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DH-ROBOTICS

Comprehensively Upgraded

ADVANCE Series Electric Cylinder

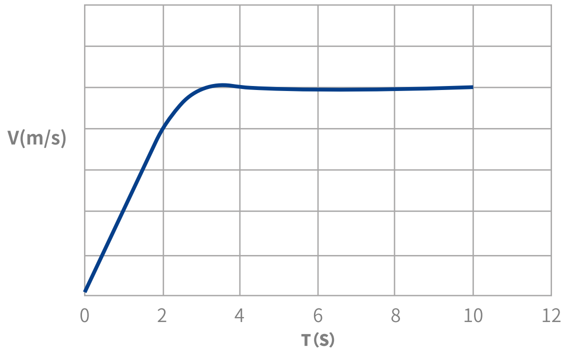
DH-ROBOTICS

Advantages of Electric Cylinder over Pneumatic Cylinder

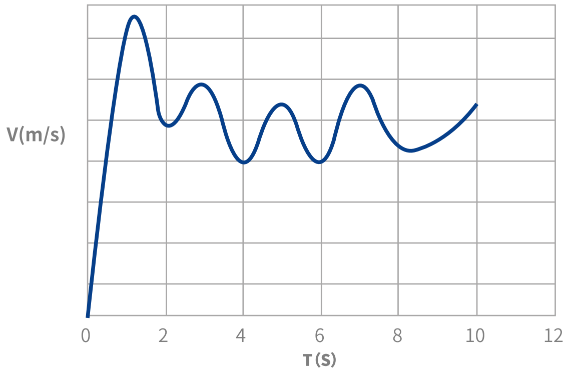
Flexibly adjustable position, force, and speed

	Electric cylinder	Pneumatic cylinder
Position	1. Multi-location programming 2. The accuracy is determined by the software with positioning repeatability accurate to ±0.02 mm	1. A magnetic switch and a mechanically controlled valve are used to achieve positioning 2. The accuracy is determined by the stopper and installation method
Force	1. Controllable and programmable 2. Capable of approaching at high speed and pressing & pushing at low speed	1. The pressure of the air channel shall be adjusted in each adjustment 2. The speed is coupled with force. To apply high thrust at low speed, an air-liquid converter shall be activated
Speed	1. Multi-section acceleration and uniform motion 2. The max. speed can reach nearly 1000 mm/s by the use of a large-lead screw	1. Large speed fluctuation 2. Delayed action 3. The speed of standard pneumatic cylinders mostly ranges from 50 to 500 mm/s

Speed Comparison

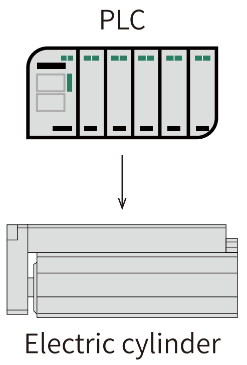


The speed and thrust of the electric cylinder are more stable and smooth

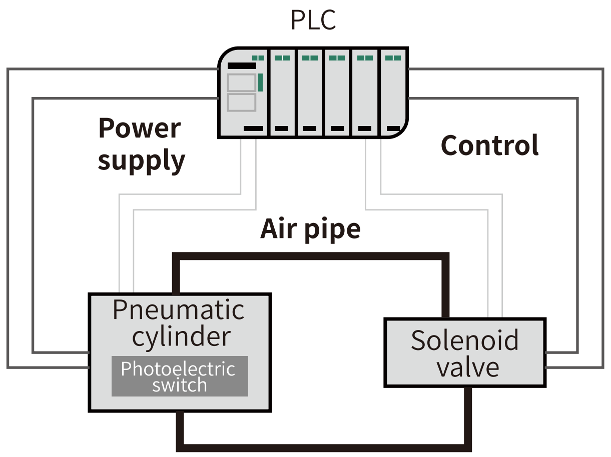


A pneumatic cylinder is compressible, resulting in poor motion stability and slow start

Comparison of Connection Types



A controller is optional for the electric cylinder and can work simply by connecting with the PLC. Position information is returned in real time, and no external photoelectric switch is required.

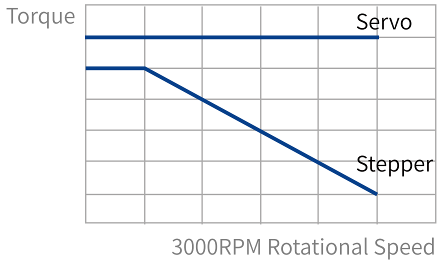


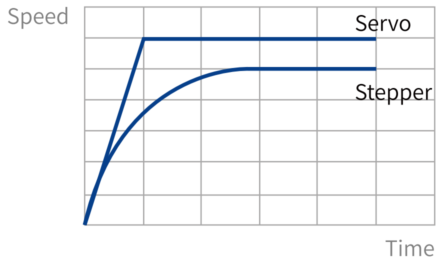
Advantages of Servo Electric Cylinder over Stepper Electric Cylinder

Better thrust and load

Stepper motor is limited by principle of the motor, high speed and strong force can no be met at the same time. Above 1000 RPM speed, the output torque drops sharply. At 3000 RPM speed (servo motor standard speed), the output torque of the servo motor will only be left a third or less. The output torque of the servo motor remains the same within the rated speed range, while the maxium speed and maximum torque of the stepper motor can not be achieved at the same time.

Closed-loop stepper motors have a speed limit of 3000 RPM speed, while servo motors can reach 6000 RPM speed or higher. Since stepper motors have the characteristic of decreasing torque as speed increases, the acceleration also decreases sharply as the speed increases, resulting in a longer acceleration section, making the working beat duration increase.

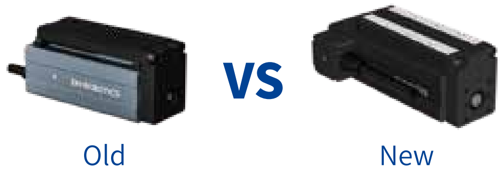




Advantages of the Upgraded Version Compared to the Previous Generation

Seamless Transition

The installation dimensions of the electric cylinder and load mounting remain unchanged, enabling seamless switching between the old and new versions.

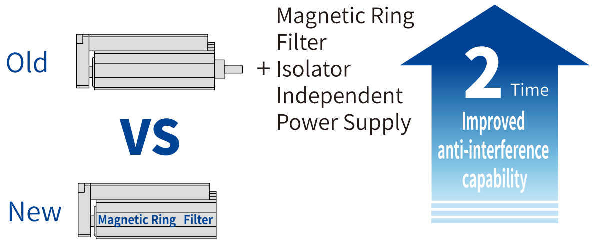


Shorter Lead Time

Production has been optimized and upgraded, reducing lead time to just 10 days, ensuring faster delivery and improving overall production efficiency.

Double the Interference Resistance

Incorporates high-performance isolation, anti-interference, and shielded integrated circuits.Power and signal interference resistance has been improved by 2×.Products are tested by national-level reliability labs, ensuring suitability for complex electromagnetic environments and reducing abnormal operation rates and environmental dependency.



Replaceable Straight Cable Design

Features a replaceable straight-exit cable design, eliminating the need for aviation connectors.Cable direction can be changed simply by loosening and refastening screws — avoiding drag chain compatibility issues caused by bulky connectors.Even if the wrong Selection is selected, the cable direction can be adjusted on-site.When replacing the gripper, only the base of the cable needs to be removed — the existing cable can be retained for simplified maintenance.

Adjust the wiring direction

Pre-sales Q&A

Q：How to Select the Right Electric Cylinder?

A：Quick selection can be made based on two motion types and the following criteria:
Positioning Motion: 1.Select the cylinder stroke based on travel distance；2.Select the load capacity based on the weight of the product；3.Select the lead screw pitch based on the required operating speed.
Pressing Motion: 1.Select the lead/screw based on the required thrust force；2.Select the cylinder stroke based on the pressing distance

Q：What type of screw and motor does the electric cylinder use?

A：The electric cylinder uses a ball screw and a servo motor.

Q：What is the difference between maximum thrust and maximum load capacity?

A：Maximum Thrust: The maximum axial force the cylinder can exert. This is a static force, not affected by load weight, external resistance, or acceleration/deceleration.
Maximum Load Capacity: The recommended value determined based on the ability to drive the load weight, overcome external resistance, bear gravitational force (including gravity acceleration), as well as static and dynamic friction during start and stop—while ensuring the service life of the product under these conditions.

Q：How accurate is the electric cylinder?

A：Repeated positioning accuracy is ±0.02 mm (±0.01 mm for some models).

Q：How is the maximum load determined? Can the electric cylinder be used beyond its rated load?

A：A: The maximum load is calculated based on the highest parameters for load, speed, and duty cycle while ensuring product longevity. Overloading is not recommended, as it will reduce component lifespan and may cause damage.

Q：How is the maximum speed determined? Can the electric cylinder be used beyond this speed?

A：The maximum speed is derived from the servo motor's rated speed of 3000 RPM. Exceeding this speed is not recommended, as it can lead to motor overheating, coil aging, torque degradation, and reduced lifespan.

Q：How to select the appropriate switching power supply?

A:Select the power supply based on the peak current of the electric cylinder.

Q:Can the cylinder with a brake maintain high-precision position and force when powered off?

A: The brake is designed for vertical installations to prevent the load from falling when power is lost. It does not maintain high-precision position or force when power is off.

Q：Can the screw precision grade be upgraded?

A：Yes, the cylinder supports upgrading to a ground C5 ball screw, achieving a repeatability of ±0.005 mm. For details, please consult our sales team.

Q：Will the electric cylinder heat up during extended operation?

A：According to third-party thermal testing, under ambient conditions of 27°C ±2°C and relative humidity of 45%–75% RH, the surface temperature remains below 50°C even after prolonged operation. For special working environments, please consult our sales team.

Q：Is the electric cylinder dustproof and waterproof?

A：The protection rating is IP40, which offers limited dust and water resistance. For higher protection levels, customization is available—please contact our sales team.

Q：Is the electric cylinder suitable for cleanroom applications? What is its cleanliness level?

A：The standard electric cylinder is suitable for Class 10,000 and above cleanrooms. For higher cleanliness requirements, customized versions are available, supporting up to Class 100 cleanroom applications. Please consult our sales team for details.

Q：Does load condition affect the actual force output during pressing motion?

A：In horizontal use, there is no difference in actual force output with or without load, as long as it is within the rated capacity.In vertical use, gravity must be considered: Upward pressing: Actual thrust = Set thrust — Load; Downward pressing: Actual thrust = Set thrust + Load.

On-Site Wiring Guidelines for Electric Cylinder

To ensure precision and reliability under complex EMI environments, follow below operation requirements:

A、Installation and Wiring (Required)

1. Mechanical Isolation

a. Avoid mounting directly on high-interference devices (e.g., VFDs, servos, linear motors). Use shock-absorbing brackets or insulating backplates (e.g., aluminum).

b. Do not bundle electric cylinder control cables with power lines of other devices (e.g., solenoids, sensors).

c. Ensure good conductivity between metal mounting surface and electric cylinder shell to prevent static buildup (conductive paste is recommended).

2. Cable Management

a. Power and signal cables must be routed separately:
i. Power cables: Twisted pair with metal shielding, grounded at both ends.
ii. Signal cables (CAN/RS485/EtherCAT): Shielded twisted pair, shield grounded at controller end.
iii. PE Grounding Cable: Cross-sectional area ⩾ 2.5 mm^2; grounding resistance ⩽ 2 Ω (measured values must be recorded in the maintenance log).For multiple devices, use a star grounding topology—series connection is strictly prohibited.

b. Keep cables short; if over 3 m, use ferrite cores to suppress high-frequency noise.

c. Prohibited Practices (to avoid communication errors):
⚠ Do not route cables in the same Wire duct as pneumatic solenoids or sensors.
⚠ Do not wrap ties directly on Electric Cylinder (use Velcro straps to minimize EMI).

B、Enhancements for Power & Signal Protection (optional)

1. Power Isolation and Filtering

a. Use an isolated power module dedicated to the electric cylinder to avoid voltage fluctuation from shared motor supply.

b. Install an EMI filter at the power input to suppress conducted switching noise. The recommended wiring sequence is: AC mains → EMI filter → isolation transformer → electric cylinder controller. EMI filter shell must be grounded to cabinet ground bar.

2. Communication Interference Protection

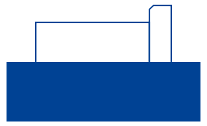
a. Install signal isolation modules to block external EMI and prevent leakage currents from other devices.

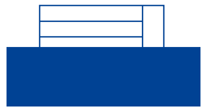
Electric Cylinder Selection Guidelines

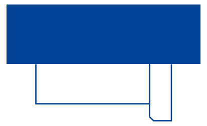
Selection Process Overview

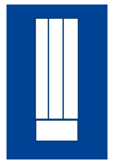
Determine load mounting method → Define stroke, speed, and acceleration requirements → Verify load parameters → Verify cantilever conditions → Confirm final model

1、Load Mounting Methods


Horizontal Mounting


Horizontal Side Mounting


Horizontal Ceiling Mounting


Vertical Mounting

2、Select a model that satisfies the stroke, maximum speed, and acceleration requirements based on the chosen mounting orientation.

Mounting Orientation	Model	Lead /Screw (mm)	Acceleration（G）	Max Speed（mm/s）	Max Stroke（mm）
Horizontal	MCE-3G MCE-3WG	1	0.2	50	50
		2	0.3	100	
		4	0.3	200	
		6	0.3	300	
	MCE-4G	5	0.2	165	150
		10	0.3	330	
Vertical	MCE-3G MCE-3WG	1	0.2	50	50
		2	0.3	100	
		4	0.3	200	
		6	0.3	300	
	MCE-4G	5	0.2	165	150
		10	0.3	330	

Selection Criteria & Parameter Verification:

Stroke⩽ the specified stroke of each model.

