

SANMOTION for Food Machinery

Stepping Systems for Food Related Equipment

Stepping Motors Lineup
with Focus on "Ease of Use"



Our Stepping Motors Can Make Your Food Machinery

- Stepping motors, despite their small sizes, have higher torques in low to middle speed ranges.
- Synchronous motors start up smoothly, and are flexible to sudden speed changes.

1 Easy Control, and Operation with Stable Speed

- Can be driven solely by command inputs from host devices such as PLC. Furthermore, unlike induction motors, synchronous motors can maintain constant speed without being affected by varying loads, providing stable productivity.

2 Accurate Positioning and Precise Repetition

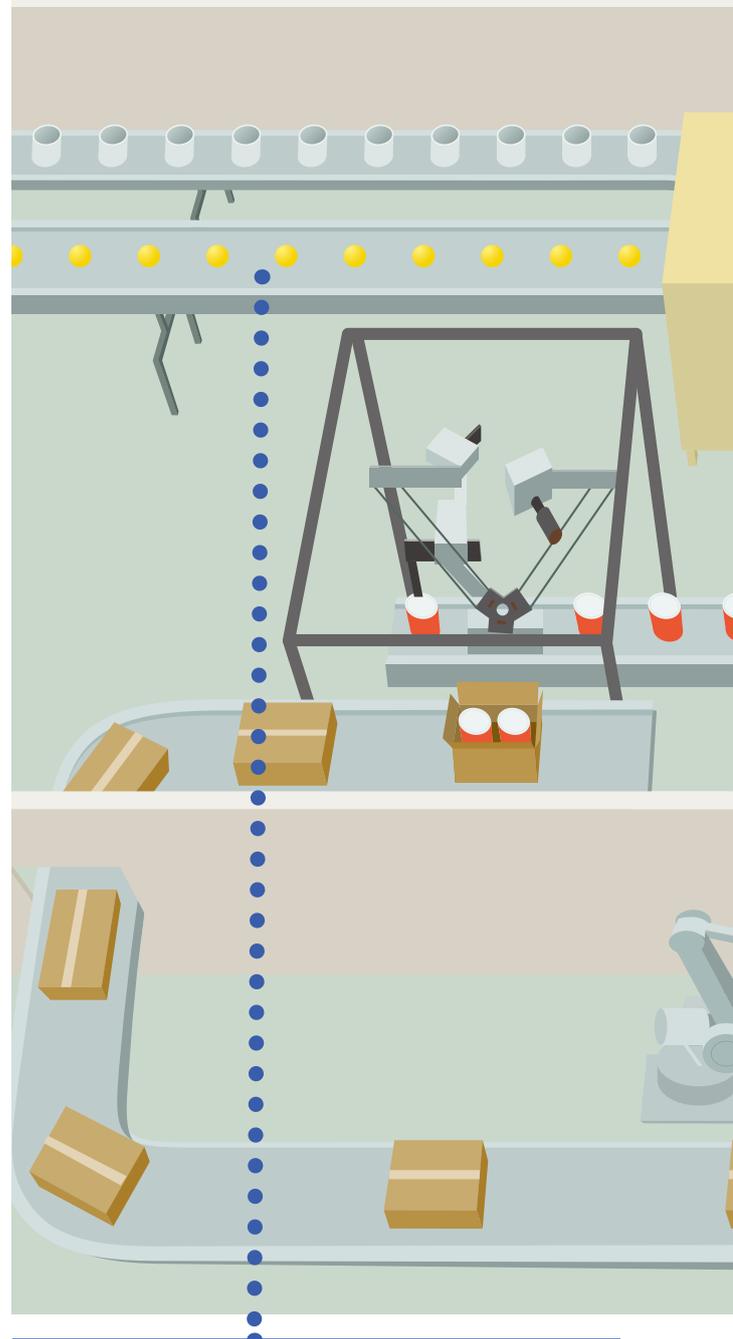
- The motor structure naturally enables accurate and precise repetitive positioning without sensors. Therefore the need for feedback from external sensors is eliminated, contributing to simplifying your system, and to stable and efficient operation.

3 Energy Efficiency

- Stepping motors are more eco-efficient, and hence contribute to reducing device power consumption.

4 Easy-to-Use Drivers and Options are Available

- The pulse-train input driver is compatible with host devices such as PLC by almost any manufacturer.
- Motors listed in this catalog can be driven by common drivers. → p. 10
- Extension cables for driver and motor communication are available as options. → p. 12



