INSTRUCTION MANUAL
For MODEL C9-03VFTC

MODEL

C9－03VFTC

POWER
ON

OFF

ITEM   C9-3VFTC
INPUT VOLT.   100V
INPUT FREQ.   50/60Hz
OUTPUT VOLT. 0-95V

AD100V   LF.OUT LF.PICKUP PF.OUT PF.PICKUP WORT.SENS.
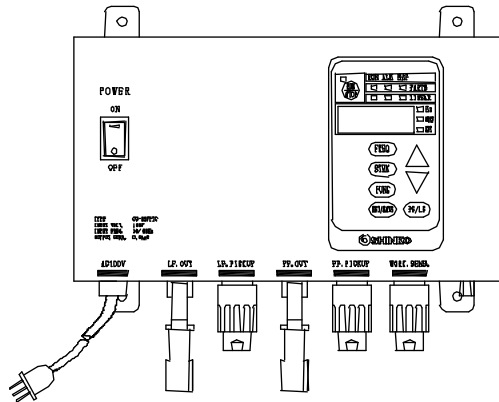
This instruction manual applies to the controller which installs the program version 4 and later.
Please check the program version of your controller on the version information.

The controller which is installed the program version 4 and later corresponds to the RoHS Directive and provides with multi-voltage power supply AC100-230V.
Maximum output voltage is as same 95V as conventional series.

First of all, please do read this "Instruction Manual" including "The Safety Instructions" for your safety and proper use of your equipment.

SINFONIA TECHNOLOGY CO., LTD.

HTE302229 ②

Introduction

Thank you for buying your SHINKO C9-Series Controller which drives a partsfeeder and a linear feeder. Before using the controller, please read this "Instruction Manual", including "Safety Instructions" thoroughly to use the controller safely and properly.

Please keep it on file for further reference and/or maintenance.

Please hand this manual to the operator of the partsfeeder without fail.

Contents

Safety Instructions

— Please read this article thoroughly without fail —

Before use the controller, please read this "Safety Instructions" carefully to use the controller safely and properly.

Use of this controller involves electrical current. There is potential hazard of electric shock to the operator. Failure to follow these instructions may result serious personal injury or property damage.

Safety Instructions are classified into "**Danger**", "**Warning**", "**Caution**" and "**Request**".

Danger ⚠	This label shows an immediate danger. Misuse of the controller and/or risky action of any person should cause the person serious and/or fatal injury and/or severe damage to your property.
Warning ⚠	This label shows an indirect danger. Misuse of the partsfeeder and/or risky action of any person should cause the person injury and/or damage to your property.
Caution ⚠	This label shows an indirect danger. Misuse of the controller and/or risky action of any person might cause the person injury and/or damage to your property.
Request ⚠	This label shows the manufacturer's strong recommendation to use the controller safely and properly. Misuse of the controller and/or risky action of any person may not cause the person injury and/or damage of your property.

■Please keep this "Instruction Manual" on file for further reference, giving easy access to the operator.

■The controller that is sold or rented to the other must keep this "Instruction Manual" on it highly visible.
  They must use the controller properly.

■The Instruction Manual should not cover all danger. Please read the Instruction Manual, Catalogues, etc. and act on the principle of Safety First.

⚠ Danger

●Don't apply this controller to a piezo-electric type partsfeeder.

●Don't use the controller where inflammable material exists. It has not explosion-proof structure.

●You should fix the controller firmly on the rigid structure, or else the operator might be injured by falling down and/or abnormal operation of it.

●Don't sprinkle the controller with water and/or submerge it into water, or else the operator must get injury and/or an electric shock.

●Before performing any maintenance work, such as removing cover, wiring, replacing a fuse, etc., the electrical supply must be disconnected at the safety disconnect switch. The electrical circuit inside involves high voltage so that the operator should get an electric shock.

Safety Instructions

—Continued—

⚠ Warning

● The electrical power supply to the SHINKO-supplied controller must be made through a customer-supplied Safety Disconnect Switch mounted next to the controller.

● Operate the controller within the stipulated range in the contracted specifications, or else malfunction, damage and/or shorter life time of it should result.

● Don't get on and/or put a thing on the controller, or else it results injury by a fall, and/or damage and/or malfunction of it.

