

1. Introduction

Unpacking

- Verify that the model No. matches your order sheet.
- Damage in transit is not found.

Should you find any discrepancy in the product, consult your local dealer.

General description of the speed controller

The MGSD type speed controller is designed to operate with a small geared motor to adjust and vary its speed. The speed is adjusted from the speed setting knob. The input voltage can be single-phase 100-120 VAC, or single-phase 200 – 240 VAC. The speed controller is compatible with EC directive and UL standard.

Compatible with DIN terminal block which is convenient to install on the distribution board, and small timer common option available from Matsushita Electric Works, Ltd. (pp. 32 – 37).

Read this manual thoroughly so that you will become gradually acquainted with the excellent features of your speed controller for small geared motor and understand how to fully utilize these functions. The speed controller is designed to be integrated into a general control board. The product must be handled by experienced personnel familiar with the product.

Designation and rating on the nameplate

Rated input voltage
Input current
Rated speed
Rated output
Serial No. (production No.)

Panasonic SPEED CONTROLLER
Model No. MGSD B2
Input 50/60Hz 1Ph 200-240V
Input Current 1.0A
Rated Speed 1400/1700min⁻¹
Rated Output 6-90W
Ser.No. 06110001G
Matsushita Electric Industrial Co., Ltd.
Made in China
C58401

Model name

Description of model No.

M G S D B 2

1-4 | 5 | 6

Series | Input power supply

Output | 1. Single phase 100 – 120 VAC
2. Single phase 200 – 240 VAC

100V	A : 3 – 40W
	B : 60 – 90W
200V	B : 6 – 90W

Serial number (production No.)

The Ser. No. on the nameplate contains the following codes.

Example

Ser.No. * 06 11 0001 *

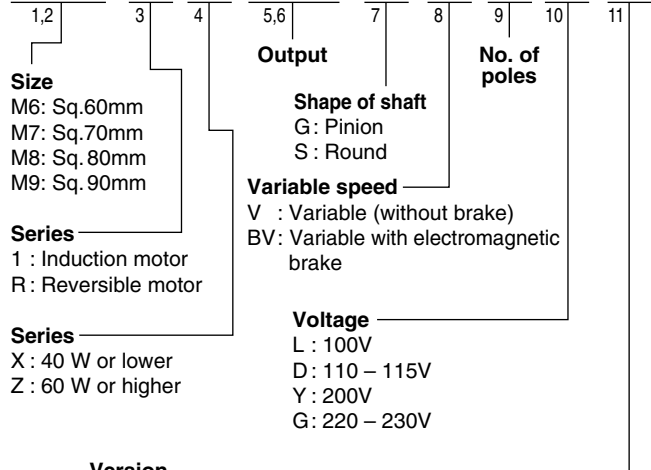
Manufacturing year | Manufacturing month | Sequential number

This product was manufactured in November 2006 and assigned a sequential number 0001.

