SANMOTION

5-PHASE STEPPING SYSTEMS

F5

Ver.3

SANYO DENKI

Extensive lineup

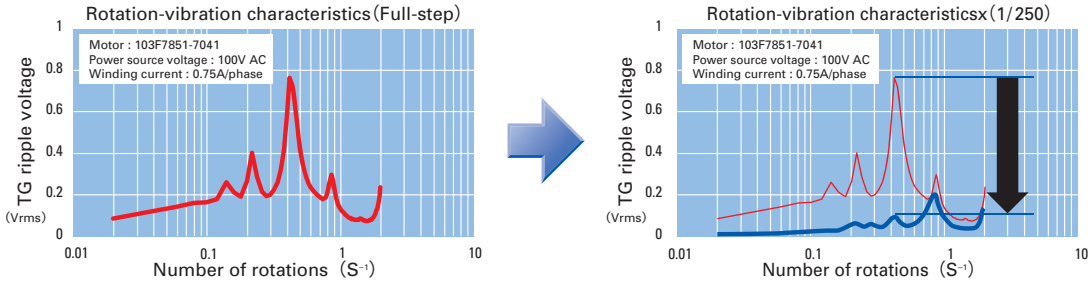
F series driver features

1 Lower vibration

AC input
DC input

AC input

■ Automicro function and microstepping system enables further reduction of vibration compared to current models.



■ Automicro function

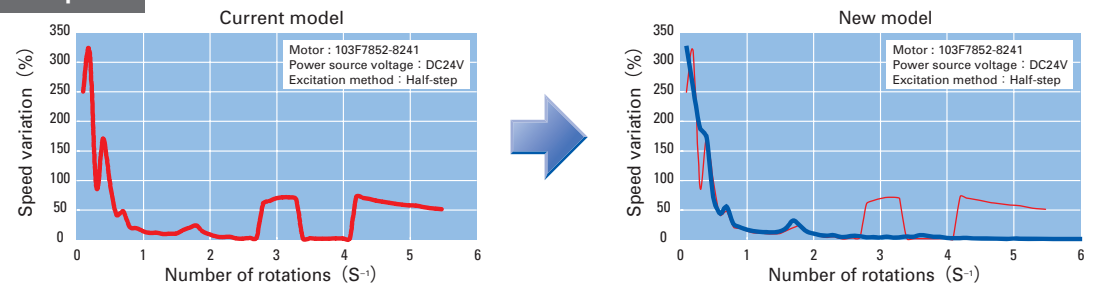
Vibration suppression is executed internally and independently from the controller.

■ Microstepping system

The basic step angle is divided by a maximum of 1/250 using 16 selectable resolution levels to enable smooth and vibration-free operation.

$$\frac{0.72}{\text{1 to 250 divisions}} = \text{0.72 to 0.00288degrees/pulse}$$

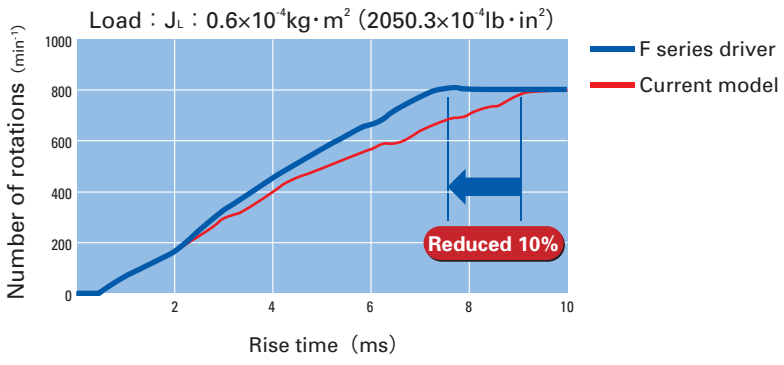
DC input



2 Shoter cycle time

AC input

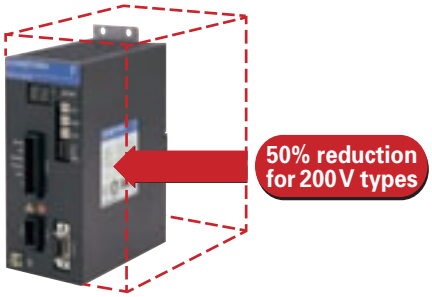
■ Improved response (up to 10% compared to current models) shortens the machine cycle time for repetitive operations.

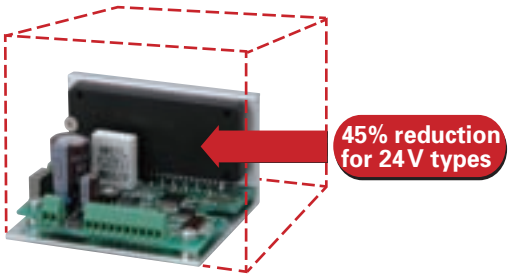


3 Control panel space is reduced

AC input
DC input

■ Volume is reduced by up to 50% for AC input types and 45% for DC input types compared to current models.





4 Easy maintenance

AC input

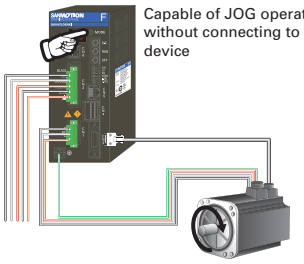
■ 2-digit 7-segment LED displays operating status and alarm for easy troubleshooting and faster system recovery.

Test run function (JOG)

AC input

With built-in positioning function

On-board JOG operation function is available for testing motor and amplifier connection without the need to connect to host device.

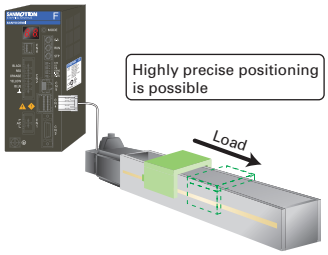


Encoder I/F Control

AC input

With built-in positioning function

Motor stall detection is possible by connecting a motor encoder. 500P/R (1000/2000 multiplier function) line driver method.

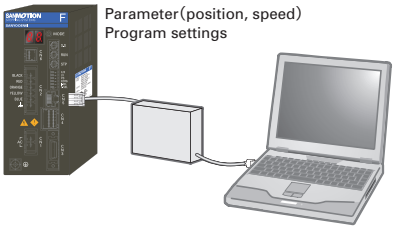


PC-based setup monitor

AC input

With built-in positioning function

Parameter and program settings can be made from the bundled setup software.

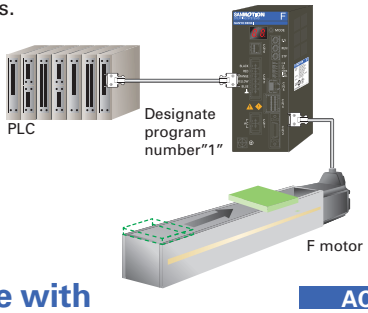


General-purpose I/O input for positioning

AC input

With built-in positioning function

System positioning is easily executed by using general-purpose I/O from an upper-level controller (PLC) to designate preset program numbers.



Compliance with international standards

AC input
DC input

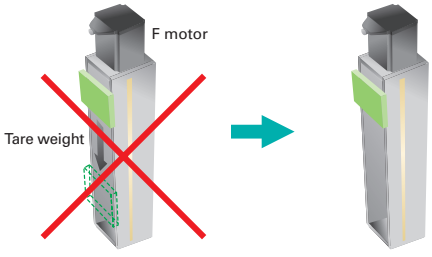
The standard specification SANMOTION F series stepping driver complies with UL and EN safety standards. Stepping motors complying with UL and EN standards are available upon request. EMC filters are also available to comply with the EMC directive.

Brake control

AC input

Automatic brake activation timing control is available when using electromagnetic brake motors.

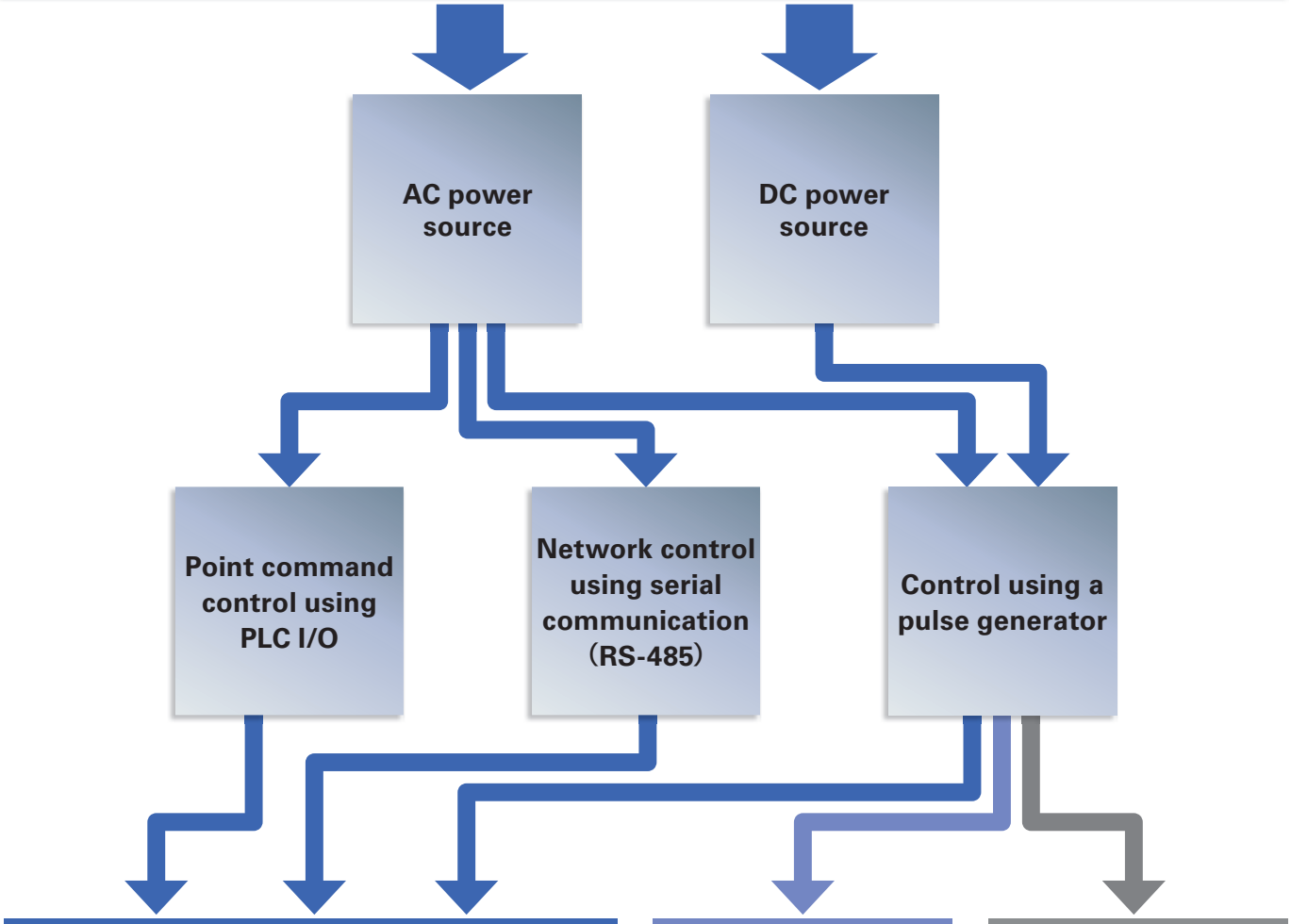
- Internal power source for brake (FP type)



Control method

How do you want to control the equipment ?

The F series offers the choice of 3 different control methods



AC input with built-in positioning function

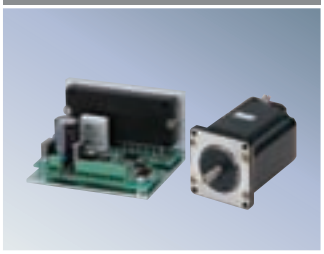
Startup via I/O :
Initiate program containing speed, acceleration/deceleration, and travel distance commands stored in the driver via the I/O.

Startup via serial communication:
Control by sending data for speed, acceleration/deceleration, and travel distance commands via serial communication.

AC input standard type

Motion is generated by pulse input commands from an upper-level controller.

DC input



Motion is generated by pulse input commands from an upper-level controller.

Set model

AC input

Standard model P.12

The standard set includes a F series driver and a F series motor.

Motor flange size

□42 (□1.65inch) □60 (□2.35inch) ø86 (ø3.39inch) ø106 (ø4.17inch)

CE / UL model P.14

The UL/CE set includes a F Series driver and a M Series motor.

Motor flange size

□42 (□1.65inch) □60 (□2.35inch) ø86 (ø3.36inch) ø106 (ø4.17inch)

Low-backlash gear model P.16

This set includes a low backlash gear that uses tapered hobbed gears to engage the final stage of the speed reduction mechanism.

Motor flange size

□42 (□1.65inch) □60 (□2.35inch) ø86 (ø3.39inch)

Reduction gear ratios

1/3.6 1/7.2 1/10 1/20 1/30 1/36

Harmonic gear model P.19

This set utilizes a harmonic gear.

Motor flange size

□42 (□1.65inch) □60 (□2.35inch) ø86 (ø3.39inch)

Reduction gear ratios

1/30 1/50 1/100

Electromagnetic brake model P.21

This set utilizes a non-excitation electromagnetic brake to maintain position in vertical load applications and hold load even during power off.

Motor flange size

□42 (□1.65inch) □60 (□2.35inch) ø86 (ø3.39inch)

DC input

Standard model P.33

The standard set includes a F series driver and a F series motor.

Motor flange size

□28 (□1.10inch) □42 (□1.65inch) □60 (□2.35inch) ø86 (ø3.39inch)

Low-backlash gear model P.35

This set includes a low backlash gear that uses tapered hobbed gears to engage the final stage of the speed reduction mechanism.

Motor flange size

□42 (□1.65inch) □60 (□2.35inch) ø86 (ø3.39inch)

Reduction gear ratios

1/3.6 1/7.2 1/10 1/20 1/30 1/36

Spur gear model P.38

This set utilizes a spur gear in the speed reduction mechanism.

Motor flange size

□28 (□1.10inch)

Reduction gear ratios

1/3.6 1/7.2 1/10 1/20 1/30 1/50

Harmonic gear model P.39

This set utilizes a harmonic gear.

Motor flange size

□28 (□1.10inch) □42 (□1.65inch) □60 (□2.35inch) ø86 (ø3.39inch)

Reduction gear ratios

1/30 1/50 1/100

Electromagnetic brake model P.41

This set utilizes a non-excitation electromagnetic brake to maintain position in vertical load applications and hold load even during power off.

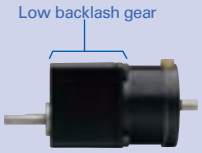
Motor flange size

□42 (□1.65inch) □60 (□2.35inch) ø86 (ø3.39inch)

Standard type

Flange side

Low-backlash gear model



Motor flange size
□42mm (□1.65inch) / □60mm (□2.35inch) / ⌀86mm (⌀3.39inch)

Harmonic gear model

Motor flange size
□42mm (□1.65inch) / □60mm (□2.35inch) / ⌀86mm (⌀3.39inch)

Standard model : F series motor
□42mm (□1.65inch) / □60mm (□2.35inch) / ⌀86mm (⌀3.39inch) / ⌀106mm (⌀4.17inch)

CE / UL model : M series motor
□42mm (□1.65inch) / □60mm (□2.35inch) / ⌀86mm ⌀3.39inch) / ⌀106mm (⌀4.17inch)

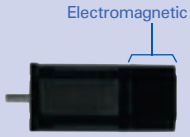
● Motors are available in standard or vacuum types.

End-cap side

Damper

Magnetic dampers can be selected according to the required inertia.

Electromagnetic brake model



Motor flange size
□42mm (□1.65inch) / □60mm (□2.35inch) / ⌀86mm (⌀3.39inch)

Brake power source (DC24V)

Required for brake-equipped stepping motor models.

Ⓑ Motor cable (optional)

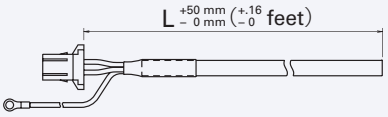
■ Bundled connectors (set models only)

Connector type	Housing	Contact	Applicable motor flange size
❶ AC power connector	1-178128-2 (AMP)	1-175218-5 (AMP)	——
❷ Motor connector	1-178128-6 (AMP)	1-175216-5 (AMP)	□42mm (□1.65inch)
	1-178128-6 (AMP)	1-175217-5 (AMP)	□60mm (□2.35inch), ⌀86mm (⌀3.39inch)
	1-178128-6 (AMP)	1-175218-5 (AMP)	⌀106mm (⌀4.17inch)
❸ I/O signal connector	10314-52A0-008 (3M)	10114-3000PE (3M)	——

■ Optional cables

ⒶAC power cable

L : m (feet)	Part number
10 (32.81)	PM-C03P1000-05
5 (16.40)	PM-C03P0500-05
3 (9.84)	PM-C03P0300-05
1 (3.28)	PM-C03P0100-05

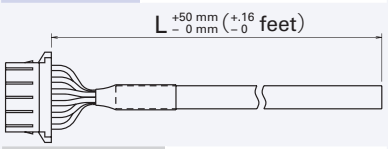


Leadwire	600V vinyl cab tire cable 3-core AWG16(1.25mm²)
Housing	1-178128-2 (AMP)
Contact	1-175218-5 (AMP)
Round-type crimp contact	1.25M4 (J.S.T. Mfg Co.)

● Cables 10m (32.81 feet) or longer are available upon request.

ⒷMotor cable

L : m (feet)	Part number
10 (32.81)	PM-C06M1000-11
5 (16.40)	PM-C06M0500-11
3 (9.84)	PM-C06M0300-11
1 (3.28)	PM-C06M0100-11

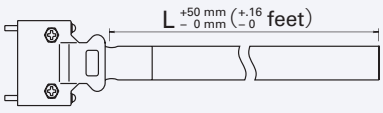


Leadwire	600V vinyl cab tire cable 6-core AWG16(0.75mm²)
Housing	1-178128-6 (AMP)
Contact	1-175218-5 (AMP)

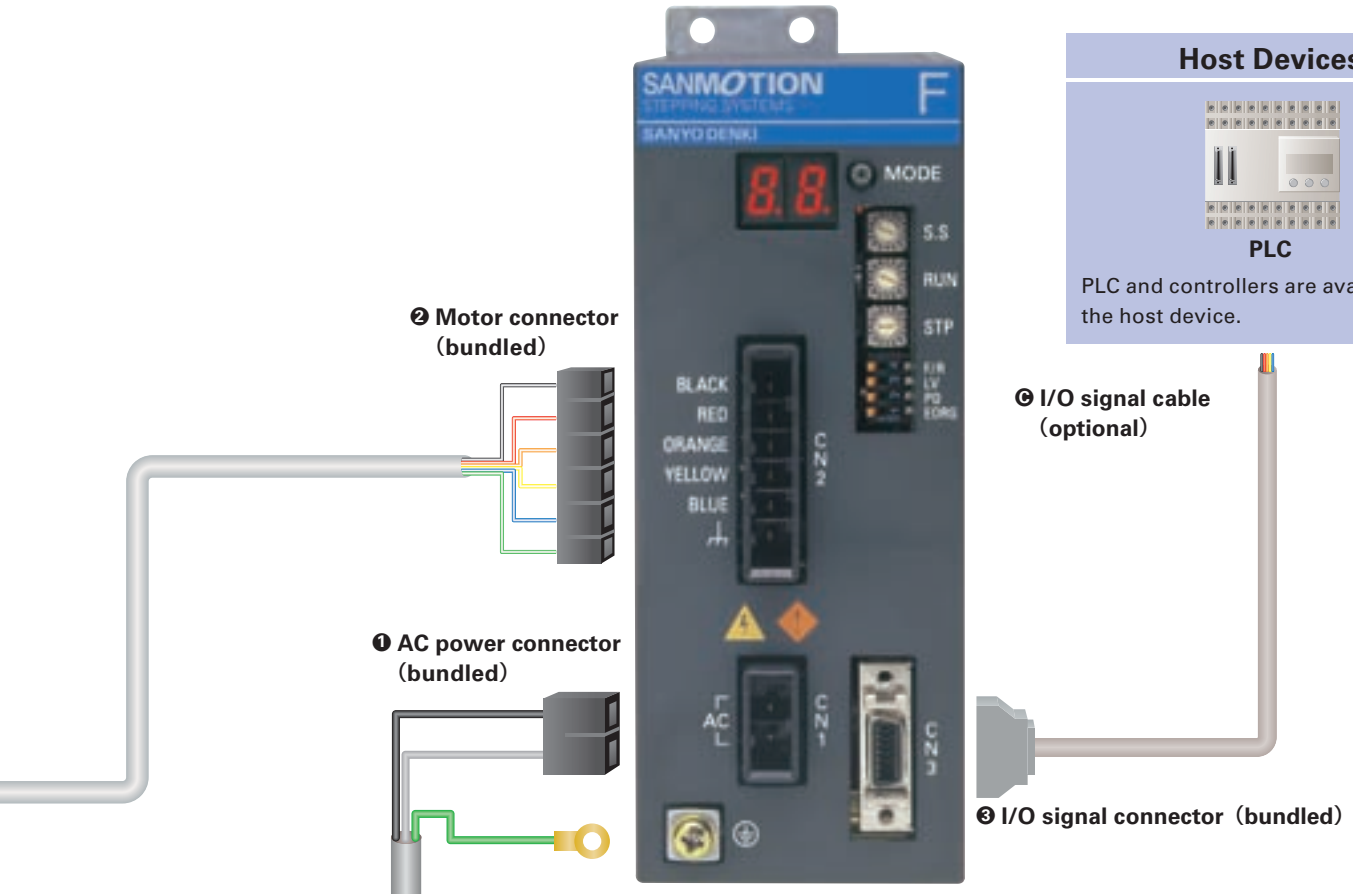
● Cables 10m (32.81 feet) or longer are available upon request.

ⒸI/O signal cable

L : m (feet)	Part number
2 (6.56)	PM-C14S0200-03
1 (3.28)	PM-C14S0100-03



Leadwire	7-pair PVC shielded cable AWG28 (0.08mm²)
Shell	10314-52A0-008 (3M)
Plug	10114-3000PE (3M)



Host Devices

PLC

PLC and controllers are available as the host device.

❷ Motor connector (bundled)

❶ AC power connector (bundled)

❸ I/O signal connector (bundled)

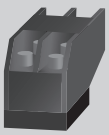
© I/O signal cable (optional)

Ⓐ AC power cable (optional)

Noise filter

Filters out incoming noise from power line

Electromagnetic contactor



Switches driver power on/off. Use together with a surge protector.

Molded case circuit breaker

Protects the power line. Cuts off circuit in the event of overcurrent.

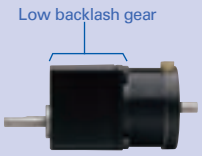
(t)
(r)

Single phase AC100V to AC230V

With built-in positioning function

Flange side

Low-backlash gear model



Motor flange size
□42mm (□1.65inch) / □60mm (□2.35inch) / ⌀86mm (⌀3.39inch)

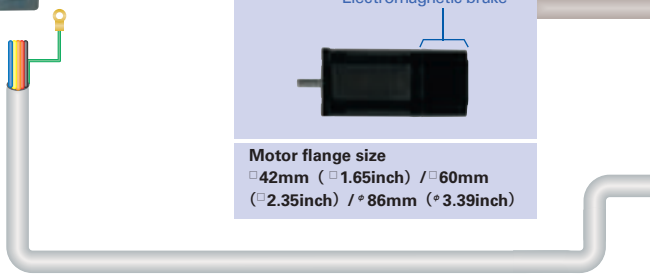
Harmonic gear model

Motor flange size
□42mm (□1.65inch) / □60mm (□2.35inch) / ⌀86mm (⌀3.39inch)

Standard model : F series motor
□42mm (□1.65inch) / □60mm (□2.35inch) / ⌀86mm (⌀3.39inch) / ⌀106mm (⌀4.17inch)

CE / UL model : M series motor
□42mm (□1.65inch) / □60mm (□2.35inch) / ⌀86mm (⌀3.39inch) / ⌀106mm (⌀4.17inch)

● Motors are available in standard or vacuum types.



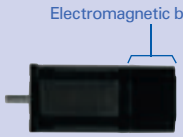
❸ Option cable for motor

End - cap side

Damper

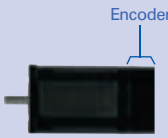
Magnetic dampers can be selected according to the required inertia.

Electromagnetic brake model



Motor flange size
□42mm (□1.65inch) / □60mm (□2.35inch) / ⌀86mm (⌀3.39inch)

Encoder equipped model



Optional

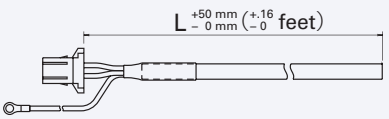
■ Bundled connectors (set models only)

Connector type	Housing	Contact	Applicable motor flange size
❶ AC power connector	1-178128-2 (AMP)	1-175218-5 (AMP)	——
❷ Motor connector	1-178128-6 (AMP)	1-175216-5 (AMP)	□42mm (□1.65inch)
	1-178128-6 (AMP)	1-175217-5 (AMP)	□60mm (□2.35inch), ⌀86mm (⌀3.39inch)
	1-178128-6 (AMP)	1-175218-5 (AMP)	⌀106mm (⌀4.17inch)
❸ I/O signal connector	10314-52A0-008 (3M)	10114-3000PE (3M)	——

■ Optional cables

❹AC power cable

L : m (feet)	Part number
10 (32.81)	PM-C03P1000-05
5 (16.40)	PM-C03P0500-05
3 (9.84)	PM-C03P0300-05
1 (3.28)	PM-C03P0100-05

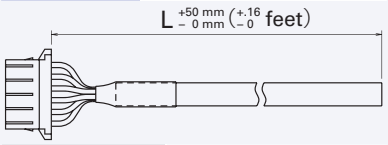


Leadwire	600V vinyl cab tire cable 3-core AWG16(1.25mm²)
Housing	1-178128-2 (AMP)
Contact	1-175218-5 (AMP)
Round-type crimp tool	1.25M4 (J.S.T.)

● Cables 10 m (32.81 feet) or longer are available upon request.

❺Motor cable

L : m (feet)	Part number
10 (32.81)	PM-C06M1000-11
5 (16.40)	PM-C06M0500-11
3 (9.84)	PM-C06M0300-11
1 (3.28)	PM-C06M0100-11

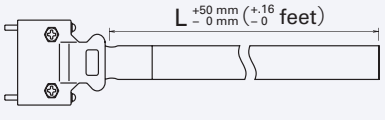


Leadwire	600V vinyl cab tire cable 6-core AWG16(0.75mm²)
Housing	1-178128-6 (AMP)
Contact	1-175218-5 (AMP)

● Cables 10 m (32.81 feet) or longer are available upon request.

❻I/O signal cable

L : m (feet)	Part number
2 (6.56)	PM-C20S0200-01
1 (3.28)	PM-C20S0100-01

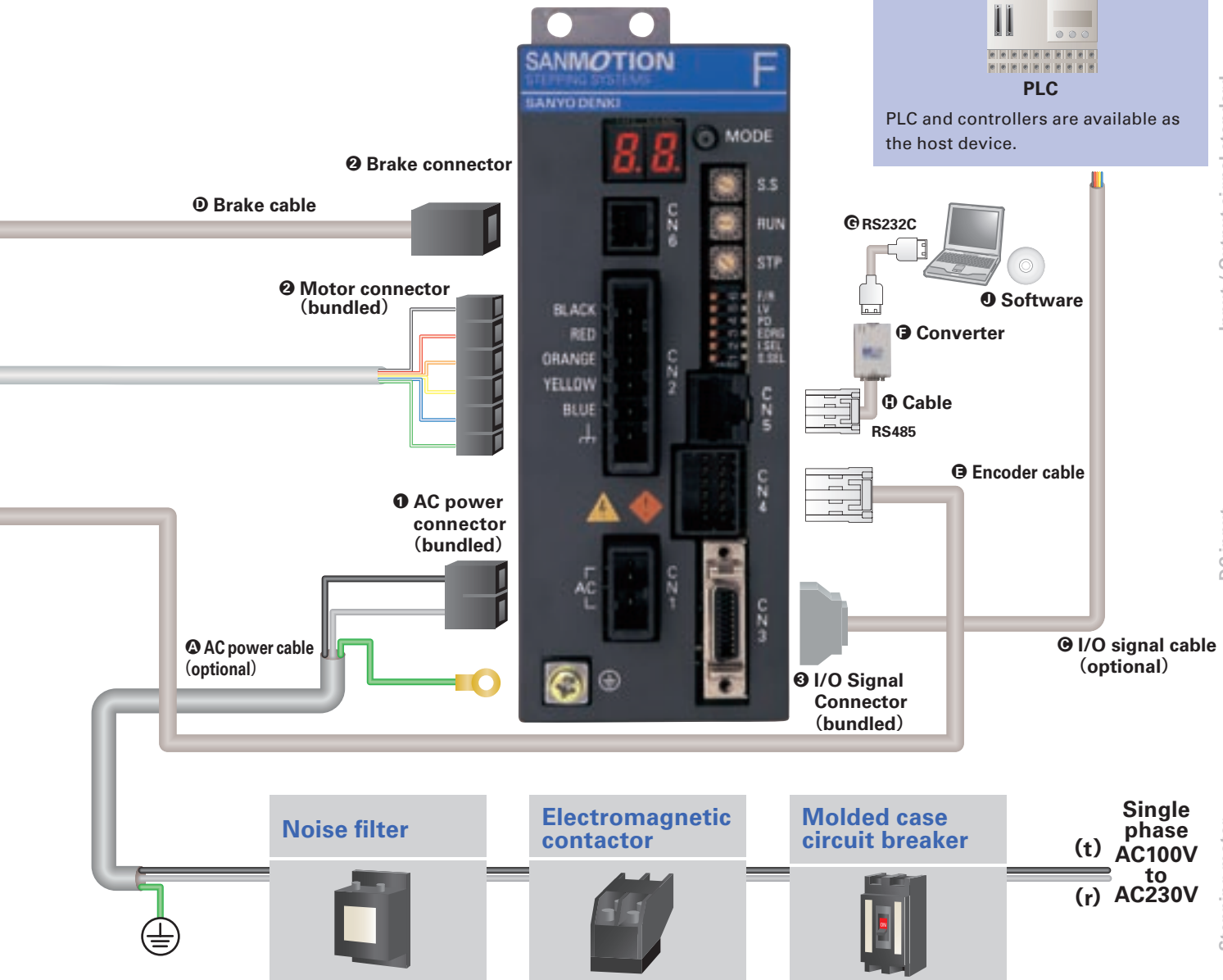


Leadwire	10-pair PVC shielded cable AWG28 (0.08mm²)
Shell	10320-52A0-008 (3M)
Plug	10120-3000PE (3M)

Host Devices

PLC

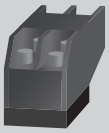
PLC and controllers are available as the host device.



Noise filter

Filters out incoming noise from power line.

Electromagnetic contactor



Switches driver power on/off. Use together with a surge protector.

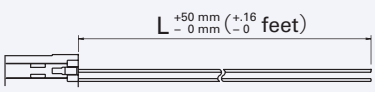
Molded case circuit breaker

Protects the power line. Cuts off circuit in the event of overcurrent.

(t) (r) **Single phase AC100V to AC230V**

ⒹBrake cable

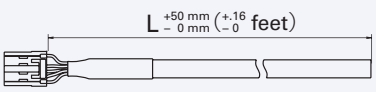
L : m (feet)	Part number
10 (32.81)	**PM-C03B1000-01**
5 (16.40)	**PM-C03B0500-01**
3 (9.84)	**PM-C03B0300-01**
1 (3.28)	**PM-C03B0100-01**



Leadwire	PVC cable AWG22 (0.3mm²)
Housing	1-1318120-3 (AMP)
Contact	1318107-1 (AMP)

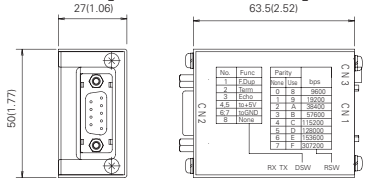
ⒺCable for encoder use

L : m (feet)	Part number
10 (32.81)	**PM-C12S1000-01**
5 (16.40)	**PM-C12S0500-01**
3 (9.84)	**PM-C12S0300-01**
1 (3.28)	**PM-C12S0100-01**



Leadwire	4-pair PVC shielded cable AWG22 (0.3mm²)
Housing	1-1318118-6 (AMP)
Plug	1318107-1 (AMP)

ⒻConverter [unit : mm (inch)]



Ⓕ Part number for RS232C-RS485 converter : 232485CFP01-01

ⒼRS232 cable is supplied by user.

ⒽPart number for FP communications cable : PM-C08S0100-05

ⒿPart number for bundled software : SFPA1W-01 (please download from website)

Part number convention

The following part number specifies a system with an F series driver (type code : FS1W075P) and a single shaft F series motor (type code : 103F7851-7041), □60mm (□2.36inch) square flange, and 46.5mm (1.83inch) motor length, equipped with low-backlash gear (reduction ratio of 1/3.6).

FS F 78 1 S - C X 3.6

Ⅰ Ⅱ Ⅲ

System spec

System type	Ⅰ (Flange side)	Ⅱ (End cap side)	Ⅲ (Reduction ratio)
Spur gear	G	—	—
Low-backlash gear	C	—	—
Harmonic gear	H	—	—
No system at Flange side	X	—	—
Electromagnetic brake	—	B	—
No system at End cap side	—	X	—
Gear ratio	—	—	3.6 to 100

(Flange side) (End cap side)
- Spur gear
- Low-backlash gear
- Harmonic gear
- Electromagnetic

Stepping motor shaft spec
S : Single shaft D : Double shaft

Stepping motor total length (Standard model)

Code	Motor flange size							
	□42mm (□1.65inch)		□60mm (□2.36inch)		φ86mm (φ3.39inch)		φ106mm (φ4.17inch)	
	Type code	Motor length : mm (inch)	Type code	Motor length : mm (inch)	Type code	Motor length : mm (inch)	Type code	Motor length : mm (inch)
1	5505	34 (1.34)	7851	46.5 (1.83)	8581	62.2 (2.45)		
2	5508	40 (1.57)	7852	55 (2.17)	8582	92.2 (3.63)	89582	163.3 (6.43)
3			7853	87.5 (3.44)	8583	125.9(4.96)	89583	221.3(8.71)
4	5510	49 (1.93)						

Stepping motor flange size
55 : □42mm (□1.65inch) 85 : φ86mm (φ3.39inch)
78 : □60mm (□2.36inch) 89 : φ106mm (φ4.17inch)

Stepping motor series name
F : F series motor
M : M series motor (CE/UL)

FS : AC Power source Standard type
FP : AC Power positioning-function-included type

Packaged Sale Model Configuration

This is a set comprising a driver, motor and connectors.

AC pulse input type Bundled driver model number : FS1W075P00

Step angle ／0.72˚ Rated current 0.75A

Model	Motor flange size	Single shaft			Double shafts		
		Set part number	Set accessories		Set part number	Set accessories	
			Motor model number	Connector number Note)		Motor model number	Connector number Note)
Standard model	□42mm	FSF551S	103F5505-7041	PM-AP-065	FSF551D	103F5505-7011	PM-AP-065
		FSF552S	103F5508-7041	PM-AP-065	FSF552D	103F5508-7011	PM-AP-065
		FSF554S	103F5510-7041	PM-AP-065	FSF554D	103F5510-7011	PM-AP-065
	□60mm	FSF781S	103F7851-7041	PM-AP-064	FSF781D	103F7851-7011	PM-AP-064
		FSF782S	103F7852-7041	PM-AP-064	FSF782D	103F7852-7011	PM-AP-064
		FSF783S	103F7853-7041	PM-AP-064	FSF783D	103F7853-7011	PM-AP-064
	ϕ86mm	FSF851S	103F8581-7041	PM-AP-064	FSF851D	103F8581-7011	PM-AP-064
		FSF852S	103F8582-7041	PM-AP-064	FSF852D	103F8582-7011	PM-AP-064
		FSF853S	103F8583-7041	PM-AP-064	FSF853D	103F8583-7011	PM-AP-064
	ϕ106mm	FSF892S	103F89582-7041	PM-AP-063	FSF892D	103F89582-7011	PM-AP-063
		FSF893S	103F89583-7041	PM-AP-063	FSF893D	103F89583-7011	PM-AP-063
Low-backlash gear model	□42mm	FSF551S-CX3.6	103F5505-70CXA4	PM-AP-065	FSF551D-CX3.6	103F5505-70CXA1	PM-AP-065
		FSF551S-CX7.2	103F5505-70CXB4	PM-AP-065	FSF551D-CX7.2	103F5505-70CXB1	PM-AP-065
		FSF551S-CX10	103F5505-70CXE4	PM-AP-065	FSF551D-CX10	103F5505-70CXE1	PM-AP-065
		FSF551S-CX20	103F5505-70CXG4	PM-AP-065	FSF551D-CX20	103F5505-70CXG1	PM-AP-065
		FSF551S-CX30	103F5505-70CXJ4	PM-AP-065	FSF551D-CX30	103F5505-70CXJ1	PM-AP-065
		FSF551S-CX36	103F5505-70CXK4	PM-AP-065	FSF551D-CX36	103F5505-70CXK1	PM-AP-065
	□60mm	FSF781S-CX3.6	103F7851-70CXA4	PM-AP-064	FSF781D-CX3.6	103F7851-70CXA1	PM-AP-064
		FSF781S-CX7.2	103F7851-70CXB4	PM-AP-064	FSF781D-CX7.2	103F7851-70CXB1	PM-AP-064
		FSF781S-CX10	103F7851-70CXE4	PM-AP-064	FSF781D-CX10	103F7851-70CXE1	PM-AP-064
		FSF781S-CX20	103F7851-70CXG4	PM-AP-064	FSF781D-CX20	103F7851-70CXG1	PM-AP-064
		FSF781S-CX30	103F7851-70CXJ4	PM-AP-064	FSF781D-CX30	103F7851-70CXJ1	PM-AP-064
		FSF781S-CX36	103F7851-70CXK4	PM-AP-064	FSF781D-CX36	103F7851-70CXK1	PM-AP-064
	ϕ86mm	FSF851S-CX3.6	103F8581-70CXA4	PM-AP-064	FSF851D-CX3.6	103F8581-70CXA1	PM-AP-064
		FSF851S-CX7.2	103F8581-70CXB4	PM-AP-064	FSF851D-CX7.2	103F8581-70CXB1	PM-AP-064
		FSF851S-CX10	103F8581-70CXE4	PM-AP-064	FSF851D-CX10	103F8581-70CXE1	PM-AP-064
		FSF851S-CX20	103F8581-70CXG4	PM-AP-064	FSF851D-CX20	103F8581-70CXG1	PM-AP-064
		FSF851S-CX30	103F8581-70CXJ4	PM-AP-064	FSF851D-CX30	103F8581-70CXJ1	PM-AP-064
		FSF851S-CX36	103F8581-70CXK4	PM-AP-064	FSF851D-CX36	103F8581-70CXK1	PM-AP-064
Harmonic gear model	□42mm	FSF551S-HX30	103F5505-70HXJ5	PM-AP-065	FSF551D-HX30	103F5505-70HXJ2	PM-AP-065
		FSF551S-HX50	103F5505-70HXL5	PM-AP-065	FSF551D-HX50	103F5505-70HXL2	PM-AP-065
		FSF551S-HX100	103F5505-70HXM5	PM-AP-065	FSF551D-HX100	103F5505-70HXM2	PM-AP-065
	□60mm	FSF781S-HX50	103F7851-70HXL4	PM-AP-064	FSF781D-HX50	103F7851-70HXL1	PM-AP-064
		FSF781S-HX100	103F7851-70HXM4	PM-AP-064	FSF781D-HX100	103F7851-70HXM1	PM-AP-064
	ϕ86mm	FSF851S-HX50	103F8581-70HXL4	PM-AP-064	FSF851D-HX50	103F8581-70HXL1	PM-AP-064
		FSF851S-HX100	103F8581-70HXM4	PM-AP-064	FSF851D-HX100	103F8581-70HXM1	PM-AP-064
Electromag-netic brake model	□42mm	FSF551S-XB	103F5505-70XB41	PM-AP-065	—	—	—
		FSF552S-XB	103F5508-70XB41	PM-AP-065	—	—	—
		FSF554S-XB	103F5510-70XB41	PM-AP-065	—	—	—
	□60mm	FSF781S-XB	103F7851-70XB41	PM-AP-064	—	—	—
		FSF782S-XB	103F7852-70XB41	PM-AP-064	—	—	—
		FSF783S-XB	103F7853-70XB41	PM-AP-064	—	—	—
	ϕ86mm	FSF851S-XB	103F8581-70XB41	PM-AP-064	—	—	—
		FSF852S-XB	103F8582-70XB41	PM-AP-064	—	—	—
		FSF853S-XB	103F8583-70XB41	PM-AP-064	—	—	—
CE / UL model	□42mm	FSM551S	103M5505-7041	PM-AP-065	FSM551D	103M5505-7011	PM-AP-065
		FSM552S	103M5508-7041	PM-AP-065	FSM552D	103M5508-7011	PM-AP-065
		FSM554S	103M5510-7041	PM-AP-065	FSM554D	103M5510-7011	PM-AP-065
	□60mm	FSM781S	103M7851-7041	PM-AP-064	FSM781D	103M7851-7011	PM-AP-064
		FSM782S	103M7852-7041	PM-AP-064	FSM782D	103M7852-7011	PM-AP-064
		FSM783S	103M7853-7041	PM-AP-064	FSM783D	103M7853-7011	PM-AP-064
	ϕ86mm	FSM851S	103M8581-7041	PM-AP-064	FSM851D	103M8581-7011	PM-AP-064
		FSM852S	103M8582-7041	PM-AP-064	FSM852D	103M8582-7011	PM-AP-064
		FSM853S	103M8583-7041	PM-AP-064	FSM853D	103M8583-7011	PM-AP-064
	ϕ106mm	FSM892S	103M89582-7041	PM-AP-063	FSM892D	103M89582-7011	PM-AP-063
		FSM893S	103M89583-7041	PM-AP-063	FSM893D	103M89583-7011	PM-AP-063

Note) Includes a driver connector set (power supply connector, input/output signal connector) and a motor connector.

