



THK Electrical Actuator Universal Series

TH

INSTRUCTION MANUAL

No.345M ver 2.00 E

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1. Introduction

1-1

Acknowledgment

Thank you for purchasing Universal Series TH.

This product is an actuator using an aluminum base and is available in abundant variations.

We hope our creative inventions and unique technologies contribute to your further prosperity.

1-2

About this manual

1-2-1

Intended audience

The person in charge of designing embedded systems of the product and installing, wiring, and maintaining the product, and the person who actually uses the product.

1-2-2

Using this manual

This manual describes correct handling methods and precautions for the product.

For the maximum performance and long life of the product, carefully read and understand this manual to safely and correctly use the product.

If you use the printed version of this manual, be sure to keep it where the intended audience can refer to it when needed.

1-2-3

Notice and attention

- Do not use or handle the product in the ways that are not described in this manual.
- Do not reproduce, reprint, or lend the whole contents or a part of this manual without permission.
- Please note that description in this manual is subject to change without prior notice in the future, due to improvements of the product or other reasons.
- 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 THK Customer Support.
- Drawings show representative examples, and may differ from your product.
- Note that THK shall not be liable for any result incurred by applying this manual, regardless of the reason.
- This manual can be applied to custom products. However, the descriptions defined in the delivery specification drawings or the delivery specification documents of those custom products should take precedence over this manual.

* Custom products represent the products that have different materials and specifications from those of the standard products on catalogs.

1-3 How to use this product

- This product cannot be used for the devices or systems that are used under the situations that can affect human life.
- If you consider using this product for special applications such as passenger movement vehicle, medical, aerospace, nuclear power, and electric power devices or systems, be sure to consult with THK in advance.
- This product is manufactured under the strict quality control, however, that does not mean that the product is free from failure.
- For applications to the equipment that may suffer serious accidents or loss from the failure of this product, install safety devices or backup devices that prevent such serious accidents or loss.

1-4 About product support

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 and Customer Support, or IMT Operation Division.

For the following information, please contact THK Customer Support.

- Technical support for this product

1-5 Product and company information

To find the latest product and company information, we recommend you to periodically access our website.

- Website URL: <http://www.thk.com/>
- Technical support website URL: <https://tech.thk.com/>

2. Safety precautions

2-1

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.



Warning “Erroneous handling may cause death or serious injury to a person”



Caution “Erroneous handling may cause injury to a person or property damage only”



“Prohibitions (don’t)”.



“Obligations (do)”.

2-2

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.**
Otherwise, it 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.**
Otherwise, it may cause electric shocks, 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.
- **Motor wrap types do not have a safety device in case of timing belt breakage. Install a safety device to the equipment for greater safety.**
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.**
Otherwise, it may cause your hand to be caught and injured.

 **Caution****■ Maintenance**

- **Turn off the machine (turning OFF power) before conducting any maintenance.**

Otherwise, it may cause electric shocks, or cause malfunction that could lead to injury.



- **If two or more people are involved in the operation, confirm the procedures such as sequences, signs, and abnormalities in advance, and appoint another person for monitoring the operation.**

Failure to do so may cause an unexpected accident.

**■ General**

- **Do not stand on this product or the packaging box.**

Otherwise, it may cause failures or damage, or cause falling that could lead to injury.

- **Do not impact this product.**

Otherwise, it may cause failures or damage, or injure you.

- **Do not apply a load that exceeds the permissible level.**

Otherwise, it may cause failures or damage, or cause abnormal operation that could lead to injury.

* For your reference, see the Appendix, which contains the static permissible moment and permissible input torque for each model number.



- **Do not disassemble or alter this product.**

Otherwise, it may cause foreign material to enter the product, which could result in fault or adversely affect the performance or service life. It may also cause abnormal operation that could lead to injury.

**■ Unpacking**

- **Be careful not to hit your hands or body against protruded parts.**

Otherwise, it may cause injury, or cause failures or damage of the product.

* Yellow tape is affixed to the product packaging to indicate the mounting locations of protrusions or fragile parts. Handle with care.

- **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 parts.**

Using a fractured product may cause injury or fault.

* The packaging also contains a successful inspection certificate that guarantees product quality. Please verify the contents.

* If you find any defect, contact our Sales Division.



■ Transportation

- **Do not drop or hit this product.**

Otherwise, it may cause injury or fracture, or a functional loss.

- **When transporting this product, do not hold any moving parts, the cover or the bellows.**

Otherwise, it may cause the product to fall, leading to injury, or cause failures or damage of the product.

- **When transporting this product, do not hold the motor, the sensor or the cable.**

Otherwise, it may cause the product to fall, leading to injury, or cause failures or damage of the product.

- **When hoisting this product, use the aluminum base, and avoid applying load to any other parts (side cover, end plate, motor, etc.)**

Note) This hanging work must be carried out only by the qualified personnel wearing the protective equipment such as helmets and safety shoes.

Otherwise, it may cause the product to fall, leading to injury, or cause failures or damage of the product.



■ 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 maximum speed when using the product.**

Otherwise, it may cause failures or damage, or cause abnormal operation that could lead to injury.

For your reference, see the basic specification, which contains the maximum speed for each model number at each stroke.

The pulley rotational speed of the belt driven specification has an upper limit of 1000 min⁻¹.

- **Do not use the failed and broken product.**

Otherwise, it may cause injury or machine failure.

3. Specifications

3-1 Basic specification

The basic specification of TH is shown as follows. Do not exceed the following basic specification when using the product.

Otherwise, it may cause failures or damage, or cause abnormal operation that could lead to injury.

3-1-1 Ball screw drive

Model	Ball screw Lead [mm]	Stroke [mm]	Rated speed [mm/s]	Motor Rated output [W]	Maximum load capacity ^{*1} [kg]			Maximum speed at each stroke ^{*2} [mm/s]							
					Horizontal mount	Wall mount	Vertical mount	Stroke [mm]							
								~790	970	1150	1330	1510	1690	1930	2170
TH20	5	190 to 2170	250	400	100	100	45	250	190	130	100	80	60	50	40
	20		55		55	16	1000	780	570	430	340	270	210	170	
	40		11		11	9	2000	1570	1140	870	680	550	420	340	
	20		1000	750	100	100	32	1000	780	570	430	340	270	210	170
	40		2000		40	40	14	2000	1570	1140	870	680	550	420	340

Model	Ball screw Lead [mm]	Stroke [mm]	Rated speed [mm/s]	Motor Rated output [W]	Maximum load capacity ^{*1} [kg]			Maximum speed at each stroke ^{*2} [mm/s]								
					Horizontal mount	Wall mount	Vertical mount	Stroke [mm]								
								~910	1090	1270	1450	1630	1870	2110	2350	2650
TH25	5	250 to 2650	250	750	120	120	50	250	190	140	110	90	70	50	40	30
	10		120		120	35	310	310	260	200	160	120	100	80	60	
	25		70		70	25	1120	950	720	560	450	350	270	220	170	
	50		25		25	12	2240	1910	1450	1130	900	700	550	450	350	

*1 The value when the acceleration/deceleration rate is 0.3G. Note that for lead 5mm this is the value at 0.15G.

