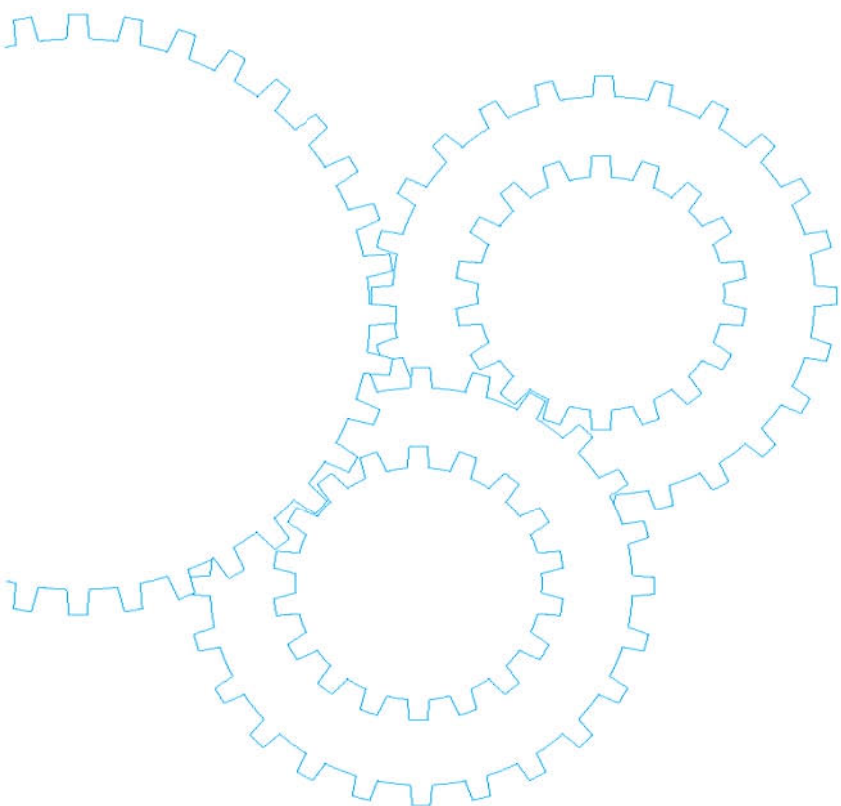


Speed Controller



Contents

- Speed Controller Overview C- 2
- Types C- 4
- Product designation C- 6

Speed controller




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 Matsushita Electric Works, Ltd.) 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 sequencer. The voltage signal can also be used as control signal.

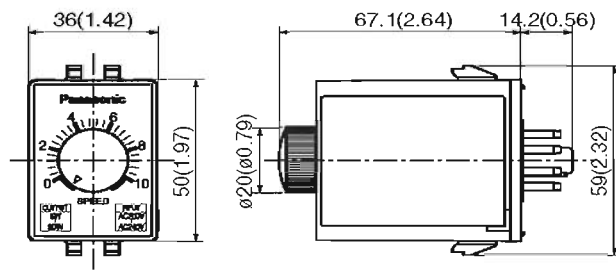
• Standard specification (MGSD type)

	MGSDA1	MGSDB1	MGSDB2
Supply voltage	Single phase 100 to 120 VAC		Single phase 200 to 240 VAC
Supply voltage tolerance	±10% (at rated voltage)		
Power frequency	50/60 Hz		
Rated input current	1.0 A	2.0 A	1.0 A
Compatible motor output	3 to 40 W	60 to 90 W	6 to 90 W
Speed control range	50Hz : 90 to 1400 min ⁻¹ 60Hz : 90 to 1700 min ⁻¹		
Speed regulation (against load)	5% : 1000 min ⁻¹ , 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 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
Matsushita Electric Works, Ltd.

