [mm]	2500
Max. positioning repeatability [mm]*1	± 0.1
Max. speed [m/s]	4
Max. acceleration [m/s <sup>2</sup> ]	25
Type of belt	75 AT 10 HPF
Type of pulley	Z 30
Pulley pitch diameter [mm]	95.49
Carriage displacement per pulley turn [mm]	300
Carriage weight [kg]	34.4
Zero travel weight [kg]	53.7
Weight for 100 mm useful stroke [kg]	2.5
Starting torque [Nm]	7.8
Rail size [mm]	25

\*1) Positioning repeatability is dependent on the type of transmission used

Tab. 113

Load capacity

Type	F <sub>x</sub> [N]		F <sub>y</sub> [N]		F <sub>z</sub> [N]	M <sub>x</sub> [Nm]	M <sub>y</sub> [Nm]	M <sub>z</sub> [Nm]
	Stat.	Dyn.	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
ZCH 170	7470	5220	189200	139200	189200	13665	38691	38691

See verification under static load and lifetime on page SL-2 and SL-3

Tab. 116

Moments of inertia of the aluminum body

Type	I <sub>x</sub> [10 <sup>7</sup> mm <sup>4</sup> ]	I <sub>y</sub> [10 <sup>7</sup> mm <sup>4</sup> ]	I <sub>p</sub> [10 <sup>7</sup> mm <sup>4</sup> ]
ZCH 170	1.973	0.984	2.957

Tab. 114

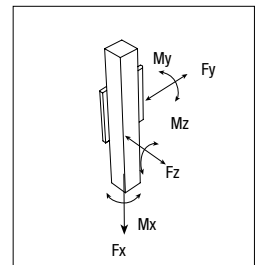
Driving belt

The driving belt is manufactured from a friction resistant polyurethane and with steel cords for high tensile stress resistance.

Type	Type of belt	Belt width [mm]	Weight per meter [kg/m]
ZCH 170	75 AT 10 HPF	75	0.435

