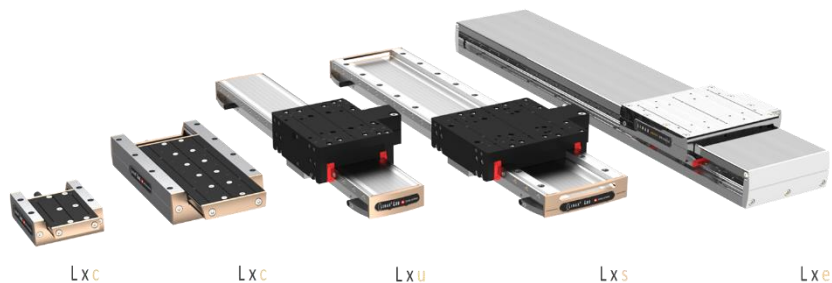


Data Sheet LINAX®

Edition 1 April 2021

LINAX® Linear Motor Axes 4 Types



Lxc, c = compact

Lxu, u = universal

Lxs, s = shuttle

Lxe, e = exclusive

Highlights

Compact dimensions, high precision

Positioning accuracy optical +/- 2 μm ,
resolution 1 μm or +/-500nm,
resolution 100nm

Positioning accuracy magnetic +/- 5 μm ,
resolution 1 μm (for Lxu and Lxs only)

Modular system with strokes from
44-1600mm

Peak forces from 24N – 180N

High cycle rates with velocities up to 4m/s
due to the linear motor

Force Control, Force Limitation Force
Monitoring with XENAX® Servo Controller

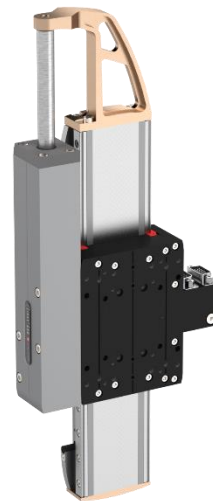
Overview

The construction of the very compact LINAX® Lxc (compact) types is based on the patented mono-bloc design. The linear motor coils are located in the mono-bloc and the magnets and the glass scale are on the slider. The magnets are moving while the coils remain stationary. No moving cables and cable chains result which translates into longer life span.



LINAX® Lxc 44F08 with Weight compensation

The Lxu (universal) types are real „all-rounders“. There are three mounting possibilities: mounting to the slider, to the ground plate or to the front face. Also interesting are the four long holes through the carriage slider. This allows for the direct back to back mounting of two Lxu sliders.



LINAX® Lxu xxF60 with Weight compensation

As the name implies, the Lxs (shuttle) types are the basis axes for long strokes. Of particular importance is the wide body construction with recessed linear motor, with which the height is reduced to just 38mm. the widely spaced guiding rails are able to withstand high moments of force.



LINAX® Lxs 800F60, with multiple carriage slider for highly integrated machine concepts

The LINAX® Lxe (*exclusive*) models have a special cover that is passed through the carriage slider of the linear motor. The result is a flat and elegant geometry for easy cleaning. This Lxe series is predestined for medical and clean room applications.



LINAX® Lxe 550F40, mit Schutzabdeckung

With the linear motor components from Jenny Science you can build your machines more compact, lighter and more efficient!

The result: Less space requirement, higher productivity and less energy consumption.

Alois Jenny
Jenny Science AG

Content

1 Code for LINAX® Types	6
2 LINAX® Lxc F08/F10/F40	6
2.1 External Dimensions LINAX® Lxc	6
2.2 Dynamics LINAX® Lxc	7
2.2.1 Power Supply, Speed Lxc 44F08	7
2.2.2 Power Supply, Speed Lxc 230F10	7
2.2.3 Power Supply, Speed Lxc 272F40	8
2.3 Precision LINAX® Lxc	9
2.3.1 Positioning Lxc	9
2.3.2 Guidings of Slider Lxc	10
2.3.3 Typical measurement results LINAX® Lxc 230F10 of series production	11
2.4 Stress Values of Guides Lxc	12
2.5 Dimensions Lxc F08/10	13
2.5.4 Installation Dimensions LINAX® Lxc 44F08	13
2.5.5 Installation Dimensions LINAX® Lxc 85F10	14
2.5.6 Installation Dimensions LINAX® Lxc 135F10	15
2.5.7 Installation Dimensions LINAX® Lxc 230F10	16
2.6 Dimensions Lxc F40	17
2.6.1 Installation Dimensions LINAX® Lxc 80F40	17
2.6.2 Installation Dimensions LINAX® Lxc 176F40	18
2.6.3 Installation Dimensions LINAX® Lxc 272F40	19
3 LINAX® Lxu F60	20
3.1 External Dimensions LINAX® Lxu F60	20
3.2 Dynamics LINAX® Lxu	21
3.2.1 Slider in Motion	21
3.2.2 Ground Plate in Motion	21
3.2.3 Power Supply, Speed Lxu 320F60 (Slider in Motion)	21
3.2.4 Power Supply, Speed Lxu 320F60 (Ground Plate in Motion)	22
3.3 Precision LINAX® Lxu	23
3.3.1 Positioning Lxu	23
3.3.2 Guidings of Slider Lxu	24
3.3.3 Typical measurement results LINAX® Lxu 320F60 of series production	25
3.4 Stress Values of Guides Lxu	25
3.5 Installation Dimensions LINAX® Lxu 40 – Lxu 320	26
4 LINAX® Lxs F60	28
4.1 External Dimensions Lxs F60	28
4.2 Dynamics LINAX® Lxs	29
4.2.1 Power Supply, Speed Lxs 1600F60	29
4.3 Precision LINAX® Lxs	30

4.3.1 Positioning Lxs	30
4.3.2 Guidings of Slider Lxs	31
4.3.3 Typical measurement results LINAX® Lxs 600F60 of series production	32
4.4 Stress Values of Guides Lxs	32
4.5 Installation Dimensions LINAX® Lxs 160 – Lxs 1600	33
5 LINAX® Lxe F40	36
5.1 External Dimensions LINAX® Lxe F40	36
5.2 Dynamics LINAX® Lxe	37
5.2.1 Power Supply, Speed Lxe 1000F60	37
5.3 Precision LINAX® Lxe	38
5.3.1 Positioning Lxe	38
5.3.2 Guidings of Slider Lxe	39
5.4 Stress Values of Guides Lxe	39
5.5 Dimensions LINAX® Lxe	40
5.5.1 Installation Dimensions LINAX® Lxe 250F40	41
5.5.2 Installation Dimensions LINAX® Lxe 400F40	41
5.5.3 Installation Dimensions LINAX® Lxe 550F40	41
5.5.4 Installation Dimensions LINAX® Lxe 800F40	42
5.5.5 Installation Dimensions LINAX® Lxe 1000F40	42
6 Weight Compensation	43
6.1 Weight Compensation STEP CAD Data	43
6.2 Weight Compensation Lxc 44F08	43
6.3 Weight Compensation Lxc 85F10, Lxc 80F40, Lxc 176F40	43
6.4 Weight Compensation Lxu 40F60, Lxu 80F60, Lxu 160F60	44
7 Front Flange Connections LINAX® Lxu	45
8 Installation, Important Instructions	46
8.1 Straightness for Mounting on Ground Plate	46
8.2 Straightness for Mounting on Slider	46
8.3 Straightness Practical Test	46
8.4 Power Supply	46
9 Maintenance, Lifespan	47
9.1 Lubrication of LINAX® Lxc Types	47
9.2 Lifespan Expectations LINAX® Lxc Types	47
9.3 Lubrication of LINAX® Lxu, Lxs, Lxe Types	48
9.4 Lifespan Expectations Lxu, Lxs, Lxe Types	48
9.5 Lifespan Extending Measures	48
9.6 Cleaning Glass Scale	49
10 Safety, Environment	50
10.1 Safety with XENAX® Servocontroller	50
10.2 Environment Conditions	50

1 Code for LINAX® Types

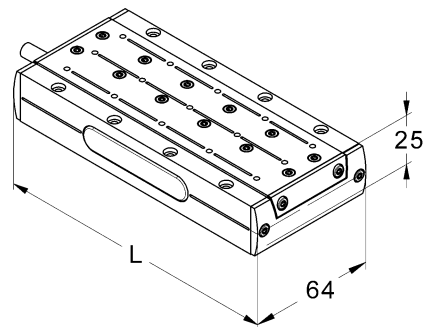
Lxc 85F10

Lx	c	85	10
Lx = LINAX®	c = compact u = universal s = shuttle e = exclusive	85 = 85mm max. net stroke	10 = 10N Nominal force 100% duty cycle

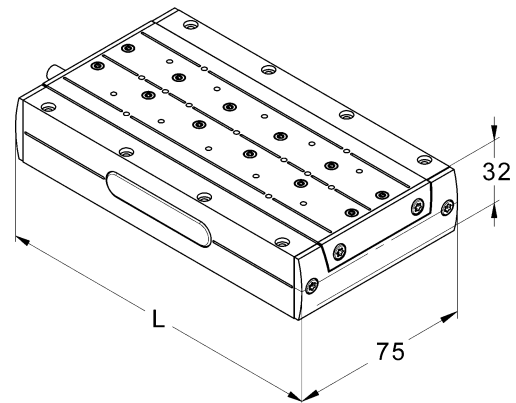
2 LINAX® Lxc F08/F10/F40

2.1 External Dimensions LINAX® Lxc

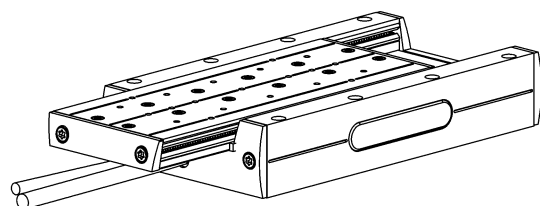
LINAX®	Lxc 44F08	Lxc 85F10	Lxc 135F10	Lxc 230F10
L [mm]	78	144	194	290



LINAX®	Lxc 80F40	Lxc 176F40	Lxc 272F40
L [mm]	169	265	361



Lxc absolute zero point according to REFERENCE:
Slider extended towards the connection cable



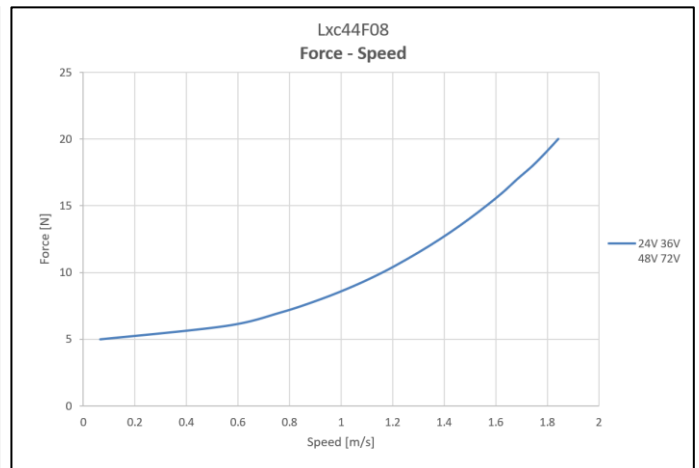
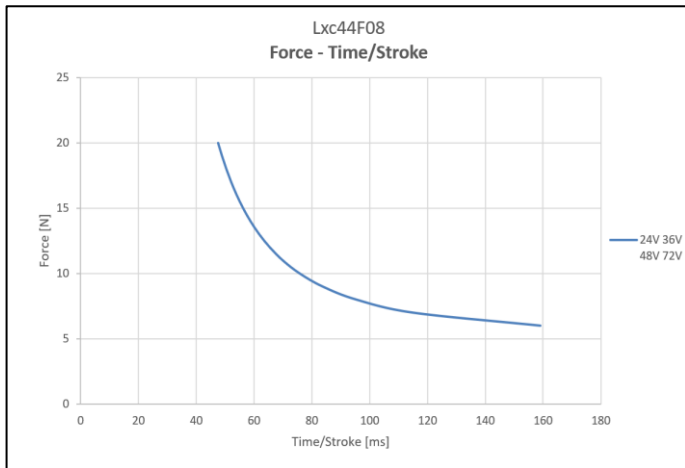
2.2 Dynamics LINAX® Lxc

LINAX®	Stroke [mm]	Force [N] nom./peak	Speed v-max* [m/s]	Acceleration a-max [m/s ²]	Min. travel Time/stroke [ms]	Weight Slider [g]	Weight Geko [g]	Weight Total [g]
Lxc 44F08	44	8/24	1.8	115	50	130	90	350
Lxc 85F10	85	10/30	2.3	85	75	230	180	650
Lxc 135F10	135	10/30	2.6	60	105	320	-	880
Lxc 230F10	230	10/30	3.0	40	155	450	-	1200
Lxc 80F40	80	40/114	3.0	165	55	520	335	1470
Lxc 176F40	176	40/114	4.0	115	90	750	530	2150
Lxc 272F40	272	40/114	4.1	80	125	1050	-	2800

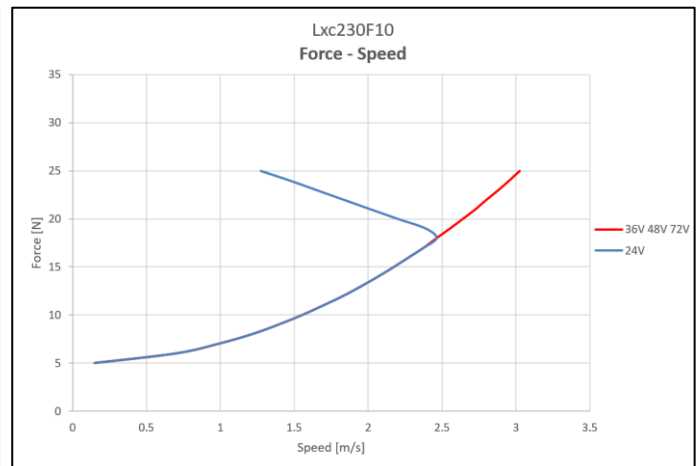
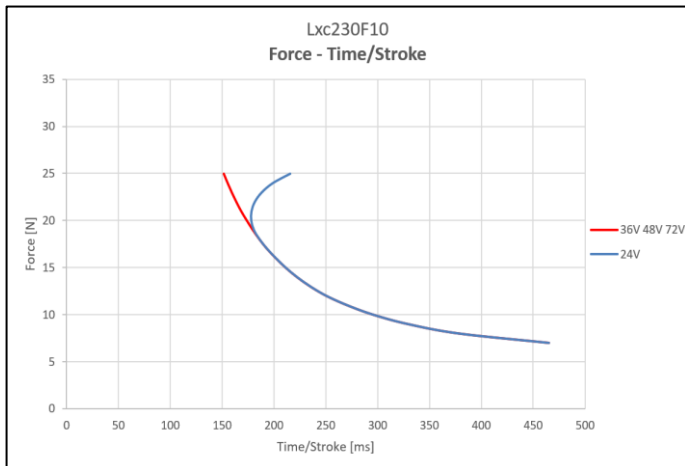
All values only valid with XENAX® Xvi and 20% S-Curve

* v-max corresponds to the maximum speed at acceleration a-max in the table. Higher speeds may be possible when the acceleration is reduced.

