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	
operating voltage	20 to 48 V	12 V
controller	external XD-A 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

Motion performance

			XLA-1 all rod lengths				unit	tolerance
			-1250	**-312**	**-78**	**Open-loop**		
LIMITS		type		-		Optical		
ENCODER		type		optical, incremental				
		grating period		80			µm	
		resolution	1250	312	78	no encoder	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* 0 g load		200		-	msec	typ.

Mechanical properties

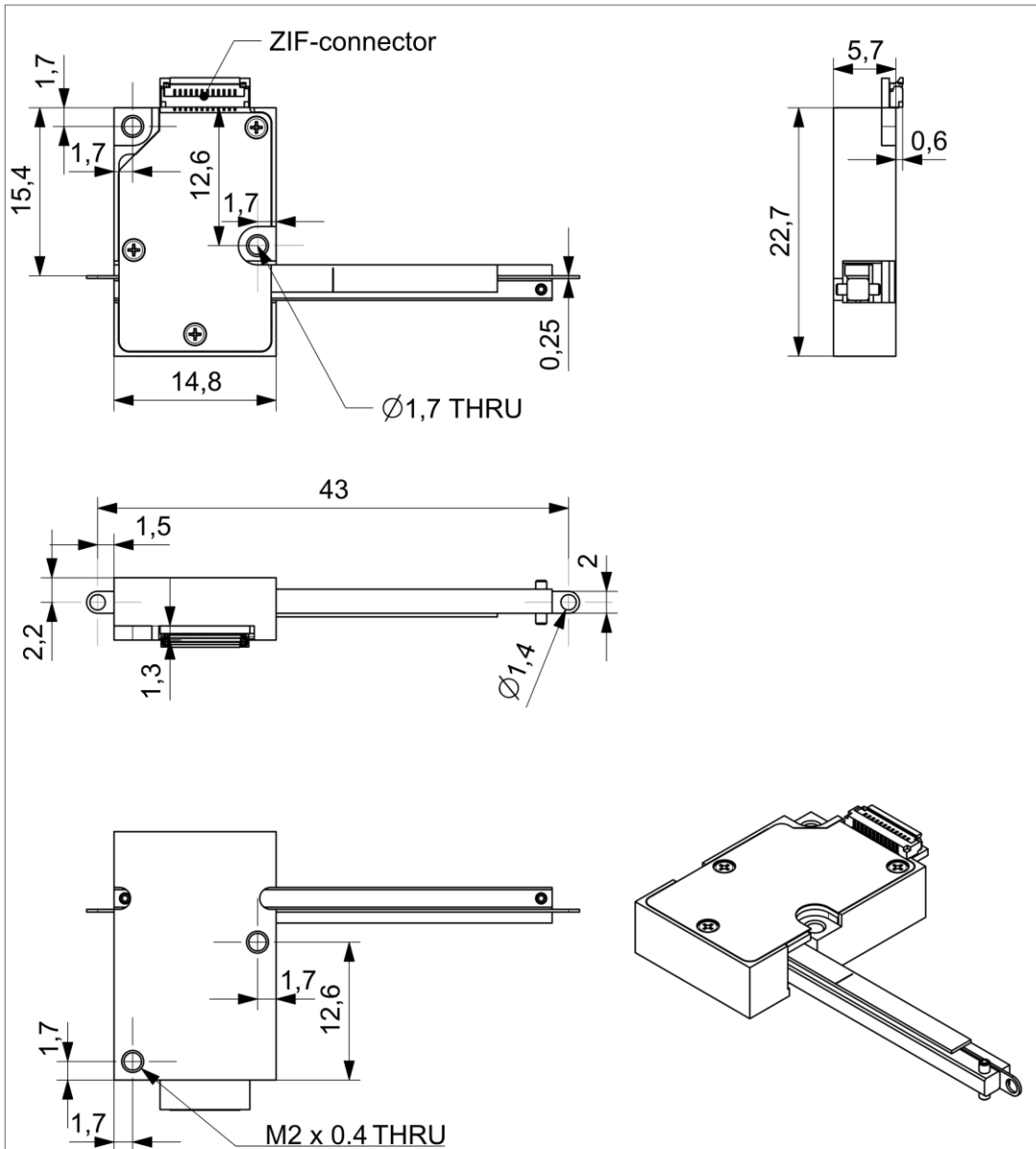|	XLA-1													unit	tolerance
rod length	**-20**	**-30**	**-40**	**-50**	**-60**	**-70**	**-80**	**-100**	**-120**	**-140**	**-160**	**-180**	**-200**	mm	± 0.1
dimensions	22.7 x 14.8 x 5.4													mm	± 0.1
stroke/ travel range	5	15	25	35	45	55	65	85	105	125	145	165	185	mm	± 0.1
mass	5.5	5.9	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	anodised 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	anodised 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

