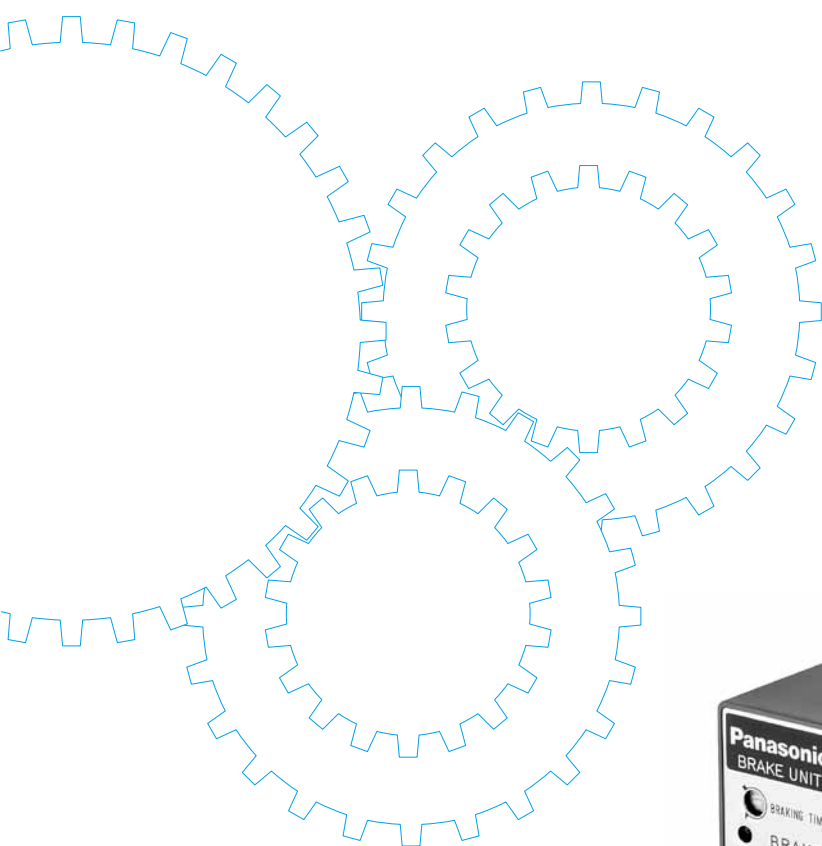


Brake Unit



Contents

- Brake Unit Overview C-26
- Product information C-27

This product is for industrial equipment. Don't use this product at general household.

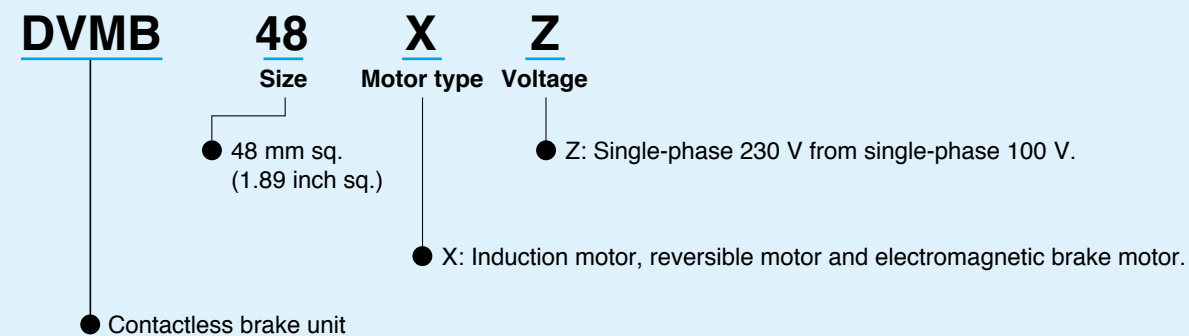
Brake Unit Overview

Outline of Brake Unit

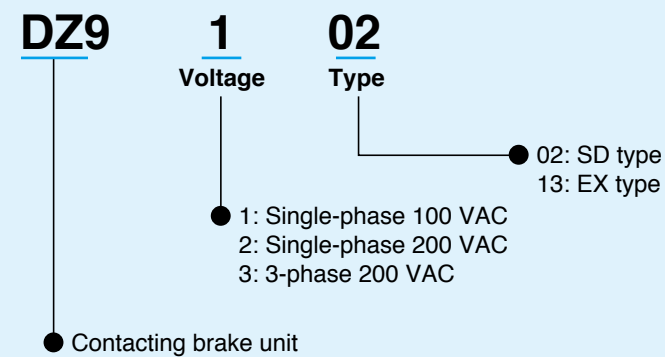
- These units are electric brakes that can stop motor immediately.
- These brake units are divided into the contactless brake unit MB48X type and contact brake unit SD type, EX types.
- The contacting type brake units can be used with 3-phase motor.
- The contactless MB48X type brake units can be used with induction motor, reversible motor and electromagnetic brake motor.
- The MB48X type, input supply is compatible with a wide range of single-phase 230 V from single-phase 100 V.

Product designation

• Contactless brake unit MB48X type



• Contacting brake unit SD type, EX type



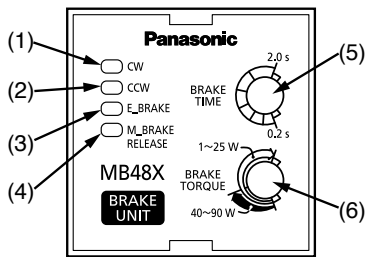
Brake Unit

Contactless brake unit MB48X type



- **Features**
 - **Maintenance-free**
Contactless configuration requires no maintenance.
 - **Can support to a wide motor capacity**
It can support up to 90 W from 1 W.
Brake resistor is not required and wiring is simplified.
 - **Easier standardization of panel design**
Control panel can be sized to DIN standard at lower total cost.
 - **Adjustment of the electric brake became easy.**
Brake time, brake torque can be adjusted steplessly, brake resistance is not required.

• Part Names and Functions



	Name	Function
(1)	CW lamp	Lights when motor is turning clockwise when viewed from output shaft.
(2)	CCW lamp	Lights when motor is turning counterclockwise when viewed from output shaft.
(3)	E_BRAKE lamp	Lights when the electric brake is operating.
(4)	M_BRAKE RELEASE lamp	Lights when the electromagnetic brake is energized, releasing braking.
(5)	Braking time control volume	Adjust the operating time of electric brake in response to inertia of the load.
(6)	Braking torque control volume	To increase the braking torque, turn the knob CW. For a motor sized between 40 W and 90 W, adjust the torque within the range indicated by the black arrow.

