CKD

New Products

Motor Driven Shuttle Mover
ESM Series

ELECTRIC SHUTTLE MOVER ESM SERIES

Job site Revolution
New Solution for Transport

CKD Corporation

CC-1259A 1

Motor driven shuttle mover

ESM SERIES

Motorless type

Belt drive

Three-dimensional transport P&P system

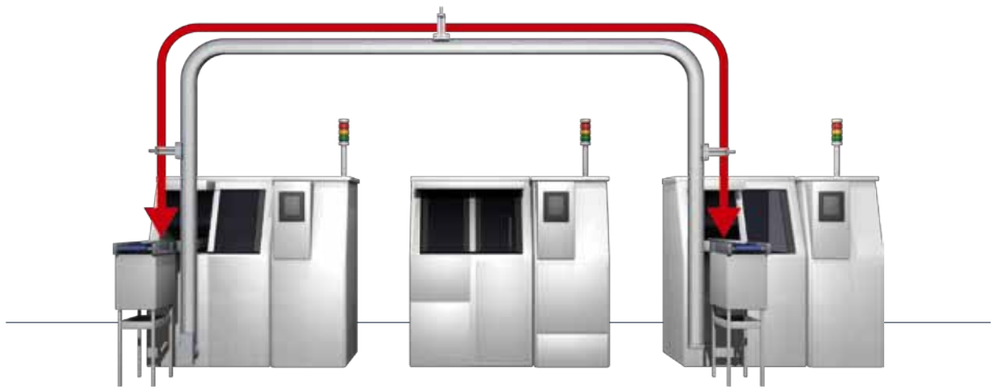
Giving a new concept to the motorless actuator.

Each rail can be connected as a module

Free and flexible combination.

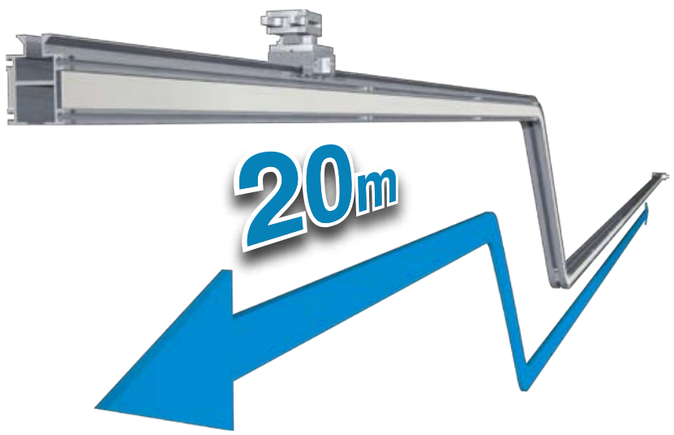
While saving space, the single motor can create the single shaft two-dimensional transport system

Two-dimensional action can be easily achieved without using multiple shaft system or gantry robot.
ESM is the solution that is user-friendly and space saving.



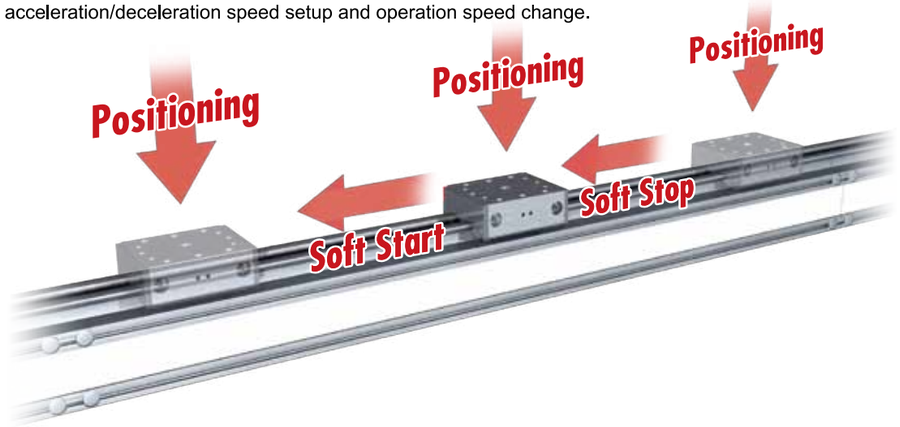
Maximum of 20 m long stroke length

Breaking the traditional concept of electric driven actuator's limitation on long stroke length, ESM has the solution for you to handle long stroke operation.



Multiple point positioning and soft start & stop

Electric driven actuators such as ESM are excellent for multiple point positioning, acceleration/deceleration speed setup and operation speed change.



Motors by various manufacturers are supported

Familiar motors can be used.

Brackets for different motors are available just like our other motorless product series.

List of supported motor manufacturers and field networks

	General purpose	SSCNET	CC-Link	MECHATRO LINK-Ⅱ	MECHATRO LINK-Ⅲ	Device Net
MITSUBISHI	●	●	●	●	●	●
Yaskawa Electric Corporation	●			●	●	●
Keyence Corporation	●			●		

The products do not come with a motor.
Customers are required to prepare, install, and adjust the motor and driver.
For details, refer to the table "Motor specifications and recommended motor model no. (rated output 750 W)" on page 2.

Solution case study

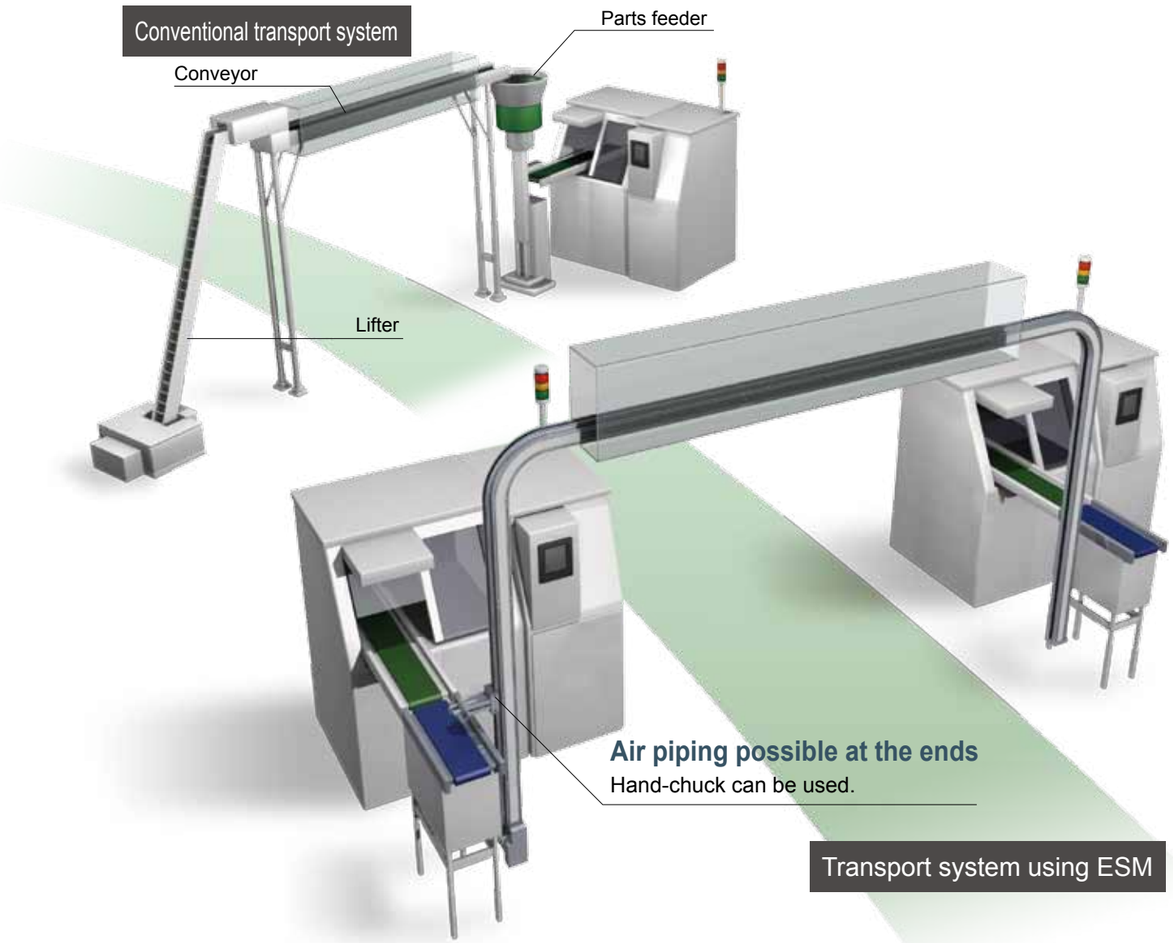
"ESM" can provide solutions for transport challenges!!

Making efficient use of the available space

Transporting work pieces from machine to machine for processing

Two dimensional transport

Maintaining the conventional pathways, work pieces can be transported from machine to machine.



Effective example

- High speed transport is possible (straight section: Max. 2,000 mm/s; curve section: Max. 1,500 mm/s).
- Work pieces can be stopped at multiple locations (repeatability ±0.5 mm).
- Soft starting and soft stopping are possible.
- The combination of straight sections and curve sections allows you to create the pathway you want.
- Pathway can be modified after setup.

For three-dimensional transport

Air Shuttle Mover **SM-25**

The air driven three-dimensional P&P sytem allows you to create a three-dimensional layout you really want.

