

GSTG

Electric actuator
Motor specifications

Guided



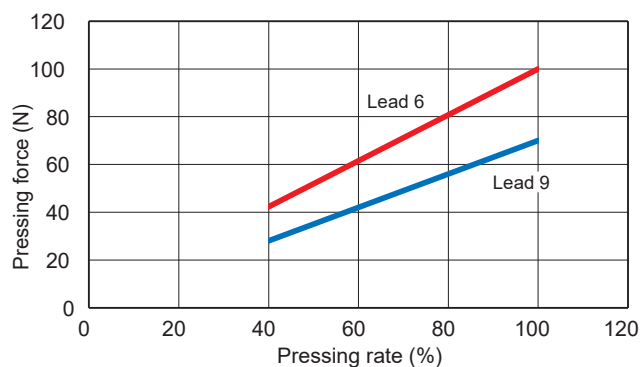
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GSTG Series variation

Actuator model No.	Motor Size	Screw lead (mm)	Max. payload (kg)		Stroke (mm) and Max. speed (mm/s)					Max. Pressing force (N)
			Horizontal	Vertical	20	25	50	75	100	
GSTG-20	□35	6	4.4	6.4	250		250			100
		9	3.2	4	400		400	300		70
GSTG-32	□42	6	9	11.6		250				220
		12	4.8	4.8		500				90
GSTG-50	□56	6	14.8	19.6		250		200		590
		12	14.8	13.2		400		350		425

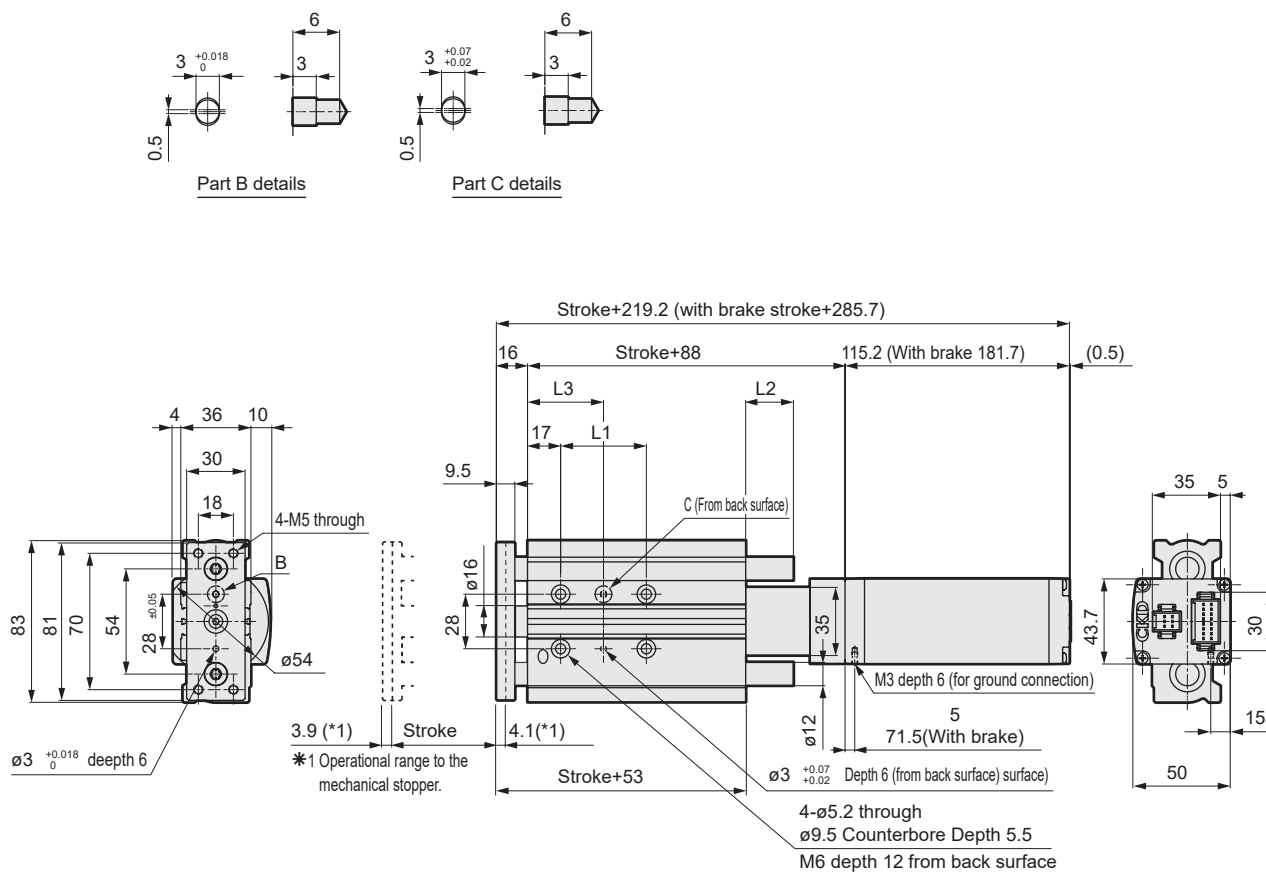
Pressing force



* The pressing force at the top is a reference value. Variation may occur according to conditions such as pressing speed.