Unit: mm (inch)

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

• 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		50/60 Hz				
Rated current		0.4 A	1 A	2.0 A	0.3 A	1 A
Compatible motor output *1		3 to 10 W	15 to 40 W	60 to 0 W	6 to 20 W	25 to 90 W
Operation change		High-response			High-stability	
Speed control range		90 to 1400 min ⁻¹ / 90 to 1700 min ⁻¹			50 to 1400 min ⁻¹ / 50 to 1700 min ⁻¹	
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-second 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 to 50°C				
Storage temperature		-20 to 60°C				

*1 Applicable to Matsushita compact speed variable geared motors. Select motors with applicable output.

*2 Electric braking has no mechanical brake holding mechanism.

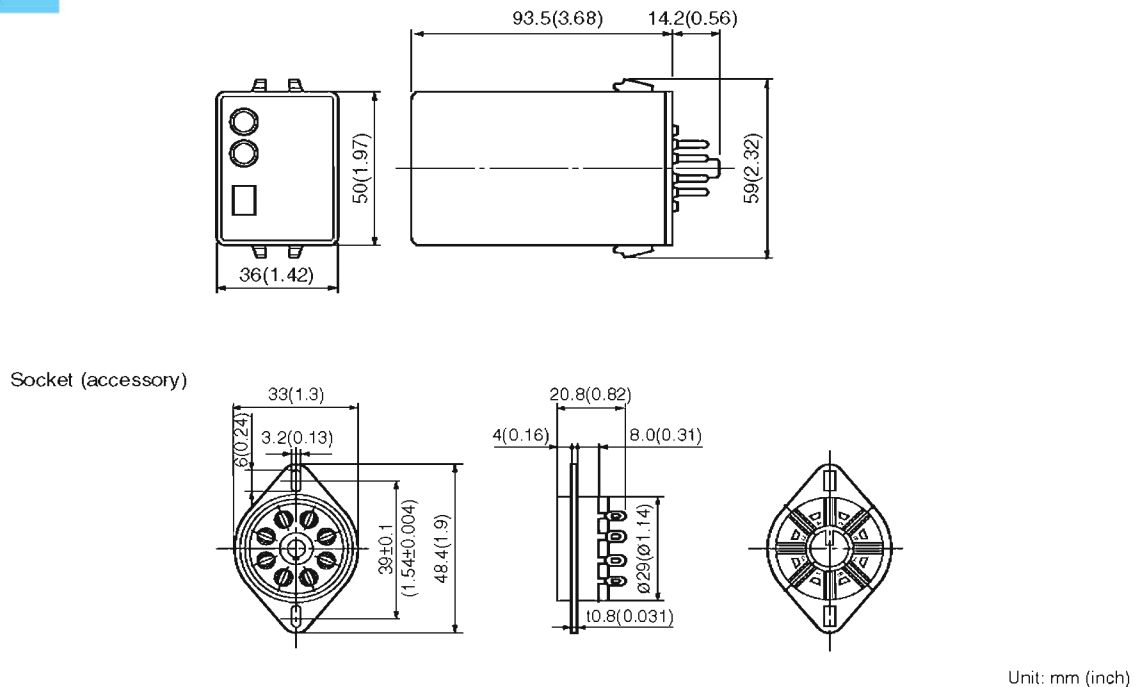
To provide brake holding, use our C&B motor or variable speed motor containing electromagnetic brake.

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



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

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.

