

# Support Unit

Models EK, BK, FK, EF, BF and FF

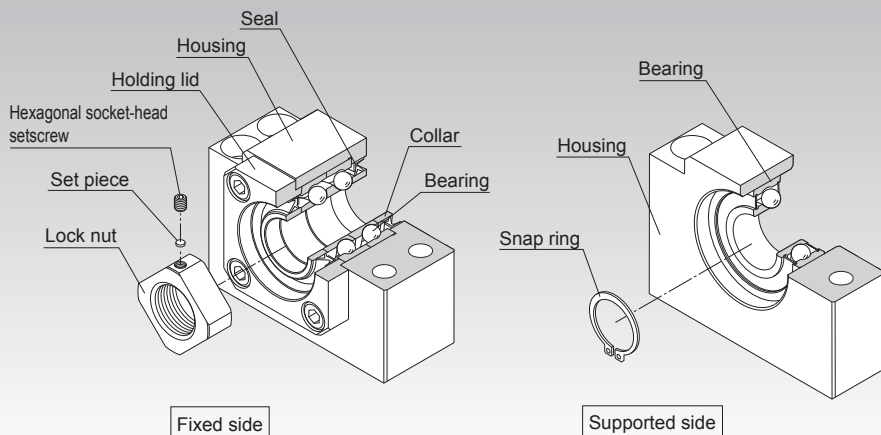


Fig.1 Structure of the Support Unit

## Structure and Features

The support unit comes in six types: models EK, FK, EF, and FF, which are tailored to model BNK precision ball screw with finished shaft ends, and models BK and BF, which are standardized for general ball screws.

The support unit on the fixed side includes a JIS Class 5-compliant angular bearing provided with an adjusted preload.

The Support Unit on the supported side uses a deep-groove ball bearing.

The internal bearings of the Support Unit models EK, FK and BK contain an appropriate amount of lithium soap-group grease that is sealed with a special seal. Thus, these models are capable of operating over a long period.

**[Uses the Optimal Bearing]**

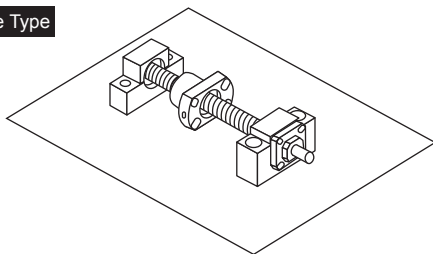
To ensure the rigidity balance with the Ball Screw, the Support Unit uses an angular bearing (contact angle:  $30^\circ$ ; DF configuration) with a high rigidity and a low torque. Miniature Support Unit models EK/FK 4, 5 and 6 are incorporated with a miniature angular bearing with a contact angle of  $45^\circ$  developed exclusively for miniature Ball Screws. This bearing has a greater contact angle of  $45^\circ$  and an increased number of balls with a smaller diameter. The high rigidity and accuracy of the miniature angular bearing provides the stable rotational performance.

**[Support Unit Shapes]**

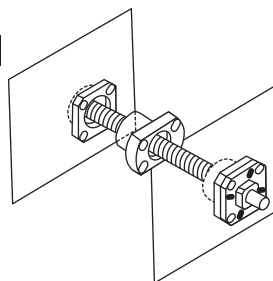
The square and round shapes are available for the Support Unit to allow the selection according to the intended use.

Example of Installation

Square Type



Round Type

**[Compact and Easy Installation]**

The Support Unit is compactly designed to accommodate the space in the installation site. As the bearing is provided with an appropriately adjusted preload, the Support Unit can be assembled with a Ball Screw unit with no further machining. Accordingly, the required man-hours in the assembly can be reduced and the assembly accuracy can be increased.

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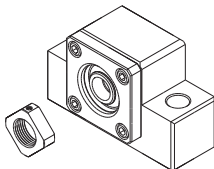
## Type

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[For the Fixed Side]

### Square Type Model EK

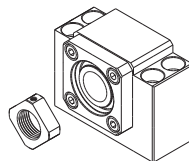
Specification Table⇒**A15-282**



(Inner diameter:  $\phi 4$  to  $\phi 20$ )

### Square Type Model BK

Specification Table⇒**A15-284**

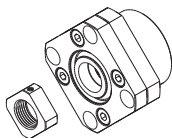


(Inner diameter:  $\phi 10$  to  $\phi 40$ )

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### Round Type Model FK

Specification Table⇒**A15-286**

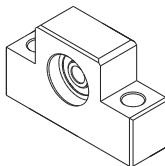


(Inner diameter:  $\phi 4$  to  $\phi 30$ )

[For the Supported Side]

### Square Type Model EF

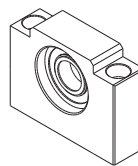
Specification Table⇒**A15-290**



(Inner diameter:  $\phi 6$  to  $\phi 20$ )

### Square Type Model BF

Specification Table⇒**A15-292**

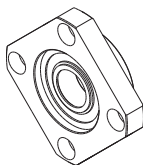


(Inner diameter:  $\phi 8$  to  $\phi 40$ )

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### Round Type Model FF

Specification Table⇒**A15-294**



(Inner diameter:  $\phi 6$  to  $\phi 30$ )

## Types of Support Units and Applicable Screw Shaft Outer Diameters

| Inner diameter of fixed-side Support Unit (mm) | Inner diameter of supported-side Support Unit (mm) | Applicable Model No. of fixed-side Support Unit | Applicable model No. of the supported side Support Unit | Type BNK with Unfinished Shaft Ends(Applicable Model No.)      | Recommended Shapes of Shaft Ends(Applicable Shaft Outer Diameter $\phi D$ ) |                                     |
|------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------|
|                                                |                                                    |                                                 |                                                         |                                                                | Shaft End H (mm)                                                            | Shaft End J (mm)                    |
| 4                                              | —                                                  | EK 4<br>FK 4                                    | —                                                       | BNK0401<br>BNK0501                                             | $\phi 6$                                                                    | —                                   |
| 5                                              | —                                                  | EK 5<br>FK 5                                    | —                                                       | BNK0601                                                        | $\phi 8$                                                                    | —                                   |
| 6                                              | 6                                                  | EK 6<br>FK 6                                    | EF 6<br>FF 6                                            | BNK0801<br>BNK0802<br>BNK0810                                  | $\phi 8$<br>$\phi 10$                                                       | —                                   |
| 8                                              | 6                                                  | EK 8<br>FK 8                                    | EF 8<br>FF 6                                            | BNK1002                                                        | $\phi 12$                                                                   | —                                   |
| 10                                             | 8                                                  | EK 10<br>FK 10<br>BK 10                         | EF 10<br>FF 10<br>BF 10                                 | BNK1004<br>BNK1010<br>BNK1202<br>BNK1205<br>BNK1208            | $\phi 14$<br>$\phi 15$                                                      | $\phi 14$<br>$\phi 15$              |
| 12                                             | 10                                                 | EK 12<br>FK 12<br>BK 12                         | EF 12<br>FF 12<br>BF 12                                 | BNK1402<br>BNK1404<br>BNK1408<br>BNK1510<br>BNK1520<br>BNK1616 | $\phi 16$<br>$\phi 18$                                                      | $\phi 16$<br>$\phi 18$              |
| 15                                             | 15                                                 | EK 15<br>FK 15                                  | EF 15<br>FF 15                                          | BNK2010<br>BNK2020                                             | $\phi 20$<br>$\phi 25$                                                      | —                                   |
|                                                |                                                    | BK 15                                           | BF 15                                                   | —                                                              | —                                                                           | $\phi 20$                           |
| 17                                             | 17                                                 | BK 17                                           | BF 17                                                   | —                                                              | —                                                                           | $\phi 25$                           |
| 20                                             | 20                                                 | EK 20<br>FK 20                                  | EF 20<br>FF 20                                          | BNK2520                                                        | $\phi 28$<br>$\phi 30$<br>$\phi 32$                                         | —                                   |
|                                                |                                                    | BK 20                                           | BF 20                                                   | —                                                              | —                                                                           | $\phi 28$<br>$\phi 30$<br>$\phi 32$ |
| 25                                             | 25                                                 | FK 25                                           | FF 25                                                   | —                                                              | $\phi 36$                                                                   | —                                   |
|                                                |                                                    | BK 25                                           | BF 25                                                   | —                                                              | —                                                                           | $\phi 36$                           |
| 30                                             | 30                                                 | FK 30                                           | FF 30                                                   | —                                                              | $\phi 40$                                                                   | $\phi 40$                           |
|                                                |                                                    | BK 30                                           | BF 30                                                   | —                                                              |                                                                             |                                     |
| 35                                             | 35                                                 | BK 35                                           | BF 35                                                   | —                                                              | —                                                                           | $\phi 45$                           |
| 40                                             | 40                                                 | BK 40                                           | BF 40                                                   | —                                                              | —                                                                           | $\phi 50$<br>$\phi 55$              |

Note1) The Supports Units in this table apply only to those Ball Screw models with recommended shaft ends shapes H, J and K, indicated on **A15-280**.

