

SANMOTION

CLOSED LOOP STEPPING SYSTEMS

PB



Vol.2

SANYO DENKI

E

ENGLISH

Hybrid system offers the best of both worlds: the ease-of-use of a stepping motor, and the reliability of a servo motor

SANMOTION PB

CLOSED LOOP STEPPING SYSTEMS

PB-R Generic Input type (RS-485+PIO)

PB-P Pulse Stream Control type

MERIT 1 Greater speed, smaller profile

High-Speed Positioning PB-R PB-P

High torque in the low-speed rotation range allows shorter positioning time with short stroke - high hit rate resolution.

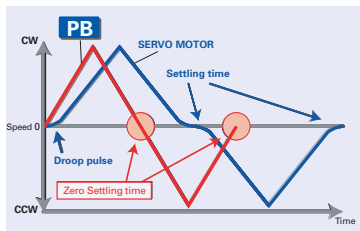
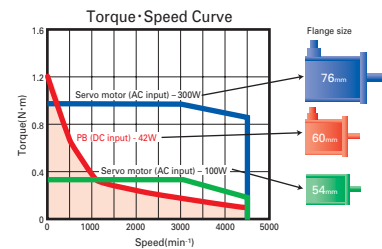


Image of switchover from forward to reverse rotation

Space Saving Profile PB-R PB-P

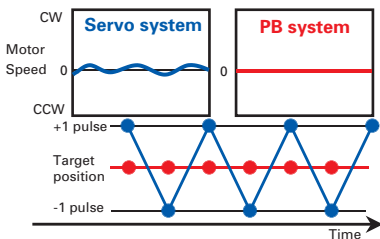
Uses high torque continuously in the low-speed range, which allows for smaller systems compared to regular servo motors.



MERIT 2 Reliable stopping power

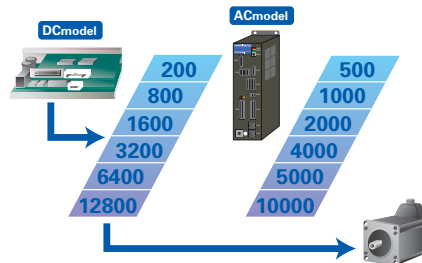
Stable Stopping PB-R PB-P

Capable of a complete stop using the holding torque feature, the same as a typical stepping motor.



High Resolution PB-R PB-P

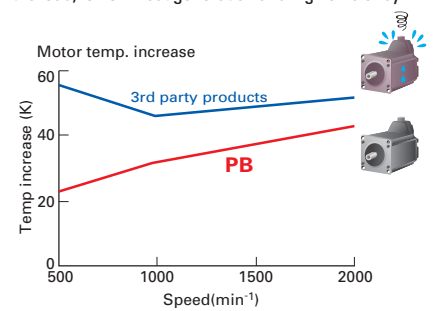
The unit for positioning command can be subdivided over a wide range of pulse ratios.



MERIT 3 Superb energy efficiency

Current Control Aids Efficiency PB-R PB-P

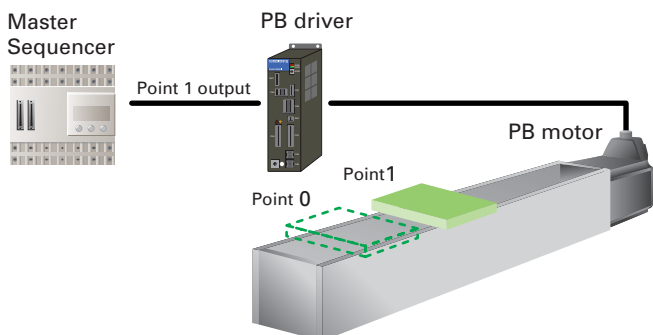
Current flow to the motor is controlled depending on the load, for low heat generation and high efficiency.



MERIT 4 Simple control protocol

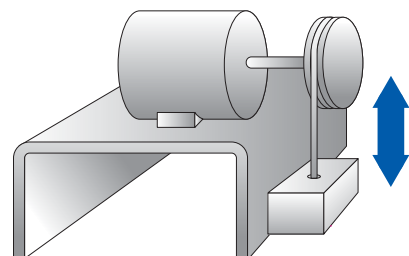
General Purpose I/O Input PB-R

The system can easily be controlled by specifying preset point numbers or program numbers using the general purpose I/O.



Supports a Wide Variety of Applications PB-R

Thrust, point specification, programming, and zero-return function are all embedded in the driver. The driver also provides added versatility with features like holding brake control and limit sensor input.

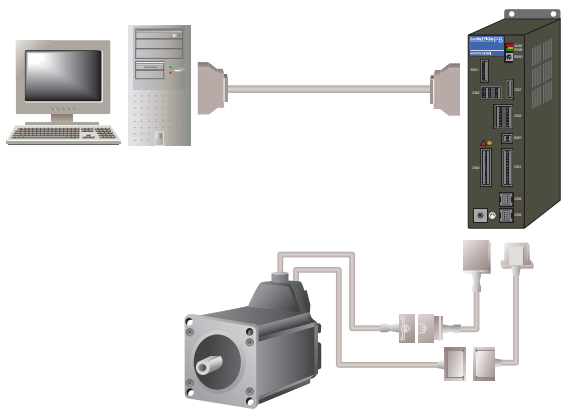


MERIT
5

Reduces the cost and time needed for system construction

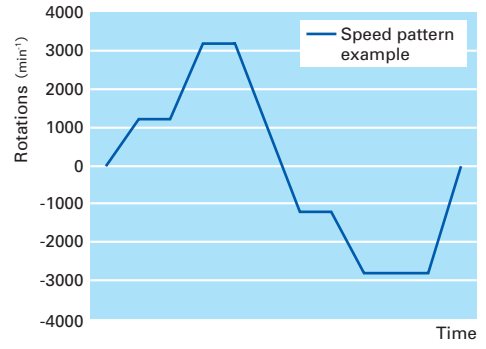
Optional cables available PB-R PB-P

Cables for master/driver and driver/motor connections are available, for hassle-free setup.



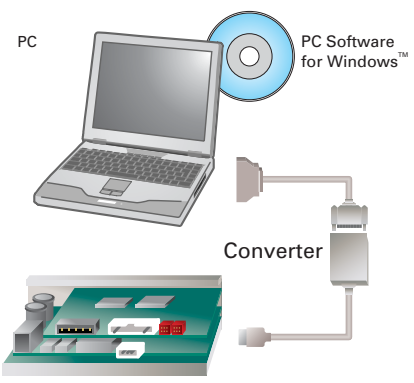
Built-in pulse generation PB-R

The PB-R system's built-in pulse generation receives numeric speed and position data from the upper device. This data is converted to internal driver commands to automatically generate the optimal speed pattern, making external pulse generators unnecessary and reducing overall system cost.



PC Interface Capability PB-R PB-P

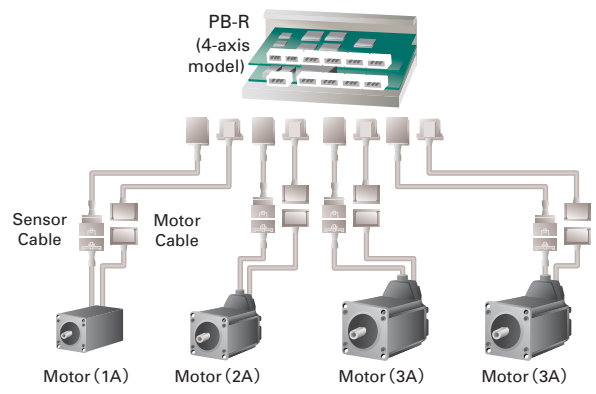
The bundled setup software allows for parameter configuration, data editing, and position and speed monitoring.



Support for up to 4-axes PB-R

Our multiple axis system allows for reduced size and weight.

- 1A, 2A, and 3A can be selected by software switches.
- Available only on DC power input models.



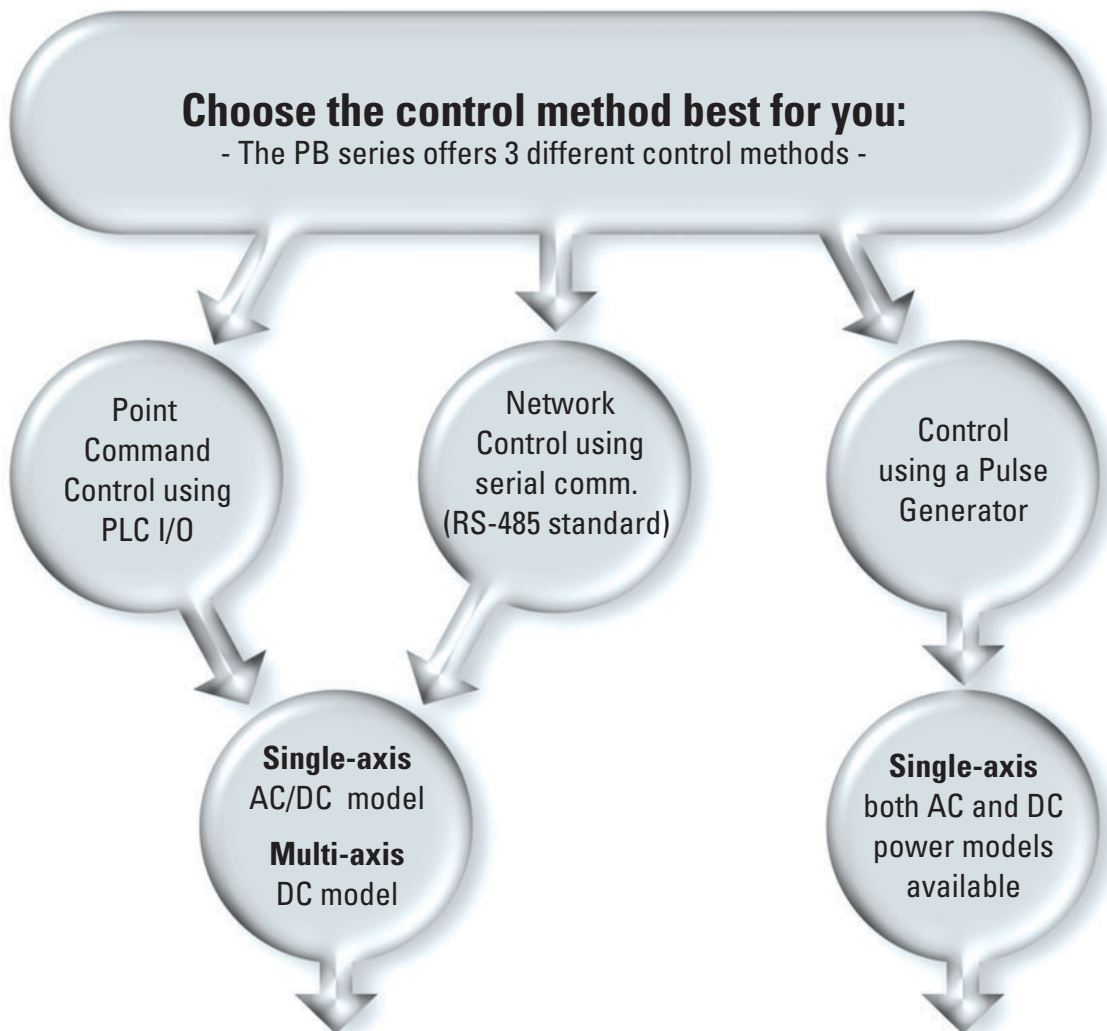
MERIT
6

Approved for use worldwide

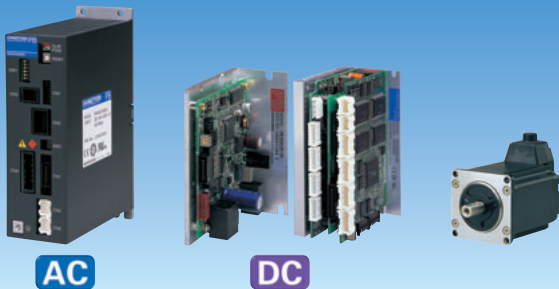


SANMOTION PB

CLOSED LOOP STEPPING SYSTEMS



SANMOTION PB-R System



- Start up via I/O
- Start a previously recorded point or program in the driver, via the I/O

- Start up via serial communication
- Start by sending speed, acceleration / deceleration, and travel distance via serial communication

Single - Axis System Configuration Diagram P7-P8 Driver Specifications P10
Driver Model Nomenclature P5 Driver Wiring Diagram P9
Motor model Nomenclature P6 Driver Dimens. Drawing P10

Multi - Axis System Configuration Diagram P11 Driver Specifications P14
Driver Model Nomenclature P5 Driver Wiring Diagram P13
Motor Model Nomenclature P6 Driver Dimens. Drawing P14

SANMOTION PB-P System



- Operation is controlled via pulse input commands from the master controller device.

System Configuration Diagram P15-P16 Driver Specifications P18
Driver Model Nomenclature P5 Driver Wiring Diagram P17
Motor Model Nomenclature P6 Driver Dimens. Drawing P18



Standard Model

The standard model includes a PB Series driver and a PB Series motor

Available in the following flange sizes: [sizes shown in "mm(NEMA)" sizes]

- AC** - 42(17) - 60 - 86(34) ▶ P19
- DC** - 28(11) - 42(17) - 50 - 56(23) - 60 ▶ P25

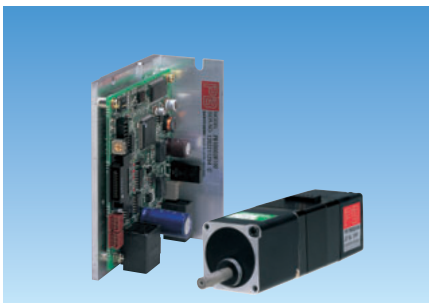


Low Backlash Gear Model

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

[Motor flange sizes shown in "mm(NEMA)" sizes]

- AC** - 42(17) - 60 ▶ P21
- DC** - 42(17) - 56(23) - 60 ▶ P27
- REDUCTION GEAR RATIO**
 - 1/3.6
 - 1/7.2
 - 1/10
 - 1/20
 - 1/30



Spur Gear Model

This model utilizes a spur gear design for gear reduction.

[Motor flange sizes shown in "mm(NEMA)" sizes]

- DC** - 28(11) ▶ P29
- REDUCTION GEAR RATIO**
 - 1/3.6
 - 1/7.2
 - 1/10
 - 1/20
 - 1/30
 - 1/50



Harmonic Gear Model

The harmonic gear provides high torque and eliminates backlash.

[Motor flange sizes shown in "mm(NEMA)" sizes]

- AC** - 42(17) - 60 ▶ P23
- DC** - 28(11) - 42(17) - 56(23) - 60 ▶ P31
- REDUCTION GEAR RATIO**
 - 1/30
 - 1/50
 - 1/100



Electromagnetic Brake Model

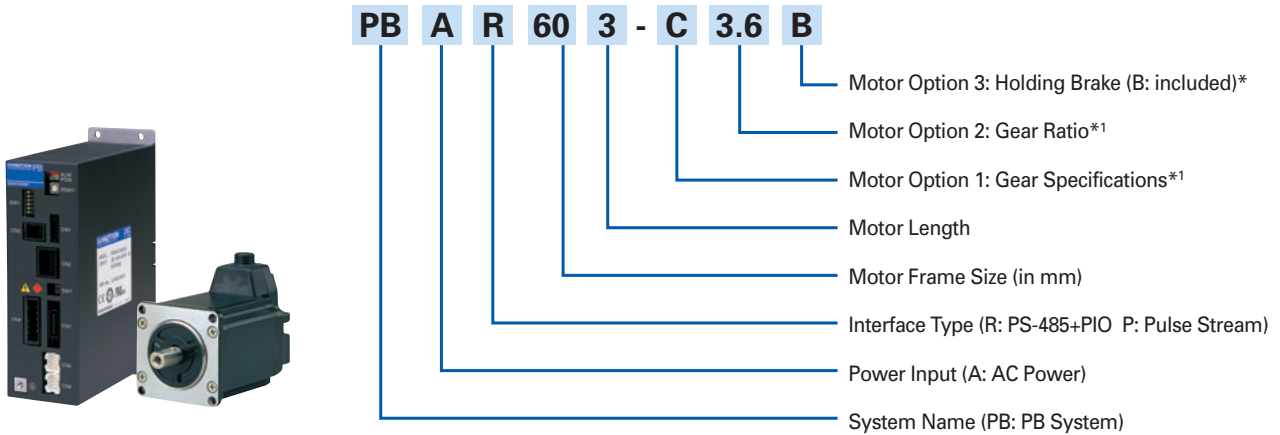
This model uses a non-excitation electromagnetic brake, capable of maintaining position and supporting a load in vertical operation, even when power is off.