Dimensions

● GSTG-20



[Dimensions by stroke]

Stroke code		020	050	075	100
Stroke (mm)		20	50	75	100
L1		24	44	44	44
L2		0	0	24.5	24.5
L3		29	39	39	39
Weight (kg)	Without brake	1.3	1.5	1.8	2
	With brake	1.7	2	2.2	2.4



Electric actuator with guide

GSTG-32

☐ 42 Stepping motor



How to order

GSTG

-

M

-

32

G

E

-

06

025

B

B

N

-

R01

1

2

3

4

5

6

7

8

9

1 Bearing

M Metal bush bearing

2 Size

32 32

3 Applicable controller * 1

G ECG-A, ECMG

4 Motor mounting direction

E Straight mounting

5 Screw lead

06 6 mm

12 12 mm

6 Stroke

025 25 mm

050 50 mm

075 75 mm

100 100 mm

7 Brake * 2

N None

B Available

8 Encoder

B Absolute encoder

C Incremental encoder

9 Relay cable * 3

N00 None

R01 Movable 1 m

R03 Movable 3 m

R05 Movable 5 m

R10 Movable 10 m

S01 Fixed 1 m

S03 Fixed 3 m

S05 Fixed 5 m

S10 Fixed 10 m

*1 For the controller, refer to page 189.

*2 When using vertically, select "Yes".

*3 Refer to page 200 for relay cable dimensions.

Specifications

Motor	☐ 42 Stepping motor	
Encoder-type	Battery-less absolute encoder Incremental encoder	
Drive method	Sliding screw ø8	
Stroke	25 to 100	
Screw lead	6	12
Max. payload kg	Horizontal	4.8
*1	Vertical	4.8
Operation speed range *2	mm/s	10 to 250
Max. acceleration/	Horizontal	0.7
deceleration	Vertical	0.3
Maximum pressing force	N	220
Pressing operation speed range	mm/s	10 to 20
Repeatability	mm	±0.01
Lost motion	mm	0.3 or less
Brake	Models	Non-excitation operation type
	Holding force	N
		140
		70
Insulation resistance	10MΩ, 500 VDC	
Withstand voltage	500 VAC for 1 minute	
Operating ambient temperature, humidity	0 to 40°C (no freezing) 35 to 80% RH (no condensation)	
Storage ambient temperature, humidity	-10 to 50°C (no freezing) 35 to 80% RH (no condensation)	
Atmosphere	No corrosive gas, explosive gas, or dust	
Degree of protection	IP40	

*1 Payload varies according to acceleration/deceleration and speed.

*2 The maximum speed may decrease depending on the conditions.

Speed and payload

[When installed horizontally]

(kg)

Speed (mm/s)	Acceleration / Deceleration 0.3G / 0.7G			
	Screw lead			
	6 mm		12 mm	
	Stroke (mm)			
	50 or less	100 or less	50 or less	100 or less
10	1.6	1.1	-	-
15	1.6	1.1	1.2	0.7
50	6.8	6.3	4.8	4.3
70	6.8	6.3	4.8	4.3
100	9	8.7	4.8	4.3
150	6.8	6.3	3.6	3.1
200	2.8	2.3	3.6	3.1
250	0.8	0.3	3.6	3.1
300	-	-	3.6	3.1
350	-	-	1.6	1.1
400	-	-	1.6	1.1
500	-	-	0.8	0.3

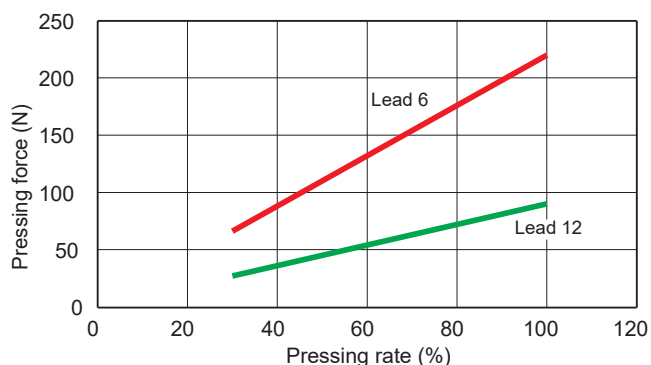
[When installed vertically]

(kg)

Speed (mm/s)	Acceleration/deceleration 0.3G			
	Screw lead			
	6 mm		12 mm	
	Stroke (mm)			
	50 or less	100 or less	50 or less	100 or less
10	8.8	8.3	-	-
15	8.8	8.3	4.4	3.9
50	11.6	11.1	4.8	4.3
70	5.2	4.7	4.8	4.3
100	5.2	4.7	4.8	4.3
150	2	1.5	4.8	4.3
200	0.8	0.3	4.5	4.3
250	-	-	1.2	0.7
300	-	-	1.2	0.7
350	-	-	-	-
400	-	-	-	-
500	-	-	-	-

* This value is for when no moment is applied to the end plate. Refer to the instruction manual for details on mounting surface flatness, etc.

