

# L-BALLS

- L-Balls
- L-Ball Dust Cover



## Structure and Features

IKO L-Balls are self-aligning rod-ends consisting of a special die-cast zinc alloy body and a stud 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

IKO 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
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 die-cast zinc 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.

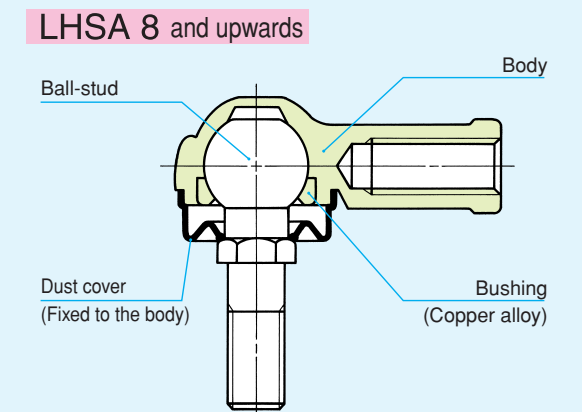
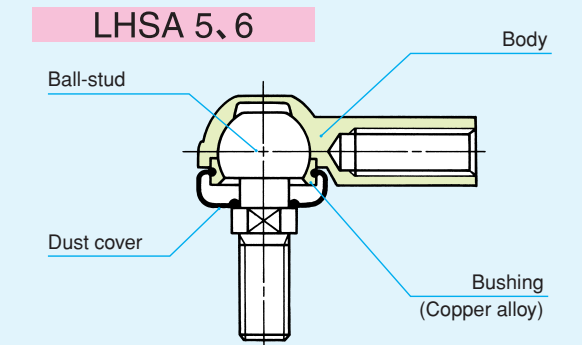
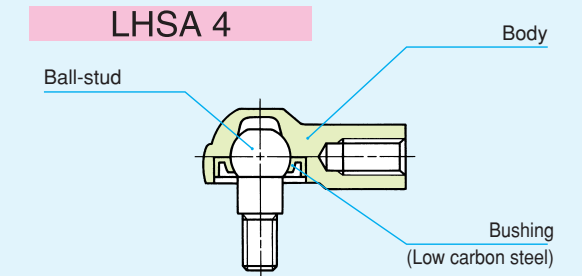
As shown in the structural drawing, these rod-ends are classified into 3 types by size. In addition, the ball-studs of LHSA 10 and lower are formed in one solid body, but those of LHSA 12 and higher, which are used under large loads, have the stud friction-welded to a high precision steel ball to give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

### L-Ball LHS

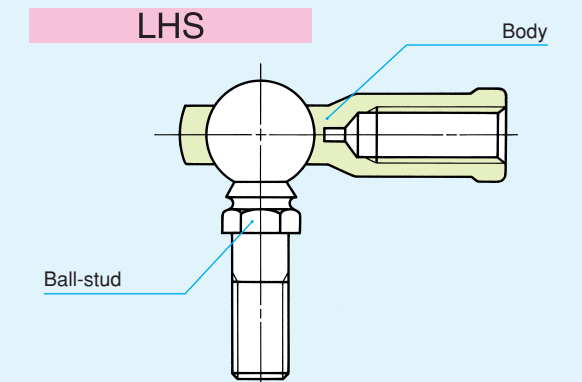
These rod-ends have a friction-welded ball-stud, and a special die-cast zinc alloy body which houses the spherical surface of the high precision steel ball. There is an almost complete contact across the sliding surfaces, and the uniform clearance guarantees a stable bearing life.

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

### Structures of L-Ball LHSA



### Structure of L-Ball LHS



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.