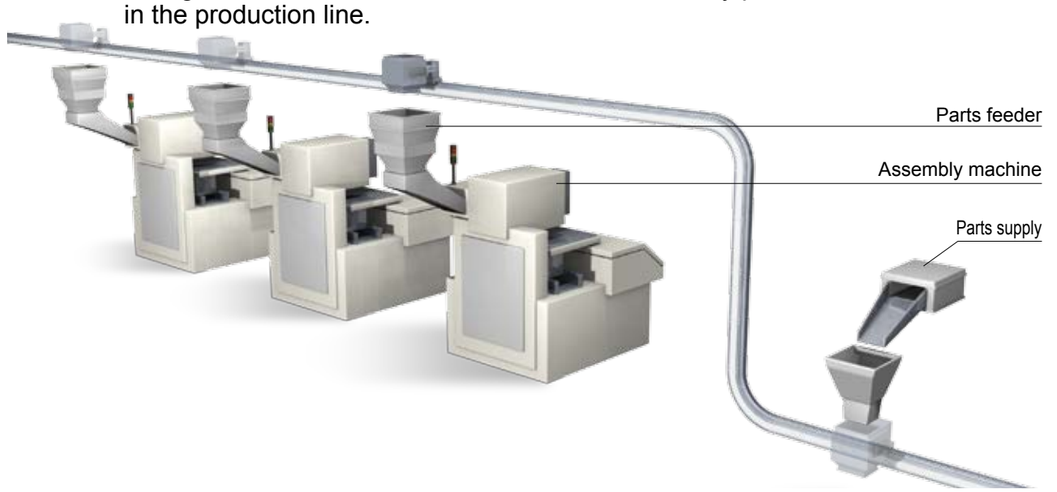
A technique to bend a cylinder tube without crushing enables a curved transport system. The product features three-dimensional transport which was previously unachievable.

Improve the production efficiency

Supplying the same parts to different machines in a straight path

Long stroke length and multiple positioning points

A single actuator can now deliver the same assembly parts to different machines in the production line.



Effective example

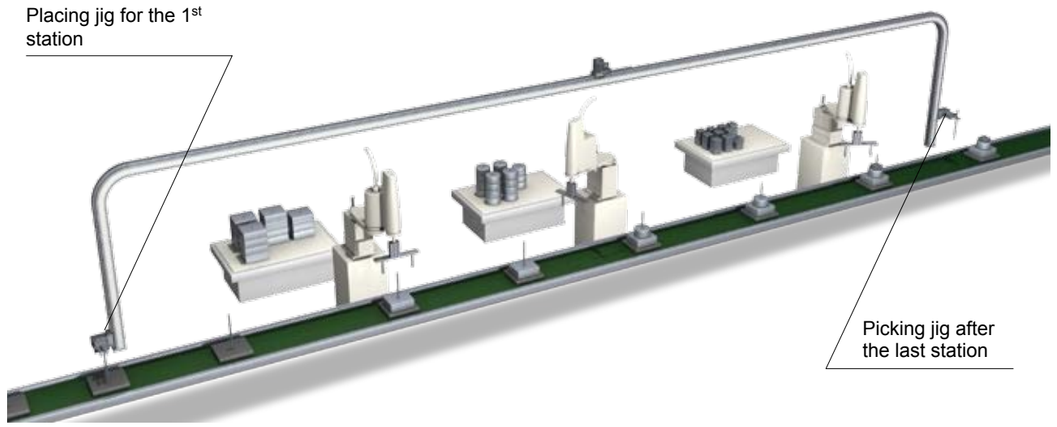
- As the production line becomes more efficient, the productivity will be increased.
- The staff workload will be reduced.
- Since the assembly machines can be arranged in a straight line, the plant space can be utilized more efficiently.

No significant capital investment or modification required

Collecting and transferring of jigs in an assembly line

Long stroke length and high speed

Jigs in an assembly line can be easily pick up after the last station and transferred back to the 1st.



Effective example

- The workload to transport the jig was eliminated.
- The entire system was improved only with few modifications of the device layout.

Motor driven shuttle mover

ESM Series

● Motor driven two-dimensional transport P&P system

RoHS

Specifications

Descriptions	ESM
Motor power supply voltage	Three-phase 200 V
Max. load capacity kg	4
Maximum speed mm/s	Straight section: 2000 or lower Curved section: 1500 or lower
Max. transfer distance (Note 1) m	20
Vertical differences (Note 2) m	3
Repeatability mm	±0.5
Lubrication	Not available
Applicable motor (Note 3)	AC servomotor 750 W For recommended motors, refer to page 2
Detection sensor (Note 4)	Proximity switch OMRON E2E-X2D1-N
Working environment	Use inside general plant (room temperature 5 to 40˚C)

Note 1: Contact CKD if the stroke length exceeds 20 m.
Note 2: The vertical difference is the difference between the heights at the highest spot and the lowest spot in the transporting path.
Note 3: Contact CKD if you want to use a motor other than the recommended motors.
Note 4: If you need to detect the origin and overruns on both ends, you need three of these. (Place an order for the required quantity. Refer to page 2 for the model no. and page 10 for the specifications.)
Note 5: You need 0.5 second or longer for either acceleration or deceleration.
Note 6: The products do not come with a motor. Customers are required to prepare, install, adjust the motor and driver.
Note 7: The products are sold as a unit. Customer are required to install and adjust them.
Note 8: If a curve unit is directly connected to the motor drive unit, the PP unit (air supply unit) cannot be used.

Weight

Unit name	Unit model no.	Weight (kg)
Carrier unit	ESM-CA	0.7
Motor drive unit	ESM-HDU-M	4
Straight unit	ESM-ST-100 (Note 1)	0.5
Tension unit	ESM-TTU	2
Curve unit	ESM-VC-90-1	3.7
	ESM-VC-90-2	3.9
	ESM-VC-45-1	1.9
	ESM-VC-45-2	2

Note 1: The weight increases by 0.5 kg as the stroke length becomes longer by 100 mm.

How to order

(1) Motor drive unit

ESM - **HDU** - **M**

Ⓐ Motor installation specifications	
M	Select the most suitable motor specifications from the table below.
Y	* Contact CKD for the manufactures and models not mentioned in the table.

Motor installation specifications and recommended motor model no. (rated output 750 W)

Manufacturer	Symbol	Motor (without brake)	Motor (with brake)
MITSUBISHI	M	HF-KP73	HF-KP73B
Yaskawa Electric Corporation	Y	SGMJV-08ADA21	SGMJV-08ADA2C
Keyence Corporation	Y	SV-M075**	SV-B075**

(2) Tension unit

ESM - **TTU**

(3) Carrier unit

ESM - **CA**

(4) Straight unit

ESM - **ST** - **100**

Ⓐ Straight unit length	
100 to 2000	100 mm to 2000 mm

Note: We accept special orders for the length between 100 mm to 2000 mm by 1 mm increment.

(5) Curve unit

ESM - **VC** - **90-1**

Ⓐ Angle	
90-1	90 degrees inside
90-2	90 degrees outside
45-1	45 degrees inside
45-2	45 degrees outside

Note : The total of 180 degrees can be used for 1 set.
Example: Two 90-degree units or four 45-degree units.

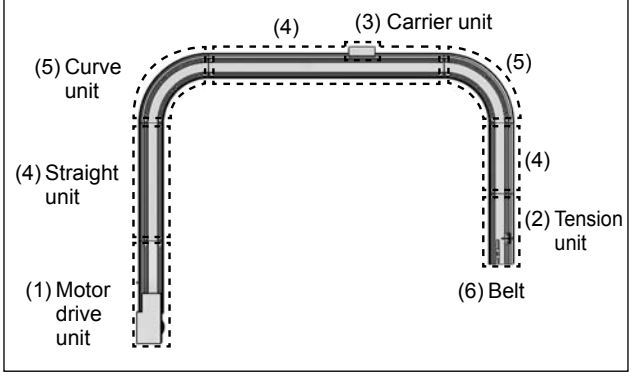
(6) Belt

ESM - **B** - **01370**

Ⓐ Belt length	
01370 to 40570	1370 mm to 40570 mm

Note: Refer to "Selection guide" on pages 7 and 8 to select the belt length.

Unit example



● Other units

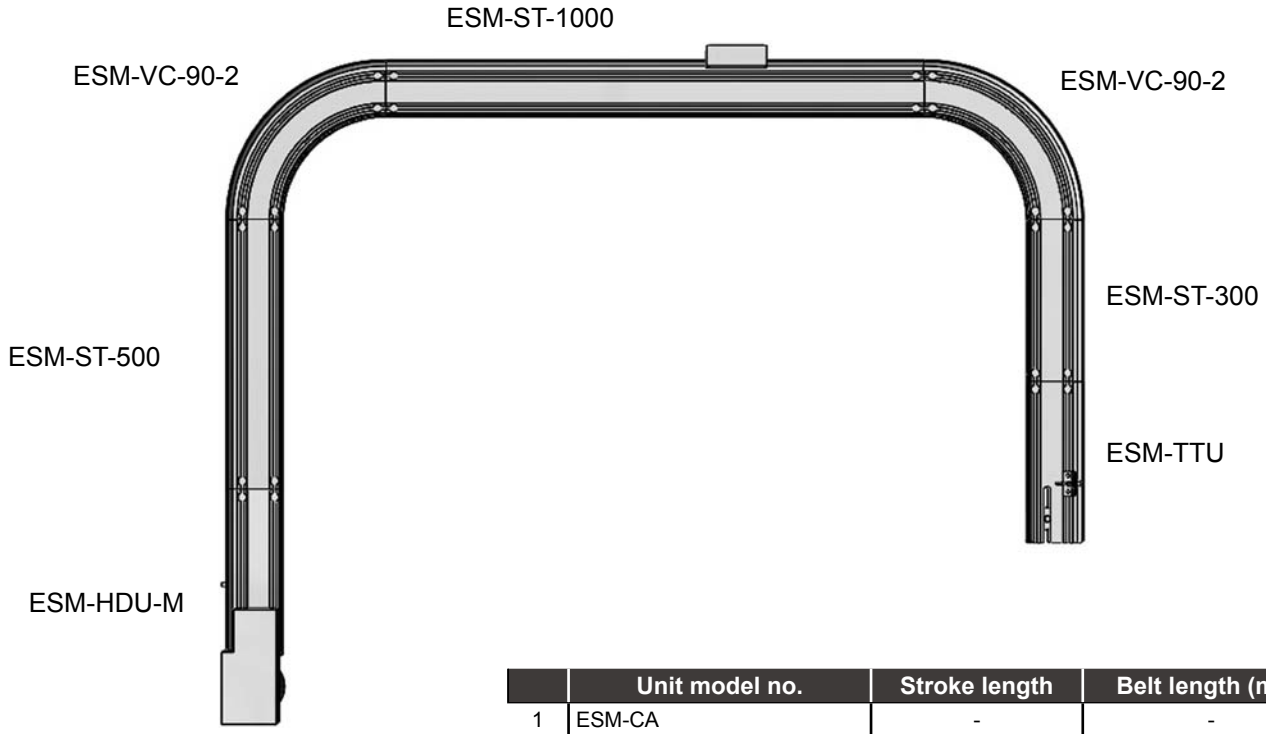
ESM - **PP1**

Ⓐ Model no.	Descriptions
PP1 (Note)	PP unit (air supply unit)
SE	Detection sensor (For details, refer to page 10.)

