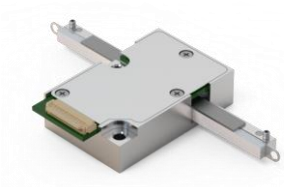


# XLA-1 Series

## Fast and compact linear actuator



The XLA micro linear actuators are world class in terms of weight, size and precision. The actuator is driven by the Crossfixx™ ultrasonic piezo motor, allowing an extremely compact design, variable speeds up to 400 mm/s and a total weight of less than 6 gram! The XLA-1 has an integrated encoder with a 1250, 312 or 78 nm resolution or open-loop. A wide range of rod lengths is available, allowing stroke lengths from 5 mm to 305 mm!

### Key features

	closed-loop	open-loop
drive principle	patented Crossfixx™ ultrasonic piezo technology	
lifetime	> 600 km / typ. 12 million cycles	
input voltage	12 to 48 V	12 V
controller	external OEM controller required	integrated controller

### Model code structure

actuator type	rod length (mm)	encoder resolution (nm)	FPC cable outlet (flexible printed cable)
XLA-1	-20	-OPEN	top side
		-1250	
		-312	
		-78	
	-30	same as for XLA-1-20	
	-40		
	-50		
	-60		
	-70		
	-80		
	-100		
	-120		
	-140		
	⋮		
	-300		
-320			

Example: **XLA-1-40-312**

- └ XLA-1 series linear actuator
- └ Rod length of 40 mm
- └ Closed-loop actuator with integrated encoder with a resolution of 312 nm

## Environmental compatibility

temperature range	-30°C to +70°C
humidity range	20% to 90% RH (non-condensing)
heat dissipation (motor only)	< 1 W
internal operation voltage	< 48 V

## Motion performance

		XLA-1 all rod lengths				unit	tolerance	
		-1250	-312	-78	Open-loop			
<b>LIMITS</b>	type	software + mechanical			magnetic + mechanical			
	type	optical, incremental			no encoder			
<b>ENCODER</b>	grating period	80				µm		
	resolution	1250	312	78		nm		
	index	1 per full stroke						
	accuracy	± 5				µm	typ.	
<b>ACTUATOR</b>	<b>positioning</b>	resolution = min. step size = min. incremental motion (MIM)	1250	350	80	20 – 50 µm (pulsed operation)	nm	typ.
		unidirectional repeatability	± 1250	± 350	± 80		nm	typ.
		bidirectional repeatability	± 2500	± 700	± 160		nm	typ.
	<b>speed</b>	max. speed	400			1000	mm/s	typ.
		min. speed	2 to 5			10	µm/s	typ.
		stability (at typical speed of 10 mm/s)	± 1			-	%	typ.
		point-to-point positioning time for a 1 mm step*	0 g load	40			-	msec
	100 g load	75						
	point-to-point positioning time	10 mm	100			-	msec	typ.
		1 mm	40					
		100 µm	30					

## Mechanical properties

	XLA-1													unit	tolerance
rod length	-20	-30	-40	-50	-60	-70	-80	-100	-120	-140	-160	-180	-200	mm	± 0.1
dimensions	22.7 x 14.8 x 5.4													mm	± 0.1
stroke/ travel range	5	15	25	35	45	55	65	85	105	125	145	165	185	mm	± 0.1
mass	5.5	5.9	6.3	6.7	7.1	7.5	7.9	8.7	9.5	10.3	11.1	11.9	12.7	g	± 5%
holding force	1													N	min.
driving force	1													N	min.
actuator materials	aluminium (housing) stainless steel (rod and housing cover)														
cable type	Closed loop version: FPC, 12 core, 0.5 mm pitch with same side contacts Open loop version: FPC, 14 core, 0.5 mm pitch with opposite side contacts														

	XLA-1						unit	tolerance
rod length	-220	-240	-260	-280	-300	-320	mm	± 0.1
dimensions	22.7 x 14.8 x 5.4						mm	± 0.1
stroke/ travel range	205	225	245	265	285	305	mm	± 0.1
mass	13.5	14.3	15.1	15.9	16.7	17.5	g	± 5%
holding force	1						N	min.
driving force	1						N	min.
actuator materials	aluminium (housing) stainless steel (rod and housing cover)							
cable type	Closed loop version: FPC, 12 core, 0.5 mm pitch with same side contacts Open loop version: FPC, 14 core, 0.5 mm pitch with opposite side contacts							

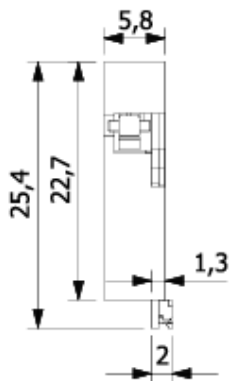
## Controller/software

The XLA-1 series actuators are compatible with all Xeryon controllers.

Controlling of the stage is done with:

- Easy-to-use Windows interface
- LabVIEW interface program (compiled program or source)
- MATLAB interface script
- C++ and Python libraries