Hollow Shaft Stepping Motors

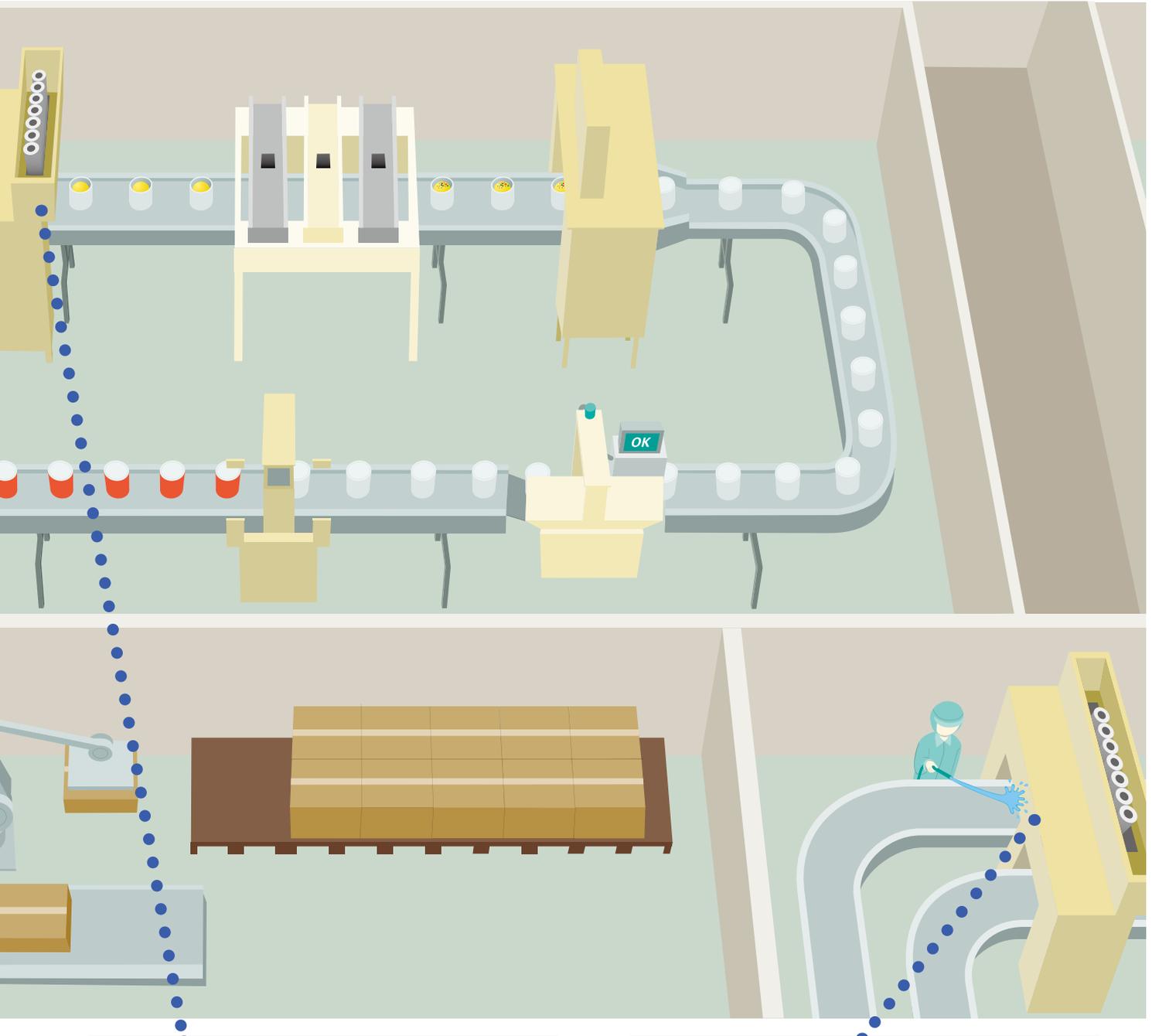
For more information → p. 4

Suitable usage

- Conveyor motors
- Air piping for rotary mechanism



Easier to Use, Providing with Higher Performance



Heavy-Duty Hollow Shaft Stepping Motors

For more information → p. 6

Suitable usage

- Simplification of rotary mechanism



Stepping Motors with IP65 Protection

For more information → p. 8

Suitable usage

- Machines that operate in splash and dust environments



Hollow Shaft Stepping Motor 2-Phase



■ Features

Utilization of the hollow shaft structure provides greater design flexibility.

- The hollow shaft structure enables reducing power mechanism component count and saving space by installing device shafts within it.
- Cables and other likes can be routed through the hollow hole.

■ Lineup

42mm sq., hollow hole diameter: 5 mm

56mm sq., hollow hole diameter: 10.9 mm

■ Options

Extension cable for driver and motor communication

Model no. 1m : F2C02M0100A

2m : F2C02M0200A

3m : F2C02M0300A

■ Compatible drivers

Model no.: BS1D200P10 (DC input) → p. 10

Operating current selection switch setting: A (1 A/phase) for 103H5210-5249

0 (2 A/phase) for 103H7126-5747

■ Precautions on purchase

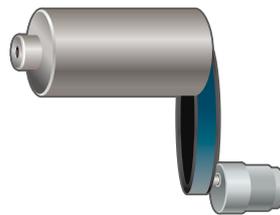
- If to be used for driving circular tables or the like, for which large load inertia is exerted on the motor, it might take longer for the load to stop.

■ Precautions on use

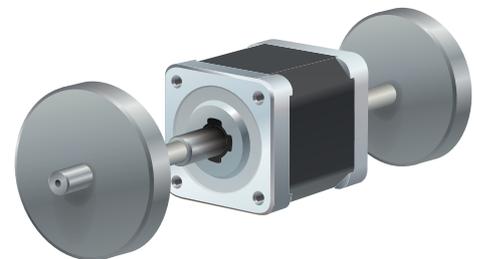
- Protection rating for this product is IP40. If to be used in moist or dust environments, please take protective measures beforehand.
- Allowable load values for this product are shown below. Please ensure that loads do not exceed the below values.
42 mm sq.: Allowable thrust load = 10 N, Allowable radial load = 193 N
56 mm sq.: Allowable thrust load = 15 N, Allowable radial load = 481 N
- Please keep the length of extension cable between motor and driver no longer than 3 m, considering voltage drops.

Hollow hole usage 1.

Motors can be installed inside of conveyor systems, with conveyor roller shafts mounted within the motor hollow holes.



■ **Conventionally**
Motor had to be installed outside the conveyor.



■ **Hollow shaft motor**
Can accommodate conveyor roller shaft within the hollow hole, saving space.

Hollow hole usage 2.

