**1 SAFETY**

For safe and proper operation, read this manual thoroughly before use so as to understand the Installation, maintenance and safety checks etc. Make sure that you have a good knowledge of the equipment and all the relevant safety precautions prior to installation.

Keep this Installation and Maintenance Manual handy so that operations can refer to it.

**1.1 General recommendation**

These safety instructions are intended to prevent a hazardous situation and/or equipment damage. These instructions indicate the level of potential hazard by a label of "CAUTION" and "WARNING" or "DANGER". To ensure safety, please observe ISO 10113 Note 1) and BS 8401:2005 Notes) and other safety practices.

| CAUTION: | Operator error could result in injury or equipment damage. |
| WARNING: | Operator error could result in serious injury or loss of life. |
| DANGER: | In extreme conditions, there is the possibility of serious injury or loss of life. |

Note 1) ISO 10113: Manipulating industrial robots.  
Note 2) BS 8401: General rules for robot safety.

**2 GENERAL**

**DANGER (In general)**

1) Avoid the use of these products in an explosive atmosphere, it could cause injury and fire.
2) Do not perform work on the actuators when the power is on. Ensure that the power is switched off before starting work, to avoid risk of electric shock.

**WARNING**

1) The compatibility of electric actuators is the responsibility of the person who designs the system or decides its specifications. Since the products specified here are used in various operating conditions, their compatibility for the specific system must be based on specifications or after analysis and/or tests to meet your specific requirements.

2) Only trained personnel should operate this equipment. Electric actuators can be dangerous if an operator is unfamiliar with them. Assembly, handling or repair of systems using electric actuators should be performed by trained and experienced operators.

3) Do not service machinery/equipment or attempt to remove components until safe conditions are confirmed.
   a) Inspection and maintenance of machinery/equipment should only be performed after confirmation of safe locked-out control positions.
   b) When equipment is to be repaired, confirm that all safety precautions are in effect.

4) Contact SMC if the product is to be used in any of the following conditions:
   a) Conditions and environments beyond the given specifications, or if the product is to be used outdoors.
   b) Installation on equipment in conjunction with atomic energy, medical equipment, food and beverages, or other systems that have potential risks.
   c) Installation in extreme environments, such as high temperature, high humidity, or near water sources.
   d) Installation in areas where there is a lot of dust or chips, or where moisture or oil splash onto the actuators.
   e) Installation in areas subject to vibrations or shocks.

5) Contact SMC for any questions, which has the possibility of having negative effects on people, property or animals, requiring special safety analysis.

**CAUTION**

1) Read thoroughly and follow this manual before installation, operation and maintenance. There is the possibility of electric shock, injury and fire.
2) Do not use the product out of specifications.
3) Do not use damaged drives and actuators. It may lead to injury and fire.
4) Do not use any plate or label attached to the product.
5) Use positioning drivers and actuators in the specified combinations. Fire and failure could occur otherwise.
6) Pay attention to the rise in temperature of the drive, motor and peripheral equipment. It may lead to burning.

| (Transport) |
| 1) Make sure not to drop the product during transport. There is a possibility of injury and damage. |
| 2) Do not hold cables during transport. It may lead to falling and injury. |
| 3) Follow the instructions to avoid collapse of cargo piles due to overloading. |

**3 UNPACKING**

**CAUTION**

Consist with the content you have received in what you ordered. Injury/damage may occur if an incorrect product is installed.

**4 INSTALLATION**

**CAUTION**

1) Take safety measures such as the installation of a protective cover if there is the possibility that operators will be exposed to danger by injury or injury to moving parts.
2) Do not depress/increase the body and table mounting surfaces. Keep the parallelism of the mounting surface within 0.5mm. A loss of parallelism may increase the sliding resistance and interfere with overall performance of the actuator.
3) When connecting a load having an external support or guide mechanism, design a suitable connection and perform safety alignment.
4) Avoid repeated bending and tension forces being applied to power transmission lines of motor cables. It may lead to breaking of wire.
5) Securely tighten all stationary and connected parts of the actuator so as to prevent them from becoming loose.
6) Run power and signal cables separately to avoid risk of interference.
7) Avoid using in the following operating environments.
   a) Locations with a lot of dust or debris, or where chips may enter the actuator.
   b) Locations where the ambient temperature is outside the range specified. (Refer to specifications)
   c) Locations where the ambient humidity is outside the specified range. (Refer to specifications)
   d) Locations where corrosive or combustible gases are generated.
   e) Locations where strong magnetic or electric fields are generated.
   f) Locations where direct vibration or impact shock occurs, etc. will be applied to the actuator unit.
   g) Locations with a lot of dust and where water or oil splash onto the actuator.

