

GTRII-V

Variable-Speed Gear Motor
Variable-Speed Motor - P/Q Type

Operation Manual

FOREWORD

Thank you for your purchase of the **GTR II-V** series variable gear motor. Please be sure to read this Operation Manual before using the motor, as it provides information that will help you use the motor correctly.

- The contents of this manual may change without notice.
- Every effort has been made in preparing this manual to provide as accurate information as possible, however, please advise us if you find any errors or omissions.

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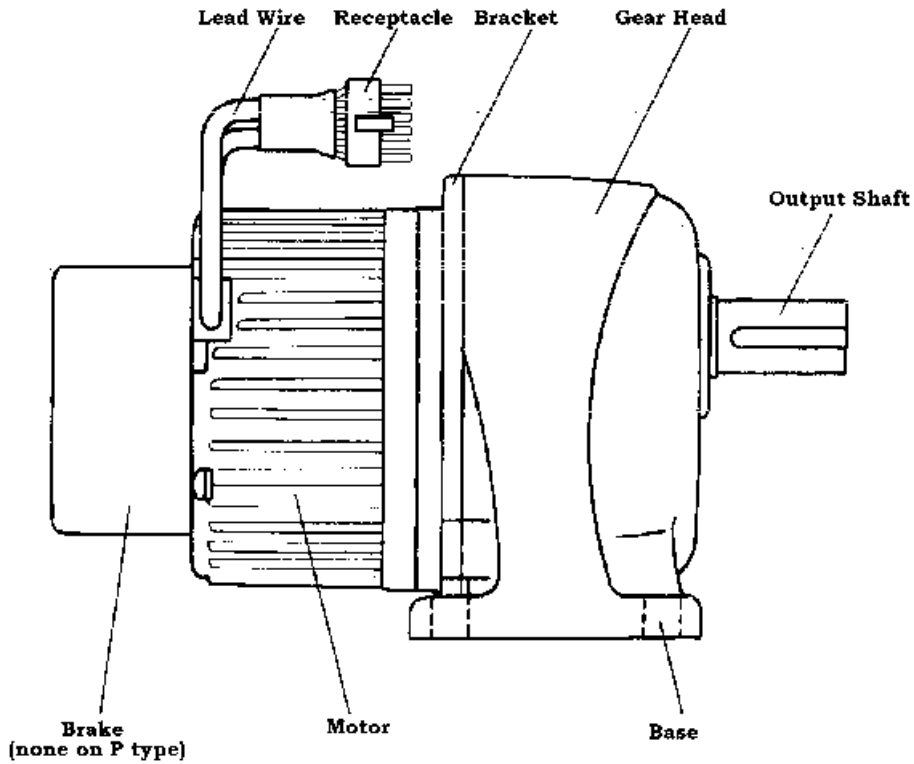
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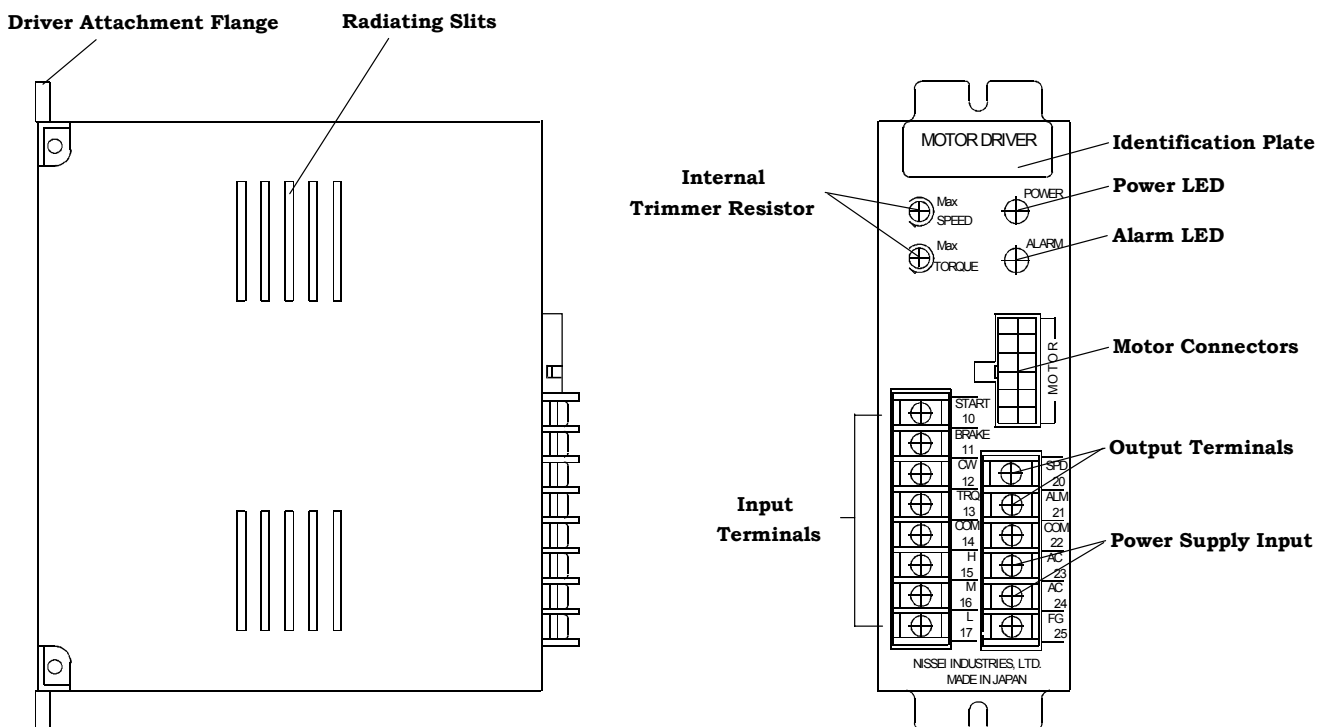
GTR II-V Series - Introduction

1-1 Parts and Functions

[a] Gear Motor



[b] Driver P/Q Type



1-2 Pre-Operation Inspection and Checklist

[a] Inspecting Contents

Perform the checks listed below, after unpacking. If you find any defects or have questions regarding this product, contact us immediately.

- (1) Check the description shown on the identification plate, and make sure that it matches that of the product that you have ordered:

Model type, reduction gear ratio, motor capacity, voltage.

- (2) Check for shipping damage.

- (3) Check nuts and bolts for looseness.

- (4) The GTR II-V series comes as a set consisting of the gear motor and driver. Check that the set is complete:

- a) Gear Motor 1
- b) Driver 1
- c) Operation Manual (this manual) ... 1
- d) Optional Equipment

[b] Bundled Package Checklist (Optional Equipment)

GTR II-V (P/Q Type)

(indicated by “O”)

No.	Option Name	Model Type	Bundled	Separate	Pieces
1	External Speed Setting Equipment	OP-RV-24B20K			
2	Protective Element	OP-CRM-2			
3	Noise Filter	OP-LF205			
4	Lightning Surge Protector for AC100V	OP-RAV10			
	for AC200V	OP-RAV20			
5	Extension Cord for P/Q 2m	OP-PQ2			
	for P/Q 5m	OP-PQ5			
	for P/Q 10m	OP-PQ10			
	for P/Q 20m	OP-PQ20			
	for P/Q 30m	OP-PQ30			
6	R Flange for20 frame	RF-20V			
	for25 frame	RF-25V			
	for30 frame	RF-30V			
	for35 frame	RF-35V			
7	Torque Arm for20 frame	TA-20			
	for25 frame	TA-25			
	for30 frame	TA-30			
	for35 frame	TA-35			

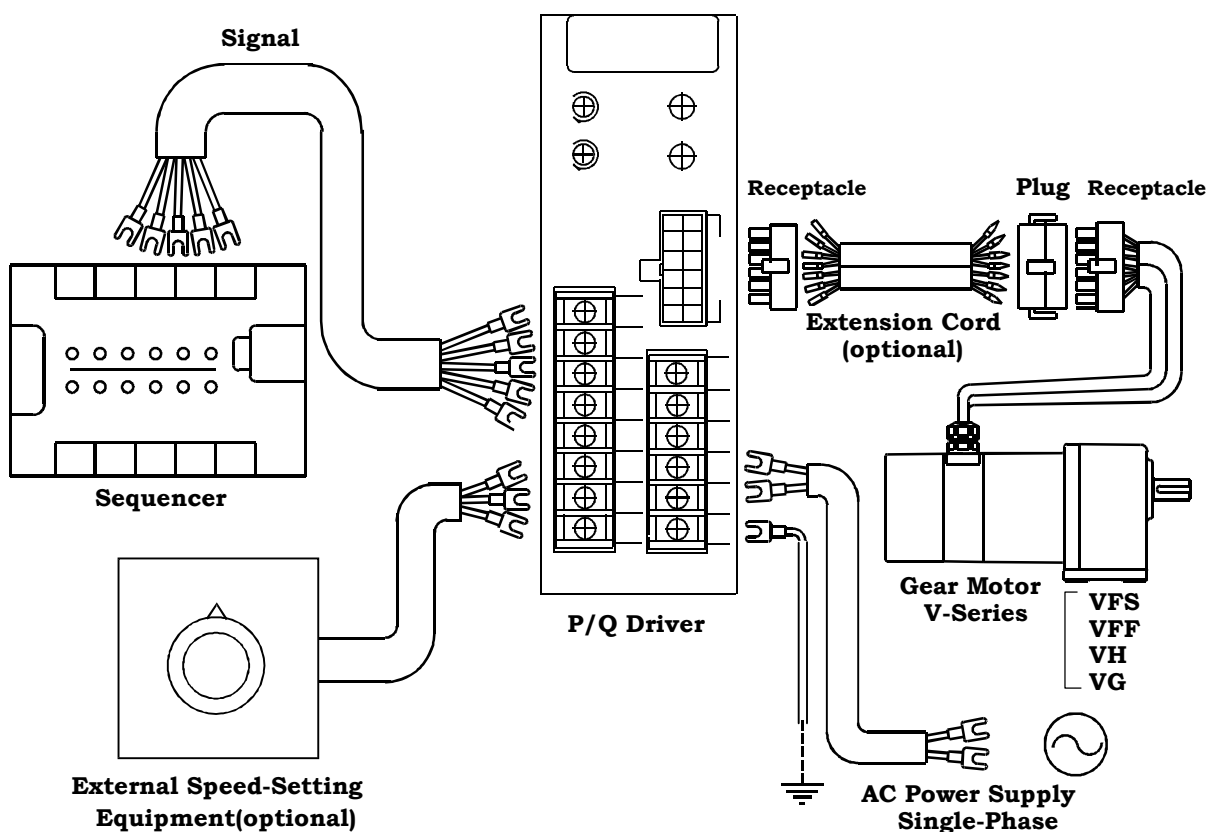
2. Connection and Installation

2-1 Connecting Procedure

Connect each piece of equipment as shown below.

