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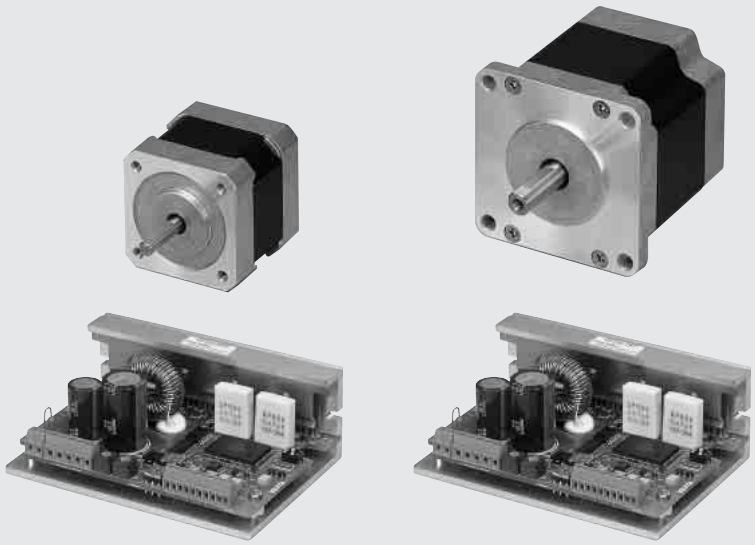
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5-Phase Stepping Motor and Driver Package

NanoStep® CFK II Series

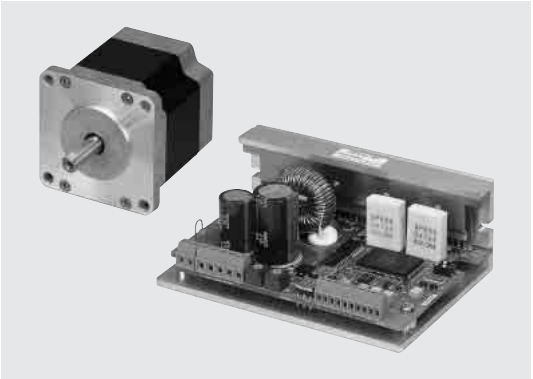
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5-Phase Stepping Motor and Driver Package

NanoStep® CFK Ⅱ Series

Offering high performance and simple operation in a compact size, the 5-phase **CFK Ⅱ** Series microstepping driver and motor package is available in both standard and high speed versions. The **CFK Ⅱ** Series provides unparalleled resolution and low vibration in an open loop system, as well as high torque in the high speed range.



Features

Extensive Motor Selection

Oriental Motor has expanded the selection of its motors, which are now available in five frame sizes from □0.79 in. (20 mm) to □3.35 in. (85 mm) with torque ranging from 3.2 oz-in (0.0231 N·m) to 890 oz-in (6.3 N·m). The high-torque P-type, 0.79 in. (20 mm) square frame motor features our latest advances in technology providing high torque in a miniature motor, allowing for quick, easy connection.

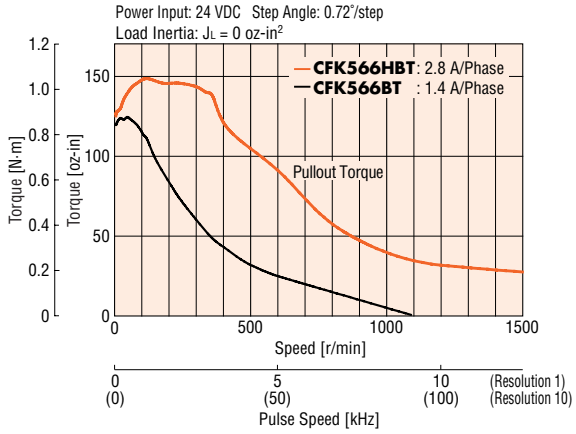
Compact, Highly Functional Board-Level Driver

The microstepping driver electronically divides the basic step angle of the motor by up to 250 (0.00288°) without the use of a reduction mechanism or other mechanical element. A total of 16 different step angles can easily be selected with a digital switch on the driver. The 24 VDC input driver has an automatic current cutback function and is capable of switching between two different step angles using a signal input. The excitation-timing signal output is convenient for detecting the mechanical home position. The size of this compact yet highly functional driver is 2.76 in. (70 mm) [W] × 3.94 in. (100 mm) [D] × 1.42 in. (36 mm) [H].

High-Speed Versions Available

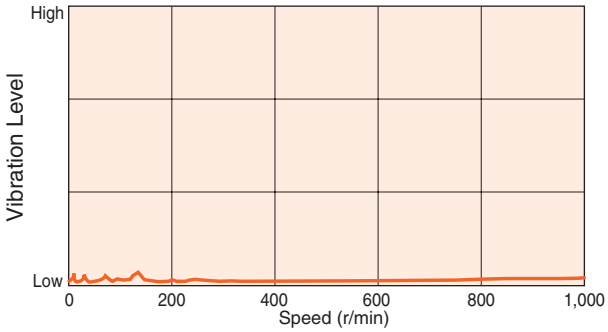
The high-speed versions provide more accurate positioning in the high-speed range, thereby reducing acceleration time.

Comparisons of Speed-Torque Characteristics

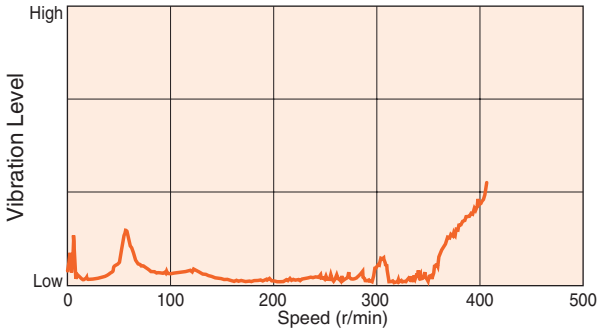


Enables Low-Vibration Operation in the Low-Speed Range

A typical 2-phase motor vibrates so much at 400 r/min, that it will start to lose synchronization (misstep). However, a typical 5-phase motor can go up to 1000 r/min without any significant increase in vibration.

