Introducing New, Quasi-Absolute Type LSAS-N10/N15

Linear Servo Actuator Quasi-Absolute Type

www.intelligentactuator.com
1 Newly Developed Quasi-Absolute Encoder

The quasi-absolute encoder is a new encoder offering the advantages of both incremental and absolute encoders.

- When the power is turned on, the actuator moves within a range of approx. 16 mm. Once the achieved position is confirmed as the current position, the actuator can be moved from that position.
  (There is no need to move to the home position, resulting in shorter operation recovery times.)
- Position data is not stored in the memory, so no absolute battery is needed.
  (This solves the problem of a dead absolute battery.)

2 High Performance

The newly developed flat core helps achieve excellent high-speed performance and high payload.

<table>
<thead>
<tr>
<th>Thrust</th>
<th>Maximum payload</th>
<th>Maximum speed</th>
<th>Maximum acceleration/deceleration</th>
</tr>
</thead>
<tbody>
<tr>
<td>N10S</td>
<td>54N</td>
<td>15 kg</td>
<td>2500 mm/s</td>
</tr>
<tr>
<td>N15S</td>
<td>86N</td>
<td>20 kg</td>
<td></td>
</tr>
<tr>
<td>N15H</td>
<td>125N</td>
<td>30 kg</td>
<td></td>
</tr>
</tbody>
</table>

3 Wide Variations

There are wide variations to choose from, according to your requirements:

- **Thrust:** Standard, High Thrust
- **Slider:** Single, Multi
- **Stroke:** 100 to 4150 mm

Lineup of IAI’s Linear Servo Actuators

- **Shaft type**
  - LSA-S6 series (Incremental)
  - LSA-S8 series (Incremental)
  - LSA-S10 series (Incremental)

- **Small type**
  - LSA-H8 series (Incremental)

- **Flat type**
  - LSA-L15 series (Incremental)

- **Medium type**
  - LSA-N10/N15/N19 series (Incremental)
  - LSAS-N10/N15 series (Quasi-Absolute)

- **Large type**
  - LSA-W21 series (Incremental)

Features
### List of Quasi-Absolute Models

<table>
<thead>
<tr>
<th>Type</th>
<th>Actuator width</th>
<th>Slider</th>
<th>Stroke</th>
<th>Rated thrust</th>
<th>Maximum payload (horizontal)</th>
<th>Maximum acceleration</th>
<th>Maximum speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>LSAS-N10SS</td>
<td>100 mm</td>
<td>Standard</td>
<td>Single 100~4100 mm</td>
<td>54N</td>
<td>15 kg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LSAS-N10SM</td>
<td>150 mm</td>
<td>Standard</td>
<td>Multi 100~3900 mm</td>
<td>54N</td>
<td>15 kg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LSAS-N15SS</td>
<td>100 mm</td>
<td>Standard</td>
<td>Single 150~4150 mm</td>
<td>86N</td>
<td>20 kg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LSAS-N15SM</td>
<td>150 mm</td>
<td>Standard</td>
<td>Multi 150~3950 mm</td>
<td>86N</td>
<td>20 kg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LSAS-N15HS</td>
<td></td>
<td>High thrust</td>
<td>Single 100~4100 mm</td>
<td>125N</td>
<td>30 kg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LSAS-N15HM</td>
<td></td>
<td>High thrust</td>
<td>Multi 150~3850 mm</td>
<td>125N</td>
<td>30 kg</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Model Specification Items

**LSAS - N** - G - T2 -

- **Series**: LSAS
- **Type**: Linear Servo Actuator Serial encoder series
- **Encoder model**: Standard type
- **Corresponding driver output**: 100S 100W
- **Stroke**: 100 mm
- **Applicable controllers**: T2
- **Cable length**: S 3 m
- **Option**: Cable track selection code (See below.)

(Note 1) The Quasi-Absolute type can be used with SSEL and XSEL-P/Q controllers only.

#### Cable Track Selection Code

<table>
<thead>
<tr>
<th>Option code</th>
<th>CT2</th>
<th>CT3</th>
<th>CT4</th>
<th>US1</th>
<th>US2</th>
<th>US3</th>
<th>US4</th>
<th>UM1</th>
<th>UM2</th>
<th>UM3</th>
<th>UM4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation direction</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>User cable track</td>
<td>None</td>
<td>S type</td>
<td>M type</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Installation Direction

- **Installation direction 1 (Standard)**: This standard installation direction applies when no direction is specified for the cable track. On single-slider models, a cable track is installed on the side shown below. On multi-slider models, cable tracks are installed on both sides.
- **Installation direction 2 (Opposite): CT2**: A cable track is installed on the side opposite to the standard specification.
- **Installation direction 3: CT3**: The same as the standard specification (cable track direction 1), except that the home is on the other side.
- **Installation direction 4: CT4**: The same as the CT2 specification (cable track direction 2), except that the home is on the other side.