Note2) For Recommended Shapes of Shaft Ends H, J, and K; refer to pages **A15-296** to **A15-301**.

## Model Numbers of Bearings and Characteristic Values

| Angular ball bearing on the fixed side |                               |                                   |                             |                 | Deep-groove ball bearing on the supported side |                   |                                 |                                 |
|----------------------------------------|-------------------------------|-----------------------------------|-----------------------------|-----------------|------------------------------------------------|-------------------|---------------------------------|---------------------------------|
| Support Unit model No.                 | Bearing                       | Axial direction                   |                             |                 | Support Unit model No.                         | Bearing model No. | Radial direction                |                                 |
|                                        |                               | Basic dynamic load rating Ca (kN) | Note) Permissible load (kN) | Rigidity (N/μm) |                                                |                   | Basic dynamic load rating C(kN) | Basic static load rating Co(kN) |
| EK 4<br>FK 4                           | AC4-12<br>(DF P5)             | 0.93                              | 1.1                         | 27              | —                                              | —                 | —                               | —                               |
| EK 5<br>FK 5                           | AC5-14<br>(DF P5)             | 1                                 | 1.24                        | 29              | —                                              | —                 | —                               | —                               |
| EK 6<br>FK 6                           | AC6-16<br>(DF P5)             | 1.38                              | 1.76                        | 35              | EF 6<br>FF 6                                   | 606ZZ             | 2.19                            | 0.87                            |
| EK 8<br>FK 8                           | 79M8A<br>(DF P5)              | 2.93                              | 2.15                        | 49              | EF 8                                           | 606ZZ             | 2.19                            | 0.87                            |
| EK 10<br>FK 10<br>BK 10                | 7000<br>equivalent<br>(DF P5) | 6.08                              | 3.1                         | 65              | EF 10<br>FF 10<br>BF 10                        | 608ZZ             | 3.35                            | 1.4                             |
| EK 12<br>FK 12<br>BK 12                | 7001<br>equivalent<br>(DF P5) | 6.66                              | 3.25                        | 88              | EF 12<br>FF 12<br>BF 12                        | 6000ZZ            | 4.55                            | 1.96                            |
| EK 15<br>FK 15<br>BK 15                | 7002<br>equivalent<br>(DF P5) | 7.6                               | 4                           | 100             | EF 15<br>FF 15<br>BF 15                        | 6002ZZ            | 5.6                             | 2.84                            |
| BK 17                                  | 7203<br>equivalent<br>(DF P5) | 13.7                              | 5.85                        | 125             | BF 17                                          | 6203ZZ            | 9.6                             | 4.6                             |
| EK 20<br>FK 20                         | 7204<br>equivalent<br>(DF P5) | 17.9                              | 9.5                         | 170             | EF 20<br>FF 20                                 | 6204ZZ            | 12.8                            | 6.65                            |
| BK 20                                  | 7004<br>equivalent<br>(DF P5) | 12.7                              | 7.55                        | 140             | BF 20                                          | 6004ZZ            | 9.4                             | 5.05                            |
| FK 25<br>BK 25                         | 7205<br>equivalent<br>(DF P5) | 20.2                              | 11.5                        | 190             | FF 25<br>BF 25                                 | 6205ZZ            | 14                              | 7.85                            |
| FK 30<br>BK 30                         | 7206<br>equivalent<br>(DF P5) | 28                                | 16.3                        | 195             | FF 30<br>BF 30                                 | 6206ZZ            | 19.5                            | 11.3                            |
| BK 35                                  | 7207<br>equivalent<br>(DF P5) | 37.2                              | 21.9                        | 255             | BF 35                                          | 6207ZZ            | 25.7                            | 15.3                            |
| BK 40                                  | 7208<br>equivalent<br>(DF P5) | 44.1                              | 27.1                        | 270             | BF 40                                          | 6208ZZ            | 29.1                            | 17.8                            |

Note) "Permissible load" indicates the static permissible load.

## Example of Installation

### [Square Type Support Unit]

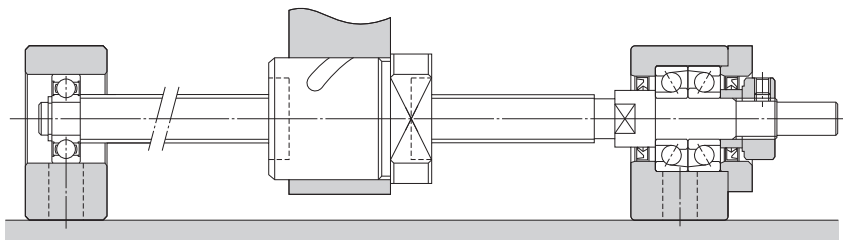


Fig.2 Example of Installing a Square Type Support Unit

### [Round Type Support Unit]

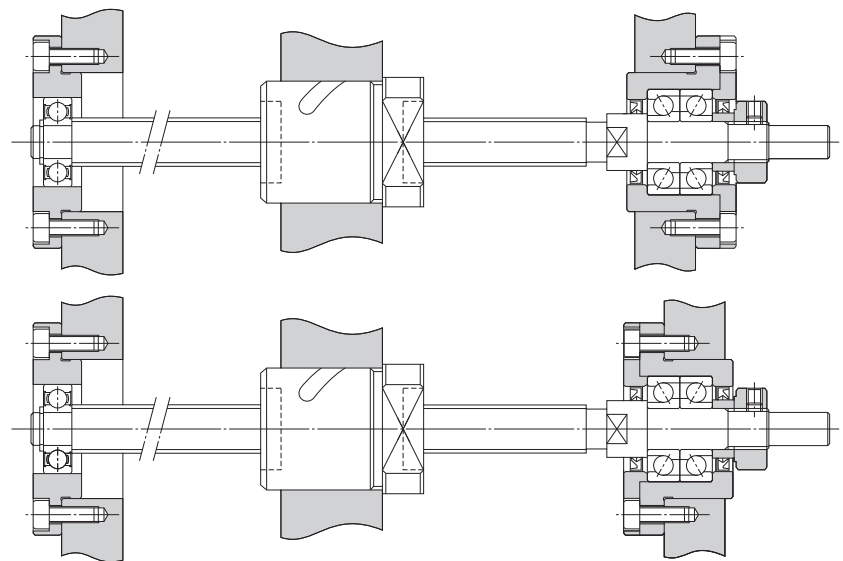


Fig.3 Example of Installing a Round Type Support Unit

## Mounting Procedure

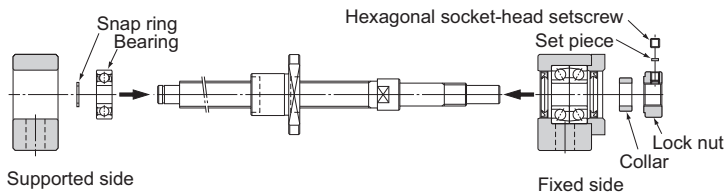
### [Installing the Support Unit]

- (1) Install the fixed side Support Unit with the screw shaft.
- (2) After inserting the fixed side Support Unit, secure the lock nut using the fastening set piece and the hexagonal socket-head setscrews.
- (3) Attach the supported side bearing to the screw shaft and secure the bearing using the snap ring, and then install the assembly to the housing on the supported side.

Note1) Do not disassemble the Support Unit.

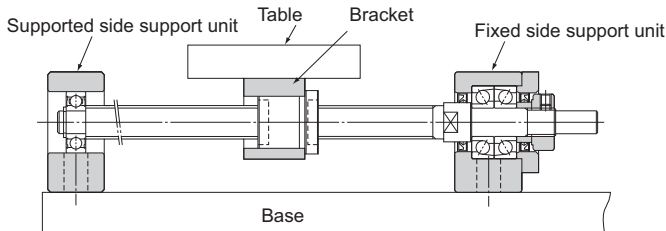
Note2) When inserting the screw shaft to the Support Unit, take care not to let the oil seal lip turn outward.

Note3) When securing the set piece with a hexagonal socket-head setscrew, apply an adhesive to the hexagonal socket-head setscrew before tightening it in order to prevent the screw from loosening. If planning to use the product in a harsh environment, it is also necessary to take a measure to prevent other components/parts from loosening. Contact THK for details.



