



***DS***  

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***DYNAMIC SERIES***



## *DS Series*

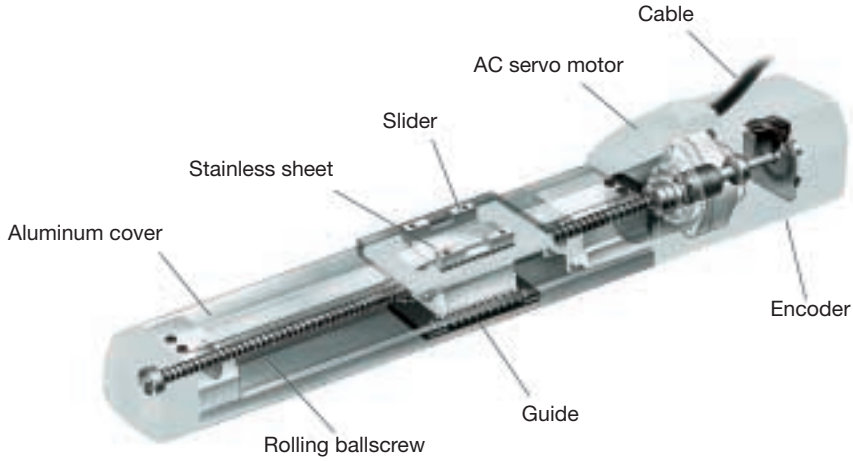
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- **Ultra compact, coupling-free design.**  
(Minimum width: 40mm, height: 46.5mm & length of the effective stroke + 192.5mm)
- **Assembly parts made exclusively for the DS.**  
( Ballscrew, guide, motor encoder, rubber seal and cable)
- **Multiple positioning up to 500 points.**
- **Standard stainless steel sheet.**
- **One-touch, easy programming.**
- **Smooth acceleration and stopping, with a high speed in motion control.**
- **Extremely competitively priced.**
- **AQ lubrication seal option**
- **Service Lite (5.000km of travel possible)**

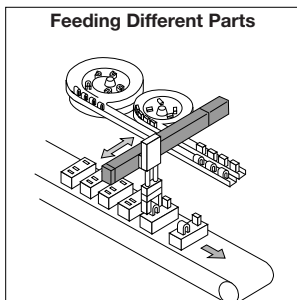


# DS

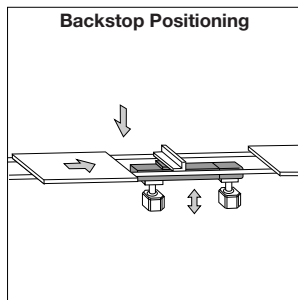
## Ultra compact, low cost, AC Servo high performance actuators



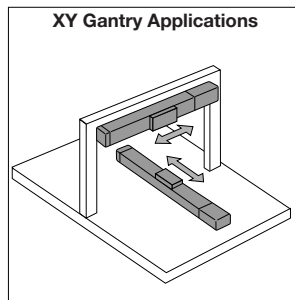
### Application Examples:



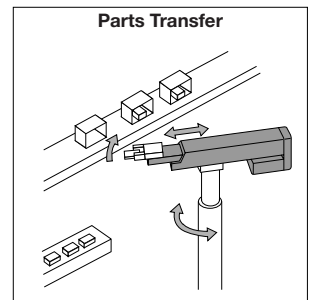
Different shaped parts are supplied by several parts feeders. The DS is very effective in multiple positioning.



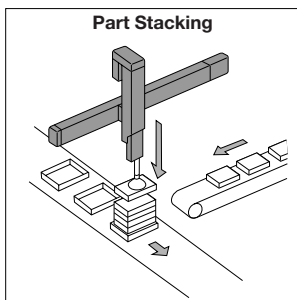
The DS is used to position a backstop to align parts for processing. This system is quick in setting up to accommodate different sized parts.



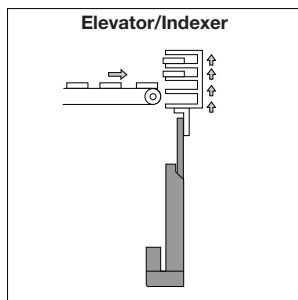
The DS can be used in gantry-type configurations to handle potting, palletising, screwdriving, dispensing, and other lightweight applications.



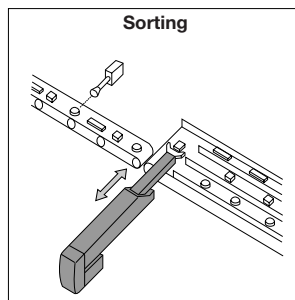
The DS arm type can be used to transfer parts.



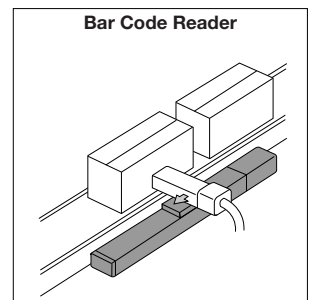
The DS can be used to safely transfer fragile parts at moderate speeds.



The DS can be used as an elevator to increment parts vertically at set distances.



The DS can be used to differentiate parts according to visual signals for placement on separate conveyors.



The DS can be used to position a variety of devices at constant speeds.

## DS Assembly Unit

### Low cost 2-axis unit

You can assemble an extremely low cost and versatile 2-axis structure by assembling single DS actuators.

### Control with 2 controllers

With a PLC, two controllers can be controlled using discrete I/O for point to point (non-coordinated) movement.

### Space saving, compact design

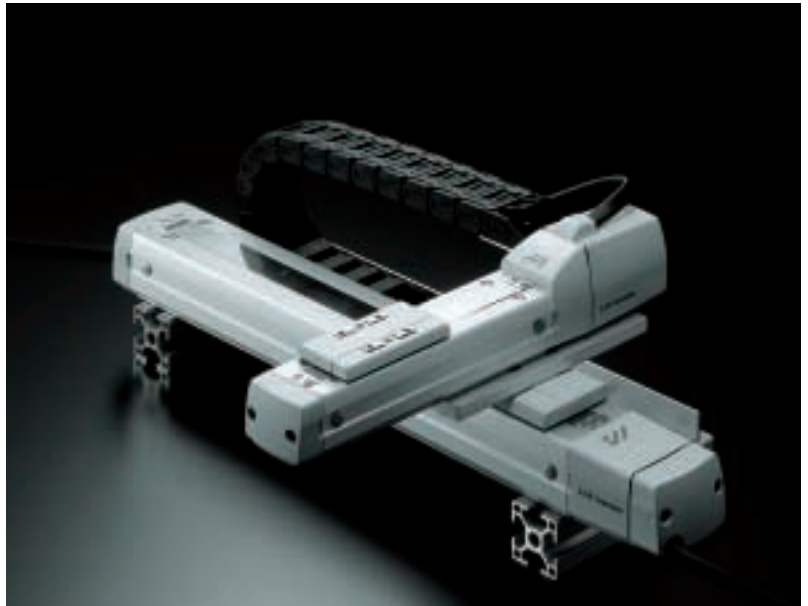
Take advantage of the DS compact size to create an ultra compact 2-axis unit.

### Can upgrade the system

Even if you are currently using a single axis, you can select and purchase component kits that allow you to upgrade your system to a 2-axis unit.

### Assembly Parts

We sell our own assembly parts kit for a single axis unit as 10 other types of assembly units.



The DS series was developed on the basis of single axis use but a 2-axis assembly unit can be used if it suits the particular use conditions. We will offer the most appropriate system for your needs so feel free to ask your sales representative about structure, configuration and connections.

## DS Controller

**Ultra high speed capability through the use of 32 BIT RISC.**

### Multi-task Control

Multi-Tasking control functions (8 programs) through Realtime OS.

### High speed in motion control

based on the Super SEL programming language.

**Memory update function by utilization of Flash Memory.**

### Easy maintenance

Detailed alarm display and simplified base structure (removable cover).

### Standard functions

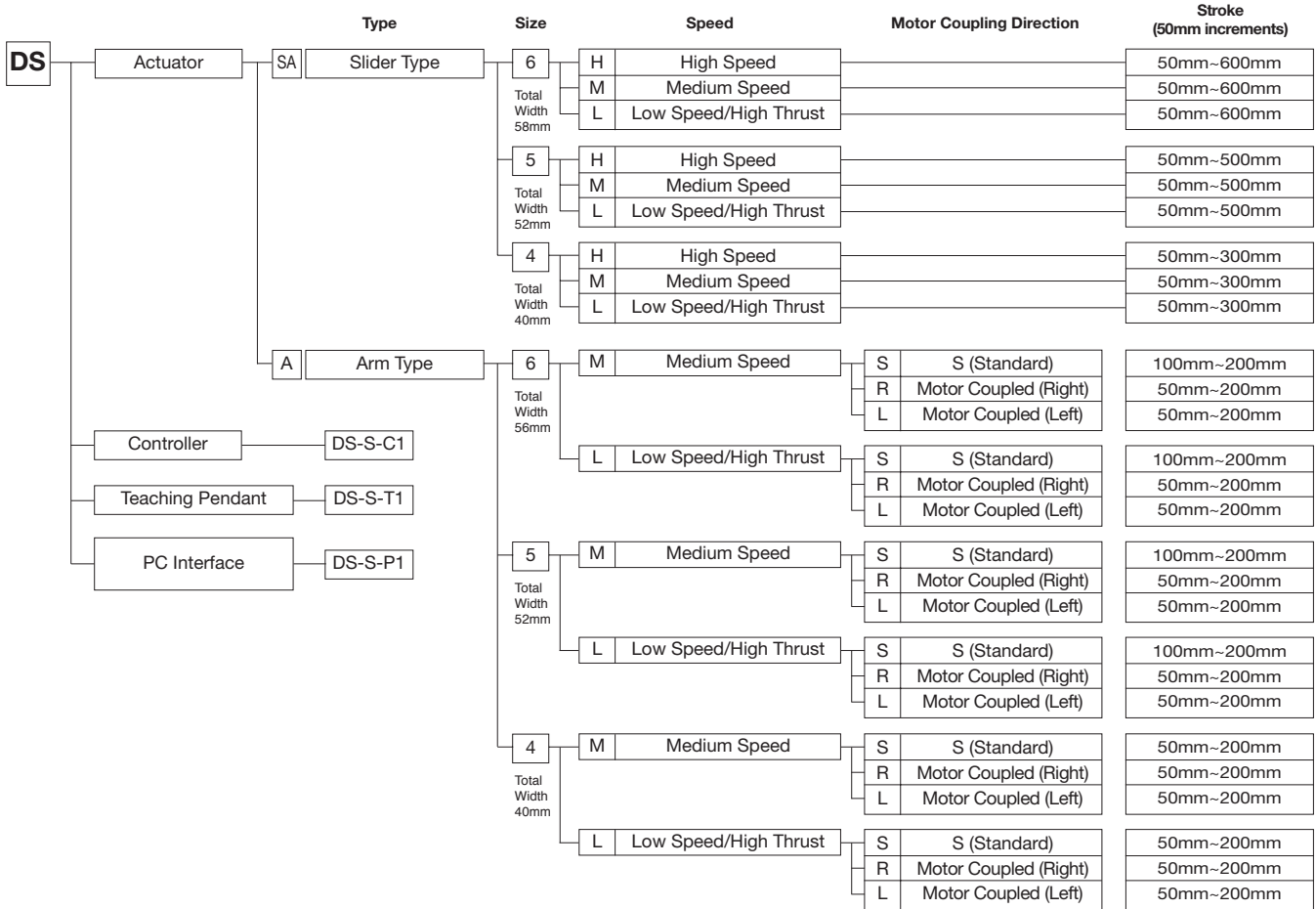
include RS232 unit and brake switch. RS232 connector is now available in standard type.

### Software improvements (WINDOWS)

New variation of Super SEL Language with a remote update function.



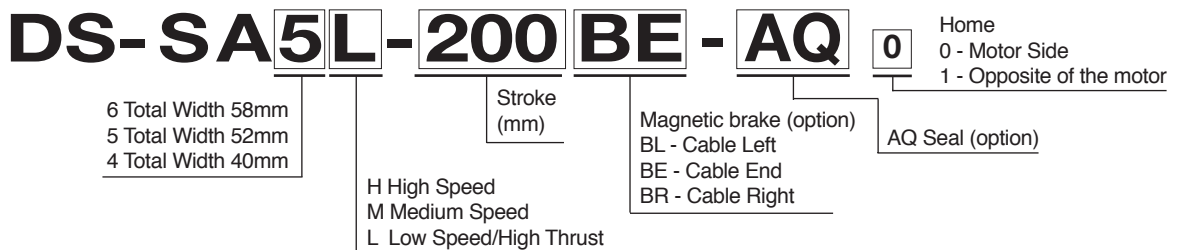
# DS Series Product Lineup



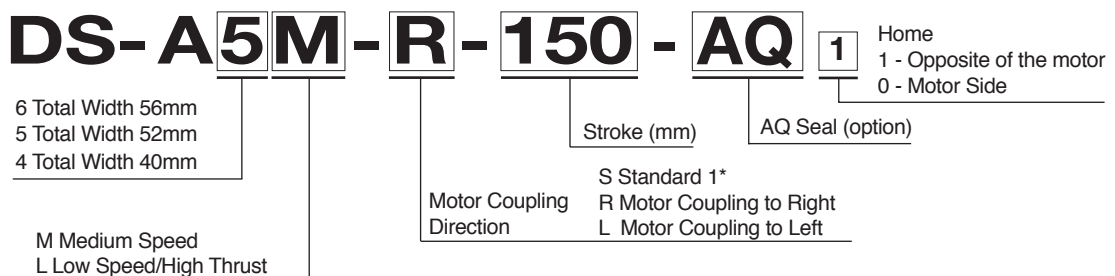
## DS Actuator Series Model

1\* DS-A-5M/5L-S-50 is not manufactured. Actuator home is on the motor side. If you wish home to be on the side opposite of the motor, please inform your sales representative when you place your order.

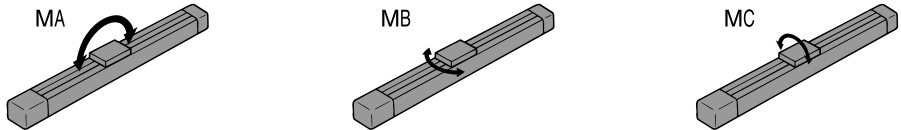
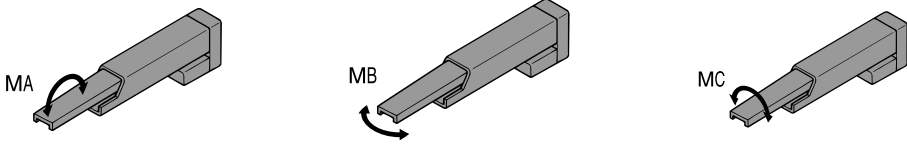
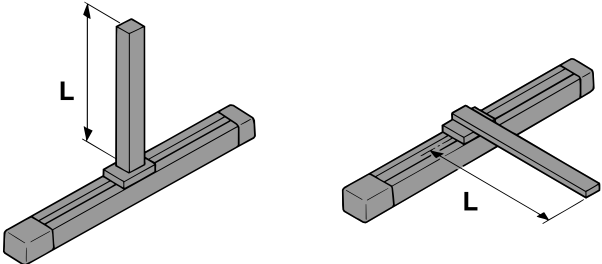
### Slider Type (Magnetic brake is optional)



### Arm Type (Magnetic brake is standard)



■ DS Actuator Specification Notes

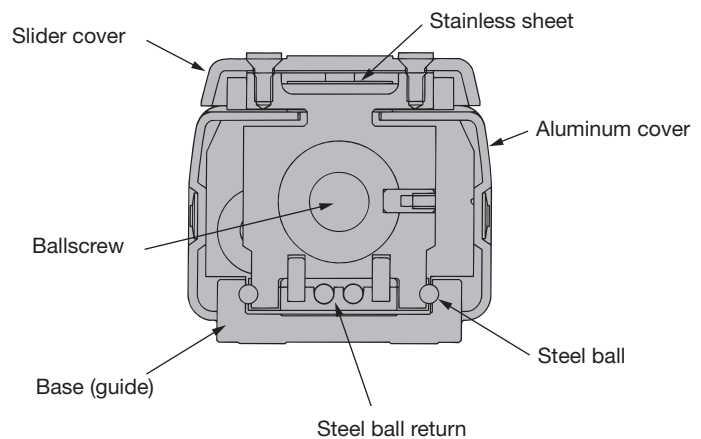
<b>Velocity</b>	The velocity can be set in 1mm/sec increments. Different velocities can be set for each position. Velocities must be set within specifications. The acceleration/deceleration can also be set separately for each position.
<b>Stroke</b>	The DS is available in 50mm increments up to the maximum stroke length.
<b>Repeatability</b>	This is positioning repeatability. There are two levels of repeatability in the DS Series. There are two types: $\pm 0.05\text{mm}$ and $\pm 0.02\text{mm}$ . Repeatability is not the same as absolute accuracy.
<b>Rated Thrust</b>	The thrust must be below the rated thrust specification. The moment must be also be taken into consideration when dealing with thrust.
<b>Payload</b>	The payload is defined as the value when the load is distributed uniformly onto the slide at an acceleration of 0.3 G (Slider Type) and 0.2 G (Arm Type). Be sure to keep the payload within the actuator specifications. If the payload is off-centre, the Moment and the Overhang Load Length must also be considered.
<b>Moment</b>	<p>MA, MB and MC moments must be at or below the specification values.</p> <p>Slider Type</p>  <p>Arm Type</p> 
<b>Overhang Load Length</b>	<p>The centre of gravity exists at the halfway point of the overhang load length.</p> 



# DS-SA

## Slider Type

- Positioning is achieved by the slide which travels along the stroke length.
- Driven by an AC servo motor and ball-screw for multiple positioning with a high degree of repeatability ( $\pm 0,02\text{mm}$  oder  $\pm 0,05\text{mm}$ ).
- Can also be used as a vertical axis (brake option available).
- A stainless steel sheet prevents dust from entering the actuator. Rigidity is maintained because the guide mechanism is integrated into the base.
- The DS-SA actuator comes in 3 types a 58mm width, a 52mm width and a 40mm width. They are compact, providing flexibility in system layout.