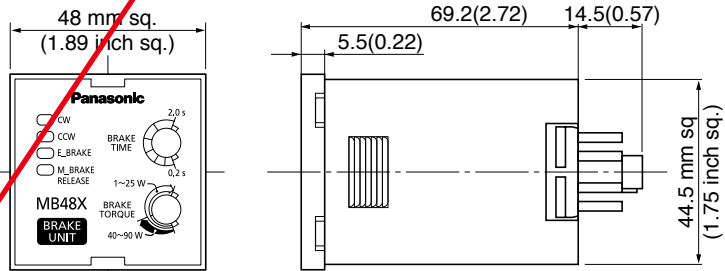
• Specification

DVMB48XZ	
Rated Voltage	Single-phase AC100 V to AC230 V
Allowable power fluctuation range	±10 %
Power supply frequency	50 Hz/60 Hz
Control input voltage	DC24 V (±10 %)
Off-state voltage	DC3 V or higher
Ambient temperature	-10 C° to +40 C° (no freezing) *1
Ambient humidity	20 % to 85 % RH (no dewing)
Altitude	1000 m or lower
Vibration	5.9 m/s² or below (10 Hz to 60 Hz)
Storage temperature, storage humidity	Normal temperature*2. Normal humidity
Basic function	Run/stop, normal/reverse rotation using the same wiring *3, instantaneous stop with electric brake, electromagnetic brake control
Applicable motor	Induction motor, reversible motor and electromagnetic brake single phase motor. 90 W from 1 W *4
Braking time setting range	Stepless regulation between 0.2 sec and 2.0 sec
Braking torque regulation	Stepless regulation
Protection degree	IP20 or equivalent
Mass	130 g

*1: Measured at a point 5 cm from brake unit body.
*2: -20 C° to +60 C° (no freezing) for a short period (a few days) of transportation
*3: Exclude induction motor (compatible with Japanese standards).
*4: The unit cannot be used with Sq.42 mm size geared motor.

Note)
1. Electric braking system has no holding torque.
2. For application requiring larger holding force, use Panasonic electromagnetic brake motor.
3. When braking a load with excessively large inertia, related issues are strength and life of motor shaft and gear. For these subjects, consult us.
4. When using motor other than compact geared motor, consult us.
5. The frequency of starting and stopping should be 6 or less per minute.

• External dimensions



Unit: mm (inch)

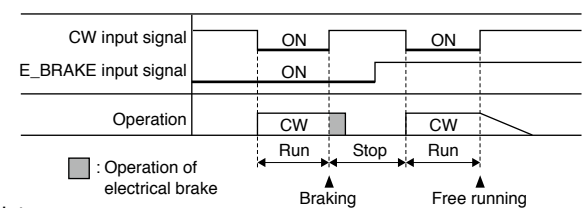
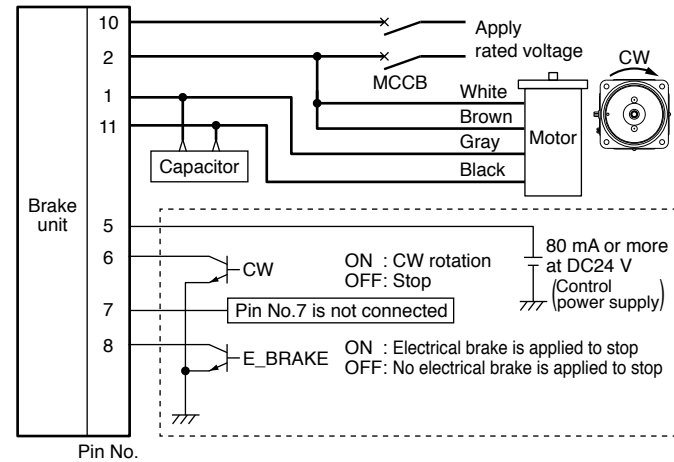
• DIN terminal block or Cap is not supplied with the product. (Please refer to page D-5 Recommended terminal.)

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

Brake Unit

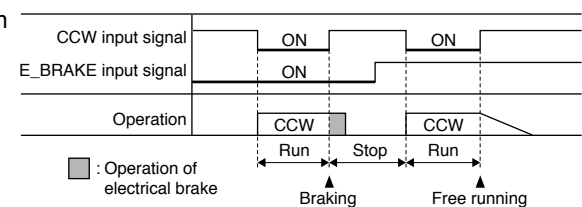
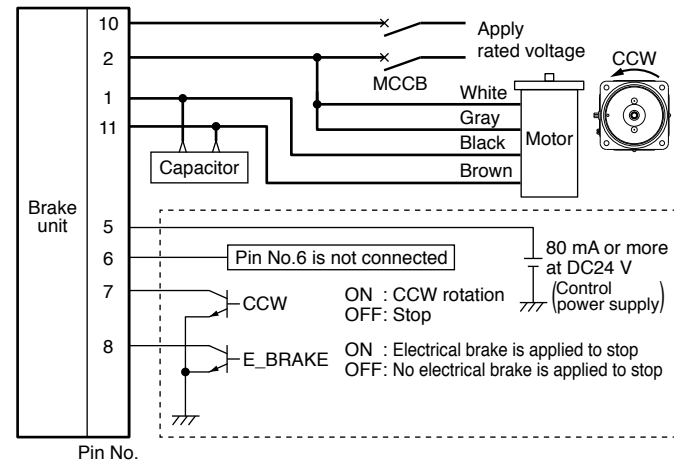
• Standard electrical wiring diagram

• Induction motor (compatible with Japanese standards) CW rotation



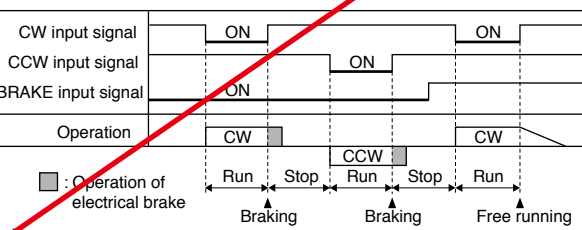
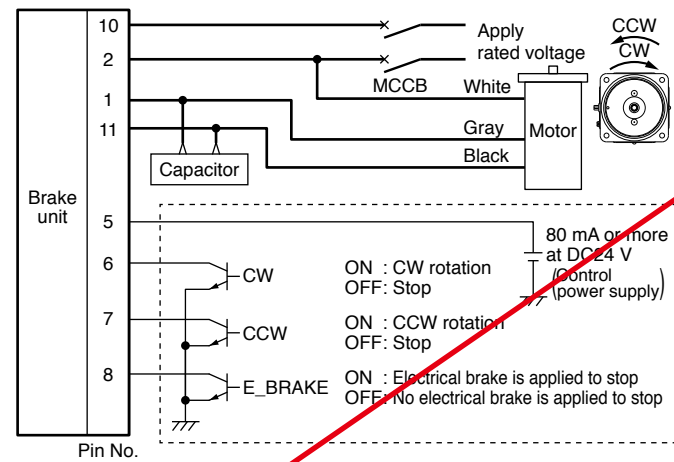
- Notes:
1. Number of motors that can be connected to the brake unit is only one.
 2. The thick solid lines represent main circuit. Use conductor of size 0.5 mm² or larger for the main circuit.
 3. Leave pins 3, 4, 7 and 9 unconnected. (These pins are not isolated from the internal circuit.)
 4. According to this wiring diagram, the motor rotates clockwise (CW) when viewed from the end of shaft. Note that output shaft of the gear head may rotate CCW.
 5. The CW lamp lights while the motor is running.

