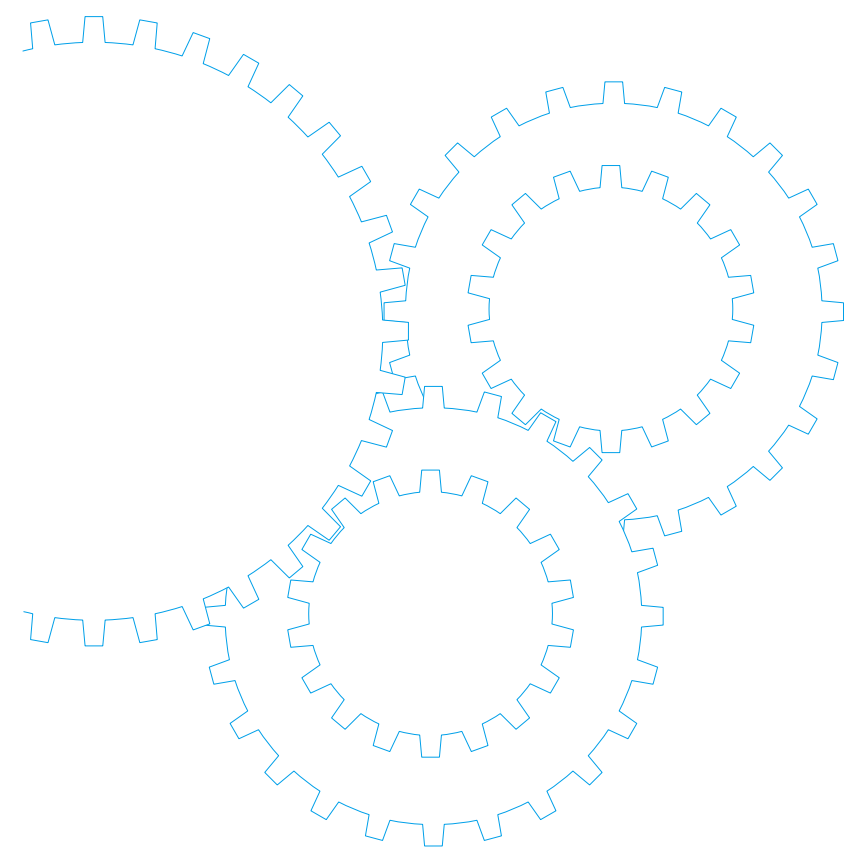


Speed Controller



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• Speed Controller Overview	C- 2
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Speed Controller Overview

Overview of Speed Controllers

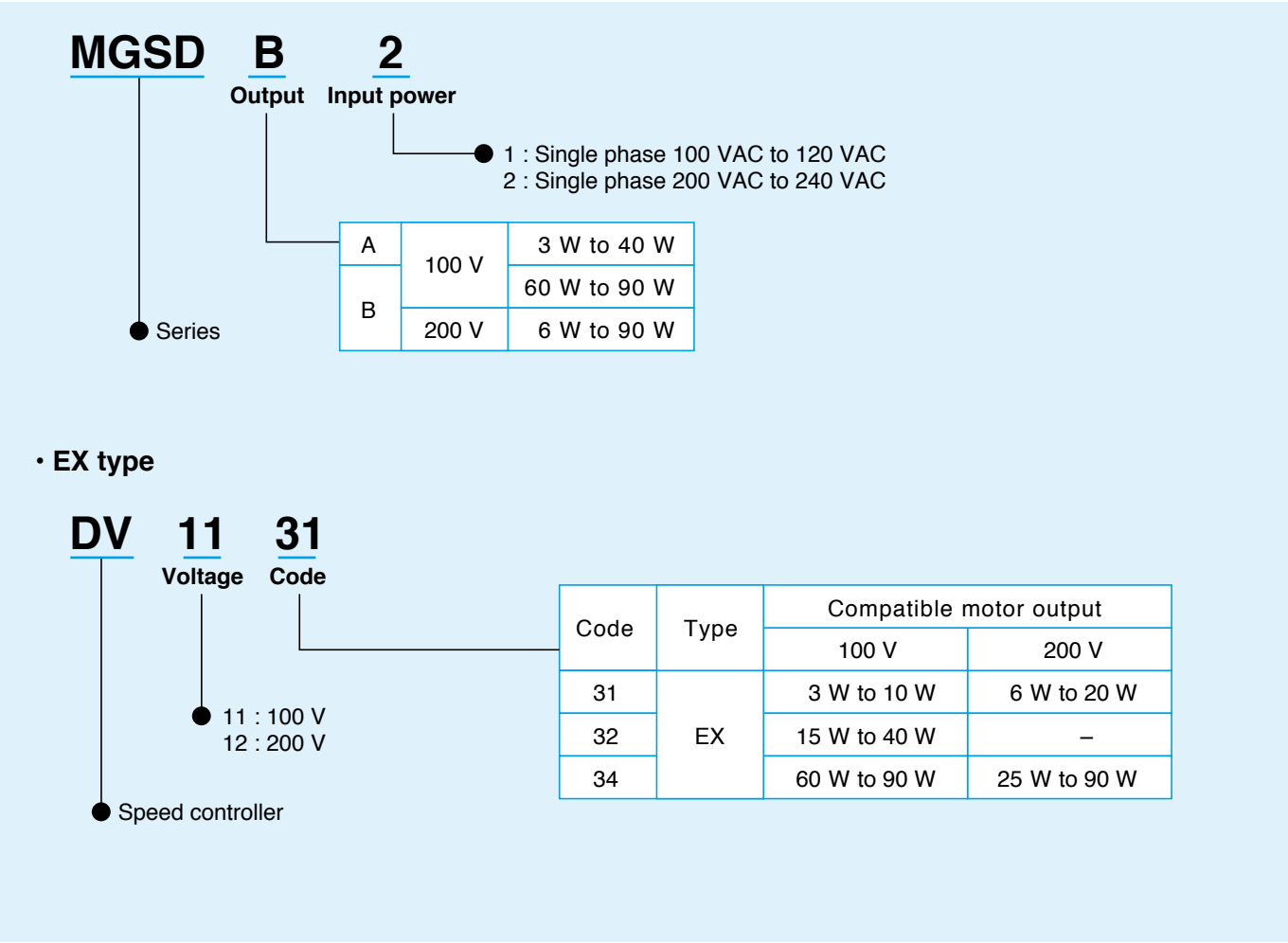
- These controllers vary speed of compact geared motors.
- The lineup of the speed controllers is divided into the following 3 types to meet various applications and configuration.

- 1. **Separate type speed controller** Speed controller of the basic configuration
- 2. **Unit type speed controller** A set of a motor and speed controller: Both can be connected through a single-touch connector.
- 3. **Inverter** Speed controller for 3-phase motor

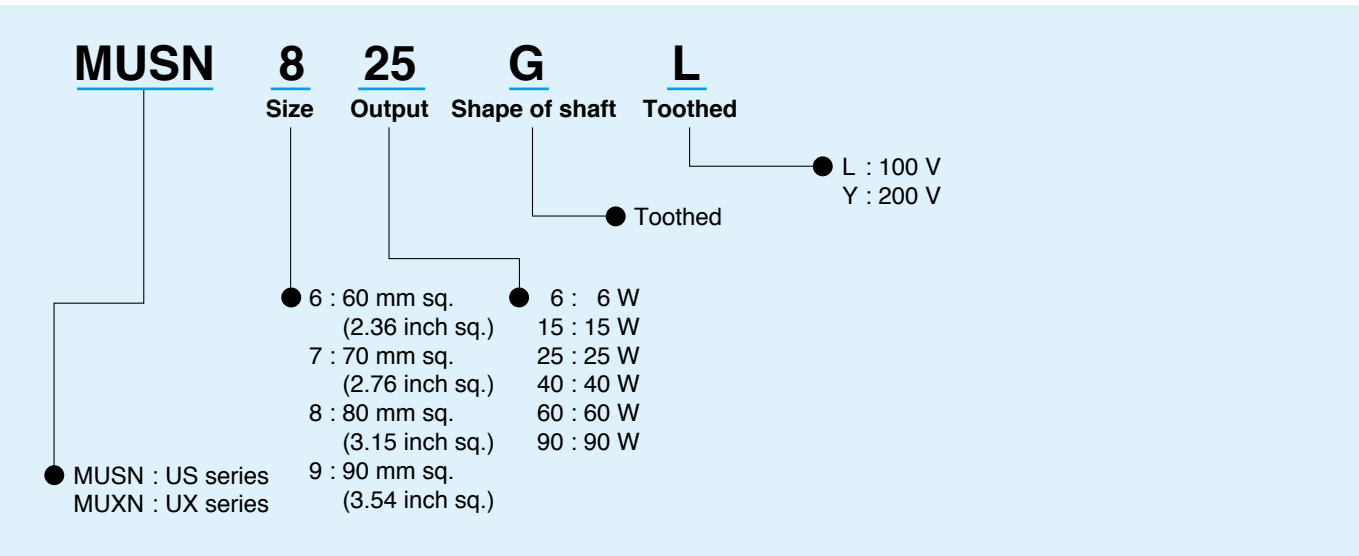
Product designation

- **Separate type speed controller**

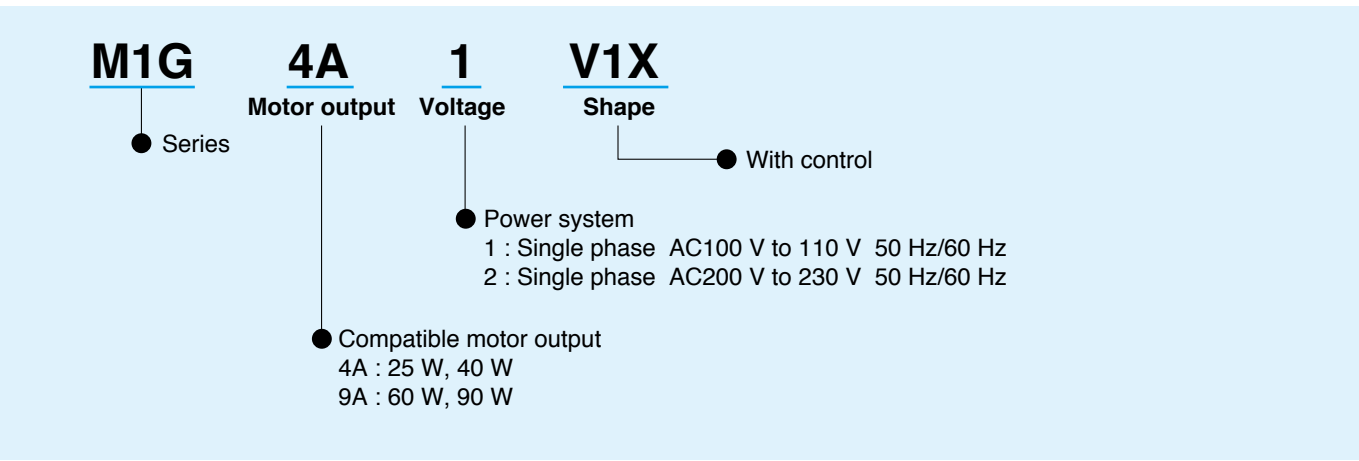
- **MGSD type**



- **Unit type speed controller**



- **Inverter**



Speed controller

• Possible combination of speed controller and motor

	Size	Output (W)	Motor		Voltage (V)	Speed controller	
			Certified	Part No.		MGSD type	EX type
Variable speed induction motor	60 mm sq. (2.36 inch sq.)	3	----	M61X3GV4L	100	MGSDA1 ★	DV1131
		6	----	M61X6GV4L	100	MGSDA1 ★	DV1131
			----	M61X6GV4Y	200	MGSDB2 ★	DV1231
			★	M61X6GV4LG(A)	100	MGSDA1 ★	----
			★	M61X6GV4DG(A)	110/115	MGSDA1 ★	----
			★	M61X6GV4YG(A)	200	MGSDB2 ★	----
			★	M61X6GV4GG(A)	220/230	MGSDB2 ★	----
		70 mm sq. (2.76 inch sq.)	10	----	M71X10GV4L	100	MGSDA1 ★
	----			M71X10GV4Y	200	MGSDB2 ★	DV1231
	15		----	M71X15GV4L	100	MGSDA1 ★	DV1132
			----	M71X15GV4Y	200	MGSDB2 ★	DV1231
			★	M71X15GV4LG(A)	100	MGSDA1 ★	----
			★	M71X15GV4DG(A)	110/115	MGSDA1 ★	----
			★	M71X15GV4YG(A)	200	MGSDB2 ★	----
			★ e	M71X15GV4GG(A)	220/230	MGSDB2 ★	----
	80 mm sq. (3.15 inch sq.)	15	----	M81X15GV4L	100	MGSDA1 ★	DV1132
			----	M81X15GV4Y	200	MGSDB2 ★	DV1231
		25	----	M81X25GV4L	100	MGSDA1 ★	DV1132
			----	M81X25GV4Y	200	MGSDB2 ★	DV1234
			★	M81X25GV4LG(A)	100	MGSDA1 ★	----
			★	M81X25GV4DG(A)	110/115	MGSDA1 ★	----
			★	M81X25GV4YG(A)	200	MGSDB2 ★	----
			★ e	M81X25GV4GG(A)	220/230	MGSDB2 ★	----
	90 mm sq. (3.54 inch sq.)	40	----	M91X40GV4L	100	MGSDA1 ★	DV1132
			----	M91X40GV4Y	200	MGSDB2 ★	DV1234
			★	M91X40GV4LG(A)	100	MGSDA1 ★	----
			★	M91X40GV4DG(A)	110/115	MGSDA1 ★	----
			★	M91X40GV4YG(A)	200	MGSDB2 ★	----
			★ e	M91X40GV4GG(A)	220/230	MGSDB2 ★	----
		60	----	M91Z60GV4L	100	MGSDB1 ★	DV1134
			----	M91Z60GV4Y	200	MGSDB2 ★	DV1234
			★	M91Z60GV4LG(A)	100	MGSDB1 ★	----
			★	M91Z60GV4DG(A)	110/115	MGSDB1 ★	----
			★	M91Z60GV4YG(A)	200	MGSDB2 ★	----
			★	M91Z60GV4GG(A)	220/230	MGSDB2 ★	----
			★ e	M91Z60GV4GGC	220/230	MGSDB2 ★	----
		90	----	M91Z90GV4L	100	MGSDB1 ★	DV1134
			----	M91Z90GV4Y	200	MGSDB2 ★	DV1234
			★	M91Z90GV4LG(A)	100	MGSDB1 ★	----
			★	M91Z90GV4DG(A)	110/115	MGSDB1 ★	----
	★		M91Z90GV4YG(A)	200	MGSDB2 ★	----	
	★		M91Z90GV4GG(A)	220/230	MGSDB2 ★	----	
	★ e		M91Z90GV4GGC	220/230	MGSDB2 ★	----	