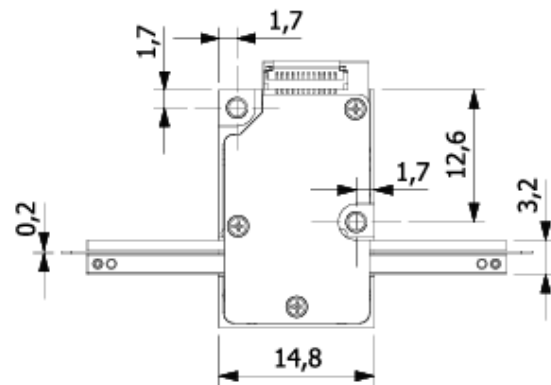
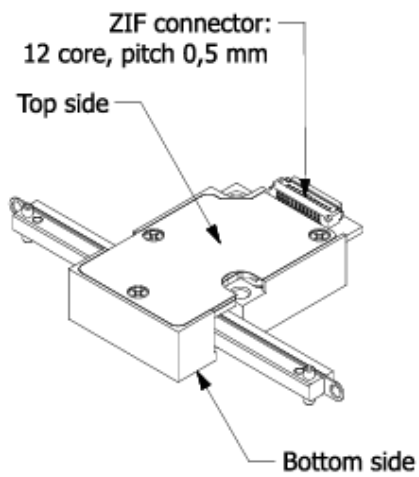
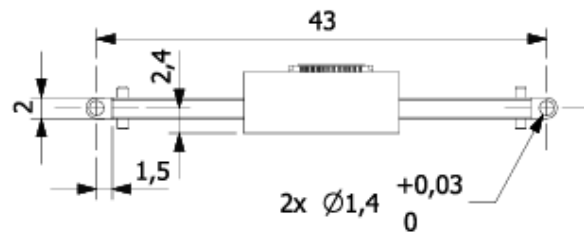
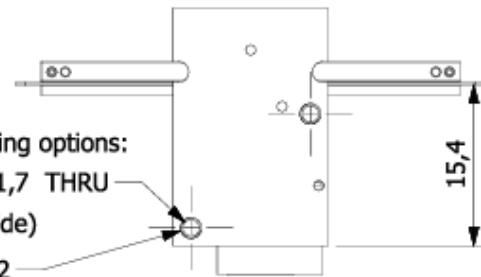
# Drawing



Two mounting options:

2x  $\varnothing 1,7$  THRU  
(top side)

2x M2  
(bottom side)



	max. tightening torque
M1,4	8 cNm
M1,6	16 cNm
M2	34 cNm

Last updated: 05/04/2024. All specifications are subject to change without prior notice.

# XLA-3 Series

## Fast and compact linear actuator



The XLA micro linear actuators are world class in terms of weight, size and precision. The actuator is driven by the Crossfixx™ ultrasonic piezo motor, allowing an extremely compact design, variable speeds up to 400 mm/s and a total weight of less than 36 gram! The XLA-3 has an integrated encoder with a 1250, 312 or 78 nm resolution or open-loop. A wide range of rod lengths is available, allowing stroke lengths from 10 mm to 300 mm! The open-loop version also comes with an integrated controller to make the whole setup even more compact.

### Key features

	closed-loop	open-loop
drive principle	patented Crossfixx™ ultrasonic piezo technology	
lifetime	> 1000 km / typ. 20 million cycles	
input voltage	12 to 48 V	12 V
controller	XD-OEM controller required	integrated controller

### Model code structure

actuator type	rod length (mm)	encoder resolution (nm)	FPC cable outlet (flexible printed cable)	
XLA-3	-45	-OPEN	- Z1 (straight, standard) - Z2 (angled)	
		-1250		
		-312		
		-78		
	-55	same as XLA-3-40		
	-65			
	-75			
	-85			
	-95			
	-105			
	-125			
	...			
	-285			
	-305			
-325				

Example: **XLA-3-45-312**

- └ XLA-3 series linear actuator
- └ Rod length of 45 mm
- └ Closed-loop actuator with integrated encoder with a resolution of 312 nm

## Environmental compatibility

temperature range	-30°C to +70°C
humidity range	20% to 90% RH (non-condensing)
heat dissipation (motor only)	< 5 W
internal operation voltage	< 48 V

## Motion performance

		XLA-3 all rod lengths				unit	tolerance	
		-1250	-312	-78	open-loop			
<b>LIMITS</b>	type	software + mechanical			magnetic + mechanical			
	type	optical, incremental			no encoder + integrated controller			
<b>ENCODER</b>	grating period	79.8				µm		
	resolution	1250	312	78		nm		
	index	1 per full stroke						
	accuracy	± 5				µm	typ.	
<b>ACTUATOR</b>	positioning	resolution = min. step size = min. incremental motion (MIM)	1250	350	80	20 – 50 µm (pulsed operation)	nm	typ.
		unidirectional repeatability	± 1250	± 350	± 80		nm	typ.
		bidirectional repeatability	± 2500	± 700	± 160		nm	typ.
	speed	max. speed	400			1000	mm/s	typ.
		min. speed	2 to 5			10	µm/s	typ.
		stability (at typical speed of 10 mm/s)	± 1			-	%	typ.
	point-to-point positioning time for a 1 mm step*	0 g load	25		-	msec	typ.	
		100 g load	40					
	point-to-point positioning time	10 mm	130			msec	typ.	
		1 mm	25					
		100 µm	20					

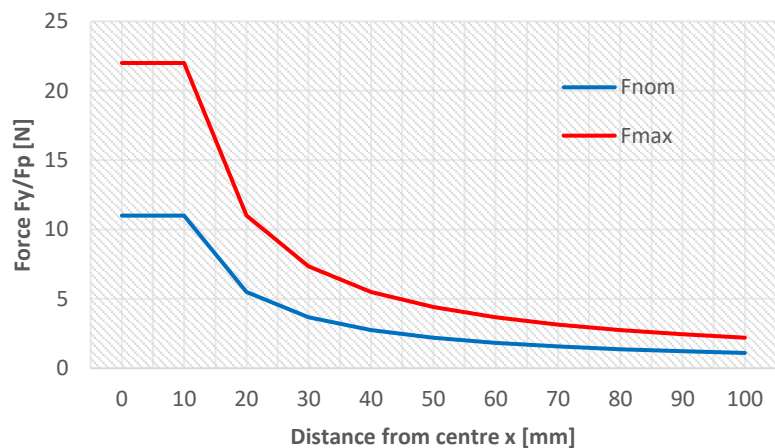
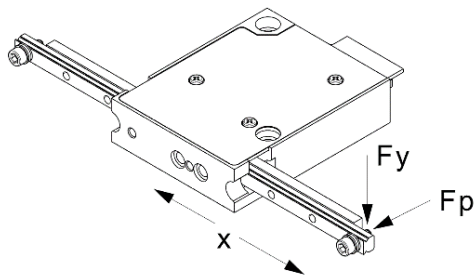
## Mechanical properties