By simplifying the system, it contributes to reducing the device size.



■ Hollow shaft motor

Gases, fluid, hoses and other likes can be routed through the hollow hole.

42mm sq.

1.8° /step

RoHS

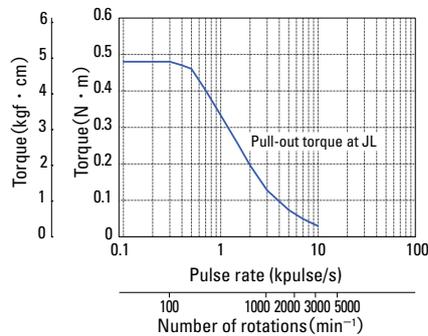
Bipolar

Model number	Holding torque at 2-phase excitation	Rated current	Wiring resistance	Winding inductance	Rotor inertia	Mass	Motor length (L)
Single shaft	[N·m] or larger	A /phase	Ω /phase	mH /phase	× 10 ⁻⁴ kg · m ²	kg	mm
103H5210-5249	0.46	1	4.8	10.6	0.074	0.37	48

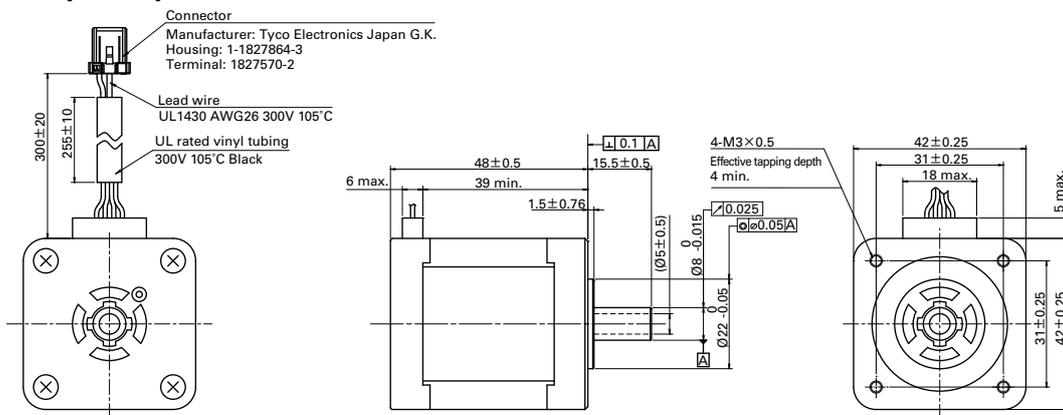
Characteristics diagram

103H5210-5249

Drivers : BS1D200P10
 Power supply voltage: 24 VDC, Wiring current: 1 A/phase
 2-Phase excitation (full step)
 $J_L=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ when rubber coupling used
 Maximum starting rate: 1100 pulse/s
 Maximum slew rate: 1100 pulse/s



Dimensions [Unit: mm]



56mm sq.

1.8° /step

RoHS

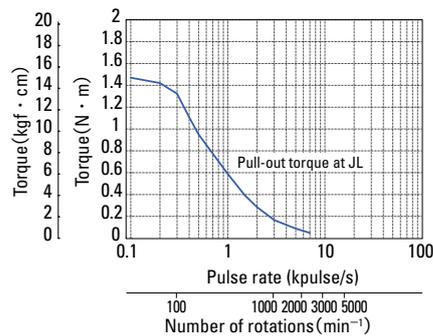
Bipolar

Model number	Holding torque at 2-phase excitation	Rated current	Wiring resistance	Winding inductance	Rotor inertia	Mass	Motor length (L)
Single shaft	[N·m] or larger	A /phase	Ω /phase	mH /phase	× 10 ⁻⁴ kg · m ²	kg	mm
103H7126-5747	1.5	2	2	9.7	0.36	0.98	75.8

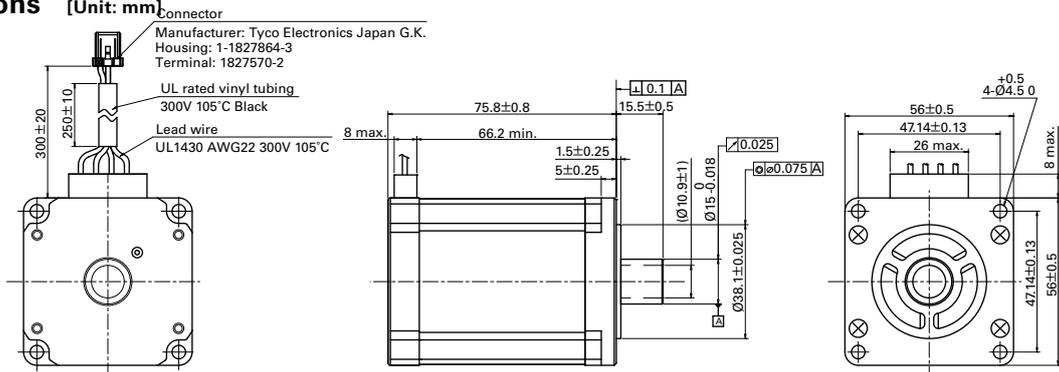
Characteristics diagram

103H7126-5747

Drivers : BS1D200P10
 Power supply voltage: 24 VDC, Wiring current: 2 A/phase
 2-Phase excitation (full step)
 $J_L=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ when rubber coupling used
 Maximum starting rate: 750 pulse/s
 Maximum slew rate: 750 pulse/s



Dimensions [Unit: mm]



Heavy-Duty Hollow Shaft Stepping Motor 2-Phase



■ Features

The allowable thrust load of this stepping motor is 37* times that of our conventional product. It is ideal in usage where large loads are exerted on motors.