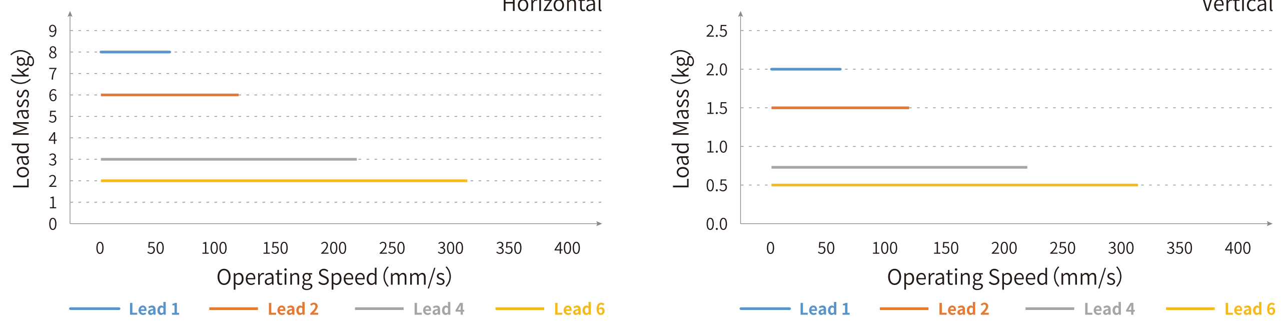
Max Speed⩽ the maximum allowable speed at the selected stroke.

Acceleration⩽ 0.2G or 0.3G.

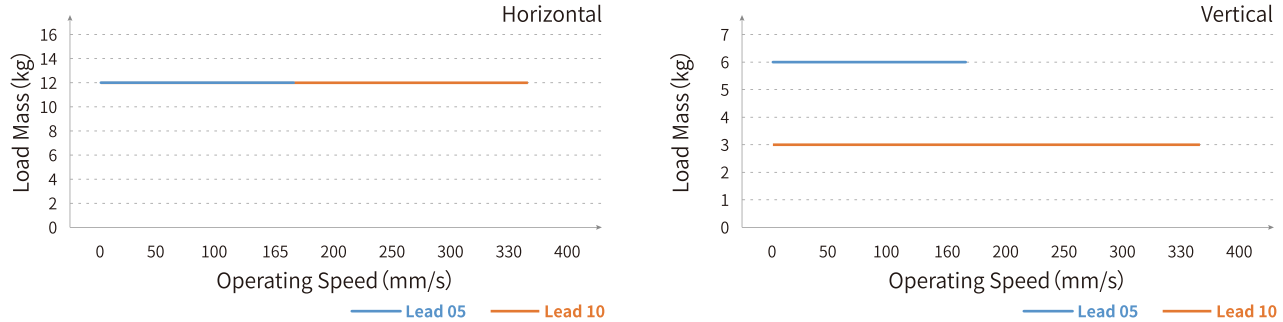
3、Model Selection Based on Load Mass at Maximum Speed

Refer to the table below to confirm whether the load mass requirements can be satisfied at the maximum speed:

MCEA-3G / MCEA-3WG



MCEA-4G



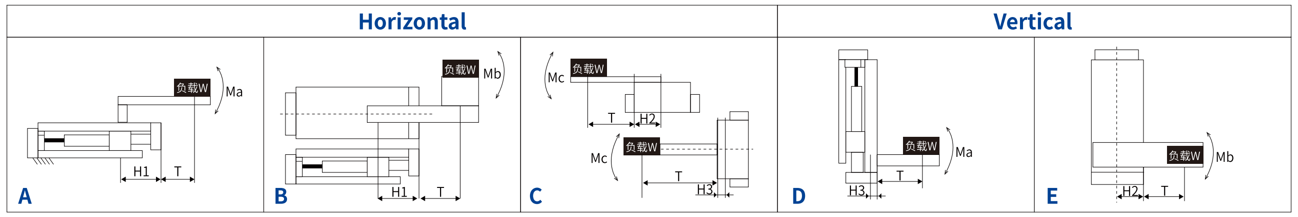
4、Load Moment Calculation & Verification

Static Moment Calculation (M1):
M1=W*L*9.8/1000(N.m)
(W = Load mass (kg); L = Distance from load center of gravity to the point of force application (mm))

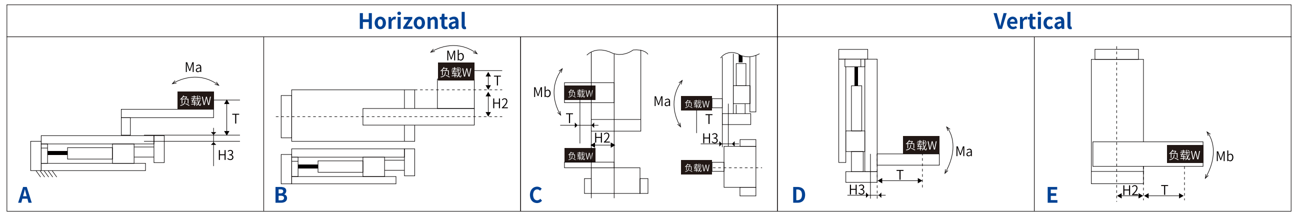
	MCE-3G	MCE-3WG	MCE-4G
H1(mm)	39	44	52
H2(mm)	16.5	23	21.5
H3(mm)	7.5	10.5	10.5

For Load Directions A and B, stroke must be considered: L = T + Hn + Stroke
For Load Directions C, D, and E, stroke is not considered: L = T + Hn

Static Moment Illustration diagram



Dynamic Moment Calculation (M2):
M2=W*L*a*9.8/1000(N.m)(W = Load mass (kg); L = Distance from load center of gravity to the point of force application (mm); a = Acceleration (m/s²);

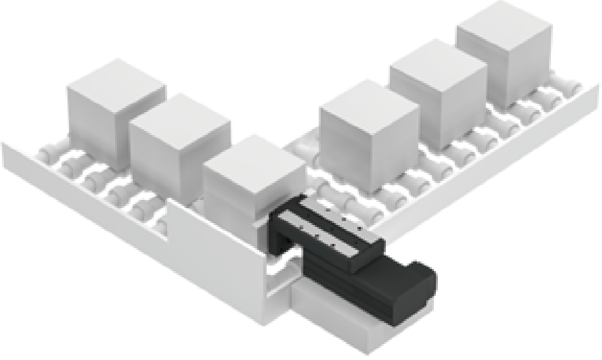


Total Operating Moment:M=M1+M2

Verification Parameters:

Operating Moment (M) < Allowable Load Moment (Ma, Mb, Mc)
A model is considered correctly selected only if all the above conditions are satisfied.

Applications

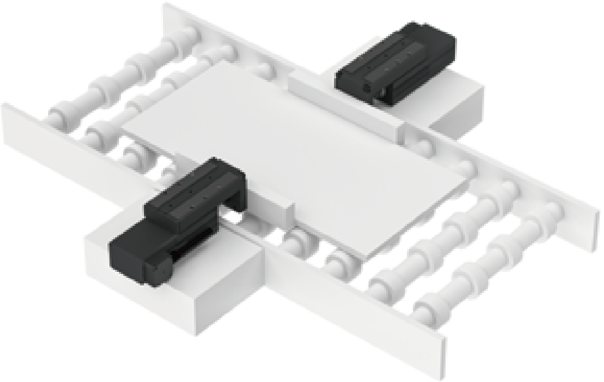


Pushing and conveying

The electric cylinder pushes the workpiece on the conveyor belt in the production line to another conveyor belt at a specific angle in place of repetitive manual operation to achieve automated production.

Advantages

The MCE series electric cylinder runs at high speed to significantly improve productivity. The thrust is adjustable up to 200 N to meet workpiece handling requirements at different weight levels. In addition, the acceleration can be programmed, enabling effective prevention of damage to workpieces, improved productivity, and reduced labour cost.



Positioning correction

The use of an electric cylinder for positioning solves the problem of large positioning error and difficult commissioning in a pneumatic cylinder. The thrust is adjustable so that damage to workpiece may be avoided. For example glass substrate positioning and panel positioning devices are used.

Advantages

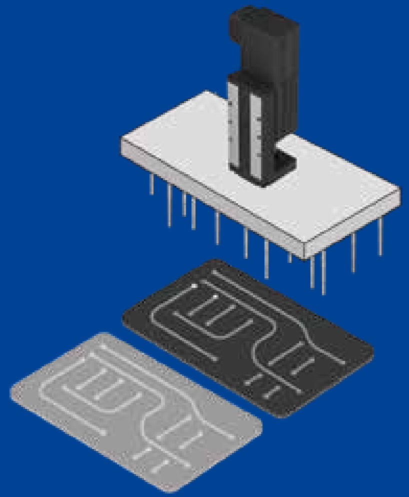
The MCE series electric cylinder has the positioning repeatability of ±0.02 mm and can perform well for accurate positioning at high speed.

Pressure loading

The MCE miniature electric cylinder pushes a heavy workpiece into the punching machine in place of manual handling, which reduces the risk of accident and improves productivity.

Advantages

The MCE series electric cylinder has excellent load capacity, with a maximum weight capacity of 15 kg in the horizontal direction. The parameters are adjustable for accurate speed governing and positioning to ensure the machining accuracy of workpiece.

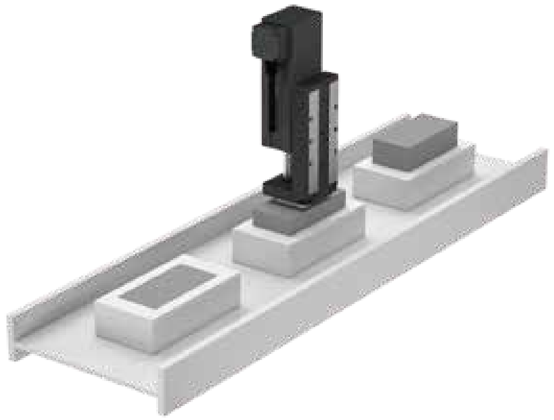


Detection

The MCE miniature electric cylinder is used to lift and lower the probes to test the conduction performance of the circuit board. The MCE miniature electric cylinder can perform well to allow multiple probes to work at a time.

Advantages

The MCE parameters are adjustable, and the position, speed, and thrust can be accurately programmed to achieve soft landing and pushing & pressing of workpieces. The MCE performs well in meeting the flexible production requirements in 3C electronics industry.

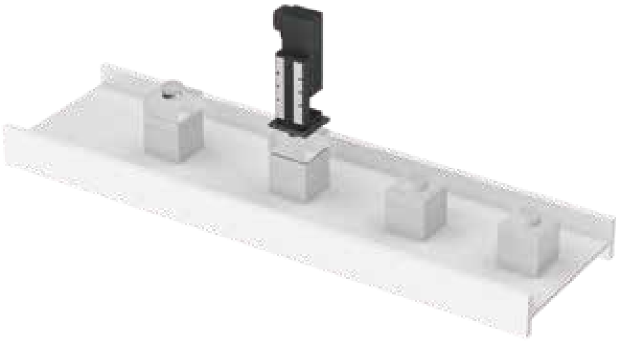


Pushing & pressing

The MCE miniature electric cylinder is used instead of conventional servo + sensor system to push and press mount components into the base in the component mounting process.

Advantages

The MCE can be programmed to achieve soft landing and pushing & pressing of workpieces at low speed after approaching the workpieces at high speed, speeding up the cycle time while reducing the defect rate and production costs.



Installation

The MCE miniature electric cylinder is used to press fit the cover of the electronic component onto the component body. The position, speed, and thrust of the electric cylinder can be governed to complete operation tasks more efficiently and stably.

Advantages

The position, speed, and thrust parameters of the MCE can be programmed to achieve soft landing and pushing & pressing of workpieces, meeting the flexible production requirements in 3C electronics industry while reducing the defect rate and downtime.

Miniature Electric Table Type Cylinder

MCEA Series

DH-ROBOTICS

Series	Width	Max payload -horizontal	Max payload -vertical	Reference Page
MCEA-3G	50mm	8 kg	2 kg	P11-12
MCEA-3WG	50mm	8 kg	2 kg	P15-16
MCEA-4G	150mm	15 kg	6 kg	P19-20
RCEA-3M	50mm	8 kg	2 kg	P23-24

Product Features

The MCEA serise is miniature linear stage cylinder features high energy density, large load capacity, and a compact and exquisite design. It is suitable for various applications, enabling the completion of complex tasks such as handling arranging, and transporting.

High Energy Density

Small size, high energy, high rigidity, with a maximum horizontal load cpacity of **15kg**.

Compact Design

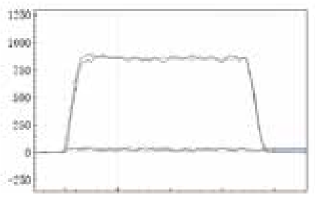
Compact overall structure with a width of only **35mm**, allowing for sensitive.

Fast and Precise

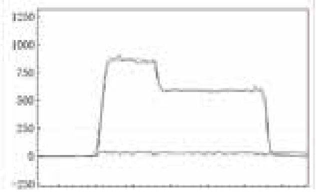
Equipped with a high-performance servo motor and precision grinding screw, achieving a maximum speed of up to **330mm/s**. The repeated positioning accuracy reaches **±0.002mm**.

Programmable Parameters Avariety of Motion Modes

The position, speed, and thrust parameters are programmable to implement essential functions of pushing, pulling, pressing, and positioning at high speed. Either the position mode or pushing & pressing mode is available.