**SA6H (High Speed Type)**

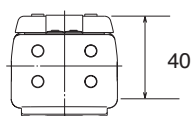
Stroke	50mm	100mm	150mm	200mm	250mm	300mm	350mm	400mm	450mm	500mm	550mm	600mm
Unit Weight	1.3kg	1.5kg	1.7kg	1.9kg	2.1kg	2.3kg	2.5kg	2.7kg	2.9kg	3.1kg	3.3kg	3.5kg
Velocity	800mm/sec									760mm/sec	640mm/sec	540mm/sec
Repeatability	+/-0.05mm											
Rated Thrust	24.2N											
Payload	Horizontal use 6kg Vertical use 1.5kg (acceleration set at 0.3G)											
Motor	AC servo motor (encoder attached to motor) 30W											
Ballscrew	Ø 10mm Lead 12mm Rolled Thread C10 Backlash 0.1mm or less											
Guide	Unique to DS Integrated into base											
Base	Extruded aluminum (A6NOIS-T5) White alumite treatment											
Moment	Ma 8.9Nm, Mb 12.7Nm, Mc 18.6Nm											
Overhang Load Length	Ma direction 220mm or less, Mb · Mc direction 220mm or less											

**SA6M (Medium speed type)**

Stroke	50mm	100mm	150mm	200mm	250mm	300mm	350mm	400mm	450mm	500mm	550mm	600mm
Unit Weight	1.3kg	1.5kg	1.7kg	1.9kg	2.1kg	2.3kg	2.5kg	2.7kg	2.9kg	3.1kg	3.3kg	3.5kg
Velocity	400mm/sec									380mm/sec	320mm/sec	270mm/sec
Repeatability	+/-0.02mm											
Rated Thrust	48.4N											
Payload	Horizontal use 12kg Vertical use 3kg (acceleration set at 0.3G)											
Motor	AC servo motor (encoder attached to motor) 30W											
Ballscrew	Ø 10mm Lead 6mm Rolled Thread C10 Backlash 0.1mm or less											
Guide	Unique to DS Integrated into base											
Base	Extruded aluminum (A6NOIS-T5) White alumite treatment											
Moment	Ma 8.9Nm , Mb 12.7Nm, Mc 18.6Nm											
Overhang Load Length	Ma direction 220mm or less, Mb · Mc direction 220mm or less											

**SA6L (Low speed high thrust type)**

Stroke	50mm	100mm	150mm	200mm	250mm	300mm	350mm	400mm	450mm	500mm	550mm	600mm
Unit Weight	1.3kg	1.5kg	1.7kg	1.9kg	2.1kg	2.3kg	2.5kg	2.7kg	2.9kg	3.1kg	3.3kg	3.5kg
Velocity	200mm/sec									190mm/sec	160mm/sec	135mm/sec
Repeatability	+/-0.02mm											
Rated Thrust	96.8N											
Payload	Horizontal use 12kg Vertical use 6kg (acceleration set at 0.2G)											
Motor	AC servo motor (encoder attached to motor) 30W											
Ballscrew	Ø 10mm Lead 3mm Rolled Thread C10 Backlash 0.1mm or less											
Guide	Unique to DS Integrated into base											
Base	Extruded aluminum (A6NOIS-T5) White alumite treatment											
Moment	Ma 8.9Nm , Mb 12.7Nm, Mc 18.6Nm											
Overhang Load Length	Ma direction 220mm or less, Mb · Mc direction 220mm or less											



Ma, Mc moment  
Standard position for offset



**SA5H (High Speed Type)**

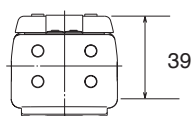
Stroke	50mm	100mm	150mm	200mm	250mm	300mm	350mm	400mm	450mm	500mm
Unit Weight	1.2kg	1.3kg	1.4kg	1.5kg	1.6kg	1.7kg	1.8kg	1.9kg	2.0kg	2.1kg
Velocity	1 ~ 800mm/sec									760mm/sec
Repeatability	+/-0.05mm									
Rated Thrust	16.7N									
Payload	Horizontal use 4kg Vertical use 1kg (acceleration set at 0.3G)									
Motor	AC servo motor (encoder attached to motor) 20W									
Ballscrew	Ø 10mm Lead 12mm									
Guide	Unique to DS Integrated into base									
Base	Extruded aluminum (A6NOIS-T5) White alumite treatment									
Moment	Ma 4.9Nm, Mb 6.8Nm, Mc 11.7Nm						Mc 7.8Nm			
Overhang Load Length	Ma direction 150mm or less, Mb · Mc direction 150mm or less									

**SA5M (Medium speed type)**

Stroke	50mm	100mm	150mm	200mm	250mm	300mm	350mm	400mm	450mm	500mm
Unit Weight	1.2kg	1.3kg	1.4kg	1.5kg	1.6kg	1.7kg	1.8kg	1.9kg	2.0kg	2.1kg
Velocity	1 ~ 400mm/sec									380mm/sec
Repeatability	+/-0.02mm									
Rated Thrust	33.3N									
Payload	Horizontal use 8kg Vertical use 2kg (acceleration set at 0.3G)									
Motor	AC servo motor (encoder attached to motor) 20W									
Ballscrew	Ø 10mm Lead 6mm									
Guide	Unique to DS Integrated into base									
Base	Extruded aluminum (A6NOIS-T5) White alumite treatment									
Moment	Ma 4.9Nm, Mb 6.8Nm, Mc 11.7Nm						Mc 7.8Nm			
Overhang Load Length	Ma direction 150mm or less, Mb · Mc direction 150mm or less									

**SA5L (Low speed high thrust type)**

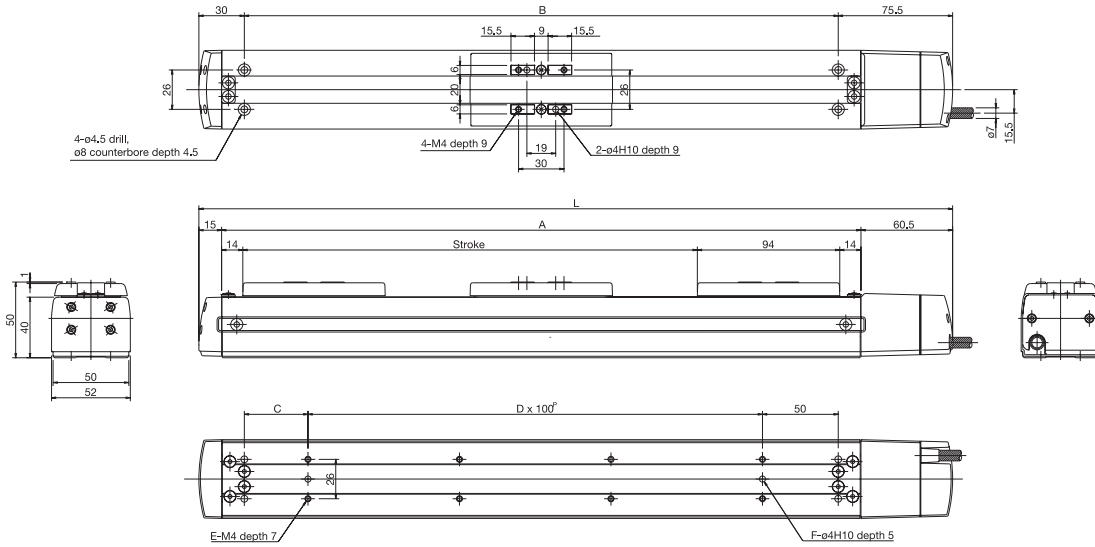
Stroke	50mm	100mm	150mm	200mm	250mm	300mm	350mm	400mm	450mm	500mm
Unit Weight	1.2kg	1.3kg	1.4kg	1.5kg	1.6kg	1.7kg	1.8kg	1.9kg	2.0kg	2.1kg
Velocity	1 ~ 200mm/sec									190mm/sec
Repeatability	+/-0.02mm									
Rated Thrust	65.7N									
Payload	Horizontal use 8kg Vertical use 4kg (acceleration set at 0.2G)									
Motor	AC servo motor (encoder attached to motor) 20W									
Ballscrew	Ø 10mm Lead 3mm									
Guide	Unique to DS Integrated into base									
Base	Extruded aluminum (A6NOIS-T5) White alumite treatment									
Moment	Ma 4.9Nm, Mb 6.8Nm, Mc 11.7Nm						Mc 7.8Nm			
Overhang Load Length	Ma direction 150mm or less, Mb · Mc direction 150mm or less									



Ma, Mc moment  
Standard position for offset

### SA5 Standard

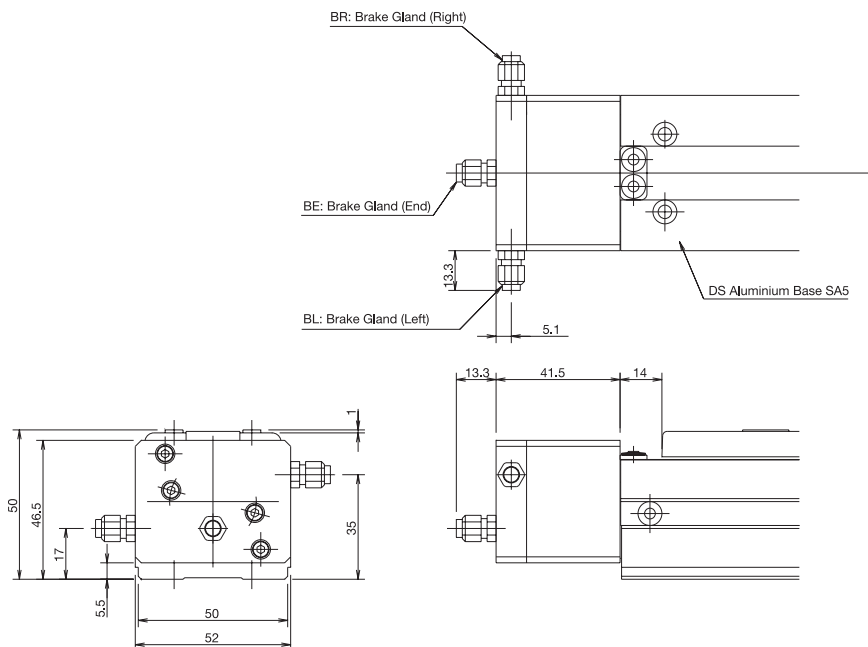
### Dimensional drawing (SA5H, SA5M, SA5L)



Stroke	50	100	150	200	250	300	350	400	450	500
L	247.5	297.5	347.5	397.5	447.5	497.5	547.5	597.5	647.5	697.5
A	172	222	272	322	372	422	472	522	572	622
B	142	192	242	292	342	392	442	492	542	592
C	92	42	92	42	92	42	92	42	92	42
D	0	1	1	2	2	3	3	4	4	5
E	2	4	4	6	6	8	8	10	10	12
F	1	2	2	2	2	2	2	2	2	2

### SA5 with brake

### Dimensional drawing (SA5H, SA5M, SA5L)



**SA4H (High speed type)**

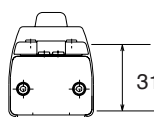
Stroke	50mm	100mm	150mm	200mm	250mm	300mm
Unit Weight	0.6kg	0.7kg	0.8kg	0.9kg	1.0kg	1.1kg
Velocity	1 ~ 665mm/sec					
Repeatability	+/-0.05mm					
Rated Thrust	19.6N					
Payload	Horizontal use 4kg Vertical use 1kg (acceleration set at 0.3G)					
Motor	AC servo motor (encoder attached to motor) 20W					
Ballscrew	Ø 8mm Lead 10mm					
Guide	Unique to DS Integrated into base					
Base	Extruded aluminum (A6NOIS-T5) White alumite treatment					
Moment	Ma 2.7Nm, Mb 3.9Nm, Mc 6.8Nm					
Overhang Load Length	Ma direction 120mm or less, Mb · Mc 120mm or less					

**SA4M (Medium speed type)**

Stroke	50mm	100mm	150mm	200mm	250mm	300mm
Unit Weight	0.6kg	0.7kg	0.8kg	0.9kg	1.0kg	1.1kg
Velocity	1 ~ 330mm/sec					
Repeatability	+/-0.02mm					
Rated Thrust	39.2N					
Payload	Horizontal use 5kg Vertical use 2.5kg (acceleration set at 0.3G)					
Motor	AC servo motor (encoder attached to motor) 20W					
Ballscrew	Ø 8mm Lead 5mm					
Guide	Uniqe to DS Integrated into base					
Base	Extruded aluminum (A6NOIS-T5) White alumite treatment					
Moment	Ma 2.7Nm, Mb 3.9Nm, Mc 6.8Nm					
Overhang Load Length	Ma direction 120mm or less, Mb · Mc direction 120mm or less					

**SA4L (Low speed high thrust type)**

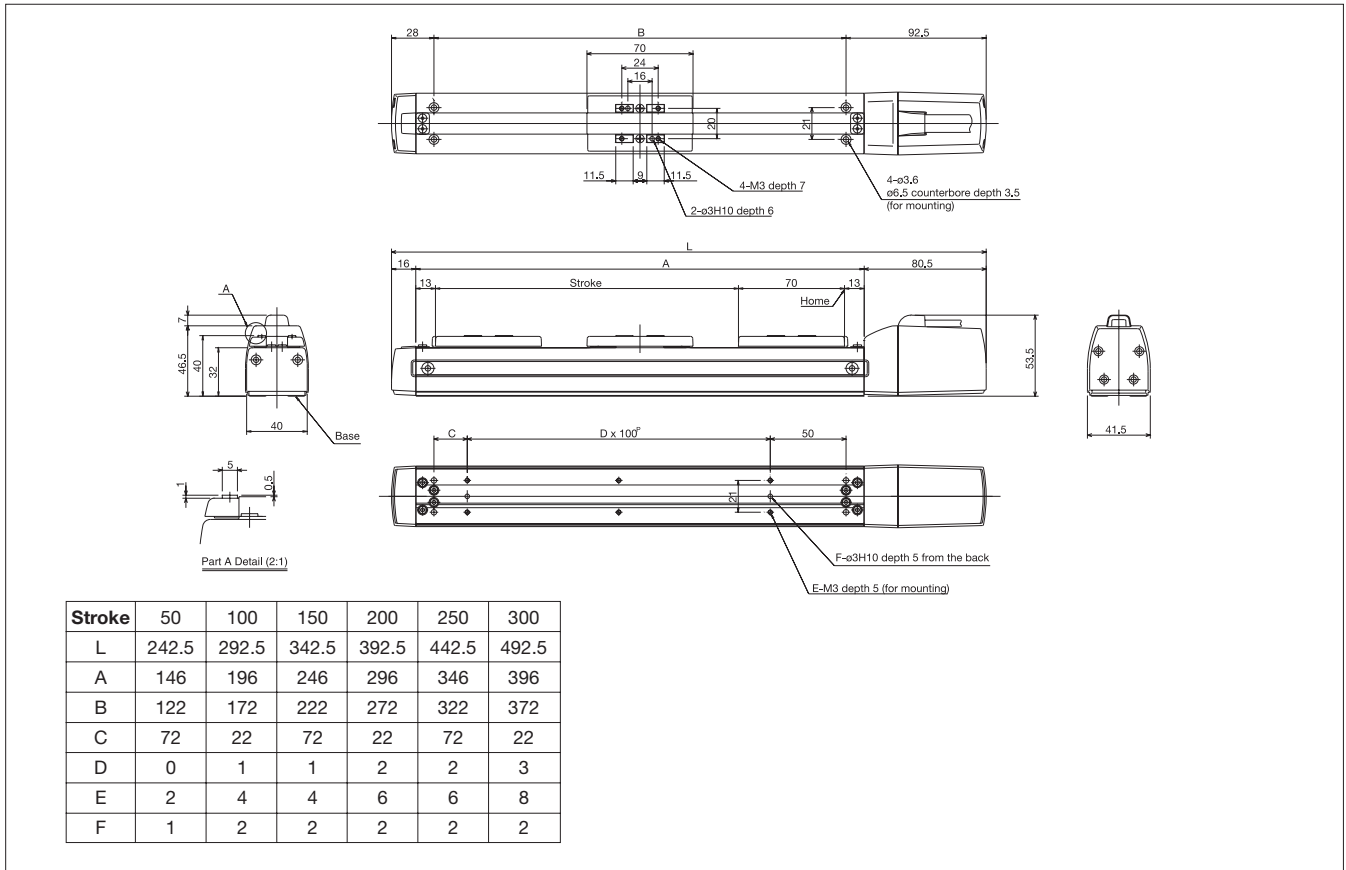
Stroke	50mm	100mm	150mm	200mm	250mm	300mm
Unit Weight	0.6kg	0.7kg	0.8kg	0.9kg	1.0kg	1.1kg
Velocity	1 ~ 165mm/sec					
Repeatability	+/-0.02mm					
Rated Thrust	78.4N					
Payload	Horizontal use 5kg Vertical use 4.5kg (acceleration set at 0.2G)					
Motor	AC servo motor (encoder attached to motor) 20W					
Ballscrew	Ø 8mm Lead 2.5mm					
Guide	Uniqe to DS Integrated into base					
Base	Extruded aluminum (A6NOIS-T5) White alumite treatment					
Moment	Ma 2.7Nm, Mb 3.9Nm, Mc 6.8Nm					
Overhang Load Length	Ma direction 120mm or less, Mb · Mc direction 120mm or less					



Ma, Mc moment  
Standard position for offset

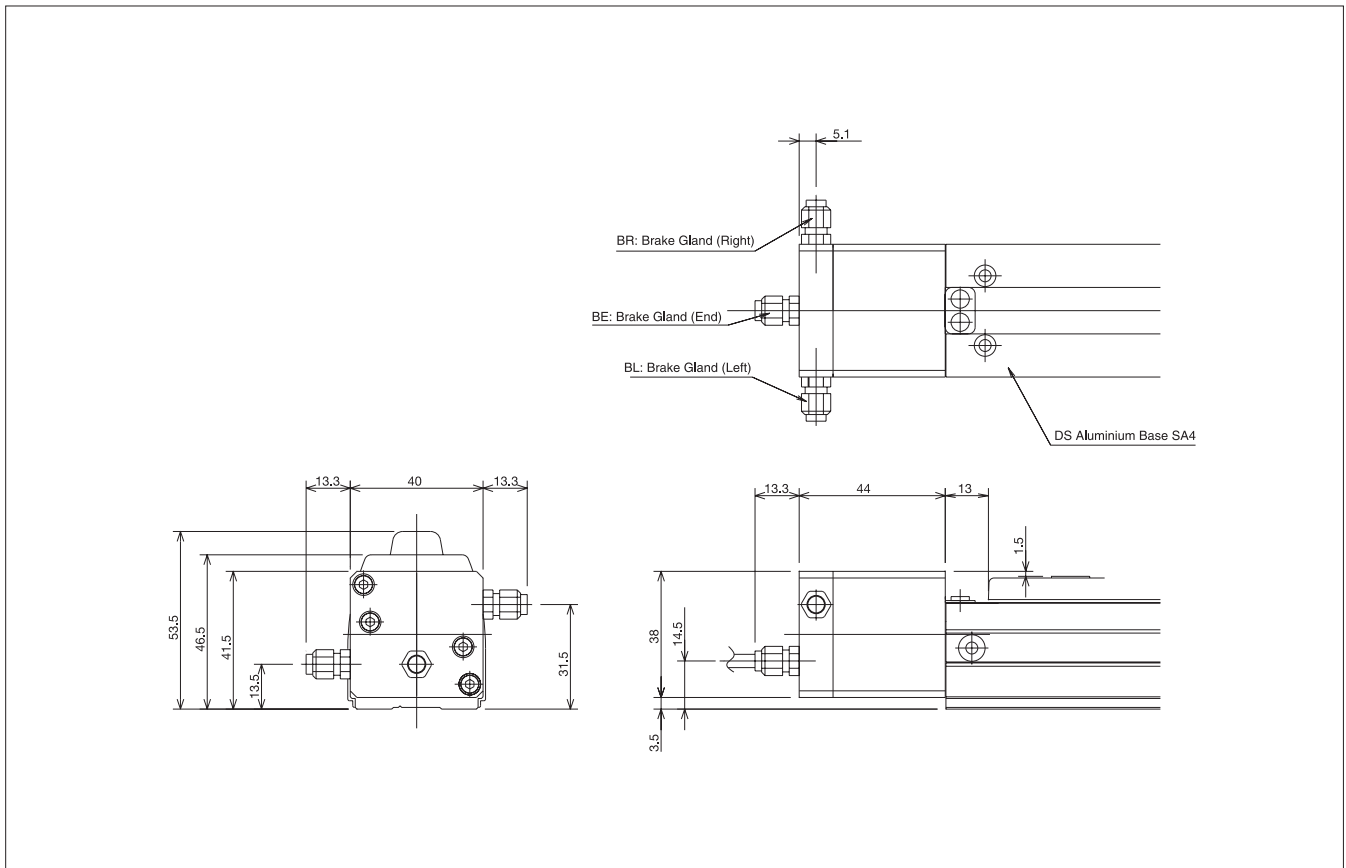
**SA4 Standard**

**Dimensional drawing (SA4H, SA4M, SA4L)**



**SA4 with brake**

**Dimensional drawing (SA4H, SA4M, SA4L)**

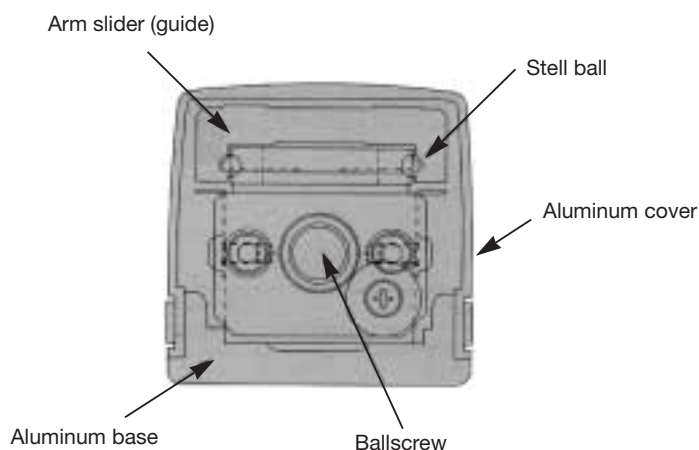




# DS-A

## Arm Type

- The DS-A is used to position parts and tools via an arm which extends out from the actuator body.
- Driven by an AC servo motor and ball-screw for multiple positioning with a high degree of repeatability ( $\pm 0.02\text{mm}$ ).
- A magnetic brake is standard and installed to prevent the arm from dropping in the event of a power loss. The arm type can be used vertically as well as horizontally.
- Can be used horizontally by extending the arm.
- The DS-A actuator comes in 3 types, a 56mm width, a 52mm width and a 40mm width. Both are compact, providing flexibility in system layout.