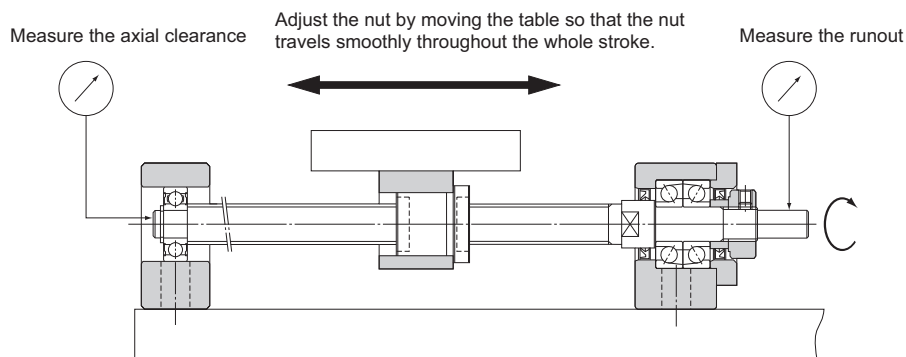
### [Installation onto the Table and the Base]

- (1) If using a bracket when mounting the ball screw nut to the table, insert the nut into the bracket and temporarily fasten it.
- (2) Temporarily fasten the fixed side Support Unit to the base.  
In doing so, press the table toward the fixed side Support Unit to align the axial center, and adjust the table so that it can travel freely.
  - If using the fixed side Support Unit as the reference point, secure a clearance between the ball screw nut and the table or inside the bracket when making adjustment.
  - If using the table as the reference point, make the adjustment either by using the shim (for a square type Support Unit), or securing the clearance between the outer surface of the nut and the inner surface of the mounting section (for a round type Support Unit).
- (3) Press the table toward the fixed-side Support Unit to align the axial center. Make the adjustment by reciprocating the table several times so that the nut travels smoothly throughout the whole stroke, and temporarily secure the Support Unit to the base.



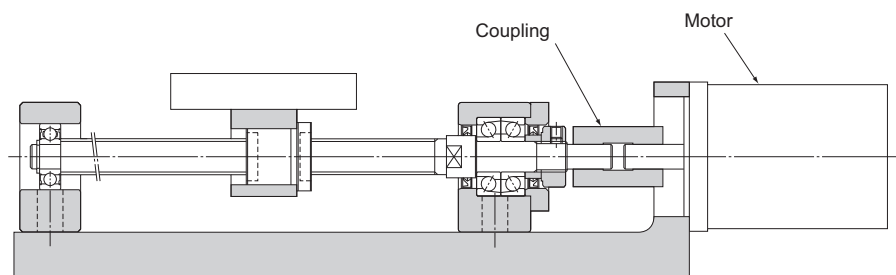
### [Checking the Accuracy and Fully Fastening the Support Unit]

While checking the runout of the ball screw shaft end and the axial clearance using a dial gauge, fully fasten the ball screw nut, the nut bracket, the fixed side Support Unit and the supported-side Support Unit, in this order.



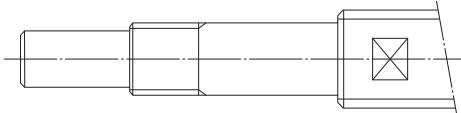
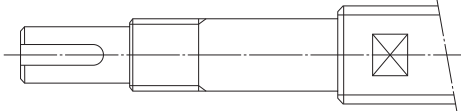
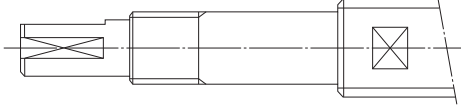
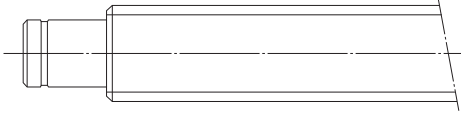
### [Connection with the Motor]

- (1) Mount the motor bracket to the base.
  - (2) Connect the motor and the ball screw using a coupling.
- Note) Make sure the mounting accuracy is maintained.
- (3) Thoroughly perform the break-in for the system.



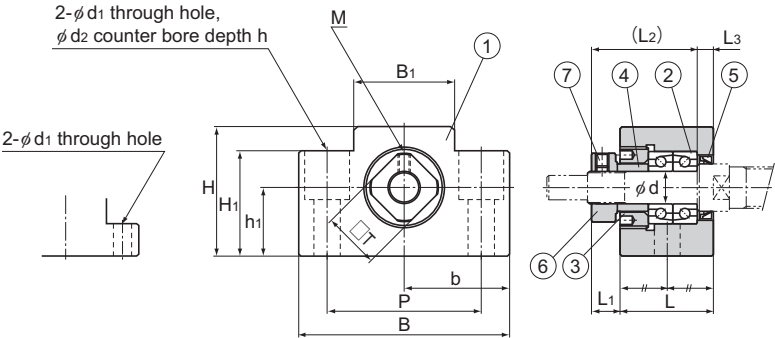
Types of Recommended Shapes of the Shaft Ends

To ensure speedy estimates and manufacturing of Ball Screws, THK has standardized the shaft end shapes of the screw shafts. The recommended shapes of shaft ends consist of shapes H, K and J, which allow standard Support Units to be used.

| Mounting method | Symbol for shaft end shape |    | Shape                                                                               | Supported Support Unit |
|-----------------|----------------------------|----|-------------------------------------------------------------------------------------|------------------------|
| Fixed           | H J                        | H1 |    | FK<br>EK               |
|                 |                            | J1 |                                                                                     | BK                     |
|                 |                            | H2 |    | FK<br>EK               |
|                 |                            | J2 |                                                                                     | BK                     |
|                 |                            | H3 |   | FK<br>EK               |
|                 |                            | J3 |                                                                                     | BK                     |
| Supported       | K                          |    |  | FF<br>EF<br>BF         |



# EK Square Type Support Unit on the Fixed Side



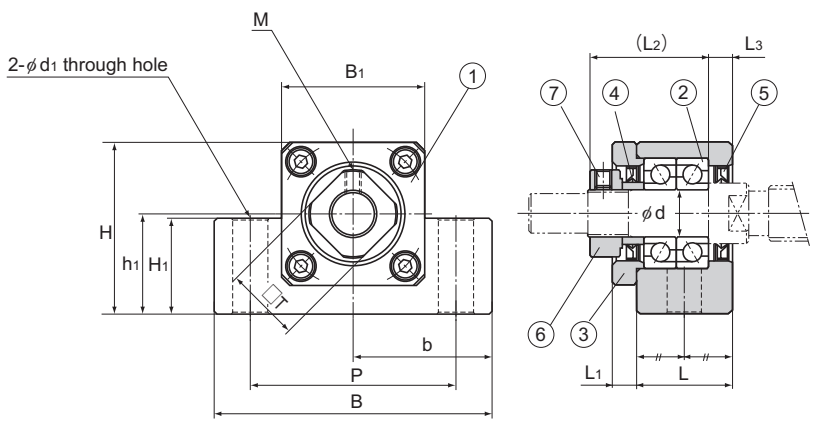
Models EK 4 and 5

Models EK 6 and 8

| Model No. | Shaft diameter<br>d | L    | L <sub>1</sub> | L <sub>2</sub> | L <sub>3</sub> | B  | H  | b<br>±0.02 |
|-----------|---------------------|------|----------------|----------------|----------------|----|----|------------|
| EK 4      | 4                   | 15   | 5.5            | 17.5           | 3              | 34 | 19 | 17         |
| EK 5      | 5                   | 16.5 | 5.5            | 18.5           | 3.5            | 36 | 21 | 18         |
| EK 6      | 6                   | 20   | 5.5            | 22             | 3.5            | 42 | 25 | 21         |
| EK 8      | 8                   | 23   | 7              | 26             | 4              | 52 | 32 | 26         |
| EK 10     | 10                  | 24   | 6              | 29.5           | 6              | 70 | 43 | 35         |
| EK 12     | 12                  | 24   | 6              | 29.5           | 6              | 70 | 43 | 35         |
| EK 15     | 15                  | 25   | 6              | 36             | 5              | 80 | 49 | 40         |
| EK 20     | 20                  | 42   | 10             | 50             | 10             | 95 | 58 | 47.5       |

Models EK 4 to 8

| Part No. | Part name                                            | No. of units |
|----------|------------------------------------------------------|--------------|
| 1        | Housing                                              | 1            |
| 2        | Bearing                                              | 1 set        |
| 3        | Set nut                                              | 1            |
| 4        | Collar                                               | 2            |
| 5        | Seal                                                 | 1            |
| 6        | Lock Nut                                             | 1            |
| 7        | Hexagonal socket-head setscrew<br>(with a set piece) | 1            |