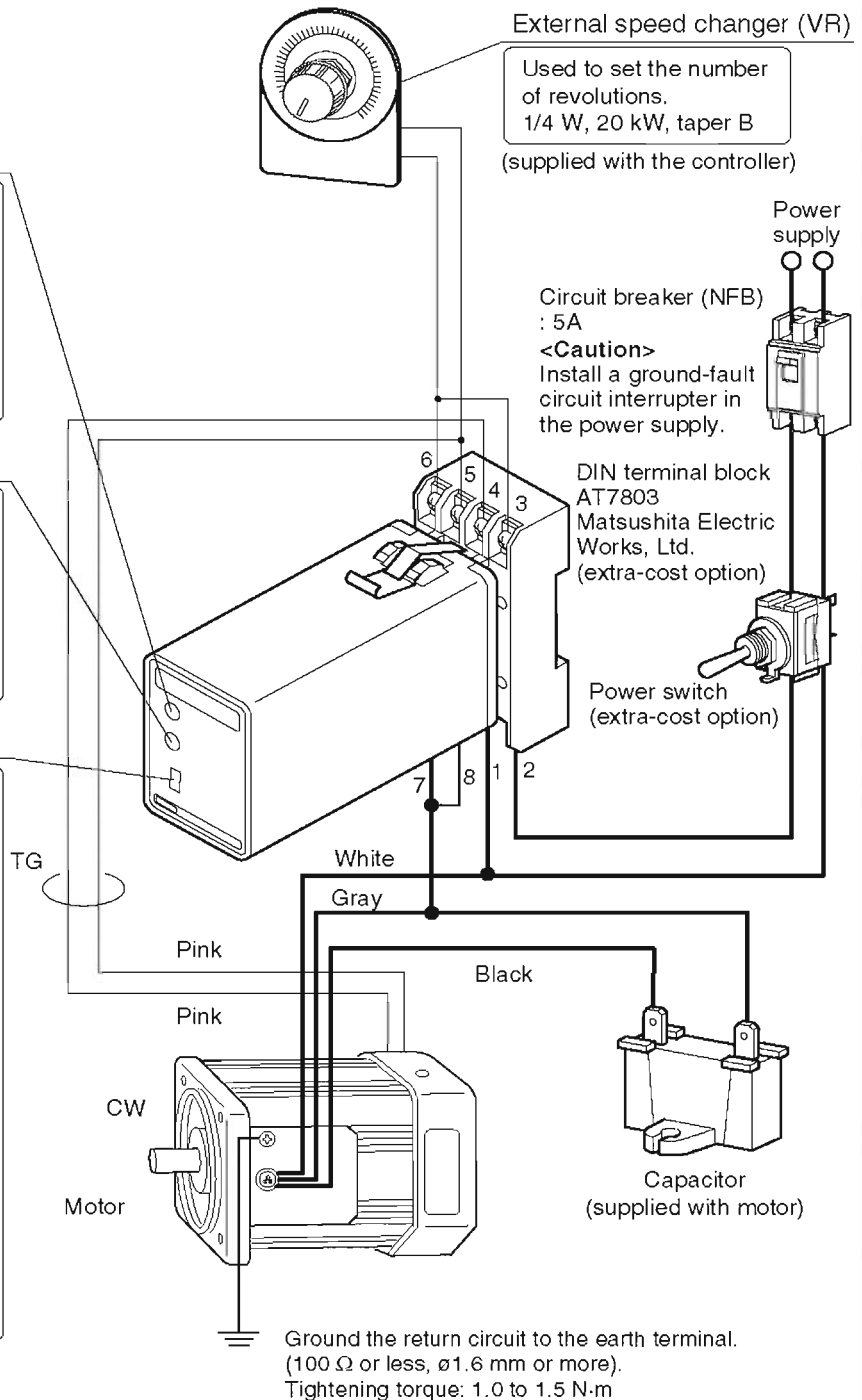
• Maximum speed control

Use this control to adjust the revolving speed when the external speed changer is set at the top speed. Adjust the speed to 1400 (min⁻¹) or below at 50 Hz; or 1700 (min⁻¹) 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.

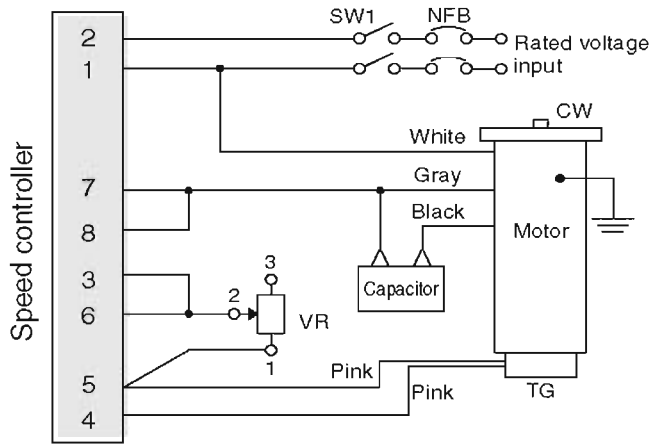


* Please read your User's manual carefully so that you will understand the operation and safety precautions before attempting to operate the system.

