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ROD



ENDS




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CAT. NO. NIKODR-1/0

ROD ENDS



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TECHNICAL TABLES

1. Bearing materials

Standard material for spherical bearing rod ends, stainless steel spherical bearing rod ends, winding shape ball joint rod ends, straight ball joint rod ends are mostly classified into balls, outer rings, races and bearing body structures. Details please refer to Table 1.1.

Table 1.1

| Classification | Series | Lubricant type | Maintenance free | Maintenance free | Maintenance free | Maintenance free |
|--------------------|--|--|--|-------------------------------|--|------------------|
| | Series | Series | Series | Series | Series | Series |
| | BNM/BNF | BM/BF | BNM..K/BNF..K | DMSS/DFSS | RBL/RBI | |
| Balls | Chromium steel, 100Cr6 (HRC 58~64), hard chrome plated | Chromium steel, 100Cr6 (HRC 58~64), hard chrome plated | Chromium steel, 100Cr6 (HRC 58~64), hard chrome plated | Stainless steel 440, hardened | Chromium steel, 100Cr6 (HRC 58~64), hard chrome plated | |
| Outer rings | — | — | Brass(H62) | Brass(H62) | — | |
| Races | Brass(H62) | PTFE | PTFE | PTFE | Brass(H62) | |
| Body | Low carbon steel, Nickel plated | Low carbon steel, Nickel plated | Low carbon steel, Nickel plated | Stainless steel 440, hardened | Low carbon steel, Nickel plated | |

2. Tolerances for spherical bearing rod ends

2.1 Thread of stretching rod
Metric thread: Female 6H and Male 6g.

2.2 Tolerances in details

Table 2.1 Inner ring for BNM, BNF, DM, DF, RBL, RBI, DMSS and DFSS series

(Unit : μm)

| d mm | | Δdmp | | ΔBs | |
|-----------|-------|--------------|------|-------------|------|
| over | incl. | max. | min. | max. | min. |
| - | 6 | +12 | 0 | 0 | -100 |
| 6 | 10 | +15 | 0 | 0 | -100 |
| 10 | 18 | +18 | 0 | 0 | -100 |
| 18 | 30 | +21 | 0 | 0 | -100 |

Table 2.2 Inner ring for BNM..K and BNF..K series

(Unit : μm)

| d mm | | Δdmp | | ΔBs | |
|-----------|-------|--------------|------|-------------|------|
| over | incl. | max. | min. | max. | min. |
| - | 6 | +12 | 0 | 0 | -150 |
| 6 | 10 | +15 | 0 | 0 | -150 |
| 10 | 12 | +18 | 0 | 0 | -150 |
| 12 | 18 | +18 | 0 | 0 | -200 |
| 18 | 30 | +21 | 0 | 0 | -200 |

Table 2.3 Outer ring for BNM, BNF, DM, DF, RBL, RBI, DMSS, DFSS, BNM..K and BNF..K series

(Unit : μm)

| d mm | | Δdmp | | ΔCs | |
|-----------|-------|--------------|------|-------------|------|
| over | incl. | max. | min. | max. | min. |
| 10 | 18 | 0 | -11 | +100 | -100 |
| 18 | 30 | 0 | -13 | +100 | -100 |
| 30 | 50 | 0 | -16 | +100 | -100 |
| 50 | 60 | 0 | -19 | +100 | -100 |

Table 2.4 Center height deviation for BNM, BNF, DM, DF, RBL, RBI, DMSS, DFSS, BNM..K and BNF..K series

| d mm | | Δhs mm | | Δhis mm | |
|-----------|-------|-------------------|-------|--------------------|-------|
| over | incl. | max. | min. | max. | min. |
| - | 6 | +1.20 | +0.80 | +0.65 | -1.05 |
| 6 | 20 | +0.80 | -1.20 | +0.80 | -1.20 |
| 20 | 30 | +1.00 | -1.70 | +1.00 | -1.70 |
| 30 | 45 | +1.40 | -2.10 | +1.40 | -2.10 |
| 45 | 60 | +1.80 | -2.70 | +1.80 | -2.70 |
| 60 | 80 | +2.25 | -3.40 | +2.25 | -3.40 |

3. Fits of Spherical Bearing Rod Ends

Fitted with Rod Ends.

Table 3.1 For shaft

| With indeterminate loads | Normal conditions |
|--------------------------|-------------------|
| n6, p6 | h6, h7 |

Table 3.2 For thread

| Male thread | Female thread |
|-------------|---------------|
| 6g | 6h |

Table 3.3 Roughness of fitting surface

(Unit : μm)

| Fitting surface | | Shaft surface | Bore surface of housing | Side of shaft shoulder, washer, housing bore shoulder |
|---|-------|---------------|-------------------------|---|
| Bearing bore diameter "d" or outer diameter "D" | | | | |
| Nominal bore diameter (mm) | | Ra \leq | Ra \leq | Ra \leq |
| over | incl. | | | |
| - | 80 | 1.25 | 1.60 | 2.00 |
| 80 | 150 | 2.00 | 2.50 | 2.50 |

To look into the table with "d" for shaft, to look into the table with "D" for housing.

Table 3.4 Shape and position tolerance of fitting surface

(Unit : μm)

| d or D mm | | Cylindricity | | Side beat of round circuitry | | Parallelism of two sides of washer |
|-----------|-------|--------------|----------------|------------------------------|----------------|------------------------------------|
| over | incl. | Housing bore | Shaft diameter | Housing bore shoulder | Shaft shoulder | |
| | | max. | max. | max. | max. | max. |
| - | 6 | 4 | - | 8 | - | 12 |
| 6 | 10 | 4 | 4 | 9 | 9 | 15 |
| 10 | 18 | 5 | 5 | 10 | 10 | 18 |
| 18 | 30 | 6 | 6 | 11 | 11 | 21 |
| 30 | 50 | 7 | 7 | 13 | 13 | 25 |
| 50 | 80 | 8 | 8 | 16 | 16 | 30 |
| 80 | 120 | 10 | 10 | 19 | 19 | 35 |
| 120 | 150 | 12 | 12 | 22 | 22 | 40 |

4. Radial Internal Clearance for Spherical Bearing Rod Ends

4.1 Maintenance-free type

4.2 Lubricant type

Table 4.1 Radial internal clearance for BNM..K, BNF..K, DM, DF, RBL, RBI, DMSS and DFSS series.