Insert each connector correctly, making sure to push it in all the way.

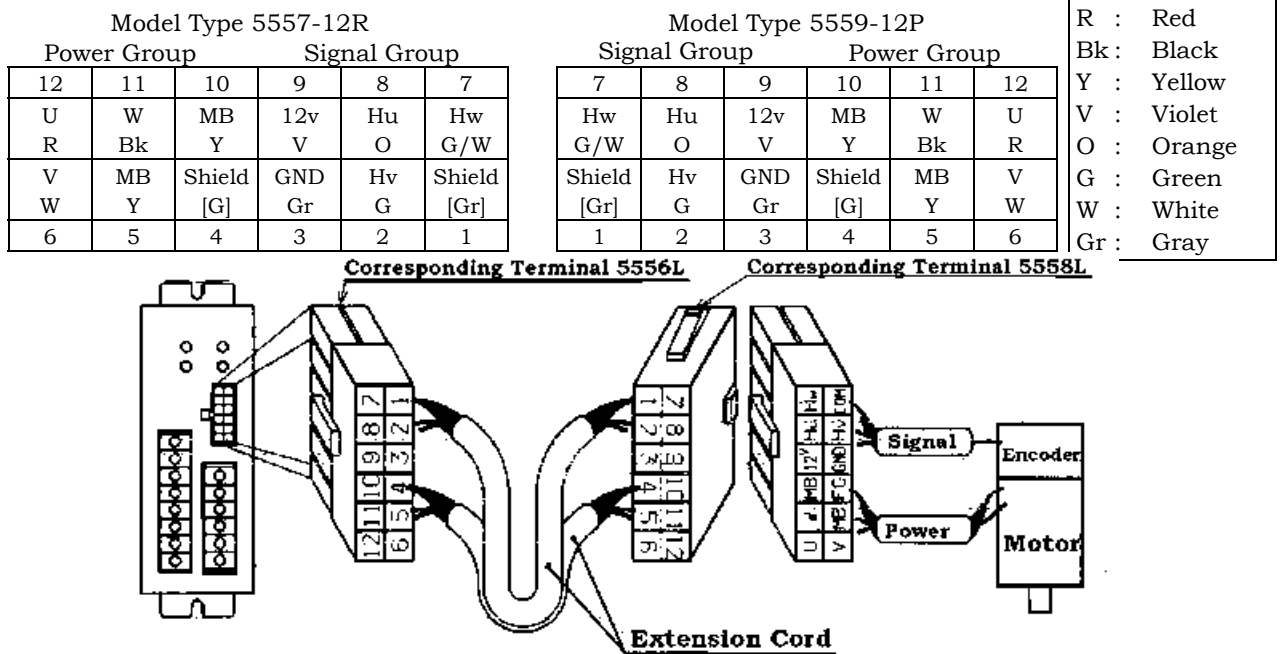
- * The cord that comes with the gear motor extends 200mm.
In most applications, an extension cord will be require.
- * A sequencer must be provided by the user.
- * Do not insert or remove the connector with the power supply connected, as doing so may damage the equipment.



2-2 Connecting the Extension Cord

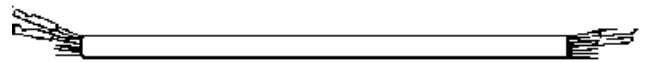
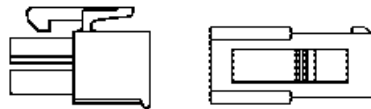
[a] Wiring Diagram

The extension cord is shipped without having the plugs and receptacles connected to it. Follow the diagrams shown below to connect the extension cord to the plugs and receptacles. Be sure to connect each wire correctly to the proper terminal, as an improper connection will damage the driver and motor.

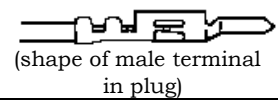
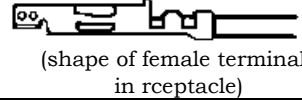


[b] Receptacle and Plug Description

- Set Content <Receptacle> <Plug>



(cord with terminals) x 2 (for power and signal)

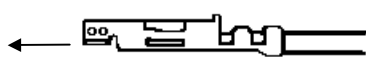
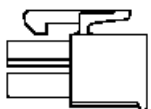


<Receptacle>			
Type	Manufacturer	Model Type	a (mm)
P·Q	Nippon Molex	5557-12R	26.4
X·Y		5557-14R	30.6
A·B		5557-16R	34.8

<Plug>			
Type	Manufacturer	Model Type	A(mm)
P·Q	Nippon Molex	5559-12P	26.4
X·Y		5559-14P	30.6
A·B		5559-16P	34.8

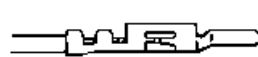
[c] Connecting The Terminals

<Receptacle>



shape of female terminal in receptacle

<Plug>



shape of male terminal in plug

* Push each terminal in place until it clicks.

2-3 Installing the Gear Motor

[a] Installation Environment

- (1) Ambient Temperature: 0 to 40 (storage: -10 to +60)
- (2) Ambient Humidity: 85% max.
- (3) Altitude: 1000m max.
- (4) Ambience: The location should have good air circulation and should be free of dust, corrosive gases, explosive gases, and vapors.
- (5) Installation Location: Indoor

NOTICE: The simplified waterproof model is recommended for use in an area where water may splash, such as in a food-processing application. The simplified waterproof model, which is provided with a cable cord, uses liquid sealant to seal between the adjoining portions of the gear motor.

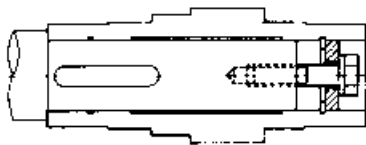
[b] Installation Procedure (VFS, VFF, VH, VG)

- (1) Using 4 bolt, mount the gear motor firmly onto a machined surface that does not create vibrations. A mounting surface that is not flat, or placed over a poorly constructed foundation, may generate vibration during operation, thus reducing the gear motor's use life. The flatness tolerance for the mounting surface is 0.3mm.

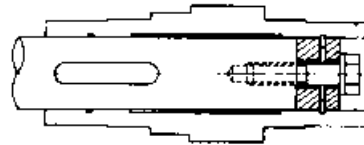
(2) Mounting, Installation, and Removal Procedures for the Driven Shaft for the Hollow-Shaft FS Type

- Mounting Procedure

[a] Driven Shaft with a step:



[b] Driven shaft without a step:



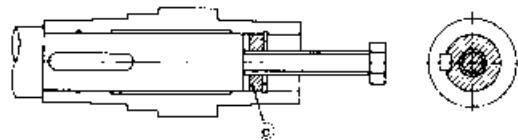
- Installing and Removing a Driven Shaft

The illustrations below describe a simple method for installing or removing a driven shaft.

[a] Installation



[b] Removal



NOTE: Before installation, apply anti-seize agent (such as molybdenum disulfide) to the driven shaft and to the inner wall of the hollow shaft. (The recommended driven shaft tolerance is approximately h7.)

Cross-sectional view of part "c".

[c] Installation Direction

As all models adopt a grease-lubricated system, there is no limitation as to the direction in which they must be installed.

[d] Coupling to the corresponding Machine

Observe the following instructions in coupling this motor to the corresponding machine:

- For the coupling sprocket, pulley, and the gear to be attached to the gear motor shaft, an engagement tolerance of approximately H7 is recommended.

(1) Direct Coupling

Be sure to install so that the center of the shafts of this motor and of the corresponding machine forms a straight line.

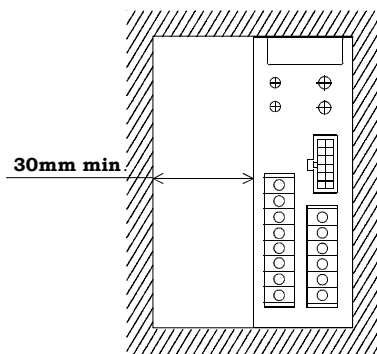
(2) Chain, Belt, or Gear-Driven

- Whichever coupling method is used, be sure to install so that the shafts of this motor and of the corresponding machine maintain a precisely parallel relationship, and that the center line of the sprocket or the pulley is perpendicular to the shaft.
- If a load is applied to the tip of the output shaft, the undue force thus created may cause the case to clack. Therefore, a sprocket, pulley, or gear must be pushed all the way to the base of the shaft, so that the force applied by a load will be as close as possible to the gear motor.
- With a belt-driven method, do not overtighten the belt (in an effort to prevent the belt from slipping) so as not to apply excess load to the bearing.
- With a chain-driven method, carefully adjust the chain tension. If there is an excess slack, the chain can create a large impact when the motor is started, thus applying undue shock to the gear motor and the corresponding machine.