* Comparing 370 N with 10 N, value for our conventional 42 mm sq. motor

■ Lineup

For **42mm sq.**,
Allowable thrust load: 370 N (approx. 37 kg)

For **60mm sq.**,
Allowable thrust load: 450 N (approx. 45 kg)

■ Options

Extension cable for driver and motor communication

Model no. 1m : F2C02M0100A

2m : F2C02M0200A

3m : F2C02M0300A

■ Compatible drivers

Model no.: BS1D200P10 (DC input) → p. 10

Operating current selection switch setting: A (1 A/phase) for SL2423-5241

0 (2 A/phase) for SL2603-5741

■ Precautions on purchase

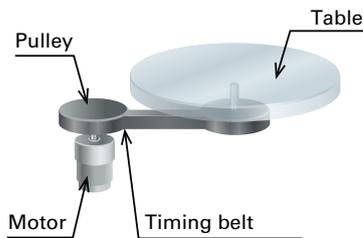
- If to be used for driving circular tables or the like, for which large load inertia is exerted on the motor, it might take longer for the load to stop.

■ Precautions on use

- Protection rating for this product is IP40. If to be used in moist or dust environments, please take protective measures beforehand.
- Allowable load values for this product are shown below. Please ensure that loads do not exceed the below values.
For 42 mm sq., Allowable thrust load: 370 N
For 60 mm sq., Allowable thrust load: 450 N
- Please keep the length of extension cable between motor and driver no longer than 3 m, considering voltage drops.

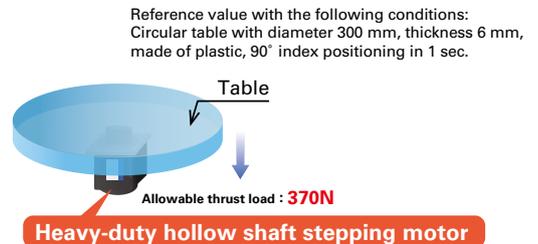
Simplification of mechanism

The large allowable thrust load enables the direct mounting of load tables to the motor. Conventional pulley and belt, or gear mechanisms can be simplified, eliminating the backlash. It is suitable for the direct driving of index tables and other likes.



■ Conventionally

Motor was unable to directly support the large table weight, and the table has to be indirectly driven with pulley and timing belt.

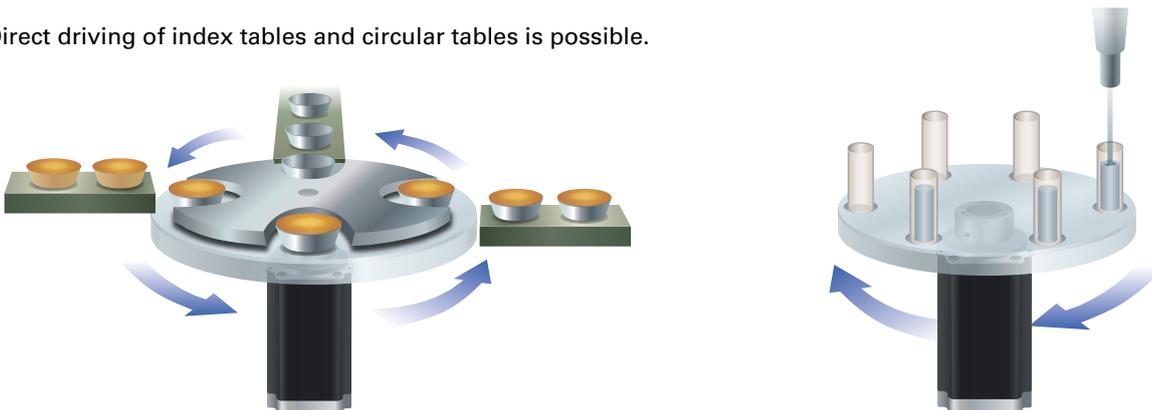


■ Heavy-duty hollow shaft stepping motor

Is capable of directly supporting the large load. The mechanism is simplified, and sensorless positioning is enabled as well.

Application examples of heavy-duty hollow shaft stepping motor

Direct driving of index tables and circular tables is possible.



42mm sq.

1.8° /step

RoHS

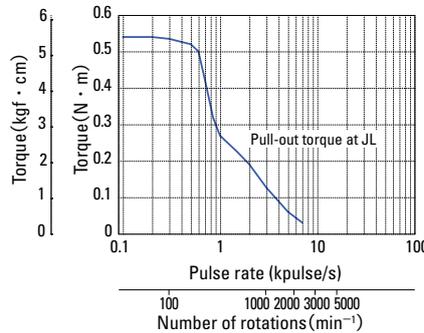
Bipolar

Model number	Holding torque at 2-phase excitation	Rated current	Wiring resistance	Winding inductance	Rotor inertia	Mass	Motor length (L)
Single shaft	[N·m] or larger	A /phase	Ω /phase	mH /phase	× 10 ⁻⁴ kg · m ²	kg	mm
SL2423-5241	0.52	1	4.8	10.5	0.2	0.5	67.5

