LAT3 Series
Model Selection 1

Selection Procedure for Positioning Operation (Refer to pages 1311 to 1313 for **Fig.1, 2, 3, 4, 5** and **Table 1, 2, 3**.)

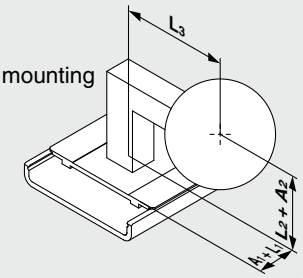
Selection Procedure	Formula / Data	Selection Example

❶ Operating conditions

List the operating conditions with consideration to the mounting orientation and shape of the workpiece.

- Stroke St [mm]
- Load mass W [g]
- Mounting orientation
- Mounting angle θ [°] **Fig.2**
- Amount of overhang Ln [mm] **Fig.1**
- Correction values for the distances to the moment center An [mm] **Fig.1** **Table 1**
- Positioning time Tp [ms]
- Positioning repeatability [μm]

15 mm
300 g
Horizontal table mounting
θ = 0°
L_1 = −10 mm
L_2 = 30 mm
L_3 = 35 mm
Tp = 200 ms
100 μm



❷ Select an actuator temporarily.

Select a model temporarily based on the required positioning repeatability and stroke.

Table 2

From Table 2, temporarily select the **LAT3-20**, which satisfies the positioning repeatability 100 μm and the minimum stroke that satisfies the stroke St = 15

Model	LAT3-10	LAT3F-10	LAT3-20	LAT3F-20	LAT3-30	LAT3F-30	LAT3M-50	LAT3F-50
Stroke [mm]	10		20		30		50	
Positioning repeatability [μm]	±90	±5	±90	±5	±90	±5	±20	±5
Measuring accuracy [μm]	30	1.25	30	1.25	30	1.25	5	1.25
Table weight [g]	50		70		90		110	

❸ Check the load mass and load factor.

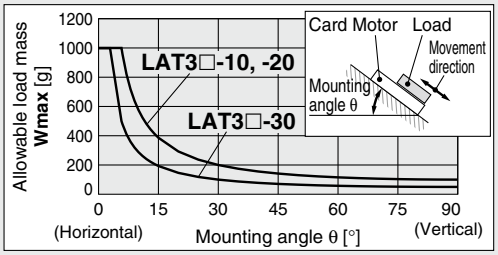
Find the allowable load mass Wmax [g] from the graph.

* Confirm that the applied load mass W [g] does not exceed the allowable load mass.

Wmax **Fig.2**

$W \leq Wmax$

From Fig. 2: θ = 0, find Wmax = 1000
As W = 300 < Wmax = 1000, the selected model can be used.



From Table 1, find the correction values for the distances to the moment center. Calculate the static moment M [N·m]. From Table 3, find the allowable moment Mmax [N·m]. Calculate the load factor αn for the static moments.

* Confirm that the total sum of the guide load factors for the static moments does not exceed 1.

An **Table 1**

$M = W/1000 \cdot 9.8 (Ln + An)/1000$

Mmax **Table 3**

$\alpha = M/Mmax$

$\Sigma\alpha p + \alpha y + \alpha r \leq 1$

From Table 1, A_1 = 32.5

Pitch moment

Mp = 300/1000 x 9.8 (−10 + 32.5)/1000
= 0.066

From Table 3, Mpmax = 0.3

αp = 0.066/0.3 = 0.22

Roll moment

Mr = 300/1000 x 9.8 x 35/1000
= 0.103

From Table 3, Mrmax = 0.2

αr = 0.103/0.2
= 0.52

$\Sigma\alpha n$ = 0.22 + 0.52
= 0.74 ≤ 1, thus, the selected model can be used.

❹ Check the positioning time.

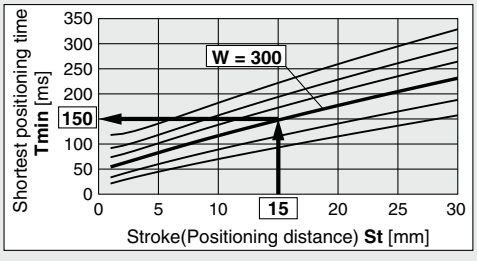
Find the shortest positioning time Tmin [ms] from the graph.

* Confirm that the positioning time Tp [ms] is longer than the shortest positioning time.

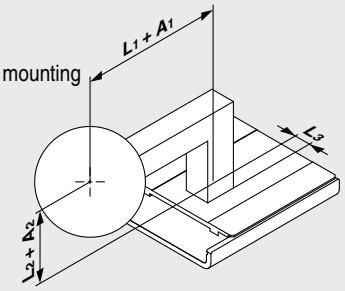
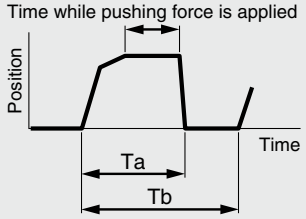
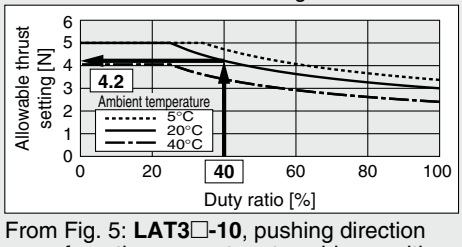
Tmin **Fig.3**

$Tp \geq Tmin$

From Fig. 3: St = 15 and W = 300, find Tmin = 150
As Tp = 200 ≥ Tmin = 150, the selected model can be used.



Selection Procedure for Pushing Operation

Selection Procedure	Formula / Data	Selection Example
1 Operating conditions List the operating conditions with consideration to the mounting orientation and shape of the workpiece. * When operating the product in a vertical direction, consider the effect of the table weight on the Card Motor (See Table 2) and the weight of the workpiece to find out the pushing force of the Card Motor.	• Stroke St [mm] • Load mass W [g] • Mounting orientation • Mounting angle θ [°] • Amount of overhang (L_1, L_2, L_3) [mm] **Fig.1** • Correction values for the distances to the moment center An [mm] **Fig.1** **Table 1** • Measuring accuracy [μm] • Positioning time Tp [ms] • Pushing force F [N] • Pushing position [mm] • Pushing direction • Positioning time + Pushing time Ta [s] • Cycle time Tb [s]	8 mm 50 g Horizontal table mounting θ = 0° L_1 = 30 mm L_2 = 10 mm L_3 = 0 mm 10 μm Tp = 150 ms 4 N 4 mm Pushing direction away from the connector 4 s 10 s 
2 Select an actuator temporarily. Select a model temporarily based on the required measuring accuracy and stroke.	**Table 2**	From Table 2, temporarily select the **LAT3F-10**, which satisfies the measuring accuracy 10 μm and the minimum stroke that satisfies the stroke St = 8
3 Check the load mass and moment. Find the allowable load mass Wmax [g] from the graph. * Confirm that the applied load mass W [g] does not exceed the allowable load mass. From Table 1, find the correction values for the distances to the moment center. Calculate the static moment M [N·m]. From Table 3, find the allowable moment Mmax [N·m]. Calculate the load factor αn for the static moments. * Confirm that the total sum of the guide load factors for the static moments does not exceed 1.	Wmax **Fig.2** $W \leq Wmax$ An **Table 1** $M = W/1000 \cdot 9.8 (Ln + An)/1000$ Mmax **Table 3** $\alpha = M/Mmax$ $\Sigma\alpha p + \alpha y + \alpha r \leq 1$	From Fig. 2: θ = 0, find Wmax = 1000 As W = 50 < Wmax = 1000, the selected model can be used. From Table 1, A_1 = 22.5 Pitch moment Mp = 50/1000 x 9.8 (30 + 22.5)/1000 = 0.026 From Table 3, Mpmax = 0.2 αp = 0.026/0.2 = 0.13 Σαn = 0.13 ≤ 1, thus, the selected model can be used.
4 Check the positioning time. Find the shortest positioning time Tmin [ms] from the graph. * Confirm that the positioning time Tp [ms] is longer than the minimum positioning time.	Tmin **Fig.3** $Tp \geq Tmin$	From Fig. 3: St = 8 and W = 50, find Tmin = 100 As Tp = 150 ≥ Tmin = 100, the selected model can be used.
5 Check the pushing force. Calculate the duty ratio [%]. Find the allowable thrust setting value from the graph. From Fig. 5, find the allowable pushing force Fmax [N] generated at the required pushing position and for the allowable thrust setting value. Confirm that the pushing force F [N] does not exceed the allowable pushing force.	Duty ratio = Ta/Tb x 100 **Fig.4** F ≤ Fmax 	Duty ratio = 4/10 x 100 = 40% From Fig. 4: **LAT3□-10** and 40% duty ratio, find the allowable thrust setting value = 4.2  From Fig. 5: **LAT3□-10**, pushing direction away from the connector at pushing position 4 mm, find Fmax = 4.5 As F = 4 ≤ Fmax = 4.5, the selected model can be used.

LAT3 Series
Model Selection 2

Selection

⚠Caution

1. **The temperature increase of the Card Motor varies depending on the duty ratio and the heat dissipation properties of the base it is mounted onto. If the temperature of the Card Motor becomes high, reduce the duty ratio by increasing the cycle time, or improve the heat transfer properties of the mounting base and the surroundings.**
2. **The pushing force generated by the Card Motor varies in relation to the thrust setting value depending on the pushing position and the pushing direction. Refer to Fig. 5 for details.**

Fig. 1 Amount of Overhang: Ln [mm], Correction Value for Distances to Moment Center: An [mm]

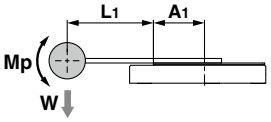
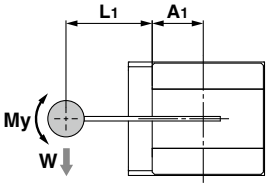
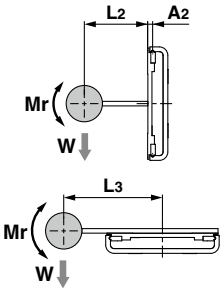
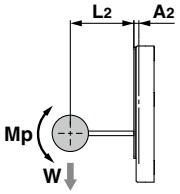
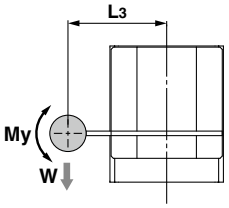
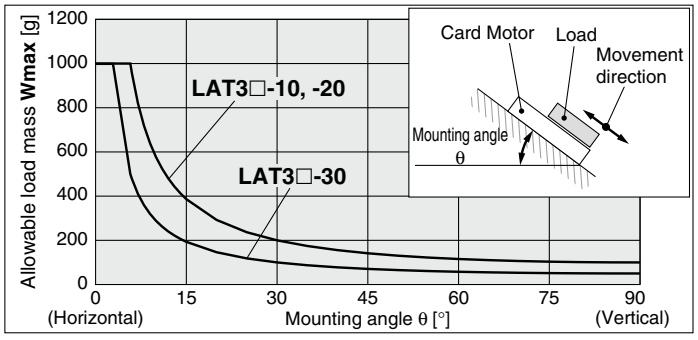
Mounting orientation	**Mp**: Pitching	**My**: Yawing	**Mr**: Rolling
Horizontal			
Vertical			—

Table 1 Correction Value for Distances to Moment Center: An [mm]

Model	A_1	A_2
LAT3□-10	22.5	2.2
LAT3□-20	32.5	2.2
LAT3□-30	42.5	2.2
LAT3□-50	35	2.4

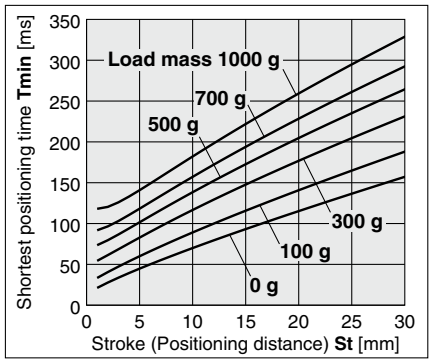
Fig. 2 Allowable Load Mass: Wmax [g]



∗ LAT3□-50 can be used only at the horizontal mounting angle (0°).

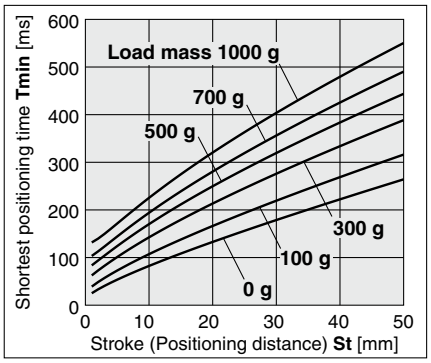
Fig. 3 Shortest Positioning Time (Reference): Tmin [ms]

LAT3-□



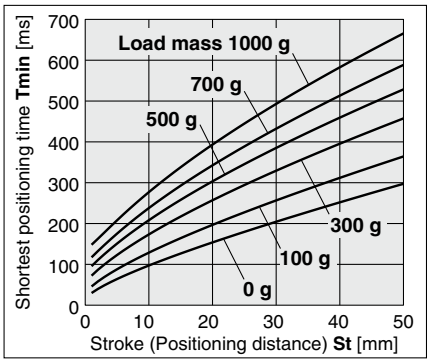
Operating conditions
Model: **LAT3-□**
Mounting orientation: Horizontal/Vertical
Step data input version: Cycle time entry method (Triangular movement profile)

LAT3M-□



Operating conditions
Model: **LAT3M-□**
Mounting orientation: Horizontal/Vertical
Step data input version: Cycle time entry method (Triangular movement profile)

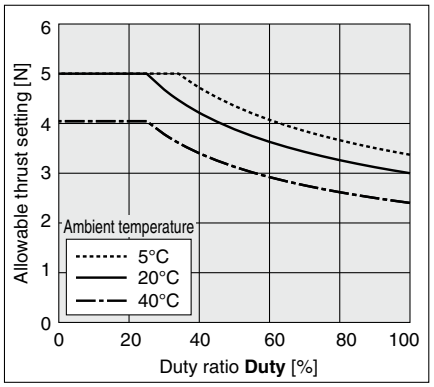
LAT3F-□



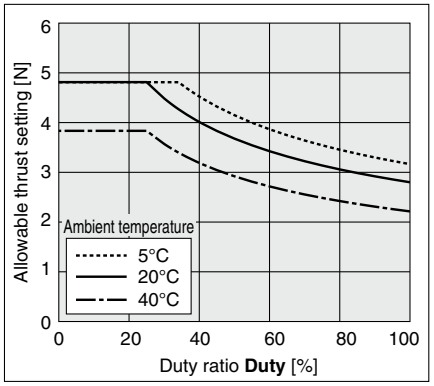
Operating conditions
Model: **LAT3F-□**
Mounting orientation: Horizontal/Vertical
Step data input version: Cycle time entry method (Triangular movement profile)

Fig. 4 Allowable Thrust Setting Value

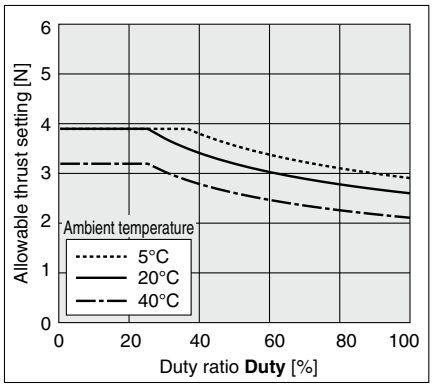
LAT3□-10



LAT3□-20



LAT3□-30



LAT3□-50

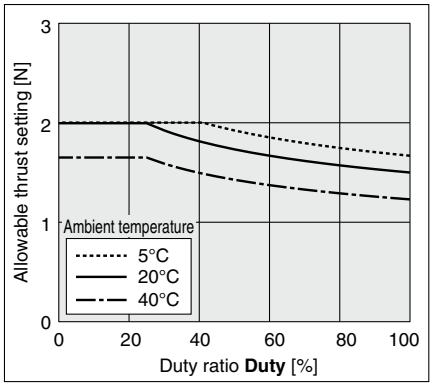
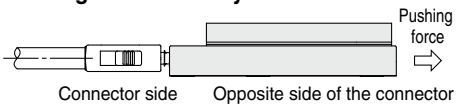


Fig. 5 Pushing Force: F [N] Characteristics (Reference)

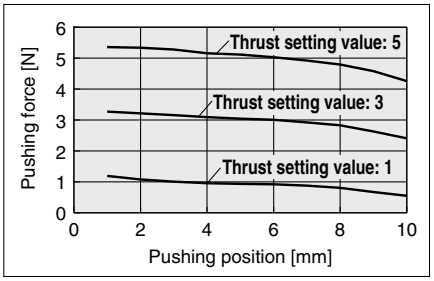
Pushing direction away from the connector



