IAI
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GB

# Rotating Nut Linear Actuator NS

## Long Stroke and High-Speed Movement

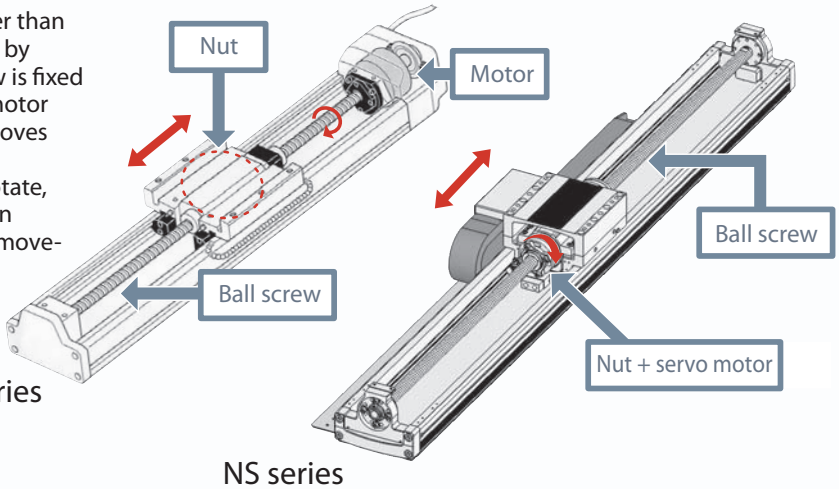

www.linearachsensysteme.de

# Nut Rotation Actuator that Provides Long Stroke and Speed Nearly as Fast as a Linear Motor

## Maximum Speed 2400 mm/s, Maximum Acceleration 1G High-Speed Performance and Multislider to Greatly Reduce Cycle Time

## 1 Moves the slider by rotating a nut, not with a ball screw

The actuator structure is that rather than moving the nut in the straight line by rotating a ball screw, the ball screw is fixed and the nut is rotated by a servo motor built into the slider, so the slider moves in a straight line.
Because the ball screw does not rotate, the influence of dangerous rotation speeds is minimal and this makes movement at high speed possible even for long strokes.

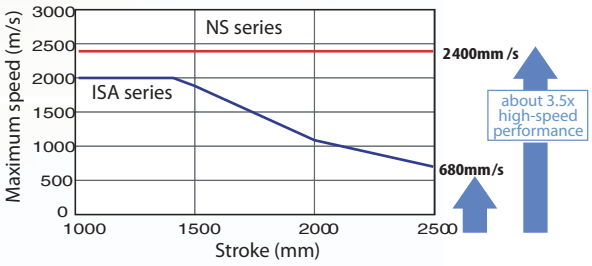



ISA series

NS series

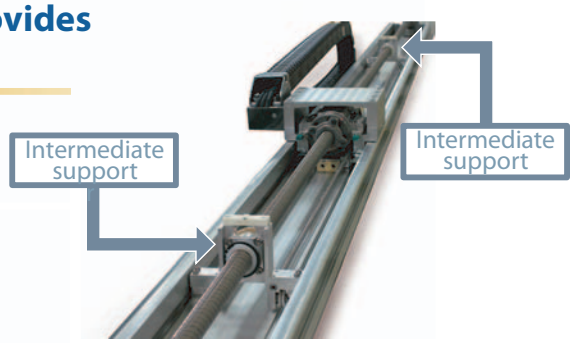
## 2 Maximum speed 2400 mm/s, maximum acceleration 1G high-speed performance

A maximum speed of 2400 mm/s is attained through the use of high-lead precision screws (equivalent to C5). Also, since there is minimal impact from dangerous rotation speeds, movement is possible at the maximum 2400 mm/s even at the maximum stroke (3000 mm), so the cycle time can be greatly reduced.



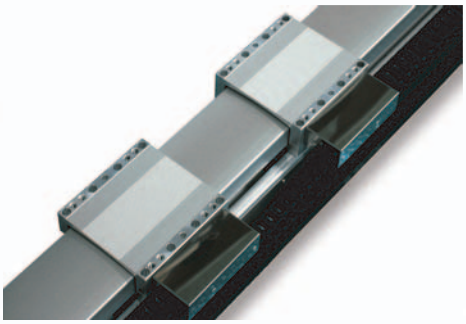

## 3 The intermediate support structure provides a long stroke of 3000 mm

The NS series combines nut rotation functions with the intermediate support structure that has proven itself in the ISA series to attain a 3000-mm stroke, stunning for a ball screw machine.



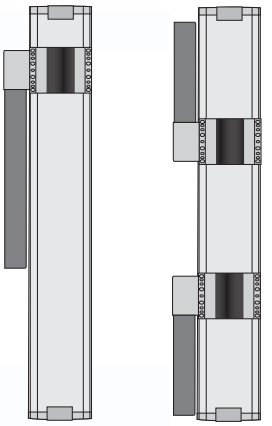

## 4 Multi-slider support (Equipped with collision prevention function)

Two sliders are set on one shaft and a multi-slider is set to operate them serarately. Since this makes it possible for two shafts to operate in the space of one shaft, it has a great effect in saving space and reducing takt time. The “collision prevention function” to prevent collisions between the sliders is standard equipment.



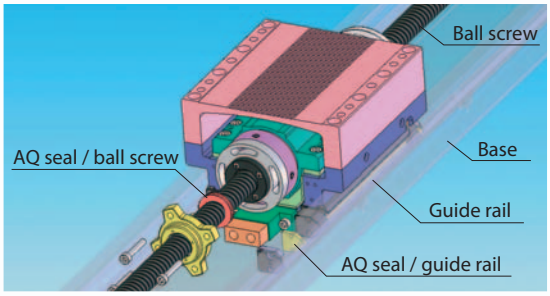
## 5 Vertical application (integrated brake)

For both single-slider and multi-slider, there are vertical versions with brake.



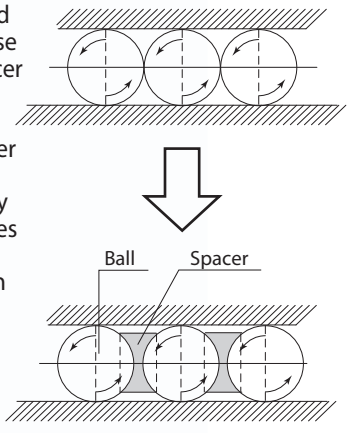

## 6 AQ seal

AQ seal is as standard equipped and provide maintenance free for long period: 3 years, 5000 km. Lubricant is supplied when the AQ seal is pushed against the guide or ball-screw surface (steel-ball rolling surface).




## 7 Retainer

Retainer is as standard equipped for low noise and a long life. A spacer (retainer) is inserted between guide balls (steel balls). The spacer eliminates annoying metal noise caused by colliding balls. It makes the guide movement smoother, resulting in improved slider operability.



# Model

**NS** — ☐ — ☐ — **400** — ☐ — ☐ — **T2** — ☐ — ☐

Series — Type — Encoder type — Motor type — Lead — Stroke — Adaptive controller — Cable length — Options

| | |
|---|---|
| **LXMS** | Horizontal specifications/ single slider |
| **LXMM** | Horizontal specifications/ multi-slider |
| **LXMXS** | Horizontal specifications/ single slider with intermediate support |
| **LZMS** | Vertical specifications/ single slider |
| **LZMM** | Vertical specifications/ multi-slider |

| | |
|---|---|
| **A** | Absolute |
| **I** | Incremental |

| | |
|---|---|
| **400** | **400 W** |

| | |
|---|---|
| **20** | **20 mm** |
| **40** | **40 mm** |

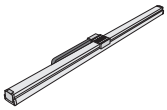
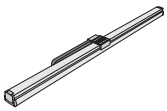
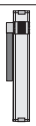
| | |
|---|---|
| **250** | **250 mm** |
| **~** | **~** |
| **3000** | **3000 mm** |

| | |
|---|---|
| **T2** | **SCON** |
| | **SSEL** |
| | **XSEL-P/Q** |

| | |
|---|---|
| **N** | No cable |
| **P** | 1 m |
| **S** | 3 m |
| **M** | 5 m |
| **X□□** | Length specified |
| | |

| | |
|---|---|
| **AQ** | AQ seal |
| **RT** | Guide with ball-retaining mechanism |
| **EU** | Metal cablejoint connector |
| **B** | Brakes (only for vertical specifications) |
| **C** | Creep sensor |
| **CT1** | Standard cable track direction 1 |
| **CT2** | Standard cable track direction 2 |
| **CT3** | Standard cable track direction 3 |
| **CT4** | Standard cable track direction 4 |
| **ET1** | Extension cable track direction 1 |
| **ET2** | Extension cable track direction 2 |
| **ET3** | Extension cable track direction 3 |
| **ET4** | Extension cable track direction 4 |
| **L** | Limit switch |