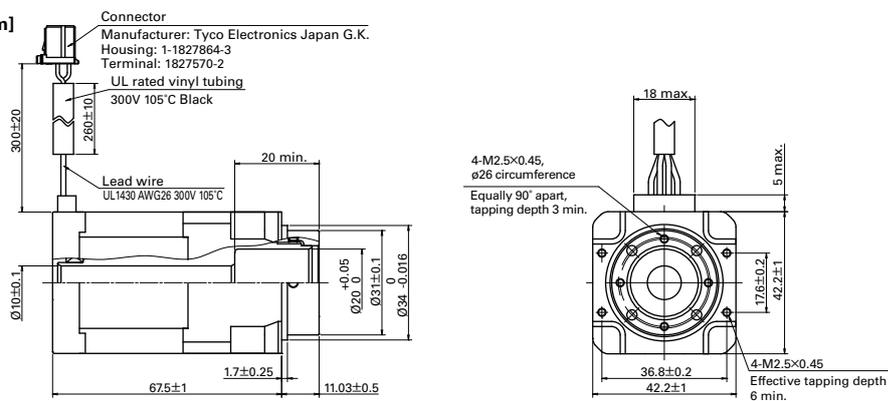
Characteristics diagram

SL2423-5241

Drivers: BS1D200P10
 Power supply voltage: 24 VDC, Wiring current: 1 A/phase
 2-Phase excitation (full step)
 $J_L=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ when rubber coupling used
 Maximum starting rate: 1060 pulse/s
 Maximum slew rate: 1150 pulse/s



Dimensions [Unit: mm]



60mm sq.

1.8° /step

RoHS

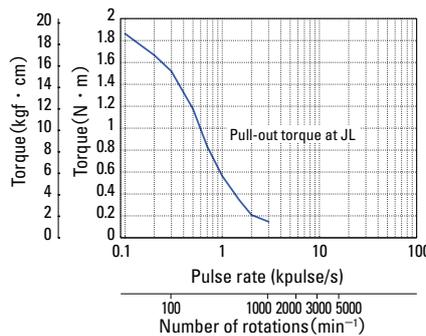
Bipolar

Model number	Holding torque at 2-phase excitation	Rated current	Wiring resistance	Winding inductance	Rotor inertia	Mass	Motor length (L)
Single shaft	[N·m] or larger	A /phase	Ω /phase	mH /phase	× 10 ⁻⁴ kg · m ²	kg	mm
SL2603-5741	2	2	2.4	11	1.34	1.6	98.7

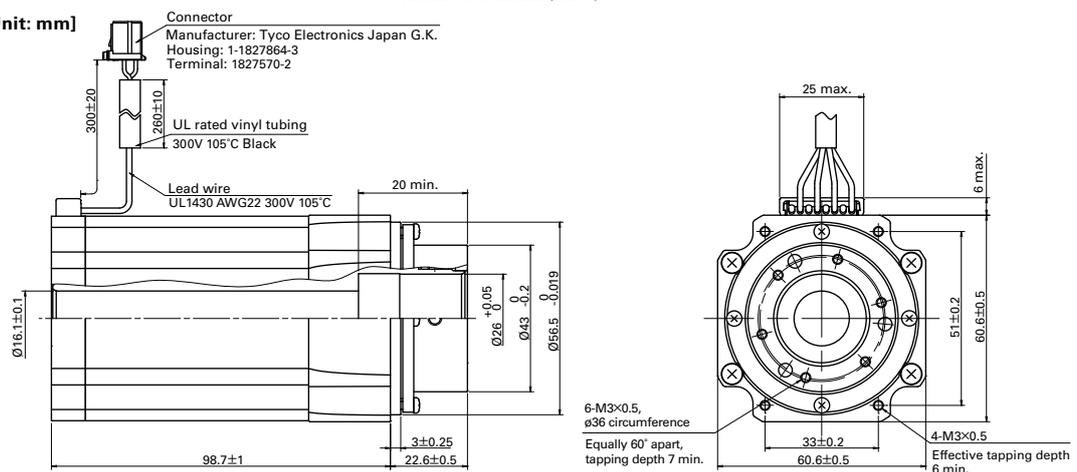
Characteristics diagram

SL2603-5741

Drivers: BS1D200P10
 Power supply voltage: 24 VDC, Wiring current: 1 A/phase
 2-Phase excitation (full step)
 $J_L=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ when rubber coupling used
 Maximum starting rate: 600 pulse/s
 Maximum slew rate: 610 pulse/s



Dimensions [Unit: mm]



IP65 Rated Splash and Dust Proof Stepping Motors

Waterproof, Dustproof

2-Phase



■ Features

These IP65 rated motors* excel in water and dust resistance, and can be safely used inside food processing machines that deal with water and powders.

*Except for the shaft and the cable end parts.

Ingress Protection (IP Code) is defined in a standard IEC (International Electrotechnical Commission) 60529:2010.

■ Lineup

56_{mm} sq.,

■ Compatible drivers

Model no.: BS1D200P10 (DC input) → p. 10

Operating current selection switch setting: 0 (2 A/phase)

■ Safety standards

CE and UL-certified

■ Options

Extension cable for driver and motor communication

Model no. 1m : F2C02M0100A

2m : F2C02M0200A

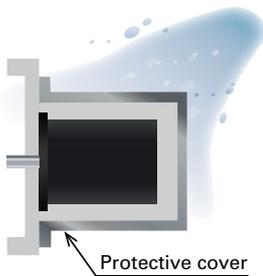
3m : F2C02M0300A

■ Precautions on use

- The shaft and cable parts are not under IP65 protection. Please take measures such as sealing for those parts.
- Brakes, encoders, and oilseals can be optionally equipped. Contact us for details.
- Food grade grease is available as an option for bearing grease. Contact us for details.
- Please keep the length of extension cable between motor and driver no longer than 3 m, considering voltage drops.

Waterproof performance

This motor can operate normally even when exposed to splash water because of its waterproof structure, eliminating the need for protective covers.



