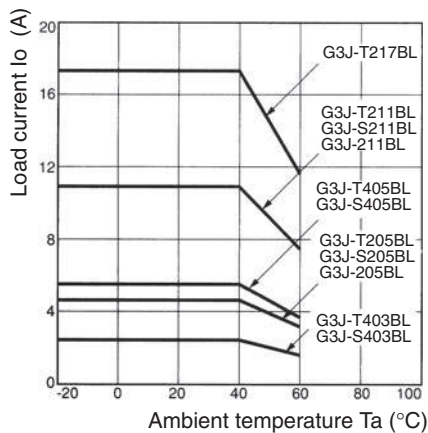


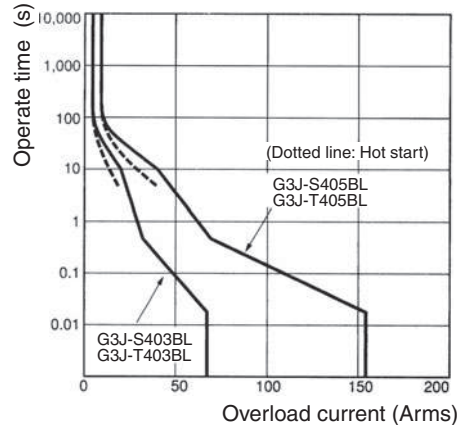
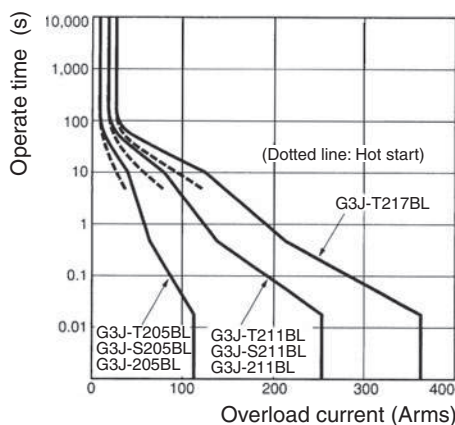
## Engineering Data

### Load Current vs. Ambient Temperature



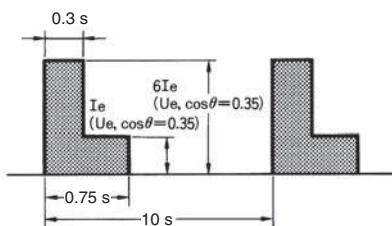
### Overload Current Resistivity

Conditions: 60 Hz,  $T_a$  of 25°C, non-repetitive (1/2 for repetitive)



### Switching Frequency Test Conditions (AC3/AC4/AC53-a)

#### AC3 Class (Immediate Start)



$I_e$ : Rated carry current  
 $U_e$ : Rated load voltage (200/400 V)

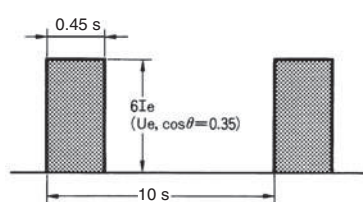
The following Soft-start conditions apply.

Ramp-up time: 1 s  
 Starting torque: 450%  $I_n$

The following Soft-start/stop conditions apply:

Ramp-up time: 1 s  
 Ramp-down time: 1 s  
 Starting torque: 450%  $I_n$

#### AC4 Class (Inching)



$I_e$ : Rated carry current  
 $U_e$ : Rated load voltage (200/400 V)

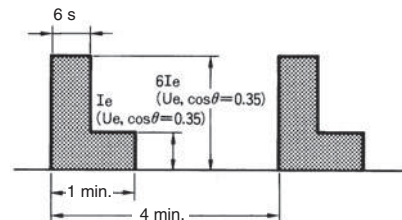
The following Soft-start conditions apply.

Ramp-up time: 1 s  
 Starting torque: 450%  $I_n$

The following Soft-start/stop conditions apply:

Ramp-up time: 1 s  
 Ramp-down time: 1 s  
 Starting torque: 450%  $I_n$

#### AC53-a: 6-6: 25-15



$I_e$ : Rated carry current  
 $U_e$ : Rated load voltage (200/400 V)

The following Soft-start conditions apply.

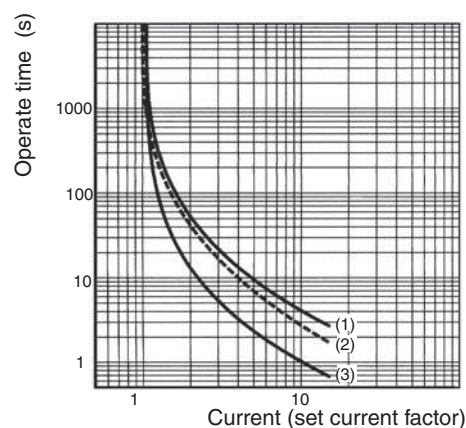
Ramp-up time: 1 s  
 Starting torque: 450%  $I_n$

The following Soft-start/stop conditions apply:

Ramp-up time: 1 s  
 Ramp-down time: 1 s  
 Starting torque: 450%  $I_n$

## ■ Recommended Thermal Overload Performance

### Overload Characteristics



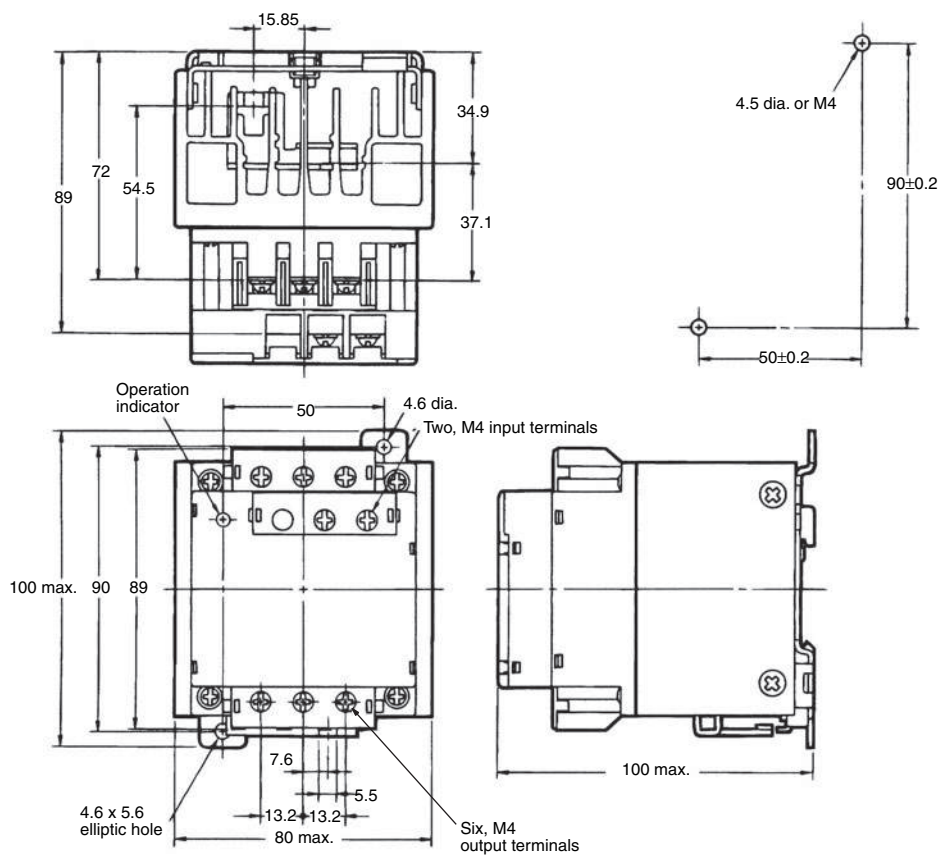
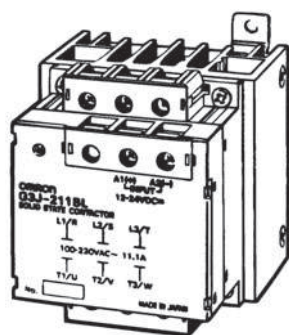
- (1): Balanced operation, 3-phase, from cold state
- (2): Balanced operation, 2-phase, from cold state
- (3): Balanced operation, 3-phase, after a long period of set current flow (hot state).

## Dimensions

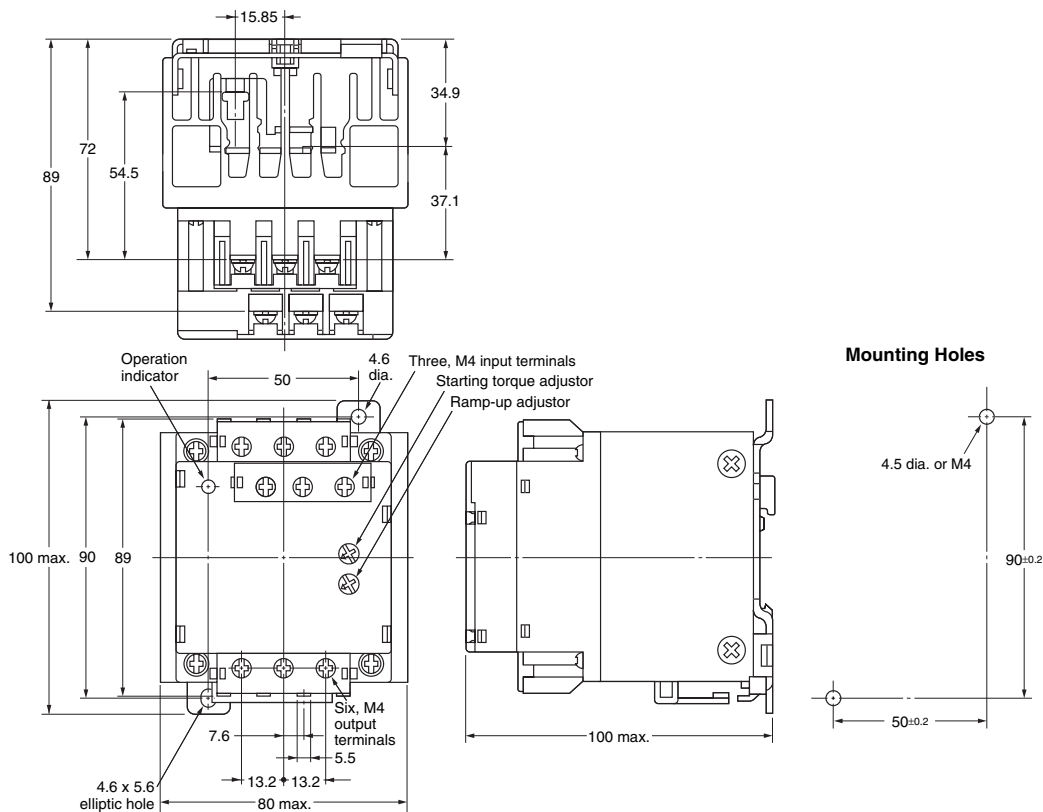
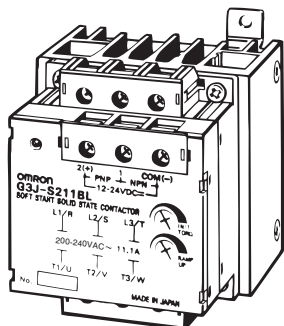
**Note:** All units are in millimeters unless otherwise indicated.

### ■ Solid State Contactors

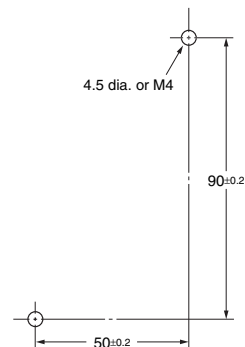
G3J-211BL  
G3J-205BL  
G3J-211BL-2  
G3J-205BL-2