		XLA-3											unit	tolerance
rod length		-45	-55	-65	-75	-95	105	-125	-145	-165	-185	-205	mm	± 0.1
dimensions	closed-loop	38 x 30 x 9.1											mm	± 0.1
	open-loop	38 x 30 x 12												
stroke / travel range		10	20	30	40	60	70	90	110	130	150	170	mm	± 0.1
mass	closed-loop	35.8	36.6	37.4	38.2	39.8	40.8	41.6	42.4	43.2	50	50.8	g	± 5%
	open-loop	37.0	37.8	38.6	39.4	50.8	51.2	52	52.8	53.6	54.4	55.2		
max. accelerations		590	505	440	390	320	300	250	220	200	180	160	m/s <sup>2</sup>	typ.
holding force		3											N	
driving force		3											N	
actuator materials		aluminum (housing) steel rod and stainless steel housing cover												
cable type		closed loop version: FPC, 12 core, 0.5 mm pitch with opposite side contacts open loop version: FPC, 14 core, 0.5 mm pitch with opposite side contacts												
bearing type		recirculating ball linear guide with end seal and lubrication storage standard preload (clearance +1 to +0 µm)												

		XLA-3						unit	tolerance
rod length		-225	-245	-265	-285	-305	-325	mm	± 0.1
dimensions	closed-loop	38 x 30 x 9.1						mm	± 0.1
	open-loop	38 x 30 x 12							
stroke / travel range		190	210	230	250	270	290	mm	± 0.1
mass	closed-loop	51.6	52.4	53	53.8	54.6	55.4	g	± 5%
	open-loop	56	56.8	57.6	58.4	59.2	60		
max. acceleration		150	135	125	120	110	100	m/s <sup>2</sup>	typ.
holding force		3						N	
driving force		3						N	
actuator materials		aluminum (housing) steel rod and stainless steel housing cover							
cable type		closed loop version: FPC, 12 core, 0.5 mm pitch with opposite side contacts open loop version: FPC, 14 core, 0.5 mm pitch with opposite side contacts							
bearing type		recirculating ball linear guide with end seal and lubrication storage standard preload (clearance +1 to +0 µm)							

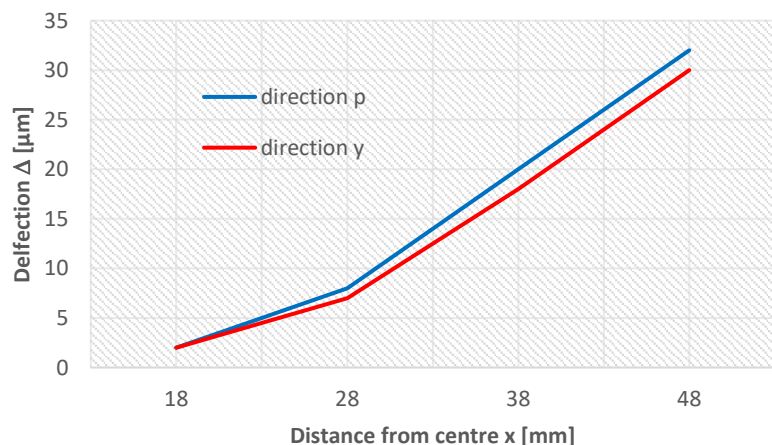
### Load rating of linear guide

In order to guarantee the lifetime specification and to maintain smooth rolling behaviour, the moment load applied to the actuator rod is limited to 0.11 Nm (nominal) and 0.22 Nm (maximal). When translated into forces  $F_y$  and  $F_p$  acting on the rod end at a distance  $x$  from the actuator centre, the following load curves are obtained. Long-term operation is allowed at load ratings up to  $F_{nom}$ , while operating at  $F_{max}$  is only advised for short periods of time.



### Rod deflection under load

When applying a load to an actuator, the rod end will deflect. Since the linear guide inside the actuator body has no or minimal play, most of this deflection is caused by elastic bending of the rod. The table below shows measured values of this deflection under a load of 1 N applied in two directions (see above figure).



## Controller/software

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The XLA-3 **closed-loop** actuators are compatible with the **XD-OEM Controller**.