● Don't bruise electric cables and/or leads. Bending by force, pulling, winding and/or clamping them cause fire and/or getting an electric shock by leakage and/or mal-conduction, and/or abnormal operation.

● Wire the controller correctly consulting the "Instruction Manual". Faulty wiring causes damage and/or abnormal operation of it.

● Before supply the controller electrical power, check the wiring again.

● The controller must be grounded properly without fail. Don't operate it without grounding.

⚠ Caution

● Please reserve maintenance space around the controller and the partsfeeder for daily check and maintenance.

● Don't install the controller dusty area. It has no dust tight enclosure.

● The controller should be installed on a rigid frame in such location as vibration-free, no heat transfer, dry and no condensation, and not frozen.

● Please lift the controller with its body and/or mounting base. Don't lift it with a cable connected to it.

● The output drive frequency range must match the resonant frequency of the partsfeeder or the linear feeder drive unit. Mismatch causes burnout of the magnet coil of the drive unit.

● Don't supply the controller electric power through a PWM type inverter, or else it must break the controller.

● Don't run and stop the controller frequently. To run and stop it every few minutes and/or with an electromagnetic contactor mounted on the power line make inner electronic parts deteriorate severely. The incoming operation signal enables it to run and stop frequently. Before turn on the power switch again at short times, make sure the lamp on the Run/Stop button has turned off.

● Don't provide any switch gear on the output line, between the controller and the drive unit, to run and stop the drive unit, or else the controller must be broken.

● Don't arc weld on the bowl, chute and trough while the controller and the drive unit are wired, or else earth leakage through the controller must break the controller.

⚠ Request

● When the controller might be used in circumstance and/or conditions that are out of the supposition of this "Instruction Manual", and/or use of it might threaten people's life and property in danger, give consideration to people's safety and act on the principle of Safety First with keeping the margin of the rating and performance of equipment.

● When the controller might be out of order or become useless, scrap it as an industrial waste subject to local regulation.
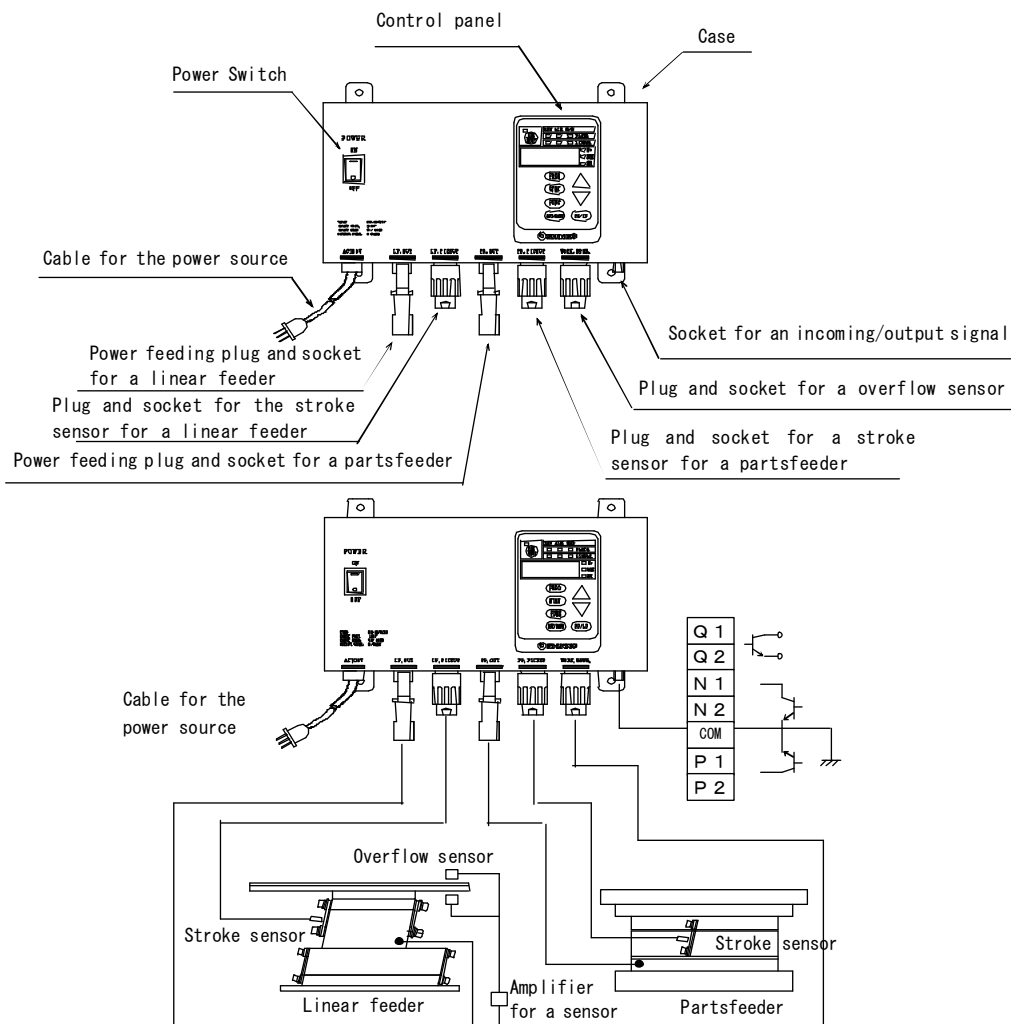
Wiring Connections

