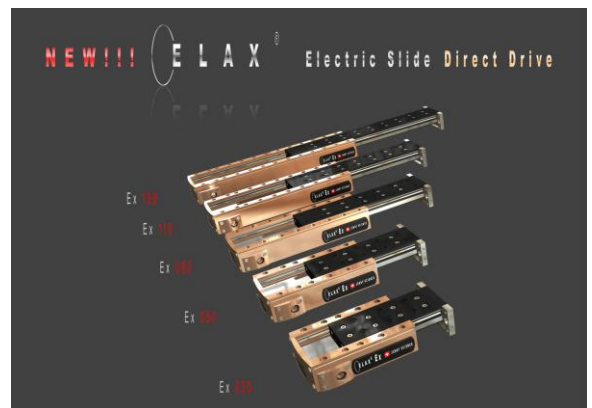


Product Overview

Version 3.3 / October 2015

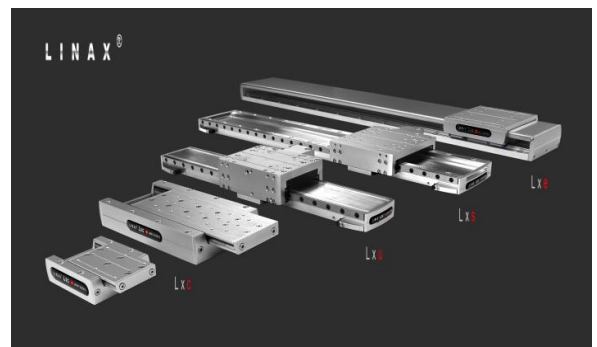
With this product overview you can assemble the appropriate components for your application in a fast and simple way. You keep the overview of all types with all possible options and cabling requirements.

New!!! ELAX® Electric Slide



LINAX® Linear Motor Axes

- Lxc c = compact
- Lxu u = universal
- Lxs s = shuttle
- Lxe e = exclusive



XENAX® Servo Controllers

- Xv 50V6
- Xvi 75V8



Commercial Products

- Servo Motors
- MC464 TrioMotion



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Content

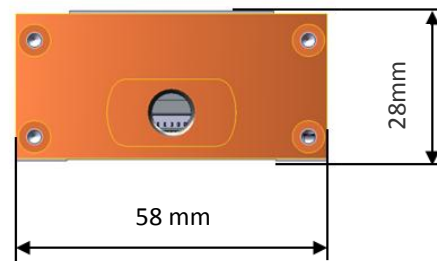
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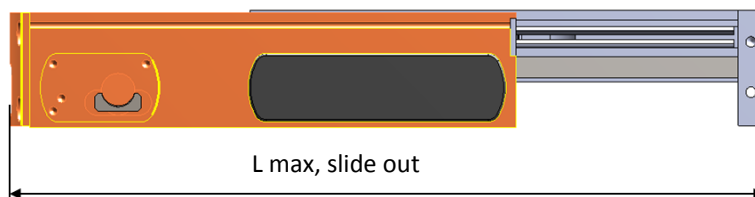
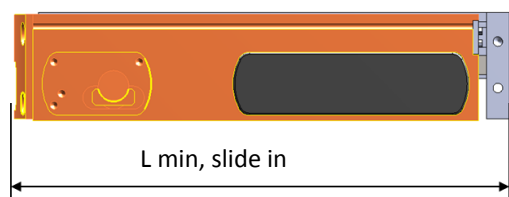
1 ELAX® Electric Linear Motor Slide



ELAX® is the evolutionary step of the widespread pneumatic slides. The great accomplishment is the patented compact integration of the linear motor in the slider case, resulting in a force/volume ratio which has hitherto never been achieved. A further essential key factor for future oriented automation solutions with ELAX® are the components with direct screw connections, the flexible one-cable connection and the function “force calibration” with which you can control, limit and monitor forces – no need for an additional force sensor.



ELAX® data sheets and CAT data (STEP) can be downloaded from www.jennyscience.ch



Type	Stroke [mm]	Force Fn/Fp [N]	Weight slide/Tot. [g]	L min [mm]	L max [mm]	Art. No
Ex 30F20	30 (1.18")	20/60 (4.5/13.5 lbf)	195/560 (0.43/1.23 lbs)	110 (4.33")	140 (5.51")	16 00 00
Ex 50F20	50 (1.97")	20/60 (4.5/13.5 lbf)	265/630 (0.58/1.39 lbs)	130 (5.12")	180 (7.09")	16 01 00
Ex 80F20	80 (3.15")	20/60 (4.5/13.5 lbf)	340/780 (0.75/1.72 lbs)	178 (7.01")	258 (10.16")	16 02 00
Ex 110F20	110 (4.33")	20/60 (4.5/13.5 lbf)	415/945 (0.91/2.08 lbs)	208 (8.19")	318 (12.52")	16 03 00
Ex 150F20	150 (5.90")	20/60 (4.5/13.5 lbf)	490/1110 (1.08/2.45 lbs)	268 (10.55")	418 (16.46")	16 04 00

Magnetic measurement system with 1µm resolution and accuracy +/- 10µm

Note: LINAX® Lxc option cleanroom, food industry and pharmaceutical industry

The LINAX® Lxc can be mounted in clean room standard with additional charge of 10%. The ball bearing carriages are filled with a special lubrication. If you wish to use this option, please add the note „**OPTION CLEANROOM/FOODINDUSTRIE/AND PHARMACEUTICAL INDUSTRY**” (depending on your requirement) on your purchase order.



Cable Connection		Art. No
Ex F20	Cable connection mounted on the left side *)	36 05 00



* cable connection on the side not possible for vertical axes with weight compensation.

1.1 Connecting Cable ELAX®

With ELAX® the cables are directly mounted into the linear motor case in favor of the compactness. The flexible one-cable connection is absolutely revolutionary which significantly simplifies the machine cabling. The cable is mounted on the back of the linear motor slide by default. **Optionally the cable can be mounted on the left side.**



In just one cable there are the wires for encoder, the 3 phases for the linear motor and for the communication between ELAX® and XENAX® servo controller. The anthracite colored **TPU** connection cables are clean room capable and as a standard length of 1.5m on stock available. Custom lengths from 0.1 up to 20m can be supplied upon request. These connection cables have a min bending radius of **40mm** for moving cables and **16mm** for fixed cables. Diameter: 8mm.



As an option, extension cables are also available.

Connecting Cable shielded, suitable for cable chain	Length [m]	*) Linear Motor Type	15 Pol D-Sub Connector and 3 Pol Wago 3,5mm Art. No
ELAX® anthracite, TPU, Clean Room 5-6 Operating temp. -40°C up to + 80°C, Ø 8mm	1.5	Ex 30F20 Ex 50F20 Ex 80F20 Ex 110F20 Ex 150F20	50 51 30 50 51 35 50 51 40 50 51 45 50 51 50
	> 1.5-20 (custom)	Ex 30F20 Ex 50F20 Ex 80F20 Ex 110F20 Ex 150F20	50 51 XX

*) Each type of linear motor slide has internally a different cable strip length; therefore they all have a different article identification number.

Connecting Cable prepared for extension shielded, suitable for cable chain	Length [m]	Type Electric Slide *)	15 Pol D-Sub connector (2 rows) Art. No
ELAX® anthracite, with 15 Pol D-Sub connector (2 rows), TPU, clean room 5-6 Operating temp. -40°C up to + 80°C Ø 8mm	1.5	Ex 30F20 Ex 50F20 Ex 80F20 Ex 110F20 Ex 150F20	50 52 30 50 52 35 50 52 40 50 52 45 50 52 50
	> 1.5-20 (custom)	Ex 30F20 Ex 50F20 Ex 80F20 Ex 110F20 Ex 150F20	50 52 XX

*) Each type of electric slide has internally a different cable strip length; therefore they all have a different article identification number.

1.2 Extension Cable Removable ELAX®

Extension cables are also useful for highly dynamic multi axis applications with cable chains. The replaceable extension cable is plugged onto a connecting cable. These anthracite **TPU** extension cables have a min. bending radius of **40mm for moving cables** and **16mm for fixed cables**.



Extension cable, shielded, suitable for cable chain	Length [m]	15 Pol D-Sub jack, 15 Pol D-Sub connector (2 rows) and 3 Pol Wago 3,5mm Art. No.
ELAX® anthrazit, TPU, Clean Room 5-6 Operating temp. -40°C up to + 80°C Ø8mm	1.5	50 56 01
	> 1.5-20 (custom)	50 56 XX

1.3 Vertical Weight Compensation ELAX®

In case of power interruption the linear motor of the ELAX® linear motor slides is powerless. If the axis is applied vertically, the slider falls downwards. With this weight compensation mounted **on the left side** * available for the ELAX® Ex 30F20 up to Ex 110F20, based on spring force, the slider moves upwards in case of power interruption. The case of the ELAX® weight compensation can be equipped with different types of spring packages for external payloads of **0-500g, 500-1000g, 1000-1500g and 1500-2000g**. For existing ELAX® linear motor slides with weight compensation, the spring packages can be reordered and can be replaced and mounted very simply on your own.



* A cable connection mounted on the left side (Art. No. 36 05 00) is not possible for ELAX® linear motor slides with weight compensation.

Ex 30F20	Description	Art. No.
Case and Cover	Please select the spring package corresponding to your payload.	36 00 00
Spring package, replaceable	0-500g	36 00 05
	500-1000g	36 00 10
	1000-1500g	36 00 15
	1500-2000g	36 00 20
Ex 50F20	Description	Art. No.
Case and Cover	Please select the spring package corresponding to your payload.	36 01 00
Spring package, replaceable	0-500g	36 01 05
	500-1000g	36 01 10
	1000-1500g	36 01 15
	1500-2000g	36 01 20
Ex 80F20	Description	Art. No.
Case and Cover	Please select the spring package corresponding to your payload.	36 02 00
Spring package, replaceable	0-500g	36 02 05
	500-1000g	36 02 10
	1000-1500g	36 02 15
	1500-2000g	36 02 20
Ex 110F20	Description	Art. No.
Case and Cover	Please select the spring package corresponding to your payload.	36 03 00
Spring package, replaceable	0-500g	36 03 05
	500-1000g	36 03 10
	1000-1500g	36 03 15
	1500-2000g	36 03 20

1.4 Chrome Steel Cover ELAX®

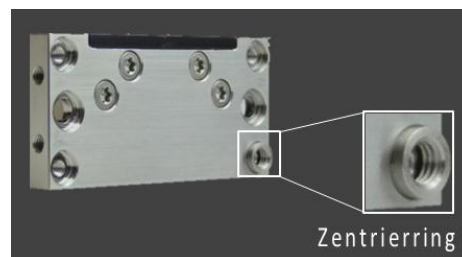
With this chrome steel cover the modular matrix holes and threads are covered and the surface is smooth and easy to clean. With the cover the ELAX® linear motor slide becomes suitable for the food- and pharmaceutical industry or for clean rooms of laboratory automation or medical technology.

For ELAX®		Art. No
Ex 30F20	Chrome steel cover ELAX® for monobloc and slide	36 06 00
Ex 50F20		36 06 05
Ex 80F20		36 06 10
Ex 110F20		36 06 15
Ex 150F20		36 06 20



1.5 Arrangement Possibilities with Direct Screw Connection ELAX®

Modular system in perfection – An essential key factor when the ELAX® slides with direct drive were developed. No matter if held flat, upright, as cross table or as linear cantilever, the ELAX® slides can be directly screwed together by dowel bushing without the need of adapter plates. The hole matrix has always a grid of 20 x 50mm (0.79" x 1.97").



Front flange
Stainless steel,
rust-free 57mm x 27.5mm x 6mm,
(2.24" x 1.08" x 0.24")

Hole matrix 20 x 50mm
(0.79" x 1.97")

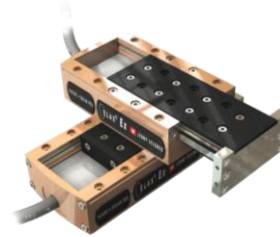
1.5.1 Y-Z Pick and Place flat

Pick and Place flat	Screws and dowel bushings	Art. No.
Ex F20	4 x dowel bushings Ø6mm 4 x hexagon socket screws, M3 x 30	36 10 00



1.5.2 Cross Table Fitting

Cross Table Fitting	Screws and dowel bushings	Art. No.
Ex F20	4 x dowel bushings $\varnothing 6\text{mm}$ 4 x hexagon socket screws, M3 x 30	36 10 00



1.5.3 X-Z Pick and Place Upright

Pick and Place upright	Screws and dowel bushings	Art. No.
Ex F20	2 x dowel bushings $\varnothing 7\text{mm}$ 2 x torx with low head, M4 x 8	36 10 01



1.6 Fixing Screws ELAX®

Fixing Screws	Screws	Art. No.
Ex F20	10 pcs M3x30 hexagon socket screws for client's mounting plate	36 11 00

Ex 30F20 = 2 Sets

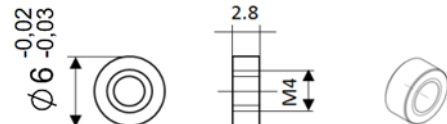
Ex 150F20 = 3 Sets

Ex 50F20/80F20/110F20 = 2 sets

1.7 Dowel Bushings $\varnothing 6$ and $\varnothing 7$ ELAX®

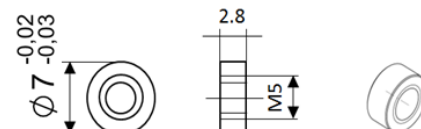
The dowel bushings with an outside $\varnothing 6\text{mm}$ and M4 inside screw thread are used for the flat connections (X-Y cross tables or Y-Z Pick and Place flat) with 4 x M3 screws.