Tab. 115

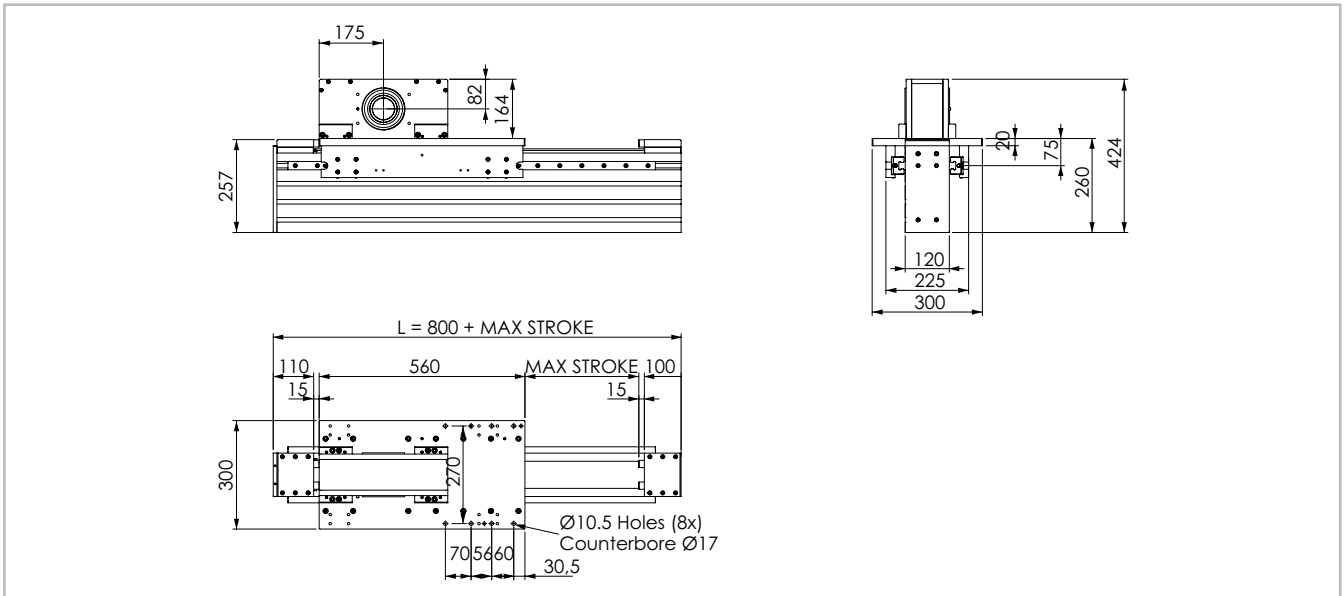
Belt length (mm) = L + 280





> ZCH 220

ZCH 220 Dimension



The length of the safety stroke is provided on request according to the customer's specific requirements.

Fig.54

Technical data

	Type
	ZCH 220
Max. useful stroke length [mm]	2500
Max. positioning repeatability [mm]*1	± 0.1
Max. speed [m/s]	4
Max. acceleration [m/s <sup>2</sup> ]	25
Type of belt	75 AT 10 HPF
Type of pulley	Z 30
Pulley pitch diameter [mm]	95.49
Carriage displacement per pulley turn [mm]	300
Carriage weight [kg]	34.4
Zero travel weight [kg]	60.7
Weight for 100 mm useful stroke [kg]	3.5
Starting torque [Nm]	7.8
Rail size [mm]	25

\*1) Positioning repeatability is dependent on the type of transmission used

Tab. 117

Moments of inertia of the aluminum body

Type	$I_x$ [10 <sup>7</sup> mm <sup>4</sup> ]	$I_y$ [10 <sup>7</sup> mm <sup>4</sup> ]	$I_p$ [10 <sup>7</sup> mm <sup>4</sup> ]
ZCH 220	4.625	1.559	6.184

Tab. 118

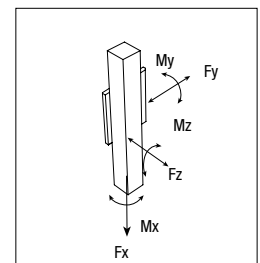
Driving belt

The driving belt is manufactured from a friction resistant polyurethane and with steel cords for high tensile stress resistance.

Type	Type of belt	Belt width [mm]	Weight per meter [kg/m]
ZCH 220	75 AT 10 HPF	75	0.435

Tab. 119

Belt length (mm) = L + 280



Load capacity

Type	$F_x$ [N]		$F_y$ [N]		$F_z$ [N]	$M_x$ [Nm]	$M_y$ [Nm]	$M_z$ [Nm]
	Stat.	Dyn.	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
ZCH 220	7470	5220	189200	139200	189200	13665	38691	38691

See verification under static load and lifetime on page SL-2 and SL-3

Tab. 120

## > Lubrication

### ZCH linear units with ball bearing guides

The ball bearing carriages of the ZCH versions are fitted with a retention cage that eliminates "steel-steel" contact between adjacent revolving parts and prevents misalignment of these in the circuits.

This system guarantees a long interval between maintenances: every

2000 Km or 1 year of use, based on the value reached first. If a longer service life is required or in case of high dynamic or high loaded applications please contact our offices for further verification.

### ZCH

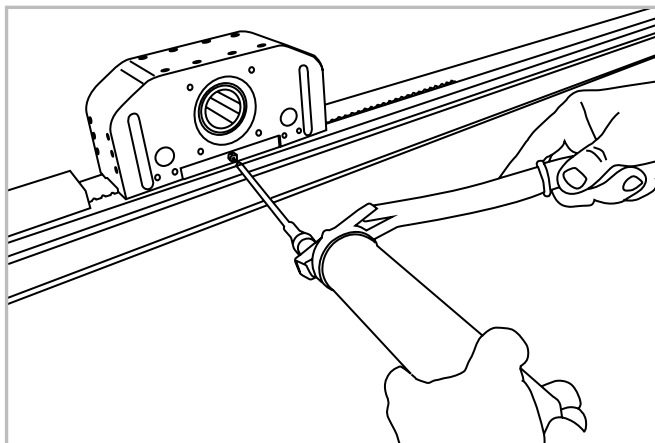


Fig. 55

- Insert the tip of the grease gun into the specific grease blocks.
- Type of lubricant: Lithium soap grease of class NLGI 2.
- For specially stressed applications or hostile environmental conditions, lubrication should be applied out more frequently.  
Contact Rollon for further advice