*2 The maximum speed is the value restricted by the motor rotational speed (3000 min⁻¹) or by the permissible rotational speed of the ball screw.

3-1-2 Belt drive

Model	Stroke [mm]	Motor rated output [W]	Reduction ratio	Max. speed [mm/s]	Maximum load capacity (horizontal)[kg]
TH20	140 to 2660	400	1/3	2000	18
			1/5	1200	60
		750	1/3	2000	20

Model	Stroke [mm]	Motor rated output [W]	Reduction ratio	Max. speed [mm/s]	Maximum load capacity (horizontal)[kg]
TH25	230 to 3590	750	1/3	2500	30

4. Structure and Model Numbers

4-1 Structure and part names

Figs.1 and 2 show the structure and part names of this product.

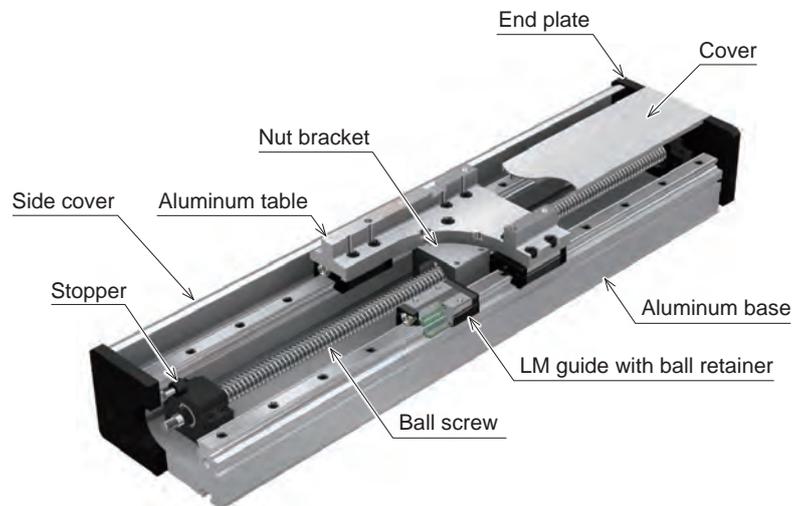


Fig. 1 Structure and part names of actuator (ball screw driven)

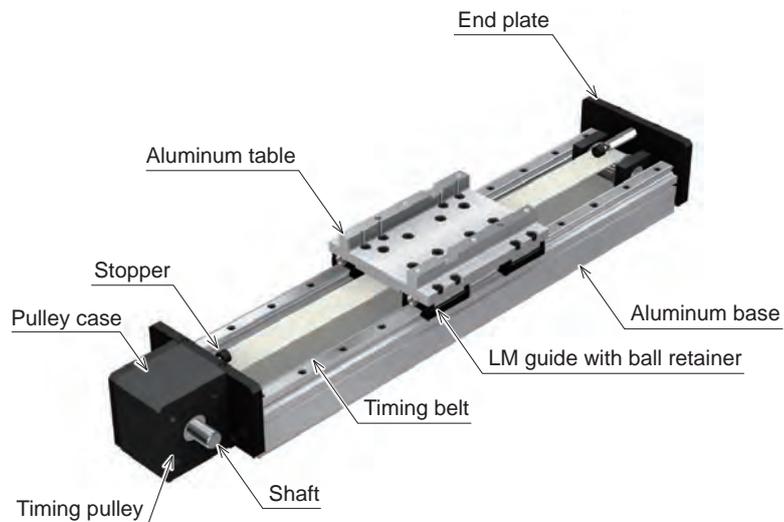


Fig. 2 Structure and part names of actuator (belt driven)

- * For details such as the dimensions and accuracy, see the delivery specification drawings, general catalog of electrical actuators, or electrical actuator site.
If you have any question, contact THK.

4. Structure and Model Numbers

4-2 Model configuration

The following is an example of model number coding for the mechanical parts only.

4-2-1 Ball screw drive

TH20 - 0970 - SW Q - B20 Q R1 G1 - B14 - C - 2 - N
 (1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12)

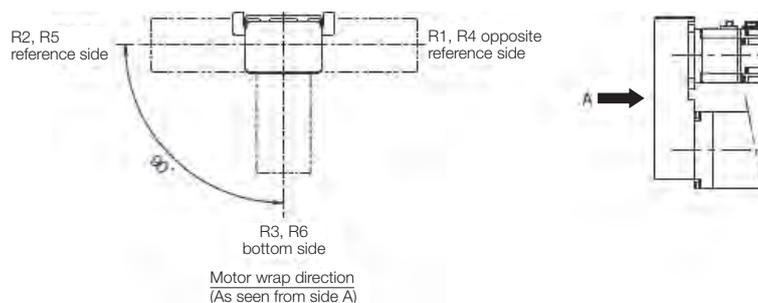
(1) Model number	TH20, TH25
(2) Stroke	0970 : 970mm (190 to 2650 mm)
(3) LM guide model number	SV : SSR-XV SW : SSR-XW HV : SHS-V
(4) LM guide with or without QZ	No symbol : Without QZ Q : With QZ
(5) Ball screw lead	B05 : 5mm ⁻¹ B10 : 10mm ⁻¹ B20 : 20mm ⁻¹ B25 : 25mm ⁻¹ B40 : 40mm ⁻¹ B50 : 50mm ⁻¹ J05 : 5mm ⁻¹ J10 : 10mm ⁻¹
(6) Ball screw with or without QZ	No symbol : Without QZ Q : With QZ
(7) Motor mounting method/ With or without motor	0 : Direct coupling (without motor) R1 : Non-standard side motor wrap ² (without motor) R2 : Reference side motor wrap ² (without motor) R3 : Bottom side motor wrap ² (without motor) 1 : Direct coupling (with motor, to be specified by the customer) R4 : Opposite reference side motor wrap ² (with motor, to be specified by the customer) R5 : Reference side motor wrap ² (with motor, to be specified by the customer) R6 : Bottom side motor wrap ² (with motor, to be specified by the customer)

*1 Ball screw leads you can select differ depending on the model number.

