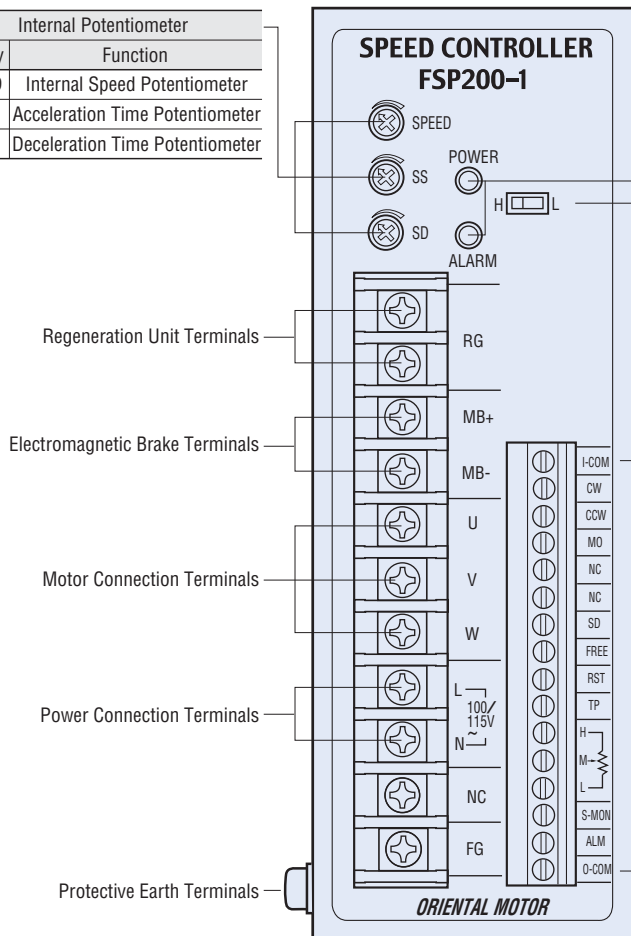


Connection and Operation

Names and Functions of Speed Controller Parts

Internal Potentiometer	
Display	Function
SPEED	Internal Speed Potentiometer
SS	Acceleration Time Potentiometer
SD	Deceleration Time Potentiometer



● The speed controller shown above uses a single-phase 100/115 VAC power supply input.

LED Display		
Display	Function	Lighting Condition
POWER	Power Indicator	Turns on (green) while power is being supplied.
ALARM	Alarm Indicator	Turns on (red) or blinks when protective function is activated.