# Specifications Table

| | Slider | Appearance | Type | Encoder type | Motor type | Lead (mm) | Stroke (mm) | Rated thrust (N) | Maximum transportable weight (kg) | Maximum speed" (mm/s) | Page |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Horizontal specifications | Single slider |  | **LXMS** | Absolute Incremental | 400 | 40 | 500 - 2200 | 170 | 40 | 2400 | **P5** |
| | | | | | | 20 | | 340.1 | 80 | 1300 | |
| | Multi-slider |  | **LXMM** | | | 40 | 250 - 2250 | 170 | 40 | 2400 | **P6** |
| | | | | | | 20 | | 340.1 | 80 | 1300 | |
| Horizontal specifications with intermediate support | Single slider |  | **LXMXS** | | | 40 | 2300 - 3000 | 170 | 40 | 2400 | **P7** |
| | | | | | | 20 | | 340.1 | 80 | 1300 | |
| Vertical specifications | Single slider |  | **LZMS** | | | 20 | 500 - 1000 | 340.1 | 16 | 1000 | **P8** |
| | Multi-slider |  | **LZMM** | | | | 250 - 950 | | | | **P9** |

# Table of Payload By Acceleration Conditions

1. Horizontal installation

| Type | Motor output (W) | Lead (mm) | Maximum speed" (mm/s) | Maximum acceleration (G) | Payload by acceleration (kg) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0.3G | 0.4G | 0.5G | 0.6G | 0.7G | 0.8G | 0.9G | 1.0G |
| LXMS LXMM | 400 | 40 | 2400 | 1.0 | 40 | 30 | 25 | 20 | 17 | 15 | 13 | 10 |
| | | 20 | 1300 | 1.0 | 80 | 60 | 48 | 40 | 34 | 30 | 27 | 24 |
| LXMXS | | 40 | 2400 | 0.3 | 40 | — | — | — | — | — | — | — |
| | | 20 | 1300 | | 80 | — | — | — | — | — | — | — |

2. Vertical installation

| Type | Motor output (W) | Lead (mm) | Maximum speed" (mm/s) | Maximum acceleration (G) | Payload by acceleration (kg) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0.3G | 0.4G | 0.5G | 0.6G | 0.7G | 0.8G | 0.9G | 1.0G |
| LZMS LZMM | 400 | 20 | 1000 | 0.8 | 16 | 12.3 | 11.1 | 10.1 | 9.2 | 6 | — | — |

# Explanation of Main Unit Options

## Brakes

Model **B**

Explanation

This is a structure that holds the slider so that if the actuator is used vertically and the power is switched Off or the servo goes Off, the slider does not fall and damage installed items. In the NS series vertical specifications (LZMS/LZMM), brakes are standard equipment. (Brakes are not set for the horizontal specifications.)

## Creep sensor

Model **C**

Explanation

When the homing operation is carried out with the incremental specifications, in order to shorten the homing time, the slider is moved at high speed to just before the position and when it passes this sensor, the speed is dropped to resume normal homing operations. Since this sensor is mounted within the actuator itself, it does not affect the appearance or external dimensions.

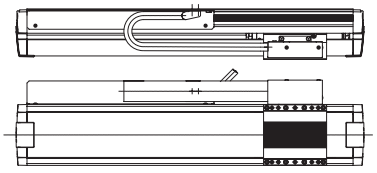
## Standard cable track installation direction change/extension cable track installation

Model **CT1/CT2/CT3/CT4** (standard cable track installation direction) **ET1/ET2/ET3/ET4** (extended cable track installation direction)

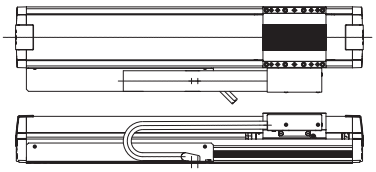
Explanation

The cable track installation direction can be selected from the following four types (including the standard installation direction).

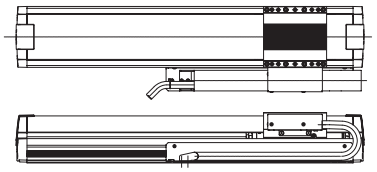
[Installation direction]



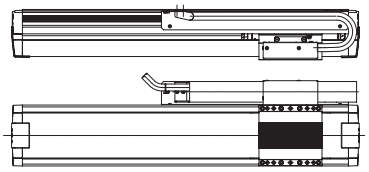
Installation direction 1 (standard)
Standard cable track: Symbol CT1
Extended cable track: Symbol ET1



Installation direction 2 (standard; different use)
Standard cable track: Symbol CT2
Extended cable track: Symbol ET2

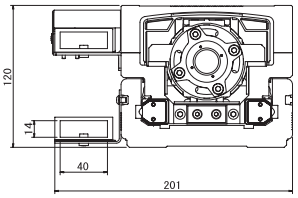


Installation direction 3 (standard; reverse origin)
Standard cable track: Symbol CT3
Extended cable track: Symbol ET3

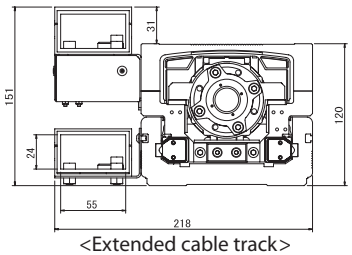


Installation direction 4 (CT2, origin reversed)
Standard cable track: Symbol CT4
Extended cable track: Symbol ET4

[Cable track internal dimensions]




<Standard cable track>




<Extended cable track>

## Origin limit switch

Model **L**

Explanation

Normal NS series homing operations use the "push contact technique" in which the origin is reached by bringing the slider in contact with a stopper, inverting, then detecting the Z phase. L (origin limit switch) is the option for executing the homing operation without contact by detecting using a proximity sensor, then inverting. Since origin limit switch is mounted within the actuator itself, it does not affect the appearance or external dimensions.

## AQ seal

Model **AQ**

Explanation

The AQ seal is a lubrication unit that utilizes lubrication material made of resin-solidified lubricant. The porous material impregnated with a large amount of lubricant allows lubricant to ooze onto its surface via the capillary effect. Combined use of the AQ seal and grease helps achieve maintenance-free for a long period.

## Guide with ball-retaining mechanism

Model **RT**

Explanation

A spacer (retainer) is inserted between guide balls (steel balls) to reduce noise while extending the service life of the guide. Since wear due to ball friction decreases, the service life of the guide will increase. Elimination of ball contact will make the guide movement smoother, resulting in improved slider operability.

## Metal cablejoint connector

Model **EU**

Explanation

Select this option for a motor/encoder cable with metal cable plugs (see back). Without this option plastic plugs are default. Cable lenghts up to 5 m are without surcharge, too.

# NS-LXMS

Single-axis robot nut rotation type Main unit width 145mm 400W horizontal specifications/single slider

## Model item

| NS | LXMS | | 400 | | | | T2 | | |
|---|---|---|---|---|---|---|---|---|---|
| Series | Type | Encoder type<br>A : Absolute<br>I : Incremental | Motor type<br>400:400W | Lead<br>40:40mm<br>20:20mm | Stroke<br>500:500mm<br>\|<br>2200:2200mm | Adaptive controller<br>T2:SCON<br>SSEL<br>XSEL-P/Q | Cable length<br>N:None<br>S :3m<br>M:5m<br>X:Length specified | Options<br>See option table below |

## Model/specs

| Model | Encoder type | Motor output (W) | Lead (mm) | Stroke (mm) | Speed (mm/s) | Acceleration (*1) | | | | Payload (*1, *2) | | | | Rated thrust (N) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Horizontal (G) | | Vertical (G) | | Horizontal (kg) | | Vertical (kg) | | |
| | | | | | | Rated | Maximum | Rated | Maximum | Rated / Maximum acceleration | | Rated / Maximum acceleration | | |
| NS-LXMS-[1]-400-40-[2]-T2-[3]-[4] | Absolute<br>Incremental | 400 | 40 | 500 - 2200 | 2400 | 0.3 | 1.0 | Horizontal only | | 40 | 10 | Horizontal only | | 170 |
| NS-LXMS-[1]-400-20-[2]-T2-[3]-[4] | | | 20 | | 1300 | 0.3 | 1.0 | | | 80 | 24 | | | 340.1 |

* For the model types above, [1] is the encoder type, [2] the stroke, [3] the cable length, and [4] the options.