1. Introduction

Motor Part Number

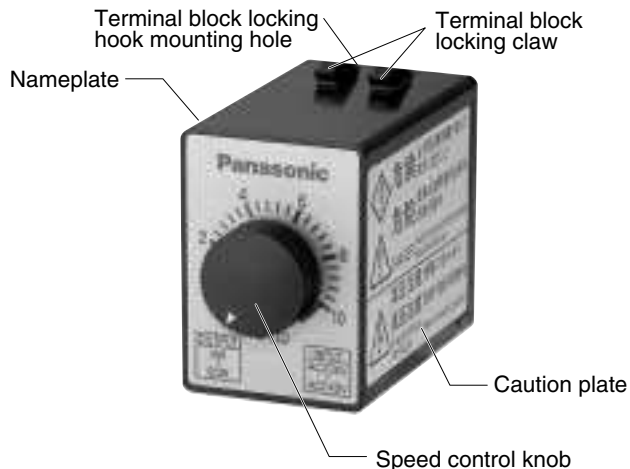
M 9 1 Z 9 0 G V 4 L G



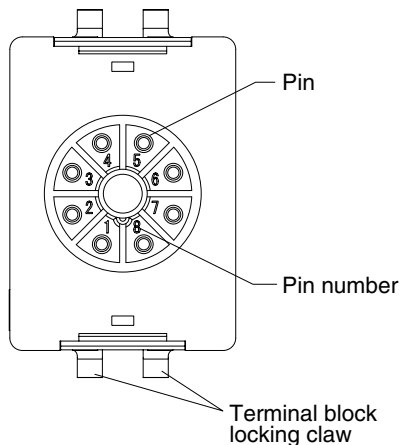
Rating

Model No.	Output	Power supply	Compatible induction motor	Compatible reversible motor
				Compatible reversible motor with electromagnetic brake
MGSDA1	3–40W	AC100V to AC120V	M61X***V4**	M6RX***V4**
				M6RX**GBV4**
				M71X***V4**
				M7RX**GBV4**
MGSDA1	3–40W	AC100V to AC120V	M81X***V4**	M8RX***V4**
				M8RX**GBV4**
				M91X***V4**
MGSDA1	3–40W	AC100V to AC120V	M91Z***V4**	M9RX***V4**
				M9RX**GBV4**
MGSDB1	60–90W	AC200V to AC240V	M61X***V4**	M6RX***V4**
				M6RX**GBV4**
				M71X***V4**
				M7RX**GBV4**
				M81X***V4**
				M8RX**GBV4**
MGSDB1	60–90W	AC200V to AC240V	M91X***V4**	M9RX***V4**
				M9RX**GBV4**
				M91Z***V4**
				M9RZ***V4**

2. Names and functions



<Rear panel>



3. Installation

Installation location

- (1) Indoors free from rain and direct sunlight: the product is not of a waterproof construction.
- (2) Free from vibration 4.9 m/s^2 or more; shock, dust, iron powder or oil mist; splash of water, oil and grinding fluid; and away from flammable materials, corrosive gas (H_2S , SO_2 , NO_2 , Cl_2 , etc.) or flammable gas.
- (3) Well ventilated dry and clean location containing negligible amount of oil or dust.

Environmental condition

Item	Condition
Operating temperature	-10 – 50°C
Storage temperature	-20 – 60°C
Operating humidity	90% RH or below (no dewing)
Allowable vibration	4.9 m/s ² or below (10 – 60 Hz)
Altitude	1000 m max.

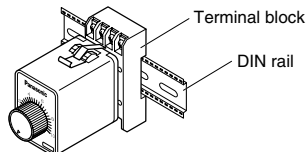
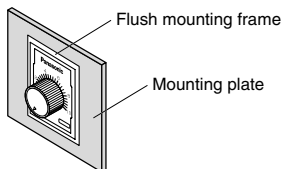
3. Installation

Installing method

The product can be mounted in either of the following two ways but must be installed inside the control board.

Orientation of the product in the control board is not limited.

- Using flush mounting frame (sold separately: see p. 34)
- Using miniature DIN terminal block (sold separately: see pp. 32 and 33)



For further information, consult the manufacturer of terminal block.

Caution

Special care is always given to our products during manufacturing and delivery to keep quality from deteriorating. Customer is also required to keep the quality by designing and providing failsafe and safety operating field and condition so that external noise, electrostatic charge, wrong wiring, wrong parts are prevented or eliminated.

In rare instances, the product may give off fume like a smoke of a cigarette if it is in a specific malfunctioning state. Precaution against possible fumes should be taken into consideration when the product is used in a clean room, etc.



Don't turn the shaft of speed control potentiometer using a tool with the knob removed.

High voltage is applied to the potentiometer:
Danger!

4. Wiring diagram

Considerations for wiring

- Use a terminal block or socket for connection. Do not solder the lead to the pin.
- When using a transformer or variable transformer, its capacity must be larger than the rated current of the product by the factor of 2 or more, to assure reliable operation.
- If the input lead is longer than 1 m (e.g. lead from a tachometer generator), seal it or replace it with shielded cable to prevent induction of noises.

<Precautions>

- Don't ground the shielding.
- The length of the wiring between the speed controller and the motor should be 3 m or shorter.
- Wiring from the tachometer generator (TG) carries current at a high voltage: Risk of electrical shock.
- When using a cooling fan motor or a motor with thermal protector, also see p. 26.

