

SANMOTION

5-PHASE STEPPING SYSTEMS

F5



Ver.4

SANYO DENKI

SANMOTION

5-PHASE STEPPING SYSTEMS

F5



AC input Set model Driver · Stepping Motor · Connector



DC input Set model Driver · Stepping motor



AC input Driver



DC input Driver



Stepping Motor

Frang size : 28mm sq. to 60mm sq., ϕ 60mm to ϕ 106mm



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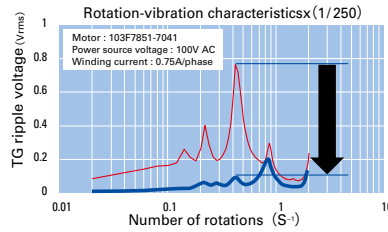
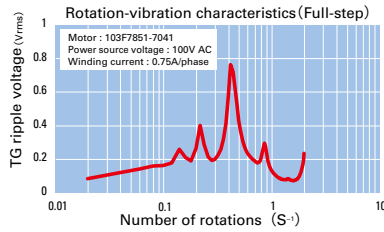
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Lower vibration

AC input
DC input

AC input

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



■ Automicro function

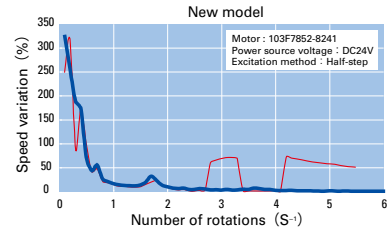
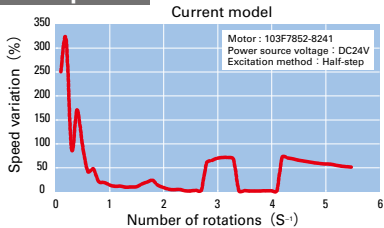
Vibration suppression is executed internally and independently from the controller.

■ 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.

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

DC input

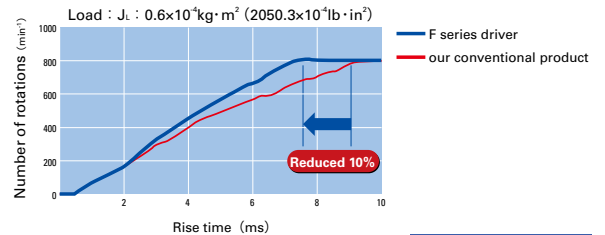


2

Shorter cycle time

AC input

- Improved response (up to 10% compared to our conventional product) shortens the machine cycle time for repetitive operations.

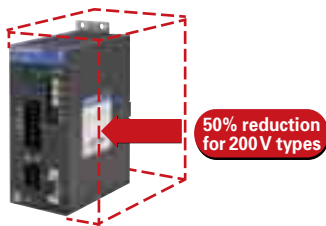


3

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 our conventional product.



4

Easy maintenance

AC input

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



Compliance with Safety 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.



Set model

AC input

Standard model

P.9

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

Motor flange size

42mm sq. (1.65inch sq.), 60mm sq. (2.35inch sq.),
Ø86mm (Ø3.39inch), Ø106mm (Ø4.17inch)



CE / UL model

P.11

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

Motor flange size

42mm sq. (1.65inch sq.), 60mm sq. (2.35inch sq.),
Ø86mm (Ø3.39inch), Ø106mm (Ø4.17inch)



Low-backlash gear model

P.13

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

Motor flange size

42mm sq. (1.65inch sq.), 60mm sq. (2.35inch sq.),
Ø86mm (Ø3.39inch)

Reduction gear ratios

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



Harmonic gear model

P.16

This set utilizes a harmonic gear.

Motor flange size

42mm sq. (1.65inch sq.), 60mm sq. (2.35inch sq.),
Ø86mm (Ø3.39inch)

Reduction gear ratios

1/30, 1/50, 1/100



Electromagnetic brake model

P.18

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

42mm sq. (1.65inch sq.), 60mm sq. (2.35inch sq.),
Ø86mm (Ø3.39inch)



DC input

Standard model

P.29

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

Motor flange size

28mm sq. (1.10inch sq.), 42mm sq. (1.65inch sq.),
60mm sq. (2.35inch sq.), Ø86mm (Ø3.39inch)



Low-backlash gear model

P.31

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

Motor flange size

42mm sq. (1.65inch sq.), 60mm sq. (2.35inch sq.),
Ø86mm (Ø3.39inch)

Reduction gear ratios

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



Spur gear model

P.34

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

Motor flange size

28mm sq. (1.10inch sq.)

Reduction gear ratios

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



Harmonic gear model

P.35

This set utilizes a harmonic gear.

Motor flange size

28mm sq. (1.10inch sq.), 42mm sq. (1.65inch sq.),
60mm sq. (2.35inch sq.), Ø86mm (Ø3.39inch)

Reduction gear ratios

1/30, 1/50, 1/100



Electromagnetic brake model

P.37

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

42mm sq. (1.65inch sq.), 60mm sq. (2.35inch sq.),
Ø86mm (Ø3.39inch)



System configuration

Flange side

Low-backlash gear model

Low backlash gear



Motor flange size
42mm sq. (1.65inch sq.) / 60mm sq.
(2.35inch sq.) / ϕ 86mm (ϕ 3.39inch)

Harmonic gear model

Harmonic gear



Motor flange size
42mm sq. (1.65inch sq.) / 60mm sq.
(2.35inch sq.) / ϕ 86mm (ϕ 3.39inch)



Standard model : F series motor
42mm sq. (1.65inch sq.) / 60mm sq. (2.35inch sq.)
/ ϕ 86mm (ϕ 3.39inch) / ϕ 106mm (ϕ 4.17inch)

CE / UL model : M series motor
42mm sq. (1.65inch sq.) / 60mm sq. (2.35inch sq.)
/ ϕ 86mm (ϕ 3.39inch) / ϕ 106mm (ϕ 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

Electromagnetic brake



Motor flange size
42mm sq. (1.65inch sq.) / 60mm sq.
(2.35inch sq.) / ϕ 86mm (ϕ 3.39inch)

Brake power source (DC24V)



Required for brake-equipped stepping motor models.

③ Motor cable (optional)

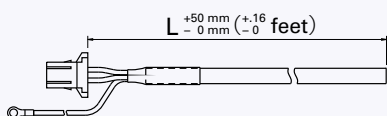
■ Bundled connectors (set models only)

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

■ Optional cables

① 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

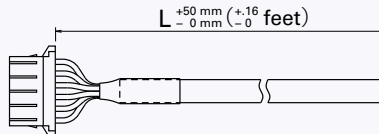


Lead wire	600V vinyl cab tire cable 3-core AWG16 (1.25mm ²)
Housing	1-178128-2 (AMP)
Contact	1-175218-5 (AMP)
Round-type crimp contact	1.25M4 (J.S.T. Mfg Co.)

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

③ 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

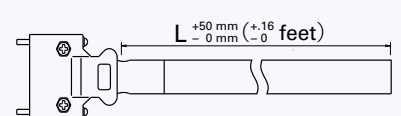


Lead wire	600V vinyl cab tire cable 6-core AWG16 (0.75mm ²)
Housing	1-178128-6 (AMP)
Contact	1-175218-5 (AMP)

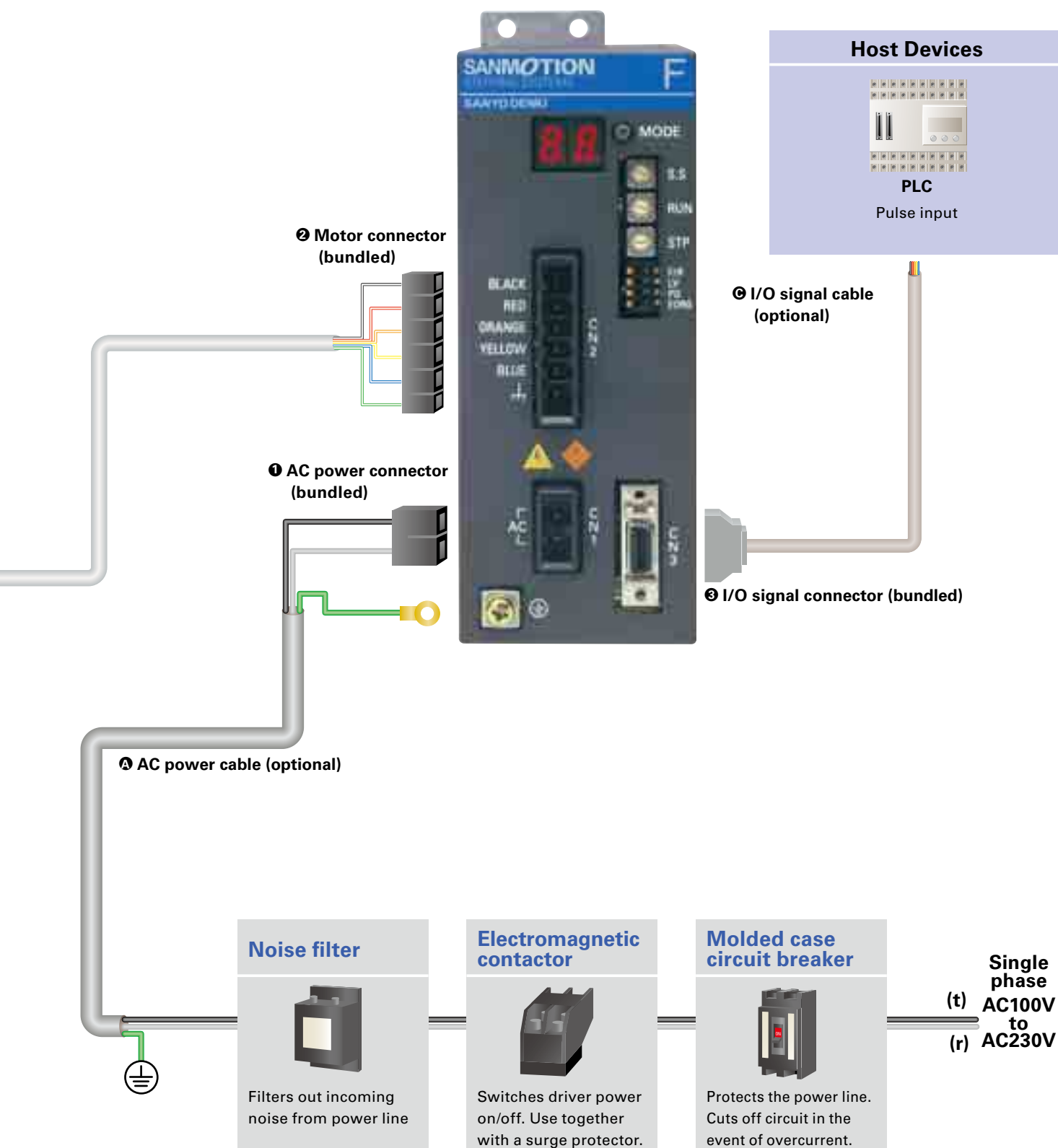
● Cables 10m (32.81 feet) or longer are available upon request.

③ I/O signal cable

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

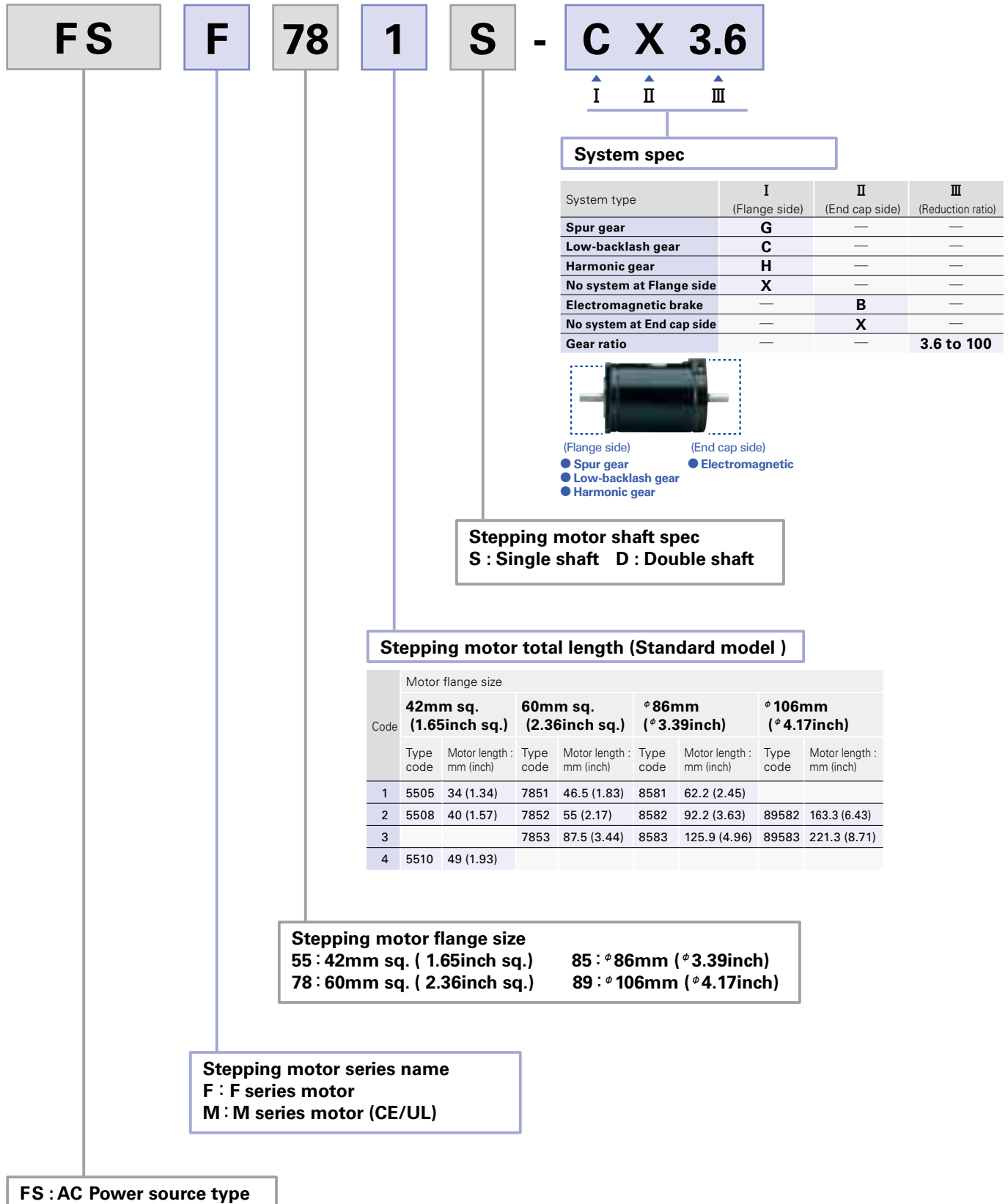


Lead wire	7-pair PVC shielded cable AWG28 (0.08mm ²)
Shell	10314-52A0-008 (3M)
Plug	10114-3000PE (3M)



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 sq. (2.36inch sq.) flange, and 46.5mm (1.83inch) motor length, equipped with low-backlash gear (reduction ratio of 1/3.6).



Set Model Configuration This is a set comprising a driver, motor and connectors.

Bundled driver (AC input) model number : FS1W075P00

Step angle / 0.72° Rated current 0.75A

Model	Motor flange size	Single shaft			Double shafts		
		Set part number	Motor model number	Connector number Note)	Set part number	Motor model number	Connector number Note)
Standard model	42mm sq.	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 sq.	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 sq.	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	103F5505-70CCK4	PM-AP-065	FSF551D-CX36	103F5505-70CCK1	PM-AP-065
	60mm sq.	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	103F7851-70CCK4	PM-AP-064	FSF781D-CX36	103F7851-70CCK1	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	103F8581-70CCK4	PM-AP-064	FSF851D-CX36	103F8581-70CCK1	PM-AP-064
Harmonic gear model	42mm sq.	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 sq.	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 sq.	FSF551S-XB	103F5505-70XB41	PM-AP-065	—	—	—
		FSF552S-XB	103F5508-70XB41	PM-AP-065	—	—	—
		FSF554S-XB	103F5510-70XB41	PM-AP-065	—	—	—
	60mm sq.	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 sq.	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 sq.	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

AC input

DC input

Stepping motor

Dimensions

Standard model

F series driver + F series motor

Motor flange size

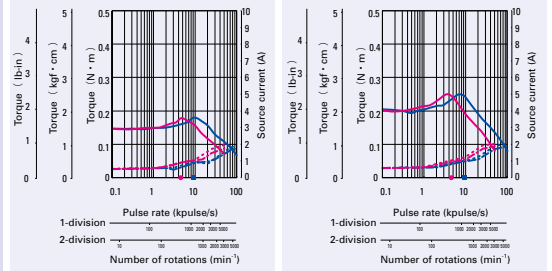
42mm sq. (1.65inch sq.), 60mm sq. (2.35inch sq.),
Ø86mm (Ø3.39inch), Ø106mm (Ø4.17inch)



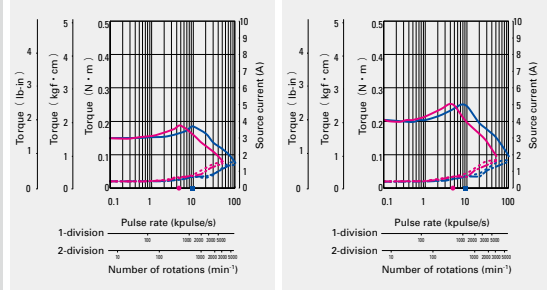
Size	Motor flange size	42mm sq. (1.65inch sq.)	
	Motor length	34mm (1.34inch)	40mm (1.57inch)
Set part number	Single shaft	FSF551S	FSF552S
	Double shaft	FSF551D	FSF552D
Holding torque	N·m(oz·in)	0.13 (18.41)	0.18 (25.49)
Rotor inertia	$\times 10^{-4}$ kg·m ² (oz·in ²)	0.03 (0.16)	0.053 (0.29)
Mass (Weight)	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.

AC100V



AC200V

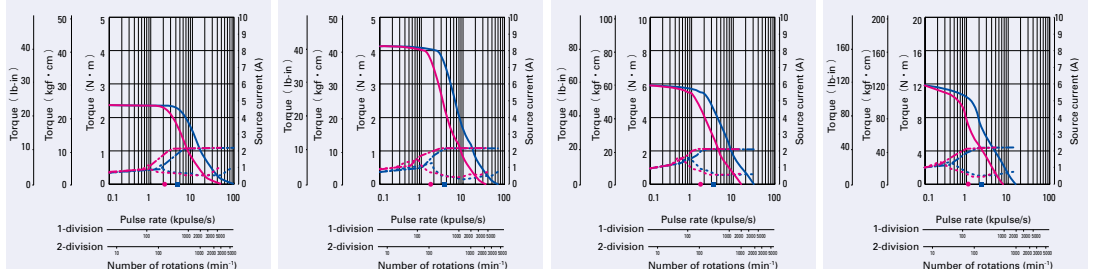


The data are measured under the drive condition of our company. The drive torque may very depending on the accuracy of customer-side equipment.

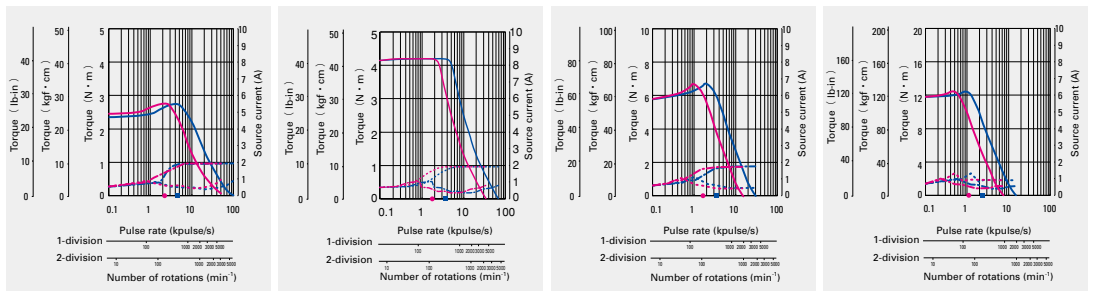
Size	Motor flange size	Ø 86mm (Ø 3.39inch)			Ø 106mm (Ø 4.17inch)	
	Motor length	62.15mm (2.47inch)	92.2mm (3.63inch)	125.85mm (4.95inch)	163.3mm (6.43inch)	
Set part number	Single shaft	FSF851S	FSF852S	FSF853S	FSF892S	
	Double shaft	FSF851D	FSF852D	FSF853D	FSF892D	
Holding torque	N·m(oz·in)	2.06 (291.7)	4.02 (569.3)	6.17 (873.7)	10.8 (1529.4)	
Rotor inertia	$\times 10^{-4}$ kg·m ² (oz·in ²)	1.45 (7.93)	2.9 (15.86)	4.4 (24.06)	14.6 (79.83)	
Mass (Weight)	kg (lbs)	1.5 (3.3)	2.5 (5.5)	3.5 (7.7)	7.5 (16.5)	
Allowable thrust load	N (lbs)	60 (13.5)	60 (13.5)	60 (13.5)	100 (22.5)	
Allowable radial load (Note1)	N (lbs)	220 (49.5)	220 (49.5)	220 (49.5)	360 (81)	

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

AC100V



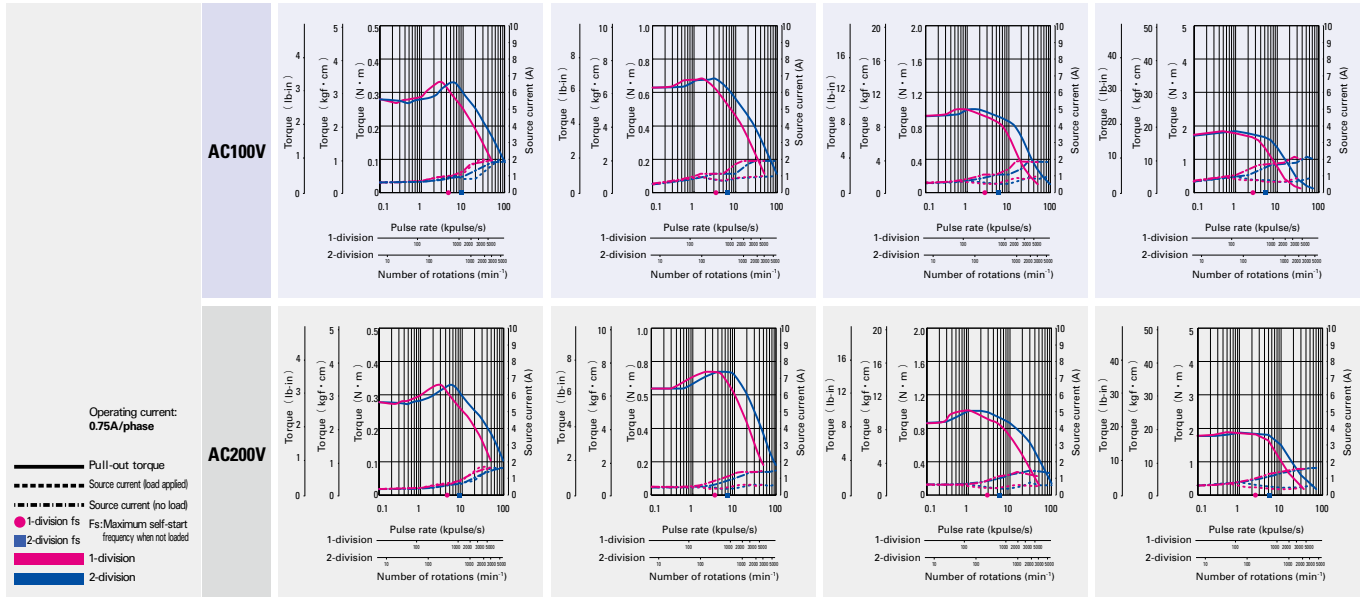
AC200V



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 sq. (1.65inch sq.)		60mm sq. (2.36inch sq.)			
	Motor length	49mm (1.93inch)		46.5mm (1.83inch)	55mm (2.17inch)	87.5mm (3.45inch)	
Set part number	Single shaft	FSF554S		FSF781S	FSF782S	FSF783S	
	Double shaft	FSF554D		FSF781D	FSF782D	FSF782D	
Holding torque	N·m(oz·in)	0.26 (36.82)		0.6 (85.0)	0.93 (131.7)	1.79 (253.5)	
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2 (\text{oz} \cdot \text{in}^2)$	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 ^(Note 1)	N (lbs)	35 (8.75)		80 (18)	80 (18)	80 (18)	

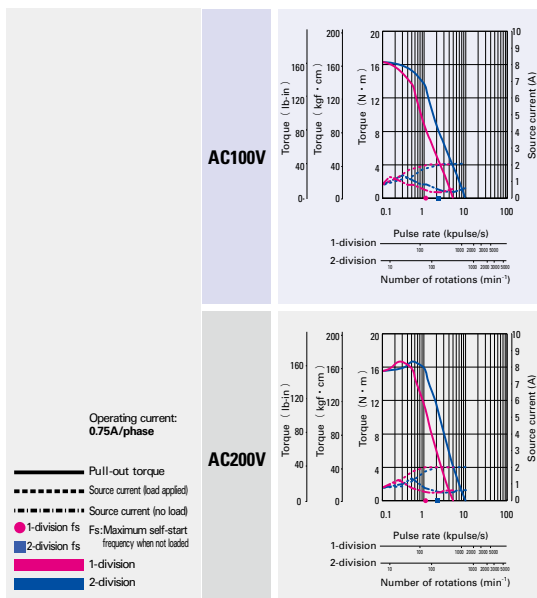
AC input



DC input

Stepping motor

Size	Motor flange size	$\phi 106\text{mm} (\phi 4.17\text{inch})$
	Motor length	221.3mm (8.71inch)
Set part number	Single shaft	FSF893S
	Double shaft	FSF893D
Holding torque	N·m(oz·in)	16 (2265.7)
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2 (\text{oz} \cdot \text{in}^2)$	22 (120.28)
Mass (Weight)	kg (lbs)	10.5 (23.1)
Allowable thrust load	N (lbs)	100 (22.5)
Allowable radial load ^(Note 1)	N (lbs)	360 (81)



Dimensions

CE / UL model

F series driver + M series motor

Motor flange size

42mm sq. (1.65inch sq.), 60mm sq. (2.35inch sq.),
Ø86mm (Ø3.39inch), Ø106mm (Ø4.17inch)

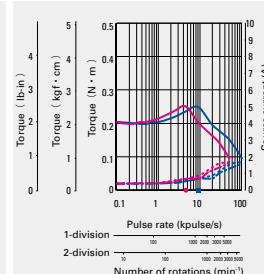
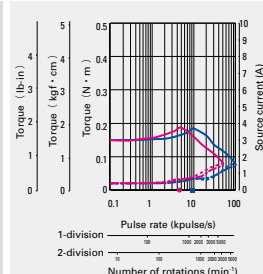
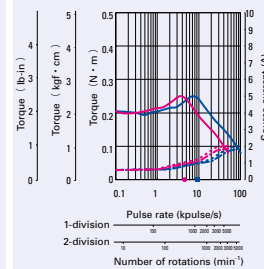
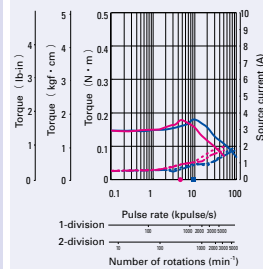


AC100V

AC200V

Operating current:
0.75A/phase

— Pull-out torque
- - - Source current (load applied)
- - - Source current (no load)
● 1-division fs
■ 2-division fs
■ 1-division
■ 2-division



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	Ø86mm (Ø3.39inch)				Ø106mm (Ø4.17inch)	
	Motor length	62.15mm (2.47inch)	92.2mm (3.63inch)	125.85mm (4.95inch)		163.3mm (6.43inch)	
Set part number	Single shaft	FSM851S	FSM852S	FSM853S		FSM892S	
	Double shaft	FSM851D	FSM852D	FSM853D		FSM892D	
Holding torque	N·m(oz·in)	2.06 (291.7)	4.02 (569.3)	6.17 (873.7)		10.8 (1529.4)	
Rotor inertia	×10 ⁻⁴ kg·m ² (oz·in ²)	1.45 (7.93)	2.9 (15.86)	4.4 (24.06)		14.6 (79.83)	
Mass (Weight)	kg (lbs)	1.5 (3.3)	2.5 (5.5)	3.5 (7.7)		7.5 (16.5)	
Allowable thrust load	N (lbs)	60 (13.5)	60 (13.5)	60 (13.5)		100 (22.5)	
Allowable radial load (Note1)	N (lbs)	220 (49.5)	220 (49.5)	220 (49.5)		360 (81)	

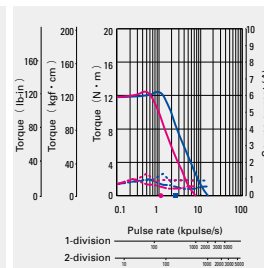
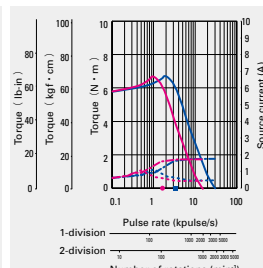
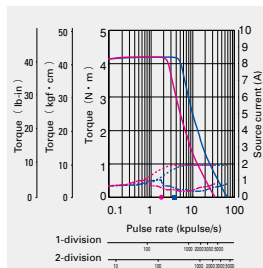
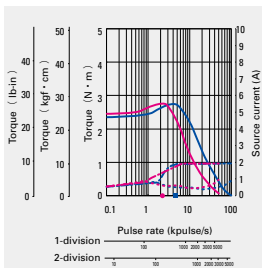
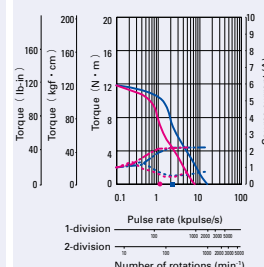
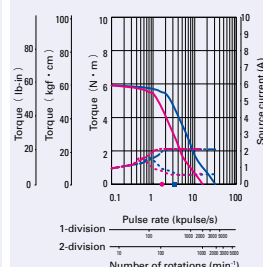
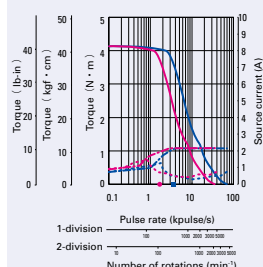
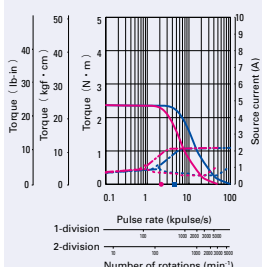
(Note1) When load is applied at 1/3 length from output shaft edge.