• Induction motor (compatible with Japanese standards) CCW rotation



- Notes:
1. Number of motors that can be connected to the brake unit is only one.
 2. The thick solid lines represent main circuit. Use conductor of size 0.5 mm² or larger for the main circuit.
 3. Leave pins 3, 4, 6 and 9 unconnected. (These pins are not isolated from the internal circuit.)
 4. According to this wiring diagram, the motor rotates counterclockwise (CCW) when viewed from the end of shaft. Note that output shaft of the gear head may rotate CW.
 5. The CCW lamp lights while the motor is running.

• Induction motor (compatible with international standards) Reversible motor

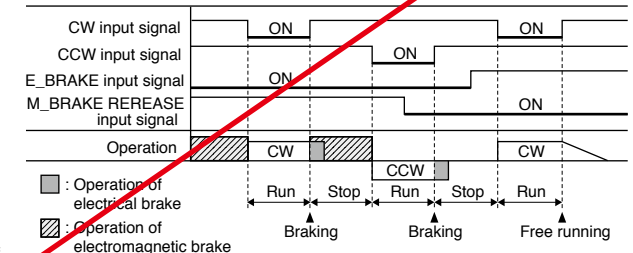
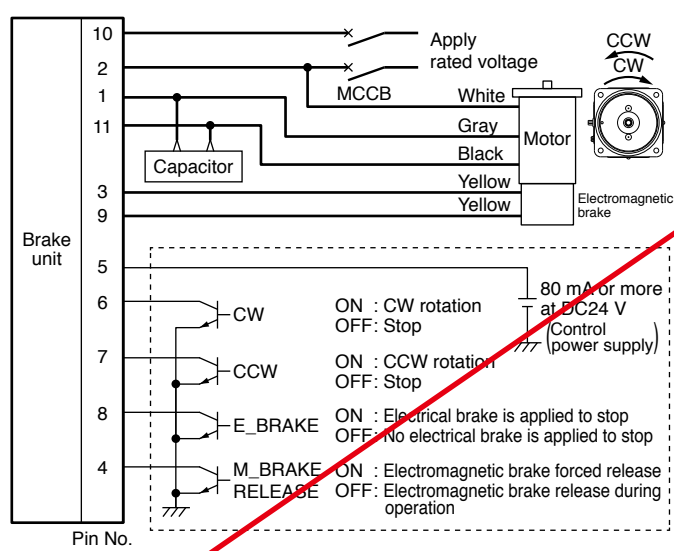


- Notes:
1. Number of motors that can be connected to the brake unit is only one.
 2. The thick solid lines represent main circuit. Use conductor of size 0.5 mm² or larger for the main circuit.
 3. Do not input CW rotation signal and CCW rotation signal at the same time. Otherwise, both signals cause application of excessive power to the motor to burn out.
 4. Do not input rotating direction change signal or the operation instruction while the electrical brake is being applied.
 5. Leave the pins 3, 4 and 9 unconnected. (These pins are not isolated from the internal circuit)
 6. For the purpose of this diagram, CW and CCW refer to direction of the motor rotation when viewed it from the motor shaft end. Note that output shaft of the gear head may turn in opposite direction.
 7. To change the rotating direction of the induction motor, wait until the motor stops completely.

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

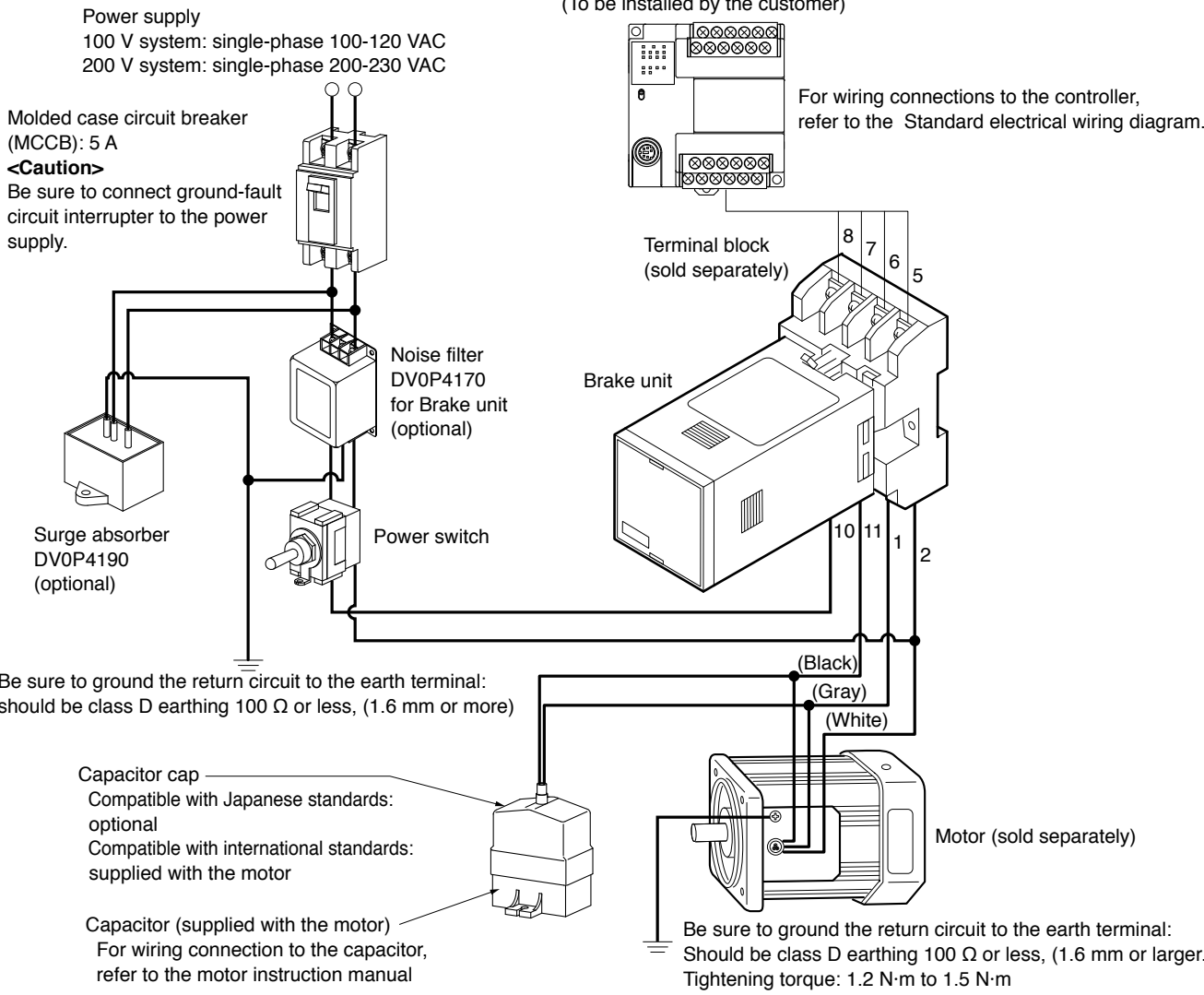
Contactless brake unit MB48X type

• Single-phase motor with electromagnetic brake



- Notes:
1. Number of motors that can be connected to the brake unit is only one.
 2. The thick solid lines represent main circuit. Use conductor of size 0.5 mm² or larger for the main circuit.
 3. Do not input CW rotation signal and CCW rotation signal at the same time. Otherwise, both signals cause application of excessive power to the motor to burn out.
 4. Do not input rotating direction change signal or the operation instruction while the electrical brake is being applied.
 5. For the purpose of this diagram, CW and CCW refer to direction of the motor rotation when viewed it from the motor shaft end. Note that output shaft of the gear head may turn in opposite direction.

