

(No. 209/309M)

LM Guide Actuator

Models KR/SKR

INSTRUCTION MANUAL

V1.02



THK CO., LTD.

Instruction Manual for LM Guide Actuator Models KR/SKR

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1. Introduction

- Thank you for purchasing the LM Guide Actuator model KR or SKR.
- This product is an integrated actuator with an LM Guide and a Ball Screw. It achieves highly rigid, highly accurate actuator functions with minimum space by integrating an LM Guide unit with both sides of the inner block, and a Ball Screw nut with the mid section of the inner block.
- This manual describes the structure of the LM Guide Actuator model KR or SKR (main unit), and the correct methods for handling, installing and maintaining the product.
- Carefully read and understand this manual before using the product, and then correctly handle the product.
- Store this manual after reading it so that it can be referred to at any time.
- Reproduction or duplication of the whole or part of this manual without permission is strictly prohibited.
- Content of this manual is subject to change without notice.
- We have made all possible efforts to make the content of this manual accurate. However, if you find any mistake or uncertainty in this manual, please contact our Sales Division or Sales Engineering Department.
- Drawings in this manual show representative examples, and may differ from your product.
- This manual can be applied to special types KR/SKR units. However, the descriptions defined in the delivery specification drawings or the delivery specification documents of those special types should take precedence over this manual.

■ Warning indications on safety

This manual uses the following warning indications according to safety matters. The descriptions next to warning indications on safety are important messages. Be sure to observe those descriptions.



It indicates that erroneous handling may cause death or serious injury to a person.



It indicates that erroneous handling may cause injury to a person or property damage only.

	It indicates prohibitions (“don’ts”).
	It indicates obligations (“dos”).

■ Identification of warning labels

This product is affixed with warning labels. Identify them when unpacking the product. Different models bear different warning labels. See Table 1 for details. For the position of each label, see Fig. 1.

Table 1 Types of warning labels

Applicable model	Warning label	
	Affixed on side face of the rail	Affixed on housing B
Models KR15, KR20, KR26, KR30H, KR33, KR45H and KR46, and models SKR20, SKR26 SKR33 and SKR46		
Models KR55 and KR65		

Affixed on the side face of the rail (example)	Affixed on housing B (example)	
		
	Without a cover	With a cover

Fig. 1 Position where a warning label is affixed

2. Safety Precautions

This section describes important precautions that you must observe.

Warning

■ General



- While this product is operating or operable, do not enter the working area of any moving part.
Doing so may cause you to touch the moving part and injure you.
- While the motor or sensor is energized, do not move or install this product.
Doing so may cause electric shock, or cause malfunction that could lead to injury.

■ Installation and operation



- If any moving part may fall by its own weight in vertical application or the like, provide a safeguard for preventing the part from falling.
If any moving part falls, it may cause injury or damage.



- While this product is operating, do not touch any moving part or rotating part.
Doing so may cause your hand to be caught and injured.

■ Maintenance



- Turn off the machine (turning off power) before performing maintenance.
Failure to do so may cause electric shock, or cause malfunction that could lead to injury.
- If two or more people are involved in the maintenance work, confirm the procedure, signs and actions to cope with anomalies or the like in advance, and separately appoint a person for monitoring the work.
Failure to do so may cause an unexpected accident.

Caution

■ General



- Do not stand on this product or the packaging box.
Doing so may cause fault and damage, or injure you.
- Do not impact this product.
Doing so may cause fault and damage, or injure you.

Caution



- Do not apply a load that exceeds the permissible level.
Doing so may cause a fault of damage, or abnormal operation that could cause injury.
 - * For the rated load and the permissible moment, see the catalog of model KR or SKR. Also see the appendix, which contains the permissible input torque for each model number. (The permissible moment is calculated from LM Guide out of consideration of bolt strength.)
-



- Do not disassemble or alter this product.
Doing so may cause foreign material to enter the product, which could result in fault or adversely affect the performance or service life, or may cause abnormal operation that could cause injury.

■ Unpacking



- Check whether the delivered product is the product you ordered.
Using a wrong product may cause malfunction that could lead to injury or fault.
- Check whether the product has any fractured part.
Using a fractured product may cause injury or fault.
 - * The packaging box contains an inspection certificate that guarantees the quality of the product. Also read the certificate.
 - * If you find any defect, contact our Sales Division.

■ Transportation



- Do not drop or hit this product.
Doing so may cause injury or fracture, or a functional loss.
 - When transporting this product, do not hold any moving part, the cover or the bellows.
Doing so may cause the product to fall, leading to injury, or cause fault or fracture.
 - When transporting this product, do not hold the motor, the sensor or the cable.
Doing so may cause the product to fall, leading to injury, or cause fault or fracture.
-



- When carrying this product, hold the bottom face of the outer rail. Models KR55 and KR65 are heavy articles (20 kg or more). Two or more people should hold the product as necessary.
Failure to do so may injure you due to a fall of the product, or cause fault or damage to the product.
 - * For the mass of the product, see the catalog of LM Guide Actuator model KR or model SKR.