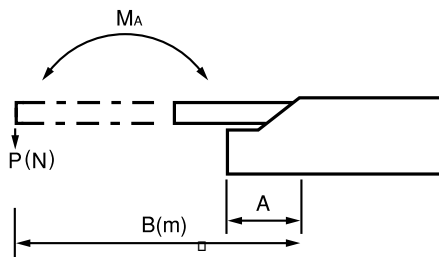


## A6M (Medium speed)

Stroke	50mm	100mm	150mm	200mm
Unit Weight	3.0kg	3.3kg	3.6kg	3.9kg
Velocity	400mm/sec			
Repeatability	+/-0.02mm			
Rated Thrust	48.4N			
Payload	Vertical use 3kg (acceleration set to 0.2G)			
Motor	AC servo motor (encoder attached to motor) 30W			
Ballscrew	Ø 10mm 12mm lead Rolled Thread C10 Backlash 0.1mm or less			
Guide	Unique to DS Integrated into base			
Base	Extruded aluminum (A6NOIS-T5) White alumite treatment			
Moment	Ma 8.1Nm, Mb 10.0Nm, Mc 6.5Nm			
Brake	Magnetic brake - energised to release			

## A6L (Low speed high thrust)

Stroke	50mm	100mm	150mm	200mm
Unit Weight	3.0kg	3.3kg	3.6kg	3.9kg
Velocity	200mm/sec			
Repeatability	+/-0.02mm			
Rated Thrust	96.8N			
Payload	Vertical use 6kg (acceleration set to 0.2G)			
Motor	AC servo motor (encoder attached to motor) 30W			
Ballscrew	Ø 10mm 6mm lead Rolled Thread C10 Backlash 0.1mm or less			
Guide	Unique to DS Integrated into base			
Base	Extruded aluminum (A6NOIS-T5) White alumite treatment			
Moment	Ma 8.1Nm, Mb 10.0Nm, Mc 6.5Nm			
Brake	Magnetic brake - energised to release			

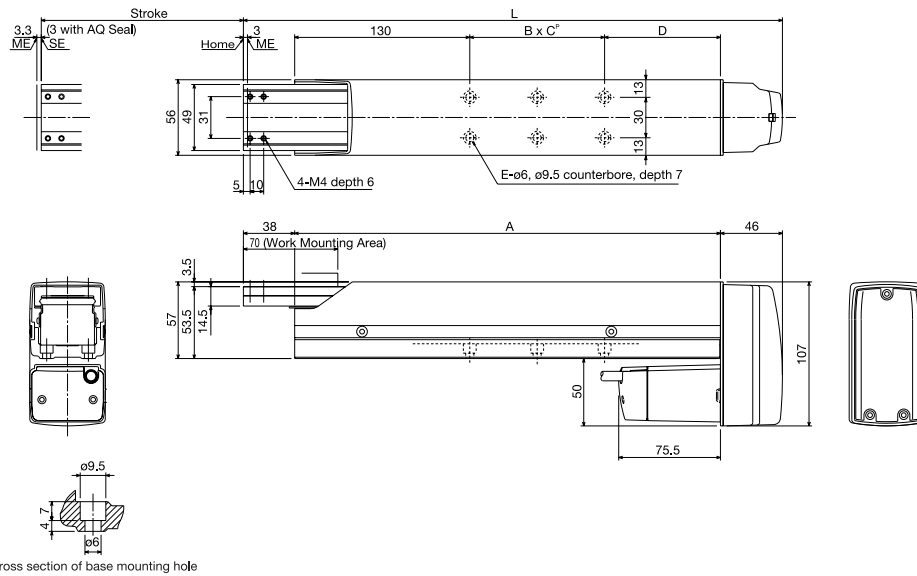


$M_A$  moment is measured at the point where  $A=20mm$  from the end of the actuator. Please use within the following range:  
 $P \times B < 8.1Nm$ .



When using horizontally, apply the load in the direction of the thrust as shown in the drawing at left.

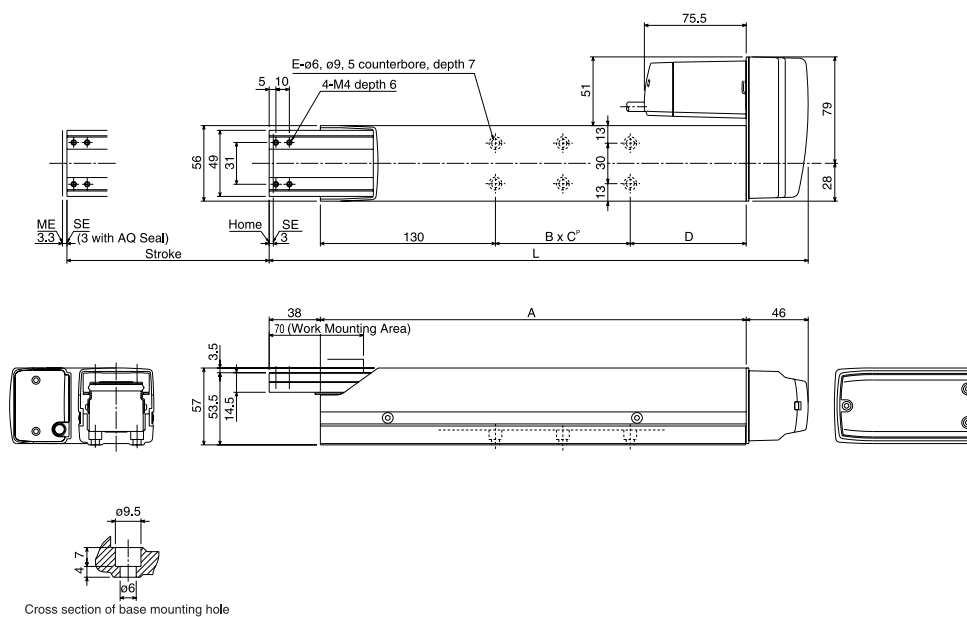
### S Type Dimensional drawing (A6M, A6L)



Stroke	*50	100	150	200
L	-	350	400	450
A	-	266	316	366
BxC <sup>P</sup>	-	1x50	2x50	2x50
D	-	86	86	136
E	-	4	6	6

\*In a 50mm stroke, there is only the L, R types.

### R (L) Type Dimensional drawing (A6M, A6L)



Stroke	50	100	150	200
L	300	350	400	450
A	216	266	316	366
BxC <sup>P</sup>	1x30	1x50	2x50	2x50
D	56	86	86	136
E	4	4	6	6

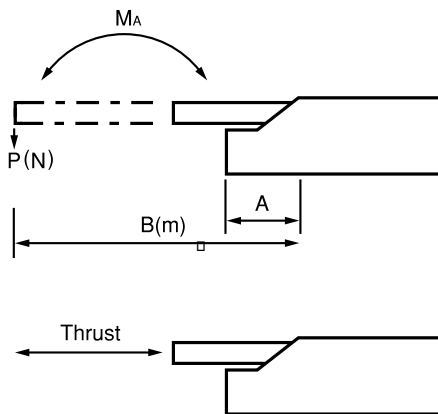
## A5M (Medium speed)

Stroke	*50mm	100mm	150mm	200mm
Unit Weight	2.2kg	2.4kg	2.6kg	2.8kg
Velocity	1 ~ 400mm/sec			
Repeatability	+/-0.02mm			
Rated Thrust	33.3N			
Payload	Vertical use 2kg (acceleration set to 0.2G)			
Motor	AC servo motor (encoder attached to motor) 20W			
Ballscrew	Ø 10mm 12mm lead			
Guide	Unique to DS Integrated into base			
Base	Extruded aluminum (A6NOIS-T5) White alumite treatment			
Moment	Ma 4.5Nm, Mb 5.4Nm, Mc 4.1Nm			
Brake	Magnetic brake - energised to release			

## A5L (Low speed high thrust)

Stroke	*50mm	100mm	150mm	200mm
Unit Weight	2.2kg	2.4kg	2.6kg	2.8kg
Velocity	1 ~ 200mm/sec			
Repeatability	+/-0.02mm			
Rated Thrust	65.7N			
Payload	Vertical use 4kg (acceleration set to 0.2G)			
Motor	AC servo motor (encoder attached to motor) 20W			
Ballscrew	Ø 10mm 6mm lead			
Guide	Unique to DS Integrated into base			
Base	Extruded aluminum (A6NOIS-T5) White alumite treatment			
Moment	Ma 4.5Nm, Mb 5.4Nm, Mc 4.1Nm			
Brake	Magnetic brake - energised to release			

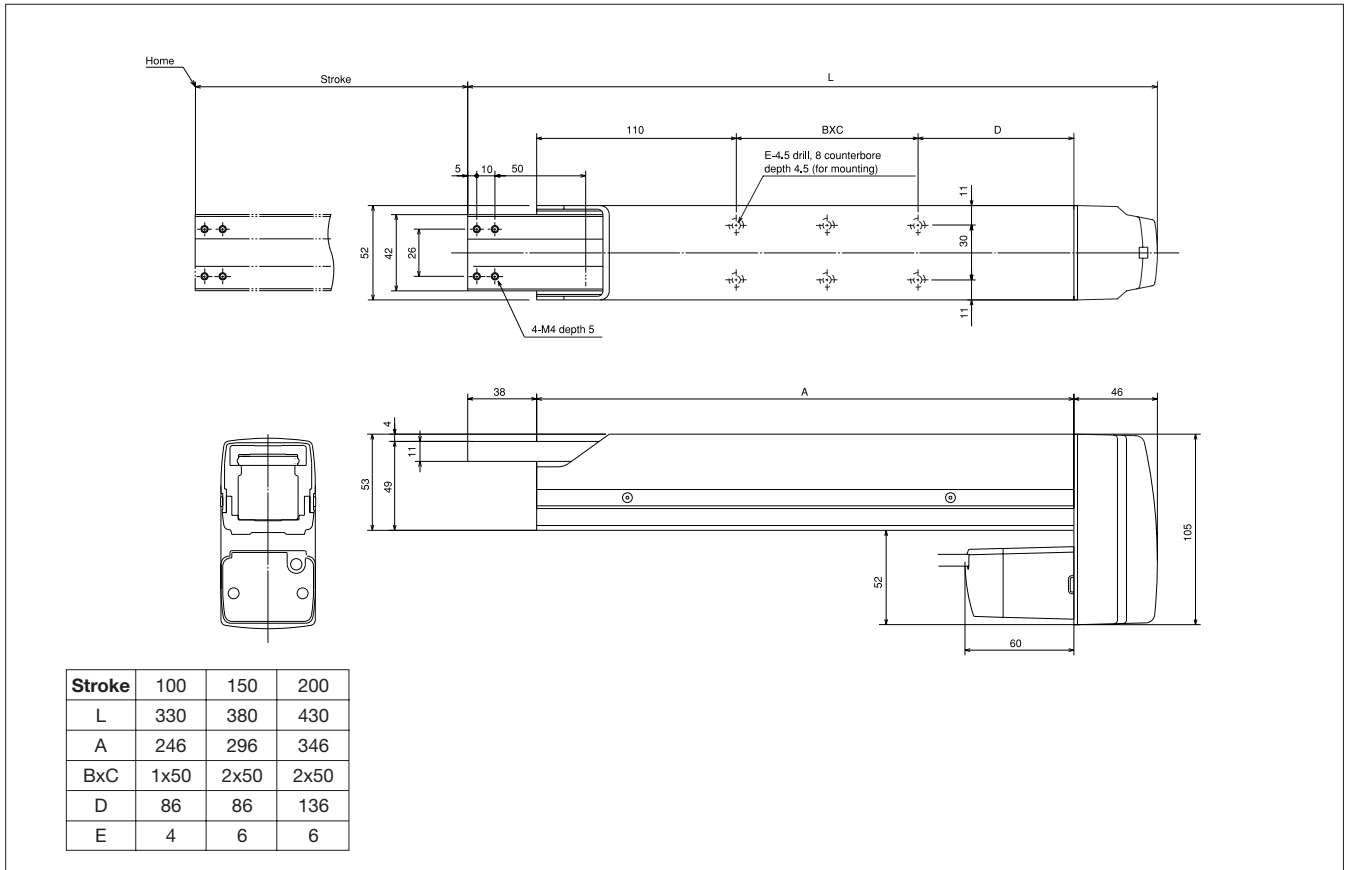
\*50mm stroke dose not apply to motor coupled S (standard) type, only the L, R Types.



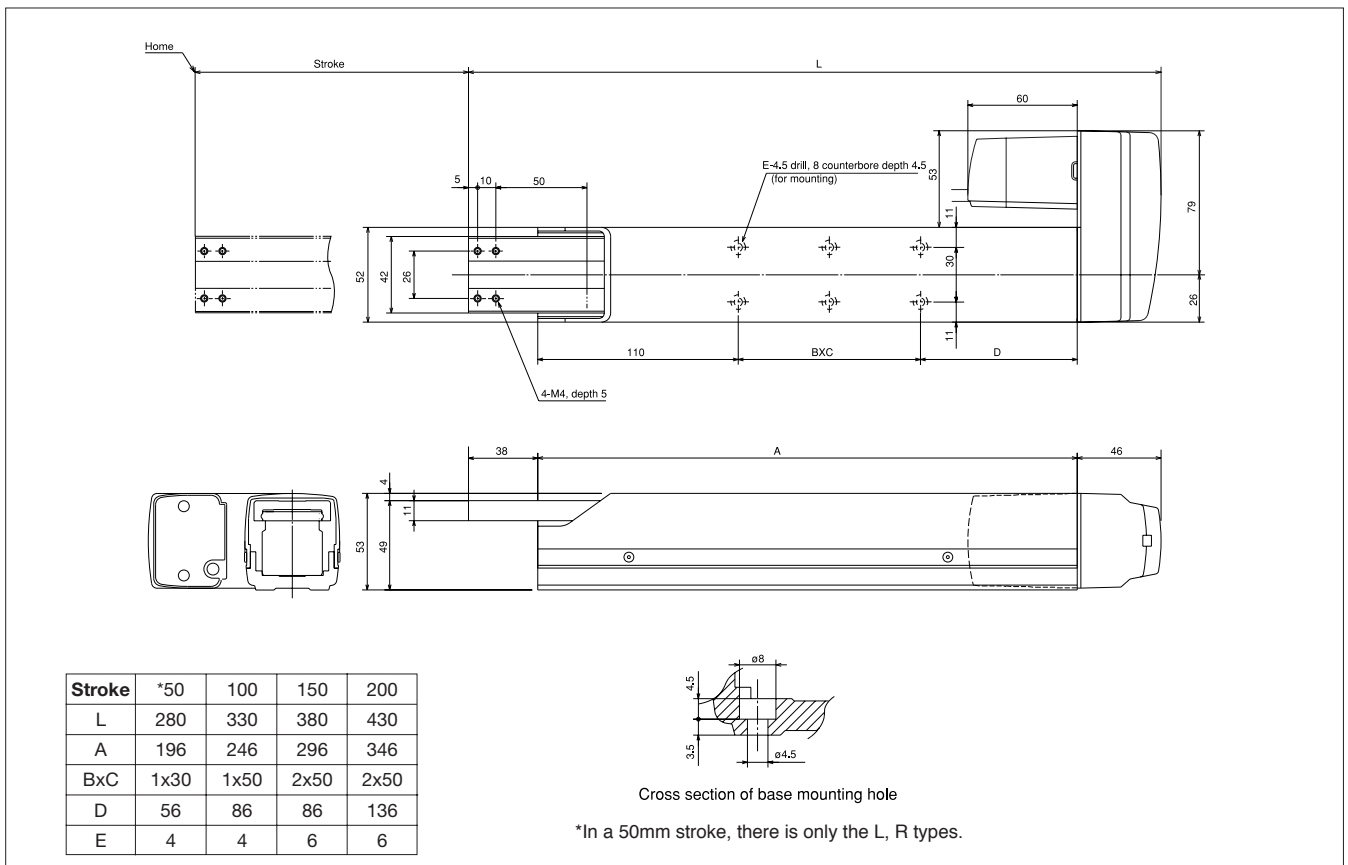
Ma moment is measured at the point where A=20mm from the end of the actuator. Please use within the following range:  
 $P \times B < 4.5Nm$ .

When using horizontally, apply the load in the direction of the thrust as shown in the drawing at left.

### S Type Dimensional drawing (A5M, A5L)



### R (L) Type Dimensional drawing (A5M, A5L)

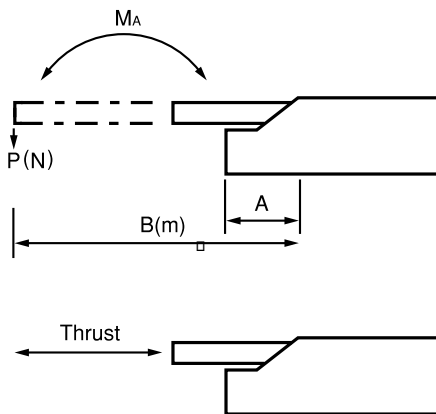


## A4M (Medium speed)

Stroke	50mm	100mm	150mm	200mm
Unit Weight	1.7kg	1.8kg	2.0kg	2.1kg
Velocity	1 ~ 330mm/sec			
Repeatability	+/-0.02mm			
Rated Thrust	39.2N			
Payload	Vertical use 2.5kg (acceleration set to 0.2G)			
Motor	AC servo motor (encoder attached to motor) 20W			
Ballscrew	Ø 8mm 10mm lead			
Guide	Unique to DS Integrated into base			
Base	Extruded aluminum (A6NOIS-T5) White alumite treatment			
Moment	Ma 2.7Nm, Mb 3.1Nm, Mc 2.9Nm			
Brake	Magnetic brake - energised to release			

## A4L (Low speed high thrust)

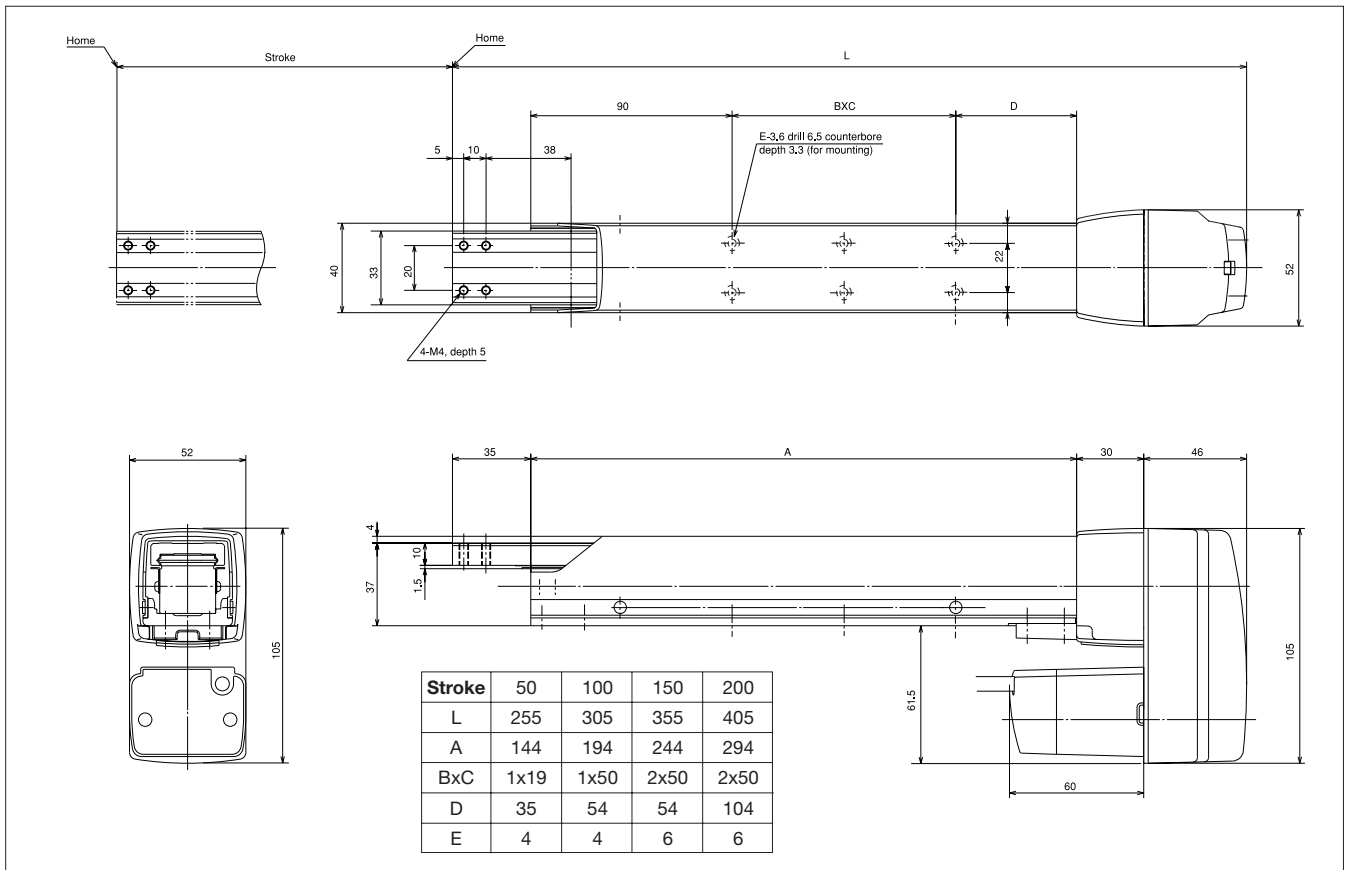
Stroke	50mm	100mm	150mm	200mm
Unit Weight	1.7kg	1.8kg	2.0kg	2.1kg
Velocity	1 ~ 165mm/sec			
Repeatability	+/-0.02mm			
Rated Thrust	78.4N			
Payload	Vertical use 4.5kg (acceleration set to 0.2G)			
Motor	AC servo motor (encoder attached to motor) 20W			
Ballscrew	Ø 8mm 5mm lead			
Guide	Unique to DS Integrated into base			
Base	Extruded aluminum (A6NOIS-T5) White alminum treatment			
Moment	Ma 2.7Nm , Mb 3.1Nm, Mc 2.9Nm			
Brake	Magnetic brake - energised to release			