2-4 Installing the Driver

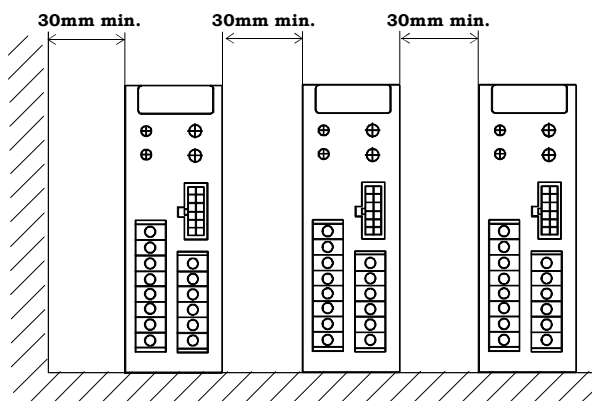
[a] Installation Environment

- [1] Ambient Temperature: 0 to 40 (storage:-10 to + 50)
- [2] Ambient Humidity: 85% max.
- [3] Select a clean and dry indoor location, away from direct sunlight, high teperature, high humidity, dust, and gases.
- [4] In case the driver is installed in an enclosed area such as inside of a control board, or in an area near a source of heat, care must be taken to prevent the driver from overheating. In situations in which the overheating protective function activates, take appropriate measures to 40 , such as using a fan to circulate the air.
- [5] Driver installation space



Allocate a minimum width of 30mm to the left side of the driver (the side that has cooling vent holes).

[6] Installing multiple drivers



Allocate a minimum width of 30mm between drivers in case multiple drivers are installed side by side.

- [7] Install shock absorbers if vibration is transmitted to the driver because of the driver's proximity to the source of vibration.
- [8] Make sure that conductive debris (such as metal shavings or pins) do not come in contact with the driver.
- [9] Do not splash water on the driver, as it will damage the driver.

3. Driver Operation Procedure and Precautions

3-1 Driver Operation Procedure

[a] Driver Parts (P/Q Type)

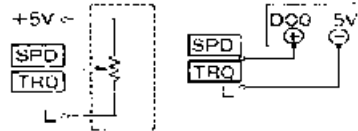
Rheostat No.	Indication	Function
1	SPEED	Internal Speed Regulator (*1)
2	TORQUE	Torque Limit Governor

(*1) The rheostat for the Internal Speed Regulator is set to the maximum rpm at the time of shipment.

(*2) Turn off the power and verify the cause before resetting.

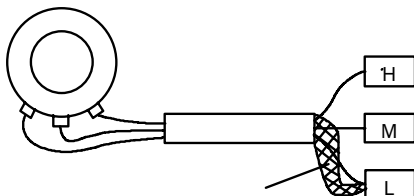
LED Display	Function
POWER	The power supply LED lights when power is on.
ALARM	The alarm LED lights when a protective device activates and causes the motor to stop (if the motor is driven continuously above the rated torque, the alarm LED will flash maximum 10 seconds (*2))

Terminal No.	Input Signal Terminal Board			Connected to the common
	Indication	Signal Name	Function	
10	START	Start/Stop	To switch start/stop inputs to the motor. To switch ON/OFF inputs to the electromagnetic brake.	START
11	BRAKE	Start/ Dynamic Brake	To switch start/dynamic brake inputs to the motor.	START
12	CW	Clockwise/ Counterclockwise	To switch directional inputs to the motor. (Do not switch directions while the motor is running.)	CCW
13	TRQ	Torque Governor ON / OFF	To switch torque governor on and off.	Torque Governor ON
14	COM	Input Signal Ground	A common ground for input signals.	-
15	H	External speed regulator input	Instead of using the internal speed regulator, this function is used when setting a speed using an external speed regulator or applying DC voltage control.	-
16	M			
17	L			

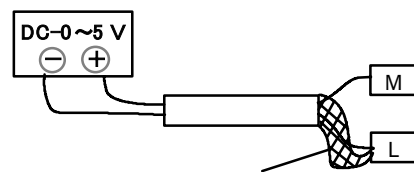


* The resistance for the external speed regulator should be set within the 1k to 20k range. (The optional OP-RV-24B24K is 20k .)

* Although a shield terminal has not been designated, the shield cable should be connected to COM (14) or L (17).



Shield Cable



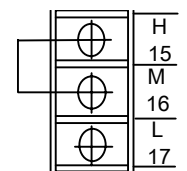
Shield Cable

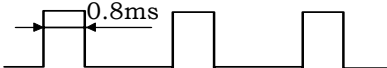
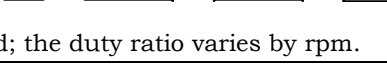
* The inputs for the internal and external speed regulators are connected in series; thus, the rpm of the motor will not exceed the value that is set in either of the two.

Internal Speed Regulator	MAX	MED	MIN	MIN-MAX	MIN-MAX
External Speed Regulator	MIN-MAX	MIN-MAX	MIN-MAX	MAX	MIN
Motor RPM	MIN-MAX	MIN-MED	MIN	MIN-MAX	MIN

IMPORTANT:

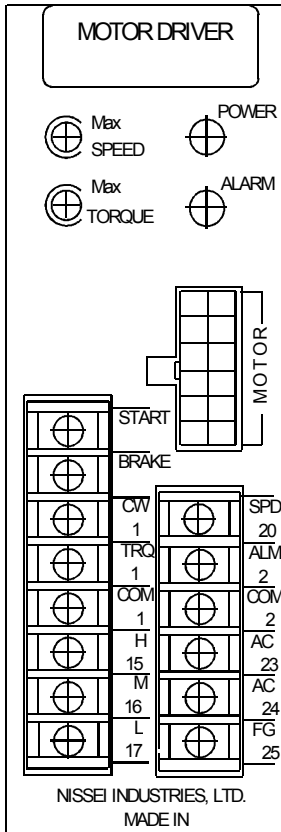
- In order to control the speed using the internal rheostat (rheostat No. 1), be sure to short the terminals H(15) and M(16) together. Unless these terminals are shorted, the rheostat will not function.
- Do not start and stop the motor via primary source, as this may damage the driver.



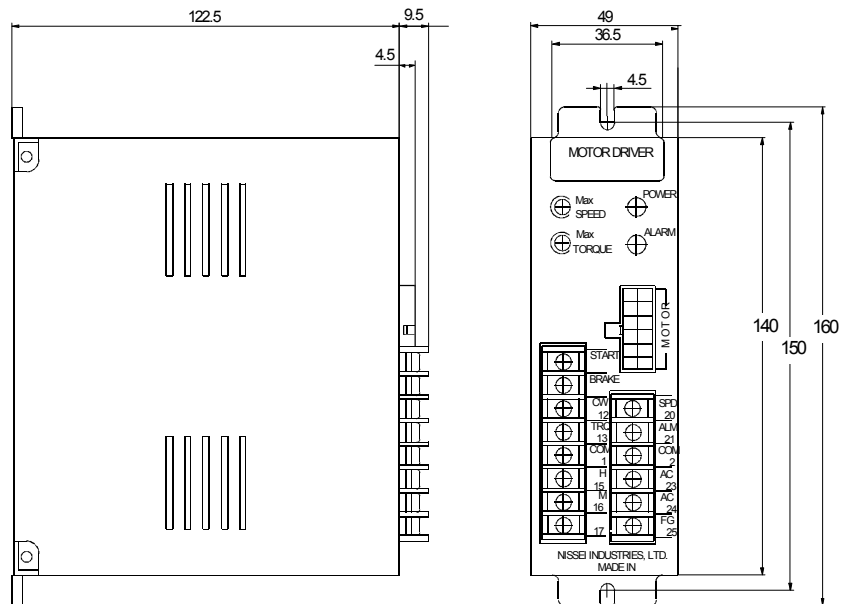
Terminal No.	Output Signal Terminal Board		
	Indication	Signal Name	Function
20	SP	Pulse Output (open-collector output)	To monitor the motor rpm. For every revolution of the motor, 25w 12 pulses 50/100/200/400w.....18 pulses (pulse width 0.8ms) Description of the pulse width 0.8ms: <div style="text-align: center;"> <p>Transistor OFF </p> <p>Transistor ON </p> </div> The pulse width is fixed; the duty ratio varies by rpm.
21	ALM	Alarm Output (open-collector output)	The alarm output turns off after the protective function has been activated and the motor has stopped. Turn off the power and verify the cause before resetting.
22	COM	Output Signal Ground	A common ground for output signals.
23	AC	Power Supply Input	Single-phase 100v ± 10%, 50Hz/60Hz
24			Single-phase 200~220v ± 10%, 50Hz/60Hz
25	FG	Frame Ground	A Class-3 ground must be provided.

*Terminal numbers 14, 17, and 22 are connected internally.