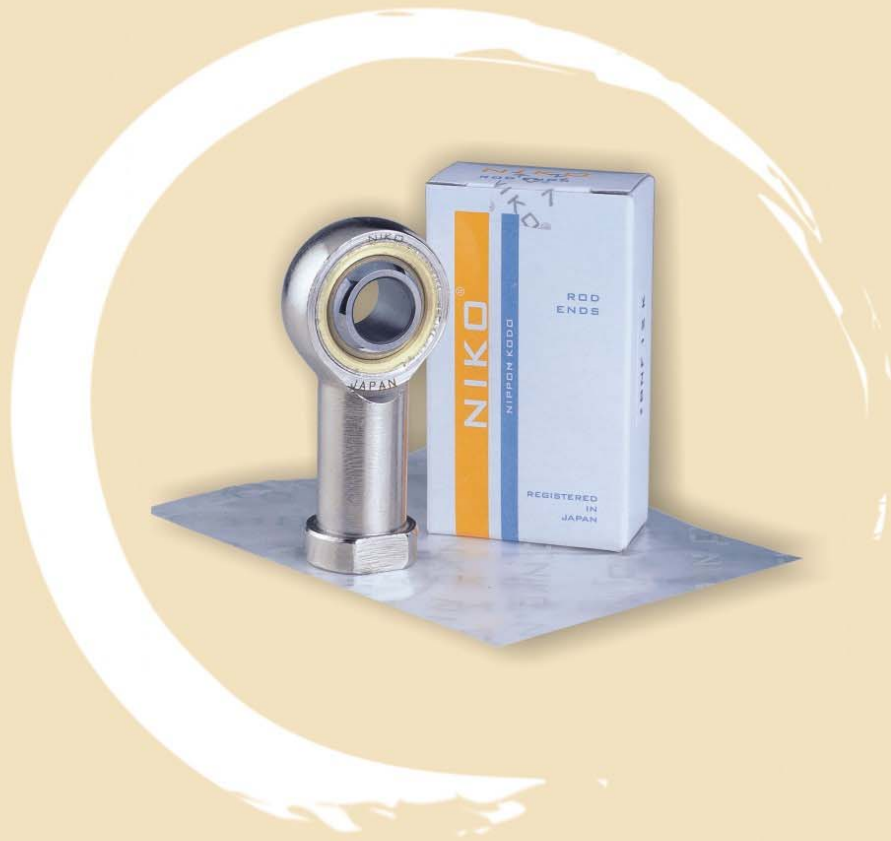
(Unit : μm)

| d mm | | Group | |
|------|-------|-------|------|
| over | incl. | min. | max. |
| - | 12 | 32 | 68 |
| 12 | 20 | 40 | 82 |
| 20 | 30 | 50 | 100 |

Table 4.2 Radial internal clearance for BNM and BNF series.

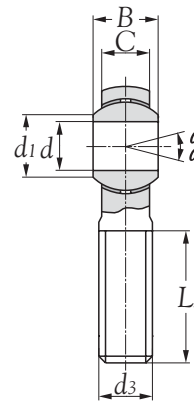
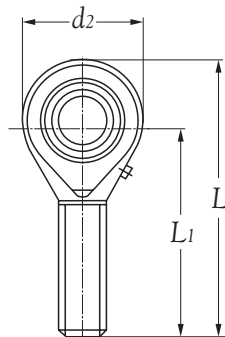
(Unit : μm)

| d mm | | Group | |
|------|-------|-------|------|
| over | incl. | min. | max. |
| - | 30 | 0 | 35 |



DIMENSION TABLES

SPHERICAL BEARING ROD ENDS (LUBRICANT TYPE)
SERIES BNM.., BNML..



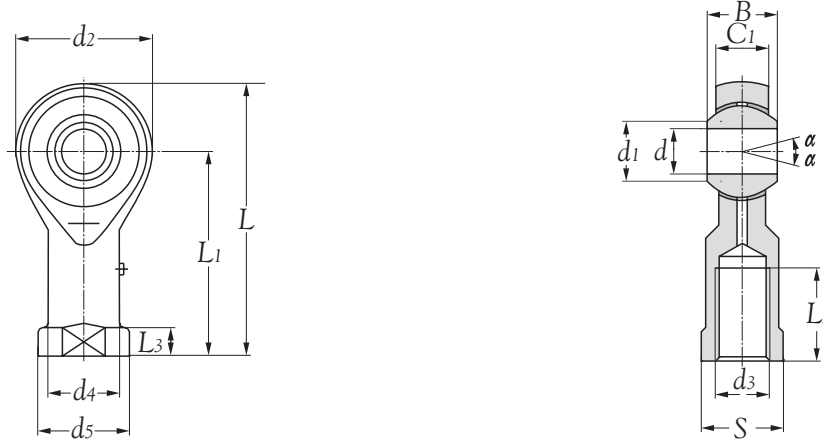
| Boundary dimensions | | | Nominal dimensions | | | | | | | α° \approx | Load ratings | | Bearing numbers | Mass kg (approx.) |
|---------------------|-------|-----|--------------------|------------|-------|-------|-----|-------|----|-----------------------------|--------------|--------------|-----------------|-------------------------|
| mm | | | mm | | | | | | | | dynamic | static | | |
| d | d_2 | B | C_1 | d_3 | L_1 | L_2 | L | d_1 | | C_d | C_s | | | |
| 5 | 16 | 8 | 6.00 | M5 x 0.80 | 33 | 20 | 41 | 7.7 | 13 | 3300 | 3900 | BNM5 | 0.0125 | |
| 6 | 18 | 9 | 6.75 | M6 x 1.00 | 36 | 22 | 45 | 9.0 | 13 | 4300 | 5300 | BNM6 | 0.0190 | |
| 8 | 22 | 12 | 9.00 | M8 x 1.25 | 42 | 25 | 53 | 10.4 | 13 | 6800 | 8500 | BNM8 | 0.0320 | |
| 10 | 26 | 14 | 10.50 | M10 x 1.50 | 48 | 29 | 61 | 12.9 | 13 | 10000 | 11000 | BNM10 | 0.0540 | |
| 12 | 30 | 16 | 12.00 | M12 x 1.75 | 54 | 33 | 69 | 15.4 | 13 | 13000 | 14000 | BNM12 | 0.0850 | |
| 14 | 34 | 19 | 13.50 | M14 x 2.00 | 60 | 36 | 77 | 16.9 | 13 | 17000 | 20000 | BNM14 | 0.1260 | |
| 16 | 38 | 21 | 15.00 | M16 x 2.00 | 66 | 40 | 85 | 19.4 | 13 | 21000 | 25000 | BNM16 | 0.1850 | |
| 18 | 42 | 23 | 16.50 | M18 x 1.50 | 72 | 44 | 93 | 21.9 | 13 | 26000 | 30000 | BNM18 | 0.2600 | |
| 20 | 46 | 25 | 18.00 | M20 x 1.50 | 78 | 47 | 101 | 24.4 | 13 | 31000 | 35000 | BNM20 | 0.3400 | |
| 22 | 50 | 28 | 20.00 | M22 x 1.50 | 84 | 51 | 109 | 25.8 | 13 | 38000 | 43000 | BNM22 | 0.4350 | |
| 25 | 60 | 31 | 22.00 | M24 x 2.00 | 94 | 57 | 124 | 29.6 | 13 | 47000 | 65000 | BNM25 | 0.6500 | |
| 30 | 70 | 37 | 25.00 | M30 x 2.00 | 110 | 66 | 145 | 34.8 | 13 | 63000 | 86000 | BNM30 | 1.0700 | |

Note: 1) Suffix "L" means with left hand thread.

2) We could supply the above models in two sorts, one is produced by forging, the another by machining.
 So, please let us know which of them is what you needed before you ordering.