### L-Ball Dust Cover PRC

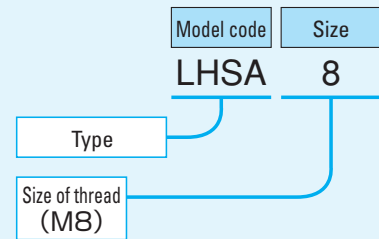
This is for the L-Ball LHS series. It is made of special synthetic rubber which has excellent resistance to oil and ozone. The cover offers very effective dust protection and prevents grease leakage.

### Identification Number

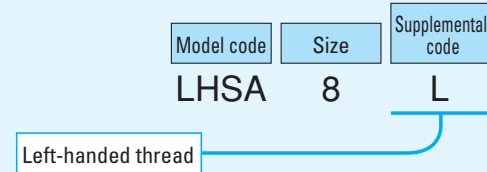
The identification number of L-Balls consists of a model code, a size and any supplemental codes as shown in the examples.

#### Examples of identification number

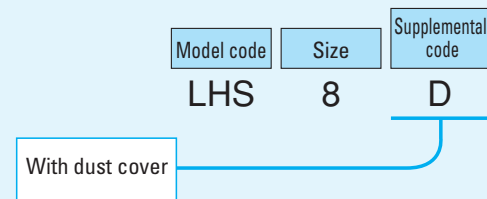
**Example 1 (Female thread of the body : In case of right-hand threaded)**



**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
L HSA	$l_1$	$\pm 0.5$
	$V$	0 -0.2 <sup>(1)</sup>
LHS	$l_1$	$\pm 0.4$
	$V$	h9

unit: mm

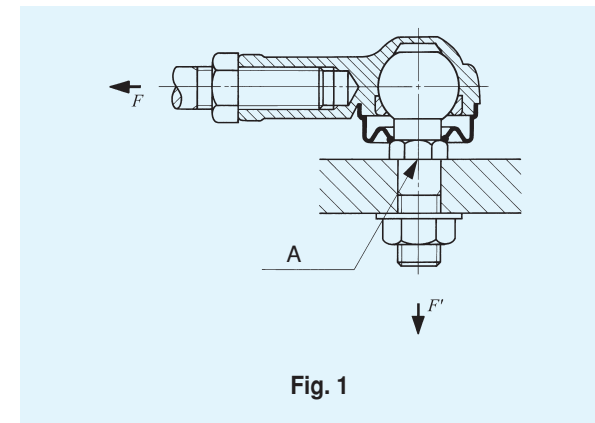
Note<sup>(1)</sup> This dimensional tolerance applies to L HSA 5 and higher.

### 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
L HSA 4	840	LHS 5	880
L HSA 5	1 180	LHS 6	1 080
L HSA 6	1 080	LHS 8	1 630
L HSA 8	1 900	LHS10	2 100
L HSA10	2 170	LHS12	2 620
L HSA10M	2 170	LHS14	3 190
L HSA12	2 790	LHS16	3 820
L HSA14	3 540	LHS18	4 610
-	-	LHS20	5 340
-	-	LHS22	6 460

unit: N

### Lubrication

L HSA is prepacked with lubricating grease ALVANIA GREASE 2 (SHELL). 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 Depth of thread

It is recommended that the depth of thread engagement into the body is more than twice the nominal diameter of thread.

#### 2 Permissible angle of tilt

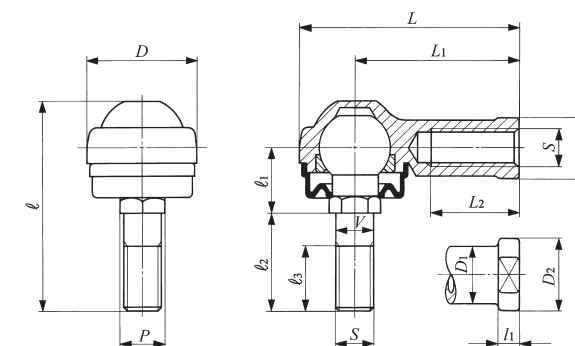
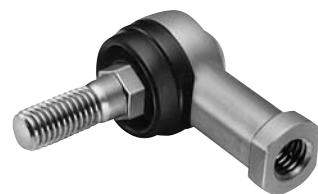
The permissible angle of tilt is shown in Table 4.