AC100V

AC200V

Operating current:
0.75A/phase

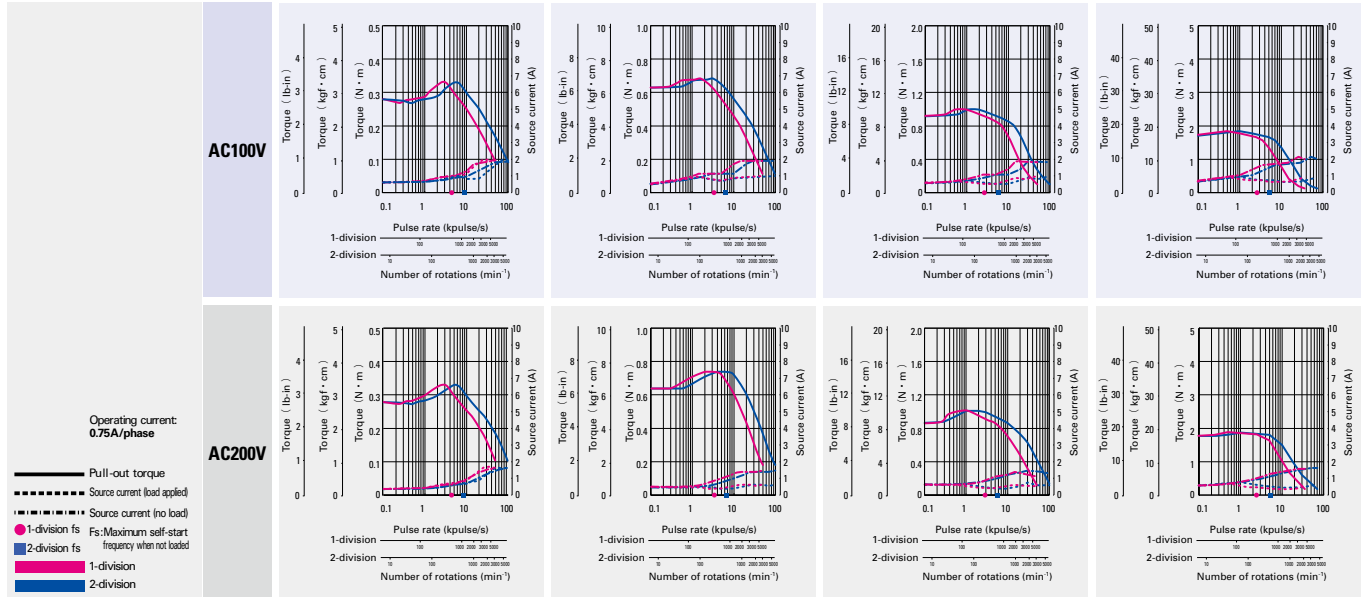
— Pull-out torque
- - - Source current (load applied)
- - - Source current (no load)
● 1-division fs
■ 2-division fs
■ 1-division
■ 2-division



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 sq. (1.65inch sq.)		60mm sq. (2.36inch sq.)			
	Motor length	49mm (1.93inch)		46.5mm (1.83inch)	55mm (2.17inch)	87.5mm (3.44inch)	
Set part number	Single shaft	FSM554S		FSM781S	FSM782S	FSM783S	
	Double shaft	FSM554D		FSM781D	FSM782D	FSM783D	
Holding torque	N·m(oz·in)	0.26 (36.82)		0.6 (85.0)	0.93 (131.7)	1.79 (253.5)	
Rotor inertia	$\times 10^{-4}$ kg·m ² (oz·in ²)	0.065 (0.36)		0.275 (1.50)	0.4 (2.19)	0.84 (4.59)	
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 ^(Note 1)	N (lbs)	35 (8.75)		80 (18)	80 (18)	80 (18)	

AC input

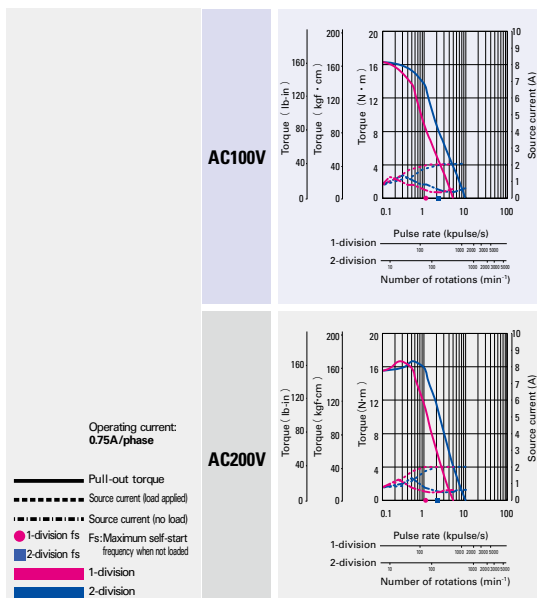


DC input

Stepping motor

Size	Motor flange size	$\phi 106$ mm ($\phi 4.17$ inch)
	Motor length	221.3mm (8.71inch)
Set part number	Single shaft	FSM893S
	Double shaft	FSM893D
Holding torque	N·m(oz·in)	16 (2265.7)
Rotor inertia	$\times 10^{-4}$ kg·m ² (oz·in ²)	22 (120.28)
Mass (Weight)	kg (lbs)	10.5 (23.1)
Allowable thrust load	N (lbs)	100 (22.5)
Allowable radial load ^(Note 1)	N (lbs)	360 (81)

Dimensions



Low-backlash gear model

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

Motor flange size

42mm sq. (1.65inch sq.), 60mm sq. (2.35inch sq.),
Ø86mm (Ø3.39inch)

Size	Motor flange size	42mm sq. (1.65inch sq.)	
	Motor + gear length	64.5mm (2.54inch)	64.5mm (2.54inch)
Set part number	Single shaft	FSF551S-CX3.6	FSF551S-CX7.2
	Double shaft	FSF551D-CX3.6	FSF551D-CX7.2
Allowable torque	N·m(oz·in)	0.343 (48.6)	0.686 (97.1)
Rotor inertia	×10 ⁻⁴ kg·m ² (oz·in ²)	0.03 (0.16)	0.03 (0.16)
Basic step angle	0.2	0.1	0.1
Gear ratio	1 : 3.6	1 : 7.2	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	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.



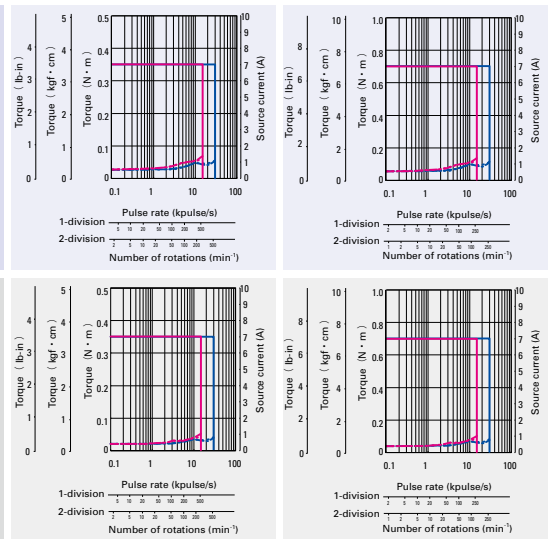
AC100V

AC200V

Operating current:
0.75A/phase

— Allowable torque
- - - Source current (load applied)
- · - · - Source current (no load)

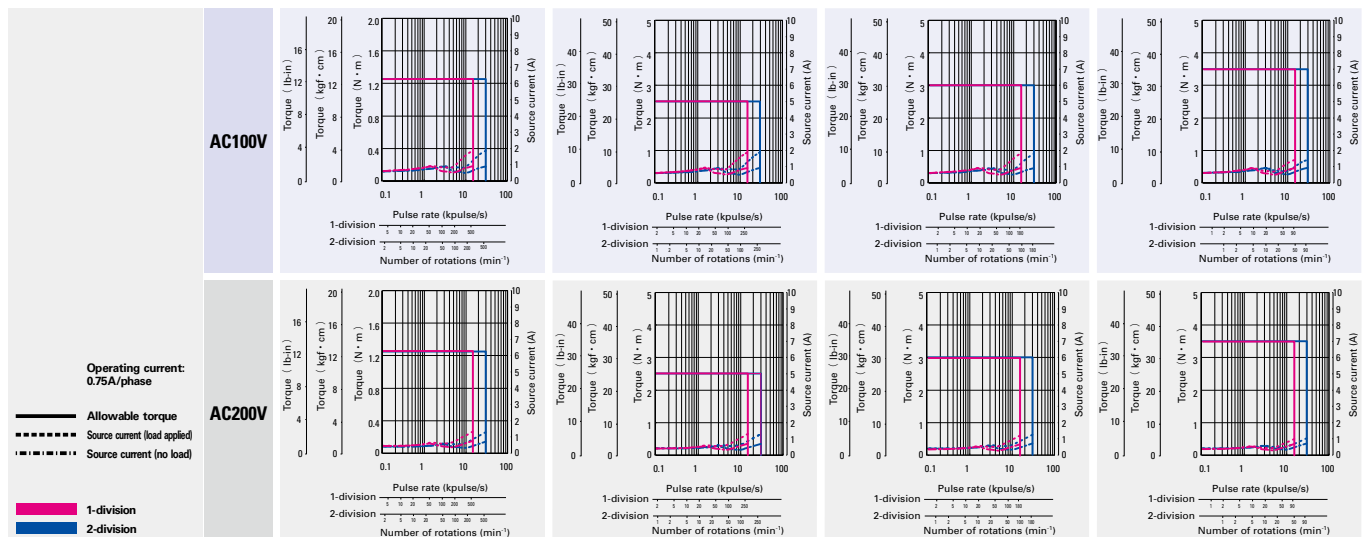
1-division
2-division



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

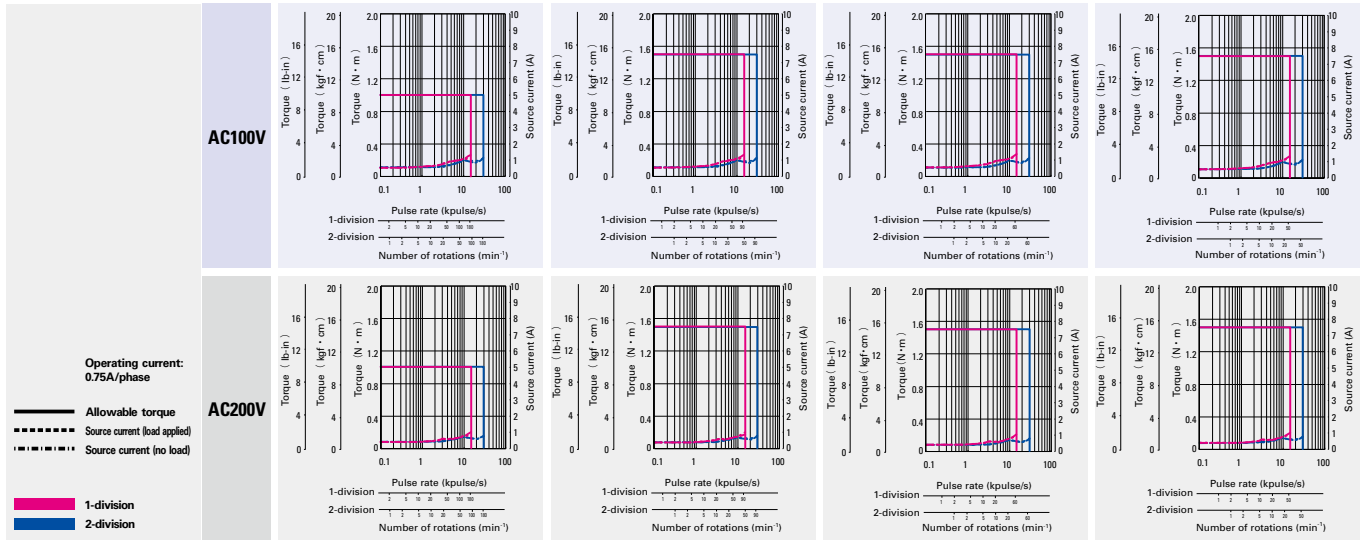
Size	Motor flange size	60mm sq. (2.36inch sq.)			
	Motor + gear length	92mm (3.62inch)	92mm (3.62inch)	92mm (3.62inch)	92mm (3.62inch)
Set part number	Single shaft	FSF781S-CX3.6	FSF781S-CX7.2	FSF781S-CX10	FSF781S-CX20
	Double shaft	FSF781D-CX3.6	FSF781D-CX7.2	FSF781D-CX10	FSF781D-CX20
Allowable torque	N·m(oz·in)	1.25 (177.0)	2.5 (354.0)	3 (424.8)	3.5 (495.6)
Rotor inertia	×10 ⁻⁴ kg·m ² (oz·in ²)	0.275 (1.5)	0.275 (1.5)	0.275 (1.5)	0.275 (1.5)
Basic step angle	0.2	0.1	0.072	0.036	0.036
Gear ratio	1 : 3.6	1 : 7.2	1 : 10	1 : 20	1 : 20
Backlash	DEG	0.55	0.25	0.25	0.17
Allowable speed	min ⁻¹	500	250	180	90
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	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.

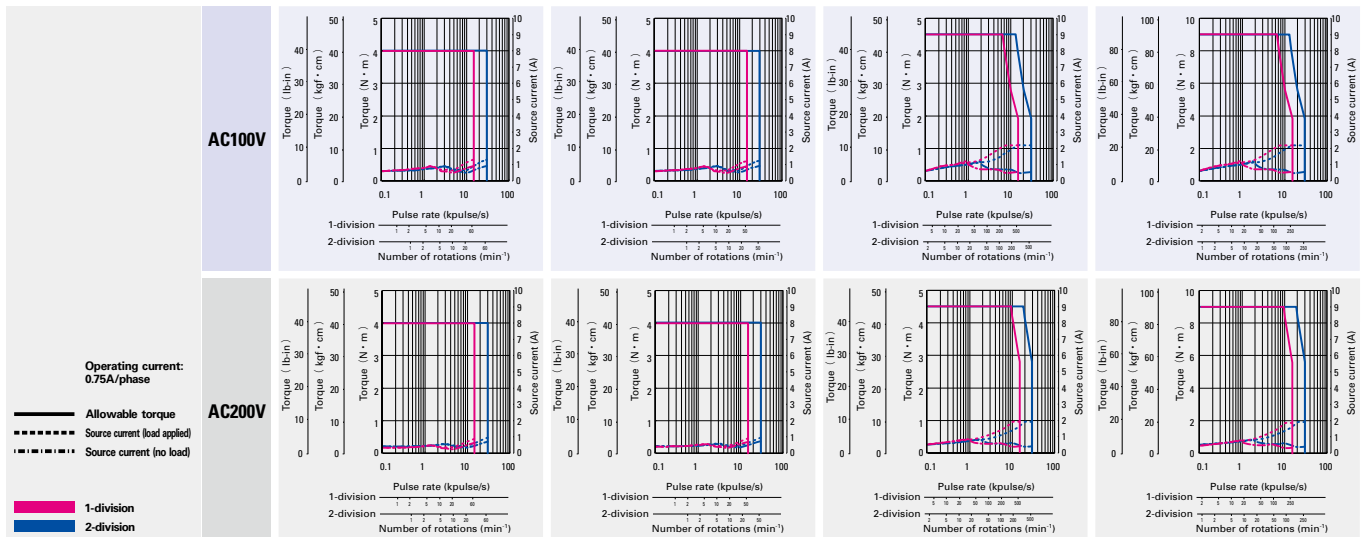


The data are measured under the drive condition of our company. The drive torque may very depending on the accuracy of customer-side equipment.

Size	Motor flange size	42mm sq. (1.65inch sq.)			
	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	FSF551S-CX20	FSF551S-CX30	FSF551S-CX36
	Double shaft	FSF551D-CX10	FSF551D-CX20	FSF551D-CX30	FSF551D-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	$\times 10^{-4}$ kg·m ² (oz·in ²)	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)



Size	Motor flange size	60mm sq. (2.36inch sq.)		φ86mm (φ3.39inch)	
	Motor + gear length	92mm (3.62inch)	92mm (3.62inch)	127.3mm (5.01inch)	127.3mm (5.01inch)
Set part number	Single shaft	FSF781S-CX30	FSF781S-CX36	FSF851S-CX3.6	FSF851S-CX7.2
	Double shaft	FSF781D-CX30	FSF781D-CX36	FSF851D-CX3.6	FSF851D-CX7.2
Allowable torque	N·m(oz·in)	4 (566.4)	4 (566.4)	4.5 (637.2)	9 (1274.5)
Rotor inertia	$\times 10^{-4}$ kg·m ² (oz·in ²)	0.275 (1.5)	0.275 (1.5)	1.45 (7.93)	1.45 (7.93)
Basic step angle		0.024	0.02	0.2	0.1
Gear ratio		1 : 30	1 : 36	1 : 3.6	1 : 7.2
Backlash	DEG	0.17	0.17	0.35	0.22
Allowable speed	min ⁻¹	60	50	500	250
Mass (Weight)	kg (lbs)	0.97 (2.13)	0.97 (2.13)	2.7 (5.94)	2.7 (5.94)
Allowable thrust load	N (lbs)	30 (6.75)	30 (6.75)	60 (13.5)	60 (13.5)
Allowable radial load (Note 1)	N (lbs)	100 (22.5)	100 (22.5)	300 (67.5)	300 (67.5)



AC input

DC input

Stepping motor

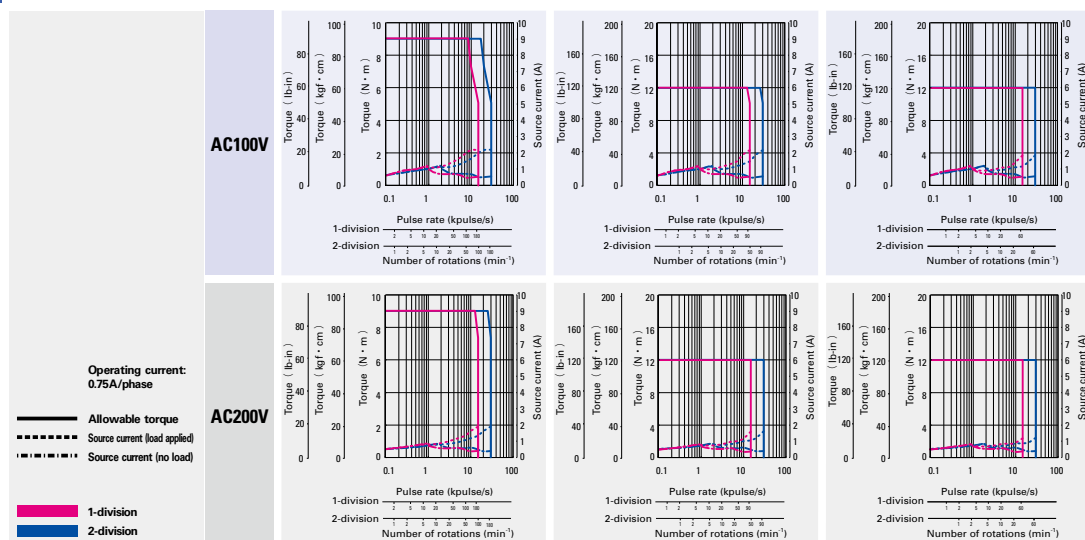
Dimensions

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)	127.3mm (5.01inch)
Set part number	Single shaft		FSF851S-CX10	FSF851S-CX20	FSF851S-CX30
	Double shaft		FSF851D-CX10	FSF851D-CX20	FSF851D-CX30
Allowable torque	N·m(oz·in)		9 (1274.5)	12 (1699.3)	12 (1699.3)
Rotor inertia	×10 ⁻⁴ kg·m ² (oz·in ²)		1.45 (7.93)	1.45 (7.93)	1.45 (7.93)
Basic step angle			0.072	0.036	0.024
Gear ratio			1 : 10	1 : 20	1 : 30
Backlash	DEG		0.22	0.15	0.15
Allowable speed	min ⁻¹		180	90	60
Mass (Weight)	kg (lbs)		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)
Allowable radial load (Note 1)	N (lbs)		300 (67.5)	300 (67.5)	300 (67.5)

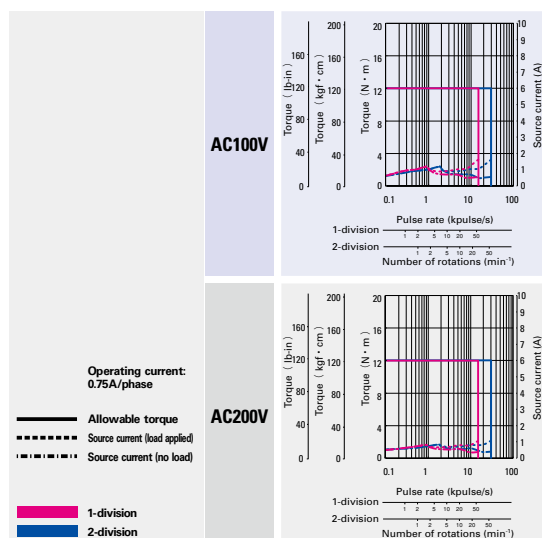
Directions of motor rotation and gear output shaft are the same for models with reduction ratio 1 : 3.6 and 1:7.2, opposite for reduction ratio 1 : 10, 1 : 20 and 1 : 30.
(Note1) When load is applied at 1/3 length from output shaft edge.



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

Size	Motor flange size		φ 86mm (φ 3.39inch)
	Motor + gear length		
Set part number	Single shaft		FSF851S-CX36
	Double shaft		FSF851D-CX36
Allowable torque	N·m(oz·in)		12 (1699.3)
Rotor inertia	×10 ⁻⁴ kg·m ² (oz·in ²)		1.45 (7.93)
Basic step angle			0.02
Gear ratio			1 : 36
Backlash	DEG		0.15
Allowable speed	min ⁻¹		50
Mass (Weight)	kg (lbs)		2.7 (5.94)
Allowable thrust load	N (lbs)		60 (13.5)
Allowable radial load (Note 1)	N (lbs)		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.

Harmonic gear model

F series driver +
F series motor with harmonic gear

Motor flange size

42mm sq. (1.65inch sq.), 60mm sq. (2.35inch sq.),
ø86mm (ø3.39inch)

Size	42mm sq. (1.65inch sq.)		
	Motor flange size		
Set part number	Motor + gear length	73.5mm (2.89inch)	73.5mm (2.89inch)
	Single shaft	FSF551S-HX30	FSF551S-HX50
Allowable torque	Double shaft	FSF551D-HX30	FSF551D-HX50
	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)
	×10 ⁻³ kg·m ² (oz·in ²)	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)
Allowableradial 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.



