GSTS

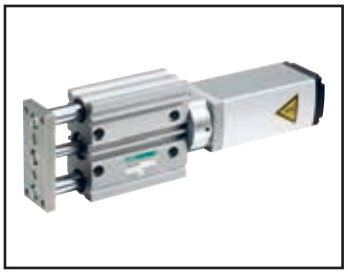
Guided

Electric actuator
Motor specifications

CONTENTS

DSTS 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	25	50	
GSTS-20	□35	6	4.4	6.4	250		100
		9	3.2	4	400		70
GSTS-32	□42	6	9	11.6	250		220
		12	4.8	4.8	500		90
GSTS-50	□56	6	14.8	19.6	250		590
		12	14.8	13.2	400		425



Electric actuator with guide

GSTS-20

□35 Stepping motor

How to order

GSTS - M - 20 G E - 06 025 B B N - R01 - F

❶Bearing

M	Metal bush bearing

❷Size

20	20

❸Applicable controller * 1

G	ECG-A, ECMG

❹Motor mounting direction

E	Straight mounting

❺Lead

06	6 mm
09	9 mm

❻Stroke

025	25 mm
050	50 mm

❼Brake *2

N	None
B	Available

❽Encoder

B	Absolute encoder
C	Incremental encoder

❾Relay 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

❿Option

Blank	End plate material: aluminum
F	End plate material: steel

*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		□35 Stepping motor	
Encoder-type		Battery-less absolute encoder Incremental encoder	
Drive method		Sliding screw ø6	
Stroke	mm	25, 50	
Screw lead	mm	6	9
Max. payload kg *1	Horizontal	4.4	3.2
	Vertical	6.4	4
Operation speed range *2	mm/s	10 to 250	12 to 400
Max. acceleration/ deceleration	Horizontal	0.7	0.7
	Vertical	0.3	0.3
Maximum pressing force	N	100	70
Pressing operation speed range	mm/s	10 to 20	12 to 20
Repeatability	mm	±0.01	
Lost motion	mm	0.3 or less	
Brake	Models	Non-excitation operation type	
	Holding force N	140	93
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)

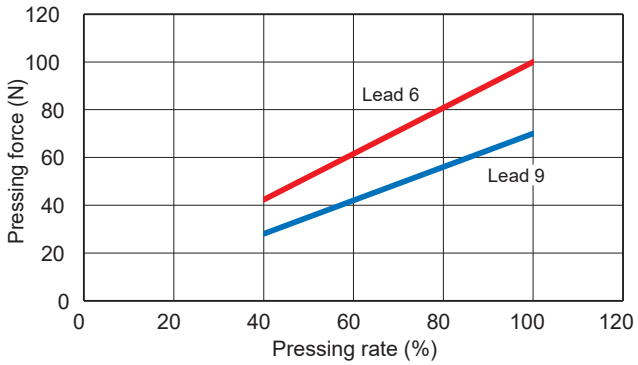
Speed (mm/s)	Acceleration / Deceleration 0.3G / 0.7G	
	Screw lead	
	6 mm	12 mm
	Stroke (mm)	
	50 or less	50 or less
10	0.8	-
12	0.8	1.5
50	4.4	3.2
70	4.4	3.2
100	4.4	3.2
150	4.4	3.2
200	2	3.2
250	2	2.4
300	-	0.4
350	-	0.4
400	-	0.4

[When installed vertically] (kg)

Speed (mm/s)	Acceleration / Deceleration 0.3G	
	Screw lead	
	6 mm	12 mm
	Storke (mm)	
	50 or less	50 or less
10	6.4	-
12	6.4	4
50	6.4	4
70	4	4
100	4	4
150	1.6	3.2
200	0.8	3
250	-	0.8
300	-	0.8
350	-	0.4
400	-	-