Dowel bushings	Dowel bushings $\varnothing 6\text{mm}$	Art. No.
Ex F20	10 x D6 -0.02/-0.08 x 2.8	36 12 00



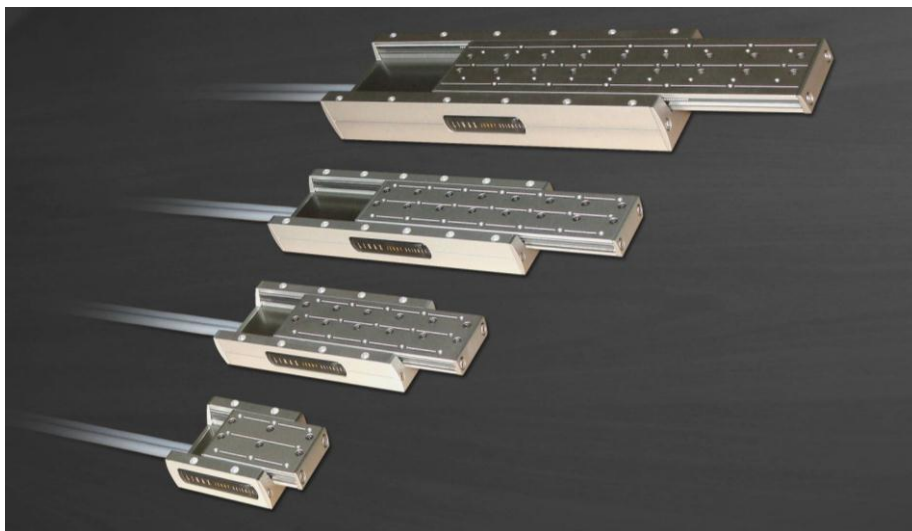
The dowel bushings with an outside $\varnothing 7\text{mm}$ and M5 inside screw thread are used where slide and front flange are connected upright with 2 x M4 screws:

Dowel bushings	Dowel bushings $\varnothing 7\text{mm}$	Art. No.
Ex F20	10 x D7 -0.02/-0.08 x 2.8	36 12 01



2 LINAX® Linear Motor Axes

2.1 LINAX® Lxc (compact)



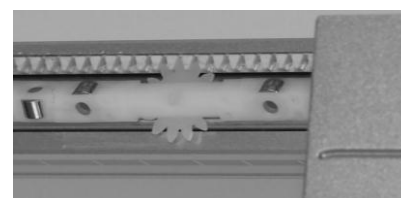
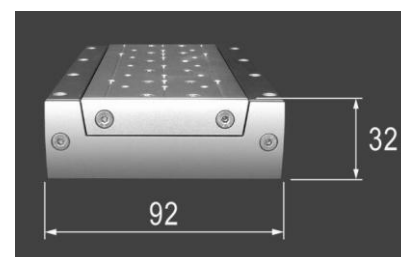
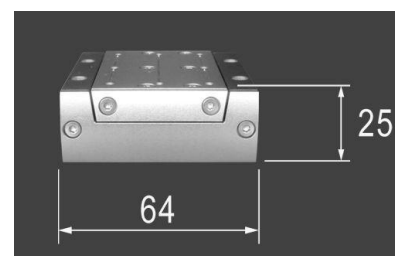
Compact series of linear motor axes in patented mono-bloc design.

The magnets move while the coils are stationary. This means that the cables are stationary and there are no movable cable chains necessary in single axis applications.

LINAX® Data sheets and **CAD files (STEP)** are available for download from

www.jennyscience.ch

Model	Stroke [mm]	Force Fn/Fp [N]	Weight Slider/Tot. [g]	Art. No.
Lxc 44F08*)	44	08/24	130/350	15 00 10
Lxc 85F10*)	85	10/30	230/650	15 01 00
Lxc 135F10	135	10/30	320/880	15 02 00
Lxc 230F10	230	10/30	450/1200	15 03 00
Lxc 80F40*)	80	40/114	520/1470	15 10 00
Lxc 176F40*)	176	40/114	750/2150	15 12 00
Lxc 272F40	272	40/114	1050/2800	15 14 00



The very compact Lxc series are based on the patented mono-bloc design. The coils are located in the mono-bloc and the magnets are at the bottom of the carriage slider.

- Centering forced control for cross rolls cage as a standard
This centering force control prevents "cage creep" and increases the reliability and life time expectancy.
- Glass scale with a resolution of 1µm, accuracy +/- 2 µm
- Optional: A resolution of 100nm, accuracy +/- 500nm is available
- *) Optional: A vertical weight compensation is available.

Cross roll cage contains a centering forced control with two toothed racks and a cog wheel. (System Schneeberger)

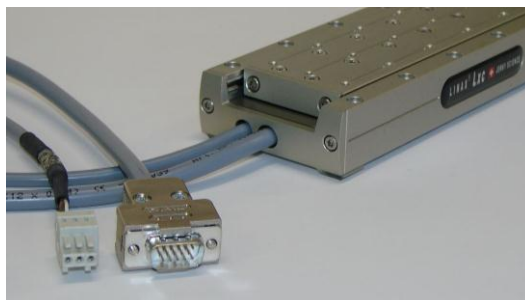
Note: LINAX® Lxc option cleanroom, food industry and pharmaceutical industry

The LINAX® Lxc can be mounted in clean room standard with additional charge of 10%. The ball bearing carriages are filled with a special lubrication. If you wish to use this option, please add the note „**OPTION CLEANROOM/FOODINDUSTRIE/AND PHARMACEUTICAL INDUSTRY**“ (depending on your requirement) on your purchase order.

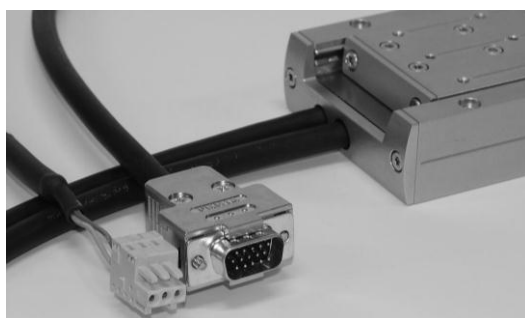


2.1.1 Connecting Cable LINAX® Lxc

With the LINAX® Lxc the connecting cables are directly mounted into the case without plugs. For this reason, a high compactness is achieved. There are two connecting cables provided. One is for the encoder and the other is for the 3 linear motor phases. The additional lines in the encoder cable are for communication between LINAX® linear motor axis and XENAX® servo controller. The grey Lütze **PUR** connecting cables are compatible for continuous flexible operation in cable chains. Standard length is 1,5m. Other lengths from 0,1 to 20m, are available on request. The minimum bending radius for **moving cable** is **82mm**. For **fixed cable**, the minimum bending radius is **41mm**.



The optionally available, blue IGUS **TPE** connecting cables have a temperature range of -35° bis +100°. They are suitable for use in **clean rooms** and oil resistant. The minimum bending radius for **moving cable** is **44mm**. For **fixed cable**, the minimum bending radius is **27mm**.



Optionally there are extension cables available.

Connecting Cable shielded, suitable for cable chain	Length [m]	*) Linear Motor Type	Motor cable with 3 pole Wago, 3.5mm Art. No.	Encoder cable with 15 pole HD D-Sub Art. No.
LINAX® Lxc, Lütze, grey RAL 7001 Temp. moving -25° up to +80° Temp. stationary -40° up to + 80°	1.5 Standard	Lxc 44F08 Lxc 85F10 Lxc 135F10 Lxc 230F10	50 22 30 50 22 35 50 22 40 50 22 45	50 23 30 50 23 35 50 23 40 50 23 45
	0.1-20	Lxc 80F40 Lxc 176F40 Lxc 272F40	50 22 50 50 22 55 50 22 60	50 23 50 50 23 55 50 23 60
LINAX® Lxc IGUS, blue, Temp. moving -35° up to +100° Suitable for clean room and oil resistant	0.1-20		custom-length	custom-length
	0.1-20		custom-length	custom-length

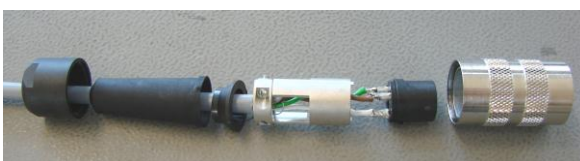
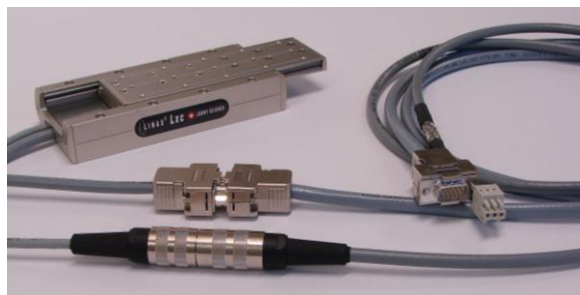
*) Each type of linear motor axis has internally different cable strip lengths; therefore they all have a different article identification number.

2.1.2 Removable Extension Cable LINAX® Lxc

Extension cables are also useful for highly dynamic multi axes applications with cable chains. Use short connection cables; then plug it into the extension cables. These extension cables run in the cable chain, and are easily replaceable. The grey Lütze **PUR** bending radius for **moving cable** is **76mm**. For **fixed cable**, the minimum bending radius is **46mm**.

Through full PUR jacket and TPE / HGI insulation these cables are optimal for cable chains, extremely harsh operation conditions and an environment with aggressive coolants and lubricants.

When using extension cables, the 3 pole Wago connector is replaced by a metallic shielded round jack from the manufacturing company "Binder".



Extension cables shielded and suitable for cable chain	length [m]	Motor cable 3 pole binder round jack to 3 pole Wago-connector 3,5mm Art. No.	Encoder cable 15 pole HD jack to 15 pole HD connector Art. No.
LINAX® Lxc/Lxe, Lütze, grey, Temp. Moving -25° up to +80°	1.5	50 26 01	50 27 01
	3.5	50 26 03	50 27 03
	5.0	50 26 05	50 27 05
	0.1-20	Custom-length	Custom-length
LINAX® Lxc/Lxe, IGUS, blue, Temp. Moving -35° up to +100° suitable for clean room and oil resistant	1.5	50 46 01	50 47 01
	3.5	50 46 03	50 47 03
	5.0	50 46 05	50 47 05
	0.1-20	Custom-length	Custom-length

2.1.3 Measuring System with 100nm Resolution LINAX® Lxc

LINAX®	Type	Art. No.
LINAX® all models	100nm Read-head with redundant double scanning	35 25 00

The optical measuring system has a standard resolution of 1µm. This resolution can be increased to 100nm while the maximum travel speed of the slider carriage will be reduced to 0.9m/s. The 100nm resolution information is stored in the LINAX® linear motor axis and is automatically detected by the XENAX® servo controller.

Existing LINAX® glass scale linear motor axes in the field can be upgraded to 100nm resolution by Jenny Science.



2.1.4 Vertical Weight Compensation LINAX® Lxc

For LINAX® F08	Maximal force	Art. No.
Lxc 44F08	0-200g	35 00 02
	200-400g	35 00 04
	400-600g	35 00 06
	600-900g	35 00 09

In case of power interruption the linear motor of the LINAX® linear motor axes is powerless. If the axis is applied vertically, the slider of the linear would fall downwards. With this weight compensation for the smallest LINAX® linear motor axis, mounted on the right side and based on spring force, the slider moves upwards in case of power interruption. It can be equipped with 4 different types of springs for external payloads of **0-200g, 200-400g, 400-600g and 600-900g.**



For LINAX® F10	Maximal force at 6 bar	Art. No.
Lxc 85F10*)	3 kg	35 01 00
Lxc 80F40	6 kg	35 02 10
Lxc 176F40	6 kg	35 02 12

*) Can be mounted on the left side upon request

In case of a power interruption, the linear motor of the LINAX® axis is powerless. If the axis is applied vertically, the slider of the linear motor would fall downwards. With this weight compensation based on compressed air without air consumption, the slider remains in position or moves upwards depending on the air adjustment. For adjustment of the air pressure use a commercial **air pressure regulator**, for example, **Festo "LRMA-QS-4, Art. No. 153 495"**.

