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DSTL System Table

Actuator model No.	Motor Size	Screw lead (mm)	Max. payload (kg)		Stroke (mm) and Max. speed (mm/s)			
			Horizontal	Vertical	50	100	150	200
DSTL-20	□35	6	4.4	6.4	90			
		9	4.4	4.8	135			
DSTL-32	□42	6	10	14	90			
		12	4	4.8	180			
DSTL-50	□56	6	14.8	13.2	72			
		12	9.2	7.2	144			



Electric actuator Guided

DSTL-20

☐ 35 Stepping motor



How to order

DSTL

-

M

-

20

S

-

E

-

06

050

T3PH

R1

A

1

-

F

1

2

3

4

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6

7

8

9

10

11

1 Bearing

M Metal bush bearing

2 Size

20 20

3 Applicable controller * 1

S ESC4

4 Motor mounting direction

E Straight mounting

5 Lead

06 6 mm

09 9 mm

6 Stroke

050 50 mm

100 100 mm

150 150 mm

200 200 mm

7 Switch

NNNN None

T3PH T-type straight

T3PV T-shaped L-type

8 Relay cable * 2

N0 None

R1 Movable 1 m

R3 Movable 3 m

R5 Movable 5 m

RX Movable 10 m

9 Controller included

N None

A DIN rail mounting specifications

B Panel mounting specifications

10 IO cable length

N None

1 1 m

3 3 m

5 5 m

X 10 m

11 Option

Blank End plate material: aluminum

F End plate material: steel

*1 For controller, refer to CC-1635A.
*2 Refer to page 104 for relay cable dimensions.

Specifications

Motor	☐ 35 Stepping motor	
Drive method	Sliding screw ø6	
Stroke mm	50 to 200	
Screw lead mm	6	9
Max. payload kg	Horizontal	4.4
*1	Vertical	4.8
Operation speed range *2 mm/s	15 to 90	22 to 135
Max. acceleration/deceleration *3 mm/s ²	1312 (setting: 9)	2938 (setting: 9)
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 Load capacity varies depending on the speed. Refer to the speed and payload table for details. If the operation sounds are loud at low speed, increase the speed.
*2 The maximum speed may decrease depending on the conditions.
*3 Refer to the speed and payload table for the acceleration/deceleration speed at other settings.
*4 Pressing operation is not supported. Collision with the mechanical end, etc., may lead to damage of parts inside the actuator.

Speed and payload

[When installed horizontally]

Switch Setting	Screw lead					
	6 mm			9 mm		
	Speed (mm/s)	Payload (kg)	Stroke (mm)	Speed (mm/s)	Payload (kg)	Stroke (mm)
0	15	4.4	50 or less	22	4.4	50 or less
1	23	4.4	200 or less	35	4.4	200 or less
2	31	4.4	200 or less	47	4.0	200 or less
3	40	4.4	200 or less	60	3.6	200 or less
4	48	3.6	200 or less	72	3.6	200 or less
5	56	3.6	200 or less	85	3.2	200 or less
6	65	2.8	200 or less	97	2.8	200 or less
7	73	2.8	200 or less	110	2.4	200 or less
8	81	2	200 or less	122	2.4	200 or less
9	90	2	200 or less	135	2	200 or less