Quantity of lubricant necessary for re-lubrication of each block:

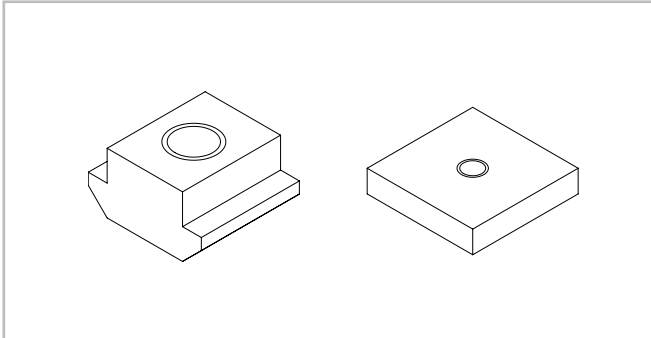
Type	Quantity of Grease [cm <sup>3</sup> ]
ZCH 60	0.2
ZCH 90	0.5
ZCH 100	0.5
ZCH 170	0.6
ZCH 220	0.6

Tab. 121

## > Accessories

To install accessories on ZCH series aluminum profile we recommend to use the T-nuts shown below

### Front insertable T-Nuts



Steel nuts to be used in the slots of the body.

Fig. 56

### Units (mm)

	Hole	Length	Code Rollon
ZCH 60	M6	15x13x8	6006071
ZCH 90-100	M4	19x19x4	6006054
	M5	19x19x4	6006051
	M6	19x19x4	6006052
	M8	19x19x4	6006053

Tab. 122

### Lateral insertable T-Nuts

Suitable for series:

ZC 170-220

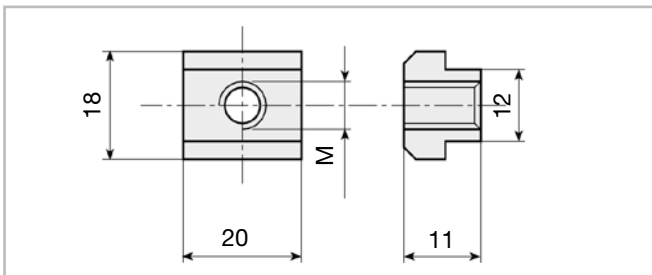


Fig. 57

Thread	Code
M5	215.1768
M6	215.1769
M8	215.1770
M10	215.2124

Tab. 123

### Bushings for ZCH series

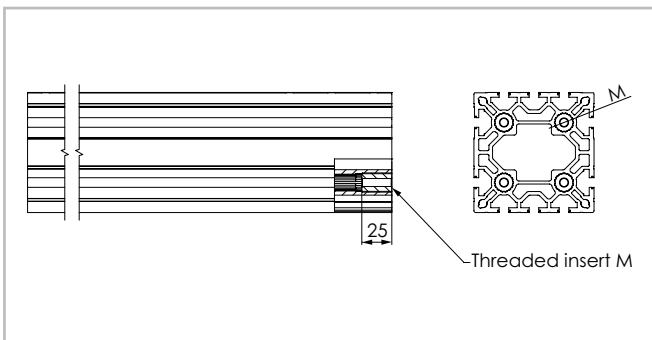


Fig. 58

	Threaded insert Nb. x M			
ZCH 60	1 x M6	<b>1 x M8</b>	1 x M10	
ZCH 90	<b>4 x M6</b>	4 x M8	4 x M10	
ZCH 100	4 x M6	<b>4 x M8</b>	4 x M10	
ZCH 170		4 x M8	<b>4 x M10</b>	4 x M12
ZCH 220		4 x M8	<b>4 x M10</b>	4 x M12

The highlighted threaded inserts are standard.  
In case of need, the others have to be ordered separately.

