SANMOTION

STEPPING SYSTEM

G

SANYO DENKI

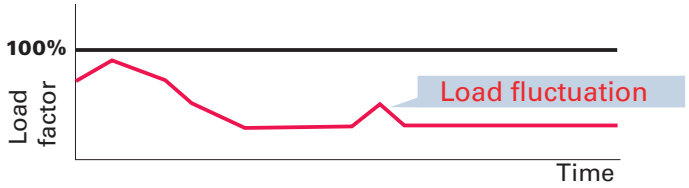
E

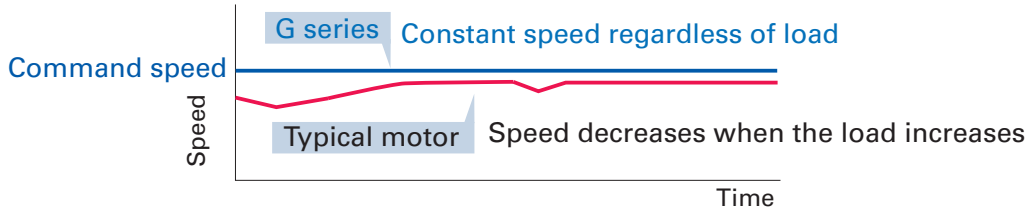
ENGLISH

The G Series stepping synchronous motor and driver system achieves excellent performance in the low-speed range, and outstanding savings on equipment costs.

Improves accuracy

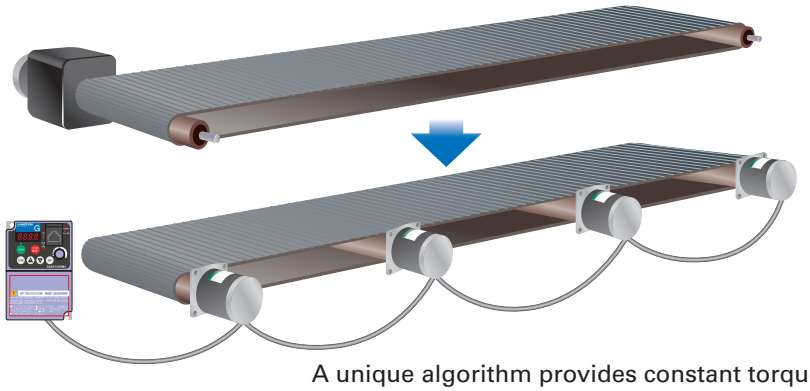
Since rotation is perfectly synchronized with the command frequency, speed control is precise and immune to disturbances or load fluctuations. Flexible and intuitive controls allow for exact operations over a wide range of speeds.



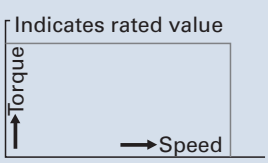
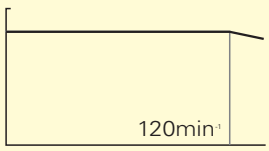
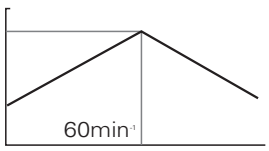
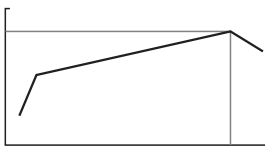


Dramatically reduces equipment costs

No gear is needed, thanks to the system's low-speed, high torque capabilities. Best of all, a single driver can control multiple motors. Moreover, superlative torque distribution decreases the time needed for mechanism adjustments and maintenance.