Connector model number	Driver connector set model number	Motor connector model number
PM-AP-063	PM-AP-078	4838971-1
PM-AP-064	PM-AP-078	4837994-1
PM-AP-065	PM-AP-078	4835758-1

Packaged Sale Model Configuration

This is a set comprising a driver, motor and connectors.

Type with built-in AC positioning function

Bundled driver model number : FP1W075P00

Step angle ／0.72˚ Rated current 0.75A

Model	Motor flange size	Single shaft			Double shafts		
		Set part number	Set accessories		Set part number	Set accessories	
			Motor model number	Connector number Note)		Motor model number	Connector number Note)
Standard model	□42mm	FPF551S	103F5505-7041	PM-AP-074	FPF551D	103F5505-7011	PM-AP-074
		FPF552S	103F5508-7041	PM-AP-074	FPF552D	103F5508-7011	PM-AP-074
		FPF554S	103F5510-7041	PM-AP-074	FPF554D	103F5510-7011	PM-AP-074
	□60mm	FPF781S	103F7851-7041	PM-AP-073	FPF781D	103F7851-7011	PM-AP-073
		FPF782S	103F7852-7041	PM-AP-073	FPF782D	103F7852-7011	PM-AP-073
		FPF783S	103F7853-7041	PM-AP-073	FPF783D	103F7853-7011	PM-AP-073
	φ86mm	FPF851S	103F8581-7041	PM-AP-073	FPF851D	103F8581-7011	PM-AP-073
		FPF852S	103F8582-7041	PM-AP-073	FPF852D	103F8582-7011	PM-AP-073
		FPF853S	103F8583-7041	PM-AP-073	FPF853D	103F8583-7011	PM-AP-073
	φ106mm	FPF892S	103F89582-7041	PM-AP-072	FPF892D	103F89582-7011	PM-AP-072
		FPF893S	103F89583-7041	PM-AP-072	FPF893D	103F89583-7011	PM-AP-072
Low-backlash gear model	□42mm	FPF551S-CX3.6	103F5505-70CXA4	PM-AP-074	FPF551D-CX3.6	103F5505-70CXA1	PM-AP-074
		FPF551S-CX7.2	103F5505-70CXB4	PM-AP-074	FPF551D-CX7.2	103F5505-70CXB1	PM-AP-074
		FPF551S-CX10	103F5505-70CXE4	PM-AP-074	FPF551D-CX10	103F5505-70CXE1	PM-AP-074
		FPF551S-CX20	103F5505-70CXG4	PM-AP-074	FPF551D-CX20	103F5505-70CXG1	PM-AP-074
		FPF551S-CX30	103F5505-70CXJ4	PM-AP-074	FPF551D-CX30	103F5505-70CXJ1	PM-AP-074
		FPF551S-CX36	103F5505-70CXK4	PM-AP-074	FPF551D-CX36	103F5505-70CXK1	PM-AP-074
	□60mm	FPF781S-CX3.6	103F7851-70CXA4	PM-AP-073	FPF781D-CX3.6	103F7851-70CXA1	PM-AP-073
		FPF781S-CX7.2	103F7851-70CXB4	PM-AP-073	FPF781D-CX7.2	103F7851-70CXB1	PM-AP-073
		FPF781S-CX10	103F7851-70CXE4	PM-AP-073	FPF781D-CX10	103F7851-70CXE1	PM-AP-073
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		FPF781S-CX30	103F7851-70CXJ4	PM-AP-073	FPF781D-CX30	103F7851-70CXJ1	PM-AP-073
		FPF781S-CX36	103F7851-70CXK4	PM-AP-073	FPF781D-CX36	103F7851-70CXK1	PM-AP-073
	φ86mm	FPF851S-CX3.6	103F8581-70CXA4	PM-AP-073	FPF851D-CX3.6	103F8581-70CXA1	PM-AP-073
		FPF851S-CX7.2	103F8581-70CXB4	PM-AP-073	FPF851D-CX7.2	103F8581-70CXB1	PM-AP-073
		FPF851S-CX10	103F8581-70CXE4	PM-AP-073	FPF851D-CX10	103F8581-70CXE1	PM-AP-073
		FPF851S-CX20	103F8581-70CXG4	PM-AP-073	FPF851D-CX20	103F8581-70CXG1	PM-AP-073
		FPF851S-CX30	103F8581-70CXJ4	PM-AP-073	FPF851D-CX30	103F8581-70CXJ1	PM-AP-073
		FPF851S-CX36	103F8581-70CXK4	PM-AP-073	FPF851D-CX36	103F8581-70CXK1	PM-AP-073
Harmonic gear model	□42mm	FPF551S-HX30	103F5505-70HXJ5	PM-AP-074	FPF551D-HX30	103F5505-70HXJ2	PM-AP-074
		FPF551S-HX50	103F5505-70HXL5	PM-AP-074	FPF551D-HX50	103F5505-70HXL2	PM-AP-074
		FPF551S-HX100	103F5505-70HXM5	PM-AP-074	FPF551D-HX100	103F5505-70HXM2	PM-AP-074
	□60mm	FPF781S-HX50	103F7851-70HXL4	PM-AP-073	FPF781D-HX50	103F7851-70HXL1	PM-AP-073
		FPF781S-HX100	103F7851-70HXM4	PM-AP-073	FPF781D-HX100	103F7851-70HXM1	PM-AP-073
	φ86mm	FPF851S-HX50	103F8581-70HXL4	PM-AP-073	FPF851D-HX50	103F8581-70HXL1	PM-AP-073
		FPF851S-HX100	103F8581-70HXM4	PM-AP-073	FPF851D-HX100	103F8581-70HXM1	PM-AP-073
Electromag-netic brake model	□42mm	FPF551S-XB	103F5505-70XB41	PM-AP-074	—	—	—
		FPF552S-XB	103F5508-70XB41	PM-AP-074	—	—	—
		FPF554S-XB	103F5510-70XB41	PM-AP-074	—	—	—
	□60mm	FPF781S-XB	103F7851-70XB41	PM-AP-073	—	—	—
		FPF782S-XB	103F7852-70XB41	PM-AP-073	—	—	—
		FPF783S-XB	103F7853-70XB41	PM-AP-073	—	—	—
	φ86mm	FPF851S-XB	103F8581-70XB41	PM-AP-073	—	—	—
		FPF852S-XB	103F8582-70XB41	PM-AP-073	—	—	—
		FPF853S-XB	103F8583-70XB41	PM-AP-073	—	—	—
CE / UL model	□42mm	FPM551S	103M5505-7041	PM-AP-074	FPM551D	103M5505-7011	PM-AP-074
		FPM552S	103M5508-7041	PM-AP-074	FPM552D	103M5508-7011	PM-AP-074
		FPM554S	103M5510-7041	PM-AP-074	FPM554D	103M5510-7011	PM-AP-074
	□60mm	FPM781S	103M7851-7041	PM-AP-073	FPM781D	103M7851-7011	PM-AP-073
		FPM782S	103M7852-7041	PM-AP-073	FPM782D	103M7852-7011	PM-AP-073
		FPM783S	103M7853-7041	PM-AP-073	FPM783D	103M7853-7011	PM-AP-073
	φ86mm	FPM851S	103M8581-7041	PM-AP-073	FPM851D	103M8581-7011	PM-AP-073
		FPM852S	103M8582-7041	PM-AP-073	FPM852D	103M8582-7011	PM-AP-073
		FPM853S	103M8583-7041	PM-AP-073	FPM853D	103M8583-7011	PM-AP-073
	φ106mm	FPM892S	103M89582-7041	PM-AP-072	FPM892D	103M89582-7011	PM-AP-072
		FPM893S	103M89583-7041	PM-AP-072	FPM893D	103M89583-7011	PM-AP-072

Note) Includes a driver connector set (power supply connector, input/output signal connector) and a motor connector.

Connector model number	Driver connector set model number	Motor connector model number
PM-AP-072	PM-AP-079	4838971-1
PM-AP-073	PM-AP-079	4837994-1
PM-AP-074	PM-AP-079	4835758-1

Standard model

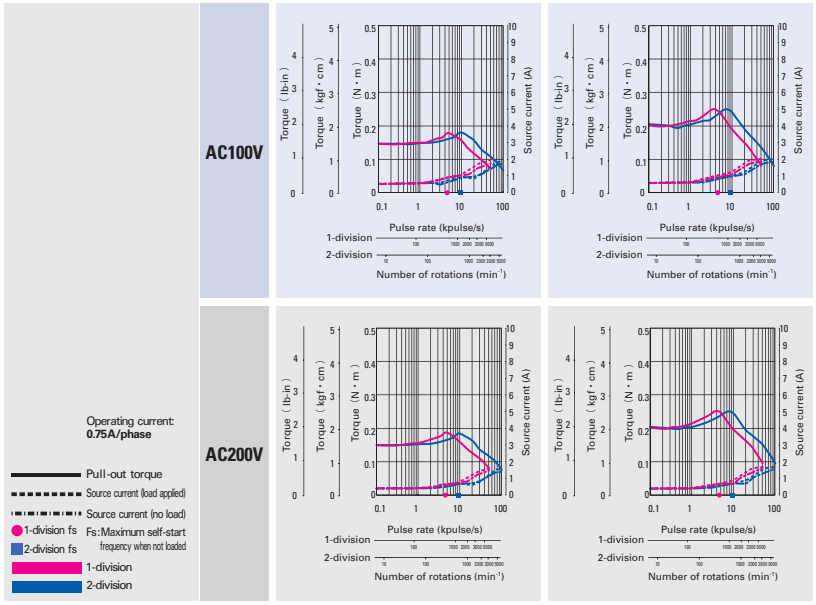
F series driver + F series motor

Motor flange size

□42 (□1.65inch) □60 (□2.35inch) φ86 (φ3.39inch) φ106 (φ4.17inch)

Size	Motor flange size	□42mm (□1.65inch)			
	Motor length	34mm (1.34inch)		40mm (1.57inch)	
Set part number	Single shaft	FSF551S	FPF551S	FSF552S	FPF552S
	Double shaft	FSF551D	FPF551D	FSF552D	FPF552D
Holding torque	N·m(oz·in)	0.13 (18.41)		0.18 (25.49)	
Rotor inertia	×10⁻⁴kg·m²(oz·in²)	0.03 (0.16)		0.053 (0.29)	
Mass (Weight)	kg (lbs)	0.23 (0.50)		0.28 (0.62)	
Allowable thrust load	N (lbs)	10 (2.25)		10 (2.25)	
Allowable radial load (Note1)	N (lbs)	35 (8.75)		35 (8.75)	

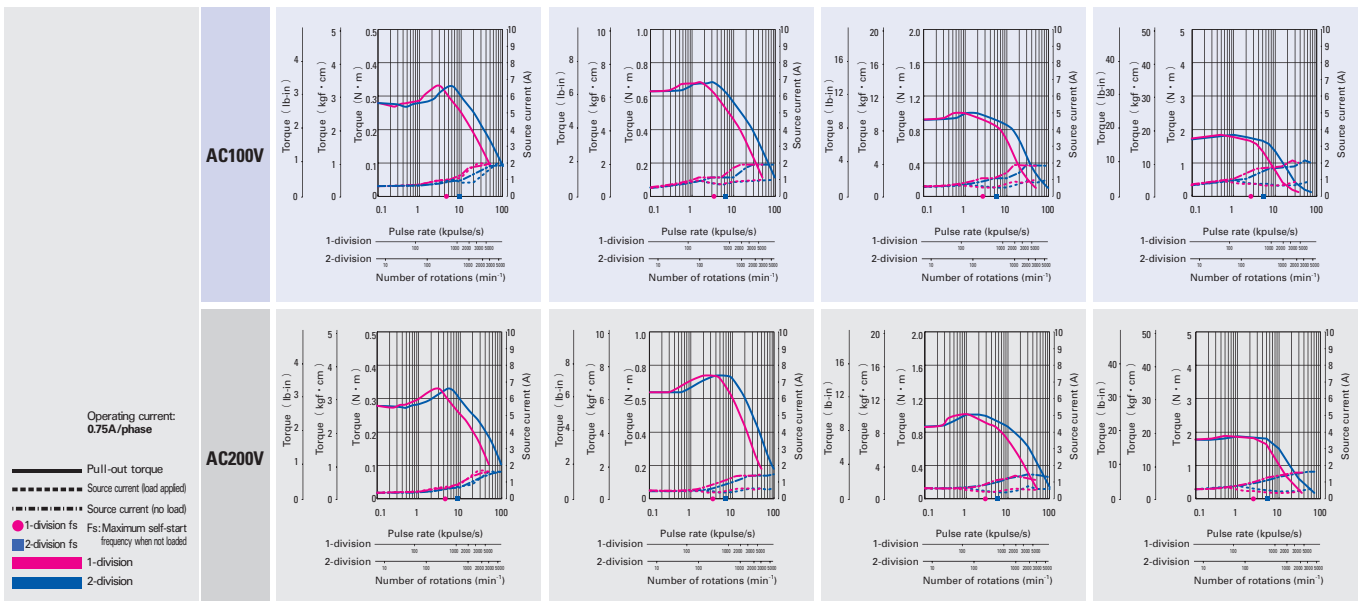
(Note1) When load is applied at 1/3 length from output shaft edge.



The data are measured under the drive condition of our company. The drive torque may very depending on the accuracy of customer-side equipment.

Size	Motor flange size	□42mm (□1.65inch)		□60mm (□2.36inch)					
	Motor length	49mm (1.93inch)		46.5mm (1.83inch)		55mm (2.17inch)		87.5mm (3.45inch)	
Set part number	Single shaft	FSF554S	FPF554S	FSF781S	FPF781S	FSF782S	FPF782S	FSF783S	FPF783S
	Double shaft	FSF554D	FPF554D	FSF781D	FPF781D	FSF782D	FPF782D	FSF782D	FPF783D
Holding torque	N·m(oz·in)	0.26 (36.82)		0.6 (85.0)		0.93 (131.7)		1.79 (253.5)	
Rotor inertia	×10⁻⁴kg·m²(oz·in²)	0.065 (0.36)		0.275 (1.50)		0.4 (2.19)		0.84 (4.60)	
Mass (Weight)	kg (lbs)	0.37 (0.81)		0.6 (1.32)		0.78 (1.72)		1.36 (3.0)	
Allowable thrust load	N (lbs)	10 (2.25)		20 (4.5)		20 (4.5)		20 (4.5)	
Allowable radial load (Note1)	N (lbs)	35 (8.75)		80 (18)		80 (18)		80 (18)	

(Note1) When load is applied at 1/3 length from output shaft edge.



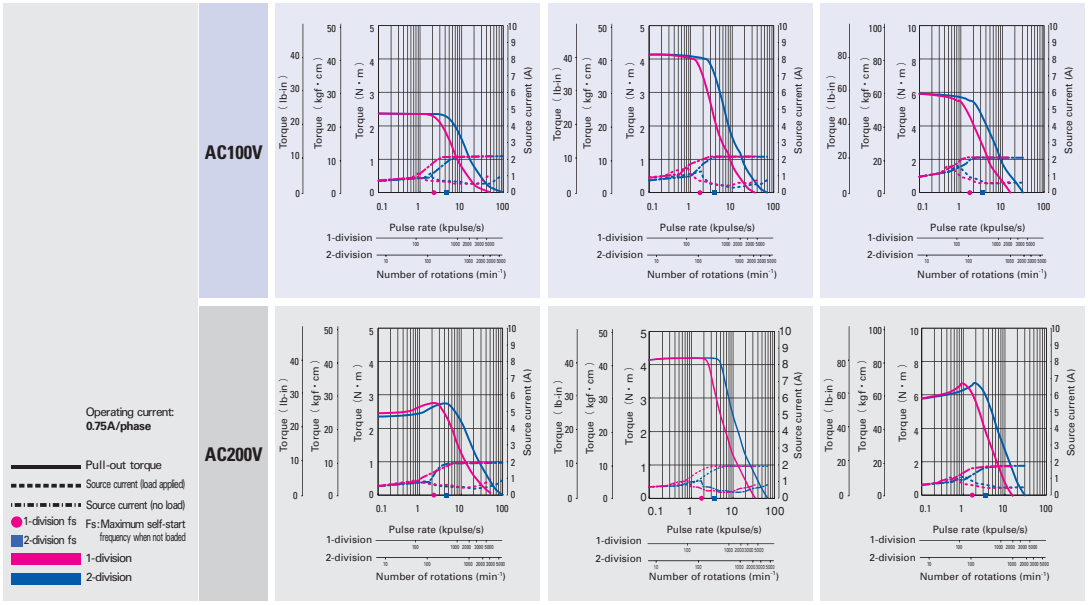
The data are measured under the drive condition of our company. The drive torque may very depending on the accuracy of customer-side equipment.

Standard model

F series driver + F series motor

Size	Motor flange size	ϕ86mm (ϕ3.39inch)					
	Motor length	62.15mm (2.47inch)		92.2mm (3.63inch)		125.85mm (4.95inch)	
Set part number	Single shaft	FSF851S	FPF851S	FSF852S	FPF852S	FSF853S	FPF853S
	Double shaft	FSF851D	FPF851D	FSF852D	FPF852D	FSF853D	FPF853D
Holding torque	N·m(oz·in)	2.06 (291.7)		4.02 (569.3)		6.17 (873.7)	
Rotor inertia	×10⁻⁴kg·m²(oz·in²)	1.45 (7.93)		2.9 (15.86)		4.4 (24.06)	
Mass (Weight)	kg (lbs)	1.5 (3.3)		2.5 (5.5)		3.5 (7.7)	
Allowable thrust load	N (lbs)	60 (13.5)		60 (13.5)		60 (13.5)	
Allowable radial load (Note1)	N (lbs)	220 (49.5)		220 (49.5)		220 (49.5)	

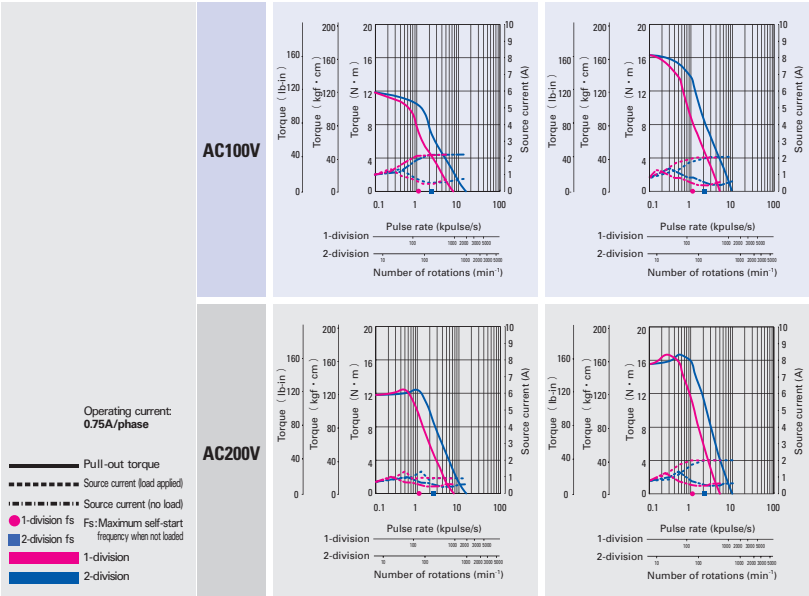
(Note1) When load is applied at 1/3 length from output shaft edge.



The data are measured under the drive condition of our company. The drive torque may very depending on the accuracy of customer-side equipment.

Size	Motor flange size	ϕ106mm (ϕ4.17inch)			
	Motor length	163.3mm (6.43inch)		221.3mm (8.71inch)	
Set part number	Single shaft	FSF892S	FPF892S	FSF893S	FPF893S
	Double shaft	FSF892D	FPF892D	FSF893D	FPF893D
Holding torque	N·m(oz·in)	10.8 (1529.4)		16 (2265.7)	
Rotor inertia	×10⁻⁴kg·m²(oz·in²)	14.6 (79.83)		22 (120.28)	
Mass (Weight)	kg (lbs)	7.5 (16.5)		10.5 (23.1)	
Allowable thrust load	N (lbs)	100 (22.5)		100 (22.5)	
Allowable radial load (Note1)	N (lbs)	360 (81)		360 (81)	

(Note1) When load is applied at 1/3 length from output shaft edge.



The data are measured under the drive condition of our company. The drive torque may very depending on the accuracy of customer-side equipment.

CE / UL model

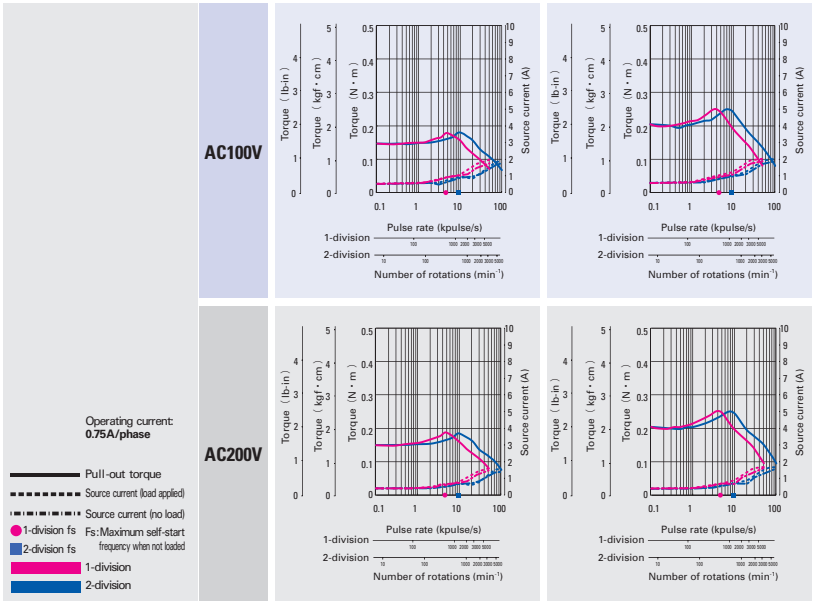
F series driver + M series motor

Motor flange size

□42 (□1.65inch) □60 (□2.35inch) φ86 (φ3.39inch) φ106 (φ4.17inch)

Size	Motor flange size	□42mm (□1.65inch)			
	Motor length	31mm (1.22inch)		50.5mm (1.99inch)	
Set part number	Single shaft	FSM551S	FPM551S	FSM552S	FPM552S
	Double shaft	FSM551D	FPM551D	FSM552D	FPM552D
Holding torque	N·m(oz·in)	0.13 (18.41)		0.18 (25.49)	
Rotor inertia	×10⁻⁴kg·m²(oz·in²)	0.03 (0.16)		0.053 (0.29)	
Mass (Weight)	kg (lbs)	0.23 (0.51)		0.28 (0.62)	
Allowable thrust load	N (lbs)	10 (2.25)		10 (2.25)	
Allowable radial load (Note1)	N (lbs)	35 (8.75)		35 (8.75)	

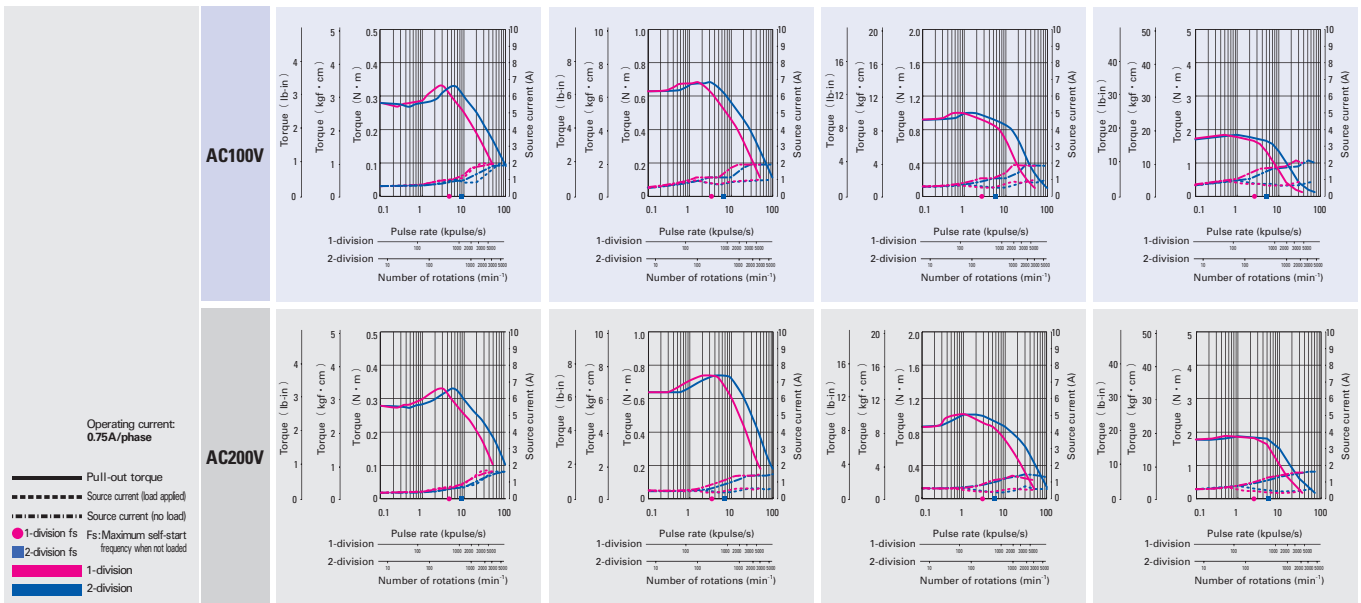
(Note1) When load is applied at 1/3 length from output shaft edge.



The data are measured under the drive condition of our company. The drive torque may very depending on the accuracy of customer-side equipment.

Size	Motor flange size	□42mm (□1.65inch)		□60mm (□2.36inch)					
	Motor length	49mm (1.93inch)		46.5mm (1.83inch)		55mm (2.17inch)		87.5mm (3.44inch)	
Set part number	Single shaft	FSM554S	FPM554S	FSM781S	FPM781S	FSM782S	FPM782S	FSM783S	FPM783S
	Double shaft	FSM554D	FPM554D	FSM781D	FPM781D	FSM782D	FPM782D	FSM783D	FPM783D
Holding torque	N·m(oz·in)	0.26 (36.82)		0.6 (85.0)		0.065 (9.20)		1.79 (253.5)	
Rotor inertia	×10⁻⁴kg·m²(oz·in²)	0.065 (0.36)		0.275 (1.50)		0.016 (0.09)		0.84 (4.59)	
Mass (Weight)	kg (lbs)	0.37 (0.81)		0.6 (1.32)		0.2 (0.44)		1.36 (3.0)	
Allowable thrust load	N (lbs)	10 (2.25)		20 (4.5)		3 (0.68)		20 (4.5)	
Allowable radial load (Note1)	N (lbs)	35 (8.75)		80 (18)		34 (7.65)		80 (18)	

(Note1) When load is applied at 1/3 length from output shaft edge.



The data are measured under the drive condition of our company. The drive torque may very depending on the accuracy of customer-side equipment.

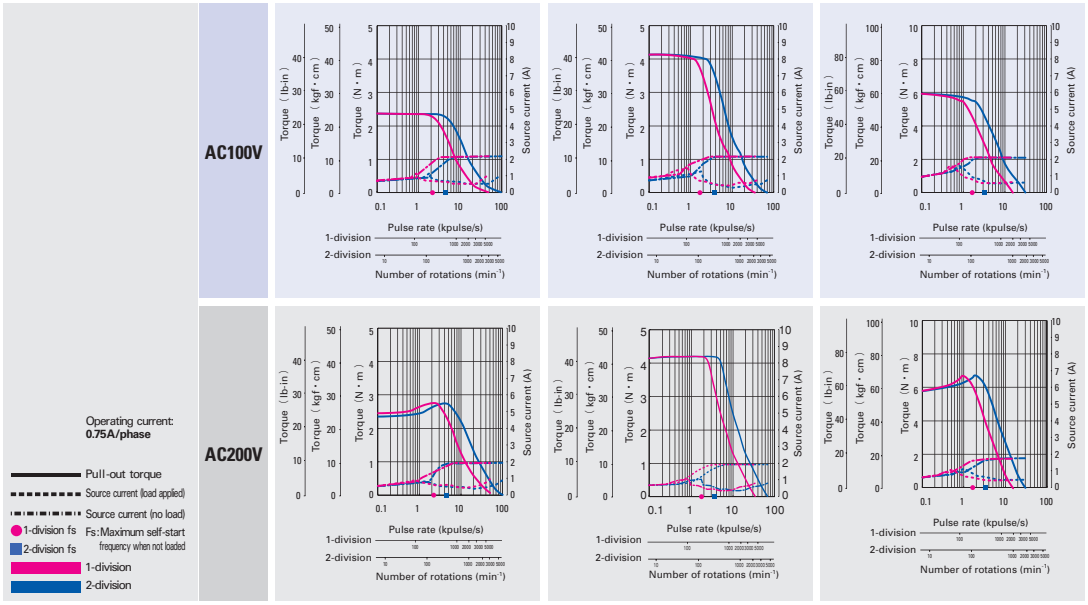
AC input Specifications

CE / UL model

F series driver + M series motor

Size	Motor flange size	φ86mm (φ3.39inch)					
	Motor length	62.15mm (2.47inch)		92.2mm (3.63inch)		125.85mm (4.95inch)	
Set part number	Single shaft	FSM851S	FPM851S	FSM852S	FPM852S	FSM853S	FPM853S
	Double shaft	FSM851D	FPM851D	FSM852D	FPM852D	FSM853D	FPM853D
Holding torque	N·m(oz·in)	2.06 (291.7)		4.02 (569.3)		6.17 (873.7)	
Rotor inertia	×10⁻⁴kg·m²(oz·in²)	1.45 (7.93)		2.9 (15.86)		4.4 (24.06)	
Mass (Weight)	kg (lbs)	1.5 (3.3)		2.5 (5.5)		3.5 (7.7)	
Allowable thrust load	N (lbs)	60 (13.5)		60 (13.5)		60 (13.5)	
Allowable radial load (Note1)	N (lbs)	220 (49.5)		220 (49.5)		220 (49.5)	

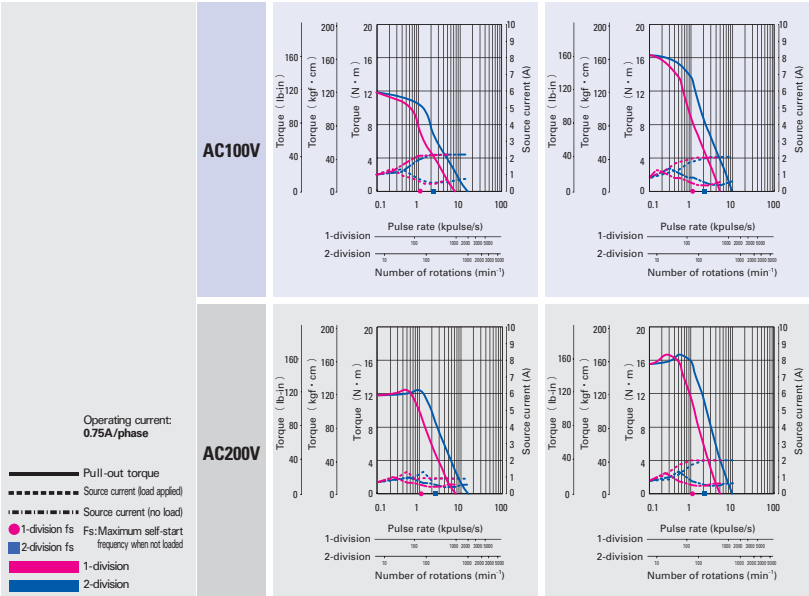
(Note1) When load is applied at 1/3 length from output shaft edge.



The data are measured under the drive condition of our company. The drive torque may very depending on the accuracy of customer-side equipment.

Size	Motor flange size	φ106mm (φ4.17inch)			
	Motor length	163.3mm (6.43inch)		221.3mm (8.71inch)	
Set part number	Single shaft	FSM892S	FPM892S	FSM893S	FPM893S
	Double shaft	FSM892D	FPM892D	FSM893D	FPM893D
Holding torque	N·m(oz·in)	10.8 (1529.4)		16 (2265.7)	
Rotor inertia	×10⁻⁴kg·m²(oz·in²)	14.6 (79.83)		22 (120.28)	
Mass (Weight)	kg (lbs)	7.5 (16.5)		10.5 (23.1)	
Allowable thrust load	N (lbs)	100 (22.5)		100 (22.5)	
Allowable radial load (Note1)	N (lbs)	360 (81)		360 (81)	

(Note1) When load is applied at 1/3 length from output shaft edge.



The data are measured under the drive condition of our company. The drive torque may very depending on the accuracy of customer-side equipment.

Low-backlash gear model

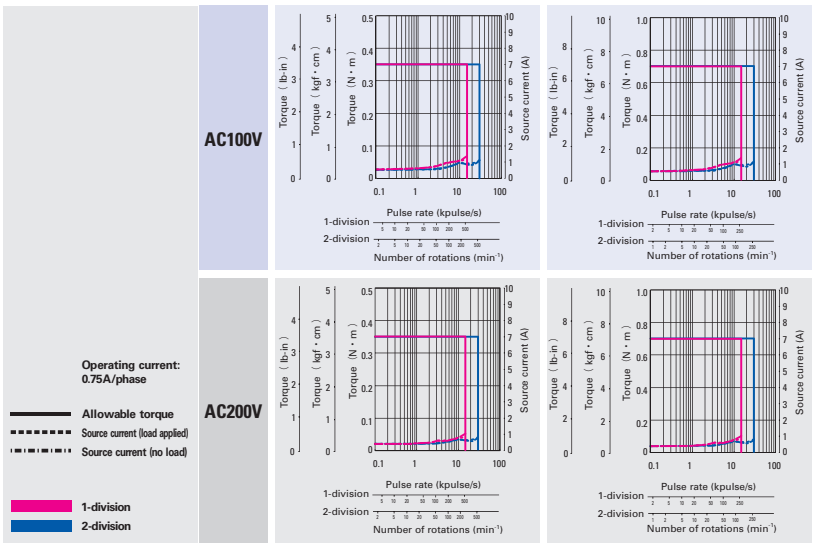
F series driver +
F series motor with low-backlash gear

Motor flange size

□42 (□1.65inch) □60 (□2.35inch) φ86 (φ3.39inch)

Size	Motor flange size	□42mm (□1.65inch)			
	Motor + gear length	64.5mm (2.54inch)		64.5mm (2.54inch)	
Set part number	Single shaft	FSF551S-CX3.6	FPF551S-CX3.6	FSF551S-CX7.2	FPF551S-CX7.2
	Double shaft	FSF551D-CX3.6	FPF551D-CX3.6	FSF551D-CX7.2	FPF551D-CX7.2
Allowable torque	N·m(oz·in)	0.343 (48.6)		0.686 (97.1)	
Rotor inertia	×10⁻⁴kg·m²(oz·in²)	0.03 (0.16)		0.03 (0.16)	
Basic step angle		0.2		0.1	
Gear ratio		1 : 3.6		1 : 7.2	
Backlash	DEG	0.6		0.4	
Allowable speed	min⁻¹	500		250	
Mass (Weight)	kg (lbs)	0.36 (0.79)		0.36 (0.79)	
Allowable thrust load	N (lbs)	15 (3.38)		15 (3.38)	
Allowable radial load (Note 1)	N (lbs)	20 (4.5)		20 (4.5)	

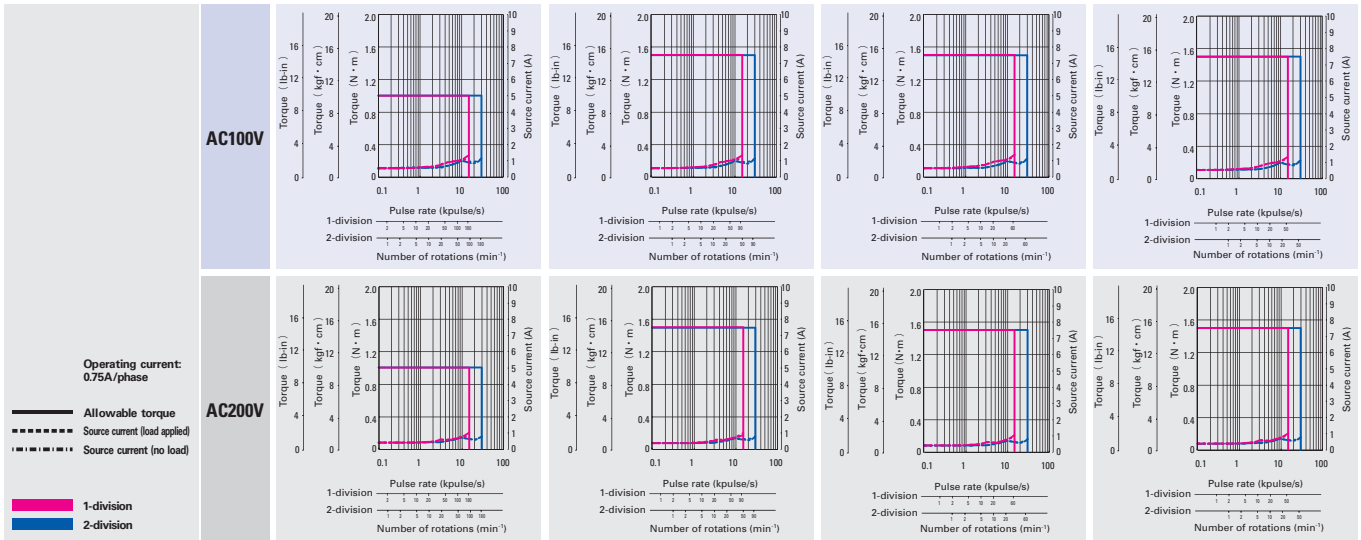
Directions of motor rotation and gear output shaft are the same for models with reduction ratio 1 : 3.6, 1 : 7.2, and 1 : 10 opposite for reduction ratio 1 : 20, 1 : 30, and 1 : 36.
(Note1) When load is applied at 1/3 length from output shaft edge.



The data are measured under the drive condition of our company. The drive torque may very depending on the accuracy of customer-side equipment.

Size	Motor flange size	□42mm (□1.65inch)							
	Motor + gear length	64.5mm (2.54inch)		64.5mm (2.54inch)		64.5mm (2.54inch)		64.5mm (2.54inch)	
Set part number	Single shaft	FSF551S-CX10	FPF551S-CX10	FSF551S-CX20	FPF551S-CX20	FSF551S-CX30	FPF551S-CX30	FSF551S-CX36	FPF551S-CX36
	Double shaft	FSF551D-CX10	FPF551D-CX10	FSF551D-CX20	FPF551D-CX20	FSF551D-CX30	FPF551D-CX30	FSF551D-CX36	FPF551D-CX36
Allowable torque	N·m(oz·in)	0.98 (138.8)		1.47 (208.2)		1.47 (208.2)		1.47 (208.2)	
Rotor inertia	×10⁻⁴kg·m²(oz·in²)	0.03 (0.16)		0.03 (0.16)		0.03 (0.16)		0.03 (0.16)	
Basic step angle		0.072		0.036		0.024		0.02	
Gear ratio		1 : 10		1 : 20		1 : 30		1 : 36	
Backlash	DEG	0.35		0.25		0.25		0.25	
Allowable speed	min⁻¹	180		90		60		50	
Mass (Weight)	kg (lbs)	0.36 (0.79)		0.36 (0.79)		0.36 (0.79)		0.36 (0.79)	
Allowable thrust load	N (lbs)	15 (3.38)		15 (3.38)		15 (3.38)		15 (3.38)	
Allowable radial load (Note 1)	N (lbs)	20 (4.5)		20 (4.5)		20 (4.5)		20 (4.5)	

Directions of motor rotation and gear output shaft are the same for models with reduction ratio 1 : 3.6 and 1:7.2, opposite for reduction ratio 1 : 10, 1 : 20 and 1 : 30.
(Note1) When load is applied at 1/3 length from output shaft edge.