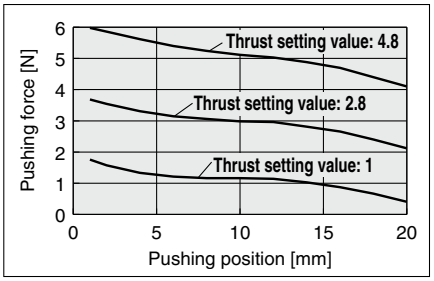
Operating conditions
Mounting orientation: Horizontal table mounting
Pushing force settings: Minimum, continuous, or maximum instantaneous thrust of each model

Table start position: Retracted end (Connector side)
Pushing direction: Away from the connector
Pushing position: Positioning distance from the connector side, retracted end

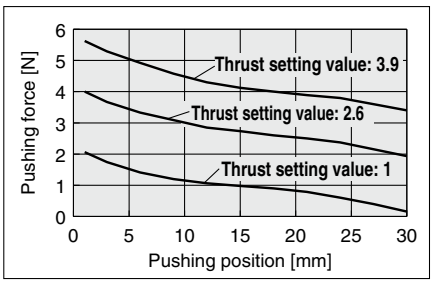
LAT3□-10



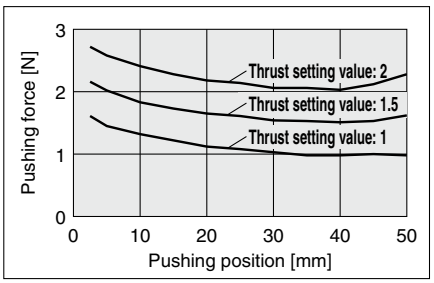
LAT3□-20



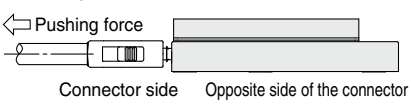
LAT3□-30



LAT3□-50



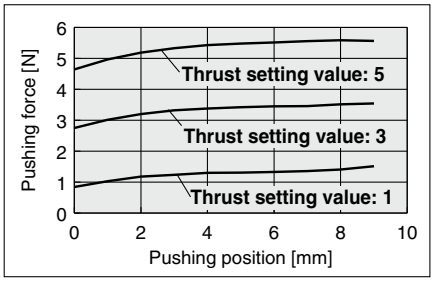
Pushing direction toward the connector



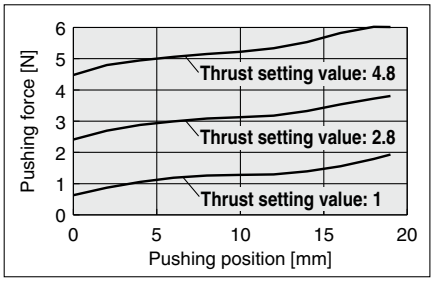
Operating conditions
Mounting orientation: Horizontal table mounting
Pushing force settings: Minimum, continuous, or maximum instantaneous thrust of each model

Table start position: Extended end (Opposite side of the connector)
Pushing force direction: Toward the connector
Pushing position: Positioning distance from the connector side, retracted end

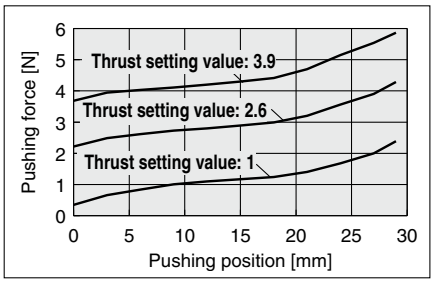
LAT3□-10



LAT3□-20



LAT3□-30



LAT3□-50

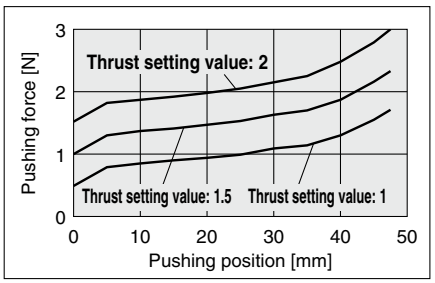
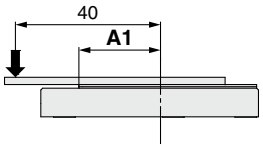


Table Displacement (Reference)

Displacement through the entire stroke when a load is applied to the point indicated by the arrow

Table displacement due to pitch moment load



LAT3□-10, -20, -30, -50

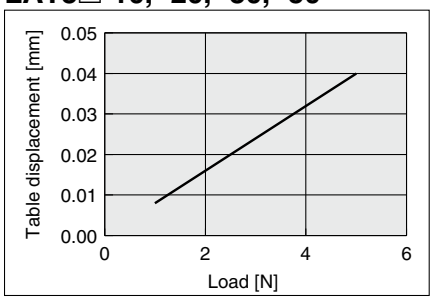
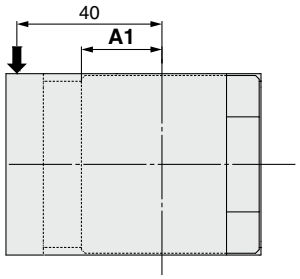


Table displacement due to yaw moment load



LAT3□-10, -20, -30, -50

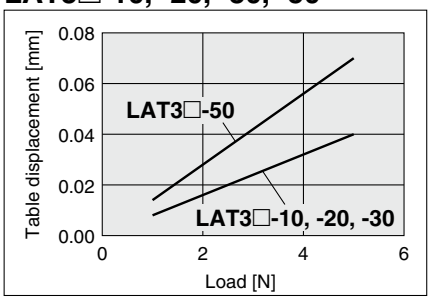
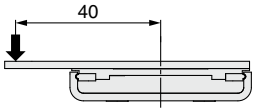


Table displacement due to roll moment load



LAT3□-10, -20, -30, -50

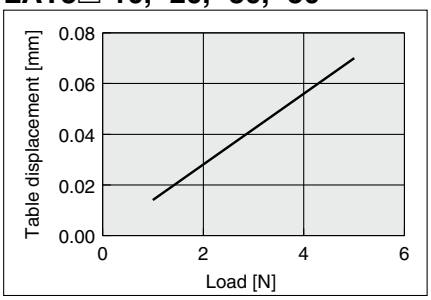


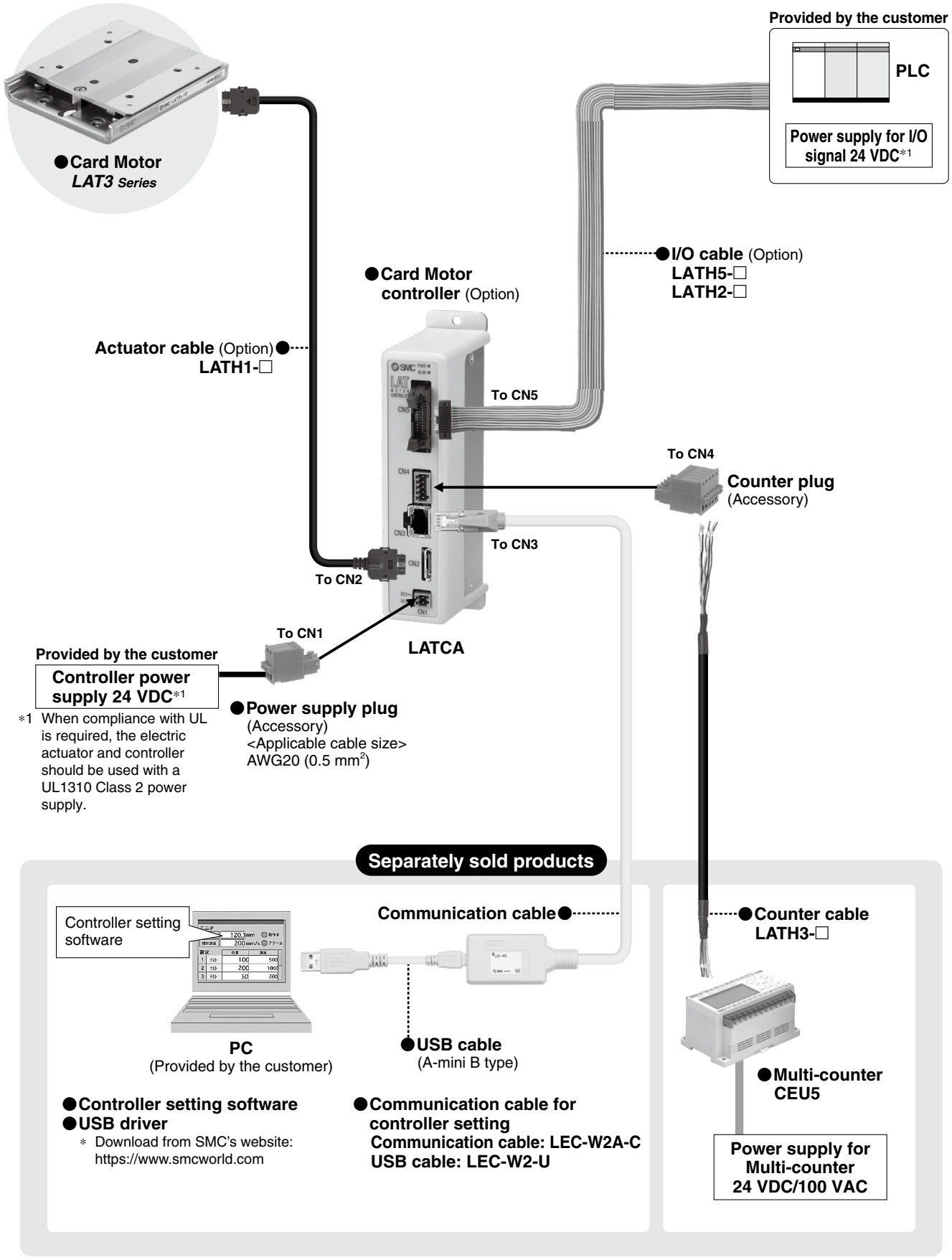
Table 2 Stroke: St [mm], Positioning Repeatability [μm], Measuring Accuracy [μm], Table Weight [g]

Model	LAT3-10	LAT3F-10	LAT3-20	LAT3F-20	LAT3-30	LAT3F-30	LAT3M-50	LAT3F-50
Stroke [mm]	10		20		30		50	
Positioning repeatability [μm]	±90	±5	±90	±5	±90	±5	±20	±5
Measuring accuracy [μm]	30	1.25	30	1.25	30	1.25	5	1.25
Table weight [g]	50		70		90		110	

Table 3 Allowable Moment: Mmax [N·m]

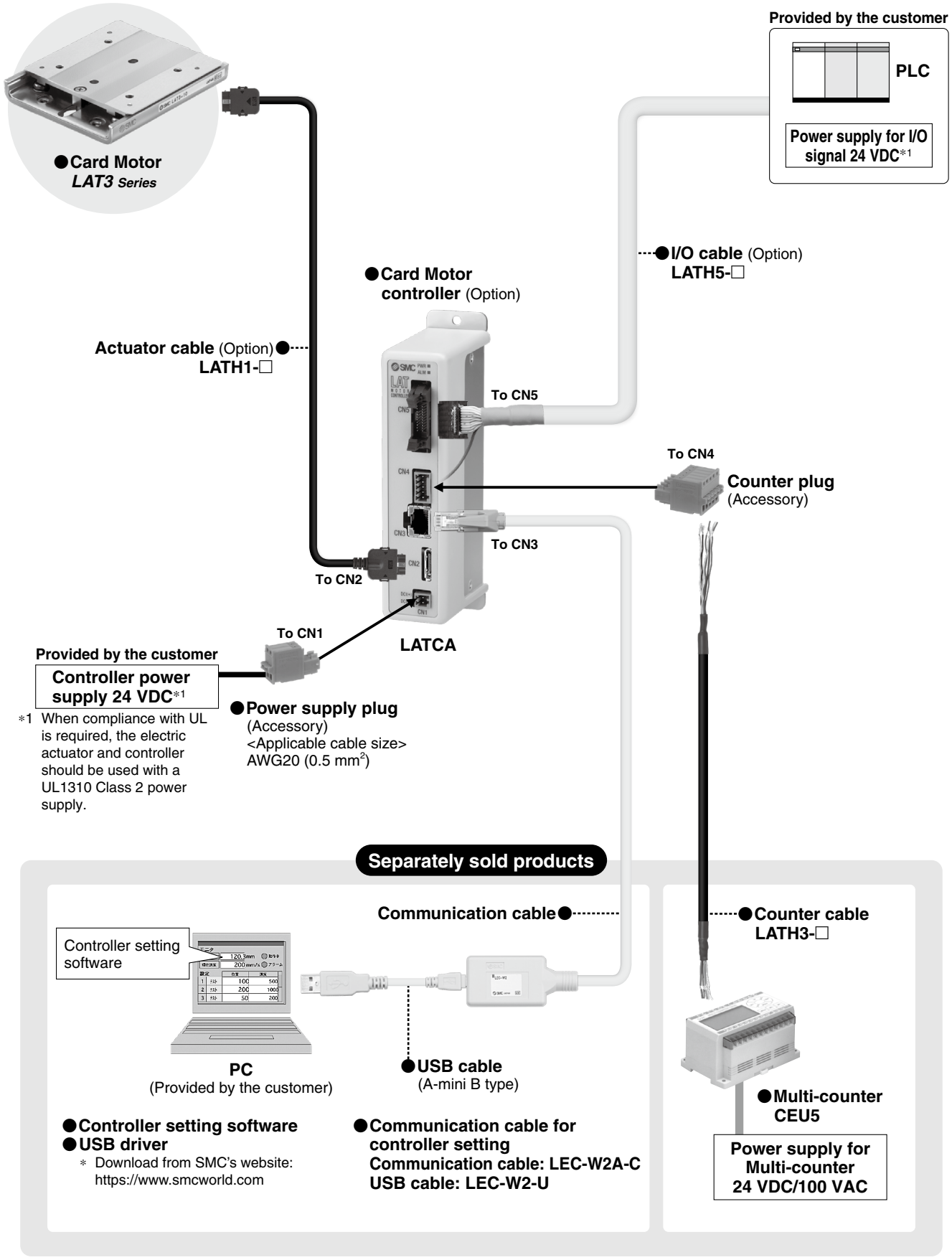
Model	Pitch moment/Yaw moment **Mpmax, Mymax**	Roll moment **Mrmax**
LAT3□-10	0.2	0.2
LAT3□-20	0.3	0.2
LAT3□-30	0.4	0.2
LAT3□-50	0.2	0.2

System Construction/General Purpose I/O



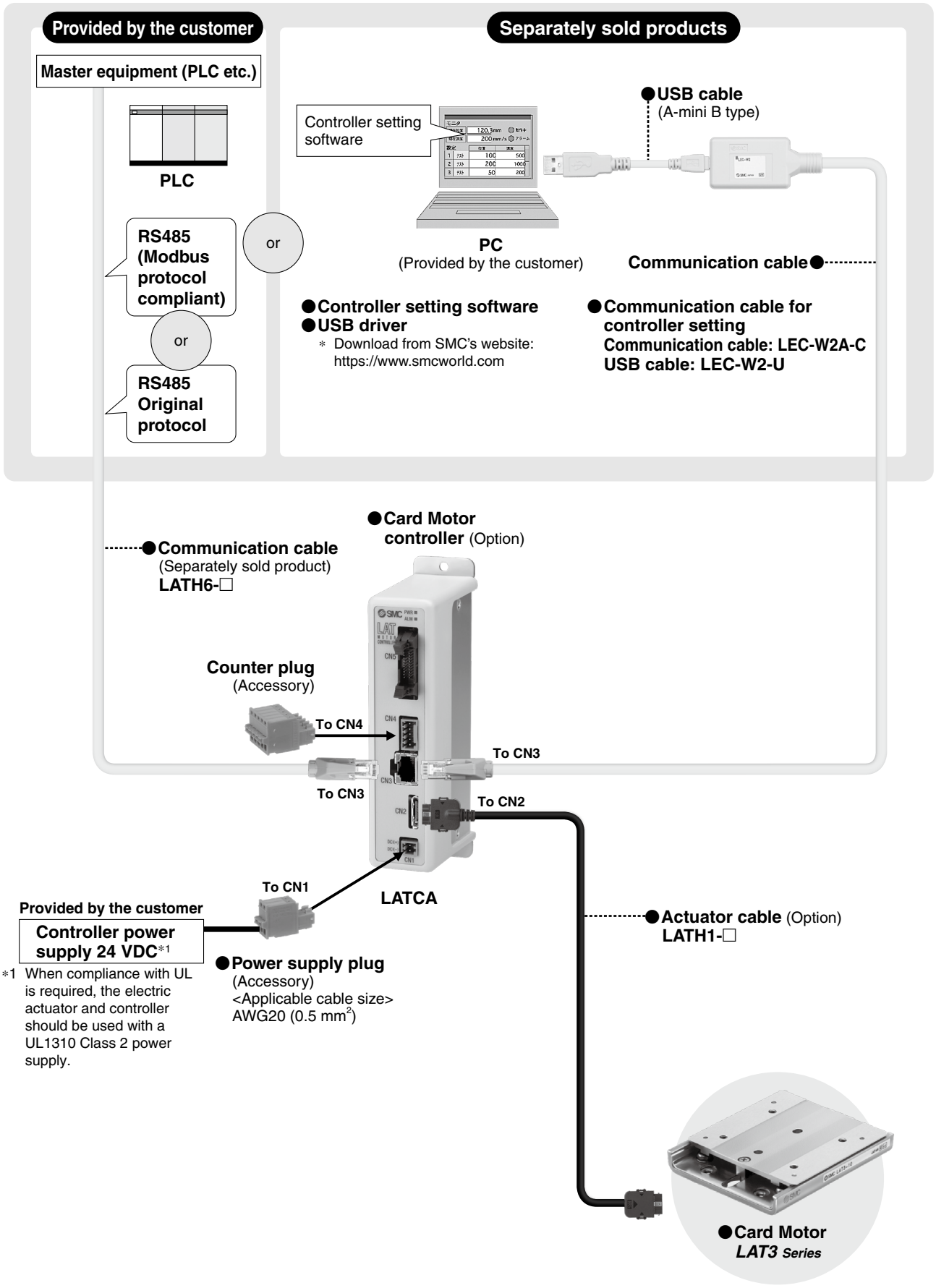
* Option: Can be ordered in the "How to Order" for the Card Motor
* Accessory: Attached to the controller
* Separately sold products: Order them separately. Refer to pages 1335 to 1338 for details.