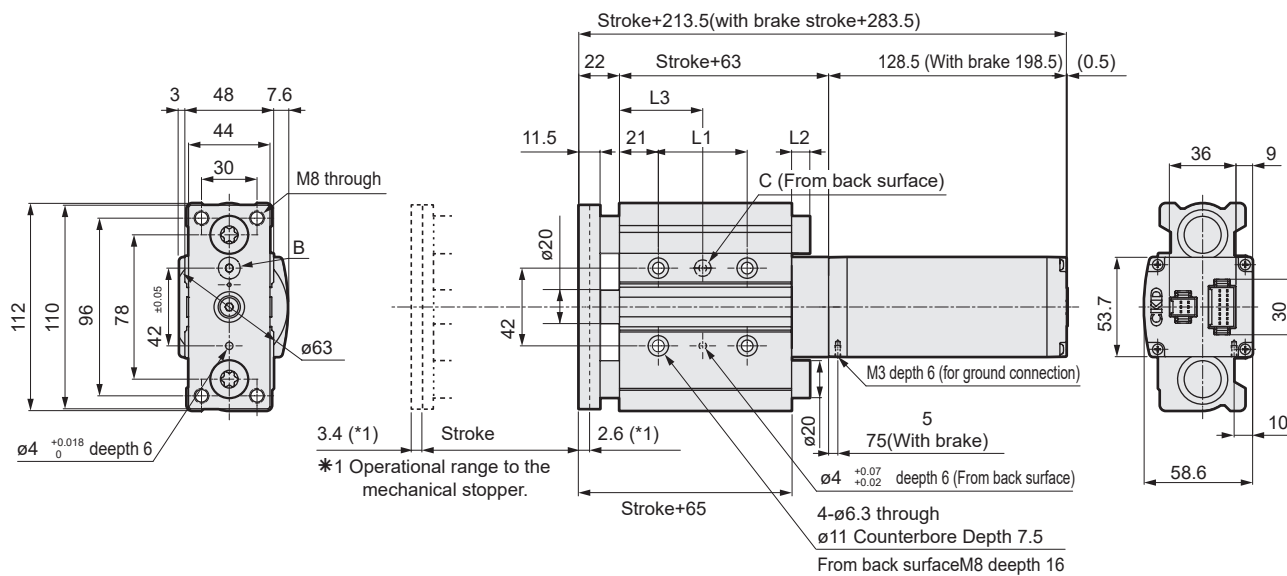
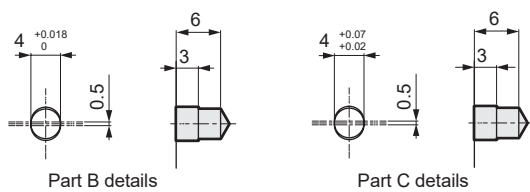
Pressing force



* The pressing force at the top is a reference value. Variation may occur according to conditions such as pressing speed.

Dimensions

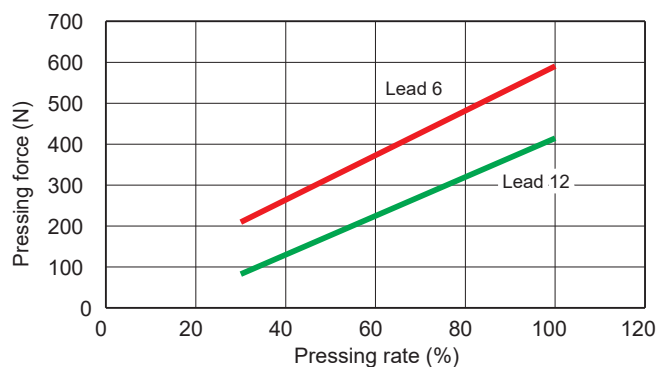
● GSTG-32



[Dimensions by stroke]

Stroke code		025	050	075	100
Stroke (mm)		25	50	75	100
L1		24	48	48	48
L2		13.5	13.5	34.5	34.5
L3		33	45	45	45
Weight (kg)	Without brake	2.6	3	3.5	3.8
	With brake	3.2	3.6	4.1	4.4