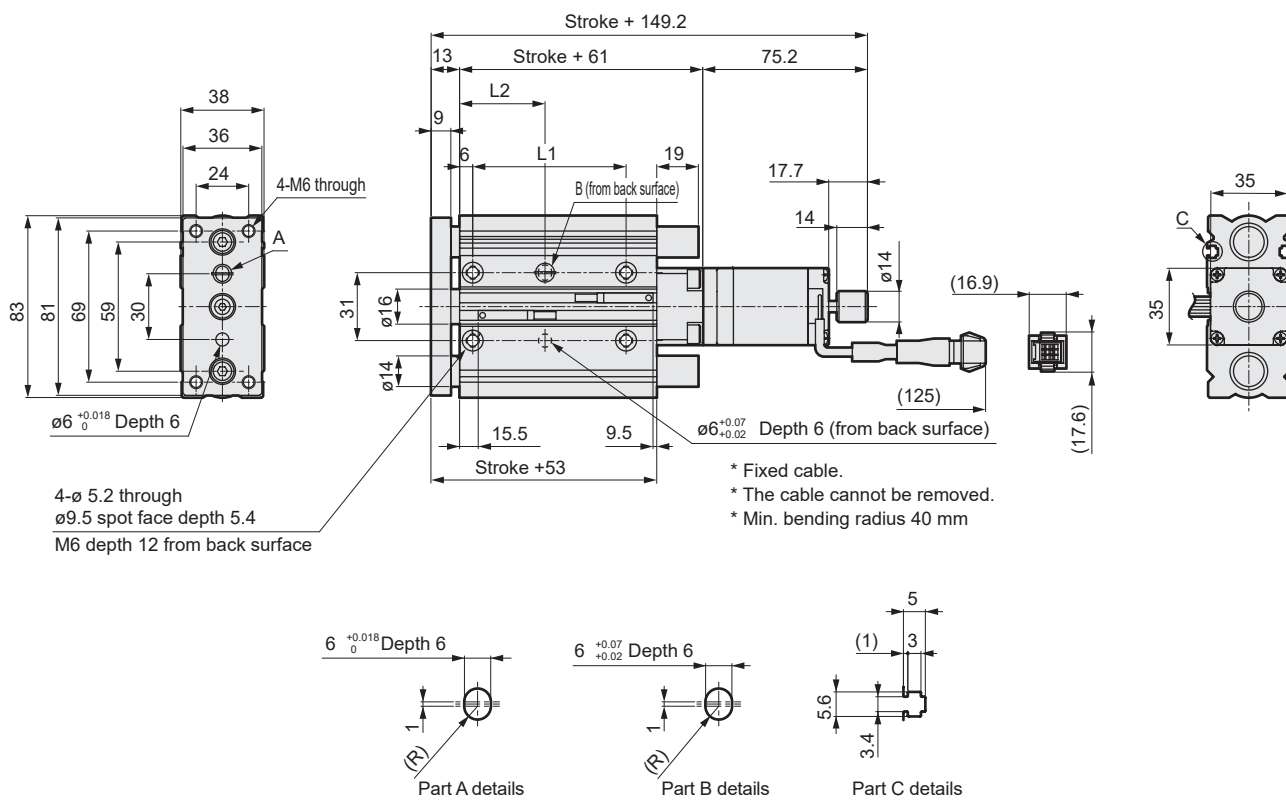
[When installed vertically]

Switch Setting	Screw lead					
	6 mm			9 mm		
	Speed (mm/s)	Payload (kg)	Stroke (mm)	Speed (mm/s)	Payload (kg)	Stroke (mm)
0	15	6.4	50 or less	22	4.8	50 or less
1	23	6.4	200 or less	35	4.8	200 or less
2	31	6.4	200 or less	47	4.8	200 or less
3	40	6.4	200 or less	60	4.8	200 or less
4	48	6.4	200 or less	72	4.4	200 or less
5	56	6.4	200 or less	85	4.4	200 or less
6	65	6.4	200 or less	97	4	200 or less
7	73	4.8	200 or less	110	3.6	200 or less
8	81	4.8	200 or less	122	3.3	200 or less
9	90	4.8	200 or less	135	3	200 or less

* The speed setting is for reference. The actual values may differ due to switch adjustment, power supply voltage, individual motor differences, variations in mechanical efficiency and/or temperature.
* 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.

Dimensions

● DSTL-20



[Dimensions by stroke]

Stroke code	050	100	150	200
Stroke (mm)	50	100	150	200
L1	70	120	170	220
L2	39	64	89	114
Weight (kg)	1.4	1.9	2.3	2.8



Electric actuator Guided

DSTL-32

☐ 42 Stepping motor



How to order

DSTL - M - 32 S E - 06 050 T3PH R1 A 1 - F

1 Bearing
M Metal bush bearing

2 Size
32 32

3 Applicable controller * 1
S ESC4

4 Motor mounting direction
E Straight mounting

5 Lead
06 6 mm
12 12 mm

6 Stroke
050 50 mm
100 100 mm
150 150 mm
200 200 mm

8 Relay cable * 2
N0 None
R1 Movable 1 m
R3 Movable 3 m
R5 Movable 5 m
RX Movable 10 m

7 Switch
NNNN None
T3PH T-type straight
T3PV T-shaped L-type

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

10 IO cable length
N None
1 1 m
3 3 m
5 5 m
X 10 m

9 Controller included
N None
A DIN rail mounting specifications
B Panel mounting specifications

*1 For controller, refer to CC-1635A.