TH20: B05, B20, B40, J05

TH25: B05, B10, B25, B50, J05, J10

*2 Motor wrapping direction



4. Structure and Model Numbers

4. Structure and Model Numbers

(8) Wrapped motor reduction ratio	No symbol	: Direct coupling
	G1	: Wrap 1/1
	G2	: Wrap 2/3
	G3	: Wrap 1/2
(9) End plate/ Motor mounting plate	B	
	D	
	F	
	J	
	B14	
	D11	
	D14	
	D19	
	F11	
	F14	
	J14	
J16		
J19		
(10) Cover/bellows	N	: Without cover
	C	: With cover
	J	: With bellows
(11) Sensor	N	: None
	6	: Photo sensor EE-SX674 3 units (OMRON Corporation)
	H	: Proximity sensor (N.O. contact) GX-F12A 3 units (Panasonic Industrial Devices SUNX Co., Ltd.)
	J	: Proximity sensor (N.O. contact) GX-F12A 1 unit Proximity sensor (N.C. contact) GX-F12B 2 units (Panasonic Industrial Devices SUNX Co., Ltd.)
(12) Cable chain	N	: None
	B	: TKP0180W40R37 (Tsubakimoto Chain Co.)
	C	: TKP0180W40R50 (Tsubakimoto Chain Co.)
	J	: KSH-24L-42 (THK)
	K	: KSH-32WL-60 (THK)
L	: KSH-32WL-110 (THK)	

* For details, see the general catalog of electrical actuators or the electrical actuator site.

4. Structure and Model Numbers

4-2-2

Belt drive

TH20 - 0920 - SW Q - EH - 0 B1 G3 03 - C - 6 - J
 (1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12)

(1) Model number	TH20, TH25	
(2) Stroke	0920	: 920mm (140 to 3590 mm)
(3) LM guide model number	SW HV	: SSR-XW : SHS-V
(4) LM guide with or without QZ	No symbol Q	: Without QZ : With QZ
(5) Driving method	EH	: Belt
(6) With or without motor	0 1	: Without motor : With motor
(7) Motor bracket	N B1 B2	: None
(8) Belt specification speed reducer	No symbol G1 G2 G3 G4 G5 G6 G7 G8	: Without speed reducer
(9) Belt specification reduction ratio	No symbol 03 05 09 15	: Without speed reducer : 1/3 : 1/5 : 1/9 : 1/15
(10) Cover/bellows	N C J	: Without cover : With cover : With bellows
(11) Sensor	N 6 H J	: None : Photo sensor EE-SX674 3 units (OMRON Corporation) : Proximity sensor (N.O. contact) GX-F12A 3 units (Panasonic Industrial Devices SUNX Co., Ltd.) : Proximity sensor (N.O. contact) GX-F12A 1 unit (Panasonic Industrial Devices SUNX Co., Ltd.) : Proximity sensor (N.C. contact) GX-F12B 2 units (Panasonic Industrial Devices SUNX Co., Ltd.)
(12) Cable chain	N B C J K L	: None : TKP0180W40R37 (Tsubakimoto Chain Co.) : TKP0180W40R50 (Tsubakimoto Chain Co.) : KSH-24L-42 (THK) : KSH-32WL-60 (THK) : KSH-32WL-110 (THK)

* For details, see the general catalog of electrical actuators or the electrical actuator site.

5. Storage and Transportation

5-1

Precautions to be observed for safe use

Caution



- **Do not drop or hit this product.**

Otherwise, it may cause injury or fracture, or a functional loss.

- **When transporting this product, do not hold any moving parts, the cover or the bellows.**

Otherwise, it may cause the product to fall, leading to injury, or cause failures or damage of the product.



- **When transporting this product, do not hold the motor, the sensor or the cable.**

Otherwise, it may cause the product to fall, leading to injury, or cause failures or damage of the product.

- **When hoisting this product, use the aluminum base, and avoid applying load to any other parts (side cover, end plate, motor etc.)**

Note) This hanging work must be carried out only by the qualified personnel wearing the protective equipment such as helmets and safety shoes.

Otherwise, it may cause the product to fall, leading to injury, or cause failures or damage of the product.



- **When carrying this product, hold the bottom face of the aluminum base. Most models of this product are heavy articles (20 kg or heavier). Two or more people should hold the product as necessary.**

Otherwise, it may cause the product to fall, leading to injury, or cause failures or damage of the product.

* For more information on the weight of the product, see the general catalog of electrical actuators or the electrical actuator site.

5. Storage and Transportation

5-2

Precautions to be observed for prevention of product failures or damage



- **Since using an adverse storage environment may cause failures, store the product in the environment described below:**
 - Place at ambient temperature within the following storage temperature range
 - Ball screw drive storage temperature: -10°C to 50°C
 - Belt drive storage temperature: 0°C to 50°C(no freezing or condensation, TH main unit only)
 - * With the packaging unopened
 - Place with non-corrosive gas nor flammable gas
 - Place with little dust, salt or metallic powder
 - Location where water, oil or chemical does not come in contact with the product
 - Location 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, otherwise, it may cause failures or damage.**

6. Installation and Operation

6-1

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.**

Otherwise, it may cause your hand to be caught and injured.

Caution



- **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.**

Otherwise, it may cause failures or damage, or cause abnormal operation that could lead to injury.

For your reference, see the specification, which contains the maximum speed for each model number at each stroke.

The pulley rotational speed of the belt driven specification has an upper limit of 1000 min⁻¹.



- **Do not use the failed and broken product.**

Otherwise, it may cause injury or machine failure.

6. Installation and Operation

6-2

Precautions to be observed for prevention of product failures or damage



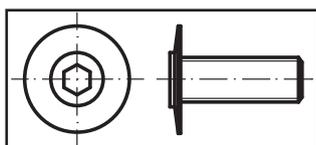
- **Since using in an adverse operating environment may cause failures use the product in the environment described below.**
 - Place at the following operating temperature range
Operating temperature: 0°C to 40°C (ambient humidity 80% RH or less, no freezing or condensation)
 - * If you desire to use the product outside of the operating temperature range, contact THK.
 - Place with non-corrosive gas nor flammable gas
 - Place with little dust, salt or metallic powder
 - Location where water, oil or chemical does not come in contact with the product
 - Location 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 into the product, 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 enters the product, take dust-proof measures that match 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.**
Take care as the stroke is shorter, particularly for types with bellows.
 - * For more information on the stroke, see the general catalog of electrical actuators or the electrical actuator site.



- **Be careful not to let the parts to be mounted on the table of this product interfere with any other parts near the stroke end.**
- **Take care if types with covers are used in any other position than horizontal (upside-down or wall-mounted), as the deflection of the cover may cause it to come in contact with components mounted on the table.**
 - * For details, please contact THK.
- **Use thin head screws for pulley cover installation if using the ball screw driven wrapped motor specification. Take care when mounting or dismounting the pulley cover as the heads of the screws may become scratched. The appearance and tightening torque (standard) are as follows.**



Thin head screw appearance

- * Tightening torque (standard)
 - : 75 N·cm --- Steel bolt (standard specification)
 - : 46 N·cm --- Stainless steel bolt

6. Installation and Operation



- Check that there is no tool or bolt in the product before operating it.
- The stoppers attached to both stroke ends are not for positioning. Do not use them for positioning.