! Caution

■ Installation and operation



- Firmly secure this product before operating it.
Failure to do so may cause abnormal operation that could cause injury, fault or fracture.
- If anomaly occurs, immediately stop the machine.
Failure to do so may cause abnormal operation that could cause injury, fault or fracture.



- Do not exceed the permissible rotation speed when using the product.
Doing so may cause fault or fracture, or abnormal operation that could lead to injury. Also see the appendix, which contains the permissible rotation speed for each model number.

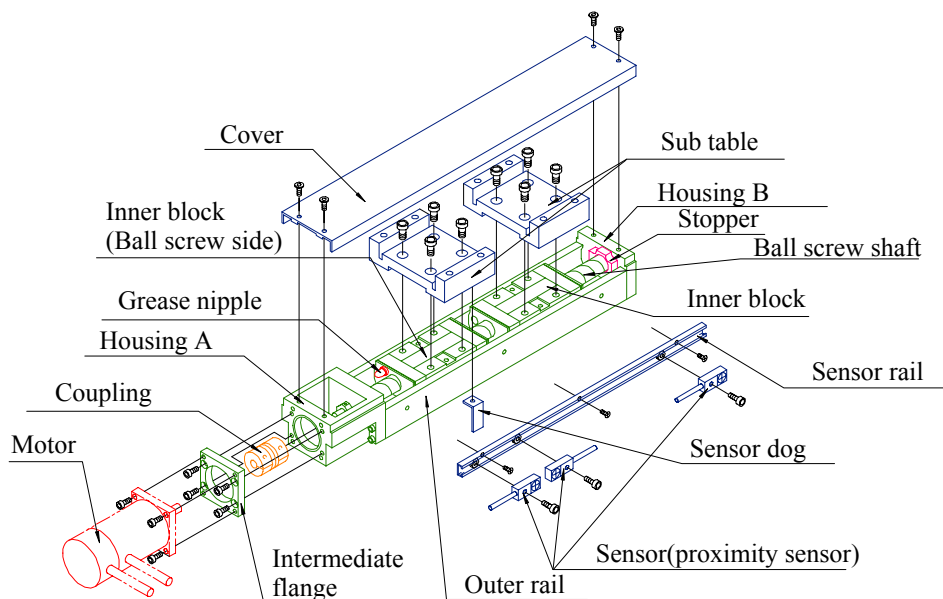
Note: The upper limit of the permissible rotation speed is set at 6000 min^{-1} in the appendix. In terms of the maximum travel speed, this value may differ from that of model KR or SKR in their respective catalogs.

- Do not use the failed and broken product.
Doing so may cause injury or machine failure.

3. Structure and Model Numbers

■ Structure and part names

Fig. 2 shows the structure and part names of this product.



Note: The figure shows a type equipped with a proximity sensor.

Note: Housing A is also attached with a stopper.

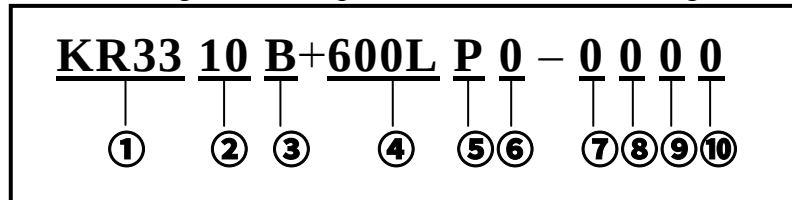
Fig. 2 The structure and part names of the actuator

* For details such as the dimensions, rated load and accuracy, see the delivery specification drawing or the catalog of the LM Guide Actuator model KR or SKR.

If you have any question, contact THK.

■ Model number coding

The following is an example of model number coding.



- | | |
|-----------------------|--------------------------------------|
| ① Model number | ⑥ With/without a motor |
| ② Ball screw lead | ⑦ With/without a cover |
| ③ Type of inner block | ⑧ With/without a sensor and its type |
| ④ Outer rail length | ⑨ Type of housing A |
| ⑤ Accuracy grade | ⑩ Type of an intermediate flange |

* For details, see the catalog of the LM Guide Actuator model KR or SKR.

4. Storage and Transportation

■ Precautions to be observed for safe use

 **Caution**



- Do not drop or hit this product.
Doing so may cause injury or fracture, or a functional loss.
- When transporting this product, do not hold any moving part, the cover or the bellows.
Doing so may cause the product to fall, leading to injury, or cause fault or fracture.
- When transporting this product, do not hold the motor, the sensor or the cable.
Doing so may cause the product to fall, leading to injury, or cause fault or fracture.



- When carrying this product, hold the bottom face of the outer rail. Models KR55 and KR65 are heavy articles (20 kg or more). Two or more people should hold the product as necessary.
Failure to do so may injure you due to a fall of the product, or cause fault or damage to the product.

* For the mass of the product, see the catalog of LM Guide Actuator model KR or model SKR.

■ Precautions to be observed for prevention of product fault or fracture

- 

- Since using an adverse storage environment may cause fault, store the product in the environment described below.
 - Place at ambient temperature within the following storage temperature range
Storage temperature: -20°C to 80°C (no freezing or condensation, main unit of model KR/SKR only)
 - * With model SKR 20 or 26: -10°C to 50°C
(no freezing or condensation, main unit of SKR only)
 - * With the product unpacked
 - Place with non-corrosive gas nor flammable gas
 - Place with little dust, salt or metallic powder
 - Place where water, oil or chemical can not contact the product
 - Place where a vibration or shock does not transmit to the main unit

- This product is provided with antirust treatment and sealed before being packed. When storing the product, enclose it in a package designated by THK and store it in a horizontal orientation while avoiding high temperature, low temperature and high humidity.