Note: This is an air supply unit installed on the carrier to supply air to the terminal end. If a curve unit is directly connected to the motor drive unit, the PP unit (air supply unit) cannot be used.

* Those other than "Other units" are required to create a set.

Unit combination examples



	Unit model no.	Stroke length	Belt length (mm)
1	ESM-CA	-	-
2	ESM-HDU-M	150	HDU + TTU = 1170
3	ESM-ST-500	500	1000
4	ESM-VC-90-2	550	910
5	ESM-ST-1000	1000	2000
6	ESM-VC-90-2	550	910
7	ESM-ST-300	300	600
8	ESM-TTU	150	-

• Transporting distance: 3200 mm
• Belt length: 6590 mm

Belt length selection and examples

Calculate the belt length based on the unit combination given above. (Refer to page 8 for details.)

1. The belt length for the motor drive unit and the tension unit is 1170 mm (fixed length).

2. Double the stroke length of the straight section.
(stroke length of [ESM-ST-500] + stroke length of [ESM-ST-1000] + stroke length of [ESM-ST-300]) × 2
= (500 + 1000 + 300) × 2
= 3600 mm

3. Belt length for the 90-degree curve unit is 910 mm.
Since there are two of them, the total will be: 910 × 2 = 1820 mm

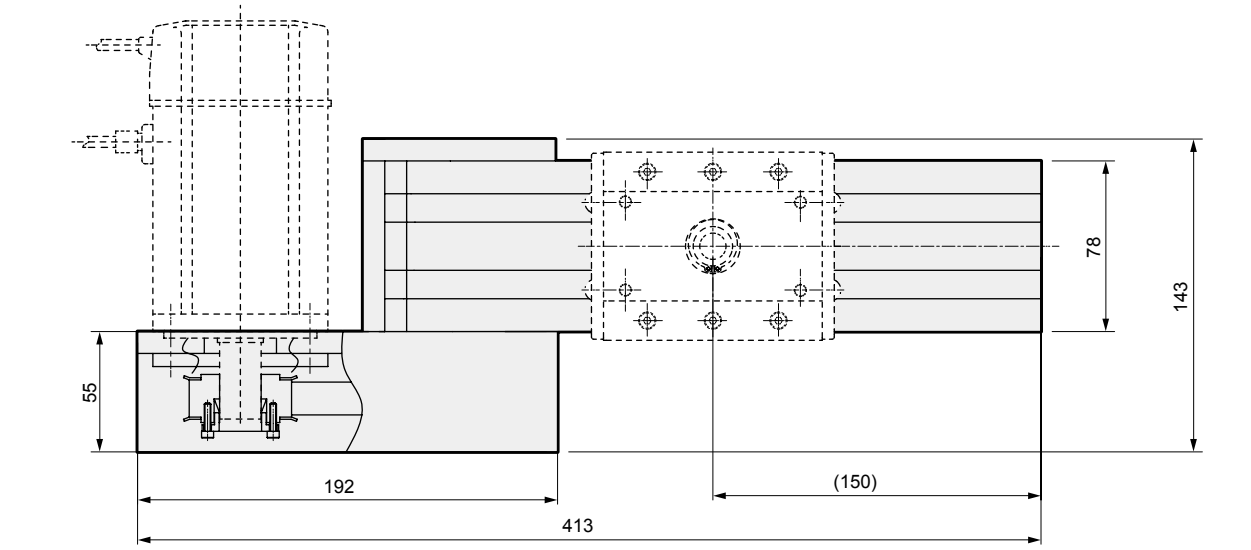
4. "Add the belt lengths obtained in steps 1, 2, and 3."

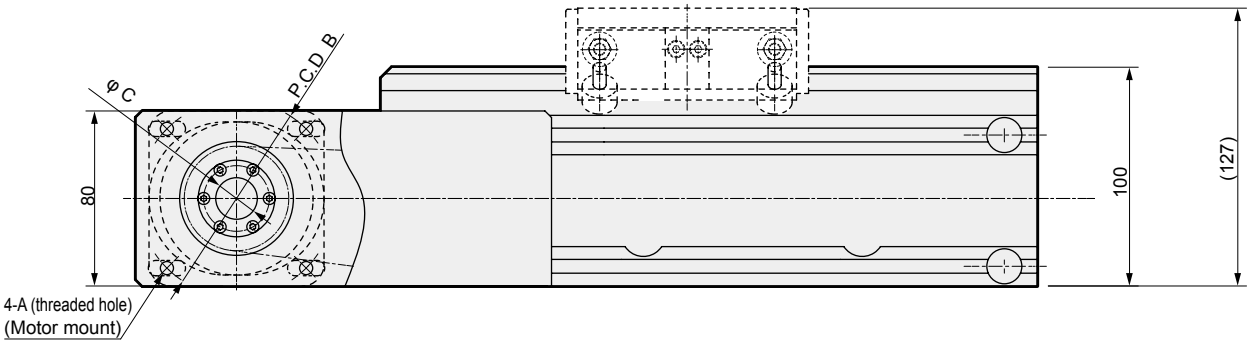
"Belt length for the motor drive unit and the tension unit" + "Double the belt length for stroke length of straight section" + "Belt length for the curve section × quantity"
= 1170 mm + 3600 mm + 1820 mm
= 6590 mm

Hence, the belt length is 6590 mm
Belt model no.: ESM-B-06590

Dimensions

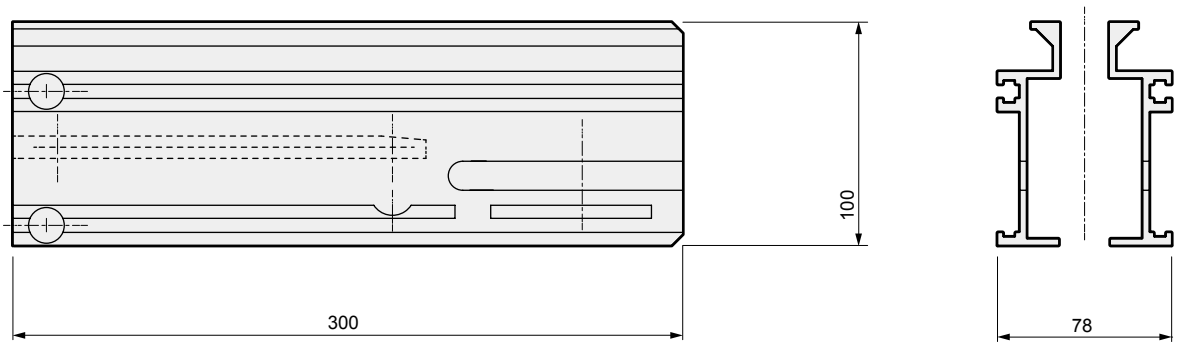
● Motor drive unit (ESM-HDU-*)





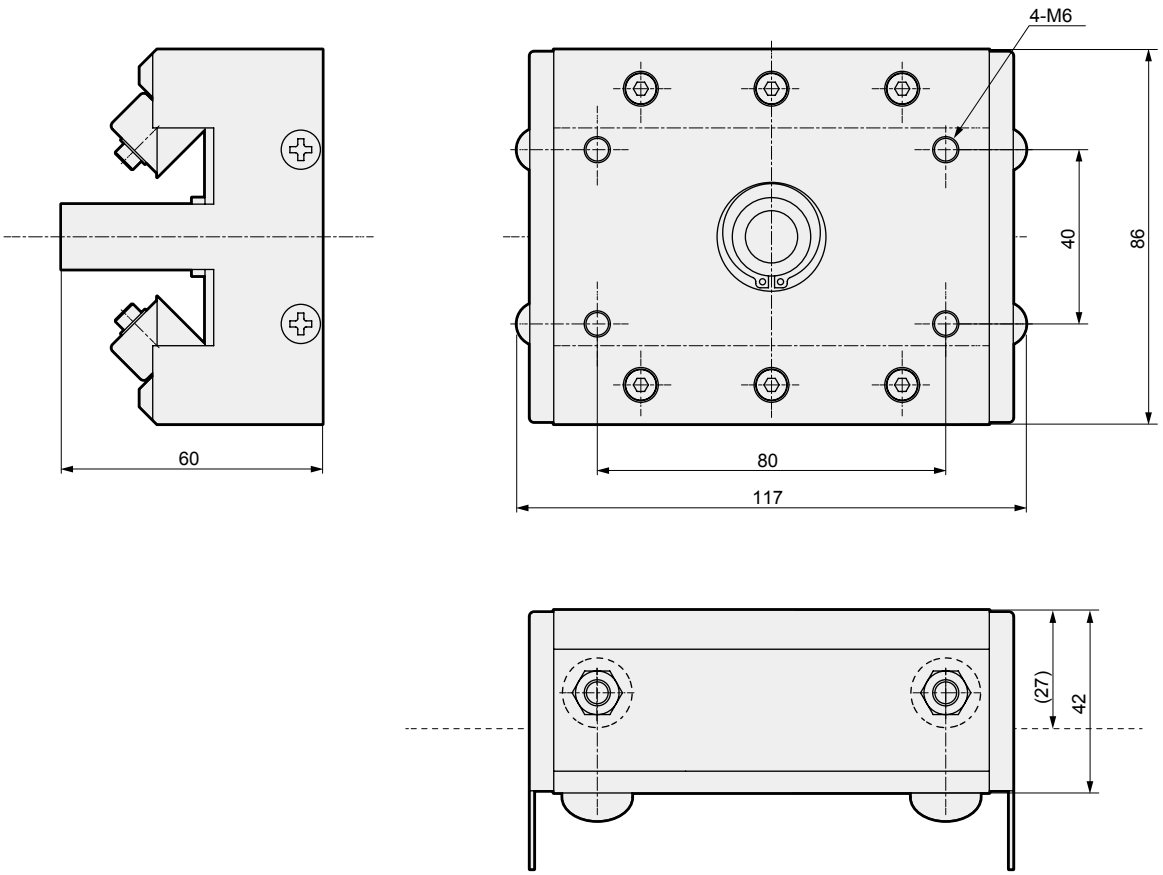
Motor installation specifications	A	B	C
M	M6	φ 90	φ 19
Y	M6	φ 90	φ 19