- Anti-rust 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.

In addition, the standard models contain the THK AFB-LF grease.

* Those with Lubricator QZ can be used without greasing.

Grease nipple is not attached for those with QZ

- For the belt driven specification, the belt tension is adjusted before shipment, but may be lowered by the initial elongation of the belt. We recommend that you check the belt tension before use and adjust it appropriately.

Refer to the appendix [Adjusting the Belt Tension].



- The photomicro sensors do not have a waterproof or dust-proof structure. Do not use it in a location 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-SX674: OMRON Corp.

6-3

Other precautions

- If you use 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.

- 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.

* Standard sensors

· GX-F12A, GX-F12B: Panasonic Industrial Devices SUNX Co., Ltd.

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

For data required to select a motor, see the catalog for your reference.

- For handling and mounting of a speed reducer, see the respective catalog and instruction manual issued by the speed reducer manufacturer [Nidec-Shimpo].

- 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.

- For selection and handling of cable chains, see the respective catalog issued by the cable chain manufacturer.

6. Installation and Operation

6-4 Mounting method

For the TH model, use the slots at the bottom of the aluminum base to secure it to the mounting surface from below with the base mounting nuts (attached) and hexagon socket head cap screws. See Fig. 3.

Make sure the screws are attached at equal intervals of roughly 250 to 300 mm.

The number of base mounting nuts is shown in Table 1, and the outline drawing thereof in Figure 5.

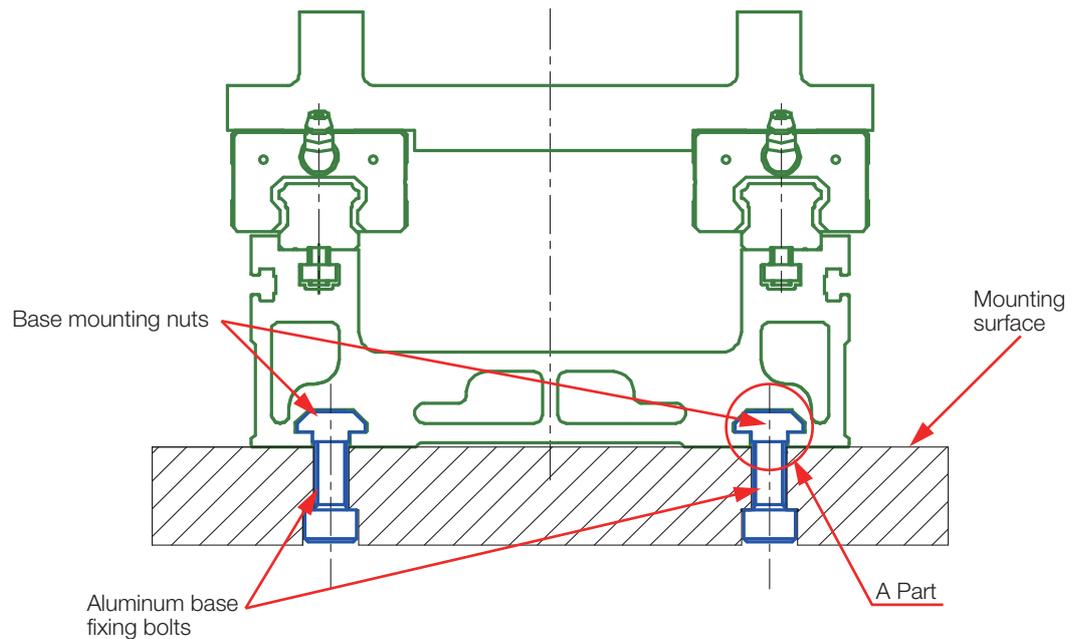


Fig. 3 Mounting drawing for TH

Note) Use the bolt with the most appropriate length. See Fig. 4.

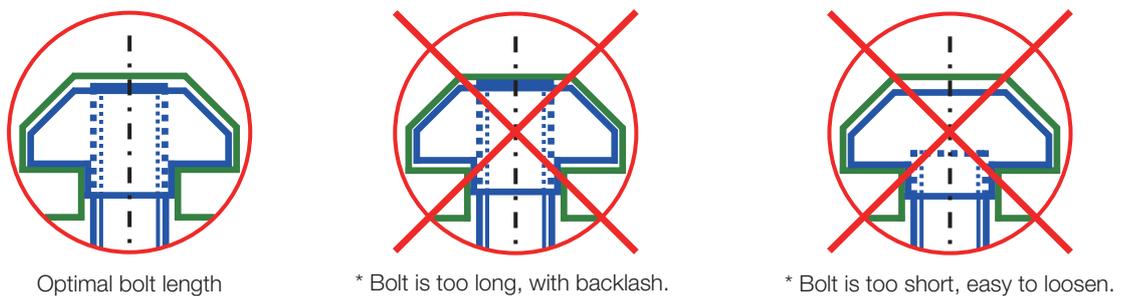


Fig. 4 Detailed Diagram: A Part

6. Installation and Operation

Base length [mm]	~460	~700	~820	~1240	~1420
Qty.	4	6	8	10	12
Base length [mm]	~1780	~2200	~2500	~3000	~3460
Qty.	14	16	18	20	24
Base length [mm]	~3700	~3820	~3940		
Qty.	26	28	30		

Table 1 Number of attached base mounting nuts

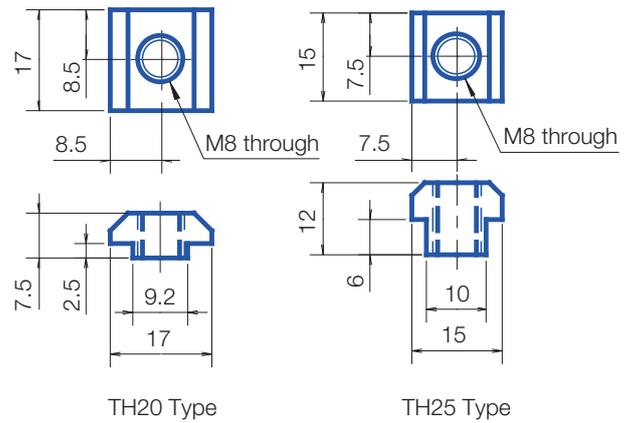


Fig. 5 Outline drawing of base mounting nuts

7. Maintenance

7. Maintenance

7-1

Precautions to be observed for safe use

Warning



- **Turn off the machine (turning OFF power) before performing maintenance.**
Otherwise, it may cause electric shocks, or cause malfunction that could lead to injury.
- **If two or more people are involved in the operation, confirm the procedures such as sequences, signs, and abnormalities in advance, and appoint another person for monitoring the operation**
Failure to do so may cause an unexpected accident.

