

DVMS1 type

Operation Manual

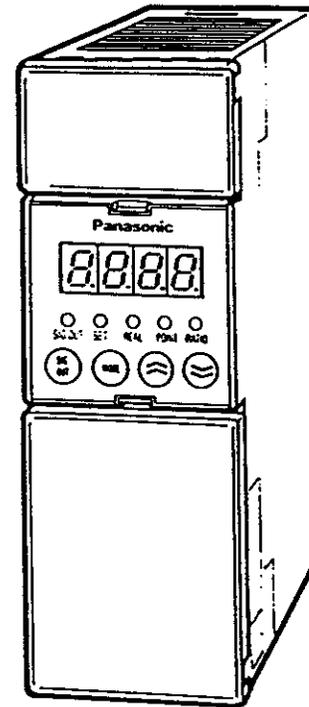


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便利メモ (お問い合わせや修理のときのために、記入しておいてください。)

ご購入年月日	年 月 日	品番 DVMS1
ご購入店名		
電話	()	-

松下電器産業株式会社 産業機器モータ事業部

〒574 大阪府大東市諸福7丁目1番1号 電話(代表) 0720(71)1212

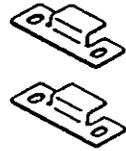
Thank you for your buying and using Panasonic Solid-State Speed Controller for G-Series, small induction geared motors

- Read this operation manual before using this product.
- Keep this operation manual at convenient place for further reference.

1. After opening the package...

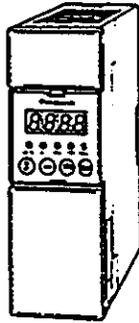
Check the followings.

- Model number
- Output
- Voltage
- Damage during transportation
- Attachment below;



Mounting backed(x2)

Use these when no
DIN rail is used.



Controller



Operation Manual

For any inquiries, contact to a dealer.

2. Model list and applicable motors

Applicable motors to this speed controller are listed below;
The motors are G-Series variable speed motor

Model	Rated voltage	Applicable motors
DVMS1AL	AC100V	15W以下
DVMS1BL		20~40W
DVMS1CL		60~90W
DVMS1AY	AC200V	15W以下
DVMS1BY		20~40W
DVMS1CY		60~90W

3. Caution for safety

■ Installation

Use this product at 0 ~ 40°C, 85% RH or less.

Avoid using this product to prevent malfunction or damage where the product is exposed to

- direct sunlight
 - heavy vibration or shock (0.5G or more)
 - dust or high humidity
 - inflammable gas, erosive gas
 - strong static electricity(nearby equipment which handles molding, powder or fluid)
 - strong electric field(nearby broadcasting or high frequency frequency welding machines)
- Install enough shield if necessary.

The product is covered with anti-dust sheet to prevent any dust or iron particles from entering to the product on installation. Remove these sheet after installation without fail.

■ Power source

- Match the power voltage to the rating of the product.
- Turn off the power while the product is not used for a long time to prevent heat rise.
- Pay attention when using transformer with smaller capacity. It may cause malfunction.

■ Chemicals · Oil · Water

- Don't subject the product to organic solvent such as alcohol, benzene or thinner, machine oil or grease, strong alkaline material such as ammonia or caustic soda.
- Don't let water or oil enter to the product. This product is not water proof.

■ Reset

Inner circuit will be reset when unexpected electric noise enters to the product or instantaneous power failure occurs.

Resumption action differs per different input mode as bellow;

A-mode; Motor restarts due to level input.

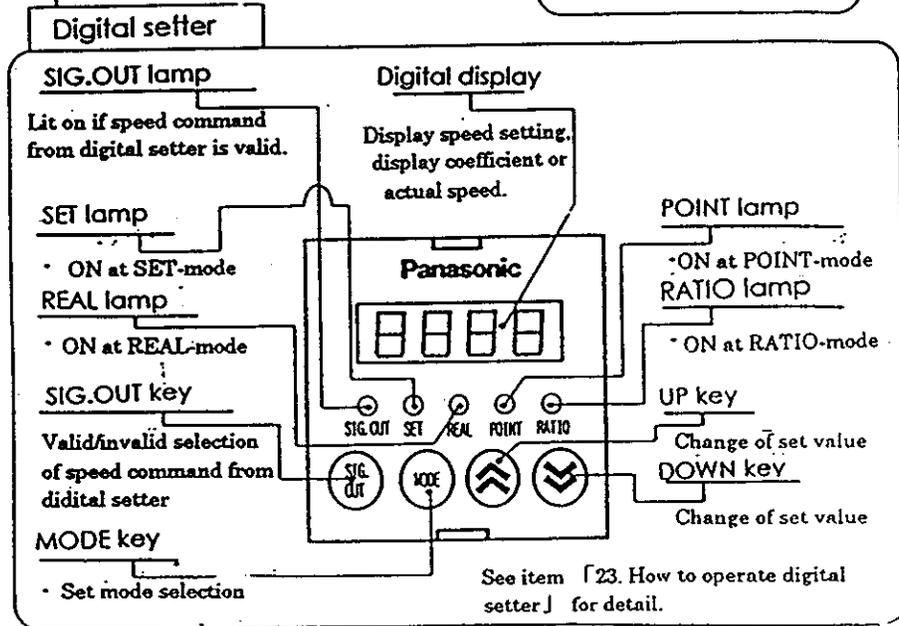
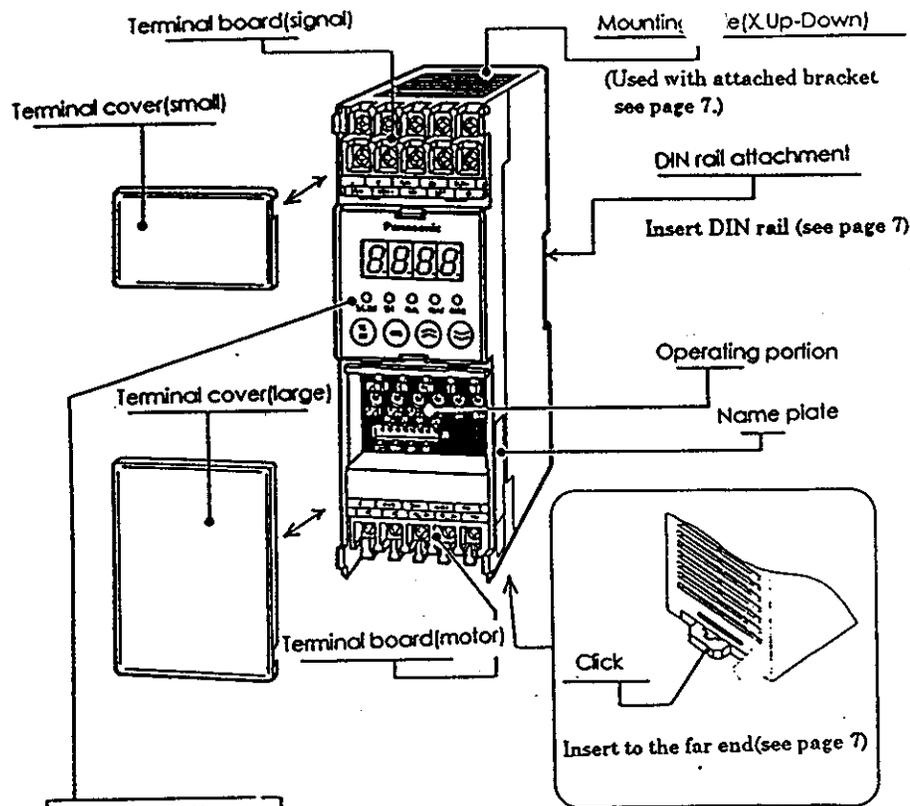
B-mode; Motor stops until next signal enters due to pulse input.

B-mode is recommended for safety.

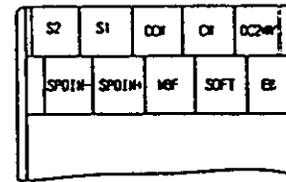
■ Wiring

- While speed is set externally, motor runs at full speed if leads come off.
- In case of motor with thermal protector, don't connect thermal protector lead(yellow) to YELLOW terminal of terminal-board.(see page 9.)