[Motor flange sizes shown in "mm(NEMA)" sizes]

- AC** - 42(17) - 60 ▶ P23
- DC** - 28(11) - 42(17) - 50 - 56(23) - 60 ▶ P33

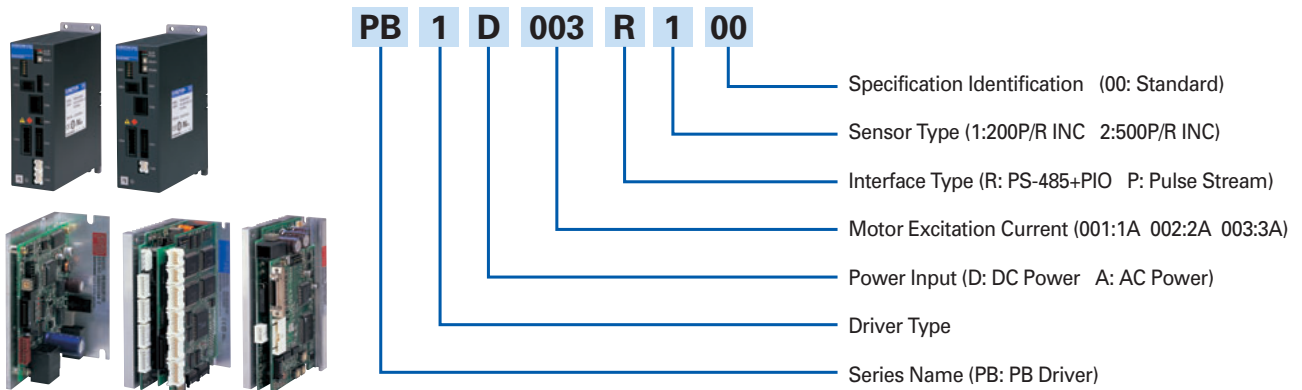
Model Nomenclature

System Model Nomenclature

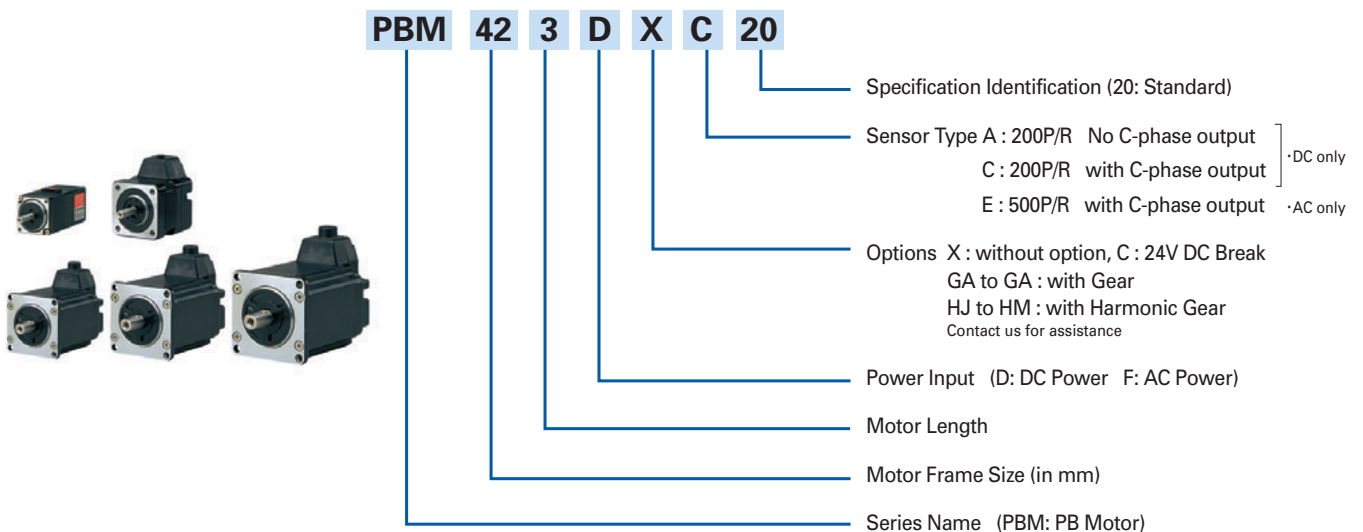


- The system model number can be configured on the AC power input models.
- *1 No symbol indicates no options.
- ※Set products includes power cords or I/O cables.

Driver Model Nomenclature



Motor Model Nomenclature



Motor Option Combination Table



AC Power Option Combination Table

MotorNo.	Motor Option Combination Table		
	Gear Box	Harmonic Gear	Electromagnetic Brake
PBM423F□E20	✓	✓	✓
PBM603F□E20	✓	✓	✓
PBM604F□E20	—	—	✓
PBM861F□E20	—	—	—
PBM862F□E20	—	—	—

DC Power Option Combination Table

MotorNo.	Motor Option Combination Table			Sensor
	Gear Box	Harmonic Gear	Electromagnetic Brake	With C-phase Output
PBM282D□A20	✓	✓	△	△
PBM284D□A20	—	—	△	✓
PBM423D□A20	✓	✓	✓	✓
PBM503D□A20	—	—	✓	✓
PBM503D□A24	—	—	✓	✓
PBM565D□A20	✓	✓	✓	✓
PBM565D□A24	△	△	✓	✓
PBM603D□A20	✓	✓	✓	✓
PBM604D□A20	—	—	✓	✓

✓ : Standard configuration

△ : Contact us for assistance

Motor Standard Specifications (common to all models)

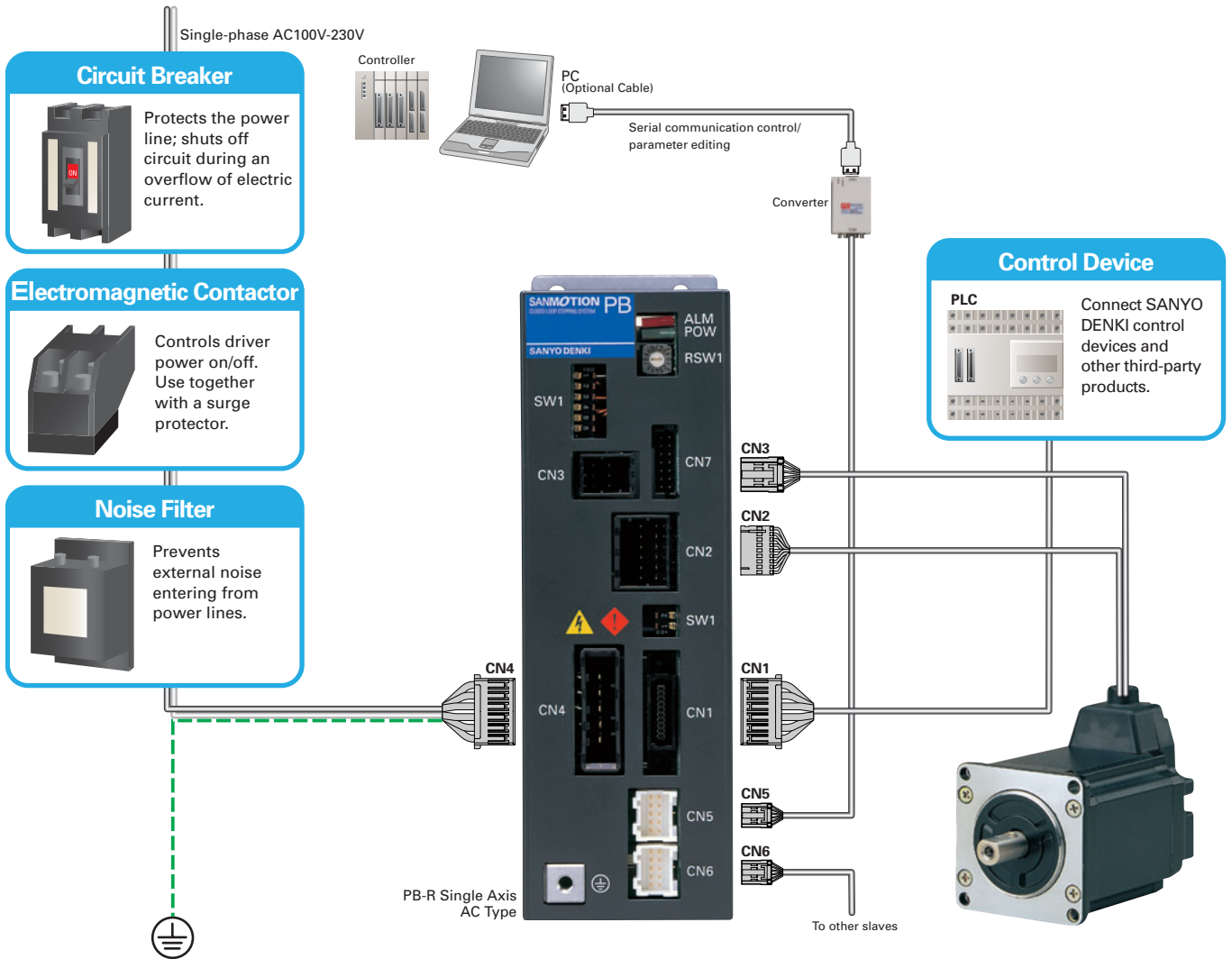
Input type	AC Power	DC Power
Motor model	PBM423F,PBM60□F,PBM86□F	PBM28□D,PBM423D,PBM503D PBM565D,PBM60□D
Insulation class	Class B(130°C)	Class B(130°C)
Withstand Voltage ※	AC1500V 50/60Hz for 1minute	AC500V 50/60Hz for 1minute
Insulation resistance ※	DC500V 100MΩ MIN.	DC500V 100MΩ MIN.
Degrees of protection	IP40	
Vibration resistance	15G (Frequency range 10 to 70Hz amplitude 1.52m 70 to 2000 acceleration 15G) Sweep time 15minute / Sweep recurrence rate The x, y and z are each tested 12 times.	
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 (With Harmonic Gear : 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 ground line and the frame to prevent noise.

※The □ symbol in the motor model number indicates the length of the motor.

PB-R Single-axis System Specification

System Configuration Diagram (AC power)



Options

AC

Input Power Specifications	AC Power	Common Specifications	
Supported Driver Model Number	PB3A003R200		
Item	Std. length model #	Standard length	Max. length
Communication Specifications	RS-485 full duplex	-	-
Power Cable	PBC7P0020A	2m	2m
Motor Power Cable *1	PBC6M0030A	3m	20m
Motor Sensor Cable *1	PBC6E0030A	3m	20m
I/O Cable (unshielded)	PBC1S0010A	1m	3m
I/O Cable (shielded)	PBC1S0010C	1m	3m
Communication Cable (for network)	PBC6C0005A	0.5m	100m
Converter Unit *2	PBFM-U3	-	-
Teaching Unit	-	-	-
Teaching Unit Cable	-	-	-
Windows® Software	SPBA1W-01	-	-
Speed Monitor Unit (F/V converter)	Driver built-in	-	-

Extension Cable Model Nomenclature

Example: The model number to the right shows a 5m extension cable selected.

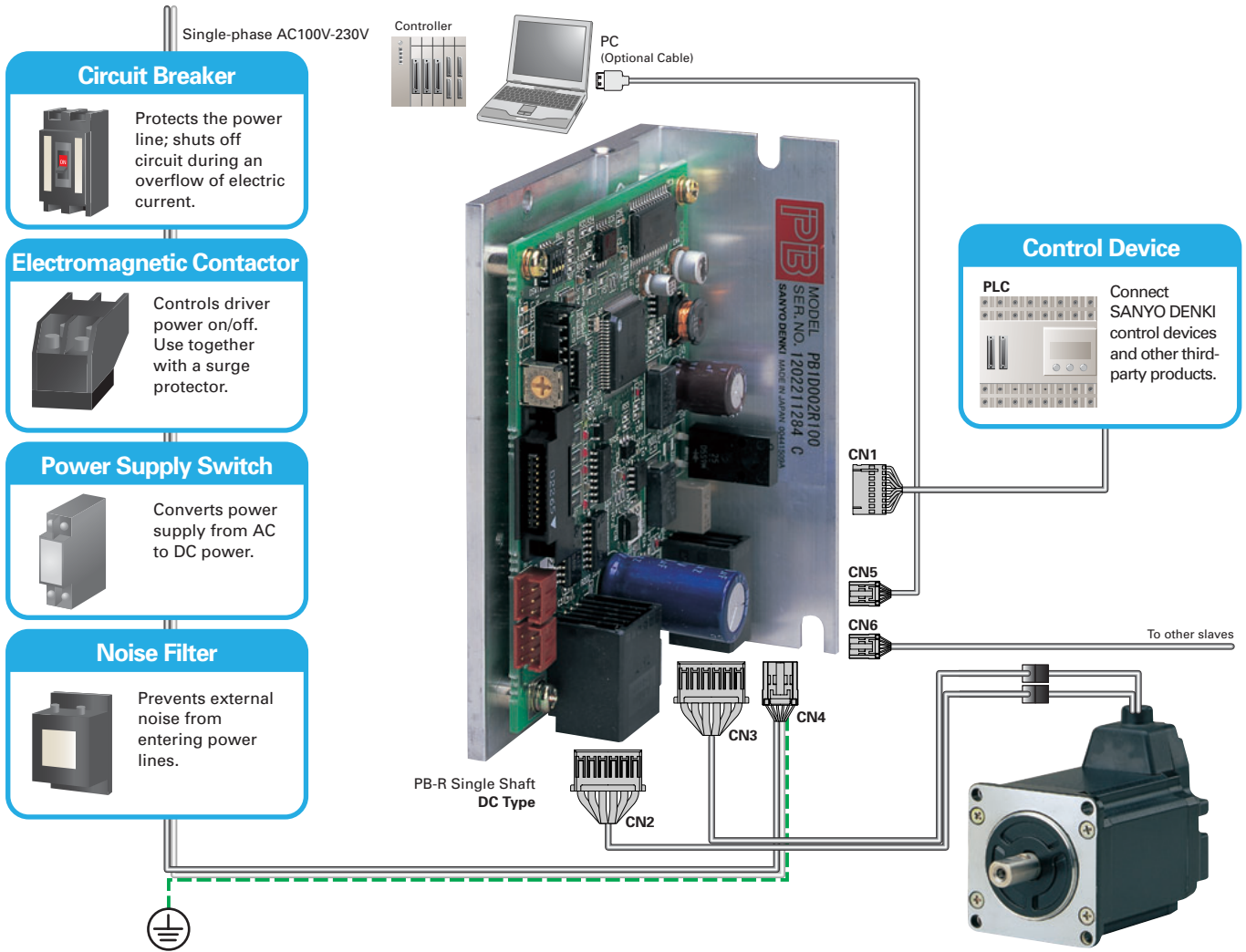
PBC0050A**
Cable length (x10cm)
※0000A is connector set.

*1 A relay cable for the motor power and sensor is required for DC power systems.

For AC power systems, the relay cable is not required if motor power and sensor length are less than 0.5m.

*2 The conversion unit includes the communication cable that connects the main converter unit and the driver from the converter.

System Configuration Diagram (DC Power)



PB - R
GENERIC INPUT

PB - P
PULSE TRAIN INPUT

GENERAL
SPECIFICATIONS

MOTOR OUTLINE
DRAWING

OPTIONS

DC

Input Power Specifications	DC Power		Common Specifications	
	Supported Driver Model Number	PB1D001R1** PB1D002R1**		
Item	Std. length model #		Std. Length	Max. Length
Communication Specifications	RS-485 Half Duplex		-	-
Power Cable	PBC5P0020A		2m	2m
Motor Power Cable *1	PBC4M0030A		3m	20m
Motor Sensor Cable *1	PBC4E0030A	PBC3E0030A	3m	20m
I/O Cable (unshielded)	PBC1S0010A		1m	3m
I/O Cable (shielded)	PBC1S0010C		1m	3m
Communication Cable (for network)	PBC3C0005A		0.5m	100m
Converter Unit *2	PBFM-U2		-	-
Teaching Unit	PB1RT-01		-	-
Teaching Unit Cable	PBC1X0020A		2m	3m
Windows® Software	SPBA1W-01		-	-
Speed Monitor Unit (F/V converter)	PBFV-U1		-	-

*1 A relay cable for the motor power and sensor is required for DC power systems.
For AC power systems, the relay cable is not required if motor power and sensor length are less than 0.5m.
*2 The conversion unit includes the communication cable that connects the main converter unit and the driver from the converter.

Amplifier Model Number Nomenclature System

PB1 D 00* R 1 0**

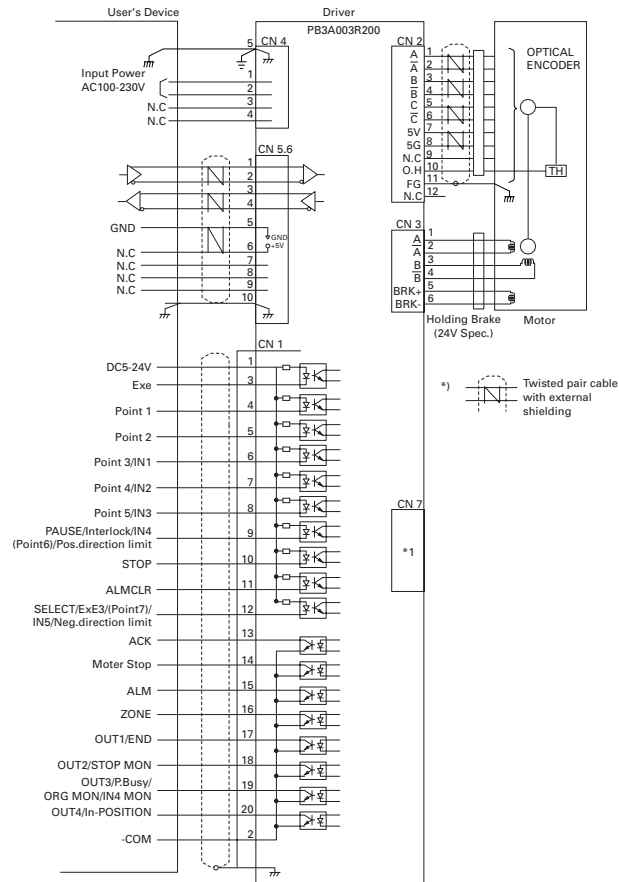
Model No. : **	Power Input	Main Circuit Power Voltage	Control Power Volt	Holding Brake Power	Ext. Sensor Power
0or4	Single	24V±10%	—	Built in	Built in
1or5	Single	24/36V±10%(at1/2A) 24/36/48V±10%(at3A)	—	24V supply	5-24V supply
2or6	Separate	24V±10%	24V±10%	Built in	Built in
3or7	Separate	24/36V±10%(at1/2A) 24/36/48V±10%(at3A)	24V±10%	24V supply	Built in

0 - 3: CN1 17 - 19 pins = Generic output
4 - 7: CN1 17 - 19 pins = Encoder signal output

PB-R Single-axis System Specifications

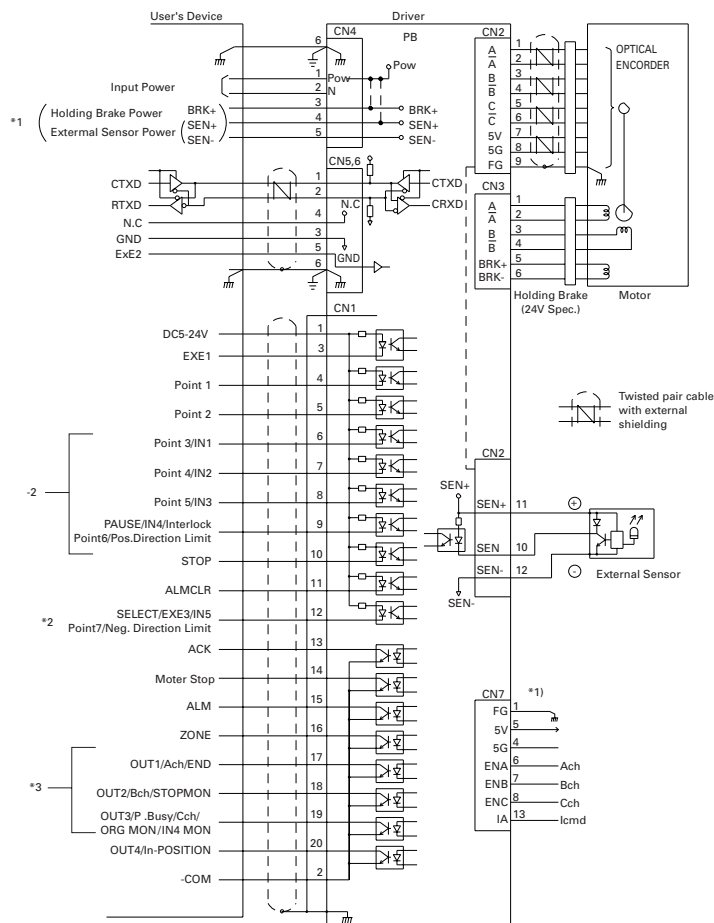
External Wiring Diagram

AC



*1 CN7 is reserved for factory settings. It is not for customer use.

