Discontinued products

Speed Controller

Contents

Speed Controller Overview

Orders are no longer accepted later than the end of March 2021.

Overview of Speed Controllers

• These controllers vary speed of compact geared motors.

Product designation

• Separate type speed controller

• EX type

DV **11** **31**

Voltage **Code**

● 11 : Single-phase 100 V
12 : Single-phase 200 V

● Speed controller

Code	Type	Compatible motor output	
		Single-phase 100 V	Single-phase 200 V
31	EX	3 W to 10 W	6 W to 20 W
32		15 W to 40 W	–
34		60 W to 90 W	25 W to 90 W

Speed controller

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• Possible combination of speed controller and motor

	Size	Output (W)	Motor			Voltage (V)	Speed controller
			Certified	Pinion shaft type	Round shaft type		EX type
Variable speed induction motor	60 mm sq. (2.36 inch sq.)	3	-----	M61X3GV4L	M61X3SV4LS	100	DV1131
		6	-----	M61X6GV4L	M61X6SV4LS	100	DV1131
			-----	M61X6GV4Y	M61X6SV4YS	200	DV1231
	70 mm sq. (2.76 inch sq.)	10	-----	M71X10GV4L	M71X10SV4LS	100	DV1131
			-----	M71X10GV4Y	M71X10SV4YS	200	DV1231
		15	-----	M71X15GV4L	M71X15SV4LS	100	DV1132
			-----	M71X15GV4Y	M71X15SV4YS	200	DV1231
	80 mm sq. (3.15 inch sq.)	15	-----	M81X15GV4L	M81X15SV4LS	100	DV1132
			-----	M81X15GV4Y	M81X15SV4YS	200	DV1231
		25	-----	M81X25GV4L	M81X25SV4LS	100	DV1132
			-----	M81X25GV4Y	M81X25SV4YS	200	DV1234
	90 mm sq. (3.54 inch sq.)	40	-----	M91X40GV4L	M91X40SV4LS	100	DV1132
			-----	M91X40GV4Y	M91X40SV4YS	200	DV1234
		60	-----	M91Z60GV4L	M91Z60SV4LS	100	DV1134
			-----	M91Z60GV4Y	M91Z60SV4YS	200	DV1234
		90	-----	M91Z90GV4L	M91Z90SV4LS	100	DV1134
			-----	M91Z90GV4Y	M91Z90SV4YS	200	DV1234
Variable speed reversible motor	60 mm sq. (2.36 inch sq.)	4	-----	M6RX4GV4L	M6RX4SV4LS	100	DV1131
		6	-----	M6RX6GV4L	M6RX6SV4LS	100	DV1131
			-----	M6RX6GV4Y	M6RX6SV4YS	200	DV1231
	70 mm sq. (2.76 inch sq.)	10	-----	M7RX10GV4L	M7RX10SV4LS	100	DV1131
			-----	M7RX10GV4Y	M7RX10SV4YS	200	DV1231
		15	-----	M7RX15GV4L	M7RX15SV4LS	100	DV1132
			-----	M7RX15GV4Y	M7RX15SV4YS	200	DV1231
	80 mm sq. (3.15 inch sq.)	20	-----	M8RX20GV4L	M8RX20SV4LS	100	DV1132
			-----	M8RX20GV4Y	M8RX20SV4YS	200	DV1231
		25	-----	M8RX25GV4L	M8RX25SV4LS	100	DV1132
			-----	M8RX25GV4Y	M8RX25SV4YS	200	DV1234
	90 mm sq. (3.54 inch sq.)	40	-----	M9RX40GV4L	M9RX40SV4LS	100	DV1132
			-----	M9RX40GV4Y	M9RX40SV4YS	200	DV1234
		60	-----	M9RZ60GV4L	M9RZ60SV4LS	100	DV1134
			-----	M9RZ60GV4Y	M9RZ60SV4YS	200	DV1234
		90	-----	M9RZ90GV4L	M9RZ90SV4LS	100	DV1134
			-----	M9RZ90GV4Y	M9RZ90SV4YS	200	DV1234
Variable speed motor with electromagnetic brake	60 mm sq. (2.36 inch sq.)	6	-----	M6RX6GBV4L	-----	100	DV1131
			-----	M6RX6GBV4Y	-----	200	DV1231
	70 mm sq. (2.76 inch sq.)	15	-----	M7RX15GBV4L	-----	100	DV1132
			-----	M7RX15GBV4Y	-----	200	DV1231
	80 mm sq. (3.15 inch sq.)	25	-----	M8RX25GBV4L	-----	100	DV1132
			-----	M8RX25GBV4Y	-----	200	DV1234
	90 mm sq. (3.54 inch sq.)	40	-----	M9RX40GBV4L	-----	100	DV1132
			-----	M9RX40GBV4Y	-----	200	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.
* For combination of C&B (variable speed induction motor) motor and speed controller please refer to the page B-351.

Speed controller

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EX type

• Features

<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)

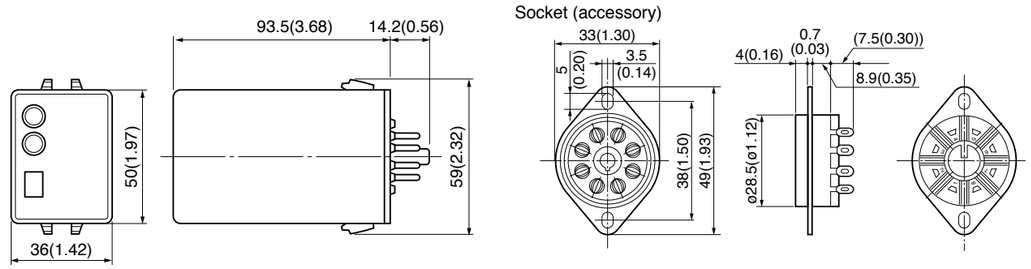
Characteristic \ Part No.	EX type				
	DV1131	DV1132	DV1134	DV1231	DV1234
Rated voltage	Single-phase 100 VAC			Single-phase 200 VAC	
Operating voltage range	±10 % (at rated voltage)				
Power frequency	50 Hz/60 Hz				
Rated current	0.4 A	1 A	2.0 A	0.3 A	1 A
Compatible motor output *1	3 W to 10 W	15 W 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

EX type

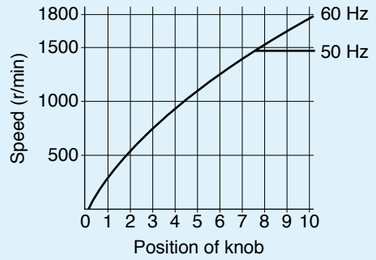
Unit: mm (inch)



• 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.)

• 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.

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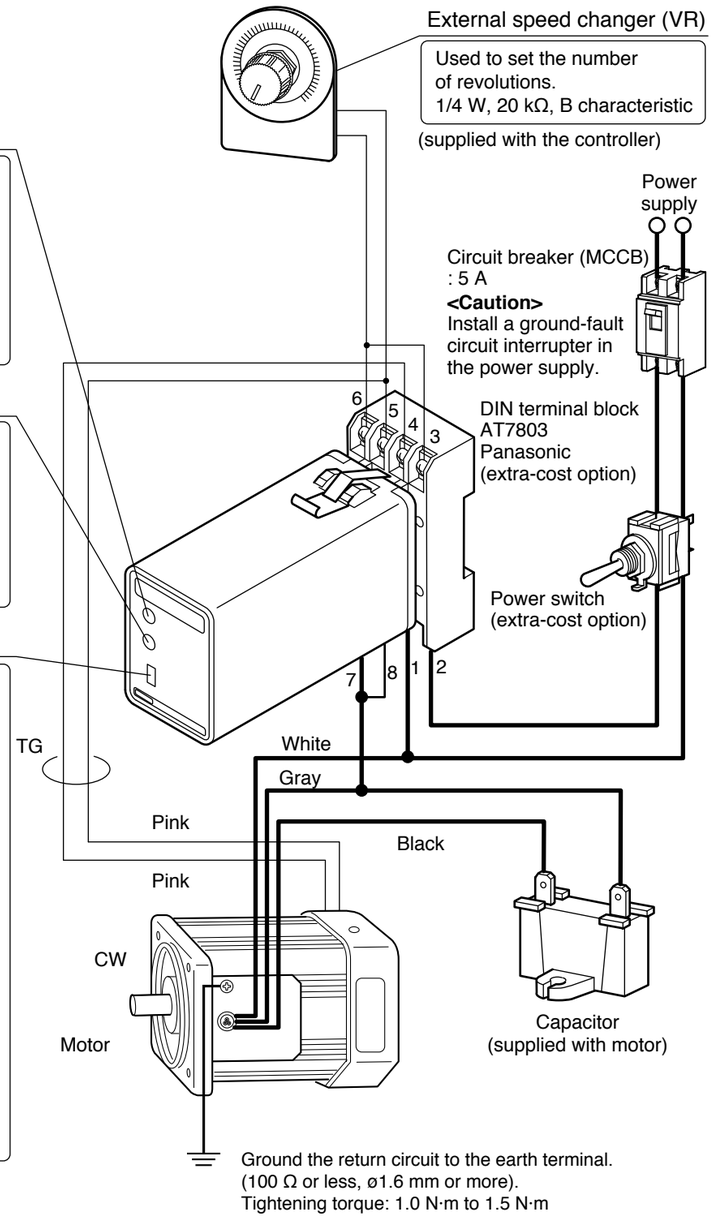
7 Wiring diagram (for unidirectional rotation)

- 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.



