

Small Geared Motor

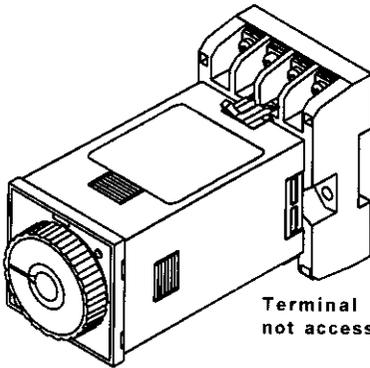
# Speed Controller

# Panasonic

OPERATION MANUAL

## SD 48 type

DVSD48AY · DVSD48BY · DVSD48CY



Terminal board is  
not accessory.

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- Thank you for buying and using Panasonic Speed Controller for Small Geared Motor.
- This operation manual describes the product, its handling and caution for safety.
- Handling and operation of this product is simple, however, mishandling may result in damage. Read this manual carefully, follow the instruction for proper installation.
- Keep this manual in a convenient place for further reference.

# Caution for safety

Read and follow the instructions in this operation manual carefully before installation, running, maintenance and inspection of the product. Knowledge of the product for safety information has to be fully understood.

In this manual, caution items are classified into [ WARNING ] and [CAUTION].



**WARNING**

: Risk of serious injury, or death if not installed/handled correctly.



**CAUTION**

: Risk of injury or damage to property if not installed/handled correctly.



**WARNING**

- Install the product into the box with a lock so that unauthorized personnel can not touch.  
Risk of electric shock.
- Do not get the product wet.  
Risk of electric shock.
- Do not handle the product with wet hands.  
Risk of electric shock.
- Turn off the power while inserting the product to a terminal board or socket.  
Risk of electric shock.
- The control inputs and outputs must have high level protection e.g. double insulation or reinforced insulation against direct contact.  
Risk of electric shock.
- Use a double insulated or reinforced insulated device speed setter.  
Risk of electric shock.
- Earth the motor to ground.  
Risk of electric shock.

# CAUTION

- Do not modify the product. This will exempt the warranty.  
Risk of electric shock and/or fire.
- When any repair is required, contact your local dealer.
- This controller is not equipped with protection.  
Install an overcurrent protector, leakage current breaker and thermal protector.  
Risk of fire.
- Miswiring may damage the product or motor.  
Risk of injury and fire.
- Do not use the product in locations where large amount of static electricity may be generated.  
Risk of injury due to a malfunction.
- Use a terminal board or socket. Do not solder to pins of the product directly, as this may damage the electronics.  
Risk of injury.
- Do not use the product in locations where inflammable or corrosive gases may be present.  
Risk of fire or explosion.
- Do not place combustible materials nearby the controller.  
Risk of fire.
- If this product is to be scrapped, treat this as an industrial waste material.
- Keep space around the speed setting knob more than 30 mm. This space is due to a finger safe area.  
Risk of injury.
- Keep space around the speed setting knob more than 100 mm. This space is due to a hand-back safe area.  
Risk of injury.

## After opening the package

Check the following;

- Is the product what you ordered ?  
Correct model No. ? Correct output ? Correct voltage ?
- Is the product damaged during transportation ?  
If any problems are found, contact your supplier.