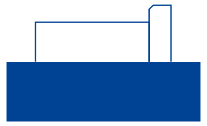


Position Mode

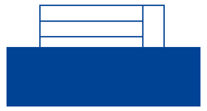


Pushing & Pressing Mode

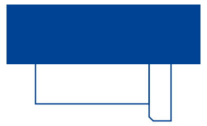
Installation



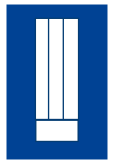
Horizontal Mounting



Horizontal Mounting on Side



Horizontal Ceiling Mounting



Vertical Mounting

Preferred Applications

- Lifting in Z-axis
- Pushing & pressing in Z-axis
- Low-stroke handling and pushing & pressing in X-axis

Application

- 3C Electronics
- New Energy
- Automotive
- Mechanical Processing

MCEA-3G

Miniature Electric Table Type Cylinder

DH-ROBOTICS

Integrated-Drive Electric Cylinder Selection Method

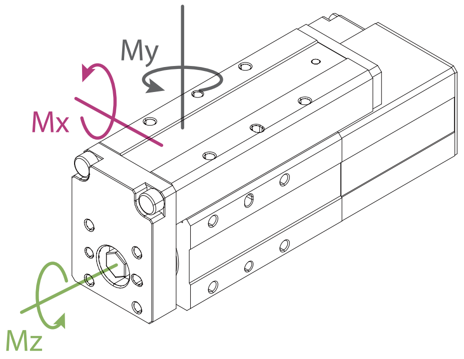
Series	Width/Guide	Lead	Stroke	Integrated Drive	Brake	Cable Direction	Applicable Drive IO Type	Cable Length	Customized *①
MCEA	3G	01	030	C	O	F1	M01	L01	0
		01 02 04 06	030 050		O Without Brake W With Brake	F1 侧面朝前出线 F2 侧面朝后出线 F3 侧面朝上出线 F4 侧面朝下出线	M01 ModbusRTU(RS485)+IO(NN) M02 ModbusRTU(RS485)+IO(PP)	L01 1m Direct Cable Outlet L03 3m Direct Cable Outlet L05 5m Direct Cable Outlet L10 10m Direct Cable Outlet	0 No Customization

External-Drive Electric Cylinder Selection Method

Series	Width/Guide	Lead	Stroke	External Drive	Brake	Cable Direction	Applicable Drive IO Type	Cable Length	Customized *①
MCEA	3G	01	030	E1	O	F1	S01	L01	0
		01 02 04 06	030 050	E1 ABZ *② E2 SSI *③	O Without Brake W With Brake	F1 侧面朝前出线 F2 侧面朝后出线 F3 侧面朝上出线 F4 侧面朝下出线	S01 SAC-S S02 SAC-N S03 SAC-NF X01 SAC-N2	L01 1m Direct Cable Outlet L03 3m Direct Cable Outlet L05 5m Direct Cable Outlet L10 10m Direct Cable Outlet	0 No Customization

Note：*① For customization fees, consult with the sales staff of DH-Robotics.
*② ABZ：Incremental Encoder: Phase search is required after power-up.
*③ SSI：Single-Turn Absolute Encoder: Phase search is not required after power-up. (It is recommended to select this type of encoder when the electric cylinder is used as the Z-axis).

TECHNICAL SPECIFICATIONS



Allowable Load Moment

Mx	9.9 N.m
My	9.9 N.m
Mz	3.3 N.m

*④ When selecting the power supply, please select according to the peak current. If the current is lower than the parameter, it will cause the product can not work normally.

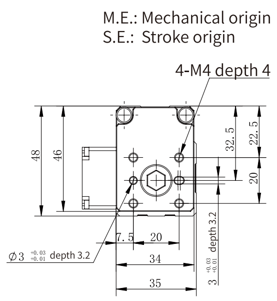
Technical Parameters

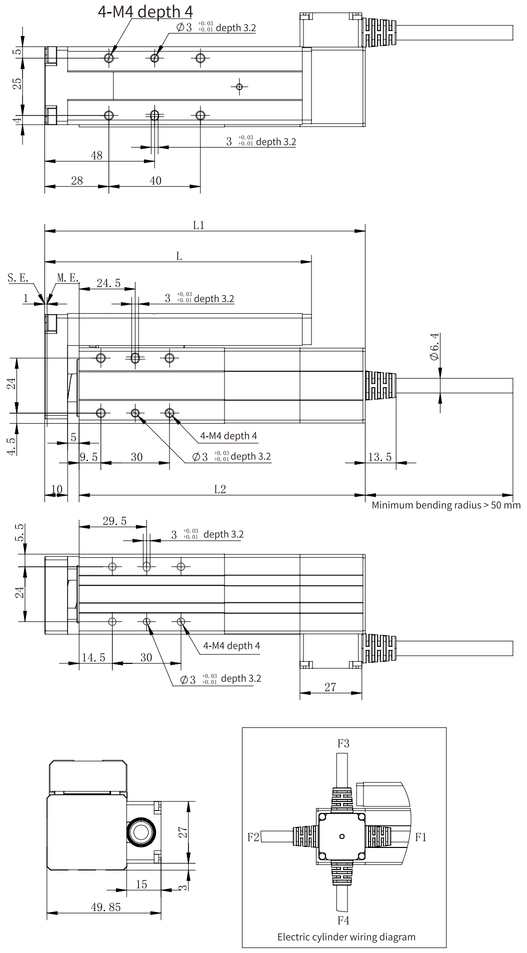
Total stroke	30 mm，50 mm			
Screw lead	1 mm	2 mm	4 mm	6 mm
Rated thrust	200 N	100 N	50 N	30 N
Min. Thrust	78 N	41 N	21 N	12 N
Max. Speed	50 mm/s	100 mm/s	200 mm/s	300 mm/s
Max. Acceleration	2000 mm/s^2	3000 mm/s^2	3000 mm/s^2	3000 mm/s^2
Max. Weight capacity - horizontal	8 kg	6 kg	3 kg	2 kg
Max. Weight capacity - vertical	2 kg	1.5 kg	0.75 kg	0.5 kg
Positioning repeatability	±0.01 mm			
Mechanical backlash	Less than 0.1mm			
Weight	30 Total stroke：0.47 kg		50 Total stroke：0.55 kg	

Operating Environment

Communication protocol	External: Depending on the Selected Driver
Rated voltage	24 V DC ± 10%
Current	1.5 A (Rated) /3 A (Peak) *④
Protection rating	IP 40
Recommended operating environment	0 to 40°C, below 85% RH
Compliance with international standards	CE，FCC，RoHS，TUV

Dimensions


M.E.: Mechanical origin
S.E.: Stroke origin
4-M4 depth 4
48
46
32.5
22.5
20
Ø3 depth 3.2
7.5
20
34
35
depth 3.2


4-M4 depth 4
Ø3 depth 3.2
3 depth 3.2
5
25
48
28
40
L1
L
S.E.
M.E.
24.5
3 depth 3.2
Ø6.4
24
4.5
5
9.5
30
4-M4 depth 4
Ø3 depth 3.2
13.5
10
L2
Minimum bending radius > 50 mm
29.5
3 depth 3.2
5.5
24
4-M4 depth 4
14.5
30
Ø3 depth 3.2
27
27
15
49.85
F3
F2
F1
F4
Electric cylinder wiring diagram

Caution:
During origin reset, the slider will keep moving to the mechanical end (ME). Please be cautious to avoid interference with surrounding objects.

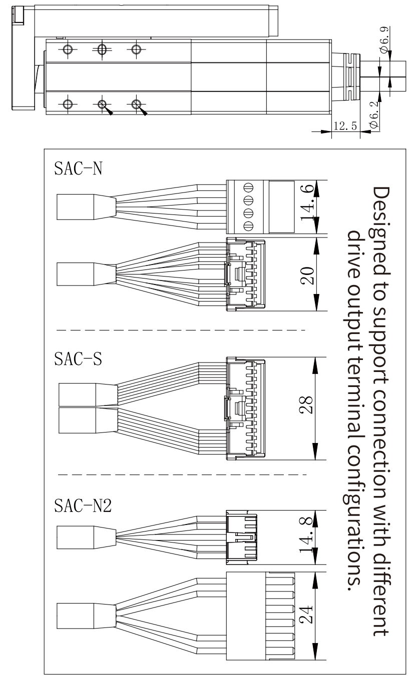
Without Brake mm

Stroke	30	50
L	96.5	116.5
L1	107	127
L2	92	112

With Brake mm

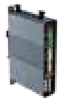
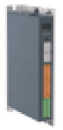
Stroke	30	50
L	96.5	116.5
L1	127	140
L2	112	125

External Electric Cylinder – Compatible with Various Drive Output Terminal Types


Ø6.9
12.5
Ø6.2
SAC-N
4.6
20
SAC-S
28
SAC-N2
4.8
24

Designed to support connection with different drive output terminal configurations.

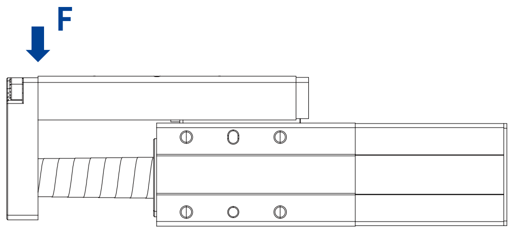
Applicable Drive

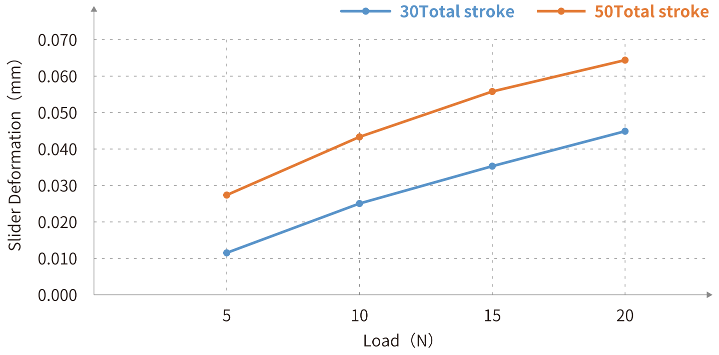
Name	Appearance	Controllable Maxes	Model	Control Methods	Feature	Input voltage	Power Capacity	Reference Page
Small Scale Single-Axis Dedicated Controller		1	SAC-S	RS485	ModbusRTU	DC24V	MAX 72W	SAC-S Selection Page P27-28
				I/O	Up to 16 I/O Points			
				Pulse+I/O	Direction+Pulse			
Single-Axis Dedicated Controller		1	SAC-N	RS485	ModbusRTU	DC24V	MAX 200W	SAC-N Selection Page P29-30
				I/O	Up to 64 I/O Points			
				Pulse+I/O	Direction+Pulse			
Single-Axis Dedicated Force Control Controller		1	SAC-NF	RS485	ModbusRTU	DC24V	MAX 200W	Please Contact us for Force Control Applications.
Dual Axis Standard Drive		2	SAC-N2	EtherCat	Standard CIA402 Axis Control	DC24V / DC48V	MAX 240W (24V) /480W (48V)	SAC-N2 Selection Page P33-34
				Pulse+I/O	Direction+Pulse			
				RS485	ModbusRTU			

Rigidity Deformation of Electric Cylinder (Reference Value)

> Axial Bending

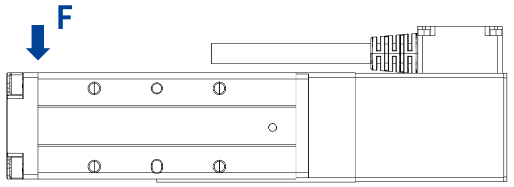
The amount of deformation at the tip of the slider due to axial bending moment load when the slider is fully extended and a load is applied at the indicated position (arrow).

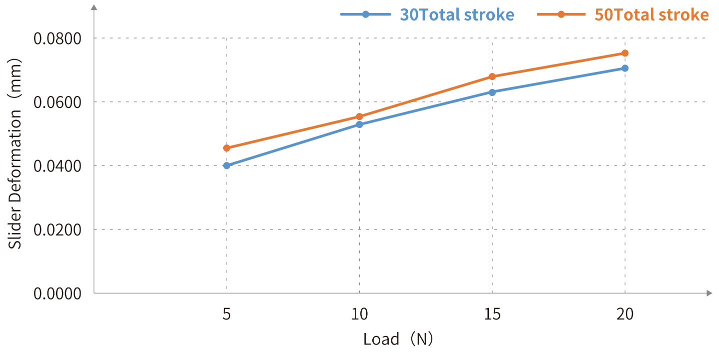




> Offset Load (Eccentric Load)

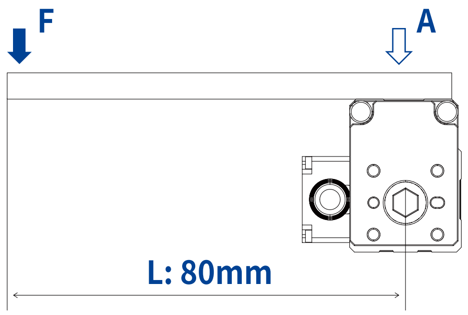
The amount of deformation at the tip of the slider caused by an offset (eccentric) moment load when the slider is fully extended and a load is applied at the indicated position (arrow).

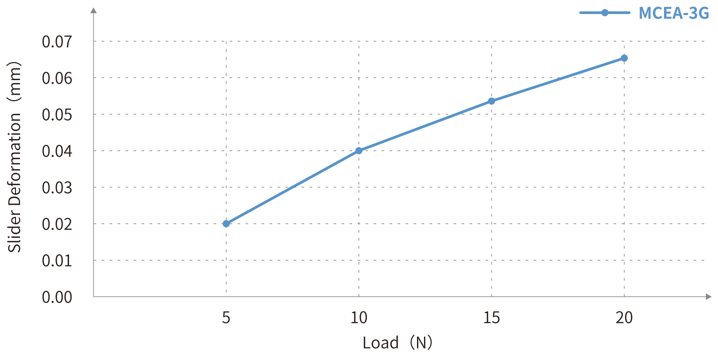




> Torsion (Rotational Moment)

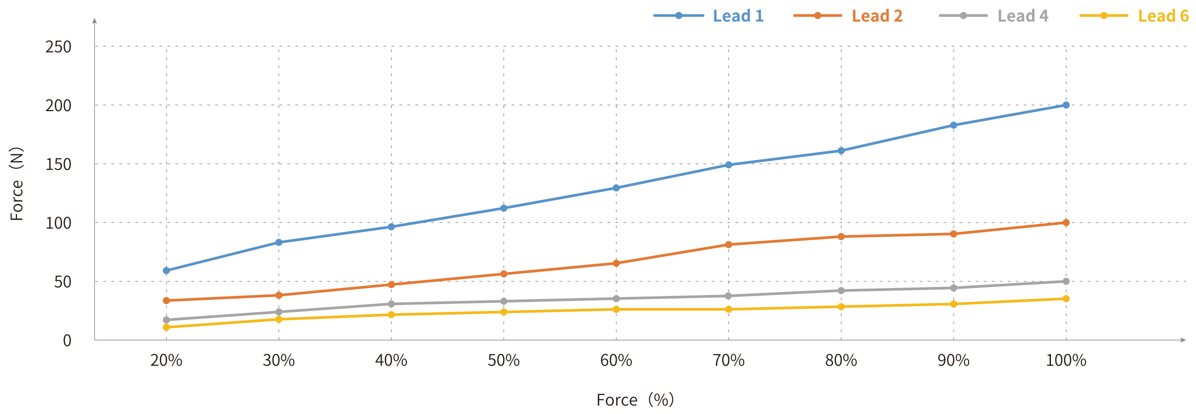
The amount of deformation at point A on the slider caused by a rotational moment load when the slider is fully retracted and a load is applied at point F.





