

SANMOTION

CLOSED LOOP STEPPING SYSTEMS

Model No. PB



Ver.3

SANYO DENKI

English

Hybrid system combining the ease-of-use of stepping motors with the reliability of servomotors.

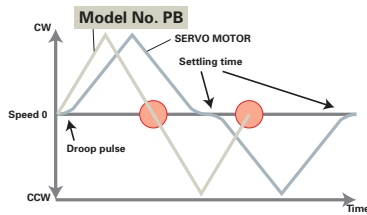
SANMOTION Model No. PB

CLOSED LOOP STEPPING SYSTEMS

MERIT **1** Increased System Speed and Smaller System Size

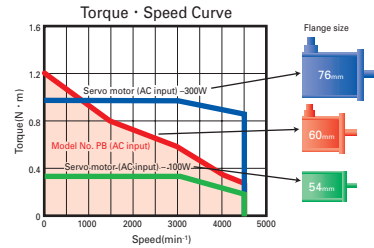
High Speed Positioning

High torque performance in the low speed range delivers shorter positioning time for short stroke/high hit rate applications.



Smaller System Size

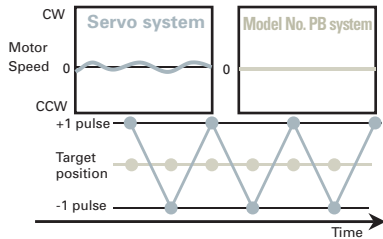
Smaller system size is achievable for low speed applications due to the availability of higher torque performance in the low speed range as compared to conventional servomotors.



MERIT **2** Stable Stand-Still

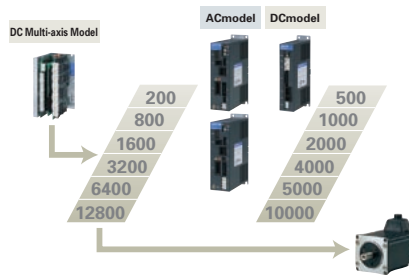
Stable Stand-Still

Complete stand-still motion is possible due to the availability of holding torque, a typical characteristic of stepping motors.



High Resolution

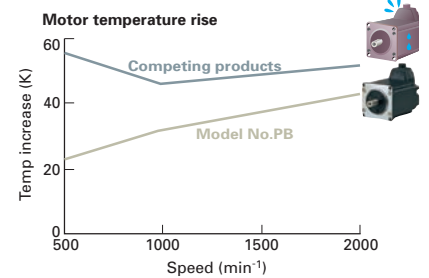
The position resolution can be subdivided for higher positioning precision.



MERIT **3** Energy-Saving

Improved Efficiency from Current Control

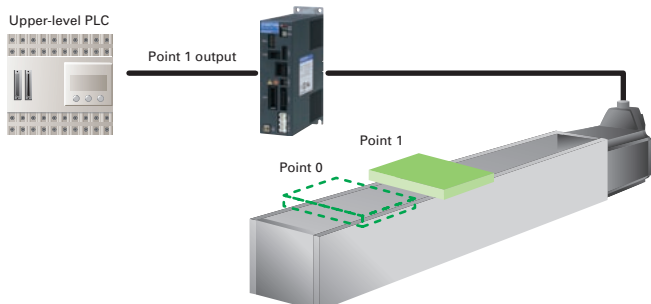
Higher efficiency from low heat generation is achieved by controlling the current flow to motor according to motor load.



MERIT **4** Simplified Control

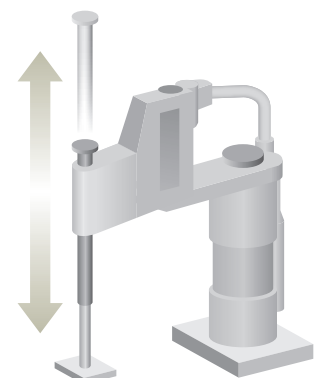
General Purpose I/O Input

System can be easily controlled by using the general purpose I/O to designate preset point or program numbers (up to 256 points).



Support For Various Operations

Comprehensive built-in amplifier functionality includes thrust control, point designation, programming, homing, holding brake control and sensor limit input.



AC Power Input

- AC R** Type General Purpose I/O Input Type (RS-485 + PIO)
- AC P** Type Pulse-Train Input Type

DC Power Input

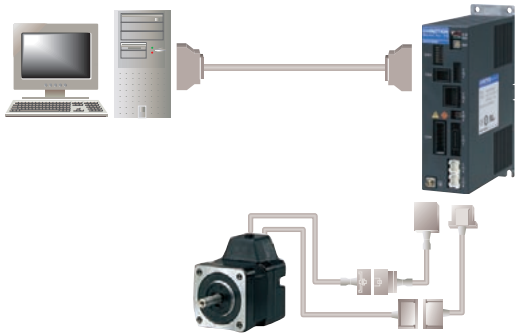
- DC M** Type Multiple Input Type (General Purpose I/O Input + Pulse-Train Input)
- DC R** Type Multi Axis General Purpose I/O Input Type (RS-485 + PIO)

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Reduced System Design Cost and Time

Wide Availability of Optional Cables and Connectors

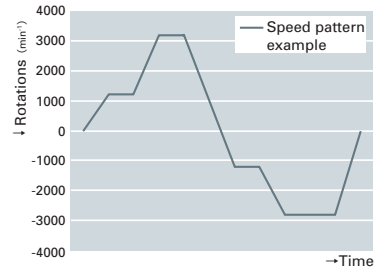
Cables and connectors for controller/amplifier and amplifier/motor connection are available for hassle-free setup.



Built-in Pulse Generation Function

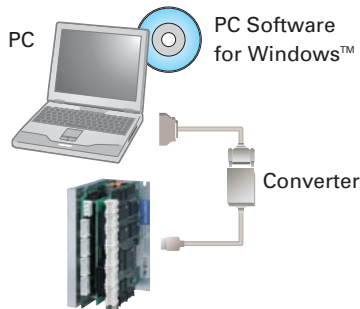
AC R Type **DC M** Type **DC R** Type Multi Axis

A built-in pulse generation function is included in the Model No. PB Types R and M. The amplifier receives speed, acceleration/deceleration and distance as numeric data from the upper-level device, and automatically generates an optimal speed pattern according to the commands internally. Since no separate pulse generator is required, this contributes to lower system cost.



PC Interface

Parameter setting, data editing and monitoring of position and speed can be done on a PC using the bundled setup software.

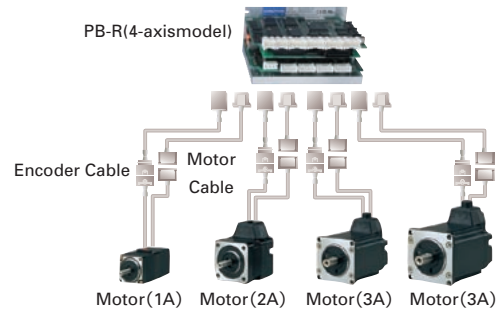


Multi-Axis Type (DC Power Input)

DC R Type Multi Axis

Multi-axis systems can be reduced in size and weight using the PB-R 4-axis type.

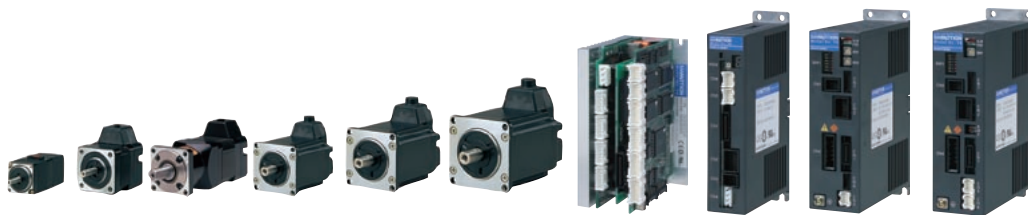
※ 1,2,3A can be selected using software switches.



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Complies with International Safety Standards

CE **UL** US Compliant



Features and Functions

Type R

Type P

Type M

Type R Multi-Axis

Type R

General Specifications

Motor Dimensional Drawings

Options

Extensive Closed-Loop Stepping System Lineup

SANMOTION Model No. PB

CLOSED LOOP STEPPING SYSTEMS

How do you want to control the equipment?

The Model No. PB Series offers 3 types of control methods.

Point Command
Control using PLC I/O

Network Control using Serial
Communication (RS-485)

Control using a Pulse
Generator

Power Source

AC Power Source

DC Power Source

Power Source

DC Power
Source

AC Power
Source

AC Power Source

Type R



- **Startup via I/O**

Startup preset points or programs in the amplifier memory using the I/O.

- **Startup via Serial Communication**

Control by transmitting speed, acceleration/deceleration and distance data via serial communication.

DC Power Source

Type R Multi-Axis



- **Startup via I/O**

Startup preset points or programs in the amplifier memory using the I/O.

- **Startup via Serial Communication**

Control by transmitting speed, acceleration/deceleration and distance data via serial communication.

DC Power Source

Type M



- **Startup via I/O**

Startup preset points or programs in the amplifier memory using the I/O.

- **Startup via Serial Communication**

Control by transmitting speed, acceleration/deceleration and distance data via serial communication.

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

AC Power Source

Type P



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



Standard Model

The standard model includes an amplifier and a motor

Motor Flange Size

AC	42	60	86	▶ P23
DC	28	42	60	



Low Backlash Gear Model

This model includes a low-backlash gear that engages the final stage with a tapered gear.

Motor Flange Size

AC	42	60	▶ P25
DC	42	60	

REDUCTION GEAR RATIO	1/3.6	1/7.2	1/10	1/20	1/30
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Spur Gear Model

This model utilizes a spur gear design for gear reduction.

Motor Flange Size

DC	28	▶ P29
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REDUCTION GEAR RATIO	1/3.6	1/7.2	1/10	1/20	1/30	1/50
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Harmonic Gear Model

The harmonic gear provides high torque and eliminates backlash.

Motor Flange Size

AC	42	60	▶ P31
DC	28	42	

REDUCTION GEAR RATIO	1/30	1/50	1/100
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Electromagnetic Brake Model

This model uses a non-excitation electromagnetic brake, capable of maintaining position and supporting a load in vertical operation, even when power is off

Motor Flange Size

AC	42	60	▶ P33
DC	28	42	

Features and Functions

Type R

Type P

Type M

Type R Multi-Axis

General Specifications

Motor Dimensional Drawings

Options

Model Nomenclature

System Model Nomenclature



PB A R 60 3 - C 3.6 B

- Motor Option 3: Holding Brake (B: included) Note1
- Motor Option 2: Gear Ratio Note1
- Motor Option 1: Gear Specifications Note1
- Motor Length
- Motor Flange Size (in mm)
- Interface Type R: RS-485+PIO P: Pulse Stream M: Multi
- Power Input A: AC Power Source D: DC Power Source
- System Name PB: Model No.PB System

Note 1: No symbol indicates no options.

Note 2: Power(1m) and unshielded I/O (1m) cables are included in the set models.

Amplifier Model Nomenclature



PB3 D 003 R 1 00

- Specification Identification 00: Standard
- Encoder Type 1: 200P/R INC 2: 500P/R INC
- Interface Type R: RS-485+PIO P: Pulse Stream M: Multi
- Motor Excitation Current 001: 1A 002: 2A 003: 3A
- Power Input A: AC Power Source D: DC Power Source
- Series Name PB□ : Model No.PB Amplifier

Motor Model Nomenclature



PBM 42 3 F X E 20

- Specification Identification 20: Standard
- Encoder Type E: 500P/R with C-phase output
A: 200P/R No C-phase output
C: 200P/R with C-phase output } DC (Multi-axis) only
- Options ※ Contact us for assistance
X: without option
C: 24V DC Break
GA ~ GL : with Gear
HJ ~ HM : with Harmonic Gear
- Power Input F: AC Power Source, DC Power Source (Single-axis)
D: DC Power Source (Multi-axis)
- Motor Length
- Motor Flange Size (in mm)
- Series Name PBM: Model No.PB Motor

※ Please enquire separately for the sizes of PBM503 and PBM565.

Motor Option Combination Table



Motor Option Combination Table			
Motor No.	Gear Box	Harmonic Gear	Electromagnetic Brake
PBM282F □ E20 / PBM282D □ A20	○	○	△
PBM284F □ E20 / PBM284D □ A20	×	×	△
PBM423F □ E20 / PBM423D □ A20	○	○	○
PBM603F □ E20 / PBM603D □ A20	○	○	○
PBM604F □ E20 / PBM604D □ A20	×	×	○

Motor Standard Specifications (common to all models)

Motor No.	PBM423F, PBM603F, PBM604F, PBM861F, PBM862F	PBM282D, PBM282F, PBM284D, PBM284F, PBM423D, PBM603D, PBM604D
Insulation class	Class B (130°C)	
Withstand Voltage ※	AC1500V 50 / 60Hz 1minute	AC500V 50 / 60Hz 1minute
Insulation resistance ※	DC500V 100MΩMIN.	
Degrees of protection	IP40	
Vibration resistance	15 G (Frequency range 10 to 70Hz amplitude 1.52mm 70 to 2000 acceleration 15G)	
Impact resistance	30G(half sine wave with 11 ms duration) The x, y and z are each tested three times for each direction for a total of 18 tests.	
Ambient temperature	-10°C to + 40°C (Harmonic Gear Model 0°C to + 40°C)	
Ambient humidity	20 to 90%RH (No Condensation)	

※ The user should not test the insulation resistance or insulation withstand voltage, because a capacitor has been inserted between the encoder output groundline and the frame to prevent noise.

Features and Functions

Type R

Type P

Type M

Type R Multi-Axis

General Specifications

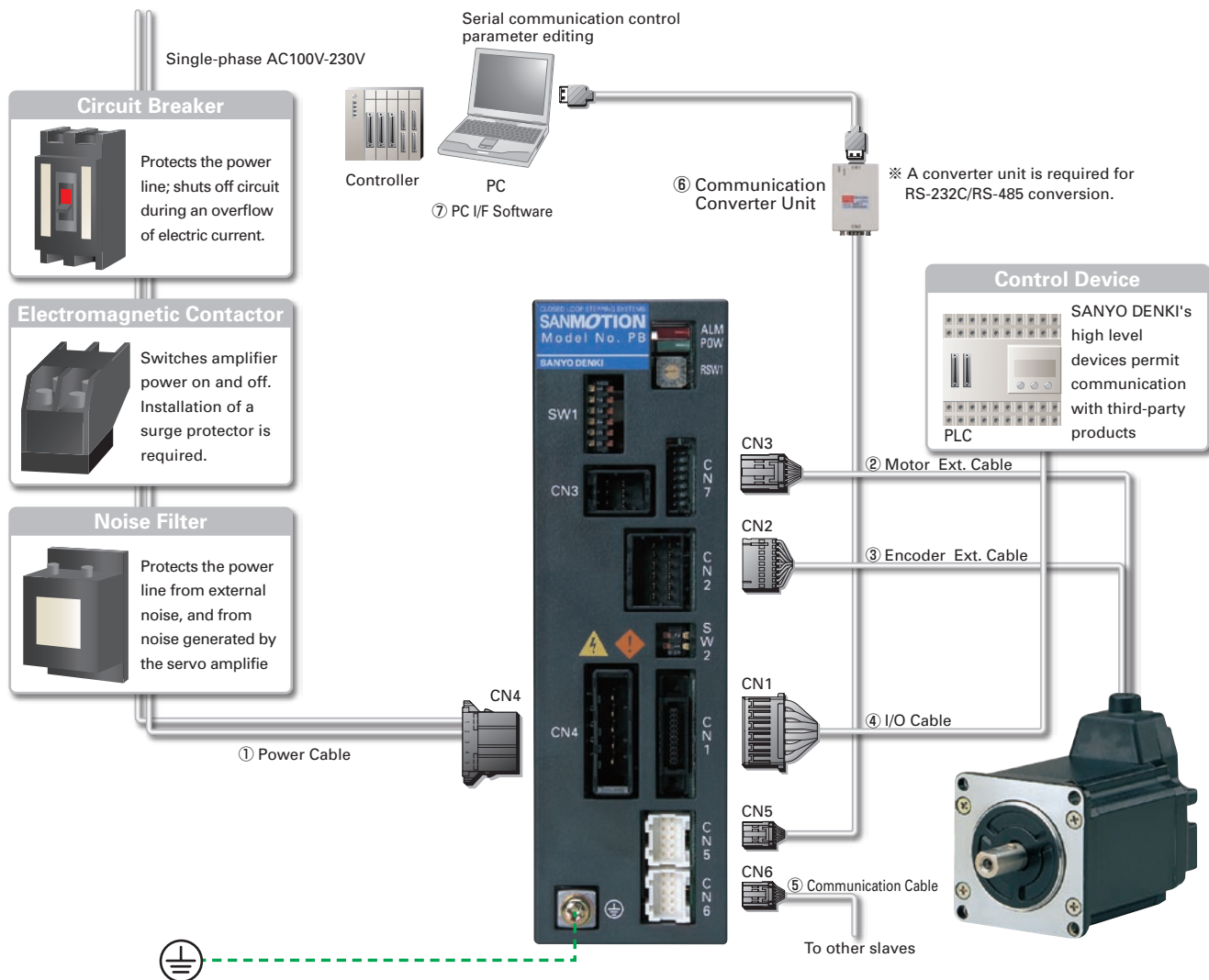
Motor Dimensional Drawings

Options

Model No. PB Type R Single-Axis Type

AC Power Input Type

System Configuration

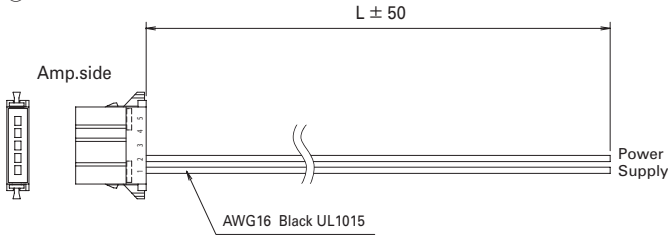


Options

Cable Type	Standard Model Number (Length)	Connector Set Model Number	Maximum Length	Remarks
① Power Cable	PBC7P0010A (1m)	PBC7P0000A	2 m	—
② Motor Ext. Cable	PBC6M0030A (3m)	PBC6M0000A	20 m	Use when an extension of 50cm or more is required.
③ Encoder Ext. Cable	PBC6E0030A (3m)	PBC6E0000A	20 m	Use when an extension of 50cm or more is required.
④ I/O Cable (unshielded)	PBC1S0010A (1m)	PBC1S0000A	2 m	—
⑤ Communication Cable	PBC6C0010A (1m)	PBC6C0000A	100 m	Use when multiple axes are connected in a daisy-chain configuration for communication.
⑥ Communication Converter Unit	PBFM-U5	Main Body Model.No : 232485CFP01-01 Cable Model.No : PBC4T0005A		RS-232C / RS-485 Converter Unit Converter unit and cable set model
⑦ PC I/F Software	SPBA1W-01	—	—	Software for operational check and parameter setting