Models EK 10 to 20

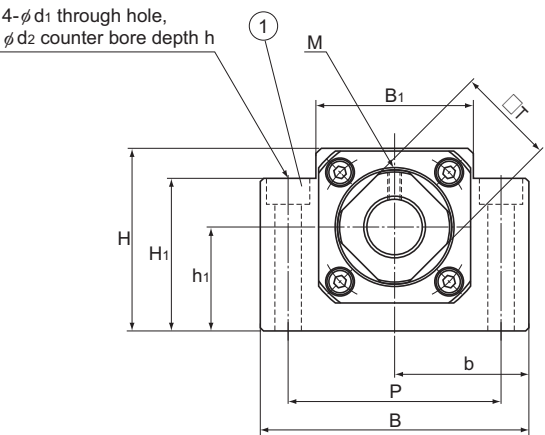
Unit: mm

| $h_1$<br>$\pm 0.02$ | $B_1$ | $H_1$ | $P$ | $d_1$ | $d_2$ | $h$ | $M$  | $T$ | Bearing used            | Mass<br>kg |
|---------------------|-------|-------|-----|-------|-------|-----|------|-----|-------------------------|------------|
| 10                  | 18    | 7     | 26  | 4.5   | —     | —   | M2.6 | 10  | AC4-12(DF P5)           | 0.06       |
| 11                  | 20    | 8     | 28  | 4.5   | —     | —   | M2.6 | 11  | AC5-14(DF P5)           | 0.08       |
| 13                  | 18    | 20    | 30  | 5.5   | 9.5   | 11  | M3   | 12  | AC6-16(DF P5)           | 0.14       |
| 17                  | 25    | 26    | 38  | 6.6   | 11    | 12  | M3   | 14  | 79M8A(DF P5)            | 0.24       |
| 25                  | 36    | 24    | 52  | 9     | —     | —   | M3   | 16  | 7000 equivalent (DF P5) | 0.46       |
| 25                  | 36    | 24    | 52  | 9     | —     | —   | M3   | 19  | 7001 equivalent (DF P5) | 0.44       |
| 30                  | 41    | 25    | 60  | 11    | —     | —   | M3   | 22  | 7002 equivalent (DF P5) | 0.55       |
| 30                  | 56    | 25    | 75  | 11    | —     | —   | M4   | 30  | 7204 equivalent (DF P5) | 1.35       |

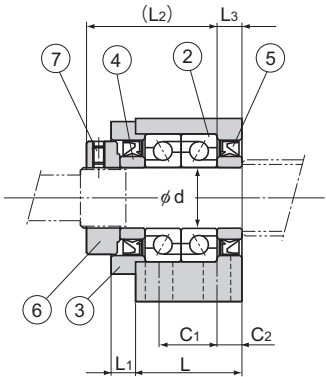
Models EK 10 to 20

| Part No. | Part name                                            | No. of units |
|----------|------------------------------------------------------|--------------|
| 1        | Housing                                              | 1            |
| 2        | Bearing                                              | 1 set        |
| 3        | Holding lid                                          | 1            |
| 4        | Collar                                               | 2            |
| 5        | Seal                                                 | 2            |
| 6        | Lock Nut                                             | 1            |
| 7        | Hexagonal socket-head setscrew<br>(with a set piece) | 1            |

# BK Square Type Support Unit on the Fixed Side



| Model No. | Shaft diameter | L  | L <sub>1</sub> | L <sub>2</sub> | L <sub>3</sub> | B   | H   | b<br>±0.02 | h <sub>1</sub><br>±0.02 | B <sub>1</sub> | H <sub>1</sub> |
|-----------|----------------|----|----------------|----------------|----------------|-----|-----|------------|-------------------------|----------------|----------------|
|           | d              |    |                |                |                |     |     |            |                         |                |                |
| BK 10     | 10             | 25 | 5              | 29             | 5              | 60  | 39  | 30         | 22                      | 34             | 32.5           |
| BK 12     | 12             | 25 | 5              | 29             | 5              | 60  | 43  | 30         | 25                      | 35             | 32.5           |
| BK 15     | 15             | 27 | 6              | 32             | 6              | 70  | 48  | 35         | 28                      | 40             | 38             |
| BK 17     | 17             | 35 | 9              | 44             | 7              | 86  | 64  | 43         | 39                      | 50             | 55             |
| BK 20     | 20             | 35 | 8              | 43             | 8              | 88  | 60  | 44         | 34                      | 52             | 50             |
| BK 25     | 25             | 42 | 12             | 54             | 9              | 106 | 80  | 53         | 48                      | 64             | 70             |
| BK 30     | 30             | 45 | 14             | 61             | 9              | 128 | 89  | 64         | 51                      | 76             | 78             |
| BK 35     | 35             | 50 | 14             | 67             | 12             | 140 | 96  | 70         | 52                      | 88             | 79             |
| BK 40     | 40             | 61 | 18             | 76             | 15             | 160 | 110 | 80         | 60                      | 100            | 90             |

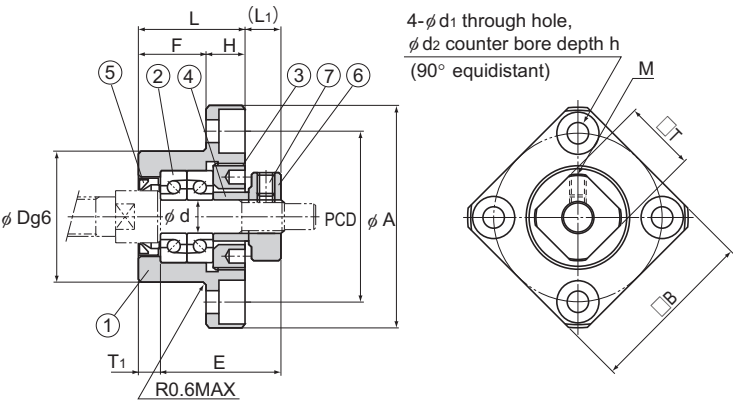


Unit: mm

|  | P   | C <sub>1</sub> | C <sub>2</sub> | d <sub>1</sub> | d <sub>2</sub> | h    | M  | T  | Bearing used            | Mass<br>kg |
|--|-----|----------------|----------------|----------------|----------------|------|----|----|-------------------------|------------|
|  | 46  | 13             | 6              | 6.6            | 10.8           | 5    | M3 | 16 | 7000 equivalent (DF P5) | 0.39       |
|  | 46  | 13             | 6              | 6.6            | 10.8           | 1.5  | M3 | 19 | 7001 equivalent (DF P5) | 0.41       |
|  | 54  | 15             | 6              | 6.6            | 11             | 6.5  | M3 | 22 | 7002 equivalent (DF P5) | 0.57       |
|  | 68  | 19             | 8              | 9              | 14             | 8.5  | M4 | 24 | 7203 equivalent (DF P5) | 1.27       |
|  | 70  | 19             | 8              | 9              | 14             | 8.5  | M4 | 30 | 7004 equivalent (DF P5) | 1.19       |
|  | 85  | 22             | 10             | 11             | 17.5           | 11   | M5 | 35 | 7205 equivalent (DF P5) | 2.3        |
|  | 102 | 23             | 11             | 14             | 20             | 13   | M6 | 40 | 7206 equivalent (DF P5) | 3.32       |
|  | 114 | 26             | 12             | 14             | 20             | 13   | M8 | 50 | 7207 equivalent (DF P5) | 4.33       |
|  | 130 | 33             | 14             | 18             | 26             | 17.5 | M8 | 50 | 7208 equivalent (DF P5) | 6.5        |

| Part No. | Part name                                         | No. of units |
|----------|---------------------------------------------------|--------------|
| 1        | Housing                                           | 1            |
| 2        | Bearing                                           | 1 set        |
| 3        | Holding lid                                       | 1            |
| 4        | Collar                                            | 2            |
| 5        | Seal                                              | 2            |
| 6        | Lock Nut                                          | 1            |
| 7        | Hexagonal socket-head setscrew (with a set piece) | 1            |

# FK Round Type Support Unit on the Fixed Side

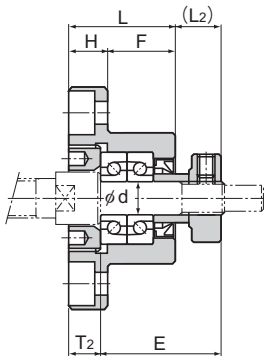


Mounting method A

Models FK 4 to 8

| Model No. | Shaft diameter | L    | H | F    | E    | D                      | A  | PCD | B  |
|-----------|----------------|------|---|------|------|------------------------|----|-----|----|
|           | d              |      |   |      |      |                        |    |     |    |
| FK 4      | 4              | 15   | 6 | 9    | 17.5 | 18<br>-0.006<br>-0.017 | 32 | 24  | 25 |
| FK 5      | 5              | 16.5 | 6 | 10.5 | 18.5 | 20<br>-0.007<br>-0.02  | 34 | 26  | 26 |
| FK 6      | 6              | 20   | 7 | 13   | 22   | 22<br>-0.007<br>-0.02  | 36 | 28  | 28 |
| FK 8      | 8              | 23   | 9 | 14   | 26   | 28<br>-0.007<br>-0.02  | 43 | 35  | 35 |

Note) When using a Model BNK finished shaft end precision ball screw, use mounting method A only.



