# **SOLUTIONS** for **Medical Devices**

### Fans

**Uninterruptible Power Supplies** Stepping Systems

San Ace



**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.

### - **A 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.

• If using the products in this catalog 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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CATALOG No. K1005B001 '17.3

## **SANYO DENKI**



# **SANYO DENKI**

helps raise the performance and usability of medical devices. We provide a variety of solutions to support the medical field.



## **SOLUTIONS** for **Medical Devices**

# SanAce Cooling Systems



## Noise is reduced, but cooling performance remains the same.

### Comparing $60 \times 60 \times 25$ mm models

Туре	Rated Speed	Max. Airflow	Max. Static Pressure	Sound Pressure Level	4 dB(A)
Silent Fan (9S type)	2,700 min <sup>-1</sup>	0.4 m <sup>3/</sup> min	19.7 Pa	16 dB(A)	less
Conventional model (109R type)	2,600 min <sup>-1</sup>	0.36 m <sup>3</sup> /min	19.6 Pa	20 dB(A)	

### Applications



Oxygen concentrator







X-ray diagnostic device

### To reduce noise...

### 1. Wind noise

The motor section is smaller than that of our conventional fans. The wider ventilation opening provides adequate airflow even when rotating at low speeds. Also, it is designed to limit noise-generating turbulence.

# Conventional model **Silent Fan** Ventilation opening Comparing 60 x 60 mm models

### 2. Electromagnetic noise

Using a soft-switching circuit improves drive motor performance and reduces electromagnetic noise when rotating at low speeds.

### 3. Vibration noise

Frame rigidity is enhanced to prevent vibration.



40 mm sq., 52 mm sq., 60 mm sq., 70 mm sq., 80 mm sq., 92 mm sq.

## Maintains cooling performance and greatly decreases power consumption.

### Comparing $80 \times 80 \times 20$ mm models

				Approx
Туре	Rated Speed	Max. Airflow	Power consumption	72%
Low Power Consumption Fan (9GA type)	2,900 min <sup>-1</sup>	0.84 m³/min	0.72 W	decrease
Conventional model (109P type)	2,900 min <sup>-1</sup>	0.84 m³/min	2.52 W	

### Applications





Medical monitor

Mammography



By blowing air vertically, space inside the device can be decreased. Features high suction and static pressure.











Blood analyzer





Air mattress (removes moisture buildup)



Powder packing machine (medicine powder suction)

## SanAce Cooling Systems



A device for controlling the rotational speed of fans with the PWM control function without the need for preparing new circuits. It contributes to reducing system power consumption and fan noise.

### **Functions**

Variable resistor control (internal)	Control fan speed using the dial on the Box type
Thermistor control	Control fan speed according to a set temperature by connecting a thermistor.
Voltage control	Control fan speed using an analog command voltage (0 to 5 V)
Variable resistor control (external)	Control fan speed by connecting a variable resister to the terminal.

Note: Thermistor and external variable resistor need to be prepared by the customer.

## By optimumizing speed to suit conditions, energy savings and low noise can be attained.





Inside scale : PWM duty cycle Outer scale : Temperature (°C)







The first compact and portable measuring device in the industry that can measure airflow and system impedance within a device. Based on measurement results, the optimal fan for the device can be selected.



**Software screens** 〈 Using measurement results and the included data viewing software 〉

The operating point of the fan can be found.





The operating point, which is essential for selecting a fan, can be determined by measuring the device's system impedance<sup>(1)</sup> and the fan's operating airflow<sup>(2)</sup>.

<sup>(1)</sup> System impedance = The resistance to the flow of air within a device. <sup>(2)</sup> Operating airflow = Actual airflow when a fan is mounted



### System impedance changes can be visualized

## San Ace Series Product Lineup



Low Power Consumption Fan

Rated voltage...5, 12, 24, 48V (Differs by model)



Blower

Rated voltage…12, 24 V (Differs by model)