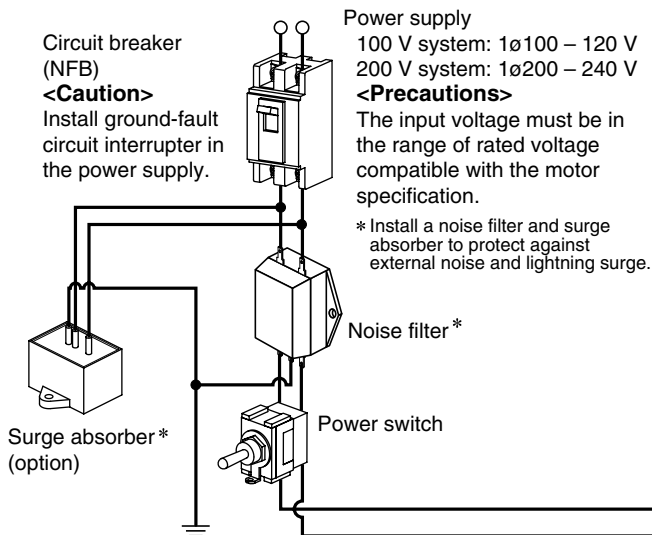
4. Wiring diagram

Wiring diagram

- The motor speed can be adjusted from the speed setting knob on the controller front panel.
- **The thick continuous lines** represent main circuit. Use conductor of size 0.75 mm² (AWG 18) or larger for the main line.
- **The thin continuous lines** represent signal circuit. Use conductor of size 0.3 mm² (AWG 22) or larger in the signal circuit. When the distance from the tachometer generator (TG) is long, use shielded twisted pair cable.

<Caution>

Do not ground the shielding material.

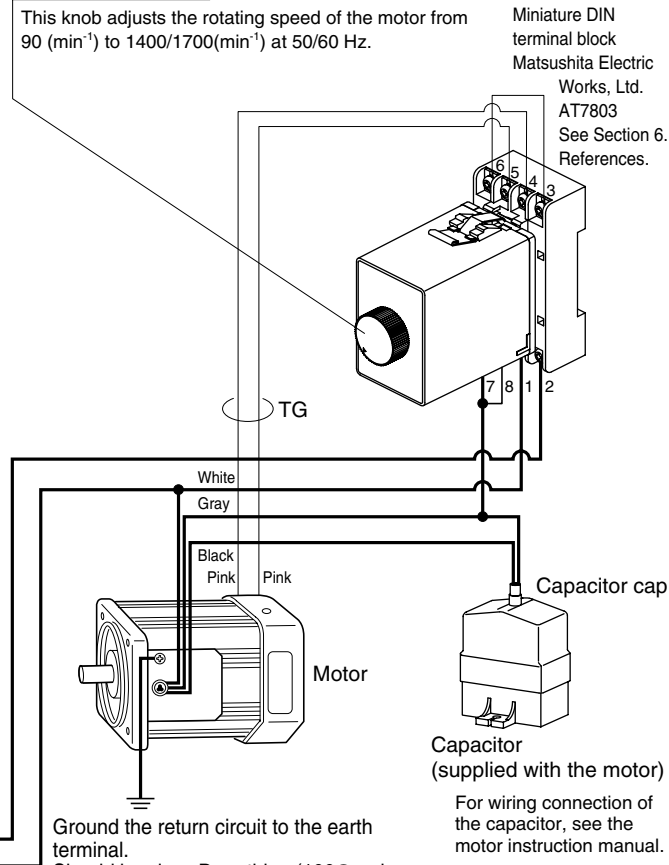


Ground the return circuit to the earth terminal.
 Should be class D earthing (100Ω or less, ø1.6 mm or more).

Speed control knob

This knob adjusts the rotating speed of the motor from 90 (min⁻¹) to 1400/1700(min⁻¹) at 50/60 Hz.

Miniature DIN terminal block
 Matsushita Electric Works, Ltd.
 AT7803
 See Section 6. References.



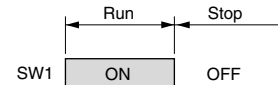
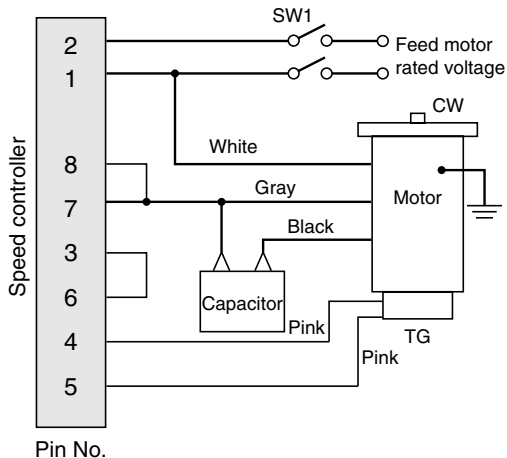
For wiring connection of the capacitor, see the motor instruction manual.