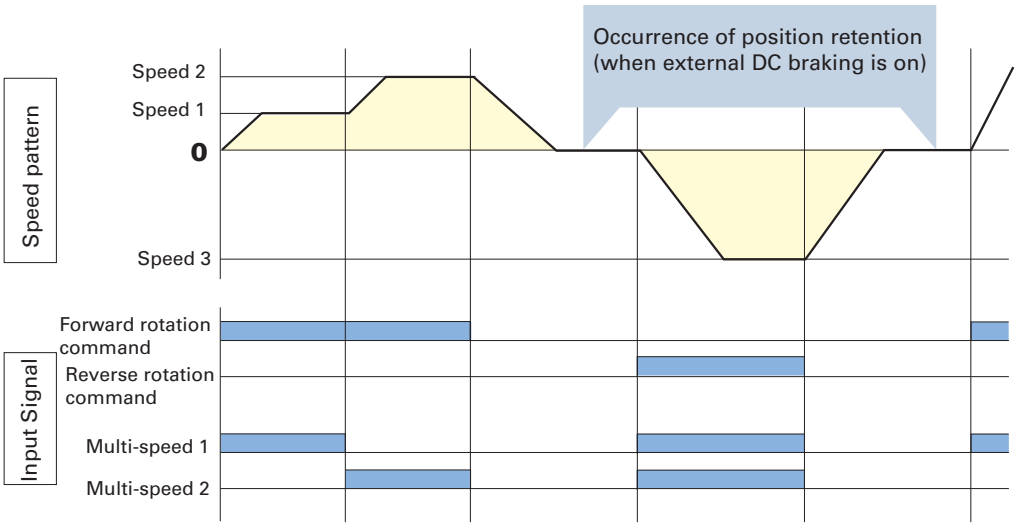


A unique algorithm provides constant torque up to the rated speed value.

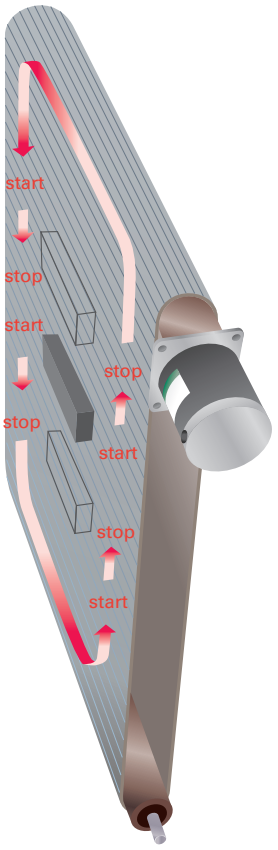
Characteristics	**SANMOTION G**	Inverter control Synchronous Motor	Inverter control Induction Motor
Sensorless	Yes	Yes	Yes
Constant torque up to rated speed	Yes	Yes	No (With few % slip)
Position Retention	Yes	Limited retention time	No (Requires mech. brake, etc.)
Positioning Motion	Yes (Timing command by I/O)	Torque retention constrained	No (No instantaneous stop)
Single Driver / Multiple Motor Operation	Yes	Yes	Yes
Single Driver / Multiple Motor Synchronization	Yes	Yes	No (Speed varies with load change)
Torque Characteristics image				

No mechanical brake required

Some of the outstanding features of the G series system include a position-retention function, instantaneous response motions such as start-up, stop, and reverse, and a simple positioning system that can be configured by an I/O command from the controller.