DC



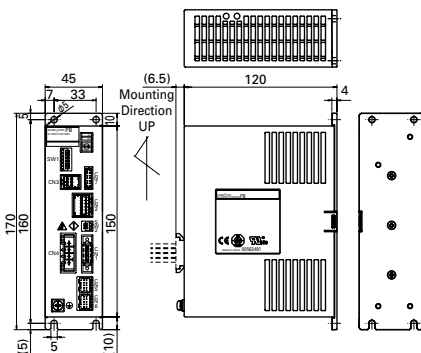
General Specifications

Power		AC Power	DC Power		
Driver Model		PB3A003R200	PB1D001R10**	PB1D002R10**	PB1D003R10**
Compatible Motors		PBM423A* E20 PBM603A* E20 PBM604A* E20 PBM861A* E20 PBM862A* E20	PBM282D*A20 PBM284D*A20	PBM423D*_20 PBM503D*_20 PBM565D*_24	PBM503D*_24 PBM565D*_20 PBM603D*_20 PBM604D*_20
Control Mode		PWM Control			
Power	Input Voltage (main circuit)	AC100-230V +10% -15%	DC24/36V±10%	DC24/36V±10%	DC24/36/48V±10%
	Max.Current Consumption	4.5Arms	1.6Arms	2.7Arms	3.7Arms
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 Type	Open Frame		
Mass		Approx. 0.9kg	Approx. 0.2kg	Approx. 0.3kg	
Dimensions		W45×H150×D120(mm)	W100×H42.5×D80(mm)	W120×H36×D70(mm)	
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	200,800,1600,3200,6400,12800		
	Regenerative Control	Built-in			
	Protective Functions	for both DC and AC systems: Current/Voltage Error, Regeneration Voltage Error, Overspeed, Encoder Disconnection, Reset Operation Error, CPU Error, Overload Stop, Push Error, Nonvolatile Memory Error, Deviation Counter OVF, Zero-return Error for AC only: PAM Voltage Error, Motor Overheat Error, Driver Overheat Error			
	LED Display	Power status, Alarm			
	Operation Functions	Normal Drive, Zero-return, Continuous Rotation, Push Operation, Module Operation			
	Rotary Switch	Slave Address Setting(0 to FHex)			
	DIP-Switches	Terminating Resistor Setting, Transmission Speed Setting			
	Point/Program Functions	Point: Max 128, Program DC: 4PRG×512Line or 8PRG×256; Line AC: 1PRG×1024 Line or 256PRG×8 Line			
	Input/Output Signals	Input Signal Functions	EXE, Point, STOP, ALMCLR Generic Input × 5 (Point/ Pause / Interlock / Generic Input / H.Limit / Zero-return Execution / Selection from SELECT)		
	Output Signal Functions	ACK, ALM, Motor Stop, ZONE Generic Output × 4 (Selection from Generic Output / Busy / In-Position / Zero-return Complete Monitor / END / STOP monitor)			
Serial Communication	Physical Layer	RS-485 Standard			
	Sync. Method	Start-stop Sync., Full Duplex	Start-Stop Synchronization, Half Duplex		
	Trans. Speed	9600bps, 38400bps, 115200bps, 128000bps			

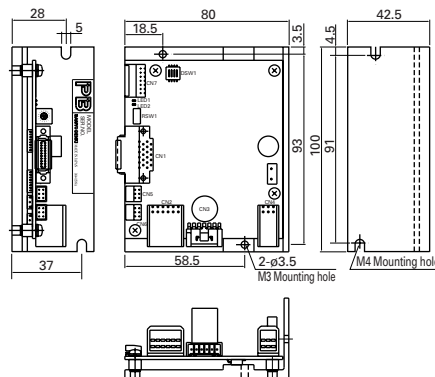
1. Power input and output should be isolated.
2. Do not test the insulation resistance or withstanding voltage, as capacitors have been inserted between the power and ground for noise prevention purposes.

Driver Dimensional Drawing Unit:mm(inch)

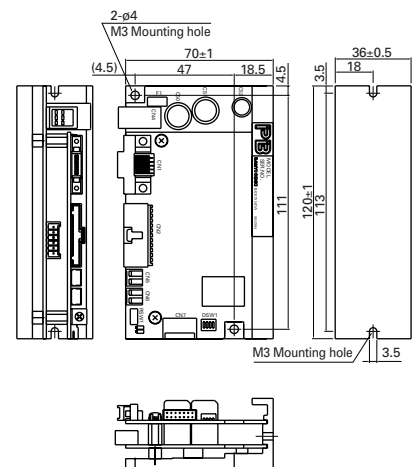
AC PB3A003R200



DC PB1D001R10** PB1D002R10** (Open Frame)

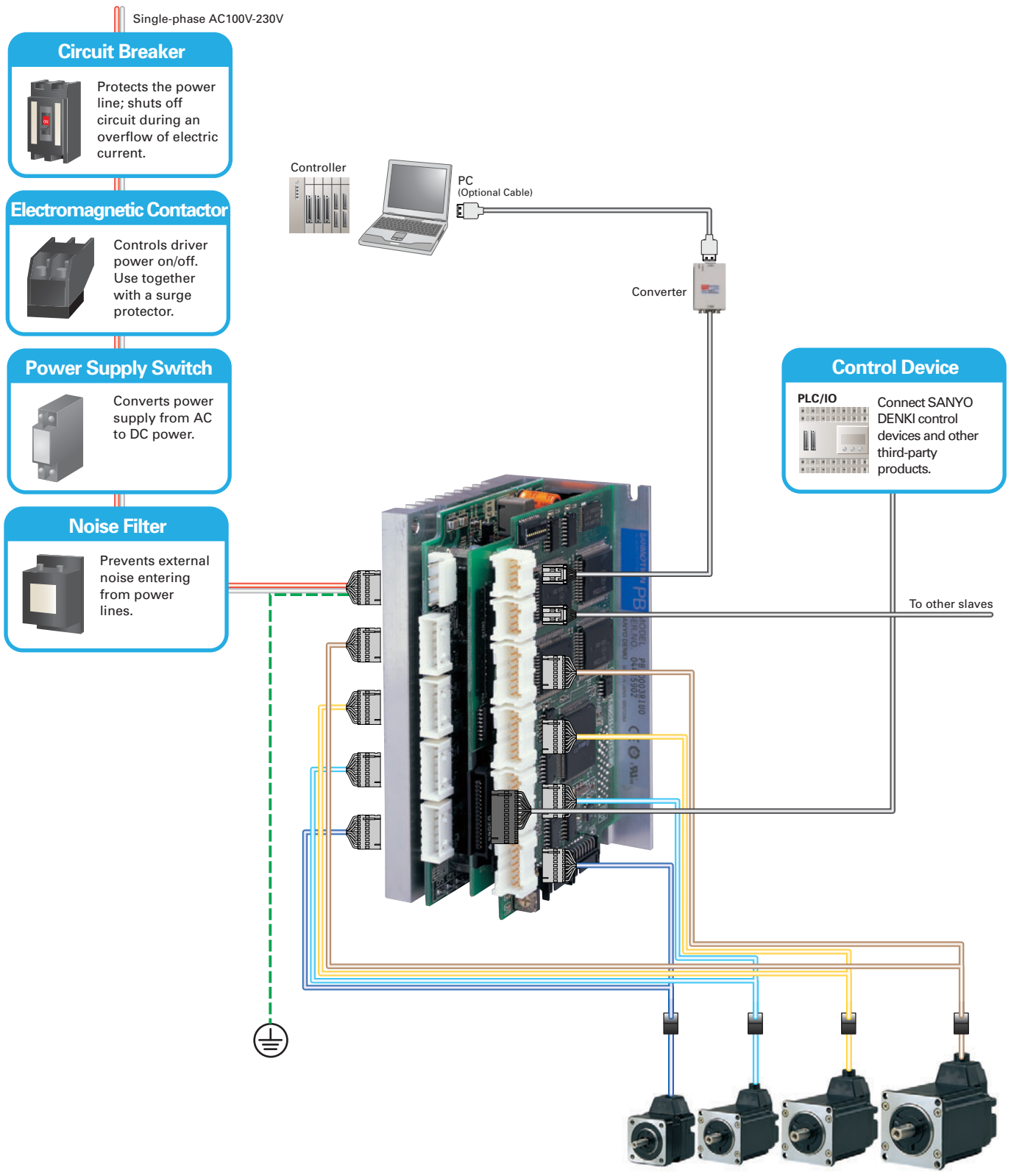


DC PB1D003R10** (Open Frame)



PB-R Multi-axis System Specifications

System Configuration Diagram (DC Power)



Options

DC

Input Power Specifications	DC Power		Common Specifications	
	PB2D003R1U0 PB2D003R1U1	PB2D003R1U2 PB2D003R1U3		
Supported Driver Model Number				
Item	Std. length model #	Std. length model #	Std. Length	Max. Length
Communication Specifications	RS-485 half duplex	RS-485 full duplex	-	-
Power Cable	PBC6P0020A		2m	2m
Motor Power Cable *1	PBC4M0030A		3m	20m
Motor Sensor Cable *1	PBC5E0030A		3m	20m
I/O Cable (unshielded)	PBC5E0030C		3m	20m
I/O Cable (shielded)	PBC4S0010A		1m	3m
Communication Cable (for network)	PBC4S0010C		1m	3m
Converter Unit *2	PBC4C0005A		0.5m	100m
Teaching Unit	PBFM-U4	PBFM-U3	-	-
Teaching Unit Cable	PBFE-01		-	-
Windows® Software	SPBR1W-01		-	-
Speed Monitor Unit (F/V converter)	PBFV-U2		-	-

*1 A relay cable for the motor power and sensor is required for DC power systems.

For AC power systems, the relay cable is not required if motor power and sensor length are less than 0.5m.

*2 The conversion unit includes the communication cable that connects the main converter unit and the driver from the converter.

Extension Cable Model Nomenclature

Example: The model number to the right shows a 5m extension cable selected

PBC0050A**
Cable length (×10m)
※0000A is connector set.

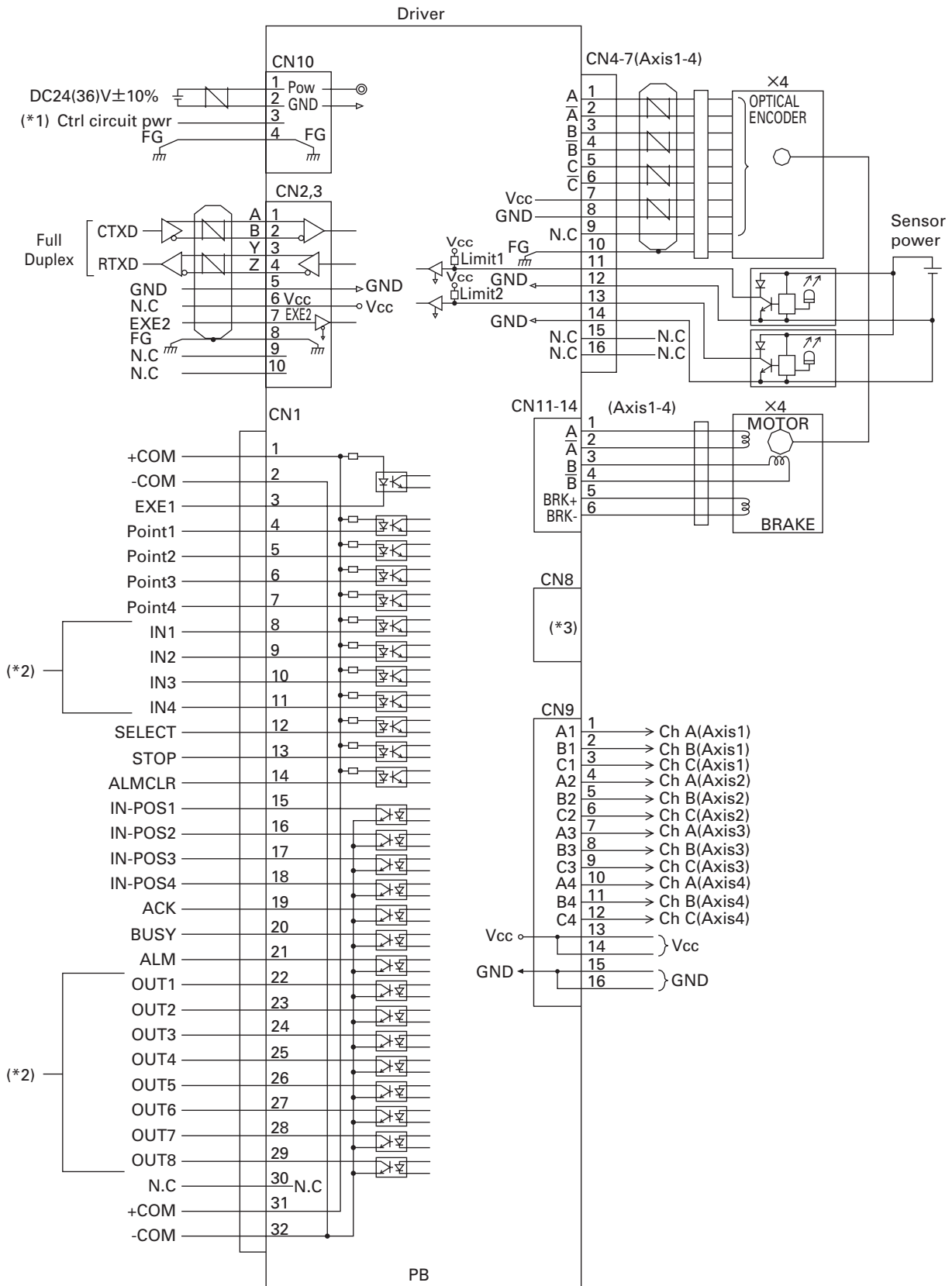
Amplifier Model Number Nomenclature System

PB2 D 003 R 1 U**

Model#	Communication Specification	Power Input	Main Circuit Power Voltage	Control Circuit Power Voltage
0	2-wire Half Duplex	Single Pwr.	24/36V±10%	———
1	2-wire Half Duplex	Separate	24/36V±10%	24V±10%
2	4-wire Full Duplex	Single Pwr.	24/36V±10%	———
3	4-wire Full Duplex	Separate	24/36V±10%	24V±10%

PB-R Multi-axis System Specifications

External Wiring Diagram



(*1): CN10 Pin #3 is connected for separate power input type only.

(*2): Functions for IN1-4,OUT1-8 can be selected via software switches.

(*3): This connector is reserved for factory configuration. It is not for customer use.

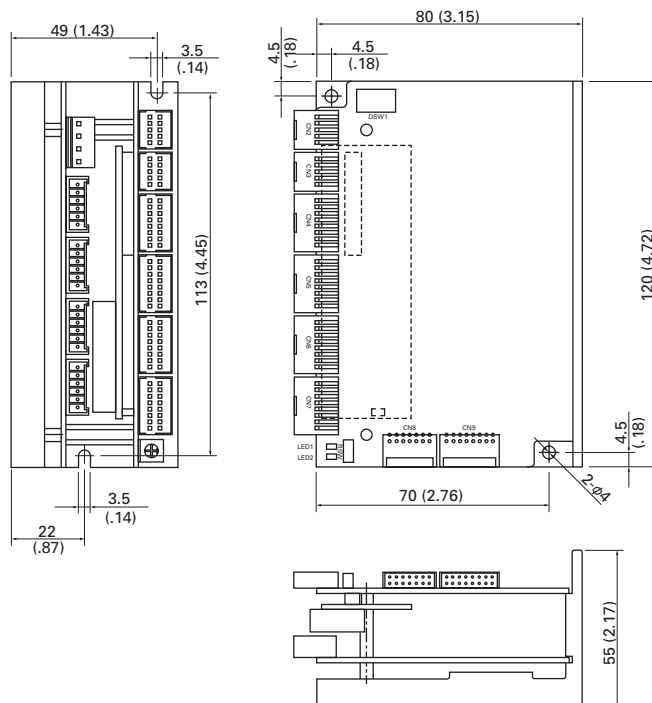
General Specifications

Driver Model	PB2D003R1U**			
Compatible Motors	PBM282D*A20, PBM284D*A20, PBM423D***20, PBM503D***20, PBM565D***24, PBM503D***24, PBM565D***20, PBM603D***20, PBM604D***20			
Control Mode	PWM Control			
Power	Input Voltage (main circuit)	DC24/36V±10%		
	MAX. Current Consumption	3.5A/axis (depends on motor capacity)		
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 - 55 Hz, X, Y, Z each direction 2H)	
Structure	Open Frame			
Mass	Approx. 0.5kg			
Dimensions	W120×H55×D80 (mm)			
Functions	Rotation Speed	0-4500min ⁻¹		
	Resolution (P/R)	200,800,1600,3200,6400,12800		
	Regenerative Control	Optional external regenerative unit (PBFE-01)		
	Protective Functions	Current/Voltage Error, Regeneration Voltage Error, Overspeed, Encoder Disconnection, Reset Operation Error, CPU Error, Overload Stop, Push Error, Nonvolatile Memory Error, Deviation Counter OVF, Zero-return Error, Driver Overheat, Others		
	LED Display	Power Status, Alarm		
	Operation Functions	Normal Drive, Zero-return, Continuous Rotation and Push Operations		
	Rotary Switch	Slave Address Setting (0 to FHex)		
	DIP-Switches	Terminating Resistor Setting, Transmission Speed Setting		
	Point/Program Functions	Points: Maximum 256, Programs 8PRG × 512 Line or 256PRG × 16 Line		
Input/Output Signals	Input Signal Functions	EXE1, 2, Point, STOP, ALMCLR, SELECT, Generic Input × 4 (selectable from Point / Pause / Interlock / Generic Input) Hard Limit (per shaft)		
	Output Signal Functions	ACK, Busy, ALM, In-Position (x4) Generic Output x 8 (Generic Output / Motor Stop / H.Limit Monitor / ZONE / Zero-return Complete / END/STOP Monitor)		
	Serial Communication	Physical Layer	RS-485 Standard	
		Sync.Method	Start-Stop Synchronization, Half Duplex / Full Duplex	
		Trans.Speed	9600bps, 38400bps, 115200bps, 128000bps	

1. Power input and output should be isolated.
2. Do not test the insulation resistance or withstanding voltage, as capacitors have been inserted between the power and ground for noise prevention purposes.

