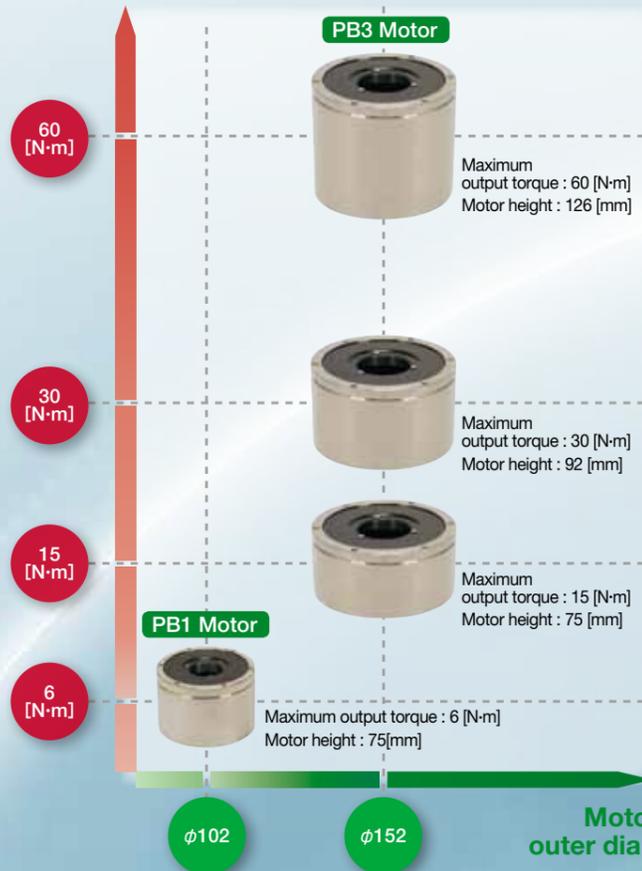# ■Features

- ・A compact size servo motor with large through hole for wiring and piping.
- ・Positioning using standard Pulse train command.
- ・Auto Tuning Function for easy start up.

■Typical applications

- ・Replacing Gear reducer and AC servo motor with Direct Drive motor.
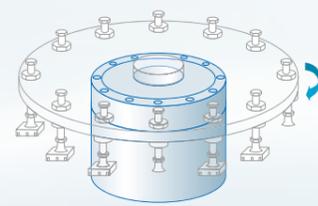- ・Reducing size and envelope of conventional positioning/transfer system.

■Line up

Maximum output torque

PB3 Motor

60 [N·m]

Maximum output torque : 60 [N·m]
Motor height : 126 [mm]

30 [N·m]

Maximum output torque : 30 [N·m]
Motor height : 92 [mm]

15 [N·m]

Maximum output torque : 15 [N·m]
Motor height : 75 [mm]

PB1 Motor

6 [N·m]

Maximum output torque : 6 [N·m]
Motor height : 75[mm]