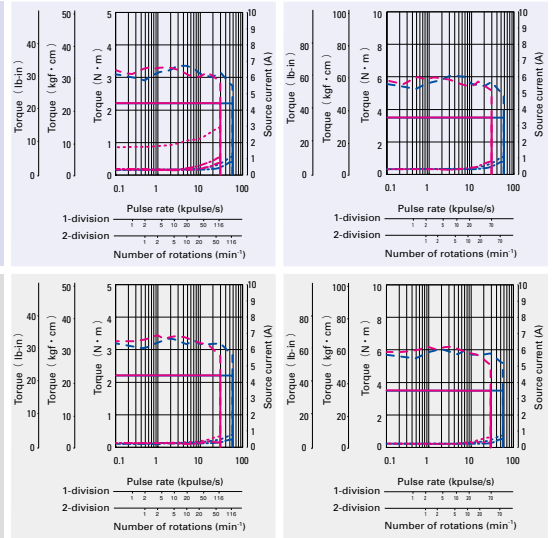
AC100V

AC200V

Operating current:
0.75A/phase

--- Momentary allowable torque
— Allowable torque
----- Source current (load applied)
- - - - - Source current (no load)

1-division
2-division

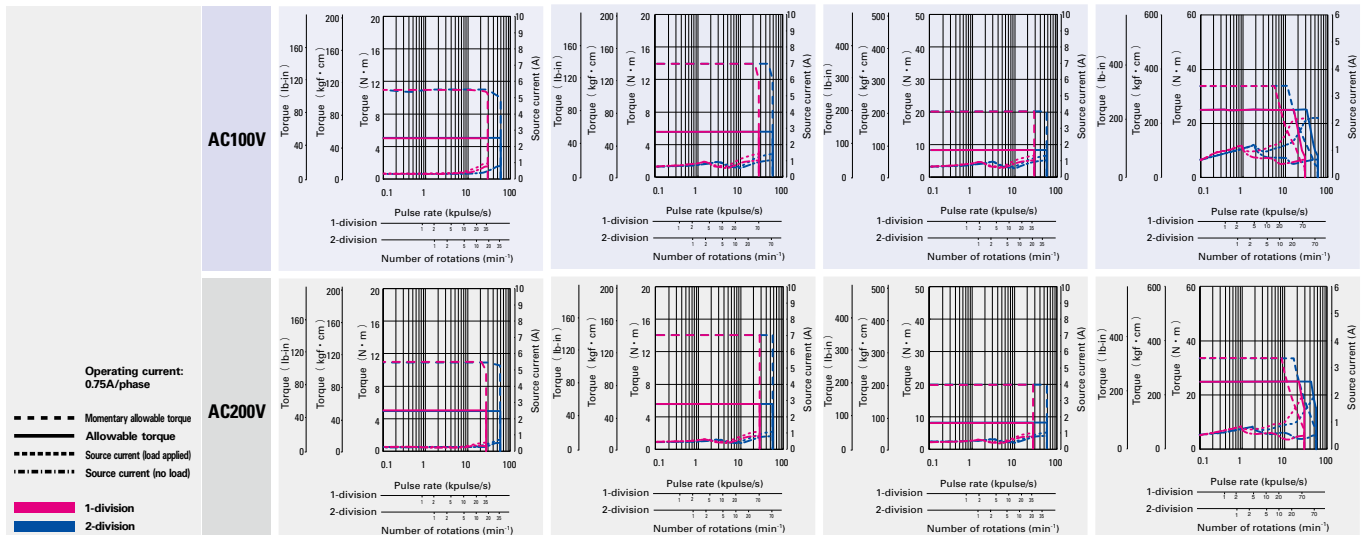


The data are measured under the drive condition of our company. The drive torque may very depending on the accuracy of customer-side equipment.

Size	Motor flange size	42mm sq. (1.65inch sq.)	60mm sq. (2.36inch sq.)		ø86mm (ø3.39inch)
	Motor + gear length	73.5mm (2.89inch)	113.5mm (4.47inch)	113.5mm (4.47inch)	144.15mm (5.68inch)
Set part number	Single shaft	FSF551S-HX100	FSF781S-HX50	FSF781S-HX100	FSF851S-HX50
	Double shaft	PPF551D-HX100	FSF781D-HX50	FSF781D-HX100	FSF851D-HX50
Allowable torque	N·m(oz·in)	5 (708.1)	5.5 (778.8)	8 (1132.9)	25 (3540.2)
Momentary allowable torque	N·m(oz·in)	11 (1557.7)	14 (1982.6)	20 (2832.2)	34 (4814.8)
Rotor inertia	×10 ⁻³ kg·m ² (oz·in ²)	0.042 (0.23)	0.31 (1.695)	0.31 (1.695)	1.65 (9.021)
Basic step angle		0.0072	0.0144	0.0072	0.0144
Gear ratio		1 : 100	1 : 50	1 : 100	1 : 50
Lost motion	Minute	2.4	0.4 to 3 ± 0.28N·m (3.965oz·in)	0.4 to 1.5 ± 0.4N·m (56.645oz·in)	0.4 to 3 ± 1N·m (141.612oz·in)
Allowable speed	min ⁻¹	35	70	35	70
Mass (Weight)	kg(lbs)	0.42 (0.92)	1.2 (2.64)	1.2 (2.64)	3.3 (7.26)
Allowable thrust load	N(lbs)	1150 (258.75)	400 (90)	400 (90)	1400 (315)
Allowable radial load ^(Note 1)	N(lbs)	209 (46.98)	360 (81)	360 (81)	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.

AC input

DC input

Stepping motor

Dimensions

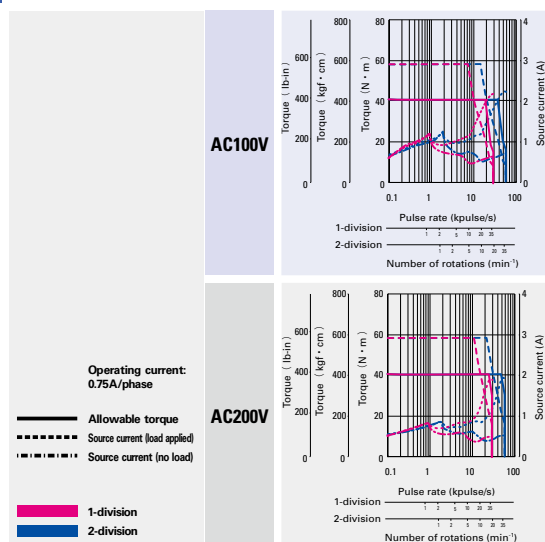
Harmonic gear model

F series driver +
F series motor with harmonic
gear

Size	Motor flange size	Φ86mm (Φ3.39inch)
	Motor + gear length	144.15mm (5.68inch)
Set part number	Single shaft	FSF851S-HX100
	Double shaft	FSF851D-HX100
Allowable torque	N·m(oz·in)	40 (5664.3)
Momentary allowable torque	N·m(oz·in)	59 (8355.1)
Rotor inertia	×10 ⁻⁴ kg·m ² (oz·in ²)	1.65 (9.021)
Basic step angle		0.0072
Gear ratio		1 : 100
Lost motion	Minute	0.4 to 3 ± 1.2N·m (169.934oz·in)
Allowable speed	min ⁻¹	35
Mass (Weight)	kg (lbs)	3.3 (7.26)
Allowable thrust load	N (lbs)	1400 (315)
Allowable radial load ^(Note 1)	N (lbs)	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.

Electromagnetic brake model

F series driver + F series motor with electromagnetic brake

Motor flange size

42mm sq. (1.65inch sq.), 60mm sq. (2.35inch sq.),
ø86mm (ø3.39inch)



Size	Motor flange size		42mm sq. (1.65inch sq.)	
	Motor + brake length		64.5mm (2.54inch)	70.5mm (2.78inch)
Set part number	Single shaft		FSF551S-XB	FSF552S-XB
Holding torque	N·m(oz·in)		0.13 (8.4)	0.18 (25.49)
Rotor inertia	×10 ⁻⁴ kg·m ² (oz·in ²)		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

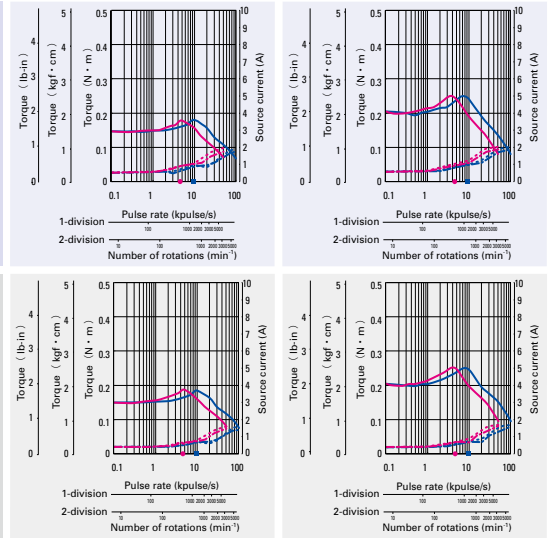
(Note1) When load is applied at 1/3 length from output shaft edge.

AC100V

AC200V

Operating current:
0.75A/phase

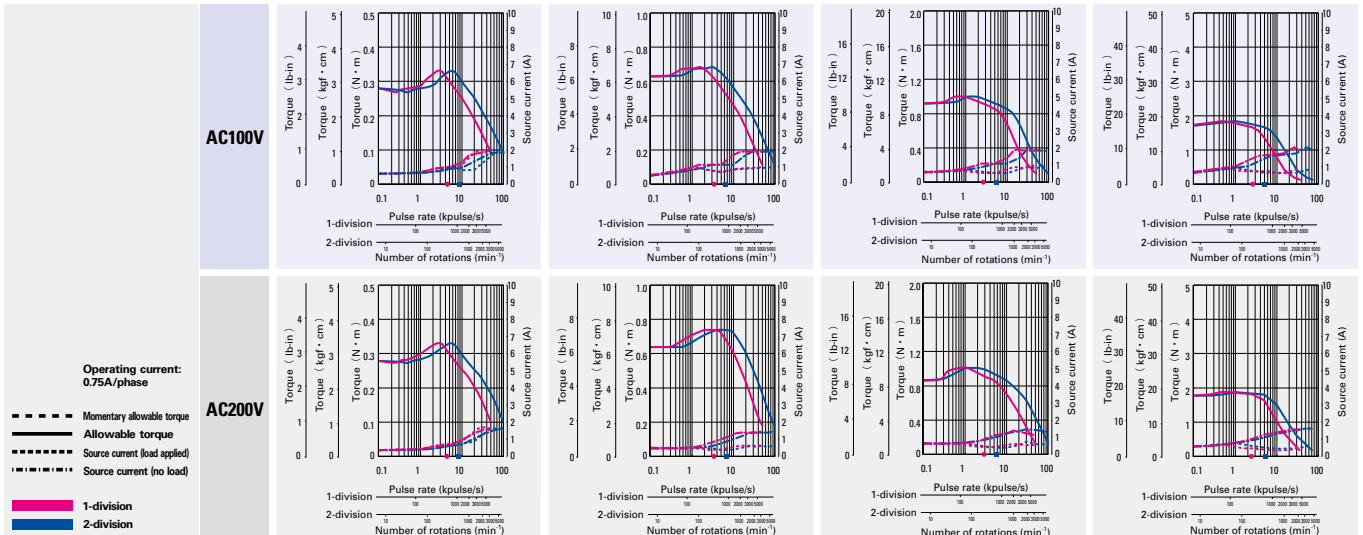
— Pull-out torque
- - - Source current (load applied)
- - - Source current (no load)
● 1-division fs
● 2-division fs
● Fs:Maximum self-start frequency when not loaded
■ 1-division
■ 2-division



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 sq. (1.65inch sq.)		60mm sq. (2.35inch sq.)	
	Motor + brake length		79.5mm (3.13inch)	85.8mm (3.38inch)	94.5mm (3.72inch)	126.7mm (4.99inch)
Set part number	Single shaft		FSF554S-XB	FSF781S-XB	FSF782S-XB	FSF783S-XB
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 ⁻⁴ kg·m ² (oz·in ²)		0.08 (0.437)	0.43 (2.351)	0.56 (3.062)	1 (5.468)
Mass (Weight)	kg (lbs)		0.52 (1.14)	0.94 (2.07)	1.12 (2.46)	1.7 (3.74)
Allowable thrust load	N (lbs)		10 (2.25)	20 (4.5)	20 (4.5)	20 (4.5)
Allowable radial load ^(Note 1)	N (lbs)		35 (8.75)	80 (18)	80 (18)	80 (18)
Brake type			No excitation actuating type	No excitation actuating type	No excitation actuating type	No excitation actuating type
Electromagnetic brake	Power supply input	V	DC24V ± 5%	DC24V ± 5%	DC24V ± 5%	DC24V ± 5%
	Excitation current	A	0.08	0.25	0.25	0.25
	Power consumption	W	2	6	6	6
	Static fiction torque	N·m(oz·in)	0.22 (31.15)	0.8 (113.29)	0.8 (113.29)	0.8 (113.29)
	Brake operating time	ms	30	30	30	30
	Brake release time	ms	20	20	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.

AC input

DC input

Stepping motor

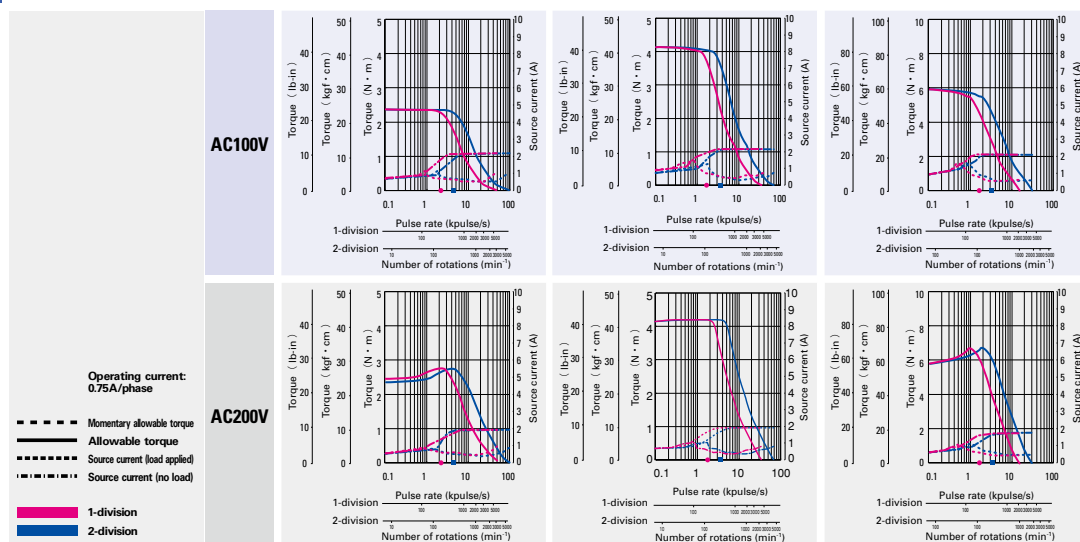
Dimensions

Electromagnetic brake model

F series driver +
F series motor with
electromagnetic brake

Size	Motor flange size		$\phi 86\text{mm}$ ($\phi 3.39\text{inch}$)		
	Motor + brake length		116.7mm (4.59inch)	146.8mm (5.78mm)	180.4mm (7.10mm)
Set part number	Single shaft		FSF851S-XB	FSF852S-XB	FSF853S-XB
Holding torque	N·m(oz·in)		2.06 (291.7)	4.02 (569.3)	6.17 (873.7)
Rotor inertia	$\times 10^{-4}\text{kg}\cdot\text{m}^2(\text{oz}\cdot\text{in}^2)$		2.24 (12.247)	3.69 (20.175)	5.19 (28.376)
Mass (Weight)	kg (lbs)		3.5 (7.7)	4.5 (9.9)	5.5 (12.1)
Allowable thrust load	N (lbs)		60 (13.5)	60 (13.5)	60 (13.5)
Allowable radial load ^(Note 1)	N (lbs)		220 (49.5)	220 (49.5)	220 (49.5)
Brake type			No excitation actuating type	No excitation actuating type	No excitation actuating type
Electromagnetic brake	Power supply input	V	DC24V $\pm$ 5%	DC24V $\pm$ 5%	DC24V $\pm$ 5%
	Excitation current	A	0.42	0.42	0.42
	Power consumption	W	10	10	10
	Static friction torque	N·m(oz·in)	4 (566.45)	4 (566.45)	4 (566.45)
	Brake operating time	ms	50	50	50
	Brake release time	ms	20	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 vary depending on the accuracy of customer-side equipment.

Common specifications

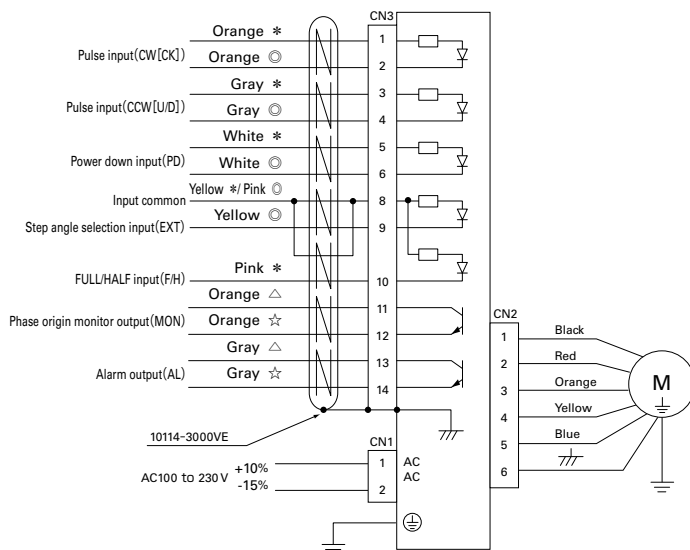
F series driver

Basic specifications	Type code	FS1W075P00	
	Power supply	Single phase AC100V to 230V +10, -15% 50/60/Hz	
	Source current	4 A MAX.	
	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°C	
	Storage temperature	-20 to +70°C	
	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 ; 5m/s ² 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.	
Functions	Mass (Weight)	0.8kg (1.77lbs)	
	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°C)	Class B (+130°C) [UL class A (+105°C)]
Operation altitude	1000m (3280 feet) MAX. above sea level	
Withstand voltage	42mm sq. (1.65inch sq.) , 60mm sq. (2.36inch sq.) , °86mm (°3.39inch) , °106mm (°4.17inch) : 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/s ² 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°C (0 to +40°C for harmonic gear model)	-10 to +40°C (0 to +40°C for harmonic gear model)
Ambient operation humidity	20 to 90%RH MAX. (no condensation)	95%RH MAX. at less than 40°C, 57%RH MAX. at less than 50°C, 35%RH MAX. at 60°C (no condensation)

External wiring diagram



- * 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	When using "2-input mode"
	2	Drive pulse for the CW direction rotation is input.
Pulse column input	1	When using "Pulse and direction mode"
	2	Drive pulse train for the stepping motor rotation is input.
CCW pulse input (standard)	3	When using "2-input mode"
	4	Drive pulse for the CCW direction rotation is input.
Rotation direction input	3	The rotation direction signal of stepping motor is input for the "Pulse and direction mode".
	4	Internal photocoupler ON...CW direction Internal photocoupler OFF...CCW direction
Power down input	5	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.)
	6	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.
	9	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	When the EXT input signal is ON (internal photocoupler ON).
	10	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	It is turned ON when the excitation phase is at the origin (in the state when the power is turned ON)
	12	It is turned ON once per 10 pulses when setting to FULL step. It is turned ON once per 20 pulses when setting to HALF step.
Alarm output	13	The signal is externally output (photocoupler ON) when one of several alarm circuits operates in the 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	88	Internal power is established.
	88	Excitation phase is origin status at power on.
	88	Command pulse is under status at input.
Alarm	01	Over-current.
	02	Overheat.
	03	Low voltage power.
	04	Over-voltage power.
	05 08	Hardware fault
	06	Motor is not connected or motor that is not in compliance with standards is connected.



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

⑤ Input/output signal interface connector

Motor interface connector

Power connector

Earth

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%.

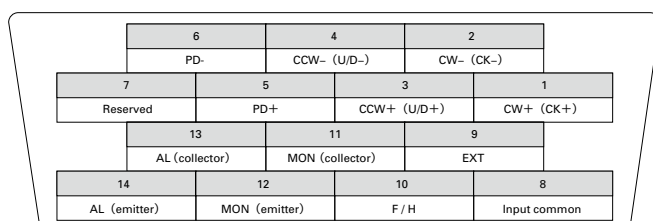
Indication	0	1	2	3	4	5	6	7
Motor current (%)	100 (Rated value)	95	90	85	80	75	70	65
Indication	8	9	A	B	C	D	E	F
Motor current (%)	60	55	50	45	40	35	30	25

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)



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.

	OFF	ON
F/R	☐	☐
LV	☐	☐
PD	☐	☐
EORG	☐	☐

OFF Input method select

OFF Low-vibration mode select

OFF Power down select

OFF Excitation select

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)

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)

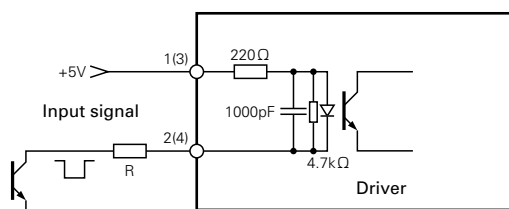
The excitation phasse when the power supply is turned on is selected.

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.

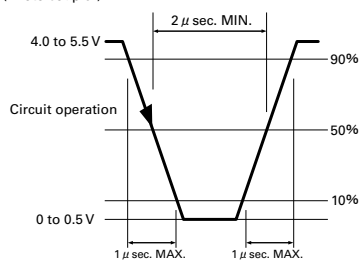
Input circuit configuration of CW (CK), CCW (U/D)



- 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.

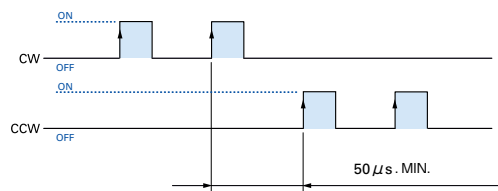
Input signal specification

(Photo coupler)



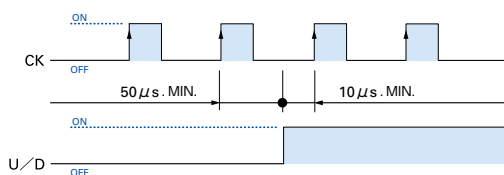
Timing of command pulse

2 input type (CW, CCW)



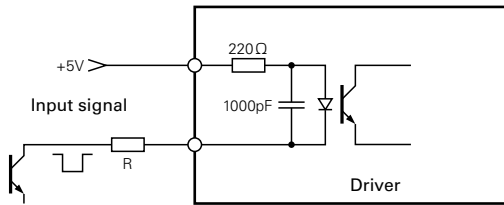
- Shaded area indicates internal photo coupler "ON". Internal circuit (motor) starts operating at leading edge of the photo coupler "ON".
- To apply pulse to CW, set CCW side internal photo coupler to "OFF".
- To apply pulse to CCW, set CW side internal photo coupler to "OFF".

1 input type (CK, U/D)



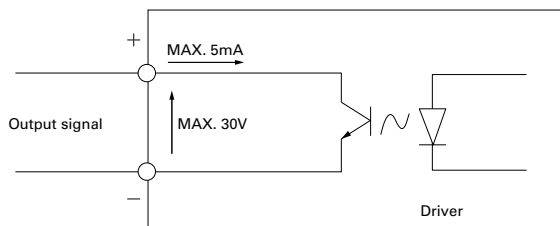
- Shaded area indicates internal photo coupler "ON". Internal circuit (motor) starts operating at leading edge of CK side photo coupler "ON".
- Switching of U/D input signal must be done while CK side internal photo coupler is "OFF".

Input circuit configuration of PD, EXT, F/H

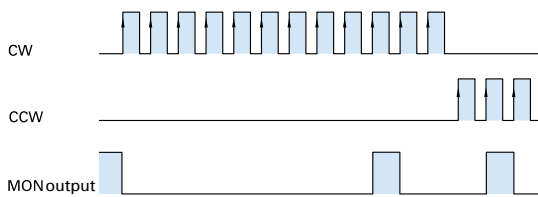


- If the peak value exceeds 5V, set the input current to approx. 15mA using the external limit resistance R.

Output signal configuration of MON, AL



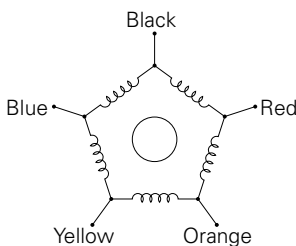
MON output



- 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.

This is an instance of the standard model, the electromagnetic brake model and the CE / UL model.

As for some of the models with the gear, the direction of motor rotation is different, please make inquiries.

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

Dimensions

Stepping motor

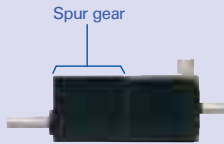
DC input

AC input

System configuration

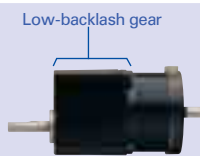
Flange side

Spur gear model



Motor flange size
28mm sq. (1.10inch sq.)

Low-backlash gear model



Motor flange size
42mm sq. (1.65inch sq.) / 60mm sq.
(2.35inch sq.) / ø86mm (ø3.39inch)

Harmonic gear model



Motor flange size
28mm sq. (1.10inch sq.)
/42mm sq. (1.65inch sq.)
/60mm sq. (2.35inch sq.) / ø86mm (ø3.39inch)



Standard model : F series motor
28mm sq. (1.10inch sq.) / 42mm sq. (1.65inch sq.)
/ 60mm sq. (2.35inch sq.) / ø86mm (ø3.39inch)

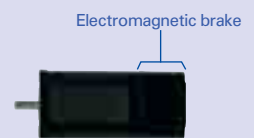
End cap side

Damper



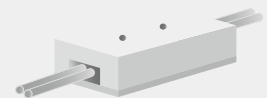
Magnetic dampers can be selected according to required inertia.

Electromagnetic brake model



Motor flange size
42mm sq. (1.65inch sq.) / 60mm sq.
(2.35inch sq.) / ø86mm (ø3.39inch)

Brake power source (DC24V)



Required for brake-equipped stepping motor models.

Motor cable

Single phase
AC100V
to
AC230V

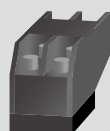
(t)
(r)

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.

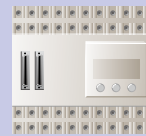
Switching power supply



Converts AC power to DC power.

