

# PIEZO FEEDER CONTROLLER

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## Instruction Manual

### 【Single-Function Type】

P212

P312

This Instruction Manual is applicable to Piezo Feeder Controller version 2 and later.  
Confirm the version information displayed upon powering ON.

Ver. 2

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.

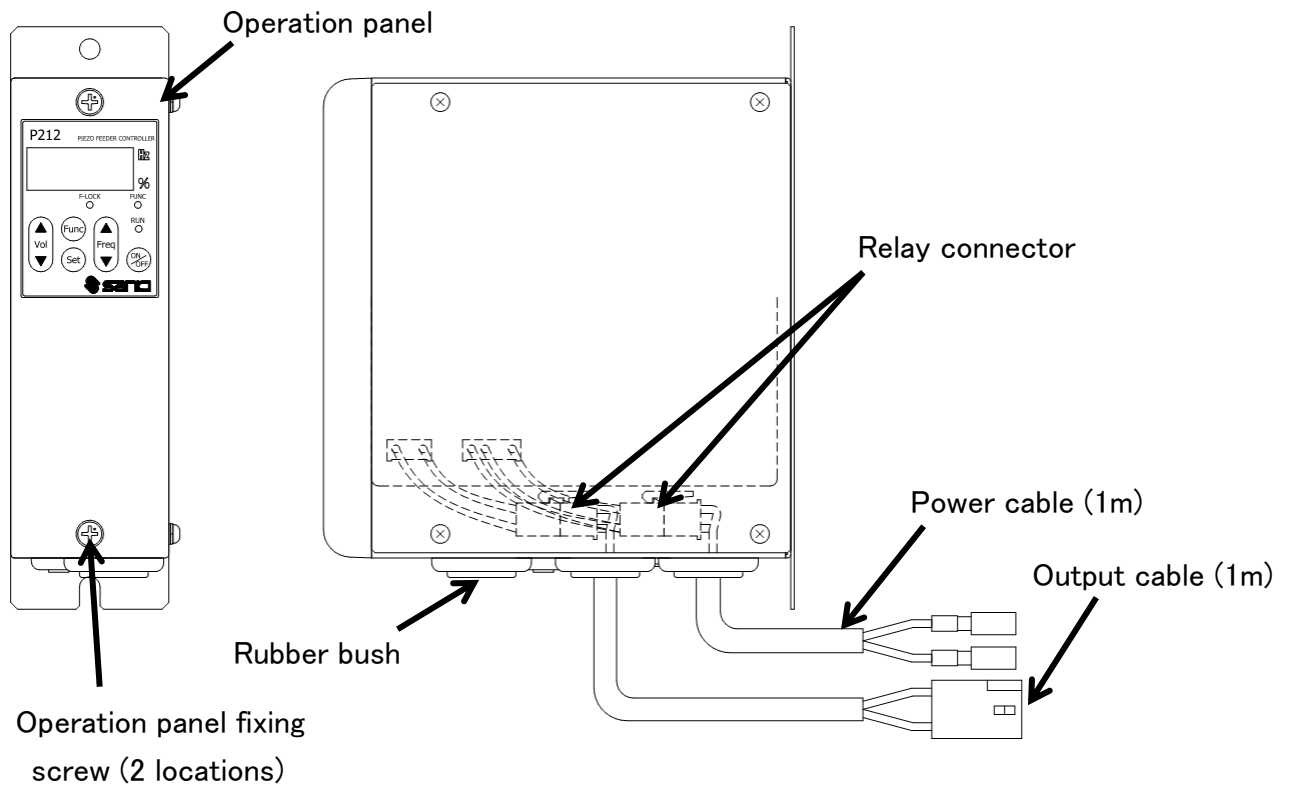
 DANGER

- 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 forcibly 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.