* When using a speed controller operative under a wide range of supply voltage (MGSD), the mating motor should be selected according to the voltage of the power supply to be used.

★ Conforming to international standards e Motor compliant with China efficiency standards : c   

★ MGSD speed controllers are compliant with c  and .

* The models with a motor model number to which “A” is suffixed are not equipped with a capacitor cap.
The models with a motor model number to which “A” is suffixed are not sold or available in Japan.

	Size	Output (W)	Motor		Voltage (V)	Speed controller	
			Certified	Part No.		MGSD type	EX type
Variable speed reversible motor	60 mm sq. (2.36 inch sq.)	3	-----	M6RX4GV4L	100	MGSDA1 ★	DV1131
		6	-----	M6RX6GV4L	100	MGSDA1 ★	DV1131
			-----	M6RX6GV4Y	200	MGSDB2 ★	DV1231
			★	M6RX6GV4LG(A)	100	MGSDA1 ★	-----
			★	M6RX6GV4DG(A)	110/115	MGSDA1 ★	-----
			★	M6RX6GV4YG(A)	200	MGSDB2 ★	-----
			★	M6RX6GV4GG(A)	220/230	MGSDB2 ★	-----
	70 mm sq. (2.76 inch sq.)	10	-----	M7RX10GV4L	100	MGSDA1 ★	DV1131
			-----	M7RX10GV4Y	200	MGSDB2 ★	DV1231
		15	-----	M7RX15GV4L	100	MGSDA1 ★	DV1132
			-----	M7RX15GV4Y	200	MGSDB2 ★	DV1231
			★	M7RX15GV4LG(A)	100	MGSDA1 ★	-----
			★	M7RX15GV4DG(A)	110/115	MGSDA1 ★	-----
			★	M7RX15GV4YG(A)	200	MGSDB2 ★	-----
			★	M7RX15GV4GG(A)	220/230	MGSDB2 ★	-----
	80 mm sq. (3.15 inch sq.)	15	-----	M8RX20GV4L	100	MGSDA1 ★	DV1132
			-----	M8RX20GV4Y	200	MGSDB2 ★	DV1231
		25	-----	M8RX25GV4L	100	MGSDA1 ★	DV1132
			-----	M8RX25GV4Y	200	MGSDB2 ★	DV1234
			★	M8RX25GV4LG(A)	100	MGSDA1 ★	-----
			★	M8RX25GV4DG(A)	110/115	MGSDA1 ★	-----
			★	M8RX25GV4YG(A)	200	MGSDB2 ★	-----
			★	M8RX25GV4GG(A)	220/230	MGSDB2 ★	-----
	90 mm sq. (3.54 inch sq.)	40	-----	M9RX40GV4L	100	MGSDA1 ★	DV1132
			-----	M9RX40GV4Y	200	MGSDB2 ★	DV1234
			★	M9RX40GV4LG(A)	100	MGSDA1 ★	-----
			★	M9RX40GV4DG(A)	110/115	MGSDA1 ★	-----
			★	M9RX40GV4YG(A)	200	MGSDB2 ★	-----
			★	M9RX40GV4GG(A)	220/230	MGSDB2 ★	-----
		60	-----	M9RZ60GV4L	100	MGSDB1 ★	DV1134
			-----	M9RZ60GV4Y	200	MGSDB2 ★	DV1234
			★	M9RZ60GV4LG(A)	100	MGSDB1 ★	-----
			★	M9RZ60GV4DG(A)	110/115	MGSDB1 ★	-----
			★	M9RZ60GV4YG(A)	200	MGSDB2 ★	-----
			★	M9RZ60GV4GG(A)	220/230	MGSDB2 ★	-----
		90	-----	M9RZ90GV4L	100	MGSDB1 ★	DV1134
			-----	M9RZ90GV4Y	200	MGSDB2 ★	DV1234
			★	M9RZ90GV4LG(A)	100	MGSDB1 ★	-----
			★	M9RZ90GV4DG(A)	110/115	MGSDB1 ★	-----
			★	M9RZ90GV4YG(A)	200	MGSDB2 ★	-----
			★	M9RZ90GV4GG(A)	220/230	MGSDB2 ★	-----
Variable speed motor with electromagnetic brake	60 mm sq. (2.36 inch sq.)	6	-----	M6RX6GBV4L	100	MGSDA1 ★	DV1131
			-----	M6RX6GBV4Y	200	MGSDB2 ★	DV1231
	70 mm sq. (2.76 inch sq.)	15	-----	M7RX15GBV4L	100	MGSDA1 ★	DV1132
			-----	M7RX15GBV4Y	200	MGSDB2 ★	DV1231
	80 mm sq. (3.15 inch sq.)	25	-----	M8RX25GBV4L	100	MGSDA1 ★	DV1132
			-----	M8RX25GBV4Y	200	MGSDB2 ★	DV1234
	90 mm sq. (3.54 inch sq.)	40	-----	M9RX40GBV4L	100	MGSDA1 ★	DV1132
			-----	M9RX40GBV4Y	200	MGSDB2 ★	DV1234

* When using a speed controller operative under a wide range of supply voltage (MGSD), the mating motor should be selected according to the voltage of the power supply to be used.

★ Conforming to international standards : c    ★ MGSD speed controllers are compliant with c  and .

* The models with a motor model number to which “A” is suffixed are not equipped with a capacitor cap.
The models with a motor model number to which “A” is suffixed are not sold or available in Japan.

* Please read your User's manual carefully so that you will understand the operation and safety precautions before attempting to operate the system.

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MGSD type



EX type

• Features

<MGSD type>

- Internal speed changer
Motor speed can be adjusted from the speed setting knob on the front panel.
Not necessary to install and connect an external speed changer to the controller.
- Electric brake enables instantaneous stop.
- Compact 8P plug-in configuration.
- Variable installation options are available.
Terminal blocks, sockets and other various options (from Panasonic) for panel board can be used.
- Compliant with international standards:

<EX type>

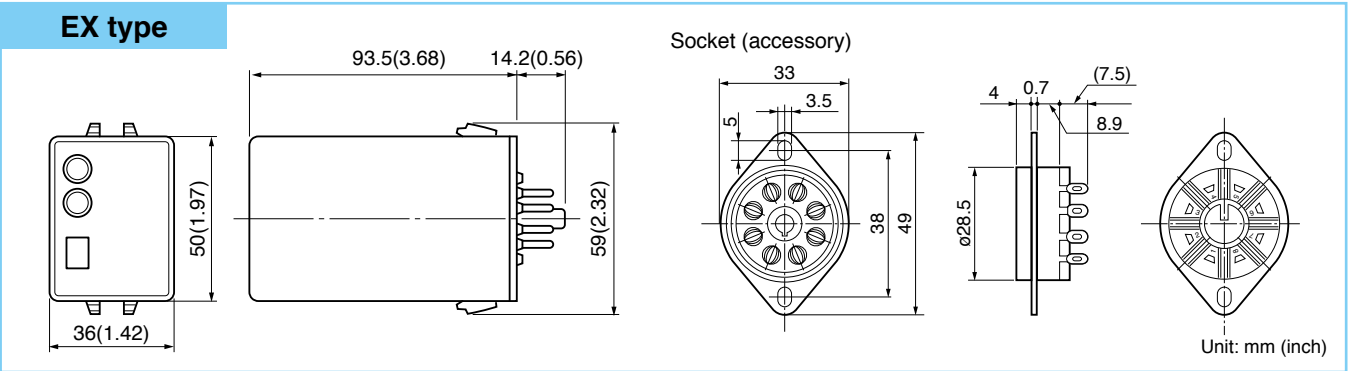
- Soft-start/soft-down
Time can be adjusted up to 5 seconds.
Excellent soft-start/soft-down linearity.
- Selectable response
High-stable and high-response can be selected with the internal changeover switch to meet the characteristic of the application.
(Factory setting: high-response)
- Excellent instantaneous stop capability
- Parallel operation
Two or more motors can be controlled from a single control knob.
- Can link with various control systems
Can control motor(s) in conjunction with different controlling systems such as PLC (Programmable Logic Controller). The voltage signal can also be used as control signal.

• Standard specification (EX type)

		EX type				
Characteristic	Part No.	DV1131	DV1132	DV1134	DV1231	DV1234
Rated voltage		Single phase 100 VAC			Single phase 200 VAC	
Operating voltage range		±10 % (at rated voltage)				
Power frequency		50 Hz/60 Hz				
Rated current		0.4 A	1 A	2.0 A	0.3 A	1 A
Compatible motor output *1		3 W to 10 W	15 W to 40 W	60 W to 90 W	6 W to 20 W	25 W to 90 W
Operation change		High-response			High-stability	
Speed control range		90 r/min to 1400 r/min / 90 r/min to 1700 r/min			50 r/min to 1400 r/min / 50 r/min to 1700 r/min	
Speed variation		5 % or more			3 % or less	
Speed setting		From external controller, e.g. external speed changer *3				
Braking*2		Active while electric braking current is flowing.				
Electric braking time		5 sec typ. The braking current will be turned off before the 5-sceond limit as the motor stops. (Braking current is 2 to 3 times the rated current.)				
Parallel operation		Enabled				
Soft-start/soft-down capability		Available (typically up to 5 sec (0 to max. speed))				
Operating temperature range		-10 °C to 50 °C				
Storage temperature		-20 °C to 60 °C				

*1 Applicable to Panasonic compact speed variable geared motors. Select motors with applicable output.
*2 Electric braking has no mechanical brake holding mechanism.
To provide brake holding, use our C&B motor or variable speed motor containing electromagnetic brake.
When braking a load having excessively high inertia, durability and life expectancy of motor shaft and gear should be taken into consideration. Use the motor within the allowable inertia.
*3 EX type is supplied with the external speed changer.

• Outline drawing

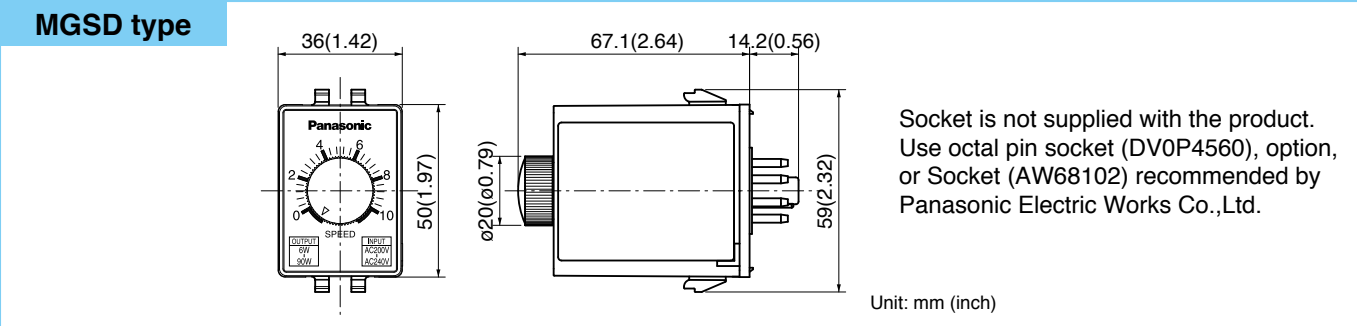


• Standard specification (MGSD type)

	MGSDA1	MGSDB1	MGSDB2
Supply voltage	Single phase 100 VAC to 120 VAC		Single phase 200 VAC to 240 VAC
Supply voltage tolerance	±10 % (at rated voltage)		
Power frequency	50 Hz/60 Hz		
Rated input current	1.0 A	2.0 A	1.0 A
Compatible motor output	3 W to 40 W	60 W to 90 W	6 W to 90 W
Speed control range	50 Hz : 90 r/min to 1400 r/min 60 Hz : 90 r/min to 1700 r/min		
Speed regulation (against load)	5 % : 1000 r/min, Typical variation at 80 % rated torque		
Speed setting	Internal		
Braking *1	Activated while electric braking current is flowing.		
Electric braking time	0.5 sec (typ.): Amount of braking current is 2 times to 3 times the rated current.		
Parallel operation	Not applicable		
Product weight	80 g		

*1 Electric braking has no mechanical holding mechanism.

