

GSTG

Guided Type

Electric Actuator with
Motor Specification



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GSTG System Table

Actuator Model No.	Motor Size	Screw Lead (mm)	Max. Payload (kg)		Stroke (mm) and Max. Speed (mm/s)					Max. Pushing 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



Electric Actuator Guided Type

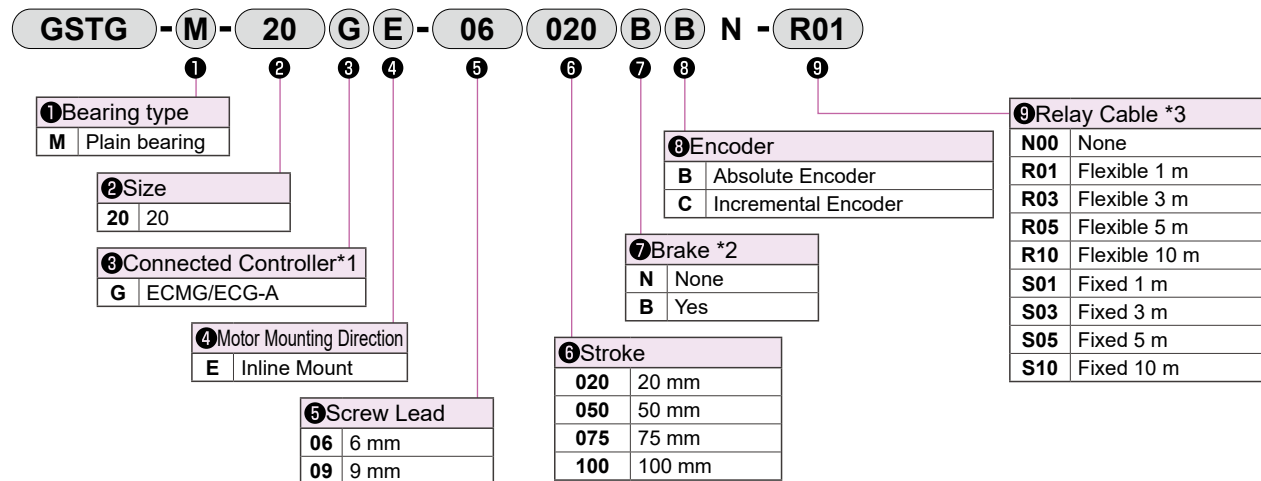
GSTG-20

□35 Stepping Motor



For compatible detailed model Nos., please see our website.

Model No. Notation Method



*1 For controllers, please refer to P. 529.

*2 Select "Yes" for vertical use.

*3 For the external dimension drawing of the relay cable, please refer to P. 576.

Specifications

Connected Controller	ECMG, ECG-A	
Motor	□35 Stepping Motor	
Encoder Type	Battery-less Absolute Encoder Incremental Encoder	
Drive Method	Sliding screw ø6	
Stroke mm	20 to 100	
Screw lead mm	6	9
Max. Payload Horizontal kg *1	4.4	3.2
Vertical	6.4	4
Operating Speed Range *2 mm/s	10 to 250	12 to 400
Max. Acceleration/ Horizontal	0.7	0.7
Deceleration/ Vertical	0.3	0.3
Max. Pushing Force N	100	70
Pushing Operation Speed Range mm/s	10 to 20	12 to 20
Repeatability *3 mm	±0.01	
Lost Motion mm	0.3 or less	
Brake Type	Non-excitation operating type	
Holding Force N	140	93
Insulation Resistance	10 MΩ, 500 VDC	
Withstanding 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	
Protection Structure	IP40	

*1 Payload varies depending on acceleration/deceleration and speed.

*2 Maximum speed may decrease depending on conditions.

*3 Since there is backlash, if stopping accuracy is required, please use an external stopper, etc., and complete positioning with a pushing motion.

Speed and Payload

[Horizontal Installation] (kg)

Speed (mm/s)	Acceleration/Deceleration 0.3/0.7 G			
	Screw Lead			
	6 mm		9 mm	
	Stroke (mm)			
	50 or less	100 or less	50 or less	100 or less
10	0.8	0.3		
12	0.8	0.3	1.5	1.1
50	4.4	3.9	3.2	2
70	4.4	3.9	3.2	2.7
100	4.4	3.9	3.2	2.7
150	4.4	3.9	3.2	2.7
200	2	1.5	3.2	2.7
250	2	1.5	2.4	1.9
300			0.4	1.9
350			0.4	
400			0.4	

[Vertical Installation] (kg)

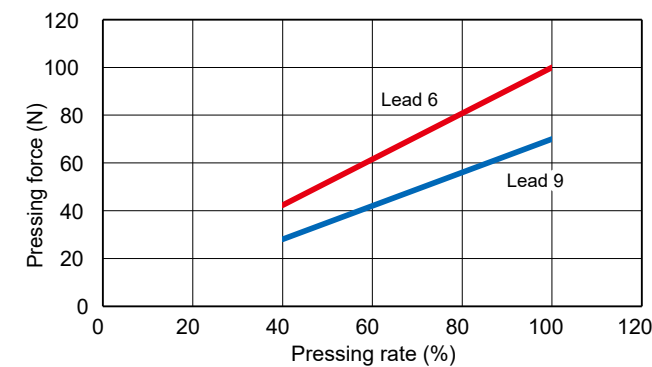
Speed (mm/s)	Acceleration/deceleration 0.3G			
	Screw Lead			
	6 mm		9 mm	
	Stroke (mm)			
	50 or less	100 or less	50 or less	100 or less
10	6.4	5.9		
12	6.4	5.9	4	3.5
50	6.4	5.9	4	3.5
70	4	3.5	4	3.5
100	4	3.5	4	3.5
150	1.6	1.1	3.2	2.7
200	0.8	0.3	3	2.7
250			0.8	0.3
300			0.8	0.3
350			0.4	
400				

* Value when no moment is applied to the end plate section. For details such as flatness of the mounting surface, please refer to the instruction manual.

