

# Control Unit Specification

	BATTERY POWERED GEARMOTORS
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# Gearmotor Specifications and Electromagnetic Brake Specifications

## Motor Specifications

Series	V										SD	
Power	50 W		0.1 kW			0.2 kW		0.4 kW		0.75 kW		
Voltage (V)	12	24	12	24	48	24	48	24	48	48		
Rated Current (A)	5.9	2.7	12.4	5.8	2.7	9.8	5.1	20.1	9.9	19.5		
Time Rating	S1 (Continuous)										S3 25 %	
Motor Lead Wire (mm <sup>2</sup> )	0.9(AWG18)		2(AWG14)			2(AWG15)						
Maximum Extension Length (m)	5										5	
Frequency of Startup/Stop	30 times/min (when using our drive)										—	
Application Ambient Temperature (°C)	0 °C to 40 °C										0 °C to 40 °C	
Application Ambient Humidity (%RH)	IP30		85 % RH max (No Condensation)			IP40/ IP44		85 % RH max (No Condensation)				
						IP65		100 % RH max (No Condensation)				
Storage Ambient Temperature (°C)	-10 °C to 60 °C (Not to freeze)										-10 °C to 60 °C (Not to freeze)	
Storage Ambient Humidity (% RH)	85 % RH max (No Condensation)										IP40/ IP44	85 % RH max (No Condensation)
											IP65	100 % RH max (No Condensation)
Vibration Resistance	0.5 G or less										0.5 G or less	
Altitude	1,000 m max										1,000 m max	
Installation Environment	A place free from corrosive gas and/or explosive gas. Well ventilated place with no dust.										IP40/ IP44	A place free from corrosive gas, explosive gas, and/or vapor. Well ventilated place with no dust.
											IP65	A place free from corrosive gas, explosive gas, and/or vapor. Not to be used underwater or in places where high water pressure is applied.
Installation Place	Indoors										IP40/ IP44	Indoors
											IP65	Indoors/Outdoors

Note: The rated current value shown in the table above is a reference value for a motor without a gearhead (motor alone). For gearmotors, refer to the load co-efficient current characteristics on pages 628 to 632.

## Electromagnetic Brake Specifications

Series	V										SD
Power	50 W		0.1 kW			0.2 kW		0.4 kW		0.75 kW	
Brake Type	Power-Off (Spring Close)										
Holding Torque (N·m) (motor shaft)	0.20		0.57			0.95		1.76		3.0	
Excitation Voltage (V) (±10 %)	12	24	12	24	48	24	48	24	48	48	
Current Consumption (A) (20 °C)	0.44	0.25	0.65	0.36	0.17	0.58	0.28	0.58	0.31	0.21	
Power Consumption (W) (20 °C)	5.3	6.0	7.8	8.6	8.3	13.9	13.2	13.9	15.1	10.0	
Lead Wire (mm <sup>2</sup> )	0.5 (AWG20)										0.3 (AWG22)

Note: The electro-magnetic brake is for holding. It cannot be used for braking.

Note: Be sure to use a surge protector to protect the drive from surge generated by turning on/off the electro-magnetic brake.

Note: Use the varistor (82 V, 1 J or more) or a diode (100 V, 1 A or more) included in the package.

Note: Due to the structure of the brake, the disc produces friction noise during motor operation. However, this does not affect the performance of the brake.

VG/APG Type  
Parallel Shaft

VH Type  
Right Angle Shaft

VF3S/VF3F Type  
Coaxial Right Angle Hollow Bore/Coaxial Right Angle Shaft  
F3S Type/Right Angle Shaft

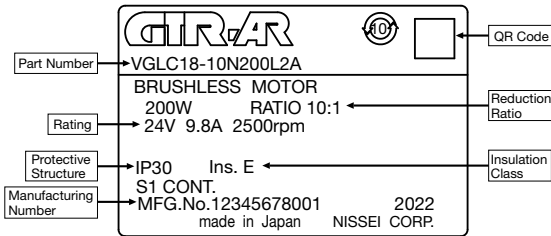
Control Unit Specification

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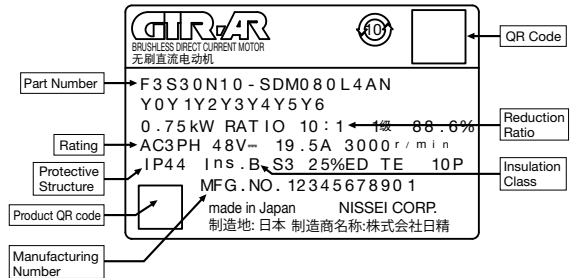
# Gearmotor Specifications and Electromagnetic Brake Specifications

## Nameplate

### V Series



### SD Series



## Electromagnetic Brake V Series

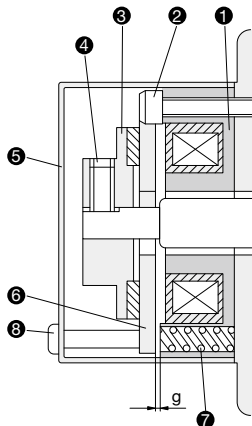
### Structure

<50 W>

- ① Field
- ② Hex Head Cap Screw
- ③ Friction Disk Assembly
- ④ Hexagon Socket Set Screw
- ⑤ Brake Cover
- ⑥ Armature
- ⑦ Spring
- ⑧ Brake Cover Fixing Screw

g: Gap

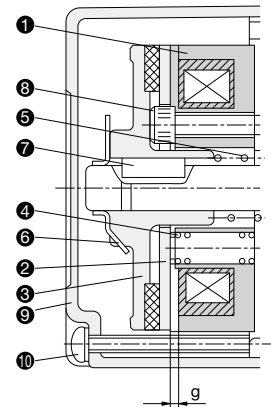
Note: The brake is a holding brake. In normal use, the gap does not need to be adjusted. However, if the brake is repeatedly used for emergency stops, the friction disc may get worn and the gap may become wider. If the gap has become wider, it may prevent the brake from releasing. In this case, please adjust the gap.  
Suitable gap  $g = 0.2 \pm 0.1$



<0.1 kW, 0.2 kW, 0.4 kW>

- ① Field
  - ② Armature
  - ③ Outer Disk
  - ④ Spring 1
  - ⑤ Spring 2
  - ⑥ Shake-proof Washer Nut
  - ⑦ Key
  - ⑧ Hex Head Cap Screw
  - ⑨ Brake Cover
  - ⑩ Brake Cover Fixing Screw
- g: Gap

Note: The brake is a holding brake. In normal use, the gap does not need to be adjusted. However, if the brake is repeatedly used for emergency stops, the friction disc may get worn and the gap may become wider. If the gap has become wider, it may prevent the brake from releasing. In this case, please adjust the gap.  
Suitable gap  $g = 0.4 \pm 0.1$



VG/AG Type  
Parallel Shaft

VH Type  
Right Angle Shaft

VF3S/VF3F Type  
Concentric Right-Angle Hollow Bore Concentric Right-Angle Shaft  
F3S Type Right-Angle Shaft

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# Gearmotors Characteristics and Specifications

## Gearmotors Characteristics

### V Series

Note: These characteristics are representative of gearmotors. Customer can refer to this graph when using their own drives.

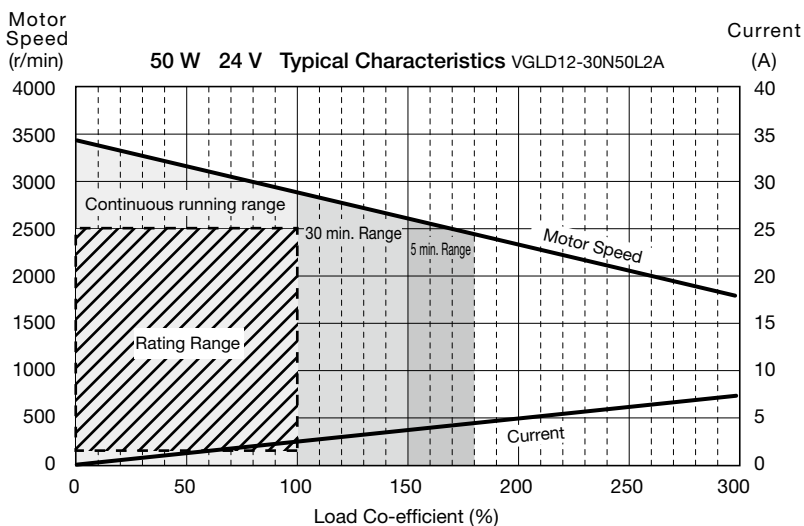
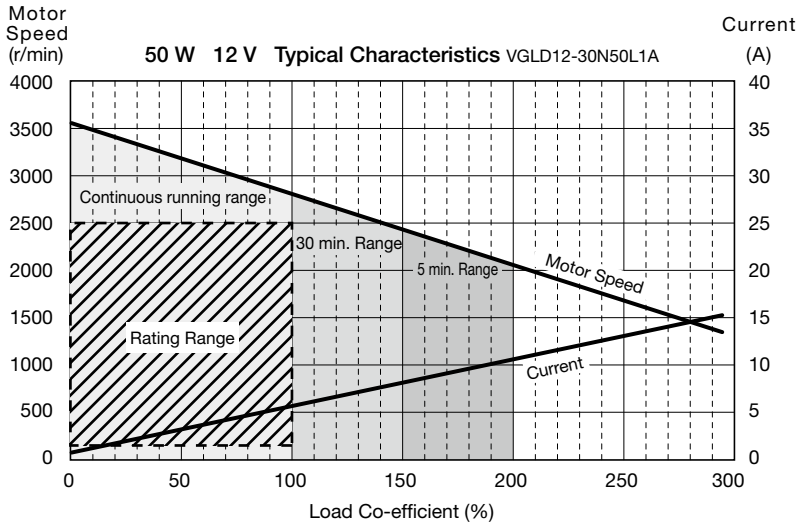
#### [Notes]

Below graphs explain relation between load co-efficient with rotational speed (motor shaft) as well of current.

The rating range defined by speed from 100 to 2500 r/min with 100 % load co-efficient.

Guidelines for use (with cold starts) at time ratings (5 minutes, 30 minutes) are also shown. However, please check the actual rating range with an actual unit.

1. The speed in the graphs below corresponds to the speed of the motor shaft. Consider the gear ratio when calculating the output shaft speed.
2. In the graphs below, 100 % corresponds to the allowable output shaft torque shown in the performance tables.
3. If a gearmotor is used outside the rating range, the life of the gearmotor may become shorter or problem may arise with the electro-magnetic brake. For details, please contact us.
4. Please make sure to maintain the surface temperature of the motor below 90 °C.



VG/APG Type  
Parallel Shaft

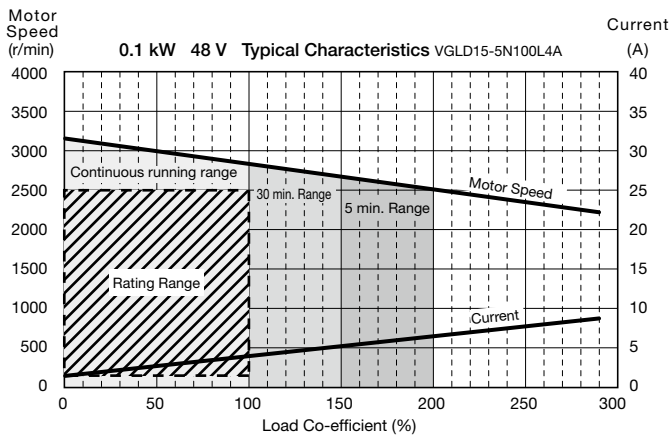
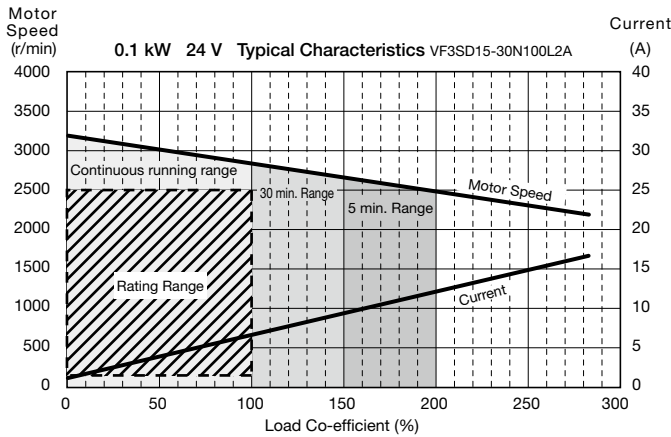
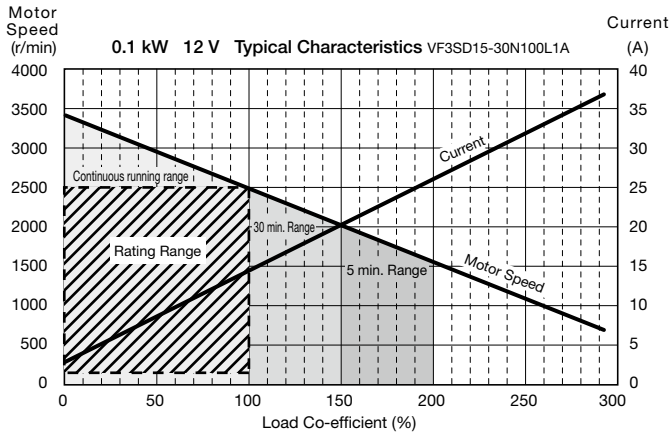
VH Type  
Right Angle Shaft

V/F3S/V/F3F Type  
Coaxial Right Angle Hollow Bore Coaxial Right Angle Shaft  
F3S Type Right Angle Shaft

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# Gearmotors Characteristics and Specifications



VG/APG Type  
Parallel Shaft

VH Type  
Right Angle Shaft

VF3S/VF3F Type  
Concentric Right-Angle Hollow Bore Concentric Right-Angle Shaft  
F3S Type Right-Angle Shaft