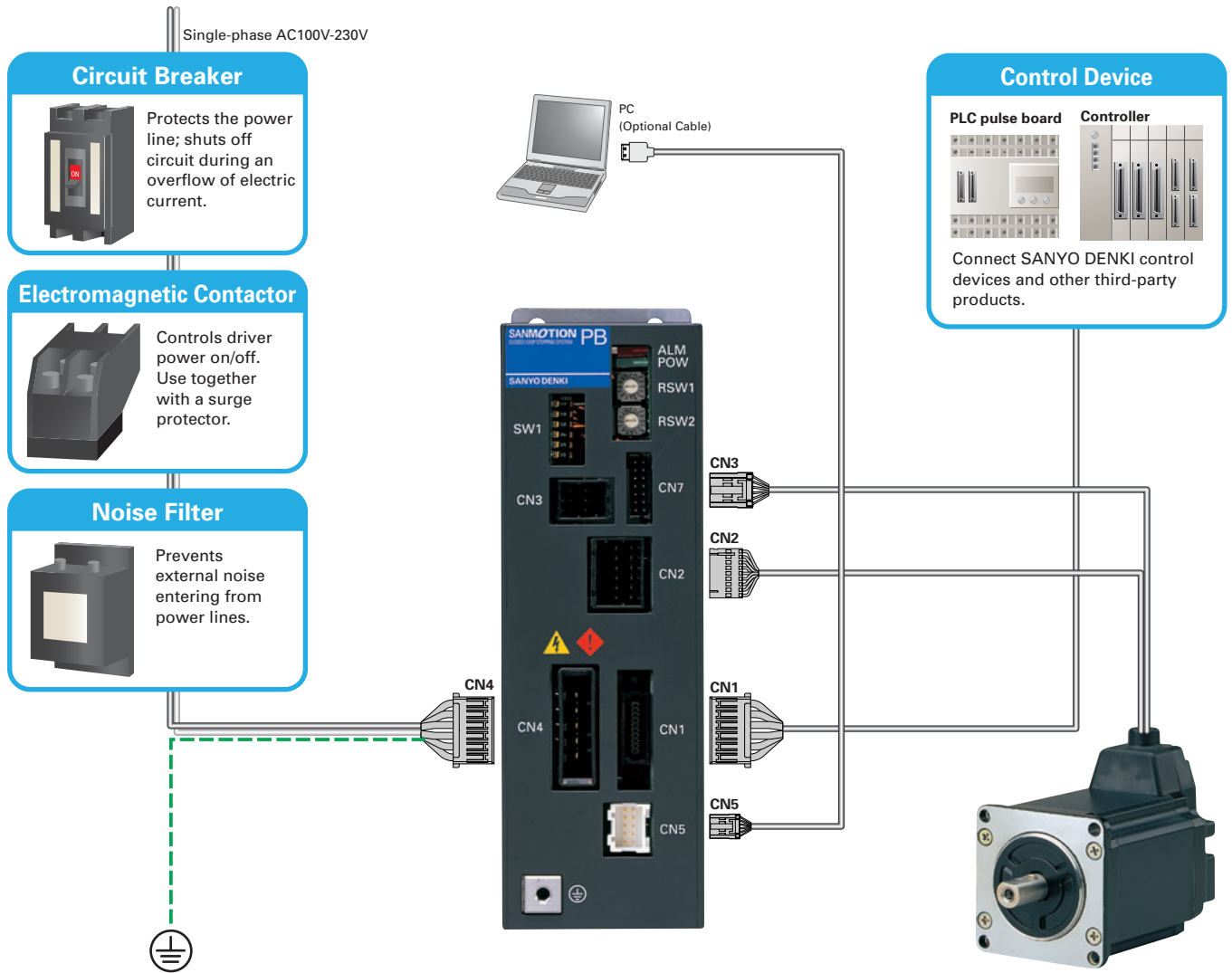
Driver Dimensional Drawing Unit:mm(inch)

DC PB2D003R1U**
(Open Frame)



PB-P System

System Configuration Diagram (AC Power)



Options

AC

Input Power Specifications	AC Power	Common Specifications	
Supported Driver Model No.	PB3A003P200	Standard Length	Max. Length
Item	Std. Length Model #		
Communication Specifications	RS-232C	-	-
Power Cable	PBC7P0020A	2m	2m
Motor Power Cable*	PBC6M0030A	3m	20m
Motor Sensor Cable*	PBC6E0030A	3m	20m
I/O Cable (shielded)	PBC1S0010C	1m	3m
Converter Unit	Not Necessary	-	-
Windows® Software	SPBA1W-01	-	-
PC I/F Cable (Dsub 9pin)	PBC5C0010A	1m	-

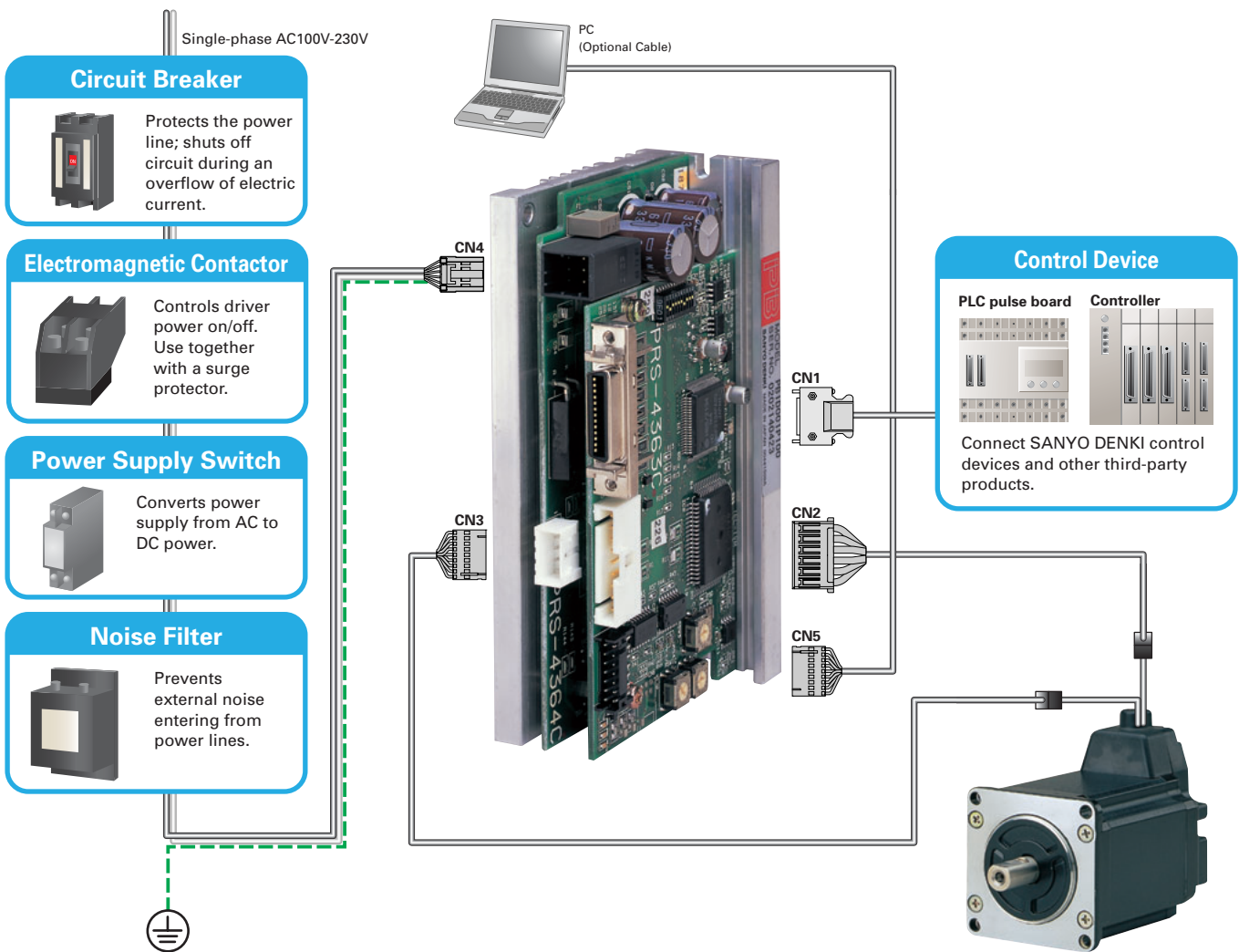
*A relay cable for motor power and the sensor is required for DC power systems.
 For AC power systems, a relay cable is not necessary if the motor power and sensor relay length is less than 0.5m.
 The speed monitor function is built-in into the driver.

Extension Cable Model Nomenclature

Example: The model number to the right indicates selection of a 5m extension cable.

PBC0050A**
 Cable length (x10cm)
 ※0000A is connector set.

System Configuration Diagram (DC power)



PB - R
GENERIC INPUT

PB - P
PULSE TRAIN INPUT

GENERAL
SPECIFICATIONS

MOTOR OUTLINE
DRAWING

OPTIONS

DC

Input power specifications	DC Power	Common Specifications	
Compatible amplifier model	PB1D00*P100		
Item	Std. length model #	Std. Length	Max. Length
Communication Specifications	RS-485 Half Duplex	-	-
Power Cable	PBC2P0020A	2m	2m
Motor Power Cable *1	PBC5M0030A	3m	20m
Motor Sensor Cable *1	PBC2E0030A	3m	20m
I/O Cable (shielded)	PBC2S0010C	1m	3m
Converter Unit *2	PBFM-U1	-	-
Windows® Software	SPBP1W-01	-	-

*1 A relay cable for the motor power and sensor is required for DC power systems.

For AC power systems, the relay cable is not required if motor power and sensor length are less than 0.5m.

*2 The conversion unit includes the communication cable that connects the main converter unit and the driver from the converter.

Amplifier Model Number Nomenclature System

PB1 D 00* P 1 0**

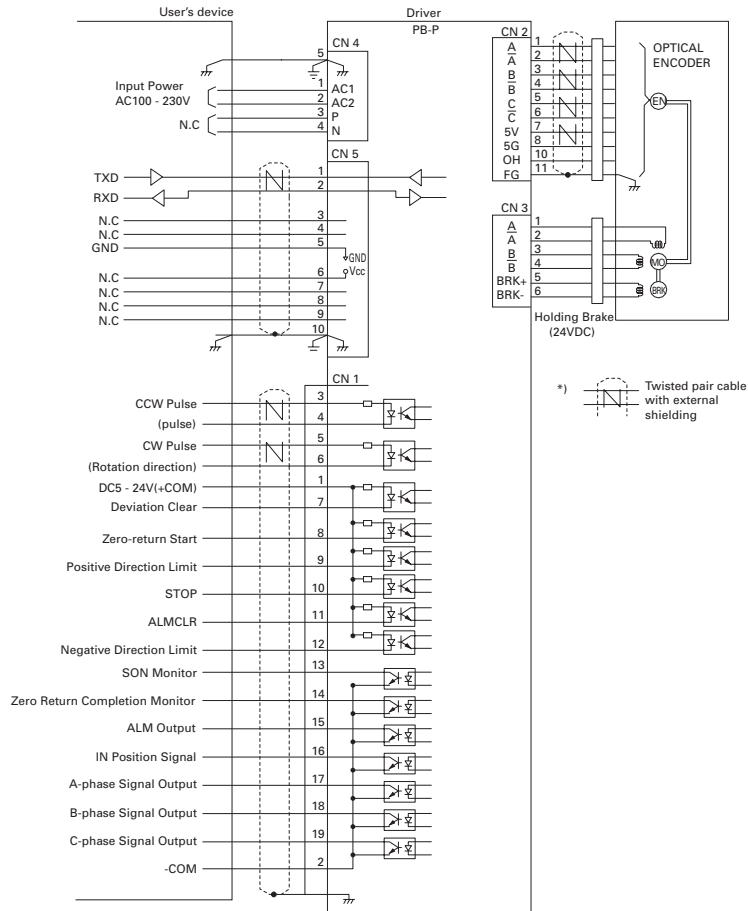
Specification Identification

Model #	Pwr.Input	Power Voltage
0	Single	24/36/48V±10%

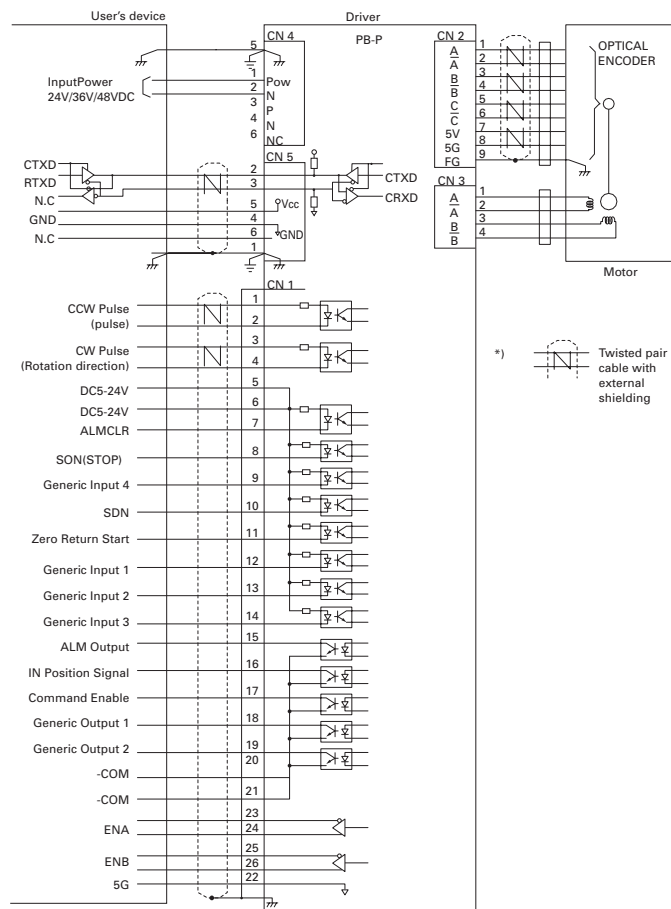
PB-P System

External Wiring Diagram

AC



DC



Note 1: CN5 is a connector dedicated for connecting the PC interface.
 Note 2: Generic input signal functions are set via the PC interface.

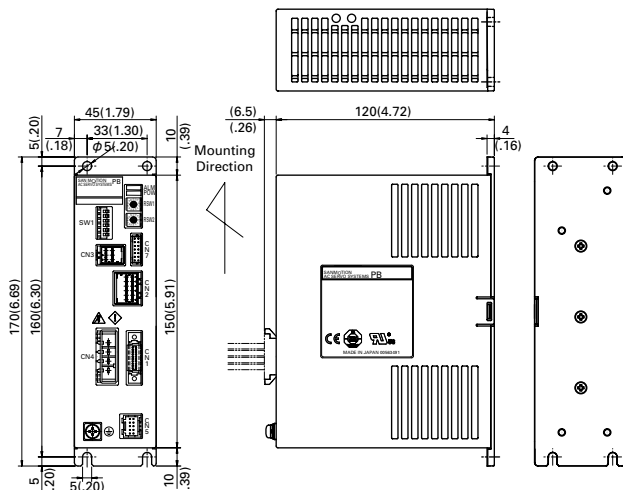
General Specifications

Power		AC Power	DC Power		
Driver Model		PB3A003P200	PB1D001P100	PB1D002P100	PB1D003P100
Compatible Motor		PBM423F*E20 PBM603F*E20 PBM604F*E20 PBM861F*E20 PBM862F*E20	PBM282D*A20 PBM284D*A20	PBM423D***20 PBM503D***20 PBM565D***24	PBM503D***24 PBM565D***20 PBM603D***20
Control mode		PWM Control			
Power	Input Voltage (main circuit)	AC100-230V -10% -15%	DC24/36/48V±10%		
	Max. Current Consumption	4.5Arms	1.6Arms	2.7Arms	3.7Arms
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 type	Open Frame		
Mass		approx. 0.9kg	approx. 0.2kg	approx. 0.3kg	
Dimensions		W45×H150×D120(mm)	W120×H36×D70(mm)		
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	200,800,1600,3200,6400,12800		
	Regenerative Control	Built-in			
	Protective Functions	For both DC and AC systems: Current/Voltage Error, Regeneration Voltage Error, Overspeed, Encoder Disconnection, Reset Operation Error, CPU Error, Overload Stop, Push Error, Nonvolatile Memory Error, Deviation Counter OVF, Zero-return Error, Position Deviation Error For AC only: PAM Voltage Error, Motor Overheat Error, Driver Overheat Error			
	LED Display	Power Status, Alarm			
	Operation Functions	Normal Drive, Zero-return Position			
	Rotary Switch	Servo Gain settings, Position Command LPF			
Input / output signals	Input Signal Functions	Pulse (1/2 input), ALMCLR, STOP, SDN, Zero-return Operation Generic Input x4(Gain Setting, Zero-return Direction, Resolution Selection, Deviation Clear) H. Limit (AC input only)			
	Output Signal Functions	ALM, In-position, Generic Output, Sensor Output A, B, C (DC power is for C-phase motor model)			
	Serial Communication	Physical Layer	RS-232C	RS-485	
		Sync. Method	Start-Stop Sync, Full Duplex	Start-Stop Synchronization, Half Duplex	
Trans. Speed	9600bps				

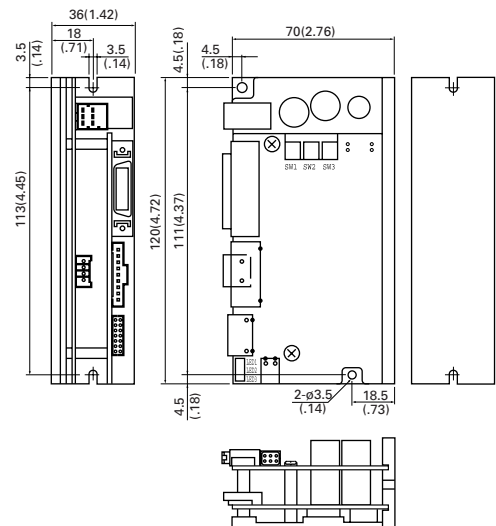
1. Power input and output should be isolated.
2. Do not test the insulation resistance or withstanding voltage, as capacitors have been inserted between the power and ground for noise prevention purposes.