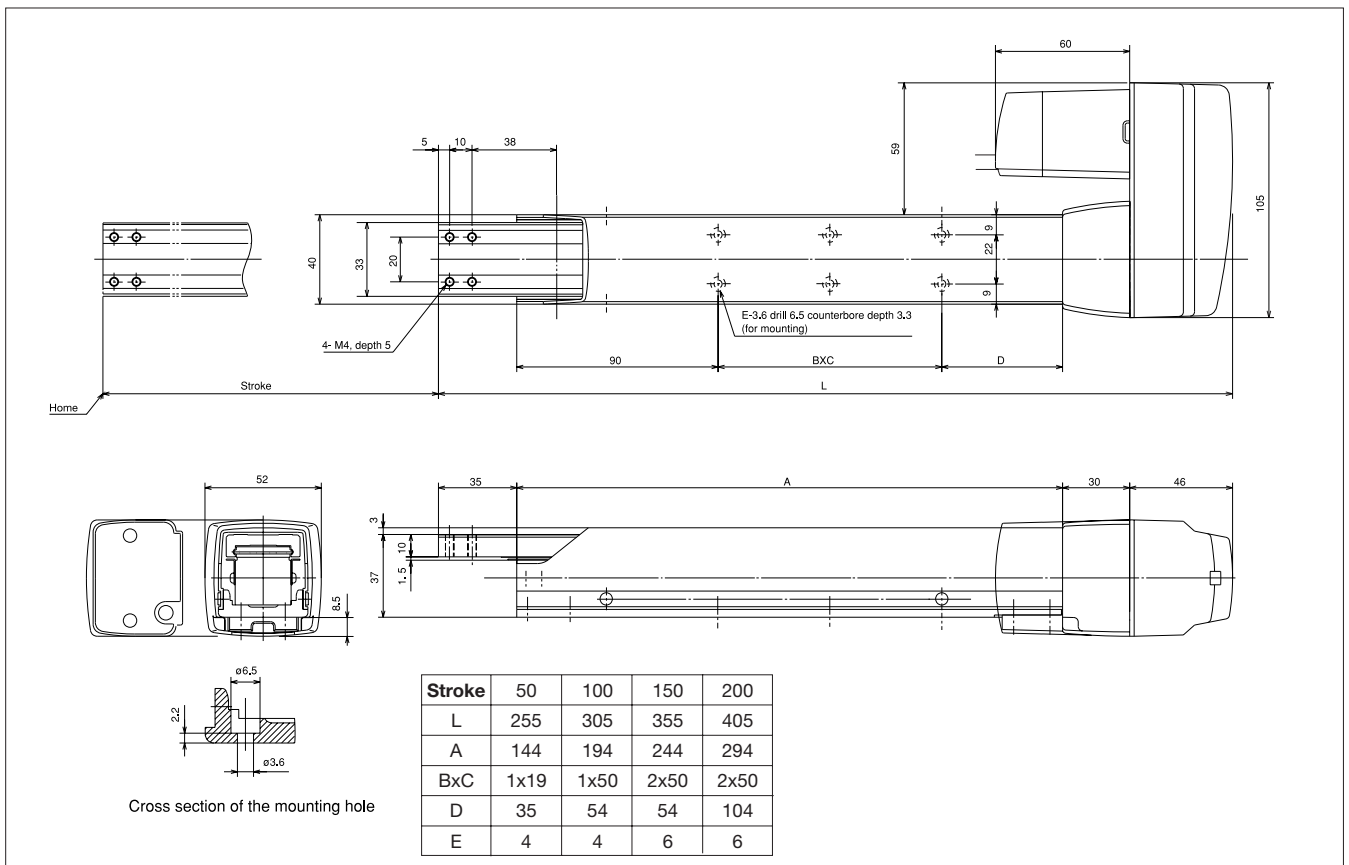
Ma moment is measured at the point where  $A=16mm$  from the end of the actuator. Please use within the following range:  
 $P \times B < 2.7Nm$ .

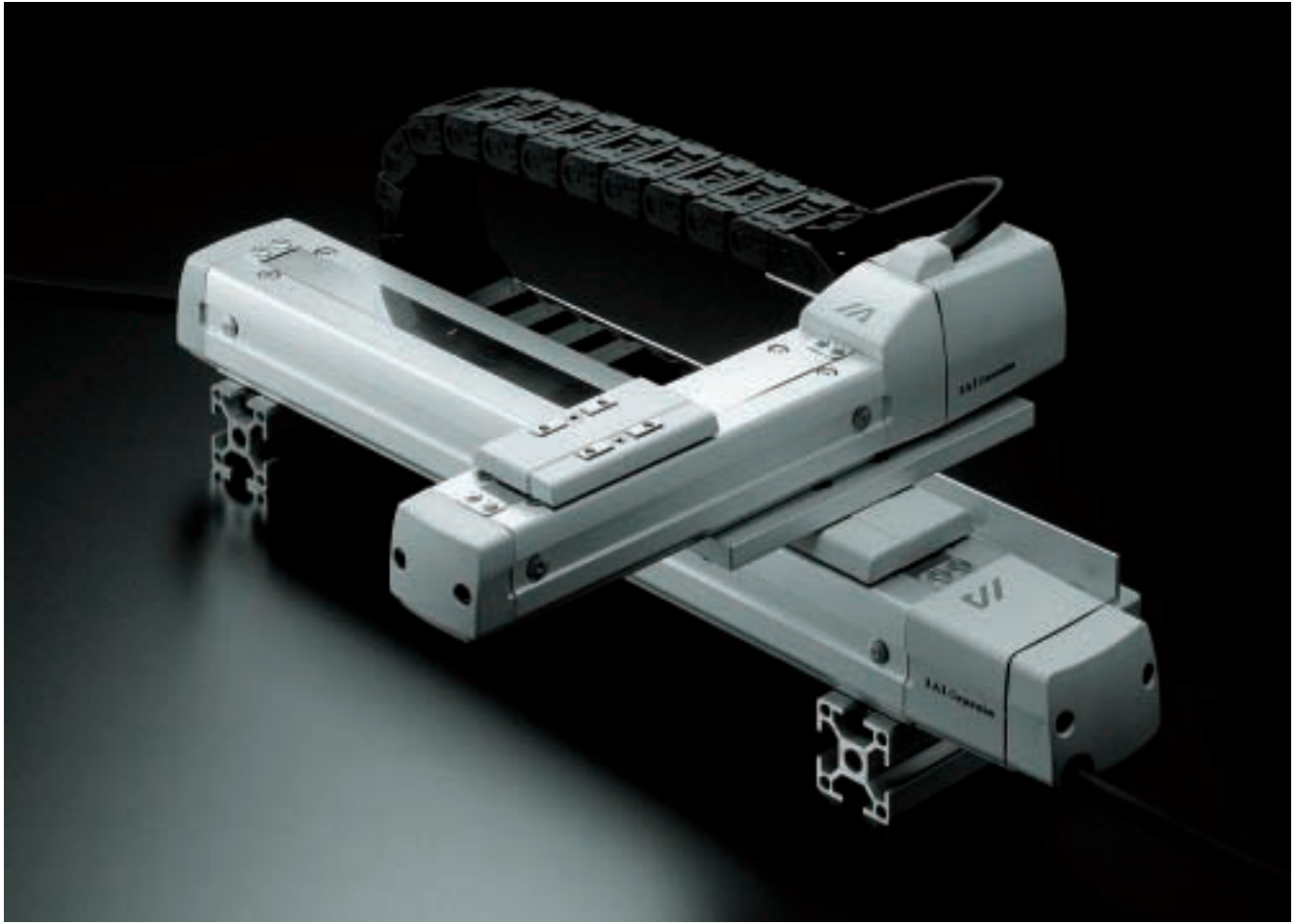
When using horizontally, apply the load in the direction of the thrust as shown in the drawing at left.

### S Type Dimensional drawing (A4M, A4L)



### R (L) Type Dimensional drawing (A4M, A4L)



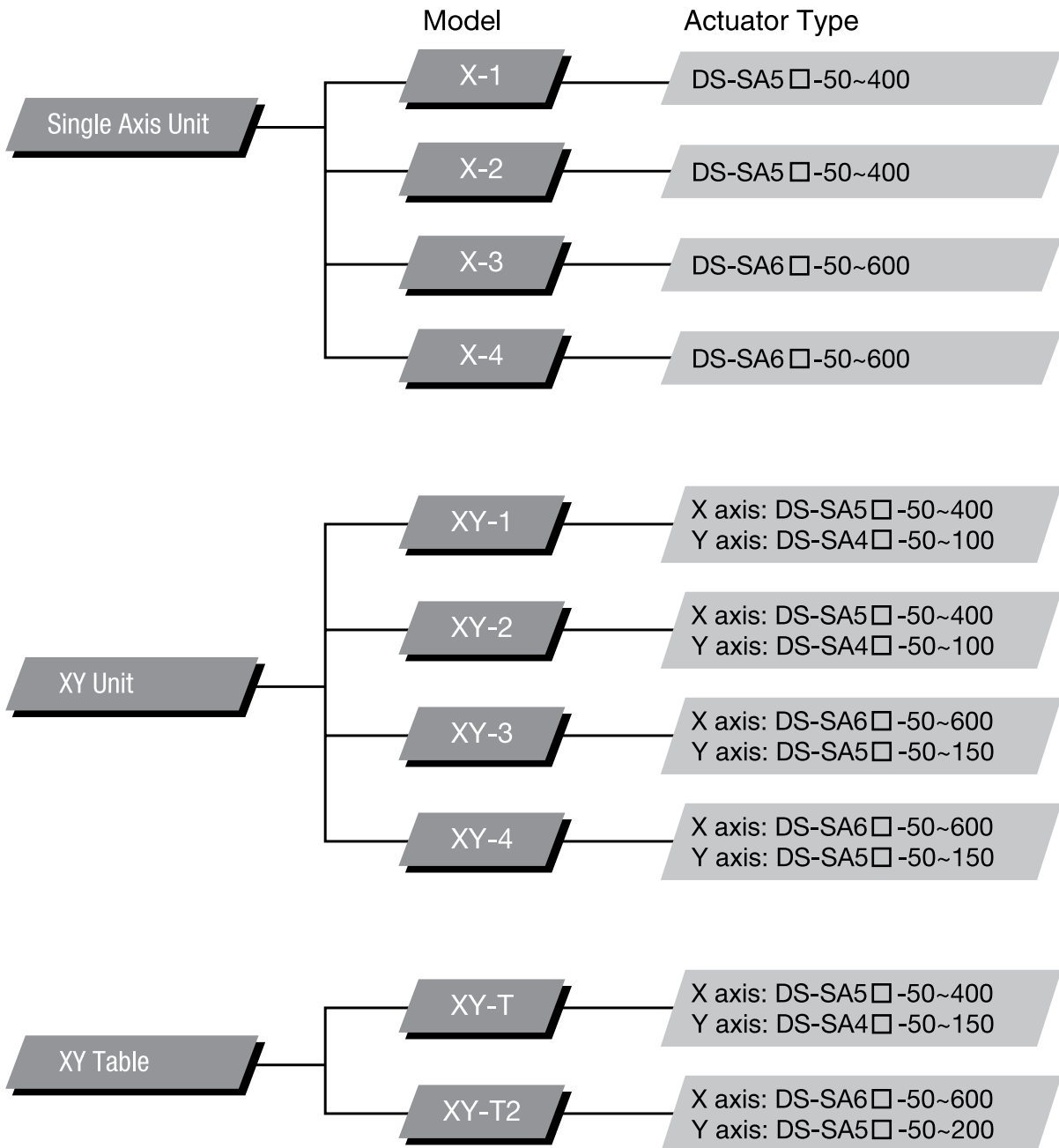


# *DS Unit*

- You can construct an extremely low cost and versatile 2-axis structure by assembly single DC actuators.
- With a PLC, two controllers can be controlled using discrete I/O for point to point (non-coordinated) movement.
- We sell assembly parts kits for 10 types of assembly units.

## DS Assembly Unit

Single axis unit	<b>DS-</b>	<b><u>X-1</u></b> (X-1~4)	<b><u>-400</u></b> X axis stroke
XY Unit	<b>DS-</b>	<b><u>XY-1</u></b> (XY-1~4)	<b><u>-300-100</u></b> X axis stroke    Y axis stroke
XY Table	<b>DS-</b>	<b><u>XY-T2</u></b> (XY-T~T2)	<b><u>-600-200</u></b> X axis stroke    Y axis stroke



# DS Single Axis Unit

**X-1**

## Slider Payload Guidelines (kg)

Actuator \ Stroke	50	100	150	200	250	300	350	400
DS-SA5H	3	3	3	3	3	3	2	2
DS-SA5M	7	7	7	7	7	7	6	6
DS-SA5L	7	7	7	7	7	7	6	6

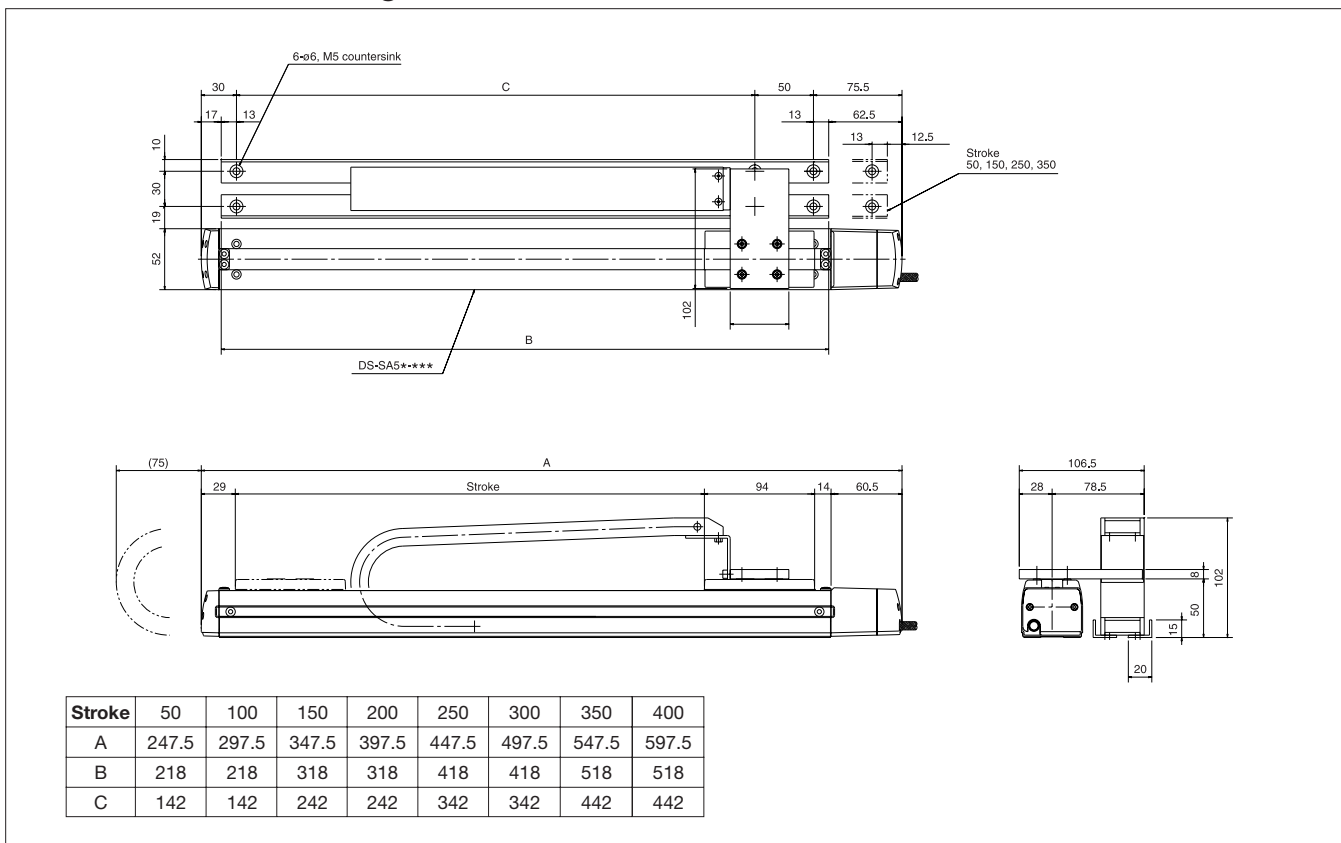
Note: Values are when acceleration is set at 0.3G (0.2G for SA5L).  
Conditions will differ when the load from the slider has a large offset.

## Kit Components

Cable track	1 set
Cable track rail	1 set
Slider bracket	1
Cable track bracket	1

\*Nuts, bolts for mounting are included  
(bolts for mounting cable track rail are not included).

## X-1 Mechanical Drawings



## X-2

### Slider Payload Guidelines (kg)

Actuator	Stroke	50	100	150	200	250	300	350	400
DS-SA5H		2	2	2	2	2	2	1.5	1.5
DS-SA5M		6	6	6	6	6	6	5	5
DS-SA5L		6	6	6	6	6	6	5	5

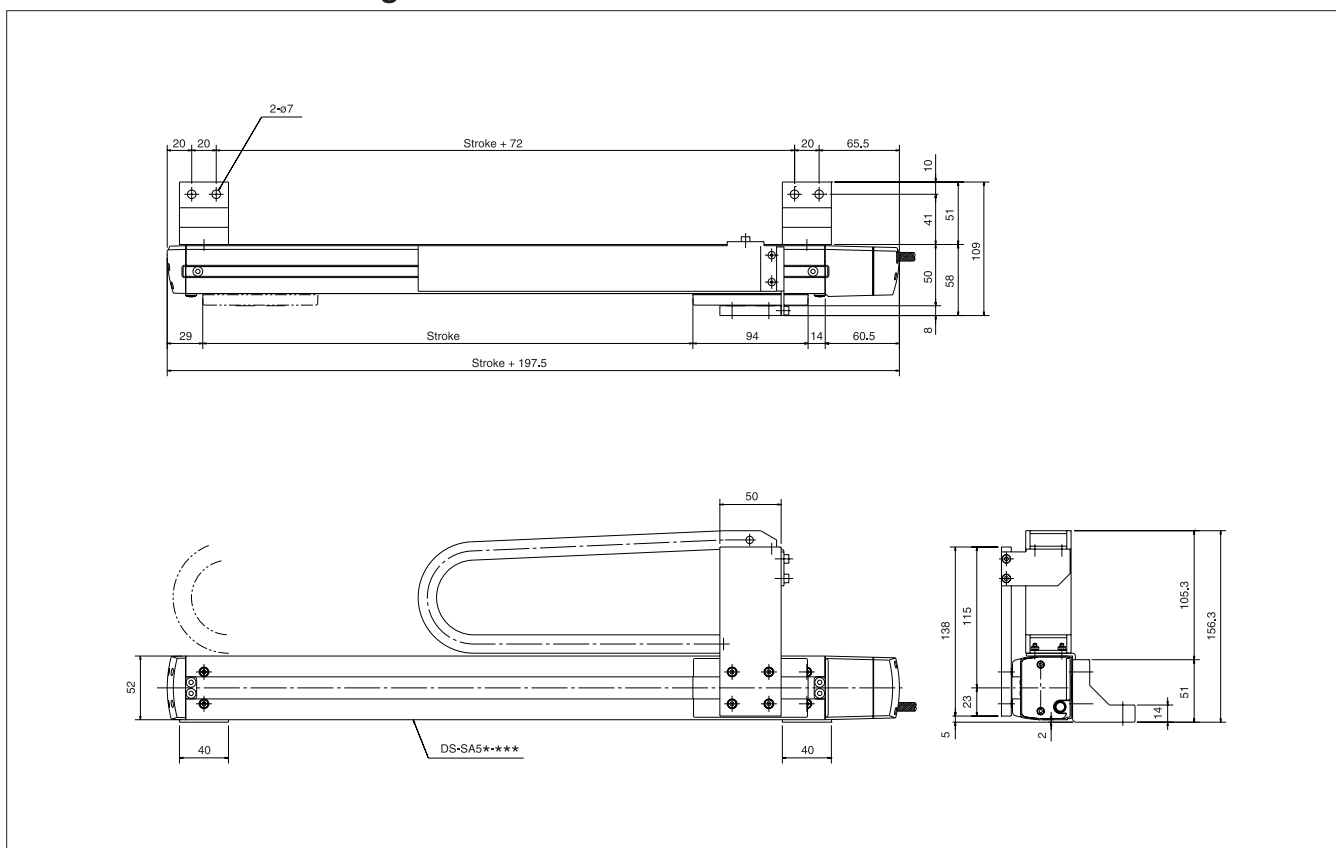
Note: Values are when acceleration is set at 0.3G (0.2G for SA5L).  
Conditions will differ when the load from the slider has a large offset.

### Kit Components

Cable track	1 set
Slider bracket	1
Cable track bracket	2
Mounting base	1 set

\*Nuts, bolts for mounting are included.