4. Wiring diagram

Standard electrical wiring diagram

Speed change only

Unidirectional rotation



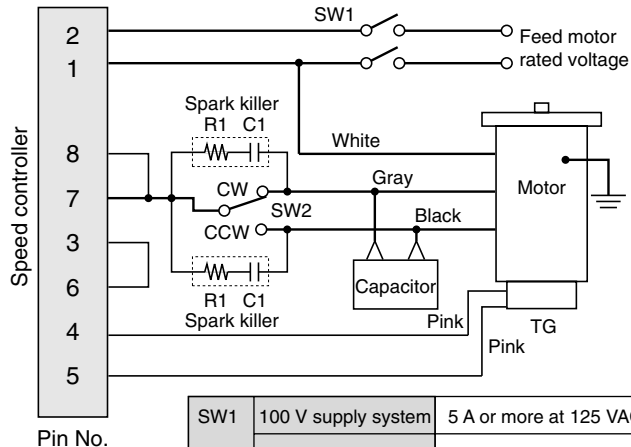
Rotating direction viewed from shaft end	
CW	Clockwise
CCW	Counterclockwise

<Note>

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

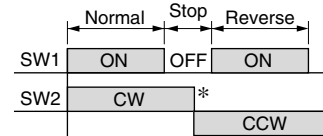


SW1	100 V supply system	5 A or more at 125 VAC
SW2	200 V supply system	5 A or more at 250 VAC
Spark killer R1+C1		DV0P008 (option)

For optional accessories, see p. 30.

<Precautions>

When using independent relay contacts for SW2 to change over normal/reverse, interlock both contacts so that they will not close simultaneously.



SW1: Power switch
SW2: Normal/Reverse selector switch

* To change rotation direction of induction motor

Provide a motor halt period. Switch over SW2 after complete stop of the motor.

• To change rotation 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.

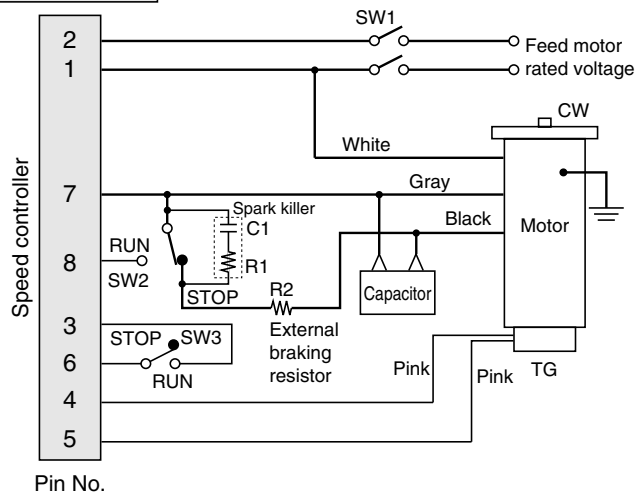
4. Wiring diagram

Unidirectional rotation and electric brake

<Precautions>

- The number of start/stop operations should be 6/min. or less.

25 W or less



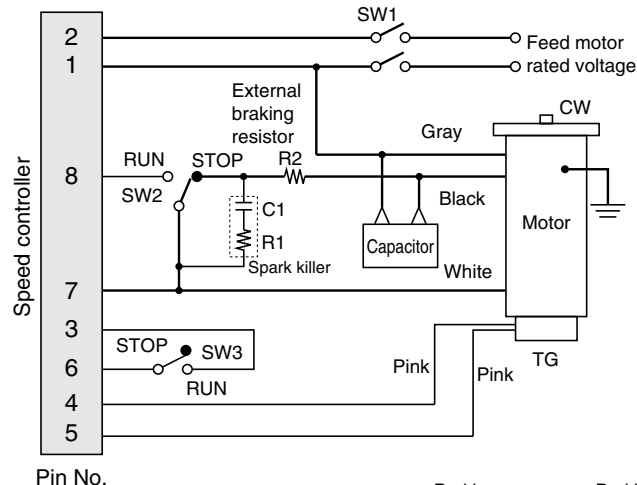
<Note>

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		10 mA at 10 VDC
Spark killer R1+C1		DV0P008 (option)
External braking resistor R2		DV0P003 (option)

For option, refer to p. 29, 30 onward.

