

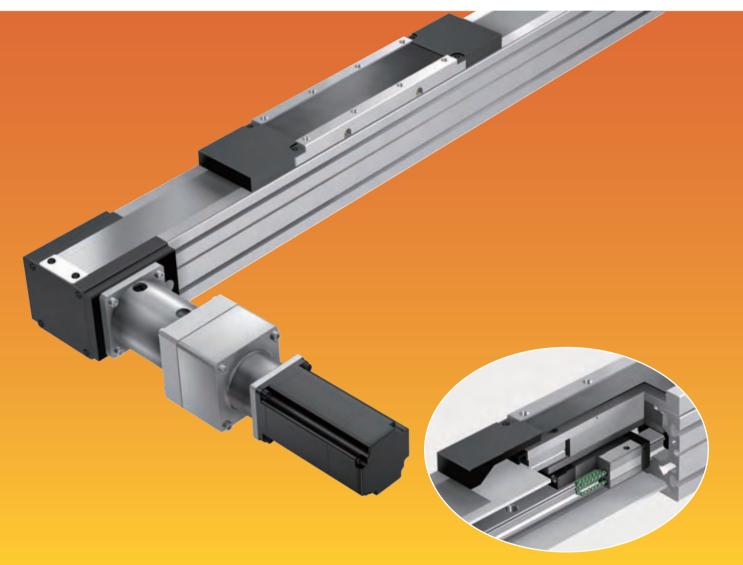




LM Actuator

Optimal for high speed and long stroke Long term maintenance-free operation is actualized Lightweight, compact structure

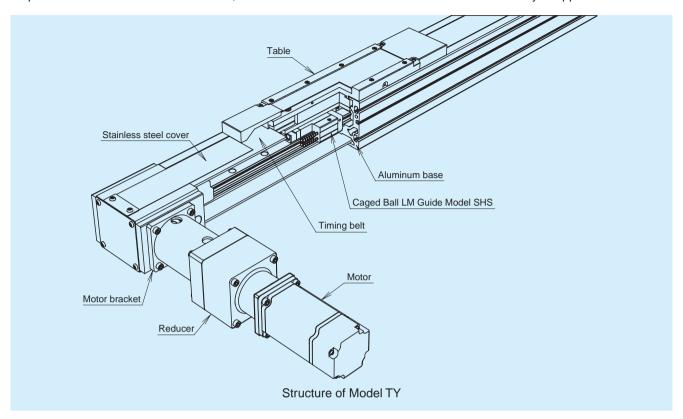




For details, visit THK at www.thk.com
*Product information is updated regularly on the THK website.

Structure of Model TY

This belt drive actuator has a caged ball LM Guide combined with a lightweight and compact aluminum base. Options such as a stainless steel cover, a motor bracket or a sensor make it useful for a variety of applications.



Features of Model TY

1. Optimal for long stroke high speed conveyance

A maximum stroke of 4749 mm* is possible due to the belt drive method.

A maximum travel speed of 3400 mm/s is possible when an AC servomotor (rated rotational speed 3000 min.-1).

Maximum Travel Speed

Unit: mm/s

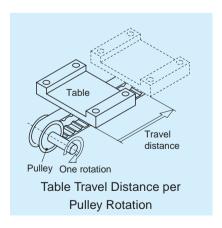
Model no.		TY20		
Reduction ratio	1/3 1/5 1/9			
Maximum travel speed	3400	2000	1100	

Note 1) Please note that when the stroke is short, it may not reach the maximum travel speed. Note 2) The maximum travel speed for actuators with a stainless steel cover is 2500 mm/s.

Table Travel Distance per Pulley Rotation

	Pitch circle diameter of the pulley [mm] Table travel distance per pulley rotation [mm]	Table travel distance per	Table travel distance [mm] per motor rotation				
		Reduction ratio: 1/3	Reduction ratio: 1/5	Reduction ratio: 1/9			
	65.25	205	68.3	41	22.8		

Note) The timing pulley has a large pitch circle diameter, so THK recommends the use of a reducer.



^{*} Stroke between the mechanical stoppers

2. Long service life and long term maintenance-free operation

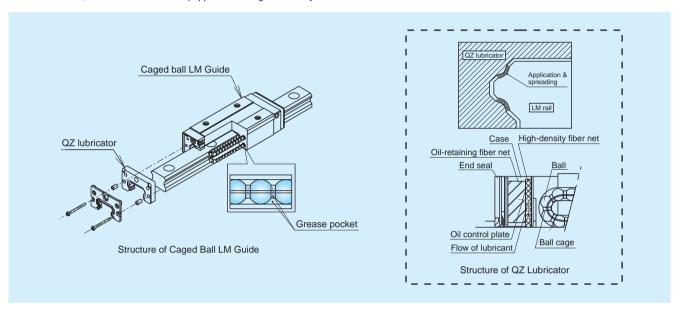
Built-in Caged Ball LM Guide model SHS.