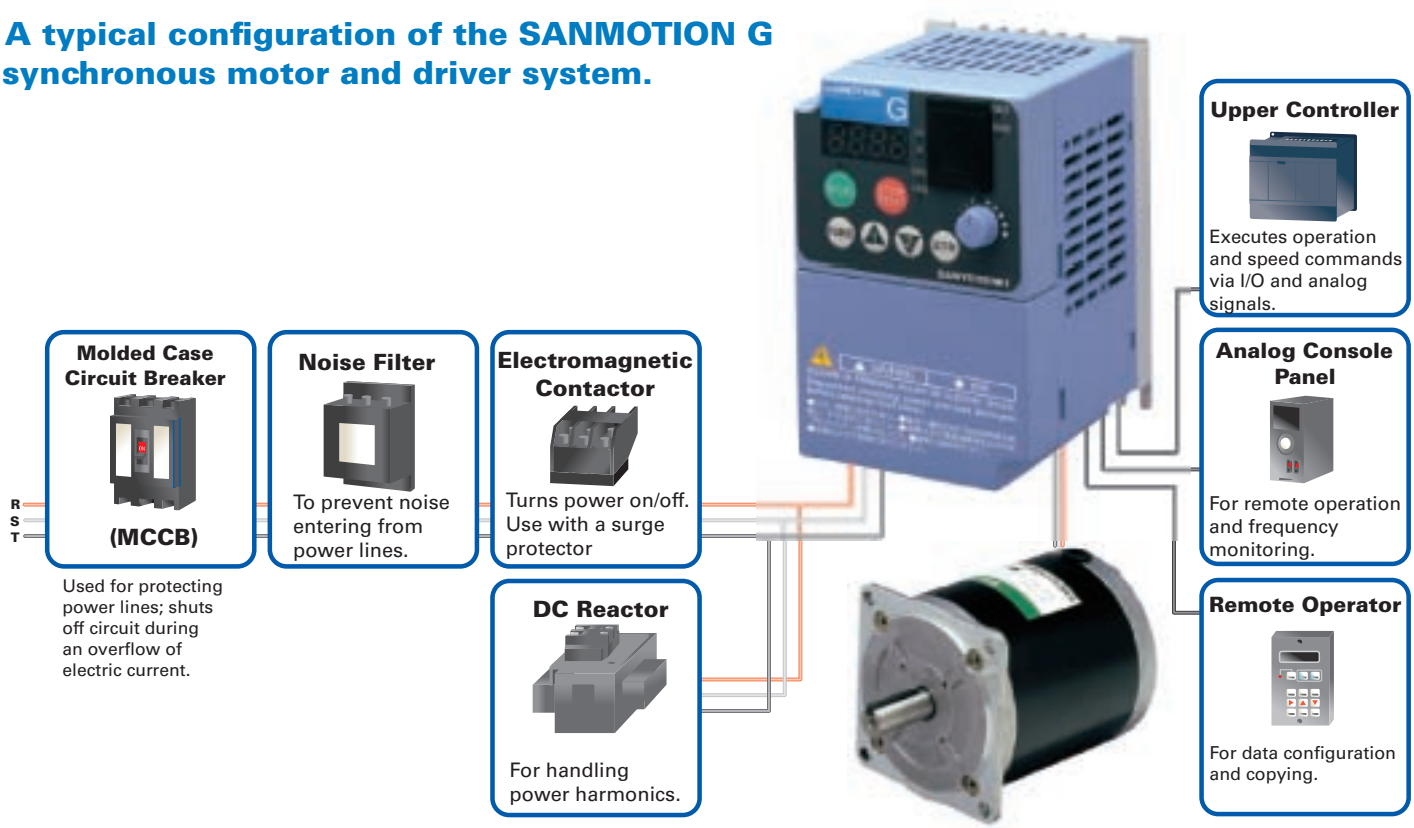


* A maximum of 16 levels of speed change are possible.



System Configuration

A typical configuration of the SANMOTION G synchronous motor and driver system.



Standard Motor Specifications

High-speed Type

ø86mm - ø106mm (NEMA 34 - 42)
Speed: 0 to 120 min^{-1}

CE/UL compliance pending

Options

- Vacuum specifications
- Low gas specifications
- Waterproof specifications

Flange size	mm (NEMA)	ø86mm (NEMA 34)
Rated Frequency	Hz	100
Rated Speed	min^{-1}	120
Rated Torque	N-m (oz-in)	1(141.6)
Rated Current	A	0.28
Rotor Inertia	kg-m^2 (oz-in-s^2)	1.6x10^{-4} (2.2x10^{-2})
Mass	kg (lbs)	1.55 (3.4)
Allowable Thrust Load	N (lbs)	60 (13.5)
Allowable Radial Load *(Note 1)*	N (lbs)	224 (50.4)

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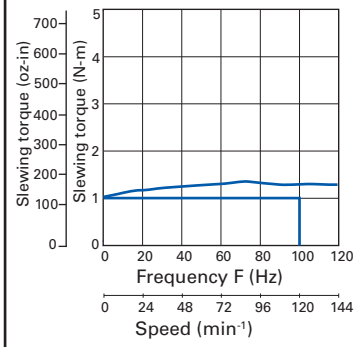

Standard Type

ø86mm - ø106mm (NEMA 34 - 42)
Speed: 0 to 72 min^{-1}

CE/UL compliance pending

Options

- Vacuum specifications
- Low gas specifications
- Waterproof specifications

Flange size	mm (NEMA)	ø86mm (NEMA 34)
Rated Frequency	Hz	60
Rated Speed	min^{-1}	72
Rated Torque	N-m (oz-in)	0.9 (127.4)
Rated Current	A	0.11
Rotor Inertia	kg-m^2 (oz-in-s^2)	1.6x10^{-4} (2.2x10^{-2})
Mass	kg (lbs)	1.55 (3.4)
Allowable Thrust Load	N (lbs)	60 (13.5)
Allowable Radial Load *(Note 1)*	N (lbs)	224 (50.4)