φ102   φ152

Motor outer diameter

■Application

Inspection equipment for electronic parts

- ●High speed and high accuracy
- ●Compact ●Clean
- ●Hollow structure (convenient for wiring/tubing)
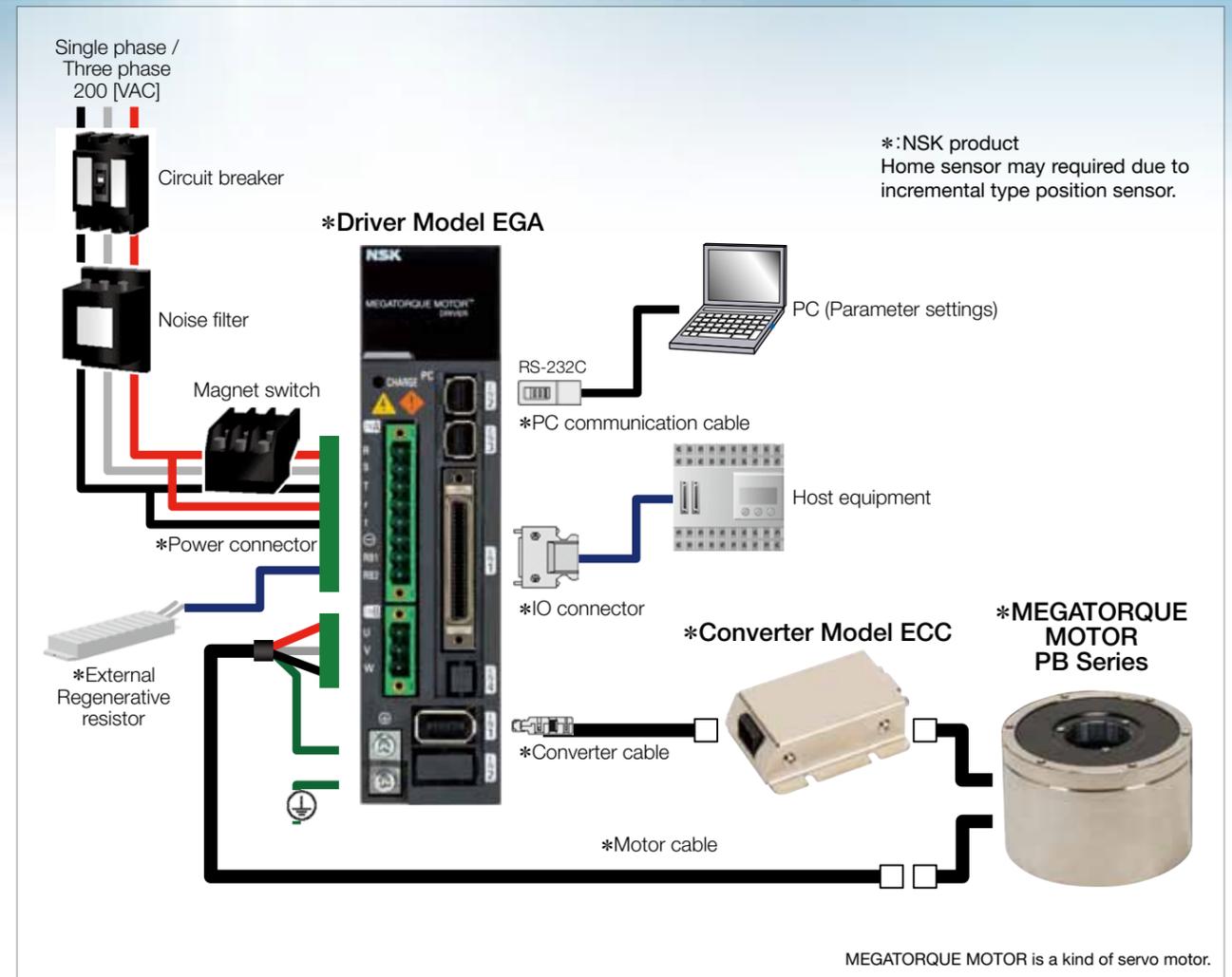
High-speed conveyance of lightweight parts
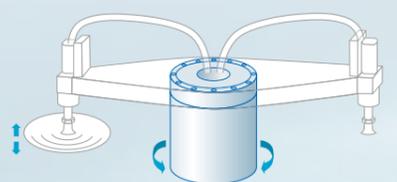
- ●High speed and high accuracy
- ●Clean ●Maintenance free
- ●Hollow structure (convenient for wiring/tubing)

■Advantage of Direct Drive Motor

The highly precise positioning which has no backlashes or lost motions is achieved. Because MEGATORQUE MOTOR is directly connected with a load without using reduction gears. Long term maintenance free is achieved by using a grease prelubricated bearing.

Positioning accuracy	Non backlash, high precisions positioning
Positioning time	Short cycle time
Deterioration with age	No performance degradation due to aging
Maintenance	Long term maintenance free
Compact	NSK motor allows users to design compact and lightweight system

1 │ System configuration

Single phase / Three phase 200 [VAC]

Circuit breaker

Noise filter

Magnet switch

∗Power connector

∗External Regenerative resistor

∗Driver Model EGA

∗: NSK product
Home sensor may required due to incremental type position sensor.

PC (Parameter settings)

RS-232C

∗PC communication cable

∗IO connector

Host equipment

∗Converter Model ECC

∗MEGATORQUE MOTOR PB Series

∗Converter cable

∗Motor cable

MEGATORQUE MOTOR is a kind of servo motor.