• Soft-start/down control

Soft-start and soft-down times can be adjusted by a single setting.
Use this feature to protect the load from shock caused by sharp speed change at startup and shutdown of the motor.
To disable the soft operation, turn the control fully clockwise.

• Maximum speed control

Use this control to adjust the revolving speed when the external speed changer is set at the top speed.
Adjust the speed to 1400 (r/min) or below at 50 Hz; or 1700 (r/min) or below at 60 Hz.

• Operation changeover switch

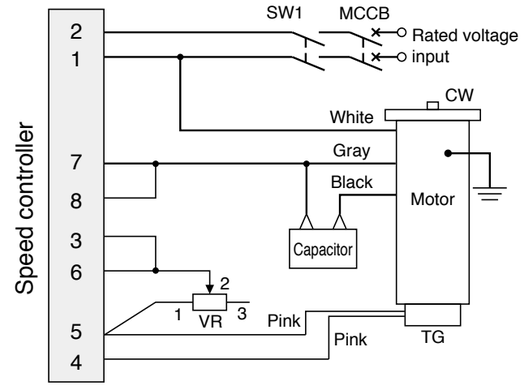
Select “high-stable” or “high-response”:

<High-stable>
- Keeps the rotation speed variation low against variation in load.
- Enables a wide range of speed control.
- Suitable for capability control.
- May fail to maintain constant rotation speed upon sharp load change.

<High-response>
- Enables quick response with low hunting.
- Suitable for positioning application.
- May fail to keep rotation speed variation low against variation in load.
- Not suitable for controlling wide range of speed.

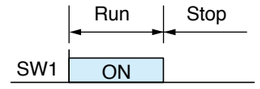
8 Speed change only

Unidirectional rotation



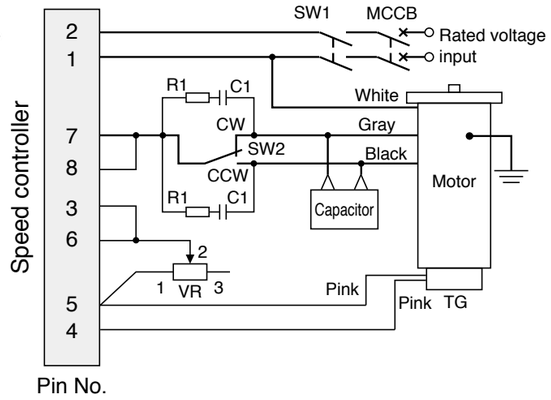
Pin No.

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.

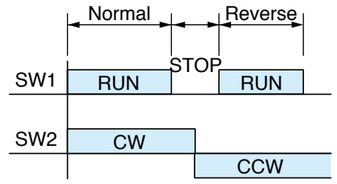


SW1	100 V supply system	5 A or more at 125 VAC
SW2	200 V supply system	5 A or more at 250 VAC
R1+C1		DV0P008A (option)

Normal/reverse rotation



Pin No.



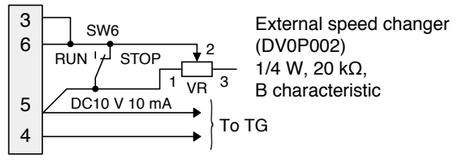
SW1 : Power switch
SW2 : Normal/reverse selector switch

<Precautions>

1. To change rotating direction of induction motor:
   Provide a motor halt period. Switch over SW2 after complete stop of the motor.
2. 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.
3. For motors for cooling fan and motors with thermal protector, also refer to page C-20.
4. When using independent relay contacts for SW2 to change over normal/reverse, interlock both contacts so that they will not close simultaneously.
5. The spark killer consisting of R1 and C1 must be used to protect the relay contacts.

Start/stop control with small signal

- With the external speed changer connected, the motor can be started/stopped with a small signal through SW6 contact while the power switch SW1 (see diagram above) is on. The SW6 provides shorter start-up time than SW1.



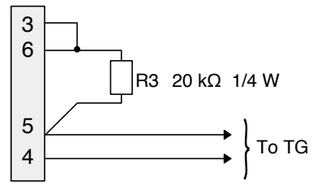
Pin No.

<Precautions>

1. Power (SW1) should be turned on at least 0.5 sec before turning on of the start signal (SW6).
2. When the motor is not operated for a prolonged time, turn off power switch (SW1).

Operation from maximum speed control

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



Pin No.

<Precautions>

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

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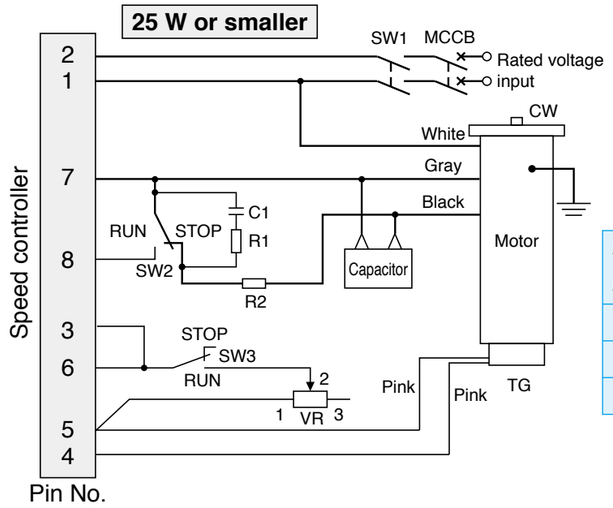
9 Unidirectional rotation and electric brake

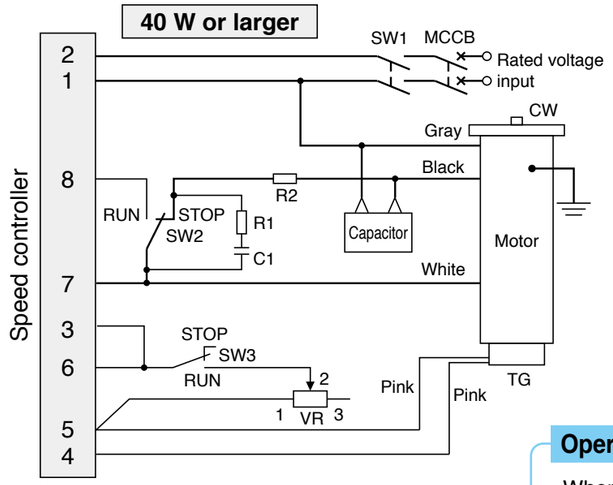
25 W or smaller

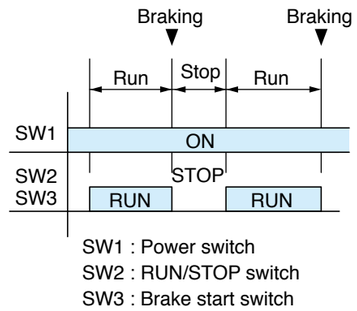


- Connection according to this wiring diagram causes the motor to rotate clockwise when viewed from the motor shaft end. To run the motor counterclockwise, interchange the connecting point of black and gray leads.

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)

40 W or larger





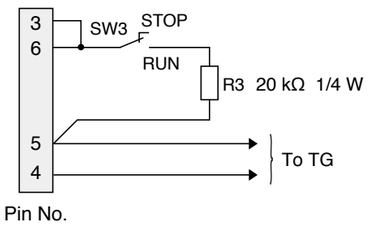
SW1 : Power switch
SW2 : RUN/STOP switch
SW3 : Brake start switch

<Precautions>

1. 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.
2. The number of start/stop cycles must be 6 times/min or less.
3. When using cooling fan motor or motor with thermal protector, also see page C-20.
4. Insert R1 and C1 to protect relay contact.
5. R2 restricts discharge current in case of capacitor short circuit during braking.