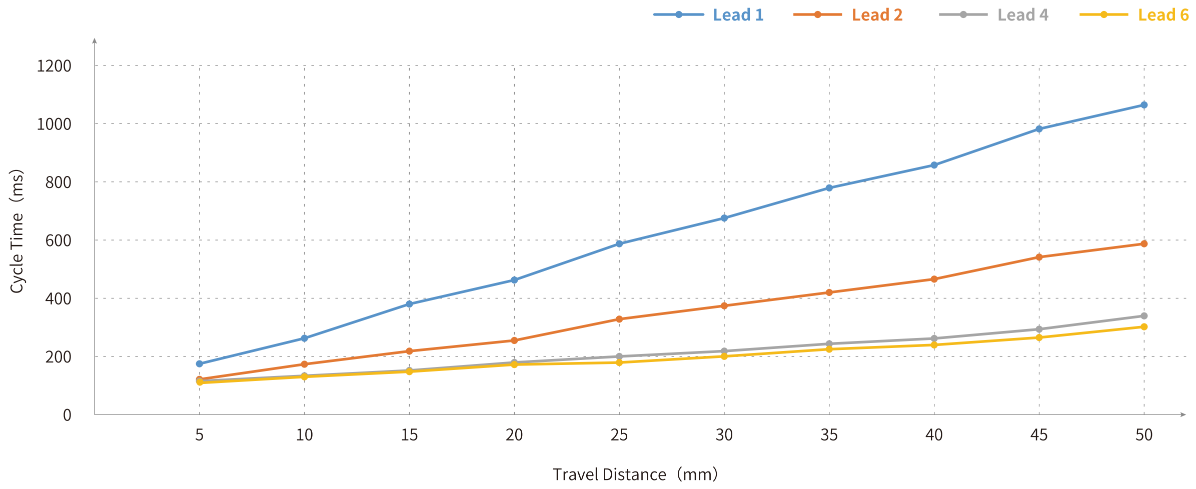
Electric Cylinder Thrust Curve (Reference Value)

Thrust output curves under different load conditions with the electric cylinder mounted horizontally.



Electric Cylinder Cycle Time Curve (Reference Value)

Reference values for maximum load operation cycle time of the electric cylinder.Note: Communication delay of 30 ms is included in the reference values.



MCEA-3WG

Miniature Electric Table Type Cylinder

Integrated-Drive Electric Cylinder Selection Method

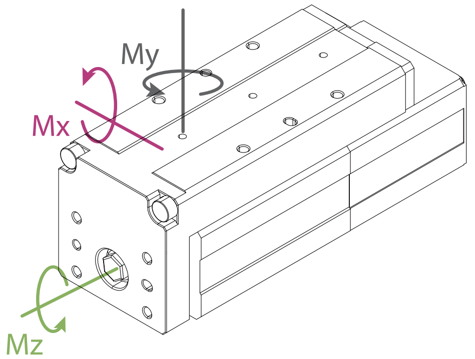
Series	Width/Guide	Lead	Stroke	Integrated Drive	Brake	Cable Direction	Applicable Drive IO Type	Cable Length	Customized *①
MCEA	3WG	01	030	C	O	F1	M01	L01	0
		01 02 04 06	030 050		**O** Without Brake **W** With Brake	**F1** 侧面朝前出线 **F2** 侧面朝后出线 **F3** 侧面朝上出线 **F4** 侧面朝下出线	**M01** ModbusRTU(RS485)+IO(NN) **M02** ModbusRTU(RS485)+IO(PP)	**L01** 1m Direct Cable Outlet **L03** 3m Direct Cable Outlet **L05** 5m Direct Cable Outlet **L10** 10m Direct Cable Outlet	**0** No Customization

External-Drive Electric Cylinder Selection Method

Series	Width/Guide	Lead	Stroke	External Drive	Brake	Cable Direction	Applicable Drive IO Type	Cable Length	Customized *①
MCEA	3WG	01	030	E1	O	F1	S01	L01	0
01 02 04 06	030 050	**E1** ABZ *② **E2** SSI *③	**O** Without Brake **W** With Brake		**F1** 侧面朝前出线 **F2** 侧面朝后出线 **F3** 侧面朝上出线 **F4** 侧面朝下出线	**S01** SAC-S **S02** SAC-N **S03** SAC-NF **X01** SAC-N2	**L01** 1m Direct Cable Outlet **L03** 3m Direct Cable Outlet **L05** 5m Direct Cable Outlet **L10** 10m Direct Cable Outlet		**0** No Customization

Note: *① For customization fees, consult with the sales staff of DH-Robotics.
*② ABZ: Incremental Encoder: Phase search is required after power-up.
*③ SSI: Single-Turn Absolute Encoder: Phase search is not required after power-up. (It is recommended to select this type of encoder when the electric cylinder is used as the Z-axis).

TECHNICAL SPECIFICATIONS



Allowable Load Moment

Mx	9.9 N.m
My	9.9 N.m
Mz	12.2 N.m

*④ When selecting the power supply, please select according to the peak current. If the current is lower than the parameter, it will cause the product can not work normally.

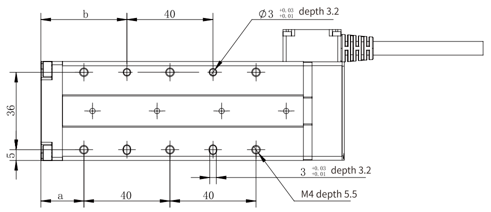
Technical Parameters

Total stroke	30 mm, 50 mm			
Screw lead	1 mm	2 mm	4 mm	6 mm
Rated thrust	200 N	100 N	50 N	30 N
Min. Thrust	78 N	41 N	21 N	12 N
Max. Speed	50 mm/s	100 mm/s	200 mm/s	300 mm/s
Max. Acceleration	2000 mm/s²	3000 mm/s²	3000 mm/s²	3000 mm/s²
Max. Weight capacity - horizontal	8 kg	6 kg	3 kg	2 kg
Max. Weight capacity - vertical	2 kg	1.5 kg	0.75 kg	0.5 kg
Positioning repeatability	±0.01 mm			
Mechanical backlash	Less than 0.1mm			
Weight	30 Total stroke: 0.62 kg		50 Total stroke: 0.7 kg	

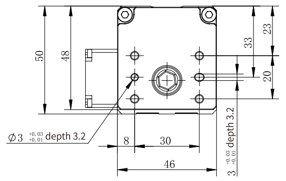
Operating Environment

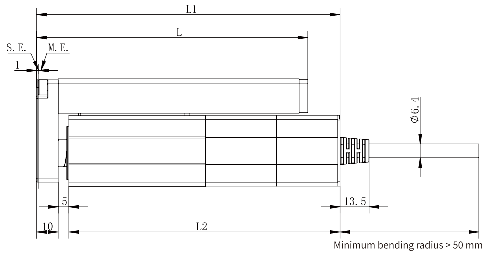
Communication protocol	External: Depending on the Selected Driver
Rated voltage	24 V DC ± 10%
Current	1.5 A (Rated) /3 A (Peak) *④
Protection rating	IP 40
Recommended operating environment	0 to 40°C, below 85% RH
Compliance with international standards	CE, FCC, RoHS, TUV

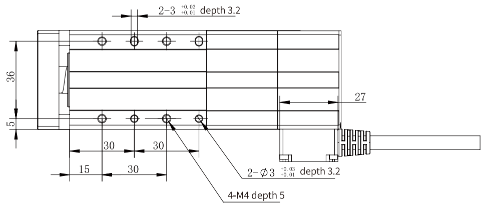
Dimensions



M.E.: Mechanical origin
S.E.: Stroke origin





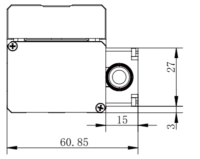


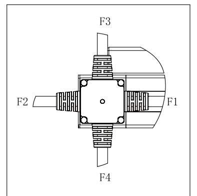
Without Brake mm

Stroke	30	50
L	106	126
L1	107	127
L2	92	113
a	38	20
b	58	40

With Brake mm

Stroke	30	50
L	106	126
L1	127	140
L2	113	126
a	38	20
b	58	40



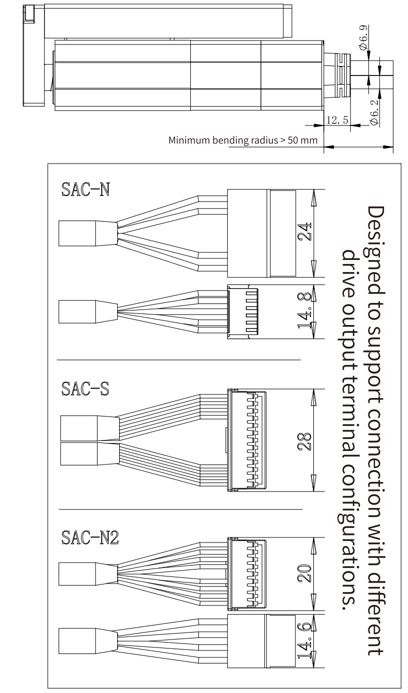


Electric cylinder wiring diagram

Note:
The number of mounting holes for the 30mm and 50mm strokebodies differs. Therefore, the drawing does not specify the exact quantity of M4 threaded holes and Ø3 pin holes. Please refer to the corresponding model's 3D simplified model for details.

Caution:
During origin reset, the slider will keep moving to the mechanical end (ME). Please be cautious to avoid interference with surrounding objects.

External Electric Cylinder – Compatible with Various Drive Output Terminal Types



Designed to support connection with different drive output terminal configurations.

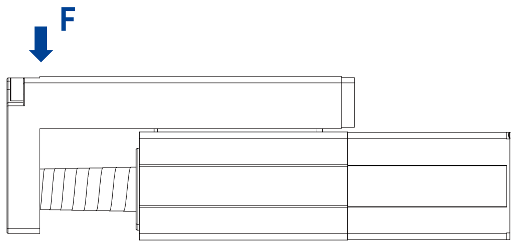
Applicable Drive

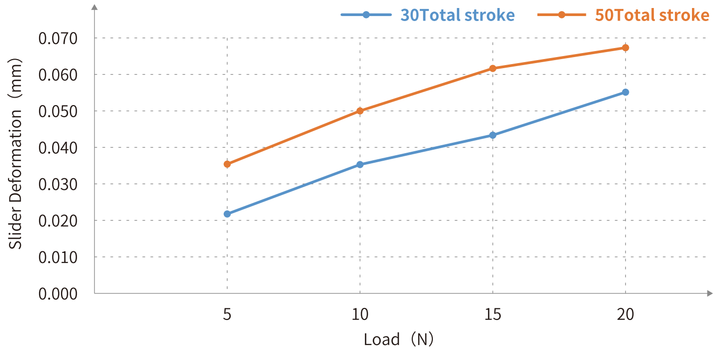
Name	Appearance	Controllable Maxes	Model	Control Methods	Feature	Input voltage	Power Capacity	Reference Page
Small Scale Single-Axis Dedicated Controller		1	SAC-S	RS485	ModbusRTU	DC24V	MAX 72W	SAC-S Selection Page P27-28
				I/O	Up to 16 I/O Points			
				Pulse+I/O	Direction+Pulse			
Single-Axis Dedicated Controller		1	SAC-N	RS485	ModbusRTU	DC24V	MAX 200W	SAC-N Selection Page P29-30
				I/O	Up to 64 I/O Points			
				Pulse+I/O	Direction+Pulse			
Single-Axis Dedicated Force Control Controller		1	SAC-NF	RS485	ModbusRTU	DC24V	MAX 200W	Please Contact us for Force Control Applications.
Dual Axis Standard Drive		2	SAC-N2	EtherCat	Standard CIA402 Axis Control	DC24V / DC48V	MAX 240W (24V) /480W (48V)	SAC-N2 Selection Page P33-34
				Pulse+I/O	Direction+Pulse			
				RS485	ModbusRTU			

Rigidity Deformation of Electric Cylinder (Reference Value)

> Axial Bending

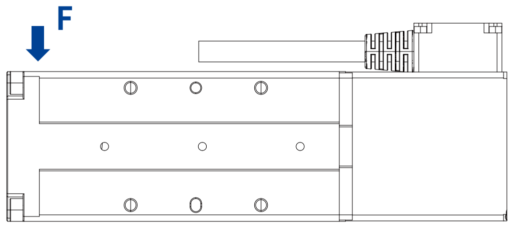
The amount of deformation at the tip of the slider due to axial bending moment load when the slider is fully extended and a load is applied at the indicated position (arrow).

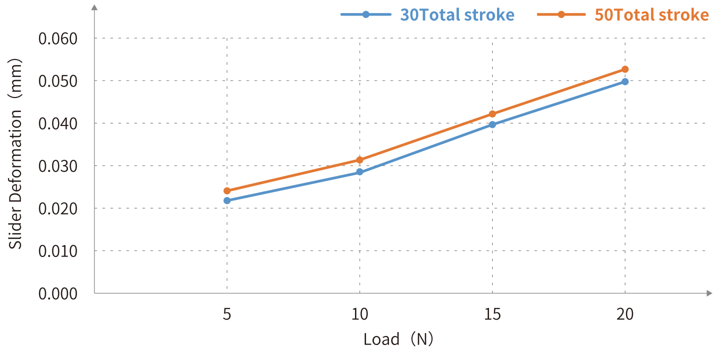




> Offset Load (Eccentric Load)

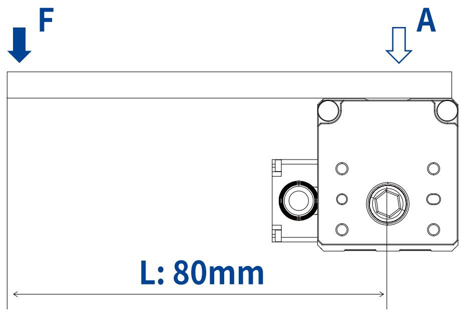
The amount of deformation at the tip of the slider caused by an offset (eccentric) moment load when the slider is fully extended and a load is applied at the indicated position (arrow).