Speed controller

8 Speed change only

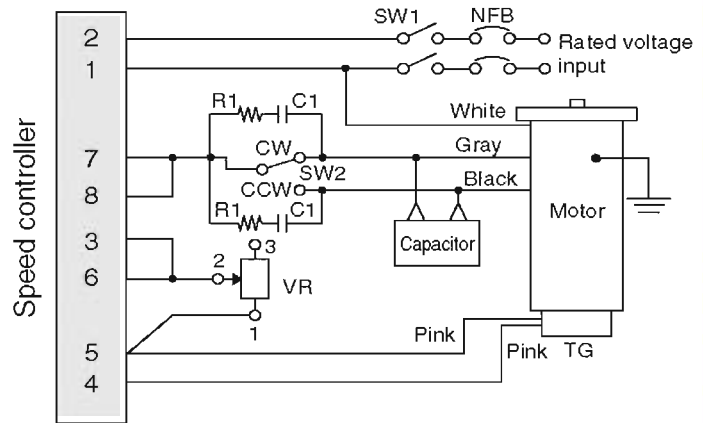
Unidirectional rotation



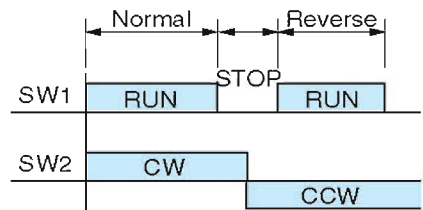
Pin No.

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.

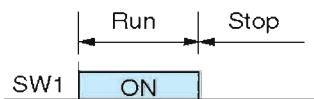
Normal/reverse rotation



Pin No.



SW1 : Power switch
SW2 : Normal/reverse selector switch



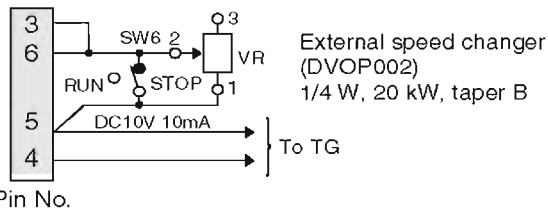
SW1	100 V supply system	5 A or more at 125 VAC
SW2	200 V supply system	5 A or more at 250 VAC
	R1+C1	DV0P008 (option)

<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. HG/HP relay from Matsushita Electric Works, Ltd.) 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

- 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.



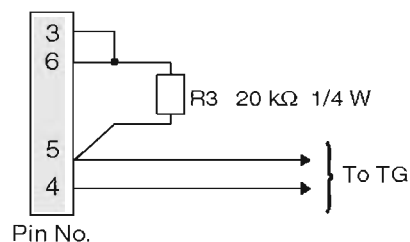
Pin No.

<Precautions>

- 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).

