

# PIEZO FEEDER CONTROLLER

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## Instruction Manual

### Single-Function Type

P212

P312

This Instruction Manual is applicable to Piezo Feeder Controller version 1 and later. Confirm the version information displayed upon powering ON.

Read the Manual carefully beforehand to ensure the safe use of the Controller. After reading, store the Manual within reach so as to be ready for rereading. The dealer is requested to be sure to deliver the Manual to the end user.



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## 1. Introduction

Thank you for your selection of our Piezo Feeder Controller, a digital controller for piezo feeder (“Controller”).

The piezo feeder is a high-efficiency, energy-saving parts feeder driven by piezoelectric elements.

In combination with the dedicated digital controller, the Controller can be operated easily and efficiently without requiring any difficult adjustment. Before connecting the piezo feeder and performing subsequent adjustment, read the Manual carefully to ensure proper use of the excellent functions of the piezoelectric parts feeder.

## 2. Before Using

Before unpacking, be careful not to have an impact or vibration on the packing.

Unpack, and check the following:

(1) Isn't there any damage caused during transport?

(2) Are the rating, capacity and model on the nameplate exactly what you have ordered?

If there is any problem, contact the dealer.

## 3. Precautions for Safety

Be sure to read the Manual carefully before the installation, operation, maintenance, checkup, etc. of the Controller to ensure your familiarity with the Controller, safety information and precautions.

In the Manual, the safety precautions are divided into “DANGER” and “CAUTION” according to their severities.

 <b>DANGER</b>	If the Controller is handled improperly, a dangerous situation could be caused, and the possibility of death or injury is assumed.
 <b>CAUTION</b>	If the Controller is handled improperly, a dangerous situation could be caused, and the possibility of medium or minor injury or partial damage is assumed.

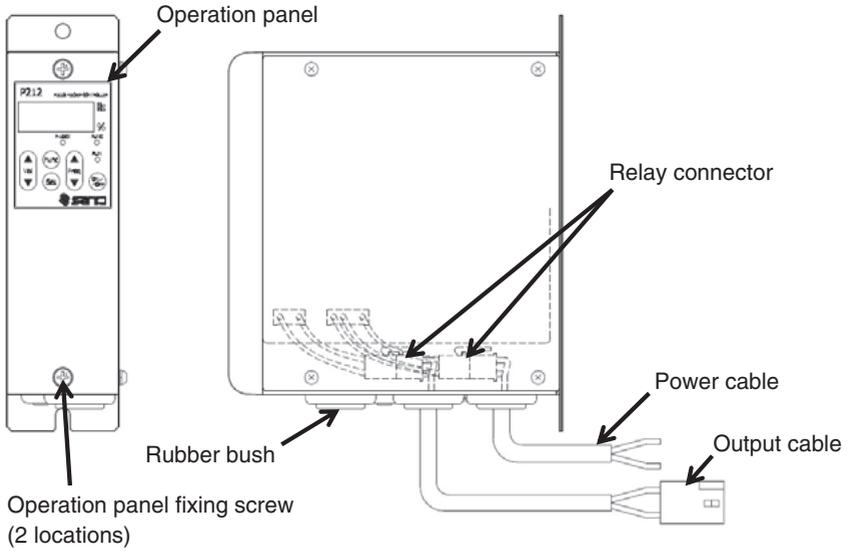
## **DANGER**

- Do not service the Controller in the Power-ON status. To avoid an electric shock, be sure to turn OFF the power supply before starting the service.
- Do not disassemble, remodel or repair the Controller, or an electric shock, a fire or injury could be caused. For repair, ask the dealer.
- Do not remove the front cover while the Controller is in the Power-ON status, or an electric shock could be caused.
- Do not put or insert anything in or into the Controller, or an electric shock or a fire could be caused.
- Do not use the Controller near explosive or flammable gas, or a fire could be caused.
- Do not splash water or liquid, or an electric shock or a fire could be caused.
- If smoke, odor or abnormal noise is emitted or other abnormality is detected, shut down the Controller immediately. If the Controller is used in the abnormal status, a fire could be caused. Contact the dealer.
- If the Controller is not operated for a long time, shut down the Controller. If the Controller is left live as it is, a fire could be caused.
- Connect the power cable and the output cable as instructed in the Manual to avoid an electric shock and a fire.
- Do not forcedly bend, pull or pinch the power cable or the output cable, or an electric shock or a fire could be caused.
- Ground the earth terminal and the ground prescribed portions without fail, or an electric shock could be caused. When working on grounding to a high position or a shaky stand, because fall or tumble could be caused conditionally, take measures to prevent fall or tumble.
- Do not conduct megger testing for any terminals other than the input terminal.