Driver Dimensional Drawing Unit:mm(inch)

AC PB3A003P200



DC PB1D001P10** / PB1D002P10** / PB1D003P10** (Open Frame)



General Specifications



AC

Standard Model

Motor External Dimensions

42(17) 60 86(34)

PB-R System

Driver Dimension. Dwg. P10
 Driver Specifications P10
 Driver Wiring Diagram P9
 Motor Dimension. Dwg. P35-37

PB-P System

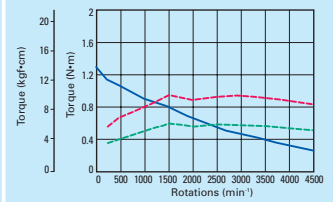
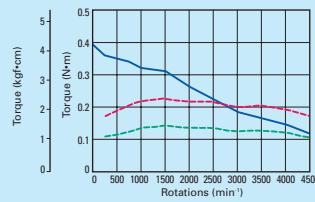
Driver Dimension. Dwg. P18
 Driver Specifications P18
 Driver Wiring Diagram P17
 Motor Dimension. Dwg. P35-37

SIZE	Motor Ext. Dim.	42mm (NEMA 17)	60mm
	Motor Length	57.6mm	70.3mm
Motor Model	Unit	PBM423FXE20	PBM603FXE20
PB-R Set Model No.		PBAR423	PBAR603
Related Driver Model No.		PB3A003R200	
PB-P Set Model No.		PBAP423	PBAP603
Related Driver Model No.		PB3A003P200	
Maximum Stall Torque	N·m(oz·in)	0.39 (55.23)	1.3 (184.1)
Rotor Inertia	$\times 10^{-4}$ kg·m ² (oz·in ²)	0.056 (0.31)	0.4 (2.19)
Allowable Thrust Load	N	9.8	14.7
Allowable Radial Load**	N	49	167
Motor Mass	kg (lbs.)	0.35 (0.77)	0.85 (1.87)

Motor Characteristics Chart

Torque
 AC100V+AC200V ———
 AC100V ———
 AC200V ———

Input Current
 AC100V - - - - -
 AC200V - - - - -



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

**The load point is determined at a position 14mm from the mounting surface.

SIZE	Motor Ext. Dim.	60mm		86mm (NEMA 34)	
	Motor Length	102.3mm		85.5mm	116mm
Motor Model	Unit	PBM604FXE20		PBM861FXE20	PBM862FXE20
PB-R Set Model No.		PBAR604		PBAR861	PBAR862
Related Driver Model No.		PB3A003R200			
PB-P Set Model No.		PBAP604		PBAP861	PBAP862
Related Driver Model No.		PB3A003P200			
Maximum Stall Torque	N·m(oz·in)	1.9 (269.1)		3.3 (495.6)	6.4 (934.6)
Rotor Inertia	$\times 10^{-4}$ kg·m ² (oz·in ²)	0.84 (4.59)		1.48 (8.09)	3 (16.40)
Allowable Thrust Load	N	14.7		60	60
Allowable Radial Load**	N	167		200	200
Motor Mass	kg (lbs.)	1.42 (3.13)		1.9 (4.19)	3.1 (6.83)

Motor Characteristics Chart

Torque

AC100V+AC200V

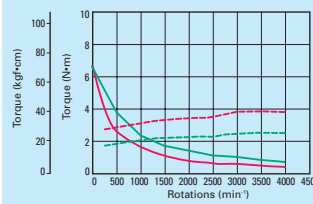
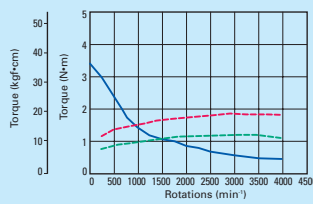
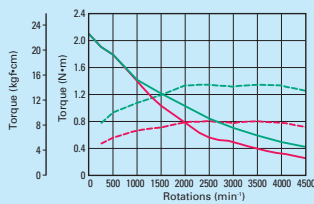
AC100V

AC200V

Input Current

AC100V

AC200V



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

**The load point is determined at a position 14mm from the mounting surface.

General Specifications



AC

Low-Backlash Gear Model

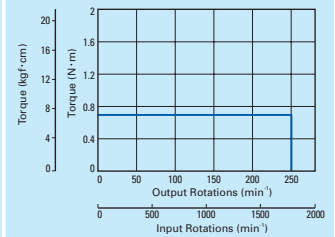
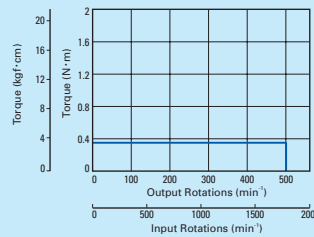
Motor External Dimensions

42(17) 60

SIZE	Motor Ext. Dim.	42mm (NEMA 17)	
	Motor Length	87.9mm	87.9mm
Motor Model	Unit	PBM423FGAE20	PBM423FGBE20
PB-R Set Model No.		PBAR423-C3.6	PBAR423-C7.2
Related Driver Model No.		PB3A003R200	
PB-P Set Model No.		PBAP423-C3.6	PBAP423-C7.2
Related Driver Model No.		PB3A003P200	
Allowable Torque	N·m (oz·in)	0.343 (48.57)	0.686 (97.14)
Rotor Inertia	$\times 10^{-4}$ kg·m ² (oz·in ²)	0.056 (0.31)	
Reduction Gear Ratio		1:3.6	1:7.2
Backlash	DEG	0.6	0.4
Allowable Rotations	min ⁻¹	500	250
Rotation Direction	Rel. to command dir.	Forward	Forward
Allowable Thrust Load	N	15	
Allowable Radial Load**	N	20	
Motor Mass	kg(lbs.)	0.48 (1.06)	

Motor Characteristics Chart

Torque
AC100V+AC200V ———
AC100V ———
AC200V ———
Input Current
AC100V - - - - -
AC200V - - - - -



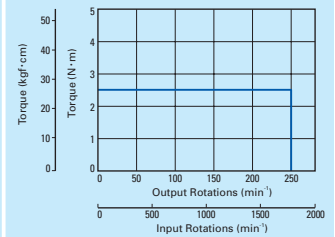
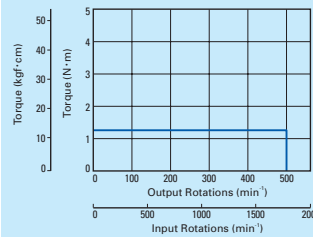
*Maintain motor case temperature at a point below 85°C.

**The load point is determined at a position 14mm from the mounting surface.

SIZE	Motor Ext. Dim.	60mm	
	Motor Length	115.8mm	115.8mm
Motor Model	Unit	PBM603FGAE20	PBM603FGBE20
PB-R Set Model No.		PBAR603-C3.6	PBAR603-C7.2
Related Driver Model No.		PB3A003R200	
PB-P Set Model No.		PBAP603-C3.6	PBAP603-C7.2
Related Driver Model No.		PB3A003P200	
Allowable Torque	N·m (oz·in)	1.25 (177.0)	2.5 (354.0)
Rotor Inertia	$\times 10^{-4}$ kg·m ² (oz·in ²)	0.4(2.19)	
Reduction Gear Ratio		1:3.6	1:7.2
Backlash	DEG	0.55	0.25
Allowable Rotations	min ⁻¹	500	250
Rotation Direction	Rel. to command dir.	Forward	Forward
Allowable Thrust Load	N	30	
Allowable Radial Load**	N	100	
Motor Mass	kg(lbs.)	1.22 (2.69)	

Motor Characteristics Chart

Torque
AC100V+AC200V ———
AC100V ———
AC200V ———
Input Current
AC100V - - - - -
AC200V - - - - -



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

**The load point is determined at a position 14mm from the mounting surface.

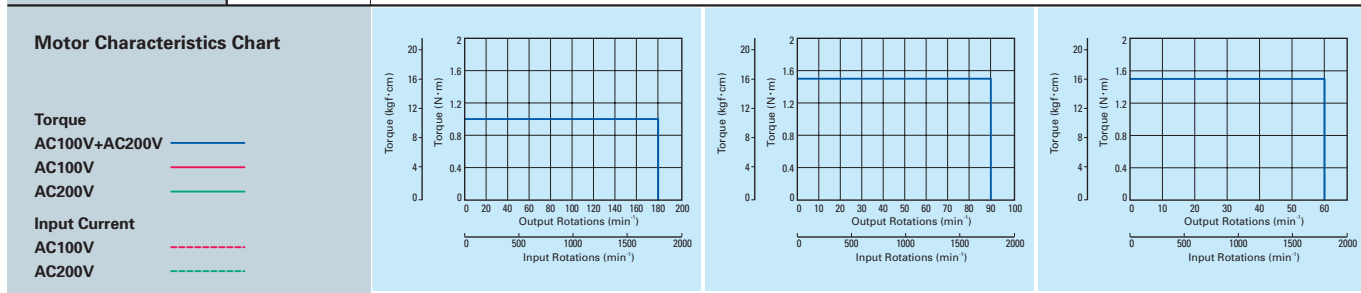
PB-R System

Driver Dimension. Dwg. P10
Driver Specifications P10
Driver Wiring Diagram P9
Motor Dimension. Dwg. P35-37

PB-P System

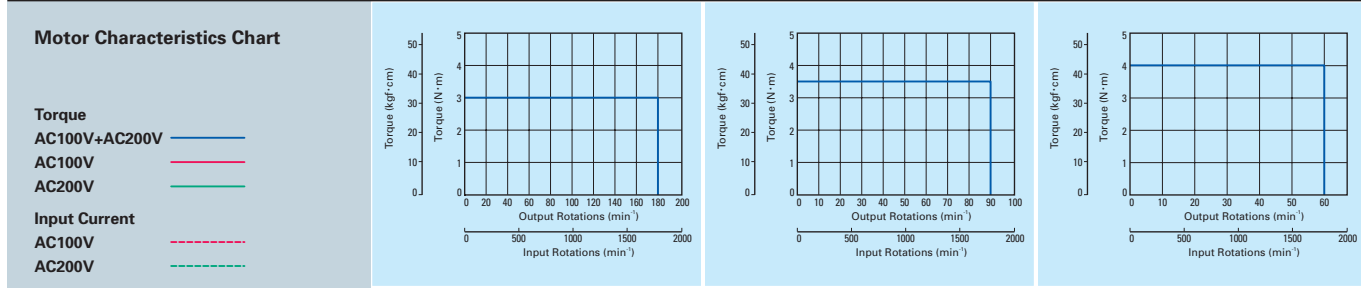
Driver Dimension. Dwg. P18
Driver Specifications P18
Driver Wiring Diagram P17
Motor Dimension. Dwg. P35-37

SIZE	Motor Ext. Dim.	42mm (NEMA 17)		
	Motor Length	87.9mm	87.9mm	87.9mm
Motor Model	Unit	PBM423FGEE20	PBM423FGGE20	PBM423FGJE20
PB-R Set Model No.		PBAR423-C10	PBAR423-C20	PBAR423-C30
Related Driver Model No.			PB3A003R200	
PB-P Set Model No.		PBAP423-C10	PBAP423-C20	PBAP423-C30
Related Driver Model No.			PB3A003P200	
Allowable Torque	N·m (oz·in)	0.98 (138.8)	1.47 (208.2)	1.47 (208.2)
Rotor Inertia	$\times 10^{-4}$ kg·m ² (oz·in ²)		0.056 (0.31)	
Reduction Gear Ratio		1:10	1:20	1:30
Backlash	DEG	0.35	0.25	0.25
Allowable Rotations	min ⁻¹	180	90	60
Rotation Direction	Rel. to command dir.	Forward	Reverse	Reverse
Allowable Thrust Load	N		15	
Allowable Radial Load**	N		20	
Motor Mass	kg(lbs.)		0.48 (1.06)	



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

SIZE	Motor Ext. Dim.	60mm		
	Motor Length	115.8mm	115.8mm	115.8mm
Motor Model	Unit	PBM603FGEE20	PBM603FGGE20	PBM603FGJE20
PB-R Set Model No.		PBAR603-C10	PBAR603-C20	PBAR603-C30
Related Driver Model No.			PB3A003R200	
PB-P Set Model No.		PBAP603-C10	PBAP603-C20	PBAP603-C30
Related Driver Model No.			PB3A003P200	
Allowable Torque	N·m (oz·in)	3 (424.8)	3.5 (495.6)	4 (566.4)
Rotor Inertia	$\times 10^{-4}$ kg·m ² (oz·in ²)		0.4 (2.19)	
Reduction Gear Ratio		1:10	1:20	1:30
Backlash	DEG	0.25		0.17
Allowable Rotations	min ⁻¹	180	90	60
Rotation Direction	Rel. to command dir.	Reverse	Reverse	Reverse
Allowable Thrust Load	N		30	
Allowable Radial Load**	N		100	
Motor Mass	kg(lbs.)		1.22 (2.69)	



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

General Specifications



AC

Harmonic Gear Model

Motor External Dimensions

42(17) 60

PB-R System

Driver Dimension. Dwg. P10
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Motor Dimension. Dwg. P35-37

PB-P System

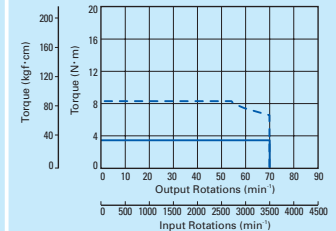
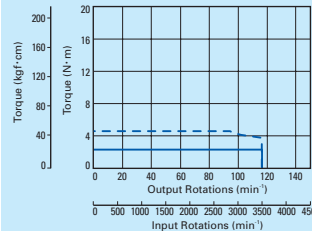
Driver Dimension. Dwg. P18
Driver Specifications P18
Driver Wiring Diagram P17
Motor Dimension. Dwg. P35-37

SIZE	Motor Ext. Dim.	42mm (MEMA 17)	
	Motor Length	97mm	97mm
Motor Model	Unit	PBM423FHJE20	PBM423FHLE20
PB-R Set Model No.		PBAR423-H30	PBAR423-H50
Related Driver Model No.		PB3A003R200	
PB-P Set Model No.		PBAP423-H30	PBAP423-H50
Related Driver Model No.		PB3A003P200	
Allowable Torque	N·m (oz·in)	2.2 (311.54)	3.5 (495.62)
Allow. instantaneous Torque	N·m (oz·in)	4.5 (637.23)	8.3 (1175.34)
Rotor Inertia	$\times 10^4 \text{kg}\cdot\text{m}^2(\text{oz}\cdot\text{in}^2)$	0.068 (0.37)	
Reduction Gear Ratio		1:30	1:50
Lost Motion	min	-	-
Hysteresis Loss	min	3.6	2.4
Allowable Rotations	min^{-1}	116	70
Allowable Thrust Load	N	1150	
Allowable Radial Load**	N	209	
Motor Mass	kg(lbs.)	0.54 (1.19)	

Motor Characteristics Chart

Allowable Torque

Allowable Instantaneous Torque



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

**The load point is determined at a position 14mm from the mounting surface.

***The gear output shaft rotates in the opposite direction.



AC

Electromagnetic Brake Model

Motor External Dimensions

42(17) 60

PB-R System

Driver Dimension. Dwg. P10
Driver Specifications P10
Driver Wiring Diagram P9
Motor Dimension. Dwg. P35-37

PB-P System

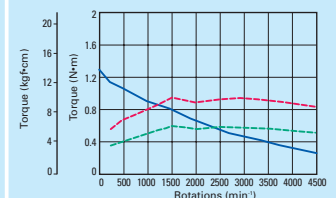
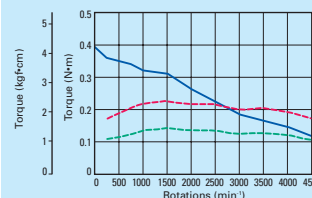
Driver Dimension. Dwg. P18
Driver Specifications P18
Driver Wiring Diagram P17
Motor Dimension. Dwg. P35-37

SIZE	Motor Ext. Dim.	42mm (NEMA 17)	60mm	
	Motor Length	90mm	113.6mm	
Motor Model	Unit	PBM423FCE20	PBM603FCE20	
PB-R Set Model No.		PBAR423-B	PBAR603-B	
Related Driver Model No.		PB3A003R200		
PB-P Set Model No.		PBAP423-B	PBAP603-B	
Related Driver Model No.		PB3A003P200		
Max. Stall Torque	N·m (oz·in)	0.39 (55.23)	1.3 (184.1)	
Rotor Inertia	$\times 10^4 \text{kg}\cdot\text{m}^2(\text{oz}\cdot\text{in}^2)$	0.071 (0.39)	0.559 (3.06)	
Allowable Thrust Load	N	9.8	14.7	
Allowable Radial Load**	N	49	167	
Motor Mass	kg(lbs.)	0.5 (1.10)	1.19 (2.62)	
Electromagnetic Brake	Operation Method	Non-excitation		
	Power Voltage	V DC24V \pm 5%		
	Excitation Current	A	0.08	0.25
	Power Consumption	W	2	6
	Friction Torque	N·m (oz·in)	0.22 (31.15)	0.78 (110.5)
	Brake Engage Time	ms	20	
	Brake Release Time	ms	30	

Motor Characteristics Chart

Allowable Torque

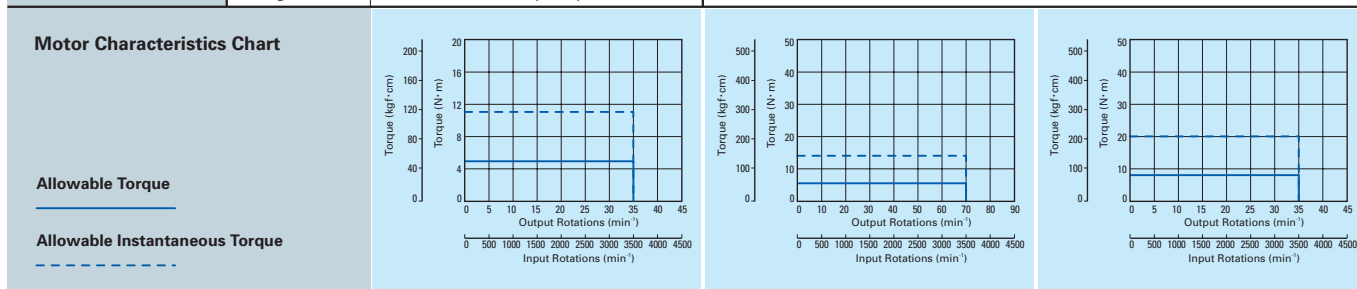
Allowable Instantaneous Torque



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

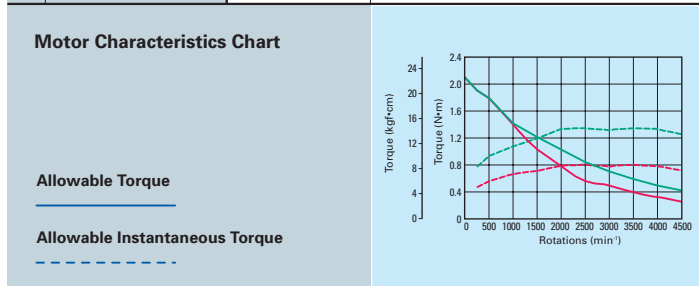
**The load point is determined at a position 14mm from the mounting surface.