ZIF-connector

1,7

15,4

1,7

12,6

1,7

14,8

0,25

⌀1,7 THRU

5,7

22,7

0,6

43

1,5

2,2

1,3

2

⌀1,4

1,7

12,6

1,7

1,7

M2 x 0.4 THRU

General roughness	General tolerance	Material		Drawing number
	f			
Scale		Treatment		Project number
2:1				XLA

XERYON PRECISION

XLA-1-40 assembly

Author: TW

Date: 21-09-2020

A4

Last updated: 24/08/2021. All specifications are subject to change without prior notice.

XLA-3 Series

Fast and compact linear actuator
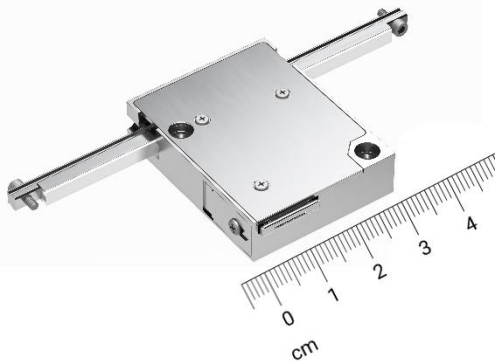
The XLA micro linear actuators are world class in terms of weight, size and precision. The actuator is driven by the Crossfixx™ ultrasonic piezo motor, allowing an extremely compact design, variable speeds up to 400 mm/s and a total weight of less than 36 gram! The XLA-3 has an integrated encoder with 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	
operating voltage	20 to 48 V	12 V
controller	external XD-A or 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	top side
		-1250	
		-312	
		-78	
	-55	same as XLA-3-40	
	-65		
	-75		
	-85		
	-105		
	-125		
	-145		
	…		
	-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

Motion performance

			XLA-3 all rod lengths			unit	tolerance
			-1250	**-312**	**-78**	**open-loop**		
LIMITS		type				optical		
ENCODER		type	optical, incremental			no encoder + integrated controller		
		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.

Mechanical properties

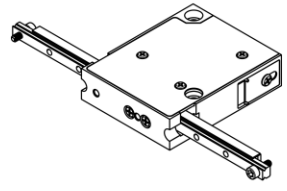|		XLA-3											unit	tolerance
rod length		**-45**	**-55**	**-65**	**-75**	**-95**	**105**	**-125**	**-145**	**-165**	**-185**	**-205**	mm	± 0.1
dimensions	closed-loop	38 x 30 x 9.1											mm	± 0.1
	open-loop	38 x 30 x 12												
stroke / travel range		10	20	30	40	60	70	90	110	130	150	170	mm	± 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		
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												