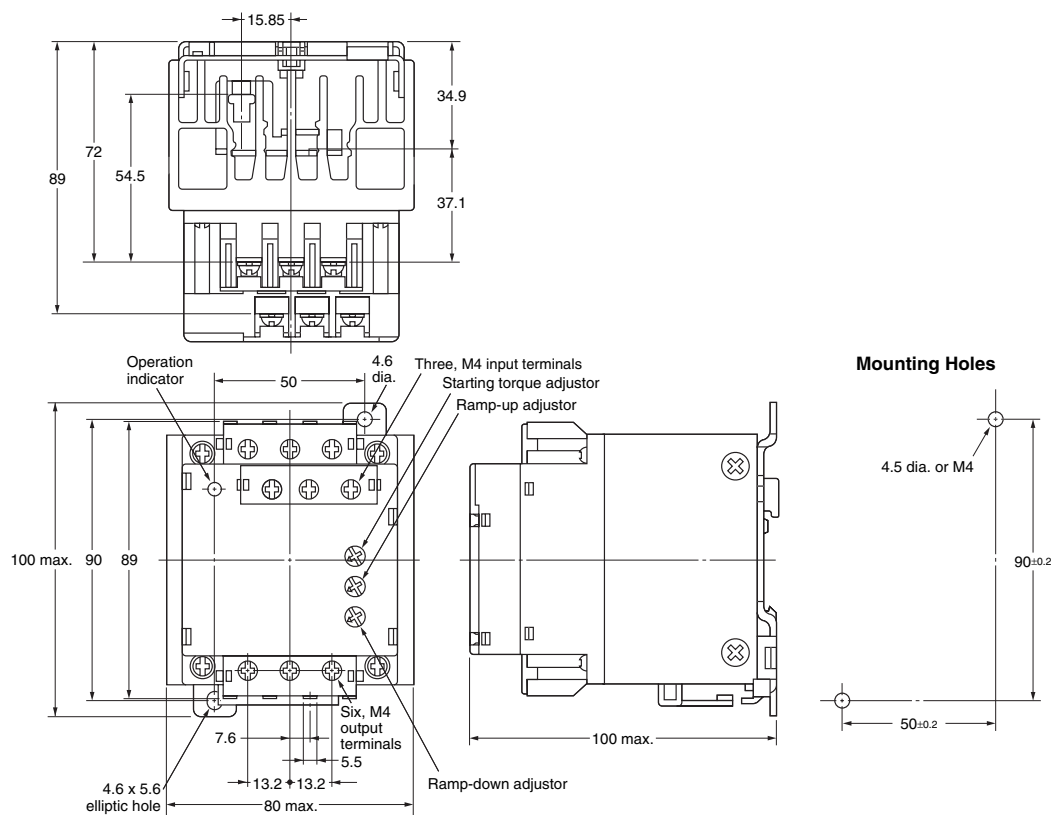
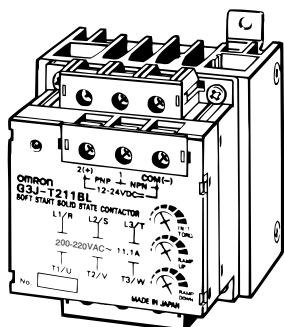
**G3J-S211BL**  
**G3J-S205BL**  
**G3J-S405BL**  
**G3J-S403BL**



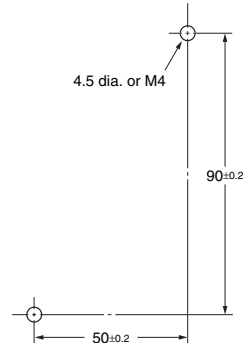
**Mounting Holes**



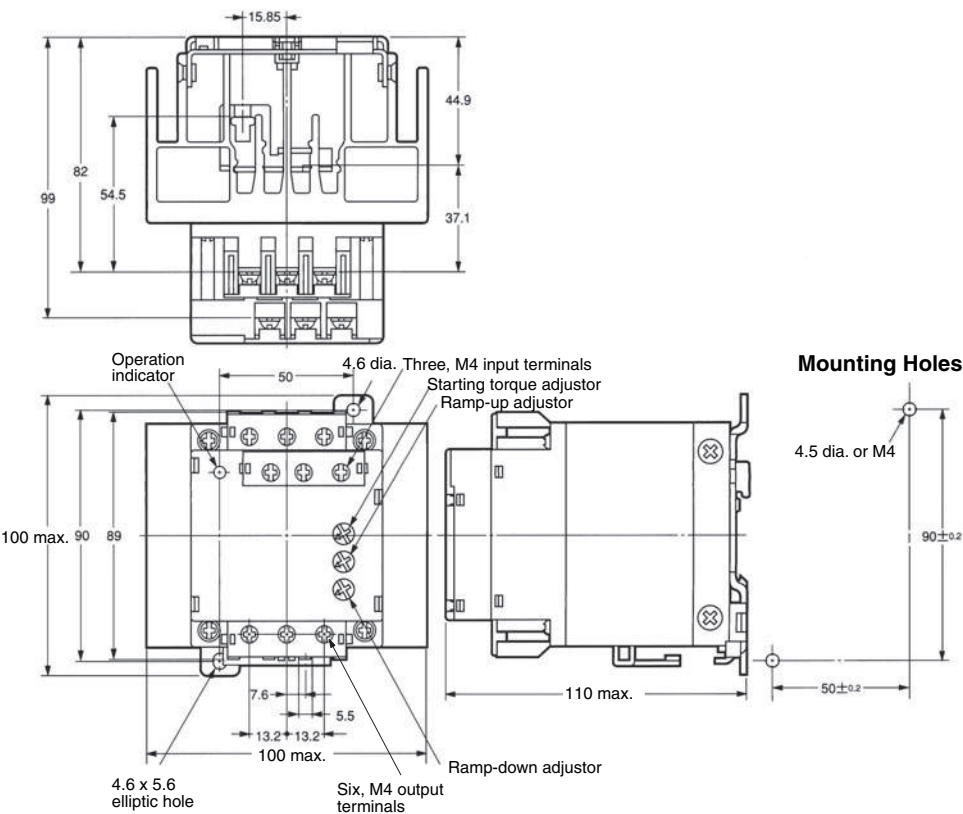
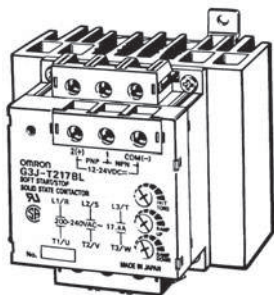
**G3J-T211BL**  
**G3J-T205BL**  
**G3J-T405BL**  
**G3J-T403BL**