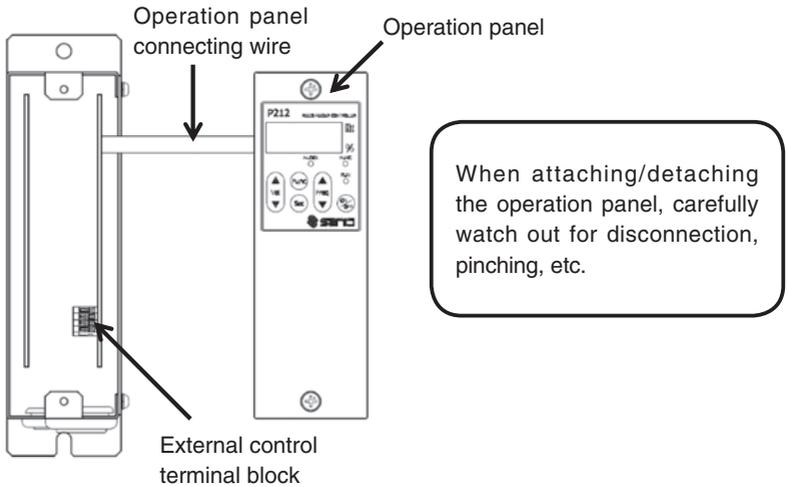
## **CAUTION**

- Do not use the Controller for an electromagnetic parts feeder or the like.
- Do not turn ON/OFF the power supply frequently, or failure could be caused.
- Do not start/stop the vibrator with an electromagnetic contactor or the like on the output side, or failure could be caused.
- Do not perform welding work on the vibrator side in the Power-ON status.
- Do not perform welding work on the vibrator side when the vibrator and the Controller are in the connected status.
- Do not remove the nameplate, the seal, or the like.
- When installing the Controller, hold and fix it firmly and properly.
- Do not transport or carry the Controller in the piled-up status, even in the packed status, or they could fall, causing injury.
- Do not place the Controller outdoors, in a humid place or in a place with excessive temperature change.
- Do not pile up the Controller two-tiered or more, even in the packed status.
- When disposing of the Controller, dispose it properly as general industrial waste.

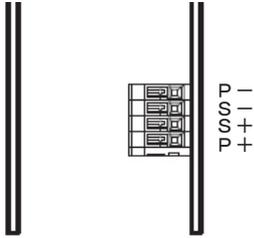
4. Name of each unit



Operation panel removed status

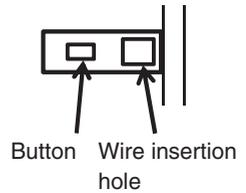


Terminal block No.



Wiring to the external signal terminal block (screw-less)

While holding down the button on the terminal block with a flat-blade screwdriver or the like, insert the wire into the wire insertion hole. Then, detach the flat-blade screwdriver to release the button, and the wire will be fixed.



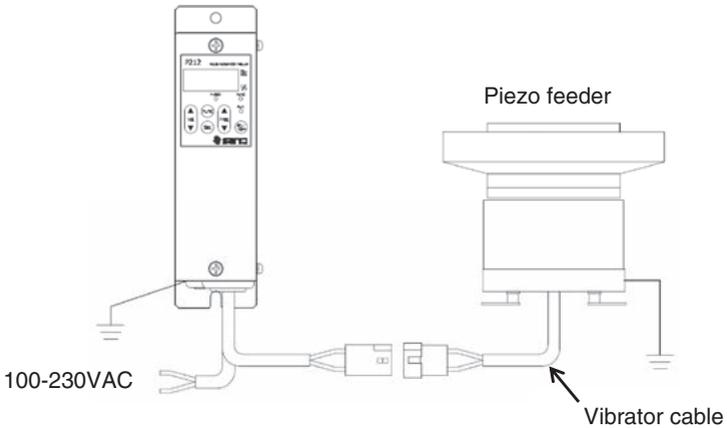
Applicable wire size

Stranded wire: 0.08 – 0.32mm<sup>2</sup> (AWG28 – 22), Strand diameter:  $\phi$ 0.12mm or more

Solid wire:  $\phi$ 0.32 – 0.65mm (AWG28 – 22)

Cover removed length: 9 – 10mm

## 5. Connection of Inputs and Outputs



### 1) Connection to the vibrator

Confirm that the power supply is in the OFF status. Then, connect the output cable of the Controller to the vibrator cable of the piezo feeder.