*2 Refer to page 104 for relay cable dimensions.

Specifications

Motor	☐ 42 Stepping motor	
Drive method	Sliding screw ø8	
Stroke mm	50 to 200	
Screw lead mm	6	12
Max. payload kg	Horizontal	10
	Vertical	4
Operation speed range *2 mm/s	15 to 90	30 to 180
Max. acceleration/deceleration *3 mm/s ²	1312 (setting: 9)	5250 (Setting: 9)
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 Load capacity varies depending on the speed. Refer to the speed and payload table for details. If the operation sounds are loud at low speed, increase the speed.

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

*3 Refer to the speed and payload table for the acceleration/deceleration speed at other settings.

*4 Pressing operation is not supported. Collision with the mechanical end, etc., may lead to damage of parts inside the actuator.

Speed and payload

[When installed horizontally]

Switch Setting	Screw lead								
	6 mm					12 mm			
	Speed (mm/s)	Payload (kg)			Speed (mm/s)	Payload (kg)			
		Stroke (mm)				Stroke (mm)			
		50 or less	100 or less	200 or less		50 or less	100 or less	200 or less	
0	15	10.0	9.5	9.0	30	4.0	3.5	3.0	
1	23	9.2	8.7	8.2	46	3.2	1.9	1.4	
2	31	6.0	5.5	5.0	63	2.8	2.3	1.8	
3	40	6.0	5.5	5.0	80	2.4	2.7	2.2	
4	48	4.0	3.5	3.0	96	2.4	1.9	1.4	
5	56	3.6	3.1	2.6	113	2.4	1.9	1.4	
6	65	3.6	3.1	2.6	130	2.4	1.9	1.4	
7	73	3.2	2.7	2.2	146	2.0	1.5	1.0	
8	81	2.4	1.9	1.4	163	1.6	1.1	0.6	
9	90	2.0	1.5	1.0	180	1.2	0.7	0.2	

[When installed vertically]