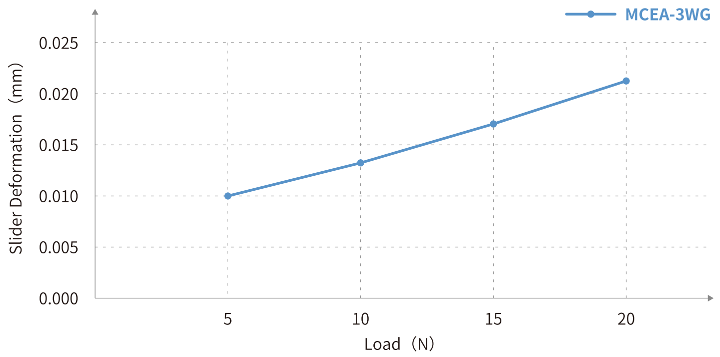




> Torsion (Rotational Moment)

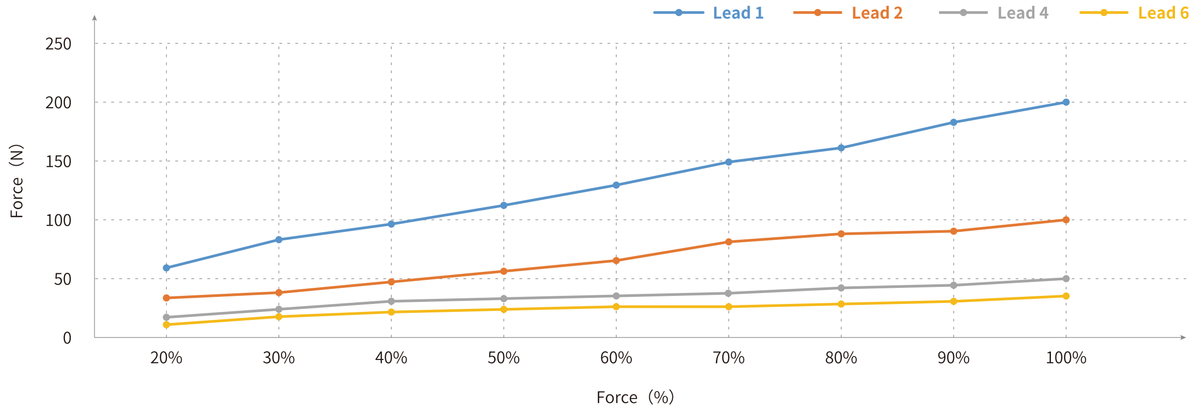
The amount of deformation at point A on the slider caused by a rotational moment load when the slider is fully retracted and a load is applied at point F.





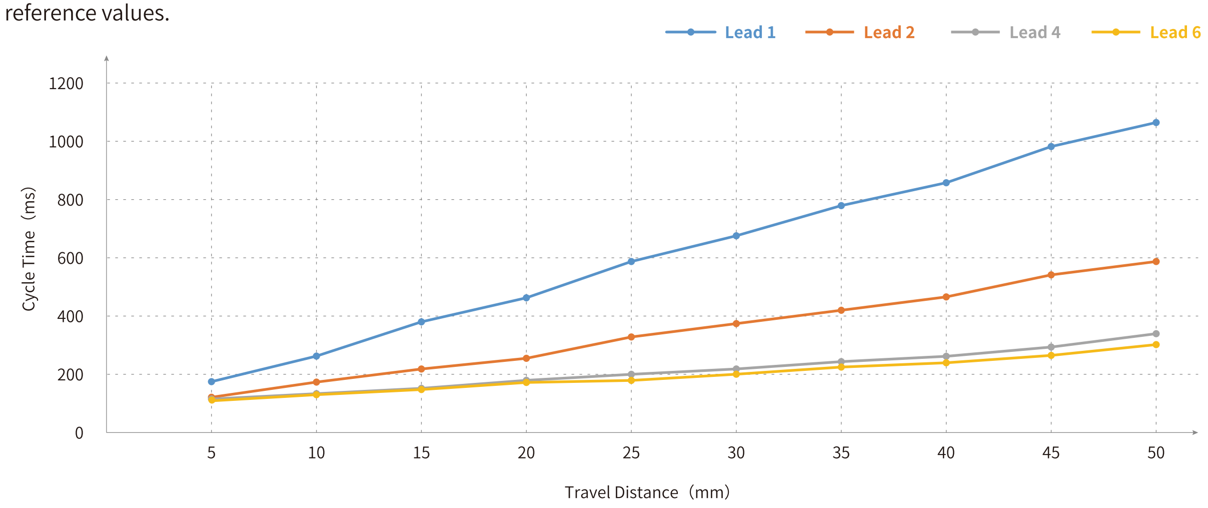
Electric Cylinder Thrust Curve (Reference Value)

Thrust output curves under different load conditions with the electric cylinder mounted horizontally.



Electric Cylinder Cycle Time Curve (Reference Value)

Reference values for maximum load operation cycle time of the electric cylinder.Note: Communication delay of 30 ms is included in the reference values.



MCEA-4G

Miniature Electric Table Type Cylinder

DH-ROBOTICS

External-Drive Electric Cylinder Selection Method

Series	Width/Guide	Lead	Stroke	External Drive	Brake	Cable Direction	Applicable Drive IO Type	Cable Length	Customized *①
MCEA	4G	05	075	E1	O	F1	S01	L01	0

Lead	
05	
10	

Stroke
075
150

External Drive	
E1	ABZ *②
E2	SSI *③

Brake	
O	Without Brake
W	With Brake

Cable Direction	
F1	侧面朝前出线
F2	侧面朝后出线
F3	侧面朝上出线
F4	侧面朝下出线

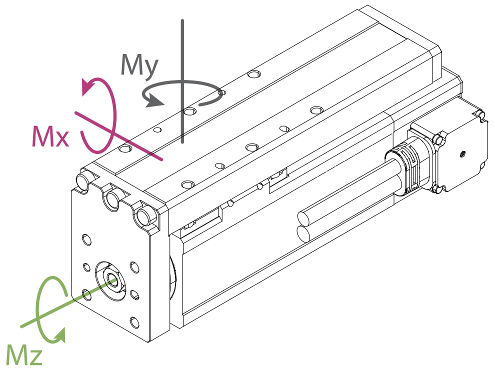
Applicable Drive IO Type	
S01	SAC-S
S02	SAC-N
S03	SAC-NF
X01	SAC-N2

Cable Length	
L01	1m Direct Cable Outlet
L03	3m Direct Cable Outlet
L05	5m Direct Cable Outlet
L10	10m Direct Cable Outlet

Customized	
0	No Customization

Note：*① For customization fees, consult with the sales staff of DH-Robotics.
*② ABZ：Incremental Encoder: Phase search is required after power-up.
*③ SSI：Single-Turn Absolute Encoder: Phase search is not required after power-up. (It is recommended to select this type of encoder when the electric cylinder is used as the Z-axis).

TECHNICAL SPECIFICATIONS



Allowable Load Moment

Mx	18.8 N.m
My	18.8 N.m
Mz	30.5 N.m

*④ When selecting the power supply, please select according to the peak current.If the current is lower than the parameter, it will cause the product can not work normally.

Technical Parameters

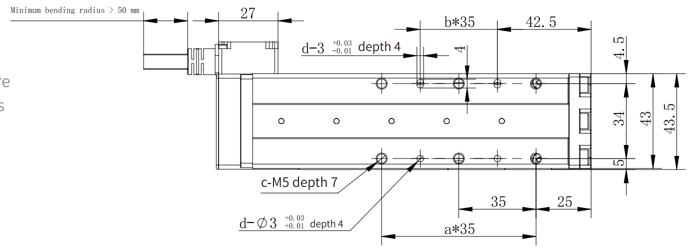
Total stroke	75 mm，150 mm	
Screw lead	5 mm	10 mm
Rated thrust	170 N	85 N
Min. Thrust	51 N	25.5 N
Max. Speed	165 mm/s	330 mm/s
Max. Acceleration	2000 mm/s^2	3000 mm/s^2
Max. Weight capacity - horizontal	15 kg	15 kg
Max. Weight capacity - vertical	6 kg	3 kg
Positioning repeatability	±0.02 mm	
Mechanical backlash	Less than 0.1mm	
Weight	75 Total stroke：1.4 kg	150 Total stroke：1.65 kg

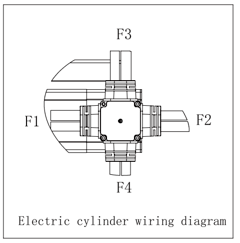
Operating Environment

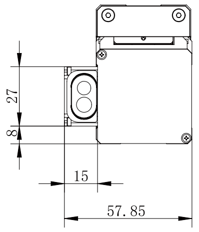
Communication protocol	External: Depending on the Selected Driver
Rated voltage	24 V DC ± 10%
Current	2.5 A (Rated) /7 A (Peak) *④
Protection rating	IP 40
Recommended operating environment	0 to 40°C, Below 85% RH
Compliance with international standards	CE，FCC，RoHS，TUV

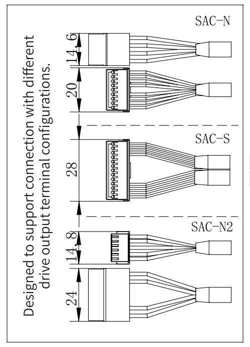
Dimensions

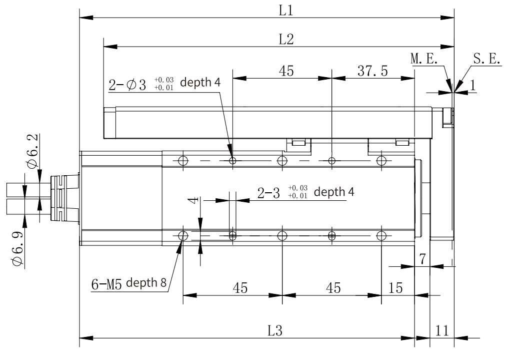
Note:
During homing/reset, the slider will move all the way to the ME (Mechanical End).Please ensure there is no interference with surrounding objects during this movement.


Minimum bending radius > 50 mm
27
d-3 depth 4
b*35
42.5
4.5
34
43
43.5
5
c-M5 depth 7
d-Ø3 depth 4
35
25
a*35

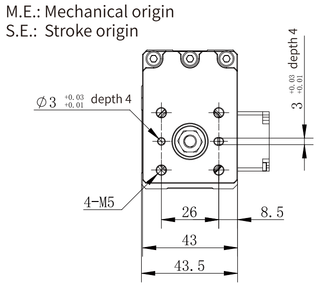

F3
F1
F2
F4
Electric cylinder wiring diagram




SAC-N
SAC-S
SAC-N2
14.6
20
28
14.8
24
Designed to support connection with different drive output terminal configurations.


L1
L2
2-Ø3 depth 4
45
37.5
M.E.
S.E.
1
Ø6.2
Ø6.9
2-3 depth 4
4
7
6-M5 depth 8
45
45
15
L3
11

M.E.: Mechanical origin
S.E.: Stroke origin

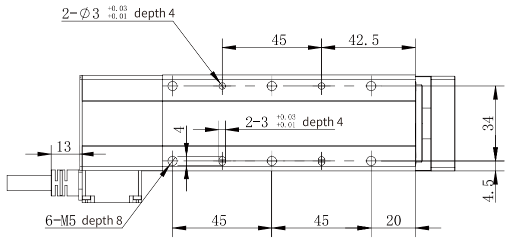

depth 4
Ø3 depth 4
3
4-M5
26
8.5
43
43.5

mm

Stroke	75	150
L1	170	243
L2	159	234
L3	152	225

a	2	4
b	1	2
c	6	10
d	2	4

注:抱闸/非抱闸长度尺寸一致


2-Ø3 depth 4
45
42.5
2-3 depth 4
4
13
34
4.5
6-M5 depth 8
45
45
20

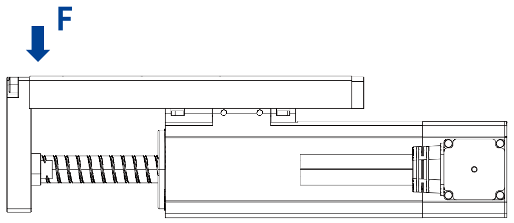
Applicable Drive

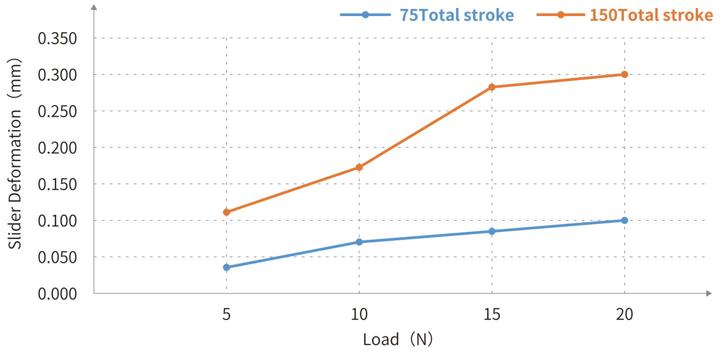
Name	Appearance	Controllable Maxes	Model	Control Methods	Feature	Input voltage	Power Capacity	Reference Page
Small Scale Single-Axis Dedicated Controller		1	SAC-S	RS485	ModbusRTU	DC24V	MAX 72W	SAC-S Selection Page P27-28
				I/O	Up to 16 I/O Points			
				Pulse+I/O	Direction+Pulse			
Single-Axis Dedicated Controller		1	SAC-N	RS485	ModbusRTU	DC24V	MAX 200W	SAC-N Selection Page P29-30
				I/O	Up to 64 I/O Points			
				Pulse+I/O	Direction+Pulse			
Single-Axis Dedicated Force Control Controller		1	SAC-NF	RS485	ModbusRTU	DC24V	MAX 200W	Please Contact us for Force Control Applications.
Dual Axis Standard Drive		2	SAC-N2	EtherCat	Standard CIA402 Axis Control	DC24V / DC48V	MAX 240W (24V) /480W (48V)	SAC-N2 Selection Page P33-34
				Pulse+I/O	Direction+Pulse			
				RS485	ModbusRTU			

Rigidity Deformation of Electric Cylinder (Reference Value)

> Axial Bending

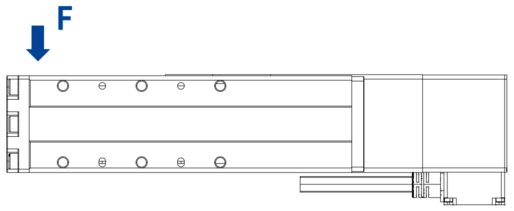
The amount of deformation at the tip of the slider due to axial bending moment load when the slider is fully extended and a load is applied at the indicated position (arrow).