Wire the controller for a partsfeeder and/or a linear feeder.
Note: Refer to item "Model of Accessories" on the page 26 for the plug and socket.
Note: Refer to "Connection of Overflow and Stroke sensors, and plugs" on the page 19 to
20 for wiring of the plug and socket.
Note: Refer to "How to use Incoming/Output Signal Terminals" on the page 21 to 22
for Socket for an incoming/output.

Control panel
Case
Power Switch
Cable for the power source
Socket for an incoming/output signal
Power feeding plug and socket for a linear feeder
Plug and socket for a overflow sensor
Plug and socket for the stroke sensor for a linear feeder
Plug and socket for a stroke sensor for a partsfeeder
Power feeding plug and socket for a partsfeeder

Cable for the power source

Q 1
Q 2
N 1
N 2
COM
P 1
P 2

Overflow sensor
Stroke sensor
Linear feeder
Amplifier for a sensor
Stroke sensor
Partsfeeder

How to operate the control panel

Name and Function of the Buttons and Lamps on the Control Panel

■ Turning   ◨ Blinkin   □ Turning off

Indication lamps
"RUN" : Turning on while the partsfeeder is running.
"ALM" : Turning on while any error is arising or when the controller is not able to catch up the set point on the constant stroke mode and auto-tuning mode because of saturation of the output voltage.
"PF/LF" : The lamp indicates the selected drive unit, "PARTS" for the partsfeeder or "LINEAR" for the linear feeder, or blinks and prompts the operator to select any drive unit.

"RUN/STOP" Button/Lamps
Each push of "Run/Stop" button runs and stops the partsfeeder manually. When the partsfeeder is enable to run the button is turning on.

"FREQ" Button
Push it and then the set point of the output drive frequency appears on the display.

"STRK" Button
Push it and then the set point of the stroke/output voltage appears on the display.
The set point is shown as percentage.

"FUNC" Button
Push it and then a function code appears on the display.

"SET/SAVE" Button
Where the frequency or the stroke value is appearing on the display, push it and then the value on the display becomes alterable or into set point alteration mode.
While the "SET" lamp is turning on push it to save the set point on the display.

DISPLAY
"Hz" : Turning on while the "FREQ" button is pushed and selected.
"STRK" : Turning of while the "STRK" button is pushed and selected.
"SET" : Turning on while the "SET/SAVE" button is pushed and the value on the display becomes alterable.

Up and Down button
"△" or "▽" buttons increases or decreases the set point on the display when function code is appearing on the display on when the set point on the display is in set point alteration mode.

"PF/LF" Button
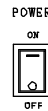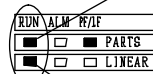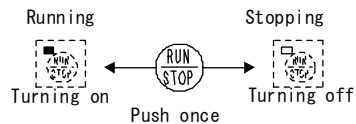Push to select the set point of the partsfeeder or linear feeder.

—Continued—

How to Run and Stop the Partsfeeder

1. Turn on the power switch.

The partsfeeder starts running immediately where the initial set points have been set.