#### User Cable Track

- **S type (Code: US□)**
- **M type (Code: UM□)**

*For the external dimensions, refer to the dimension drawing on the page describing each model.*
Serial encoder quasi-absolute actuators can be operated with two types of controllers: SSEL-C and XSEL-P/Q. See the figure below for the actuator/controller connections and peripherals.

**SSEL Controller**

- **Teaching pendant**
  - Model number: SEL-T/TD
  - Model number: E5-TP-TD
- **PLC**
- **Regenerative resistance unit**
  - Model number: REU-2
- **Panel unit**
  - Model number: PU-1
- **Main power supply**
  - Single-phase 100 VAC
  - Single-phase 200 VAC
- **Field network**
- **Conversion cable**
  - Model number: CB-SEL-SJ002
- **Encoder cable**
  - Model number: CB-X1-PA
  - Recommended models:
    - MC1220 (100 V)
    - MC1210 (200 V)
- **USB cable**
  - Model number: CB-SEL-USB010
- **Motor cable**
  - Model number: CB-MT-MA
  - (For shaft, small, flat and medium types)
- **System memory backup battery**
  - Model number: AB-5-CS (with case)
  - Model number: AB-5 (battery only)
  - *1 The system memory back battery is needed to retain flag and other data used in the program after the power is turned off.
- **PC software**
  - Model number: IA-101-X-MW (with RS232C cable)
  - Model number: IA-101-X-USB (with USB cable)
- **Regenerative resistance unit cable**
  - Model number: CB-SC-REU010
  - (Comes with the regenerative resistance unit)
- **I/O flat cable**
  - Model number: CB-D5-P0020
  - (Comes with the controller)
- **USB cable**
  - Model number: CB-SEL-USB010
  - (Comes with the PC software IA-101-X-USB)
- **I/O flat cable**
  - Model number: CB-D5-P0020
  - (Comes with the controller)
- **USB cable**
  - Model number: CB-SEL-USB010
  - (Comes with the PC software IA-101-X-USB)
- **System memory backup battery**
  - Model number: AB-5-CS (with case)
  - Model number: AB-5 (battery only)

* Be sure to use a noise filter when connecting the power supply.

* Take note that the encoder cable for the LSAS series is different from the type used for the LSA series.
XSEL Controller

**Main power supply**  
Single-phase 200 VAC / Three-phase 200 VAC

*Be sure to install filters equivalent to the following when connecting the power supply:

- **Noise filter**  
  Recommended models
  - Three-phase MC1320 (Manufacturer: TDK Lambda)
  - Single-phase MXB-1220-33 (Manufacturer: TDK Lambda)
  - ESD-R-25 (Manufacturer: NEC Tokin)
  - RFC-H13 (Manufacturer: Kitagawa Kogyo)

- **Ring core**  
  Recommended model
  - For control power supply: ZCAT3035-1330 (Manufacturer: TDK)
  - For motor power supply: R-A-7818K2-2A (Manufacturer: Okaya Electric Industries)

- **Clamp filter**  
  Recommended models
  - Three-phase: R-A-7818K2-2A
  - Single-phase: R-A-7818K2-2A

- **Surge protector**  
  Recommended models
  - Three-phase: R-A-7818K2-2A
  - Single-phase: R-A-7818K2-2A

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- **Teaching pendant**  
  Model number: SEL-T/TD/TG  
  IA-T-X/XD

- **I/O flat cable**  
  Model number: CB-X-P10020  
  (Comes with the controller)

- **Regenerative resistance unit**  
  Model number: REU-1

- **Regenerative resistance unit cable**  
  Model number: CB-ST-REU010  
  (Comes with the regenerative resistance unit)

- **RS232C cable**  
  Model number: CB-ST-E1MW050-EB
  (For shaft, small, flat and medium types)

- **USB conversion unit**  
  Model number: IA-CV-USB

- **USB cable**  
  Model number: CB-SEL-USB010

- **PC software**  
  Model number: IA-101-X-MW (with)
  IA-101-X-USB (with), and
  IA-101-X-USBMW (with)

- **Model number:**
  - XSEL-T/TD/TG IA-T-X/XD
  - CB-X-P10020
  - REU-1
  - CB-ST-REU010
  - CB-ST-E1MW050-EB
  - IA-CV-USB
  - CB-SEL-USB010
  - IA-101-X-MW
  - IA-101-X-USB
  - IA-101-X-USBMW

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**DeviceNet**  
**CC-Link**  
**ProfiBus**  
**Ethernet**

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**Motor cable**  
Model number: CB-X-MA

**Encoder cable**  
Model number: CB-X-PA

*Take note that the encoder cable for the LSAS series is different from the type used for the LSA series.
When selecting a linear servo actuator, the following two conditions must be met.

- The **required thrust for acceleration** must be **no more than the maximum thrust** of the linear servo actuator.
- The **thrust during continuous operation** must be **no more than the rated thrust** of the linear servo actuator.