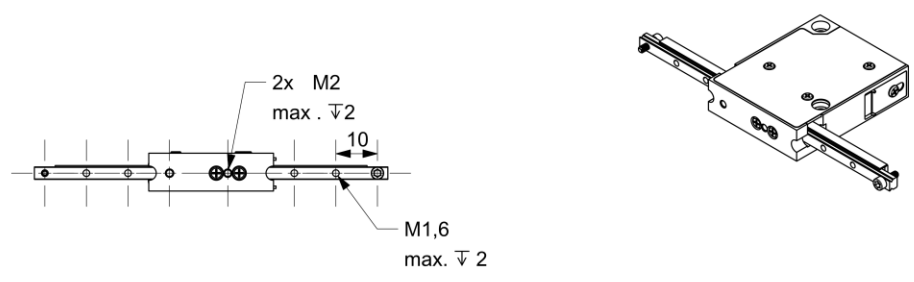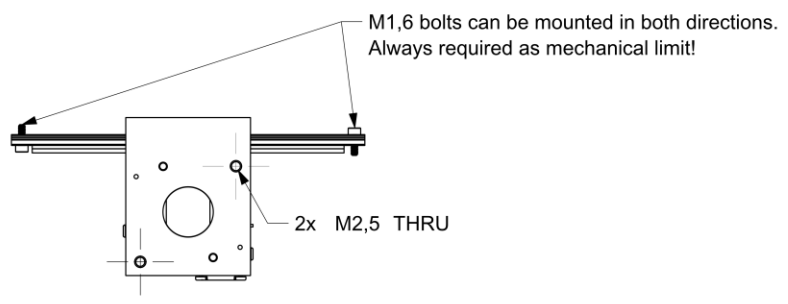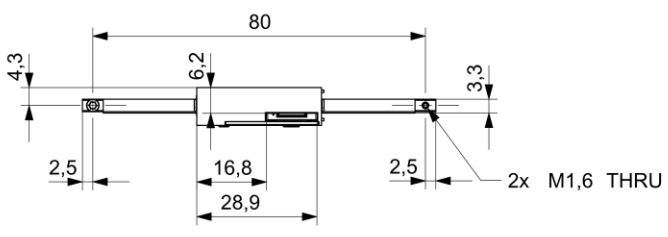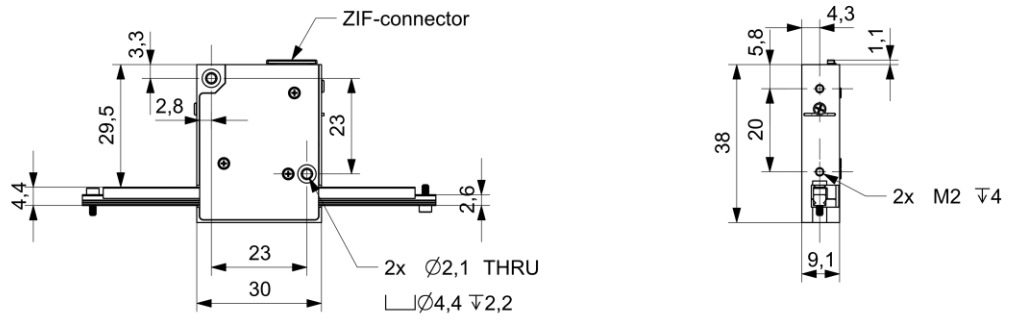|		XLA-3						unit	tolerance
rod length		**-225**	**-245**	**-265**	**-285**	**-305**	**-325**	mm	± 0.1
dimensions	closed-loop	38 x 30 x 9.1						mm	± 0.1
	open-loop	38 x 30 x 12							
stroke / travel range		190	210	230	250	270	290	mm	± 0.1
mass	closed-loop	51.6	52.4	53	53.8	54.6	55.4	g	± 5%
	open-loop	56	56.8	57.6	58.4	59.2	60		
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							

Controller/software

The XLA-3 **closed-loop** actuators are compatible with the **XD-A 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

ZIF-connector

3,3
29,5
2,8
23
4,4
2,6
23
30

2x Ø2,1 THRU
Ø4,4 ▽2,2

4,3
5,8
1,1
38
20
9,1

2x M2 ▽4

80
4,3
6,2
3,3
2,5
16,8
2,5
28,9

2x M1,6 THRU

M1,6 bolts can be mounted in both directions.
Always required as mechanical limit!

2x M2,5 THRU

2x M2
max. ▽2
10

M1,6
max. ▽ 2

General roughness	General tolerance	Material		Drawing number
√	∩			
Scale		Treatment		Project number
1 : 1				XLA-3

XERYON PRECISION   XLA-3-85 assembly (rev.A)

Author: BV   Date : 12-05-2021   A3

Measurement data
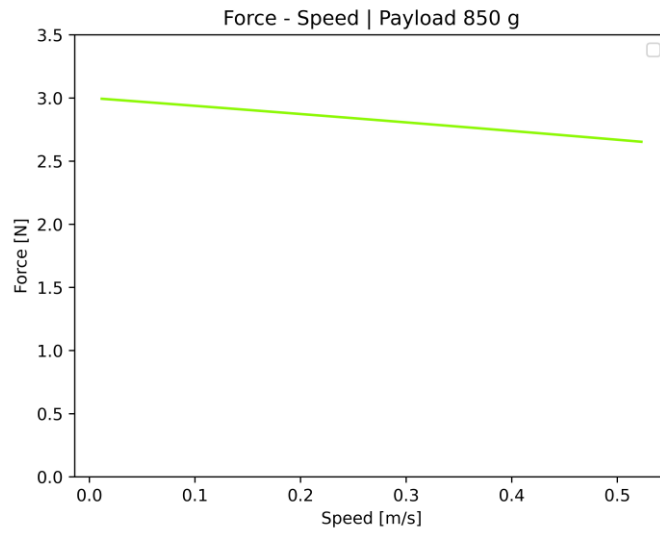
Typical force-speed diagram of an XLAs-3 stage with a payload of 850g.

