



Patent pending

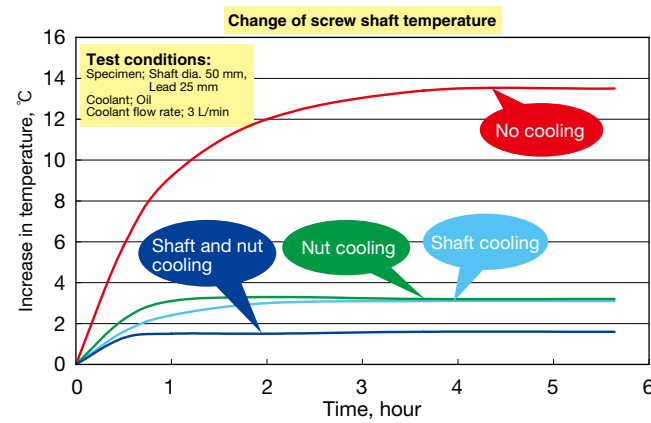
Nut Cooling Ball Screws for High Precision Machine Tools

This new ball screw can simplify ball screw cooling to make machine tools more speedy and precise. Even long ball screws with a hollow shaft that are difficult to cool can be cooled. This product can meet the needs for improved precision for a wide range of machining tools -large and small.



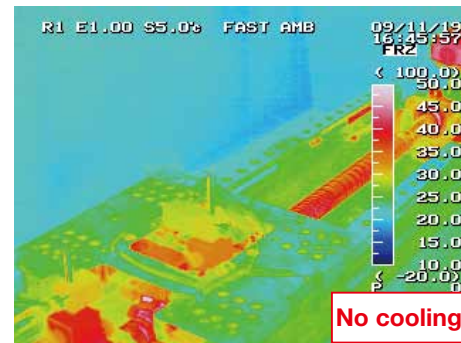
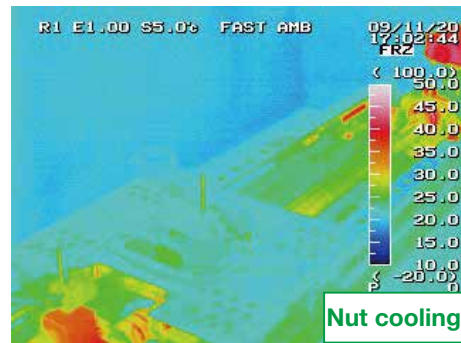
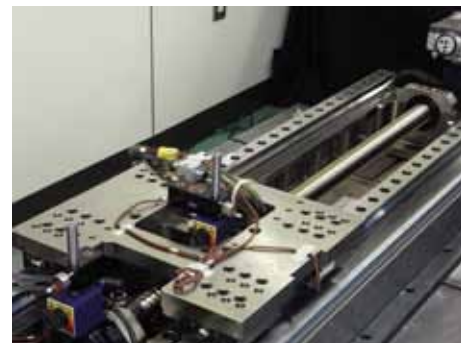
Cooling effects

By optimizing the cooling structure inside the nut, cooling capacity equivalent to hollow shaft cooling has been achieved. The nut in contact with the table is cooled, so that heat conduction from the table to the ball screw is blocked. Moreover, by cooling hollow shaft in parallel, the screw shaft and ball nut can be cooled at the same time for even more precise temperature control.



Internal design in consideration of preload torque change

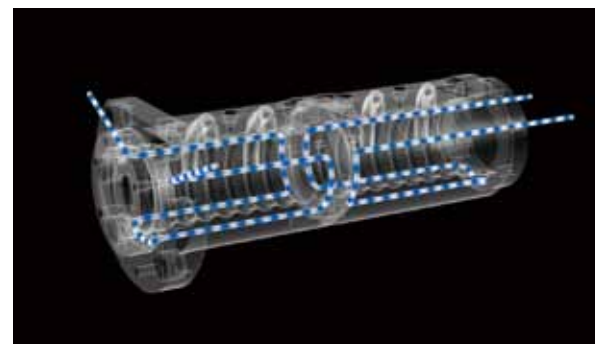
The nut cooling ball screw has double contact-point preload in the tensile direction. This prevents an increase in preload torque when the nut is cooled, enabling effective cooling of the ball screw.



Cooling structure

The cooling fluid goes in a balanced way through the nut. Double nuts have separate coolant routes for each nut for efficient cooling. Cooling fluid does not go through the inside of spacers, so coolant fluid does not leak even when preload drops and airtightness is maintained.

Cooling structure



Improved handling

Ball screws can be cooled by simply attaching piping to the exterior flange part.* Sliding seals and rotary joints that are required for hollow shaft cooling are not needed. Dimensions for mounting area (without nut cooling) are the same as conventional products, so the nut cooling can be implemented without changing machine designs.