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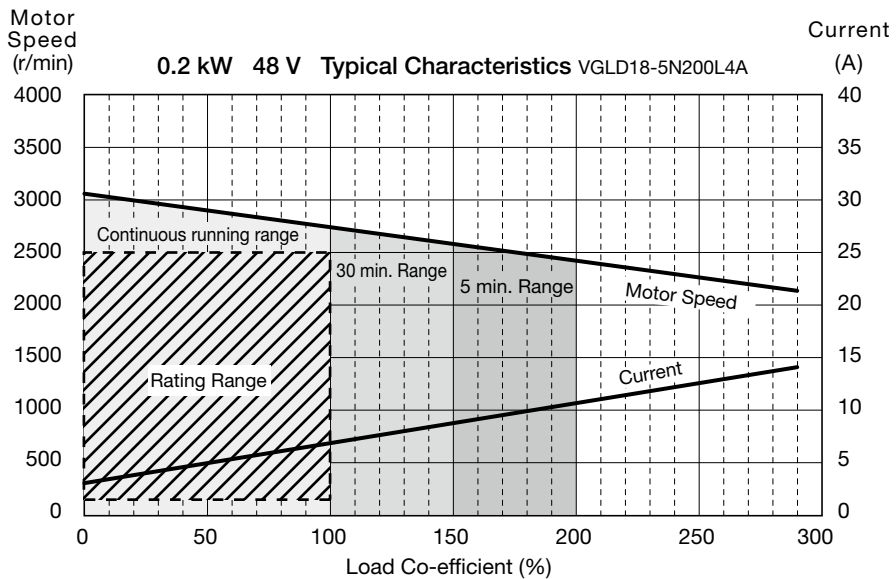
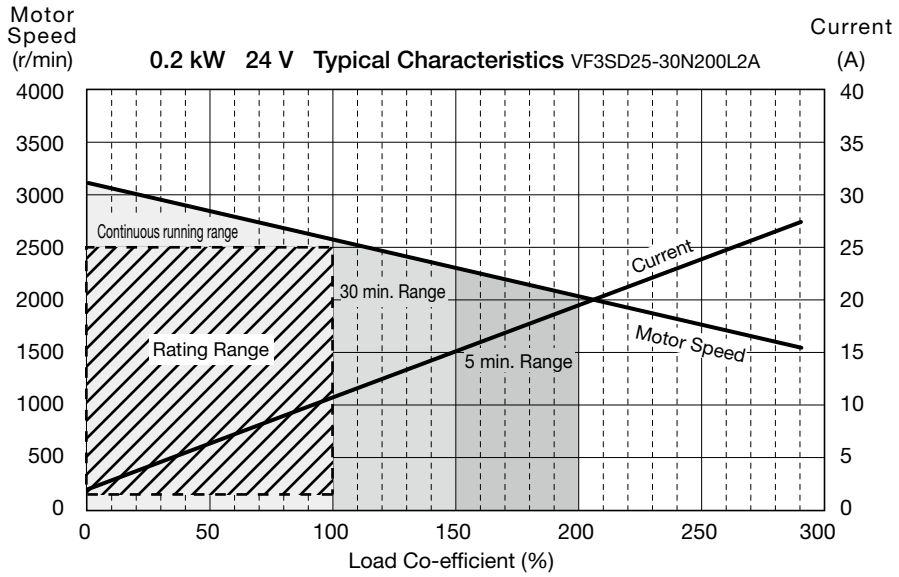
V/G/PG Type  
Parallel Shaft

VH Type  
Right Angle Shaft

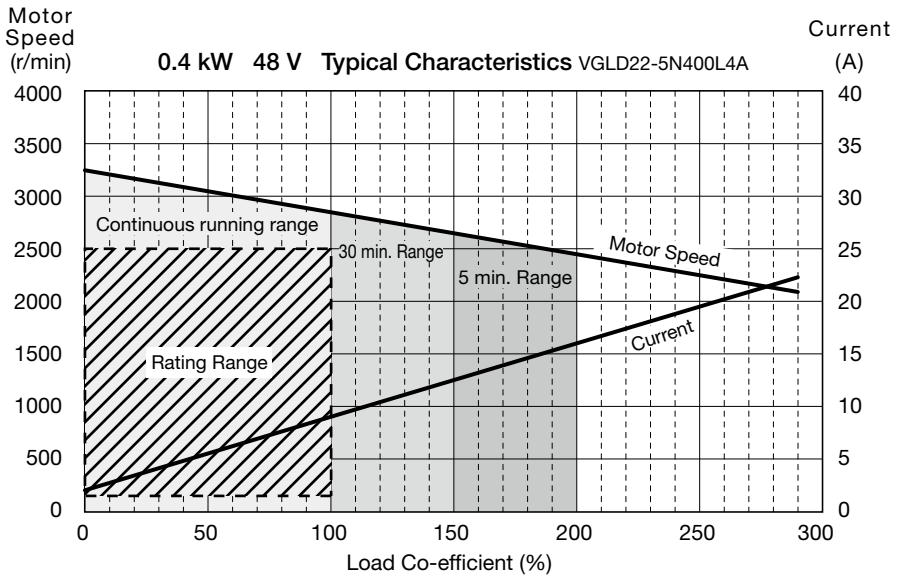
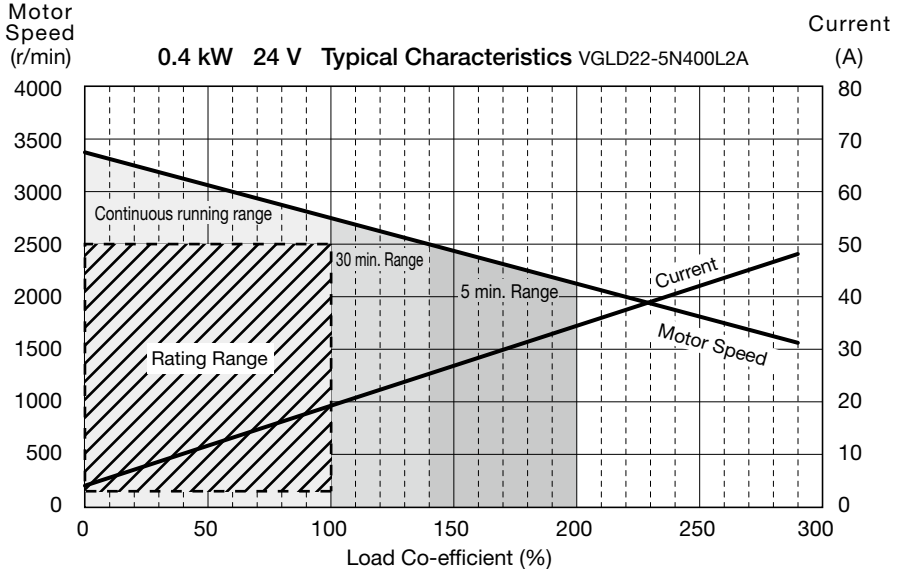
V/S3M/F3F Type  
Concentric Right Angle Hollow Bore Concentric Right Angle Shaft  
F3S Type Right Angle Shaft

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# Gearmotors Characteristics and Specifications



VG/APG Type  
Parallel Shaft

VH Type  
Right Angle Shaft

VF3S/VF3F Type  
Concentric Right-Angle Hollow Core Concentric Right-Angle Shaft  
F3S Type Right-Angle Shaft

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**SD Series**

Note: These characteristics are representative characteristics of gearmotors Refer to these graphs if the customer wishes to design a drive of their own.

**[Notes]**

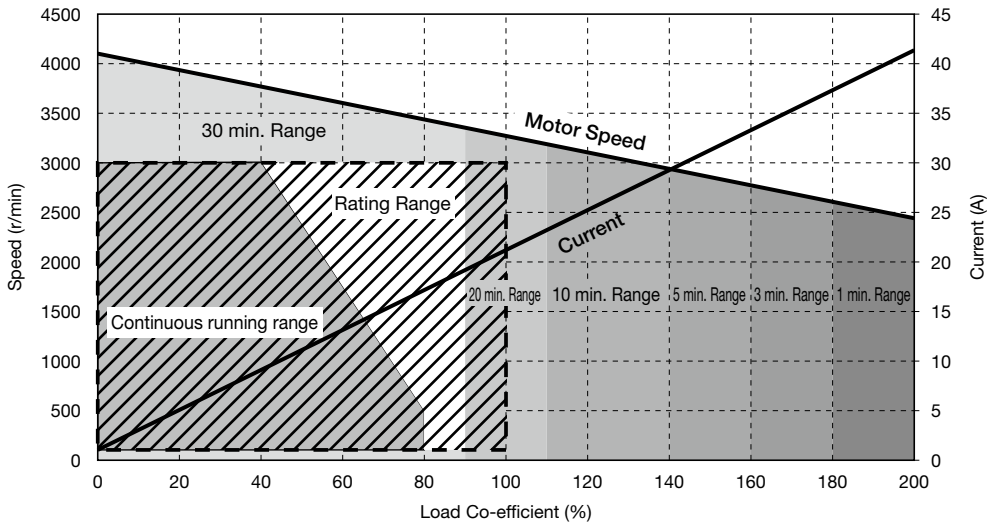
Below graphs explain relation between load co-efficient with rotational speed (motor shaft) as well of current.

The rating range defined by speed from 80 to 3000 r/min with 100 % load co-efficient.

Guidelines for use (with cold starts) at time ratings (5 minutes, 30 minutes) are also shown. However, please check the actual rating range with an actual unit.

1. The speed in the graphs below corresponds to the speed of the motor shaft. Consider the gear ratio when calculating the output shaft speed.
2. In the graphs below, 100 % corresponds to the allowable output shaft torque shown in the performance tables.
3. If a gearmotor is used outside the rating range, the life of the gearmotor may become shorter or problem may arise with the electro-magnetic brake. For details, please contact us.
4. Take care to keep the surface temperature of the motor below 90 °C.

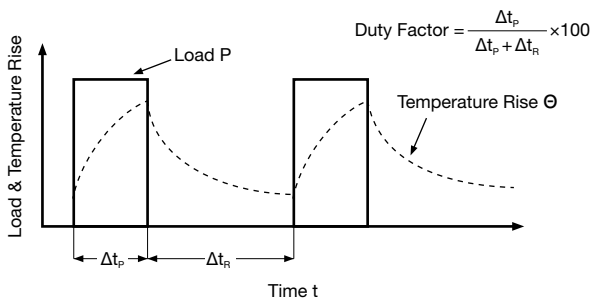
**0.75 kW 48 V Typical Characteristics**



The rating class of this product is the intermittent periodic rating (S3 25 %).

The intermittent periodic rating (S3) is the specification of repeating a cycle consisting of an operation period under a constant load and a deactivation period with no voltage applied.

The duty factor of this product is 25 %.





# Dedicated Drives (Sold Separately)

## Type Code

Series	Motor Type	Brake Type	Power	Supply Voltage	Option
<b>A</b>	<b>BL</b>	<b>CD</b>	<b>010</b>	<b>L2</b>	<b>X</b>
<b>A</b>	<b>SD</b>	<b>NB</b>	<b>080</b>	<b>L4</b>	<b>X</b>
①	②	③	④	⑤	⑥

① Series	A :GTR-AR
② Motor Type	BL : Brushless Motor V Series
	SD : Brushless Motor SD Series
③ Brake Type	CD : V Series common to gearmotors with a brake and gearmotors without a brake
	NB : SD Series common to gearmotors with a brake and gearmotors without a brake
④ Power	005 : 50 W
	010 : 0.1 kW
	020 : 0.2 kW
	040 : 0.4 kW
	080 : 0.75 kW
⑤ Supply Voltage	L1 : 12 V
	L2 : 24 V
	L4 : 48 V
⑥ Option	Blank : Standard Specification
	X : Special Specification Code

VG/PG Type  
Parallel Shaft

VH Type  
Right Angle Shaft

VF3S/VF3F Type  
Concentric Right-Angle Hollow Core/Concentric Right-Angle Shaft  
F3S Type/Right-Angle Shaft





## Model Lineup

The combinations of supply voltages and powers are as follows:





Series	Power	Supply Voltage		
		12 V	24 V	48 V
V	50 W	A-BLCD005L1	A-BLCD005L2	—
	0.1 kW	A-BLCD010L1	A-BLCD010L2	A-BLCD010L4
	0.2 kW	—	A-BLCD020L2	A-BLCD020L4
	0.4 kW	—	A-BLCD040L2	A-BLCD040L4
SD	0.75 kW	—	—	A-SDNB080L4

## Nameplate

### V Series

Part Number	MODEL : A- BLCD040L4	
Input Specifications	INPUT : DC48V 10.6A	
Output Specifications	OUTPUT : AC3PH 0- 48V 0- 150Hz 10, 1A	Software Version
Serial Number	S/ N : 01705240123 0001 01	Hardware Version
Global Standards	   	Product QR code
	NISSEI CORP. made in japan	

### SD Series

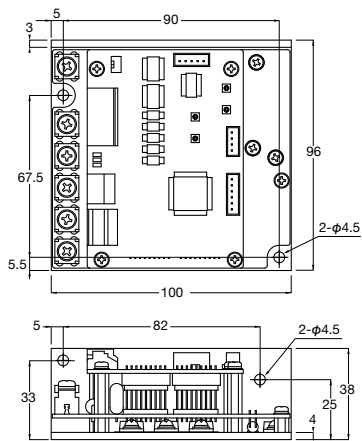
Part Number	MODEL : A- SDNB080L4	
Input Specifications	INPUT : DC48V 19.6A	
Output Specifications	OUTPUT : AC3PH 0- 48V 0- 333Hz 19, 5A	Software Version
Serial Number	S/ N : 01911290123 0007 04	Hardware Version
Global Standards	   	Product QR code
	NISSEI CORP. made in japan	

Control Unit Specification

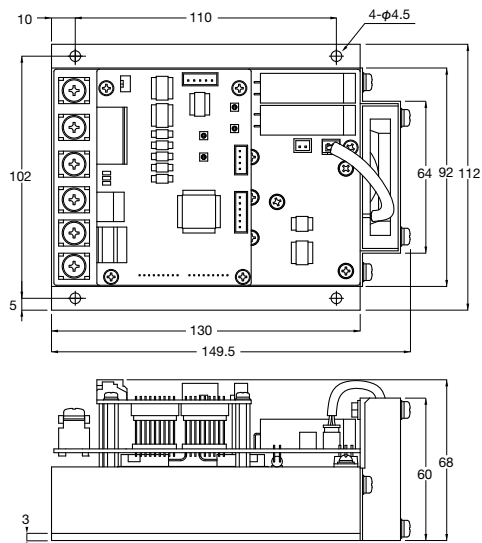
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## Dimension Diagrams

<Figure 1>



<Figure 2>



Series	Power	Voltage	Part Number	Figure Number	Approx. Weight (kg)
V	50 W	12 VDC	A-BLCD005L1	1	0.29
		24 VDC	A-BLCD005L2	1	0.29
	0.1 kW	12 VDC	A-BLCD010L1	1	0.29
		24 VDC	A-BLCD010L2	1	0.29
	0.2 kW	48 VDC	A-BLCD010L4	1	0.29
		24 VDC	A-BLCD020L2	1	0.29
	0.4 kW	48 VDC	A-BLCD020L4	1	0.29
		24 VDC	A-BLCD040L2	2	0.73
SD	0.75 kW	48 VDC	A-BLCD040L4	1	0.29
		48 VDC	A-SDNB080L4	2	0.73