MOTOR	Connector for the motor
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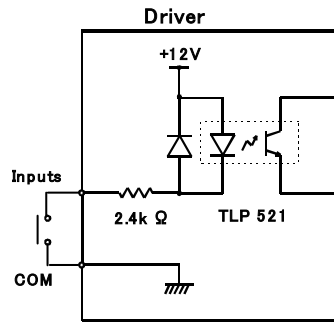
P/Q Type Driver Dimensional Drawing Weight; 0.8kgf



[b] Control Input/Output Circuits and Connections

(1) Internal Configuration of Input Circuits (photo-coupler input type)

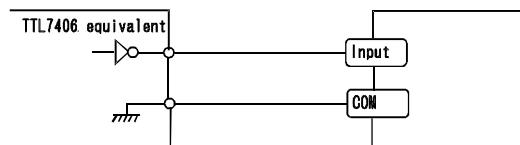
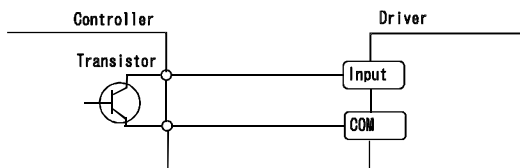
Terminal No.	Name
10	START
11	BRAKE
12	CW
13	TRQ



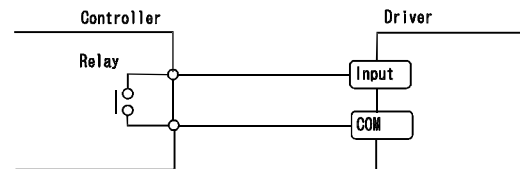
To connect to an external, non-contact circuit, the leakage current with the switch turned off must be kept under 0.1 mA.

Input Command Procedure

(non-contact control)



(contact control)

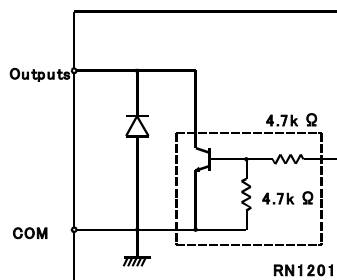


Note:

TTL 7406
(an equivalent product with an output voltage tolerance of 12V minimum)
A TTL with an output voltage tolerance of 5V may not be used.)

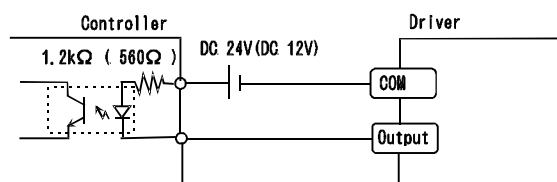
(2) Internal Configuration of output Circuits (open-collector output type)

Terminal No.	Name
20	SPD
21	ALM



Maximum load voltage 30V
Maximum load current 20mA

Example of output signal connection



3-2 Pre-Installation Noise-Prevention Measures (to prevent post-installation problems)

[1] Noise-Prevention Measures

While it is true that the more elaborate a noise measure the more effective it is, often a simple noise measure can solve a noise-related problem if it is applied properly.

Thus, it is important to implement an economical noise-prevention measure that is appropriate for the extent of the noise and the scope of the equipment being used. Please contact us for further details.

[2] Before installing the driver

It is important to apply noise-prevention measures before enclosing the GTR II driver in the control board, or before installing the driver. Once the system is found to be generating a noise-related problem, a solution may involve large expenditures in terms of materials and time.

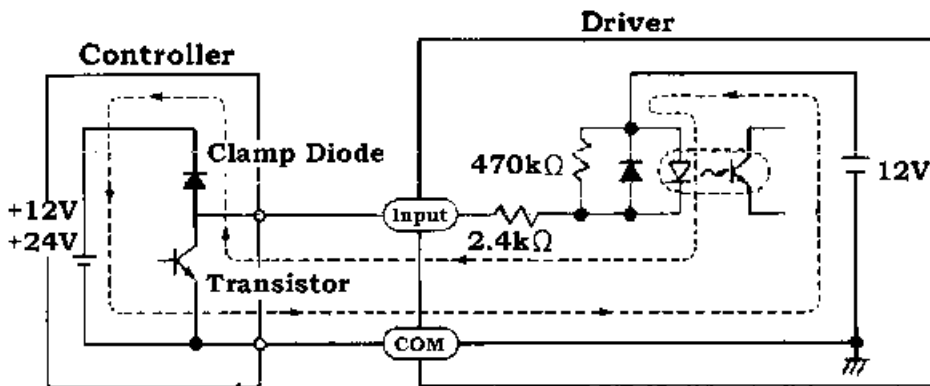
> The following are noise-prevention measures that can be taken before installation:

- a) Keep the main circuit and signal circuit harnesses separate.
- b) Enclose the main circuit harness in a metal pipe.
- c) Apply a shield cable or a twist-shield cable to the control circuit.
- d) Implement appropriate grounding work and wiring.

These measures help prevent most noise-related problems.

3-3 Precautions Concerning Peripheral Equipment

[a] Using a controller with internal clamp diode



In a wiring layout such as the one illustrated in the upper diagram, if the driver power is first turned on before a startup, or if the controller power is turned off with the driver power remaining on, the current may go around in a circle, as indicated by the arrows in the diagram, causing the motor to operate.

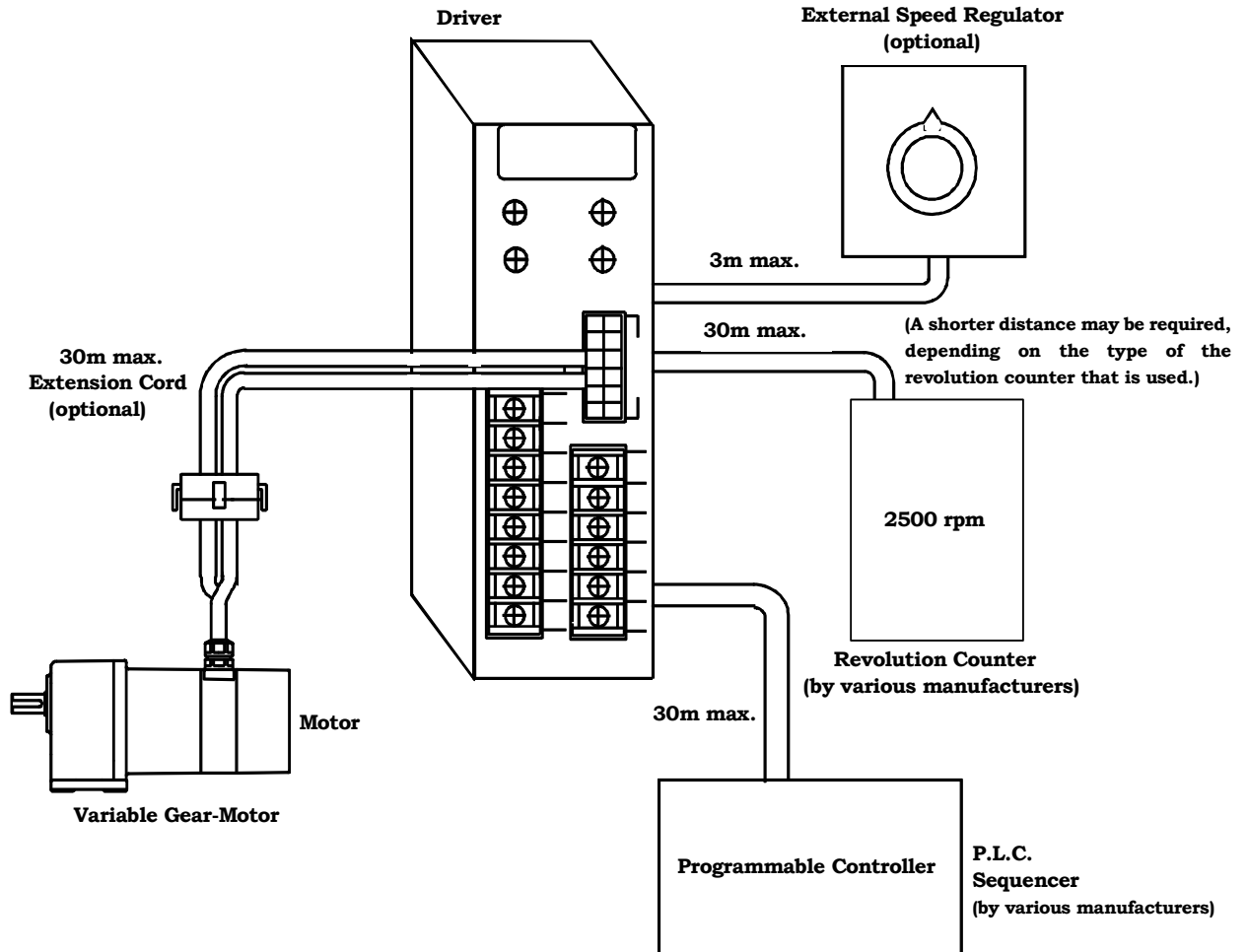
Also, if both the controller and the driver are turned on or off simultaneously, the motor may operate temporarily, due to the difference in the capacity of the power sources. Therefore, to turn on the power, always turn the controller on first; to turn off the power, always turn off the driver first.

To turn power on: controller on; then, driver on.

To turn power off: driver off; then, controller off.

The clamp diode is placed in the circuit to protect the transistor from an inductive load.

[b] Maximum extension distance to peripheral equipment



* If any of the lengths given above must be exceeded to meet your needs, please contact us for additional information.

- [1] A dedicated extension cord (optional equipment) is recommended for use between the motor and the driver.
- [2] If the motor must be mounted on a movable piece, exposing the cable (or extension cord) to repeated bending and stretching, the optional cable may not be appropriate. Please contact us for details concerning this type of application .
- [3] If a non-contact solid-state relay (SSR) is used to execute various commands to the driver, be sure to use a SSR with a leakage current below 0.1mA.