### Condition ① Maximum thrust

For the slider to accelerate according to the command, the required thrust for acceleration $F_a$ must be smaller than the maximum thrust of the linear servo actuator. Obtain the required thrust for acceleration ($F_a$) using the formula below:

$$ F_a = (M + m) \cdot a + F_f $$

- $M$: Weight of the slider (kg)
- $m$: Load carried by the slider (kg)
- $a$: Commanded acceleration (m/s²)
- $F_f$: Traveling resistance (N)

If $F_a$ obtained above is smaller than the maximum thrust of the linear servo actuator, Condition ① is met.

### Selection Method

#### Model

<table>
<thead>
<tr>
<th>Model number</th>
<th>Weight of slider (kg)</th>
<th>Traveling resistance $F_f$ (N)</th>
<th>Maximum thrust $F_T$ (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N10SS</td>
<td>3.0</td>
<td>$5V+16.5$</td>
<td>162N</td>
</tr>
<tr>
<td>N15SS</td>
<td>4.0</td>
<td>$10V+25$</td>
<td>See the graph on the right.</td>
</tr>
<tr>
<td>N15HS</td>
<td>5.0</td>
<td>$17V+30$</td>
<td>See the graph on the right.</td>
</tr>
</tbody>
</table>

* $V$: Slider’s travel speed (m/s) (Under the triangular condition, the attained speed is used.)

#### Maximum thrust of N15SS/N15HS

<table>
<thead>
<tr>
<th>Slider's travel speed (mm/s)</th>
<th>Motor-generated output (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>240</td>
</tr>
<tr>
<td>500</td>
<td>258</td>
</tr>
<tr>
<td>1000</td>
<td>375</td>
</tr>
</tbody>
</table>

If the required thrust for acceleration ($F_a$) exceeds the maximum thrust of the linear servo actuator, the load carried on the slider or acceleration must be reduced.

Check the maximum loading mass and maximum acceleration using the formulas below:

**Maximum loading mass**

$$ m = \frac{(F_a - F_f)}{a} - M $$

**Maximum acceleration**

$$ a = \frac{(F_a - F_f)}{(M + m)} $$
Condition ② Thrust during continuous operation

The thrust during continuous operation $F_t$, calculated by considering the load and duty, must be smaller than the rated thrust of the linear servo actuator. Obtain the thrust during continuous operation using the formula below:

$$F_t = \sqrt{F_a^2 \cdot t_a + F_f^2 \cdot t_f + F_d^2 \cdot t_d}$$

- $F_a$: Required thrust for acceleration (N)
- $t_a$: Acceleration time (s)
- $F_f$: Traveling resistance (N)
- $t_f$: Travel time at constant speed (s)
- $F_d$: Required thrust for deceleration (N)
- $t_d$: Deceleration time (s)

$t$: Operating time per cycle (s)

Thrust during continuous operation ($F_t$) ≤ Rated thrust of linear servo actuator

- $t_a$, which represents the acceleration time, is calculated differently depending on whether the operation pattern is the ① trapezoid pattern or ② triangle pattern.

The difference between the trapezoid pattern and triangle pattern is whether the attained speed is greater or smaller than the set speed when the actuator is operated over the distance of its travel at the set speed.

Attained speed ($V_{max}$) = \sqrt{\text{Travel distance (m)} \times \text{Set acceleration (m/s²)}}

Set speed < Attained speed → ① Trapezoid pattern
Set speed > Attained speed → ② Triangle pattern

① Trapezoid pattern

$$t_a = \frac{V_s}{a}$$

- $V_s$: Set speed (m/s)
- $a$: Commanded acceleration (m/s²)

② Triangle pattern

$$t_a = \frac{V_t}{a}$$

- $V_t$: Set speed (m/s)
- $a$: Commanded acceleration (m/s²)

$t_f$ represents the travel time at constant speed.

Calculate the thrust using the formula below:

$$F_d = (M+m) \cdot a - F_f$$

$t_d$ represents the deceleration time. If the acceleration and deceleration are the same, $t_d$ should be the same as the acceleration time.

$$t_d = \frac{V}{a}$$

- $V$: Speed (m/s)
- $a$: Deceleration (m/s²)

$t$ represents the operating time per cycle, corresponding to the sum of the acceleration time ($t_a$), travel time at constant speed ($t_f$), deceleration time ($t_d$), settling time (0.15 sec) and stationary time.

If the thrust during continuous operation $F_t$ obtained above is smaller than the rated thrust, Condition ② is met.

<table>
<thead>
<tr>
<th>Rated thrust (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N10SS</td>
</tr>
<tr>
<td>N15SS</td>
</tr>
<tr>
<td>N15HS</td>
</tr>
</tbody>
</table>

To calculate the cycle time at which the actuator can be operated continuously, do so using the formula below based on the maximum acceleration obtained according to Condition ①:

$$t = \frac{F_a^2 \cdot t_a + F_f^2 \cdot t_f + F_d^2 \cdot t_d}{F_t^2}$$

The actuator can be operated if the operating conditions meet both Conditions ① and ② above. If either condition cannot be met, reduce the load carried on the slider, lower the acceleration, lower the duty (*) or take other appropriate measure.