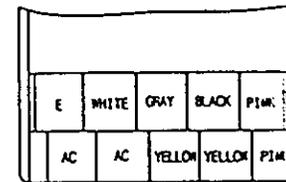
4. Title of each part and function



Terminal board



Signal-terminal board

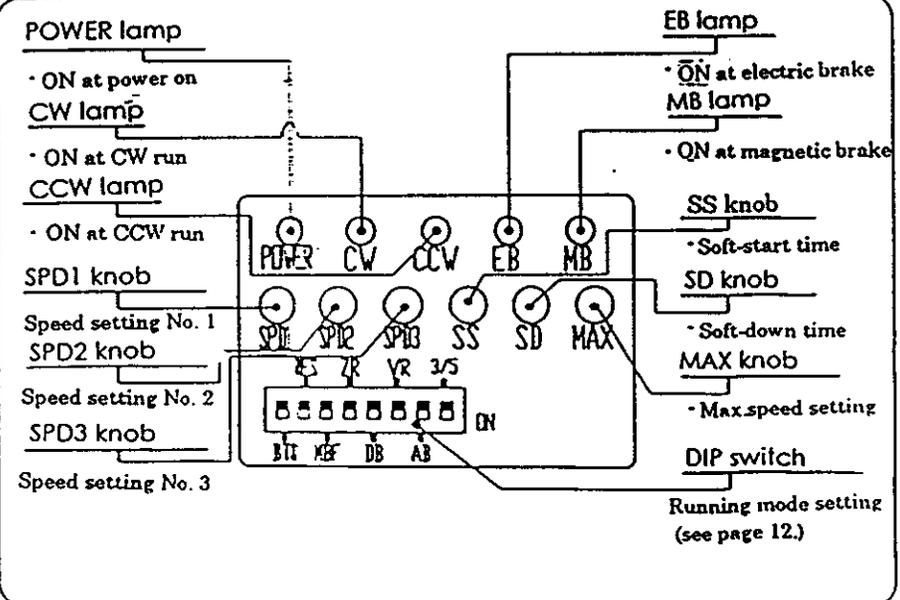


Motor terminal board

Title	Function/application	
	A-mode	B-mode
DC24V	DC 24V power input	
CR	CW run signal input	
COF	CCW run signal input	
EB	Electric brake setting signal	
SOFT	Soft run setting signal input	
MFB	E-M brake release signal input	Stop signal input
S1, S2	Setting speed selection signal input	
SPOIN+ SPOIN-	External speed setting input	

Title	Application
AC	Power input
E	Ground
WHITE, GRAY, BLACK	Motor leads(white,gray,black) connection
PINK	Tachogenerator lead(pink) connection
YELLOW	Electro-magnetic brake lead(yellow) connection

OPERATING PORTION



5. Before operation

■ Wiring

- When a frequent thunder strike is expected, install a thunder surge killer at secondary circuit of the main distributor.
- Parallel wiring or same wiring of the product with a high capacity electric furnace, welding machine and apparatus driven by high-frequency/high power such as inverter may cause malfunction due to electrical noise.

For countermeasure;

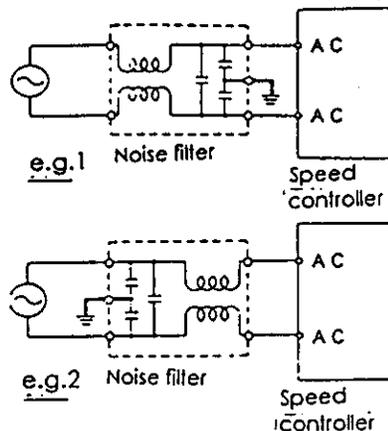
- Use separate power supply and make separate wiring from the main of other apparatus.

- Install a noise filter (see right fig.)

- This product is controlled by thyrister, and might generate noise interference to radio equipment.

For countermeasure;

- Install a noise filter(see right fig.)



■ At running

- 90°C or below at the motor surface
Motor surface temperature varies per different environment, load condition or frequency of start/stop. When the motor surface temperature exceeds 90°C, it may damage the motor. Use a higher capacity motor in this case.

■ Reset period

- Allow approx. 0.5 sec(1 sec for digital setting) before running the motor after turning on the power. Note that during this period, no input signal will be received.

■ Brake torque setting

- Set DIP switch, BTQ per the motor output based on the table below;

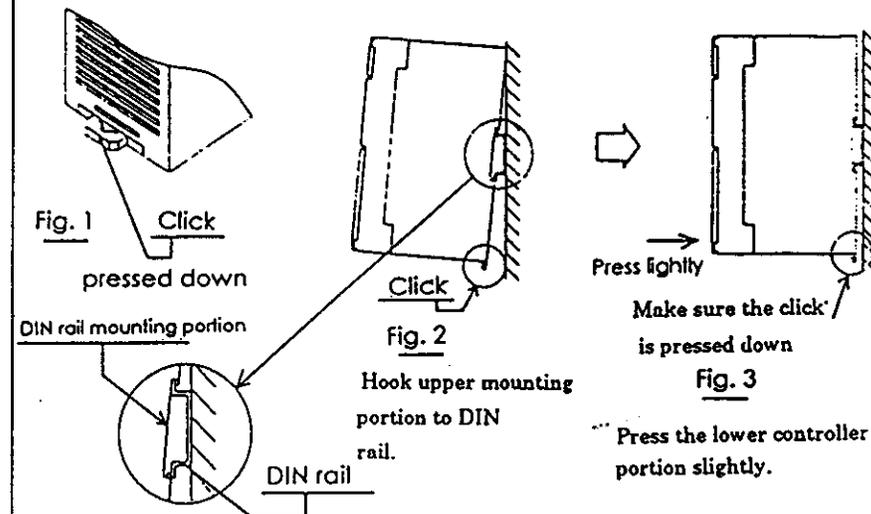
Over 40W	OFF
Under 25W	ON

Incorrect setting may damage the motor.

6. Installation

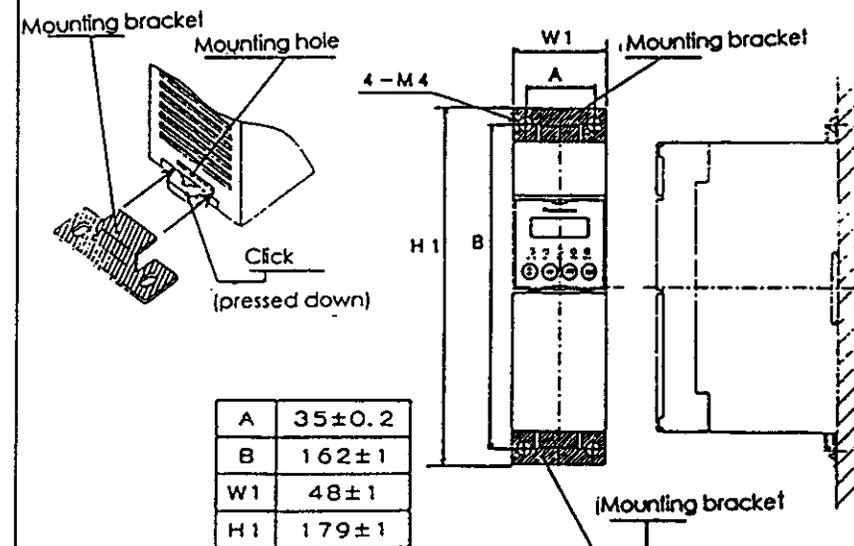
■ Install on to DIN rail

Install the product to DIN rail by pressing down the click as per fig. 1, 2 and 3.
Make sure the click is pressed down.



■ Installation with mounting bracket(attachment)

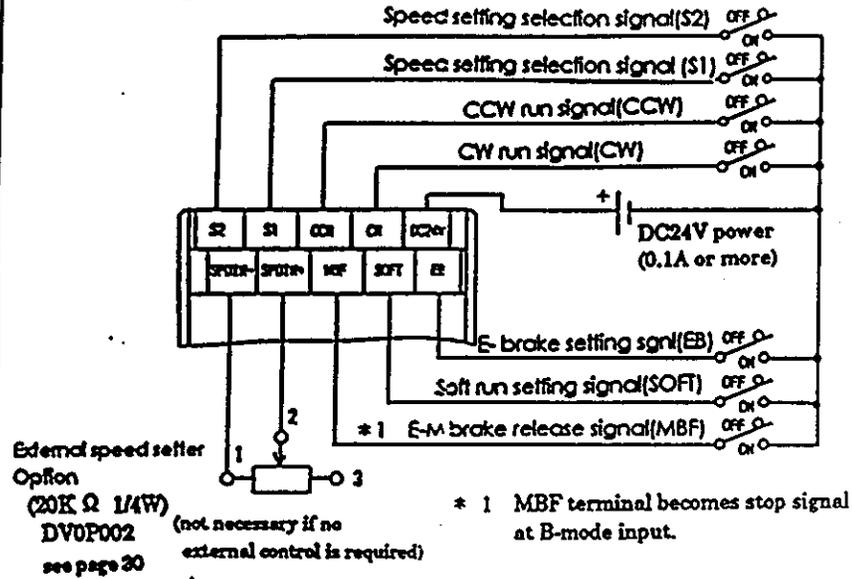
Insert the attached mounting bracket to mounting holes(Up/Down) while pressing down the click, and fix with M4 screw.