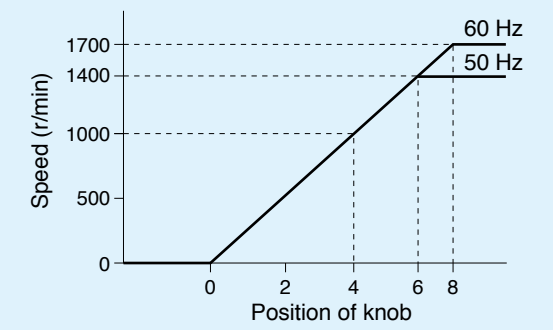
• Outline drawing



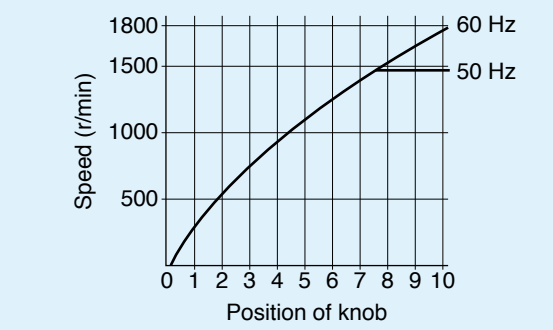
• Setting of Speed

In the case of the MGSD type, the built-in speed reference is used to set the speed. In the case of the EX type, the external speed reference is used to set the speed. The figure below shows an example of the relation between the position of the speed setting knob and the speed of the motor. (Note that there is an approx. 10 % fluctuation due to variations in the voltage generation of the circuit and tacho-generator.)

• MGSD type



• EX type



* Please read your User's manual carefully so that you will understand the operation and safety precautions before attempting to operate the system.

* Please read your User's manual carefully so that you will understand the operation and safety precautions before attempting to operate the system.

• Connection diagram list

Connection diagram	Function	Speed controller	Page
1	Wiring diagram (for unidirectional rotation)	MGSD type	C- 8
2	Speed change only	MGSD type	C- 9
3	Unidirectional rotation and electric brake	MGSD type	C-10
4	Normal/reverse rotation and electric brake	MGSD type	C-11
5	Wiring of cooling fan motor (F) or motor with thermal protector (TP)	MGSD type	C-12
6	Wiring to electromagnetic brake (40 W or smaller)	MGSD type	C-12
7	Wiring diagram (for unidirectional rotation)	EX type	C-13
8	Speed change only	EX type	C-14
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10	Normal/reverse rotation and electric brake	EX type	C-16
11	Multispeed setting application	EX type	C-17
12	Speed change with analog signal	EX type	C-17
13	Operation through contactless signal	EX type	C-18
14	Parallel operation through external speed changer	EX type	C-18
15	Parallel operation through analog signal	EX type	C-19
16	Soft-operation	EX type	C-19
17	Wiring of cooling fan motor (F) and motor with thermal protector (TP)	EX type	C-20
18	Wiring to electromagnetic brake	EX type	C-20

1 Wiring diagram (for unidirectional rotation)

- The motor revolving speed can be set from the speed setting knob on the panel.
- The thick continuous lines represent main circuit. Use conductor of size 0.75 mm² or larger for the main line.
- The thin continuous lines represent signal circuit. Use conductor of size 0.3 mm² or larger in the signal circuit.

When the distance from the tachometer generator (TG) is long, use shielded twisted pair cable.
Do not ground the shielding material.

Speed control knob
This knob adjusts the rotating speed of the motor from 90 (r/min) to 1400 (r/min) /1700 (r/min) at 50 Hz/60 Hz.

Power supply
100 VAC system: Single phase 100 VAC to 120 VAC
200 VAC system: Single phase 200 VAC to 240 VAC

Circuit breaker (MCCB)
: 5 A

<Caution>
Install a ground-fault circuit interrupter in the power supply.

<Precautions>
The input voltage must be in the range of rated voltage compatible with the motor specification.
*Install a noise filter and surge absorber to protect against external noise and lightning surge.

Miniature DIN terminal block
Panasonic AT7803

Capacitor cap
• National specifications: Option
• Specifications compliant with overseas standards: Attachment
* In the case of models with a model number to which "A" is suffixed, the capacitor cap is optional.
The models with a model number to which "A" is suffixed (not equipped with a capacitor cap) are not sold or available in Japan.

Capacitor
(supplied with the motor)
For connection to the capacitor, see the motor instruction manual.

Ground the return circuit to the earth terminal.
(100 Ω or smaller, ø1.6 mm or more).
Tightening torque: 1.0 N·m to 1.5 N·m

2 Speed change only

Unidirectional rotation

Rotating direction viewed from shaft end
CW Clockwise
CCW Counterclockwise

Pin No.

Normal/reverse rotation

SW1 : Power switch
SW2 : Normal/reverse selector switch

SW1	100 V supply system	5 A or more at 125 VAC
SW2	200 V supply system	5 A or more at 250 VAC
Spark killer R1+C1	DV0P008A (option)	

- <Precautions>**
- To change rotating direction of induction motor:
Provide a motor halt period. Switch over SW2 after complete stop of the motor.
 - To change rotating direction of reversible motor:
A motor halt period is not necessary. Switch over SW2 while keeping SW1 turned ON. When configuring SW2 with relay contacts, use a relay having large gap between contacts (e.g. HL relay from Panasonic) to prevent malfunction due to short-circuited capacitor.
 - For motors for cooling fan and motors with thermal protector, also refer to page C-12.
 - When using independent relay contacts for SW2 to change over normal/reverse, interlock both contacts so that they will not close simultaneously.
 - The spark killer consisting of R1 and C1 must be used to protect the relay contacts.

* Please read your User's manual carefully so that you will understand the operation and safety precautions before attempting to operate the system.

3 Unidirectional rotation and electric brake

25 W or smaller

Pin No.

40 W or larger

Pin No.

• Connection according to this wiring diagram causes the motor to rotate clockwise when viewed from the motor shaft end. To run the motor counterclockwise, interchange the connecting point of black and gray leads.

SW1 : Power switch
SW2 : RUN/STOP switch
SW3 : Brake start switch

SW1	100 V supply system	5 A or more at 125 VAC
SW2	200 V supply system	5 A or more at 250 VAC
SW3		DC10 V 10 mA
Spark killer R1+C1		DV0P008A (option)
External braking resistor R2		DV0P003 (option)

- <Precautions>
- When SW2 and SW3 are switched from RUN to STOP, electric braking is applied for approx. 0.5 sec, and the motor stops instantly.
Difference in switching time between SW2 and SW3 must be 0.1 sec or shorter. If SW2 (SW3) is in RUN position while SW3 (SW2) is in STOP, abnormal operation occurs (full speed rotation for a short time) and motor temperature rises excessively.
 - The number of start/stop operations must be 6 times/min or less.
 - For motors for cooling fan and motors with thermal protector, also refer to page C-12.
 - The spark killer consisting of R1 and C1 must be used to protect the relay contacts.
 - R2 limits flow of discharging current upon short-circuiting of the capacitor during braking.

4 Normal/reverse rotation and electric brake

25 W or smaller

Pin No.

40 W or larger

Pin No.

Rotating direction viewed from shaft end

CW	Clockwise
CCW	Counterclockwise

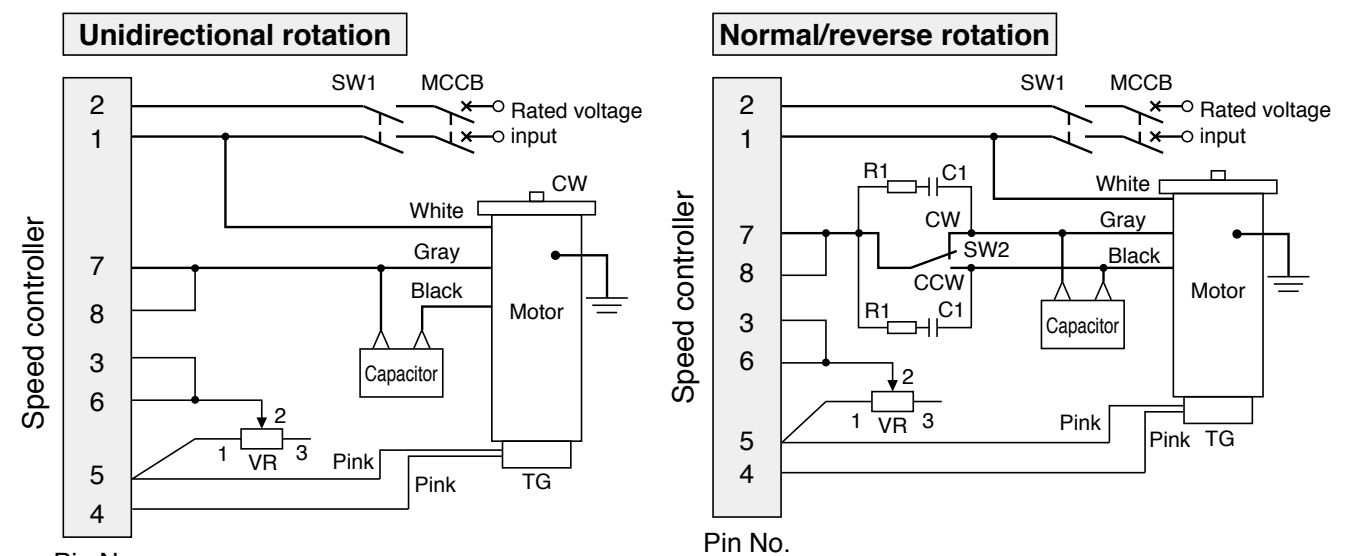
SW1 : Power switch
SW2 : RUN/STOP switch
SW3 : Braking start switch
SW4 : Normal/reverse selector switch

SW1, SW2	100 V supply system	5 A or more at 125 VAC
SW4, SW5	200 V supply system	5 A or more at 250 VAC
SW3		DC10 V 10m A
Spark killer R1+C1		DV0P008A (option)
External braking resistor R2		DV0P003 (option)

- <Precautions>
- When SW2 and SW3 are switched from RUN to STOP, electric braking is applied for approx. 0.5 sec, and the motor stops instantly. (Do not operate SW4 and SW5 until the motor stops.)
Difference in switching time between SW2 and SW3 must be 0.1 sec or smaller. If SW2 (SW3) is in RUN position while SW3 (SW2) is in STOP, abnormal operation occurs (full speed rotation for a short time) and motor temperature rises excessively.
 - Do not change the motor rotating direction (SW4, SW5) while the motor is running.
 - The number of start/stop operations must be 6 times/min or less.
 - For motors for cooling fan and motors with thermal protector, also refer to page C-12.
 - The spark killer consisting of R1 and C1 must be used to protect the relay contacts.

* Please read your User's manual carefully so that you will understand the operation and safety precautions before attempting to operate the system.

8 Speed change only



Pin No.

This wiring diagram causes the motor to rotate clockwise when viewed from the motor shaft end.
To run the motor counterclockwise, interchange the connecting point of black and gray leads.