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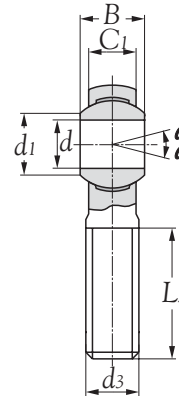
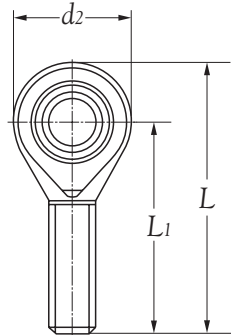
SPHERICAL BEARING ROD ENDS (LUBRICANT TYPE)
SERIES BNF., BNFL..



| Boundary dimensions | | | Nominal dimensions | | | | | | | | | | | $\alpha \approx$ | Load ratings | | Bearing numbers | Mass kg (approx.) |
|---------------------|-----------------------|----------|-----------------------|----------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|----------|-----------------------|-----------------------|----|-----------------------|-----------------------|----------------|-----------------|-------------------------|
| mm | | | mm | | | | | | | | | | | | dynamic static N | | | |
| <i>d</i> | <i>d</i> ₂ | <i>B</i> | <i>C</i> ₁ | <i>S</i> | <i>d</i> ₃ | <i>d</i> ₄ | <i>d</i> ₅ | <i>L</i> ₁ | <i>L</i> ₂ | <i>L</i> | <i>L</i> ₃ | <i>d</i> ₁ | | <i>C</i> _d | <i>C</i> _s | | | |
| 5 | 16 | 8 | 6.00 | 9 | M5 x 0.80 | 9.0 | 11 | 27 | 14 | 35 | 4.0 | 7.7 | 13 | 3300 | 3900 | BNF5 | 0.016 | |
| 6 | 18 | 9 | 6.75 | 11 | M6 x 1.00 | 10.0 | 13 | 30 | 14 | 39 | 5.0 | 9.0 | 13 | 4300 | 5300 | BNF6 | 0.026 | |
| 8 | 22 | 12 | 9.00 | 14 | M8 x 1.25 | 12.5 | 16 | 36 | 17 | 47 | 5.0 | 10.4 | 13 | 6800 | 8500 | BNF8 | 0.044 | |
| 10 | 26 | 14 | 10.50 | 17 | M10 x 1.50 | 15.0 | 19 | 43 | 21 | 56 | 6.5 | 12.9 | 13 | 10000 | 11000 | BNF10 | 0.072 | |
| 10 | 26 | 14 | 10.50 | 17 | M10 x 1.25 | 15.0 | 19 | 43 | 21 | 56 | 6.5 | 12.9 | 13 | 10000 | 11000 | BNF10.1 | 0.072 | |
| 12 | 30 | 16 | 12.00 | 19 | M12 x 1.75 | 17.5 | 22 | 50 | 24 | 65 | 6.5 | 15.4 | 13 | 13000 | 14000 | BNF12 | 0.108 | |
| 12 | 30 | 16 | 12.00 | 19 | M12 x 1.25 | 17.5 | 22 | 50 | 24 | 65 | 6.5 | 15.4 | 13 | 13000 | 14000 | BNF12.1 | 0.108 | |
| 14 | 34 | 19 | 13.50 | 22 | M14 x 2.00 | 20.0 | 25 | 57 | 27 | 74 | 8.0 | 16.9 | 13 | 17000 | 20000 | BNF14 | 0.161 | |
| 16 | 38 | 21 | 15.00 | 22 | M16 x 2.00 | 22.0 | 27 | 64 | 33 | 83 | 8.0 | 19.4 | 13 | 21000 | 25000 | BNF16 | 0.225 | |
| 16 | 38 | 21 | 15.00 | 22 | M16 x 1.50 | 22.0 | 27 | 64 | 33 | 83 | 8.0 | 19.4 | 13 | 21000 | 25000 | BNF16.1 | 0.225 | |
| 18 | 42 | 23 | 16.50 | 27 | M18 x 1.50 | 25.0 | 31 | 71 | 36 | 92 | 10.0 | 21.9 | 13 | 26000 | 30000 | BNF18 | 0.295 | |
| 20 | 46 | 25 | 18.00 | 30 | M20 x 1.50 | 27.5 | 34 | 77 | 40 | 100 | 10.0 | 24.4 | 13 | 31000 | 35000 | BNF20 | 0.382 | |
| 22 | 50 | 28 | 20.00 | 32 | M22 x 1.50 | 30.0 | 37 | 84 | 43 | 109 | 12.0 | 25.8 | 13 | 38000 | 43000 | BNF22 | 0.488 | |
| 25 | 60 | 31 | 22.00 | 36 | M24 x 2.00 | 33.5 | 42 | 94 | 48 | 124 | 12.0 | 29.6 | 13 | 47000 | 65000 | BNF25 | 0.749 | |
| 30 | 70 | 37 | 25.00 | 41 | M30 x 2.00 | 40.0 | 50 | 110 | 56 | 145 | 15.0 | 34.8 | 13 | 63000 | 86000 | BNF30 | 1.130 | |
| 30 | 70 | 37 | 25.00 | 41 | M27 x 2.00 | 40.0 | 50 | 110 | 56 | 145 | 15.0 | 34.8 | 13 | 63000 | 86000 | BNF30.1 | 1.130 | |

- Note: 1) Suffix "L" means with left hand thread.
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SPHERICAL BEARING ROD ENDS (MAINTENANCE-FREE TYPE)
SERIES DM.., DML..



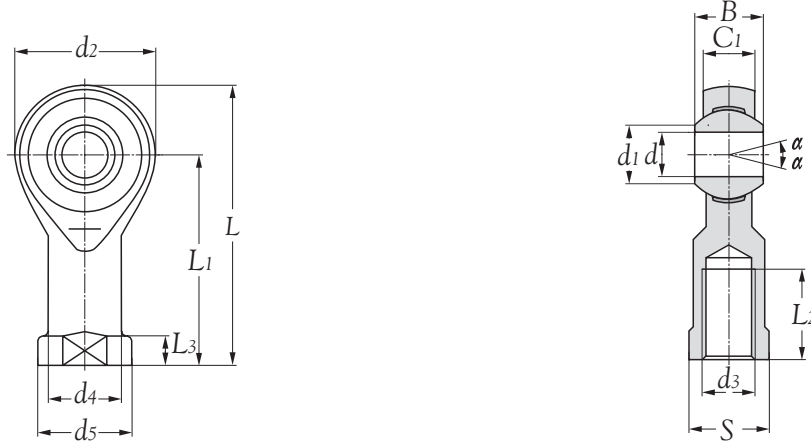
| Boundary dimensions | | | Nominal dimensions | | | | | | | α° \approx | Load ratings | | Bearing numbers | Mass kg (approx.) |
|---------------------|-------|-----|--------------------|------------|-------|-------|-----|-------|----|-----------------------------|--------------|-------------|-----------------|-------------------------|
| mm | | | mm | | | | | | | | dynamic | static | | |
| d | d_2 | B | C_1 | d_3 | L_1 | L_2 | L | d_1 | | C_d | C_s | | | |
| 5 | 16 | 8 | 6.00 | M5 x 0.80 | 33 | 20 | 41 | 7.7 | 13 | 3300 | 3900 | DM5 | 0.013 | |
| 6 | 18 | 9 | 6.75 | M6 x 1.00 | 36 | 22 | 45 | 9.0 | 13 | 4300 | 5300 | DM6 | 0.019 | |
| 8 | 22 | 12 | 9.00 | M8 x 1.25 | 42 | 25 | 53 | 10.4 | 13 | 6800 | 8500 | DM8 | 0.032 | |
| 10 | 26 | 14 | 10.50 | M10 x 1.50 | 48 | 29 | 61 | 12.9 | 13 | 10000 | 11000 | DM10 | 0.054 | |
| 12 | 30 | 16 | 12.00 | M12 x 1.75 | 54 | 33 | 69 | 15.4 | 13 | 13000 | 14000 | DM12 | 0.085 | |
| 14 | 34 | 19 | 13.50 | M14 x 2.00 | 60 | 36 | 77 | 16.9 | 13 | 17000 | 20000 | DM14 | 0.126 | |
| 16 | 38 | 21 | 15.00 | M16 x 2.00 | 66 | 40 | 85 | 19.4 | 13 | 21000 | 25000 | DM16 | 0.185 | |
| 18 | 42 | 23 | 16.50 | M18 x 1.50 | 72 | 44 | 93 | 21.9 | 13 | 26000 | 30000 | DM18 | 0.260 | |
| 20 | 46 | 25 | 18.00 | M20 x 1.50 | 78 | 47 | 101 | 24.4 | 13 | 31000 | 35000 | DM20 | 0.340 | |
| 22 | 50 | 28 | 20.00 | M22 x 1.50 | 84 | 51 | 109 | 25.8 | 13 | 38000 | 43000 | DM22 | 0.435 | |
| 25 | 60 | 31 | 22.00 | M24 x 2.00 | 94 | 57 | 124 | 29.6 | 13 | 47000 | 65000 | DM25 | 0.650 | |
| 30 | 70 | 37 | 25.00 | M30 x 2.00 | 110 | 66 | 145 | 34.8 | 13 | 63000 | 86000 | DM30 | 1.070 | |