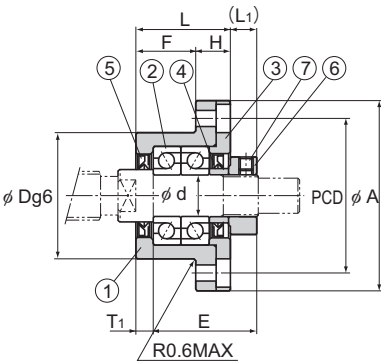
Mounting method B

Unit: mm

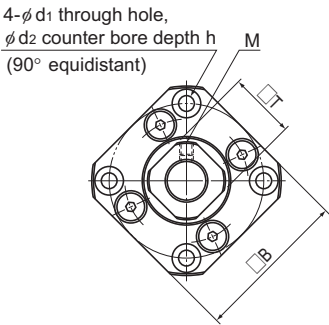
|  | Installation procedure A |                | Installation procedure B |                | d <sub>1</sub> | d <sub>2</sub> | h | M    | T  | Bearing used  | Mass<br>kg |
|--|--------------------------|----------------|--------------------------|----------------|----------------|----------------|---|------|----|---------------|------------|
|  | L <sub>1</sub>           | T <sub>1</sub> | L <sub>2</sub>           | T <sub>2</sub> |                |                |   |      |    |               |            |
|  | 5.5                      | 3              | 6.5                      | 4              | 3.4            | 6.5            | 4 | M2.6 | 10 | AC4-12(DF P5) | 0.05       |
|  | 5.5                      | 3.5            | 7                        | 5              | 3.4            | 6.5            | 4 | M2.6 | 11 | AC5-14(DF P5) | 0.06       |
|  | 5.5                      | 3.5            | 8.5                      | 6.5            | 3.4            | 6.5            | 4 | M3   | 12 | AC6-16(DF P5) | 0.08       |
|  | 7                        | 4              | 10                       | 7              | 3.4            | 6.5            | 4 | M3   | 14 | 79M8A(DF P5)  | 0.15       |

| Part No. | Part name                                            | No. of units |
|----------|------------------------------------------------------|--------------|
| 1        | Housing                                              | 1            |
| 2        | Bearing                                              | 1 set        |
| 3        | Set nut                                              | 1            |
| 4        | Collar                                               | 2            |
| 5        | Seal                                                 | 1            |
| 6        | Lock Nut                                             | 1            |
| 7        | Hexagonal socket-head setscrew<br>(with a set piece) | 1            |

# FK Round Type Support Unit on the Fixed Side

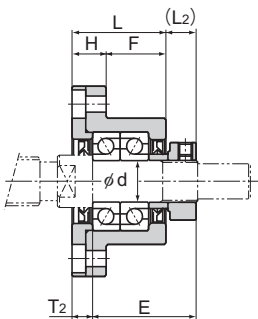


Mounting method A



Models FK 10 to 30

| Model No. | Shaft diameter | L  | H  | F  | E    | D                      | A   | PCD | B  |
|-----------|----------------|----|----|----|------|------------------------|-----|-----|----|
|           | d              |    |    |    |      |                        |     |     |    |
| FK 10     | 10             | 27 | 10 | 17 | 29.5 | 34<br>-0.009<br>-0.025 | 52  | 42  | 42 |
| FK 12     | 12             | 27 | 10 | 17 | 29.5 | 36<br>-0.009<br>-0.025 | 54  | 44  | 44 |
| FK 15     | 15             | 32 | 15 | 17 | 36   | 40<br>-0.009<br>-0.025 | 63  | 50  | 52 |
| FK 20     | 20             | 52 | 22 | 30 | 50   | 57<br>-0.01<br>-0.029  | 85  | 70  | 68 |
| FK 25     | 25             | 57 | 27 | 30 | 60   | 63<br>-0.01<br>-0.029  | 98  | 80  | 79 |
| FK 30     | 30             | 62 | 30 | 32 | 61   | 75<br>-0.01<br>-0.029  | 117 | 95  | 93 |



Mounting method B

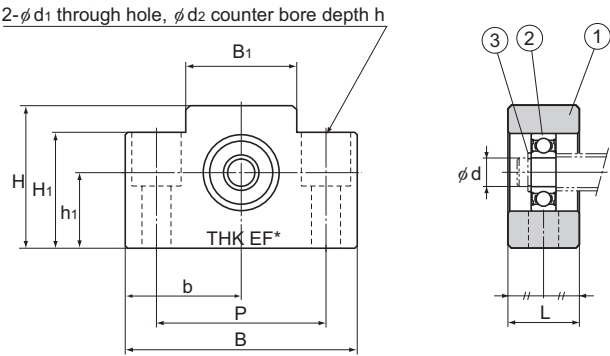
Unit: mm

|  | Installation procedure A |                | Installation procedure B |                | d <sub>1</sub> | d <sub>2</sub> | h  | M  | T  | Bearing used            | Mass<br>kg |
|--|--------------------------|----------------|--------------------------|----------------|----------------|----------------|----|----|----|-------------------------|------------|
|  | L <sub>1</sub>           | T <sub>1</sub> | L <sub>2</sub>           | T <sub>2</sub> |                |                |    |    |    |                         |            |
|  | 7.5                      | 5              | 8.5                      | 6              | 4.5            | 8              | 4  | M3 | 16 | 7000 equivalent (DF P5) | 0.21       |
|  | 7.5                      | 5              | 8.5                      | 6              | 4.5            | 8              | 4  | M3 | 19 | 7001 equivalent (DF P5) | 0.22       |
|  | 10                       | 6              | 12                       | 8              | 5.5            | 9.5            | 6  | M3 | 22 | 7002 equivalent (DF P5) | 0.39       |
|  | 8                        | 10             | 12                       | 14             | 6.6            | 11             | 10 | M4 | 30 | 7204 equivalent (DF P5) | 1.09       |
|  | 13                       | 10             | 20                       | 17             | 9              | 15             | 13 | M5 | 35 | 7205 equivalent (DF P5) | 1.49       |
|  | 11                       | 12             | 17                       | 18             | 11             | 17.5           | 15 | M6 | 40 | 7206 equivalent (DF P5) | 2.32       |

Ball Screw Peripherals

| Part No. | Part name                                         | No. of units |
|----------|---------------------------------------------------|--------------|
| 1        | Housing                                           | 1            |
| 2        | Bearing                                           | 1 set        |
| 3        | Holding lid                                       | 1            |
| 4        | Collar                                            | 2            |
| 5        | Seal                                              | 2            |
| 6        | Lock Nut                                          | 1            |
| 7        | Hexagonal socket-head setscrew (with a set piece) | 1            |

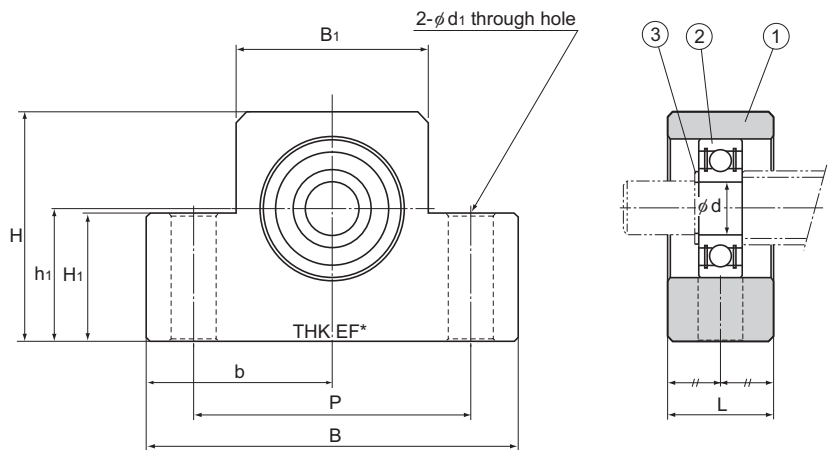
# EF Square Type Support Unit on the Supported Side



Models EF 6 and 8

| Model No. | Shaft diameter<br>d | L  | B  | H  | b<br>±0.02 | h <sub>1</sub><br>±0.02 | B <sub>1</sub> |
|-----------|---------------------|----|----|----|------------|-------------------------|----------------|
| EF 6      | 6                   | 12 | 42 | 25 | 21         | 13                      | 18             |
| EF 8      | 6                   | 14 | 52 | 32 | 26         | 17                      | 25             |
| EF 10     | 8                   | 20 | 70 | 43 | 35         | 25                      | 36             |
| EF 12     | 10                  | 20 | 70 | 43 | 35         | 25                      | 36             |
| EF 15     | 15                  | 20 | 80 | 49 | 40         | 30                      | 41             |
| EF 20     | 20                  | 26 | 95 | 58 | 47.5       | 30                      | 56             |

Note) The area marked with “\*” is imprinted with a numeric character(s) as part of the model number.