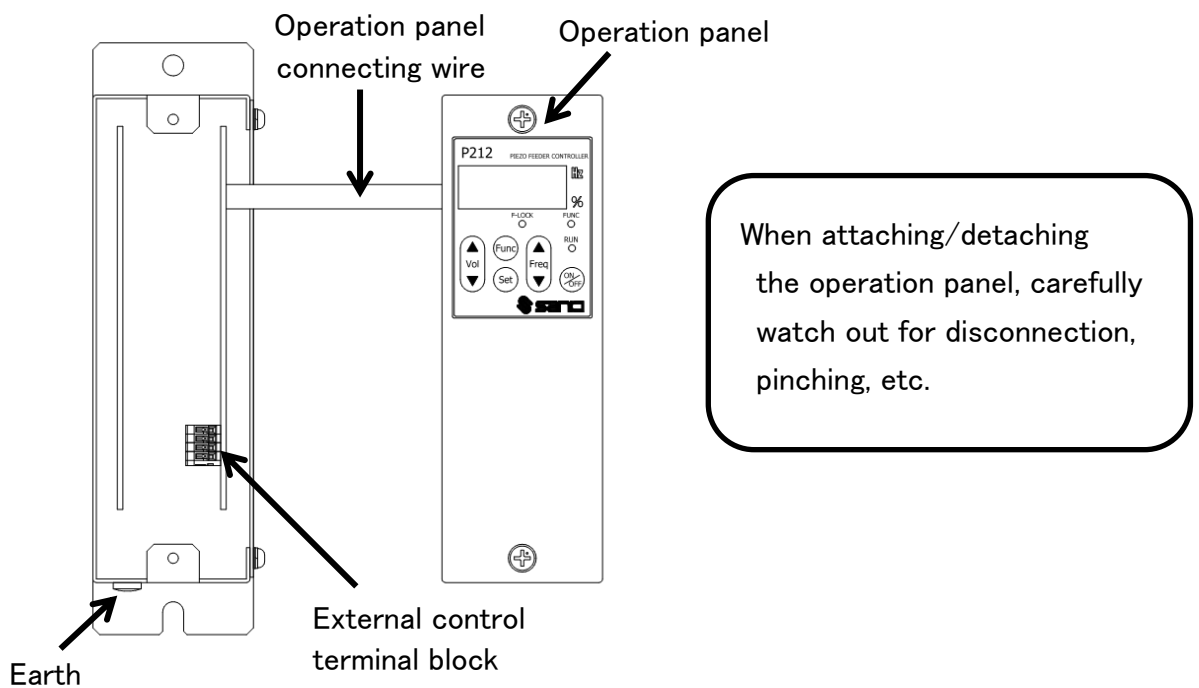
 CAUTION

- 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 feeder side in the Power-ON status.
- Do not perform welding work on the feeder side when the feeder 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.

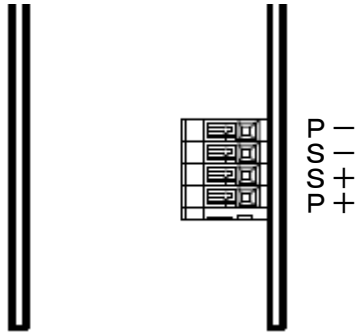
#### 4. Name of Each Part



#### Operation panel removed status

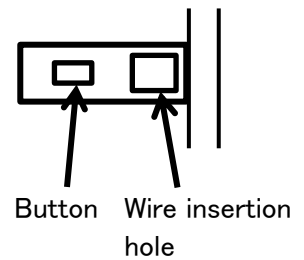


Terminal block No.



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

While holding down the button on the terminal block with a flat-blade screwdriver or similar, 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)

Wire strip length: 9 – 10mm

## 5. First-Time Use

### Starting operation flow

#### Input/output connection



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

#### Amplitude adjustment



Adjust the amplitude to optimize the work transfer speed.

Outputs the setting (output voltage, frequency) for a certain length of time.

- Set the output voltage and the frequency manually.

#### Added function

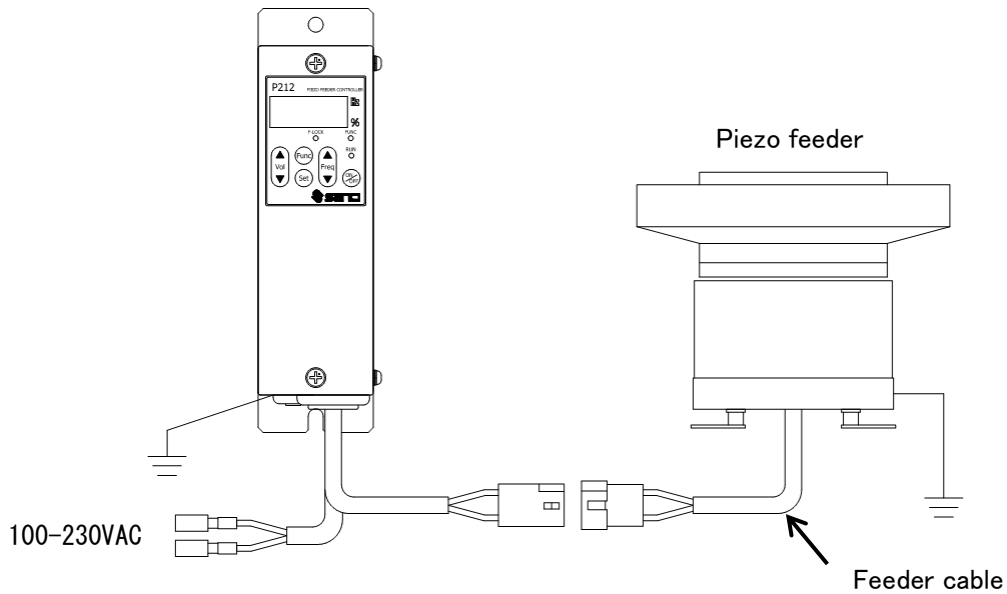


- Set the soft start and the soft stop.