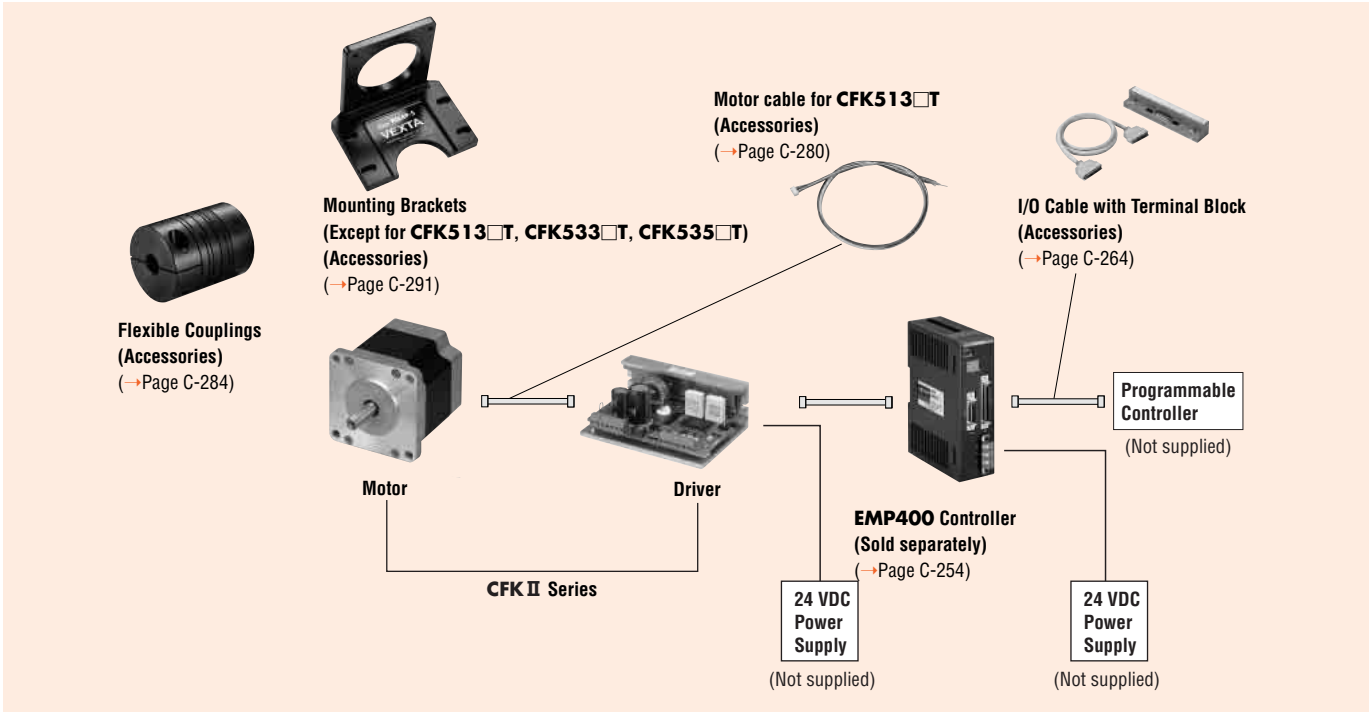


CFK Ⅱ Series 5-Phase Microstepping Driver and Motor



Comparable 2-Phase Microstepping Driver and Motor

System Configuration



An example of a single-axis system configuration with the **EMP400** Series controller.

Product Number Code

CFK 5 6 6 H A T

- **CFK**: NanoStep CFK II Series
- **5**: 5-Phase
- **6**: Motor Frame Size **1**: 0.79 in. sq. (20 mm sq.), **3**: 1.10 in. sq. (28 mm sq.), **4**: 1.65 in. sq. (42 mm sq.), **6**: 2.36 in. sq. (60 mm sq.), **9**: 3.35 in. sq. (85 mm sq.)
- **6**: Motor Case Length
- **H**: **H**: High Speed Type, **P**: High Torque Type, **Blank**: Standard Type
- **A**: Shaft Type **A**: Single Shaft, **B**: Double Shaft
- **T**: Terminal Connection Type

Product Line

Type	Power Supply Voltage	Maximum Holding Torque				
		□0.79 in. (□20 mm)	□1.10 in. (□28 mm)	□1.65 in. (□42 mm)	□2.36 in. (□60 mm)	□3.35 in. (□85 mm)
High Torque Type	24 VDC	3.2 oz-in (0.0231 N·m)	—	—	—	—
Standard Type		—	4.6~8.5 oz-in (0.033~0.06 N·m)	18.4~34 oz-in (0.13~0.24 N·m)	59~230 oz-in (0.42~1.66 N·m)	—
High-Speed Type		—	—	—	117~230 oz-in (0.83~1.66 N·m)	290~890 oz-in (2.1~6.3 N·m)

High Torque Type Standard Type

Motor Frame Size: □ 0.79 in. (□ 20 mm)

Motor Frame Size: □ 1.10 in. (□ 28 mm)

Specifications

Model			CFK513PAT*1	CFK533AT	CFK535AT
	Single Shaft				
	Double Shaft		CFK513PBT*1	CFK533BT	CFK535BT
Maximum Holding Torque		oz-in (N·m)	3.2 (0.0231)	4.6 (0.033)	8.5 (0.06)
Rotor Inertia J		oz-in^2 (kg·m^2)	0.0142 (2.6×10^{-7})	0.049 (9×10^{-7})	0.098 (18×10^{-7})
Rated Current		A/phase	0.35	0.75	
Basic Step Angle			0.72°		
Power Source Input			24 VDC±10% 0.6 A	24 VDC±10% 1 A	
Excitation Mode			Microstep: Basic Step Angle/n*2 (/step)		
Weight	Motor	lb. (kg)	0.11 (0.05)	0.22 (0.1)	0.37 (0.17)
	Driver	lb. (kg)	0.44 (0.2)		
Dimension No.	Motor		1	2	
	Driver		6		

How to Read Specifications Table→Page C-9

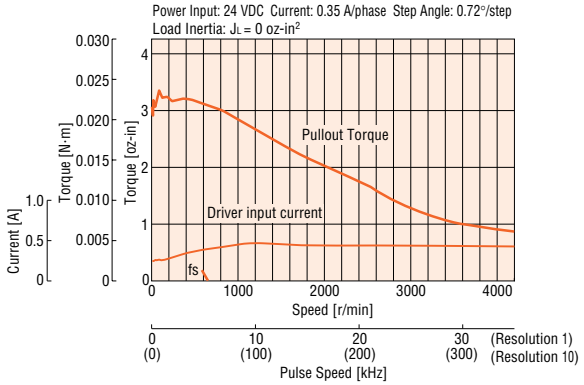
*1 A motor cable with a connector of [2 ft. (0.6 m)] is included with the motor and driver unit of connector type.

*2 Sixteen resolutions are available, where n=1, 2, 2.5, 4, 5, 8, 10, 20, 25, 40, 50, 80, 100, 125, 200 and 250.

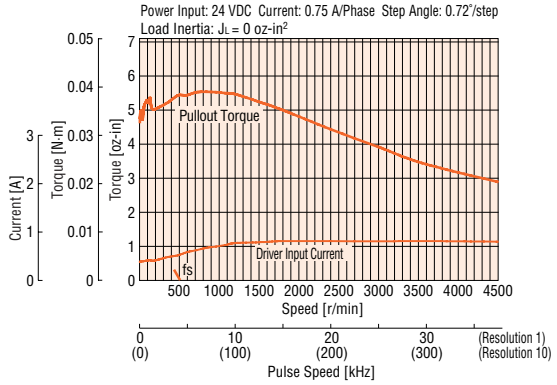
Speed — Torque Characteristics

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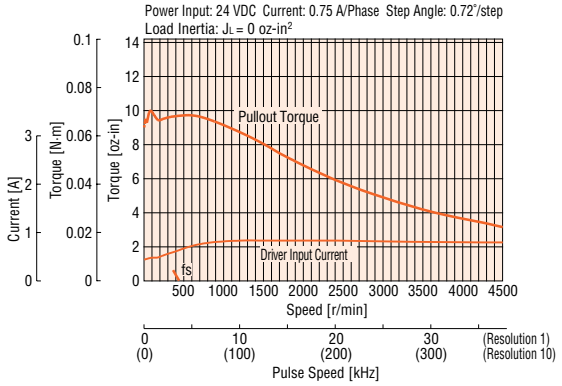
CFK513P□T



CFK533□T



CFK535□T



Note:
The pulse input circuit responds up to approximately 500 kHz with a pulse duty of 50 %.

