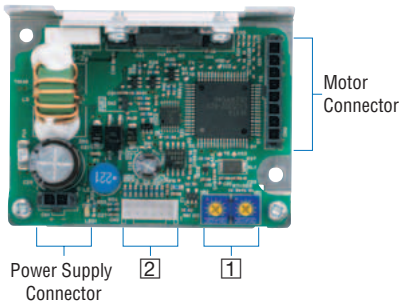
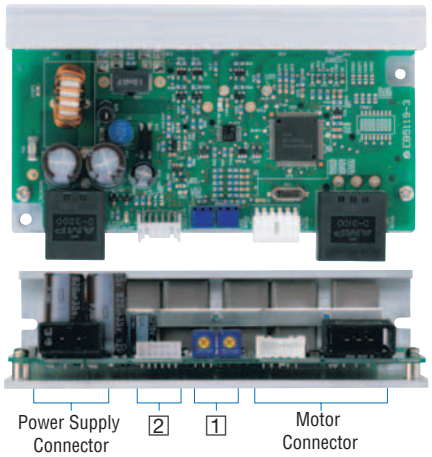
Connection and Operation

Names and Functions of Driver Parts

◇15 W (1/50 HP), 30 W (1/25 HP), 50 W (1/15 HP)



◇100 W (1/8 HP)



1 Speed Potentiometers

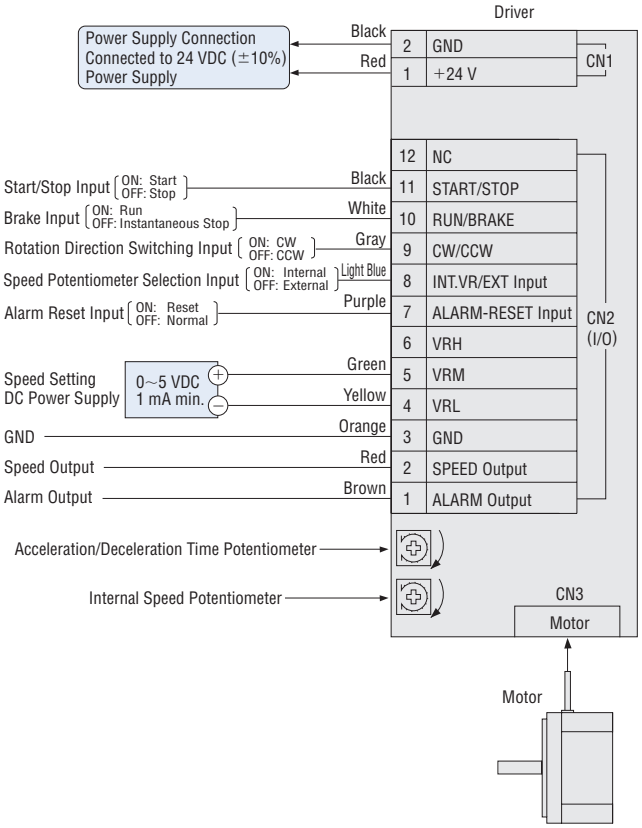
Indication	Potentiometer Name	Function
VR1	Internal Speed Potentiometer	Set and adjust the operating speed of the motor.
VR2	Acceleration/Deceleration Time Potentiometer	Set a common acceleration/deceleration time in the range of 0.5 to 10 seconds.

2 Input/Output Signals

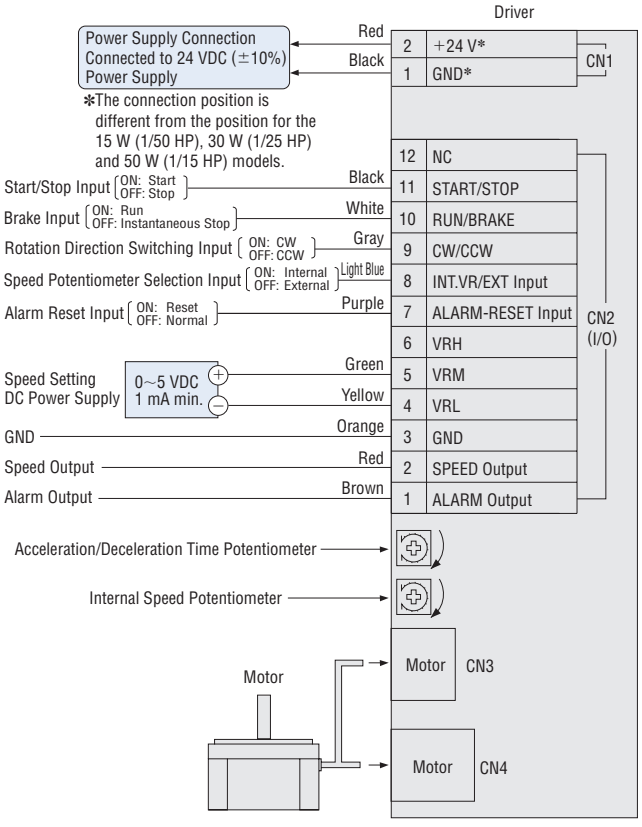
Indication	Input/Output	Pin No.	Function
CN2	Output	1	ALARM Output
		2	SPEED Output
	I/O Signal Common	3	GND
	Analog Input	4	VRL Input
		5	VRM Input
		6	VRH Input
	Input	7	ALARM-RESET Input
		8	INT.VR/EXT Input
		9	CW/CCW Input
		10	RUN/BRAKE Input
		11	START/STOP Input
		12	NC