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

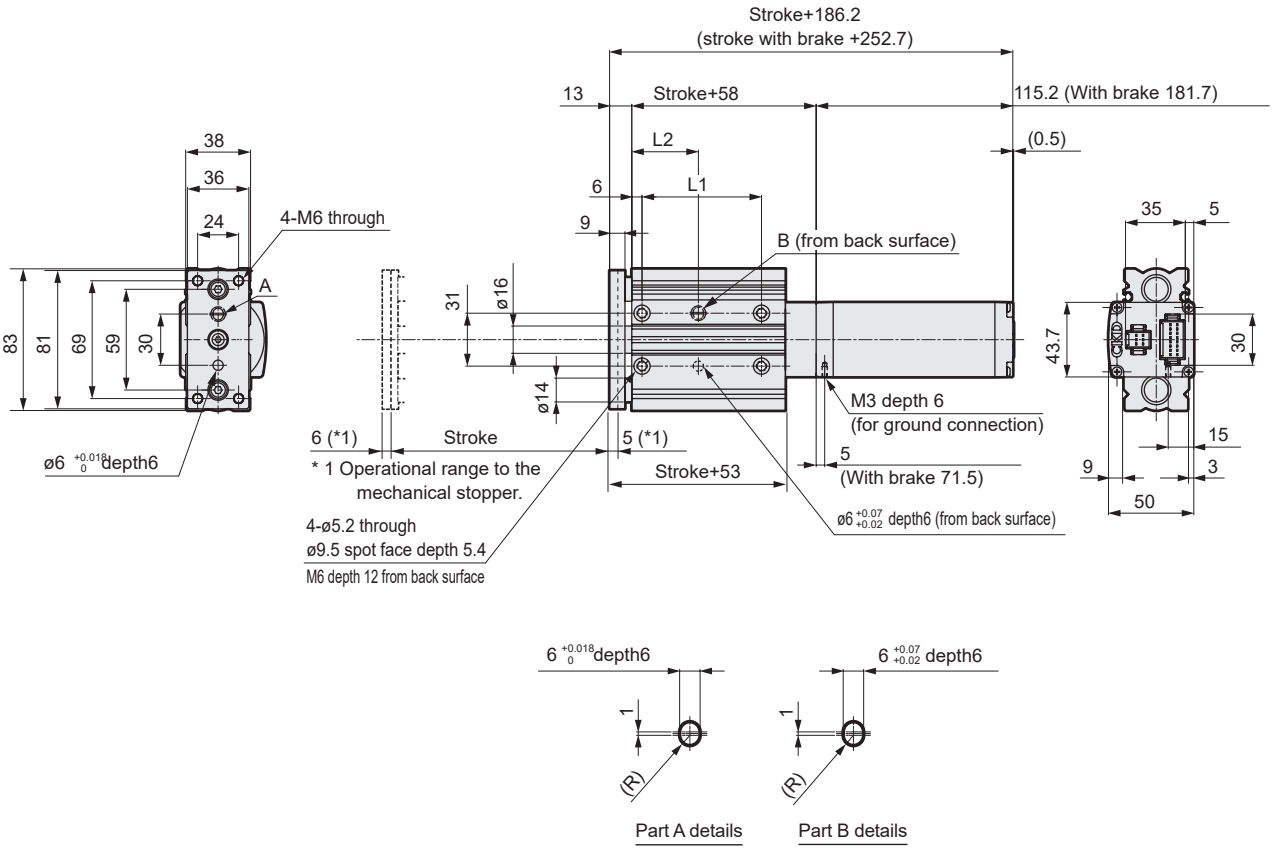
Pressing force



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

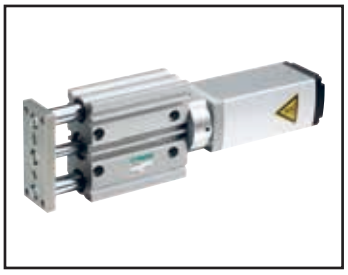
Dimensions

● GSTS-20



[Dimensions by stroke]

Stroke code		025	050
Stroke (mm)		25	50
L1		45	70
L2		26.5	39
Weight (kg)	Without brake	1.2	1.5
	With brake	1.7	1.9



