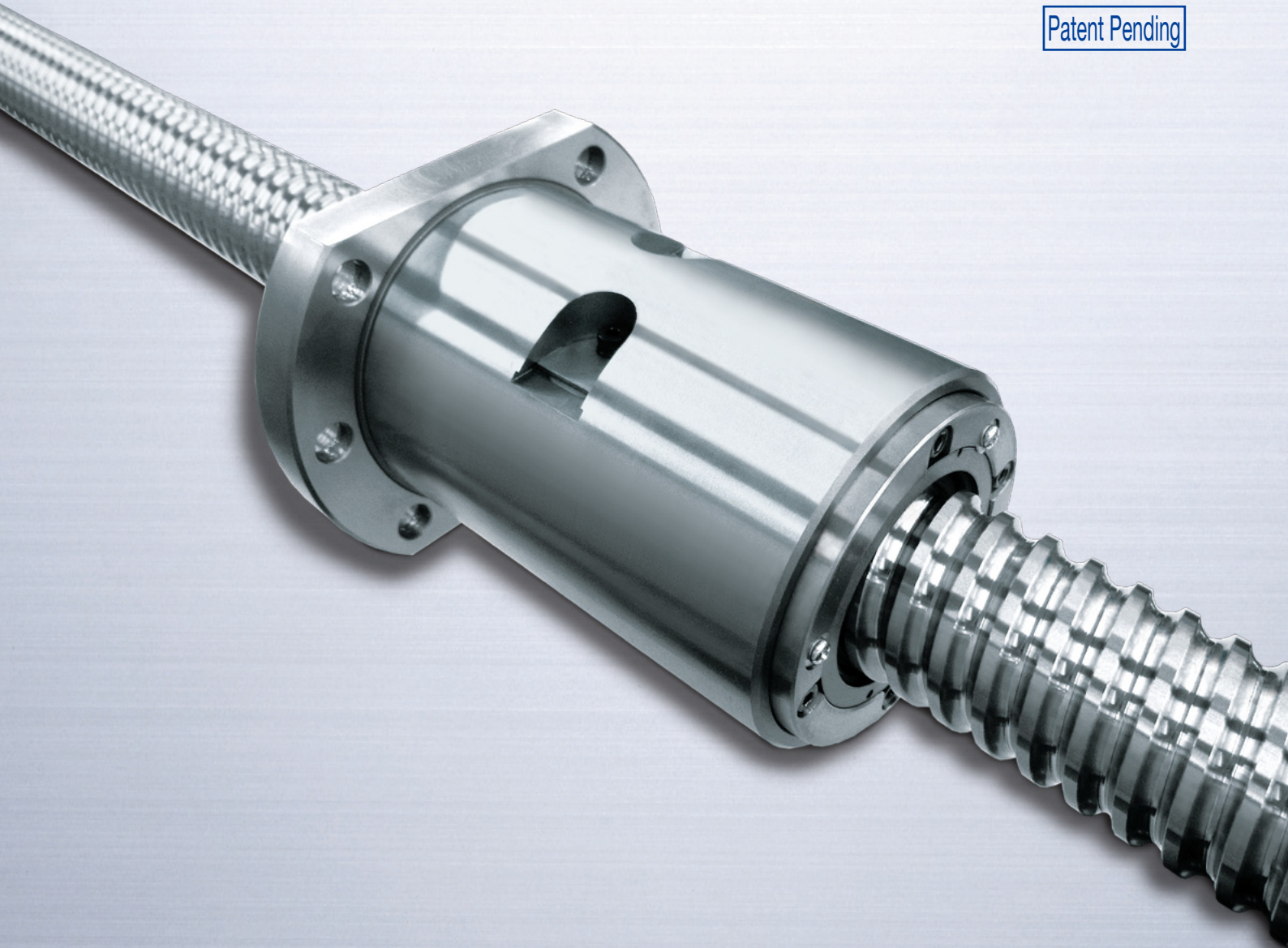


# Ball Screw with X1 Seals for Machine Tool Applications

The newly developed X1 seal combines high dustproof performance with grease retention performance. These improvements contribute to longer service life for machine tools and reduce environmental impact.



Patent Pending



## ■ Features

### 1. Highly dustproof

Particle penetration ratio reduced to less than 1/30 of existing standard seals, thus contributing to longer service life for machine tools.

### 2. Superior grease retention

Lubricant consumption can be reduced and grease splattering suppressed. The function is even more effective with an automatic grease supply system.

### 3. Contact seal with low torque

Low seal torque is achieved by optimizing the seal shape,.