XLA-5 Series
Fast and compact linear actuator
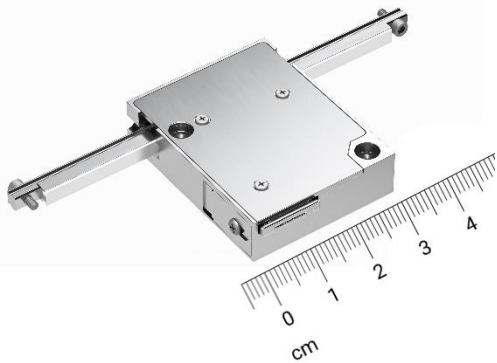
The XLA micro linear actuators are world class in terms of weight, size and precision. The actuator is driven by the Crossfixx™ ultrasonic piezo motor, allowing an extremely compact design, variable speeds up to 200 mm/s and a total weight of less than 36 gram! The XLA-5 has an integrated encoder with 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 300 mm! The open-loop version also comes with an integrated controller to make the whole setup even more compact.

Key featuress

	closed-loop	open-loop
drive principle	patented Crossfixx™ ultrasonic piezo technology	
lifetime	> 1000 km / typ. 20 million cycles	
operating voltage	20 to 48 V	12 V
controller	external XD-A or 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	top side
		-1250	
		-312	
		-78	
	-55	same as XLA-5-40	
	-65		
	-75		
	-85		
	-105		
	-125		
	-145		
	…		
	-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

Motion performance

			XLA-5 all rod lengths			unit	tolerance
			-1250	**-312**	**-78**	**open-loop**		
LIMITS	type					optical		
ENCODER	type		optical, incremental					
	grating period		80			no encoder + integrated controller	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	200			500	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.

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		
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												

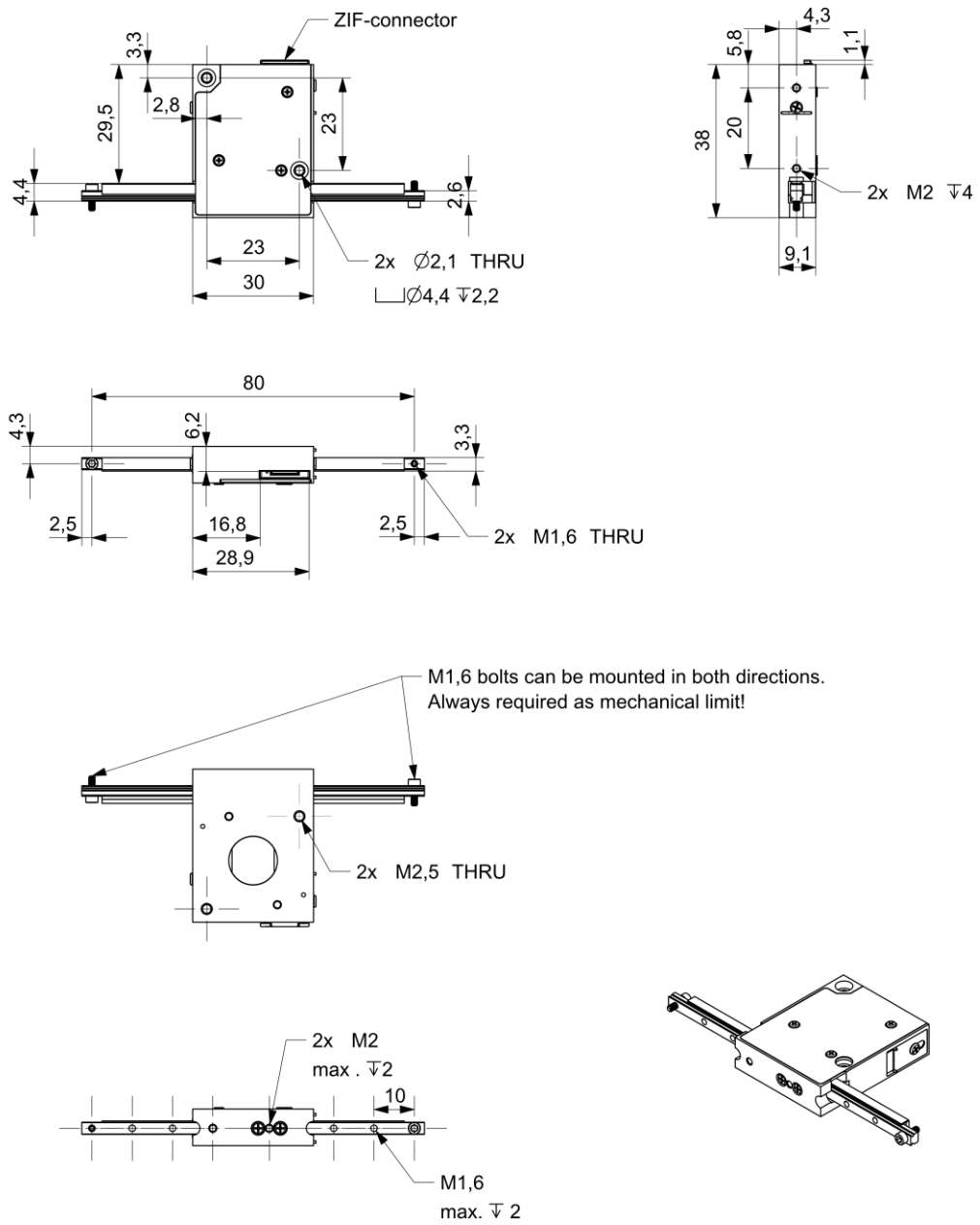|		XLA-5						unit	tolerance
rod length		**-225**	**-245**	**-265**	**-285**	**-305**	**-325**	mm	± 0.1
dimensions	closed-loop	38 x 30 x 9.1						mm	± 0.1
	open-loop	38 x 30 x 12							
stroke / travel range		190	210	230	250	270	290	mm	± 0.1
mass	closed-loop	51.6	52.4	53	53.8	54.6	55.4	g	± 5%
	open-loop	56	56.8	57.6	58.4	59.2	60		
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							