A great advantage of the weight compensation is the support of the linear motor in vertical orientation. The motor runs without a static weight and is not heating in a stationary position. You get higher dynamics and at the same time you also save energy.



2.1.5 Dirt Wiper on Magnet Track LINAX® Lxc F40

Zu LINAX® F40	Type	Art. Nr.
Lxc 80F40	Dirt wiper incl. 2 form milled front plates to LINAX® Lxc F40	35 06 00
Lxc 176F40		35 06 05
Lxc 272F40		35 06 10

Due to the construction of these stronger Lxc F40 series the linear motor opening between magnets and coils is bigger than on the smaller Lxc F08/F10 types. This is why the optional dirt wipers are only available for the LINAX® Lxc F40.

Besides dirt, small parts such as small screws (watch industry) can get stuck in this gap. This can potentially damage poles or coils. With this dirt wiper, particles >2/10mm are prevented from entering in the linear motor.



2.1.6 Fixing Screws for Monobloc LINAX® Lxc

Linear Motor Type	Screws	Art. No.
Lxc F08 / Lxc F10	10 x hexagon socket screws M3 x 27 low head, stainless	35 10 01
Lxc F40	10 x hexagon socket screws M3 x 35 low head, stainless	35 20 01

The very compact dimensions of the LINAX® Lxc let just little room for connecting screws. This is why for the Lxc axes, screws with low heads are to be used. Screws with standard heads would potentially get jammed in cross table applications.

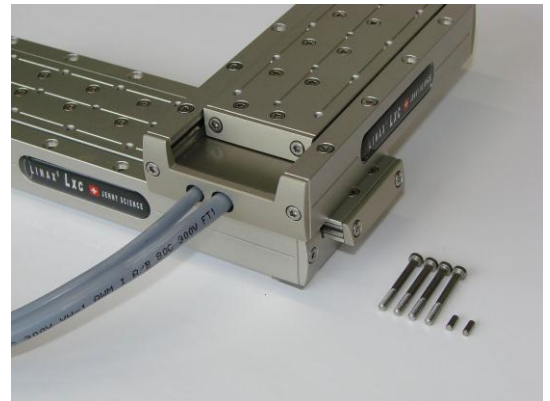
Lxc 44F08/85F10 = 1 Set
Lxc 135F10/230F10 = 2 Sets

Lxc 80F10 = 1 Set
Lxc 176F40/272F40 = 2sets



2.1.7 Cross Table Fixing Screws LINAX® Lxc

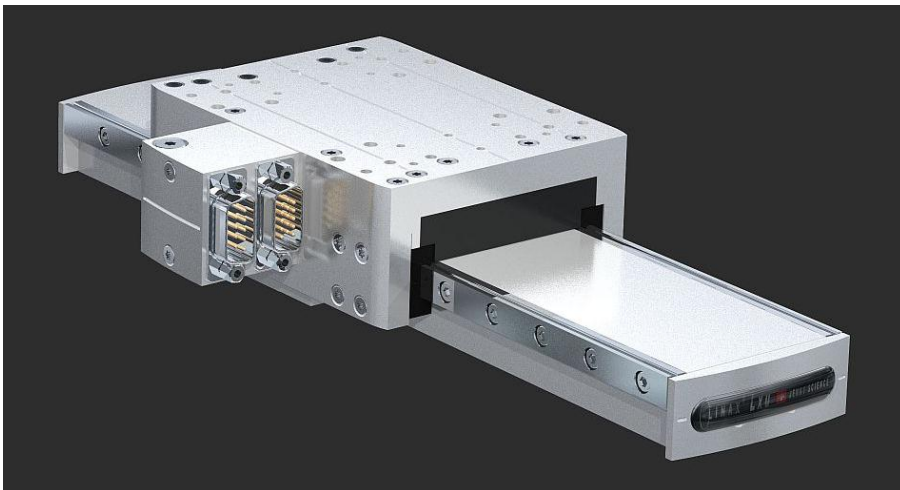
Cross Table	Screws and centering pins	Art. No.
Lxc F08 / Lxc F10	4 x hexagon socket screws M3 x 27, low head 2 x centering pin Ø 2,5 x 6, stainless	35 10 00
Lxc F40	4 x hexagon socket screws M3 x 35, low head 2 x centering pin Ø 2,5 x 6, stainless	35 20 00



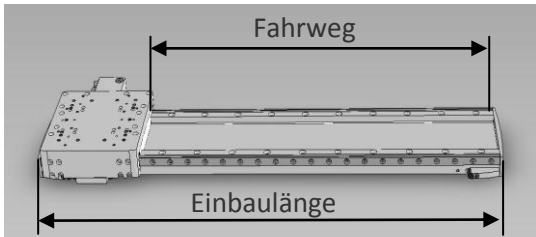
The various LINAX® linear motor types can be directly mounted to each other without the need of adapter plates. For cross table combinations there are multiple grid patterns possible.

For the choice of the according screws, the upper mounted linear motor is relevant (For example if a LINAX® Lxc F10 is mounted on the top of a LINAX® Lxc F40, use fixing screw set for the Lxc F10).

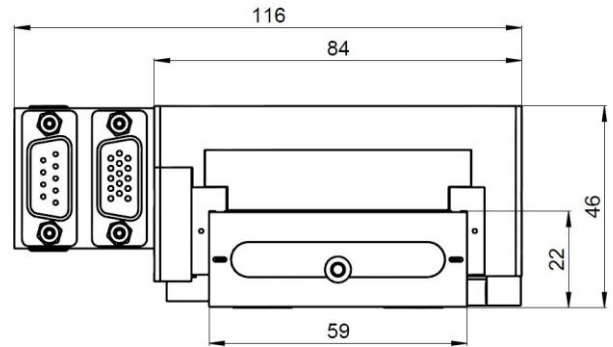
2.2 LINAX® Lxu (universal)



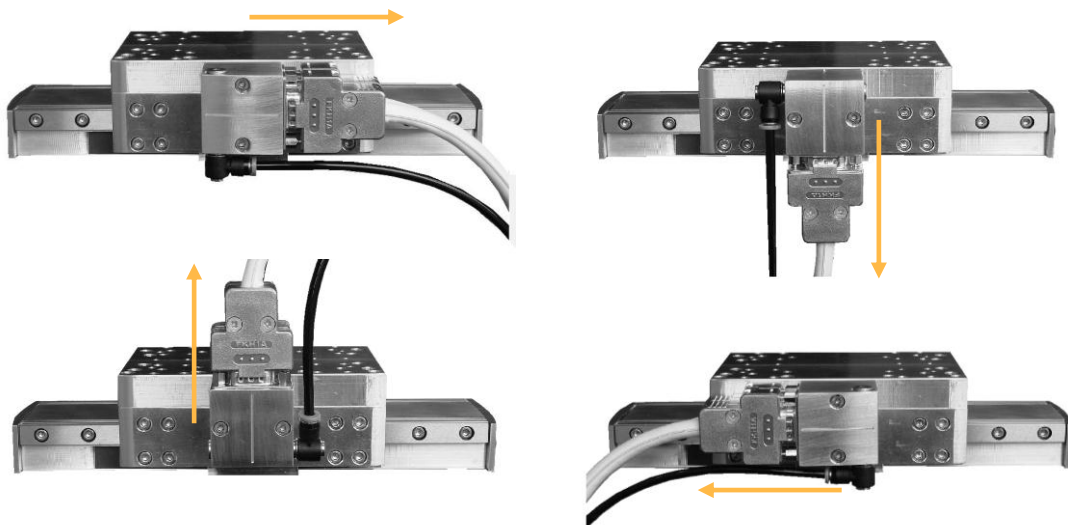
These universal linear motor axes are real “all-rounders”. There are three mounting possibilities: mounting to carriage slider; to the ground plate; or to the front face. The four long holes through the carriage slider allow direct screw connections for the back to back mounting of two LINAX® Lxu slides, which is ideal for X-Z handling. For vertical orientations, an optional weight compensation unit is available. The air pressure coupling is on the 90° “rotatable” connector case. This LINAX® Lxu linear motor axes can be controlled only with the new, more powerful XENAX® Xvi 75V8 servo controller.



LINAX® Lxu (and Lxs)
Installation length = Stroke + 130mm



The connector case is rotatable with a 90° pattern, in 4 directions.



Type	Stroke [mm]	Force Fn/Fp [N]	Weight carriage slider/total [g].	magnetic measuring scale +/- 8µm Art. No.	optical measuring scale +/- 2µm Art. No.
Lxu 40F60*)	40	60/180	950/1700	15 32 00	15 33 00**)
Lxu 80F60*)	80	60/180	950/1900	15 32 02	15 33 02**)
Lxu 160F60*)	160	60/180	950/2200	15 32 06	15 33 06**)
Lxu 240F60	240	60/180	950/2600	15 32 10	15 33 10**)
Lxu 320F60	320	60/180	950/2900	15 32 14	15 33 14**)

Magnetic measurement system with 1µm standard resolution; accuracy +/- 8µm

*) These models are available with vertical weight compensation.

**.) Optical measuring system with a resolution of 100nm available:

LINAX®	Type	Art. No.
LINAX® Lxu	100nm Read-head with redundant double scanning	35 25 00

The optical measuring system has a standard resolution of 1µm. This resolution can be increased to 100nm while the maximum travel speed of the slider carriage will be reduced to 0.9m/s.

All measurement systems have a separate reference track on the entire length with distance-coded reference marks. After a short move of maximum 10mm, the absolute position is automatically calculated by XENAX® servo controller. No external "zero point sensor" is necessary.

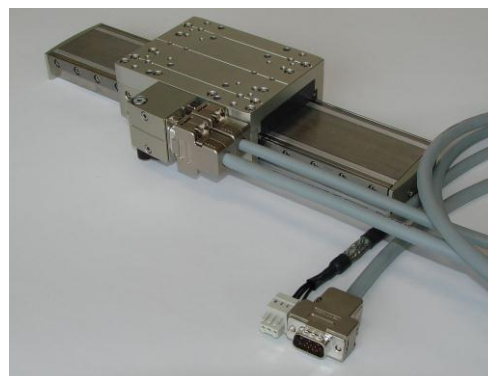
Note: LINAX® Lxu option cleanroom, food industry and pharmaceutical industry

The LINAX® Lxu can be mounted in clean room standard with additional charge of 10%. The ball bearing carriages are filled with a special lubrication. If you wish to use this option, please add the note „**OPTION CLEANROOM/FOODINDUSTRIE/AND PHARMACEUTICAL INDUSTRY**“ (depending on your requirement) on your purchase order.



2.2.1 Connecting Cable LINAX® Lxu

With the LINAX® Lxu (and Lxs) the cables are removable and are connected with D-Sub connectors to the connector housing. One cable is for the encoder and the other is for the 3 phases of linear motor. For the communication between LINAX® linear motor axis and XENAX® servo controller, additional lines for communication exists in the encoder cable. Through full PUR jacket and TPE / HGI insulation these cables are optimal for cable chains, extremely harsh operation conditions and an environment with aggressive coolants and lubricants. The **bending radius for moving cable is 98mm. For fixed cable, the minimum bending radius is 50mm.** The optionally available, **blue IGUS TPE connecting cable has a minimum bending radius of 44mm for moving cable and of 27mm for fixed cable.**



Connecting Cable shielded, suitable for cable chains	Length [m]	Motor cable 9 Pol D-Sub jack on 3 pole Wago-connector 3,5mm Art. No.	Encoder cable 15 pole HD jack on 15 pole HD connector Art. No.
LINAX® Lxs /Lxu, Lütze, grey, Temp. Moving -25° bis +80°	1.5 3.0 5.0 0.1-20	50 20 10 50 20 15 50 20 20 Custom-length	50 21 10 50 21 15 50 21 20 Custom-length
LINAX® Lxs / Lxu, IGUS, blue, Temp. Moving -35° bis +100° Suitabel for clean room and oil resistant	0.1-20	Custom-length	Custom-length

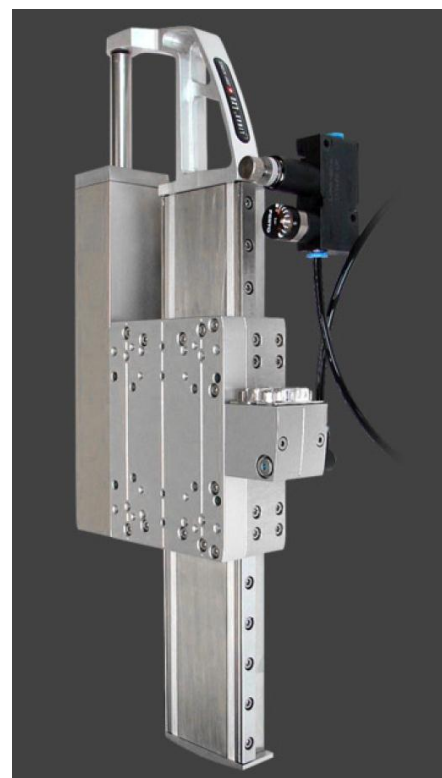
Extensions Cables:

Upon request, removable extension cables are available for LINAX® Lxu linear motor axes.