## Options

| Name | Model | Reference page | Remarks |
|---|---|---|---|
| Creep sensor | C | P4 | |
| Standard cable track installation direction change | CT1 ~ CT4 | P4 | Although standard (CT1) please indicate |
| Extended cable track | ET1 ~ ET4 | P4 | |
| Limit switch | L | P4 | |
| AQ seal | AQ | P4 | Although standard please indicate |
| Guide with ball-retaining mechanism | RT | P4 | Although standard please indicate |
| Metal cablejoint connector | EU | P4 | Cable lenghts up to 5 m w/o surcharge |

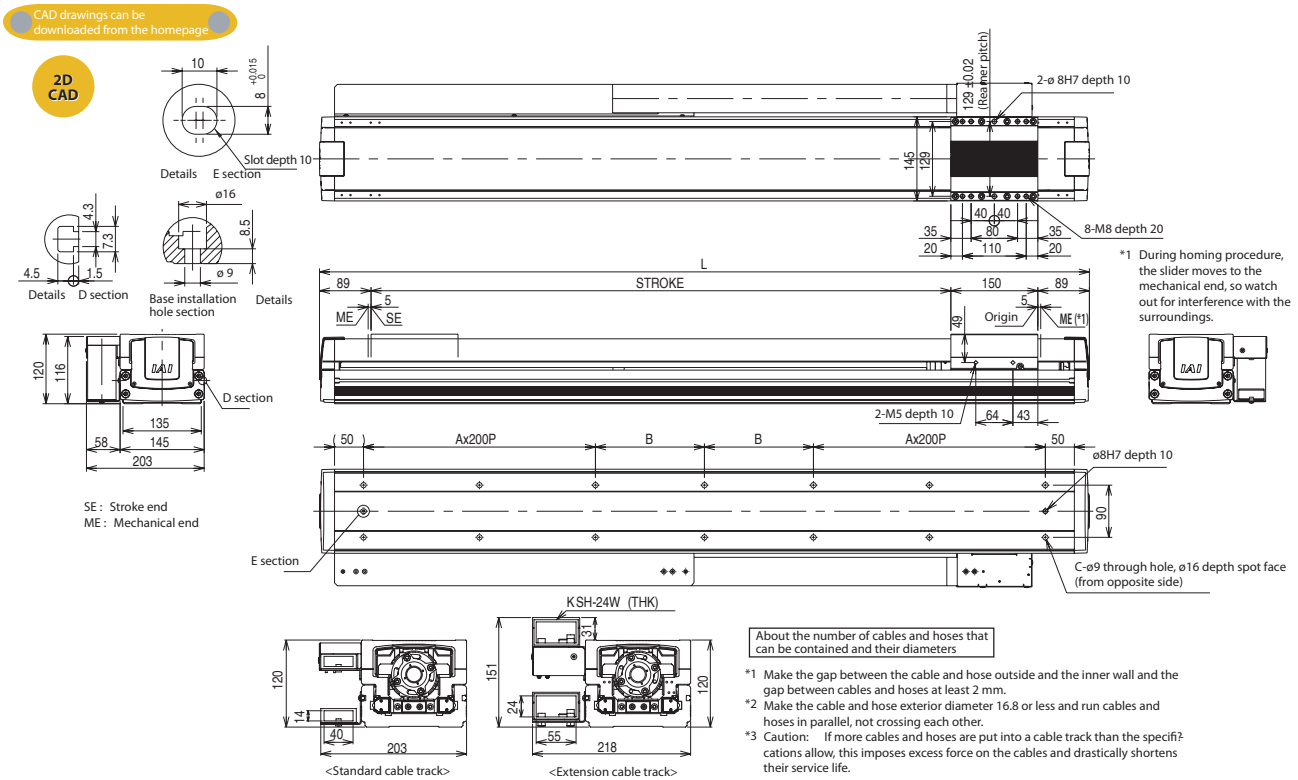
## Common specifications

| | |
|---|---|
| Drive type | Ball screw ø20 mm Equivalent to C5 form rolled |
| Repeatability | Absolute specifications ±0.01 mm/Incremental specifications ± 0.02 mm |
| Backlash | 0.02 mm max. |
| Guide | Base one-piece model |
| Permitted load moment | Ma: 104.9N m Mb: 149.9N m Mc :248.9N m |
| Extension load length | Ma direction: 750 mm max. Mb, Mc direction: 750 mm max. |
| Base | Material: Aluminum, white treated alumite |
| Cable length (*3) | N: No cable S: 3m M: 5m X: Length specified |
| Usage ambient temperature | 0-40º C, 85% RH max. (no condensation allowed) |

## Dimension diagram

CAD drawings can be downloaded from the homepage

2D CAD




*1 During homing procedure, the slider moves to the mechanical end, so watch out for interference with the surroundings.

About the number of cables and hoses that can be contained and their diameters

*1 Make the gap between the cable and hose outside and the inner wall and the gap between cables and hoses at least 2 mm.
*2 Make the cable and hose exterior diameter 16.8 or less and run cables and hoses in parallel, not crossing each other.
*3 Caution: If more cables and hoses are put into a cable track than the specifications allow, this imposes excess force on the cables and drastically shortens their service life.

| Stroke | 500 | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L | 828 | 928 | 1028 | 1128 | 1228 | 1328 | 1428 | 1528 | 1628 | 1728 | 1828 | 1928 | 2028 | 2128 | 2228 | 2328 | 2428 | 2528 |
| A | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 5 | 5 |
| B | 138 | 188 | 238 | 288 | 138 | 188 | 238 | 288 | 138 | 188 | 238 | 288 | 138 | 188 | 238 | 288 | 138 | 188 |
| C | 10 | 10 | 10 | 10 | 14 | 14 | 14 | 14 | 18 | 18 | 18 | 18 | 22 | 22 | 22 | 22 | 26 | 26 |
| Weight (kg) | 18.6 | 20.1 | 21.6 | 23.1 | 24.5 | 26.0 | 27.5 | 29.0 | 30.5 | 32.0 | 33.5 | 35.0 | 36.5 | 38.0 | 39.5 | 41.0 | 42.5 | 43.9 |

## Adaptive controller specifications

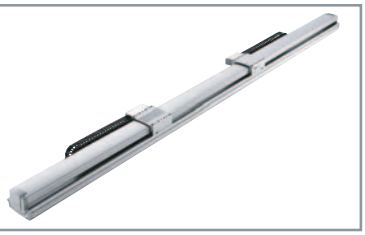
| Adaptive controller | Maximum number of axes controlled | Connectable encoder types | Operation method | Power supply voltage |
|---|---|---|---|---|
| X-SEL-P/Q | 6 axes | Absolute/ incremental | Program | Three phase/ single phase 230 VAC |
| SSEL | 2 axes | | | Single phase |
| SCON | 1axis | | Positioner pulse string control | 100/230 VAC |

**Notes**

Note 1: For details on the relationship between the acceleration and the payload, see Page 3.
Note 2: The payload is the value when operating at the maximum speed.
Note 3: The maximum cable length is 30 m. When specifying the length, enter in meters. (Example: X08=8 m)

# NS-LXMM

Single-axis robot nut rotation type Main unit width 145mm 400W
Horizontal specifications/multi-slider



## Model item

**NS — LXMM — □ — 400 — □ — □ — T2 — □ — □**

| NS | LXMM | □ | 400 | □ | □ | T2 | □ | □ |
|---|---|---|---|---|---|---|---|---|
| Series | Type | Encoder type<br>A : Absolute<br>I : Incremental | Motor type<br>400:400W | Lead<br>40:40mm<br>20:20mm | Stroke<br>250:250mm<br>\|<br>2250:2250mm | Adaptive controller<br>T2:SCON<br>SSEL<br>XSEL-P/Q | Cable length<br>N:None<br>S :3m<br>M:5m<br>X:Length specified | Options<br>See option table below |

## Model/specs

| Model | Encoder type | Motor output (W) | Lead (mm) | Stroke (mm) | Speed (mm) | Acceleration (*1) | | | | Payload (*1, *2) | | | | Rated thrust (N) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Horizontal (kg) | | Vertical (kg) | | Horizontal (kg) | | Vertical (kg) | | |
| | | | | | | Rated | Maximum | Rated | Maximum | Rated / Maximum acceleration | | Rated / Maximum acceleration | | |
| NS-LXMM-[1]-400-40-[2]-T2-[3]-[4] | Absolute Incremental | 400 | 40 | 250 ~ 2250 | 2400 | 0.3 | 1.0 | Horizontal only | | 40 | 10 | Horizontal only | | 170 |
| NS-LXMM-[1]-400-20-[2]-T2-[3]-[4] | | | 20 | | 1300 | 0.3 | 1.0 | | | 80 | 24 | | | 340.1 |

* For the model types above, [1] is the encoder type, [2] the stroke, [3] the cable length, and [4] the options.

