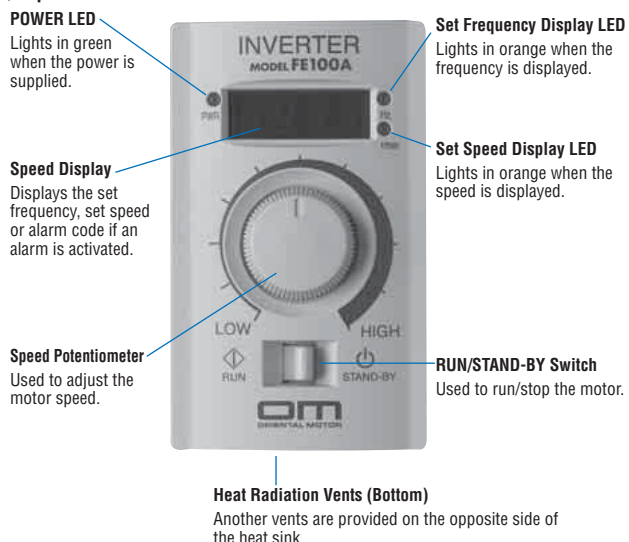


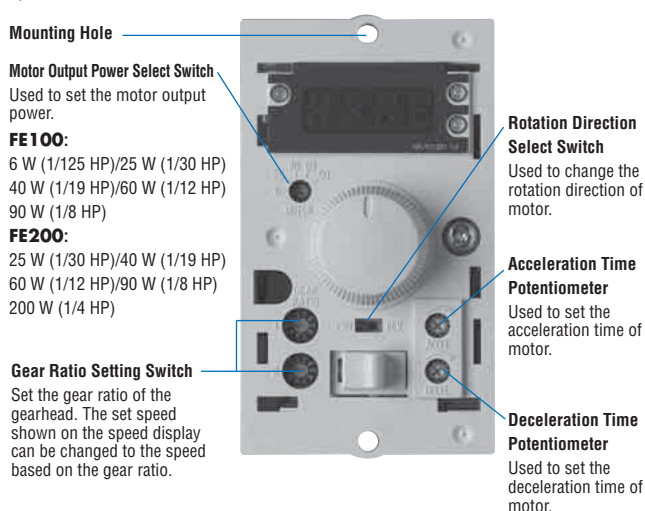
## Connection and Operation

### Names and Functions of Speed Controller Parts

#### Speed Controller Front Panel



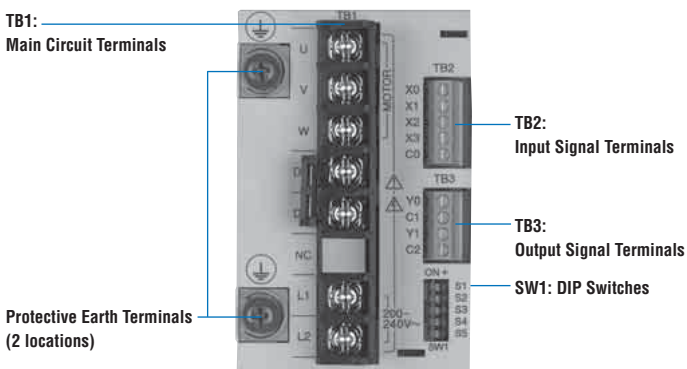
#### When Front Panel is Removed



#### Note:

- The speed shown on the speed display is set value, not the actual speed of the motor output shaft.

#### Speed Controller Rear Panel



#### Note:

- DL1 and DL2 are connected by a short circuit bar at shipment.

#### Main Circuit Terminals TB1

Terminal Name	Description
U	Motor connection terminal
V	
W	
DL1	Reactor connection terminal
DL2	
L1	Power supply connection terminal*
L2	
L3	

\*Terminals L1 and L2 are used for the single-phase power supply voltage specification.

