



# Rod End

THK General Catalog

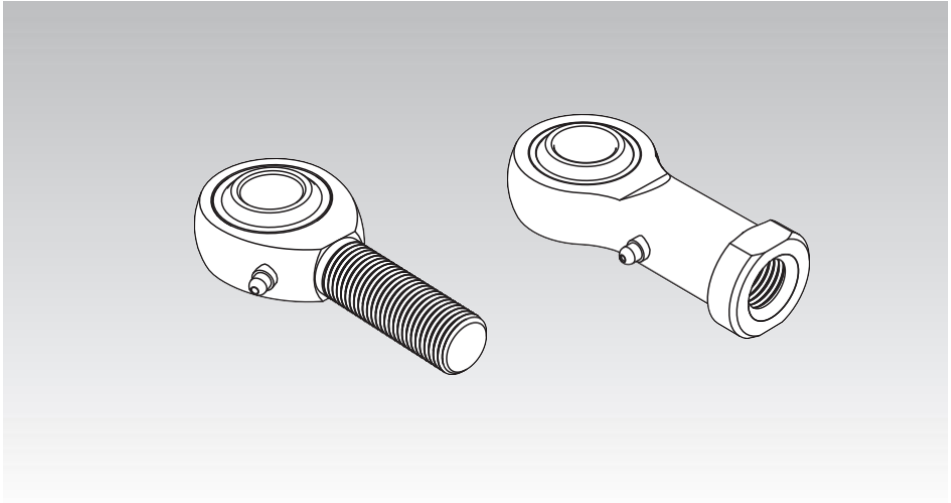
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## Features of the Rod End



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### Features

The Rod End is a self-aligning plain bearing that uses a spherical inner ring which has the same level of accuracy and hardness as bearing steel balls. With the combination of a spherical inner ring whose sliding surface is mirror-finished and a rationally designed holder, the Rod End ensures play-free, extremely smooth rotation and oscillation.

# Types of the Rod End

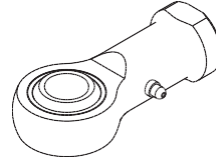
## Types and Features

### Type Provided with a Female Threading - Model PHS

Specification Table⇒A23-6

With model PHS, a copper alloy with high conformability is inserted between the chromate treated steel holder and the spherical inner ring, in which only the circumference of the spherical area is hard chrome plated. This structure ensures high rigidity, high wear resistance and high corrosion resistance.

The grease nipple on the holder allows grease to be applied to the sliding surface as necessary.



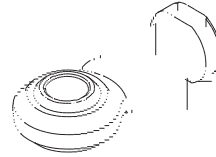
Model PHS

### No Lubrication Type - Model NHS-T

Specification Table⇒A23-8

This no lubrication rod end uses self-lubricating synthetic resin formed between the steel holder and the spherical inner ring.

Since the clearance on the sliding surface is minimized, an accurate link motion is achieved.

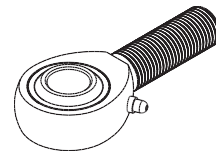


Model NHS-T

### Male thread Type - Model POS

Specification Table⇒A23-10

This model is a highly rigid rod end that is basically the same as the female threading type model PHS, but has a male thread on the holder end.

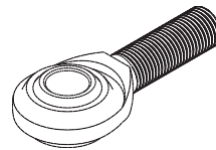


Model POS

### No Lubrication, Male thread Type - Model NOS-T

Specification Table⇒A23-12

This model is a no lubrication rod end that is basically the same as the female threading type model NHS-T, but has a male thread on the holder end.



Model NOS-T

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## Standard Type - Model PB

With model PB, a copper alloy with high conformability is inserted between the steel outer ring and the spherical inner ring, in which only the spherical area is hard chrome plated. This structure makes this model a highly rigid Spherical Plain Bearing with high corrosion resistance and high wear resistance.

The oil groove and the greasing hole on the outer ring allow grease to be applied to the sliding surface as necessary.

Specification Table⇒A23-14



Model PB

## Selecting a Rod End

### [Permissible Load P]

The static load capacity ( $C_s$ ) indicated in the specification tables, is presented as a guide for the mechanical strength of the Rod End. Select a bearing while taking into account the safety factor ( $f_s$ ) indicated in Table1 according to the type of the load.

Table1 Safety Factor ( $f_s$ )

Type of load	Lower limit of $f_s$
Constant load in a constant direction	2 to 3
Fluctuating load in a constant direction	3 to 5
Load in varying directions	5 to 8

According to the type of load, select a bearing that satisfies the following equation from a mechanical strength's viewpoint.

$$P \leq \frac{C_s}{f_s} \quad \cdot(1)$$

- P : Permissible Load (N)
- $C_s$  : Static load capacity (N)
- $f_s$  : Safety factor (see Table1)

### [Dynamic Load Capacity $C_d$ ]

The dynamic load capacity refers to the upper limit of load that the spherical area can receive without showing seizure while the Rod End is rotating or oscillating. The dynamic load capacity is obtained from the following approximation formula using the static load capacity ( $C_s$ ) <sup>(note 1)</sup> indicated in the specification table.