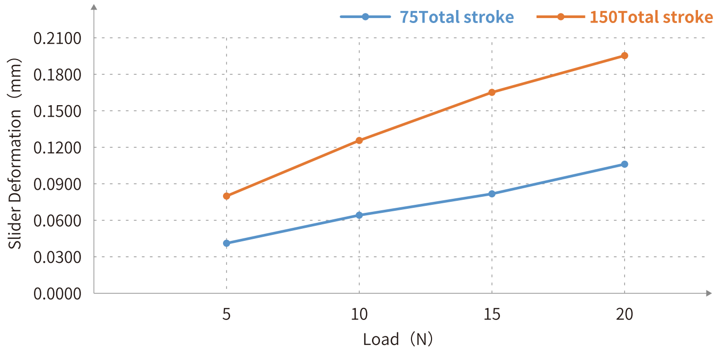




> Offset Load (Eccentric Load)

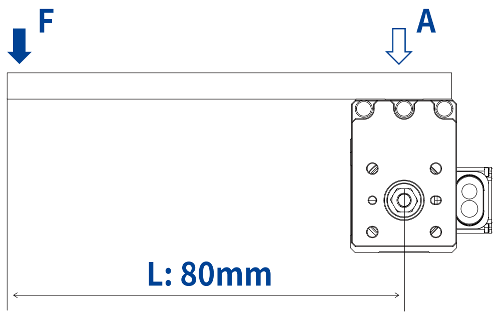
The amount of deformation at the tip of the slider caused by an offset (eccentric) moment load when the slider is fully extended and a load is applied at the indicated position (arrow).

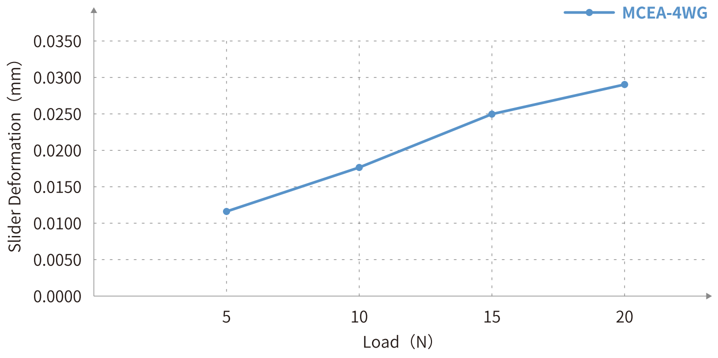




> Torsion (Rotational Moment)

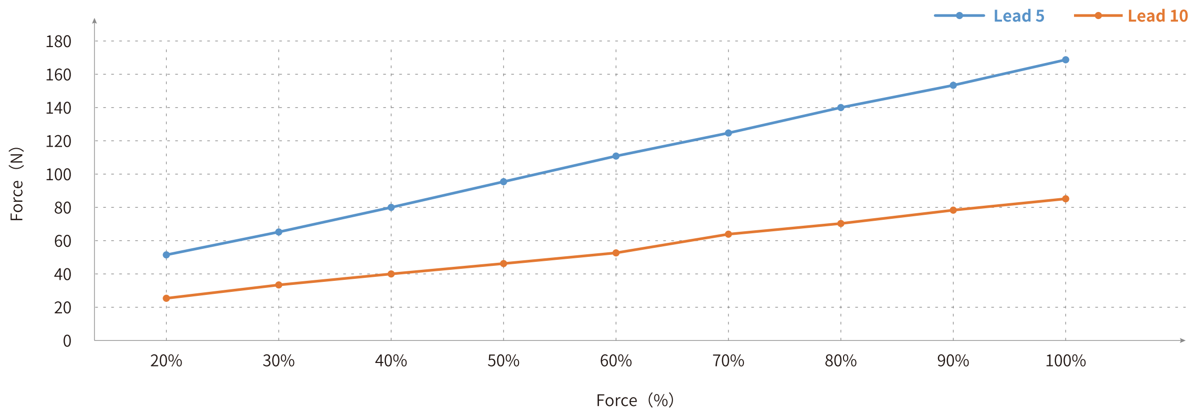
The amount of deformation at point A on the slider caused by a rotational moment load when the slider is fully retracted and a load is applied at point F.





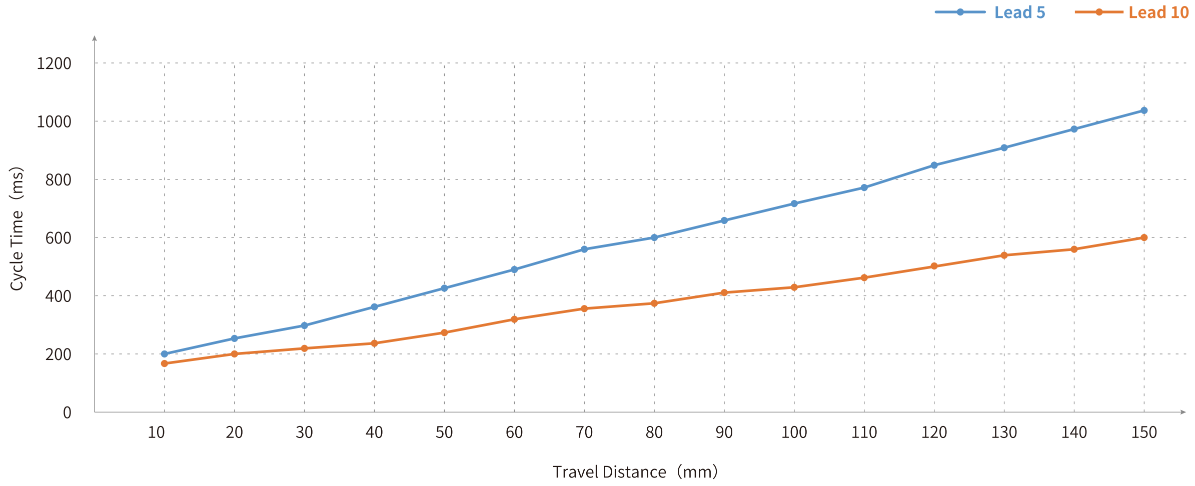
Electric Cylinder Thrust Curve (Reference Value)

Thrust output curves under different load conditions with the electric cylinder mounted horizontally.



Electric Cylinder Cycle Time Curve (Reference Value)

Reference values for maximum load operation cycle time of the electric cylinder.Note: Communication delay of 30 ms is included in the reference values.



RCEA-3M

Miniature Electric Table Type Cylinder

DH-ROBOTICS

Integrated-Drive Electric Cylinder Selection Method

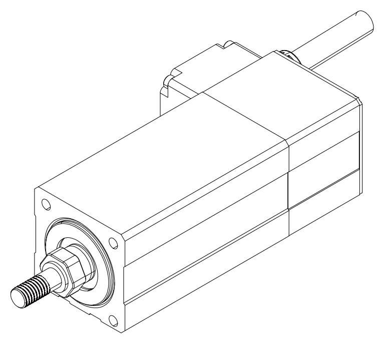
Series	Width/Guide	Lead	Stroke	Integrated Drive	Brake	Cable Direction	Applicable Drive IO Type	Cable Length	Customized *①
RCEA	3M	01	030	C	O	F1	M01	L01	0
		01 02 04 06	030 050		**O** Without Brake **W** With Brake	**F1** 侧面朝前出线 **F2** 侧面朝后出线 **F3** 侧面朝上出线 **F4** 侧面朝下出线	**M01** ModbusRTU(RS485)+IO(NN) **M02** ModbusRTU(RS485)+IO(PP)	**L01** 1m Direct Cable Outlet **L03** 3m Direct Cable Outlet **L05** 5m Direct Cable Outlet **L10** 10m Direct Cable Outlet	**0** No Customization

External-Drive Electric Cylinder Selection Method

Series	Width/Guide	Lead	Stroke	External Drive	Brake	Cable Direction	Applicable Drive IO Type	Cable Length	Customized *①
RCEA	3M	01	030	E1	O	F1	S01	L01	0
		01 02 04 06	030 050	**E1** ABZ *② **E2** SSI *③	**O** Without Brake **W** With Brake	**F1** 侧面朝前出线 **F2** 侧面朝后出线 **F3** 侧面朝上出线 **F4** 侧面朝下出线	**S01** SAC-S **S02** SAC-N **S03** SAC-NF **X01** SAC-N2	**L01** 1m Direct Cable Outlet **L03** 3m Direct Cable Outlet **L05** 5m Direct Cable Outlet **L10** 10m Direct Cable Outlet	**0** No Customization

Note: *① For customization fees, consult with the sales staff of DH-Robotics.
*② ABZ: Incremental Encoder: Phase search is required after power-up.
*③ SSI: Single-Turn Absolute Encoder: Phase search is not required after power-up. (It is recommended to select this type of encoder when the electric cylinder is used as the Z-axis).

TECHNICAL SPECIFICATIONS



Note:
1、Since the drive screw is not equipped with a stop-rotation structure, please add a structure with a stop-rotation function, such as a guide rail, to the end of the drive screw (without a stop-rotation structure, the drive screw will rotate with the rotation of the motor and cannot move back and forth). In addition, please do not use floating joints at the connection between the stop structure and the tie rod.
2、The horizontal load mass is the value with the use of an external rail.
3、Do not apply a load to the tie rod other than in the direction of tie rod movement.

*④ When selecting the power supply, please select according to the peak current. If the current is lower than the parameter, it will cause the product can not work normally.

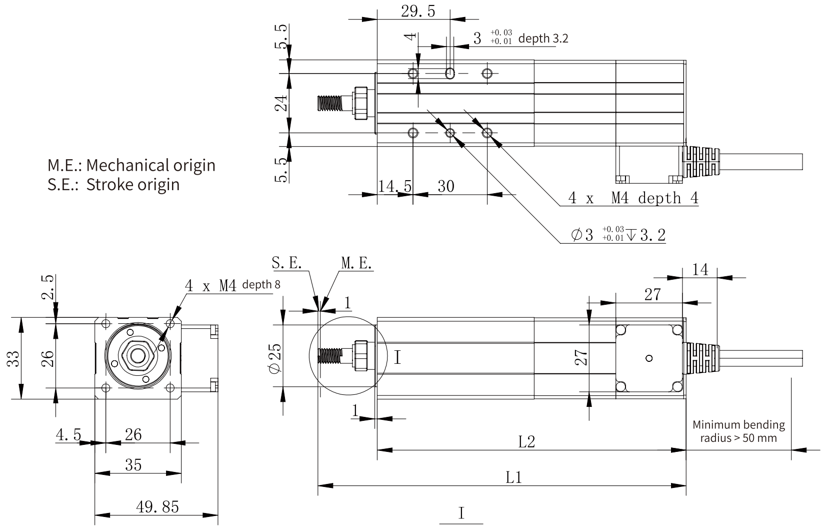
Technical Parameters

Total stroke	30 mm, 50 mm			
Screw lead	1 mm	2 mm	4 mm	6 mm
Rated thrust	200 N	100 N	50 N	30 N
Max. Speed	50 mm/s	100 mm/s	200 mm/s	300 mm/s
Max. Acceleration	2000 mm/s²	3000 mm/s²	3000 mm/s²	3000 mm/s²
Max. Weight capacity - horizontal	8 kg	6 kg	3 kg	2 kg
Max. Weight capacity - vertical	2 kg	1.5 kg	0.75 kg	0.5 kg
Positioning repeatability	±0.01 mm			
Mechanical backlash	Less than 0.1mm			
Weight	30 Total stroke: 0.47 kg		50 Total stroke: 0.55 kg	

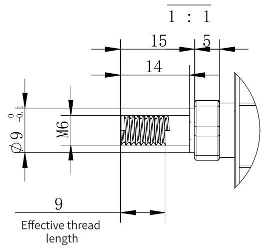
Operating Environment

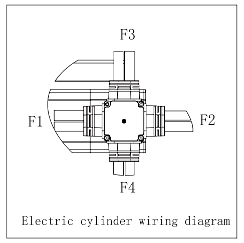
Communication protocol	External: Depending on the Selected Driver
Rated voltage	24 V DC ± 10%
Current	1.5 A (Rated) /3 A (Peak) *④
Protection rating	IP 40
Recommended operating environment	0 to 40°C, below 85% RH
Compliance with international standards	CE, FCC, RoHS, TUV

Dimensions



M.E.: Mechanical origin
S.E.: Stroke origin





Electric cylinder wiring diagram

Without Brake mm

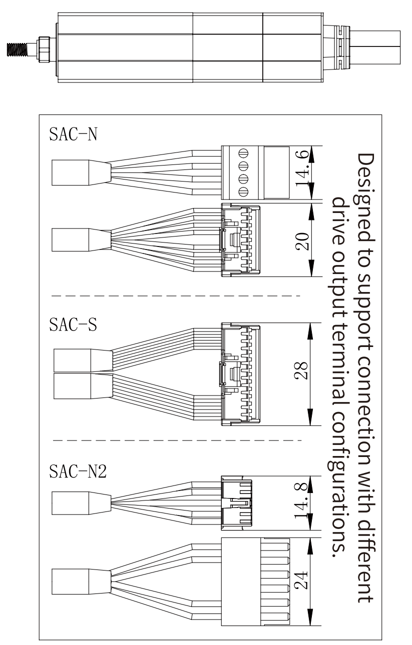
Stroke	30	50
L1	116	136
L2	92	112

With Brake mm

Stroke	30	50
L1	136	149
L2	112	125

Note:
During homing/reset, the slider will move all the way to the ME (Mechanical End).Please ensure there is no interference with surrounding objects during this movement.

External Electric Cylinder – Compatible with Various Drive Output Terminal Types

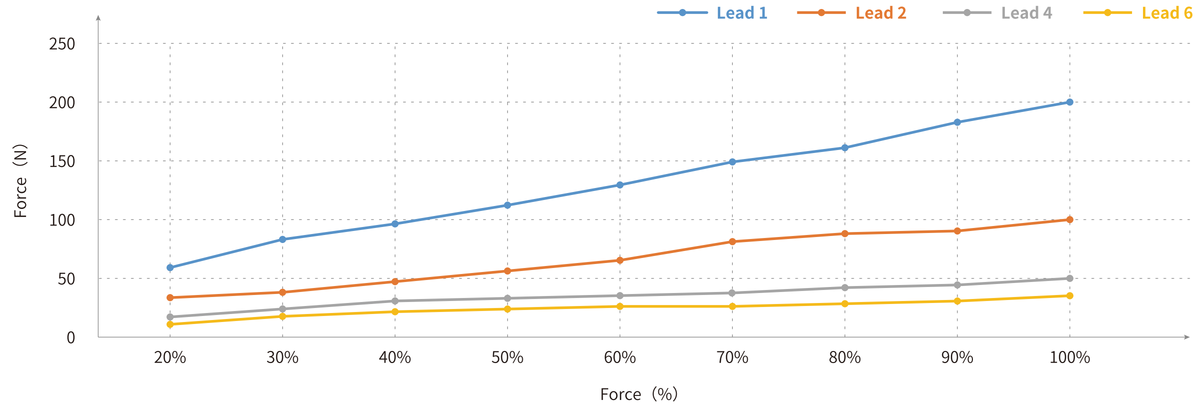

SAC-N
14.6
20
SAC-S
28
SAC-N2
14.8
24
Designed to support connection with different drive output terminal configurations.