■ Conventionally

Protective cover was necessary to protect the motor against water.

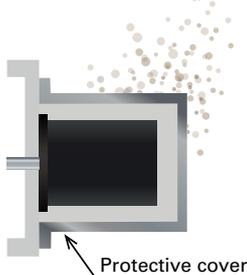


■ IP65 rated protection motor

Can be used without protective cover with its high waterproof performance.

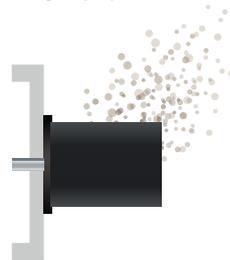
Protection against dust

This motor can be used with no problem inside the food processing equipment that deal with powders.



■ Conventionally

Protective cover was necessary to protect the motor against fine particles such as powders.



■ IP65 rated protection motor

Can be used without a protective cover with its high dustproof performance.

56mm sq.

1.8° /step

RoHS

Bipolar

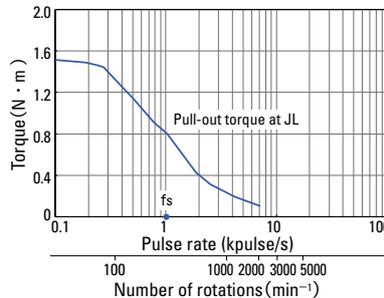
Model number	Connector type	Holding torque at 2-phase excitation [N·m] or larger	Rated current A /phase	Wiring resistance Ω /phase	Winding inductance mH /phase	Rotor inertia × 10 ⁻⁴ kg · m ²	Mass kg	Allowable thrust load N	Allowable radial load N
SP2566-5160	SP2566-5100	1.7	2	2	9.2	0.36	1.2	15	23

• Models with brakes, encoders, or oil seals differ in their model numbers, rotor inertia, and mass.

Characteristics diagram

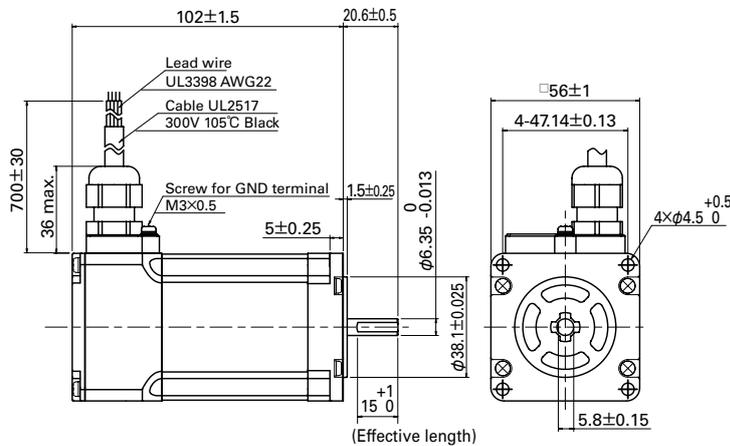
SP2566-5160
SP2566-5100

Drivers : BS1D200P10
Power supply voltage: 24 VDC, Wiring current: 1 A/phase
2-Phase excitation (full step)
 $J_L = 0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ when rubber coupling used
fs: Maximum starting rate when not loaded

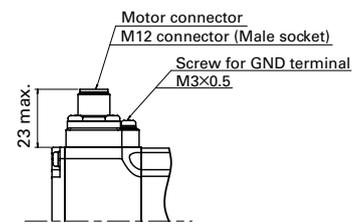


Dimensions [Unit: mm]

Cable type



Connector type



Ingress protection ratings (IP code)

Definition of Ingress Protection (IP Code)

IP XX

Second digit: Protection against water

First digit: Protection against solid objects and access to hazardous parts

First digit	Description
0	No protection
1	Protection against solid objects of 50 mm or larger
2	Protection against solid objects of 12.5 mm or larger
3	Protection against solid objects of 2.5 mm or larger
4	Protection against solid objects of 1 mm or larger
5	Protection against a level of dust that could hinder operation or impair safety
6	Complete protection against dust

Second digit	Description
0	No protection
1	Protection against vertically dripping water
2	Protection against dripping water up to 15° to vertical line
3	Protection against spraying water
4	Protection against splashing water
5	Protection against low pressure water jets
6	Protection against high pressure water jets
7	Protection against temporary immersion in water
8	Protection against submersion in water

Ingress Protection (IP Code) is defined as above in a standard IEC (International Electrotechnical Commission) 60529* "Degrees of protection provided by enclosures (IP Code)". *IEC 60529:2010