#### Normal operation



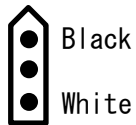
## 6. Input/Output Connections



### 1) Vibratory feeder drive connection

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

The connector wire colors should be identified as follows:



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

### 2) Power source connection

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 connect to the utility power source.
- ※2: Be sure to ground the controller.
- ※3: Do not perform the ON/OFF control on the input power supply side.

3) External signal [in1 Input] connection

The operation/stop of the feeder is operated according to external signal.

When the external signal is not used, set parameter as “Parameter No. 06 = Lo.”

※1. 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.

After the connection is completed, attach the operation panel, and then turn ON the power supply.

The operation panel is connected to the main unit of the controller with a connecting wire.

When attaching/detaching the operation panel, carefully watch out for disconnection or pinching.

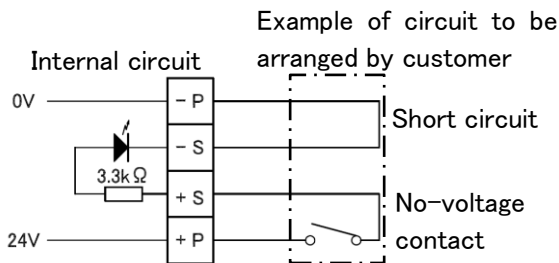
※2. The [+P] - [-P] line can also be used as an outlet of 24VDC, 160mA.

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.

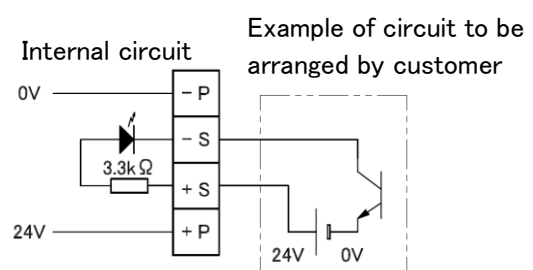
Make connection to the external control terminal block by using the method ① or ② below while watching out for the signal to be used and the connection method. When wiring, be careful not to make mistake about the polarity.

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]

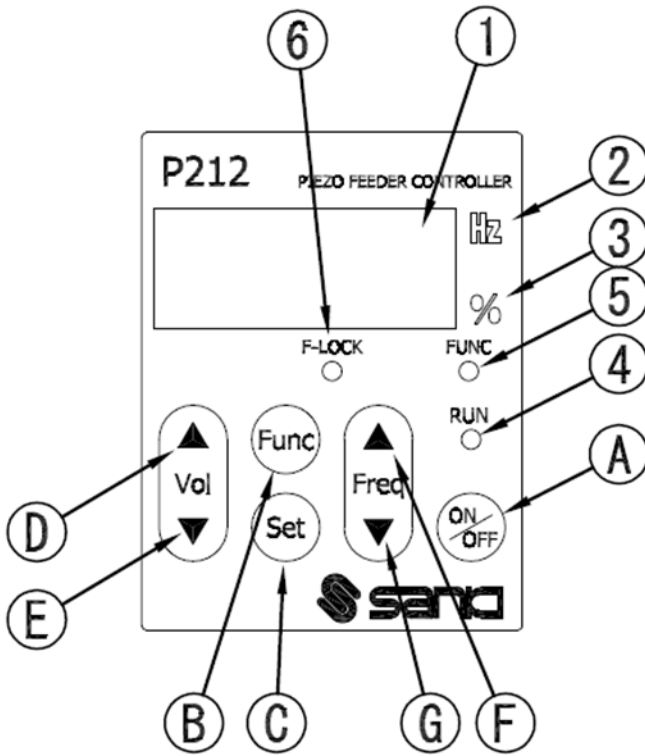
	Signal input status		Feeder operation condition	
			Setting: hi	Setting: Lo
in1 Input Parameter No. 6	Connection ①: Close	Connection ②: 24VDC	Operation condition	Stop
	Connection ①: Open	Connection ②: 0V	Stop	Operation condition

□: Default

## 7. Explanation of Operation Panel

### 7-1. Explanation of Operation Panel

#### 1) Pilot lamps



No	Name	Function
①	Data display	A 7-segment, 4-digit LED Displays voltage, frequency, each settings and error codes.
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: Switches the frequency lock setting. Long pressing: Switches the mode between the parameter mode and the normal mode.
C	Set key	Brief pressing: Changes and locks the data.
D	Vol ▲ 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 ▼ key	
F	Freq ▲ key	Normal mode: Adjusts the frequency. When pressed briefly when the voltage is being displayed, the voltage display switches to the frequency display. Frequency lock setting display: Changes the frequency lock setting. Parameter mode: Changes the parameter data.
G	Freq ▼ key	

## 7-2. Display Mode

### 1) Normal mode

Displays and sets the output voltage, frequency and frequency lock setting on the data display area.