POWER
ON
OFF

2. Push "RUN/STOP" button to stop running. To restart push the button again.

RUN lamp for the partsfeeder
Running: Turning on
Stopping: Blinking or Turning

Running   Stopping

RUN ALM PF/LF
■ □ ■ PARTS
■ □ □ LINEAR

Turning on   Turning off
Push once

RUN lamp for the linear feeder
Running: Turning on
Stopping: Blinking or Turning

If "RUN" lamp is not turned on or the partsfeeder does not run even if the "RUN" lamp is turned on, please check the following items. When the "Run" lamp is blinking see the next article.

a. Estimated cause: The stroke/output voltage has been set for "0".
Remedy: Set up the stroke/output voltage.

b. Estimated cause: The output drive frequency of the controller is off the resonant frequency of the partsfeeder.
Remedy: Adjust it nearer to the resonant frequency up to get enough stroke.

c. Estimated cause: The controller stops by "Error".
Remedy: Resolve the error indicated by "ERROR CODE". See page 25.
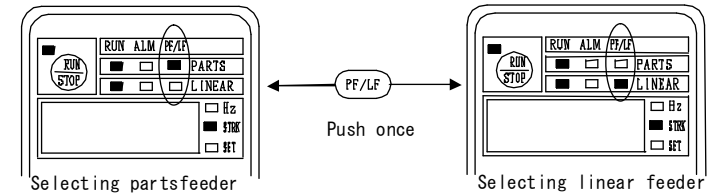
Alarm by blinking "RUN" lamp

"RUN" lamp alarms by blinking when the incoming operation signal on the terminals "P1" and "P2" and/or the overflow signal are set for stopping even if "Run/Stop" is turning on.

"Run/Stop" Button/Lamps	Incoming operation signal Terminals "P1" and "P2"	Overflow sensor signal	"PF/LF" "RUN" lamp	Operation of the partsfeeder
Turning on	Both signals are set for running		■ Turning on	Running
	Both or any signal is set for stopping		◪ Blinking	Stopping
Turning off	Unrelated		□ Turning off	

How to adjust the Drive Frequency

The drive frequency is adjusted manually in the constant voltage mode or constant stroke mode. In the auto-tuning mode manual set point is ignored but it is adjusted automatically to the resonant frequency of the drive unit.

1. You should select any drive unit that is adjusted by turning on the lamp "PARTS" or "LINEAR" at the "PF/LF" with "PF/LF" button.

RUN STOP   RUN ALM PF/LF   ■ PARTS   □ LINEAR   □ Hz □ STRK □ SET

PF/LF
Push once

RUN STOP   RUN ALM PF/LF   ■ PARTS   □ LINEAR   □ Hz □ STRK □ SET

Selecting partsfeeder   Selecting linear feeder

2. Push "FREQ" button and present frequency value appears on the display.

180.0 ■Hz □STRK □SET

3. Push "SET/SAVE" button and choose set point alteration mode.
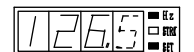
Now "SET" lamp is blinking to show set point alteration mode.

Note: In the auto-tuning mode set point alteration is prohibited while the "RUN" lamp at the "PF/LF" is turning on.

180.0 ■Hz □STRK ◪SET

4. Alter the frequency value with "△" and "▽" buttons.

Pushing the button more than 5 seconds the figure changes faster.

180.0 ■Hz □STRK □SET

126.5 ■Hz □STRK □SET

5. Push "SET/SAVE" button to save the set point altered.

While the "SET" lamp is turning on "SET/SAVE" button saves the new set point and then the "SET" lamp is turned off.
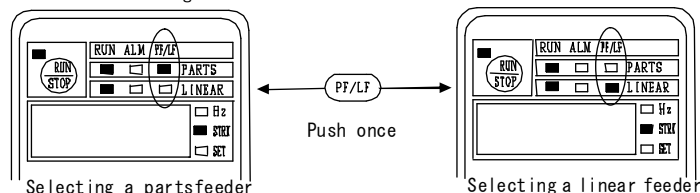
SP-0 ■Hz □STRK □SET   Saving the set point
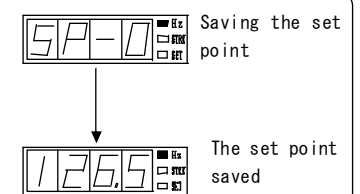
126.5 ■Hz □STRK □SET   The set point saved

How to set up the stroke

Set point of the stroke must be set up while the drive unit is running.

1. You should select any drive unit that is adjusted by turning on the lamp "PARTS" or "LINEAR" at the "PF/LF". Push "PF/LF" button to change the selection.