#### I/O Signal Terminals TB2, TB3

Terminal	Terminal Name	Description
TB2 (Input)	X0	RUN/STOP
	X1	FWD/REV
	X2	Alarm reset
	X3	External speed setting input
	C0	SG (Common)
TB3 (Output)	Y0	Running
	C1	Common
	Y1	Alarm
	C2	Common

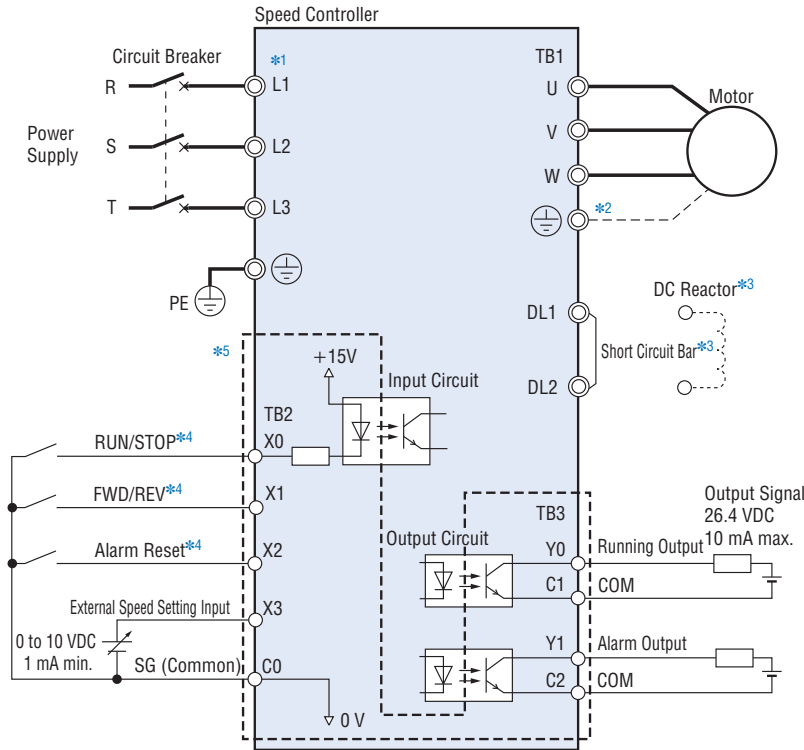
#### DIP Switches SW1

No.	Function	Description
S1	Remote/Local switching (RUN/STOP)	ON: Operation by external input signals (remote) OFF: Operation using the RUN/STAND-BY switch (local)
S2	Remote/Local switching (Rotation direction)	ON: Operation by external input signals (remote) OFF: Operation using the rotation direction select switch (local)
S3	Sink/Source switching	ON: Source input OFF: Sink input
S4	Carrier frequency switching	ON: 10 kHz OFF: 15 kHz
S5	Set speed display switching	ON: Displayed in set speed (r/min) OFF: Displayed in set frequency (Hz)

- Factory setting: OFF

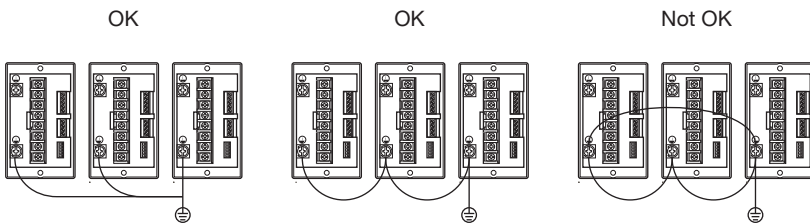
● Connection Diagram

● This connection diagram shows an example of three-phase 200-240 VAC specifications.



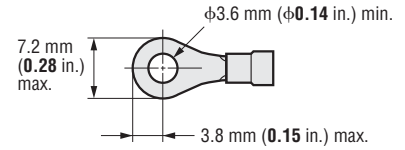
- \*1 For a single-phase power supply specification, connect the power supply to the L1 and L2 terminals.
- \*2 If the grounding resistance exceeds 0.1 Ω, motor should be grounded directly.
- \*3 Remove the short circuit bar when connecting a DC reactor.
- \*4 Input signals X0, X1 and X2 apply when the speed controller is connected by mechanical contacts or by means of sequence connection using a sink transistor (0 VDC, common). When sequence connection (+15 to 24 VDC, common) is made using a source transistor, +15 to 24 VDC power supply must be connected externally.
- \*5 The I/O signal connection terminals conform to SELV circuit and are isolated from dangerous voltages by means of reinforced insulation.