SW1	100 V supply system	5 A or more at 125 VAC
SW2	200 V supply system	5 A or more at 250 VAC
R1+C1	DV0P008A (option)	

SW1 : Power switch
SW2 : Normal/reverse selector switch

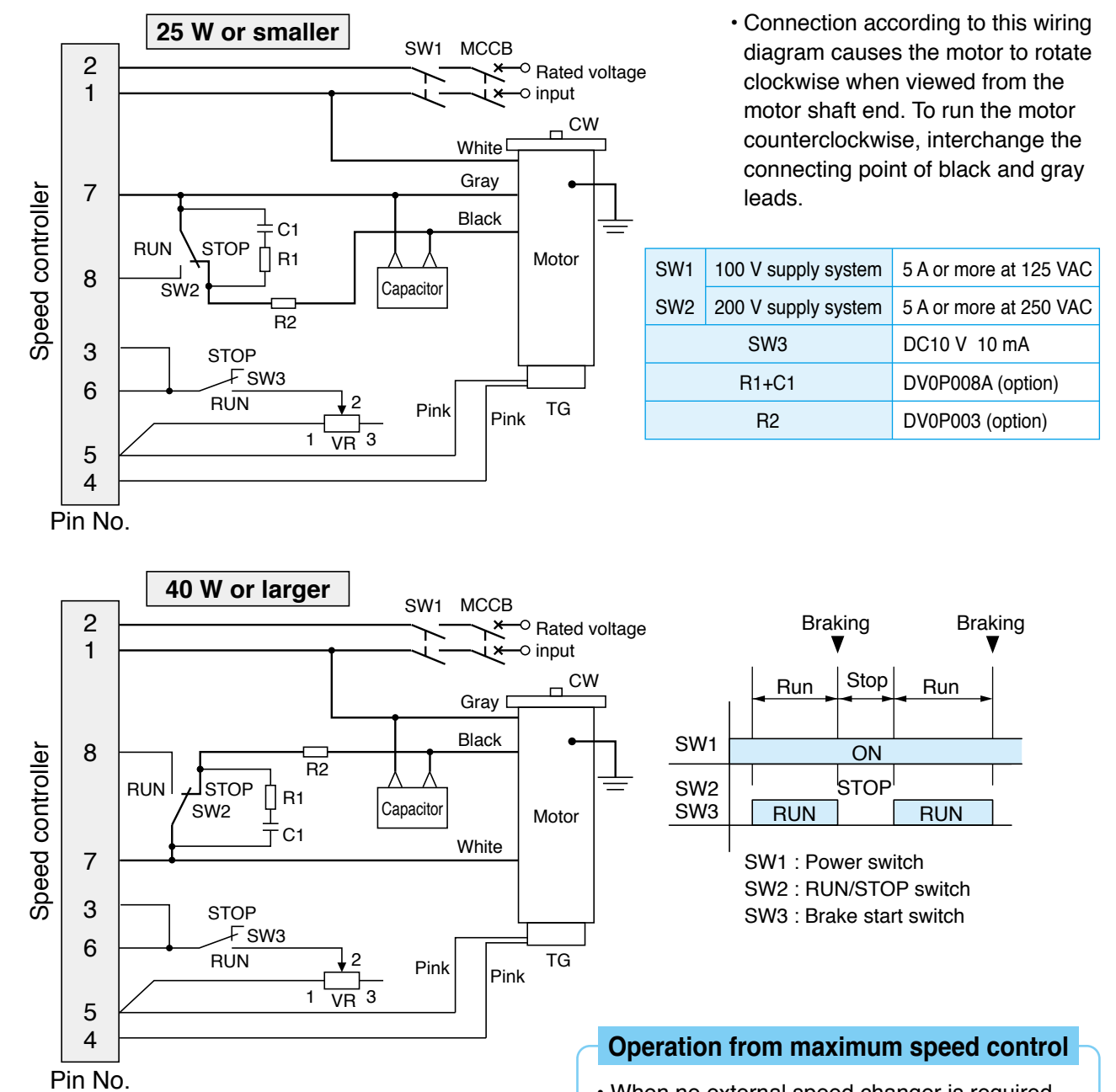
- <Precautions>**
- To change rotating direction of induction motor:
Provide a motor halt period. Switch over SW2 after complete stop of the motor.
 - To change rotating direction of reversible motor:
A motor halt period is not necessary. Switch over SW2 while keeping SW1 turned ON. When configuring SW2 with relay contacts, use a relay having large gap between contacts (e.g. HL relay from Panasonic) to prevent malfunction due to short-circuited capacitor.
 - For motors for cooling fan and motors with thermal protector, also refer to page C-20.
 - When using independent relay contacts for SW2 to change over normal/reverse, interlock both contacts so that they will not close simultaneously.
 - The spark killer consisting of R1 and C1 must be used to protect the relay contacts.

Start/stop control with small signal

Operation from maximum speed control

- <Precautions>**
- Power (SW1) should be turned on at least 0.5 sec before turning on of the start signal (SW6).
 - When the motor is not operated for a prolonged time, turn off power switch (SW1).
1. Connect a fixed resistor (R3) in place of external speed changer (VR).

9 Unidirectional rotation and electric brake



Pin No.

• Connection according to this wiring diagram causes the motor to rotate clockwise when viewed from the motor shaft end. To run the motor counterclockwise, interchange the connecting point of black and gray leads.

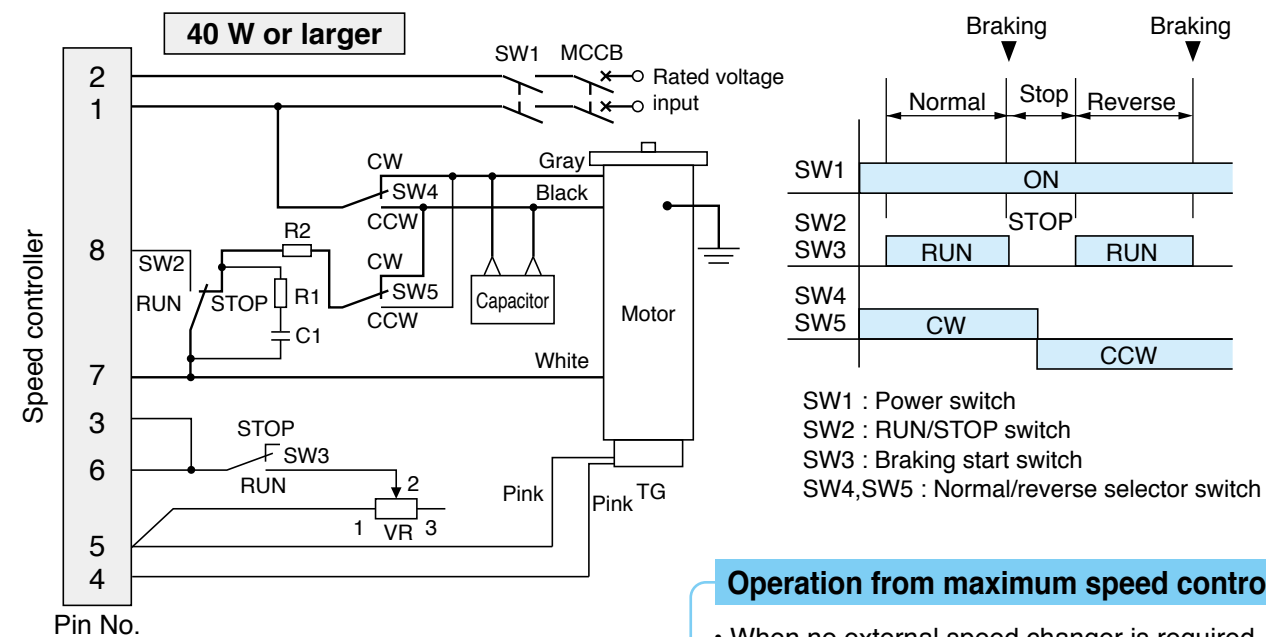
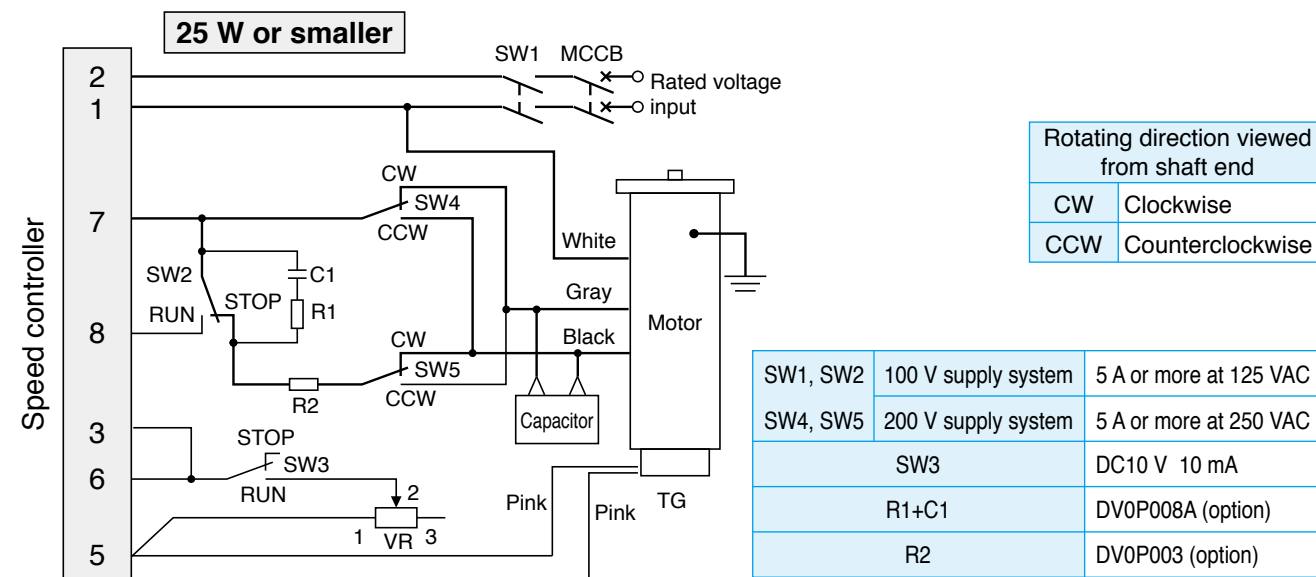
SW1	100 V supply system	5 A or more at 125 VAC
SW2	200 V supply system	5 A or more at 250 VAC
SW3	DC10 V 10 mA	
R1+C1	DV0P008A (option)	
R2	DV0P003 (option)	

SW1 : Power switch
SW2 : RUN/STOP switch
SW3 : Brake start switch

<Precautions>

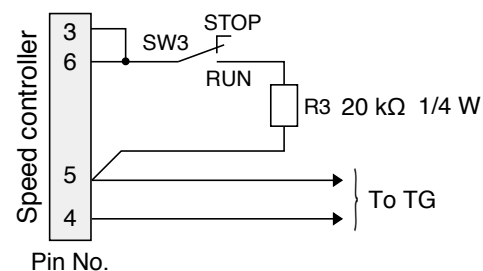
- When SW2 and SW3 are switched from RUN to STOP, electric braking is applied for approx. 5 sec, or until the motor stops. SW2 and SW3 must be operated simultaneously. Otherwise, abnormal operation occurs (full speed rotation for a short time), causing the motor temperature rises excessively.
- The number of start/stop cycles must be 6 times/min or less.
- When using cooling fan motor or motor with thermal protector, also see page C-20.
- Insert R1 and C1 to protect relay contact.
- R2 restricts discharge current in case of capacitor short circuit during braking.

10 Normal/reverse rotation and electric brake



Operation from maximum speed control

- When no external speed changer is required, the speed can be adjusted from the maximum speed control.



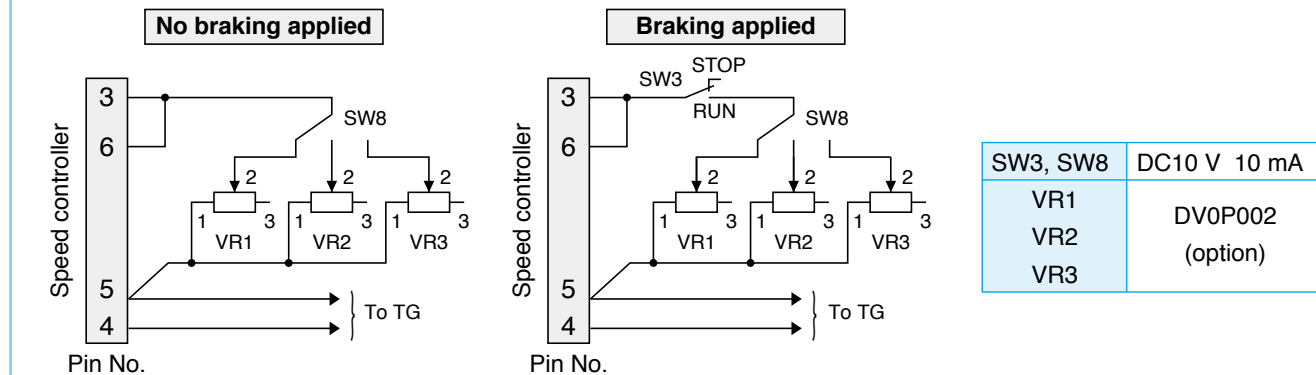
<Precautions>

- Connect a fixed resistor (R3) in place of external speed changer (VR).

<Precautions>

- When SW2 and SW3 are switched from RUN to STOP, electric braking is applied for approx. 5 sec, or until the motor stops. (Do not operate SW4 and SW5 until the motor stops completely.) SW2 and SW3 must be operated simultaneously. Otherwise, abnormal operation occurs (full speed rotation for a short time), causing the motor temperature rises excessively.
- Do not change the rotating direction (SW4, SW5) while the motor is running.
- The number of start/stop cycles must be 6 times/min or less.
- When using cooling fan motor or motor with thermal protector, also see page C-20.
- Insert R1 and C1 to protect relay contact.
- R2 restricts discharge current in case of capacitor short circuit during braking.