Push once

Selecting a partsfeeder

Selecting a linear feeder

2. Push "STRK" button and present stroke/voltage value appears on the display.

The read on the display shows percentage per the maximum default.

Example in the auto-tuning or the constant stroke mode

Example in the constant stroke mode

3. Push "SET/SAVE" button and choose set point alteration mode.

Example in the auto-tuning mode

Example in the constant stroke mode
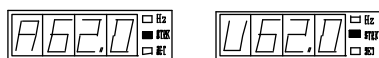
Now "SET" lamp is tuning on and the value on the display blinks to show set point alteration mode.
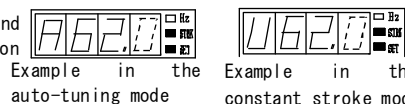
4. Alter slowly the stroke value with "△" or "▽" button observing the stroke. Push the button more than 5 seconds the figure changes faster. The adjustable range is 0.0 to 100%
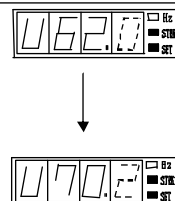
5. Push "SET/SAVE" button to save the set point altered.
While the "SET" lamp is turning on "SET/SAVE" button saves the new set point and then the "SET" lamp is turned off.

Saving the set point

The set point saved
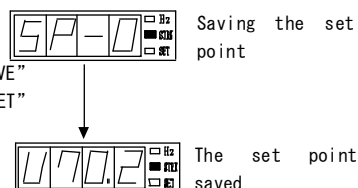
## How to select a Function Code

**1.** Push "FUNC" button and a function code appears on the display.

2. Select the function code altered with "△" or "▽" button.
Example shows the function of Soft Start Ramp-up time.
Please see List of Function Code on page 24.

3. In case both drive units may be relating to the selected function code "PF/LF" lamp blinks. Please select any drive unit with "PF/LF" button.
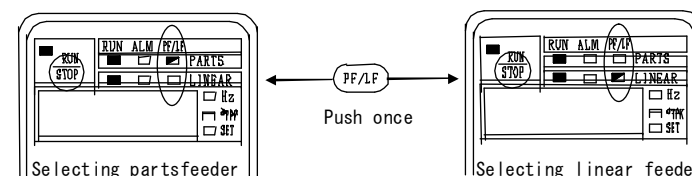
Push once
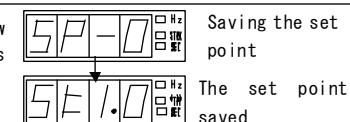
Selecting partsfeeder

Selecting linear feeder

4. Push "SET/SAVE" button and choose set point alteration mode.
Now "SET" lamp is blinking to show set point alteration mode.
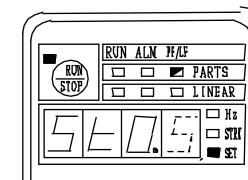
5. Alter the figure with "△" or "▽" button.
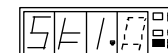
6. Push "SET/SAVE" button to save the new set point and then the "SET" lamp is turned off.
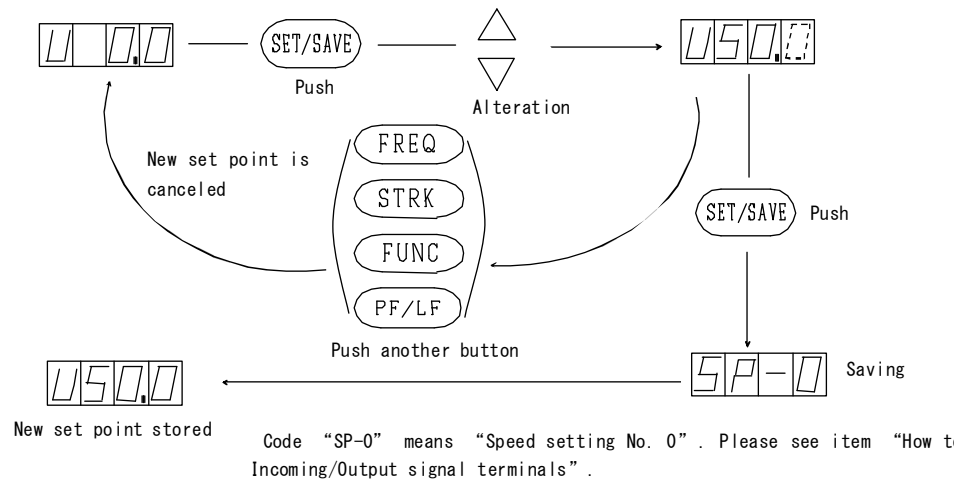
Saving the set point

The set point saved

Saving Data

To alter the set points you have to push "SET/SAVE" button and choose set point alteration mode. Then "SET" lamp is blinking to show set point alteration mode. You are able to alter the figure with "△" or "▽" button.