SIZE	Motor Ext. Dim.	42mm (NEMA 17)		60mm	
	Motor Length	97mm		137.3mm	137.3mm
Motor Model	Unit	PBM423FHME20		PBM603FHLE20	PBM603FHME20
PB-R Set Model No.		PBAR423-H100		PBAR603-H50	PBAR603-H100
Related Driver Model No.		PB3A003R200		PB3A003R200	
PB-P Set Model No.		PBAP423-H100		PBAP603-H50	PBAP603-H100
Related Driver Model No.		PB3A003P200		PB3A003P200	
Allowable Torque	N · m (oz·in)	5 (708.03)		5.5 (778.84)	8 (1132.86)
Allow.instantaneous Torque	N · m (oz·in)	11 (1157.68)		14 (1982.50)	20 (2832.14)
Rotor Inertia	$\times 10^{-4}$ kg · m ² (oz·in ²)	0.068 (0.37)		0.435 (2.38)	
Reduction Gear Ratio		1:100		1:50	1:100
Load Motion	min	-		0.4 to 3(± 0.28 N·m)	
Hysteresis Loss	min	2.4		-	
Allowable Rotations	min ⁻¹	35		70	35
Allowable Thrust Load	N	1150		400	
Allowable Radial Load**	N	209		360	
Motor Mass	kg(lbs.)	0.54 (1.19)		1.45 (3.20)	



*Maintain motor case temperature at a point below 85°C.
 **The load point is determined at a position 14mm from the mounting surface.
 ***The gear output shaft rotates in the opposite direction.

SIZE	Motor Ext. Dim.	60mm	
	Motor Length	145.6mm	
Motor Model	Unit	PBM604FCE20	
PB-R Set Model No.		PBAR604-B	
Related Driver Model No.		PB3A003R200	
PB-P Set Model No.		PBAP604-B	
Related Driver Model No.		PB3A003P200	
Max. Stall Torque	N·m (oz·in)	1.9 (269.1)	
Rotor Inertia	$\times 10^{-4}$ kg·m ² (oz·in ²)	1 (5.47)	
Allowable Thrust Load	N	14.7	
Allowable Radial Load**	N	167	
Motor Mass	kg(lbs.)	1.76 (3.88)	
Electromagnetic Brake	Operation Method	Non-excitation	
	Power Voltage	V	DC24V \pm 5%
	Excitation Current	A	0.25
	Power Consumption	W	6
	Friction Torque	N·m (oz·in)	0.78 (110.5)
	Brake Engage Time	ms	20
	Brake Release Time	ms	30



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

General Specifications



DC Standard Model

Motor External Dimensions



PB-R Single-axis System
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 Motor Dimension. Dwg. P35-37

PB-R Multi-axis System
 Driver Dimension. Dwg. P14
 Driver Specifications P14
 Driver Wiring Diagram P13
 Motor Dimension. Dwg. P35-37

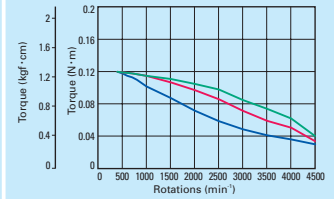
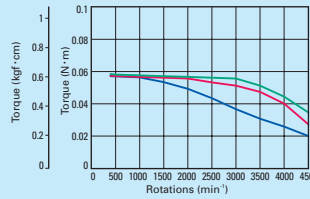
PB-P System
 Driver Dimension. Dwg. P18
 Driver Specifications P18
 Driver Wiring Diagram P17
 Motor Dimension. Dwg. P35-37

SIZE	Motor Ext. Dim.	28mm (NEMA 11)	
	Motor Length	58.5mm	77.8mm
Motor Model	Unit	PBM282DXA20	PBM284DXA20
Related Driver No. (PB-R single-axis)		PB1D001R1**	
Related Driver No. (PB-R multi-axis)		PB2D003R1U*	
Related Driver No. (PB-R single-axis)		PB1D001P100	
Maximum Stall Torque	N·m(oz·in)	0.055 (7.79)	0.115 (16.28)
Rotor Inertia	$\times 10^{-4}$ kg·m ² (oz·in ²)	0.008 (0.04)	0.016 (0.09)
Allowable Thrust Load	N	9.8	9.8
Allowable Radial Load**	N	33	33
Motor Mass	kg(lbs.)	0.16 (0.35)	0.23 (0.51)

Motor Characteristics Chart

Allowable Torque

- 24V —
- 36V —
- 48V —
- 24V+36V+48V —



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

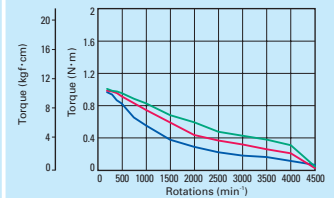
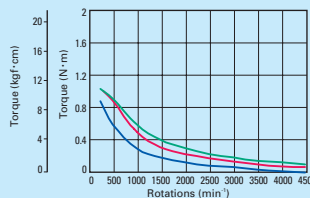
**The load point is determined at a position 14mm from the mounting surface.

SIZE	Motor Ext. Dim.	56mm (NEMA 23)	
	Motor Length	91mm	91mm
Motor Model	Unit	PBM565DX*24	PBM565DX*20
Related Driver No. (PB-R single-axis)		PB1D002R1**	PB1D003R1**
Related Driver No. (PB-R multi-axis)		PB2D003R1U*	
Related Driver No. (PB-R single-axis)		PB1D002P100	PB1D003P100
Maximum Stall Torque	N·m(oz·in)	1.42 (201.1)	0.98 (138.8)
Rotor Inertia	$\times 10^{-4}$ kg·m ² (oz·in ²)	0.36 (1.97)	
Allowable Thrust Load	N	14.7	
Allowable Radial Load**	N	167	
Motor Mass	kg(lbs.)	1.05 (2.31)	

Motor Characteristics Chart

Allowable Torque

- 24V —
- 36V —
- 48V —
- 24V+36V+48V —



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

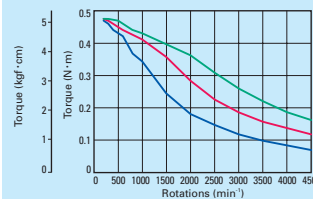
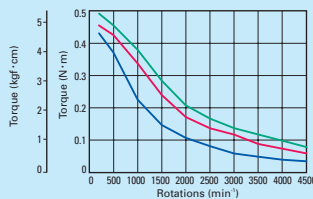
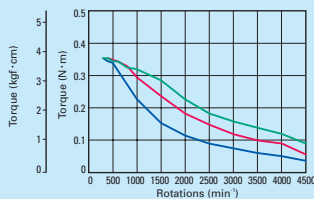
**The load point is determined at a position 14mm from the mounting surface.

SIZE	Motor Ext. Dim.	42mm (NEMA 17)		50mm	
	Motor Length	57.6mm		66.5mm	66.5mm
Motor Model	Unit	PBM423DX*20		PBM503DX*20	PBM503DX*24
Related Driver No. (PB-R single-axis)		PB1D002R1**			PB1D003R1**
Related Driver No. (PB-R multi-axis)		PB2D003R1U*			PB2D003R1U*
Related Driver No. (PB-R single-axis)		PB1D002P100			PB1D003P100
Maximum Stall Torque	N·m(oz·in)	0.39 (55.23)		0.57 (80.72)	0.47 (66.56)
Rotor Inertia	x10 ⁻⁴ kg·m ² (oz·in ²)	0.056 (0.31)		0.12 (0.66)	
Allowable Thrust Load	N	9.8		14.7	
Allowable Radial Load**	N	49		96	
Motor Mass	kg(lbs.)	0.35 (0.77)		0.59 (1.30)	

Motor Characteristics Chart

Allowable Torque

- 24V —
- 36V —
- 48V —
- 24V+36V+48V —



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

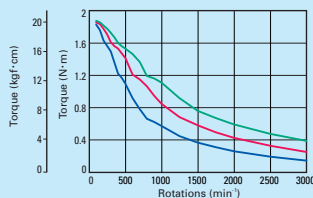
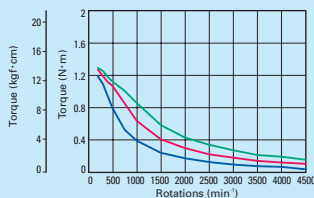
**The load point is determined at a position 14mm from the mounting surface.

SIZE	Motor Ext. Dim.	60mm	
	Motor Length	70.3mm	102.3mm
Motor Model	Unit	PBM603DX*20	PBM604DX*20
Related Driver No. (PB-R single-axis)		PB1D003R1**	
Related Driver No. (PB-R multi-axis)		PB2D003R1U*	
Related Driver No. (PB-R single-axis)		PB1D003P100	
Maximum Stall Torque	N·m(oz·in)	1.3 (184.1)	1.9 (269.1)
Rotor Inertia	x10 ⁻⁴ kg·m ² (oz·in ²)	0.4 (2.19)	0.84 (4.59)
Allowable Thrust Load	N	14.7	
Allowable Radial Load**	N	167	
Motor Mass	kg(lbs.)	0.85 (1.87)	1.42 (3.13)

Motor Characteristics Chart

Allowable Torque

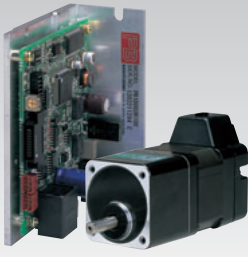
- 24V —
- 36V —
- 48V —
- 24V+36V+48V —



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

**The load point is determined at a position 14mm from the mounting surface.

General Specifications



DC

Low-Backlash Gear Model

Motor External Dimensions

42(17) | 56(23) | 60

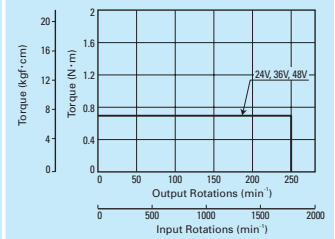
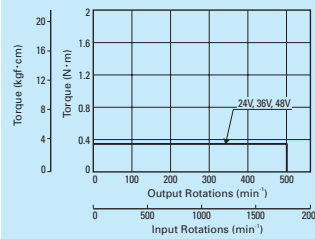
See P29

SIZE	Motor Ext. Dim.	42mm (NEMA 17)	
	Motor Length	87.9mm	87.9mm
Motor Model	Unit	PBM423DGA*20	PBM423DGB*20
Related Driver No. (PB-R single-axis)		PB1D002R1**	
Related Driver No. (PB-R multi-axis)		PB2D003R1U*	
Related Driver No. (PB-R single-axis)		PB1D002P100	
Allowable Torque	N·m(oz·in)	0.343 (48.57)	0.7 (99.12)
Rotor Inertia	$\times 10^{-4}\text{kg}\cdot\text{m}^2(\text{oz}\cdot\text{in}^2)$	0.56 (3.06)	
Reduction Gear Ratio		1:3.6	1:7.2
Backlash	DEG	0.6	0.4
Allowable Rotations	min^{-1}	500	250
Rotation Direction	Rel. to cmd. direc.	Forward	Forward
Allowable Thrust Load	N	15	
Allowable Radial Load**	N	20	
Motor Mass	kg(lbs.)	0.48 (1.06)	

Motor Characteristics Chart

Allowable Torque

24V —
36V —
48V —
24V+36V+48V —



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

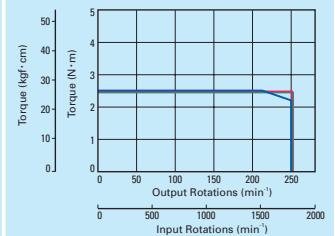
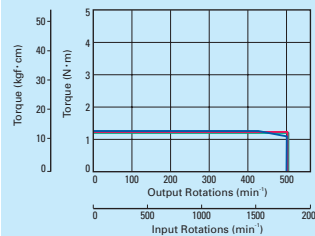
**The load point is determined at a position 1/3 of the length from the output shaft.

SIZE	Motor Ext. Dim.	56mm (NEMA 23)	
	Motor Length	136.5mm	136.5mm
Motor Model	Unit	PBM565DGA*20	PBM565DGB*20
Related Driver No. (PB-R single-axis)		PB1D003R1**	
Related Driver No. (PB-R multi-axis)		PB2D003R1U*	
Related Driver No. (PB-R single-axis)		PB1D003P100	
Allowable Torque	N·m(oz·in)	1.25 (177.0)	2.5 (354.0)
Rotor Inertia	$\times 10^{-4}\text{kg}\cdot\text{m}^2(\text{oz}\cdot\text{in}^2)$	0.36 (1.97)	
Reduction Gear Ratio		1:3.6	1:7.2
Backlash	DEG	0.55	0.25
Allowable Rotations	min^{-1}	500	250
Rotation Direction	Rel. to cmd. direc.	Forward	Forward
Allowable Thrust Load	N	30	
Allowable Radial Load**	N	100	
Motor Mass	kg(lbs.)	1.42 (3.13)	

Motor Characteristics Chart

Allowable Torque

24V —
36V —
48V —
24V+36V+48V —



*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.

PB-R Single-axis System

Driver Dimension. Dwg. P10
Driver Specifications P10
Driver Wiring Diagram P9
Motor Dimension. Dwg. P35-37

PB-R Multi-axis System

Driver Dimension. Dwg. P14
Driver Specifications P14
Driver Wiring Diagram P13
Motor Dimension. Dwg. P35-37

PB-P System

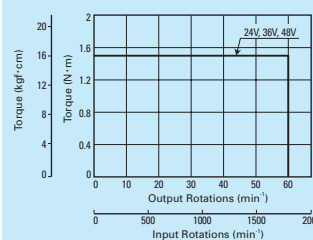
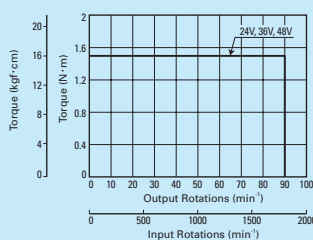
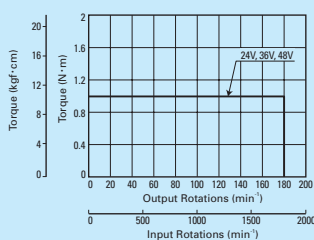
Driver Dimension. Dwg. P18
Driver Specifications P18
Driver Wiring Diagram P17
Motor Dimension. Dwg. P35-37

SIZE	Motor Ext. Dim.	42mm (NEMA 17)		
	Motor Length	87.9mm	87.9mm	87.9mm
Motor Model	Unit	PBM423DGE*20	PBM423DGG*20	PBM423DGJ*20
Related Driver No. (PB-R single-axis)			PB1D002R1**	
Related Driver No. (PB-R multi-axis)			PB2D003R1U*	
Related Driver No. (PB-R single-axis)			PB1D002P100	
Allowable Torque	N·m(oz·in)	0.98 (138.8)	1.47 (208.2)	
Rotor Inertia	$\times 10^{-4}$ kg·m ² (oz·in ²)	0.056 (0.31)		
Reduction Gear Ratio		1:10	1:20	1:30
Backlash	DEG	0.35	0.25	0.25
Allowable Rotations	min ⁻¹	180	90	60
Rotation Direction	Rel. to cmd. direc.	Forward	Reverse	Reverse
Allowable Thrust Load	N	15		
Allowable Radial Load**	N	20		
Motor Mass	kg(lbs.)	0.48 (1.06)		

Motor Characteristics Chart

Allowable Torque

- 24V ———
- 36V ———
- 48V ———
- 24V+36V+48V ———



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

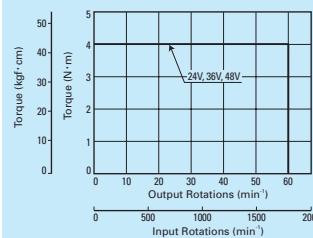
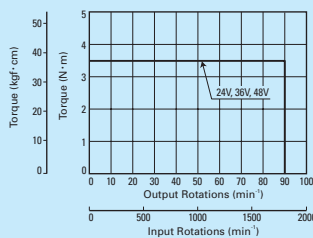
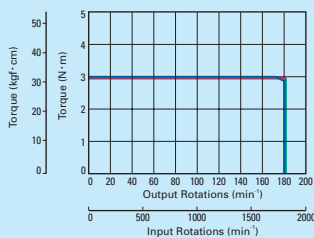
**The load point is determined at a position 1/3 of the length from the output shaft.

SIZE	Motor Ext. Dim.	56mm (NEMA 23)		
	Motor Length	136.5mm	136.5mm	136.5mm
Motor Model	Unit	PBM565DGE*20	PBM565DGG*20	PBM565DGJ*20
Related Driver No. (PB-R single-axis)			PB1D003R1**	
Related Driver No. (PB-R multi-axis)			PB2D003R1U*	
Related Driver No. (PB-R single-axis)			PB1D003P100	
Allowable Torque	N·m(oz·in)	3 (424.8)	3.5 (495.62)	4 (566.4)
Rotor Inertia	$\times 10^{-4}$ kg·m ² (oz·in ²)	0.36 (1.97)		
Reduction Gear Ratio		1:10	1:20	1:30
Backlash	DEG	0.25	0.17	0.17
Allowable Rotations	min ⁻¹	180	90	60
Rotation Direction	Rel. to cmd. direc.	Reverse	Reverse	Reverse
Allowable Thrust Load	N	30		
Allowable Radial Load**	N	100		
Motor Mass	kg(lbs.)	1.42 (3.13)		

Motor Characteristics Chart

Allowable Torque

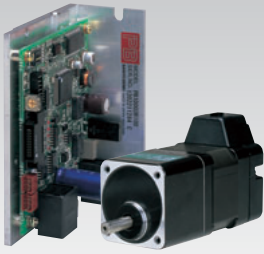
- 24V ———
- 36V ———
- 48V ———
- 24V+36V+48V ———



*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.