Standard Type Motor Frame Size: □ 1.65 in. (□ 42 mm), □ 2.36 in. (□ 60 mm)

Specifications

Model			CFK543AT	CFK544AT	CFK545AT	CFK564AT	CFK566AT	CFK569AT
	Double Shaft		CFK543BT	CFK544BT	CFK545BT	CFK564BT	CFK566BT	CFK569BT
Maximum Holding Torque		oz-in (N·m)	18.4 (0.13)	25 (0.18)	34 (0.24)	59 (0.42)	117 (0.83)	230 (1.66)
Rotor Inertia J		oz-in^2 (kg·m^2)	0.191 (35×10^{-7})	0.3 (54×10^{-7})	0.37 (68×10^{-7})	0.96 (175×10^{-7})	1.53 (280×10^{-7})	3.1 (560×10^{-7})
Rated Current		A/phase	0.75			1.4		
Basic Step Angle			0.72°					
Power Source Input			24 VDC±10% 1 A			24 VDC±10% 2 A		
Excitation Mode			Microstep: Basic Step Angle/n* (/step)					
Weight	Motor	lb. (kg)	0.46 (0.21)	0.59 (0.27)	0.77 (0.35)	1.3 (0.6)	1.8 (0.8)	2.9 (1.3)
	Driver	lb. (kg)	0.44 (0.2)					
Dimension No.	Motor		3			4		
	Driver		6					

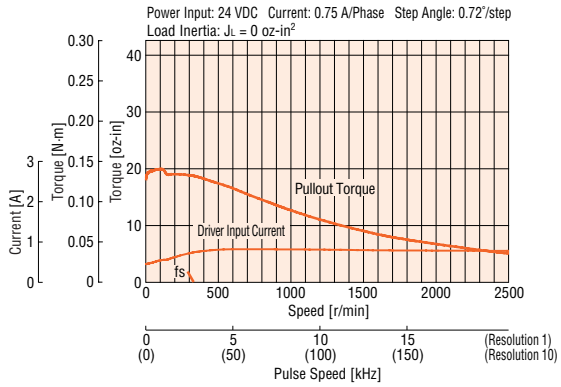
How to Read Specifications Table→Page C-9

* Sixteen resolutions are available, where n=1, 2, 2.5, 4, 5, 8, 10, 20, 25, 40, 50, 80, 100, 125, 200 and 250.

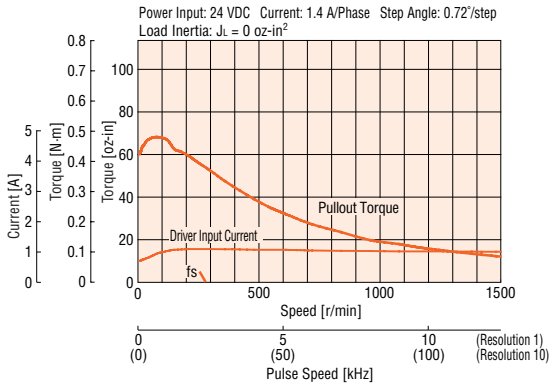
Speed — Torque Characteristics

How to Read Speed-Torque Characteristics→Page C-10

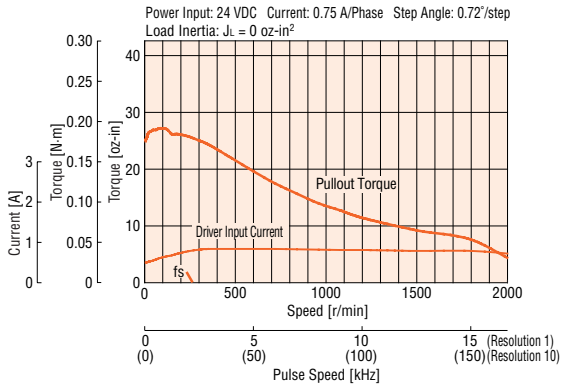
CFK543□T



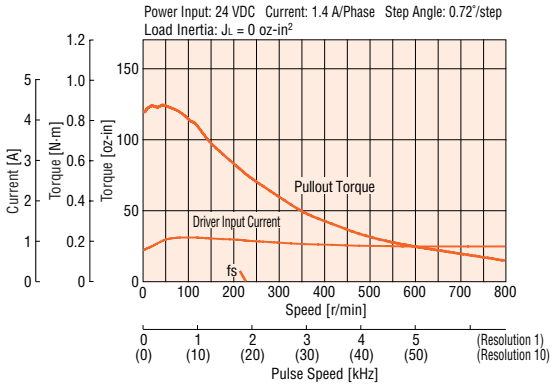
CFK564□T



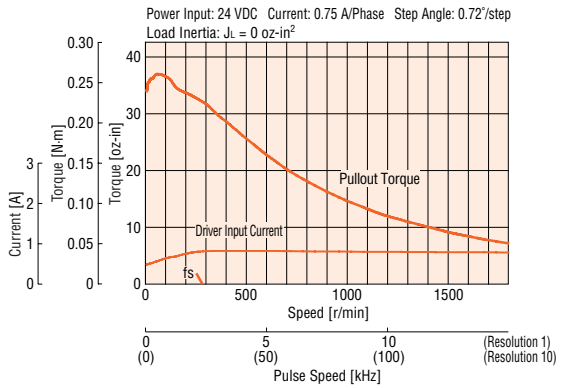
CFK544□T



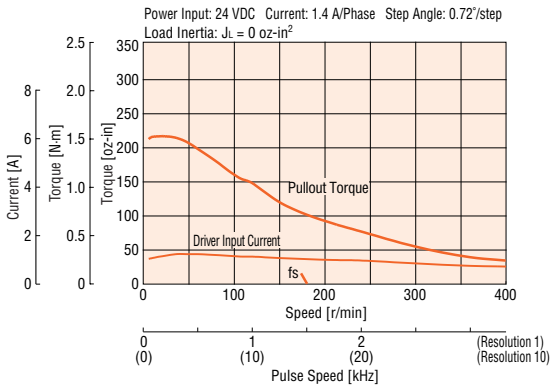
CFK566□T



CFK545□T



CFK569□T



Note:
The pulse input circuit responds up to approximately 500 kHz with a pulse duty of 50 %.