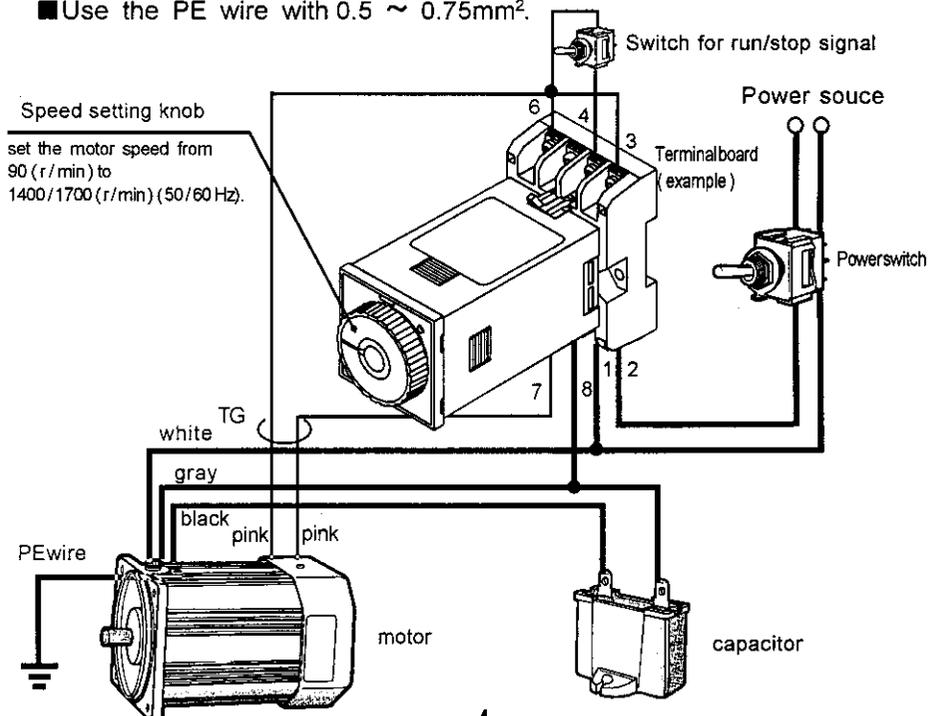
## Model list and applicable motor

See the table below for the applicable motor to this speed controller;  
The motor is Panasonic Small Geared Motor (variable speed motor).

Rated Voltage	AC200 ~240V
Motor Output	
3~20W	DVSD48AY
25~40W	DVSD48BY
60~90W	DVSD48CY

## Wiring diagram (One-way run)

- Motor speed can be set with the speed setting knob on the upper side of the controller.
- Thick line shows the main line. Use the wire with  $0.5 \sim 0.75\text{mm}^2$ .
- Thin line shows the signal line. Use the wire with  $0.3\text{mm}^2$ . If long wire has to be used for tachogenerator(TG), use the twisted shield wire with 2 core.(Do not ground the shield wire.)
- Use the PE wire with  $0.5 \sim 0.75\text{mm}^2$ .



## Before operation

### Caution on installation

Use the product at  $-10\sim 50^{\circ}\text{C}$ , 85%RH or less. Avoid where this product is subject to;

- direct sun light for a long time(outdoor)
- heavy vibration or shock( $5\text{m/s}^2$  or larger)
- dust and high humidity.
- inflammable or corrosive gases.
- strong static electricity
- strong electric field(nearby broadcasting equipment or high frequency welding machine)Install adequate shielding.

Install the product in the control box with lock so that unauthorized personnel can not touch.

Do not place combustible materials nearby the product.

- Insulation Category(Overvoltage Category)  
: II
- Pollution Degree  
: 2

### Chemical , oil, water

- Do not subject the product to organic solvent such as alcohol,benzene or thinner and machine oil or grease,and strong alkalescence material such as ammonia or caustic soda. Do not use the product where environment contains above materials.
- Do not let water or oil enter to the product. This product is not waterproofed.
- Do not handle the product with wet hands.

### Caution at running

- Use and run the motor with its surface temperature up to  $90^{\circ}\text{C}$ . This temperature varies depending on surrounding temperature, load and frequency of start / stop. If it exceeds  $90^{\circ}\text{C}$ , use higher output motor.(Measure the temperature with thermometer, thermocouple,or thermotape.)
- On turning the speed setting knob, do not force turning it exceeding the stopper at both "0" and "Full scale" side.
- Speed setting to be made between scales of the plate.
- Even if the speed setting is 「0」, the motor shaft may turn a little at power on, when the power capacity is small, or power off time is short. Pay extra attention.
- Do not take off the speed setting knob.
- Limit the start/stop frequency to 6 times per minute max..