- Do not apply an excessive load on the package, since doing so may cause fault or fracture.

5. Installation and Operation

■ Precautions to be observed for safe use

Warning



- If any moving part may fall by its own weight in vertical application or the like, provide a safeguard for preventing the part from falling. If any moving part falls, it may cause injury or damage.



- While this product is operating, do not touch any moving part or rotating part. Doing so may cause your hand to be caught and injured.



- Firmly secure this product before operating it. Failure to do so may cause abnormal operation that could cause injury, fault or fracture.



- If anomaly occurs, immediately stop the machine. Failure to do so may cause abnormal operation that could cause injury, fault or fracture.

Caution



- Do not exceed the permissible rotation speed when using the product. Doing so may cause fault or fracture, or abnormal operation that could lead to injury. Also see the appendix, which contains the permissible rotation speed for each model number.

Note: The upper limit of the permissible rotation speed is set at 6000 min^{-1} in the appendix. In terms of the maximum travel speed, this value may differ from that of model KR or SKR in their respective catalogs.

- Do not use a failed or damaged product. Doing so may cause injury or fracture.

■ Precautions to be observed for prevention of product fault or fracture



- Since using an adverse service environment may cause fault, use the product in the environment described below.
 - Place at the following storage temperature range
Service temperature: 0°C to 40°C (no freezing or condensation)
 - * If you desire to use the product outside of the service temperature range, contact THK.
 - Place with non-corrosive gas nor flammable gas
 - Place with little dust, salt or metallic powder
 - Place where water, oil or chemical can not contact the product
 - Place where a vibration or shock does not transmit to the main unit
- Certain types of coolants may cause trouble to the function of the product. If using the product in an environment where the coolant may enter the inner block, contact THK.
- Prevent foreign material such as dust or metallic powder from entering the product since it may cause abnormal wear or shorten the service life.

If foreign material may enter the product, take a dustproof measure that matches the service atmosphere.

- The mounting surface for this product must be a machined plane or have accuracy equivalent to the machined plane. If the surface is insufficiently accurate, it may adversely affect the performance or the service life. In addition, be sure to mount the product on a sufficiently rigid base.
- Use the product within the stroke range.
Note that the stroke of a type equipped with a bellows is especially short.
* For the specific stroke, see the catalog of the LM Guide Actuator model KR or SKR.
- Take care not to let the inner block of this product, or a part to be mounted on the sub table, interfere with any other part near the stroke end.

Note: In model KR33 equipped with a cover, the top face of the cover-mounting bolt is higher than the top face of the sub table. Take this into account when designing a part to be mounted on the sub table. See Fig. 3.

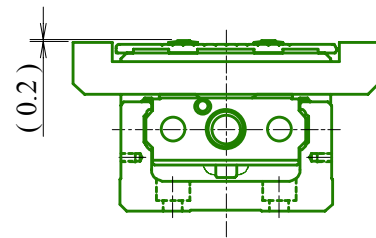
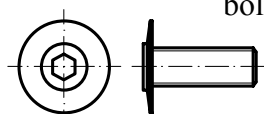


Fig. 3 Cross section of model KR33 equipped with a cover

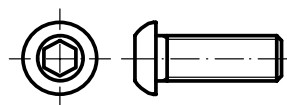
- Use model KR equipped with a standard bellows in a horizontal orientation. For use in other orientations, contact THK.
If the product is used in wall mount or inverted position, the bellows may come off.
- Note that if using a type equipped with a cover in other than horizontal orientation (inverse or wall-mount orientation), a part to be mounted on the sub-table may contact the cover due to deflection of the cover.
* For details, contact THK.
- With a model equipped with a cover, thin head screws are used to mount the cover. When mounting or removing the cover, take care not to damage the head of the screws.

Note: Some models use cross-recessed screws for precision equipment (No. 0, class-1 pan head screw) or hexagon socket button bolts.

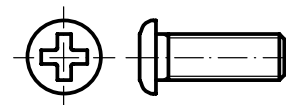
- Model KR15: cross-recessed screw for precision equipment (No. 0, class-1 pan head screw)
- Models KR30H, KR45H, SKR33 and SKR46: hexagon socket button bolt



Outline view of thin-head screw



Outline view of No. 0 class-1 pan head screw



Outline view of hexagon socket button bolt

- Check that there is no tool or bolt in the product before operating it.
-  ● The stoppers attached to both stroke ends of this product are not for positioning. Do not use them for positioning.
- Anti-corrosive oil is applied on the product. Thoroughly wipe off the oil before operating the product. In addition, supply grease after trial run, and then use the product.
The standard models contain the following greases.
 - Model KR15: THK AFF Grease
 - Models KR20/26, models SKR20/26: THK AFA Grease
 - Models KR30H to 65, models SKR33/46: THK AFB-LF Grease

Note: The standard type of model SKR does not have a grease nipple for lubrication. Apply grease directly to the raceway.
-  ● The photomicro sensors do not have a waterproof or dustproof structure. Do not use it in a place where much dust or oil mist is present, or where water, oil or chemical directly or indirectly flies.
For other detail information, see the catalog issued by the sensor manufacturer.
 - * Standard sensors
 - EE-SX671, EE-SX674: OMRON Corp.