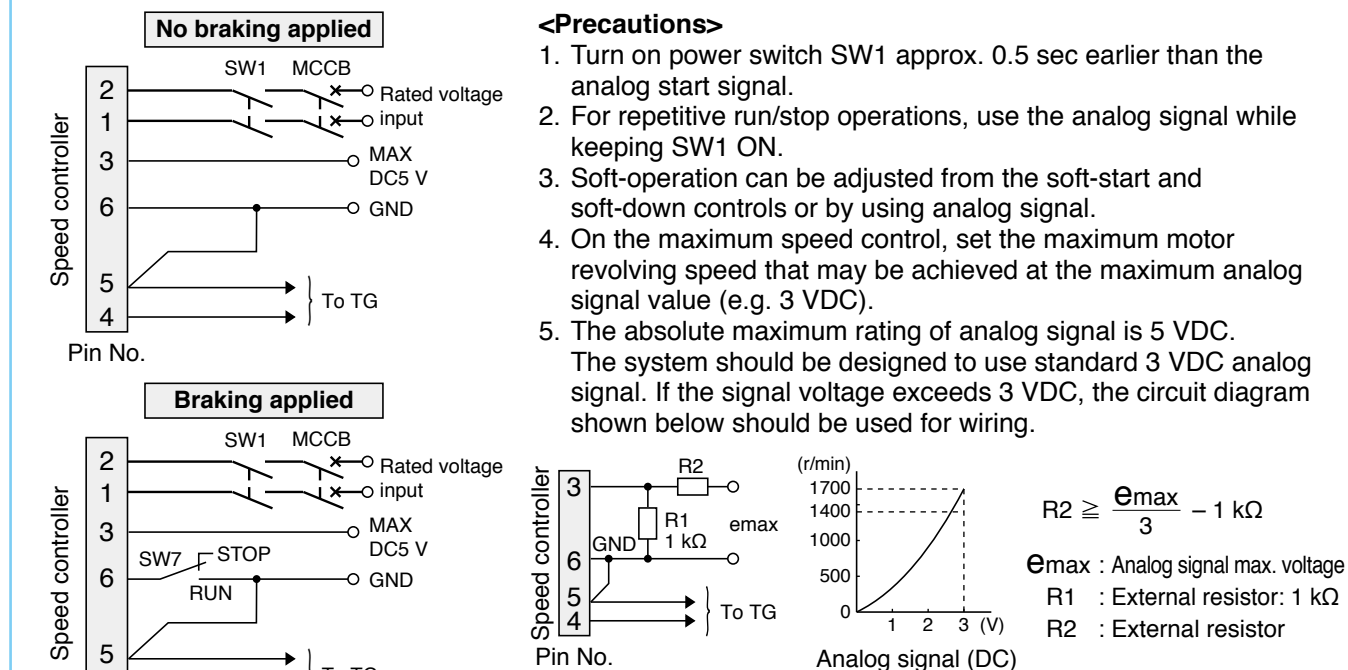
11 Multispeed setting application



<Precautions>

- Set external speed changers VR1, VR2 and VR3 to 3 different speeds and select the desired speed from SW8.
- When activating the brake, simultaneously switch over SW3 and RUN-STOP of other switches.
- For remaining wirings, refer to the corresponding wiring diagrams.

12 Speed change with analog signal



SW1	100 V supply system	5 A or more at 125 VAC
	200 V supply system	5 A or more at 250 VAC
SW7DC10 V 10 mA		

- Revolution speed "0" signal should not exceed 0.1 VDC.
- The input speed pattern (curve) may not be exactly reflected on the motor speed, due to inertial effect of the load, especially during stop sequence.
- The percentage ripple of analog voltage signal should be 2 % or less.
- For other wirings, refer to the corresponding circuit/wiring diagrams.
- When using the braking feature, motor wiring (pins 1, 7 and 8) should be in accordance with pages C-15 and C-16. To activate braking, switch SW2 and SW7 at the same time. If SW2 is in RUN position while SW7 is in STOP, abnormal operation occurs (full speed rotation for a short time); or if SW7 is in RUN position while SW2 is in STOP, motor temperature rises excessively.

13 Operation through contactless signal

• Small signal relays SW3, SW6 and SW7 can be replaced with transistor.

No braking applied

Braking applied

Analog signal and brake

Internal equivalent circuit

14 Parallel operation through external speed changer

<Precautions>

- The resistance R_s of the external speed changer VR should be as follows:
 $R_s = 20/N \text{ (k}\Omega\text{)}$
where, N is the number of motors.
- For synchronous operation or ratio operation, desired revolving speeds must be set from the maximum speed control.
Soft-start and soft-down controls and operation changeover switch must be set to the same position.
- Wirings from the external speed changer VR should be connected to the same pins (No.5 and 6) on the controller.
- Malfunction may occur as the number of devices operated in parallel increases.
To secure correct operation, connect a noise filter to each unit.
- For other electrical connections, refer to corresponding circuit/wiring diagrams.

15 Parallel operation through analog signal

<Precautions>

The input impedance of the controller is approx. 100 k Ω .
The output impedance of the analog signal source should be determined based on the total input impedance of the speed controllers.

16 Soft-operation

• Soft-start, soft-down

<Precautions>

- Power switch SW1 should be turned on approx. 0.5 sec before the operation start signal from SW6.
- When repeating run/stop cycles, turn on/off only SW6 while keeping SW1 turned ON. In this way, the motor can be controlled by using a small signal. To stop operation for a long time, also turn off SW1.
- Soft-start/soft-down period is the time required for the equipment to start up from stop state to full speed when the external speed changer is set at maximum value.
- Soft-start/soft-down control, when at the full clockwise position, disables the soft-down function. As the stop signal is input, power supply to the motor is turned off immediately. However, the revolving speed gradually decreases in proportion to the inertia of the load and motor starts free-running stop sequence.
- Soft-start/soft-down control can set maximum time length of approx. 5 seconds (Typ. at FCCW). The setting may be exceeded if the inertia of the load is too large.
- For other electrical connections, refer to corresponding circuit/wiring diagrams.

• Soft-start and electric brake

Electrical wirings are the same as for “Unidirectional rotation and electric brake” and “Normal/reverse rotation and electric brake”.
Adjust the soft-start time from the soft-start/down control.
Motor will stop quickly by electric brake despite the volume settings of soft-down operation.

SW1	100 V supply system	5 A or more at 125 VAC
	200 V supply system	5 A or more at 250 VAC
SW6		DC10 V 10 mA

17 Wiring of cooling fan motor and motor with thermal protector

SW A	Momentary N.O. contact	
SW B	Momentary N.C. contact	
Ry	100 V supply system	125 VAC 5 A or more 3a contact
	200 V supply system	250 VAC 5 A or more 3a contact

<Precautions>

- The thermal protector (TP) is an automatic reset type. To prevent hazards caused by restarting, connect the TP as shown above. Don't connect TP directly to the power supply.
- Once the TP operates, cooling period is required before the operation can restart.
- Connect the cooling fan motor (F) across pins 1 and 2 on the power terminal.
- Motor (M) and tachometer generator (TG) should be connected according to corresponding wiring diagram shown later.

18 Wiring to electromagnetic brake

• Variable speed motor with electromagnetic brake should be wired as shown below.

SW1	100 V supply system	5 A or more at 125 VAC
SW9	200 V supply system	5 A or more at 250 VAC
R1+C1	DV0P008A (option)	

<Precautions>

- SW9 should be switched to RUN or STOP at the same time as the other switches are switched to RUN or STOP.
If the other switches are set to RUN while the brake is energized (SW9 in STOP position), the motor will generate heat.
- For other wirings, refer to the corresponding circuit/wiring diagrams.
If the application is speed change without using electric braking (page C-14), perform wiring according to "Start/stop control with small signal".

UX series

US series

• Features

<UX series>

- Provided with quick-connect* socket
- Can be extended up to 5 m through extension cable (option)
- The CPU enables the following various functions:
 - Digital setting of revolving speeds
 - Instantaneous conversion of gear head speed and conveyor speed
 - Digital display of actual speed
 - Soft-start, soft-down
 - Backup of setting conditions
 - Set locking

<US series>

- Provided with quick-connect* socket
- Can be extended up to 5 m through extension cable (option)

* When connected (B-323 page) unit motor.

• UX series

- Please refer to pages B-324 to B-340 to check the specification and combination of motor and speed controller.
- When ordering the motor and speed controller as a set, place an order using the unit model number.

• Part No.

Capacity	Voltage	UX series
6 W	100 V	DVUX606L
	200 V	DVUX606Y
15 W	100 V	DVUX715L
	200 V	DVUX715Y
25 W	100 V	DVUX825L
	200 V	DVUX825Y
40 W	100 V	DVUX940L
	200 V	DVUX940Y
60 W	100 V	DVUX960L
	200 V	DVUX960Y
90 W	100 V	DVUX990L
	200 V	DVUX990Y

• Specification

	UX series
Output	6 W : 15 W : 25 W : 40 W : 60 W : 90 W
Rated voltage	single-phase 100 VAC / single-phase 200 VAC
Power frequency	50 Hz / 60 Hz
Speed control range	90 r/min to 1400 r/min / 90 r/min to 1700 r/min
Speed variation	5 % (standard value)
Speed setting	Digital
Operating temperature	0 °C to 40 °C
Storage temperature	-10 °C to 60 °C
Soft-start/soft-down time	0.1 sec to 30 sec

- The 90 W models contain a thermal protector to prevent burnout for motor.

• US series

- Please refer to pages B-324 to B-340 to check the specification and combination of motor and speed controller.
- When ordering the motor and speed controller as a set, place an order using the unit model number.

• Part No.

Capacity	Voltage	US series
6 W	100 V	DVUS606L
	200 V	DVUS606Y
15 W	100 V	DVUS715L
	200 V	DVUS715Y
25 W	100 V	DVUS825L
	200 V	DVUS825Y
40 W	100 V	DVUS940L
	200 V	DVUS940Y
60 W	100 V	DVUS960L
	200 V	DVUS960Y
90 W	100 V	DVUS990L
	200 V	DVUS990Y

• Specification

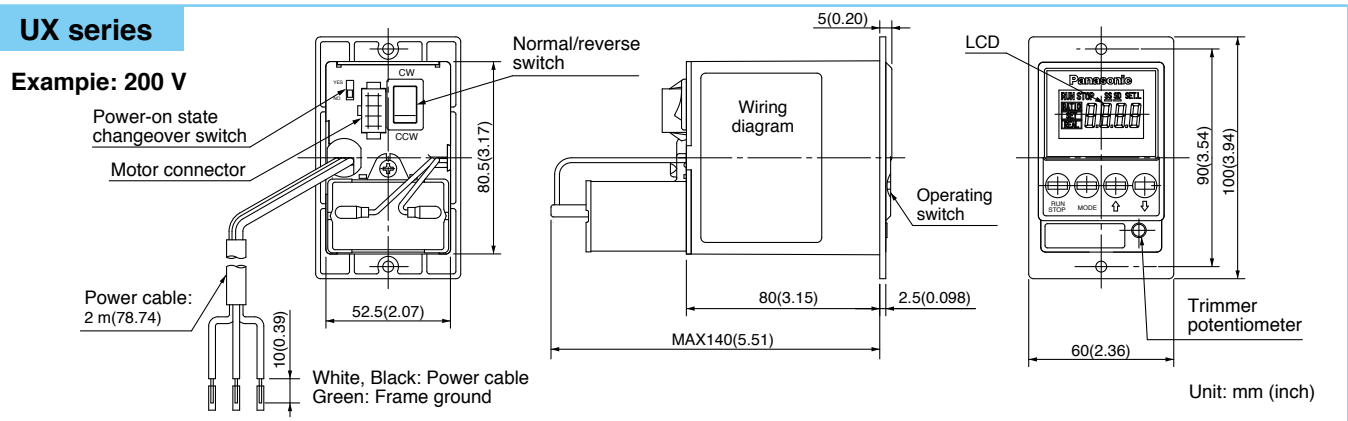
	US series
Output	6 W : 15 W : 25 W : 40 W : 60 W : 90 W
Rated voltage	single-phase 100 VAC / single-phase 200 VAC
Power frequency	50 Hz / 60 Hz
Speed control range	90 r/min to 1400 r/min / 90 r/min to 1700 r/min
Speed variation	5 % (standard value)
Speed setting	Analog
Operating temperature	-10 °C to 40 °C
Storage temperature	-20 °C to 60 °C
Soft-start/soft-down time	—

- The 90 W models contain a thermal protector to prevent burnout for motor.