### Caution on wiring

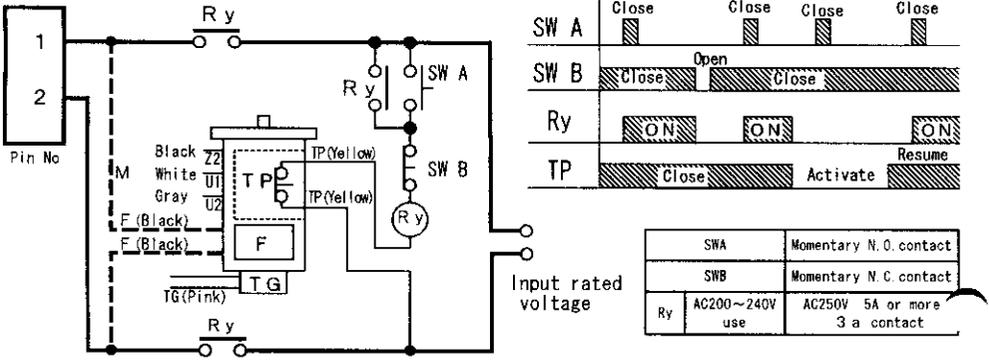
- Use the terminal board or socket for wiring. Do not solder directly to the pins of the controller.
- Turn off the power at wiring or inserting the product to the terminal board or socket
- This controller is not equipped with protector. Install an overcurrent protector, leakage current breaker and thermal protector for safety.
- High voltage is charged through the external speed setter or tachogenerator wiring, since these are not insulated from the power.
- Miswiring may damage the controller or motor. Pay extra attention to wiring.
- Avoid the same or parallel wiring with high capacity electric furnace/welder controlled by thyristor, or apparatus driven by high frequency/high power. Risk of malfunction.
- Where frequent thunder strikes are expected,install a 「Thunder surge killer」, such as ZNR, at secondary circuit of the main distributor.
- Since the product is controlled by thyrister,it might give radio interference to a radio or other wireless equipment.  
Use noise filter if necessary.  
(Noisefilterby TOKIN, MR02043 or equivalent)
- If the wiring at external speed setting, or tachogenerator wire comes off, the motor runs at max. speed. Pay extra attention.
- If an electro-magnetic contact or switch is used, take such a measure for surge voltage installing spark killer between contacts.
- Use the transformer for insulation.
- Earth the motor to ground.
- Keep space around the speed setting knob more than 30mm.(finger safe area)
- Keep space around the speed setting knob more than 100mm.(hand-back safe area)
- The length of lead wires between controller and motor is 5m max..

### Caution on power supply

- Use a speed controller which matches to the power source voltage.
- Turn off the power, if the product is not in use for long periods.
- If step-down transformer with smaller capacity is used, it may cause a failure or malfunction. Pay extra attention.

# Wiring of motor with cooling fan(F),thermal protector (TP)

Applicable motor  
15~ 90W

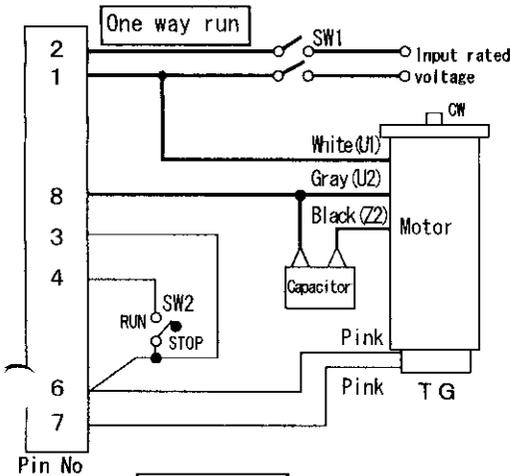


## [Note]

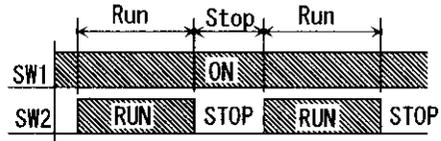
1. Thermal protector (TP) is auto-resume type. Use the above wiring to prevent any danger caused by restarting. Do not connect the thermal protector (TP) to the power directly.
2. Once the TP is activated, cooling time is required for resumption.
3. Connect the cooling fan (F) to the power terminals (pin No. ① and ②). Only 90W.
4. For wiring of the motor (M) or tachogenerator (TG), refer to the coming pages per application.