V/G/APG Type  
Parallel Shaft

V/H Type  
Right Angle Shaft

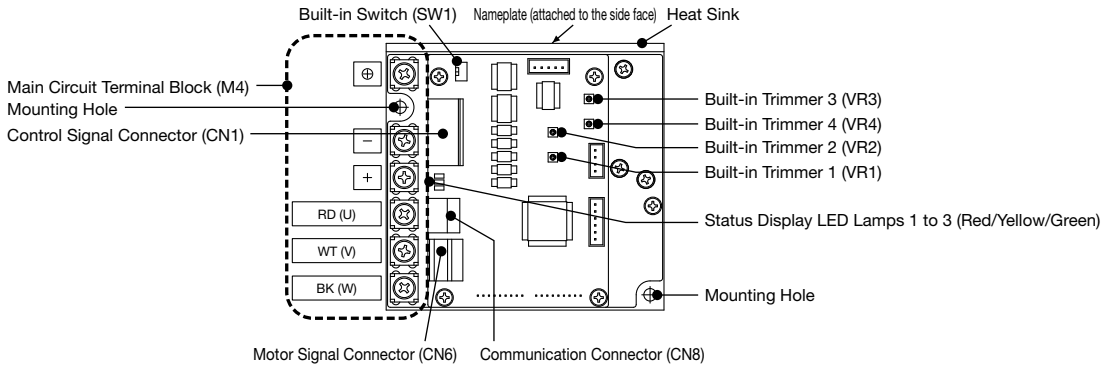
V/F3S/V/F3F Type  
Concentric Right Angle Hollow Bore  
F3S Type Right Angle Shaft

Control Unit Specification

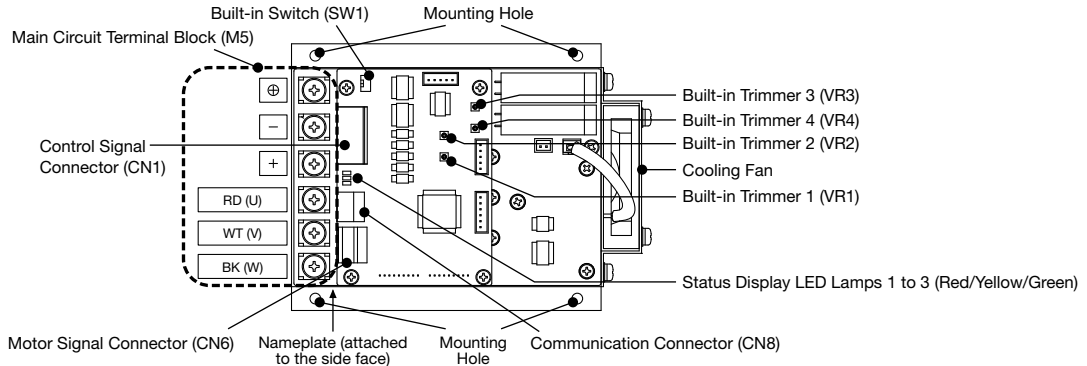
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## Names of Parts

**A-BLCD005L1 / A-BLCD005L2 / A-BLCD010L1 / A-BLCD010L2 / A-BLCD010L4 / A-BLCD020L2 / A-BLCD020L4 / A-BLCD040L4**



**A-BLCD040L2 / A-SDNB080L4**



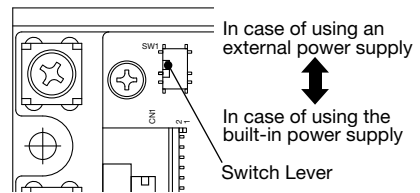
## Built-in Switch

When inputting a control signal, choose to use the built-in power supply (+15 V) of the drive or an external power supply.

Code	Setting	Description	
SW1	In case of using an external power supply (Default)	The gearmotor will be disconnected from the built-in power supply of the drive.	
	In case of using the built-in power supply	V Series	IN-COM (CN1-1) will be shorted with GND inside the drive. A voltage of 15 V will be applied to each of the input terminals I1 to I8.
		SD Series	A voltage of 15 V will be applied to each of the input terminals I1 to I8.

Note: For the internal circuit, refer to page 645.

## Built-in Switch Setting



VG/PG Type Parallel Shaft

VH Type Right Angle Shaft

VF3S/VF3F Type Concentric Right-Angle Hollow Bore/Concentric Right-Angle Stat F3S Type/Right-Angle Stat

Control Unit Specification

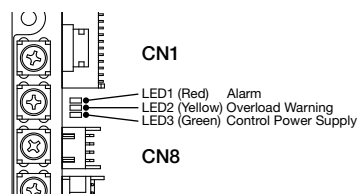
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## Status Display LED Lamps

This function displays the status of the drive with LED lamps. The LED lamps light up according to the specifications described below.

Code	Color	Specification
LED1	Red	This LED lamp lights up when an alarm occurs.
LED2	Yellow	This LED lamp lights up during overload operation (operation above the rated current of the motor) and goes off when the overload state is cleared. In addition it goes off where as there is a overload alarm.
LED3	Green	This LED lamp lights up when the control power supply is turned on. It also lights up or blinks when an alarm occurs. The number of blinks indicates the type of alarm.

## LED Lamp Layout



## Built-in Trimmer

The drive is provided with four built-in trimmers. The following settings can be made by adjusting the trimmers.

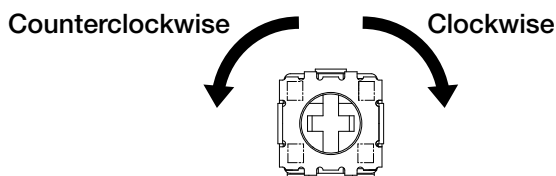
Code	Function Name	Description	Default
VR1	Built-in Trimmer 1 (Speed Setting Device)	The command speed increases by turning the trimmer clockwise. (Note 1) The setting ranges are as follows: V Series: 0 to 3000 r/min SD Series: 0 to 4000 r/min The maximum value of the speed setting by the trimmer can be changed with Pn040. (Note 2)	Clockwise MAX
VR2	Built-in Trimmer 2 (Acceleration/Deceleration Time Setting Device)	The acceleration/deceleration time increases by turning the trimmer clockwise. Setting Range: 0.00 to 5.00 s The standard speed of the acceleration/deceleration time setting by the trimmer can be changed with Pn025. The default values of the standard speed are as follows: V Series: 2500 r/min SD Series: 3000 r/min	Counterclockwise MAX
VR3	Built-in Trimmer 3 (Torque Limit Setting Device)	The torque limit value increases by turning the trimmer clockwise. Setting Range: 0 to 200 %	Clockwise MAX
VR4	Built-in Trimmer 4	Not used	—

Note 1: The function of built-in trimmer 1 is disabled upon shipment. To enable built-in trimmer 1, change the user parameter (Pn000) to "4." The default setting is set to an external analog command.

Note 2: The speed can be set to up to 5000 r/min with the trimmer, but the speeds at which motors can rotate are as follows:

V Series: Up to 3000 r/min  
SD Series: Up to 4000 r/min

## Rotational Directions of Trimmers

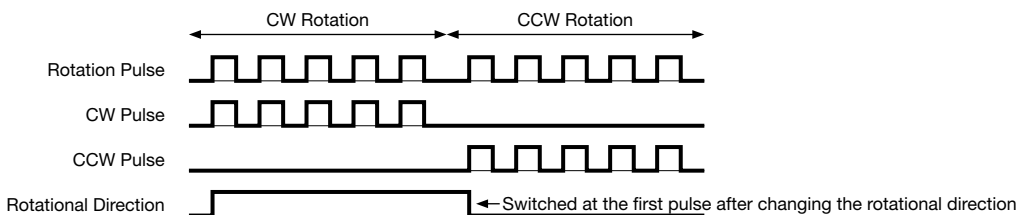


# Control Unit Specification

Series		V				SD	
Applicable Motor Power		50 W	0.1 kW	0.2 kW	0.4 kW	0.75 kW	
Output Current (Rated/Maximum)	12 V	5.9 A/11.8 A	12.4 A/24.8 A	—	—	—	
	24 V	2.7 A/5.4 A	5.8 A/11.6 A	9.8 A/19.6 A	20.1 A/40.2 A	—	
	48 V	—	2.7 A/5.4 A	5.1 A/10.2 A	9.9 A/19.8 A	19.5 A/39 A	
Input Supply Power (Rated Current/Maximum Current)	12 V	6.4 A/15.4 A	13.1 A/31.4 A	—	—	—	
	24 V	3.4 A/8.2 A	6.1 A/14.6 A	10.9 A/26.2 A	23.1 A/55.4 A	—	
	48 V	—	3.0 A/7.2 A	5.4 A/13.0 A	10.6 A/25.4 A	19.6 A/52.3 A	
Main Circuit/Control Circuit Input Voltage Range		For 12 V: 10 to 15 VDC For 24 V: 20 to 30 VDC For 48 V: 40 to 60 VDC					
Rated Speed		2500 r/min			3000 r/min		
Function	Control	Variable Speed Range	100 to 3000 r/min			80 to 4000 r/min	
		Speed Command Method	External analog command, PWM speed command, pulse frequency speed command, built-in trimmer 1, speed commands 1 to 8				
		Acceleration/Deceleration Time	Built-in trimmer 2, acceleration times 1 and 2, deceleration times 1 and 2			Built-in trimmer 2, acceleration times 1 and 2, deceleration times 1 and 2, external analog command	
		Torque Limit	External analog command, built-in trimmer 3, torque limit values 1 to 4				
	Input	Number of input points	Sequence Input: 8 points Analog Input: 1 point				
		Input Function	CW, CCW, speed command selection, acceleration/deceleration time selection, torque limit value selection, alarm reset/emergency stop, brake control signal forced ON command, DC lock, load inertia switch, PWM speed command, pulse frequency speed command				
	Output	Number of output points	Sequence Output: 4 points Analog Output: 1 point				
		Output Function	Abnormality detection, operation, rotation pulse, CW rotation pulse, CCW rotation pulse, rotational direction, rotating, over rated torque, over designated torque, brake control signal, voltage drop warning (Note 2)				
	Safeguard Function		Overload, over-voltage, voltage drop, drive overheat, over-speed, overcurrent, sensor error, system error				
Environment	Application Ambient Temperature	-10 °C to 50 °C					
	Storage Ambient Temperature	-25 °C to 70 °C					
	Application Ambient Humidity	95 %RH max (No condensation)					
	Altitude	1,000 m max					
	Vibration	2.0 G or less					
Global Standards Conformance		CE Marking (EMC Command), KC Mark					
Protective Structure		IP00					
RoHS Directive		Conformance					
Motor-Drive Wiring Length		Maximum Extension Length: 5 m					

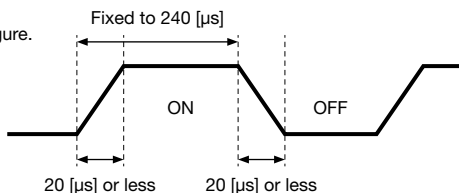
Note 1: Regenerative energy will be fed to the power supply unit through this drive.

Note 2: 18 pulses will be output for 50 W to 0.4 kW and 30 pulses will be output for 0.75 kW per motor rotation. The ON time is fixed to 240 [μs].



### \*About pulse waveform

The specification of the output pulse is as shown in the right figure. Select a counter according to the specification.



Note: The duty ratio differs depending on the frequency.

VG/AG Type  
Parallel Shaft

VH Type  
Right Angle Shaft

VF3S/VF3F Type  
Concentric Right-Angle Hollow Bore Concentric Right-Angle Shaft  
F3S Type Right-Angle Shaft

Control Unit Specification

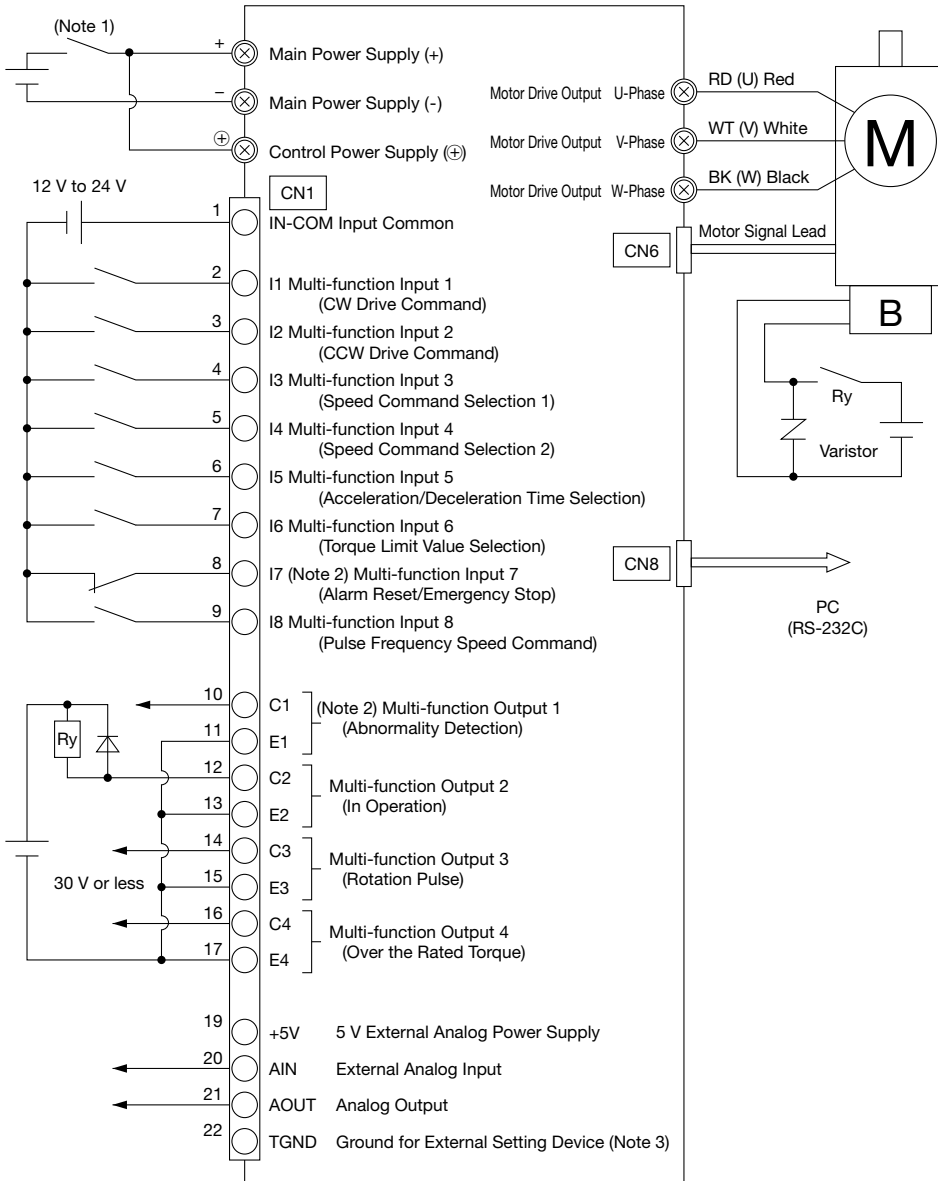
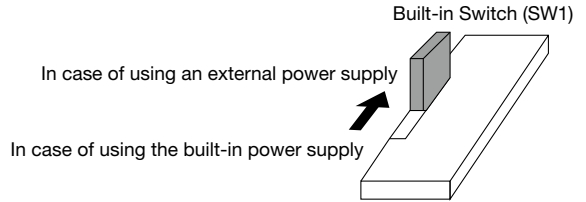
Technical Documentation

# Wiring Diagrams

## V Series: 50 W to 0.4 kW

### ■ Sink Connection Example (When Using an External Power Supply)

When using an external power supply, set the built-in switch (SW1) of the drive as shown in the figure on the right.