* To lower the duty, the ratio of the travel time (acceleration + constant speed + deceleration) to the cycle time must be lowered.
**LSAS-N10SS**

**Model Specification Items**
- **Model**
  - LSAS – N10SS – G – 100S – T2 –
- **Type**
  - Encoder model
- **Corresponding driver output (W)**
- **Stroke**
  - Every 100 mm (mm)
- **Speed (Note 1) (mm/s)**
  - 1~2500
- **Payloads (Note 2) (kg)**
  - Horizontal 15, Vertical –
- **Rated thrust (N)**
  - 54
- **Maximum thrust (N)**
  - 162
- **Maximum acceleration (G) (Note 2)**
  - 3

**Options**
- **Serial encoder, quasi-absolute type**
  - 100S: 100N
  - 100: 100 mm

**Common Specifications**
- **Drive method**
  - Linear servo motor
- **Positioning repeatability**
  - ±0.005 mm
- **Allowable dynamic moment**
  - (Note 3) Ma: 76.4 N•m, Mb: 46.3 N•m, Mc: 25.7 N•m
- **Overhang load length**
  - 340 mm max. in Ma direction, 340 mm max. in Mb/Mc directions
- **Base**
  - Material: Aluminum with black alumite treatment
- **Applicable controllers**
  - T2: SEL, XSEL-P/Q
- **Cable length (Note 4)**
  - N: None, 5: 3 m, M: 5 m, XL: Specified length
- **Ambient operating temperature**
  - 0 to 40°C, 85% RH max. (No condensation)

**Option**
- **Name**
- **Model number**
- **Page**
- **Remarks**
  - Cable track installation direction
  - User cable track, S type
  - User cable track, M type

**Diagram**
- CAD drawings are available for download from our website

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**Applicable Controller Specifications**
- **Applicable controllers**
  - XSEL-P/Q
- **Maximum number of controller axes**
  - 4 axes
- **Operating method**
  - Program
- **Power-supply voltage**
  - Single-phase 200V AC
  - –

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**Caution**
- If the stroke is short, the maximum speed may not be reached.
- Note: Depending on the operating conditions. Refer to P5
- Take note that the actuator can be installed only horizontally. It cannot be used vertically, lying on its side, hanging from the ceiling, etc.
- Based on a traveling life of 10,000 km.
- The maximum cable length is 20 mm.
- Specify a desired length in m. (Example: X08 = 8 m)
LSAS-N10SM

**Model Specification**

<table>
<thead>
<tr>
<th>Model number</th>
<th>Encoder model</th>
<th>Corresponding driver output (W)</th>
<th>Stroke (Note 1) (mm)</th>
<th>Speed (Note 1) (mm/s)</th>
<th>Payloads (Note 2)</th>
<th>Rated thrust (N)</th>
<th>Maximum thrust (N)</th>
<th>Maximum acceleration (G) (Note 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LSAS-N10SM-G</td>
<td>Serial encoder, quasi-absolute</td>
<td>1005</td>
<td>100~3900</td>
<td>1~2500</td>
<td>15</td>
<td>–</td>
<td>54</td>
<td>162</td>
</tr>
</tbody>
</table>

*For contents of the model specification items, refer to page 2.

**Option**

<table>
<thead>
<tr>
<th>Name</th>
<th>Model number</th>
<th>Page</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>User cable track, 5 type</td>
<td>US1</td>
<td>➔ P2</td>
<td>Installation direction 1</td>
</tr>
<tr>
<td>User cable track, M type</td>
<td>UM1</td>
<td>➔ P2</td>
<td>Installation direction 1</td>
</tr>
</tbody>
</table>

**Diagram**

- User cable track (S/M types) (*2)
- 2D CAD
- Section view of user cable track
- 160 (when installing M)
- 160 (when installing S)

**Common Specifications**

<table>
<thead>
<tr>
<th>Drive method</th>
<th>Linear servo motor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positioning repeatability</td>
<td>±0.005 mm</td>
</tr>
<tr>
<td>Allowable dynamic moment (Note 3) Ma: 76.4 N-m Mb: 46.3 N-m Mc: 25.7 N-m</td>
<td></td>
</tr>
<tr>
<td>Overhang load length</td>
<td>340 mm max. in Ma direction, 340 mm max. in Mb/Mc directions</td>
</tr>
<tr>
<td>Base</td>
<td>Material: Aluminum with black anodized treatment</td>
</tr>
<tr>
<td>Applicable controllers</td>
<td>T2: SEL, XSEL-P/Q</td>
</tr>
<tr>
<td>Cable length (Note 4)</td>
<td>N: None S: 3 m M: 5 m XL: Specified length</td>
</tr>
<tr>
<td>Ambient operating temperature</td>
<td>0 to 40°C, 85% RH max. (No condensation)</td>
</tr>
</tbody>
</table>