# Basic wiring ( variable speed run )

View from motor shaft	
CW	Clockwise
CCW	Counter clockwise

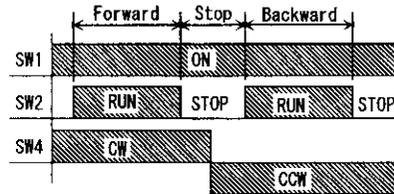
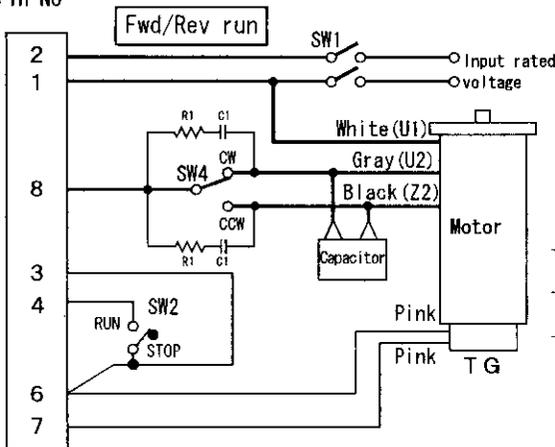


In this wiring, motor rotating direction becomes CW viewed from pin No. For CCW, exchange the black and gray wire.



SW1	AC200~240V use	AC250V 5A or more
SW2	DC10V 10mA	
R1, C1	Spark killer	

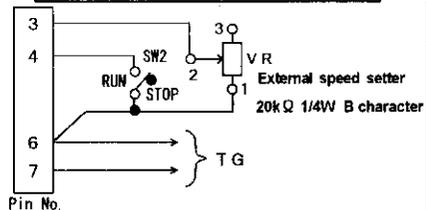
(See page 12 for parts.)



Pin No.  
[Note]

- To make a forward/reverse run with an induction motor, set a stop period, and select the SW4 after the motor stops completely.
- To make a forward/reverse run with a reversible motor, no stop period is required. Change the rotating direction with the SW4 while the SW1 is ON. If the SW4 is composed of relay contact, use the one which has a longer contact distance to prevent a failure due to capacitor short
- In case of the motor with cooling fan motor or thermal protector, refer to page 6.
- In case of forward/reverse run, and the SW4 consists of independent relay contact, allow an interlock so that the contact may not close at the same time.

## In case remote control is required

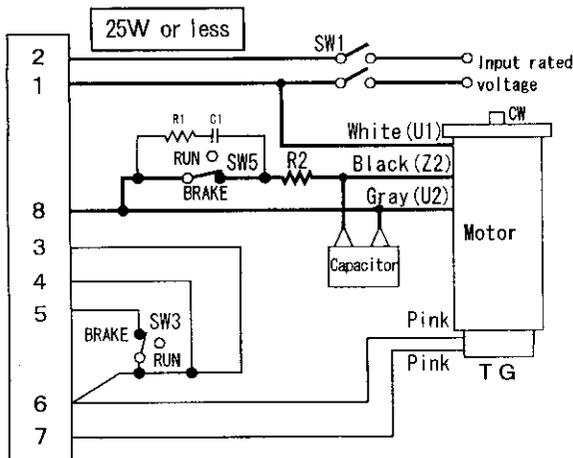


Pin No.