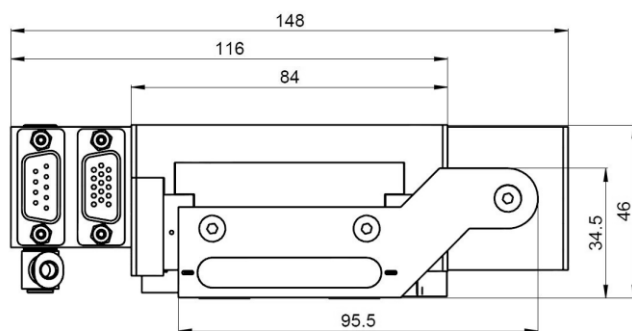
2.2.2 Vertical Weight Compensation LINAX® Lxu

In case of a power interruption, the linear motor of the LINAX® axis is powerless. If the axis is applied vertically, the slider of the linear motor would fall downwards. With this weight compensation based on compressed air without air consumption, the slider remains in position or moves upwards depending on the air adjustment. For adjustment of the air pressure use a commercial **air pressure regulator**, for example, **Festo "LRMA-QS-4, Art. No. 153 495"**. The air pressure coupling is on the 90° "rotatable" connector case.

A great advantage of the weight compensation is the support of the linear motor in vertical orientation. The motor runs without a static weight and is not heating in a stationary position. You get higher dynamics and at the same time you also save energy.



Gewichts-kompensation	Maximalkraft bei 6 bar	Art. Nr.
Lxu 40F60 / Lxu 80F60	6 kg	35 03 01
Lxu 160F60	6 kg	35 03 05



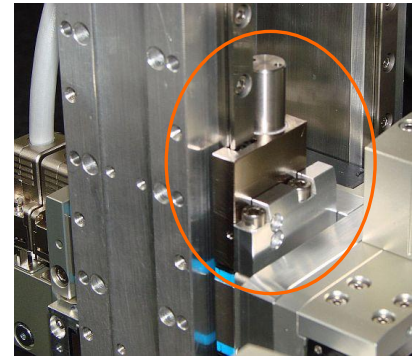
2.2.3 Spring Operated Brake LINAX® Lxu

The spring operated brake is applied onto the guiding rail. In the “off” status the brake is inactive (non air-pressure). By activating a 3/2 way pneumatic valve, (for example FESTO CPE10 M1BH-3GL-QS-4, Article No. 196 846), the brake is released with compressed air.

In use with the ENAX® Xvi 75V8 servo controller, an OUTPUT FUNCTION can be assigned for the automatic control of the brake valve.

IMPORTANT: The stroke of the linear motor axis is reduced by 35mm with the installation of the spring operated brake. For example, the LINAX® Lxu 320F60 with a spring applied brake has a stroke of 285mm instead of 320mm.

Spring Operated Brake	Maximal holding force	Art. No.
Lxu 80F60 - Lxu 320F60	6 kg	35 03 30



2.2.4 Cover Caps for Screws LINAX® Lxu

Linear Motor Type	Cover Caps	Art. No.
Lxu F60	Cap to cover the LINAX® Lxu/Lxs screws on the guiding rails	35 08 00

Lxu40F60 = 8 pcs

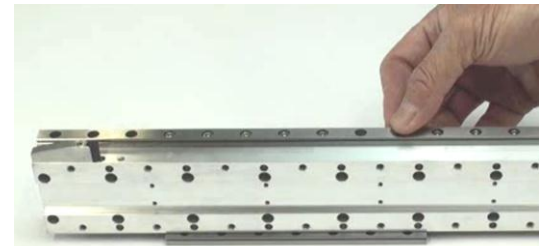
Lxu 80F60 = 10 pcs

Lxs 520F60 = 32 pcs

Lxu 160F60 = 14 pcs

Lxu 320F60 = 22 pcs

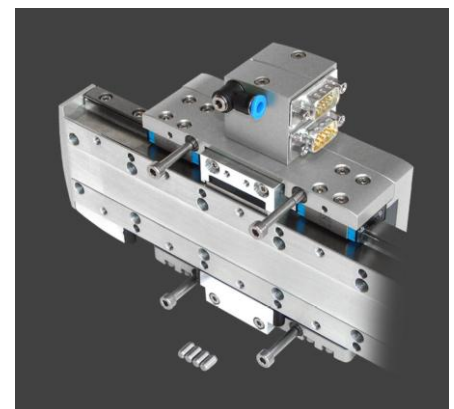
Lxs 1600F60 = 86 pcs



2.2.5 Cross Table Fixing Screws LINAX® Lxu

Linear Motor Type	Screws and centering pins	Art. No.
Lxu F60	4 x hexagon socket screws M4 x 40, 4 x centering pins Ø 4 x 8 stainless	35 11 10

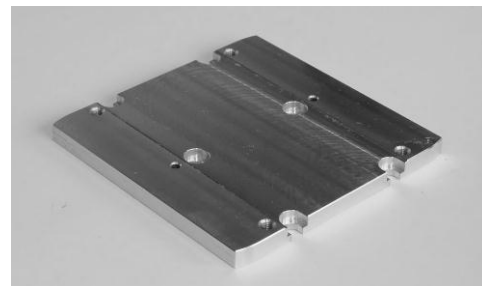
The various LINAX® linear motor types can be directly mounted to each other without the need of adapter plates. The four long holes through the carriage slider allow direct screw connections for the back to back mounting of two LINAX® Lxu slides, which is ideal for X-Z handling.



2.2.6 Adapter Plate LINAX® Lxu

With this adapter plate a LINAX® Lxu slider can be connected to another LINAX® Lxu ground plate, incl. screws and centering pins.

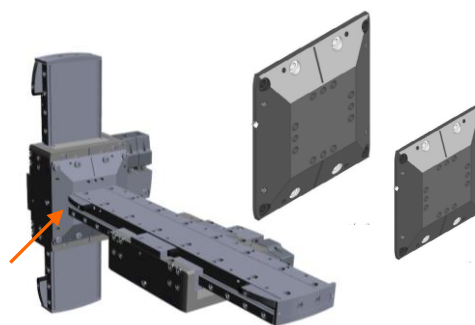
Linear Motor Type	Function	Art. No
Lxu 40F60 bis Lxu 320F60	Connection of Lxu slider to auf Lxu ground plate	35 12 00



2.2.7 Front Flange LINAX® Lxu

With the front flange it is possible to mount different Pick and Place orientations: The front plate of a LINAX® Lxu is replaced by the front flange which can directly be mounted to:

- to an ELAX slide (upright or flat),
- to a LINAX® Lxc F08/F10 or F40
- or to the carriage slider of another LINAX® Lxu.

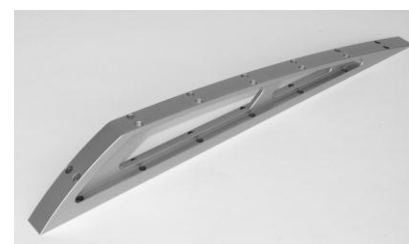


Front Flange LINAX® Lxu	Accessories	Art. No.
For ELAX® Ex F20 upright	incl. 2 centering pins 4x8, 6 torx M4x8 and 2 dowel bushings D7	35 12 02
For ELAX® Ex F20 flat	incl. 2 centering pins 4x8, 4 torx M4x8, 4 hexagon socket screws M3x30 and 4 dowel bushings D6	35 12 03
For Lxu	incl. 2 centering pins 4x8, 4 torx M4x12, 4 centering pins 2.5x5 and 8 torx M4x8	35 12 05
For Lxc F40	incl. 2 centering pins 4x8, 4 torx M4x12, 4 centering pins 2.5x5 and 4 hexagon socket screws M3x35	35 12 06
For Lxc F08/F10	incl. 6 centering pins 4x8, 8 torx M4x8 and 4 torx M4x12	35 12 07

2.2.8 Cantilever Armor LINAX® Lxu

The cantilever armour is used with long cantilever stroke constructions (e.g. with LINAX® Lxu 320F60) for maximum stability and minimal bending.

Linear Motor Type	Armor	Art. No.
Lxu 320F60	For LINAX® Lxu cantilever	35 13 10

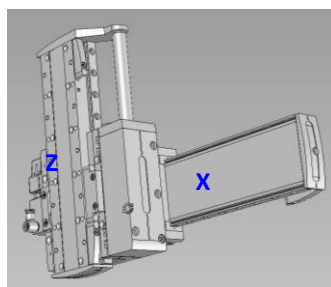


2.2.9 Additional Carriage Slider LINAX® Lxu

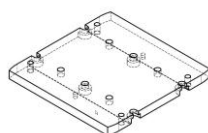
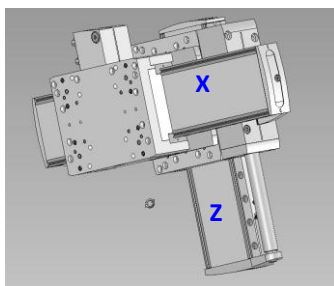
With the LINAX® Lxs linear motor axes it is possible to assemble two or more carriage sliders on the same ground plate. The cable connector can be orientated on the left or right side of the slider. Each carriage slider requires a XENAX® servo controller.

Linear Motor Type	Type of carriage slider	Art. No.
Lxu xxxF60	Carriage slider to LINAX® Lxu "universal" F60 with precise, self-lubricating ball bearing carriages, integrated linear motor with dirt wiper and magnetic measurement system , resolution 1 μm , accuracy $\pm 8\mu\text{m}$	35 30 20
Lxu xxxF60	Carriage slider to LINAX® Lxu "universal" F60 with precise, self-lubricating ball bearing carriages, integrated linear motor with dirt wiper and optical measurement system , resolution 1 μm , accuracy $\pm 2\mu\text{m}$	35 30 22

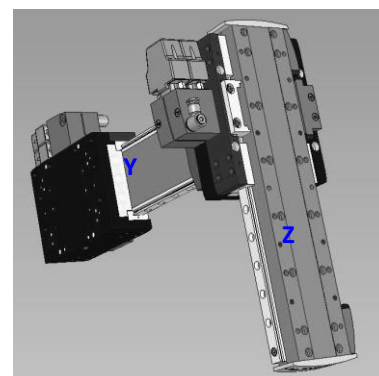
2.2.10 Examples of X-Z Construction Possibilities LINAX® Lxu



LINAX® direct connection; Lxu carriage slider to Lxu carriage slider. „Back to back mounting“.



Lxu ground plate on Lxu carriage slider with adapter plate Lxu



X-Z LINE PORTAL

(design for highest dynamic)

The ground plate of the X-axis is mounted on the wall in upright orientation. The carriage slider of this X-axis is directly fixed to the carriage slider of the Z-axis. The Z-axis needs more installation space because the ground plate is moving. But this construction allows storing all cables in the same cable chain. The Z-axis is equipped with the optional weight compensation.

X-Z LINE PORTAL

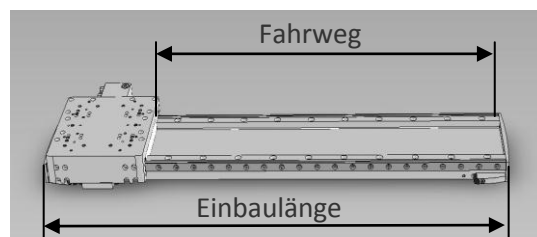
(design for minimal installation space)

The ground plate of the Z-axis is in a vertical orientation mounted on the wall. The ground plate on the X-axis is horizontally orientated and connected to the carriage slider of the Z-axis with the adapter plate. Since no ground plate is moving in longitudinal direction the installation space is minimal. The Z-axis also holds the weight of X-axis. Therefore, the Z-axis is equipped with the optional weight compensation.

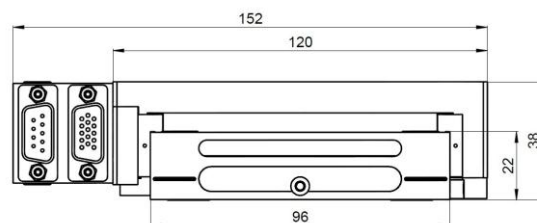
Y-Z LINE CANTILEVER

The carriage slider of the Y-axis is mounted sidewise. The carriage slider of the Z-axis is fixed vertical with the front flange of the Y-axis. The front flange of the Y-axis can be fixed with 90° pattern in 4 directions to the Z-axis. This allows the carriage slider of the Y-axis to be oriented on the left (like displayed), on the right, upwards or downwards.

2.3 LINAX® Lxs (shuttle)



LINAX® Lxu (and Lxs)
Installation length = Stroke + 130mm



These LINAX® linear motor axes can only be controlled with the powerful XENAX® Xvi 75V8 Servocontroller.