- Connect the speed controller and motor using an accessory connection cable (sold separately). The maximum wiring distance is 20 m (65.6 ft.). Connection cables → Page B-170
- Keep the I/O signal cable to a length of 10 m (32.8 ft.) or below, and separate it from power lines. When setting speed externally, use a twisted-pair shielded wire, shielded wire, etc.
- Do not share the grounding cable with a welder or other power equipment. If multiple speed controller are used, pay attention not to loop the cables.

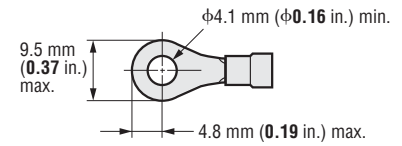


◇ Applicable Crimp Terminals

- Main Circuit Connection Terminal (M3.5)  
Round Terminal with Insulation



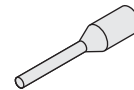
- Protective Earth Terminal (M4)  
Round Terminal with Insulation



● I/O Terminals

Use the terminals specified below for connection using crimp terminals. Please note that the applicable crimp terminal will vary depending on the size of the wire. The following terminals can be used with wires of AWG20 to 18.

Manufacturer: Phoenix Contact  
 AI 0.5-6 Applicable wire size AWG20 (0.5 mm<sup>2</sup>)  
 AI 0.75-6 Applicable wire size AWG18 (0.75 mm<sup>2</sup>)

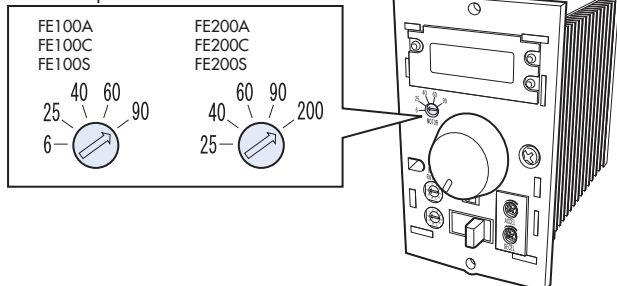


● Operation

◇ Before Operation

Set the motor output power select switch in accordance with the motor to be combined. If the motor output power setting is incorrect, it may cause heat generation or insufficient torque.

Motor Output Power Select Switch



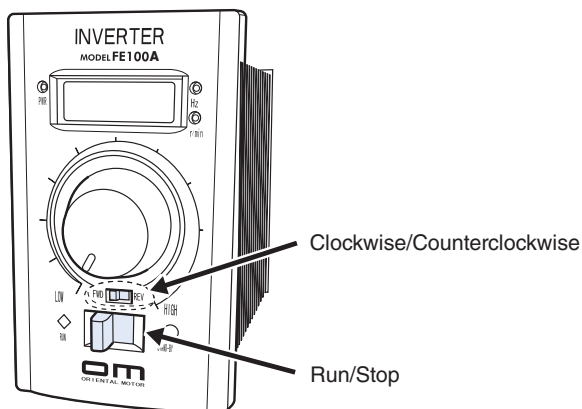
◇ Operation on the Speed Controller Front Panel

● Run/Stop

Setting the RUN/STAND-BY switch to RUN will cause the motor to run, while setting it to STAND-BY will stop the motor.

● Rotation Direction Setting

To set the rotation direction, remove the front panel and change the rotation direction to switch FWD (clockwise) or REV (counterclockwise).



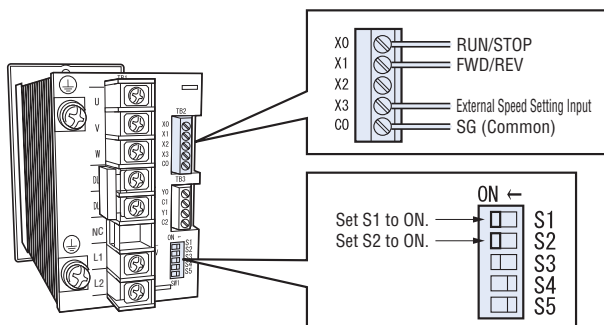
◇ Operation by External Input Signals

Change the DIP switch settings on the speed controller rear panel.

S1 (ON): Motor runs or stops by external input.