■ Other precautions

- If using proximity sensors close to each other, they may interfere with each other. To avoid such mutual interference, consider taking an appropriate measure such as keeping a sufficient distance between the sensors and using sensors of different frequencies.
For details, see the catalog issued by the sensor manufacturer.
It is also possible to attach sensor rails on both sides of the outer rail.
Note: With models KR15/20/26 and models SKR20/26, sensor rails are installed on both sides of the outer rail as standard, depending of the rail length.
- If a stainless steel sensor dog is used when a proximity sensor is used, note that the detection distance is shorter than that of an iron dog.
For details, see the catalog issued by the sensor manufacturer.
 - * The sensor dog of models KR15/20/26 and models SKR20/26 is made of stainless steel.
 - * Standard sensors
 - APM-D3A1-001, APM-D3B1-003 : YAMATAKE Corp.
 - GL-12F, GXL-N12F, GXL-N12FB, GL-N12F, GL-N12FB : SUNX Limited

- For selection and handling of a motor, see the respective catalog/instruction manual issued by the motor manufacturer.

We have data necessary for selecting a motor. Contact THK for details.

- For selection, handling and mounting of a coupling, see the respective catalog issued by the coupling manufacturer.

Check necessary data such as permissible torque, eccentricity, deflection angle and tightening torque of the assembly bolt.

Note: Off-the-shelf couplings may not be used.

For details, see the appendix.

■ Mounting method

For model KR or SKR, use the countersunk holes on the outer rail and secure the actuator on the mounting surface using hexagon socket bolts. See Fig. 4.

Note: To secure the outer rail of model KR15, use M3 hexagon socket button bolts.

Bolts for securing the outer rail

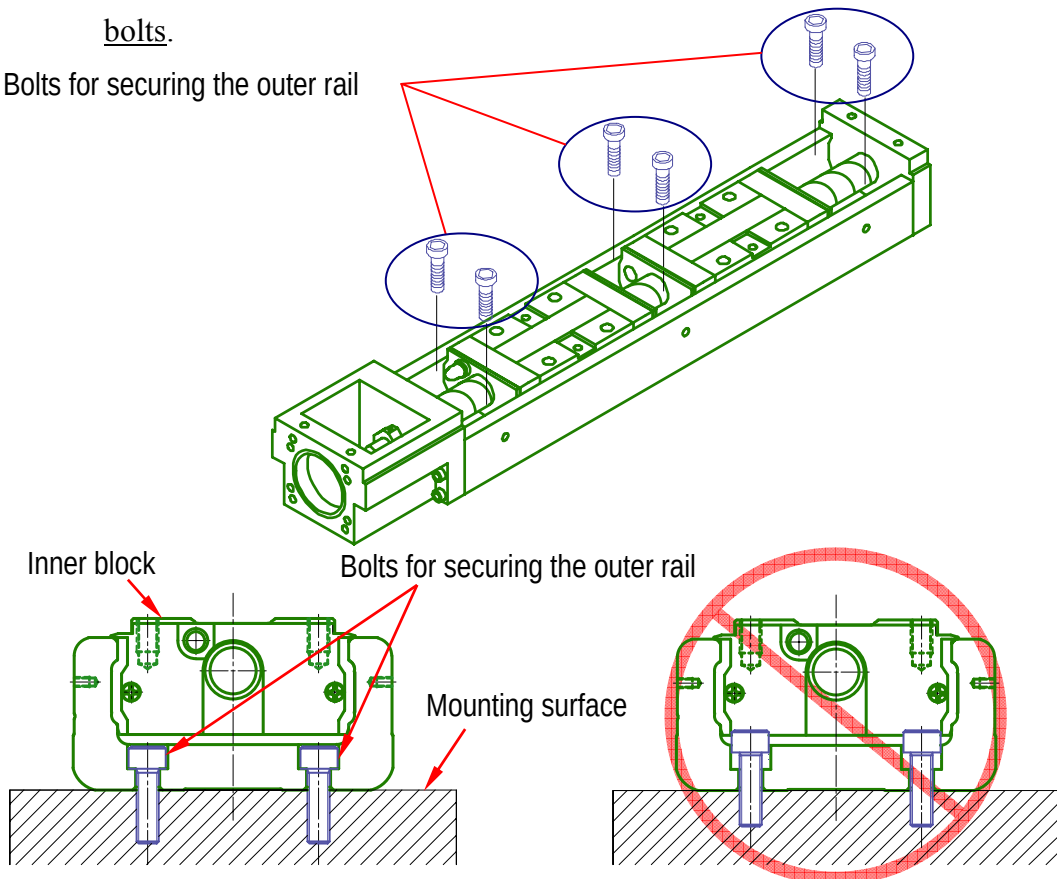


Fig. 4 Drawing for mounting models KR/SKR

Note: Mount the actuator so that the bolts for securing the outer rail do not interfere with the inner block.