System Construction/Pulse Signal



* Option: Can be ordered in the "How to Order" for the Card Motor
* Accessory: Attached to the controller
* Separately sold products: Order them separately. Refer to pages 1335 to 1338 for details.

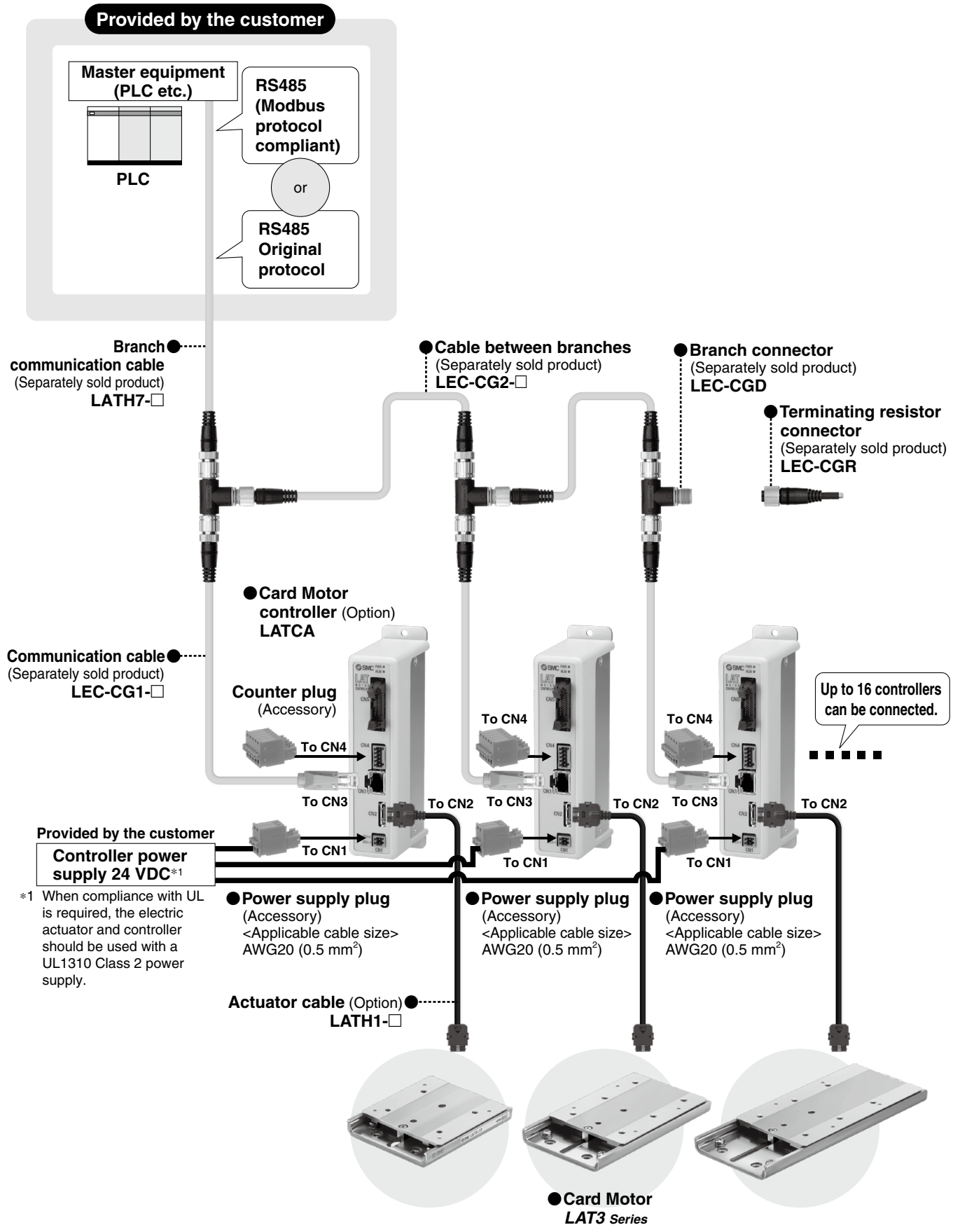
System Construction/Serial Communication (One Controller)



*1 When compliance with UL is required, the electric actuator and controller should be used with a UL1310 Class 2 power supply.

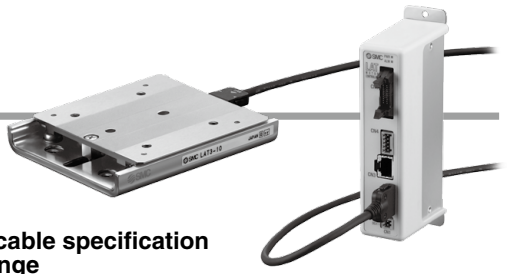
∗ Option: Can be ordered in the "How to Order" for the Card Motor
∗ Accessory: Attached to the controller
∗ Separately sold products: Order them separately. Refer to pages 1335 to 1338 for details.

System Construction/Serial Communication (2 to 16 Controllers)



* Option: Can be ordered in the "How to Order" for the Card Motor
* Accessory: Attached to the controller
* Separately sold products: Order them separately. Refer to pages 1335 to 1338 for details.

Card Motor
LAT3 Series



How to Order

LAT3 F – 10 – 1 AN 1 D – □

Card Motor

Sensor resolution

Nil	30 μm
M	5 μm
F	1.25 μm

Stroke

Model	Stroke			
	10 mm	20 mm	30 mm	50 mm
LAT3	○	○	○	—
LAT3M	—	—	—	○
LAT3F	○	○	○	○

○: Compatible —: Not compatible

Actuator cable length

Nil	Without cable
1	1 m
3	3 m
5	5 m

Controller∗1

Nil	Without controller
AN	With controller LATCA (NPN)
AP	With controller LATCA (PNP)

I/O cable length∗2

Nil	Without cable
1	1 m
3	3 m
5	5 m

Controller mounting

Nil	Screw mounting
D∗3	DIN rail

I/O cable specification change

Nil	No specification change
X152	Without shield∗4

∗1 Refer to page 1321 (LATCA) for detailed specifications of the controller.
∗2 If "Without controller" has been selected, the I/O cable is also not included.
Therefore it is not possible to select the I/O cable for this option. If the I/O cable is required, please order it separately. (Refer to page 1336, "[I/O cable]" for details.)
∗3 The DIN rail is not included. If the DIN rail is required, please order it separately. (Refer to page 1322, "DIN rail" and "DIN rail mounting adapter" for details.)
∗4 The included I/O cable is changed from LATH5 to LATH2 (normally LATH5).

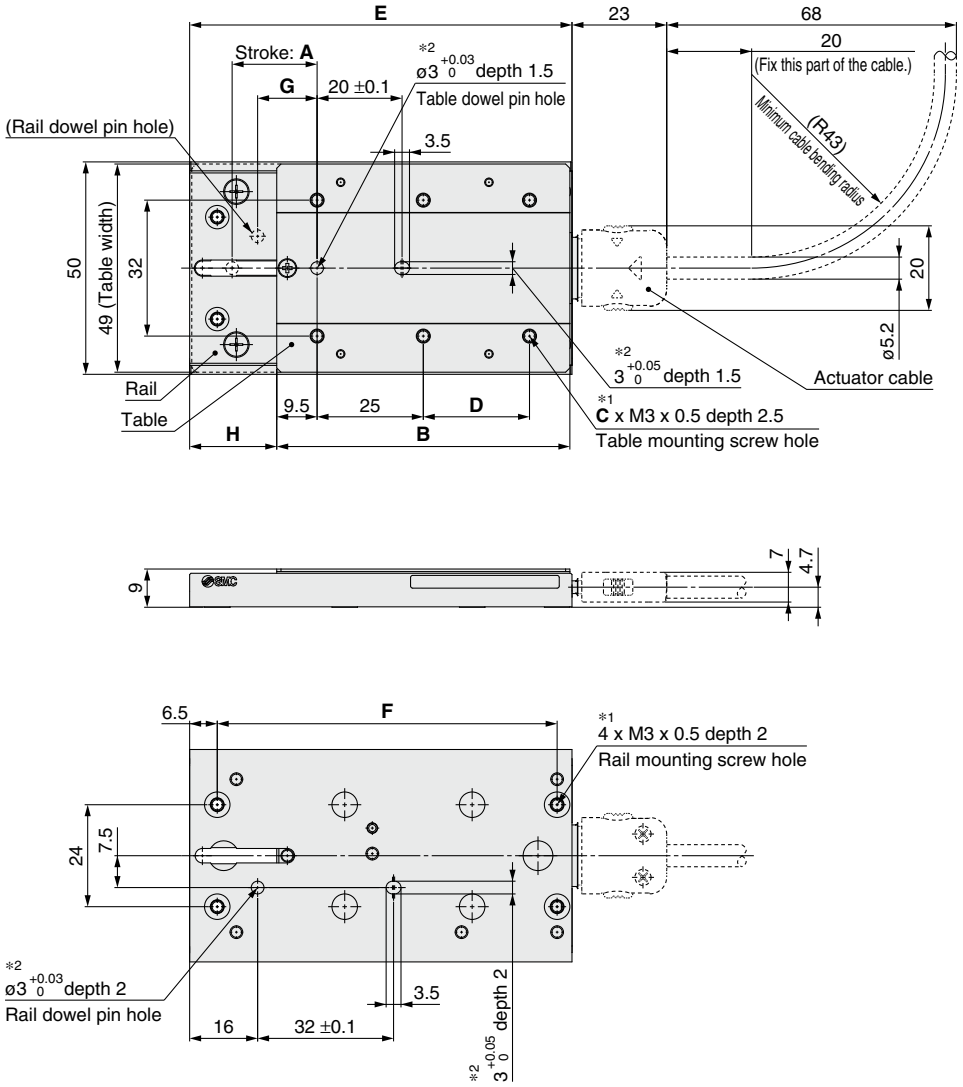
Specifications

Model		LAT3-10	LAT3F-10	LAT3-20	LAT3F-20	LAT3-30	LAT3F-30	LAT3M-50	LAT3F-50
Stroke [mm]		10		20		30		50	
Motor	**Type**	Moving magnet type linear motor							
	Maximum instantaneous thrust [N]∗1 ∗2 ∗3	5.2		6		5.5		2.5	
	Continuous thrust [N]∗1 ∗2 ∗3	3		2.8		2.6		1.5	
Guide	**Type**	Linear guide with circulating balls							
	Maximum load mass [g]	Horizontal: 1000, Vertical: 100				Horizontal: 1000, Vertical: 50		Horizontal: 1000, Vertical: Not possible	
Sensor	**Type**	Optical linear encoder (incremental)							
	Resolution [μm]	30	1.25	30	1.25	30	1.25	5	1.25
	Origin position signal	None	Provided	None	Provided	None	Provided	Provided	
Pushing operation	**Pushing speed [mm/s]**	6							
	Thrust setting value∗1 ∗2 ∗3	1 to 5		1 to 4.8		1 to 3.9		1 to 2	
Positioning operation	**Positioning resolution [μm]**	30	1.25	30	1.25	30	1.25	5	1.25
	Positioning repeatability [μm]∗4 ∗5	±90	±5	±90	±5	±90	±5	±20	±5
Measurement	**Accuracy [μm]**∗4 ∗5	±100	±10	±100	±10	±100	±10	±40	±10
Maximum speed [mm/s]∗6		400							
Operating temperature range [°C]		5 to 40 (No condensation)							
Operating humidity range [%]		35 to 85 (No condensation)							
Weight [g]∗7		130		190		250		360	
Table weight [g]		50		70		90		110	

∗1 Continuous thrust can be generated and maintained continuously. Maximum instantaneous thrust is the maximum peak thrust that can be generated. Refer to **Fig. 4** Allowable thrust setting value (Page 1312) and to **Fig. 5** Pushing force characteristics (Page 1312).
∗2 When mounted on a base with good heat dissipating capacity at 20°C ambient temperature
∗3 The pushing force varies depending on the operating environment, pushing direction and table position. Refer to **Fig. 5** Pushing force characteristics (Page 1312).
∗4 When the temperature of the Card Motor is 20°C
∗5 The accuracy after mounting the Card Motor may vary depending on the mounting conditions, operating conditions and environment, so please calibrate it with the equipment used in your application.
∗6 The maximum speed varies depending on the operating conditions (load mass, positioning distance).
∗7 The weight of the Card Motor itself. Controllers and cables are not included.

Dimensions

LAT3□-□



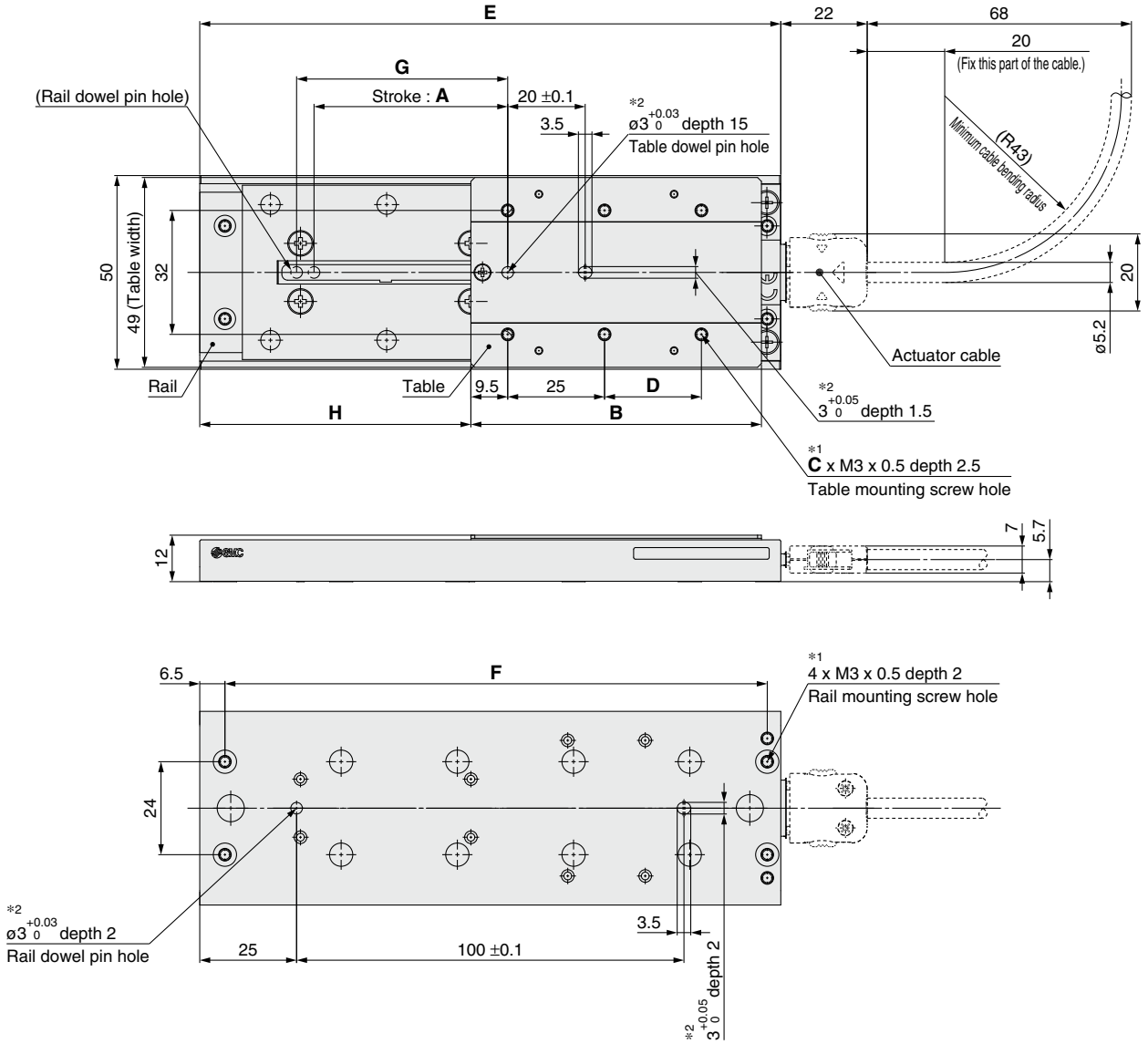
∗1 Refer to page 1340 regarding Specific Product Precautions for the mounting screws.
∗2 The length of the part of the dowel pin inserted into the positioning hole should be shorter than the specified depth.
∗3 The origin positions G and H are reference dimensions (guide). Refer to page 1333 for details on the origin position.
∗ This drawing shows the origin position.