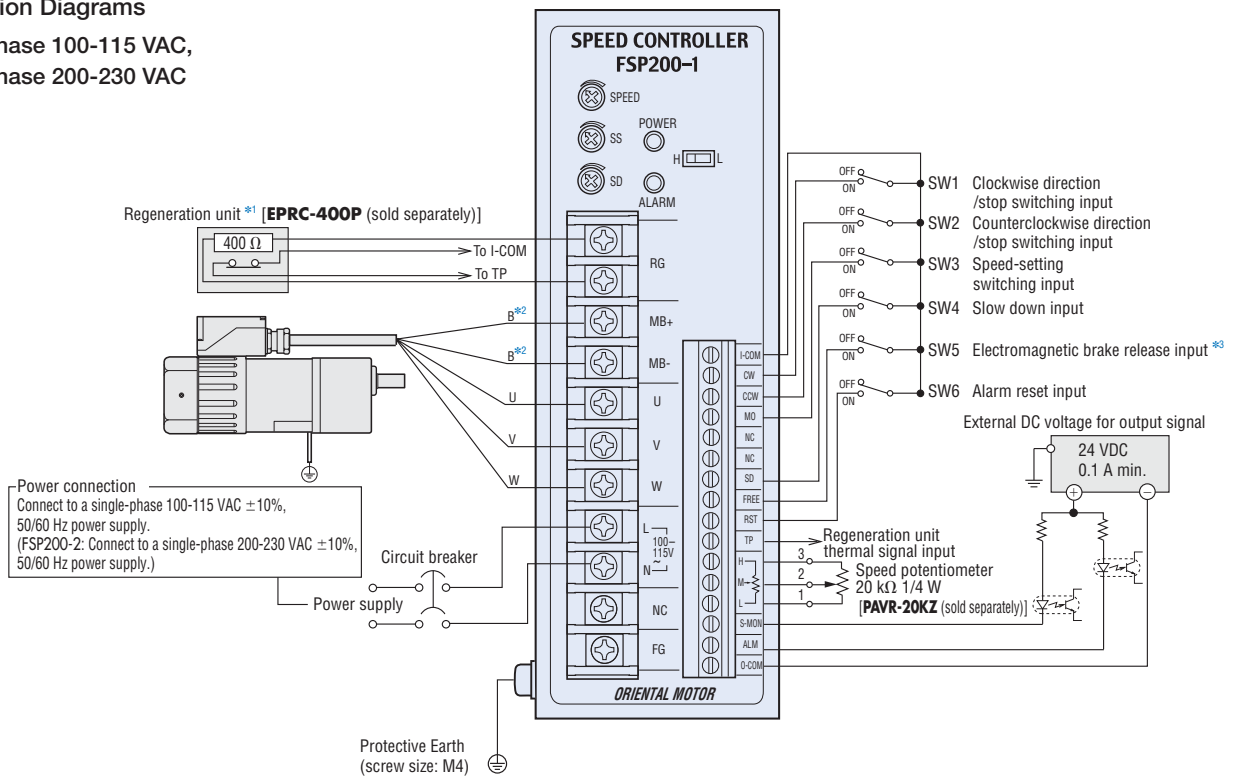
Switch

Set the switch to "H" if the cable between the motor and speed controller is less than 10 m (32.8 ft.) in length. Set it to "L" if the cable length exceeds 10 m (32.8 ft.).