Electric actuator with guide

GSTS-32

□42 Stepper motor

How to order

GSTS - M - 32 G E - 06 025 B B N - R01 - F

❶Bearing

M	Metal bush bearing

❷Size

32	32

❸Applicable controller * 1

G	ECG-A, ECMG

❹Motor mounting direction

E	Straight mounting

❺Lead

06	6 mm
12	12 mm

❻Stroke

025	25 mm
050	50 mm

❼Brake *2

N	None
B	Available

❽Encoder

B	Absolute encoder
C	Incremental encoder

❾Relay 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

❿Option

Blank	End plate material: aluminum
F	End plate material: steel

*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 Stepper motor	
Encoder-type		Battery-less absolute encoder Incremental encoder	
Drive method		Sliding screw ø8	
Stroke	mm	25, 50	
Screw lead	mm	6	12
Max. payload kg *1	Horizontal	9	4.8
	Vertical	11.6	4.8
Operation speed range *2	mm/s	10 to 250	15 to 500
Max. acceleration/ deceleration	Horizontal	0.7	0.7
	Vertical	0.3	0.3
Maximum pressing force	N	220	90
Pressing operation speed range	mm/s	10 to 20	15 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)

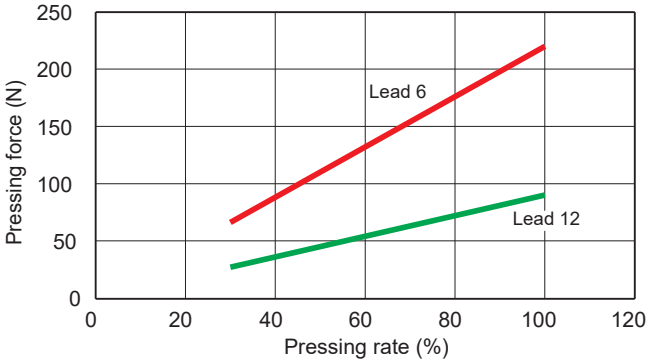
Speed (mm/s)	Acceleration / Deceleration 0.3G / 0.7G Screw lead 6 mm Stroke (mm) 50 or less	Acceleration / Deceleration 0.3G / 0.7G Screw lead 12 mm Stroke (mm) 50 or less
10	1.6	-
15	1.6	1.2
50	6.8	4.8
70	6.8	4.8
100	9	4.8
150	6.8	3.6
200	2.8	3.6
250	0.8	3.6
300	-	3.6
350	-	1.6
400	-	1.6
500	-	0.8

[When installed vertically] (kg)

Speed (mm/s)	Acceleration / Deceleration 0.3G Screw lead 6 mm Storke (mm) 50 or less	Acceleration / Deceleration 0.3G Screw lead 12 mm Storke (mm) 50 or less
10	8.8	-
15	8.8	4.4
50	11.6	4.8
70	5.2	4.8
100	5.2	4.8
150	2	4.8
200	0.8	4.5
250	-	1.2
300	-	1.2
350	-	-
400	-	-
500	-	-