40 W or higher



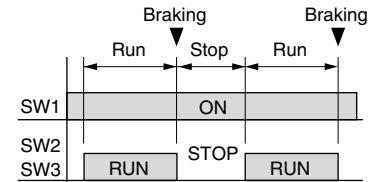
<Precautions>

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 smaller.

<Precautions>

If SW2 is in RUN position while SW3 is in STOP, abnormal operation occurs (full speed rotation for a short time; or if SW3 is in RUN position while SW2 is in STOP, motor temperature rises excessively.



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

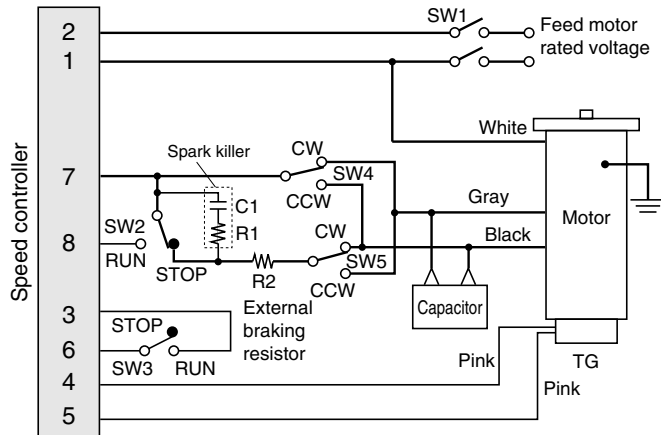
4. Wiring diagram

Normal/reverse rotation and electric brake

<Precautions>

- The number of start/stop operations should be 6/min. or less.

25 W or less



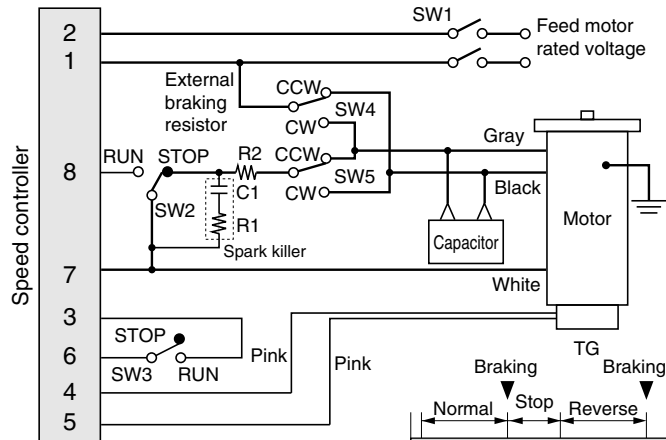
Pin No.

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		DC10V 10mA
Spark killer R1+C1		DV0P008 (option)
External braking resistor R2		DV0P003 (option)

For option, refer to p. 29, 30 onward.

40 W or higher



Pin No.

<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.

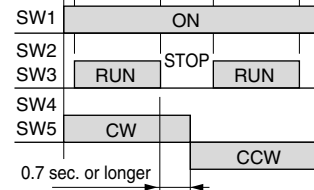
Difference in switching time between SW2 and SW3 must be 0.1 sec. or smaller.

<Precautions>

If SW2 is in RUN position while SW3 is in STOP, abnormal operation occurs (full speed rotation for a short time; or if SW3 is in RUN position while SW2 is in STOP, motor temperature rises excessively).

<Precautions>

Never attempt to change direction (SW4, SW5) while motor is running or electric brake is being applied.