● Tension unit (ESM-TTU)

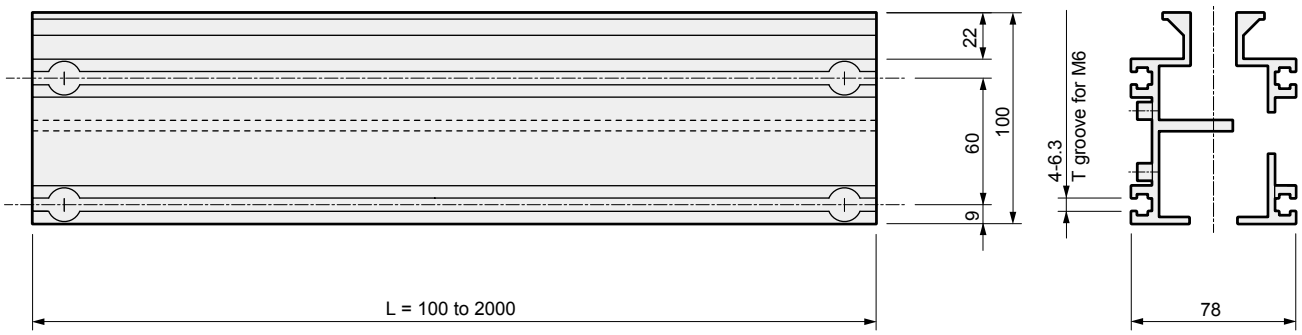


Dimensions

● Carrier unit (ESM-CA)

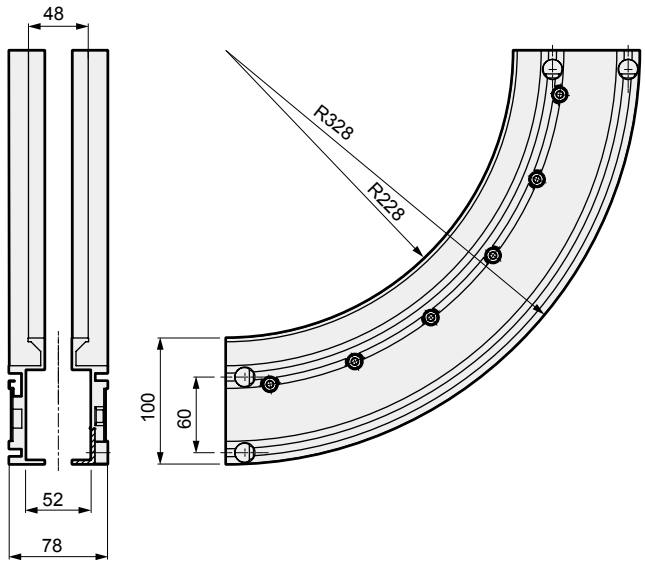


● Straight unit (ESM-ST-*)

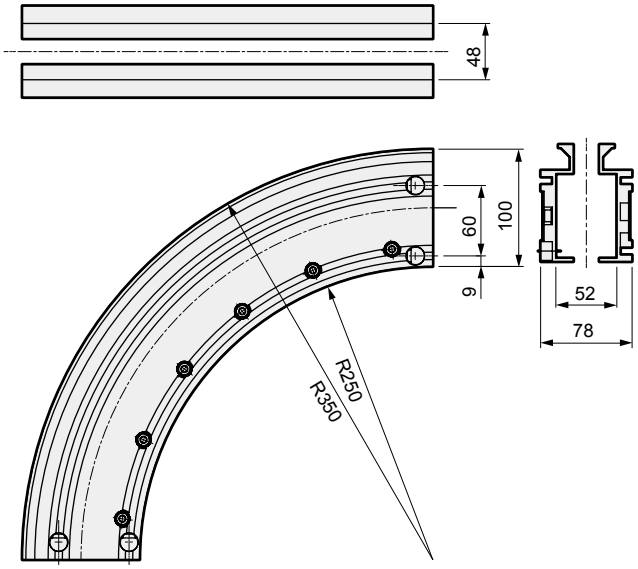


Dimensions

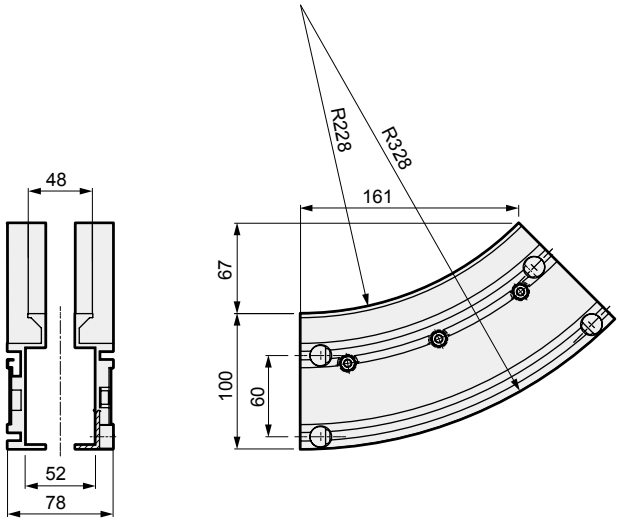
● Curve unit: inside (ESM-VC-90-1)



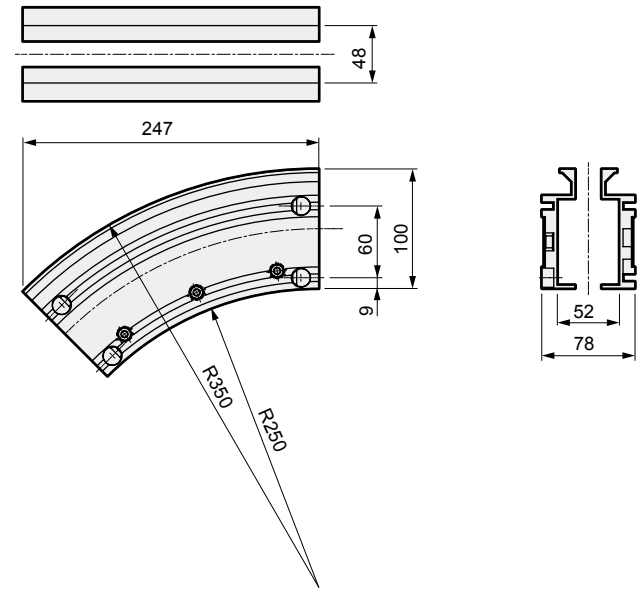
● Curve unit: outside (ESM-VC-90-2)



● Curve unit: inside (ESM-VC-45-1)



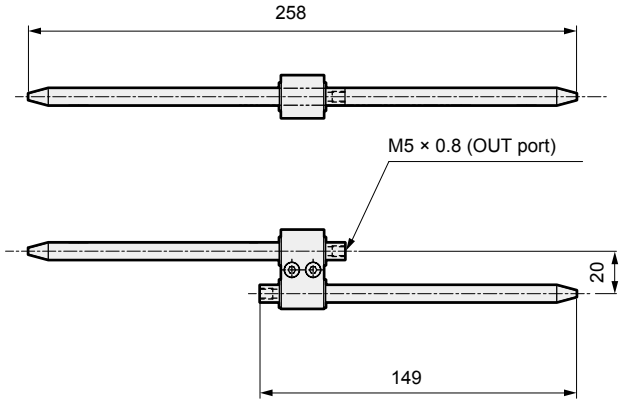
● Curve unit: outside (ESM-VC-45-2)



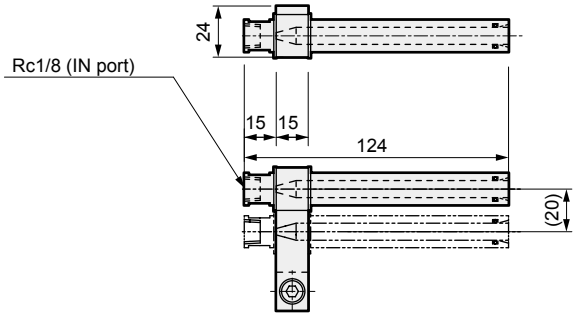
Dimensions

● PP unit (ESM-PP1, air supply unit)