**Mounting Holes**



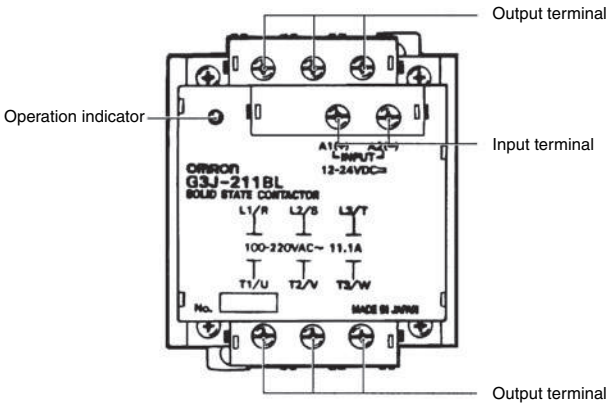
G3J-T217BL



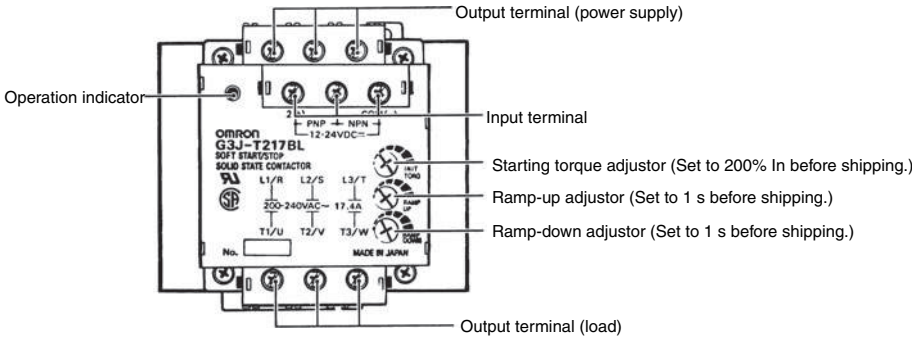
# Installation

## ■ Nomenclature

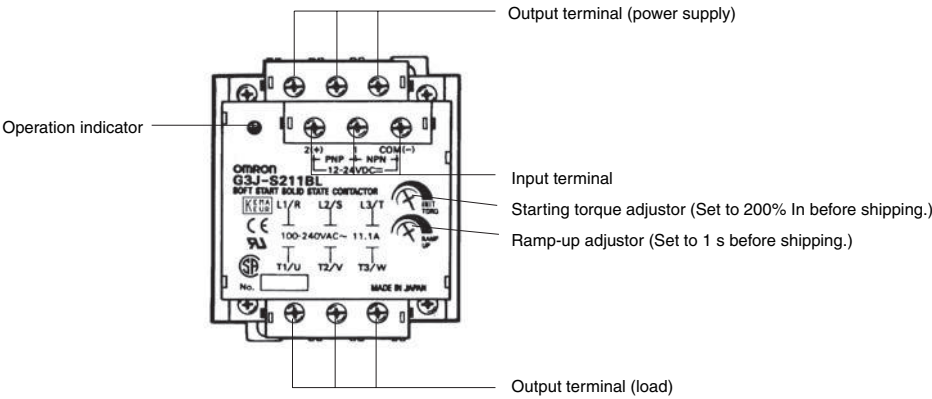
### G3J



### G3J-T

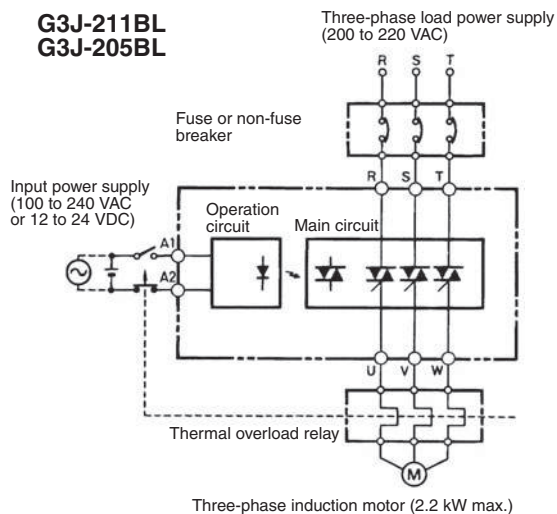


### G3J-S

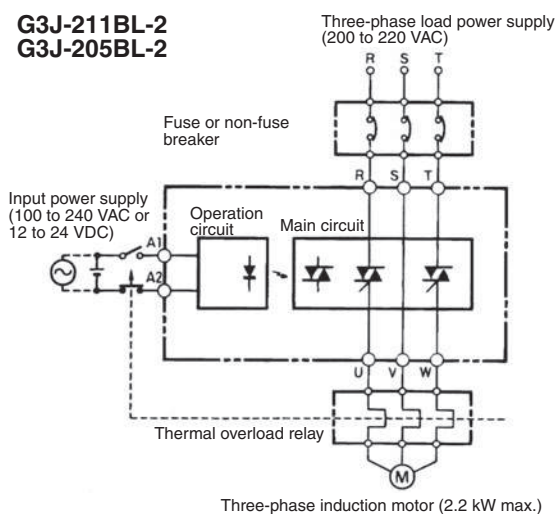


# Internal Connections

## Simple 3-element Models

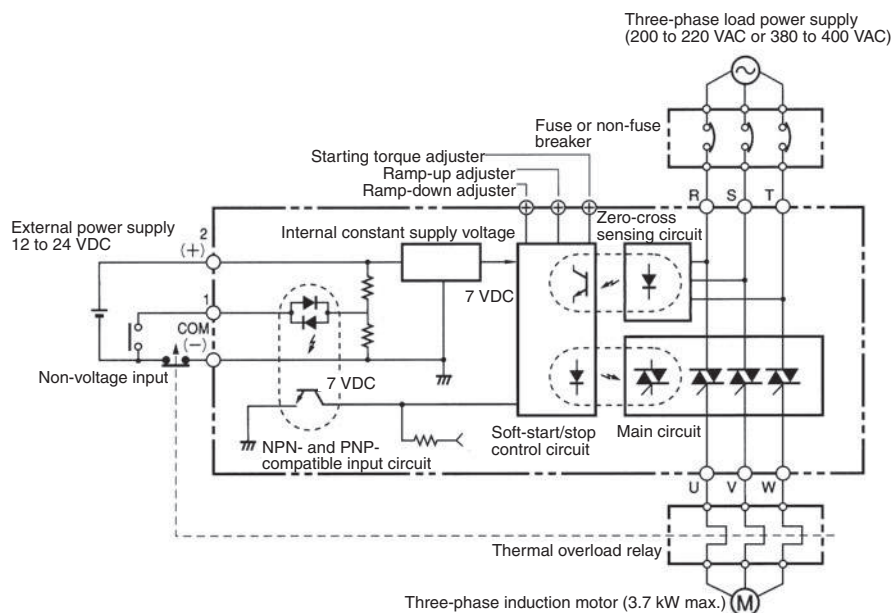


## Simple 2-element Models



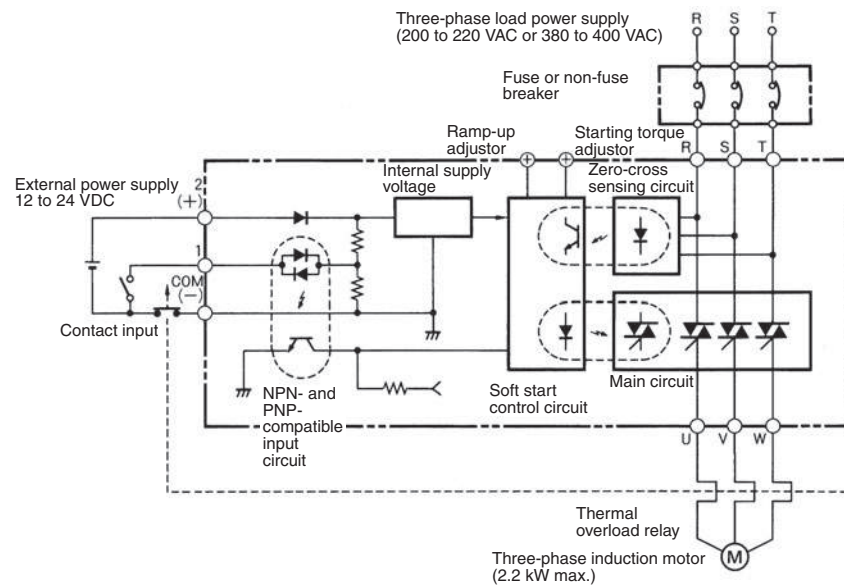
## Soft-start/stop Models

**G3J-T217BL**  
**G3J-T211BL**  
**G3J-T205BL**  
**G3J-T405BL**  
**G3J-T403BL**



## Soft-start Models

G3J-S211BL  
G3J-S205BL  
G3J-S405BL  
G3J-S403BL



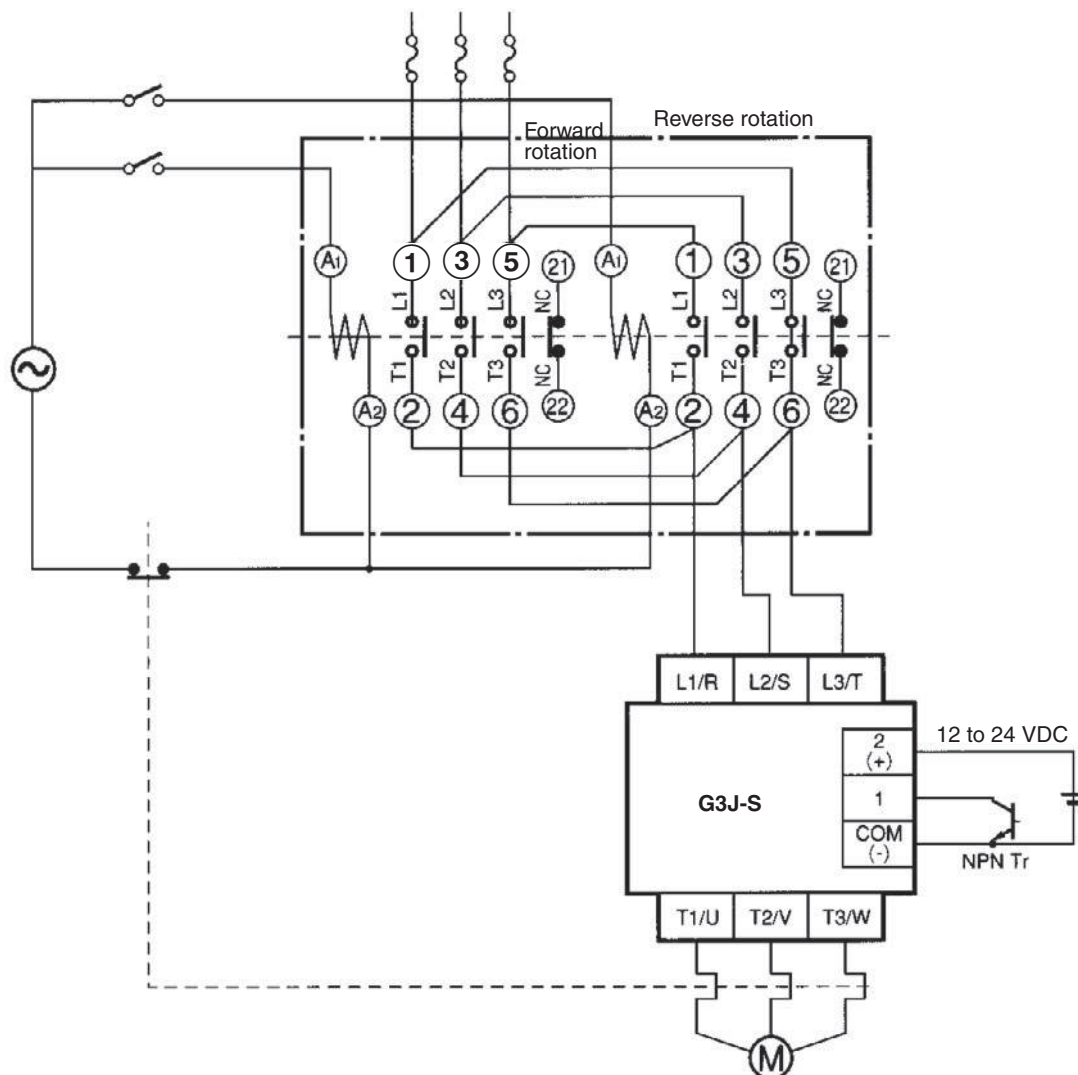


## Forward/Reverse Rotation

### G3J-S or G3J-T with a Reversible Contactor with Built-in Mechanical Interlock Function

G3J-S□BL or G3J-T□BL