As the name implies, the Lxs shuttle series are basic axes for long strokes up to 1600mm. Of particular importance is the wide-body construction with recessed linear motor, through which the height is reduced to just 38mm. The wide spaced guiding rails are able to withstand high moments of force. For example for long Lxu cantilever axes.

Type	Stroke [mm]	Force Fn/Fp [N]	Weight carriage slider/total [g].	Art. No. Magnetic measuring scale +/- 8µm	Art. No. optical measuring scale +/- 2µm
Lxs 160F60	160	60/180	1000/2600	15 30 06	15 31 06*)
Lxs 200F60	200	60/180	1000/2800	15 30 08	15 31 08*)
Lxs 320F60	320	60/180	1000/3400	15 30 14	15 31 14*)
Lxs 400F60	400	60/180	1000/3900	15 30 18	15 31 18*)
Lxs 520F60	520	60/180	1000/4500	15 30 24	15 31 24*)
Lxs 600F60	600	60/180	1000/5000	15 30 28	15 31 28*)
Lxs 800F60	800	60/180	1000/6100	15 30 38	15 31 38*)
Lxs 1000F60	1000	60/180	1000/7200	15 30 48	15 31 48*)
Lxs 1200F60	1200	60/180	1000/8400	15 30 58	15 31 58*)
Lxs 1600F60	1600	60/180	1000/10800	15 30 78	N/A

Measurement system magnetic with 1µm standard resolution; accuracy +/- 8µm

*) Optical measuring system with a resolution of 100nm available:

LINAX®	Type	Art. No.	
LINAX® Lxs	100nm Read-head with redundant double scanning	35 25 00	The optical measuring system has a standard resolution of 1µm. This resolution can be increased to 100nm while the maximum travel speed of the slider carriage will be reduced to 0.9m/s.

All measurement systems have a separate reference track on the entire length with distance-coded reference marks. After a short move of maximum 10mm, the absolute position is automatically calculated by XENAX® servo controller. No external "zero point sensor" is necessary.

Note: LINAX® Lxs option cleanroom, food industry and pharmaceutical industry

The LINAX® Lxs can be mounted in clean room standard with additional charge of 10%. The ball bearing carriages are filled with a special lubrication. If you wish to use this option, please add the note „**OPTION CLEANROOM/FOODINDUSTRIE/AND PHARMACEUTICAL INDUSTRY**“ (depending on your requirement) on your purchase order.



2.3.1 Connecting Cable LINAX® Lxs

The connecting cable LINAX® Lxs are identical to the connecting cable LINAX® Lxu and the connector cases are also rotatable with a 90° pattern, in 4 directions. Through full PUR jacket and TPE / HGI insulation these cables are optimal for cable chains, extremely harsh operation conditions and an environment with aggressive coolants and lubricants. The **bending radius for moving cable is 98mm. For fixed cable, the minimum bending radius is 50mm.** The optionally available, blue IGUS TPE connecting cable has a **minimum bending radius of 44mm for moving cable and of 27mm for fixed cable.**

Connecting Cable shielded, suitable for cable chains	Length [m]	Motor cable 9 Pol D-Sub connector on 3 pole Wago-connector, 3.5mm Art. No.	Encoder cable 15 pole HD jack on 15 pole HD connector Art. No.
LINAX® Lxs /Lxu, Lütze, grey, Temp. Moving -25° bis +80°	1.5	50 20 10	50 21 10
	3.0	50 20 15	50 21 15
	5.0	50 20 20	50 21 20
	0.1-20	Custom-length	Custom-length
LINAX® Lxs / Lxu, IGUS, blue, Temp. Moving -35° bis +100° Suitabel for clean room and oil resistant	0.1-20	Custom-length	Custom-length

Extensions Cables:

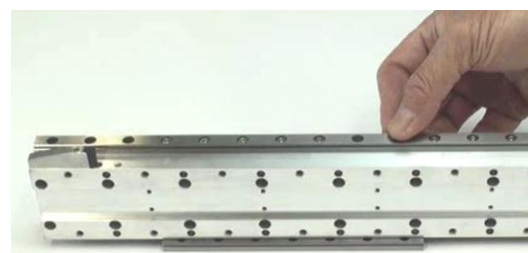
Upon request, removable extension cables are available for LINAX® Lxs linear motor axes.

2.3.2 Cover Caps for Screws LINAX® Lxs

Linear Motor Type	Cover Caps	Art. No.
Lxu F60	Cap to cover the LINAX® Lxu/Lxs screws on the guiding rails	35 08 00

Lxs 160F60 = 14 pcs
 Lxs 200F60 = 16 pcs
 Lxs 320F60 = 22 pcs
 Lxs 400F60 = 26 pcs
 Lxs 520F60 = 32 pcs

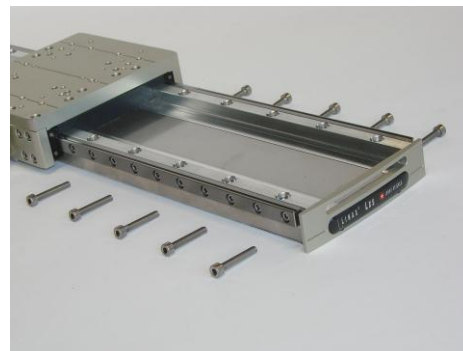
Lxs 600F60 = 36 pcs
 Lxs 800F60 = 46 pcs
 Lxs 1000F60 = 56 pcs
 Lxs 1200F60 = 66 pcs
 Lxs 1600F60 = 86 pcs



2.3.3 Fixings Screws for Ground Plate LINAX® Lxs

Linear Motor Type	Screws	Art. No.
Lxs F60	10 x hexagon socket screws M4 x 25 stainless	35 11 05

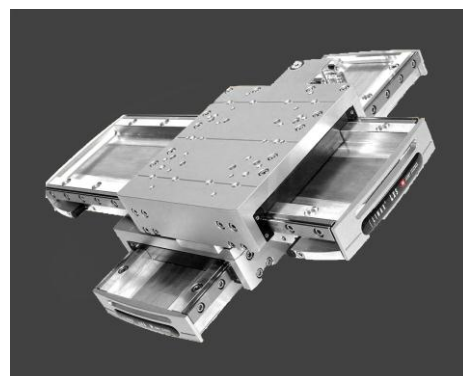
Lxs 160F60/ 200F60 = 2 fixing screw sets
 Lxs 320F60/400F60 = 3 fixing screw sets
 Lxs 520F60/600F60 = 4 fixing screw sets
 Lxs 800F60 = 5 fixing screw sets
 Lxs 1000F60 = 6 fixing screw sets
 Lxs 1200F60 = 7 fixing screw sets
 Lxs 1600F60 = 9 fixing screw sets



2.3.4 Cross Table Fixing Screws LINAX® Lxs

Linear Motor Type	Screws and centering pins	Art. No.
Lxs F60	6 x hexagon socket screws M4 x 25, 4 x centering pins Ø 4 x 8 stainless	35 11 20

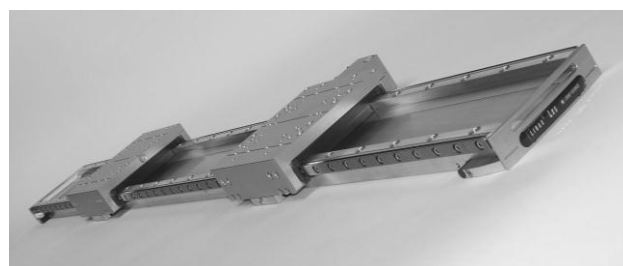
The various LINAX® linear motor types can be directly mounted to each other without the need of adapter plates. For cross table combinations there are multiple grid patterns possible. For the choice of the according screws, the upper mounted linear motor is relevant



2 LINAX® Lxs 160F60, high precision X-Y cross table

2.3.5 Additional Carriage Slider LINAX® Lxs

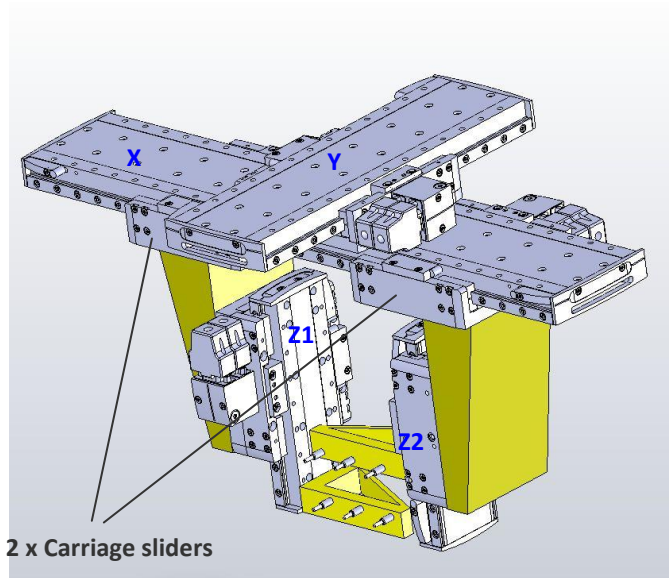
With the LINAX® Lxs linear motor axes it is possible to assemble two or more carriage sliders on the same ground plate. The cable connector can be orientated on the left or right side of the slider. Each carriage slider requires a XENAX® servo controller.



Linear Motor Type	Type of carriage slider	Art. No.
Lxs xxxF60	Carriage slider to LINAX® Lxs "shuttle" F60 with precise, self-lubricating ball bearing carriages, integrated linear motor with dirt wiper and magnetic measuring system , resolution 1 µm, accuracy +/-8µm	35 30 10
Lxs xxxF60	Carriage slider to LINAX® Lxs "shuttle" F60 with precise, self-lubricating ball bearing carriages, integrated linear motor with dirt wiper and optical measuring system , resolution 1 µm, accuracy +/-2µm	35 30 12

Sample: Portal robot with additional carriage slider on X-axis

X-axis: 1 x Lxs 400F60 incl. add. carriage slider
Y-axis: 1 x Lxs 160F60
Z-axes: 2 x Lxu 40F60 facing each other
Control: 5 x XENAX® Xvi 75V8 with EtherCAT®

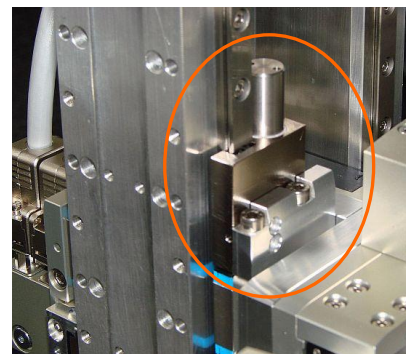


2.3.6 Spring Operated Brake LINAX® Lxs

The spring operated brake is applied onto the guiding rail. In the “off” status the brake is inactive (non air-pressure). By activating a 3/2 way pneumatic valve, (for example FESTO CPE10 M1BH-3GL-QS-4, Article No. 196 846), the brake is released with compressed air.

In use with the ENAX® Xvi 75V8 servo controller, an OUTPUT FUNCTION can be assigned for the automatic control of the brake valve.

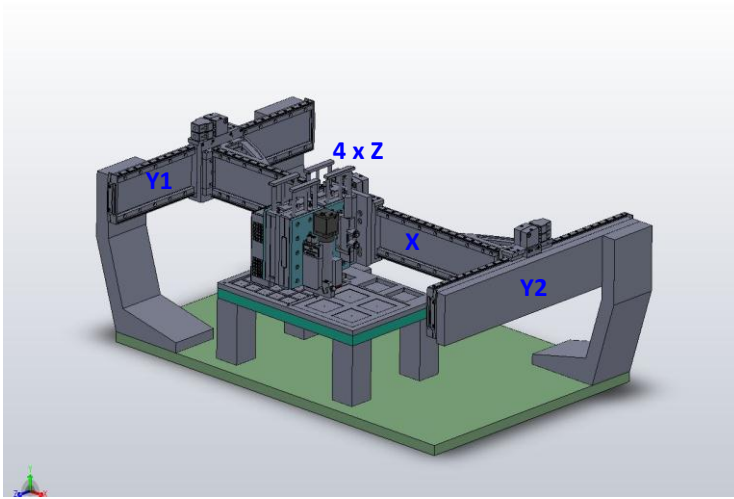
IMPORTANT: The stroke of the linear motor axis is reduced by 35mm with the installation of the spring operated brake. For example, the LINAX® Lxs 200F60 with a spring applied brake has a stroke of 165mm instead of 200mm.