● Carrier unit side nozzle

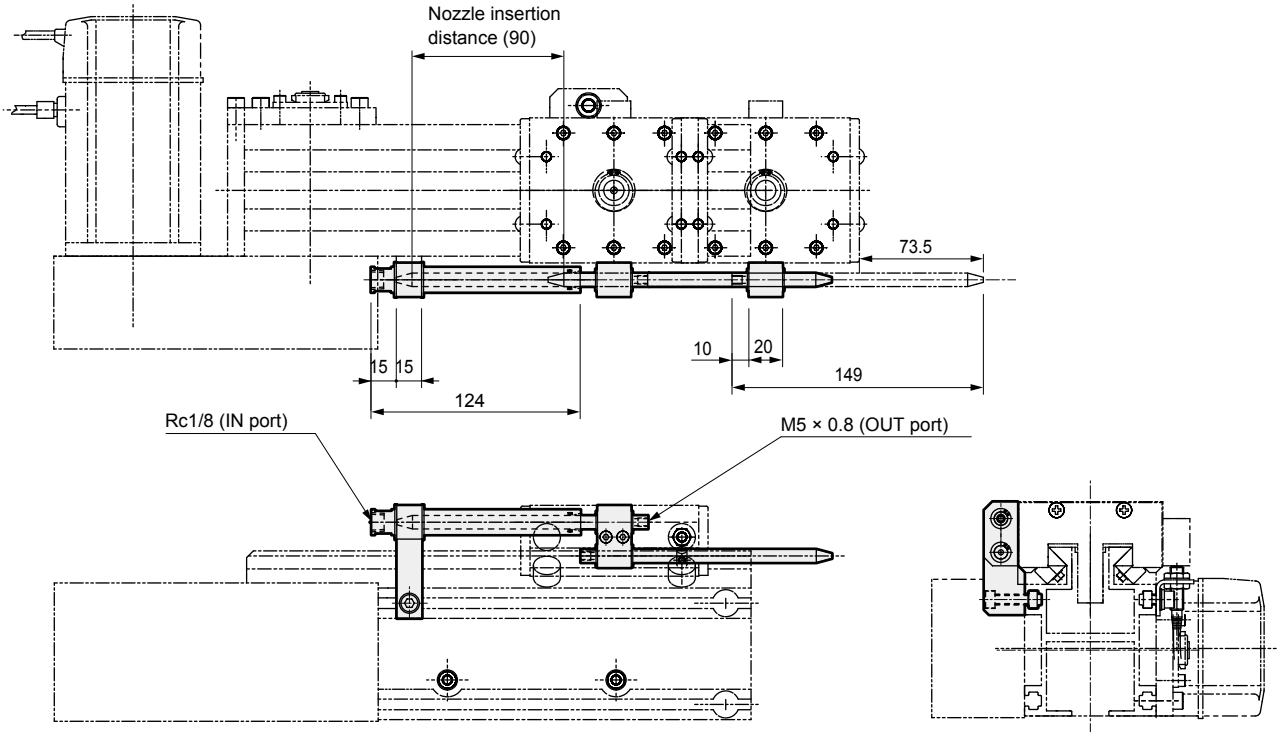


● Motor drive unit, tension unit side nozzle



Note: If a curve unit is directly connected to the motor drive unit, the PP unit (air supply unit) cannot be used.

● PP unit installation structure diagram (reference)



Unit selection

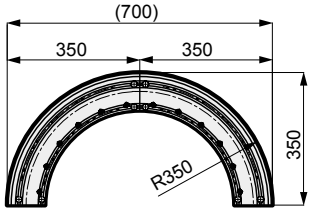
STEP-1 Checking the stroke and belt length for each unit

Unit name	Model no.	Stroke length (mm)	Belt length (mm)
Motor drive unit	ESM-HDU	150	1170 (including the tension unit) (Fixed length)
Straight unit	Example ESM-ST-100 ESM-ST-200 ESM-ST-1200 ESM-ST-2000	100 200 1200 2000	200 400 2400 4000 (Stroke length × 2)
Tension unit	ESM-TTU	150	- (Refer to the motor drive unit)
Inside 90-degree curve unit	ESM-VC-90-1	360	910 (fixed length)
Outside 90-degree curve unit	ESM-VC-90-2	550	910 (fixed length)
Inside 45-degree curve unit	ESM-VC-45-1	180	455 (fixed length)
Outside 45-degree curve unit	ESM-VC-45-2	275	455 (fixed length)

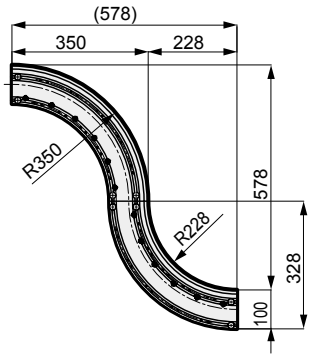
STEP-2 Min. dimensions of combinations with a curve unit

* The total of 180 degrees can be used for 1 set.

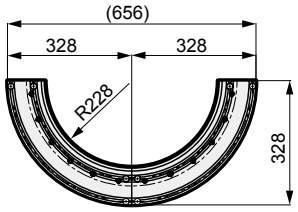
● 90-degree outside & 90-degree outside



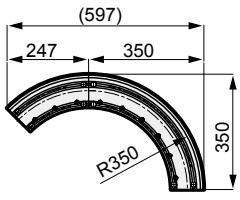
● 90-degree outside & 90-degree inside



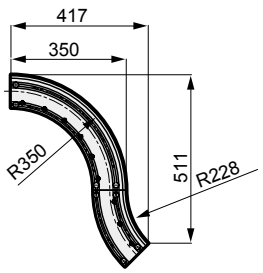
● 90-degree inside & 90-degree inside



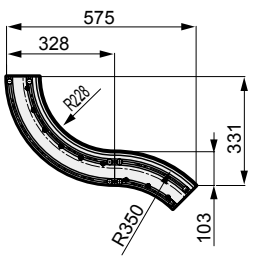
● 45-degree outside & 90-degree outside



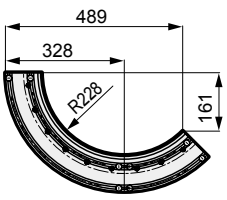
● 90-degree outside & 45-degree inside



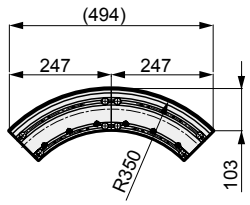
● 90-degree inside & 45-degree outside



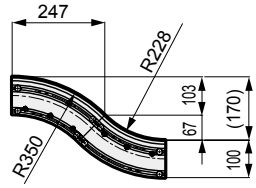
● 90-degree inside & 45-degree inside



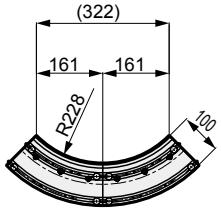
● 45-degree outside & 45-degree outside



● 45-degree outside & 45-degree inside



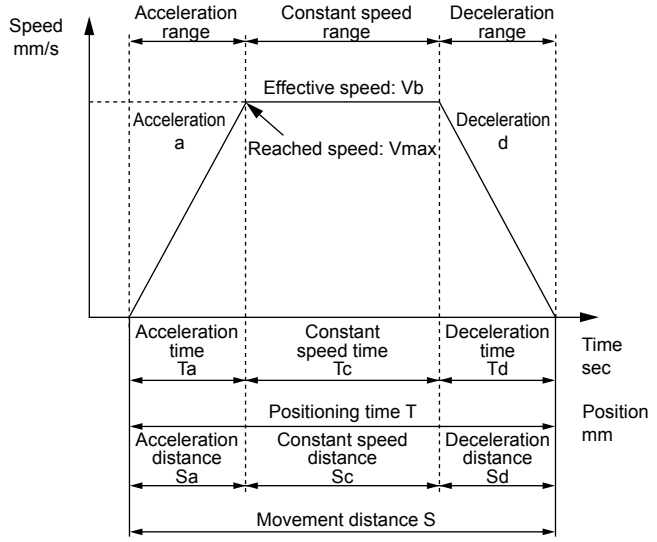
● 45-degree inside & 45-degree inside



Unit selection

STEP-3 Checking the tact time

Calculate the tact time for the selected products following the example below, and confirm it will meet the specifications. Select the rotational speed and rotational acceleration and deceleration for the motor you have selected from the specifications table for each model (pages 1 & 2).



	Descriptions	Symbol	Unit	Remarks
Set value	Speed setting	V	mm/s	
	Acceleration setting	a	mm/s^2	
	Deceleration setting	d	mm/s^2	
	Movement distance	S	mm	
Calculated value	Reached speed	Vmax	mm/s	$= (2 \times a \times d \times S/(a+d))^{1/2}$
	Effective speed	Vb	mm/s	Smaller one between V and Vmax
	Acceleration time	Ta	s	= Vb/a <0.5 sec and over>
	Deceleration time	Td	s	= Vb/d <0.5 sec and over>
	Constant speed time	Tc	s	= Sc/Vb
	Acceleration distance	Sa	mm	$= (a \times Ta^2)/2$
	Deceleration distance	Sd	mm	$= (d \times Td^2)/2$
	Constant speed distance	Sc	mm	= S - (Sa + Sd)
	Positioning time	T	s	= Ta + Tc + Td

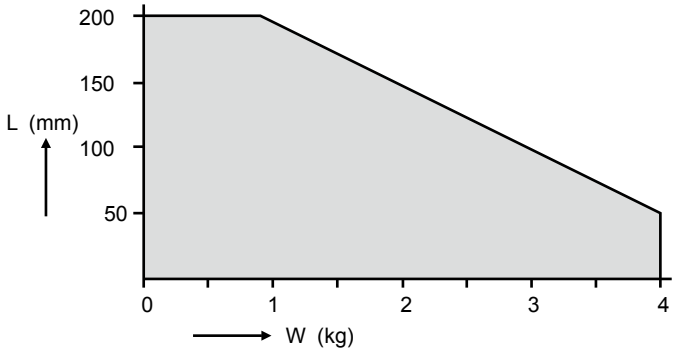
- Do not use the products above the specification speed.
- Acceleration/Deceleration settings based on acceleration/deceleration time vary depending on the speed setting and the stroke length.
- Depending on the acceleration/deceleration settings and the stroke length, the trapezoidal speed waveform may not be able to be formed (speed does not reach the set speed). Compare Vmax and the speed setting.
- Acceleration/Deceleration time should be 0.5 second or longer.