Optional Cable

① Power Cable

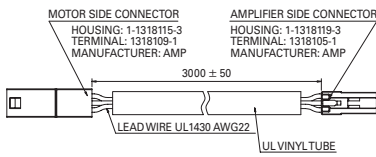


PIN No.	LEAD COLR	
1	Black	AC1
2	Black	AC2
3	—	—
4	—	—
5	—	—

Connector Set : PBC7P0000A

Manufacturer	Type	Qty.
AMP	Housing : 1-178288-5	1
	Contact : 1-175218-5	5

② Motor Ext. Cable



Connector Connection Of Motor Side

PIN No.	LEAD COLR	
A1	Blue	Motor Lead Wire
B1	Orange	Motor Lead Wire
A2	Red	Motor Lead Wire
B2	Yellow	Motor Lead Wire
A3	White	Brake Lead Wire
B3	Black	Brake Lead Wire

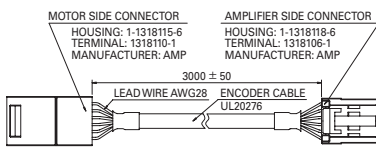
Connector Connection Of Amplifier Side

PIN No.	LEAD COLR	
1(A1)	Blue	Motor Lead Wire
2(B1)	Orange	Motor Lead Wire
3(A2)	Red	Motor Lead Wire
4(B2)	Yellow	Motor Lead Wire
5(A3)	White	Brake Lead Wire
6(B3)	Black	Brake Lead Wire

Connector Set : PBC6M0000A

Manufacturer	Type	Qty
AMP	Housing : 1-1318119-3	1
	Terminal : 1318105-1	6
	Housing : 1-1318115-3	1
	Terminal : 1318105-1	6

③ Encoder Ext. Cable



Connector Connection Of Motor Side

PIN No.	LEAD COLR	
A1	Blue	CHANNEL A
B1	Brown	CHANNEL A
A2	Green	CHANNEL B
B2	Purple	CHANNEL B
A3	White	CHANNEL C
B3	Yellow	CHANNEL C
A4	Red	+5V
B4	Black	0V
A5	N.C.	—
B5	Orange	OVER HEAT
A6	Black	Shield
B6	N.C.	—

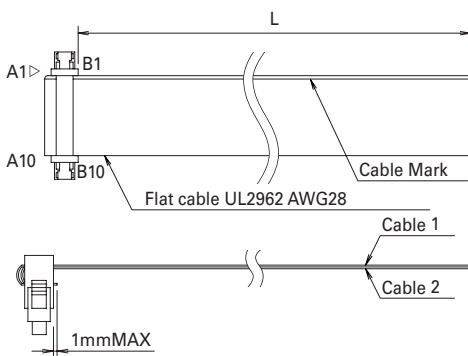
Connector Connection Of Amplifier Side

PIN No.	LEAD COLR	
1(A1)	Blue	CHANNEL A
2(B1)	Brown	CHANNEL A
3(A2)	Green	CHANNEL B
4(B2)	Purple	CHANNEL B
5(A3)	White	CHANNEL C
6(B3)	Yellow	CHANNEL C
7(A4)	Red	+5V
8(B4)	Black	0V
9(A5)	N.C.	—
10(B5)	Orange	OVER HEAT
11(A6)	Black	Shield
12(B6)	N.C.	—

Connector Set : PBC6E0000A

Manufacturer	Type	Qty
AMP	Housing : 1-1318115-6	1
	Terminal : 1318110-1	10
	Housing : 1-1318118-6	1
	Housing : 1-1318118-6	10

④ I/O Cable (unshielded)



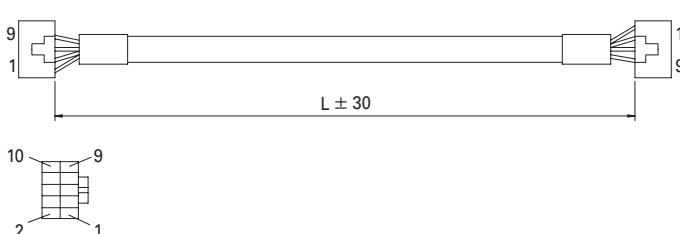
Cable Connection

Cable 1	Cable 2
A1-No.1	B1-No.11
A2-No.2	B2-No.12
A3-No.3	B3-No.13
A4-No.4	B4-No.14
A5-No.5	B5-No.15
A6-No.6	B6-No.16
A7-No.7	B7-No.17
A8-No.8	B8-No.18
A9-No.9	B9-No.19
A10-No.10	B10-No.20

Connector Set : PBC1S0000A

Manufacturer	Type	Qty
KEL	CONNECTOR : 8822E-020-171D	1

⑤ Communication Cable



Connector relay cable

Signal Name	CNA Pin.No.	Color	CNB Pin.No.	Signal Name
A	1	Yellow	1	A
B	2	White	2	B
(Y)	3	Brown	3	(Y)
(Z)	4	Blue	4	(Z)
GND	5	Black	5	GND
Vcc	6	Red	6	Vcc
—	7	Purple	7	—
—	—	Green	—	—
—	8	—	8	—
—	9	—	9	—
FG	10	Drain	10	FG

Connector Set : PBC6C0000A

Manufacturer	Type	Qty
JST	Housing : PADP-10V-1-S	2
	Contact : SPH-002T-P0.5L	20

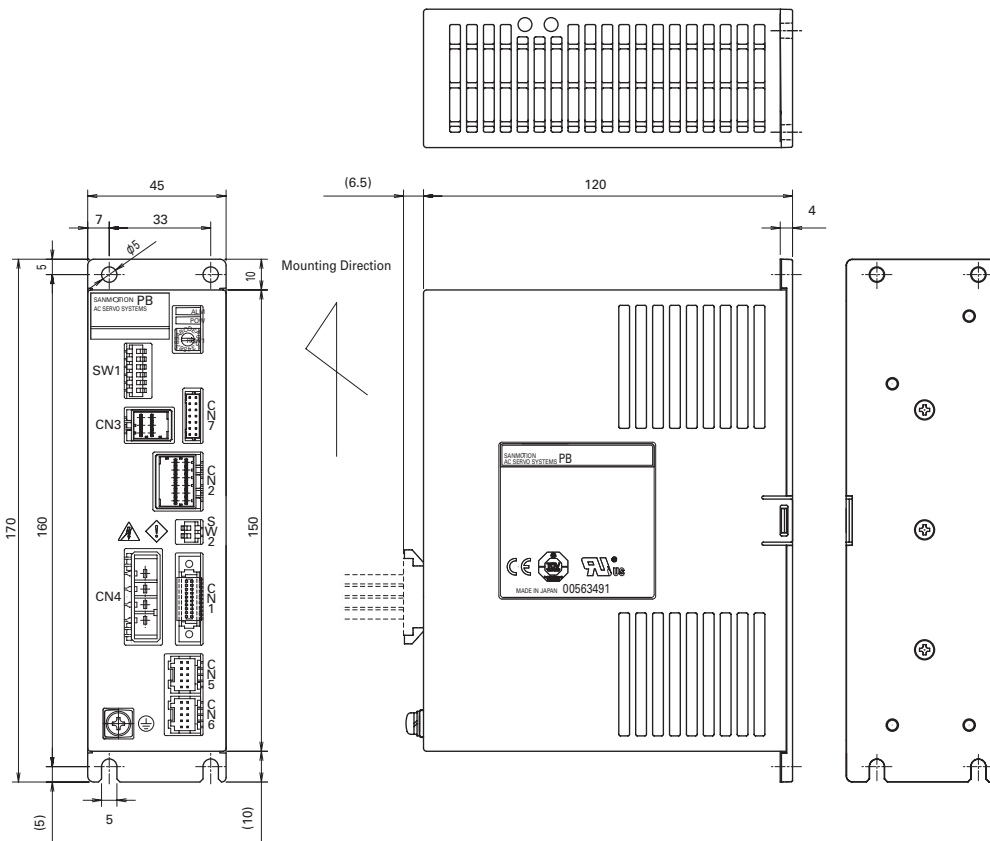
Model No. PB Type R Single-Axis Type

AC Power Input Type

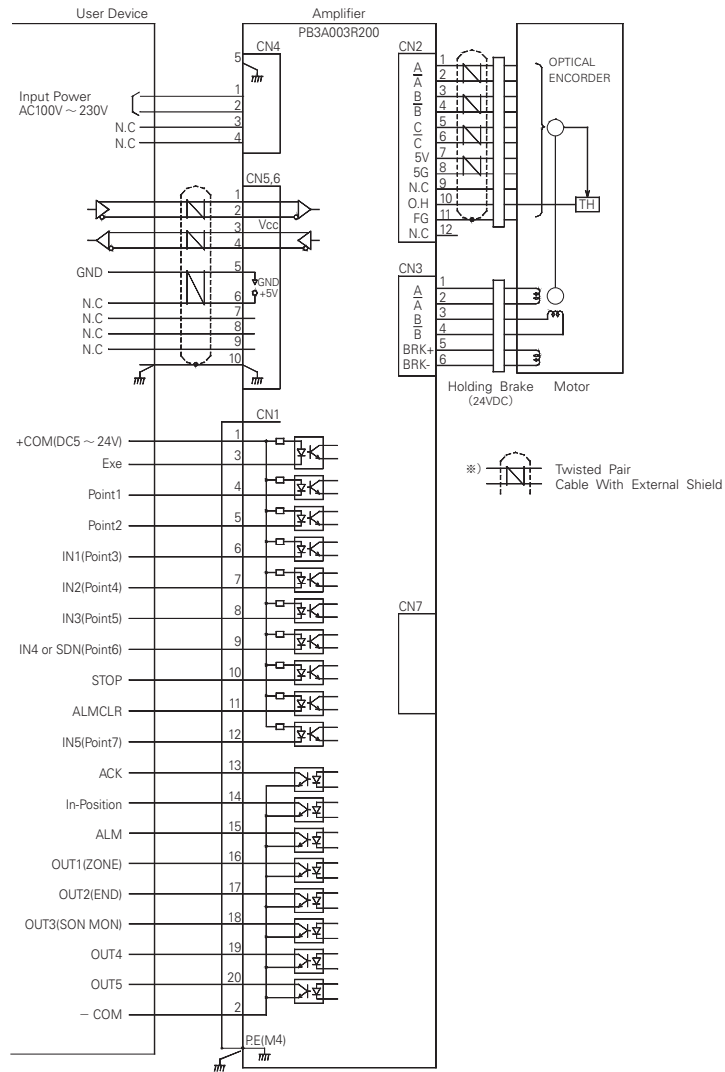
General Specifications

Amplifier Model		PB3A003R200
Control Mode		PWM Control SIN drive method
Power Supply	Single Power	AC100, 115 / 200, 230V - 15% +10% 50 / 60Hz
Environment	Ambient temp.	0 to 55°C
	Operating Storage	-20 to 70°C
	Operating/Storage Humidity	Maximum 90% RH (non-condensing)
	Vibration Resistance	0.5G (tested with frequency range 10 to 55 Hz, X, Y, Z each direction 2H)
Structure		Tray structure Rear mounting type
Mass/Dimensions		Approx. 0.8kg W45×H150×D120
Functions	Rotation Speed	0 to 4500min ⁻¹ (4000min ⁻¹ is used for an 86mm-square motor)
	Resolution (P/R)	500, 1000, 2000, 4000, 5000, 10000
	Regeneration Process	Internal (external regeneration available)
	Protective Functions	Encoder Disconnection, Encoder Counter Error, Power Voltage Error, Initialization Error, Position Deviation Error, Over-speed, Regeneration Voltage Error, Zero-return Error, Absolute position sign reversal, Deviation Counter Overflow, Motor Overheat, Amplifier Overheat, Internal voltage Error, Over-current, CPU Error
	LED Display	Power status, Alarm (flashing indicator)
	Operation Functions	Normal Drive (incremental move command, absolute move command), Zero-return, Module Operation, Push Operation
	Switch	DIP SW1: Transmission Speed Setting (9600, 38400, 115200, 128000bps) DIP SW2: Terminating Resistor Setting RSW : Node Address Setting (0 to F)
Input/Output Signals	Input Signals	Fixed function (2) : EXE, Point, ALMCLR, STOP Selectable (5) : Point, Pause, Interlock, SELECT, Generic Input, HOME, Hard Limit
	Output Signals	CN1 Fixed function (2) : ALM, In-Position, Ack Selectable (5) : ZONE, END, Busy, HEND, SON MON, Generic Input, Input Monitor
	Communication Specifications	RS-485 Standard Start-Stop Synchronization, Full Duplex Trans. Speed: 9600, 38400, 115200, 128000bps

Amplifier Dimensional Drawing



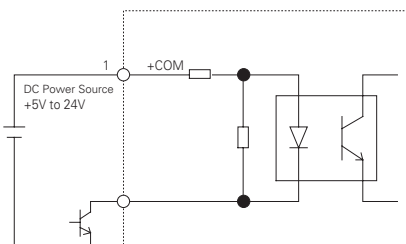
External Wiring Diagram



Input / Output Signals Circuit

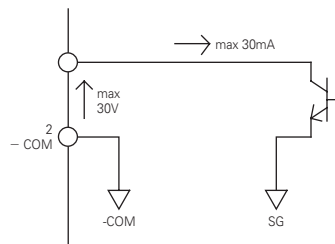
Generic Input

Input Voltage Specifications : DC3 to 5V±10%



Generic Output

Output Current : 30mA Max



Features and Functions

Type R

Type P

Type M

Type R Multi-Axis

General Specifications

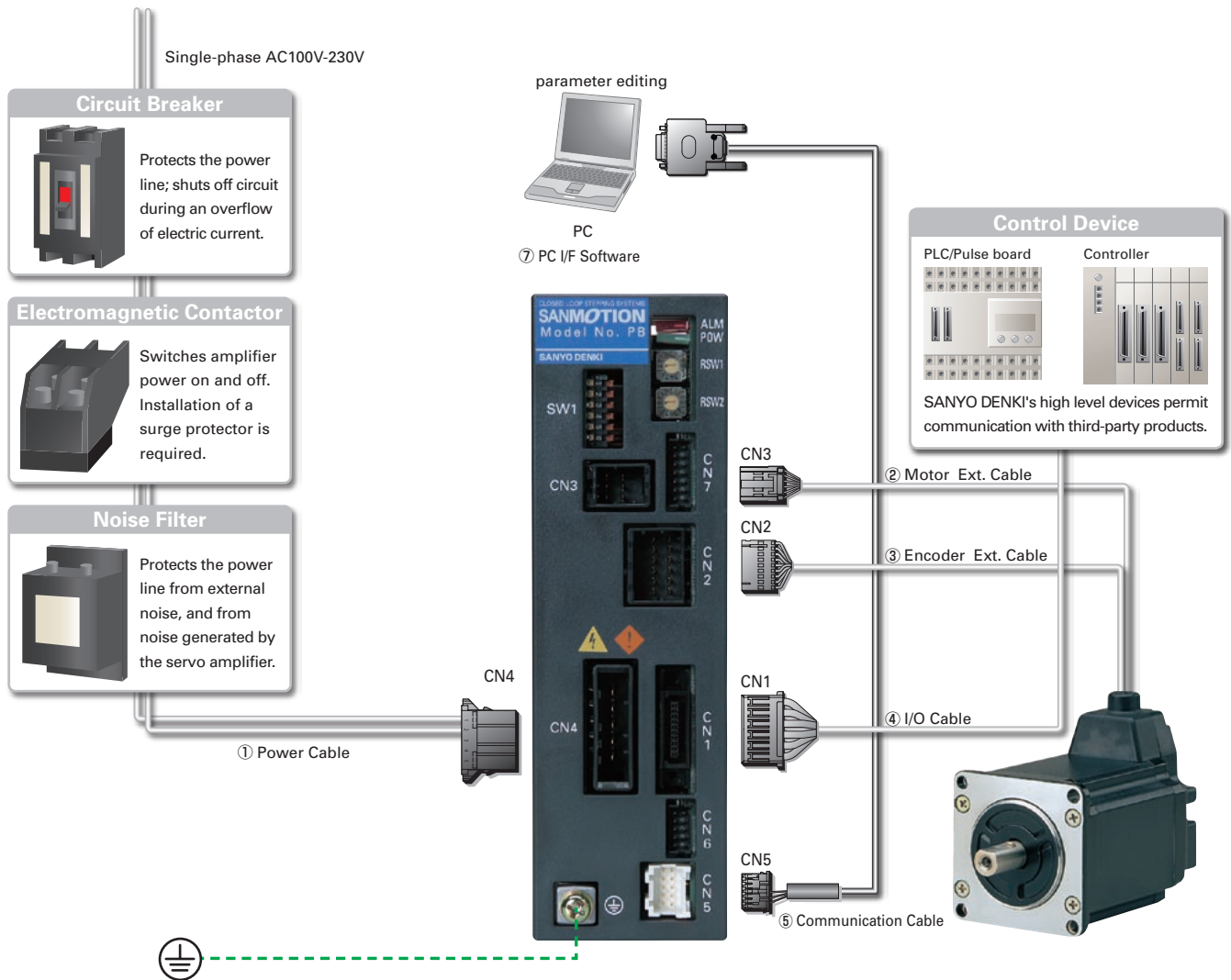
Motor Dimensional Drawings

Options

Model No. PB Type P

AC Power Input Type

System Configuration

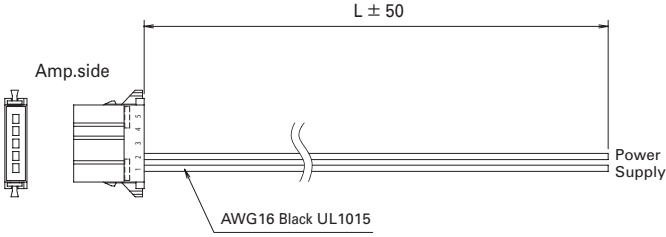


Options

Cable Type	Standard Model Number (Length)	Connector Set Model Number	Maximum Length	Remarks
① Power Cable	PBC7P0010A (1m)	PBC7P0000A	2 m	—
② Motor Ext. Cable	PBC6M0030A (3m)	PBC6M0000A	20 m	Use when an extension of 50cm or more is required.
③ Encoder Ext. Cable	PBC6E0030A (3m)	PBC6E0000A	20 m	Use when an extension of 50cm or more is required.
④ I/O Cable (shielded)	PBC1S0010C (1m)	PBC1S0000A	2 m	—
⑤ Communication Cable (Dsub9pin)	PBC5C0010A (1m)	—	—	Dedicated cable for RS-232C communications
⑥ Communication Converter Unit	Not required	—	—	—
⑦ PC I/F Software	SPBA1W-01	—	—	Software for operational check and parameter setting

Optional Cable

① Power Cable

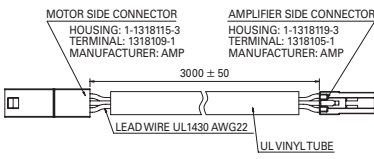


PIN No.	LEAD COLR	
1	Black	AC1
2	Black	AC2
3	—	—
4	—	—
5	—	—

Connector Set : PBC7P0000A

Manufacturer	Type	Qty.
AMP	Housing : 1-178288-5	1
	Contact : 1-175218-5	5

② Motor Ext. Cable



Connector Connection Of Motor Side

PIN No.	LEAD COLR	
A1	Blue	Motor Lead Wire
B1	Orange	Motor Lead Wire
A2	Red	Motor Lead Wire
B2	Yellow	Motor Lead Wire
A3	White	Brake Lead Wire
B3	Black	Brake Lead Wire