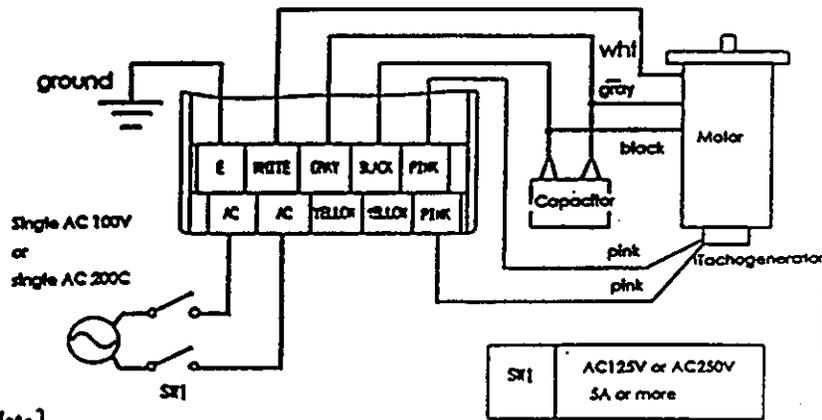
7. Wiring

Basic wiring

Wiring at signal terminal board



Wiring at motor terminal board

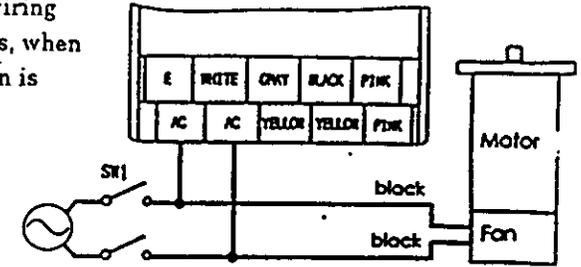


[Note]

1. Thick line shows main circuit. Use wire of 0.5 mm² or larger.
2. Above fig. shows wiring when small relay is used. If programmable controller is used, see page 18.
3. While external speed setting (SPDIN+, SPDIN- terminals) is used, and if the leads come off, motor runs at full speed.
4. Standard tightening torque of screws is 60 [Ncm] (6 [kgcm]).

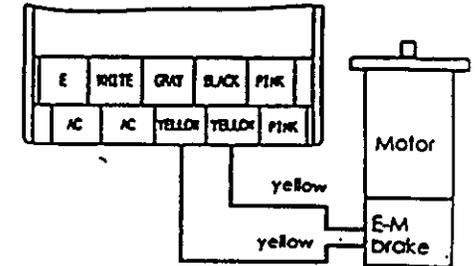
Wiring of separate excitation fan

Use the additional wiring as the right fig. shows, when separate excitation fan is used.



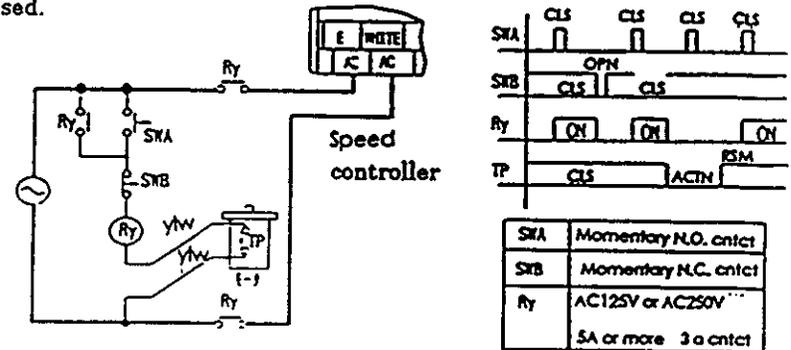
Wiring of electro-magnetic brake

Use the additional wiring as the right fig. shows, when the motor with electro-magnetic brake is used.



Wiring of thermal protector

See the fig. below when the motor with thermal protector (TP) (with leads) is used.



[Note]

1. Don't connect thermal protector leads (yellow) to YELLOW terminal of the terminal board.
2. Thermal protector is auto-return type.
3. Allow cooling time before resumption once thermal protector is activated.
4. Follow the basic wiring for the motor, tachogenerator and signal wire.

8. Running examples

The table below shows basic running examples.

Speed setting with digital setter

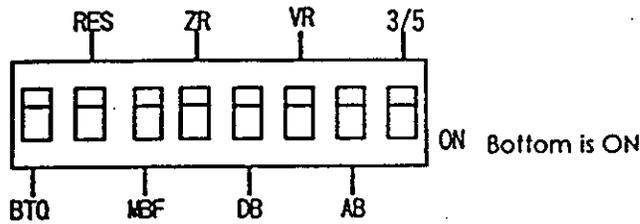
No.	Where to operate	Operation	Action/others
1	Wiring	Correct wiring	No external speed setter is required.
2	DIP switch	BTQ-40W or larger :OFF BTQ-25W or smaller:ON Others :OFF	
3	Signal input	All off	POWER lamp turns on.
4	AC power DC power	Turn on	
5	Is SET lamp on ?		
YES ↓ NO			
6	MODE key	Press once	SET lamp turns on(SET mode).
7	MODE key	Press for 2sec or longer	POINT lamp turns on(POINT mode)
8	MODE key	Press once	RATIO lamp turns on(RATIO mode)
9	UP key DOWN key	Set the display to "1.00"	Setting of display coefficient
10	MODE key	Press for 2sec or longer	SET lamp turns on(SET mode)
11	UP key DOWN key	Set the display to "1400/1700"(50/60 Hz)	Speed setting
12	Is SIG.OUT lamp on ?		
YES ↓ NO			
13	SIG.OUT key	Press once	SIG.OUT lamp on(speed command valid)
14	CW run signal	ON	Motor runs at CW. CW lamp turns on.
15	MODE key	Press once	Displays actual speed. REAL lamp turns on(REAL mode)
16	MAX knob	Adjust so as the display becomes preset value.	Calibration of motor speed (see page 20)
17	CW run signal	OFF	Motor stops.
18	CCW run signal	ON	Motor runs at CCW CCW lamp turns on.
19	MODE key	Press once	SET lamp turns on(SET mode)
20	UP key DOWN key	Change of setting value	Motor speed varies.
21	CCW run signal	OFF	Motor stops.

Speed setting with external speed setter(+2step variable)

No.	Where to operate	Operation	Action/others
1	Wiring	Correct wiring	
2	DIP switch	BTQ-40W or larger :OFF BTQ-25W or smaller:ON VR :ON Others :OFF	
3	Signal input	All off	POWER lamp turns on.
5	AC power DC power	Turn on	
6	MODE key	Press for 2sec or longer	POINT lamp turns on(POINT mode)
7	MODE key	Press once	RATIO lamp turns on(RATIO mode)
8	UP key DOWN key	Set the display to "1.00"	Setting of display coefficient
9	MODE key	Press for 2sec or longer	RATIO lamp turns on(SET mode)
10	CW run signal	ON	Motor runs at CW. CW lamp turns on.
11	External speed setting	Full right turn	Set the external speed setter at max.
12	MAX knob	Set the display to "1400/1700"(50/60 Hz)	Calibrates the motor speed. (see page 20)
13	External speed setting	Set the 1st. speed	Setting of 1st. speed
14	Setting speed selection signal(S1)	ON	Selection of setting speed No.1 (SPD1 knob)
15	SPD1 knob	Set the 2nd. speed	Setting of 2nd. speed
16	Setting speed selection signal(S1)	OFF	Motor runs at 1st. speed
17	Setting speed selection signal(S1)	ON	Motor runs at 2nd. speed
18	CW run signal	OFF	Motor stops.

9. DIP switch setting

The following functions can be selected with the integral DIP switches.



SW	Function	OFF	ON
BTQ	Brake torque selection	Smaller brake torque (40W or larger motor is used)	Larger brake torque (25W or smaller motor is used)
RES	Response selection	High stability mode Small speed fluctuation against load fluctuation Suitable for load control Tends to be unstable at sudden load change	High response mode Better response with no hunching Suitable for positioning Large speed fluctuation against load change
MBF	Release of electro-magnetic brake	Brake will be retained while motor stops by stopping power supply.	Release the brake while motor stops.
ZR	0-speed detection release	Setting of 0-speed detection	Release of 0-speed detection
DB	Setting of deceleration brake(see P21)	Release of deceleration brake	Setting of deceleration brake
VR	Selection of external speed setting (see page 15)	Digital setting selection while both of speed setting signals(S1 and S2) are OFF	External speed setting selection while both of speed setting signals(S1 and S2) are OFF.
AB	Selection of input mode (see page 13)	A-mode(level input)	B-mode(pulse input)
3/5	Selection of ref. voltage at speed command by analog voltage(0-5V)	Analog voltage command of 0-3V, or external speed setter	Analog voltage command of 0-5V

*1 The controller enters to alarm mode if the motor receives the run command while the MBF switch is turned on.(see page 22)

*2 0-speed detection becomes void to the motor with electro-magnetic brake.