Note 1: During regenerative operation, such as lifting operation or deceleration, do not disconnect the motor from the battery in a state where the main power supply (+) and the control power supply (⊕) are connected.

Note 2: For safety reasons, the polarity is reversed under the default settings.

Note 3: Draw the reference analog voltage from the main power supply (-) terminal.

V/G/AG Type  
Parallel Shaft

VH Type  
Right Angle Shaft

V/F3S/V/F3F Type  
Coaxial Right Angle Hollow Drive Coaxial Right Angle Shaft  
F3S Type Right Angle Shaft

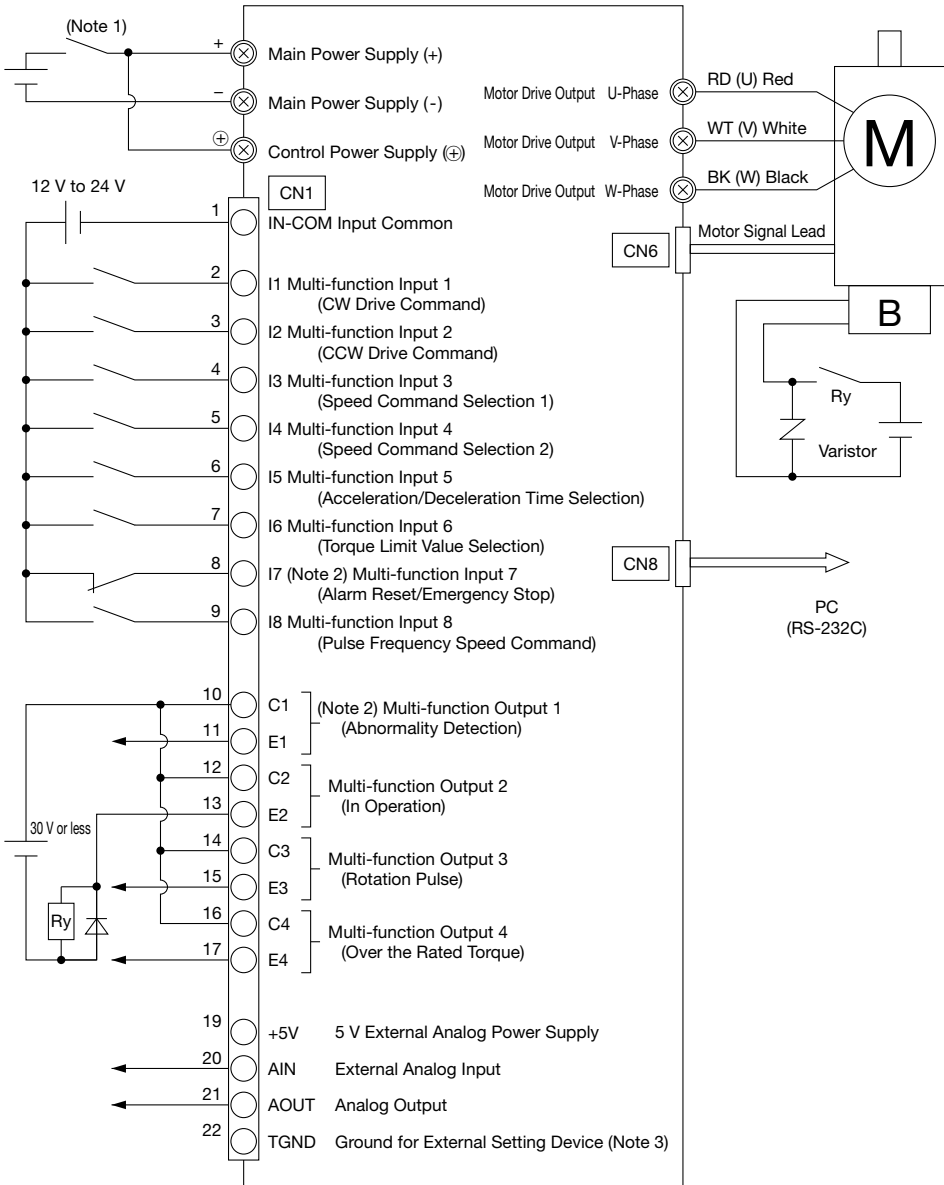
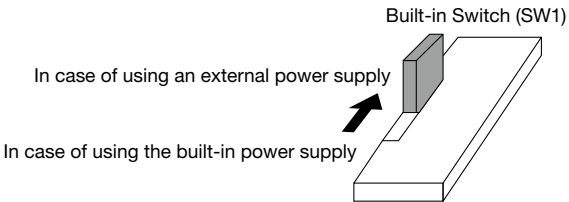
Control Unit Specification

Technical Documentation

**V Series: 50 W to 0.4 kW**

**Source Connection Example  
(When Using an External Power Supply)**

When using an external power supply, set the built-in switch (SW1) of the drive as shown in the figure on the right.



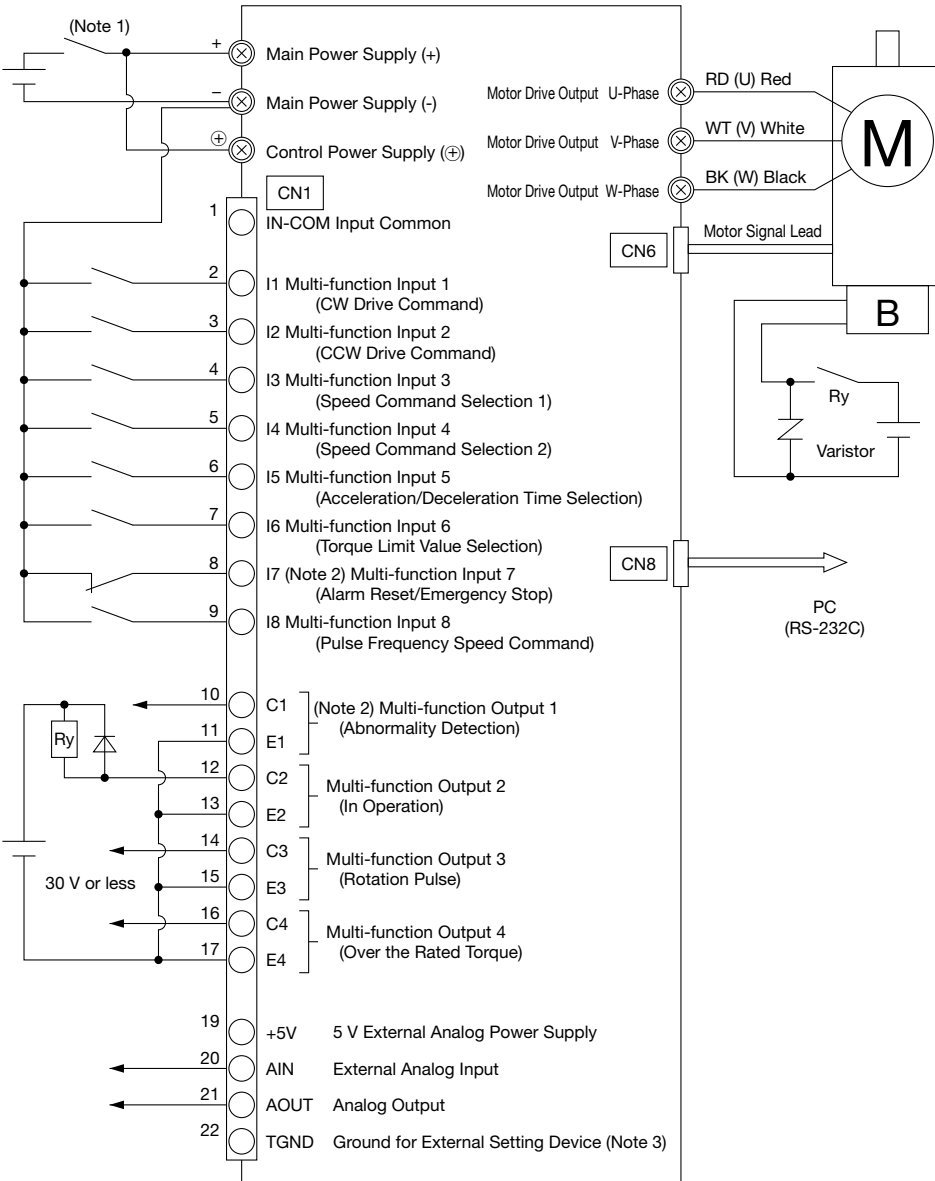
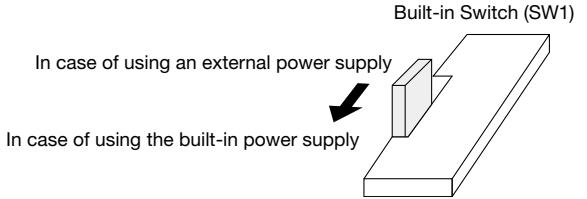
Note 1: During regenerative operation, such as lifting operation or deceleration, do not disconnect the motor from the battery in a state where the main power supply (+) and the control power supply (+) are connected.  
 Note 2: For safety reasons, the polarity is reversed under the default settings.  
 Note 3: Draw the reference analog voltage from the main power supply (-) terminal.

VG/AG Type Parallel Shaft
VH Type Right Angle Shaft
VF3S/VF3F Type Concentric Right-Angle Hollow Core Concentric Right-Angle Shaft F3S Type Right-Angle Shaft
Control Unit Specification
Technical Documentation

V Series: 50 W to 0.4 kW

**Sink Connection Example (When Using the Built-in Power Supply)**

When using the built-in power supply, set the built-in switch (SW1) of the drive as shown in the figure on the right.



Note 1: During regenerative operation, such as lifting operation or deceleration, do not disconnect the motor from the battery in a state where the main power supply (+) and the control power supply (⊕) are connected.

Note 2: For safety reasons, the polarity is reversed under the default settings.

Note 3: Draw the reference analog voltage from the main power supply (-) terminal.

VG/AG Type Parallel Shaft

VH Type Right Angle Shaft

VFS3V/F3F Type Coaxial Right Angle Hollow Drive Coaxial Right Angle Shaft F3S Type Right Angle Shaft

Control Unit Specification

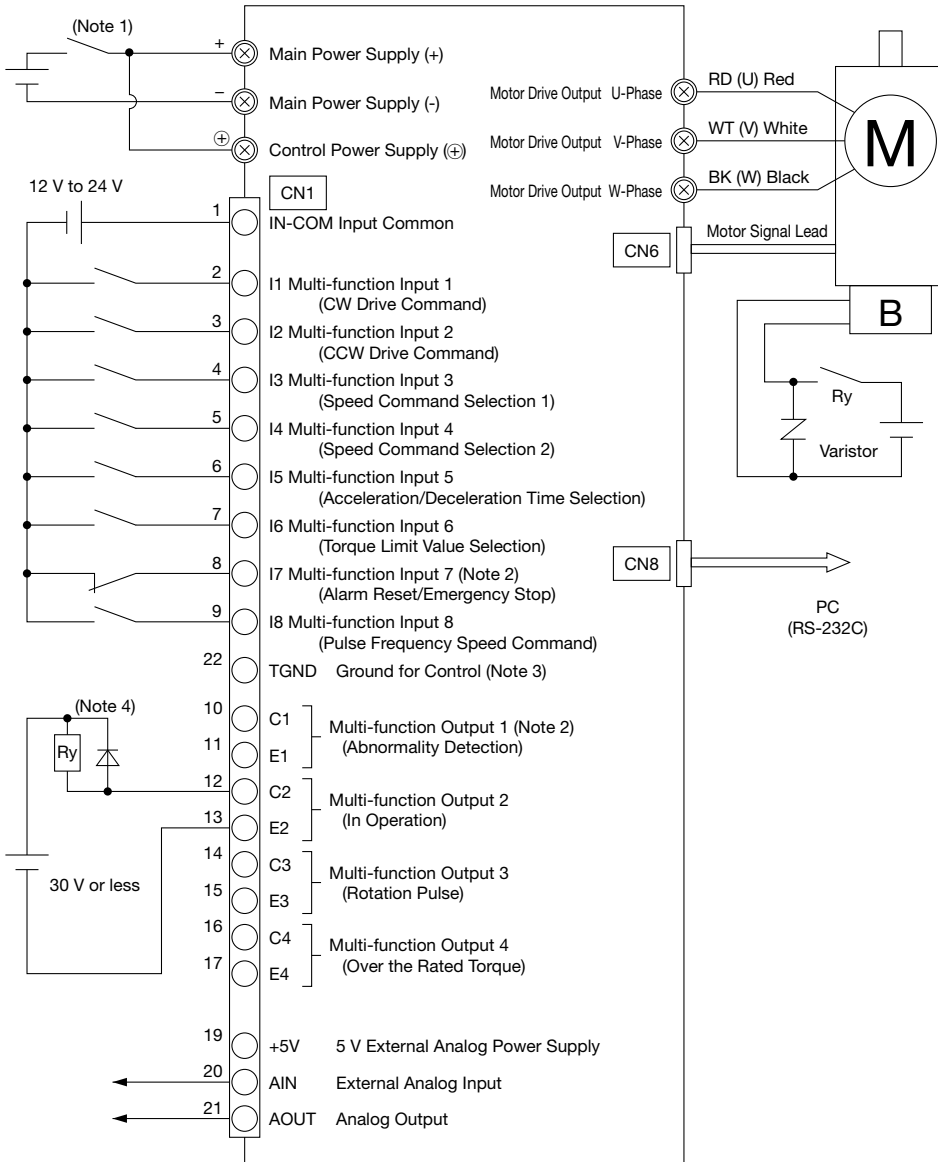
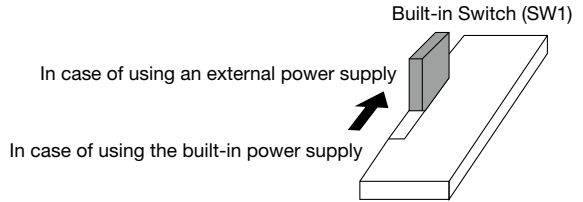
Technical Documentation



## SD Series 0.75 kW

### Sink Connection Example (When Using an External Power Supply)

When using an external power supply, set the built-in switch (SW1) of the drive as shown in the figure on the right.