• wiring diagram (for reversible motor)



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

Brake Unit

Contacting type



- These brake units are electric brakes used to instantaneously stop motors.
- These electric brakes have longer life expectancy and can perform inching operation.

• Features

<SD type>

1. Compact 8P plug-in configuration.
2. Can be used in combination with other commercially available SSR (contactless relay).
These combinations enable the use of electrical signals for “run” and “quick stop” control of motors.
3. The electric brake operates for approx. 0.5 sec.

<EX type>

1. Can be controlled using electrical signal.
Electrical signal can be used for “run”, “quick stop” and “coast to stop” control of motors.
2. Operation time of the electric brake is adjustable.
Operation time is set to a suitable value within the range from 0.1 sec to 2 sec
3. “Run” and “Instantaneous stop” lamps are provided.

• Names and functions

• Braking time control

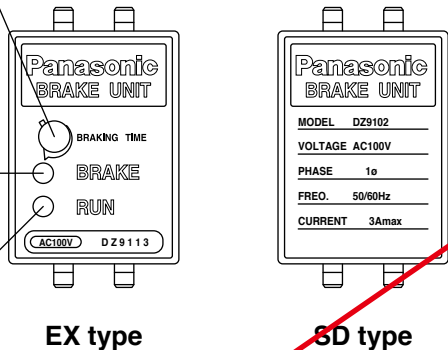
Adjusts the time up to 2 sec (standard).
Since longer braking current increases motor temperature, the shortest time necessary to stop the motor is the recommended setting.

• Brake lamp

Lights in red while the braking current is flowing.

• Run lamp

Lights in green while the motor is running.



• Models and applicable motors

	Rated voltage	SD type			EX type	
		DZ9102	DZ9202	DZ9302	DZ9113	DZ9213
Induction motor Reversible motor	Single-phase 100 V	○	-----	-----	○	-----
	Single-phase 200 V	-----	○	-----	-----	○
3-phase motor	3-phase 200 V	-----	-----	○	-----	-----

• Specification

<SD type>

Item	Part No.	DZ9102	DZ9202	DZ9302
Rated voltage		Single-phase 100 VAC	Single-phase 200 VAC	3-phase 200 VAC
Power frequency		50 Hz/60 Hz		
Permissible current		Operation current 3 A		
Applicable motor		3 W to 90 W*1		
Braking method		Feeds electric braking current for a specified time		
Electric braking time		0.5 sec (typ)		
Operating temperature		-10 °C to 50 °C		
Storage temperature		-10 °C to 60 °C		

<EX type>

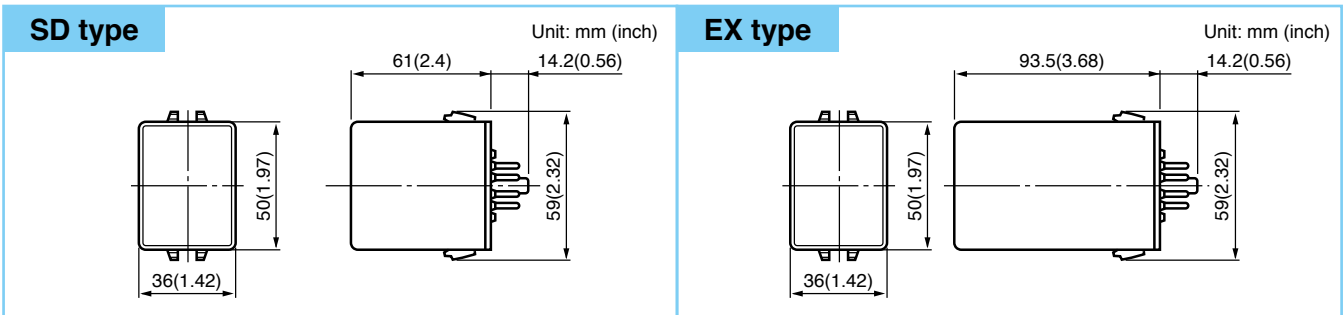
Item	Part No.	DZ9113	DZ9213
Rated voltage		Single-phase 100 VAC	Single-phase 200 VAC
Power frequency		50 Hz/60 Hz	
Permissible current		Operation current 3 A	
Applicable motor		3 W to 90 W*1	
Braking method		Feeds electric braking current for a specified time	
Electric braking time		Variable up to 2 sec (typ)	
Operating temperature		-10 °C to 50 °C	
Storage temperature		-10 °C to 60 °C	

*1: The unit cannot be used with Sq.42 mm size geared motor.

[Notes]

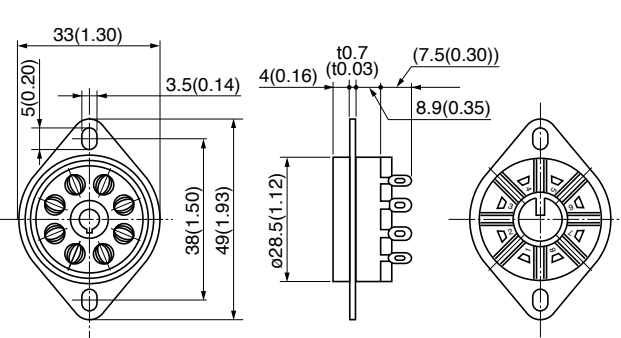
1. Electric braking system has no holding torque.
2. For application requiring holding force, use Panasonic electromagnetic brake motor.
3. When braking a load with excessively large inertia, related issues are strength and life of motor shaft and gear. For these subjects, consult us.
4. When using motor other than compact geared motor, consult us.
5. The brake unit can not be used when using M4G□F of the gearhead part number.
6. The international standard motor other than the above rated voltage can not be used.
7. The frequency of starting and stopping should be 6 or less per minute.