Combination table

Motor Reference No.	Converter Reference No.	Driver Reference No.	Motor cable Reference No.	Converter cable Reference No.
M-PB1006JN001	M-ECC-PB1006GA201	M-EGA-15A2301	M-CA***A101 ***: cable length 002 : 2 [m] 004 : 4 [m] 008 : 8 [m]	M-CC***A101 ***: cable length 002 : 2 [m] 004 : 4 [m] 008 : 8 [m]
M-PB3015JN001	M-ECC-PB3015GA201			
M-PB3030JN001	M-ECC-PB3030GA201			
M-PB3060JN001	M-ECC-PB3060GA201	M-EGA-30A2301		

Accessories

Name	Reference No.	Remarks
Power connector	M-FAE0001	CNA connector
IO connector	M-FAE0002	CN1 connector
Mounting bracket	M-FAE0003	Front mounting bracket for Driver
Regenerative resistor	M-FAE0004	80 [W]
Regenerative resistor	M-FAE0005	220 [W]
PC communication cable	M-FAE0006	Cable length : 2 850 [mm]
Connector set	M-FAE0007	CNA and CN1

3 | Driver

3.1. Driver Reference number

Example of Reference number : **M-EGA** - **15** **A** **2** **3** **01**

- Driver Model EGA
- Maximum output current 15：15 [Arms]　30：30 [Arms]
- Power voltage A：200to230 [VAC] (Single phase/Three phase)
- Design number 01：Standard
- Function 3：Pulse train input
- Position sensor code 2：Incremental

3.2. Specifications

3.3.1. General specifications

| Functional item		M-EGA-15A2301	M-EGA-30A2301
Control function		Position control	
Control system		IGBT: PWM control Sinusoidal drive	
Main circuit power	Three phase	200 to 230 [VAC] +10/-15 [%] , 50/60 [Hz]] +/-3 [Hz]	
	Single phase	200 to 230 [VAC] +10/-15 [%] , 50/60 [Hz] +/-3 [Hz]	220 to 230 [VAC] +/-10 [%] , 50/60 [Hz] +/-3 [Hz]
Control power	Single phase	200 to 230 [VAC] +10/-15 [%] , 50/60 [Hz] +/-3 [Hz]	
Power capacity	Main Power (Rated)	M-PB1006JN001 : 0.3 [kVA] M-PB3015JN001 : 0.5 [kVA] M-PB3030JN001 : 1.0 [kVA]	M-PB3060JN001 : 2.0 [kVA]
	Control Power	40 [VA]	
Environment	Operating temperatures	0 to 55 [°C]	
	Storing temperatures	-20 to +65 [°C]	
	Operating/Storing humidity	Below 90 [%RH] (No condensation)	
	Elevation	Below 1,000 [m]	
	Vibration	4.9 [m/s^2]	
	Shock	19.6 [m/s^2]	
Dimensions (H×W×D)		160×40×130 [mm]	160×50×130 [mm]
Mass		0.75 [kg]	0.9 [kg]
Alarms		Over current, Current detection error, Over load, Regeneration error, Driver overheating, External overheating, Over voltage, Main circuit power low voltage, Main circuit power supply open phase, Control power supply low voltage, Encoder error, Over speed, Speed control error, Speed feedback error, Excessive position, Positioning command pulse error, Built-in memory error, Parameter error	
Digital operator		Status display, Monitor display, Alarm display, Parameter setting, Test operation, Adjustment mode	
Dynamic brake circuit		Built-in	
Regeneration process circuit		Built-in *	
Monitors	Speed monitor (VMON)	2.0 [V] +/-10 [%] (at 1,000 [min^{-1}])	
	Torque (TCMON)	2.0 [V] +/-10 [%] (at 100 [%])	

＊ Please refer 6.Accessories in case of Regenerative reistor is required.