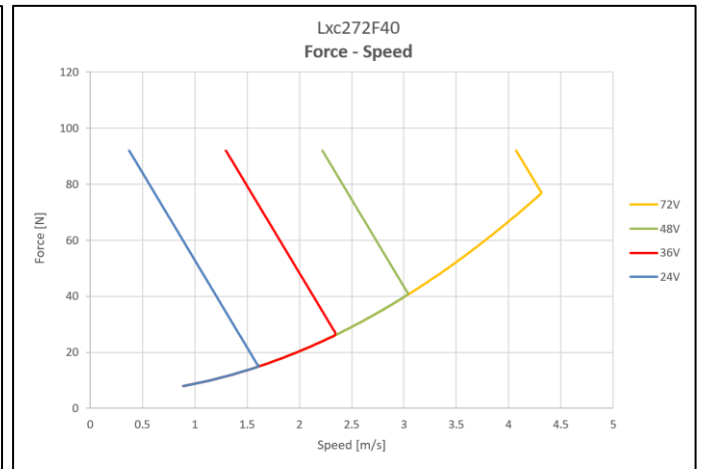
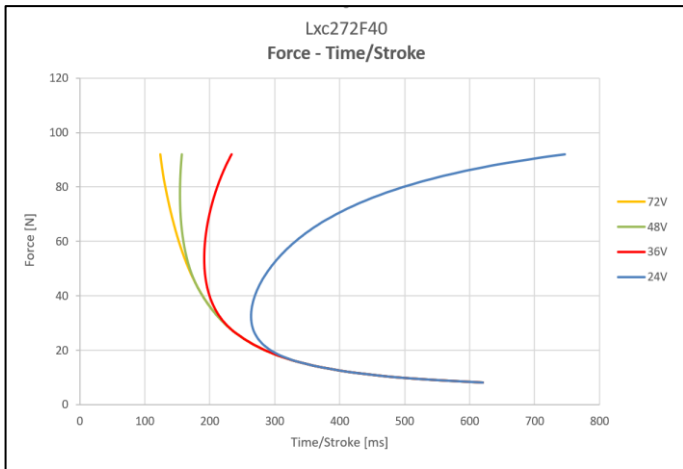
2.2.1 Power Supply, Speed Lxc 44F08



2.2.2 Power Supply, Speed Lxc 230F10



2.2.3 Power Supply, Speed Lxc 272F40

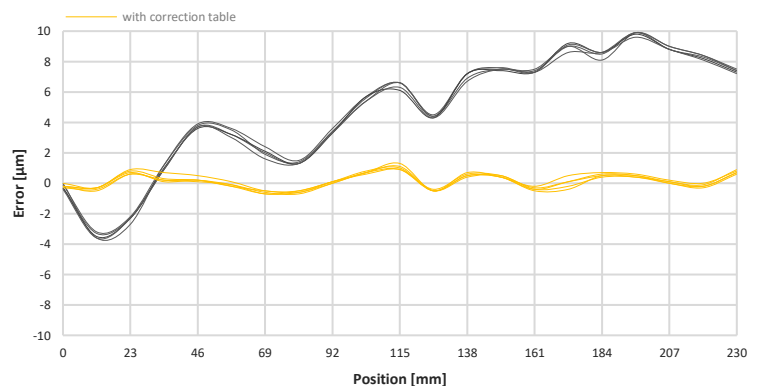


2.3 Precision LINAX® Lxc

2.3.1 Positioning Lxc

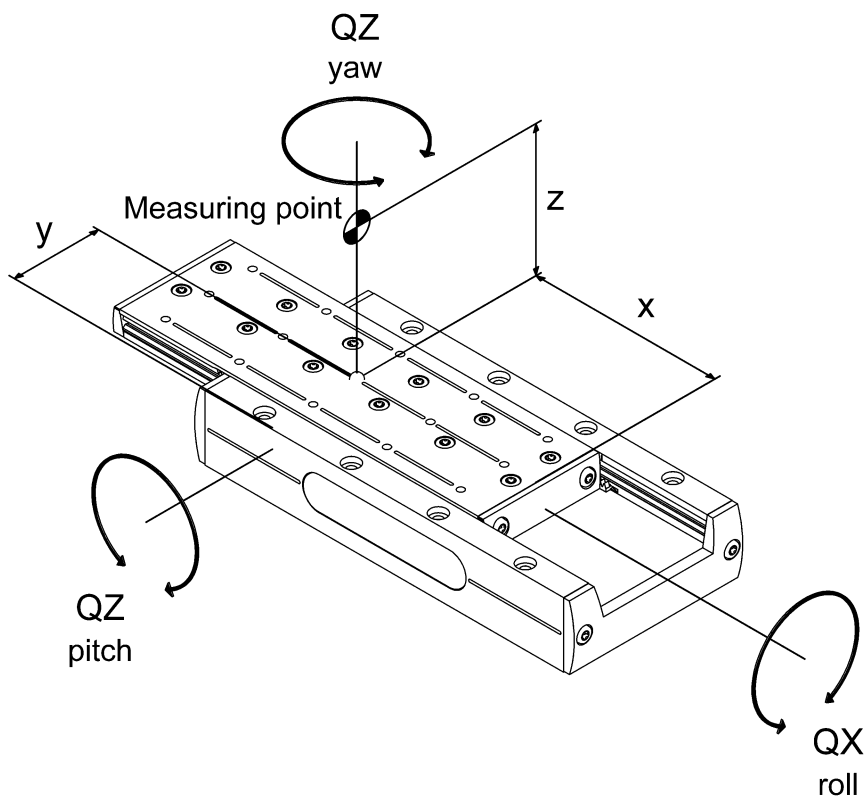
Standard resolution of optical measuring scale	1µm / counter increment
Repeatability	< +/-1.5µm
Optional optical measuring scale with high resolution	100nm / counter increment
Repeatability	< +/-400nm
Linear expansion optical measuring scale	8.5µm/m/°C
Reference	Automatic calculation of the absolute position through the distance coded reference marks, max 10mm, direction of reference can be selected. The reference has to be completed only once after powering on the logic power (24V). The absolute position will be stored until the logic power is turned off (XENAX® Servo controller).
Mechanical zero point absolute	It is located 1.5mm before the mechanical limit. This is where the slider is positioned on the right end while the cable case is in the front of the user.
Correction table for position errors with Servo controller Xvi 48V8/75V8/75V8S	The XENAX® Servo controller offers the possibility to correlate the encoder position with the actual position.

Position accuracy optical 1µm
150mm over measuring system



2.3.2 Guidings of Slider Lxc

Cross roller bearings with are used for the LINAX® Lxc linear motor axes. The cross roller bearings are installed in cages and are equipped with forced centering. This construction is very robust and reliable (>50Mio cycles). The LINAX® Lxc linear motor axes have the following tolerances. These data is based on measures with linear motors free of load.



LINAX®	Running Accuracy horizontal EYX	Running Accuracy vertical EZX	Tilt Error QX (roll)	Tilt Error QY (pitch)	Tilt Error QZ (yaw)	Tolerance Constr. height
Lxc 44F08	±5µm	±5µm	±15ws	±30ws	±20ws	±0,1mm
Lxc 85F10	±7µm	±7µm	±20ws	±35ws	±25ws	±0,1mm
Lxc 135F10	±10µm	±10µm	±20ws	±40ws	±30ws	±0,1mm
Lxc 230F10	±12µm	±12µm	±20ws	±50ws	±35ws	±0,1mm
Lxc 80F40	±8µm	±8µm	±20ws	±30ws	±30ws	±0,1mm
Lxc 176F40	±10µm	±10µm	±20ws	±35ws	±35ws	±0,1mm
Lxc 272F40	±12µm	±12µm	±20ws	±40ws	±40ws	±0,1mm

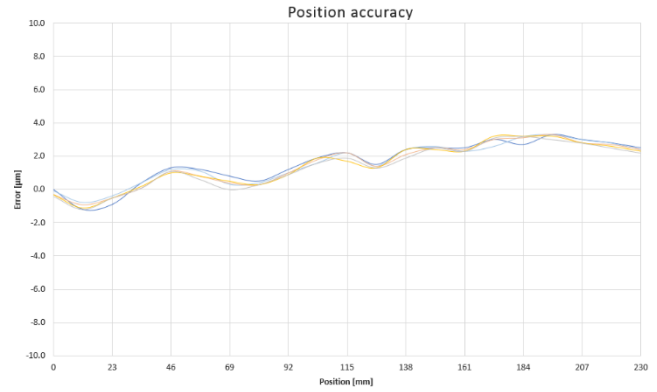
2.3.3 Typical measurement results LINAX® Lxc 230F10 of series production

Position accuracy

Resolution optical: $1\mu\text{m}$
 Absolute accuracy: $\pm 2.5\mu\text{m}$

Repeatability forward: $0.8\mu\text{m}$
 Repeatability backward: $1.0\mu\text{m}$
 Repeatability bi-directional: $1.3\mu\text{m}$

Position accuracy 25mm over measuring system



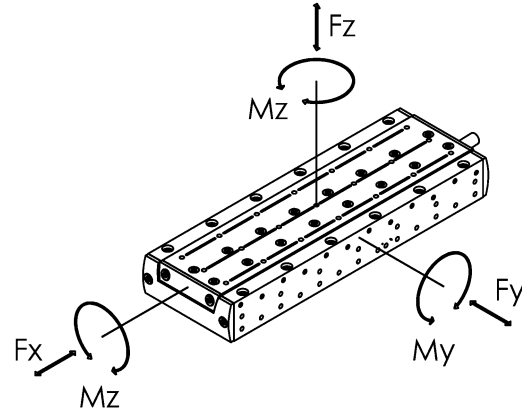
Tilt error

QX roll: ± 9.5 asec
 QY pitch: ± 10.3 asec
 QZ yaw: ± 9 asec



2.4 Stress Values of Guides Lxc

LINAX®	Mx max [Nm]	Fy max [N] Fz max [N]	My max [Nm] Mz max [Nm]
Lxc 44F08	17	787	11
Lxc 85F10	37	1722	43
Lxc 135F10	47	2181	66
Lxc 230F10	49	2296	95
Lxc 80F40	129	4080	133
Lxc 176F40	165	5236	230
Lxc 272F40	186	5916	328

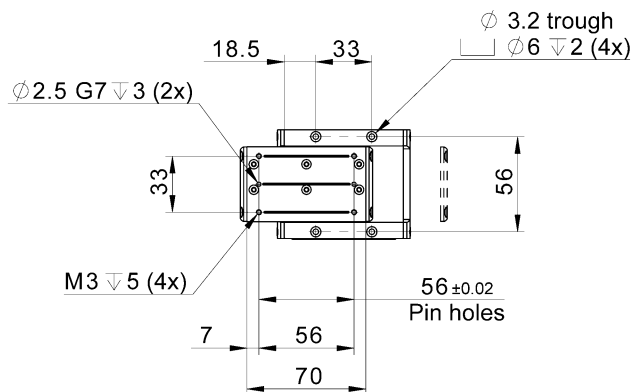
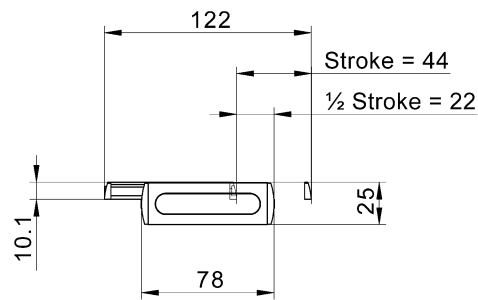
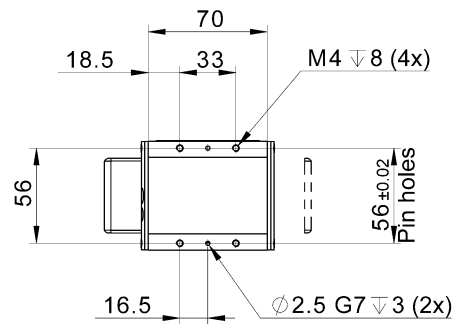
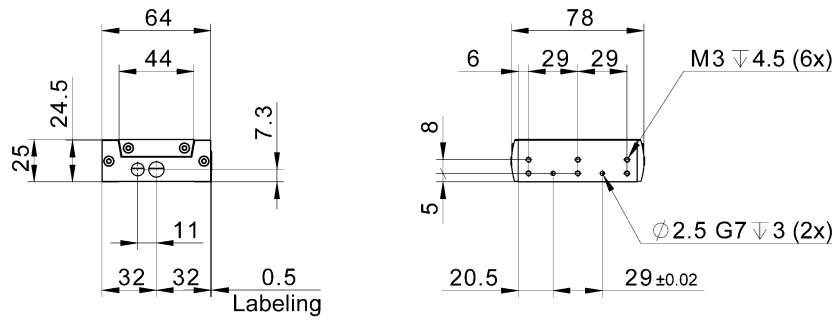


Besides adhering to the individual maximal loads, the following equation must comply if there are multiple forces and moments acting simultaneously on the linear motor:

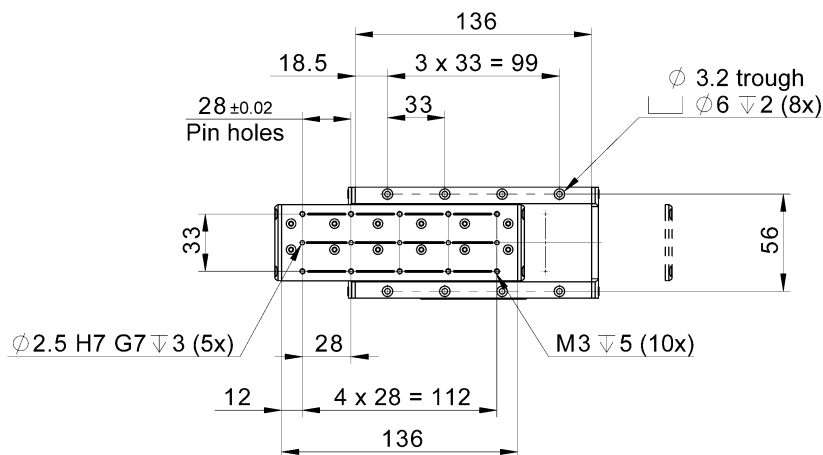
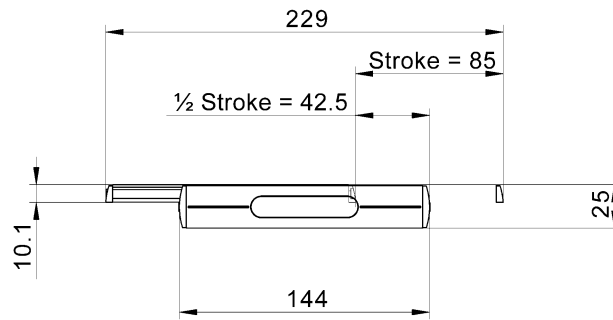
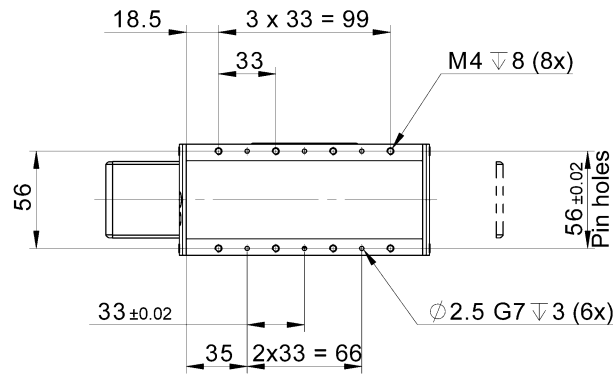
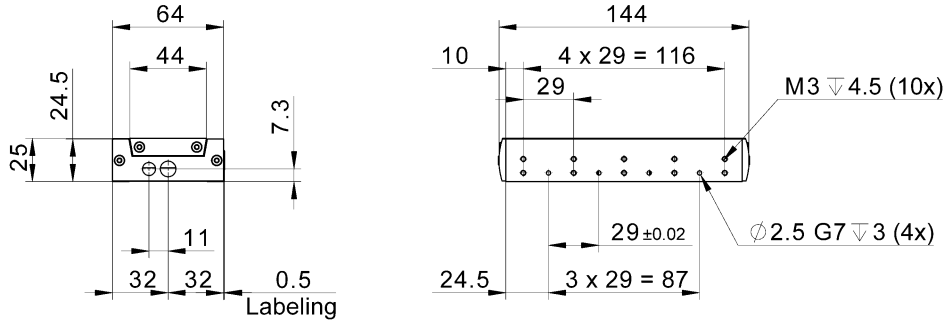
$$\frac{|Fy|}{Fy \max} + \frac{|Fz|}{Fz \max} + \frac{|Mx|}{Mx \max} + \frac{|My|}{My \max} + \frac{|Mz|}{Mz \max} \leq 1$$

