



Linear Motor Actuator

GLM20AP



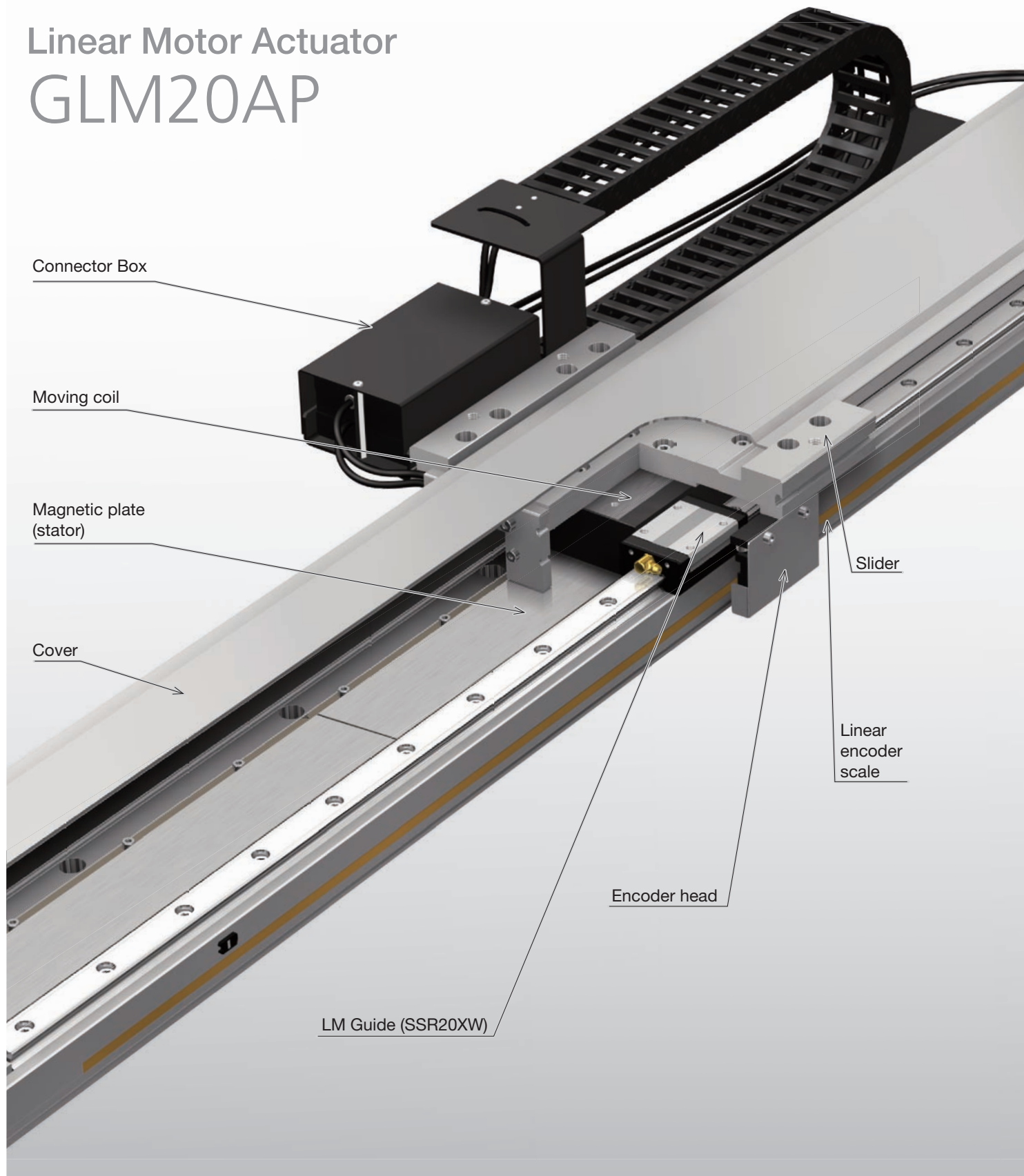
For details, visit THK at www.thk.com

*Product information is updated regularly on the THK website.

THK CO., LTD.
TOKYO, JAPAN

CATALOG No. 363-1E

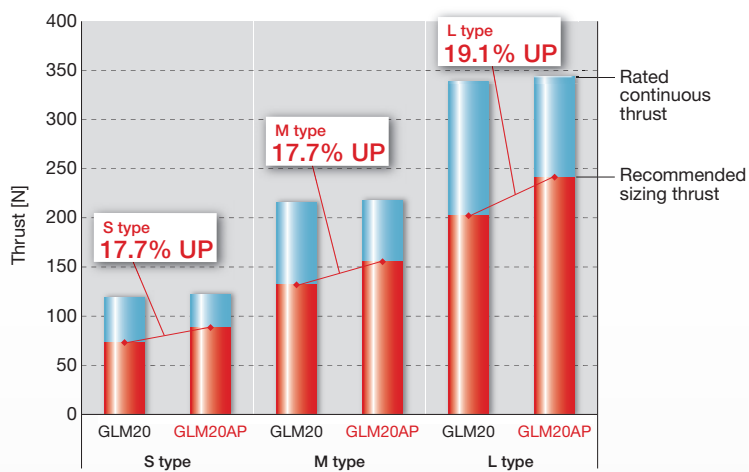
Linear Motor Actuator GLM20AP



Conforms to international standards



Using a newly designed moving coil, GLM20AP generates lower temperature increases, and complies with UL Certification. Also selecting the connector box conforms to CE compliance as well. This linear motor actuator offers high speeds, rapid acceleration/deceleration, and high precision and complies with the international standards of safety and reliability.



Sizing thrust increased up to 19%

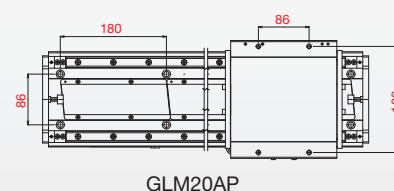
The existing GLM20's moving coil and magnetic plate have been newly designed, which drastically improved the sizing thrust. As a result, further improvement of throughput has become possible.

Maintains mounting compatibility of GLM20

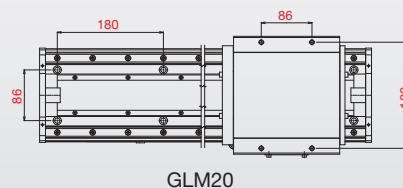
GLM20AP and GLM20 have compatibility in mounting dimensions, so that they can be replaced with each other.*

* The slider length differs slightly.

See the dimensioned drawing (P.11 to 16) for the stroke of GLM20AP.



GLM20AP



GLM20

High speed, rapid acceleration/deceleration

Linear motor actuator exerts high speed motion even with long stroke as it can directly convert electromagnetic force into the linear motion. (The maximum speed of 3m/s^* is possible.)

Rapid acceleration and deceleration of up to 2G^* are achieved by reducing its mass as a result of using aluminum parts for the slider.

* Reduction may be required depending on payload or operating conditions.

Check the Basic Specifications (P.7) for details.

High precision

Full-closed feedback control by direct driving and with a linear encoder eliminates lost motion and backlash, achieving high precision. The positioning repeatability can be as high as $\pm 1\mu\text{m}^*$.

* Depends on the resolution of the linear encoder. Check the Basic Specifications (P.7) for more details.

Long stroke

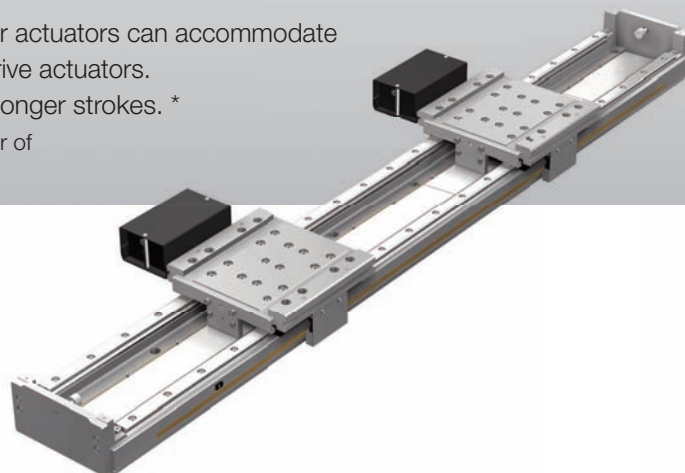
Since the magnetic plates are jointed, the linear motor actuators can accommodate longer strokes that are not possible with ball screw drive actuators.

Also, the joint type base for GLM20AP enable even longer strokes.*

* The joint type base may be used only when a linear encoder of Magnescale or HEIDENHAIN is used.

Multi-sliders

Multiple sliders can be mounted on a single axis base and controlled independently.



Model Number Chart

Model no.	Combined no. of sliders/Motor type	Stroke	Encoder/Resolution	Magnetic pole sensor	Driver
GLM20AP	S	0490	R01K	J	TD20

① GLM20AP	② S : S type M : M type L : L type 2S : S type (2pcs.) (multi-sliders) 2M : M type (2pcs.) (multi-sliders) 2L : L type (2pcs.) (multi-sliders)	③ 0130 : 130mm to 2650 : 2650mm ③ See Table 1. Stroke List.	④ G10K : 10.0μm G05K : 5.0μm R01K : 1.0μm H01K : 1.0μm R500 : 0.5μm R100 : 0.1μm	⑤ J : With magnetic pole sensor N : No magnetic pole sensor	⑥ TD20 : Driver Model TD 200VAC specifications ⑥ Driver + input power-supply voltage E.g.: TD20 TD : Driver Model TD 20 : 200VAC specifications
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② Combined no. of sliders + Motor type
 E.g.: 2S
 2 : Slider (2 pcs.)
 S : S type
 Note: For one slider, no number is indicated and only motor type. Multiple sliders can be mounted on a single axis base.

④ Encoder manufacturer + Resolution
 E.g.: R01K
 Note: The maximum speed and positioning repeatability of the actuator vary according to the linear encoder resolution. See Table 2. Encoder List.

⑤ In case that the magnetic pole sensor is not equipped, automatic magnetic pole detection is executed when the first servo-on command is sent. During the automatic magnetic pole detection, the slider will travel several millimeters back and forth for approximately 10 seconds. Magnetic pole detection may fail if an excessive load is applied to the slider, if the position of center of gravity of the work overhangs, or if the slider is subject to external forces or high resistance. In these cases, models with a magnetic pole sensor are recommended for these situations.

Note: With the above model number, a set of an actuator, driver, and cable will be available. If only an actuator is needed, please contact THK. Customer is to provide the motion controller and cable between the controller and driver.

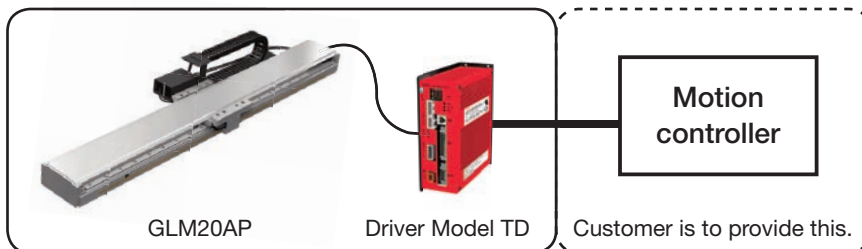


Table 1. Stroke List

③ Stroke		*****														
Stroke [mm]	S type	0130	0310	0490	0670	0850	1030	1210	1390	1570	1750	1930	2110	2290	2470	2650
	M type	-	0160	0340	0520	0700	0880	1060	1240	1420	1600	1780	1960	2140	2320	2500
	L type	-	-	0200	0380	0560	0740	0920	1100	1280	1460	1640	1820	2000	2180	2360
Base length [mm]		400	580	760	940	1120	1300	1480	1660	1840	2020	2200	2380	2560	2740	2920
Overall actuator length [mm]		420	600	780	960	1140	1320	1500	1680	1860	2040	2220	2400	2580	2760	2940

Note 1: The stroke of the multiple-slider type differs. For details, please contact THK.
 Note 2: The standard base length is recommended to conform to the standard magnetic plate length.
 Note 3: Maximum length of the single base is 4400mm.
 With the base joint model, use an encoder of Magnescale or HEIDENHAIN.

Table 2. Encoder List

④ Encoder/Resolution		*****				
Encoder manufacturer	Model no.	Resolution [μm]		Positioning repeatability [μm]		Maximum speed [m/s]
Magnescale	PL25	G10K	10.0	±10		3.0
Magnescale	PL25	G05K	5.0	±5		
RENISHAW	RGH22X	R01K	1.0	±1		
HEIDENHAIN	LIDA277	H01K	1.0			
RENISHAW	RGH22Z	R500	0.5			1.5
RENISHAW	RGH22Y	R100	0.1			0.3

Note 1: Maximum speed and positioning repeatability of the linear motor vary according to the linear encoder resolution.
 Note 2: The values of resolution are after quadrature.

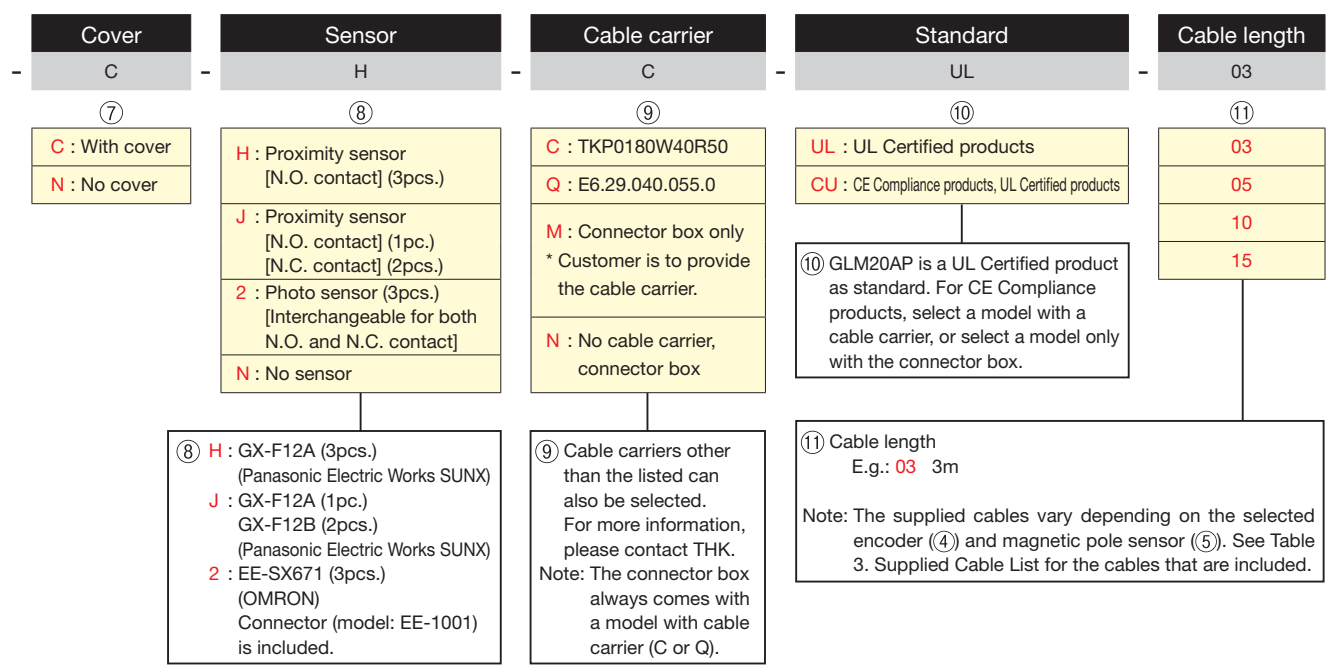


Table 3. Supplied Cable List

⑪ Cable length
* *

④ Encoder/Resolution	⑤ Magnetic pole sensor	Power cable	Encoder, magnetic pole sensor cable	Origin detector cable	Cable between the interpolator and driver when the magnetic pole sensor is equipped	Cable between interpolator and driver
R01K/R500/R100	J : With magnetic pole sensor	KDK-**-CU	KJET-**-CU	-	-	-
R01K/R500/R100	N : No magnetic pole sensor		KET-**-CU	-	-	-
G10K/G05K	J : With magnetic pole sensor		CK-**-	CE09-**-	KSJT-**-CU	-
G10K/G05K	N : No magnetic pole sensor		CK-**-	CE09-**-	-	KSET-01-CU
H01K	J : With magnetic pole sensor		KHET-**-CU	-	-	-
H01K	N : No magnetic pole sensor		KEK-**-CU	-	-	-

Pages with Further Details

Item	Reference Item
② Motor type	P.7 Basic Specifications, Thrust - speed characteristics
③ Stroke	P.11 to 16 Dimensions
④ Encoder/Resolution	P.7 Basic Specifications
⑥ Driver	P.21 Driver Basic Specifications
⑧ Sensor	P.17 Sensor Dimensions
⑨ Cable carrier	P.18 Cable Carrier Dimensions
⑩ Standard	P. 34 Glossary
⑪ Cable length	P.8 to 10 System Configuration

Driver

Note: GLM20AP comes with a driver attached to the actuator.