### 3.3.2. Input command, position feedback signal output, general input, general output

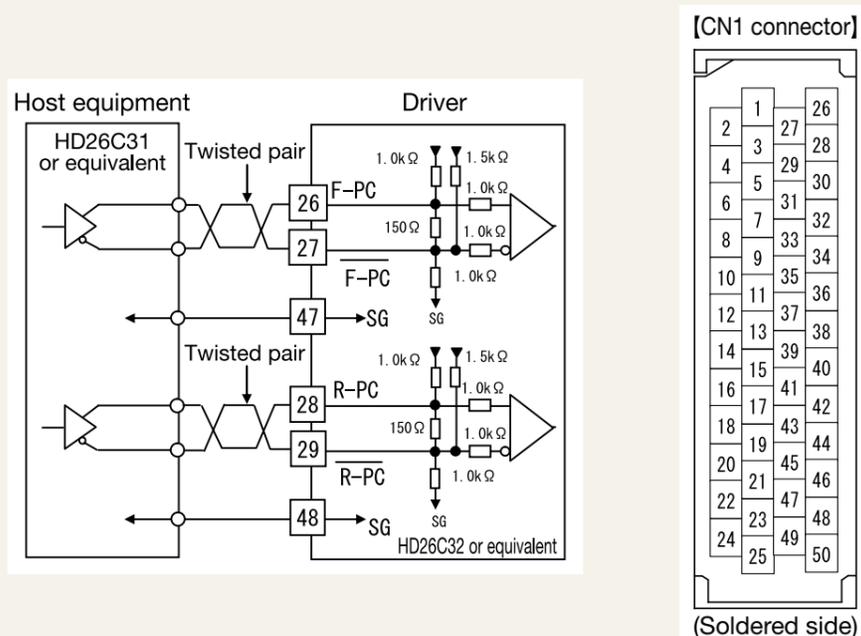|		
Position command	Maximum input pulse frequency	5 [Mpps] (CW+CCW pulse, Code + Pulse train) 1.25 [Mpps] (90 [°] -phase difference two-phase pulse)
	Input pulse form	CW + CCW command pulse, Code + Pulse train command or 90 [°] -phase difference two-phase pulse train command
	Electronic gear	N/D (N=1 to 2,097,152, D=1 to 2,097,152) however, 1/2,097,152 ≦ N/D ≦ 2,097,152
Position feedback signal		A/B phase pulse output: N/32,768 (N=1 to 32,767), 1/N (N=1 to 64) or 2/N (N=3 to 64) Z phase pulse output : 80 [count / rev]
Sequence input		Interactive photo coupler (sink, source connection): 6 inputs
		Line receiver: 2 inputs
		Input power voltage range: 5 [VDC] +/- 5 [%] / 12 to 24 [VDC] +/- 10 [%], 100[mA] or over
		Servo on, Alarm reset, Torque limit, CW rotation prohibit, CCW rotation prohibit, Command prohibit,Forced discharge, Emergency stop, Gain switching, Internal speed setting, Start of estimation of magnetic pole position, etc.
Sequence output		Open collector output: 8 outputs
		External power supply voltage (OUT-PWR): 5 [VDC] +/- 5 [%] / 12 to 24 [VDC] +/- 10 [%], 20 [mA] or over
		Circuit power for output signal: 5 [VDC] +/- 5 [%] / Max. 10 [mA] (per 1 output) Circuit power for output signal: 12 to 15 [VDC] +/- 10 [%] / Max. 30 [mA] (per 1 output) Circuit power for output signal: 24 [VDC] +/- 10 [%] / Max. 50 [mA] (per 1 output)
		Servo ready, Power on, Servo on, Torque limiting, Speed limiting, Low speed, Velocity attainment, Matching speed, Zero speed, Command acceptable, Status of gain switch, Velocity loop proportional control status, CW Over Travel, CCW Over Travel, Warning, Alarm code (3 bit), Start of estimation of magnetic pole position, etc.