**Applicable Controller Specifications**

<table>
<thead>
<tr>
<th>Applicable controllers</th>
<th>Maximum number of controlled axes</th>
<th>Operating method</th>
<th>Power supply voltage</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>XSEL-P/Q</td>
<td>6 axes</td>
<td>Program</td>
<td>Single/Three-phase 200 VAC</td>
<td>➔ P5</td>
</tr>
<tr>
<td>SEL</td>
<td>2 axes</td>
<td>Program/positioner</td>
<td>Single-phase 200 VAC</td>
<td>➔ P5</td>
</tr>
</tbody>
</table>

**Caution**

1. The cable track may expand and become slightly larger than the dimensions shown below.
2. The user cable track can be used only when the stroke is 2000 mm or less.
3. With the user cable track specification, dimension L corresponds to 60 mm less than the dimension shown in the table.
4. The cable track overhang length is as follows: Standard cable track: 10 mm max. User cable track: 20 mm max.
**LSAS-N15SS**

**Model Specification**

<table>
<thead>
<tr>
<th>Model number</th>
<th>Encoder model</th>
<th>Corresponding driver output</th>
<th>Stroke Every 100 mm (mm)</th>
<th>Speed (Note 1) (mm/s)</th>
<th>Payloads (Note 2)</th>
<th>Rated thrust (N)</th>
<th>Maximum thrust (N)</th>
<th>Maximum acceleration (G) (Note 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LSAS-N15SS-G-200S-T2</td>
<td>Serial encoder, quasi-absolute</td>
<td>200S: 200W</td>
<td>150 ~ 4150</td>
<td>1 ~ 2500</td>
<td>20</td>
<td>–</td>
<td>86</td>
<td>Refer to PS</td>
</tr>
</tbody>
</table>

*For contents of the model specification items, refer to page 2.

**Option**

<table>
<thead>
<tr>
<th>Name</th>
<th>Model number</th>
<th>Page</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable track installation direction</td>
<td>CT2 ~ 4</td>
<td>– P2</td>
<td>Installation direction 2 to 4</td>
</tr>
<tr>
<td>User cable track, S type</td>
<td>US1 ~ US4</td>
<td>– P2</td>
<td>Installation direction 1 to 4</td>
</tr>
<tr>
<td>User cable track, M type</td>
<td>UM1 ~ UM4</td>
<td>– P2</td>
<td>Installation direction 1 to 4</td>
</tr>
</tbody>
</table>

**Common Specifications**

- **Drive method**: Linear servo motor
- **Positioning repeatability**: ±0.005 mm
- **Allowable dynamic moment (Note 3)**: Ma: 111.7 N•m, Mb: 66.6 N•m, Mc: 50.0 N•m
- **Overhang load length**: 450 mm max. in Ma direction, 450 mm max. in Mb/Mc directions
- **Base**: Material: Aluminium with black alumite treatment
- **Applicable controllers**: T2: 5SEL, XSEL-P/Q
- **Cable length (Note 4)**: N: None, S: 3 m, M: 5 m
- **XSEL-P/Q**: 6 axes Program/Simple three-phase 200 VAC
- **SEL**: 2 axes Program/Positioner/Simple three-phase 200 VAC

**Diagram**

- CAD drawings are available for download from our website.

- Cable track installation direction: CT2 ~ 4
- User cable track, S type: US1 ~ US4
- User cable track, M type: UM1 ~ UM4

**Applicable Controller Specifications**

<table>
<thead>
<tr>
<th>Applicable controllers</th>
<th>Maximum number of controlled axes</th>
<th>Operating method</th>
<th>Power-supply voltage</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>XSEL-P/Q</td>
<td>6 axes</td>
<td>Program</td>
<td>Single-phase 200 VAC</td>
<td>– P10</td>
</tr>
<tr>
<td>SEL</td>
<td>2 axes</td>
<td>Program/Positioner</td>
<td>Single-phase 200 VAC</td>
<td>– P10</td>
</tr>
</tbody>
</table>

**Note 1**: The cable length is 20 mm.

**Note 2**: Based on a traveling life of 10,000 km.

**Note 3**: The maximum cable length is 20 mm. Specify a desired length in m.

**Note 4**: The maximum cable length is 20 mm.

**Caution**: If the stroke is short, the maximum speed may not be reached.

**Caution**: The actuator can be installed only horizontally (it cannot be used vertically, lying on its side, hanging from the ceiling, etc.).
**LSAS-N15SM**

**Model Specification**

<table>
<thead>
<tr>
<th>Model number</th>
<th>Encoder model</th>
<th>Corresponding driver output (W)</th>
<th>Stroke Every 100 mm (mm)</th>
<th>Speed (Note 1) (mm/s)</th>
<th>Payloads (Note 2)</th>
<th>Rated thrust (N)</th>
<th>Maximum thrust (N)</th>
<th>Maximum acceleration (G) (Note 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LSAS-N15SM-G-200S-T2</td>
<td>Serial encoder, quasi-absolute</td>
<td>2005</td>
<td>150–3950</td>
<td>1–2500</td>
<td>20</td>
<td>–</td>
<td>86</td>
<td>Refer to PS</td>
</tr>
</tbody>
</table>