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

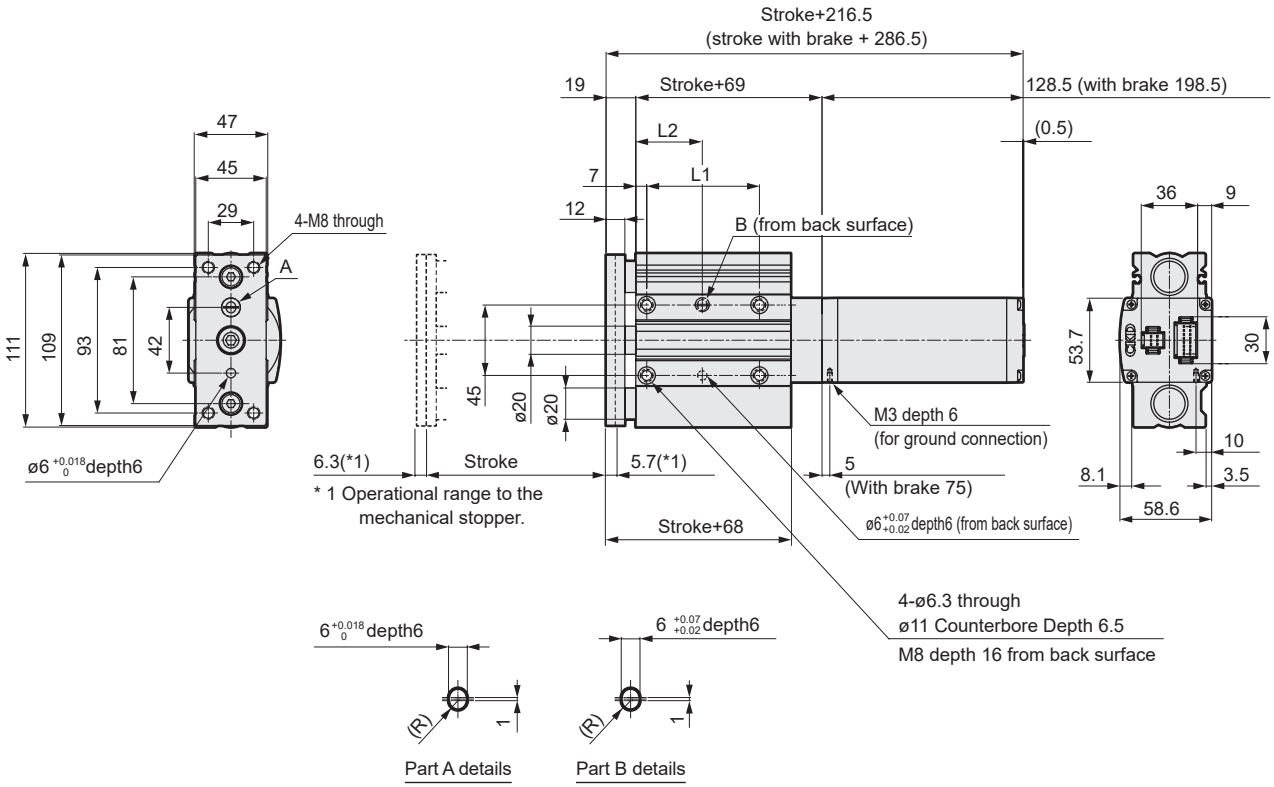
Pressing force



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

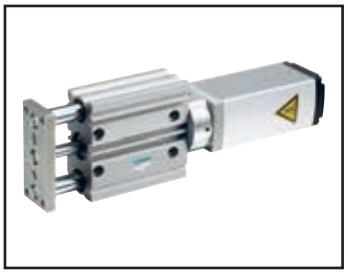
Dimensions

● GSTS-32



[Dimensions by stroke]

Stroke code		025	050
Stroke (mm)		25	50
L1		47	72
L2		30	42.5
Weight (kg)	Without brake	2.4	2.8
	With brake	3	3.4



Electric actuator with guide

GSTS-50

□56 Stepping motor

How to order

GSTS - M - 50 G E - 06 025 B B N - R01 - F

❶Bearing

M	Metal bush bearing

❷Size

50	50

❸Applicable controller * 1

G	ECG-A, ECMG

❹Motor mounting direction

E	Straight mounting

❺Lead

06	6 mm
12	12 mm

❻Stroke

025	25 mm
050	50 mm

❼Brake *2

N	None
B	Available

❽Encoder

B	Absolute encoder
C	Incremental encoder

❾Relay 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

❿Option

Blank	End plate material: aluminum
F	End plate material: steel

*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		□56 Stepping motor	
Encoder-type		Battery-less absolute encoder Incremental encoder	
Drive method		Sliding screw ø12	
Stroke	mm	25, 50	
Screw lead	mm	6	12
Max. payload kg *1	Horizontal	14.8	14.8
	Vertical	19.6	13.2
Operation speed range *2	mm/s	20 to 250	20 to 400
Max. acceleration/ deceleration	Horizontal	0.7	0.7
	Vertical	0.3	0.3
Maximum pressing force	N	590	425
Pressing operation speed range	mm/s	20	20
Repeatability	mm	±0.01	
Lost motion	mm	0.3 or less	
Brake	Models	Non-excitation operation type	
	Holding force N	640	320
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)