[mm]

Model	Stroke	Table dimensions			Rail dimensions		Origin position∗3	
	A	B	C	D	E	F	G	H
LAT3□-10	10	49	4	—	60	50	4	10.5
LAT3□-20	20	69	6	25	90	80	14	20.5
LAT3□-30	30	89	6	25	120	110	24	30.5

Dimensions

LAT3□-50



∗1 Refer to page 1340 regarding Specific Product Precautions for the mounting screws.
∗2 The length of the part of the dowel pin inserted into the positioning hole should be shorter than the specified depth.
∗3 The origin positions G and H are reference dimensions (guide). Refer to page 1333 for details on the origin position.
∗ This drawing shows the origin position.

[mm]

Model	Stroke	Table dimensions			Rail dimensions		Origin position*3	
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**
LAT3□-50	50	75	6	25	150	140	54.5	70

Card Motor Controller
(Step Data Input Type/Pulse Input Type)

LATCA Series

How to Order

LATCA – **N** □ □ – □

Controller for the Card Motor

Parallel I/O

N	NPN
P	PNP

Option

Nil	Screw mounting
D∗2	DIN rail mounting

I/O cable (with shield) length∗1

Nil	Without cable
1	1 m
3	3 m
5	5 m

I/O cable specification change

Nil	No specification change
X152	Without shield∗3

∗1 I/O cable LATH5-□ is supplied.
The actuator cable, the counter cable and the controller setting cable are not supplied with the controller.
Refer to pages 1335 to 1338 for options.
∗2 The DIN rail is not included. If the DIN rail is required, please order it separately. (Refer to page 1322.)
∗3 The included I/O cable is changed from LATH5 to LATH2 (normally LATH5).

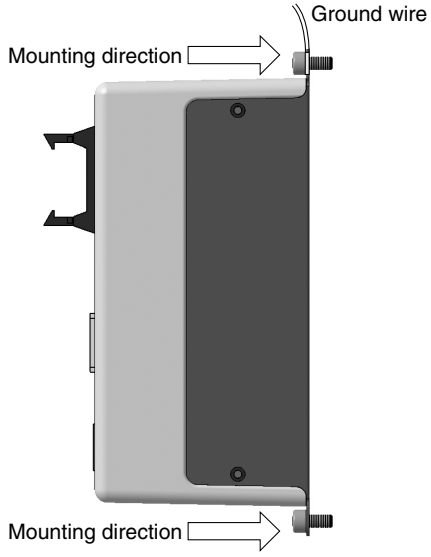
Specifications

Model	LATCA	
Setting method∗1	Step data input type	Pulse input type
Compatible actuator	Card Motor LAT3 series	
Number of axis	1 axis	
Power supply∗2	Power supply voltage: 24 VDC ±10%, Current consumption∗3 : Rated 2 A (Peak 3 A) , Power consumption∗3 : Rated 48 W (Maximum 72 W)	
Control system	Closed loop	
Movement mode	Positioning operation, Pushing operation	
Number of step data	15 points	4 points
Parallel input	6 inputs (Optically isolated)	
Parallel output	4 outputs (Optically isolated, open collector output)	
Pulse input mode	—	Pulse and direction control mode CW and CCW control mode Quadrature control mode
Pulse signal input maximum frequency	—	100 kHz (Open collector) 200 kHz (Differential)
Position display output∗4	A-phase and B-phase pulse signals, RESET signal (NPN open collector output)	
Serial communication	RS485 (Modbus protocol compliant), RS485 (Original protocol)	
Communication speed	2400 bps, 9600 bps, 19200 bps, 38400 bps, 57600 bps	
LED indicator	2 LED's (Green and Red)	
Cooling method	Natural air-cooling	
Operating temperature range	0 to 40°C (No condensation)	
Operating humidity range	90% or less (No condensation)	
Insulation resistance	Between case and FG: 50 MΩ (500 VDC)	
Weight∗5	Screw mounting: 130 g, DIN rail mounting: 150 g	
Controller setting software∗6	LATC-Configurator	
Setting cable	LEC-W2A-C, LEC-W2-U	

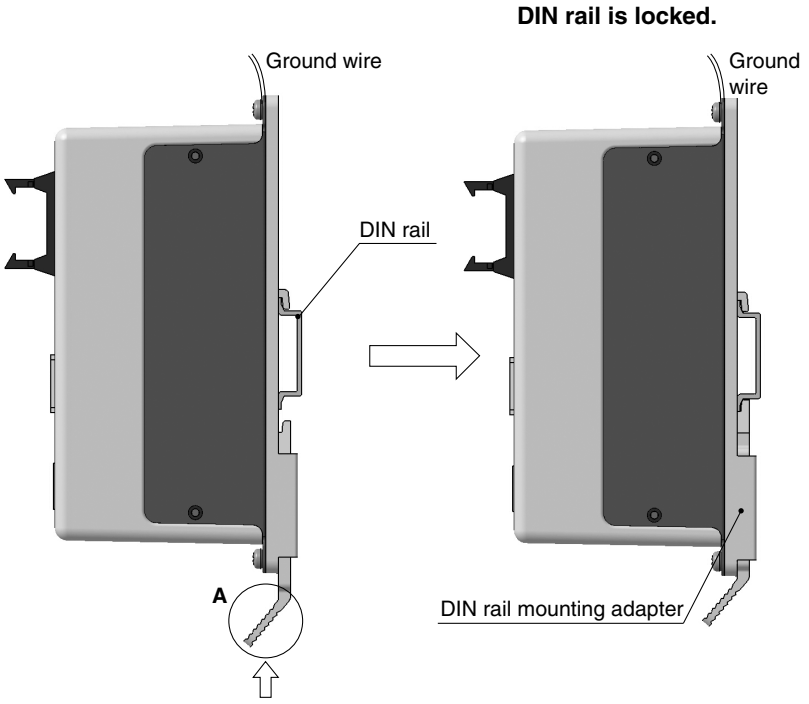
∗1 Either the step data input type or pulse input type can be selected after purchase.
∗2 For the controller, use a power supply which satisfies the max. current consumption and power consumption. However, be sure not to use an "inrush-current limited" type.
∗3 Rated current: Current consumption when continuous thrust is generated. Peak current: Current consumption when maximum instantaneous thrust is generated.
∗4 Specification for the connection of the separately sold multi-counter (CEU5).
∗5 Cables are not included.
∗6 The controller setting software can be downloaded via the SMC website: https://www.smcworld.com

How to Mount

a) Screw mounting (LATCA-□□)
(Installation with two M4 screws)



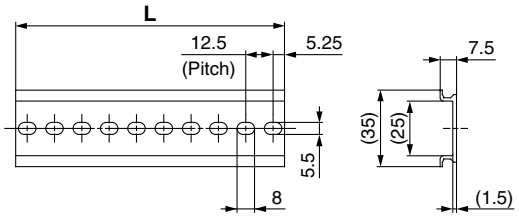
b) DIN rail mounting (LATCA-□□D)
(Installation with the DIN rail)



Hook the controller on the DIN rail and press the lever of section **A** in the arrow direction to lock it.

DIN rail
AXT100-DR-□

∗ For □, enter a number from the “No.” line in the table below.
Refer to the dimension drawings on page 1323 for the mounting dimensions.



L Dimensions

No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
L	23	35.5	48	60.5	73	85.5	98	110.5	123	135.5	148	160.5	173	185.5	198	210.5	223	235.5	248	260.5

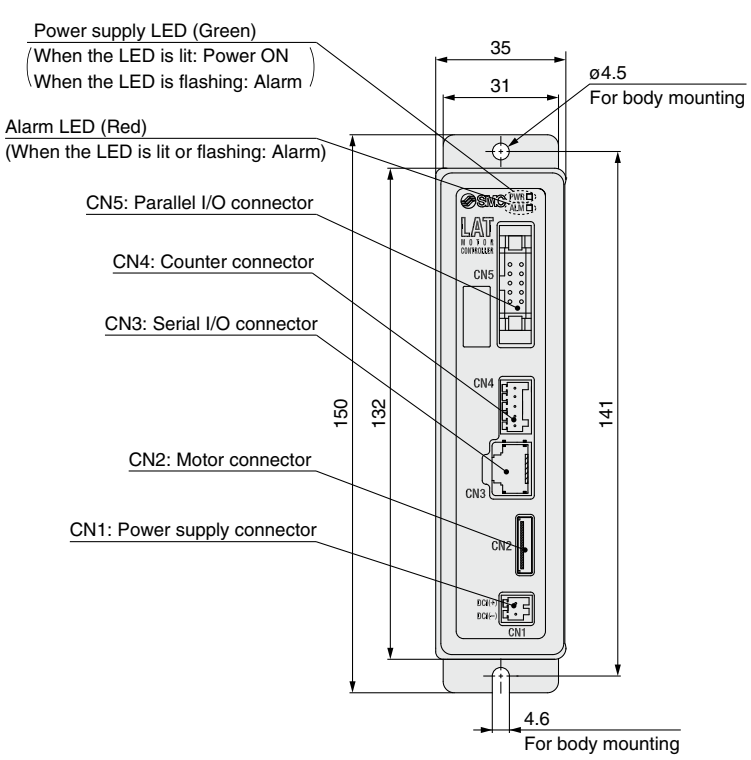
No.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
L	273	285.5	298	310.5	323	335.5	348	360.5	373	385.5	398	410.5	423	435.5	448	460.5	473	485.5	498	510.5

DIN rail mounting adapter
LEC-D0 (with 2 mounting screws)

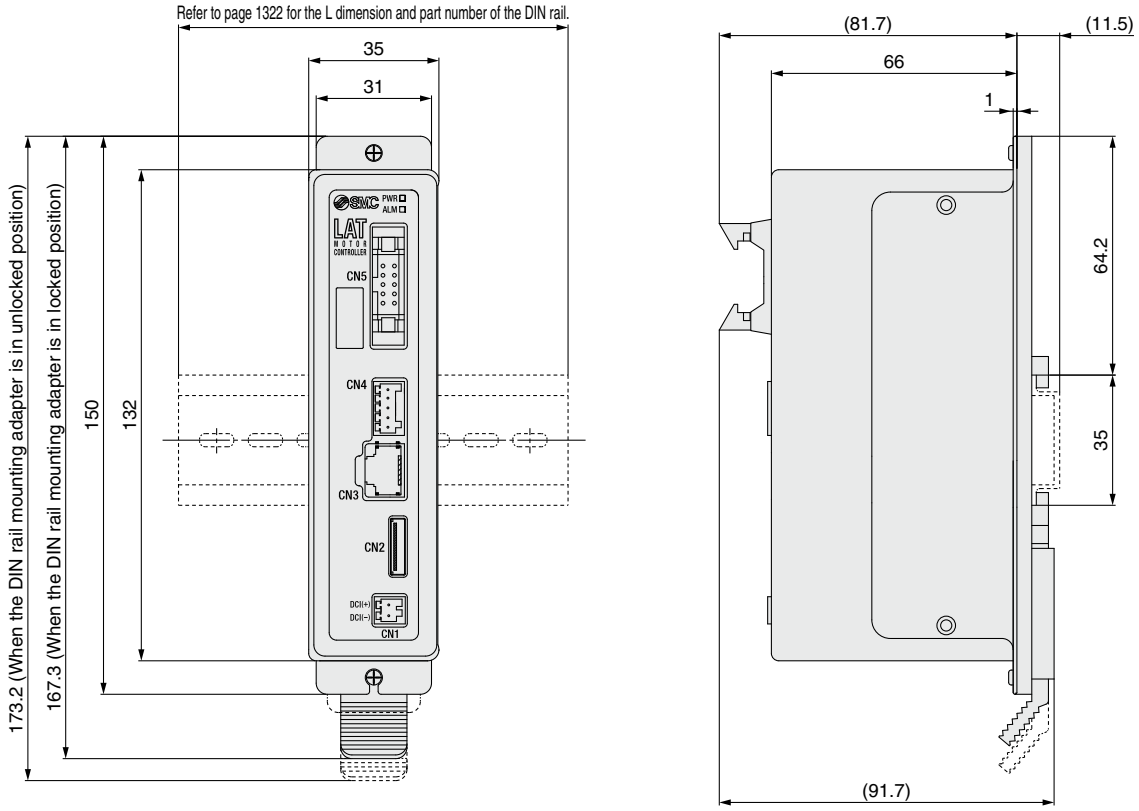
The DIN rail mounting adapter can be retrofitted onto a screw mounting type controller.

Dimensions

a) Screw mounting (LATCA-□□)



b) DIN rail mounting (LATCA-□□D)



* When two or more controllers are used, the space between the controllers should be 10 mm or more.

Wiring Example

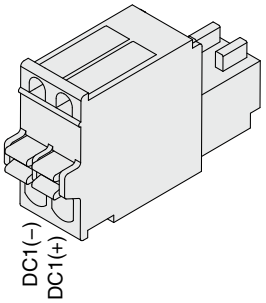
Power Supply Connector: CN1

* The power supply plug is an accessory (supplied with the controller). Use an AWG20 (0.5 mm²) cable for connecting the power supply plug to a 24 VDC power supply.

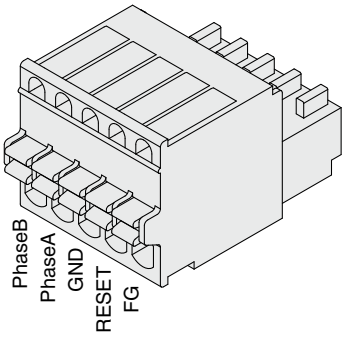
Power Supply Connector Terminal

Terminal name	Function	Details
DC1(–)	Power supply(–)	The negative (–) power supply terminal to the controller. Power (–) is also supplied to the Card Motor via the internal circuit of the controller and actuator cable.
DC1(+)	Power supply(+)	The positive (+) power supply terminal to the controller. Power (+) is also supplied to the Card Motor via the internal circuit of the controller and actuator cable.

Power supply plug



Counter plug



Counter Connector: CN4

* The counter plug is an accessory (supplied with the controller).
* Use the counter cable (LATH3-□) for connecting the counter to the counter plug.