## Options

| Name | Model | Reference page | Remarks |
|---|---|---|---|
| Creep sensor | C | P4 | |
| Standard/Extended cable pair | CT1/ET1 | P4 | Although standard (CT1) please indicate |
| Limit switch | L | P4 | |
| AQ seal | AQ | P4 | Although standard please indicate |
| Guide with ball-retaining mechanism | RT | P4 | Although standard please indicate |
| Metal cablejoint connector | EU | P4 | Cable lenghts up to 5 m w/o surcharge |

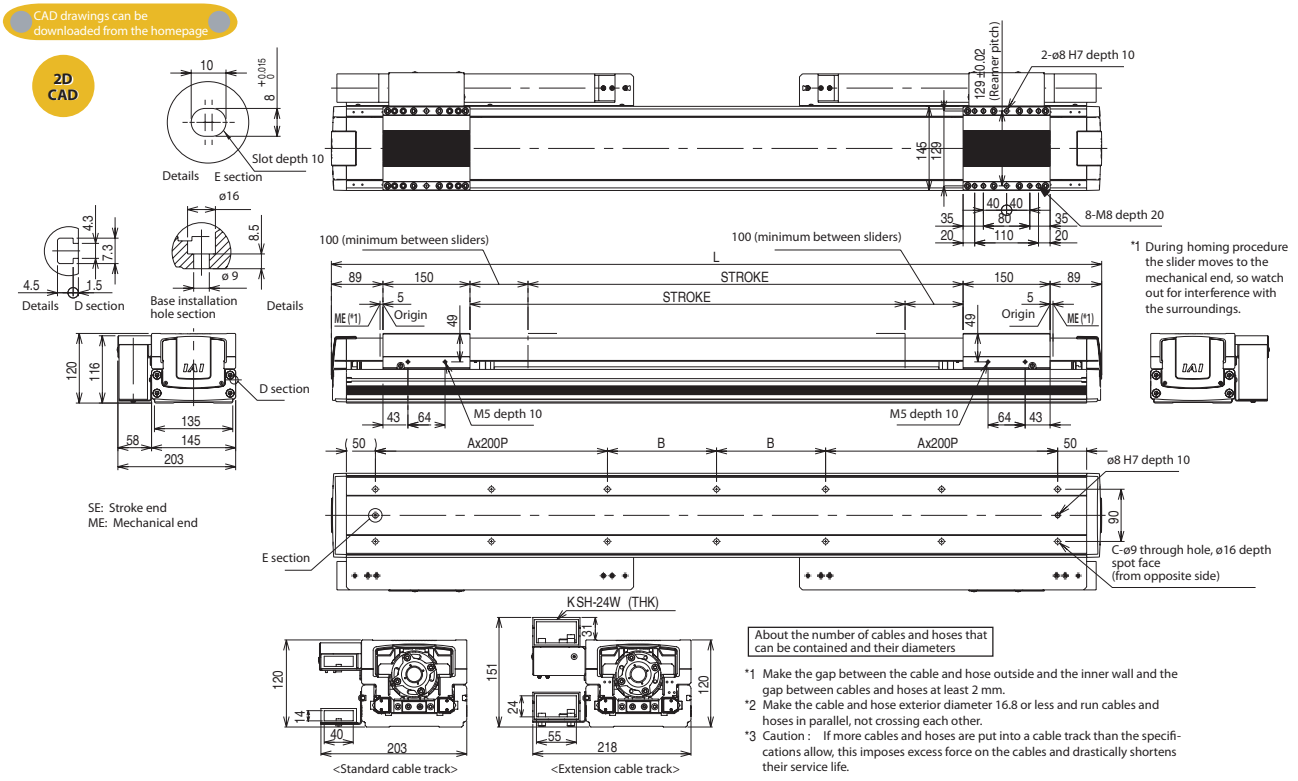
## Common specifications

| | |
|---|---|
| Drive type | Ball screw ø20 mm Equivalent to C5 form rolled |
| Repeatability | Absolute specifications ±0.01 mm/Incremental specifications ± 0.02 mm |
| Backlash | 0.02 mm max. |
| Guide | Base one-piece model |
| Permitted load moment | Ma:104.9N m Mb:149.9N m Mc:248.9N m |
| Extension load length | Ma direction: 750 mm max. Mb, Mc directions: 750 mm max. |
| Base | Material: Aluminum, white treated alumite |
| Cable length (*3) | N: No cable S: 3m M: 5m X: Length specified |
| Usage ambient temperature | 0-40º C, 85% RH max. (no condensation allowed) |

## Dimension diagram

CAD drawings can be downloaded from the homepage

2D CAD




*1 During homing procedure the slider moves to the mechanical end, so watch out for interference with the surroundings.

About the number of cables and hoses that can be contained and their diameters

*1 Make the gap between the cable and hose outside and the inner wall and the gap between cables and hoses at least 2 mm.
*2 Make the cable and hose exterior diameter 16.8 or less and run cables and hoses in parallel, not crossing each other.
*3 Caution : If more cables and hoses are put into a cable track than the specifications allow, this imposes excess force on the cables and drastically shortens their service life.

| Stroke | 250 | 350 | 450 | 550 | 650 | 750 | 850 | 950 | 1050 | 1150 | 1250 | 1350 | 1450 | 1550 | 1650 | 1750 | 1850 | 1950 | 2050 | 2150 | 2250 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L | 828 | 928 | 1028 | 1128 | 1228 | 1328 | 1428 | 1528 | 1628 | 1728 | 1828 | 1928 | 2028 | 2128 | 2228 | 2328 | 2428 | 2528 | 2628 | 2728 | 2828 |
| A | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 6 |
| B | 138 | 188 | 238 | 288 | 138 | 188 | 238 | 288 | 138 | 188 | 238 | 288 | 138 | 188 | 238 | 288 | 138 | 188 | 238 | 288 | 138 |
| C | 10 | 10 | 10 | 10 | 14 | 14 | 14 | 14 | 18 | 18 | 18 | 18 | 22 | 22 | 22 | 22 | 26 | 26 | 26 | 26 | 30 |
| Weight (kg) | 24.7 | 26.4 | 28.2 | 29.9 | 31.6 | 33.4 | 35.1 | 36.8 | 38.6 | 40.3 | 42 | 43.8 | 45.5 | 47.2 | 48.9 | 50.7 | 52.4 | 54.1 | 55.9 | 57.6 | 59.3 |

## Adaptive controller specifications

| Adaptive controller | Maximum number of axes controlled | Connectable encoder types | Operation method | Power supply voltage |
|---|---|---|---|---|
| X-SEL-P/Q | 6 axes | Absolute/ incremental | Program | Three phase/ single 230VAC |
| SSEL | 2 axes | | | Single phase 100/230 VAC |
| SCON | 1axis | | Positioner pulse string control | |

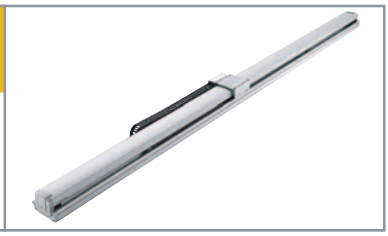
Remarks: For multislider axis, 2-axes controller is required. In case of SCON, two SCONs are necessary. (Please be reminded that there is no collision safety function for SCON)

**Notes**

Note 1: For details on the relationship between the acceleration and the payload, see Page 3.
Note 2: The payload is the value when operating at the maximum speed.
Note 3: The maximum cable length is 30 m. When specifying the length, enter in meters. (Example: X08=8 m)

# NS-LXMXS

Single-axis robot nut rotation type, Main unit width 145mm 400W
Horizontal specifications, single slider with intermediate support



## Model item

**NS — LXMXS — □ — 400 — □ — □ — T2 — □ — □**

| NS | LXMXS | □ | 400 | □ | □ | T2 | □ | □ |
|---|---|---|---|---|---|---|---|---|
| Series | Type | Encoder type<br>A : Absolute<br>I : Incremental | Motor type<br>400:400W | Lead<br>40:40mm<br>20:20mm | Stroke<br>2300:2300mm<br>\|<br>3000:3000mm | Adaptive controller<br>T2:SCON<br>SSEL<br>XSEL-P/Q | Cable length<br>N:None<br>S :3m<br>M:5m<br>X:Length specified | Options<br>See option table below |

## Model/specs

| Model | Encoder type | Motor output (W) | Lead (mm) | Stroke (mm) | Speed (mm) | Acceleration (*1) | | | | Payload (*1, *2) | | Rated thrust (N) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Horizontal (kg) | | Vertical (kg) | | Horizontal (kg) | Vertical (kg) | |
| | | | | | | Rated | Maximum | Rated | Maximum | Rated / Maximum acceleration | Rated / Maximum acceleration | |
| NS-LXMXS-□-400-40-□-T2-□-□ | Horizontal only | 400 | 40 | 2300 ~ 3000 | 2400 | 0.3 | | Horizontal only | | 40 | Horizontal only | 170 |
| NS-LXMXS-□-400-20-□-T2-□-□ | | | 20 | | 1300 | 0.3 | | | | 80 | | 340.1 |

* For the model types above, □1 is the encoder type, □2 the stroke, □3 the cable length, and □4 the options.