Common Specifications C-111 | Dimensions C-112 | Connection and Operation C-114 | Motor and Driver Combinations C-118

High-Speed Type Motor Frame Size: □ 2.36 in. (□ 60 mm), □ 3.35 in. (□ 85 mm)

Specifications

Model			CFK566HAT / CFK566HBT	CFK569HAT / CFK569HBT	CFK596HAT / CFK596HBT	CFK599HAT / CFK599HBT	CFK5913HAT / CFK5913HBT
Maximum Holding Torque		oz-in (N·m)	117 (0.83)	230 (1.66)	290 (2.1)	580 (4.1)	890 (6.3)
Rotor Inertia J		oz-in² (kg·m²)	1.53 (280×10⁻⁷)	3.1 (560×10⁻⁷)	7.7 (1400×10⁻⁷)	14.8 (2700×10⁻⁷)	22 (4000×10⁻⁷)
Rated Current		A/phase	2.8				
Basic Step Angle			0.72°				
Power Source Input			24 VDC±10% 4 A				
Excitation Mode			Microstep: Basic Step Angle/n* (/step)				
Weight	Motor	lb. (kg)	1.8 (0.8)	2.9 (1.3)	3.7 (1.7)	6.2 (2.8)	8.4 (3.8)
	Driver	lb. (kg)	0.48 (0.22)				
Dimension No.	Motor		4		5		
	Driver		6				

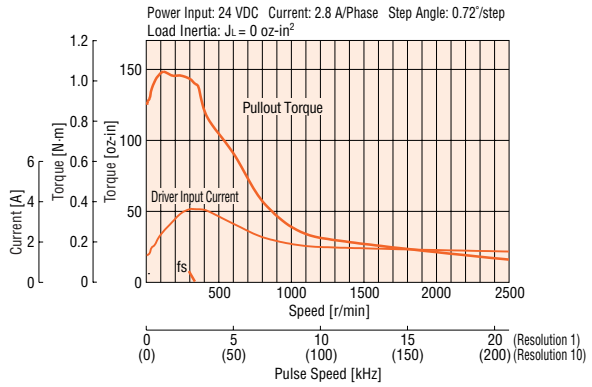
How to Read Specifications Table→Page C-9

* Sixteen resolutions are available, where n=1, 2, 2.5, 4, 5, 8, 10, 20, 25, 40, 50, 80, 100, 125, 200 and 250.

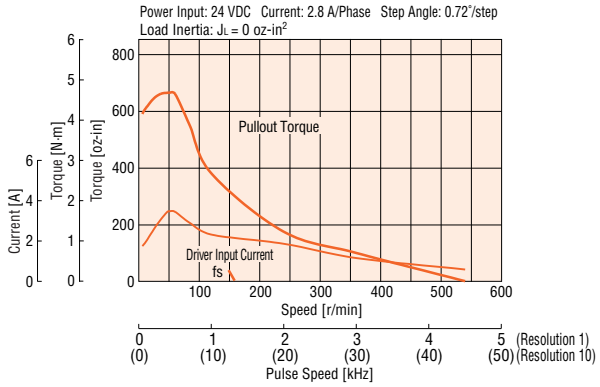
Speed — Torque Characteristics

How to Read Speed-Torque Characteristics→Page C-10

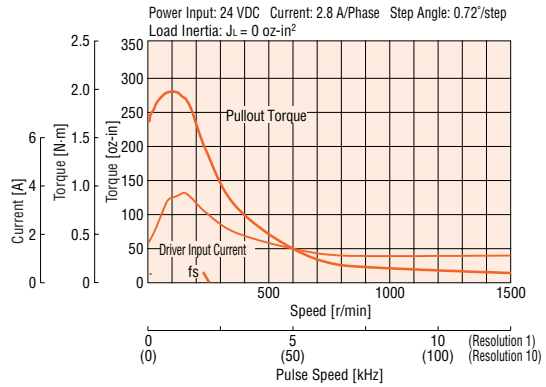
CFK566H□T



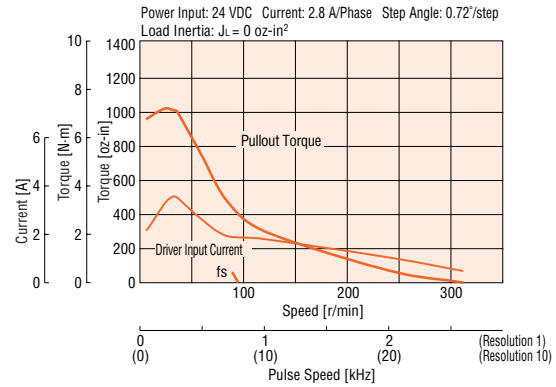
CFK599H□T



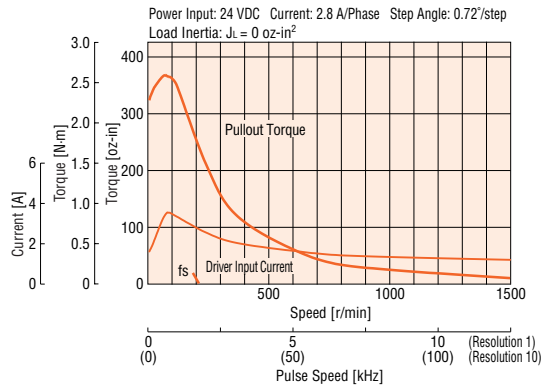
CFK569H□T



CFK5913H□T



CFK596H□T



Note:
The pulse input circuit responds up to approximately 500 kHz with a pulse duty of 50 %.

Common Specifications

Input Signal	Input Mode	Photocoupler input Signal Voltage Photocoupler "ON": +4.5～+5V Photocoupler "OFF": 0～+1 V (Voltage between terminals) Pulse, Direction Rotation Input: 20 mA maximum, input resistance 220 Ω All Windings OFF, Step Angle Select Input: 15 mA maximum, input resistance 470Ω
	Pulse Signal	Step command pulse signal (CW direction operation command signal in 2-pulse input mode) Pulse width: 1 μs minimum, pulse rise/fall: 2 μs maximum, Pulse duty : Max. 50 % The motor moves one step when the pulse input is switched from photocoupler On to Off. Maximum Input Pulse Frequency 500 kHz (When the pulse duty is 50 %) Negative logic pulse input.
	Rotation Direction Signal	Rotation direction command signal, Photocoupler "ON": CW; Photocoupler "OFF": CCW (CCW direction operation command signal in 2-pulse input mode Pulse width: 1 μs minimum, pulse rise/fall: 2 μs maximum, Pulse duty : Max. 50 % The motor moves one step when the pulse input is switched from photocoupler On to Off. Maximum Input Pulse Frequency 500 kHz (When the pulse duty is 50 %) Negative logic pulse input.)
	Step Angle Select Signal	Step angle specified by DATA1 when photocoupler is OFF. Step angle specified by DATA2 when photocoupler is ON.
	All Windings Off Signal	When in the "photocoupler ON" state, the output current to the motor is cut off and the motor's shaft can be rotated manually. When in the "photocoupler OFF" state, the operating current is supplied to the motor.
Output Signal	Output Mode	Photocoupler, Open collector output, External usage conditions: 24 VDC maximum, 10 mA maximum.
	Excitation Timing Signal	The signal is output each time the excitation sequence returns to the initial stage "0". (Photocoupler: ON) e.g. 0.72°/step (resolution 1): Signal output every 10 pulses; or 0.072°/step (resolution 10); Signal output every 100 pulses
Functions		Step angle switch, Pulse input mode switch, Current check switch, Automatic current cutback
Cooling Method		Natural ventilation

● The input power current supplied to the driver represents the maximum input value (which varies with pulse speed).