GSTG-20 Series

Pushing Force/External Dimension Drawings

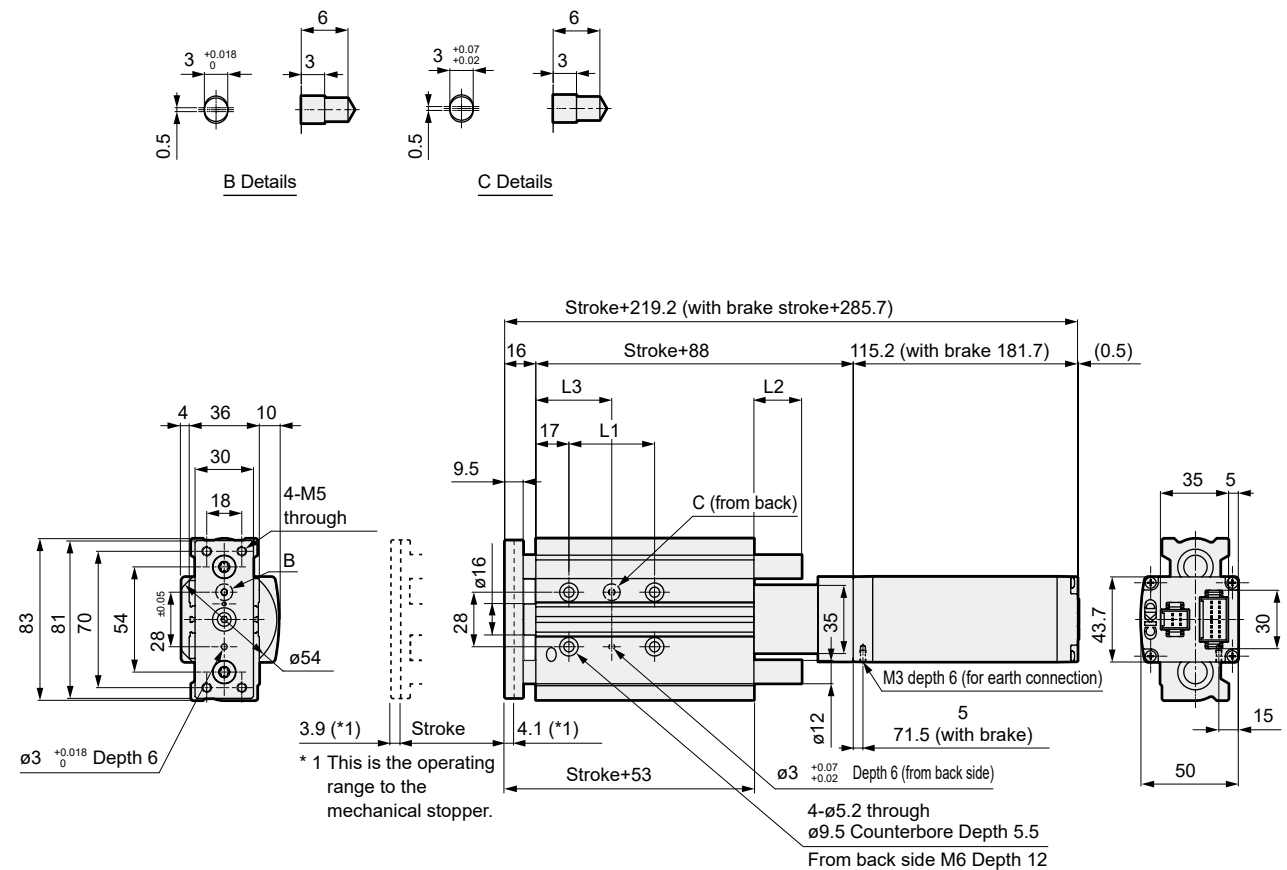
Pushing Force



* The upper pushing force is a reference value. It may vary depending on conditions such as pushing speed.

External Dimension Drawing

● GSTG-20



[Dimension Table 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 Guided Type

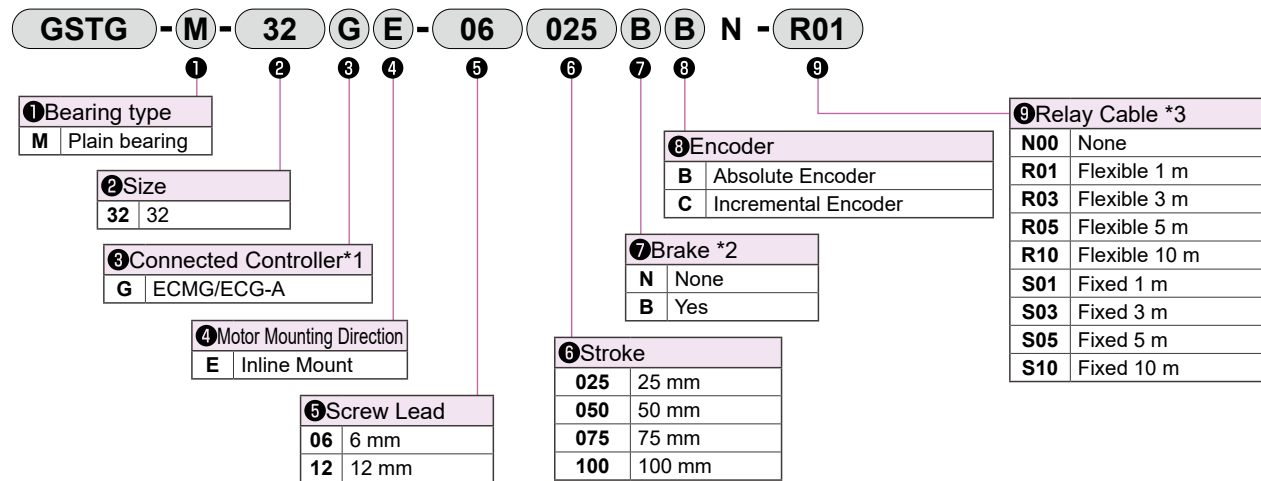
GSTG-32

□42 Stepping Motor



For compatible detailed model Nos., please see our website.