6. Maintenance

■ Precautions to be observed for safe use

Warning

-  • Turn off the machine (turning off power) before performing maintenance.
Failure to do so may cause electric shock, or cause malfunction that could lead to injury.
- If two or more people are involved in the maintenance work, confirm the procedure, signs and actions to cope with anomalies or the like in advance, and separately appoint a person for monitoring the work.
Failure to do so may cause an unexpected accident.

Caution

-  • When handling grease, wear protective glasses and protective gloves.
If grease gets into eyes or touch the skin, it may affect your body such as causing inflammation.
-  • Do not apply grease to a flame, a firework or a high-temperature object.
Doing so may ignite the grease, which could cause fire.

* For other information on handling grease, see the precautions indicated on the grease package or catalog. We have Material Safety Data Sheets for THK original greases. Contact THK for details.

■ Precautions to be observed for prevention of product fault or fracture

-  • To have this product fully exerts its functions, it is essential to lubricate the product. Be sure to supply grease on a regular basis.
Using the product with insufficient lubrication may shorten the service life.
- Do not to let foreign material enter the LM Guide or the Ball Screw.
Doing so may cause fault, or could adversely affect the performance or the service life.
-  • Do not mix greases of different types.
Doing so may affect the performance.

■ Daily inspection

- Before operating the product, visually check for any exterior damage or stain.
- Check the grease state (stain, etc.). If the grease is significantly stained, wipe off the grease, and then supply new grease.

*Supply the new grease until it comes out from the inner block.

- Check whether abnormal noise or vibration occurs during operation. If abnormal noise or vibration occurs, immediately stop the machine and inspect the state of the product.

Insufficient lubrication or loosening of a mounting bolt can be a cause of abnormal noise or vibration. Check for insufficient lubrication or loosening of a mounting bolt.

■ Periodical inspection

- Perform more detailed inspection approximately once every 3 to 6 months.
 - Check the lubrication state, and then clean the product and replenish the grease.
 - Inspect whether the mounting bolts have loosened, and if any of them has loosened, retighten it.

■ Lubrication

- The standard models are supplied with the following greases before shipment.
 - Model KR15: THK AFF Grease
 - Models KR20/26, models SKR20/26: THK AFA Grease
 - Models KR30H to 65, models SKR33/46: THK AFB-LF GreaseFor details of these three greases, see the appendix.

- For normal operation, replenish grease approximately every 100 km travel distance or 6 months.

However, note that the greasing interval varies with the service conditions or the service environment. We recommend determining the greasing interval through the initial inspection.

*Model SKR ensures long-term maintenance-free operation due to the ball cage effect. However, we recommend determining the greasing interval through inspection.

- Models KR20 to 33 have a grease nipple PB107, and model KR45H to 65 have a grease nipple A-M6F, as standard.

Model KR15 have a $\phi 2$ mm oil hole.

Fig. 5 shows the shapes of the grease nipples.

Note: The standard type of model SKR does not have a grease nipple for lubrication. Apply grease directly to the raceway.

Models SKR20 to 33 can be attached with PB107, and model SKR46 can be attached with A-M6F. Specify whether you require a grease nipple when placing an order.

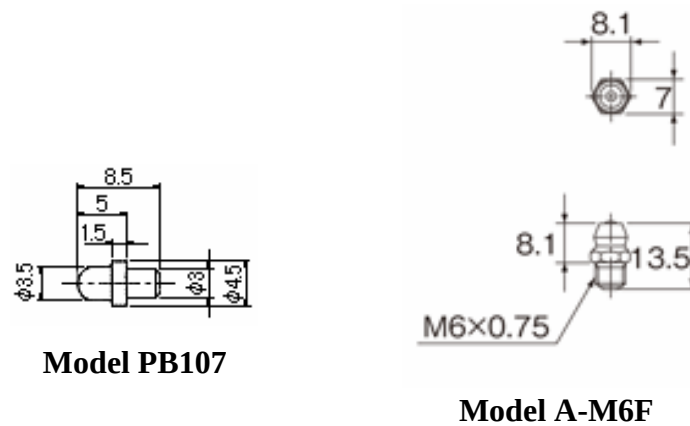


Fig. 5 Shapes of the grease nipples

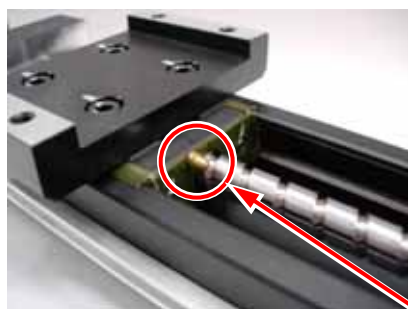
- The appendix introduces the grease gun unit for lubrication for your reference.

■ Method for supplying grease

Fig. 6 shows a representative greasing method for your reference.

Procedure

1. Wipe off the old grease with clean waste cloth or the like.
2. Supply grease using a grease gun as indicated in the figure below. (Move the inner block or the ball screw shaft by hand while supplying grease, to permeate the grease throughout.)
3. Travel the block back and forth throughout.
4. Wipe off the surplus grease.