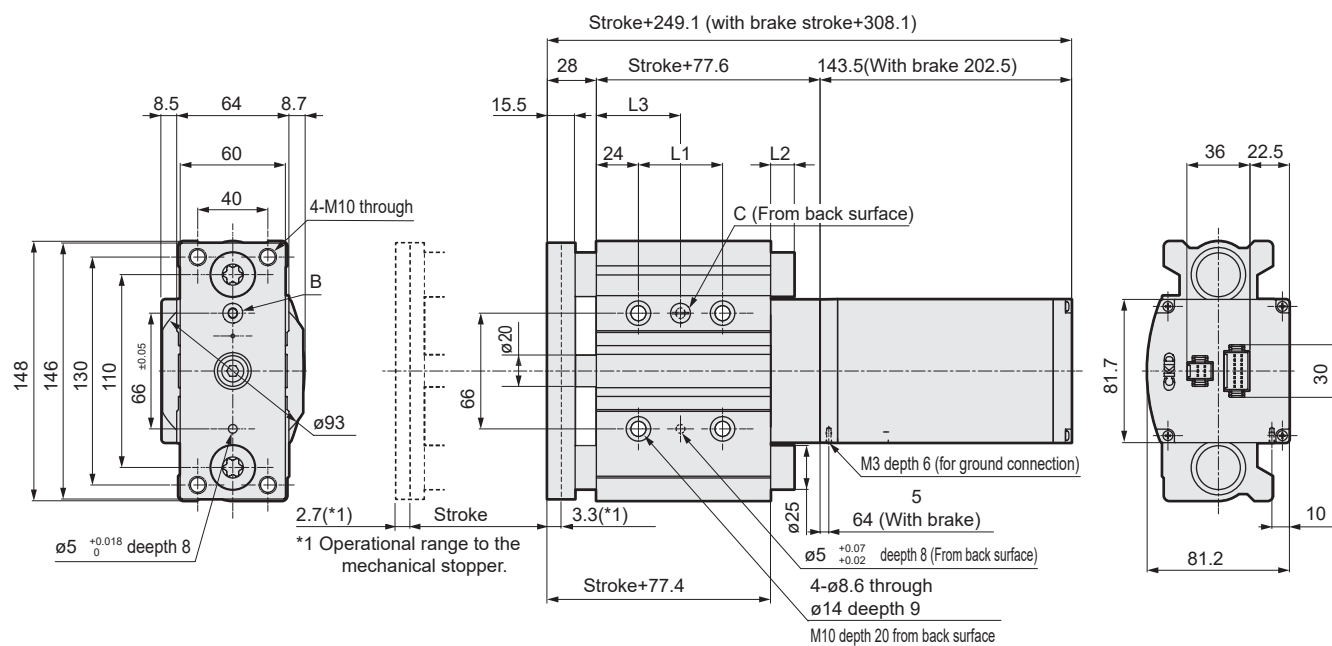
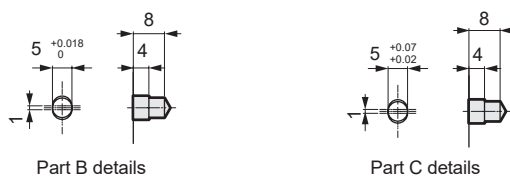
Pressing force



* The pressing force at the top is a reference value. Variation may occur according to conditions such as pressing speed.

Dimensions

● GSTG-50



[Dimensions by stroke]

Stroke code		025	050	075	100
Stroke (mm)		25	50	75	100
L1		24	48	48	48
L2		13.1	13.1	38.1	38.1
L3		36	48	48	48
Weight (kg)	Without brake	4.9	5.5	6.3	6.9
	With brake	6.2	6.8	7.6	8.2

Model selection

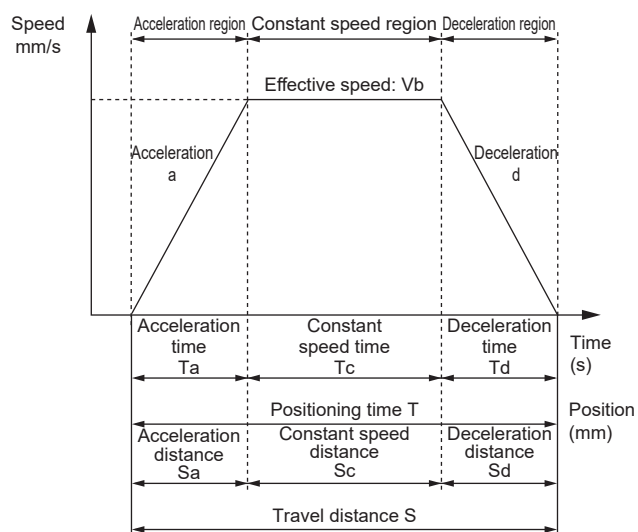
STEP 1 Confirming payload

Payload varies with mounting orientation, screw lead, transport speed, acceleration/deceleration and power supply voltage. Refer to the Series Variation (page 137), the specification table for each model and the Table of Payload by Speed and Acceleration / Deceleration to select the size and screw lead.

STEP 2 Confirming positioning time

Calculate the positioning time with the selected product according to the following example and confirm that the required tact is achievable.