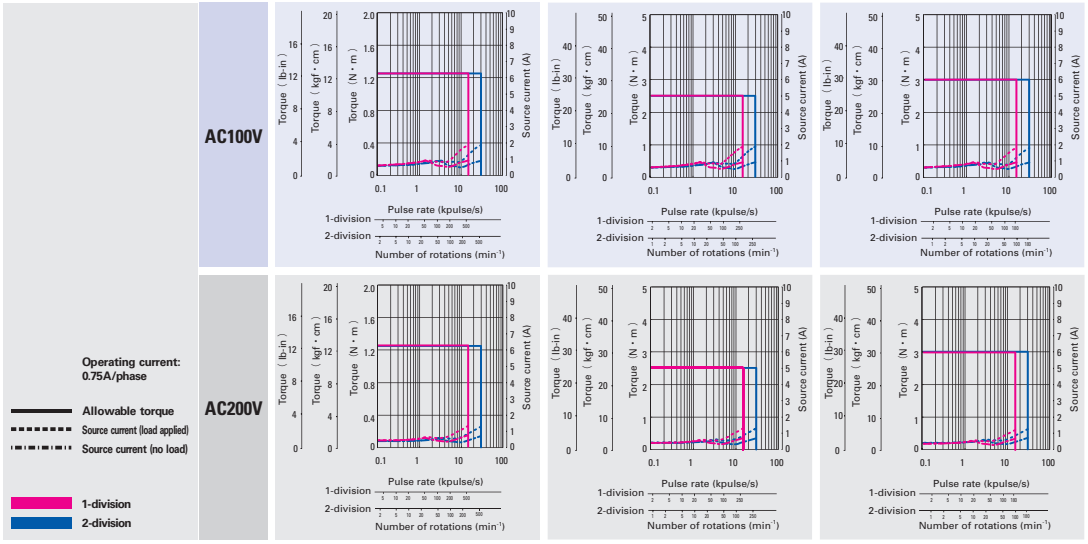
The data are measured under the drive condition of our company. The drive torque may very depending on the accuracy of customer-side equipment.

Low-backlash gear model

F series driver +
F series motor with low-backlash gear

Size	Motor flange size	□60mm (□2.36inch)					
	Motor + gear length	92mm (3.62inch)		92mm (3.62inch)		92mm (3.62inch)	
Set part number	Single shaft	FSF781S-CX3.6	FPF781S-CX3.6	FSF781S-CX7.2	FPF781S-CX7.2	FSF781S-CX10	FPF781S-CX10
	Double shaft	FSF781D-CX3.6	FPF781D-CX3.6	FSF781D-CX7.2	FPF781D-CX7.2	FSF781D-CX10	FPF781D-CX10
Allowable torque	N·m(oz·in)	1.25 (177.0)		2.5 (354.0)		3 (424.8)	
Rotor inertia	×10⁻⁴kg·m²(oz·in²)	0.275 (1.5)		0.275 (1.5)		0.275 (1.5)	
Basic step angle		0.2		0.1		0.072	
Gear ratio		1 : 3.6		1 : 7.2		1 : 10	
Backlash	DEG	0.55		0.25		0.25	
Allowable speed	min⁻¹	500		250		180	
Mass (Weight)	kg (lbs)	0.97 (2.13)		0.97 (2.13)		0.97 (2.13)	
Allowable thrust load	N (lbs)	30 (6.75)		30 (6.75)		30 (6.75)	
Allowable radial load (Note 1)	N (lbs)	100 (22.5)		100 (22.5)		100 (22.5)	

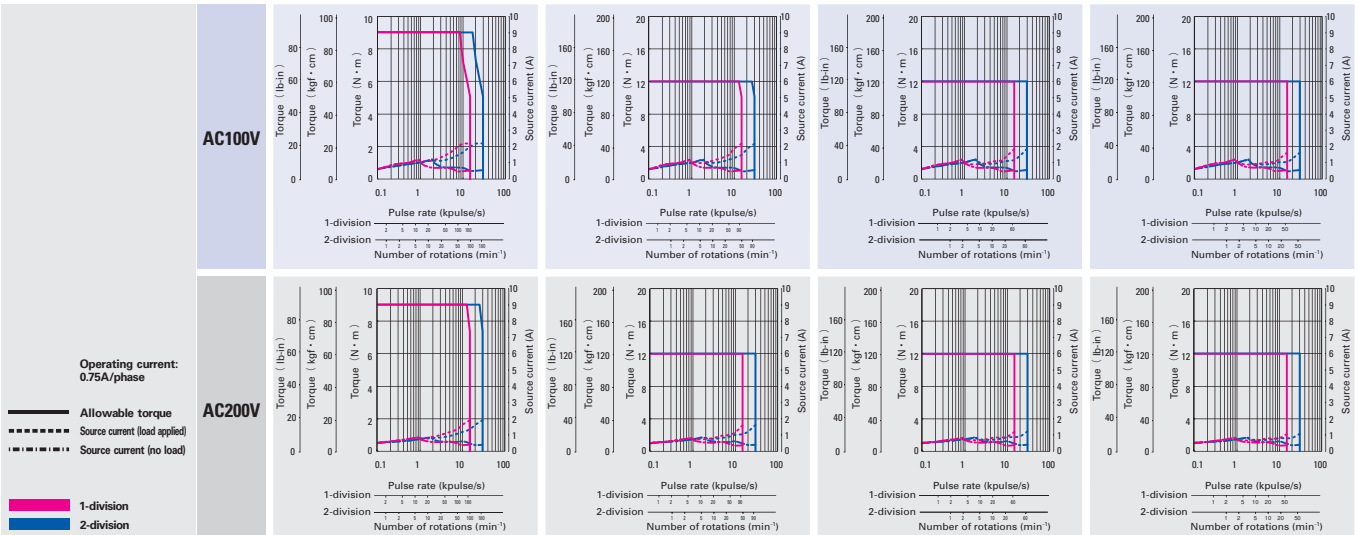
Directions of motor rotation and gear output shaft are the same for models with reduction ratio 1 : 3.6 and 1:7.2, opposite for reduction ratio 1 : 10, 1 : 20 and 1 : 30.
(Note1) When load is applied at 1/3 length from output shaft edge.



The data are measured under the drive condition of our company. The drive torque may very depending on the accuracy of customer-side equipment.

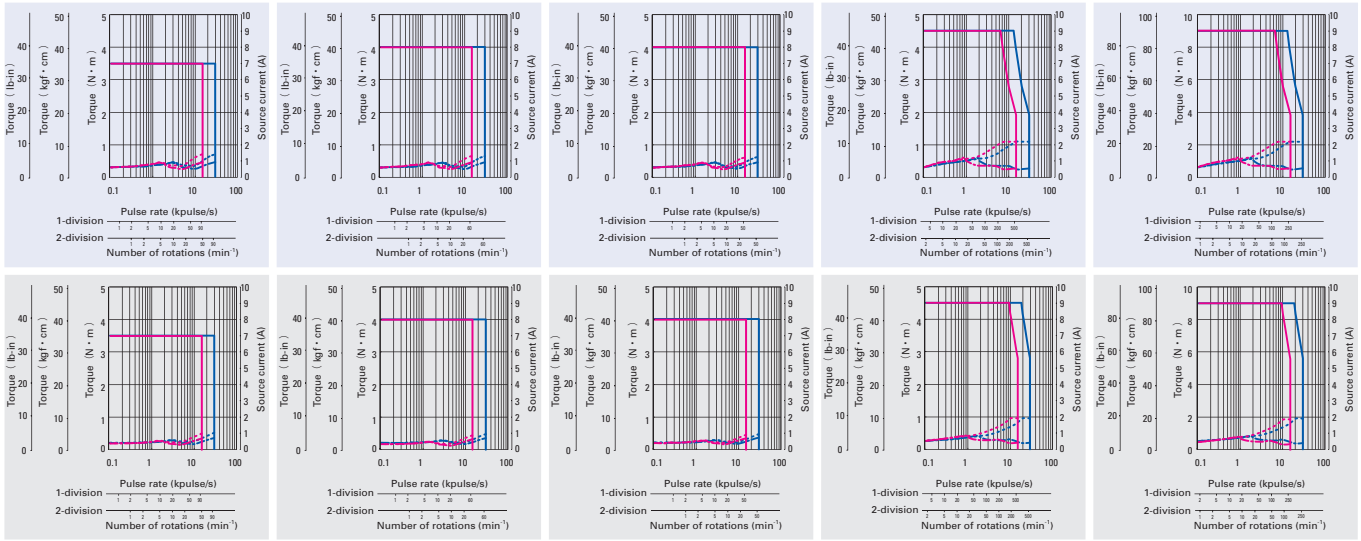
Size	Motor flange size	φ86mm (φ3.39inch)					
	Motor + gear length	127.3mm (5.01inch)		127.3mm (5.01inch)		127.3mm (5.01inch)	
Set part number	Single shaft	FSF851S-CX10	FPF851S-CX10	FSF851S-CX20	FPF851S-CX20	FSF851S-CX30	FPF851S-CX30	FSF851S-CX36	FPF851S-CX36
	Double shaft	FSF851D-CX10	FPF851D-CX10	FSF851D-CX20	FPF851D-CX20	FSF851D-CX30	FPF851D-CX30	FSF851D-CX36	FPF851D-CX36
Allowable torque	N·m(oz·in)	9 (1274.5)		12 (1699.3)		12 (1699.3)		12 (1699.3)	
Rotor inertia	×10⁻⁴kg·m²(oz·in²)	1.45 (7.93)		1.45 (7.93)		1.45 (7.93)		1.45 (7.93)	
Basic step angle		0.072		0.036		0.024		0.02	
Gear ratio		1 : 10		1 : 20		1 : 30		1 : 36	
Backlash	DEG	0.22		0.15		0.15		0.15	
Allowable speed	min⁻¹	180		90		60		50	
Mass (Weight)	kg (lbs)	2.7 (5.94)		2.7 (5.94)		2.7 (5.94)		2.7 (5.94)	
Allowable thrust load	N (lbs)	60 (13.5)		60 (13.5)		60 (13.5)		60 (13.5)	
Allowable radial load (Note 1)	N (lbs)	300 (67.5)		300 (67.5)		300 (67.5)		300 (67.5)	

Directions of motor rotation and gear output shaft are the same for models with reduction ratio 1 : 3.6 and 1:7.2, opposite for reduction ratio 1 : 10, 1 : 20 and 1 : 30.
(Note1) When load is applied at 1/3 length from output shaft edge.



The data are measured under the drive condition of our company. The drive torque may very depending on the accuracy of customer-side equipment.

□60mm (□2.36inch)						φ86mm (φ3.39inch)			
92mm (3.62inch)		92mm (3.62inch)		92mm (3.62inch)		127.3mm (5.01inch)		127.3mm (5.01inch)	
FSF781S-CX20	FPF781S-CX20	FSF781S-CX30	FPF781S-CX30	FSF781S-CX36	FPF781S-CX36	FSF851S-CX3.6	FPF851S-CX3.6	FSF851S-CX7.2	FPF851S-CX7.2
FSF781D-CX20	FPF781D-CX20	FSF781D-CX30	FPF781D-CX30	FSF781D-CX36	FPF781D-CX36	FSF851D-CX3.6	FPF851D-CX3.6	FSF851D-CX7.2	FPF851D-CX7.2
3.5 (495.6)		4 (566.4)		4 (566.4)		4.5 (637.2)		9 (1274.5)	
0.275 (1.5)		0.275 (1.5)		0.275 (1.5)		1.45 (7.93)		1.45 (7.93)	
0.036		0.024		0.02		0.2		0.1	
1 : 20		1 : 30		1 : 36		1 : 3.6		1 : 7.2	
0.17		0.17		0.17		0.35		0.22	
90		60		50		500		250	
0.97 (2.13)		0.97 (2.13)		0.97 (2.13)		2.7 (5.94)		2.7 (5.94)	
30 (6.75)		30 (6.75)		30 (6.75)		60 (13.5)		60 (13.5)	
100 (22.5)		100 (22.5)		100 (22.5)		300 (67.5)		300 (67.5)	



Harmonic gear model

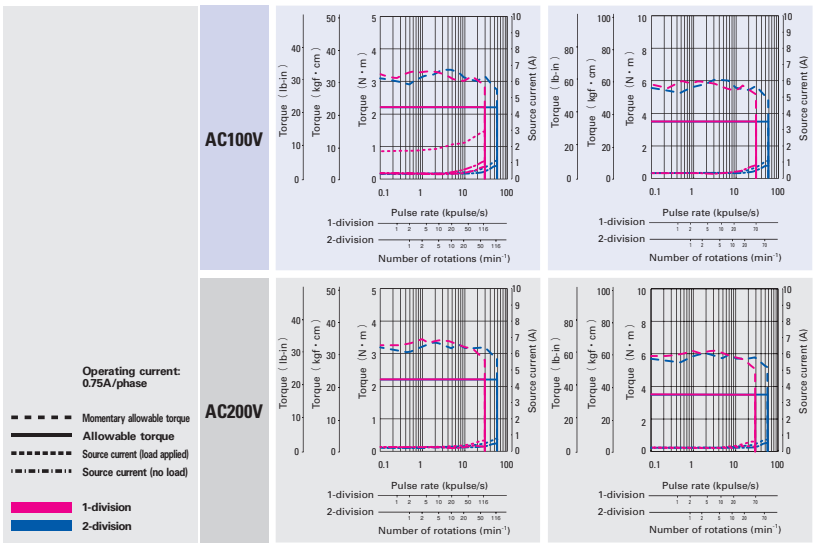
F series driver +
F series motor with harmonic gear

Motor flange size

□42 (□1.65inch) □60 (□2.35inch) φ86 (φ3.39inch)

Size	Motor flange size	□42mm (□1.65inch)			
	Motor + gear length	73.5mm (2.89inch)		73.5mm (2.89inch)	
Set part number	Single shaft	FSF551S-HX30	FPF551S-HX30	FSF551S-HX50	FPF551S-HX50
	Double shaft	FSF551D-HX30	FPF551D-HX30	FSF551D-HX50	FPF551D-HX50
Allowable torque	N·m(oz·in)	2.2 (311.5)		3.5 (495.6)	
Momentary allowable torque	N·m(oz·in)	4.5 (637.3)		8.3 (1175.4)	
Rotor inertia	×10⁻⁴kg·m²(oz·in²)	0.042 (0.23)		0.042 (0.23)	
Basic step angle		0.024		0.0144	
Gear ratio		1:30		1:50	
Hysteresis loss	Minute	3.6		2.4	
Allowable speed	min⁻¹	116		70	
Mass (Weight)	kg(lbs)	0.42 (0.92)		0.42 (0.92)	
Allowable thrust load	N(lbs)	1150 (258.75)		1150 (258.75)	
Allowable radial load (Note 1)	N(lbs)	209 (46.98)		209 (46.98)	

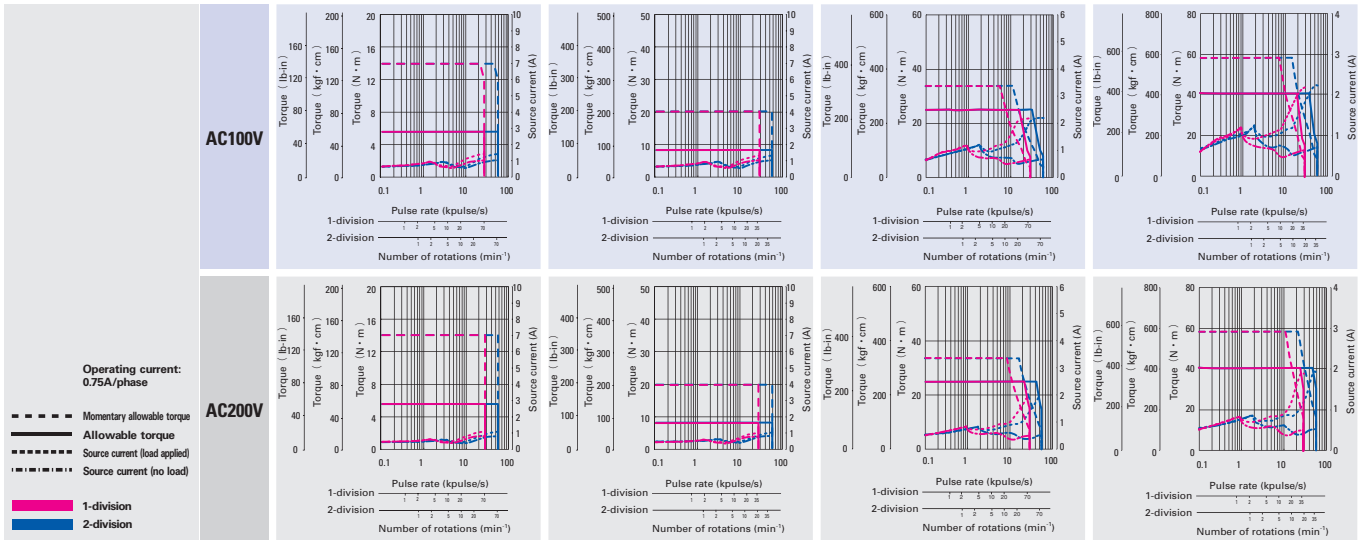
Directions of gear output shaft are the opposite.
(Note1) When load is applied at 1/3 length from output shaft edge.



The data are measured under the drive condition of our company. The drive torque may very depending on the accuracy of customer-side equipment.

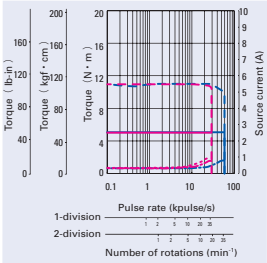
Size	Motor flange size	□60mm (□2.36inch)				φ86mm (φ3.39inch)			
	Motor + gear length	113.5mm (4.47inch)		113.5mm (4.47inch)		113.5mm (4.47inch)		113.5mm (4.47inch)	
Set part number	Single shaft	FSF781S-HX50	FPF781S-HX50	FSF781S-HX100	FPF781S-HX100	FSF851S-HX50	FPF851S-HX50	FSF851S-HX100	FPF851S-HX100
	Double shaft	FSF781D-HX50	FPF781D-HX50	FSF781D-HX100	FPF781D-HX100	FSF851D-HX50	FPF851D-HX50	FSF851D-HX100	FPF851D-HX100
Allowable torque	N·m(oz·in)	5.5 (778.8)		8 (1132.9)		25 (3540.2)		40 (5664.3)	
Momentary allowable torque	N·m(oz·in)	14 (1982.6)		20 (2832.2)		34 (4814.8)		59 (8355.1)	
Rotor inertia	×10⁻⁴kg·m²(oz·in²)	0.31 (1.695)		0.31 (1.695)		1.65 (9.021)		1.65 (9.021)	
Basic step angle		0.0144		0.0072		0.0144		0.0072	
Gear ratio		1:50		1:100		1:50		1:100	
Lost motion	Minute	0.4 to 3 ± 0.028N·m (3.965oz·in)		0.4 to 1.5 ± 0.4N·m (56.645oz·in)		0.4 to 3 ± 1N·m (141.612oz·in)		0.4 to 3 ± 1.2N·m (169.934oz·in)	
Allowable speed	min⁻¹	70		35		70		35	
Mass (Weight)	kg(lbs)	1.2 (2.64)		1.2 (2.64)		3.3 (7.26)		3.3 (7.26)	
Allowable thrust load	N(lbs)	400 (90)		400 (90)		1400 (315)		1400 (315)	
Allowable radial load (Note 1)	N(lbs)	360 (81)		360 (81)		1350 (303.5)		1380 (310.5)	

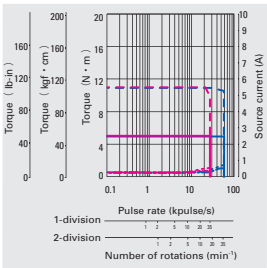
Directions of gear output shaft are the opposite.
(Note1) When load is applied at 1/3 length from output shaft edge.



The data are measured under the drive condition of our company. The drive torque may very depending on the accuracy of customer-side equipment.

□42mm (□1.65inch)	
73.5mm (2.89inch)	
FSF551S-HX100	FPF551S-HX100
FSF551D-HX100	
FPF551D-HX100	
5 (708.1)	
11 (1557.7)	
0.042 (0.23)	
0.0072	
1 : 100	
2.4	
35	
0.42 (0.92)	
1150 (258.75)	
209 (46.98)	





Electromagnetic brake model

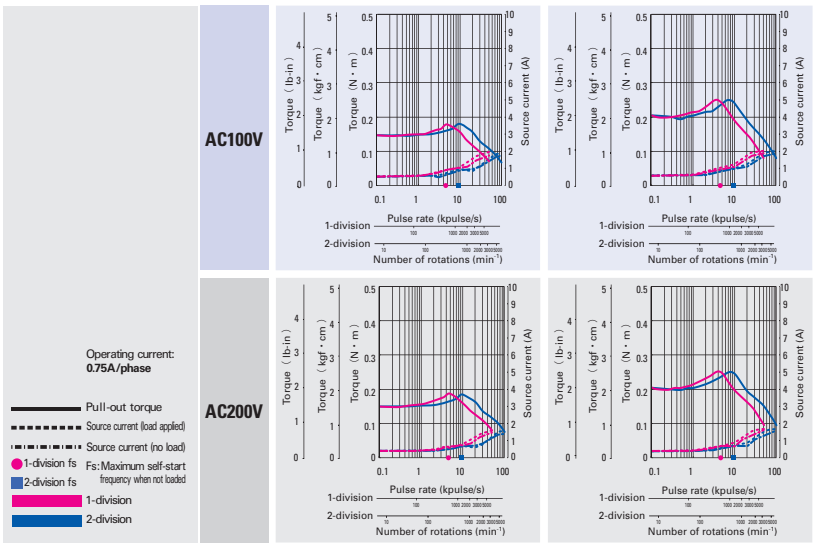
F series driver + F series motor with electromagnetic brake

Motor flange size

□42 (□1.65inch) □60 (□2.35inch) φ86 (φ3.39inch)

Size	Motor flange size		□42mm (□1.65inch)	
	Motor + brake length		64.5mm (2.54inch)	70.5mm (2.78inch)
Set part number	Single shaft		FSF551S-XB / FPF551S-XB	FSF552S-XB / FPF552S-XB
Holding torque		N·m(oz·in)	0.13 (8.4)	0.18 (25.49)
Rotor inertia		×10⁻⁴kg·m²(oz·in²)	0.045 (0.246)	0.068 (0.372)
Mass (Weight)		kg (lbs)	0.38 (0.84)	0.43 (0.95)
Allowable thrust load		N (lbs)	10 (2.25)	10 (2.25)
Allowable radial load(Note 1)		N (lbs)	35 (8.75)	35 (8.75)
Brake type			No excitation actuating type	No excitation actuating type
Electromagnetic brake	Power supply input	V	DC24V ± 5%	DC24V ± 5%
	Excitation current	A	0.08	0.08
	Power consumption	W	2	2
	Static fiction torque	N·m(oz·in)	0.22 (31.15)	0.22 (31.15)
	Brake operating time	ms	30	30
	Brake release time	ms	20	20

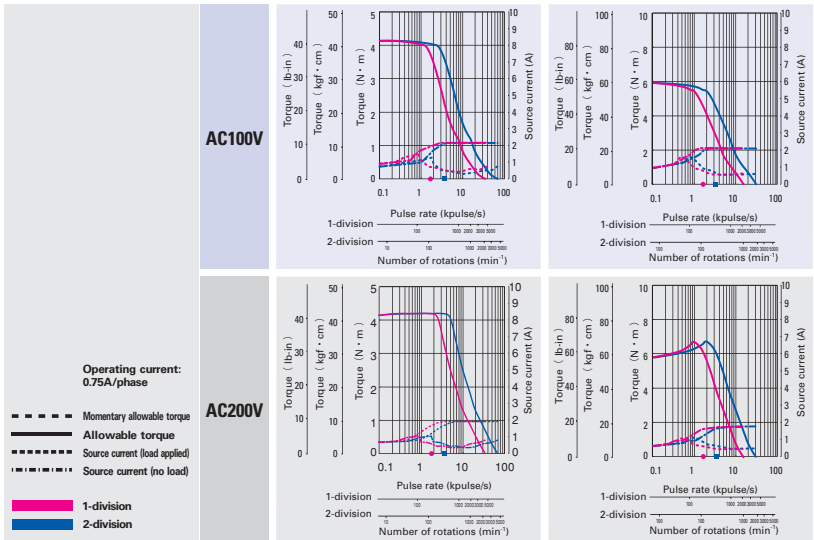
(Note1) When load is applied at 1/3 length from output shaft edge.



The data are measured under the drive condition of our company. The drive torque may very depending on the accuracy of customer-side equipment.

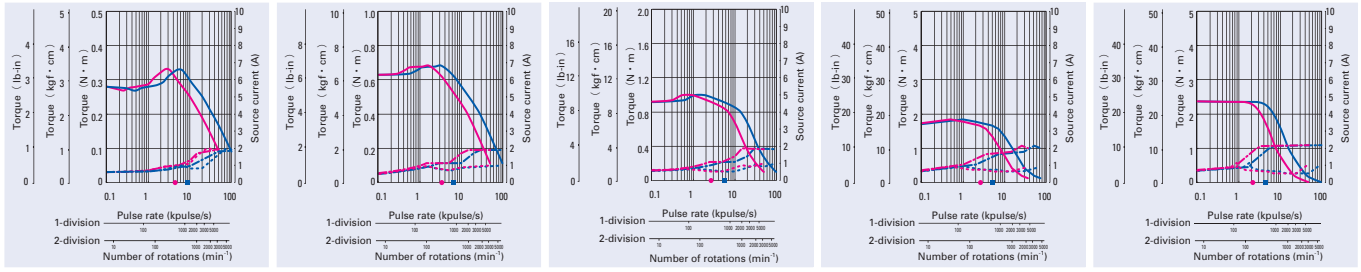
Size	Motor flange size		φ86mm (φ3.39inch)	
	Motor + brake length		146.8mm (5.78mm)	180.4mm (7.10mm)
Set part number	Single shaft		FSF852S-XB / FPF852S-XB	FSF853S-XB / FPF853S-XB
Holding torque		N·m(oz·in)	4.02 (569.3)	6.17 (873.7)
Rotor inertia		×10⁻⁴kg·m²(oz·in²)	3.69 (20.175)	5.19 (28.376)
Mass (Weight)		kg (lbs)	4.5 (9.9)	5.5 (12.1)
Allowable thrust load		N (lbs)	60 (13.5)	60 (13.5)
Allowable radial load(Note 1)		N (lbs)	220 (49.5)	220 (49.5)
Brake type			No excitation actuating type	No excitation actuating type
Electromagnetic brake	Power supply input	V	DC24V ± 5%	DC24V ± 5%
	Excitation current	A	0.42	0.42
	Power consumption	W	10	10
	Static fiction torque	N·m(oz·in)	4 (566.45)	4 (566.45)
	Brake operating time	ms	50	50
	Brake release time	ms	20	20

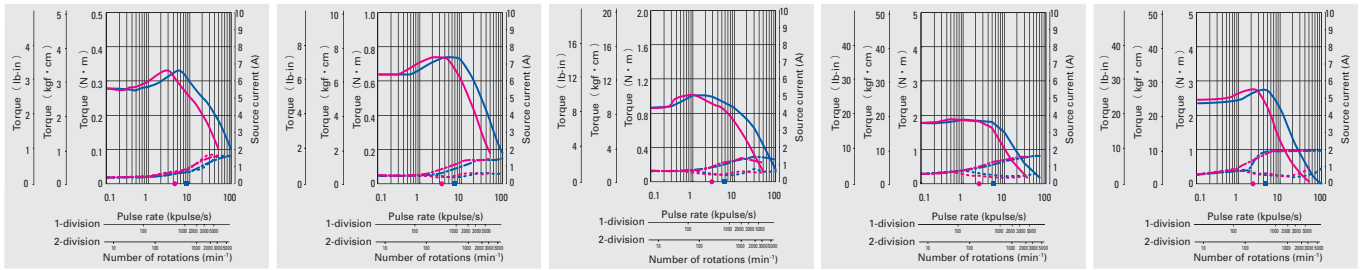
(Note1) When load is applied at 1/3 length from output shaft edge.



The data are measured under the drive condition of our company. The drive torque may very depending on the accuracy of customer-side equipment.

□42mm (□1.65inch)		□60mm (□2.36inch)				φ86mm (φ3.39inch)	
79.5mm (3.13inch)		85.8mm (3.38inch)		94.5mm (3.72inch)		126.7mm (4.99inch)		116.7mm (4.59inch)	
FSF554S-XB	FPF554S-XB	FSF781S-XB	FPF781S-XB	FSF782S-XB	FPF782S-XB	FSF783S-XB	FPF783S-XB	FSF851S-XB	FPF851S-XB
0.26 (36.82)		0.6 (85.0)		0.98 (138.8)		1.79 (253.5)		2.06 (291.7)	
0.08 (0.437)		0.43 (2.351)		0.56 (3.062)		1 (5.468)		2.24 (12.247)	
0.52 (1.14)		0.94 (2.07)		1.12 (2.46)		1.7 (3.74)		3.5 (7.7)	
10 (2.25)		20 (4.5)		20 (4.5)		20 (4.5)		60 (13.5)	
35 (8.75)		80 (18)		80 (18)		80 (18)		220 (49.5)	
No excitation actuating type		No excitation actuating type		No excitation actuating type		No excitation actuating type		No excitation actuating type	
DC24V ± 5%		DC24V ± 5%		DC24V ± 5%		DC24V ± 5%		DC24V ± 5%	
0.08		0.25		0.25		0.25		0.42	
2		6		6		6		10	
0.22 (31.15)		0.8 (113.29)		0.8 (113.29)		0.8 (113.29)		4 (566.45)	
30		30		30		30		50	
20		20		20		20		20	





Common specifications

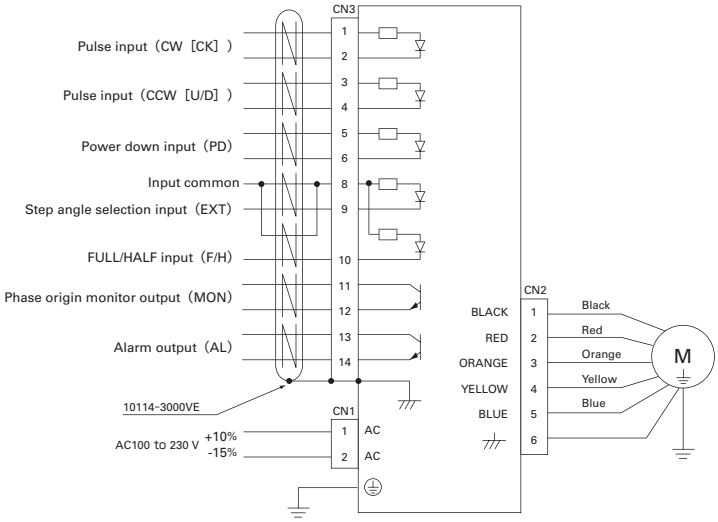
■ F series driver

Basic specifications		Type code	**FS1W075S**
		Power supply	Single phase AC100V to 230V +10, -15% 50/60/Hz
		Source current	4 A MAX.
	Environment	Protection class	Class Ⅰ
		Operation environment	Installation category (over-voltage category) : Ⅱ , pollution degree: 2
		Applied standards	EN50178、UL508C
		Ambient operation temperature	0 to 50℃
		Storage temperature	-20 to +70℃
		Ambient operation humidity	35 to 85%RH (no condensation)
		Storage humidity	10 to 90%RH (no condensation)
		Operation altitude	1000 m (3280 feet) MAX. above sea level
		Vibration resistance	Tested under the following conditions ; 4.9m/s², frequency range 10 to 55Hz, direction along X, Y and Z axes, for 2 hours each
		Impact resistance	Not influenced at NDS-C-0110 standard section 3.2.2 division "C" .
		Withstand voltage	Not influenced when 1500V AC is applied between power input terminal and cabinet for one minute.
		Insulation resistance	10M ohm MIN. when measured with 500V DC megohmmeter between input terminal and cabinet.
		Mass (Weight)	0.8kg (1.77lbs)
Functions		Protection functions	Driver overheating, main circuit power supply error, and over-current
		LED indication	Power monitor, phase origin monitor, pulse monitor, alarm
CN3		Input signal	Photo-coupler input system ; input resistance: 220 Ω ; input-signal "H" level : 4.0 to 5.5V ; input-signal "L" level : 0 to 0.5V
		Output signal	From the photo coupler by the open collector output Output specification : Vceo = 30V MAX., Ic = 5mA

■ F series motor / M series motor

Stepping motor type	F series motor	M series motor
Motor Type	103F55 □□ /103F785 □ /103F858 □ /103F8958 □	103M55 □□ /103M785 □ /103M858 □ /103M8958 □
Type	—	S1 (continuous operation)
Insulation class	Class B (+130℃)	Class B (+130℃) [UL class A (+105℃)]
Operation altitude	1000m (3280 feet) MAX. above sea level	
Withstand voltage	□42mm (□1.65inch) , □60mm (□2.36inch) , φ86mm (φ3.39inch) , φ106mm (φ4.17inch) : AC1500V 50/60Hz for 1 minute	
Insulation resistance	100M ohm MIN. against DC500V	
Protection grade	IP40	
Vibration resistance	Amplitude of 1.52mm (0.06inch) (P-P) at frequency range 10 to 500Hz for 15 minutes sweep time along X, Y, and Z axes for 12 times.	
Impact resistance	490m/s² of acceleration for 11 ms with half-sine wave applying three times for X, Y, and Z axes each, 18 times in total.	
Ambient operation temperature	-10 to +50℃ (0 to +40℃ for harmonic gear model)	
Ambient operation humidity	90% MAX. at less than 40℃, 57% MAX. at less than 50℃ , 35% MAX. at 60℃ (no condensation)	

■ External wiring diagram : FS type



*	Marking : 1 red marking / pitch
◎	Marking : 1 black marking / pitch
△	Marking : 2 red markings / pitch
☆	Marking : 2 black markings / pitch

※ Marking size : width : 1mm,
space : 1mm,
pitch : 12mm

■ Specification summary of CN3 I/O signal

Signal name	CN3 Pin number	Function
CW pulse input (standard)	1 2	When using "2-input mode" Drive pulse for the CW direction rotation is input.
Pulse column input	1 2	When using "Pulse and direction mode" Drive pulse train for the stepping motor rotation is input.
CCW pulse input (standard)	3 4	When using "2-input mode" Drive pulse for the CCW direction rotation is input.
Rotation direction input	3 4	The rotation direction signal of stepping motor is input for the "Pulse and direction mode". Internal photocoupler ON···CW direction Internal photocoupler OFF···CCW direction
Power down input	5 6	Inputting the PD signal cuts OFF the current flowing through the stepping motor (turns OFF the power) . (The power down input can be changed to the power low function by selecting dipswitches.) PD input signal ON (internal photocoupler ON) ···PD function enabled PD input signal OFF (internal photocoupler OFF) ···PD function disabled
Step angle selection input	8 9	Inputting the EXT signal enables the FULL/HALF selection input. EXT input signal ON (internal photocoupler ON) ···External input signal F/H enabled EXT input signal OFF (internal photocoupler OFF) ···Main unit rotary switch S. S enabled
FULL/HALF selection input	8 10	When the EXT input signal is ON (internal photocoupler ON). F/H input signal ON (internal photocoupler ON) ···HALF step F/H input signal OFF (internal photocoupler OFF) ···FULL step
Phase origin monitor output	11 12	It is turned ON when the excitation phase is at the origin (in the state when the power is turned ON) It is turned ON once per 10 pulses when setting to HALF step. It is turned ON once per 20 pulses when setting to FULL step.
Alarm output	13 14	The signal is externally output when one of several alarm circuits operates in the PM driver. At this time, the stepping motor is in the unexcited state.

(Note) The CW rotation direction of stepping motor means the clockwise direction rotation as viewed from the output shaft side (flange side) . The CCW rotation direction means the counterclockwise direction rotation as viewed from the output shaft side (flange side) .

Driver part name

2-digit LED indication

	Indication	Description
Status	8.8.	Internal power is established.
	8.8	Excitation phase is origin status at power on.
	8.8.	Command pulse is under status at input.
Alarm	0 1	Over-current.
	0 2	Overheat.
	0 3	Low voltage power.
	0 4	Over-voltage power.
	0 5 - 0 8	Hardware fault

Display switch Alarm history of 10 previous alarms can be displayed on 2-digit LED.

1. **Step angle selection switch**
2. **Current selection switch**
3. **0-speed current adjustment switch**
4. **Function selection DIP switch**

Motor interface connector

Power connector

Earth

5. **Input/output signal interface connector**

1 Step angle selection switch (S.S)

Basic step angle divisor (up to 250 divisions) .

Indication	0	1	2	3	4	5	6	7
Number of divisions	1	2	2.5	4	5	8	10	20
Indication	8	9	A	B	C	D	E	F
Number of divisions	25	40	50	80	100	125	200	250

Initial configuration of factory shipment is set to 1 (Half steps) .

2 Operation current selection switch (RUN)

Motor current during operation can be selected from 100 to 25%.

Indication	0	1	2	3	4	5	6	7
Motor current (%)	100 (Rated value)	95	90	85	80	75	70	65
Indication	8	9	A	B	C	D	E	F
Motor current (%)	60	55	50	45	40	35	30	25

Initial configuration of factory shipment is set to 0 (rated value) .

3 Current adjustment at operation halt switch (STP)

Motor current at 0-speed can be selected from 100 to 25%.

Indication	0	1	2	3	4	5	6	7
Motor current (%)	100 (Rated value)	95	90	85	80	75	70	65
Indication	8	9	A	B	C	D	E	F
Motor current (%)	60	55	50	45	40	35	30	25

Initial configuration of factory shipment is set to A (50% of rated value) .
Driver and motor should be operated at around 50% of rated value to reduce heat.

5 Input/output signal interface connector

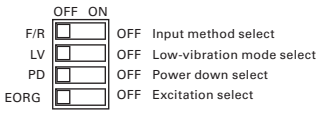
Input signal connector is used for interface with upper level controller, etc. Driver side connector is 10214-52A2JL. (Sumitomo 3M)

6	4	2	
PD-	CCW- (U/D-)	CW- (CK-)	
7	5	3	1
Reserved	PD+	CCW+ (U/D+)	CW+ (CK+)
13	11	9	
AL (collector)	MON (collector)	EXT	
14	12	10	8
AL (emitter)	MON (emitter)	F / H	Input common

Terminal arrangement of CN3 connector

4 Function selection DIP switch

Selects an appropriate function for specification.
Check that the ex-factory settings are as follows.



Input method select (F/R)

Selects input pulse type.

F/R	Input pulse type
ON	1 input (Pulse&direction)
OFF	2 input (CW, CCW)

Low-vibration mode select (LV)

Provides low-vibration, smooth operation even if resolution is rough (1-division, 2-division, etc)

LV	Operation
ON	Auto-micro function
OFF	Micro-step

Power down select (PD)

Selects current for power down signal input.

PD	Motor current
ON	Current by rotary switch STP (power low)
OFF	0A (power off)

Excitation select (EORG)

The excitation phasse when the power supply is turned on is selected.

EORG	Original excitation phase
ON	Excitation phase at power shut off
OFF	Phase origin

By turning on the EORG, excitation phase when power OFF will be saved.
Therefore, there will be no shaft displacement when turning the power ON.