Selection guide

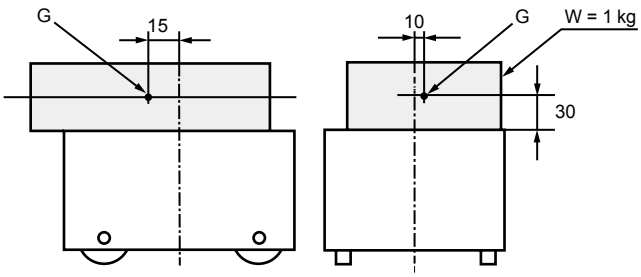
STEP-4 Confirming the maximum allowable load

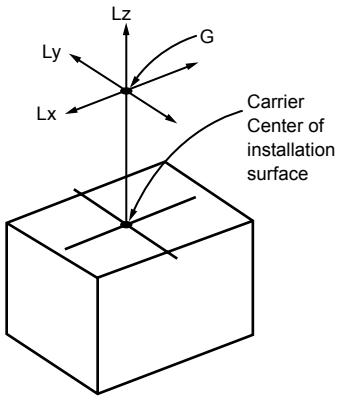
The maximum allowable load may vary depending on the overhang of the center of gravity of the load.

* The allowable load weight may vary depending on the overhang. Use this product within the range of the following graph.
* Refer to the examples of selection when calculating the overhang L.



● Example of selection





W: Load weight
G: Center of gravity of load
Lx: Displacement of G in the X direction
Ly: Displacement of G in the Y direction
Lz: Displacement of G in the Z direction
L: Amount of overhang
L = Lx + Ly + Lz

W = 1 kg

Lx = 15 mm
Ly = 10 mm
Lz = 30 mm
L = 15 + 10 + 30 = 55 mm

For the displacement of the center of gravity of the load, L = 55 mm is allowed as it remains inside the range of the graph if W = 1 kg.

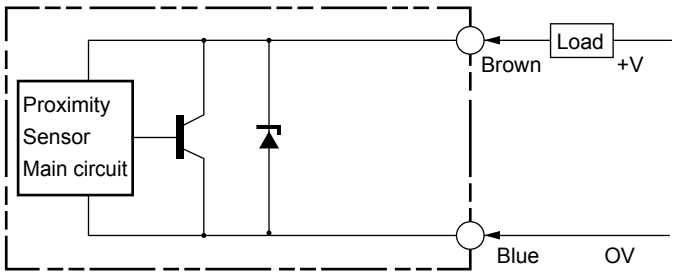
Detection sensor

Type	Manufacturer	Model
Proximity sensor	OMRON	E2E-X2D1-N

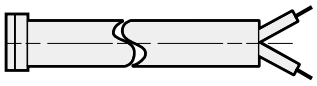
Performance

Descriptions	Specifications
Cylindrical type detection head size	M8
Type	Shield type
Detection method	Induction type
Detection range	2 mm ±10%
Distance setting	0 to 1.6 mm
Hysteresis	15% or less of the detection range
Detectable materials	Magnetic metals (Detection range decreases for non-magnetic metals)
Standard object for detection	Iron 8 × 8 × 1 mm
Response frequency	DC: 1.5 kHz (average)
Power supply voltage	12 to 24 VDC ripple (P-P) 10% or less
Working voltage range	10 to 30 VDC
Leakage current	0.8 mA or less
Control output (output type)	Two-wire DC
Control output (switching capacity)	3 to 100 mA
Indicator light	Power indicator (red) and setting indicator (green)
Ambient temperature range	During operation: -25 to 70˚C. In storage: -40 to 85˚C (no freezing and no condensation)
Ambient humidity range	During operation: 35 to 95% RH. In storage: 35 to 95% RH (no condensation)
Thermal effect	Detection range varies within ±15% in the temperature range of -25 to +70˚C. (detection range at 23˚C as the standard)

Output circuit



Wiring diagram



Terminal arrangement

Color	Arrangement
Brown	+V
Blue	0V

Repair parts

Set name	Set no.	Set descriptions
Roller set	ESM-RO	Rollers, shafts, and bearing assemblies (for 1 unit)
Joint set	ESM-JO	Drive block, joint plate, and screws
Carrier side belt	Belt for ESM-B-****	For specially modified belts and model no., refer to page 2
Motor side belt	ESM-B-K	For the motor pulley

* Specify the set no. when you place an order.
* Avoid sunlight, oil, water, and ozone for rubber and urethane parts in the set. Store them in a cool and low-humidity place.

Shuttle mover standard type / high load type

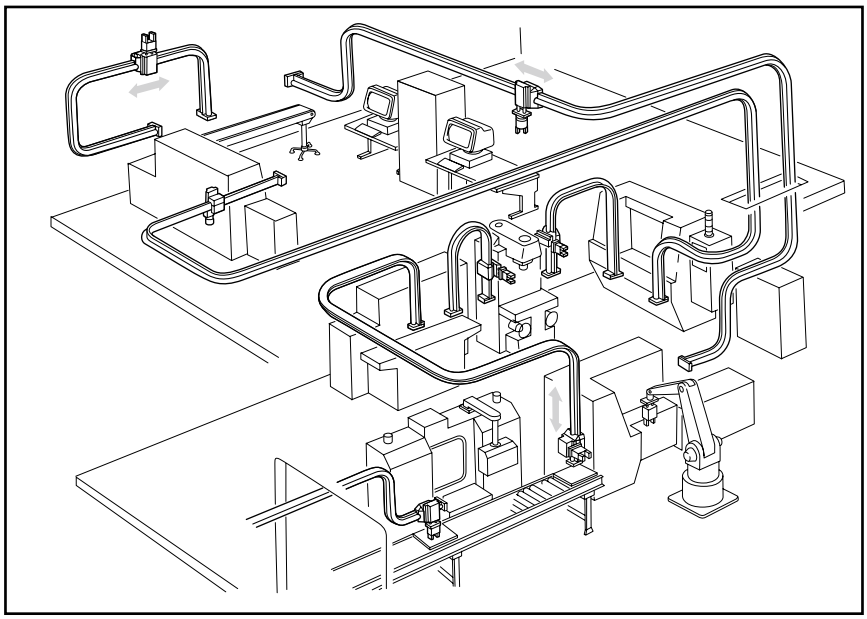
SM-25 Series

The configuration which enables free layout.
Air driven three-dimensional transport P&P system

RoHS CAD

Overview

The air driven three-dimensional transport P&P system shuttle mover (SM-25) employs a rodless cylinder that combines air with a magnetic force. The product features three-dimensional transport which was previously unachievable. Use of a sleeve and O-ring in the connecting portion of the cylinder tube eliminates leakage of air and also enables easy assembly. This configuration enables free layout.



Specifications

Model no. / Descriptions		Standard type	High load type
Working fluid		Compressed air	
Max. working pressure	MPa	0.6	
Min. working pressure	MPa	0.3	
Ambient temperature	°C	5 to 40	
Bore size	mm	φ 25	
Port size		Rc3/8	
Magnet holding force	N	120	240
Max. allowable load weight	kg	2 (total load weight to be mounted)	4 (total load weight to be mounted)
Max. transfer distance	m	20	
Stroke limit adjustment length	mm	±10	
Cushion	Piston	Rubber cushion	
	Carrier	Shock absorber	
Lubrication		Not required (use turbine oil class 1 ISO VG32 if necessary)	

* For details, refer to the shuttle mover SM series pages in "Pneumatic Cylinders I" (catalog No. CB-029SA).

Safety Precautions

Always read this section before use.

When you design and manufacture a system using CKD actuators, you are required to confirm the safety of the mechanical system as well as that of the electrical control system, to create a safe application.
It is important to select, use, handle and maintain the product appropriately to ensure that the CKD product is used safely.
Observe warnings and precautions to ensure device safety.
Check that device safety is ensured and a safe device is manufactured.

WARNING

1 This product is designed and manufactured as a general industrial machine part.
It must be handled by an operator having sufficient knowledge and experience.

2 Use the product within specifications range.

This product must be used within its stated specifications. It must not be modified or machined additionally.
This product is intended for use as a device or part for general-purpose industrial machinery. It is not intended for use outdoors (except for outdoor type) or for use under the following conditions or environment.
(Note that this product can be used when CKD is consulted prior to use and the customer consents to CKD product specifications. The customer must provide safety measures to avoid risks in the event of problems.)

❶ Use for special applications including nuclear energy, railway, aircraft, marine vessels, vehicles, medicinal devices, devices or applications coming into contact with beverages or food, amusement devices, emergency circuits (shutoff, release), press machines, brake circuits, and safety devices or applications.
❷ Use for applications where life or property could be significantly affected, and special safety measures are required.

3 Be sure to observe the organization standards and regulations related to the safety of device design and control, etc.

4 Do not remove the product until you can ensure safety.

❶ Inspect and service the machine and devices after confirming safety of the entire system related to this product.
❷ Note that there may be hot or charged sections even after operation is stopped.
❸ When you inspect or service the equipment, be sure to turn off power to all of the devices. Take care to avoid electrical shock

5 Be sure to observe all the warnings and precautions of the product to prevent accidents.

❶ You may encounter an unexpected movement of the device during a teaching operation or test run. Do not touch the actuator. When you operate the machine from a spot where you cannot see the shaft, make sure that any movement of the actuator does not pose a danger.