Upon turning ON the power supply, this display appears.

### 2) Parameter mode (Pilot lamp ⑤FUNC lights up.)

Shows and sets the parameter on the data display.(Details⇒P.15)

To switch the display mode, press the Func key long for 2 sec.

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

## 7-3. Setting the Frequency Lock

This setting is enabled when the normal mode (output voltage, frequency) is in display. When the Func key is pressed, the pilot lamp ⑥F-LOCK starts blinking, and the data display area displays the current setting.

When the Func key is pressed again, the voltage is displayed.

Voltage (Frequency) → ⑥F-LOCK → Voltage

To select the setting, press the Freq▲ key or Freq▼ key. To execute the setting change, press the Set key.

When the setting change is completed, the voltage is displayed.

If the process is brought forward to the next item by pressing the Func key without pressing the Set key during the setting change, the setting will not be changed.

※If there is no key operation for over 5 min, the voltage is displayed.

on : The frequency cannot be changed.

oFF: The frequency can be changed.

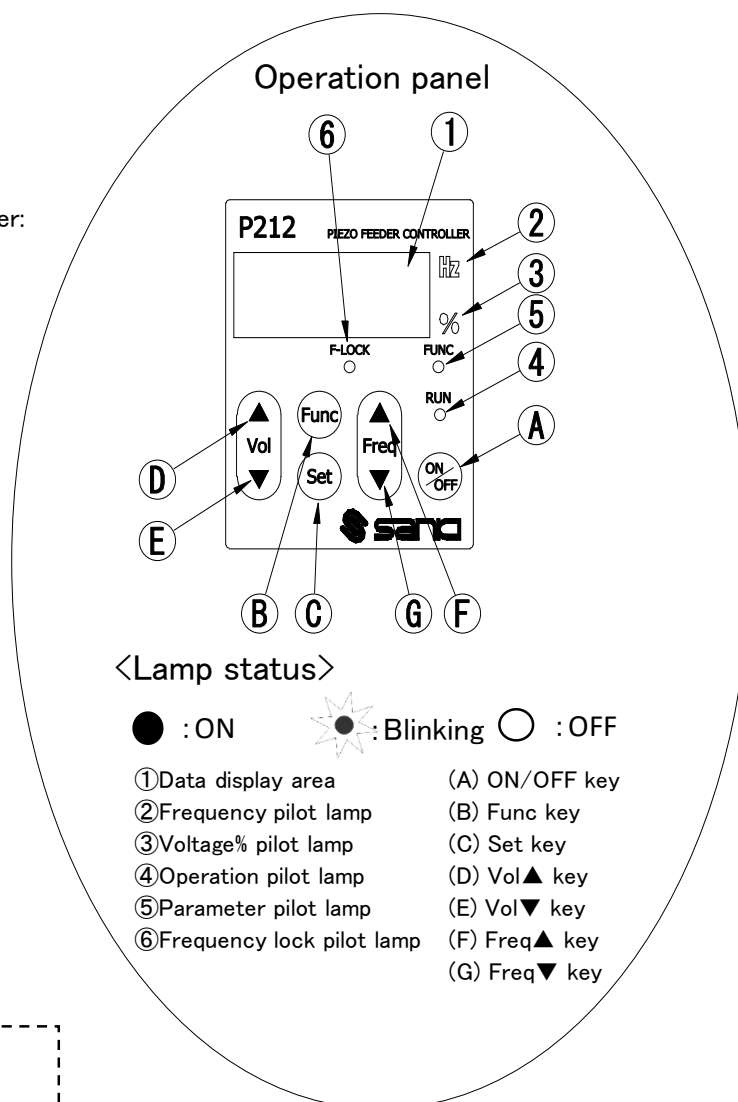
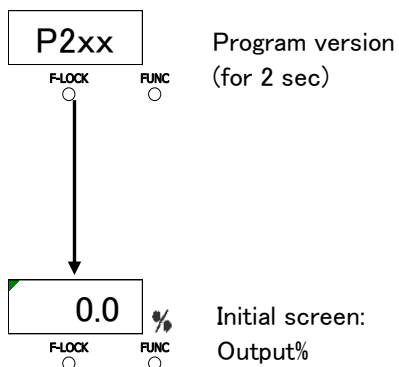
## 7-4. Preparation for Operation

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 mistake the polarity.