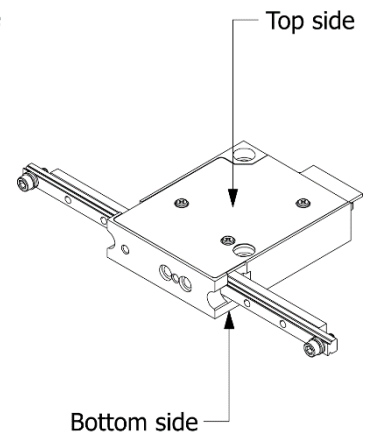
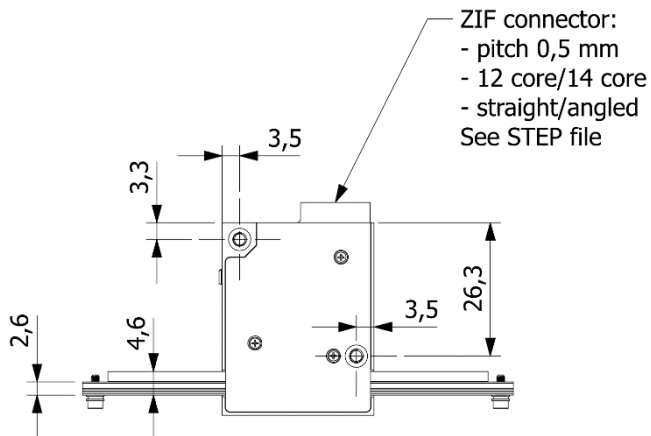
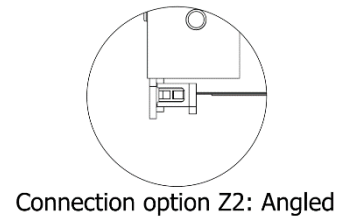
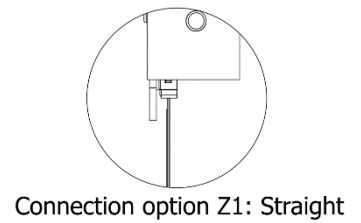
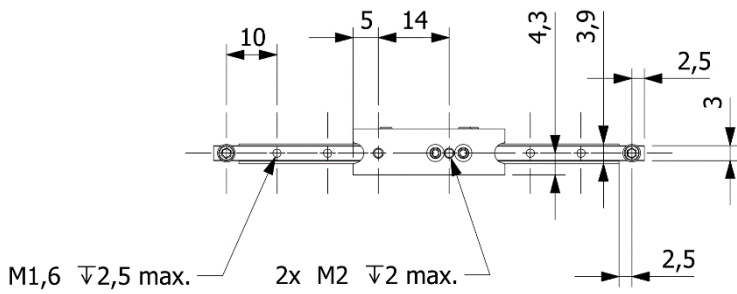
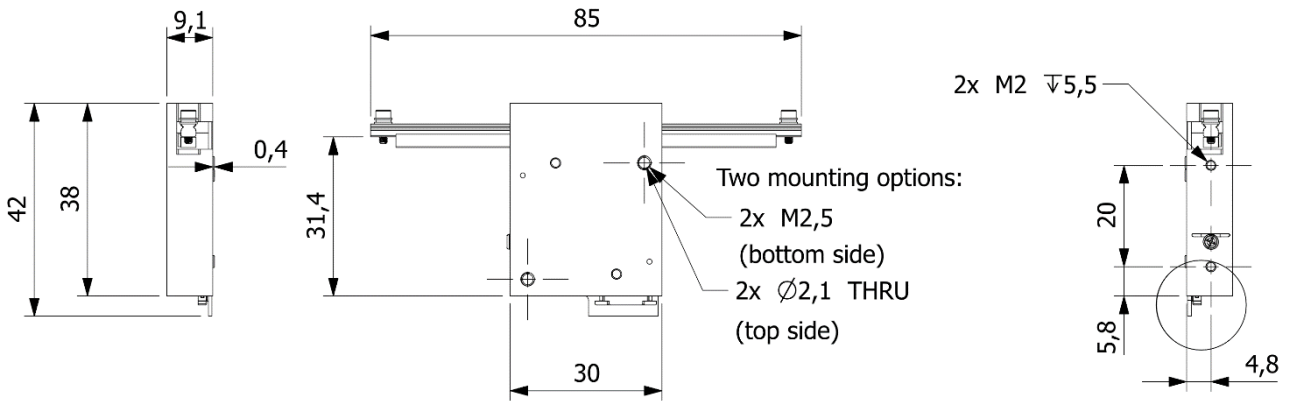
The XLA-3 **open-loop** actuators have a **built-in controller**.

Controlling of the stage is done with:

- Easy-to-use Windows interface
- LabVIEW interface program (compiled program or source)
- MATLAB interface script
- C++ and Python libraries



# Drawing



	max. tightening torque
M1,6	16 cNm
M2	34 cNm
M2,5	60 cNm

Last updated: 03/06/2024. All specifications are subject to change without prior notice.

# XLA-5 Series

## Fast and compact linear actuator



The XLA micro linear actuators are world class in terms of weight, size and precision. The actuator is driven by the Crossfixx™ ultrasonic piezo motor, allowing an extremely compact design, variable speeds up to 400 mm/s and a total weight of less than 36 gram! The XLA-5 has an integrated encoder with a 1250, 312 or 78 nm resolution or open-loop. A wide range of rod lengths is available, allowing stroke lengths from 10 mm to 290 mm! The open-loop version also comes with an integrated controller to make the whole setup even more compact.

### Key features

	closed-loop	open-loop
drive principle	patented Crossfixx™ ultrasonic piezo technology	
lifetime	> 1000 km / typ. 20 million cycles	
input voltage	12 to 48 V	12 V
controller	XD-OEM controller required	integrated controller

### Model code structure

actuator type	rod length (mm)	encoder resolution (nm)	FPC cable outlet (flexible printed cable)	
XLA-5	-45	-OPEN	- Z1 (straight, standard) - Z2 (angled)	
		-1250		
		-312		
		-78		
	-55	same as XLA-5-40		
	-65			
	-75			
	-85			
	-95			
	-105			
	-125			
	...			
	-285			
	-305			
-325				

Example: **XLA-5-45-312**

- └ XLA-5 series linear actuator
- └ Rod length of 45 mm
- └ Closed-loop actuator with integrated encoder with a resolution of 312 nm

## Environmental compatibility

temperature range	-30°C to +70°C
humidity range	20% to 90% RH (non-condensing)
heat dissipation (motor only)	< 5 W
internal operation voltage	< 60 V

## Motion performance

		XLA-5 all rod lengths				unit	tolerance	
		-1250	-312	-78	open-loop			
<b>LIMITS</b>	type	software + mechanical			magnetic + mechanical			
	type	optical, incremental			no encoder + integrated controller			
<b>ENCODER</b>	grating period	79.8				µm		
	resolution	1250	312	78		nm		
	index	1 per full stroke						
	accuracy	± 5				µm	typ.	
<b>ACTUATOR</b>	positioning	resolution = min. step size = min. incremental motion (MIM)	1250	350	80	20 – 50 µm (pulsed operation)	nm	typ.
		unidirectional repeatability	± 1250	± 350	± 80		nm	typ.
		bidirectional repeatability	± 2500	± 700	± 160		nm	typ.
	speed	max. speed	400			1000	mm/s	typ.
		min. speed	2 to 5			10	µm/s	typ.
		stability (at typical speed of 10 mm/s)	± 1			-	%	typ.
		point-to-point positioning time for a 1 mm step*	0 g load	25			-	msec
	100 g load	40						
	point-to-point positioning time	10 mm	130			-	msec	typ.
		1 mm	25					
		100 µm	20					