[Note]

- Set the speed setting knob to 「0」 scale.
- Shorten the wiring as much as possible. Use the twisted shield wire if malfunction is expected by an external noise. (Do not ground the shield portion.)

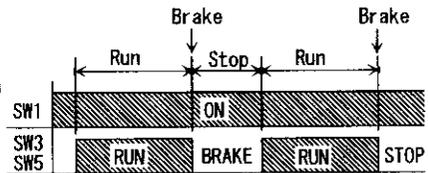
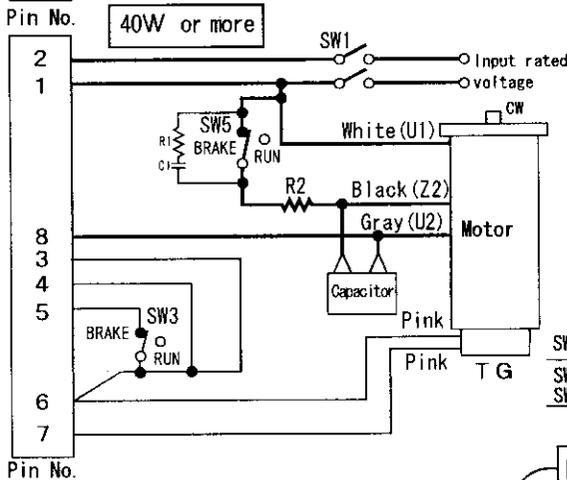
# Basic wiring ( One-way +Electric brake )



With this wiring, the motor runs at CW. To run at CCW, exchange the black and gray wire.

SW1	AC200~240V	AC250V 5A
SW5	use	or more
SW3		DC10V 10mA
R1, C1		Spark killer
R2		Externar brake resistor

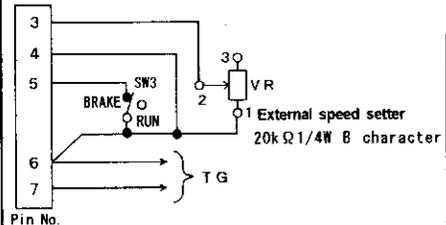
(See page 12 for parts.)



## [Note]

1. Brake(electric brake) will be activated for approx.0.5 sec, by changing the SW3 and SW5 from RUN to STOP, and the motor stops immediately.
2. Limit the frequency of start and stop 6 times per minute max.
3. In case of the motor with cooling fan motor or thermal protector, refer to page 6.

## In case remote control is required

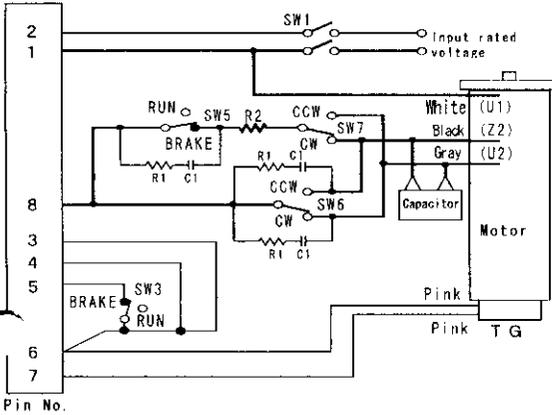


## [Note]

1. Set the speed setting knob to 「0」 scale.
2. Shorten the wiring as much as possible. Use the twisted shield wire if malfunction is expected by an external noise. (Do not ground the shield portion.)