4. Specification and Performance

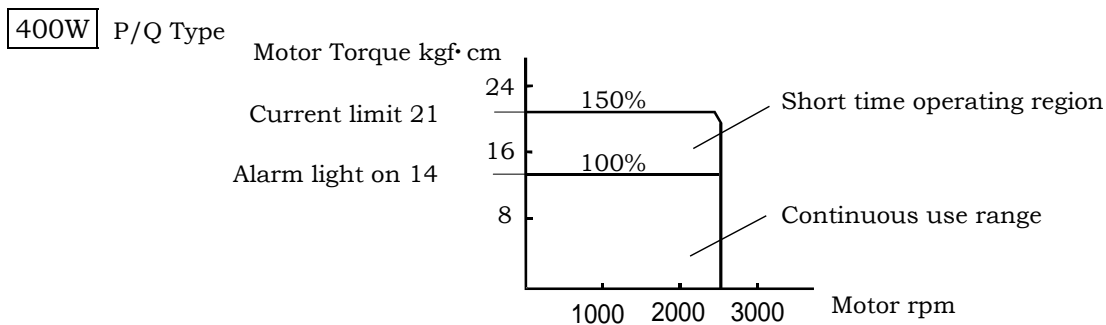
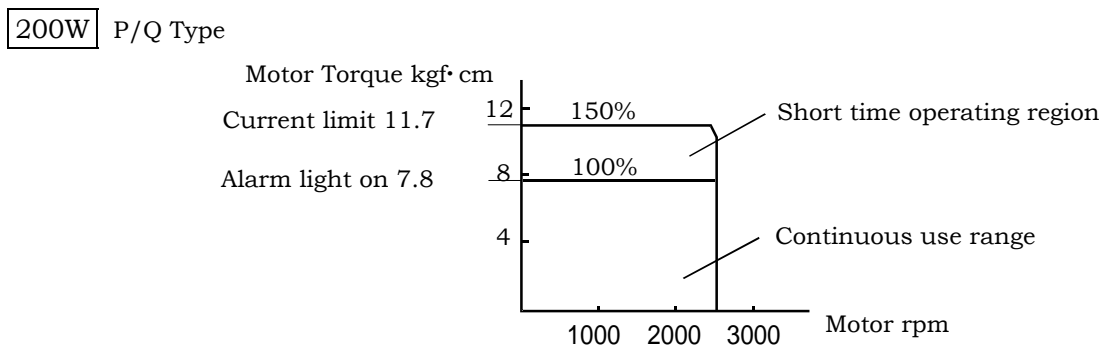
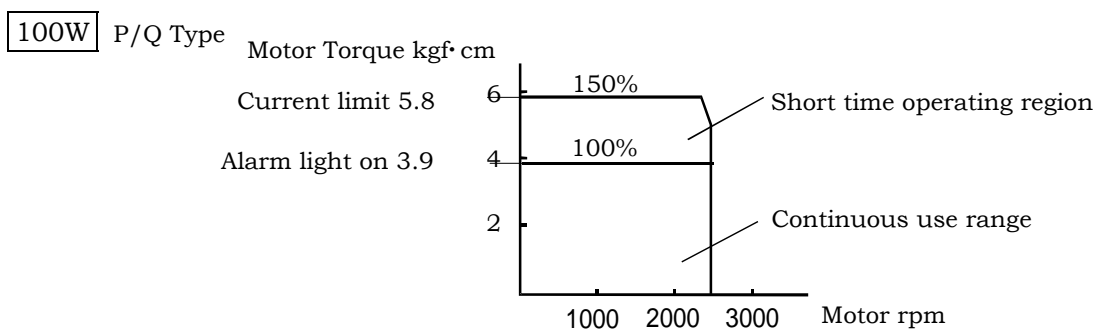
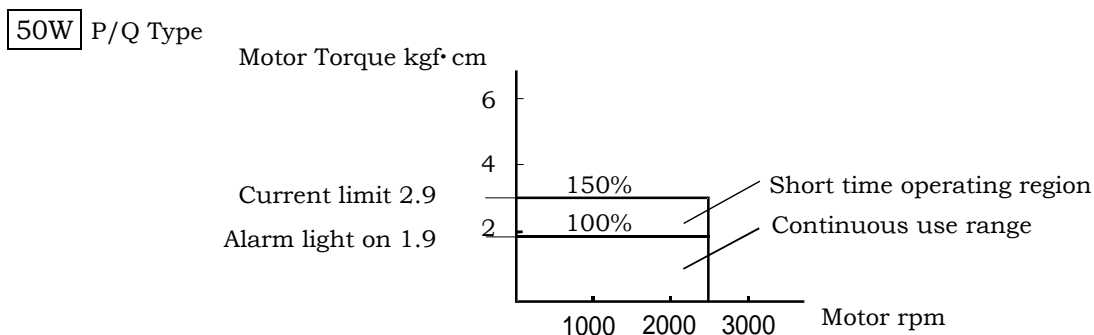
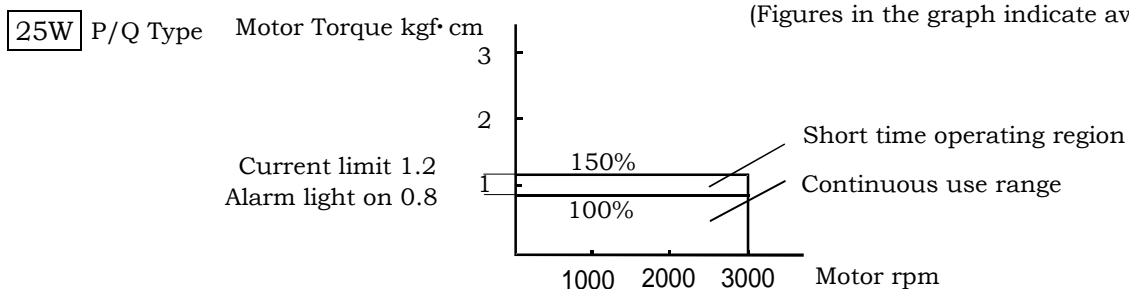
4-1 Driver and Motor Specifications

P/Q Type

Item		Capacity				
		25W	50W	100W	200W	400W
Function	Rated Speed (rpm)	3000	2500	2500	2500	2500
	Speed Control Range (rpm)	300~3000	300~2500	300~2500	300~2500	300~2500
	Motor Rated Torque (kgf·cm)	0.8(100%)	1.9(100%)	3.9(100%)	7.8(100%)	14(100%)
	Motor Momentary Maximum Torque (kgf·cm)	1.2(150%)	2.9(150%)	5.8(150%)	12(150%)	21(150%)
Power Supply	Power Supply (single phase) 100V 200V	100V ± 10%				
		200~220V ± 10%				
	Frequency Hz	50/60Hz				
	Input Current (driver input)	100V 200V	0.75A 0.37A	VG,VH VF 1.4A/1.8A VG,VH VF 0.8A/1.0A	2.1A 1.2A	4.2A 2.0A
Method	Speed Detection Method	Hall IC (for rotor pole detection)				
	Speed Control Command	1. Internal Speed Regulator 2. External Speed Regulator (1k - 20k 1/4W) 3. DC Voltage Control (DC 0 - 5 V)				Item 1, 2, and 3 are connected in series.
Input Knob	Internal Speed Regulator					
	Torque Limit Governor	When the torque limit governor is activated, the torque will remain at the maximum rated torque, a level which will not cause the alarm light to turn on.				
Input Signals	Start / Stop					
	Start / Dynamic Brake					
	Switching the Direction of Rotation					
	Torque Governor ON / OFF					
	Input Signal Method	Photo-coupler input method; input resistance 2.4k . Internal power supply voltage 12V				
Output Signals	Pulse Output	12ppr	18ppr	18ppr	18ppr	18ppr
	Alarm Output					
	Output Signal Method	Open-collector output External use condition: DC30V max.; 20mA max.				
Protection	Overload	If a load exceeding the motor's rated capacity is applied longer than 10 seconds.				
	Driver Overheating	If the temperature of the driver internal radiating plate exceeds 85 .				
Indicator	Power Supply					
	Alarm	Flashes dimly during starting, and remains on bright for alarm (stopping the motor).				
Remote Control Distance (max.)		30m				

4-2 Motor Use Range

(Figures in the graph indicate average values.)



4-3 Alarm Indication and Processing

> P/Q Type (Alerts by turning on the alarm lamp (ALARM LED.))

Alarm Name	Cause	Countermeasure
Overload	The motor is driven continuously above the rated torque longer than 10 seconds.	1. Re-examine the motor capacity 2. Re-examine the reduction gear ratio.
Driver Overheating	Driver overheated, with its internal temperature rising above 80 .	1. Improve heat dissipation around the driver. 2. Remove any sources of heat around the driver.