Connection Diagrams

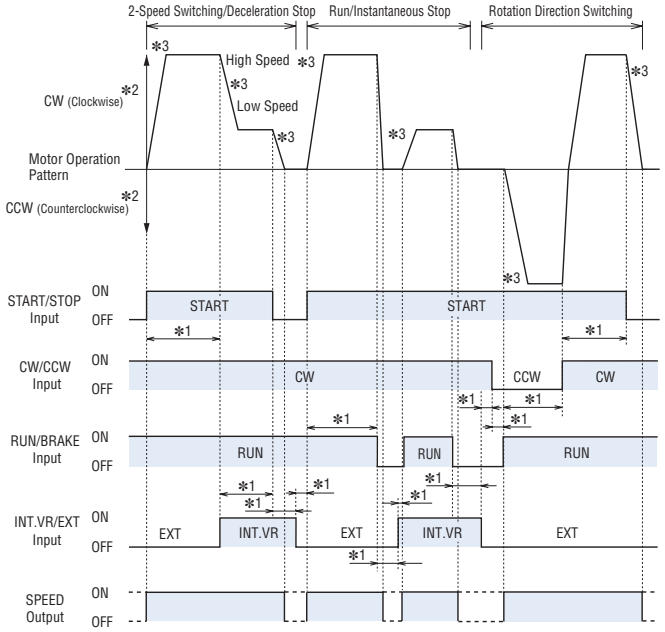
◇15 W (1/50 HP), 30 W (1/25 HP), 50 W (1/15 HP)



◇100 W (1/8 HP)



●Timing Chart



- All operations of run/stop, instantaneous stop and rotation direction switching operations can be controlled with the START/STOP, RUN/BRAKE and CW/CCW signals.
- If both the START/STOP signal and the RUN/BRAKE signal are set to ON, the motor rotates. The motor will accelerate over the time set by the acceleration/deceleration time potentiometer. During this time, if the CW/CCW signal is set to ON, the motor rotates clockwise as viewed from the shaft end of the motor; if the CW/CCW signal is set to OFF, the motor rotates in the counterclockwise direction.
- If the RUN/BRAKE signal is set to OFF while the START/STOP signal is ON, the motor stops instantaneously. If the START/STOP signal is set to OFF while the RUN/BRAKE signal is ON, the motor will stop with deceleration time set by the acceleration/deceleration time potentiometer.
- The duration of each input signal must be 10 ms or longer.
- Do not operate (turn ON/OFF) two or more input signals simultaneously. There must be a minimum interval of 10 ms before another input signal can be operated after an input signal has been operated.

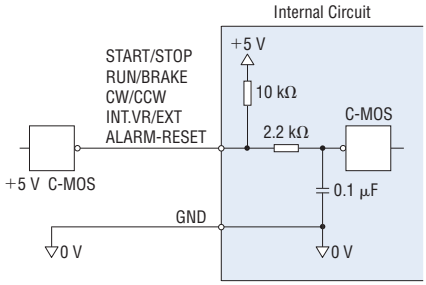
∗1 At least 10 ms
∗2 The direction applies to the motor alone. The specific direction will vary depending on the gear ratio.
∗3 The motor will start/stop over the time set by the acceleration/deceleration time potentiometer.

●Input/Output Signal Circuits

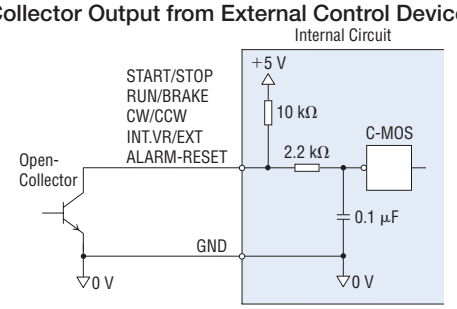
◇Input Circuit

The driver's signal inputs use the C-MOS input method.
The signal status indicates a voltage level of 0 to 0.5 VDC when the signal is ON, or 4 to 5 VDC when it is OFF.