Note 1: During regenerative operation, such as lifting operation or deceleration, do not disconnect the motor from the battery in a state where the main power supply (+) and the control power supply (⊕) are connected.

Note 2: For safety reasons, the polarity is reversed under the default settings.

Note 3: Perform wiring by referring to "Precautions for wiring" on page 648.

Note 4: This figure is a wiring example for using a brake.

VG/AG Type  
Parallel Shaft

VH Type  
Right Angle Shaft

VF3S/VF3F Type  
Concentric Right-Angle Hollow Shaft  
Concentric Right-Angle Shaft  
F3S Type Right-Angle Shaft

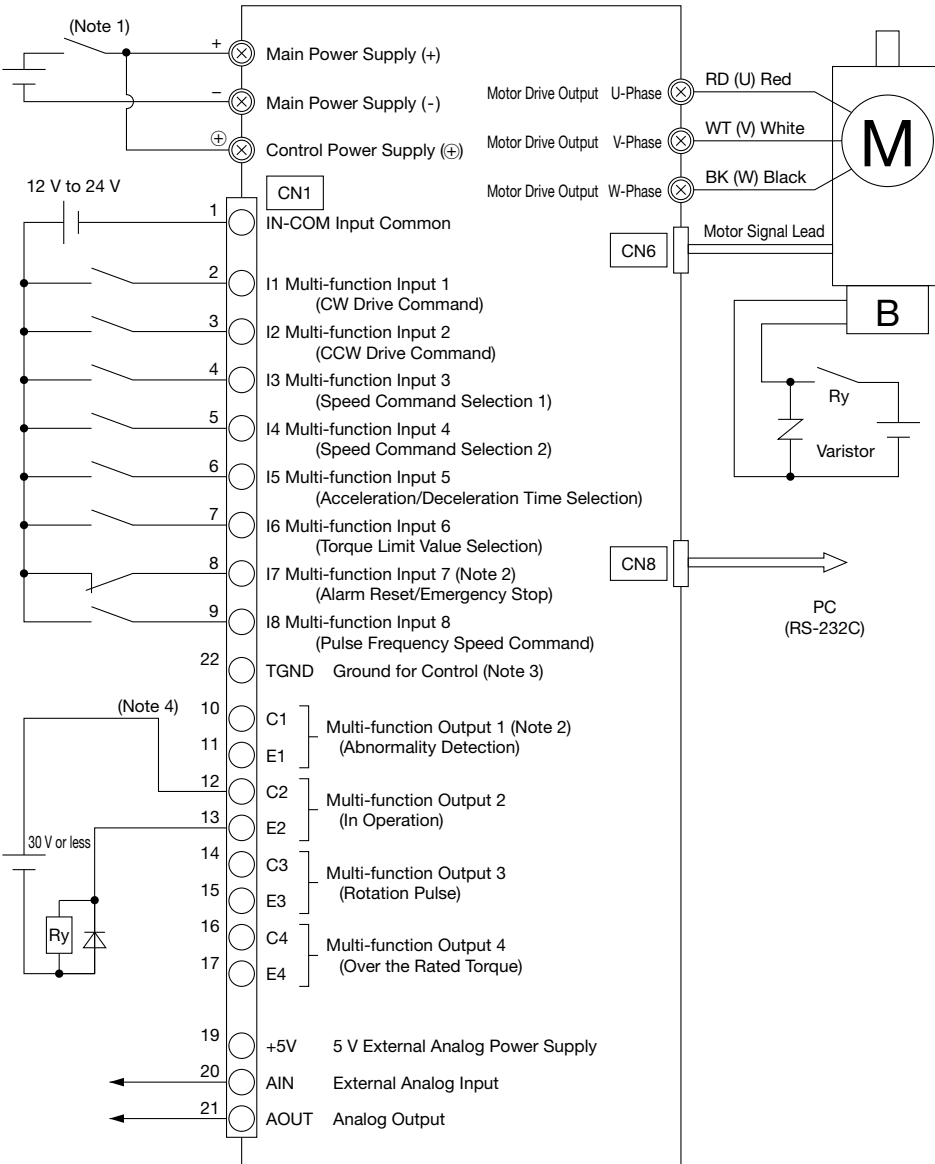
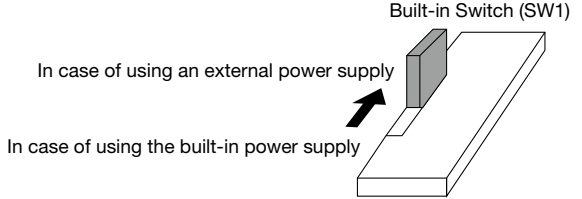
Control Unit Specification

Technical Documentation

**SD Series 0.75 kW**

**Source Connection Example (When Using an External Power Supply)**

When using an external power supply, set the built-in switch (SW1) of the drive as shown in the figure on the right.



Note 1: During regenerative operation, such as lifting operation or deceleration, do not disconnect the motor from the battery in a state where the main power supply (+) and the control power supply (+) are connected.  
 Note 2: For safety reasons, the polarity is reversed under the default settings.  
 Note 3: Perform wiring by referring to "Precautions for wiring" on page 648.  
 Note 4: This figure is a wiring example for using a brake.

V/Δ/PG Type Parallel Shaft

VH Type Right Angle Shaft

V/FS/V/FS Type Coaxial Right Angle Hollow Bore Coaxial Right Angle Shaft F/S Type Right Angle Shaft

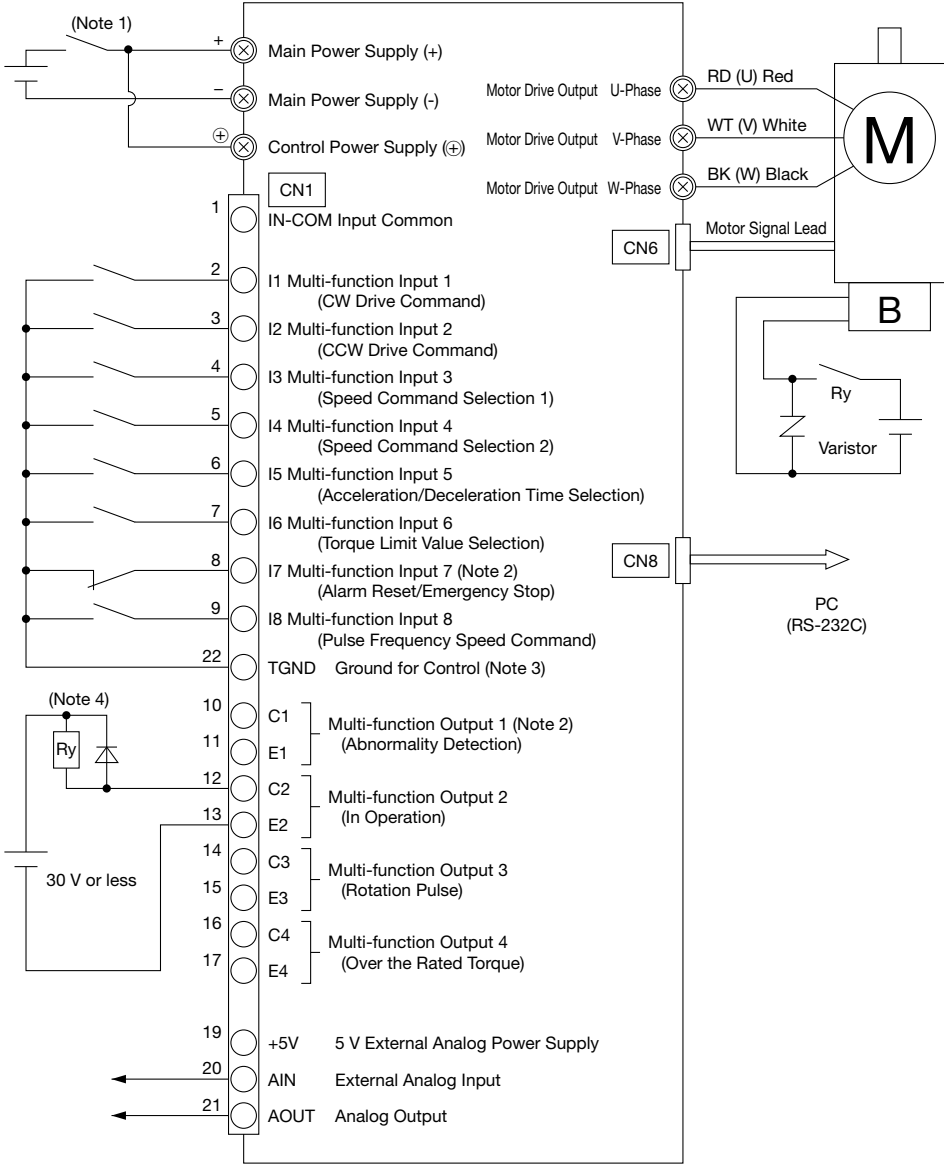
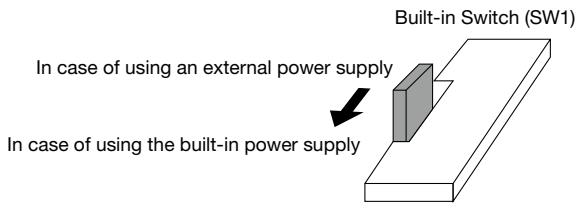
Control Unit Specification

Technical Documentation

**SD Series 0.75 kW**

**Sink Connection Example  
(When Using the Built-in Power Supply)**

When using the built-in power supply, set the built-in switch (SW1) of the drive as shown in the figure on the right.



Note 1: During regenerative operation, such as lifting operation or deceleration, do not disconnect the motor from the battery in a state where the main power supply (+) and the control power supply (±) are connected.  
 Note 2: For safety reasons, the polarity is reversed under the default settings.  
 Note 3: Perform wiring by referring to "Precautions for wiring" on page 648.  
 Note 4: This figure is a wiring example for using a brake.

VG/AGP Type Parallel Shaft

VH Type Right Angle Shaft

VF3S/VF3F Type Concentric Right-Angle Hollow Shaft, Concentric Right-Angle Shaft, F3S Type Right-Angle Shaft

Control Unit Specification

Technical Documentation

# Explanation of Terminals

Since the I/F is not isolated from the main power supply, perform wiring with care.

## ■ Connector Specifications

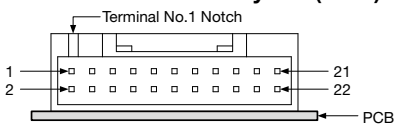
Code	Manufacturer	Part Number	Remarks
Terminal Block (TM1 to 6)	—	—	Tightening torque: 0.8 to 1.2 N·m (M4) Tightening torque: 1.6 to 2.0 N·m (M5)
CN1	J.S.T.MFG.CO.,LTD.	S22B-PUDSS-1	Compatible Housing: PUDP-22V-S Adaptable Terminal: SPUD-001T-P0.5
CN6	J.S.T.MFG.CO.,LTD.	S05B-XASK-1	Compatible Housing: XAP-05V-1 Adaptable Terminal: SXA-001T-P0.6
CN8	J.S.T.MFG.CO.,LTD.	S4B-XH-A	Compatible Housing: XHP-4 Adaptable Terminal: SXH-001T-P0.6N

## ■ Layout of Terminal Block

Terminal Number	Function Name	Description
⊕	Control Power Supply (+)	The positive side of the control power supply.
-	Main Power Supply (-)	V Series The negative side of the main power supply. This is also the negative side of the control power supply. SD Series The negative side of the control power supply and the main power supply.
+	Main Power Supply (+)	The negative side of the main power supply.
RD(U)	Motor Drive Output U-Phase	Connect the terminal to the motor. (Note 1)
WT(W)	Motor Drive Output V-Phase	
BK(W)	Motor Drive Output W-Phase	

Note 1: Pay attention to the connection of the motor drive output. If the connection is incorrect, the motor will not operate.

## ■ I/O Connector Layout (CN1)



Terminal No.	Terminal Name	Function Name	Default
1	IN_COM	Input Common (Note 1)	—
2	I1	Multi-function Input 1	CW drive command
3	I2	Multi-function Input 2	CCW drive command
4	I3	Multi-function Input 3	Speed Command Selection 1
5	I4	Multi-function Input 4	Speed Command Selection 2
6	I5	Multi-function Input 5	Acceleration/Deceleration time selection
7	I6	Multi-function Input 6	Torque Limit Value Selection 1
8	I7	Multi-function Input 7	Alarm Reset/Emergency Stop (Note 2)
9	I8	Multi-function Input 8	Pulse Frequency Speed Command
10	C1	Multi-function Output 1	Abnormality Detection (Note 2)
11	E1	Multi-function Output 2	In Operation
12	C2		
13	E2	Multi-function Output 3 (Compatible with high-speed pulse output) (Note 3)	Rotation Pulse
14	C3		
15	E3	Multi-function Output 4 (Compatible with high-speed pulse output) (Note 3)	Over Rated Torque
16	C4		
17	E4	Not used	—
18	—	5 V External Analog Power Supply (Note 4)	—
19	+5V	External Analog Input Terminal	Speed Command
20	AIN	Analog Output Terminal	Speed (outputting actual speed of motor)
21	AOUT	Ground for External Setting Device (Note 5)	—
22	TGND		

Note 1: When the built-in switch is set to use the built-in power supply, the terminal will be shorted with TGND inside.

Note 2: The I/O polarity is reversed by default.

Note 3: Multi-function outputs 3 and 4 are compatible with high-speed pulse output. When selecting rotation pulse, CW rotation pulse, or CCW rotation pulse among the output functions, assign the function to multi-function outputs 3 and 4.

Note 4: This is the power supply output terminal. Do not connect an external power supply.

Note 5: Connect the terminal only when using an external setting device. Do not connect it to another terminal when no external setting device is used.

## ■ Layout of Motor Signal Connector (CN6) (Note 1)

Terminal No.	Terminal Name	Function Name
1	+15V	Power supply 15 V
2	HALL_U	Hall sensor input U-Phase
3	HALL_V	Hall sensor input V-Phase
4	HALL_W	Hall sensor input W-Phase
5	GND	Ground (Note 2)

Note 1: The maximum extension length is 5 m.

Note 2: Do not connect the terminal to the main power supply (-).

## ■ Layout of Communication Connector (CN8)

Terminal No.	Terminal Name	Function Name
1	+5V	Power supply 5 V
2	TxD	Data transmission
3	RxD	Data receipt
4	GND	Ground (Note 1)

Note 1: Do not connect the terminal to the main power supply (-).