Caution



- **When handling grease, wear safety goggles 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, firework, or high-temperature object.**
Otherwise, it may ignite the grease, which could cause fire.

* For other information on handling grease, see the precautions indicated on the grease package or catalog. SDS (Safety Data Sheets) for THK original grease are available for download from the THK technical support website. If you have any questions, contact THK.

7-2

Precautions to be observed for prevention of product failures or damage



- **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 let foreign material enter the LM guide or ball screw.**
Otherwise, it may cause failures, or could adversely affect the performance or service life.
- **Be careful not to let foreign material get caught between the gears of the timing belt and pulley.**
Otherwise, it may cause failures, or could adversely affect the performance.



- **Do not mix different types of greases.**
Otherwise, it may affect the performance.

7. Maintenance

7. Maintenance

7-3 Daily inspection

- **Before operating the product, visually check 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, and exhaust the stained grease.)
- **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.**
Check insufficient lubrication or loosening a mounting bolt that can cause abnormal noise or vibration.

7-4 Periodical inspection

- **For the products including timing belts (wrapped motor type/belt drive type), we recommend adjusting the belt tension after about a month of operation.**
 - Initial elongation of the belt may lower the belt tension.
 - **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 or not each mounting bolt is loose, if any of them has loosened, retighten it.
- Inspection of timing belt (for the products using timing belts)
- Adjust the belt tension. (See Appendix)
 - * If you use the product with the belt tension low, it may adversely affect the performance.
 - Check whether the timing belt contacts the flange part of the pulley. If it contacts, adjust the alignment of the pulley.
(See Appendix)
 - * If you continue to use the product with the timing belt contacting the flange part, it may cause a fracture of the flange or abnormal wear of the belt.
 - Visually check abnormal wear, scratch, or crack on the teeth or side of the timing belt.

7. Maintenance

7. Maintenance

7-5

Lubrication

- **The standard models contain THK AFB-LF grease before shipment.**

See the appendix for details of the greases.

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

* See “Method for supplying grease” on page 7-6.

Note that the greasing interval varies with the service conditions or operating environment.

We recommend determining the greasing interval through the initial inspection.

* Note that the greasing interval becomes shorter than usual in case of high-load use or under the environment where oil content decreases.

* The retainer effect of the LM guide allows it to be long-term maintenance free. However, we recommend determining the greasing interval through an initial inspection

* If Lubricator QZ is mounted to the LM guide and ball screw section, the maintenance interval can be further extended.

However, note that the maintenance interval varies with the service conditions or the operating environment.

- **For lubrication, the LM guide and ball screw part have grease nipples as standard.**

* **Excluding those with Lubricator QZ**

Table 2 shows the model numbers of the grease nipples and applicable nozzle types of the grease gun. As well, Fig. 6 shows the shape of the grease nipples.

Model	Greased part, model number	Grease nipple model number		Applicable nozzle type
TH20	LM guide	SSR20	B-M6F	H type nozzle
		SHS20		
	Ball screw	BTK2005V	PB107	Dedicated nozzle U type N type attachment
		BLK2020		
		WTF2040		
	JPF2005	A-MT6×1	H type nozzle	
TH25	LM guide	SSR25	B-M6F	H type nozzle
		SHS25		
	Ball screw	BTK2505V	C-MT6×1	H type nozzle
		DK2510		
		BLK2520		
		BLK2525		
		WTF2550		
		JPF2505	A-MT6×1	H type nozzle
JPF2510				

Table 2 Grease nipple model number and applicable nozzle type

7. Maintenance

7. Maintenance

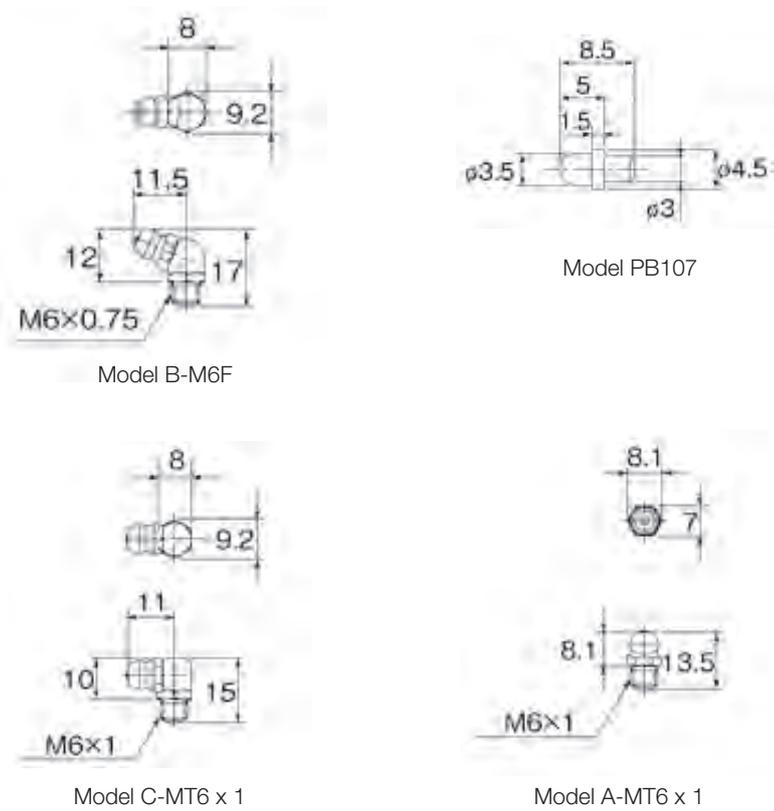


Fig. 6 Shapes of the grease nipples

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

7. Maintenance

7. Maintenance

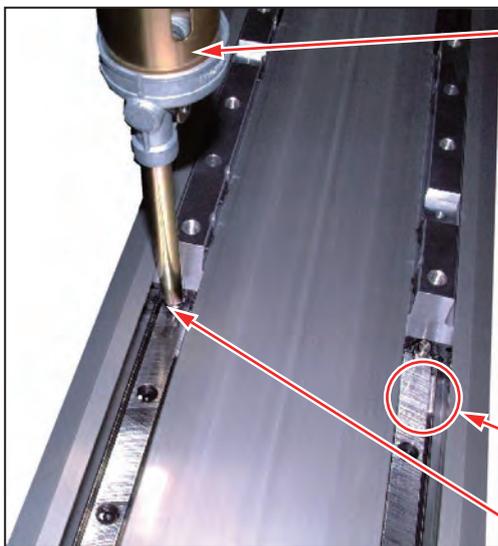
7-6 Method for supplying grease

Fig. 7 shows a representative greasing method for your reference.