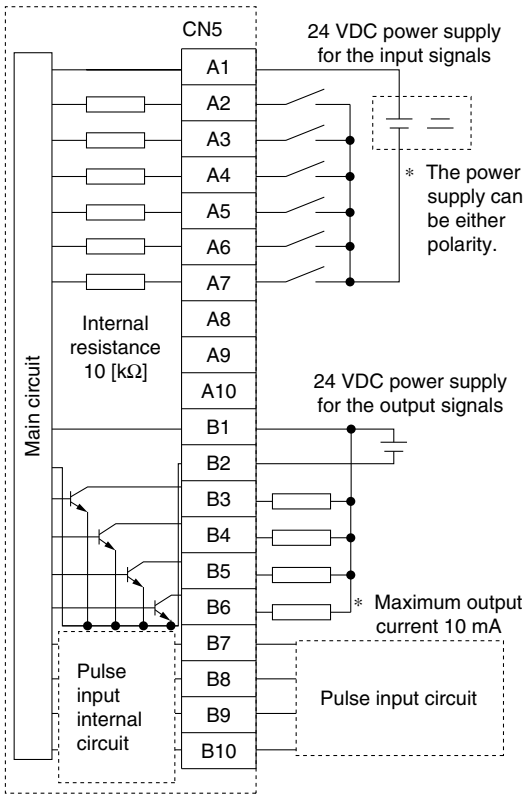
Counter Connector Terminal

Name	Details	Cable color
PhaseB	Connect to the phase B wire of the counter cable.	White
PhaseA	Connect to the phase A wire of the counter cable.	Red
GND	Connect to the GND wire of the counter cable.	Light gray
RESET	Connect to the Reset wire of the counter cable.	Yellow
FG	Connect to the FG wire of the counter cable.	Green

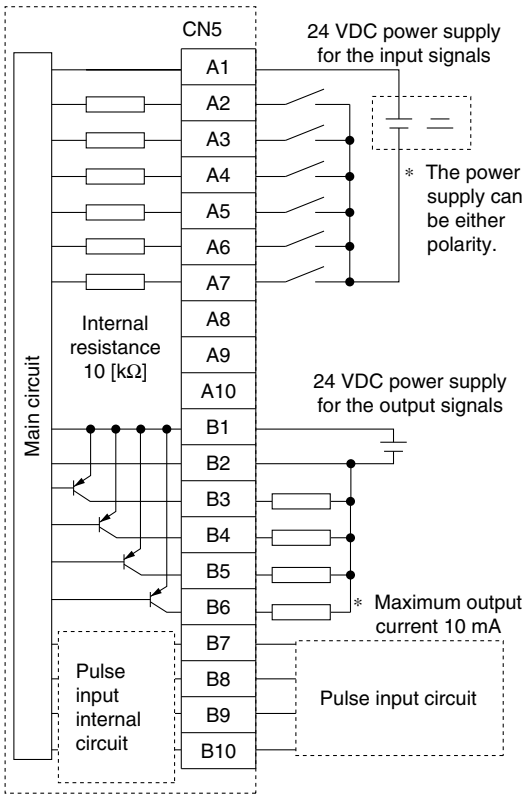
Parallel I/O Connector: CN5

* Use the I/O cable (LATH5-□) to connect a PLC, etc., to the CN5 parallel I/O connector.
* The wiring is specific to the type of parallel I/O (NPN or PNP). Refer to the wiring diagrams below for correct wiring of NPN and PNP type controllers.

■NPN



■PNP



* When using the controller by the step data input type, do not wire as there is an internal circuit to use terminals B7 to B10 as the pulse signal input terminals.

Wiring Example

Step Data Input Type

Input/Output Signal

Terminal no.	Input/Output	Function	Details
A1	Input	COM	Connect a 24 VDC power supply for the input signals. (Polarity is reversible)
A2		IN0	Selection of step data number specified by a Bit No. (combinations of IN0 to IN3)
A3		IN1	
A4		IN2	
A5		IN3	
A6		DRIVE	Command to drive the motor
A7		SVON	Command to turn the servo motor ON
A8		NC	Not connected
A9		NC	Not connected
A10		NC	Not connected
B1	Output	DC2(+)	Connect the 24 V power supply terminal for the output signals.
B2		DC2(–)	Connect the 0 V power supply terminal for the output signals.
B3		BUSY	ON when the actuator is moving*1
B4		ALARM	OFF when alarm is generated*2
B5		OUT0	Select an output function among BUSY, INP, INFP, INF, AREA A, AREA B, OVC, and OVT.*3
B6		OUT1	
B7	Input	NC	Not connected
B8		NC	Not connected
B9		NC	Not connected
B10		NC	Not connected

∗1 Other output functions can also be assigned to the BUSY output.
∗2 This output signal turns ON when power is supplied to the controller, but turns OFF in alarm condition (N.C.).
∗3 INP is set as a default for OUT0, and INF for OUT1.

OUT0 and OUT1 Optional Output Functions*4

Name	Details
BUSY	ON when the actuator is moving*1
INP	ON when the table is within the “INP” output range of the current “Target Position.”
INFP	ON when the table is within the positioning repeatability range of the actuator for the current “Target Position.”
INF	ON when the pushing force is within the “Threshold Force Value.”
AREA A, AREA B	ON when the table is within the set “Area Ranges.”
OVC	ON when the set current has been exceeded
OVT	ON when the set temperature has been exceeded

∗4 One output function can be selected for each OUT0 and OUT1.

Pulse Input Type

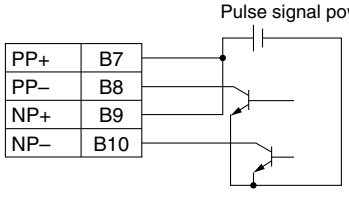
Input/Output Signal

Terminal no.	Input/Output	Function	Details
A1	Input	COM	Connect a 24 VDC power supply for the input signals. (Polarity is reversible)
A2		IN0	Selection of step data number specified by a Bit No. (combinations of IN0 and IN1)
A3		IN1	
A4		SETUP	Instruction to return to origin
A5		CLR	Deviation reset
A6		TL	Instruction to pushing operation
A7		SVON	Command to turn the servo motor ON
A8		NC	Not connected
A9		NC	Not connected
A10		NC	Not connected
B1	Output	DC2(+)	Connect the 24 V power supply terminal for the output signals.
B2		DC2(–)	Connect the 0 V power supply terminal for the output signals.
B3		BUSY	ON when the actuator is moving*1
B4		ALARM	OFF when alarm is generated*2
B5		OUT0	Select an output function among BUSY, INP, INFP, INF, AREA A, AREA B, OVC, and OVT.*3
B6		OUT1	
B7	Input	PP+	Connect the pulse input signal*4
B8		PP–	
B9		NP+	
B10		NP–	

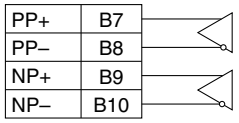
∗1 Other output functions can also be assigned to the BUSY output.
∗2 This output signal turns ON when power is supplied to the controller, but turns OFF in alarm condition (N.C.).
∗3 INP is set as a default for OUT0, and INF for OUT1.
∗4 The function assignment changes according to the pulse input mode.

Pulse Input Circuit Example

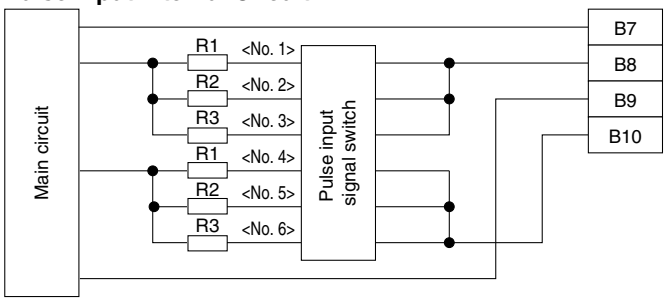
Pulse signal output of positioning unit is open collector output



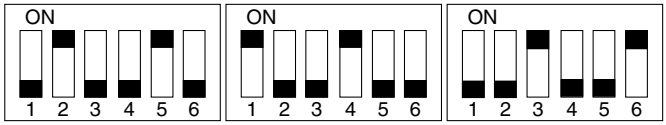
Pulse signal output of positioning unit is differential output



Pulse Input Internal Circuit



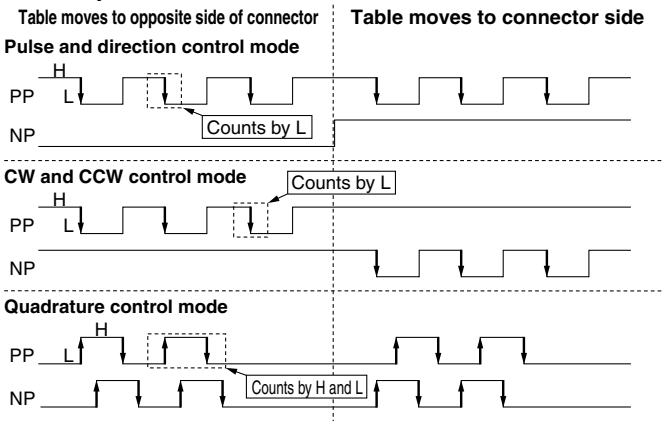
	Signal input method	Pulse input signal power supply voltage	Pulse input signal switch setting	Current limiting resistor R specifications
(a)	Open collector input	24 VDC ±10%	No. 2 & No. 5: ON, Others: OFF	R2 = 1.5 kΩ
(b)		5 VDC ±5%	No. 1 & No. 4: ON, Others: OFF	R1 = 220 Ω
(c)	Differential input	—	No. 3 & No. 6: ON, Others: OFF	R3 = 120 Ω



(a) Open collector input (24 V) **(b) Open collector input (5 V)** **(c) Differential input**

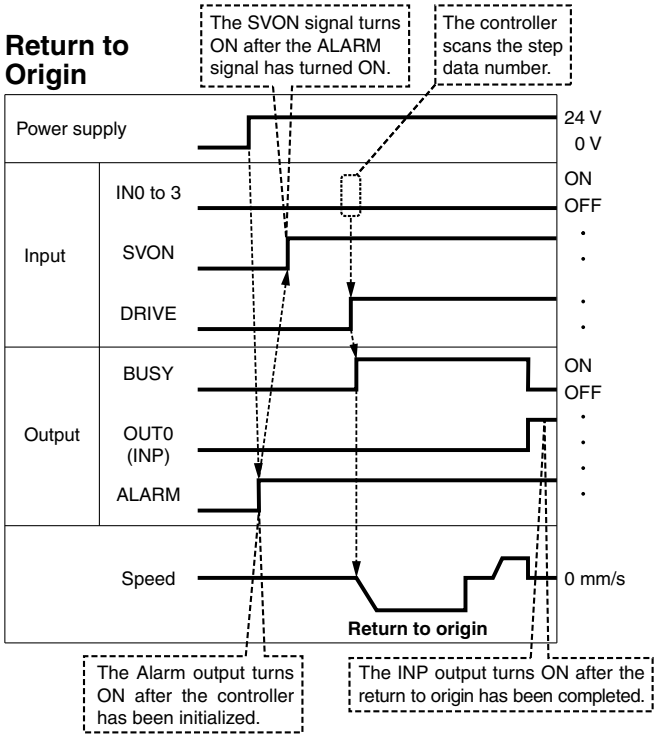
Change the switch in the controller according to the pulse input signal power supply voltage. For differential input, connect the positioning unit using the line driver which is equivalent to DS26C31.

Pulse Input Mode



Signal Timing (When step data input type is selected)

Return to Origin

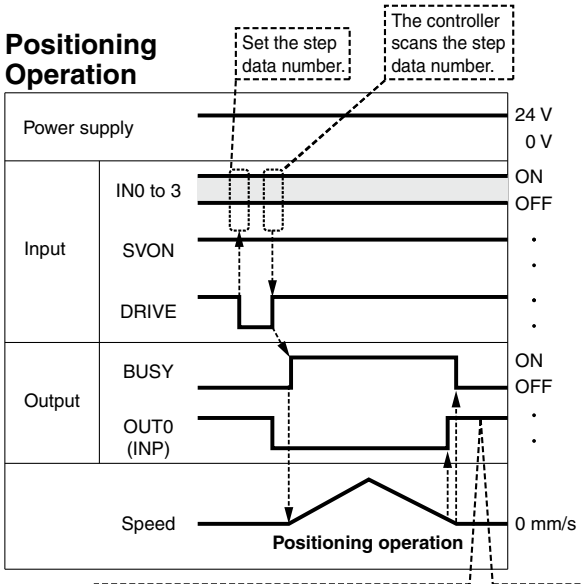


∗ "ALARM" is expressed as a negative-logic circuit.

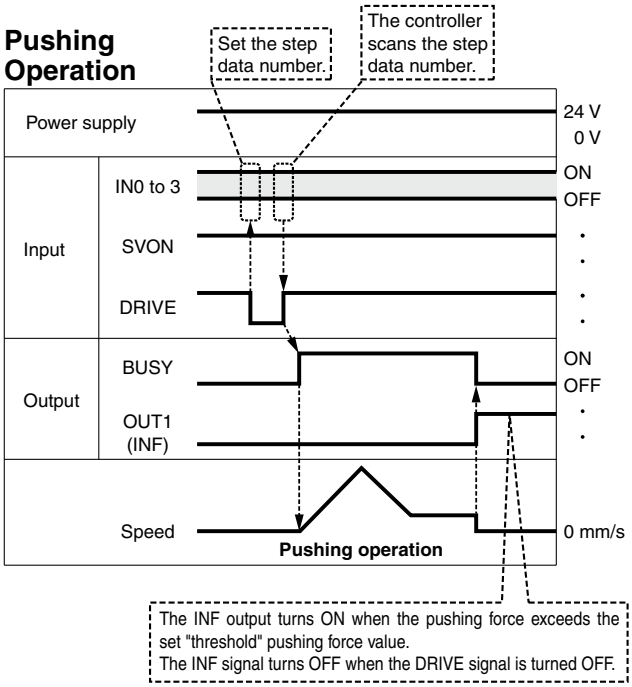
⚠ Caution

- Use a 2 ms interval or more between input signals, and maintain the signal state for at least 2 ms.
- Turn ON the SVON signal first after that the ALARM signal has turned ON after power has been supplied to the controller. If the SVON signal is already ON, the operation will not start for safety reasons.
- Keep the DRIVE signal turned ON until the next operation instruction is given except when stopped during operation.
- When the DRIVE signal is turned OFF during positioning operation, the table of the Card Motor stops, and holds the position.
- When the DRIVE signal is turned OFF during pushing operation, the pushing operation is completed and this position is retained.
- When using a multi-counter, after [Return to Origin] has been performed, turn the DRIVE signal OFF for 300 ms or more to allow for the counter to be reset.
  If the table is moved before the counter has been reset, a deviation in the multi-counter's displayed value may occur.

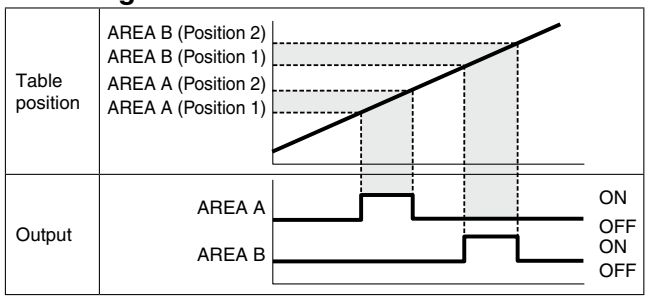
Positioning Operation



Pushing Operation

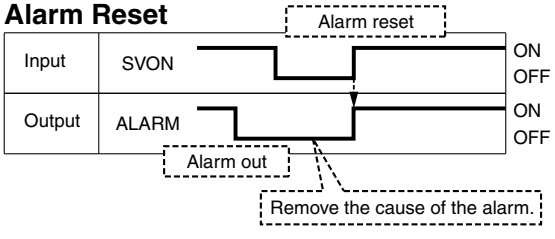


AREA Signal



∗ Select the AREA signal for the parallel output signal (OUT0 or OUT1).

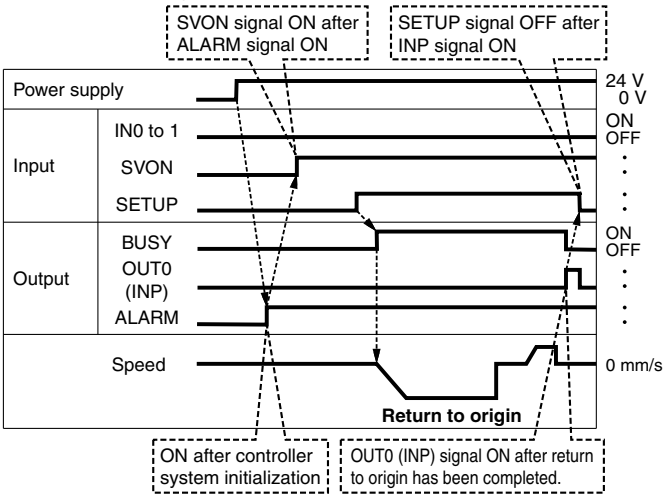
Alarm Reset



∗ "ALARM" is expressed as a negative-logic circuit.