Supply grease from the grease nipple attached on the end face of the inner block. Mount the nozzle and the attachment (nozzle only depending on the model number) to the grease gun, and then insert the nozzle/attachment into the grease nipple to supply grease.

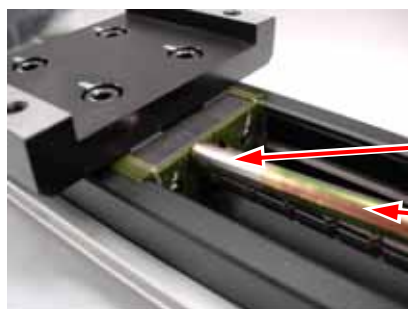


Fig. 6 Method for supplying grease

7. Appendix

■ Permissible input torque

- Table 2 shows the permissible input torque when the product is directly coupled with a motor. If you use a motor that exceeds the permissible input torque, consider taking a necessary measure such as limiting the motor torque.

Table 2 Permissible input torque

Model number	Ball screw lead (mm)	Outer diameter of ball screw shaft end (mm)	Permissible input torque (N·m)
KR15	1	3	0.051
	2		0.103
KR20	1	4	0.207
	6		0.422
KR26	2	5	0.622
	6		0.802
KR30H	6,10	6	1.244
KR33	6,10	6	1.244
KR45H	10,20	10	5.498
KR46	10,20	8	2.707
KR55	20	12	8.57
KR65	25	15	18.14
SKR20	1	4	0.13
	6		0.422
SKR26	2	5	0.435
	6		0.802
SKR33	6	8	2.86
	10,20		3.22
SKR46	10,20	10	5.498

- * The permissible input torque values above (excluding some models) are each calculated from the torsion strength of the ball screw shaft end.
- Models whose permissible input torques are limited by the static permissible load (axial direction) of the support bearing section:
⇒ Models KR15, KR26 (lead: 2 mm), SKR26 (lead: 2 mm) and SKR33 (lead: 6 mm)
 - Models whose permissible input torques are limited by the static permissible load of the Ball Screw:
⇒ Models KR20 (lead: 1 mm) and SKR20 (lead: 1 mm)

Note: The permissible input torque of a type with a wrap-around motor differs from the above table. Contact THK for details.

■ Permissible rotation speed

- Table 3 shows the permissible rotation speed of each of model KR products for your reference.

Table 3 Permissible rotation speed of model KR

Model number	Ball screw lead (mm)	LM rail length (mm)	Permissible rotation speed (min ⁻¹)			
			Long block		Short block	
			Precision grade or higher	Normal/High- accuracy grade	Precision grade or higher	Normal/High- accuracy grade
KR15	1,2	200 or less	6000	6000	-	-
KR20	1	200 or less	6000	6000	-	-
	6		6000	6000	-	-
KR26	2	300 or less	6000	6000	-	-
	6		6000	5900	-	-
KR30H	6,10	150	6000	4700	6000	4700
		200	6000	4700	6000	4700
		300	6000	4700	6000	4700
		400	6000	4700	6000	4700
		500	5900	4700	5300	4700
		600	3950	3950	3600	3600
		700	2820	2820	2610	2610
KR33	6,10	150	6000	4700	6000	4700
		200	6000	4700	6000	4700
		300	6000	4700	6000	4700
		400	6000	4700	6000	4700
		500	5900	4700	5300	4700
		600	3950	3950	3600	3600
		700	2820	2820	2610	2610
KR45H	10	340	4440	3120	4440	3120
		440	4440	3120	4440	3120
		540	4440	3120	4440	3120
		640	4440	3120	4440	3120
		740	4380	3120	3860	3120
		840	-	3120	-	2950
		940	-	2580	-	2330
	20	340	4440	3120	4440	3120
		440	4440	3120	4440	3120
		540	4440	3120	4440	3120
		640	4440	3120	4440	3120
		740	4290	3120	3860	3120
		840	-	3120	-	2950
		940	-	2530	-	2330

Model number	Ball screw lead (mm)	LM rail length (mm)	Permissible rotation speed (min ⁻¹)			
			Long block		Short block	
			Precision grade or higher	Normal/High- accuracy grade	Precision grade or higher	Normal/High- accuracy grade
KR46	10	340	4440	3120	4440	3120
		440	4440	3120	4440	3120
		540	4440	3120	4440	3120
		640	4440	3120	4440	3120
		740	4440	3120	3900	3120
		840	-	3120	-	2980
		940	-	2600	-	2350
	20	340	4440	3120	4440	3120
		440	4440	3120	4440	3120
		540	4440	3120	4440	3120
		640	4440	3120	4440	3120
		740	4340	3120	3900	3120
		840	-	3120	-	2980
		940	-	2550	-	2350
KR55	20	980	3360	2400	-	-
		1080	2720	2400	-	-
		1180	2240	2240	-	-
		1280	-	1880	-	-
		1380	-	1600	-	-
KR65	25	980	2690	1920	-	-
		1180	2690	1920	-	-
		1380	2030	1920	-	-
		1680	-	1330	-	-

Note: The upper limit of the permissible rotation speed is set at 6000 min⁻¹.