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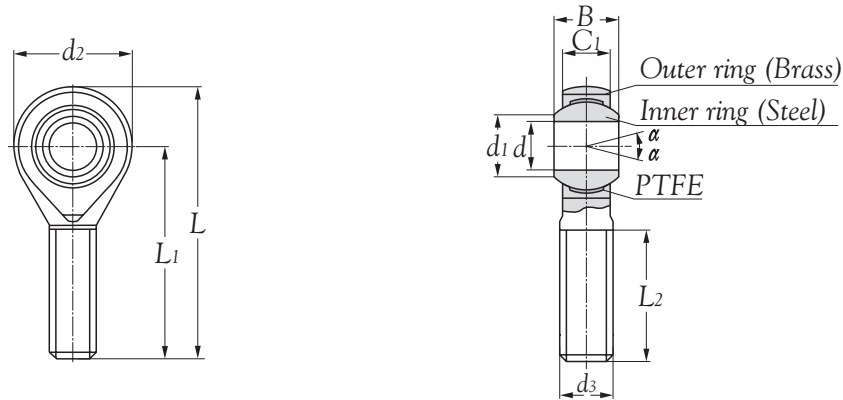
**SPHERICAL BEARING ROD ENDS (MAINTENANCE-FREE TYPE)
SERIES DF., DFL..**



| Boundary dimensions | | | Nominal dimensions | | | | | | | | | | | α° \approx | Load ratings | | Bearing numbers | Mass kg (approx.) |
|---------------------|-----------------------|----------|-----------------------|----------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|----------|-----------------------|-----------------------|----|-----------------------------|-----------------------|---------------|-----------------|-------------------------|
| mm | | | mm | | | | | | | | | | | | dynamic | static | | |
| <i>d</i> | <i>d</i> ₂ | <i>B</i> | <i>C</i> ₁ | <i>S</i> | <i>d</i> ₃ | <i>d</i> ₄ | <i>d</i> ₅ | <i>L</i> ₁ | <i>L</i> ₂ | <i>L</i> | <i>L</i> ₃ | <i>d</i> ₁ | | <i>C</i> _d | <i>C</i> _s | | | |
| 5 | 16 | 8 | 6.00 | 9 | M5 x 0.80 | 9.0 | 11 | 27 | 14 | 35 | 4.0 | 7.7 | 13 | 3300 | 3900 | DF5 | 0.016 | |
| 6 | 18 | 9 | 6.75 | 11 | M6 x 1.00 | 10.0 | 13 | 30 | 14 | 39 | 5.0 | 9.0 | 13 | 4300 | 5300 | DF6 | 0.026 | |
| 8 | 22 | 12 | 9.00 | 14 | M8 x 1.25 | 12.5 | 16 | 36 | 17 | 47 | 5.0 | 10.4 | 13 | 6800 | 8500 | DF8 | 0.044 | |
| 10 | 26 | 14 | 10.50 | 17 | M10 x 1.50 | 15.0 | 19 | 43 | 21 | 56 | 6.5 | 12.9 | 13 | 10000 | 11000 | DF10 | 0.072 | |
| 10 | 26 | 14 | 10.50 | 17 | M10 x 1.25 | 15.0 | 19 | 43 | 21 | 56 | 6.5 | 12.9 | 13 | 10000 | 11000 | DF10.1 | 0.072 | |
| 12 | 30 | 16 | 12.00 | 19 | M12 x 1.75 | 17.5 | 22 | 50 | 24 | 65 | 6.5 | 15.4 | 13 | 13000 | 14000 | DF12 | 0.108 | |
| 12 | 30 | 16 | 12.00 | 19 | M12 x 1.25 | 17.5 | 22 | 50 | 24 | 65 | 6.5 | 15.4 | 13 | 13000 | 14000 | DF12.1 | 0.108 | |
| 14 | 34 | 19 | 13.50 | 22 | M14 x 2.00 | 20.0 | 25 | 57 | 27 | 74 | 8.0 | 16.9 | 13 | 17000 | 20000 | DF14 | 0.161 | |
| 16 | 38 | 21 | 15.00 | 22 | M16 x 2.00 | 22.0 | 27 | 64 | 33 | 83 | 8.0 | 19.4 | 13 | 21000 | 25000 | DF16 | 0.225 | |
| 16 | 38 | 21 | 15.00 | 22 | M16 x 1.50 | 22.0 | 27 | 64 | 33 | 83 | 8.0 | 19.4 | 13 | 21000 | 25000 | DF16.1 | 0.225 | |
| 18 | 42 | 23 | 16.50 | 27 | M18 x 1.50 | 25.0 | 31 | 71 | 36 | 92 | 10.0 | 21.9 | 13 | 26000 | 30000 | DF18 | 0.295 | |
| 20 | 46 | 25 | 18.00 | 30 | M20 x 1.50 | 27.5 | 34 | 77 | 40 | 100 | 10.0 | 24.4 | 13 | 31000 | 35000 | DF20 | 0.382 | |
| 22 | 50 | 28 | 20.00 | 32 | M22 x 1.50 | 30.0 | 37 | 84 | 43 | 109 | 12.0 | 25.8 | 13 | 38000 | 43000 | DF22 | 0.488 | |
| 25 | 60 | 31 | 22.00 | 36 | M24 x 2.00 | 33.5 | 42 | 94 | 48 | 124 | 12.0 | 29.6 | 13 | 47000 | 65000 | DF25 | 0.749 | |
| 30 | 70 | 37 | 25.00 | 41 | M30 x 2.00 | 40.0 | 50 | 110 | 56 | 145 | 15.0 | 34.8 | 13 | 63000 | 86000 | DF30 | 1.130 | |