(Note) The power has to be turned on again to resume the operation when each of ZR, DB, VR or AB DIP switch setting is changed.

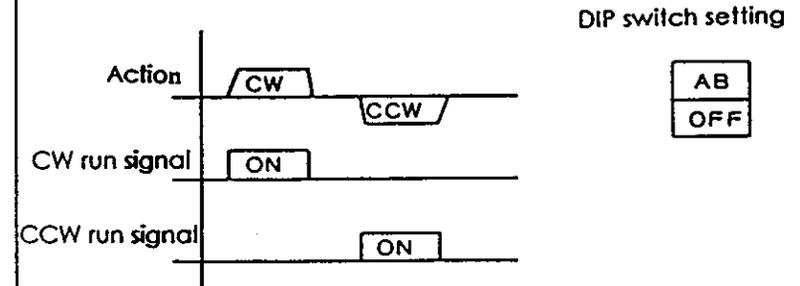
10. Input mode

This controller features 2 types of signal input mode. Use the mode which is suitable to each application.

■ A-mode(level input)

Motor runs while CW or CCW-run signal is turned on, and stops while this signal is turned off. (including soft-down running).

Therefore, one signal selection makes the motor run and stop.

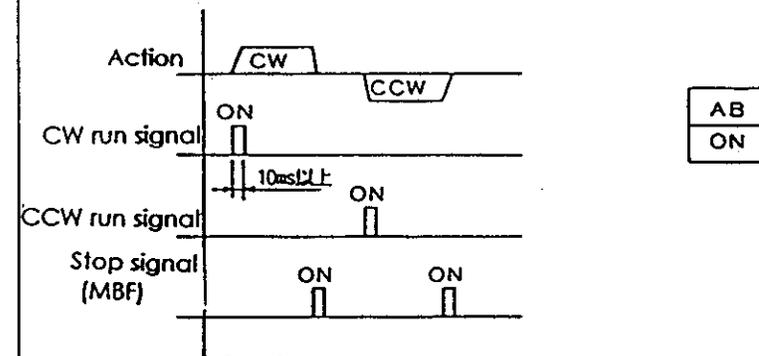


Note that when signal is entered while the controller is reset due to instantaneous power failure or external noise, motor will start running.

■ B-mode(pulse input)

Motor runs while CW or CCW run signal turns on, and stops while stop signal (MBF) is turned on. (including soft-down run)

It is possible to compose the circuit with simple momentary ON switch, since input signal for start/stop does not have to be maintained.



[Note] Make pulse width 10ms or longer.

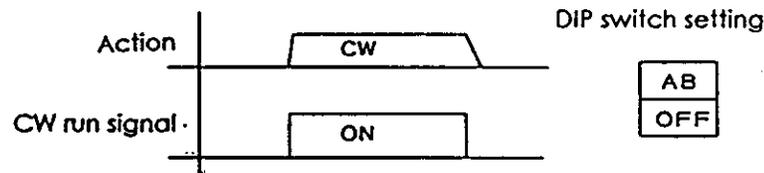
11. Signal input and action

■ CW run signal

● A-mode

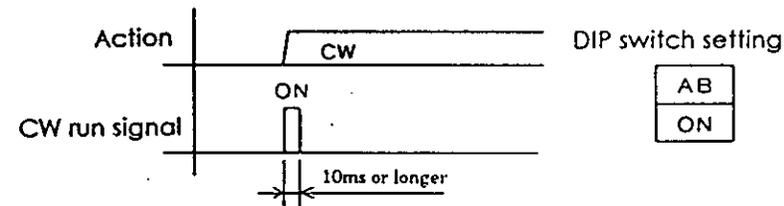
Motor runs at CW with ON of this input.

Motor stops running at CW(including soft-down) with OFF.



● B-mode

Motor starts running at CW with ON of this input.

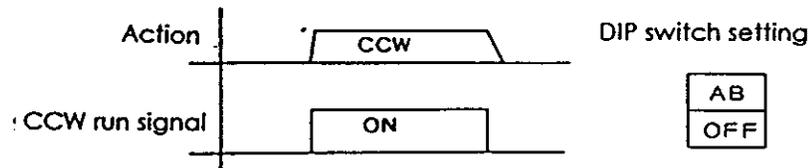


■ CCW run signal

● A-mode

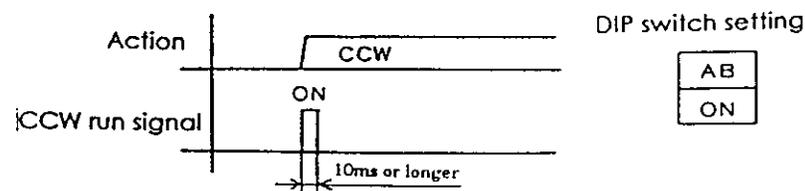
Motor runs at CCW with ON of this input.

Motor stops running at CCW with OFF(including soft-down).



● B-mode

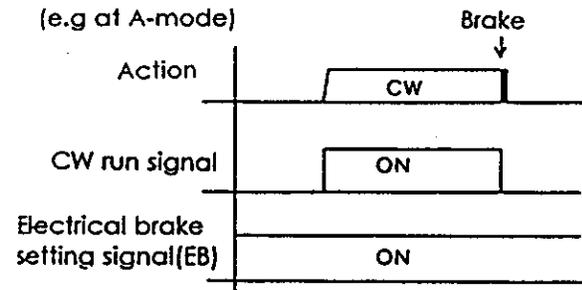
Motor starts running at CCW with ON



■ Electrical brake setting signal(EB)

Electrical brake can be set with ON of this signal, and motor stops immediately while stopping.

Note that electric brake does not work while soft run is set.



■ Soft-run setting signal(SOFT)

Soft-run will be activated with ON.

Refer to page 19, 「Soft-run」 for detail.

■ Release signal input of electro-magnetic brake/stop signal(MBF)

● A-mode

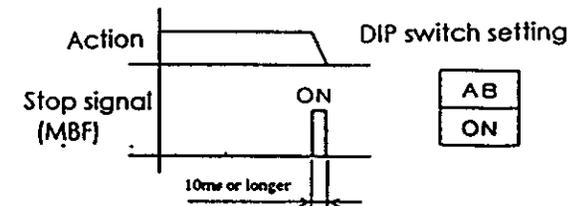
Electro-magnetic brake is released during motor running regardless of MBF input. Electro-magnetic brake can be released during motor stop with ON of this input.

DIP switch setting



● B-mode

Motor stops running with ON of this input (including soft down).



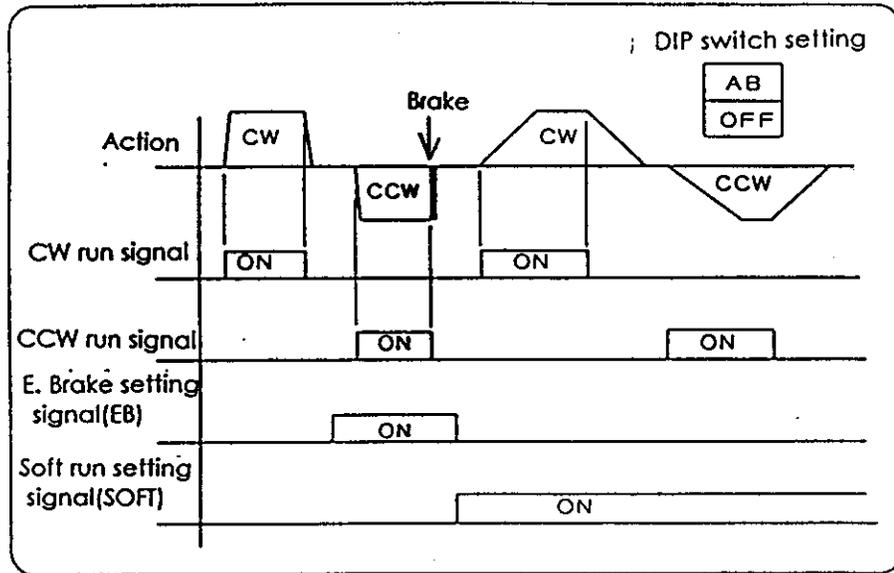
■ Speed setting selection signal(S1,S2)

Setting speed can be selected as the table below, with speed setting select signals(S1,S2)