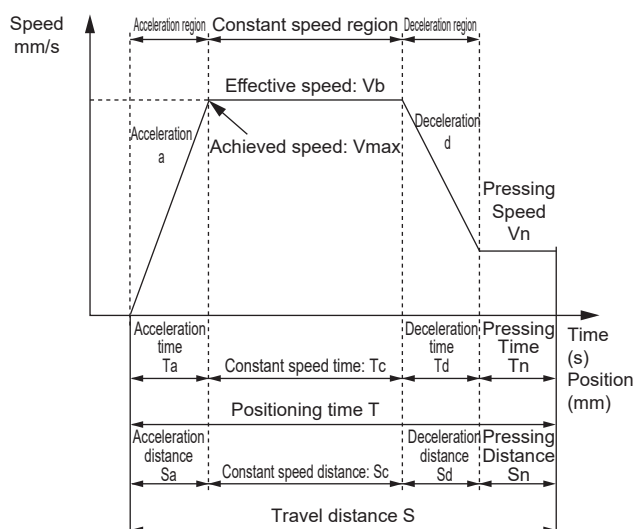
Positioning time for general transport operation



	Description	Code	Unit	Remarks
Set value	Set speed	V	mm/s	
	Set acceleration	a	mm/s ²	
	Set deceleration	d	mm/s ²	
	Travel distance	S	mm	
Calculated value	Achieved speed	Vmax	mm/s	$=\{2 \times a \times d \times S / (a+d)\}^{1/2}$
	Effective speed	Vb	mm/s	Smaller of V and Vmax
	Acceleration time	Ta	s	$=Vb / a$
	Deceleration time	Td	s	$=Vb / d$
	Constant speed time	Tc	s	$=Sc / Vb$
	Acceleration distance	Sa	mm	$=(a \times Ta^2) / 2$
	Deceleration distance	Sd	mm	$=(d \times Td^2) / 2$
	Constant speed distance	Sc	mm	$=S - (Sa + Sd)$
	Positioning time	T	s	$=Ta + Tc + Td$

- * Do not use at speeds that exceed the specifications.
- * Depending on acceleration/deceleration and stroke, the trapezoid speed waveform may not be formed (the set speed may not be achieved). In this case, select the effective speed (Vb) from the set speed (V) and the achieved speed (Vmax), whichever is smaller.
- * Acceleration and deceleration differ depending on the product and working conditions. Refer to pages 138, 140 and 142 for details.
- * While settling time depends on working conditions, it may take 0.2 seconds or so.
- * $1\text{ G} \approx 9.8\text{m/s}^2$.

Positioning time for pressing operation



	Description	Code	Unit	Remarks
Set value	Set speed	V	mm/s	
	Set acceleration	a	mm/s ²	
	Set deceleration	d	mm/s ²	
	Travel distance	S	mm	
	Pressing speed	Vn	mm/s	
Calculated value	Pressing distance	Sn	mm	
	Achieved speed	Vmax	mm/s	$=\{2 \times a \times d \times (S - Sn + Vn^2 / 2 / d) / (a+d)\}^{1/2}$
	Effective speed	Vb	mm/s	The lesser value of V and Vmax
	Acceleration time	Ta	s	$=Vb / a$
	Deceleration time	Td	s	$=(Vb - Vn) / d$
	Constant speed time	Tc	s	$=Sc / Vb$
	Pressing time	Tn	s	$=Sn / Vn$
	Acceleration distance	Sa	mm	$=(a \times Ta^2) / 2$
	Deceleration distance	Sd	mm	$=((Vb + Vn) \times Td) / 2$
	Constant speed distance	Sc	mm	$=S - (Sa + Sd + Sn)$
	Positioning time	T	s	$=Ta + Tc + Td + Tn$

- * Do not use at speeds that exceed the specifications.
- * Pressing speed differs depending on the product.
- * Depending on acceleration/deceleration and stroke, the trapezoid speed waveform may not be formed (the set speed may not be achieved). In this case, select the effective speed (Vb) from the set speed (V) and the achieved speed (Vmax), whichever is smaller.
- * Acceleration and deceleration differ depending on the product and working conditions. Refer to pages 138, 140 and 142 for details.
- * While settling time depends on working conditions, it may take 0.2 seconds or so.
- * $1\text{ G} \approx 9.8\text{m/s}^2$.

STEP 3 Confirming static allowable load and moment

Calculate the load and moment that are generated when the end plate is stopped. Confirm that the lateral load (W) and torsion moment (MY) are as follows. Make sure that the resultant moment (MT) satisfies the following formula according to the formula below.

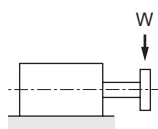
Resultant moment

$$M_T = \frac{MP}{MP_{\max}} + \frac{MR}{MR_{\max}} \leq 1.0$$

Static allowable load and moment

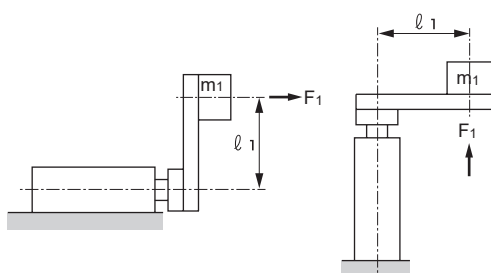
Model No.	Stroke (mm)	Lateral load W (N)	Bending moment MP max (N·m)	Torsion moment MY max (N·m)	Radial moment MR max (N·m)
GSTG-20	20	67	35.3	0.9	35.3
	50	46		0.62	
	75	60		0.8	
	100	51		0.69	
GSTG-32	25	223	171.5	4.35	171.5
	50	180		3.5	
	75	179		3.48	
	100	156		3.04	
GSTG-50	25	348	294	9.56	294
	50	296		7.86	
	75	292		8.02	
	100	257		7.07	