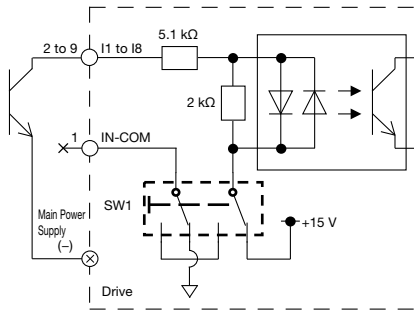
# I/O Terminal Wiring

## V Series: 50 W to 0.4 kW

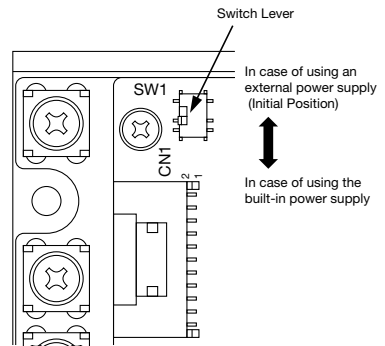
### Control Input

- When using the built-in power supply (Set SW1 to the CN1 side.)

<Sink Connection>

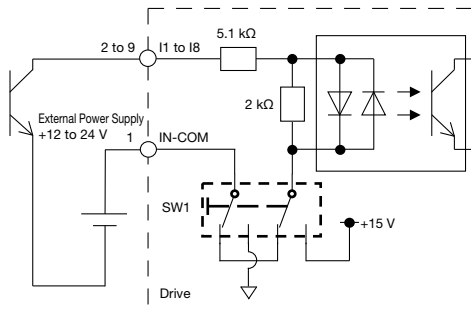


Note: Do not use CN1-1 (IN-COM) as shown in the figure above.

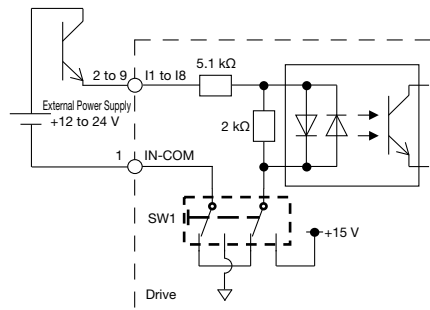


- When using an external power supply (Set SW1 to the opposite side of CN1.)

<Sink Connection>

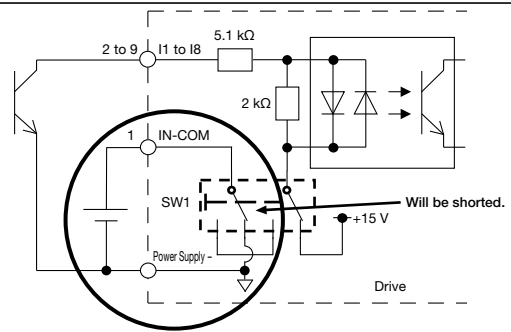


<Source Connection>



### [Precautions for use of an external power supply]

If a sink connection is made using an external power supply with SW1 used as the built-in power supply and "-" of the input terminal power supply and "-" of the main and control power supplies are common, the power supplies may be shorted and the internal fuse may burn out. If the internal fuse is burned out, the drive needs to be replaced.

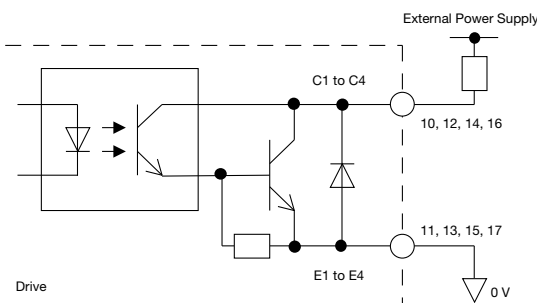


### Control Output

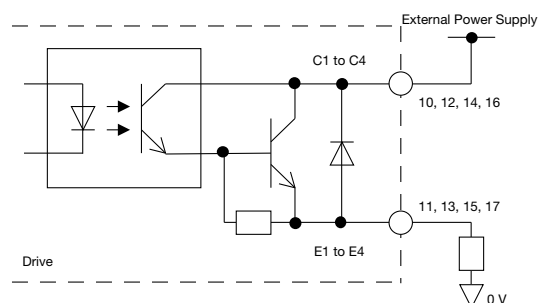
- Maximum rated value of control output

Maximum voltage between C and E		30 V
Maximum current	C1/E1, C2/E2	100 mA
	C3/E3, C4/E4	50 mA

<Sink Connection>



<Source Connection>



**V Series: 50 W to 0.4 kW**

**External Analog Input**

By inputting a DC voltage to the AIN terminal (external analog input terminal), a speed command value or torque limit value command can be enabled.

Note: The criterion for the DC voltage is different between the external speed setting device and the DC voltage control.

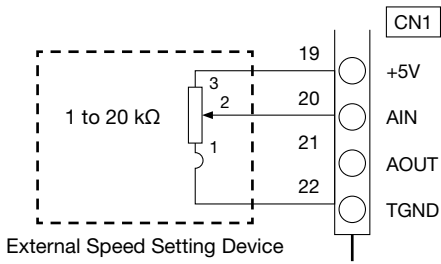
Connect the wires by referring to the following wiring examples:

● External speed setting device wiring example

An external speed setting device is available as an option.

If you prepare an external speed setting device from another vendor, select one within the range of 1 to 20 kΩ.

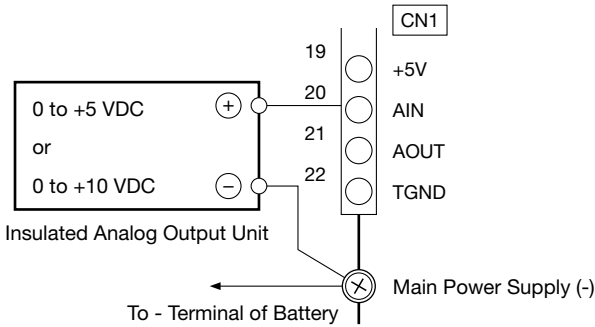
Do not connect TGND to any terminal other than terminal No. 1 of the external speed setting device.



● DC voltage control wiring example

If you intend to use an analog output unit or the like, one having an insulated output is recommended.

Connect the - output terminal of the analog output unit directly to the drive main power supply (-).



VC/APG Type  
Parallel Shaft

VH Type  
Right Angle Shaft

VF3S/VF3F Type  
Concentric Right Angle Hollow Bore  
F3S Type Right Angle Shaft

Control Unit Specification

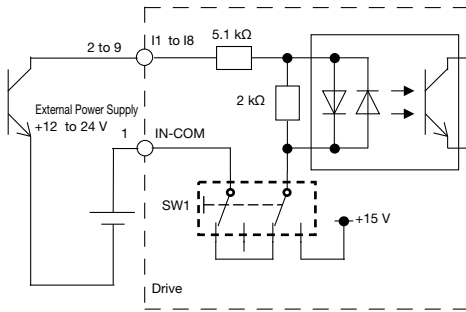
Technical Documentation

## SD Series 0.75 kW

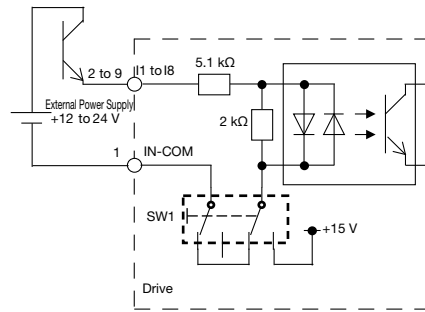
### Control Input

- When using an external power supply (Set SW1 to the O side (default).)

<Sink Connection>

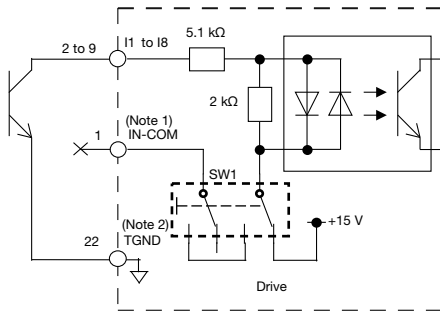


<Source Connection>

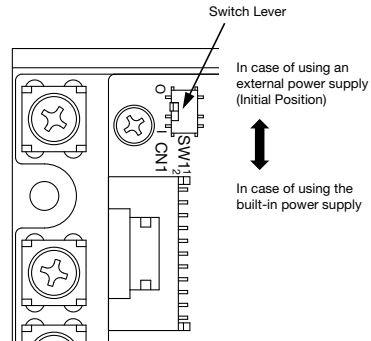


- When using the built-in power supply (Set SW1 to the I side.)

<Sink Connection>



Note 1: IN-COM will not be used when using the built-in power supply  
 Note 2: Perform wiring by reference to Precautions for wiring on page 648.

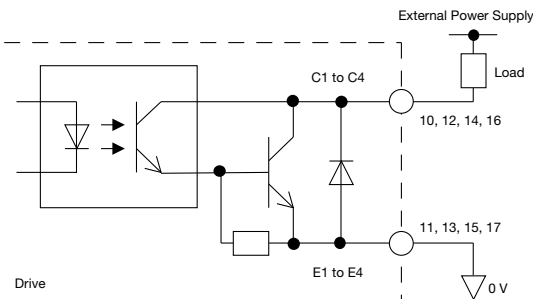


### Control Output

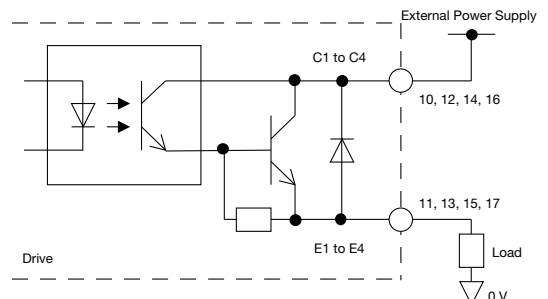
- Maximum rated value of control output

Maximum voltage between C and E		30 V
Maximum current	C1/E1, C2/E2	100 mA
	C3/E3, C4/E4	50 mA

<Sink Connection>



<Source Connection>



VG/PG Type  
Parallel Shaft

VH Type  
Right Angle Shaft

VF3S/VF3F Type  
Concentric Right-Angle Hollow Shaft  
Concentric Right-Angle Shaft  
F3S Type Right-Angle Shaft

Control Unit Specification

Technical Documentation

**SD Series 0.75 kW**

**External Analog Input**

By inputting a DC voltage to the AIN terminal (external analog input terminal), a speed command value or torque limit value command can be enabled.

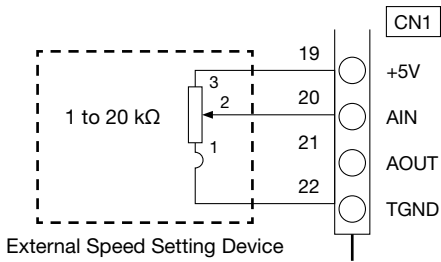
Note: The criterion for the DC voltage is different between the external speed setting device and the DC voltage control.

Connect the wires by referring to the following wiring examples:

● External speed setting device wiring example

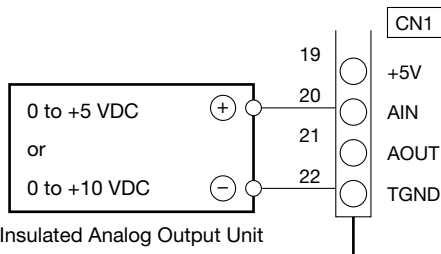
An external speed setting device is available as an option.

If you prepare an external speed setting device from another vendor, select one within the range of 1 to 20 kΩ.



● DC voltage control wiring example

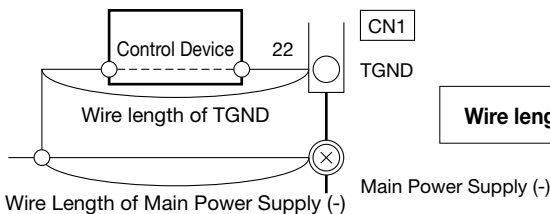
If you intend to use an analog output unit or the like, one having an insulated output is recommended.



● Precautions for wiring

When TGND and the main power supply (-) are connected outside the drive, the current flowing through the main power supply (-) will be diverted to the TGND side. Each current value depends on the wiring resistance. If a current of 2 A or more flows to the TGND side, it may cause damage to the drive and control device. Perform wiring under the conditions shown below.

Wire to be connected to TGND: 0.4 mm (AWG26) or less in diameter  
 Wire to be Connected to main power supply (-): 1.6 mm (AWG14) or more in diameter





# Parameter List

## User Parameters

### How to Set Parameters

User parameters can be changed using the software “ACD-PSTool” for computer (hereinafter referred to as PC).

Note: “ACD-PSTool” can be downloaded from our website for free.

Note: The communication cable between a PC (RS-232C) and the drive is an optional item (sold separately).

- The operation check of “ACD-PSTool” is performed by any of the following operating systems:  
Windows7®, Windows8®, Windows8.1®, and Windows10®

### Parameter List

- Attributes

Each parameter has an attribute. Read the descriptions below.

Attribute	Description
P	When the parameter is changed, the setting will become effective after rebooting The previous setting will remain effective until the power is rebooted.
S	When the parameter is changed, the setting will become effective after the motor stops or the power is rebooted. The previous setting will remain effective while the motor is operating.
D	As soon as the parameter is changed, the new setting will become effective.

## Command Parameters: Parameters Related to Command Settings

No.	Name	Description	Unit	Setting Range		Default Value		Attribute
				V Series	SD Series	V Series	SD Series	
Pn000	Speed Command Source Selection	Used to select a speed command method. 1: External analog command 2: PWM speed command 3: Pulse frequency speed command 4: Built-in trimmer 1 5: Speed command 1 (Pn001)	—	1 to 5	1 to 5	1	1	S
Pn001	Speed Command 1	Used to set speed command 1.	r/min	100 to 3000	80 to 4000	2500	3000	D
Pn002	Speed Command 2	Used to set speed command 2.	r/min	100 to 3000	80 to 4000	2500	3000	D
Pn003	Speed Command 3	Used to set speed command 3.	r/min	100 to 3000	80 to 4000	2500	3000	D
Pn004	Speed Command 4	Used to set speed command 4.	r/min	100 to 3000	80 to 4000	2500	3000	D
Pn005	Speed Command 5	Used to set speed command 5.	r/min	100 to 3000	80 to 4000	2500	3000	D
Pn006	Speed Command 6	Used to set speed command 6.	r/min	100 to 3000	80 to 4000	2500	3000	D
Pn007	Speed Command 7	Used to set speed command 7.	r/min	100 to 3000	80 to 4000	2500	3000	D
Pn008	Speed Command 8	Used to set speed command 8.	r/min	100 to 3000	80 to 4000	2500	3000	D
Pn020	Acceleration/Deceleration Time Command Source Selection	Used to select the command method for acceleration/deceleration time 1. 1: Built-in trimmer 2 2: Acceleration time 1, deceleration time 1	—	1 to 2	1 to 2	1	1	S
Pn021	Acceleration Time 1	Used to set acceleration time 1 from 0 r/min to the acceleration/deceleration time standard speed (Pn025).	s	0.00 to 5.00	0.00 to 5.00	0.1	0.1	D
Pn022	Deceleration Time 1	Used to set deceleration time 1 from the acceleration/deceleration time standard speed (Pn025) to 0 r/min.	s	0.00 to 5.00	0.00 to 5.00	0.1	0.1	D
Pn023	Acceleration Time 2	Used to set acceleration time 2 from 0 r/min to the acceleration/deceleration time standard speed (Pn025).	s	0.00 to 5.00	0.00 to 5.00	0.1	0.1	D
Pn024	Deceleration Time 2	Used to set deceleration time 2 from the acceleration/deceleration time standard speed (Pn025) to 0 r/min.	s	0.00 to 5.00	0.00 to 5.00	0.1	0.1	D
Pn025	Acceleration/Deceleration Time Standard Speed	Used to set the acceleration/deceleration time standard speed. Acceleration time: Time from 0 r/min to this parameter Deceleration time: Time from this parameter to 0 r/min	r/min	1000 to 5000	1000 to 5000	2500	3000	S

Attribute S: The change will become applicable after the motor stops or the power is rebooted. D: The change will become applicable at any time.