2.5 Dimensions Lxc F08/10

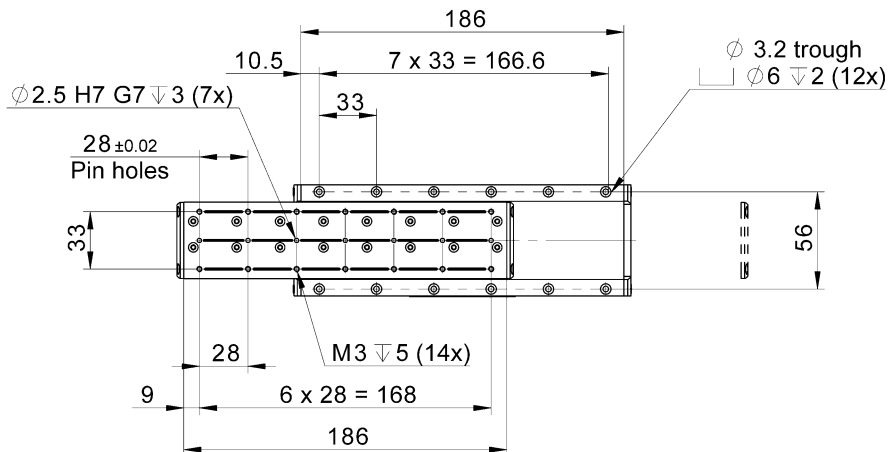
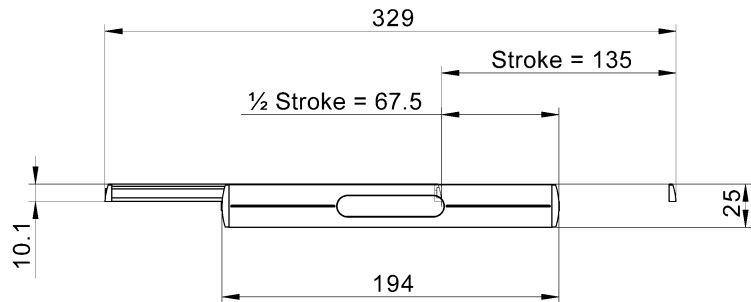
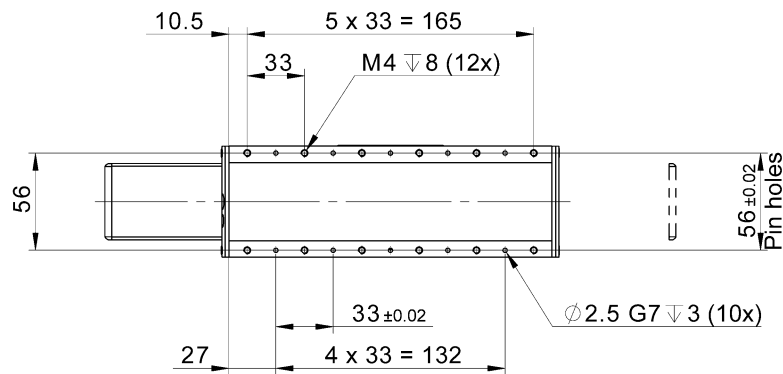
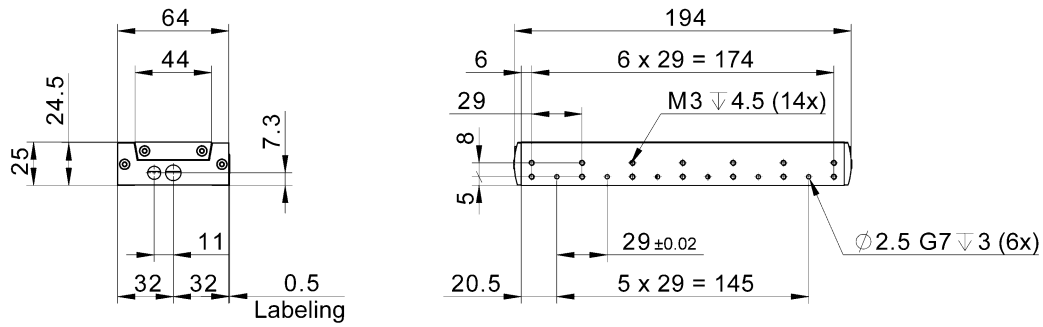
2.5.4 Installation Dimensions LINAX® Lxc 44F08



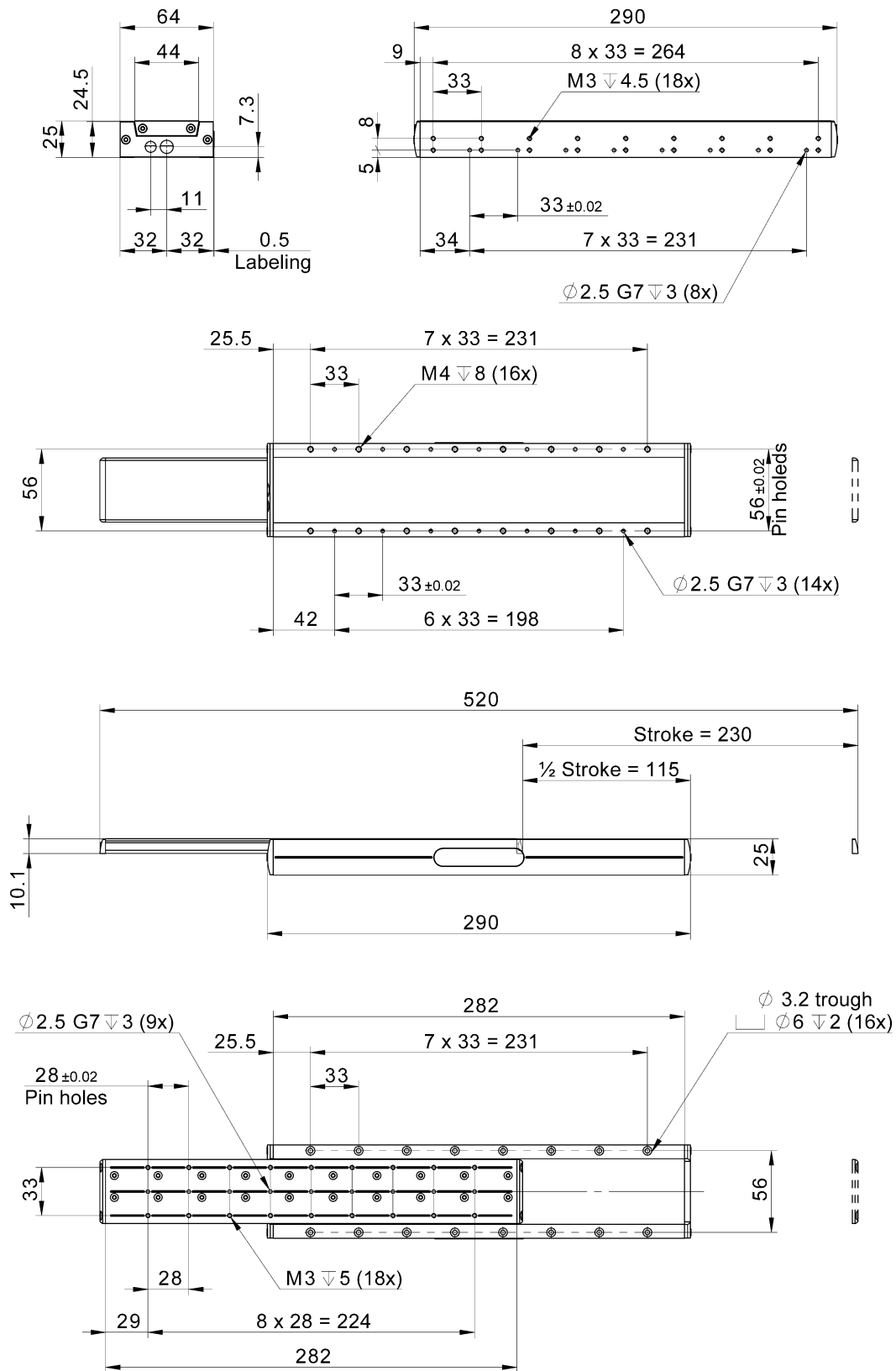
2.5.5 Installation Dimensions LINAX® Lxc 85F10



2.5.6 Installation Dimensions LINAX® Lxc 135F10

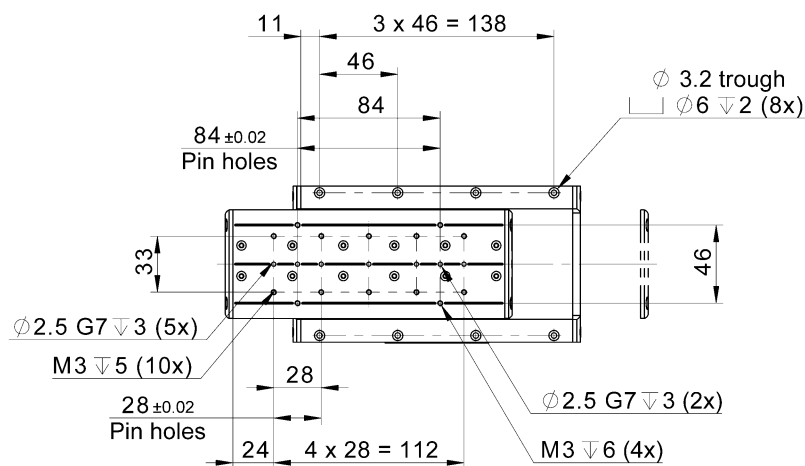
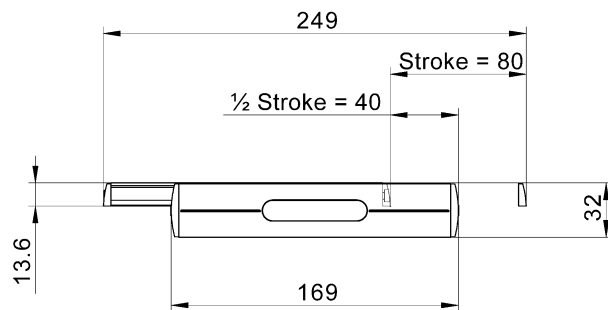
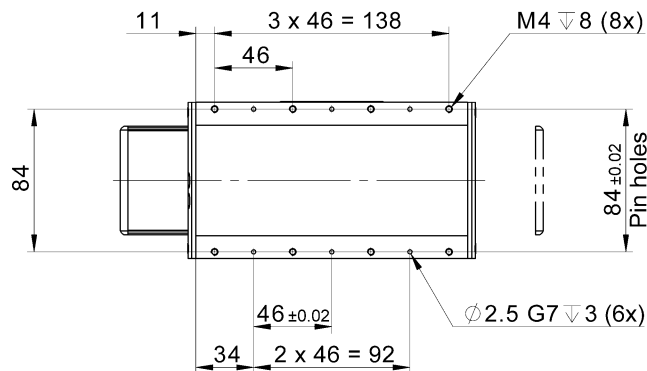
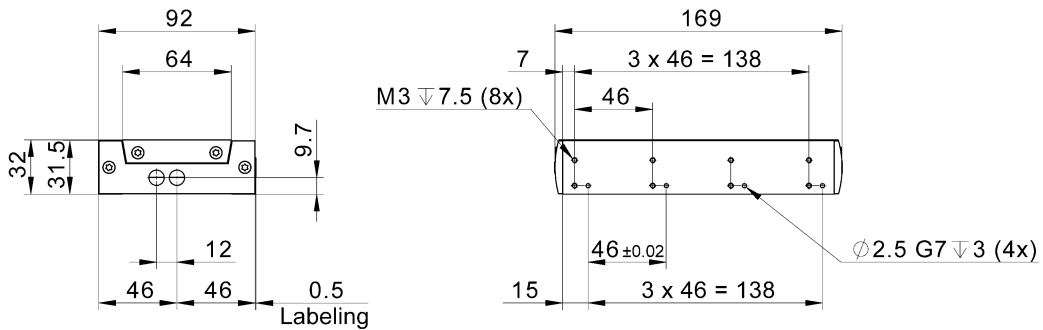


2.5.7 Installation Dimensions LINAX® Lxc 230F10

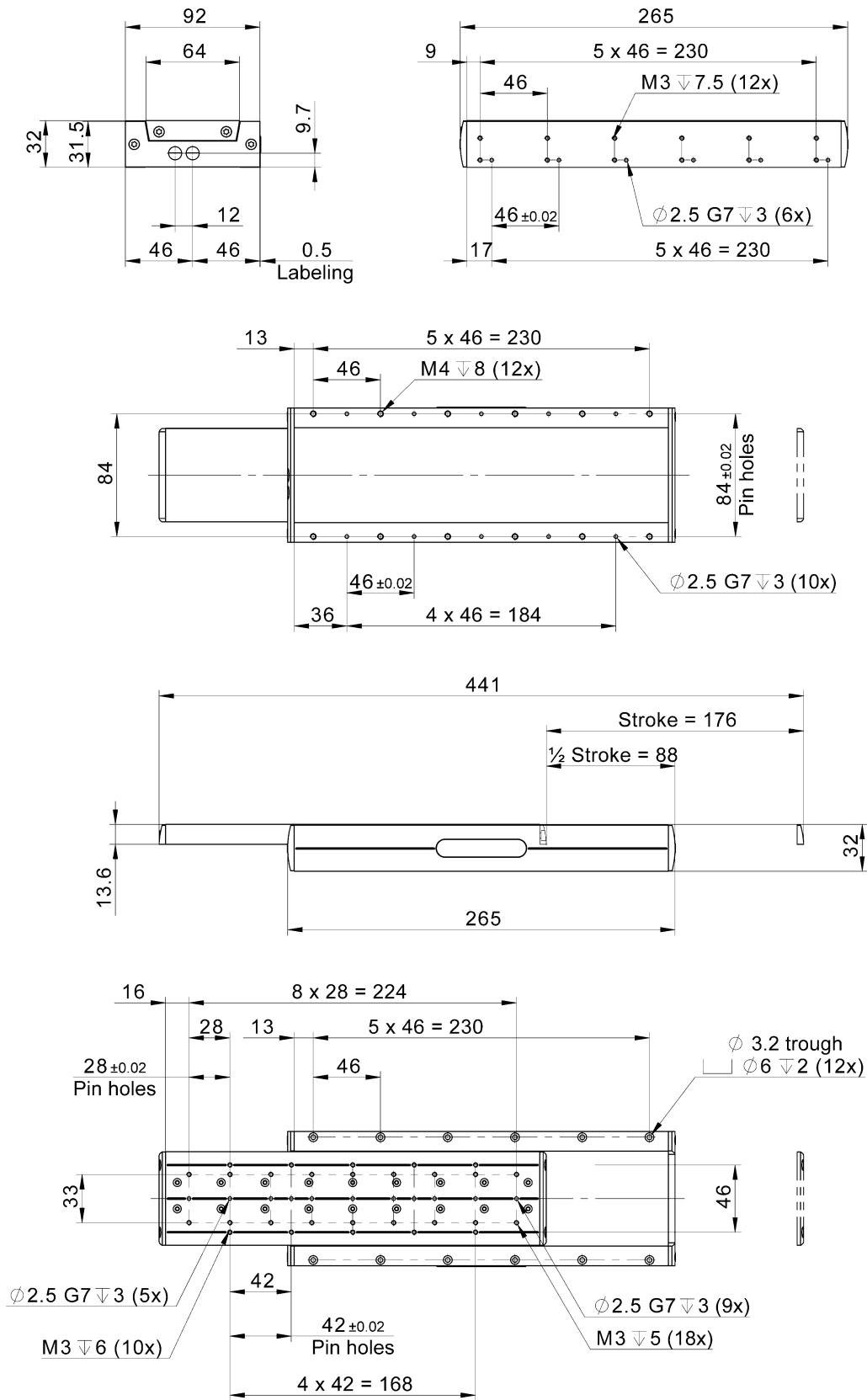


2.6 Dimensions Lxc F40

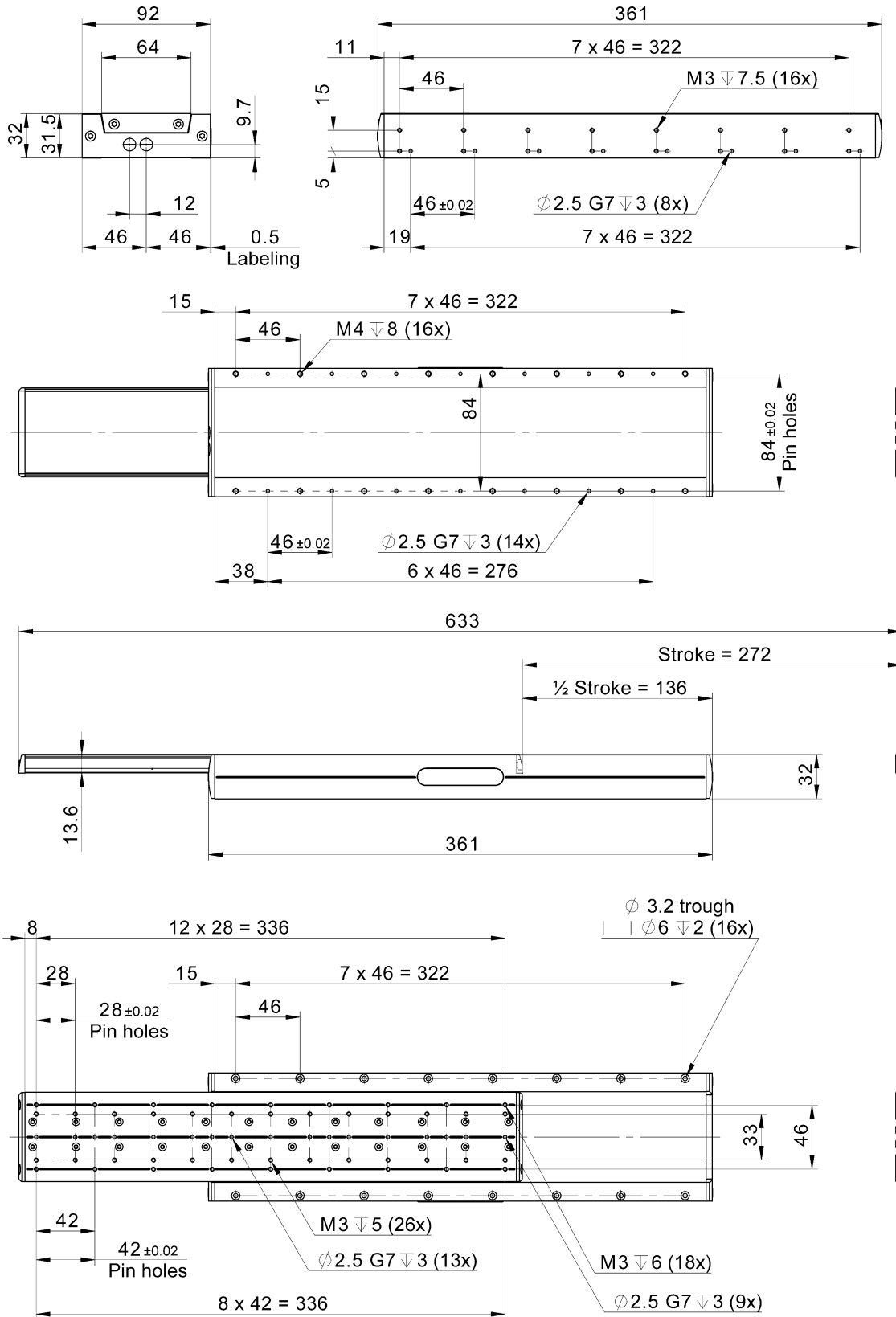
2.6.1 Installation Dimensions LINAX® Lxc 80F40



