

# L-BALLS

- L-Balls
- L-Ball Dust Cover



## Structure and Features

**IKO** L-Balls are self-aligning rod-ends consisting of a special zinc die-cast alloy body and a studed ball which has its axis at right angles to the body. They can perform tilting movement, oscillating movement and rotation with low torque, and transmit power smoothly due to uniform clearance between the sliding surfaces. Their superior wear resistance assures stable accuracy for long periods of time, and maintenance is simple. They are very economical bearings. For these reasons, they are widely used in link mechanisms in automobiles, construction machinery, farm and packaging machines, etc.

## Types

L-Balls are available in various types as shown in Table 1.

**Table 1 Type of L-Balls**

| Type       | L-Ball |     | L-Ball dust cover |
|------------|--------|-----|-------------------|
|            | LHSA   | LHS | PRC               |
| Model code | LHSA   | LHS | PRC               |

### L-Ball LHSA

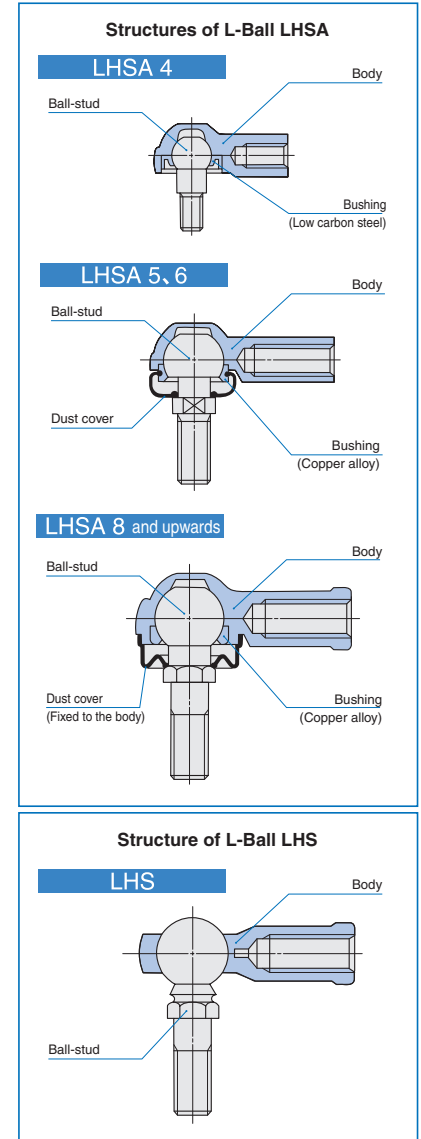
These are compact rod-ends in which the spherical part of the ball-stud are held by the special zinc die-cast alloy body. There is a dust cover on the stud side and good quality lithium soap base grease is prepacked. They can be run for long periods of time without re-lubrication and have excellent lubrication and anti-dust properties.

As shown in the structural drawing, these rod-ends are classified into 3 types by size. In addition, the ball-studs of LHSA 10 and lower are formed in one solid body, but those of LHSA 12 and higher, which are used under large loads, have the stud friction-welded to a high precision steel ball to give greater resistance to wear.

### L-Ball LHS

These rod-ends have a friction-welded ball-stud, and a special zinc die-cast alloy body which houses the spherical surface of the high precision steel ball. There is an almost complete contact across the sliding surfaces, and the uniform clearance guarantees a stable bearing life.

An L-Ball dust cover can be attached to these rod-ends. If the rod-ends are lubricated with lithium soap



base grease, they have excellent lubrication and anti-dust properties and can run for long periods of time without re-lubrication. When the L-Ball LHS is delivered with a dust cover on request, lithium soap base grease is prepacked.

K  
LHSA  
LHS

**L-Ball Dust Cover PRC**

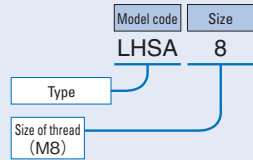
This is for the L-Ball LHS series. It is made of special synthetic rubber which has excellent resistance to oil and ozone. The cover offers very effective dust protection and prevents grease leakage.

**Identification Number**

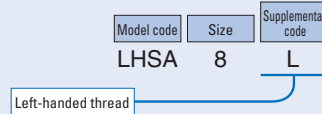
The identification number of L-Balls consists of a model code, a size and any supplemental codes as shown in the examples.

**Examples of identification number**

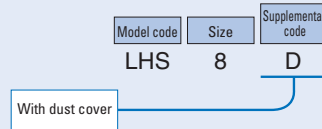
**Example 1 (Female thread of the body : In case of right-hand threaded)**



**Example 2 (Female thread of the body : In case of left threaded)**



**Example 3 (when a dust cover PRC is attached to LHS)**



**Accuracy**

The accuracy of L-Balls is shown in Table 2.