VG/AGP Type  
Parallel Shaft

VH Type  
Right Angle Shaft

VF3S/VF3F Type  
Concentric Right-Angle Hollow Shaft  
VF3 Type Right-Angle Shaft

Control Unit Specification

Technical Documentation

No.	Name	Description	Unit	Setting Range	Default Value		Attribute
					V Series	SD Series	
Pn030	Torque Limit Value Command Source Selection	Used to select the command method for torque limit value 1. 1: External analog command 2: Built-in trimmer 3 3: Torque Limit Value 1	—	1 to 3	2	2	S
Pn031	Torque Limit Value 1	Used to set torque limit value 1.	%	0 to 200	150	150	D
Pn032	Torque Limit Value 2	Used to set torque limit value 2.	%	0 to 200	150	150	D
Pn033	Torque Limit Value 3	Used to set torque limit value 3.	%	0 to 200	150	150	D
Pn034	Torque Limit Value 4	Used to set torque limit value 4.	%	0 to 200	150	150	D
Pn040	Built-in Trimmer 1/ PWM Speed Command Standard Speed	Used to set the standard speed of the built-in trimmer and the PWM speed command (Duty 100 %).	r/min	100 to 5000	3000	4000	S
Pn041	Frequency Setting for Pulse Frequency Speed Command	Used to set the frequency of the pulse frequency speed command at the standard speed (Pn042).	×10Hz	1 to 9999	2500	3000	S
Pn042	Standard Speed for Pulse Frequency Speed Command	Used to set the standard speed of the pulse frequency speed command.	r/min	1 to 5000	2500	3000	S
Pn043	PWM Speed Command Frequency	Used to set the frequency of PWM signal to be input.	Hz	10 to 100000 (Note 1)	1000	1000	S
Pn050	External Analog Input Level	Used to set the voltage level of the external analog input. 1: 0 to 10 V 2: 0 to 5 V	—	1 to 2	2	2	S
Pn051	Analog Input Gain	Used to set the inclination of the external analog command.	(r/min) /V or %/V	-9.99 to 9.99	0.6	0.8	S
Pn052	Analog Input Offset	Used to set the offset of the external analog command.	r/min or V%	0 to 9999	0	0	S
Pn060	Analog Output Selection	Used to set the function to be outputted in analog form. 1: Speed (The actual speed of the motor will be outputted.) 2: Load co-efficient (The load co-efficient of the motor will be outputted.) 3: Commanded speed (The commanded speed of the drive will be outputted.)	—	1 to 3	1	1	D
Pn061	Analog Output Gain	Used to set the inclination of the analog output.	V/(r/min) or V/%	-99.99 to 99.99	1.00	1.00	D
Pn062	Analog Output Offset	Used to set the offset of the analog output.	V	0.00 to 5.00	0.00	0.00	D

Attribute S: The change will become applicable after the motor stops or the power is rebooted. D: The change will become applicable at any time.  
Note 1: Frequencies of 10 to 1000 Hz can be set in increments of 1 Hz, and frequencies of 1000 to 100000 Hz can be set in increments of 10 Hz.

### ■ Pn030 Torque Limit Value Command Source Selection/Pn031 to Pn034 Torque Limit Value 1 to 4

These parameters are used to set motor output torque limit values.

Select a torque limit value using Multi-function Input: Torque Limit Value Selection 1 and 2.

The torque limit values corresponding to the combinations shown in the table below can be commanded by changing the ON/OFF state of the input terminals to which Torque Limit Value Selection 1 and 2 are assigned.

When both Torque Limit Value Selection 1 and 2 are set to OFF, change the setting of Torque Limit Value 1 Selection (Pn030) to select the command method for the torque limit value.

Torque Limit Value Selection 1	Torque Limit Value Selection 2	Torque Command	
OFF	OFF	Torque Limit Value Command Source Selection (Pn030)	1: External Analog Command 2: Built-in Trimmer 3 3: Torque Limit Value 1 (Pn031)
ON	OFF	Torque Limit Value 2 (Pn032)	
OFF	ON	Torque Limit Value 3 (Pn033)	
ON	ON	Torque Limit Value 4 (Pn034)	

## Command parameters: Parameters related to command settings

No.	Name	Description	Unit	Setting Range	Default Value	Attribute
Pn100	I1 Input Function Selection	Used to select the function of input terminal 1.	—	1 to 12	1	P
Pn101	I2 Input Function Selection	Used to select the function of input terminal 2.	—	1 to 12	2	P
Pn102	I3 Input Function Selection	Used to select the function of input terminal 3.	—	1 to 12	3	P
Pn103	I4 Input Function Selection	Used to select the function of input terminal 4.	—	1 to 12	4	P
Pn104	I5 Input Function Selection	Used to select the function of input terminal 5.	—	1 to 12	6	P
Pn105	I6 Input Function Selection	Used to select the function of input terminal 6.	—	1 to 12	7	P
Pn106	I7 Input Function Selection	Used to select the function of input terminal 7.	—	1 to 12	9	P
Pn107	I8 Input Function Selection	Used to select the function of input terminal 8.	—	1 to 14	14	P
Pn110	I1 Input Polarity Selection	Used to select the polarity of input terminal 1.	—	0 to 1	0	P
Pn111	I2 Input Polarity Selection	Used to select the polarity of input terminal 2.	—	0 to 1	0	P
Pn112	I3 Input Polarity Selection	Used to select the polarity of input terminal 3.	—	0 to 1	0	P
Pn113	I4 Input Polarity Selection	Used to select the polarity of input terminal 4.	—	0 to 1	0	P
Pn114	I5 Input Polarity Selection	Used to select the polarity of input terminal 5.	—	0 to 1	0	P
Pn115	I6 Input Polarity Selection	Used to select the polarity of input terminal 6.	—	0 to 1	0	P
Pn116	I7 Input Polarity Selection	Used to select the polarity of input terminal 7.	—	0 to 1	1	P
Pn117	I8 Input Polarity Selection	Used to select the polarity of input terminal 8.	—	0 to 1	0	P
Pn120	C1-E1 Output Function Selection	Used to select the function of output terminal 1.	—	1 to 11	1	P
Pn121	C2-E2 Output Function Selection	Used to select the function of output terminal 2.	—	1 to 11	2	P
Pn122	C3-E3 Output Function Selection	Used to select the function of output terminal 3.	—	1 to 11	3	P
Pn123	C4-E4 Output Function Selection	Used to select the function of output terminal 4.	—	1 to 11	8	P
Pn125	C1-E1 Output Polarity Selection	Used to select the polarity of output terminal 1.	—	0 to 1	1	P
Pn126	C2-E2 Output Polarity Selection	Used to select the polarity of output terminal 2.	—	0 to 1	0	P
Pn127	C3-E3 Output Polarity Selection	Used to select the polarity of output terminal 3.	—	0 to 1	0	P
Pn128	C4-E4 Output Polarity Selection	Used to select the polarity of output terminal 4.	—	0 to 1	0	P

P: The change will become applicable after the power is rebooted.

### Input Terminal Function List

Setting	Function
1	CW drive command
2	CCW drive command
3	Speed Command Selection 1
4	Speed Command Selection 2
5	Speed Command Selection 3
6	Acceleration/Deceleration time selection
7	Torque Limit Value Selection 1
8	Torque Limit Value Selection 2
9	Alarm reset/Emergency stop
10	Brake control signal forced ON command
11	Direct current lock
12	Load inertia switch
13	PWM speed command
14	Pulse Frequency Speed Command

### Output Terminal Function List

Setting	Function
1	Error detection
2	In Operation
3	Rotation Pulse
4	CW rotation pulse
5	CCW rotation pulse
6	Rotational Direction
7	Rotating
8	Over Rated Torque
9	Over specified torque
10	Brake control signal
11	Voltage drop warning

Note 1: The brake control signal is available from software Ver. 0004. Do not use a drive of Ver. 0003 or older version.

VG/AG Type  
Parallel Shaft

VH Type  
Right Angle Shaft

VF3S/VF3F Type  
Concentric Right-Angle Hollow Shaft  
Concentric Right-Angle Shaft  
F3S Type Right-Angle Shaft

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### Comparison Parameters: Parameters Related to Comparisons of Output Functions

No.	Name	Description	Unit	Setting Range	Default Value	Attribute
Pn151	Current Limit Value upon Direct Current Lock	Used to set the current value (rated current ratio) when the direct current lock is activated.	%	0 to 100	30	D
Pn160	Torque Detection Level	Used to set the current value (rated current ratio) at which the output of over specified torque will be turned ON.	%	0 to 200	80	S
Pn161	Torque Detection Hysteresis Width	Used to set the hysteresis width (rated current ratio) at which the output of over specified torque will be turned OFF.	%	0 to 50	10	S
Pn165	Rated Torque Detection Hysteresis Width	Used to set the hysteresis width (rated current ratio) of the torque at which the output of over rated torque will be turned OFF.	%	0 to 50	10	S

### Mechanical Brake Parameters: Parameters Related to the Mechanical Brake

No.	Name	Description	Unit	Setting Range	Default Value		Attribute
					V Series	SD Series	
Pn170	Mechanical Brake Release Speed Level	Used to set the internal commanded speed value at which the brake control signal will be turned ON.	r/min	1 to 1000	20	20	S
Pn171	Mechanical Brake Operation Speed Level	Used to set the internal commanded speed at which the brake control signal will be turned OFF.	r/min	0 to 1000	20	20	S
Pn172	Mechanical Brake Release Standby Time	Used to set the delay time until the signal is actually turned ON after the internal commanded speed reaches or exceeds the brake control signal ON speed.	s	0.000 to 2.000	0.005	0.005	S
Pn173	Mechanical Brake Operation Standby Time	Used to set the delay time until the signal is actually turned OFF after the internal commanded speed reaches or exceeds the brake control signal OFF speed.	s	0.000 to 2.000	0.005	0.005	S
Pn175	Input Voltage Drop Warning Voltage	Used to set the voltage that will issue an input voltage drop warning alarm.	V	0.0 to 50.0	12 V:10.0 24 V:20.0 48 V:40.0	40.0	D
Pn180	Dynamic Brake Transition Speed	Used to set the speed of transition to the dynamic brake during a deceleration stop.	r/min	30 to 5000	50 W:3000 100 W:3000 200 W:500 400 W:500	4000	S

Attribute S: The change will become applicable after the motor stops or the power is rebooted. D: The change will become applicable at any time.

V3/APG Type  
Parallel Shaft

VH Type  
Right Angle Shaft

VF3S/VF3F Type  
Concentric Right Angle Hollow Bore Concentric Right Angle Shaft  
F3S Type Right Angle Shaft

Control Unit Specification

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## Gain Parameters: Parameters Related to Gains

No.	Name	Description	Unit	Setting Range		Default Value		Attribute
				V Series	SD Series	V Series	SD Series	
Pn200	Rigidity Table	Used to set a rigidity table. After the setting is completed, the following parameters will be changed to the set values in each table. - Speed Control Proportional Gain (Pn201) - Speed Control Integral Time (Pn202) - Torque Filter Time Constant (Pn203)	—	1 to 5	1 to 5	3	3	S
Pn201	Speed Control Proportional Gain	Used to set the proportional gain of speed control.	—	0 to 200	0 to 200	100	180	D
Pn202	Speed Control Integral Time	Used to set the integral time of speed control. Integral control will be disabled when "0" is set.	—	0 to 1000	0 to 1000	80	80	D
Pn203	Torque Filter Time Constant	Used to set the time constant of the torque filter.	ms	0.0 to 10.0	0.0 to 10.0	2.0	2.0	D
Pn204	Moment of Inertia Ratio 1	Used to set the moment of inertia ratio of the connected load. Set the percentage of the moment inertia to the motor rotor inertia as the motor shaft equivalent.	%	0 to 9999	0 to 9999	0	0	D
Pn205	Moment of Inertia Ratio 2	Used to set the moment of inertia ratio of the connected load. Set the percentage of the moment inertia to the motor rotor inertia as the motor shaft equivalent.	%	0 to 9999	0 to 9999	0	0	D
Pn250	Overload Selection	Used to select a method for detecting overload alarms. <V Series> 1: Detection based on the overload application time 2: Detection based on the electronic thermal. <SD Series> Cannot be changed.	—	1 to 2	2	2	2	S
Pn300	User Parameter reset	When "5" is set, the user parameters will reset, and this parameter will become "0."	—	0 to 5	0 to 5	0	0	P

P: The change will become applicable after the power is rebooted.  
S: The change will become applicable after the motor stops or the power is rebooted.  
D: The change will become applicable at any time.

## ■ Rigidity Table List

Setting	Speed Control Proportional Gain		Speed Control Integral Time		Torque Filter Time Constant	
	V Series	SD Series	V Series	SD Series	V Series	SD Series
1	60	160	120	100	3.0	3.0
2	80	170	100	90	2.5	2.5
3	100	180	80	80	2.0	2.0
4	120	190	60	70	1.5	1.5
5	140	200	40	60	1.0	1.0

VG/AG Type  
Parallel Shaft

VH Type  
Right Angle Shaft

VF3S/VF3F Type  
Concentric Right-Angle Hollow Bore Concentric Right-Angle Shaft  
F3S Type Right-Angle Shaft

Control Unit Specification

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# Safeguard Function List

When an error is detected, this drive will output an error detection signal and display the error state with an LED lamp. (LED1 (red) will light up, or LED3 (green) will light up or blink.)  
 Moreover, in case of an error, the motor will enter the emergency stop state (free run state), regardless of the operating state. In such a case, the brake control signal will be turned OFF, and the brake control signal forced ON command will become disabled.