You have to save the new set point with pushing "SET/SAVE" button so that hereafter the new set point becomes effective.

If you push another button or turn off the power switch before saving the new set point the old set points are effective or the new set point is canceled.

```
U 0.0  →  (SET/SAVE)  →  △   →   U50.0
              Push         ▽
                        Alteration
```

New set point is canceled

```
( FREQ )
( STRK )          (SET/SAVE)  Push
( FUNC )
( PF/LF )
```

Push another button

```
U50.0  ←  SP-0   Saving
```

New set point stored

Code "SP-0" means "Speed setting No. 0". Please see item "How to Incoming/Output signal terminals".

How to initialize the set point

Procedure for initializing the set points

a. Turn off the power source	b. Pushing "FREQ" button, turn on the power source.	c. Initializing Keep pushing the "FREQ" button.	d. Initialized Then release the button.
POWER ON / OFF	(FREQ) + POWER ON / OFF	Ur X.X □Hz □STK □DWA "Ur x.x" shows the program version	360.0 ■Hz □STK □NW or U 0.0 □Hz ■STK □NW

Initial Setting up Procedure

Preparation for operation

The preparation for operation is described hereunder. Please follow the setting up procedure and see the detail on the page in the hollow arrow.

1) Initial Set point
Set up the drive frequency range according to your partsfeeder and linear feeder.

Drive Frequency Range
Select the drive frequency range according to your partsfeeder and linear feeder.
Full-wave Drive Unit: ME and LFB series: 90 to180HzHigh-frequency Drive Unit: HME and HLFB series: 180 to 360Hz

★Operation mode

2) Setting up the Stroke
Set up the stroke of the partsfeeder and linear feeder so smooth that work pieces are discharging on the track.

Auto-tuning mode
● Use a stroke sensor
● The drive frequency chases and catches up the resonant frequency of the drive unit automatically.
● The stroke must be set manually.
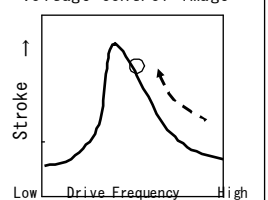● The controller controls the stroke constant at above set point.

Auto-tuning control image
Stay on the resonant frequency automatically
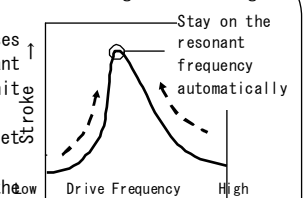
Constant Output Voltage mode
● Use no stroke sensor
● The drive frequency and output voltage/stroke must be set manually
● The controller controls the output voltage constant at above set point.

Constant Stroke & Voltage control image

3) Setting up the maximum stroke and Scaling of the stroke

Constant Stroke mode
● Use a stroke sensor
● The drive frequency and the stroke must be set manually.
● The controller controls the stroke constant at above set point.

4) Additional Function

5) Daily operation

Setting up Soft start ramp-up time
Setting up On-delay and Off-delay time for Overflow control
Speed change with an incoming signal, etc.

Note: When any trouble arises in the setting up action, initialize the set point and restart setting up from the beginning.
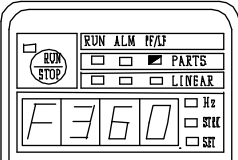
Initial Setting up Procedure

— Continued —

How to adjust the Drive frequency range

First of all, stop the drive unit pushing "RUN/STOP" button.

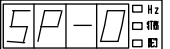**1.** Push "FUNC" button to select function code.

`Ur3.0` □ Hz / □ STRK / □ SET

2. Select the function code "Fxxx" for the drive frequency range with "△" or "▽" button.
"x" means a numerical value.

`F360` □ Hz / □ CTK / □ MTA

3. Then "PF/LF" lamp is blinking. Please select the partsfeeder or linear feeder with "PF/LF" button.

RUN ALM PF/LF ☑ PARTS □ LINEAR
`F360` □ Hz / □ STRK / □ SET

4. Push "SET/SAVE" button and choose set point alteration mode.
Now "SET" lamp is tuning on and the numerical value of the code is blinking.