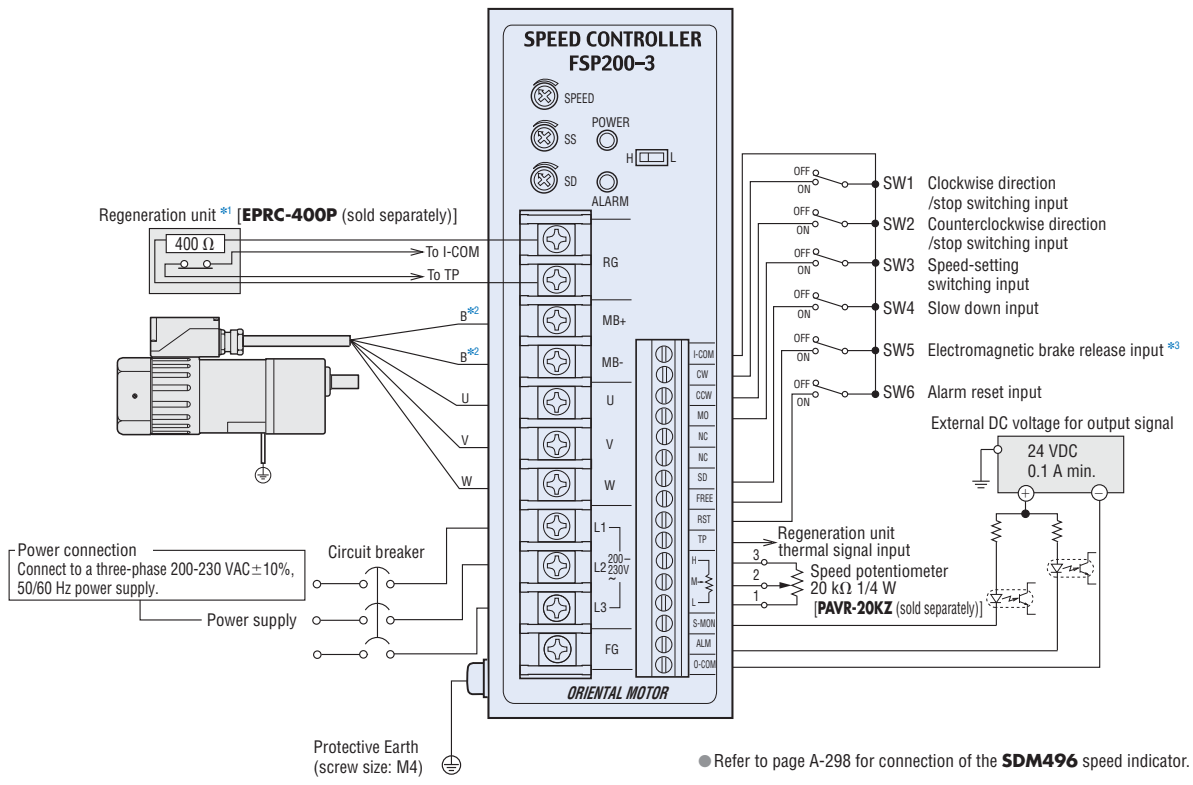
Input/Output Signal Terminals Block		
Display	Signal Name	Function
I-COM	Ground Terminal for Input Signals	Ground terminal for input signals
CW	Clockwise Direction Input	Clockwise direction/stop switching input signal
CCW	Counterclockwise Direction Input	Counterclockwise direction/stop switching input signal
MO	Speed Setting Switching Input	Internal/external speed setting switching input
NC	—	
NC	—	
SD	Slow Down Input	Instantaneous stop/deceleration stop switching input
FREE	Electromagnetic Brake Release Input	Electromagnetic brake releases/locks switching input
RST	Alarm Reset Input	This input functions as the Alarm-RESET input when a speed controller protective functions is activated.
TP	Thermal Signal Input	This input is used to connect the lead wire of the regeneration unit's internal thermal protector.
H, M, L	Speed Setting Input	These are connected for speed control by the external speed potentiometer or external DC voltage.
S-MON	Speed Monitor Output	This output is used to monitor the motor speed. Pulse signals at a rate of 12 pulses per rotation of the motor output shaft.
ALM	Alarm Output	When the protective function is activated, this output is set to OFF and the motor stops.
O-COM	Ground Terminal for Output Signals	Ground terminal for output signals

● Connection Diagrams

◇ Single-phase 100-115 VAC, Single-phase 200-230 VAC



◇ Three-phase 200-230 VAC



● Refer to page A-298 for connection of the **SDM496** speed indicator.

- *1 This should be connected only when using a regeneration unit.
- *2 This should be connected only for a speed control motor and controller package with electromagnetic brake.
- *3 The electromagnetic brake release input can be used only with a speed control motor and controller package with electromagnetic brake.

Notes:

- When wiring the motor and the speed controller, keep a maximum distance of 50 m (164 ft.) or less. If the wiring between the motor and the speed controller needs to be extended by 10 m (32.8 ft.) or more, use a polyethylene-insulated electric wire of AWG16 (1.25 mm²) or larger. Do not connect more than one cable or allow the overall wiring length to exceed 50 m (164 ft.). This may cause a malfunction.
- With the electromagnetic brake type, setting the wiring length too long delays the operation of the electromagnetic brake [by approx. 100 ms at a wiring length of 50 m (164 ft.)]. To minimize the delay time, use separate cables for the electromagnetic brake and motor cable.
- The signal wiring and motor cables should be kept away from noise-generating equipment or power lines.

◇ Connecting the Motor and Speed Controller

A motor cable is not supplied with the product. Please purchase the appropriate cable.

● Connecting the Motor

[Applicable lead wires]

AWG18 (0.75 mm²) min.

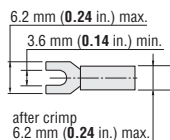
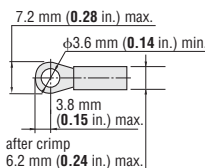
[Applicable Crimp Terminals]

Use a crimp terminal for the electromagnetic brake type.