DC24V/
DC36V

Host Devices



Pulse input

I/O signal cable



To motor

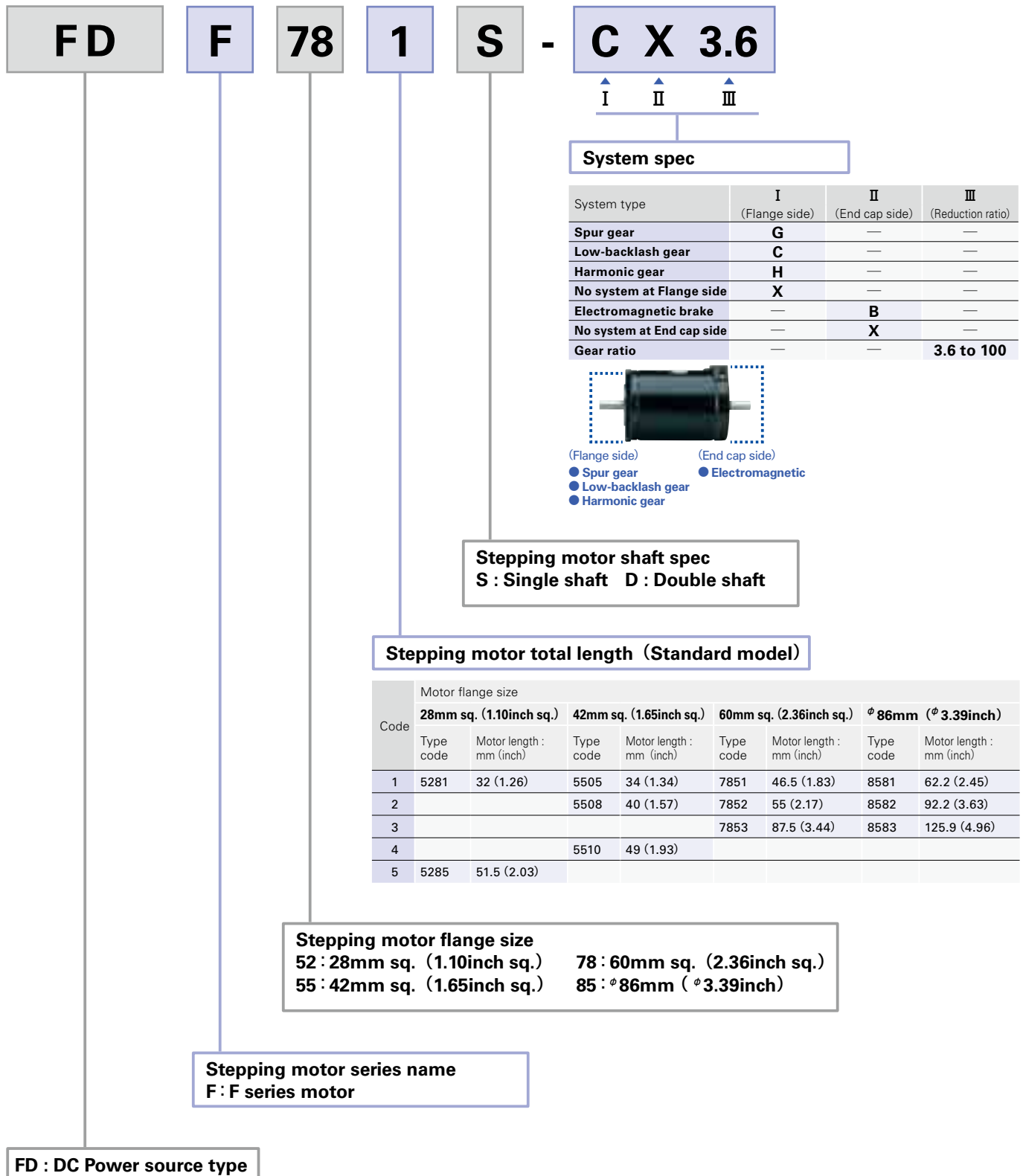
DC power cable

To DC power source

To I/O signal

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 sq. (2.36inch sq.) flange, and 46.5mm (1.83inch) motor length, equipped with low-backlash gear (reduction ratio of 1/3.6).



Set Model Configuration This is a set comprising a driver and motor.

Bundled driver (DC input) 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 sq.	FDF521S	SH5281-7241	FDF521D	SH5281-7211	0.75A
		FDF525S	SH5285-7241	FDF525D	SH5285-7211	0.75A
	42mm sq.	FDF551S	103F5505-8241	FDF551D	103F5505-8211	1.4A
		FDF552S	103F5508-8241	FDF552D	103F5508-8211	1.4A
	60mm sq.	FDF554S	103F5510-8241	FDF554D	103F5510-8211	1.4A
		FDF781S	103F7851-8241	FDF781D	103F7851-8211	1.4A
	ø86mm	FDF782S	103F7852-8241	FDF782D	103F7852-8211	1.4A
		FDF783S	103F7853-8241	FDF783D	103F7853-8211	1.4A
		FDF851S	103F8581-8241	FDF851D	103F8581-8211	1.4A
		FDF852S	103F8582-8241	FDF852D	103F8582-8211	1.4A
Low-backlash gear model	42mm sq.	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	103F5505-82CCK4	FDF551D-CX36	103F5505-82CCK1	1.4A
	60mm sq.	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	103F7851-82CCK4	FDF781D-CX36	103F7851-82CCK1	1.4A
	ø86mm	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	103F8581-82CCK4	FDF851D-CX36	103F8581-82CCK1	1.4A
Spur gear model	28mm sq.	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 sq.	FDF521S-HX50	SH5281-72HXL4	FDF521D-HX50	SH5281-72HXL1	0.75A
		FDF521S-HX100	SH5281-72HXM4	FDF521D-HX100	SH5281-72HXM1	0.75A
	42mm sq.	FDF551S-HX30	103F5505-82HXJ5	FDF551D-HX30	103F5505-82HXJ2	1.4A
		FDF551S-HX50	103F5505-82HXL5	FDF551D-HX50	103F5505-82HXL2	1.4A
	60mm sq.	FDF551S-HX100	103F5505-82HXM5	FDF551D-HX100	103F5505-82HXM2	1.4A
		FDF781S-HX50	103F7851-82HXL4	FDF781D-HX50	103F7851-82HXL1	1.4A
	ø86mm	FDF781S-HX100	103F7851-82HXM4	FDF781D-HX100	103F7851-82HXM1	1.4A
		FDF851S-HX50	103F8581-82HXL4	FDF851D-HX50	103F8581-82HXL1	1.4A
		FDF851S-HX100	103F8581-82HXM4	FDF851D-HX100	103F8581-82HXM1	1.4A
	Electromagnetic brake model	FDF551S-XB	103F5505-82XB41	—	—	1.4A
		FDF552S-XB	103F5508-82XB41	—	—	1.4A
		FDF554S-XB	103F5510-82XB41	—	—	1.4A
		FDF781S-XB	103F7851-82XB41	—	—	1.4A
		FDF782S-XB	103F7852-82XB41	—	—	1.4A
		FDF783S-XB	103F7853-82XB41	—	—	1.4A
	ø86mm	FDF851S-XB	103F8581-82XB41	—	—	1.4A
		FDF852S-XB	103F8582-82XB41	—	—	1.4A

AC input

DC input

Stepping motor

Dimensions

Standard model

F series driver + F series motor

Motor flange size

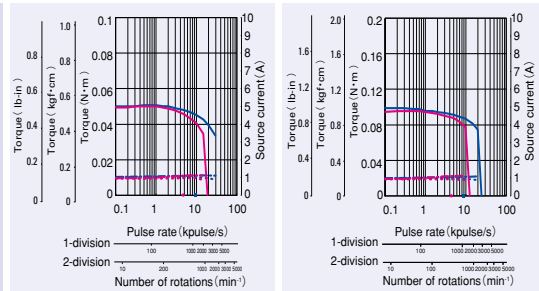
28mm sq. (1.10inch sq.), 42mm sq. (1.65inch sq.),
60mm sq. (2.35inch sq.), Ø86mm (Ø3.39inch)

Size	Motor flange size	28mm sq. (1.10inch sq.)	
		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 ⁻⁴ kg·m ² (oz·in ²)	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)

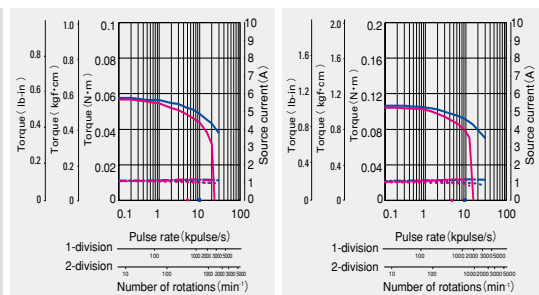
(Note1) When load is applied at 1/3 length from output shaft edge.



DC24V



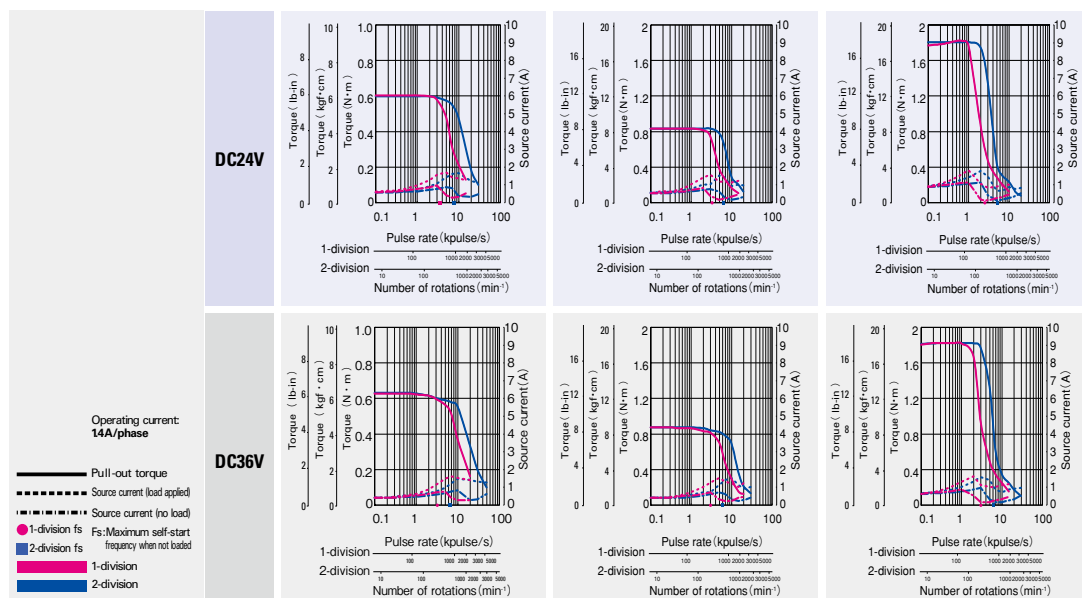
DC36V



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

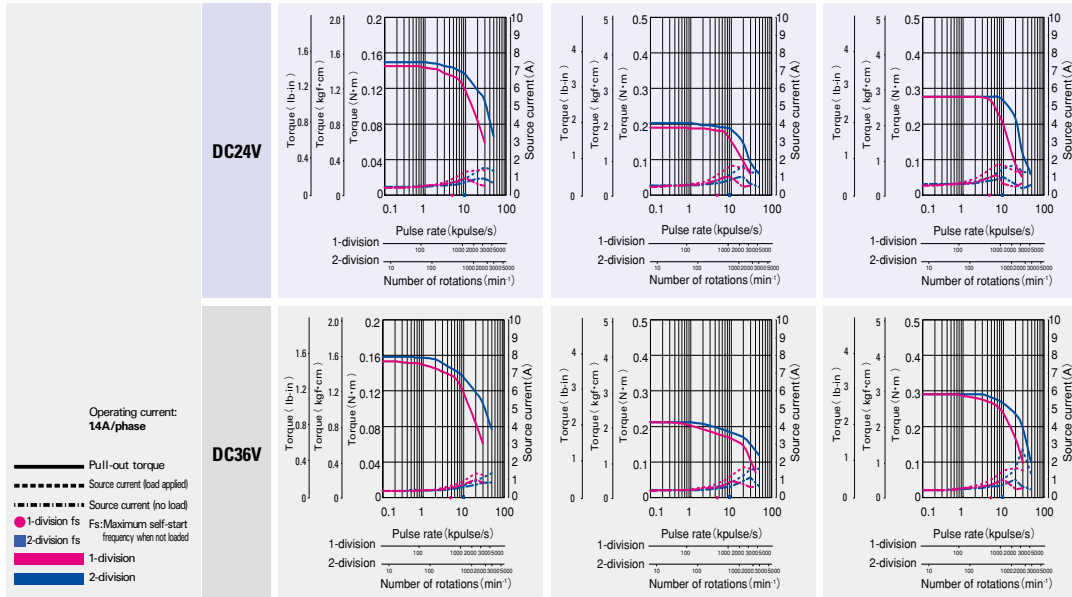
Size	Motor flange size	60mm sq. (2.36inch sq.)		
		46.5mm (1.83inch)	55mm (2.17inch)	87.5mm (3.45inch)
Set part number	Single shaft	FDF781S	FDF782S	FDF783S
	Double shaft	FDF781D	FDF782D	FDF783D
Holding torque	N·m(oz·in)	0.55 (77.9)	0.87 (123.2)	1.67 (236.5)
Rotor inertia	×10 ⁻⁴ kg·m ² (oz·in ²)	0.275 (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.

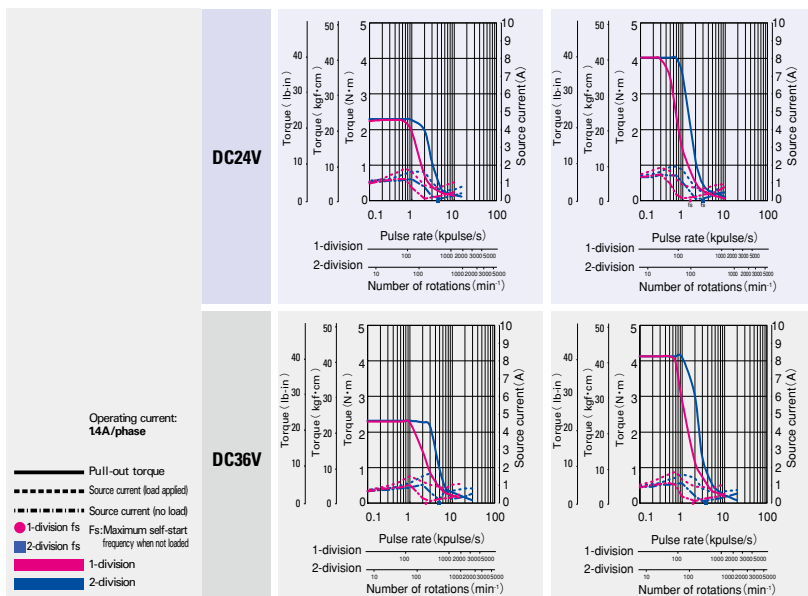


The data are measured under the drive condition of our company. The drive torque may very depending on the accuracy of customer-side equipment.

Size	Motor flange size	42mm sq. (1.65inch sq.)		
	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)	0.25 (35.4)
Rotor inertia	$\times 10^{-4}$ kg·m ² (oz·in ²)	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 (283.2)	4.02 (569.3)
Rotor inertia	$\times 10^{-4}$ kg·m ² (oz·in ²)	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)



AC input

DC input

Stepping motor

Dimensions

Low-backlash gear model

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

Motor flange size

42mm sq. (1.65inch sq.), 60mm sq. (2.35inch sq.),
Ø86mm (Ø3.39inch)

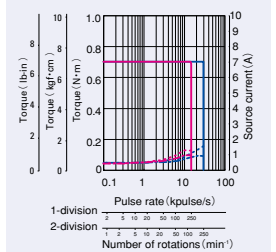
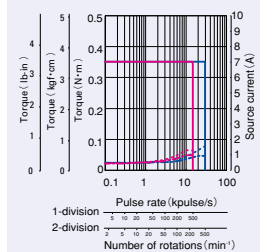
Size	Motor flange size	42mm sq. (1.65inch sq.)	
		64.5mm (2.54inch)	64.5mm (2.54inch)
Set part number	Single shaft	FDF551S-CX3.6	FDF551S-CX7.2
	Double shaft	FDF551D-CX3.6	FDF551D-CX7.2
Allowable torque	N·m(oz·in)	0.343 (48.6)	0.686 (97.1)
Rotor inertia	$\times 10^{-4}$ kg·m ² (oz·in ²)	0.03 (0.16)	0.03 (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.

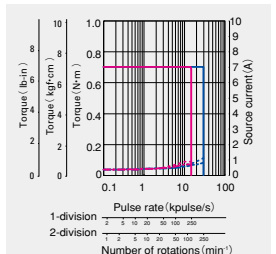
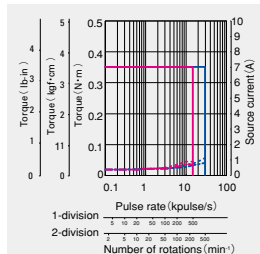
(Note1) When load is applied at 1/3 length from output shaft edge.



DC24V



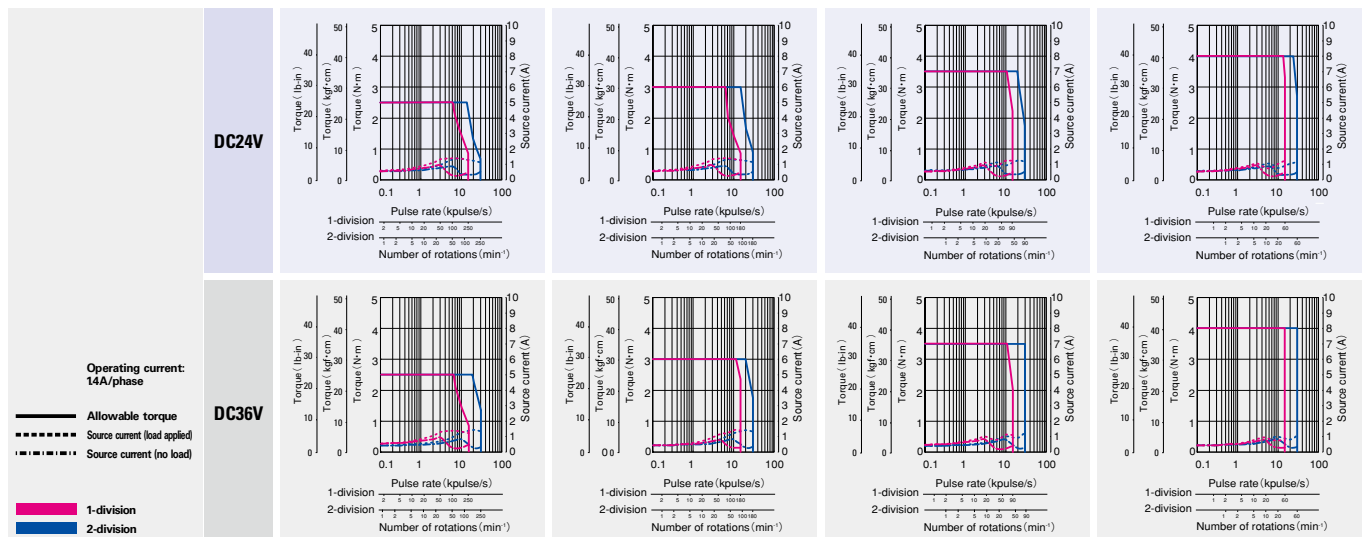
DC36V



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 sq. (2.36inch sq.)			
		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	$\times 10^{-4}$ kg·m ² (oz·in ²)	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.

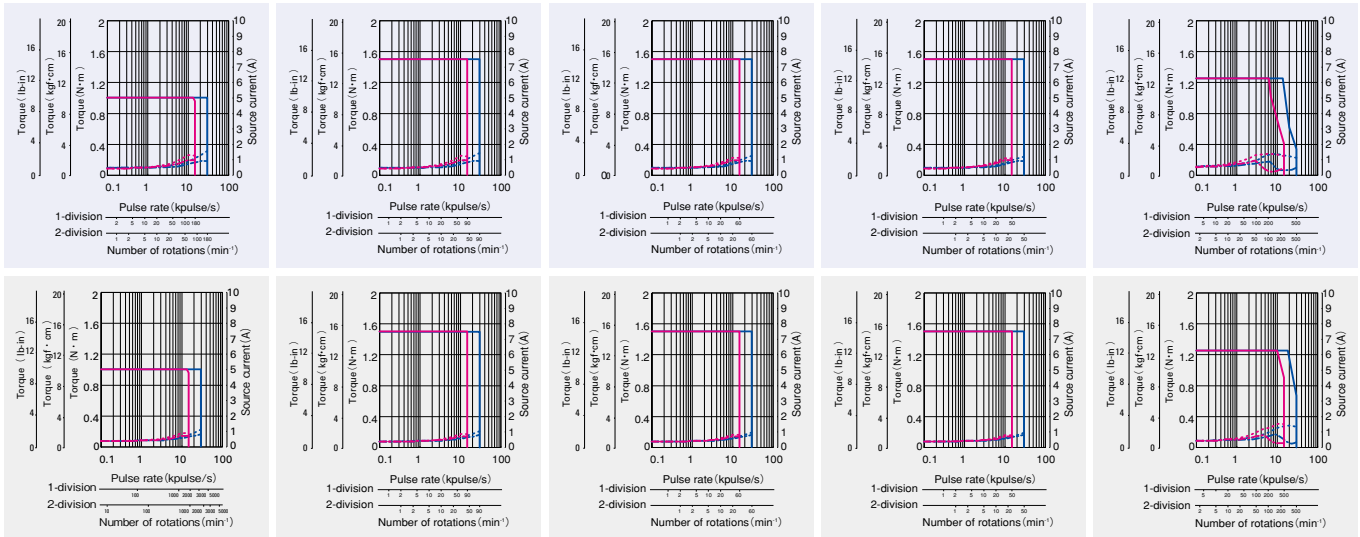


The data are measured under the drive condition of our company. The drive torque may very depending on the accuracy of customer-side equipment.

42mm sq. (1.65inch sq.)

60mm sq. (2.36inch sq.)

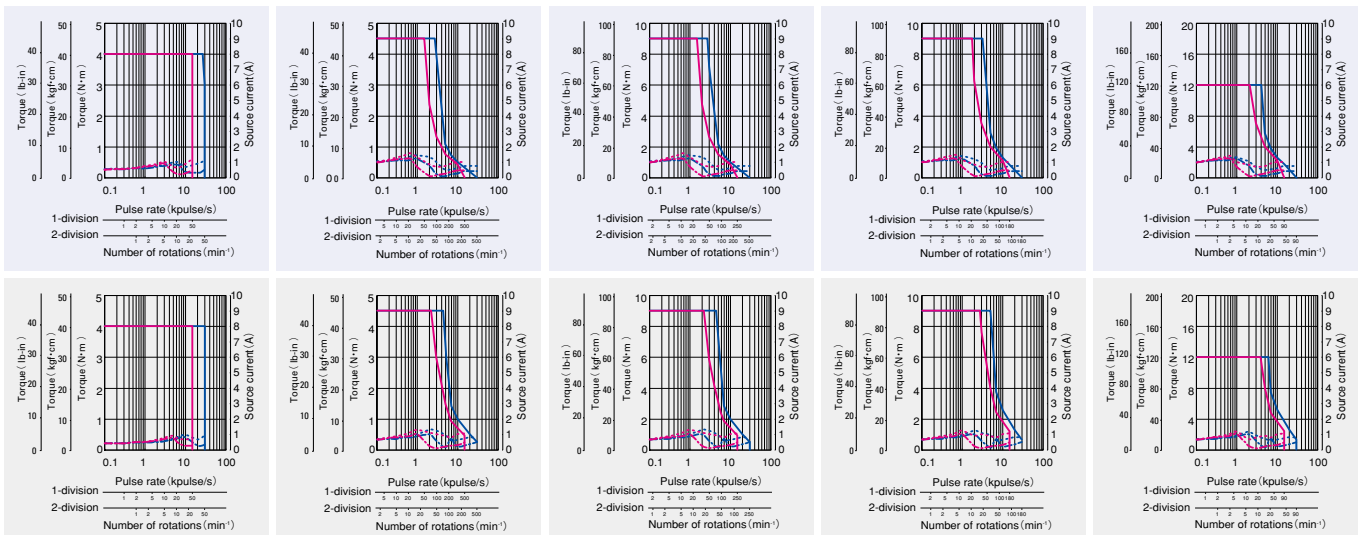
64.5mm (2.54inch)	64.5mm (2.54inch)	64.5mm (2.54inch)	64.5mm (2.54inch)	92mm (3.62inch)
FDF551S-CX10	FDF551S-CX20	FDF551S-CX30	FDF551S-CX36	FDF781S-CX3.6
FDF551D-CX10	FDF551D-CX20	FDF551D-CX30	FDF551D-CX36	FDF781D-CX3.6
0.98 (138.8)	1.47 (208.2)	1.47 (208.2)	1.47 (208.2)	1.25 (177.0)
0.03 (0.16)	0.03 (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 sq. (2.36inch sq.)

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)



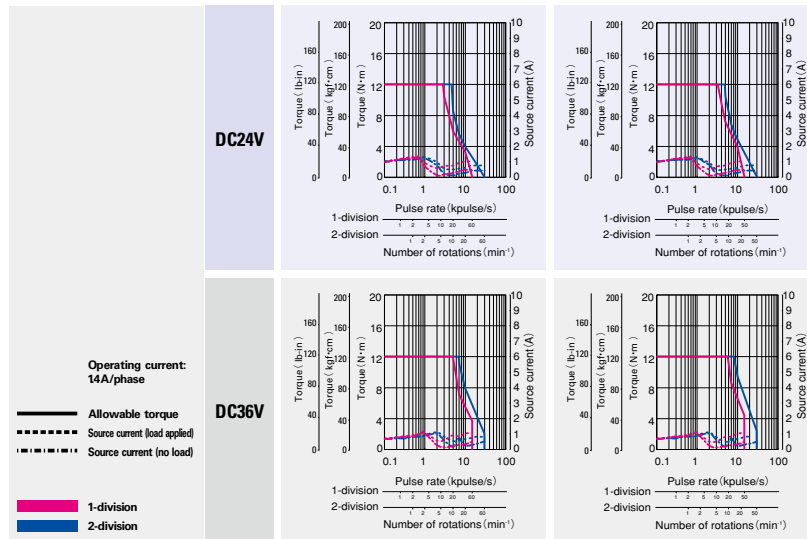
Low-backlash gear model

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

Size	Motor flange size	φ86mm (φ3.39inch)	
		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 ⁻⁴ kg·m ² (oz·in ²)	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

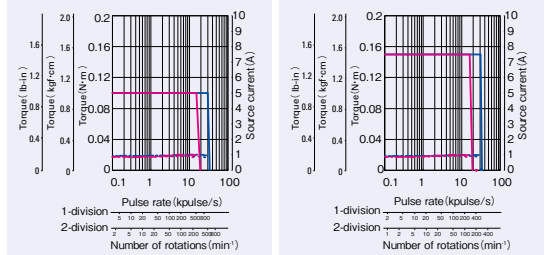
Motor flange size
28mm sq. (1.10inch sq.)

Size	Motor flange size	28mm sq. (1.10inch sq.)	
	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	$\times 10^{-4}$ kg·m ² (oz·in ²)	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)

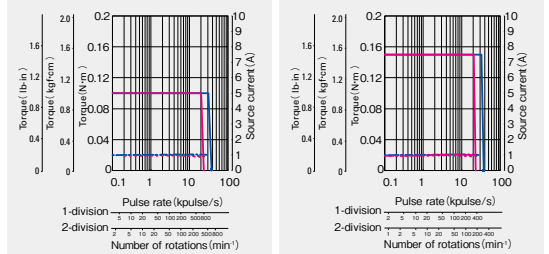
Directions of motor rotation and gear output shaft are the same for models with reduction ratio 1 : 3.6, 1 : 7.2, 1 : 30 and 1 : 50 opposite for reduction ratio 1 : 10.
(Note1) When load is applied at 1/3 length from output shaft edge.