RUN ALM PF/LF ☑ PARTS □ LINEAR
`F360` □ Hz / □ STRK / ■ SET

5. Select the code with "△" or "▽" button according to your drive unit.

`F180` □ Hz / □ STK / □ MTA

Function Code	Drive frequency range	Type of Drive unit
F 1 8 0	90 to 180Hz	Full-wave Drive Unit
F 3 6 0	180 to 360Hz	High-frequency Drive Unit

6. Push "SET/SAVE" button to save the new set point and to be effective.

`SP-0` □ Hz / □ STK / □ MTA   Saving the set point
↓
`F180` □ Hz / □ STK / □ MTA   The set point saved

Stroke adjustment on the Auto-tuning Mode

After setting up "Drive frequency range", please set up the stroke of the partsfeeder or linear feeder.
Put some work pieces in the bowl or the chute and set up the stroke so that they are discharged smoothly on the track.

Stroke adjustment on the partsfeeder/Auto-tuning mode

1 Push "RUN/STOP" button and then automatically the drive frequency chases and catch up the resonance point of the partsfeeder drive unit. While it is chasing "RUN/STOP" lamp is blinking and the lamp turns off after catching up.

Blinking

Note: If the display shows 90.0 or 180.0, lower limit of the drive frequency range, the resonance point of the drive unit should be out of the "Drive frequency range". Please check the type of the drive unit.

2. Push "STRK", "PF/LF" and "SET/SAVE" button in order to select the alteration mode on the partsfeeder.

RUN ALM PF/LF ■ ■ PARTS ■ □ LINEAR
`A 0.0` □ Hz / ■ STRK / ■ SET

3 Push "△" button to increase the stroke up to the work piece is discharged smoothly and at proper feeding rate.
Note: Increasing the stroke the vibration of the drive unit might fluctuate till the controller has caught up the resonance point.

4 Push "SET/SAVE" button to save the new set point.

`SP-0` □ Hz / ■ STRK / ■ SET   Saving the set point
↓
`A66.5` □ Hz / ■ STRK / ■ MTA   The set point saved

Stroke adjustment on the linear feeder/Auto-tuning mode

In case the linear feeder is driven by auto-tuning mode the drive frequency has already caught up the resonance point of the linear feeder through above item 1.
Push "PF/LF" button to select the linear feeder and follow the procedure above.
After adjustment you must save the set point without fail.

RUN ALM PF/LF ■ ■ PARTS ■ ■ LINEAR
`A 0.0` □ Hz / ■ STRK / ■ SET

Store Data
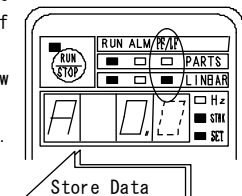
Stroke adjustment on the Constant Voltage Mode

After setting up "Drive frequency range", please set the stroke of the partsfeeder or linear feeder.
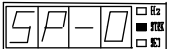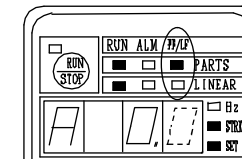Put some work pieces in the bowl or the chute and set the stroke so that they are discharged smoothly on the track.

Stroke adjustment on the partsfeeder/Constant voltage mode

1. Push "STRK", "PF/LF" and "SET/SAVE" button in order to select alteration mode of the output voltage on the partsfeeder.

2. Push "△" button to increase the output voltage/stroke. The set point should be 60 to 70%.
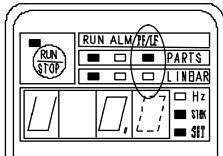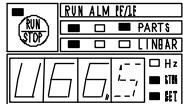
   Note: The read on the display shows percentage per the default or 95V.

3. Push "FREQ", "PF/LF" and "SET/SAVE" button in order to select alteration mode on the partsfeeder.
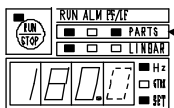
   The read on the display shows the output drive frequency.

   Note: The read on the display is "360.0" for high frequency drive unit.