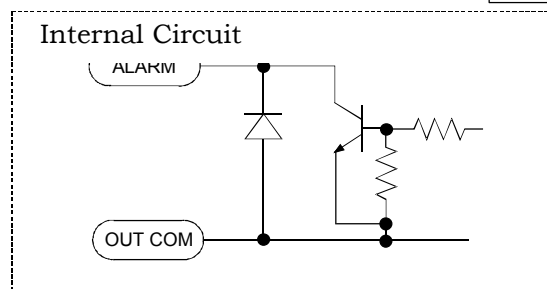
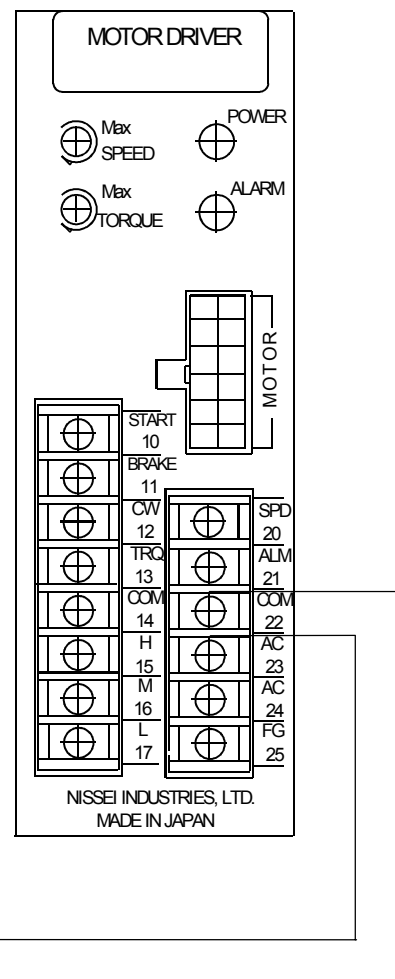
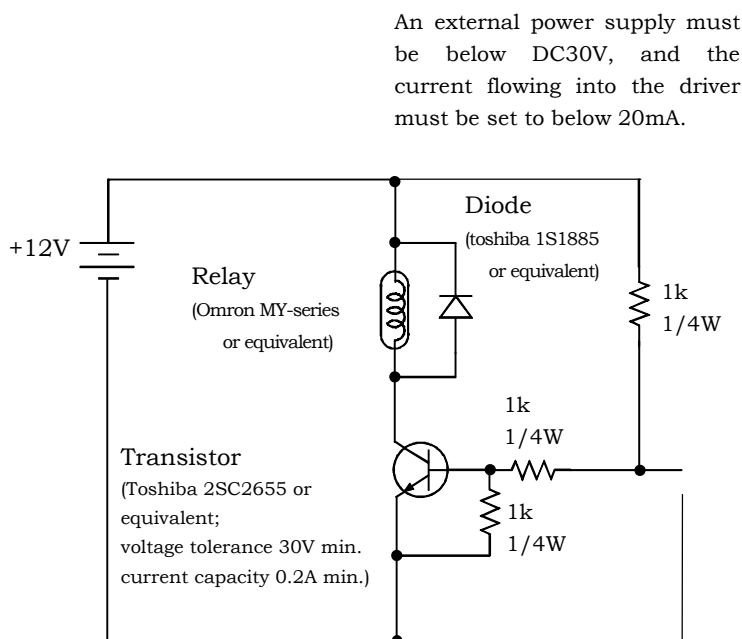
4-4 Alarm Signal Processing Example

The wiring methods shown below may be used to extend the alarm function to external implements such as emergency bells or lights.

- In case of an emergency, when the power supply is cut off, the transistor in the driver will in an off (open) state. Normally, the transistor is on (closed).
- Open-collector output

[Connection]

Relay operation

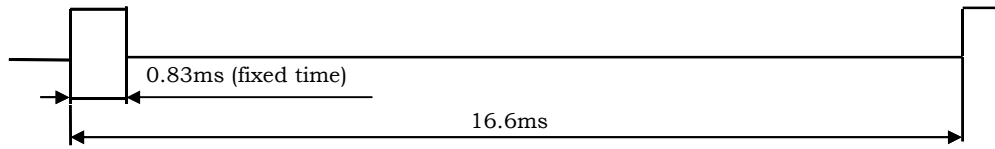


4-5 Pulse Output (P/Q Type)

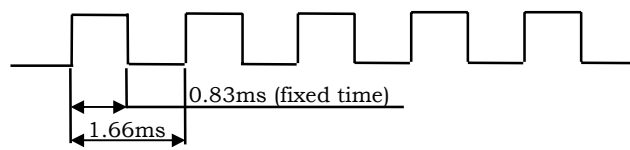
[a] Signal Duty Ratio

(1) 12ppr (25W)

Motor Shaft 300 rpm

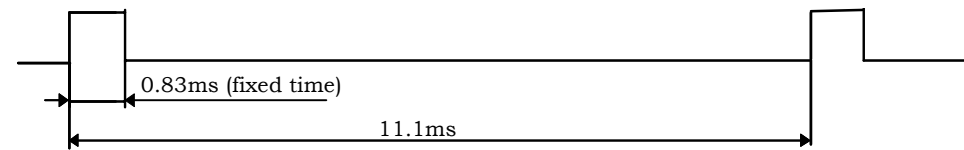


Motor Shaft 3000 rpm

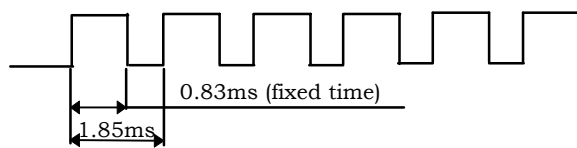


(2) 18ppr (50,100,200,400W)

Motor Shaft 300 rpm



Motor Shaft 2500 rpm



[b] Pulse-Counting Process

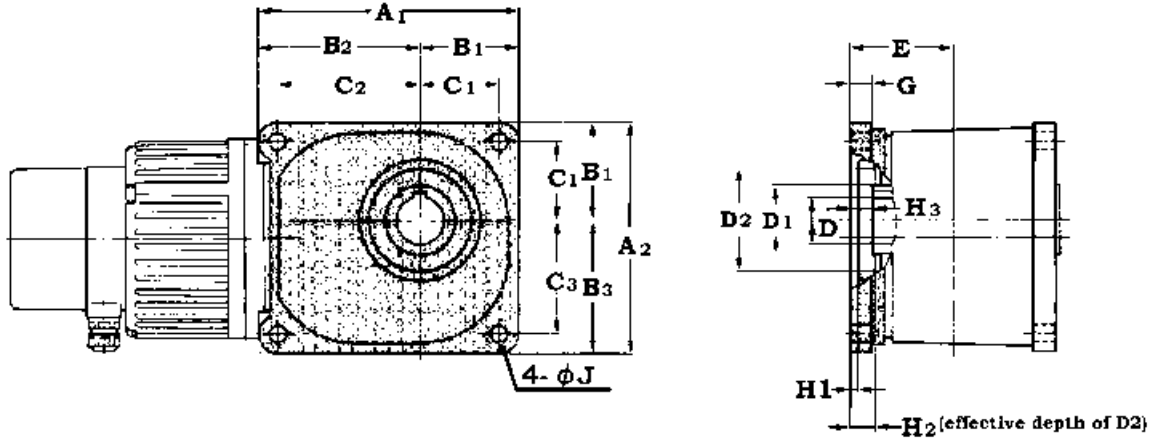
A high-speed counter is recommended.

5. Optional Equipment

5-1 For the Gear Motor

[1] VFS (hollow shaft) Option

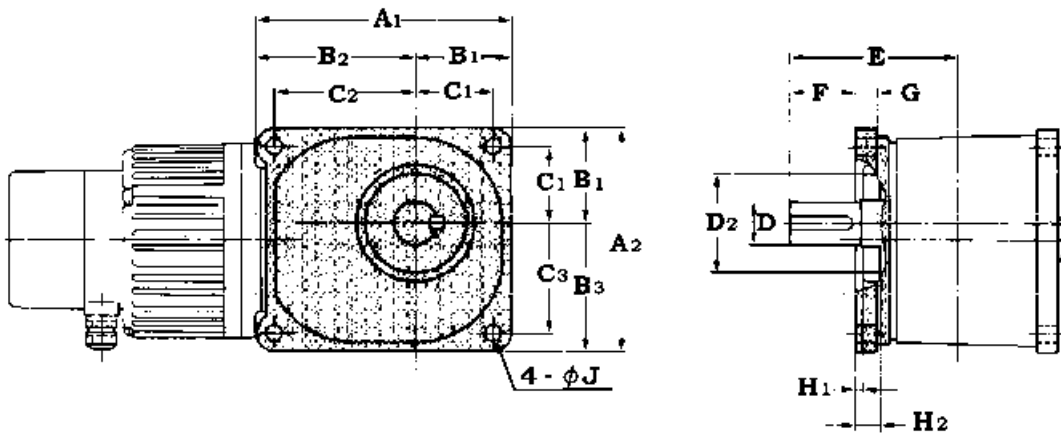
Dimensional drawing for R-frame installation



Part No.	Applicable Frame No.	A ₁	A ₂	B ₁	B ₂	B ₃	C ₁	C ₂	C ₃	E	G	H ₁	H ₂	H ₃	D ₂ (H8)	Output Shaft		J
																D ₁	D (H8)	
RF-20V	20	128	112	47	81	65	38	72	56	51	10	1	13	12	46	29	20	8.5
RF-25V	25	147	131	54.5	92.5	76.5	44	82	66	59	12	6	12	11	58	39	25	11
RF-30V	30	164	146	62	102	84	50	90	72	65	14	5	15	14	65	44	30	11
RF-35V	35	188	168	68	120	100	56	108	88	70	16	3	18	17	72	49	35	13

[2] VFF (solid shaft) Option

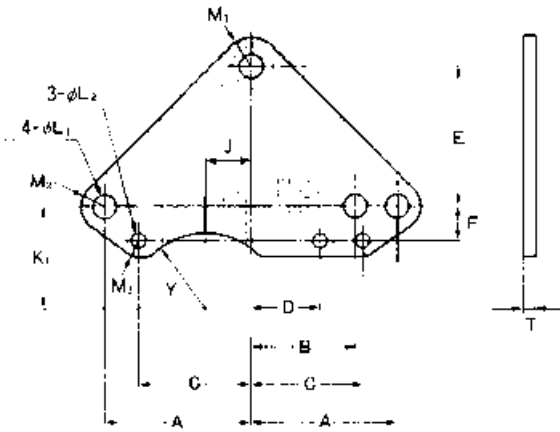
Dimensional drawing for R-frame installation