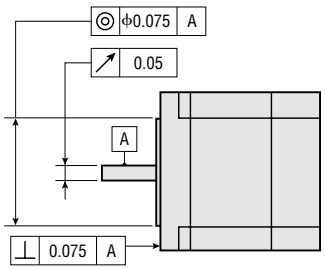
General Specifications

		Motor	Driver
Insulation Resistance		100 MΩ minimum under normal temperature and humidity, when measured by a 500 VDC megger between the windings and case.	—
Dielectric Strength		Sufficient to withstand 1.5 kV (**CFK513□T**, **CFK53□T**: 0.5 kV, **CFK54□T**: 1.0 kV), 50 Hz power applied between the windings and casing for one minute under normal temperature and humidity.	—
Insulation Class		Class B [266°F (130°C)] Recognized as Class A [221°F (105°C)] by UL and CSA standards.	—
Operating Environment	Ambient Temperature	14°F～122°F (−10°C～+50°C) (nonfreezing)	32°F～104°F (0°C～+40°C) (nonfreezing)
	Ambient Humidity	85% or less (noncondensing)	
	Atmosphere	No corrosive gases, dust, water or oil.	
Temperature Rise		Temperature rise of the coil measured by the Change Resistance Method is 144°F (80°C) or less. (at standstill, five phases energized)	—
Static Angle Error*1		±3 arc minutes (±0.05°) [**CFK513**: ±10 arc minutes (±0.17°), **CFK53□**: ±5 arc minutes (±0.084°)]	—
Shaft Runout		0.002 inch (0.05 mm) T.I.R.*4	—
Radial Play*2		0.001 inch (0.025 mm) max. [Load torque: 1.12 lb. (5 N)]	—
Axial Play*3		0.003 inch (0.075 mm) max. [Load torque: 2.2 lb. (10 N)]	—
Concentricity		0.003 inch (0.075 mm) T.I.R.*4	—
Perpendicularity		0.003 inch (0.075 mm) T.I.R.*4	—

*1 This value is for full step with no load (value changes with size of load).
*2 Radial Play: Displacement in shaft position in the radial direction, when a 1.12 lb. (5 N) load is applied in the vertical direction to the tip of the motor's shaft.
*3 Axial Play: Displacement in shaft position in the axial direction, when a 2.2 lb. (10 N) load is applied to the motor's shaft in the axial direction.
*4 T.I.R. (Total Indicator Reading): Total dial gauge reading when the measured section is rotated one revolution centered on a reference axis.

Note:

● Do not measure insulation resistance or perform the dielectric strength test while the motor and driver are connected.



Permissible Overhung Load and Permissible Thrust Load

Unit = Upper values: lb./Lower values: N

Model	Overhung Load Distance from Shaft End [in. (mm)]					Thrust Load
	0 (0)	0.2 (5)	0.39 (10)	0.59 (15)	0.79 (20)	
CFK513P□T	2.7 12	3.3 15	—	—	—	The permissible thrust load [lb.(N)] shall be no greater than the motor mass.
CFK533□T **CFK535□T**	5.6 25	7.6 34	11.7 52	—	—	
CFK543□T **CFK544□T** **CFK545□T**	4.5 20	5.6 25	7.6 34	11.7 52	—	
CFK564□T **CFK566□T, CFK566H□T** **CFK569□T, CFK569H□T**	14.1 63	16.8 75	21 95	29 130	42 190	
CFK596H□T **CFK599H□T** **CFK5913H□T**	58 260	65 290	76 340	87 390	108 480	

- Enter the shaft type **A** or **B** in the box (□) within the model number.

Dimensions

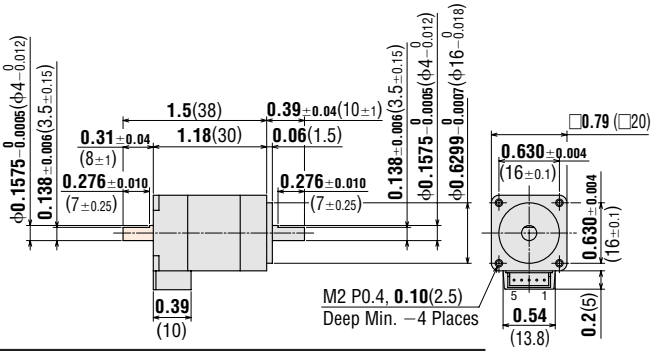
Scale 1/4, Unit = **inch** (mm)

Motor

High Torque Type

1 Motor Frame Size: □ 0.79 in. (□ 20 mm)

(Scale 1/2)



Model	Motor Model	Weight lb. (kg)	DXF
CFK513P□T	PK513P□	0.11 (0.05)	B316

- Enter the shaft type **A** or **B** in the box (□) within the model number.
- Motor cable with connector [2 ft. (0.6 m)] is included with the package. UL Style 3265, AWG24. If you are purchasing only a motor for maintenance purpose, etc., the motor cable with connector will not be supplied.

Applicable Connector

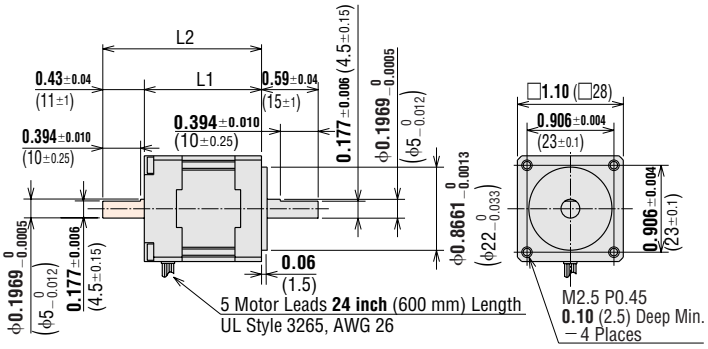
Contact Housing	51065-0500 (MOLEX)
Contact	50212-8100 (MOLEX)
Crimp tool	57176-5000 (MOLEX)

Note:
Connectors are not included.
Use the motor cables with connector (not included).

Standard Type

2 Motor Frame Size: □ 1.10 in. (□ 28 mm)

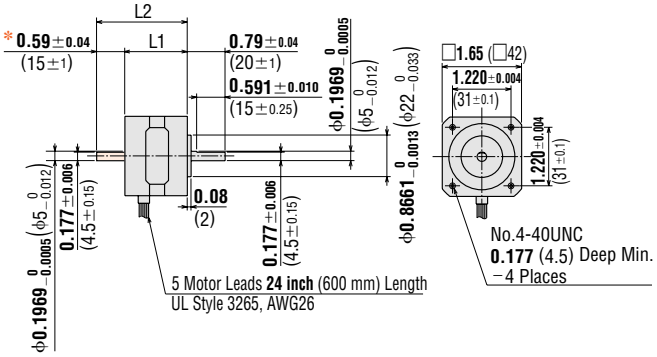
(Scale 1/2)



Model	Motor Model	L1 inch (mm)	L2 inch (mm)	Weight lb. (kg)	DXF
CFK533□T	PMM33□H2	1.22 (31)	1.65 (42)	0.22 (0.1)	B036
CFK535□T	PMM35□H2	1.99 (50.5)	2.42 (61.5)	0.37 (0.17)	B037

- Enter the shaft type **A** or **B** in the box (□) within the model number.