Applicable Drive

Name	Appearance	Controllable Maxes	Model	Control Methods	Feature	Input voltage	Power Capacity	Reference Page
Small Scale Single-Axis Dedicated Controller		1	SAC-S	RS485	ModbusRTU	DC24V	MAX 72W	SAC-S Selection Page P27-28
				I/O	Up to 16 I/O Points			
				Pulse+I/O	Direction+Pulse			
Single-Axis Dedicated Controller		1	SAC-N	RS485	ModbusRTU	DC24V	MAX 200W	SAC-N Selection Page P29-30
				I/O	Up to 64 I/O Points			
				Pulse+I/O	Direction+Pulse			
Single-Axis Dedicated Force Control Controller		1	SAC-NF	RS485	ModbusRTU	DC24V	MAX 200W	Please Contact us for Force Control Applications.
Dual Axis Standard Drive		2	SAC-N2	EtherCat	Standard CIA402 Axis Control	DC24V / DC48V	MAX 240W (24V) /480W (48V)	SAC-N2 Selection Page P33-34
				Pulse+I/O	Direction+Pulse			
				RS485	ModbusRTU			

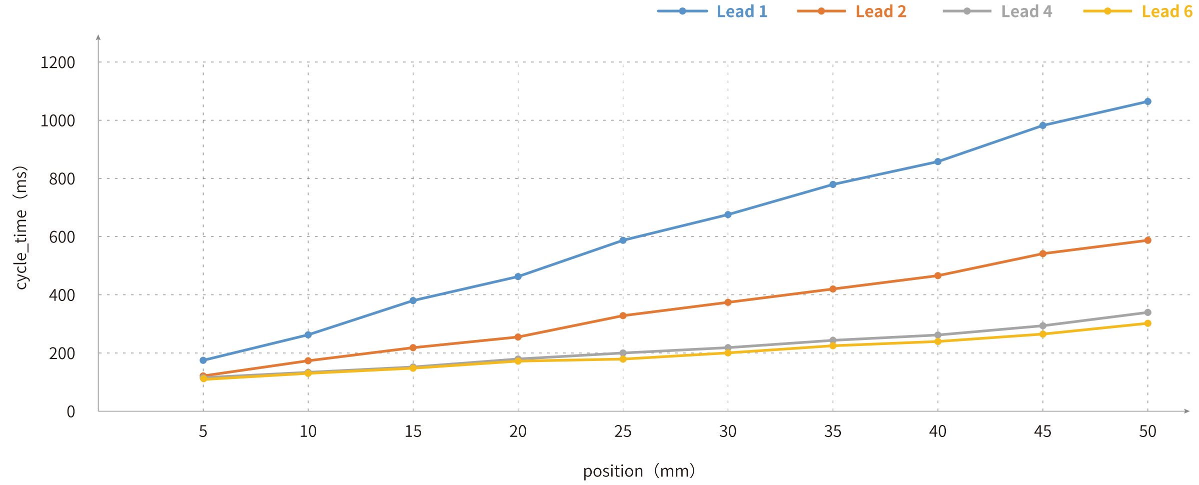
Electric Cylinder Thrust Curve (Reference Value)

Thrust output curves under different load conditions with the electric cylinder mounted horizontally.

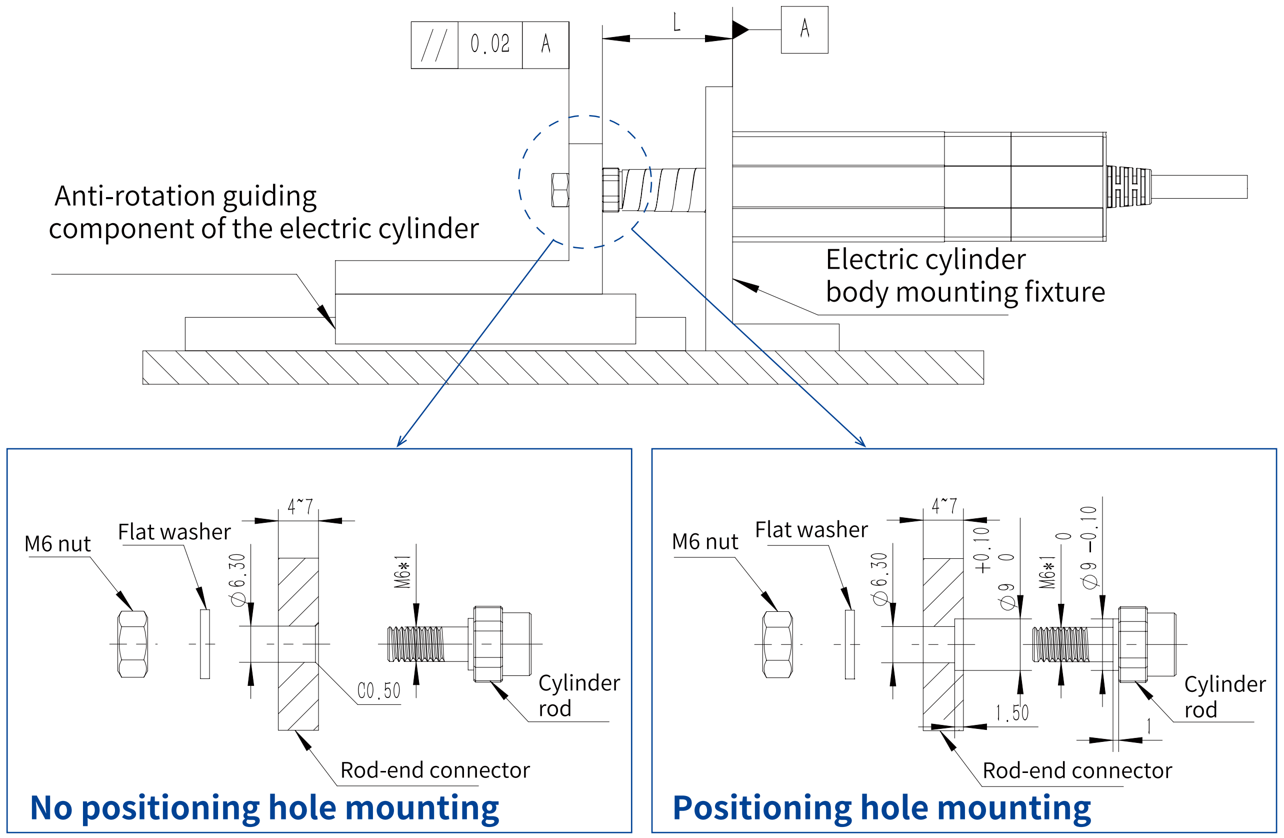


Electric Cylinder Cycle Time Curve (Reference Value)

Reference values for maximum load operation cycle time of the electric cylinder.Note: Communication delay of 30 ms is included in the reference values.

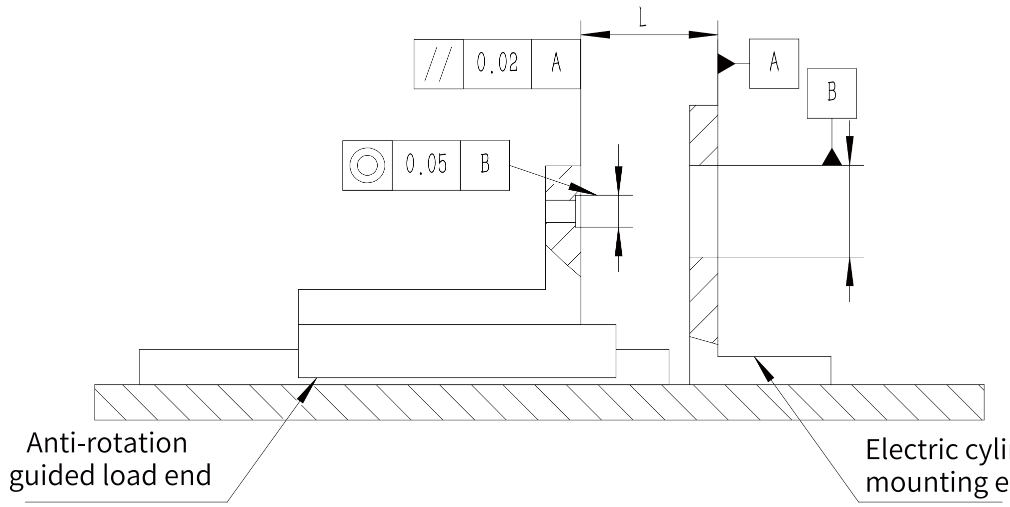


Anti-rotation Mechanism Installation Diagram


0.02
A
L
A
Anti-rotation guiding component of the electric cylinder
Electric cylinder body mounting fixture
M6 nut
Flat washer
4~7
⌀6.30
M6*1
C0.50
Cylinder rod
Rod-end connector
No positioning hole mounting
M6 nut
Flat washer
4~7
⌀6.30
⌀9 +0.10 0
M6*1
⌀9 0 -0.10
1.50
1
Cylinder rod
Rod-end connector
Positioning hole mounting

Note:
Do not use floating couplings to connect the anti-rotation mechanism of the drive shaft. Otherwise, radial oscillations may apply lateral force to the lead screw, potentially resulting in malfunction or premature damage of the drive shaft.

Electric Cylinder and Anti-rotation Guided Load Installation Diagram


L
0.02
A
A
B
0.05
B
Anti-rotation guided load end
Electric cylinder mounting end

Note:
The mounting hole tolerance between the cylinder mounting section and the anti-rotation guided load end should be controlled within 0.05 mm, and parallelism should be within 0.02 mm. Poor accuracy may result in abnormal noise, vibration, and may lead to malfunction or damage to the electric cylinder.

Drive

Series	Number of Controllable Axes	Support Control Methods	Reference Page
SAC-S	1	I/O, Pulse(24V), ModbusRTU RS485	P29-30
SAC-N	1	I/O, Pulse(24V), ModbusRTU RS485	P31-32
SAC-N2	2	EtherCAT, IO	P33-34

Product Features

DH-Robotics servo drives feature advanced technology and broad applicability. With an integrated dual-axis EtherCAT design, they support various motor types and provide robust performance across a wide range of applications.

Multi-axis Synchronous Control & High-Precision Response

Supports EtherCAT bus control for nanosecond-level multi-axis synchronization. High-speed 3.5 kHz velocity loop enables stable, vibration-free motion. Compatible with a wide range of motors, including servo motors, linear motors, and voice coil motors. Supports various encoder protocols (Biss-C, SSI, Endat, etc.) with up to 24-bit feedback resolution.

Auto Tuning & Intelligent Identification

Smart algorithms streamline commissioning, reducing tuning time by 60%, Automatically identifies system parameters such as load, inertia, cogging force, and friction, Adaptive stiffness tuning enhances overall system robustness,Built-in motor parameter library simplifies installation and configuration.

High-Precision Force Control & Mechanical Error Compensation

Hardware-based current loop with high-precision current sampling; supports soft landing, Effectively compensates for mechanical errors such as guide rail misalignment, spring resistance, and cogging, High-precision force control algorithm enables effortless 0.01 N-level force control, Enables intelligent full-stroke control with 1g resolution.

Versatile Control Modes & System Expandability

Supports position, velocity, torque, and hybrid control modes for diverse application needs, Vertically aligned modular multi-axis design with 3× overload capacity, Offers a wide range of industrial control protocols including EtherCAT, RS485, EtherNet/IP, and CC-Link, Designed to meet the demands of complex industrial automation integration.

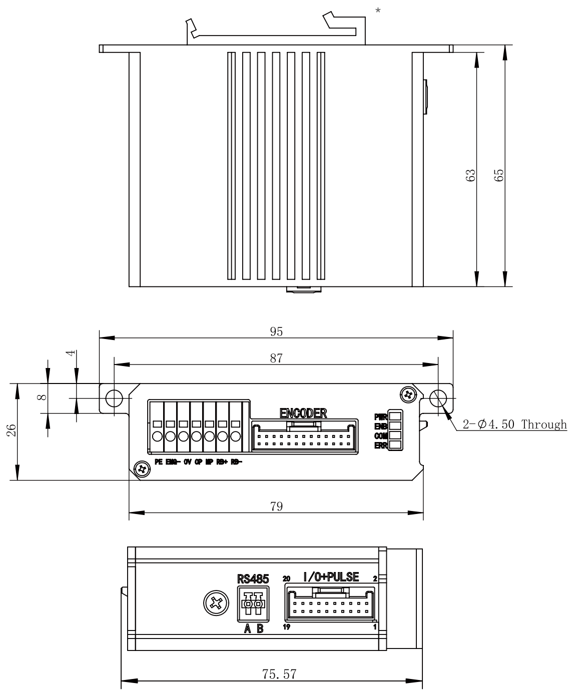
SAC-S

Single Axis Controllor

Selection Method

Series	Type	Communication interface	Voltage	Rated Current	Encoder	IO Cable Length	Customized
SAC	S	M1	K	03	A1	0	0
	S Simple	**M1** ModbusRTU (RS485)+IO(NN) **M2** ModbusRTU (RS485)+IO(PP)	**K** 24V	**03** 3A	**A1** Incremental ABZ+ Single-Turn Absolute SSI	**0** No IO Cable **1** 1m IO Cable **2** 2m IO Cable	**0** No Customization **1** Customization

TECHNICAL SPECIFICATIONS



*Guide rail clips are industry standard size and can be removed when installed with screws

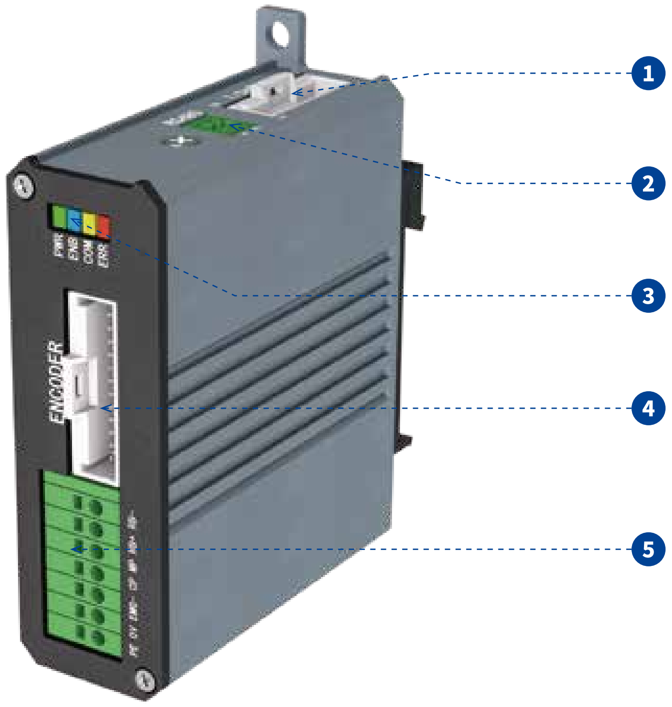
Technical Parameters

Number of controllable axes	1
Support control methods	I/O, Pulse(24V), ModbusRTU RS485
Number of points	16
I/o and pulse connection holder	20PIN Connector
Number of i/o	8 in 8 out
Debugging protocols	RS485(Modbus-RTU)
Pulse type	Opticalcoupler
Max. Pulse frequency	100 Kpps
Brake control	Support
Force-controlled Closed-loop control	Support

Operating Environment

Input voltage	24 V DC ± 10%
Output current	3 A(Rated)/9 A(Peak)
Recommended operating Environment	0 to 40°C, below 85% RH
Ip class	IP 20
Weigh	150 g

Interface Diagram



① I/O and Pulse(24V) Interface:

20-Pin Terminal Block, including I/O interfaces and pulse (24V) input interfaces.