General Specifications



DC

Low-Backlash Gear Model

Motor External Dimensions

60

PB-R Single-axis System

Driver Dimension. Dwg. P10
Driver Specifications P10
Driver Wiring Diagram P9
Motor Dimension. Dwg. P35-37

PB-R Multi-axis System

Driver Dimension. Dwg. P14
Driver Specifications P14
Driver Wiring Diagram P13
Motor Dimension. Dwg. P35-37

PB-P System

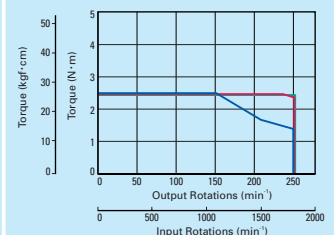
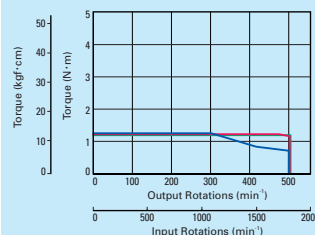
Driver Dimension. Dwg. P18
Driver Specifications P18
Driver Wiring Diagram P17
Motor Dimension. Dwg. P35-37

SIZE	Motor Ext. Dim.	60mm	
	Motor Length	115.8mm	115.8mm
Motor Model	Unit	PBM603DGA*20	PBM603DGB*20
Related Driver No. (PB-R single-axis)		PB1D003R1**	
Related Driver No. (PB-R multi-axis)		PB2D003R1U*	
Related Driver No. (PB-R single-axis)		PB1D003P100	
Allowable Torque	N·m(oz·in)	1.25 (177.0)	2.5 (354.0)
Rotor Inertia	x10 ⁻⁴ kg·m ² (oz·in ²)	0.4 (2.19)	
Reduction Gear Ratio		1:3.6	1:7.2
Backlash	DEG	0.55	0.25
Allowable Rotations	min ⁻¹	500	250
Rotation Direction	Rel. to cmd. direc.	Forward	Forward
Allowable Thrust Load	N	30	
Allowable Radial Load**	N	100	
Motor Mass	kg(lbs.)	1.22 (2.69)	

Motor Characteristics Chart

Allowable Torque

24V —
36V —
48V —
24V+36V+48V —



*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.



DC

Spur Gear Model

Motor External Dimensions

28(17)

PB-R Single-axis System

Driver Dimension. Dwg. P10
Driver Specifications P10
Driver Wiring Diagram P9
Motor Dimension. Dwg. P35-37

PB-R Multi-axis System

Driver Dimension. Dwg. P14
Driver Specifications P14
Driver Wiring Diagram P13
Motor Dimension. Dwg. P35-37

PB-P System

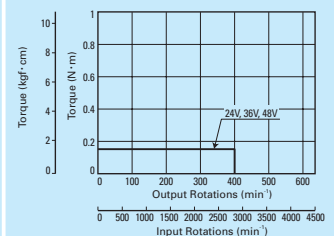
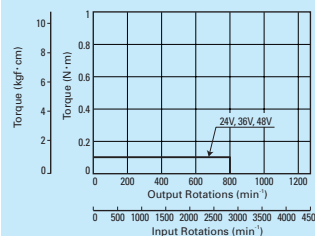
Driver Dimension. Dwg. P18
Driver Specifications P18
Driver Wiring Diagram P17
Motor Dimension. Dwg. P35-37

SIZE	Motor Ext. Dim.	28mm (NEMA 11)	
	Motor Length	88.5mm	88.5mm
Motor Model	Unit	PBM282DGA*20	PBM282DGB*20
Related Driver No. (PB-R single-axis)		PB1D001R1**	
Related Driver No. (PB-R multi-axis)		PB2D003R1U*	
Related Driver No. (PB-R single-axis)		PB1D001P100	
Allowable Torque	N·m(oz·in)	0.1 (14.16)	0.15 (21.24)
Rotor Inertia	x10 ⁻⁴ kg·m ² (oz·in ²)	0.017 (0.09)	
Reduction Gear Ratio		1:3.6	1:7.2
Backlash	DEG	2	
Allowable Rotations	min ⁻¹	800	400
Rotation Direction	Rel. to cmd. direc.	Forward	Forward
Allowable Thrust Load	N	10	
Allowable Radial Load**	N	15	
Motor Mass	kg(lbs.)	0.22 (0.49)	

Motor Characteristics Chart

Allowable Torque

24V —
36V —
48V —
24V+36V+48V —



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

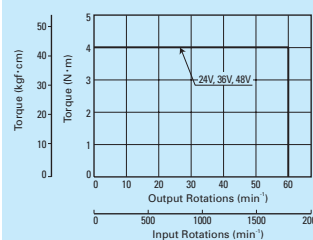
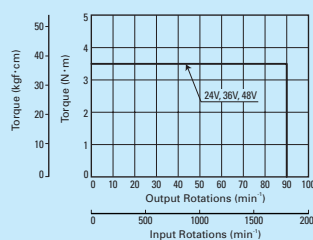
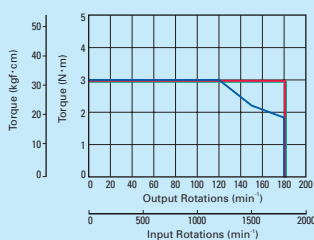
**The load point is determined at a position 1/3 of the length from the output shaft.

SIZE	Motor Ext. Dim.	60mm		
	Motor Length	115.8mm	115.8mm	115.8mm
Motor Model	Unit	PBM603DGE*20	PBM603DGG*20	PBM603DGJ*20
Related Driver No. (PB-R single-axis)			PB1D003R1**	
Related Driver No. (PB-R multi-axis)			PB2D003R1U*	
Related Driver No. (PB-R single-axis)			PB1D003P100	
Allowable Torque	N·m(oz·in)	3 (424.8)	3.5 (495.6)	4 (566.4)
Rotor Inertia	$\times 10^{-4}$ kg·m ² (oz·in ²)		0.4 (2.19)	
Reduction Gear Ratio		1:10	1:20	1:30
Backlash	DEG	0.25	0.17	
Allowable Rotations	min ⁻¹	180	90	60
Rotation Direction	Rel. to cmd. direc.	Reverse	Reverse	Reverse
Allowable Thrust Load	N		30	
Allowable Radial Load**	N		100	
Motor Mass	kg(lbs.)	1.22 (2.69)		

Motor Characteristics Chart

Allowable Torque

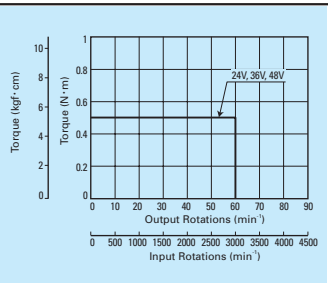
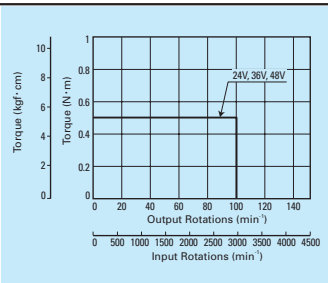
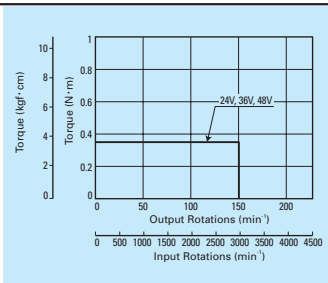
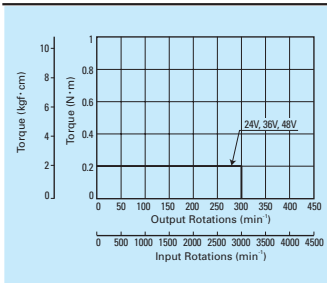
- 24V ———
- 36V ———
- 48V ———
- 24V+36V+48V ———



*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 (NEMA 11)			
88.5mm	88.5mm	88.5mm	88.5mm
PBM282DGE*20	PBM282DGG*20	PBM282DGJ*20	PBM282DGL*20
		PB1D001R1**	
		PB2D003R1U*	
		PB1D001P100	
0.2 (28.32)	0.35 (49.56)	0.5 (70.80)	0.5 (70.80)
0.017 (0.09)			
1:10	1:20	1:30	1:50
2		1.5	
300	150	100	60
Reverse	Forward	Forward	Forward
10			
15			
0.22 (0.49)			



*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.

General Specifications



DC Harmonic Gear Model

Motor External Dimensions

28(11) | 42(17) | 56(23)

60

PB-R Single-axis System
 Driver Dimension. Dwg. P10
 Driver Specifications P10
 Driver Wiring Diagram P9
 Motor Dimension. Dwg. P35-37

PB-R Multi-axis System
 Driver Dimension. Dwg. P14
 Driver Specifications P14
 Driver Wiring Diagram P13
 Motor Dimension. Dwg. P35-37

PB-P System
 Driver Dimension. Dwg. P18
 Driver Specifications P18
 Driver Wiring Diagram P17
 Motor Dimension. Dwg. P35-37

SIZE	Motor Ext. Dim.	28mm (NEMA 11)	
	Motor Length	97mm	97mm
Motor Model	Unit	PBM282DHLA20	PBM282DHMA20
Related Driver No. (PB-R single-axis)		PB1D001R1**	
Related Driver No. (PB-R multi-axis)		PB2D003R1U*	
Related Driver No. (PB-P)		PB1D001P100	
Allowable Torque	N·m(oz·in)	1.5 (212.4)	2 (282.3)
Allow. Instantaneous Torque	N·m(oz·in)	2.7 (382.3)	3.6 (509.8)
Rotor Inertia	$\times 10^{-4}$ kg·m ² (oz·in ²)	0.012 (0.07)	
Reduction Gear Ratio		1:50	1:100
Lost Motion	min	0.4 to 3 (± 0.06 N·m)	
Allowable Rotations	min ⁻¹	70	35
Allowable Thrust Load	N	9.8	
Allowable Radial Load**	N	33	
Motor Mass	kg(lbs.)	0.27 (0.60)	

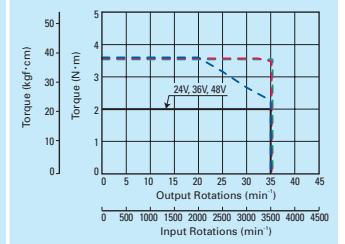
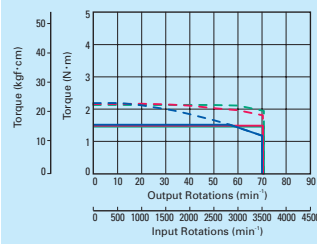
Motor Characteristics Chart

Allowable Torque

24V ——— 24V ———
 36V ——— 36V ———
 48V ——— 48V ———
 24V+36V+48V ——— 24V+36V+48V ———

Allowable Instantaneous Torque

24V - - - - - 24V - - - - -
 36V - - - - - 36V - - - - -
 48V - - - - - 48V - - - - -
 24V+36V+48V - - - - - 24V+36V+48V - - - - -



*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.

SIZE	Motor Ext. Dim.	56mm (NEMA 23)	
	Motor Length	158mm	158mm
Motor Model	Unit	PBM565DHL*20	PBM565DHM*20
Related Driver No. (PB-R single-axis)		PB1D002R1**	PB1D003R1**
Related Driver No. (PB-R multi-axis)		PB2D003R1U*	PB2D003R1U*
Related Driver No. (PB-P)		PB1D002P100	PB1D003P100
Allowable Torque	N·m(oz·in)	5.5 (778.8)	8 (1132.9)
Allow. Instantaneous Torque	N·m(oz·in)	14 (1982.5)	20 (2832.1)
Rotor Inertia	$\times 10^{-4}$ kg·m ² (oz·in ²)	0.39 (2.13)	
Reduction Gear Ratio		1:50	1:100
Lost Motion	min	0.4 to 3 (± 0.28 N·m)	
Allowable Rotations	min ⁻¹	70	35
Allowable Thrust Load	N	400	
Allowable Radial Load**	N	360	
Motor Mass	kg(lbs.)	1.65 (3.64)	

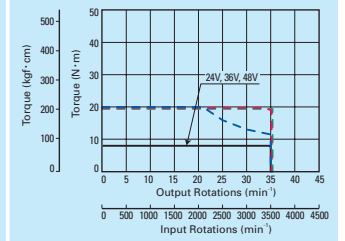
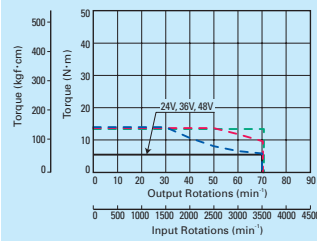
Motor Characteristics Chart

Allowable Torque

24V ——— 24V ———
 36V ——— 36V ———
 48V ——— 48V ———
 24V+36V+48V ——— 24V+36V+48V ———

Allowable Instantaneous Torque

24V - - - - - 24V - - - - -
 36V - - - - - 36V - - - - -
 48V - - - - - 48V - - - - -
 24V+36V+48V - - - - - 24V+36V+48V - - - - -

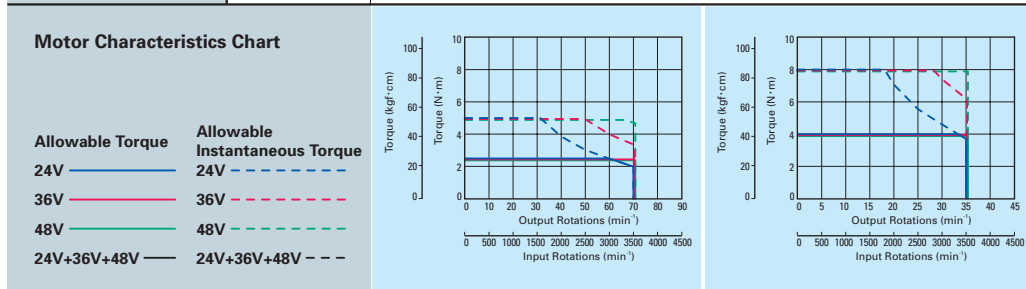


*Maintain motor case temperature at a point below 85°C.

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

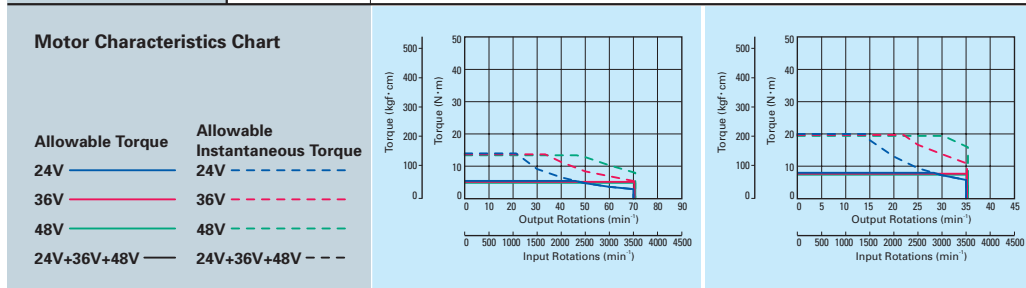
***The gear output shaft rotates in the opposite direction.

SIZE	Motor Ext. Dim.	42mm (NEMA 17)	
	Motor Length	105.7mm	105.7mm
Motor Model	Unit	PBM423DHL*20	PBM423DHM*20
Related Driver No. (PB-R single-axis)		PB1D002R1**	
Related Driver No. (PB-R multi-axis)		PB2D003R1U*	
Related Driver No. (PB-P)		PB1D002P100	
Allowable Torque	N·m(oz·in)	2.5 (354.0)	4 (566.4)
Allow. Instantaneous Torque	N·m(oz·in)	5 (708.0)	8 (1132.9)
Rotor Inertia	$\times 10^{-4}$ kg·m ² (oz·in ²)	0.068 (0.37)	
Reduction Gear Ratio		1:50	1:100
Lost Motion	min	0.4 to 3 (± 0.16 N·m)	0.4 to 3 (± 0.2 N·m)
Allowable Rotations	min ⁻¹	70	35
Allowable Thrust Load	N	200	
Allowable Radial Load**	N	220	
Motor Mass	kg(lbs.)	0.64 (1.41)	



*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.

SIZE	Motor Ext. Dim.	60mm	
	Motor Length	137.3mm	137.3mm
Motor Model	Unit	PBM603DHL*20	PBM603DHM*20
Related Driver No. (PB-R single-axis)		PB1D003R1**	PB1D003R1**
Related Driver No. (PB-R multi-axis)		PB2D003R1U*	PB2D003R1U*
Related Driver No. (PB-P)		PB1D003P100	PB1D003P100
Allowable Torque	N·m(oz·in)	5.5 (778.8)	8 (1132.9)
Allow. Instantaneous Torque	N·m(oz·in)	14 (1982.5)	20 (2382.1)
Rotor Inertia	$\times 10^{-4}$ kg·m ² (oz·in ²)	0.435 (2.38)	
Reduction Gear Ratio		1:50	1:100
Lost Motion	min	0.4 to 3 (± 0.28 N·m)	0.4 to 3 (± 0.4 N·m)
Allowable Rotations	min ⁻¹	70	35
Allowable Thrust Load	N	400	
Allowable Radial Load**	N	360	
Motor Mass	kg(lbs.)	1.45 (3.20)	



*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.

