Snap action limit switches with positive opening mechanism enable general industrial machines to comply with EC directives and to acquire CE marking.

**ORDER GUIDE**

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<th>Catalog listing</th>
<th>Operating characteristics</th>
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<td>LJA10-11A21N</td>
<td>O.F. (Max.) operating force</td>
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<tr>
<td></td>
<td></td>
<td>11.8 N</td>
</tr>
<tr>
<td>Adjustable roller lever</td>
<td>LJA10-13A21N</td>
<td>11.8 N</td>
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<tr>
<td>Boot seal roller plunger</td>
<td>LJA10-57A21N</td>
<td>18.6 N</td>
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**STANDARDS COMPLIANCE**

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<td>UL 508</td>
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<td>EN 60947-5-1</td>
<td>R 9551074</td>
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<tr>
<td>CQC</td>
<td>GB14048.5</td>
<td>2003010305083858</td>
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INTERNAL SWITCH: N.C./N.O. electrically independent contacts (Zb)

- Internal switches in the LJA Series have a twin-contact structure with N.C./N.O. electrically independent contacts (Zb).
- The movable contact plates for the N.C. and N.O. contacts are independent from each other and mutually insulated. This switch is a type of two-circuit and double-breaking switch using twin contacts.

OPERATIONAL DESCRIPTION OF LJA INTERNAL SWITCH

Conventional LS general purpose limit switch……… LJA switch………

In the conventional two-circuit double-breaking switch, if fusing occurs at the N.C. contact and the switch is activated, N.C. and N.O. circuits can become electrically connected. If this occurs, the power supply circuit may be short-circuited or the load may be burned out depending on the circuit configuration.

In an LJA Series switch, even if fusing occurs and the switch is activated, N.C. and N.O. circuits cannot be connected. Therefore, even though a separate power supply is put on the N.C. and N.O. sides as shown in the above Figure, the short-circuited power supply and burned out load can be avoided. Additionally, as the switch is pushed in, the cam is rotated to push up the N.C. contact plate and forcibly release the fused contact.

CONTACTS FORCED OPEN BY CAM (N.C. contacts only)

As shown in the above Figure, the cam forcibly pushes up the N.C. contact from the bottom. With this mechanism, the contacts are forcibly opened even if they are fused.
## PERFORMANCE

### Standards
- **Compliance**: NECA C 4508/UJIC C 8201-5-1, IEC60947-5-1, EN50041 (mounting hole dimension only)
- **Certification**: EN60947-5-1(TUV)/UL508(UL)/CSA C22-2 No.14(C-UL)/GB14048.5(CQC)

### Structure
- **Contact type**: Zb(EN60947-5-1)
- **Contact shape**: Screw (M3 round head screw with square washer)
- **Terminal shape**: Immersion proof type (JIS), IP67(IEC60529), Type 6p(UL50)
- **Protective structure**: See Table 1.
- **Pollution level**: 3(EN60947-5-1)

### Electrical performance
#### (1) General characteristics
- **Dielectric strength**
  - Between non-continuous terminals: 2,100 Vac, 50/60 Hz for 1min.
  - Between each terminal and non-live metal part: 5,300 Vac, 50/60 Hz for 1min.
  - Between each terminal and ground: 5,300 Vac, 50/60 Hz for 1min.
  - Between different terminals: 5,300 Vac, 50/60 Hz for 1min.
- **Insulation resistance**: 100 MΩ or more (by 500 Vdc megger)
- **Initial contact resistance**: 25 mΩ or less (6 to 8 Vdc, thermal current 1A, measured by voltage drop method)
- **Recommended min. operating voltage/current**: 24V-10 mA, 12V-20 mA
- **Rated operating voltage**: 400 Vac, 250 Vdc
- **Rated thermal current (Ith)**: 10A
- **Rated frequency**: AC voltage, 45 to 65 Hz, and DC voltage
- **Short-circuit protection**: BUSSMANN KTK-10 (10A) fast acting fuse or equivalent, (TÜV)/10A fast acting fuse (CQC)
- **Rated insulation voltage (Ui)**: 500 Vac or 275 Vdc
- **Conditional rated short-circuit current**: 1,000A (with coil load)
- **Switching over-voltage**: Category III (IEC60620-1)
- **Rated impulse withstanding voltage (Uimp)**: Between each terminal and non-live metal part: 6000V, Between non-continuous terminals: 7400V
- **Electrical protection**: class I (IEC 60536)