# Ball Screw with X1 Seals for Machine Tool Applications

## Ball screw specifications

### ● Structure

The ball screw with X1 seals has a double seal structure combining a dustproof seal and a grease-retaining seal. It improves both dustproof performance and grease retention performance, and it can reduce lubricant consumption. Moreover, by optimizing the seal shape, heat generation by the seals is reduced.

### ● Scope of application in NSK Ball Screw series

Ball screws for high-speed machine tools HMS series, (Nut model: ZFRC) HMD series, (Nut model: EM)

\*for specifications other than the above, please contact NSK.

### ● Accuracy grade / Axial play

Accuracy grade: C3 and C5 grades of JIS standard Axial play: 0 (Offset preload)

\*for specifications other than the above, please contact NSK.

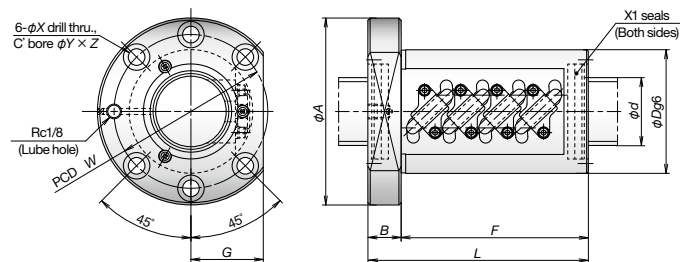
### ● Cautions regarding design

Cut through the thread screw to the end.

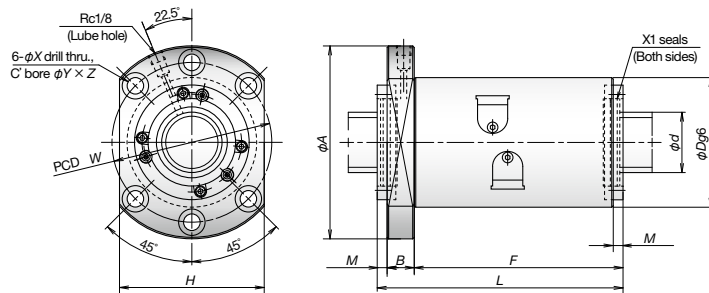
Additional torque by X1 seal is about 15-35 N-cm.

Maximum overall shaft length is 2900 mm.

## Nut Model ZFRC



## Nut Model EM



Nut dimensions of ball screw with X1 seals

Model No.	Shaft dia. $d$	Lead $l$	Basic load rating [kN]		Axial rigidity $K$ [N/ $\mu$ m]	Nut dimensions								Bolt holes			
			Dynamic $C_a$	Static $C_{0a}$		$L$	$F$	$M$	$B$	$D$	$A$	$G$	$H$	$X$	$Y$	$Z$	$W$
ZFRC4010-10	40	10	52.0	137	1 090	173	151	-	22	82	124	47	-	11	17.5	11	102
ZFRC4012-10		12	61.0	155	1 110	197	175	-	22	86	128	48	-	11	17.5	11	106
ZFRC4508-10	45	8	37.3	118	1 160	146	124	-	22	82	124	47	-	11	17.5	11	102
ZFRC5010-10		10	57.7	175	1 320	174	151	-	23	93	135	51	-	11	17.5	11	113
ZFRC5012-10	50	12	77.6	214	1 360	200	177	-	23	100	146	55	-	14	20	13	122
EM4016-4E		16	57.1	130	1 020	172	148	6	18	86	128	-	96	11	17.5	11	106
EM4020-6E	40	20	66.9	165	1 340	164	139	7	18	86	128	-	96	11	17.5	11	106
EM4516-4E		16	59.6	145	1 060	173	148.5	6.5	18	92	134	-	102	11	17.5	11	112
EM4520-6E	45	20	69.1	186	1 470	164	139	7	18	92	134	-	102	11	17.5	11	112
EM5016-4E		16	61.8	160	1 150	173	148.5	6.5	18	98	140	-	107	11	17.5	11	118
EM5020-6E	50	20	73.2	206	1 600	164	139	7	18	98	140	-	107	11	17.5	11	118

Notes: 1. All of the above are right-hand screws.

2. Value shown as rigidity  $K$  is the value when 5% of the basic dynamic load rating  $C_a$  has been applied as the preload.

◆ X1 seals are also available for some BSS series. (Table 1 for minimum nut outside diameter.)

Please contact NSK for details.

Shaft dia. $d$	Minimum $D$
40	70
45	75
50	82

### Handling precautions

Maximum temperature for use: 60 °C (measured at outside diameter of ball nut)

Chemicals that must be avoided: Do not leave ball screw in hexane, thinner, or other organic solvents that remove oil, in white kerosene, or in rust preventive oil that contains white kerosene compounds.

For more information about NSK products, please contact:

[www.nsk.com](http://www.nsk.com)

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