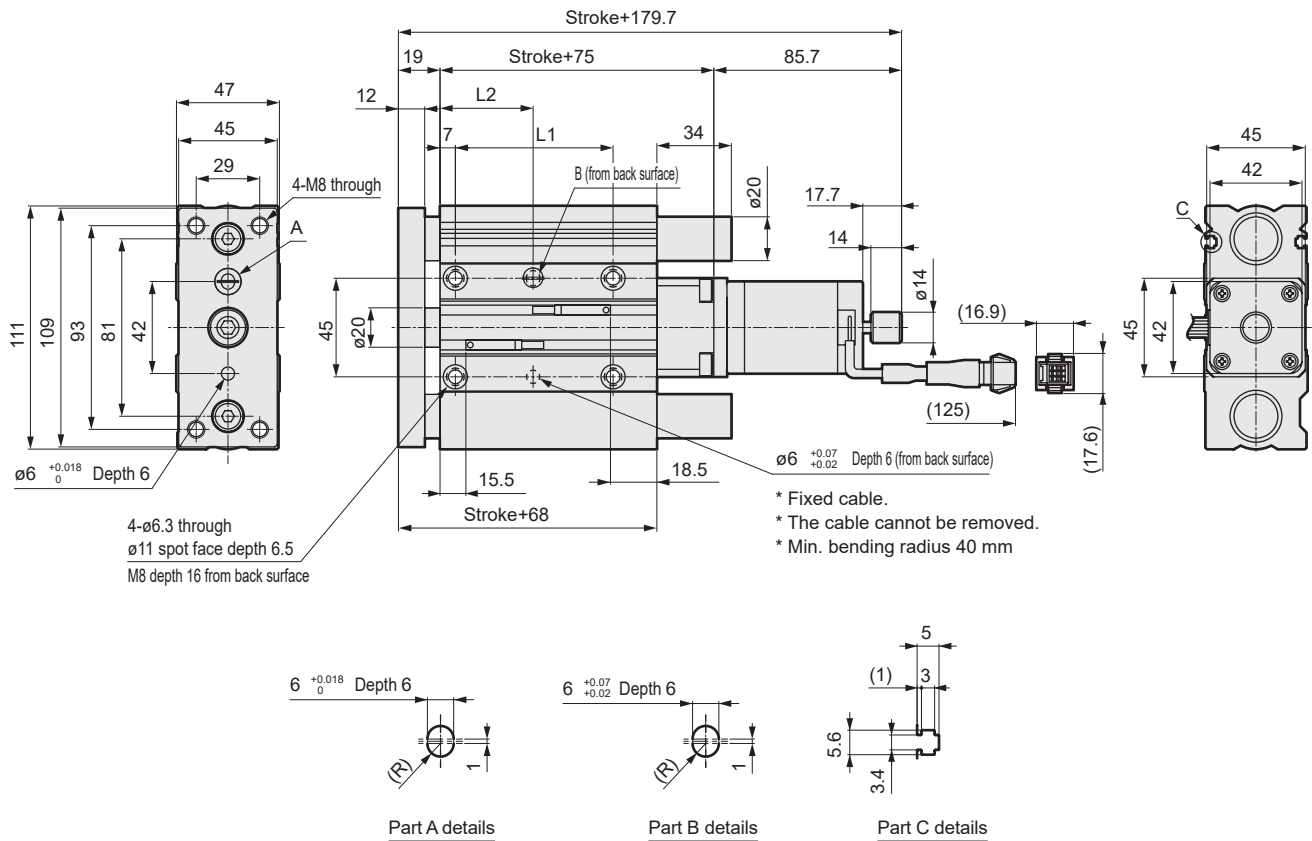
Switch Setting	Screw lead								
	6 mm					12 mm			
	Speed (mm/s)	Payload (kg)			Speed (mm/s)	Payload (kg)			
		Stroke (mm)				Stroke (mm)			
		50 or less	100 or less	200 or less		50 or less	100 or less	200 or less	
0	15	14	13.5	13	30	4.8	4.3	3.8	
1	23	13.2	12.7	12.2	46	4	3.5	3.0	
2	31	12.4	11.9	11.4	63	4	3.5	3.0	
3	40	11.6	11.1	10.6	80	4	3.5	3.0	
4	48	11.6	11.1	10.6	96	3.6	3.1	2.6	
5	56	11.6	11.1	10.6	113	3.2	2.7	2.2	
6	65	10.8	10.3	9.8	130	2.8	2.3	1.8	
7	73	10.8	10.3	9.8	146	2.4	1.9	1.4	
8	81	10	9.5	9.0	163	2.0	1.5	1.0	
9	90	9.2	8.7	8.2	180	1.6	1.1	0.6	

* The speed setting is for reference. The actual values may differ due to switch adjustment, power supply voltage, individual motor differences, variations in mechanical efficiency and/or temperature.

* 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.

Dimensions

● DSTL-32

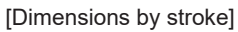


[Dimensions by stroke]

Stroke code	050	100	150	200
Stroke (mm)	50	100	150	200
L1	72	122	172	222
L2	42.5	67.5	92.5	117.5
Weight (kg)	2.7	3.6	4.2	5.3

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

● DSTL-50



Stroke code	050	100	150	200
Stroke (mm)	50	100	150	200
L1	76	126	176	226
L2	44.5	69.5	94.5	119.5
Weight (kg)	5.2	6.5	7.7	9.1