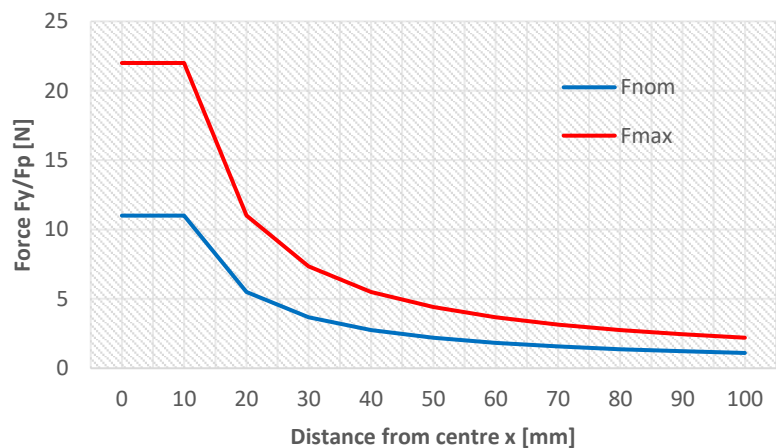
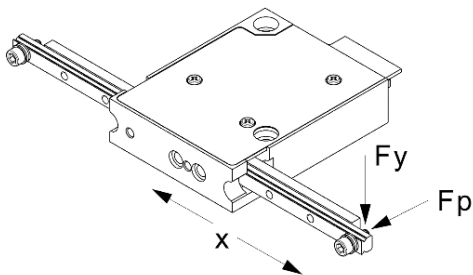
## Mechanical properties

		XLA-5											unit	tolerance
rod length		-45	-55	-65	-75	-95	105	-125	-145	-165	-185	-205	mm	± 0.1
dimensions	closed-loop	38 x 30 x 9.1											mm	± 0.1
	open-loop	38 x 30 x 12												
stroke / travel range		10	20	30	40	60	70	90	110	130	150	170	mm	± 0.1
mass	closed-loop	35.8	36.6	37.4	38.2	39.8	40.8	41.6	42.4	43.2	50	50.8	g	± 5%
	open-loop	37.0	37.8	38.6	39.4	50.8	51.2	52	52.8	53.6	54.4	55.2		
max. acceleration		950	840	730	650	530	490	420	370	330	300	270	m/s <sup>2</sup>	typ.
holding force		5											N	
driving force		5											N	
actuator materials		aluminum (housing) steel rod and stainless steel housing cover												
cable type		Closed loop version: FPC, 12 core, 0.5 mm pitch with opposite side contacts Open loop version: FPC, 14 core, 0.5 mm pitch with opposite side contacts												
bearing type		recirculating ball linear guide with end seal and lubrication storage standard preload (clearance +1 to +0 µm)												

		XLA-5						unit	tolerance
rod length		-225	-245	-265	-285	-305	-325	mm	± 0.1
dimensions	closed-loop	38 x 30 x 9.1						mm	± 0.1
	open-loop	38 x 30 x 12							
stroke / travel range		190	210	230	250	270	290	mm	± 0.1
mass	closed-loop	51.6	52.4	53	53.8	54.6	55.4	g	± 5%
	open-loop	56	56.8	57.6	58.4	59.2	60		
max. acceleration		250	220	210	200	180	170	m/s <sup>2</sup>	typ.
holding force		5						N	
driving force		5						N	
actuator materials		aluminum (housing) steel rod and stainless steel housing cover							
cable type		Closed loop version: FPC, 12 core, 0.5 mm pitch with opposite side contacts Open loop version: FPC, 14 core, 0.5 mm pitch with opposite side contacts							
bearing type		recirculating ball linear guide with end seal and lubrication storage standard preload (clearance +1 to +0 µm)							

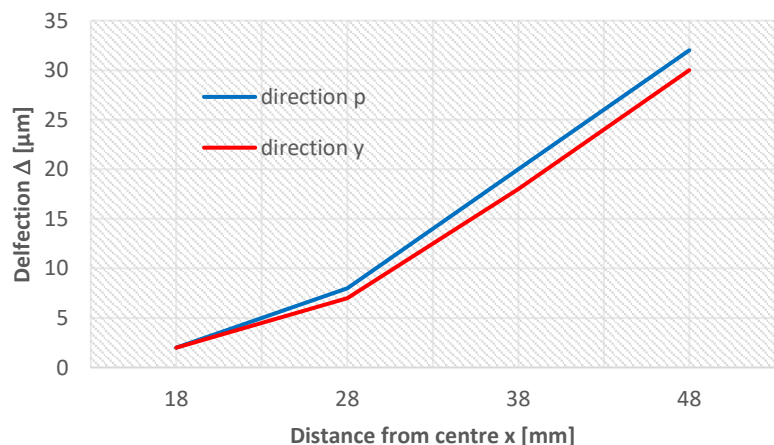
### Load rating of linear guide

In order to guarantee the lifetime specification and to maintain smooth rolling behaviour, the moment load applied to the actuator rod is limited to 0.11 Nm (nominal) and 0.22 Nm (maximal). When translated into forces  $F_y$  and  $F_p$  acting on the rod end at a distance  $x$  from the actuator centre, the following load curves are obtained. Long-term operation is allowed at load ratings up to  $F_{nom}$ , while operating at  $F_{max}$  is only advised for short periods of time.



### Rod deflection under load

When applying a load to an actuator, the rod end will deflect. Since the linear guide inside the actuator body has no or minimal play, most of this deflection is caused by elastic bending of the rod. The table below shows measured values of this deflection under a load of 1 N applied in two directions (see above figure).