Operation from maximum speed control

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



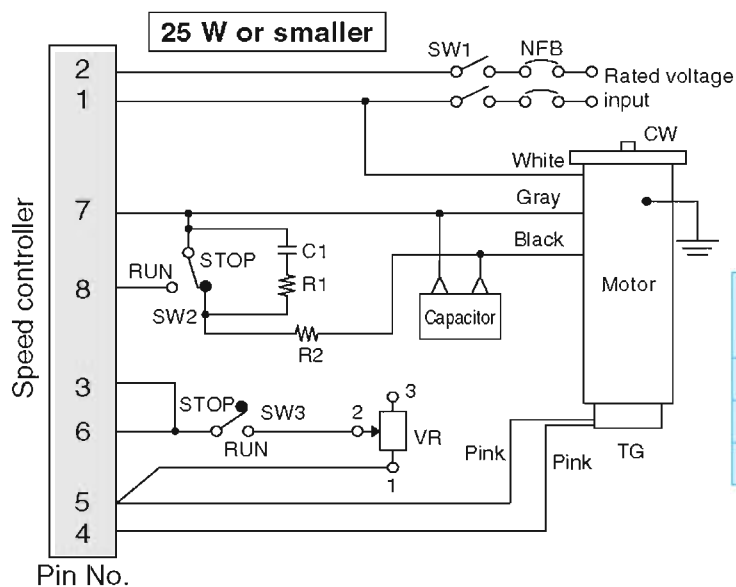
Pin No.

<Precautions>

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

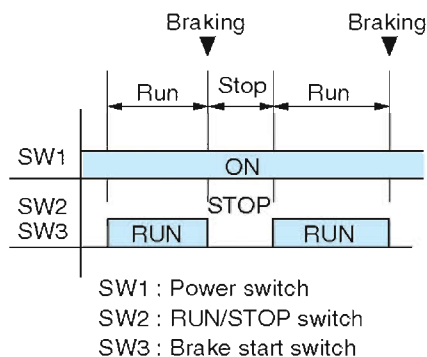
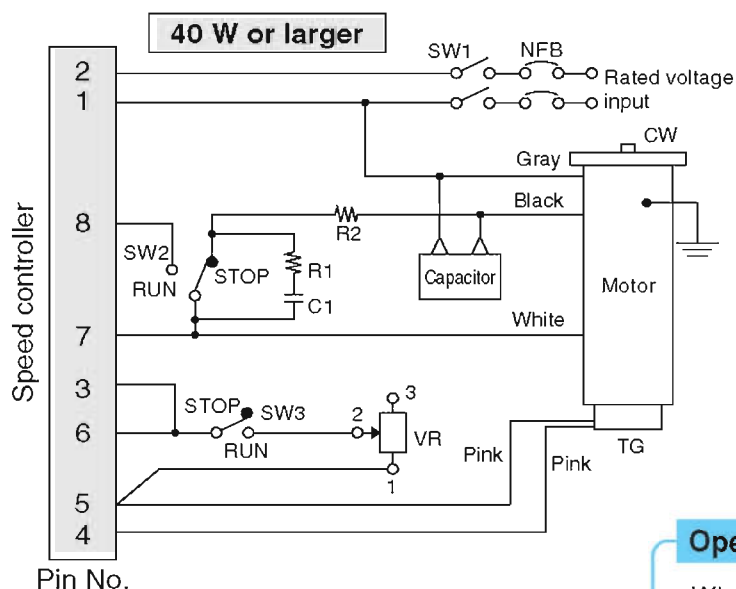
* Please read your User's manual carefully so that you will understand the operation and safety precautions before attempting to operate the system.

9 Unidirectional rotation and electric brake



- 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	DV0P008 (option)	
R2	DV0P003 (option)	

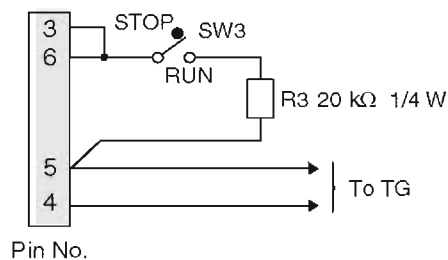


<Precautions>

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/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.