### X-2 Mechanical Drawings



# DS Single Axis Unit

## X-3

### Slider Payload Guidelines (kg)

Actuator \ Stroke	50	100	150	200	250	300	350	400	450	500	550	600
DS-SA6H	5	5	5	5	5	5	5	5	5	5	5	5
DS-SA6M	11	11	11	11	11	11	11	11	11	11	11	11
DS-SA6L	11	11	11	11	11	11	11	11	11	11	11	11

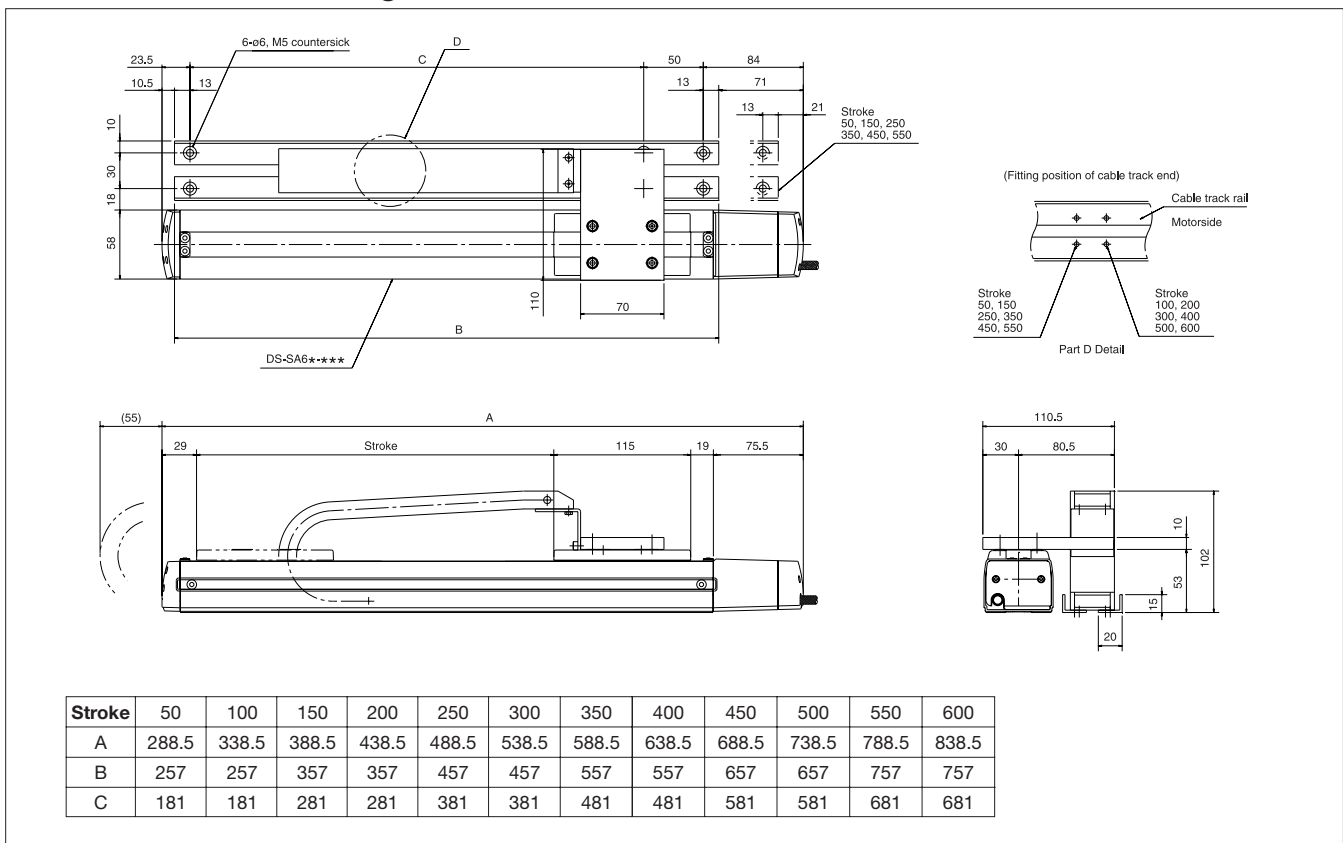
Note: Values are when acceleration is set at 0.3G (0.2G for SA6L).  
Conditions will differ when the load from the slider has a large offset.

### Kit Components

Cable track	1 set
Cable track rail	1 set
Slider bracket	1
Cable track bracket	1

\*Nuts, bolts for mounting are included  
(bolts for mounting cable track rail are not included).

### X-3 Mechanical Drawings



## X-4

### Slider Payload Guidelines (kg)

Actuator \ Stroke	50	100	150	200	250	300	350	400	450	500	550	600
DS-SA6H	4	4	4	4	4	4	4	4	4	4	4	4
DS-SA6M	10	10	10	10	10	10	10	10	10	10	10	10
DS-SA6L	10	10	10	10	10	10	10	10	10	10	10	10

Note: Values are when acceleration is set at 0.3G (0.2G for SA6L). Conditions will differ when the load from the slider has a large offset.

### Kit Components

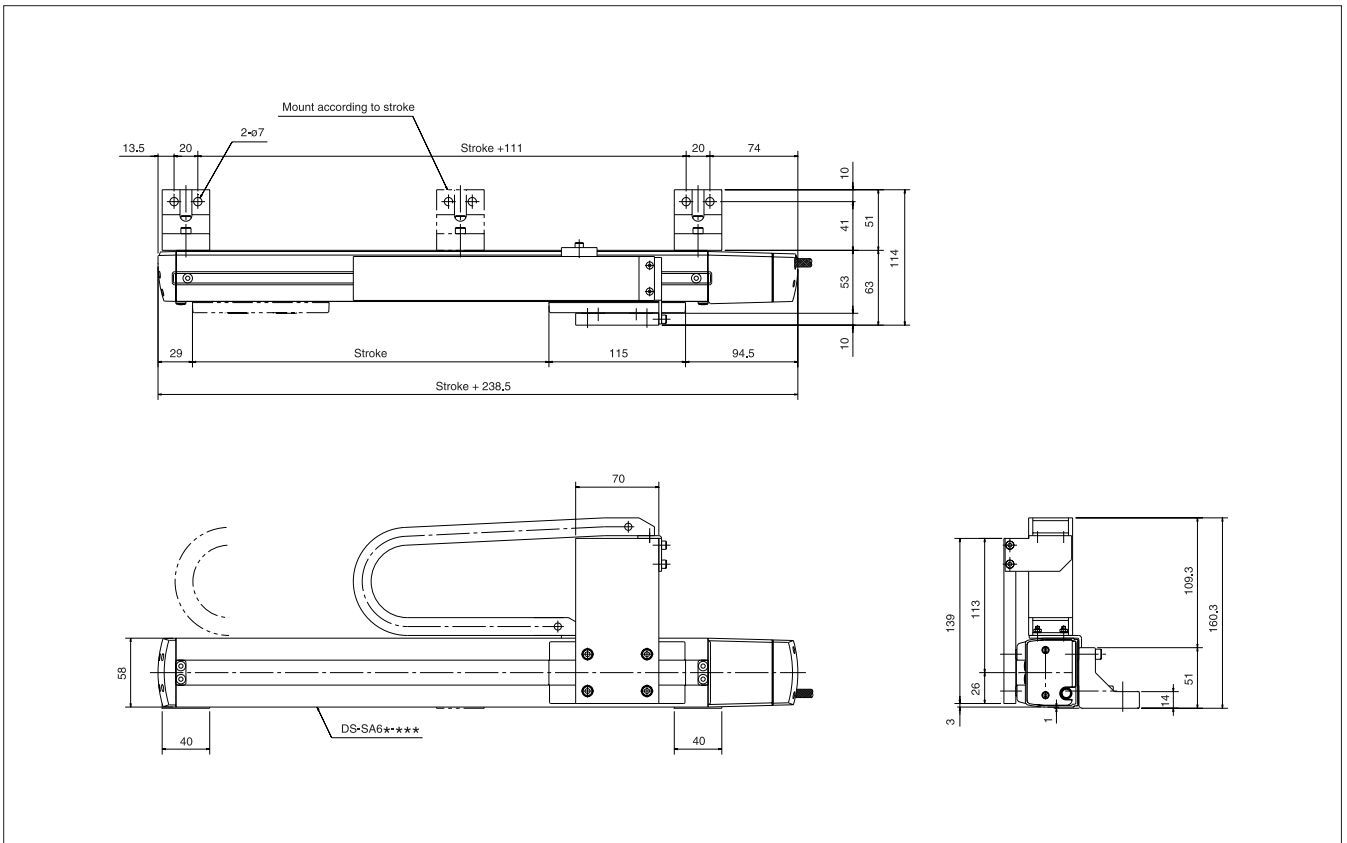
Cable track	1 set
Slider bracket	1
Cable track bracket	1
Mounting base	Number shown below *1

\*Nuts, bolts for mounting are included.

X-4	Stroke											
	50	100	150	200	250	300	350	400	450	500	550	600
Number	2	2	2	3	3	3	3	3	4	4	4	4

\*1 For longer stroke length, DS large unit requires more than 2 mounting bases in order to avoid warp and torsion.

### X-4 Mechanical Drawings



# DS XY Unit

## XY-1

### Y Axis Slider Payload Guidelines (kg)

Y Axis Actuator		DS-SA4H		DS-SA4M		DS-SA4L	
Y Axis Stroke (mm)		50	100	50	100	50	100
X Axis	DS-SA5H-50~400	2.0	2.0	2.0	2.0	2.0	2.0
	DS-SA5M-50~400	2.5	2.5	3.0	3.0	3.0	3.0
	DS-SA5L-50~400	2.5	2.5	3.0	3.0	3.0	3.0

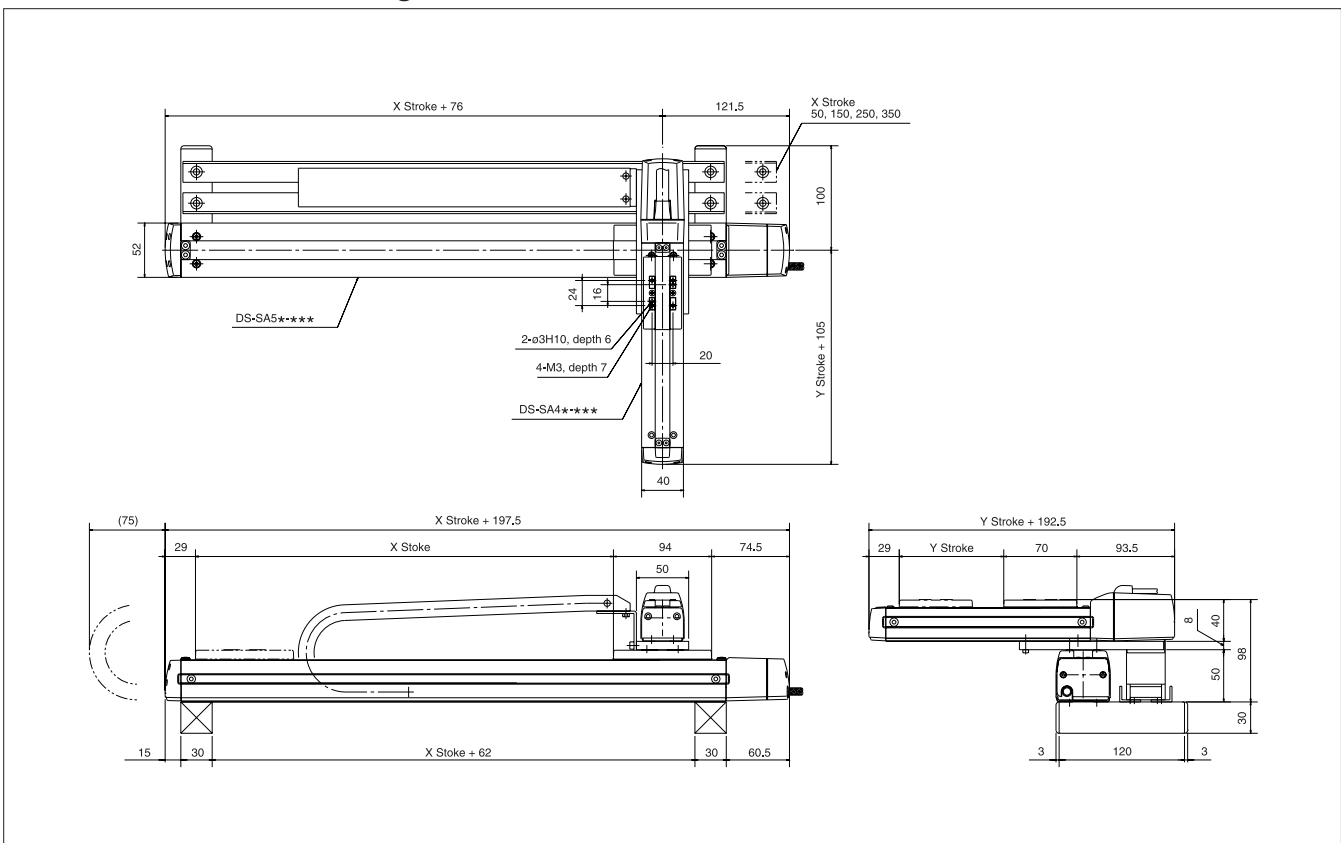
Note: Values are when acceleration is set at 0.3G (0.2G for SA5L).  
Conditions will differ when the load from the slider has a large offset.

### Kit Components

Cable track	1 set
X-Y bracket	1
Cable track rail	1 set
Mounting base (Nuts for actuator mounting plate included)	1 set
Cable track bracket	1

\*Nuts, bolts for mounting are included.

### XY-1 Mechanical Drawing





# DS XY Unit

## XY-3

### Y Axis Slider Payload Guidelines (kg)

Y Axis Actuator		DS-SA5H			DS-SA5M			DS-SA5L		
Y Axis Stroke (mm)		50	100	150	50	100	150	50	100	150
X Axis	DS-SA6H	3.0	3.0	2.5	3.0	3.0	2.5	3.0	3.0	2.5
	DS-SA6M	3.5	3.5	3.5	5.0	5.0	5.0	5.0	5.0	5.0
	DS-SA6L	3.5	3.5	3.5	5.0	5.0	5.0	5.0	5.0	5.0

Note: Values are when acceleration is set at 0.3G (0.2G for SA6L). Conditions will differ when the load from the slider has a large offset.

### Kit Components

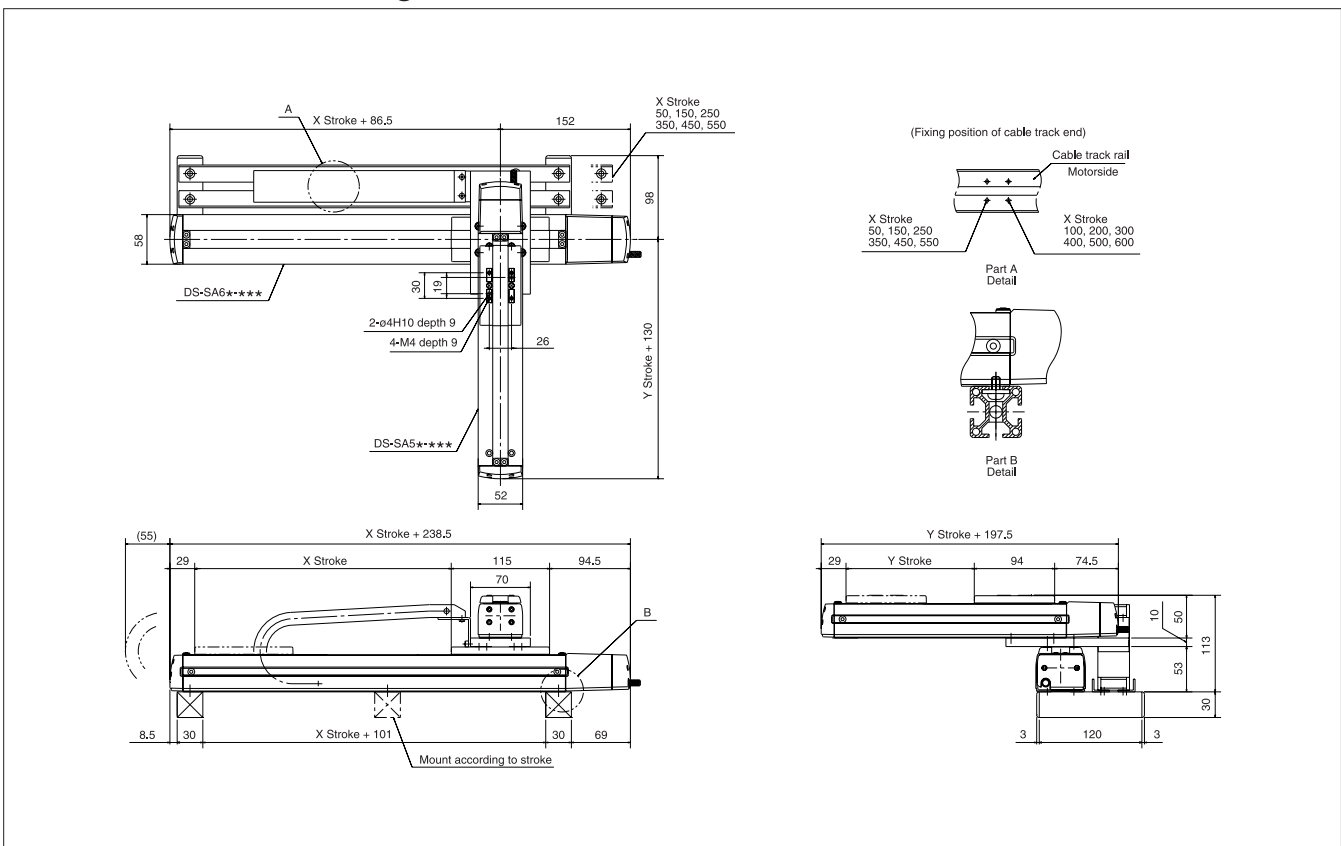
Cable track	1 set
X-Y bracket	1
Cable track rail	1 set
Mounting base	Number shown below *1
Cable track bracket	1

\*Nuts, bolts for mounting are included.

XY-3	Stroke mm											
	50	100	150	200	250	300	350	400	450	500	550	600
Number	2	2	2	3	3	3	3	3	4	4	4	4

\*1 For longer stroke length, DS large unit requires more than 2 mounting bases in order to avoid warp and torsion.

### XY-3 Mechanical Drawing



**XY-4**

**Y Axis Slider Payload Guidelines (kg)**

Y Axis Actuator		DS-SA5H			DS-SA5M			DS-SA5L		
Y Axis Stroke (mm)		50	100	150	50	100	150	50	100	150
X Axis	DS-SA6H	3.0	3.0	2.5	3.0	3.0	2.5	3.0	3.0	2.5
	DS-SA6M	3.0	3.0	3.0	4.5	4.5	4.5	4.5	4.5	4.5
	DS-SA6L	3.0	3.0	3.0	4.5	4.5	4.5	4.5	4.5	4.5

Note: Values are when acceleration is set at 0.3G (0.2G for SA6L). Conditions will differ when the load from the slider has a large offset.

**Kit Components**

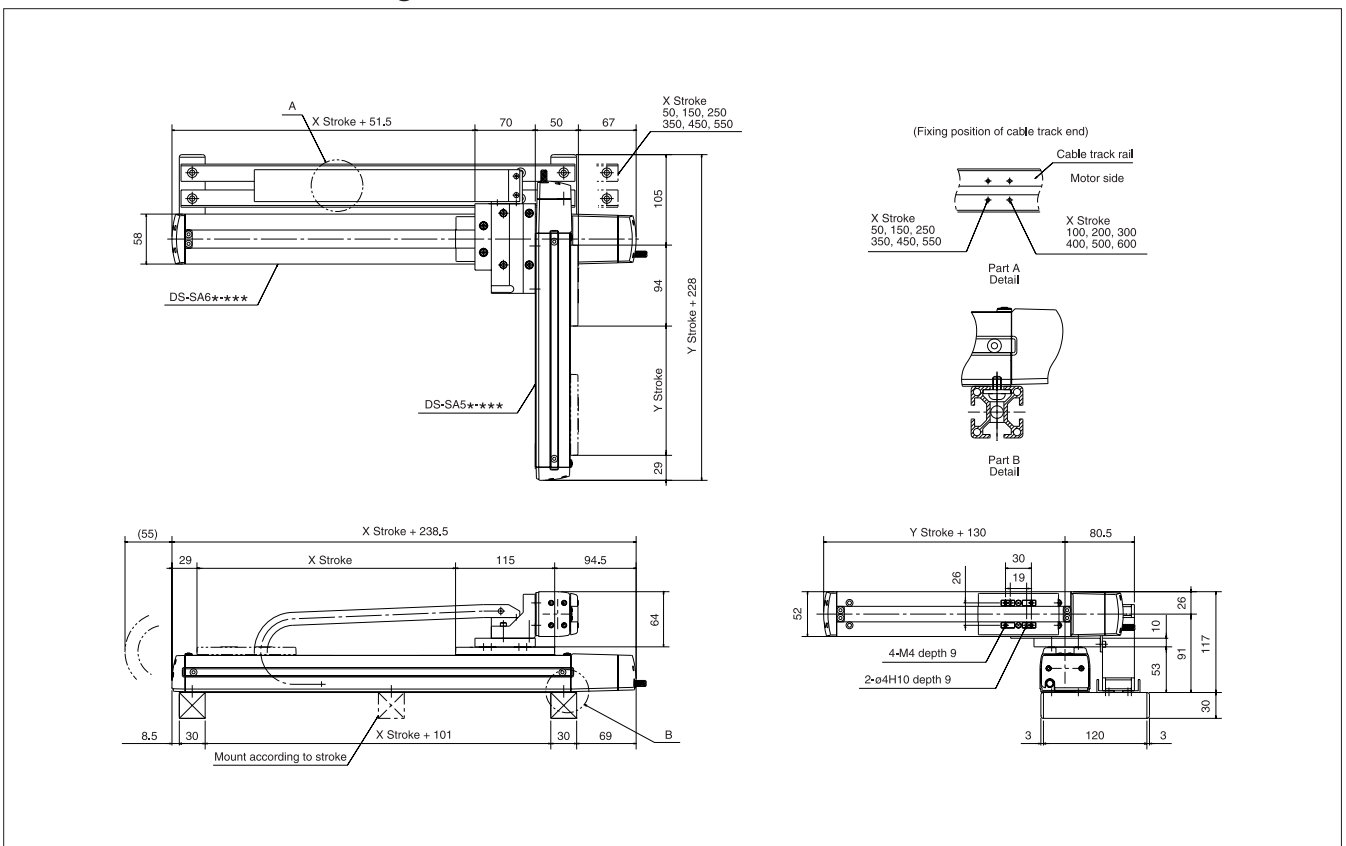
- Cable track 1 set
- X-Y bracket 1
- Cable track rail 1 set
- Middle Plate 1
- Mounting base Number shown below \*1
- Cable track bracket 1

\*Nuts, bolts for mounting are included.