*For contents of the model specification items, refer to page 2.*

**Options**

<table>
<thead>
<tr>
<th>Name</th>
<th>Model number</th>
<th>Page</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>User cable track, S type</td>
<td>US1</td>
<td>P2</td>
<td>Installation direction 1</td>
</tr>
<tr>
<td>User cable track, M type</td>
<td>UM1</td>
<td>P2</td>
<td>Installation direction 1</td>
</tr>
</tbody>
</table>

**Common Specifications**

- **Drive method**: Linear servo motor
- **Positioning repeatability**: ±0.005 mm
- **Allowable dynamic moment**: (Note 3) Ma: 111.7 N•m, Mb: 66.6 N•m, Mc: 50.0 N•m
- **Overhang load length**: 450 mm max. in Ma direction, 450 mm max. in Mb/Mc directions
- **Base**: Material: Aluminum with black alumite treatment
- **Applicable controllers**: T2: SSEL, XSEL-P/Q
- **Cable length**: (Note 4) N: None, S: 3 m, M: 5 m, X:
- **Ambient operating temperature**: 0 to 40°C, 85% RH max. (No condensation)

**Diagram**

- User cable track can be used only when the stroke is 2000 mm or less.
- Use the cable track overhang length is as follows: Standard cable track: 10 mm max. User cable track: 20 mm max.

**Applicable Controller Specifications**

<table>
<thead>
<tr>
<th>Applicable controllers</th>
<th>Maximum number of controlled axes</th>
<th>Operating method</th>
<th>Power-supply voltage</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>XSEL-P/Q</td>
<td>8 axes</td>
<td>Program</td>
<td>Single-phase 200 VAC</td>
<td>P10</td>
</tr>
<tr>
<td>SSEL</td>
<td>2 axes</td>
<td>Program</td>
<td>Single-phase 200 VAC</td>
<td>P10</td>
</tr>
</tbody>
</table>

**Caution**

- If the stroke is short, the maximum speed may not be reached.
- Varies depending on the operating conditions. (Refer to PS)
- Take note that this actuator can be installed only horizontally. It cannot be used vertically, lying on its side, hanging from the ceiling, etc.
- Based on a traveling life of 10,000 km.
- The maximum cable length is 20 m. Specify a desired length in m. (Example: 308 = 2 m)
### LSAS-N15HS

**Model Specification Items**

<table>
<thead>
<tr>
<th>Model number</th>
<th>Encoder model</th>
<th>Corresponding driver output (W)</th>
<th>Stroke (Every 100 mm) (mm)</th>
<th>Speed (Note 1)</th>
<th>Payloads (Note 2)</th>
<th>Rated thrust (N)</th>
<th>Maximum thrust (N)</th>
<th>Maximum acceleration (G) (Note 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LSAS-N15HS-G-200S</td>
<td>Serial encoder, quasi-absolute type</td>
<td>2005</td>
<td>100–4100</td>
<td>1–2500</td>
<td>30</td>
<td>–</td>
<td>125</td>
<td>Refer to PS</td>
</tr>
</tbody>
</table>

*For contents of the model specification items, refer to page 2.*

### Option

<table>
<thead>
<tr>
<th>Name</th>
<th>Model number</th>
<th>Page</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable track installation direction</td>
<td>CT2–4</td>
<td>P2</td>
<td>Installation direction 2 to 4</td>
</tr>
<tr>
<td>User cable track, S type</td>
<td>US1–US4</td>
<td>P2</td>
<td>Installation direction 1 to 4</td>
</tr>
<tr>
<td>User cable track, M type</td>
<td>UM1–UM4</td>
<td>P2</td>
<td>Installation direction 1 to 4</td>
</tr>
</tbody>
</table>

### Common Specifications

- **Drive method**: Linear servo motor
- **Positioning repeatability**: ≤0.005 mm
- **Allowable dynamic moment (Note 3)**: Ma: 155.8 N·m, Mb: 91.1 N·m, Mc: 71.5 N·m
- **Overhang load length**: 450 mm max. in Ma direction, 450 mm max. in Mb/Mc directions
- **Base**: Material: Aluminum with black alumite treatment
- **Applicable controllers**: T2: SSEL, XSEL-P/Q
- **Cable length (Note 4)**: N: None; S: 3 m; M: 5 m; X: Specified length
- **Ambient operating temperature**: 0 to 40°C, 85% RH max. (No condensation)

### Diagram

- **CAD**: 2D CAD
- **Diagram**: User cable track S/M types
- **View**: Section view of user cable track