Long service life and long term maintenance-free operation are possible because there is no mutual friction between the balls and grease retention is improved due to the effect of the caged ball.

QZ Lubricator is equipped as standard*.

The QZ Lubricator supplies an optimal amount of lubricant to the raceway of the LM rail, substantially extending maintenance intervals.

* For Model TY, the QZ Lubricator is equipped on a single side only for each LM block.

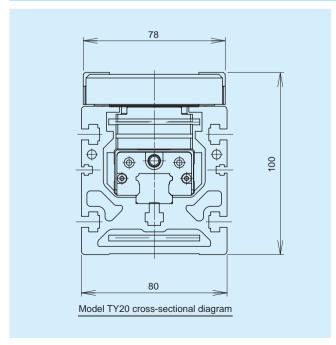


Quality dustproof cover optional*

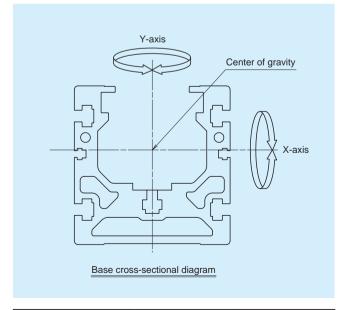
A tightly sealing stainless steel cover prevents foreign matter from entering the actuator.

* Please note that, with a stainless steel cover, maximum base length and maximum travel speed will be restricted. (Maximum base length: 3540 mm; maximum travel speed: 2500 mm/s)

4. Lightweight, compact structure



Lightweight and compact structure using narrow-width aluminum extrusion for base material.



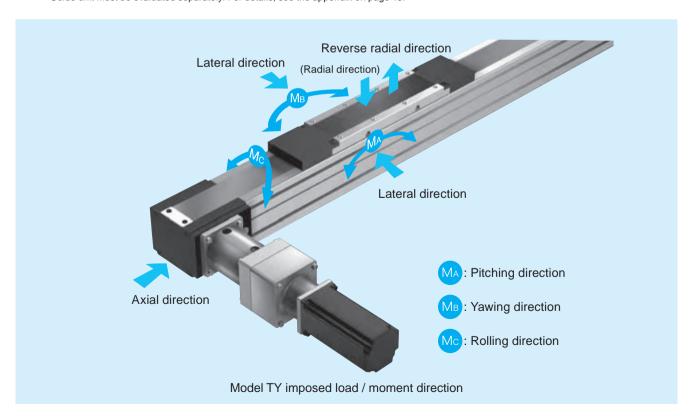
Base geometrical moment of inertia	lx [mm⁴]	1.49 × 10 ⁶	
	ly [mm⁴]	1.94 × 10 ⁶	
Mass [ko	6.65		



Specifications

Mo	del no.		TY20	
Drive	e method		Timing belt drive	
Pitch circle diame	eter of the pulley [mm	1]	65.25	
Positioning rep	eatability Note 1) [mm]		±0.1	
Mechanical	Stroke Note 2) [mm]		549 to 4749 (specifications without a stainless steel cover)	
Model no. fo	or LM Guide use		SHS20V (Two blocks)	
1110 111 17	Basic dynamic I	oad rating C [N]	22300	
LM Guide unit	Basic static loa	ad rating C ₀ [N]	38400	
Reverse radial direction			28700	
	Lateral	direction	9000	
Static Permissible Load Note 3) [N]			1100 (when using a concentric type reducer)	
	Axial d	irection	450 (when using a orthogonal axis type reducer [symbol: D1])	
			900 (when using a orthogonal axis type reducer [symbol: D2])	
	N	1 _A	2000	
Static Permissible Moment Note 4) [N-m]	N	1в	600	
[]	N	1c	500	
Maximum load capacity	Reduction ratio 1/3	Motor ouput 750 W	15	
guideline Note 5) [kg]	Reduction ratio 1/5	Motor ouput 750 W	30	
(horizontal mount)	Reduction ratio 1/9	Motor ouput 400 W	55	

- Note 1) Positioning repeatability is standardized at an ambient temperature of 20°C.
- Note 2) Effective stroke is less than mechanical stroke for stainless steel cover option. Please refer to the dimensions tables for details (page 6).
- Note 3) The static permissible load is determined by either the bolt tightening strength or static rated load of the LM Guide unit. For the axial direction, it is determined by the torsional strength of pulley shaft.
- Note 4) Static permissible moment is the maximum value of the moment that can load on each direction.
- Note 5) Maximum load capacity guideline is the load during rated speed of the motor at the acceleration/deceleration of 0.5G. Also, the travel life of the LM Guide unit must be evaluated separately. For details, see the appendix on page 13.