## 8. Operation and Amplitude Adjustment Method

### ① Power ON

The following are displayed in this order:



#### <Lamp status>

● : ON    ✨ : Blinking    ○ : OFF

- ① Data display area
- ② Frequency pilot lamp
- ③ Voltage% pilot lamp
- ④ Operation pilot lamp
- ⑤ Parameter pilot lamp
- ⑥ Frequency lock pilot lamp
- (A) ON/OFF key
- (B) Func key
- (C) Set key
- (D) Vol▲ key
- (E) Vol▼ key
- (F) Freq▲ key
- (G) Freq▼ key

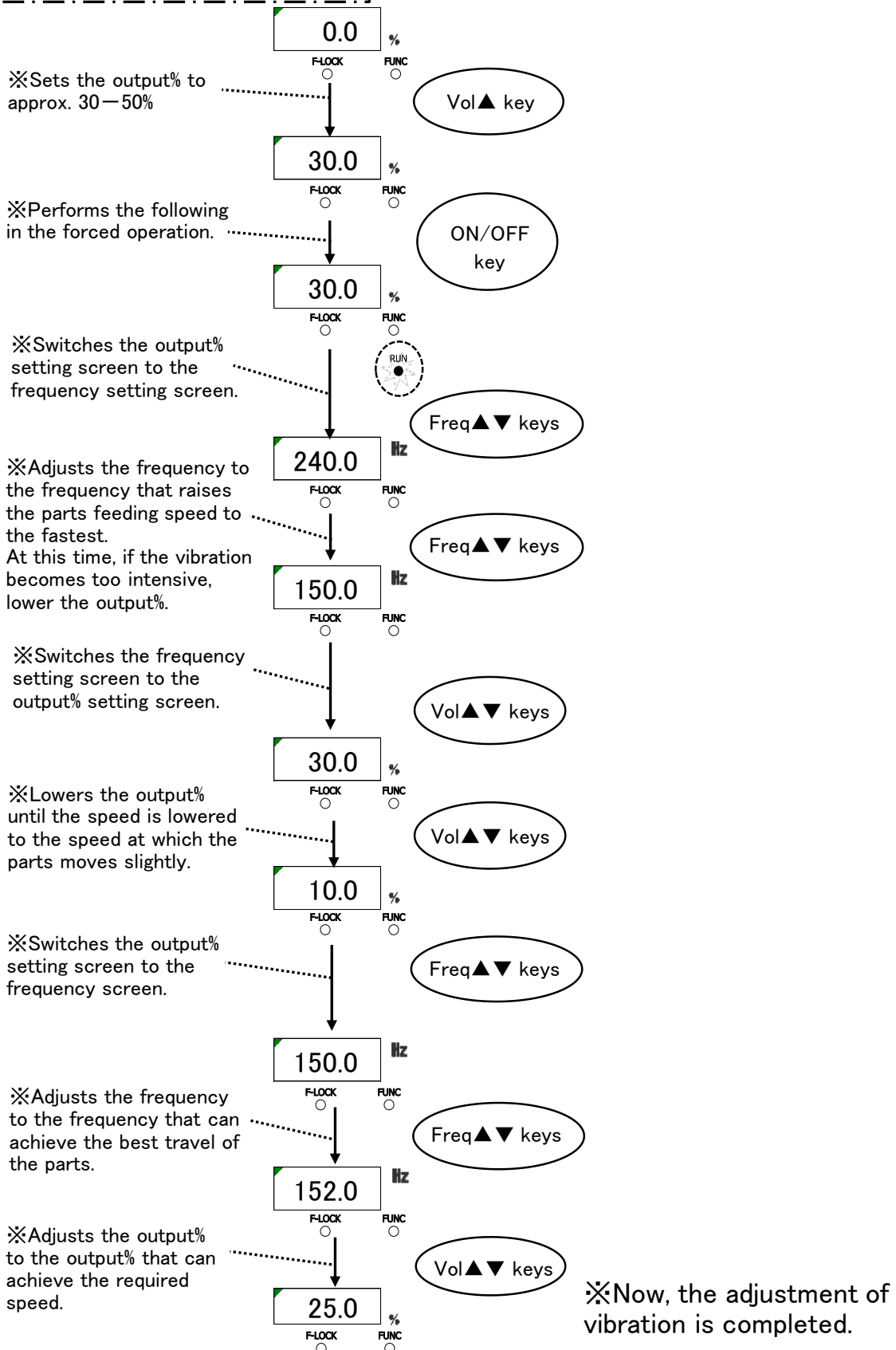
#### <Meaning of RUN lamp status>

- ON: In operation by remote control
- OFF: Operation at a stop (when remote control is OFF)
- ✨ Quick blinking: In forced operation
- ✨ Slow blinking: Forced operation at a stop

\* Forced operation means  
 ⇒ Forcibly starting/stopping the operation by pressing the ON/OFF button whether the operation is remote-controlled or not

※Go to <② Adjustment of vibration>.