### Applicable Controller Specifications

<table>
<thead>
<tr>
<th>Applicable controllers</th>
<th>Maximum number of controlled axes</th>
<th>Operating method</th>
<th>Power-supply voltage</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>XSEL-P/Q</td>
<td>6 axes</td>
<td>Program</td>
<td>Single-phase 200 VAC</td>
<td>PS1</td>
</tr>
<tr>
<td>SSEL</td>
<td>2 axes</td>
<td>Program/potentiometer</td>
<td>Single-phase 200 VAC</td>
<td>PS1</td>
</tr>
</tbody>
</table>

*Note 1: The cable track may expand and become slightly larger than the dimensions shown below.*

*Note 2: The user cable track can be used only when the stroke is 2000 mm or less.*

*Note 3: With the user cable track specification, dimension L corresponds to "55 mm less than the dimension shown in the table.*

*Note 4: The cable track overhang length is as follows: Standard cable track: 10 mm max. User cable track: 20 mm max.*

---

**Table of values**

<table>
<thead>
<tr>
<th>Stroke (mm)</th>
<th>N</th>
<th>S</th>
<th>M</th>
<th>X</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>120</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>140</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>160</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>180</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>200</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>220</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>240</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>260</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>280</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

**Specifications**

- **Drive method**: Linear servo motor
- **Positioning repeatability**: ≤0.005 mm
- **Allowable dynamic moment (Note 3)**: Ma: 155.8 N·m, Mb: 91.1 N·m, Mc: 71.5 N·m
- **Overhang load length**: 450 mm max. in Ma direction, 450 mm max. in Mb/Mc directions
- **Base**: Material: Aluminum with black alumite treatment
- **Applicable controllers**: T2: SSEL, XSEL-P/Q
- **Cable length (Note 4)**: N: None; S: 3 m; M: 5 m; X: Specified length
- **Ambient operating temperature**: 0 to 40°C, 85% RH max. (No condensation)**

**Caution**

- *Note 1: If the stroke is short, the maximum speed may not be reached.*
- *Note 2: Varies depending on the operating conditions. (Refer to PS)*
- *Note 3: Take note that this actuator can be installed only horizontally. It cannot be used vertically, lying on its side, hanging from the ceiling, etc.*
- *Note 4: Based on a traveling life of 10,000 km.*
- *Note 5: The maximum cable length is 20 mm. Specify a desired length in m. (Example: 300 = 3 m)*
**Model Number/Specification**

<table>
<thead>
<tr>
<th>Model number</th>
<th>Encoder model</th>
<th>Corresponding driver output (W)</th>
<th>Stroke (Every 100 mm)</th>
<th>Speed (Note 1) (mm/s)</th>
<th>Payloads (Note 2)</th>
<th>Rated thrust (N)</th>
<th>Maximum thrust (N)</th>
<th>Maximum acceleration (G)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LSAS-N15HM-G-200S</td>
<td>Serial encoder, quasi-absolute</td>
<td>200S</td>
<td>150 – 3850</td>
<td>1 – 2500</td>
<td>30</td>
<td>–</td>
<td>125</td>
<td>Refer to PS</td>
</tr>
</tbody>
</table>

*For contents of the model specification items, refer to page 2.

**Option**

<table>
<thead>
<tr>
<th>Name</th>
<th>Model number</th>
<th>Page</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>User cable track, S type</td>
<td>US1</td>
<td>P2</td>
<td>Installation direction 1</td>
</tr>
<tr>
<td>User cable track, M type</td>
<td>UM1</td>
<td>P2</td>
<td>Installation direction 1</td>
</tr>
</tbody>
</table>

**Common Specifications**

<table>
<thead>
<tr>
<th>Drive method</th>
<th>Linear servo motor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positioning repeatability</td>
<td>±0.005 mm</td>
</tr>
<tr>
<td>Allowable dynamic moment (Note 3)</td>
<td>Ma: 155.8 N•m  Mb: 91.1 N•m  Mc: 71.5 N•m</td>
</tr>
<tr>
<td>Overhang load length</td>
<td>450 mm max. in Ma direction, 450 mm max. in Mb/Mc directions</td>
</tr>
<tr>
<td>Base</td>
<td>Material: Aluminium with black alumite treatment</td>
</tr>
<tr>
<td>Applicable controllers</td>
<td>T2: SEL, XSEL-P/Q</td>
</tr>
<tr>
<td>Cable length (Note 4)</td>
<td>N: None  S: 3 m  M: 5 m  XL: 1: Specified length</td>
</tr>
<tr>
<td>Ambient operating temperature</td>
<td>0 to 40°C, 85% RH max. (No condensation)</td>
</tr>
</tbody>
</table>

**Diagram**

- User cable track S/M types
- Detailed view of G
- Detailed view of H
- Section view of user cable track

**Applicable Controller Specifications**

<table>
<thead>
<tr>
<th>Applicable controllers</th>
<th>Maximum number of controlled axes</th>
<th>Operating method</th>
<th>Power supply voltage</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>XSEL-P/Q</td>
<td>6 axes</td>
<td>Program</td>
<td>Single-phase 200 VAC</td>
<td>PS</td>
</tr>
<tr>
<td>XS</td>
<td>2 axes</td>
<td>Program</td>
<td>Single-phase 200 VAC</td>
<td>PS</td>
</tr>
</tbody>
</table>