## Options

| Name | Model | Reference page | Remarks |
|---|---|---|---|
| Creep sensor | C | P4 | |
| Standard cable track installation direction change | CT1 ~ CT4 | P4 | Although standard (CT1) please indicate |
| Extended cable track | ET1 ~ ET4 | P4 | |
| Limit switch | L | P4 | |
| AQ seal | AQ | P4 | Although standard please indicate |
| Guide with ball-retaining mechanism | RT | P4 | Although standard please indicate |
| Metal cablejoint connector | EU | P4 | Cable lenghts up to 5 m w/o surcharge |

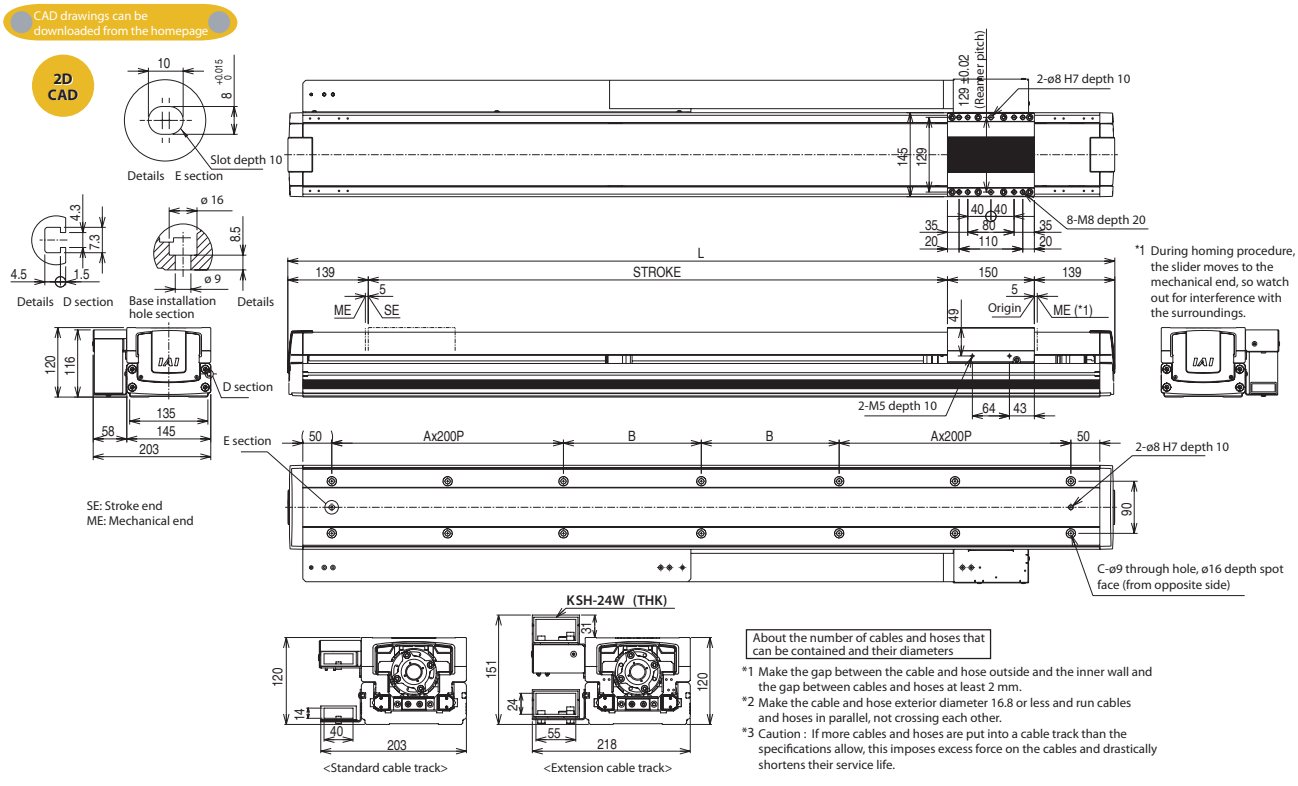
## Common specifications

| | |
|---|---|
| Drive type | Ball screw ø20 mm Equivalent to C5 form rolled |
| Repeatability | Absolute specifications ±0.01 mm/Incremental specifications ± 0.02 mm |
| Backlash | 0.02 mm max. |
| Guide | Base one-piece model |
| Permitted load moment | Ma:104.9N m Mb:149.9N m Mc:248.9N m |
| Extension load length | Ma direction: 750 mm max. Mb, Mc directions: 750 mm max. |
| Base | Material: Aluminum, white treated alumite |
| Cable length (*3) | N: No cable S: 3m M: 5m X: Length specified |
| Usage ambient temperature | 0-40º C, 85% RH max. (no condensation allowed) |

## Dimension diagram

CAD drawings can be downloaded from the homepage

2D CAD




*1 During homing procedure, the slider moves to the mechanical end, so watch out for interference with the surroundings.




About the number of cables and hoses that can be contained and their diameters

*1 Make the gap between the cable and hose outside and the inner wall and the gap between cables and hoses at least 2 mm.
*2 Make the cable and hose exterior diameter 16.8 or less and run cables and hoses in parallel, not crossing each other.
*3 Caution : If more cables and hoses are put into a cable track than the specifications allow, this imposes excess force on the cables and drastically shortens their service life.

| Stroke | 2300 | 2400 | 2500 | 2600 | 2700 | 2800 | 2900 | 3000 |
|---|---|---|---|---|---|---|---|---|
| L | 2728 | 2828 | 2928 | 3028 | 3128 | 3228 | 3328 | 3428 |
| A | 5 | 6 | 6 | 6 | 6 | 7 | 7 | 7 |
| B | 288 | 138 | 188 | 238 | 288 | 138 | 188 | 238 |
| C | 26 | 30 | 30 | 30 | 30 | 34 | 34 | 34 |
| Weight (kg) | 46.4 | 47.9 | 49.4 | 50.9 | 52.3 | 53.8 | 55.3 | 56.8 |

## Adaptive controller specifications

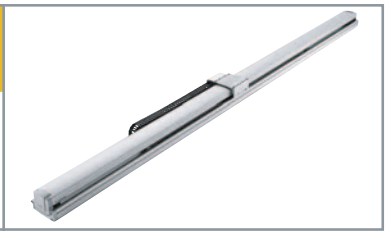
| Adaptive controller | Maximum number of axes controlled | Connectable encoder types | Operation method | Power supply voltage |
|---|---|---|---|---|
| X-SEL-P/Q | 6 axes | Absolute/ incremental | Program | Three phase/ single phase 230 VAC |
| SSEL | 2 axes | | | Single phase 100/230 VAC |
| SCON | 1 axis | | Positioner pulse string control | |

**Notes**

Note 1: The maximum acceleration is 0.3 G.
Note 2: The payload is the value when operating at the maximum speed.
Note 3: The maximum cable length is 30 m. When specifying the length, enter in meters. (Example: X08=8 m)

# NS-LZMS

Single-axis robot nut rotation type, Main unit width 145mm 400W
Vertical specifications, single slider



## Model item

| NS | LZMS | □ | 400 | □ | □ | T2 | □ | □ |
|---|---|---|---|---|---|---|---|---|
| Series | Type | Encoder type<br>A : Absolute<br>I : Incremental | Motor type<br>400:400W | Lead<br>40:40mm | Stroke<br>500:500mm<br>\|<br>1000:1000mm | Adaptive controller<br>T2:SCON<br>SSEL<br>XSEL-P/Q | Cable length<br>N:None<br>S :3m<br>M:5m<br>X:Length specified | Options<br>See the option price table below. |

## Model/specs

| Model | Encoder type | Motor output (W) | Lead (mm) | Stroke (mm) | Maximum speed (m/s) | Acceleration (*1) | | | | Payload (*1, *2) | | | Rated thrust (N) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Horizontal (G) | | Vertical (G) | | Horizontal (kg) | Vertical (G) | | |
| | | | | | | Rated | Maximum | Rated | Maximum | Rated / Maximum acceleration | Rated / Maximum acceleration | | |
| NS-LZMS-□-400-40-□-T2-□-B-□ | Absolute Incremental | 400 | 20 | 500 ~1000 | 1000 | For vertical only | | 0.3 | 0.8 | For vertical only | 16 | 6.0 | 340.1 |

* For the model types above, □1 is the encoder type, □2 the stroke, □3 the cable length, and □4 the options.