**Table 2 Tolerance**

| Type | Dimension symbol | Tolerance                 |
|------|------------------|---------------------------|
| LHSA | $l_1$            | $\pm 0.5$                 |
|      | $V$              | 0<br>- 0.2 <sup>(1)</sup> |
| LHS  | $l_1$            | $\pm 0.4$                 |
|      | $V$              | h9                        |

unit: mm

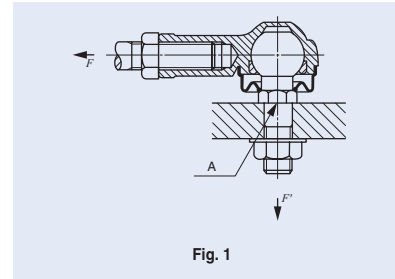
Note<sup>(1)</sup> This dimensional tolerance applies to LHSA 5 and higher.

**Selection of L-Balls**

The static load capacity and maximum operating load of L-Balls are determined in consideration of the strength of the ball stud and the body. Accordingly, L-Balls are selected on the basis of the static load capacity  $C_s$  shown in the dimension table and the maximum operating load shown in Table 3.

**Static load capacity**

The static load capacity  $C_s$  shown in the dimension table represents the allowable axial force  $F$  which is determined by the mechanical strength of the ball-stud at the section 'A' under the bending moment due to the force  $F$  as illustrated in Fig. 1. If  $F$  increases beyond the static load capacity, deformation will begin at A, leading to breakage.



**Maximum operating load**

The strength of the body must also be taken into consideration when L-Balls are operated in a high-temperature or low-temperature atmosphere or receive repetitive loads of long duration or shock loads. A guideline for maximum operating load of L-Balls is shown in Table 3. When the fixing bolt in the main body is fixed and a load is applied in the direction of  $F'$ , the bending stress in the fixing bolt must be taken into consideration.

**Table 3 Maximum operating load**

| Identification number | Maximum operating load | Identification number | Maximum operating load |
|-----------------------|------------------------|-----------------------|------------------------|
| LHSA 4                | 840                    | LHS 5                 | 880                    |
| LHSA 5                | 1 180                  | LHS 6                 | 1 080                  |
| LHSA 6                | 1 080                  | LHS 8                 | 1 630                  |
| LHSA 8                | 1 900                  | LHS10                 | 2 100                  |
| LHSA10                | 2 170                  | LHS12                 | 2 620                  |
| LHSA10M               | 2 170                  | LHS14                 | 3 190                  |
| LHSA12                | 2 790                  | LHS16                 | 3 820                  |
| LHSA14                | 3 540                  | LHS18                 | 4 610                  |
| —                     | —                      | LHS20                 | 5 340                  |
| —                     | —                      | LHS22                 | 6 460                  |

unit: N

**Lubrication**

LHSA is prepacked with lubricating grease ALVANIA GREASE S2 (SHOWA SHELL SEKIYU K.K.). LHS is not provided with prepacked grease. Perform proper lubrication for use.

Operating LHS without lubrication will increase the wear of the sliding contact surface or cause seizure.

**Operating Temperature Range**

The maximum allowable temperature for L-Balls is +80°C.

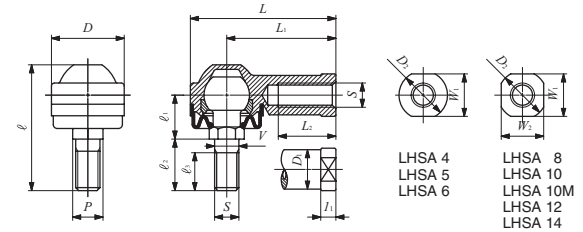
**Precautions for Use**

- 1 Tightening depth**  
It is recommended that the tightening depth of the screw into the body is more than twice the nominal diameter of thread.
- 2 Allowable tilting angle**  
The allowable tilting angle is shown in Table 4.