Procedure

1. Wipe off the old grease or stains using a cleanwaste cloth.
2. Supply grease using a grease gun as indicated in the figure below: (Move the table or ball screw by hand to permeate the grease throughout.)
3. Carry out pre-conditioning operation to apply the grease throughout.
4. Wipe off grease leaking or accumulating in the corner.

Lubrication of LM Guide



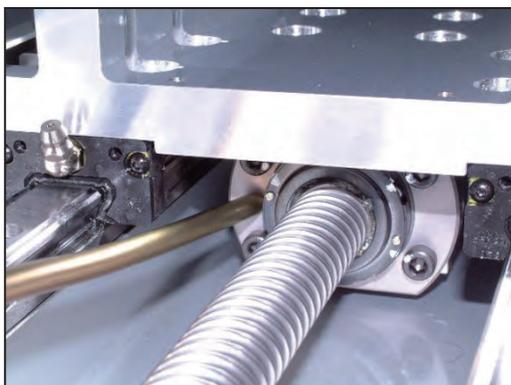
Supply grease from the grease nipple attached on the end face of the LM block. (4 locations)

Mount the H type nozzle to the grease gun, insert it into the nipple, and inject the grease.

Grease nipple

H type nozzle

Ball screw lubrication



TH20



TH25

Supply grease from the grease nipple attached on the ball screw flange. Mount the H type nozzle or N type attachment and U type dedicated nozzle on the grease gun, insert it into the nipple, and inject the grease.

Fig. 7 Method for supplying grease

8. Appendix

8-1

Adjusting the belt tension for the belt drive specification

- The belt tension is adjusted before our shipment, but be sure to inspect it before use. Also, check the belt tension during periodic inspections.
Adjust the tension if it is below the appropriate tension.
* The belt tension set values (standard) are shown in Tables 3 and 4.
- Adjusting the belt tension

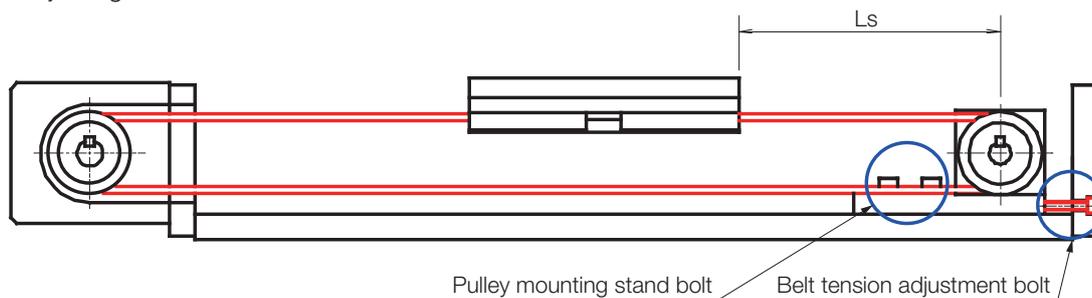


Fig. 8 Belt drive specification schematic

1. Loosen the pulley mounting stand bolts (4 pcs).
2. Bring the belt to the appropriate tension.
Stroke the table so that the value of L_s in Figure 8 is the same as the values shown in Tables 3 and 4.
* Two ways of adjusting the belt tension are shown below.
 - 2-1. Adjusting using a belt tensimeter
Ping the center of the belt with a finger etc., measure the frequency (of vibration), and adjust the belt tension adjustment bolt until appropriate tension is obtained.
Note) Be sure to adjust so that the belt tension in the width direction becomes uniform.
Note) For how to use the belt tensimeter, see the instruction manual of each manufacturer.
Note) Belt used: MA belt, manufactured by NOK
* Belt pitch: 5mm, belt width: 40mm, unit weight: 0.154kg/m

8. Appendix

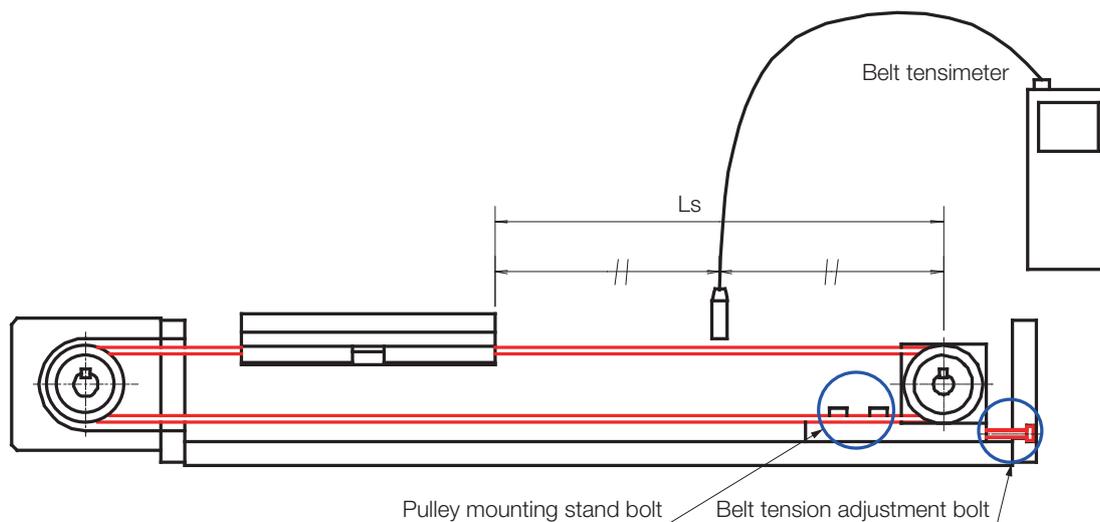


Fig. 9 Adjusting using a belt tensimeter

2-2. Adjusting using pressing force and deflection

- Push the center of the belt with pressing force F , and adjust the belt tension adjustment bolt until appropriate tension is obtained.

* Refer to the next page for the value of pressing force F .

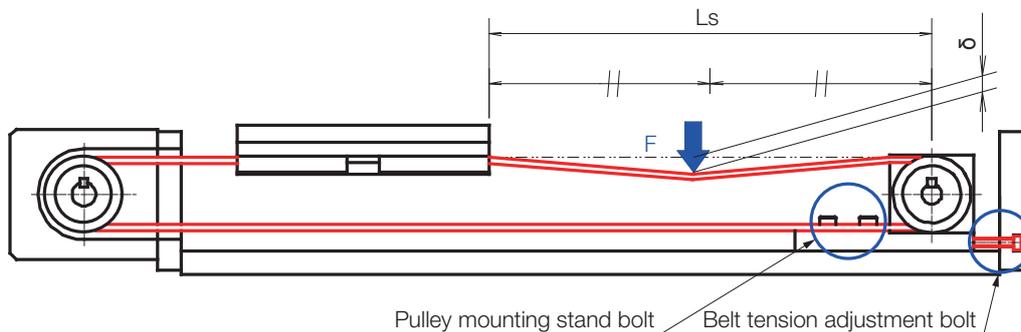


Fig. 10 Adjusting using pressing force and deflection

3. Move the pulley mounting stand to the left and right to adjust the belt to the center of the pulley.

* If adjustment is difficult, loosen the adjustment bolt and adjust the tension while adjusting the belt to the center of the pulley.