3.2. Dimension

M-EGA-15A2301
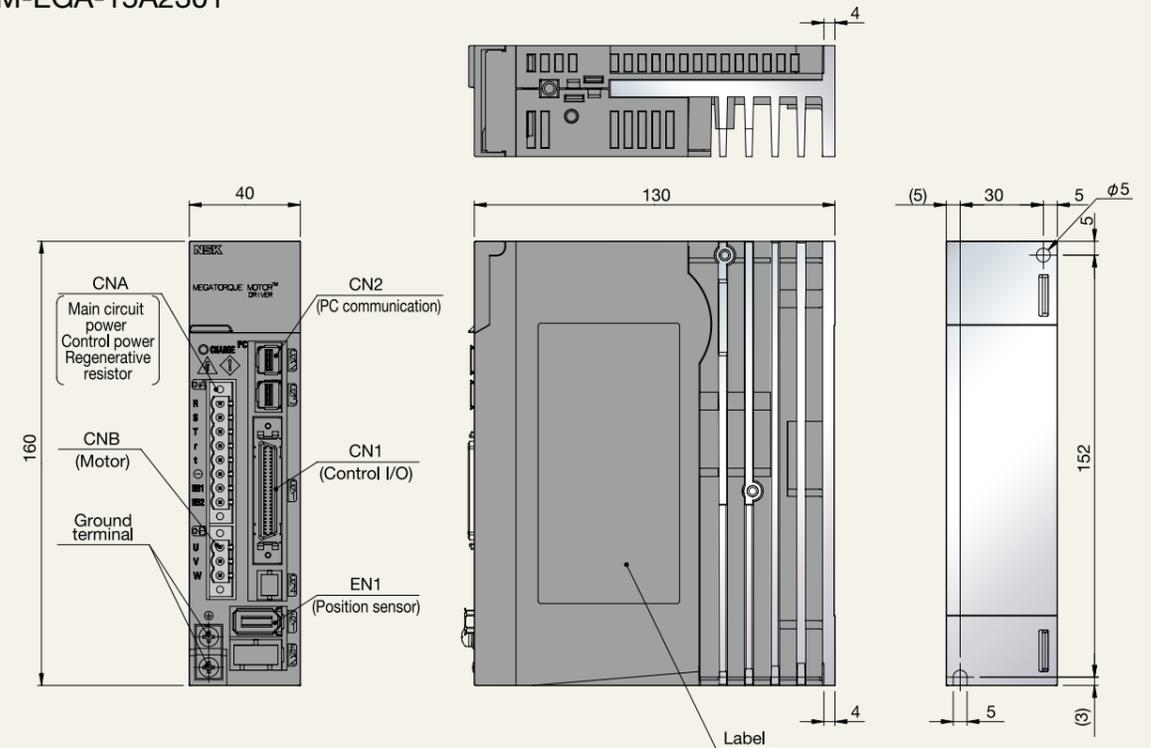
M-EGA-30A2301
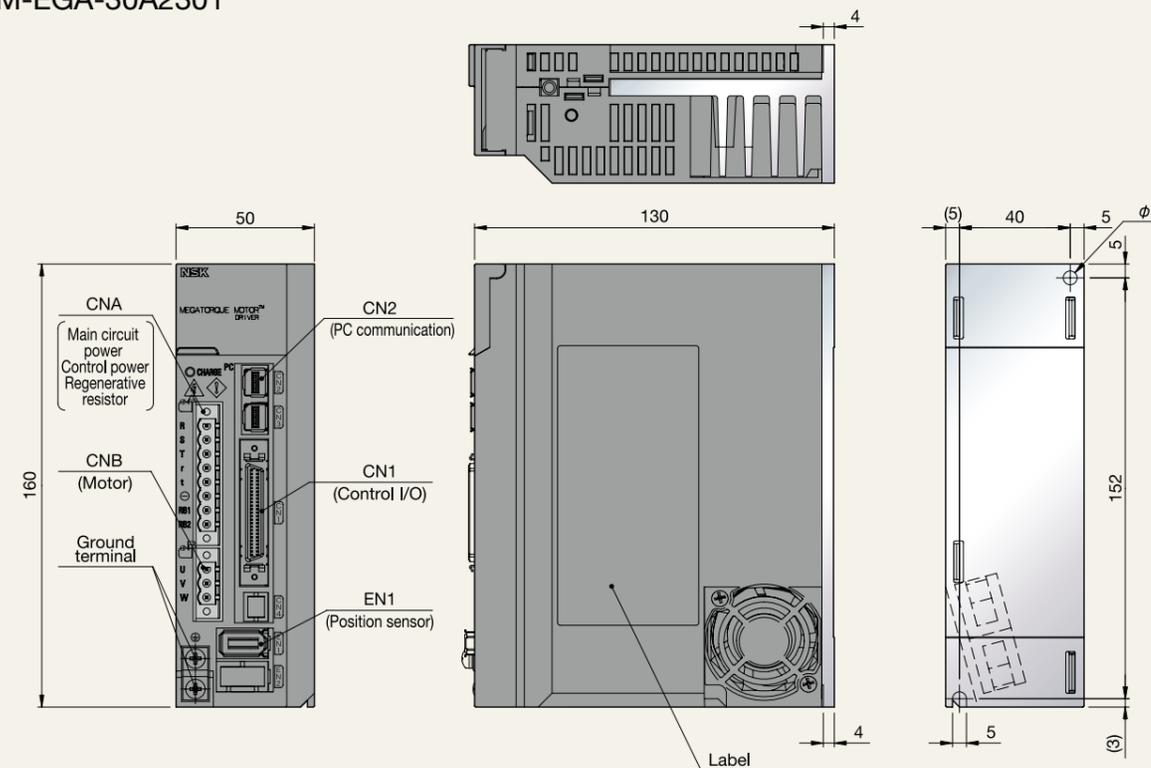
3.4. CN1 Signal and function