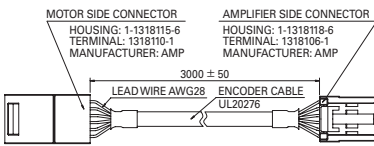
Connector Connection Of Amplifier Side

PIN No.	LEAD COLR	
1(A1)	Blue	Motor Lead Wire
2(B1)	Orange	Motor Lead Wire
3(A2)	Red	Motor Lead Wire
4(B2)	Yellow	Motor Lead Wire
5(A3)	White	Brake Lead Wire
6(B3)	Black	Brake Lead Wire

Connector Set : PBC6M0000A

Manufacturer	Type	Qty.
AMP	Housing : 1-1318119-3	1
	Terminal : 1318105-1	6
	Housing : 1-1318115-3	1
	Terminal : 1318105-1	6

③ Encoder Ext. Cable



Connector Connection Of Motor Side

PIN No.	LEAD COLR	
A1	Blue	CHANNEL A
B1	Brown	CHANNEL A
A2	Green	CHANNEL B
B2	Purple	CHANNEL B
A3	White	CHANNEL C
B3	Yellow	CHANNEL C
A4	Red	+5V
B4	Black	0V
A5	N.C.	—
B5	Orange	OVER HEAT
A6	Black	Shield
B6	N.C.	—

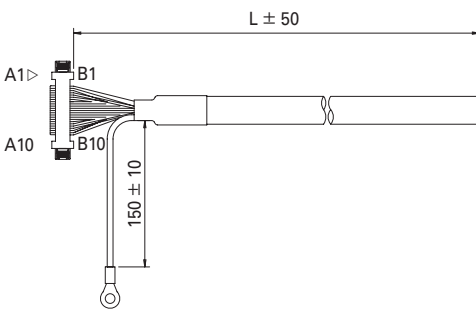
Connector Connection Of Amplifier Side

PIN No.	LEAD COLR	
1(A1)	Blue	CHANNEL A
2(B1)	Brown	CHANNEL A
3(A2)	Green	CHANNEL B
4(B2)	Purple	CHANNEL B
5(A3)	White	CHANNEL C
6(B3)	Yellow	CHANNEL C
7(A4)	Red	+5V
8(B4)	Black	0V
9(A5)	N.C.	—
10(B5)	Orange	OVER HEAT
11(A6)	Black	Shield
12(B6)	N.C.	—

Connector Set : PBC6E0000A

Manufacturer	Type	Qty.
AMP	Housing : 1-1318115-6	1
	Terminal : 1318110-1	10
	Housing : 1-1318118-6	1
	Housing : 1-1318118-6	10

④ I/O Cable (shielded)



CN1 Wiring

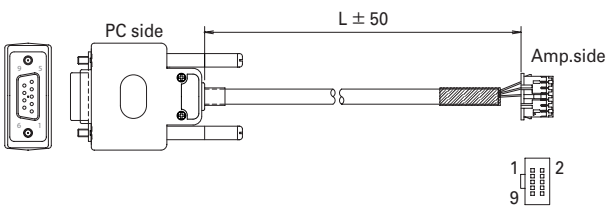
CN1 PIN No.	Mark Display	Mark	LINE COLR
A1		Red	Orange
A2		Black	
A3		Red	Gray
A4		Black	
A5		Red	White
A6		Black	
A7		Red	Yellow
A8		Black	
A9		Red	Pink
A10		Black	

CN1 PIN No.	Mark Display	Mark	LINE COLR
B1		Red	Orange
B2		Black	
B3		Red	Gray
B4		Black	
B5		Red	White
B6		Black	
B7		Red	Yellow
B8		Black	
B9		Red	Pink
B10		Black	

Connector Set : PBC1S0000A

Manufacturer	Type	Qty.
KEL	Connector : 8822E-020-171D	1
	Crimp Contact : V1.25-M4	—
	Drain Wire : UL1007 20AWG	—
	Cable : UL20276-28AWG	—

⑤ Communication Cable (Dsub 9Pin)



Connector relay cable

PC Side Pin No.	Signal Name	Amplifier Side Pin No.	Signal Name
1	N.C.	1	RXD
2	RXD	2	TXD
3	TXD	3	N.C.
4	N.C.	4	N.C.
5	GND	5	GND
6	N.C.	6	N.C.
7	N.C.	7	N.C.
8	N.C.	8	N.C.
9	N.C.	9	N.C.
		10	Shield

(RS-232C D-Sub 9Pin)

※ Without connector set

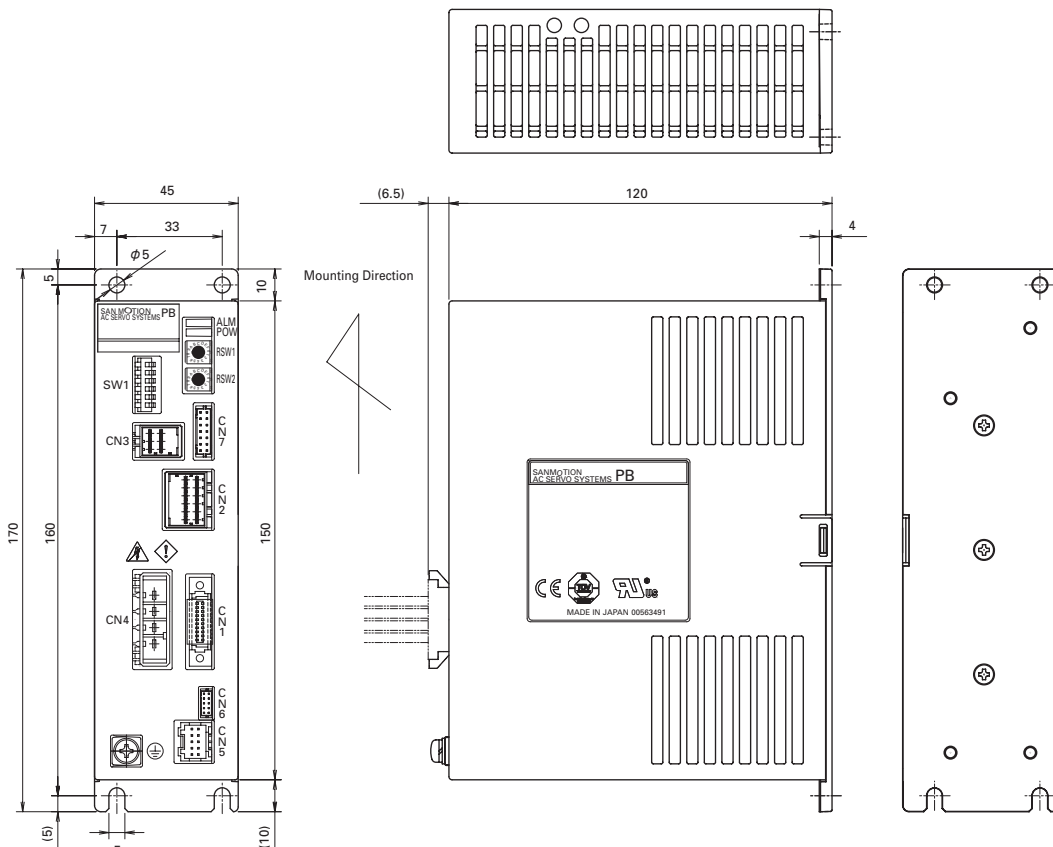
Model No. PB Type P

AC Power Input Type

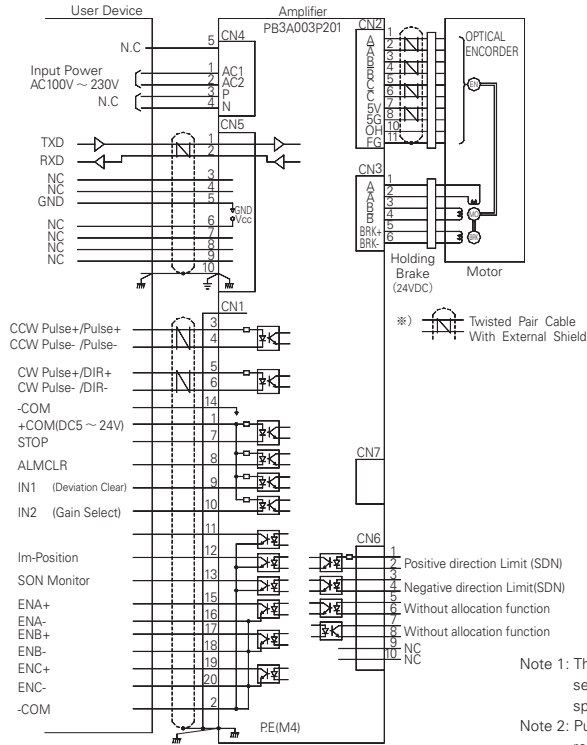
General Specifications

Amplifier Model		PB3A003P201、PB3A003P202	
Control Mode		PWM Control SIN drive method	
Power Supply	Single Power	AC100, 115 / 200、230V - 15% +10% 50 / 60Hz	
Environment	Ambient temp.	Operating	0 to 55°C
		Storage	- 20 to 70°C
	Operating/Storage Humidity		Maximum 90% RH (non-condensing)
	Vibration Resistance		0.5G (tested with frequency range 10 to 55 Hz, X, Y, Z each direction 2H)
Structure		Tray structure Rear mounting type	
Mass/Dimensions		Approx. 0.8kg W45×H150×D120	
Functions	Rotation Speed	0 to 4500min ⁻¹ (4000min ⁻¹ is used for an 86mm-square motor)	
	Resolution (P/R)	500, 1000, 2000, 4000, 5000, 10000	
	Regeneration Process	Internal (external regeneration available)	
	Protective Functions	Encoder Disconnection, Encoder Counter Error, Power Voltage Error, Initialization Error, Position Deviation Error, Over-speed,Regeneration Voltage Error, Zero-return Error, Absolute position sign reversal, Deviation Counter Overflow, Motor Overheat, Amplifier Overheat, Internal voltage Error, Over-current, CPU Error	
	LED Display	Power status, Alarm (flashing indicator)	
	Functions	Normal Drive, Zero-return, S-shape Acceleration / Deceleration Drive	
	Switch	DIP SW1: Pulse Input Type Select (ON: 2 Input OFF: 1 Input) DIP SW2, 3: Resolution Selection (500, 1000, 5000, 10000P/R) ※ 2000 and 4000 division resolution modes are selected via communication DIP SW 4 to 6: Motor Select RSW1: Normalize velocity loop gain setting RSW2: S-Shape filter potentiometer setting	
Input/ Output Signals	Input Signals	Pulse, Deviation Clear, HOME, Hard.Limit, STOP, ALMCLR	
	Output Signals	SON Monitor, ALM, Zero-return completion, In-Position, Encoder Signal Output	
	Communication Specifications	RS-232C (For parameter setting) Trans. Speed : 9600bps	

Amplifier Dimensional Drawing



External Wiring Diagram

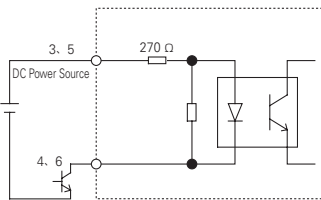


Input / Output Signals Circuit

PB3A003P201

Pulse Input

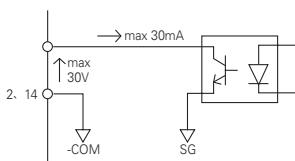
Input Voltage Specifications : DC3 to 5V±10%



In case the voltage is at 5V or more:
Insert a resistor "R" which satisfies "
 $(\text{Input Voltage} - 1V) / (220 + R) \approx 10 \text{ mA}$

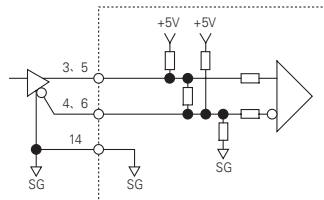
Encoder Signal Input

Connector Voltage: DC5 to 24V±10%
Output Current : 30mA Max

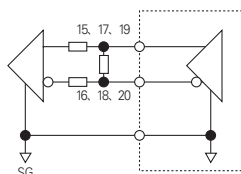


PB3A003P202

Pulse Input



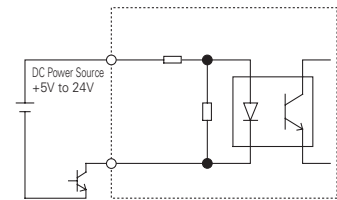
Encoder Signal Input



PB3A003P201/202

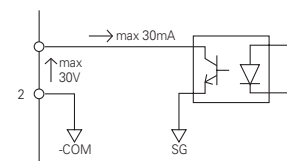
Generic Input / Limit Input

Input Voltage Specifications : DC3 to 5V±10%



Generic Output

Connector Voltage: DC5 to 24V±10%
Output Current : 30mA Max



Features and Functions

Type R

Type P

Type M

Type R Multi-Axis

General Specifications

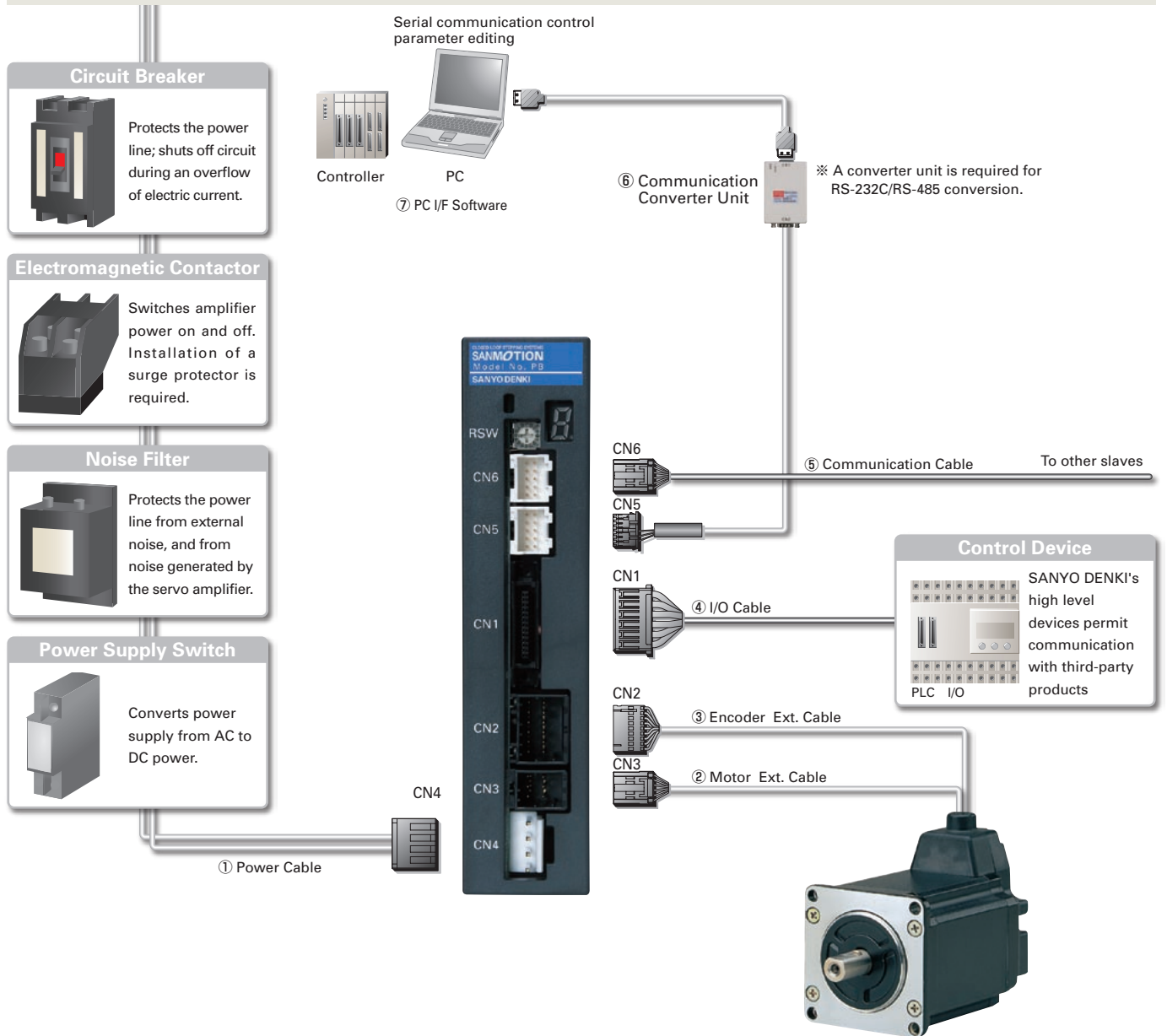
Motor Dimensional Drawings

Options

Model No. PB Type M

DC Power Input Type

System Configuration

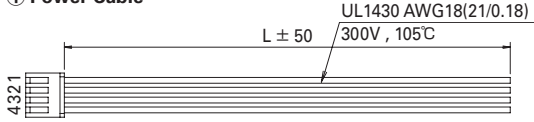


Options

Cable Type	Standard Model Number (Length)	Connector Set Model Number	Maximum Length	Remarks
① Power Cable	PBC6P0010A (1m)	PBC6P0000A	2 m	—
② Motor Ext. Cable	PBC6M0030A (3m)	PBC6M0000A	20 m	Use when an extension of 50cm or more is required.
③ Encoder Ext. Cable	PBC6E0030A (3m)	PBC6E0000A	20 m	Use when an extension of 50cm or more is required.
④ I/O Cable (unshielded)	PBC5S0010A (1m)	PBC5S0000A	2 m	—
④ I/O Cable (shielded)	PBC5S0010C (1m)	PBC5S0000A	2 m	Use for pulse input
⑤ Communication Cable (to Amp.)	PBC6C0010A (1m)	PBC6C0000A	100 m	Use when multiple axes are connected in a daisy-chain configuration for communication.
⑥ Communication Converter Unit	PBFM-U5	Main Body Model.No : 232485CFP01-01 Cable Model.No : PBC4T0005A		RS-232C / RS-485 Converter Unit Converter unit and cable set model
⑦ PC I/F Software	SPBAIW01	—	—	Software for operational check and parameter setting

Optional Cable

① Power Cable

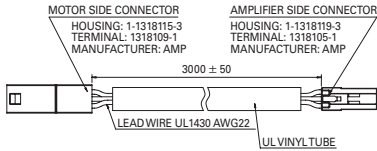


PIN No.	LEAD COLR	Signal Name
1	Red	DC+24/48V
2	Blue	GND
3	Yellow	—
4	Green	FG

Connector Set : PBC7P0000A

Manufacturer	Type	Qty.
JST	Connector : VHR-4N	1
	Contact : SVH-21T-P1.1	4
	Appropriate electric wire : AWG#22-18	—

② Motor Ext. Cable



Connector Connection Of Motor Side

PIN No.	LEAD COLR	
A1	Blue	Motor Lead Wire
B1	Orange	Motor Lead Wire
A2	Red	Motor Lead Wire
B2	Yellow	Motor Lead Wire
A3	White	Brake Lead Wire
B3	Black	Brake Lead Wire