DC24V



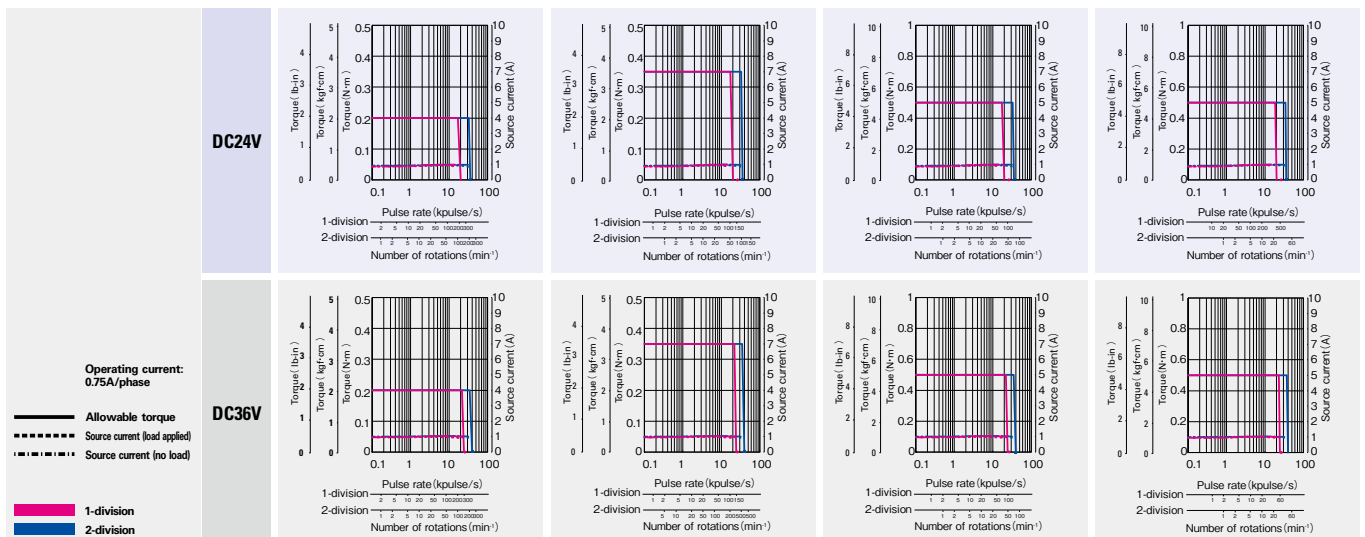
DC36V



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 sq. (1.10inch sq.)			
	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	FDF521D-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	$\times 10^{-4}$ kg·m ² (oz·in ²)	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.

AC input

DC input

Stepping motor

Dimensions

Harmonic gear model

F series driver +
F series motor with harmonic gear

Motor flange size

28mm sq. (1.10inch sq.), 42mm sq. (1.65inch sq.),
60mm sq. (2.35inch sq.), $\phi 86\text{mm}$ ($\phi 3.39\text{inch}$)

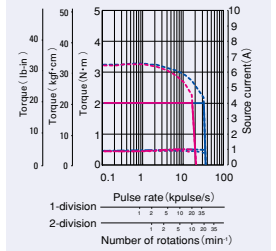
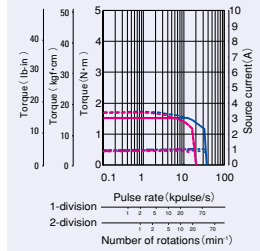
Size	Motor flange size	28mm sq. (1.10inch sq.)	
		70.7mm (2.78inch)	70.7mm (2.78inch)
Set part number	Single shaft	FDF521S-HX50	FDF521S-HX100
	Double shaft	FDF521D-HX50	FDF521D-HX100
Allowable torque	N·m(oz·in)	1.5 (212.4)	2 (283.2)
Momentary allowable torque	N·m(oz·in)	2.7 (382.4)	3.6 (509.8)
Rotor inertia	$\times 10^{-4}\text{kg}\cdot\text{m}^2(\text{oz}\cdot\text{in}^2)$	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 $3 \pm 0.06\text{N}\cdot\text{m}$ (0.85oz·in)	0.4 to $3 \pm 0.08\text{N}\cdot\text{m}$ (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.

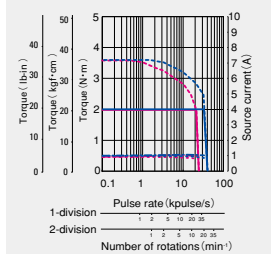
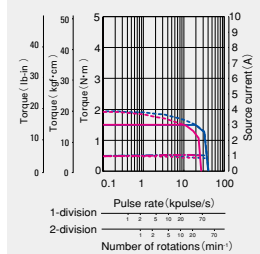
(Note1) When load is applied at 1/3 length from output shaft edge.



DC24V



DC36V

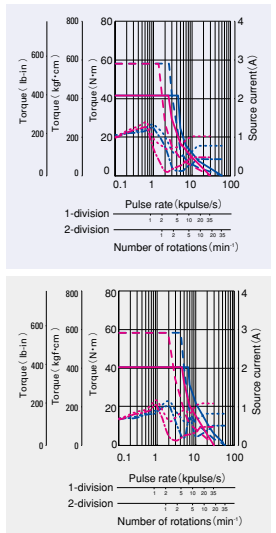
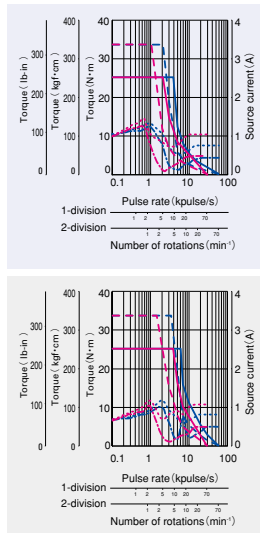
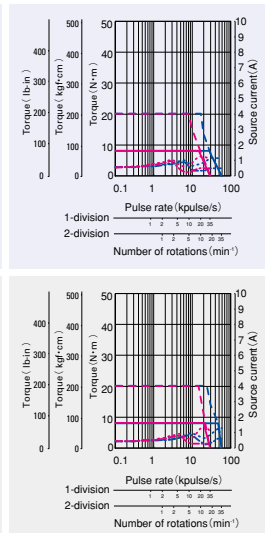
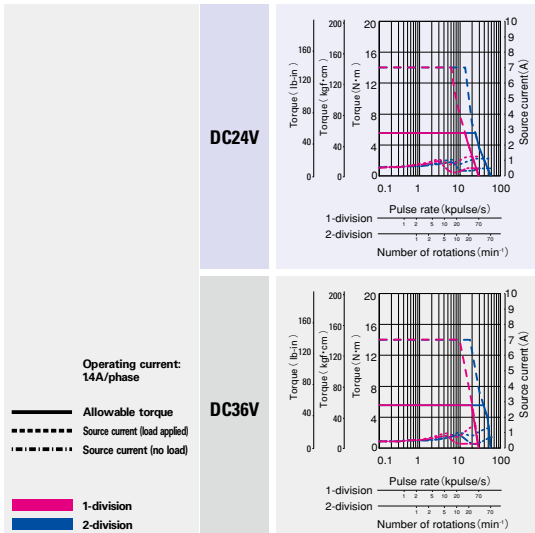


The data are measured under the drive condition of our company. The drive torque may very depending on the accuracy of customer-side equipment.

Size	Motor flange size	60mm sq. (2.36inch sq.)		$\phi 86\text{mm}$ ($\phi 3.39\text{inch}$)	
		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	$\times 10^{-4}\text{kg}\cdot\text{m}^2(\text{oz}\cdot\text{in}^2)$	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 $3 \pm 0.28\text{N}\cdot\text{m}$ (3.965oz·in)	0.4 to $3 \pm 0.4\text{N}\cdot\text{m}$ (56.645oz·in)	0.4 to $3 \pm 1\text{N}\cdot\text{m}$ (141.612oz·in)	0.4 to $3 \pm 1.2\text{N}\cdot\text{m}$ (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)

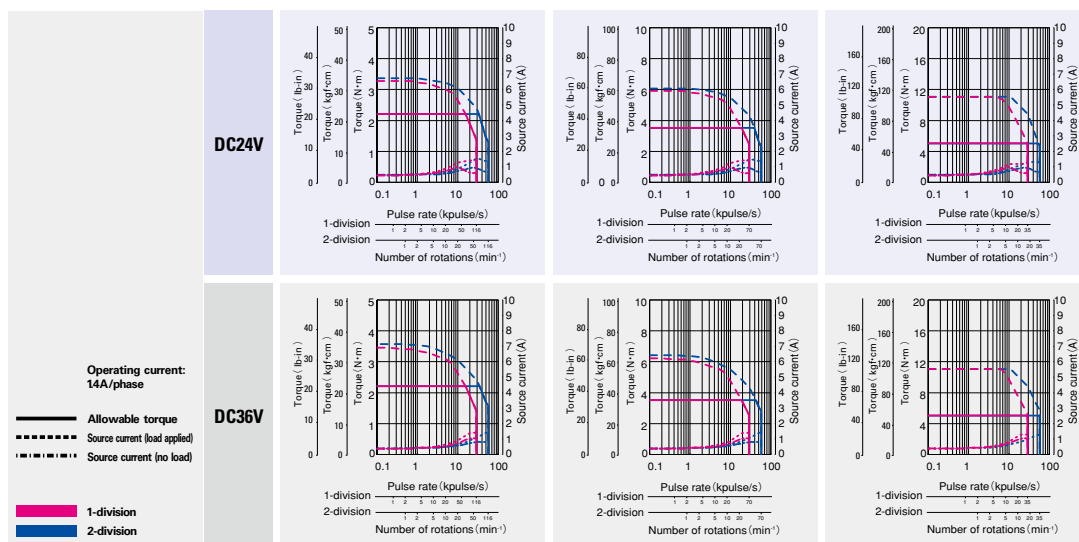
Directions of gear output shaft are the opposite.

(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 sq. (1.65inch sq.)		
	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	×10 ⁻⁴ kg·m ² (oz·in ²)	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

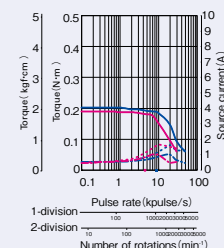
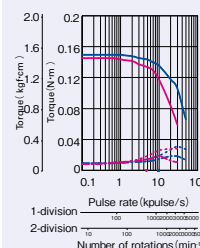
42mm sq. (1.65inch sq.), 60mm sq. (2.35inch sq.),
Ø86mm (Ø3.39inch)



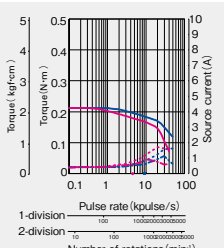
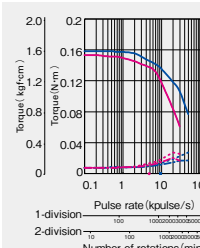
Size	42mm sq. (1.65inch sq.)	
	64.5mm (2.54inch)	70.5mm (2.78inch)
Motor flange size		
Motor + brake length		
Set part number	Single shaft	
Holding torque	N·m(oz·in)	
Rotor inertia	×10 ⁻⁴ kg·m ² (oz·in ²)	
Mass (Weight)	kg (lbs)	
Allowable thrust load	N (lbs)	
Allowable radial load (Note 1)	N (lbs)	
Brake type	No excitation actuating type	
Electromagnetic brake	Power supply input	V
	Excitation current	A
	Power consumption	W
	Static friction torque	N·m(oz·in)
	Brake operating time	ms
	Brake release time	ms

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

DC24V



DC36V



Operating current:
14A/phase

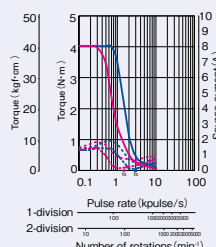
— Pull-out torque
- - - Source current (load applied)
- - - Source current (no load)
● 1-division fs
■ 2-division fs
■ 1-division
■ 2-division

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

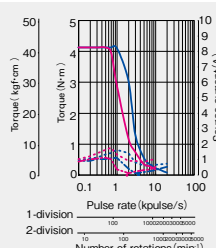
Size	Ø86mm (Ø3.39inch)	
	Motor flange size	Motor + brake length
Set part number	Single shaft	
Holding torque	N·m(oz·in)	
Rotor inertia	×10 ⁻⁴ kg·m ² (oz·in ²)	
Mass (Weight)	kg (lbs)	
Allowable thrust load	N (lbs)	
Allowable radial load (Note 1)	N (lbs)	
Brake type	No excitation actuating type	
Electromagnetic brake	Power supply input	V
	Excitation current	A
	Power consumption	W
	Static friction torque	N·m(oz·in)
	Brake operating time	ms
	Brake release time	ms

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

DC24V



DC36V

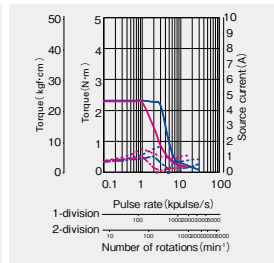
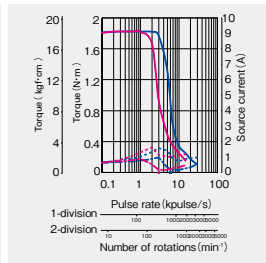
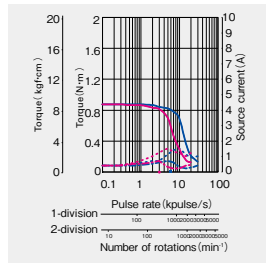
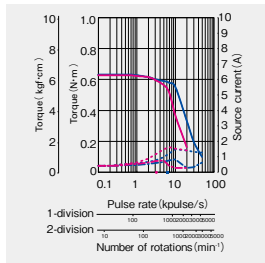
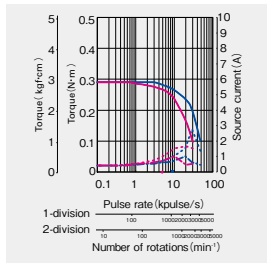
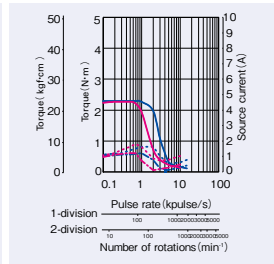
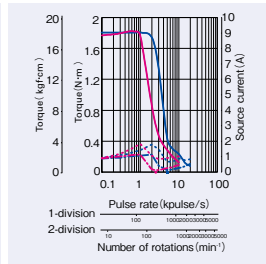
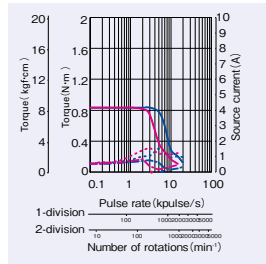
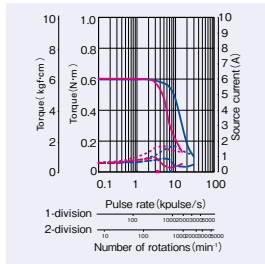
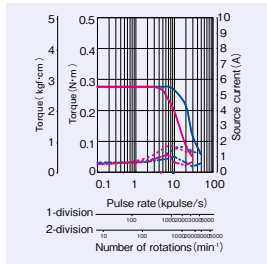


Operating current:
14A/phase

— Pull-out torque
- - - Source current (load applied)
- - - Source current (no load)
● 1-division fs
■ 2-division fs
■ 1-division
■ 2-division

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 sq. (1.65inch sq.)		60mm sq. (2.36inch sq.)		ø86mm (ø3.39inch)	
79.5mm (3.13inch)		85.8mm (3.38inch)		126.7mm (4.99inch)	
FDF554S-XB		FDF781S-XB		FDF783S-XB	
0.26 (36.82)		0.6 (85.0)		1.67 (236.5)	
0.08 (0.44)		0.43 (2.35)		1 (5.47)	
0.52 (1.14)		0.94 (2.07)		1.7 (3.74)	
10 (2.25)		20 (4.5)		20 (4.5)	
35 (8.75)		80 (18)		80 (18)	
No excitation actuating type		No excitation actuating type		No excitation actuating type	
DC24V ± 5%		DC24V ± 5%		DC24V ± 5%	
0.08		0.25		0.25	
2		6		6	
0.22 (31.15)		0.8 (113.29)		0.8 (113.29)	
30		30		30	
20		20		20	
				220 (49.5)	
				No excitation actuating type	
				DC24V ± 5%	
				0.42	
				10	
				4 (566.45)	
				50	
				20	



Common specifications

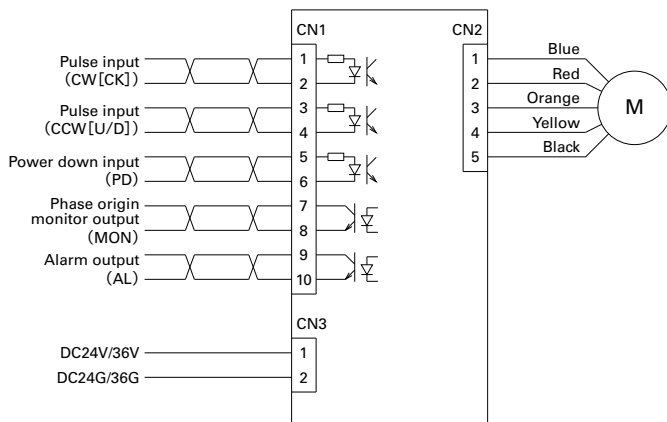
■ F series driver

Basic specifications	Model	FS1D140P10
	Power supply	DC24 V / 36 V $\pm 10\%$
	Source current	3 A MAX.
	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°C
	Storage temperature	-20 to +70°C
	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 ; 5m/s ² 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.
Functions	Mass (Weight)	0.1kg (0.05lbs)
	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
I/O signals	LED indication	Power monitor, alarm
	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.
I/O signals	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°C)
Operation altitude	1000m (3280 feet) or less above sea level
Withstand voltage	28mm sq. (1.10inch sq.) : AC1000V 50/60Hz for 1 minute, 42mm sq. (1.65inch sq.) , 60mm sq. (2.36inch sq.) , °86mm (°3.39inch) , °106mm (°4.17inch) : 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/s ² 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°C (0 to +40°C for harmonic gear model)
Ambient operation humidity	20 to 90%RH MAX. (no condensation)

■ External wiring diagram



■ Applicable wire sizes

Part	size	Allowable wire length
Power supply	AWG22(0.3mm ²)	2m MAX.
Input/output signal	AWG24(0.2mm ²) to AWG22(0.3mm ²)	2m MAX.
Motor	AWG22(0.3mm ²)	Under 3m

■ Specification summary of CN1 I/O signal

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

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

AC input

DC input

Stepping motor

Dimensions



3 Power LED(POW)

Motor interface terminal block (CN2)

Power terminal block (CN3)

1 Current selection switch

2 Function selection DIP switch

4 Alarm LED (ALM)

Input/output signal interface terminal block

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.

	OFF	ON	
EX	☐	☐	Half step
F/R	☐	☐	2-input mode (CW, CCW pulse-input method)
ACD1	☐	☐	Stopping current : 40% of driving current
ACD2	☐	☐	
EORG	☐	☐	Phase origin
MODE	☐	☐	Reservation : Don't turn it ON.
SPARE	☐	☐	
SPARE	☐	☐	

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 phase 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)

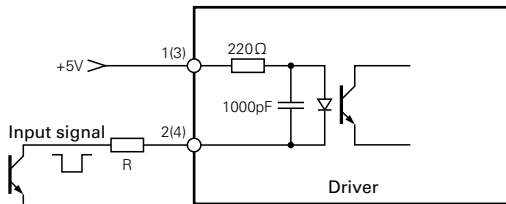
Lights up during alarm conditions.

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 (photocoupler ON) 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.

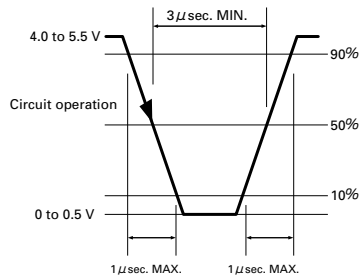
Input circuit configuration of CW (CK), CCW (U/D)



- 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.

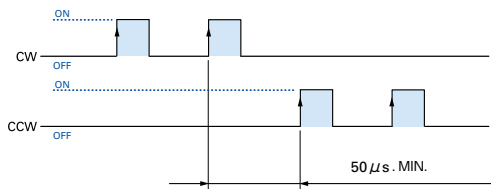
Input signal specification

(Photo coupler)



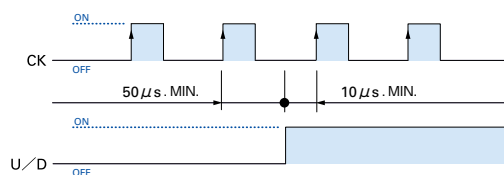
Timing of command pulse

2 input type (CW, CCW)



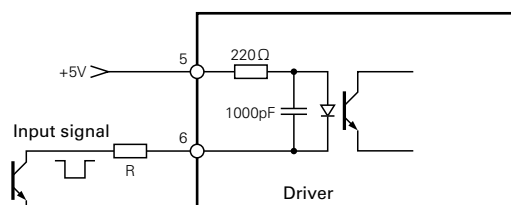
- Shaded area indicates internal photo coupler "ON". Internal circuit (motor) starts operating at leading edge of the photo coupler "ON".
- To apply pulse to CW, set CCW side internal photo coupler to "OFF".
- To apply pulse to CCW, set CW side internal photo coupler to "OFF".

1 input type (CK, U/D)



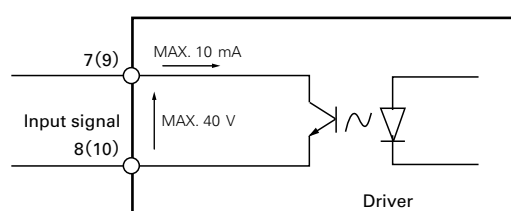
- Shaded area indicates internal photo coupler "ON". Internal circuit (motor) starts operating at leading edge of CK side photo coupler "ON".
- Switching of U/D input signal must be done while CK side internal photo coupler is "OFF".

Input circuit configuration of PD

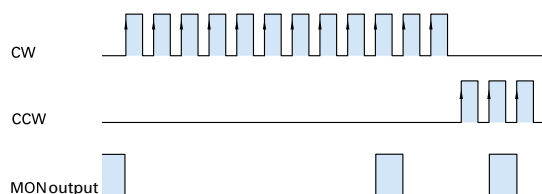


- If the peak value exceeds 5V, set the input current to approx. 15mA using the external limit resistance R.

Output signal configuration of MON, AL



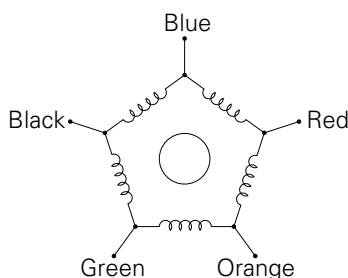
MON output



- 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 clockwise when viewed from the output shaft side at the direct current energization in the following order.

This is an instance of the standard model and the electromagnetic brake model.

As for some of the models with the gear, the direction of motor rotation is different, please make inquiries.

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.)

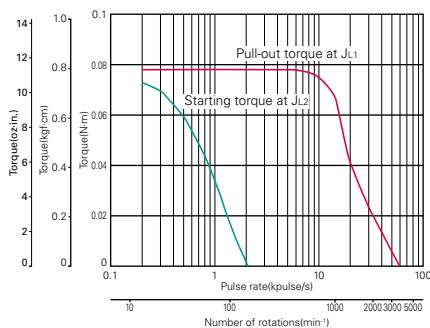
103-45 □□ -70 □□

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 ⁻⁴ kg · m ² (oz · in ²)]	[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)

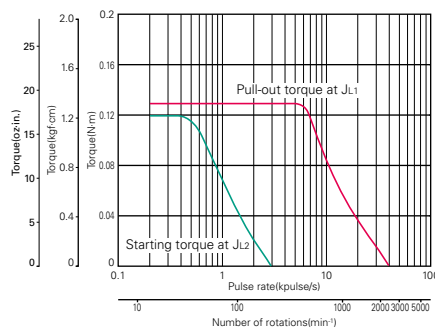
Pulse rate-torque characteristics

103-4505-70 □□



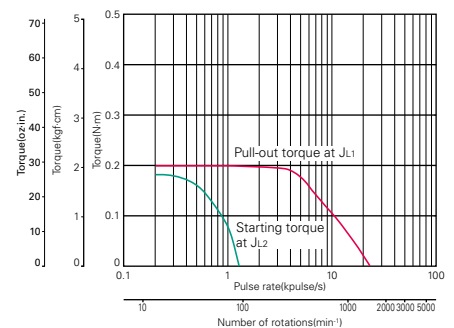
Constant current circuit
Source voltage : DC24V · operating current : 0.75A/phase,
5-phase excitation (full step)
 $J_{L1} = [0.33 \times 10^{-4} \text{kg} \cdot \text{m}^2 (1.80 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling
 $J_{L2} = [0.18 \times 10^{-4} \text{kg} \cdot \text{m}^2 (0.98 \text{oz} \cdot \text{in}^2)]$ use the direct coupling

103-4507-70 □□



Constant current circuit
Source voltage : DC24V · operating current : 0.75A/phase,
5-phase excitation (full step)
 $J_{L1} = [0.33 \times 10^{-4} \text{kg} \cdot \text{m}^2 (1.80 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling
 $J_{L2} = [0.18 \times 10^{-4} \text{kg} \cdot \text{m}^2 (0.98 \text{oz} \cdot \text{in}^2)]$ use the direct coupling

103-4510-70 □□



Constant current circuit
Source voltage : DC24V · operating current : 0.75A/phase,
5-phase excitation (full step)
 $J_{L1} = [0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2 (5.14 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling
 $J_{L2} = [0.8 \times 10^{-4} \text{kg} \cdot \text{m}^2 (4.37 \text{oz} \cdot \text{in}^2)]$ use the direct coupling



5-phase stepping motor

Ø60mm (Ø2.36inch)

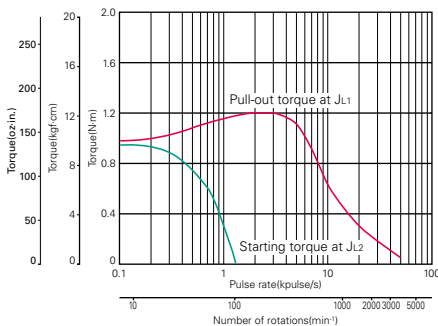
103-7566-70 □□

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 ⁻⁴ kg · m ² (oz · in ²)]	[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)

$J_{L1} = [2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2 (14.22 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling

$J_{L2} = [2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2 (14.22 \text{oz} \cdot \text{in}^2)]$ use the direct coupling



5-phase stepping motor

28mm sq. (1.10inch sq.)