Controller/software

The XLA-5 **closed-loop** actuators are compatible with the **XD-A 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

ZIF-connector

2x Ø2,1 THRU
⌴Ø4,4 ⤓2,2

2x M2 ⤓4

2x M1,6 THRU

M1,6 bolts can be mounted in both directions.
Always required as mechanical limit!

2x M2,5 THRU

2x M2
max. ⤓2

M1,6
max. ⤓ 2

Last updated: 14/06/2023. All specifications are subject to change without prior notice.

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XLA-10 Series

Fast and compact linear actuator
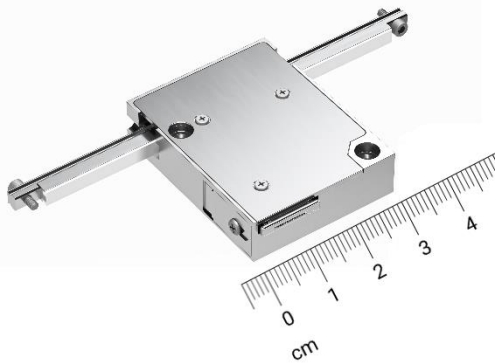
The XLA micro linear actuators are world class in terms of weight, size and precision. The actuator is driven by the Crossfixx™ ultrasonic piezo motor, allowing an extremely compact design, variable speeds up to 200 mm/s and a total weight of less than 36 gram! The XLA-10 has an integrated encoder with 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 300 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 featuress

	closed-loop	open-loop
drive principle	patented Crossfixx™ ultrasonic piezo technology	
lifetime	> 1000 km / typ. 20 million cycles	
operating 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	
	-85		
	-100		
	-115		
	-130		
	-145		
	-160		
	…		
	-295		
	-310		
	-325		

Example: **XLA-10-45-312**

⌐ XLA-10 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)	< 10 W
internal operation voltage	< 100 V

Motion performance

			XLA-10 all rod lengths				unit	tolerance
			-1250	**-312**	**-78**	**open-loop**		
LIMITS		type				optical		
ENCODER		type	optical, incremental					
		grating period	80			no encoder + integrated controller	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	200			500	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/s²	typ.
		operation duty cycle		50 120			% sec	max.