### **PWM Controller**

	Вох Туре		
Model no.	9PC8666X-S001		
Size [mm]	86 (H) x 66 (W) x 38 (D)		
Rated voltage [VDC]	12, 24, and 48		
Power consumption [W]	0.2 <sup>(1)</sup>		
Operating voltage range [VDC]	7 to 60		
Operating temperature [°C ]	-20 to+70		
Output PWM signal	$V_{\mbox{\tiny OH}}$ (high level voltage): 3.3 or 5 VDC (selecta		
No. of connectable fans	Up to 4 fans		
Control functions <sup>(2)</sup>	Voltage control, Internal adjustment (variable resistor) control, External adjustment (variable resistor) control <sup>(3)</sup> , Thermistor control <sup>(3)</sup>		
Mounting method	DIN rail mounting or screw mounting		
Mass [g]	110		
Material	Case: Plastics		
<sup>(1)</sup> When output terminals are turned on <sup>(2)</sup> Control functions are mutually exclusive for Box Type. <sup>(3)</sup> Variable resistor and thermistor are not supplied with the controller and need to be prepared separate			

### **Airflow Tester**

Model no.		9AT2560S-000 🗌 (1)	
Measurement	Airflow	m³/min	
units	Static pressure	Pa	
Measurement	Airflow	0.20 to 8.00 m <sup>3</sup> / min	
range	Static pressure	0 to 1,000 Pa	
	Airflow	$\pm$ 7% of maximum measurable airf	
Measurement accuracy	Static pressure	$\pm$ 10 Pa (0.04 inchH2O) for measur $\pm$ 50 Pa (0.20 inchH2O) for measur	
Operating	Ambient temperature	0 to 40 °C	
environment	Humidity	20 to 85% RH (non-condensing)	
Display		Data no., Measurement values (air	
		Measurement mode selection	
Interface		Digital output: Included USB serial	
Dewer oursh	Input voltage	100 to 240 VAC, 50/60 Hz	
Power supply	Power consumption	260 VA max.	
Dimensions		600 (W) x 250 (H) x 250 (D) mm	
Mass		Main unit: Approx. 6 kg, Connectio	
Included periphe	rals	1 Set of measurement nozzles, Plas AC power cable (2.5 m), USB serial	

<sup>(1)</sup> The AC power plug shape differs with the number in  $\Box$  of model numbers.

AC power plug included in models with 1 in 🗌 is for Japan and North America regions (2 parallel flat pins + a round grounding pin), Input voltage: 100/120 VAC, 50/60 Hz AC power plug included in models with 2 in 🗌 is for Europe region (2 round pins + a female grounding contact), Input voltage: 220 VAC, 50 Hz AC power plug included in models with 3 in 🗌 is for China region (2 angled flat pins + a flat grounding pin), Input voltage: 220 VAC, 50 Hz Product also available without an AC power cable. Model no. 9AT2560S-0000, 9AT2560A-0000, 9AT2560C-0000

<sup>(2)</sup> Static pressure values are calculated with standard atmosphere as 1013 hPa at 20 °C.

Check the SANYO DENKI website for other models in our lineups.



РСВ Туре		
9PC8045D-V001	9PC8045D-R001	9PC8045D-T001
80 (H) x 45 (W) x 17	(D)	

selectable), Frequency: 25 kHz					
ntrol, ontrol <sup>(3)</sup> ,	Voltage control	Variable resistor control <sup>(3)</sup>	Thermistor control <sup>(3)</sup>		
	Screw mounting				
	27				
	PCB: FR-4				
vpe.					

9AT2560A-000 (1) 9AT2560C-000 (1) CFM CFM inchH20 Pa 7 to 282 CFM 7 to 282 CFM 0 to 4.01 inchH<sup>2</sup>O 0 to 1,000 Pa

flow with each nozzle

rement results lower than 200 Pa, rement results higher than 200 Pa

flow, static pressure<sup>(2)</sup>), Measurement status, Nozzle selection,

adapter

on duct (including board holder): Approx. 1.5 kg

stic mounting board (5 pcs / set), Connection duct, adapter, Instruction manual, Quick start guide, Data viewer software

# SANUPS Power Systems



Make systems safe and secure!

**Accident-Resistant UPS Series** 

Even if natural disasters, lightning, or accidents such as overcurrents occur, these UPSs continue supplying power and avoid the risks of equipment outages and data loss. SANYO DENKI has a lineup of compact UPSs to achieve power redundancy.



CT Scanne

Blood analyzer

Online UPS with a bi-directional power conversion module to provide high quality power.

## RMΔ

3-Phase 3-wire, 200 V

Even if either of UPS rectifier or inverter fails, the bi-directional power conversion module has both functions and can operate as a backup unit.