• Terminal Block

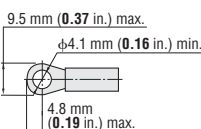
Round Terminal with Insulation

U-Shape Terminal with Insulation



• Protective Earth Terminal

Round Terminal with Insulation



● Connecting the Speed Controller

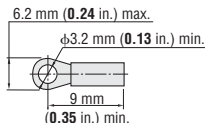
[Applicable lead wires]

AWG18 (0.75 mm²) min.

[Applicable Crimp Terminals]

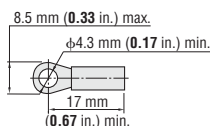
• Power Connection Terminal, Motor Connection Terminal

Round Terminal with Insulation



• Protective Earth Terminal

Round Terminal with Insulation



Input/Output Signal Terminals

When a crimp terminal is used for connection, use such terminals as shown below.

Manufacturer: Phoenix Contact

AI 0.25-6

Applicable wire size: AWG24 (0.2 mm²)

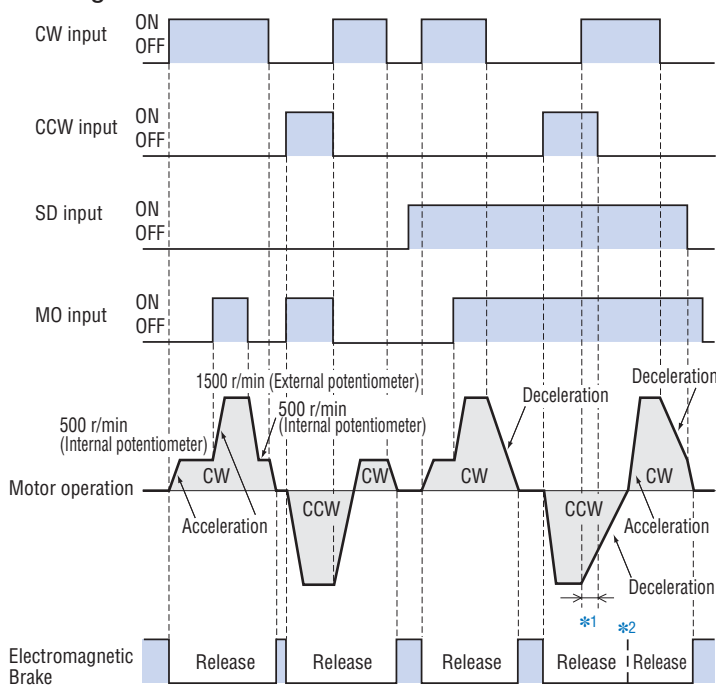
AI 0.34-6

Applicable wire size: AWG22 (0.3 mm²)

AI 0.5-6

Applicable wire size: AWG20 (0.5 mm²)

● Timing Chart



*1 The motor will stop if the CW and CCW inputs are simultaneously turned ON.

*2 The electromagnetic brake may be left released when the motor runs and/or stops if a short cycle or a shorter time is set for the acceleration/deceleration time.

- The CW input signal, CCW input signal, M0 input signal and SD input signal can be used to control all motor operations, such as run, stop, direction switching, speed switching.
- Switching the CW input ON will cause the motor to turn clockwise as viewed from the motor shaft, while switching the CCW input ON will cause the motor to turn counterclockwise. Switching each signal OFF will stop the motor. The motor will start at the rise time corresponding to the time set on the acceleration time potentiometer.
- Switching the M0 input ON select the speed set on the external speed potentiometer. Switching the M0 input OFF will cause the motor to operate at the speed set on the internal speed potentiometer. The timing chart shown left is based on an internal speed potentiometer setting of 500 r/min and an external speed potentiometer setting of 1500 r/min.
- If the motor is stopped with switching the SD input ON, the motor stops at the time set by the deceleration time potentiometer.
- To release the electromagnetic brake when the motor is stopped, turn the FREE (electromagnetic brake release) input ON. This releases the electromagnetic brake and allow the motor's output shaft to turn freely. (This function is available only with a speed control system with an electromagnetic brake.)