# Basic wiring(Fwd/Rev run +Electric brake)

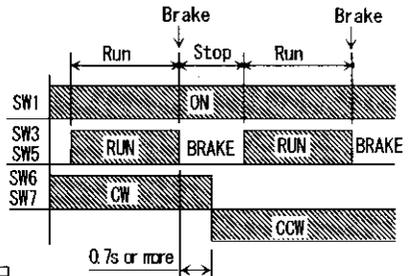
30W or less



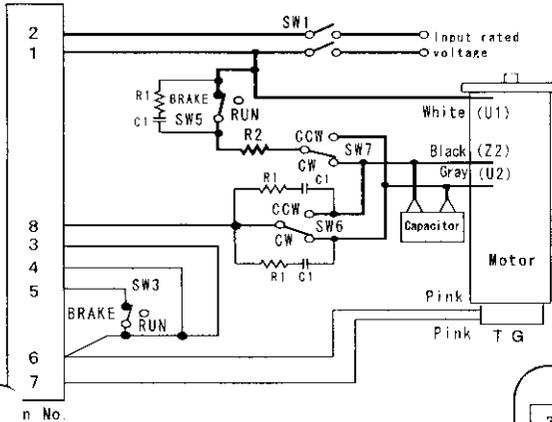
View from motor shaft	
CW	Clockwise
CCW	Counter clockwise

SW1 SW5 SW6 SW7	AC200~240V use	AC250V 5A or more
SW3	DC10V 10mA	
R1, C1	Spark killer	
R2	External brake resistor	

(See page 12 for parts.)



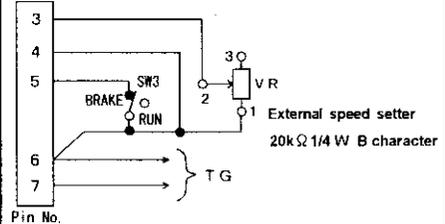
30W or more



## [Note]

1. Brake(electric brake) will be activated for approx.0.5 sec. by changing the SW3 and SW5 from RUN to STOP, and the motor stops immediately. (Do not operate SW6 and 7 while the electric brake is activated.)
2. Do not change the rotating direction(SW6 and 7),while the motor is running.
3. Limit the frequency of start and stop 6 times per minute max.
4. In case of the motor with fan or thermal protector, refer to page 6.

In case remote control is required.

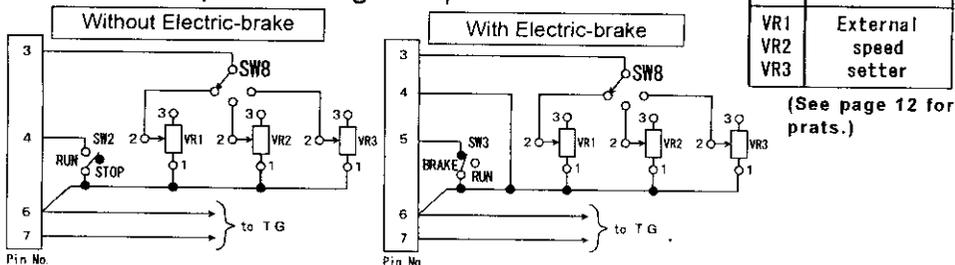


## [Note]

1. Set the speed setting knob to 「0」scale.
2. Shorten the wiring as much as possible.Use the twisted shield wire if malfunction is expected by an external noise.(Do not ground the shield portion.)

## Other wiring

### ■ When multispeed setting is required.

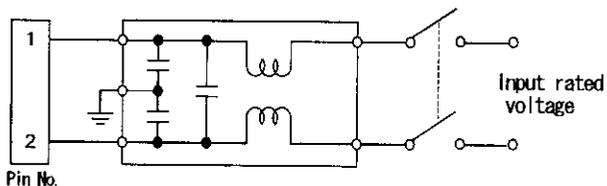


#### [Note]

1. Set the external speed setting knob to 「0」 scale.
2. Set each speed with an external speed setter, VR1, VR2 and VR3, and select with SW8.
3. Select the SW3 at the same time of selection of other switches of RUN-BRAKE.
4. See other wiring diagrams per application.

## Noise measure

If any malfunction occurs due to an external noise, a noise filter installation as below, may reduce the effect.



Noise filter(e.gTOKIN MR-2043:Approval for TÜV ,VDE0565-3)

If the distance between the motor and controller becomes long, or wiring of the external speed setter or speed meter becomes long, it may be subject to the external noise as well. In this case, a noise filter has the same effect.