## Options

| Name | Model | See Page | Remarks |
|---|---|---|---|
| Brakes | B | P4 | Although standard please indicate |
| Creep sensor | C | P4 | |
| Standard cable track installation direction change | CT1 ~ CT4 | P4 | Although standard (CT1) please indicate |
| Extended cable track | ET1 ~ ET4 | P4 | |
| Limit switch | L | P4 | |
| AQ seal | AQ | P4 | Although standard please indicate |
| Guide with ball-retaining mechanism | RT | P4 | Although standard please indicate |
| Metal cablejoint connector | EU | P4 | Cable lenghts up to 5 m w/o surcharge |

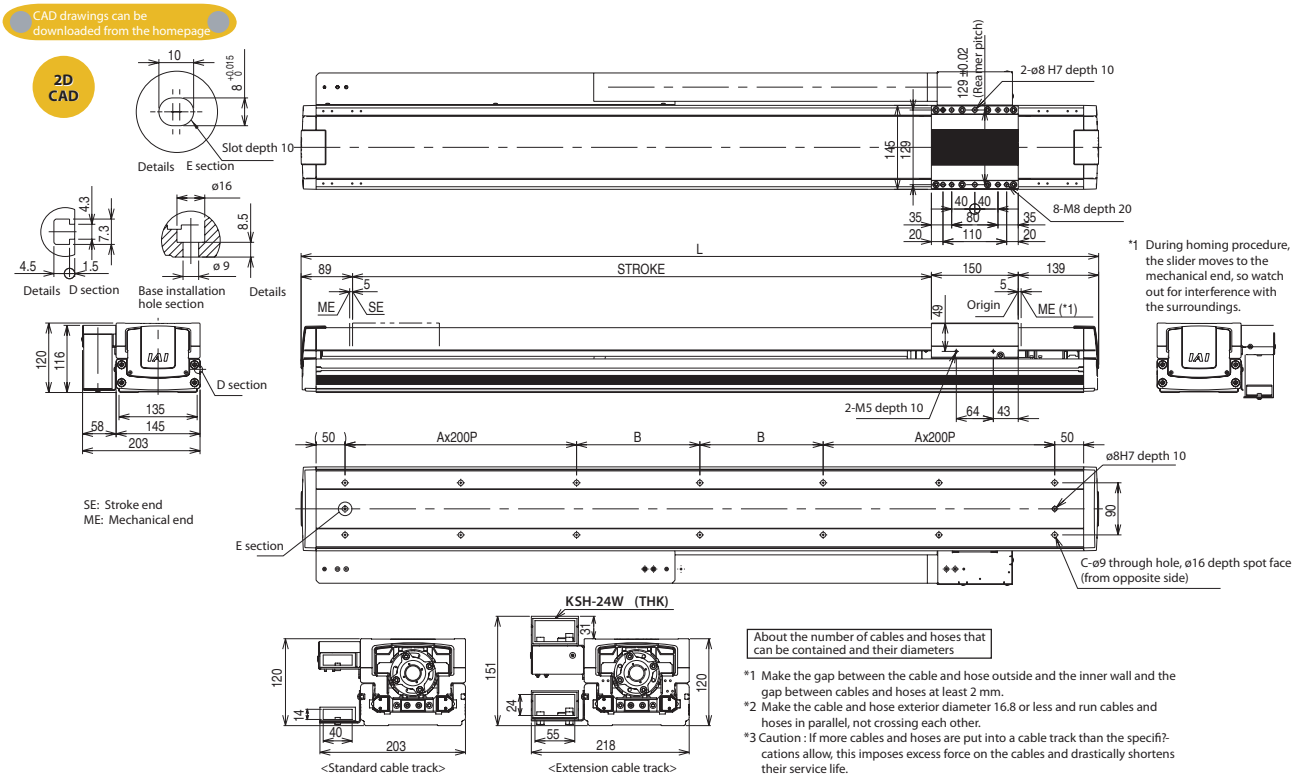
## Common specifications

| | |
|---|---|
| Drive type | Ball screw ø20 mm Equivalent to C5 form rolled |
| Repeatability | Absolute specifications ±0.01 mm/Incremental specifications ± 0.02 mm |
| Backlash | 0.02 mm max. |
| Guide | Base one-piece model |
| Permitted load moment | Ma:104.9N m Mb:149.9N m Mc:248.9N m |
| Extension load length | Ma direction: 750 mm max. Mb, Mc directions: 750 mm max. |
| Brakes | Non-excitation operation electromagnetic brakes standard equipment |
| Base | Material: Aluminum, white treated alumite |
| Cable length (*3) | N: No cable S: 3m M: 5m X: Length specified |
| Usage ambient temperature | 0-40° C, 85% RH max. (no condensation allowed) |

## Dimension diagram

CAD drawings can be downloaded from the homepage

2D CAD




*1 During homing procedure, the slider moves to the mechanical end, so watch out for interference with the surroundings.



KSH-24W (THK)




About the number of cables and hoses that can be contained and their diameters

*1 Make the gap between the cable and hose outside and the inner wall and the gap between cables and hoses at least 2 mm.
*2 Make the cable and hose exterior diameter 16.8 or less and run cables and hoses in parallel, not crossing each other.
*3 Caution : If more cables and hoses are put into a cable track than the specifi?-cations allow, this imposes excess force on the cables and drastically shortens their service life.

| Stroke | 500 | 600 | 700 | 800 | 900 | 1000 |
|---|---|---|---|---|---|---|
| L | 878 | 978 | 1078 | 1178 | 1278 | 1378 |
| A | 1 | 1 | 1 | 2 | 2 | 2 |
| B | 163 | 213 | 263 | 113 | 163 | 213 |
| C | 10 | 10 | 10 | 14 | 14 | 14 |
| Weight (kg) | 19.9 | 21.4 | 22.9 | 24.4 | 25.9 | 27.4 |

## Adaptive controller specifications

| Adaptive controller | Maximum number of axes controlled | Connectable encoder types | Operation method | Power supply voltage |
|---|---|---|---|---|
| X-SEL-P/Q | 6 axes | Absolute/ incremental | Program | Three phase/ single phase 230 VAC |
| SSEL | 2 axes | | | |
| SCON | 1 axis | | Positioner pulse string control | Single phase 100/230 VAC |

**Notes**

Note 1: For details on the relationship between the acceleration and the payload, see Page 3.
Note 2: The payload is the value when operating at the maximum speed.
Note 3: The maximum cable length is 30 m. When specifying the length, enter in meters. (Example: X08=8 m)

# NS-LZMM

Single-axis robot nut rotation type, Main unit width 145 mm 400W
Vertical specification multi-slider

## Model item

**NS** — **LZMM** — [ ] — **400** — [ ] — [ ] — **T2** — [ ] — [ ]

| NS | LZMM | [ ] | 400 | [ ] | [ ] | T2 | [ ] | [ ] |
|---|---|---|---|---|---|---|---|---|
| Series | Type | Encoder type<br>A : Absolute<br>I : Incremental | Motor type<br>400:400W | Lead<br>20:20mm | Stroke<br>250:250mm<br>\|<br>950:950mm | Adaptive controller<br>T2:SCON<br>SSEL<br>XSEL-P/Q | Cable length<br>N:None<br>S :3m<br>M:5m<br>X:Length specified | Options<br>Option table below<br>Reference |

## Model/specs

| Model | Encoder type | Motor output (W) | Lead (mm) | Stroke (mm) | Speed (mm/s) | Acceleration (*1) | | | | Payload (*1, *2) | | | Rated propulsion |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Horizontal (G) | | Vertical (G) | | Horizontal (G) | Vertical (G) | | |
| | | | | | | Ratings | Maximum | Ratings | Maximum | Ratings / Maximum acceleration | Ratings / Maximum acceleration | | |
| NS-LZMM- [1] -400-20- [2] -T2- [3] -B- [4] | Absolute Incremental | 400 | 20 | 250 ~ 950 | 1000 | Vertical only | 0.3 | 0.8 | | Vertical only | 16 | 6.0 | 340.1 |

* For the model type above, [1] is the encoder type, [2] the stroke, [3] the cable length, and [4] the options.

## Options

| Name | Model | Reference page | Remarks |
|---|---|---|---|
| Brakes | B | P4 | Although standard please indicate |
| Creep sensor | C | P4 | |
| Standard/Extended cable pair | CT1/ET1 | P4 | Although standard (CT1) please indicate |
| Limit switch | L | P4 | |
| AQ seal | AQ | P4 | Although standard please indicate |
| Guide with ball-retaining mechanism | RT | P4 | Although standard please indicate |
| Metal cablejoint connector | EU | P4 | Cable lenghts up to 5 m w/o surcharge |