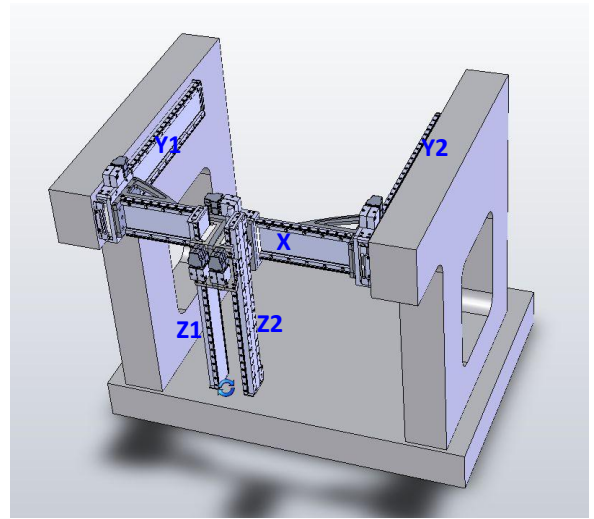
Spring Operated Brake	Maximal holding force	Art. No.
Lxs	Bis 8 kg	35 03 35



2.3.7 Gantry Constructions LINAX® Lxs



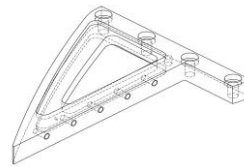
X-axis: 1 x Lxs 600F60
Y-axes: 2 x Lxs F400F60
Z-axes: 4 x Lxc 85F10 with weight compensation
Control: 7 x XENAX® Xvi 75V8 with EtherCAT®



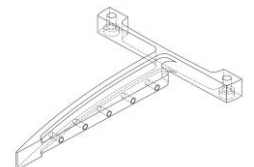
X-axis: 1 x Lxs 400F60
Y-axes: 2 x Lxs F400F60
Z-axes: 2 x Lxu 320F60 with spring-applied brake
Ansteuerung: 5 x XENAX® Xvi 75V8 with EtherCAT®

2.3.8 Gantry Angle Bracket LINAX® Lxs

In the “gantry” configuration, all axes are arranged upright. This saves space and increases the stability in vertical orientation. There is no bending of the axes. The basic frame design is less complex. The parallelism of the two synchronous Y-axis should be +/- 5µm over the length of the ground plate. If this accuracy is not reached, flexible angle brackets can be mounted on one side of the X-axis which should absorb a tolerance of +/-50 µm.

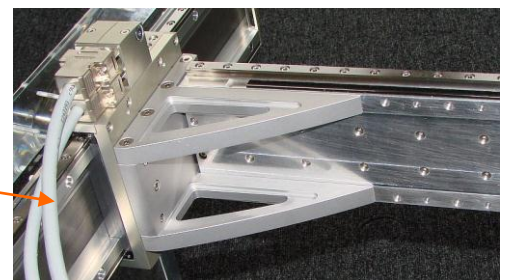


Gantry angle bracket

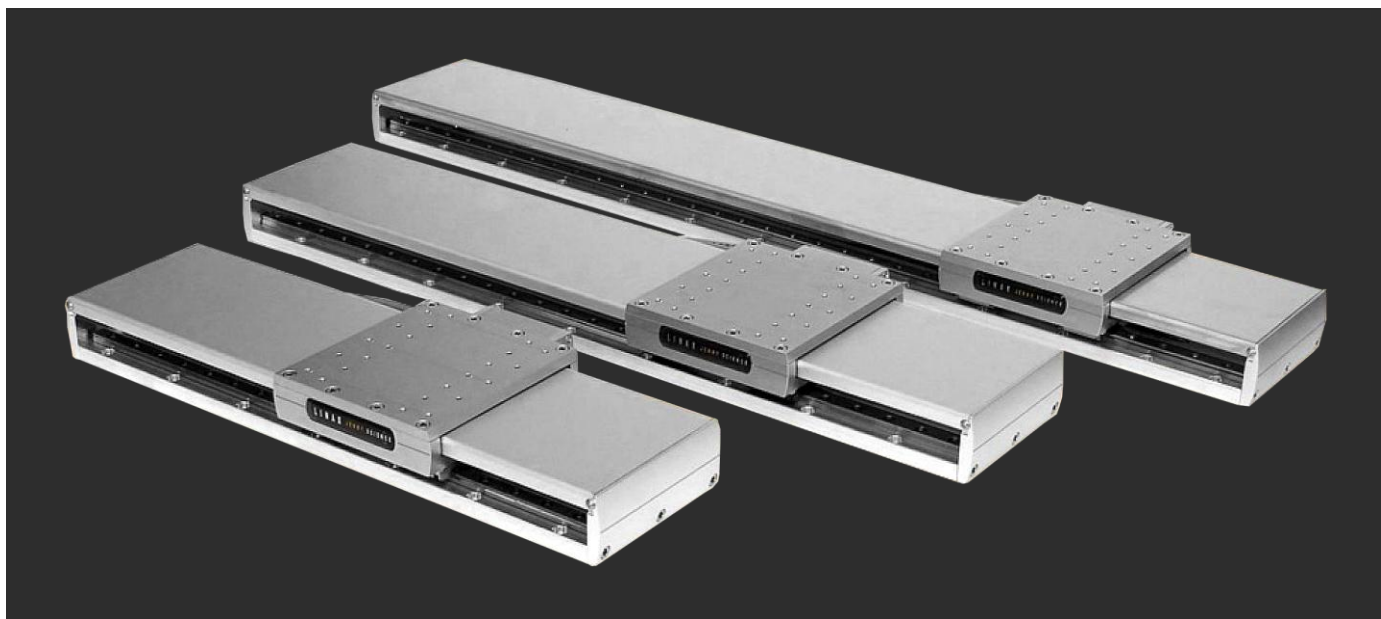


Flexible gantry angle bracket

Gantry	Angle Bracket	Art. No.
Lxs xxxF60	1 x Angle bracket ground plate gantry angle bracket top gantry angle bracket bottom	35 12 10
Lxs xxxF60	1 x Angle bracket ground plate flexible gantry angle bracket top flexible gantry angle bracket bottom	35 12 15

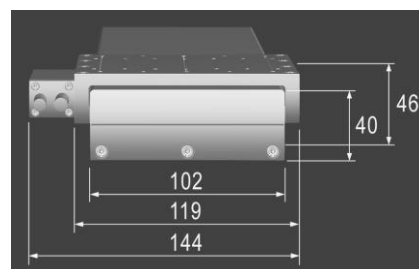


2.4 LINAX® Lxe (exclusive)



The LINAX® Lxe linear motors have a special cover. This results in a flat and elegant exterior geometry for easy cleaning. Additional carriage sliders on the same ground plate allow highly integrated machine solutions. Available Lxe stroke lengths begin at 250mm up to 1000mm.

Type	Stroke [mm]	Force Fn/Fp [N]	Weight carriage slider/total [g]	Art. No.
Lxe 250F40	250	40/114	980/3080	15 20 00*)
Lxe 400F40	400	40/114	980/3850	15 22 00*)
Lxe 550F40	550	40/114	980/4620	15 24 00*)
Lxe 800F40	800	40/114	980/5900	15 26 00*)
Lxe 1000F40	1000	40/114	980/6930	15 28 00*)



*) Optical measuring system with a resolution of 100nm available:

LINAX®	Type	Art. No.
LINAX® Lxe	100nm Read-head with redundant double scanning	35 25 00

The optical measuring system has a standard resolution of 1µm. This resolution can be increased to 100nm while the maximum travel speed of the slider carriage will be reduced to 0.9m/s.

All measurement systems have a separate reference track on the entire length with distance-coded reference marks. After a short move of maximum 10mm, the absolute position is automatically calculated by XENAX® servo controller. No external "zero point sensor" is necessary.

Note: LINAX® Lxe option cleanroom, food industry and pharmaceutical industry

The LINAX® Lxe can be mounted in clean room standard with additional charge of 10%. The ball bearing carriages are filled with a special lubrication. If you wish to use this option, please add the note „**OPTION CLEANROOM/FOODINDUSTRIE/AND PHARMACEUTICAL INDUSTRY**“ (depending on your requirement) on your purchase order.



2.4.1 Connecting Cable LINAX® Lxe

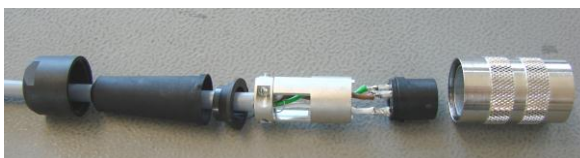
Connecting Cable shielded, suitable for cable chains	Length [m]	Motor cable with 3 pole Wago-connector, 3.5mm Art. No.	Encoder cable with 15 pole HD D-Sub connector Art. No.
LINAX® Lxe, Lütze, grey Temp. Moving -25° up to +80°	1.5	50 22 10	50 23 10
	3.0	50 22 15	50 23 15
	5.0	50 22 20	50 23 20
	0.1-20	Custom length	Custom length
LINAX® Lxe IGUS, blue, Temp. Moving -35° bis +100° suitable for clean rooms and oil resistant	0.1-20	Custom length	Custom length

2.4.2 Removable Extension Cable LINAX® Lxe

Extension cables are also useful for highly dynamic multi axes applications with cable chains. Use short connection cables; then plug it into the extension cables. These extension cables run in the cable chain, and are easily replaceable. The grey Lütze **PUR** bending radius for **moving cable** is **76mm**. For **fixed cable**, the minimum bending radius is **46mm**.

Through full PUR jacket and TPE / HGI insulation these cables are optimal for cable chains, extremely harsh operation conditions and an environment with aggressive coolants and lubricants.

When using extension cables, the 3 pole Wago connector is replaced by a metallic shielded round jack from the manufacturing company "Binder".



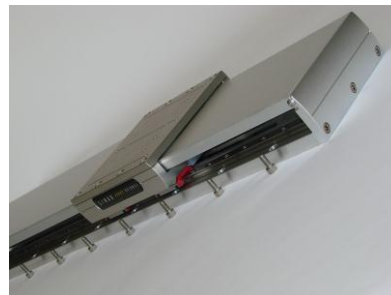
Extension cables shielded and suitable for cable chain	length [m]	Motor cable 3 pole binder round jack to 3 pole Wago-connector 3.5mm Art. No.	Encoder cable 15 pole HD jack to 15 pole HD connector Art. No.
LINAX® Lxc/Lxe, Lütze, grey, Temp. moving -25° up to +80°	1.5	50 26 01	50 27 01
	3.5	50 26 03	50 27 03
	5.0	50 26 05	50 27 05
	0.1-20	Custom-length	Custom-length
LINAX® Lxc/Lxe, IGUS, blue, Temp. moving -35° up to +100° suitable for clean rooms and oil resistant	1.5	50 46 01	50 47 01
	3.5	50 46 03	50 47 03
	5.0	50 46 05	50 47 05
	0.1-20	Custom-length	Custom-length

2.4.3 Fixing Screws LINAX® Lxe

Linear Motor Type	Screws	Art. No.
Lxe F40	10 x hexagon socket screws M4 x 12 stainless	35 11 01

Lxe 250F40/400F60 = 2 Set
Lxe 550F40 = 3 Sets

Lxe 800F40 = 4 Set
Lxe 1000F40 = 5sets



2.4.4 Cross Table Fixing Screws LINAX® Lxe

For cross table constructions with two Lxe F40, the top part of the carriage slider that is placed on the bottom of the cross table should be removed first. The total height of the cross table will be reduced by 6mm to 86mm.

Lin	and centering pins	Art. No.
	socket screws M4 x 12 g pins Ø 4 x 8, stainless	35 11 00

2.4.5 Additional Carriage Slider LINAX® Lxe

With the LINAX® Lxs linear motor axes it is possible to assemble two or more carriage sliders on the same ground plate. The cable connector can be orientated on the left or right side of the slider. Each carriage slider requires a XENAX® servo controller

Linear Motor Type	Type of carriage slider	Art. No.
Lxe xxx F40	Carriage slider to LINAX® Lxe "exclusive" F40 with precise, self-lubricating ball bearing carriages, integrated linear motor and optical measurement system , resolution 1 µm, accuracy +/-2µm	35 30 00



2.5 Maintenance

2.5.1 Cleaning Glass Scale of LINAX®

At the end of the mechanical installation, the glass scale should be cleaned. Afterwards please do not touch the glass scale anymore.

If the error 54 occurs “read-head signal goes off”, the glass scale is dirty and a reading problem may result. Use a cloth and a degreasing, non-abrasive, cleaning liquid. e.g., clear, cleaning petrol from a chemist, to clean the glass scale.



2.5.2 Lubricating Cross Roller Guides ELAX® and LINAX® Lxc

Die ELAX® and LINAX® Lxc linear bearing have two cross roller cages and four miniature precision shafts. The cross roller cages contain a centering forced control with two toothed racks and a cog wheel (system Schneeberger). This cross roller guides is highly reliable and needs low maintenance. We recommend lubricating all visible shafts every 12 months. Use a oil-soaked cotton swabs with high performance lubricant OKS 671 or another commercial ball bearing oil. If oil is getting on the glass scale please make sure clean it before operating the linear motor.