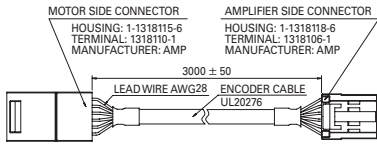
Connector Connection Of Amplifier Side

PIN No.	LEAD COLR	
1(A1)	Blue	Motor Lead Wire
2(B1)	Orange	Motor Lead Wire
3(A2)	Red	Motor Lead Wire
4(B2)	Yellow	Motor Lead Wire
5(A3)	White	Brake Lead Wire
6(B3)	Black	Brake Lead Wire

Connector Set : PBC6M0000A

Manufacturer	Type	Qty.
AMP	Housing : 1-1318119-3	1
	Terminal : 1318105-1	6
	Housing : 1-1318115-3	1
	Terminal : 1318105-1	6

③ Encoder Ext. Cable



Connector Connection Of Motor Side

PIN No.	LEAD COLR	
A1	Blue	CHANNEL A
B1	Brown	CHANNEL A
A2	Green	CHANNEL B
B2	Purple	CHANNEL B
A3	White	CHANNEL C
B3	Yellow	CHANNEL C
A4	Red	+5V
B4	Black	0V
A5	N.C.	—
B5	Orange	OVER HEAT
A6	Black	Shield
B6	N.C.	—

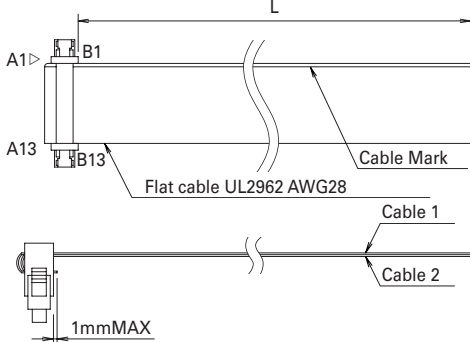
Connector Connection Of Amplifier Side

PIN No.	LEAD COLR	
1(A1)	Blue	CHANNEL A
2(B1)	Brown	CHANNEL A
3(A2)	Green	CHANNEL B
4(B2)	Purple	CHANNEL B
5(A3)	White	CHANNEL C
6(B3)	Yellow	CHANNEL C
7(A4)	Red	+5V
8(B4)	Black	0V
9(A5)	N.C.	—
10(B5)	Orange	OVER HEAT
11(A6)	Black	Shield
12(B6)	N.C.	—

Connector Set : PBC6E0000A

Manufacturer	Type	Qty.
AMP	Housing : 1-1318115-6	1
	Terminal : 1318110-1	10
	Housing : 1-1318118-6	1
	Housing : 1-1318118-6	10

④ I/O Cable (unshielded)



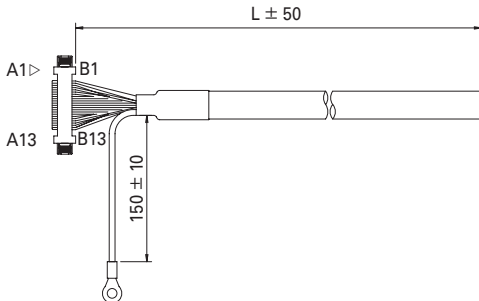
Cable Connection

Cable 1	Cable 2
A1-No.1	B1-No.14
A2-No.2	B2-No.15
A3-No.3	B3-No.16
A4-No.4	B4-No.17
A5-No.5	B5-No.18
A6-No.6	B6-No.19
A7-No.7	B7-No.20
A8-No.8	B8-No.21
A9-No.9	B9-No.22
A10-No.10	B10-No.23
A11-No.11	B11-No.24
A12-No.12	B12-No.25
A13-No.13	B13-No.26

Connector Set : PBC1S0000A

Manufacturer	Type	Qty.
KEL	Connector : 8822E-020-171D-13	1

④ I/O Cable (shielded)



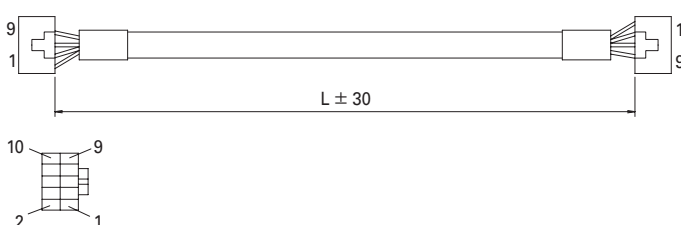
CN Wiring

CN1 Pin.No.	Signal Name	Mark	LINE COLR	CN1 Pin.No.	Signal Name	Mark	LINE COLR
A1		Red	Orange	B1		Black	Gray
A2		Black		B2		Red	
A3		Red		B3		Black	White
A4		Black		B4		Red	
A5		Red		B5		Black	Yellow
A6		Black	White	B6		Red	
A7		Red		B7		Black	Pink
A8		Black	Yellow	B8		Red	
A9		Red		B9		Black	Orange
A10		Black	Pink	B10		Red	
A11		Red		B11		Black	Gray
A12		Black	Orange	B12		Red	
A13		Red	Gray	B13		Black	White

Connector Set : PBC5S0000A

Manufacturer	Type	Qty.
KEL	Connector : 8822E-026-171D-13	1
	Crimp Contact : V1.25-M4	—
	Drain Wire : UL1007 20AWG	—
	Cable : UL20276-28AWG	—

⑤ Communication Cable (Dsub 9 Pin)



Connector relay cable

Signal Name	CNA Pin.No.	Color	CNB Pin.No.	Signal Name
A	1	White	1	A
B	2	Brown	2	B
(Y)	3	Blue	3	(Y)
(Z)	4	Black	4	(Z)
GND	5	Red	5	GND
Vcc	6	Purple	6	Vcc
—	7	Green	7	—
—	8	—	8	—
—	9	—	9	—
FG	10	Drain	10	FG

Connector Set : PBC6C0000A

Manufacturer	Type	Qty.
JST	Housing : PADP-10V-1-S	2
	Contact : SPH-002T-P0.5L	20

Model No. PB Type M

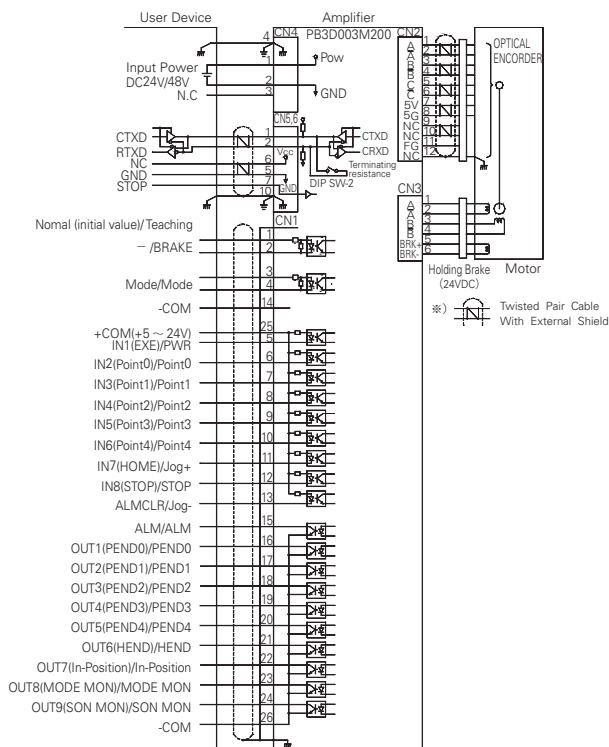
DC Power Input Type

General Specifications

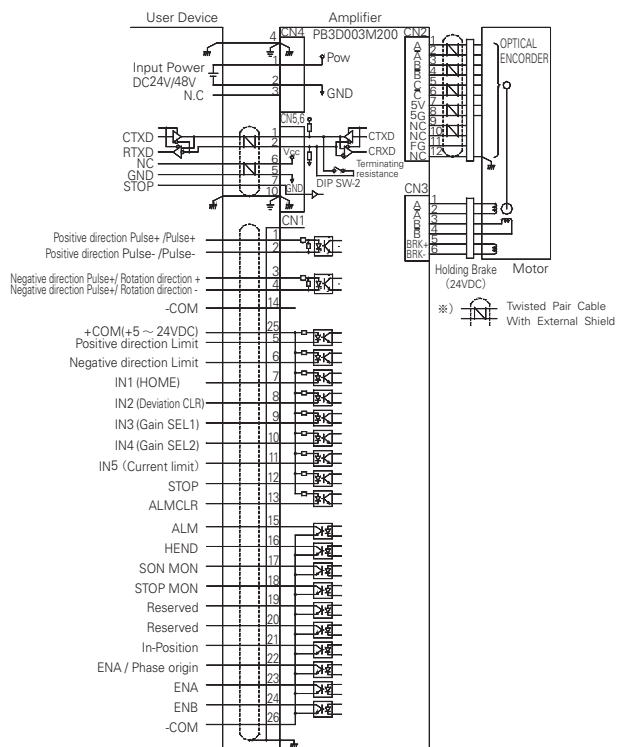
Amplifier Model		PB3D003M200		
Interface		Generic Input (SW1=ON)	Pulse Train Input (SW1 = OFF)	
Control Mode		PWM Control SIN drive method		
Power Supply	Single Power	DC24 / 48V ±10%		
Environment	Ambient temp.	Operating	0 to 55°C	
		Storage	- 20 to 70°C	
	Operating/Storage Humidity	Maximum 90% RH (non-condensing)		
	Vibration Resistance	0.5G (tested with frequency range 10 to 55 Hz, X, Y, Z each direction 2H)		
Mass/Dimensions		Approx. 0.36kg W32xH160xD95		
Functions	Rotation Speed	0 to 4500min ⁻¹		
	Resolution (P/R)	500, 1000, 2000, 4000, 5000, 10000		
	Regeneration Process	Built-in		
	Protective Functions	Power Voltage Error, Regeneration Voltage Error, Over-speed, Encoder Disconnection, CPU Error, Overload Stop, Excessive Position Deviation, Zero-return Error, Nonvolatile Memory Error, Initialization Error (Power Line Disconnection)		
	Display	7SEG LED Display		
	Functions	Normal Drive (incremental move , absolute move), Zero-return, Module Operation, Push Operation, Teaching Functions Point Functions: 128Point Program Functions: 1PRG×1024Line 32PRG×32Line 128PRG×8Line	Normal Drive, Zero-return	
	Rotary Switch	Node Address Setting (0 to F)	Normalize velocity loop gain setting	
	DIP-Switches	SW1 : Interface Selection (On: RS-485, OFF: Pulse) SW2 : Terminating Resistor Setting (On: with terminating resistance)		
Input/Output Signals	Input Signals	(Normal Mode) STOP, EXE, POINT, HOME, JOG, SELECT, Pause, Interlock, Generic Input, MODE SELECT, Hard Limit, ALM CLR (Teaching Mode) STOP, JOG, Point, PWR	Pulse, STOP, ALMCLR, Gain Setting, Deviation Clear, HOME	
	Output Signals	(Normal Mode) Ack, PEND, END, Busy, Zone, Mode MON, STOP MON, In-Position, Homing complete, Generic Output, Encoder Output, Input Monitor (Teaching Mode) PEND, HEND, In-Position, Mode MON, SON MON	ALM, STOP MON, In-Position, Homing complete, Encoder Output, SON MON, STOP MON	
	Communication Specifications	RS-485 Standard Start-Stop Synchronization, Full Duplex		
	Trans. Speed	9600, 38400, 115200, 128000bps	9600bps	

External Wiring Diagram

Generic Input DIP Switch SW1:ON

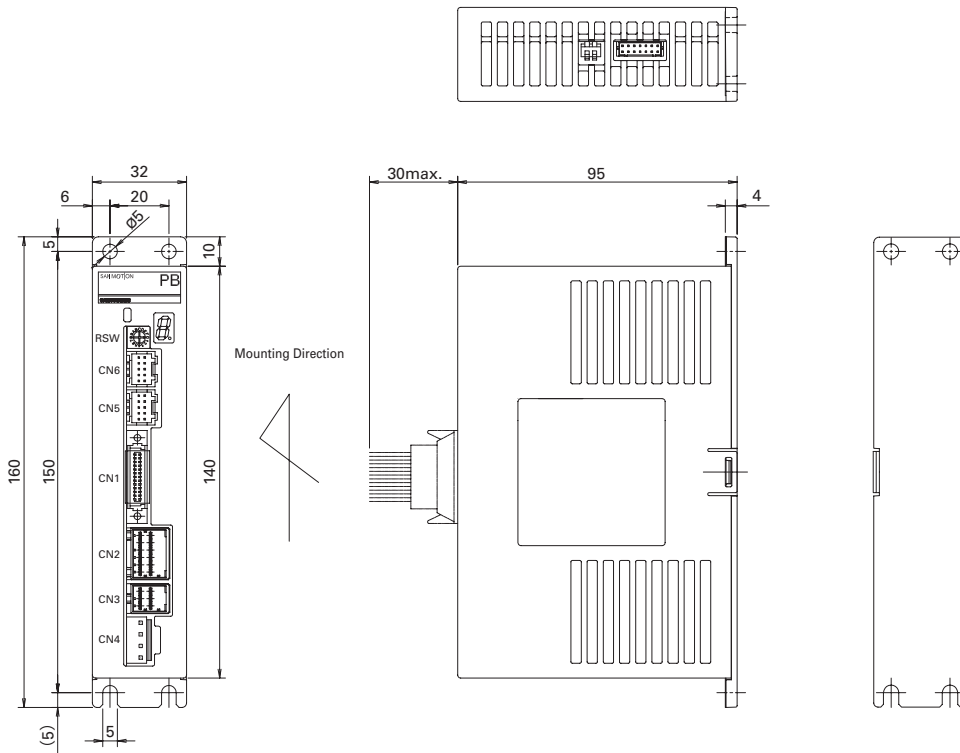


Pulse Stream Input DIP Switch SW1:OFF



Note 1: The CN1 general-purpose input / output signal function is selected through communication. Please see the basic specifications for details.

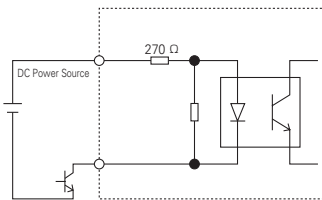
Amplifier Dimensional Drawing



Input/ Output Signals Circuit

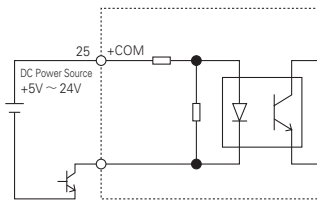
■ CN1- Pin. No.1,2 / No.3,4

Input Voltage Specifications : DC3 to 5V ± 10%



■ Generic Input (CN1- Pin.5 to No.13)

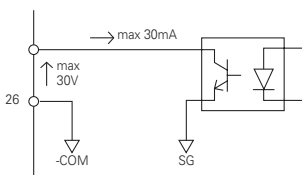
Input Voltage Specifications : DC5 to 24V ± 10%



In case the voltage is at 5V or more:
Insert a resistor 'R' which satisfies $(\text{Input Voltage} - 1V) / (220 + R) \approx 10 \text{ mA}$

■ Generic Output

Connector Voltage: DC5 to 24V ± 10%
Output Current : 30mA Max



Features and Functions

Type R

Type P

Type M

Type R Multi-Axis

General Specifications

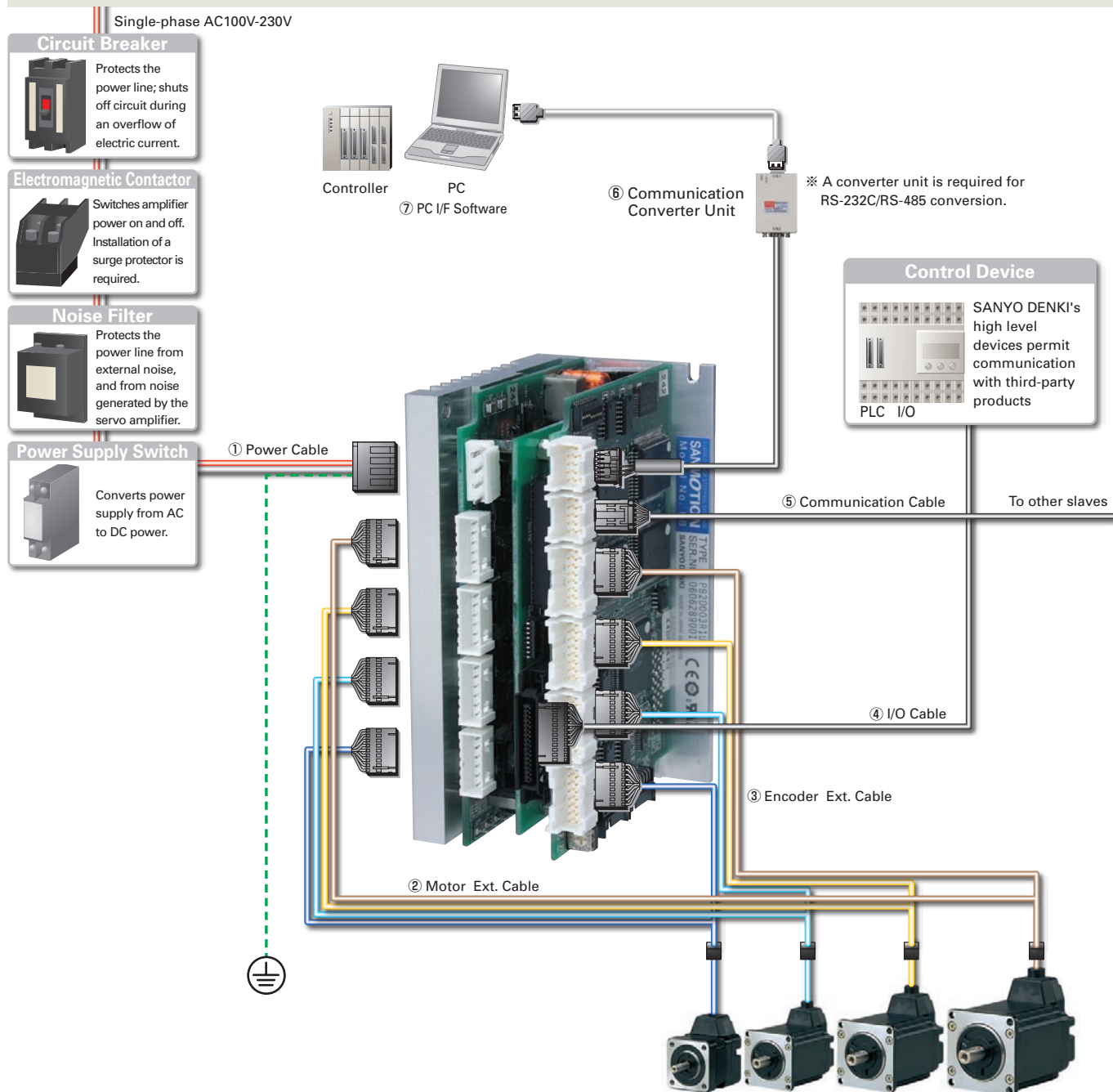
Motor Dimensional Drawings

Options

Model No. PB Type R Multi-Axis Type

DC Power Input Type

System Configuration

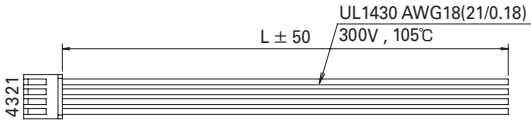


Options

Cable Type	Standard Model Number (Length)	Connector Set Model Number	Maximum Length	Remarks
① Power Cable	PBC6P0010A (1m)	PBC6P0000A	2 m	—
② Motor Ext. Cable	PBC4M0030A (3m)	PBC4M0000A	20 m	An extension cable is required.
③ Encoder Ext. Cable	PBC5E0030A (3m)	PBC5E0000A	20 m	An extension cable is required.
③ Encoder Cable (with limit sensor input)	PBC5E0030C (3m)	PBC5E0000A	20 m	Please specify when using an external limit sensor.
④ I/O Cable	PBC4S0010A (1m)	PBC4S0000A	2 m	—
⑤ Communication Cable	PBC4C0010A (1m)	PBC4C0000A	100 m	Use when multiple axes are connected in a daisy-chain configuration for communication.
⑥ Communication Converter Unit	PBFM-U5	Main Body Model.No : 232485CFP01-01 Cable Model.No : PBC4T0005A	RS-232C / RS-485 Converter Unit Converter unit and cable set model	
⑦ PC I/F Software	SPBR1W-01	—	—	Software for operational check and parameter setting
⑧ Regenerative Unit	PBFE-01	—	—	Required if regeneration voltage is more than 40V