Tab. 124

## > Alignment nuts

### Nuts for steel guide rails

**Material:** galvanised steel.

#### Code 209.1855

Alignment nuts.  
V-shaped guide rail: 35x16  
Profile with slot 12.5 mm.  
Series: ZC 170-220

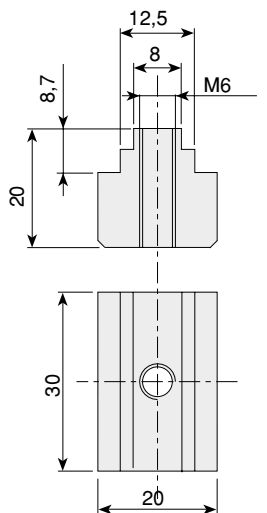
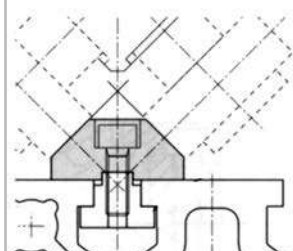


Fig. 59

#### Code 209.0298

Alignment nuts.  
V-shaped guide rail: 35x16  
Profile with slot 8 mm.  
Series: ZC 100

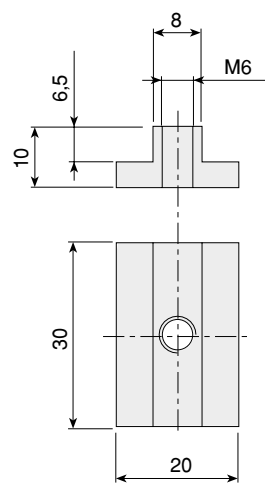
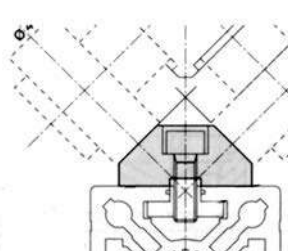


Fig. 60

### Alignment nut for slot 12.5 mm

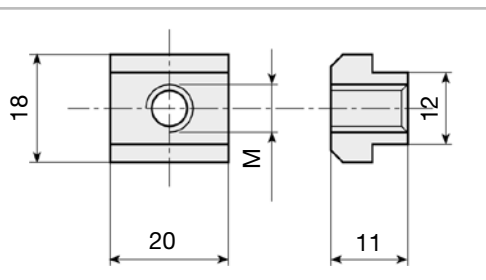


Fig. 61

**Material:** galvanised steel. Suitable for series: ZC 170-220

Thread	Code
M5	215.1768
M6	215.1769
M8	215.1770
M10	215.2124

Tab. 125

### Alignment nut for slot 12.5 mm front insertable

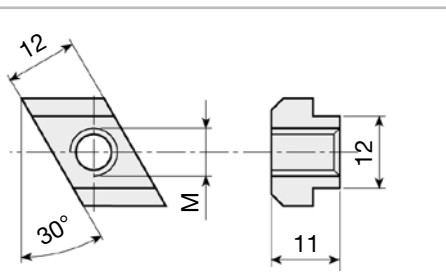


Fig. 62

**Material:** galvanised steel. Suitable for series: ZC 170-220

Thread	Code
M5	215.1771
M6	215.1772
M8	215.1773
M10	215.2125

Tab. 126

### Threaded nuts and plates

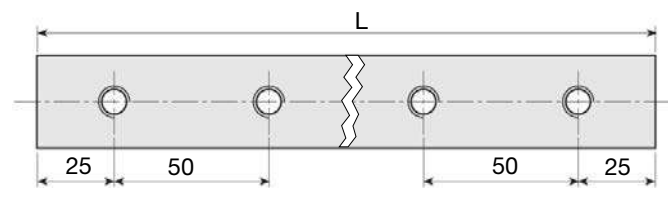
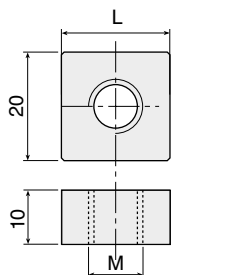


Fig.63

M12 (CH19) hexagonal-head screws can be used as stud bolts in profiles with 12.5 mm slots.