Rated output capacity		[No. of phases/wires]	
(kVA)	(kW)	Input/Output voltage	Standard
50	45	[3-Phase 3-wire]	10 min
100	90	200 V	

Online UPS with a rich lineup A11J Single-phase 2-wire, 200/100 V Rated output capacity 5, 10, 15, 20kVA

Even if one unit malfunctions, the remaining units can continue to supply stable power.



Rated output capacity		[No. of phases/wires]	I/O connector type	Rack mount		Battery runtime
(kVA)	(kW)	Input/Output voltage			Standard	(Available options)
F	4.5			0	5, 10 min	15, 25, 35, 45 min
J	4.0	- [Single-phase 2-wire] - <b>200 V models</b> 200 / 208 / 220 / 230 / 240 V		-		30, 60, 180 min
10	0		2-wire] dels / 230 / 240 V	0		15, 25, 35 min
10	3			-		30, 60, 180 min
15	12 5			0		15, 25 min
10	13.3			-		30, 60, 180 min
20	10*			0		15 min
20	10			_		30, 60, 180 min

A variety of othrer products are available including 100 V and 200 V input models, and single-phase 3-wire output models. Contact SANYO DENKI for details \* 17 kW for UL/CE-certified model.

# **SANUPS**

### Rated output capacity 50 kVA, 100 kVA







N+1 redundant operation means that even if one unit malfunctions a backup is available.

### (Only 200 V I/O models are listed)

## SANUPS Power Systems



This UPS uses nickel metal hydride batteries. Battery life is approximately twice as long as our conventional model.

	Conventional model	UPS unit, cooling fan Battery	Expected life: 7 years Expected life: 5 years	
		UPS unit, cooling fan		<b>F</b>
	ATIG-NI	Battery		Expected life: <b>IU</b> years
-	(	0 !	5 10	) (years) (Ambient temperature: 25°C)

Rated output capacity (kVA)	(kW)	[No. of phases/wires] Input/Output voltage	I/O connector type	Rack mount	Battery runtime
1	0.7	[Single-phase 2-wire]			12 min
1.5	1.05	100 / 110 / 115 / 120 V	Quitlet	$\bigcirc$	18 min
1	0.8	[Single-phase 2-wire]	outiet	0	10 min
1.5	1.2	200 / 220 / 230 / 240 V			15 min

## **SANUPS** Series Product Lineup



This catalog only lists model numbers of major models. The actual purchased model number may be different depending on detailed specifications.

Column	Online UPS resilient to in A11K
1 kVA	s kva

### Suitable for servers and network environments.

Rated output capacity		[No. of phases/wires]	I/O connector type	Rack mount	Battery runtime		
(kVA)	(kW)	Input/Output voltage			Standard	(Available options)	
1	0.8		Outlet	0			
1.5	1.2	[Single-phase 2-wire]	Outlet	0		30, 60, 120, 180 min	
2	1.6	100 V models	Outlet/Terminal block	0	10 min		
3	2.4	100 / 110 / 120V	Outlet/Terminal block	0		25, 60, 120, 180 min	
5	4		Terminal block	0		30, 60, 120 min	



By using both a UPS and a diesel power generator, over 10 hours of continuous operation is possible. An online UPS continues to supply inverter power even during grid outages and instantaneous voltage dips.

Rated output capacity	[No. of phases/wires] [No. of phases/wires]		Battery runtime	
(kVA)	Input voltage	Output voltage	Standard	
20, 30	[3-Phase 3-wire]	[Single-phase 3-wire] 100 / 200 V models	10	
10, 15, 20, 30, 50, 75, 100	200 V models	[3-Phase 3-wire] 200 V models	- 10 min	

# SANUPS

## nput fluctuations





# SANMOTION Servo Systems



### **Reduce temperature rise within devices! Reduce noise and vibration!**

Details in  $\rightarrow$  p. 18

Model No. PB

# **Closed Loop Stepping Systems**

Flange size **28** mm sq. to **86** mm sq

## **Efficient driving**

Closed loop stepping systems combine stepping motors with position detecting encoders that provide feedback for closed loop control. Without step-out, they are more reliable than open loop stepping systems. They also have efficient driving.





## **Closed loop control for** low heat generation

An open loop control system continuously supplies rated current to a stepping motor, regardless of the load. The closed-loop control system Model No.PB can supply only the current necessary for the motor's required torque, lowering heat generation.