Optional Cable

① Power Cable



Connector Connection Of Amplifier Side

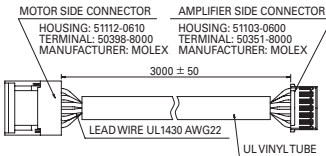
PIN No.	LEAD COLR	Signal Name
1	Red	DC+24/48V
2	Blue	GND
3	Yellow	DC+24V *1
4	Green	FG

Connector Set : PBC6P0000A

Manufacturer	Type	Qty.
JST	Connector : VHR-4N	1
	Contact : SVH-21T-P1.1	4
	Appropriate electric wire : AWG#22-18	—

*Connect only for amplifiers with part numbers ending with "1" or "2"

② Motor Ext. Cable



Connector Connection Of Motor Side

PIN No.	LEAD COLR	
A1	Blue	Motor Lead Wire
B1	Orange	Motor Lead Wire
A2	Red	Motor Lead Wire
B2	Yellow	Motor Lead Wire
A3	White	Brake Lead Wire
B3	Black	Brake Lead Wire

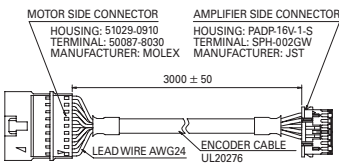
Connector Connection Of Amplifier Side

PIN No.	LEAD COLR	
1(A1)	Blue	Motor Lead Wire
2(B1)	Orange	Motor Lead Wire
3(A2)	Red	Motor Lead Wire
4(B2)	Yellow	Motor Lead Wire
5(A3)	White	Brake Lead Wire
6(B3)	Black	Brake Lead Wire

Connector Set : PBC4M0000A

Manufacturer	Type	Qty.
MOLEX	Housing : 51112-0610	1
	Terminal : 50398-8000	6
	Housing : 51103-0600	1
	Terminal : 50351-8000	6

③ Encoder Ext. Cable



Connector Connection Of Motor Side

PIN No.	LEAD COLR	
1	Blue	CHANNEL A
2	Brown	CHANNEL A
3	Green	CHANNEL B
4	Purple	CHANNEL B
5	White	CHANNEL C
6	Yellow	CHANNEL C
7	Red	+5V
8	Black	0V
9	Black	Shield

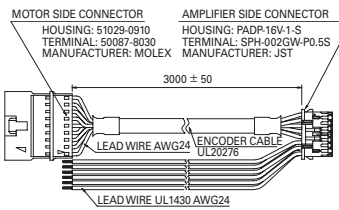
Connector Connection Of Amplifier Side

PIN No.	LEAD COLR	
1	Blue	CHANNEL A
2	Brown	CHANNEL A
3	Green	CHANNEL B
4	Purple	CHANNEL B
5	White	CHANNEL C
6	Yellow	CHANNEL C
7	Red	+5V
8	Black	0V
9	Black	Shield
10	N.C.	—
11	N.C.	—
12	N.C.	—
13	N.C.	—
14	N.C.	—
15	N.C.	—
16	N.C.	—

Connector Set : PBC5E0000A

Manufacturer	Type	Qty.
MOLEX	Housing : 51029-0910	1
	Terminal : 50087-8030	9
JST	Housing : PADP-16V-1-S	1
	Terminal : SPH-002GW-P0.5S	15

③ Encoder Cable (with limit sensor input)



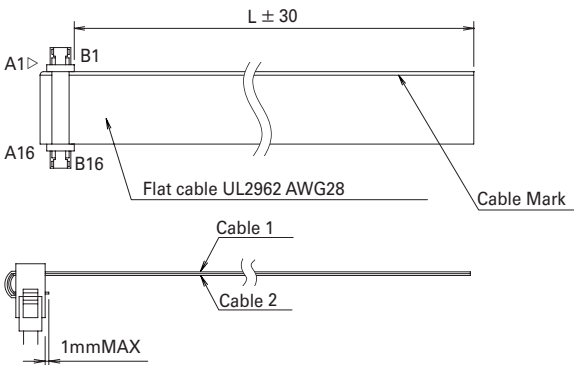
Connector Connection Of Motor Side

PIN No.	LEAD COLR	
1	Blue	CHANNEL A
2	Brown	CHANNEL A
3	Green	CHANNEL B
4	Purple	CHANNEL B
5	White	CHANNEL C
6	Yellow	CHANNEL C
7	Red	+5V
8	Black	0V
9	Black	Shield

Connector Connection Of Amplifier Side

PIN No.	LEAD COLR	
1	Blue	CHANNEL A
2	Brown	CHANNEL A
3	Green	CHANNEL B
4	Purple	CHANNEL B
5	White	CHANNEL C
6	Yellow	CHANNEL C
7	Red	+5V
8	Black	0V
9	Black	Shield
10	N.C.	—
11	Blue	SDN
12	Black	GND
13	Yellow	LIMIT
14	Black	GND
15	Red	Vcc
16	Red	Vcc

④ I/O Cable (unshielded)



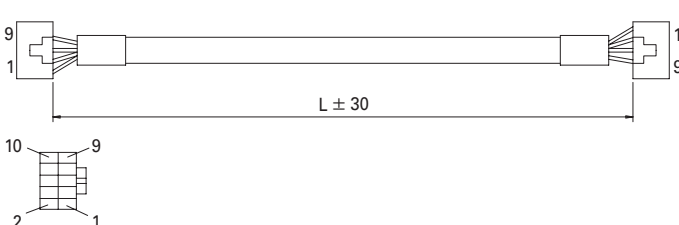
Cable Connection

Cable 1	Cable 2
A1-No.1	B1-No.17
A2-No.2	B2-No.18
A3-No.3	B3-No.19
A4-No.4	B4-No.20
A5-No.5	B5-No.21
.	.
.	.
.	.
A13-No.13	B13-No.29
A14-No.14	B14-No.30
A15-No.15	B15-No.31
A16-No.16	B16-No.32

Connector Set : PBC4S0000A

Manufacturer	Type	Qty.
KEL	Connector : 8822E-032-171D	1

⑤ Communication Cable



Connector relay cable

Signal Name	CNA Pin.No.	Color	CNB Pin.No.	Signal Name
A	1	Yellow	1	A
B	2	White	2	B
(Y)	3	Brown	3	(Y)
(Z)	4	Blue	4	(Z)
GND	5	Black	5	GND
Vcc	6	Red	6	Vcc
STOP	7	Purple	7	STOP
—	—	Green	—	—
FG	8	Drain	8	FG
—	—	—	—	—
—	—	—	—	—
—	—	—	—	—

Connector Set : PBC4C0000A

Manufacturer	Type	Qty.
JST	Housing : PADP-10V-1-S	2
	Contact : SPH-002TP0.5L	20

Features and Functions

Type R

Type P

Type M

Type R Multi-Axis

General Specifications

Motor Dimensional Drawings

Options

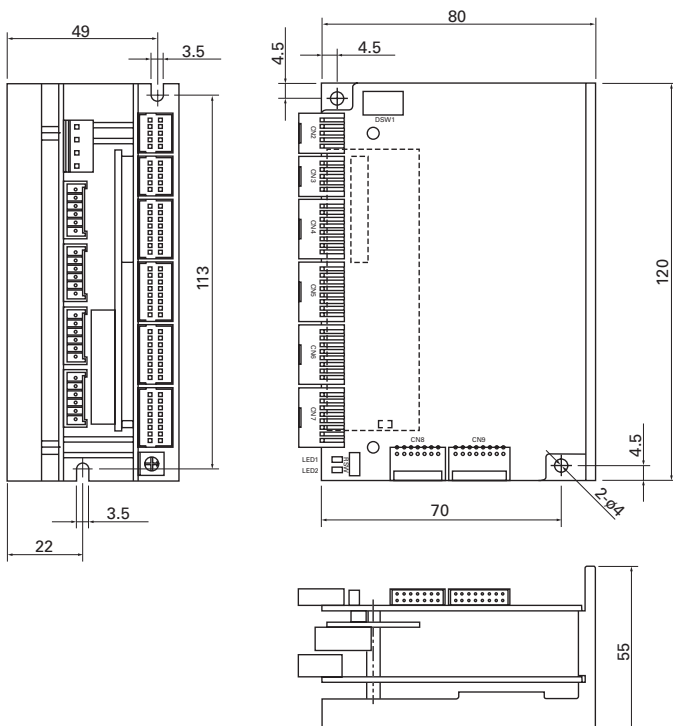
Model No. PB Type R Multi-Axis Type

DC Power Input Type

General Specifications

Amplifier Model		PB2D003R1U△	
Control Mode		PWM Control Trapezoidal drive method	
Power Supply	Main Power Supply	DC24V/36V±10%	
	Control Power Supply	DC24V±10% (only for part numbers ending with "1" or "3")	
Environment	Ambient temp.	Operating	0 to 55°C
		Storage	- 20 to 70°C
	Operating/Storage Humidity		Maximum 90% RH (non-condensing)
	Vibration Resistance		0.5G (tested with frequency range 10 to 55 Hz, X, Y, Z each direction 2H)
Structure		Open Frame	
Mass/Dimensions		Approx. 0.8kg W120×H55×D80	
Functions	Rotation Speed	0 to 4500min ⁻¹	
	Resolution (P/R)	200, 800, 1600, 3200, 6400, 12800	
	Regeneration Process	Not available (External regenerative unit is optional)	
	Protective Functions	Over-voltage, Regenerated voltage overload, Over-speed, Encoder disconnection, Reset error, CPU error, Overload stop, Soft Servo Error, Amplifier Overheat	
	Display	Power status, Alarm (flashing indicator)	
	Functions	Operation Functions : Normal Drive(incremental move , absolute move), Zero-return, push operation Point Function : 256Point Program Function : 256PRG×16Line 8PRG×512LINE	
	Switch	DIP SW1,2 : Transmission Speed Setting DIP SW3 to 6 : Axis valid / invalid (On: Activate) DIP SW7 to 10 : Terminating Resistor Setting (On: with terminating resistance) Rotary SW : Node Address Setting (0 to E)	
Input/ Output Signals	Input Signals	CN1 Fixed function (4) : EXE, Point, SELECT, STOP, ALMCLR CN1 Selectable (4) : Generic Input, Point, Pause, Interlock CN4 to CN7 Allocation Function (2 X 4-axis) Hard.Limit (SDN) Signal	
	Output Signals	CN1 Fixed function In-Position, Ack, Busy, ALM CN1Selectable (8) Generic Output, Motor Stop, H.Limit Monitor, ZONE, Zero-return completion, END, STOP Monitor, SDN Monitor	
	Communication Specifications	RS-485 Standard Start-Stop Synchronization, Half Duplex (Part numbers ending with "0" or "1") RS-485 Standard Start-Stop Synchronization, Full Duplex (Part numbers ending with "2" or "3")	

Amplifier Dimensional Drawing

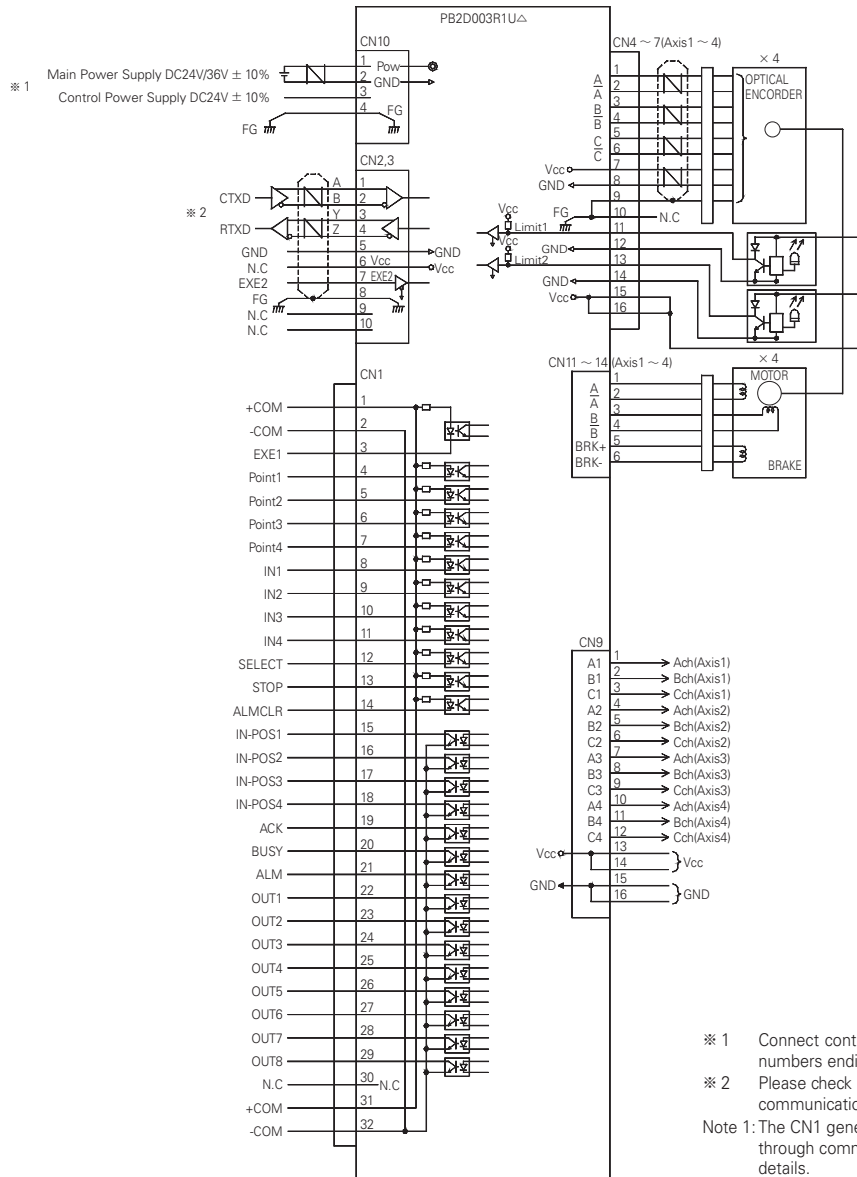


Amplifier Model Number Nomenclature

PB2D003R1U△

△	Communication Specifications	Power Input
0	Start-Stop Synchronization, Half Duplex	Single Pwr.
1		Separate
2	Start-Stop Synchronization, Full Duplex	Single Pwr.
3		Separate

External Wiring Diagram



Features and Functions

Type R

Type P

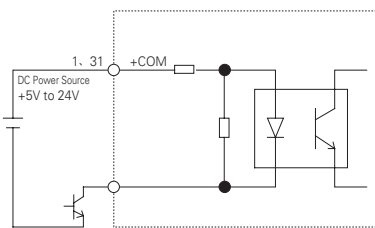
Type M

Type R Multi-Axis

Input/ Output Signals Circuit

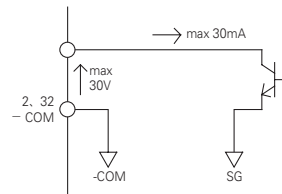
Generic Input

Input Voltage Specifications : DC5V to 24V±10%



Generic Output

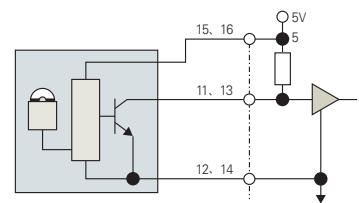
Generic Output 30 mA Max



Hard Limit (SDN)