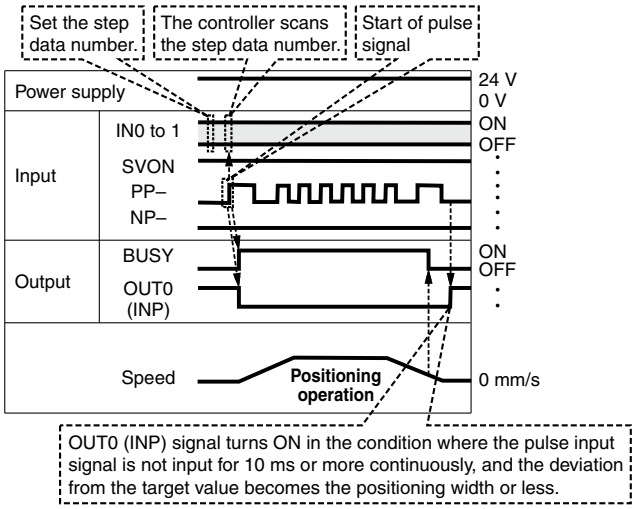
Signal Timing (When pulse input type is selected)

Return to Origin



∗ "ALARM" is expressed as a negative-logic circuit.

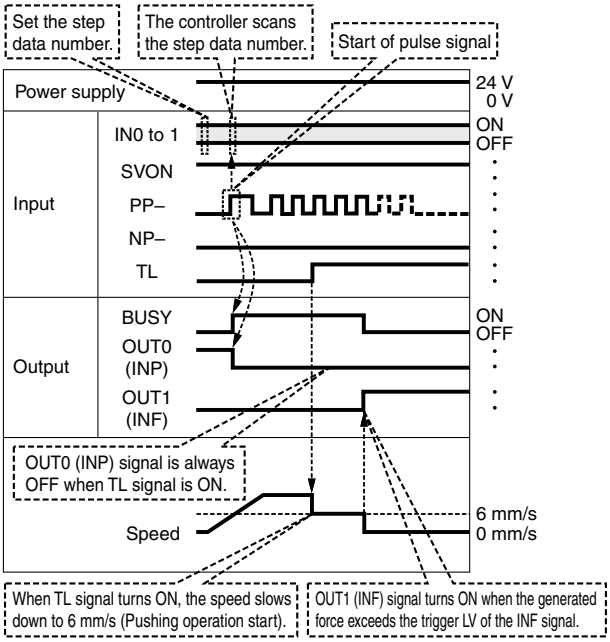
Positioning Operation



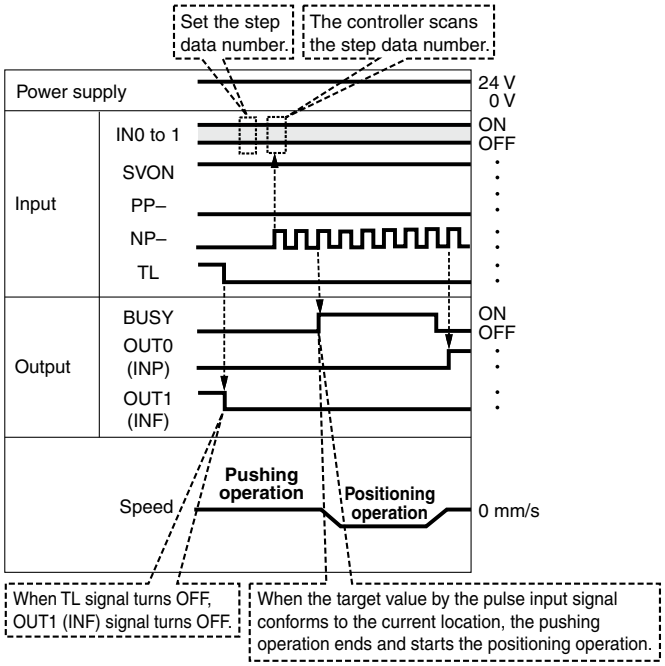
⚠ Caution

- Turn ON the SVON signal first after that the ALARM signal has turned ON after power has been supplied to the controller. If the SVON signal is already ON, the operation will not start for safety reasons.
- During the return to origin, do not input a pulse input signal until the SETUP signal has turned OFF. Pulse input signals input while the SETUP signal is turned ON will be invalidated. In addition, when using a multi-counter, turn the SETUP signal OFF and then wait for 300 ms or more before inputting a pulse signal. If the table is moved before the counter has been reset, a deviation in the multi-counter's displayed value may occur.
- Do not input the pulse signals PP and NP at the same time in the CW and CCW control mode.
- When changing the moving direction of the actuator, be sure to leave an interval of 10 [ms] or more, and input a pulse signal of reverse direction.
- After the IN0 and IN1 signals are changed, leave an interval of 10 ms or more, then input a pulse signal.

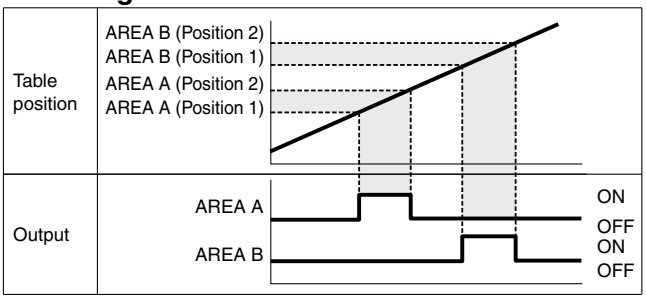
Pushing Operation



Operation after Pushing Operation

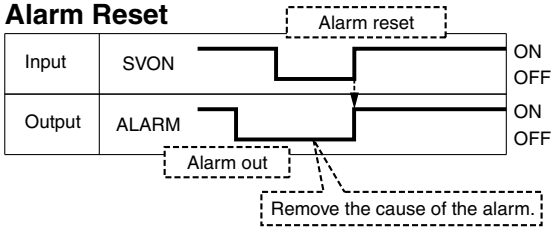


AREA Signal



∗ Select the AREA signal for the parallel output signal (OUT0 or OUT1).

Alarm Reset



∗ "ALARM" is expressed as a negative-logic circuit.

Serial Communication

Communication Specifications

Item		Details
Protocol∗1		Original, Modbus
Communication data		ASCII, RTU∗2 ∗3
Node type		Slave (Controller)
Error checking		None
Frame size		Variable length: Max. 128 bytes
Communication method		RS485, asynchronous system
	Communication speed	2400 bps, 9600 bps, 19200 bps, 38400 bps, 57600 bps∗4
	Data bit	8 bit
	Parity	Even parity
	Stop bit	1 bit
	Flow control	None

∗1 The protocol is recognized automatically.
∗2 RTU is only compatible with Modbus.
∗3 Modbus protocol automatically recognizes both ASCII and RTU.
∗4 The product is set to 19200 bps at the time of shipment from the factory. After purchase, it is possible to change to one of the other communication speeds.

Function

①**Setting of step data**
The contents of the step data such as the target position and positioning time can be set.

②**Acquisition of operation information**
Information such as the status of a parallel I/O signal and table position can be acquired.

③**Step data operation**
Without inputting a parallel I/O signal, the step data number can be selected from the communication device of the PLC, etc. via serial communication to specify the operation.

④**Direct operation**
Operation can be executed by setting the target position, positioning time, etc. each time.

⚠ Caution

Use the controller setting software to set the basic settings (refer to the following) of the controller.
1. Select input type.
2. Card Motor product number
3. Return to origin method
4. Step data input method
5. Card Motor mounting orientation
6. Set the controller ID. (Set to "1" at the time of shipment)
7. Select output signal.

Step Data Setting Methods and Movement Profiles

There are two methods for setting the step data in the Card Motor controller as described below.

Cycle time entry method
To operate the table based on the target position and positioning time, or to operate it at high frequency. The speed, acceleration and deceleration are calculated automatically after the target position and positioning time have been set.

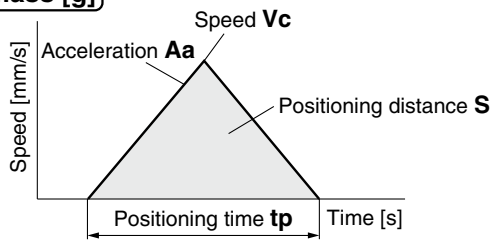
Speed entry method
To operate the table at a constant speed. The table moves to the set target position based on the set speed, acceleration and deceleration.

Cycle Time Entry Method (Positioning Operation)

Setting items: Target position [mm] Positioning time [s] Load mass [g]

Calculate the positioning distance S [mm] between the start position and the target position. The table will move to the target position based on the set positioning time tp [s] according to a triangular movement profile as shown in the diagram on the right.

∗ It is not necessary to enter the speed, acceleration and deceleration since they are calculated automatically by the Card Motor Controller Setting Software.

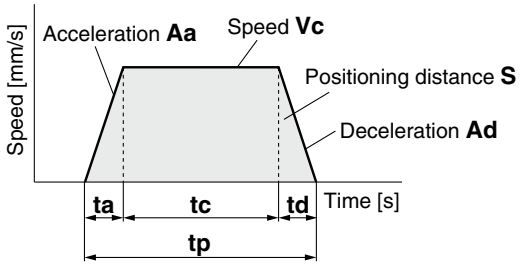


The positioning time should be set longer than the shortest positioning time shown in **Fig. 3** on page 1311 with consideration to the load mass during the operation. If there is overshoot or vibration, set the positioning time longer.

Speed Entry Method (Positioning Operation)

Setting items: Target position [mm] Speed [mm/s] Acceleration [mm/s²] Deceleration [mm/s²] Load mass [g]

Calculate the positioning distance S [mm] between the start position and the target position. The table will move to the target position based on the set speed Vc [mm/s], acceleration Aa [mm/s²] and deceleration Ad [mm/s²] according to a trapezoidal movement profile as shown in the diagram on the right.



Refer to the equations below for how to calculate the acceleration, constant velocity and deceleration times and distances.

Acceleration time: ta = Vc / Aa [s]

Deceleration time: td = Vc / Ad [s]

Acceleration distance: Sa = 0.5 x Aa x ta² [mm]

Deceleration distance: Sd = 0.5 x Ad x td² [mm]

Distance with constant velocity: Sc = S – Sa – Sd [mm]

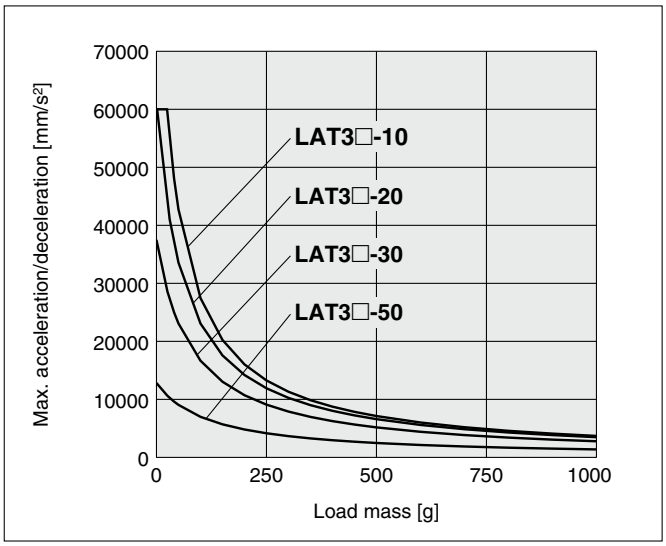
Time with constant velocity: tc = Sc / Vc [s]

Positioning time: tp = ta + tc + td [s]

(Add settling time∗1 to the positioning time to obtain the real cycle time.)

∗1 The settling time varies depending on the positioning distance and load mass. 0.15 seconds (0.25 seconds for the load mass of 500 g or more) at maximum can be used as a reference value.

The acceleration and deceleration should be smaller than the maximum acceleration/deceleration with consideration to the load mass during the operation as specified in the diagram on the right.



⚠ Caution
If the acceleration/deceleration is low, the table may not reach the set speed due to a triangular movement profile.

Cycle Time Entry

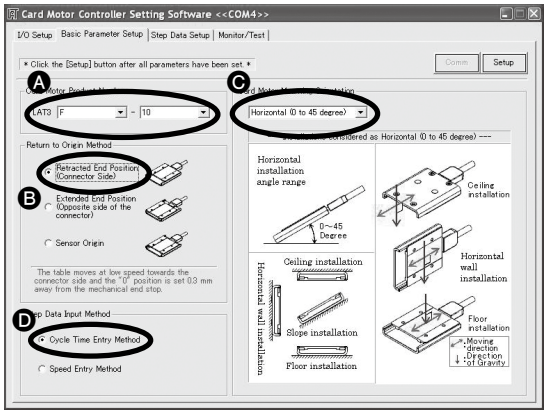
The controller automatically calculates the speed, acceleration and deceleration after the user has entered how many seconds it should take for the Card Motor table to move to the target position. Therefore, there is no need to enter the speed, acceleration and deceleration.

Cycle Time Entry Method

Step 1 Basic settings

Set each item described below and register it to the controller by clicking [Setup].

Ⓐ **[Card Motor Product Number]**: Enter the product number of the connected Card Motor.
Ⓑ **[Return to Origin Method]**: Select origin method and position.
Ⓒ **[Card Motor Mounting Orientation]**: Select horizontal or vertical.
Ⓓ **[Step Data Input Method]**: Select cycle time entry method

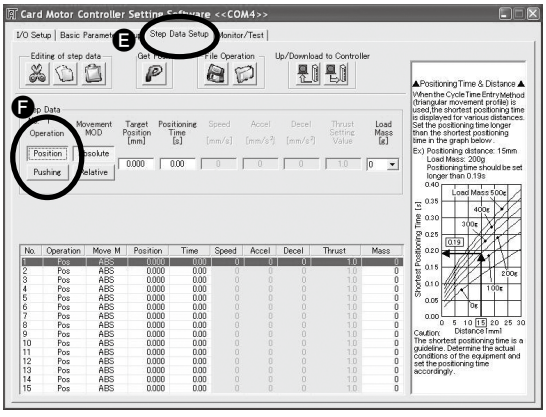


Step 2 Setting of the operating conditions -Selection of operation type-

Ⓔ **Select the [Step Data Setup] tab.**
Ⓕ **Select "Operation" type.**

Position For transporting a workpiece to a specific position

Pushing For applying force to a workpiece or for measuring the size of a workpiece



Step 3 Setting of the operating conditions -Entering of the operating values-

<Positioning operation>

Items to enter

Ⓖ **Target position [mm]** Distance from the origin position (or current position) to the target position

Ⓗ **Positioning time [s]** Time required to move to the target position

Ⓘ **Load mass [g]** Select the approximate weight of attachment or workpieces mounted on the Card Motor table.

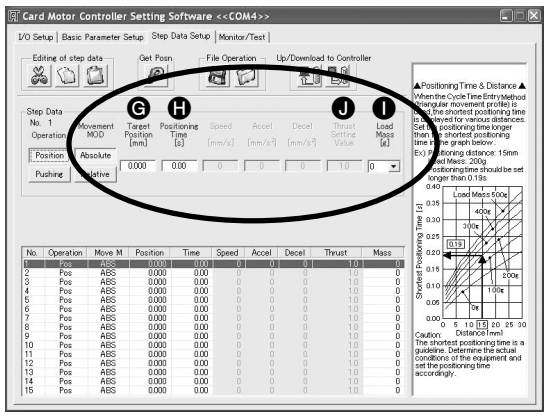
<Pushing operation>

Items to enter

Ⓖ **Target position [mm]**
Ⓗ **Positioning time [s]**
Ⓘ **Load mass [g]**

\+

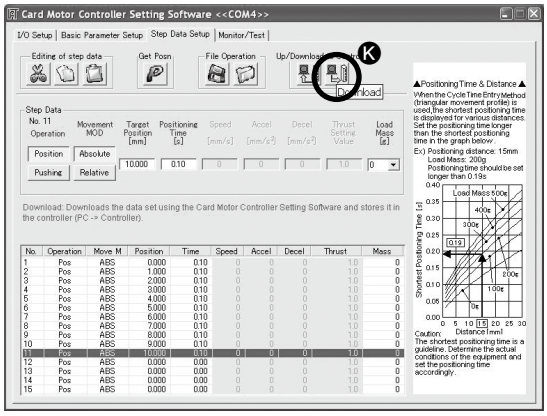
Ⓙ **Thrust setting value** Force to be applied



Step 4 Download the completed settings

After the operating conditions have been set,

Ⓚ **Click the [Download] button to complete the settings.**



∗ Refer to the Operation Manual for details.