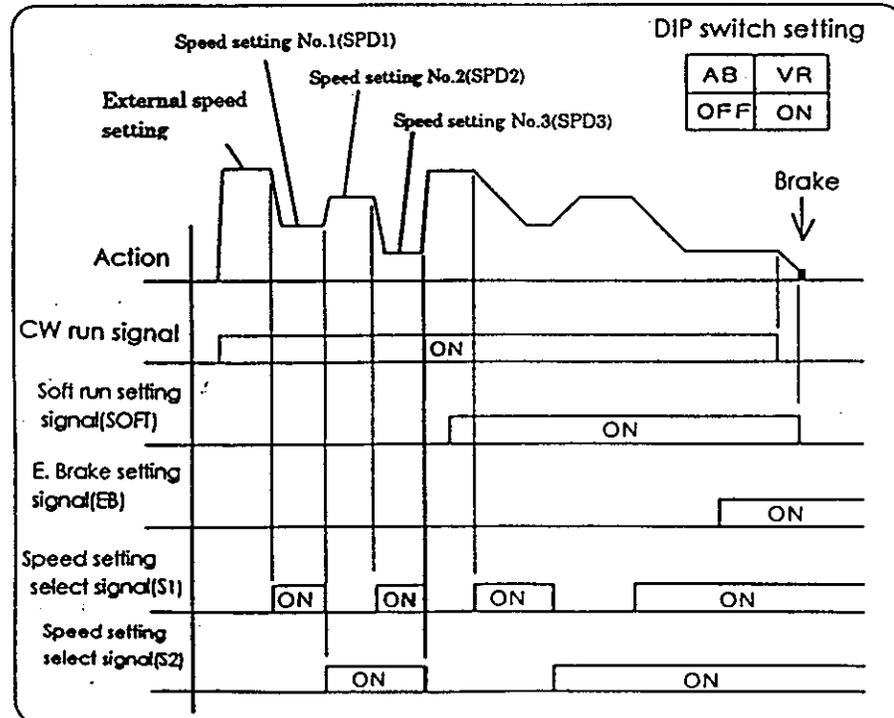
S1	S2	DIP switch VR	Speed setting
OFF	OFF	OFF	Digital setter
OFF	OFF	ON	External setter
ON	OFF	-	Setting speed No.1(SPD1 knob)
OFF	ON	-	Setting speed No.2(SPD2 knob)
ON	ON	-	Setting speed No.3(SPD3 knob)

12. Running pattern(example)

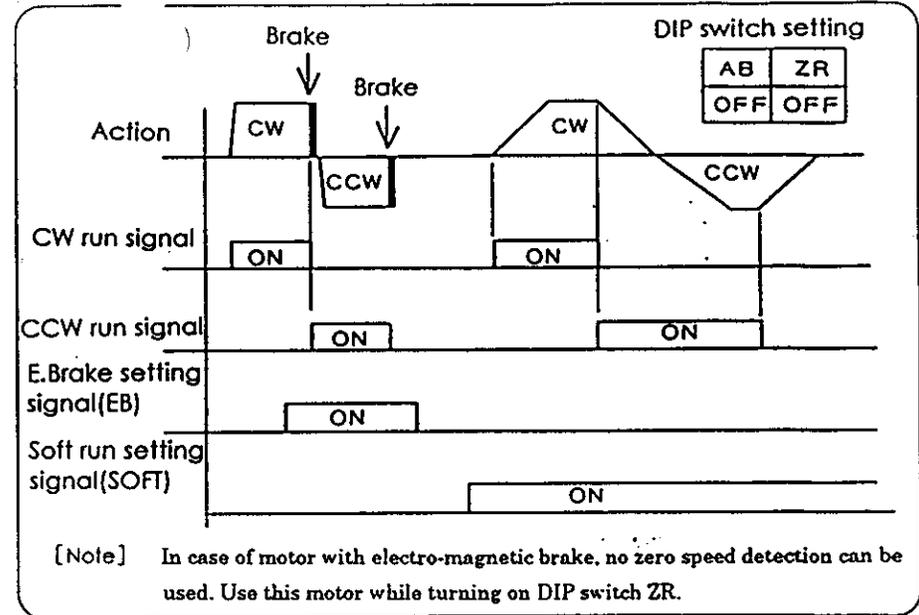
■ E.G1(A-mode FWD/REV run + E.Brake or Soft-run)



■ E.G2(A-mode 4-variable speed + Soft run + E. Brake)

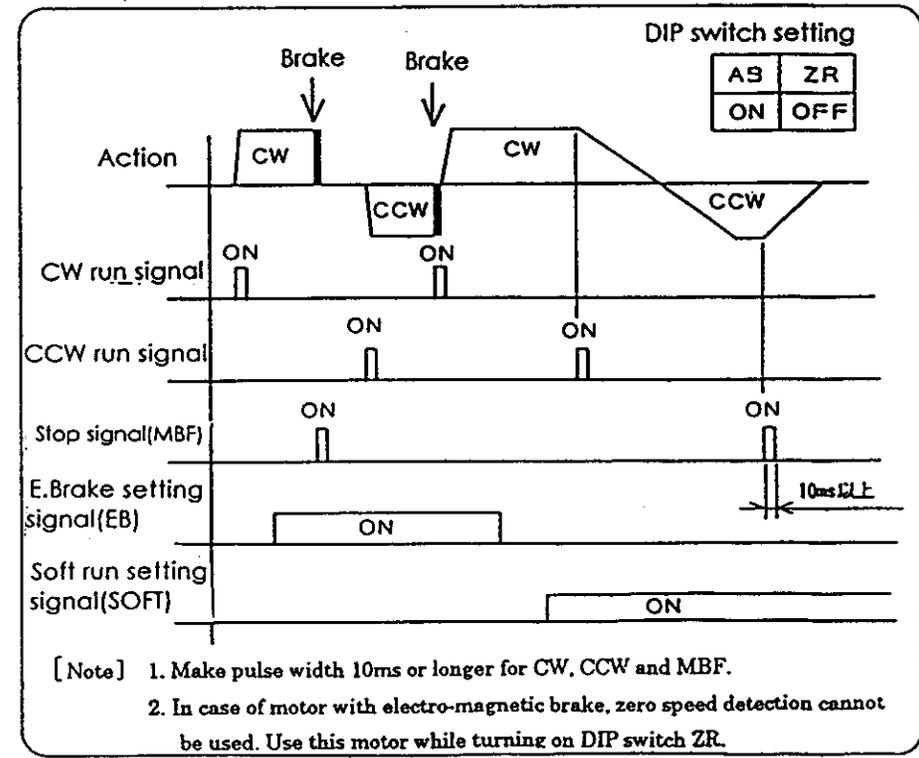


■ E.G3(A-mode FWD/REV run + E.Brake or Soft run + Zero speed detection)



[Note] In case of motor with electro-magnetic brake, no zero speed detection can be used. Use this motor while turning on DIP switch ZR.

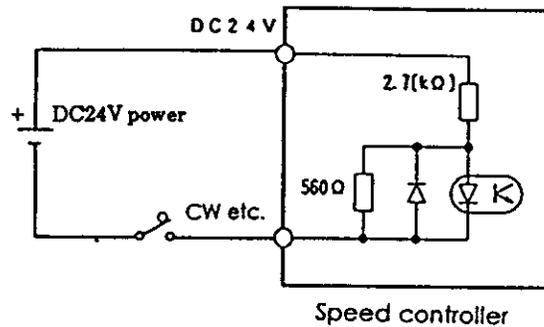
■ E.G4(B-mode FWD/REV run + E.Brake or Soft run + Zero speed detection)



[Note] 1. Make pulse width 10ms or longer for CW, CCW and MBF.
2. In case of motor with electro-magnetic brake, zero speed detection cannot be used. Use this motor while turning on DIP switch ZR.

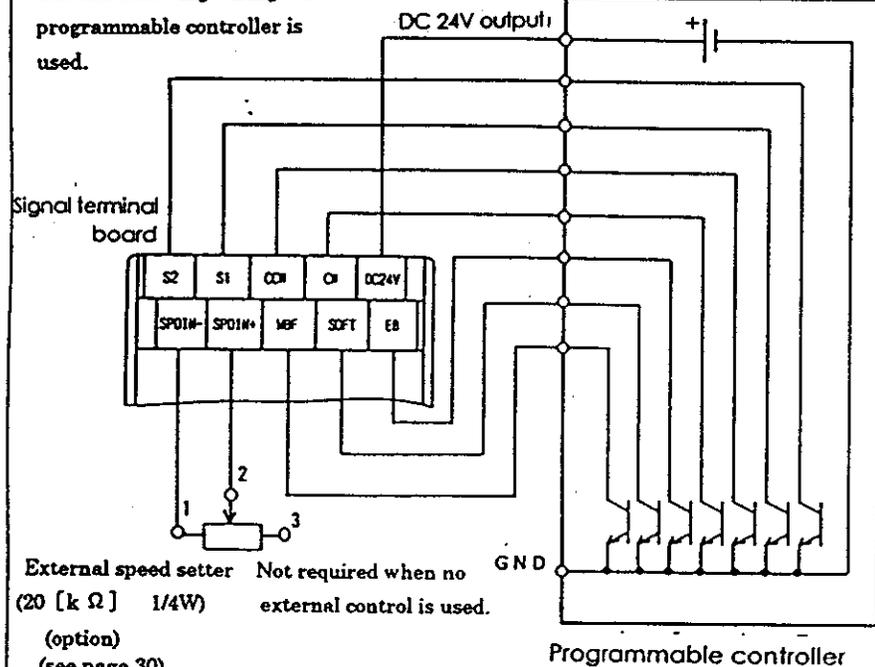
13. Internal equivalent circuit of signal input

Each input terminal of CW, CCW, S1, S2, EB, SOFT and MBF is photo coupler input, and internal equivalent circuit is composed as below;



14. When programmable controller is used...

Use the following wiring when programmable controller is used.