**Table 4 Permissible angle of tilt**

Nominal dia. mm	L HSA	LHS
$V$	$\alpha$	$\alpha$
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

L-BALL



LHSA

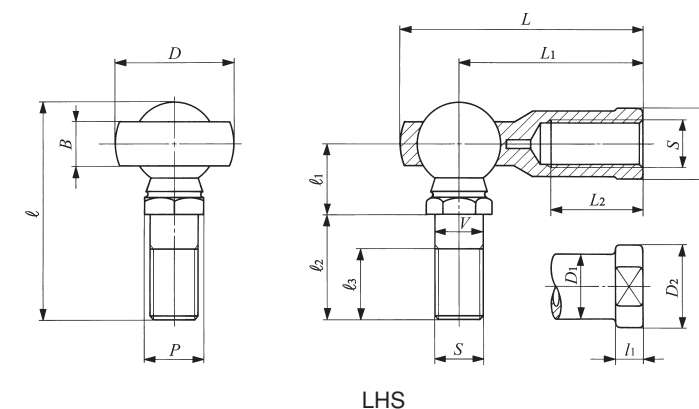
Identification number	Mass (Ref.) g	Boundary dimensions mm												
		Thread S	V	D	L	L <sub>1</sub>	L <sub>2</sub>	l <sub>1</sub>	W	D <sub>1</sub>	D <sub>2</sub>	ℓ	P	ℓ <sub>1</sub>
LHSA 4	11	M 4 × 0.7	* 4	14	25.5	18	8	4	8	8	10	19.5	* 5.5	7
LHSA 5	27	M 5 × 0.8	5	17	38.5	30	16	5	10	10	12	32.5	8	12
LHSA 6	27	M 6 × 1	6	19	39.5	30	16	5	10	10	12	32.5	8	12
LHSA 8	64	M 8 × 1.25	8	24	48	36	19	5	14	13	16	41.5	10	14.5
LHSA 10	106	M10 × 1.25	10	28	57	43	23	6.5	17	15	19	49	12	16
LHSA 10M	106	M10 × 1.5	10	28	57	43	23	6.5	17	15	19	49	12	16
LHSA 12	180	M12 × 1.75	12	34	67	50	27	6.5	19	17.5	22	64	14	20
LHSA 14	260	M14 × 2	14	38	76	57	30	8	22	20	25	72	17	22.5

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

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

LHSA  
LHS

L-BALL



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

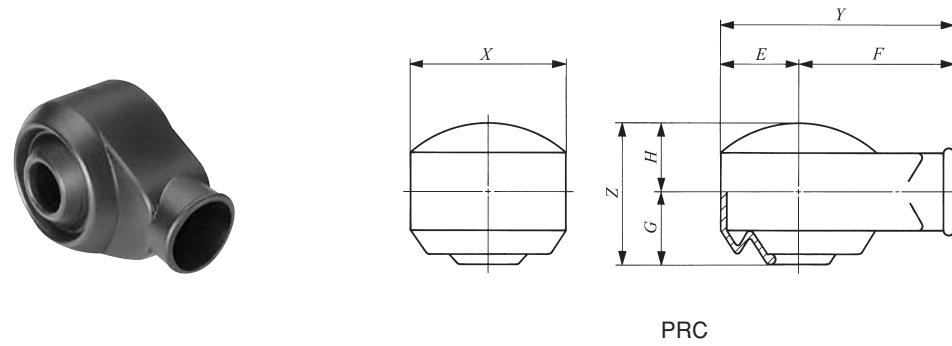
Remark Not provided with prepacked grease. Perform proper lubrication for use.

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

LHSA  
LHS

**L-BALL**

L-Ball Dust Cover



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



LHSA  
LHS