Operation from maximum speed control

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

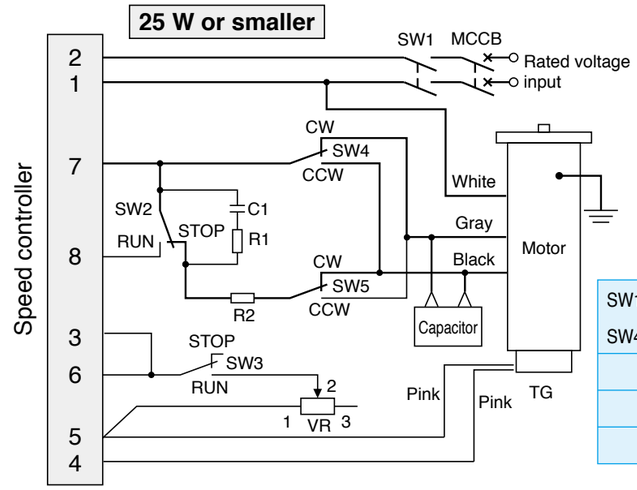


<Precautions>

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

10 Normal/reverse rotation and electric brake

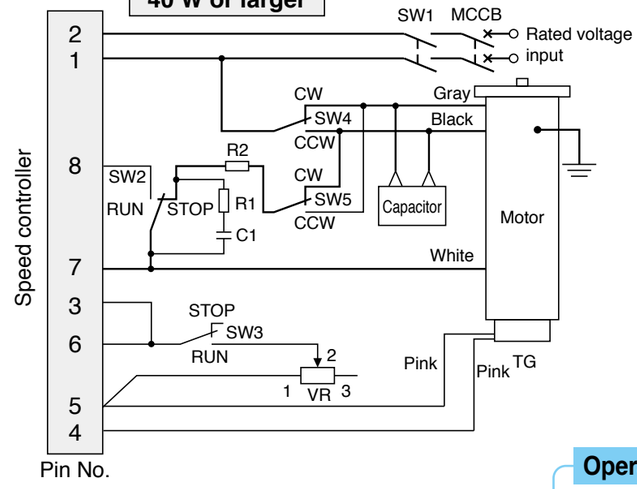
25 W or smaller

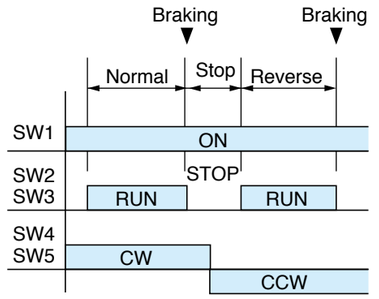


Rotating direction viewed from shaft end	
CW	Clockwise
CCW	Counterclockwise

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 10 mA
R1+C1		DV0P008A (option)
R2		DV0P003 (option)

40 W or larger





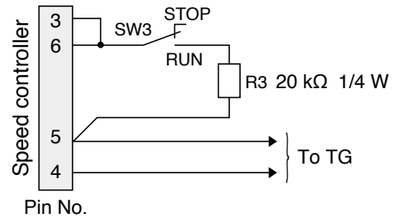
SW1 : Power switch
SW2 : RUN/STOP switch
SW3 : Braking start switch
SW4,SW5 : Normal/reverse selector switch

<Precautions>

1. 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.
2. Do not change the rotating direction (SW4, SW5) while the motor is running.
3. The number of start/stop cycles must be 6 times/min or less.
4. When using cooling fan motor or motor with thermal protector, also see page C-20.
5. Insert R1 and C1 to protect relay contact.
6. R2 restricts discharge current in case of capacitor short circuit during braking.

Operation from maximum speed control

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



<Precautions>

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

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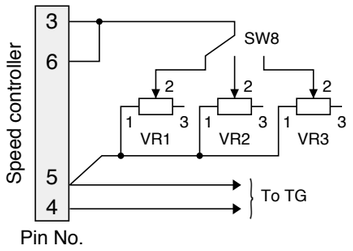
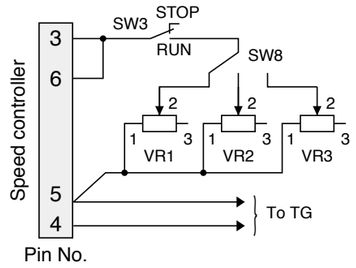
11 Multispeed setting application

No braking applied



Braking applied



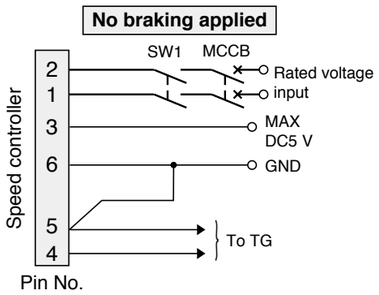
SW3, SW8	DC10 V 10 mA
VR1 VR2 VR3	DV0P002 (option)

<Precautions>

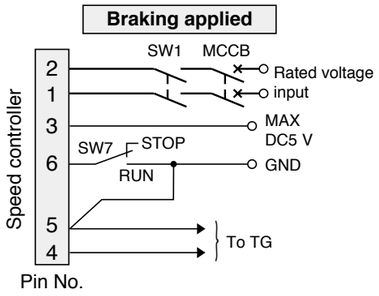
1. Set external speed changers VR1, VR2 and VR3 to 3 different speeds and select the desired speed from SW8.
2. When activating the brake, simultaneously switch over SW3 and RUN-STOP of other switches.
3. For remaining wirings, refer to the corresponding wiring diagrams.

12 Speed change with analog signal

No braking applied



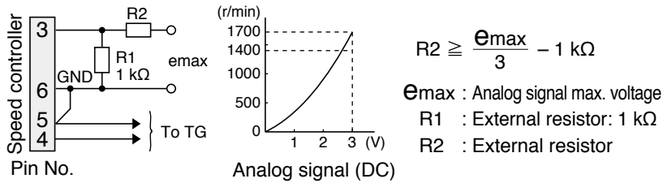
Braking applied



SW1	100 V supply system	5 A or more at 125 VAC
	200 V supply system	5 A or more at 250 VAC
SW7		DC10 V 10 mA

<Precautions>

1. Turn on power switch SW1 approx. 0.5 sec earlier than the analog start signal.
2. For repetitive run/stop operations, use the analog signal while keeping SW1 ON.
3. Soft-operation can be adjusted from the soft-start and soft-down controls or by using analog signal.
4. On the maximum speed control, set the maximum motor revolving speed that may be achieved at the maximum analog signal value (e.g. 3 VDC).
5. The absolute maximum rating of analog signal is 5 VDC. The system should be designed to use standard 3 VDC analog signal. If the signal voltage exceeds 3 VDC, the circuit diagram shown below should be used for wiring.



$$R2 \geqq \frac{e\max}{3} - 1\ k\Omega$$

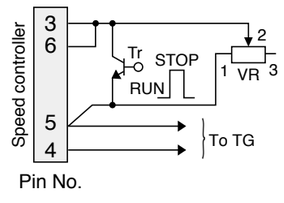
emax : Analog signal max. voltage
R1 : External resistor: 1 kΩ
R2 : External resistor

6. Revolution speed “0” signal should not exceed 0.1 VDC.
7. 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.
8. The percentage ripple of analog voltage signal should be 2 % or less.
9. For other wirings, refer to the corresponding circuit/wiring diagrams.
10. 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.

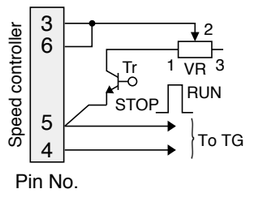
13 Operation through contactless signal

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

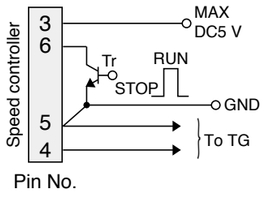
No braking applied



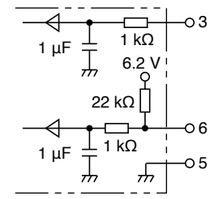
Braking applied



Analog signal and brake



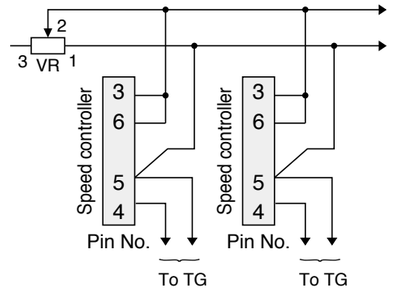
Internal equivalent circuit



14 Parallel operation through external speed changer

<Precautions>

1. The resistance Rs of the external speed changer VR should be as follows:
   Rs = 20/N (kΩ)
   where, N is the number of motors.
2. 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.
3. Wirings from the external speed changer VR should be connected to the same pins (No.5 and 6) on the controller.
4. Malfunction may occur as the number of devices operated in parallel increases.
   To secure correct operation, connect a noise filter to each unit.
5. For other electrical connections, refer to corresponding circuit/wiring diagrams.