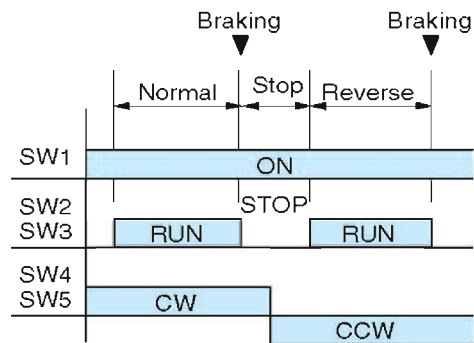
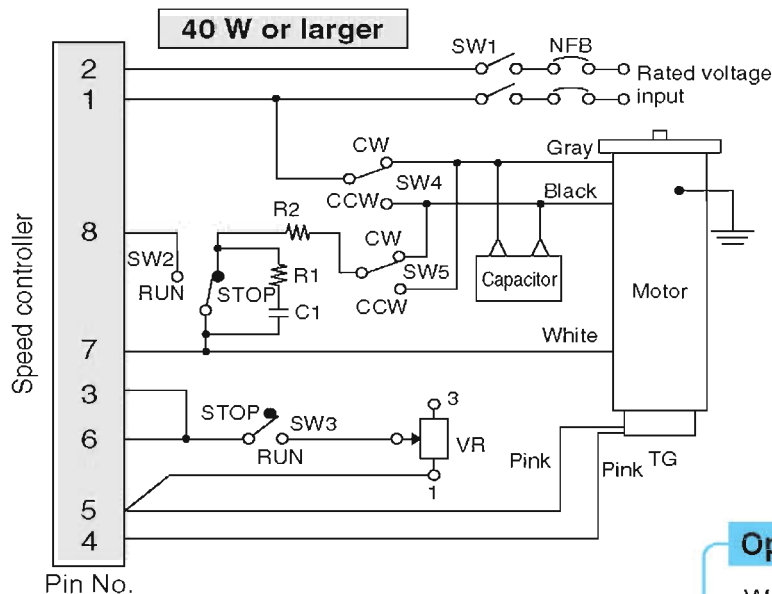
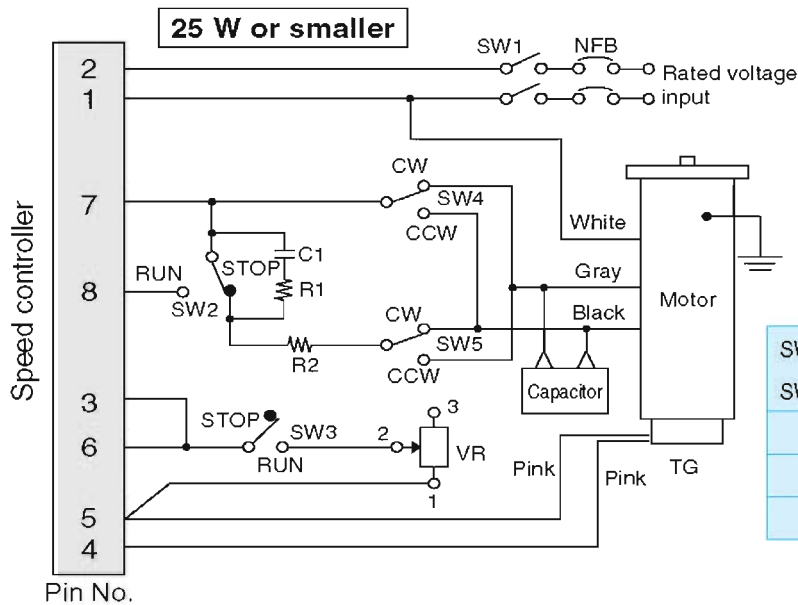


<Precautions>

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

Speed controller

10 Normal/reverse rotation and electric brake



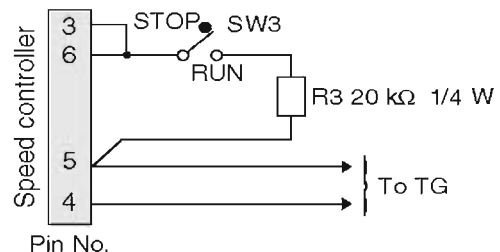
SW1 : Power switch
 SW2 : RUN/STOP switch
 SW3 : Braking start switch
 SW4, SW5 : Normal/reverse selector switch

<Precautions>

- When SW2 and SW3 are switched from RUN to STOP, electric braking is applied for approx. 5 sec, or until the motor stops. (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/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.