● Lateral load W (N)



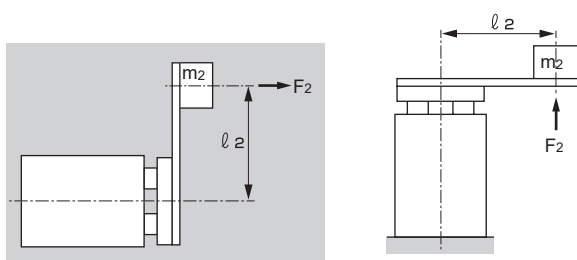
● Bending moment MP (N·m)

$$MP = F_1 \times \ell_1 = 10 \times m_1 \times G \times \ell_1$$



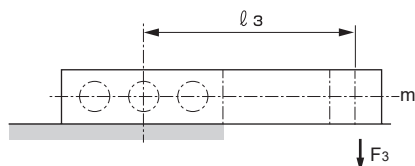
● Radial moment MR. (N·m)

$$MR = F_2 \times \ell_2 = 10 \times m_2 \times G \times \ell_2$$



● Torsion moment MY (N·m)

$$MY = F_3 \times \ell_3 = 10 \times m_3 \times \ell_3$$



m_1 :
 m_2 :
 m_3 :

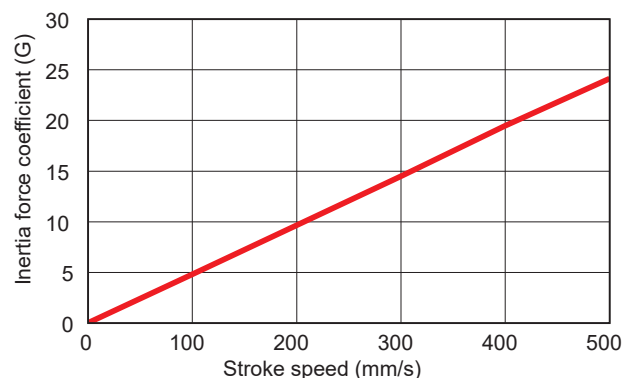
} Load (kg)

ℓ_1 :
 ℓ_2 :
 ℓ_3 :

} Eccentric distance (m)

G: Inertia force coefficient

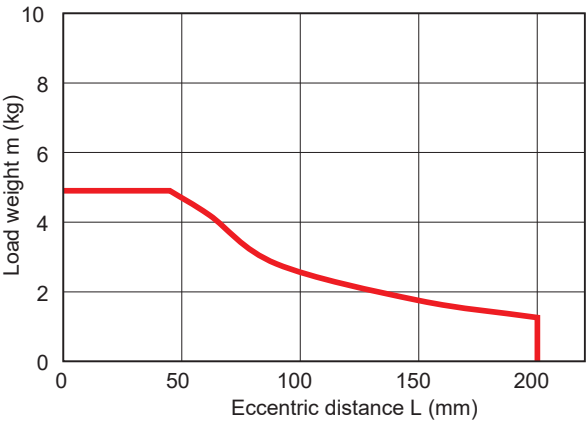
Fig. 1 Trend of inertia force coefficient for guided type



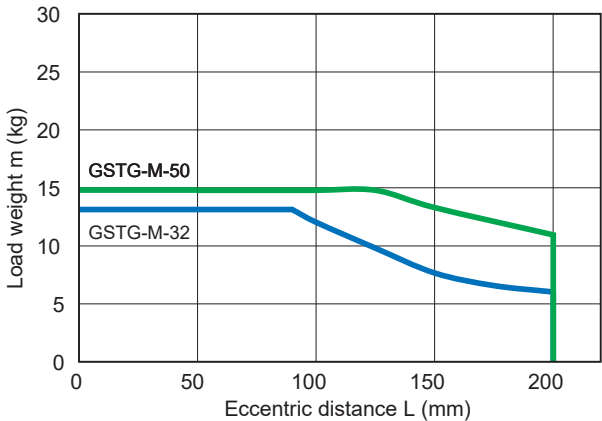
STEP 4 **Checking allowable overhang length**

Make sure that the overhang length during operation is within the allowable range.