Model Number Chart

TY20 - 084 - B1 - C - B

(1)

(2)

(3)

(4)

(5)

① Model no. TY20

② Base length e.g.: if it is 840 mm: 084

if it is 1020 mm: 102

3 Motor bracket
N: No motor bracket

For concentric type reducer

B1: Pilot diameter ø50H7, ø5.5, PCD60 B2: Pilot diameter ø70H7, ø6.6, PCD90 **For orthogonal axis type reducer** D1: Pilot diameter ø70H7, M6, PCD90 D2: Pilot diameter ø80H7, M6, PCD100

4 Cover N: No cover

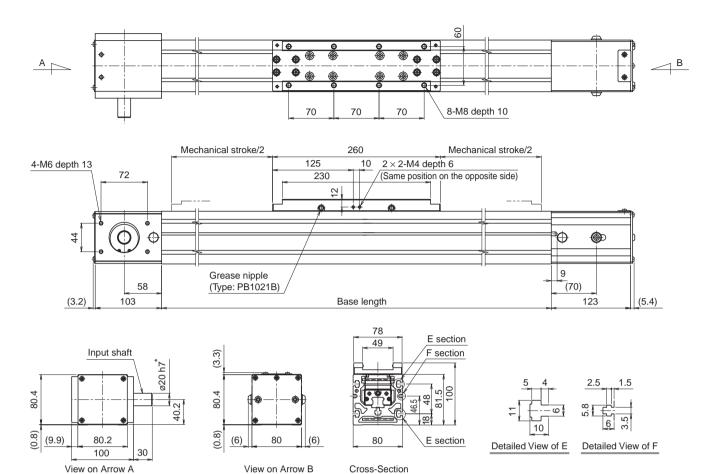
C: With a stainless steel cover

5 Sensor N: None

B: Photo Sensor EE-SX674 (3 pcs.)
D1: Proximity Sensor GL-N12F (3 pcs.)

D2: Proximity Sensor GL-N12F (1 pc.), GL-N12FB (2 pcs.)

Model TY20 (No cover)



* When installing an orthogonal axis type reducer, please note that the input shaft will differ (see page 8).

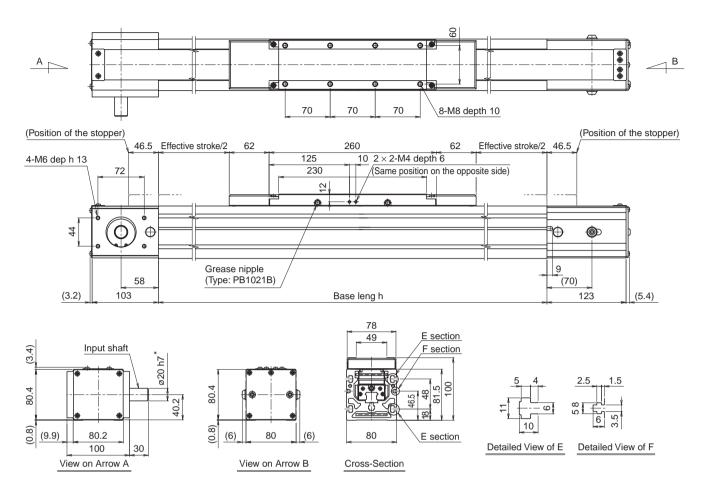
Base length [mm]	840	1020	1320	1620	1920	2220	2520	2820	3120
Mechanical stroke [mm]	549	729	1029	1329	1629	1929	2229	2529	2829
Main unit weight [kg]	13.4	15.1	17.9	20.7	23.5	26.3	29.1	31.9	34.7

Base length [mm]	3420	3720	4020	4320	4620	5040
Mechanical stroke [mm]	3129	3429	3729	4029	4329	4749
Main unit weight [kg]	37.5	40.3	43.1	45.9	48.7	52.6

Note 1) Above figure shows the slider in mid-stroke.

Note 2) Please contact THK for strokes other than those listed above.

Note 3) Please install the unit using the T-slot (E section) on the side (see page 12).



^{*} When installing an orthogonal axis type reducer, please note that the input shaft will differ (see page 8).

Base length [mm]	840	1020	1320	1620	1920	2220	2520	2820	3120
Mechanical stroke [mm]	549	729	1029	1329	1629	1929	2229	2529	2829
Effective stroke [mm]	456	636	936	1236	1536	1836	2136	2436	2736
Main unit weight [kg]	13.8	15.5	18.3	21.2	24.0	26.8	29.6	32.4	35.2

Base length [mm]	3420
Mechanical stroke [mm]	3129
Effective stroke [mm]	3036
Main unit weight [kg]	38.1

Note 1) Above figure shows the slider in mid-stroke.

Note 2) Please use the actuator within effective strokes. Contact THK for strokes other than those listed above.

Note 3) Please install the unit using the T-slot (E section) on the side (see page 12).

Note 4) The maximum manufacturable base length is 3540 mm for stainless steel cover specifications. Please contact THK for details.

Motor brackets for various reducers are available.