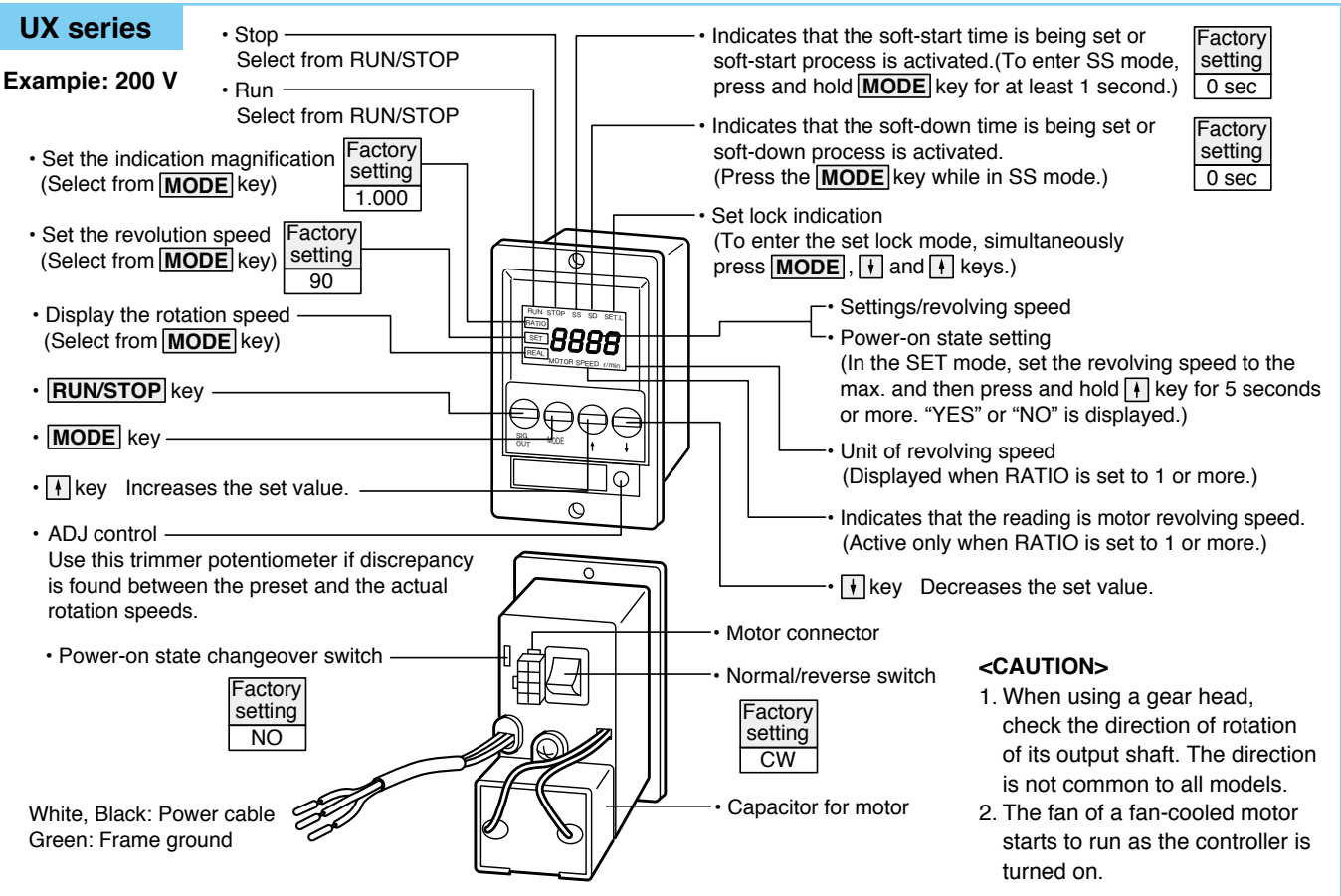
* Please read your User's manual carefully so that you will understand the operation and safety precautions before attempting to operate the system.

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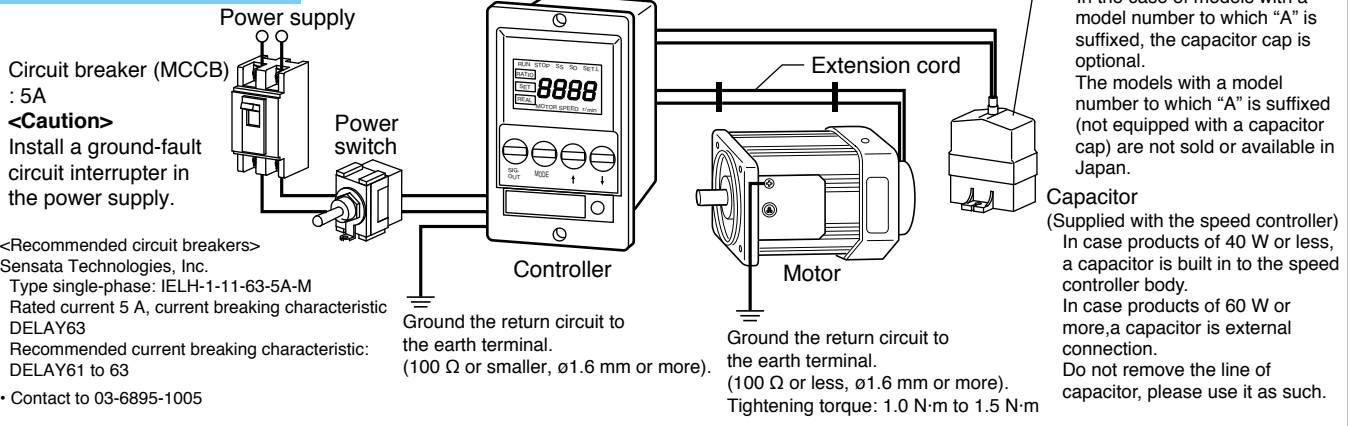
• Outline drawing



• Names and functions



Wiring diagram



• Operating method and preparation (UX series)

- Check the Power-on state setting.
- Setting the Normal/reverse switch. (Switch on the back of the controller.)
- Connect the "motor connector".
- Turn on power.
- Setting of display magnification(**RATIO** mode), rotation speed (**SET** mode), soft start/down (**SS/SD** mode).
- Press the **RUN** key, motor will rotating.

► Power-on state setting

The state of the unit upon power-up can be preset from the power-on state setting switch.

(1) "YES"		(2) "NO"	
Upon power-on, the unit reproduces the state as it was turned off.		Upon power-on, the unit is in stop mode regardless of the state at the previous power off. To restart, operate RUN-STOP key.	
Previous state	Upon power-on	Previous state	Upon power-on
"STOP"	→ Startup (after approx. 2 sec)	"STOP"	→ Stop
"RUN"	→	"RUN"	→ Stop

• Modes of operation (UX series)

► **RATIO** mode

By setting the speed in unit of motor revolving speed multiplied by the factor or by displaying the actual speed, gear head output shaft speed or belt conveyor travel speed can be converted. The **RATIO** mode is used to set the factor.
Selection of indication magnification can be made from **↑** and **↓** keys.
Reduction gear ratio setting value (to display the settings in terms of gear head output shaft speed)
<"SET" or "REAL" reading = motor revolving speed divided by gear reduction settings>

The reduction ratios of Panasonic gear head are stored in the unit, choose the suitable one by using **↑** and **↓** keys:
1.000→3→... 100 ...→202 ...→1000 ...→2020
Multiple number setting value (to display the settings in terms of the speed of belt conveyor)
<"SET" or "REAL" reading = motor revolving speed multiplied by multiplication factor>
Multiplication can be set by the factor of 0.005 to 0.995: select the desired one from **↑** and **↓** keys.
1.000→0.995→...→0.015→0.010→0.005 (in unit of 0.005)

► **SET** mode

In this mode, the revolving speed can be set to a value within the range shown below, by using **↑** and **↓** keys.
[With reading magnification 1.000]
Value can be set in unit of 10 r/min.
<Example>
• Power frequency 50 Hz :
90→100→110 ...→1400 r/min
• Power frequency 60Hz :
90→100→110 ...→1400 ...1700 r/min
[With reading magnification other than 1.000]
Readings are based on the reading magnification setting in **RATIO** mode and gear reduction ratio setting. Desired value can be selected among the values shown below, by using **↑** and **↓** keys.

<Example> Reduction gear ratio = 3
Selection unit is 10/3 r/min. The reading rounds off fraction.
• Power frequency 50 Hz: 29.9→33.3→36.6 ...→466.6 r/min
• Power frequency 60 Hz: 29.9→33.3→36.6 ...→466.6 ...→566.6 r/min
<Example> Magnification = 0.500
Selection unit is 10 x 0.500. The reading rounds off fraction.
• Power frequency 50 Hz: 45.0→50.0→55.0 ...→700.0
• Power frequency 60 Hz: 45.0→50.0→55.0 ...→700.0 ...850.0
[Note] Exception: reading magnification 1.000 "MOTOR SPEED r/min" is displayed. Only "r/min" is displayed when the value exceeds 1.000. Otherwise, nothing is displayed.

► **REAL** mode

In the **REAL** mode, motor's real revolutions multiplied by the reading magnification is displayed.
[Reading magnification 1.000]
The speed is displayed in unit of 5 r/min.
<Example>
0→5 ...→90→100→110 ...→1400 ...→1700 r/min
[With reading magnification other than 1.000]
Readings are based on the reading magnification setting in **RATIO** mode and gear reduction ratio setting.

<Example> Reduction gear ratio = 3
Selection unit is 5/3 r/min. The reading rounds off fraction.
0→1.6 ...→29.9→33.3→36.6 ...→466.6 ...→566.6 r/min
<Example> Magnification = 0.500
Selection unit is 10 x 0.500. The reading rounds off fraction.
0→2.5 ...→45.0→50.0→55.0 ...→700.0 ...→850.0
[Note] Exception: reading magnification 1.000 "MOTOR SPEED r/min" is displayed. Only "r/min" is displayed when the value exceeds 1.000. Otherwise, nothing is displayed.

* Please read your User's manual carefully so that you will understand the operation and safety precautions before attempting to operate the system.

Speed controller

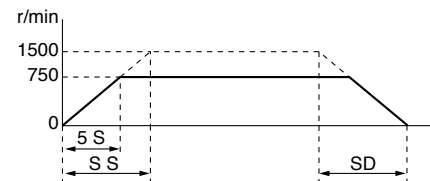
Unit type UX series

► Soft start (SS) / Soft down (SD) setting mode

To enter SS mode, press and hold MODE key for at least 1 second. To enter SD mode, press the MODE key while in SS mode.

The Soft start · Soft down time in each mode to be set individually, and you can select a value by $\uparrow$ and $\downarrow$ key. In unit of 0.1 sec, up to 30 sec.

Note 1) Soft start (SS) · Soft down (SD)



The Soft start · Soft down time is defined as the time required to change revolving speed between 0 r/min and 1500 r/min.

<Example>

When the soft-start time is set to 10 seconds and “SET” revolving speed is 750 r/min, then,

$10 \times \frac{750 \text{ r/min}}{1500 \text{ r/min}} = 5$

This means that 5 seconds are required to change from 0 r/min to 750 r/min. The same applies to “SD”.

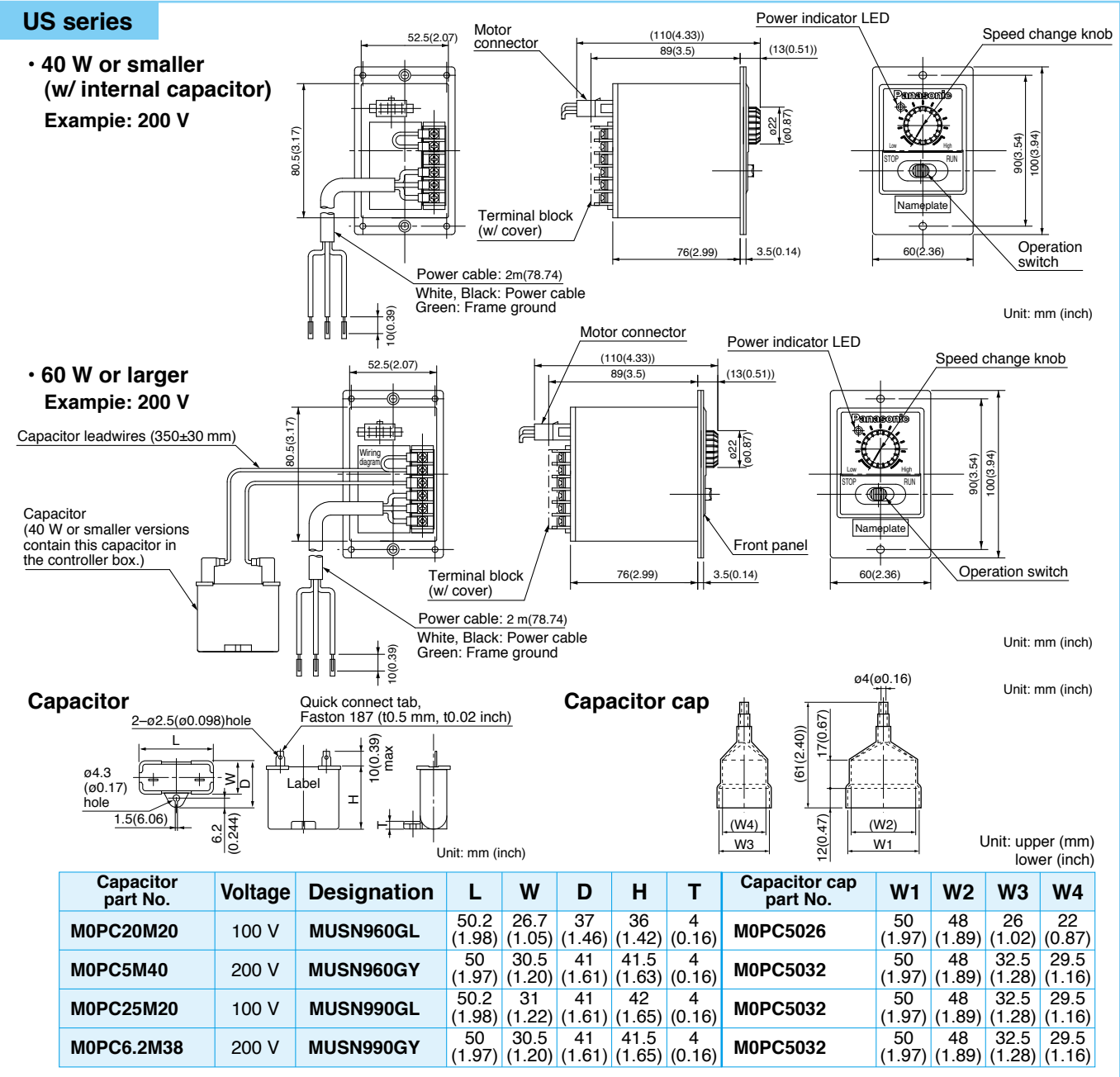
Note 2)

In the practical application, speed change time will be longer than the Soft start · Soft down time if the load inertia is large.