• Outline drawing

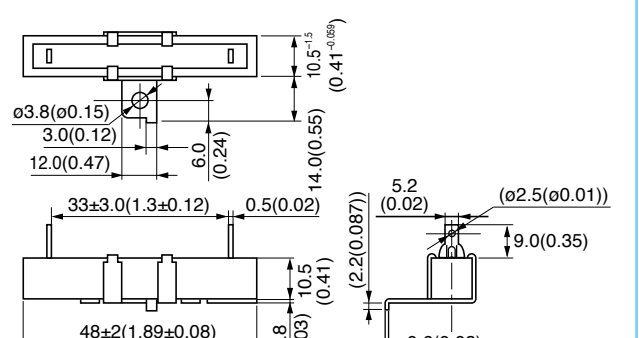


Accessories

• Socket (common to SD and EX)



• External resistor for braking (for DZ9302 only)



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

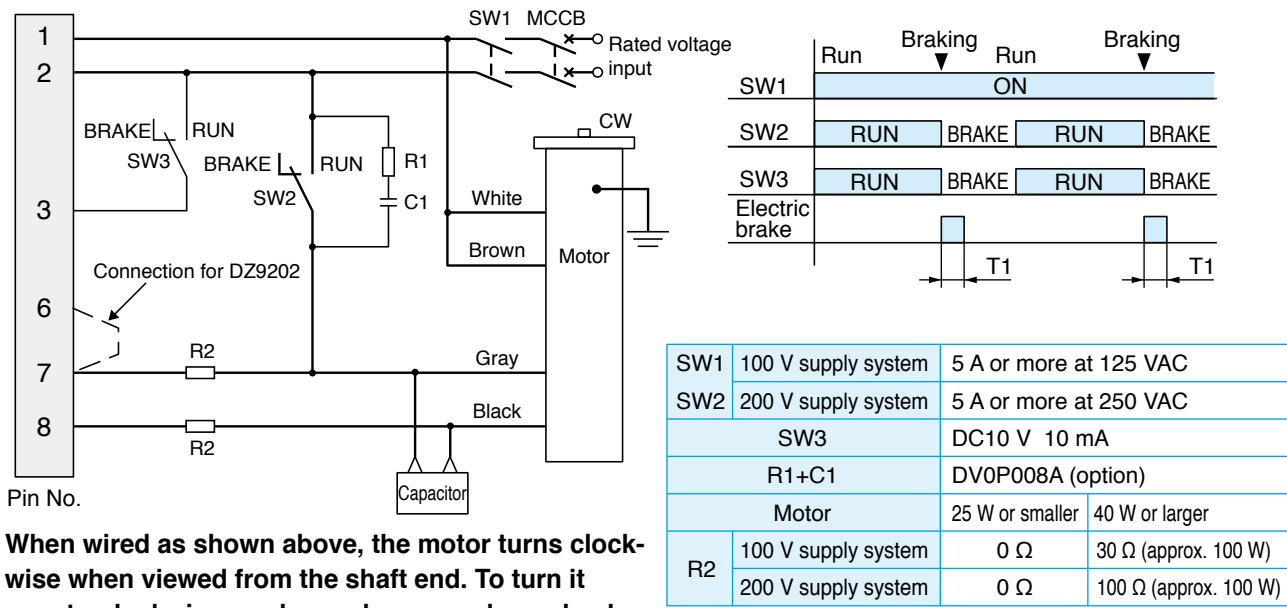
* Please read your User's manual carefully so that you will understand the operation and safety precautions before attempting to operate the system.

Brake Unit

Contacting SD type

The thick continuous lines in the circuit diagram below represent main circuit. Use conductor of 0.75 mm² (AWG18) or more. The thin continuous lines represent signal circuit. Use conductor of size 0.3 mm² (AWG22) or more.

• DZ9102 and DZ9202 fundamental electrical wiring diagram (induction motor)



• When wired as shown above, the motor turns clockwise when viewed from the shaft end. To turn it counterclockwise, exchange brown and gray leads.

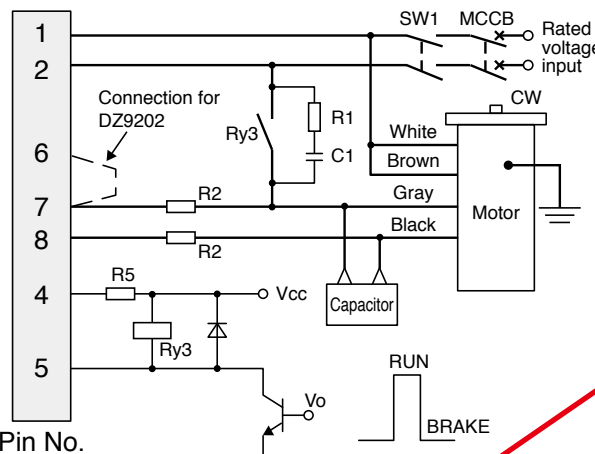
[Notes]

- When SW2 and SW3 are switched from RUN to BRAKE, electric brake is applied for approx. 0.5 sec (T1) causing the motor to stop quickly.
- Both SW2 and SW3 should be switched from RUN to BRAKE at the same time.
- The wattage of R2 depends on frequency of start and stop operations. First check the power dissipation.

Control signal

• When using power relay

RY3 Panasonic: HC type relay or equivalent



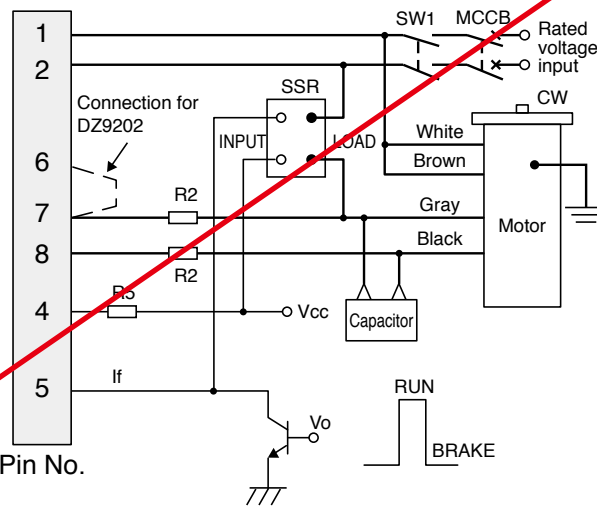
[Notes]

- Use 0 W R5 when Vcc is below 6 VDC. When Vcc is 6 VDC or higher, determine the value of R5 according to the equation shown below. Ripple of Vcc should be 5 % or below. (Internal resistance 220 Ω)
$$R5 = \frac{V_{cc} - 6 V}{I_f} \text{ at } I_f = 15 \text{ mA to } 20 \text{ mA}$$

• Example $V_{cc} = 24 V$ $I_f = 20 \text{ mA}$
$$R5 = \frac{24 - 6}{20 \times 10^{-3}} = 900 \Omega \approx 1 \text{ k}\Omega$$
- Also refer to SSR handling precaution (see contactless relay catalog).