Mechanical properties

		XLA-10											unit	tolerance
rod length		**-55**	**-70**	**-85**	**-100**	**-115**	**-130**	**-145**	**-160**	**-175**	**-190**	**-205**	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												

		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									

Controller/software

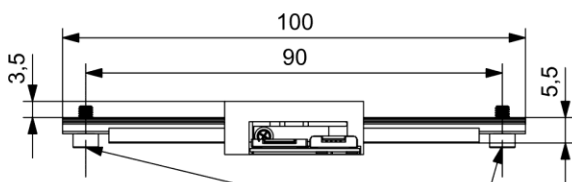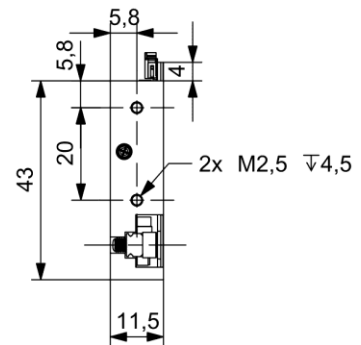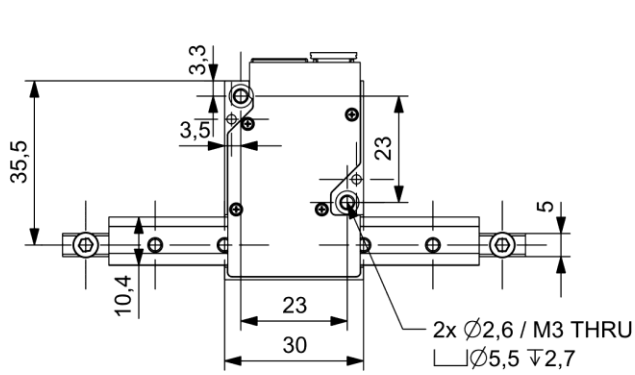The XLA-10 **closed-loop** actuators are compatible with the **XD-OEM Controller**.

The XLA-10 **open-loop** actuators have a **built-in controller**.
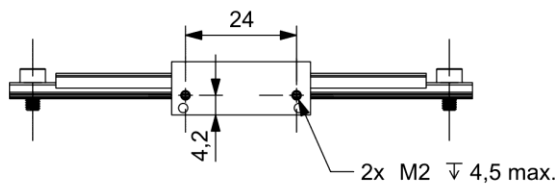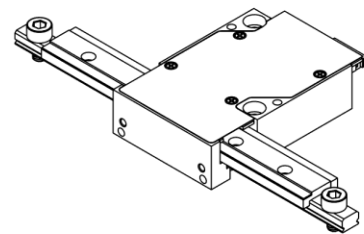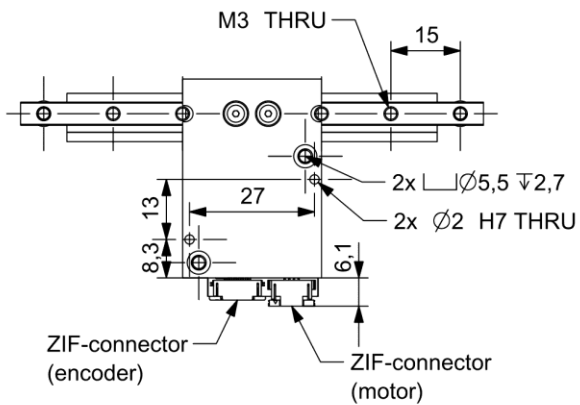
Controlling of the stage is done with:

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

Last updated: 24/11/2023. All specifications are subject to change without prior notice.

3,3
3,5
35,5
23
10,4
23
30
5
2x Ø2,6 / M3 THRU
⌴Ø5,5 ▽2,7

5,8
5,8
4
43
20
2x M2,5 ▽4,5
11,5

100
90
3,5
5,5

M3 bolts always required as mechanical limit!

M3 THRU
15
27
13
8,3
6,1
2x ⌴Ø5,5 ▽2,7
2x Ø2 H7 THRU

ZIF-connector
(encoder)
ZIF-connector
(motor)

24
4,2
2x M2 ▽ 4,5 max.

General roughness	General tolerance	Material		Drawing number
✓	⌒			XXXX.YYY.ZZZ.A
Scale		Treatment		Project number
1:1	⊲⊢ ⊕			XLA-10

XERYON PRECISION

XLA-10-100 assembly (rev. A0)

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Date : 24-11-2023

A3