* 6000 min⁻¹: The maximum rotation speed of the AC servomotor that is assumed to be used in models KR and SKR.

Note: If using the product at rotation speed exceeding the value in Table 3, contact THK.

- Table 4 shows the permissible rotation speed of each of model SKR products for your reference.

Table 4 Permissible rotation speed of model SKR

Model number	Ball screw	LM rail length (mm)	Permissible rotation speed (min ⁻¹)	
	lead (mm)		Long block	Short block
SKR20	1	200 or less	6000	-
	6		6000	-
SKR26	2	300 or less	6000	-
	6		6000	-
SKR33	6,10	150	6000	
		200	6000	
		300	6000	
		400	6000	
		500	6000	
		600	5520	5030
		700	3930	3640
	20	150	6000	-
		200	6000	-
		300	6000	-
		400	6000	-
		500	6000	-
		600	5340	-
		700	3830	-
SKR46	10	340	6000	
		440	6000	
		540	6000	
		640	6000	5480
		740	4410	4000
		940	2580	2400
	20	340	6000	
		440	6000	
		540	6000	
		640	5960	5320
		740	4300	3900
		940	2535	2350

Note: The upper limit of the permissible rotation speed is set at 6000 min⁻¹.

* 6000 min⁻¹: The maximum rotation speed of the AC servomotor that is assumed to be used in models KR and SKR.

Note: If using the product at rotation speed exceeding the value in Table 4, contact THK.

Note: With model SKR, there is no variation in the permissible rotation speed by accuracy grade.

■ Precautions on the coupling

- If the product is used in combination with any of the motors in Table 5, an off-the-shelf coupling may not be used.

If you consider applying any of the combinations in Table 5, contact THK.

Table 5 Combination of models KR and SKR with couplings

		Motor model number			
KR15	YASKAWA ELECTRIC	SGMM-A1 SGMM-A2	KR45H	YASKAWA ELECTRIC	SGMAH-A3 SGMAH-A5 SGMAH-01 SGMPH-01
	Mitsubishi Electric	HC-AQ013 HC-AQ023		Matsushita Electric	MSMA3A MSMA5A MSMA01 MQMA01
	ORIENTAL MOTOR	ASC34AK ASC36AK PMU33/35			
KR26 SKR26	YASKAWA ELECTRIC	SGMM-A1 SGMM-A2 SGMM-A3	KR46	YASKAWA ELECTRIC	SGMAH-A3 SGMAH-A5 SGMAH-01
	Matsushita Electric	MSMA3A MSMA5A			MSMA3A MSMA5A MSMA01
	Mitsubishi Electric	HC-AQ013 HC-AQ023 HC-AQ033		Mitsubishi Electric	HC-MFS053 HC-KFS053 HC-MFS13 HC-KFS13
	ORIENTAL MOTOR	ASC34AK ASC36AK AS46,ASC46 PMU33/35			
			SKR46	YASKAWA ELECTRIC	SGMAH-A3 SGMAH-A5 SGMAH-01 SGMPH-01
					MSMA3A MSMA5A MSMA01 MQMA01
				Mitsubishi Electric	HC-MFS053 HC-KFS053 HC-MFS13 HC-KFS13

■ Introduction to the greases contained in the standard models

AFA Grease

It is high-class grease with a long service life using a urea-based consistency enhancer with high-class synthetic oil as the base oil.

- Characteristics

- Unlike ordinary metal soap based grease, it excels in antioxidation stability and can be used for a long period.
- Grease unsusceptible to entrance of water.
- Grease that does not easily soften even if used for a long period.

- Representative properties

Test item		Representative property values
Worked penetration (25°C, 60 W)		285
Dropping point: °C		261
Copper plate corrosion (100°C, 24 h)		Accepted
Evaporation: mass% (99°C, 22 h)		0.2
Oil separation rate: mass% (100°C, 24 h)		0.5
Antioxidation stability: kPa (99°C, 100 h)		80
Mixing stability (100,000 W)		329
Resistance to removal of grease during the water rinse: mass% (38°C, 1 h)		0.6
Low temperature torque: mN·m (-20°C)	Startup	170
	Rotation	70
Anticorrosive test (52°C, 48 h)		Accepted
Service temperature range (°C)		-45 to +160



Fig. 7 Appearance of the grease tube and the product box

AFB-LF Grease

It is universal grease using a lithium-based consistency enhancer with refined mineral oil as the base oil.

- Characteristics

- Excels in abrasion resistance and extreme pressure resistance in comparison to off-the-shelf universal lithium-based grease due to the action of a special additive.
- Not easily softens and excels in mechanical stability even if used for a long period.
- Unsusceptible to influences of water such as softening in case of water entrance and decrease in extreme pressure resistance.

- Representative properties

Test item	Representative property values
Worked penetration (25°C, 60 W)	275
Dropping point: °C	193
Copper plate corrosion (100°C, 24 h)	Accepted
Evaporation: mass% (99°C, 22 h)	0.36
Oil separation rate: mass% (100°C, 24 h)	0.6
Antioxidation stability: kPa (99°C, 100 h)	15
Mixing stability (100,000 W)	345
Timken load capacity: kg	20.4
Resistance to removal of grease during the water rinse: mass% (38°C, 1 h)	1.8
Anticorrosive test (52°C, 48 h)	Accepted
Service temperature range (°C)	-15 to +100



Fig. 8 Appearance of the grease tube and the product box

AFF Grease

Using high-class synthetic oil and lithium-based consistency enhancer and additive, this grease has a stable rolling resistance that has not been achieved with conventional vacuum grease or low particle-generative grease.