## Low vibration

The encoder detects the position of the rotor and controls the current supply for the best excitation timing. Since closed-loop control does not supply excess current to the motor, it produces less vibration than open loop stepping systems.

### Motor temperature rise comparison

• 2-Phase stepping system



Motor speed fluctuation characteristics comparison



Motor: 103H7822-0410, Driver: US1D200P10 Closed loop stepping system Motor: PBM603DXK50, Driver: PB4003P340



Decrease vibration by increasing the resolution of the motor.

### Motor step response comparison





Suppress vibration of the motor with rubber, reducing noise and transmission of vibration to the equipment.

### Noise level comparison (with/without mounting surface damper)



Note: Mounting screws need to be prepared by the customer

Damper specifications

Model no.: 3535051-1

Hardness: 45° Material: Nitrile rubber



Note 1: Noise effect varies depending on the housing where the mounting surface damper is installed. 2: We can provide motors with mounting surface dampers installed. Please contact a SANYO DENKI sales representative 3. Please pay attention to motor temperature rise since motors get hot with damper installed



## SANMOTION

2-Phase

2-Phase





Compared to standard stepping motors, high-resolution stepping motors have less overshoot and undershoot per step, so they can be driven with less vibration.



# SANMOTION Servo Systems



## **Make devices smaller and lighter!**

### **Heavy-Duty Hollow Shaft Stepping Motor** 2-Phase

Flange size 42 mm sq. Thrust load: 370 N (Approx. 37 kg) 60 mm sq. Thrust load: 450 N (Approx. 45kg)

This stepping motor has an allowable thrust load (limit value of load that can be applied in the direction parallel to the shaft axis) 37 times\* that of our existing product.

It can be used for applications where large loads are applied.

\* 370 N as opposed to 10 N of our existing model (for 42 x 42 mm sized model)



### Compatible driver

Model no.: BS1D200P10 (DC input)

Operating current selection switch setting: With an SL2423-5241 motor: A (1 A/phase) With an SL2603-5741 motor: 0 (2 A/phase)

### Driver/motor connection relay cable

Model no.: 1 m : F2C02M0100A 2 m : F2C02M0200A 3 m : F2C02M0300A

### Precautions on use

When used for driving objects like circular tables, load inertia applied to the motor is higher and stopping time may be longer.

### Notes on use

• The protection rating of this product is IP40. If the usage environment will contain mist, water, or powder, take measures to protect the motor. • The allowable load limit of this product is detailed below. Do not exceed the below load limits.

42 mm sq. Thrust load: 370 N 60 mm sq. Thrust load: 450 N

• When using an extension cable between the motor and driver, be aware of voltage drop and use a cable under approximately 3 m.

### For example, when using this motor in a rotary table...

### Former mounting method

Because it is not capable of receiving the load of the workpiece directly, the table is indirectly driven using a pulley and timing belt.



Simplify the mechanism by directly receiving the load of the workpiece.



<b>42</b> mm sq. 1.8° /ste	p RoHS	Bipolar						
Model number	Ho 2-	olding torque at phase excitation	Rated \ current r	Wiring resistance	Winding inductance	Rotor inertia	Mass	Motor lenath (L)
Single shaft	[N	·m] or greater	A /phase	Ω /phase	mH /phase	$ imes$ 10 <sup>-4</sup> kg $\cdot$ m <sup>2</sup>	kg	mm
SL2423-5241	0.9	52	1 4	4.8	10.5	0.2	0.5	67.5
Characteristics diagram	6	0.6						
SL2423-5241 Drivers : BS1D200P10 Power supply voltage: 24 VDC, Wiring current: 1 2-Phase excitation (full step) J_=0.94 × 10*kg · m² when rubber coupling us Maximum starting rate: 1060 pulse/s Maximum slew rate: 1150 pulse/s	(m3, 100, 100, 100, 100, 100, 100, 100, 10	0.5 0.5 0.4 0.3 0.2 0.1 0	Pull-out torque a	at JL				
		0.1 1 Pulse ra	10 ate (kpulse/s)	100				
		100 10	1000 2000 3000 50	00				
	Connector	Number of r	otations(min <sup>-</sup>	')				
۳۵۳۵۵ ۲۵۳۵۵ 60 mm sq. 1.8° /ste	P RoHS	-1827804-3 1827570-2 vinyl tubing C Black 6 300V 105 C 	034 -0.016	4-M2.5×0.45, ø26 circumference Equally 90° apart, tapping depth 3 min.	18 max.	4.M2.5×0.45 Effective tapping depth	-	
Model number		Holding torque at	Rated	Wiring	Winding	Rotor inertia	Mass	Motor
Single shaft		[N·m] or greater	A /phase	resistance e Ω/phase	inductance mH /phase	$\times 10^{-4}$ kg · m <sup>2</sup>	kq	length (L) 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 2-Phase excitation (full step) J <sub>4</sub> =0.94 × 10 <sup>4</sup> Kg · m <sup>2</sup> when rubber coupling us Maximum starting rate: 600 pulse/s Maximum slew rate: 610 pulse/s	l (uu - jusy) A/phase Louding ed	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Pull-out torque	at JL				
		Puls	e rate (kpulse/	/s)				
		100 Number	1000 2000 300 of rotations(m	0 5000 nin <sup>-1</sup> )				
Dimensions [Unit: mm]	Connect Manufac	or cturer: Tyco Electronics Japan ( : 1-1827864-3	G.K.					
Ē	Victorial diagram in the second secon	d vinyl tubing 5°C Black re 20 n AWG22 300V 105°C	nin.			25 max.	6 max.	