Model No. Notation Method



*1 For controllers, please refer to P. 529.

*2 Select "Yes" for vertical use.

*3 For the external dimension drawing of the relay cable, please refer to P. 576.

Specifications

Connected Controller		ECMG, ECG-A	
Motor		□42 Stepping Motor	
Encoder Type		Battery-less Absolute Encoder Incremental Encoder	
Drive Method		Sliding screw ø8	
Stroke	mm	25 to 100	
Screw lead	mm	6	12
Max. Payload	Horizontal	9	4.8
kg *1	Vertical	11.6	4.8
Operating Speed Range *2 mm/s		10 to 250	15 to 500
Max. Acceleration/	Horizontal	0.7	0.7
Deceleration	Vertical	0.3	0.3
Max. Pushing Force	N	220	90
Pushing Operation Speed Range mm/s		10 to 20	15 to 20
Repeatability	*3 mm	±0.01	
Lost Motion		0.3 or less	
Brake	Type	Non-excitation operating type	
	Holding Force N	140	70
Insulation Resistance		10 MΩ, 500 VDC	
Withstanding 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	
Protection Structure		IP40	

*1 Payload varies depending on acceleration/deceleration and speed.

*2 Maximum speed may decrease depending on conditions.

*3 Since there is backlash, if stopping accuracy is required, please use an external stopper, etc., and complete positioning with a pushing motion.

Speed and Payload

[Horizontal Installation]	(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

[Vertical Installation] (kg)

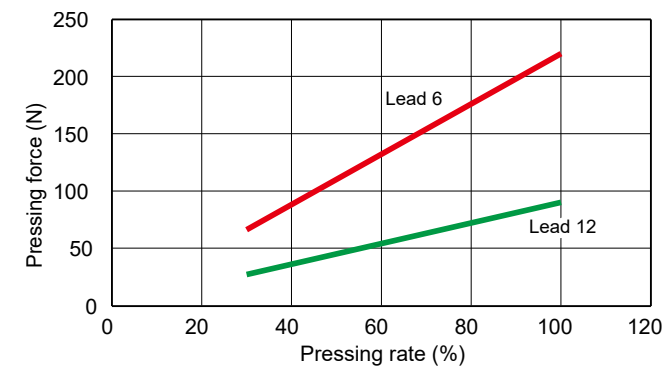
Speed (mm/s)	Acceleration/deceleration 0.3G			
	Screw Lead			
	6 mm		12 mm	
	Stroke (mm)			
	50 or less	100 or less	50 or less	100 or less
10	8.8	8.3		
15	8.8	8.3	4.4	3.9
50	11.6	11.1	4.8	4.3
70	5.2	4.7	4.8	4.3
100	5.2	4.7	4.8	4.3
150	2	1.5	4.8	4.3
200	0.8	0.3	4.5	4.3
250			1.2	0.7
300			1.2	0.7
350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

* Value when no moment is applied to the end plate section. For details such as flatness of the mounting surface, please refer to the instruction manual.