To resolve the error detection state, eliminate all factors that caused the alarm, and reset the alarm.

The PC software “ACD-PSTool” enables you to check the history of errors that occurred in the past. For details, refer to the instruction manual for “ACD-PSTool”.

V/G/AG Type  
Parallel Shaft

VH Type  
Right Angle Shaft

V/F3S/V/F3F Type  
Concentric Right Angle Hollow Bore Concentric Right Angle Shaft  
F3S Type Right Angle Shaft

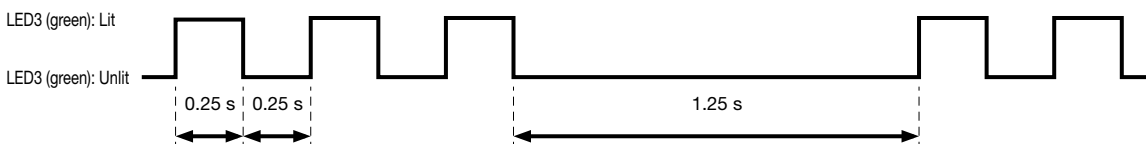
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## Drives error list and display method

The following list shows the blinking patterns of LED3 (green) when errors are detected, and the conditions under which alarms will be issued.

Number of blinks of LED 3 (green)	Alarm Name	Alarm Issuing Condition
0 times (stays lit)	Overload	An alarm will be issued based on the operation time in overload operation. Two detection methods, detection based on the lapse of given time and detection by electronic thermal, are available. *Refer to the explanation of the user parameter Pn250 for details.
Once	Overvoltage	An alarm will be issued if the input voltage of the drive exceeds the maximum input voltage.
Twice	Voltage drop	An alarm will be issued if the input voltage of the drive drops below the minimum input voltage when the motor is in operation (including special lock).
Three times	Drive overheat	An alarm will be issued if the temperature of the drive heat sink exceeds 85 °C.
Four times	Overspeed	An alarm will be issued if the speed of the motor (including when the motor is rotated) exceeds 1.2 times the maximum speed.
Five times	Overcurrent	An alarm will be issued if a current 500 to 600 % or more of the rated current of the motor flows into the drive.
Six times	Sensor error	An alarm will be issued if the pattern of the hall signal pattern is HHH or LLL.
Ten times	System error	An alarm will be issued if there is an error inside the drive.



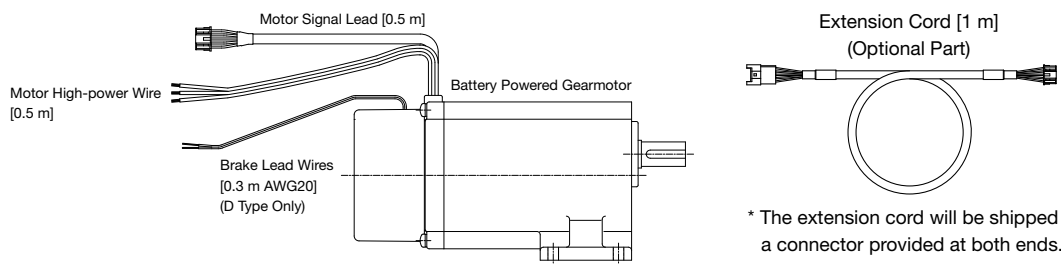
# Connection Method and Installation

## Connection Method

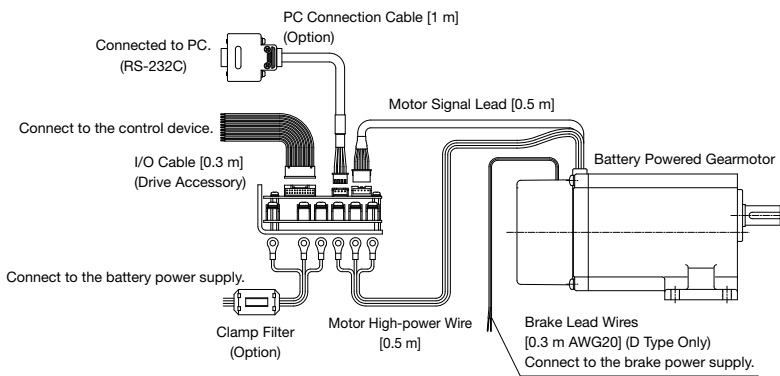
### V Series: 50 W to 0.4 kW

Connect devices as shown in the figure below.

- The length of the cords from the gearmotor is 0.5 m.
- Use the optional extension cord if you need to extend the motor signal lead.
- When extending a cord by connecting optional extension cords, the overall length must not exceed 4.5 m (up to four extension cords).
- Extension cords are not available for the motor's power wire and the brake lead wires.  
Please use a cord with a wire diameter not smaller than the wire diameter specified on page 626, with length of 5 m or less. Minimize the length of the motor power wire. Otherwise the characteristics may be impaired



### Example of Connection to Our Drives



## Motor Signal Lead and Power Wire

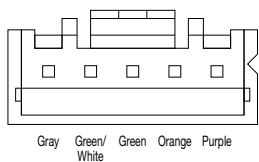
### Signal Lead Colors and Signal Names

Color of Lead Wire	Function
Purple	Pole sensor power supply (15 V for our drive)
Orange	U-phase pole signal output (open collector)
Green	V-phase pole signal output (open collector)
Green/White	W-phase pole signal output (open collector)
Gray	GND

### Motor Power Wire Colors and Signal Names

Color of Lead Wire	Description
Red	U-Phase
White	V-Phase
Black	W-Phase

### Connector Pin Arrangement



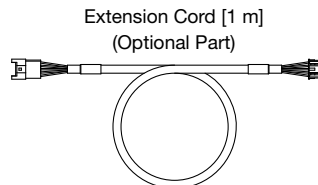
### Brake Lead Wire Colors and Voltage Specifications

Color of Lead Wire	Voltage
Yellow	12 V specification
White	24 V specification
Orange	48 V specification

### SD Series 0.75 kW

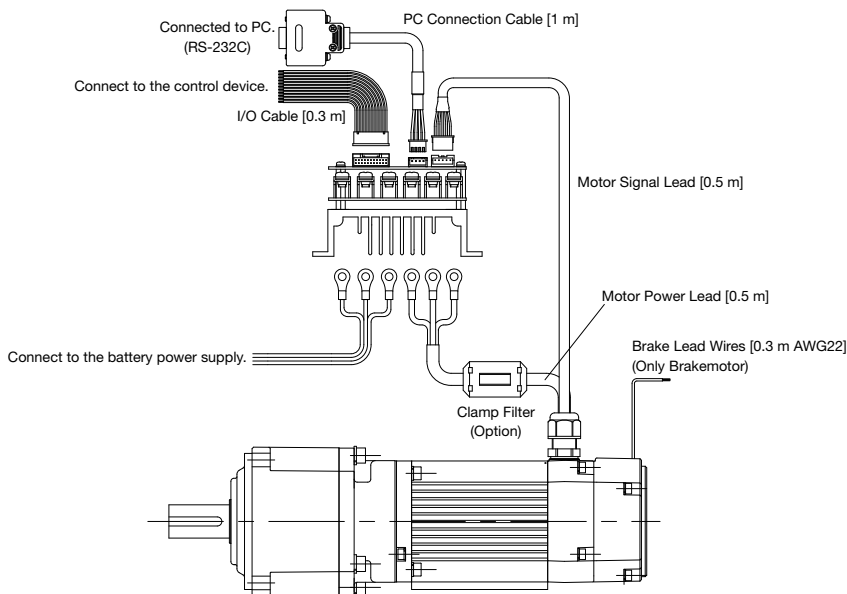
Connect devices as shown in the figure below.

- The length of the cords from the gearmotor is 0.5 m.
- Use the optional extension cord if you need to extend the motor signal lead.
- When extending a cord by connecting optional extension cords, the overall length must not exceed 4.5 m (up to four extension cords).
- Extension cords are not available for the motor power lead and the brake lead wires. Please use a cord with a wire diameter not smaller than the wire diameter specified on page 626, with length of 5 m or less. Minimize the length of the motor power lead. Otherwise the characteristics may be impaired



\* The extension cord will be shipped with a connector provided at both ends.

### Example of Connection to Our Drives



### Motor Signal Lead and Power Lead

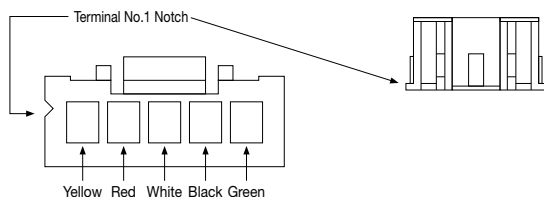
#### Signal Lead Colors and Signal Names

Color of Lead Wire	Function
Yellow	Pole sensor power supply (15 V for our drive)
Red	U-phase pole signal output (open collector)
White	V-phase pole signal output (open collector)
Black	W-phase pole signal output (open collector)
Green	GND

#### Motor Power Lead Colors and Signal Names

Color of Lead Wire	Description
Red	U-Phase
White	V-Phase
Black	W-Phase

#### Connector Pin Arrangement



#### Brake Lead Wire Colors and Voltage Specifications

Color of Lead Wire	Voltage
Brown	48 V specification



# Precautions for Installation

When installing drives, keep the following precautions in mind:

## ■ Installation Environment

Ambient Temperature: -10 °C to 50 °C

Ambient Humidity: 95 % RH max (No condensation)

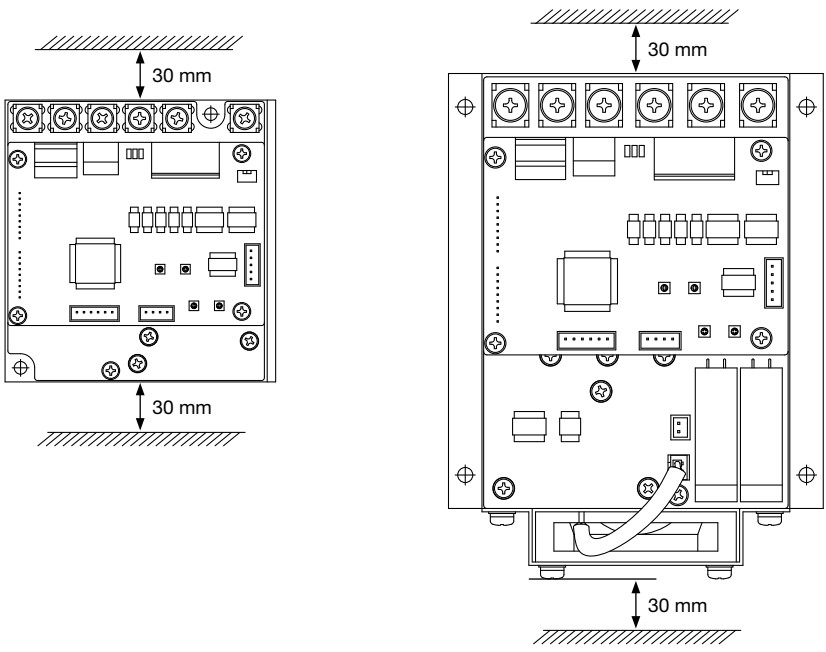
Altitude: 1000 m or lower

Environment: A place free from corrosive gas, explosive gas, and/or vapor. Well ventilated place with no dust.

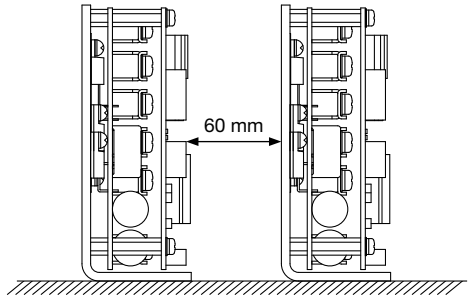
Vibration: 2.0 G or less

Installation Place: Indoors

- \* When installing a drive, place it in a switchboard or take other measures to prevent foreign substances from entering it.
- \* There is no restriction on the mounting posture of the drive, but keep a clearance of 30 mm or more above and below the drive.



When installing drives side by side, keep an interval of 60 mm or more between them.

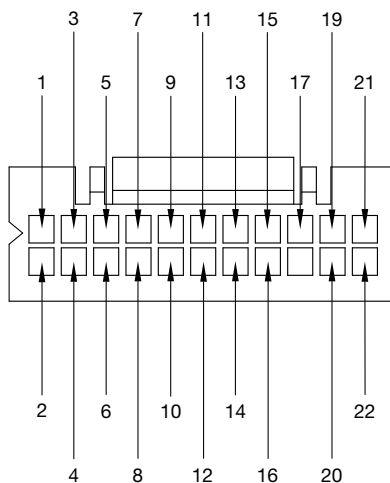
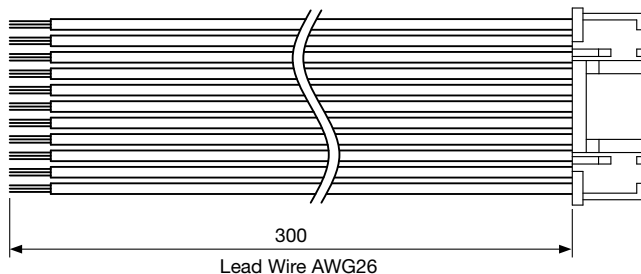


VG/APG Type Parallel Shaft
VH Type Right Angle Shaft
VF3S/VF3F Type Concentric Right-Angle Hollow Shaft Concentric Right-Angle Shaft F3S Type Right-Angle Shaft
Control Unit Specification
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# Accessories

## I/O Cable (to Be Connected to CN1)

No.	Description	Color
1	IN-COM	Yellow
2	I1	
3	I2	
4	I3	
5	I4	
6	I5	
7	I6	
8	I7	
9	I8	Green
10	C1	
11	E1	
12	C2	
13	E2	
14	C3	
15	E3	
16	C4	
17	E4	Orange
18	—	
19	+5V	
20	AIN	
21	AOUT	
22	TGND	



Code	Manufacturer	Type on Board Side	Type on I/O Cable Side
CN1	J.S.T.MFG.CO.,LTD.	S22B-PUDSS-1	Compatible Housing: PUDP-22V-S
			Adaptable Terminal: SPUD-001T-P0.5

VG/AG Type  
Parallel Shaft

VH Type  
Right Angle Shaft

VF3S/VF3F Type  
Concentric Right Angle Hollow Bore/Concentric Right Angle Shaft  
F3S Type/Right Angle Shaft

Control Unit Specification

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# MEMO

VG/APG Type Parallel Shaft	VH Type Right Angle Shaft	V/FSM/FSF Type Concentric Right Angle Hollow Bore Concentric Right Angle Shaft F5S Type Right Angle Shaft	Control Unit Specification	Technical Documentation
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