Operation Modes

The Card Motor controller has two operation modes as described below.

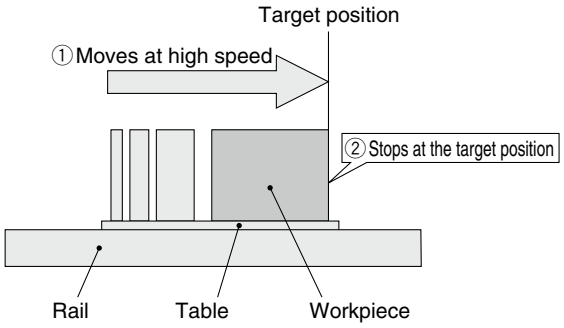
Position For transporting a workpiece to a specific position

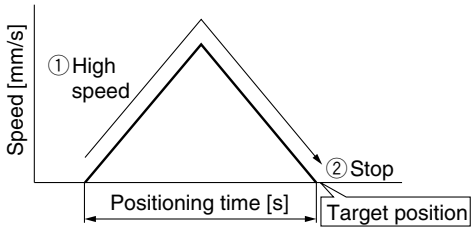
Pushing For applying force to a workpiece or for measuring the size of a workpiece

Positioning Operation

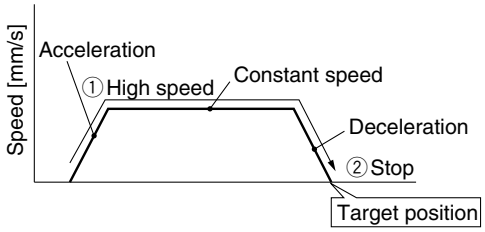
Cycle Time Entry Method: The acceleration and deceleration are automatically calculated based on the set positioning time, and the table moves according to a triangular movement profile ① and stops at the set target position ②.

Speed Entry Method: The table moves based on the set acceleration, speed and deceleration according to a trapezoidal movement profile ① and stops at the target position ②.





Movement profile for the Cycle Time Entry Method (Triangular)

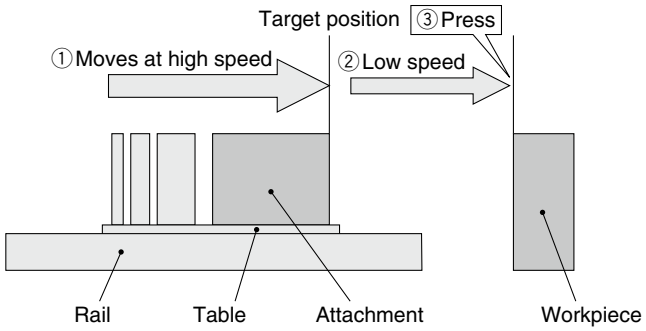


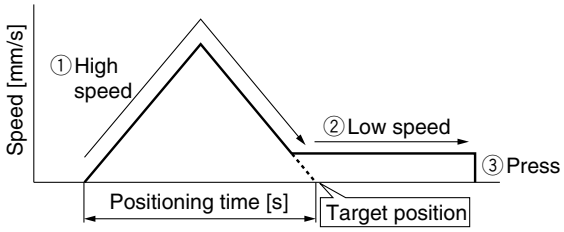
Movement profile for the Speed Entry Method (Trapezoidal)

Pushing Operation

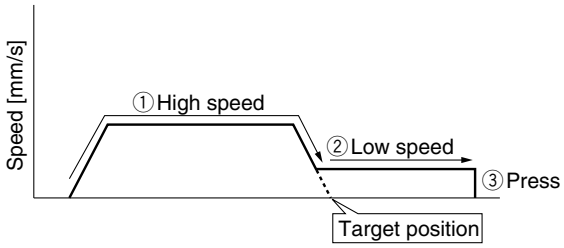
Cycle Time Entry Method: The acceleration and deceleration are automatically calculated based on the set positioning time, and the table moves according to a triangular movement profile close to the target position ①, and continues to move at low speed (6 mm/s) until it comes into contact with the workpiece ②. After the table has come into contact with the workpiece the Card Motor presses the workpiece ③.

Speed Entry Method: The table moves based on the set acceleration, speed and deceleration according to a trapezoidal movement profile close to the target position ①, and continues to move at low speed (6 mm/s) until it comes into contact with the workpiece ②. After the table has come into contact with the workpiece the Card Motor presses the workpiece ③.





Movement profile for the Cycle Time Entry Method (Triangular)



Movement profile for the Speed Entry Method (Trapezoidal)

⚠Caution

For pushing operations, set the target position at least 1 mm away from the position where the table or the pushing tool comes into contact with the workpiece. Otherwise, the table may hit the workpiece at a speed exceeding the specified 6 mm/s pushing speed, which could damage the workpiece and Card Motor.

The pushing force varies from the thrust setting value depending on the operating environment, pushing direction and table position. The thrust setting value is a nominal value. Calibrate the thrust setting value according to the application requirements.

Operation Modes

Length measurement, differentiation and quality judgement of workpieces are possible using the multi-counter (separately sold products: refer to page 1338) and the AREA outputs of the controller.

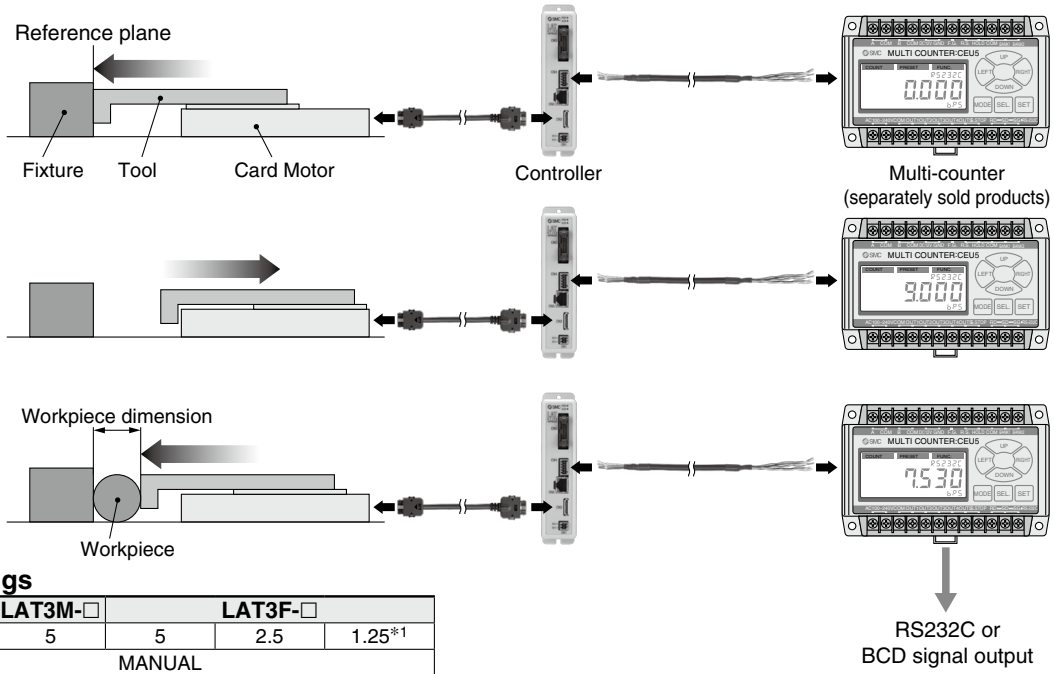
Length Measurement

The amount of table movement is detected by the sensor (encoder) built into the Card Motor for measuring the size of workpieces.

① Touch the reference plane with the tool and reset the counter.

② Return the tool.

③ Touch the workpiece with the tool to measure the size of it.
(The counter displays and outputs the length.)



CEU5 Multi-counter Settings

Card Motor model	LAT3-□	LAT3M-□	LAT3F-□		
Encoder resolution [μm]	30	5	5	2.5	1.25*1
Connected model	MANUAL				
Multiplication factor	X4	X4	X1	X2	X4
Value per 1 pulse	00.0300	00.0050	00.0050	00.0025	0.00125
Decimal point position	**.****				*.*****
Input signal	2PHASE				

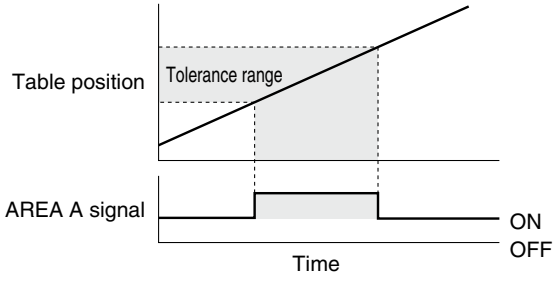
*1 The decimal numbers will not be displayed when the resolution is set to "0.00125", because the CEU5 multi-counter has a 6-digit display.

⚠Caution
The multi-counter may lose pulses when a long counter cable is used or the Card Motor is driven at high speed.

Workpiece Quality Judgement and Differentiation

The area output range preset in the controller is compared with the table position, and the AREA output signals are activated by the controller when the table is within the set range. These signals are used for quality judgement and differentiation of workpieces.

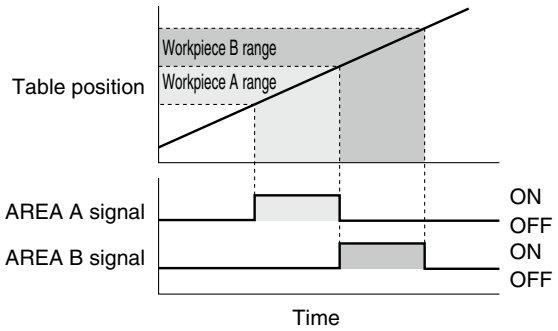
Workpiece quality judgement



Judgement results

		Judgement
AREA A signal at stop	ON	OK
	OFF	Not OK

Workpiece differentiation



Judgement results

		AREA B signal at stop	
		ON	OFF
AREA A signal at stop	ON	Workpiece A	—
	OFF	Workpiece B	—

It is possible to output up to 31 preset points using the multi-counter (separately sold products: refer to page 1338).

Return to Origin

The Card Motor uses an incremental type sensor (linear encoder) to detect the position of the table. Therefore it is necessary to return the table to the origin position after the power has been turned on. There are three [Return to Origin] methods as stated below.

In any of the methods, the origin position (0) will be set at the connector side. When the table is moved away from the connector toward the opposite side, after the [Return to Origin] has been performed, the new position of the table is added in the controller (incremental positive direction).

① Retracted end position (Connector side)

The default origin position is set as the end on the connector side [Retracted End Position].
The table is moved to the connector side, returns toward the side opposite the connector side by 0.3 mm from the end, and stops.
The stop position is set as 0 (the origin position).

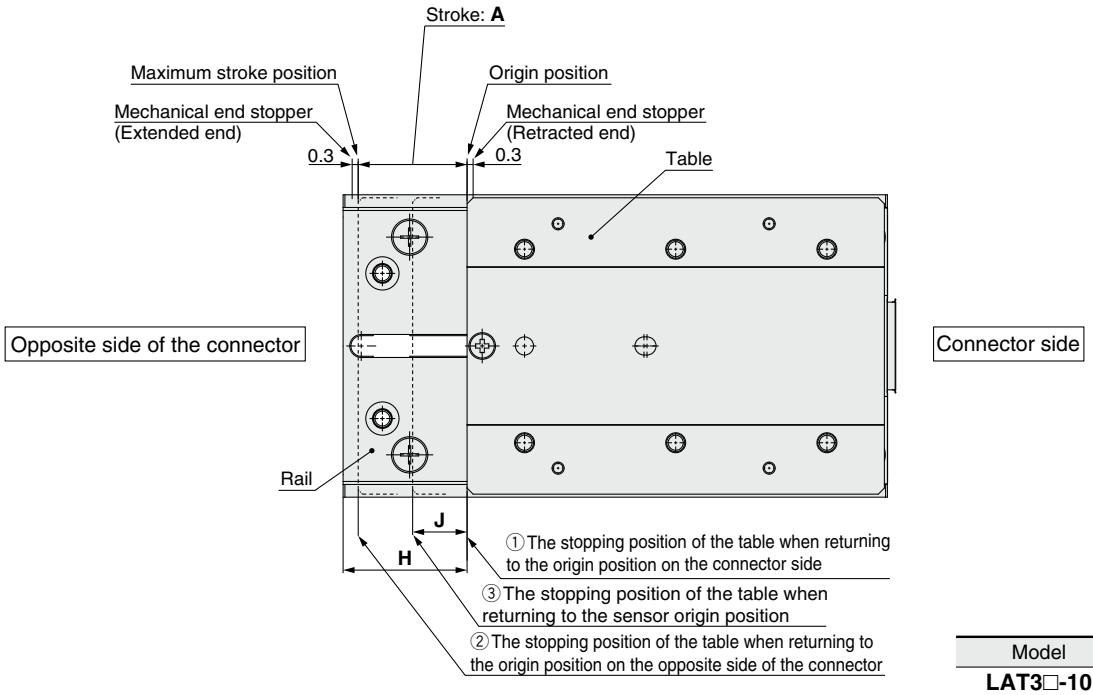
② Extended end position

Fixture is used to stop the table of the card motor when [Return to Origin] is performed.
The table is moved to the side opposite the connector side, returns toward the connector side by 0.3 mm from the end, and stops.
The origin position (0) is set at an A mm stroke away from the stopping position toward the connector side.

③ Sensor origin

This method is used to achieve high positioning repeatability accuracy of the origin position.
Only the LAT3M-□ and LAT3F-□, which feature an integrated sensor equipped with an origin position signal, can use this method.
The table is moved to the connector side, and while returning toward the side opposite the connector side from the end it stops at the position where the sensor's origin position signal is detected.
The origin position (0) is set at a certain distance (J) away from the stopping position toward the connector side.

If the table is returned to the origin position by the mechanical end stopper installed in the Card Motor, the origin position will be set to the position shown below.



Model	A	H	J*1
LAT3□-10	10	10.5	5
LAT3□-20	20	20.5	5
LAT3□-30	30	30.5	15
LAT3□-50	50	70	25

*1 Only for the LAT3M-□ and LAT3F-□

⚠ Caution

- The origin position varies depending on the return to origin position method. Adjust according to the specific equipment used with this product.
- If the return to origin position is performed using fixture or workpiece to stop the table, the origin position may be set outside of the travel range. Do not set the target position of the step data outside of the Card Motor movable range. It may damage the workpieces and the Card Motor.