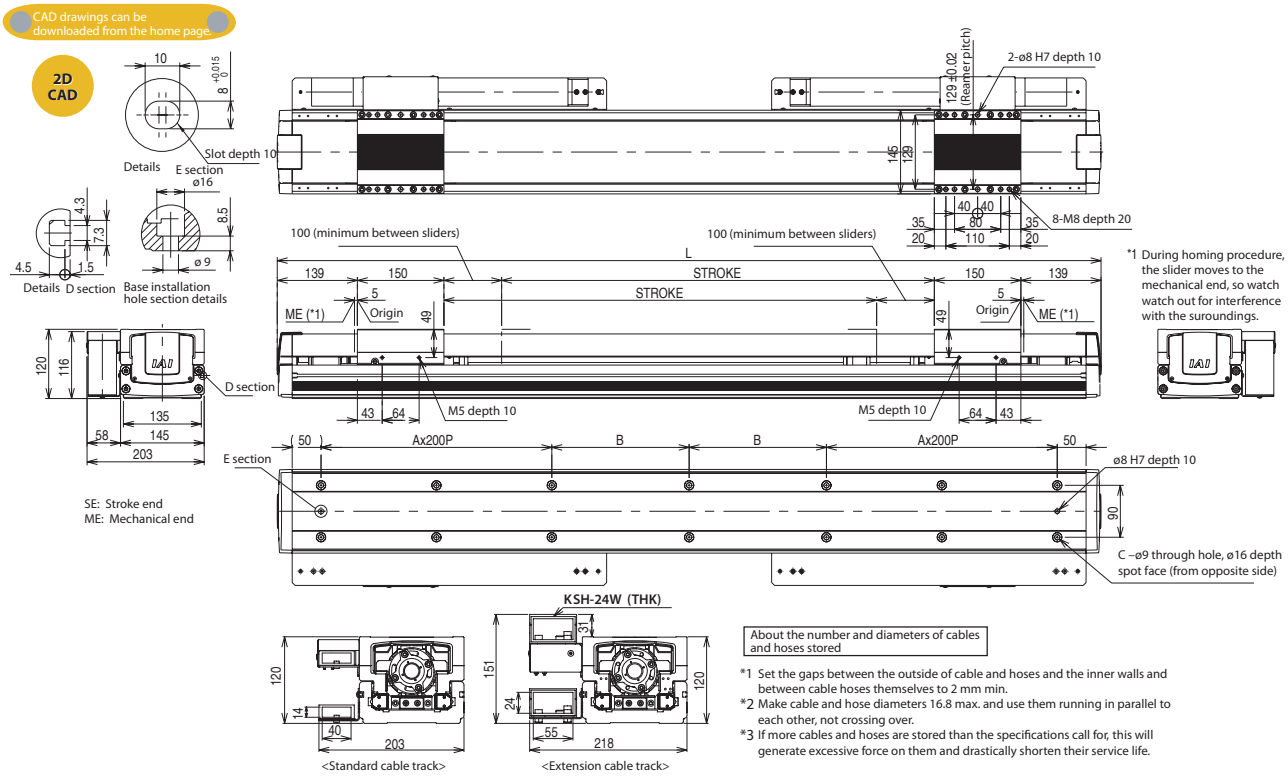
## Common specifications

| | |
|---|---|
| Drive type | Ball screw ø20 mm Equivalent to C5 form rolled |
| Repeatability | Absolute specifications ±0.01 mm/Incremental specifications ± 0.02 mm |
| Backlash | 0.02 mm max. |
| Guide | Base one-piece model |
| Permitted load moment | Ma:104.9N m Mb:149.9N m Mc:248.9N m |
| Extended load length | Ma direction: 750 mm max. Mb, Mc direction: 750 mm max. |
| Brakes | Non-excitation operating electromagnetic brakes standard |
| Base | Material: Aluminum, white treated alumite |
| Cable length (*3) | N: No cable S: 3m M: 5m X: Length specified |
| Usage temperature | 0-40° C, 85% RH max. (no condensation allowed) |

## Dimensional diagam

CAD drawings can be downloaded from the home page.

2D CAD







About the number and diameters of cables and hoses stored

*1 Set the gaps between the outside of cable and hoses and the inner walls and between cable hoses themselves to 2 mm min.
*2 Make cable and hose diameters 16.8 max. and use them running in parallel to each other, not crossing over.
*3 If more cables and hoses are stored than the specifications call for, this will generate excessive force on them and drastically shorten their service life.

| Stroke | 250 | 350 | 450 | 550 | 650 | 750 | 850 | 950 |
|---|---|---|---|---|---|---|---|---|
| L | 928 | 1028 | 1128 | 1228 | 1328 | 1428 | 1528 | 1628 |
| A | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 |
| B | 188 | 238 | 288 | 138 | 188 | 238 | 288 | 138 |
| C | 10 | 10 | 10 | 14 | 14 | 14 | 14 | 18 |
| Weight (kg) | 27.1 | 28.8 | 30.5 | 32.2 | 34 | 35.7 | 37.4 | 39.2 |

## Adaptive controller specifications

| Adaptive controller | Maximum number of axes controlled | Connectable encoder types | Operation dimensions | Power supply voltage |
|---|---|---|---|---|
| X-SEL-P/Q | 6 axes | Absolute/ incremental | Program | Three phase/ single phase 230VAC |
| SSEL | 2 axes | | | |
| SCON | 1axis | | Positioner pulse string control | Single phase 100/230VAC |

Remarks: For multislider axis, 2-axes controller is required. In case of SCON, two SCONs are necessary. (Please be reminded that there is no collision safety function for SCON)

**Notes**

Note 1: For the relationship between the acceleration and the payload, see Page 3.

Note 2: The payload is the value when operating at the maximum speed.

Note 3: The maximum cable length is 30 m. Enter the length specification in meters. (Example: X08=8 m)

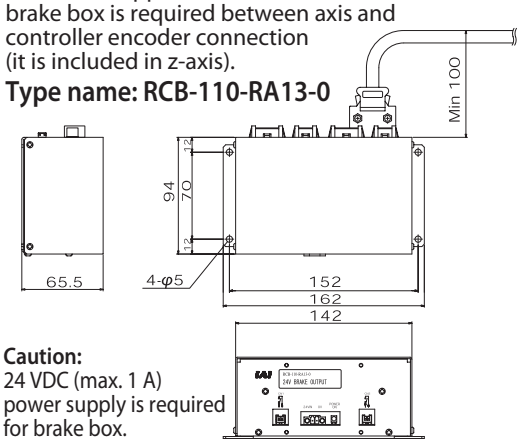
# Controller specifications

| | Controller series type | SCON | SSEL | XSEL | |
|---|---|---|---|---|---|
| | | | | P (Standard) Type | Q (Global) Type |
| Basic specifications | Appearance |  |  |  |  |
| | Power supply capacity | 844 VA | 1660 VA max. (for 400W, 2-axis operation) | 4998 VA max. (for 2400W, 6-axis operation) | |
| | Input power supply | Single phase 230 VAC | Single phase 100 VAC<br>Single phase 230 VAC | Three-phase 200 VAC<br>Single phase 230 VAC | |
| | Within operating power supply voltage | ±10% | | | |
| Control specifications | Maximum connected total axis output (W) | 750W (230V power supply specifications) | 400W (100V power supply specifications) 800W (230V power supply specifications) | 2400W (for three-phase power)<br>1600W (for single-phase power) | |
| | Maximum number of axes controlled | 1 axis | 2 axis | 6 axis | |
| | Position detection technique | Incremental encoder/absolute encoder | | | |
| | Drive power cut-off | Internal relay cut-off | | Internal relay cut-off | External safety circuit |
| | Operation technique | Positioner operation<br>Pulse string control | Program operation<br>Positioner operation<br>(Switchable) | Program operation only | |
| Program | Program count | -- | 64 | | |
| | Program step count | -- | 2000 | 6000 | |
| | Multi-task program count | -- | 8 | 16 | |
| | Position count | 512 max. | 1500 | 4000 | |
| | Data input device (Option) | Teaching box<br>Model: CON-T-ENG<br><br>Software for PC<br>Model: RCM-101-MW<br>(for RS232 communications)<br>RCM-101-USB<br>(for USB communications) | Teaching box<br>Model: SEL-T/TD-J<br><br>Software for PC<br>Model: IA-101-X-MW-J<br>(for RS232 communications)<br>IA-101-X-USB<br>(for USB communications) | Teaching box<br>Model: SEL-T/TD<br><br>Software for PC<br>Model: IA-101-X-MW<br>(for RS232 communications)<br>IA-101-X-USB<br>(for USB communications) | Teaching box<br>Models: SEL-TD, IA-T-XA<br><br>Software for PC<br>Model: IA-101-XA-MW<br>(for RS232 communications)<br>Safety category support<br>(with cable) |
| Input/output communications | Standard I/O | 16 inputs/16 outputs<br>(NPN/PMP selectable) | 24 inputs/8 outputs<br>(NPN/PMP selectable) | 32 inputs/16 outputs<br>(NPN/PMP selectable) | |
| | Expanded I/O | Not possible | | 192 inputs max./192 outputs max. | |
| | Field network | DeviceNet, CC-Link, ProfiBus | (Future support planned) | DeviceNet, CC-Link, ProfiBus, Ethernet | |
| General specifications | Usage ambient temperature and humidity | 0-40º C, 10-95% (no condensation allowed) | | | |
| | Usage ambient atmosphere | There must be no corrosive gas and dust must not be particularly bad. | | | |
| | External dimensions | 72(W)×200.5(H)×121(D) | 100 (W) x 202.6 (H) x 126 (D)<br>When absolute battery mounted | 340 (W) x 195 (H) x 125.3 (D)<br>(For 6-axis absolute specifications) | |
| | Weight | 1.1kg | 1.4kg | 5.7 kg (for 6-axis absolute specifications) | |
| | Accessories | I/O flat cable (40 lines) | I/O flat cable (34 lines) | I/O flat cable (50 lines) | |

## Brake box (included in z-axis)

For vertical application (LZMS/LZMM), brake box is required between axis and controller encoder connection (it is included in z-axis).