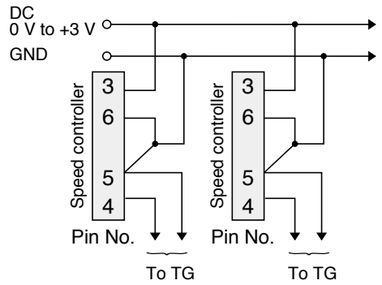


Orders are no longer accepted later than the end of March 2021.

15 Parallel operation through analog signal

<Precautions>

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



16 Soft-operation

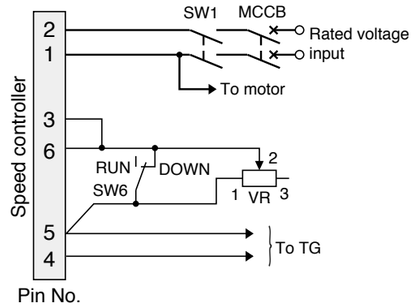
• Soft-start, soft-down

<Precautions>

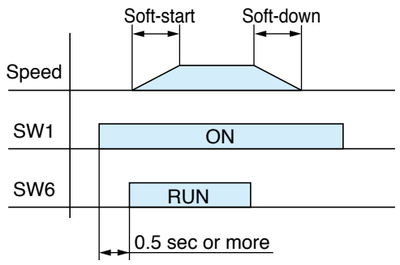
1. Power switch SW1 should be turned on approx. 0.5 sec before the operation start signal from SW6.
2. When repeating run/stop cycles, turn on/off only SW6 while keeping SW1 turned ON. In this way, the motor can be controlled by using a small signal. To stop operation for a long time, also turn off SW1.
3. 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.
4. 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.
5. Soft-start/soft-down control can set maximum time length of approx. 5 seconds (Typ. at CCW). The setting may be exceeded if the inertia of the load is too large.
6. For other electrical connections, refer to corresponding circuit/wiring diagrams.

• Soft-start and electric brake

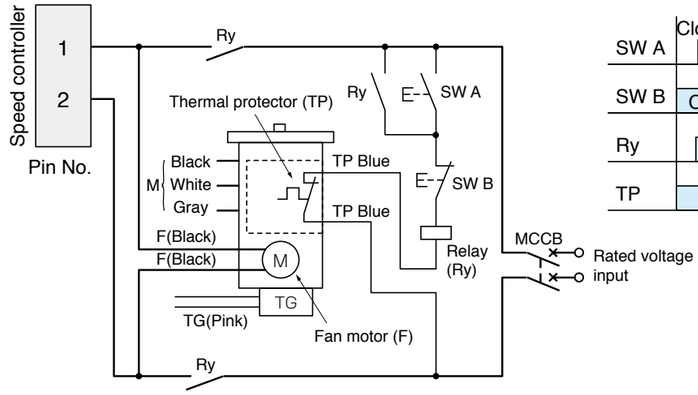
Electrical wirings are the same as for “Unidirectional rotation and electric brake” and “Normal/reverse rotation and electric brake”.
Adjust the soft-start time from the soft-start/down control.
Motor will stop quickly by electric brake despite the volume settings of soft-down operation.



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



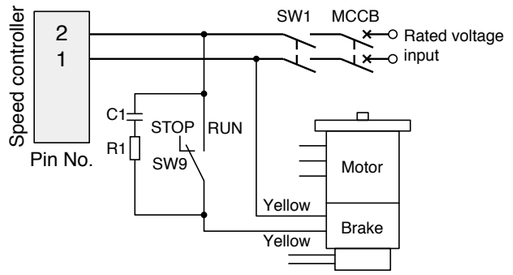
SW A		Momentary N.O. contact
SW B		Momentary N.C. contact
Ry	100 V supply system	125 VAC 5 A or more 3a contact
	200 V supply system	250 VAC 5 A or more 3a contact

<Precautions>

1. 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.
2. Once the TP operates, cooling period is required before the operation can restart.
3. Connect the cooling fan motor (F) across pins 1 and 2 on the power terminal.
4. Motor (M) and tachometer generator (TG) should be connected according to corresponding wiring diagram shown on page C-14 to C-19.

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>

1. 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.
2. 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”.

* 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 Overview

Orders are no longer accepted later than the end of March 2022.

Overview of Speed Controllers

• These controllers vary speed of compact geared motors.

Product designation

• Unit type speed controller

MUSN **8** **25** **G** **L**

Size

6 : 60 mm sq. (2.36 inch sq.)
7 : 70 mm sq. (2.76 inch sq.)
8 : 80 mm sq. (3.15 inch sq.)
9 : 90 mm sq. (3.54 inch sq.)

Output

6 : 6 W
15 : 15 W
25 : 25 W
40 : 40 W
60 : 60 W
90 : 90 W

Shape of shaft

Toothed

Voltage

L : Single-phase 100 V
Y : Single-phase 200 V

MUSN : US series

Speed controller

Orders are no longer accepted later than the end of March 2022.

Unit type US series

US series

• Features

<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.

• 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.

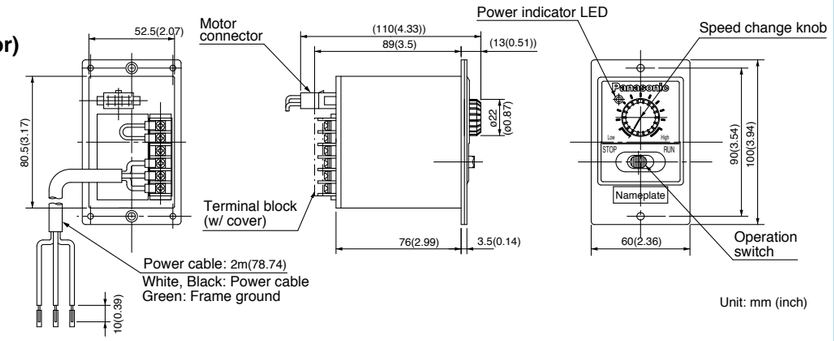
Orders are no longer accepted later than the end of March 2022.

• Outline drawing

US series

• 40 W or smaller (w/ internal capacitor)

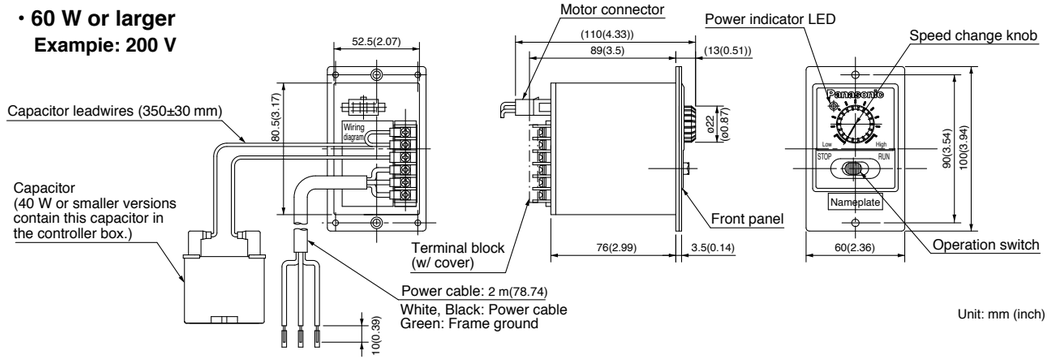
Exampie: 200 V



Unit: mm (inch)

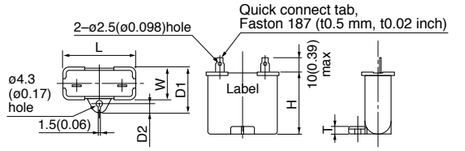
• 60 W or larger

Exampie: 200 V



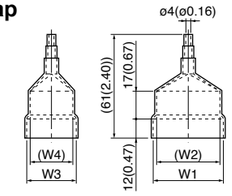
Unit: mm (inch)

Capacitor



Unit: mm (inch)

Capacitor cap



Unit: mm (inch)

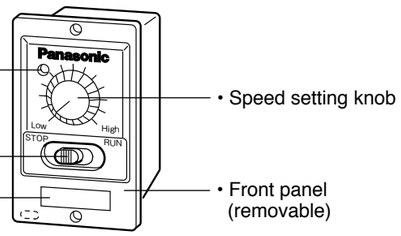
Unit: upper (mm)
lower (inch)

Capacitor part No.	Voltage	Designation	L	W	D1	D2	H	T
M0PC20M20A	100 V	MUSN960GL	39.5 (1.56)	26.7 (1.05)	37 (1.46)	6 (0.24)	41 (1.61)	4 (0.16)
M0PC5M40	200 V	MUSN960GY	50 (1.97)	30.5 (1.20)	41 (1.61)	6.2 (0.24)	41.5 (1.63)	4 (0.16)
M0PC25M20	100 V	MUSN990GL	50.2 (1.98)	31 (1.22)	41 (1.61)	6.2 (0.24)	42 (1.65)	4 (0.16)
M0PC6.2M38	200 V	MUSN990GY	50 (1.97)	30.5 (1.20)	41 (1.61)	6.2 (0.24)	41.5 (1.65)	4 (0.16)