When the driver is purchased separately for maintenance, specify the model numbers below.

TD - 045CU - 200AC - GA20SU - 1U - N

① ② ③ ④ ⑤ ⑥

① Model no.	TD	: Driver Model TD
② Capacity	045CU 075CU 100CU	: 450W (for S type motor) : 750W (for M type motor) : 1kW (for L type motor)
③ Input power-supply voltage	200AC	: Single-phase/three-phase 200VAC Note: TD-100CU is available only with the input power supply of three-phase 200VAC.
④ Motor type	GA20SU GA20MU GA20LU	: GLM20AP S type : GLM20AP M type : GLM20AP L type
⑤ Resolution	10U 5U 1U 500N 100N	: 10.0μm : 5.0μm : 1.0μm : 0.5μm : 0.1μm
⑥ Magnetic pole sensor	J N	: With magnetic pole sensor equipped : No magnetic pole sensor

Setup tools

● Digital operator

D - CON2

①

① Type	D - CON2	: Digital operator (→ P.20)
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● Communication cable (RS-232C cable for communicating to PC when using D-Assist)

K232 - 01

①

① Cable length	01	: 1m
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Note: D-Assist (PC software) is a required tool for setting and changing the parameters of Driver Model TD. (→ P.20)

PC software can be downloaded free of charge after logging in the THK technical support site. (Japanese and English are available)
<https://tech.thk.com/>

The communication cable will not come as an accessory with the actuator or Driver Model TD; place your order for a cable by using the above model number.

Encoder adjuster

* Only with a HEIDENHAIN optical linear encoder

APS27

①

① Type	APS27	: Encoder adjuster (→ P.20)
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Note: APS27 is an encoder adjuster for checking the mounting tolerance of LIDA277 with TTL interface.

Encoders are already adjusted when the actuator is shipped, however the encoder adjuster may be required for readjustment when, for example, maintenance or inspection is performed.

Note 1: GLM20AP comes with a power cable, encoder cable and magnetic pole sensor cable.

When the cable is purchased separately for maintenance, specify the model numbers below according to the linear encoder type.

Note 2: In the case of the actuator specifications with a magnetic linear encoder (Magnescale), the origin detection cable CE-09-** is supplied as an accessory.

● With the optical linear encoder (RENISHAW) (→ P.8 System Configuration)

K DK - 03 - CU

①

②

③

① Symbol	K	
② Type	DK	: Power cable (standard length of the cable: 3m, 5m, 10m, 15m)
	ET	: Encoder cable (standard length of the cable: 3m, 5m, 10m, 15m)
	JET	: Encoder, magnetic pole sensor cable (standard length of the cable: 3m, 5m, 10m, 15m)
③ Cable length	03	: 3m (please select from standard length) * If the cable other than the standard length is required, please contact THK.

● With the magnetic linear encoder (Magnescale) (→ P.9 System Configuration)

K DK - 03 - CU

①

②

③

① Symbol	K	
② Type	DK	: Power cable (standard length of the cable: 3m, 5m, 10m, 15m)
	SET	: Cable between the interpolator and driver (standard length of the cable: 1m)
	SJT	: Cable between the interpolator and driver when the magnetic pole sensor is equipped (Standard length of the cable between the interpolator and the driver: 1m fixed) (Standard length of the cable between the magnetic pole sensor and the driver: 3m, 5m, 10m, 15m)
③ Cable length	03	: 3m (please select from standard length) * If the cable other than the standard length is required, please contact THK.

C K - 03

①

②

③

① Symbol	C	
② Type	K	: Encoder cable (standard length of the cable: 3m, 5m, 10m, 15m)
	E09	: Cable for origin detector (standard length of the cable: 3m, 5m, 10m, 15m)
③ Cable length	03	: 3m (please select from standard length) * If the cable other than the standard length is required, please contact THK.

● With the optical linear encoder (HEIDENHAIN) (→ P.10 System Configuration)

K DK - 03 - CU

①

②

③

① Symbol	K	
② Type	DK	: Power cable (standard length of the cable: 3m, 5m, 10m, 15m)
	EK	: Encoder cable (standard length of the cable: 3m, 5m, 10m, 15m)
	HET	: Encoder, magnetic pole sensor cable (standard length of the cable: 3m, 5m, 10m, 15m)
③ Cable length	03	: 3m (please select from standard length) * If the cable other than the standard length is required, please contact THK.

Product Specifications

Basic specifications

Item	Motor type	S type					M type					L type					
Driver model no.		TD-045CU-200AC-GA20SU					TD-075CU-200AC-GA20MU					TD-100CU-200AC-GA20LU					
Main circuit power supply voltage		Single-phase/three-phase 200VAC					Single-phase/three-phase 200VAC					Three-phase 200VAC					
Maximum thrust [N] *1		336					618					954					
Rated continuous thrust [N] *1		118					220					344					
Maximum speed [m/s] *2		3.0		1.5	0.3		3.0		1.5	0.3		3.0		1.5	0.3		
Resolution [μ m]		10.0	5.0	1.0	0.5	0.1	10.0	5.0	1.0	0.5	0.1	10.0	5.0	1.0	0.5	0.1	
Positioning repeatability [μ m]		± 10	± 5	± 1		± 10	± 5	± 1		± 10	± 5	± 1		± 10	± 5	± 1	
Maximum load capacity [kg] *3		46.1					86.1					134.6					
Estimated load capacity [kg] *4		7.7					15.0					24.5					

*1 This is the value when the armature coil average temperature is 90°C under the condition with the ambient temperature of 20°C

*2 Maximum speed varies according to the linear scale resolution.

E.g.: Motor type - S type, selected driver - TD-045CU-200AC-GA20SU, resolution - 0.1 μ m, maximum speed - 0.3m/s

*3 Speed or acceleration/deceleration may be reduced by the payload mass. See "GLM20AP Selection Method" on Pages 26 to 32.

The maximum load capacity is the mass that can be driven with the acceleration of approx. 0.5G.

*4 The estimated load capacity is the mass that can be driven with the acceleration of approx. 2G, with the maximum speed of 1.0 m/s, and at a duty factor of 50% of a constant stroke.

However, operable mass may vary as it may be affected by thrust-speed characteristics depending on speed.

Thrust - speed characteristics

[200V main circuit power supply]

Motor type : S type

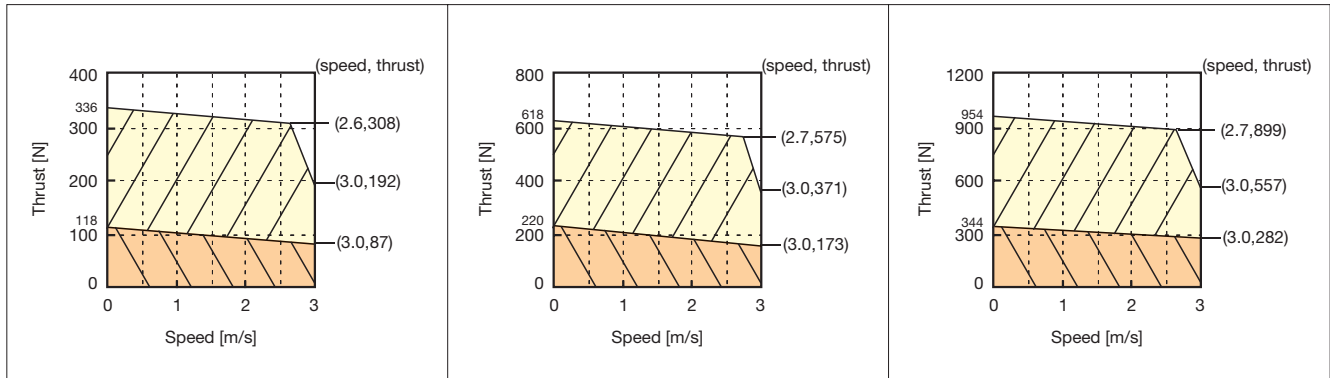
Driver : TD-045CU-200AC-GA20SU

Motor type : M type

Driver : TD-075CU-200AC-GA20MU

Motor type : L type

Driver : TD-100CU-200AC-GA20LU



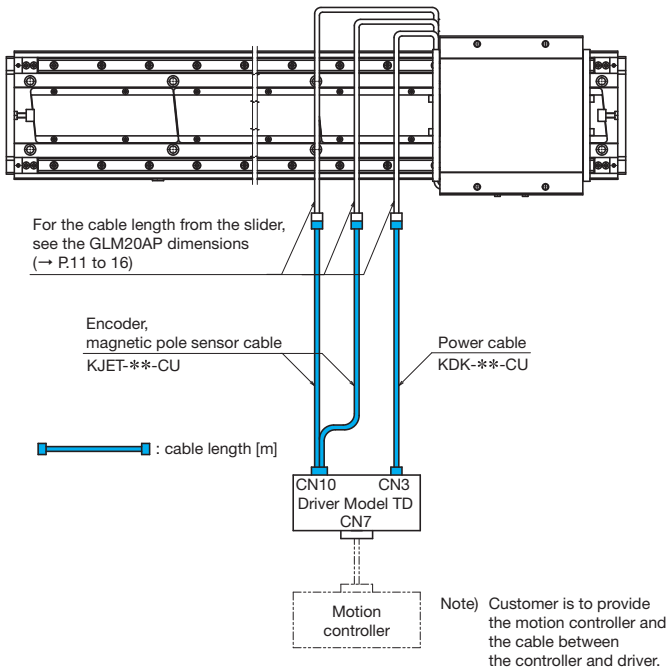
: Maximum thrust
 : Rated continuous thrust

Note: The above thrust-speed characteristics show the values that take into consideration the sliding resistance component of the LM Guide which depends on the slider attraction force and slider mass.

System Configuration

With the optical linear encoder (RENISHAW)

Specifications with the magnetic pole sensor



Combination of the power cable and encoder cable

① Cable length

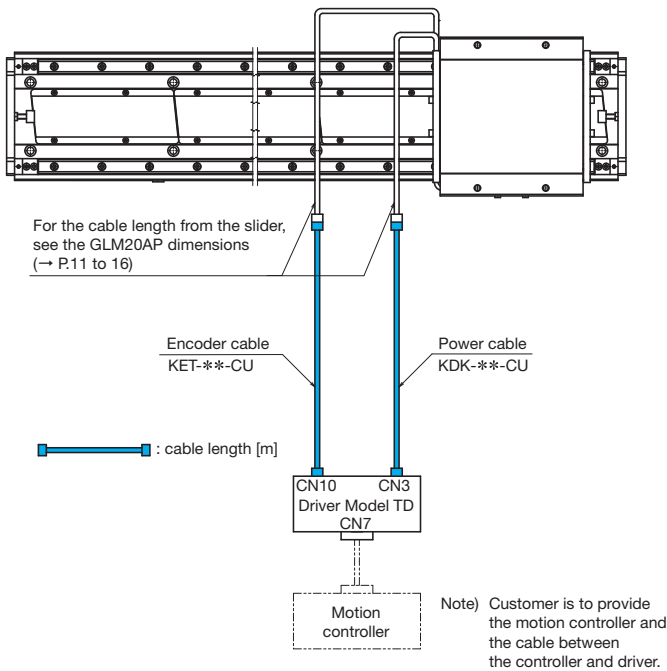
**

Cable length	Power cable	Length	Encoder cable	Length
03	KDK-03-CU	3m	KJET-03-CU	3m
05	KDK-05-CU	5m	KJET-05-CU	5m
10	KDK-10-CU	10m	KJET-10-CU	10m
15	KDK-15-CU	15m	KJET-15-CU	15m

Note: The table above lists a standard combination of the cable length. If the combinations other than the table above is required, please contact THK.

With the optical linear encoder (RENISHAW)

Specifications without the magnetic pole sensor



Combination of the power cable and encoder cable

① Cable length

**

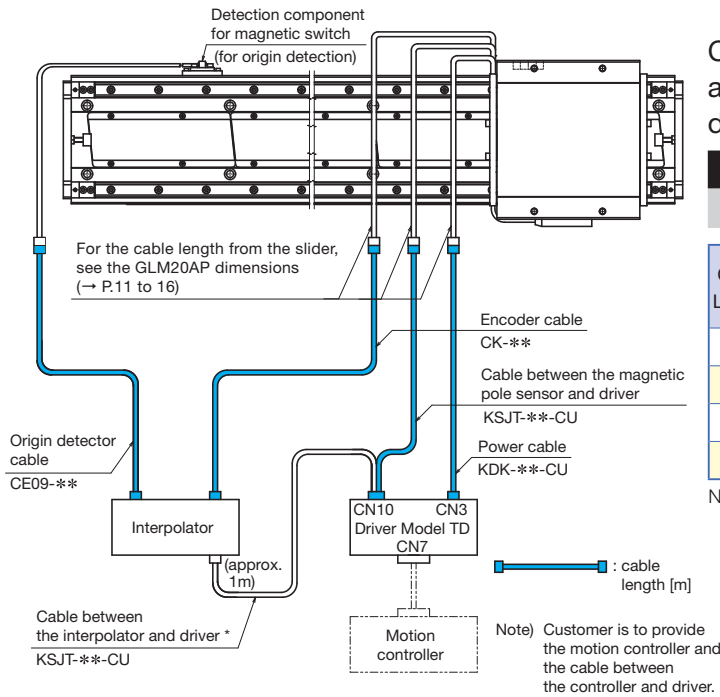
Cable length	Power cable	Length	Encoder cable	Length
03	KDK-03-CU	3m	KET-03-CU	3m
05	KDK-05-CU	5m	KET-05-CU	5m
10	KDK-10-CU	10m	KET-10-CU	10m
15	KDK-15-CU	15m	KET-15-CU	15m

Note: The table above lists a standard combination of the cable length. If the combinations other than the table above is required, please contact THK.

System Configuration

With the magnetic linear encoder (Magnescale)

Specifications with the magnetic pole sensor



Combination of the power cable, encoder cable, and cable between the magnetic pole sensor and driver

⑪ Cable length

**

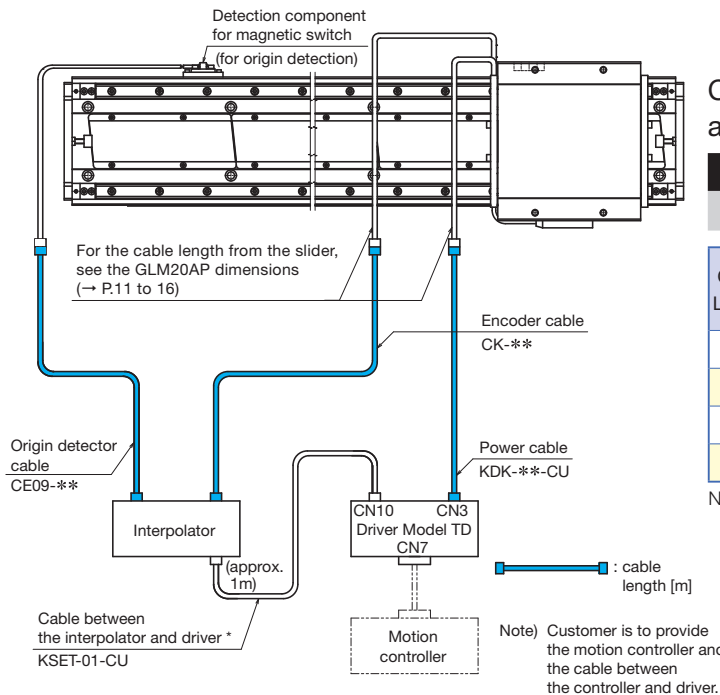
Cable Length	Power Cable	Length	Encoder Cable	Length	Cable between magnetic pole sensor and driver	Length
03	KDK-03-CU	3m	CK-03	3m	KSJT-03-CU	3m
05	KDK-05-CU	5m	CK-05	5m	KSJT-05-CU	5m
10	KDK-10-CU	10m	CK-10	10m	KSJT-10-CU	10m
15	KDK-15-CU	15m	CK-15	15m	KSJT-15-CU	15m

Note: The table above lists a standard combination of the cable length. The same cable length as the CE09-**-** cable for origin detector is supplied. If the combinations other than the table above is required, please contact THK.

* Cable between the interpolator and driver has the fixed length of approx. 1m.

With the magnetic linear encoder (Magnescale)

Specifications without the magnetic pole sensor



Combination of the power cable, encoder cable, and cable between the interpolator and driver.