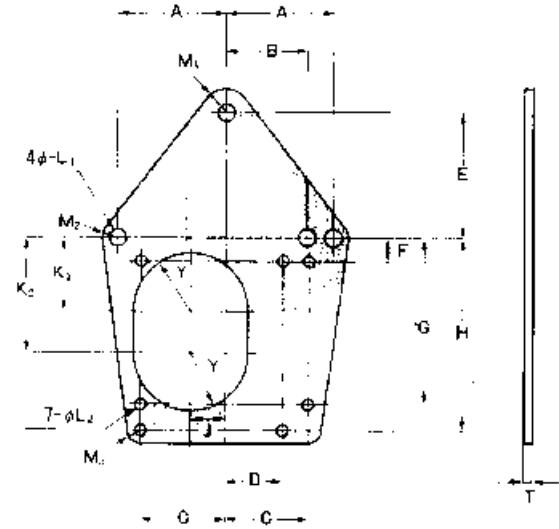
Part No.	Applicable Frame No.	A ₁	A ₂	B ₁	B ₂	B ₃	C ₁	C ₂	C ₃	E	G	H ₁	H ₂	D ₂ (H8)	Output Shaft		G
															D ₁	D (H8)	
RF-20V	18	128	112	47	81	65	38	72	56	82	10	1	13	46	31	18	8.5
RF-25V	22	147	131	54.5	92.5	76.5	44	82	66	95	12	6	12	58	36	22	11
RF-30V	28	164	146	62	102	84	50	90	72	107	14	5	15	65	42	28	11
RF-35V	32	188	168	68	120	100	56	108	88	124	16	3	18	72	54	32	13

[3] VFS (hollow shaft) Option
 Dimensional drawing for torque arm

Drawing No.[1]



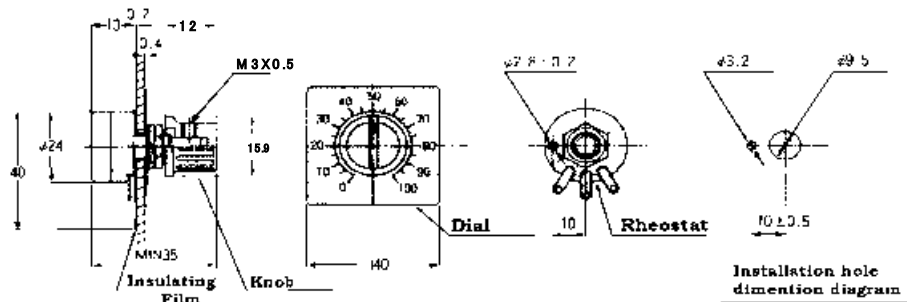
Drawing No.[2]



Part No.	Applicable Frame No.	Drawing No.	A	B	C	D	E	F	G	H	J	K ₁	K ₂	L ₁	L ₂	M ₁	M ₂	M ₃	Y	T
TA-20	20	1	55	39	42	26	52	13	-	-	17	38	-	9	5.5	R11	R9	R6	R28	4.5
TA-25	25	1	63	47	47	31	61	16	-	-	19	44	-	11	6.5	R15	R10.5	R7	R34	4.5
TA-30	30	1	70	52	53	35	70	17	-	-	20	50	-	11	9	R15	R12	R9	R39	6
TA-35	35	2	82	62	64	44	94	18	126	146	26	56	88	13	9	R18	R12	R10	R43.5	6

5-2 For the Driver

[1] External Speed Regulator / OP-RV-24B20K (20k)



[2] Extension Cord

(Connectors are provided in the same package, but not connected to the extension cord.)

- MotorCapacity 25W - 400W; Applicable to S C V series motor
- The same extension cord applies whether it is provided with a magnetic brake (Q Type) or not (P Type).

Part Name

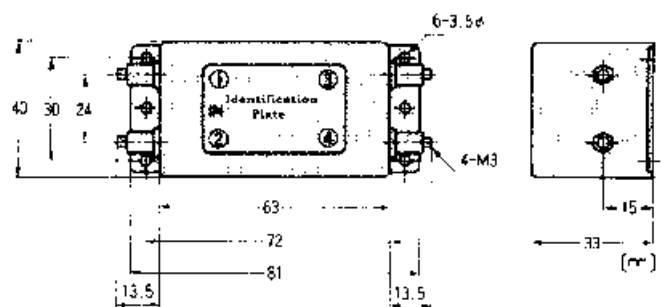
Type	Extension Cord Length	Option Name
P/Q Type	2m	OP-PQ2
	5m	OP-PQ5
	10m	OP-PQ10
	20m	OP-PQ20
	30m	OP-PQ30

- Follow the instructions on page 9 to connect the connectors to the extension cord. Exercise extreme caution, as the driver and the motor can be damaged if they are not connected correctly.

[3] Noise Filter / OP-LF205

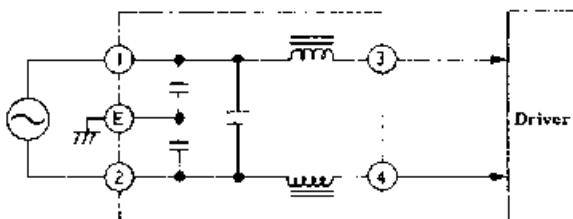
Often, a motor may emit noise to a radio or other devices nearby. In such situations, this device can be installed to the power supply side of the driver to shield the driver unit and wiring, thus reducing static noise.

Although a noise filter is provided internally, this device can be used in case the motor shares the same power supply with sources of high-frequency noises such as an electrical welder or an electrical discharge machine.

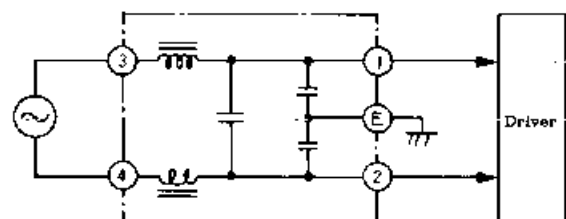


Manufacturer	Part Name
TOKIN	LF205A

- Wiring Diagram for preventing noise from being emitted out

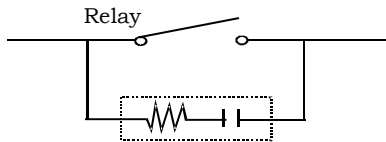


- Wiring Diagram for preventing noise from entering

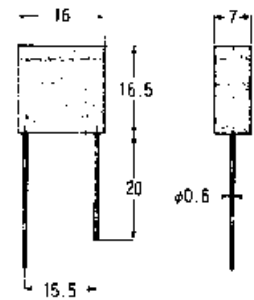


[4] Protective Element / OP-CRM-2

The protective element absorbs surge voltage that is generated when the coil is opened and closed, thus preventing the driver from operating improperly. A protective element must be used between the coil and devices that will be used in the same board as the driver, such as an electromagnetic welder or timer.



Protective Element

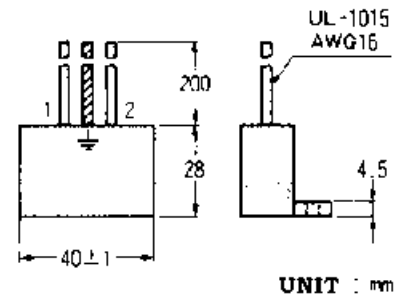
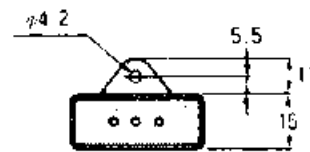


• The element may be used for preventing sparks at the switches on the power supply line.
(120 0.1 μ F)

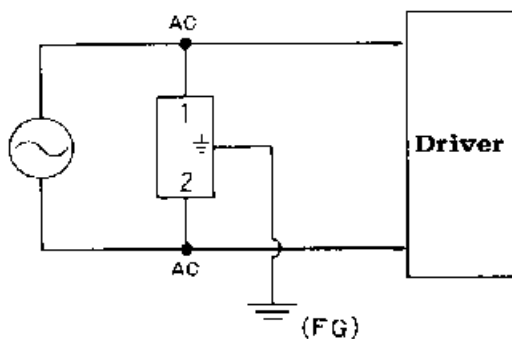
This filter is dedicated to protecting the driver from lightning surges. The use of this product is recommended, as noise filters do not have the capability to absorb lightning surges.