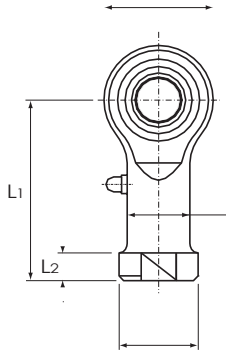
$$C_d = \frac{C_s}{\sqrt[3]{n}} \quad \cdot(2)$$

- $C_d$  : Dynamic load capacity (N)
- $C_s$  : Static load capacity (N)
- n : Revolutions per minute ( $\text{min}^{-1}$ )

The selected bearing must meet both the permissible load obtained from equation (1) and the dynamic load capacity obtained from equation (2).

Note1) Static load capacity ( $C_s$ ) refers to the value obtained by multiplying the projected area on the spherical section by the permissible surface pressure, and is used to obtain the dynamic load capacity.

# Model PHS (Female Threading Type)



Model No.	Outer dimensions			Threaded		Holder Dimensions		
	Length L	Diameter D	Width B <sub>1</sub> 0 -0.1	S <sub>1</sub> JIS Class 2	W 0 -0.2	D <sub>1</sub>	D <sub>2</sub>	B ±0.1
PHS 5	35	16	8	M5 × 0.8	9	9	11	6
PHS 6	39	18	9	M6 × 1	11	10	13	6.75
PHS 8	47	22	12	M8 × 1.25	14	12.5	16	9
PHS 10	56	26	14	M10 × 1.5	17	15	19	10.5
PHS 12	65	30	16	M12 × 1.75	19	17.5	22	12
PHS 14	74	34	19	M14 × 2	22	20	25	13.5
PHS 16	83	38	21	M16 × 2	22	22	27	15
PHS 18	92	42	23	M18 × 1.5	27	25	31	16.5
PHS 20	100	46	25	M20 × 1.5	30	27.5	34	18
PHS 22	109	50	28	M22 × 1.5	32	30	37	20
PHS 25	124	60	31	M24 × 2	36	33.5	42	22
PHS 30	145	70	37	M30 × 2	41	40	50	25

## [Material]

Holder : S35C (Chromate treatment)  
 Spherical inner ring: SUJ2, 58 HRC or higher  
 ( Hard chrome plated except for the inner surface of the inner ring )

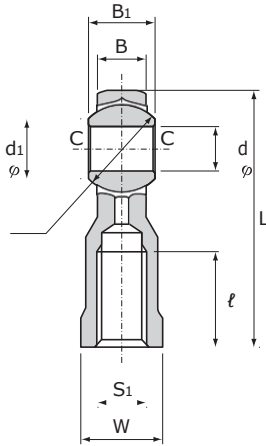
Bush : copper alloy

## [Fitting with the Shaft]

Condition	Dimensional tolerance of the shaft
Normal load	h7
Indeterminate load	p6

## Model number coding

**PHS10 L**  
 Model number |  
 Left-hand thread



Unit: mm

L <sub>1</sub>	L <sub>2</sub>	ℓ	Grease nipple	Spherical inner ring dimensions				Permissible tilt angles			Static applied load Radial C <sub>s</sub>	Mass
				d	Ball diameter Da mm (inch)	d <sub>1</sub>	C	α <sub>1</sub> °	α <sub>2</sub> °	α <sub>3</sub> °		
				H7							N	g
27	4	14	PB107	5	11.112( <sup>7</sup> / <sub>16</sub> )	7.7	0.3	8	13	30	5590	16.5
30	5	14		6	12.7( <sup>1</sup> / <sub>2</sub> )	9	0.3	8	13	30	6860	25
36	5	17		8	15.875( <sup>5</sup> / <sub>8</sub> )	10.4	0.5	8	14	25	9800	43
43	6.5	21		10	19.05( <sup>3</sup> / <sub>4</sub> )	12.9	0.5	8	14	25	13200	72
50	6.5	24		12	22.225( <sup>7</sup> / <sub>8</sub> )	15.4	0.5	8	13	25	16700	107
57	8	27		14	25.4(1)	16.9	0.7	10	16	24	20600	160
64	8	33		16	28.575(1 <sup>1</sup> / <sub>8</sub> )	19.4	0.7	9	15	24	25000	210
71	10	36		18	31.75(1 <sup>1</sup> / <sub>4</sub> )	21.9	0.7	9	15	24	29400	295
77	10	40		20	34.925(1 <sup>3</sup> / <sub>8</sub> )	24.4	0.7	9	15	24	34300	380
84	12	43		22	38.1(1 <sup>1</sup> / <sub>2</sub> )	25.8	0.7	10	15	23	41200	490
94	12	48	A-M6F	25	42.862(1 <sup>11</sup> / <sub>16</sub> )	29.6	0.8	9	15	23	72500	750
110	15	56		30	50.8(2)	34.8	0.8	10	17	23	92200	1130

**[Clearance]**

Unit: mm

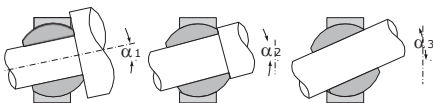
Radial clearance	0.035 or less
Axial clearance	0.1 or less

**[Lubrication]**

Apply lubricant before using the product. The holder has a greasing hole and an oil groove; they allow grease to be replenished through the grease nipple as necessary.

**[Identification of Left-hand Thread]**

If the female threading is left-hand, symbol "L" is added. The actual product is marked with symbol "L" on the holder.



Permissible Tilt Angles

Rod End

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