The connector wire colors should be identified as follows:



- ※1: Do not connect any vibrator other than the piezo feeder made by Sanki.
- ※2: Do not operate with no load.
- ※3: Be sure to ground the vibrator.

### 2) Connection to the power source

Connect the power cable to the single-phase power source.

Do not turn ON the power supply until the whole wiring work is completed.

- ※1: Be sure to make a connection to the utility power source.
- ※2: Be sure to ground the Controller.

### 3) Connection of the external signal [in1 Input]

The operation/stop of the vibrator is operated according to external signal.  
When the external signal is not used, set as "Parameter No. 06 = Lo."

※To connect the external signal, the operation panel should be removed.

Confirm that the power supply is in the OFF status. Then, detach the operation panel.

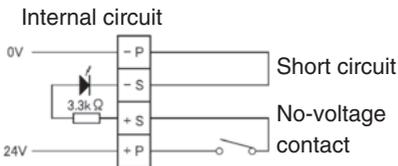
The operation panel is connected to the main unit of the Controller with a connection wire. When attaching/detaching the operation panel, carefully watch out for disconnection or pinching.

To operate the start/stop of the Controller according to external control signal, either method of non-voltage contact signal or voltage signal (24VDC) can be used.

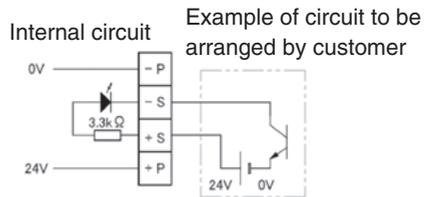
Make connection to the external control terminal block by using the method ① or ② below while watching out for the signal to be used and the connection method. When wiring, be careful not to make mistake about the polarity.

The current of 24VDC and 10mA or less flows between [+S] and [-S]. Carefully select the connection device (e.g., minute current relay).

#### ① No-voltage contact signal



#### ② Voltage signal (24VDC)

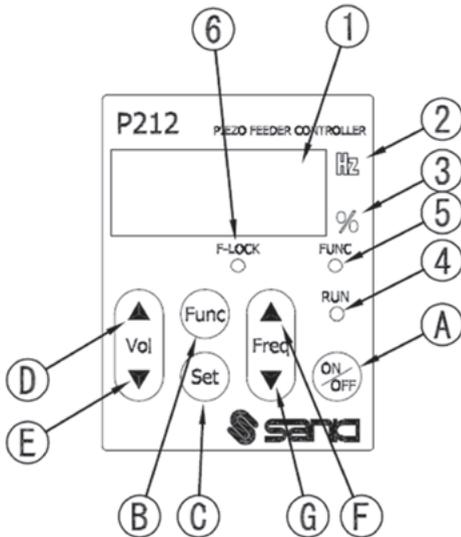


#### [in1 Input logic]

	Signal input status		Vibrator operation condition	
			Setting: Hi	Setting: Lo
in1 Input Parameter No. 6	Connection ① : Close	Connection ② : 24VDC	Operation condition	Stop
	Connection ① : Open	Connection ② : 0V	Stop	Operation condition

: Default

## 6. Explanation of Operation Panel



### 1) Pilot lamps

No.	Name	Function
①	Data display	A 7-segment, 4-digit LED Displays voltage, frequency, each setting and error code.
②	Frequency pilot lamp	ON when the data display is showing frequency
③	Voltage % pilot lamp	ON when the data display is showing voltage
④	Operation pilot lamp	Indicates the output condition of the Controller. ON: The Controller is in operation under external control. Blinking: The Controller is in forced operation by the ON/OFF key. Long OFF and blinking: The Controller is at a forced stop by the ON/OFF key.
⑤	Parameter mode pilot lamp	ON when the parameter is being set
⑥	Frequency lock pilot lamp	ON when the frequency is locked.