GSTG-32 Series

Pushing Force/External Dimension Drawings

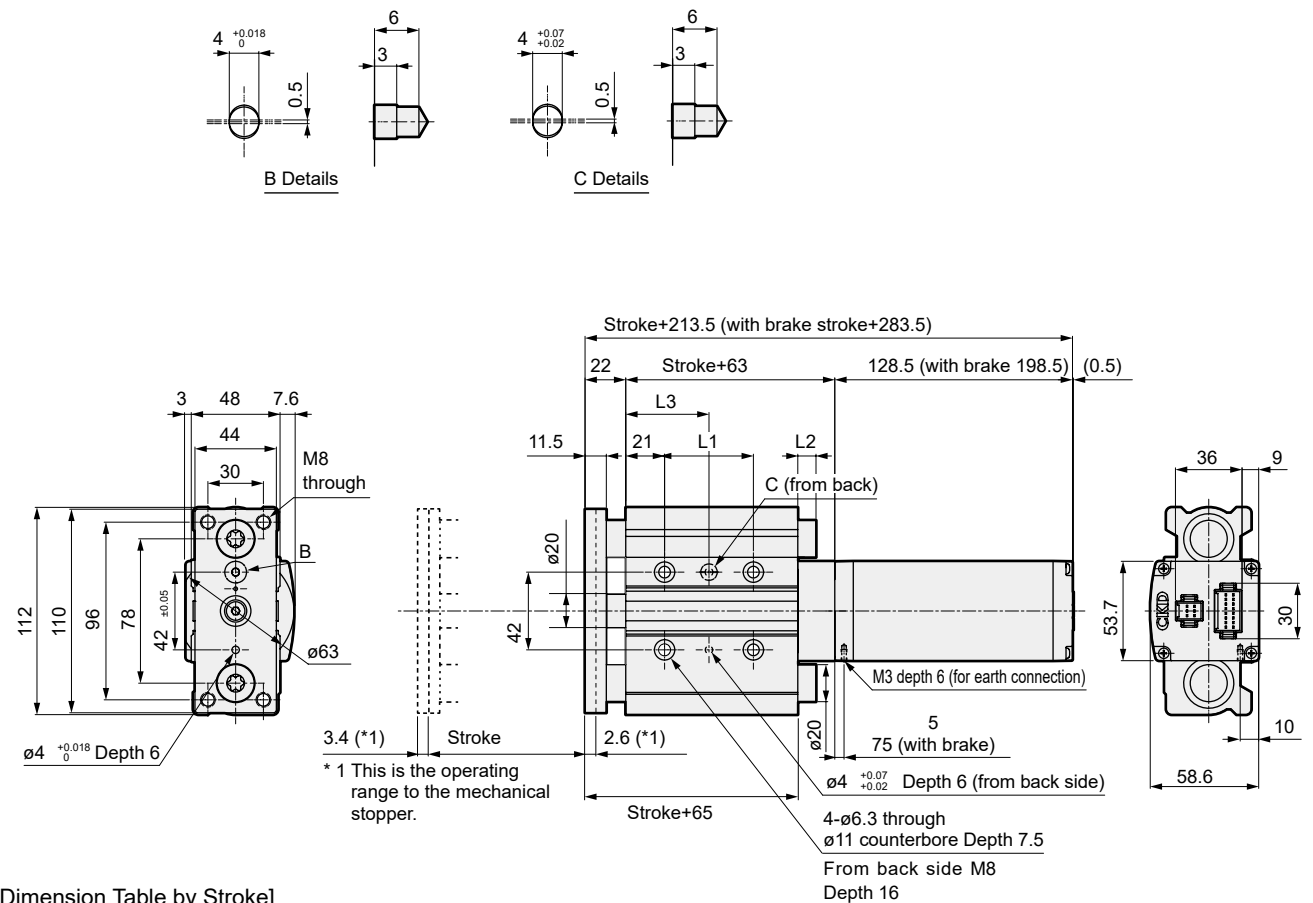
Pushing Force



* The upper pushing force is a reference value. It may vary depending on conditions such as pushing speed.

External Dimension Drawing

● GSTG-32



[Dimension Table 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



Electric Actuator Guided Type

GSTG-50

□56 Stepping Motor



For compatible detailed model Nos., please see our website.

Model No. Notation Method

GSTG - M - 50 G E - 06 025 B B N - R01

1	2	3	4	5	6	7	8	9
1 Bearing type	2 Size	3 Connected Controller*1	4 Motor Mounting Direction	5 Screw Lead	6 Stroke	7 Brake *2	8 Encoder	9 Relay Cable *3
M Plain bearing	50 50	G ECMG/ECG-A	E Inline Mount	06 6 mm 12 12 mm	025 25 mm 050 50 mm 075 75 mm 100 100 mm	N None B Yes	B Absolute Encoder C Incremental Encoder	N00 None R01 Flexible 1 m R03 Flexible 3 m R05 Flexible 5 m R10 Flexible 10 m S01 Fixed 1 m S03 Fixed 3 m S05 Fixed 5 m S10 Fixed 10 m

*1 For controllers, please refer to P. 529.
*2 Select "Yes" for vertical use.
*3 For the external dimension drawing of the relay cable, please refer to P. 576.

Specifications

Connected Controller	ECMG, ECG-A	
Motor	□56 Stepping Motor	
Encoder Type	Battery-less Absolute Encoder Incremental Encoder	
Drive Method	Sliding screw ø12	
Stroke	mm 25 to 100	
Screw lead	mm 6 12	
Max. Payload	Horizontal	14.8
kg *1	Vertical	13.2
Operating Speed Range *2	mm/s	20 to 250 20 to 400
Max. Acceleration/	Horizontal	0.7
Deceleration	Vertical	0.3
Max. Pushing Force	N	590 425
Pushing Operation Speed Range	mm/s	20 20
Repeatability	*3 mm	±0.01
Lost Motion	mm	0.3 or less
Brake	Type	Non-excitation operating type
Holding Force N		640 320
Insulation Resistance	10 MΩ, 500 VDC	
Withstanding Voltage	500 VAC for 1 minute	
Operating Ambient	0 to 40°C (no freezing)	
Temperature, Humidity	35 to 80% RH (no condensation)	
Storage Ambient	-10 to 50°C (no freezing)	
Temperature, Humidity	35 to 80% RH (no condensation)	
Atmosphere	No corrosive gas, explosive gas, or dust	
Protection Structure	IP40	

*1 Payload varies depending on acceleration/deceleration and speed.
*2 Maximum speed may decrease depending on conditions.
*3 Since there is backlash, if stopping accuracy is required, please use an external stopper, etc., and complete positioning with a pushing motion.

Speed and Payload

[Horizontal Installation]				(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	
20	14.8	12.8	4.4	2.4	
50	9.6	7.6	9.6	7.6	
70	9.6	7.6	9.6	7.6	
100	9.6	7.6	14.8	12.8	
150	6	4	10.8	8.8	
200	4	2	10.8	8.8	
250	0.4		6	4	
300			6	4	
350			2.8	0.8	
400			0.7		

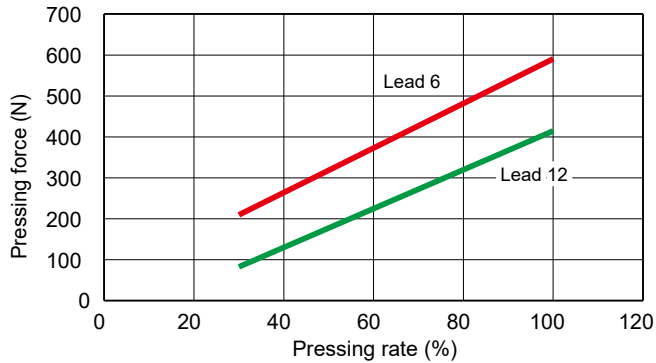
[Vertical Installation]			(kg)	
Speed (mm/s)	Acceleration/deceleration 0.3G			
	Screw Lead			
	6 mm		12 mm	
	Stroke (mm)			
	50 or less	100 or less	50 or less	100 or less
20	19.6	18.6	3.6	2.6
50	14	13	13.2	12.2
70	4.8	3.8	12	11
100	4.8	3.8	10.5	11
150	0.8		4	3
200			4	3
250			2	1.5
300			0.7	
400				

* Value when no moment is applied to the end plate section. For details such as flatness of the mounting surface, please refer to the instruction manual.