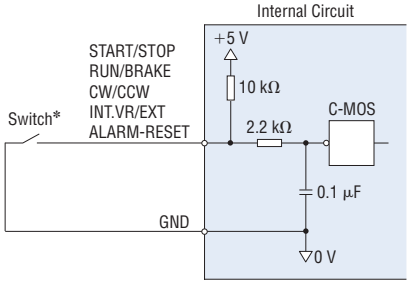
• 5 VDC C-MOS Output from External Control Device



• Open-Collector Output from External Control Device

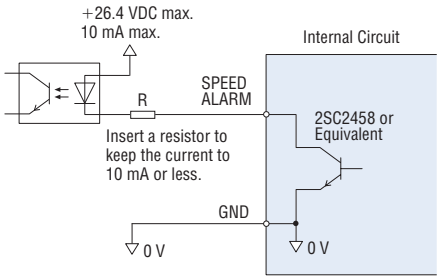


• Switch Connection



∗Use a switch capable of opening/closing the current flow at 5 VDC, 1 mA maximum.

◇Output Circuit

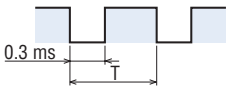


◇SPEED Output

The system outputs pulse signals (with a width of 0.3 ms) at a rate of 30 pulses per rotation of the motor output shaft synchronized with the motor operation.
You can measure the SPEED output frequency and calculate the motor speed.

$$\text{Motor speed (r/min)} = \frac{\text{SPEED output frequency [Hz]}}{30} \times 60$$

$$\text{SPEED output frequency (Hz)} = \frac{1}{T}$$



◇ALARM Output

The ALARM output is normally ON and goes OFF when there is an alarm.

◇ALARM-RESET

When the motor is stopped, setting this signal ON, then returning it to OFF resets the alarm.
Please return either the START/STOP input or the RUN/BRAKE input to OFF before inputting the ALARM-RESET. The ALARM-RESET is not accepted if both these signals are ON.

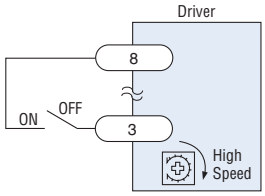
Notes

- 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 Setting Method

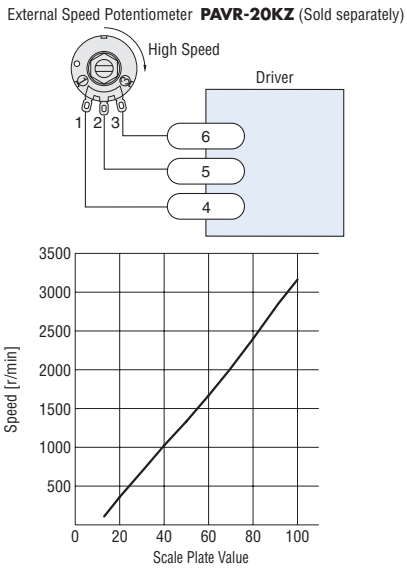
◇Internal Speed Potentiometer

When INT.VR/EXT input is set to ON, the speed can be set with the internal speed potentiometer.
There is no need for this connection when the internal speed potentiometer is not used.



◇External Speed Potentiometer (Sold separately)

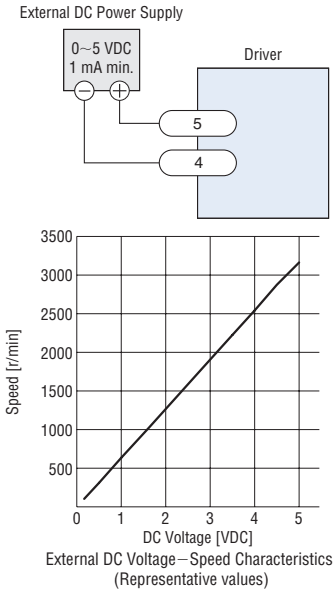
When separating the motor speed setting from the driver, connect the accessory external speed potentiometer as follows.



External Speed Potentiometer Scale—Speed Characteristics
(Representative values)

◇External DC Voltage

When setting the motor speed with an external DC voltage, do so in the following manner.



External DC Voltage—Speed Characteristics
(Representative values)

Note

- The speed in the graph represents the speed of a motor alone. The gearhead output shaft speed of the combination type or geared type is calculated by dividing the graph speed by the gear ratio.