### 2) Operation keys

No.	Name	Function
A	ON/OFF key	Performs the forced operation and the forced stopping.
B	Func key	Brief pressing: Sets the frequency lock. Long pressing: Switches the mode between the parameter mode and the normal mode.
C	Set key	Brief pressing: Changes and locks the data. Long pressing: Saves the data (voltage, frequency, each setting).
D	Vol UP key	Normal mode: Adjusts the output voltage. When pressed briefly when the frequency is being displayed, the frequency display switches to the voltage display. Parameter mode: Selects the parameter No.
E	Vol DOWN key	
F	Freq UP key	Normal mode: Adjusts the frequency. When pressed briefly when the voltage is being displayed, the voltage display switches to the frequency display. Switches the ON/OFF of frequency lock Parameter mode: Changes the parameter data.
G	Freq DOWN key	

## 7. Display Mode

- Normal mode: Shows and sets the output voltage or the frequency on the data display.
- Parameter mode: Shows and sets the parameter on the data display.

When the Func key is pressed long for over 2 sec, the mode switches.

Regardless of the display mode, operation and stopping through the panel and under the external control is enabled.

### 1) Setting the frequency lock

When the Func key is pressed when the data display is showing the output voltage or the frequency in the normal mode, the F-LOCK lamp starts blinking, and the data display shows the current settings.

To select the setting, press the Freq UP/DOWN keys.

To change the setting, press the Set key.

When the setting change is completed, the data display shows the voltage.

※If the key operation is not tried for over 5 min, the data display shows the voltage.

on: The frequency cannot be changed.

off: The frequency can be changed.

The settings are saved to the operation memory.

### 2) Setting the parameter

(1) When the Func key is pressed long for over 2 sec in the normal mode, the FUNC lamp lights up and the mode switches to the parameter mode.

The data display shows the current parameter set value.

The operation is enabled when the Controller is in either condition, at a stop and in operation.

(2) Select the parameter to be changed (⇒ P. 13) by pressing the Vol UP/DOWN keys.

(3) When the Set key is pressed, the parameter No. (left 2 digits) starts blinking, and the set value can now be changed. Change the set value by pressing the Freq UP/DOWN keys.

(4) When the Set key is pressed, the parameter No. lights up, and the change is saved temporarily.

(5) When the power supply is turned OFF in this status, the saved contents are cleared.

Press the Func key long for over 2 sec to return to the normal mode.

(6) Press the Set key long for over 2 sec.

The data display shows "SAVE" in blinking, the parameter data, the voltage% and the frequency are saved, and the data display shows the voltage.

※If the key operation is not tried for over 5 min, the mode switches to the normal mode, and the data display shows the voltage.

## 8. First-Time Use

Flow up to operation start

Input/output connection



- Connect the input and the output.
- Connect the external I/O signals.

Amplitude adjustment



Adjust the amplitude to optimize the work transfer speed.

Output the set output voltage and the frequency for a certain length of time.

- Set the output voltage and the frequency manually.

Added function



- Set the soft start and the soft stop.

Normal operation

## 9. Adjusting Amplitude

Before powering ON the Controller, recheck the model, specifications and power voltage of the Controller to confirm no discrepancy, and also recheck the connections to confirm no wrong connection. Particularly when external signal is used, be careful not to make mistake about the polarity.

When the Controller is powered ON, the current software version is shown on the display, then the newest settings (factory setting when the Controller is used for the first time) are read to the operation memory, and the Controller starts operation.

The following explanation assumes that the parameter No. 06 = Hi (factory setting) and the external control (in1) is not used. When adjusting, load a small amount of work in the bowl or chute for use only as a guide to adjustment.

- (1) Power ON the Controller.  
The Controller starts displaying the normal mode (output voltage%). (Factory setting: Output voltage% = 0.0%)
- (2) Set the output voltage% by pressing the Vol UP/DOWN keys.  
For the first-time adjustment, because the vicinity of the resonance point is searched for, aim at around 30 – 50% to make it easy to find vibration.
- (3) When the ON/OFF key is pressed, the Controller comes into the forced operation, and starts outputting.  
The RUN lamp starts blinking.
- (4) Press the Freq UP/DOWN keys to display the frequency, and adjust the frequency to make the work runs best.  
If the vibration becomes excessive due to approach to the resonance point during this adjustment, lower the output voltage%.
- (5) Lower the output voltage% until the vibration reduces in intensity to such an extent that the work moves slightly when the Vol UP/DOWN keys are pressed, and adjust the frequency to make the work run best by pressing the Freq UP/DOWN keys.
- (6) Now, the frequency adjustment is completed.  
Set the output voltage% to the required speed by pressing the Vol UP/DOWN keys.
- (7) Lock the set frequency not to be changed by mistake.  
When the Func key is pressed, the F-LOCK lamp starts blinking, and the display shows “off.”  
Change “off” to “on” by pressing the Freq UP/DOWN keys, and press the Set key.  
The F-LOCK lamp lights up, and the frequency is locked.
- (8) If the Controller is powered OFF in this status, the status before adjustment is resumed. To prevent this, save the adjusted data.  
Press the Set key long for over 2 sec. The data display shows “SAVE” in blinking, and shows the normal mode voltage.  
Now, the voltage%, the frequency and the parameter data are saved.