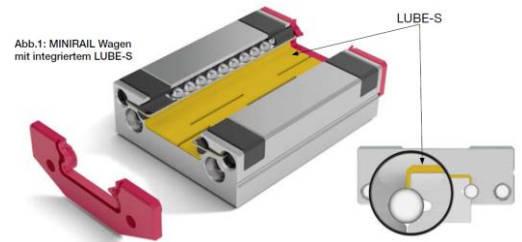
2.5.3 Lubricating Ball Bearing Guides LINAX® Lxe/Lxs/Lxu

As a standard the LINAX® Lxe, Lxs and Lxu are delivered with the ball bearing guides (red) which need very little maintenance
Important: If the guiding rails are cleaned, please apply new lubricant on the guides to avoid that the lubricant in the reservoir is used up too quickly.

Depending on the operational environment the linear motors are equipped with 3 different types of ball bearing guides:

Current Guiding Systems

- Red carriages, standard:** Low on maintenance, we recommend to re-lubricate every 5'000km with „Isoflex Topas NB 5051“
- Red carriages, clean room:** Re-lubricate After 3'000km or at least every 12 months with „Klüberalfa HX 83-302“
- Red oder black carriages
Food or pharma industry:** Re-lubricate After 3'000km or at least every 12 months with „Klübersynth UH1 14-151“



Integrated long term lubrication system

Previous Guiding Systems

- | | |
|--|--|
| <p>Blau, Standard
Blau, Reinraum</p> | <p>Black, Clean Room, food and pharma industry
Red, standard</p> |
|--|--|

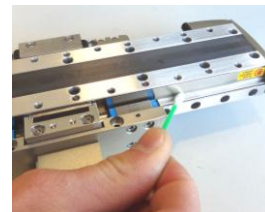
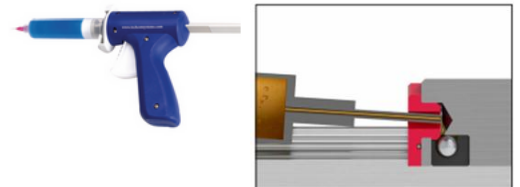
⚠ In order to be better able to assist you with maintenance and the according maintenance instruments, we kindly ask you to contact us and provide us with the serial number of your LINAX® linear motors.

Application Instructions:

The carriages are lubricated with a dosage pistol in which the cartridge contains the according lubricant. The slider of the motor should be placed either in the front or in the back of its ground plate. You only have to lubricate either from the front or from the back of the linear motor, but make sure to lubricate on the top and on the bottom on the left and on the right side.

The red ball bearing carriages have two needle holes on the front face. Please put the dosage pistol through the needle hole and apply lubricant until lubricant exits on to the guiding rails.

For linear motors with an optical measuring system please make sure to remove the lubricant surplus with a cotton swap.



Lubrications sets with dosage pistol and lubrication cartridges

Linear Motor Type	Lubrication Set	Art. No.
LINAX® Lxe/Lxs/Lxu	dosage pistol to lubricate LINAX® Lxe, Lxs, Lxu ball bearings (excl. lubricant filled cartridge)	55 00 10
	Cartridge with standard lubricant: Lubricant "Isoflex Topas NB 5051" filled cartridge to lubricate the LINAX® Lxe, Lxs, Lxu ball bearings (red standard bearing carriages)	55 00 11
	Cartridge with clean room lubricant: Lubricant "Klüberalfa HX 83-302" filled cartridge to lubricate the LINAX® Lxe, Lxs, Lxu ball bearings (red clean room bearing carriages)	55 00 12
	Cartridge with food industry lubricant: Lubricant "Klübersynth UH1 14-151" filled cartridge to lubricate the LINAX® Lxe, Lxs, Lxu ball bearings (red and black bearing carriages for food industry)	55 00 13
	Cartridge with standard lubricant: Lubricant "MG10/MT" filled cartridge to lubricate the LINAX® Lxe, Lxs, Lxu ball bearings (blue standard bearing carriages)	55 00 14
	Cartridge with clean room lubricant: Lubricant "MG10/CG2" filled cartridge to lubricate the LINAX® Lxe, Lxs, Lxu ball bearings (blue clean room bearing carriages)	55 00 15



Lubrication Sets with Syringe

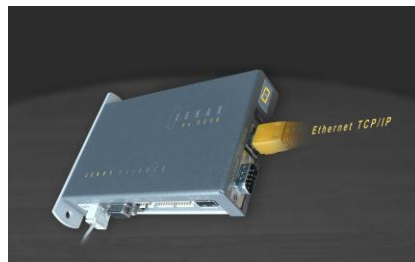
Linear Motor Type	Lubricant	Art. No.
LINAX® Lxe/Lxs/Lxu	Syringe with standard lubricant: "MG10/MT" grease filled syringe to lubricate the slider of the LINAX® Lxe, Lxs, Lxu ball bearing guides (blue standard carriages)	55 00 00
	Syringe with clean room lubricant: "MG10/CG2" grease filled syringe to lubricate the slider of the LINAX® Lxe, Lxs, Lxu ball bearing guides (blue clean room carriages)	55 00 01
	Syringe with standard/clean room oil: oil filled syringe to moisturize the guiding rails after they were cleaned, for LINAX® Lxe, Lxs and Lxu (red standard/clean room carriages)	55 00 05



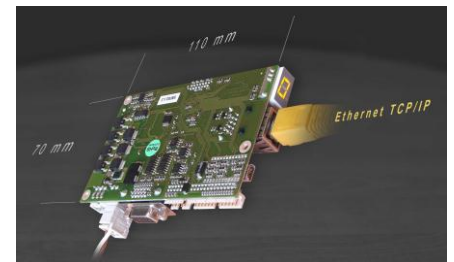
3 XENAX® Servo Controller



XENAX® Xvi 75V8



XENAX® Xv 50V6



XENAX® Xvo 50V5 OEM



Setup

With the Web browser (such as Firefox®, Internet Explorer®), the user navigates through the parameterization menu. The integrated Web server in the XENAX® Ethernet servo controller contains the Java GUI WebMotion®. Never before has the set-up of a servo controller been easier.

With an Ethernet switch, you can instantly combine several axes for multi-axes operation. As a standard, 12 digital Inputs and 8 digital Outputs are available to connect sensors, valves and/or superior PLC's. The firmware can handle up to 64 programs; 50 positioning points and 5 individual trajectory profiles.

Power-current supply:

The typical power supply voltage is 24V DC. With the larger axes, Lxs/Lxu F60 or Lxc/Lxe F40, and for higher speed, a 48V or 72V DC voltage is recommended. In this configuration speeds of >1.5m/s up to 4m/s are possible.

POWER REQUIREMENTS: For a single axis, 3-5A; For 2, axes 5-7A; For 3, axes 7-10A; For 5, axes 12-15A depending on payload and dynamics.

Important: The 0V line of the power supply must be connected to a ground point of the machine chassis.



3.1 XENAX® Servo Controller Model Overview

Model	Xvi 75V8 Ethernet	Xv 50V6 Ethernet	Xv 50V6 Slave	Xvo 50V5 Ethernet OEM	Xvo 50V5 OEM
Art. No. 24V Input PLC	10 16 01	10 11 01	10 13 00	10 14 02	10 15 02
For linear motor axes					
LINAX® Lxc /Lxe	X	X	X	X	X
LINAX® Lxs/Lxu	X	-	-	-	-
For electric slides					
ELAX®	X	-	-	-	-
For AC, EC, DC motors	X	X	X	X	X
Web Browser setup	X	X	-	X	_***
Ethernet TCP/IP	X	X	-	X	-
CANopen® integ.	-	(X)	-	-	-
RS232	X	X	X	X	X
RS485	-	X	X	-	-
Puls / Direction	X	X	X	X	X
Input	12	12	12	12	12
Output*	8 / 24V act.	8	8	8	8
Start-up Key	(X)	(X)	(X)	-	-
Voltage	15-75V	15-50V	15-50V	15-50V	15-50V
Power-Current	8/18A	6/12A	6/12A	5/12A	5/12A
Binary coded programming	X	X	X	X	X
Bus Module					
EtherCAT®					
Powerlink®	X	-	-	-	-
CANopen®					
Profinet®					
Master/Slave Operation	X	-	-	-	-
S-Curve speed profile	X	-	-	-	-
Safety Motion Unit SMU TÜV certified	X	-	-	-	-
Force Calibration	X	-	-	-	-
Dimension [mm]	182x110x30	142x85x25	142x85x25	110x70x18	110x70x18
Weight [g]	515	300	290	75	65

(X) = Option (X in Klammer)

* The Outputs of the XENAX® Xvi 75V8 servo controller are configurable as sink driver (0V) or source driver (24V). It is also possible to configure the sink and source driver together.

You can download the XENAX® manual from our website: www.jennyscience.ch/en

3.1.1 PLC und Optio Kabel

PLC and Optio cables to XENAX® Xvi 75V8 round, shielded, free wire end (PLC) and RJ45 cable, shielded (Optio)	Length [m]	Art. No.
PLC 26 Pole, 12 Input / 8 Output	1.5	50 24 30
	3	50 24 31
	X	Custom length
Optio 8 Pole, Analogue, Puls/Direction, 2nd encoder channel	0.5	50 31 00
	X	Custom length



PLC and Optio cables to XENAX® Xvi 50V6 round, shielded, free wire end	Length [m]	Art. No.
PLC 26 Pole, 12 Input / 8 Output	1.5	50 24 10
	3	50 24 11
	X	Custom length
Optio 10 Pole, Analogue, Puls/Direction, 2nd encoder channel	1.5	50 25 10
	X	Custom length



PLC and Optio cables to XENAX® Xv 50V6 flat cables, not shielded, free wire end	Length [m]	Art. No.
PLC 26 Pole, 12 Input / 8 Output	1	50 24 00
Optio 10 Pole, Analogue, Puls/Direction, 2nd encoder channel	1	50 25 00



These flat cables are not shielded and are only to be used for cable lengths less than 1m. Unshielded flat cables are only suitable in laboratory automation.

3.1.2 Start-up Key

XENAX® Xvi 75V8 and Xv 50V6	Art. No.
Start-up Key mit EEPROM und 2 Adresscodierschalter 01 – 99	30 04 00

All parameters and application programs can be saved to the Start-up Key. The Start-up Key can be plugged into a new, unprogrammed servo controller and when powered on, all data will be installed automatically. At the same time, the card identifier (CI) is also read from the Start-up Key into the XENAX®.



3.1.3 I/O Box for Commissioning and Testing

XENAX® I/O Box 12 switches for Inputs, 4 Inputs binary coded with rotary switches 8 LED for Output 1-8	Art. No.
Xvi 75V8, LED bicolor green= 0V, red = 24V	30 07 10
Xv 50V6 / Xvo 50V5	30 07 00

The XENAX® I/O box is useful for the set up and testing of the Linear-Motor with the XENAX® Controller. 8 switches are connected to inputs 1-8. The binary coded rotary switch is connected to inputs 9-12. This is how programs 1-15 can be preselected (operation mode 10 or higher). Through input trigger 8 the preselected program will be started. The outputs can be chosen to be sink driver (0V) or source driver (24V) or both. The 8 LED will show the current status.



3.1.4 Power Recovery

XENAX® Power Recovery	Art. No.
Xvi 75V8	30 08 00

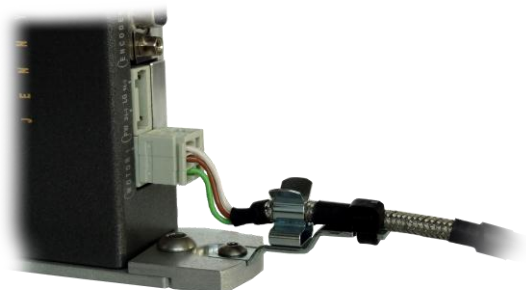
Die XENAX® Power Recovery prevents the flow of retard energy into the power supply. Retard energy can cause errors on some power supplies.



3.1.5 EMC Shielding Clamp for Motor Cable

XENAX® EMC shielding clamp	Art. No.
Xvi 75V8	30 09 00

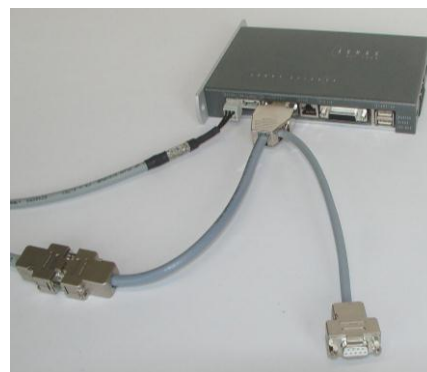
The EMC shielding clamp ensures a secure and simple connection of the shield to the motor cable and helps to avoid errors on data transfers. The shielding clamp is for LINAX® linear motors as well as ELAX® electric slides designed. With an additional cable binder, the cable will also be strain-relieved.



3.1.6 Xvi Y-Cable for Encoder Signal Pick-Up

Y-Cable	Length [m]	Art. No.
Xvi 75V8 Xv 50V6	2 x 0.2m	50 28 00

The Y-cable allows picking up the quadrature encoder signals (A, B) of the measurement system for external control process or for an “electronic gear-box”. The signal transfer is differential, RS422.