2.6.2 Installation Dimensions LINAX® Lxc 176F40



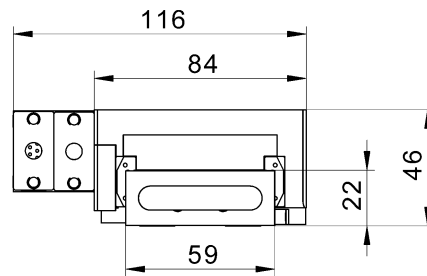
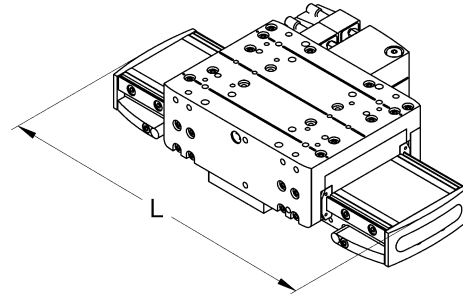
2.6.3 Installation Dimensions LINAX® Lxc 272F40



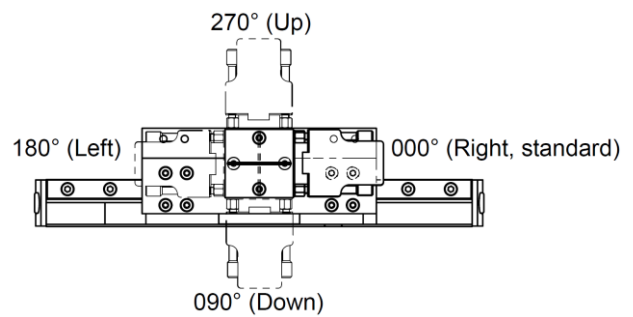
3 LINAX® Lxu F60

3.1 External Dimensions LINAX® Lxu F60

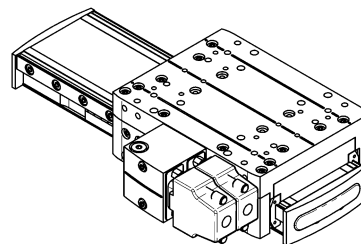
LINAX® Lxu	L [mm]
Lxu 40F60	170
Lxu 80F60	210
Lxu 160F60	290
Lxu 240F60	370
Lxu 320F60	450



Lxs and Lxu
Rotary connector case in 90° pattern
Default cable connector directed to the right



Lxu absolute zero point according to REFERENCE:
Slider extended towards the connection cable



3.2 Dynamics LINAX® Lxu

3.2.1 Slider in Motion

LINAX®	Stroke [mm]	Force [N] nom./peak	Speed v-max* [m/s]	Acceleration a-max [m/s ²]	Min. travel time/stroke [ms]	Weight Slider [g]	Weight comp.	Weight Total [g]
Lxu 40F60	40	60/180	1.9	140	45	950	350	1700
Lxu 80F60	80	60/180	2.8	140	55	950	350	1900
Lxu 160F60	160	60/180	4.1	140	80	950	600	2200
Lxu 240F60	240	60/180	4.1	140	100	950	-	2600
Lxu 320F60	320	60/180	4.1	140	115	950	-	2900

All values only valid with XENAX® Xvi and 20% S-Curve

* v-max corresponds to the maximum speed at acceleration a-max in the table. Higher speeds may be possible when the acceleration is reduced.

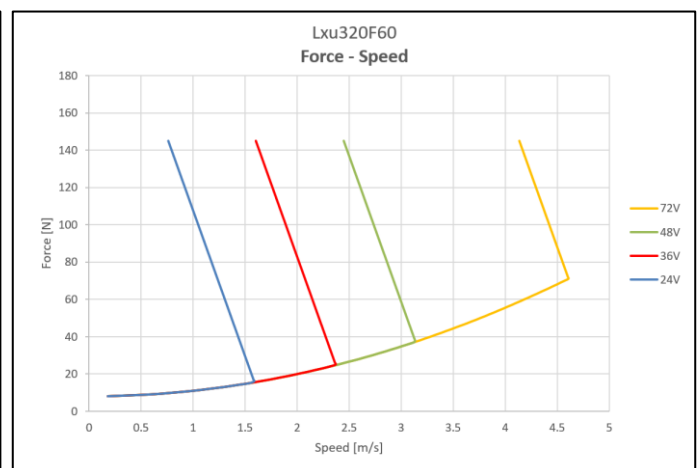
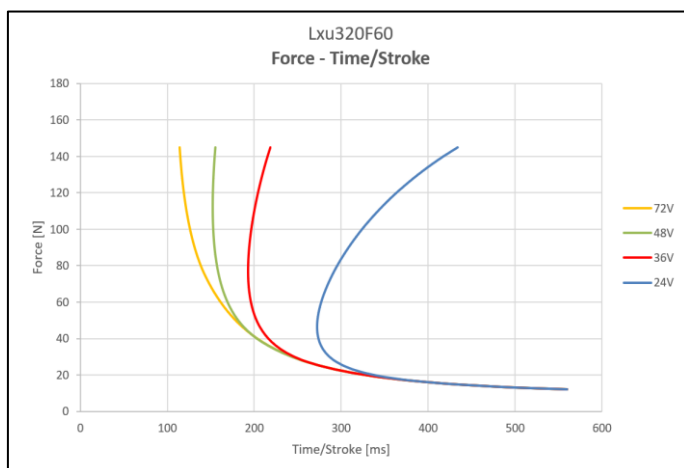
3.2.2 Ground Plate in Motion

LINAX®	Stroke [mm]	Force [N] nom./peak	Speed v-max* [m/s]	Acceleration a-max [m/s ²]	Min. travel time/stroke [ms]	Weight Ground Plate [g]	Weight comp.	Weight Total [g]
Lxu 40F60	40	60/180	2.0	180	40	750	350	1700
Lxu 80F60	80	60/180	2.8	140	60	950	350	1900
Lxu 160F60	160	60/180	3.7	110	85	1250	585	2200
Lxu 240F60	240	60/180	4.1	85	120	1650	-	2600
Lxu 320F60	320	60/180	4.1	70	140	1850	-	2900

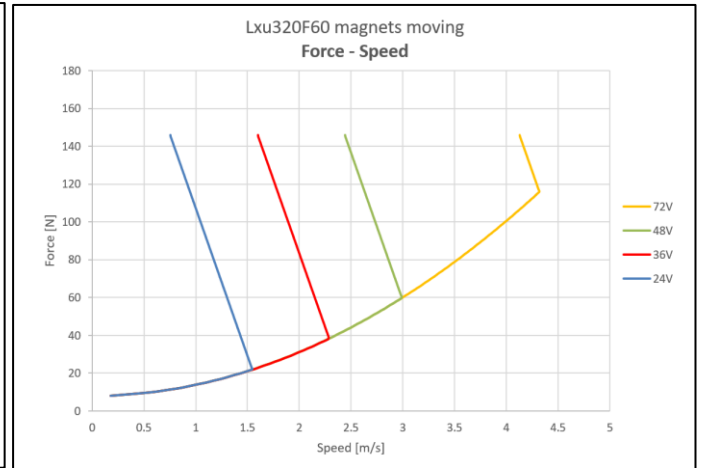
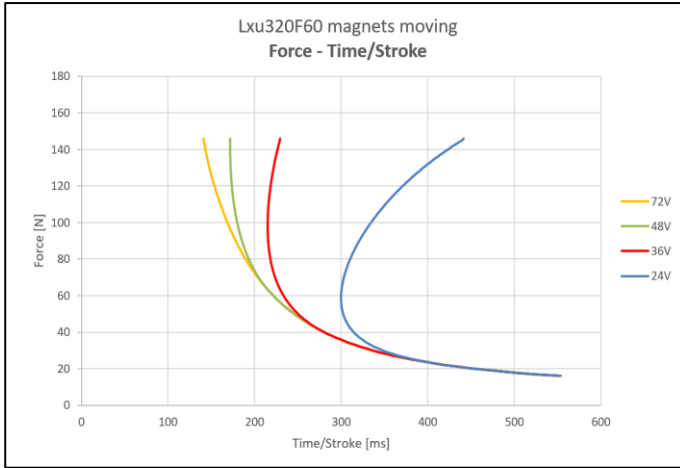
All values only valid with XENAX® Xvi and 20% S-Curve

* v-max corresponds to the maximum speed at acceleration a-max in the table. Higher speeds may be possible when the acceleration is reduced.

3.2.3 Power Supply, Speed Lxu 320F60 (Slider in Motion)



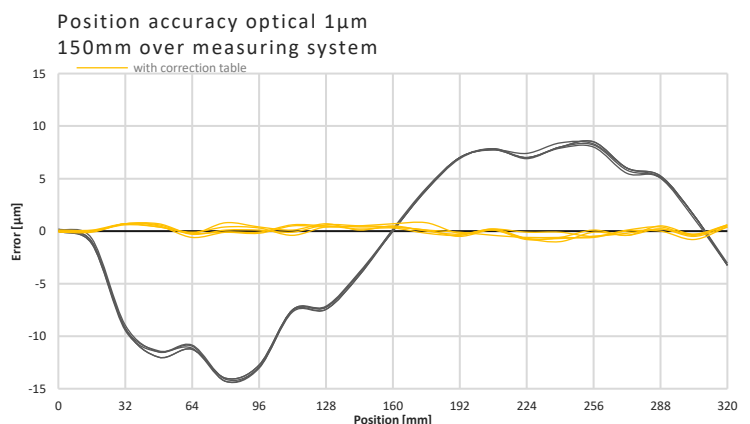
3.2.4 Power Supply, Speed Lxu 320F60 (Ground Plate in Motion)



3.3 Precision LINAX® Lxu

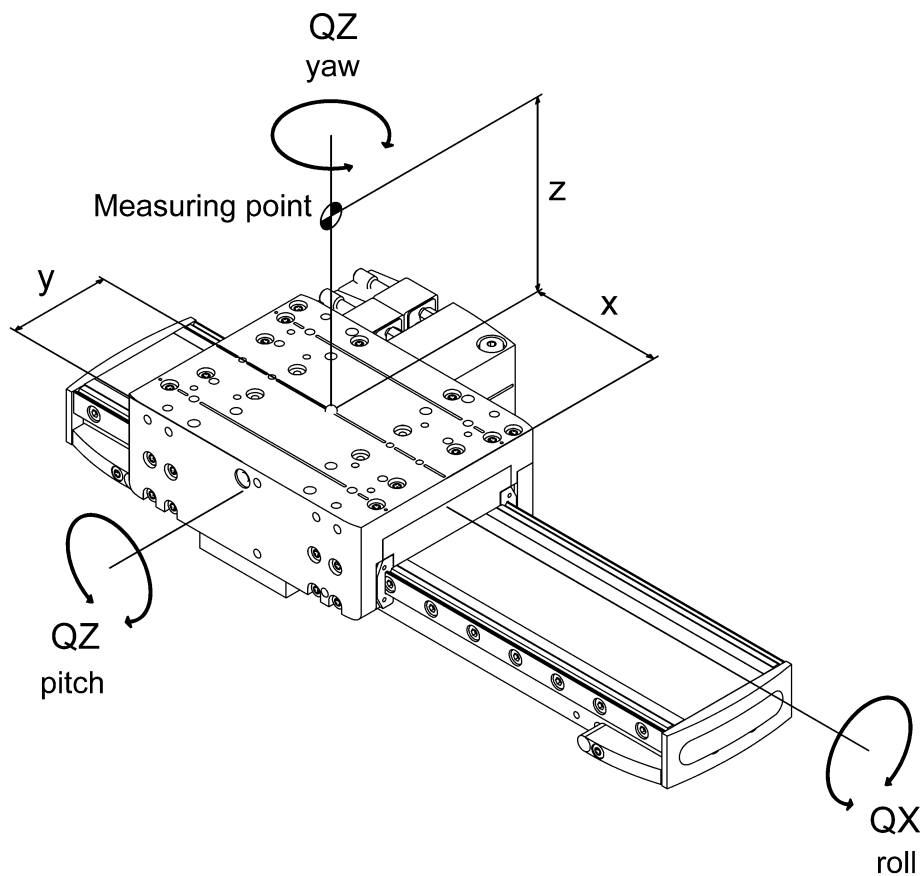
3.3.1 Positioning Lxu

Standard magnetic measuring scale	1µm / counter increment
Repeatability	< +/-5µm
Optional optical measuring scale	1µm / counter increment
Repeatability	< +/-2µm
Optional optical measuring scale with high resolution	100nm / counter increment
Repeatability	< +/-500nm
Linear expansion magnetic measuring scale	11µm/m/°C
Linear expansion optical measuring scale	8.5µm/m/°C
Reference	Automatic calculation of the absolute position through the distance coded reference marks, max 10mm with optical and max 40mm with magnetic measuring scale, direction of reference can be selected. The reference has to be completed only once after powering on the logic power (24V). The absolute position will be stored until the logic power is turned off (XENAX® Servo controller).
Mechanical zero point	It is located 1.5mm before the mechanical limit. This is where the slider is positioned on the right end while the cable case is in the front of the user.
Correction table for position errors with servo controller Xvi 48V8/75V8/75V8S	The XENAX® servo controller offers the possibility to correlate the encoder position with the actual position.



3.3.2 Guidings of Slider Lxu

Ball bearing guides are used for the LINAX® Lxu linear motors. This guiding system is maintenance free for 20'000km or five years as stated by the supplier. The LINAX® Lxu linear motor axes have following tolerances as a standard. These data is based on measures with linear motors free of load.