Speed controller

Unit type US series

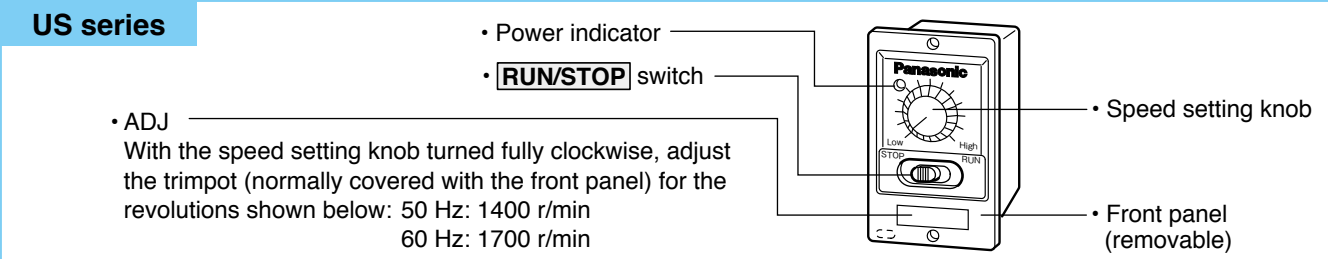
• Outline drawing



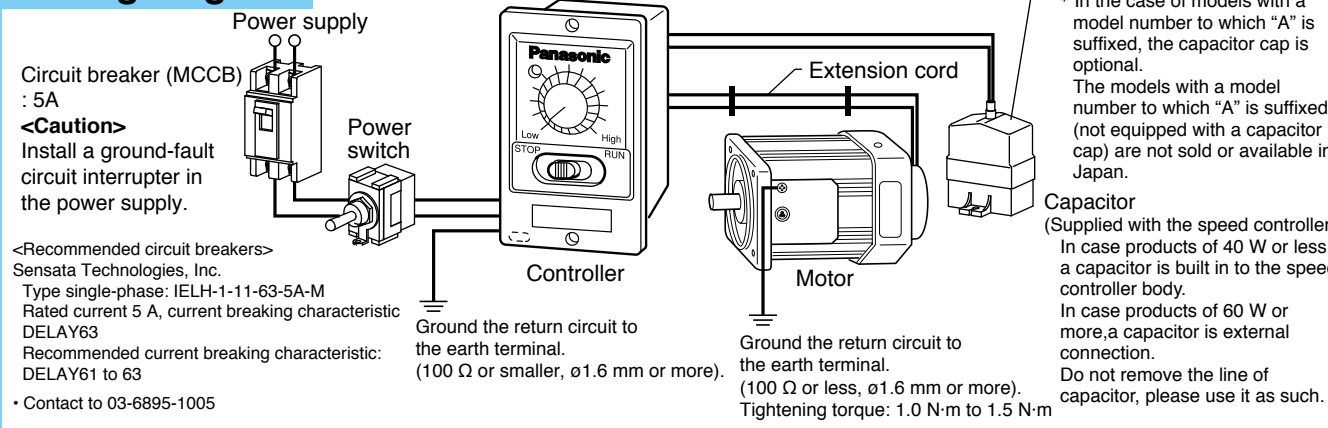
* Please read your User's manual carefully so that you will understand the operation and safety precautions before attempting to operate the system.

Unit type US series

• Names and functions



Wiring diagram



• Operating method (US series)

1. Connect the “motor connector”.
2. Make sure that the **RUN/STOP** switch is in “STOP” position. Connect the power cable to the AC source.
3. Turn on power. “Power” indicator will light.
4. Place the **RUN/STOP** switch in “RUN” position, and the motor starts.
CAUTION: Do not place the switch lever in between RUN and STOP.
5. To stop the motor, move the lever to “STOP” position.
Note that the **RUN/STOP** switch does not turn on/off power supply: when not using the motor for a long period, turn off the main power switch.
6. The electric fan, if used with the motor, rotates as the power to the speed controller is turned on and stops as the controller power source is turned off.

• Changing direction of rotation (US series)

• Unidirectional rotatio

Terminal “CW” or “CCW” on the controller rear panel should be left open.

Direction when viewed from motor output shaft end	
Clockwise	Connect COM to CW
Counterclockwise	Connect COM to CCW

[Note]
When a gear head is connected, the direction of its output shaft may or may not be the same as that of motor shaft depending on the reduction ratio.

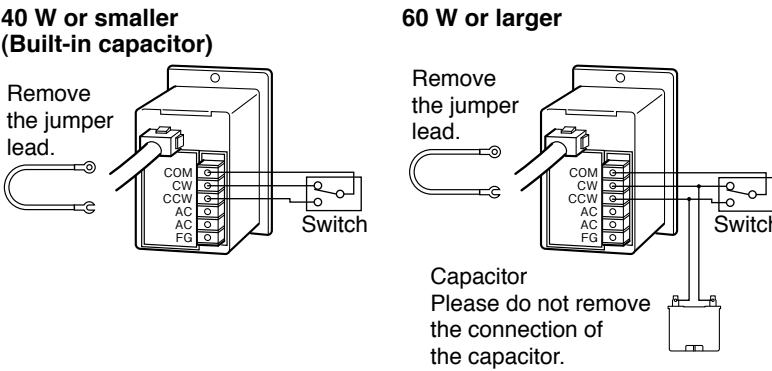
• Normal/reverse rotation

When it is necessary to select the rotating direction, connect the switch as shown in the figure.

[Note]

Do not operate this switch while the motor is running.

Switch specification	
• Single-pole double-throw: ON-OFF-ON	
• 100 V power: 5 A at 200 VAC or more	
• 200 V power: 3 A at 400 VAC or more	



* Please read your User's manual carefully so that you will understand the operation and safety precautions before attempting to operate the system.

Speed controller

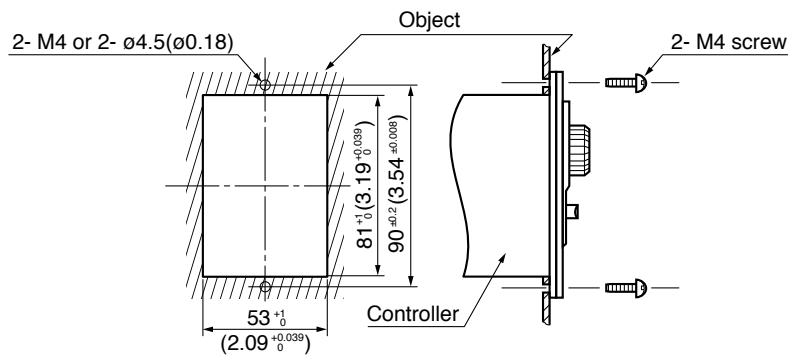
Unit type

• Mounting method (UX series, US series)

<Mounting through square holes>

UX series, US series

Unit: mm (inch)



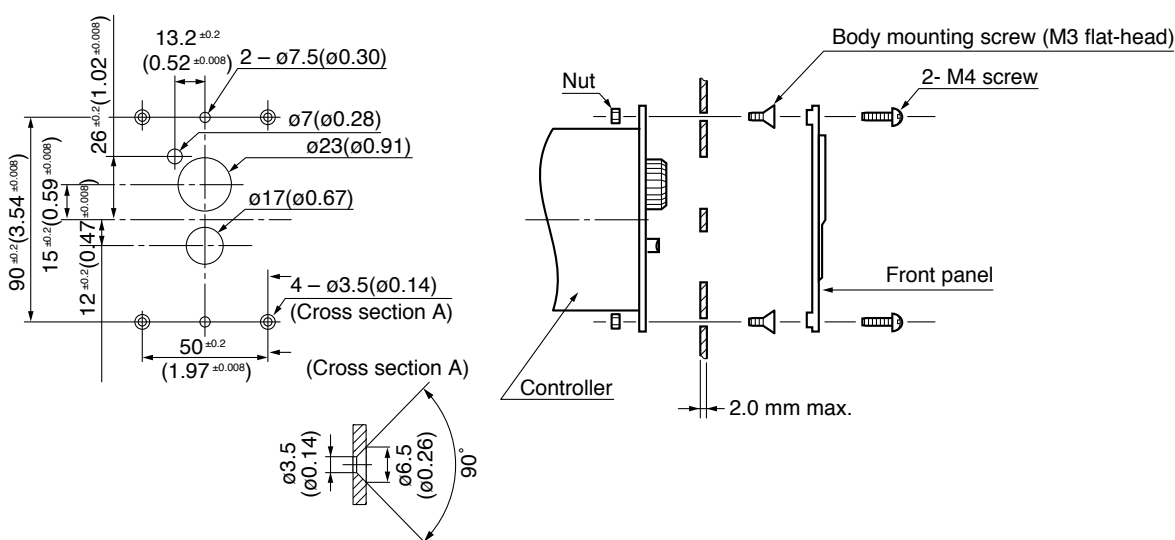
Mounting procedure

1. Drill 2 square holes in the object.
2. Secure the controller and front panel with 2 M4 screws.

<Mounting without using square hole>

US series only

Unit: mm (inch)



Caution

Wall thickness of the equipment where the controller is to be mounted should be 2 mm or less.

Mounting procedure

1. Drill 2 square holes in the wall of the object.
2. Remove the front panel from the controller.
3. Secure the controller body with M3 flat-head screws and nuts.
4. Place the front panel on the wall and secure the panel with M4 screws and nuts.

<To install controller and motor separately>

When installing the speed controller at a distance more than 1 m from the motor, use optional "extension cord" that is supplied as standard accessory (allowable distance 5 m). Refer to page D-4 (Option).