[Note] Use the basic wiring diagram for others than signal wires.

15. Soft run

At starting/stopping, or when setting speed is change, a large shock will be applied since large acceleration is applied to machine or traveling goods.

Soft run is designed to avoid this shock by moderating the speed command variation.

Soft run consists of soft start and soft down and both can be individually.

	Operation	Action
Soft start	SS knob	Activated at starting or when switched from low speed to high
	Turn to the right to make soft start time longer	
Soft down	SD knob	Activated at stopping or when switched from high speed to low
	Turn to the right to make soft down time longer	

- Soft start time · Soft down time

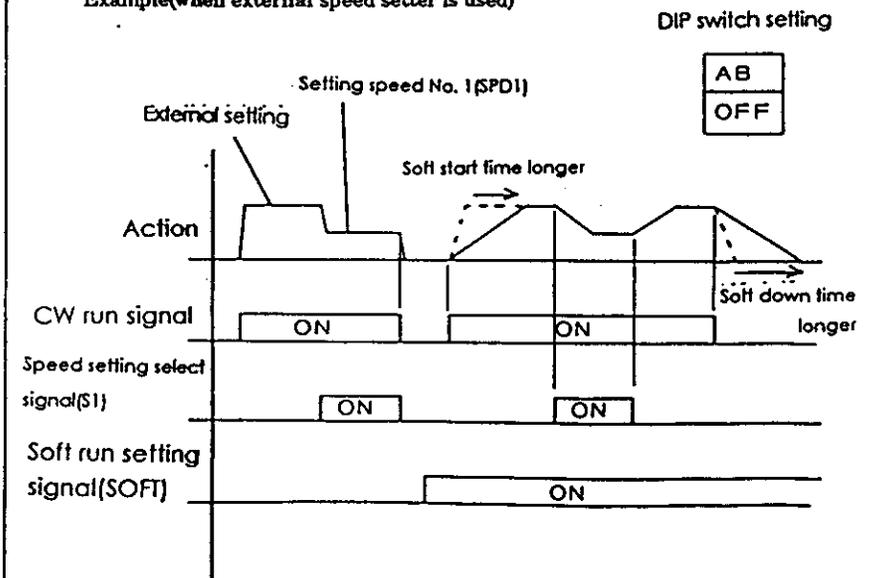
Soft start/down time is defined as varying time from stop to 1,000 [r/min] or from 1,000 [r/min] while turning MAX knob, SS knob and SD knob to the full right.

This time can be adjusted up to 5 sec. max.

- How to set

Turn on soft run setting signal(SOFT).

Example(when external speed setter is used)



16. Electrical brake

Motor stops immediately with stop command while turning on electrical brake signal(EB).

Note that no electrical brake will be activated while soft run signal(SOFT) is turned on.

This speed controller is featured by brake torque limiting capability by selecting voltage to be applied to the motor at electrical brake. Thus make it possible to activate electrical brake to higher output motor without external current limiting resistor.

Set DIP switch as the table below:

Motor output	DIP switch BTQ
25W or smaller	ON
40W or larger	OFF

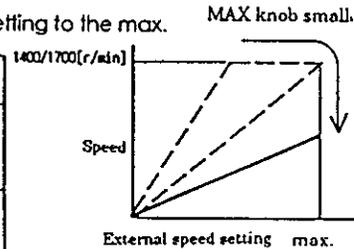
Incorrect setting may damage the motor.

17. MAX knob

MAX knob can be used in the following 2 ways:

1. Speed adjustment by making external speed setting to the max.

Setting range	90~1400/1700[r/min](50/60[Hz])	
How to set	MAX knob larger (right turn)	higher speed
	MAX knob smaller (left turn)	lower speed



2. Correction of motor speed with digital setter

Actual motor speed does not always match to the preset speed with digital setter. With this MAX knob, speed deviation can be corrected to some extent.

How to correct:

1. Turn on the power while turning off DIP switch VR.
2. Set the speed to the max. running speed at SET mode.
3. Run the motor. (In this case, S1 and S2 signals have to be turned off to select digital setter, and turn on SIG.OUT lamp with SIG.OUT key.)
4. Make action mode to REAL mode.
5. Adjust MAX knob so as the actual speed displayed to become the preset speed.

[Note]

1. When the speed is adjusted with MAX knob, other speed(SPD1, SPD2 or SPD3) will be adjusted as well proportionally.
2. Set the speed 1400/1700 [r/min] (50/60 [Hz]) or lower.

18. Deceleration brake

This controller is featured with function which can make speed control even when negative torque is applied to the motor(when actual speed exceeds preset speed), by applying controlled electrical brake(Roll-down control). This function is defined as Deceleration brake in this manual.

This function can be activated while turning on DIP switch DB. (Power has to be turned on again when switch setting is changed.)

Merits	Demerits
<ul style="list-style-type: none"> ○ Controls speed while negative torque is applied(when bringing down the object). ○ Response is quick while changing from high speed to low speed. ○ Decelerating action will follow per preset soft down time even with larger inertia of load, thanks to deceleration brake at soft down. 	<ul style="list-style-type: none"> ○ Speed variation might not be smooth during soft down due to load condition. ○ Motor might stop once while changing from high speed to low due to overshoot.

19. Zero speed detection

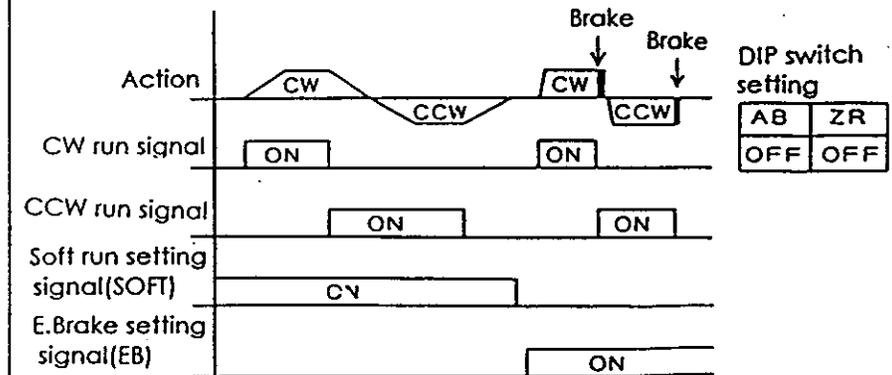
(In case of motor with electro-magnetic motor, this function becomes void. Use while turning on DIP switch ZR)

In some cases depending on the type of motor(especially induction motor) or load condition, motor tends to keep running at the same direction even though the reverse direction run command is entered.

When zero speed detection is set, motor starts reversion without fail by detecting motor stop(zero speed).

Zero speed detection can be set by turning off DIP switch ZR.

(The power has to be turned on again when switch setting is changed.)



[Note] If the motor can be reversed without setting zero speed detection, but zero speed detection is set, reaction time of reverse may become longer. Set this function based on each application.

20. Error detection

Following situations are taken as errors and controller turns to alarm mode.

- motor is kept locked for more than 10 sec.
- broken wire of tachogenerator is detected for more than 10 sec.
- motor is given command of running while electro-magnetic brake is open by turning on DIP switch MBF.
- input signals are not stable and not distinguishable.

● Action at alarm mode

Power supply to the motor and electro-magnetic brake will be shut down.

CW lamp, CCW lamp, EB lamp and MB lamp will flash.

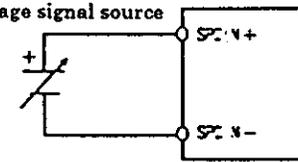
Digital display will flash.

Turn of the power again to resume operation from alarm mode.