Table of Supported Motor Bracket for Concentric Type Reducer

	Reducer (cond	centric)		Symbol	
Manufacturer	Model no.	Reduction ratio	Rated output [W]	Symbol	
	VR*F-3B-100	1/3	100		
	VR*F-3B-200	1/3	200		
	VR*F-3B-400	1/3	400	D4	
	VR*F-5B-100	1/5	100	B1	
	VR*F-5B-200	1/5	200		
Shimpo Drives	VR*F-S9B-100	1/9	100		
	VR*F-3C-750	1/3	750		
	VR*F-5C-400	1/5	400		
	VR*F-5C-750	1/5	750	B2	
	VR*F-S9C-200	1/9	200		
	VR*F-S9C-400	1/9	400		

Table of Supported Motor Bracket for Orthogonal Axis Type Reducer

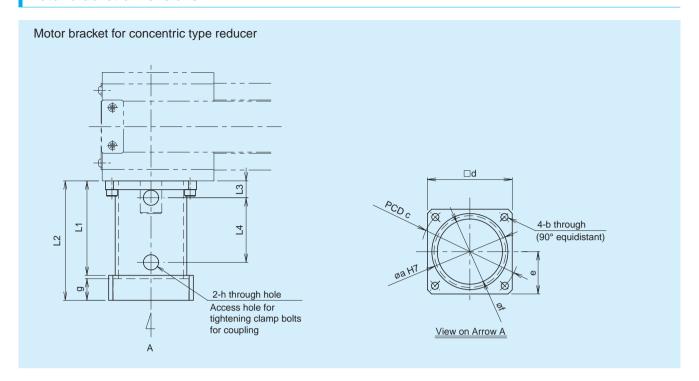
	Reducer (orthogo	onal axis)		Symbol	
Manufacturer	Model no.	Reduction ratio	Rated output [W]	Symbol	
	NEVSH-3B-100-TH1	1/3	100		
	NEVSH-3B-200-TH1	1/3	200		
	NEVSH-3B-400-TH1	1/3	400	D1	
	NEVSH-5B-100-TH1	1/5	100		
Shimpo Drives	NEVSH-5B-200-TH1	1/5	200		
	NEVSH-9B-100-TH1	1/9	100		
	NEVSH-3C-750-TH1	1/3	750		
	NEVSH-5C-400-TH1	1/5	400	D2	
	NEVSH-9C-200-TH1	1/9	200		

Note 1) The load inertial moment is bigger because this product uses the belt drive method. Using a reducer is recommended.

Note 2) Please see Shimpo Drives, Inc.'s catalog for detailed reducer specifications.

Note 3) The orthogonal axis type reducer is a special specification. Please contact THK for details.

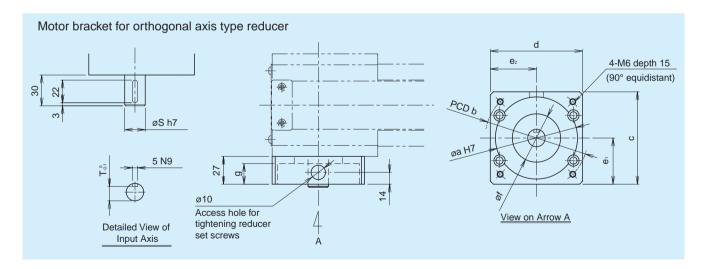
Note 4) If a reducer is installed by THK, please provide the motor manufacturer and model number of the motor.



Dimensions of Motor Bracket for Concentric Type Reducer

Unit: mm

Motor bracket code		Motor bracket dimensions										
	а	b	С	d	е	f	g	h	L1	L2	L3	L4
B1	50	5.5	60	56	28	45	14	12	73	87	20	40
B2	70	6.6	90	78	39	60	20	14	90	110	15.5	59.5



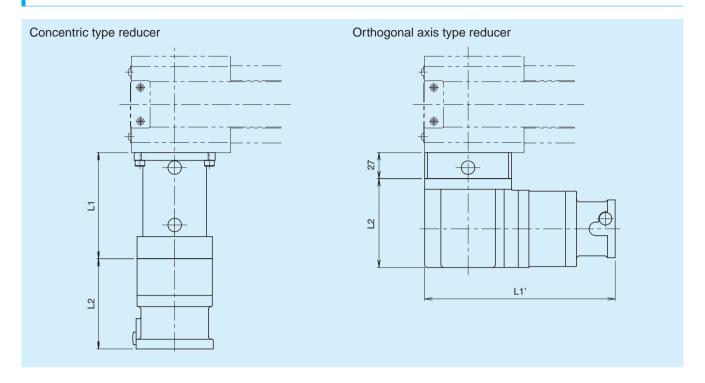
Dimensions of Motor Bracket for Orthogonal Axis Type Reducer

Unit: mm

Motor bracket code				1	Motor bracke	t dimension	3			
	а	b	С	d	e 1	e ₂	f	g	S	Т
D1	70	90	78	86	39	43	-	-	13	10
D2	80	100	90	90	45	45	47	20	17	14

Note) Keys are not included in the reducer. Please have keys ready when installing the reducer.