② RS485 Interface:

Used for debugging, control, and monitoring.

③ Indicators:

Power indicator and status indicator.

④ Actuator Interface:

Connects to the actuator of the electric cylinder, including motor power line, encoder line, and brake line interfaces.

⑤ Power Supply, Discharge, Emergency Stop, and PE Interface:

Logic Power Supply Interface: Supplies power to internal logic circuits, brake, and some external interfaces.

Motor Power Supply Interface: Supplies power to the motor for motion.

PE (Protective Earth) Interface: Connects to the equipment's protective earth (ground) connection.

SAC-N

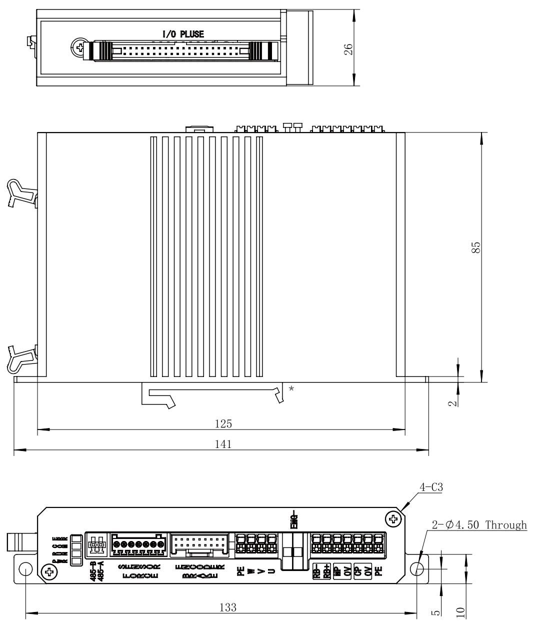
Single Axis Controllor

Selection Method

Series	Type	Communication interface	Voltage	Rated Current	Encoder	IO Cable Length	Customized
SAC	N	M0	K	03	A1	0	0
	N Standard **NF** Standard + Closed-loop force control *①	**M0** ModbusRTU(RS485) +Pulse+IO(NPN/PNP Compatible) **M1** ModbusRTU (RS485)+IO(NN) **M2** ModbusRTU (RS485)+IO(PP)	**K** 24V	**03** 3A **10** 10A	**A1** Incremental ABZ+ Single-Turn Absolute SSI	**0** No IO Cable **1** 1m IO Cable **2** 2m IO Cable	**0** No Customization **1** Customization

*① For SAC-NF selection, please contact DH technical support for application and process confirmation.

TECHNICAL SPECIFICATIONS



*Guide rail clips are industry standard size and can be removed when installed with screws

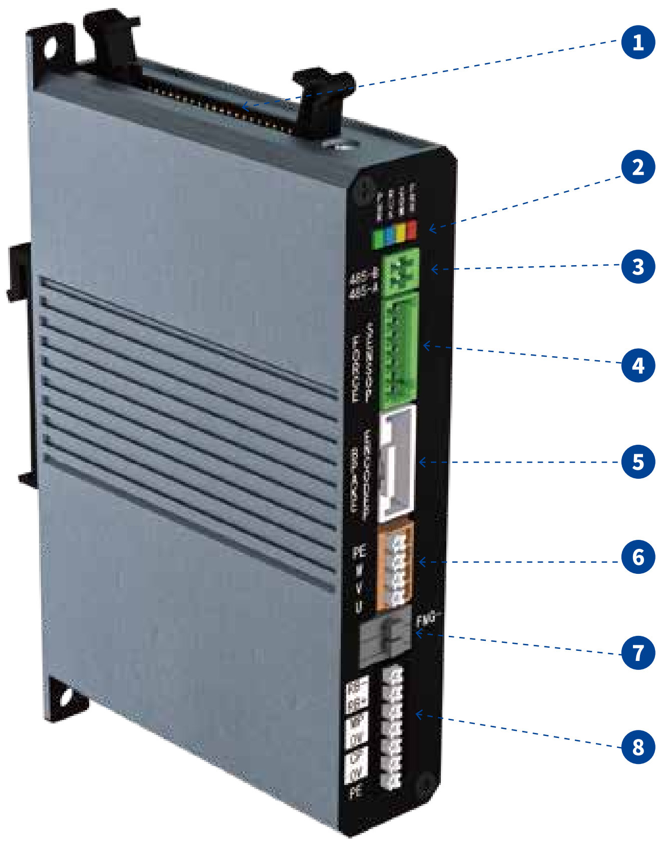
Technical Parameters

Number of controllable axes	1
Support control methods	I/O, Pulse(24V), ModbusRTU RS485
Number of points	64
I/o and pulse connection holder	40PIN Connector
Number of i/o	16 in 16 out
Debugging protocols	RS485(Modbus-RTU)
Pulse type	Opticalcoupler
Max. Pulse frequency	100 Kpps
Brake control	Support
Force-controlled Closed-loop control	Support

Operating Environment

Input voltage	24 V DC ± 10%
Output current	3 A(Rated)/9 A(Peak) 10A(Rated)/25A(Peak)
Recommended operating Environment	0 to 40°C, below 85% RH
Ip class	IP 20
Weigh	300 g

Interface Diagram



① **I/O and Pulse (24V) Interface:**
40-Pin Terminal Block, including I/O interfaces and pulse(24V) input interfaces.

② **Indicators:**
Power indicator and status indicator.

③ **RS485 Interface:**
Used for debugging, control, and monitoring.

④ **Sensor Interface:**
Relay sensor interface.

⑤ **Feedback and Brake Interface:**
Connects to the encoder and brake of the actuator.

⑥ **Motor Interface:**
UVW and PE connections for the motor of the actuator.

⑦ **Emergency Stop:**
Emergency Stop Control Interface: Used for emergency stop control.

⑧ **Power Supply, Discharge, and PE Interface:**
Logic Power Supply Interface: Supplies power to internal logic circuits, brake, and some external interfaces.
Motor Power Supply Interface: Supplies power to the motor for motion.
PE (Protective Earth) Interface: Connects to the equipment's protective earth (ground) connection.

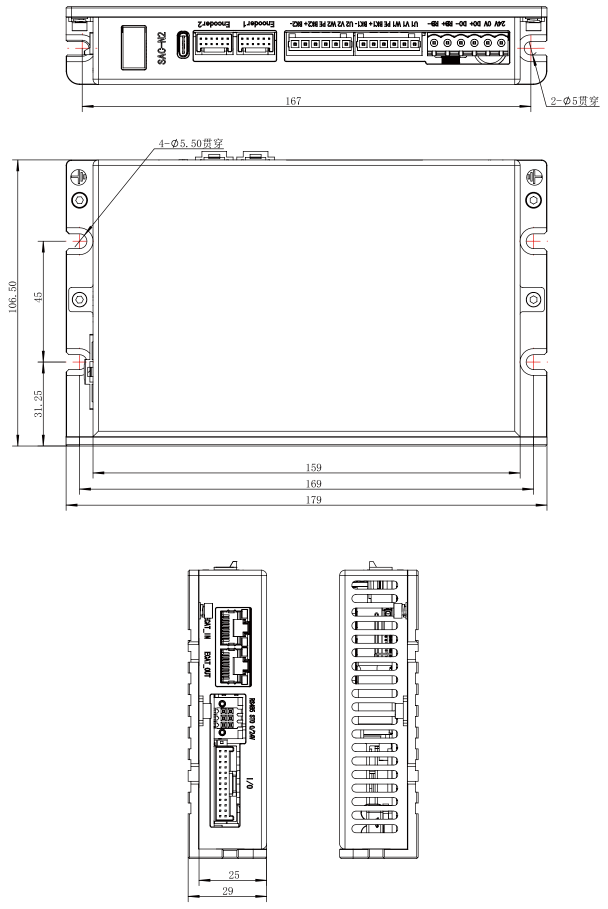
SAC-N2

Dual-axis Controller

Selection Method

Series	Type/Axis	Communication interface	Voltage	Rated Current	Encoder	Rated Current	Encoder	Customized
SAC	N 2	EC	U	03	A1	03	A1	0
	N Standard **2** Dual-Axis	**EC** EtherCAT	**U** 24V，48V	**03** 3A **10** 10A	**A1** Incremental ABZ+ Single-Turn Absolute SSI	**03** 3A **10** 10A	**A1** Incremental ABZ+ Single-Turn Absolute SSI	**0** No Customization **1** Customization

TECHNICAL SPECIFICATIONS



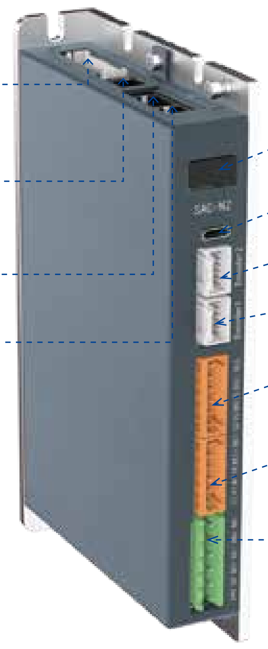
Technical Parameters

Controlled axis	2	
Supported control methods	EtherCAT, IO	
EtherCAT control modes	Position Mode, Velocity Mode, Torque Mode, and Hybrid Mode	
Power supply voltage	24 V	
Motor voltage	24 V / 48 V	
Model	SAC-N2-EC-U-03A1-03A1	SAC-N2-EC-U-10A1-10A1
Output rated current	3 A	10 A
Output peak current	9 A	18 A
Power supply voltage	24 V, 72 W 48 V, 144 W	24 V, 240 W 48 V, 480 W
Encoder	Supports BissC\SSI\Endat\Motegi\ABZ	
Limit Switch, home position, probe	Supported	
Size	179 mm×107.65 mm×29 mm	

Operating Environment

Overload	3 times overload for more than 2.5 seconds
Minimum etherCAT period	200 us
Filters	4 or more
Closed-loop control	Supported
Gantry control	Synchronized in nanoseconds
High-precision encoder and sampling	Supports 23-bit resolution
Auto-tuning gain	Supported
Protection	Overcurrent, Overvoltage, Overheating protection; STO (Safe Torque Off) function
Speed loop response	3.5 KHz
Weight	< 0.6 KG
Protection Level	IP20
Operating Temperature	0~55 °C

Interface Diagram



① **I/O:**
I/O for both axes.Multiplexed pulse interface with 24 Vdc power supply

② **RS485/STO:**
RS485 interface and STO safety torque protection. With 24Vdc power supply

③ **EtherCAT_IN:**
Bus communication input interface

④ **EtherCAT_OUT:**
Bus communication output interface

⑤ **Display:**
Status panel

⑥ **USB:**
Type-C debugging interface

⑦ **Encoder2:**
Axis 2 encoder interface

⑧ **Encoder1:**
Axis 1 encoder interface

⑨ **Motor2:**
Axis 2 motor power interface UVWPE. Motor holding brake interface

⑩ **Motor1:**
Axis 1 motor power interface UVWPE. Motor holding brake interface

⑪ **Power:**
Motor power, logic power input, Drain Brake Resistor Interface

DH-Robotics' Gripper and Cylinder Communication Protocol Conversion Box

The communication within DH-Robotics' Servo Gripper and Servo Electric Cylinder defaults to Modbus RTU (RS485) and a small number of I/O. If customers choose other communication protocols, they will need to use the communication protocol conversion box. The following communication protocol conversion boxes are available for selection:

	Communication Protocol Conversion Box Name	Ordering Model
	EtherCAT 1-1	M2E-B1-1
	EtherCAT 1-4	M2E-B1-4
	EtherCAT转 I/O 1-more	Please contact our technical staff confirm the specific parameters
	TCP/IP 1-1	M2T-B1-1-YBT
	PROFINET 1-2	M2P2-B1-2-HJ
	PROFINET 1接11	M2P-B1-11-9
	Modbus RTU (RS485) to USB Converter Module	A801-0036-WG

Customer Trust

More than 800 customers around the world are using DH-Robotics products
The number of customers continues to grow rapidly. . .

一汽-大众 FAW-VOLKSWAGEN	SAMSUNG	TOYOTA	LENS 蓝思科技	周大福 CHOW TAI FOOK
FOXCONN	Lyric Robot	BOSCH	HUAWEI	LUXSHARE ICT
BYD	dji 大疆创新	molex	mindray 迈瑞	GREE 格力
上汽大众 SAIC VOLKSWAGEN	京东方 BOE	KFC	Lenovo	FANUC
中国航天	HELLA	COMAU	SanDisk	JABIL GREEN POINT

Version Change Log

Revision Date	Released Version	Change Log
2025.05	CN.2505	· Version one

Due to continuous product upgrades, content changes may occur without prior notice.

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