Common specifications

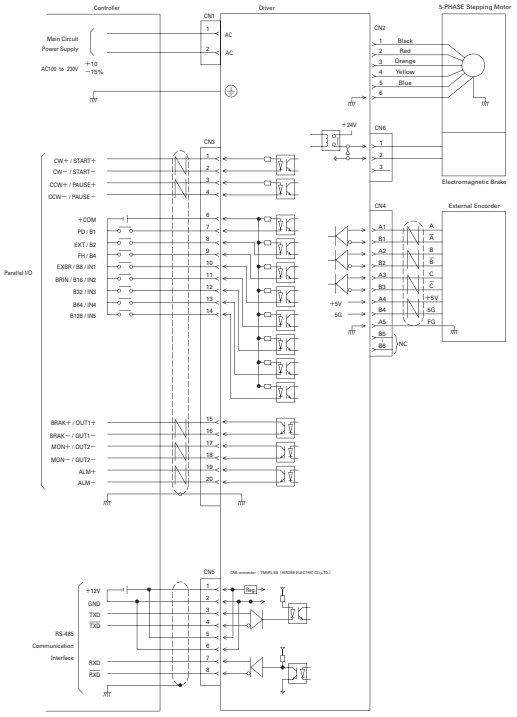
■ F series driver

Basic specifications		Type code	**FP1W075P**
		Power supply	Single phase AC100V to 230V +10, -15% 50/60/Hz
		Source current	4 A MAX.
	Environment	Protection class	Class Ⅰ
		Operation environment	Installation category (over-voltage category) : Ⅱ , pollution degree: 2
		Applied standards	EN50178, UL508C
		Ambient operation temperature	0 to 50℃
		Storage temperature	-20 to +70℃
		Ambient operation humidity	35 to 85% RH (no condensation)
		Storage humidity	10 to 90% RH (no condensation)
		Operation altitude	1000m (3280feet) MAX. above sea level
		Vibration resistance	Tested under the following conditions ; 4.9m/s², frequency range 10 to 55Hz, direction along X, Y and Z axes, for 2 hours each
		Impact resistance	Not influenced at NDS-C-0110 standard section 3.2.2 division "C" .
		Withstand voltage	Not influenced when 1500V AC is applied between power input terminal and cabinet for one minute.
		Insulation resistance	10M ohm MIN. when measured with 500V DC megohmmeter between input terminal and cabinet.
		Mass (Weight)	0.8kg (1.77lbs)
Functions		Protection functions	Driver overheating, main circuit power supply error, and over-current
		LED indication	Power monitor, phase origin monitor, pulse monitor, alarm
CN3		Input signal	Photo-coupler input system ; input resistance: 220 Ω ; input-signal "H" level : 4.0 to 5.5V ; input-signal "L" level : 0 to 0.5V
		Output signal	From the photo coupler by the open collector output Output specification : Vceo = 30V MAX., Ic = 5mA

■ F series motor / M series motor

Stepping motor type	F series motor	M series motor
Motor Type	103F55□□ /103F785□ /103F858□ /103F8958□	103M55□ /103M785□ /103M858□ /103M8958□
Type	—	S1 (continuous operation)
Insulation class	Class B (+130℃)	Class B (+130℃) [UL class A (+105℃)]
Operation altitude	1000m (3280 feet) MAX. above sea level	
Withstand voltage	□42mm (□1.65inch) , □60mm (□2.36inch), φ86mm (φ3.39inch) , φ106mm (φ4.17inch) : AC1500V 50/60Hz for 1 minute	
Insulation resistance	100M ohm MIN. against DC500V	
Protection grade	IP40	
Vibration resistance	Amplitude of 1.52mm (0.06inch) (P-P) at frequency range 10 to 500Hz for 15 minutes sweep time along X, Y, and Z axes for 12 times.	
Impact resistance	490m/s² of acceleration for 11 ms with half-sine wave applying three times for X, Y, and Z axes each, 18 times in total.	
Ambient operation temperature	-10 to +50℃ (0 to +40℃ for harmonic gear model)	
Ambient operation humidity	90% MAX. at less than 40℃s, 57% MAX. at less than 50℃ , 35% MAX. at 60℃ (no condensation)	

■ External wiring diagram : FP type



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◎	Marking : 1 black marking / pitch
△	Marking : 2 red markings / pitch
☆	Marking : 2 black markings / pitch

※ Marking size : width : 1mm,
space : 1mm,
pitch : 12mm

■ Spacification summary of CN3 I/O signal (Pulse train I/F mode)

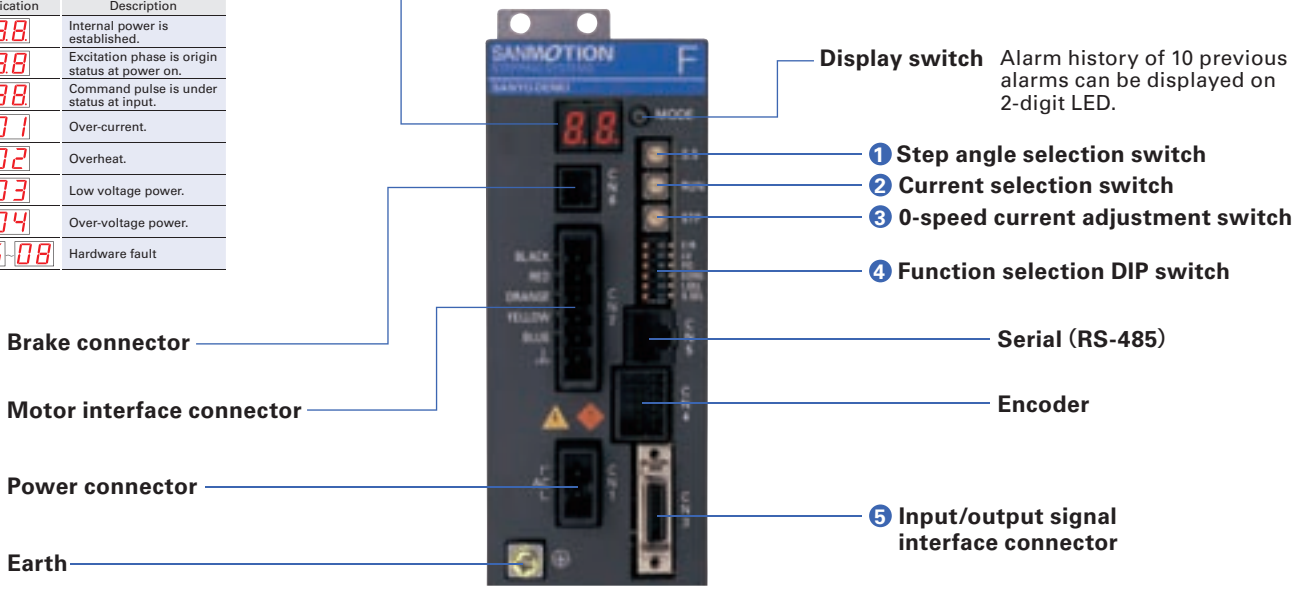
Signal name	Pin number	Function
CW pulse input (standard)	1 2	When using "2-input mode" Drive pulse for the CW direction rotation is input.
Pulse column input	1 2	When using "Pulse and direction mode" Drive pulse train for the stepping motor rotation is input.
CCW pulse input (standard)	3 4	When using "2-input mode" Drive pulse for the CCW direction rotation is input.
Rotation direction input	3 4	The rotation direction signal of stepping motor is input for the "Pulse and direction mode". Internal photocoupler ON···CW direction Internal photocoupler OFF···CCW direction
Gnenral-purpose input common	6	Input signal common of the 7 to 14 pins DC5V to DC24V is input.
Power down input	7	Inputting the PD signal cuts OFF the current flowing through the stepping motor (turns OFF the power). (The power down input can be changed to the power low function by selecting dipswitches.) PD input signal ON (internal photocoupler ON) ···PD function enabled PD input signal OFF (internal photocoupler OFF) ···PD function disabled
Step angle selection input	8	Inputting the EXT signal enables the FULL/HALF selection input. EXT input signal ON (internal photocoupler ON) ···External input signal F/H enabled EXT input signal OFF (internal photocoupler OFF) ···Main unit rotary switch S. S enabled
FULL/HALF selection input	9	When the EXT input signal is ON (internal photocoupler ON). F/H input signal ON (internal photocoupler ON) ···HALF step F/H input signal OFF (internal photocoupler OFF) ···FULL step
Brake control select input	10	Brake retention/release timing can be controlled by the BRIN signal by inputting the EXBR signal. EXBR input signal ON (internal photo coupler ON)···External input signal BRIN effective EXBR input signal OFF (internal photo coupler OFF)···The driver controls the brake automatically
Brake control input	11	When the EXBR input signal on (internal photo coupler on) BRIN input signal ON (internal photo coupler on) ···Brake release BRIN input signal OFF (internal photo coupler off) ···Brake retention
Brake status output	15 16	When the brake is released it turns ON, when the brake is retained it turns OFF.
Phase origin monitor output	17 18	It is turned ON when the excitation phase is at the origin (in the state when the power is turned ON) It is turned ON once per 10 pulses when setting to HALF step. It is turned ON once per 20 pulses when setting to FULL step.
Alarm output	19 20	The signal is externally output when one of several alarm circuits operates in the PM driver. At this time, the stepping motor is in the unexcited state.

The CW rotation direction of stepping motor means the clockwise direction rotation as viewed from the output shaft side (flange side) . The CCW rotation direction means the counterclockwise direction rotation as viewed from the output shaft side (flange side) .

Driver part name

2-digit LED indication

	Indication	Description
Status	8.8.	Internal power is established.
	8.8	Excitation phase is origin status at power on.
	8.8.	Command pulse is under status at input.
Alarm	0 1	Over-current.
	0 2	Overheat.
	0 3	Low voltage power.
	0 4	Over-voltage power.
	0 5 - 0 8	Hardware fault



1 Step angle selection switch (S.S)

Basic step angle divisor (up to 250 divisions).

Indication	0	1	2	3	4	5	6	7
Number of divisions	1	2	2.5	4	5	8	10	20
Indication	8	9	A	B	C	D	E	F
Number of divisions	25	40	50	80	100	125	200	250

Initial configuration of factory shipment is set to 1 (Half steps)

2 Operation current selection switch (RUN)

Motor current during operation can be selected from 100 to 25%.

Indication	0	1	2	3	4	5	6	7
Motor current (%)	100 (Rated value)	95	90	85	80	75	70	65
Indication	8	9	A	B	C	D	E	F
Motor current (%)	60	55	50	45	40	35	30	25

Initial configuration of factory shipment is set to 0 (rated value).

3 Current adjustment at operation halt switch (STP)

Motor current at 0-speed can be selected from 100 to 25%.

Indication	0	1	2	3	4	5	6	7
Motor current (%)	100 (Rated value)	95	90	85	80	75	70	65
Indication	8	9	A	B	C	D	E	F
Motor current (%)	60	55	50	45	40	35	30	25

Initial configuration of factory shipment is set to A (50% of rated value).
Driver and motor should be operated at around 50% of rated value to reduce heat.

5 Input/output signal interface connector

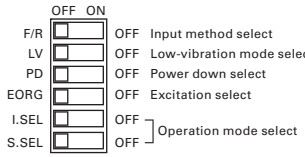
Input signal connector is used for interface with upper level controller, etc. Driver side connector is 10214-52A2JL. (Sumitomo 3M)

10	8	6	4	2
EXBR / B8 / IN1	EXT / B2	+COM	CCW– / PAUSE–	CW– / START–
9	7	5	3	1
FH / B4	PD / B1	Reserved	CCW+ / PAUSE+	CW+ / START+
20	18	16	14	12
ALM–	MON– / OUT2–	BRAK– / OUT1–	B128 / IN5	B32 / IN3
19	17	15	13	11
ALM+	MON+ / OUT2–	BRAK+ / OUT1+	B64 / IN4	BRIN / B16 / IN2

Terminal arrangement of CN3 connector

4 Function selection DIP switch

Selects an appropriate function for specification.
Check that the ex-factory settings are as follows.



Input method select (F/R)

Selects input pulse type.

F/R	Input pulse type
ON	1 input (Pulse&direction)
OFF	2 input (CW, CCW)

Low-vibration mode select (LV)

Provides low-vibration, smooth operation even if resolution is rough (1-division, 2-division, etc)

LV	Operation
ON	Auto-micro function
OFF	Micro-step

Power down select (PD)

Selects current for power down signal input.

PD	Motor current
ON	Current by rotary switch STP (power low)
OFF	0A (power off)

Excitation select (EORG)

The excitation phasse when the power supply is turned on is selected.

EORG	Original excitation phase
ON	Excitation phase at power shut off
OFF	Phase origin

By turning on the EORG, excitation phase when power OFF will be saved.
Therefore, there will be no shaft displacement when turning the power ON.

(I.SEL)

The operation mode is selected.

I.SEL	
ON	Selects S.SEL-setting operation mode
OFF	Pulse-train I/F mode

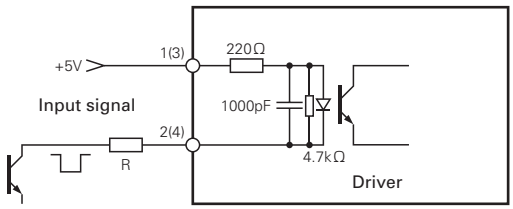
(S.SEL)

The operation mode is selected.

S.SEL	
ON	Serial I/F mode
OFF	Parallel I/F mode

Function descriptions for switches 1 to 4 apply to pulse-train I/F mode. See the user's manual for settings in serial-I/F and parallel-I/F modes.

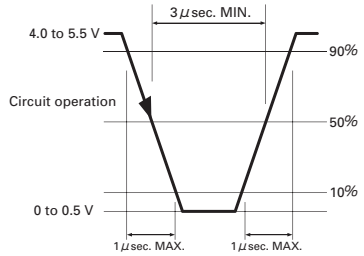
Input circuit configuration of CW (CK), CCW (U/D)



- Pulse duty 50% MAX.
- Maximum input frequency:250kpulse/s
- When the crest value of the input signal exceeds 5V, use the external limit resistance R to limit the input current to approximately 15mA.

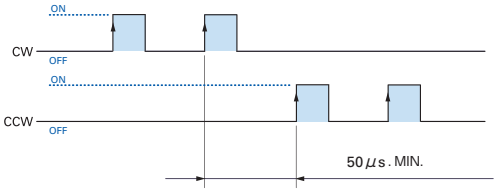
■ Input signal specification

〈Photo coupler〉



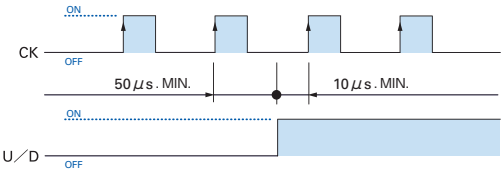
■ Timing of command pulse

2 input type（CW, CCW）



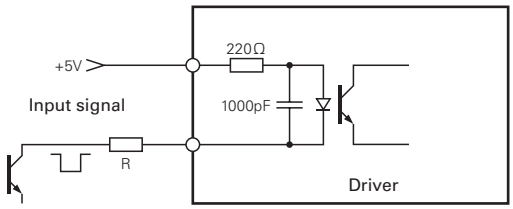
- Shaded area indicates internal photo coupler “ON”. Internal circuit (motor) starts operating at leading edge of the photo coupler “ON”.
- To apply pulse to CW, set CCW side internal photo coupler to “OFF”.
- To apply pulse to CCW, set CW side internal photo coupler to “OFF”.

1 input type（CK, U/D）



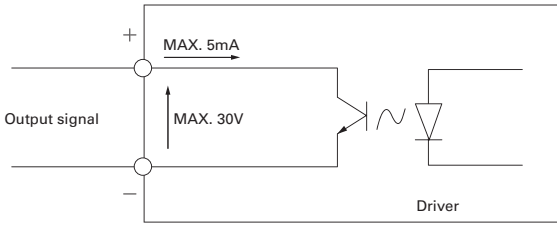
- Shaded area indicates internal photo coupler “ON”. Internal circuit (motor) starts operating at leading edge of CK side photo coupler “ON”.
- Switching of U/D input signal must be done while CK side internal photo coupler is “OFF”.

Input circuit configuration of PD, EXT, F/H

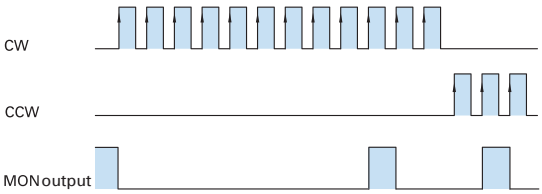


・If the peak value exceedes 5V, set the input current to approx. 15mA using the external limit resistance R.

Output signal configuration of MON, AL



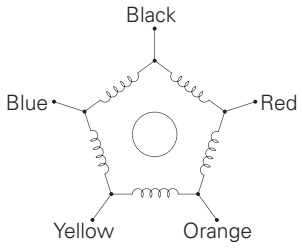
MON output



- Photo coupler at phase origin of motor excitation (status at power on) is set to "ON" (setting when number of divisions is 1).
- Output from MON is set to on at every 7.2 degrees of motor output shaft from phase origin.

Internal wire connection and direction of motor rotate

■ Internal wire connection



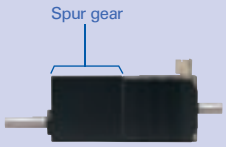
■ Direction of motor rotate

The direction of motor rotate is counterclockwise when viewed from the output shaft side at the direct current energization in the following order.

Type		Exciting order									
		1	2	3	4	5	6	7	8	9	10
Color of leads	Black	−	−	−	−		+	+	+	+	
	Red		+	+	+	+		−	−	−	−
	Orange	+		−	−	−	−		+	+	+
	Yellow	−	−		+	+	+	+		−	−
	Blue	+	+	+		−	−	−	−		+

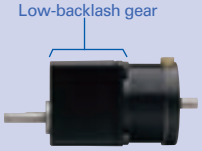
Flange side

Spur gear model



Motor flange size
□28 (□1.10inch)

Low-backlash gear model



Motor flange size
□42mm (□1.65inch) / □60mm (□2.35inch) / ⌀86mm (⌀3.39inch)

Harmonic gear model

Motor flange size
□28mm (□1.10inch) / □42mm (□1.65inch) / □60mm (□2.35inch) / ⌀86mm (⌀3.39inch)

Standard model : F series motor
□28mm (□1.10inch) / □42mm (□1.65inch) / □60mm (□2.35inch) / ⌀86mm (⌀3.39inch)

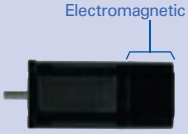
Motor cable

End cap side

Damper

Magnetic dampers can be selected according to required inertia.

Electromagnetic brake moadel



Motor flange size
□42mm (□1.65inch) / □60mm (□2.35inch) / ⌀86mm (⌀3.39inch)

Brake power source (DC24V)

Required for brake-equipped stepping motor models.

Single phase AC100V to AC230V

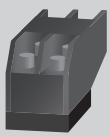
(t)

(r)

Molded case circuit breaker

Protects the power line. Cuts off circuit in the event of overcurrent.

Electromagnetic contactor



Switches driver power on/off. Use together with a surge protector.

Noise filter

Filters out incoming noise from power line.

Switching power supply

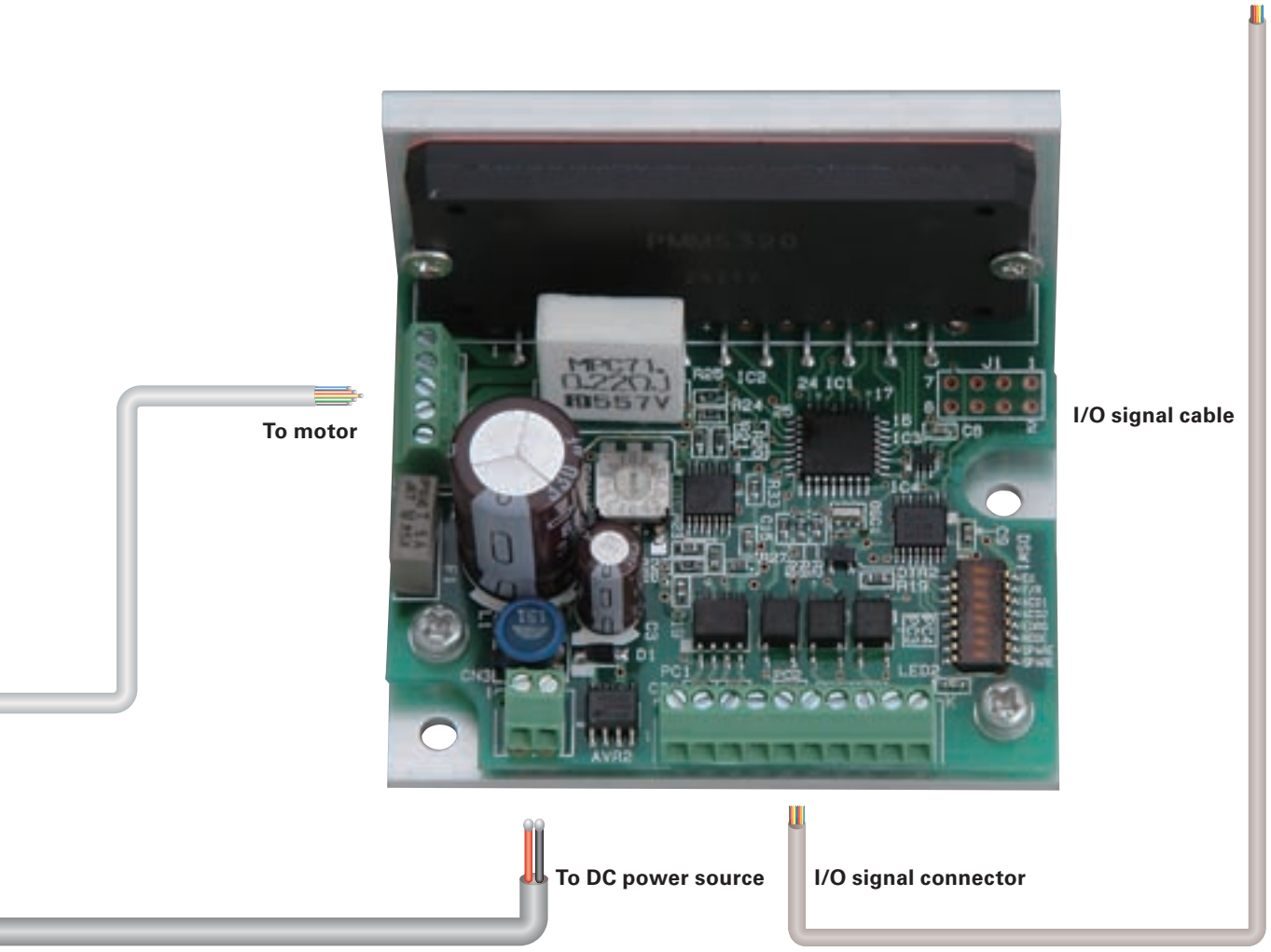
Converts AC power to DC power.

DC24V/ DC36V

Host Devices

PLC

PLC and controllers are available as the host device.



Part number convention

The following part number specifies a system with an F series driver (type code : FS1D140P) and a single shaft F series motor (type code : 103F7851-8421) , □60mm (□2.36inch) square flange, and 46.5mm (1.83inch) motor length, equipped with low-backlash gear (reduction ratio of 1/3.6).

FD F 78 1 S - C X 3.6

I II III

System spec

System type	I (Flange side)	II (End cap side)	III (Reduction ratio)
Spur gear	G	—	—
Low-backlash gear	C	—	—
Harmonic gear	H	—	—
No system at Flange side	X	—	—
Electromagnetic brake	—	B	—
No system at End cap side	—	X	—
Gear ratio	—	—	3.6 to 100

(Flange side)
- Spur gear
- Low-backlash gear
- Harmonic gear

(End cap side)
- Electromagnetic

Stepping motor shaft spec
S : Single shaft D : Double shaft

Stepping motor total length (Standard model)

Code	Motor flange size							
	□28mm (□1.10inch)		□42mm (□1.65inch)		□60mm (□2.36inch)		φ86mm (φ3.39inch)	
	Type code	Motor length : mm (inch)	Type code	Motor length : mm (inch)	Type code	Motor length : mm (inch)	Type code	Motor length : mm (inch)
1	5281	32 (1.26)	5505	34 (1.34)	7851	46.5 (1.83)	8581	62.2 (2.45)
2			5508	40 (1.57)	7852	55 (2.17)	8582	92.2 (3.63)
3					7853	87.5 (3.44)	8583	125.9 (4.96)
4			5510	49 (1.93)				
5	5285	51.5 (2.03)						

Stepping motor flange size
52 : □28mm (□1.10inch) **78 : □60mm (□2.36inch)**
55 : □42mm (□1.65inch) **85 : φ86mm (φ3.39inch)**

Stepping motor series name
F : F series motor

FD : DC Power source Standard type

Packaged Sale Model Configuration

This is a set comprising a driver and motor.

DC Bundled driver model number : FS1D140P10

Step angle ／0.72˚

Model	Motor flange size	Single shaft		Double shafts		Rated current
		Set part number	Set accessories Motor model number	Set part number	Set accessories Motor model number	
Standard model	□28mm	FDF521S	SH5281-7241	FDF521D	SH5281-7211	0.75A
		FDF525S	SH5285-7241	FDF525D	SH5285-7211	0.75A
	□42mm	FDF551S	103F5505-8241	FDF551D	103F5505-8211	1.4A
		FDF552S	103F5508-8241	FDF552D	103F5508-8211	1.4A
		FDF554S	103F5510-8241	FDF554D	103F5510-8211	1.4A
	□60mm	FDF781S	103F7851-8241	FDF781D	103F7851-8211	1.4A
		FDF782S	103F7852-8241	FDF782D	103F7852-8211	1.4A
		FDF783S	103F7853-8241	FDF783D	103F7853-8211	1.4A
	φ86mm	FDF851S	103F8581-8241	FDF851D	103F8581-8211	1.4A
		FDF852S	103F8582-8241	FDF852D	103F8582-8211	1.4A
Low-backlash gear model	□42mm	FDF551S-CX3.6	103F5505-82CXA4	FDF551D-CX3.6	103F5505-82CXA1	1.4A
		FDF551S-CX7.2	103F5505-82CXB4	FDF551D-CX7.2	103F5505-82CXB1	1.4A
		FDF551S-CX10	103F5505-82CXE4	FDF551D-CX10	103F5505-82CXE1	1.4A
		FDF551S-CX20	103F5505-82CXG4	FDF551D-CX20	103F5505-82CXG1	1.4A
		FDF551S-CX30	103F5505-82CXJ4	FDF551D-CX30	103F5505-82CXJ1	1.4A
		FDF551S-CX36	103F5505-82CXK4	FDF551D-CX36	103F5505-82CXK1	1.4A
	□60mm	FDF781S-CX3.6	103F7851-82CXA4	FDF781D-CX3.6	103F7851-82CXA1	1.4A
		FDF781S-CX7.2	103F7851-82CXB4	FDF781D-CX7.2	103F7851-82CXB1	1.4A
		FDF781S-CX10	103F7851-82CXE4	FDF781D-CX10	103F7851-82CXE1	1.4A
		FDF781S-CX20	103F7851-82CXG4	FDF781D-CX20	103F7851-82CXG1	1.4A
		FDF781S-CX30	103F7851-82CXJ4	FDF781D-CX30	103F7851-82CXJ1	1.4A
		FDF781S-CX36	103F7851-82CXK4	FDF781D-CX36	103F7851-82CXK1	1.4A
	φ86mm	FDF851S-CX3.6	103F8581-82CXA4	FDF851D-CX3.6	103F8581-82CXA1	1.4A
		FDF851S-CX7.2	103F8581-82CXB4	FDF851D-CX7.2	103F8581-82CXB1	1.4A
		FDF851S-CX10	103F8581-82CXE4	FDF851D-CX10	103F8581-82CXE1	1.4A
		FDF851S-CX20	103F8581-82CXG4	FDF851D-CX20	103F8581-82CXG1	1.4A
		FDF851S-CX30	103F8581-82CXJ4	FDF851D-CX30	103F8581-82CXJ1	1.4A
		FDF851S-CX36	103F8581-82CXK4	FDF851D-CX36	103F8581-82CXK1	1.4A
Spur gear model	□28mm	FDF521S-GX3.6	SH5281-72GXA4	FDF521D-GX3.6	SH5281-72GXA1	0.75A
		FDF521S-GX7.2	SH5281-72GXB4	FDF521D-GX7.2	SH5281-72GXB1	0.75A
		FDF521S-GX10	SH5281-72GXE4	FDF521D-GX10	SH5281-72GXE1	0.75A
		FDF521S-GX20	SH5281-72GXG4	FDF521D-GX20	SH5281-72GXG1	0.75A
		FDF521S-GX30	SH5281-72GXJ4	FDF521D-GX30	SH5281-72GXJ1	0.75A
		FDF521S-GX50	SH5281-72GXL4	FDF521D-GX50	SH5281-72GXL1	0.75A
Harmonic gear model	□28mm	FDF521S-HX50	SH5281-72HXL4	FDF521D-HX50	SH5281-72HXL1	0.75A
		FDF521S-HX100	SH5281-72HXM4	FDF521D-HX100	SH5281-72HXM1	0.75A
	□42mm	FDF551S-HX30	103F5505-82HXJ5	FDF551D-HX30	103F5505-82HXJ2	1.4A
		FDF551S-HX50	103F5505-82HXL5	FDF551D-HX50	103F5505-82HXL2	1.4A
		FDF551S-HX100	103F5505-82HXM5	FDF551D-HX100	103F5505-82HXM2	1.4A
	□60mm	FDF781S-HX50	103F7851-82HXL4	FDF781D-HX50	103F7851-82HXL1	1.4A
		FDF781S-HX100	103F7851-82HXM4	FDF781D-HX100	103F7851-82HXM1	1.4A
	φ86mm	FDF851S-HX50	103F8581-82HXL4	FDF851D-HX50	103F8581-82HXL1	1.4A
		FDF851S-HX100	103F8581-82HXM4	FDF851D-HX100	103F8581-82HXM1	1.4A
Harmonic gear model	□42mm	FDF551S-XB	103F5505-82XB41	—	—	1.4A
		FDF552S-XB	103F5508-82XB41	—	—	1.4A
		FDF554S-XB	103F5510-82XB41	—	—	1.4A
	□60mm	FDF781S-XB	103F7851-82XB41	—	—	1.4A
		FDF782S-XB	103F7852-82XB41	—	—	1.4A
		FDF783S-XB	103F7853-82XB41	—	—	1.4A
	φ86mm	FDF851S-XB	103F8581-82XB41	—	—	1.4A
		FDF852S-XB	103F8582-82XB41	—	—	1.4A

Standard model

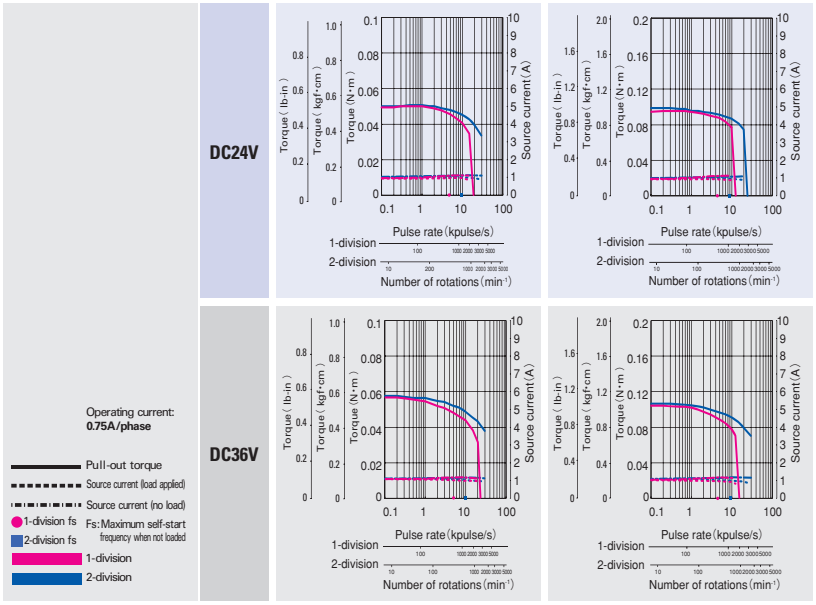
F series driver + F series motor

Motor flange size

□28 (□1.10inch) □42 (□1.65inch) □60 (□2.35inch) φ86 (φ3.39inch)

Size	Motor flange size		□28mm (□1.10inch)	
	Motor length		32mm (1.26inch)	51.5mm (2.03inch)
Set part number	Single shaft		FDF521S	FDF525S
	Double shaft		FDF521D	FDF525D
Holding torque		N·m(oz·in)	0.041 (5.81)	0.078 (11.05)
Rotor inertia		×10⁻⁴kg·m²(oz·in²)	0.01 (0.05)	0.022 (0.09)
Mass (Weight)		kg (lbs)	0.11 (0.22)	0.2 (0.44)
Allowable thrust load		N (lbs)	3 (0.68)	3 (0.68)
Allowable radial load(Note 1)		N (lbs)	42 (9.44)	53 (11.91)

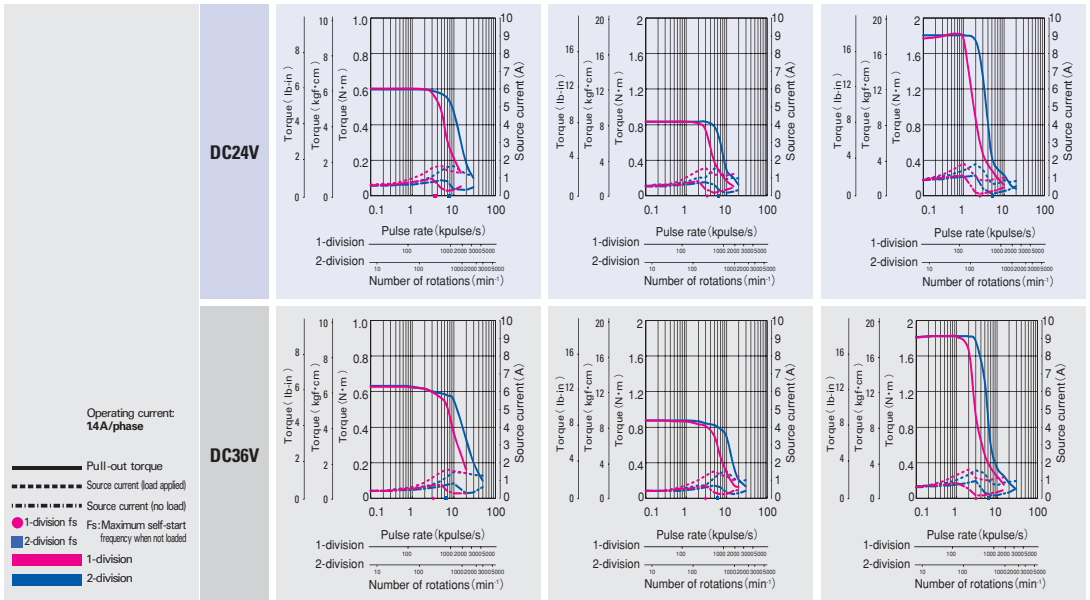
(Note1) When load is applied at 1/3 length from output shaft edge.



The data are measured under the drive condition of our company. The drive torque may very depending on the accuracy of customer-side equipment.

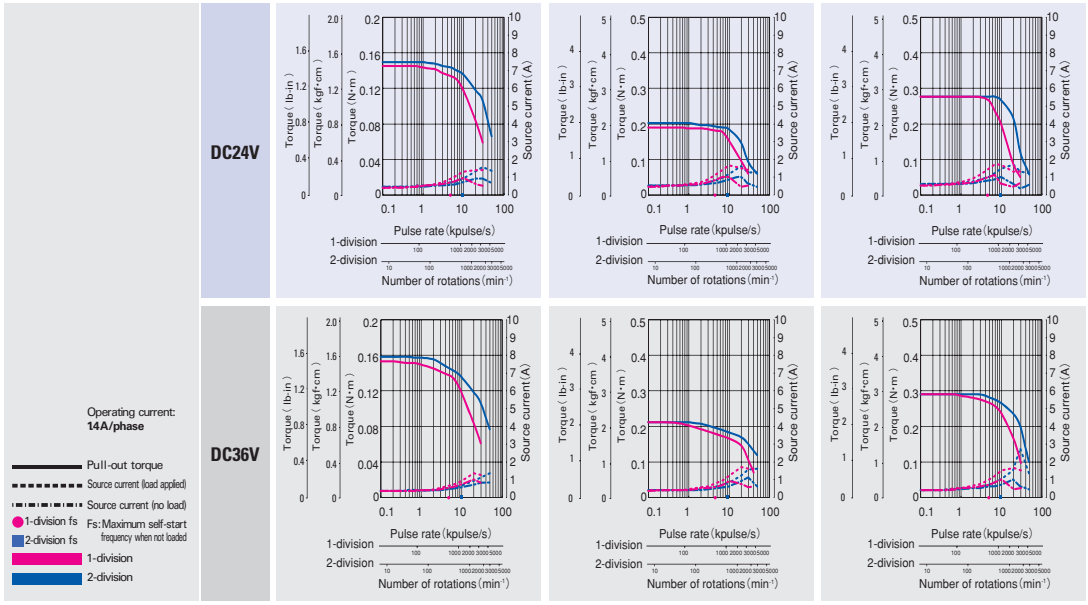
Size	Motor flange size		□60mm (□2.36inch)		
	Motor length		46.5mm (1.83inch)	55mm (2.17inch)	55mm (2.17inch)
Set part number	Single shaft		FDF781S	FDF782S	FDF783S
	Double shaft		FDF781D	FDF782D	FDF783D
Holding torque		N·m(oz·in)	0.55 (77.9)	0.87 (123.2)	1.67 (236.5)
Rotor inertia		×10⁻⁴kg·m²(oz·in²)	0.275 (1.50)	0.4 (2.19)	0.84 (4.59)
Mass (Weight)		kg (lbs)	0.6 (1.32)	0.78 (1.72)	1.36 (3.0)
Allowable thrust load		N (lbs)	20 (4.5)	20 (4.5)	20 (4.5)
Allowable radial load(Note 1)		N (lbs)	80 (18)	80 (18)	80 (18)

(Note1) When load is applied at 1/3 length from output shaft edge.

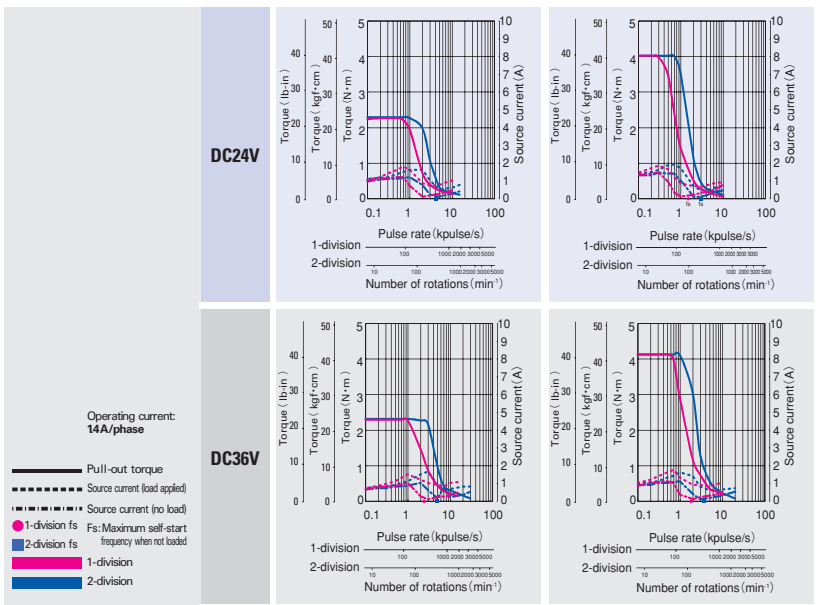


The data are measured under the drive condition of our company. The drive torque may very depending on the accuracy of customer-side equipment.

Size	Motor flange size	□42mm (□1.65inch)		
	Motor length	34mm (1.34inch)	40mm (1.57inch)	49mm (1.93inch)
Set part number	Single shaft	FDF551S	FDF552S	FDF554S
	Double shaft	FDF551D	FDF552D	FDF554D
Holding torque	N·m(oz·in)	0.13 (18.41)	0.18 (25.49)	0.26 (36.82)
Rotor inertia	×10⁻⁴kg·m²(oz·in²)	0.03 (0.16)	0.053 (0.29)	0.065 (0.36)
Mass (Weight)	kg (lbs)	0.23 (0.50)	0.28 (0.62)	0.37 (0.81)
Allowable thrust load	N (lbs)	10 (2.25)	10 (2.25)	10 (2.25)
Allowable radial load (Note 1)	N (lbs)	35 (8.75)	35 (8.75)	35 (8.75)



Size	Motor flange size	φ86mm (φ3.39inch)	
	Motor length	62.15mm (2.47inch)	92.2mm (3.63inch)
Set part number	Single shaft	FDF851S	FDF852S
	Double shaft	FDF851D	FDF852D
Holding torque	N·m(oz·in)	2.06 (291.7)	4.02 (569.3)
Rotor inertia	×10⁻⁴kg·m²(oz·in²)	1.45 (7.93)	2.9 (15.86)
Mass (Weight)	kg (lbs)	1.5 (3.3)	2.5 (5.5)
Allowable thrust load	N (lbs)	60 (13.5)	60 (13.5)
Allowable radial load (Note 1)	N (lbs)	220 (49.5)	220 (49.5)



Low-backlash gear model

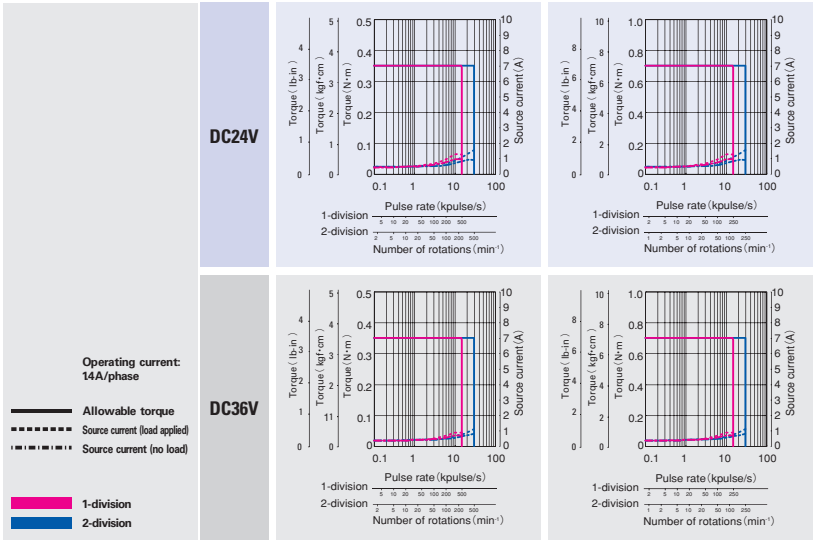
F series driver +
F series motor with low-backlash gear

Motor flange size

□42 (□1.65inch) □60 (□2.35inch) φ86 (φ3.39inch)

Size	Motor flange size		□42mm (□1.65inch)	
	Motor + gear length		64.5mm (2.54inch)	64.5mm (2.54inch)
Set part number	Single shaft		FDF551S-CX3.6	FDF551S-CX7.2
	Double shaft		FDF551D-CX3.6	FDF551D-CX7.2
Allowable torque		N·m(oz·in)	0.343 (48.6)	0.686 (97.1)
Rotor inertia		×10⁻⁴kg·m²(oz·in²)	0.03 (0.16)	0.03 (0.16)
Basic step angle			0.2	0.1
Gear ratio			1 : 3.6	1 : 7.2
Backlash		DEG	0.6	0.4
Allowable speed		min⁻¹	500	250
Mass (Weight)		kg (lbs)	0.36 (0.79)	0.36 (0.79)
Allowable thrust load		N (lbs)	15 (3.38)	15 (3.38)
Allowable radial load (Note 1)		N (lbs)	20 (4.5)	20 (4.5)

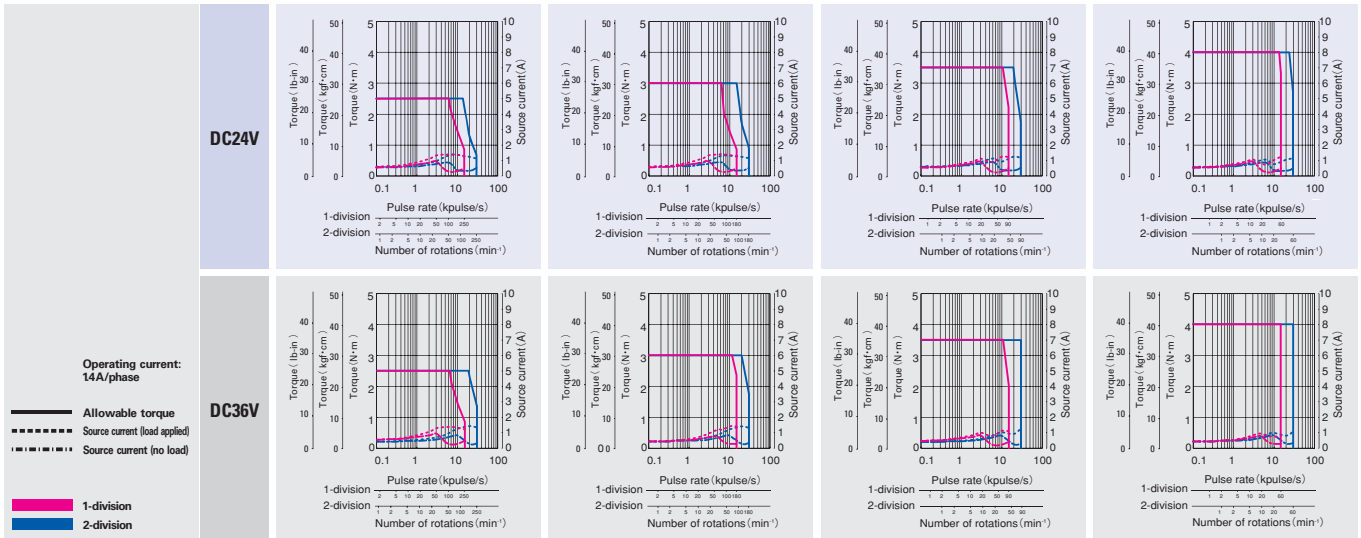
Directions of motor rotation and gear output shaft are the same for models with reduction ratio 1 : 3.6, 1 : 7.2 and 1 : 10 opposite for reduction ratio 1 : 20, 1 : 30, and 1 : 36.
(Note1) When load is applied at 1/3 length from output shaft edge.