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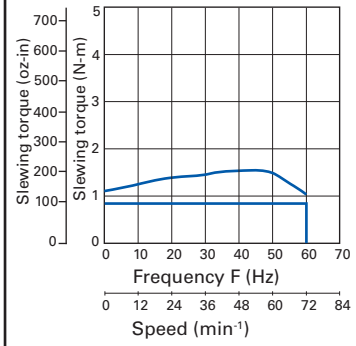

(Note 1): When load is applied at 1/3 from output shaft angle.

ø86mm (NEMA 34)	ø86mm (NEMA 34)	ø106mm (NEMA 42)	mm (NEMA)
100	100	100	Hz
120	120	120	min^{-1}
1.8 (254.9)	2.2 (311.5)	2.9 (410.6)	N-m (oz-in)
0.42	0.45	0.50	A
$3.2x10^{-4}$ ($4.5x10^{-2}$)	$4.4x10^{-4}$ ($6.2x10^{-2}$)	$14.6x10^{-4}$ ($20.0x10^{-2}$)	kg-m^2 (oz-in-s^2)
2.7 (6.0)	3.9 (8.6)	7.4 (16.3)	kg (lbs)
60 (13.5)	60 (13.5)	100 (22.5)	N (lbs)
197 (44.3)	167 (37.5)	392 (88.1)	N (lbs)

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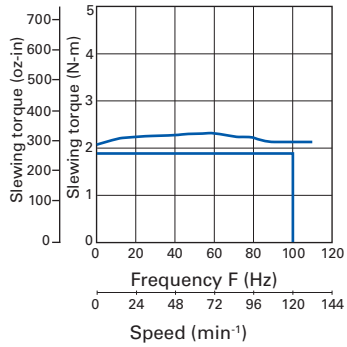

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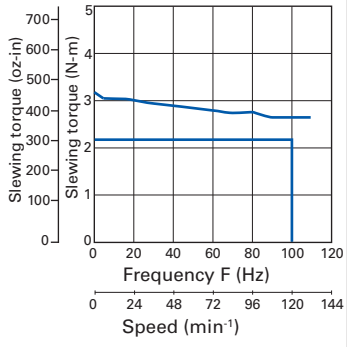

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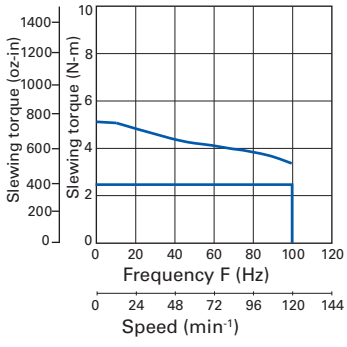

ø86mm (NEMA 34)	ø86mm (NEMA 34)	ø106mm (NEMA 42)	mm (NEMA)
60	60	60	Hz
72	72	72	min^{-1}
1.3 (184.1)	2 (283.2)	3.7 (523.9)	N-m (oz-in)
0.13	0.17	0.22	A
$3.2x10^{-4}$ ($4.5x10^{-2}$)	$4.4x10^{-4}$ ($6.2x10^{-2}$)	$14.6x10^{-4}$ ($20.0x10^{-2}$)	kg-m^2 (oz-in-s^2)
2.7 (6.0)	3.9 (8.6)	7.4 (16.3)	kg (lbs)
60 (13.5)	60 (13.5)	100 (22.5)	N (lbs)
197 (44.3)	167 (37.5)	392 (88.1)	N (lbs)

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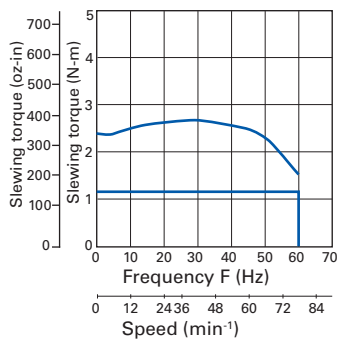