Model selection

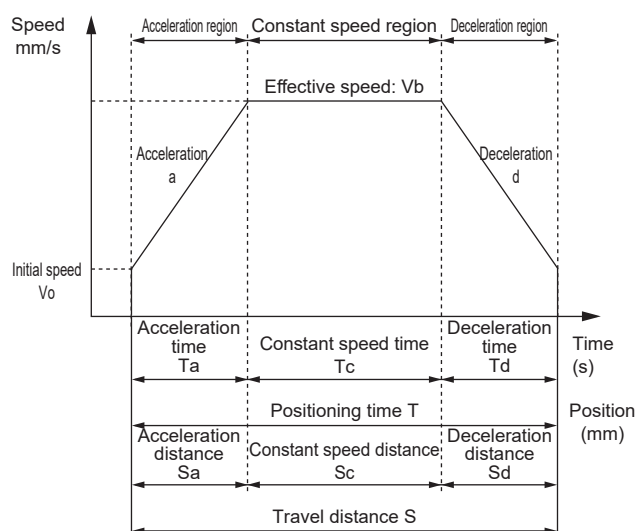
STEP 1 Confirming payload

Payload varies with mounting orientation, screw lead and transport speed. Refer to the Series Variation (page 53), the specification table for each model and the Table of Payload by Speed Setting 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	Formula
Set value	Initial speed	V0	mm/s	According to the table below (= value of switch setting 0)
	Speed setting	V	mm/s	Refer to the table below
	Acceleration	a	mm/s ²	According to the table below (fixed value)
	Deceleration	d	mm/s ²	According to the table below (fixed value)
Calculated value	Travel distance	S	mm	*
	Achieved speed	Vmax	mm/s	$= (S \times a + V_0^2)^{1/2}$
	Effective speed	Vb	mm/s	The lesser value of V and Vmax
	Acceleration time	Ta	s	$= (Vb - V_0) / a$
	Deceleration time	Td	s	$= (Vb - 0) / d$
	Constant speed time	Tc	s	$= S_c / Vb$
	Acceleration distance	Sa	mm	$= V_0 \times Ta + (a \times Ta^2) / 2$
	Deceleration distance	Sd	mm	$= Vb \times Td - (d \times Td^2) / 2$
	Constant speed distance	Sc	mm	$= S - 2 \times Sa - Sd$
	Positioning time	T	s	$= 2 \times Ta + Tc$

* Depending on the speed setting and stroke, the trapezoid speed waveform may not be formed (the set speed may not be achieved). In this case, select the execution speed (Vb) from the set speed (V) and the achieved speed (Vmax), whichever is smaller.

* Acceleration/deceleration depends on the speed setting.

* Speed is determined by the settings of rotary switches 1 and 2.

* Though the stabilization time differs depending on working conditions, it may take approximately 0.2s.

[Speed setting] (mm/s)

Switch setting	Size 20		Size 32		Size 50	
	L6	L9	L6	L12	L6	L12
0	15	22	15	30	15	30
1	23	35	23	46	21	42
2	31	47	31	63	27	55
3	40	60	40	80	34	68
4	48	72	48	96	40	80
5	56	85	56	113	46	93
6	65	97	65	130	53	106
7	73	110	73	146	59	118
8	81	122	81	163	65	131
9	90	135	90	180	72	144

[Acceleration, deceleration] (mm/s²)

Switch setting	Size 20		Size 32		Size 50	
	L6	L9	L6	L12	L6	L12
0	0	0	0	0	0	0
1	53	119	53	212	38	153
2	129	290	129	518	90	360
3	229	513	229	916	155	620
4	351	787	351	1407	234	934
5	497	1114	497	1990	325	1301
6	666	1492	666	2666	431	1722
7	858	1922	858	3435	549	2196
8	1074	2404	1074	4296	681	2724
9	1312	2938	1312	5250	827	3306

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

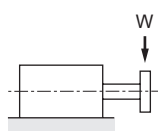
$$M_T = \frac{MP}{MP_{\max}} + \frac{MR}{MR_{\max}} \leq 1.0$$

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)
DSTL-M-20	50	54	32.6	0.80	32.6
	100	38		0.56	
	150	30		0.44	
	200	24		0.35	
DSTL-M-32	50	161	107.4	3.26	107.4
	100	121		2.45	
	150	97		1.96	
	200	81		1.64	
DSTL-M-50	50	243	201.7	6.68	201.7
	100	189		5.20	
	150	155		4.26	
	200	131		3.60	

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

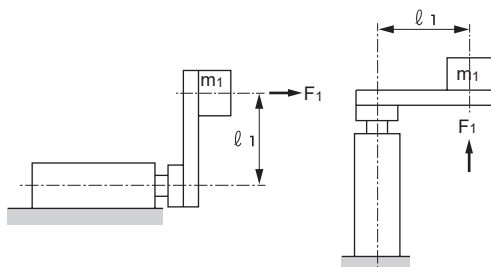


$$\frac{m_1 \times \ell_1 \times 10}{L} \leq W$$

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

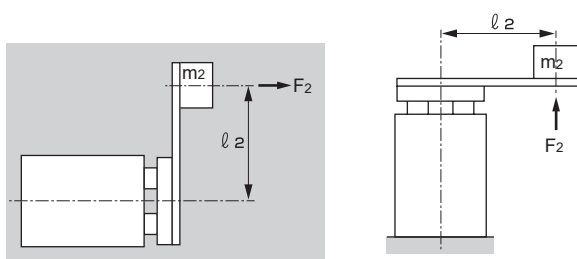
● Bending moment MP (N·m)