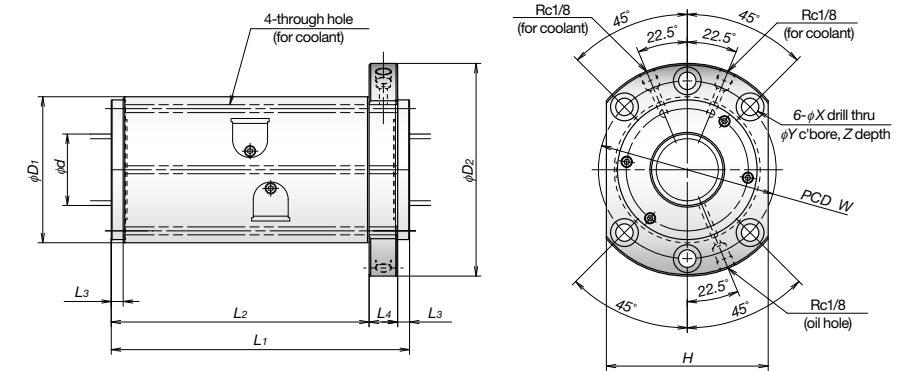
*When cooling double nuts, piping is required on the nut end face on the other side of the flange.

Long ball screws can be cooled at a low cost

Since these products are suitable for long ball screws for which hollow hole processing is difficult, improved precision of large machine tools can be achieved at a low cost.

Nut cooling ball screws: dimension chart

● Single nut cooling ball screws (for HMD series, nut type: EM)



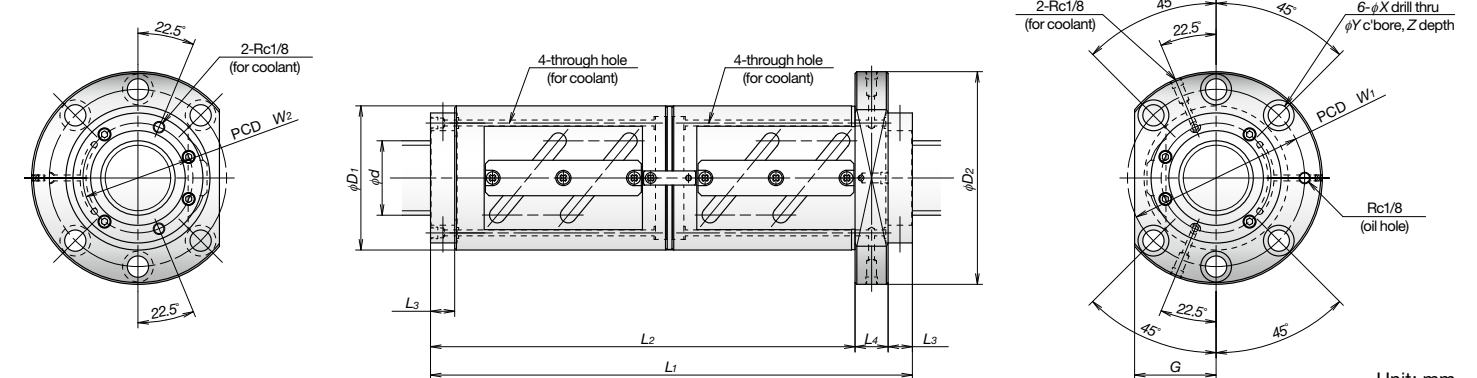
• Option symbols "NC" are included in the assembly part number. (Example : W4012-123ZMNCX-C5Z20)

Applicable dimensions for HMD Series

| Model No. | Shaft dia. d | Lead l | Nut dimensions | | | | | | | | | | |
|-----------|--------------|--------|----------------|----------------|-----|----------------|----------------|----------------|----------------|-----|----|------|------|
| | | | D ₁ | D ₂ | H | L ₁ | L ₂ | L ₃ | L ₄ | W | X | Y | Z |
| EM4016-4E | 40 | 16 | 86 | 128 | 96 | 166 | 140.5 | 7.5 | 18 | 106 | 11 | 17.5 | 11 |
| EM4020-6E | | 20 | | | | 156 | 130.5 | 7.5 | 18 | | | | |
| EM4025-6E | | 25 | | | | 188 | 162.5 | 7.5 | 18 | | | | |
| EM4030-6E | | 30 | | | | 219 | 193.5 | 7.5 | 18 | | | | |
| EM4516-4E | 45 | 16 | 92 | 134 | 102 | 166 | 140.5 | 7.5 | 18 | 112 | 11 | 17.5 | 11 |
| EM4520-6E | | 20 | | | | 156 | 130.5 | 7.5 | 18 | | | | |
| EM4525-6E | | 25 | | | | 188 | 162.5 | 7.5 | 18 | | | | |
| EM5016-4E | 50 | 16 | 98 | 140 | 107 | 166 | 140.5 | 7.5 | 18 | 118 | 11 | 17.5 | 11 |
| EM5020-6E | | 20 | | | | 156 | 130.5 | 7.5 | 18 | | | | |
| EM5025-6E | | 25 | | | | 188 | 162.5 | 7.5 | 18 | | | | |
| EM5030-6E | | 30 | | | | 219 | 193.5 | 7.5 | 18 | | | | |
| EM6316-4E | 63 | 16 | 122 | 180 | 138 | 176 | 139 | 9 | 28 | 150 | 18 | 26 | 17.5 |