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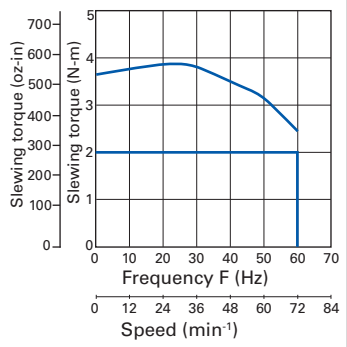

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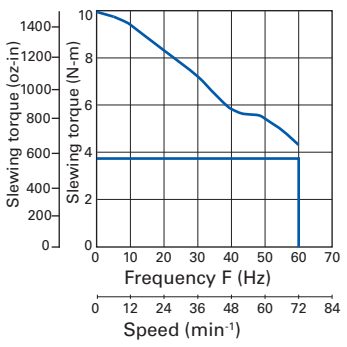


*The examples of torque characteristics in these charts are based on a parameter setting of 14 kHz.
Torque characteristics will vary based on parameter settings, as shown by the curved line in each chart.

Driver Specifications

Driver Number Items		GH1B012Z00 Specifications
Driver Rated Capacity (kVA)		200V: 0.4; 220 V: 0.5
Rated Input AC Voltage		Single-phase/3-phase 200 to 240V±10%; 50 to 60 Hz±5%
Rated Output Voltage (Note 2)		3-phase 200~240V (depending on receiving voltage)
Rated Output Current (A) (Note 1)		1.4
Driver Mass (lbs.)		1.54
Driver IP Rating		IP 20
Control Method		Sine Wave PWM Control
Output Frequency Range		0.1~400 Hz
Frequency Accuracy		Digital Command ±0.01%; Analog Command ±0.2%;25±10°C relative to maximum frequency
Frequency Setting Resolution		Digital Setting: 0.1 Hz Analog Setting: max. frequency/1000
Voltage/Frequency Characteristics		V/f Characteristics (constant torque)
Overload Current Rating		150%, 1 minute
Acceleration/Decelration Time		0.01~3000 seconds Linear/S-curve 2nd acceleration/deceleration setting
Carrier Frequency Changing Range		2.0~14.0 kHz
DC Braking	Internal DC Braking	Operates when frequency is below DC braking frequency during deceleration by stop command
	External DC Braking	Operates when frequency is less than start-up frequency during external input
Protective Functions		Overcurrent, overvoltage, undervoltage, electronic thermal, temperature abnormality, ground overcurrent at start-up, overload limit, receiving overvoltage, external trip, memory error, CPU error, restart after power failure prevention error, internal communication error, overvoltage control during deceleration
Optional equipment: noise filter, DC reactor, AC reactor, remote operator, connector cables, regenerative braking unit/resistor		

Driver Number Items		GH1B012Z00 Specifications (cont.)
Frequency Command Method: Frequency Setting		Setting by attached volume, up/down keys 2W 1kΩ~2kΩ variable resistance, DC 0~10V (input impedance 10kΩ); 4~20 mA (input impedance 250Ω); Communication via RS-485 port (Modbus RTU)
Operation Command Method: Forward/Reverse Rotation; Stop		Forward/stop rotation operation by stop keys (rotation direction switched by command); reverse rotation and stop possible when terminals are allocated (1a or 1b); operation and stop via RS-485 port (Modbus RTU)
Input Signal: Intelligent Input		Allocate input signals for intelligent input terminals 1~5. Forward/reverse rotation command, multi-speed command, reset input, current input selection, restart after power failure prevention function, external trip, forced operation, 3-wire function (start, stop, forward/reverse), free-run stop command, J-jogging command,2-stage acceleration/deceleration command, external DC braking, remote control function (speed up/down), PID valid/invalid, PID deviation clear, thermistor input, up/down clear, soft lock command
Output Signal	Intelligent Output	Allocate output signals for intelligent output terminals 11~12. Signal during operation command, output at the time of reaching constant speed, output over set frequency, overload warning signal, PID excessive deviation signal, alarm signal, analog input disconnection detection signal
	Frequency Monitor	Select frequency signal and current signal from the analog meter (DC 0~10 V, 1 mA max) and analog output terminal
	Intelligent Relay Output	Output the intelligent output and its function signal by relay (1c contact)
Other Functions		AVR function, frequency upper/lower limit, 16-stage multi-speed, starting frequency adjustment, jogging operation, carrier freq. change, PID control, frequency jump, analog gain/bias adjustment, S-curve acceleration, retry function, trip monitor, soft lock function, freq. change display, motor speed up/down, starting voltage setting
General Specifications: Ambient temperature: -10 to 40°C (up to carrier frequency 5 kHz), -10 to 50°C (reduced carrier frequency and output current); Storage temperature: -20 to 65°C (short term during transportation); Humidity: 20 to 90% RH; Vibration: 5.9m/s² (0.6 G), 10~55 Hz (complies with JIS C0040 [1999]); Applicable standards; Complies with UL/CE standards (insulation distance; but EMC filter must be prepared separately per EMC Directives.		