Terminal number	Signal name	Description
1	—	Do notconnect
2	—	Do not connect
3	AO	A phase pulse output
4	$\overline{AO}$	/A phase pulse output
5	BO	B phase pulse output
6	$\overline{BO}$	/B phase pulse output
7	ZO	Z phase pulse output
8	$\overline{ZO}$	/Z phase pulse output
9	PS	Resolver signal output
10	$\overline{PS}$	/Resolver signal output
11	ZOP	Z phase pulse output
12	SG	Common for pins 3 to 11
17	—	Do not connect
18	—	Do not connect
19	—	Do not connect
20	—	Do not connect
21	—	Do not connect
22	T-COMP	Torque compensation input
23	SG	Common for pin 22
26	F-PC	CW command pulse input
27	$\overline{F-PC}$	CW command pulse input
28	R-PC	CCW command pulse input
29	$\overline{R-PC}$	CCW command pulse input
47	SG	Common for pins 26 and 27
48	SG	Common for pins 28 and 29
30	MON1	Analog monitor output
31	SG	Common for pin 30

Terminal number	Signal name	Description
13	CONT7	Position command pulse disabled function/shutdown at zero velocity function
14	$\overline{CONT7}$	
15	CONT8	Alarm reset function
16	$\overline{CONT8}$	
38	SG	Common for pins 13 to 16
32	CONT6	CW over travel function
33	CONT5	CCW over travel function
34	CONT4	Deviation clear function
35	CONT3	Magnetic pole position estimation input
36	CONT2	Emergency stop function
37	CONT1	Servo-ON function
50	CONT-COM	General input power supply
39	OUT1	In-Position window
40	OUT2	Magnetic pole position estimation ready
41	OUT3	Operation setup completion
42	OUT4	Magnetic pole position estimation end
43	OUT5	Alarm code bit 5
44	OUT6	Alarm code bit 6
45	OUT7	Alarm code bit 7
46	OUT8	Alarm status
49	OUT-PWR	Power source for general output
24	OUT-COM	General output Common
25	OUT-COM	General output Common

· Terminal number 26 to 29: CW + CCW pulse command, Code + pulse train command or 90 [°] -phase difference two-phase pulse train command can be selected.
· Terminal number 13 to 16, 32 to 37: Shipping set
· Terminal number 39 to 46: Shipping set
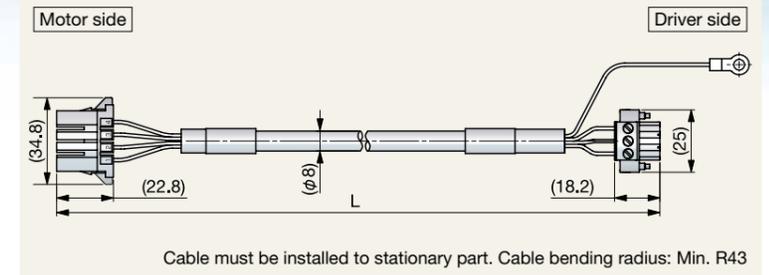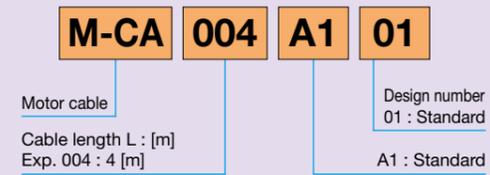
3.5. Pulse train input signal specifications

Host equipment / Driver

【CN1 connector】

(Soldered side)

4.1. Motor cable

4.1.1. Motor cable Reference number

Example :

| M-CA | 004 | A1 | 01 |

Motor cable

Cable length L : [m]
Exp. 004 : 4 [m]

Design number
01 : Standard

A1 : Standard

4.1.2. Dimension

Motor side

Driver side

(34.8)   (22.8)   φ8   L   (18.2)   (25)