* CN4 ~ 7

Not insulated



General Specifications

Motor Dimensional Drawings

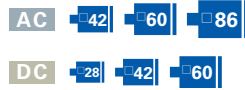
Options



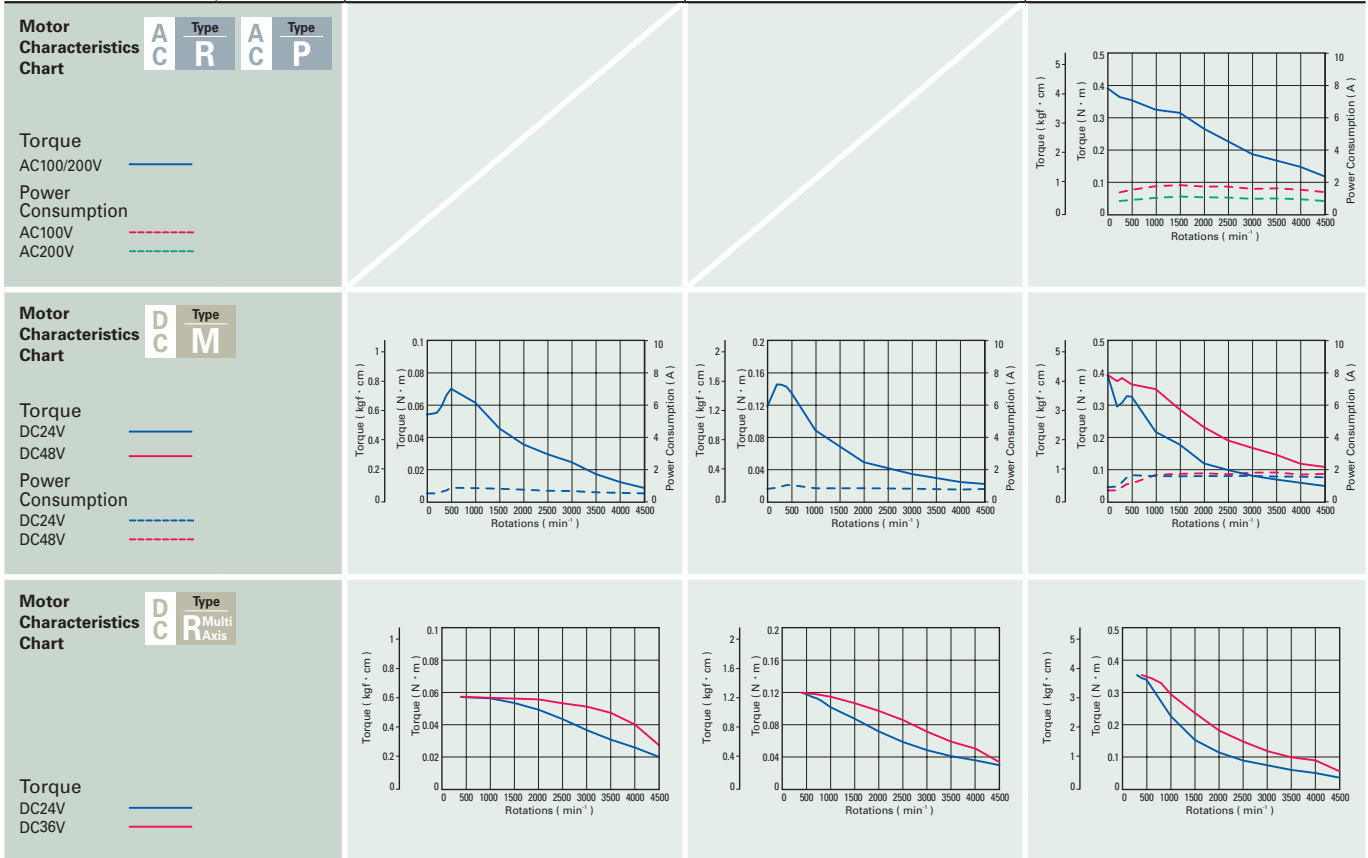
General Specifications

Standard Model

Motor Flange Size

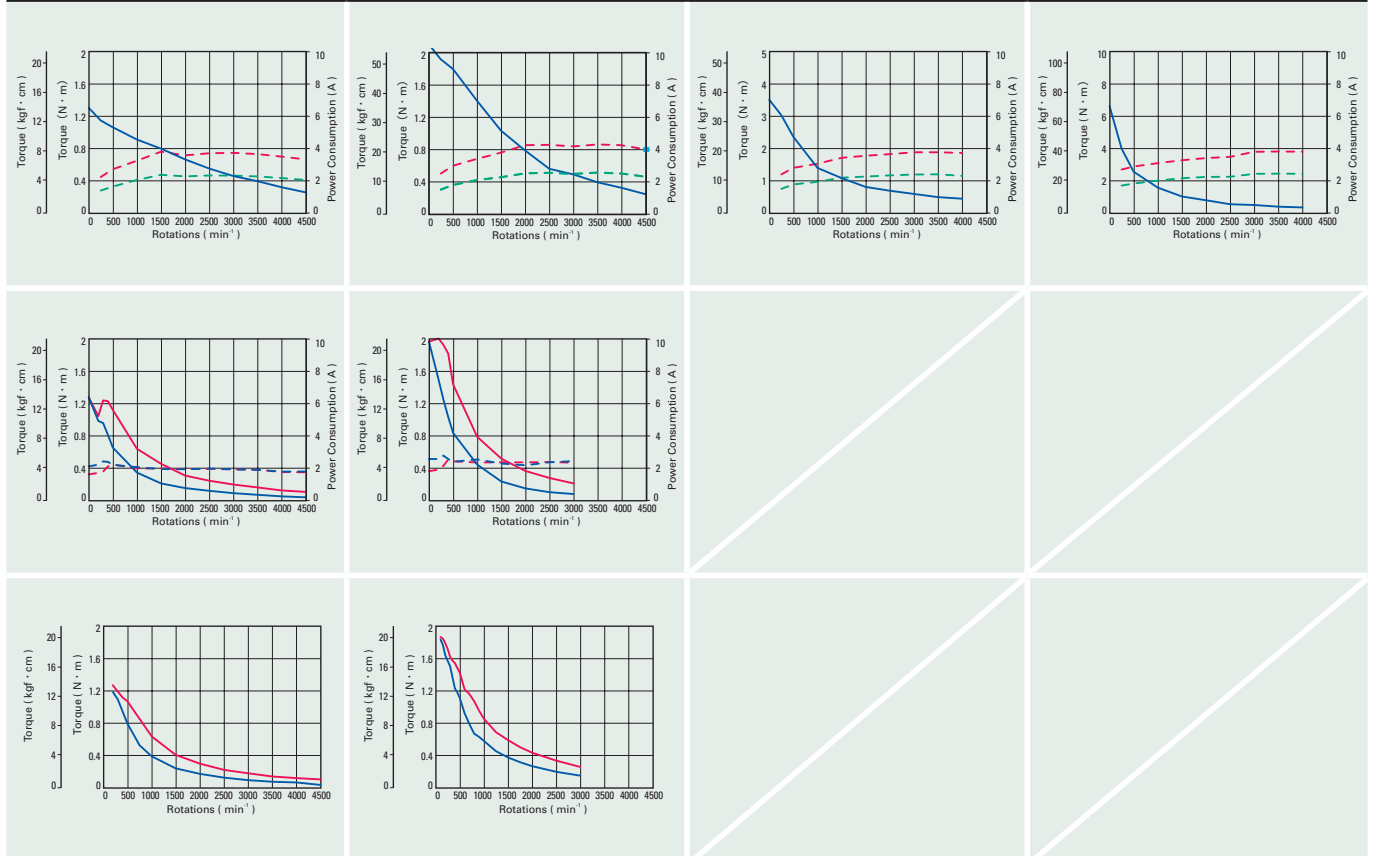


Size	Motor Flange Size	□ 28mm		□ 42mm
	Motor Length	58.5mm	77.8mm	57.6mm
Motor Model (A C)	Unit	—	—	PBM423FXE20
Type R Set Model No.		—	—	PBAR423
Related Amplifier Model No		—	—	PB3A003R200
Type P Set Model No.		—	—	PBAP423
Related Amplifier Model No		—	—	PB3A003P200
Motor Model (D C)		PBM282FXE20	PBM284FXE20	PBM423FXE20
Type M Set Model No.		PBDM282	PBDM284	PBDM423
Related Amplifier Model No			PB3D003M200	
Motor Model (D C)		PBM282DXA20	PBM284DXA20	PBM423DXA20
Type R Multi-axis Model No.			PB2D003R1U△	
Max. Stall Torque	N · m	0.055	0.115	0.39
Rotor Inertia	× 10 ⁻⁴ kg · m ²	0.008	0.016	0.056
Allowable Thrust Load	N	9.8	9.8	9.8
Allowable Radial Load ^{**2}	N	33	33	49
Motor Mass	kg	0.16	0.23	0.35



*Maintain motor case temperature at a point below 85°C .
 **The load point is determined at a position 14mm from the mounting surface.

□ 60mm		□ 86mm	
70.3mm	102.3mm	85.5mm	116mm
PBM603FXE20	PBM604FXE20	PBM861FXE20	PBM862FXE20
PBAR603	PBAR604	PBAR861	PBAR862
PB3A003R200			
PBAP603	PBAP604	PBAP861	PBAP862
PB3A003P200			
PBM603FXE20	PBM604FXE20	—	—
PBDM603	PBDM604	—	—
PB3D003M200			
PBM603DXA20	PBM604DXA20	—	—
PB2D003R1U△			
1.3	1.9	3.3	6.4
0.4	0.84	1.48	3
14.7		60	60
167		200	200
0.85	1.42	1.9	3.1



Features and Functions

Type R

Type P

Type M

Type R Multi-Axis

General Specifications

Motor Dimensional Drawings

Options



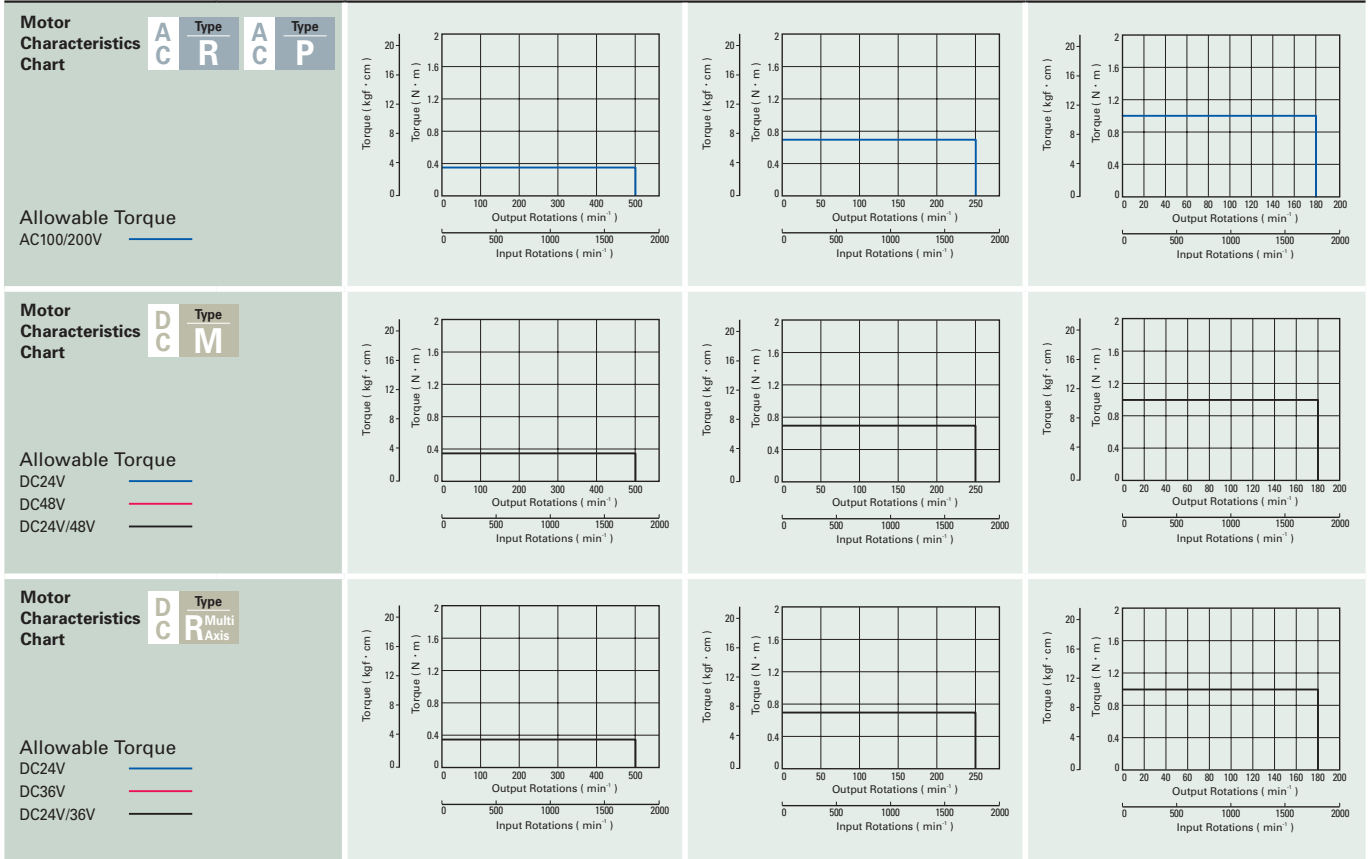
General Specifications

Low Backlash Gear Model

Motor Flange Size

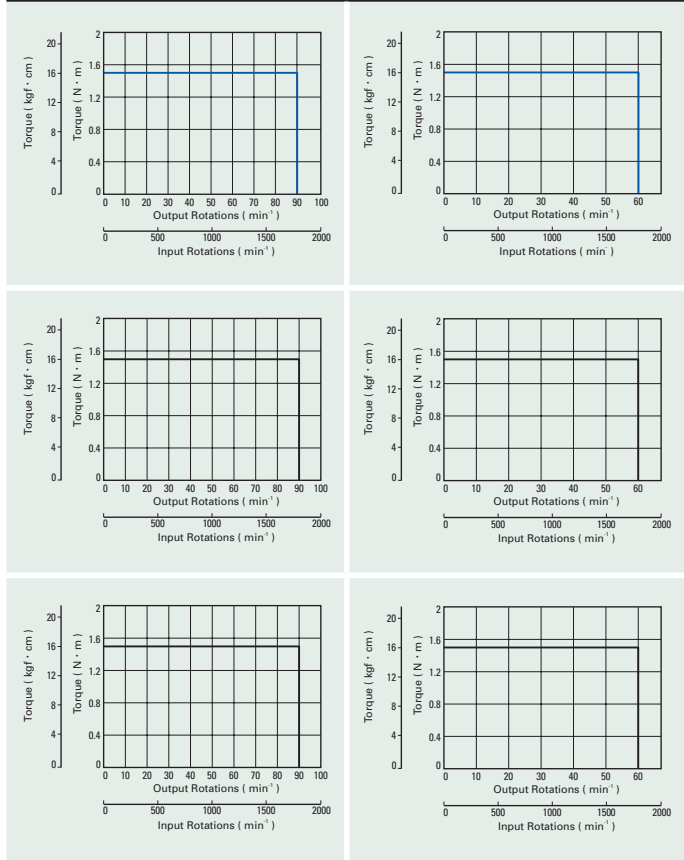


Size	Motor Flange Size	□42mm		
	Motor Length + Gear Length	87.9mm		
Motor Model (A C)	Unit	PBM423FGAE20	PBM423FGBE20	PBM423FGEE20
Type R Set Model No.		PBAR423-C3.6	PBAR423-C7.2	PBAR423-C10
Related Amplifier Model No		PB3A003R200		
Type P Set Model No.		PBAP423-C3.6	PBAP423-C7.2	PBAP423-C10
Related Amplifier Model No		PB3A003P200		
Motor Model (D C)		PBM423FGAE20	PBM423FGBE20	PBM423FGEE20
Type M Set Model No.		PBDM423-C3.6	PBDM423-C7.2	PBDM423-C10
Related Amplifier Model No		PB3D003M200		
Motor Model (D C)		PBM423DGAA20	PBM423DGBA20	PBM423DGEA20
Type R Multi-axis Model No.		PB2D003R1U△		
Max. Stall Torque	N · m	0.343	0.686	0.98
Rotor Inertia	× 10 ⁻⁴ kg · m ²	0.056		
Reduction Gear Ratio		1:3.6	1:7.2	1:10
Backlash	DEG	0.6	0.4	0.35
Allowable Rotations	min ⁻¹	500	250	180
Rotation Direction	Rel. to command dir.	Forward		
Allowable Thrust Load	N	15		
Allowable Radial Load*2	N	20		
Motor Mass	kg	0.48		



*Maintain motor case temperature at a point below 85°C .
 **The load point is determined at a position 1/3 of the length from the output shaft.

□ 42mm	
87.9mm	
PBM423FGGE20	PBM423FGJE20
PBAR423-C20	PBAR423-C30
PB3A003R200	
PBAP423-C20	PBAP423-C30
PB3A003P200	
PBM423FGGE20	PBM423FGJE20
PBDM423-C20	PBDM423-C30
PB3D003M200	
PBM423DGGA20	PBM423DGJA20
PB2D003R1U△	
1.47	
0.056	
1:20	1:30
0.25	
90	60
Reverse	
15	
20	
0.48	



Features and Functions

Type R

Type P

Type M

Type R Multi-Axis

General Specifications

Motor Dimensional Drawings

Options

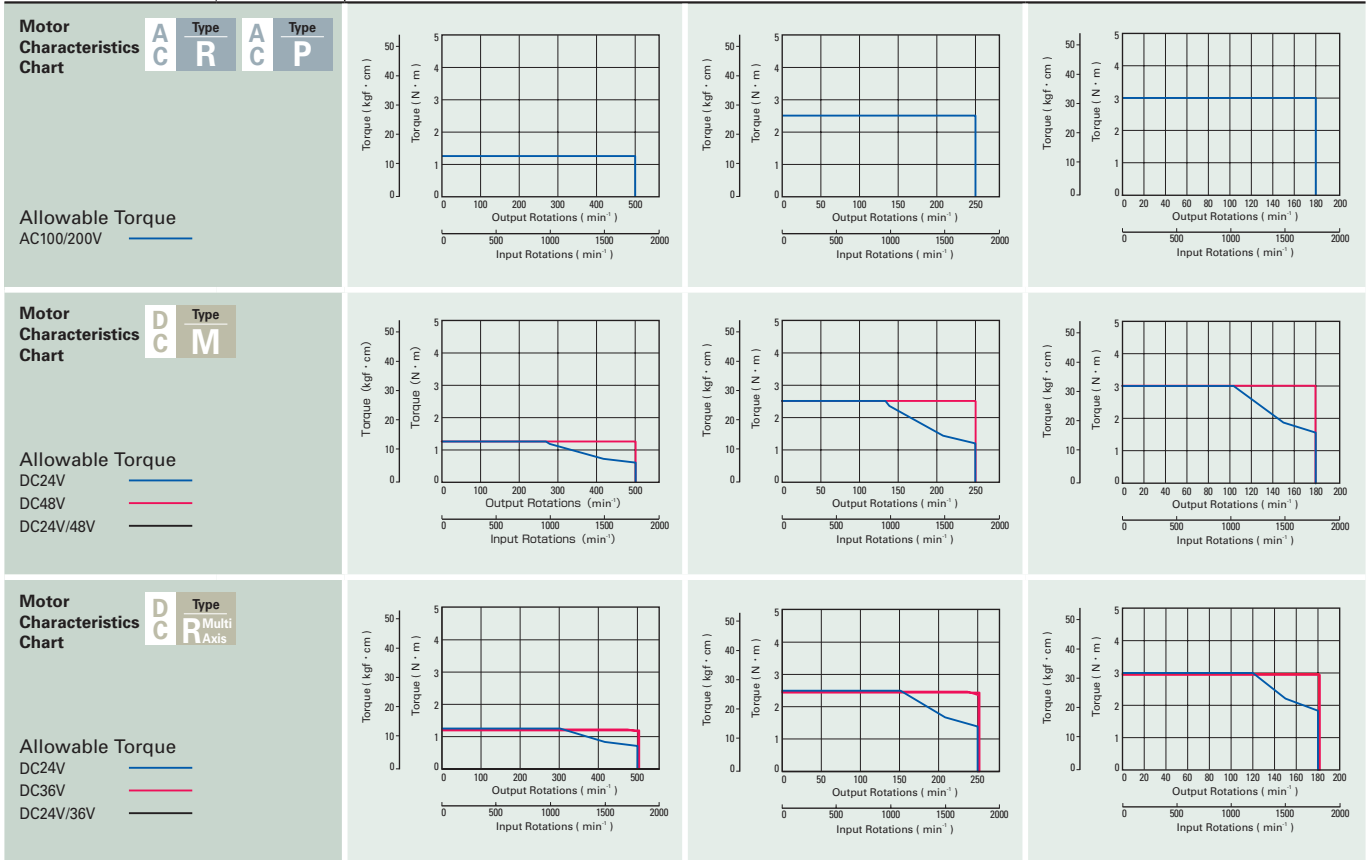
General Specifications

Low Backlash Gear Model

Motor Flange Size



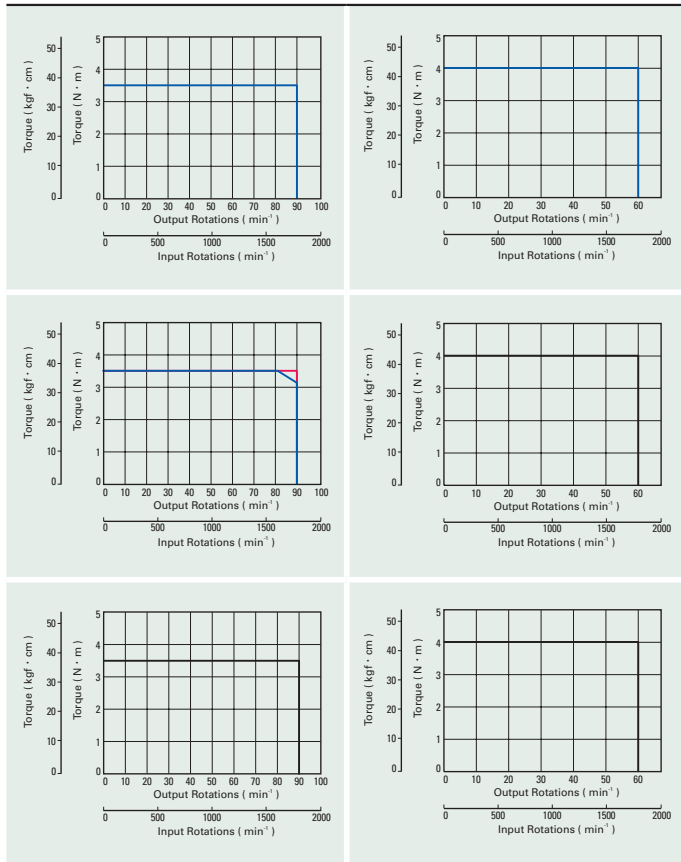
Size	Motor Flange Size	□ 60mm		
	Motor Length + Gear Length	115.8mm		
Motor Model (A C)	Unit	PBM603FGAE20	PBM603FGBE20	PBM603FGEE20
Type R Set Model No.		PBAR603-C3.6	PBAR603-C7.2	PBAR603-C10
Related Amplifier Model No		PB3A003R200		
Type P Set Model No.		PBAP603-C3.6	PBAP603-C7.2	PBAP603-C10
Related Amplifier Model No		PB3A003P200		
Motor Model (D C)	Unit	PBM603FGAE20	PBM603FGBE20	PBM603FGEE20
Type M Set Model No.		PBDM603-C3.6	PBDM603-C7.2	PBDM603-C10
Related Amplifier Model No		PB3D003M200		
Motor Model (D C)	Unit	PBM603DGAA20	PBM603DGBA20	PBM603DGEA20
Type R Multi-axis Model No.		PB2D003R1U△		
Max. Stall Torque	N · m	1.25	2.5	3
Rotor Inertia	× 10 ⁻⁴ kg · m ²	0.4		
Reduction Gear Ratio		1:3.6	1:7.2	1:10
Backlash	DEG	0.55	0.25	
Allowable Rotations	min ⁻¹	500	250	180
Rotation Direction	Rel. to command dir.	Forward		Reverse
Allowable Thrust Load	N	30		
Allowable Radial Load*2	N	100		
Motor Mass	kg	1.22		



*Maintain motor case temperature at a point below 85°C .