## Controller/software

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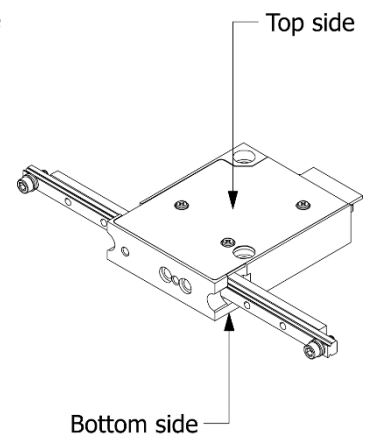
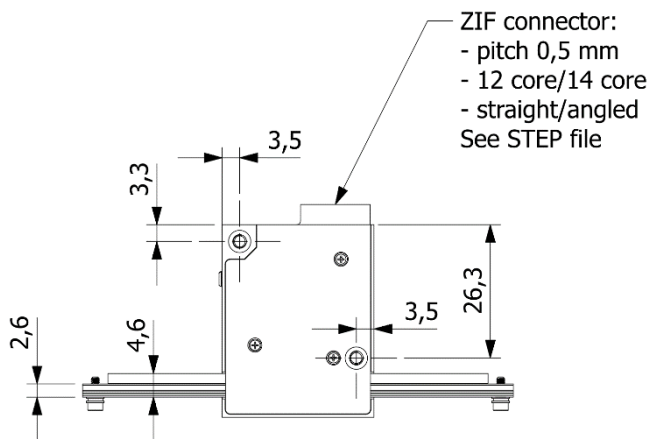
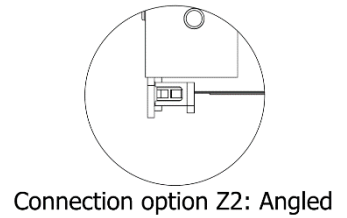
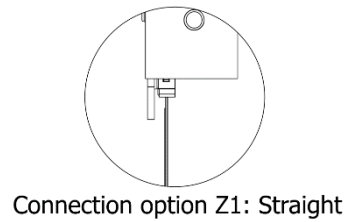
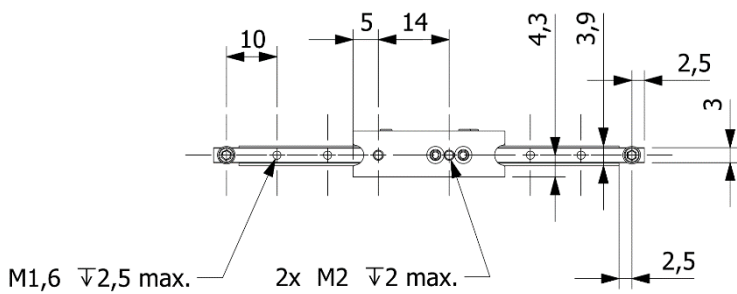
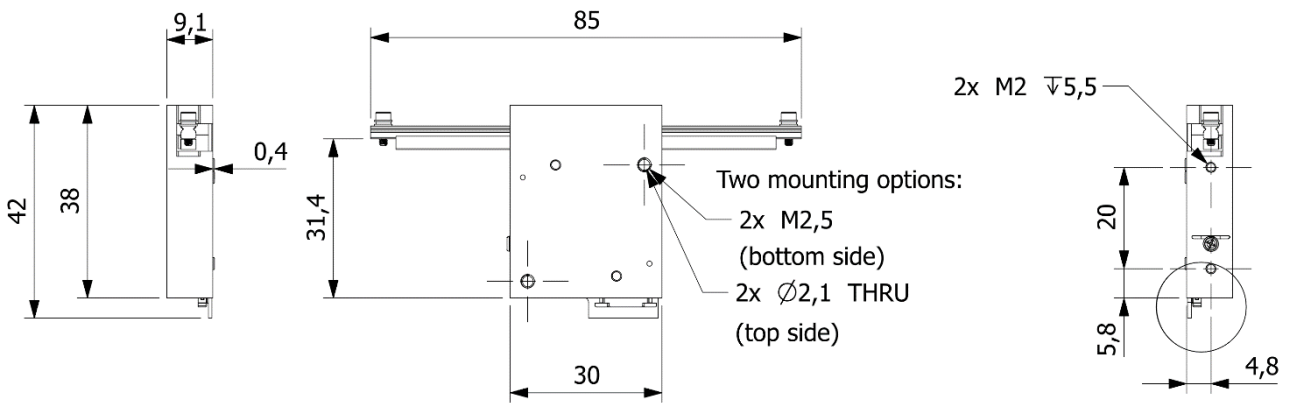
The XLA-5 **closed-loop** actuators are compatible with the **XD-OEM Controller**.

The XLA-5 **open-loop** actuators have a **built-in controller**.

Controlling of the stage is done with:

- Easy-to-use Windows interface
- LabVIEW interface program (compiled program or source)
- MATLAB interface script
- C++ and Python libraries

# Drawing

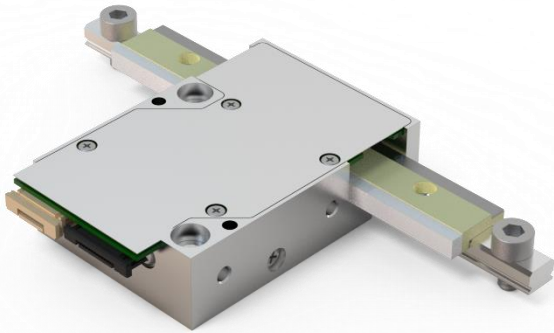


	max. tightening torque
M1,6	16 cNm
M2	34 cNm
M2,5	60 cNm

Last updated: 04/06/2024. All specifications are subject to change without prior notice.

# XLA-10 Series

## Fast and compact linear actuator



The XLA micro linear actuators are world class in terms of weight, size and precision. The actuator is driven by the Crossfixx™ ultrasonic piezo motor, allowing an extremely compact design, variable speeds up to 400 mm/s and a total weight of less than 55 gram! The XLA-10 has an integrated encoder with a 1250, 312 or 78 nm resolution or open-loop. A wide range of rod lengths is available, allowing stroke lengths from 10 mm to 285 mm! The open-loop version also comes with an integrated controller to make the whole setup even more compact. The design of the XLA-10 allows it to be **stackable**, this way actuators can be placed very closely to each other.