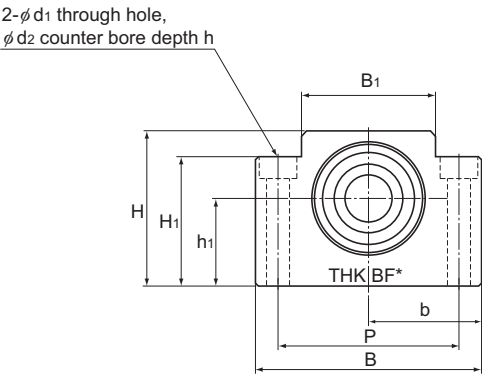
Models EF 10 to 20

Unit: mm

|  | H <sub>1</sub> | P  | d <sub>1</sub> | d <sub>2</sub> | h  | Bearing used | Snap ring size | Mass kg |
|--|----------------|----|----------------|----------------|----|--------------|----------------|---------|
|  | 20             | 30 | 5.5            | 9.5            | 11 | 606ZZ        | C6             | 0.07    |
|  | 26             | 38 | 6.6            | 11             | 12 | 606ZZ        | C6             | 0.13    |
|  | 24             | 52 | 9              | —              | —  | 608ZZ        | C8             | 0.33    |
|  | 24             | 52 | 9              | —              | —  | 6000ZZ       | C10            | 0.32    |
|  | 25             | 60 | 9              | —              | —  | 6002ZZ       | C15            | 0.38    |
|  | 25             | 75 | 11             | —              | —  | 6204ZZ       | C20            | 0.63    |

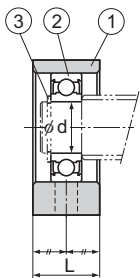
| Part No. | Part name | No. of units |
|----------|-----------|--------------|
| 1        | Housing   | 1            |
| 2        | Bearing   | 1            |
| 3        | Snap ring | 1            |

# BF Square Type Support Unit on the Supported Side



| Model No. | Shaft diameter<br>d | L  | B   | H   | b<br>$\pm 0.02$ | h<br>$\pm 0.02$ | B <sub>1</sub> | H <sub>1</sub> |
|-----------|---------------------|----|-----|-----|-----------------|-----------------|----------------|----------------|
| BF 10     | 8                   | 20 | 60  | 39  | 30              | 22              | 34             | 32.5           |
| BF 12     | 10                  | 20 | 60  | 43  | 30              | 25              | 35             | 32.5           |
| BF 15     | 15                  | 20 | 70  | 48  | 35              | 28              | 40             | 38             |
| BF 17     | 17                  | 23 | 86  | 64  | 43              | 39              | 50             | 55             |
| BF 20     | 20                  | 26 | 88  | 60  | 44              | 34              | 52             | 50             |
| BF 25     | 25                  | 30 | 106 | 80  | 53              | 48              | 64             | 70             |
| BF 30     | 30                  | 32 | 128 | 89  | 64              | 51              | 76             | 78             |
| BF 35     | 35                  | 32 | 140 | 96  | 70              | 52              | 88             | 79             |
| BF 40     | 40                  | 37 | 160 | 110 | 80              | 60              | 100            | 90             |

Note) The area marked with “\*” is imprinted with a numeric character(s) as part of the model number.

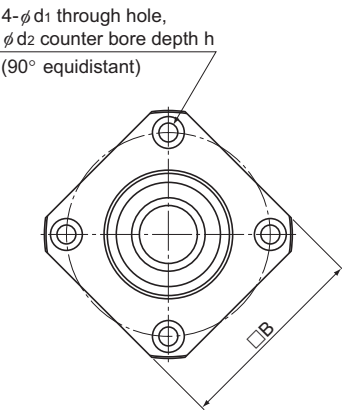


Unit: mm

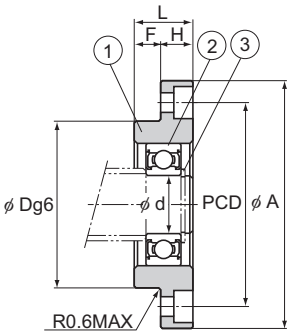
|  | P   | d <sub>1</sub> | d <sub>2</sub> | h    | Bearing used | Snap ring used | Mass<br>kg |
|--|-----|----------------|----------------|------|--------------|----------------|------------|
|  | 46  | 6.6            | 10.8           | 5    | 608ZZ        | C8             | 0.29       |
|  | 46  | 6.6            | 10.8           | 1.5  | 6000ZZ       | C10            | 0.3        |
|  | 54  | 6.6            | 11             | 6.5  | 6002ZZ       | C15            | 0.38       |
|  | 68  | 9              | 14             | 8.5  | 6203ZZ       | C17            | 0.74       |
|  | 70  | 9              | 14             | 8.5  | 6004ZZ       | C20            | 0.76       |
|  | 85  | 11             | 17.5           | 11   | 6205ZZ       | C25            | 1.42       |
|  | 102 | 14             | 20             | 13   | 6206ZZ       | C30            | 1.97       |
|  | 114 | 14             | 20             | 13   | 6207ZZ       | C35            | 2.22       |
|  | 130 | 18             | 26             | 17.5 | 6208ZZ       | C40            | 3.27       |

| Part No. | Part name | No. of units |
|----------|-----------|--------------|
| 1        | Housing   | 1            |
| 2        | Bearing   | 1            |
| 3        | Snap ring | 1            |

# FF Round Type Support Unit on the Supported Side



| Model No. | Shaft diameter<br>d | L  | H  | F  | D                      | A   |
|-----------|---------------------|----|----|----|------------------------|-----|
| FF 6      | 6                   | 10 | 6  | 4  | 22<br>-0.007<br>-0.02  | 36  |
| FF 10     | 8                   | 12 | 7  | 5  | 28<br>-0.007<br>-0.02  | 43  |
| FF 12     | 10                  | 15 | 7  | 8  | 34<br>-0.009<br>-0.025 | 52  |
| FF 15     | 15                  | 17 | 9  | 8  | 40<br>-0.009<br>-0.025 | 63  |
| FF 20     | 20                  | 20 | 11 | 9  | 57<br>-0.01<br>-0.029  | 85  |
| FF 25     | 25                  | 24 | 14 | 10 | 63<br>-0.01<br>-0.029  | 98  |
| FF 30     | 30                  | 27 | 18 | 9  | 75<br>-0.01<br>-0.029  | 117 |

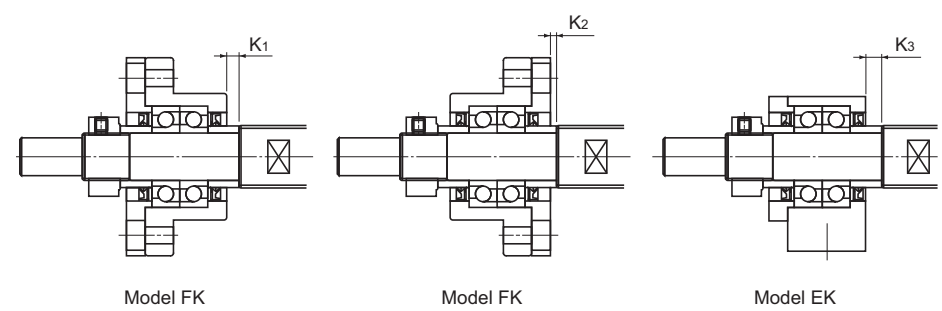


Unit: mm

|  | PCD | B  | d <sub>1</sub> | d <sub>2</sub> | h   | Bearing used | Snap ring used | Mass<br>kg |
|--|-----|----|----------------|----------------|-----|--------------|----------------|------------|
|  | 28  | 28 | 3.4            | 6.5            | 4   | 606ZZ        | C6             | 0.04       |
|  | 35  | 35 | 3.4            | 6.5            | 4   | 608ZZ        | C8             | 0.07       |
|  | 42  | 42 | 4.5            | 8              | 4   | 6000ZZ       | C10            | 0.11       |
|  | 50  | 52 | 5.5            | 9.5            | 5.5 | 6002ZZ       | C15            | 0.2        |
|  | 70  | 68 | 6.6            | 11             | 6.5 | 6204ZZ       | C20            | 0.27       |
|  | 80  | 79 | 9              | 14             | 8.5 | 6205ZZ       | C25            | 0.67       |
|  | 95  | 93 | 11             | 17.5           | 11  | 6206ZZ       | C30            | 1.07       |