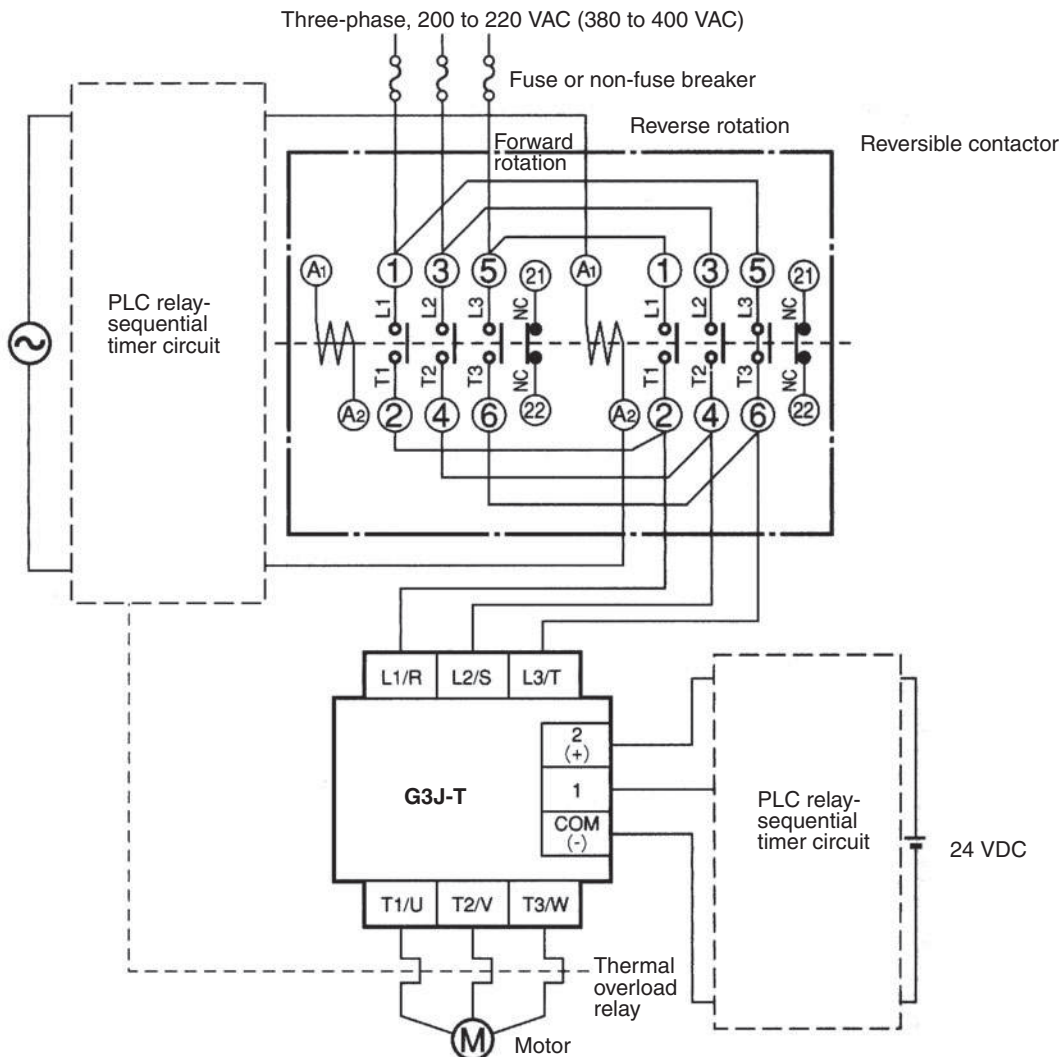
Three-phase, 200 to 220 VAC (380 to 400 VAC)



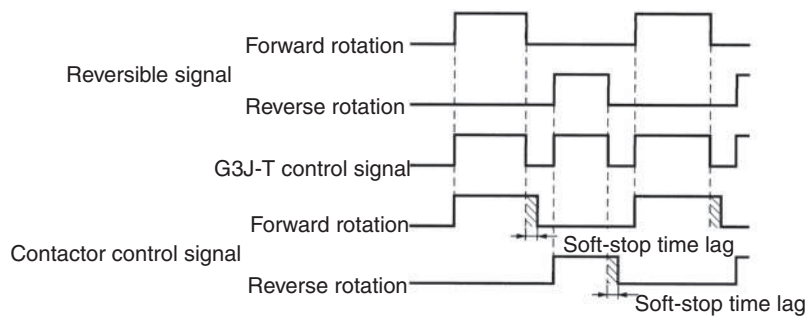
- Note:**
1. Be sure to use a fuse or non-fuse breaker to protect the G3J.
  2. Make sure that the interval between forward and reverse operations is at least 100 ms.
  3. Be sure to apply the input signal of the G3F-S after the reversible contactor starts operating. If the input signal is applied before the contactor starts operating, the soft-start function may not operate.



## G3J-S or G3J-T



For soft-stop control, the G3J-T has enough load current to continue rotating the motor during ramp-down time setting even after the control signal of the G3J-T is turned OFF. Therefore, a time lag is required between the time when the G3J-T stops operating up to the time when the reversible