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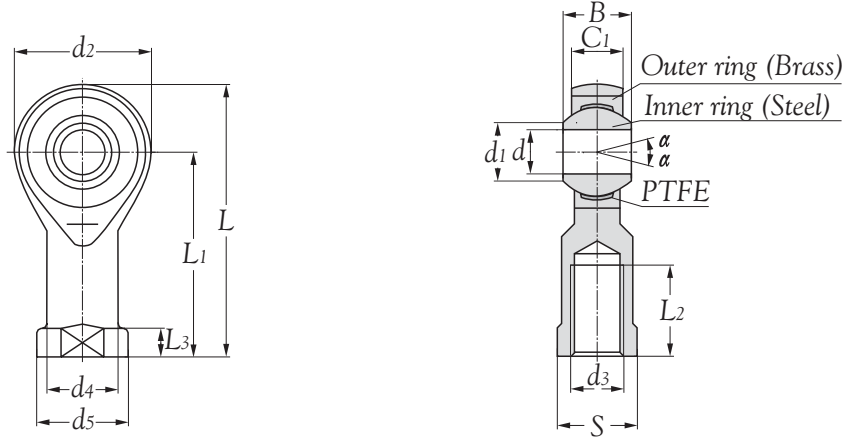
SPHERICAL BEARING ROD ENDS (MAINTENANCE-FREE TYPE)
SERIES BNM..K, BNML..K



| Boundary dimensions | | | Nominal dimensions | | | | | | | $\alpha \approx$ | Load ratings | | Bearing numbers | Mass kg (approx.) |
|---------------------|-----------------------|----------|-----------------------|-----------------------|-----------------------|-----------------------|----------|-----------------------|----|-----------------------|-----------------------|---------------|-----------------|-------------------------|
| mm | | | mm | | | | | | | | dynamic static N | | | |
| <i>d</i> | <i>d</i> ₂ | <i>B</i> | <i>C</i> ₁ | <i>d</i> ₃ | <i>L</i> ₁ | <i>L</i> ₂ | <i>L</i> | <i>d</i> ₁ | | <i>C</i> _d | <i>C</i> _s | | | |
| 5 | 18 | 8 | 6.00 | M5 x 0.80 | 33 | 19 | 42 | 7.7 | 4 | 4000 | 7500 | BNM5K | 0.013 | |
| 6 | 20 | 9 | 6.75 | M6 x 1.00 | 36 | 22 | 46 | 8.9 | 9 | 4400 | 9300 | BNM6K | 0.020 | |
| 8 | 24 | 12 | 9.00 | M8 x 1.25 | 42 | 25 | 54 | 10.4 | 13 | 8000 | 16700 | BNM8K | 0.033 | |
| 10 | 28 | 14 | 10.50 | M10 x 1.50 | 48 | 29 | 62 | 12.9 | 13 | 12900 | 23400 | BNM10K | 0.056 | |
| 12 | 32 | 16 | 12.00 | M12 x 1.75 | 54 | 33 | 70 | 15.4 | 13 | 17000 | 32000 | BNM12K | 0.087 | |
| 14 | 36 | 19 | 13.50 | M14 x 2.00 | 60 | 38 | 78 | 16.8 | 13 | 24000 | 41900 | BNM14K | 0.129 | |
| 16 | 42 | 21 | 15.00 | M16 x 2.00 | 66 | 40 | 87 | 19.3 | 13 | 28500 | 52700 | BNM16K | 0.189 | |
| 18 | 46 | 23 | 16.50 | M18 x 1.50 | 72 | 44 | 95 | 21.8 | 13 | 35000 | 63800 | BNM18K | 0.267 | |
| 20 | 50 | 25 | 18.00 | M20 x 1.50 | 78 | 47 | 103 | 24.3 | 13 | 40000 | 78100 | BNM20K | 0.348 | |
| 22 | 54 | 28 | 20.00 | M22 x 1.50 | 84 | 51 | 111 | 25.8 | 13 | 52000 | 97200 | BNM22K | 0.443 | |
| 25 | 60 | 31 | 22.00 | M24 x 2.00 | 94 | 58 | 124 | 29.6 | 13 | 60000 | 122100 | BNM25K | 0.600 | |
| 30 | 70 | 37 | 25.00 | M30 x 2.00 | 110 | 71 | 145 | 34.8 | 13 | 81000 | 168400 | BNM30K | 1.030 | |

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 2) We could supply the above models in two sorts, one is produced by forging, the another by machining.
 So, please let us know which of them is what you needed before you ordering.
 3) We supply this series of rod end bearings strictly in accordance with the above specifications,
 any changes are on special order.

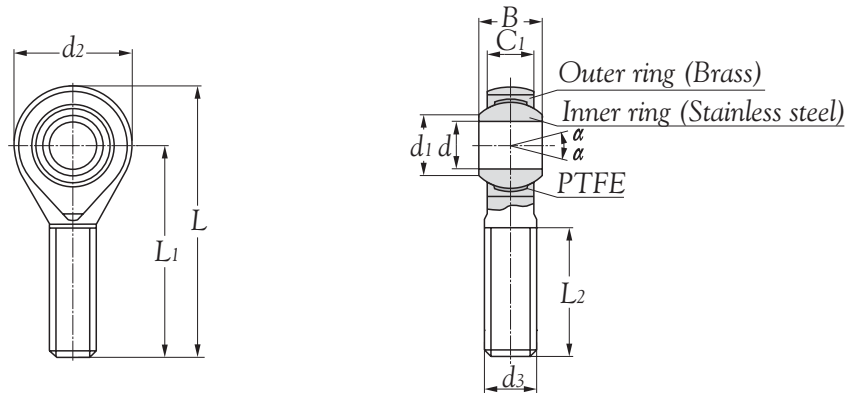
SPHERICAL BEARING ROD ENDS (MAINTENANCE-FREE TYPE)
SERIES BNF..K, BNFL..K



| Boundary dimensions | | | Nominal dimensions | | | | | | | | | | | $\alpha \approx$ | Load ratings | | Bearing numbers | Mass kg (approx.) |
|---------------------|-----------------------|----------|-----------------------|----------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|----------|-----------------------|-----------------------|-----------------------|-----------------------|---------------------|-----------------|-----------------|-------------------------|
| mm | | | mm | | | | | | | | | | | | dynamic static N | | | |
| <i>d</i> | <i>d</i> ₂ | <i>B</i> | <i>C</i> ₁ | <i>S</i> | <i>d</i> ₃ | <i>d</i> ₄ | <i>d</i> ₅ | <i>L</i> ₁ | <i>L</i> ₂ | <i>L</i> | <i>L</i> ₃ | <i>d</i> ₁ | <i>C</i> _d | <i>C</i> _s | | | | |
| 5 | 18 | 8 | 6.00 | 9 | M5 x 0.80 | 9.0 | 11 | 27 | 10 | 36 | 4.5 | 7.7 | 13 | 6000 | 7500 | BNF5K | 0.018 | |
| 6 | 20 | 9 | 6.75 | 11 | M6 x 1.00 | 10.0 | 13 | 30 | 12 | 40 | 5.0 | 8.9 | 13 | 7200 | 9300 | BNF6K | 0.027 | |
| 8 | 24 | 12 | 9.00 | 13 | M8 x 1.25 | 12.5 | 16 | 36 | 16 | 48 | 5.0 | 10.4 | 13 | 11600 | 16700 | BNF8K | 0.046 | |
| 10 | 28 | 14 | 10.50 | 17 | M10 x 1.50 | 15.0 | 19 | 43 | 20 | 57 | 6.5 | 12.9 | 13 | 14500 | 23400 | BNF10K | 0.076 | |
| 10 | 28 | 14 | 10.50 | 17 | M10 x 1.25 | 15.0 | 19 | 43 | 20 | 57 | 6.5 | 12.9 | 13 | 14500 | 23400 | BNF10.1K | 0.076 | |
| 12 | 32 | 16 | 12.00 | 19 | M12 x 1.75 | 17.5 | 22 | 50 | 22 | 66 | 6.5 | 15.4 | 13 | 17000 | 32000 | BNF12K | 0.115 | |
| 12 | 32 | 16 | 12.00 | 19 | M12 x 1.25 | 17.5 | 22 | 50 | 22 | 66 | 6.5 | 15.4 | 13 | 17000 | 32000 | BNF12.1K | 0.115 | |
| 14 | 36 | 19 | 13.50 | 22 | M14 x 2.00 | 20.0 | 25 | 57 | 25 | 75 | 8.0 | 16.8 | 13 | 24000 | 41900 | BNF14K | 0.170 | |
| 16 | 42 | 21 | 15.00 | 22 | M16 x 2.00 | 22.0 | 27 | 64 | 28 | 85 | 8.0 | 19.3 | 13 | 28500 | 52700 | BNF16K | 0.230 | |
| 16 | 42 | 21 | 15.00 | 22 | M16 x 1.50 | 22.0 | 27 | 64 | 28 | 85 | 8.0 | 19.3 | 13 | 28500 | 52700 | BNF16.1K | 0.230 | |
| 18 | 46 | 23 | 16.50 | 27 | M18 x 1.50 | 25.0 | 31 | 71 | 32 | 94 | 10.0 | 21.8 | 13 | 35000 | 63800 | BNF18K | 0.320 | |
| 20 | 50 | 25 | 18.00 | 32 | M20 x 1.50 | 27.5 | 34 | 77 | 33 | 102 | 10.0 | 24.3 | 13 | 40000 | 78100 | BNF20K | 0.415 | |
| 22 | 54 | 28 | 20.00 | 32 | M22 x 1.50 | 30.0 | 37 | 84 | 37 | 111 | 10.0 | 25.8 | 13 | 52000 | 97200 | BNF22K | 0.540 | |
| 25 | 60 | 31 | 22.00 | 36 | M24 x 2.00 | 33.5 | 42 | 94 | 42 | 124 | 12.0 | 29.6 | 13 | 60000 | 122100 | BNF25K | 0.750 | |
| 30 | 70 | 37 | 25.00 | 41 | M30 x 2.00 | 40.0 | 51 | 110 | 51 | 145 | 15.0 | 34.8 | 13 | 81000 | 168400 | BNF30K | 1.130 | |