Capacitor cap part No.	W1	W2	W3	W4
M0PC3926	39.5 (1.56)	37.5 (1.48)	26 (1.02)	25 (0.98)
M0PC5032	50 (1.97)	48 (1.89)	32.5 (1.28)	29.5 (1.16)
M0PC5032	50 (1.97)	48 (1.89)	32.5 (1.28)	29.5 (1.16)
M0PC5032	50 (1.97)	48 (1.89)	32.5 (1.28)	29.5 (1.16)

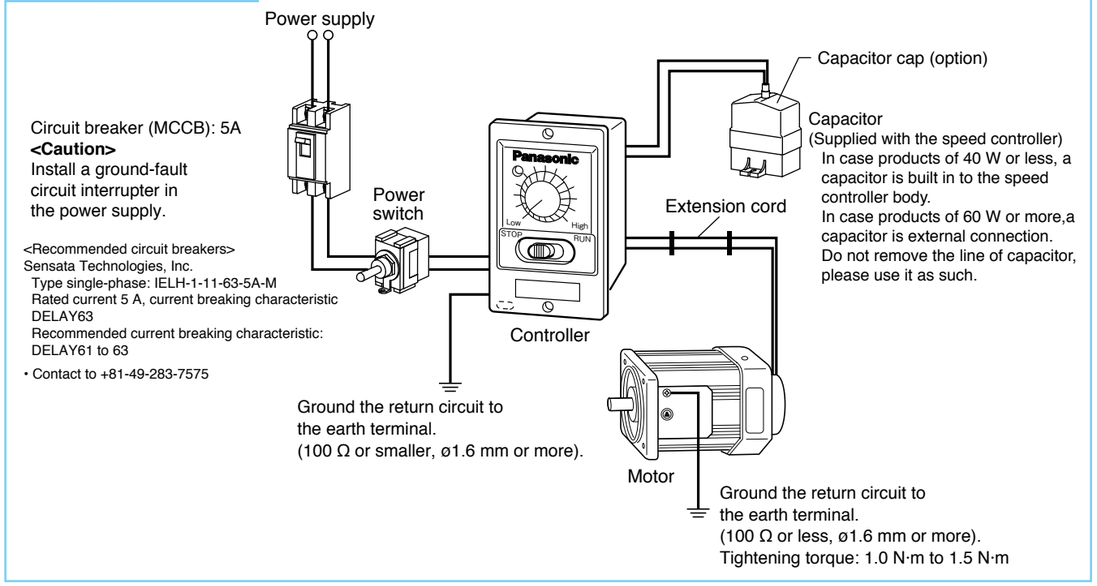
• Names and functions

US series



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

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. If there is a forced cooling fan equipped to the motor, the fan will start rotating when power is turned on to the controller.
   In order to stop the forced cooling fan, please turn off the source of power to the controller.

• 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.

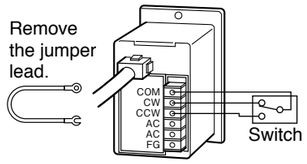
• Normal/reverse rotation

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

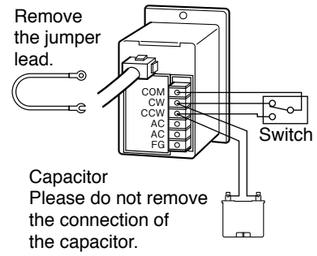
[Note]
Do not operate this switch while the motor is running.

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

40 W or smaller (Built-in capacitor)



60 W or larger

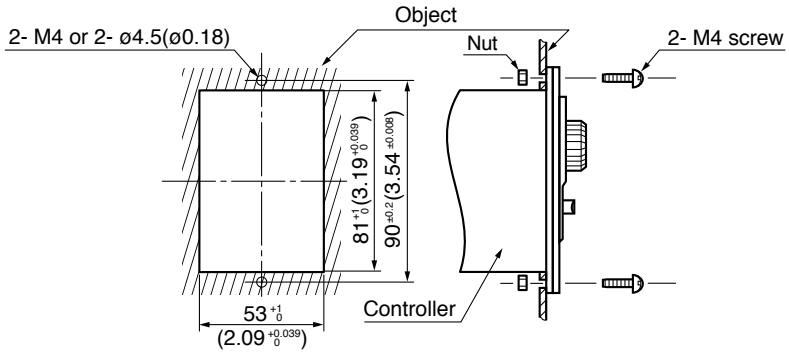


* Please read your User's manual carefully so that you will understand the operation and safety precautions before attempting to operate the system.

• Mounting method (US series)

<Mounting through square holes>

Unit: mm (inch)



Caution

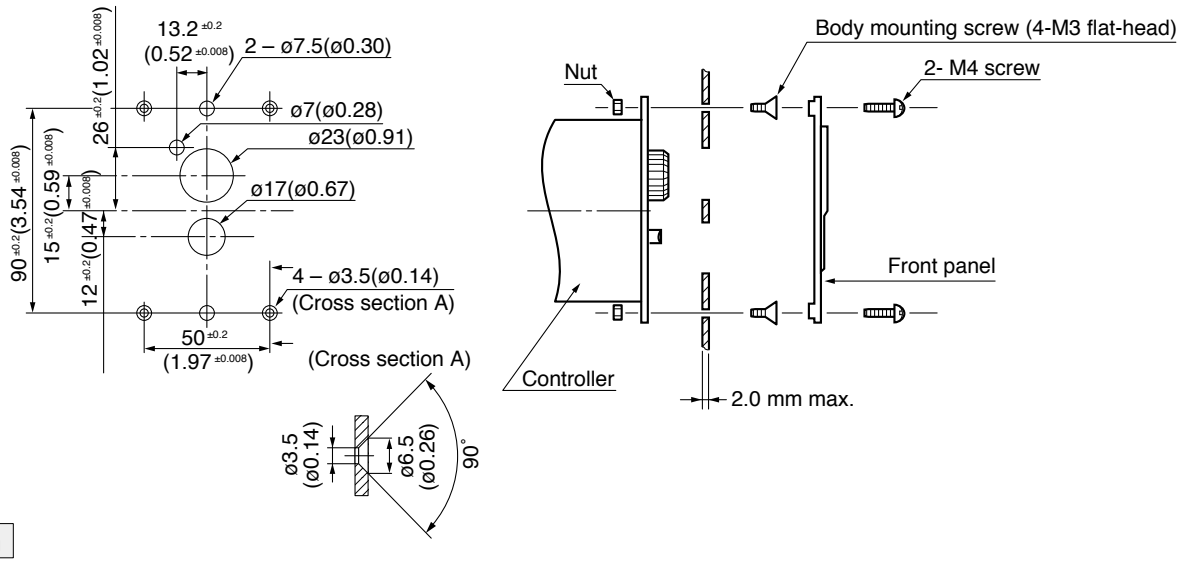
Mounting screws and nuts are not included in accessories. Please prepare by customer.

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>

Unit: mm (inch)



Caution

Wall thickness of the equipment where the controller is to be mounted should be 2 mm or less.
Mounting screws and nuts are not included in accessories. Please prepare by customer.

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).

* 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 Overview

Orders are no longer accepted later than the November 1st, 2021.

Overview of Speed Controllers

• These controllers vary speed of compact geared motors.

Product designation

• Separate type speed controller

• MGSD type

MGSD **B** **2**

Output **Input power**

1 : Single-phase 100 VAC to 120 VAC
2 : Single-phase 200 VAC to 240 VAC

A	100 V	3 W to 40 W
B		60 W to 90 W
	200 V	6 W to 90 W

Series

* 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.

Speed controller

Orders are no longer accepted later than the November 1st, 2021.