#### (2) EN 60947-5-1 related characteristics
- **Actuator strength**
  - Roller lever type: 49 N in operating direction for 1min. or more
  - Plunger type: 93 N in operating direction for 1min. or more
  - Rod lever type: 12 N in operating direction for 1min. or more
- **Terminal strength**
  - Impact resistance: 300 m/s², contact opening for 1ms. or less in free position and total travel position.
  - Vibration resistance: Frequency: 10 to 55 Hz, peak-to-peak amplitude: 1.5 mm, continuous for 2hrs. Contact opening for 1ms. or less in free position and total travel position.
  - Allowable operating speed: 1 mm/s to 0.5 mm/s
    - Min. speed: 0.1 s or less in the unstable contact status
    - Max. speed: Actuator should not be broken
- **Operating frequency**: 120 operations/min. or less
- **Mechanical life**: Leverage type: 15 million operations or more. Plunger type: 5 million operations or more
- **Operating temperature range**: –25 to +70°C (No freezing allowed)
- **Operating humidity range**: 98%RH or less
- **Body**: 5 to 6 N-m (M5 screw)
- **Terminal**: 0.6 to 1.0 N-m (M3 round head screw with square washer)
- **Cover**: 1.3 to 1.7 N-m (M4 screw)
- **Head**: 0.8 to 1.2 N-m (M3.5 screw)
- **Roller lever**: 4 to 5.2 N-m (M5 screw)

### Electrical protection
- **Category used**: AC-15: Solenoid load
  - DC-13: Solenoid load
- **Ue**: Rated operating voltage
- **Ie**: Rated operating current

### Environmental conditions
- **Operating temperature range**: –25 to +70°C (No freezing allowed)
- **Operating humidity range**: 98%RH or less
- **Body**: 5 to 6 N-m (M5 screw)
- **Terminal**: 0.6 to 1.0 N-m (M3 round head screw with square washer)
- **Cover**: 1.3 to 1.7 N-m (M4 screw)
- **Head**: 0.8 to 1.2 N-m (M3.5 screw)
- **Roller lever**: 4 to 5.2 N-m (M5 screw)

### Recommended tightening torque

#### Table 1. Electrical rating

<table>
<thead>
<tr>
<th>EN 60947-5-1</th>
<th>UL508</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC-15: Ue=AC400V, Ie=2A</td>
<td>2A/400 Vac General Use Load</td>
</tr>
<tr>
<td>Ue=AC240V, Ie=3A</td>
<td>3A/240 Vac General Use Load</td>
</tr>
<tr>
<td>DC-13: Ue=DC250V, Ie=0.27A</td>
<td>0.27A/240 Vdc</td>
</tr>
<tr>
<td></td>
<td>0.55A/120 Vdc</td>
</tr>
</tbody>
</table>

### CONTACT CONFIGURATION
- Zb: Mutually insulated twin-contact type double gap contact element with 4 terminals (EN 60947-5-1)
- ☞ Symbol for control switch with positive opening circuit operation (EN60947-5-1)
**APPEARANCE, OPERATING CHARACTERISTICS, AND EXTERNAL DIMENSIONS**

### Roller lever

![Roller lever](image)

- **O.F. (operating force)** (N max.) 11.8
- **R.F. (release force)** (N min.) 0.5
- **P.T. (pretravel)** (˚ max.) 25
- **O.T. (overtravel)** (˚ min.) 45
- **M.D. (movement differential)** (˚ max.) 13
- **T.T. (total travel)** (˚ min.) 70
- **P.O. (travel to positive opening position)** (˚ max.) 55
- **P.O.F. (positive opening force)** (N max.) 12.7

**Note 1.** A mounting pitch of 58.7 to 60 is possible.

**Note 2.** When using N.C. for safety, a push-in amount exceeding the P.O. point shown on the left should be kept.

**Note 3.** Dimensional tolerance is ±0.8 unless otherwise specified.

### Adjustable roller lever

![Adjustable roller lever](image)

- **O.F. (operating force)** (N max.) 11.8
- **R.F. (release force)** (N min.) 0.5
- **P.T. (pretravel)** (˚ max.) 25
- **O.T. (overtravel)** (˚ min.) 45
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**Boot seal roller plunger**

(UNIT: MM)

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**Note 2.** When using N.C. for safety, a push-in amount exceeding the P.O. point shown on the left should be kept.