⑪ Cable length

**

Cable Length	Power Cable	Length	Encoder Cable	Length	Cable between interpolator and driver
03	KDK-03-CU	3m	CK-03	3m	KSET-01-CU (Cable length 1m only)
05	KDK-05-CU	5m	CK-05	5m	
10	KDK-10-CU	10m	CK-10	10m	
15	KDK-15-CU	15m	CK-15	15m	

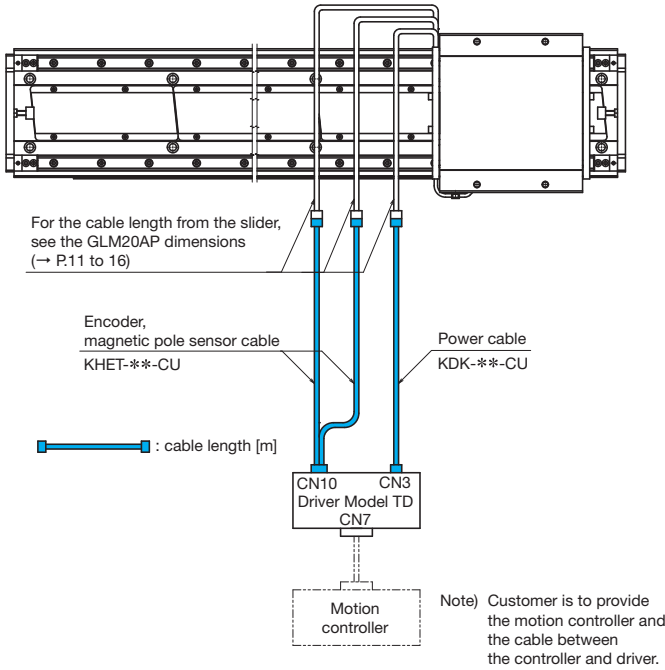
Note: The table above lists a standard combination of the cable length. The same cable length as the CE09-**-** cable for origin detector is supplied. If the combinations other than the table above is required, please contact THK.

* Cable between the interpolator and driver has the fixed length of approx. 1m.

System Configuration

With the optical linear encoder (HEIDENHAIN)

Specifications with the magnetic pole sensor



Combination of the power cable and encoder cable

① Cable length

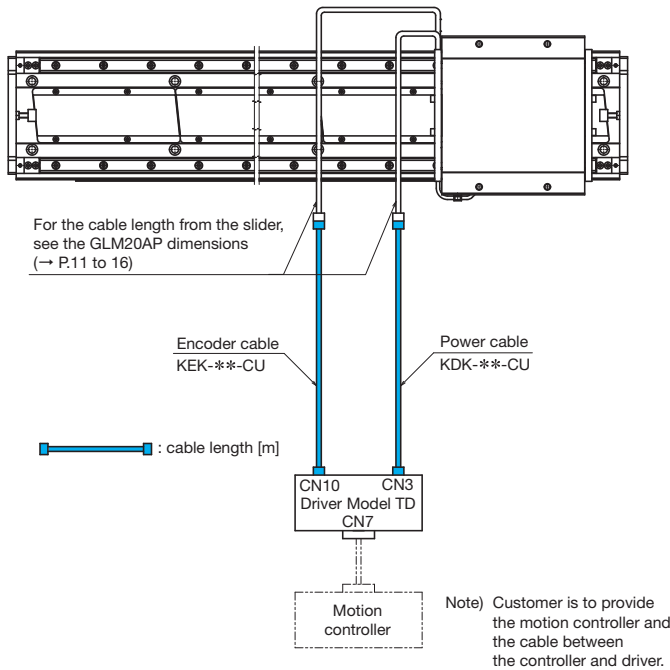
**

Cable length	Power cable	Length	Encoder cable	Length
03	KDK-03-CU	3m	KHET-03-CU	3m
05	KDK-05-CU	5m	KHET-05-CU	5m
10	KDK-10-CU	10m	KHET-10-CU	10m
15	KDK-15-CU	15m	KHET-15-CU	15m

Note: The table above lists a standard combination of the cable length. If the combinations other than the table above is required, please contact THK.

With the optical linear encoder (HEIDENHAIN)

Specifications without the magnetic pole sensor



Combination of the power cable and encoder cable

① Cable length

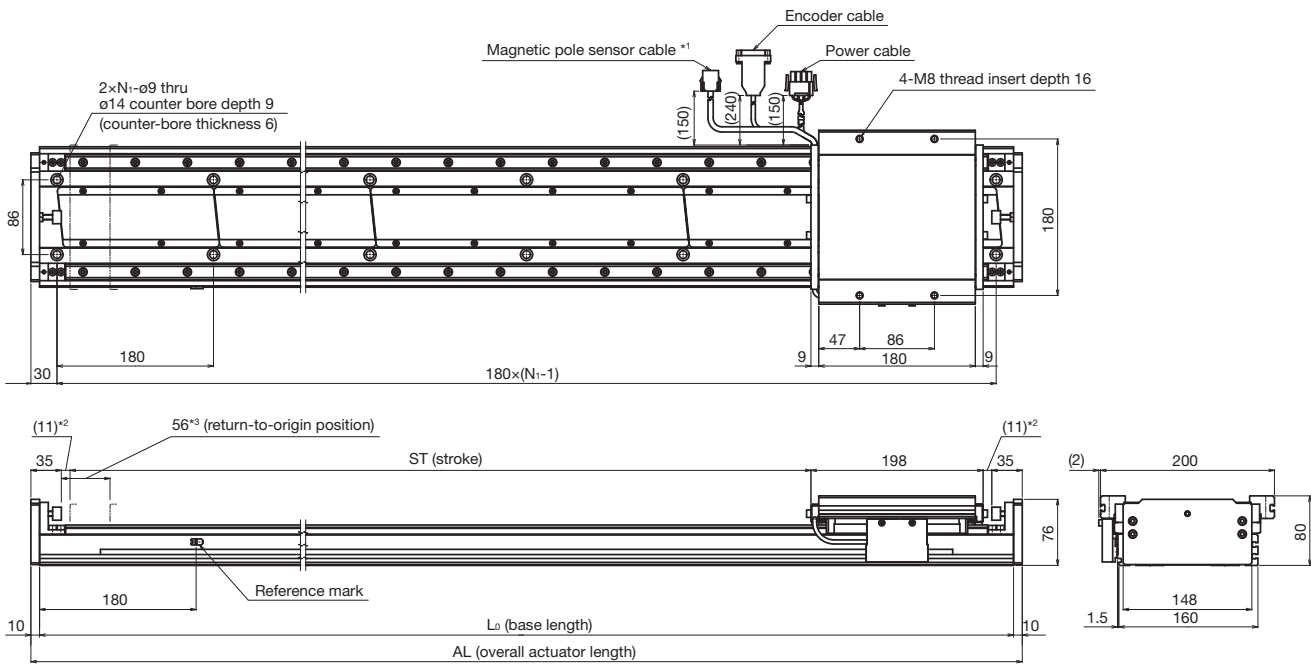
**

Cable length	Power cable	Length	Encoder cable	Length
03	KDK-03-CU	3m	KEK-03-CU	3m
05	KDK-05-CU	5m	KEK-05-CU	5m
10	KDK-10-CU	10m	KEK-10-CU	10m
15	KDK-15-CU	15m	KEK-15-CU	15m

Note: The table above lists a standard combination of the cable length. If the combinations other than the table above is required, please contact THK.

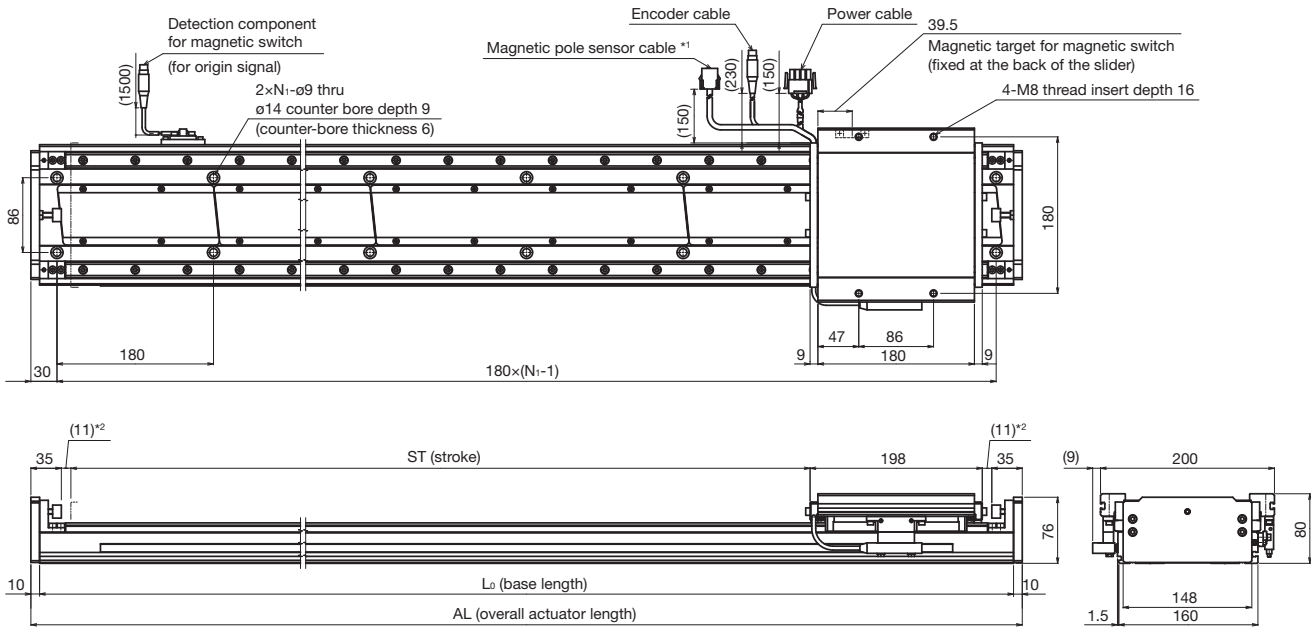
Dimensions Motor type: S type

With the optical linear encoder (RENISHAW)



*1 Please note that the magnetic pole sensor cable is not supplied unless the actuator is equipped with a magnetic pole sensor.
 *2 The distance from the mechanical stopper to the set stroke position.
 *3 Return-to-origin position when the reference mark is used.

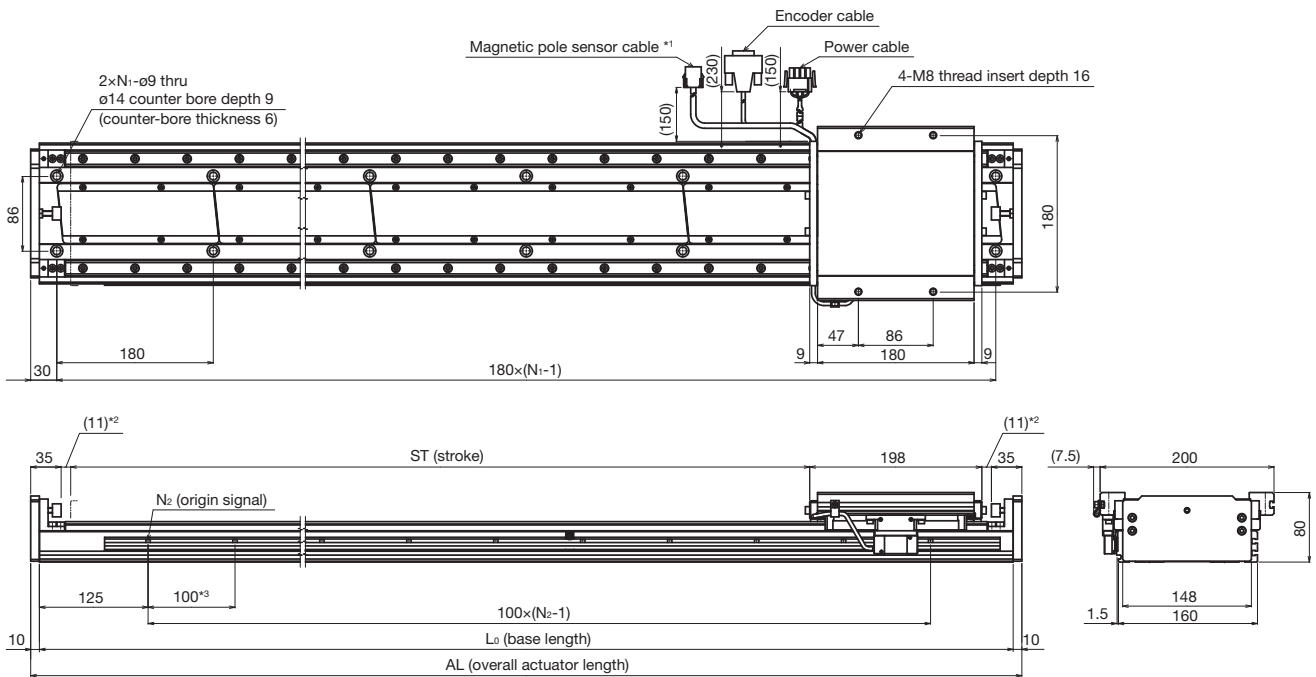
With the magnetic linear encoder (Magnescale)



*1 Please note that the magnetic pole sensor cable is not supplied unless the actuator is equipped with a magnetic pole sensor.
 *2 The distance from the mechanical stopper to the set stroke position.

Dimensions Motor type: S type

With the optical linear encoder (HEIDENHAIN)



- *1 Please note that the magnetic pole sensor cable is not supplied unless the actuator is equipped with a magnetic pole sensor.
- *2 The distance from the mechanical stopper to the set stroke position.
- *3 Origin signal is sent every 100mm. Select the actually used origin position with an external sensor.

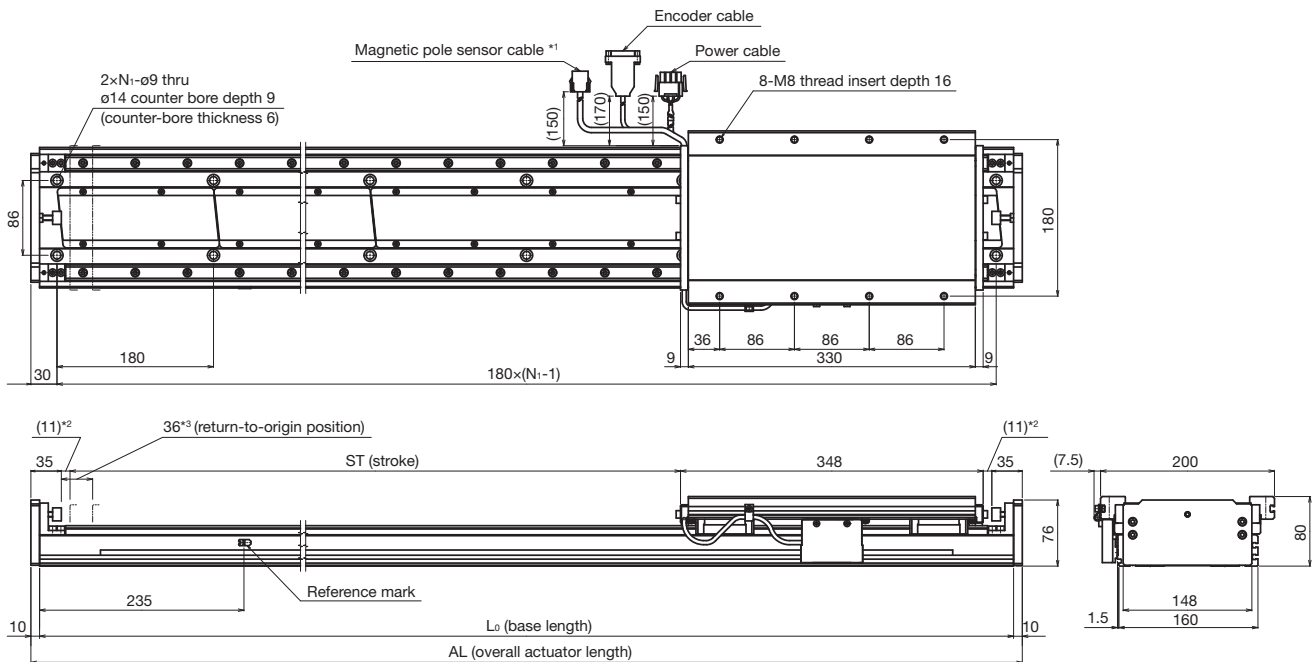
Detailed dimensions

GLM20AP-S-		0130*	0310	0490	0670	0850	1030	1210	1390	1570	1750	1930	2110	2290	2470	2650
Stroke [mm] (Stroke between the mechanical stoppers)	ST	130 (152)	310 (332)	490 (512)	670 (692)	850 (872)	1030 (1052)	1210 (1232)	1390 (1412)	1570 (1592)	1750 (1772)	1930 (1952)	2110 (2132)	2290 (2312)	2470 (2492)	2650 (2672)
Base length [mm]	L ₀	400	580	760	940	1120	1300	1480	1660	1840	2020	2200	2380	2560	2740	2920
Overall actuator length [mm]	AL	420	600	780	960	1140	1320	1500	1680	1860	2040	2220	2400	2580	2760	2940
No. of mounting holes per row:	N ₁	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
No. of origin signal (HEIDENHAIN only)	N ₂	1	3	4	6	8	10	11	13	15	17	19	21	22	24	26
Overall actuator mass [kg]	M	11.4	14.0	16.7	19.4	22.0	24.7	27.3	30.0	32.7	35.3	38.0	40.7	43.3	46.0	48.6

- * The central base mounting hole may not be able to be used if a model with a short stroke is used. In that case, use a nut for the base mounting hole to secure with the T-slot. For the base mounting nut, please contact THK.
- Note 1: The above stroke applies to the single-slider model. For the stroke with the 2-slider model, please contact THK.
- Note 2: The values in () are strokes between the mechanical stoppers.
- Note 3: Models are shipped with transportation parts (eye nut) attached.
- Note 4: The overall actuator mass is an approximate value for a single-slider model that does not include optional parts, cables, drivers, slider mounting jigs or transportation parts.