The data are measured under the drive condition of our company. The drive torque may very depending on the accuracy of customer-side equipment.

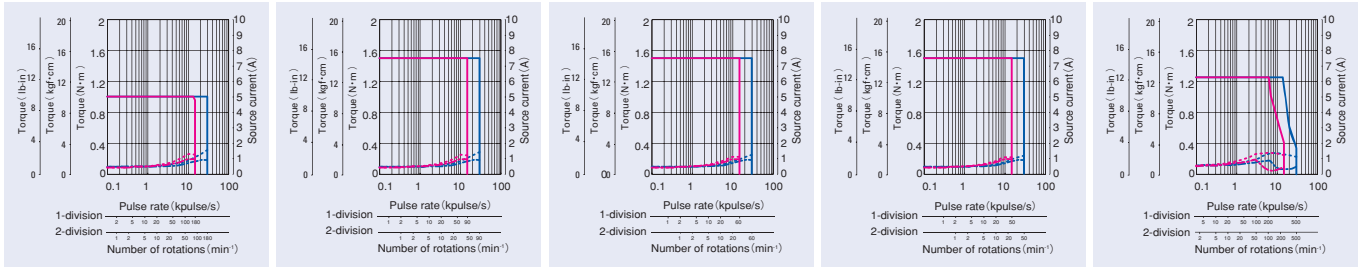
Size	Motor flange size		□60mm (□2.36inch)			
	Motor + gear length		92mm (3.62inch)	92mm (3.62inch)	92mm (3.62inch)	92mm (3.62inch)
Set part number	Single shaft		FDF781S-CX7.2	FDF781S-CX10	FDF781S-CX20	FDF781S-CX30
	Double shaft		FDF781D-CX7.2	FDF781D-CX10	FDF781D-CX20	FDF781D-CX30
Allowable torque		N·m(oz·in)	2.5 (354.0)	3 (424.8)	3.5 (495.6)	4 (566.4)
Rotor inertia		×10⁻⁴kg·m²(oz·in²)	0.275 (1.5)	0.275 (1.5)	0.275 (1.5)	0.275 (1.5)
Basic step angle			0.1	0.072	0.036	0.024
Gear ratio			1 : 7.2	1 : 10	1 : 20	1 : 30
Backlash		DEG	0.25	0.25	0.17	0.17
Allowable speed		min⁻¹	250	180	90	60
Mass (Weight)		kg (lbs)	0.97 (2.13)	0.97 (2.13)	0.97 (2.13)	0.97 (2.13)
Allowable thrust load		N (lbs)	30 (6.75)	30 (6.75)	30 (6.75)	30 (6.75)
Allowable radial load (Note 1)		N (lbs)	100 (22.5)	100 (22.5)	100 (22.5)	100 (22.5)

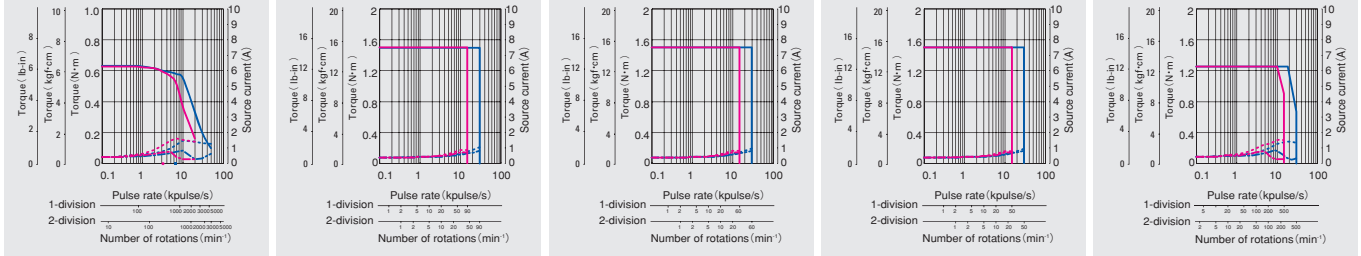
Directions of motor rotation and gear output shaft are the same for models with reduction ratio 1 : 3.6 and 1:7.2, opposite for reduction ratio 1 : 10, 1 : 20 and 1 : 30.
(Note1) When load is applied at 1/3 length from output shaft edge.



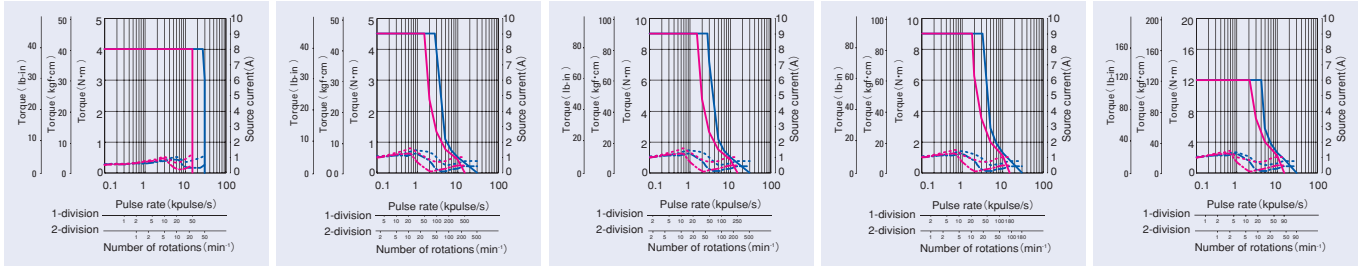
The data are measured under the drive condition of our company. The drive torque may very depending on the accuracy of customer-side equipment.

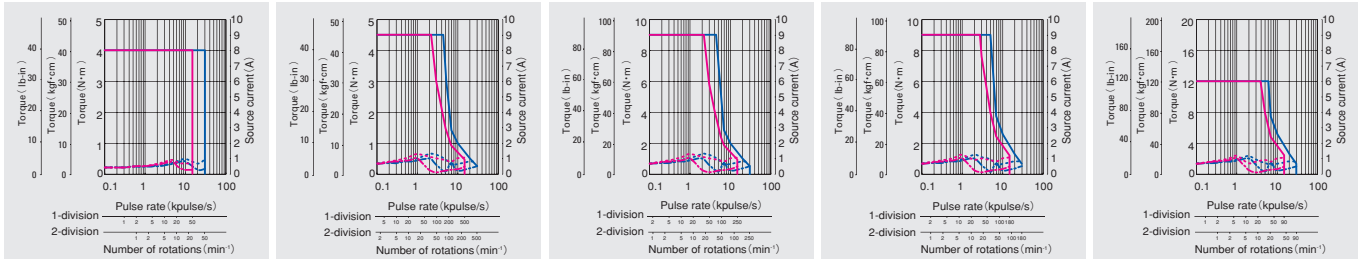
□42mm (□1.65inch)				□60mm (□2.36inch)
64.5mm (2.54inch)	64.5mm (2.54inch)	64.5mm (2.54inch)	64.5mm (2.54inch)	92mm (3.62inch)
FDF551S-CX10	FDF551S-CX20	FDF551S-CX30	FDF551S-CX36	FDF781S-CX3.6
FDF551D-CX10	FDF551D-CX20	FDF551D-CX30	FDF551D-CX36	FDF781D-CX3.6
0.98 (138.8)	1.47 (208.2)	1.47 (208.2)	1.47 (208.2)	1.25 (177.0)
0.03 (0.16)	0.03 (0.16)	0.03 (0.16)	0.03 (1.5)	0.275
0.072	0.036	0.024	0.02	0.2
1 : 10	1 : 20	1 : 30	1 : 36	1 : 3.6
0.35	0.25	0.25	0.25	0.55
180	90	60	50	500
0.36 (0.79)	0.36 (0.79)	0.36 (0.79)	0.36 (0.79)	0.97 (2.13)
15 (3.38)	15 (3.38)	15 (3.38)	15 (3.38)	30 (6.75)
20 (4.5)	20 (4.5)	20 (4.5)	20 (4.5)	100 (22.5)





□60mm (□2.36inch)	φ86mm (φ3.39inch)			
92mm (3.62inch)	127.3mm (5.01inch)	127.3mm (5.01inch)	127.3mm (5.01inch)	127.3mm (5.01inch)
FDF781S-CX36	FDF851S-CX3.6	FDF851S-CX7.2	FDF851S-CX10	FDF851S-CX20
FDF781D-CX36	FDF851D-CX3.6	FDF851D-CX7.2	FDF851D-CX10	FDF851D-CX20
4 (566.4)	4.5 (637.2)	9 (1274.5)	9 (1274.5)	12 (1699.3)
0.275 (1.51)	1.45 (7.93)	1.45 (7.93)	1.45 (7.93)	1.45 (7.93)
0.02	0.2	0.1	0.072	0.036
1 : 36	1 : 3.6	1 : 7.2	1 : 10	1 : 20
0.17	0.35	0.22	0.22	0.15
50	500	250	180	90
0.97 (2.13)	2.7 (5.94)	2.7 (5.94)	2.7 (5.94)	2.7 (5.94)
30 (6.75)	60 (13.5)	60 (13.5)	60 (13.5)	60 (13.5)
100 (22.5)	300 (67.5)	300 (67.5)	300 (67.5)	300 (67.5)



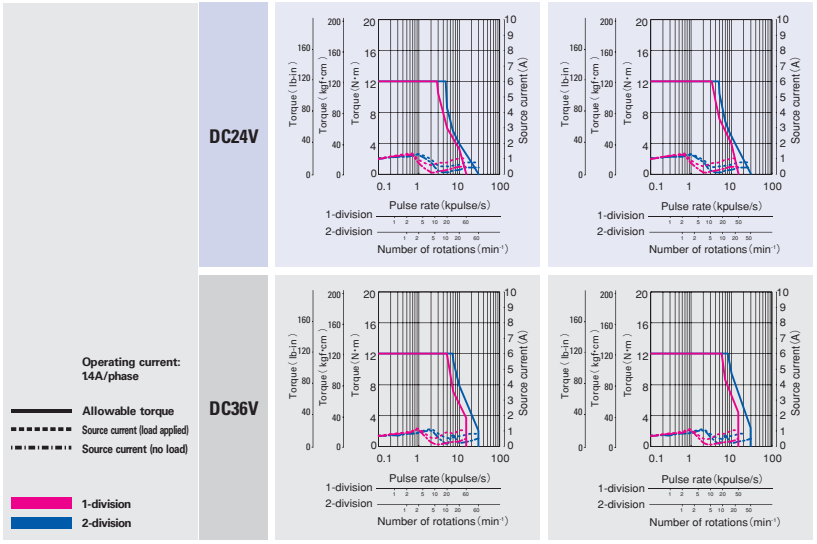


Low-backlash gear model

F series driver +
F series motor with low-backlash gear

Size	Motor flange size		φ86mm (φ3.39inch)	
	Motor + gear length		127.3mm (5.01inch)	127.3mm (5.01inch)
Set part number	Single shaft		FDF851S-CX30	FDF851S-CX36
	Double shaft		FDF851D-CX30	FDF851D-CX36
Allowable torque		N·m(oz·in)	12 (1699.3)	12 (1699.3)
Rotor inertia		×10⁻⁴kg·m²(oz·in²)	1.45 (7.93)	1.45 (7.93)
Basic step angle			0.024	0.02
Gear ratio			1 : 30	1 : 36
Backlash		DEG	0.15	0.15
Allowable speed		min⁻¹	60	50
Mass (Weight)		kg (lbs)	2.7 (5.94)	2.7 (5.94)
Allowable thrust load		N (lbs)	60 (13.5)	60 (13.5)
Allowable radial load (Note 1)		N (lbs)	300 (67.5)	300 (67.5)

Directions of motor rotation and gear output shaft are the same for models with reduction ratio 1 : 3.6, opposite for reduction ratio 1 : 10, 1 : 20, 1 : 30, and 1 : 36.
(Note1) When load is applied at 1/3 length from output shaft edge.



The data are measured under the drive condition of our company. The drive torque may very depending on the accuracy of customer-side equipment.

Spur gear model

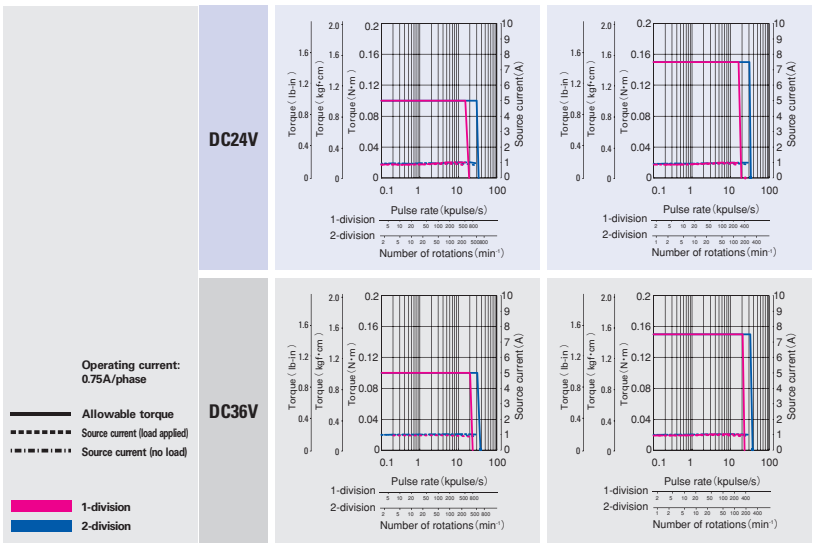
F series driver + F series motor with spur gear

Motor flange size

□28 (□1.10inch)

Size	Motor flange size		□28mm (□1.10inch)	
	Motor + gear length		61.5mm (2.42inch)	61.5mm (2.42inch)
Set part number	Single shaft		FDF521S-GX3.6	FDF521S-GX7.2
	Double shaft		FDF521D-GX3.6	FDF521D-GX7.2
Allowable torque		N·m(oz·in)	0.1 (14.16)	0.15 (21.24)
Rotor inertia		x10⁻⁴kg·m²(oz·in²)	0.01 (0.05)	0.01 (0.05)
Basic step angle			0.2	0.1
Gear ratio			1 : 3.6	1 : 7.2
Backlash		DEG	2	2
Allowable speed		min⁻¹	800	400
Mass (Weight)		kg (lbs)	0.17 (0.37)	0.17 (0.37)
Allowable thrust load		N (lbs)	10 (2.25)	10 (2.25)
Allowable radial load (Note 1)		N (lbs)	15 (3.38)	15 (3.38)

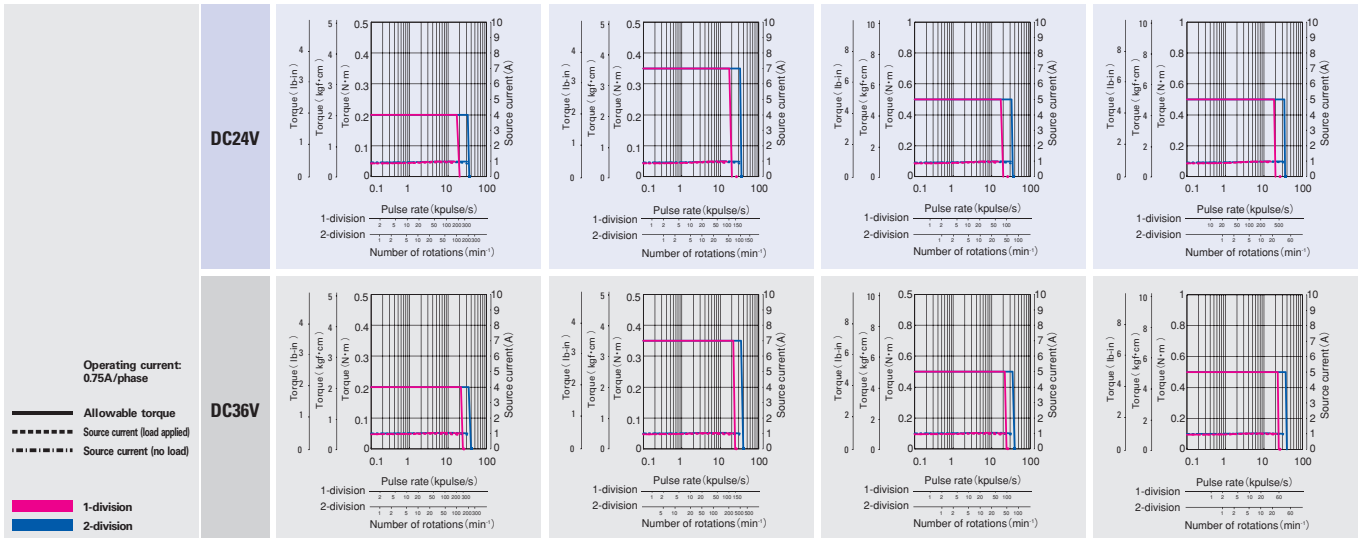
Directions of motor rotation and gear output shaft are the same for models with reduction ratio 1 : 3.6, 1 : 7.2, 1 : 30 and 1 : 50 opposite for reduction ratio 1 : 10.
(Note1) When load is applied at 1/3 length from output shaft edge.



The data are measured under the drive condition of our company. The drive torque may very depending on the accuracy of customer-side equipment.

Size	Motor flange size		□28mm (□1.10inch)			
	Motor + gear length		61.5mm (2.42inch)	61.5mm (2.42inch)	61.5mm (2.42inch)	61.5mm (2.42inch)
Set part number	Single shaft		FDF521S-GX10	FDF521S-GX20	FDF521S-GX30	FDF521S-GX50
	Double shaft		FDF551D-GX10	FDF521D-GX20	FDF521D-GX30	FDF521D-GX50
Allowable torque		N·m(oz·in)	0.2 (28.32)	0.35 (49.6)	0.5 (70.80)	0.5 (70.80)
Rotor inertia		x10⁻⁴kg·m²(oz·in²)	0.01 (0.05)	0.01 (0.05)	0.01 (0.05)	0.01 (0.05)
Basic step angle			0.072	0.036	0.024	0.0144
Gear ratio			1 : 10	1 : 20	1 : 30	1 : 50
Backlash		DEG	2	1.5	1.5	1.5
Allowable speed		min⁻¹	300	150	100	60
Mass (Weight)		kg (lbs)	0.17 (0.37)	0.17 (0.37)	0.17 (0.37)	0.17 (0.37)
Allowable thrust load		N (lbs)	10 (2.25)	10 (2.25)	10 (2.25)	10 (2.25)
Allowable radial load (Note 1)		N (lbs)	15 (3.38)	15 (3.38)	15 (3.38)	15 (3.38)

Directions of motor rotation and gear output shaft are the same for models with reduction ratio 1 : 3.6, 1 : 7.2, 1 : 30, and 1 : 50 opposite for reduction ratio 1 : 10.
(Note1) When load is applied at 1/3 length from output shaft edge.



The data are measured under the drive condition of our company. The drive torque may very depending on the accuracy of customer-side equipment.

Harmonic gear model

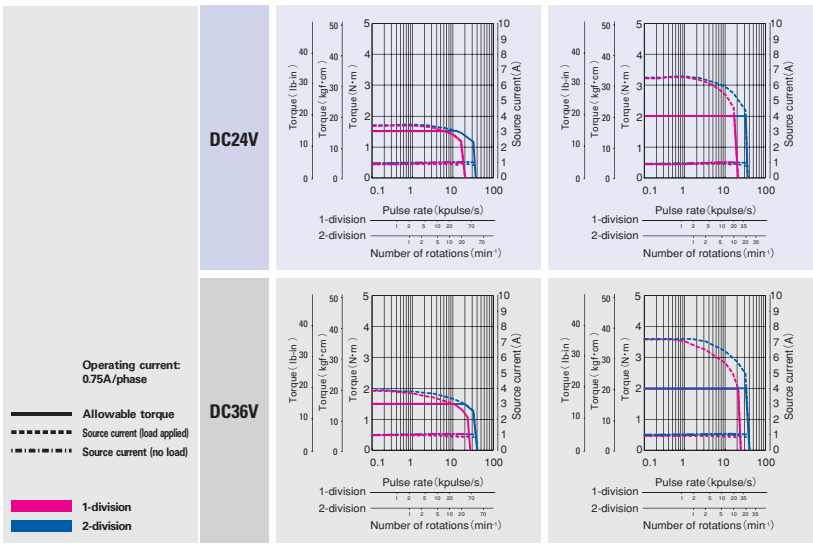
F series driver +
F series motor with harmonic gear

Motor flange size

□28 (□1.10inch) □42 (□1.65inch) □60 (□2.35inch) φ86 (φ3.39inch)

Size	Motor flange size	□28mm (□1.10inch)	
	Motor + gear length	70.7mm (2.78inch)	70.7mm (2.78inch)
Set part number	Single shaft	FDF521S-HX50	FDF521S-HX100
	Double shaft	FDF521D-HX50	FDF521D-HX100
Allowable torque	N·m(oz·in)	1.5 (212.4)	2 (283.2)
Momentary allowable torque	N·m(oz·in)	2.7 (382.4)	3.6 (509.8)
Rotor inertia	×10⁻⁴kg·m²(oz·in²)	0.013 (0.066)	0.013 (0.066)
Basic step angle		0.0144	0.0072
Gear ratio		1 : 50	1 : 100
Lost motion	Minute	0.4 to 3 ± 0.006N · m (0.85oz · in)	0.4 to 3 ± 0.008N · m (1.133oz · in)
Allowable speed	min⁻¹	70	35
Mass (Weight)	kg (lbs)	0.22 (0.48)	0.22 (0.48)
Allowable thrust load	N (lbs)	100 (22.5)	100 (22.5)
Allowable radial load(Note 1)	N (lbs)	160 (36)	160 (36)

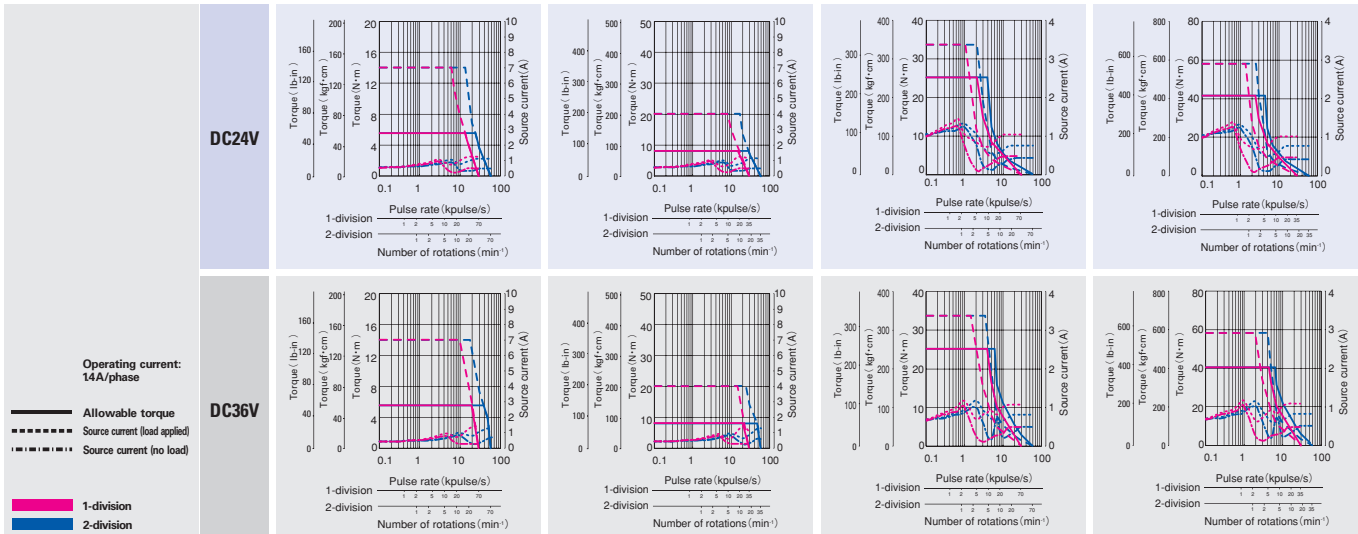
Directions of gear output shaft are the opposite.
(Note1) When load is applied at 1/3 length from output shaft edge.



The data are measured under the drive condition of our company. The drive torque may very depending on the accuracy of customer-side equipment.

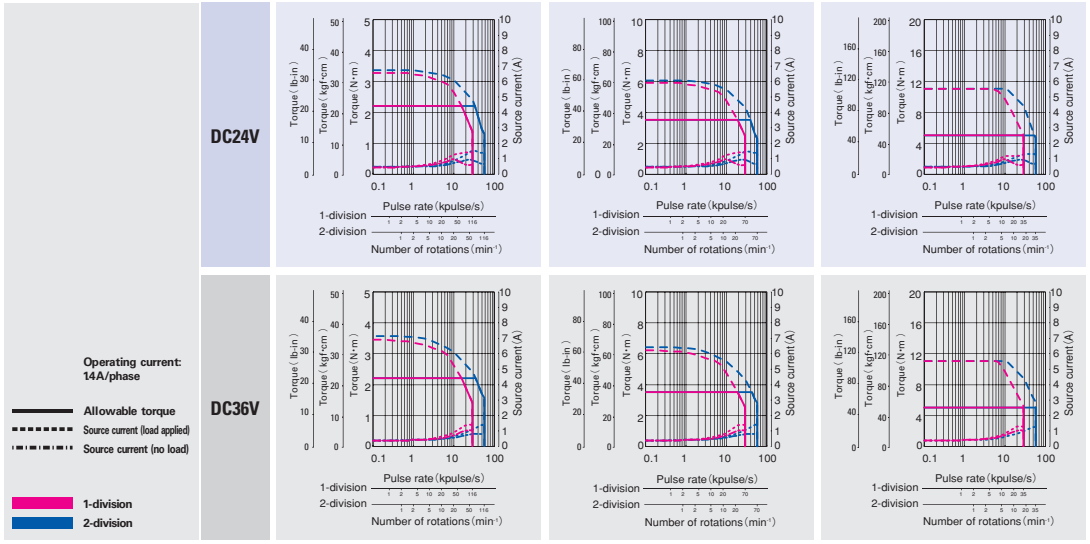
Size	Motor flange size		□60mm (□2.36inch)		φ86mm (φ3.39inch)	
	Motor + gear length		113.5mm (4.47inch)	113.5mm (4.47inch)	144.15mm (5.68inch)	144.15mm (5.68inch)
Set part number	Single shaft		FDF781S-HX50	FDF781S-HX100	FDF851S-HX50	FDF851S-HX100
	Double shaft		FDF781D-HX50	FDF781D-HX100	FDF851D-HX50	FDF851D-HX100
Allowable torque		N·m(oz·in)	5.5 (778.8)	8 (1132.9)	25 (3540.2)	41 (5805.9)
Momentary allowable torque		N·m(oz·in)	14 (1982.6)	20 (2832.2)	34 (4814.8)	59 (8355.1)
Rotor inertia		×10⁻⁴kg·m²(oz·in²)	0.31 (1.695)	0.31 (1.695)	1.65 (9.02)	1.65 (9.02)
Basic step angle			0.0144	0.0072	0.0144	0.0072
Gear ratio			1 : 50	1 : 100	1 : 50	1 : 100
Lost motion		Minute	0.4 to 3 ± 0.28N · m (3.965oz · in)	0.4 to 3 ± 0.4N · m (56.645oz · in)	0.4 to 3 ± 1N · m (141.612oz · in)	0.4 to 3 ± 1.2N · m (169.934oz · in)
Allowable speed		min⁻¹	70	35	70	35
Mass (Weight)		kg (lbs)	1.2 (2.64)	1.2 (2.64)	3.3 (7.26)	3.3 (7.26)
Allowable thrust load		N (lbs)	400 (90)	400 (90)	1400 (315)	1400 (315)
Allowable radial load(Note 1)		N (lbs)	360 (81)	360 (81)	1380 (310.5)	1380 (310.5)

Directions of gear output shaft are the opposite.
(Note1) When load is applied at 1/3 length from output shaft edge.



The data are measured under the drive condition of our company. The drive torque may very depending on the accuracy of customer-side equipment.

Size	Motor flange size	□42mm (□1.65inch)		
	Motor + gear length	73.5mm (2.89inch)	73.5mm (2.89inch)	73.5mm (2.89inch)
Set part number	Single shaft	FDF551S-HX30	FDF551S-HX50	FDF551S-HX100
	Double shaft	FDF551D-HX30	FDF551D-HX50	FDF551D-HX100
Allowable torque	N·m(oz·in)	2.2 (311.547)	3.5 (495.643)	5 (708.061)
Momentary allowable torque	N·m(oz·in)	4.5 (637.3)	8.3 (1175.4)	11 (1557.7)
Rotor inertia	x10⁻⁴kg·m²(oz·in²)	0.042 (0.23)	0.042 (0.23)	0.0042 (0.02)
Basic step angle		0.024	0.0144	0.0072
Gear ratio		1 : 30	1 : 50	1 : 100
Lost motion	Minute	0.4 to 1.5 ± 0.16N · m (22.658oz · in) *reference	0.4 to 1.5 ± 0.16N · m (22.658oz · in) *reference	0.4 to 1.5 ± 0.2N · m (28.322oz · in) *reference
Hysteresis loss	Minute	3.6	2.4	2.4
Allowable speed	min⁻¹	116	70	35
Mass (Weight)	kg (lbs)	0.42 (0.92)	0.42 (0.92)	0.42 (0.92)
Allowable thrust load	N (lbs)	1150 (258.75)	1150 (258.75)	1150 (258.75)
Allowable radial load(Note 1)	N (lbs)	275 (61.88)	275 (61.88)	275 (61.88)



Electromagnetic brake model

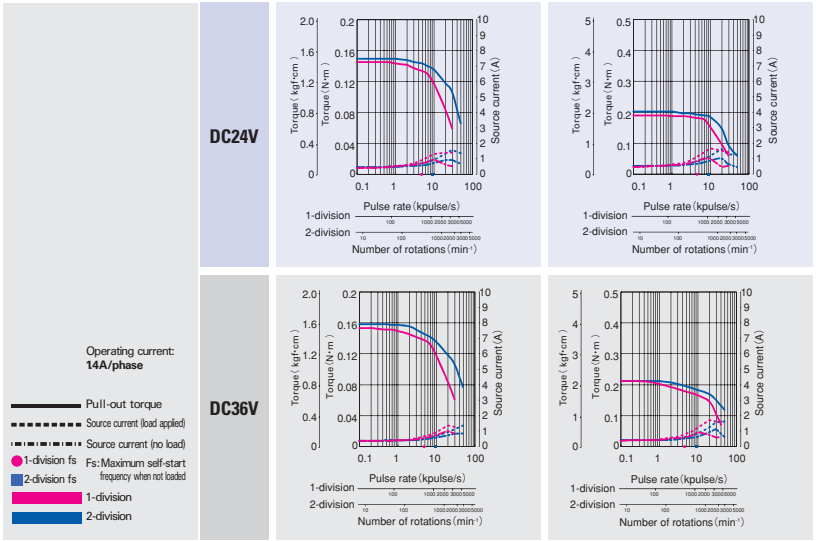
F series driver +
F series motor with electromagnetic brake

Motor flange size

□42 (□1.65inch) □60 (□2.35inch) φ86 (φ3.39inch)

Size	Motor flange size		□42mm (□1.65inch)	
	Motor + brake length		64.5mm (2.54inch)	70.5mm (2.78inch)
Set part number	Single shaft		FDF551S-XB	FDF552S-XB
			FDF551D-XB	FDF552D-XB
Holding torque		N·m(oz·in)	0.13 (8.4)	0.18 (25.49)
Rotor inertia		×10⁻⁴kg·m²(oz·in²)	0.045 (0.25)	0.068 (0.37)
Mass (Weight)		kg (lbs)	0.38 (0.84)	0.43 (0.95)
Allowable thrust load		N (lbs)	10 (2.25)	10 (2.25)
Allowable radial load(Note 1)		N (lbs)	35 (8.75)	35 (8.75)
Brake type			No excitation actuating type	No excitation actuating type
Electromagnetic brake	Power supply input	V	DC24V ± 5%	DC24V ± 5%
	Excitation current	A	0.08	0.08
	Power consumption	W	2	2
	Static friction torque	N·m(oz·in)	0.22 (31.15)	0.22 (31.15)
	Brake operating time	ms	30	30
	Brake release time	ms	20	20

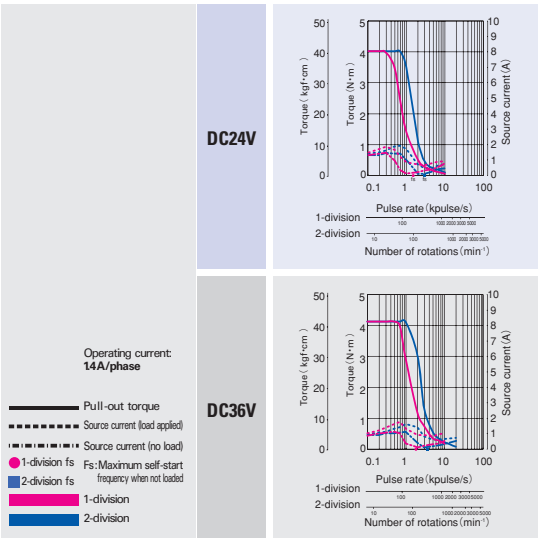
(Note1) When load is applied at 1/3 length from output shaft edge.



The data are measured under the drive condition of our company. The drive torque may very depending on the accuracy of customer-side equipment.

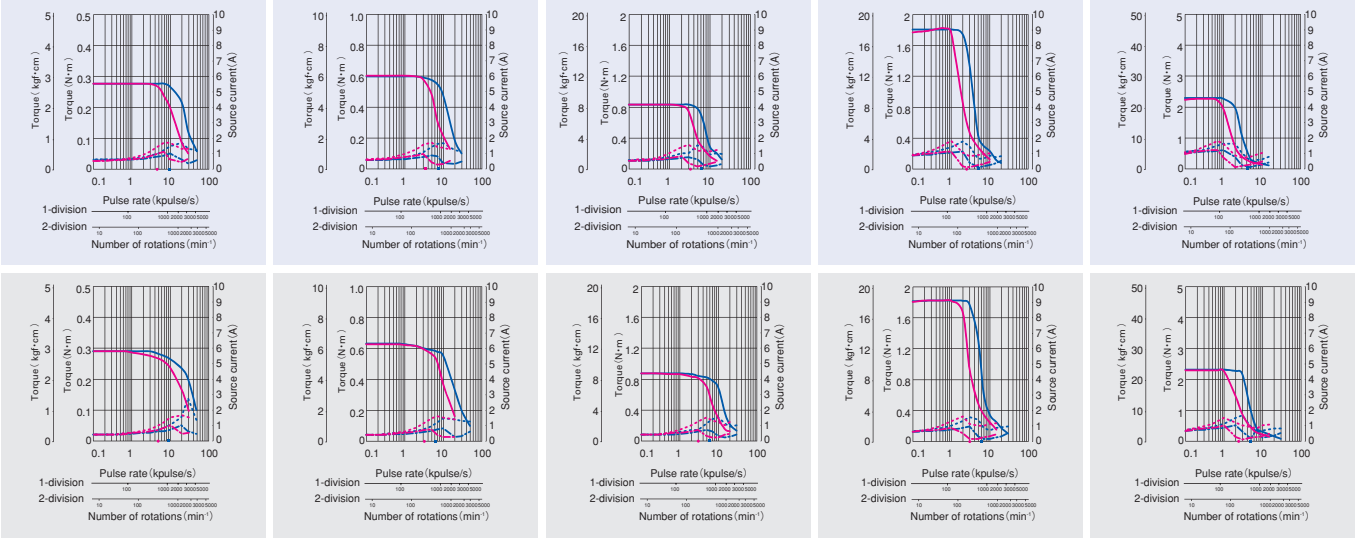
Size	Motor flange size		φ86mm (φ3.39inch)
	Motor + brake length		146.8mm (5.78mm)
Set part number	Single shaft		FDF852S-XB
			FDF852D-XB
Holding torque		N·m(oz·in)	4.02 (569.3)
Rotor inertia		×10⁻⁴kg·m²(oz·in²)	3.69 (20.18)
Mass (Weight)		kg (lbs)	4.5 (9.9)
Allowable thrust load		N (lbs)	60 (13.5)
Allowable radial load(Note 1)		N (lbs)	220 (49.5)
Brake type			No excitation actuating type
Electromagnetic brake	Power supply input	V	DC24V ± 5%
	Excitation current	A	0.42
	Power consumption	W	10
	Static friction torque	N·m(oz·in)	4 (566.45)
	Brake operating time	ms	50
	Brake release time	ms	20

(Note1) When load is applied at 1/3 length from output shaft edge.



The data are measured under the drive condition of our company. The drive torque may very depending on the accuracy of customer-side equipment.

□42mm (□1.65inch)	□60mm (□2.36inch)			φ86mm (φ3.39inch)
79.5mm (3.13inch)	85.8mm (3.38inch)	94.5mm (3.72inch)	126.7mm (4.99inch)	116.7mm (4.59inch)
FDF554S-XB	**FDF781S-XB**	**FDF782S-XB**	**FDF783S-XB**	**FDF851S-XB**
FDF552D-XB	**FDF781D-XB**	**FDF782D-XB**	**FDF783D-XB**	**FDF851D-XB**
0.26 (36.82)	0.6 (85.0)	0.93 (131.7)	1.67 (236.5)	2.06 (291.7)
0.08 (0.44)	0.43 (2.35)	0.56 (3.06)	1 (5.47)	2.24 (12.25)
0.52 (1.14)	0.94 (2.07)	1.12 (2.46)	1.7 (3.74)	3.5 (7.7)
10 (2.25)	20 (4.5)	20 (4.5)	20 (4.5)	60 (13.5)
35 (8.75)	80 (18)	80 (18)	80 (18)	220 (49.5)
No excitation actuating type	No excitation actuating type	No excitation actuating type	No excitation actuating type	No excitation actuating type
DC24V ± 5%	DC24V ± 5%	DC24V ± 5%	DC24V ± 5%	DC24V ± 5%
0.08	0.25	0.25	0.25	0.42
2	6	6	6	10
0.22 (31.15)	0.8 (113.29)	0.8 (113.29)	0.8 (113.29)	4 (566.45)
30	30	30	30	50
20	20	20	20	20



Common specifications

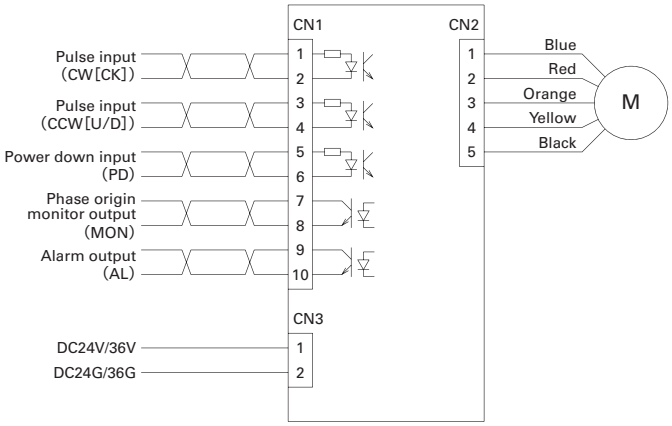
■ F series driver

Basic specifications	Item		**FS1D140P□□**
	Power supply		DC24 V / 36 V ±10 %
	Source current		3 A MAX.
	Environment	Protection class	Class Ⅲ
		Operation environment	Installation category (over-voltage category) : Ⅰ, pollution degree: 2
		Applied standards	EN61010-1、UL508C
		Ambient operation temperature	0 to 50℃
		Storage temperature	-20 to +70℃
		Ambient operation humidity	35 to 85%RH (no condensation)
		Storage humidity	10 to 90%RH (no condensation)
		Operation altitude	1000 m (3280 feet) or less above sea level
		Vibration resistance	Tested under the following conditions ; 4.9m/s², frequency range 10 to 55Hz, direction along X, Y and Z axes, for 2 hours each
		Impact resistance	Not influenced at NDS-C-0110 standard section 3.2.2 division "C".
		Withstand voltage	Not influenced when 1500V AC is applied between power input terminal and cabinet for one minute.
		Insulation resistance	10M ohm MIN. when measured with 500V DC megohmmeter between input terminal and cabinet.
	Mass (Weight)		0.1kg (0.05lbs)
Functions	Selection function		Step angle, pulse input method, step current, non-operating current, and operating current
	Protection functions		Open phase protection, Voltage reduction in the main circuit power
	LED indication		Power monitor, alarm
I/O signals	Command pulse input signal		Photo-coupler input system ; input resistance: 220 Ω ; input-signal "H" level : 4.0 to 5.5V ; input-signal "L" level : 0 to 0.5V, MAX. input frequency : 35kpulse/s
	Power down input signal		Photo-coupler input system ; input resistance: 220 Ω ; input-signal "H" level : 4.0 to 5.5V ; input-signal "L" level : 0 to 0.5V
	Input signal		Open collector output by photo coupler, output signal standard, Vceo = 40V MAX., Ic = 10 mA MAX.
	Output signal		Open collector output by photo coupler, output signal standard, Vceo = 40V MAX., Ic = 10 mA MAX.