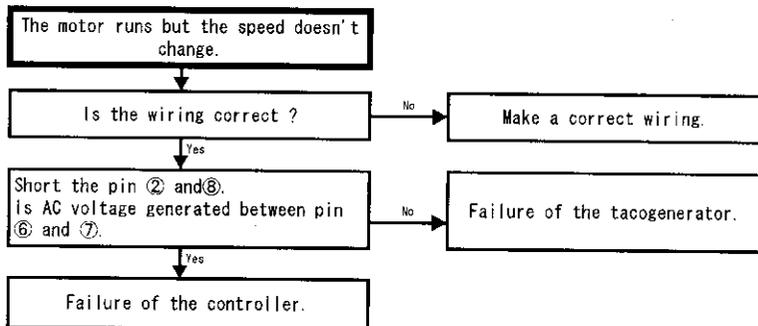
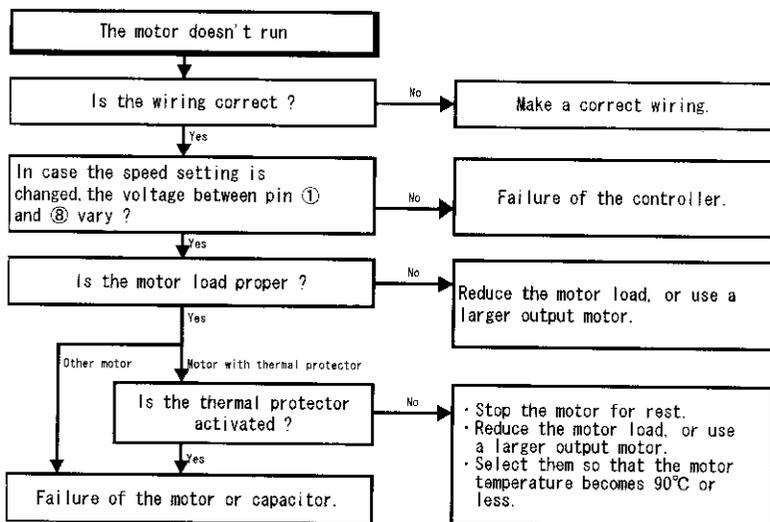
## Maintenance

Periodical maintenance stated below, is important to prevent an unexpected malfunction, which might be caused by the environmental affect(temperature, humidity, dust, vibration, etc.), or aging affect of the component and its life end.

1. Does the motor run smoothly?
2. Does the motor generate abnormal noise during running?
3. Does the motor generate abnormal heat?

## Troubleshooting

When any malfunction occurs, check and take measures per the following table. If no cause can be identified, or the controller seems to be a failure, contact to your supplier.



## Other preparations

Prepare the parts as below, if necessary.

### External speed setter

[Note]

Use an insulation paper to secure insulation between terminal and mounting chassis. Inner circuit of the speed controller is not insulated from the power. If the terminal touches the chassis, it may cause an electric shock or damage the controller.

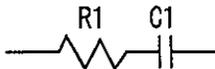
Ratings: 20 k $\Omega$  1/4 W B character

### External brake resistor

External brake resistor is 5.6 $\Omega$ . If you use commercially available resistor, use one with 4.7 ~ 6.8 $\Omega$  (10W or more).

### Spark killer

Spark killer has a capacitance of 0.1  $\mu$  F and resistance of 120 $\Omega$ . If you use commercially available one, use as follows;



R1 = 10 ~ 200  $\Omega$  (1/4 W or more )  
C1 = 0.1 ~ 0.33  $\mu$  F (AC 250 V)

### Overcurrent protector

Overcurrent protector is quick-acting fuse ( rated current : 3A ). Use the fuse which is approved for VDE or TÜV

### Thunder surge killer

Use a thunder surge killer approval for TÜV ( IEC384-14 ).