contactor is turned OFF. The ramp-down time of the G3J-T is adjustable up to approximately 25 s max. Therefore, set the time lag to 25 s in the initial sequence during the adjustment stage. Adjust the time lag of the sequential circuit according to the application.



**Note:** Make sure that the interval between forward and reverse operations is at least 100 ms. If the G3J is turned ON by noise input, short-circuiting between phases will result. In order to prevent this, insert a protective resistor.

### WARNING

Do not use two G3J-S or G3J-T Units together in reversible operation.

## ■ Connections Example

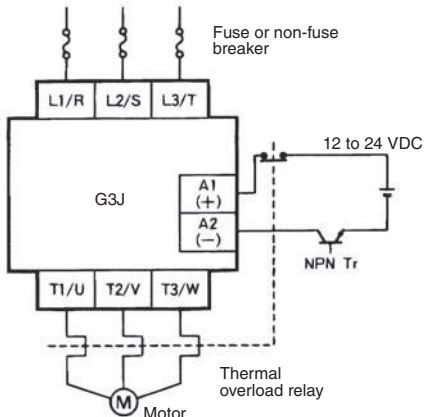
Harmonized protection is ensured for motor overcurrents.

Be sure to supply power to the G3J through a fuse or non-fuse breaker to protect the G3J from damage due to short-circuiting.