**Table 4 Allowable tilting angle**

| Nominal dia. mm | LHSA $\alpha$ | LHS $\alpha$ |
|-----------------|---------------|--------------|
| 4               | 15            | —            |
| 5               | 17            | 15           |
| 6               | 17            | 17           |
| 8               | 18            | 18           |
| 10              | 19            | 19           |
| 12              | 19            | 19           |
| 14              | 20            | 20           |
| 16              | —             | 20           |
| 18              | —             | 21           |
| 20              | —             | 20           |
| 22              | —             | 21           |

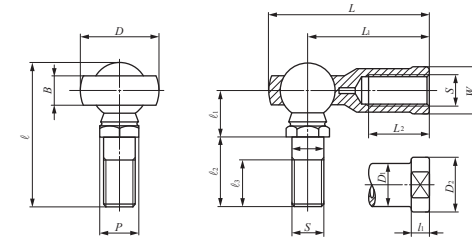
unit: degree



| Identification number | Mass (Ref.)<br>g | Boundary dimensions mm |    |    |      |                |                |                |                |                |                |                |      |      |  |
|-----------------------|------------------|------------------------|----|----|------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|------|------|--|
|                       |                  | Thread<br>S            | V  | D  | L    | L <sub>1</sub> | L <sub>2</sub> | l <sub>1</sub> | W <sub>1</sub> | W <sub>2</sub> | D <sub>1</sub> | D <sub>2</sub> | l    | P    |  |
| <b>LHSA 4</b>         | 11               | M 4×0.7                | *4 | 14 | 25   | 18             | 8              | 4              | 8              | —              | 8              | 10             | 19.5 | *5.5 |  |
| <b>LHSA 5</b>         | 27               | M 5×0.8                | 5  | 17 | 38.5 | 30             | 16             | 5              | 10             | —              | 10             | 12             | 32.5 | 8    |  |
| <b>LHSA 6</b>         | 27               | M 6×1                  | 6  | 19 | 39.5 | 30             | 16             | 5              | 10             | —              | 10             | 12             | 32.5 | 8    |  |
| <b>LHSA 8</b>         | 64               | M 8×1.25               | 8  | 24 | 48   | 36             | 19             | 5              | 14             | 14             | 13             | 16             | 41.5 | 10   |  |
| <b>LHSA 10</b>        | 106              | M10×1.25               | 10 | 28 | 57   | 43             | 23             | 6.5            | 17             | 17             | 15             | 19             | 49   | 12   |  |
| <b>LHSA 10M</b>       | 106              | M10×1.5                | 10 | 28 | 57   | 43             | 23             | 6.5            | 17             | 17             | 15             | 19             | 49   | 12   |  |
| <b>LHSA 12</b>        | 180              | M12×1.75               | 12 | 34 | 67   | 50             | 27             | 6.5            | 19             | 19             | 17.5           | 22             | 64   | 14   |  |
| <b>LHSA 14</b>        | 260              | M14×2                  | 14 | 38 | 76   | 57             | 30             | 8              | 22             | 22             | 20             | 25             | 72   | 17   |  |

Remarks1. The item marked \* is manufactured with a neck diameter of  $\phi 3.4$ . The item marked \* is manufactured with a diameter of  $\phi 5.5$  instead of a width across flats.  
 2. Provided with prepacked grease.

| l <sub>1</sub> | l <sub>2</sub> | l <sub>3</sub> | Ball dia. | Static load capacity |   |
|----------------|----------------|----------------|-----------|----------------------|---|
|                |                |                |           | C <sub>s</sub>       | N |
| 7              | 7              | 5              | 8         | 880                  |   |
| 12             | 13             | 10             | 11.112    | 1 180                |   |
| 12             | 13             | 10             | 11.112    | 1 670                |   |
| 14.5           | 17             | 12.5           | 15        | 4 380                |   |
| 16             | 21             | 17             | 19.05     | 7 400                |   |
| 16             | 21             | 17             | 19.05     | 7 400                |   |
| 20             | 30             | 20             | 22.225    | 9 900                |   |
| 22.5           | 33.5           | 22             | 25.4      | 14 600               |   |