3 Motor Frame Size: □ 1.65 in. (□ 42 mm)



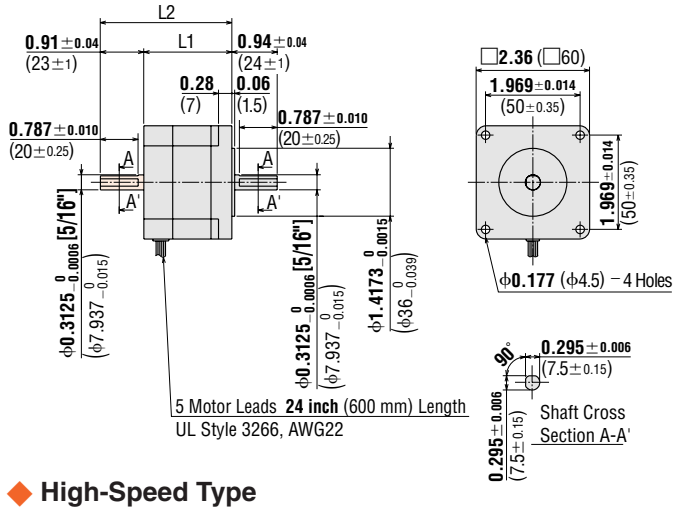
* The length of machining on double shaft model is **0.591±0.010** (15±0.25).

Model	Motor Model	L1 inch (mm)	L2 inch (mm)	Weight lb. (kg)	DXF
CFK543□T	PK543N□WA	1.3 (33)	1.89 (48)	0.46 (0.21)	B068U
CFK544□T	PK544N□WA	1.54 (39)	2.13 (54)	0.59 (0.27)	B069U
CFK545□T	PK545N□WA	1.85 (47)	2.44 (62)	0.77 (0.35)	B070U

- Enter the shaft type **A** or **B** in the box (□) within the model number.
- These dimensions are for double shaft models. For single shaft models, ignore the shaded areas.

◆ Standard Type, High-Speed Type

4 Motor Frame Size: □ 2.36 in. (□ 60 mm)

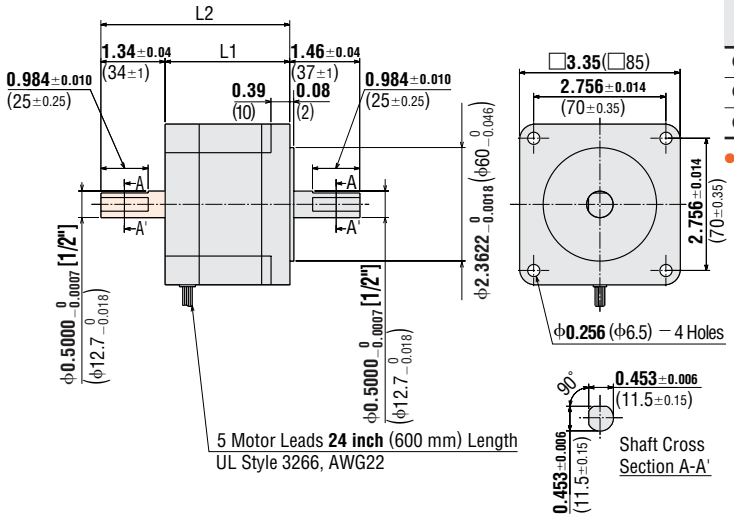


Model	Motor Model	L1 inch (mm)	L2 inch (mm)	Weight lb. (kg)	DXF
CFK564□T	PK564N□WA	1.83 (46.5)	2.74 (69.5)	1.3 (0.6)	B071U
CFK566□T	PK566N□WA	2.26 (57.5)	3.17 (80.5)	1.8 (0.8)	B072U
CFK566H□T	PK566H-N□A				
CFK569□T	PK569N□WA	3.43 (87)	4.33 (110)	2.9 (1.3)	B073U
CFK569H□T	PK569H-N□A				

● Enter the shaft type **A** or **B** in the box (□) within the model number.

◆ High-Speed Type

5 Motor Frame Size: □ 3.35 in. (□ 85 mm)



Model	Motor Model	L1 inch (mm)	L2 inch (mm)	Weight lb. (kg)	DXF
CFK596H□T	PK596-N□A	2.6 (66)	3.94 (100)	3.7 (1.7)	B155U
CFK599H□T	PK599-N□A	3.78 (96)	5.12 (130)	6.2 (2.8)	B156U
CFK5913H□T	PK5913-N□A	4.96 (126)	6.3 (160)	8.4 (3.8)	B157U

● Enter the shaft type **A** or **B** in the box (□) within the model number.

● These dimensions are for double shaft models.
For single shaft models, ignore the shaded areas.

● Driver

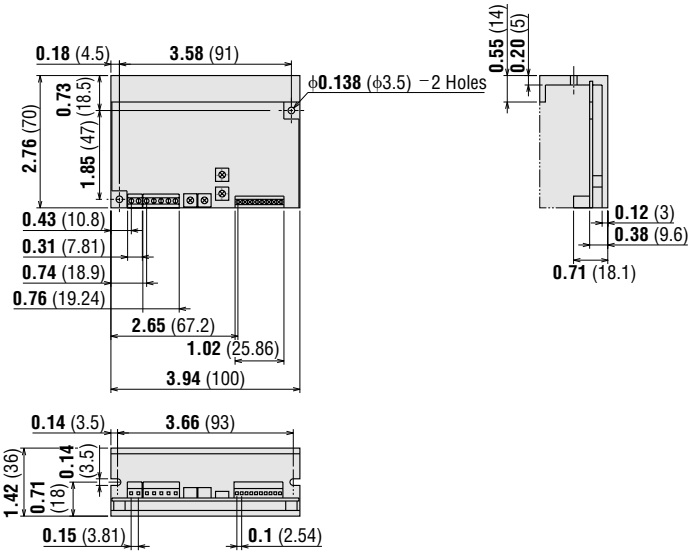
6 Model: DFC5103T, DFC5107T, DFC5114T

Weight: 0.44 lb. (0.2 kg)

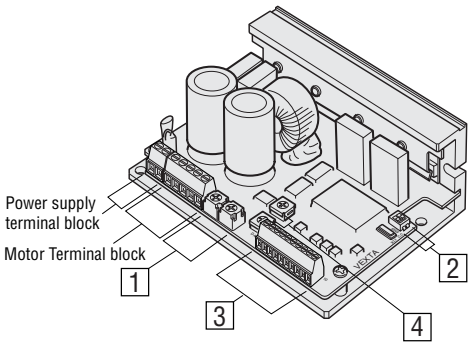
Model: DFC5128T

Weight: 0.48 lb. (0.22 kg)