6 Be sure to observe all the warnings and cautions to avoid electrical shock.

❶ Do not touch the heat sink, the cement resistor inside the controller, and the motor.
Due to its high temperature, you may get burned. Take enough time to let them cool down before you start servicing.
Do not touch any electrical parts even if power is turned off, as high voltage may be applied until the charge in the capacitor is fully released, which takes approximately three minutes.
❷ Before you start maintenance or inspection, turn off power to the controller.
Otherwise you may get high voltage electrical shock.
❸ Do not connect or disconnect the connectors while power is on. This may result in malfunction, failure, or electrical shock.

7 The over current protection device should be installed.

The wiring to the controller should be equipped with the over current protection device (circuit breaker or circuit protector) for the power line (power supply connector and power supply terminal block) and the primary power line of the control line (I/O connector), as defined in "JIS B 9960-1:2008 Machine Safety - Electrical devices on machinery - Part 1: General requirements."

(extract from JIS B 9960-1 7.2.1 General)
If there is any possibility of the circuit current of the machine (electrical device) exceeding either the rated value of a component or the allowable current of an conductive part, whichever is smaller, an over current protection must be provided. The rated values or the settings that should be selected are defined in Section 7.2.10.

8 Observe warnings and precautions below to prevent accidents.

■ The precautions are ranked as "DANGER", "WARNING", and "CAUTION" in this section.

DANGER : When a dangerous situation may occur if handling is mistaken leading to fatal or serious injuries, and when there is a high degree of emergency to a warning.

WARNING : When a dangerous situation may occur if handling is mistaken leading to fatal or serious injuries.

CAUTION : When a dangerous situation may occur if handling is mistaken leading to minor injuries or physical damage.

Note that some items described as "CAUTION" may lead to serious results depending on the situation.
Every item provides important information and must be observed.

limited warranty and disclaimer

1 Warranty period

This warranty shall be valid for one year after delivery to the customer's designated site.

2 Scope of warranty

If any faults, found to be the responsibility of CKD, occur during the above warranty term, the product shall be replaced, the required replacement parts provided free of charge, or shall be repaired at the CKD factory free of charge.

Note that the following faults are excluded from the warranty scope:

(1) When the product is used exceeding the conditions and environment described in the product specifications.
(2) When the product is incorrectly used due to carelessness or incorrect management.
(3) The malfunction resulting from factors other than the product.
(4) Faults caused by improper use of the product.
(5) Faults caused by a modification of structure, performance, or specifications, which CKD has no involvement with or a repair conducted by an agent not specified by CKD.
(6) Faults which could be avoided if the customer's equipment has the performance and structure which are expected as the industry standards at the time when CKD products are installed.
(7) Faults caused by matters that could not be predicted with the technologies applied when the product was delivered.
(8) Faults caused by an external factor including but not limited to fire, earthquake, flooding, lightning, force majeure, natural calamity, pollution, salty or gaseous atmosphere, and abnormal voltage.

The warranty covers the actually delivered product, and does not cover any damage resulting from losses induced by faults in the delivered product.

3 Warranty of exported products

(1) We offer repair service to CKD products returned to our plant or a company or plant we specify. The work and costs accompanying the returning of the product is not covered by the warranty.
(2) The repaired product shall be delivered to a location in Japan with packaging suitable for domestic transport. The terms and conditions of the warranty define the basics. When the product-specific warranty differs from this warranty, the specification drawing or the specification shall govern.

4 Compatibility confirmation

The customer is responsible for confirming the compatibility of CKD products with the customer's systems, machines and equipment.

5 Scope of the service

The product price does not include service charge for sending technicians to the customer's site. The following shall be added to the charges.

(1) Guidance for installation and adjusting and the presence at the test run
(2) Maintenance, inspection, adjustment, and repair
(3) Technical guidance and technical training (operation, program, wiring method, safety education, etc.)

Safety Precautions

Always read this section before use.

Product-specific precautions: Motor driven shuttle mover ESM Series

Design & selection

⚠DANGER

■ Do not operate the product where there are hazardous materials such as combustibles, flammables, and explosives.
It may ignite, catch fire, or explode.

■ Ensure that the product does not come into contact with water drops and oil drops. They may cause a fire or failure.

■ Be sure to securely install the product so that a workpiece can be securely held.
If the product falls, drops, or malfunctions, this may lead to personal injuries.

⚠WARNING

■ The carrier unit should be operated within the specified speed limit.

■ It is not possible to fix the carrier unit and use the rail portion as a mobile unit.

■ Avoid scratching the rail with a workpiece or a tool dropped by an error during mounting or removal of a workpiece.
Failure to observe this could result in operation faults.

■ If a foreign object gets lodged between the carrier unit and the rail, the product may malfunction.

■ Be sure to provide a safety cover along the path to prevent an accident if a workpiece is dropped.

■ The product should be used in a normal plant environment where people can work.
(The temperature should be between 5 to 40˚C.)

■ Do not use the product in water, in oil, in powder, or where it will come into contact with cutting fluid or cutting chips, as these may lead to malfunction.

■ The product cannot be used in a corrosive environment.

■ Use this product in accordance with the specifications range.

■ Provide a safety circuit or design the system so that stopping the operation for emergency or during outage does not cause any personal injuries or damages on the machine.

■ Install the product indoors at a location where humidity is low.
Avoid the location exposed to elements or of high humidity (humidity 85% or higher with condensation). This may cause an electrical leak or a fire. Oil mist and oil drops are also strictly prohibited.

● Using the product in such an environment may lead to a damage or malfunction.

■ Install the product at a location free of direct sun, dust, heat source, corrosive gases, explosive gases, flammable gases, and flammables.
Chemical resistance is not taken into account for this product.
It could fail, explode, or ignite.

■ Operate or store the product at a location free of strong electromagnetic waves, ultraviolet rays, and radiation.
It could malfunction or fail.

■ Take into consideration the possibility of power supply failure.

● Design the system so that a power supply failure does not cause any personal injuries or damages on the machine.

■ Determine how the machine should be re-started after an emergency stop or abnormal stop.

● Design the system so that restarting does not cause any personal injuries or damages on the machine.
If you should reset the electric driven actuator to the starting position, provide the system with a safety device.
Take into consideration the possibility of motor failure.
Design the system so that a power supply failure does not cause any personal injuries or damages on the machine.

■ Avoid using this product where vibration and impact are present.

■ Do not apply a load to the product which is greater than or equal to the allowable load listed in the materials for selection.

⚠CAUTION

■ The belt runs inside the rail. Ensure that foreign objects such as cutting chips do not enter the unit during assembly.

■ Use the product within a range so that the carrier unit never collides the stroke end.

■ Indicate the maintenance conditions in the device's instruction manual.

● The product's performance may drop too low to keep an appropriate safety level depending on use conditions, use environment, and maintenance status. With correct maintenance, the product functions can be used to the fullest.

■ When installing, setting up, adjusting, and servicing the product, read through the instruction manual and follow the instructions carefully.

■ The product is manufactured in accordance with various regulations and standards.
Never modify the product.

■ Read the instruction manuals for the motors and the control devices installed on the product. Follow the instructions when you design the wiring or wire the product paying particular attention to safety.

■ The customer is responsible for confirming the compatibility of CKD products with the customer's systems, machines and equipment.

Installation & adjustment

⚠ DANGER

■ Do not enter the operating range of the product when it is ready to be operated. The product may make a sudden move leading to injury.

⚠ WARNING

■ For the standard installation, supporting pillars should be placed for every 3 m. (Customers are asked to provide supporting pillars by themselves.)
■ Ensure that no twisting, bending, or pulling force applies to the rail when you attach supporting pillars or beams.
■ Do not tap the product with a hammer to move it. Do not lift it directly with wire.
■ Be sure to install a safety cover where the system goes over/through aisles and work areas or where a hand or body part may come into contact.
■ Ensure sufficient room around the stroke end as below:
(1) Room to mount/remove workpieces.
(2) Room for the motor.
(3) Room to replace the belt at the tensioner.
■ After completing installation and before installing the motor, move the carrier manually by hand to ensure that nothing will interfere with the movement of the carrier within the operating range.
■ Do not let foreign objects, such as cutting chips from drilling, enter inside the frame and the belt.
■ The product has precision parts inside it. Never let it fall or give vibration/impact to it during transport.
It may result in breakage of a part.
■ When you temporally place it on the ground, put it horizontally.
■ Do not climb on the packaging or put an object on it.
■ Maintain the ambient temperature between -10 to 50˚C with no freezing and the ambient humidity between 35 to 80% with no condensation during transport.
It may result in breakage of the product.
■ Install the product on incombustible material. If the product is installed directly on combustible material or placed close to combustible material, it may lead to a fire.
This may result in burning.
■ Do not step on the product or use it in place of a step ladder. Do not put any object on it.
This may lead to personal injuries and damage to or malfunction of the product.
■ Design the system so that no personal injuries or product damage may occur if power supply failure occurs.
This may lead to an unexpected accident.
■ When malfunctions occur, stop the operation immediately and contact CKD's local sales office.

⚠ CAUTION

■ Do not place the product where significant vibration or impact may be inflicted.
It may lead to malfunction.
■ Do not let an external force move the movable part of product. Do not make abrupt deceleration.
This may lead to malfunction or damage due to regenerated power.
■ When you return the carrier unit to the origin, do not let it hit the mechanical stopper. You may let it contact the stopper slowly.
This may damage the parts resulting in malfunction.
■ Durability may vary depending on the transport load and the work environment. Design the system with sufficient margin for the transport load. Use the system so that no impact may be inflicted upon moving parts.
■ Do not let the excessive moment apply onto the carrier unit. Refer to "Maximum allowable load" on page 9 for details.
This may damage the product resulting in malfunction.
■ Do not move the carrier before you install the motor. The belt inside the product may be bent causing kinks and scratches of the belt leading to its premature failure.
■ The flatness of the installation surface should be 0.05 mm per 200 mm or less so that any twisting or bending force may not be inflicted on the product.
■ The flatness of the work piece surface installed on the carrier unit should be 0.02 mm or less so that any twisting or bending force may be inflicted on the product.
This may damage the product resulting in malfunction.
■ Tighten the mounting bolts following the tightening torque table below.