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



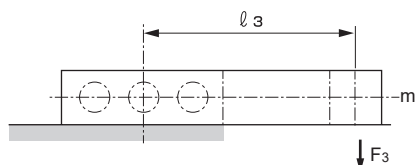
● Radial moment MR (N·m)

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



● Torsion moment MY (N·m)

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

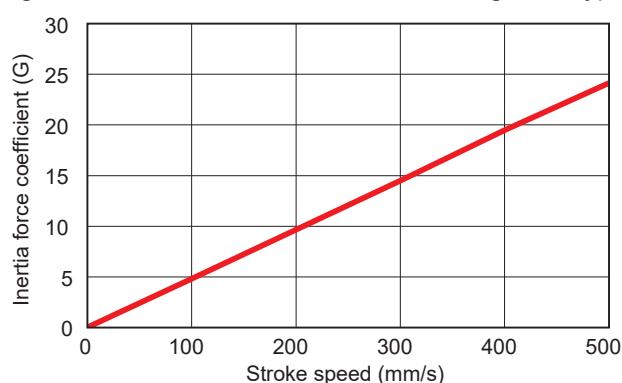


m1:
m2:
m3: } Load (kg)

ℓ1:
ℓ2:
ℓ3: } Eccentric distance (m)

G: Inertia force coefficient

Fig. 1 Trend of inertia force coefficient for guided type



D Series (Screw drive)

D Series (Spring drive)

ESC3 (Controller)

G Series

ECG-A (Controller)

ECG-B (Controller)

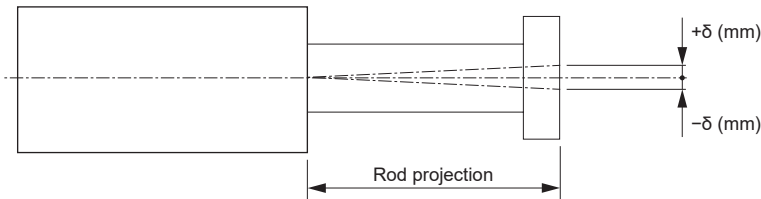
Safety Caution

Model selection Check sheet

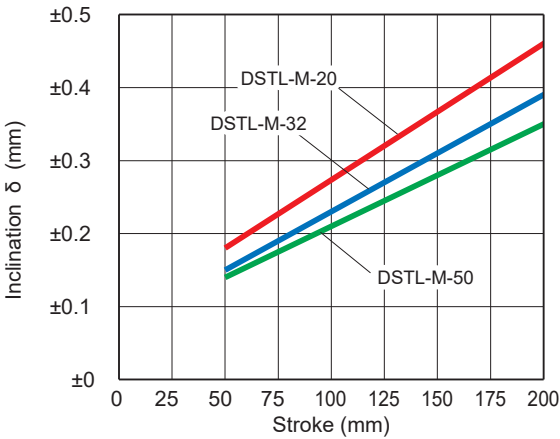
Model selection

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)

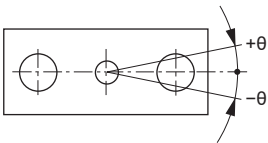


DSTL-M



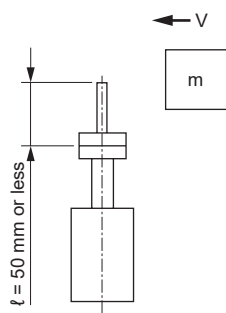
Non-rotating accuracy

(reference value)