Operation from maximum speed control

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



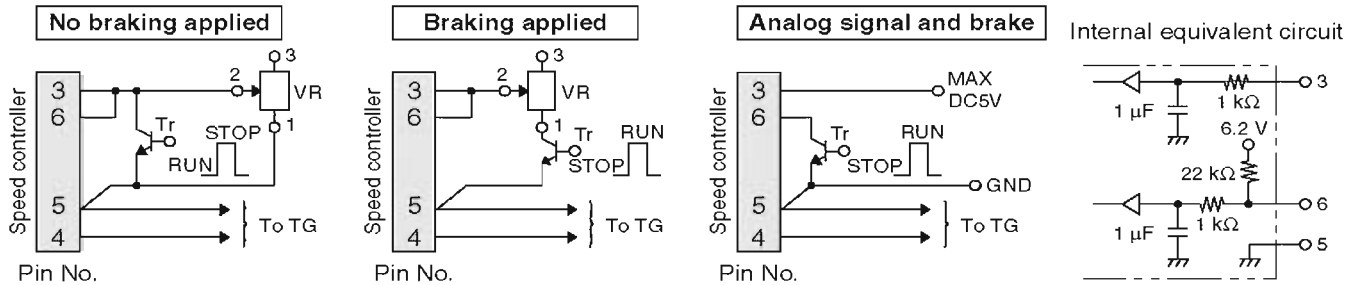
<Precautions>

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

Speed controller

13 Operation through contactless signal

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

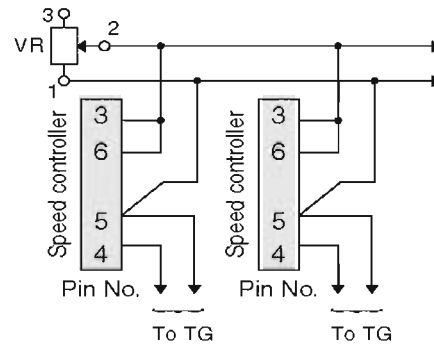


14 Parallel operation through external speed changer

<Precautions>

1. The resistance R_s of the external speed changer VR should be as follows:

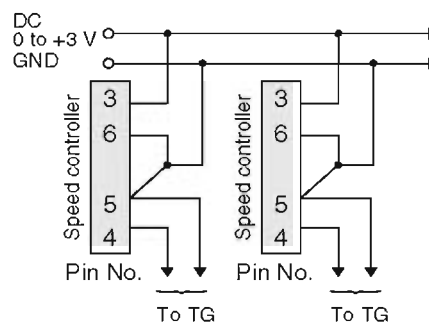
$$R_s = 20/N \text{ (k}\Omega\text{)}$$
 where, N is the number of motors.
2. For synchronous operation or ratio operation, desired revolving speeds must be set from the maximum speed control.
 Soft-start and soft-down controls and operation changeover switch must be set to the same position.
3. Wirings 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.



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

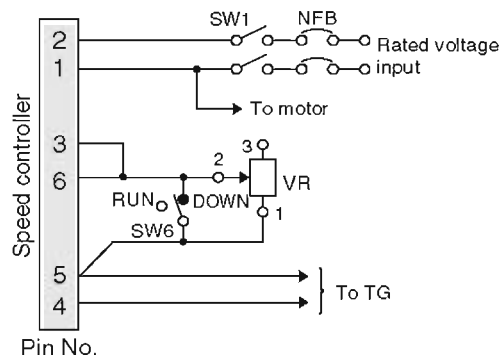
<Precautions>

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 FCCW). 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.