3.1.7 Xvi Master-Slave Cable

XENAX® Xvi	Length [m]	Art. No.
Master-Slave Cabel	0.5	50 25 20

The master-slave operation is software based via I2C bus. It is typical for handling modules. For example, with three linear motor axes a Pick & Place application with rotary axis can be realized. The programming has to be completed with the master device, which automatically recognizes the connected slave devices. Each device is identified with a Card Identifier (CI), the master always carries the number 0.



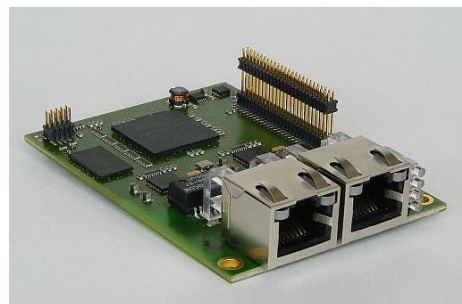
3.1.8 Xvi Computer Cable PC/Laptop for RS232

XENAX®		Art. No.
Xvi 75V8	D-Sub 9 Pole to USB-B, 1.8m	50 20 00

With this computer cable the RS232 interface is connected to the XENAX® servo controller. The cable is usually used for communications or for service purposes.



3.1.9 Xvi Bus Module



Protocol		Art. No.
EtherCAT®*)	Bus module clipped onto XENAX® Xvi 75V8 Rapid, internal data binding via data and address bus	30 10 00
POWERLINK®*)		30 10 10
CANopen®*)		30 10 05
Profinet®**)		30 10 15

*) The user application interface is standardized according to CANopen® over Ethernet DS 301 and DS402 (Communication and Drive control protocol profiles).

***) The interface is standardized according to PROFIdrive

Protocol		Art. No.
EtherCAT® Powerlink®	RJ45 cable for bus-communication, 0.5m, yellow	50 31 00



3.1.10 Xvi 75V8 Safety Motion Unit (SMU) TÜV certified

XENAX® Xvi 75V8 SMU	Art. No.
Safety Motion Unit (SMU) SIL2, Perform. Level D, Cat 3, Safety STO, SS1, SS2, SLS	30 20 00



In order to use the TÜV certified functional safety, a XENAX® servo controller Xvi 75F8 with optional integrated Safety Motion Unit (SMU) is needed.

Functional Safety:

STO	Safe Stop Off	Immediate shut-down to the output stage
SS1	Safe Stop 1	Stop followed by shut-down of the output stage
SS2	Safe Stop 2	Stop while remaining in stop position, axis remains under power, power stage active
SLS	Safely Limited Speed	Limiting and Observing of a safe speed. If Safety Limited Speed (SLS) is exceeded, Safe Stop (SS2) while observing the position window. If position window is exceeded aswell, then triggering STO, shut-down of The output stage.

Subsequent upgrade of SMU modules on existing XENAX® Servo Controllers is only possible on hardware V4 and higher and can only be completed by Jenny Science assembly.

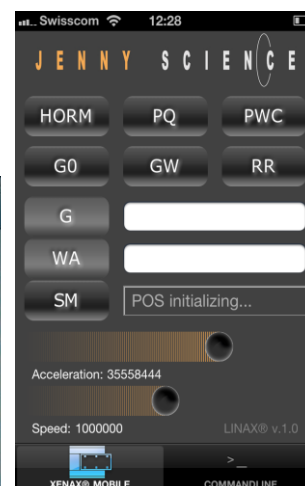
Functional Safety with SMU can be used for all LINAX® und ELAX® linear motor types and for rotary brushless motors. Rotary brush type DC motors are excluded off he TÜV certified functional safety.

3.1.11 iPhone APP controls LINAX®

The Jenny Science iPhone App can be downloaded for free in the „App Store“. The XENAX® servo controller has to be connected to a WLAN. Via WIFI the iphone can then connect to the WLAN. Please make sure that the WIFI symbol always stays active. It is advisable to deactivate the mobile data on the phone.

When the iPhone App is started the IP address of the XENAX® Controller can be entered and the linear motor can be set in motion with the iPhone.

For setup, testing or maintenance you can control individual axes with your iPhone. All you need is a WLAN connection and the IP address of the according XENAX® servo controllers.



4 Axis Interpolation

4.1 Axis Interpolation via Realtime Ethernet

Interpolation via real-time Ethernet

With the new XENAX® Xvi servo controller and a bus module, it becomes possible to connect to Ethernet real-time bus systems like EtherCAT® or Powerlink®. Trajectories will be sent as position points in a fast cycle of only a few 100us to all connected axes synchronously. Typically, the protocol profile CANopen® over Ethernet according to DS 301 and DS402 with a standard XML definition file is used. The calculation of the trajectories is completed by the superior PLC.

Interesting EtherCAT® master solutions

EtherCAT® is currently the fastest Ethernet access and therefore ideal for multi-axis interpolation. In the meantime there are also economically priced EtherCAT® master solutions available besides the PLC controls.

E.g. The MC464 of TRIO (www.triomotion.com) which can interpolate via EtherCAT® interface up to 64 axes. The programming is completed by "Motion Perfect", a simple but efficient programming language with BASIC similar syntax.

Alternatively take out solutions with PC/Laptop as EtherCAT® master are available. The company Kithara (www.kithara.de) provides a multi-task EtherCAT® master software for Windows. The user is able to program at the well-known software development platform C/C++ or Delphi.



MC 464 Trio Motion	Art. No.
<p>MC464 Axis interpolator incl. EtherCAT module and enabling code for 2 axes to connect to the XENAX® servo controller. Number of axes expandable by enabling codes. Ethernet TCP/IP for programming, incl. program CD for the first delivery.</p>	<p>09 06 00</p>

5 Commercial Products

5.1 AC-Servo Motor

Type	Mn/Mpeak	n-max U/Min	Specifications	Art. No.
B28D4I	0.38 / 1.4	6000	No key-way	13 04 00
B28D4I-K	0.38 / 1.4	6000	With key way	13 05 00
B28D4I-KB	0.38 / 1.4	6000	With key way and brake	13 05 10



Three phase servo motors

These brushless servo motors contain a 4 pole winding, brushless and an integrated encoder (4096 inc. per rev.) with A/B channel and line driver. All motors have a fully shielded metallic connector, suitable for harsh industrial environment.

5.1.1 Connecting Cable AC-Servo Motor

Cable Type	Type	Length [m]	Art. No.
Motor	Coninvers jack, 3 Pol Wago 3,5mm	0.5/1.5/2.5/ 5.0/10.0	50 19 0X
Motor with key way and brake in use with XENAX® Xvi *)	Coninvers jack, 3 Pol Wago 3,5mm 26 Pol D-Sub connector for XENAX® Xvi	0.5/1.5/2.5/ 5.0/10.0	50 19 0X
Encoder /Hall	Coninvers jack, 15 Pol HD D-Sub	0.5/1.5/2.5/ 5.0/10.0	50 03 0X



*) Special motor cable for servo motors with key way and brake controlled by all other Jenny Science controllers are available upon request.

Article number ending „0X“ = Cable length in meters

Use the following:

00 = 0.5m 01= 2.5m 03 = 5.0m
04 = 10,0m 08 = 1.5m

5.2 Ultra Compact Rotary Axis with Hollow Shaft

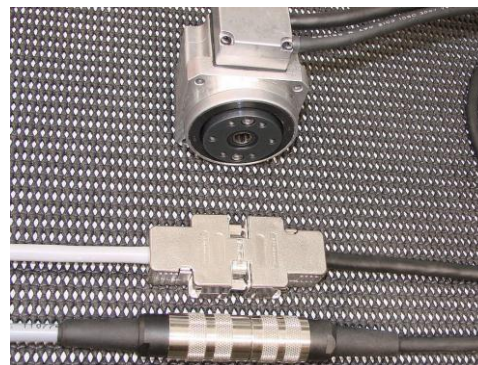
Type	Mn/ Mpeak	n-max U/Min	Flange, Hollow Shaft	Art. No.
RA 50R30	0.75 / 1.8	200	50 x 50mm Ø 6.2mm	13 06 00
RA 60R30	1.8 / 4.5	200	60 x 60mm Ø 8.0mm	13 06 10



Ultra compact, three-phase servo motor with 10 pole winding and a high precision reduction gear of 1:30 which is free from backlash. The internal encoder has 8'000 increments A/B per revolution on the motor shaft. These are 240'000 inc. per revolution at the hollow shaft output of the gear. Accordingly, the resolution is 5.4 arc seconds. The connection cables of 0.2m are standard, with one round connector and one HD-D-Sub connector assembled. These cables are suitable to connect with extension cables at different lengths.

5.2.1 Ultra Compact Rotary Axis Connecting Cable

Extension cables shielded, suitable for cable chain	Length [m]	Motor 3 pole round connector "Binder", Wago 3,5mm Art. No.	Encoder 15 pole HD connector To 15 pole HD jack Art. Nr.
Lütze, grau, Temp. moving -25° up to +80°	1.5	1.5	50 26 01
	3.5	3.5	50 26 03
	5.0	5.0	50 26 05
	0.1-20	0.1-20	Custom-length
IGUS, blue, Temp. moving -35° up to +100° Clean room suitable and oil resistant	1.5	1.5	50 46 01
	3.5	3.5	50 46 03
	5.0	5.0	50 46 05
	0.1-20	0.1-20	Custom-length



These extension cables for the ultra compact rotary axis are identical to the extension cables of the LINAX® Lxc / Lxe linear motor axes.

5.3 Round Table with Direct Drive and Hollow Shaft

Modell	Mn/ Mpeak	n-max U/Min	Flange, Hollow shaft	Art. No.
RT-62-12H60	0.115 Nm 0.4 Nm	1200	62 x 60mm Ø 12mm	13 07 00
RT-120-25H80	1.8 Nm 6.5 Nm	155	120 x 80mm Ø 25mm	13 07 10
RT-120-30H37	1.1 Nm 4.8 Nm	480	120 x 37mm Ø 30mm	13 07 15



The direct drive is an ironless torque motor without cogging forces. The high resolution measuring encoder is integrated and has a zero-pulse per rotation for the reference. The RT hollow shaft motors can be directly controlled with a XENAX® Xvi servo controller.

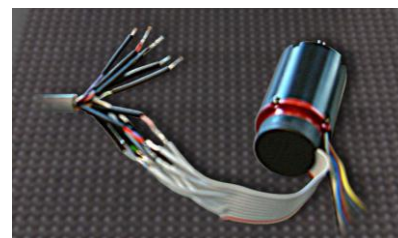
One motor connecting cable and one cable fan out (encoder and hall cable) of each 3.0m is included as a standard, mounted with a 3 pole Wago 3.5mm and 15 pole HD connector.

5.3.1 Round Table with Direct Drive and Hollow Shaft and Connecting Cable

Extension cables shielded, suitable for cable chain	Length [m]	Motor 3 pole round connector "Binder", Wago 3,5mm Art. No.	Encoder 15 pole HD connector To 15 pole HD jack Art. Nr.
Lütze, grau, Temp. moving -25° up to +80°	1.5	1.5	50 26 01
	3.5	3.5	50 26 03
	5.0	5.0	50 26 05
	0.1-20	0.1-20	Custom-length
IGUS, blue, Temp. moving -35° up to +100° Clean room suitable and oil resistant	1.5	1.5	50 46 01
	3.5	3.5	50 46 03
	5.0	5.0	50 46 05
	0.1-20	0.1-20	Custom-length

These extension cables for the ultra compact rotary axis are identical to the extension cables of the LINAX® Lxc / Lxe linear motor axes.

5.4 Setup and Cabeling of non Jenny Science Motors



The XENAX® servo controllers are also suitable to control commercial brushless and brush type three phases servo motors (AC-/BL-/EC-). Of course it is also possible to control brush type DC Motors. For that purpose it is necessary to use rotary encoders with A / B signals (preferably differential, RS422). When powering on the electrical angle is determined with the hall signals. Then the vector oriented current commutation can be completed. For brush type DC motors an incremental encoder is needed.

Cables Servo Motor

Assembling cables	Cable	Length [m]	Art. No.
Motor 3 pole, Wago 3,5mm Encoder/Hall 15 pole HD D-Sub	Lütze, shielded	1.5 0.2 – 5	50 90 00 Custom-length

Preparing Motor Parameters

Motor Parameter	Necessary parameters	Parameter Memory	Art. No.
according data sheet of servo motor	Torque constant [Nm/A] Rotor inertia [kg*m2] Number of pole pair [1] Resistance phase to phase [mΩ] Inductivity phase to phase [μH] Nominal current [A] Resolution of encoder [INC/REV]	WebMotion® Open -> from File Save -> to XENAX	50 90 05

The XENAX® Xvi 75V8 controls with state controller and observer mathematically. This is why the exact motor data is necessary.

This parametrization can also be completed by the end user. Please refer tot he manual **Param_Rotativ_Xvi.pdf** on www.jennyscience.ch under „DOWNLOAD“.

For additional information or questions, please contact directly the specialist:

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