### Simple DC-input Models

G3J-□BL, G3J-□BL-2

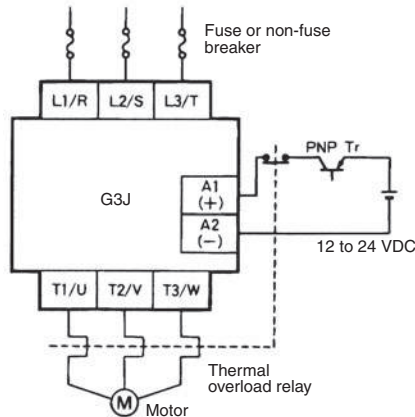
Three-phase, 200 to 220 VAC



### Simple DC-input Models

G3J-□BL, G3J-□BL-2

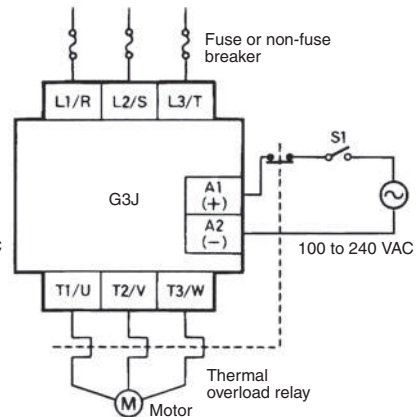
Three-phase, 200 to 220 VAC



### Simple AC-input Models

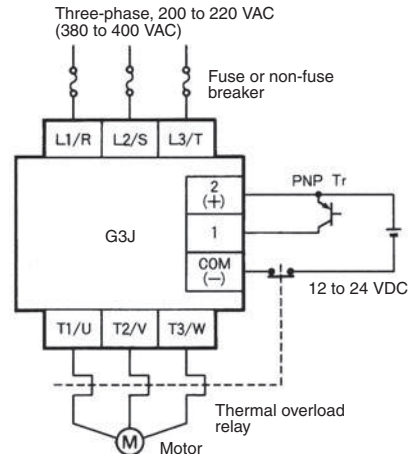
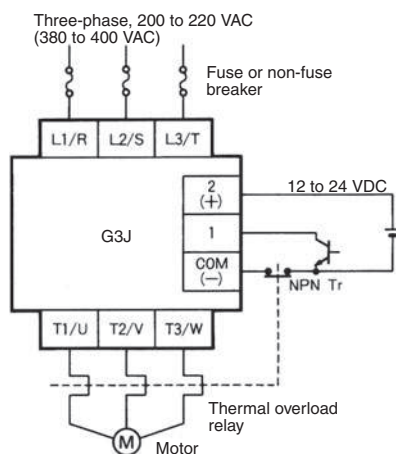
G3J-□BL, G3J-□BL-2

Three-phase, 200 to 220 VAC



### Soft-start/Soft-start/stop Models

G3J-S□BL, G3J-T□BL



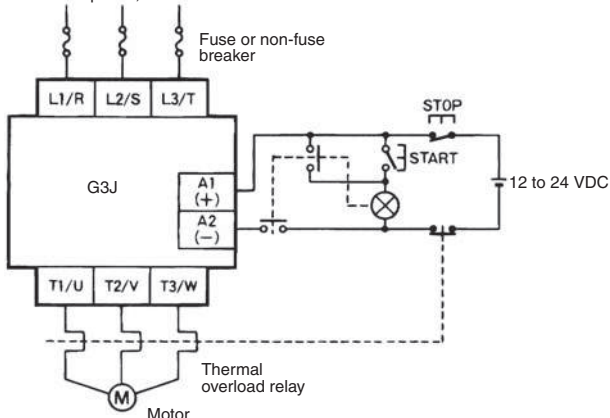
**Note:** 1. When the minimum applicable load of the thermal relay auxiliary contacts becomes smaller than the input current of the G3J, insert a bleeder resistance.

2. Connect the thermal relay NC contact to the 2 (+) or COM (-) line. Connecting the thermal relay NC contact to the 1 input will cause contact failure.

### Self-hold Circuits

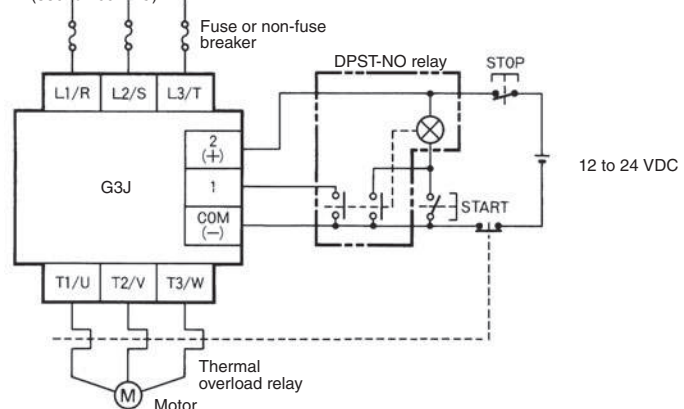
G3J-□BL, G3J-□BL-2

Three-phase, 200 to 220 VAC



G3J-S□BL, G3J-T□BL

Three-phase, 200 to 220 VAC (380 to 400 VAC)



**Note:** Be sure to use a fuse or non-fuse breaker to protect the G3J.

## ■ Fuse Selection

The following table shows the  $I^2t$  (60 Hz half-wave 1 cyc) values for G3J models.

Model	$I^2t$
G3J-T217BL	2,660A <sup>2</sup> s
G3J-S211BL G3J-T211BL	1,260A <sup>2</sup> s
G3J-S205BL G3J-T205BL	121A <sup>2</sup> s
G3J-S405BL G3J-T405BL	260A <sup>2</sup> s
G3J-S403BL G3J-T403BL	260A <sup>2</sup> s

When selecting a fuse to protect a G3J, use a quick-breaking fuse for semiconductor protection that satisfies the following condition:  
fuse's  $I^2t$  < G3J's  $I^2t$ .

# Operation

## ■ Soft-Start/Stop (Function of G3J-T)

The G3J-T is a solid state contactor that smoothly starts and stops machines and equipment connected to power supplies without damaging the machines, equipment, or power supplies.

### Soft-start Time

The voltage imposed on the motor increases while ignition  $\alpha$  is gradually reduced, thus gradually increasing the rotation speed of the motor.

### Ramp-up Time

Ramp-up time is a period required for ignition  $\alpha$  to become zero degrees with a 100% voltage imposed on the motor.

### Starting Torque

Starting torque is determined by the value of ignition  $\alpha$  immediately after the input signal is turned ON.