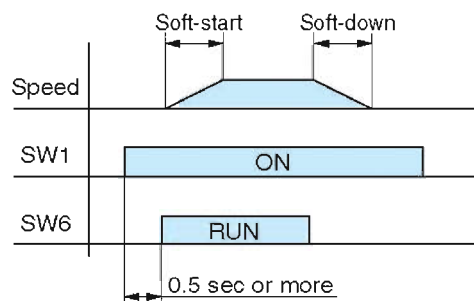
• Soft-start and electric brake

Electrical wirings are the same as for "Unidirectional rotation and electric brake" and "Normal/reverse rotation and electric brake".

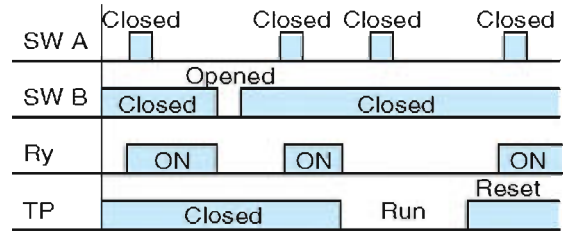
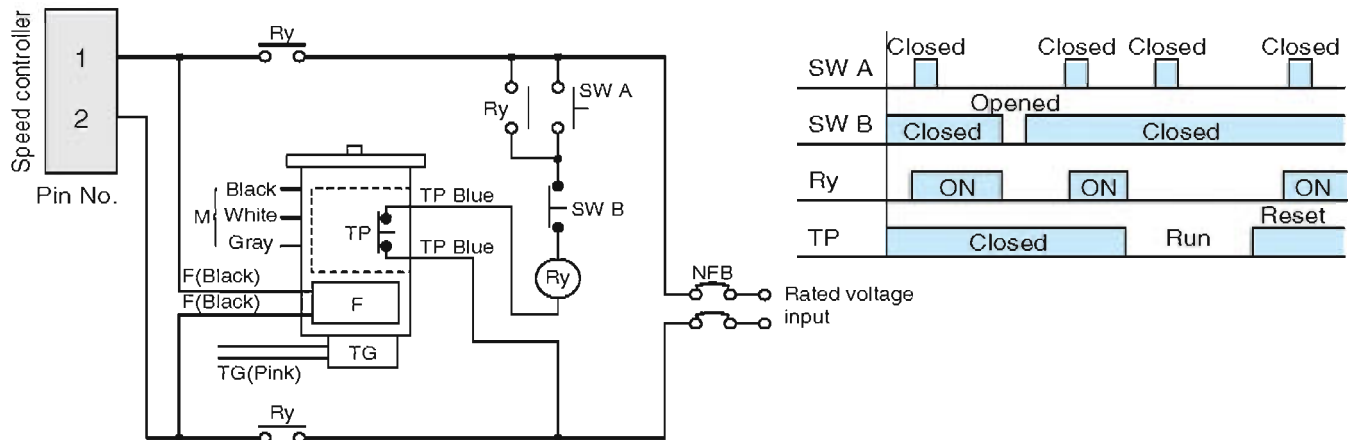
Adjust the soft-start time from the soft-start/down control.



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



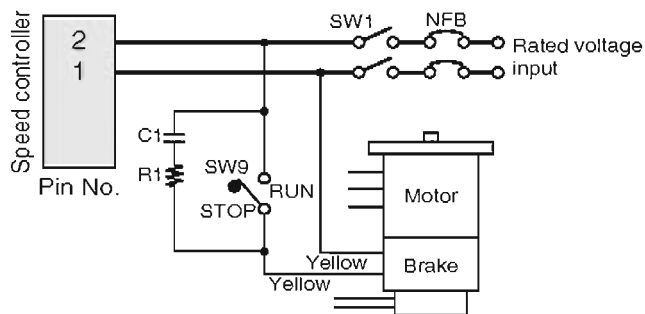
	SW A	Momentary N.O. contact
	SW B	Momentary N.C. contact
Ry	100 V supply system	125 VAC 5 A or more 3a contact
	200 V supply system	250 VAC 5 A or more 3a contact

<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 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	DV0P008 (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".