DXF B285U



Connection and Operation



1 Current Adjustment Potentiometer

Indicator	Potentiometer Name	Function
RUN	Motor run current potentiometer	For adjusting the motor running current
STOP	Motor stop current potentiometer	For adjusting the current at the motor standstill

2 Function Select Switches

Indicator	Switch Name	Function
2P/1P	Pulse input mode switch	Switch between 1-pulse input mode and 2-pulse input mode.
C.C./OFF	DC check switch	Adjusts the motor's running current. When running current the motor, always have this switch set to OFF. The factory setting is OFF

3 Input/Output Signal

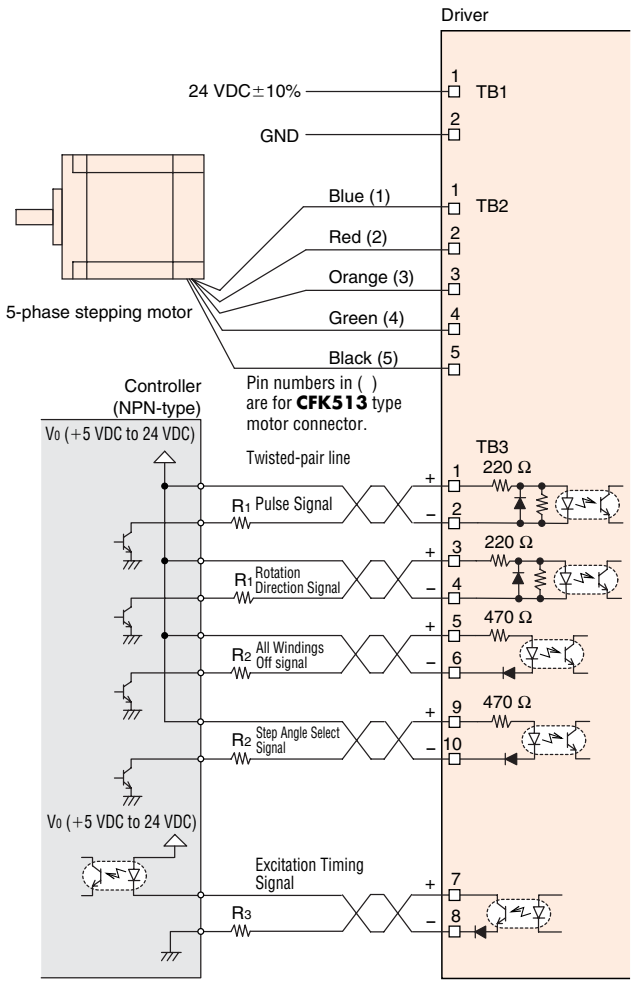
Indicator	Input/Output	Terminal No.	Signal Name
TB3	Input signal	1	Pulse Signal (CW Pulse Signal)
		2	
		3	Rotation Direction Signal (CCW Pulse Signal)
		4	
		5	All Windings Off Signal
		6	
	Output signal	7	Excitation Timing Signal
		8	
	Input signal	9	Step Angle Select Signal
		10	

4 Resolution Select Switches

Indicator	Switch Name	Function
DATA1	Step Angle Select Switch	Each switch can be set to the desired resolution from the 16 resolution levels.
DATA2		

Step Angle	Resolution	Step Angle Select Switch (Common to DATA 1 and DATA 2)
0.72°	1	0
0.36°	2	1
0.288°	2.5	2
0.18°	4	3
0.144°	5	4
0.09°	8	5
0.072°	10	6
0.036°	20	7
0.0288°	25	8
0.018°	40	9
0.0144°	50	A
0.009°	80	B
0.0072°	100	C
0.00576°	125	D
0.0036°	200	E
0.00288°	250	F

Connection Diagrams



Notes:

- Keep the input single voltage Vo between 5 VDC and 24 VDC. When Vo is equal to 5 VDC, the external resistances R1 and R2 are not necessary. When Vo is above 5 VDC, connect R1 and R2 to keep the current as follows:
  Pulse, Rotation Direction: 10 mA to 20 mA max.
  All Windings Off, Step Angle Select: 10 mA to 15 mA max.
- Keep the output signal voltage Vo between 5 VDC and 24 VDC. When Vo is equal to 5 VDC, the external resistance R3 is not necessary. When it is above 5 VDC, connect R3 to keep the current below 10 mA max.
- Use twisted-pair wire of AWG 24 to AWG 22 and 6.6 feet (2 m) or less in length for the signal line.
- Note that as the length of the pulse signal line increases, the maximum transmission frequency decreases.(→Technical Reference Page F-36)
- Suitable wire size for the TB1, TB2 and TB3 terminal block is between AWG20 and AWG26. Use AWG 22 to AWG 20 for standard type (DFC5103T, DFC5107T, DFC5114T) and AWG 20 to AWG 18 for high-speed type (DFC5128T) for power supply lines.
- Use spot grounding to ground the driver and external controller.
- Signal lines should be kept at least 3.9 inches (10 cm) away from power lines (power supply lines and motor lines). Do not bind the signal line and power line together.
- If noise generated by the motor lead wire causes a problem, try shielding the motor lead wires with conductive tape or wire mesh.
- Incorrect connection of DC power input will lead to driver damage. Make sure that the polarity is correct before turning the power on.

Description of Input/Output Signals

Pulse Input and Rotation Direction Input

1-Pulse Input Mode

Pulse Signal

"Pulse" signal is input to the Pulse－terminal. When the photocoupler state changes from "ON" to "OFF", the motor rotates one step. The direction of rotation is determined by the rotation direction signal.

Rotation Direction Input

The "Rotation Direction" signal is input to D./CCW－terminal. A "photocoupler ON" signal input commands a clockwise direction rotation. A "photocoupler OFF" signal input commands a counter-clockwise direction rotation.

2-Pulse Input Mode

CW Pulse Signal

"Pulse" signal is input to the P./CW－terminal. When the photocoupler state changes from "ON" to "OFF", the motor rotates one step in the clockwise direction.

CCW Pulse Signal

"Pulse" signal is input to the D./CCW－terminal. When the photocoupler state changes from "ON" to "OFF", the motor rotates one step in the counterclockwise direction.

All Windings Off (A.W. OFF) Input

When the "All Windings Off" (A.W. OFF) signal is in the "photocoupler ON" state, the current to the motor is cut off and motor torque is reduced to zero. The motor output shaft can then be rotated freely by hand. This signal is used when moving the motor by external force or the manual home position.

Step Angle Select (C/S) Input

When the "Step Angle Select" signal is in the "photocoupler OFF" state, the step angle set by step resolution select switch DATA1 is selected, and when the "Step Angle Select" signal is in the "photocoupler ON" state, the step angle set by step resolution select switch DATA2 is selected. This signal can be used to change the motor speed or amount of rotation without altering the input pulses.

Excitation Timing (TIMING) Output

The Excitation Timing signal is output once each time the excitation sequence returns to step "0" in synchronization with input pulse. The excitation sequence is designed to complete one cycle as the motor shaft rotates 7.2˚.

0.72˚/step (resolution 1): Signal is output once every 10 pulses.

0.072˚/step (resolution 10): Signal is output once every 100 pulses.