- Note: 1) Suffix "L" means with left hand thread.
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**STAINLESS STEEL SPHERICAL BEARING ROD ENDS (MAINTENANCE-FREE TYPE)
SERIES DMSS., DMSSL..**



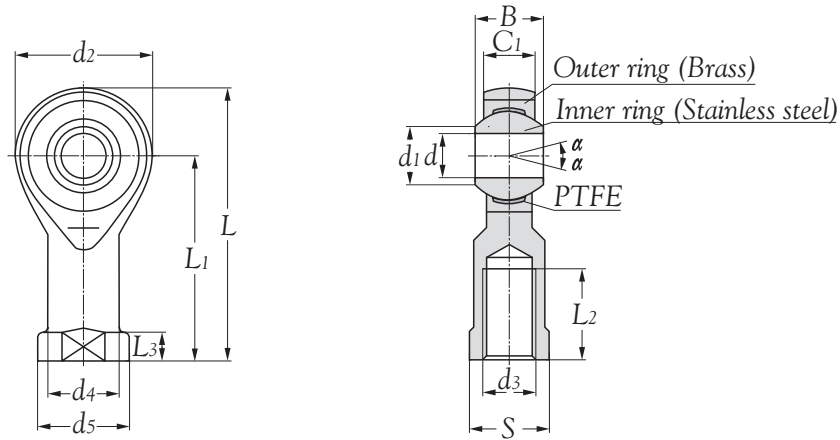
| Boundary dimensions | | | Nominal dimensions | | | | | | | $\alpha \approx$ | Load ratings | | Bearing numbers | Mass kg (approx.) |
|---------------------|-----------------------|----------|-----------------------|-----------------------|-----------------------|-----------------------|----------|-----------------------|----|-----------------------|-----------------------|---------------|-----------------|-------------------------|
| mm | | | mm | | | | | | | | dynamic | static | | |
| <i>d</i> | <i>d</i> ₂ | <i>B</i> | <i>C</i> ₁ | <i>d</i> ₃ | <i>L</i> ₁ | <i>L</i> ₂ | <i>L</i> | <i>d</i> ₁ | | <i>C</i> _d | <i>C</i> _s | | | |
| 5 | 16 | 8 | 6.00 | M5 x 0.80 | 33 | 20 | 41 | 7.7 | 13 | 3300 | 3900 | DMSS5 | 0.013 | |
| 6 | 18 | 9 | 6.75 | M6 x 1.00 | 36 | 22 | 45 | 9.0 | 13 | 4300 | 5300 | DMSS6 | 0.019 | |
| 8 | 22 | 12 | 9.00 | M8 x 1.25 | 42 | 25 | 53 | 10.4 | 13 | 6800 | 8500 | DMSS8 | 0.032 | |
| 10 | 26 | 14 | 10.50 | M10 x 1.50 | 48 | 29 | 61 | 12.9 | 13 | 10000 | 11000 | DMSS10 | 0.054 | |
| 12 | 30 | 16 | 12.00 | M12 x 1.75 | 54 | 33 | 69 | 15.4 | 13 | 13000 | 14000 | DMSS12 | 0.085 | |
| 14 | 34 | 19 | 13.50 | M14 x 2.00 | 60 | 36 | 77 | 16.9 | 13 | 17000 | 20000 | DMSS14 | 0.126 | |
| 16 | 38 | 21 | 15.00 | M16 x 2.00 | 66 | 40 | 85 | 19.4 | 13 | 21000 | 25000 | DMSS16 | 0.185 | |
| 18 | 42 | 23 | 16.50 | M18 x 1.50 | 72 | 44 | 93 | 21.9 | 13 | 26000 | 30000 | DMSS18 | 0.260 | |
| 20 | 46 | 25 | 18.00 | M20 x 1.50 | 78 | 47 | 101 | 24.4 | 13 | 31000 | 35000 | DMSS20 | 0.340 | |
| 22 | 50 | 28 | 20.00 | M22 x 1.50 | 84 | 51 | 109 | 25.8 | 13 | 38000 | 43000 | DMSS22 | 0.435 | |
| 25 | 60 | 31 | 22.00 | M24 x 2.00 | 94 | 57 | 124 | 29.6 | 13 | 47000 | 65000 | DMSS25 | 0.650 | |
| 30 | 70 | 37 | 25.00 | M30 x 2.00 | 110 | 66 | 145 | 34.8 | 13 | 63000 | 86000 | DMSS30 | 1.070 | |

Note: 1) Suffix "L" means with left hand thread.

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3) We supply this series of rod end bearings strictly in accordance with the above specifications,
any changes are on special order.

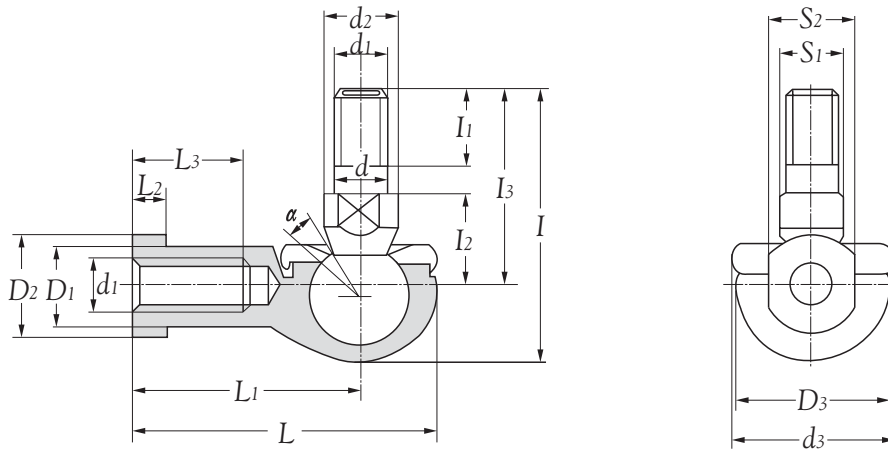
**STAINLESS STEEL SPHERICAL BEARING ROD ENDS (MAINTENANCE-FREE TYPE)
SERIES DFSS., DFSSL..**