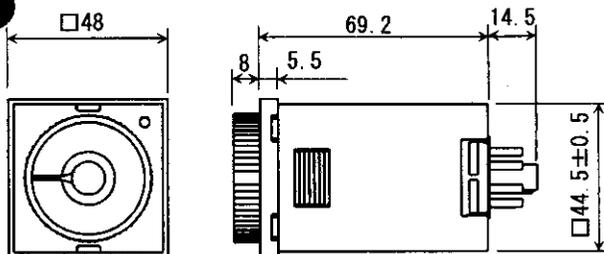
## Specifications

Model name	DVSD 48AY	DVSD 48BY	DYSD 48CY
Characteristics			
Rated voltage	Single phase AC200~240V		
Working voltage	±10%		
Input frequency	50/60 (HZ)		
Rated current	0.3A	0.5A	1.0A
Applicable motor output	3~20W	25~40W	60~90W
Rated output current	0.27A	0.45A	0.9A
Rated output voltage	200~240V (depending on input voltage)		
Speed setting range	90~1400 (r/min) / 90~1700 (r/min)		
Speed setter	Built in (External setting volume available)		
Braking	Run the brake current		
Working temperature	-10~50°C		
Storage temperature	-20~60°C		
Working humidity	85%RH or less (Without dew)		
Working altitude	1000 (m) or less		
Working atmospheric pressure	900 (hPa) or more		

Applicable motor is Panasonic variable speed motor. For the specifications of the motor, refer to catalogue.

Electric brake does not have a holding torque.

## Dimensions



## Standards

These controllers are authorized by TÜV Rheinland.

Certificate No. : R 9750065

Report No. : E9661441E01

Approved standards : DIN VDE 0160/05.88 , DIN VDE 0160 A1/04.89

## CE conformity

### ● EMC directive

The EC directive relating to electromagnetic compatibility is effective for "equipment" which may either cause electromagnetic disturbances or be affected by such disturbances.

- The speed controller is a piece of electrical equipment intended for installation into control cabinets.
- The controller is directed as a component for the control of variable speed drives with Panasonic variable speed motor to be installed into a machine or to be assembled together with other components to form a machine or a system.
- The final user is responsible for the compliance with the EMC-directive when applying the machine.
- The electromagnetic compatibility of a machine depends on the method and accuracy of the installation.  
Special care must be taken for
  - filters
  - screens
  - grounding

### ● LVD directive

The low voltage directive is effective for all electrical equipment for use with a rated voltage between 50V and 1000V AC and between 75 and 1500 V DC under with normal ambient conditions.

The objective of the low voltage directive is to ensure that only electrical equipment which does not endanger the safety of man or animals is placed on the market. It should also be designed to conserve material assets.

- The speed controller is designed to be installed into control cabinets.
- The compliance of the user system to the legal regulations applicable remains the responsibility of the user.
- All control inputs and outputs of the controller are not main-isolated. The control inputs and outputs must have a high level of protection e.g. double insulation or reinforced insulation taken against direct contact.
- In the machine or system, the user must include measures which limit the consequences in the case of malfunction or failure of the controller (increase of motor speed or sudden stop) so that any danger for man or material is avoided e.g.:
  - Further independent equipment for the mounting of safety-relevant values (speed, end positions, etc.)
  - Electrical or non-electrical protective equipment (latching or mechanical blocking)

Considered generic standards

- DIN VDE 0110
- DIN VDE 0160

Applicable motor

M61A6GV4GE	M91A40GVK4GE	M6RA6GV4GE	M9RA40GVK4GE
M71A15GV4GE	M91C60GVK4GE	M7RA15GV4GE	M9RC60GVK4GE
M81A25GVK4GE	M91C90GVK4GE	M8RA25GVK4GE	M9RC90GVK4GE



MEMO

Date	
Shop or distributor	
	TEL.

Matsushita Electric Industrial Co., Ltd.

7-1-1 Morofuku, Daito, Osaka 574, Japan

TEL(0720)71-1212