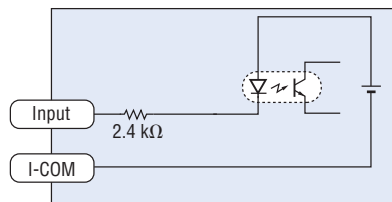
Note:

- Ensure that the temperature of the motor case does not exceed 90°C (194°F).

● Signal Input Circuit

◇ Input Signal Circuit

Common to CW, CCW and SD, FREE*, RST inputs.

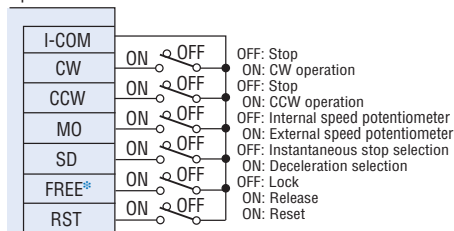


* The FREE input is used only with a speed control system with electromagnetic brake.

◇ Connection Example for Input Signals

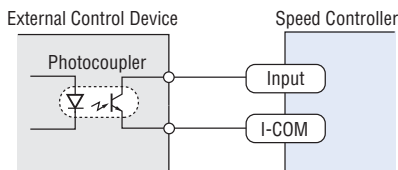
● Controlled by Small Capacity Relays

Speed Controller



- Use a small capacity contact point type relay capable of switching 24 VDC, 5 mA.
- * The FREE input is used only with a speed control system with electromagnetic brake.

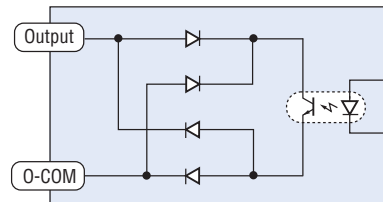
● Electronic Input Control



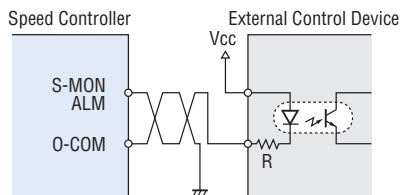
● Signal Output Circuit

◇ Output Signal Circuit

Common to S-MON, ALM outputs.



◇ Connection Example for Output Signals



Output signal is open-collector output, so an external power supply (Vcc) is required. Use a power supply of no more than 26.4 VDC and connect a limit resistor (R) so that the output current does not exceed 10 mA. When using neither the speed output function nor the alarm output function, this connection is not required.

Speed monitor output: Pulse signals are output at a rate at 12 pulses per rotation of the motor output shaft. (When the pulse duty is 50%) (Note that this is monitoring of the speed command issued from the speed controller to the motor, not that of the speed measured at the motor's output shaft.)

$$\text{Motor speed [r/min]} = \frac{\text{Speed output frequency [Hz]}}{12} \times 60$$

Alarm output: This signal is output when a protection function for overload, circuit overheat, overvoltage, undervoltage, overcurrent or EEPROM error has been activated. When an alarm signal is output, this output is turned to OFF between the ALM output and O-COM terminals.

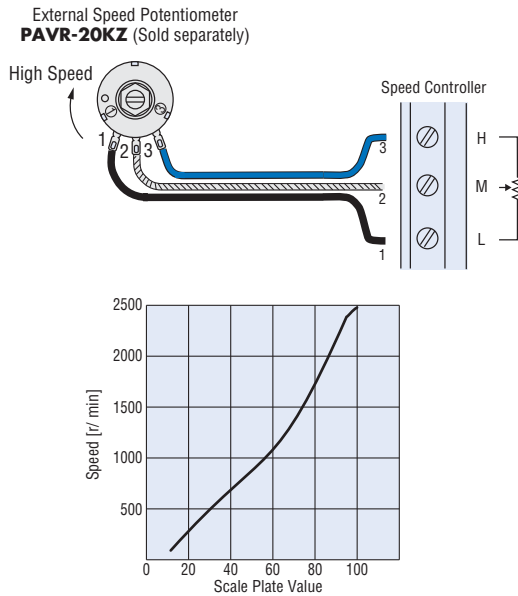
● Speed Setting Method

◇ Speed Setting by Internal Speed Potentiometer

The internal speed potentiometer is selected when the M0 (speed-setting switching input) is set to OFF. Turning the internal speed potentiometer clockwise sets a faster speed, while turning it counterclockwise brings the motor to a stop.