## ② Adjustment of vibration



## 9. Added Function

### 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.

Parameter No. 0C: Soft start = The time until the set output is achieved after the operation starts

Parameter No. 0d: Soft stop = The time until the stop is made from the set output after the stop conditions are met.

The set time is 0.2—9.9 sec. (The default value is invalid.)

## 10. Initialization of the Set Data 【Returning to the factory setting】

- (1) When the Controller is in the Power-OFF status, power ON the Controller by pressing the Vol ▲ key and the Freq ▼ 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. Remote Unit (RCU-3A)

When the remote unit is connected, the output voltage of the Piezo controller can be operated by remote control.

※The frequency to be used for remote control is the set frequency of the main unit of the controller.

For details of usage of the remote unit, refer to the instruction manual of Remote Unit (RCU-3A).

### 1) Function

Variable voltage input: 3 contacts (Select variable resistance or analog input of 0 – 5VDC for each contact.)

Switching input of variable voltage input: 3 contacts (No-voltage contact input)

### 2) Connection

Connect the remote unit to the terminal block of the main unit of the Controller Px12.

### 3) Usage

(1) Set the remote unit to valid (Parameter No. 0L:on).

(2) Set [in1] to hi (Parameter No. 06:hi).

(3) Adjust the amplitude by referring to “8. Operation and Amplitude Adjustment Method.”

※The vibration adjusted here is the maximum value that can be operated by the remote unit.

(4) Start operation.

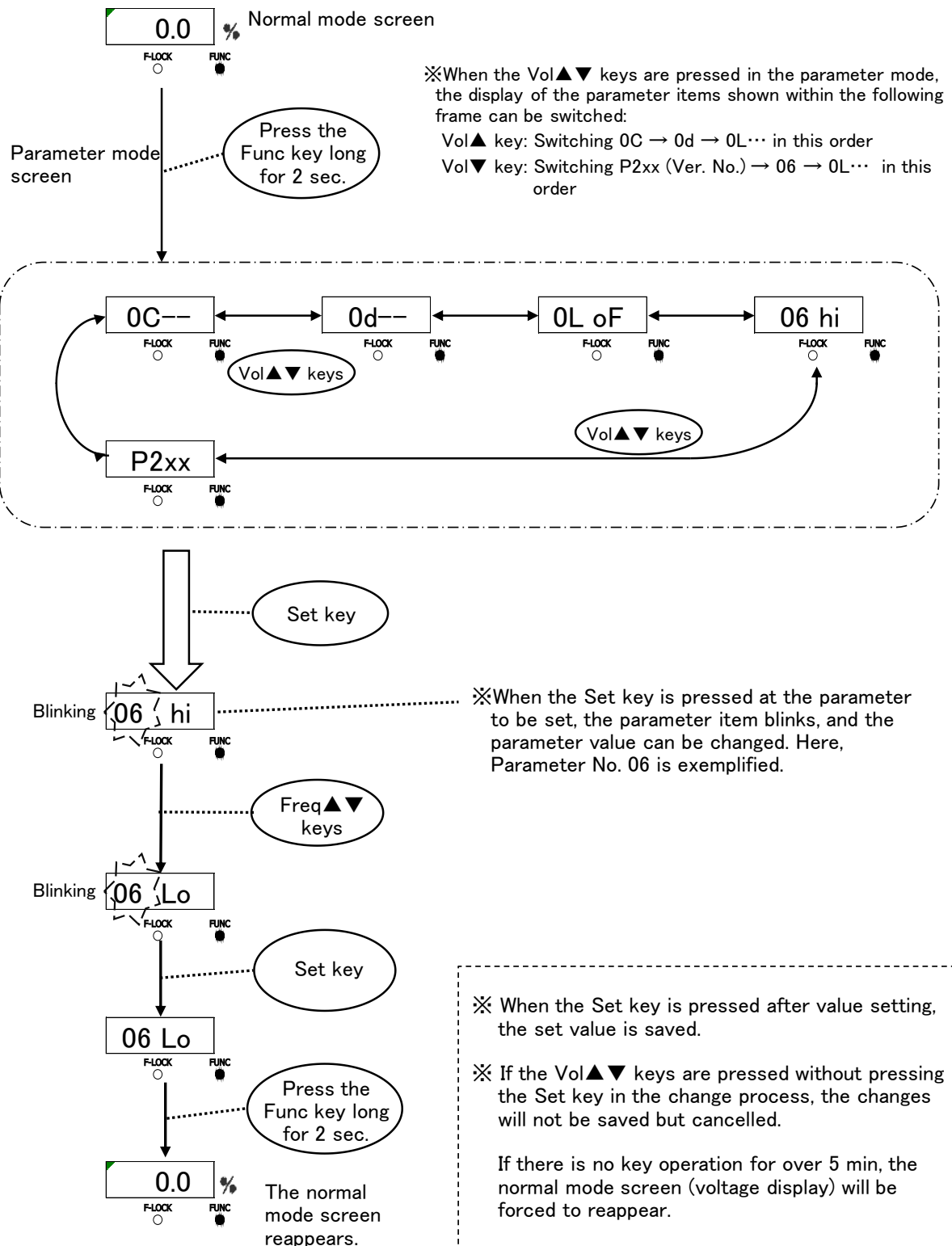
Operate the start/stop according to the control signal from the remote unit side.