• Possible combination of speed controller and motor

	Size	Output (W)	Motor			Voltage (V)	Speed controller
			Certified	Pinion shaft type	Round shaft type		MGSD type
Variable speed induction motor	60 mm sq. (2.36 inch sq.)	3	-----	M61X3GV4L	M61X3SV4LS	100	MGSDA1 ★
		6	-----	M61X6GV4L	M61X6SV4LS	100	MGSDA1 ★
			-----	M61X6GV4Y	M61X6SV4YS	200	MGSDB2 ★
			✪	M61X6GV4LG(A)	M61X6SV4LG(A)	100	MGSDA1 ★
			✪	M61X6GV4DG(A)	M61X6SV4DG(A)	110/115	MGSDA1 ★
			✪	M61X6GV4YG(A)	M61X6SV4YG(A)	200	MGSDB2 ★
			✪	M61X6GV4GG(A)	M61X6SV4GG(A)	220/230	MGSDB2 ★
	70 mm sq. (2.76 inch sq.)	10	-----	M71X10GV4L	M71X10SV4LS	100	MGSDA1 ★
			-----	M71X10GV4Y	M71X10SV4YS	200	MGSDB2 ★
		15	-----	M71X15GV4L	M71X15SV4LS	100	MGSDA1 ★
			-----	M71X15GV4Y	M71X15SV4YS	200	MGSDB2 ★
			✪	M71X15GV4LG(A)	M71X15SV4LG(A)	100	MGSDA1 ★
			✪	M71X15GV4DG(A)	M71X15SV4DG(A)	110/115	MGSDA1 ★
			✪	M71X15GV4YG(A)	M71X15SV4YG(A)	200	MGSDB2 ★
			✪ ⓔ	M71X15GV4GG(A)	M71X15SV4GG(A)	220/230	MGSDB2 ★
	80 mm sq. (3.15 inch sq.)	15	-----	M81X15GV4L	M81X15SV4LS	100	MGSDA1 ★
			-----	M81X15GV4Y	M81X15SV4YS	200	MGSDB2 ★
		25	-----	M81X25GV4L	M81X25SV4LS	100	MGSDA1 ★
			-----	M81X25GV4Y	M81X25SV4YS	200	MGSDB2 ★
			✪	M81X25GV4LG(A)	M81X25SV4LG(A)	100	MGSDA1 ★
			✪	M81X25GV4DG(A)	M81X25SV4DG(A)	110/115	MGSDA1 ★
			✪	M81X25GV4YG(A)	M81X25SV4YG(A)	200	MGSDB2 ★
			✪ ⓔ	M81X25GV4GG(A)	M81X25SV4GG(A)	220/230	MGSDB2 ★
	90 mm sq. (3.54 inch sq.)	40	-----	M91X40GV4L	M91X40SV4LS	100	MGSDA1 ★
			-----	M91X40GV4Y	M91X40SV4YS	200	MGSDB2 ★
			✪	M91X40GV4LG(A)	M91X40SV4LG(A)	100	MGSDA1 ★
			✪	M91X40GV4DG(A)	M91X40SV4DG(A)	110/115	MGSDA1 ★
			✪	M91X40GV4YG(A)	M91X40SV4YG(A)	200	MGSDB2 ★
			✪ ⓔ	M91X40GV4GG(A)	M91X40SV4GG(A)	220/230	MGSDB2 ★
		60	-----	M91Z60GV4L	M91Z60SV4LS	100	MGSDB1 ★
			-----	M91Z60GV4Y	M91Z60SV4YS	200	MGSDB2 ★
			✪	M91Z60GV4LG(A)	M91Z60SV4LG(A)	100	MGSDB1 ★
			✪	M91Z60GV4DG(A)	M91Z60SV4DG(A)	110/115	MGSDB1 ★
			✪	M91Z60GV4YG(A)	M91Z60SV4YG(A)	200	MGSDB2 ★
			✪	M91Z60GV4GG(A)	M91Z60SV4GG(A)	220/230	MGSDB2 ★
			✪ ⓔ	M91Z60GV4GGB	M91Z60SV4GGB	220/230	MGSDB2 ★
			✪ ⓔ	M91Z60GV4GGC	M91Z60SV4GGC	220/230	MGSDB2 ★
		90	-----	M91Z90GV4L	M91Z90SV4LS	100	MGSDB1 ★
			-----	M91Z90GV4Y	M91Z90SV4YS	200	MGSDB2 ★
			✪	M91Z90GV4LG(A)	M91Z90SV4LG(A)	100	MGSDB1 ★
			✪	M91Z90GV4DG(A)	M91Z90SV4DG(A)	110/115	MGSDB1 ★
			✪	M91Z90GV4YG(A)	M91Z90SV4YG(A)	200	MGSDB2 ★
			✪	M91Z90GV4GG(A)	M91Z90SV4GG(A)	220/230	MGSDB2 ★
			✪ ⓔ	M91Z90GV4GGB	M91Z90SV4GGB	220/230	MGSDB2 ★
			✪ ⓔ	M91Z90GV4GGC	M91Z90SV4GGC	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.
* For combination of C&B (variable speed induction motor) motor and speed controller please refer to the page B-351.

✪ **Conforming to international standards** ⓔ **Motor compliant with China efficiency standards :** c UL us CE UK CA

★ **MGSD speed controllers are compliant with** c UL us **and** CE.

* 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.

	Size	Output (W)	Motor			Voltage (V)	Speed controller
			Certified	Pinion shaft type	Round shaft type		MGSD type
Variable speed reversible motor	60 mm sq. (2.36 inch sq.)	4	-----	M6RX4GV4L	M6RX4SV4LS	100	MGSDA1 ★
		6	-----	M6RX6GV4L	M6RX6SV4LS	100	MGSDA1 ★
			-----	M6RX6GV4Y	M6RX6SV4YS	200	MGSDB2 ★
			✪	M6RX6GV4LG(A)	M6RX6SV4LG(A)	100	MGSDA1 ★
			✪	M6RX6GV4DG(A)	M6RX6SV4DG(A)	110/115	MGSDA1 ★
			✪	M6RX6GV4YG(A)	M6RX6SV4YG(A)	200	MGSDB2 ★
			✪	M6RX6GV4GG(A)	M6RX6SV4GG(A)	220/230	MGSDB2 ★
	70 mm sq. (2.76 inch sq.)	10	-----	M7RX10GV4L	M7RX10SV4LS	100	MGSDA1 ★
			-----	M7RX10GV4Y	M7RX10SV4YS	200	MGSDB2 ★
		15	-----	M7RX15GV4L	M7RX15SV4LS	100	MGSDA1 ★
			-----	M7RX15GV4Y	M7RX15SV4YS	200	MGSDB2 ★
			✪	M7RX15GV4LG(A)	M7RX15SV4LG(A)	100	MGSDA1 ★
			✪	M7RX15GV4DG(A)	M7RX15SV4DG(A)	110/115	MGSDA1 ★
			✪	M7RX15GV4YG(A)	M7RX15SV4YG(A)	200	MGSDB2 ★
			✪	M7RX15GV4GG(A)	M7RX15SV4GG(A)	220/230	MGSDB2 ★
	80 mm sq. (3.15 inch sq.)	20	-----	M8RX20GV4L	M8RX20SV4LS	100	MGSDA1 ★
			-----	M8RX20GV4Y	M8RX20SV4YS	200	MGSDB2 ★
		25	-----	M8RX25GV4L	M8RX25SV4LS	100	MGSDA1 ★
			-----	M8RX25GV4Y	M8RX25SV4YS	200	MGSDB2 ★
			✪	M8RX25GV4LG(A)	M8RX25SV4LG(A)	100	MGSDA1 ★
			✪	M8RX25GV4DG(A)	M8RX25SV4DG(A)	110/115	MGSDA1 ★
			✪	M8RX25GV4YG(A)	M8RX25SV4YG(A)	200	MGSDB2 ★
			✪	M8RX25GV4GG(A)	M8RX25SV4GG(A)	220/230	MGSDB2 ★
	90 mm sq. (3.54 inch sq.)	40	-----	M9RX40GV4L	M9RX40SV4LS	100	MGSDA1 ★
			-----	M9RX40GV4Y	M9RX40SV4YS	200	MGSDB2 ★
			✪	M9RX40GV4LG(A)	M9RX40SV4LG(A)	100	MGSDA1 ★
			✪	M9RX40GV4DG(A)	M9RX40SV4DG(A)	110/115	MGSDA1 ★
			✪	M9RX40GV4YG(A)	M9RX40SV4YG(A)	200	MGSDB2 ★
			✪	M9RX40GV4GG(A)	M9RX40SV4GG(A)	220/230	MGSDB2 ★
		60	-----	M9RZ60GV4L	M9RZ60SV4LS	100	MGSDB1 ★
			-----	M9RZ60GV4Y	M9RZ60SV4YS	200	MGSDB2 ★
			✪	M9RZ60GV4LG(A)	M9RZ60SV4LG(A)	100	MGSDB1 ★
			✪	M9RZ60GV4DG(A)	M9RZ60SV4DG(A)	110/115	MGSDB1 ★
			✪	M9RZ60GV4YG(A)	M9RZ60SV4YG(A)	200	MGSDB2 ★
			✪	M9RZ60GV4GG(A)	M9RZ60SV4GG(A)	220/230	MGSDB2 ★
		90	-----	M9RZ90GV4L	M9RZ90SV4LS	100	MGSDB1 ★
			-----	M9RZ90GV4Y	M9RZ90SV4YS	200	MGSDB2 ★
			✪	M9RZ90GV4LG(A)	M9RZ90SV4LG(A)	100	MGSDB1 ★
			✪	M9RZ90GV4DG(A)	M9RZ90SV4DG(A)	110/115	MGSDB1 ★
			✪	M9RZ90GV4YG(A)	M9RZ90SV4YG(A)	200	MGSDB2 ★
			✪	M9RZ90GV4GG(A)	M9RZ90SV4GG(A)	220/230	MGSDB2 ★
Variable speed motor with electromagnetic brake	60 mm sq. (2.36 inch sq.)	6	-----	M6RX6GBV4L	-----	100	MGSDA1 ★
			-----	M6RX6GBV4Y	-----	200	MGSDB2 ★
	70 mm sq. (2.76 inch sq.)	15	-----	M7RX15GBV4L	-----	100	MGSDA1 ★
			-----	M7RX15GBV4Y	-----	200	MGSDB2 ★
	80 mm sq. (3.15 inch sq.)	25	-----	M8RX25GBV4L	-----	100	MGSDA1 ★
			-----	M8RX25GBV4Y	-----	200	MGSDB2 ★
	90 mm sq. (3.54 inch sq.)	40	-----	M9RX40GBV4L	-----	100	MGSDA1 ★
			-----	M9RX40GBV4Y	-----	200	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 :** c UL us CE UK CA ★ **MGSD speed controllers are compliant with** c UL us **and** CE.