◇ Speed Setting by External Speed Potentiometer (Sold separately)

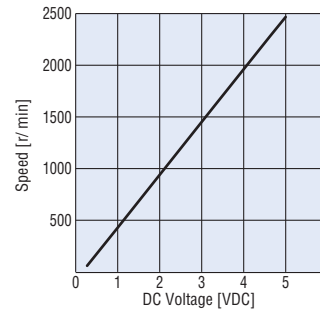
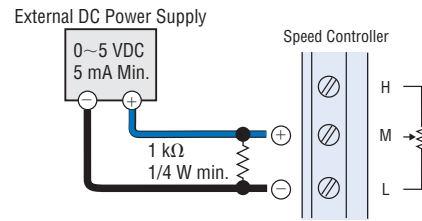
The external speed potentiometer can be used when the M0 (speed-setting switching input) is set to ON. When the accessory external speed potentiometer is used, connect it as illustrated below. Turning the external speed potentiometer clockwise sets a faster speed.



External Speed Potentiometer Scale—Speed Characteristics (Representative values)

◇ Speed Setting by External DC Voltage

External DC voltage can be used when the M0 (speed-setting switching input) is set to ON. To set the motor speed by external DC voltage, connect a DC power supply as illustrated below. Raising the DC voltage sets a faster speed.



External DC Voltage—Speed Characteristics (Representative values)

■ List of Motor and Speed Controller Combinations

Model name for motor, gearhead and speed controller combinations are shown below.

● Speed Control Motor and Controller Package

◇ Combination Type

Model	Motor Model	Gearhead Model	Speed Controller Model
BHF62AT-□RH	BHM62T-G2	BH6G2-□RH	FSP200-1
BHF62AT-□RA		BH6G2-□RA	
BHF62AT-□		BH6G2-□	
BHF62CT-□RH		BH6G2-□RH	FSP200-2
BHF62CT-□RA		BH6G2-□RA	
BHF62CT-□		BH6G2-□	
BHF62ST-□RH		BH6G2-□RH	FSP200-3
BHF62ST-□RA		BH6G2-□RA	
BHF62ST-□		BH6G2-□	

● Enter the gear ratio in the box (□) within the model name.

◇ Round Shaft Type

Model	Motor Model	Speed Controller Model
BHF62AT-A	BHM62T-A	FSP200-1
BHF62CT-A		FSP200-2
BHF62ST-A		FSP200-3

● Speed Control Motor and Controller Package with Electromagnetic Brake

◇ Combination Type

Model	Motor Model	Gearhead Model	Speed Controller Model
BHF62AMT-□RH	BHM62MT-G2	BH6G2-□RH	FSP200-1
BHF62AMT-□RA		BH6G2-□RA	
BHF62AMT-□		BH6G2-□	
BHF62CMT-□RH		BH6G2-□RH	FSP200-2
BHF62CMT-□RA		BH6G2-□RA	
BHF62CMT-□		BH6G2-□	
BHF62SMT-□RH		BH6G2-□RH	FSP200-3
BHF62SMT-□RA		BH6G2-□RA	
BHF62SMT-□		BH6G2-□	

● Enter the gear ratio in the box (□) within the model name.

◇ Round Shaft Type

Model	Motor Model	Speed Controller Model
BHF62AMT-A	BHM62MT-A	FSP200-1
BHF62CMT-A		FSP200-2
BHF62SMT-A		FSP200-3