General Specifications



DC Electromagnetic Brake Model

Motor External Dimensions

28(11) | 42(17) | 50

56(23) | 60

PB-R Single-axis System
 Driver Dimension. Dwg. P10
 Driver Specifications P10
 Driver Wiring Diagram P9
 Motor Dimension. Dwg. P35-37

PB-R Multi-axis System
 Driver Dimension. Dwg. P14
 Driver Specifications P14
 Driver Wiring Diagram P13
 Motor Dimension. Dwg. P35-37

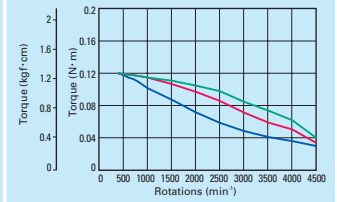
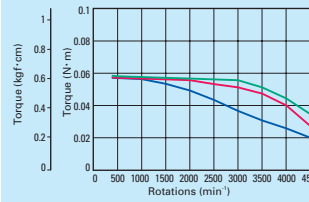
PB-P System
 Driver Dimension. Dwg. P18
 Driver Specifications P18
 Driver Wiring Diagram P17
 Motor Dimension. Dwg. P35-37

SIZE	Motor Ext. Dim.	28mm (NEMA 11)		
	Motor Length	97.8mm	117.1mm	
Motor Model	Unit	PBM282DC*20	PBM284DC*20	
Related Driver No. (PB-R single-axis)		PB1D001R1**		
Related Driver No. (PB-R multi-axis)		PB2D003R1U*		
Related Driver No. (PB-R single-axis)		PB1D001P100		
Max. Stall Torque	N·m(oz·in)	0.055 (7.79)	0.115 (16.28)	
Rotor Inertia	$\times 10^{-4}$ kg·m ² (oz·in ²)	0.019 (0.10)	0.027 (0.15)	
Allowable Thrust Load	N	9.8		
Allowable Radial Load**	N	33		
Motor Mass	kg(lbs.)	0.28 (0.62)	0.35 (0.77)	
Electromagnetic Brake	Operation Method	Non-excitation		
	Power Voltage	DC24V \pm 5%		
	Excitation Current	0.15		
	Power Consumption	3.6		
	Friction Torque	N·m(oz·in)	0.049 (6.94)	
	Brake Engage Time	ms	20	
Brake Release Time	ms	20		

Motor Characteristics Chart

Allowable Torque

24V —
 36V —
 48V —
 24V+36V+48V —



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

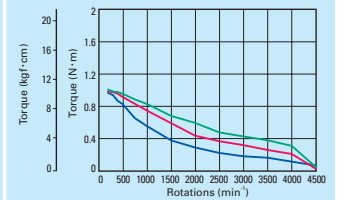
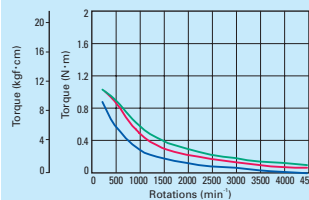
**The load point is determined at a position 1/3 of the length from the output shaft.

SIZE	Motor Ext. Dim.	56mm (NEMA 23)		
	Motor Length	134.3mm	134.3mm	
Motor Model	Unit	PBM565DC*24	PBM565DC*20	
Related Driver No. (PB-R single-axis)		PB1D002R1**	PB1D003R1**	
Related Driver No. (PB-R multi-axis)		PB2D003R1U*		
Related Driver No. (PB-R single-axis)		PB1D002P100	PB1D003P100	
Max. Stall Torque	N·m(oz·in)	1.42 (201.1)	0.98 (138.8)	
Rotor Inertia	$\times 10^{-4}$ kg·m ² (oz·in ²)	0.395 (2.160)		
Allowable Thrust Load	N	14.7		
Allowable Radial Load**	N	167		
Motor Mass	kg(lbs.)	1.38 (3.04)		
Electromagnetic Brake	Operation Method	Non-excitation		
	Power Voltage	DC24V \pm 5%		
	Excitation Current	0.27		
	Power Consumption	7		
	Friction Torque	N·m(oz·in)	0.49 (69.39)	
	Brake Engage Time	ms	25	
Brake Release Time	ms	40		

Motor Characteristics Chart

Allowable Torque

24V —
 36V —
 48V —
 24V+36V+48V —



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

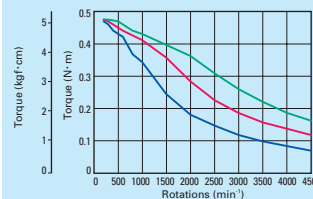
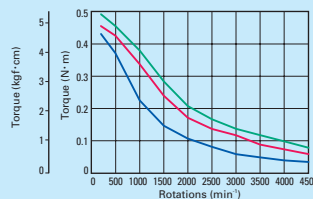
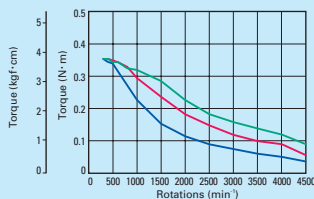
**The load point is determined at a position 1/3 of the length from the output shaft.

SIZE	Motor Ext. Dim.	42mm (NEMA 170)		50mm	
	Motor Length	90mm		102.5mm	102.5mm
Motor Model	Unit	PBM423DC*20		PBM503DC*20	PBM503DC*24
Related Driver No. (PB-R single-axis)		PB1D002R1**			PB1D003R1**
Related Driver No. (PB-R multi-axis)		PB2D003R1U*			
Related Driver No. (PB-R single-axis)		PB1D002P100			PB1D003P100
Max. Stall Torque	N·m(oz·in)	0.39 (55.23)		0.57 (80.72)	0.47 (66.56)
Rotor Inertia	$\times 10^{-4}$ kg·m ² (oz·in ²)	0.071 (0.39)		0.128 (0.70)	
Allowable Thrust Load	N	9.8		14.7	
Allowable Radial Load**	N	49		98	
Motor Mass	kg(lbs.)	0.5 (1.10)		0.83 (1.83)	
Electromagnetic Brake	Operation Method	Non-excitation			
	Power Voltage	V			
	Excitation Current	A		DC24V ± 5%	
	Power Consumption	W		0.27	
	Friction Torque	N·m(oz·in)		6.5	
	Brake Engage Time	ms		20	
	Brake Release Time	ms		35	

Motor Characteristics Chart

Allowable Torque

- 24V ———
- 36V ———
- 48V ———
- 24V+36V+48V ———



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

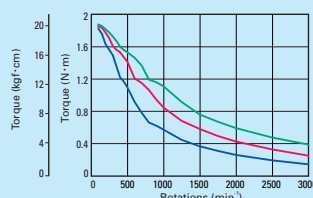
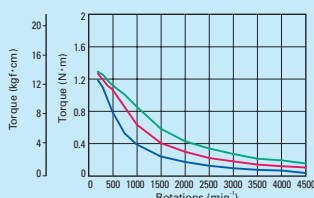
**The load point is determined at a position 1/3 of the length from the output shaft.

SIZE	Motor Ext. Dim.	60mm	
	Motor Length	113.6mm	145.6mm
Motor Model	Unit	PBM603DC*20	PBM604DC*20
Related Driver No. (PB-R single-axis)		PB1D003R1**	PB1D003R1**
Related Driver No. (PB-R multi-axis)		PB2D003R1U*	PB2D003R1U*
Related Driver No. (PB-R single-axis)		PB1D003P100	PB1D003P100
Max. Stall Torque	N·m(oz·in)	1.3 (184.1)	1.9 (269.1)
Rotor Inertia	$\times 10^{-4}$ kg·m ² (oz·in ²)	0.559 (3.06)	1 (5.47)
Allowable Thrust Load	N	14.7	
Allowable Radial Load**	N	167	
Motor Mass	kg(lbs.)	1.19 (2.62)	1.76 (3.88)
Electromagnetic Brake	Operation Method	Non-excitation	
	Power Voltage	V	
	Excitation Current	A	
	Power Consumption	W	
	Friction Torque	N·m(oz·in)	
	Brake Engage Time	ms	
	Brake Release Time	ms	

Motor Characteristics Chart

Allowable Torque

- 24V ———
- 36V ———
- 48V ———
- 24V+36V+48V ———



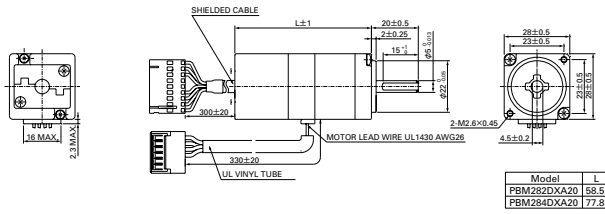
*Maintain motor case temperature at a point below 85°C.

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

28mm (NEMA11)

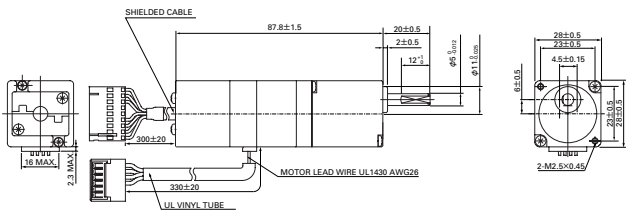
● Standard Model

PBM282DXA20 **DC**
 PBM284DXA20 **DC**



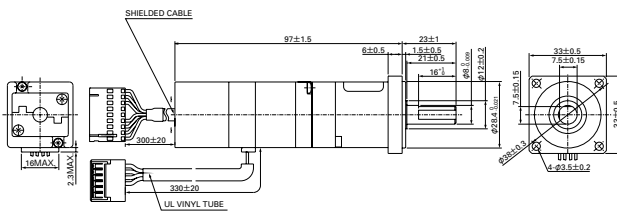
● Spur Gear Model

PBM282DG*A20 **DC**



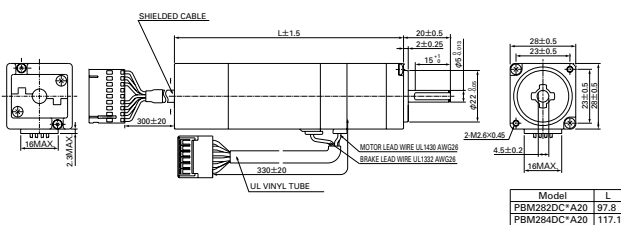
● Harmonic Gear Model

PBM282DH*A20 **DC**



● Electromagnetic Brake Model

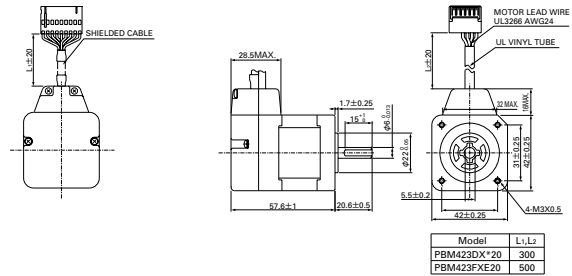
PBM282DC*A20 **DC**
 PBM284DC*A20 **DC**



42mm (NEMA17)

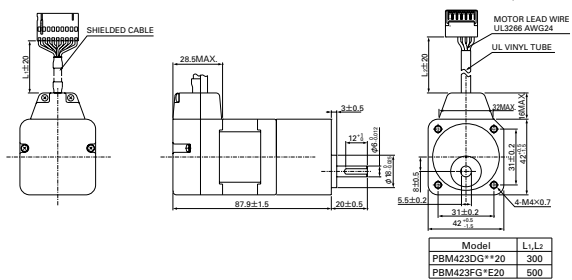
● Standard Model

PBM423DX*20 **DC** PBM423FXE20 **AC**



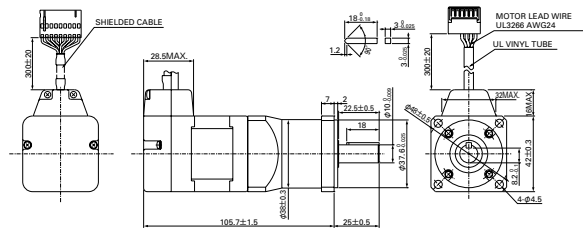
● Low-backlash Gear Model

PBM423DG*20 **DC** PBM423FG*E20 **AC**

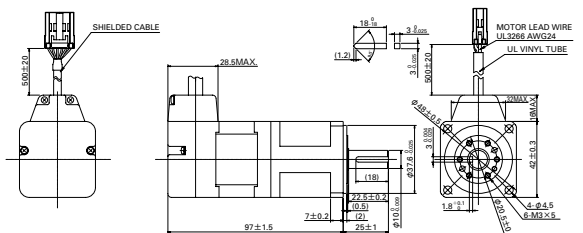


● Harmonic Gear Model

PBM423DH*20 **DC**

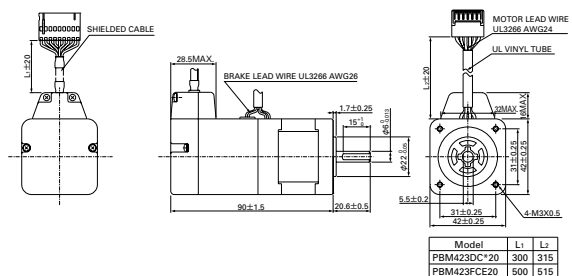


PBM423FH*E20 **AC**



● Electromagnetic Brake Model

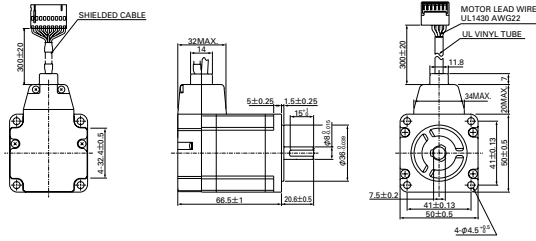
PBM423DC*20 **DC** PBM423FCE20 **AC**



50mm

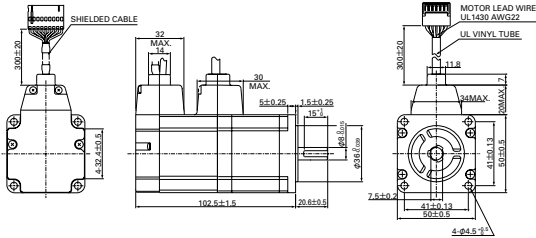
● Standard Model

PBM503DX*20 **DC**
 PBM503DX*24 **DC**



● Electromagnetic Brake Model

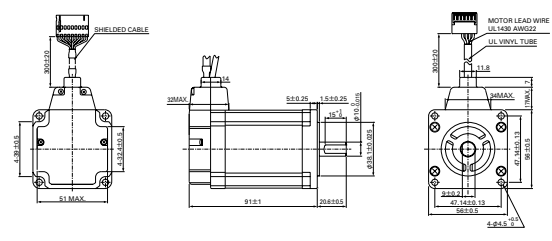
PBM503DC*20 **DC**
 PBM503DC*24 **DC**



56mm (NEMA23)

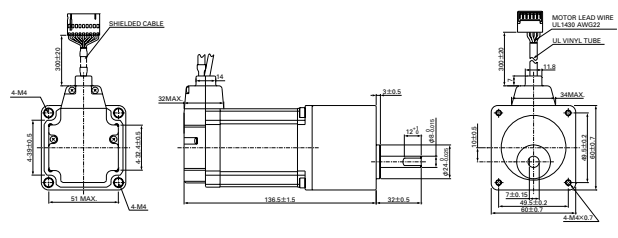
● Standard Model

PBM565DX*20 **DC**
 PBM565DX*24 **DC**



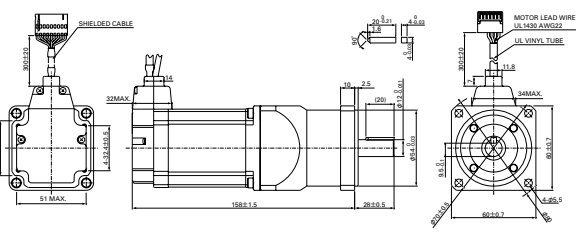
● Low-backlash Gear Model

PBM565DG**20 **DC**



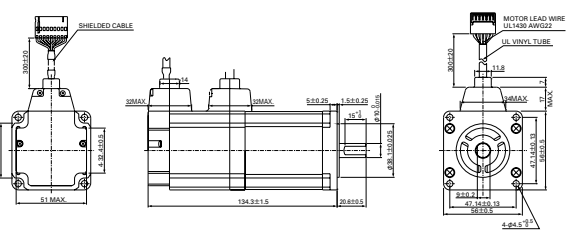
● Harmonic Gear Model

PBM565DH**20 **DC**



● Electromagnetic Brake Model

PBM565DC*20 **DC**
 PBM565DC*24 **DC**



Options

PC Interface Description

Driver Type	Power model	Communications Specifications	RS-232C/RS-485 Converter Unit	Software
PB-RType (Single-axis)	AC model	RS-485/Full duplex	PBFM-U3	SPBA1W-01
	DC model	RS-485/Half duplex	PBFM-U2	
PB-R(Multi-axis)	DC model	RS-485/Half duplex	PBFM-U2	
PB-PType	AC model	RS-232C/Half duplex	Not necessary	
	DC model	RS-485/Full duplex	PBFM-U1	

PC Interface Software Display Screens



1:Program Input Screen



2:Point Input Screen



3:Parameter Input Screen

PB-R PC Interface Software Functions

Functions

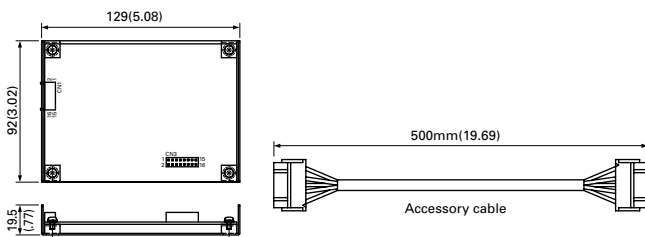
- Direct command capability
- Point data editing/execution
- Program data editing/execution
- Current position/Alarm/Amplifier status monitoring
 - Lead Pitch Conversion
 - Off-line Editing
 - Teaching Function, etc

Program Functions

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

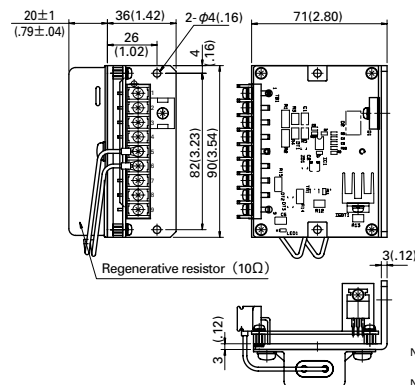
Speed Monitor Unit (All PB-R Types)

Model number: PBFV-U2



External Regeneration Unit (for the PB-R Multi-axis model)

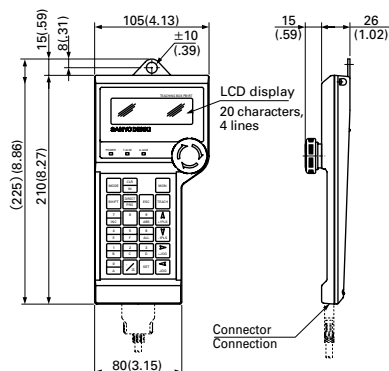
Model number: PBF E-01



Teaching Box (supports the PB-R Single-axis DC model)

Main unit model number: PB1RT-01

Cable model number: PBC1X0020A (2m)



- Note 1: TB1-Connector block wiring screw M3
Tightening torque 0.6 Nm
- 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 drivers 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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