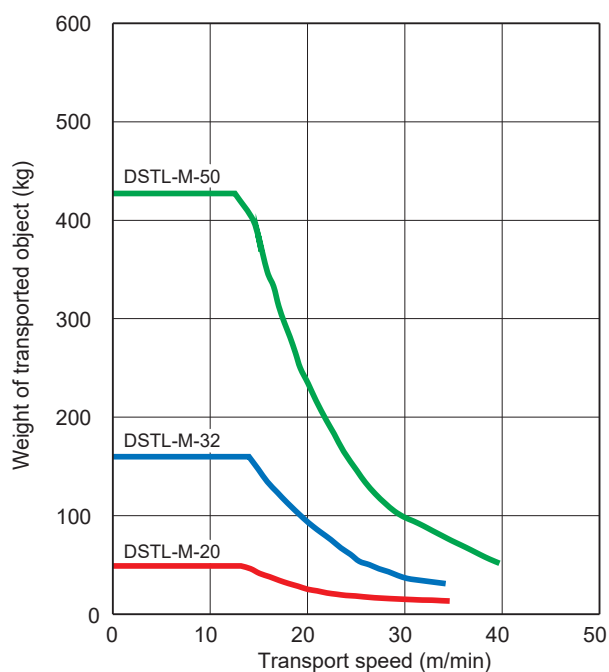
Size	Non-rotating accuracy θ (degrees)
DSTL-M-20	±0.10
DSTL-M-32	±0.08
DSTL-M-50	±0.07

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 section is $\ell=50$ mm or less.
- *3 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.).
- *4 Refer to page 22 for the calculation of the required operational thrust.
- *5 Calculate the actuator thrust with the following formula.
Thrust = vertical load capacity $\times 10$ (N)

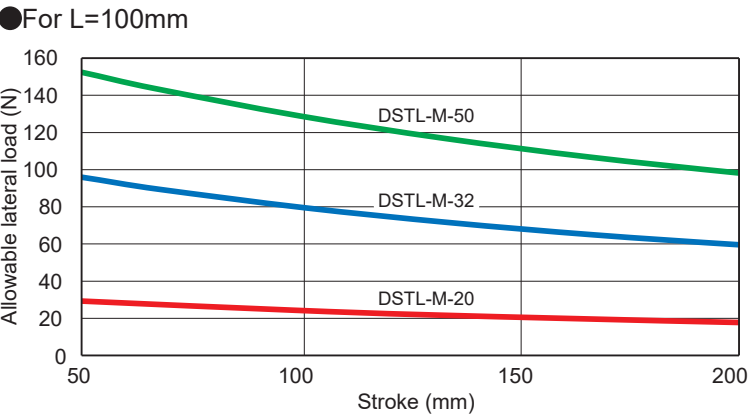
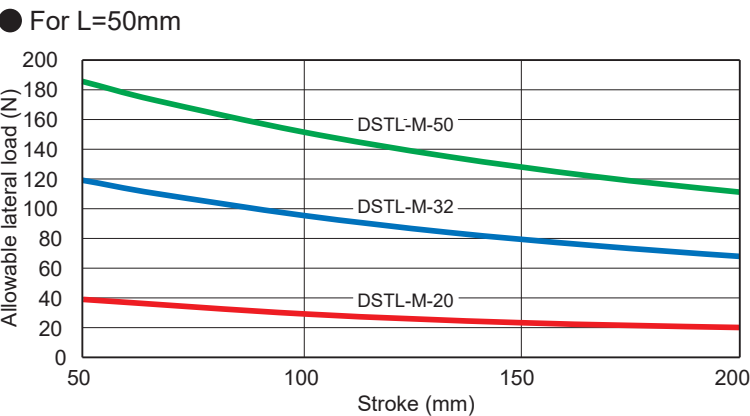
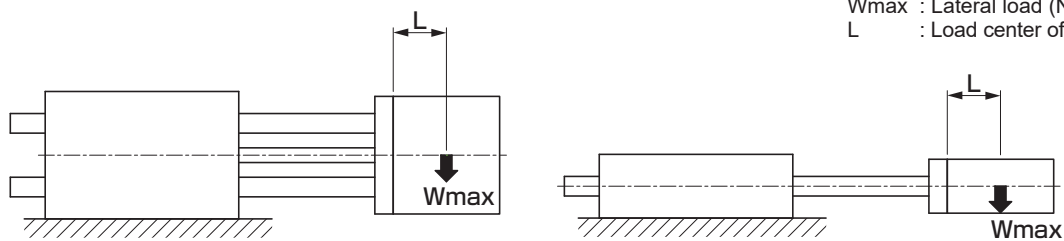
Impact load



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

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

Allowable lateral load Metal bush bearing



*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.