GSTG-50 Series

Pushing Force/External Dimension Drawings

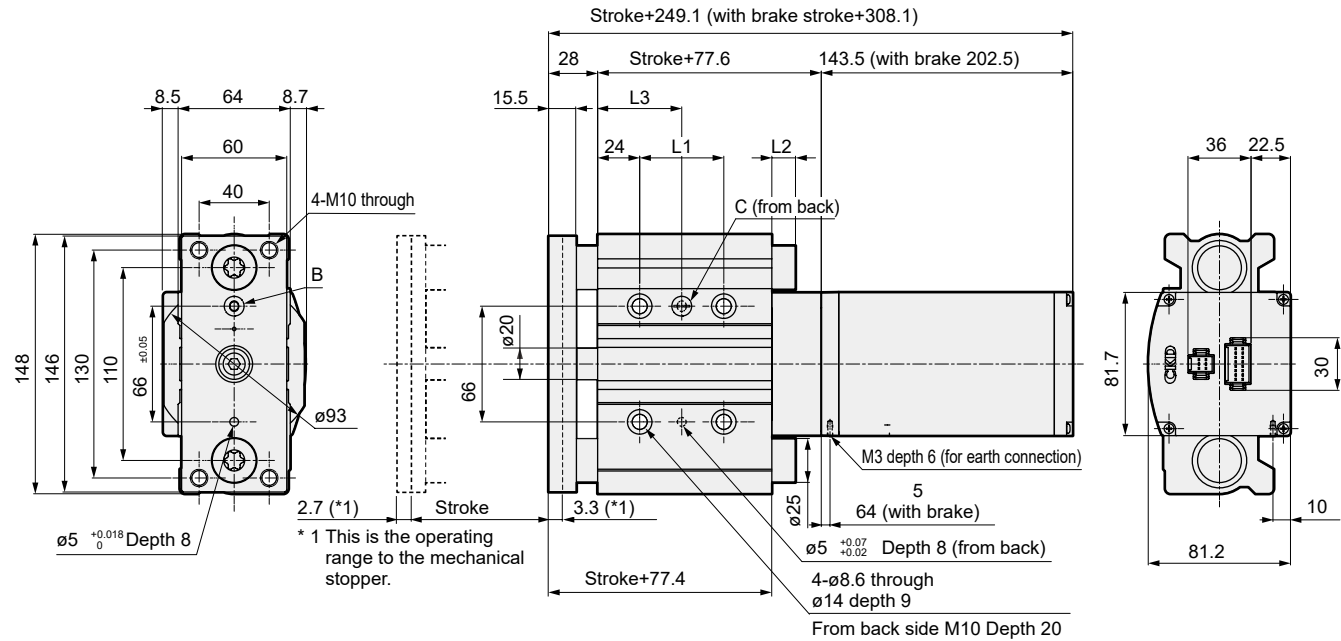
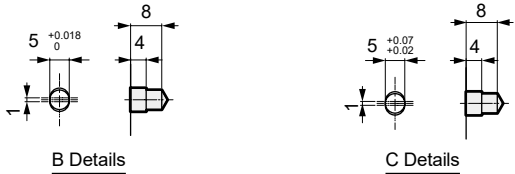
Pushing Force



* The upper pushing force is a reference value. It may vary depending on conditions such as pushing speed.

External Dimension Drawing

● GSTG-50



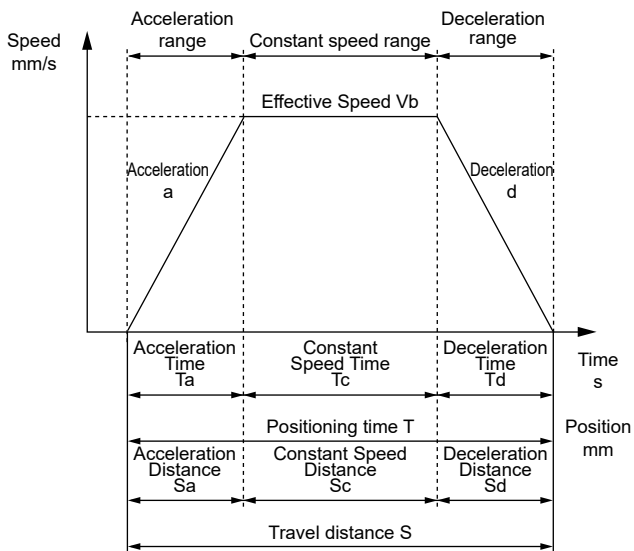
STEP1 Confirmation of Payload

The payload varies depending on the mounting orientation, screw lead, transport speed, and acceleration/deceleration. Select the size and screw lead by referring to the system table (P. 353), the specification table for each model, and the payload table by speed and acceleration/deceleration.

STEP2 Confirmation of Positioning Time

Calculate the positioning time for the selected product according to the example below and check if it meets the required tact time.

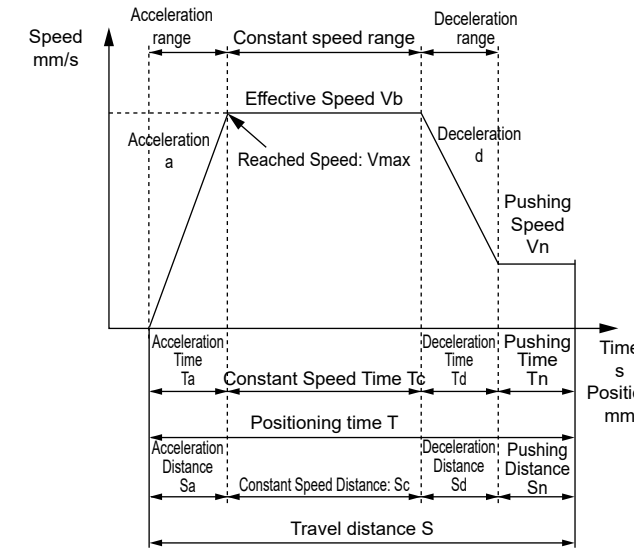
Positioning time for general transfer operations



	Content	Code	Unit	Remarks
Setting Value	Set Speed	V	mm/s	
	Set Acceleration	a	mm/s ²	
	Set Deceleration	d	mm/s ²	
	Travel Distance	S	mm	
Calculated Value	Reached Speed	Vmax	mm/s	$= [2 \times a \times d \times S / (a + d)]^{1/2}$
	Effective Speed	Vb	mm/s	The 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 exceeding the specifications.
* Depending on the acceleration/deceleration and stroke, a trapezoidal velocity waveform may not be formed (the set speed may not be reached). In that case, select the smaller of the set speed (V) and the reached speed (Vmax) as the effective speed (Vb).
* Acceleration and deceleration vary depending on the product and usage conditions. Refer to P. 354, 356 and 358 for details.
* Settling time varies depending on the usage conditions, but it may take about 0.2 s.
* 1G $\approx$ 9.8 m/s².