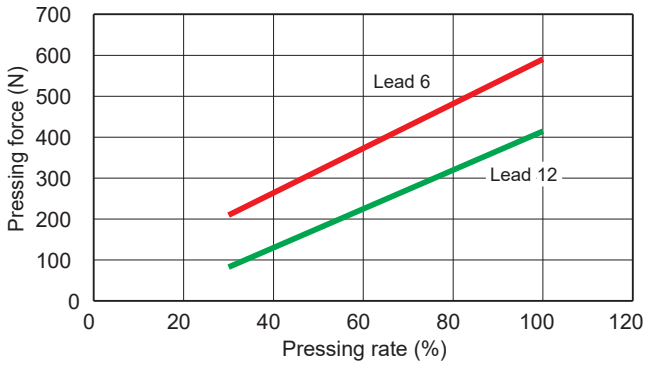
Speed (mm/s)	Acceleration / Deceleration 0.3G / 0.7G	
	Screw lead	
	6 mm	12 mm
	Stroke (mm)	
	50 or less	50 or less
20	14.8	4.4
50	9.6	9.6
70	9.6	9.6
100	9.6	14.8
150	6	10.8
200	4	10.8
250	0.4	6
300	-	6
350	-	2.8
400	-	0.7

[When installed vertically] (kg)

Speed (mm/s)	Acceleration / Deceleration 0.3G	
	Screw lead	
	6 mm	12 mm
	Storke (mm)	
	50 or less	50 or less
20	19.6	3.6
50	14	13.2
70	4.8	12
100	4.8	10.5
150	0.8	4
200	-	4
250	-	2
300	-	0.7
400	-	-

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

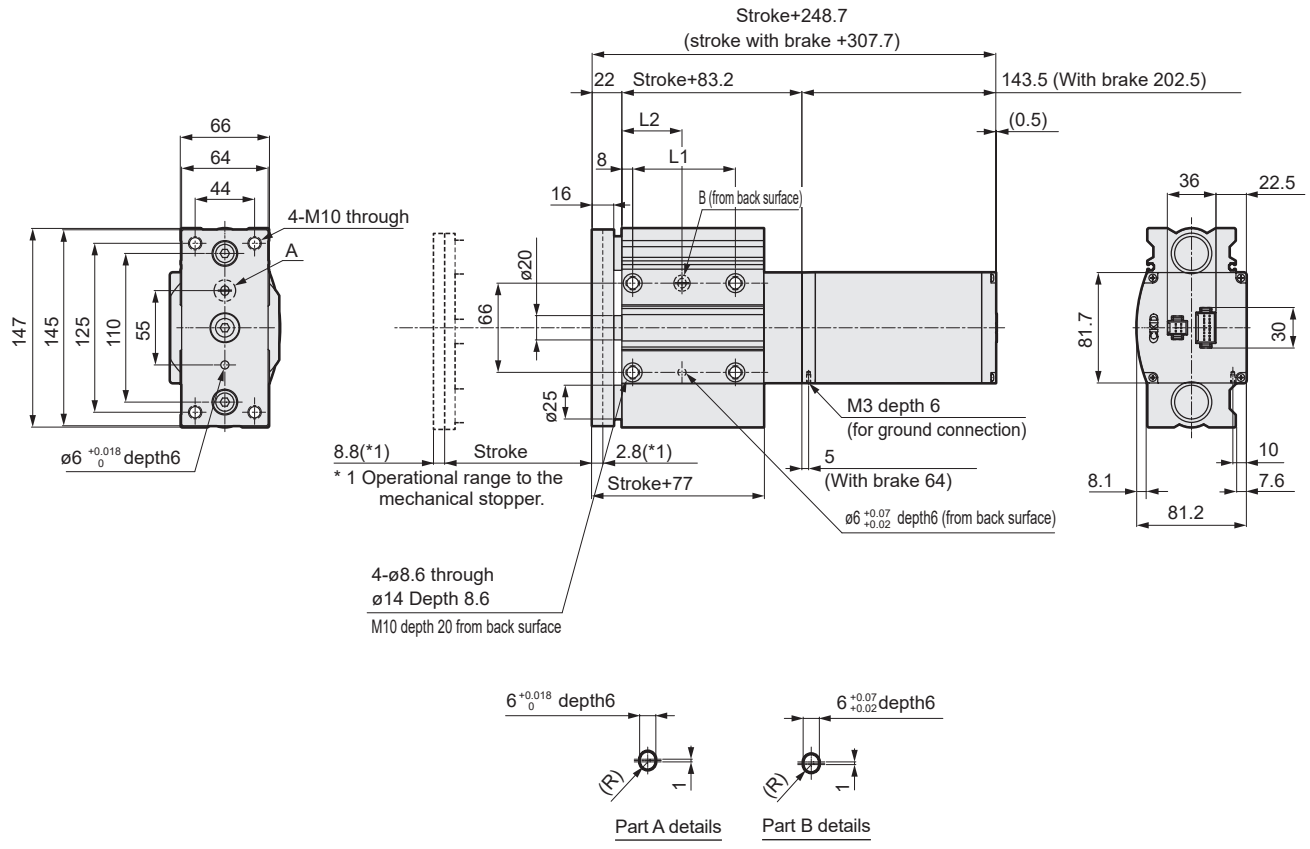
Pressing force



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

Dimensions

● GSTS-50



[Dimensions by stroke]