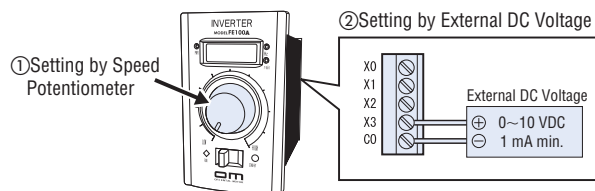
S2 (ON): Rotation direction changes by external input.

Once the DIP switch settings have been changed, the motor can be run/stopped using the RUN/STOP signal and its rotation direction can be controlled using the FWD/REV signal.



◇ Speed Setting

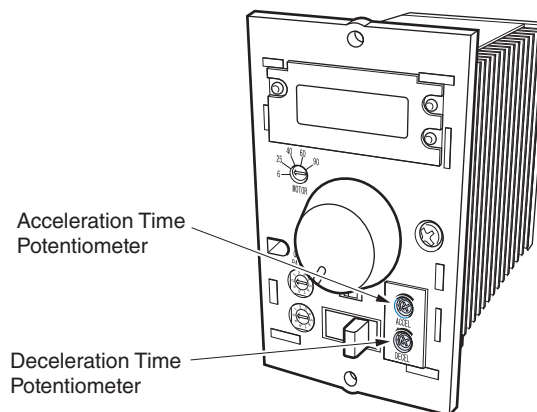
The motor speed can be set using the two methods explained below.



The motor rotates at either speed ① or ②, which is the higher setting. When the motor is to be rotated by external DC voltage, keep the speed potentiometer on the speed controller at the LOW end.

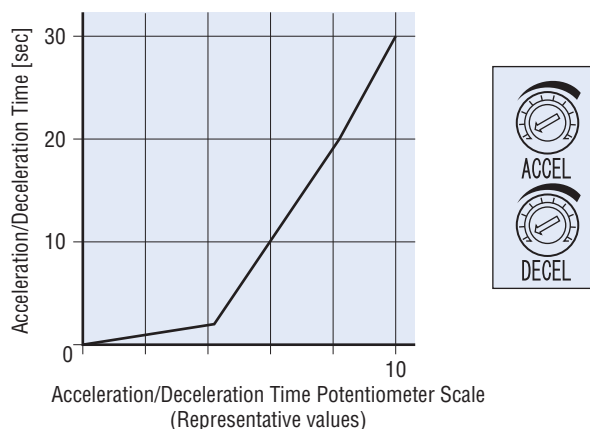
◇ Acceleration/Deceleration Time Setting

When starting, the motor accelerates at the specified acceleration time. When stopped, it decelerates at the specified deceleration time. The acceleration time and deceleration time can be set in a range of 0.1 to 30 seconds.



◇ Acceleration/Deceleration Time Characteristics

The graph below shows the acceleration/deceleration time characteristics (representative values) at 80 Hz (2400 r/min).



◇ Display Mode Switching

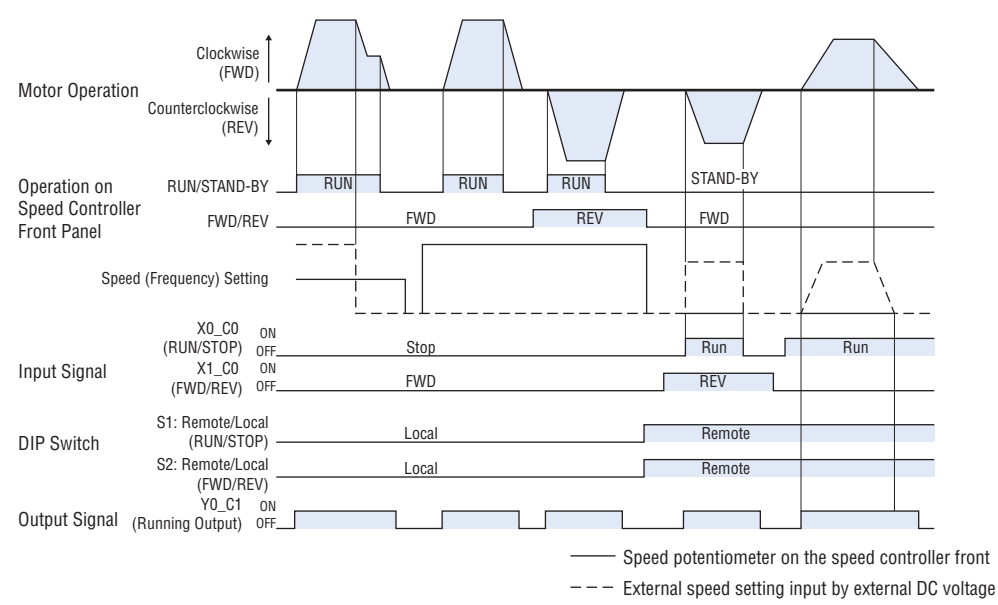
While the motor is running, the set speed is displayed in frequency (Hz). You can change the display to set speed (r/min) by the DIP switch on the speed controller rear panel.