Setting Software

[Controller setting software]

LATC-Configurator

* Download from SMC's website:
  https://www.smcworld.com

Compatible Controller/Driver

Step data input type/Pulse input type
LATCA Series

Hardware Requirements

OS	**IBM PC/AT compatible machine running Windows® 10 (32-bit and 64-bit), Windows® 11.**
Communication interface	**USB 1.1 or USB 2.0 ports**
Display	**XGA (1024 x 768)**

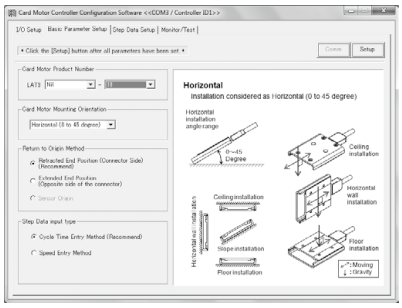
* Windows® 10 and Windows® 11 are registered trademarks of Microsoft Corporation.
* Refer to the SMC website for version upgrade information: https://www.smcworld.com

Function

- **Status display for parallel input signals and manual output of parallel output signals**
- **Entering of driven actuator**
- **Select input type (Step data input type/Pulse input type)**
- **Setting of the step data operating conditions**
- **Jog, constant speed and distance movements and test operation**
- **Monitoring of operation status (parallel input/output signals, position, speed and thrust)**
- **Alarm history display**

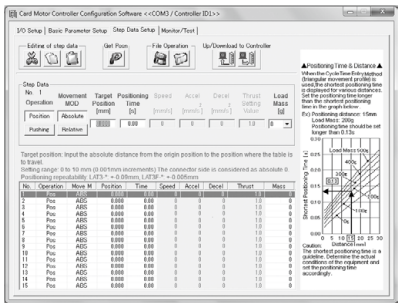
Screen Example (Step data input type)

Basic Parameter Setup



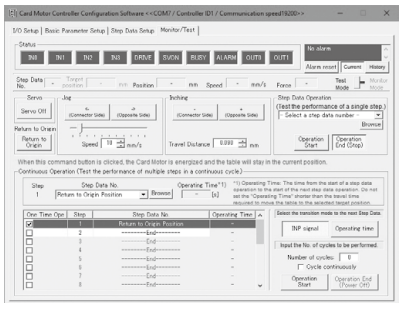
- Model selection of the Card Motor connected to controller
- Selection of return to origin method
- Selection of entry method
  (Cycle time entry method/Speed entry method)

Step Data Setup



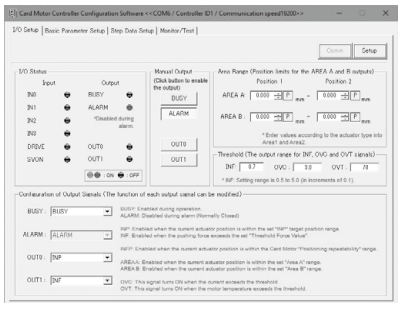
- Creation of 15 point step data
- Save/Open file of step data
- Setting step data to controller (Upload)
- Confirming step data set in controller (Download)
- Setting target position and positioning time (Cycle time entry method)
- Setting target position, speed, acceleration and deceleration
  (Speed entry method)

Monitor/Test



- Confirming set step data
- Can be used to jog and move at a constant rate.
- Operation confirmation of step data using PC
- Monitoring current position, current speed, and input/output status of parallel I/O
- Alarm history display

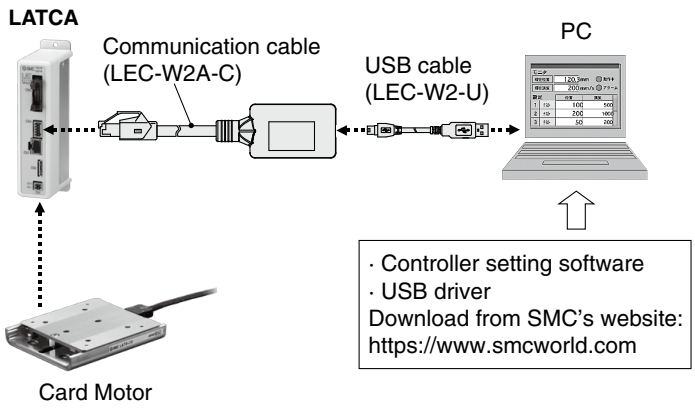
I/O Setup



- Confirming input status of parallel I/O
- Manual output of parallel I/O
- Selection of output signal of parallel I/O

Separately Sold Products

[Communication cable for controller setting]



How to Order

LEC-W2A-C
Communication cable

LEC-W2-U
USB cable

Compatible Controller/Driver

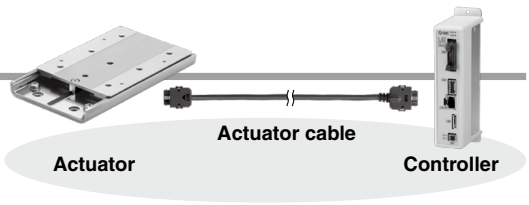
Step data input type/Pulse input type **LATCA Series**

Hardware Requirements

OS	Windows® 10, Windows® 11
Communication interface	USB 1.1 or USB 2.0 ports
Display	1024 x 768 or more

* Windows® 10 and Windows® 11 are registered trademarks of Microsoft Corporation.

Separately Sold Products

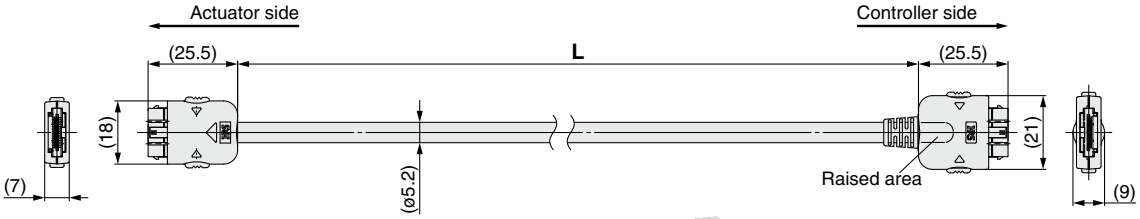


[Actuator cable]

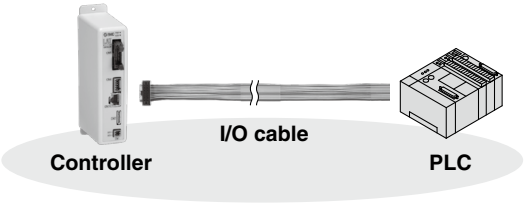
LATH1 − 1

Cable length (L)

1	1 m
3	3 m
5	5 m



∗ The actuator cable is direction dependent.
Make sure to connect the Card Motor side of the cable to the Card Motor and vice versa. There is a small raised area on the connector for the controller.



[I/O cable (without shield)]

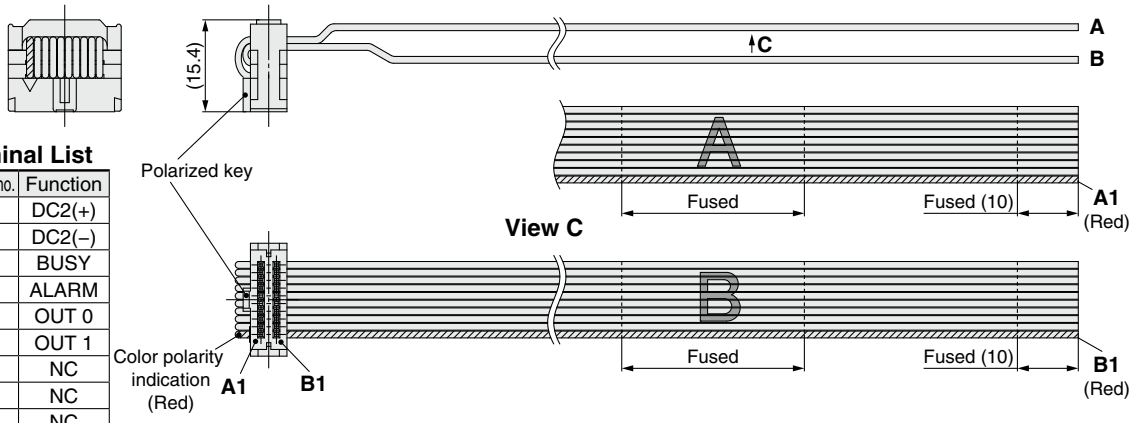
This is used when inputting/outputting a general-purpose I/O signal.

LATH2 − 1

Cable length (L)

1	1 m
3	3 m
5	5 m

∗ Conductor size: AWG28

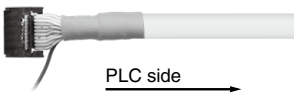


Parallel I/O Plug Terminal List

Terminal no.	Function	Terminal no.	Function
A1	COM	**B1**	DC2(+)
A2	IN 0	**B2**	DC2(–)
A3	IN 1	**B3**	BUSY
A4	IN 2	**B4**	ALARM
A5	IN 3	**B5**	OUT 0
A6	DRIVE	**B6**	OUT 1
A7	SVON	**B7**	NC
A8	NC	**B8**	NC
A9	NC	**B9**	NC
A10	NC	**B10**	NC

[I/O cable (with shield)]

The cable is shielded. This is used when inputting a pulse input signal.

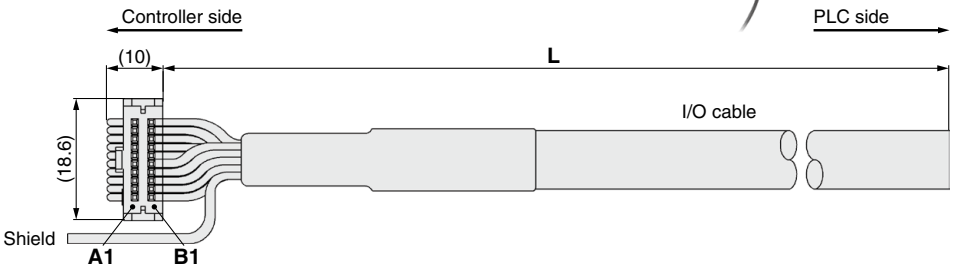


LATH5 − 1

Cable length (L)

1	1 m
3	3 m
5	5 m

∗ Conductor size: AWG28



Parallel I/O Plug Terminal List (Pulse input type)

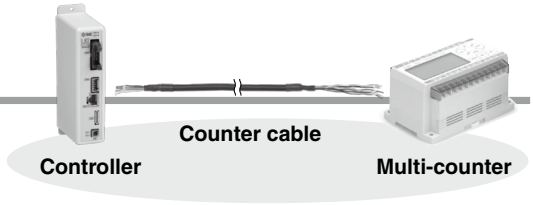
Terminal no.	Function	Insulation color	Dot mark	Dot color
A1	COM	Light brown	■	Red
A2	IN0			Black
A3	IN1	Yellow	■	Red
A4	SETUP			Black
A5	CLR	Light green	■	Red
A6	TL			Black
A7	SVON	Gray	■	Red
A8	NC			Black
A9	NC	White	■	Red
A10	NC			Black

Terminal no.	Function	Insulation color	Dot mark	Dot color
B1	DC2(+)	Light brown	■■	Red
B2	DC2(–)			Black
B3	BUSY	Yellow	■■	Red
B4	ALARM			Black
B5	OUT0	Light green	■■	Red
B6	OUT1			Black
B7∗1	PP+	Gray	■■	Red
B8∗1	PP–			Black
B9∗1	NP+	White	■■	Red
B10∗1	NP–			Black

∗1 When using the controller for the step data input type, do not wire output terminals B7 to B10. It can cause a failure as there is an internal circuit used as a pulse signal input terminal.

∗ When a step data input type is selected for input type of the controller, the function of each terminal differs from the list on the left. Refer to the LATH2 when using the controller for the step data input type.

Separately Sold Products

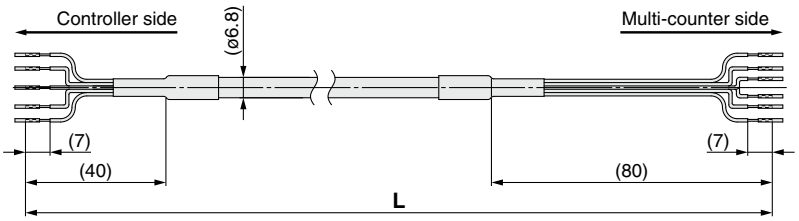


[Counter cable]

LATH3 − 1

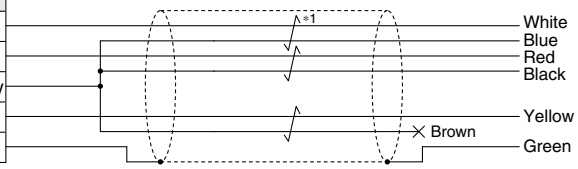
Cable length (L)

1	1 m
3	3 m
5	5 m



Wiring Diagram

Terminal no.	Circuit	Cable color
1	PhaseB	White
2	PhaseA	Red
3	GND	Light gray
4	RESET	Yellow
5	FG	Green



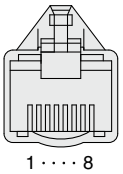
*1 ⫽ indicates a twisted pair cable.

[Communication cable]

LATH6 − 1

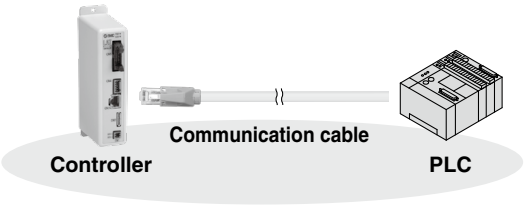
Cable length (L)

1	1 m



Communication Plug Terminal List

Terminal no.	Function	Insulation color
1	NC	—
2	NC	—
3	SD+	White
4	SD−	Black
5	NC	—
6	NC	—
7	NC	—
8	NC	—
Connector case	FG	Shield

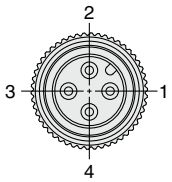


[Branch communication cable]

LATH7 − 1

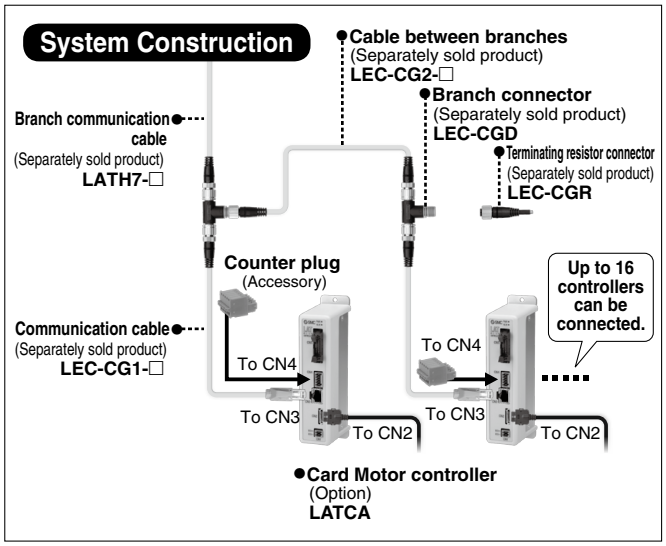
Cable length (L)

1	1 m



Branch Communication Plug Terminal List

Terminal no.	Function	Insulation color
1	NC	—
2	SD+	White
3	FG	Shield
4	SD−	Black



[Cable]

LEC − CG 1 − L

Cable type

1	Communication cable
2	Cable between branches

Cable length

K	0.3 m
L	0.5 m
1	1 m

Communication cable

Cable between branches

[Branch connector]

LEC − CGD

Branch connector

[Terminating resistor]

LEC − CGR

Separately Sold Products

[Multi-counter]

This counter displays the table position of the Card Motor and performs preset outputs according to the program (preset data and output form, etc.) when measuring. The RS-232C can be used to send the table position to a PLC or PC or to set the Multi-counter.

CEU5 □□ – □

Power voltage

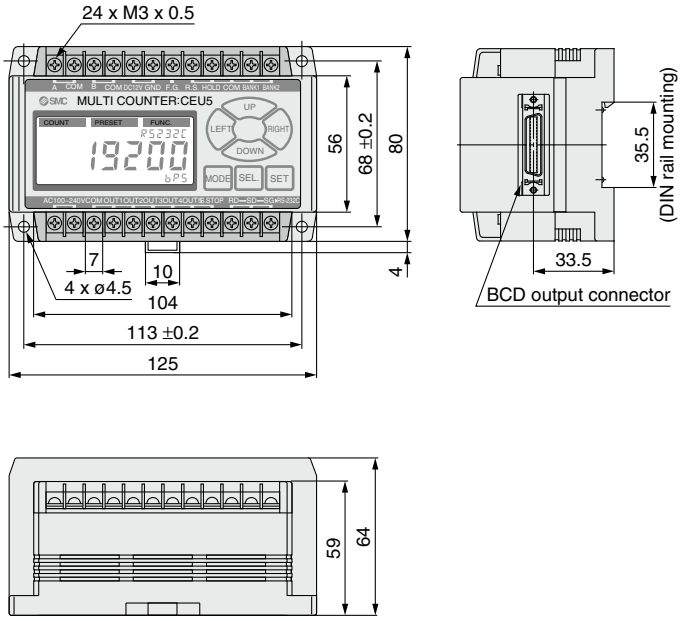
Nil	100 to 240 VAC
D	24 VDC

External output

Nil	RS-232C
B	RS-232C + BCD

Output transistor

Nil	NPN open collector output
P	PNP open collector output



Specifications

Model	**CEU5□□-□**
Mounting method	Surface mounting (Fixed by DIN rail or screw)
Operation mode	Operating mode, Data setting mode, Function setting mode
Display	LCD with backlight
Number of digits	6 digits
Counting speed	100 kHz
Insulation resistance	Between case and AC line: 500 VDC, 50 MΩ or more
Ambient temperature	0 to +50°C (No freezing)
Ambient humidity	35 to 85% RH (No condensation)
Weight	350 g or less

∗ Refer to the **Web Catalog** and the Operation Manual for details.

■Wiring Example

Multi-counter CEU5
Terminal Block

Name	Cable color
A	Red
COM	Black
B	White
COM	Blue
12 VDC	–
GND	–
F.G.	Green
RESET	Yellow
HOLD	–
COM	–
BANK1	–
BANK2	–

Controller LATCA
Counter Plug

Cable color	Name
White	PhaseB
Red	PhaseA
Light gray	GND
Yellow	RESET
Green	F.G.

Counter cable
LATH3-□

Provided by the customer