●Multi-Motor Control

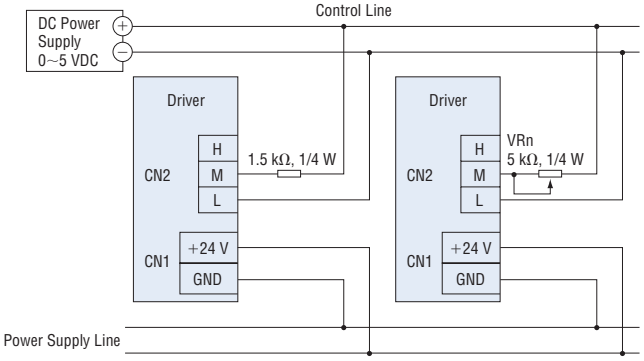
Two or more sets of motors and drivers can be operated at the same speed by using a DC power supply or an external speed potentiometer.

◇When External DC Power Supply is Used

- Use a DC power supply with current capacity equal to or greater than the value obtained by the following expression.

  Current capacity (N is the number of drivers) I = 1×N (mA)
  Example: When two drivers are used, current capacity should be at least 2 mA.

- Connect the other input/output lines to each driver individually.
- Motor speed differences can be adjusted by connecting a resistor of 1.5 kΩ, 1/4 W to the M terminal of the first driver, and a 5 kΩ, 1/4 W variable resistor (VRn) to the M terminals of the other drivers.



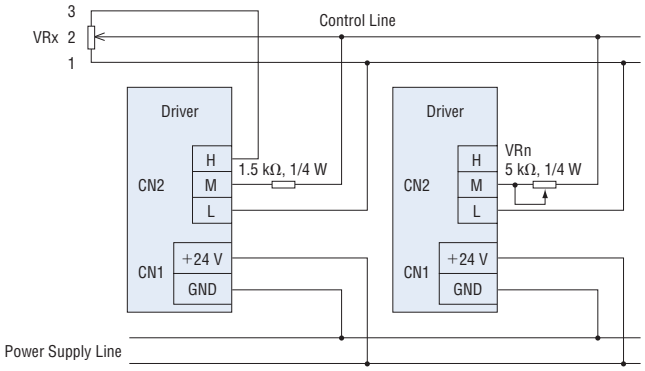
◇When External Speed Potentiometer is Used

As shown below, make the power supply line and the speed control line common to set the speed at VRx.

- The required resistance of the external speed potentiometer is calculated by the following expression.

  Resistance value (N is the number of drivers) VRx = 20/N (kΩ), N/4 (W)
  Example: When two drivers are used, the resistance is 10 kΩ, 1/2 W.

- Connect the other input/output lines to each driver individually.
- Motor speed differences can be adjusted by connecting a resistor of 1.5 kΩ, 1/4 W to the M terminal of the first driver, and a 5 kΩ, 1/4 W variable resistor (VRn) to the M terminals of the other drivers.
- No more than five motors should be operated simultaneously when using the external speed potentiometer.



List of Motor and Driver Combinations

●Geared Type

The geared type has an integrated motor and gearhead. The combination of motor and gearhead cannot be changed.

Output Power	Model	Geared Motor Model	Driver Model
15 W (1/50 HP)	**BLH015K-□**	BLHM015K-□	BLHD15K

●Combination Type – Parallel Shaft Gearhead

The combination type comes with the motor and parallel shaft gearhead pre-assembled.

Output Power	Model	Motor Model	Gearhead Model	Driver Model
30 W (1/25 HP)	**BLH230KC-□**	BLHM230KC-GFS	GFS2G□	BLHD30K
50 W (1/15 HP)	**BLH450KC-□**	BLHM450KC-GFS	GFS4G□	BLHD50K
100 W (1/8 HP)	**BLH5100KC-□**	BLHM5100KC-GFS	GFS5G□	BLHD100K

●Combination Type – Hollow Shaft Flat Gearhead

The combination type comes with the motor and hollow shaft flat gearhead pre-assembled.

Output Power	Model	Motor Model	Gearhead Model	Driver Model
30 W (1/25 HP)	**BLH230KC-□FR**	BLHM230KC-GFS	GFS2G□FR	BLHD30K
50 W (1/15 HP)	**BLH450KC-□FR**	BLHM450KC-GFS	GFS4G□FR	BLHD50K
100 W (1/8 HP)	**BLH5100KC-□FR**	BLHM5100KC-GFS	GFS5G□FR	BLHD100K

●Round Shaft Type

Output Power	Model	Motor Model	Driver Model
15 W (1/50 HP)	**BLH015K-A**	BLHM015K-A	BLHD15K
30 W (1/25 HP)	**BLH230KC-A**	BLHM230KC-A	BLHD30K
50 W (1/15 HP)	**BLH450KC-A**	BLHM450KC-A	BLHD50K
100 W (1/8 HP)	**BLH5100KC-A**	BLHM5100KC-A	BLHD100K

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