* 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.

Speed controller

Orders are no longer accepted later than the November 1st, 2021.

MGSD 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: cULus CE

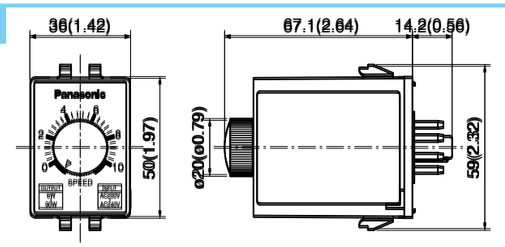
• Standard specification (MGSD type)

	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 EX type	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

MGSD type



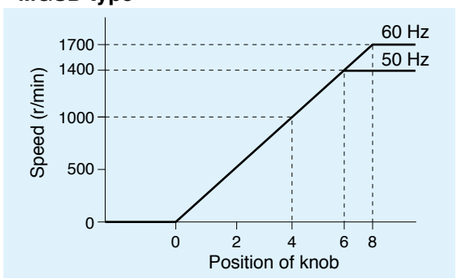
Socket is not supplied with the product.
Use octal pin socket (DV0P4560), option, or Socket (AW68102) recommended by Panasonic Industrial Devices SUNX Co.,Ltd.

Unit: mm (inch)

• 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



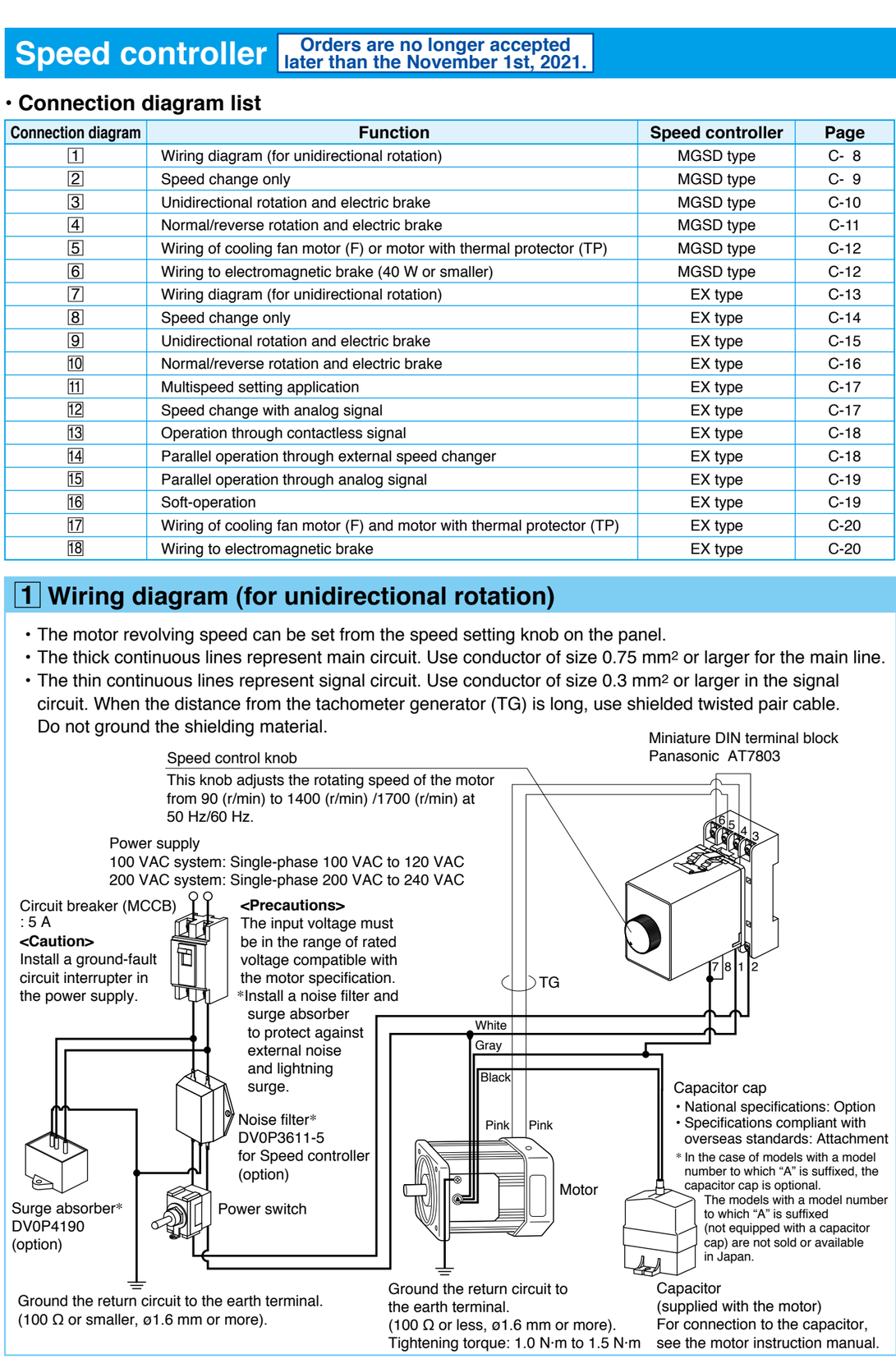
* Please read your User's manual carefully so that you will understand the operation and safety precautions before attempting to operate the system.

• 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
9	Unidirectional rotation and electric brake	EX type	C-15
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

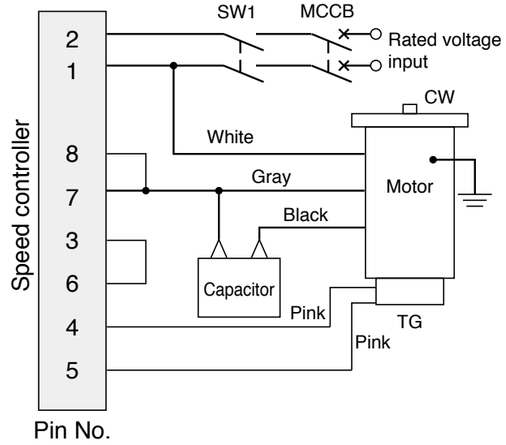
1 Wiring diagram (for unidirectional rotation)

- 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.

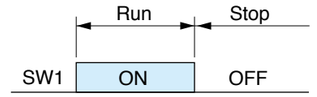


2 Speed change only

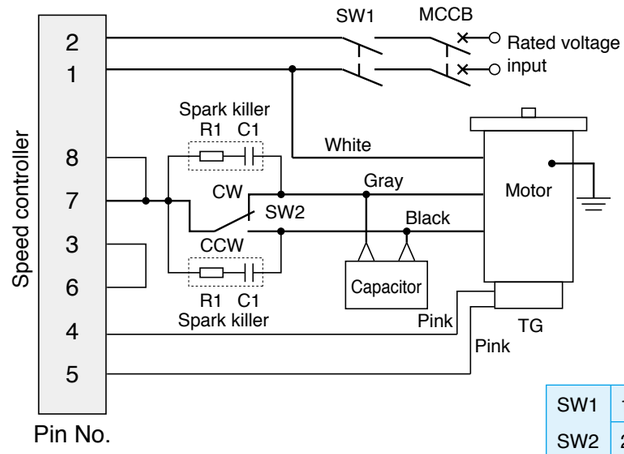
Unidirectional rotation

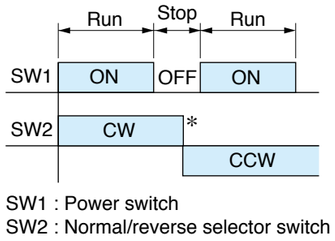


Rotating direction viewed from shaft end	
CW	Clockwise
CCW	Counterclockwise



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>

1. To change rotating direction of induction motor:
   Provide a motor halt period. Switch over SW2 after complete stop of the motor.
2. 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.
3. For motors for cooling fan and motors with thermal protector, also refer to page C-12.
4. When using independent relay contacts for SW2 to change over normal/reverse, interlock both contacts so that they will not close simultaneously.
5. 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.