Speed controller

inverter



• Features

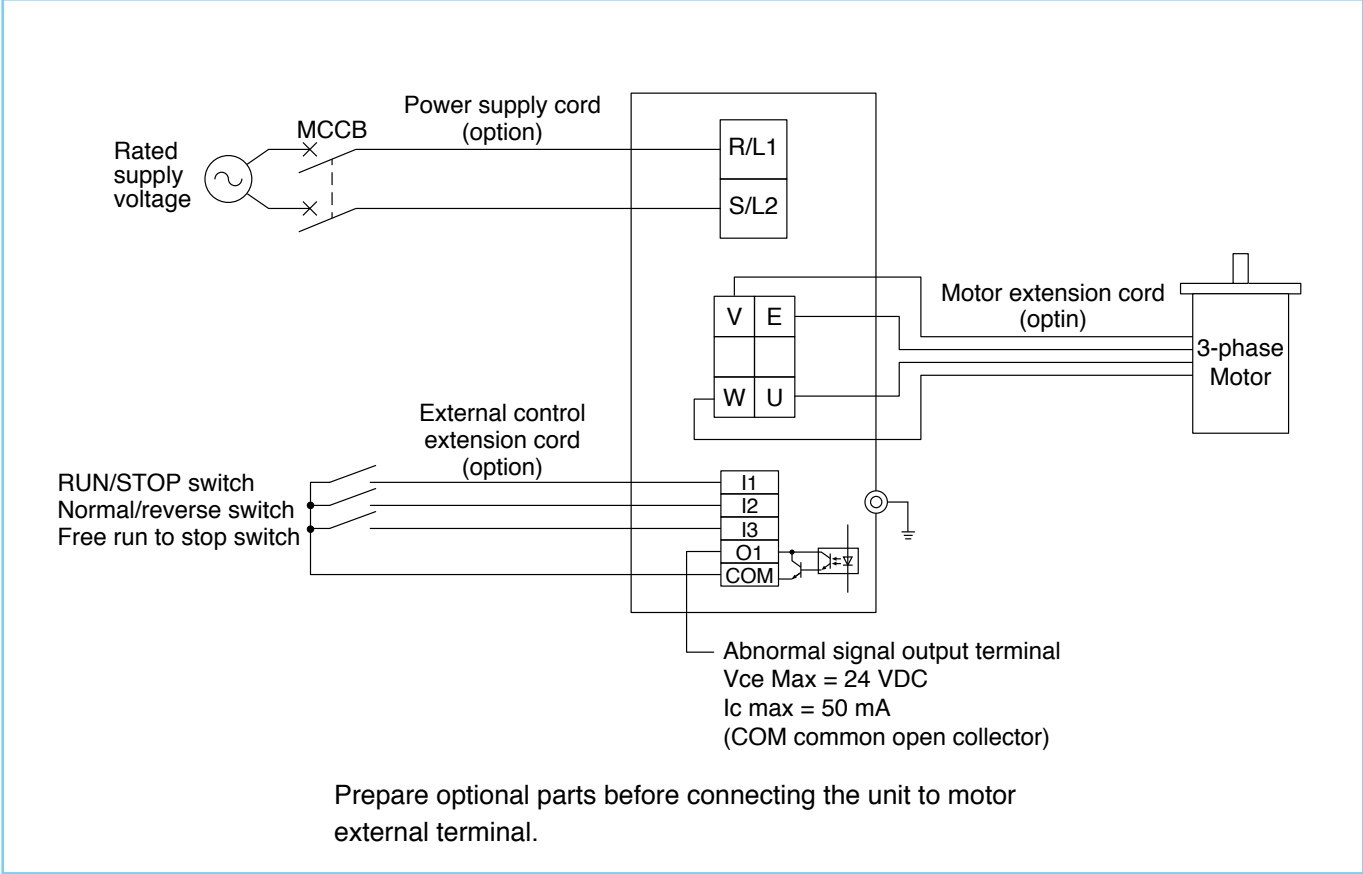
- Extremely compact and low noise (compared with preceding models).
- Can control 3-phase 200 V motor by using single-phase 100 V power (use of voltage doubler). Single-phase 200 V version is available.
- Easy to operate control knob.
- External normal/reverse switches.
- Applicable to only 3-phase motors.

• Standard specification

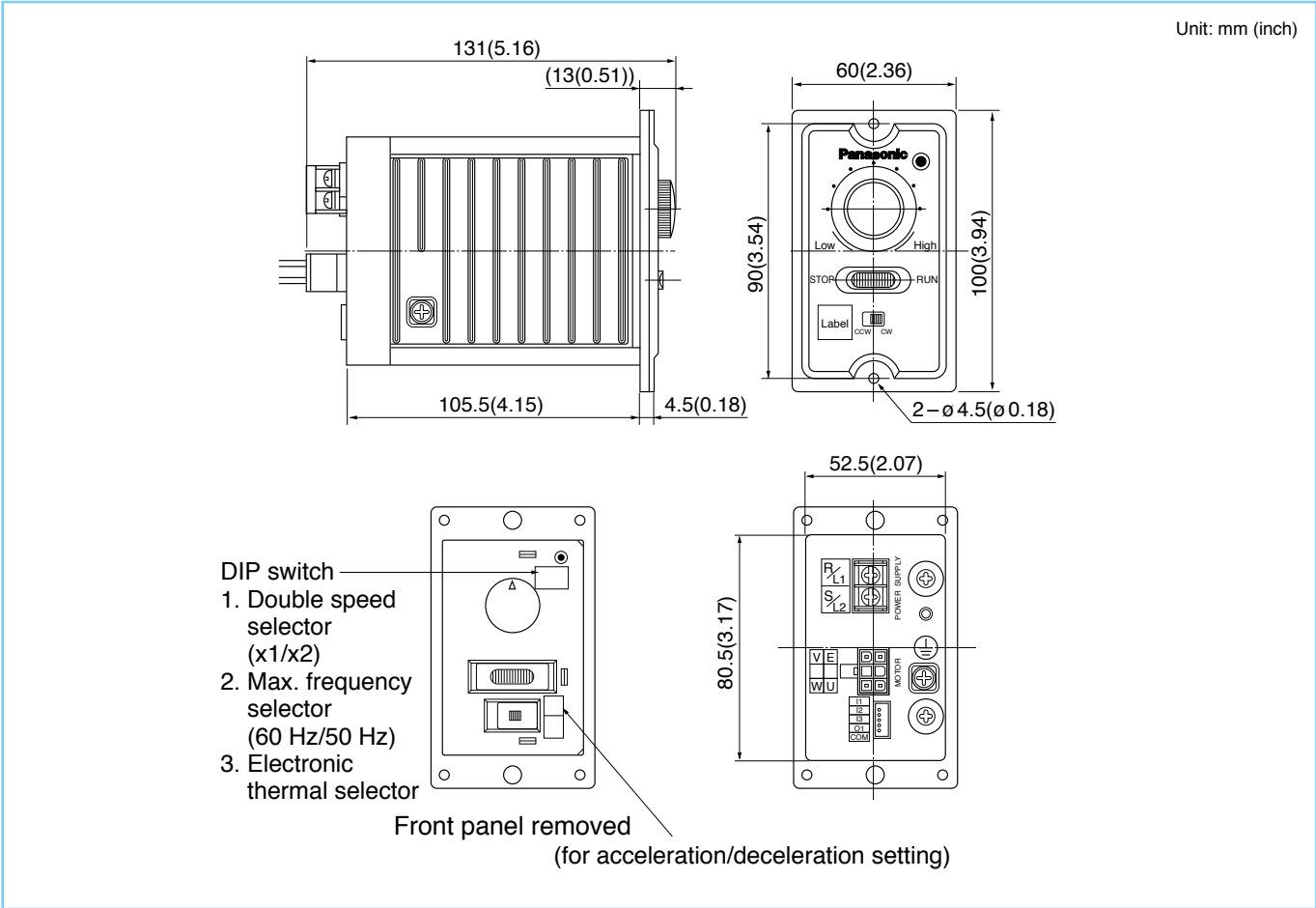
Part number		M1G4A1V1X	M1G9A1V1X	M1G4A2V1X	M1G9A2V1X
Output rating	Applicable motor (W) *1	25/40	60/90	25/40	60/90
	Output volt-ampere (kVA) *2	0.11/0.16	0.19/0.27	0.11/0.16	0.20/0.28
	Rated output current (A)	0.28/0.4	0.49/0.7	0.28/0.4	0.49/0.7
	Rated output voltage	3-phase 200 VAC to 220 VAC		3-phase 200 VAC to 230 VAC	
	Voltage	Single-phase 100 VAC to 110 VAC		Single-phase 200 VAC to 230 VAC	
Power source	Permissible voltage variation	±10 %			
	Frequency	50 Hz/60 Hz ±5 %			
	Controlling system	Low noise sine-wave PWM			
Control method	Output frequency range *3	1.0 Hz to 120 Hz (factory setting: 60 Hz)			
	Acceleration/deceleration time setting *4	0 sec to 30 sec			
	Overload current rating	150 % 1 min.			
	Regenerative braking torque *5	Short time average deceleration torque 100 %			
	Frequency setting	Panel control			
	Operation switch, normal/reverse switch	Panel switch			
	External signal	(input): operation instruction, normal/reverse instruction, free-run stop; (output): abnormal signal			
Protective function		Undervoltage, overcurrent, overvoltage, instantaneous power interruption, stall, overload shutdown, self-diagnosis trip			
	Electronic-thermal	25 W/40 W	60 W/90 W	25 W/40 W	60 W/90 W
	Ambient temperature	-10 °C to +40 °C (no freezing)			
	Ambient humidity	90 % RH (no dewing)			
	Atmosphere	Indoor (free from foreign objects such as corrosive gas and dust)			
	Altitude	Up to 1000 m			
Protective construction		Closed type (IP20)			

*1. Panasonic 3-phase compact geared motors MoM series 4 models.
*2. Measured at rated output voltage at 220 V (M1GoA1V1X), 230 V (M1GoA2V1X).
*3. When using a gear head, keep the output frequency 60 Hz, or below.
*4. When set to "0", actual time is 0.05 sec.
*5. Regenerative braking torque refers to a short-time averaged deceleration and not a continuous torque.
Deceleration at a frequency higher than the fundamental frequency provides lower torque. No internal braking resistor is provided.
*6. Electromagnetic brake power supply voltage of the motor with an electromagnetic brake please use the AC230 V from AC200 V.
Please do not use the output of the inverter for the power supply of the electromagnetic brake.
There is when the brake can not be released.
* Before using the product, carefully read through "Instruction manual" to understand the safety precautions and operation of it.
* Please read your User's manual carefully so that you will understand the operation and safety precautions before attempting to operate the system.

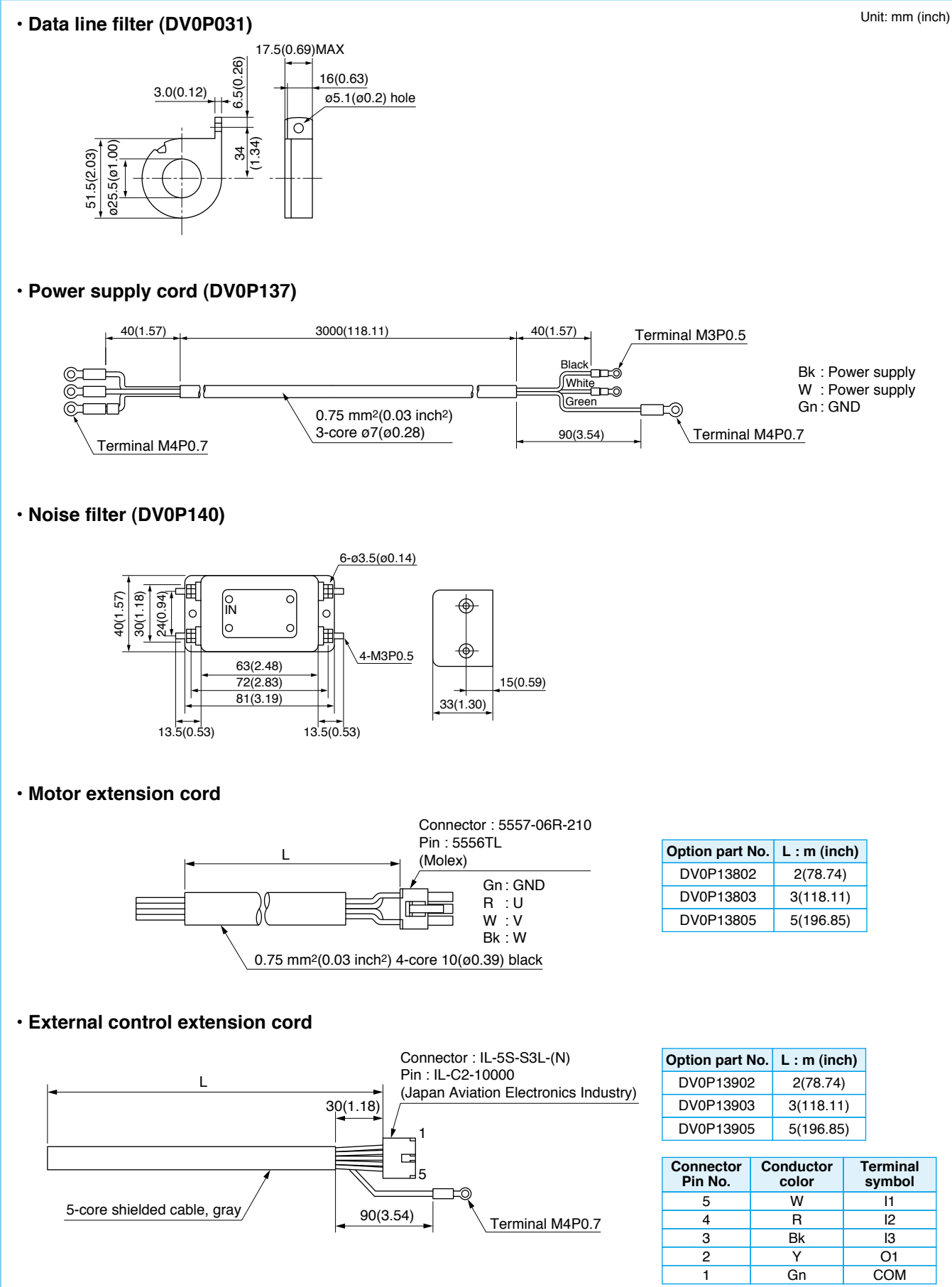
• Layout drawing



• Outline drawing



• Option



* Please read your User's manual carefully so that you will understand the operation and safety precautions before attempting to operate the system.

* Please read your User's manual carefully so that you will understand the operation and safety precautions before attempting to operate the system.