■ F series motor

Stepping motor type	F series motor
Motor Type	103F35□□ /103F55□□ /103F785□ /103F858□ /103F8958□
Type	——
Insulation class	Class B (+130℃)
Operation altitude	1000m (3280 feet) or less above sea level
Withstand voltage	□28mm (□1.10inch) : AC1000V 50/60Hz for 1 minute, □42mm (□1.65inch), □60mm (□2.36inch), φ86mm (φ3.39inch), φ106mm (φ4.17inch) : AC1500V 50/60Hz for 1 minute
Insulation resistance	100Mohm MIN. against DC500V
Protection grade	IP40
Vibration resistance	Amplitude of 1.52mm (0.06inch) (P-P) at frequency range 10 to 500Hz for 15 minutes sweep time along X, Y, and Z axes for 12 times.
Impact resistance	490m/s2 of acceleration for 11 ms with half-sine wave applying three times for X, Y, and Z axes each, 18 times in total.
Ambient operation temperature	-10 to +50℃ (0 to +40℃ for harmonic gear model)
Ambient operation humidity	90% MAX. at less than 40℃, 57% MAX. at less than 50℃ , 35% MAX. at 60℃ (no condensation)

■ External wiring diagram



■ Specification summary of CN1 I/O signal

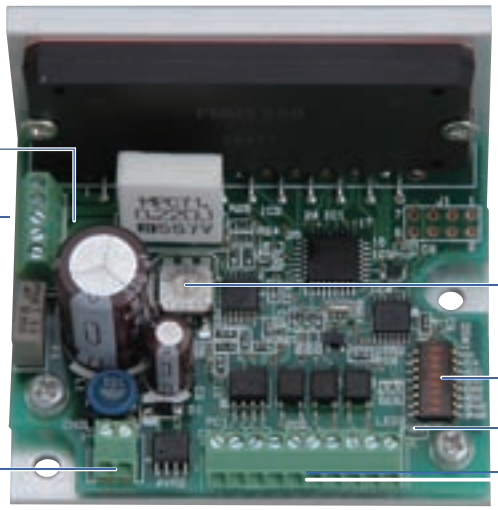
Signal name	CN1 Pin number	Function
CW pulse input (standard)	1 2	When using "2-input mode" Drive pulse for the CW direction rotation is input.
Pulse column input	1 2	When using "Pulse and direction mode" Drive pulse train for the stepping motor rotation is input.
CCW pulse input (standard)	3 4	When using "2-input mode" Drive pulse for the CCW direction rotation is input.
Rotation direction input	3 4	The rotation direction signal of stepping motor is input for the "Pulse and direction mode". Internal photocoupler ON···CW direction Internal photocoupler OFF···CCW direction
Power down input	5 6	Inputting the PD signal cuts OFF the current flowing through the stepping motor. Iinternal photocoupler ON···PD function enabled Iinternal photocoupler OFF···PD function disabled
Phase origin monitor output	7 8	It is turned ON when the excitation phase is at the origin (in the state when the power is turned ON) It is turned ON once per 10 pulses when setting to HALF step. It is turned ON once per 20 pulses when setting to FULL step.
Alarm output	9 10	The signal is externally output when one of several alarm circuits operates in the PM driver. At this time, the stepping motor is in the unexcited state.

The CW rotation direction of stepping motor means the clockwise direction rotation as viewed from the output shaft side (flange side) . The CCW rotation direction means the counterclockwise direction rotation as viewed from the output shaft side (flange side).

■ Applicable wire sizes

Part	size	Allowable wire length
Power supply	AWG22(0.3mm²)	2m MAX.
Input/output signal	AWG24(0.2mm²) to AWG22(0.3mm²)	photo coupler type : 2m MAX.
Motor	AWG22(0.3mm²)	3m MIN.

Driver part name



1 Current selection switch (RUN)

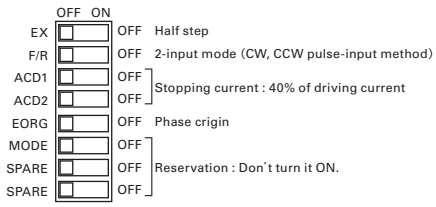
Enable to select operating current value to stepping motor.

Dial	0	1	2	3	4	5	6	7
Stepping motor current (A)	1.4	1.35	1.3	1.25	1.2	1.15	1.1	1.05
Dial	8	9	A	B	C	D	E	F
Stepping motor current (A)	1.0	0.95	0.9	0.85	0.8	0.75	0.7	0.65

The factory default value is F(0.65A).
Please check the rated current of the motor to be combined before selecting the operation current.

2 Function selection DIP switch

Selects an appropriate function for specification.
Check that the ex-factory settings are as follows.



Step angle selection (EX)

Selects the basic step angle.

EX	Exciting mode
ON	Full step (0.72˚/pulse)
OFF	Half step (0.36˚/pulse)

Input method select (F/R)

Selects input pulse type.

F/R	Input pulse type
ON	1 input (CK,U/D)
OFF	2 input (CW、CCW)

Current adjustment at operation halt (ACD1、ACD2)

Selects the value of the motor current during stand-still.

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

Initial configuration of factory shipment is set to 40% of rated value.
Driver and motor should be operated at around 50% of rated value to reduce heat.

Excitation select (EORG)

The excitation phasse when the power supply is turned on is selected.

EORG	Original excitation phase
ON	Excitation phase at power shut off
OFF	Phase origin

By turning on the EORG, excitation phase when power OFF will be saved.
Therefore, there will be no shaft displacement when turning the power ON.

3 Power LED (POW)

Lights up when main circuit power supply is switched on.

Indicator	Explanation
"POW" is displayed.	Main circuit power supply is switched on.

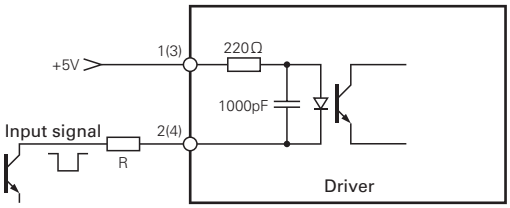
4 Alarm LED (ALM)

Lights up during alarm conditions.

Indicator	Explanation
"ALM" is displayed.	Motor cable is broken, or switching element in driver is faulty. The main circuit voltage is out of specifications range (Less than DC19V).

When "ALM" is displayed, the winding current of the stepping motor is cut off and it is in a "non-excitation" state. At the same time, an output signal is transmitted from the alarm output terminal (AL) to an external source. When the alarm circuit is operating, this state is maintained until it is reset by switching on the power supply again. When an alarm condition has occurred, please take corrective actions to rectify the cause of the alarm before switching on the power supply again.

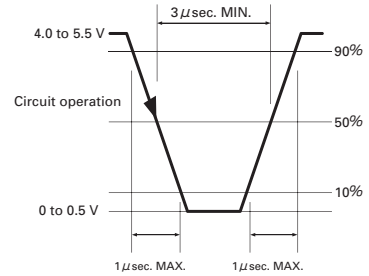
Input circuit configuration of CW (CK), CCW (U/D)



- Pulse duty 50% MAX.
- Maximum input frequency:35kpulse/s
- When the crest value of the input signal exceeds 5V, use the external limit resistance R to limit the input current to approximately 15mA.

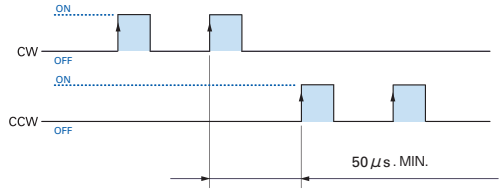
■ Input signal specification

〈Photo coupler〉



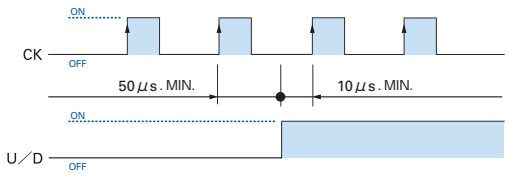
■ Timing of command pulse

2 input type（CW, CCW）



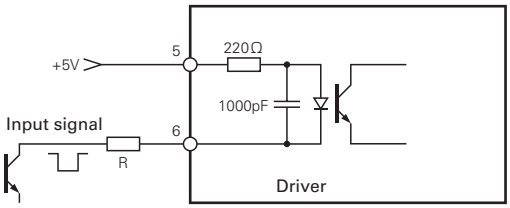
- Shaded area indicates internal photo coupler “ON”. Internal circuit (motor) starts operating at leading edge of the photo coupler “ON”.
- To apply pulse to CW, set CCW side internal photo coupler to “OFF”.
- To apply pulse to CCW, set CW side internal photo coupler to “OFF”.

1 input type（CK, U/D）



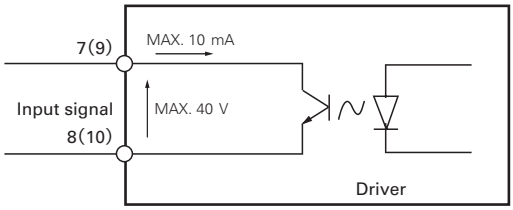
- Shaded area indicates internal photo coupler “ON”. Internal circuit (motor) starts operating at leading edge of CK side photo coupler “ON”.
- Switching of U/D input signal must be done while CK side internal photo coupler is “OFF”.

Input circuit configuration of PD

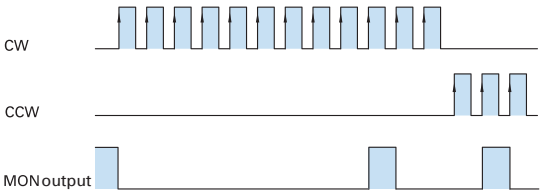


・If the peak value exceedes 5V, set the input current to approx. 15mA using the external limit resistance R.

Output signal configuration of MON, AL



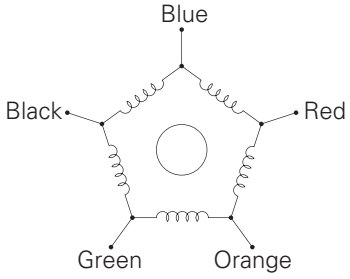
MON output



- Photo coupler at phase origin of motor excitation (status at power on) is set to "ON" (setting when number of divisions is 1).
- Output from MON is set to on at every 7.2 degrees of motor output shaft from phase origin.

Internal wire connection and direction of motor rotate

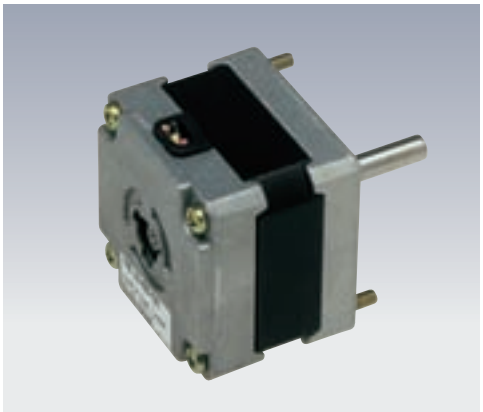
■ Internal wire connection



■ Direction of motor rotate

The direction of motor rotate is counterclockwise when viewed from the output shaft side at the direct current energization in the following order.

Type		Exciting order									
		1	2	3	4	5	6	7	8	9	10
Color of leads	Blue			+	+	+			−	−	−
	Red	−	−			+	+	+			−
	Orange		−	−	−			+	+	+	
	Green	+			−	−	−			+	+
	Black	+	+	+			−	−	−		



5-phase stepping motor

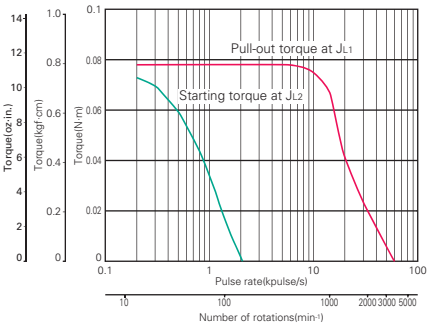
39mm sq. (1.54inch sq.)

103-45 □□ -70 □□
0.36° /step

Model		Holding torque at 5-phase energization	Rated current	Wiring resistance	Winding inductance	Rotor inertia	Mass (Weight)
Single shaft	Double shafts	[N · m (oz · in) MIN.]	A/phase	Ω /phase	mH/phase	[×10⁻⁴kg · m²(oz · in²)]	[kg (lbs)]
103-4505-7040	**-7010**	0.078 (11.05)	0.75	2	1.97	0.0182 (0.10)	0.17
103-4507-7040	**-7010**	0.108 (15.29)	0.75	2.35	3.8	0.024 (0.13)	0.2 (0.44)
103-4510-7040	**-7010**	0.167 (23.65)	0.75	3	6.2	0.036 (0.20)	0.3 (0.66)

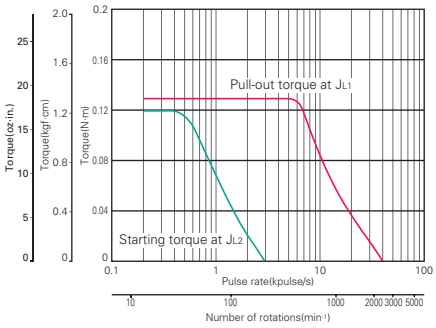
■ Pulse rate-torque characteristics

■ 103-4505-70□□



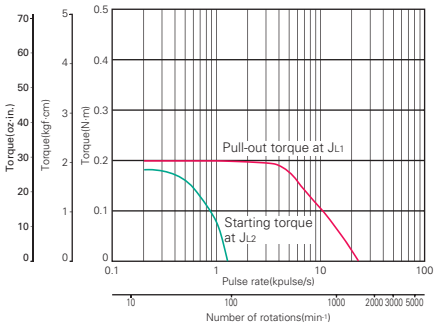
Constant current circuit
Source voltage : DC24V · operating current : 0.75A/phase,
5-phase excitation (full step)
J_{L1} = [0.33x10⁻⁴kg·m² (1.80oz · in²) use the rubber coupling]
J_{L2} = [0.18x10⁻⁴kg·m² (0.98oz·in²) use the direct coupling]

■ 103-4507-70□□



Constant current circuit
Source voltage : DC24V · operating current : 0.75A/phase,
5-phase excitation (full step)
J_{L1} = [0.33x10⁻⁴kg·m² (1.80oz · in²) use the rubber coupling]
J_{L2} = [0.18x10⁻⁴kg·m² (0.98oz·in²) use the direct coupling]

■ 103-4510-70□□



Constant current circuit
Source voltage : DC24V · operating current : 0.75A/phase,
5-phase excitation (full step)
J_{L1} = [0.94x10⁻⁴kg·m² (5.14oz · in²) use the rubber coupling]
J_{L2} = [0.8x10⁻⁴kg·m² (4.37oz·in²) use the direct coupling]

The data are measured under the drive condition of our company. The drive torque may very depending on the accuracy of customer-side equipment.

5-phase stepping motor

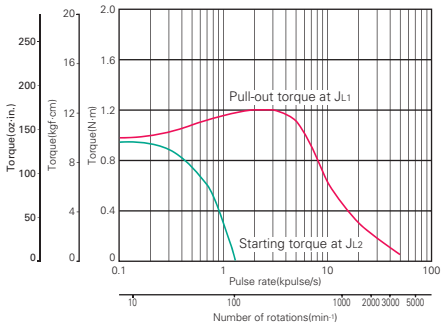
60mm cir. (2.36inch cir.)

103-7566-70 □□
0.45° /step

Model		Holding torque at 5-phase energization	Rated current	Wiring resistance	Winding inductance	Rotor inertia	Mass (Weight)
Single shaft	Double shafts	[N · m (oz · in) MIN.]	A/phase	Ω /phase	mH/phase	[×10⁻⁴kg·m²(oz·in²)]	[kg (lbs)]
103-7566-7041	**-7011**	0.91 (128.9)	0.75	4.8	23	0.235 (1.28)	1.1 (2.43)

■ Pulse rate-torque characteristics

■ **103-7566-70□□**



Constant current circuit
Source voltage : AC100V · operating current : 0.75A/phase,
5-phase excitation (full step)
J_{L1} = [2.6x10⁻⁴kg·m² (14.22oz·in²) use the rubber coupling]
J_{L2} = [2.6x10⁻⁴kg·m² (14.22oz·in²) use the direct coupling]

The data are measured under the drive condition of our company. The drive torque may very depending on the accuracy of customer-side equipment.

5-phase stepping motor

28mm sq. (1.10inch sq.)

SH528□-□□□□

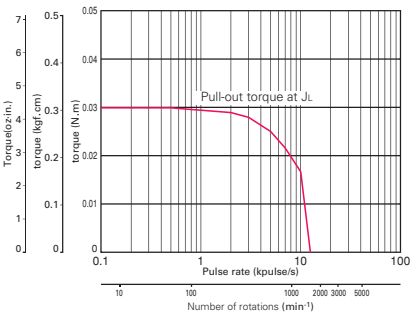
0.72° /step

■ Motor with leads

Model		Holding torque at 5-phase energization	Rated current	Wiring resistance	Winding inductance	Rotor inertia	Mass (Weight)
Single shaft	Double shafts	[N·m (oz·in) MIN.]	A/phase	Ω /phase	mH/phase	[×10⁻⁴kg·m²(oz·in²)]	[kg (lbs)]
SH5281-3041	**-3011**	0.045 (6.37)	0.35	4.5	2.7	0.01 (0.05)	0.11 (0.24)
SH5281-7041	**-7011**	0.041 (5.81)	0.75	1.05	0.44	0.01 (0.05)	0.11 (0.24)
SH5285-3041	**-3011**	0.085 (12.04)	0.35	5	3.5	0.022 (0.12)	0.2 (0.44)
SH5285-7041	**-7011**	0.078 (11.05)	0.75	1.15	0.64	0.022 (0.12)	0.2 (0.44)

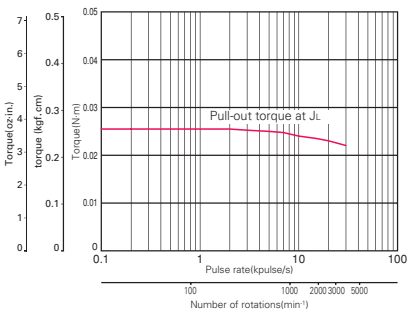
■ Pulse rate-torque characteristics

■ SH5281-30□□



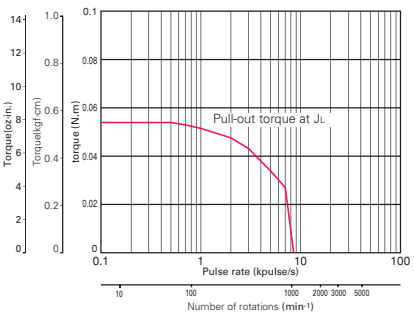
Constant current circuit
Source voltage : DC12V · operating current : 0.35A/phase,
5-phase excitation (full step)
J_L = [0.01x10⁻⁴kg · m² (0.05oz · in²) pulley balancer system]

■ SH5281-70□□



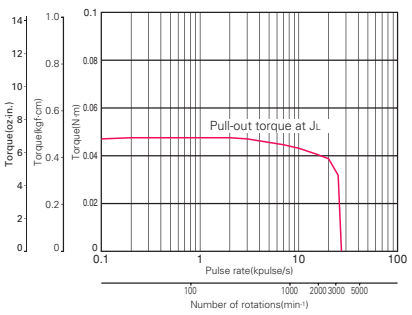
Constant current circuit
Source voltage : DC24V · operating current : 0.75A/phase,
5-phase excitation (full step)
J_L = [0.01x10⁻⁴kg · m² (0.05oz · in²) pulley balancer system]

■ SH5285-30□□



Constant current circuit
Source voltage : DC12V · operating current : 0.35A/phase,
5-phase excitation (full step)
J_L = [0.01x10⁻⁴kg · m² (0.05oz · in²) pulley balancer system]

■ SH5285-70□□



Constant current circuit
Source voltage : DC24V · operating current : 0.75A/phase,
5-phase excitation (full step)
J_L = [0.01x10⁻⁴kg · m² (0.05oz · in²) pulley balancer system]

The data are measured under the drive condition of our company. The drive torque may very depending on the accuracy of customer-side equipment.

5-phase stepping motor

42mm sq.（1.65inch sq.）

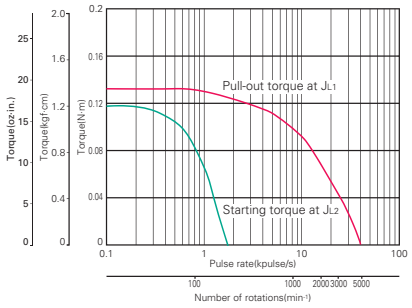
103H55 □□ -70 □□

0.72˚ /step

Model		Holding torque at 5-phase energization	Rated current	Wiring resistance	Winding inductance	Rotor inertia	Mass (Weight)
Single shaft	Double shafts	[N · m（oz · in） MIN.]	A/phase	Ω /phase	mH/phase	[×10⁻⁴kg·m²(oz·in²)]	[kg（lbs）]
103H5505-7040	**-7010**	0.127 (17.98)	0.75	1.45	1.2	0.03 (0.16)	0.23 (0.50)
103H5508-7040	**-7010**	0.176 (24.92)	0.75	1.6	1.8	0.053 (0.29)	0.28 (0.62)
103H5510-7040	**-7010**	0.255 (36.11)	0.75	2.2	2.2	0.065 (0.36)	0.37 (0.82)

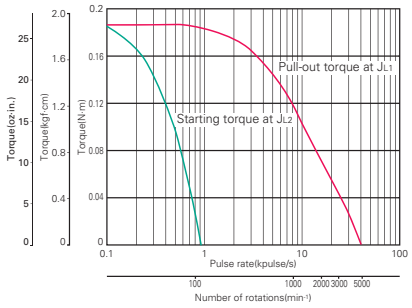
■ Pulse rate-torque characteristics

■ 103H5505-70□□



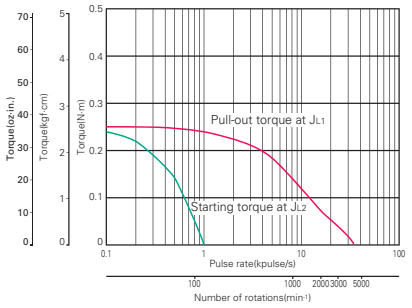
Constant current circuit
Source voltage : DC24V·operating current:0.75A/phase,
5-phase excitation (full step)
J_{L1} = [0.94x10⁻⁴kg·m²(5.14oz·in²) use the rubber coupling]
J_{L2} = [0.8x10⁻⁴kg·m²(4.37oz·in²) use the direct coupling]

■ 103H5508-70□□



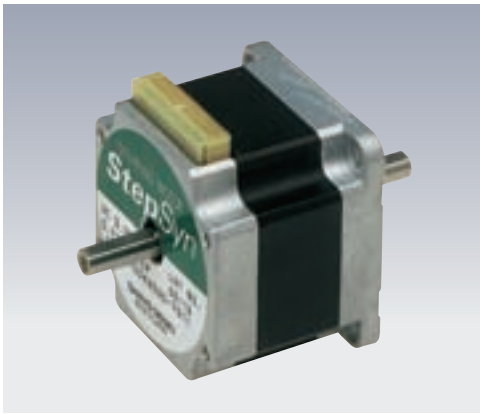
Constant current circuit
Source voltage : DC24V·operating current:0.75A/phase,
5-phase excitation (full step)
J_{L1} = [0.94x10⁻⁴kg·m²(5.14oz·in²) use the rubber coupling]
J_{L2} = [0.8x10⁻⁴kg·m²(4.37oz·in²) use the direct coupling]

■ 103H5510-70□□



Constant current circuit
Source voltage : DC24V·operating current:0.75A/phase,
5-phase excitation (full step)
J_{L1} = [0.94x10⁻⁴kg·m²(5.14oz·in²) use the rubber coupling]
J_{L2} = [0.8x10⁻⁴kg·m²(4.37oz·in²) use the direct coupling]

The data are measured under the drive condition of our company. The drive torque may very depending on the accuracy of customer-side equipment.



5-phase stepping motor

50mm sq. (1.97inch sq.)

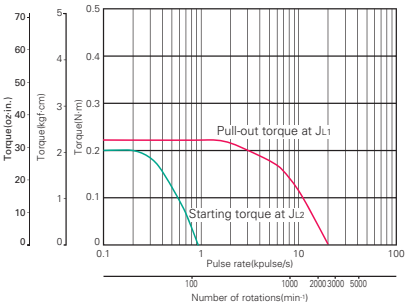
103H650 □ - □□□□

0.72° /step

Model		Holding torque at 5-phase energization	Rated current	Wiring resistance	Winding inductance	Rotor inertia	Mass (Weight)
Single shaft	Double shafts	[N · m (oz · in) MIN.]	A/phase	Ω /phase	mH/phase	[×10⁻⁴kg · m²(oz · in²)]	[kg (lbs)]
103H6500-7041	**-7011**	0.235 (33.28)	0.75	2	4	0.057 (0.31)	0.38 (0.84)
103H6500-8041	**-8011**	0.225 (31.86)	1.5	0.47	0.85	0.057 (0.31)	0.38 (0.84)
103H6501-7041	**-7011**	0.39 (55.23)	0.75	2.6	5.6	0.105 (0.57)	0.44 (0.97)
103H6501-8041	**-8011**	0.39 (55.23)	1.5	0.65	1.45	0.105 (0.57)	0.44 (0.97)

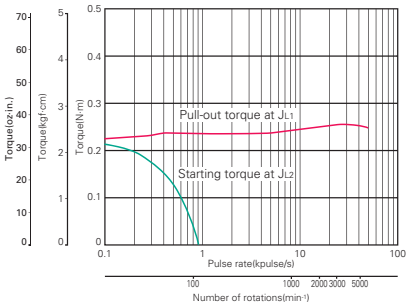
■ Pulse rate-torque characteristics

■ 103H6500-70□□



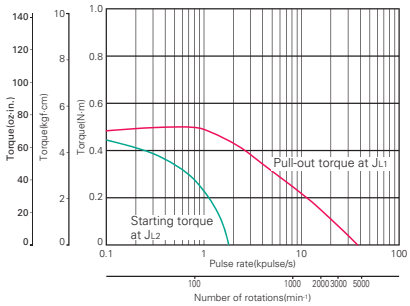
Constant current circuit
Source voltage : DC24V · operating current : 0.75A/phase,
5-phase excitation (full step)
J_{L1} =[0.94x10⁻⁴kg·m² (5.14oz·in²) use the rubber coupling]
J_{L2} =[0.8x10⁻⁴kg·m² (4.37oz·in²) use the direct coupling]

■ 103H6500-80□□



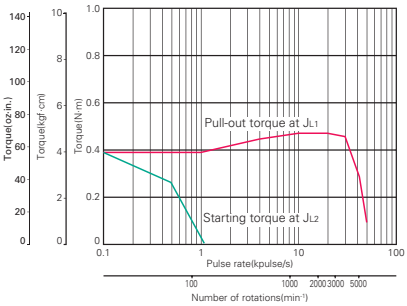
Constant current circuit
Source voltage : AC100V · operating current : 1.5A/phase,
5-phase excitation (full step)
J_{L1} =[0.94x10⁻⁴kg · m² (5.14oz · in²) use the rubber coupling]
J_{L2} =[0.8x10⁻⁴kg · m² (4.37oz · in²) use the direct coupling]

■ 103H6501-70□□



Constant current circuit
Source voltage : DC24V · operating current : 0.75A/phase,
5-phase excitation (full step)
J_{L1} =[0.94x10⁻⁴kg·m² (5.14oz·in²) use the rubber coupling]
J_{L2} =[0.105x10⁻⁴kg·m² (4.37oz·in²) pulley balancer system]

■ 103H6501-80□□



Constant current circuit
Source voltage : AC100V · operating current : 1.5A/phase,
5-phase excitation (full step)
J_{L1} =[0.94x10⁻⁴kg · m² (5.14oz · in²) use the rubber coupling]
J_{L2} =[0.8x10⁻⁴kg · m² (4.37oz · in²) use the direct coupling]

The data are measured under the drive condition of our company. The drive torque may very depending on the accuracy of customer-side equipment.

5-phase stepping motor

60mm sq. (2.36inch sq.)

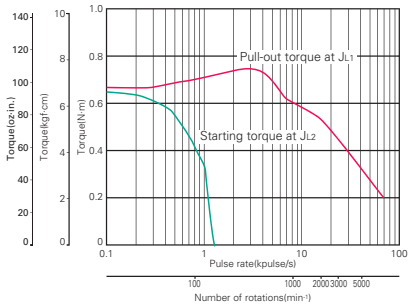
103H785 □ - □□□□

0.72˚ /step

Model		Holding torque at 5-phase energization	Rated current	Wiring resistance	Winding inductance	Rotor inertia	Mass (Weight)
Single shaft	Double shafts	[N · m (oz · in) MIN.]	A/phase	Ω /phase	mH/phase	[×10⁻⁴kg·m²(oz·in²)]	[kg (lbs)]
103H7851-7051	**-7021**	0.65 (92.0)	0.75	2.75	4.75	0.275 (1.50)	0.6 (1.32)
103H7851-8051	**-8021**	0.65 (92.0)	1.5	0.64	1.2	0.275 (1.50)	0.6 (1.32)
103H7852-7051	**-7021**	0.98 (138.8)	0.75	3.4	7.75	0.4 (2.19)	0.78 (1.72)
103H7852-8051	**-8021**	0.98 (138.8)	1.5	0.8	2	0.4 (2.19)	0.78 (1.72)
103H7853-7051	**-7021**	1.86 (263.4)	0.75	5.5	15	0.84 (4.59)	1.36 (3.00)
103H7853-8051	**-8021**	1.86 (263.4)	1.5	1.28	3.85	0.84 (4.59)	1.36 (3.00)

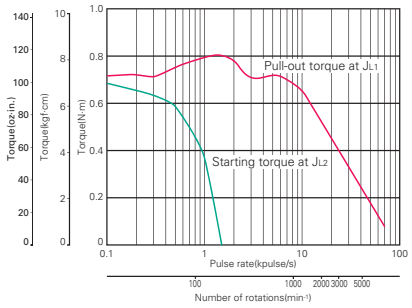
Pulse rate-torque characteristics

■ 103H7851-70□□



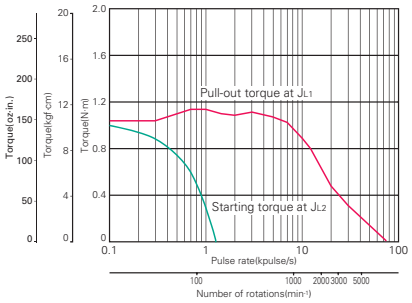
Constant current circuit
Source voltage : AC100V·operating current : 0.75A/phase,
5-phase excitation (full step)
J_{L1} =[0.94x10⁻⁴kg·m² (5.14oz·in²) use the rubber coupling]
J_{L2} =[0.8x10⁻⁴kg·m² (4.37oz·in²) use the direct coupling]

■ 103H7851-80□□



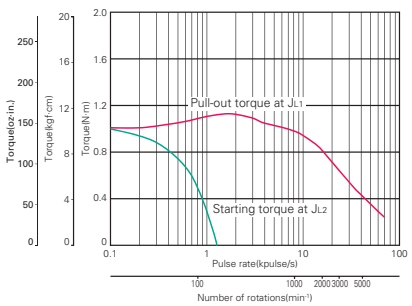
Constant current circuit
Source voltage : AC100V·operating current : 0.75A/phase,
5-phase excitation (full step)
J_{L1} =[0.94x10⁻⁴kg·m² (5.14oz·in²) use the rubber coupling]
J_{L2} =[0.8x10⁻⁴kg·m² (4.37oz·in²) use the direct coupling]

■ 103H7852-70□□



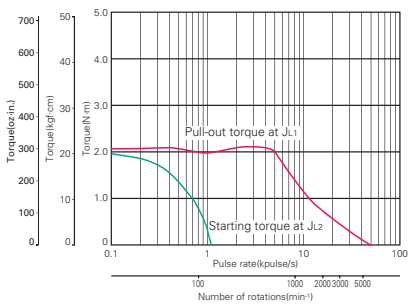
Constant current circuit
Source voltage : AC100V·operating current : 0.75A/phase,
5-phase excitation (full step)
J_{L1} =[2.6x10⁻⁴kg·m² (40.46oz·in²) use the rubber coupling]
J_{L2} =[2.6x10⁻⁴kg·m² (40.46oz·in²) use the direct coupling]

■ 103H7852-80□□



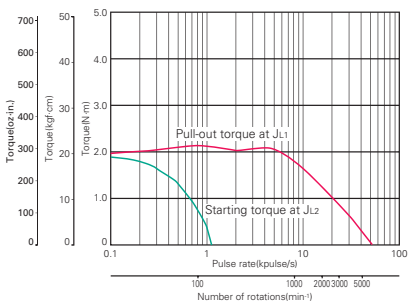
Constant current circuit
Source voltage : AC100V·operating current : 1.5A/phase,
5-phase excitation (full step)
J_{L1} =[2.6x10⁻⁴kg · m² (5.14oz · in²) use the rubber coupling]
J_{L2} =[2.6x10⁻⁴kg·m² (4.37oz · in²) use the direct coupling]

■ 103H7853-70□□



Constant current circuit
Source voltage : AC100V · operating current : 1.5A/phase,
5-phase excitation (full step)
J_{L1} =[7.4x10⁻⁴kg·m² (14.22oz·in²) use the rubber coupling]
J_{L2} =[7.4x10⁻⁴kg·m² (14.22oz·in²) use the direct coupling]

■ 103H7853-80□□



Constant current circuit
Source voltage : AC100V·operating current : 1.5A/phase,
5-phase excitation (full step)
J_{L1} =[7.4x10⁻⁴kg·m² (40.46oz·in²) use the rubber coupling]
J_{L2} =[7.4x10⁻⁴kg·m² (40.46oz·in²) use the direct coupling]

5-phase stepping motor

60mm cir. (2.36inch cir.)

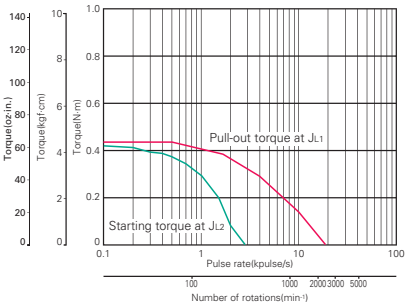
103H752 □ - □□□□

0.72° /step

Model		Holding torque at 5-phase energization	Rated current	Wiring resistance	Winding inductance	Rotor inertia	Mass (Weight)
Single shaft	Double shafts	[N · m (oz · in) MIN.]	A/phase	Ω /phase	mH/phase	[×10⁻⁴kg·m²(oz·in²)]	[kg (lbs)]
103H7521-7051	**-7021**	0.46 (65.1)	0.75	2.4	4.3	0.148 (0.81)	0.51 (1.12)
103H7521-8051	**-8021**	0.46 (65.1)	1.5	0.6	1.1	0.148 (0.81)	0.51 (1.12)
103H7522-7051	**-7021**	0.735 (104.1)	0.75	3.3	7.5	0.18 (0.98)	0.6 (1.32)
103H7522-8051	**-8021**	0.735 (104.1)	1.5	0.75	2	0.18 (0.98)	0.6 (1.32)
103H7523-7051	**-7021**	1.568 (222.0)	0.75	5.2	21	0.423 (2.31)	1.1 (2.43)
103H7523-8051	**-8021**	1.568 (222.0)	1.5	1.4	5.4	0.423 (2.31)	1.1 (2.43)

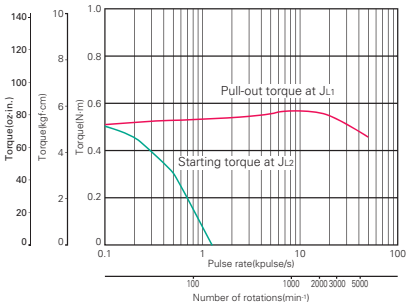
■ Pulse rate-torque characteristics

■ 103H7521-70□□



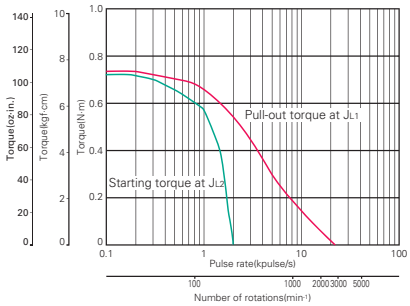
Constant current circuit
Source voltage: DC24V·operating current : 0.75A/phase,
5-phase excitation (full step)
J_{L1} =[0.94x10⁻⁴kg·m² (5.14oz·in²) use the rubber coupling]
J_{L2} =[0.51x10⁻⁴kg·m² (2.79oz·in²) pulley balancer system]

■ 103H7521-80□□



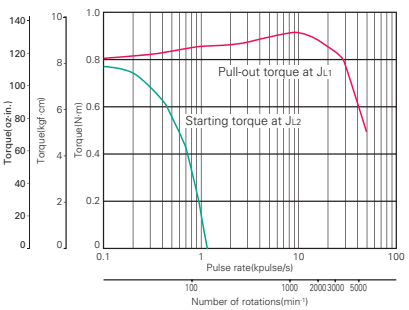
Constant current circuit
Source voltage : AC100V·operating current : 1.5A/phase,
5-phase excitation (full step)
J_{L1} =[0.94x10⁻⁴kg·m² (5.14oz·in²) use the rubber coupling]
J_{L2} =[0.8x10⁻⁴kg·m² (4.37oz·in²) use the direct coupling]

■ 103H7522-70□□



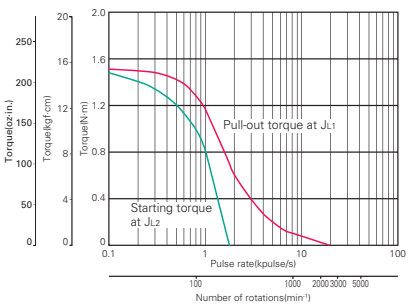
Constant current circuit
Source voltage : DC24V·operating current : 0.75A/phase,
5-phase excitation (full step)
J_{L1} =[2.6x10⁻⁴kg·m² (14.22oz·in²) use the rubber coupling]
J_{L2} =[0.6x10⁻⁴kg·m² (3.28oz·in²) pulley balancer system]

■ 103H7522-80□□



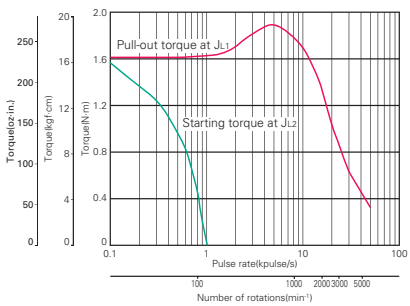
Constant current circuit
Source voltage : AC100V·operating current : 1.5A/phase,
5-phase excitation (full step)
J_{L1} =[2.6x10⁻⁴kg·m² (14.22oz·in²) use the rubber coupling]
J_{L2} =[2.6x10⁻⁴kg·m² (14.22oz·in²) use the direct coupling]

■ 103H7523-70□□



Constant current circuit
Source voltage : DC24V·operating current : 0.75A/phase,
5-phase excitation (full step)
J_{L1} =[7.4x10⁻⁴kg·m² (40.46oz·in²) use the rubber coupling]
J_{L2} =[1.1x10⁻⁴kg·m² (6.01oz·in²) pulley balancer system]

■ 103H7523-80□□



Constant current circuit
Source voltage: AC100V·operating current : 1.5A/phase,
5-phase excitation (full step)
J_{L1} =[7.4x10⁻⁴kg·m² (40.46oz·in²) use the rubber coupling]
J_{L2} =[7.4x10⁻⁴kg·m² (40.46oz·in²) use the direct coupling]

The data are measured under the drive condition of our company. The drive torque may very depending on the accuracy of customer-side equipment.