DIP Switch Settings

S5 (OFF): Displayed in set frequency (Hz)

S5 (ON): Displayed in set speed (r/min)

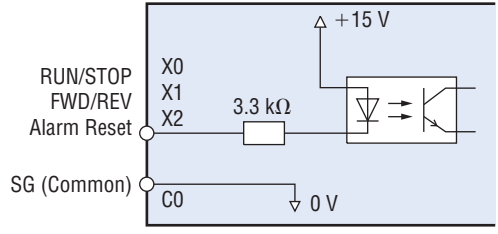
● Timing Chart



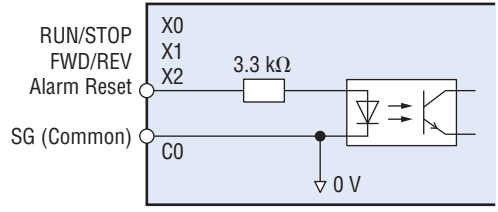
- DIP switch setting is effective only when the motor is stopped. If any DIP switch setting is changed while the motor is running, the new setting will become effective only after the motor is stopped.
- If external DC voltage is connected to the speed controller, the speed set by the X3 terminal (external speed setting input) or speed set by the speed potentiometer on the speed controller front panel, whichever is higher is given priority.
- To change the rotation direction, wait for the motor to stop and then input a reversing signal. Instant change of the rotation direction in motor's operation may cause damage to the gearhead or motor due to load impact.
- The rotation direction of motor is as viewed from the motor shaft (FWD: clockwise, REV: counterclockwise). The direction of gearhead shaft rotation may differ from motor shaft rotation depending on the gear ratio of the gearhead.

● Input Signal Circuit

◇ Sink Logic



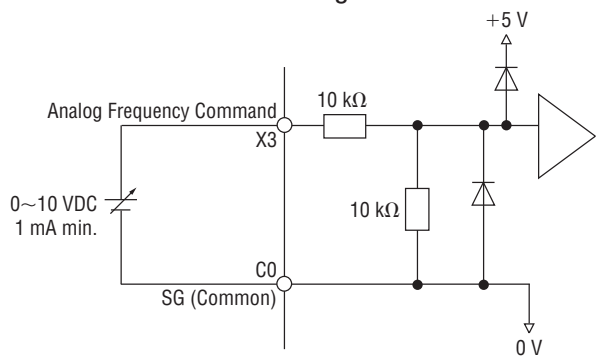
◇ Source Logic



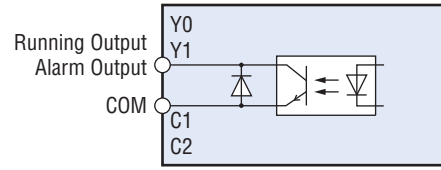
Note:

- When sequence connection is made using a source transistor, +15 to 24 VDC power supply must be connected externally.

◇ Connection of External DC Voltage



● Output Signal Circuit



● When an External Control Device with a Built-In Clamp Diode is Used

When an external control device with a built-in clamp diode is used, if the power is being supplied to the speed controller, current may flow and cause the motor to run, even if the power supply of the external control device is off. Because the power capacity differs, the motor may also run when the power supplies are turned on/off simultaneously.

Turn on the power of the external control device before the speed controller. Turn off the power of the speed controller before the external control device.