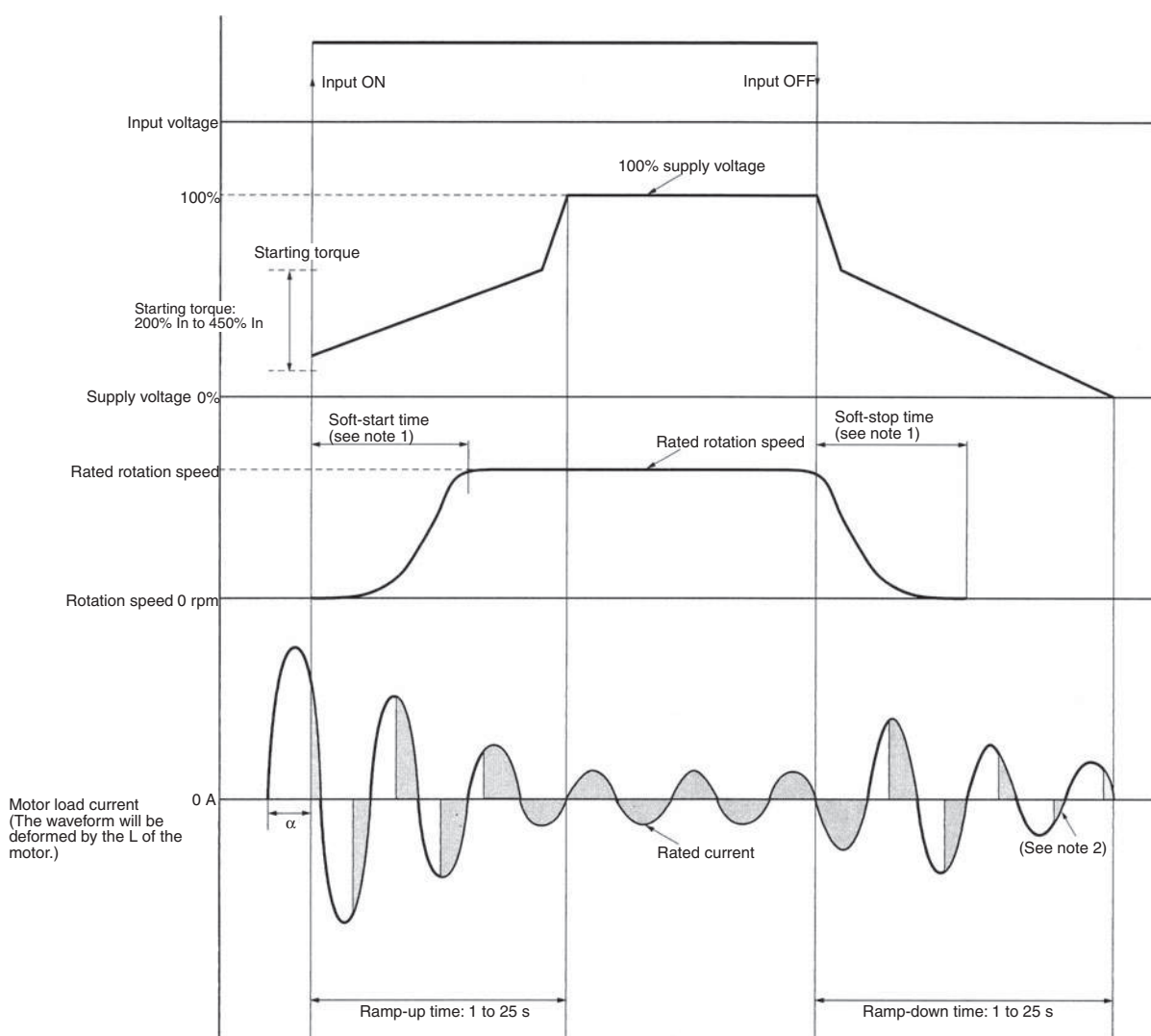
### Soft-stop Time

The voltage imposed on the motor decreases while ignition  $\alpha$  is gradually increased, thus gradually decreasing the rotation speed of the motor.

### Ramp-down Time

Ramp-down time is a period required for ignition  $\alpha$  to become 180 degrees with a 0% voltage imposed on the motor.

## Soft-start/stop Characteristics



- Note: 1.** In addition to starting torque, ramp-up time, and ramp-down time, the soft-start time and soft-stop time vary with the load characteristics such as the inertia and friction factor of the load. Therefore, the soft-start time or soft-stop time will not increase beyond a certain point.
- 2.** Due to the soft-stop control characteristics, the load current continues flowing even after the motor stops. Set to the optimum value according to the adjustment steps.

## ■ Soft-start/stop Setting Method

### Adjuster

#### Starting Torque Setting with the Starting Torque Adjuster

The starting torque of a motor can be set within a range from 200% to 450% In provided that the starting torque is 600% In when the motor is started at full voltage, which allows optimum motor control without any time lag at the time the motor starts.



Set with a Phillips or flat-blade screwdriver.

#### Ramp-up Time Setting with the Ramp-up Adjuster

The ramp-up time of a motor can be set within a range from 1 to 25 s, with which the soft-start time of the motor is adjusted until the motor rotates at full speed.



Set with a Phillips or flat-blade screwdriver.

#### Ramp-down Time Setting with the Ramp-down Adjuster

The ramp-down time of a motor can be set within a range from 1 to 25 s, with which the soft-stop time of the motor is adjusted until the motor decelerates to a stop.



Set with a Phillips or flat-blade screwdriver.

### Adjustment Steps

1. Start and stop the motor with the factory settings.  
Ramp-up adjuster: 1 s  
Starting torque adjuster: 200% In  
Ramp-down adjuster: 1 s
2. If the motor does not rotate smoothly, increase the starting torque.
3. Gradually increase the ramp-up time to adjust the start time.
4. Gradually increase the ramp-down time to adjust the stop time.
5. The soft-start time or soft-stop time will not increase beyond a certain point (depend on load). Do not set the ramp-up time or ramp-down time beyond this point.

### Further Adjustment or Arrangement

1. Increase the starting torque if the motor does not start with a long soft-start time.
2. To start normally (i.e., not using soft-start) use a simple G3J model.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

In the interest of product improvement, specifications are subject to change without notice.

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- Systems, machines, and equipment that could present a risk to life or property.

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