Reducer dimensions

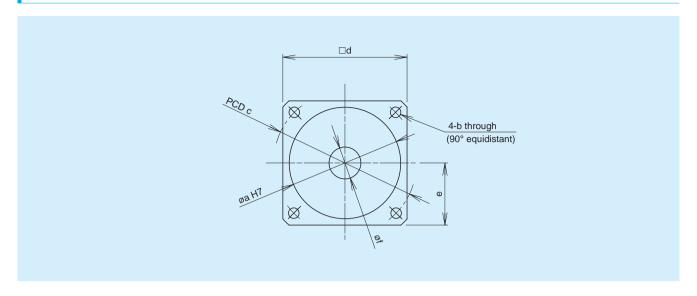


Dimensions When Mounting the Reducer

	External dimension	ns of reducer [mm]			
Manufacturer	Model no.	Reduction ratio	Rated output [W]	L1	L2
	VR*F-3B-100	1/3	100	87	67.5
	VR*F-3B-200	1/3	200		72.5
	VR*F-3B-400	1/3	400		72.5
	VR*F-5B-100	1/5	100		67.5
	VR*F-5B-200 1/5	1/5	200		72.5
Shimpo Drives	VR*F-S9B-100	1/9	100		67.5
	VR*F-3C-750	1/3	750		93.5
	VR*F-5C-400	1/5	400		89.5
	VR*F-5C-750	1/5	750	110	93.5
	VR*F-S9C-200	1/9	200		89.5
	VR*F-S9C-400	1/9	400		89.5

	External dimension	ns of reducer [mm]			
Manufacturer	Model no.	Reduction ratio	Rated output [W]	L1'	L2'
	NEVSH-3B-100-TH1	1/3	100	144.5	
	NEVSH-3B-200-TH1	1/3	200	149.5	
	NEVSH-3B-400-TH1	1/3	400	149.5	
	NEVSH-5B-100-TH1	1/5	100	163.5	89
Shimpo Drives	NEVSH-5B-200-TH1	1/5	200	168.5	
	NEVSH-9B-100-TH1	1/9	100	163.5	
	NEVSH-3C-750-TH1	1/3	750	171.5	
	NEVSH-5C-400-TH1	1/5	400	197.5	92
	NEVSH-9C-200-TH1	1/9	200	197.5	

Dimensions of the reducer mounting section



Dimensions of the Reducer Mounting Section

Unit: mm

Reducer	Mounting section dimensions						
model no.	а	b*	C*	d*	e*	f*	
VR*F-3B-100, VR*F-5B-100, VR*F-S9B-100 NEVSH-3B-100-TH1, NEVSH-5B-100-TH1	30	M4	46	40	20	8	
NEVSH-9B-100-TH1 NEVSH-9B-100-TH1	30	МЗ	45	38	19	8	
VR*F-3B-200, VR*F-5B-200, VR*F-S9C-200	50	M5	70	60	30	14	
NEVSH-3B-200-TH1, NEVSH-5B-200-TH1 NEVSH-9C-200-TH1	50	M4	70	60	30	11	
VR*F-3B-400, VR*F-5C-400, VR*F-S9C-400 NEVSH-3B-400-TH1, NEVSH-5C-400-TH1	50	M5	70	60	30	14	
	50	M4	70	60	30	14	
VR*F-3C-750, VR*F-5C-750, NEVSH-3C-750-TH1	70	M5	90	80	40	19	
	70	M6	90	80	40	16	
	70	M6	90	80	40	19	

 $[\]ensuremath{^{\star}}$ Please select the dimensions according to the motor.

Sensor

Model TY can equip various sensors to the T-groove at the side of the base.

When selecting a sensor, please specify using the corresponding code from the table below.

Tables of Various Sensors

Туре	Output operation	Sensor model number	No. of units	Manufacturer	Symbol
Photo Sensor	N.O. / N.C. (selectable)	EE-SX674	3	OMRON	В
	N.O. (Normally Open)	GL-N12F	3		D1
Proximity Sensor	N.O. (Normally Open)	GL-N12F	1	SUNX	D2
	N.C. (Normally Closed)	GL-N12FB	2		D2

Note 1) All sensor ouputs are NPN outputs.

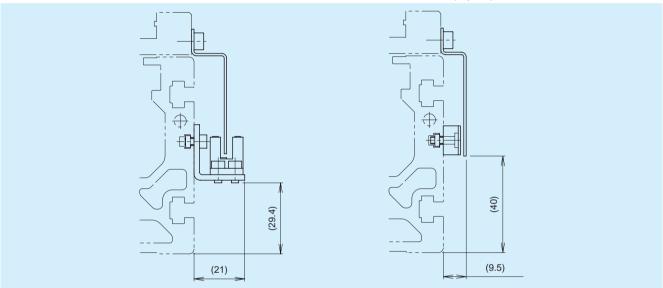
Note 2) N.O. contact point is a normally-open type; N.C. contact point is a normally-closed type.