**The load point is determined at a position 1/3 of the length from the output shaft.

□ 60mm	
115.8mm	
PBM603FGGE20	PBM603FGJE20
PBAR603-C20	PBAR603-C30
PB3A003R200	
PBAP603-C20	PBAP603-C30
PB3A003P200	
PBM603FGGE20	PBM603FGJE20
PBDM603-C20	PBDM603-C30
PB3D003M200	
PBM603DGGA20	PBM603DGJA20
PB2D003R1U△	
3.5	4
0.4	
1:20	1:30
0.17	
90	60
Reverse	
30	
100	
1.22	



Features and Functions

Type R

Type P

Type M

Type R Multi-Axis

General Specifications

Motor Dimensional Drawings

Options



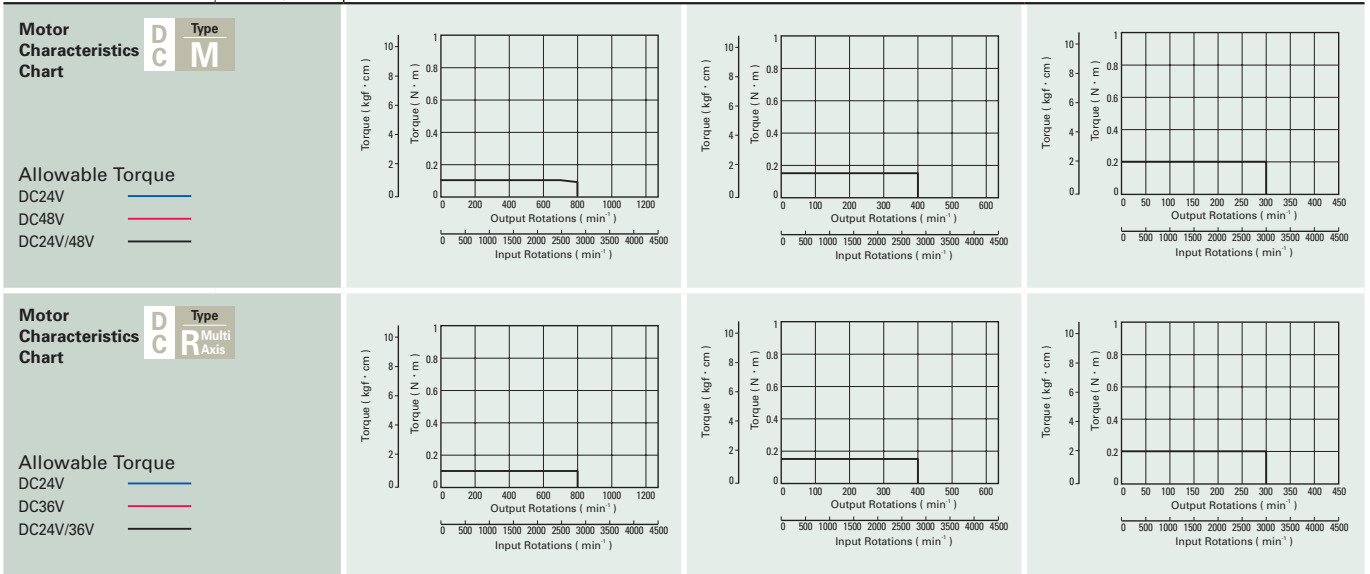
General Specifications

Spur Gear Model

Motor Flange Size

DC 28

Size	Motor Flange Size	□ 28mm		
	Motor Length + Gear Length	88.5mm		
Motor Model (D C)	Unit	PBM282FGAE20	PBM282FGBE20	PBM282FGEE20
Type M Set Model No.		PBDM282-G3.6	PBDM282-G7.2	PBDM282-G10
Related Amplifier Model No		PB3D003M200		
Motor Model (D C)		PBM282DGAA20	PBM282DGBA20	PBM282DGEA20
Type R Multi-axis Model No.		PB2D003R1U△		
Allowable Torque	N · m	0.1	0.15	0.2
Rotor Inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	0.017		
Reduction Gear Ratio		1:3.6	1:7.2	1:10
Backlash	DEG	2		
Allowable Rotations	min^{-1}	800	400	300
Rotation Direction	Rel. to command dir.	Forward		Reverse
Allowable Thrust Load	N	10		
Allowable Radial Load ^{**2}	N	15		
Motor Mass	kg	0.22		



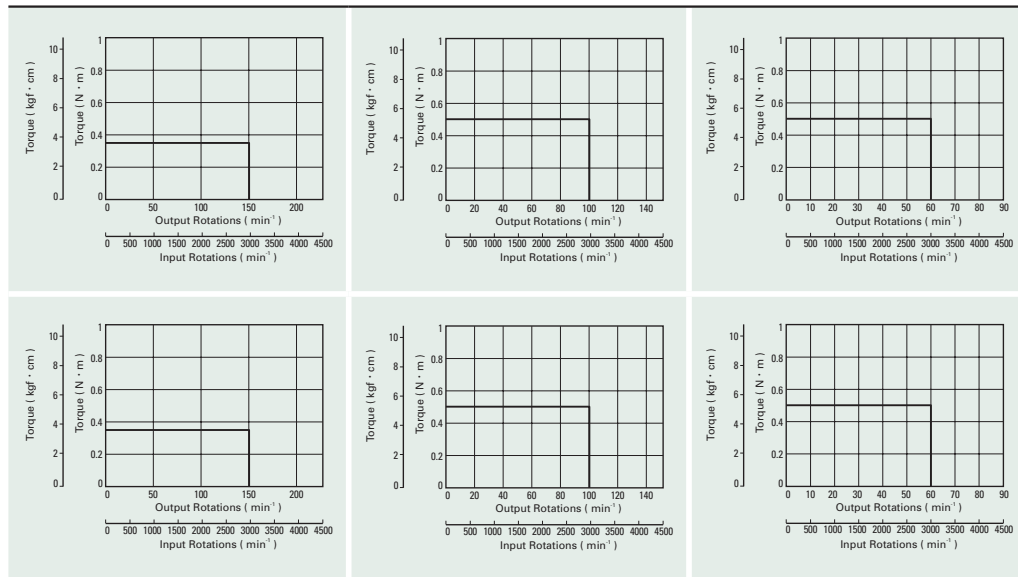
*Maintain motor case temperature at a point below 85°C.

**The load point is determined at a position 1/3 of the length from the output shaft.

□ 28mm

88.5mm

PBM282FGGE20	PBM282FGJE20	PBM282FGLE20
PBDM282-G20	PBDD282-G30	PBDD282-G50
PB3D003M200		
PBM282DGA20	PBM282DGJA20	PBM282DGLA20
PB2D003R1U△		
0.35	0.5	
0.017		
1:20	1:30	1:50
1.5		
150	100	60
Forward		
10		
15		
0.22		



Features and Functions

Type R

Type P

Type M

Type R Multi-Axis

General Specifications

Motor Dimensional Drawings

Options



General Specifications

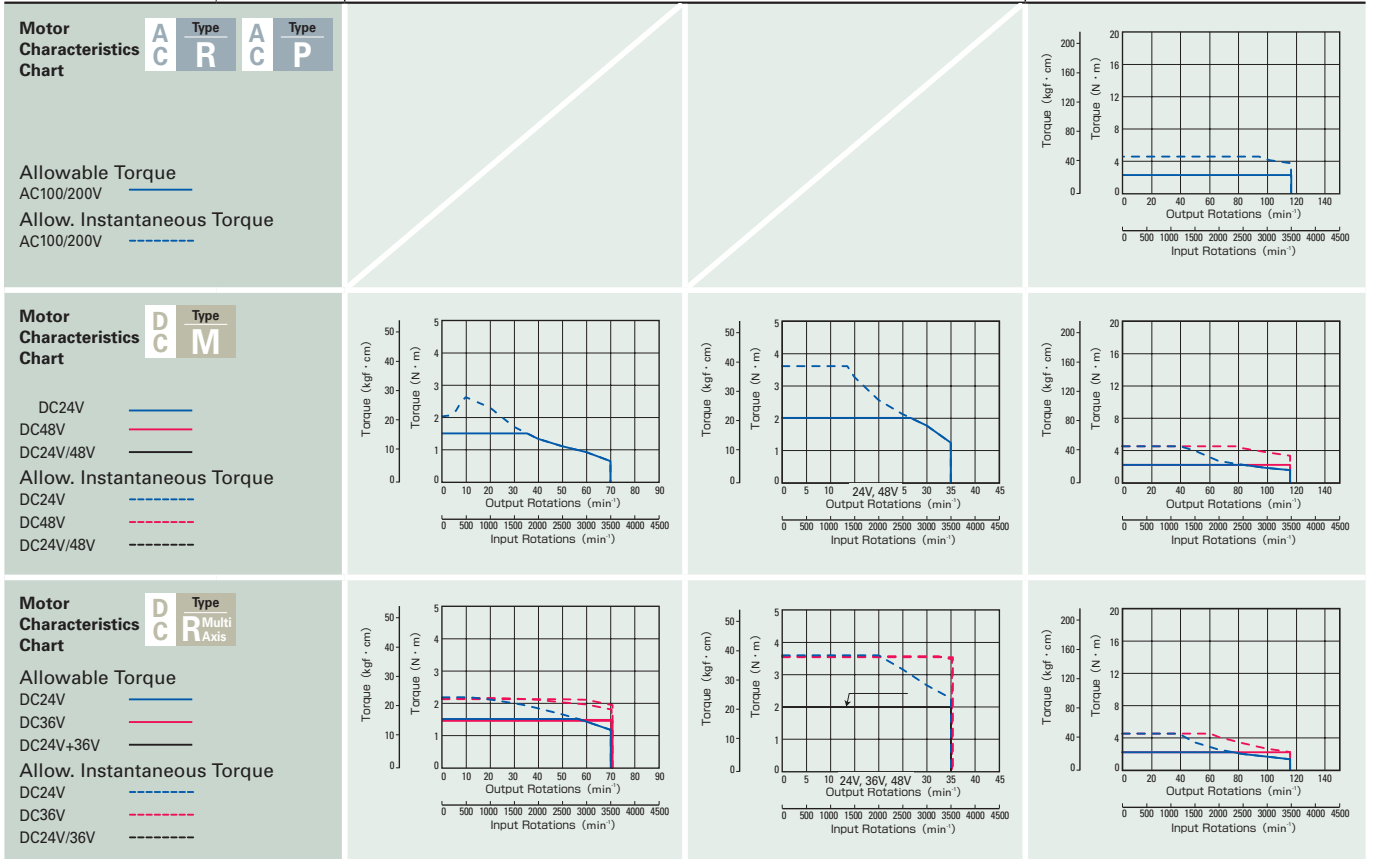
Harmonic Gear Model

Motor Flange Size

AC □42 □60

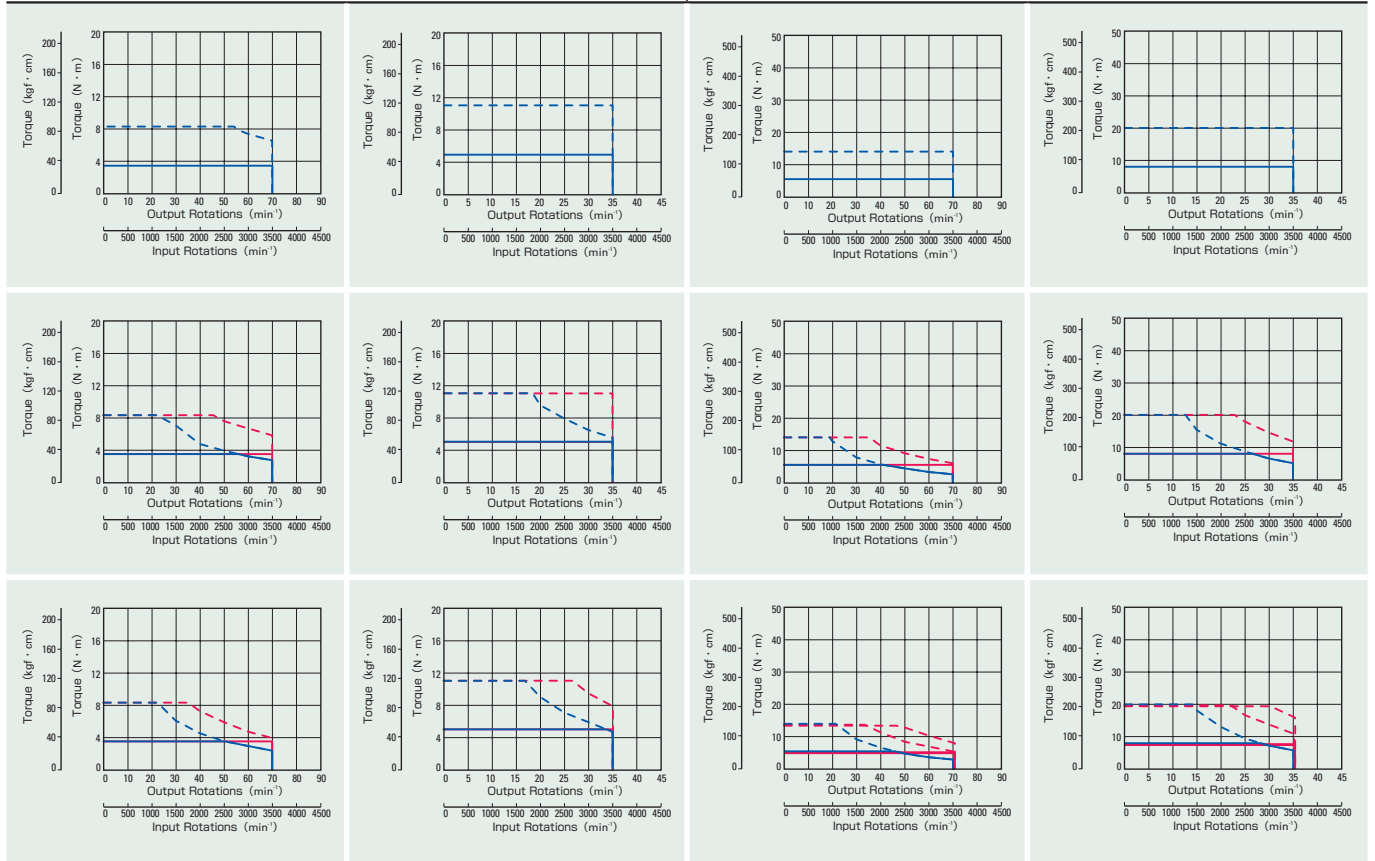
DC □28 □42 □60

Size	Motor Flange Size	□ 28mm		□ 42mm
	Motor Length + Gear Length	97mm		
Motor Model (A C)	Unit	—	—	PBM423FHJE20
Type R Set Model No.		—	—	PBAR423-H30
Related Amplifier Model No		—	—	PB3A003R200
Type P Set Model No.		—	—	PBAP423-H30
Related Amplifier Model No		—	—	PB3A003P200
Motor Model (D C)		PBM282FHLE20	PBM282FHME20	PBM423FHJE20
Type M Set Model No.		PBDM282-H50	PBDM282-H100	PBDM423-H30
Related Amplifier Model No		PB3D003M200		
Motor Model (D C)		PBM282DHLE20	PBM282DHMA20	PBM423DHJA20
Type R Multi-axis Model No.		PB2D003R1U△		
Allowable Torque	N · m	1.5	2	2.2
Allow. Instantaneous Torque	N · m	2.7	3.6	4.5
Rotor Inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	0.012		0.068
Reduction Gear Ratio		1:50	1:100	1:30
Lost Motion	min	0.4 ~ 3 (± 0.06N · m)		—
Hysteresis Loss	min	—		3.6
Allowable Rotations	min^{-1}	70	35	116
Allowable Thrust Load	N	100		1150
Allowable Radial Load*2	N	160		209
Motor Mass	kg	0.27		0.54



*Maintain motor case temperature at a point below 85°C . **The load point is determined at a position 1/3 of the length from the output shaft. ***The gear output shaft rotates in the opposite direction.