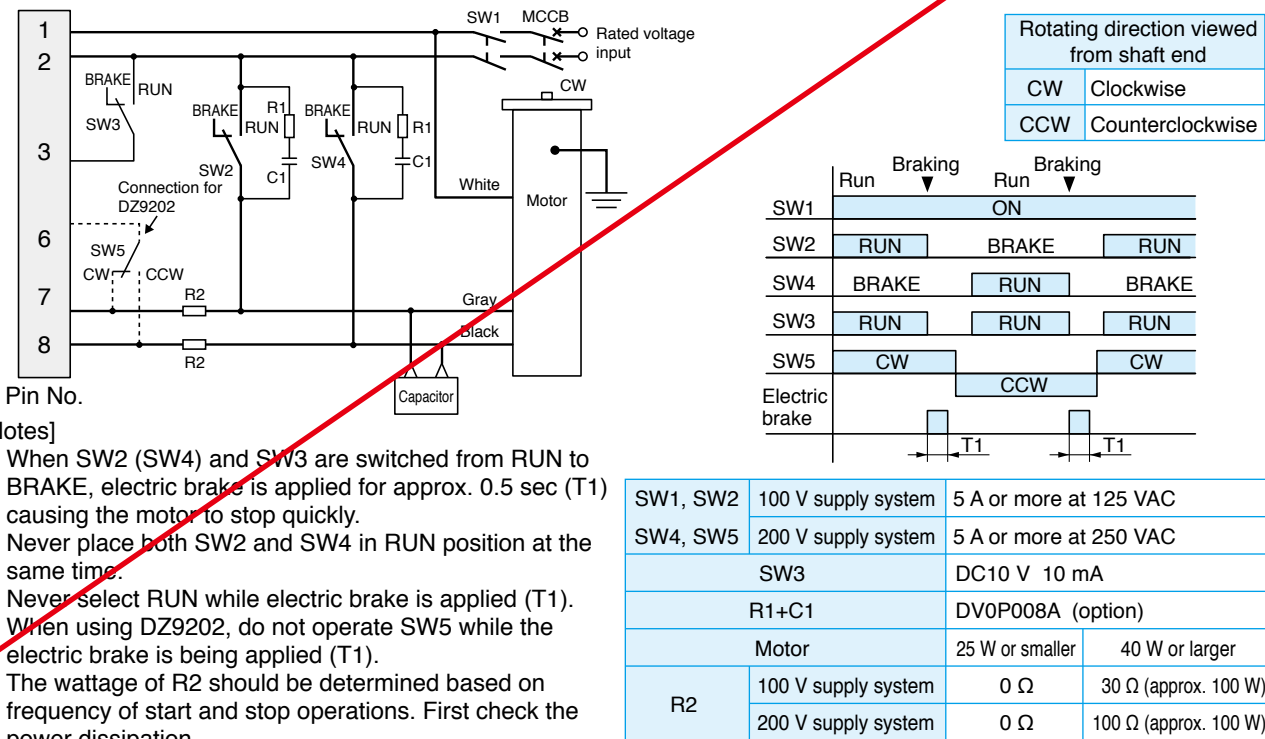
• When using contactless relay (SSR)

SSR Panasonic: AQ-J 10 A type or equivalent



The thick continuous lines in the circuit diagram below represent main circuit. Use conductor of 0.75 mm² (AWG18) or more. The thin continuous lines represent signal circuit. Use conductor of size 0.3 mm² (AWG22) or more.

• DZ9102 and DZ9202 standard electrical diagram (reversible motor)



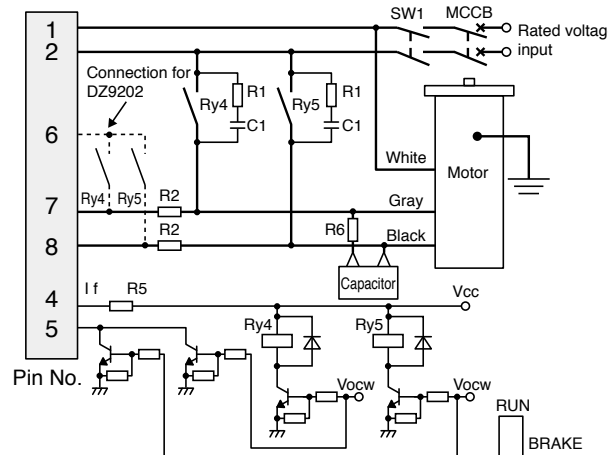
Pin No.

[Notes]

- When SW2 (SW4) and SW3 are switched from RUN to BRAKE, electric brake is applied for approx. 0.5 sec (T1) causing the motor to stop quickly.
- Never place both SW2 and SW4 in RUN position at the same time.
- Never select RUN while electric brake is applied (T1).
- When using DZ9202, do not operate SW5 while the electric brake is being applied (T1).
- The wattage of R2 should be determined based on frequency of start and stop operations. First check the power dissipation.

Control signal

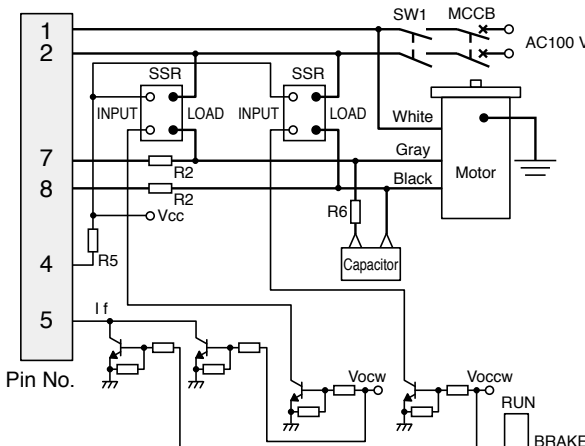
• When using power relay



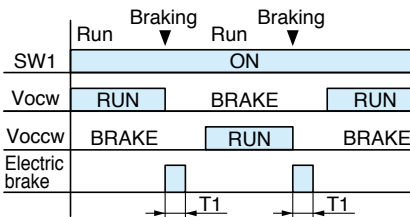
[Notes]

- Use 0 Ω R5 when Vcc is below 6 VDC. When Vcc is 6 VDC or higher, determine the value of R5 according to the equation shown in description for induction motor. Ripple of Vcc should be 5 % or below. (Internal resistance 220 Ω)
- Ry4 and Ry5 should be relay or electromagnetic contactor with the rated voltage two or more times the power supply voltage and the rated current 3 A or more.
- Do not place Vocw and Voccw in RUN at the same time.
- Be sure to use resistor R6 to protect relay, SSR and capacitor. Current will flow through R6 - 2 A 90 W; 1.7 A 60 W; 1 A 40 W; 0.6 A 25 W; 0.4 A 15 W.
- Also refer to SSR handling precaution (see contactless relay catalog).

• When using contactless relay (SSR)
(Cannot be used for DZ9202)



SSR	Panasonic: AQ-J 10 A type or equivalent
R6	10 Ω

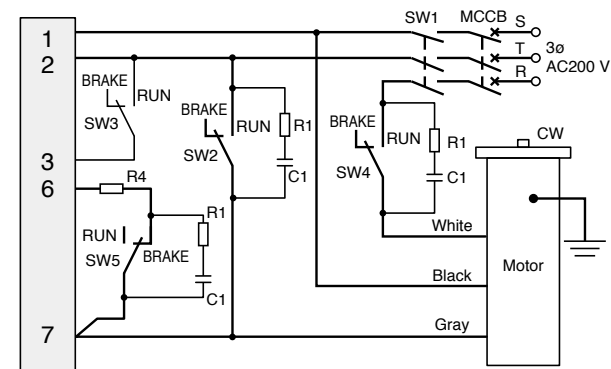


Brake Unit

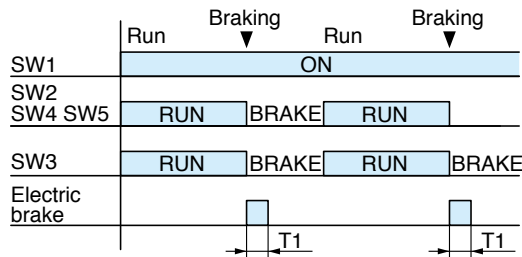
Contacting SD type

The thick continuous lines in the circuit diagram below represent main circuit. Use conductor of 0.75 mm² (AWG18) or more. The thin continuous lines represent signal circuit. Use conductor of size 0.3 mm² (AWG22) or more.