**Material:** galvanised steel. Suitable for series: ZC 170-220

Thread	Threaded holes	L	Code
M10	1	40	215.0477
M12	1	40	209.1281
M10	1	20	209.1277
M10	2*	80	209.1776
M10	3*	150	209.1777
M10	4*	200	209.1778
M10	5*	250	209.1779
M10	6*	300	209.1780
M10	7*	350	209.1781

\* Hole centre-distance: 50 mm.

Tab. 127

Adapter flange for gearbox assembly

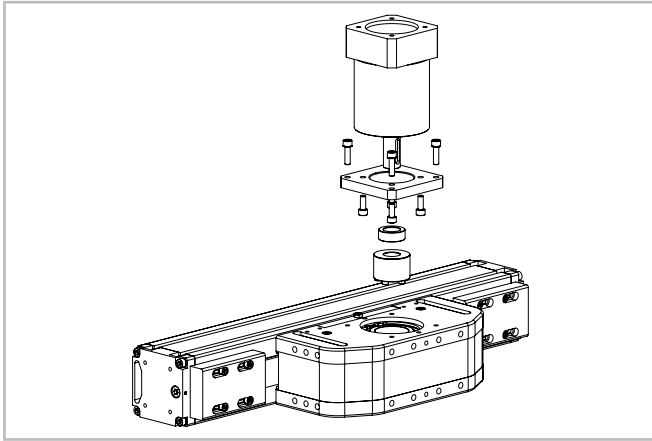


Fig. 64

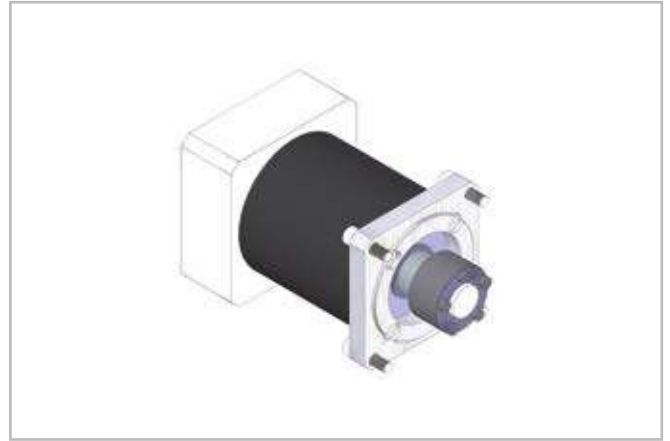


Fig. 65

Assembly kit includes: shrink disk; adapter plate; fixing hardware

Unit	Gearbox type (not included)	Kit Code
ZCH 60	SP 100	G002255
	LP 090	G001920
	LP 070	G002264
	MP080	G001915
	CP080	G001970
	PSF221	G001917
ZCH 90	RF 27	G002335
	LP 090	G002254
	SP 100	G002316
	MP 080	G002328
	PSF 321	G002345
	PSF 221	G002348
ZCH 100	LP120; PE5; LC120	G001856
	SP100; P5	G001857
	PSF321	G001858
	PSF521	G001859
	EP120TT	G001860
	MP105	G001861
	MP080	G001951

Tab. 128

For other gearbox type ask Rollon

# Ordering key

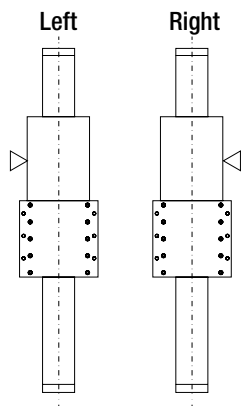
## > Identification codes for the ZCH linear unit

ZCH	10 06 = 60 09 = 90 10 = 100 17 = 170 22 = 220	1A	02000	1A	
					Linear motion system <i>see pg. ML-42</i>
					L=total length of the unit
					Drive head code
					Linear unit size <i>see from pg. ML-43 to pg. ML-51</i>
					ZCH series <i>see pg. ML-40</i>

In order to create identification codes for Actuator Line, you can visit: <http://configureactuator.rollon.com>



### Left / right orientation



# Multiaxis systems

1 - Two axis Y-Z system



2 - Two axis 2X-Y system



3 - Three axis 2X-Y-Z system



4 - Three Axis X-Y-Z system



5 - Y-2Z system



6 - Y-3Z system



M  
L