Dimensions Motor type: M type

With the optical linear encoder (RENISHAW)

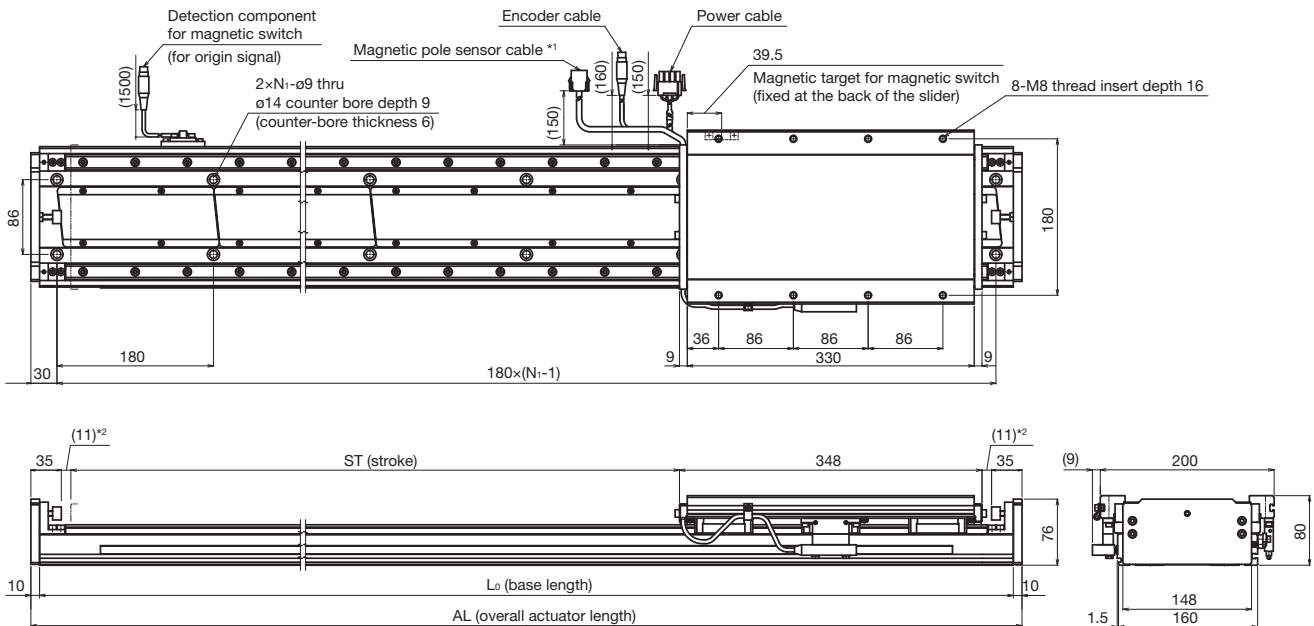


*1 Please note that the magnetic pole sensor cable is not supplied unless the actuator is equipped with a magnetic pole sensor.

*2 The distance from the mechanical stopper to the set stroke position.

*3 Return-to-origin position when the reference mark is used.

With the magnetic linear encoder (Magnescale)

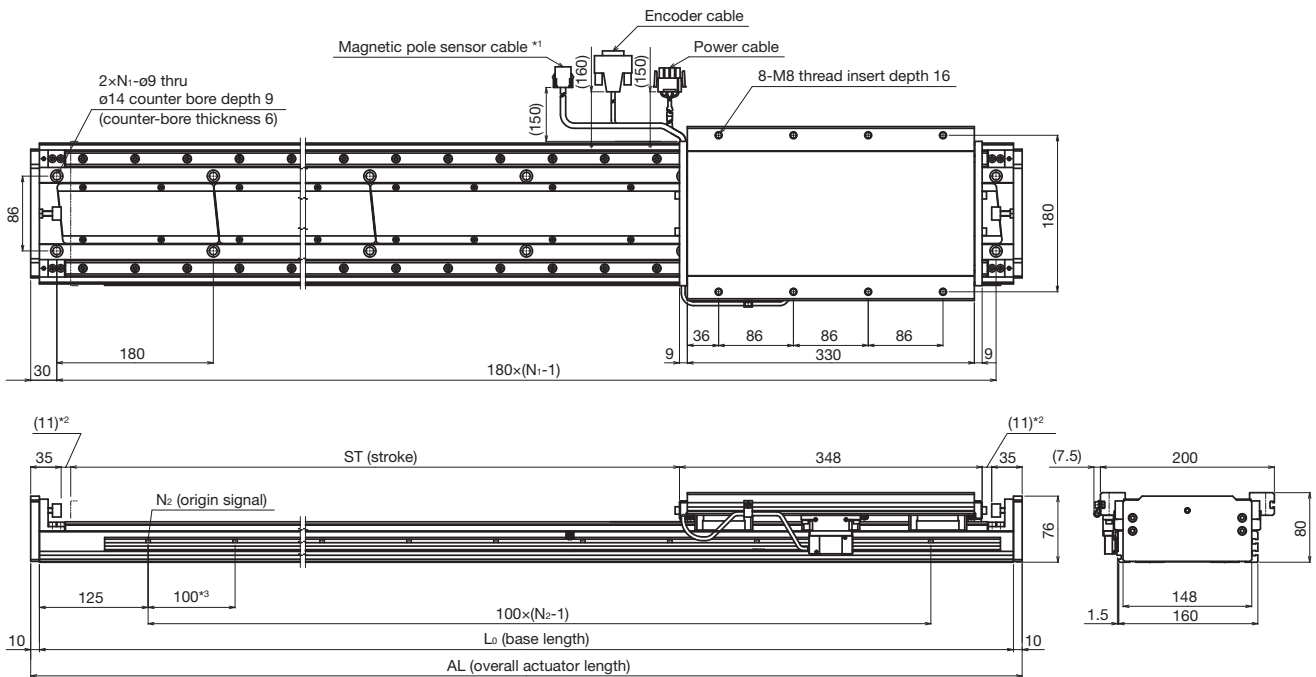


*1 Please note that the magnetic pole sensor cable is not supplied unless the actuator is equipped with a magnetic pole sensor.

*2 The distance from the mechanical stopper to the set stroke position.

Dimensions Motor type: M type

With the optical linear encoder (HEIDENHAIN)



- *1 Please note that the magnetic pole sensor cable is not supplied unless the actuator is equipped with a magnetic pole sensor.
- *2 The distance from the mechanical stopper to the set stroke position.
- *3 Origin signal is sent every 100mm. Select the actually used origin position with an external sensor.

Detailed dimensions

GLM20AP-M-		0160	0340	0520	0700	0880	1060	1240	1420	1600	1780	1960	2140	2320	2500
Stroke [mm] (Stroke between the mechanical stoppers)	ST	160 (182)	340 (362)	520 (542)	700 (722)	880 (902)	1060 (1082)	1240 (1262)	1420 (1442)	1600 (1622)	1780 (1802)	1960 (1982)	2140 (2162)	2320 (2342)	2500 (2522)
Base length [mm]	L ₀	580	760	940	1120	1300	1480	1660	1840	2020	2200	2380	2560	2740	2920
Overall actuator length [mm]	AL	600	780	960	1140	1320	1500	1680	1860	2040	2220	2400	2580	2760	2940
No. of mounting holes per row:	N ₁	4	5	6	7	8	9	10	11	12	13	14	15	16	17
No. of origin signal (HEIDENHAIN only)	N ₂	2	4	6	7	9	11	13	15	16	18	20	22	24	25
Overall actuator mass [kg]	M	17.8	20.5	23.2	25.8	28.5	31.1	33.8	36.5	39.1	41.8	44.5	47.1	49.8	52.4

Note 1: The above stroke applies to the single-slider model. For the stroke with the 2-slider model, please contact THK.

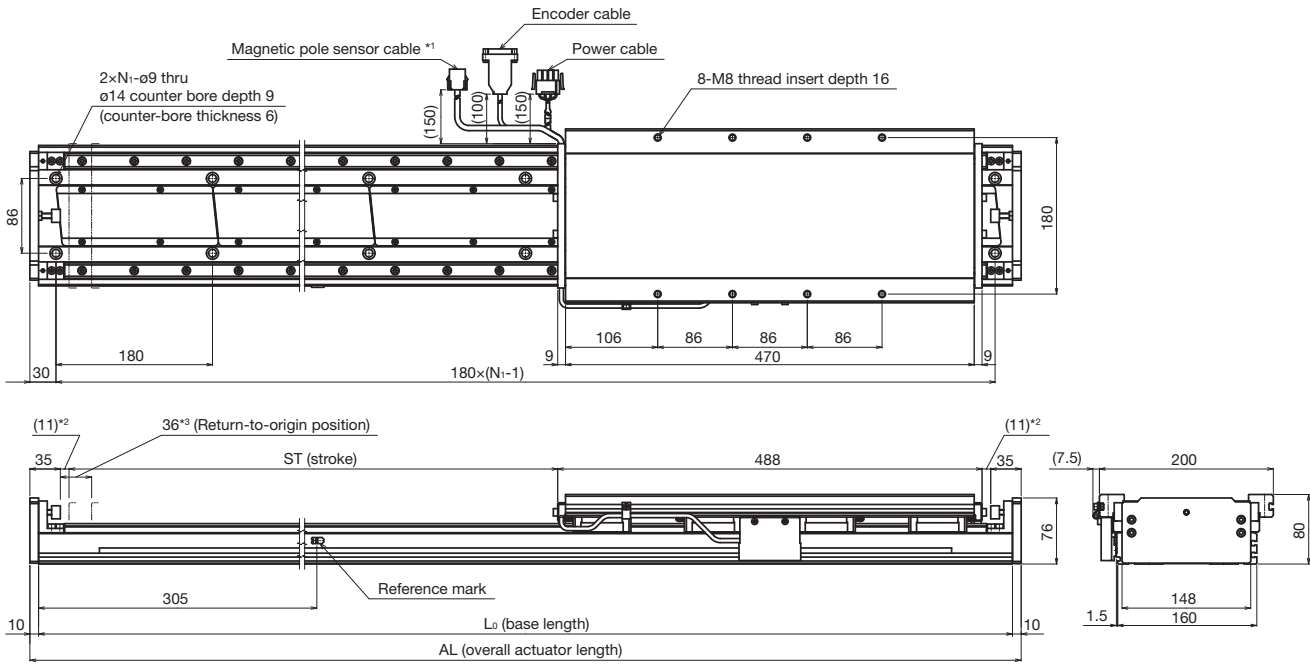
Note 2: The values in () are strokes between the mechanical stoppers.

Note 3: Models are shipped with transportation parts (eye nut) attached.

Note 4: The overall actuator mass is an approximate value for a single-slider model that does not include optional parts, cables, drivers, slider mounting jigs or transportation parts.

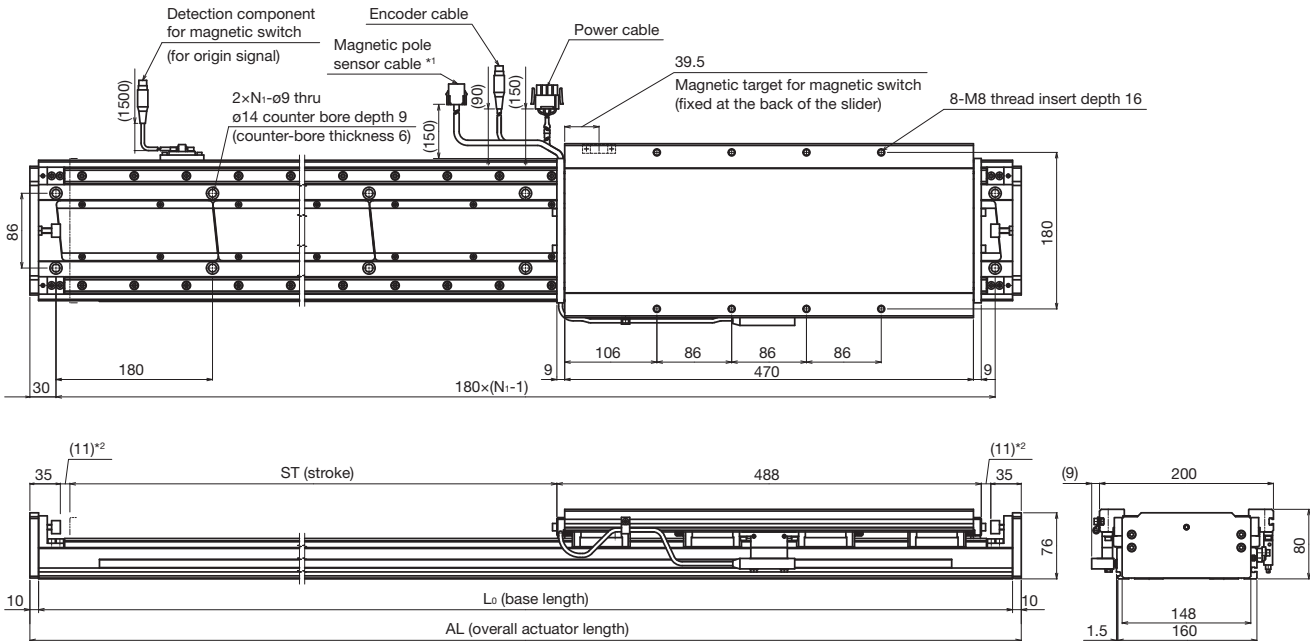
Dimensions Motor type: L type

With the optical linear encoder (RENISHAW)



*1 Please note that the magnetic pole sensor cable is not supplied unless the actuator is equipped with a magnetic pole sensor.
 *2 The distance from the mechanical stopper to the set stroke position.
 *3 Return-to-origin position when the reference mark is used.

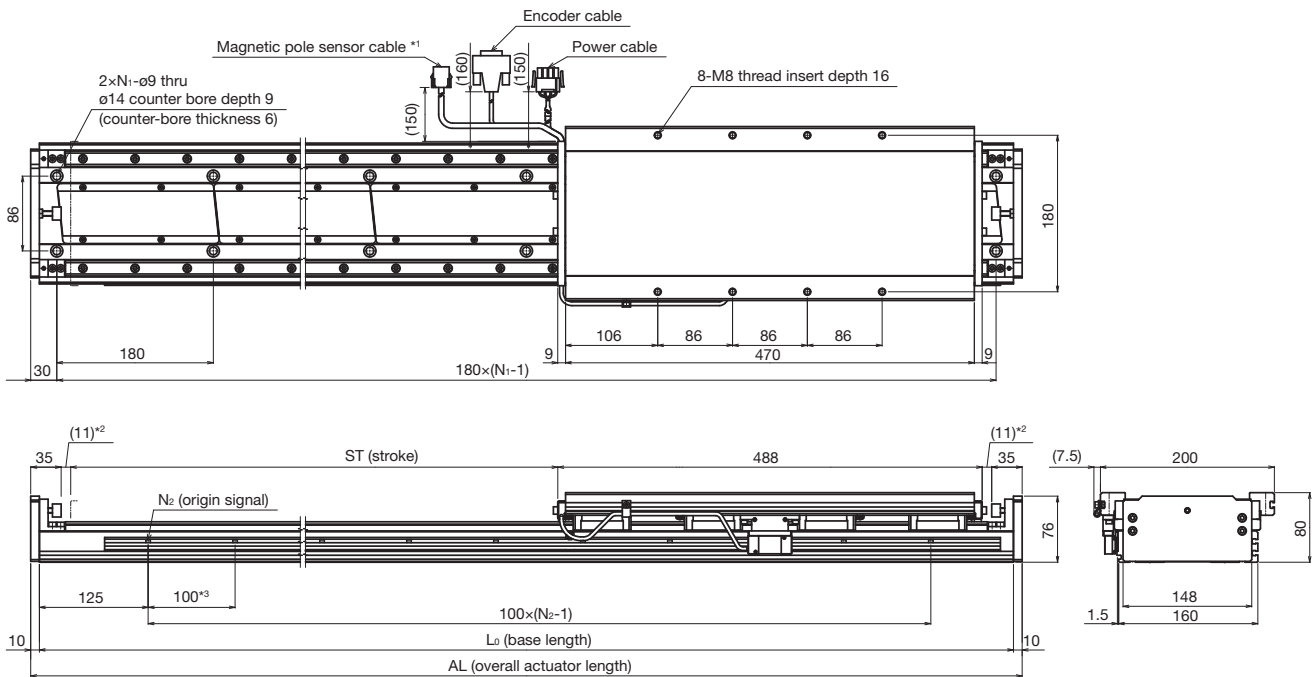
With the magnetic linear encoder (Magnescale)



*1 Please note that the magnetic pole sensor cable is not supplied unless the actuator is equipped with a magnetic pole sensor.
 *2 The distance from the mechanical stopper to the set stroke position.