Note 1: The operational rated output current value for a sinlge driver is indicated. However, the output value will change depending on the carrier frequency setting. Before connecting multiple motors to a single driver, please contact us for additional information.
Note 2: The output voltage is lowered when the supply voltage is lowered.

Driver Operation Panel

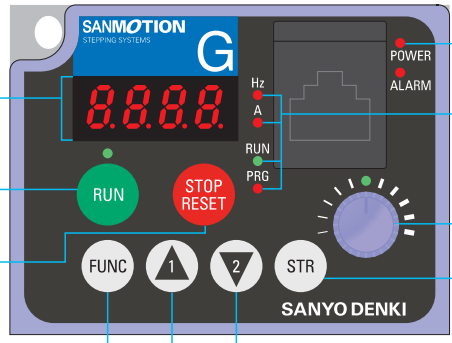
PARAMETER DISPLAY
4 digit display for frequency, motor current, motor speed, and alarm status.

RUN KEY
Push to begin operation.

STOP/RESET KEY
To stop operation and reset system alarms.

FUNCTION KEY
For scrolling through function codes and modifying settings.

UP/DOWN KEY
To access the monitor mode, default settings, or advanced functions.



POWER LED
Displays status of control circuit power.

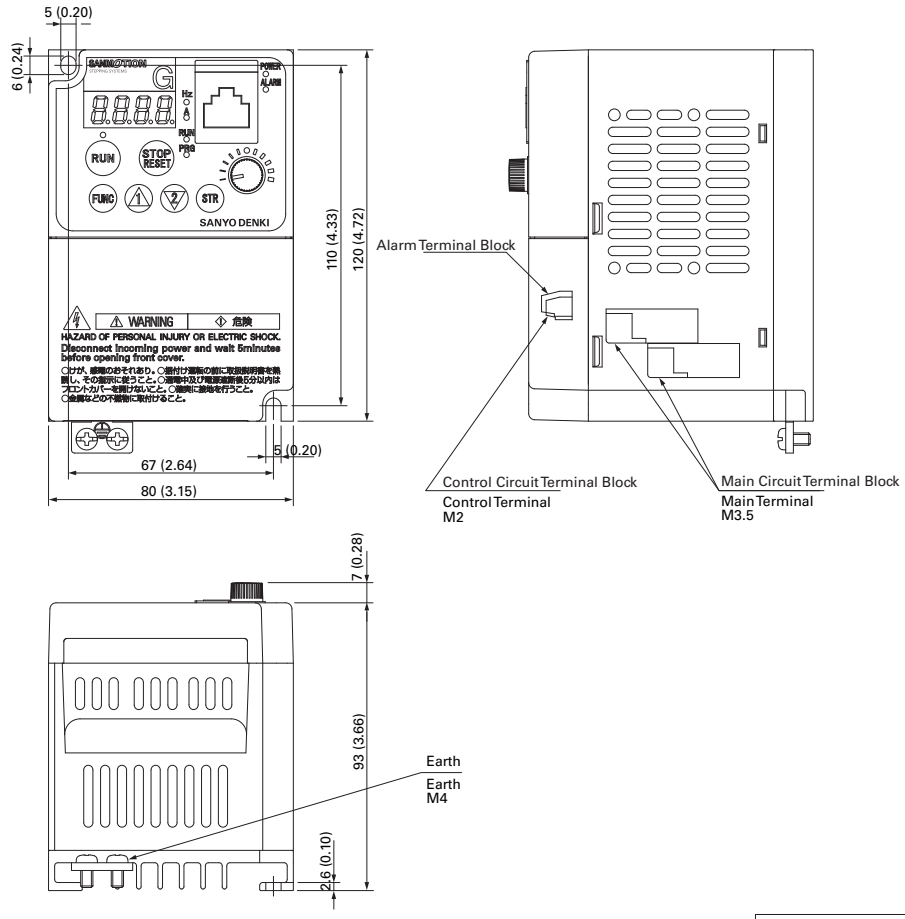
DISPLAY UNIT (Hz/A) LEDs
Displays monitor conditions (Hz, A) and inverter operation (RUN, PRG).