**Caution**

- If the stroke is short, the maximum speed may not be reached.
- Various depending on the operating conditions. (Refer to PS)
- Take note that this actuator can be installed only horizontally. It cannot be used vertically, lying on its side, hanging from the ceiling, etc. (Note 1)
- Based on a traveling life of 10,000 km. (Note 2)
- The maximum cable length is 20 mm. Specify a desired length in m. (Example: 300 = 1 m)
<table>
<thead>
<tr>
<th></th>
<th>Controller series/type</th>
<th>SSEL</th>
<th>XSEL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Base specifications</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exterior view</td>
<td></td>
<td><img src="image1.png" alt="Image" /></td>
<td><img src="image2.png" alt="Image" /></td>
</tr>
<tr>
<td>Power-supply capacity</td>
<td>1610 VA max. (when operated with N15HM)</td>
<td>4988 VA max. (2400 W as total output of 6 operating axes)</td>
<td></td>
</tr>
<tr>
<td>Input power supply</td>
<td>Single-phase 200 VAC</td>
<td>Three-phase 200 VAC</td>
<td></td>
</tr>
<tr>
<td>Operating power-supply voltage range</td>
<td>±10%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total output of maximum number of connected axes (W)</td>
<td>800 W (200-V power-supply specification)</td>
<td>2400 W (three-phase) *1</td>
<td></td>
</tr>
<tr>
<td>Maximum number of controlled axes</td>
<td>2 axes</td>
<td>6 axes</td>
<td></td>
</tr>
<tr>
<td>Position detection system</td>
<td>Redundancy not supported</td>
<td>Serial encoder, quasi-absolute</td>
<td></td>
</tr>
<tr>
<td>Safety circuit configuration</td>
<td>Redundancy not supported</td>
<td>Redundancy supported</td>
<td></td>
</tr>
<tr>
<td>Operation type</td>
<td>Program operation</td>
<td>Program operation only</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Positioner operation (Switchable)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of programs</td>
<td>128</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of program steps</td>
<td>9999</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of multi-tasking programs</td>
<td>8</td>
<td></td>
<td>16</td>
</tr>
<tr>
<td>Number of positions</td>
<td>20000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I/O communication</td>
<td>Standard I/Os</td>
<td>24 input points/8 output points (NPN/PNP selectable)</td>
<td>32 input points/16 output points (NPN/PNP selectable)</td>
</tr>
<tr>
<td></td>
<td>Extended I/Os</td>
<td>Not supported</td>
<td>Up to 192 input points/up to 192 output points</td>
</tr>
<tr>
<td></td>
<td>Field network</td>
<td>DeviceNet, CC-Link, ProfiBus</td>
<td>DeviceNet, CC-Link, ProfiBus, Ethernet</td>
</tr>
<tr>
<td>General specifications</td>
<td>Ambient operating temperature/humidity</td>
<td>0 to 40°C, 10 to 95% (no condensation)</td>
<td>Free from corrosive gases or too much powder dust</td>
</tr>
<tr>
<td>External dimensions</td>
<td>100 (W) x 202.6 (H) x 126 (D)</td>
<td>373 (W) x 195 (H) x 125.3 (D) (with 6-axis extended I/O base)</td>
<td></td>
</tr>
<tr>
<td>Mass</td>
<td>1.4 kg</td>
<td>5.7 kg (6-axis specification)</td>
<td></td>
</tr>
<tr>
<td>Accessory</td>
<td>I/O flat cable (34-core)</td>
<td>I/O flat cable (50-core)</td>
<td></td>
</tr>
</tbody>
</table>

*1 In the case of a single-phase specification, triple the corresponding driver output of each model. (Example: For the N10SS, 100 x 3 = 300 W)
Controller Options

Regenerative Resistance Unit (Option)

- **Feature**: This unit converts to heat the regenerative current that generates as the motor decelerates. Confirm the total wattage of the operating actuator on the table below and provide the regenerative resistance if needed.
- **Model numbers**: REU-1 (for XSEL) REU-2 (for SSEL)

<table>
<thead>
<tr>
<th>Horizontal</th>
<th>XSEL-P/Q</th>
<th>SSEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>~100W</td>
<td>~200W</td>
</tr>
<tr>
<td>1</td>
<td>~600W</td>
<td>~800W</td>
</tr>
<tr>
<td>2</td>
<td>~1200W</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>~1800W</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>~2400W</td>
<td></td>
</tr>
</tbody>
</table>

* Depending on the operating conditions, the required regenerative resistance may be greater than as specified above.

Maintenance Parts

Motor cable

**Model number** CB-X-MA

![Motor cable diagram]

Encoder cable

**Model number** CB-X1-PA

![Encoder cable diagram]