When the start/stop operation is made by using the ON/OFF key of the main unit of the controller Px12, the input on the remote unit side becomes invalid.



## 12. Parameter Setting Method

### 1) Parameter data setting method



## 2) Parameter list

Each time the Vol▲ key is pressed, the parameter display switches in the descending order of the following table. Each time the Vol▼ key is pressed, the parameter display switches in the ascending order.

No.	Function	Description	Setting range	Default value	Change during operation
0C	Soft start	Output soft start timer	0. 2-9. 9 --: Invalid	--	○
0d	Soft stop	Output soft stop timer	0. 2-9. 9 --: Invalid	--	○
0L	Remote Unit setting	oF: The remote unit is invalid. on: The remote unit is valid.	oF/on	oF	○
0E	in1 setting	in1 Input logic	hi: Operation with the contact "Close" Lo: Operation with the contact "Open"	hi	○
	Version information	Program version		P2xx	

Change during operation: ○ ... Enabled, ■ ... Disabled

## 13. 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 by either of the following methods (1) and (2).

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 ▼ key and the Freq ▼ key together long for over 3 sec, and the error will be reset.

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

### 2) Alert display

When the Set key is pressed, an alert is displayed.

The output will not stop even during the operation.

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

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

## 14. Troubleshooting

Trouble	Probable cause	Corrective action
The feeder 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 feeder.	Connect the output connector to the feeder.
	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.
The overcurrent error (E-01) is displayed.	The feeder is probably abnormal.	Contact the dealer.
	Ground fault was caused due to damage to the controller output cable cover or the feeder wire cover.	Replace the damaged cable or wire.
	The frequency is deviant.	Adjust the frequency to the resonance frequency.
One of the memory errors (E-10 – 12) occurs when the Controller starts.	There was a memory error when the power supply was turned ON.	Reset the power supply. If the same error recurs, contact our sales agent for consultation.

## 15. Options

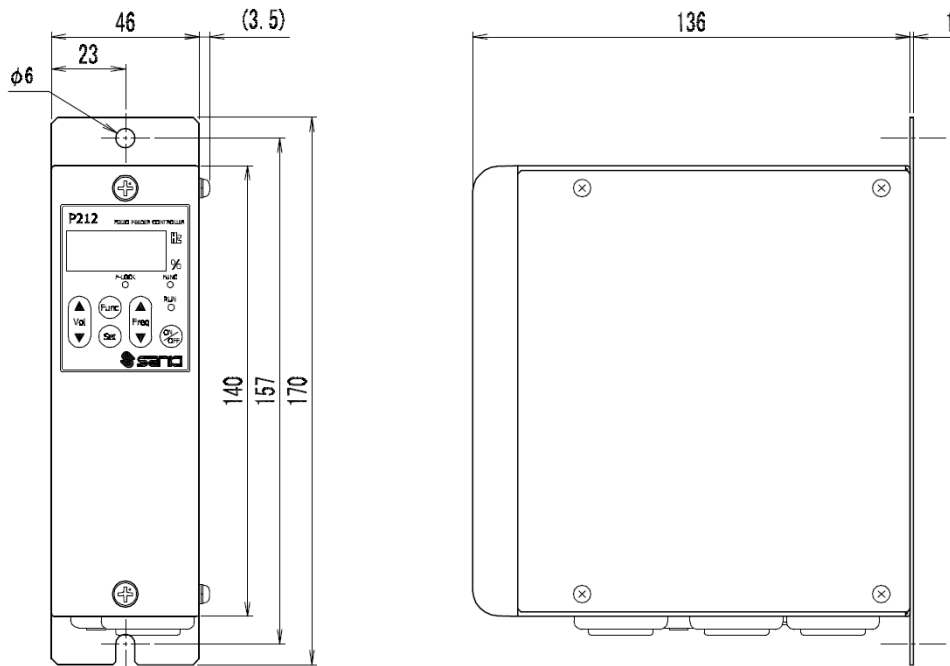
Name	Applied wire	Length (mm)	Terminal		Remarks
Power cable	VCTF 0.75x3	1200	Nichifu pin terminal male	PC-2005M	Mounting as standard
Output cable	VCTFK 0.75x2	1200	Molex terminal	1189ATL	
			Molex housing 3P	1396R1	