5-phase stepping motor

86mm cir. (3.39inch cir.)

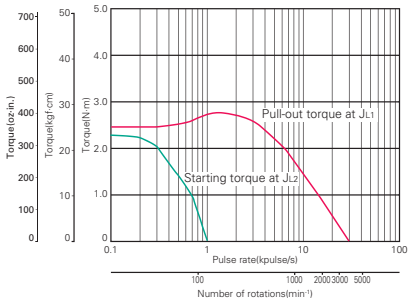
103H858 □ - □□□□

0.72˚ /step

Model		Holding torque at 5-phase energization	Rated current	Wiring resistance	Winding inductance	Rotor inertia	Mass (Weight)
Single shaft	Double shafts	[N · m (oz · in) MIN.]	A/phase	Ω /phase	mH/phase	[×10⁻⁴kg·m²(oz·in²)]	[kg (lbs)]
103H8581-7041	**-7011**	2.06 (291.7)	0.75	5.7	25	1.45 (7.93)	1.5 (3.31)
103H8581-8041	**-8011**	2.06 (291.7)	1.5	1.5	5.6	1.45 (7.93)	1.5 (3.31)
103H8582-7041	**-7011**	4.02 (569.3)	0.75	8.6	41	2.9 (15.86)	2.5 (5.51)
103H8582-8041	**-8011**	4.02 (569.3)	1.5	2	10.6	2.9 (15.86)	2.5 (5.51)
103H8583-7041	**-7011**	6.17 (873.7)	0.75	10.5	59	4.4 (24.06)	3.5 (7.72)
103H8583-8041	**-8011**	6.17 (873.7)	1.5	2.5	15	4.4 (24.06)	3.5 (7.72)

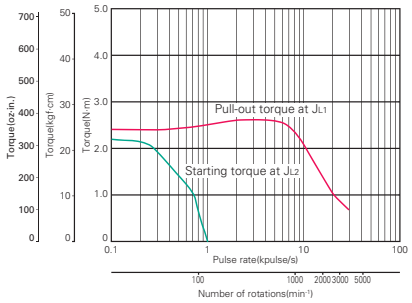
Pulse rate-torque characteristics

■ 103H8581-70□□



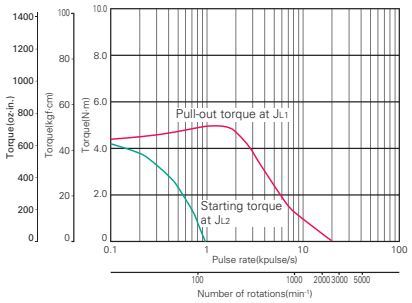
Constant current circuit
Source voltage : AC100V · operating current : 0.75A/phase,
5-phase excitation (full step)
J_{L1} =[7.4x10⁻⁴kg·m² (40.46oz·in²) use the rubber coupling]
J_{L2} = [1.45x10⁻⁴kg·m² (7.93oz·in²) pulley balancer system]

■ 103H8581-80□□



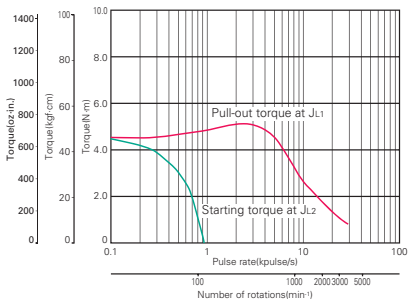
Constant current circuit
Source voltage : AC100V · operating current : 1.5A/phase,
5-phase excitation (full step)
J_{L1} =[7.4x10⁻⁴kg·m² (40.46oz·in²) use the rubber coupling]
J_{L2} =[1.45x10⁻⁴kg·m² (7.93oz·in²) pulley balancer system]

■ 103H8582-70□□



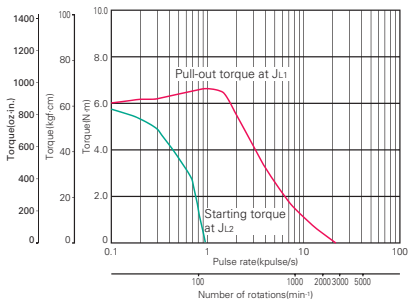
Constant current circuit
Source voltage : AC100V · operating current : 0.75A/phase,
5-phase excitation (full step)
J_{L1} =[15.3x10⁻⁴kg·m² (83.65oz·in²) use the rubber coupling]
J_{L2} =[2.9x10⁻⁴kg·m² (15.86oz·in²) pulley balancer system]

■ 103H8582-80□□



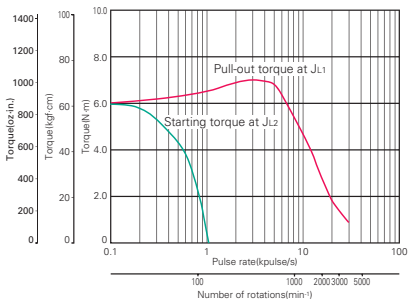
Constant current circuit
Source voltage : AC100V · operating current : 1.5A/phase,
5-phase excitation (full step)
J_{L1} =[15.3x10⁻⁴kg·m² (83.65oz·in²) use the rubber coupling]
J_{L2} =[2.9x10⁻⁴kg·m² (15.86oz·in²) pulley balancer system]

■ 103H8583-70□□



Constant current circuit
Source voltage : AC100V · operating current : 0.75A/phase,
5-phase excitation (full step)
J_{L1} =[43x10⁻⁴kg·m² (235.10oz·in²) use the rubber coupling]
J_{L2} =[4.4x10⁻⁴kg·m² (24.06oz·in²) pulley balancer system]

■ 103H8583-80□□



Constant current circuit
Source voltage : AC100V · operating current : 1.5A/phase,
5-phase excitation (full step)
J_{L1} =[43x10⁻⁴kg·m² (235.10oz·in²) use the rubber coupling]
J_{L2} =[4.4x10⁻⁴kg·m² (24.06oz·in²) pulley balancer system]

5-phase stepping motor

106mm cir. (4.17inch cir.)

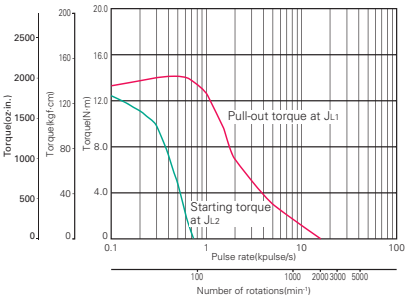
103H8958 □ - □□□□

0.72° /step

Model		Holding torque at 5-phase energization	Rated current	Wiring resistance	Winding inductance	Rotor inertia	Mass (Weight)
Single shaft	Double shafts	[N · m (oz · in) MIN.]	A/phase	Ω /phase	mH/phase	[×10⁻⁴kg·m²(oz·in²)]	[kg (lbs)]
103H89582-7041	**-7011**	10.8 (1529.4)	0.75	9	90	14.6 (79.83)	7.5 (16.53)
103H89582-8041	**-8011**	10.8 (1529.4)	1.5	2	26	14.6 (79.83)	7.5 (16.53)
103H89583-7041	**-7011**	16 (2265.7)	0.75	12.5	125	22 (120.28)	10.5 (23.15)
103H89583-8041	**-8011**	16 (2265.7)	1.5	2.9	33.4	22 (120.28)	10.5 (23.15)

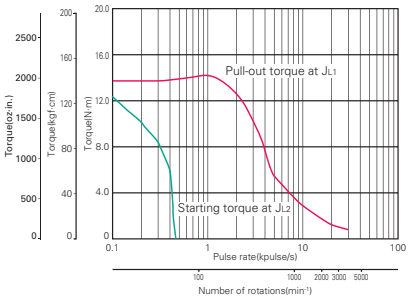
■ Pulse rate-torque characteristics

■ 103H89582-70□□



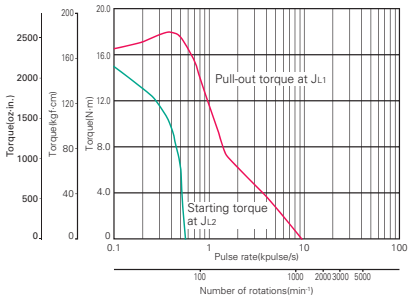
Constant current circuit
Source voltage : AC100V · operating current : 0.75A/phase,
5-phase excitation (full step)
J_{L1} =[43x10⁻⁴kg·m² (235.10oz·in²) use the rubber coupling]
J_{L2} =[43x10⁻⁴kg·m² (235.10oz·in²) use the rubber coupling]

■ 103H89582-80□□



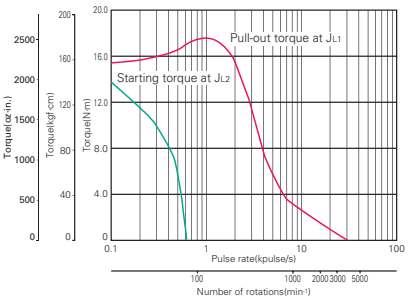
Constant current circuit
Source voltage : AC100V · operating current : 1.5A/phase,
5-phase excitation (full step)
J_{L1} =[43x10⁻⁴kg·m² (235.10oz·in²) use the rubber coupling]
J_{L2} =[43x10⁻⁴kg·m² (235.10oz·in²) use the rubber coupling]

■ 103H89583-70□□



Constant current circuit
Source voltage : AC100V · operating current : 0.75A/phase,
5-phase excitation (full step)
J_{L1} =[43x10⁻⁴kg·m² (235.10oz·in²) use the rubber coupling]
J_{L2} =[43x10⁻⁴kg·m² (235.10oz·in²) use the rubber coupling]

■ 103H89583-80□□



Constant current circuit
Source voltage : AC100V · operating current : 1.5A/phase,
5-phase excitation (full step)
J_{L1} =[43x10⁻⁴kg·m² (235.10oz·in²) use the rubber coupling]
J_{L2} =[43x10⁻⁴kg·m² (235.10oz·in²) use the rubber coupling]

The data are measured under the drive condition of our company. The drive torque may very depending on the accuracy of customer-side equipment.

5-phase stepping motor

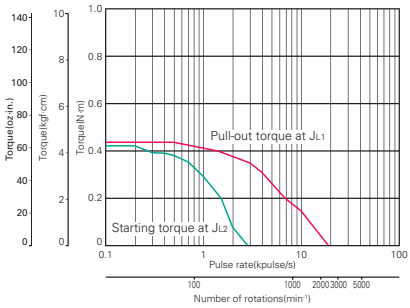
60mm cir. (2.36inch cir.)

103H752 □ -6 □□□
CE marked
0.72° /step

Model		Holding torque at 5-phase energization	Rated current	Wiring resistance	Winding inductance	Rotor inertia	Mass (Weight)
Single shaft	Double shafts	[N · m (oz · in) MIN.]	A/phase	Ω /phase	mH/phase	[×10⁻⁴kg·m²(oz·in²)]	[kg (lbs)]
103H7521-6050	**-6020**	0.46 (65.1)	0.75	2.4	4.3	0.148 (0.81)	0.51 (1.12)
103H7521-6250	**-6220**	0.46 (65.1)	1.5	0.6	1.1	0.148 (0.81)	0.51 (1.12)
103H7522-6050	**-6020**	0.735 (104.1)	0.75	3.3	7.5	0.18 (0.98)	0.6 (1.32)
103H7522-6250	**-6220**	0.735 (104.1)	1.5	0.75	2	0.18 (0.98)	0.6 (1.32)
103H7523-6050	**-6020**	1.568 (222.0)	0.75	5.2	21	0.423 (2.31)	1.1 (2.43)
103H7523-6250	**-6220**	1.568 (222.0)	1.5	1.4	5.4	0.423 (2.31)	1.1 (2.43)

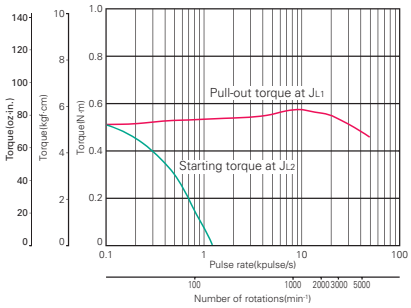
■ Pulse rate-torque characteristics

■ 103H7521-60□□



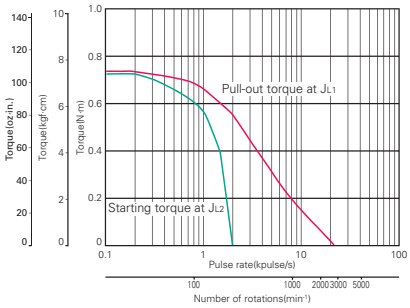
Constant current circuit
Source voltage : DC24V·operating current : 0.75A/phase, 5-phase excitation (full step)
J_{L1} =[0.94x10⁻⁴kg·m²(5.14oz·in²) use the rubber coupling]
J_{L2} =[0.51x10⁻⁴kg·m²(2.79oz·in²) pulley balancer system]

■ 103H7521-62□□



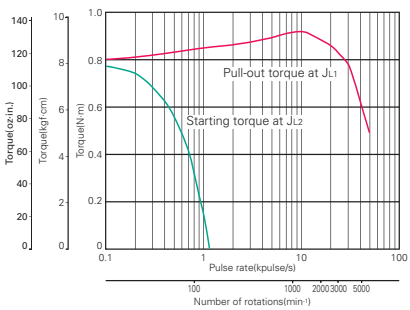
Constant current circuit
Source voltage : AC100V·operating current : 1.5A/phase, 5-phase excitation (full step)
J_{L1} =[0.94x10⁻⁴kg·m²(5.14oz·in²) use the rubber coupling]
J_{L2} =[0.8x10⁻⁴kg·m²(4.37oz·in²) use the direct coupling]

■ 103H7522-60□□



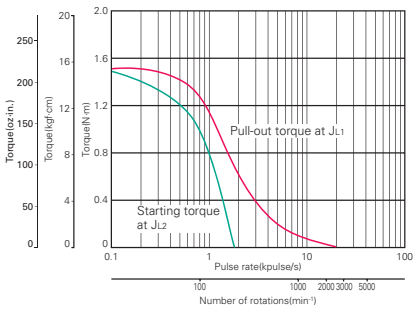
Constant current circuit
Source voltage : DC24V·operating current : 0.75A/phase, 5-phase excitation (full step)
J_{L1} =[2.6x10⁻⁴kg·m²(14.22oz·in²) use the rubber coupling]
J_{L2} =[0.6x10⁻⁴kg·m²(3.28oz·in²) pulley balancer system]

■ 103H7522-62□□



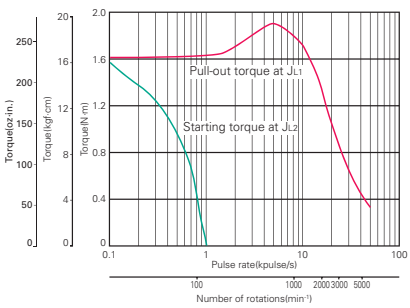
Constant current circuit
Source voltage : AC100V·operating current : 1.5A/phase, 5-phase excitation (full step)
J_{L1} =[2.6x10⁻⁴kg·m²(14.22oz·in²) use the rubber coupling]
J_{L2} =[2.6x10⁻⁴kg·m²(14.22oz·in²) use the direct coupling]

■ 103H7523-60□□



Constant current circuit
Source voltage : DC24V·operating current : 0.75A/phase, 5-phase excitation (full step)
J_{L1} =[7.4x10⁻⁴kg·m²(40.46oz·in²) use the rubber coupling]
J_{L2} =[1.1x10⁻⁴kg·m²(6.01oz·in²) pulley balancer system]

■ 103H7523-62□□



Constant current circuit
Source voltage : AC100V·operating current : 1.5A/phase, 5-phase excitation (full step)
J_{L1} =[7.4x10⁻⁴kg·m²(40.46oz·in²) use the rubber coupling]
J_{L2} =[7.4x10⁻⁴kg·m²(40.46oz·in²) use the direct coupling]

5-phase stepping motor

86mm cir. (3.39inch cir.)

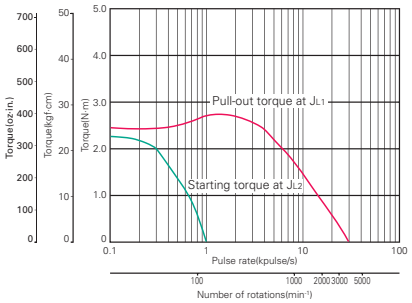
103H858 □ -6 □□□
CE marked
0.72° /step

CE

Model		Holding torque at 5-phase energization	Rated current	Wiring resistance	Winding inductance	Rotor inertia	Mass (Weight)
Single shaft	Double shafts	[N · m (oz · in) MIN.]	A/phase	Ω /phase	mH/phase	[×10⁻⁴kg·m²(oz·in²)]	[kg (lbs)]
103H8581-6050	**-6020**	2.06 (291.7)	0.75	5.7	25	1.45 (7.93)	1.5 (3.31)
103H8581-6250	**-6220**	2.06 (291.7)	1.5	1.5	5.6	1.45 (7.93)	1.5 (3.31)
103H8582-6050	**-6020**	4.02 (569.3)	0.75	8.6	41	2.9 (15.86)	2.5 (5.51)
103H8582-6250	**-6220**	4.02 (569.3)	1.5	2	10.6	2.9 (15.86)	2.5 (5.51)
103H8583-6050	**-6020**	6.17 (873.7)	0.75	10.5	59	4.4 (24.06)	3.5 (7.72)
103H8583-6250	**-6220**	6.17 (873.7)	1.5	2.5	15	4.4 (24.06)	3.5 (7.72)

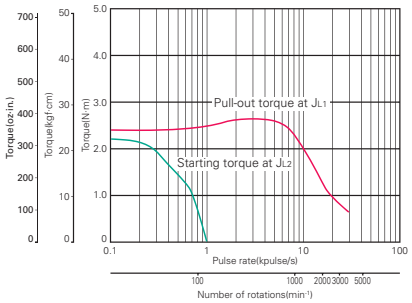
■ Pulse rate-torque characteristics

■ 103H8581-60□□



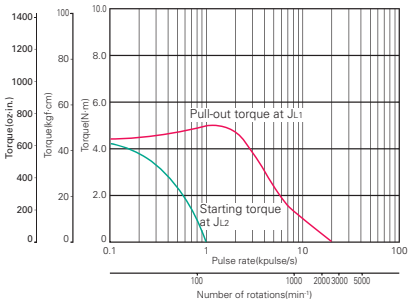
Constant current circuit
Source voltage : AC100V·operating current:0.75A/phase,
5-phase excitation (full step)
J_{L1} =[7.4x10⁻⁴kg·m²(40.46oz·in²) use the rubber coupling]
J_{L2} =[1.45x10⁻⁴kg·m²(7.93oz·in²) pulley balancer system]

■ 103H8581-62□□



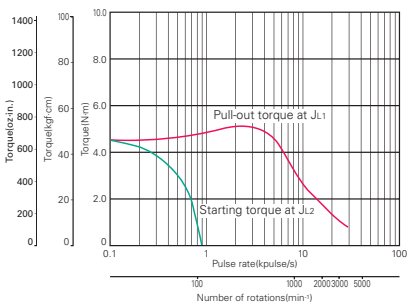
Constant current circuit
Source voltage : AC100V·operating current:1.5A/phase,
5-phase excitation (full step)
J_{L1} =[7.4x10⁻⁴kg·m²(40.46oz·in²) use the rubber coupling]
J_{L2} =[1.45x10⁻⁴kg·m²(7.93oz·in²) pulley balancer system]

■ 103H8582-60□□



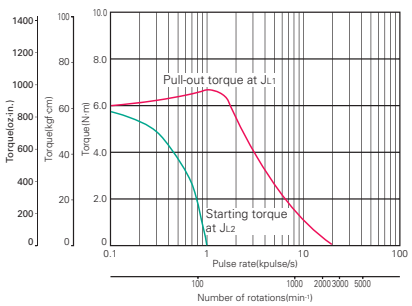
Constant current circuit
Source voltage:AC100V·operating current:0.75A/phase,
5-phase excitation (full step)
J_{L1} =[15.3x10⁻⁴kg·m²(83.65oz·in²) use the rubber coupling]
J_{L2} =[2.9x10⁻⁴kg·m²(15.86oz·in²) pulley balancer system]

■ 103H8582-62□□



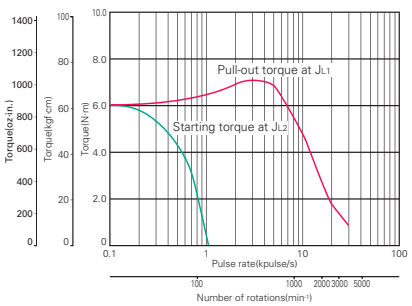
Constant current circuit
Source voltage : AC100V · operating current:1.5A/phase,
5-phase excitation (full step)
J_{L1} =[15.3x10⁻⁴kg·m²(83.65oz·in²) use the rubber coupling]
J_{L2} =[2.9x10⁻⁴kg·m²(15.86oz·in²) pulley balancer system]

■ 103H8583-60□□



Constant current circuit
Source voltage:AC100V·operating current:0.75A/phase,
5-phase excitation (full step)
J_{L1} =[43x10⁻⁴kg·m²(235.10oz·in²) use the rubber coupling]
J_{L2} =[4.4x10⁻⁴kg·m²(24.06oz·in²) pulley balancer system]

■ 103H8583-62□□



Constant current circuit
Source voltage:AC100V·operating current:1.5A/phase,
5-phase excitation (full step)
J_{L1} =[43x10⁻⁴kg·m²(235.10oz·in²) use the rubber coupling]
J_{L2} =[4.4x10⁻⁴kg·m²(24.06oz·in²) pulley balancer system]

The data are measured under the drive condition of our company. The drive torque may very depending on the accuracy of customer-side equipment.

5-phase stepping motor

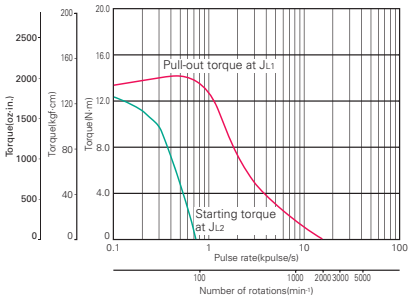
106mm cir. (4.17inch cir.)

103H8958 □ -6 □□□
CE marked
0.72° /step

Model		Holding torque at 5-phase energization	Rated current	Wiring resistance	Winding inductance	Rotor inertia	Mass (Weight)
Single shaft	Double shafts	[N · m (oz · in) MIN.]	A/phase	Ω /phase	mH/phase	[×10⁻⁴kg·m²(oz·in²)]	[kg (lbs)]
103H89582-6050	**-6020**	10.8 (1529.4)	0.75	9	90	14.6 (79.83)	7.5 (16.53)
103H89582-6250	**-6220**	10.8 (1529.4)	1.5	2	26	14.6 (79.83)	7.5 (16.53)
103H89583-6050	**-6020**	16 (2265.7)	0.75	12.5	125	22 (120.28)	10.5 (23.15)
103H89583-6250	**-6220**	16 (2265.7)	1.5	2.9	33.4	22 (120.28)	10.5 (23.15)

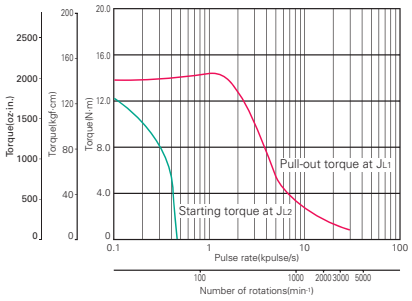
■ Pulse rate-torque characteristics

■ 103H89582-60□□



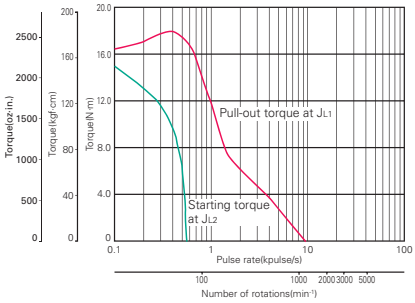
Constant current circuit
Source voltage : AC100V · operating current : 0.75A/phase,
5-phase excitation (full step)
J_{L1} =[43x10⁻⁴kg·m²(235.10oz·in²) use the rubber coupling]
J_{L2} =[43x10⁻⁴kg·m²(235.10oz·in²) use the rubber coupling]

■ 103H89582-62□□



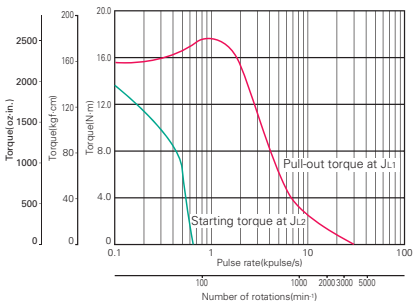
Constant current circuit
Source voltage : AC100V · operating current : 1.5A/phase,
5-phase excitation (full step)
J_{L1} =[43x10⁻⁴kg·m²(235.10oz·in²) use the rubber coupling]
J_{L2} =[43x10⁻⁴kg·m²(235.10oz·in²) use the rubber coupling]

■ 103H89583-60□□



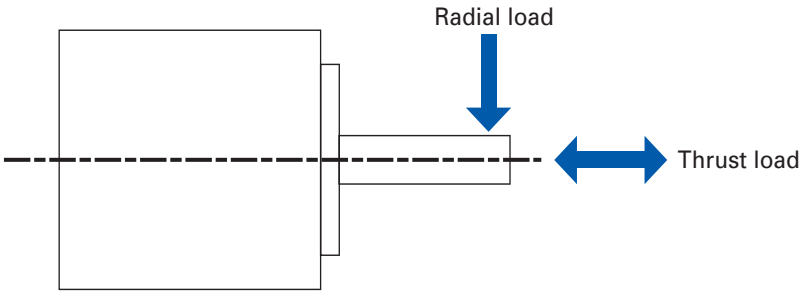
Constant current circuit
Source voltage : AC100V · operating current : 0.75A/phase,
5-phase excitation (full step)
J_{L1} =[43x10⁻⁴kg·m²(235.10oz·in²) use the rubber coupling]
J_{L2} =[43x10⁻⁴kg·m²(235.10oz·in²) use the rubber coupling]

■ 103H89583-62□□



Constant current circuit
Source voltage : AC100V · operating current : 1.5A/phase,
5-phase excitation (full step)
J_{L1} =[43x10⁻⁴kg·m²(235.10oz·in²) use the rubber coupling]
J_{L2} =[43x10⁻⁴kg·m²(235.10oz·in²) use the rubber coupling]

Allowable radial / thrust load



unit = upper section : N / lower berth : lbs

Frange size	Model number	Distance from end of shaft : mm (inch)				Thrust load : N (lbs)
		0 (0)	5 (0.2)	10 (2.25)	15 (3.38)	
		Radial load : N (lbs)				
□28mm (□1.10 inch)	SH528 □ (SH5285-7041)	49 (1.93)	53 (2.09)	53 (2.09)	–	3 (0.12)
		11 (0.43)	11 (0.43)	11 (0.43)	–	0.67 (0.03)
□39mm (□1.54 inch)	103-45 □□ (4510-7040)	26 (1.02)	33 (1.3)	42 (1.65)	60 (2.36)	10 (2.25)
		5 (0.2)	7 (0.28)	9 (0.35)	13 (0.51)	2.25 (0.09)
□42mm (□1.65 inch)	103H55 □□ 103F55 □□ (F5510-7041)	29 (1.14)	36 (1.42)	49 (1.93)	52 (2.05)	10 (2.25)
		6 (0.24)	8 (0.31)	11 (0.43)	11 (0.43)	2.25 (0.09)
□50mm (□1.97 inch)	103H65 □□	71 (2.8)	87 (3.43)	115 (4.53)	167 (6.57)	15 (3.38)
		15 (0.59)	19 (0.75)	25 (0.98)	37 (1.46)	3.37 (0.13)
φ 60mm (φ 2.36 inch)	103H75 □□	94 (3.7)	116 (4.57)	153 (6.02)	222 (8.74)	15 (3.38)
		21 (0.83)	26 (1.02)	34 (1.34)	49 (1.93)	3.37 (0.13)
	103-75 □□	68 (2.68)	85 (3.35)	113 (4.45)	166 (6.54)	15 (3.38)
		15 (0.59)	19 (0.75)	25 (0.98)	37 (1.46)	3.37 (0.13)
□60mm (□ 2.36 inch)	103H78 □□	70 (2.76)	87 (3.43)	114 (4.49)	165 (6.5)	20 (0.79)
		15 (0.59)	19 (0.75)	25 (0.98)	37 (1.46)	4.5 (0.18)
	103F78 □□ 103M78 □□	62 (2.44)	75 (2.95)	94 (3.7)	127 (5)	20 (0.79)
		13 (0.51)	16 (0.63)	21 (0.83)	28 (1.1)	4.5 (0.18)
φ 86mm (φ 3.39 inch)	103H85 □□ 103F85 □□ 103M85 □□	191 (7.52)	234 (9.21)	301 (11.85)	421 (16.57)	60 (2.36)
		42 (1.65)	52 (2.05)	67 (2.64)	94 (3.7)	13 (0.51)
		350 (13.78)	424 (16.69)	535 (21.06)	726 (28.58)	60 (2.36)
		78 (3.07)	95 (3.74)	120 (4.72)	163 (6.42)	13 (0.51)
φ 106mm (φ 4.17 inch)	103H895 □□ 103F895 □□ 103M895 □□	321 (12.64)	356 (14.02)	401 (15.79)	457 (18)	100 (3.94)
		72 (2.83)	80 (3.15)	90 (3.54)	102 (4.02)	22 (0.86)
		–	–	–	–	–

General specifications

	SH528 □	103H55 □□	103H650 □	103H752 □	103H785 □	103H858 □	103H8958 □	103-45 □□	103-7566
Insulation class	Class B (130˚C)								
Insulation resistance	Not less than 100M Ω between winding and frame by DC500V megger at normal temperature and humidity.								
Withstand voltage	Without abnormality when applying 50/60Hz,1000V AC (500V AC for SH528 □ and103H55 □□ ,103-45 □□) for 1 minute between winding and frame at normal temperature and humidity.								
Operating environment	Ambient temperature -10˚C to +50˚C								
	Ambient humidity 20% to 90%								
Wiringtemperature increase	80K MAX. (based on Sanyo Denki standard)								
Standing angle error	± 0.09˚	± 0.09˚	± 0.09˚	± 0.09˚	± 0.09˚	± 0.09˚	± 0.09˚	± 0.04˚	± 0.09˚
Axial play	0.075mm (0.002952inch) MAX., Load 4.4N (1lbs)	0.075mm (0.002952inch) MAX., Load 4.4N (1lbs)	0.075mm (0.002952inch) MAX., Load 9N (2lbs)	0.075mm (0.002952inch) MAX., Load 9N (2lbs)	0.075mm (0.002952inch) MAX., Load 9N (2lbs)	0.075mm (0.002952inch) MAX., Load 9N (2lbs)	0.075mm (0.002952inch) MAX., Load 9N (2lbs)	0.075mm (0.002952inch) MAX., Load 4.4N (1lbs)	0.075mm (0.002952inch) MAX., Load 9N (2lbs)
Radial play (Note 1)	0.025mm (0.00098inch) MAX., Load 4.4N (1lbs)								
Shaft runout	0.025mm (0.00098inch)								
Inserted part concentricity against shaft	φ0.05mm (0.00197inch)	φ0.05mm (0.00197inch)	φ0.075mm (0.00295inch)	φ0.075mm (0.00295inch)	φ0.075mm (0.00295inch)	φ0.075mm (0.00295inch)	φ0.075mm (0.00295inch)	φ0.05mm (0.00197inch)	φ0.075mm (0.00295inch)

(Note1) When load is applied at 1/3 length from output shaft edge.

General specifications (models to CE marking)

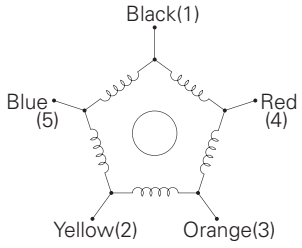
	103H752 □	103H858 □	103H8958 □
Rated voltage	DC12-200V	DC12-300V	
Applied standards (Low voltage directive)	EN60034-1, IEC34-5 (EN60034-5) , EN60204-1, EN60950, EN61010-1		
Specification type	S1 (continuous running duty type)		
Protection grade	IP43		
Protection class	Class I		
Operating environment	Pollution degree 2		
Insulation class	Class B (130˚C)		
Insulation resistance	Not less than 100M Ω between winding and frame by DC500V megger at normal temperature and humidity.		
Withstand voltage	Without abnormality when applying 50/60Hz, 1600V AC (1500kV AC for 103H752 □) for 1 minute (leakage current 10mA) between winding and frame at normal temperature and humidity.		
Operating environment	Ambient temperature -10˚C to +50˚C		
	Ambient humidity 20% to 90% (no condensation)		
Wiringtemperature increase	80K MAX. (Based on Sanyo Denki standard)		
Standing angle error	± 0.09˚	± 0.09˚	± 0.09˚
Axial play	0.075mm (0.002952inch) MAX., Load 9N (2lbs)		
Radial play (Note 1)	0.075mm (0.002952inch) MAX., Load 4.4N (1lbs)		
Shaft runout	0.025mm (0.00098inch)		
Inserted part concentricity against shaft	φ0.075 mm (0.00295inch)	φ0.075 mm (0.00295inch)	φ0.075 mm (0.00295inch)
Fitted surface angularity against shaft	0.075 mm (0.00295inch)	0.075 mm (0.00295inch)	0.075 mm (0.00295inch)

(Note 1) When load is applied at 1/3 length from output shaft edge.

Internal wire connection and direction of motor rotate

■ Internal wire connection

Connector pin number in the parentheses



■ Direction of motor rotate

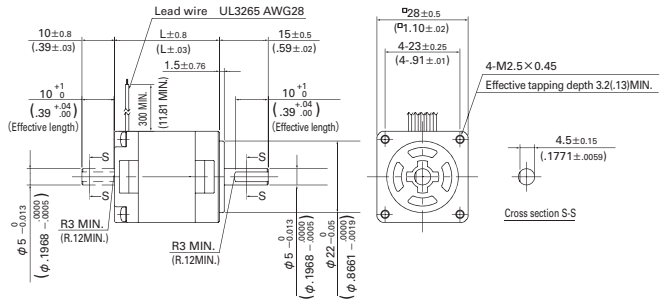
The direction of motor rotate is counterclockwise when viewed from the output shaft side at the direct current energization in the following order.

Type				Exciting order									
				1	2	3	4	5	6	7	8	9	10
Color of leads	Black	Connector pin No.	(1)	−	−	−	−		+	+	+	+	
	Red		(4)		+	+	+	+		−	−	−	−
	Orange		(3)	+		−	−	−	−		+	+	+
	Yellow		(2)	−	−		+	+	+	+		−	−
	Blue		(5)	+	+	+		−	−	−	−		+

Standard model / CE/UL model

[Unit : mm (inch)]

□28mm (□1.10inch)



Set part number	Motor model number	Motor length (L) : mm (inch)
FDF521 △	SH5281-72 △ 1	32 (1.26)
FDF525 △	SH5285-72 △ 1	51.5 (2.03)
–	SH5281- ● 0 △ 1	32 (1.26)
–	SH5285- ● 0 △ 1	51.5 (2.03)

□ : Driver specifications

Motor shaft spec	Set type code
AC Power source Standard type	S
AC Power source Positioning function included type	P
DC Power source Standard type	D

■ : Motor specifications

Motor shaft spec	Set type code
F Series motor	F
M Series motor (CE · UL)	M

△ : Motor shaft specification code

Motor shaft spec	Set type code	Motor type code
Single shaft	S	4
Double shaft	D	1

▲ : Motor shaft specification code

Motor shaft spec	Set type code	Motor type code
Single shaft	S	7
Double shaft	D	2

▼ : Motor shaft specification code

	Set type code	Motor type code
Single shaft	S	5
Double shaft	D	2

◆ : Rated current

0.75A	0
1.5A	2

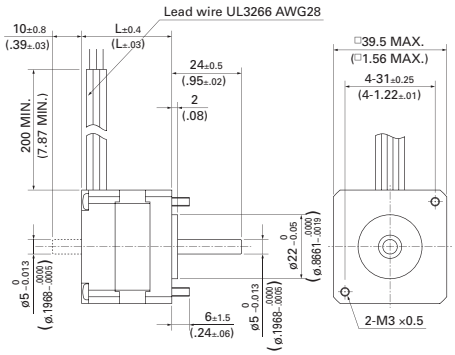
◇ : Motor shaft specification code

Motor shaft spec	Set type code	Motor type code
Single shaft	S	5
Double shaft	D	2

● : Rated current

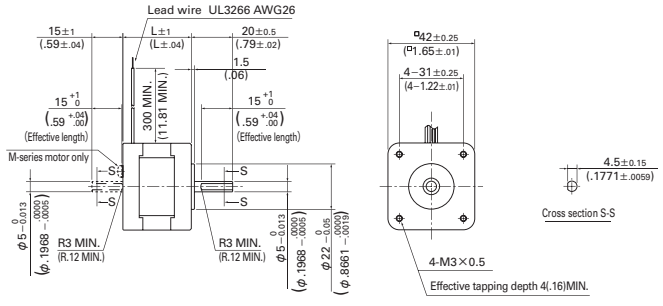
0.35A	3
0.75A	7
1.5A	8

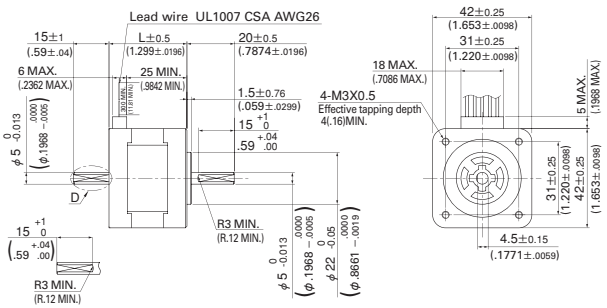
□39mm (□1.54inch)



Set part number	Motor model number	Motor length : mm (inch)
–	103-4505-70 △ 0	31 (1.22)
–	103-4507-70 △ 0	35.2 (1.39)
–	103-4510-70 △ 0	44.3 (1.74)

□42mm (□1.65inch)

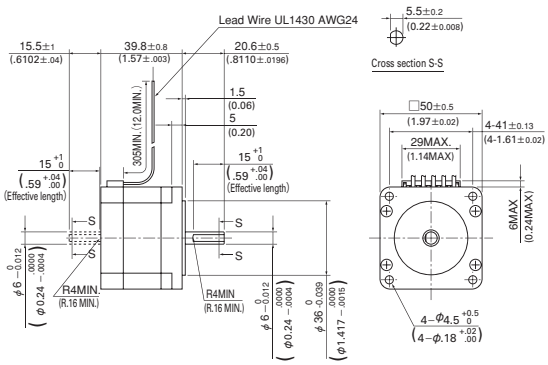




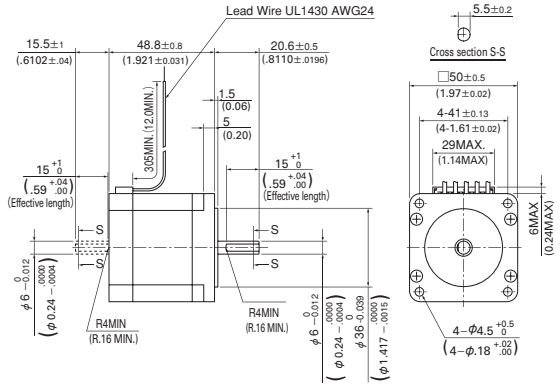
Set part number	Motor model number	Motor length (L) : mm (inch)
F □ F551 △	103 ■ 5505-70 △ 1	34 (1.34)
F □ F552 △	103 ■ 5508-70 △ 1	40 (1.57)
F □ F554 △	103 ■ 5510-70 △ 1	49 (1.93)
FDF551 △	103F5505-82 △ 1	34 (1.34)
FDF552 △	103F5508-82 △ 1	40 (1.57)
FDF554 △	103F5510-82 △ 1	49 (1.93)

Set part number	Motor model number	Motor length (L) : mm (inch)
–	103H5505-70 △ 0	33 (1.3)
–	103H5508-70 △ 0	39 (1.54)
–	103H5510-70 △ 0	48 (1.89)

□50mm (□1.97inch)

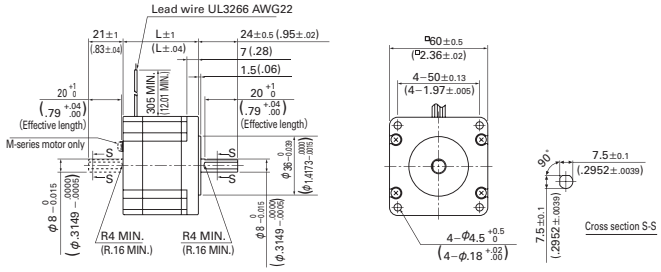


Set part number	Motor model number
–	103H6500-70 △ 1
–	103H6500-80 △ 1

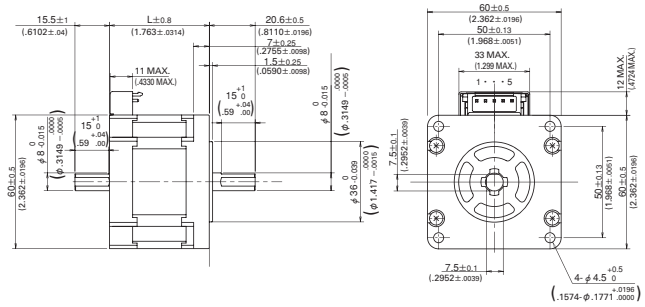


Set part number	Motor model number
–	103H6501-70 △ 1
–	103H6501-80 △ 1

□60mm (□2.36inch)