| Boundary dimensions | | | Nominal dimensions | | | | | | | | | | | Load ratings | | Bearing numbers | Mass kg (approx.) |
|---------------------|-----------------------|----------|-----------------------|----------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|----------|-----------------------|-----------------------|---------------|-----------------------|-----------------------|-----------------|-------------------------|
| mm | | | mm | | | | | | | | | | | dynamic static N | | | |
| <i>d</i> | <i>d</i> ₂ | <i>B</i> | <i>C</i> ₁ | <i>S</i> | <i>d</i> ₃ | <i>d</i> ₄ | <i>d</i> ₅ | <i>L</i> ₁ | <i>L</i> ₂ | <i>L</i> | <i>L</i> ₃ | <i>d</i> ₁ | <i>α</i> ≈ | <i>C</i> _d | <i>C</i> _s | | |
| 5 | 16 | 8 | 6.00 | 9 | M5 x 0.80 | 9.0 | 11 | 27 | 14 | 35 | 4.0 | 7.7 | 13 | 3300 | 3900 | DFSS5 | 0.016 |
| 6 | 18 | 9 | 6.75 | 11 | M6 x 1.00 | 10.0 | 13 | 30 | 14 | 39 | 5.0 | 9.0 | 13 | 4300 | 5300 | DFSS6 | 0.026 |
| 8 | 22 | 12 | 9.00 | 14 | M8 x 1.25 | 12.5 | 16 | 36 | 17 | 47 | 5.0 | 10.4 | 13 | 6800 | 8500 | DFSS8 | 0.044 |
| 10 | 26 | 14 | 10.50 | 17 | M10 x 1.50 | 15.0 | 19 | 43 | 21 | 56 | 6.5 | 12.9 | 13 | 10000 | 11000 | DFSS10 | 0.072 |
| 10 | 26 | 14 | 10.50 | 17 | M10 x 1.25 | 15.0 | 19 | 43 | 21 | 56 | 6.5 | 12.9 | 13 | 10000 | 11000 | DFSS10.1 | 0.072 |
| 12 | 30 | 16 | 12.00 | 19 | M12 x 1.75 | 17.5 | 22 | 50 | 24 | 65 | 6.5 | 15.4 | 13 | 13000 | 14000 | DFSS12 | 0.108 |
| 12 | 30 | 16 | 12.00 | 19 | M12 x 1.25 | 17.5 | 22 | 50 | 24 | 65 | 6.5 | 15.4 | 13 | 13000 | 14000 | DFSS12.1 | 0.108 |
| 14 | 34 | 19 | 13.50 | 22 | M14 x 2.00 | 20.0 | 25 | 57 | 27 | 74 | 8.0 | 16.9 | 13 | 17000 | 20000 | DFSS14 | 0.161 |
| 16 | 38 | 21 | 15.00 | 22 | M16 x 2.00 | 22.0 | 27 | 64 | 33 | 83 | 8.0 | 19.4 | 13 | 21000 | 25000 | DFSS16 | 0.225 |
| 16 | 38 | 21 | 15.00 | 22 | M16 x 1.50 | 22.0 | 27 | 64 | 33 | 83 | 8.0 | 19.4 | 13 | 21000 | 25000 | DFSS16.1 | 0.225 |
| 18 | 42 | 23 | 16.50 | 27 | M18 x 1.50 | 25.0 | 31 | 71 | 36 | 92 | 10.0 | 21.9 | 13 | 26000 | 30000 | DFSS18 | 0.295 |
| 20 | 46 | 25 | 18.00 | 30 | M20 x 1.50 | 27.5 | 34 | 77 | 40 | 100 | 10.0 | 24.4 | 13 | 31000 | 35000 | DFSS20 | 0.382 |
| 22 | 50 | 28 | 20.00 | 32 | M22 x 1.50 | 30.0 | 37 | 84 | 43 | 109 | 12.0 | 25.8 | 13 | 38000 | 43000 | DFSS22 | 0.488 |
| 25 | 60 | 31 | 22.00 | 36 | M24 x 2.00 | 33.5 | 42 | 94 | 48 | 124 | 12.0 | 29.6 | 13 | 47000 | 65000 | DFSS25 | 0.749 |
| 30 | 70 | 37 | 25.00 | 41 | M30 x 2.00 | 40.0 | 50 | 110 | 56 | 145 | 15.0 | 34.8 | 13 | 63000 | 86000 | DFSS30 | 1.130 |

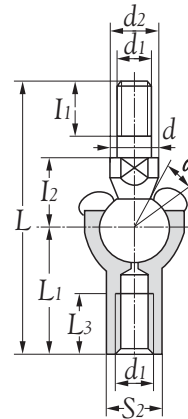
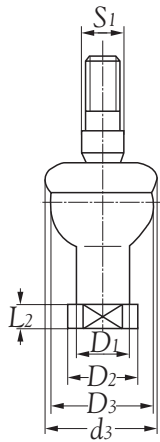
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**WINDING SHAPE BALL JOINT RODEND
SERIES RBL...**