## 16. Specifications

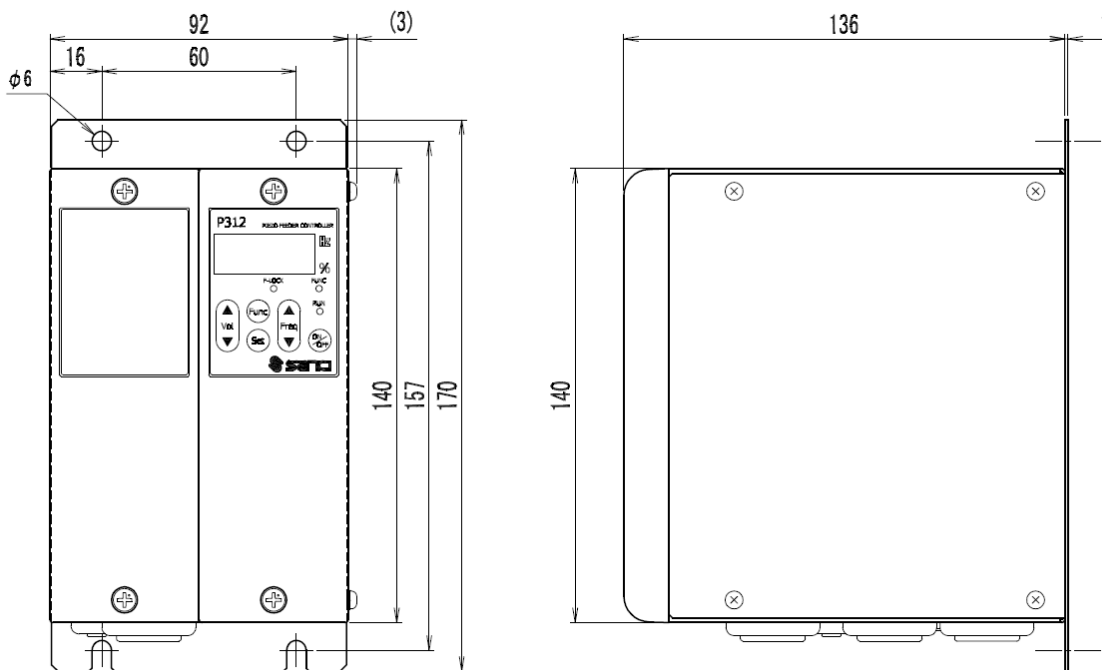
Model		P212	P312
Input	Voltage	100/230VAC±10%	
	Frequency	50/60Hz	
	Number of phases	Single phase	
Output	Control method	Sine wave PWM method	
	Maximum current	50mA	170mA
	Voltage	0 – 240VAC	
	Frequency	50 – 400Hz	
Added function	Operation and stop	Operation and stop enabled according to external signal (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	

17. Outside Dimensional Drawing

【 P 2 1 2 】



【 P 3 1 2 】



※The input and output cables are omitted.

## 18. 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.

Issued in February 2015  
Revision: February 2017, Ver. 2

[Revision to Ver. 1 – Additions and changes]

1. This instruction manual was reviewed overall.
2. The LOAD and SAVE operations for parameters were abolished, and automatic saving was adopted.
3. The SAVE operation of the voltage and frequency was abolished, and the automatic saving of them was adopted.
4. Compatibility with the Remote Unit (RCU-3A) was established.



SANKI COMPANY LIMITED.

◇Sendai Office Tel: +81-22-263-8345 Fax: +81-22-263-8354

◇Tokyo Office Tel: +81-3-3493-6187 Fax: +81-3-3493-6195

◇Nagoya Office Tel: +81-52-691-1147 Fax: +81-52-692-1915

◇Osaka Office Tel: +81-6-6746-8222 Fax: +81-6-6746-8224



<http://www.sanki-web.co.jp>