LHS

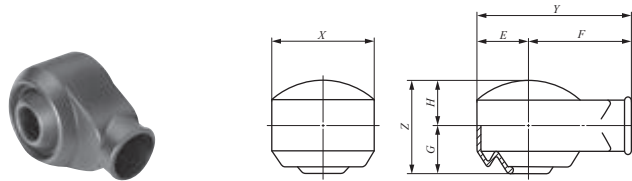
| Identification number | Mass (Ref.)<br>g | Boundary dimensions mm |    |      |      |       |                |                |                |    |                |                |      |    |
|-----------------------|------------------|------------------------|----|------|------|-------|----------------|----------------|----------------|----|----------------|----------------|------|----|
|                       |                  | Thread<br>S            | V  | D    | B    | L     | L <sub>1</sub> | L <sub>2</sub> | l <sub>1</sub> | W  | D <sub>1</sub> | D <sub>2</sub> | l    | P  |
| <b>LHS 5</b>          | 22               | M 5×0.8                | 5  | 17   | 6    | 35.5  | 27             | 16             | 4              | 9  | 9              | 11             | 30.5 | 8  |
| <b>LHS 6</b>          | 32               | M 6×1                  | 6  | 19.5 | 6.75 | 39.7  | 30             | 16             | 5              | 11 | 10             | 13             | 36.5 | 10 |
| <b>LHS 8</b>          | 60               | M 8×1.25               | 8  | 24   | 9    | 48    | 36             | 19             | 5              | 14 | 12.5           | 16             | 44   | 11 |
| <b>LHS 10</b>         | 102              | M10×1.5                | 10 | 28   | 10.5 | 57    | 43             | 23             | 6.5            | 17 | 15             | 19             | 52.5 | 13 |
| <b>LHS 12</b>         | 160              | M12×1.75               | 12 | 32   | 12   | 66    | 50             | 27             | 6.5            | 19 | 17.5           | 22             | 61   | 17 |
| <b>LHS 14</b>         | 227              | M14×2                  | 14 | 36   | 13.5 | 75    | 57             | 30             | 8              | 22 | 20             | 25             | 69   | 17 |
| <b>LHS 16</b>         | 300              | M16×2                  | 16 | 40   | 15   | 84    | 64             | 36             | 8              | 22 | 22             | 27             | 74   | 19 |
| <b>LHS 18</b>         | 445              | M18×1.5                | 18 | 45   | 16.5 | 93.5  | 71             | 40             | 10             | 27 | 25             | 31             | 84   | 22 |
| <b>LHS 20</b>         | 580              | M20×1.5                | 20 | 49   | 18   | 101.5 | 77             | 43             | 10             | 30 | 27.5           | 34             | 90.5 | 24 |
| <b>LHS 22</b>         | 765              | M22×1.5                | 22 | 54   | 20   | 111   | 84             | 47             | 12             | 32 | 30             | 37             | 99   | 27 |

Remark No grease is prepacked. Perform proper lubrication.

| l <sub>1</sub> | l <sub>2</sub> | l <sub>3</sub> | Ball dia. | Static load capacity |   |
|----------------|----------------|----------------|-----------|----------------------|---|
|                |                |                |           | C <sub>s</sub>       | N |
| 10             | 15             | 11             | 11.112    | 2 080                |   |
| 11.5           | 18.5           | 14             | 12.7      | 3 290                |   |
| 14.5           | 21.5           | 15             | 15.875    | 4 900                |   |
| 17             | 26             | 18             | 19.05     | 7 640                |   |
| 20             | 30             | 20             | 22.225    | 12 400               |   |
| 22.5           | 33.5           | 22             | 25.4      | 14 600               |   |
| 24.5           | 35.5           | 23             | 28.575    | 19 500               |   |
| 27.5           | 40.5           | 25             | 31.75     | 25 600               |   |
| 30             | 43             | 27             | 34.925    | 31 600               |   |
| 32.5           | 47.5           | 30             | 38.1      | 39 800               |   |

**L-BALL**

L-Ball Dust Cover



PRC

| Identification number | Boundary dimensions mm |      |      |    |      |      |      |
|-----------------------|------------------------|------|------|----|------|------|------|
|                       | X                      | Y    | E    | F  | Z    | G    | H    |
| <b>PRC 5</b>          | 20                     | 29   | 10   | 19 | 16   | 8    | 8    |
| <b>PRC 6</b>          | 22                     | 31   | 11   | 20 | 19   | 9.5  | 9.5  |
| <b>PRC 8</b>          | 27                     | 38.5 | 13.5 | 25 | 24   | 12   | 12   |
| <b>PRC 10</b>         | 31                     | 45.5 | 15.5 | 30 | 27   | 14   | 13   |
| <b>PRC 12</b>         | 36                     | 53   | 18   | 35 | 32   | 16.5 | 15.5 |
| <b>PRC 14</b>         | 40                     | 60   | 20   | 40 | 36.5 | 19   | 17.5 |
| <b>PRC 16</b>         | 44                     | 68   | 22   | 46 | 40   | 20.5 | 19.5 |
| <b>PRC 18</b>         | 49                     | 74.5 | 24.5 | 50 | 46   | 23.5 | 22.5 |
| <b>PRC 20</b>         | 54                     | 82   | 27   | 55 | 50   | 25.5 | 24.5 |
| <b>PRC 22</b>         | 59                     | 89.5 | 29.5 | 60 | 53.5 | 27.5 | 26   |



**K**

LHSA  
LHS