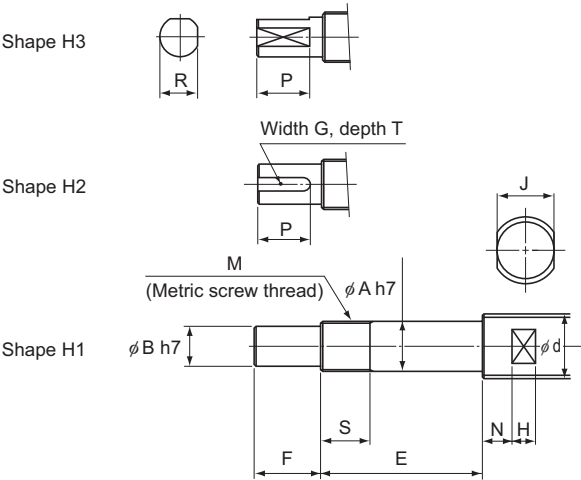
| Part No. | Part name | No. of units |
|----------|-----------|--------------|
| 1        | Housing   | 1            |
| 2        | Bearing   | 1            |
| 3        | Snap ring | 1            |

# Recommended Shapes of Shaft Ends - Shape H (H1, H2 and H3) (For Support Unit Models FK and EK)



| Support Unit model No. |          | Ball screw shaft outer diameter | Shaft outer diameter of the bearing | B  | E  | F  | Metric screw thread |    |
|------------------------|----------|---------------------------------|-------------------------------------|----|----|----|---------------------|----|
| Model FK               | Model EK |                                 |                                     |    |    |    | M                   | S  |
| FK4                    | EK4      | 6                               | 4                                   | 3  | 23 | 5  | M4×0.5              | 7  |
| FK5                    | EK5      | 8                               | 5                                   | 4  | 25 | 6  | M5×0.5              | 7  |
| FK6                    | EK6      | 10*1                            | 6                                   | 4  | 30 | 8  | M6×0.75             | 8  |
| FK8                    | EK8      | 12                              | 8                                   | 6  | 35 | 9  | M8×1                | 10 |
| FK10                   | EK10     | 14                              | 10                                  | 8  | 36 | 15 | M10×1               | 11 |
| FK10                   | EK10     | 15                              | 10                                  | 8  | 36 | 15 | M10×1               | 11 |
| FK12                   | EK12     | 16                              | 12                                  | 10 | 36 | 15 | M12×1               | 11 |
| FK12                   | EK12     | 18                              | 12                                  | 10 | 36 | 15 | M12×1               | 11 |
| FK15                   | EK15     | 20                              | 15                                  | 12 | 49 | 20 | M15×1               | 13 |
| FK15                   | EK15     | 25                              | 15                                  | 12 | 49 | 20 | M15×1               | 13 |
| FK20                   | EK20     | 28                              | 20                                  | 17 | 64 | 25 | M20×1               | 17 |
| FK20                   | EK20     | 30                              | 20                                  | 17 | 64 | 25 | M20×1               | 17 |
| FK20                   | EK20     | 32                              | 20                                  | 17 | 64 | 25 | M20×1               | 17 |
| FK25                   | —        | 36                              | 25                                  | 20 | 76 | 30 | M25×1.5             | 20 |
| FK30                   | —        | 40                              | 30                                  | 25 | 72 | 38 | M30×1.5             | 25 |

Note) Support Units are designed to have dimensions so that combinations of models FK and FF, models EK and EF or models BK and BF are used on the same shaft.  
If desiring the shaft end to be machined at THK, add the shape symbol in the end of the Ball Screw model number.  
(Example) TS2505+500L-H2K  
(Shape H2 on the fixed side; shape K on the supported side)  
For the permissible radial runout of the shaft bearing end face, refer to JIS B 1192 (ISO 3408).  
\*1 FK6 and EK6 also support ø8 mm outer diameter ball screws. Contact THK for details.

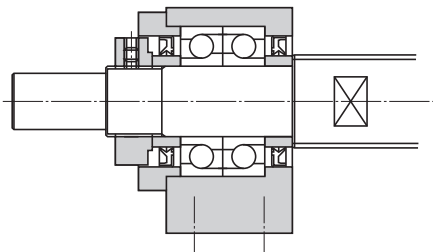


Unit: mm

|  | Width across flat |    |    | Shape H2<br>Keyway |                |    | Shape H3<br>Cut flat on two side |    | Support Unit position |                |                |
|--|-------------------|----|----|--------------------|----------------|----|----------------------------------|----|-----------------------|----------------|----------------|
|  | J                 | N  | H  | G<br>N9            | T<br>+0.1<br>0 | P  | R                                | P  | Model FK              |                | Model EK       |
|  |                   |    |    |                    |                |    |                                  |    | K <sub>1</sub>        | K <sub>2</sub> | K <sub>3</sub> |
|  | 4                 | 4  | 4  | —                  | —              | —  | 2.7                              | 4  | 1.5                   | 0.5            | 1.5            |
|  | 5                 | 4  | 4  | —                  | —              | —  | 3.7                              | 5  | 2                     | 0.5            | 2              |
|  | 5                 | 4  | 4  | —                  | —              | —  | 3.7                              | 6  | 3.5                   | 0.5            | 3.5            |
|  | 8                 | 5  | 5  | —                  | —              | —  | 5.6                              | 7  | 3.5                   | 0.5            | 3.5            |
|  | 10                | 5  | 7  | 2                  | 1.2            | 11 | 7.5                              | 11 | 0.5                   | −0.5           | −0.5           |
|  | 10                | 5  | 7  | 2                  | 1.2            | 11 | 7.5                              | 11 | 0.5                   | −0.5           | −0.5           |
|  | 13                | 6  | 8  | 3                  | 1.8            | 12 | 9.5                              | 12 | 0.5                   | −0.5           | −0.5           |
|  | 13                | 6  | 8  | 3                  | 1.8            | 12 | 9.5                              | 12 | 0.5                   | −0.5           | −0.5           |
|  | 16                | 6  | 9  | 4                  | 2.5            | 16 | 11.3                             | 16 | 4                     | 2              | 5              |
|  | 18                | 7  | 10 | 4                  | 2.5            | 16 | 11.3                             | 16 | 4                     | 2              | 5              |
|  | 21                | 8  | 11 | 5                  | 3              | 21 | 16                               | 21 | 1                     | −3             | 1              |
|  | 24                | 8  | 12 | 5                  | 3              | 21 | 16                               | 21 | 1                     | −3             | 1              |
|  | 27                | 9  | 13 | 5                  | 3              | 21 | 16                               | 21 | 1                     | −3             | 1              |
|  | 27                | 10 | 13 | 6                  | 3.5            | 25 | 19                               | 25 | 5                     | −2             | —              |
|  | 32                | 10 | 15 | 8                  | 4              | 32 | 23.5                             | 32 | −3                    | −9             | —              |

Note) The ball nut flange faces the fixed side unless otherwise specified.  
If desiring the flange to face the supported side, add symbol G in the end of the Ball Screw model number when placing an order.  
(Example) BIF2505-5RRGO+420LC5-H2KG

# Recommended Shapes of Shaft Ends - Shape J (J1, J2 and J3) (For Support Unit Model BK)

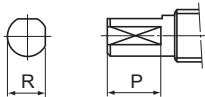


Model BK

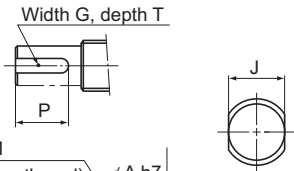
| Support Unit<br>model No.<br><br>Model BK | Ball screw<br>shaft outer<br>diameter<br><br>d | Shaft outer<br>diameter of<br>the bearing<br><br>A | B  | E  | F  | Metric screw thread |
|-------------------------------------------|------------------------------------------------|----------------------------------------------------|----|----|----|---------------------|
|                                           |                                                |                                                    |    |    |    | M                   |
| BK10                                      | 14                                             | 10                                                 | 8  | 39 | 15 | M10×1               |
| BK10                                      | 15                                             | 10                                                 | 8  | 39 | 15 | M10×1               |
| BK12                                      | 16                                             | 12                                                 | 10 | 39 | 15 | M12×1               |
| BK12                                      | 18                                             | 12                                                 | 10 | 39 | 15 | M12×1               |
| BK15                                      | 20                                             | 15                                                 | 12 | 40 | 20 | M15×1               |
| BK17                                      | 25                                             | 17                                                 | 15 | 53 | 23 | M17×1               |
| BK20                                      | 28                                             | 20                                                 | 17 | 53 | 25 | M20×1               |
| BK20                                      | 30                                             | 20                                                 | 17 | 53 | 25 | M20×1               |
| BK20                                      | 32                                             | 20                                                 | 17 | 53 | 25 | M20×1               |
| BK25                                      | 36                                             | 25                                                 | 20 | 65 | 30 | M25×1.5             |
| BK30                                      | 40                                             | 30                                                 | 25 | 72 | 38 | M30×1.5             |
| BK35                                      | 45                                             | 35                                                 | 30 | 83 | 45 | M35×1.5             |
| BK40                                      | 50                                             | 40                                                 | 35 | 98 | 50 | M40×1.5             |
| BK40                                      | 55                                             | 40                                                 | 35 | 98 | 50 | M40×1.5             |

Note) Support Units are designed to have dimensions so that combinations of models FK and FF, models EK and EF or models BK and BF are used on the same shaft.  
 If desiring the shaft end to be machined at THK, add the shape symbol in the end of the Ball Screw model number.  
 (Example) TS2505+500L-J2K  
 (Shape J2 on the fixed side; shape K on the supported side)  
 For the permissible radial runout of the shaft bearing end face, refer to JIS B 1192 (ISO 3408).