4. Tighten the pulley mounting bolts temporarily and slowly stroke the moving part, making sure that the belt and pulley flange do not come into contact. If the belt and pulley flange come into contact, loosen the bolts and move the pulley mounting base to the left and right to adjust the position until there is no contact across the entire stroke.

5. Fully tighten the pulley mounting stand bolts. The tightening torque is as follows.

* Tightening torque: 2480 N·cm --- Steel bolt (standard specification)

1870 N·cm --- Stainless steel bolt

8. Appendix

8. Appendix

- Belt tension set value
 - Adjust the belt tension to **800 N**.
The frequency and deflection are shown in Tables 3 and 4.
 - * The pressing force F should be **50 N** or so.

Base length [mm]	Ls [mm]	Vibration frequency f [Hz]	Deflection δ [mm]
460	164	220.0	2.6
580	284	127.1	4.5
700	404	89.3	6.5
820	524	68.9	8.4
1060	764	47.2	12.2
1240	944	38.2	15.1
1420	1000	36.1	16.0
1600	1000	36.1	16.0
1780	1000	36.1	16.0
1960	1000	36.1	16.0
2200	1000	36.1	16.0
2440	1000	36.1	16.0
2680	1000	36.1	16.0
2980	1000	36.1	16.0

Table 3 TH20 type belt tension set value

Base length [mm]	Ls [mm]	Vibration frequency f [Hz]	Deflection δ [mm]
580	258	139.9	4.1
700	378	95.5	6.0
820	498	72.5	8.0
1060	738	48.9	11.8
1240	918	39.3	14.7
1420	1000	36.1	16.0
1600	1000	36.1	16.0
1780	1000	36.1	16.0
1960	1000	36.1	16.0
2200	1000	36.1	16.0
2440	1000	36.1	16.0
2680	1000	36.1	16.0
2980	1000	36.1	16.0
3280	1000	36.1	16.0
3580	1000	36.1	16.0
3940	1000	36.1	16.0

Table 4 TH25 type belt tension set value

8. Appendix

8. Appendix

8-2 Wrapped motor specification (ball screw drive)

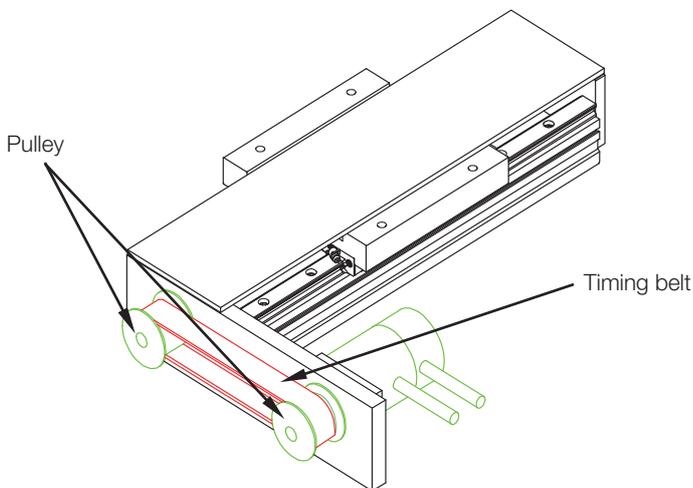


Fig. 11 Wrapped motor schematic (with pulley cover removed)

- Adjust the belt tension of the motor wrap section when installing the motor. Mount the motor so that the deflection of the belt is δ by pushing the center of the belt with pressing force F . (See Fig. 12)

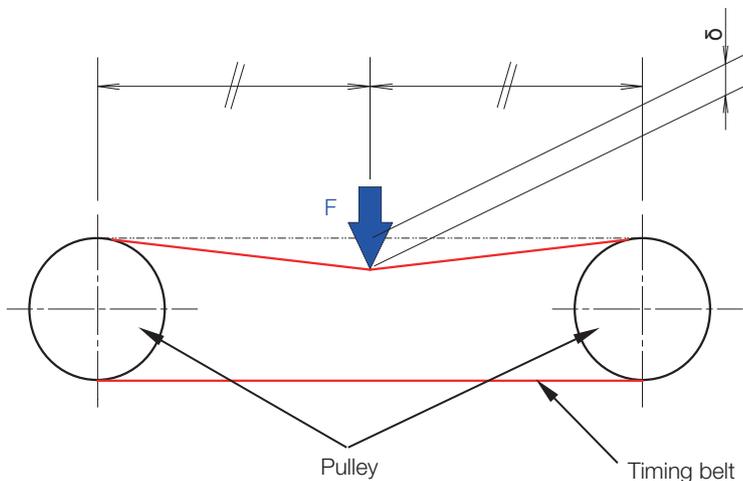


Fig. 12 Adjusting the belt tension in motor wrapping

Motor side wrap Recommended initial tension: 92.1 to 122.5 N Pressing force F : 10.7 to 12.0 N Deflection δ : 2.8 mm	Motor down wrap Recommended initial tension: 92.1 to 122.5 N Pressing force F : 10.7 to 12.0 N Deflection δ : 2.4 mm
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8. Appendix

8. Appendix

8-3 Static permissible moment

- Static permissible moment is shown in Table 5.

Model	TH20	TH25
LM guide model	SHS20V	SHS25V
Static permissible moment [N·m]	Ma:1290 Mb:590 Mc:1180	Ma:2090 Mb:980 Mc:1720

Table 5 Static permissible moment

Note) For LM guide models other than SHS-V, contact THK.

8-4 Permissible input torque

- Tables 6 to 8 show 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.