Unit: mm

● Double nut cooling ball screws (tube-type nut, nut type: DFT)



Unit: mm

| Model No. | Shaft dia. d | Lead l | Nut dimensions | | | | | | | | | | | |
|-------------|--------------|--------|----------------|----------------|----------------|----------------|----------------|----------------|----|----------------|----|------|------|----------------|
| | | | D ₁ | D ₂ | L ₁ | L ₂ | L ₃ | L ₄ | G | W ₁ | X | Y | Z | W ₂ |
| DFT5010-7.5 | 50 | 10 | 93 | 135 | 303 | 275 | 10 | 18 | 51 | 113 | 11 | 17.5 | 11 | 73 |
| DFT5012-5 | | 12 | 100 | 146 | 279 | 245 | 12 | 22 | 55 | 122 | 14 | 20 | 13 | 78 |
| DFT5016-5 | | 16 | 100 | 146 | 344 | 306 | 16 | 22 | | | | | | |
| DFT5020-3 | | 20 | 100 | 146 | 327 | 279 | 20 | 28 | | | | | | |
| DFT5510-5 | 55 | 10 | 102 | 144 | 243 | 215 | 10 | 18 | 54 | 122 | 11 | 17.5 | 11 | 80 |
| DFT6310-7.5 | 63 | 10 | 108 | 154 | 307 | 275 | 10 | 22 | 58 | 130 | 14 | 20 | 13 | 88 |
| DFT6312-5 | | 12 | 115 | 161 | 279 | 245 | 12 | 22 | 61 | 137 | 14 | 20 | 13 | 91 |
| DFT6316-5 | | 16 | 122 | 180 | 350 | 306 | 16 | 28 | 69 | 150 | 18 | 26 | 17.5 | 93 |
| DFT6320-5 | | 20 | 122 | 180 | 407 | 359 | 20 | 28 | | | | | | |
| DFT8010-5 | 80 | 10 | 130 | 176 | 247 | 215 | 10 | 22 | 66 | 152 | 14 | 20 | 13 | 108 |
| DFT8012-5 | | 12 | 136 | 182 | 279 | 245 | 12 | 22 | 68 | 158 | 14 | 20 | 13 | 110 |
| DFT8016-5 | | 16 | 143 | 204 | 350 | 306 | 16 | 28 | 77 | 172 | 18 | 26 | 17.5 | 112 |
| DFT8020-5 | | 20 | 143 | 204 | 407 | 359 | 20 | 28 | | | | | | |
| DFT10012-5 | 100 | 12 | 160 | 220 | 285 | 245 | 12 | 28 | 82 | 188 | 18 | 26 | 17.5 | 134 |
| DFT10016-5 | | 16 | 170 | 243 | 354 | 306 | 16 | 32 | 91 | 205 | 22 | 32 | 21.5 | 136 |
| DFT10020-5 | | 20 | 170 | 243 | 411 | 359 | 20 | 32 | | | | | | |

• Option symbols "NC" are included in the assembly part number. (Example : W5012-123DNC-C5Z10)

Operating suggestions

If heat impact from the bearing is too great, separate cooling for bearing and surrounding areas is recommended. For details, please contact NSK.

Worldwide Sales Offices

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SINGAPORE P: +65-6496-8000

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TAIPEI ☆ P: +886-2-2509-3305
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TAIWAN NSK TECHNOLOGY CO., LTD.

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BANGKOK P: +66-2320-2555

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HANOI P: +84-4-3955-0159

NSK REPRESENTATIVE OFFICE

HO CHI MINH CITY P: +84-8-3822-7907

Europe

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NSK EUROPE LTD. (EUROPEAN HEADQUARTERS)

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NSK UK LTD.

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NSK CORPORATION

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Mexico:

NSK RODAMIENTOS MEXICANA, S.A. DE C.V.

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NSK CORPORATION

MONTERREY P: +52-81-8000-7300

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