6) Perform the following inspections before operating an actuator or controller:
   a) Inspection for damage to the actuators/controller power lines.
   b) Inspection for looseness of the connectors to each power line and signal line.
   c) Inspection for looseness of the actuator/controller connections.
   d) Inspection for abnormal operation of the actuator/controller.
   e) Emergency stop buttons are not operated.
   f) Implement preventive measures such as a fuse enclosure to prevent human entry to the operating area of the actuator/contoller.
   g) Take measures to prevent an emergency stop by using a sensor, etc. To prevent human entry into the above mentioned operating area.

7) Design Points
   a) Do not allow impact or shock load to be applied to the actuator table. (Slider)
   b) A protective cover is recommended to minimize the risk of human injury.

**5 CE DIRECTIVES**

5.1 Machinery Directive 98/37/EC

SMC Electric Actuators are designed as components and thus are intended for incorporation into machinery and assemblies, which are covered by the Machinery Directive 98/37/EC (refer to annex B). CE marking is therefore not applied to Electric Actuators.

5.2 Electromagnetic Compatibility (EMC) Directive 89/336/EC

SMC use CE marked motors and drives for the actuators. Please refer to the relevant manuals for installation guidelines.

5.3 Low Voltage Directive (LVD) 73/23/EC

The drivers and motors for these products are in compliance with the LVD. Please refer to the relevant manuals for installation guidelines.

**CAUTION**

Always observe installation guidelines and safety instructions of motors and drivers to ensure electrical safety and compliance with the Directive.

**6 MOUNTING THE ELECTRICAL ACTUATOR**

**CAUTION**

1) Take care that actuator movement does not catch cables.
2) Give adequate consideration to the arrangement of wiring, etc., when mounting. If wiring is forced into inappropriate arrangement, this may lead to breaks in the wiring and result in malfunction.
3) Ensure that the cables are secured and avoid bending the cables at sharp angles where they enter the actuator, and also be sure that the cables do not move freely.
4) Do not use until you verify that the equipment can operate properly.
5) Securely tighten all stationary and connected parts of the actuator, so that they will not become loose.

6) When attaching a workload, do not apply strong impact shock or a large moment. If an outside force exceeding the allowable moment is applied, this may cause looseness in the guide unit, an increase in sliding resistance or other problems.
7) If abnormal heating, smoking or fire occurs in the actuator/controller, shut off the power supply immediately.
8) If the electric actuator is repeatedly operated for short strokes (20mm or less) this may cause loss of grease. Therefore operate the actuator for a full stroke once every 40 to 60 cycles.

**6.1 Reference surfaces**

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimension A (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIH100</td>
<td>100</td>
</tr>
<tr>
<td>LIH100D</td>
<td>100</td>
</tr>
<tr>
<td>LIH200</td>
<td>200</td>
</tr>
<tr>
<td>LIH200D</td>
<td>200</td>
</tr>
</tbody>
</table>

**6.2 Actuator mounting**

**6.2.1 Mounting possibilities**

**T-slot Bottom Mount**

LIH100/LJ1S10  LIH100D/LJ1S10D
LIH200/LJ1S20  LIH200D/LJ1S20D

**T-tuts for mounting electric actuators**

Use T-tuts for T-slot mounting of an actuator. When mounting by means of T-tuts alone, the quantity of T-tuts indicated below should be used as a minimum.

<table>
<thead>
<tr>
<th>Model</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIH100</td>
<td>100mm stroke 5 pcs 300mm stroke or more 6 pcs</td>
</tr>
<tr>
<td>LIH100D</td>
<td>6 pcs</td>
</tr>
<tr>
<td>LIH200</td>
<td>6 pcs</td>
</tr>
<tr>
<td>LIH200D</td>
<td>6 pcs</td>
</tr>
</tbody>
</table>

Note 1) Although T-tuts (LI-LI) for mounting are included with the body for LIH100/LJ1S10, they are optional for other models.

Note 2) To insert the T-tuts remove the covers at both ends of the body and insert them into the T-tuts.

Note 3) When accurate positioning of the actuator body is required, also machine 2 offset slotted pin holes to dimensions shown above.