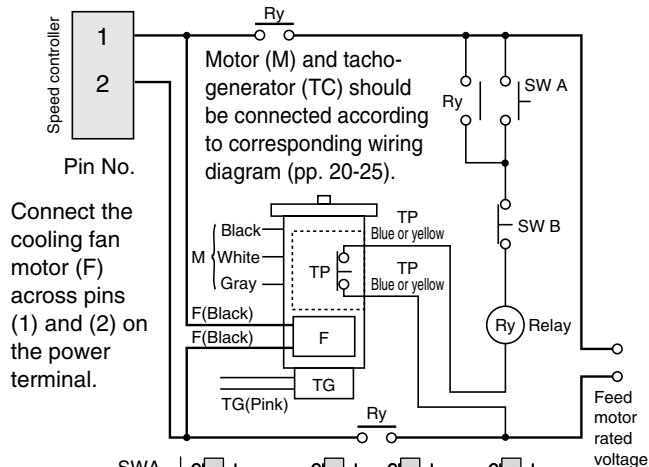
- SW1: Power switch
- SW2: RUN/STOP switch
- SW3: Braking start switch
- SW4, SW5: Normal/Reverse selector switch

4. Wiring diagram

Peripheral wiring

Motor wiring with cooling fan motor (F) or thermal protector (TP)

The thermal protector (TP) is an automatic reset type. To prevent hazards caused by restarting of TP, operate it by connecting wiring as shown below. Don't connect TP directly to the power supply.

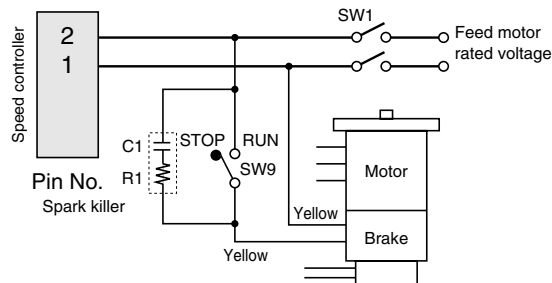


Once the TP operates, cooling period is required until the operation can start.

	SW A	Momentary N.O. contact
	SW B	Momentary N.C. contact
Relay Ry	100 V supply system	AC125V 5 A or more 3a contact
	200 V supply system	AC125V 5 A or more 3a contact

Wiring to electromagnetic brake (40 W or below)

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



SW1	100V supply system	AC125V 5 A or more
SW9	200V supply system	AC250V 5 A or more
Spark killer R1+C1		DV0P008 (option)

For option, refer to p. 30 onward.

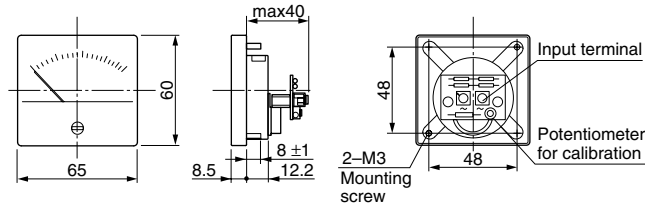
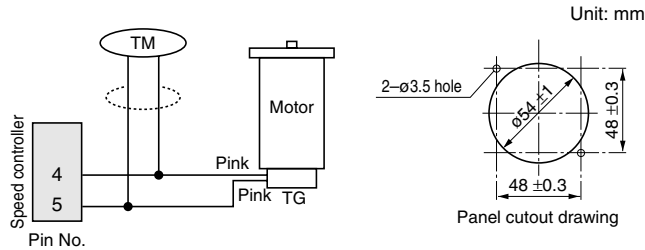
<Precautions>

1. Operate SW9 simultaneously with RUN/STOP switching of other switches, if any.
2. For remaining wirings, refer to corresponding wiring diagram.

5. Options

Tachometer (DVOP001)

This tachometer is especially designed to operate with our speed controller so that it can provide easier displaying of motor speed.



<Precautions>

- Connect the tachometer in parallel with the tachometer generator (TG).
- If the tachometer (TM) requires longer connection cable, use shielded twisted pair cable. Don't ground shielding of the cable.
- Accuracy of tachometer readings will depend on variation in motor performance and operating environment (temperature and noise). The tachometer should be used as a rough indicator.

<Note>

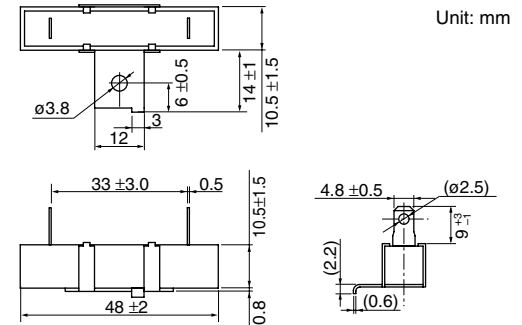
Calibrate the scale of the tachometer (TM) from the potentiometer on the rear panel.