□ 42mm		□ 60mm	
97mm		137.3mm	
PBM423FHLE20	PBM424FHME20	PBM603FHLE20	PBM603FHME20
PBAR423-H50	PBAR423-H100	PBAR603-H50	PBAR603-H100
PB3A003R200			
PBAP423-H50	PBAP423-H100	PBAP603-H50	PBAP603-H100
PB3A003P200			
PBM423FHLE20	PBM423FHME20	PBM603FHLE20	PBM603FHME20
PBDM423-H50	PBDM423-H100	PBDM603-H50	PBDM603-H100
PB3D003M200			
PBM423DHLE20	PBM423DHMA20	PBM603DHLE20	PBM603DHMA20
PB2D003R1U△			
3.5	5	5.5	8
8.3	11	14	20
0.068		0.435	
1:50	1:100	1:50	1:100
—	—	0.4 ~ 3 (± 0.28N · m)	0.4 ~ 3 (± 0.4N · m)
2.4	2.4	—	—
70	35	70	35
1150		400	
209		360	
0.54		1.45	



Features and Functions

Type R

Type P

Type M

Type R Multi-Axis

General Specifications

Motor Dimensional Drawings

Options



General Specifications

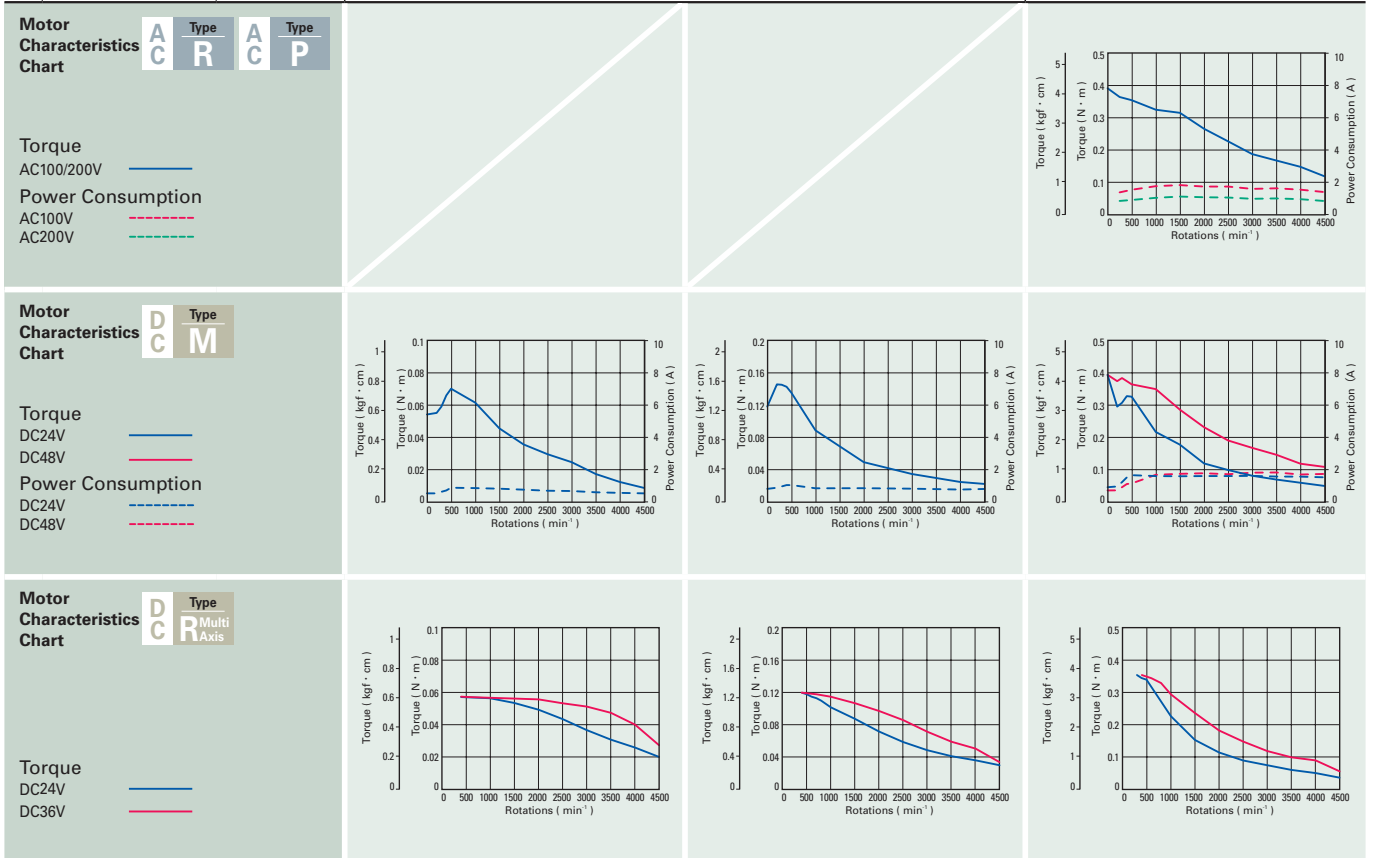
Electromagnetic Brake Model

Motor Flange Size

AC □42 □60

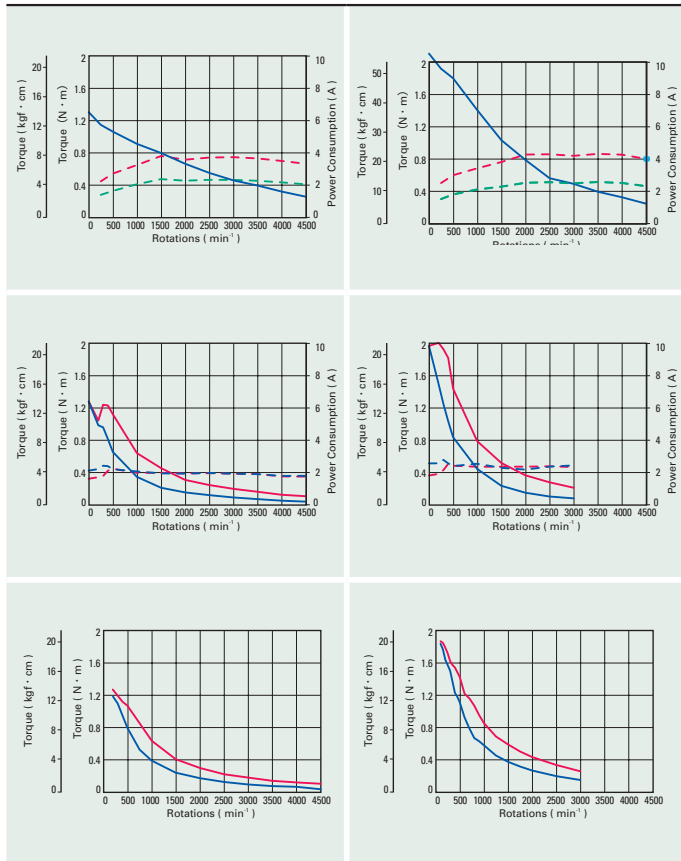
DC □28 □42 □60

Size	Motor Flange Size	□ 28mm		□ 42mm	
	Motor Length + Brake Length	97.8mm	117.1mm	90mm	
Motor Model (A C)	Unit	—	—	PBM423FCE20	
Type R Set Model No.		—	—	PBAR423-B	
Related Amplifier Model No		—	—	PB3A003R200	
Type P Set Model No.		—	—	PBAP423-B	
Related Amplifier Model No		—	—	PB3A003P200	
Motor Model (D C)		PBM282FCE20	PBM284FCE20	PBM423FCE20	
Type M Set Model No.		PBDM282-B	PBDM284-B	PBDM423-B	
Related Amplifier Model No		PB3D003M200			
Motor Model (D C)		PBM282DCA20	PBM284DCA20	PBM423DCA20	
Type R Multi-axis Model No.		PB2D003R1U△			
Max. Stall Torque	N · m	0.055	0.115	0.39	
Rotor Inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	0.008	0.016	0.056	
Allowable Thrust Load	N	9.8	9.8	9.8	
Allowable Radial Load ^{# 2}	N	33	33	49	
Motor Mass	kg	0.16	0.23	0.35	
Electromagnetic Brake	Operation Method	Non-excitation			
	Power Voltage	DC24V $\pm 5\%$			
	Excitation Current	0.15		0.08	
	Power Consumption	3.6		2	
	Friction Torque	N · m	0.049		0.22
	Brake Engage Time	ms	20		
	Brake Release Time	ms	20		30



*Maintain motor case temperature at a point below 85°C. **The load point is determined at a position 1/3 of the length from the output shaft.

□ 60mm	
113.6mm	145.6mm
PBM603FCE20	PBM604FCE20
PBAR603-B	PBAR604-B
PB3A003R200	
PBAP603-B	PBAP604-B
PB3A003P200	
PBM603FCE20	PBM604FCE20
PBDM603-B	PBDM604-B
PB3D003M200	
PBM603DCA20	PBM604DCA20
PB2D003R1U△	
1.3	1.9
0.4	0.84
14.7	
167	
0.85	1.42
Non-excitation	
DC24V ± 5%	
0.25	
6	
0.78	
20	
30	



Features and Functions

Type R

Type P

Type M

Type R Multi-Axis

General Specifications

Motor Dimensional Drawings

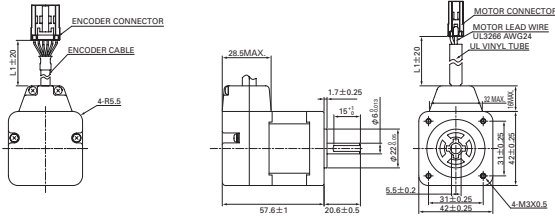
Options

42mm

Standard Model

PBM423FXE20 AC DC

PBM423DXA20 DC Multi Axis

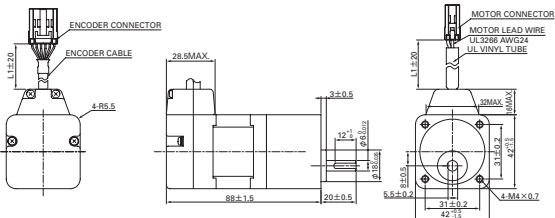


MODEL	L1
PBM423FXE20	500
PBM423DXA20	300

Low Backlash Gear Model

PBM423FG E20 AC DC

PBM423DG A20 DC Multi Axis

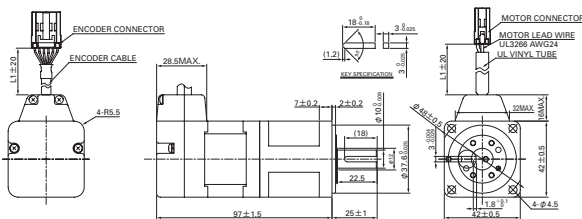


MODEL	L1
PBM423FG E20	500
PBM423DG A20	300

Harmonic Gear Model

PBM423FH E20 AC DC

PBM423DH A20 DC Multi Axis

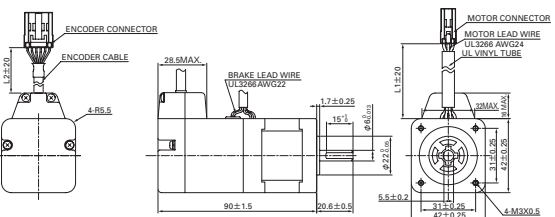


MODEL	L1
PBM423FH E20	500
PBM423DH A20	300

Electromagnetic Brake Model

PBM423FCE20 AC DC

PBM423DCA20 DC Multi Axis



MODEL	L1	L2
PBM423FCE20	515	500
PBM423DCA20	315	300

60mm

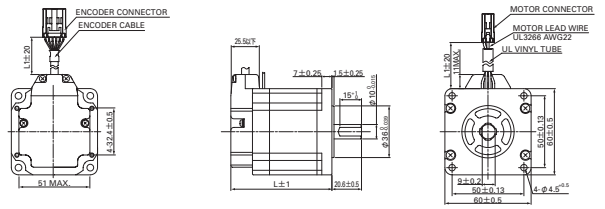
Standard Model

PBM603FXE20 AC DC

PBM604FXE20 AC DC

PBM603DXA20 DC Multi Axis

PBM604DXA20 DC Multi Axis

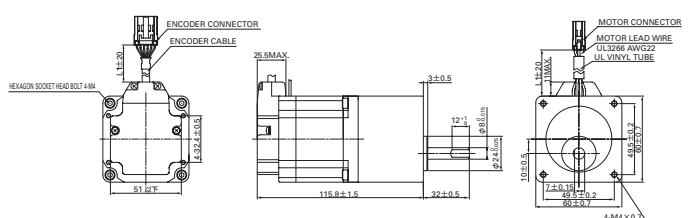


MODEL	L	L1
PBM603FXE20	70.3	500
PBM604FXE20	102.3	500
PBM603DXA20	70.3	300
PBM604DXA20	102.3	300

Low Backlash Gear Model

PBM603FG E20 AC DC

PBM603DG A20 DC Multi Axis

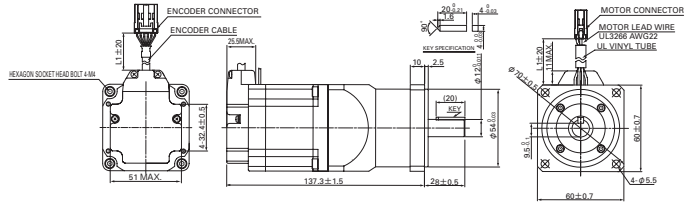


MODEL	L1
PBM603FG E20	500
PBM603DG A20	300

Harmonic Gear Model

PBM603FH E20 AC DC

PBM603DH A20 DC Multi Axis



MODEL	L1
PBM603FH E20	500
PBM603DH A20	300

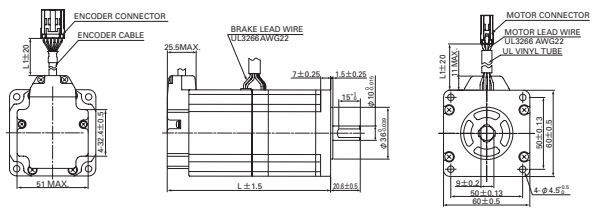
Electromagnetic Brake Model

PBM603FCE20 AC DC

PBM604FCE20 AC DC

PBM603DCA20 DC Multi Axis

PBM604DCA20 DC Multi Axis



MODEL	L	L1
PBM603FCE20	113.6	500
PBM604FCE20	145.6	500
PBM603DCA20	113.6	300
PBM604DCA20	145.6	300

Features and Functions

Type R

Type P

Type M

Type R Multi-Axis

General Specifications

Motor Dimensional Drawings

Options

Motor Dimensional Drawings

Unit:mm

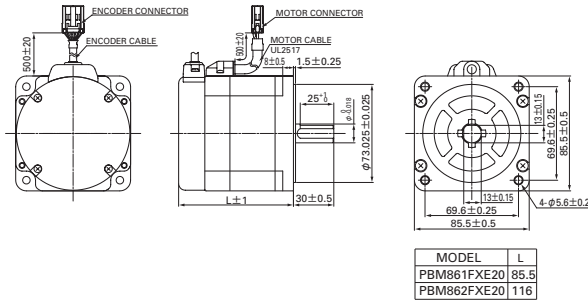
86mm

86mm

Standard Model

PBM861FXE20 AC

PBM862FXE20 AC



Connector Specification Of Motor Side

AC DC

Encoder Connector

Housing : 1-1318118-6
Terminal : 1318106-1
Manufacturer : AMP

Motor Connector

Housing : 1-1318119-3
Terminal : 1318105-1
Manufacturer : AMP

DC Multi-axis

Encoder Connector

Housing : 51030-0930
Terminal : 50083-8070
Manufacturer : MOLEX

Motor Connector

Housing : 5111-0610
Terminal : 50397-8000
Manufacturer : MOLEX

Connector Connection Of Encoder Side

PIN No.	LEAD COLR	
A1	Blue	CHANNEL A
B1	Brown	CHANNEL \bar{A}
A2	Green	CHANNEL B
B2	Purple	CHANNEL \bar{B}
A3	White	CHANNEL C
B3	Yellow	CHANNEL \bar{C}
A4	Red	+5V
B4	Black	0V
A5	N.C.	—
B5	Orange	OVER HEAT
A6	Black	Shield
B6	N.C.	—

Encoder Cable : UL20276

Connector Connection Of Motor Side

Standard Model, Low Backlash Gear Model, Harmonic Gear Model

PIN No.	LEAD COLR	
A1	Blue	Motor Lead Wire
B1	Orange	Motor Lead Wire
A2	Red	Motor Lead Wire
B2	Yellow	Motor Lead Wire
A3	N.C.	—
B3	N.C.	—

Electromagnetic Brake Model

PIN No.	LEAD COLR	
A1	Blue	Motor Lead Wire
B1	Orange	Motor Lead Wire
A2	Red	Motor Lead Wire
B2	Yellow	Motor Lead Wire
A3	Brake +	Brake Lead Wire
B3	Brake -	Brake Lead Wire

Connector Connection Of Encoder Side

2 Channel

PIN No.	LEAD COLR	
1	Blue	CHANNEL A
2	Brown	CHANNEL \bar{A}
3	Green	CHANNEL B
4	Purple	CHANNEL \bar{B}
5	N.C.	—
6	N.C.	—
7	Red	+5V
8	Black	0V
9	Black	FG (Shield)

Encoder Cable : UL20121

(3 Channel)

PIN No.	LEAD COLR	
1	Blue	CHANNEL A
2	Brown	CHANNEL \bar{A}
3	Green	CHANNEL B
4	Purple	CHANNEL \bar{B}
5	White	CHANNEL C
6	Yellow	CHANNEL \bar{C}
7	Red	+5V
8	Black	0V
9	Black	FG (Shield)

Encoder Cable : UL20276

Connector Connection Of Motor Side

Standard Model, Low Backlash Gear Model, Harmonic Gear Model

PIN No.	LEAD COLR	
1	Blue	Motor Lead Wire
2	Orange	Motor Lead Wire
3	Red	Motor Lead Wire
4	Yellow	Motor Lead Wire
5	N.C.	—
6	N.C.	—

Electromagnetic Brake Model

PIN No.	LEAD COLR	
1	Blue	Motor Lead Wire
2	Orange	Motor Lead Wire
3	Red	Motor Lead Wire
4	Yellow	Motor Lead Wire
5	Brake +	Brake Lead Wire
6	Brake -	Brake Lead Wire

Options

□ PC Interface Description

PC Interface Software Display Screens

1: Program Input Screen

2: Point Input Screen

3: Parameter Input Screen

PB-R PC Interface Software Functions

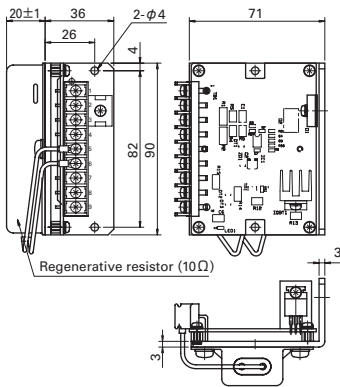
■ Functions

- Direct command capability
- Point data editing/execution
- Program data editing/execution
- Current position/Alarm/Amplifier status monitoring
- Lead Pitch Conversion
- Off-line Editing
- Teaching Function, etc

■ Program Functions

- Various branching conditions (Position, Input Port, Direct, Motor Stop)
- Timer Wait
- Subroutine Structure
- Loop Counter, etc.

Regenerative Unit (DC For Type R Multi-axis) Model : PBFE-01



Note 1 :TB1-Connector block wiring screw M3
Tightening torque 0.6 N · m
Note 2 : The external regenerative resistor is mounted
on the rear surface

■ 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 amplifiers 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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