21. Variable speed run with analog signal

Motor runs at variable speed with analog voltage signal in the following circuit:

Analog voltage signal source



Speed controller

DIP switch setting

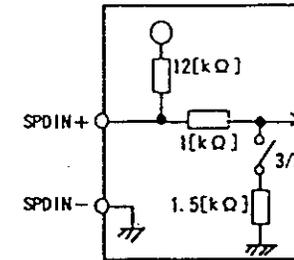
VR	3/5
ON	e_{max} 3V以下: OFF 3~5V: ON

e_{max} : Max.voltage of power

Power supply specification of analog voltage signal power supply

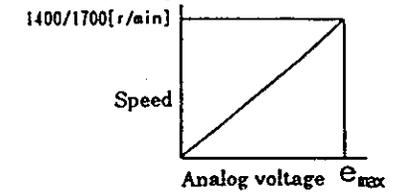
Zero speed J signal	DC30 [mV] or lower
Ripple rate	2% or smaller
Output impedance	Use smaller one referring to internal equiv. circuit

Internal equivalent circuit



Speed controller

Relation between command voltage and speed (typical)



In case speed of max.analog voltage signal with MAX knob is set to 1400/1700 [r/min] (50/60 [Hz])

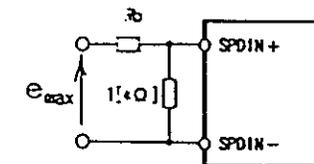
[Note]

1. If the max.voltage of analog voltage signal is 5V or larger, turn off DIP switch 3/5 and wire as per below;

$$R_b \geq \frac{e_{max}}{3} - 1 \text{ [k}\Omega\text{]}$$

DIP switch setting

VR	3/5
ON	OFF



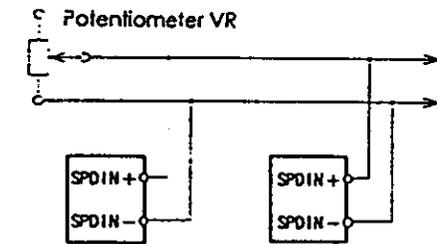
Speed controller

2. For the motor, tachogenerator or signal wiring, use the basic wiring diagram.

22. Parallel run

Use the following wiring for parallel run

● In case of using external speed setter



DIP switch setting

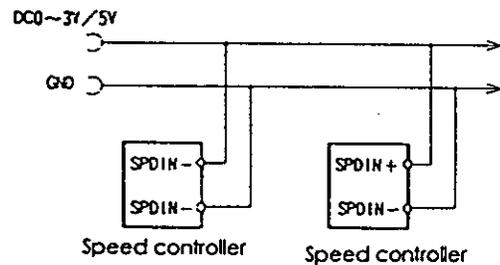


$$R_s = \frac{20}{n} \text{ [k}\Omega\text{]}$$

R_s : Resistance of VR
 n : number of motors

Speed controller Speed controller

● In case using analog voltage signal



DIP switch setting

VR	3/5
ON	e_{max} 3V以下: OFF 3~5V: ON

e_{max} : Max voltage of analog voltage signal power supply

Specification of analog voltage signal power source

[Zero] speed signal	DC30 [mV] or under
Ripple rate	2% or lower
Output impedance	Use as small as possible referring to internal equivalent circuit

[Note]

1. In case of synchronized run and proportional run, adjust the necessary speed with MAX knob. Adjust SS knob and SD knob etc. as well.
2. Wiring to SPDIN+ and SPDIN- terminals have to be consistent as above Fig. shows.
3. If the number of motors to be run parallelly increase, there are more change for malfunction. Take necessary countermeasures such as installing individual noise filter referring to page 6.
4. For the motor, tachogenerator and signal wiring, use the basic wiring diagram.

23. How to set digital setter

■ Outline of function

Digital setter can be used in the following 4 modes:

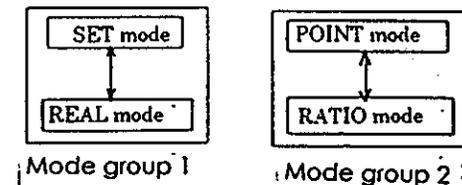
SET mode	: Speed setting	
REAL mode	: Actual speed display	
POINT mode	: Setting of decimal point figures to be displayed	To be used at
RATIO mode	: Setting of display coefficient	initial setting

■ Shift between mode

Classify SET mode and REAL mode as mode group 1, and POINT mode and RATIO mode as mode group 2. Use MODE key to shift between each mode as below:

1. Within the same mode group.

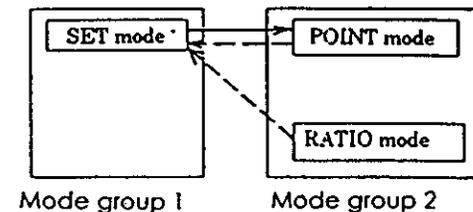
Press MODE key once (2 sec or shorter)



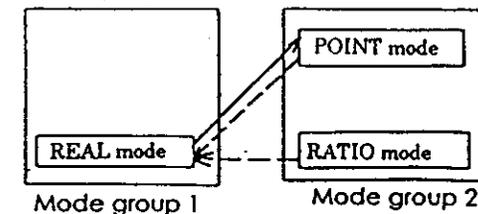
2. Between mode group

Press MODE key for longer than 2 sec

- when mode group 1 is at SET mode.



- when mode group 1 is at REAL mode.



[Note] If no key is pressed for more than 10 sec at POINT mode or REAL mode, mode will return to the previous mode at group 1 like MODE key is pressed for more than 2 sec.

■ RATIO mode

Set the speed with a value by dividing the motor speed with display coefficient, or display the actual speed. Thus, the motor speed at output gear head or conveyer speed can be calculated.

Use this RATIO mode to set this coefficient, and following value can be set with UP or DOWN key:

Display coefficient	step
0.100 - 0.999	0.001
1.00 - 9.99	0.01
10.0 - 99.9	0.1
100 - 999	1
1000 - 9999	10

Setting value will be stored even after the power is turned off.

■ SET mode

Set the motor speed with this mode. Use UP or DOWN key to select the followings: (if display coefficient is 1.00)

50 [Hz] 90~ 1400 [r/min] step 10 [r/min]

60 [Hz] 90~ 1700 [r/min] step 10 [r/min]

If display coefficient is other than 1.00, value which the above setting value is divided by the coefficient will be displayed.

(e.g.) if the display coefficient is 50, 1/50th of the motor speed will be displayed.

50 [Hz] 1.8~ 28 step 0.2

60 [Hz] 1.8~ 34 step 0.2

(This corresponds to the output gear head speed with 1/50 gear head.)

Setting value will be stored even after the power is turned off.

■ POINT mode

If the display coefficient is set over 2.01 at RATIO mode, decimal point figure to be displayed can be changed at SET or REAL mode, in this POINT mode.

Use UP or DOWN key to change and refer the table below for the range:

Display coefficient	Decimal point
201 - 9990	X.XXX ~ X.
20.1 - 200	XX.XX ~ XX
2.01 - 20.0	XXX.X ~ XXX.
0.100 - 2.00	XXXX.fixed

Setting value will be stored even after the power is turned off.

■ REAL mode

Measures the actual motor speed for 1 sec, and displays in the value which is divided by the display efficiency set at SET mode.

Allow some delay between the actual and displayed speed.

■ ON of DIP switch VR

If the DIP switch VR is turned on, shifting to SET mode cannot be made.

When SIG.OUT key is pressed, mistouch display of "EEE" will be displayed.

■ SIG.OUT

Speed setting value with digital setter becomes valid only when SIG.OUT lamp is turned on, and the signal will be fed to the speed controller (this set speed will be selected while both of S1 and S2 signals are OFF.)

While SIG.OUT lamp is turned off, zero speed, that is stop signal, will be fed to the speed controller.

SIG.OUT lamp ON or OFF can be selected with SIG.OUT key.

And this status can be stored even after the power is turned off. (2 sec after selection.)

[Note] Note that the storage times have some limit. Avoid frequent change.

■ Display

The table below shows the content of display of digital setter

Mode	Digital display	RATIO lamp	SET lamp	REAL lamp	POINT lamp
RATIO	Display coefficient	ON	-	-	-
SET	Setting speed	-	ON	-	-
REAL	Actual speed	-	-	ON	-
POINT	previously SET	Setting speed	-	ON	flash
	previously REAL	Actual speed	-	-	ON flash
Alarm mode	8888 flash	-	-	-	-
System error *1	SSSS flash	-	-	-	-
Mistouch	EEEE	-	-	-	-
FULL display *2	FULL	-	no change	no change	no change

*1 System error : Some error at inner circuit.

Turn on the power to try to resume operation

In this case, the setting values return to the factory setting

If no operation resumes, contact to a dealer.

*2 FULL display : If the coefficient setting is small and the displayed value exceeds 9999, "FULL" will be displayed.

Also if the motor speed exceeds 2000r/min at REAL mode.

"FULL" will be displayed.