Dimensions Motor type: L type

With the optical linear encoder (HEIDENHAIN)



- *1 Please note that the magnetic pole sensor cable is not supplied unless the actuator is equipped with a magnetic pole sensor.
- *2 The distance from the mechanical stopper to the set stroke position.
- *3 Origin signal is sent every 100mm. Select the actually used origin position with an external sensor.

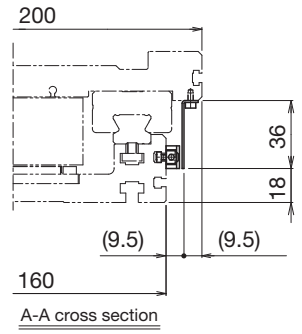
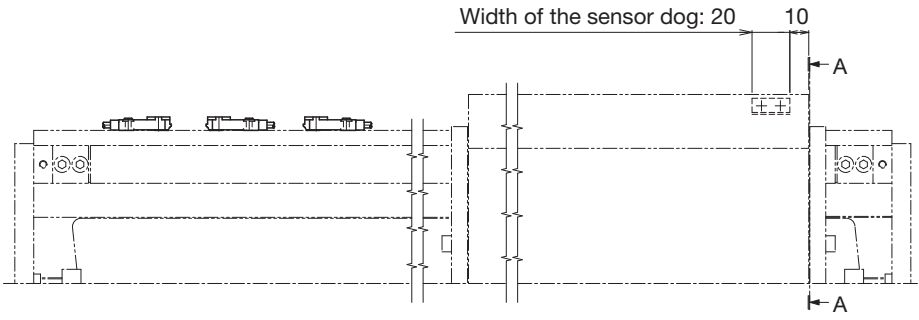
Detailed dimensions

GLM20AP-L-	0200*	0380	0560	0740	0920	1100	1280	1460	1640	1820	2000	2180	2360
Stroke [mm] (Stroke between the mechanical stoppers)	ST 200 (222)	380 (402)	560 (582)	740 (762)	920 (942)	1100 (1122)	1280 (1302)	1460 (1482)	1640 (1662)	1820 (1842)	2000 (2022)	2180 (2202)	2360 (2382)
Base length [mm]	L ₀ 760	940	1120	1300	1480	1660	1840	2020	2200	2380	2560	2740	2920
Overall actuator length [mm]	AL 780	960	1140	1320	1500	1680	1860	2040	2220	2400	2580	2760	2940
No. of mounting holes per row:	N ₁ 5	6	7	8	9	10	11	12	13	14	15	16	17
No. of origin signal (HEIDENHAIN only)	N ₂ 2	4	6	8	9	11	13	15	17	18	20	22	24
Overall actuator mass [kg]	M 24.3	27.0	29.6	32.3	34.9	37.6	40.3	42.9	45.6	48.3	50.9	53.6	56.2

- * The central base mounting hole may not be able to be used if a model with a short stroke is used. In that case, use a nut for the base mounting hole to secure with the T-slot. For the base mounting nut, please contact THK.
- Note 1: The above stroke applies to the single-slider model. For the stroke with the 2-slider model, please contact THK.
- Note 2: The values in () are strokes between the mechanical stoppers.
- Note 3: Models are shipped with transportation parts (eye nut) attached.
- Note 4: The overall actuator mass is an approximate value for a single-slider model that does not include optional parts, cables, drivers, slider mounting jigs or transportation parts.

Sensor Dimensions

Proximity sensor "H", "J"



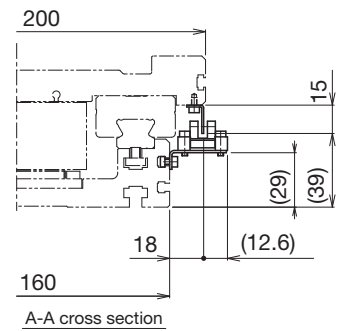
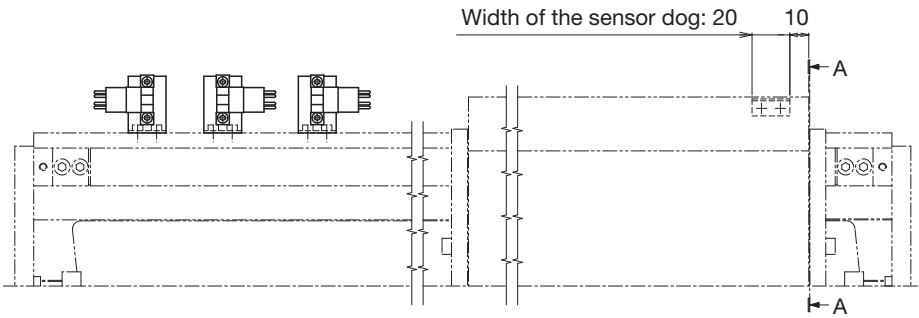
⑧ Sensor
H

GX-F12A [N.O. contact] (3pcs.)
(Panasonic Electric Works SUNX)

⑧ Sensor
J

GX-F12A [N.O. contact] (1pc.)
GX-F12B [N.C. contact] (2pcs.)
(Panasonic Electric Works SUNX)

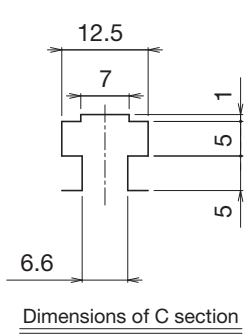
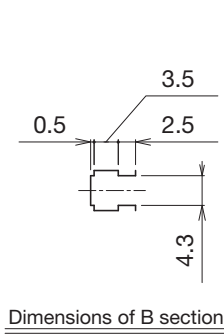
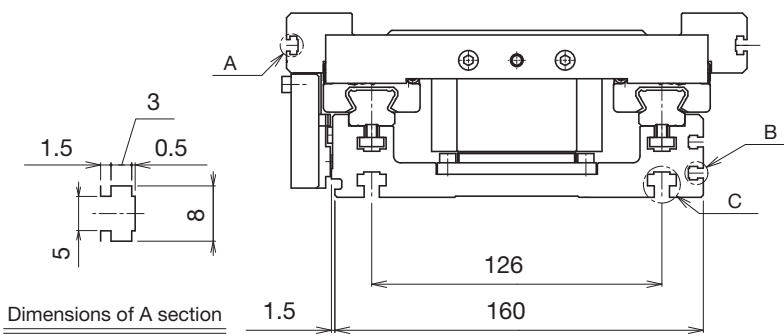
Photo sensor "2"



⑧ Sensor
2

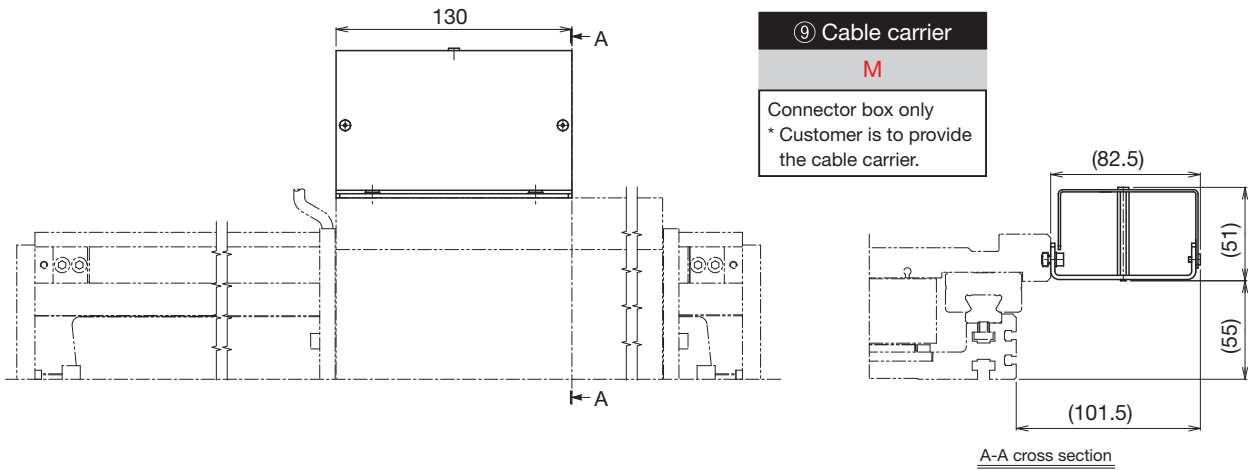
EE-SX671 [Interchangeable for both N.O. and N.C. contact] (3pcs.)
(OMRON)
Connector (model: EE-1001) is included.

T-Slot Dimensions

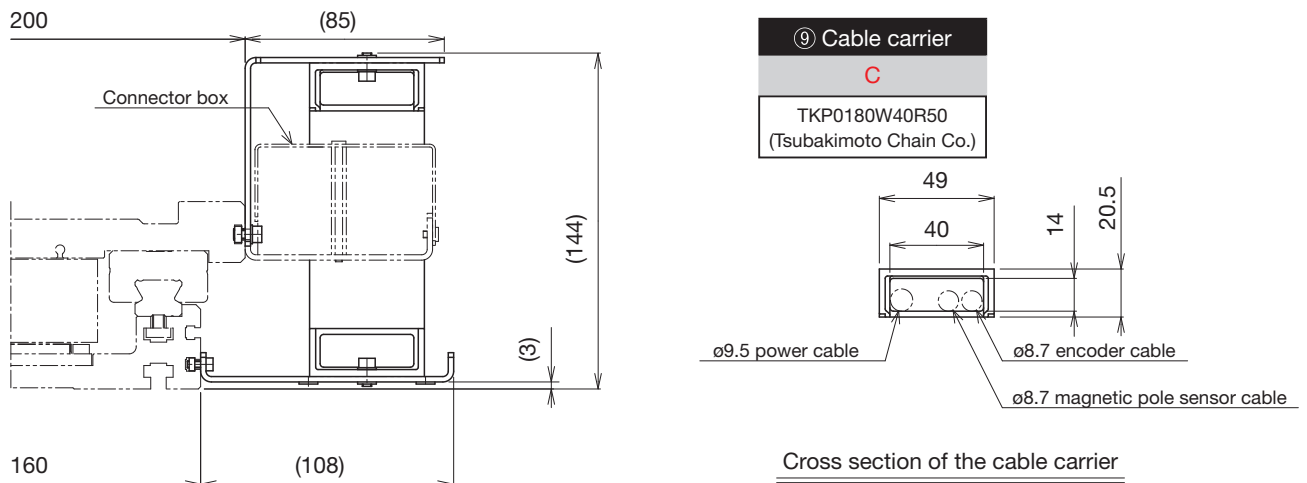


Cable Carrier Dimensions

Connector box "M"

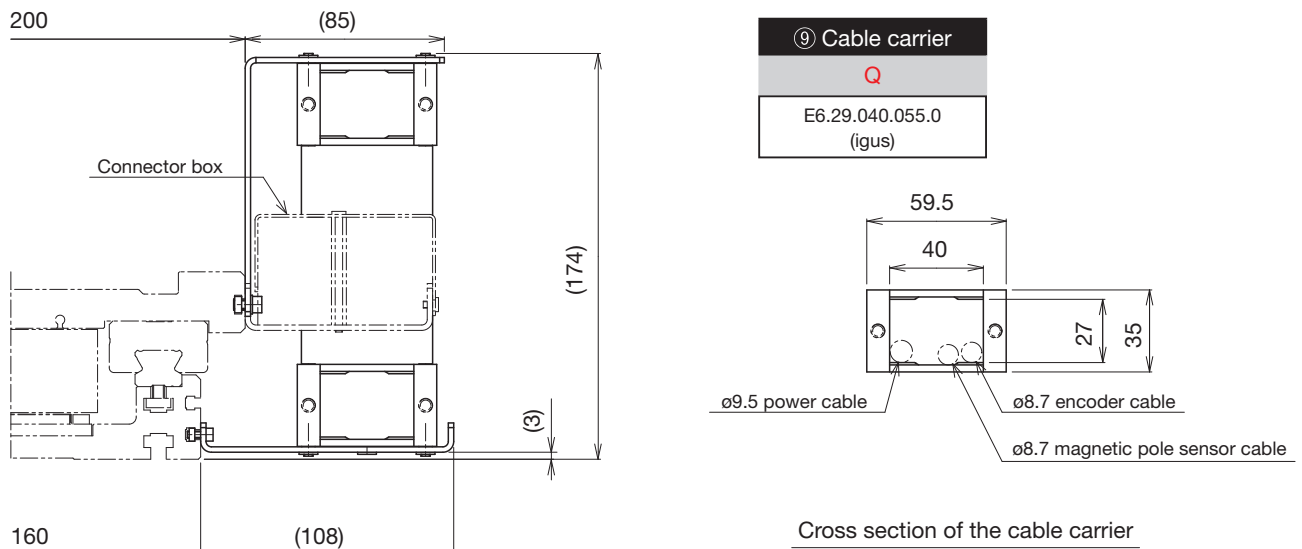


Cable carrier "C"




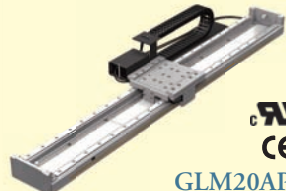

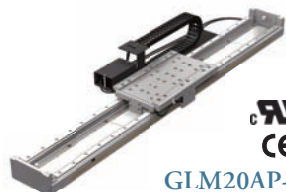


Note: When selecting a model with a cable carrier, the connector box is always included.

Cable carrier "Q"



Note: When selecting a model with a cable carrier, the connector box is always included.

Driver Model TD Designed Specifically for Driving Linear Motors

Driver model no.	Main circuit power supply voltage	External dimensions	Power capacity [kVA]	Appearance	Compatible linear motor actuator(s)
TD-045CU-200AC -GA20SU	Single-phase/ three-phase 200VAC	W: 60 mm H: 180 mm L: 125 mm	1.4	 UL CE	 UL CE GLM20AP-S
TD-075CU-200AC -GA20MU	Single-phase/ three-phase 200VAC	W: 65 mm H: 180 mm L: 162 mm	1.9	 UL CE	 UL CE GLM20AP-M
TD-100CU-200AC -GA20LU	Three-phase 200VAC	W: 94.5 mm H: 180 mm L: 165 mm	2.3	 UL CE	 UL CE GLM20AP-L

Features

1. Driver designed especially for driving linear motors

The drivers are specifically designed for driving linear motors in order to maximize the features of the linear motor actuators such as high speed, rapid acceleration/deceleration and outstanding constant speed.

2. Superior servo performance

Outstanding servo performance is achieved as a result of adopting THK's unique control algorithm.

3. Conforming to international standards that have reputation of superb safety and reliability

All the electronic parts/printed circuit boards and sheet metal/painting conform with the RoHS directive. Safety and reliability have been improved by obtaining CE compliance and UL Certification. Also, the product is fully compliant with THK green procurement.

4. Adequate setup tools

Parameter and others can be set easily by digital operator [D-CON2] and PC software [D-Assist].

Setup Tools

D-CON2 or D-Assist are required to change Driver Model TD parameters.

Digital operator D-CON2



W : 83mm
H : 141mm
D : 23mm

Features

Quick setup

Quick setup is possible by simply connecting it to the Driver Model TD.

Easy operation

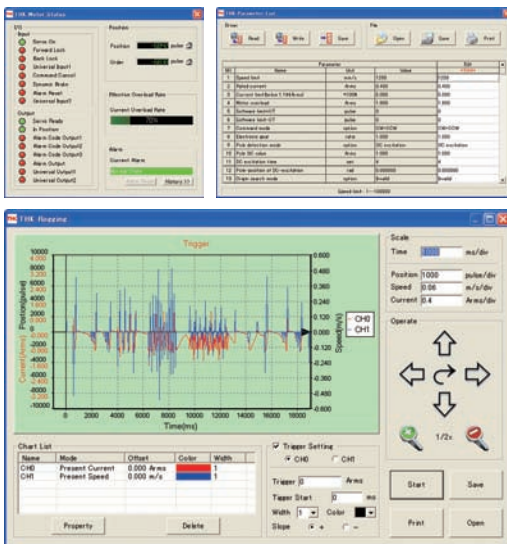
Sheet key and highly visible LCD display (16 characters x 2 lines). Easily set parameters.

Function

- Parameter checking/change/writing/saving
- Monitor (I/O, position, alarm, sizing thrust)
- JOG/FEED operation
- Communication speed setting

Note: Not supplied. Please order separately from THK.