**Type name: RCB-110-RA13-0**




**Caution:**
24 VDC (max. 1 A) power supply is required for brake box.

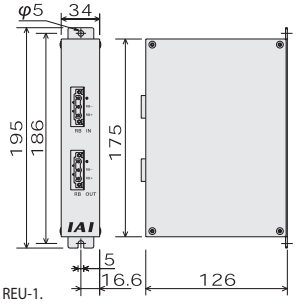
## Regenerative resistance unit

**Features:** This unit returns regenerative electric current when the motor builds heat as it decelerates. Please verify the total W of the actuator from charge below, as it is necessary to make preparations to the regenerative resistance.

**Models:** **REU-1 (XSEL)**
**REU-2 (SCON/SSEL)**

| | Horizontal | | | Vertical | | |
|---|---|---|---|---|---|---|
| Units | XSEL | SSEL | SCON | XSEL | SSEL | SCON |
| 0 | ~200W | ~800W | ~200W | ~100W | ~200W | ~100W |
| 1 | ~1000W | | ~750W | ~800W | ~600W | ~400W |
| 2 | ~1500W | | | ~1200W | ~800W | ~750W |
| 3 | ~2000W | | | ~1600W | | |
| 4 | | | | ~2000W | | |
| 5 | | | | ~2400W | | |

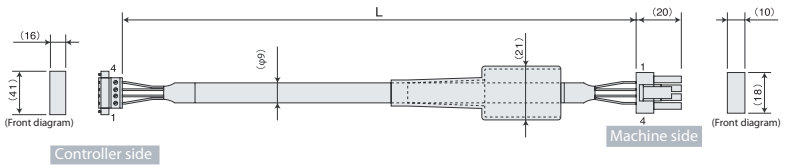
**Notes:**
1) There may be more times when regenerative resistance is needed than listed above depending on operating conditions.
2) SCON/SSEL: If 2 units are necessary, please arrange one each of REU-2 and REU-1.



## Motor cable (for XSEL-KE/KT/P/Q, SSEL, SCON) *

Model **CB-X-MA□□□/CB-XEU-MA□□□** ("EU": Cable option, see fig. down)

Enter the cable length (L) at □□□. Up to 30 meters is supported. Example: 080=8 m



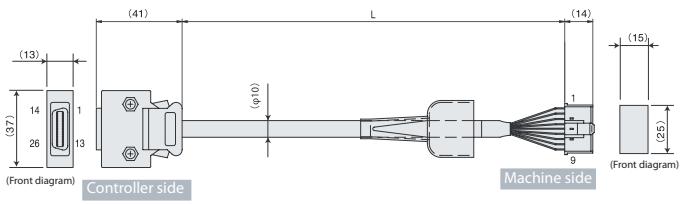

| Wire | Color | Signal | No. |
|---|---|---|---|
| 0.75sq | Green | PE | 1 |
| | Red | U | 2 |
| | White | V | 3 |
| | Black | W | 4 |

| No. | Signal | Color | Wire |
|---|---|---|---|
| 1 | U | Red | 0.75sq (press fit) |
| 2 | V | White | |
| 3 | W | Black | |
| 4 | PE | Green | |

## Encoder cable (for XSEL-P/Q, SSEL, SCON)

Model **CB-X3-PA□□□/CB-X3EU-PA□□□** ("EU": Cable option, see fig. down)

Enter the cable length (L) at □□□. Up to 30 meters is supported. Example: 080=8 m




| Wire | Color | Signal | No. |
|---|---|---|---|
| AWG26 (soldered) | — | — | 10 |
| | — | — | 11 |
| | — | E24V | 12 |
| | — | 0V | 13 |
| | — | LS | 26 |
| | — | CLEEP | 25 |
| | — | OT | 24 |
| | — | RSV | 23 |
| | — | — | 9 |
| | — | — | 18 |
| | — | — | 19 |
| | White/blue | A+ | 1 |
| | White/yellow | A− | 2 |
| | White/red | B+ | 3 |
| | White/black | B− | 4 |
| | White/purple | Z+ | 5 |
| | White/gray | Z− | 6 |
| | Orange | SRD+ | 7 |
| | Green | SRD− | 8 |
| | Purple | BAT+ | 14 |
| | Gray | BAT− | 15 |
| | Red | VCC | 16 |
| | Black | GND | 17 |
| | Blue | BKR− | 20 |
| | Yellow | BKR+ | 21 |
| | — | — | 22 |

The shield is clamped to the hood.

Drain line and shield braid

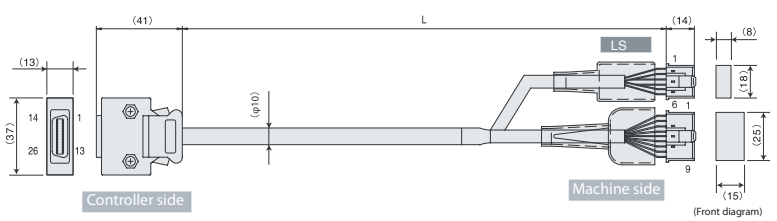
(The wire colors white/blue show the band color/insulation color.)

| No. | Signal | Color | Wire |
|---|---|---|---|
| 1 | A | White/blue | AWG26 (press fit) |
| 2 | A | White/yellow | |
| 3 | B | White/red | |
| 4 | B | White/black | |
| 5 | Z | White/purple | |
| 6 | Z | White/gray | |
| 7 | — | — | |
| 8 | — | — | |
| 9 | FG | Drain | |
| 10 | SD | Orange | |
| 11 | SD | Green | |
| 12 | BAT+ | Purple | |
| 13 | BAT− | Gray | |
| 14 | VCC | Red | |
| 15 | GND | Black | |
| 16 | — | — | |
| 17 | BK− | Blue | |
| 18 | BK+ | Yellow | |

## Encoder cable (for XSEL-P/Q, SSEL, SCON, specifications with limit switch)

Model **CB-X3-PLA□□□/CB-X3EU-PLA□□□** ("EU": Cable option, see fig. down)

Enter the cable length (L) at □□□. Up to 30 meters is supported. Example: 080=8 m




| Wire | Color | Signal | No. |
|---|---|---|---|
| AWG26 (soldered) | — | — | 10 |
| | — | — | 11 |
| | White/orange | E24V | 12 |
| | White/green | 0V | 13 |
| | Brown/blue | LS | 26 |
| | Brown/yellow | CLEEP | 25 |
| | Brown/red | OT | 24 |
| | Brown/black | RSV | 23 |
| | — | — | 9 |
| | — | — | 18 |
| | — | — | 19 |
| | White/blue | A+ | 1 |
| | White/yellow | A− | 2 |
| | White/red | B+ | 3 |
| | White/black | B− | 4 |
| | White/purple | Z+ | 5 |
| | White/gray | Z− | 6 |
| | Orange | SRD+ | 7 |
| | Green | SRD− | 8 |
| | Purple | BAT+ | 14 |
| | Gray | BAT− | 15 |
| | Red | VCC | 16 |
| | Black | GND | 17 |
| | Blue | BKR− | 20 |
| | Yellow | BKR+ | 21 |
| | — | — | 22 |

The shield is clamped to the hood.

Drain line and shield braid

(The wire colors white/blue show the band color/insulation color.)

| No. | Signal | Color | Wire |
|---|---|---|---|
| 1 | E24V | White/orange | AWG26 (press fit) |
| 2 | 0V | White/green | |
| 3 | LS | Brown/blue | |
| 4 | CLEEP | Brown/black | |
| 5 | OT | Brown/red | |
| 6 | RSV | Brown/black | |

| No. | Signal | Color | Wire |
|---|---|---|---|
| 1 | A | White/blue | AWG26 (press fit) |
| 2 | A | White/yellow | |
| 3 | B | White/red | |
| 4 | B | White/black | |
| 5 | Z | White/purple | |
| 6 | Z | White/gray | |
| 7 | — | — | |
| 8 | — | — | |
| 9 | FG | Drain | |
| 10 | SD | Orange | |
| 11 | SD | Green | |
| 12 | BAT+ | Purple | |
| 13 | BAT− | Gray | |
| 14 | VCC | Red | |
| 15 | GND | Black | |
| 16 | — | — | |
| 17 | BK− | Blue | |
| 18 | BK+ | Yellow | |

**Option EU (European Standard)**

*** Motor Cable suitable for all Controllers:**

[XSEL] [SSEL] [SCON]

Ihr zuverlässiger IAI Partner:
Schlüter Automation und Sensorik GmbH
Friedrichstr. 21 - D-79677 Schönau
Tel: +49 (0) 7673 91828-0 Fax: -50
mail@schlueter-automation.de
www.linearachsensysteme.de