LINAX®	Running Accuracy horizontal EYX	Running Accuracy vertical EZX	Tilt Error QX (roll)	Tilt Error QY (pitch)	Tilt Error QZ (yaw)	Tolerance Constr. height
Lxu 40F60	±5µm	±4µm	±8as	±10as	±15as	±0,1mm
Lxu 80F60	±5µm	±4µm	±8as	±10as	±20as	±0,1mm
Lxu 160F60	±8µm	±5µm	±10as	±20as	±25as	±0,1mm
Lxu 240F60	±10µm	±5µm	±10as	±20as	±30as	±0,1mm
Lxu 320F60	±12µm	±6µm	±10as	±20as	±35as	±0,1mm

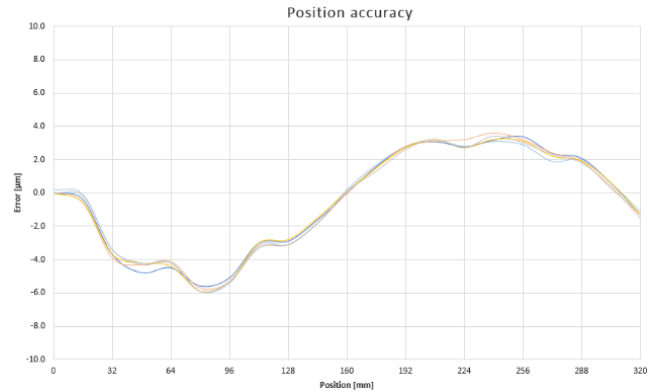
3.3.3 Typical measurement results LINAX® Lxu 320F60 of series production

Position accuracy

Resolution optical: 1 μm
 Absolute accuracy: ±5 μm

Repeatability forward: 0.6 μm
 Repeatability backward: 0.7 μm
 Repeatability bi-directional: 1.2 μm

Position accuracy 55mm over (Z) measuring system



Tilt error

QX roll: ±6.8 asec
 QY pitch: ±7.6 asec
 QZ yaw: ±15.2 asec

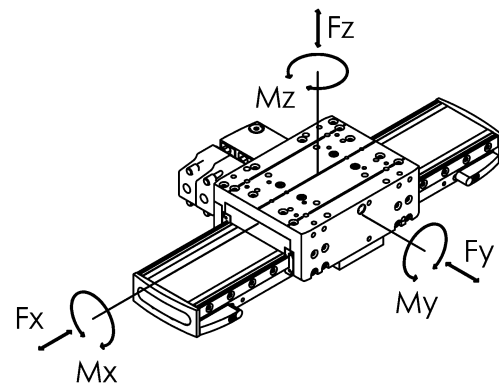


3.4 Stress Values of Guides Lxu

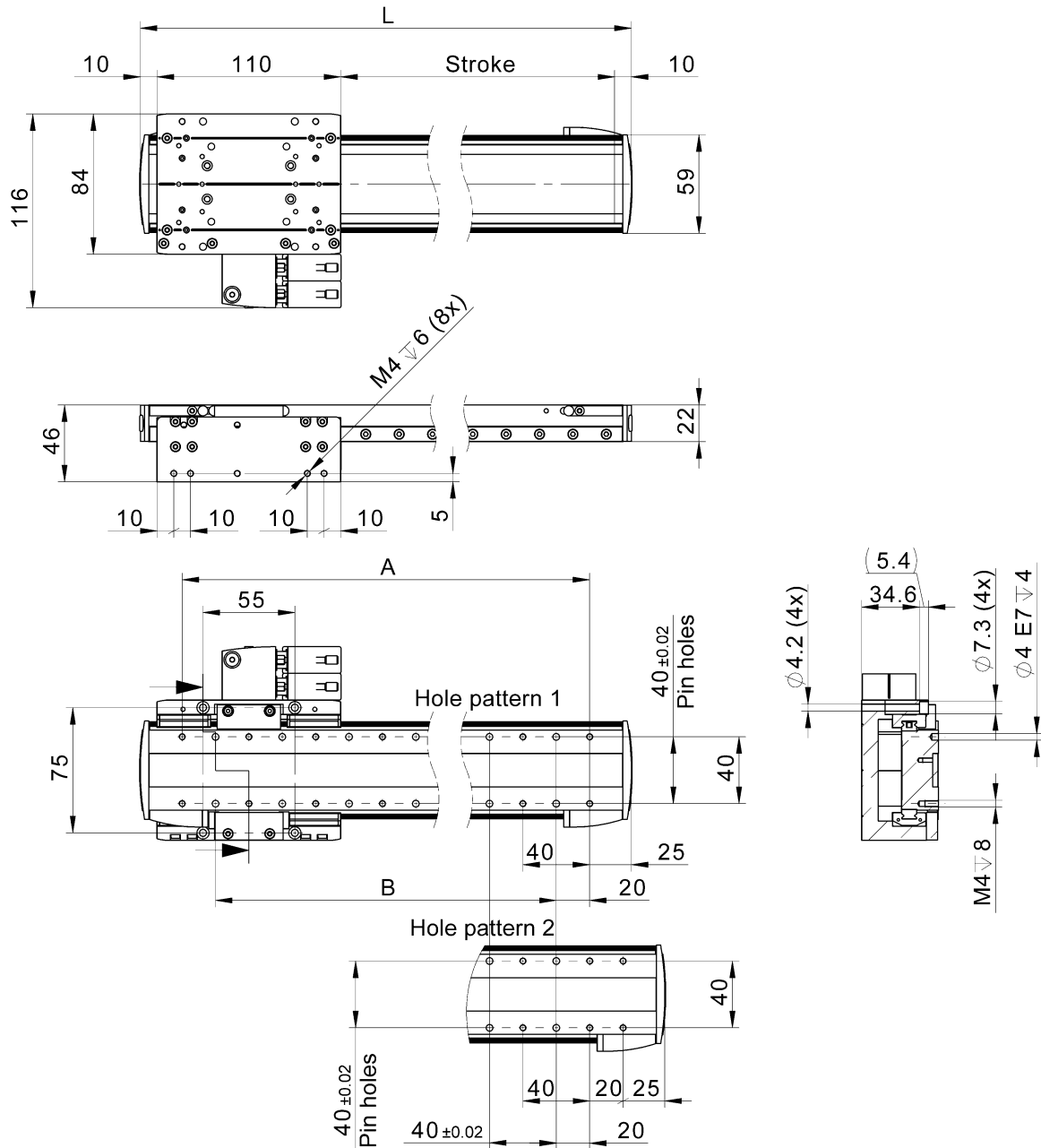
LINAX® Lxu	Mx max [Nm]	Fy max [N] Fz max [N]	My max [Nm] Mz max [Nm]
Lxu xxF60	149	5400	211

Besides adhering to the individual maximal loads, the following equation must comply if there are multiple forces and moments acting simultaneously on the linear motor:

$$\frac{|F_y|}{F_{y \max}} + \frac{|F_z|}{F_{z \max}} + \frac{|M_x|}{M_{x \max}} + \frac{|M_y|}{M_{y \max}} + \frac{|M_z|}{M_{z \max}} \leq 1$$

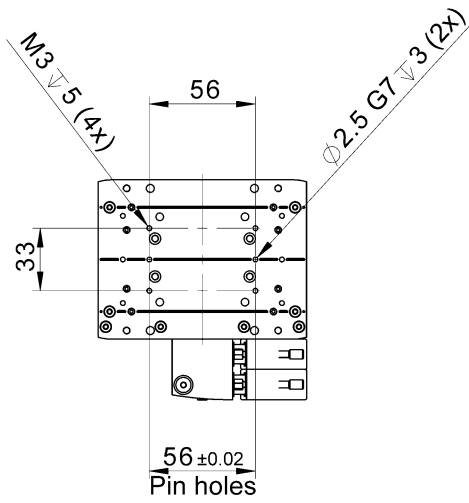


3.5 Installation Dimensions LINAX® Lxu 40 – Lxu 320

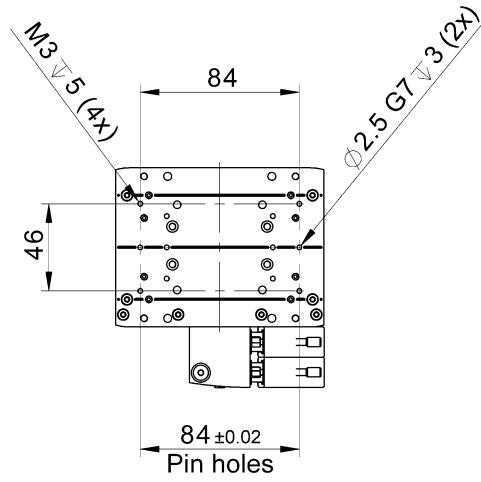


Type	Stroke[mm]	L[mm]	A[mm]	B[mm]	Hole pattern
Lxu 40F60	40	170	80	40	2
Lxu 80F60	80	210	160	120	1
Lxu 160F60	160	290	240	200	1
Lxu 240F60	240	370	320	280	1
Lxu 320F60	320	450	400	360	1

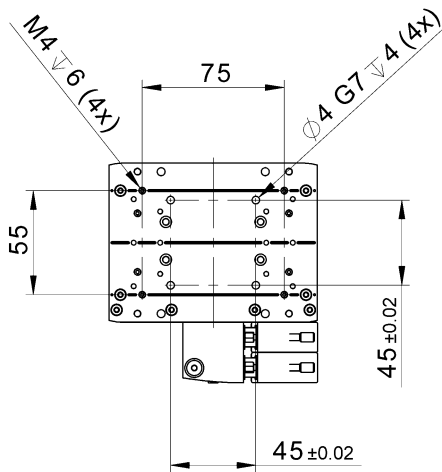
Cross table with Lxc F08 / F10 Monoblock



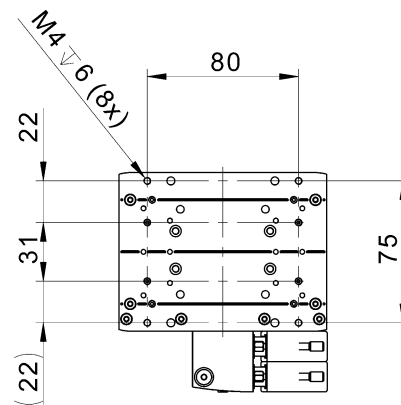
Cross table width Lxc F40 Monoblock



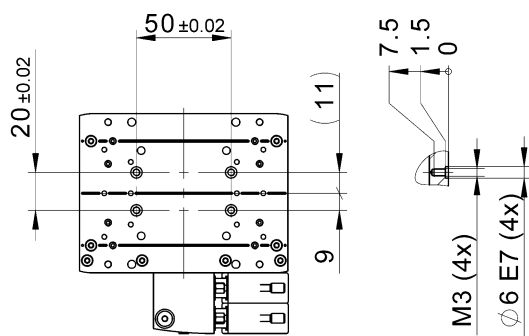
Cantilever with Lxu F60 slider (back to back)



Application with Lxu front flange



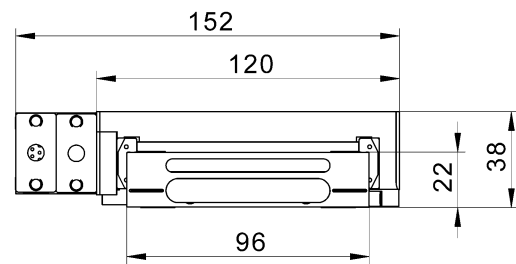
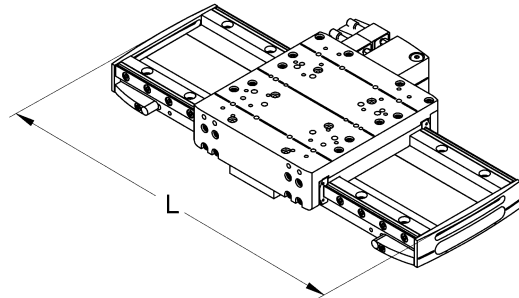
Cantilever with Ex F20



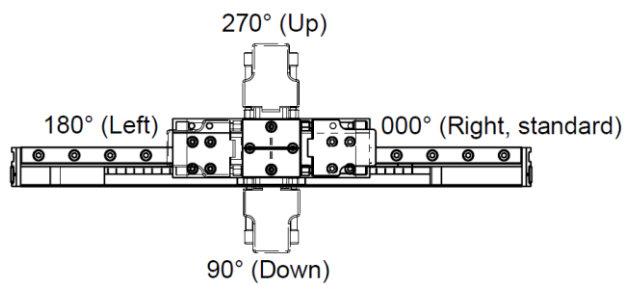
4 LINAX® Lxs F60

4.1 External Dimensions Lxs F60

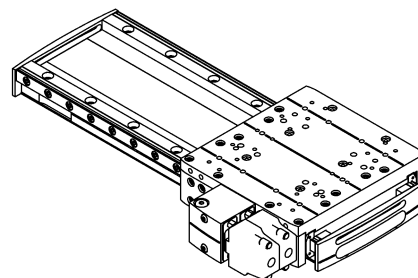
LINAX® Lxs	L [mm]
Lxu 160F60	290
Lxu 200F60	330
Lxu 320F60	450
Lxu 400F60	530
Lxu 520F60	650
Lxu 600F60	730
Lxu 800F60	930
Lxu 1000F60	1130
Lxu 1200F60	1330
Lxu 1600F60	1730



Lxs and Lxu
Rotary connector case in 90° pattern
Default cable connector directed to the right



Lxs absolute zero point according to REFERENCE:
Slider extended towards the connection cable



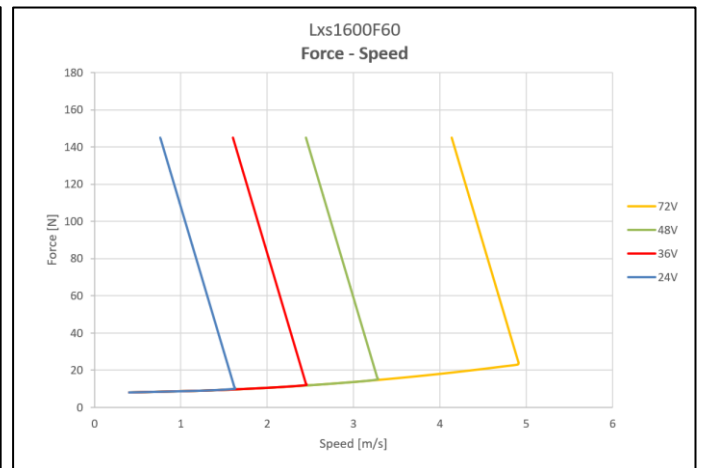
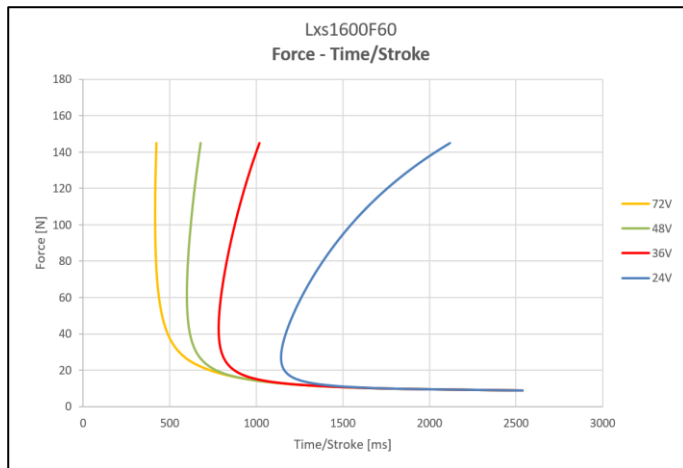
4.2 Dynamics LINAX® Lxs

LINAX®	Stroke [mm]	Force [N] nom./peak	Speed v-max* [m/s]	Acceleration a-max [m/s ²]	Min. travel Time/stroke [ms]	Weight Slider [g]	Weight Total [g]
Lxs 160F60	160	60/180	4.1	135	80	1000	2600
Lxs 200F60	200	60/180	4.1	135	90	1000	2800
Lxs 320F60	320	60/180	4.1	135	120	1000	3450
Lxs 400F60	400	60/180	4.1	135	140	1000	3900
Lxs 520F60	520	60/180	4.1	135	165	1000	4500
Lxs 600F60	600	60/180	4.1	135	185	1000	5000
Lxs 800F60	800	60/180	4.1	135	235	1000	6100
Lxs 1000F60	1000	60/180	4.1	135	285	1000	7200
Lxs 1200F60	1200	60/180	4.1	135	335	1000	8400
Lxs 1600F60	1600	60/180	4.1	135	435	1000	10600

All values only valid with XENAX® Xvi and 20% S-Curve

* v-max corresponds to the maximum speed at acceleration a-max in the table. Higher speeds may be possible when the acceleration is reduced.