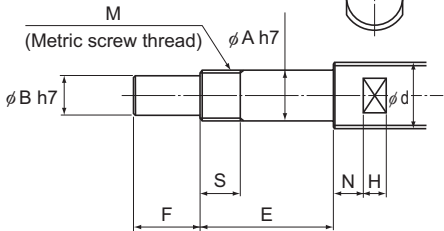
Shape J3



Shape J2



Shape J1

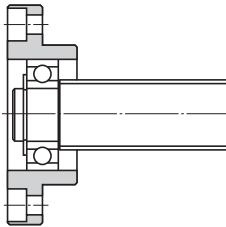


Unit: mm

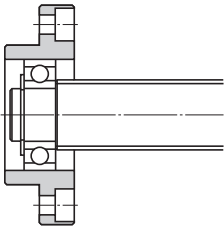
|  |    | Width across flat |    |    | Shape J2<br>Keyway |                |    | Shape J3<br>Cut flat on two side |    |
|--|----|-------------------|----|----|--------------------|----------------|----|----------------------------------|----|
|  | S  | J                 | N  | H  | G<br>N9            | T<br>+0.1<br>0 | P  | R                                | P  |
|  | 16 | 10                | 5  | 7  | 2                  | 1.2            | 11 | 7.5                              | 11 |
|  | 16 | 10                | 5  | 7  | 2                  | 1.2            | 11 | 7.5                              | 11 |
|  | 14 | 13                | 6  | 8  | 3                  | 1.8            | 12 | 9.5                              | 12 |
|  | 14 | 13                | 6  | 8  | 3                  | 1.8            | 12 | 9.5                              | 12 |
|  | 12 | 16                | 6  | 9  | 4                  | 2.5            | 16 | 11.3                             | 16 |
|  | 17 | 18                | 7  | 10 | 5                  | 3              | 21 | 14.3                             | 21 |
|  | 15 | 21                | 8  | 11 | 5                  | 3              | 21 | 16                               | 21 |
|  | 15 | 24                | 8  | 12 | 5                  | 3              | 21 | 16                               | 21 |
|  | 15 | 27                | 9  | 13 | 5                  | 3              | 21 | 16                               | 21 |
|  | 18 | 27                | 10 | 13 | 6                  | 3.5            | 25 | 19                               | 25 |
|  | 25 | 32                | 10 | 15 | 8                  | 4              | 32 | 23.5                             | 32 |
|  | 28 | 36                | 12 | 15 | 8                  | 4              | 40 | 28.5                             | 40 |
|  | 35 | 41                | 14 | 19 | 10                 | 5              | 45 | 33                               | 45 |
|  | 35 | 46                | 14 | 20 | 10                 | 5              | 45 | 33                               | 45 |

Note) The ball nut flange faces the fixed side unless otherwise specified.  
If desiring the flange to face the supported side, add symbol G in the end of the Ball Screw model number when placing an order.  
(Example) BIF2505-5RRGO+420LC5-J2KG

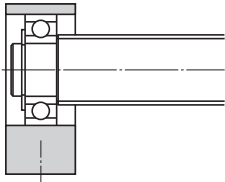
# Recommended Shapes of Shaft Ends - Shape K (For Support Unit Models FF, EF and BF)



Model FF



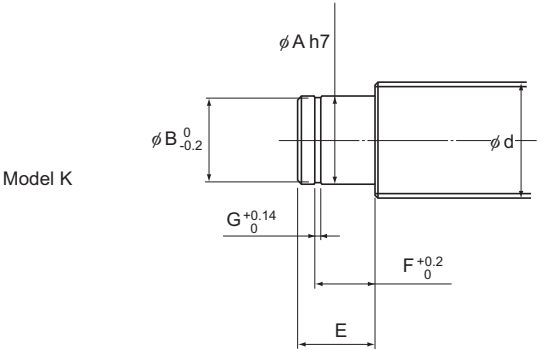
Model FF



Model EF  
Model BF

| Support Unit model No. |          |          | Ball screw shaft<br>outer diameter | Shaft outer diameter<br>of the bearing |
|------------------------|----------|----------|------------------------------------|----------------------------------------|
| Model FF               | Model EF | Model BF |                                    |                                        |
| FF6                    | EF6      | —        | 8                                  | 6                                      |
| —                      | EF8      | —        | 12                                 | 6                                      |
| FF10                   | EF10     | BF10     | 14                                 | 8                                      |
| FF10                   | EF10     | BF10     | 15                                 | 8                                      |
| FF12                   | EF12     | BF12     | 16                                 | 10                                     |
| FF12                   | EF12     | BF12     | 18                                 | 10                                     |
| FF15                   | EF15     | BF15     | 20                                 | 15                                     |
| FF15                   | EF15     | BF15     | 25                                 | 15                                     |
| —                      | —        | BF17 *   |                                    | 17                                     |
| FF20                   | EF20     | BF20 **  | 28                                 | 20                                     |
| FF20                   | EF20     | BF20 **  | 30                                 | 20                                     |
| FF20                   | EF20     | BF20 **  | 32                                 | 20                                     |
| FF25                   | —        | BF25     | 36                                 | 25                                     |
| FF30                   | —        | BF30     | 40                                 | 30                                     |
| —                      | —        | BF35     | 45                                 | 35                                     |
| —                      | —        | BF40     | 50                                 | 40                                     |
| —                      | —        | BF40     | 55                                 | 40                                     |

Note) Support Units are designed to have dimensions so that combinations of models FK and FF, models EK and EF or models BK and BF are used on the same shaft.  
 If desiring the shaft end to be machined at THK, add the shape symbol in the end of the Ball Screw model number.  
 (Example) TS2505+500L-H2K  
 (Shape H2 on the fixed side; shape K on the supported side)  
 For the permissible radial runout of the shaft bearing end face, refer to JIS B 1192 (ISO 3408).



Unit: mm

|  | E       | Snap ring groove |               |      |
|--|---------|------------------|---------------|------|
|  |         | B                | F             | G    |
|  | 9       | 5.7              | 6.8           | 0.8  |
|  | 9       | 5.7              | 6.8           | 0.8  |
|  | 10      | 7.6              | 7.9           | 0.9  |
|  | 10      | 7.6              | 7.9           | 0.9  |
|  | 11      | 9.6              | 9.15          | 1.15 |
|  | 11      | 9.6              | 9.15          | 1.15 |
|  | 13      | 14.3             | 10.15         | 1.15 |
|  | 13      | 14.3             | 10.15         | 1.15 |
|  | 16      | 16.2             | 13.15         | 1.15 |
|  | 19 (16) | 19               | 15.35 (13.35) | 1.35 |
|  | 19 (16) | 19               | 15.35 (13.35) | 1.35 |
|  | 19 (16) | 19               | 15.35 (13.35) | 1.35 |
|  | 20      | 23.9             | 16.35         | 1.35 |
|  | 21      | 28.6             | 17.75         | 1.75 |
|  | 22      | 33               | 18.75         | 1.75 |
|  | 23      | 38               | 19.95         | 1.95 |
|  | 23      | 38               | 19.95         | 1.95 |

Note) \*When model BK17 (shaft end shape: J) is used on the fixed side for a Ball Screw with a shaft outer diameter of 25 mm, the shaft end shape on the supported side is that for model BF17.

\*\*The dimensions in the parentheses in the table above are that of model BF20. They differ from those of models FF20 and EF20. When placing an order, be sure to specify the model number of the Support Unit to be used.