PC software D-Assist



Features

Easy to operate on PC

In addition to D-CON2, parameters can be changed using your own PC. Operational states are displayed as a waveform.

PC software is offered free of charge from the website

PC software can be downloaded free of charge after logging in the THK technical support site. (Japanese and English are available) <https://tech.thk.com/>

Function

- Parameter checking/change/writing/saving
- Monitor (I/O, position, alarm, sizing thrust)
- Logging (position/speed/waveform display of current)
- JOG/FEED operation
- Communication speed setting

Note: The RS-232C (K232-01) PC communication cable is required. Please order the cable from THK.

Encoder Adjuster

* Only with a HEIDENHAIN optical linear encoder

Encoder adjuster APS27



APS27 is an encoder adjuster for checking the mounting tolerance of LIDA277 with TTL interface. Encoders are already adjusted when the actuator is shipped, however the encoder adjuster may be required for readjustment during maintenance and inspections.

To make adjustments, connect LIDA277 to the encoder cable via the PS27 test connector, or directly adjust the encoder with the PG27 test unit.

The encoder is correctly mounted if both the incremental signal and origin signal LEDs light in green.

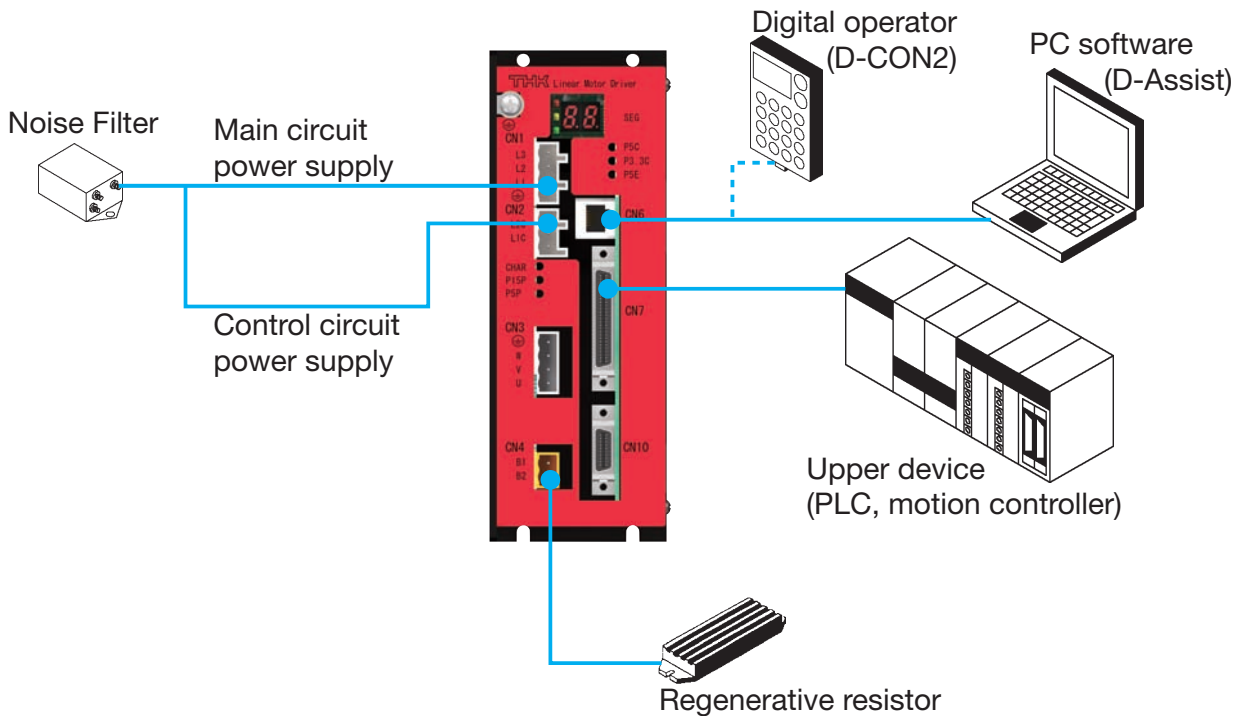
If the LEDs light in red, the mounting of the encoder must be readjusted.

	APS27
Encoder	LIDA277
Function	Good/faulty TTL signal (incremental signal and origin signal)
Accessories	PS27: Test connector PG27: Test unit Power unit for PG27 (110 to 240VAC, includes adapter plug) light blocking film

Driver Basic Specifications

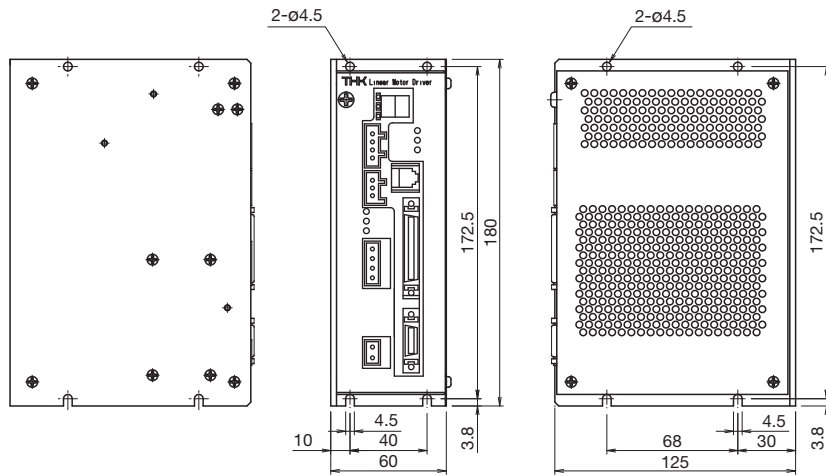
Driver model no. TD-		045CU-200AC-GA20SU	075CU-200AC-GA20MU	100CU-200AC-GA20LU
Motor type	GLM20AP-	S	M	L
Main circuit power supply	Voltage/frequency	Single-phase/three-phase 170 to 250VAC 50/60Hz		Three-phase 170 to 250VAC 50/60Hz
Control circuit power supply	Voltage/frequency	Single-phase 170 to 250VAC 50/60Hz		
Power capacity [kVA]		1.4	1.9	2.3
Control specifications	Control method	Single-phase or three-phase full-wave rectification, IGBT PWM control, sinusoidal-wave drive		
	Feedback	90-degree phase difference 2-phase pulse (phase A + phase B)		
Command input pulse	Type	Select either of Code + Pulse train, CCW + CW pulse train or 90-degree phase difference 2 phase pulse (phase A + phase B)		
	Form	Line driver (+5V level)		
	Frequency	Maximum 5MHz		
LED display		Charged LED, internal power source LED × 5, 7 segments LED 2-digit, display LED × 3		
I/O signals	Position signal output	Phase A, phase B, phase Z: Line driver output		
	Sequence input	Photo coupler input: servo on, forward rotation drive prohibition, reverse rotation drive prohibition, alarm reset, command pulse block, DB input, universal input ×2		
	Sequence output	Photo coupler output: servo alarm, alarm code (3-bit), positioning completion, servo ready, universal output ×2		
Service environment	Service (storage) temperature	Service temperature 0 to +50°C Storage temperature -20 to +85°C (no freezing allowed)		
	Service (storage) humidity	Max. 90% RH (no condensation allowed)		
Anti vibration/impact resistance		2G (JIS C60068-2-6)/100G (JIS C60068-2-27)		
Line noise tolerance		1500V 500ns Common mode, normal mode		
Communication functions		RS-232C×1 port:For PC software or digital operator connection, I/O status display, parameter setting, alarm display, and JOG motion are available.		
Protection functions		Regeneration overload, IPM module abnormality, motor overcurrent (U, V phases), main circuit overvoltage, main circuit insufficient voltage, motor overload, encoder alarm, system alarm, driver overheat, excessive position error, uncontrolled motion detection (during servo ON), EEPROM error, magnetic pole detection error, electronic thermal alarm, abnormal parameter setting, software limit, abnormal motion		
Mass [kg]		1.0	1.3	2.0

Peripheral Equipment Configuration

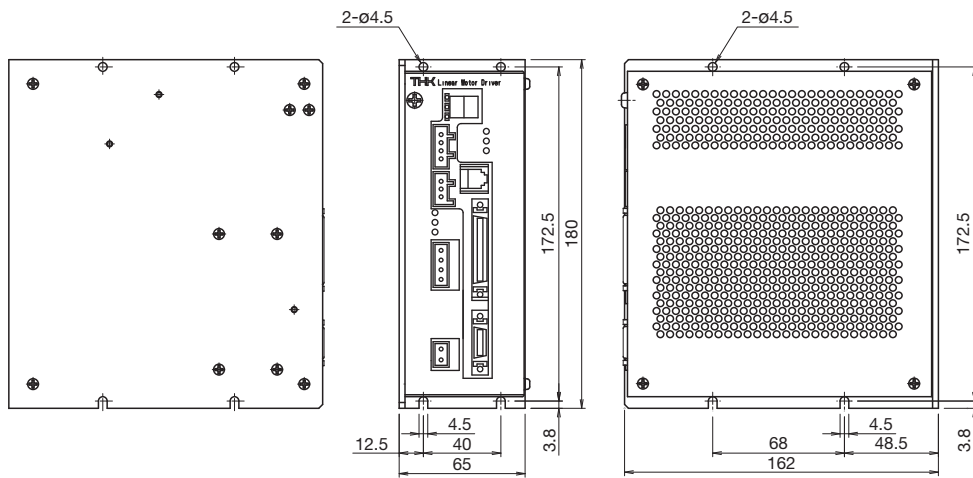


External Dimensions of the Driver

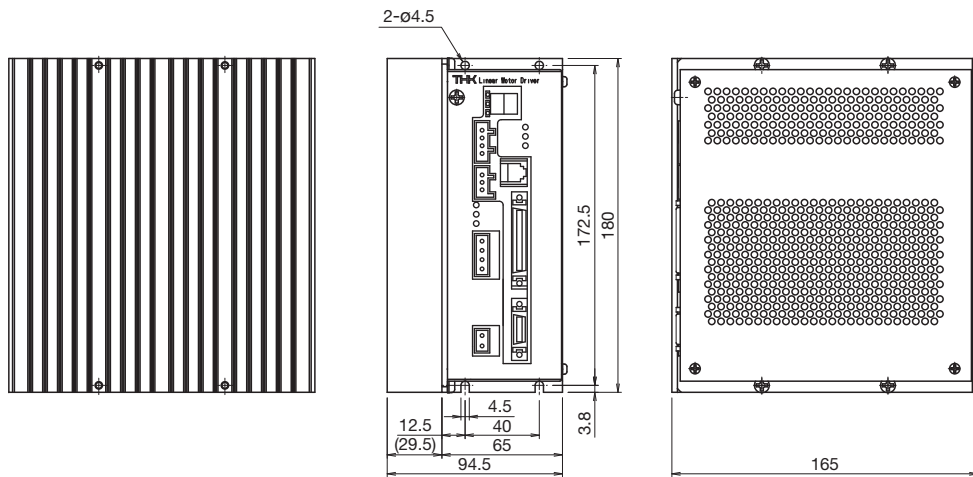
TD-045CU-200AC-GA20SU



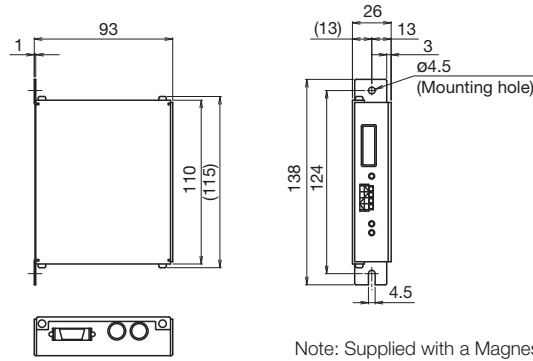
TD-075CU-200AC-GA20MU



TD-100CU-200AC-GA20LU



MJ100: Interpolator



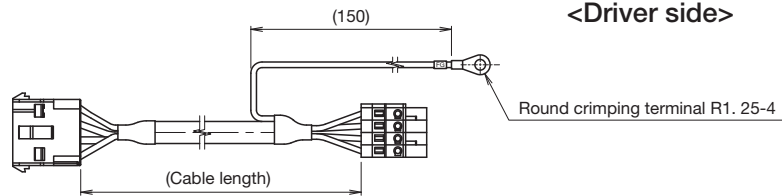
Note: Supplied with a Magnescale magnetic linear encoder.

Cable Specifications

KDK-**-CU: Power cable

<Motor side>

<Driver side>



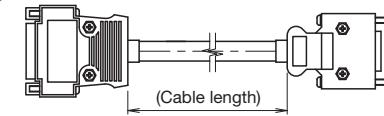
Cap : 350780-1 (Tyco Electronics Japan G.K.)
Socket : 350550-3 (Tyco Electronics Japan G.K.)

Plug: 231-104 (WAGO)

KET-**-CU: Encoder cable

<Linear encoder side>

<Driver side>



Hood : XM2S-1513 (OMRON)
Socket : XM2D-1501 (OMRON)

NS Shell kit : 10320-52A0-008 (Sumitomo 3M)
Plug : 10120-3000PE (Sumitomo 3M)

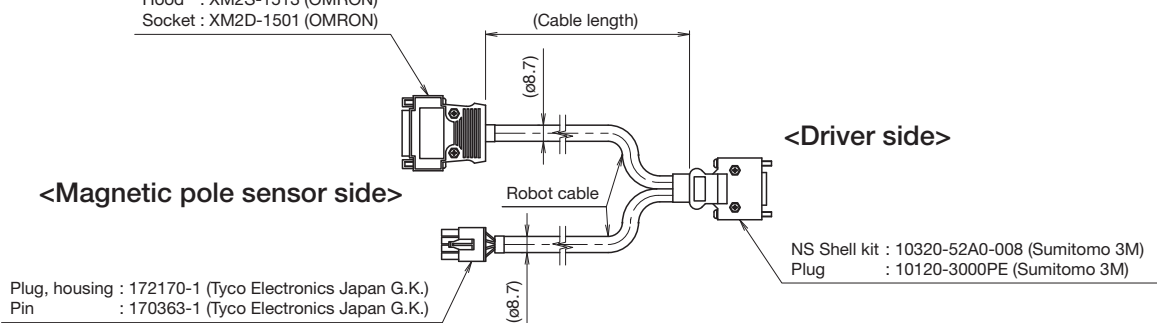
KJET-**-CU: Encoder, magnetic pole sensor cable

<Linear encoder side>

Hood : XM2S-1513 (OMRON)
Socket : XM2D-1501 (OMRON)

<Magnetic pole sensor side>

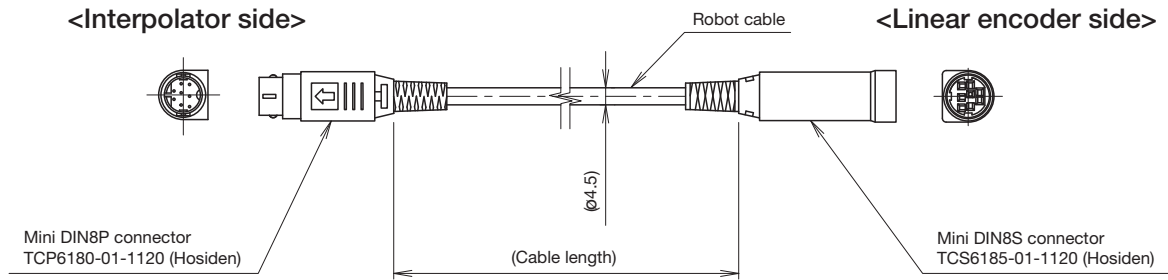
<Driver side>



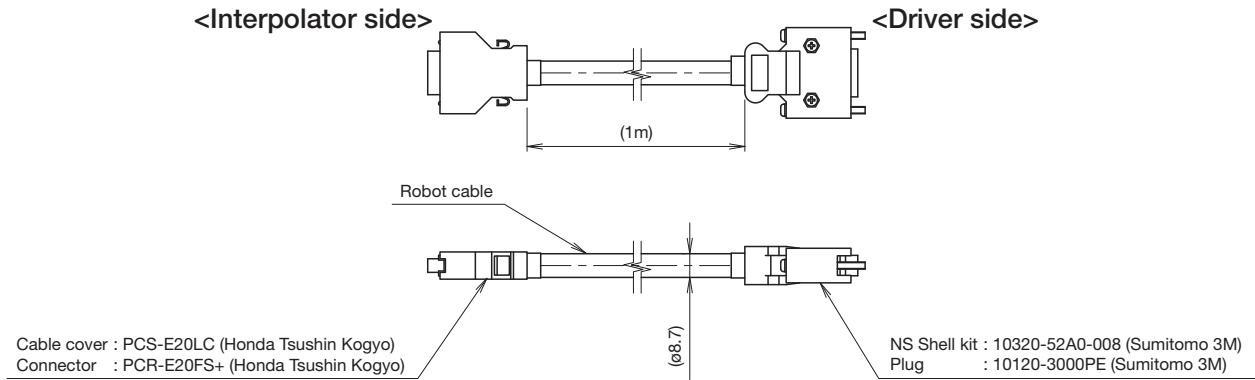
Plug, housing : 172170-1 (Tyco Electronics Japan G.K.)
Pin : 170363-1 (Tyco Electronics Japan G.K.)