Note 3) Sensors are mounted on the product before being shipped. Please note that a photosensor connector is not included.

Sensor mounting dimensions

B : EE-SX674 (3 pcs.) [OMRON]

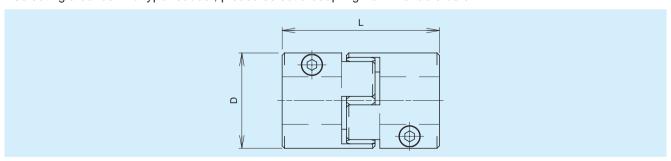
D1 : GL-N12F (3 pcs.) [SUNX] D2 : GL-N12F (1 pc.) GL-N12FB (2 pcs.) [SUNX]



^{*} The direction of the sensor is changeable. The sensor can be removed by sliding the sensor mounting nut from the opposite side of the motor.

Coupling

A coupling is not necessary because the orthogonal axis type reducer has coupling-less specifications. When selecting a concentric type reducer, please select a coupling from the table below.



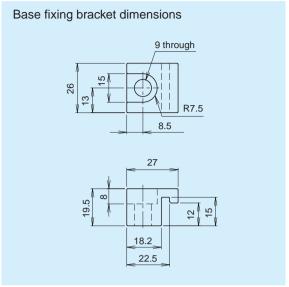
Counting Model no	Manufacturar	External d	limensions	Appliachle Deducers
Coupling Model no.	Manufacturer	L [mm]	D [mm]	Applicable Reducers
ALS-040-R-12B-20B	Miki Dullov	66	40	VR*F-*B
ALS-055-R-19B-20B	Miki Pulley	78	55	VR*F-*C

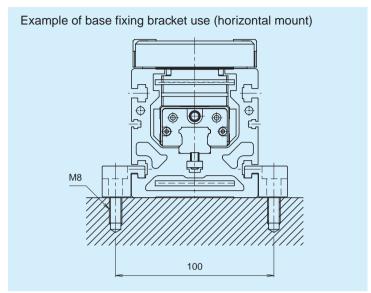
Please see the catalog of the coupling manufacturers (Miki Pulley Co., Ltd.) for details.

Base mounting bracket

The mounting brackets for mounting the base are available.

Note) this is not a standard attachment, so please specify the number of pieces required.





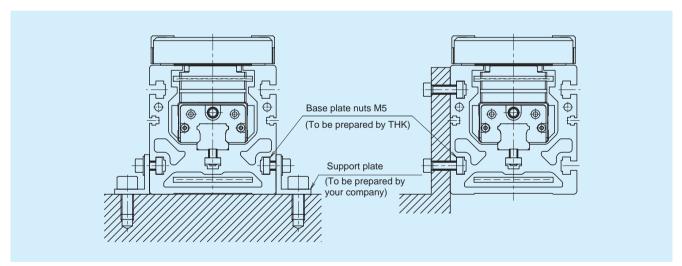
Note 1) Mounting position must be horizontal. If a wall mounting position is used, please contact THK.

Note 2) Mounting intervals of the base fixing brackets should be approximately 250 to 300 mm.

Example of mounting the base (horizontal mount)

The diagram below shows a base mounting example without using the base fixing brackets.

Note) Mounting position must be horizontal. If a wall mounting position is used, please contact THK.

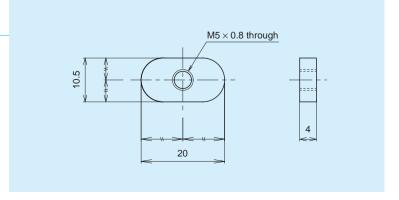


Dimensions of the nuts for mounting the base

The nuts are available for mounting the base that are used for the above mounting example. This is not a standard attachment, so please specify the number of pieces required.

Note) Mounting intervals of the base mounting nut should be approximately 250 to 300 mm.

* Mount the base mounting nut by sliding it from the opposite side of the motor.



^{*} Mount the base fixing bracket by sliding it from the opposite side of the motor.

Appendix

Selecting a Model TY

① Calculate the service life of the LM Guide from load conditions in order to check that it is sufficiently safe and satisfies the desired service life.



② Select the motor and check that the output torque of the reducer is the same as permissible input torque of the actuator or less.



3 Select the options (motor bracket, sensor, cover) as necessary.

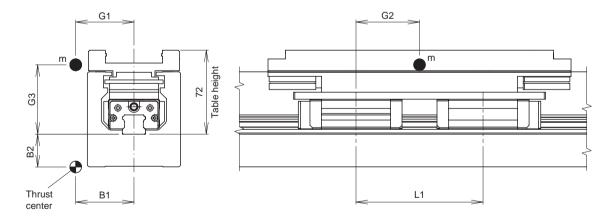
Service life / static safety factor

For information about the service life and static safety factor of the TY model LM Guide, see the LM Guide section in the General Catalog. Also, rated life of the LM Guide can be calculated in the THK's technical support site (https://tech.thk.com/), or using the technical calculation software that is recorded in the CD catalog. See the data in the table below when calculating rated life.