24. Maintenance

Daily and periodical maintenance is required to prevent any unexpected malfunctions caused by environmental effect (temperature, humidity, dust or vibration etc.), aging components or life of component. Check if

1. motor runs smoothly,
2. motor generates abnormal noise at running
3. motor generates abnormal heat.

25. Troubleshooting

If any trouble occurs, check and follow the table below.
If no error factor is identified, or the controller is identified as defective, contact to a dealer.

Symptom	Where to check	Correction etc.
Motor doesn't run	Correct wiring ?	Correct the wiring.
	Correct voltage ?	Apply correct voltage.
	Is POWER lamp on ?	Check the above.
	Is CW or CCW lamp on ?	Check the wiring at signal terminal board and applied voltage to signals.
	Does the lamp flash ?	The controller is at alarm mode. Refer to page 22 and remove the factor.
When the speed is set by digital setter;	Is the DIP switch VR turned on ?	Turn off VR, and turn on the power again.
	Is the SIG.OUT lamp on ?	Turn on the SIG.OUT lamp with the SIG.OUT key.
When the speed is set externally,	Is the DIP switch VR on ?	Turn on VR, and turn on the power again.
	Is the speed setting correct ?	Set the speed correctly.
	Is the speed setting as "stop" ?	
	Is the thermal protector is activated ? (motor with thermal protector)	Stop operation for resuming. Lower the load or use larger motor. Select the motor so as its surface temperature may not exceed 90°C.
	Is the MAX knob is at min. ? (far left)	Adjust the MAX knob to the proper value. (see page 20)
	Is the capacitor connected ?	Connect the proper capacitor.

Symptom	Where to check	Correction etc.
Motor runs at reverse direction	Are the GRAY and BLACK wires connected to the motor terminal correctly ? Are the wiring for CW and CCW run correct ?	Correct the wiring.
Motor runs at full speed	Is the tachogenerator lead (pink) connected to PINK terminal ?	Correct the wiring.
	Does the lead come off from external speed setter ?	The controller is at alarm
Motor doesn't stop even by turning off the CW or CCW run signal	Isn't the soft run set ? (SOFT signal; ON) (Note if the soft down time is set too long, the speed changes only gradually.)	Set the soft down time properly. (see page 19)
	Is the input mode B-mode ? (DIP switch AB; ON)	Turn off the DIP switch AB to use at A-mode. Stop the motor by turning on the MBF signal to use at B-mode.
Brake doesn't work.	Is the electric brake set ? (EB signal; ON) Is the soft run set ? (SOFT signal; ON)	Turn on the EB signal and turn off the SOFT signal to activate electric brake.

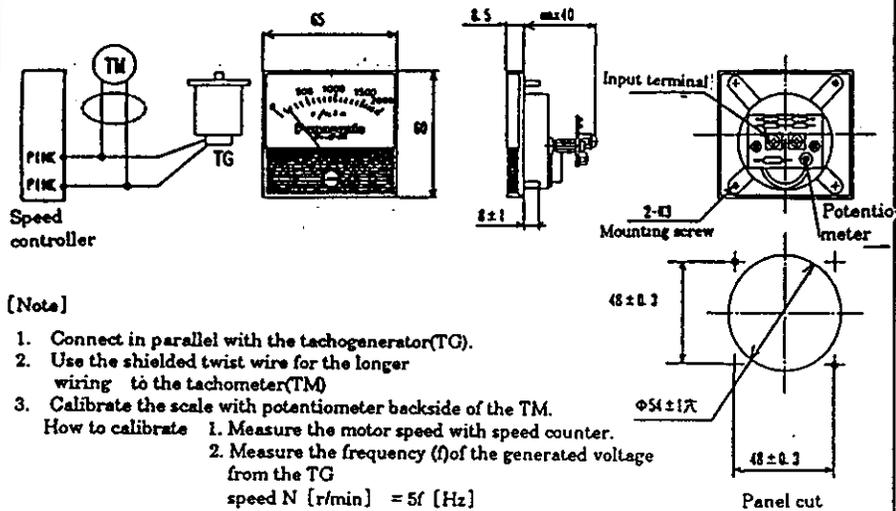
26. Description of symbols

Symbol	Description
BTQ	Brake torque
CCW	Counter clockwise
CW	Clockwise
DB	Deceleration brake
EB	Electric brake
MB	Electro-magnetic brake
MBF	Release of MB
RES	Response
SD	Soft down
SIG.OUT	Speed setting signal from digital setter (Signal out)
SOFT	Soft run
SS	Soft start
ZR	0-speed detection

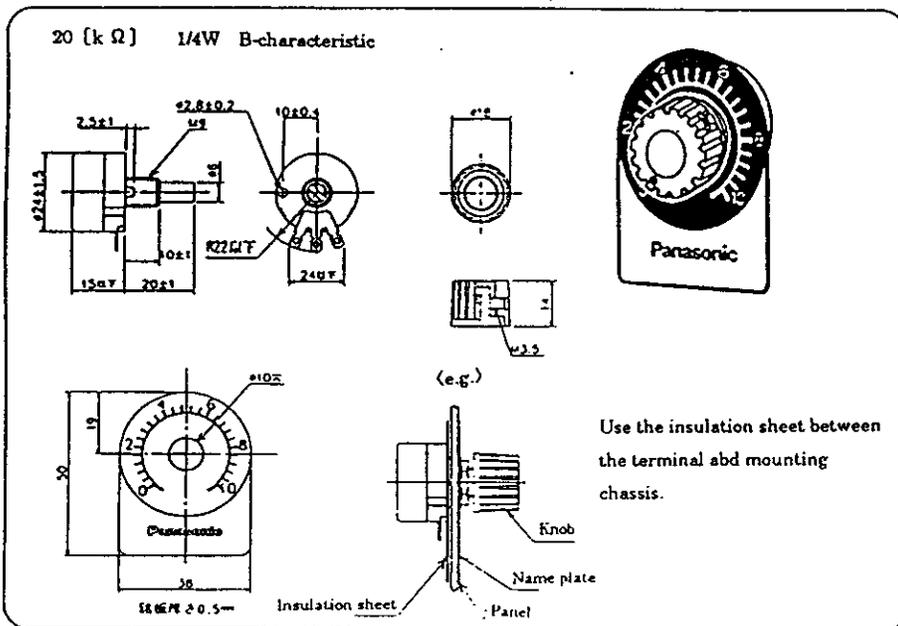
27. Options

■ Tachometer (DVOP001)

The motor speed can be displayed easily.



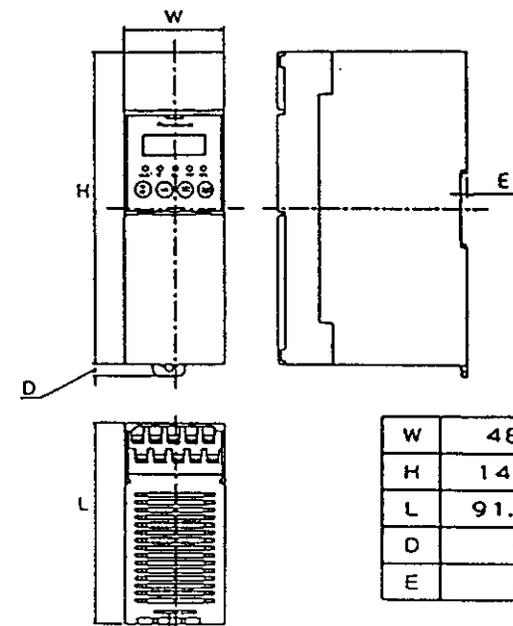
■ External speed setter(DVOP002)



28. Specifications

	DVMS1AL	DVMS1BL	DVMS1CL	DVMS1AY	DVMS1BY	DVMS1CY
Rated voltage	AC 100 V			AC 200 V		
Working voltage	± 10 % (of the rated voltage)					
Frequency	50 / 60 Hz					
Rated current	0.4A	1.0A	2.0A	0.3A	0.6A	1.0A
Applicable motor output	below 15W	20 - 40W	60 - 90W	below 15W	20 - 40W	60 - 90W
Speed control range	90 - 1400/1700 r/min(50/60 Hz)					
Speed setting	Integrated 3 + external setting(or digital setting)					
Electric brake time	Max. 2 sec					
E-Magnetic brake	Featured					
Response selection	High stability/High response					
Deceleration brake	Featured					
Digital setting of speed	Featured					
Display of actual speed	Featured					
Control power voltage	DC 24 V ± 10 %					
External setting voltage	DC 0 ~ 3 V / DC 0 ~ 5 V					
Working temperature	0 ~ 40 °C					
Storage temperature	-10 ~ 60 °C					

Dimensions



W	48 ± 1
H	144 ± 1
L	91.5 ± 1
D	6
E	3