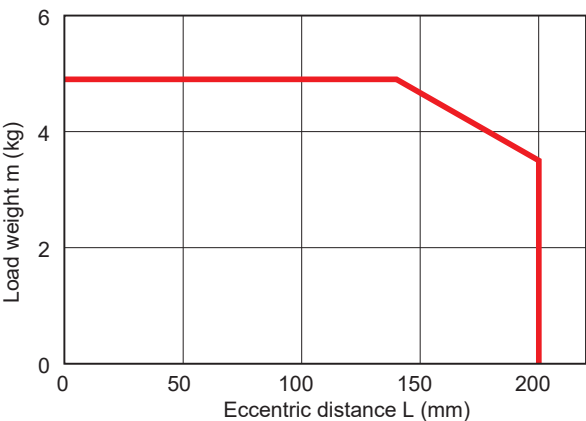
- GSTG-M-20
- Stroke 50 mm or less



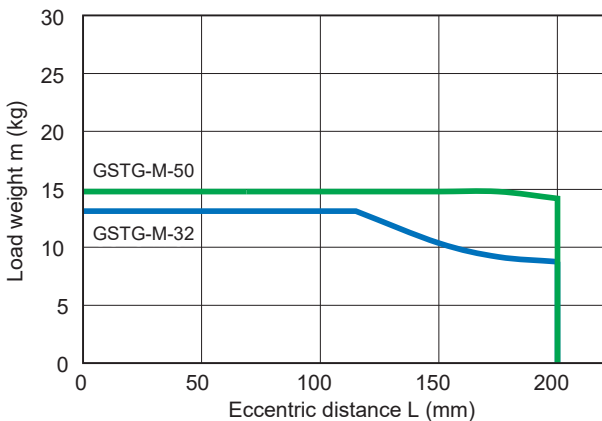
- GSTG-M-32, 50
- Stroke 50 mm or less



- GSTG-M-20
- Over 50 mm stroke

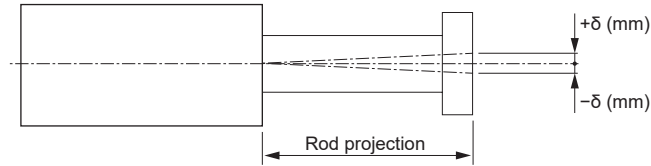


- GSTG-M-32, 50
- Over 50 mm stroke

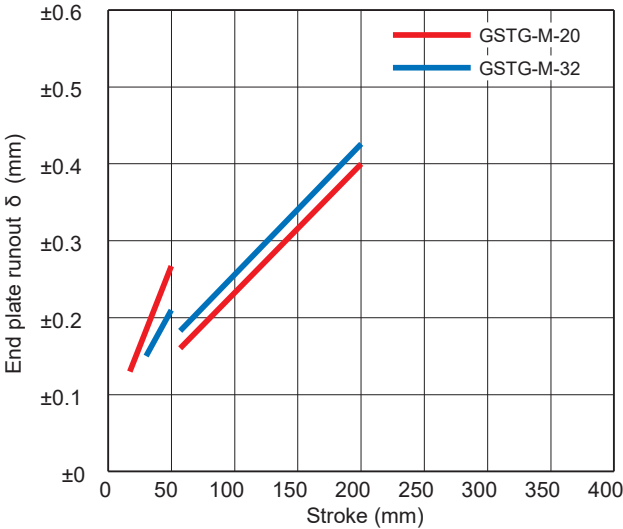


Deflection

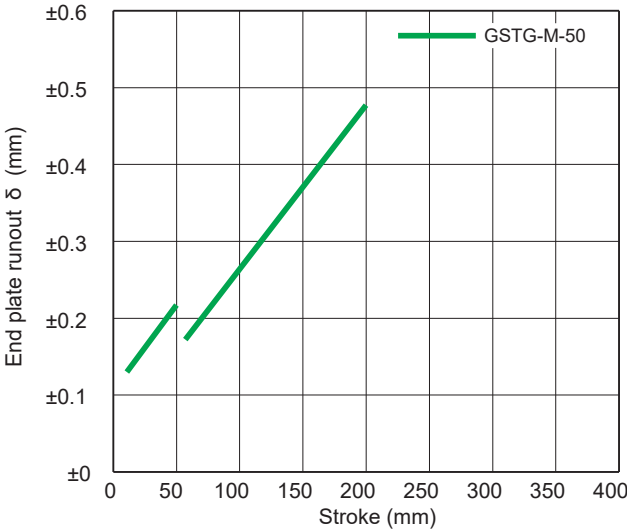
For the runout amount δ produced at the end of the end plate when no load is applied, the value in the graph below is used as a guide. (Excluding sag of guide rod)



● GSTG-M-20, 32

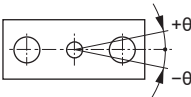


● GSTG-M-50



Non-rotating accuracy

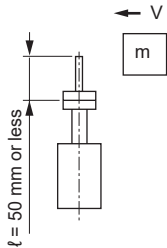
(reference value)



Size	Non-rotating accuracy θ (degree)
GSTG-20	±0.07
GSTG-32	±0.06
GSTG-50	±0.05

DSGD2	D Series (Screw drive)	D Series (Spring drive)	ESC3 (Controller)	GSSD2	GSTK	GSTG	GSTS	GSTL	GCKW	ECG-A (Controller)	ECG-B (Controller)	Safety Caution	Model selection Check sheet
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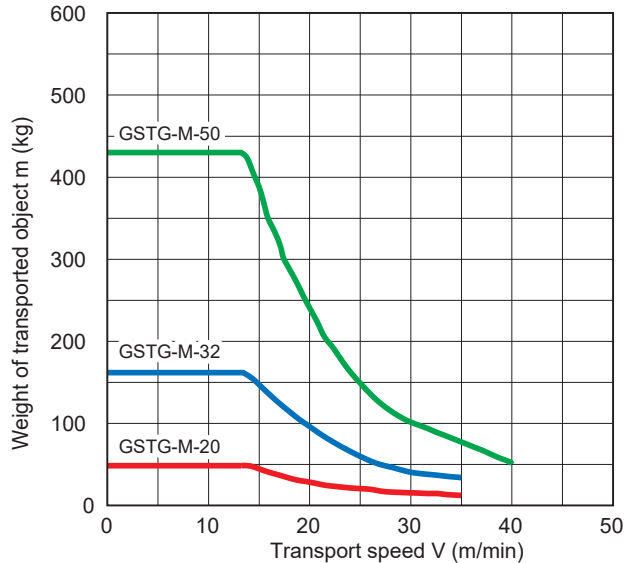
Specified range when using the product as a stopper