Cable must be installed to stationary part. Cable bending radius: Min. R43

4.2. Converter cable

4.2.1. Converter cable Reference number

Example :

| M-CC | 004 | A1 | 01 |

Converter cable

Cable length L : [m]
Exp. 004 : 4 [m]

Design number
01 : Standard

A1 : Standard

4.2.2. Dimension

Converter side

Driver side

(36.8)   (42)   φ8   L   (39.6)   (22.7)

Cable must be installed to stationary part. Cable bending radius: Min. R90
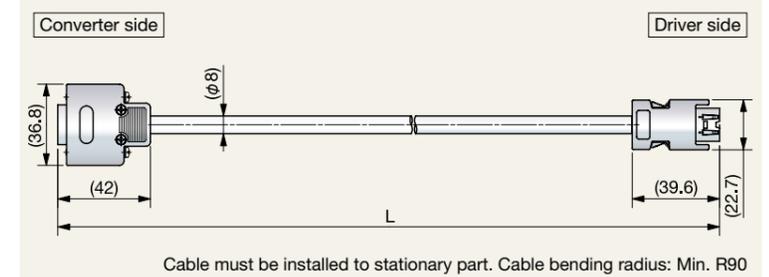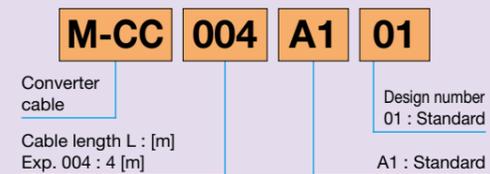
5.1. Converter Reference Number

Example : | M-ECC | - | PB1006 | GA | 2 | 01 |

Converter Model ECC

Motor model

GA : For Driver Model EGA

Design number 01 : Standard

Position sensor code 2 : Incremental

5.2. Dimension

CN1 (Motor side)

4 -(R)   Label   CN2 (Driver side)

43   23.5   61   52±0.6   4   33±0.3   20   73

Material : Steel
Surface treatment : Nickel plating
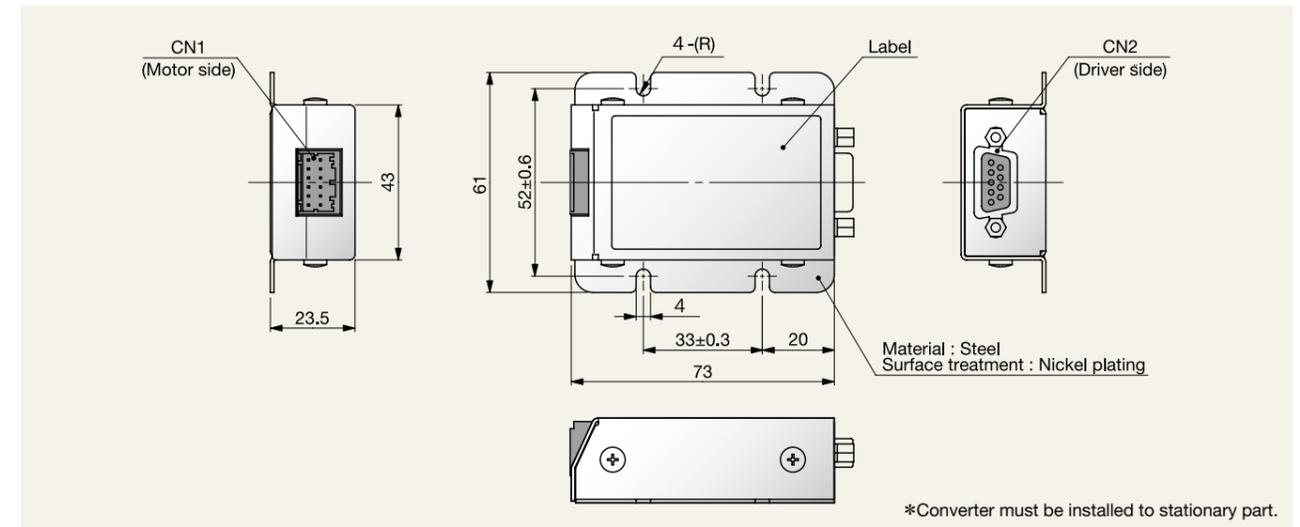
＊Converter must be installed to stationary part.