Stroke code		025	050
Stroke (mm)		25	50
L1		51	76
L2		32	44.5
Weight (kg)	Without brake	4.4	5
	With brake	5.7	6.3

Model selection

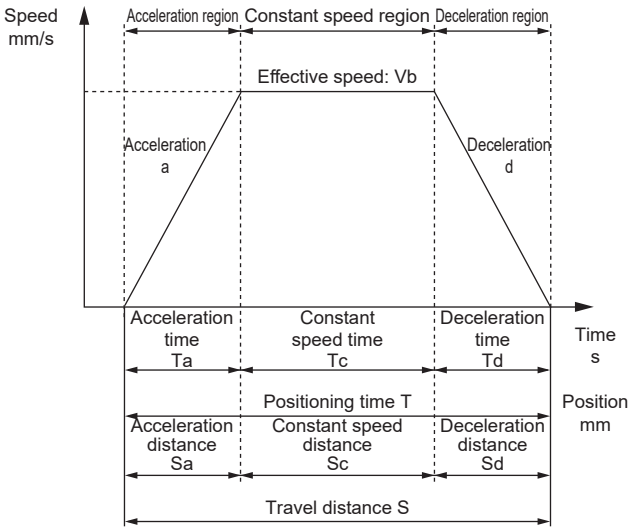
STEP 1 Confirming payload

Payload varies with mounting orientation, screw lead, transport speed, acceleration/deceleration and power supply voltage. Refer to the Series Variation (page 151), the specification table for each model and the Table of Load Capacity 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.

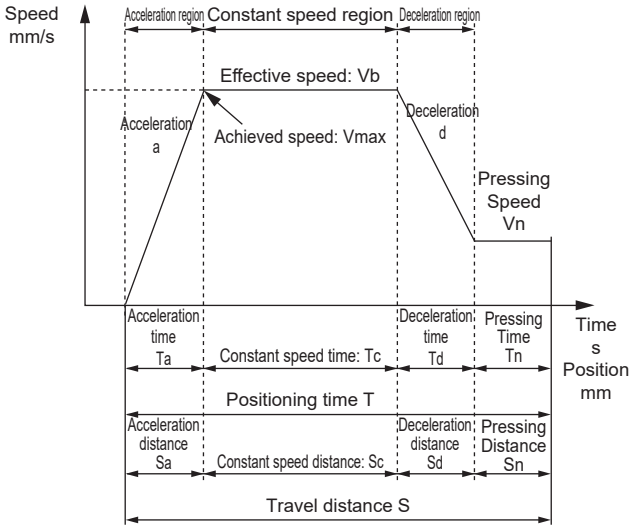
Positioning time for general transport operation



	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 152, 154 and 156 for details.
* While settling time depends on working conditions, it may take 0.2 seconds or so.
* 1 G ≈ 9.8m/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	
	Pressing distance	Sn	mm	
Calculated value	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)×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 152, 154 and 156 for details.
* While settling time depends on working conditions, it may take 0.2 seconds or so.
* 1 G ≈ 9.8m/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

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

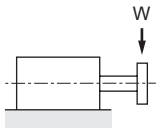
Static allowable load and moment

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)
GSTS-M-20	25	48	32.6	0.71	32.6
	50	35		0.52	
GSTS-M-32	25	141	107.4	2.86	107.4
	50	109		2.21	
GSTS-M-50	25	213	201.7	5.86	201.7
	50	170		4.68	

When operating the unit under a load, calculate the allowable load using the following formula.
Catalog allowable lateral load × 0.9

●Lateral load W (N)