Positioning time for pushing operations



	Content	Code	Unit	Remarks
Setting Value	Set Speed	V	mm/s	
	Set Acceleration	a	mm/s ²	
	Set Deceleration	d	mm/s ²	
	Travel Distance	S	mm	
	Pushing Speed	Vn	mm/s	
	Pushing Distance	Sn	mm	
Calculated Value	Reached 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 smaller of V and Vmax
	Acceleration Time	Ta	s	$= Vb / a$
	Deceleration Time	Td	s	$= (Vb - Vn) / d$
	Constant Speed Time	Tc	s	$= Sc / Vb$
	Pushing 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 exceeding the specifications.
* Pushing speed varies depending on the product.
* Depending on the acceleration/deceleration and stroke, a trapezoidal velocity waveform may not be formed (the set speed may not be reached). In that case, select the smaller of the set speed (V) and the reached speed (Vmax) as the effective speed (Vb).
* Acceleration and deceleration vary depending on the product and usage conditions. Refer to P. 354, 356 and 358 for details.
* Settling time varies depending on the usage conditions, but it may take about 0.2 s.
* 1G $\approx$ 9.8 m/s².

STEP3 Confirmation of Static Allowable Load and Static Allowable Moment

Calculate the load and moment that occur when the end plate stops. Confirm that the lateral load (W) and torsional moment (MY) are as follows. Following the formula below, confirm that the resultant moment (MT) satisfies the following expression.

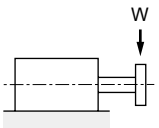
Resultant moment

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

Static Allowable Load and Static Allowable Moment

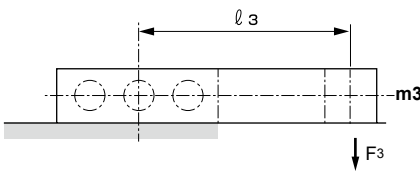
Model No.	Stroke (mm)	Lateral Load W (N)	Bending moment MPmax (N·m)	Torsional moment MYmax (N·m)	Lateral bending moment MRmax (N·m)
GSTG-20	20	67	35.3	0.9	35.3
	50	46		0.62	
	75	60		0.8	
	100	51		0.69	
GSTG-32	25	223	171.5	4.35	171.5
	50	180		3.5	
	75	179		3.48	
	100	156		3.04	
GSTG-50	25	348	294	9.56	294
	50	296		7.86	
	75	292		8.02	
	100	257		7.07	

● Lateral load W (N)



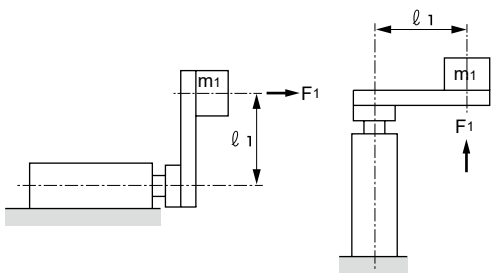
● Torsional moment MY (N·m)

$$MY = F3 \times \ell 3 = 10 \times m3 \times \ell 3$$



● Bending moment MP (N·m)

$$MP = F1 \times \ell 1 = 10 \times m1 \times G \times \ell 1$$



m1: Load weight (kg)
m2: Load weight (kg)
m3: Load weight (kg)
 $\ell 1$: Eccentricity (m)
 $\ell 2$: Eccentricity (m)
 $\ell 3$: Eccentricity (m)

G: Inertial force coefficient

● Lateral bending moment MR (N·m)

$$MR = F2 \times \ell 2 = 10 \times m2 \times G \times \ell 2$$

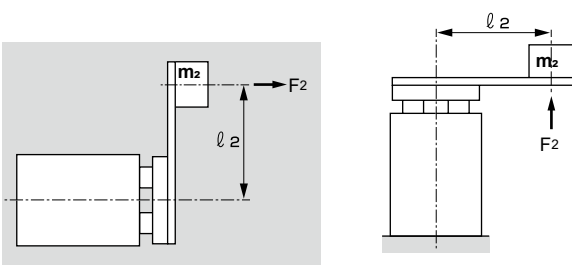
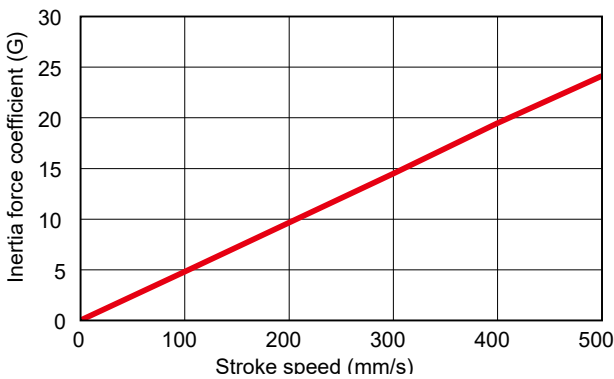


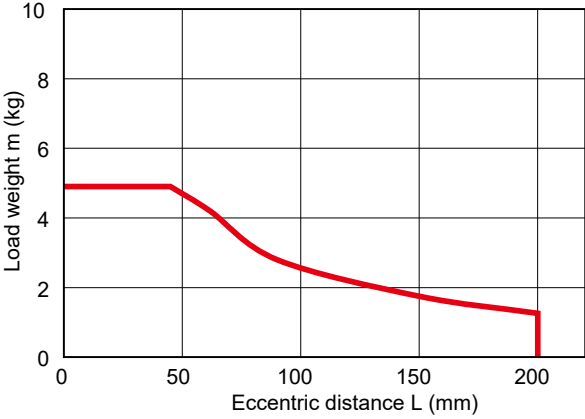
Figure 1 Trend of inertial force coefficient for guided type