It is advisable to record the final output frequency and output voltage% for the next maintenance.

## 10. Added Function

The power outlet of the Controller is of 24VDC, 160mA. Watch out for the total consumption current to ensure that it will not exceed the power outlet capacity.

### Soft start and soft stop functions

If the rising time or falling time of the piezo feeder should be adjusted, change the settings of the soft start or soft stop.

To change the settings, set the relevant parameter accordingly.

The set time range is 0.2 – 9.9 sec. (Default value: 0.2 sec)

### [Returning to the factory setting]

- (1) When the Controller is in the Power-OFF status, power ON the Controller by pressing the Vol UP key and the Freq DOWN key together. The Controller starts in the initialization mode, and the data display shows “99” in blinking.
- (2) In this status, press the Func key and the Set key together long for over 3 sec. All set data are reset.
- (3) Upon the completion of resetting, the data display shows “99” in lighting.
- (4) When the Func key is pressed long for over 2 sec, the Controller starts in the factory setting status.

So is the case with powering OFF and then powering ON the Controller.

※When the above procedure is taken, all set data of parameter, frequency and voltage are cleared.

## 11. Parameter list

No.	Function	Description	Setting range	Default value
c	Soft start	Output soft start timer	0.2-9.9 --: Invalid	0.2
d	Soft stop	Output soft stop timer	0.2-9.9 --: Invalid	0.2
	% display	Output voltage backup display		0.0
	Hz display	Frequency backup display		240.0
06	in1 setting	in1 input logic	Hi: Operation with the contact “Close” Lo: Operation with the contact “Open”	Hi

Display: 1st digit = Operation pattern 1, 2nd digit = Parameter No., 3rd and 4th digits = Set value

## 12. Guard and Alert

### 1) Error display

If an error occurs, the error No. is displayed on the data display, and the output is stopped forcibly.

Reset the error as described below.

When resetting the error, eliminate the abnormality beforehand.

If the external signal is an operation condition, be careful that the Controller becomes ready for operation upon resetting.

(1) Power OFF the Controller, and the error will be reset.

(2) Press the Vol DOWN key and the Freq DOWN key together long for over 3 sec, and the error will be reset.

### 2) Alert display

An alert is displayed during operation or adjustment.

The output will not stop.

If the Controller is continuously used as it is, an error may occur. Therefore, review the settings, etc.

Error No.	Error name	Contents
E-01	Overcurrent error	The output is over the maximum output current.
E-02	Overvoltage error	The output is over than the maximum output voltage.
E-10	Parameter error	Memory error on startup
E-11	Operation data error	Memory error on startup
E-12	System data error	Memory error on startup

Alert No.	Alert name	Contents
E-81	Overvoltage alert	The output voltage is the highest.

### 13. Troubleshooting

Trouble	Probable cause	Corrective action
The vibrator does not vibrate.	The power cable is not connected.	Connect the power cable.
	“Voltage (%)” is “0.0.”	Set “Voltage(%)”.
	The set frequency is wrong.	Adjust the frequency to the resonance frequency.
	The output connectors is disconnected from the vibrator.	Connect the output connector to the vibrator.
	The RUN lamp is OFF.	Check the external control. Check the parameter settings.
	The RUN lamp is blinking.	Press the ON/OFF key
The frequency cannot be adjusted.	The F-LOCK lamp is ON.	Release the lock.
When the power is turned OFF, the settings are cleared.	The data has not yet been saved.	Save the data.
The overcurrent error (E-01) is displayed.	The vibrator is probably abnormal.	Contact the dealer.
	Ground fault was caused due to damage to the controller output cable cover or the vibrator wire cover.	Replace the damaged cable or wire.
	The frequency is deviant.	Adjust the frequency to the resonance frequency.