Compatible Driver

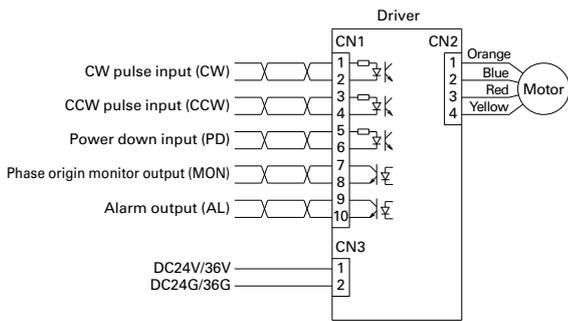
RoHS Bipolar

General specifications

Basic information	Model no.	BS1D200P10			
	Input source	24 or 36 VDC \pm 10%			
	Source current	3 A			
	Mass (Weight)	0.09 kg			
Functions	Selection functions	Step angle, Pulse input mode, Low-vibration mode, Standstill current, Operating current, Initial excitation phase			
	Protective functions	Open phase, Main circuit power supply voltage drop			
	LED indicator	Power lamp, Alarm indicator			
I/O signals	Command pulse input signal	Photocoupler input type, Input resistance: 220 Ω , High-level signal input voltage: 4.0 to 5.5 V, Low-level signal input voltage: 0 to 0.5 V, Maximum input frequency: 150 kpulse/s			
	Power down input signal	Photocoupler input type, Input resistance: 220 Ω , High-level signal input voltage: 4.0 to 5.5 V, Low-level signal input voltage: 0 to 0.5 V			
	Phase origin monitor output signal	Open collector output by photocoupler Output specification: Vceo = 40 V max., Ic = 10 mA max.			
	Alarm output signal	Open collector output by photocoupler Output specification: Vceo = 40 V max., Ic = 10 mA max.			
CE (TÜV)	Directives	Category	Standard	Name	
	Low-voltage directives	—	EN61010-1	—	
	EMC directives	Emission	EN55011-A	EN55011-A	Mains terminal disturbance voltage
			EN55011-A	EN55011-A	Electromagnetic radiation disturbance
		Immunity	EN61000-4-2	EN61000-4-2	Electrostatic discharge immunity test
			EN61000-4-3	EN61000-4-3	RS (Radio-frequency amplitude modulated electromagnetic field) Radiated, radio-frequency, electromagnetic field immunity test
			EN61000-4-4	EN61000-4-4	Electrical fast transient/burst immunity test
EN61000-4-6	EN61000-4-6	Conducted disturbances Immunity to conducted disturbances, induced by radio-frequency fields			
UL	Acquired standards	Applicable standards	File no.		
	UL	UL508C	E179775		
	UL for Canada				

Connections and Signals

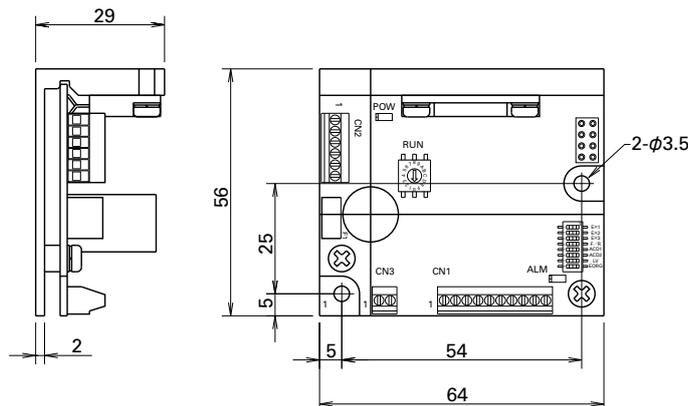
External wiring diagram



Applicable wire sizes

Item	Wire sizes	Allowable wire length
For power supply	AWG22 (0.3 mm ²)	2 m max.
For I/O signals	AWG24 (0.2 mm ²) to AWG22 (0.3 mm ²)	2 m max.
For motor	AWG22 (0.3 mm ²)	3 m min.

Dimensions [Unit: mm]



Functions



1 Operating current selection rotary switch (RUN)

The value of the motor operating current can be set.

Scale reading	0	1	2	3	4	5	6	7
Motor current (A)	2.0	1.9	1.8	1.7	1.6	1.5	1.4	1.3
Scale reading	8	9	A	B	C	D	E	F
Motor current (A)	1.2	1.1	1.0	0.9	0.8	0.7	0.6	0.5

· The factory setting is F (0.5 A).

Select the current value after checking the rated current of the motor to use.

2 Function selection DIP switches

You can select functions that are suitable for your system.

Factory settings

	OFF	ON	
EX1	<input type="checkbox"/>	<input type="checkbox"/>	Resolution: 8 divisions
EX2	<input type="checkbox"/>	<input type="checkbox"/>	
EX3	<input type="checkbox"/>	<input type="checkbox"/>	
F/R	<input type="checkbox"/>	<input type="checkbox"/>	2-Pulse input mode (CW, CCW pulse input)
ACD1	<input type="checkbox"/>	<input type="checkbox"/>	Standstill current: 40% of operating current
ACD2	<input type="checkbox"/>	<input type="checkbox"/>	
LV	<input type="checkbox"/>	<input type="checkbox"/>	Micro-step operation
EORG	<input type="checkbox"/>	<input type="checkbox"/>	Phase origin

1, Step angle selection (switches EX1, EX2, EX3) Selects the division number of the basic step angle.

EX1	EX2	EX3	Resolution
ON	ON	ON	1 division (FULL step)
OFF	ON	OFF	2 divisions
ON	OFF	OFF	4 divisions
OFF	OFF	OFF	8 divisions
OFF	OFF	ON	16 divisions

2, Input mode selection (F/R)

Selects pulse input modes.

F/R	Pulse input mode
ON	1-Pulse input mode (CK, U/D)
OFF	2-Pulse input mode (CW, CCW)

3, Standstill current selection (ACD1, ACD2)

Select the value of the motor current at standstill.

ACD2	ACD1	Motor current
ON	ON	100% of operating current
ON	OFF	60% of operating current
OFF	ON	50% of operating current
OFF	OFF	40% of operating current

· Initial factory setting is 40% of the rated current value.

Driver and motor should be operated at around 50% to reduce driver and motor heating.

4, Low-vibration mode selection (LV)

Provides low-vibration and smooth operation even with low resolution settings such as 1-division and 2-division.

LV	Initial excitation phase
ON	Low-vibration operation
OFF	Micro-step operation

5, Excitation selection (EORG)

The excitation phase when power is turned on can be selected.