XY-4	Stroke mm											
	50	100	150	200	250	300	350	400	450	500	550	600
Number	2	2	2	3	3	3	3	3	4	4	4	4

\*1 For longer stroke length, DS large unit requires more than 2 mounting bases in order to avoid warp and torsion.

**XY-4 Mechanical Drawing**





**XY-T2**

**Y Slider Payload Guidelines (kg)**

Y Axis Actuator		DS-SA5H				DS-SA5M				DS-SA5L			
Y Axis Stroke (mm)		50	100	150	200	50	100	150	200	50	100	150	200
X Axis	DS-SA6H	3.0	3.0	2.5	2.5	3.0	3.0	2.5	2.5	3.0	3.0	2.5	2.5
	DS-SA6M	4.0	4.0	4.0	4.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
	DS-SA6L	4.0	4.0	4.0	4.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5

Note 1: Values are when acceleration is set at 0.3G ( 0.2G for SA6L).  
Conditions will differ when the load from the Y axis slider has a large offset.

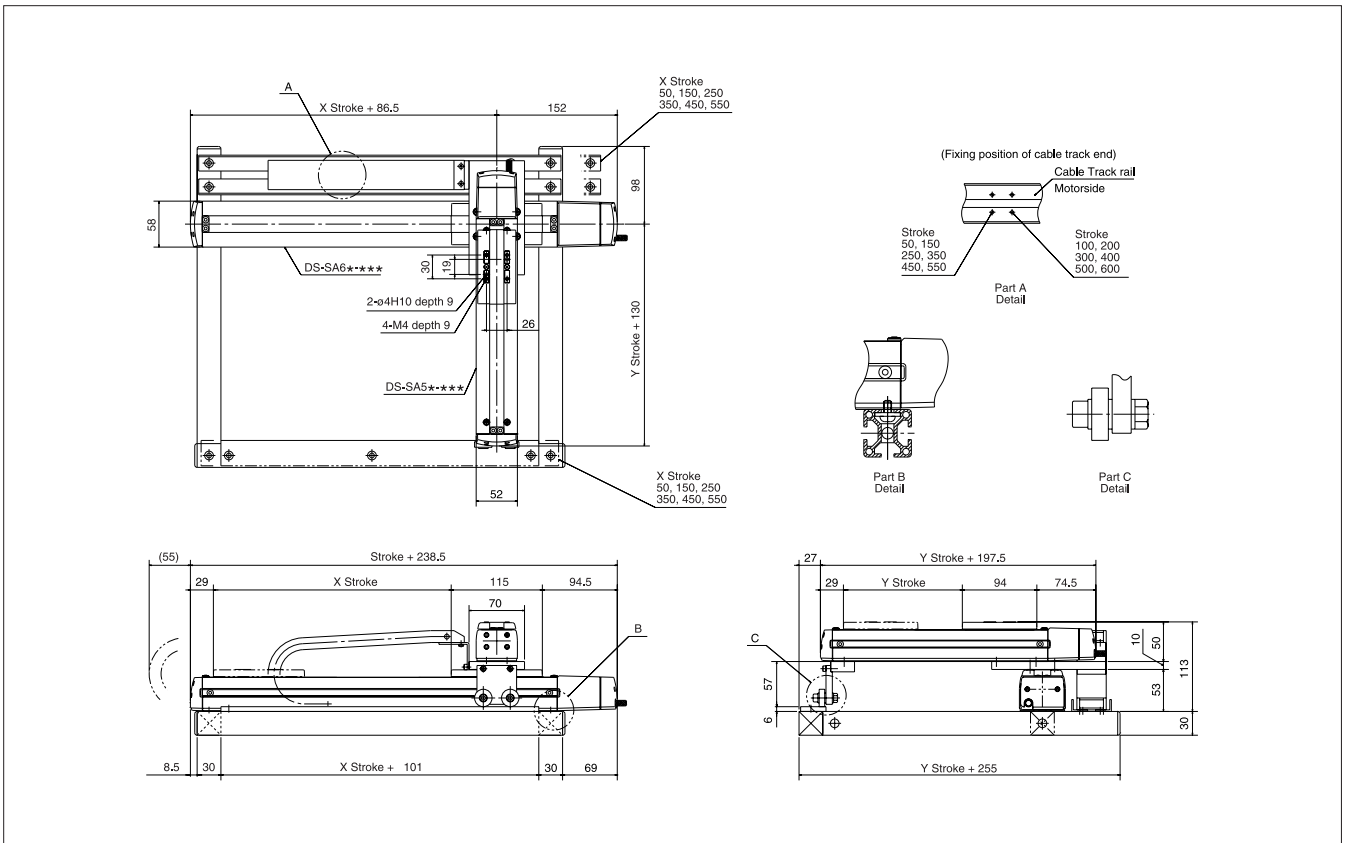
Note 2: The load when the axes are stationary should not exceed 8kg including Y slider payload shown above (on condition that load is uniformly distributed on the slider).

**Kit Components**

- Cable track 1 set
- Mounting base (nuts for actuator mounting plate included) 1 set
- Cable track rail 1 set
- Cam follower type guide module 1 set
- Cable track bracket 1
- X-Y bracket 1

\*Nuts, bolts for mounting are included.

**XY - T2 Mechanical Drawings**





# DS-S-C1

## DS Controller

- Ultra high speed with the use of 32 Bit RISC CPU.
- Improved Software (WINDOWS).
- Connection choice of either the position (simple function) or program mode (high function).
- By the commands of other devices such as a PLC, the position mode is used as a positioner.
- With the commands of other devices such as a PLC, the program mode reduces the load of other devices by using the following functions:

### **Multi-task**

Parallel processing of up to 8 programs to control external devices.

### **Variable calculation**

Using variables, a common program can be set for regulated movements.

### **BCD or Binary I/O**

allows more information to be exchanged.

### **Accurate positioning**

is obtainable by jogging the actuator to the desired position and reading the current value.

### **Easy incremental movements**

### **Motion cancellation**

is possible, even during movements.



# 1. Specification

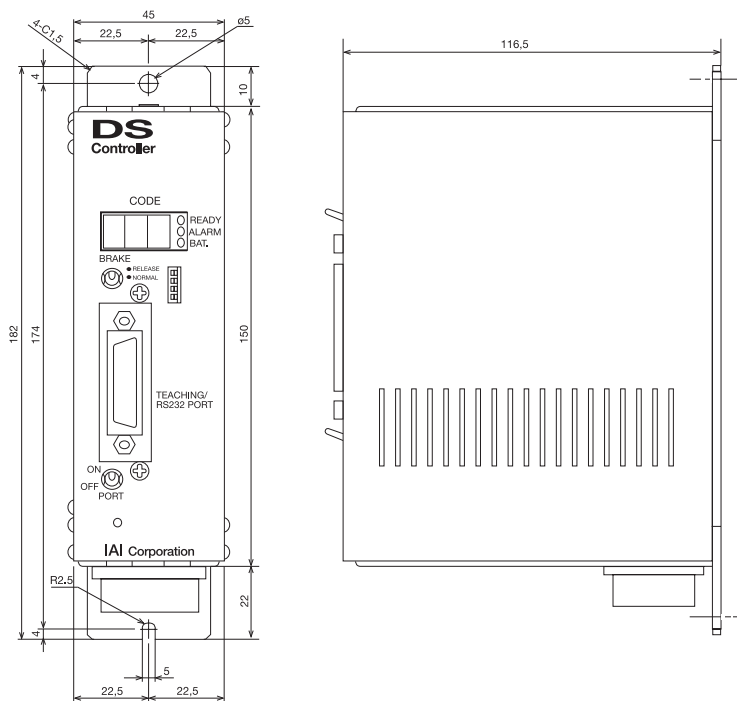
Power Voltage	DC 24V ±10%
Power Current	24W Rated (Maximum 48W)
Ambient Temperature & Humidity	Temperature: 0~50°C Humidity: 95% RH or less
Operating Environment	IP 20, Free of corrosive gas, no excessive dust
Isolation Resistance	500V 10MΩ or more
Immunity • Interference	In accordance with EN 50082-2
Unit Weight	860g
Überwachungsfunktionen	Driver alarm (Motor excess current Excess voltage Driver temperature check) Overload check Software limit check
Motor	AC Servo Motor
Control Functions	Multi-task Control Super SEL Controller
Memory Capacity	Total: 1000 steps, 500 positions
Memory Device	COMS RAM Battery Backup
Number of programs	32 programs, Multi-task function (maximum of 8 programs)
Input/Output (DC24V) Non-insulated	Dedicated inputs: 8 (PRG No. 1,2,4,8,10,20) Dedicated inputs: 1 (START) User inputs: 15 Dedicated outputs: 2 (READY, ALARM) User outputs: 6
Data Input Method	Teaching pendant or RS232 Communication
Communication	EIA RS232 Standard Asynchronous
Remote Update Functions	Software update (via floppy disk)

# 2. Type

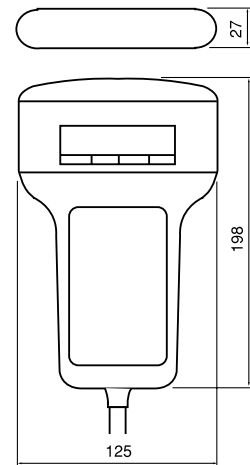
Controller Main Body	DS-S-C1-EU I/O shield cable, 5m 34 core
Teaching Pendant (Option)	DS-S-T1
PC Software	DS-S-P1

# 3. External Dimension

**Controller DS-S-C1**

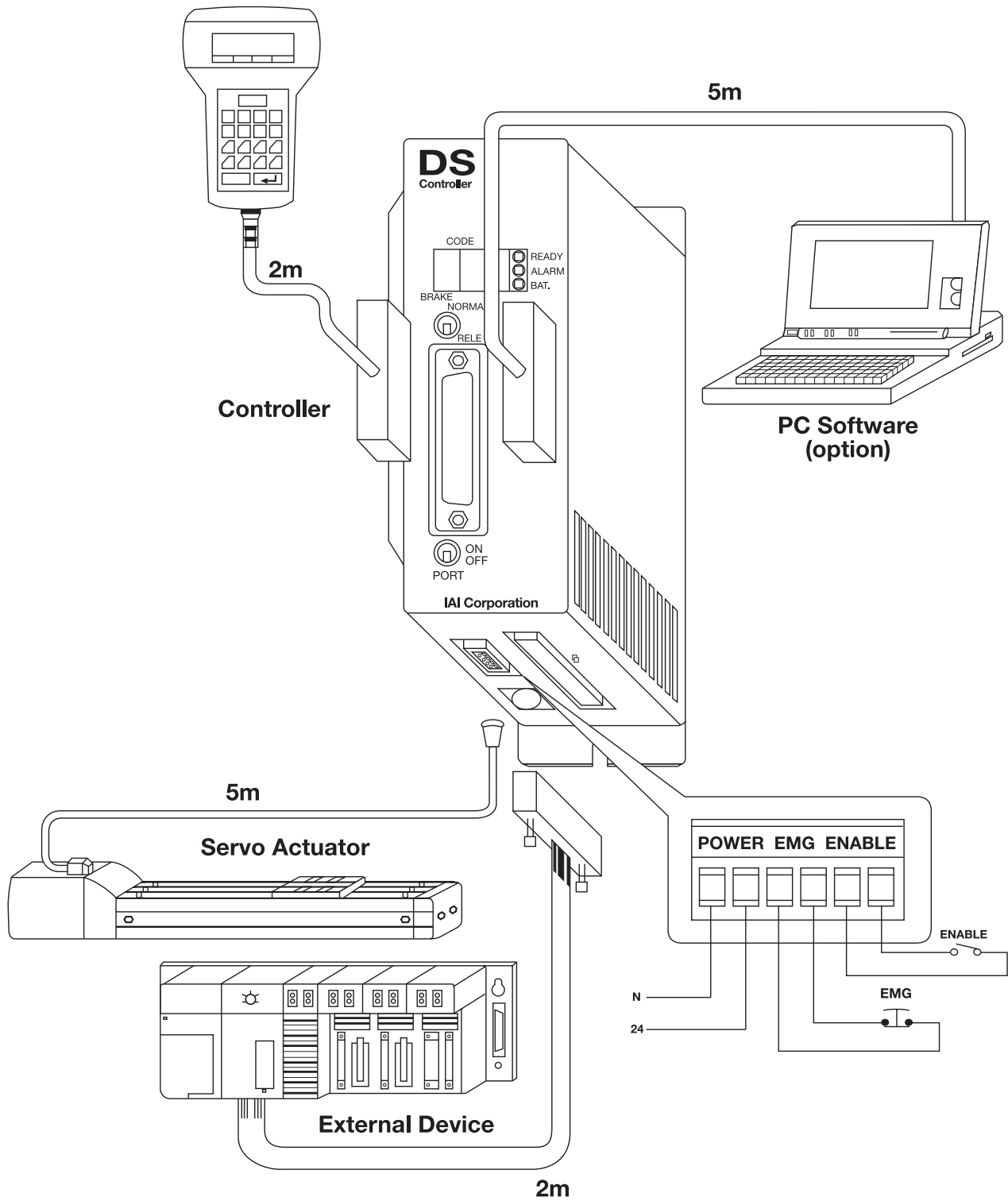


**Teaching Pendant DS-S-T1**



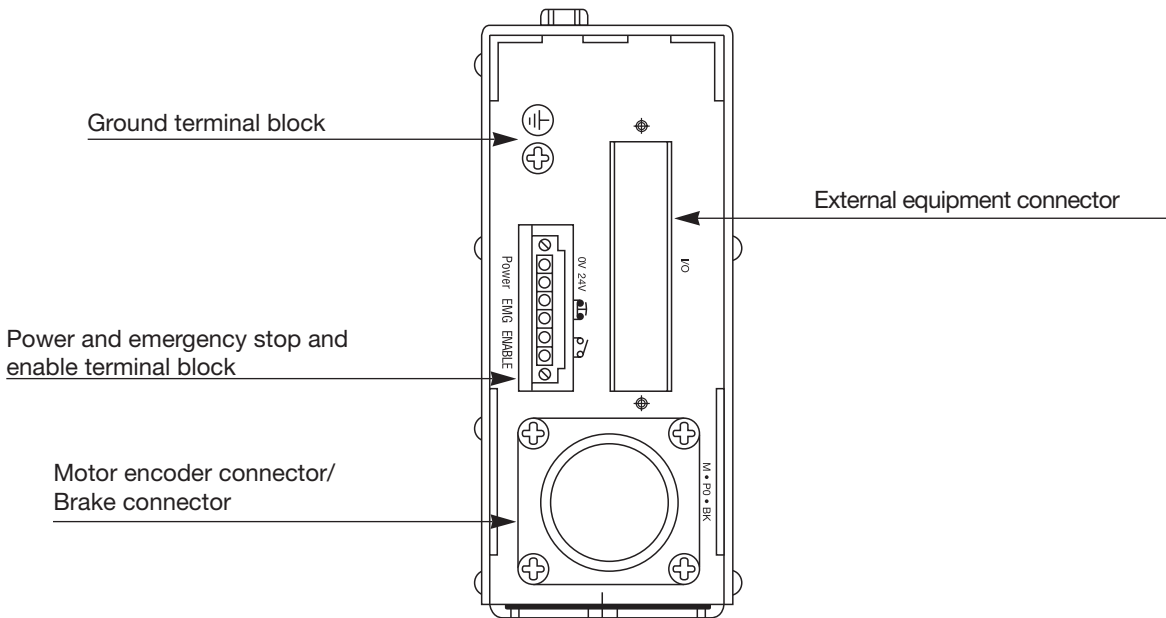
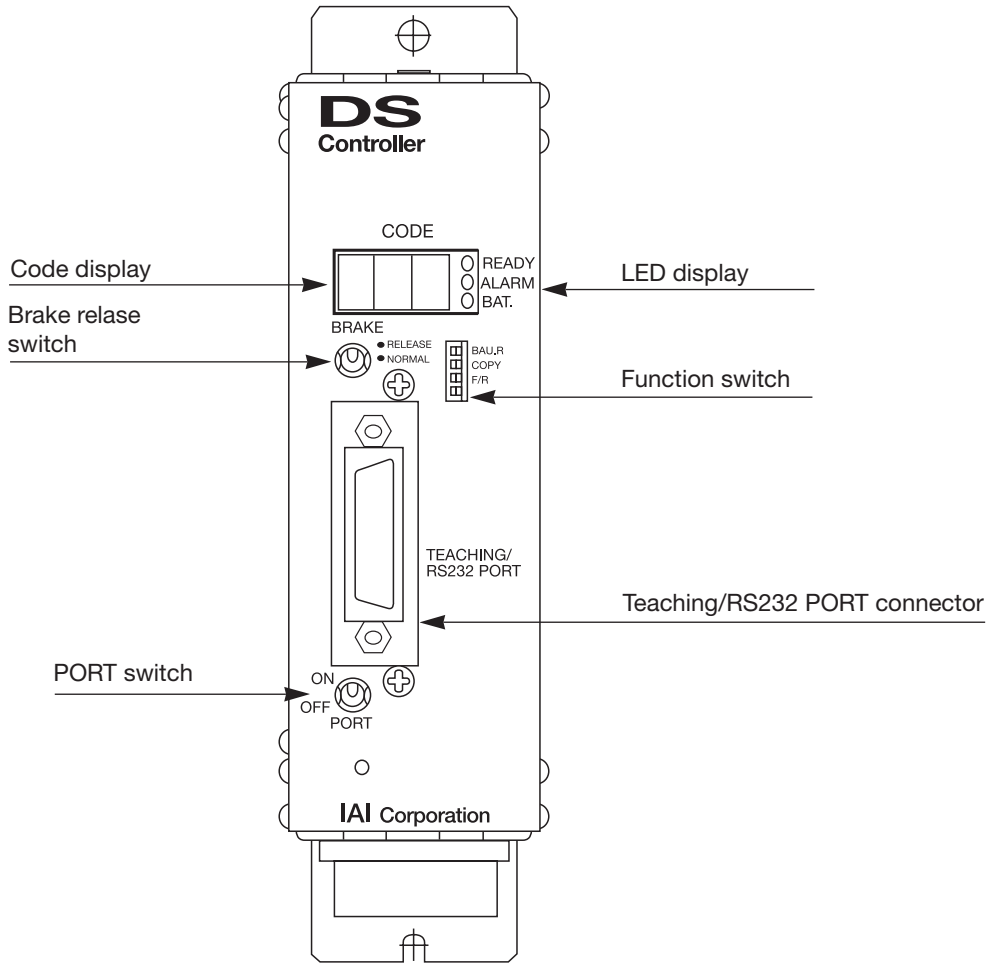
**4. Connecting Method**

Teaching Pendant (option)

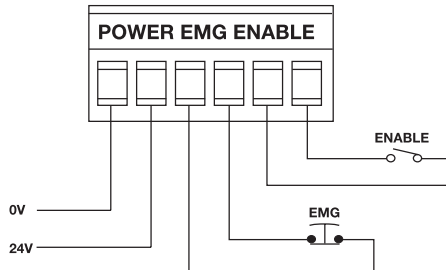


# 5. Part Names and Function

## (1) Part Names



### (2) Function

CODE display	This is a 3-digit display device that indicates the operating status of the controller.
LED display	<ul style="list-style-type: none"> <li>•READY: This indicates that the controller is ready to be operated.</li> <li>•ALARM: This is the display when there is a malfunction in the equipment.</li> <li>•BAT.: This indicates battery voltage is low.</li> </ul>
Brake release switch	<p>RELEASE: The brake is released.</p> <p>NORMAL: The brake is ON. (This is the normal setting)</p> <p>The brake release switch is enabled during the servo free state indicated below:</p> <ol style="list-style-type: none"> <li>1. From the time the power is turned ON until the homing command is given.</li> <li>2. When (Svof) is selected during direct teaching.</li> <li>3. When an alarm occurs.</li> </ol>
PORT switch	<p>ON: The TEACHING/RS232PORT is enabled. However, when the TEACHING/RS232PORT connector is not connected, an emergency stop occurs.</p> <p>OFF: The TEACHING/RS232PORT is disengaged. However, even when the TEACHING/RS232 PORT connector is not connected, the emergency stop is released.</p> <p>Note: When the controller is powered up, plug in or remove the TEACHING/RS232PORT connector when the PORT switch is OFF.</p>
Function switch	<p>BAU.R: This is the switch for changing the Baud rate.</p> <p>COPY: This is the switch for COPY from ROM to FLASH memory.</p> <p>F/R: This is the switch for changing FLASH and ROM.</p> <p>Note: At the time the unit is shipped, all switches are set to OFF so use them as is under normal circumstances.</p>
TEACHING/RS232 PORT connector	This is the connector for connecting the teaching pendant or a personal computer.
Motor•encoder/brake connector	This is the connector for connecting the actuator motor•encoder and brake.
I/O Connector	This is the connector for connecting other devices such as a sequencer.
Ground terminal block	This is the M3 screw for the ground connection.
Power, emergency stop and enable terminal block	<p>This is the terminal for POWER 0V and 24V power.</p> <p>The two EMG terminals are for connecting the emergency stop switch.</p> <p>The two ENABLE terminals must be always kept shorted either with wire or contact point. (The driver power will go off and become Driver Alarm[EA1] if the short at ENABLE is released when servo is on. In this case, it will recover after the controller is powered on again.)</p> <p>Note: Please do not connect the two ENABLE terminals to other circuits.</p> <p>At the time the unit is shipped, EMG terminals and ENABLE terminals are shorted and connected to emergency stop connector.</p> 

Note: This controller does not have a power switch.