SH528 □ - □□□□

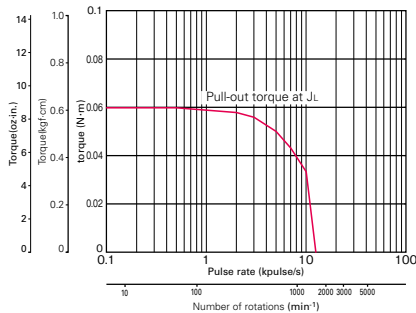
0.72° /step

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 ⁻⁴ kg · m ² (oz · in ²)]	[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)

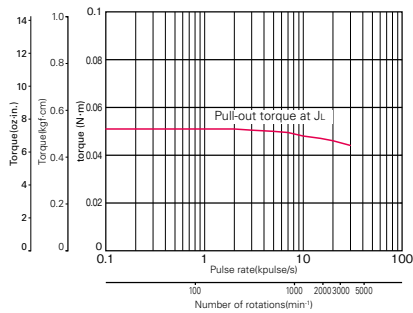
Pulse rate-torque characteristics

SH5281-30 □□



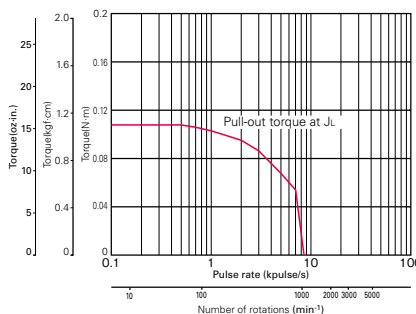
Constant current circuit
Source voltage : DC12V · operating current : 0.35A/phase,
5-phase excitation (full step)
 $J_L = [0.01 \times 10^{-4} \text{kg} \cdot \text{m}^2 (0.05 \text{oz} \cdot \text{in}^2) \text{ pulley balancer system}]$

SH5281-70 □□



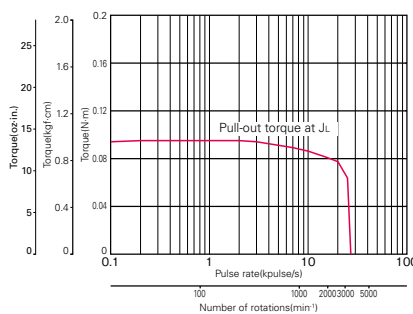
Constant current circuit
Source voltage : DC24V · operating current : 0.75A/phase,
5-phase excitation (full step)
 $J_L = [0.01 \times 10^{-4} \text{kg} \cdot \text{m}^2 (0.05 \text{oz} \cdot \text{in}^2) \text{ pulley balancer system}]$

SH5285-30 □□



Constant current circuit
Source voltage : DC12V · operating current : 0.35A/phase,
5-phase excitation (full step)
 $J_L = [0.01 \times 10^{-4} \text{kg} \cdot \text{m}^2 (0.05 \text{oz} \cdot \text{in}^2) \text{ pulley balancer system}]$

SH5285-70 □□



Constant current circuit
Source voltage : DC24V · operating current : 0.75A/phase,
5-phase excitation (full step)
 $J_L = [0.01 \times 10^{-4} \text{kg} \cdot \text{m}^2 (0.05 \text{oz} \cdot \text{in}^2) \text{ pulley balancer system}]$

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.)

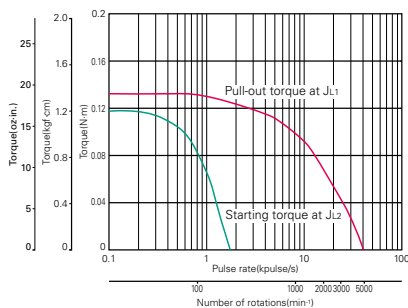
103H55 □□ -70 □□

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 ⁻⁴ kg · m ² (oz · in ²)]	[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 □□

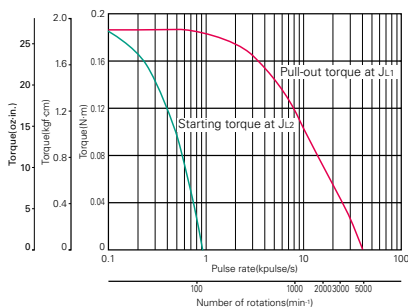


Constant current circuit

Source voltage : DC24V·operating current:0.75A/phase, 5-phase excitation (full step)

J_{1.1} = [0.94×10⁻⁴kg·m²(5.14oz·in²) use the rubber coupling]J_{1.2} = [0.8×10⁻⁴kg·m²(4.37oz·in²) use the direct coupling]

103H5508-70 □□

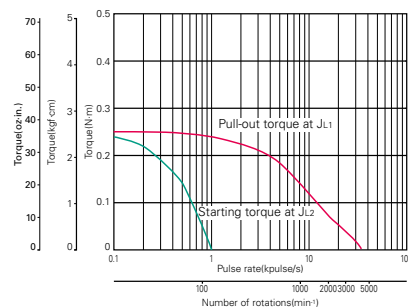


Constant current circuit

Source voltage : DC24V·operating current:0.75A/phase, 5-phase excitation (full step)

J_{1.1} = [0.94×10⁻⁴kg·m²(5.14oz·in²) use the rubber coupling]J_{1.2} = [0.8×10⁻⁴kg·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_{1.1} = [0.94×10⁻⁴kg·m²(5.14oz·in²) use the rubber coupling]J_{1.2} = [0.8×10⁻⁴kg·m²(4.37oz·in²) use the direct coupling]



5-phase stepping motor

50mm sq. (1.97inch sq.)

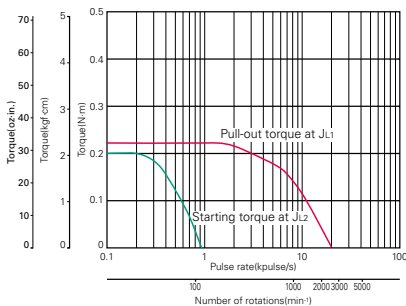
103H650 □ - □□□□

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 ⁻⁴ kg · m ² (oz · in ²)]	[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)

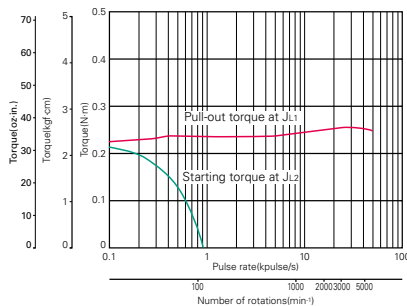
Pulse rate-torque characteristics

103H6500-70 □□



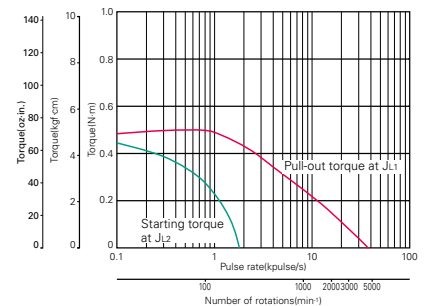
Constant current circuit
Source voltage : DC24V · operating current : 0.75A/phase,
5-phase excitation (full step)
 $J_{L1} = [0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2 (5.14 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling]
 $J_{L2} = [0.8 \times 10^{-4} \text{kg} \cdot \text{m}^2 (4.37 \text{oz} \cdot \text{in}^2)]$ use the direct coupling]

103H6500-80 □□



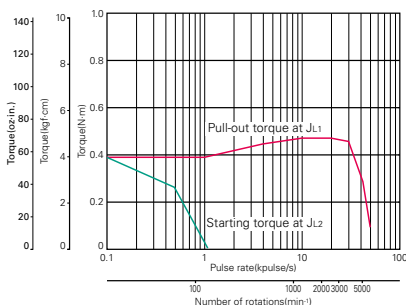
Constant current circuit
Source voltage : AC100V · operating current : 1.5A/phase,
5-phase excitation (full step)
 $J_{L1} = [0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2 (5.14 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling]
 $J_{L2} = [0.8 \times 10^{-4} \text{kg} \cdot \text{m}^2 (4.37 \text{oz} \cdot \text{in}^2)]$ use the direct coupling]

103H6501-70 □□



Constant current circuit
Source voltage : DC24V · operating current : 0.75A/phase,
5-phase excitation (full step)
 $J_{L1} = [0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2 (5.14 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling]
 $J_{L2} = [0.105 \times 10^{-4} \text{kg} \cdot \text{m}^2 (4.37 \text{oz} \cdot \text{in}^2)]$ pulley balancer system]

103H6501-80 □□



Constant current circuit
Source voltage : AC100V · operating current : 1.5A/phase,
5-phase excitation (full step)
 $J_{L1} = [0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2 (5.14 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling]
 $J_{L2} = [0.8 \times 10^{-4} \text{kg} \cdot \text{m}^2 (4.37 \text{oz} \cdot \text{in}^2)]$ use the direct coupling]



5-phase stepping motor

60mm sq. (2.36inch sq.)

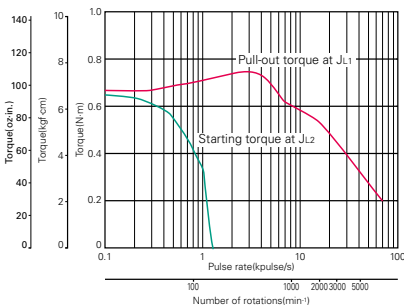
103H785 □ - □□□□

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 ⁻⁴ kg · m ² (oz · in ²)]	[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 □□

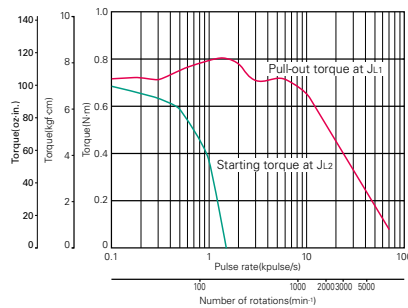


Constant current circuit

Source voltage : AC100V·operating current : 0.75A/phase, 5-phase excitation (full step)

J₁ = [0.94×10⁻⁴kg · m² (5.14oz · in²) use the rubber coupling]
J₂ = [0.8×10⁻⁴kg · m² (4.37oz · in²) use the direct coupling]

103H7851-80 □□

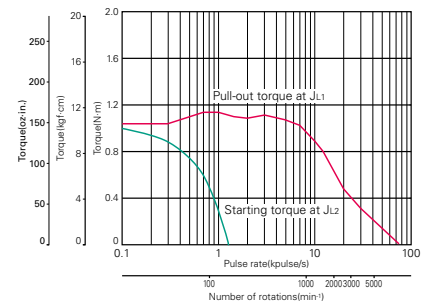


Constant current circuit

Source voltage : AC100V·operating current : 0.75A/phase, 5-phase excitation (full step)

J₁ = [2.6×10⁻⁴kg · m² (40.46oz · in²) use the rubber coupling]
J₂ = [2.6×10⁻⁴kg · m² (40.46oz · in²) use the direct coupling]

103H7852-70 □□

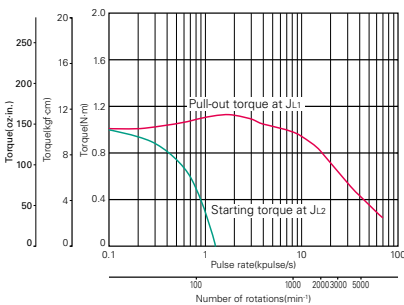


Constant current circuit

Source voltage : AC100V·operating current : 0.75A/phase, 5-phase excitation (full step)

J₁ = [2.6×10⁻⁴kg · m² (40.46oz · in²) use the rubber coupling]
J₂ = [2.6×10⁻⁴kg · m² (40.46oz · in²) use the direct coupling]

103H7852-80 □□

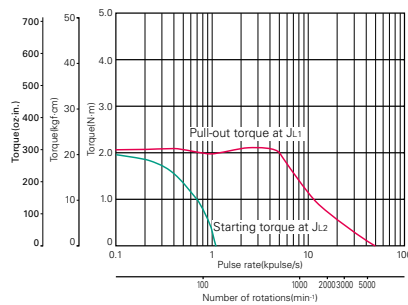


Constant current circuit

Source voltage : AC100V·operating current : 1.5A/phase, 5-phase excitation (full step)

J₁ = [2.6×10⁻⁴kg · m² (5.14oz · in²) use the rubber coupling]
J₂ = [2.6×10⁻⁴kg · m² (4.37oz · in²) use the direct coupling]

103H7853-70 □□

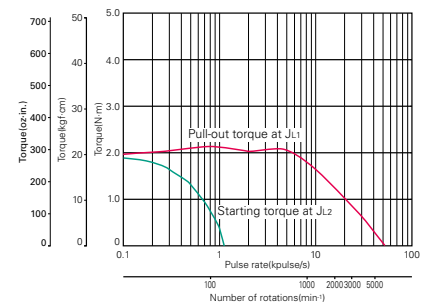


Constant current circuit

Source voltage : AC100V · operating current : 1.5A/phase, 5-phase excitation (full step)

J₁ = [7.4×10⁻⁴kg · m² (14.22oz · in²) use the rubber coupling]
J₂ = [7.4×10⁻⁴kg · 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)

J₁ = [7.4×10⁻⁴kg · m² (40.46oz · in²) use the rubber coupling]
J₂ = [7.4×10⁻⁴kg · m² (40.46oz · in²) use the direct coupling]



5-phase stepping motor

Ø60mm (Ø2.36inch)

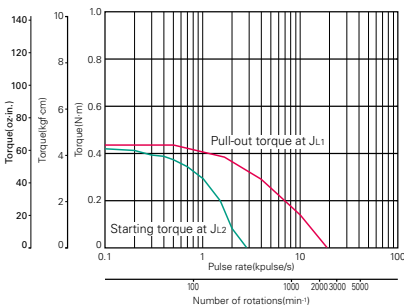
103H752 □ - □□□□

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 ⁻⁴ kg · m ² (oz · in ²)]	[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)

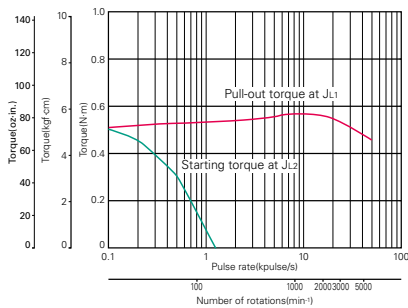
Pulse rate-torque characteristics

103H7521-70 □□



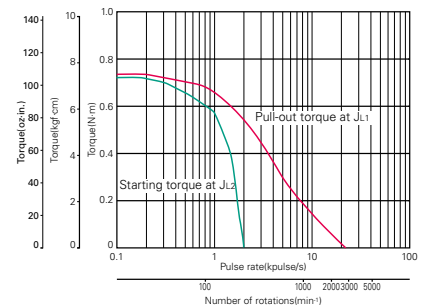
Constant current circuit
Source voltage: DC24V·operating current : 0.75A/phase,
5-phase excitation (full step)
 $J_{L1} = [0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2 (5.14 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling]
 $J_{L2} = [0.51 \times 10^{-4} \text{kg} \cdot \text{m}^2 (2.79 \text{oz} \cdot \text{in}^2)]$ pulley balancer system]

103H7521-80 □□



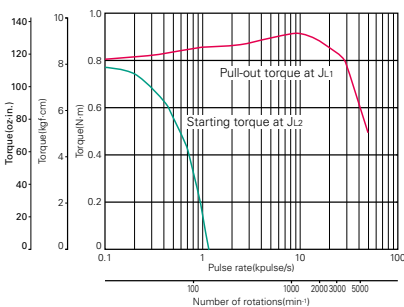
Constant current circuit
Source voltage: AC100V·operating current : 1.5A/phase,
5-phase excitation (full step)
 $J_{L1} = [0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2 (5.14 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling]
 $J_{L2} = [0.8 \times 10^{-4} \text{kg} \cdot \text{m}^2 (4.37 \text{oz} \cdot \text{in}^2)]$ use the direct coupling]

103H7522-70 □□



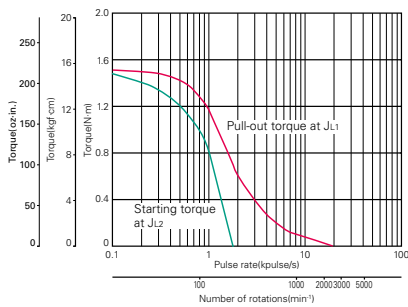
Constant current circuit
Source voltage: DC24V·operating current : 0.75A/phase,
5-phase excitation (full step)
 $J_{L1} = [2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2 (14.22 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling]
 $J_{L2} = [0.6 \times 10^{-4} \text{kg} \cdot \text{m}^2 (3.28 \text{oz} \cdot \text{in}^2)]$ pulley balancer system]

103H7522-80 □□



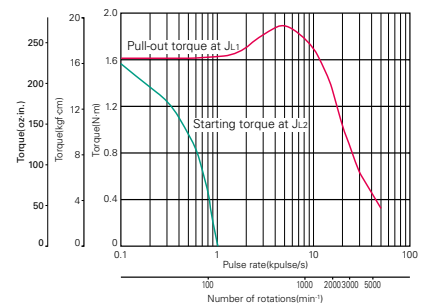
Constant current circuit
Source voltage: AC100V·operating current : 1.5A/phase,
5-phase excitation (full step)
 $J_{L1} = [2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2 (14.22 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling]
 $J_{L2} = [2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2 (14.22 \text{oz} \cdot \text{in}^2)]$ use the direct coupling]

103H7523-70 □□



Constant current circuit
Source voltage: DC24V·operating current : 0.75A/phase,
5-phase excitation (full step)
 $J_{L1} = [7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2 (40.46 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling]
 $J_{L2} = [1.1 \times 10^{-4} \text{kg} \cdot \text{m}^2 (6.01 \text{oz} \cdot \text{in}^2)]$ pulley balancer system]

103H7523-80 □□



Constant current circuit
Source voltage: AC100V·operating current : 1.5A/phase,
5-phase excitation (full step)
 $J_{L1} = [7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2 (40.46 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling]
 $J_{L2} = [7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2 (40.46 \text{oz} \cdot \text{in}^2)]$ use the direct coupling]



5-phase stepping motor

$\varnothing 86\text{mm}$ ($\varnothing 3.39\text{inch}$)

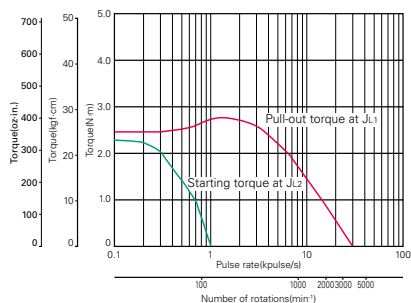
103H858 ☐ - ☐☐☐☐

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	[$\times 10^{-4}\text{kg} \cdot \text{m}^2(\text{oz} \cdot \text{in}^2)$]	[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 ☐☐

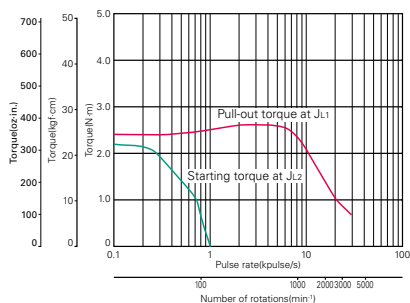


Constant current circuit

Source voltage: AC100V·operating current: 0.75A/phase, 5-phase excitation (full step)

 $J_{L1} = [7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2 (40.46 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling) $J_{L2} = [1.45 \times 10^{-4} \text{kg} \cdot \text{m}^2 (7.93 \text{oz} \cdot \text{in}^2)]$ pulley balancer system)

103H8581-80 ☐☐

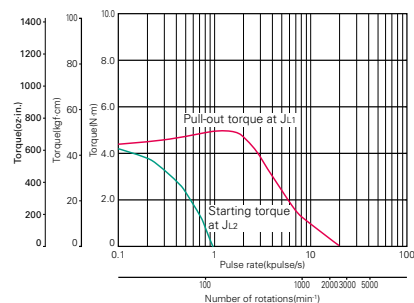


Constant current circuit

Source voltage: AC100V·operating current: 1.5A/phase, 5-phase excitation (full step)

 $J_{L1} = [7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2 (40.46 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling) $J_{L2} = [1.45 \times 10^{-4} \text{kg} \cdot \text{m}^2 (7.93 \text{oz} \cdot \text{in}^2)]$ pulley balancer system)

103H8582-70 ☐☐

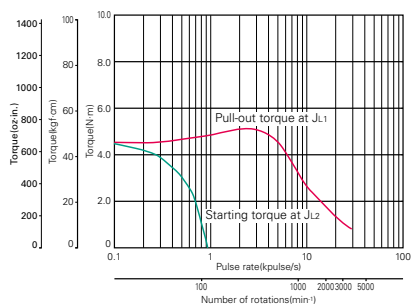


Constant current circuit

Source voltage: AC100V·operating current: 0.75A/phase, 5-phase excitation (full step)

 $J_{L1} = [15.3 \times 10^{-4} \text{kg} \cdot \text{m}^2 (83.65 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling) $J_{L2} = [2.9 \times 10^{-4} \text{kg} \cdot \text{m}^2 (15.86 \text{oz} \cdot \text{in}^2)]$ pulley balancer system)

103H8582-80 ☐☐

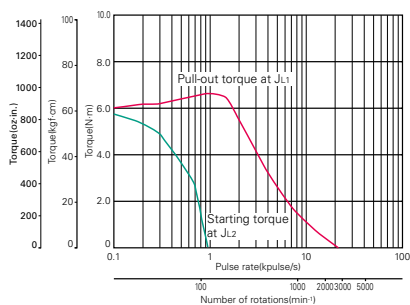


Constant current circuit

Source voltage: AC100V·operating current: 1.5A/phase, 5-phase excitation (full step)

 $J_{L1} = [15.3 \times 10^{-4} \text{kg} \cdot \text{m}^2 (83.65 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling) $J_{L2} = [2.9 \times 10^{-4} \text{kg} \cdot \text{m}^2 (15.86 \text{oz} \cdot \text{in}^2)]$ pulley balancer system)

103H8583-70 ☐☐

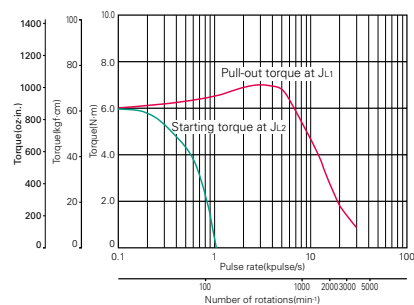


Constant current circuit

Source voltage: AC100V·operating current: 0.75A/phase, 5-phase excitation (full step)

 $J_{L1} = [43 \times 10^{-4} \text{kg} \cdot \text{m}^2 (235.10 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling) $J_{L2} = [4.4 \times 10^{-4} \text{kg} \cdot \text{m}^2 (24.06 \text{oz} \cdot \text{in}^2)]$ pulley balancer system)

103H8583-80 ☐☐



Constant current circuit

Source voltage: AC100V·operating current: 1.5A/phase, 5-phase excitation (full step)

 $J_{L1} = [43 \times 10^{-4} \text{kg} \cdot \text{m}^2 (235.10 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling) $J_{L2} = [4.4 \times 10^{-4} \text{kg} \cdot \text{m}^2 (24.06 \text{oz} \cdot \text{in}^2)]$ 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

Ø106mm (Ø4.17inch)

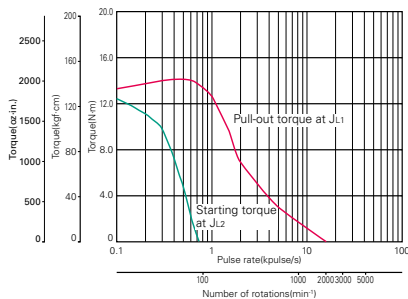
103H8958 □ - □□□□

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 ⁻⁴ kg · m ² (oz · in ²)]	[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)

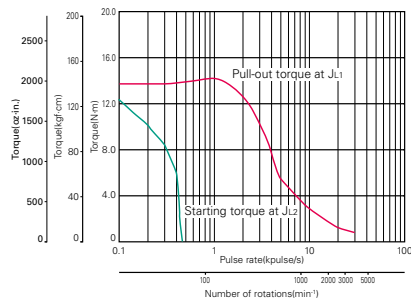
Pulse rate-torque characteristics

103H89582-70 □ □



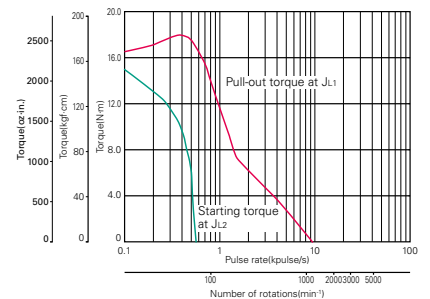
Constant current circuit
Source voltage: AC100V-operating current: 0.75A/phase, 5-phase excitation (full step)
 $J_{L1} = [43 \times 10^{-4} \text{kg} \cdot \text{m}^2 (235.10 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling
 $J_{L2} = [43 \times 10^{-4} \text{kg} \cdot \text{m}^2 (235.10 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling

103H89582-80 □ □



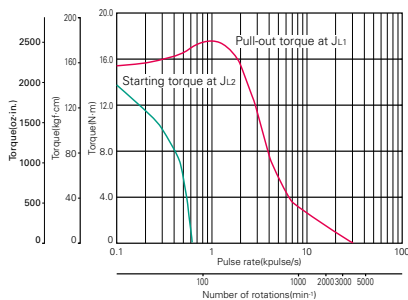
Constant current circuit
Source voltage: AC100V-operating current: 1.5A/phase, 5-phase excitation (full step)
 $J_{L1} = [43 \times 10^{-4} \text{kg} \cdot \text{m}^2 (235.10 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling
 $J_{L2} = [43 \times 10^{-4} \text{kg} \cdot \text{m}^2 (235.10 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling

103H89583-70 □ □



Constant current circuit
Source voltage: AC100V-operating current: 0.75A/phase, 5-phase excitation (full step)
 $J_{L1} = [43 \times 10^{-4} \text{kg} \cdot \text{m}^2 (235.10 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling
 $J_{L2} = [43 \times 10^{-4} \text{kg} \cdot \text{m}^2 (235.10 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling

103H89583-80 □ □



Constant current circuit
Source voltage: AC100V-operating current: 1.5A/phase, 5-phase excitation (full step)
 $J_{L1} = [43 \times 10^{-4} \text{kg} \cdot \text{m}^2 (235.10 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling
 $J_{L2} = [43 \times 10^{-4} \text{kg} \cdot \text{m}^2 (235.10 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling



5-phase stepping motor

$\varnothing 60\text{mm}$ ($\varnothing 2.36\text{inch}$)