*When installed vertically

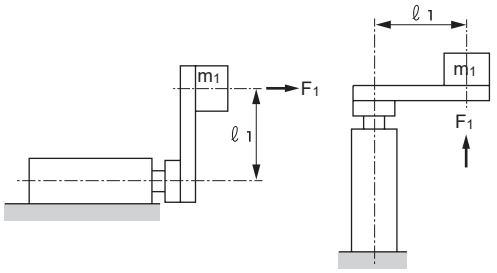


$$\frac{m_1 \times \ell_1 \times 10}{L} \leq W$$

Size	L
20	0.016+st
32	0.022+st
50	0.025+st

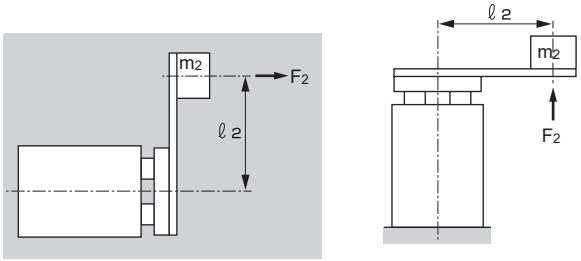
●Bending moment MP (N·m)

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



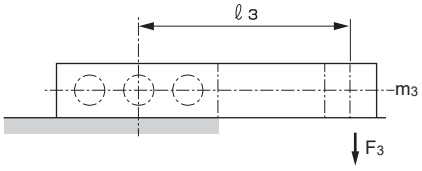
●Radial moment MR. (N·m)

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



●Torsion moment MY (N·m)

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

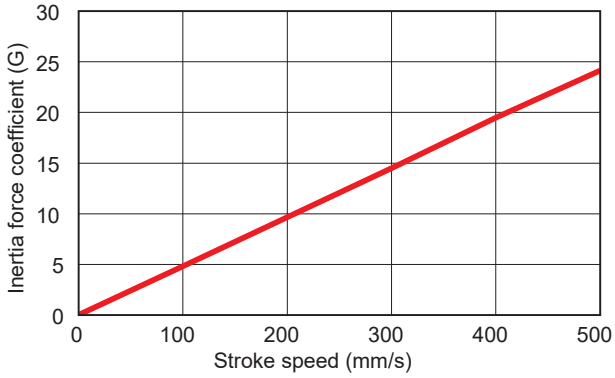


m1: **m2**: **m3**: } Load (kg)

ℓ1: **ℓ2**: **ℓ3**: } Eccentric distance (m)

G: Inertia force coefficient

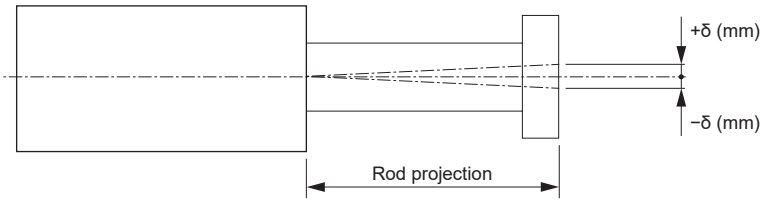
Fig. 1 Trend of inertia force coefficient for guided type

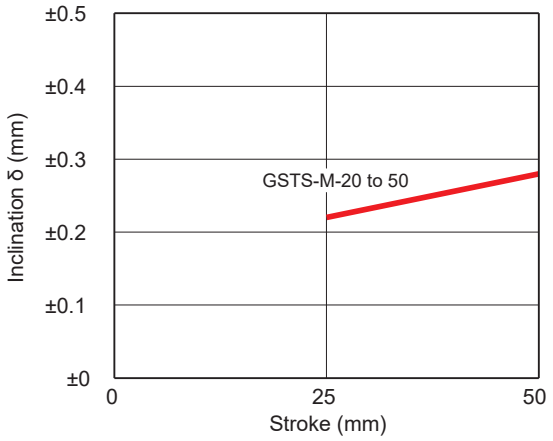


Model selection

Deflection

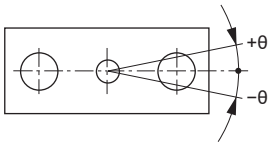
For the inclination that is produced at the end of the end plate when no load is applied, the value in the graph below is used as a guide. (Excluding sag of guide rod)