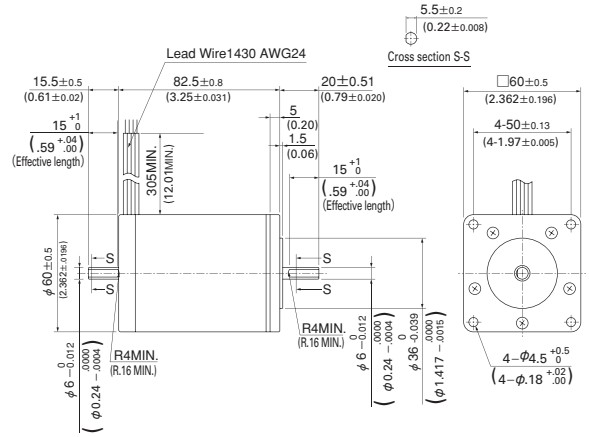


Set part number	Motor model number	Motor length (L) : mm (inch)
F□F781 △	103■7851-70 △ 1	46.5 (1.83)
F□F782 △	103■7852-70 △ 1	55 (2.17)
F□F783 △	103■7853-70 △ 1	87.5 (3.44)
FDF781 △	103F7851-82 △ 1	46.5 (1.83)
FDF782 △	103F7852-82 △ 1	55 (2.17)
FDF783 △	103F7853-82 △ 1	87.5 (3.44)



Set part number	Motor model number	Motor length (L) : mm (inch)
–	103H7851-●0 △ 1	44.8 (1.76)
–	103H7852-●0 △ 1	53.8 (2.1)
–	103H7853-●0 △ 1	85.8 (3.38)

Φ60mm (Φ2.36inch)

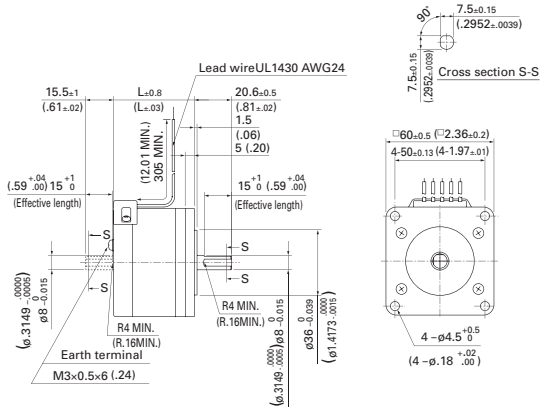


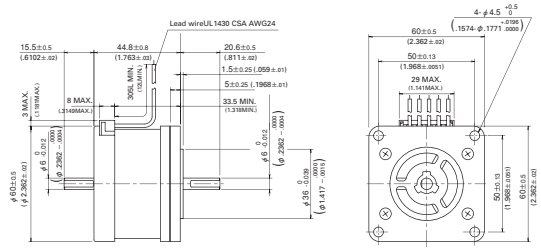
Set part number	Motor model number	Motor length (L) : mm (inch)
–	103-7566-70 △ 1	82.5

Standard model / CE/UL model

[Unit : mm (inch)]

φ60mm (φ2.36inch)

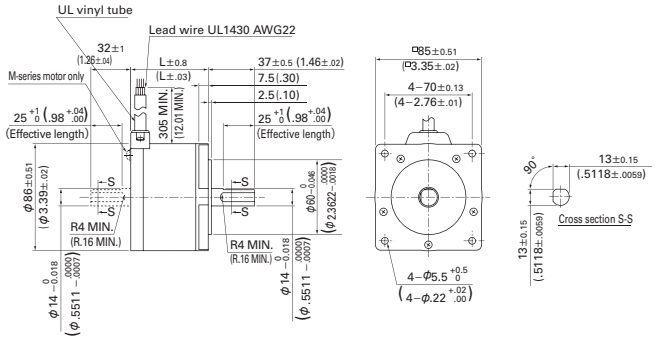


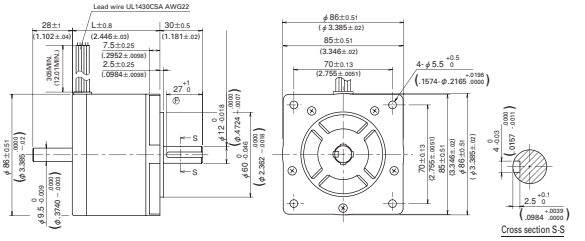


Set part number	Motor model number	Motor length : mm (inch)
–	103H7521-6◆▼0	44.8 (1.76)
–	103H7522-6◆▼0	53.8 (2.12)
–	103H7523-6◆▼0	85.8 (3.38)

Set part number	Motor model number	Motor length : mm (inch)
–	103H7521-●0▼1	44.8 (1.76)
–	103H7522-●0▼1	53.8 (2.12)
–	103H7523-●0▼1	85.8 (3.38)

φ86mm (φ3.39inch)

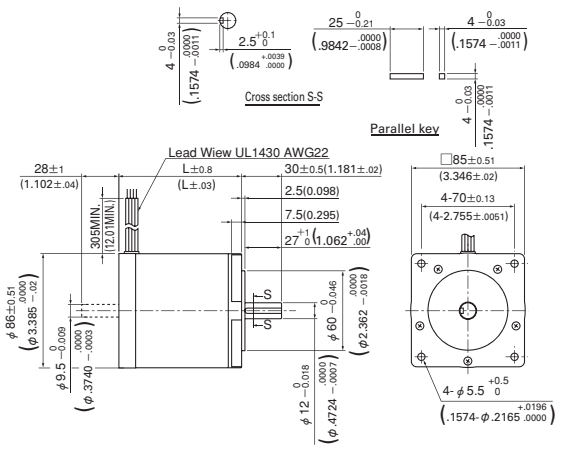




Set part number	Motor model number	Motor length (L): mm (inch)
F□F851△	103■8581-70△1	62.15 (2.45)
F□F852△	103■8582-70△1	92.2 (3.63)
F□F853△	103■8583-70△1	125.85 (4.95)
FDF851△	103F8581-82△1	62.15 (2.45)
FDF852△	103F8582-82△1	92.2 (3.63)

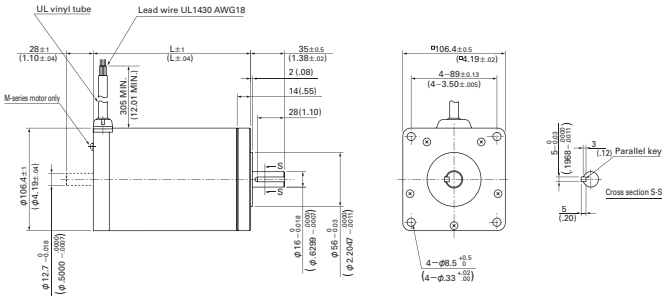
Set part number	Motor model number	Motor length (L): mm (inch)
–	103H8581-●0△1	62.15 (2.45)
–	103H8582-●0△1	92.2 (3.63)
–	103H8583-●0△1	125.85 (4.95)

φ86mm (φ3.39inch)

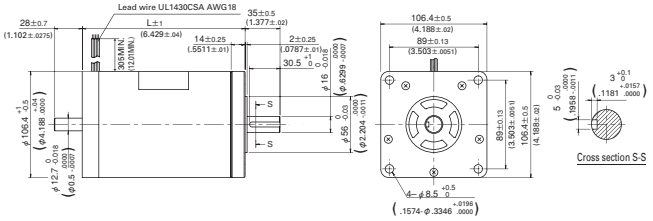


Set part number	Motor model number		Motor length (L): mm (inch)
	Single shaft	Double shaft	
–	103H8581-6050	-6020	62.15 (2.47)
–	103H8581-6250	-6220	62.15 (2.47)
–	103H8582-6050	-6020	92.2 (3.63)
–	103H8582-6250	-6220	92.2 (3.63)
–	103H8583-6050	-6020	125.85 (4.95)
	103H8583-6250	-6220	125.85 (4.95)

φ106mm (φ4.17inch)

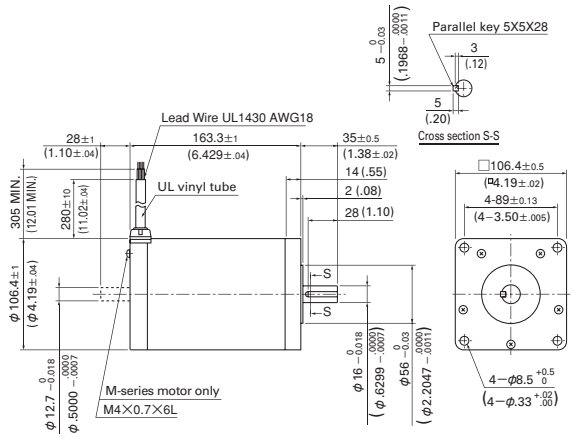


Set part number	Motor model number	Motor length (L) : mm (inch)
F □ F892 △	103 ■ 89582-70 △ 1	163.3 (6.43)
F □ F893 △	103 ■ 89583-70 △ 1	221.3 (8.71)

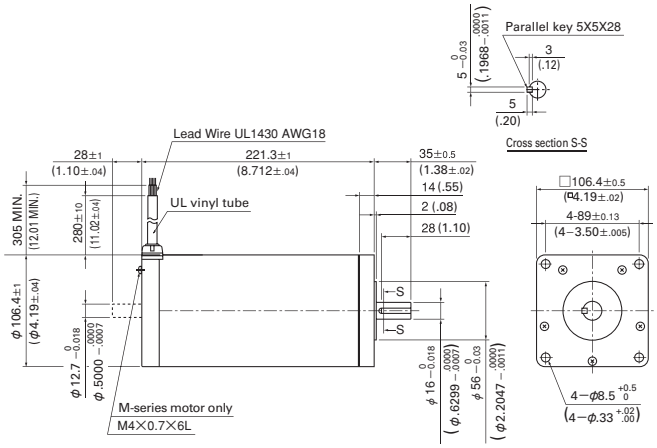


Set part number	Motor model number	Motor length (L) : mm (inch)
–	103H89582- ● 0 △ 1	163.3 (6.43)
–	103H89583- ● 0 △ 1	221.3 (8.71)

φ106mm (φ4.17inch)



Set part number	Motor model number	
	Single shaft	Double shaft
–	103H89582-6050	-6020
–	103H89582-6250	-6220



Set part number	Motor model number	
	Single shaft	Double shaft
–	103H89583-6050	-6020
–	103H89583-6250	-6220

□ : Driver specifications

Motor shaft spec	Set type code
AC Power source Standard type	S
AC Power source Positioning function included type	P
DC Power source Standard type	D

■ : Motor specifications

Motor shaft spec	Set type code
F Series motor	F
M Series motor (CE · UL)	M

△ : Motor shaft specification code

Motor shaft spec	Set type code	Motor type code
Single shaft	S	4
Double shaft	D	1

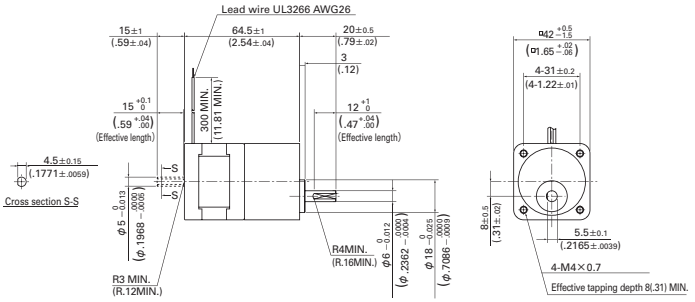
● : Rated current

0.75A	7
1.5A	8

Low-backlash gear model

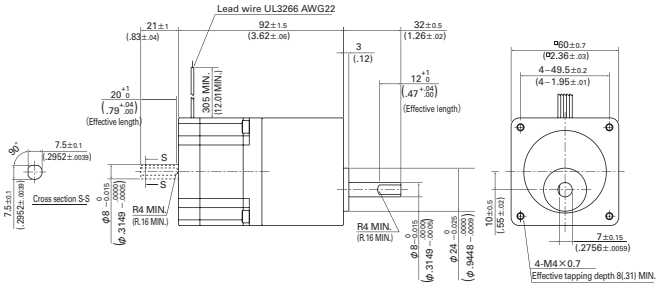
[Unit : mm (inch)]

□42mm (□1.65inch)



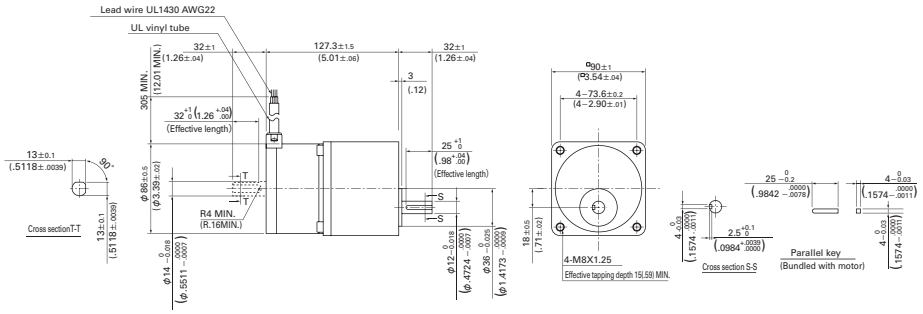
Set part number	Motor model number
F□F551△-CX3.6	103F5505-7□CXA△
F□F551△-CX7.2	103F5505-7□CXB△
F□F551△-CX10	103F5505-7□CXE△
F□F551△-CX20	103F5505-7□CXG△
F□F551△-CX30	103F5505-7□CXJ△
F□F551△-CX36	103F5505-7□CXK△

□60mm (□2.36inch)



Set part number	Motor model number
F□F781△-CX3.6	103F7851-7□CXA△
F□F781△-CX7.2	103F7851-7□CXB△
F□F781△-CX10	103F7851-7□CXE△
F□F781△-CX20	103F7851-7□CXG△
F□F781△-CX30	103F7851-7□CXJ△
F□F781△-CX36	103F7851-7□CXK△

φ86mm (φ3.39inch)



Set part number	Motor model number
F□F851△-CX3.6	103F8581-7□CXA△
F□F851△-CX7.2	103F8581-7□CXB△
F□F851△-CX10	103F8581-7□CXE△
F□F851△-CX20	103F8581-7□CXG△
F□F851△-CX30	103F8581-7□CXJ△
F□F851△-CX36	103F8581-7□CXK△

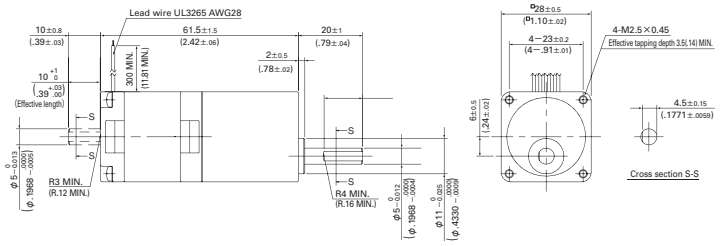
△ : Motor shaft specification code

Motor shaft spec	Set type code	Motor type code
Single shaft	S	4
Double shaft	D	1

Spur gear model

[Unit : mm (inch)]

□28mm (□1.10inch)



Set part number	Motor model number
FDF521△-GX3.6	SH5281-72GXA△
FDF521△-GX7.2	SH5281-72GXB△
FDF521△-GX10	SH5281-72GXE△
FDF521△-GX20	SH5281-72GXG△
FDF521△-GX30	SH5281-72GXJ△
FDF521△-GX50	SH5281-72GXL△

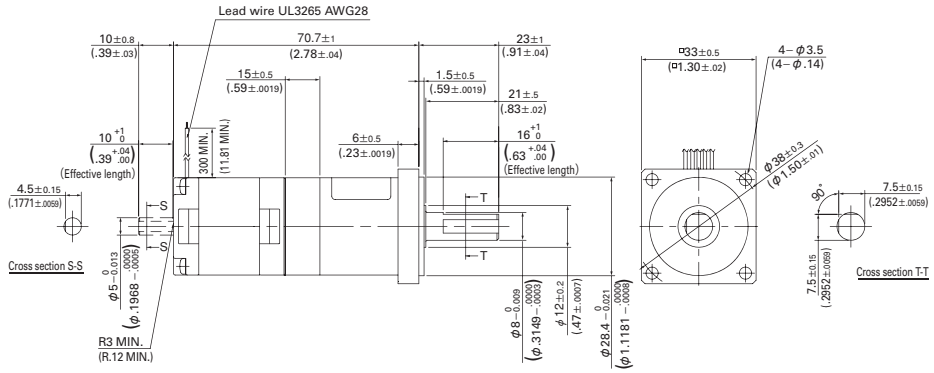
△ : Motor shaft specification code

Motor shaft spec	Set type code	Motor type code
Single shaft	S	4
Double shaft	D	1

Harmonic gear model

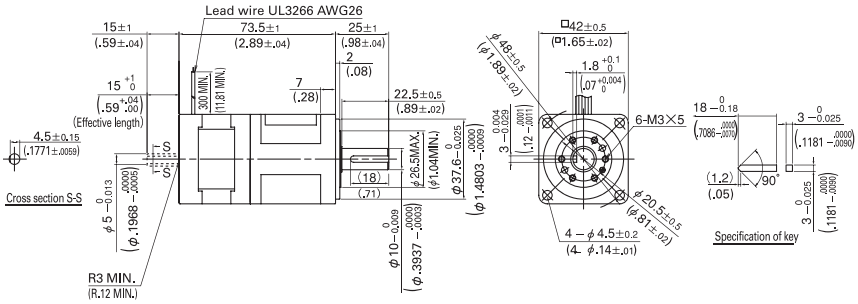
[Unit : mm (inch)]

□28mm (□1.10inch)



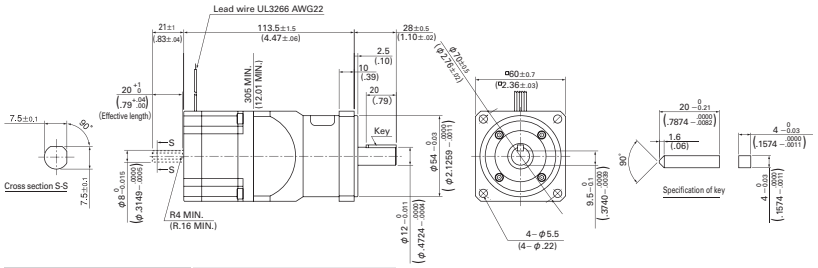
Set type code	Motor type code
FSF351 △ -HX50	103F3505-72HXL △
FSF351 △ -HX100	103F3505-72HXM △

□42mm (□1.65inch)



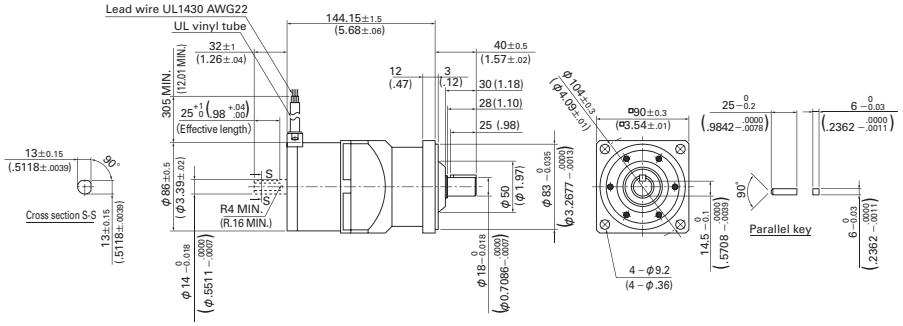
Set type code	Motor type code
F □ F551 △ -HX30	103F5505- □□ HXJ ◇
F □ F551 △ -HX50	103F5505- □□ HXL ◇
F □ F551 △ -HX100	103F5505- □□ HXM ◇

□60mm (□2.36inch)



Set type code	Motor type code
F □ F781 △ -HX50	103F7851- □□ HXL △
F □ F781 △ -HX100	103F7851- □□ HXM △

⌀86mm (⌀3.39inch)



Set type code	Motor type code
F □ F851 △ -HX50	103F8581- □□ HXL △
F □ F851 △ -HX100	103F8581- □□ HXM △

△ : Motor shaft specification code

Motor shaft spec	Set type code	Motor type code
Single shaft	S	4
Double shaft	D	1

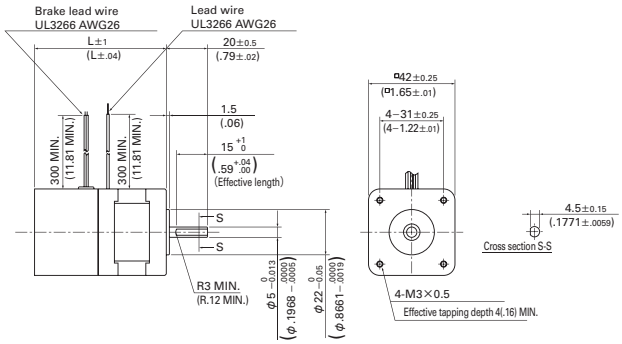
◇ : Motor shaft specification code

Motor shaft spec	Motor type code
Single shaft	5
Double shaft	2

Electromagnetic brake model

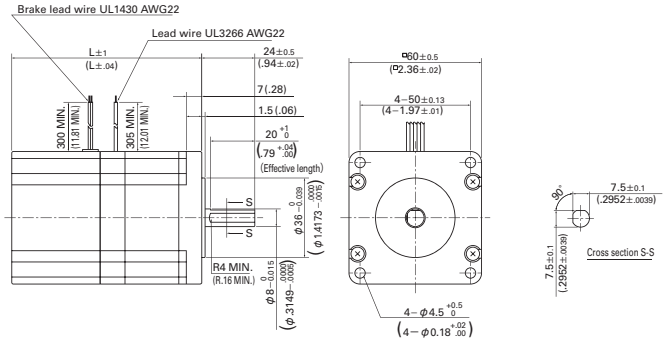
[Unit : mm (inch)]

□42mm (□1.65inch)



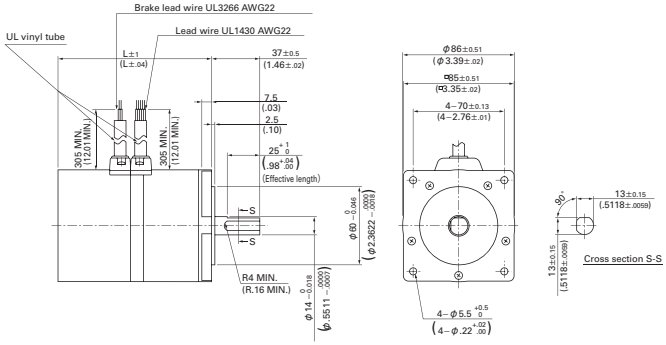
Set part number	Motor model number	Motor + brake length : mm (inch)
F□F551S-XB	103F5505-□□XB41	64.5 (2.54)
F□F552S-XB	103F5508-□□XB41	70.5 (2.78)
F□F554S-XB	103F5510-□□XB41	79.5 (3.13)

□60mm (□2.36inch)



Set part number	Motor model number	Motor + brake length : mm (inch)
F□F781S-XB	103F7851-□□XB41	85.8 (3.38)
F□F782S-XB	103F7852-□□XB41	94.5 (3.72)
F□F783S-XB	103F7853-□□XB41	126.7 (4.99)

φ86mm (φ3.39inch)



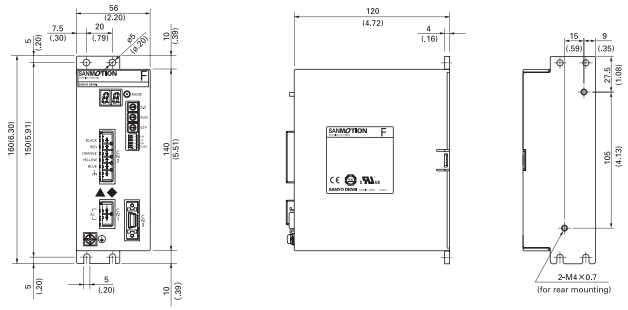
Set part number	Motor model number	Motor + brake length : mm (inch)
F□F851S-XB	103F8581-□□XB41	116.7 (4.59)
F□F852S-XB	103F8582-□□XB41	146.8 (5.78)
F□F853S-XB	103F8583-□□XB41	180.4 (7.10)

F series driver (CE [TÜV] • UL)

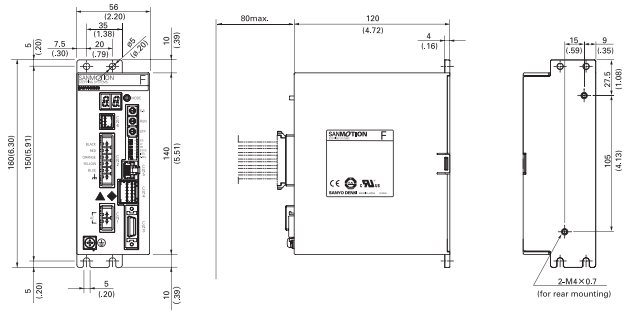
[Unit : mm (inch)]

AC input

FS type

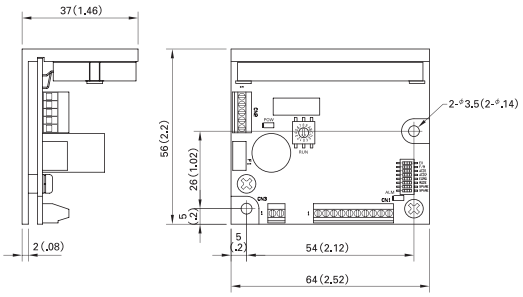


FP type



DC input

FD type



Safety standards

F series AC driver

UL	Acquired standards		Standard part	File No.
	UL UL for Canada		UL508C	E179775
CE (TÜV)	Directives	Category	Standard part	Name
	Low-voltage directives	–	EN50178	–
	EMC directives	Emission	EN55011-A	Terminal disturbance voltage
			EN55011-A	Electromagnetic radiation disturbance
		Immunity	EN61000-4-2	ESD (Electrostatic discharge)
			EN61000-4-3	RS (Radio-frequency amplitude modulated electromagnetic field)
			EN61000-4-4	Fast transionts
			EN61000-4-6	Surges
			EN61000-4-5	CS (Radio-frequency common mode)
			EN61000-4-11	Voltage dips, Voltage interruptions

F series DC driver

UL	Acquired standards		Standard part	File No.
	UL UL for Canada		UL508C	E179775
CE (TÜV)	Directives	Category	Standard part	Name
	Low-voltage directives	–	EN61010-1	–
	EMC directives	Emission	EN55011-A	Terminal disturbance voltage
			EN55011-A	Electromagnetic radiation disturbance
		Immunity	EN61000-4-2	ESD (Electrostatic discharge)
			EN61000-4-3	RS (Radio-frequency amplitude modulated electromagnetic field)
			EN61000-4-4	Fast transionts
			EN61000-4-6	Surges

M series motor

UL	Acquired standards	File No.	
	UL UL for Canada	E208878	
CE	Standard category	Standard part	
	Low-voltage directives	EN-60034-1	
		IEC34-5 (EN-60034-5)	

- EMC characteristics may vary depending on the configuration of the users' control panel, which contains the driver or stepping motor, or the arrangement and wiring of other electrical devices.
- Validation test of F series driver has been performed for low-voltage EMC directives at TÜV (TÜV SUD Japan) for self-declaration of CE marking.

Safety Consideration

The drivers and stepping motors are the products designed to be used for the general industrial devices.
When using those, pay enough attention to the following points.

・Read thoroughly the Operation Manual prior to placement, assembly and/or operation in order to use the product properly.

・Refrain from modifying or processing the product in any way.

・Consult with the distributor or professional experts for placement or maintenance services of the product.

・In case of the following uses of the product, contact with us for the special care required to the operation, maintenance and management such as multiplexing the system, installing an emergency electric generator set, or so forth.

❶Use for the medical devices concerned with a fatal accident
❷Use for trains, elevators, and so forth that are likely to cause an accident resulting in injury, damage or death.
❸Use in the computer system highly influential to the social life or the public systems.
❹Use in other devices highly influential to maintaining the human safety or the public functions.

In addition to the above, consult with us for use in such a vibration environment as automobile or transportation.

Read the Operation Manual thoroughly prior to the use (placement, operation, maintenance and inspection) to put the product in use properly.

Make yourself knowledgeable and familiarize with the devices, safety issues and cautions before handling the product.

After reading the Operation Manual or the like, keep it in the place where the users can refer to whenever necessary.

Indication by (Warning Label) on the product

Either or all of the following indications are given by the Warning Labels depending on the type of the driver or stepping motor.

This label is stuck near the high voltage part such as the electrically charged or cover-protected section, warning that the place where it is likely to cause an electric shock.

This label is stuck on the place where the driver or stepping motor body should be easily acknowledged, warning that it is likely to cause burns from high temperature.

This label is stuck near the GND terminals of the driver or stepping motor for which grounding is required, suggesting that the terminals should be actually grounded.

This label is stuck for the driver or stepping motor to which the power source is applied in the voltage exceeding the safety standard, drawing attention against the electric shock.

Safety ranks of the cautions

Following four ranks are provided.

DANGER Improper operations or use is most likely to result in serious injury or death.

CAUTION Improper operations or use is likely to result in average or minor injury, or in property damage.

In spite of the cautions with the ⚠CAUTION CAUTION label, it may cause serious results. Either the contents of the labels is describing important cautions to be followed inevitably.

PROHIBITED Indicates what shall not be done.

COMPULSORY Indicates what shall be done.

DANGER

＜General matters＞

1. Do not use the product in an explosive, flammable or corrosive atmosphere, watery place or near a combustible material. Doing so may cause injury or fire.
2. Have a person with expert knowledge for performing the transportation, placement, wiring, operation, maintenance or inspection of the product. Without such knowledge, it may cause an electric shock, injury or fire.
3. Do not work for wiring, maintenance servicing or inspection with the electric power on. Perform either of those five minutes after turning the power off, or otherwise, it may cause an electric shock.
4. When the protective functions of the product is activated, turn the power off immediately and eliminate the cause. If continuing the operation without eliminating the cause, the product may operate improperly and cause injury or a breakdown of the system devices.
5. Stepping motor may run out of order at the operating and stopping occasions, depending on the magnitude of the load. Put the product into use after confirming with the adequate trial test operation in the maximum load conditions that the product performs reliable operation. Doing otherwise may cause a breakdown of the system. (Should the product run out of order in the use to drive upward/downward, it may cause a fall of the load.)
6. Do not touch the internal parts of the driver. Doing so may cause an electric shock.

＜Wiring＞

7. Do not connect the stepping motor directly with the commercial power outlet. Doing so may cause an electric shock, injury or fire. The power shall be supplied to the stepping motor through the driving circuit.
8. Use the electric power source within the rated input voltage. Using otherwise may cause fire or an electric shock.
9. Connect the driver and stepping motor to the ground. Using without grounding may cause an electric shock.
10. Do not harm, forcibly put a stress, or load a heavy article on the cable or get it caught between the articles. Doing so may cause an electric shock.
11. Perform wiring with the power cable as instructed by the wiring diagram or the Operation Manual. Doing otherwise may cause an electric shock or fire.

＜Operation＞

12. Be sure not to touch the rotating part of the stepping motor during its operation. Touching it may cause injury.
13. Neither reach or touch the electric terminals while electric power is on. Doing so may cause an electric shock.
14. Never disconnect any of the connectors while electric power is on. Doing so may cause an electric shock and corruption.

＜General matters＞

1. Prior to placement, operation, maintenance servicing or inspection, be sure to read the Operation Manual and follow the instructions to perform those. Failure to follow the instructions may cause an electric shock, injury or fire.
2. Do not use the driver or the stepping motor outside the specified conditions. Doing so may cause an electric shock, injury or fire.
3. Do not insert a finger or a thing into the opening of the product. Doing so may cause an electric shock, injury or fire.
4. Do not use the damaged driver or stepping motor. Doing so may cause injury, fire or the like.
5. Use the driver and stepping motor in the designated combination. Using otherwise may cause fire or a trouble.
6. Be careful that the temperature rises in the operating driver, stepping motor or peripheral devices. Failure to be careful may cause a burn.

＜Unpacking＞

7. Unpack while confirming the ceiling. Failure to do so may cause injury.
8. Confirm if the product is the one having been ordered. Installing an incorrect product may cause a breakdown.

＜Wiring＞

9. Do not perform measurement of the insulation resistance or withstand insulation voltage of the product. Doing so may cause a breakdown. Instead, contact with us for such inspection.
10. Perform wiring conforming to the technical standards of electric facility or the internal rule. Doing otherwise may cause burning or fire.
11. Ensure that wiring has been correctly done. Operating without correct wiring may cause the stepping motor to run out of control and result in injury.
12. Take insulation process for the attached condenser or the external resistance connection terminals. Failure to do so may cause an electric shock.

＜Placement＞

13. Do not climb or attach a heavy article on the product. Doing so may cause injury.
14. Neither block nor stuff the aspiration/exhaust vent with a foreign particle. Doing so may cause fire.
15. Follow the instructions for the direction to place. Failure to do so may cause a trouble.
16. Keep a distance as instructed by the Operation Manual for the driver from the inner surface of the control console or other devices. Failure to do so may cause a trouble.
17. Place the product with a great care so as to prevent from the danger such as a tumble or a turnover.

CAUTION

18. Mount the product on an incombustible material such as metal. Doing otherwise may cause fire.
19. Confirm the rotating direction before connecting with the mechanical device. Failure to do so may cause injury or a breakdown.
20. Do not touch the motor output spindle (including the key slot and gears) with a bare hand. Doing so may cause injury.

＜Operation＞

21. The stepping motor is not equipped with any protective device. Take protective measures using an over-current protective relay, a ground fault interrupter, a protective device from excess temperature, and an emergency stopping device. Failure to do so may cause injury or fire.
22. Do not touch the product for a period after the power is on or has been turned off, since the driver and stepping motor remain in the high temperature. Doing so may cause burns. Especially the temperature rises considerably of the stepping motor depending on the operating conditions. Use the motor on the condition so that its surface temperature becomes 100°C or under.
23. Stop the operation immediately when an emergency occurs. Failure to do so may cause an electric shock, injury or fire.
24. Do not change adjustment to an extreme, for such a change results in the unstable operation. Doing so may cause injury.
25. When conducting the trial operation, make the stepping motor fixed firmly, and confirm the operation by disconnecting with the mechanical system before connecting with it. Failure to do so may cause injury.
26. When the alarm has been activated, eliminate the cause and ensure the safety to resume operation. Failure to do so may cause injury.
27. When the electric power recovers after the momentary interruption, do not approach the devices because the system may re-start operation by itself. (Set the system so as to secure the safety even when it re-start on such occasion.) Failure to do so may cause injury.
28. Confirm that the electric power supply is all proper conforming to the specifications. Failure to do so may cause a trouble.
29. The brake mechanism of the motor with the electro-magnetic brake is to hold the movable section and the motor position. Do not use it as a safety measure, or doing so may cause the breakdown of the system.
30. Fix the key firmly when operating the motor with key individually. Failure to do so may cause injury.

＜Maintenance services＞

31. Be careful when performing maintenance services or inspection about the temperature which rises highly in the driver and stepping motor frame. Failure to do so may cause burns.
32. It is recommended to replace the electrolytic condenser of the driver with a new one for securing the preventive measure after using for 5 years, the expected life in the average 40°C. The expected life of the fuse and cooling fan motor is 10 years in the average 40°C. Thus, the periodical replacement is recommended.
33. Contact with us for repair. If the product is disassembled by the user, it may put it out of action.

＜Transportation＞

34. Handle the product with care during transportation so as to prevent from the danger such as a tumble or a turnover.
35. Do not hold with the cable or the motor spindle. Doing so may cause a trouble or injury.

＜Retirement＞

36. When scrapping the driver or stepping motor, treat it for the general industrial waste.

PROHIBITED

＜Storage＞

1. Avoid the place exposed to rain or water drops, or in an environment with hazardous gas or liquid for storing the product. Failure to do so may cause a trouble.

＜Maintenance services＞

2. Do not assemble or repair the product. Doing so may cause fire or an electric shock.

＜General matters＞

3. Do not remove the rating plate.

COMPULSORY

＜Storage＞

1. Store the product within the specified conservation temperature and humidity in the place not exposed to the sun beam.
2. If the driver has been stored for a long period (3 years or longer for a guide), consult with us. The capacitance may have decreased with the electrolytic condenser due to the long period storage, and it may cause a trouble.

＜Operation＞

3. Install an external emergency stop circuit to turn the power off for the instant halt of operation.
4. Put the product into operation in the specified ambient temperature and humidity.

＜Transportation＞

5. Excess loading of the product on the carrier may cause the load to fall in pieces. Follow the instructions given outside the package.

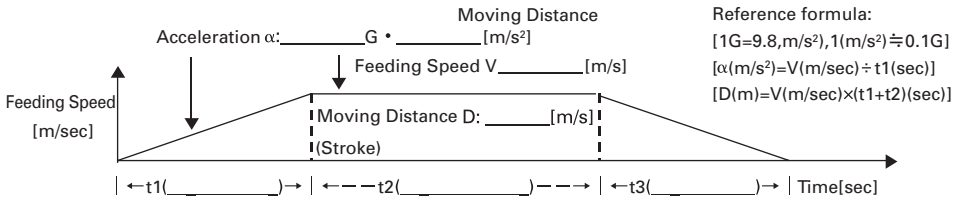
Inquiry Check Sheet

Please provide the following information when placing an order or making an inquiry.
Also feel free to include any questions that require our attention.

Company Name:
Department:
Telephone :
Fax:
1) Application:
2) Name of Machinery:
3) Number of Units:

Date:

To contact us:
Phone: +81 3 3917 5157
Fax: +81 3 3917 0643

	Item	Contents
❶	Name of target equipment	Equipment name, category (transport, processing, test, other)
❷	Name of servo axis	Axis name, axial mechanism (horizontal/vertical), brake mechanism (yes/no)
❸	Current condition of above axis	Manufacturer Name ( ) Series Name ( ) Motor Capacity ( ) Hydraulic, Mechanical, or New System ( )
❹	Positioning accuracy	± mm / ± μm
❺	Operation pattern	 Reference formula: [1G=9.8,m/s²),1(m/s²)≒0.1G] [α(m/s²)=V(m/sec)÷t1(sec)] [D(m)=V(m/sec)×(t1+t2)(sec)]
❻	Mechanism	Ball-screw/screw-rotation type (horizontal), ball-screw/nut-rotation type (horizontal), rack and pinion (horizontal), belt/chain (horizontal), rotary table, roll feed, instability
❼	Mechanical structure	WT (table mass) kg / WL (work mass) kg / WA (mass of other drive parts) kg WR (rack mass) kg / WB (belt/chain mass) kg / WC (counterbalance mass) kg Fa (external force in axial direction) N / Fb (ball-screw preload) N / T (roll pushing force) N Dr1 (drive-side roll diameter) mm / Dr2 (follower-side roll diameter) mm Lr1 (drive-side roll length) mm / Lr2 (follower-side roll length) mm / G (reduction ratio) JG (speed-reducer inertia) kg·m² / JC (coupling inertia) kg·m² JN (nut inertia) kg·m² / JO (other motor-axis conversion inertia) kg·m² Db (ball-screw diameter) mm / Lb (ball-screw axial length) mm / Pb (ball-screw lead) mm Dp (pinion/pulley diameter) mm / Lp (pinion axial length) mm / Tp (pulley thickness) mm Dt (table diameter) mm / Dh (table-support diameter) mm / LW (load shift from axis) mm Ds (table shaft diameter) mm / Ls (table shaft length) mm ρ (specific gravity of ball-screw/pinion/pulley/table-shaft material) kg/cm³ μ(friction coefficient between sheet and sliding-surface/support-section/roll) / ρ1 (specific gravity of roll-1 material) kg/cm³ ρ2 (specific gravity of roll-2 material) kg/cm³ / κ(internal friction coefficient of preload nut) η(mechanical efficiency) / JL (load inertia of motor-axis conversion) kg·m² TF (friction torque of motor axis conversion) N·m / TU (imbalance torque of motor axis conversion) N·m
❽	Speed reducer	Customer-provided (/); Sanyo standard (planet/spur/no-backlash-planet:: /); other (/)
❾	Sensor type	Sensor type specified (yes / no) Yes: (incremental , optical absolute , optical absolute [resolver absolute with incremental function]) Resolution ( )
❿	Input format	Position , speed, torque, communications (SERCOS / CAN / DeviceNet) other ( )
⓫	Upper-level equipment (controller)	Sequencer , laptop , customer-developed product , Sanyo-provided , other ( )
⓬	Usage environment and other requirements	Cutting , clean-room use , anti-dust measures , other ( )
⓭	Estimated production	Single product: ( ) units/month ( ) units/year
⓮	Development schedule	Prototype period: ( )Year ( )Month Production period: ( )Year ( )Month
⓯	Various measures	Related documentation (already submitted ; send later by mail) Visit/PR desired (yes / no) Meeting desired (yes / no)
⓰	Miscellaneous (questions, pending problems, unresolved issues, etc.)	

■ 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 drivers and motors 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.

http://www.sanyodenki.co.jp

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*Remarks : Specifications Are SubjectTo Change Without Notice.

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