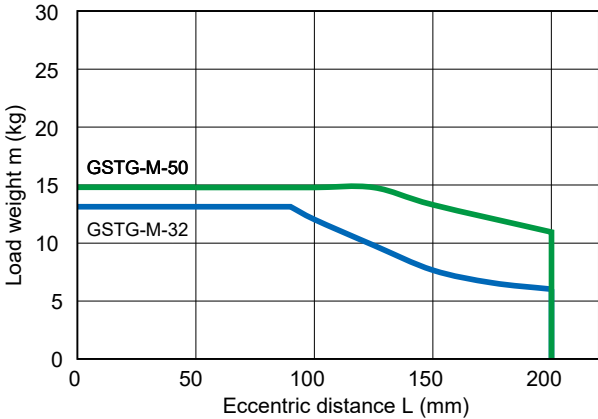
STEP4 Confirmation of Allowable Overhang Length

Confirm that the overhang length during operation is within the allowable overhang length range.

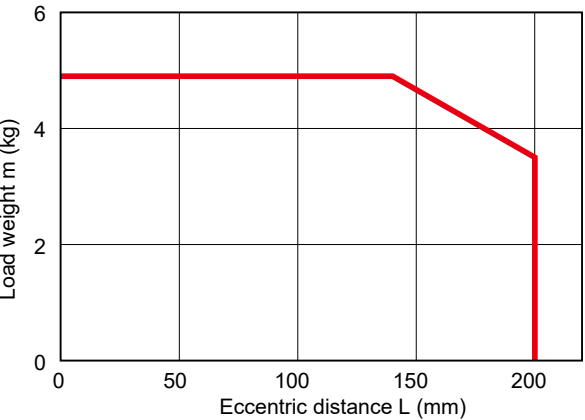
● GSTG-M-20
· Stroke 50 mm or less



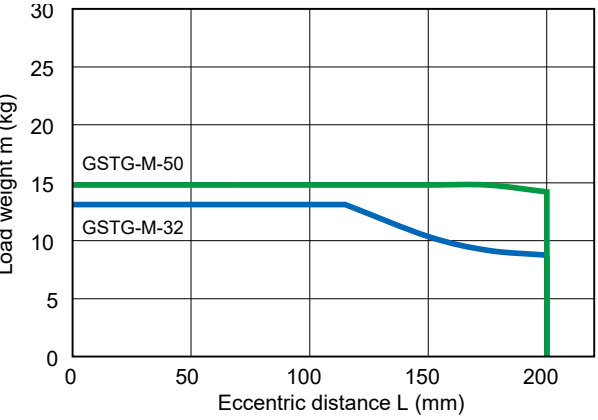
● GSTG-M-32, 50
· Stroke 50 mm or less



● GSTG-M-20
· Stroke exceeds 50 mm

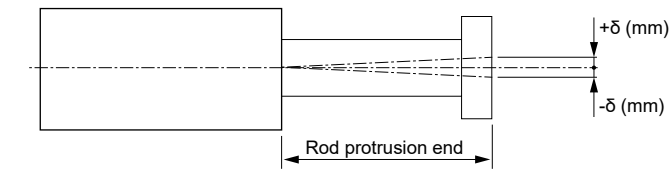


● GSTG-M-32, 50
· Stroke exceeds 50 mm

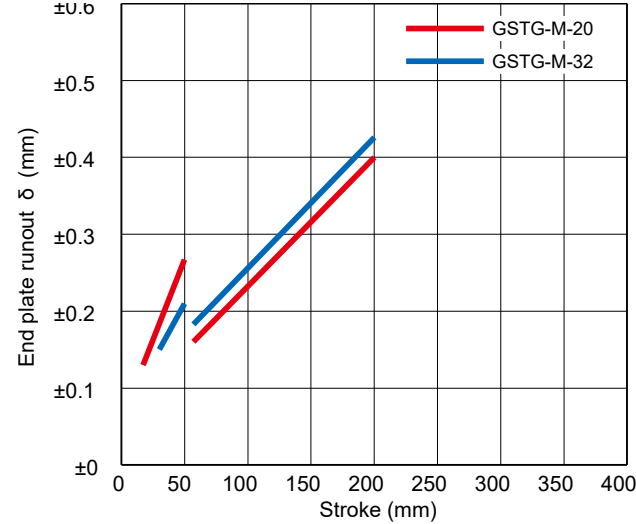


Runout accuracy

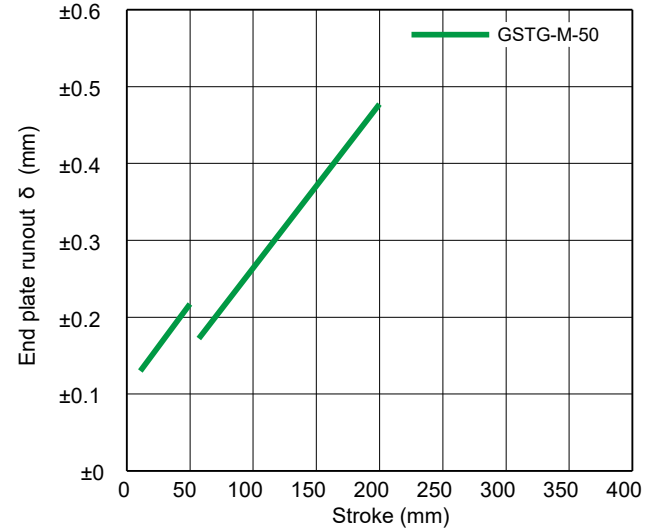
The amount of runout δ that occurs at the tip of the end plate when there is no load is estimated by the values in the graph below. (Excluding the amount of deflection of the guide rod)