4.2.1 Power Supply, Speed Lxs 1600F60

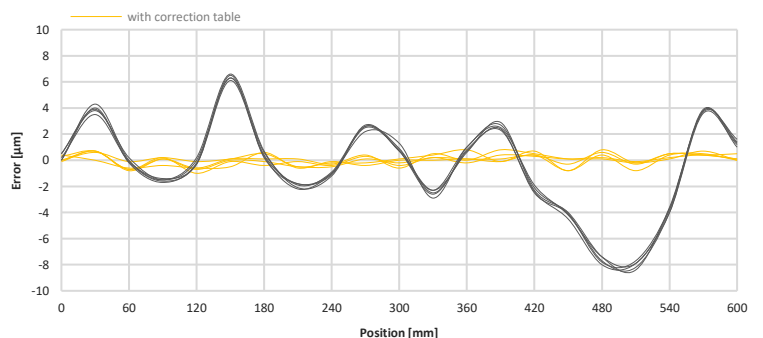


4.3 Precision LINAX® Lxs

4.3.1 Positioning Lxs

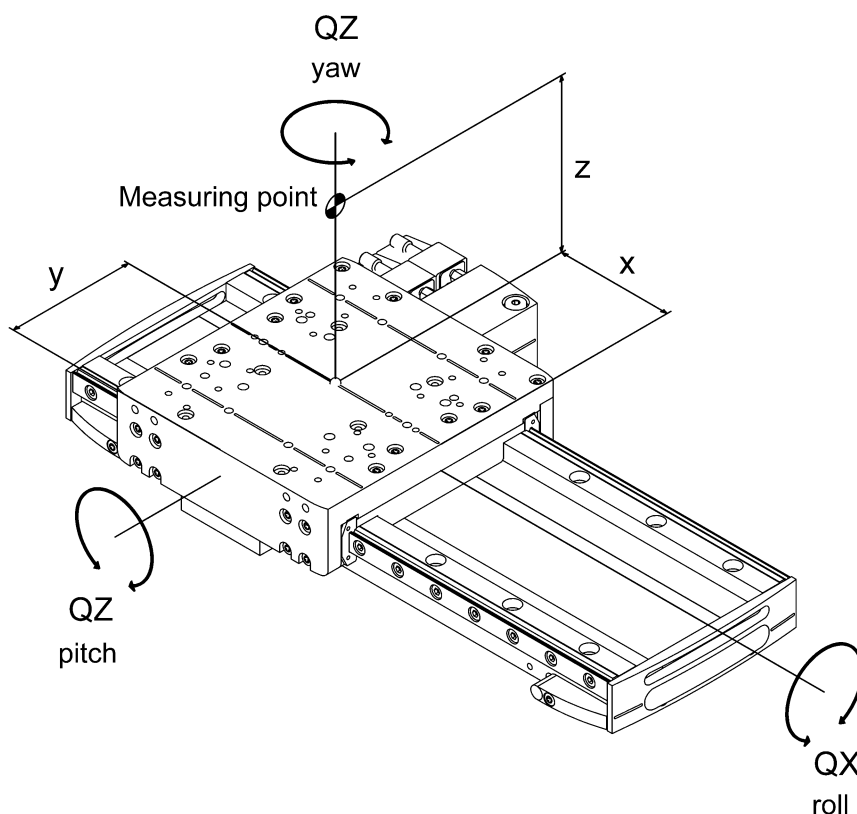
<p>Standard magnetic measuring scale Repeatability</p>	<p>1µm / counter increment < +/-5µm</p>
<p>Optional optical measuring scale Repeatability</p>	<p>1µm / counter increment, not available for Lxs 1600F60 < +/-2µm</p>
<p>Optional optical measuring scale with high resolution Repeatability</p>	<p>100nm / counter increment, not available for Lxs 1600F60 < +/-500nm</p>
<p>Linear expansion magnetic measuring scale</p>	<p>11µm/m/°C</p>
<p>Linear expansion optical measuring scale</p>	<p>8.5µm/m/°C</p>
<p>Reference</p>	<p>Automatic calculation of the absolute position through the distance coded reference marks; max 10mm by the optical scale max 40mm by the magnetic scale Lxs 160-600 max 60mm by the magnetic scale Lxs 800-1600 ,direction of reference can be selected. The reference has to be completed only once after powering on the logic power (24V). The absolute position will be stored until the logic power is turned off (XENAX® Servo controller).</p>
<p>Mechanical zero point</p>	<p>It is 1.5mm before the mechanical limit. This is where the slider is positioned on the right end while the cable case is in the front of the user.</p>
<p>Correction table for positionerrors with servo controller Xvi 48V8/75V8/75V8S</p>	<p>The XENAX® servo controller offers the possibility to correlate the encoder position with the actual position.</p>

Position accuracy optical 1µm
150mm over measuring system



4.3.2 Guidings of Slider Lxs

For the LINAX® Lxs linear motor axis, ball bearing guides are used. This guiding system is maintenance free for 20'000km or five years as stated by the supplier. The LINAX® Lxs linear motor axes have following tolerances as a standard. These data is based on measures with linear motors free of load.

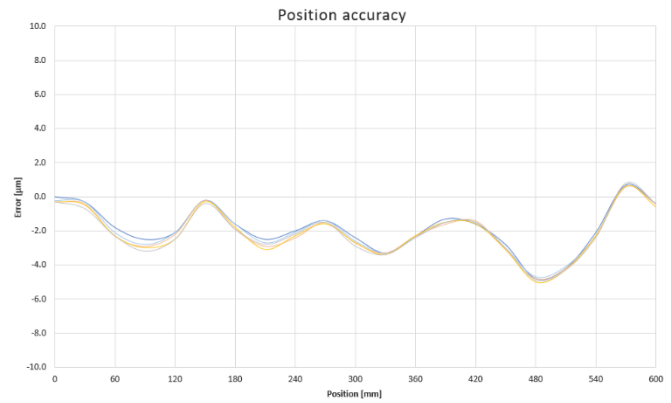


LINAX®	Running Accuracy horizontal EYX	Running Accuracy vertical EZX	Tilt Error QX (roll)	Tilt Error QY (pitch)	Tilt Error QZ (yaw)	Tolerance Constr. height
Lxs 160F60	±5µm	±3µm	±5as	±10as	±10as	±0,1mm
Lxs 200F60	±5µm	±3µm	±5as	±10as	±10as	±0,1mm
Lxs 320F60	±8µm	±4µm	±15as	±20as	±15as	±0,1mm
Lxs 400F60	±10µm	±4µm	±15as	±20as	±15as	±0,1mm
Lxs 520F60	±10µm	±4µm	±20as	±20as	±20as	±0,1mm
Lxs 600F60	±10µm	±5µm	±20as	±20as	±20as	±0,1mm
Lxs 800F60	±10µm	±7µm	±25as	±25as	±25as	±0,1mm
Lxs 1000F60	±12µm	±8µm	±30as	±25as	±25as	±0,1mm
Lxs 1200F60	±13µm	±9µm	±30as	±25as	±25as	±0,1mm
Lxs 1600F60	±16µm	±12µm	±35as	±30as	±30as	±0,1mm

4.3.3 Typical measurement results LINAX® Lxs 600F60 of series production

Position accuracy

Resolution optical: 1 μm
 Absolute accuracy: ±2.9 μm
 Repeatability forward: 0.7 μm
 Repeatability backward: 0.7 μm
 Repeatability bi-directional: 1.3 μm
 Position accuracy 50mm over (Z) measuring system



Tilt error

QX roll: ±4.7 asec
 QY pitch: ±6.9 asec
 QZ yaw: ±5.1 asec

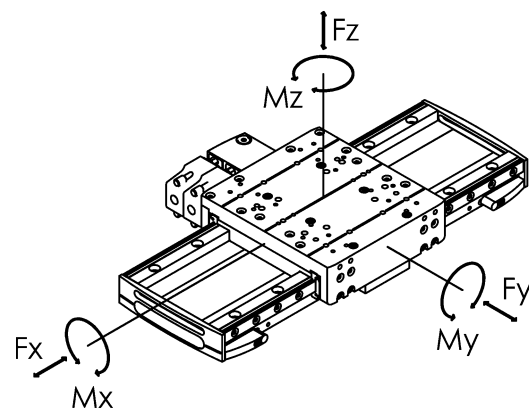


4.4 Stress Values of Guides Lxs

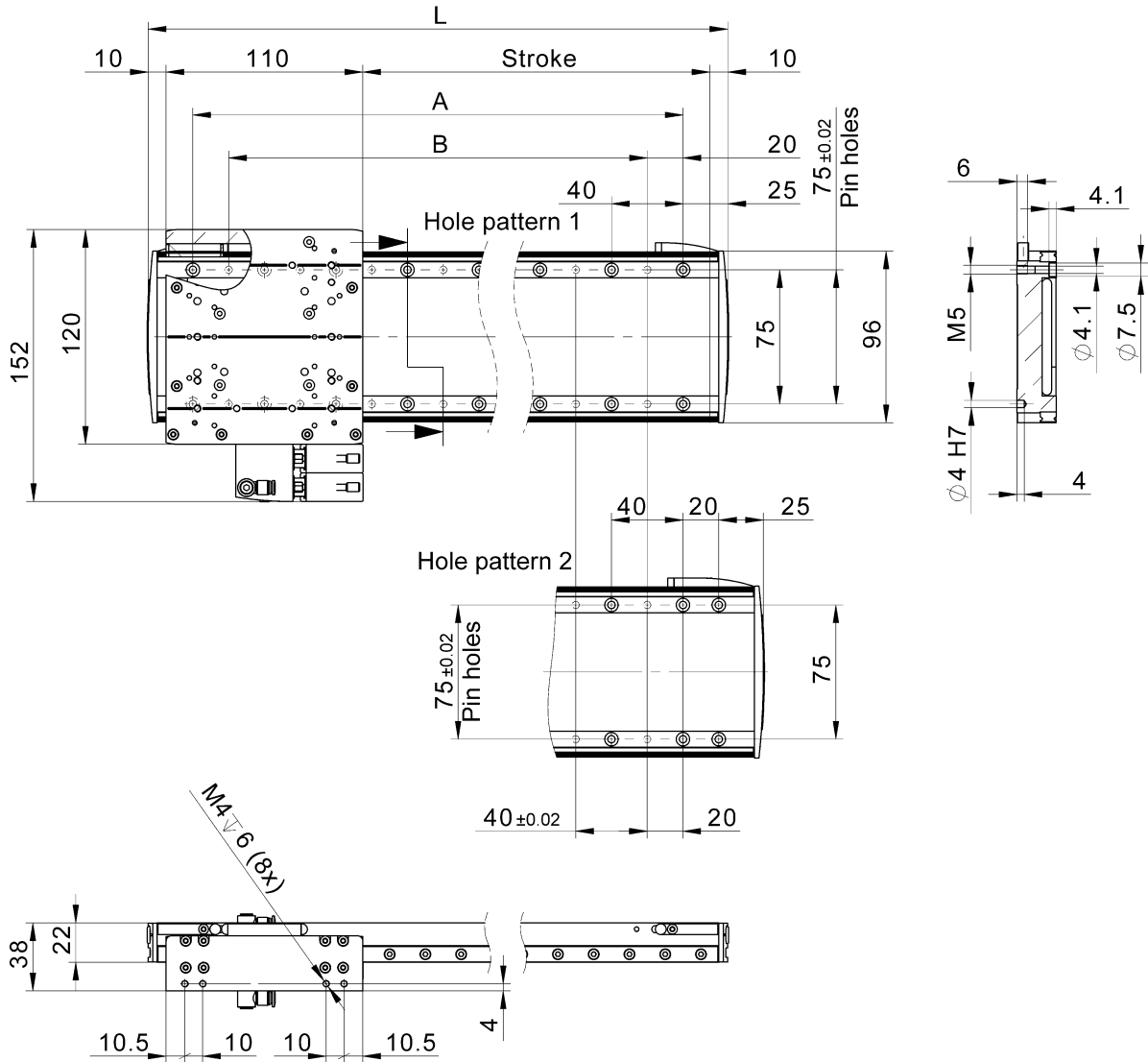
LINAX® Lxs	Mx max [Nm]	Fy max [N] Fz max [N]	My max [Nm] Mz max [Nm]
Lxs xxF60	243	5400	211

Besides adhering to the individual maximal loads, the following equation must comply if there are multiple forces and moments acting simultaneously on the linear motor:

$$\frac{|F_y|}{F_{y \max}} + \frac{|F_z|}{F_{z \max}} + \frac{|M_x|}{M_{x \max}} + \frac{|M_y|}{M_{y \max}} + \frac{|M_z|}{M_{z \max}} \leq 1$$

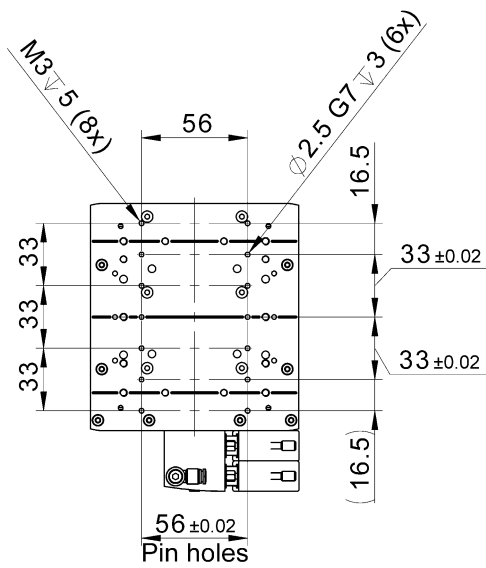


4.5 Installation Dimensions LINAX® Lxs 160 – Lxs 1600

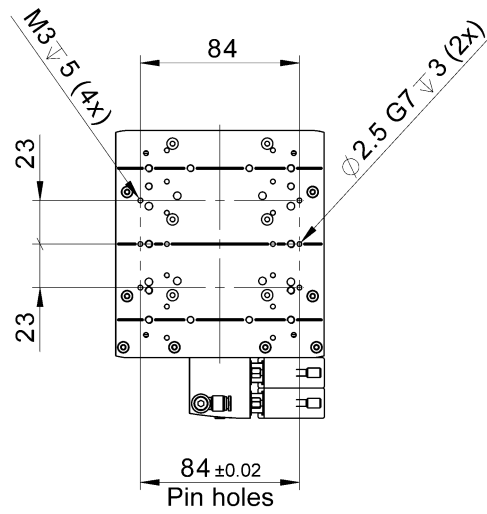


Type	Stroke[mm]	L[mm]	A[mm]	B[mm]	Hole pattern
Lxs 160F60	160	290	240	200	1
Lxs 200F60	200	330	240	200	2
Lxs 320F60	320	450	400	360	1
Lxs 400F60	400	530	480	440	1
Lxs 520F60	520	650	560	520	2
Lxs 600F60	600	730	640	600	2
Lxs 800F60	800	930	880	840	1
Lxs 1000F60	1000	1130	1040	1000	2
Lxs 1200F60	1200	1330	1280	1240	1
Lxs 1600F60	1600	1730	1680	1640	1

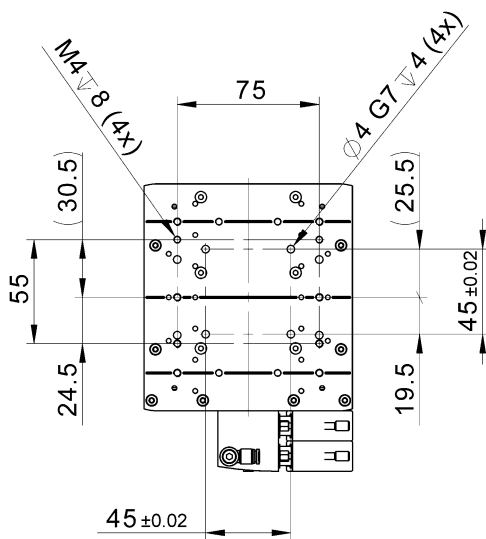
Cross table with Lxc F08 / F10 Monoblock



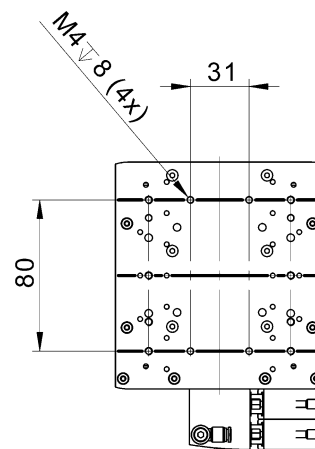
Cross table width Lxc F40 Monoblock



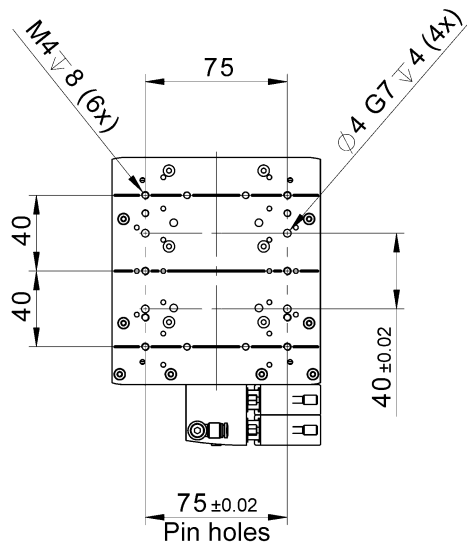
Cantilever with Lxu F60 slider (back to back)