For LIH100 - 2 holes 3H10
For LIH100D - 2 holes 4H10
For LIH200 - 3 holes 4H10
For LIH200D - 3 holes 4H10

**Model LJ1-T8**

**Height 6.4g**

**Electric Actuators: Type LIH model**

<table>
<thead>
<tr>
<th>Model</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIH100</td>
<td>100mm stroke 5 pcs 300mm stroke or more 6 pcs</td>
</tr>
<tr>
<td>LIH100D</td>
<td>6 pcs</td>
</tr>
<tr>
<td>LIH200</td>
<td>6 pcs</td>
</tr>
<tr>
<td>LIH200D</td>
<td>6 pcs</td>
</tr>
</tbody>
</table>

* Only series LIH100, LJ1S10D has the T-tuts built into the body.
6.3 Motor mounting

**CAUTION:** Refer to relevant motor manual for further information

### 6.3.1 Standard / Tsubaki Cableveyor specifications

**Dimension table**

<table>
<thead>
<tr>
<th>Type</th>
<th>Motor mounting area dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>LJ1H/S10R/Y</td>
<td>T10B0100 - T10B0200</td>
</tr>
<tr>
<td>LJ1H/S10G</td>
<td>T10B0100 - T10B0200</td>
</tr>
<tr>
<td>Thread size</td>
<td>M4 x 0.7, M3 x 0.5</td>
</tr>
<tr>
<td>Tightening torque (Nm)</td>
<td>2.4 ± 0.1, 1.5 ± 0.1</td>
</tr>
<tr>
<td>Effective thread length (mm)</td>
<td>8 ± 6</td>
</tr>
<tr>
<td>Quantity</td>
<td>2 ± 4</td>
</tr>
<tr>
<td>P.C.D. (mm)</td>
<td>46 ± 45</td>
</tr>
</tbody>
</table>

* When mounting a coupling on the motor, mount it within the dimensional range shown on the right.

**Note:** On the -X60-Q option the top mount method cannot be used. (Use the threaded mounting holes from underneath)

### 6.3.2 Clean Room Specification / Dust Seal Specification

**Dimension table**

<table>
<thead>
<tr>
<th>Type</th>
<th>Motor mounting area dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>LJ1H/S20R/Y</td>
<td>T10B0100 - T10B0500, T10B0100 - T10B0500</td>
</tr>
<tr>
<td>LJ1H/S20G</td>
<td>T10B0100 - T10B0500, T10B0100 - T10B0500</td>
</tr>
<tr>
<td>Thread size</td>
<td>M4 x 0.7, M3 x 0.5</td>
</tr>
<tr>
<td>Tightening torque (Nm)</td>
<td>2.4 ± 0.1, 1.5 ± 0.1</td>
</tr>
<tr>
<td>Effective thread length (mm)</td>
<td>8 ± 6</td>
</tr>
<tr>
<td>Quantity</td>
<td>2 ± 4</td>
</tr>
<tr>
<td>P.C.D. (mm)</td>
<td>46 ± 45</td>
</tr>
</tbody>
</table>

* When mounting a coupling on the motor, mount it within the dimensional range shown on the left.

**Note:** On the -X60-Q option the top mount method cannot be used. (Use the threaded mounting holes from underneath)

### Coupling - Mounting precautions

**DANGER**

Provide a safety mechanism

If the product breaks down, the driven part can be completely separated from the driving part. To prevent hazards, be sure to provide a safety mechanism.

**CAUTION**

1) Use our specified bolts and screws only. The use of bolts or screws other than those specified can damage the bolts, screws or product. Use our specified bolts only.

2) For models without a brake, use a high-torque coupling for use in an AC drive system.

3) For models with a brake, use a high-torque coupling for use in a DC drive system.
7 ELECTRICAL ACTUATOR STANDARD SPECIFICATIONS

WARNING
Never operate the actuator outside the specifications.

Specifications LJ1H10 (50W AC Servomotor)

<table>
<thead>
<tr>
<th>Stroke (mm)</th>
<th>Weight (kgf)</th>
<th>Operating temperature range (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>0.4</td>
<td>5 to 45 (with or without condensation)</td>
</tr>
<tr>
<td>200</td>
<td>0.5</td>
<td>5 to 45 (with or without condensation)</td>
</tr>
<tr>
<td>300</td>
<td>0.6</td>
<td>5 to 45 (with or without condensation)</td>
</tr>
<tr>
<td>400</td>
<td>0.7</td>
<td>5 to 45 (with or without condensation)</td>
</tr>
<tr>
<td>500</td>
<td>0.8</td>
<td>5 to 45 (with or without condensation)</td>
</tr>
</tbody>
</table>

Specifications LJ1H20 (100W AC Servomotor)