Note) Please note that the calculation of the service life is a theoretical calculation. Under actual operation, life may vary depending on the operating conditions including operating environment, lubricating condition, mounting accuracy, rigidity, etc.

LM Guide unit

Thrust position		a a siti a n	Disakanan	Movable unit			
Model no. for	Thrust position		Block span	Mass	Cent	er of gravity pos	ition
LM Guide use	B1 [mm]	B2 [mm]	L1 [mm]	m [kg]	G1 [mm]	G2 [mm]	G3 [mm]
SHS20V	0	-45	109	1.2	0	54.5	52.2



Selecting the motor

When selecting the motor for mounting on Model TY, please select by referring to the data in the table below. Please contact each motor manufacturer for information on motor selection and motor specifications.

	Timing pulley				
Timing belt model no.	Model no.	Pitch diameter [mm]	Inertia (total of two pieces) [kg-cm²]		
050-MA5	41-MA5-050	65.25	5.8		

^{*} Belt mass: 0.192 kg/m

Belt length = base length \times 2 + 280 mm

[Reference]

Coupling Model no.	Manufacturer	Inertia [kg-cm²]
ALS-040-R-12B-20B	Miki Dullov	0.4
ALS-055-R-19B-20B	Miki Pulley	1.63

^{*} Please see the catalog of the coupling manufacturers (Miki Pulley Co., Ltd.) for details.

Concentric type reducer model no.	Inertia [kg-cm²]	Manufacturer
VR*F-3B-100	0.0575	
VR*F-5B-100	0.04	
VR*F-S9B-100	0.035	
VR*F-3B-200	0.135	
VR*F-5B-200	0.118	
VR*F-S9C-200	0.275	Shimpo Drives
VR*F-3B-400	0.145	
VR*F-5C-400	0.363	
VR*F-S9C-400	0.275	
VR*F-3C-750	0.913	
VR*F-5C-750	0.713	

Orthogonal axis type reducer model no.	Inertia [kg-cm²]	Manufacturer
NEVSH-3B-100-TH1	0.33	
NEVSH-3B-200-TH1	0.338	
NEVSH-3B-400-TH1	0.338	
NEVSH-5B-100-TH1	0.16	
NEVSH-5B-200-TH1	0.271	Shimpo Drives
NEVSH-9B-100-TH1	0.109	
NEVSH-3C-750-TH1	1.31	
NEVSH-5C-400-TH1	0.727	
NEVSH-9C-200-TH1	0.655	

^{*} Please see the catalog for the reducer manufacturer (Shimpo Drives, Inc.) for details.

^{*} Please see the catalog for the reducer manufacturer (Shimpo Drives, Inc.) for details

Reducer specifications	Bracket code	Permissible input torque [N-m]
Concentric type reducer	B1, B2	37.3
Orthogonal axis type	D1	15.6
reducer	D2	29.5





Precautions on Use

Operation

- Unnecessarily disassembling this product may allow foreign objects to enter reduce functionality.
- Do not drop or knock this product. Doing so may cause injury or damage the unit. If the product is dropped or impacted, functionality may be reduced even if there is no surface damage
- Do not allow foreign matter such as dust and cutting powder to enter. This may damage the ball recirculation part or reduce functionality.
- When the product is in motion or about to be in motion, do not touch any moving parts. Do not go near the actuator when it is in motion.
- 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.
- · Anti-rust oil is applied to the input axis for coupling installation. Please wipe the an i-rust oil off completely when installing couplings.
- · Mounting position must be horizontal. If a wall mounting position is used, please contact THK.

The wrong environment can cause poor production failure. The best places to use the device are as follows:

- An environment with an ambient temperature from 0 to 40°C and humidity of no more than 80% RH that will not expose the product to freezing or condensation.
- Contact THK if you are considering using the product in an environment with an operating temperature outside of the specified range.
- A place free from corrosive gas or flammable gas.
- A place free from dust, salt or metal powder.
- A place where water, oil and chemicals will not get on the product.
- · Places where vibration or impact are not transmitted to the unit.
- · Contact THK if the product will be used in a special environment, such as one with constant vibration, a clean room, a vacuum, or a low-/hightemperature environment.

Lubrication

- · Please use this product after sealing lubricant.
- In order to effectively use this product, lubrication is required. Insufficient lubrication may increase abrasion on the rolling part and shorten service life. THK AFB-LF grease, the standard grease for this product, is enclosed.
- Do not use a mix of lubricants with different physical properties
- Please contact THK if using special lubricants.
- Please contact THK if using this product with oil lubrication.
- The greasing interval is usually 100 km; however, this may vary depending on the operating conditions, so THK recommends determining a greasing interval during the initial inspection.
- · Regular lubricants may not be used when this product is operated in a special environment such as one with constant vibration, a clean room, a vacuum, or low-/ high-temperature environment. In such cases, please contact THK,

Storage

- . When storing the product, enclose it in a package designated by THK and store it in a horizontal orientation while avoiding locations subject to high temperature, low temperature and high humidity.
- "LM GUIDE," and " are registered trademarks of THK CO., LTD.