● GSTG-M-20, 32

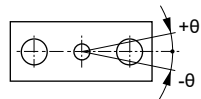


● GSTG-M-50



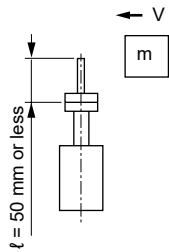
Non-rotation accuracy

(Reference value)



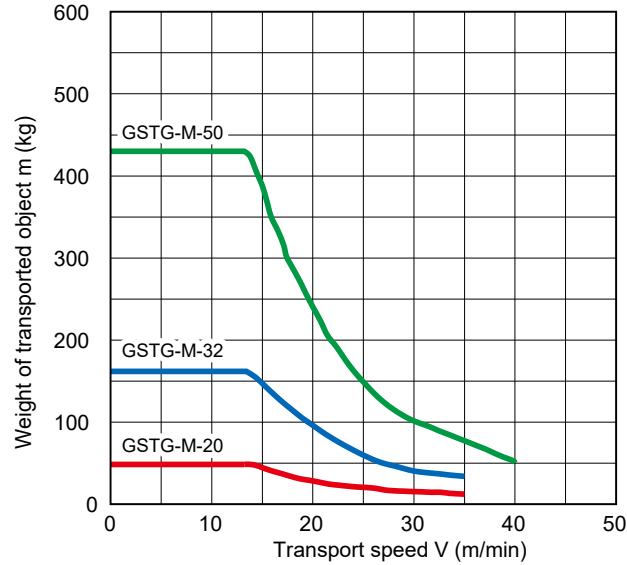
Size	Non-rotation accuracy θ (degrees)
GSTG-20	± 0.07
GSTG-32	± 0.06
GSTG-50	± 0.05

Operating range when used as a stopper

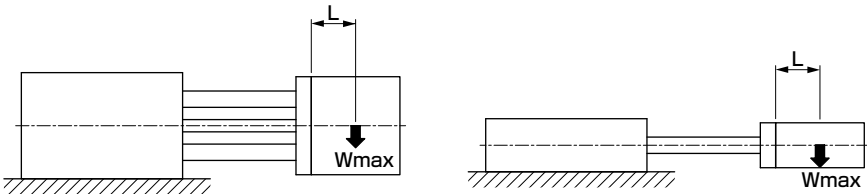


- *1 When using as a stopper, please select a model with a stroke of 50 or less.
- *2 The total length of the stopper part should be $l = 50$ mm or less.
- *3 When fixing the actuator body, ensure the bolt screwing depth is 2d or more and consider measures to prevent loosening (adhesive, spring washer, etc.).
- *4 For calculation of required operating thrust, please refer to P. 436.
- *5 Please calculate the actuator thrust using the formula below.
Thrust = Vertical payload $\times$ 10 (N)

Impact load
GSTG-M (Plain bearing)

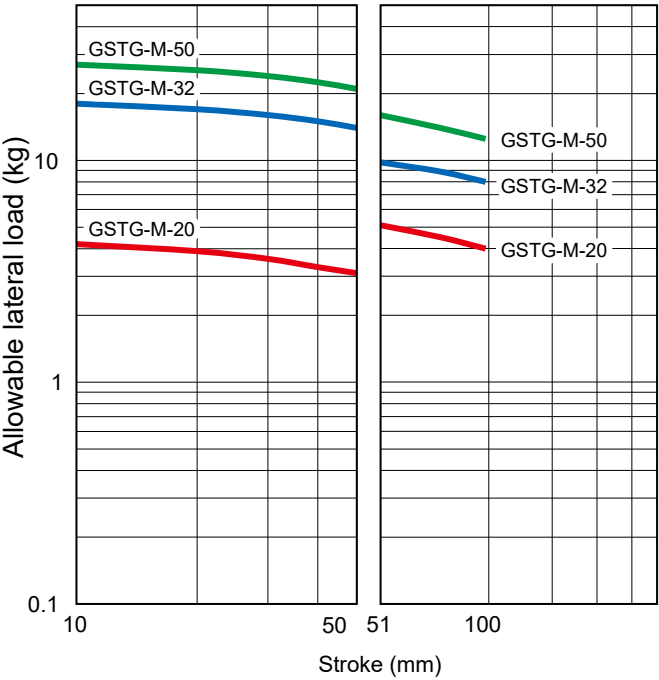


Allowable Lateral Load Plain bearing

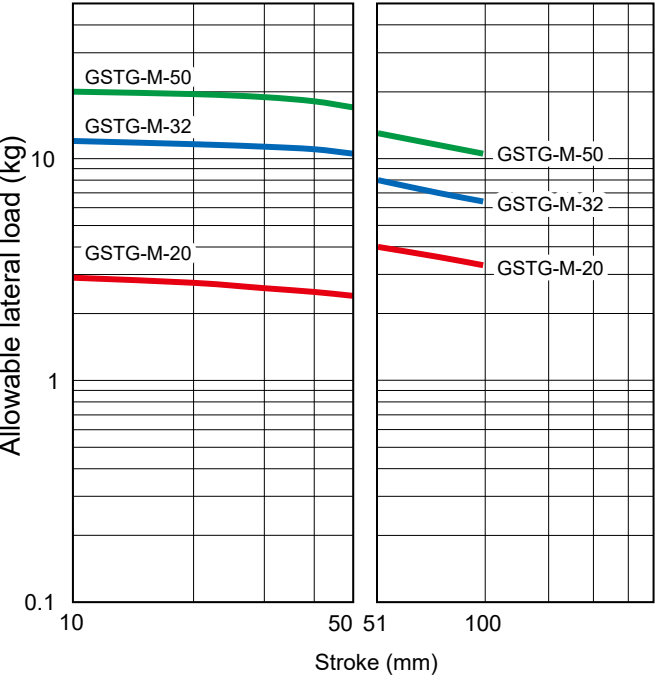


Wmax: Lateral load (kg)
L: Load's center of gravity position (mm)

● When L=50 mm



● When L=100 mm



G Series

GSSD2

GSTK

GSTG

GSTS

GSTL

GCKW

G Series

GSSD2

GSTK

GSTG

GSTS

GSTL

GCKW