	Manufacturer	Part Name
100V Model	Okaya Electric	RAV-401BWZ-2A

	Manufacturer	Part Name
200V Model	Okaya Electric	RAV-781BWZ-2A



UNIT : mm



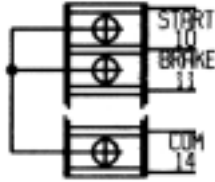
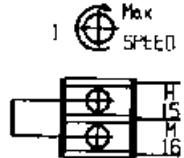


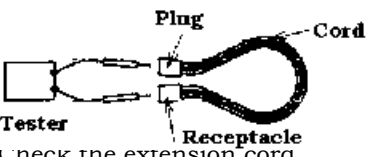
[5] Lightning Surge Protector

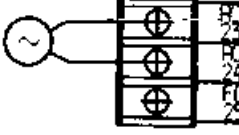
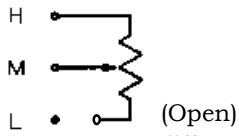
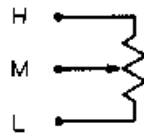
OP-RAV10

OP-RAV20

• Wiring Diagram

6. P/Q Type - Causes of Faulty Operation and Countermeasures

Symptom	Probable Cause	Area to be Inspected	Countermeasures
Motor does not rotate (The power supply lamp is on.)	[1] Improper command	   	Connect the terminals as shown on the left.
	a) Both the No.10(START) terminal and the No.11(BRAKE) terminal might not be properly shorted to the No.14(COM) terminal.		Connect the terminals as shown on the left.
	b) (If setting the speed in the internal speed regulator.) The No.15(H) and No.16(M) terminals are not shorted together.		Set to a required speed.
	c) (If setting the speed in the external speed regulator.) The No.1 trimmer rheostat (SPEED) is at minimum.		Set to a required torque.
Motor does not rotate (The power supply lamp is on.)	d) With the No.13 (TRQ) terminal shorted to the No.14 (COM) terminal, the No.2 trimmer rheostat (TORQUE) is at minimum.		Set to a required torque.
	[2] Extension cord connector pins interchanged	Verify the connection after referring to the section "Connecting the Extension Cord", on page 9 of this booklet.	
	[3] Extension cord connector pins inserted poorly (Open circuit in the motor power or signal lines)	 Check the extension cord terminals for continuity.	Repair or replace.
	[4] Open circuit in the motor windings	Using a tester, measure the resistance between poles of the motor power line. (There is no problem if the inter-wire values are uniform.)	If the test results are abnormal, replace the motor.

Symptom	Probable Cause	Area to be Inspected	Countermeasures
Motor does not rotate. (The power supply lamp is off.)	<p>[1] The A/C power supply is not applied properly.</p> <p>[2] An internal fuse is blown.</p> <p>a) The applied power supply is almost twice the rated voltage.</p> <p>b) The motor cable is shorted.</p> <p>c) The driver circuit has been damaged by a strong noise, such as that generated by a lightning surge.</p>	 <p>Recheck the connection.</p>	<p>Connect the terminals as shown on the left.</p> <p>The manufacturer will investigate the cause.</p>
Alarm light on.	<p>Overload operation</p> <p>Driver overheated</p> <p>Brake not released</p>	<p>Verify the amount of brake gap.</p> <p>Refer to the maintenance section of this manual.</p>	<p>Re-examine the motor capacity.</p> <p>Re-examine the transportable weight and allowable moment. (Please request the Engineering Division of Nissei Industries to select an optimal configuration for your application.)</p> <ol style="list-style-type: none"> 1. Improve heat dissipation around the driver. 2. Remove any source of heat from the area near the driver. <p>Adjust the brake to provide an optimal amount of gap.</p>
Speed cannot be varied.	<p>[1] The external speed regulator is not connected correctly. (L is open)</p>  <p>[The connection is different from that of a speed-control for an induction motor rated below 90W.]</p>		<p>Connect the terminals as shown on the left.</p>

Symptom	Probable Cause	Area to be Inspected	Countermeasures
Motor runs and stops intermittently.	<p>[1] Improper operation due to an external noise. [There may be a noise applied to the cable between the driver and the motor.]</p> <p>[2] Looseness or poor contact of connectors</p> <p>[3] Lead wire almost cut</p> <p>[4] Poor contact of input command terminals</p>	<p>Significant improvement in noise reduction can be made by using the optional extension cord. However, when using other types of extension cords, separate the power line (motor UVW line, and brake line) from the signal line (Hall IC signals Hu, Hv, and Hw), and make sure that they are not adjacent to one another.</p> <p>Re-connect the connectors, making sure that they are not loose.</p> <p>Using a tester, measure the resistance between poles, as well as the continuity of each wire, while wiggling the lead wires.</p> <p>Re-connect the connectors, making sure that they are not loose.</p>	<p>[1] Use the optional extension cord.</p> <p>[2] When extending the lines, separate the power line from the signal line, and make sure that they are not adjacent to one another.</p>
Unstable speed.	<p>[1] Abnormal external speed regulator rheostat</p> <p>[2] Abnormal external DC voltage</p> <p>[3] Operating out of the allowable speed range</p> <p>[4] Malfunction due to external noise The brake does not work (Q Type).</p>	<p>Using a tester, measure the resistance of the rheostat.</p> <p>Measure and verify the external DC voltage.</p> <p>Investigate if the speed is within the allowable range. Make sure to use a P/Q motor at 300 rpm minimum.</p> <p>Coordinate with the manufacturer to implement a countermeasure.</p>	<p>Replace if the rheostat is found to be faulty.</p> <p>Re-examine the applicability of the equipment used.</p> <p>Implement counter measures including: installing a noise filter, connecting ground, and separating the power line from the signal line.</p>
The brake does not work (Q Type).	Worn brake friction lining	Remove the brake cover and inspect the remaining lining material.	Replace the brake lining.
Malfunction of the GTR II-V itself.	Abnormal gear noise Abnormal vibration		Contact the manufacturer.

7. Maintenance and Use Life

7-1 Maintenance and Use Life

[Main Unit]

- All models use grease lubricant, without needing replacement or replenishment. The gear motor has been designed for an approximate use life of 10,000 hours.
- The life of the oil seals may vary according to use conditions. The seals may need to be replaced even before the motor has logged 10,000 hours.

7-2 Brake Gap Adjustment Procedure

- > On a Q-Type (variable speed type with brake) motor, the brake lining may gradually wear after the brake is used for a long time, causing the gap (g2) to increase.

(The Y-Type (speed servo type, with brake) and B-Type (position servo type, with brake) motors are maintenance-free, rarely needing brake gap adjustment.

If the gap exceeds the proper gap (g1,g2), it would make it difficult for the electromagnet to pull in the armature. As a result, the brake cannot be released. If the motor continues to operate in this state, it will run while the brake is being applied. This creates an overload condition, and after the alarm lamp is turned on, the motor will stop.

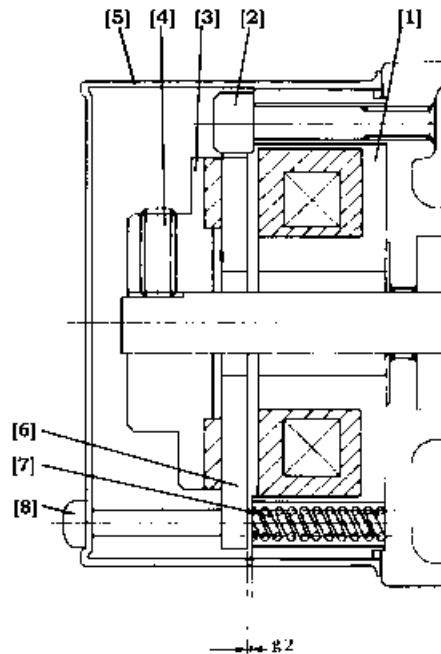
In order to operate this motor safely, the brake gap inspection or adjustment must be performed periodically (yearly, or after 2 to 3 million brake applications).

Adjustment Procedure

[1] V-Series, 25W, 50W

- (1) Remove the brake cover [5]
- (2) Loosen the hexagon socket screw [4]
- (3) Insert a 0.2mm shim in the gap g2 to press the friction disc and tighten the hexagon socket screw [4]
- (4) Pull out the shim.

- [1] Field
 - [2] Hexagon socket bolt
 - [3] Friction disc
 - [4] Hexagon socket screw
 - [5] Brake cover
 - [6] Armature
 - [7] Spring
 - [8] Brake cover mounting screw
- g2: Gap



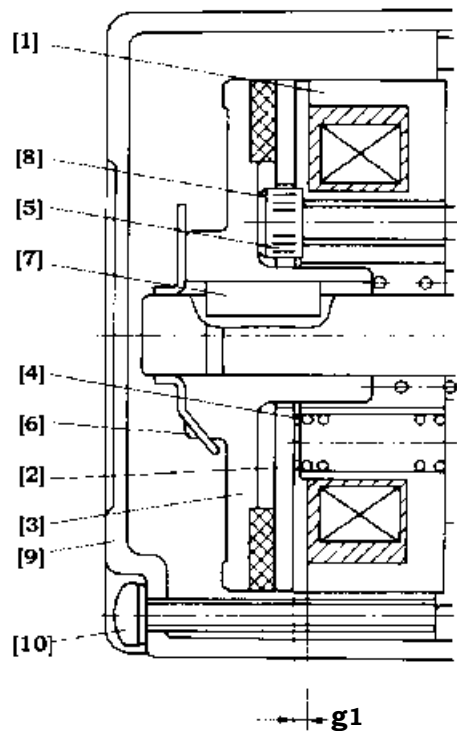
* If the brake is used for a long time, the brake gap g2 will exceed 0.5mm, and the brake will not be able to be released. Therefore, it is best to inspect and adjust be brake gap periodically.

Proper gap $g2 = 0.2 \pm 0.1$

[2] V-Series 100W, 200W, 400W

- (1) Remove the brake cover [9]
- (2) Lift up and remove the tab of the locknut [6] from the groove of the outer disc [3].
- (3) Tighten the locknut until it locks lightly. (At this time, $g1=0.2\text{mm}$.)
- (4) Then, loosen the locknut between 60° to 120° .
- (5) Bend the tab of the lochnut that is closest the groove of the outer disc.

- [1] Field
 - [2] Armature
 - [3] Outer disc
 - [4] Spring 1
 - [5] Spring 2
 - [6] Locknut
 - [7] Key
 - [8] Hexagon socket bolt
 - [9] Brake cover
 - [10] Brake cover mounting screw
- g1: gap



* If the brake is used for a long time, the brake gap g1 will exceed 0.7mm, and the brake will not be able to be released. Therefore, it is best to inspect and adjust be brake gap periodically.

Proper gap $g1 = 0.4 \pm 0.1$