# 6. I/O Interface

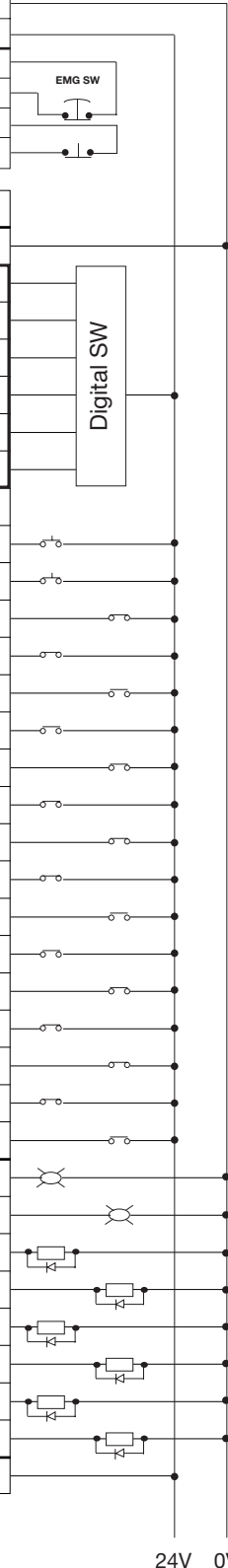
## Program Mode

Terminal Block (6 pin)

Pin No.	Signal Name
1	N
2	+24V
3	24V (Out)
4	EMG Stop
5	ENABLE
6	ENABLE

I/O Connector (34 pin)

Pin No.	Section	Port No.	Function
1	0V		External current 0V
18	Input		PRG No.1 Input
2			PRG No.2 Input
19			PRG No.4 Input
3			PRG No.8 Input
20			PRG No.10 Input
4			PRG No.20 Input
21			NC
5			CPU Reset
22		000	External Start Input
6		001	User Input
23		002	User Input
7	003	User Input	
24	004	User Input	
8	005	User Input	
25	006	User Input	
9	007	User Input	
26	008	User Input	
10	009	User Input	
27	010	User Input	
11	011	User Input	
28	012	User Input	
12	013	User Input	
29	014	User Input	
13	015	User Input	
30	Output	300	Alarm Output
14		301	Ready Output
31		302	User Output
15		303	User Output
32		304	User Output
16		305	User Output
33		306	User Output
17		307	User Output
34	+24V		External Current +24V Input



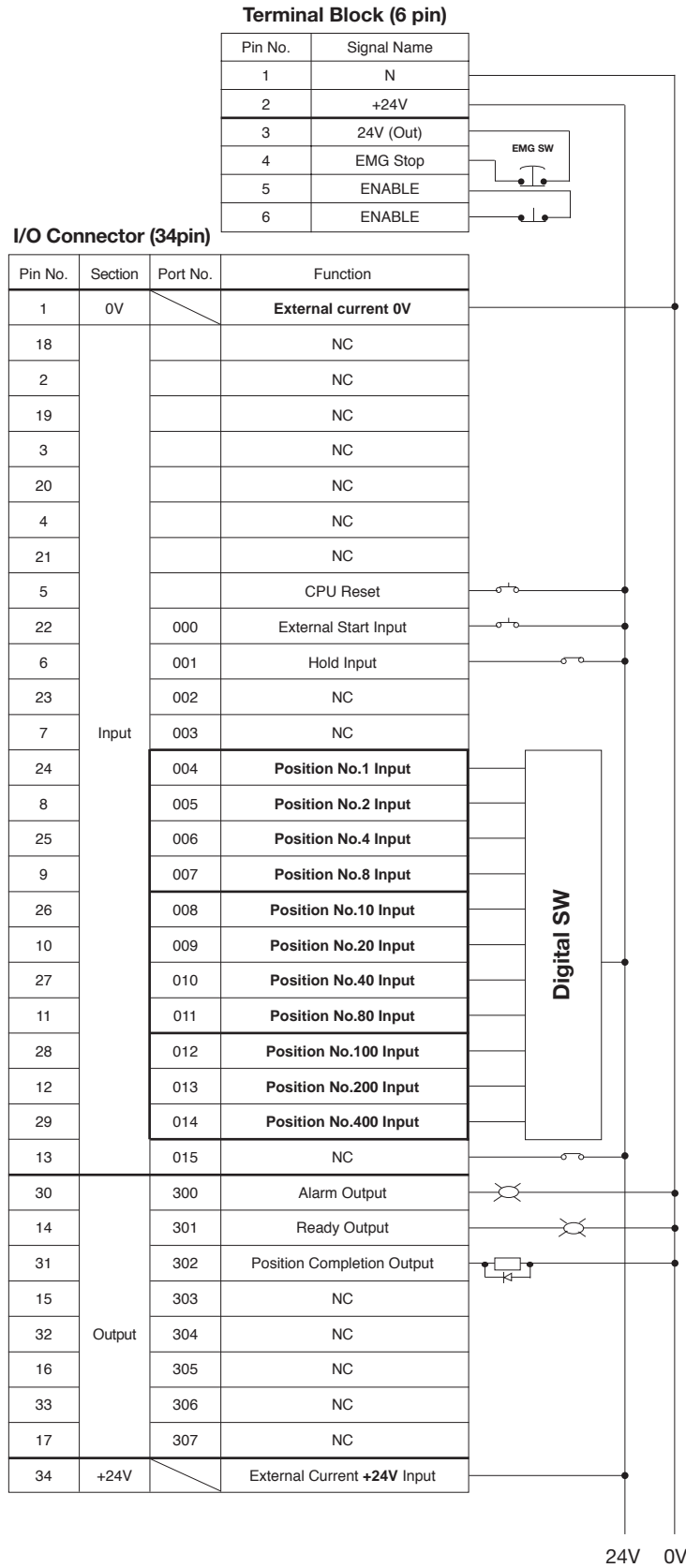
Note:

PRG=Program  
NC=No Contact

24V 0V

This is a sample wiring diagram.

**Position Mode**



Note:  
NC =No Contact

This is a sample wirin diagram.

## External Input Circuit

External Power Voltage	DC 24V $\pm$ 10%
Input Current	7mA 1 circuit
ON/OFF Voltage	ON voltage .... Min DC 18.0V OFF voltage .... Max DC 6.0V
External Connection Device	No-voltage contact point (minimum ca. DC 5V•1mA) Photoelectric•proximity sensor (PNP type) PLC Transistor output (PNP open collector type) PLC Contact point output (minimum load about DC5V•1mA)

Note: When a no-contact circuit is connected to an external circuit, make sure that the leakage current is under 1mA when the switch is OFF or, it could cause faulty operation.

## External Output Circuit

Load Voltage	DC 24V $\pm$ 10%	Equivalent for TD62084
Maximum Load Current	100mA / 1 point 400mA peak (all current)	
Leakage Current	Max 0.1mA / 1point	
External Connection Device	Miniature relay PLC input unit (PNP type)	

Note 1: For all of the external outputs, a protective diode is connected on the inside.

Note 2: Take care when connecting because if the load short circuits or the current exceeds the maximum load current, this will cause a failure in output circuit.

## 7. Position Mode and Program Mode

The controller has two modes of operation;

### Position Mode

The DS Controller operates via the commands of external devices (example: PLC)

Once the controller completes a movement, it sends a completion signal to the external device.

### Program Mode

By combining programs within the DS Controller, various tasks can be performed. By utilising the multi-task, it is easier to control other devices (at times, PLC is unnecessary).

## Mode and Software

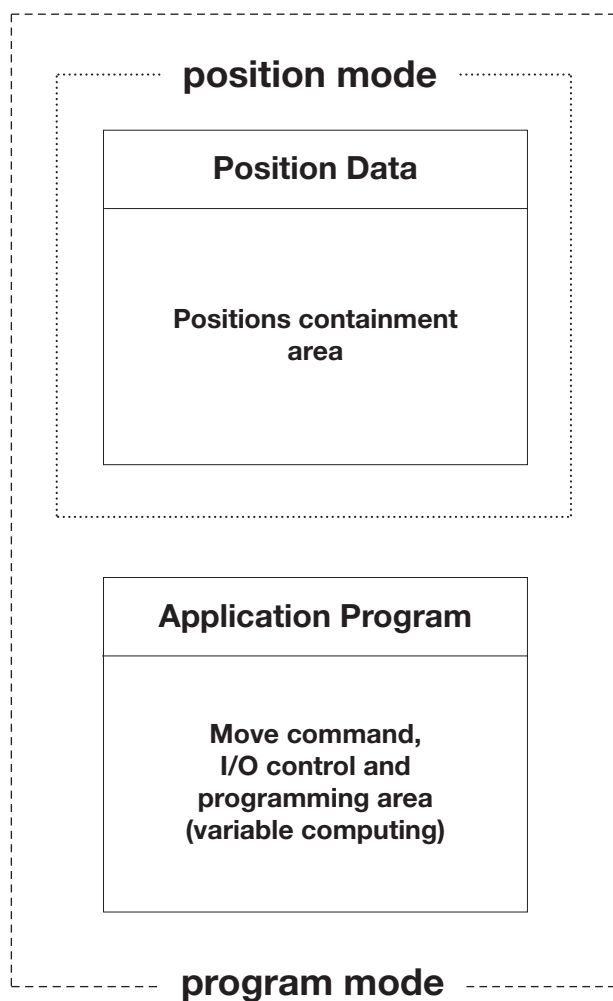
The controller software has two areas to enter data:

**Position Data:** Stores all of the position data

**Application Program:** Stores and creates Move commands, I/O control and Multi-task control

The controller is operated by either the **Position Mode** or **Program Mode**. The chart below shows the relationship between the two modes:

### DS-S-C1

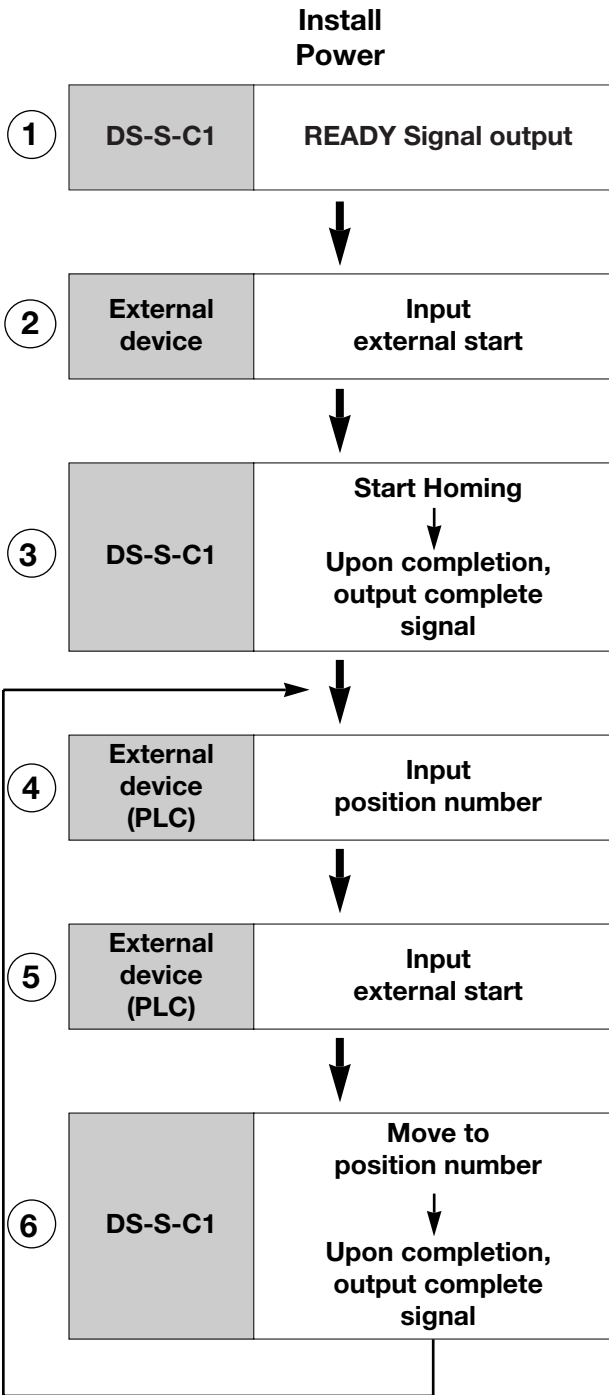


Position No.	Position Data
0001	50.00
0002	150.00
0003	200.00
0004	250.00
0005	350.00

Step	Command	Explanation
1	SVON	Turns the Servo ON
2	HOME	Executes Homing
3	VEL 500	Sets the velocity to 500 mm/sec
4	TAG 01	
5	MOVP 001	Moves to Position No.1
6	MOVP 002	Moves to Position No.2
7	MOVP 003	Moves to Position No.3
8	MOVP 004	Moves to Position No.4
9	MOVP 005	Moves to Position No.5
10	GOTO 01	Jumps to TAG 01

# 8. Position Mode

## 1. Operation



Pin No.	Section	Port Nr.	Function	Cable Colour
1	0V		External current 0V	Orange/Red A
18	Input		NC	Orange/Blue A
2			NC	Grey/Red A
19			NC	Grey/Blue A
3			NC	White/Red A
20			NC	White/Blue A
4			NC	Yellow/Red A
21			Reserve	Yellow/Blue A
5			CPU Reset	Pink/Red A
22		000	External Start Input	Pink/Blue A
6		001	Hold Input	Orange/Red B
23		002	NC	Orange/Blue B
7		003	NC	Grey/Red B
24		004	Position No.1 Input	Grey/Blue B
8		005	Position No.2 Input	White/Red B
25		006	Position No.4 Input	White/Blue B
9	007	Position No.8 Input	Yellow/Red B	
26	008	Position No.10 Input	Yellow/Blue B	
10	009	Position No.20 Input	Pink/Red B	
27	010	Position No.40 Input	Pink/Blue B	
11	011	Position No.80 Input	Orange/Red C	
28	012	Position No.100 Input	Orange/Blue C	
12	013	Position No.200 Input	Grey/Red C	
29	014	Position No.400 Input	Grey/Blue C	
13	015	NC	White/Red C	
30	Output	300	Alarm Output	White/Blue C
14		301	Ready Output	Yellow/Red C
31		302	Positioning Complete Output	Yellow/Blue C
15		303	NC	Pink/Red C
32		304	NC	Pink/Blue C
16		305	NC	Orange/Red D
33		306	NC	Orange/Blue D
17	307	NC	Grey/Red D	
34	+24V		External Current +24V Input	Grey/Blue D

②, ⑤

④

①

③, ⑥

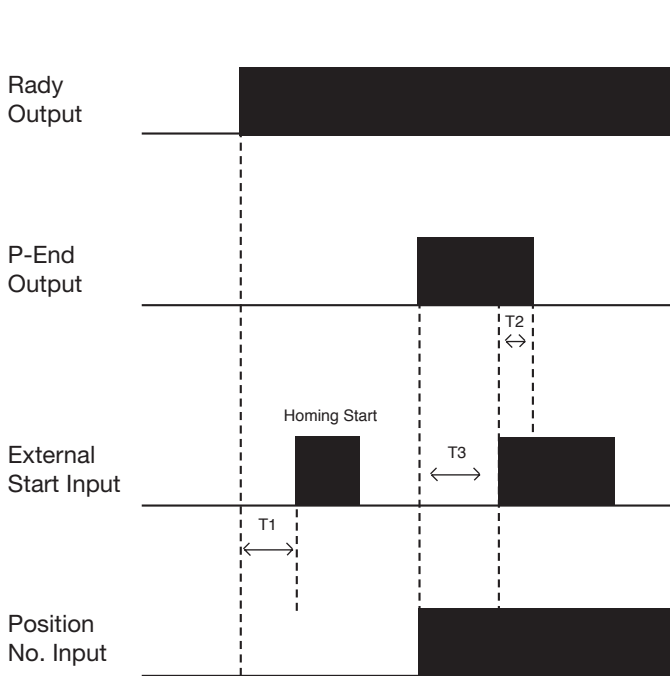
## 2. I/O Port

	Port No.	Functions	Explanation
Input		NC	*Note: When using the positioning mode, turn the program no. input to [0] (OFF)
		NC	
		NC	
		NC	
		NC	
		NC	
		Reserve	
		CPU Reset Input	Restarts the controller.
	000	External Start Input	At the moment input turns ON, the actuator moves to the designated position.
	001	Hold Input	When this turns ON, the servo actuator decelerates to a stop.
	002 ∧ 003	NC	002 - 003 changes to NC during the positioning mode.
	004	Position No.1	10° units 004 -014 are used as BCD codes to designate the position no.
	005	Position No.2	
	006	Position No.4	
	007	Position No.8	
008	Position No.10	10 <sup>1</sup> units The moment input port 000 (external start input) turns ON, the actuator moves to the designated position.	
009	Position No.20		
010	Position No.40		
011	Position No.80		
012	Position No.100	10 <sup>2</sup> units Homing is performed when there is no position number designation.	
013	Position No.200		
014	Position No.400		
015	NC	015 changes to NC during positioning mode.	
Output	300	Emergency Stop/ AlarmOutput	This turns ON during an emergency stop or when an error occurs.
	301	Ready Output	This turns ON when the controller is ready.
	302	Positioning Complete Output	This turns ON once position move is complete.
	303 ∧ 007	NC	303~307 changes to NC.during positioning mode.

Note: NC = No Contact

### 3. Timing of each signal

#### 1. Starting



**T1:** The time from the READY signal ON to homing start input.

T1 = Min. 50msec

**T2:** The time from the external start signal ON to the P-End signal OFF.

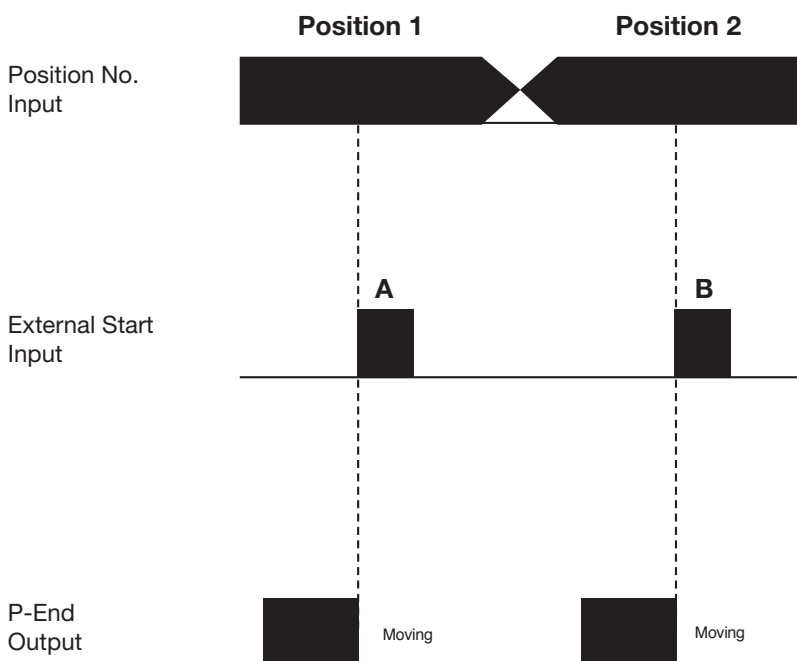
T2 = Max. 15msec

**T3:** The time from the P-End signal ON to when the external start signal input can be entered.

T3 = Min. 50 msec

**Note:** Please do not input Position No. Input and External Start Input at the same time.

#### 2. Timing for Position No. Switching



A: Position 1 execution start

B: Position 2 execution start

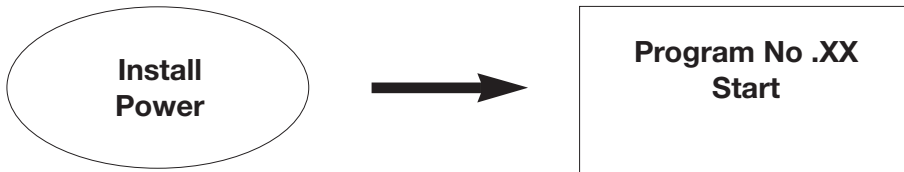
The timing for the position number shifting is the time from after the position presently being executed is completed until the next external start input (start signal) can be input.