### Key features

	closed-loop	open-loop
drive principle	patented Crossfixx™ ultrasonic piezo technology	
lifetime	> 1000 km / typ. 20 million cycles	
input voltage	48 V	12 V
controller	XD-OEM controller required	integrated controller

### Model code structure

actuator type	rod length (mm)	encoder resolution (nm)	FPC cable outlet (flexible printed cable)	
XLA-10	-55	-OPEN	top side	
		-1250		
		-312		
		-78		
	-70	same as XLA-10-55		top side
	-85			
	-100			
	-115			
	-130			
	-145			
	-160			
	...			
	-295			
	-310			
-325				

Example: **XLA-10-55-312**

- └ XLA-10 series linear actuator
- └ Rod length of 55 mm
- └ Closed-loop actuator with integrated encoder with a resolution of 312 nm

## Environmental compatibility

temperature range	-30°C to +70°C
humidity range	20% to 90% RH (non-condensing)
heat dissipation (motor only)	< 10 W
internal operation voltage	< 120 V

## Motion performance

		XLA-10 all rod lengths				unit	tolerance	
		-1250	-312	-78	open-loop			
LIMITS	type	software + mechanical			magnetic (adjustable) + mechanical			
	type	optical, incremental			no encoder + integrated controller			
ENCODER	grating period	80				µm		
	resolution	1250	312	78		nm		
	index	1 per full stroke						
	accuracy	± 5				µm	typ.	
ACTUATOR	positioning	resolution = min. step size = min. incremental motion (MIM)	1250	350	80	50 – 100 µm (pulsed operation)	nm	typ.
		unidirectional repeatability	± 1250	± 350	± 80		nm	typ.
		bidirectional repeatability	± 2500	± 700	± 160		nm	typ.
	speed	max. speed	400			1000	mm/s	typ.
		min. speed	2 to 5			10	µm/s	typ.
		stability (at typical speed of 10 mm/s)	± 1			-	%	typ.
		point-to-point positioning time for a 1 mm step* 0g load	50			-	msec	typ.
		max. acceleration 0g load	400				m/s <sup>2</sup>	typ.
		operation duty cycle	50 120				% sec	max.

## Mechanical properties

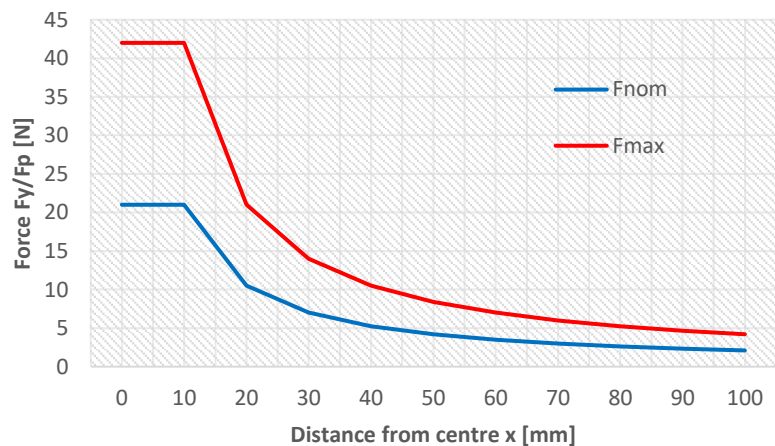
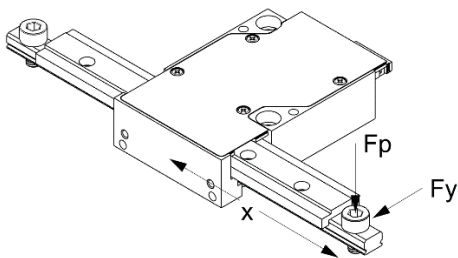
		XLA-10											unit	tolerance
		-55	-70	-85	-100	-115	-130	-145	-160	-175	-190	-205		
rod length													mm	± 0.1
dimensions	closed-loop	43 x 30 x 11.5											mm	± 0.1
	open-loop	43 x 30 x 14.5												
stroke / travel range		15	30	45	60	75	90	105	120	135	150	165	mm	± 0.1
mass	closed-loop	54.9	56.3	57.7	59.1	60.6	62.1	63.7	65.3	66.9	68.6	70.3	g	± 5%
	open-loop	56.1	57.5	58.9	60.3	61.8	63.3	64.9	66.5	68.1	69.8	71.5		
holding force		10											N	
driving force		10											N	
actuator materials		aluminum (housing) steel rod and stainless steel housing cover												
cable type		Closed loop version: FPC, 12 core, 0.5 mm pitch with opposite side contacts Open loop version: FPC, 14 core, 0.5 mm pitch with opposite side contacts												
bearing type		recirculating ball linear guide with end seal and lubrication storage light preload (clearance +0 to -0.5 µm)												



		XLA-10								unit	tolerance
rod length		-220	-235	-250	-265	-280	-295	-310	-325	mm	± 0.1
dimensions	closed-loop	43 x 30 x 11.5								mm	± 0.1
	open-loop	43 x 30 x 14.5									
stroke / travel range		180	195	210	225	240	255	270	285	mm	± 0.1
mass	closed-loop	72.0	73.8	75.7	77.6	79.5	81.5	83.5	85.6	g	± 5%
	open-loop	73.2	75	76.9	78.8	80.7	82.7	84.7	86.8		
holding force		10								N	
driving force		10								N	
actuator materials		aluminum (housing) steel rod and stainless steel housing cover									
cable type		Closed loop version: FPC, 12 core, 0.5 mm pitch with opposite side contacts Open loop version: FPC, 14 core, 0.5 mm pitch with opposite side contacts									
bearing type		recirculating ball linear guide with end seal and lubrication storage light preload (clearance +0 to -0.5 µm)									