NS Shell kit : 10320-52A0-008 (Sumitomo 3M)
Plug : 10120-3000PE (Sumitomo 3M)

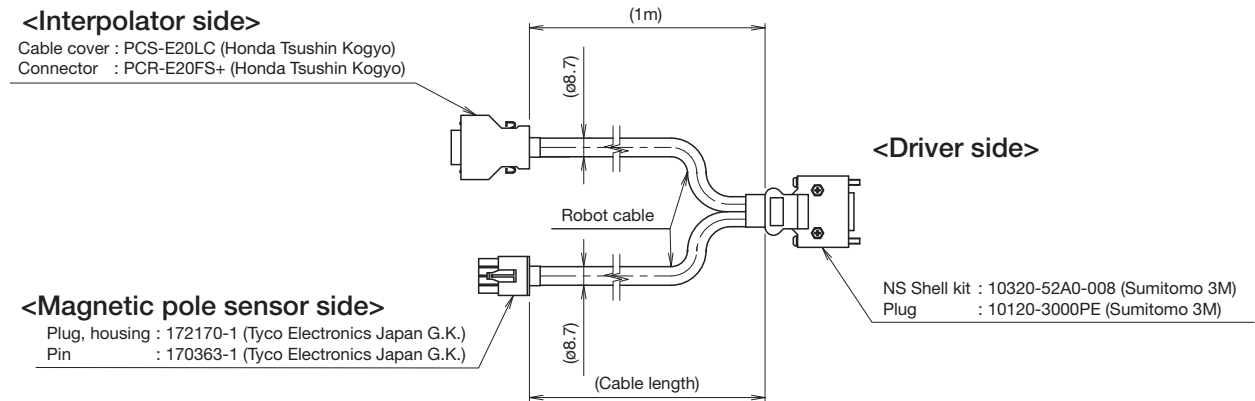
CK-**: Encoder cable



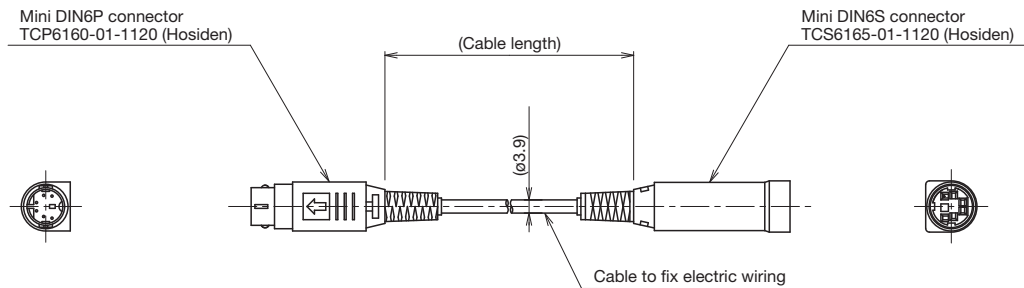
KSET-01-CU: Cable between the interpolator and driver



KSJT-**-CU: Cable between the interpolator and driver when the magnetic pole sensor is equipped



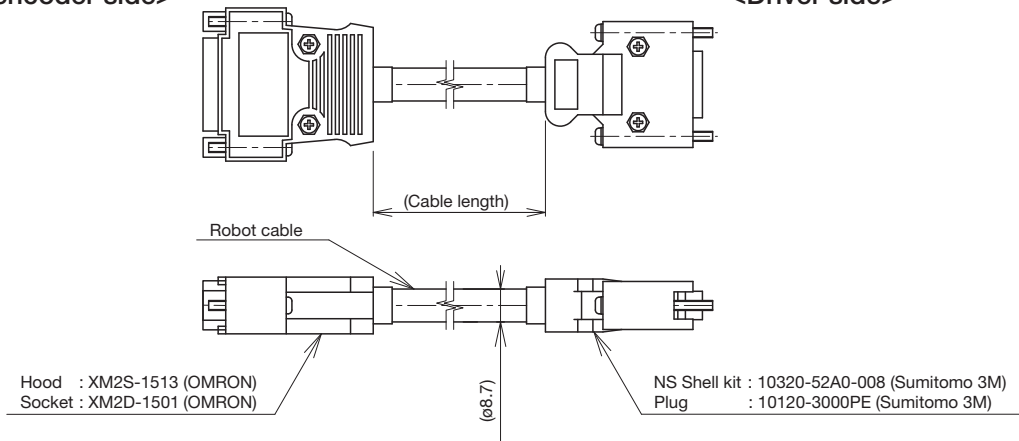
CE09-**: Origin detector cable



KEK--CU: Encoder cable**

<Linear encoder side>

<Driver side>



KHET--CU: Encoder, magnetic pole sensor cable**

<Linear encoder side>

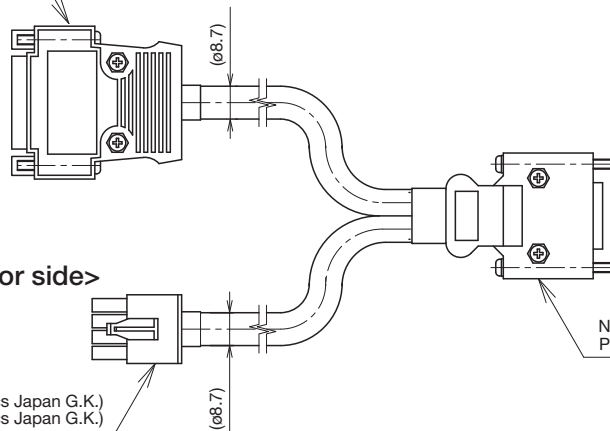
Hood : XM2S-1513 (OMRON)
Socket : XM2D-1501 (OMRON)

<Magnetic pole sensor side>

Plug, housing : 172170-1 (Tyco Electronics Japan G.K.)
Socket : 170363-1 (Tyco Electronics Japan G.K.)

<Driver side>

NS Shell kit : 10320-52A0-008 (Sumitomo 3M)
Plug : 10120-3000PE (Sumitomo 3M)



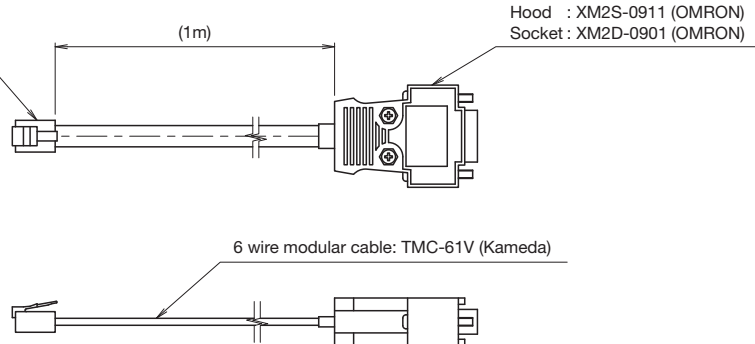
K232-01: PC communication cable RS-232C

<Driver side>

Modular jack: MS6-6 (Kameda)

<PC side>

Hood : XM2S-0911 (OMRON)
Socket : XM2D-0901 (OMRON)



GLM20AP Selection Method

Select the linear motor following the procedure below.

* If you provide the usage conditions, THK can select a recommended model number.
Please contact THK.

1. Evaluate the maximum thrust ratio

Make sure that the maximum thrust of the motor exceeds the required thrust for operations.
It is recommended to use with **80% or less** of the maximum thrust by load fluctuations into account.

2. Evaluate the RMS thrust ratio

Make sure that the rated continuous thrust of the motor exceeds the required RMS thrust.
It is recommended to use with **70% or less** of the rated continuous thrust by taking load fluctuations into account.

* It is recommended to use with 60% or less of the the rated continuous thrust when using the actuator in a ceiling mount.
Please contact THK for details.

3. Confirm the specifications of the selected model number

Check the detailed specifications of the model number selected using the above process, to ensure that external dimensions, stroke, maximum speed, resolution and positioning repeatability all satisfy the requirement.

4. Selection of regenerative resistor

A regenerative resistor may be required depending on the operating conditions.
Check the "GLM20AP Instruction Manual" and Evaluation of regenerative resistor (→ P.32) for the selection method.

Calculation conditions

m_1	Payload	[kg]
m_2	Slider mass	[kg]
V	Motion speed	[m/s]
g	Gravitational acceleration (9.807m/s ²)	
μ	Friction coefficient	
α	Acceleration	[m/s ²]
L	Stroke	[m]
P	Motor attraction force	[N]
f	Sliding resistance of LM block	[N]
n	No. of LM blocks being used	
T	1 cycle time	[s]
t ₁	Acceleration time	[s]
t ₂	Constant speed time	[s]
t ₃	Deceleration time	[s]
t ₄	Stop time	[s]

Data for selection

Motor type	S type	M type	L type
Slider mass: m_2 [kg]	5.3 (5.1)	9.1 (8.9)	12.9 (12.7)
Motor attraction force: P [N]	1232	2547	3728
No. of LM blocks being used: n [pcs]	4	6	8
Sliding resistance of LM block: f [N]	3.7		
Friction coefficient: μ	0.01		
Maximum load capacity [kg] *1	46.1	86.1	134.6
Estimated load capacity [kg] *2	7.7	15.0	24.5

Note: The values in () are for the specifications without the magnetic pole sensor.

*1 Speed or acceleration/deceleration may be reduced by the payload mass. See "GLM20AP Selection Method" on Pages 26 to 32.

The maximum load capacity is the mass that can be driven with the acceleration of approx. 0.5G.

*2 The estimated load capacity is the mass that can be driven with the acceleration of approx. 2G, with the maximum speed of 1.0 m/s, and at a duty factor of 50% of a constant stroke.

However, operable mass may vary as it may be affected by thrust-speed characteristics depending on speed.

Table 1. Permissible driver regenerative energy

Driver model no.	Permissible regenerative energy E_2 [J]	Minimum permissible resistance [Ω]	Regenerative power [W]			
			RH120 100 Ω	RH150 100 Ω	RH220 100 Ω	RH300C 100 Ω
				RF180 100 Ω	RF240 100 Ω	
TD-045CU-200AC-GA20SU	4.5	100	70	90	120	200
TD-075CU-200AC-GA20MU	13.1	100	70	90	120	200
TD-100CU-200AC-GA20LU	19.7	100	70	90	120	200

Table 2. External regenerative resistor and reference model for reference

Name	Type	Specifications	Manufacturer
Regenerative resistor	RH*** 100 Ω *	Without thermostat	Iwaki Musen Kenkyusho
	RH*** 100 Ω * -***B	With thermostat (external)	
	RF*** 100 Ω * -***B	With thermostat (internal)	
Female plug: 2-pole Pin pitch: 5.08mm	231-302/026-000		WAGO

Note: * under the Type column of the regenerative resistor indicates, from the left toward the right, the power, permissible resistance, and thermostat temperature, respectively. For details, refer to the manufacturer's catalog.

Evaluating the maximum thrust ratio

The required maximum thrust F_{\max} is the largest value out of the values calculated by the following three formulas:

Load force: F [N]	$F = \mu \times m_1 \times g$
Thrust during acceleration: F_a [N]	$F_a = (m_1 + m_2) \times \alpha + F$
Thrust during deceleration: F_{d1} [N]	$F_{d1} = (m_1 + m_2) \times \alpha - F$

Required maximum thrust F_{\max} : Maximum value of F , F_a and F_{d1} above

Find the maximum thrust F_{peak} of the actuator at the motion speed from the thrust-speed characteristics chart in product specifications (→ P.7).

Maximum thrust ratio (%): $\frac{F_{\max}}{F_{\text{peak}}} \times 100$ 80% or less is recommended.

Evaluating the RMS thrust ratio

Calculate the RMS (root-mean-square) thrust from the load force, thrust during acceleration, and thrust during deceleration with respect to each duration.

RMS thrust: F_{rms} [N]	$F_{\text{rms}} = \sqrt{\frac{F_a^2 \times t_1 + F^2 \times (t_2 + t_4) + F_{d1}^2 \times t_3}{T}}$
----------------------------------	---

Also, from the motion profile, average speed: V_{ave} is calculated.

Average speed: V_{ave} [m/s]	$V_{\text{ave}} = \frac{L}{T \text{ (1 cycle time)}}$
---------------------------------------	---

Find the rated continuous thrust F_{cont} of the motor from the thrust-speed characteristics chart in product specifications (→ P.7).

RMS thrust ratio (%): $\frac{F_{\text{rms}}}{F_{\text{cont}}} \times 100$ 70% or less is recommended.

Evaluating the regenerative resistor

Use the following formula to calculate the thrust during deceleration.

Thrust during deceleration: F_{d2} [N]

$$F_{d2} = (m_1 + m_2) \times \alpha - [(m_1 + m_2) \times g + P] \times \mu + f \times n$$

Regeneration energy: E_1 [J]

$$E_1 = F_{d2} \times t_3 \times \frac{V}{2}$$

Check the permissible regenerative energy E_2 of the driver to be used. (→ P.27 Table 1)

If $E_2 < E_1$, regeneration resistor is required.

Required capacity of regenerative resistor: W_k [W]

$$W_k = \frac{(E_1 - E_2)}{0.2 \times T}$$

Example of Selection

The examination below shows that if GLM20AP-S type can drive a payload of 10kg along the following motion profile:

Selection model	: GLM20AP-S type 200VAC specifications without magnetic pole sensor
Payload	: $m_1 = 10$ [kg]
Slider mass	: $m_2 = 5.1$ [kg]
Motion speed	: $V = 1.0$ [m/s]
Acceleration	: $\alpha = 10$ [m/s ²]
Stroke	: $L = 1.0$ [m]
Friction coefficient	: $\mu = 0.01$
Gravitational acceleration	: $g = 9.807$ [m/s ²]

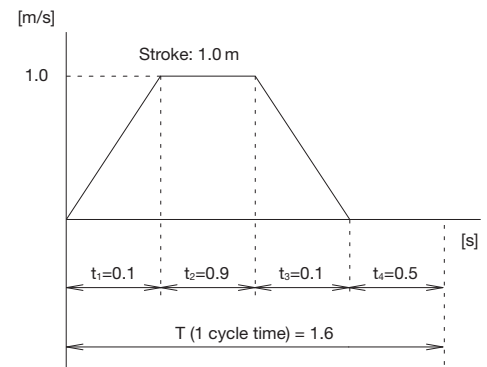


Figure: Motion profile

(1) Evaluating the required maximum thrust ratio

The required maximum thrust is the largest value out of the values calculated by the following three formulas.

$$\begin{aligned} \text{Load force} \quad : F &= \mu \times m_1 \times g \\ &= 0.01 \times 10 \times 9.807 \\ &= 1.0 \text{ [N]} \end{aligned}$$

$$\begin{aligned} \text{Thrust during acceleration} : F_a &= (m_1 + m_2) \times \alpha + F \\ &= (5.1 + 10) \times 10 + 1.0 \\ &= 152.0 \text{ [N]} \end{aligned}$$

$$\begin{aligned} \text{Thrust during deceleration} : F_{d1} &= (m_1 + m_2) \times \alpha - F \\ &= (5.1 + 10) \times 10 - 1.0 \\ &= 150.0 \text{ [N]} \end{aligned}$$

From the above calculation results:

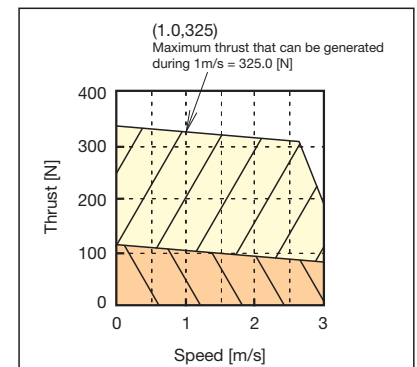
Required maximum thrust: $F_{\max} = F_a = 152.0$ [N]

Thrust-speed characteristics chart (Figure) for GLM20AP-S type shows that the thrust of the motor's maximum thrust:

F_{peak} (at speed = 1.0m/s) = 325 [N]

Therefore, the ratio of the required maximum thrust to the motor's maximum thrust is:

$$\frac{F_{\max}}{F_{\text{peak}}} \times 100 = \frac{152}{325} \times 100 = \underline{47[\%]} (\leq 80\%)$$



Motor type : S type
Driver : TD-045CU-200AC-GA20SU

Figure: Thrust-speed characteristics chart

(2) Evaluating the RMS thrust ratio

Calculate the RMS (root-mean-square) thrust from the load force, thrust during acceleration, and thrust during deceleration with respect to each duration.