• DZ9302 fundamental electrical wiring diagram (3-phase motor)



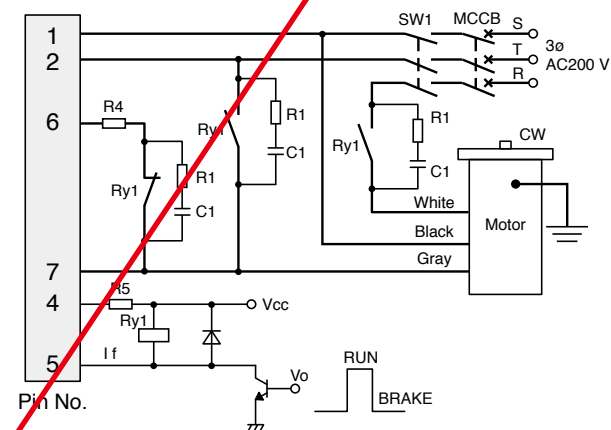
SW1, SW2	AC250 V 10 A min.
SW4, SW5	
SW3	DC10 V 10 mA
R1+C1	DV0P008A (option)
R4	Accessory



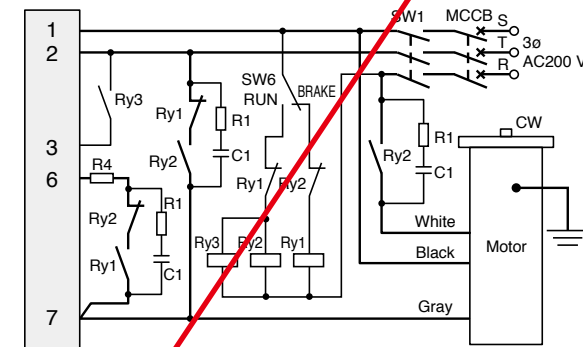
- [Notes]
- When SW2, SW3 and SW4 are switched from RUN to BRAKE, electric brake is applied for approx. 0.5 sec (T1) causing the motor to stop quickly.
 - Do not place these switches to RUN position while the electric braking is applied (T1).
 - A massive amount of current will flow through SW2, SW4 and SW5. Use a disconnecting device (switch or relay) rated at 10 A or more. When using a relay, use Panasonic: HL type relay or equivalent.

Control signal

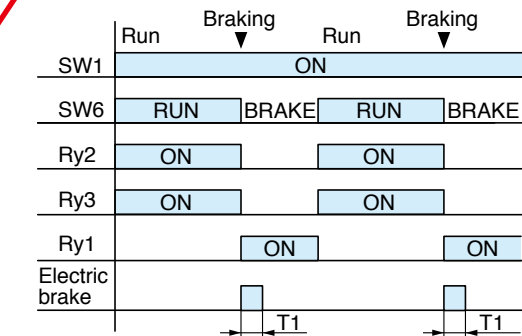
• When using power relay



• For application using inching motion frequently
If SW2 and SW5 emit long sparks, use of the following circuit is recommended.

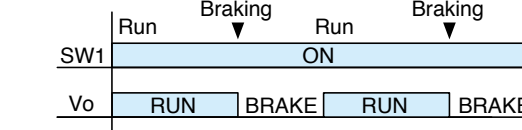


SW1, SW6	AC250 V 10 A min.
RY1, RY2	Panasonic: HL type relay or equivalent
R1+C1	DV0P008A (option)
R4	Accessory
RY3	Twin contact or Au-clad contact relay



- [Notes]
- Ry1 and Ry2 should be interlocked to avoid simultaneous "ON".

RY1	Panasonic: HL type relay or equivalent
-----	--



- [Notes]
- Use 0 Ω R5 when Vcc is below 6 VDC. When Vcc is 6 VDC or higher, determine the value of R5 according to the equation shown below. Ripple of Vcc should be 5 % or below. (Internal resistance 220 Ω)
- Resistance of R5 $R5 = \frac{Vcc - 6 V}{If}$ at If = 15 mA to 20 mA
- Example Vcc = 24 V If = 20 mA
- $$R5 = \frac{24 - 6}{20 \times 10^{-3}} = 900 \Omega \approx 1 k\Omega$$

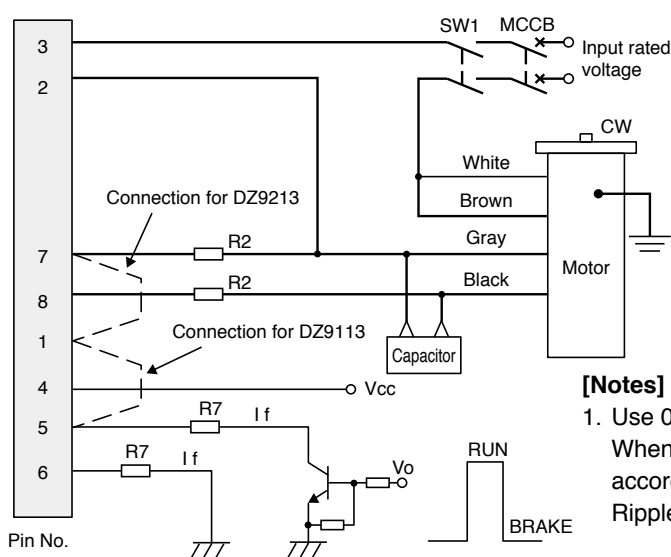
* Please read your User's manual carefully so that you will understand the operation and safety precautions before attempting to operate the system.

Brake Unit

Contacting EX type

The thick continuous lines in the circuit diagram below represent main circuit. Use conductor of 0.75 mm² (AWG18) or more. The thin continuous lines represent signal circuit. Use conductor of size 0.3 mm² (AWG22) or more.

• DZ9113/DZ9213 fundamental electrical wiring diagram (unidirectional rotation and braking)



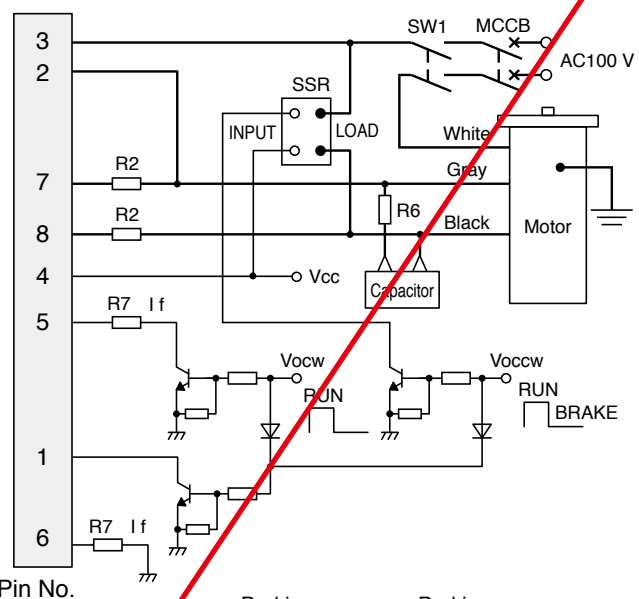
• When wired as shown left, the motor turns clockwise when viewed from the shaft end. To turn it counterclockwise, exchange brown and gray leads.