POTENTIOMETER

STORE KEY
Stores setting data in the unit's memory.

Dimensions

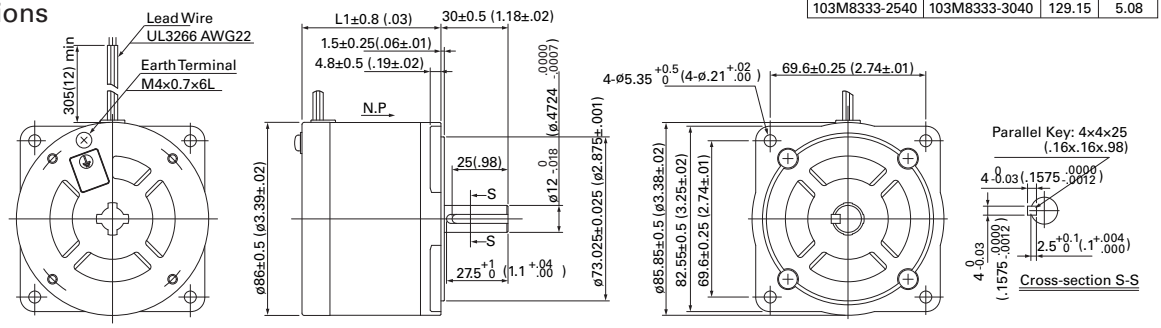
Driver Dimensions
unit: mm (inch)



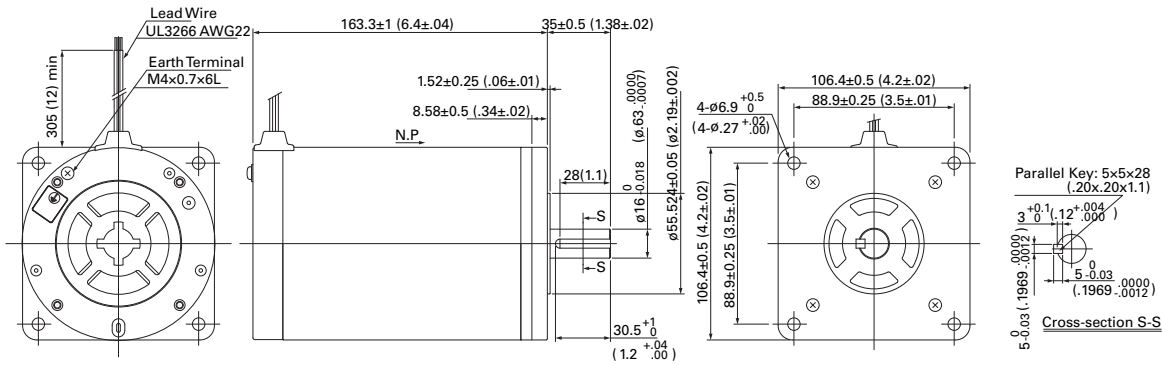
Part Number		L1(mm)	L1(inch)
103M8331-2540	103M8331-3040	62.15	2.45
103M8332-2540	103M8332-3040	95.65	3.77
103M8333-2540	103M8333-3040	129.15	5.08

Motor Dimensions
unit: mm(inch)