EORG	Initial excitation phase
ON	Excitation phase when power shut off
OFF	Phase origin

· By turning on the EORG, the excitation phase when power is turned off will be saved, which prevents shaft displacement when the power is turned on next time.

Summary of I/O signal specifications

Signal name	CN1 Pin no.	Function outlines
CW pulse input (CW) (Standard)	1 2	When in "2-pulse input mode", this signal inputs driving pulses that make the motor rotate in a CW direction.
Pulse train input (CK)	1 2	When in "1-pulse input mode", this signal inputs driving pulses for motor rotation.
CCW pulse input (CCW) (Standard)	3 4	When in "2-pulse input mode", the signal inputs driving pulses that make the motor rotate in a CCW direction.
Rotational direction input (U/D)	3 4	When in "1-pulse input mode", the signal inputs the motor rotational direction. Internal photocoupler on ... CW direction Internal photocoupler off ... CCW direction
Power down input (PD)	5 6	Inputting a PD signal will cut off the current flowing to the motor. (Internal photocoupler on) ... PD function in effect. (Internal photocoupler off) ... PD function not in effect.
Phase origin monitor output (MON)	7 8	When the excitation phase is at the origin—the state when power is turned on—this output is activated. For FULL step, it is activated with 4 pulses; for HALF step, it is activated with 8 pulses.
Alarm output (AL)	9 10	If alarm circuit is activated inside the driver, it outputs an alarm signal to outside (with photocoupler on). After that, the stepping motor status turns to unexcited.

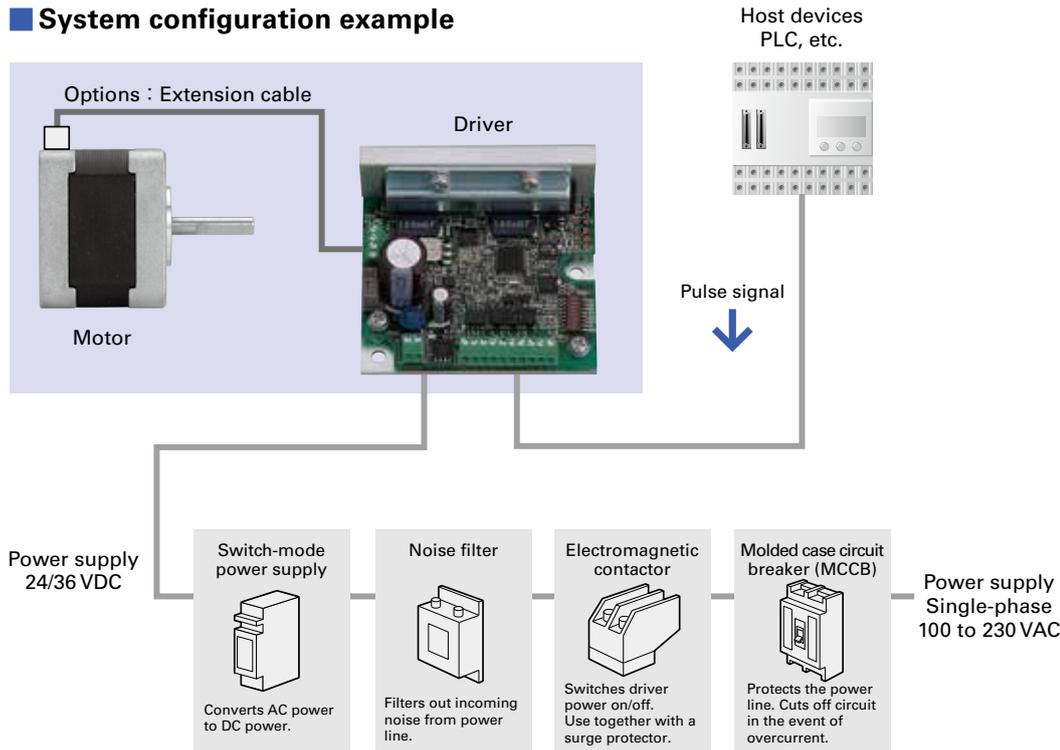
※ As for the motor rotational directions, CW stands for the clockwise direction, and CCW stands for the counterclockwise direction, seen from output shaft side.

Options (sold separately)

Extension cable for driver and motor communication

Model no.	Cable length	Compatible motor	Compatible driver
F2C02M0100A	1 m	103H5210-5249	BS1D200P10
F2C02M0200A	2 m	103H7126-5747	
F2C02M0300A	3 m	SL2423-5241	
		SL2603-5741	
F2C01M0100A	1 m	SP2566-5100	
F2C01M0200A	2 m		
F2C01M0300A	3 m		

System configuration example



Precautions For Adoption

Cautions

Failure to follow the precautions on the right may cause moderate injury and property damage, or in some circumstances, could lead to a serious accident. Always follow all listed precautions.

Cautions

- Read the accompanying Instruction Manual carefully prior to using the product.
- If applying to medical devices and other equipment affecting people's lives, please contact us beforehand and take appropriate safety measures.
- If applying to equipment that can have significant effects on society and the general public, please contact us beforehand.
- Do not use this product in an environment where vibration is present, such as in a moving vehicle or shipping vessel.
- Do not perform any retrofitting, re-engineering, or modification to this equipment.
- The products presented in this catalog are meant to be used for general industrial applications. If using for special applications related to aviation and space, nuclear power, electric power, submarine repeaters, etc., please contact us beforehand.

*For any question or inquiry regarding the above, contact our Sales Department.

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