### 14. Options

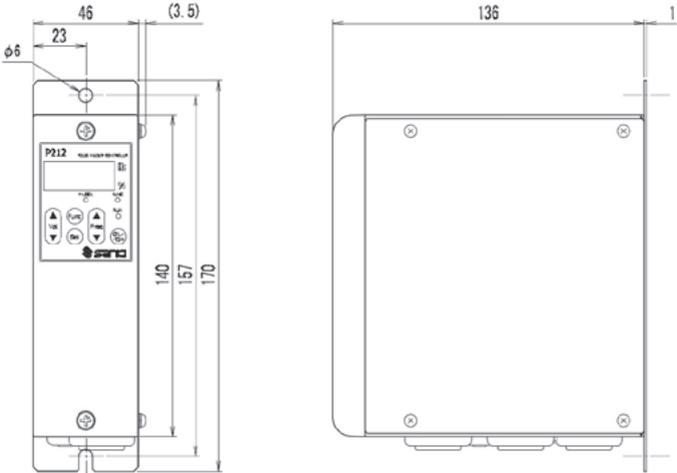
Name	Applied wire	Length (mm)	Terminal		Remarks
Power cable	VCTF 0.75×3	1200	Nichifu pin terminal male	PC-2005M	Provided on option
Output cable	VCTFK 0.75×2	1200	Molex terminal	1189ATL	
			Molex housing 3P	1396R1	

## 15. Specifications

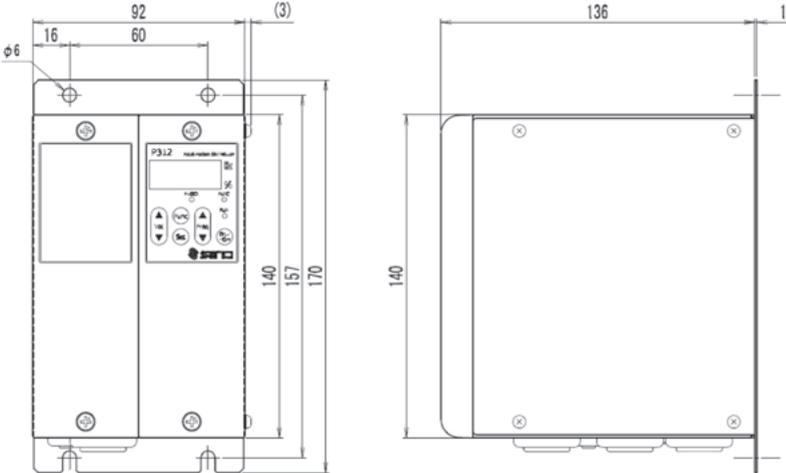
Model		P212	P312
Input	Voltage	100/230VAC±10%	
	Frequency	50/60Hz	
	Number of phases	Single phase	
Output	Control method	Sine wave PWM method	
	Maximum current	50mA	170mA
	Voltage	0 - 240VAC	
	Frequency	50 - 400Hz	
Added function	Operation and stop	Operation and stop enabled according to external signal (contact or 24VDC)	
	Others	Soft start, soft stop, short-circuit protection, etc.	
	Power outlet	24VDC, 160mA	
Operating temperature range		0 - 40°C	
Operating humidity range		30 - 90% (no condensation)	
Place of use		Indoor (no corrosive gas, dust or the like)	
Noise resistance		1000Vp or more	
Incoming capacity		15VA	26VA
Mass		1.1kg	2.3kg
Applicable vibrator	Bowl feeder (Indicated REF- or later model)	90A, 120A, 150A 110i, 150i	190A, 230A, 300A, 390B, 460B 190i
	Inline feeder (Indicated REF- or later model)	L5A, L15A L25A, L60A, L125A L30AG, L75AG, L150AG, L200AG, L250AG	

16. Outside Dimensional Drawing

[P212]



[P312]



※The input and output cables are omitted.

## 17. Warranty

The warranty shall continue in effect for one year from the date of shipping.  
(However, the warranty period is calculated based on 8-hour operation a day.)

[Warranty conditions]

1. If failure or break is caused to the Controller by any defect in the design, material or workmanship of the Controller in the normal usage in accordance with the precautions described in the Instruction Manual, labels put on the Controller, and others during the warranty period, we shall provide free repair or part replacement.
2. However, even if it is within the warranty period, following cases shall not be covered under our warranty:
  - ① Failure or break caused by a fire, an earthquake, a flood or the like, or unspecified power source (voltage, frequency)
  - ② Failure caused by improper handling or operation
  - ③ Failure caused by handling against the usage, specifications or precautions described in the Instruction Manual
  - ④ Failure or break caused by remodeling, disassembly or the like conducted without our consent

The contents of this Instruction Manual are subject to change for functional improvement without notice.

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