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THK CO., LTD.

HEAD OFFICE 3-11-6, NISHI-GOTANDA, SHINAGAWA-KU, TOKYO 141-8503 JAPAN

INTERNATIONAL SALES DEPARTMENT PHONE:+81-3-5434-0351 FAX:+81-3-5434-0353

Global site: http://www.thk.com/

NORTH AMERICA THK America, Inc. HEADQUARTERS Phone:+1-847-310-1111 ●CHICAGO OFFICE NORTH EAST OFFICE Phone:+1-845-369-4035 ●ATLANTA OFFICE ●LOS ANGELES OFFICE

Phone:+1-847-310-1111 Fax:+1-847-310-1182

Fax:+1-845-369-4909 Phone:+1-770-840-7990 Fax:+1-770-840-7897

Phone:+1-949-955-3145 Fax:+1-949-955-3149 SAN FRANCISCO OFFICE

Phone:+1-925-455-8948

DETROIT OFFICE Fax:+1-925-455-8965

Phone:+1-248-858-9330 Fax:+1-248-858-9455 ●TORONTO OFFICE Phone:+1-905-820-7800 Fax:+1-905-820-7811

SOUTH AMERICA THK Brasil LTDA

Phone:+55-11-3767-0100 Fax:+55-11-3767-0101

EUROPE

THK GmbH

●EUROPEAN HEADQUARTERS

Phone:+49-2102-7425-555 Fax:+49-2102-7425-556

DÜSSELDORF OFFICE

Fax:+49-2102-7425-299 Phone:+49-2102-7425-0

•FRANKFURT OFFICE Phone:+49-2102-7425-650 Fax:+49-2102-7425-699 STUTTGART OFFICE Phone:+49-7150-9199-0 Fax:+49-7150-9199-888 ●MÜNCHEN OFFICE Phone:+49-8937-0616-0 Fax:+49-8937-0616-26 OU.K. OFFICE Phone:+44-1908-30-3050 Fax:+44-1908-30-3070 ●ITALY M LANO OFFICE Phone:+39-039-284-2079 Fax:+39-039-284-2527 **ITALY BOLOGNA OFFICE** Phone:+39-051-641-2211 Fax:+39-051-641-2230 SWEDEN OFFICE Phone:+46-8-445-7630

AUSTRIA OFFICE Fax:+46-8-445-7639 Phone:+43-7229-51400 Fax:+43-7229-51400-79 SPAIN OFFICE Phone:+34-93-652-5740 Fax:+34-93-652-5746 TURKEY OFFICE Phone:+90-216-362-4050 Fax:+90-216-569-7150 PRAGUE OFFICE Phone:+420-2-41025-100 Fax:+420-2-41025-199 MOSCOW OFFICE Phone:+7-495-649-80-47 Fax:+7-495-649-80-44 THK Europe B.V.

Phone:+31-040-290-9500 Fax:+31-040-290-9599

Fax:+33-4-3749-1401

E NDHOVEN OFFICE

Phone:+33-4-3749-1400

THK France S.A.S.

CHINA

THK (CHINA) CO.,LTD.

•HEADQUARTERS

Phone:+86-411-8733-7111 Fax:+86-411-8733-7000 SHANGHAI OFFICE

Phone:+86-21-6219-3000 Fax:+86-21-6219-9890 **BEIJING OFFICE** Phone:+86-10-8441-7277 Fax:+86-10-6590-3557

CHENGDU OFFICE Phone:+86-28-8526-8025 Fax:+86-28-8525-6357 ●GUANGZHOU OFFICE

Phone:+86-20-8523-8418 Fax:+86-20-3801-0456 THK (SHANGHAI) CO.,LTD. Phone:+86-21-6275-5280 Fax:+86-21-6219-9890

TAIWAN

THK TAIWAN CO.,LTD.

●TAIPEI HEAD OFFICE

TAICHUNG OFFICE Phone:+886-4-2359-1505 Fax:+886-4-2359-1506

OTAINAN OFFICE Phone:+886-6-289-7668 Fax:+886-6-289-7669 KOREA

SEOUL REPRESENTATIVE OFFICE

Phone:+82-2-3468-4351 Fax:+82-2-3468-4353

SINGAPORE

THK LM SYSTEM Pte. Ltd. Phone:+65-6884-5500

Fax:+65-6884-5550

INDIA

BANGALORE REPRESENTATIVE OFFICE Phone:+91-80-2330-1524 Fax:+91-80-2314-8226