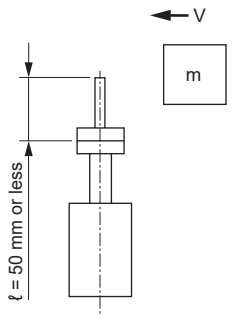
Non-rotating accuracy

(reference value)



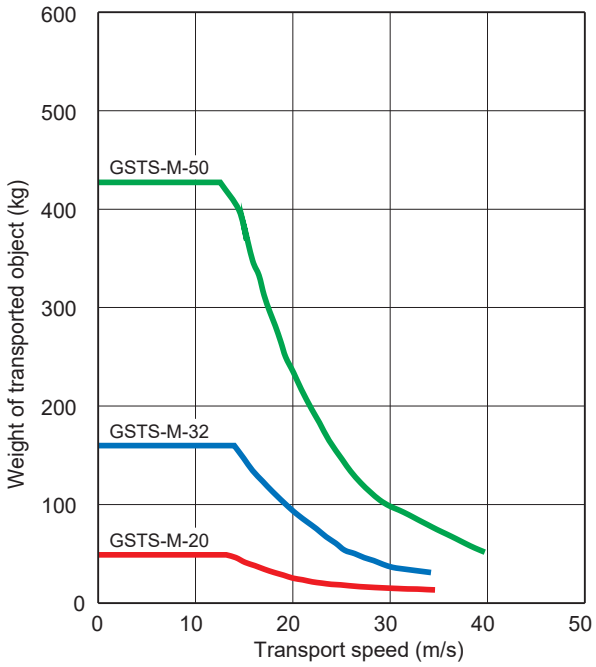
Size	Non-rotating accuracy θ (degrees)
GSTS-M-20	±0.10
GSTS-M-32	±0.08
GSTS-M-50	±0.07

Specified range when using the product as a stopper

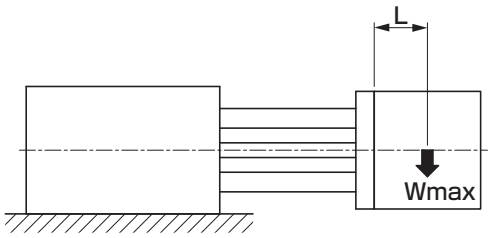


*1 Make sure that the total length of the stopper section is ℓ=50 mm or less.
*2 Make sure that the screw insertion depth of the bolt is 2d and over when fixing the actuator body and consider countermeasures for preventing looseness (adhesive, spring washer, etc.).
*3 Refer to page 22 for the calculation of the required operational thrust.
*4 Calculate the actuator thrust with the following formula.
Thrust = vertical load capacity ×10 (N)

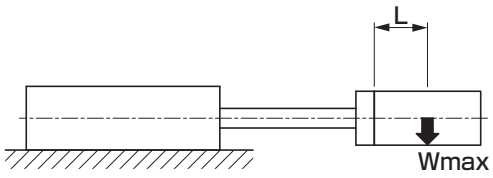
Impact load

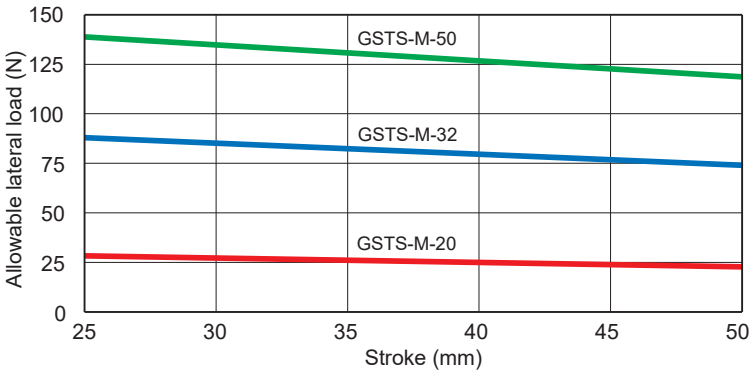


Allowable lateral load　Metal bush bearing



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





*1 When operating the unit under a load, calculate the allowable lateral load using the following formula. Catalog allowable lateral load value × 0.9
*2 When designing, be sure to consider the safety factor according to the operating conditions.