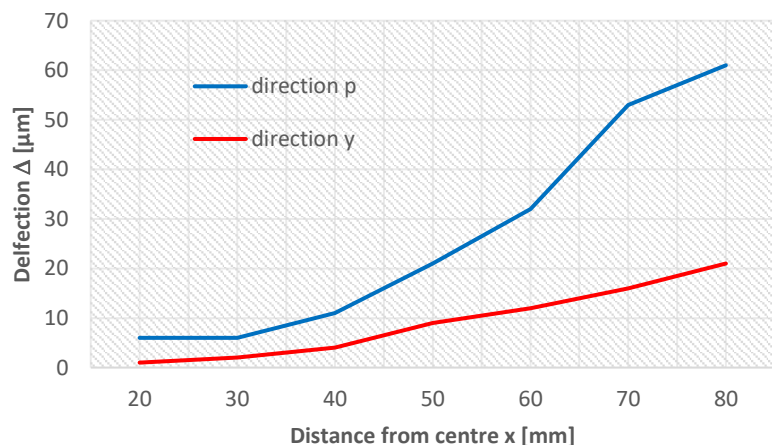
## Load rating of linear guide

In order to guarantee the lifetime specification and to maintain smooth rolling behaviour, the moment load applied to the actuator rod is limited to 0.21 Nm (nominal) and 0.42 Nm (maximal). When translated into forces  $F_y$  and  $F_p$  acting on the rod end at a distance  $x$  from the actuator centre, the following load curves are obtained. Long-term operation is allowed at load ratings up to  $F_{nom}$ , while operating at  $F_{max}$  is only advised for short periods of time.



## Rod deflection under load

When applying a load to an actuator, the rod end will deflect. Since the linear guide inside the actuator body has no or minimal play, most of this deflection is caused by elastic bending of the rod. The table below shows measured values of this deflection under a load of 1 N applied in two directions (see above figure).



## Controller/software

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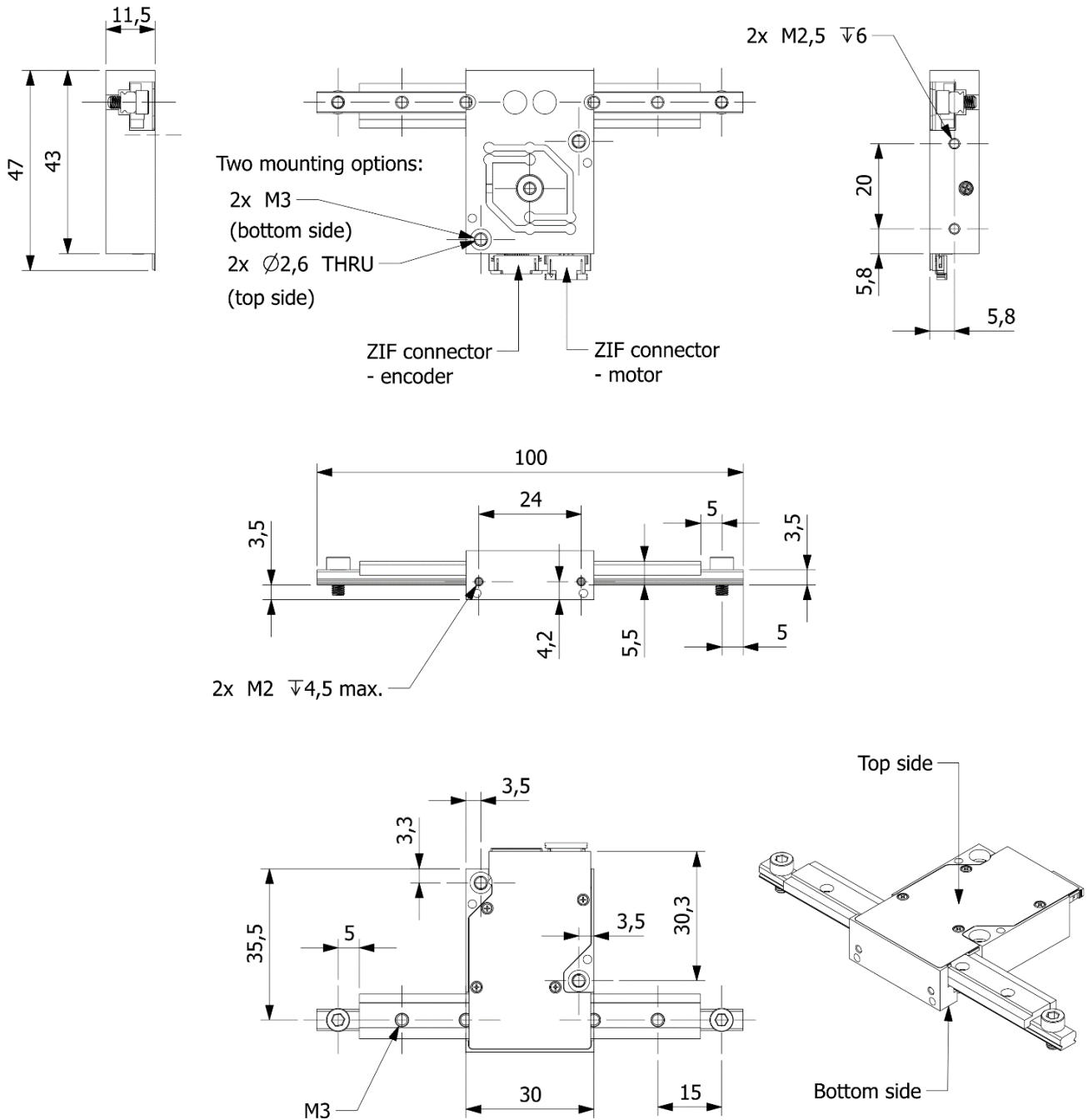
The XLA-10 **closed-loop** actuators are compatible with the **XD-OEM Controller**.

The XLA-10 **open-loop** actuators have a **built-in controller**.

Controlling of the stage is done with:

- Easy-to-use Windows interface
- LabVIEW interface program (compiled program or source)
- MATLAB interface script
- C++ and Python libraries

# Drawing



	max. tightening torque
M1,6	16 cNm
M2	34 cNm
M2,5	60 cNm
M3	120 cNm

Last updated: 03/06/2024. All specifications are subject to change without prior notice.