<table>
<thead>
<tr>
<th>Stroke (mm)</th>
<th>Weight (kgf)</th>
<th>Operating temperature range (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>0.6</td>
<td>5 to 45 (with or without condensation)</td>
</tr>
<tr>
<td>200</td>
<td>0.8</td>
<td>5 to 45 (with or without condensation)</td>
</tr>
<tr>
<td>300</td>
<td>1.0</td>
<td>5 to 45 (with or without condensation)</td>
</tr>
<tr>
<td>400</td>
<td>1.2</td>
<td>5 to 45 (with or without condensation)</td>
</tr>
<tr>
<td>500</td>
<td>1.4</td>
<td>5 to 45 (with or without condensation)</td>
</tr>
</tbody>
</table>

Specifications LJ1H30 (150W AC Servomotor)

<table>
<thead>
<tr>
<th>Stroke (mm)</th>
<th>Weight (kgf)</th>
<th>Operating temperature range (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>1.2</td>
<td>5 to 45 (with or without condensation)</td>
</tr>
<tr>
<td>200</td>
<td>1.5</td>
<td>5 to 45 (with or without condensation)</td>
</tr>
<tr>
<td>300</td>
<td>1.8</td>
<td>5 to 45 (with or without condensation)</td>
</tr>
<tr>
<td>400</td>
<td>2.0</td>
<td>5 to 45 (with or without condensation)</td>
</tr>
<tr>
<td>500</td>
<td>2.2</td>
<td>5 to 45 (with or without condensation)</td>
</tr>
</tbody>
</table>

8 WIRING

9 OPERATION

1. Never access or touch terminals and switches while energized. It may lead to electric shock.
2. Never touch any moving part of the actuator when it is powered up or operating. This may lead to injury.
3. It is important to perform a maintenance inspection on the LJ1 series electronic actuator in order to operate the actuator safely and to ensure its optimal performance. We urge you to familiarize yourself with the information contained below, which will enable you to perform maintenance inspections properly.
4. Before performing a maintenance inspection, be sure to verify that the power to the controller is turned off. Be extremely careful in handling the actuator with its power off, because there is a danger of moving the table if a momentary power-off is inadvertently applied to the actuator.

10 MAINTENANCE INSPECTION

1. After making sure that the sliding surface is free of debris or scratches, manually move the table back and forth, to spread the grease. Use grease such as Albana No.2 by Showa Shell Oil or Daffy Corenea No.2 by Idemitsu Koso. Apply the above mentioned grease by hand to the linear guide. Using rubber gloves or rubber finger covers to avoid contamination.
2. After clearing the threaded portion of the slide screw, manually apply grease to the threads, and move the table back and forth, to spread the grease. Use grease such as 5N20 by Showa Shell Oil or Daffy Corenea No.2 by Idemitsu Koso. Apply the above mentioned grease by hand to the slideguide. Using rubber gloves or rubber finger covers to avoid contamination.
3. After clearing the threaded portion of the slide guide, manually apply grease to the threads, and move the table back and forth, to spread the grease. Use grease such as 5N20 by Showa Shell Oil or Daffy Corenea No.2 by Idemitsu Koso. Apply the above mentioned grease by hand to the slideguide. Using rubber gloves or rubber finger covers to avoid contamination.
4. Do not perform an inspection while the actuator is in operation. If you must perform an inspection while the actuator is in operation, keep clear of area of movement of the actuator.
5. Check the voltage using a tester, more than 1 minute after the power is turned off before commencing any wiring and inspection.
6. Check the connections using a tester, more than 1 minute after the power is turned off before commencing any wiring and inspection.
7. Tighten adjustment screw A in the center again at the specified torque.
9) Move the table again back and forth to be sure that there is no problem. If the following conditions are found, repeat the adjustment procedure:
1) The table, without a load, does not move when pushed manually.
2) A large amount of play is felt at the table.
10) Retract the side cover, top cover (or body cover) in the opposite sequence of removal.
Note: If the table vibrates excessively even after adjusting the bearing, consult SMC.

10.3 Clean room option (-X60)
Change of materials, anti-corrosive treatment, use of a special grease, and vacuum cleaning of the inside of the actuator allow operation in a clean room.

Periodic inspection

Periodic inspection

CAUTION

Maintenance of the grease parts of the dust seal is necessary.

Maintenance should be performed at 4000km, 4 million reciprocations or within 6 months, whichever occurs first.

Specified grease: Order code LJ1S10

10.5 TSUBAKI CABLEVEYOR Specification (-X40)

Able to compactly arrange supporting guides for cables and hoses.

Notes:
1) Dust seal material: Polyurethane
Consult SMC for details.
2) Measures for use in a moist environment are not provided. Also, depending on the environment, it may not be possible to use the dust seal. Consult SMC.

10.4 Dust seal option (-X70)

Websites

SMC Corporation www.smcworld.com
SMC Europe www.smeu.com