103H752 ☐ -6 ☐ ☐ ☐

CE marked

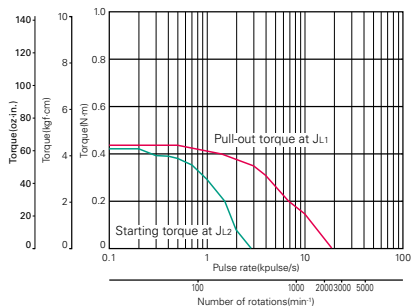
0.72° /step



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	[$\times 10^{-4}\text{kg} \cdot \text{m}^2(\text{oz} \cdot \text{in}^2)$]	[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 ☐ ☐ ☐

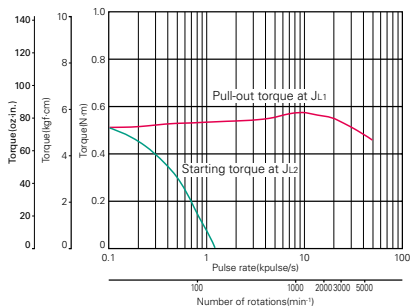


Constant current circuit

Source voltage : DC24V·operating current : 0.75A/phase, 5-phase excitation (full step)

 $J_{L1} = [0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2 (5.14 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling) $J_{L2} = [0.51 \times 10^{-4} \text{kg} \cdot \text{m}^2 (2.79 \text{oz} \cdot \text{in}^2)]$ pulley balancer system)

103H7521-62 ☐ ☐ ☐

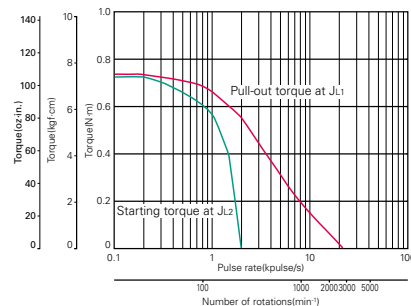


Constant current circuit

Source voltage : AC100V·operating current : 1.5A/phase, 5-phase excitation (full step)

 $J_{L1} = [0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2 (5.14 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling) $J_{L2} = [0.8 \times 10^{-4} \text{kg} \cdot \text{m}^2 (4.37 \text{oz} \cdot \text{in}^2)]$ use the direct coupling)

103H7522-60 ☐ ☐ ☐

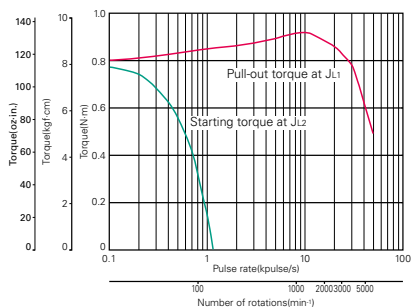


Constant current circuit

Source voltage : DC24V·operating current : 0.75A/phase, 5-phase excitation (full step)

 $J_{L1} = [2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2 (14.22 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling) $J_{L2} = [0.6 \times 10^{-4} \text{kg} \cdot \text{m}^2 (3.28 \text{oz} \cdot \text{in}^2)]$ pulley balancer system)

103H7522-62 ☐ ☐ ☐

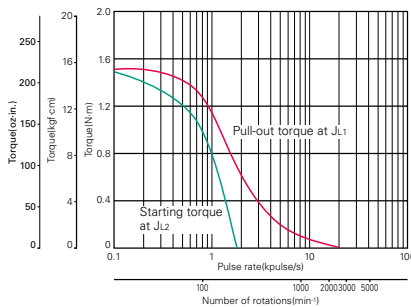


Constant current circuit

Source voltage : AC100V·operating current : 1.5A/phase, 5-phase excitation (full step)

 $J_{L1} = [2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2 (14.22 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling) $J_{L2} = [2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2 (14.22 \text{oz} \cdot \text{in}^2)]$ use the direct coupling)

103H7523-60 ☐ ☐ ☐

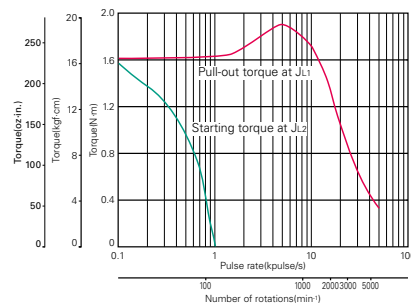


Constant current circuit

Source voltage : DC24V·operating current : 0.75A/phase, 5-phase excitation (full step)

 $J_{L1} = [7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2 (40.46 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling) $J_{L2} = [1.1 \times 10^{-4} \text{kg} \cdot \text{m}^2 (6.01 \text{oz} \cdot \text{in}^2)]$ pulley balancer system)

103H7523-62 ☐ ☐ ☐



Constant current circuit

Source voltage : AC100V·operating current : 1.5A/phase, 5-phase excitation (full step)

 $J_{L1} = [7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2 (40.46 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling) $J_{L2} = [7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2 (40.46 \text{oz} \cdot \text{in}^2)]$ 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

Ø86mm (Ø3.39inch)

103H858 □ -6 □ □ □

CE marked

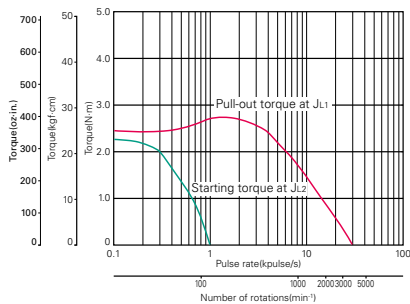
0.72° /step



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 ⁻⁴ kg · m ² (oz · in ²)]	[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)

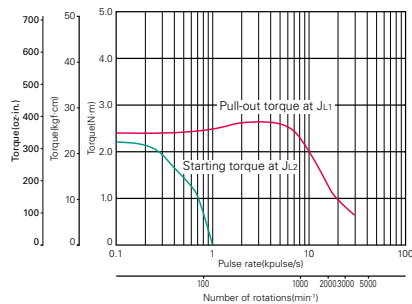
Pulse rate-torque characteristics

103H8581-60 □ □



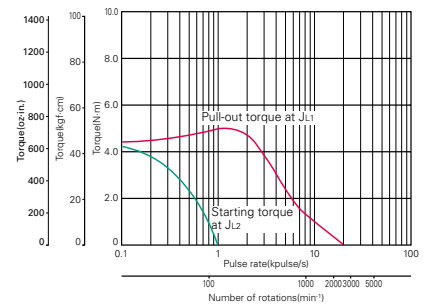
Constant current circuit
Source voltage : AC100V·operating current:0.75A/phase,
5-phase excitation (full step)
 $J_{L1} = [7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2 (40.46 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling]
 $J_{L2} = [1.45 \times 10^{-4} \text{kg} \cdot \text{m}^2 (7.93 \text{oz} \cdot \text{in}^2)]$ pulley balancer system]

103H8581-62 □ □



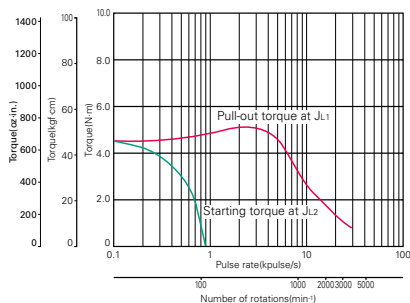
Constant current circuit
Source voltage : AC100V·operating current:1.5A/phase,
5-phase excitation (full step)
 $J_{L1} = [7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2 (40.46 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling]
 $J_{L2} = [1.45 \times 10^{-4} \text{kg} \cdot \text{m}^2 (7.93 \text{oz} \cdot \text{in}^2)]$ pulley balancer system]

103H8582-60 □ □



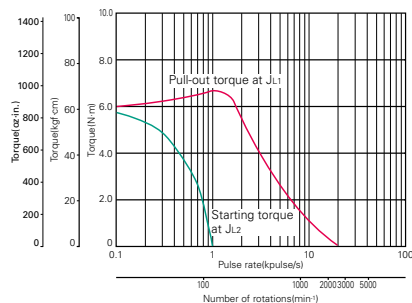
Constant current circuit
Source voltage : AC100V·operating current:0.75A/phase,
5-phase excitation (full step)
 $J_{L1} = [15.3 \times 10^{-4} \text{kg} \cdot \text{m}^2 (83.65 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling]
 $J_{L2} = [2.9 \times 10^{-4} \text{kg} \cdot \text{m}^2 (15.86 \text{oz} \cdot \text{in}^2)]$ pulley balancer system]

103H8582-62 □ □



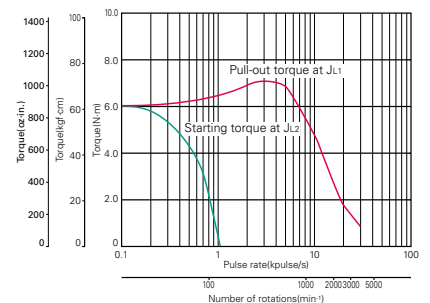
Constant current circuit
Source voltage : AC100V · operating current:1.5A/phase,
5-phase excitation (full step)
 $J_{L1} = [15.3 \times 10^{-4} \text{kg} \cdot \text{m}^2 (83.65 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling]
 $J_{L2} = [2.9 \times 10^{-4} \text{kg} \cdot \text{m}^2 (15.86 \text{oz} \cdot \text{in}^2)]$ pulley balancer system]

103H8583-60 □ □



Constant current circuit
Source voltage : AC100V·operating current:0.75A/phase,
5-phase excitation (full step)
 $J_{L1} = [43 \times 10^{-4} \text{kg} \cdot \text{m}^2 (235.10 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling]
 $J_{L2} = [4.4 \times 10^{-4} \text{kg} \cdot \text{m}^2 (24.06 \text{oz} \cdot \text{in}^2)]$ pulley balancer system]

103H8583-62 □ □



Constant current circuit
Source voltage : AC100V·operating current:1.5A/phase,
5-phase excitation (full step)
 $J_{L1} = [43 \times 10^{-4} \text{kg} \cdot \text{m}^2 (235.10 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling]
 $J_{L2} = [4.4 \times 10^{-4} \text{kg} \cdot \text{m}^2 (24.06 \text{oz} \cdot \text{in}^2)]$ pulley balancer system]



5-phase stepping motor

$\varnothing 106$ mm ($\varnothing 4.17$ inch)

103H8958 ☐ -6 ☐ ☐ ☐

CE marked

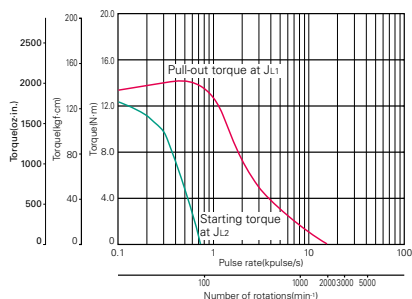
0.72°/step



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	[$\times 10^{-4}$ kg · m ² (oz · in ²)]	[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)

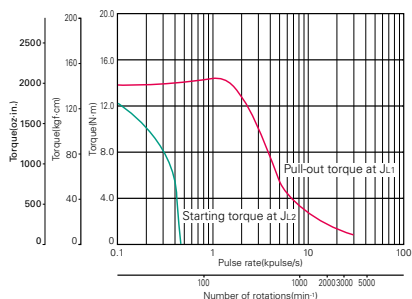
Pulse rate-torque characteristics

103H89582-60 ☐ ☐



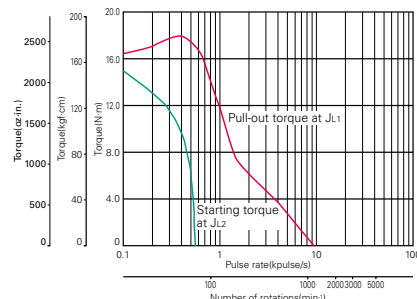
Constant current circuit
 Source voltage: AC100V·operating current: 0.75A/phase,
 5-phase excitation (full step)
 $J_{L1} = [43 \times 10^{-4} \text{kg} \cdot \text{m}^2 (235.10 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling]
 $J_{L2} = [43 \times 10^{-4} \text{kg} \cdot \text{m}^2 (235.10 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling]

103H89582-62 ☐ ☐



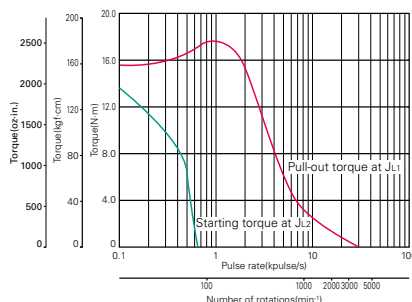
Constant current circuit
 Source voltage: AC100V·operating current: 1.5A/phase,
 5-phase excitation (full step)
 $J_{L1} = [43 \times 10^{-4} \text{kg} \cdot \text{m}^2 (235.10 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling]
 $J_{L2} = [43 \times 10^{-4} \text{kg} \cdot \text{m}^2 (235.10 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling]

103H89583-60 ☐ ☐



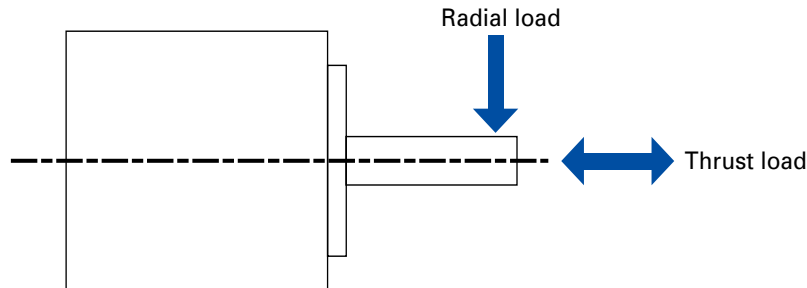
Constant current circuit
 Source voltage: AC100V·operating current: 0.75A/phase,
 5-phase excitation (full step)
 $J_{L1} = [43 \times 10^{-4} \text{kg} \cdot \text{m}^2 (235.10 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling]
 $J_{L2} = [43 \times 10^{-4} \text{kg} \cdot \text{m}^2 (235.10 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling]

103H89583-62 ☐ ☐



Constant current circuit
 Source voltage: AC100V·operating current: 1.5A/phase,
 5-phase excitation (full step)
 $J_{L1} = [43 \times 10^{-4} \text{kg} \cdot \text{m}^2 (235.10 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling]
 $J_{L2} = [43 \times 10^{-4} \text{kg} \cdot \text{m}^2 (235.10 \text{oz} \cdot \text{in}^2)]$ use the rubber coupling]

Allowable radial / thrust load



Frange size	Model number	unit	Distance from end of shaft : mm (inch)				Thrust load
			0 (0)	5 (0.2)	10 (2.25)	15 (3.38)	
			Radial load				
28mm sq. (1.10 inch sq.)	SH528 □ (SH5285-7041)	N	49 (1.93)	53 (2.09)	53 (2.09)	—	3 (0.12)
		lbs	11 (0.43)	11 (0.43)	11 (0.43)	—	0.67 (0.03)
39mm sq. (1.54 inch sq.)	103-45 □□ (4510-7040)	N	26 (1.02)	33 (1.3)	42 (1.65)	60 (2.36)	10 (2.25)
		lbs	5 (0.2)	7 (0.28)	9 (0.35)	13 (0.51)	2.25 (0.09)
42mm sq. (1.65 inch sq.)	103H55 □□ 103F55 □□ (F5510-7041)	N	29 (1.14)	36 (1.42)	49 (1.93)	52 (2.05)	10 (2.25)
		lbs	6 (0.24)	8 (0.31)	11 (0.43)	11 (0.43)	2.25 (0.09)
50mm sq. (1.97 inch sq.)	103H65 □□	N	71 (2.8)	87 (3.43)	115 (4.53)	167 (6.57)	15 (3.38)
		lbs	15 (0.59)	19 (0.75)	25 (0.98)	37 (1.46)	3.37 (0.13)
ϕ 60mm (ϕ 2.36 inch)	103H75 □□	N	94 (3.7)	116 (4.57)	153 (6.02)	222 (8.74)	15 (3.38)
		lbs	21 (0.83)	26 (1.02)	34 (1.34)	49 (1.93)	3.37 (0.13)
	103-75 □□	N	68 (2.68)	85 (3.35)	113 (4.45)	166 (6.54)	15 (3.38)
		lbs	15 (0.59)	19 (0.75)	25 (0.98)	37 (1.46)	3.37 (0.13)
60mm sq. (2.36 inch sq.)	103H78 □□	N	70 (2.76)	87 (3.43)	114 (4.49)	165 (6.5)	20 (0.79)
		lbs	15 (0.59)	19 (0.75)	25 (0.98)	37 (1.46)	4.5 (0.18)
	103F78 □□ 103M78 □□	N	62 (2.44)	75 (2.95)	94 (3.7)	127 (5)	20 (0.79)
		lbs	13 (0.51)	16 (0.63)	21 (0.83)	28 (1.1)	4.5 (0.18)
ϕ 86mm (ϕ 3.39 inch)	103H85 □□	N	191 (7.52)	234 (9.21)	301 (11.85)	421 (16.57)	60 (2.36)
		lbs	42 (1.65)	52 (2.05)	67 (2.64)	94 (3.7)	13 (0.51)
	103F85 □□ 103M85 □□	N	350 (13.78)	424 (16.69)	535 (21.06)	726 (28.58)	60 (2.36)
		lbs	78 (3.07)	95 (3.74)	120 (4.72)	163 (6.42)	13 (0.51)
ϕ 106mm (ϕ 4.17 inch)	103H895 □□ 103F895 □□ 103M895 □□	N	321 (12.64)	356 (14.02)	401 (15.79)	457 (18)	100 (3.94)
		lbs	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 □ and 103H55 □□,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% (no condensation)								
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	*0.05mm (0.00197inch)	*0.05mm (0.00197inch)	*0.075mm (0.00295inch)	*0.075mm (0.00295inch)	*0.075mm (0.00295inch)	*0.075mm (0.00295inch)	*0.075mm (0.00295inch)	*0.05mm (0.00197inch)	*0.075mm (0.00295inch)
Fitted surface angularity against shaft	0.1mm (0.00394inch)	0.1mm (0.00394inch)	0.075mm (0.00295inch)	0.075mm (0.00295inch)	0.075mm (0.00295inch)	0.075mm (0.00295inch)	0.075mm (0.00295inch)	0.075mm (0.00295inch)	0.075mm (0.00295inch)

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

General specifications (models to CE marking)

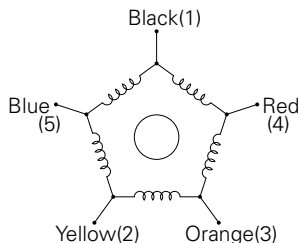
	103H752 □	103H858 □	103H8958 □
Rated voltage	DC12-200V	DC12-300V	
Applied standards (Low voltage directive)	EN60034-1, IEC34-5 (EN60034-5) , EN60204-1, EN60950, EN61010-1		
Specification type	S1 (continuous running duty type)		
Protection grade	IP43		
Protection class	Class I		
Operating environment	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	*0.075 mm (0.00295inch)	*0.075 mm (0.00295inch)	*0.075 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



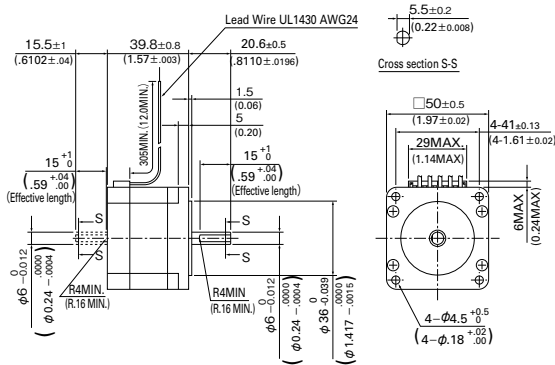
Direction of motor rotate

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

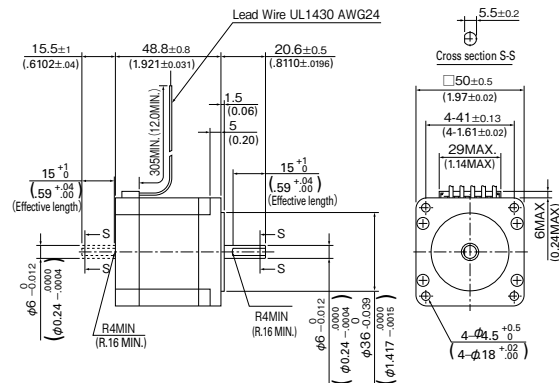
As for some of the models with the gear, the direction of motor rotation is different, please make inquiries.

Type				Exciting order									
Color of leads	Black	Connector pin No.	(1)	—	—	—	—	+	+	+	+	—	—
	Red		(4)	—	+	+	+	+	—	—	—	—	—
	Orange		(3)	+	—	—	—	—	—	+	+	+	+
	Yellow		(2)	—	—	—	+	+	+	+	—	—	—
	Blue		(5)	+	+	+	—	—	—	—	—	—	+

50mm sq. (1.97inch sq.)

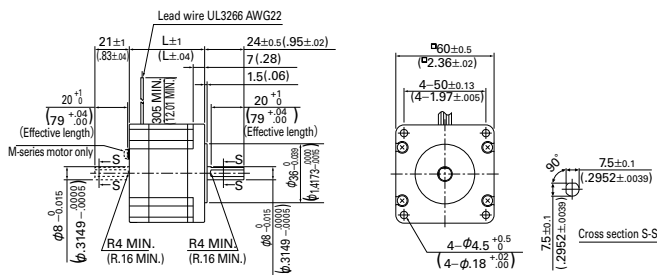


Set part number	Motor model number
—	103H6500-70 △ 1
—	103H6500-80 △ 1

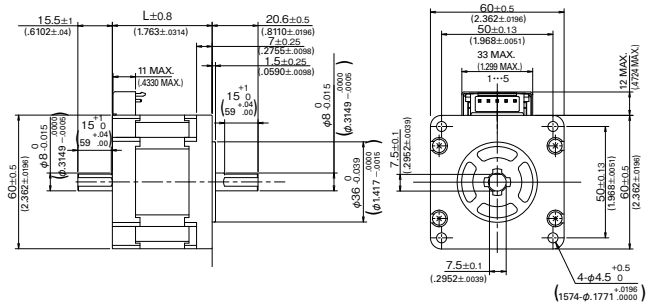


Set part number	Motor model number
—	103H6501-70 △ 1
—	103H6501-80 △ 1

60mm sq. (2.36inch sq.)

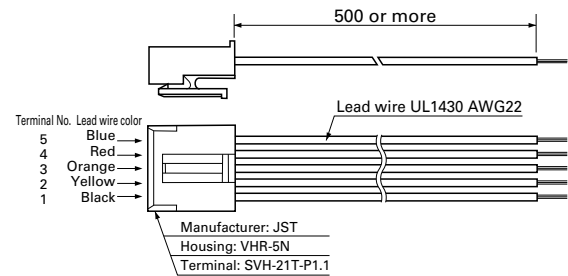


Set part number	Motor model number	Motor length (L) : mm (inch)
FS ■ 781 △	103 ■ 7851-70 △ 1	46.5 (1.83)
FS ■ 782 △	103 ■ 7852-70 △ 1	55 (2.17)
FS ■ 783 △	103 ■ 7853-70 △ 1	87.5 (3.44)
FDF781 △	103F7851-82 △ 1	46.5 (1.83)
FDF782 △	103F7852-82 △ 1	55 (2.17)
FDF783 △	103F7853-82 △ 1	87.5 (3.44)

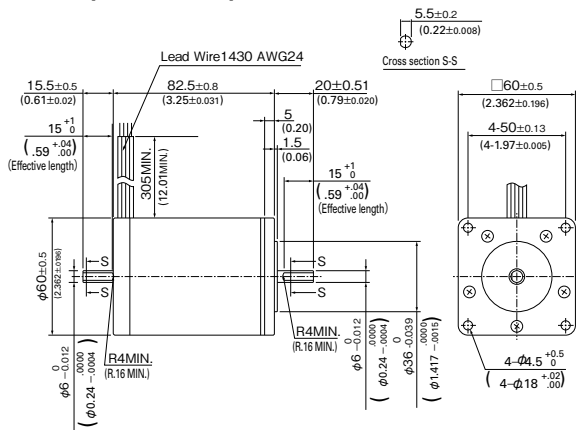


Set part number	Motor model number	Motor length (L) : mm (inch)
—	103H7851-● 0 △ 1	44.8 (1.76)
—	103H7852-● 0 △ 1	53.8 (2.1)
—	103H7853-● 0 △ 1	85.8 (3.38)

Motor cable Model No. : 4837847-1



φ 60mm (φ 2.36inch)

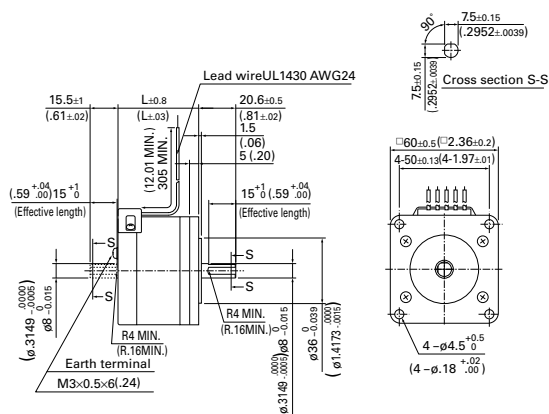


Set part number	Motor model number	Motor length (L) : mm (inch)
—	103-7566-70 △ 1	82.5

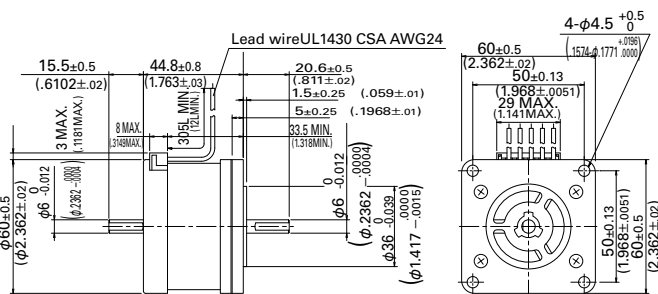
Standard model / CE/UL model

[Unit: mm (inch)]

φ 60mm (φ 2.36inch)

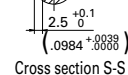
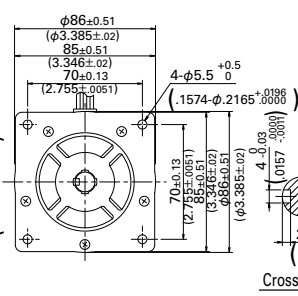
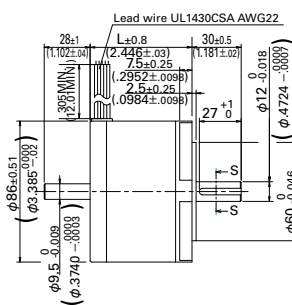
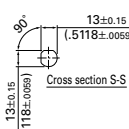
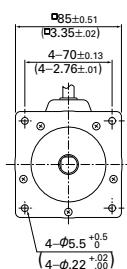
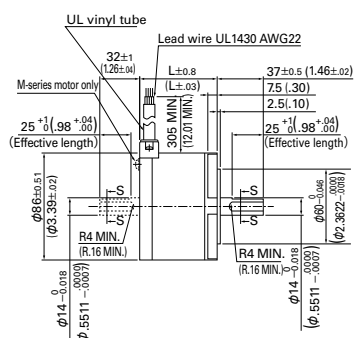