Permissible input torque [N·m]		Ball screw Lead [mm]		
Motor mounting method	ACC/DEC rate	5	20	40
Direct motor coupled	-	2.4	9.5	9.5
Wrapped motor	1	2.4	9.6	9.6
	2/3	1.6	6.4	6.4
	1/2	1.2	4.8	4.8

Table 6 Permissible input torque for TH20 ball screw drive

Permissible input torque [N·m]		Ball screw Lead [mm]			
Motor mounting method	ACC/DEC rate	5	10	25	50
Direct motor coupled	-	3.5	7	15	15
Wrapped motor	1	3.5	7	15	15
	2/3	2.3	4.7	11	11
	1/2	1.7	3.5	8.3	8.3

Table 7 Permissible input torque for TH25 ball screw drive

Model	Permissible input torque [N·m]
TH20	38.3
TH25	40.5

Table 8 Permissible input torque for belt drive

8. Appendix

8. Appendix

8-5

Introduction of the grease

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

Item	Representative property values	Test method	
Consistency enhancer	Lithium-based grease		
Base oil	Refined mineral oil		
Base oil kinetic viscosity: mm ² /s (40°C)	170	ISO 2137 ISO 2176 ISO 6743 ISO 11009 ISO 12924	
Worked penetration (25°C, 60 W)	275		
Mixing stability (100,000 W)	345		
Dropping point: °C	193		
Evaporation: mass% (99°C, 22 h)	0.4		
Oil separation rate: mass% (100°C, 24 h)	0.6		
Copper plate corrosion (B method, 100°C, 24 h)	Accepted		
Low temperature torque: mN·m (-20°C)	Startup		130
	Rotation		51
4-ball test (fusion load): N	3089		ASTM D2596
Operating temperature range: °C	-15 to 100		
Appearance color	Brownish yellow		



Fig. 13 Appearance of the grease tube and the product box

8-6

Introduction of the grease gun unit

Grease Gun Unit MG70

The grease gun unit MG70 is capable of supplying grease to TH20 and TH25 models by replacing the dedicated nozzle. 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 9 shows the specifications of the grease gun while Fig. 14 shows its appearance.

Discharge pressure	19.6 MPa max
Discharge rate	0.6 cc/stroke
Grease	70 g bellows cartridge
Overall length	235 mm (excluding nozzle)
Weight	480 g (with nozzle, excluding grease)

Table 9 Specifications of the grease gun

8. Appendix

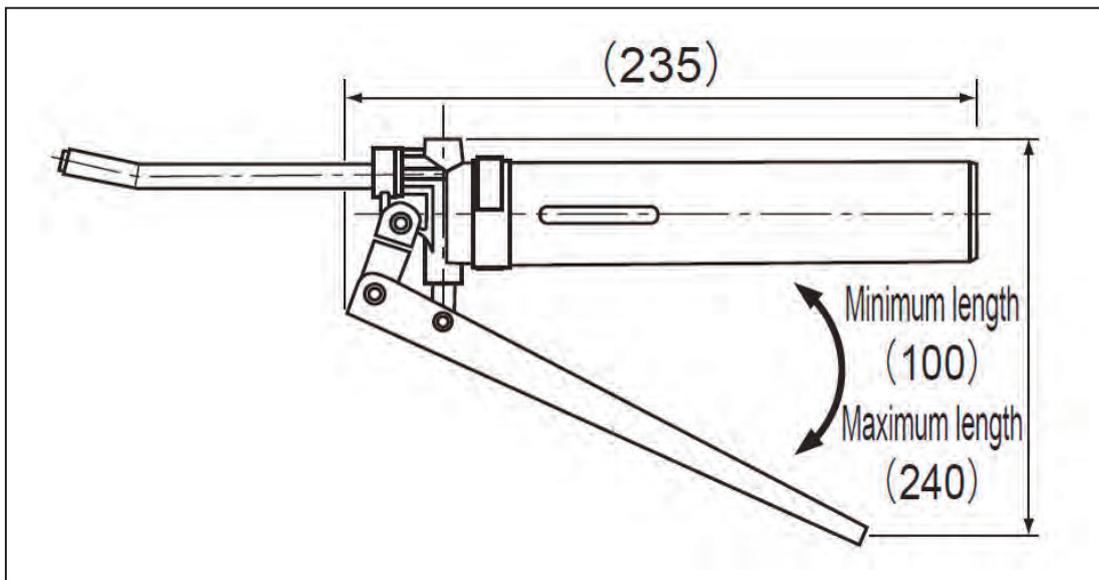


Fig. 14 Appearance of the grease gun

Fig. 15 shows the shapes of the nozzles and attachment for the grease gun used to lubricate TH.

- Attaching the H type allows you to lubricate the LM guide.
 - Attaching the H type or the N type attachment to the U type dedicated nozzle allows you to lubricate the ball screw.
- * Using the P type attachment allows you to supply grease to a part difficult to lubricate (by dropping grease onto the raceway).

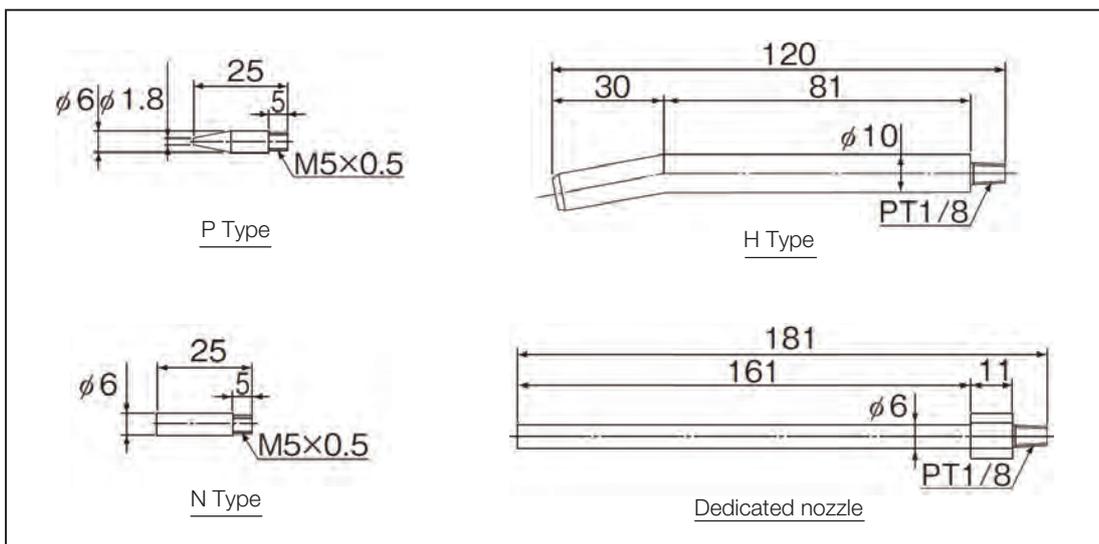


Fig. 15 Shapes of the nozzles and the attachment for the grease gun

Appendix

Revision history

The instruction manual No. is described on the back cover.

Date of issue	Instruction manual No.	Details
June 2017	No.345M ver 1.00 E	First edition
February 2018	No.345M ver 2.00 E	Errors corrected



THK Electric Actuator Universal Series

TH

INSTRUCTION MANUAL