3±0.25

22.6±0.5

98.7±1



# SANMOTION Servo Systems



## **SANMOTION** Series Product Lineup

osed Loop Stepping System SANMOTION Model No.PB Type R: AC input, RS-485 + parallel I/O type							
Common motor specifications Lead wire length: 500 ± 20 mm Common driver specifications Dimensions (W x H x D): 42 x 170 x 120 mm							
Motor dimensions Flange size x motor length (mm)	Maximum stall torque (N · m)	Motor model number	Driver model number (Input power supply 100 to 115 VAC)	Driver model number (Input power supply 200 to 230 VAC)			
42×55.9	0.35	PBM423FXK30-M					
60×68.8	1.3	PBM603FXK30-M					
60×100.8	1.9	PBM604FXK30-M	PB4A002R300	PB4A002R301			
86×79.5	3.1	PBM861FXK30-M					
86×110	6.1	PBM862FXK30-M					

losed Loop Stepping System SANMOTION Model No.PB Type R: AC input, RS-485 + parallel I/O type							
Common motor specifications Lead wire length: 500 ± 20 mm Common driver specifications Dimensions (W x H x D): 42 x 170 x 120 mm							
Motor dimensions Flange size x motor length (mm)	Maximum stall torque (N · m)	Motor model number	Driver model number (Input power supply 100 to 115 VAC)	Driver model number (Input power supply 200 to 230 VAC)			
42×55.9	0.35	PBM423FXK30-M					
60×68.8	1.3	PBM603FXK30-M					
60×100.8	1.9	PBM604FXK30-M	PB4A002R300	PB4A002R301			
86×79.5	3.1	PBM861FXK30-M					
86×110	6.1	PBM862FXK30-M					

### Closed Loop Stepping System SANMOTION Model No.PB Type P: AC input, Pulse train input type

Common motor specifications	ead wire length: 500 $\pm$ 20 mm	Common driver specifications Dimens	sions (W x H x D): 42 x 170 x 120 mm	
Motor dimensions Flange size x motor length (mm)	Maximum stall torque (N·m)	Motor model number	Driver model number (Input power supply 100 to 115 VAC)	Driver model number (Input power supply 200 to 230 VAC)
42×55.9	0.35	PBM423FXK30-M		
60×68.8	1.3	PBM603FXK30-M		
60×100.8	1.9	PBM604FXK30-M	PB4A002P300	PB4A002P301
86×79.5	3.1	PBM861FXK30-M		
86×110	6.1	PBM862FXK30-M		

### Closed Loop Stepping System SANMOTION Model No.PB Type P: DC input, Pulse train input type, Multi-axis

Common motor specifications	Lead wire length: 500 $\pm$ 20 mm	Common driver specifications	Power supply: 24/48VDC, Dimensions (W x H x D): 60 x 160 x 95 mm, No. of controllable axes: 4		
Motor dimensions Flange size x motor length (mm)	Maximum stall torque (N·m)	Motor model number	Driver model number		
28×59.2	0.055	PBM281DXE50		-	
28×78.5	0.115	PBM285DXE50			
42×55.9	0.39	PBM423DXK50	PB4D003P340		
60×68.8	1.05	PBM603DXK50			
60×100.8	1.85	PBM604DXK50		_	