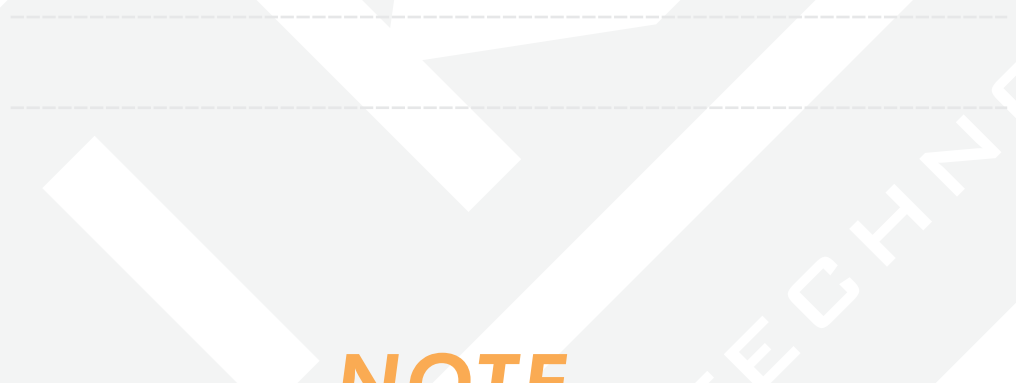


| Nominal dimensions | | | | | | | | | | | | | | | | | | | Load ratings dynamic N Cd | Bearing numbers | Mass kg (approx.) |
|--------------------|----------|---------|---------|---------|----|------|-----|----|-----|----|---------|---------|---------|---------|-----|----|---------|-------|------------------------------------|-----------------|-------------------------|
| mm | | | | | | | | | | | | | | | | | | | | | |
| d | d1 | d2 | d3 | I | I1 | I2 | I3 | S1 | L | L1 | L2 | L3 | D1 | D2 | D3 | S2 | α° ≈ | | | | |
| | | min max | min max | min max | | | max | | max | | max min | max min | max max | max max | max | | | | | | |
| 5 | M5x0.80 | 9 | 19 | 29.0 | 8 | 10.0 | 21 | 7 | 35 | 27 | 4.0 | 14 | 9.0 | 11 | 16 | 9 | 25 | 2200 | RBL5 | 0.026 | |
| 6 | M6x1.00 | 10 | 20 | 35.5 | 11 | 11.0 | 26 | 8 | 40 | 30 | 5.0 | 14 | 10.0 | 13 | 19 | 11 | 25 | 3500 | RBL6 | 0.039 | |
| 8 | M8x1.25 | 12 | 24 | 42.5 | 12 | 14.0 | 31 | 10 | 48 | 36 | 5.0 | 17 | 12.5 | 16 | 23 | 14 | 25 | 6600 | RBL8 | 0.068 | |
| 10 | M10x1.25 | 14 | 30 | 50.5 | 15 | 17.0 | 37 | 11 | 57 | 43 | 6.5 | 21 | 15.0 | 19 | 27 | 17 | 25 | 10000 | RBL10 | 0.112 | |
| 10 | M10x1.50 | 14 | 30 | 56.5 | 21 | 17.0 | 43 | 11 | 57 | 43 | 6.5 | 21 | 15.0 | 19 | 27 | 17 | 25 | 10000 | RBL10B | 0.112 | |
| 12 | M12x1.25 | 17 | 32 | 57.5 | 17 | 19.0 | 42 | 15 | 66 | 50 | 6.5 | 25 | 17.5 | 22 | 31 | 19 | 25 | 16000 | RBL12 | 0.164 | |
| 12 | M12x1.75 | 17 | 32 | 64.5 | 24 | 19.0 | 49 | 15 | 66 | 50 | 6.5 | 25 | 17.5 | 22 | 31 | 19 | 25 | 16000 | RBL12B | 0.164 | |
| 14 | M14x1.50 | 19 | 38 | 73.5 | 22 | 21.5 | 56 | 17 | 75 | 57 | 8.0 | 26 | 20.0 | 25 | 35 | 22 | 25 | 19000 | RBL14 | 0.254 | |
| 14 | M14x2.00 | 19 | 38 | 79.5 | 28 | 21.5 | 62 | 17 | 75 | 57 | 8.0 | 26 | 20.0 | 25 | 35 | 22 | 25 | 19000 | RBL14B | 0.254 | |
| 16 | M16x1.50 | 22 | 44 | 79.5 | 23 | 23.5 | 60 | 19 | 84 | 64 | 8.0 | 32 | 22.0 | 27 | 39 | 22 | 20 | 26000 | RBL16 | 0.336 | |
| 16 | M16x2.00 | 22 | 44 | 85.5 | 29 | 23.5 | 66 | 19 | 84 | 64 | 8.0 | 32 | 22.0 | 27 | 39 | 22 | 20 | 26000 | RBL16B | 0.336 | |
| 18 | M18x1.50 | 23 | 45 | 90.0 | 25 | 26.5 | 68 | 20 | 93 | 71 | 10.0 | 34 | 25.0 | 31 | 44 | 27 | 20 | 33000 | RBL18 | 0.464 | |
| 20 | M20x1.50 | 27 | 50 | 90.0 | 25 | 27.0 | 68 | 24 | 99 | 77 | 10.0 | 35 | 27.5 | 34 | 44 | 30 | 20 | 45000 | RBL20 | 0.538 | |
| 22 | M22x1.50 | 27 | 52 | 95.0 | 26 | 28.0 | 70 | 24 | 100 | 84 | 12.0 | 41 | 30.0 | 37 | 50 | 32 | 16 | 48000 | RBL22 | 0.713 | |

STRAIGHT BALL JOINT ROD ENDS
SERIES RBI...



| Nominal dimensions | | | | | | | | | | | | | | | α° \approx | Load ratings dynamic N Cd | Bearing numbers | Mass kg (approx.) |
|--------------------|------------|-----------|-----------|-----------|------|----|----------|----|-----------|-----------|-----------|-----------|-----------|----|-----------------------------|------------------------------------|-----------------|-------------------------|
| mm | | | | | | | | | | | | | | | | | | |
| d | d1 | d2 min | d3 max | I1 min | I2 | S1 | L max | L1 | L2 max | L3 min | D1 max | D2 max | D3 max | S2 | | | | |
| 5 | M5 x 0.80 | 9 | 20 | 8 | 11.0 | 7 | 46.0 | 24 | 4.0 | 12 | 9.0 | 11 | 17 | 9 | 15.0 | 2800 | RBI5 | 0.025 |
| 6 | M6 x 1.00 | 10 | 20 | 11 | 12.2 | 8 | 55.2 | 28 | 5.0 | 15 | 10.0 | 13 | 20 | 11 | 15.0 | 3700 | RBI6 | 0.041 |
| 8 | M8 x 1.25 | 12 | 24 | 12 | 16.0 | 10 | 65.0 | 32 | 5.0 | 16 | 12.5 | 16 | 24 | 14 | 15.0 | 5800 | RBI8 | 0.075 |
| 10 | M10 x 1.25 | 14 | 30 | 15 | 19.5 | 11 | 74.5 | 35 | 6.5 | 18 | 15.0 | 19 | 28 | 17 | 15.0 | 8400 | RBI10 | 0.120 |
| 10 | M10 x 1.50 | 14 | 30 | 21 | 19.5 | 11 | 80.5 | 35 | 6.5 | 18 | 15.0 | 19 | 28 | 17 | 15.0 | 8400 | RBI10B | 0.120 |
| 12 | M12 x 1.25 | 17 | 32 | 17 | 21.0 | 15 | 84.0 | 40 | 6.5 | 20 | 17.5 | 22 | 32 | 19 | 15.0 | 11000 | RBI12 | 0.180 |
| 12 | M12 x 1.75 | 17 | 32 | 24 | 21.0 | 15 | 91.0 | 40 | 6.5 | 20 | 17.5 | 22 | 32 | 19 | 15.0 | 11000 | RBI12B | 0.180 |
| 14 | M14 x 1.50 | 19 | 38 | 22 | 23.5 | 17 | 103.0 | 45 | 8.0 | 25 | 20.0 | 25 | 36 | 22 | 11.0 | 15000 | RBI14 | 0.270 |
| 14 | M14 x 2.00 | 19 | 38 | 28 | 23.5 | 17 | 109.0 | 45 | 8.0 | 25 | 20.0 | 25 | 36 | 22 | 11.0 | 15000 | RBI14B | 0.270 |
| 16 | M16 x 1.50 | 22 | 44 | 23 | 25.5 | 19 | 112.0 | 50 | 8.0 | 27 | 22.0 | 27 | 40 | 22 | 11.0 | 15000 | RBI16 | 0.360 |
| 16 | M16 x 2.00 | 22 | 44 | 29 | 25.5 | 19 | 118.0 | 50 | 8.0 | 27 | 22.0 | 27 | 40 | 22 | 11.0 | 15000 | RBI16B | 0.360 |
| 18 | M18 x 1.50 | 23 | 45 | 25 | 31.0 | 20 | 130.0 | 58 | 10.0 | 31 | 25.0 | 31 | 45 | 27 | 11.0 | 19000 | RBI18 | 0.540 |
| 20 | M20 x 1.50 | 27 | 50 | 25 | 29.0 | 24 | 133.0 | 63 | 10.0 | 34 | 27.5 | 34 | 45 | 30 | 7.5 | 19000 | RBI20 | 0.570 |
| 22 | M22 x 1.50 | 27 | 52 | 26 | 33.0 | 24 | 145.0 | 70 | 12.0 | 37 | 30.0 | 37 | 50 | 32 | 7.5 | 23000 | RBI22 | 0.760 |



NOTE

AUTOMATION TECHNOLOGY