**Note 3.** Dimensional tolerance is ±0.8 unless otherwise specified.

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### Catalog Listing

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>O.F. (operating force) (N max.)</td>
<td>18.6</td>
</tr>
<tr>
<td>R.F. (release force) (N min.)</td>
<td>2.0</td>
</tr>
<tr>
<td>F.P. (free position) (mm max.)</td>
<td>51</td>
</tr>
<tr>
<td>O.P. (operating position) (mm)</td>
<td>48 ± 1</td>
</tr>
<tr>
<td>P.T. (pretravel) (mm max.)</td>
<td>3</td>
</tr>
<tr>
<td>O.T. (overtravel) (mm min.)</td>
<td>4.5</td>
</tr>
<tr>
<td>M.D. (movement differential) (mm max.)</td>
<td>1.3</td>
</tr>
<tr>
<td>T.T. (total travel) (mm min.)</td>
<td>6.5</td>
</tr>
<tr>
<td>P.O. (travel to positive opening position) (mm max.)</td>
<td>5.5</td>
</tr>
<tr>
<td>P.O.F. (positive opening force) (N max.)</td>
<td>27</td>
</tr>
</tbody>
</table>

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### Auxiliary Actuators

**● LS-6PA64-102**

- Sintered stainless steel roller (17.4 dia. x 7.1)
- Roller lever can also be attached to opposite side

**● LS-6PA64-201, LS-6PA64-202**

- Sintered stainless steel roller (17.4 dia. x 7.1)
- LS-6PA64-201: nylon roller (17.4 dia. x 7.1)
- LS-6PA64-202: nylon roller (17.4 dia. x 7.1)

**● LS-6PA64-211, LS-6PA64-212**

- Sintered stainless steel roller (17.4 dia. x 7.1)
- LS-6PA64-211: nylon roller (17.4 dia. x 7.1)
- LS-6PA64-212: nylon roller (17.4 dia. x 7.1)
1. Changing the operating direction of a roller lever switch

Roller lever switch are factory-assembled to operate in both directions. It is possible to change to one operating direction (clockwise or counterclockwise) corresponding to the customer’s operation method. To change the operating direction, follow the steps below.

Step 1. Loosen the four screws on the switch head and remove it.
Step 2. Turn over the head, push the internal plunger guide (black cylindrical part), and then turn it to set the desired operating direction. Set the mark on the internal plunger guide to RL, R, or L on the head to set the desired operation.

RL: operation in both directions
R: operation in clockwise direction (CW)
L: operation in counterclockwise direction (CCW)

Step 3. Reassemble the switch head and body.

2. Mounting the switch

The mounting of LJA Series limit switches is compatible with that of LS Series general purpose compact switches. Mount the switch as shown in the following Figures.

2.1 Mounting the LJA Series switch (mounting in conformity with EN 50041) (unit: mm)

Three mounting holes indicated by “•” shown in the Fig. on the left, that is, 5.2dia. hole, oval hole 5.2 x 5.6, and oval hole 5.2 x 6.5, can be secured. Note. The back mounting cannot be performed using the mounting hole having a mounting pitch of 30 x 60.

2.2 If mounting compatibility with LS Series general purpose compact switch is required

Mounting the LS-J Series switch

Four 5.2dia. mounting holes indicated by “•” shown in the Fig. on the left can be secured or four M6 screws on the back can be secured.

Mounting the LJA Series switch

Two M6 screws diagonally opposite to each other on the back of the switch indicated by “•“ shown in the Fig. can be secured, or two 5.2dia. mounting holes diagonally opposite to each other or four 5.2dia. mounting holes can be secured.

3. Wiring

- Do not wire while the power is ON. There is a danger of electrical shock or unexpected movement of the mechanism.

4. Adjustment

- Do not apply excessive force (5 times the O.F. or more) to the actuator beyond the travel limit position. Doing so may damage the switch.
- Set the overtravel between 1/3 and 2/3 of the rated value. With a small overtravel, vibration or shock may cause the contacts to rattle or to make poor contact.

5. Environment

- Do not use the switch in an environment where strong acid or alkali is directly splashed onto it.
6. Other cautions

- Do not apply a lubricant to the sliding part of the actuator or any other component. Application of an inappropriate lubricant may degrade sliding performance or impair the protective structure.
- Remove any foreign substances adhering to the sliding part. Dust or any other foreign substance attached to the sliding part may cause a malfunction.
- Check the actual load.

To increase reliability, confirm that the switch has no problems in actual use before using the switch.

Before use, thoroughly read the “Precautions for use” and “Precautions for handling” in the Technical Guide on pages D-101 to D-112 as well as the instruction manual and product specification for this switch.