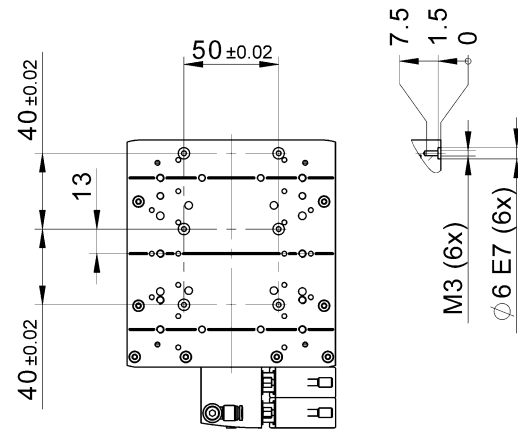
Application with Lxu front flange



Cross table with Lxs F60 Base plate



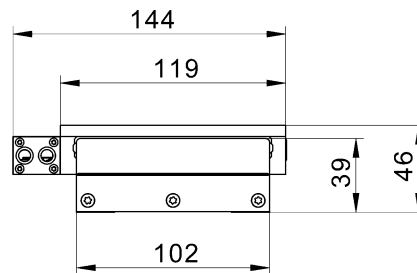
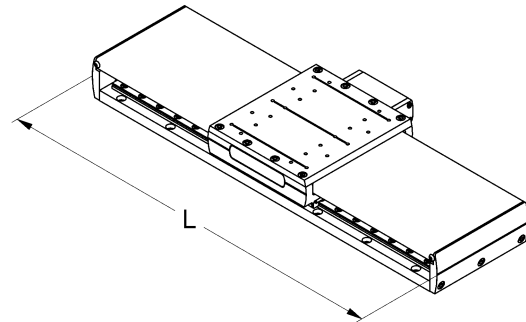
Cantilever with Ex F20



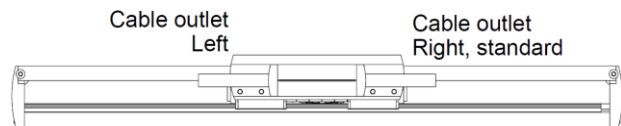
5 LINAX® Lxe F40

5.1 External Dimensions LINAX® Lxe F40

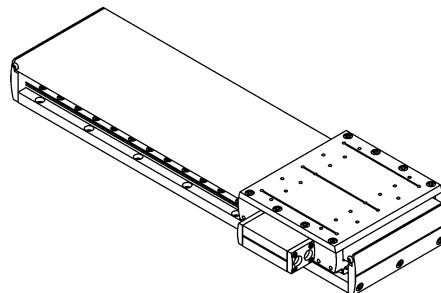
LINAX® Lxe	L [mm]
Lxe 250F60	386
Lxe 400F60	536
Lxe 550F60	686
Lxe 800F60	936
Lxe 1000F60	1136



Lxe
 Cable outlet to the left or right
 Default cable outlet to the right



Lxe absolute zero point according to REFERENCE:
 Slider extended towards the connection cable



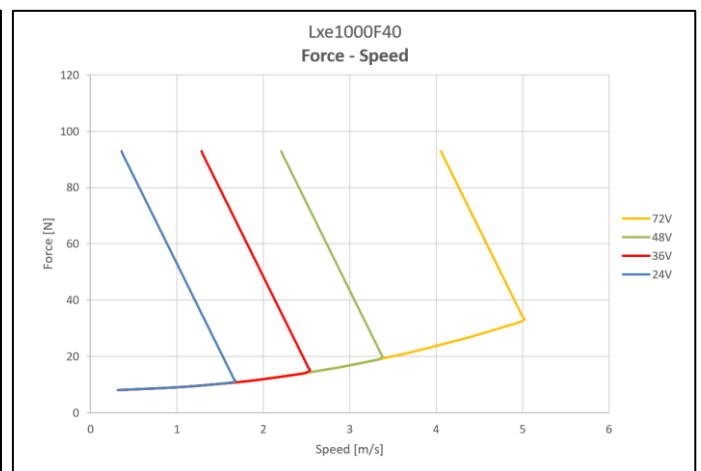
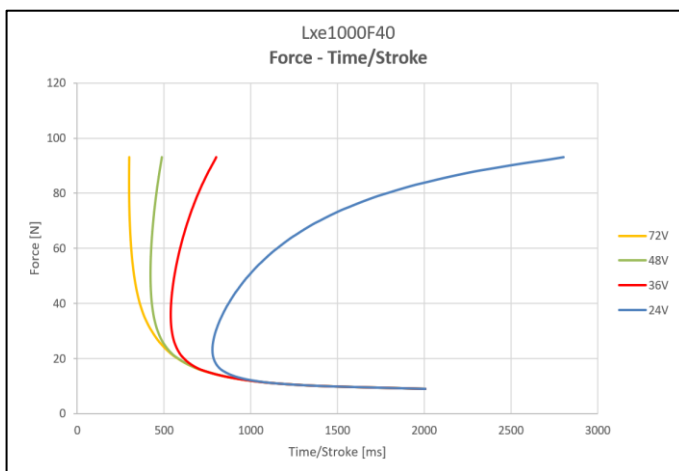
5.2 Dynamics LINAX® Lxe

LINAX®	Stroke [mm]	Force [N] nom./peak	Speed v-max* [m/s]	Acceleration a-max [m/s ²]	Min. travel Time/stroke [ms]	Weight Slider [g]	Weight Total [g]
Lxe 250F40	250	40/114	4.0	85	120	980	3080
Lxe 400F40	400	40/114	4.0	85	155	980	3850
Lxe 550F40	550	40/114	4.0	85	195	980	4620
Lxe 800F40	800	40/114	4.0	85	255	980	5900
Lxe 1000F40	1000	40/114	4.0	85	305	980	6930

All values only valid with XENAX® Xvi and 20% S-Curve

* v-max corresponds to the maximum speed at acceleration a-max in the table. Higher speeds may be possible when the acceleration is reduced.

5.2.1 Power Supply, Speed Lxe 1000F60



5.3 Precision LINAX® Lxe

5.3.1 Positioning Lxe

Standard resolution of optical measuring scale	1µm / counter increment
Repeatability	< +/-2µm
Optional optical measuring scale with high resolution	100nm / counter increment
Repeatability	< +/-500nm
Linear expansion optical measuring scale	8.5µm/m/°C
Reference	Automatic calculation of the absolute position through the distance coded reference marks, max 10mm, direction of reference can be selected. The reference has to be completed only once after powering on the logic power (24V). The absolute position will be stored until the logic power is turned off (XENAX® Servo controller).
Mechanical zero point absolute	1.5mm before the mechanical limit. This is where the slider is positioned on the right end while the cable case is in the front of the user.
Correction table for position errors with servo controller Xvi 48V8/75V8/75V8S	The XENAX® servo controller offers the possibility to correlate the encoder position with the actual position.

5.3.2 Guidings of Slider Lxe

For the LINAX® Lxe linear motor axis, ball bearing guides are used. This guiding system is maintenance free for 20'000km or five years as stated by the supplier. The LINAX® Lxe linear motor axes have following tolerances as a standard. These data is based on measures with linear motors free of load.

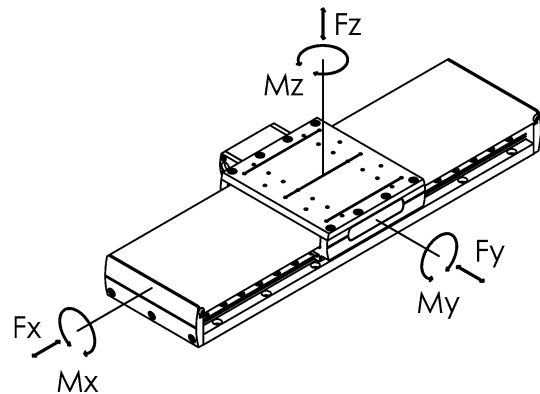
LINAX®	Running Accuracy horizontal EYX	Running Accuracy vertical EZX	Tilt Error QX (roll)	Tilt Error QY (pitch)	Tilt Error QZ (yaw)	Tolerance Constr. height
Lxe 250F40	±8µm	±5µm	±10as	±10as	±15as	±0,1mm
Lxe 400F40	±10µm	±8µm	±10as	±10as	±20as	±0,1mm
Lxe 550F40	±12µm	±8µm	±20as	±20as	±25as	±0,1mm
Lxe 800F40	±14µm	±10µm	±25as	±25as	±25as	±0,1mm
Lxe 1000F40	±16µm	±10µm	±25as	±25as	±30as	±0,1mm

5.4 Stress Values of Guides Lxe

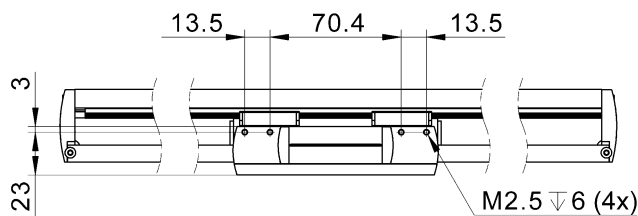
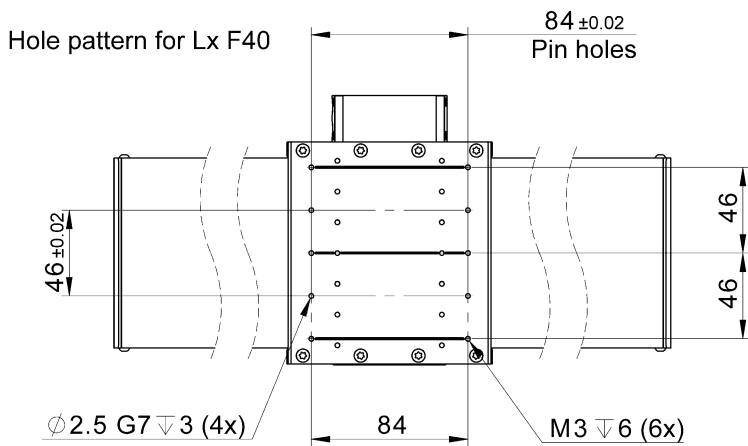
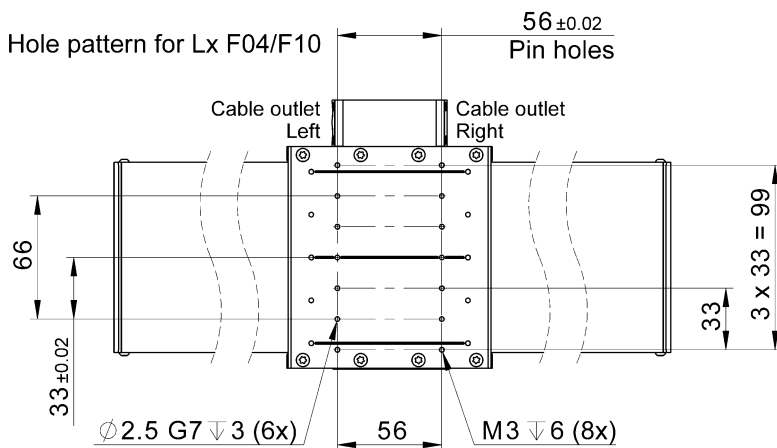
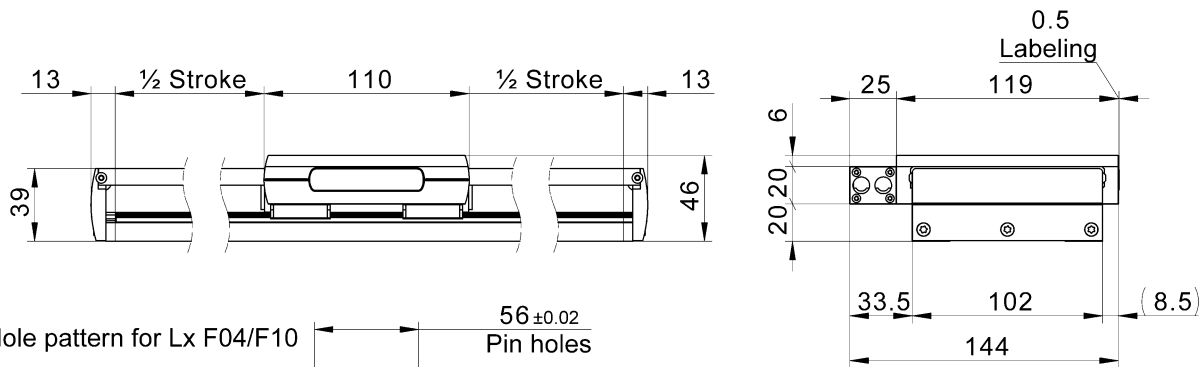
LINAX® Lxe	Mx max [Nm]	Fy max [N] Fz max [N]	My max [Nm] Mz max [Nm]
Lxe xxF40	205	5400	194

Besides adhering to the individual maximal loads, the following equation must comply if there are multiple forces and moments acting simultaneously on the linear motor:

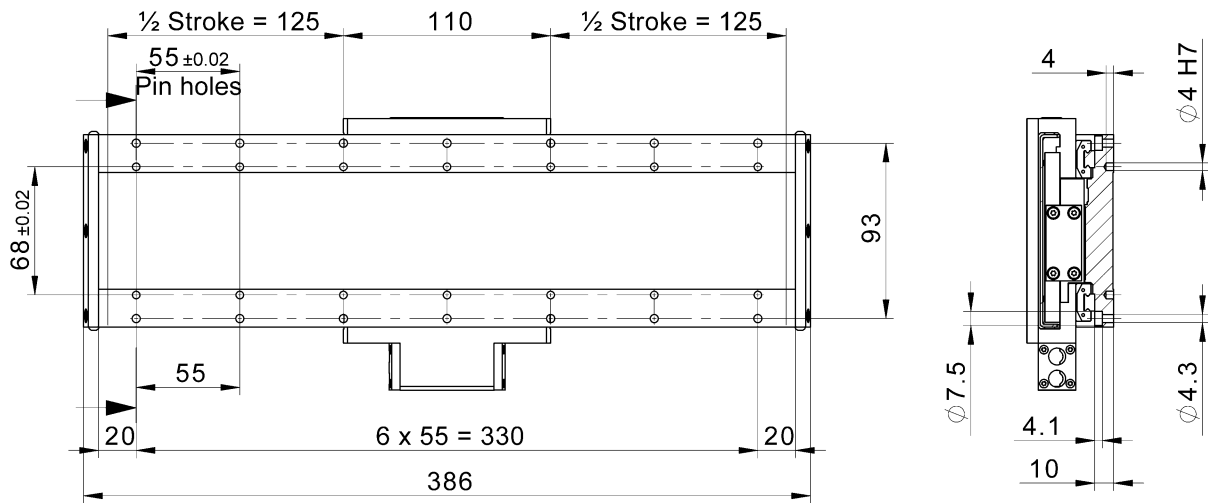
$$\frac{|Fy|}{Fy \max} + \frac{|Fz|}{Fz \max} + \frac{|Mx|}{Mx \max} + \frac{|My|}{My \max} + \frac{|Mz|}{Mz \max} \leq 1$$