- Characteristics

- Excels in conformability at low speed operation with a small fluctuation in rolling resistance due to a low viscose resistance.
- Optimal for use in a clean room due to excellently low particle-generative characteristics.
- Allows the greasing interval to be extended due to excellent wear resistance in micro vibrations.

- Representative properties

Test item		Representative property values
Worked penetration (25°C, 60 W)		315
Dropping point: °C		216
Copper plate corrosion (100°C, 24 h)		Accepted
Evaporation: mass% (99°C, 22 h)		0.43
Oil separation rate: mass% (100°C, 24 h)		2.6
Antioxidation stability: kPa (99°C, 100 h)		39
Dirt: pieces/cm ³	25 µm or larger	0
	75 µm or larger	0
	125 µm or larger	0
Mixing stability (100,000 W)		329
Low temperature torque: mN•m (-20°C)	Startup	220
	Rotation	40
Apparent viscosity: Pa•s (-10°C, 10s ⁻¹)		340
Timken load capacity: kg		5.44
4-ball test (fusion load): N		3089
Fretting resistance: mg		3.8
Service temperature range (°C)		-40 to 120



Fig. 9 Appearance of the grease tube and the product box

■ Introduction to the grease gun unit

Grease gun unit MG70



The grease gun unit MG70 is capable of supplying grease for models KR15 to KR65 by replacing dedicated nozzles. The grease gun has a slit window that allows you to visually check the remaining amount of grease. Since grease is contained in a 70 g bellows cartridge, you can replace the nozzle without soiling your hand.

Table 6 shows the specifications of the grease gun while Fig. 10 shows its appearance.

Table 6 Specifications of the grease gun

Discharge pressure	20 MPa max
Discharge rate	0.6 cm ³ /stroke
Grease	70 g bellows cartridge
Overall length	235 mm (excluding nozzle)
Mass	480 g (with nozzle, excluding grease)

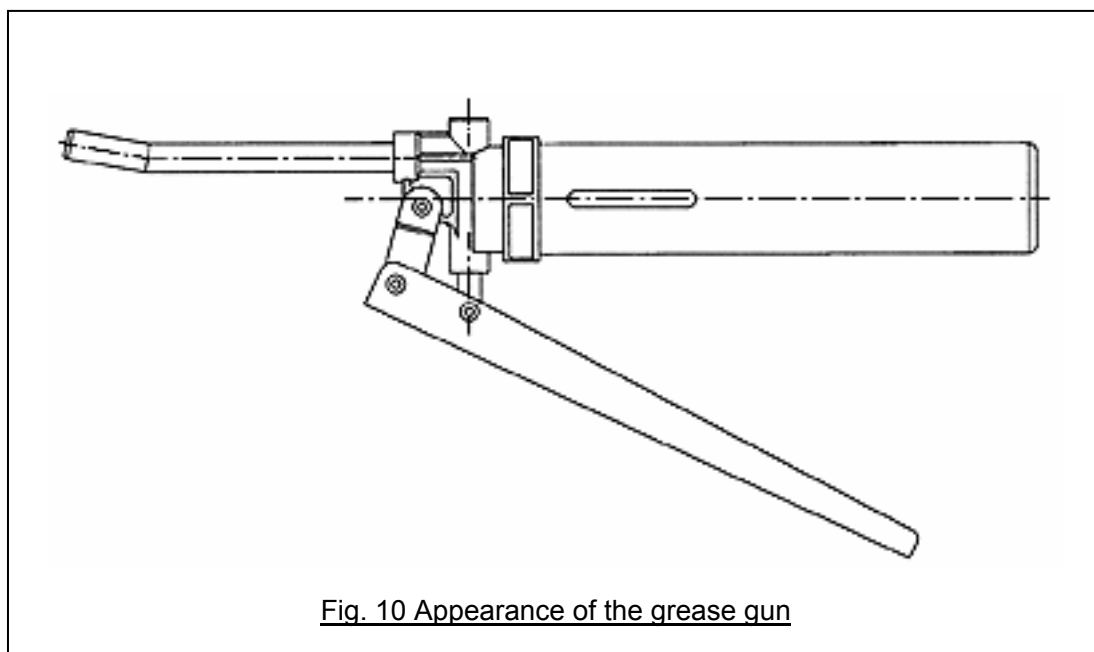


Fig. 11 shows the shapes or the nozzles and attachment for the grease gun used to lubricate model KR.

- Attaching the attachment type N to the dedicated nozzle type U allows you to lubricate models KR20 to 33.
- Attaching type H allows you to lubricate models KR45H to 65.
- Attaching the attachment type P to the dedicated nozzle type U allows you to lubricate model KR15. It also allows you to supply grease to a part difficult to lubricate (by dropping grease onto the raceway).