1. While running the motor at its full rotation speed without load, adjust to 1450 min^{-1} if power supply is at 50 Hz, or 1750 min^{-1} if 60 Hz.
2. Monitor the output signal of the TG on an oscilloscope and determine the frequency. And adjust:
rotating speed $N (\text{min}^{-1}) = 5 \times f (\text{Hz})$

Caution: Since the circuit is not isolated from the power supply, use an insulated tool such as an insulated screwdriver to protect against electric shock.

External braking resistor (DVOP003)

5.6 Ω 10W



<Precautions>

The resistance of DVOP003 is 5.6 Ω . When using commercially available resistor, choose 4.7-6.8 Ω , 10 W or larger.

8. Specification

General specification

Part No.	MGSDA1	MGSDB1	MGSDB2
Power source	ø1 100 – 120 VAC		ø1 200 – 240 VAC
Supply voltage permissible variable range	Rated voltage ±10%		
Power supply frequency	50/60Hz		
Rated input current	1.0A	2.0A	1.0A
Compatible motor output	3 – 40W	60 – 90W	6 – 90W
Speed control range	50Hz : 90 – 1400min ⁻¹ 60Hz : 90 – 1700min ⁻¹ Speed will vary depending on variation in motor performance and operating conditions (temperature, noise).		
Speed variations (against load)	5% (standard) 1000min ⁻¹ , Amount of change in speed at 80% rated torque		
Speed setting	Internal (external speed changer can be installed)		
Braking *1	Active while electric braking current is flowing		
Electric braking time	0.5 s (standard) Amount of braking current is 2-3 times the rated current.		
Parallel running	Not applicable		
Equipment weight	80g		

*1 Electric braking has no mechanical brake holding mechanism.

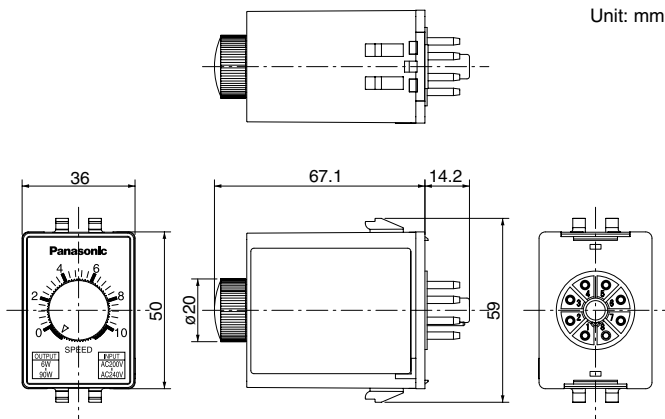
Reversible motor has simple continuous sliding brake which will provide certain mechanical holding function.

To provide further brake holding, use our C&B motor (unidirectional only) 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.

Dimensions

• Speed controller



English

9. Inspection and maintenance

Inspection

Periodically check and maintenance to assure safe and reliable operation of the speed controller.

Practical considerations for checking and maintenance

Turning off/on of power supply must be done by the personnel responsible for the maintenance work.

Checking items and period of maintenance work

Under normal operating condition

**Ambient temperature (annual average) 30°C,
100% load factor, 20 hours max./day**

Perform daily check and periodic check as shown below:

Category	Frequency	Check for
Daily check	Every day	<ul style="list-style-type: none"> • Ambient temperature, humidity, dust, dirt, foreign material • Unusual vibration, shock, sound • Main circuit voltage • Smell • Contaminated pin • Damaged wiring • Loose connection (motor, devices) • Misalignment • Foreign matters on load
Periodic check	Once/year	<ul style="list-style-type: none"> • Excessively overheating motor

<Precautions>

The frequency specified for periodic check should be changed as necessary depending on operating condition.

Guideline for replacement

No reference can be established since components and parts should be replaced based on operating condition and method. Replace or repair defective or malfunctioning parts.

⊘

DON'T

Consult us when it is necessary to overhaul the assembly.

Product	Category	Life expectancy	Remarks
Speed controller	Electrolytic capacitor	Approx. 5 years	Life expectancy is reference for replacement. Potentially defective part must be replaced before expected lifetime.
Motor, gear	See motor instruction manual.		

Troubleshooting

If a problem occurs with your system, use the following procedure for locating and remove the cause.

In the event the problem cannot be isolated or the speed controller is suspected, or if you have any questions, please contact us or your local agency.