## 9. Program Mode

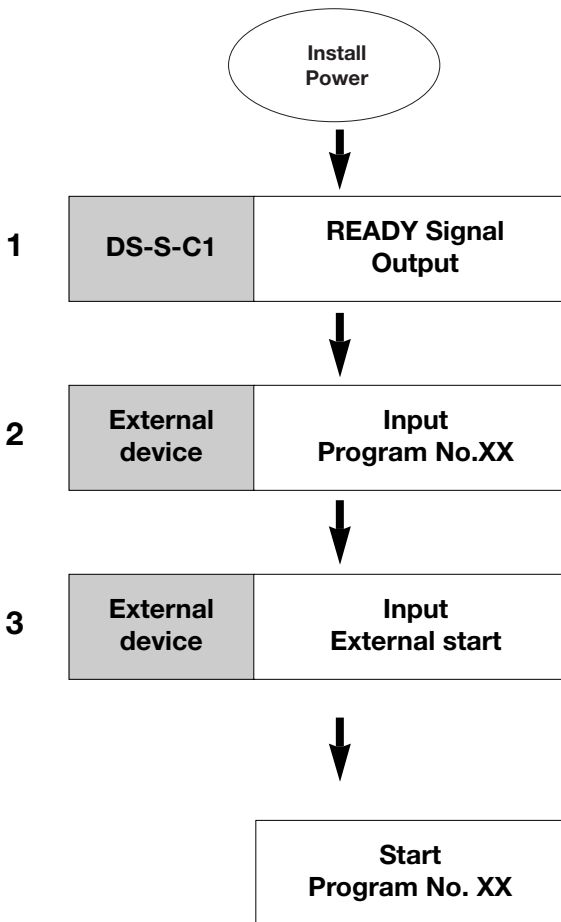
### (1) Operation

#### 1. Automatic start by a parameter setting

The program number XX (PRG No. XX) is input into the parameter's "automatic start program no."



#### 2. Start by an external device



Pin No.	Section	Port No.	Function	Cable Colour
1	0V		External current 0V	Orange/Red A
18			<b>Position No.1 Input</b>	Orange/Blue A
2			<b>Position No.2 Input</b>	Grey/Red A
19			<b>Position No.4 Input</b>	Grey/Blue A
3			<b>Position No.8 Input</b>	White/Red A
20			<b>Position No.10 Input</b>	White/Blue A
4			<b>Position No.20 Input</b>	Yellow/Red A
21	Input		Reserve	Yellow/Blue A
5			CPU Reset	Pink/Red A
22		000	External Start Input	Pink/Blue A
6		001	User Input	Orange/Red B
23		002	User Input	Orange/Blue B
7		003	User Input	Grey/Red B
24		004	User Input	Grey/Blue B
8		005	User Input	White/Red B
25		006	User Input	White/Blue B
9		007	User Input	Yellow/Red B
26		008	User Input	Yellow/Blue B
10		009	User Input	Pink/Red B
27		010	User Input	Pink/Blue B
11		011	User Input	Orange/Red C
28		012	User Input	Orange/Blue C
12	013	User Input	Grey/Red C	
29	014	User Input	Grey/Blue C	
13	015	User Input	White/Red C	
30	Output	300	Alarm Output	White/Blue C
14		301	Ready Output	Yellow/Red C
31		302	User Output	Yellow/Blue C
15		303	User Output	Pink/Red C
32		304	User Output	Pink/Blue C
16		305	User Output	Orange/Red D
33		306	User Output	Orange/Blue D
17		307	User Output	Grey/Red D
34	+24V		External Current +24V Input	Grey/Blue D

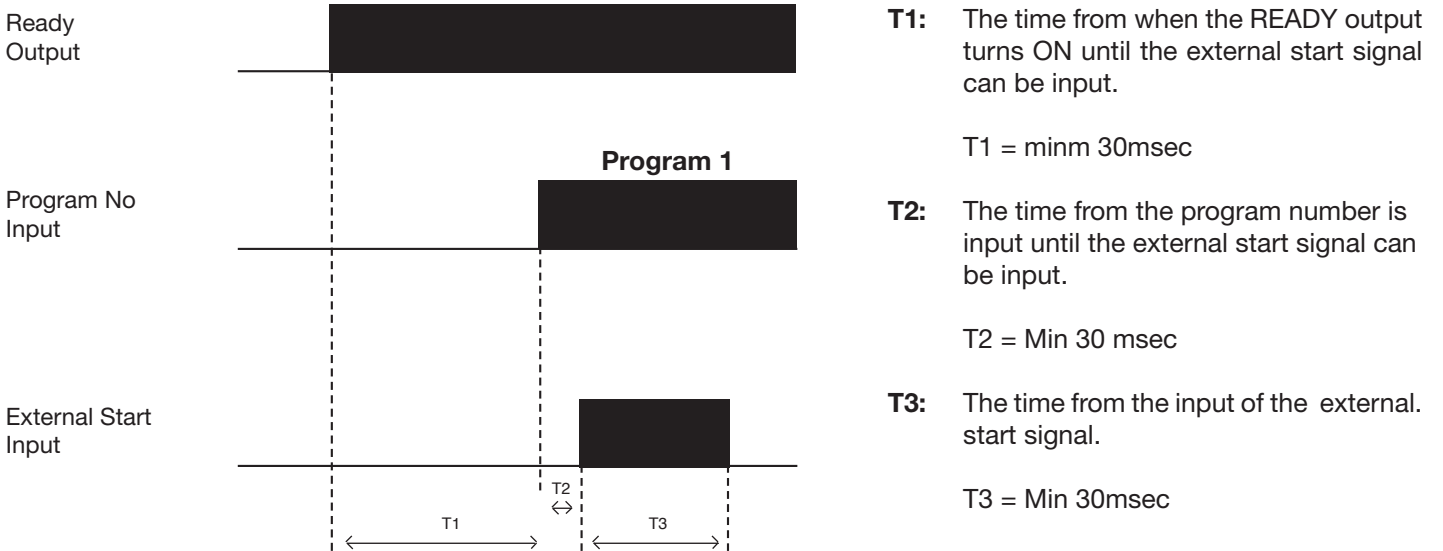
## (2) I/O Port Chart

Port No.	Function	Explanation
	PRG No. 01	Designated BCD inputs for start program. The moment input port 000 (external start input) turns ON, the designated program is executed.
	PRG. No. 02	
	PRG. No. 04	
	PRG. No. 08	
	PRG. No. 10	
	PRG. No. 20	
	Reserve	
	CPU Reset Input	Restarts the controller.
000	External <b>Start</b> Input	At the moment input turns ON, the designated program is executed.
001 ∩ 015	User Input	The user can use this input as he chooses.
300	Emergency Stop/ Alarm Output	This turns ON during an emergency stop or when an error occurs.
301	Ready Output	This turns ON when the controller is ready.
302 ∩ 307	User Output	The user can use this output port as he chooses.

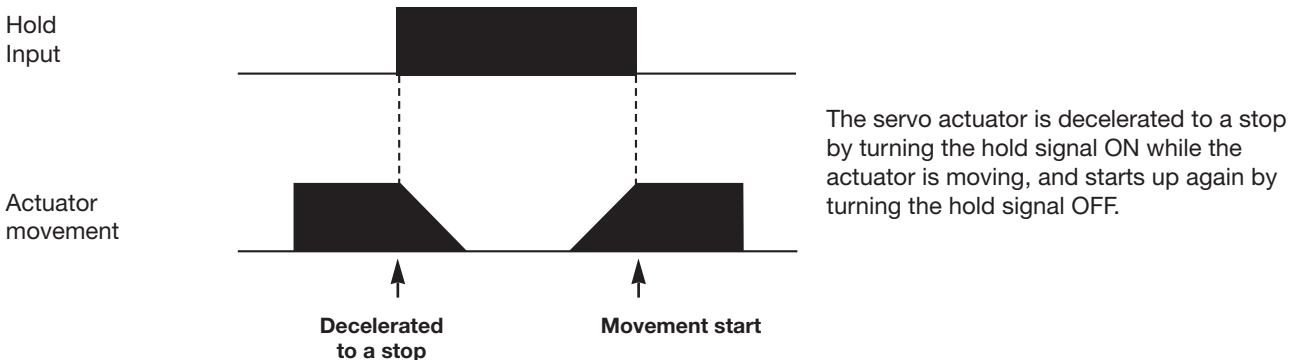
Note: Homing is executed within the program.

## (3) Timing of each signal

### 1. Start



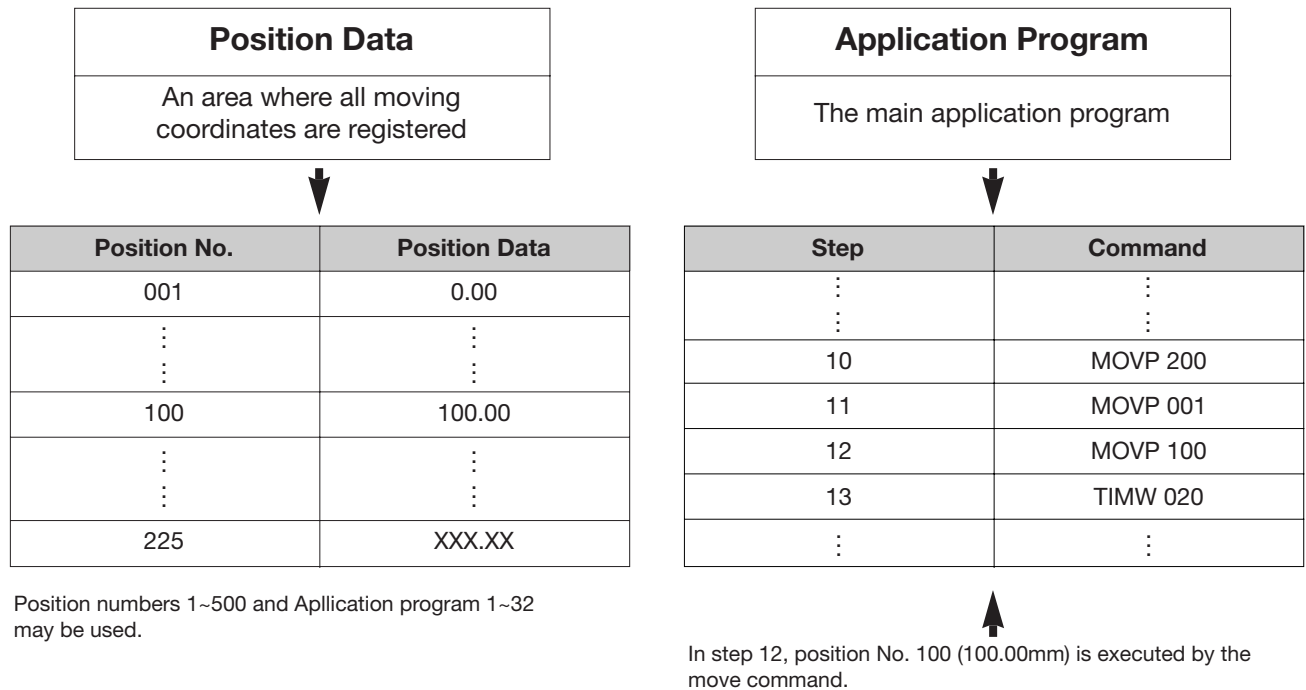
### 2. Timing of motion using the hold signal



## (4) Program Structure

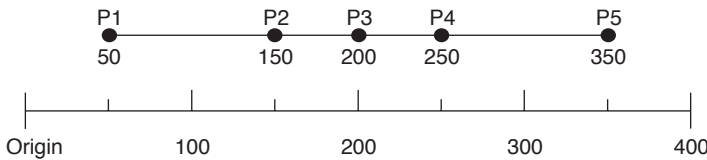
### 1. Program Structure

The program consists of "Position Data" which registers only the coordinate values, and "Application Program" which executes all movements.



### 2. Program Structure

It is not necessary to input the Position Data in an ascending order. The order will be done in the Application Program.



**[Position Data]**

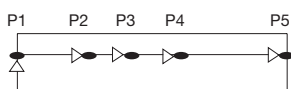
Position No.	Position Data
0001	50.00
0002	150.00
0003	200.00
0004	250.00
0005	350.00

### 3. Application Program

This programs commands that actually execute such movements as Move, Output ON, Output OFF and Timer. In addition, it registers up to 32 programs. The chart on the right is a combination example using the Position Data and Application Program.

**[Application Program Example]**

P1 → P2 → P3 → P4 → P5 → P1 (This path is repeated):



Step	Command	Explanation
1	SVON	Turns the Servo ON
2	HOME	Executes Homing
3	VEL 500	Sets the velocity to 500 mm/sec
4	TAG 01	
5	MOVP 001	Moves to Position No.1
6	MOVP 002	Moves to Position No.2
7	MOVP 003	Moves to Position No.3
8	MOVP 004	Moves to Position No.4
9	MOVP 005	Moves to Position No.5
10	GOTO 01	Jumps to TAG 01

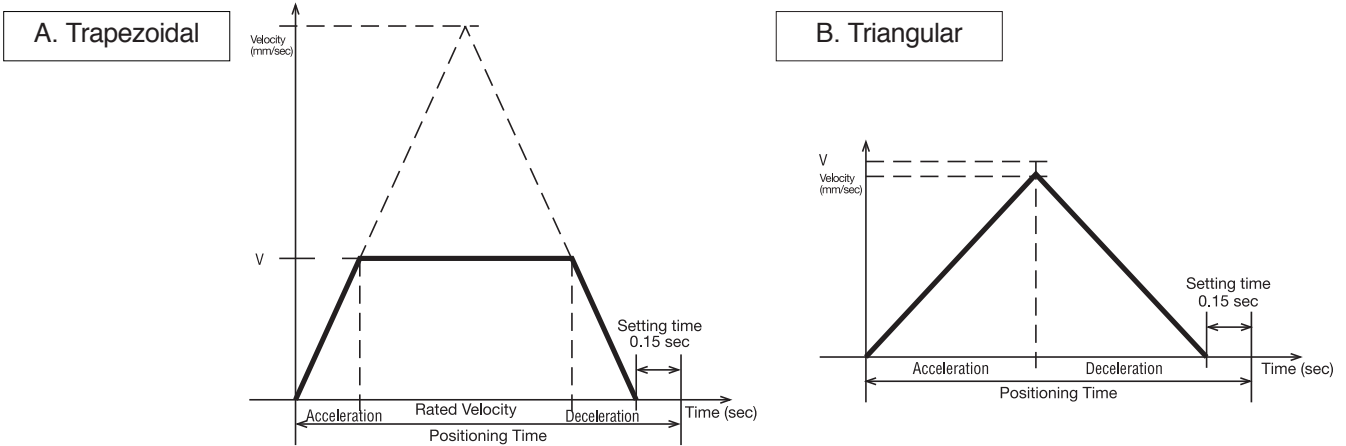
## (5) SEL Language commands for DS Type

Category	Function	Command
Numeric Calculations	Assign	LET
	Move	TRAN
	Clear variables	CLR
Arithmetic Calculations	Add	ADD
	Subtract	SUB
	Multiply	MULT
	Divide	DIV
	Figure remainder	MOD
Functional Calculations	Sine	SIN
	Cosine	COS
	Tangent	TAN
	Arctangent	ATN
	Square root	SQR
Logic Operations	Logic AND	AND
	Logic OR	OR
	Logic EXOR	EOR
Compare	Comparison	CPXX
Timer	Time wait	TIMW
	Time wait cancel	TIMC
	Acquire time	GTTM
I/O • Flag Operations	Output Flag [ON OFF NT]	BTXX
	Input Flag [ON OFF]	WTXX
	Binary input (Max 15 bit)	IN
	BCD input (Max 3 digits)	INB
	Binary input (Max 6 bit)	OUT
	BCD Input (Max 1 digits)	OUTB
Program Control	Jump	GOTO
	Declare jump target	TAG
	Execute subroutine	EXSR
	Start subroutine	BGSR
	End subroutine	EDSR
Task Control	Terminate program	EXIT
	Start program	EXPG
	Stop other programs	ABPG
Position Operations	Assign position to variable 199	PGET
	Assign value of variable 199	PPUT
	Clear point data	PCLR
	Copy point data	PCPY
	Read current position of axis	PRED
	Confirm position data	PTST
	Assign position velocity	PVEL
	Assign position acceleration	PACC
Confirm position size	PSIZ	

Category	Function	Command
Actuator Control Designation	Set velocity	VEL
	Set velocity factor	OVRD
	Set acceleration	ACC
	Set S motion ratio	SCRV
	Set offset	OFST
	Declare pause port	HOLD
	Declare stop complete port	CANC
	Acquire axis status	AXST
Actuator Control Commands	Servo [ON OFF]	SVXX
	Homing	HOME
	Move to designated position	MOVP
	Move to designated position	MVPI
	Directly designate move	MOVD
	Incremental movement	MVDI
	PATH Movement	PATH
	Jog [FN FF BN BF]	JXWX
Input/Output Flag Operation Commands	Axis slows to a halt	STOP
	Compare [EQ NE GT GE LT LE] *	IFXX
	Declare command execution when conditions are unestablished	ELSE
	Declare IF ending	EDIF
Structure DO Commands	Loop [EQ NE GT GE LT LE]	DWXX
	Escape from DO	LEAV
	Repeat DO	ITER
	Declare DO complete	EDDO

**Positioning Time Calculation**

The positioning time of the actuator can be calculated. There are two patterns depending on the distance of the move and the acceleration/deceleration setting:



Determine the appropriate pattern for your application and use the following calculation:

**Pattern Check**

The pattern is determined depending on the arriving velocity compared to the velocity setting when the actuator is operated at a set acceleration.

- V = Max. Velocity of the actuator (see Parameter)
- Vmax. = Arrival Velocity (maximum achieved velocity)
- D = Distance (mm)

$$\begin{aligned} \text{Arrival Velocity (Vmax)} &= \sqrt{\text{Distance [mm]} \times \text{Acceleration}} \\ &= \sqrt{\text{Dmm} \times 9.800 \text{ mm/s}^2 \times \text{Acceleration Setting in DS Controller (G)}} \end{aligned}$$

Velocity (V) ≤ Arrival Velocity (Vmax) . . . . .Trapezoidal Shape  
 Velocity (V) > Arrival Velocity (Vmax) . . . . .Triangular Shape

**Positioning Calculation**

**A. Trapezoidal**

$$\text{Positioning Time (T)} = \frac{\text{Distance [mm]}}{\text{Velocity [mm/s]}} + \frac{\text{Velocity [mm/s]}}{\text{Acceleration [mm/s}^2]} + \text{Settling Time (0.15 s)}$$

**B. Triangular**

$$\text{Positioning Time (T)} = 2 \sqrt{\frac{\text{Distance [mm]}}{\text{Acceleration [mm/s}^2]}} + \text{Settling Time (0.15 s)}$$

$$\begin{aligned} \text{Acceleration Time} &= \frac{\text{Arrival Velocity [mm/sec]}}{\text{Acceleration [mm/sec}^2]} \\ \text{Acceleration distance} &= \frac{\text{Acceleration [mm/sec}^2] \times (\text{Acceleration Time [sec]})^2}{2} \end{aligned}$$

**Caution:** Acceleration = Controller Acceleration Setting (G) x 9.800 mm/sec<sup>2</sup>. For example, if the controller acceleration setting is 0.3G, then the acceleration = 0.3G x 9.800mm/sec<sup>2</sup> = 2.940 mm/sec<sup>2</sup>.  
 Position settling time is the time it takes to verify the completion of movement to the desired position.

**Remarks**

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***Remarks***

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**Remarks**

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**DS Series**  
**Catalogue No. 1200-E**

Providing quality products since 1986



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