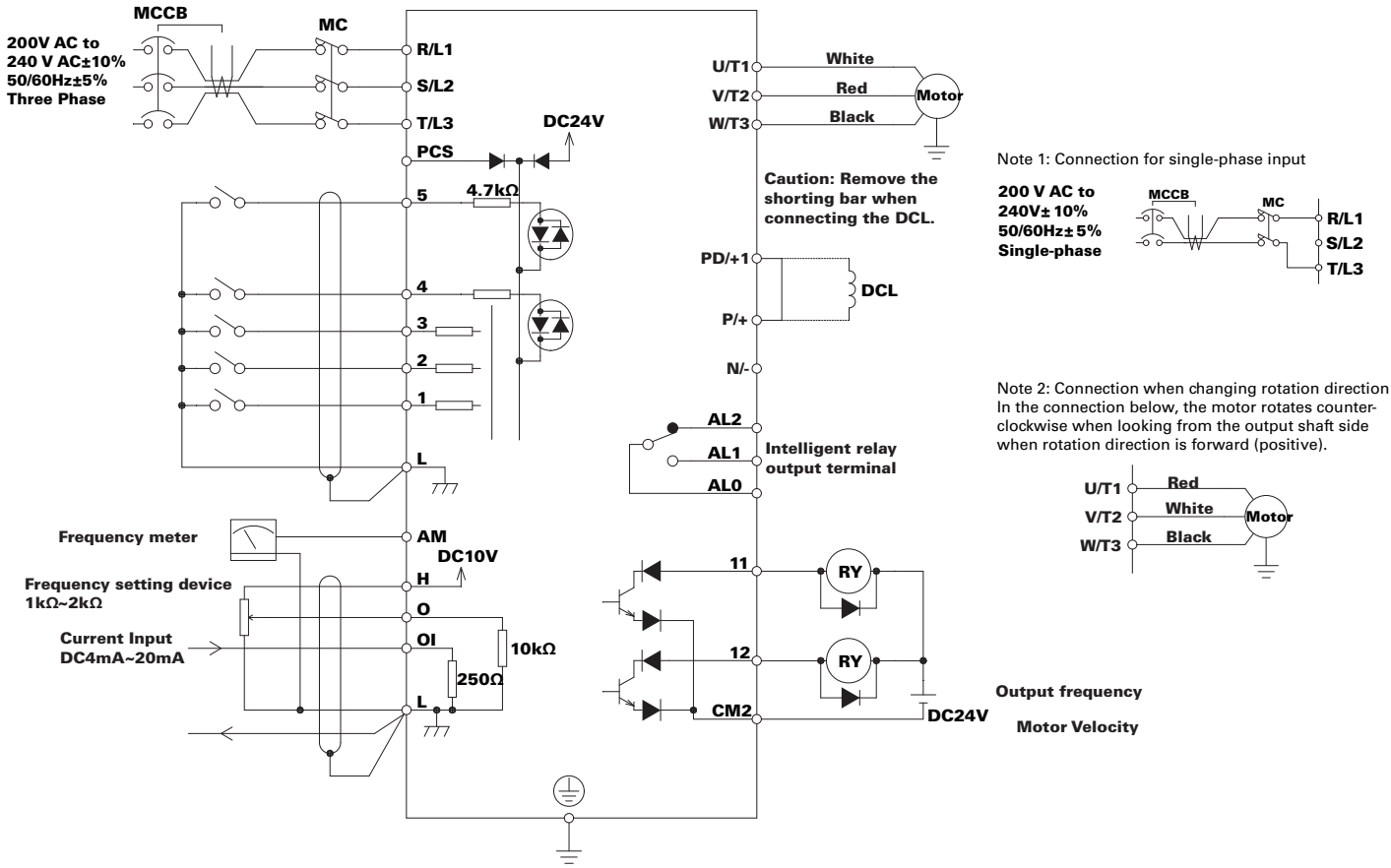
ø86mm NEMA 34
P/N 103M833Δ-



ø106mm NEMA 42
P/N 103M89332-



External Connection Diagram



■ Precautions Regarding Use

⚠ Caution

The possibility of moderate or minor injury and the occurrence of physical damage are assumed when the precautions at right column are not observed. Depending on the situation, this may cause serious consequences. Be sure to follow all listed precautions.

⚠ Cautions

- Be sure to read the instruction manual before using this product.
- Take sufficient safety measures and contact us before applying this product to medical equipment that may involve human lives.
- Contact us before adapting this product for use with equipment that could cause serious social or public effects.
- The use of this product in high motion environments where vibration is present, such as in vehicles or shipping vessels, is prohibited.
- Do not convert or modify any equipment components.

* Please contact our Business Division for questions and consultations regarding the above.

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