Set part number	Motor model number	Motor length : mm (inch)
—	103H7521-6 ◆▼ 0	44.8 (1.76)
—	103H7522-6 ◆▼ 0	53.8 (2.12)
—	103H7523-6 ◆▼ 0	85.8 (3.38)



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)

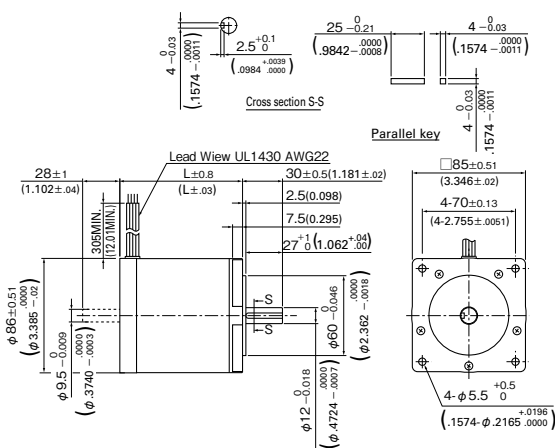
φ 86mm (φ 3.39inch)



Set part number	Motor model number	Motor length (L): mm (inch)
FS ■ 851 △	103 ■ 8581-70 △ 1	62.15 (2.45)
FS ■ 852 △	103 ■ 8582-70 △ 1	92.2 (3.63)
FS ■ 853 △	103 ■ 8583-70 △ 1	125.85 (4.95)
FDF851 △	103F8581-82 △ 1	62.15 (2.45)
FDF852 △	103F8582-82 △ 1	92.2 (3.63)

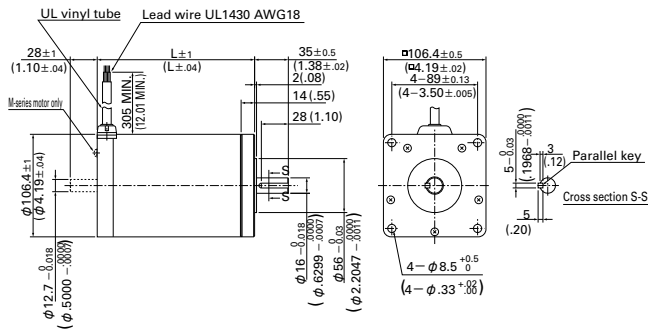
Set part number	Motor model number	Motor length (L): mm (inch)
—	103H8581-● 0 △ 1	62.15 (2.45)
—	103H8582-● 0 △ 1	92.2 (3.63)
—	103H8583-● 0 △ 1	125.85 (4.95)

Ø 86mm (Ø 3.39inch)

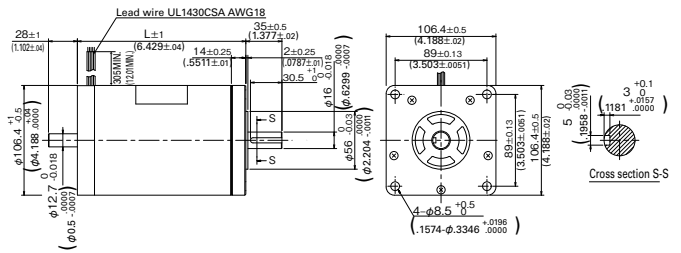


Set part number	Motor model number		Motor length (L): mm (inch)
	Single shaft	Double shaft	
—	103H8581-6050	-6020	62.15 (2.47)
—	103H8581-6250	-6220	62.15 (2.47)
—	103H8582-6050	-6020	92.2 (3.63)
—	103H8582-6250	-6220	92.2 (3.63)
—	103H8583-6050	-6020	125.85 (4.95)
—	103H8583-6250	-6220	125.85 (4.95)

$\phi 106\text{mm}$ ($\phi 4.17\text{inch}$)

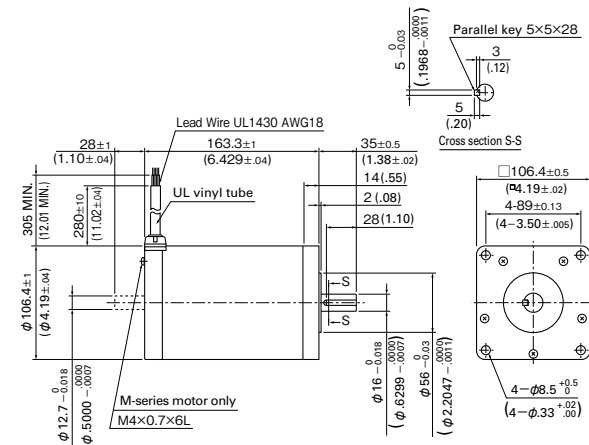


Set part number	Motor model number	Motor length (L) : mm (inch)
FS ■ 892 △	103 ■ 89582-70 △ 1	163.3 (6.43)
FS ■ 893 △	103 ■ 89583-70 △ 1	221.3 (8.71)

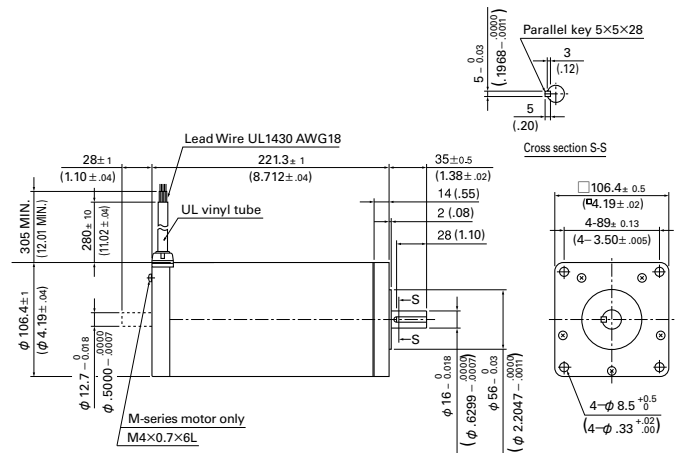


Set part number	Motor model number	Motor length (L) : mm (inch)
—	103H89582-● 0 △ 1	163.3 (6.43)
—	103H89583-● 0 △ 1	221.3 (8.71)

$\phi 106\text{mm}$ ($\phi 4.17\text{inch}$)



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
DC Power source Standard type	D

■ : Motor specifications

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

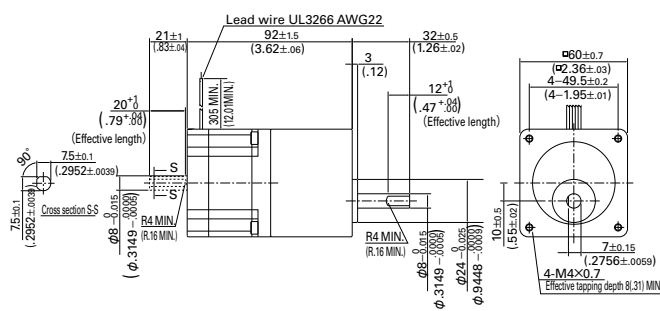
△ : Motor shaft specification code

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

60mm sq. (2.36inch sq.)



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

Lead wire UL1430 AWG22

UL vinyl tube

305 MIN.
(12.01 MIN.)

32 ± 1
(1.26 ± 0.04)

127.3 ± 1.5
(5.01 ± 0.06)

32 ± 1
(1.26 ± 0.04)

3
(.12)

32⁺¹₀ (1.26^{+0.04}_{0.00})
(Effective length)

25⁺¹₀ (0.98^{+0.04}_{0.00})
(Effective length)

13 ± 0.1
(.5118 ± 0.0039)

5°

13 ± 0.1
(.5118 ± 0.0039)

Cross section T-T

φ86 ± 0.5
(φ3.39 ± 0.02)

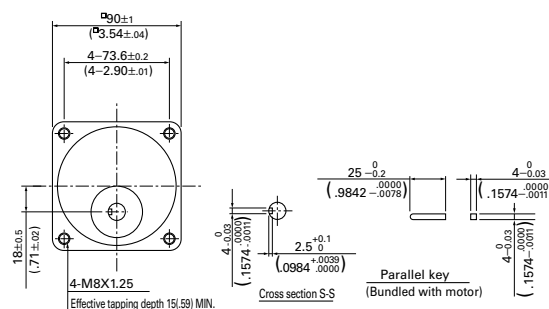
R4 MIN.
(R.16 MIN.)

φ14⁰_{-0.018}
(φ.5511 - .0007)

φ12⁰_{-0.018}
(φ.4724 - .0007)

φ36⁰_{-0.025}
(φ.1417 - .0010)

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



△ : Motor shaft specification code

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

[Unit: mm (inch)]

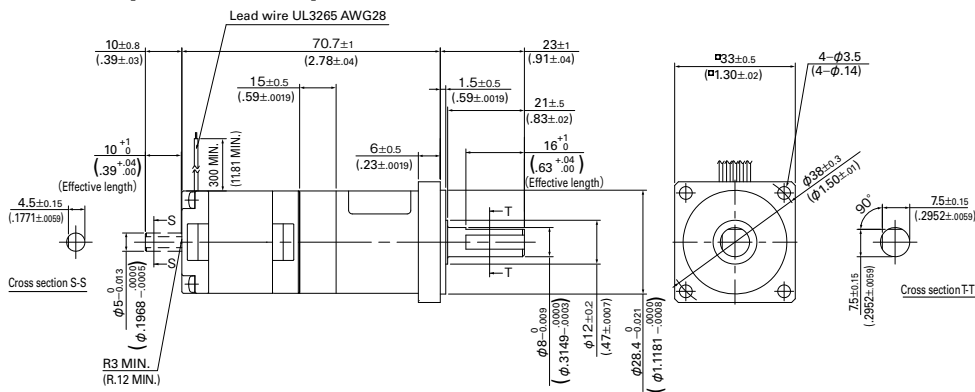
Set part number	Motor model number
FDF521 △ -GX3.6	SH5281-72GXA △
FDF521 △ -GX7.2	SH5281-72GXB △
FDF521 △ -GX10	SH5281-72GXE △
FDF521 △ -GX20	SH5281-72GXG △
FDF521 △ -GX30	SH5281-72GXJ △
FDF521 △ -GX50	SH5281-72GXI △

△ : Motor shaft specification code

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

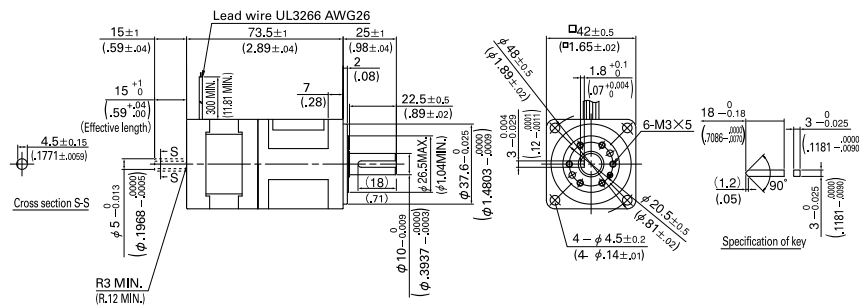
[Unit: mm (inch)]

28mm sq. (1.10inch sq.)



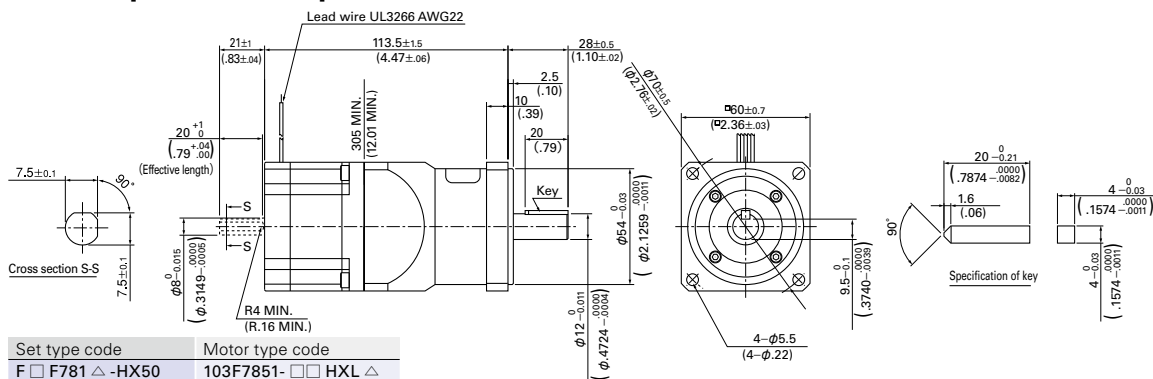
Set type code	Motor type code
FDF521 △ -HX50	103F3505-72HXL △
FDF521 △ -HX100	103F3505-72HXM △

42mm sq. (1.65inch sq.)



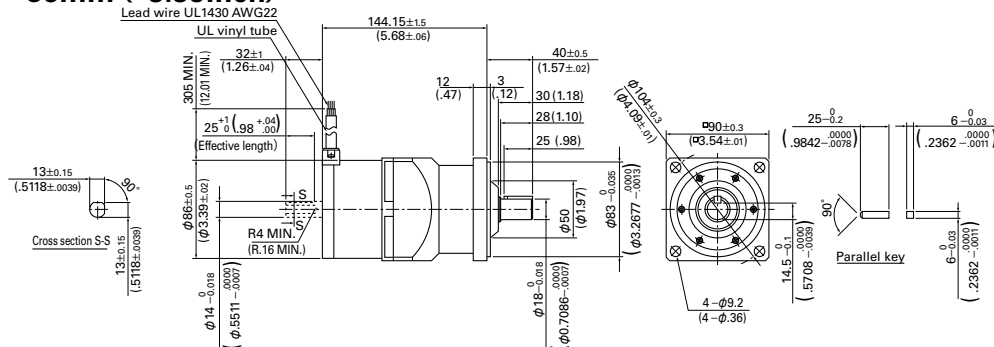
Set type code	Motor type code
F ☐ F551 ☐ -HX30	103F5505- ☐ ☐ HXJ ☐
F ☐ F551 ☐ -HX50	103F5505- ☐ ☐ HXL ☐
F ☐ F551 ☐ -HX100	103F5505- ☐ ☐ HXM ☐

60mm sq. (2.36inch sq.)



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

φ 86mm (φ 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

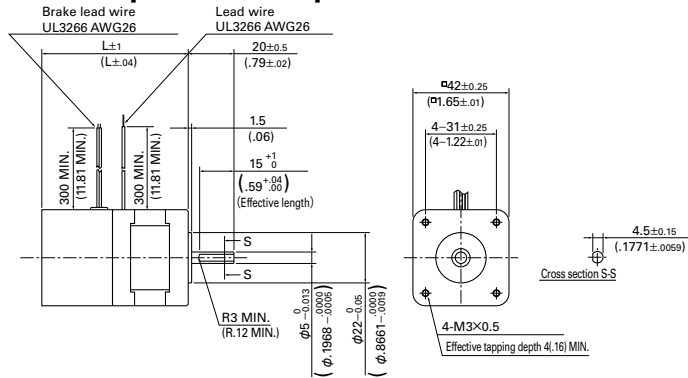
◇ : Motor shaft specification code

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

Electromagnetic brake model

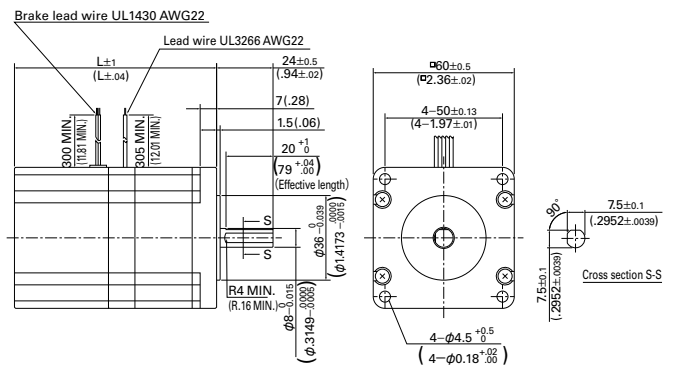
[Unit : mm (inch)]

42mm sq. (1.65inch sq.)



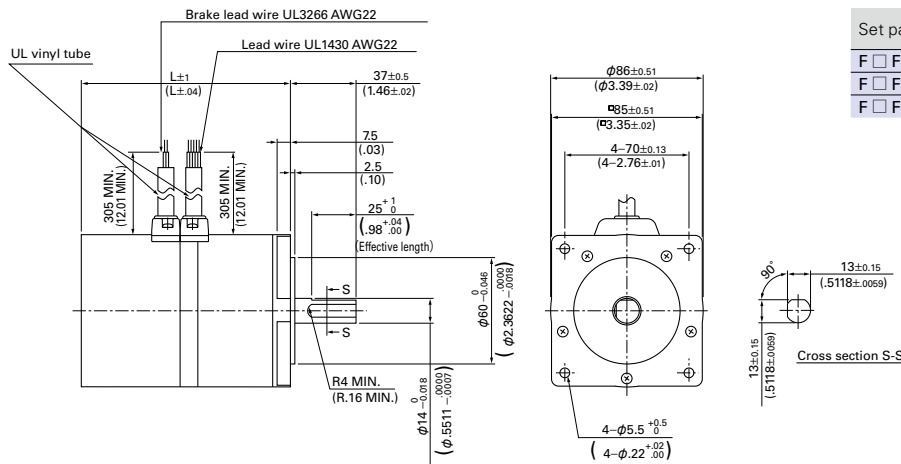
Set part number	Motor model number	Motor + brake length : mm (inch)
F □ F551S-XB	103F5505- □ □ XB41	64.5 (2.54)
F □ F552S-XB	103F5508- □ □ XB41	70.5 (2.78)
F □ F554S-XB	103F5510- □ □ XB41	79.5 (3.13)

60mm sq. (2.36inch sq.)



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)

φ 86mm (φ 3.39inch)

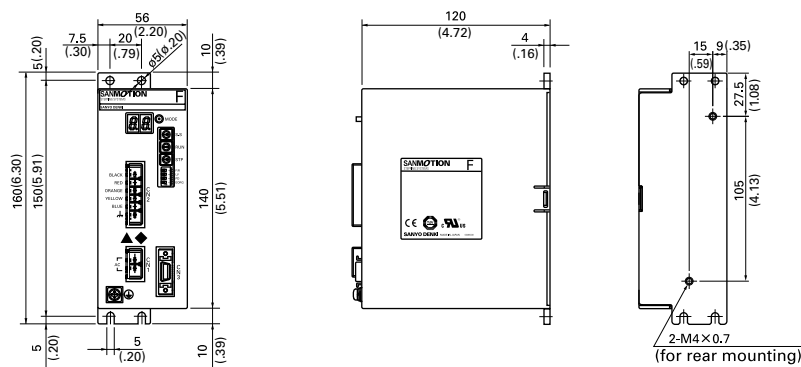


Set part number	Motor model number	Motor + brake length : mm (inch)
F □ F851S-XB	103F8581- □ □ XB41	116.7 (4.59)
F □ F852S-XB	103F8582- □ □ XB41	146.8 (5.78)
F □ F853S-XB	103F8583- □ □ XB41	180.4 (7.10)

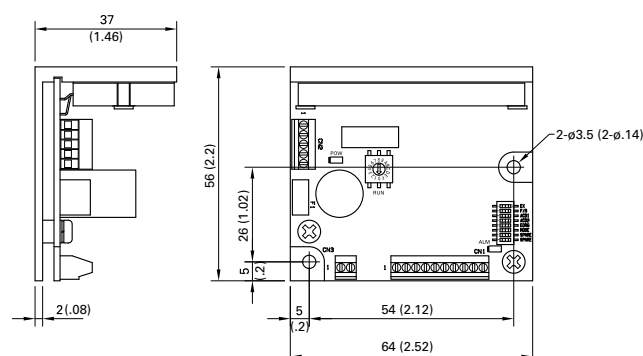
Driver (CE [TÜV] • UL)

[Unit : mm (inch)]

AC input



DC input



Safety standards

AC driver

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

DC driver

UL	Acquired standards		Standard part	File No.
	UL		UL508C	E179775
	UL for Canada			
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
			EN61000-4-2	ESD (Electrostatic discharge)
		Immunity	EN61000-4-3	RS (Radio-frequency amplitude modulated electromagnetic field)
			EN61000-4-4	Fast transients
			EN61000-4-6	Surges

M series motor

UL	Acquired standards		Standard part	File No.
	UL		UL1004, UL2111	E208878
	UL for Canada			
CE	Standard category		Standard part	
			EN-60034-1	
	Low-voltage directives		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.

- ① Use for the medical devices concerned with a fatal accident.
- ② Use for trains, elevators, and so forth that are likely to cause an accident resulting in injury, damage or death.
- ③ Use in the computer system highly influential to the social life or the public systems.
- ④ Use 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** 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.

< Placement >

12. Take insulation process for the attached condenser or the external resistance connection terminals. Failure to do so may cause an electric shock.
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: _____

Date: _____

Department: _____

To contact us: _____

Telephone : _____

Phone: +81 3 3917 5157

Fax: _____

Fax: +81 3 3917 0643

1) Application: _____

2) Name of Machinery: _____

3) Number of Units: _____

Item	Contents																																																																																																
① Name of target equipment	Equipment name, category (transport, processing, test, other)																																																																																																
② Name of servo axis	Axis name, axial mechanism (horizontal/vertical), brake mechanism (yes/no)																																																																																																
③ Current condition of above axis	Manufacturer Name () Series Name () Motor Capacity () Hydraulic, Mechanical, or New System ()																																																																																																
④ Positioning accuracy	± mm / ± μm																																																																																																
⑤ Operation pattern	Reference formula: $[1G=9.8, m/s^2], 1(m/s^2) \approx 0.1G]$ $[\alpha(m/s^2)=V(m/sec) \div t1(sec)]$ $[D(m)=V(m/sec) \times (t1+t2)(sec)]$																																																																																																
⑥ 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																																																																																																
⑦ Mechanical structure	<table border="0"> <tr> <td>WT (table mass)</td><td>kg</td> <td>WL (work mass)</td><td>kg</td> <td>WA (mass of other drive parts)</td><td>kg</td> </tr> <tr> <td>WR (rack mass)</td><td>kg</td> <td>WB (belt/chain mass)</td><td>kg</td> <td>WC (counterbalance mass)</td><td>kg</td> </tr> <tr> <td>Fa (external force in axial direction)</td><td>N</td> <td>Fb (ball-screw preload)</td><td>N</td> <td>T (roll pushing force)</td><td>N</td> </tr> <tr> <td>Dr1 (drive-side roll diameter)</td><td>mm</td> <td>Dr2 (follower-side roll diameter)</td><td>mm</td> <td></td><td></td> </tr> <tr> <td>Lr1 (drive-side roll length)</td><td>mm</td> <td>Lr2 (follower-side roll length)</td><td>mm</td> <td>G (reduction ratio)</td><td></td> </tr> <tr> <td>JG (speed-reducer inertia)</td><td>kg·m²</td> <td>JC (coupling inertia)</td><td>kg·m²</td> <td></td><td></td> </tr> <tr> <td>JN (nut inertia)</td><td>kg·m²</td> <td>JO (other motor-axis conversion inertia)</td><td>kg·m²</td> <td></td><td></td> </tr> <tr> <td>Db (ball-screw diameter)</td><td>mm</td> <td>Lb (ball-screw axial length)</td><td>mm</td> <td>Pb (ball-screw lead)</td><td>mm</td> </tr> <tr> <td>Dp (pinion/pulley diameter)</td><td>mm</td> <td>Lp (pinion axial length)</td><td>mm</td> <td>Tp (pulley thickness)</td><td>mm</td> </tr> <tr> <td>Dt (table diameter)</td><td>mm</td> <td>Dh (table-support diameter)</td><td>mm</td> <td>LW (load shift from axis)</td><td>mm</td> </tr> <tr> <td>Ds (table shaft diameter)</td><td>mm</td> <td>Ls (table shaft length)</td><td>mm</td> <td></td><td></td> </tr> <tr> <td>ρ (specific gravity of ball-screw/pinion/pulley/table-shaft material)</td><td></td> <td></td><td>kg/cm³</td> <td></td><td></td> </tr> <tr> <td>μ (friction coefficient between sheet and sliding-surface/support-section/roll)</td><td></td> <td>ρ1 (specific gravity of roll-1 material)</td><td></td> <td></td><td>kg/cm³</td> </tr> <tr> <td>ρ2 (specific gravity of roll-2 material)</td><td></td> <td>κ (internal friction coefficient of preload nut)</td><td></td> <td></td><td></td> </tr> <tr> <td>η (mechanical efficiency)</td><td></td> <td>JL (load inertia of motor-axis conversion)</td><td></td> <td></td><td>kg·m²</td> </tr> <tr> <td>TF (friction torque of motor axis conversion)</td><td></td> <td>TU (imbalance torque of motor axis conversion)</td><td></td> <td></td><td>N·m</td> </tr> </table>	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·m ²	JC (coupling inertia)	kg·m ²			JN (nut inertia)	kg·m ²	JO (other motor-axis conversion inertia)	kg·m ²			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/cm ³			μ (friction coefficient between sheet and sliding-surface/support-section/roll)		ρ1 (specific gravity of roll-1 material)			kg/cm ³	ρ2 (specific gravity of roll-2 material)		κ (internal friction coefficient of preload nut)				η (mechanical efficiency)		JL (load inertia of motor-axis conversion)			kg·m ²	TF (friction torque of motor axis conversion)		TU (imbalance torque of motor axis conversion)			N·m
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⑧ Speed reducer	Customer-provided (/); Sanyo standard (planet/spur/no-backlash-planet:: /); other (/)																																																																																																
⑨ Sensor type	Sensor type specified (yes / no) Yes: (incremental , optical absolute , optical absolute [resolver absolute with incremental function]) Resolution ()																																																																																																
⑩ Input format	Position , speed, torque, communications (SERCOS / CAN / DeviceNet) other ()																																																																																																
⑪ Upper-level equipment (controller)	Sequencer , laptop , customer-developed product , Sanyo-provided , other ()																																																																																																
⑫ Usage environment and other requirements	Cutting , clean-room use , anti-dust measures , other ()																																																																																																
⑬ Estimated production	Single product: () units/month () units/year																																																																																																
⑭ Development schedule	Prototype period: ()Year ()Month Production period: ()Year ()Month																																																																																																
⑮ Various measures	Related documentation (already submitted ; send later by mail) Visit/PR desired (yes / no) Meeting desired (yes / no)																																																																																																
⑯ Miscellaneous (questions, pending problems, unresolved issues, etc.)																																																																																																	

■ Precautions For Adoption



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.

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*Remarks : Specifications Are Subject To Change Without Notice.

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