RMS thrust:

$$F_{rms} = \sqrt{\frac{F_a^2 \times t_1 + F^2 \times (t_2 + t_4) + F_{d1}^2 \times t_3}{T}}$$

$$= \sqrt{\frac{152.0^2 \times 0.1 + 1.0^2 \times (0.9 + 0.5) + 150.0^2 \times 0.1}{1.6}}$$

$$= 53.4 \text{ [N]}$$

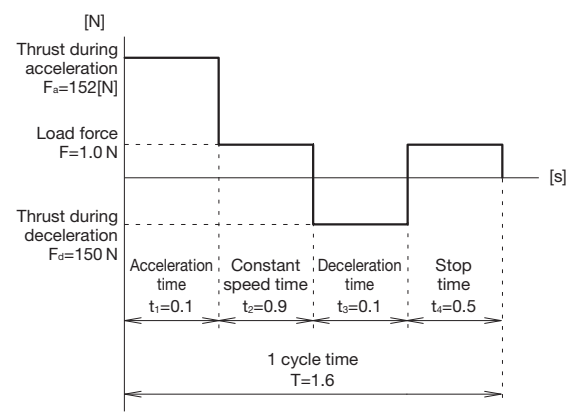


Figure: Thrust and time

Also, from the motion profile, average speed : V_{ave} is calculated:

$$V_{ave} = \frac{L}{T} = \frac{1.0}{1.6} = 0.625 \text{ [m/s]}$$

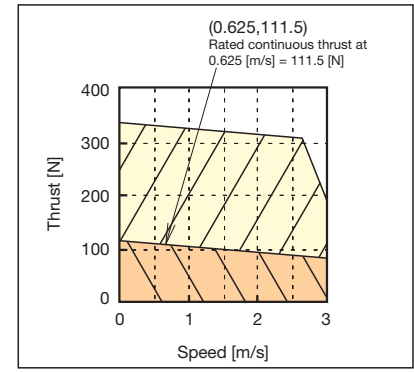
Thrust-speed characteristics chart for GLM20AP-S type shows that the thrust of the motor's rated continuous thrust:

$$F_{cont} \text{ (at the time of average speed } 0.625\text{m/s)} = 111.5 \text{ [N]}$$

Therefore, the RMS thrust ratio for the rated continuous thrust is:

$$\frac{F_{rms}}{F_{cont}} \times 100 = \frac{53.4}{111.5} \times 100 = \underline{\underline{48[\%]}} (\leq 70\%)$$

As the result above, of the maximum thrust ratio and RMS thrust ratio, this application shall be concluded operative.



Motor type : S type
Driver : TD-045CU-200AC-GA20SU

Figure: Thrust-speed characteristics chart

(3) Evaluating the regenerative resistor

Determine whether or not a regenerative resistor is required, by comparing the value calculated from the thrust during deceleration, deceleration time and motion speed with the permissible regenerative energy of the driver.

Use the following formula to calculate the thrust during deceleration.

$$\text{Thrust during deceleration} : F_{d2} = (m_1 + m_2) \times \alpha - \{[(m_1 + m_2) \times g + P] \times \mu + f \times n\} = 122.4 \text{ [N]}$$

$$\text{Motor attraction force} : P = 1232 \text{ [N]}$$

$$\text{Sliding resistance of LM block} : f = 3.7 \text{ [N]}$$

$$\text{No. of LM blocks} : n = 4 \text{ (for GLM20AP-S)}$$

$$\text{Deceleration time} : t_3 = 0.1 \text{ [s]}$$

$$\text{Cycle time} : T = 1.6 \text{ [s]}$$

$$\text{Motion speed} : V = 1.0 \text{ [m/s]}$$

$$\text{Regenerative energy in the above case: } E_1 = F_{d2} \times t_3 \times \frac{V}{2} = 6.12 \text{ [J]}$$

From Table 1 on P.27, the permissible regeneration of the driver being used (TD-045CU-200AC-GA20SU) is:

$$E_2 = 4.5 \text{ [J]}$$

Because $E_2 < E_1$, an external regenerative resistance is required.

$$\text{The required capacity of the external regenerative resistor is: } W_K = \frac{(E_1 - E_2)}{0.2 \times T} = \underline{\underline{5.06 \text{ [W]}}}$$

0.2 in the above formula is the value where the load factor in use of the external regenerative resistor is 20%.

Because the required capacity of the external regenerative resistor is 5.06 W, select a recommended regenerative resistor model number with the capacity of 5.06W or more.

* Minimum permissible resistance of TD-045CU-200AC-GA20SU = 100 [Ω]

Therefore, select the RH120 100 Ω (70W) [Iwaki Musen Kenkyusho].

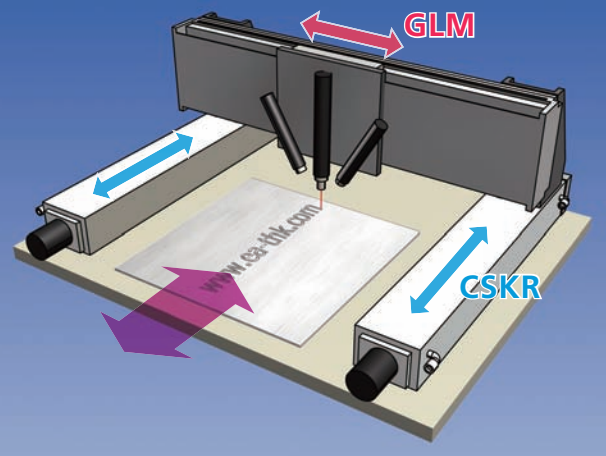
Note 1: Check with the manufacturer for detailed specifications of the external regenerative resistor, including load characteristics and thermostat specifications.

Note 2: If an external regenerative resistor is required, the customer is to provide the connector for connection (→ P.27 Table 2).

Application Example

Laser marking

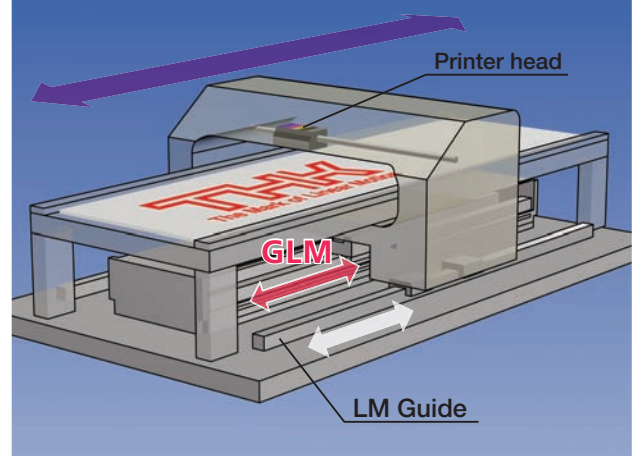
Machining, assembly



Model No. CSKR GLM
 CSKR and GLM are used for the section that moves the laser. By using CSKR, clean series, and GLM, a series that drives the load without physical contact and generates little dust, application in a clean room has been made possible.

Printer

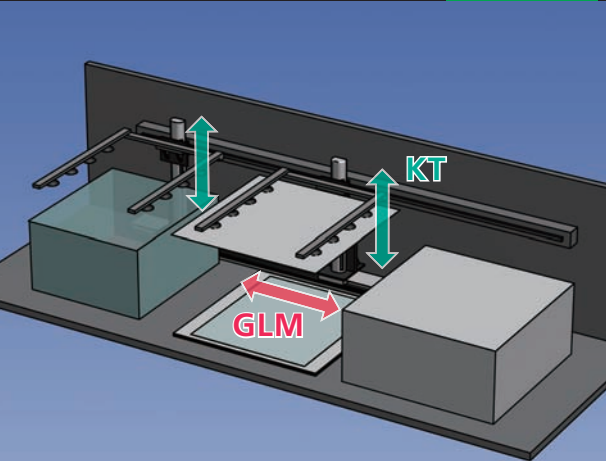
Other



Model No. GLM LM Guide
 GLM is used for the transfer section of the head. By using GLM that boasts of a high precision and a high resolution, high-definition printing is possible.

Liquid crystal substrate transfer device

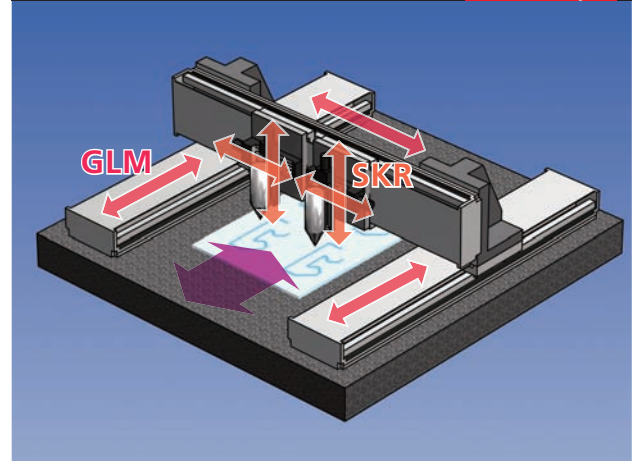
Transfers



Model No. GLM KT
 This device alternately stacks liquid crystal substrates over spacers. The two-slider model GLM is used for the transfer section and KT is used for the elevating section. KT is used for multiple-point positioning, so that an independent slider can be used for transfer operations with a short takt time.

Dispenser

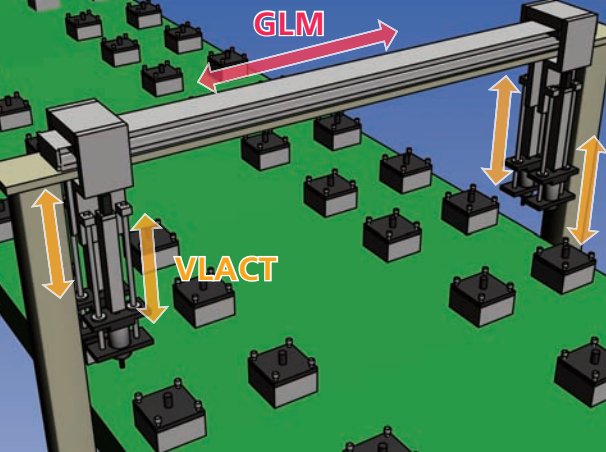
Machining, assembly



Model No. SKR GLM
 SKR and GLM are used for the dispenser section. The use of a linear motor delivers high-speed and smooth operation, improving the dispensing accuracy.

Nut runner

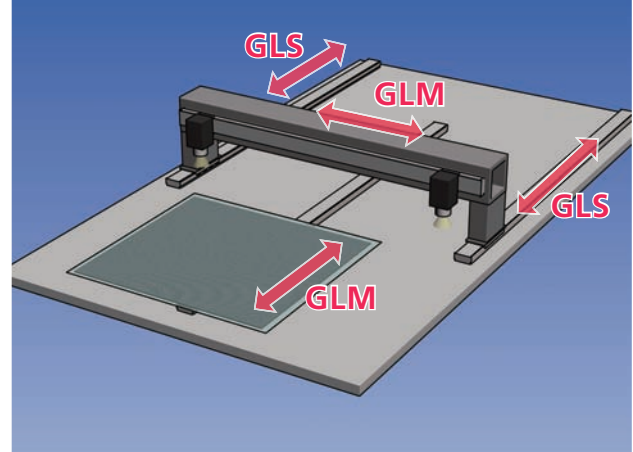
Machining, assembly



Model No. GLM VLACT
 VLACT is used for the elevating section of a screw tightening machine and GLM is used for the transfer section. By performing independent control operations with a multiple-slider model in the linear motor series, productivity can be improved.

Glass substrate exposure equipment

Machining, assembly



Model No. GLM GLS
 GLM is used for the section that transfers the substrate, and GLS is used for the exposure unit driving section. Using joint base model, high-speed movements with a stroke as long as 5000 mm can be achieved.

| Maximum thrust |

Indicates the largest value of the force that the slider can generate instantaneously.

| Magnetic pole sensor |

The sensor that identify N and S poles of the magnet. This is used to detect the relative position between the coil and polarity of the permanent magnet.

| Optical linear encoder |

A position detector that detects the positional information of the slider by using light (laser light). This is used for the application that require high precision and high resolution.

| Magnetic linear encoder |

A position detector that detects the positional information of the slider by using magnetism. This possesses superb environmental resistance compared to the optical type.

| CE compliance |



Statutory safety logo for the products sold in the EU region. For the unit products such as drivers, etc., obtaining the CE compliance approval became fully compulsory from January 1996 by the EMC directive and low voltage directive.

(1) EMC Directive

- Immunity test: Capacity to withstand noise from outside
- Emission test: Capacity to reduce the release of noise to outside

(2) Low Voltage Directive

- Requirement of electric safety for the electric products that are operated by the power source of 50 to 1000VAC and 75 to 1500VDC.

| RoHS Directive |

This is a hazardous substances control act enforced by EU on July 1, 2006, prohibiting electric and electronic equipment to contain the specified hazardous substances. If the products contain the hazardous substances that are controlled by this directive, they cannot be sold within the EU region.

| UL Standard |



UL stands for Underwriters Laboratories Inc., a nonprofit organization in the United States. The UL standard created by UL has garnered public trust as the highest authority for safety standards, and UL Marking is used by many state and local governments in the US.

UL has been approved as the certification and testing agency in Canada by the Canadian Standards Association, and is recognized throughout all states in Canada.

If the products are evaluated in accordance with the safety standards of both America and Canada, and prove that they conform to the standards, they can bear UL Marking, c-UL Marking, or a combination of these.

| Rated continuous thrust |

Indicates the force that the slider can continuously generate.

| Maximum load capacity |

Indicates the maximum mass that can be transferred by loading onto the actuator.

* THK defines the maximum load capacity as the mass that can be transferred with approx. 0.5G acceleration. For actual selection, see Selection Method (P.26 to 32) in this catalog and please contact THK.

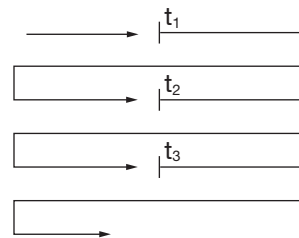
| Resolution |

Minimum travel distance that can be set.

Note: This does not guarantee the positioning accuracy.

| Positioning repeatability |

Position to a given point from the same direction seven times, measure the stopping points and then calculate the value of half the maximum difference of the reading. Perform this measurement at the center and at both ends of the travel distance; the largest value becomes the measurement value, and the positioning repeatability is expressed by placing the symbol "±" next to the value of half the maximum difference.



= 1/2 of the maximum difference between t_1 , t_2 ,... t_7

| THK green procurement |

THK Group, through the development of its business activities as well as the social life of each employee, acknowledges that we are deeply related to global environment, and thus would like to tackle with effectively reducing environmental impact. When procuring raw materials and parts used in the production of the products, or those indirect materials and tools used in the production processes, THK Group implements the measures to consider reducing their impact on the environment.

Precautions on Use

● Environment

- The wrong environment can cause failure for the actuator and driver. The best places to use the device are as follows:
- For actuators, an environment with a room and 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.
 - For drivers, an environment with a room and ambient temperature from 0 to 50 °C and humidity of no more than 90% RH that will not expose the product to freezing or condensation.
 - A place free from corrosive gas or flammable gas.
 - Places where none of the following are flying around: iron particles, or any other conductive particles, dust, oil mist, cutting fluid, water, salt, organic solvents.
 - Places that are not exposed to direct sunlight or radiant heat.
 - Places where no strong electric fields or strong magnetic fields occur.
 - Places where vibration or impact are not transmitted to the unit.
 - Places that are easy to inspect and clean.

● Safety Precautions

- This product consists mostly of heavy items (20 kg or more). When moving heavy items, use 2 or more people or moving equipment. Otherwise, injury or damage may occur.
- When transporting and installing this unit, mount the supplied eye nut to the base and attach the slider fixing screw. Always remove the eye nut and slider fixing screw when operating the actuator.
- Do not drop or knock this product. Doing so may cause injury or damage the unit.
- Unnecessarily disassembling this product may allow foreign objects to enter and reduce functionality. Also, there is a risk of electric shock from the driver.
- The PL seal is attached to the magnetic plate, the end plate, the slider and the connector box of the actuator unit.
- The magnetic plate (stator) is a very powerful magnet. Keep magnetic bodies (particularly metals) away from the magnet plate. There is a risk of getting the finger(s) jammed between the metal body and the magnet due to the attractive force of the magnet. Also, persons using cardiac pacemakers should absolutely stay away from the magnet.
- Never touch the moving section of the actuator when it is energized. Also, when the product is in motion, or in a state of readiness for motion, do not enter the movement zone of the actuator.
- When carrying out installation, adjustment, inspection or maintenance of the actuator unit, driver or connected associated devices, always remove all plugs from the power sockets, and use locking or safety plugs etc. so that no one but an operator can turn on the power again. Also, display a notice explaining what work is in progress in a position that is readily seen.
- 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.
- Read the manual carefully, understanding the content properly, and be sure to observe all safety precautions.

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