Thread size	Tightening torque (N·m)
M3	0.7
M4	1.5
M5	3
M6	5.2
M8	12.5
M10	24.5

During use & maintenance

⚠ DANGER

- Do not operate the product with wet hands.
  Failure to observe may result in an electrical shock.
- If you find any abnormality of the belt such as wear on cogs, damage on sides of the belt, cracks at cogs, cracks or softening on the back side of the belt, and partial clefts, stop the operation immediately. Use environment or conditions may not be correct for the product.

⚠ CAUTION

- Be sure to turn off power when you conduct inspection or maintenance.
- Regular cleaning is required when you use the product at a location where the rails tend to become dirty easily.
- Regularly inspect the product two or three times a year to ensure its proper operation.
- Properly maintain the tension of the belts. You should pay attention to the initial stretching of the belts. If the tension is incorrect, vibration or noise may increase resulting in shortened service life, or belt cogs may jump over pulley cogs.
- Be sure to turn off power to the product when you perform maintenance, inspection, or repair. Take measures so that other people do not turn on power or operate the system inadvertently while you are working on the product.
- When you dispose of the product, follow the laws and regulations concerning the cleaning and disposal of the product. Be sure to outsource to a certified waste disposal specialist.

Related products

Electric driven actuator motorless type

Catalog No.CC-1165A, CC-1216A, CC-1217A, CC-1257A

■ Ball thread drive ETS Series

- 8 motor sizes, 7 lead types, and 5 motor mounting orientations.
- The motor you are familiar with can be used.
- Models with origin sensors and limit sensors are also available.
- Any stroke length between 100 to 1500 mm (50 mm increment) can be chosen.
- Maximum load capacity of 150 kg and maximum speed of 2,000 mm/s provide versatility.

■ Belt drive ETV Series

- Belt driven type based on ETS Series.
- Any stroke length between 100 to 3,500 mm (50 mm increment) can be chosen. The maximum speed is 2,000 mm/s achieving long stroke length at high speed.
- 6 motor sizes and 6 motor mounting orientations.
- The motor you are familiar with can be used.

■ Ball thread drive low particle generation specifications ECS Series

- Based on ETS Series, the product features the full-cover construction and the suction port to achieve low particle generation.
- 7 motor sizes, 7 lead types, and 5 motor mounting orientations.
- The motor you are familiar with can be used.
- Models with origin sensors and limit sensors are also available.
- Any stroke length between 100 to 1500 mm (50 mm increment) can be chosen.
- Maximum load capacity of 150 kg and maximum speed of 2,000 mm/s provide versatility.

■ Belt drive ECV Series

- Based on ETV Series, the product features the full-cover construction and the suction port to achieve low particle generation.
- 6 motor sizes and 6 motor mounting orientations.
- The motor you are familiar with can be used.

Electric driven actuator ERL2/ESD2 Series

Catalog No.CC-1219A

■ Number of positioning points

A versatile "63 positioning points" model is added to the previous "7 positioning points" models.

■ Simple and easy setting tool

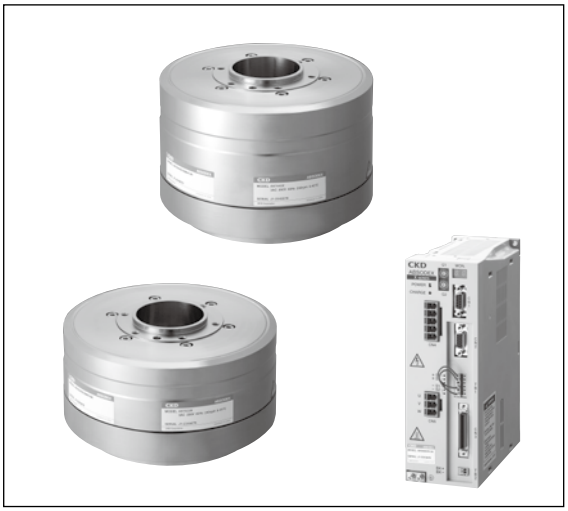
A simple and easy setting tool "E Tools" is introduced in addition to the teaching pendant "ETP2."

■ Fully compatible

Any combination of an actuator and a controller is acceptable thanks to its fully compatible feature.

ABSODEX high precision type AX7000X Series

Catalog No.CC-1238A



■ High resolution

High resolution encoder whose resolution is approximately eight times higher than that of the previous models
is included (4,194,304 pulses per rotation).
Repeatability of ±2 seconds achieved.

■ High responsiveness

In addition to highly precise positioning accuracy, responsiveness and stability at a constant speed are greatly improved.

■ Flexible positioning

"Flexible programming feature" which allows you to implement complicated actions easily and "Largest variety of I/O signals" convenient for communicating with host devices are included.

■ Easier to use PC software, AX Tools

The industry's first AI (artificial intelligence) adjustment feature is included.
Even a novice can make adjustment like an expert.
This is very helpful when you need to quickly launch a new system.

ABSODEX small type AX6000M Series

Catalog No.CC-1148A

■ Space saving

In addition to the exterior dimensions smallest in the industry, the concentric design (rotary shaft and the fixed shaft are the same) allows compact system design eliminating wasted space.

■ Flexibility

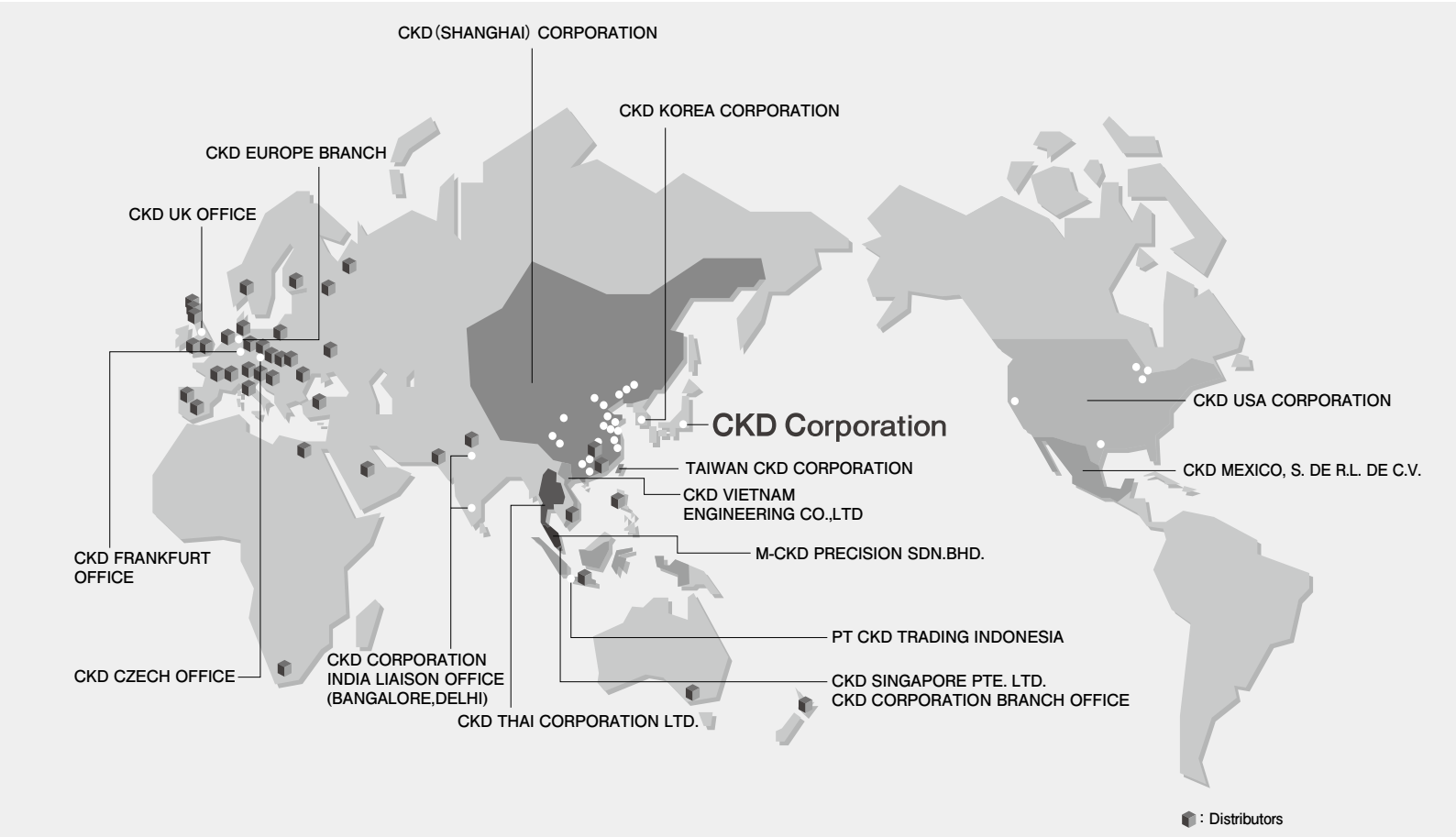
Rich in programming features, it is easy to accomplish what you really want.

Furthermore, this also supports simple operation settings such as automatic creation of a program specifying the points.

■ High reliability and maintenance-free

Direct drive system with no gears, this provides stable operation without worrying about the deterioration of accuracy due to gear wear or even gear breakage cause by overloading.

WORLD−NETWORK



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