Step Angle Selection

With the **CFK II** Series, the motor speed and step distance can be changed without changing the input pulse frequency by switching the step angle switch. The step angle is set with step angle setting switches DATA1 and DATA2. DATA1 and DATA2 each have 16 settings from which one step angle each can be selected. The step angles that can be set are shown in the table below.

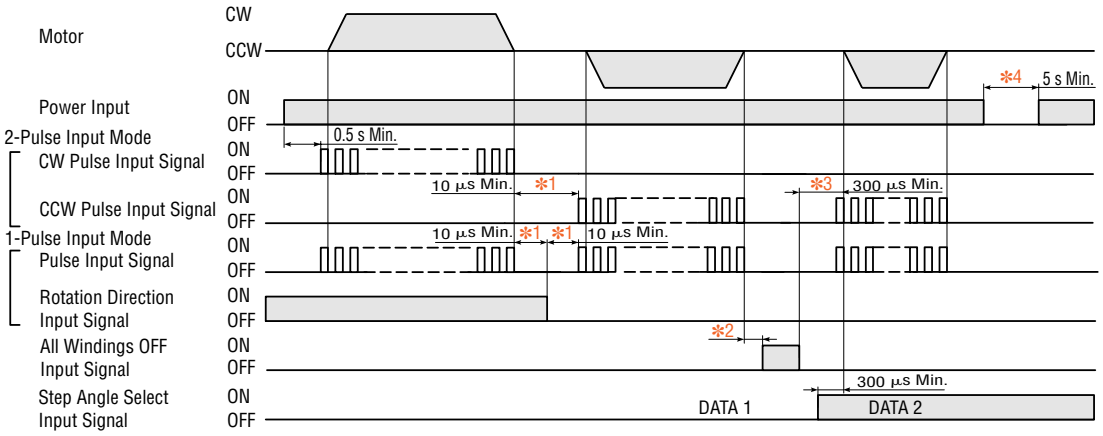
DATA1 and DATA2 are set to the scale corresponding to the step angle selected for each. The step angle is changed with the step angle select signals.

Photocoupler "OFF": The step angle set with DATA1 is selected.

Photocoupler "ON": The step angle set with DATA2 is selected.

Step Angle	Resolution	Step Angle Select Switch (Common to DATA 1 and DATA 2)
0.72°	1	0
0.36°	2	1
0.288°	2.5	2
0.18°	4	3
0.144°	5	4
0.09°	8	5
0.072°	10	6
0.036°	20	7
0.0288°	25	8
0.018°	40	9
0.0144°	50	A
0.009°	80	B
0.0072°	100	C
0.00576°	125	D
0.0036°	200	E
0.00288°	250	F

Timing Chart



The shaded section indicates that the photocoupler is on.

*1 Switching time to change CW, CCW pulse (2-pulse input mode), and switching time to change direction (1-pulse input mode) 10 μ sec is shown as a response time of circuit. The motor may need more time.
*2 Depends on load inertia, load torque, and starting frequency.
*3 Never input a step pulse signal immediately after switching the "All Winding Off" signal to the photocoupler off state. The motor may not start.
*4 Wait at least 5 seconds before turning on the power.

Adjusting the Current

Adjusting the Motor Current

Use the "RUN" potentiometer to decrease the current and suppress the temperature rise in the motor/driver, or when there is sufficient motor torque and you want to suppress vibration by lowering the current.
Use the "STOP" potentiometer to readjust the current at motor standstill in relation to the holding-brake force of the motor.

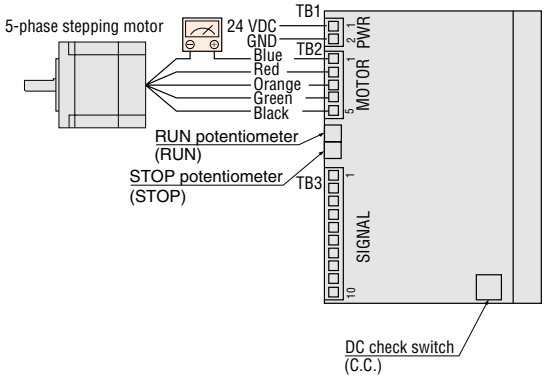
Factory settings

Running current: Rated current
Current at motor standstill: Approx. 50% of rated current

Follow the procedure below to adjust the motor current.

1 Connecting an Ammeter

Connect a DC ammeter as illustrated below.
Connect an ammeter between pin ① of TB2 connector and the motor. Set all driver input signals to the "photocoupler OFF" state.



Note:
- Do not input pulse signals.

2 Adjusting the Motor Running Current

To adjust the motor running current, follow the procedure below:

1. Set the current-checking switch to the "photocoupler ON" state. Keep other signals in the "photocoupler OFF" state.
2. Turn on the power to the driver.
3. Use the "RUN" potentiometer to adjust the motor's running current.
4. When the power is turned on, the value measured by the ammeter represents the total current in two phases through the blue motor lead wire. The current for one phase is equivalent to one-half the ammeter value. (Example: To set the current to 1.0 A/phase, adjust the current level until the ammeter reads 2.0 A.)
5. When the running current has been adjusted, set the current-checking switch back to the "photocoupler OFF" state.

Notes:
- Be sure to use the motor at the rated current or below.
- Adjusting the running current will also change the current at standstill.

3 Adjusting the Current at Motor Standstill

To adjust the current at motor standstill, follow the procedure below:

1. Set the current-checking switch to the "photocoupler OFF" state. Keep other signals in the "photocoupler OFF" state.
2. Turn on the power to the driver.
3. Use the "STOP" potentiometer to adjust the motor's running current.
4. When the power is turned on, the value measured by the ammeter represents the total current in two phases through the blue motor lead wire. The current for one phase is equivalent to one-half the ammeter value. (Example: To set the current to 1.0 A/phase, adjust the current level until the ammeter reads 2.0 A.)

$$\text{Holding Torque [oz-in (N·m)]} = \frac{\text{Maximum Holding Torque [oz-in (N·m)]} \times \text{Current at Standstill [A]}}{\text{Motor rated current [A]}}$$

Notes:
- Always set the running current first, turn off the driver power and turn it back on, and then set the current at standstill. Setting the running current after current at standstill may change the current setting at standstill.
- Setting the current at motor standstill too low may affect the starting of the motor or the position-holding action.

List of Motor and Driver Combinations

Type	Model	Motor Model	Driver Model
High Torque	**CFK513P□T**	PK513P□	DFC5103T
Standard	**CFK533□T**	PMM33□H2	DFC5107T
	CFK535□T	PMM35□H2	
	CFK543□T	PK543N□WA	
	CFK544□T	PK544N□WA	
	CFK545□T	PK545N□WA	
	CFK564□T	PK564N□WA	DFC5114T
	CFK566□T	PK566N□WA	
	CFK569□T	PK569N□WA	
High Speed	**CFK566H□T**	PK566H-N□A	DFC5128T
	CFK569H□T	PK569H-N□A	
	CFK596H□T	PK596-N□A	
	CFK599H□T	PK599-N□A	
	CFK5913H□T	PK5913-N□A	

- Enter the shaft type **A** or **B** in the box (□) within the model number.

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