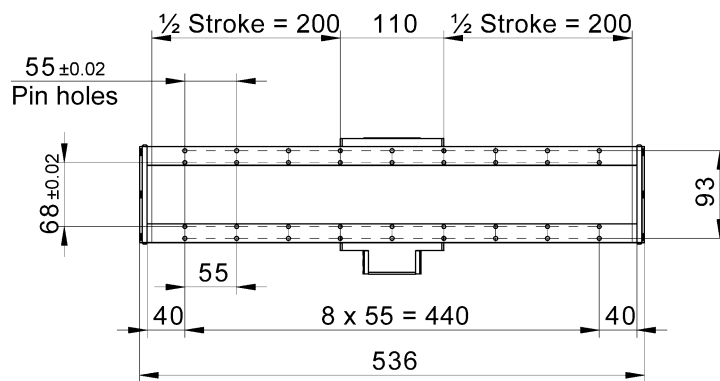
5.5 Dimensions LINAX® Lxe



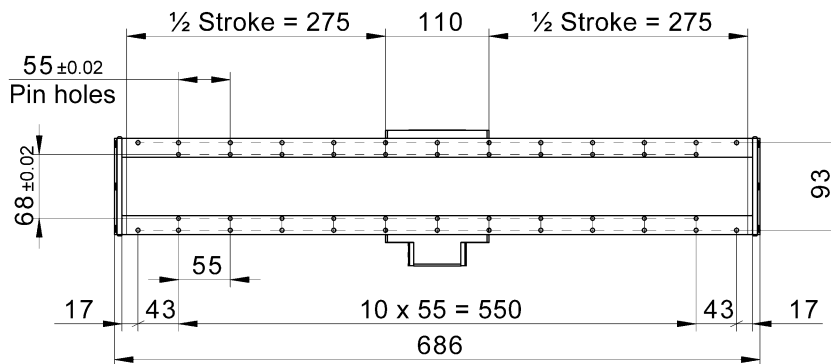
5.5.1 Installation Dimensions LINAX® Lxe 250F40



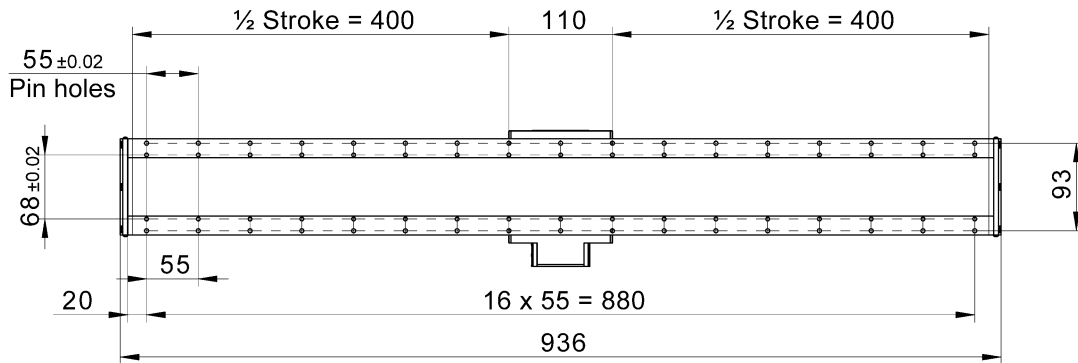
5.5.2 Installation Dimensions LINAX® Lxe 400F40



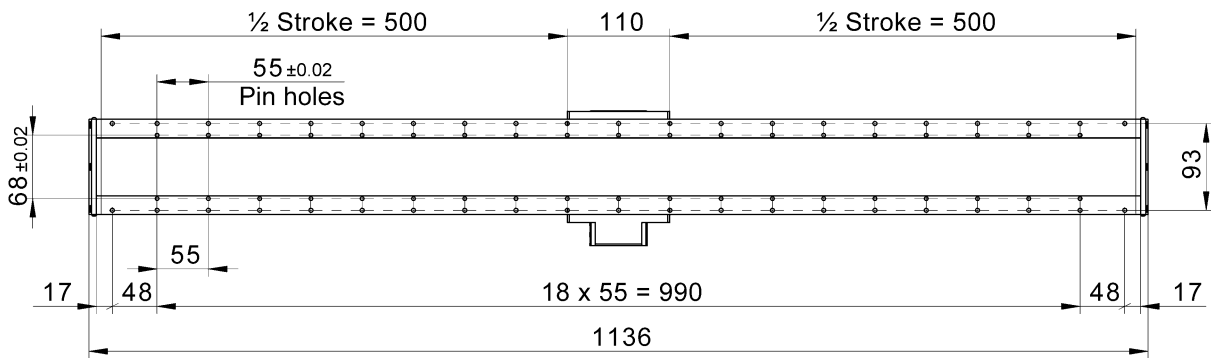
5.5.3 Installation Dimensions LINAX® Lxe 550F40



5.5.4 Installation Dimensions LINAX® Lxe 800F40



5.5.5 Installation Dimensions LINAX® Lxe 1000F40



6 Weight Compensation

In case of power interruption the motor of the LINAX® linear motors becomes powerless. If the axis is mounted vertically, the slider falls downwards. The optional available weight compensation can prevent this. If the XENAX® Xvi Servo Controller is connected and the logic power remains under power (e.g. emergency stop) the coils are shorted. The linear motor which acts as generator brakes the drive. The weight compensation will avoid that the slider is moving constantly downwards.

When compared to a simple brake, a further great advantage of the weight compensation is the relief of the vertical linear motor. With the weight compensation the motor operates weightlessly and heats much less. This savings in energy can be re-used for higher dynamics.

6.1 Weight Compensation STEP CAD Data

CAD drawings can be downloaded as .STEP files from www.jennyscience.ch.

6.2 Weight Compensation Lxc 44F08

The weight compensation for the compact Lxc 44F08 linear motor axis is available in the version with spring force and with compressed air.

The weight compensation with spring force can be equipped with 4 different springs for external payloads of **0-200g, 200-400g, 400-600g and 600-900g.**



6.3 Weight Compensation Lxc 85F10, Lxc 80F40, Lxc 176F40

The weight compensation is mounted on the right side and is based on air pressure while there is no air consumption. With a customary air pressure regulator e.g. Festo "VRPA" the compensation force can be adjusted until the weight of the slider and the payload are fully compensated. If there is power interruption the slider remains in position or moves slowly upward depending on the adjustment of the air pressure regulator. The weight compensation for the Lxc 85F10 can also be mounted on the right side.



6.4 Weight Compensation Lxu 40F60, Lxu 80F60, Lxu 160F60

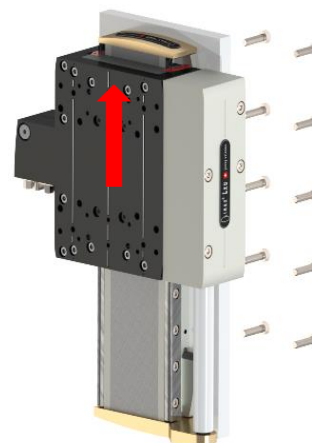
This weight compensation for the Lxu axis is also based on air pressure, while there is no air consumption. The air connection of weight compensation is located on the connector case to save room and to keep cables one-sided. With a customary air pressure regulator e.g. Festo "VRPA" the compensation force can be adjusted until the slider holds position or moves upwards in case of power interruption.



Effective direction of weight compensation with moving ground plate.

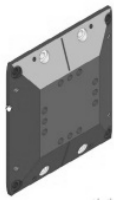


Effective direction of the weight compensation with moving the slide.

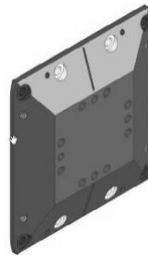


7 Front Flange Connections LINAX® Lxu

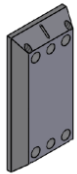
There can be mounted a further Lxu or a Lxc linear motor axis on the front of the LINAX® Lxu. If the front plate is removed, the front flange Lxu can be mounted with 4 screws and 2 centering pins. These front flanges can be rotated, mounted and centred in a 90° pattern (except from ELAX®).



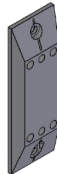
Lxu-Lxc F08/F10



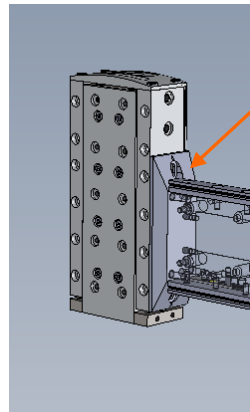
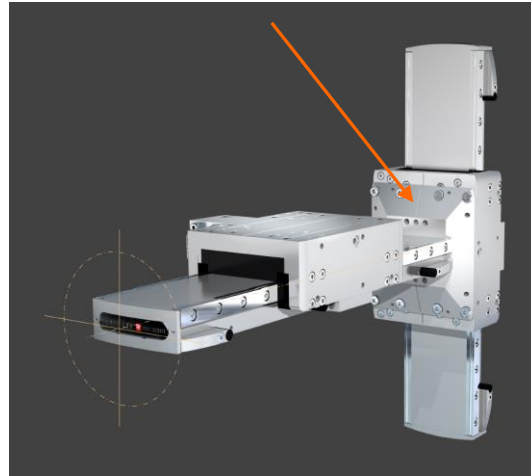
Lxu-Lxu
Lxu-Lxc F40



Lxu-Elax flat



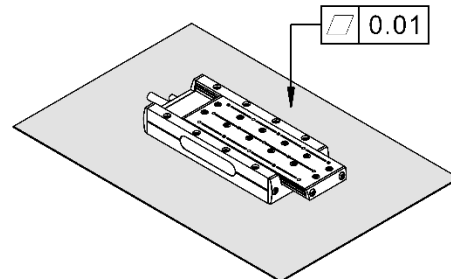
Lxu-Elax upright



8 Installation, Important Instructions

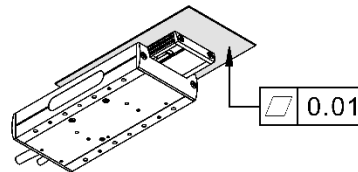
8.1 Straightness for Mounting on Ground Plate

If the LINAX® linear motor axes are mounted on a ground plate, it has to have a straightness of 0.01mm. If the straightness is out of this tolerance, the LINAX® linear motor axis can be distorted when screwed to the ground plate which might cause the guidings to seize. This increases the wear and tear, reduces the lifespan and might even destroy the guiding system



8.2 Straightness for Mounting on Slider

These same conditions hold true for components that are mounted on the slider of the LINAX® linear motor axis. The contact surface has to have a straightness of 0.01mm.



8.3 Straightness Practical Test

Before mounting the ground plate or the slider, please test how smooth the slider can be moved by hand. After tightening the screws, move the slider again by hand. There should not be any noticeable changes in smoothness, otherwise the contact surfaces have to be revised.

8.4 Power Supply

The typical POWER supply is 24V DC. For the stronger LINAX® F40 / F60 axes with high masses (>2kg) or high dynamics (>1.5m/s) a POWER supply of 48V or 72V DC is applicable. The current consumption per axis can be up to 8A and 18A peak per axis. Depending on mass in motion, profile and power supply voltage.

LINAX® TYP	I _{COMMUTATION} [A]	I _{MAX} [A]
LINAX® Lxc F08	6.1	7.0
LINAX® Lxc F10	5.5	9.2
LINAX® Lx F40	6.0	10.9
LINAX® Lx F60	8.0	15.7

For a fuse protection of the power supply it must be considered that a short peak current of 8A can be reached for the rotating field adjustment.

For a detailed calculation of the required power supply in your application, please contact our support <https://www.jennyscience.ch/en/contact/support>.

9 Maintenance, Lifespan

9.1 Lubrication of LINAX® Lxc Types

The initial lubrication through Jenny Science prior to delivery should be sufficient for multiple years, depending on the operational demands of the linear motor.

The LINAX® Lxc series with cross roll cages are force centered through gear pinions and gear rods. The lubrication intervals depend on multiple parameters, such as operational demands, dynamics, operational temperature, pollution etc. Preventively we suggest to lubricate the bearing rails every 12 months. For this we recommend the dosage pistol incl. Lubricating cartridge.

155.00.10 VA Dosage pistole for lubrication
155.00.11 VA Cartridge with standard lubricant



9.2 Lifespan Expectations LINAX® Lxc Types

The LINAX® linear motor axes operate without wear and tear and without loss in accuracy over time. Generally speaking the mechanical guiding system is the determining factor for life span.

The LINAX® Lxc linear motor axes have cross roll guides with the favourable linear support. These types of guides are precise, robust and low-maintenance. The LINAX® Lxc cross roll guiding cages are centered with racks and pinions. According to our experiences a lifespan of over 100 Mio cycles can be achieved at medium strain, good maintenance and without external dirt particles.



9.3 Lubrication of LINAX® Lxu, Lxs, Lxe Types

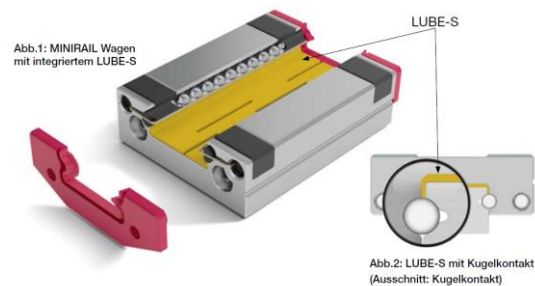
For the Lxu, Lxs and Lxe types we use ball bearing guides with integrated permanent lubrication.

For the older LINAX® models re-lubrication was completed with a lubricant filled syringe in order to refill the internal lubrication reservoir. Depending on dynamics the re-lubrication was suggested every 12 months.



The most recent used guiding carriages are maintenance free and no re-lubrication is necessary. The reservoir at the inside of the carriages lubricates all the balls automatically. Even for short-stroke applications lubrication is ensured.

Long term lubrication system integrated!



9.4 Lifespan Expectations Lxu, Lxs, Lxe Types

The guiding carriages have an integrated lubrication reservoir as a standard.

We recommend to re-lubricate the guiding system every 5'000km.

Important: If the guiding rails are cleaned, it has to be re-lubricated afterwards otherwise the lubricant in the reservoir might be used up and the guiding rails might run dry.

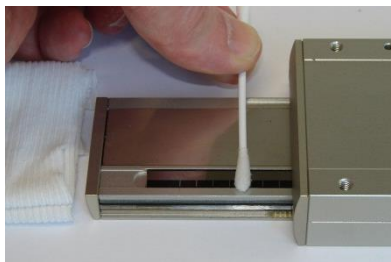
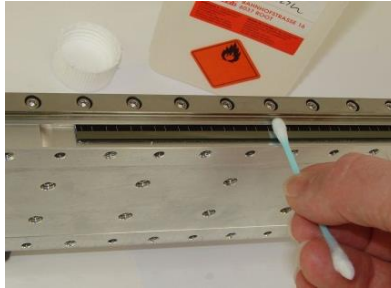
9.5 Lifespan Extending Measures

- Program trajectories with curve profile instead of trapezoidal profiles (XENAX® servo controller, default S-curve profile = 20%).
- Dynamics should only be as high as necessary.
- Movements which are not cycle time relevant can be executed slower.
- Prevent that dirt particles get into guiding rails and guiding carriages.
- Clean and lubricate guiding beams every 12 months.

9.6 Cleaning Glass Scale

After mechanical mounting or if there is visible dirt, the glass scale should be cleaned thoroughly. Please do not touch glass scale afterwards.

If there is error „54, LINAX® measuring head signal too weak” the glass scale is contaminated and signal errors might occur. Use cotton swab or lint-free cloth with thin fluid and de-greasing detergent. E.g. cleaning alcohol from drugstore or pharmacy.



10 Safety, Environment

10.1 Safety with XENAX® Servocontroller

EN 61000-6-2:2005
Electromagnetic compatibility (EMC),
Immunity for industrial environments

EMC Immunity Testing, Industrial Class A

EN 61326-3-1
IFA:2012
EN 61326-1, EN 61800-3, EN 50370-1

Immunity for Functional Safety
Functional safety of power drive systems
Electrostatic discharges ESD, Electromagnetic Fields,
Fast electric transients Bursts, radio frequency common
mode

EN 61000-6-3:2001
Electromagnetic compatibility (EMC),
Emission standard for residential,
commercial and light-industrial
environments

EMC Emissions Testing, Residential Class B

EN 61326-1, EN61800-3, EN50370-1
IFA:2012

Radiated EM Field, Interference voltage
Functional safety of power drive systems

10.2 Environment Conditions

Storage and transport

No storage outside. Storage rooms have to be well-ventilated and dry. Storage temperature from -25°C bis +55°C

Operating temperature

5°C -50°C environment, after 40°C performance reduction

Operating humidity

10-90% non-condensing

Cooling

No external cooling needed.

Dynamics can possibly be increased by mounting the slider case on a thermoconductive ground plate.

Protection

IP 40

Note

This data sheet contains copyright protected information. All rights are reserved. This document may not be in its entirety or partially copied, duplicated or translated without the prior consent of Jenny Science AG.

Jenny Science AG grants no guarantee on, or will be held responsible for, any incidents resulting from false information.

Information in this instruction manual is subject to change.

Jenny Science AG
Sandblatte 7a
CH-6026 Rain, Schweiz

Tel +41 (0) 41 455 44 55
Fax +41 (0) 41 455 44 50

www.jennyscience.ch
alois.jenny@jennyscience.ch

© **Copyright Jenny Science AG 2021**