### Closed Loop Stepping System SANMOTION Model No.PB Type P: DC input, Pulse train input type, Multi-input type (pulse train/RS-485 + parallel I/O)

Common motor specifications	Lead wire length: 500 $\pm$ 20 mm $\bullet$ Common driver specifications		Power supply: 24/48VDC, Dimensions (W x H x D): 32 x 160 x 95 mm			
Motor dimensions Flange size x motor length (mm)	Maximum stall torque (N·m)	Motor model number	Driver model number (Single power supply type)	Driver model number (Dual power supply type)		
28 × 58.5	0.055	PBM282FXE20				
28 × 77.8	0.115	PBM284FXE20				
42 × 57.6	0.39	PBM423FXE20	PB3D003M200	PB3D003M201		
60 × 70.3	1.3	PBM603FXE20				
60 × 102.3	1.9	PBM604FXE20				

### 5-Phase Stepping System SANMOTION F5 Linear Actuator Stepping Motor

 Common motor specifications Lead wire length: SL5421 motors… 300 mm or longer, SL5601 motors… 600 mm or longer Driver (Model no.: FS1D140P10) specifications
 Power supply: 24/36VDC, Full-step/Half-step, Dimensions (W x H x D): 64 x 37 x 56 mm

Motor dimensions Flange size x motor length (mm)	Brake	Rated current (A/phase)	Stroke (mm)	Thrust (N)	Speed (mm/s)	Resolution (mm)	Motor model number	Driver model number
42 × 87	No	0.75	50	370	48	0.004	SL5421-7241	
42 × 117	Yes	0.75	50	370	48	0.004	SL5421-72XB41	ES1D140D10
60 × 135.6	No	1.4	80	450	64	0.008	SL5601-8241	F31D140F10
60 × 135.6	Yes	1.4	80	450	64	0.008	SL5601-82XB41	

### 2-Phase Stepping System SANMOTION F2

### Bipolar, Thin-type Stepping Motor

Common motor specifications Lead wire length: 300 mm or longer							
Motor dimensions Flange size x motor length (mm)         Maximum stall torque (N·m)         Rated current (A/phase)         Step angle (degree)         Shaft         Mass (kg)         Motor model number							
42 × 11.6 0.083 1.0 1.8 Single shaft 0.07 SS2421-5041							
42 × 18.6 0.186 1.0 1.8 Single shaft 0.14 SS2422-5041							
50 × 11.4 0.1 1.0 1.8 Single shaft 0.09 SS2501-8040							
50 × 16.4 0.215 1.0 1.8 Single shaft 0.15 SS2502-8040							

Drivers for these motors need to be prepared by the customer

### **Bipolar, High-Resolution Stepping Motor**

Common motor specifications	Lead wire length: 300 mm	n or longer 🌑 Common	driver specifications	Power supply: 24/36VDC, Microstepping, Dimensions (W x H x D): 64 x 29 x 56 mm		
Motor dimensions Flange size x motor length (mm)	Maximum stall torque (N · m)	Rated current (A/phase)	Step angle (degree)	Shaft	Motor model number	Driver model number
42 × 33	0.23	2	0.9	Single shaft	SH1421-5241	
42 × 39	0.34	2	0.9	Single shaft	SH1422-5241	
42 × 48	0.48	2	0.9	Single shaft	SH1424-5241	P\$1D200P10
60 × 42	0.69	2	0.9	Single shaft	SH1601-5240	B31D200F10
60 × 54	1.28	2	0.9	Single shaft	SH1602-5240	
60 × 76	2.15	2	0.9	Single shaft	SH1603-5240	
			*	· ·	•	·

### Formerly

Large motors make devices bigger and heavier.



Motor length: 33 mm Motor mass: 0.23 kg Holding torque: 0.2 N ⋅ m

### Solution

Small motors help make devices compact and lighter.

Motor length: 16.4 mm

our existing motor

our existing motor Holding torque: 0.215 N ⋅ m

Motor mass: 0.15 kg

Approx. **50%** smaller than

Approx. **35**% smaller than



## SANMOTION