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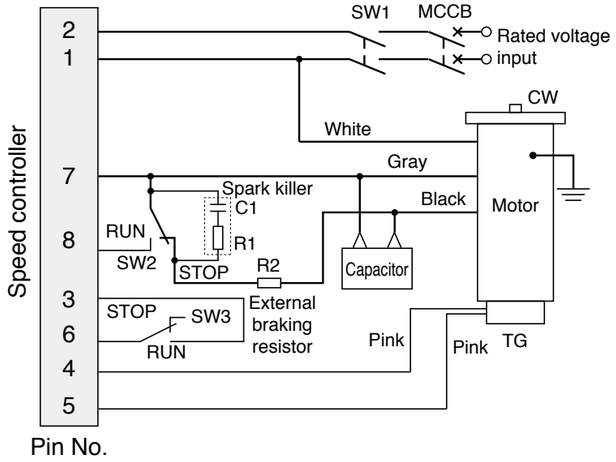
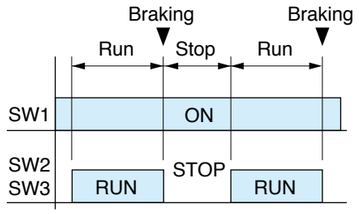
Orders are no longer accepted later than the November 1st, 2021.

3 Unidirectional rotation and electric brake

25 W or smaller



- 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

40 W or larger

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)

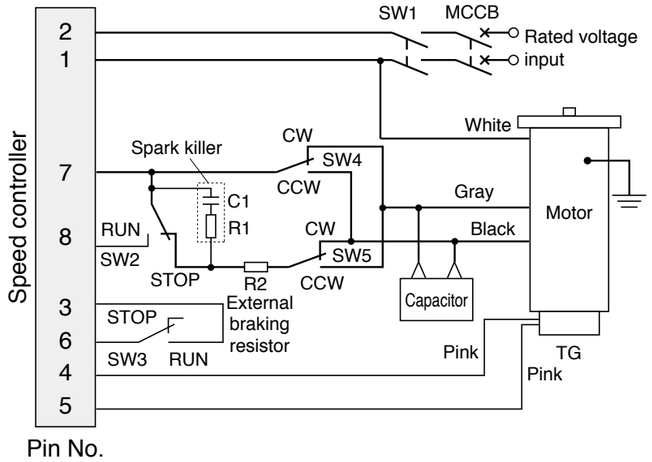
<Precautions>

1. 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.
2. The number of start/stop operations must be 6 times/min or less.
3. For motors for cooling fan and motors with thermal protector, also refer to page C-12.
4. The spark killer consisting of R1 and C1 must be used to protect the relay contacts.
5. R2 limits flow of discharging current upon short-circuiting of the capacitor during braking.

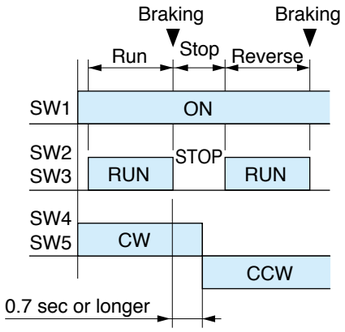
* Please read your User's manual carefully so that you will understand the operation and safety precautions before attempting to operate the system.

4 Normal/reverse rotation and electric brake

25 W or smaller



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

40 W or larger

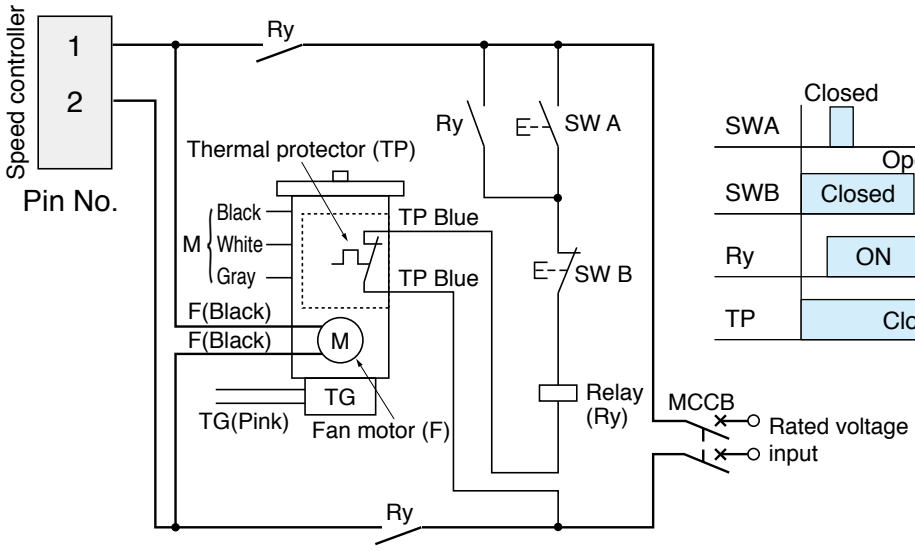
SW1, SW2	100 V supply system	5 A or more at 125 VAC
SW4, SW5	200 V supply system	5 A or more at 250 VAC
SW3		DC10 V 10m A
Spark killer R1+C1		DV0P008A (option)
External braking resistor R2		DV0P003 (option)

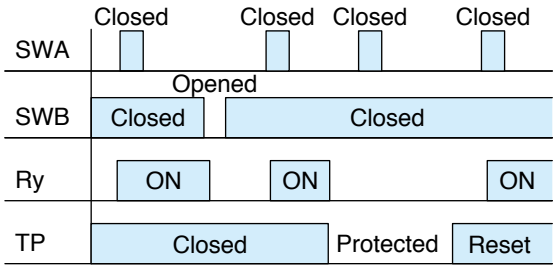
<Precautions>

1. 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.
2. Do not change the motor rotating direction (SW4, SW5) while the motor is running.
3. The number of start/stop operations must be 6 times/min or less.
4. For motors for cooling fan and motors with thermal protector, also refer to page C-12.
5. The spark killer consisting of R1 and C1 must be used to protect the relay contacts.
6. R2 limits flow of discharging current upon short-circuiting of the capacitor during braking.

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

5 Wiring of cooling fan motor (F) or motor with thermal protector (TP)





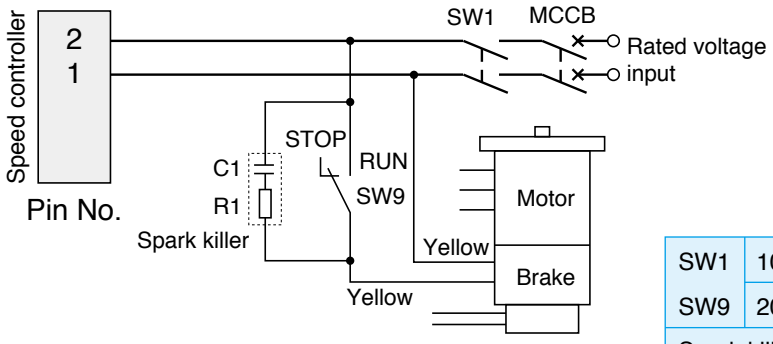
SW A		Momentary N.O. contact
SW B		Momentary N.C. contact
Relay Ry	100 V supply system	125 VAC 5 A or more 3a contact
	200 V supply system	250 VAC 5 A or more 3a contact

<Precautions>

1. 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.
2. Once the TP operates, cooling period is required before the operation can restart.
3. Connect the cooling fan motor (F) across pins 1 and 2 on the power terminal.
4. Motor (M) and tachometer generator (TG) should be connected according to corresponding wiring diagram shown on page C-9 to C-11.

6 Wiring to electromagnetic brake (40 W or smaller)

• 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
Spark killer R1+C1		DV0P008A (option)

<Precautions>

1. Operate SW9 simultaneously with RUN/STOP switching of other switches, if any.
   Placing other switch to RUN position while the brake is active (SW9 at STOP position) causes the motor to generate heat.
2. For remaining wirings, refer to corresponding wiring diagram.

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