SW1	100 V supply system	5 A or more at 125 VAC
	200 V supply system	5 A or more at 250 VAC
Motor	25 W or smaller	40 W or larger
R2	100 V supply system	0 Ω 30 Ω (approx. 100 W)
	200 V supply system	0 Ω 100 Ω (approx. 100 W)

[Notes]

- Use 0 Ω R7 when Vcc is below 6 VDC. When Vcc is 6 VDC or higher, determine the value of R7 according to the equation shown below. Ripple of Vcc should be 5 % or below. (Internal resistance 90 Ω)
- Resistance of R7 $R7 = \frac{Vcc(MIN) - 6 V}{If}$ at If = 32 mA to 45 mA
- Example: Vcc (MIN) = 12 V If = 40 mA
$$R7 = \frac{12 - 6}{40 \times 10^{-3}} = 150 \Omega$$
- The wattage of R2 depends on frequency of start and stop operations. First check the power dissipation.

• DZ9113 application wiring diagram (normal/reverse rotation and braking)



Motor	Single-phase 100 V Reversible motor
SSR	Panasonic: AQ-J 10 A type or equivalent
R6	10 Ω

[Notes]

- For information on R2, SW1, etc., not found in this figure, refer to the fundamental electrical diagram shown above.
- For information on the SSR, refer to the related documents available from the contactless relay manufacturer.
- The rated voltage of SSR should be 2 times or more the power supply voltage and the surge rating should be 100 A or more.
- Be sure to use resistor R6 to protect SSR and capacitor. Current will flow through R6 - 2 A 90 W; 0.7 A 60 W; 1 A 40 W; 0.6 A 25 W; 0.4 A 15 W. Determine the wattage by first checking the heat dissipation.
- Never turn on the motor while the electric braking is operating (T1).
- Do not place Vocw and Voccw in RUN position at the same time.
- For Vcc and R7, refer to "Unidirectional rotation and braking" above.

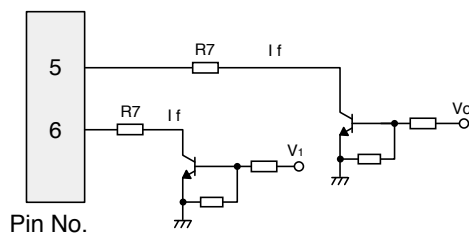
* Please read your User's manual carefully so that you will understand the operation and safety precautions before attempting to operate the system.

Brake Unit

Contacting EX type

• Stopping coasting DZ9113/DZ9213

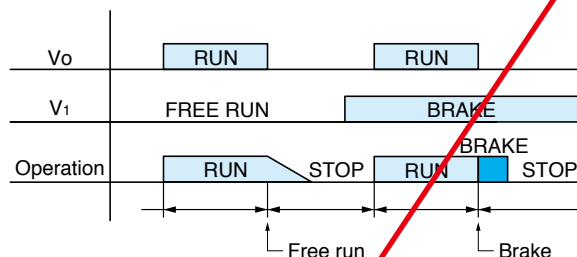
• Coast stopping circuit wiring diagram



[Notes]

1. Turning on and off of input voltage V1 on pin 6 causes coasting and braking, respectively.
2. For the resistance value of R7, refer to basic electric wiring diagram (unidirection rotation and braking) of DZ9113/DZ9213.
3. For the remaining wiring connections, refer to respective electric wiring diagrams.

• Operation

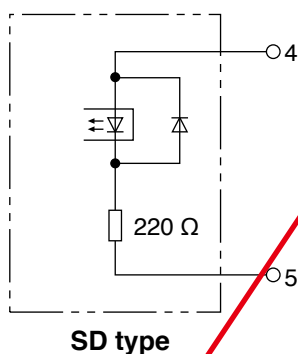


SD type, EX type

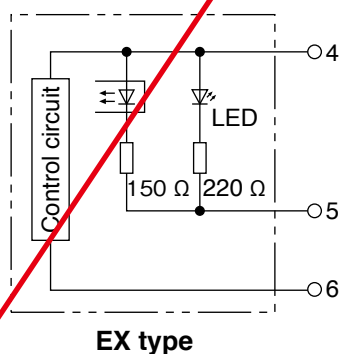
The thick continuous lines in the circuit diagram below represent main circuit. Use conductor of 0.75 mm² (AWG18) or more. The thin continuous lines represent signal circuit. Use conductor of size 0.3 mm² (AWG22) or more.

• Contactless signal input driving

- These are internal equivalent circuits that may be used for contactless signal driving devices such as TTL and MOSIC.

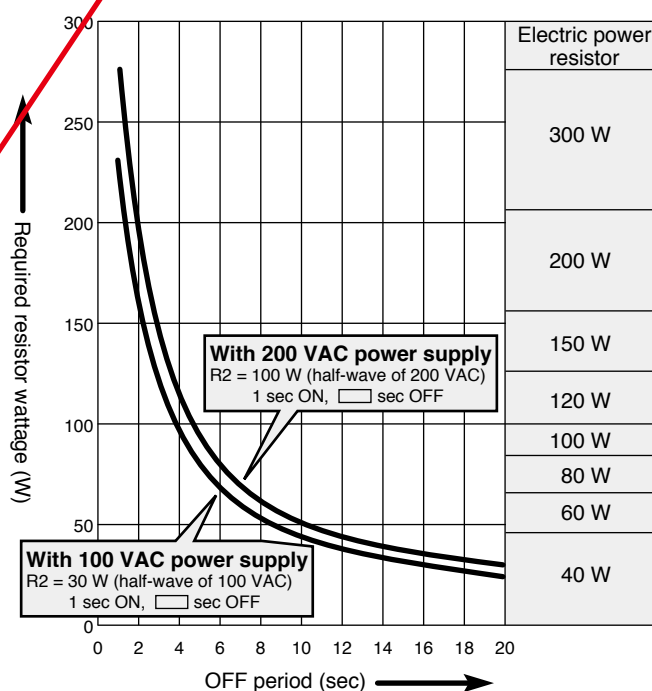


SD type



EX type

• Wattage of fixed resistor (R2)



[Notes]

The curves shown above are required wattage of electric power resistor R2 to maintain the surface temperature of it at 200 °C or below when it is driven with WR (average on/off cycle power) and 35 % load factor.

Load factor = 35 % ON duration (braking time) = 1 sec (fixed)

1. When 100 VAC supply $WR = 476 / (Toff + 1)$

2. When 200 VAC supply $WR = 571 / (Toff + 1)$

Example: 10 sec run; 5 sec stop; 1 sec braking; under 100 VAC
 $WR = 476 / [(10 + 5 + 1) + 1] = 31.7 \text{ W}$

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