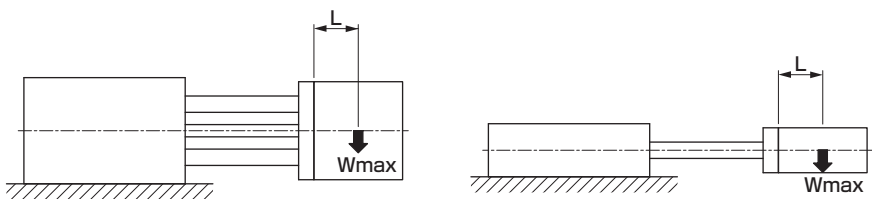
- *1 When using the cylinder as a stopper, select a model with stroke 50 or less.
- *2 Make sure that the total length of the stopper is $l=50$ mm or less.
- *3 When fixing the actuator body, make sure that the screw insertion depth of the bolt is $2d$ and over, and take countermeasures for preventing looseness (adhesive, spring washer, etc.) into consideration.
- *4 Refer to page 22 for the calculation of the required working thrust.
- *5 Calculate the actuator thrust with the following formula.
Thrust = vertical payload $\times 10$ (N)

Impact load

GSTG-M (metal bush bearing)

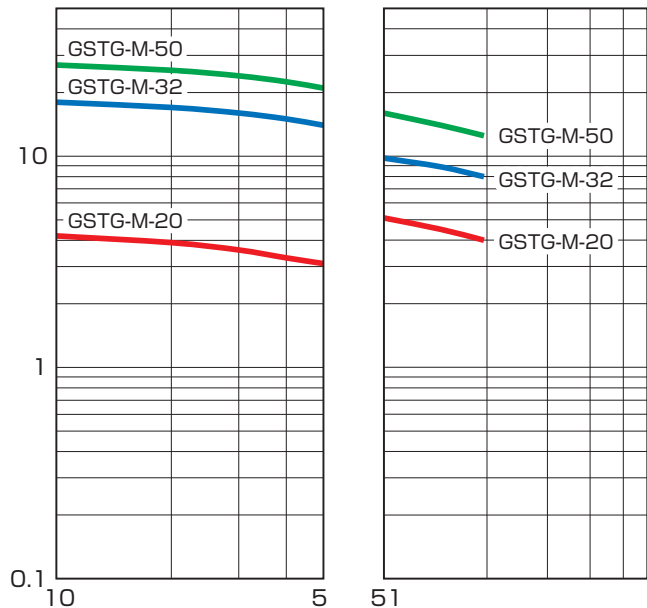


Allowable lateral load Metal bush bearing

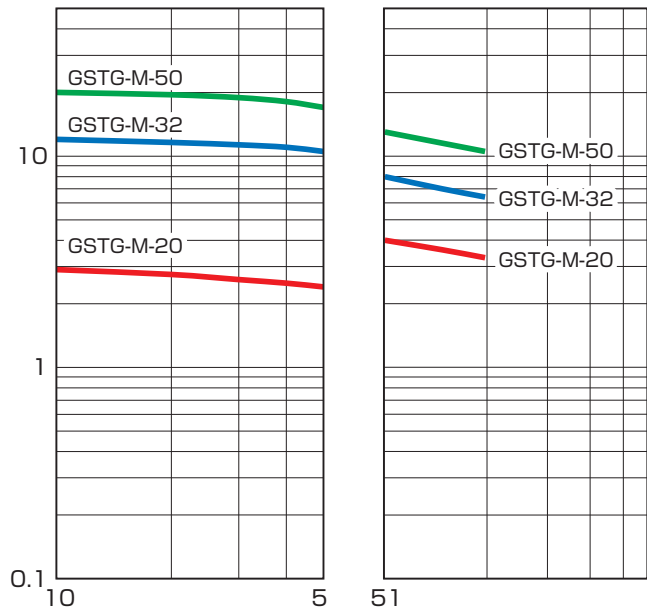


Wmax: Lateral load (kg)
L : Load center of gravity position (mm)

●For L=50mm



●For L=100mm



DSSD2	D Series (Screw drive)	D Series (Spring drive)	ESC3 (Controller)	G Series
DSTK	DSTG	DSTS	DSTL	
DMSG	DLSH	DCKW		
GSSD2	GSTK	GSTG	GSTS	
GSTL	GCKW			
ECG-A (Controller)	ECG-B (Controller)			
Safety Caution	Model selection	Check sheet		