4. Push "▽" button to decrease the output drive frequency so as to discharge the work pieces smoothly and at proper feeding rate. The characteristic curve below shows a decrease of the drive frequency results in the increase of the stroke.

   Constant voltage mode adjustment

5. Push "SET/SAVE" button to save the set point.Saving the set point

   The set point saved

Stroke adjustment on the linear feeder/Constant voltage mode

Push "PF/LF" button to select the linear feeder and then follow the procedure above. After adjustment you must save the set point without fail.

Store Data

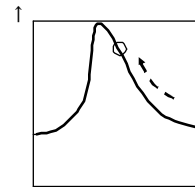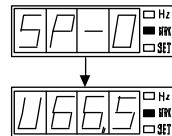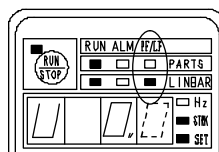## Stroke adjustment on the Constant Stroke Mode

After setting up "Drive frequency range", please set up the stroke of the partsfeeder or linear feeder.
Put some work pieces in the bowl or the chute and set up the stroke so that they are discharged smoothly on the track.

1. First of all, tune the drive frequency and stroke by auto-tuning.

   Please see "Stroke adjustment on the Auto-tuning Mode".

2. Select the function code "mod x" or operation mode and then set it up as "mod 1" for the constant stroke mode.
   Push "PF/LF" button to select the partsfeeder or linear feeder.
   Then push "SET/SAVE" button to save the set point.

3. Push "FREQ" button and the drive frequency appears on the display.

4. Push "SET/SAVE" button and choose set point alteration mode.
   The first digit blinks.

   Blinking

5. Adjust the drive frequency with "△" or "▽" button. The adjustment should be done within the range in which "ALM" lamp does not turn on.
   Adjustment of the drive frequency, generally speaking, is possible within ±3% of the auto-tuned point.
   Note: In the adjustment the stroke might be hunting you should reduce the control gain on the function code "G".

6. Push "SET/SAVE" button to save the set point.

   SET/SAVE ⟶ SP-0 ⟶ 123.8
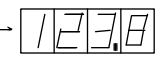
   Storing   New data is stored

Initial Setting up Procedure

—Continued—

Scaling of the stroke

The scaling of the stroke converts the set point of the stroke, about 60 to 70%, into 100%.
The scaling must be done at the speed setting No. 0. As for the speed setting number see article "How to use Incoming/Output Signal Terminals".

1. The stroke of the drive unit should be set at the maximum stroke used but it should not exceed the allowable maximum stroke of the drive unit.

Example: "STRK" set point at the maximum stroke

maximum stroke data

`A300`

2. Push "FUNC" button and then the function code appears on the display.

`Ur X.X`

3. Push and select function code "H x.xx" for scaling coefficient with "△" or "▽" button.
The coefficient appears on the display. Please select the partsfeeder or linear feeder with "PF/LF" button.
The scaling coefficient means a magnifying ratio to the original stroke set point.
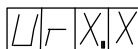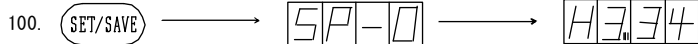
Example: Present stroke set point   "30.0"
        Scaling coefficient   "1.00"   by changing it "2.00"
        New stroke set point   "60.0"

`H1.00`

4. Push "SET/SAVE" button to choose the alteration mode.
The second digit of the scaling coefficient on the display blinks.

Changeable   Blinking

`H1.00`

5. Again push and hold "SET/SAVE" button more than three (3) seconds. The controller automatically calculates and shows the minimum scaling coefficient for magnifying the present stroke set point to 100.

(SET/SAVE) ⟶ `SP-0` ⟶ `H3.34`
Push more than three seconds   Storing   New data is stored

Example: Present stroke set point   "30.0"
        New stroke set point   "100.0"

6. Push "STRK" button.
Please check the set point is "100" on the display on the drive unit you had chosen.
In case stroke set point is already set on speed change signal 1 to 3 they are simultaneously scaled by above procedure.

`A100`

Note: If you want to change the scaling coefficient or reset it select the alteration mode and change the blinking figure with "△" or "▽" button. Save the new set point with pushing "SET/SAVE" button.

Additional Functions

Quick ejection of the work pieces in the bowl

If you want to change the kind of work piece this operation mode drives the partsfeeder larger stroke than usual to eject work pieces in the bowl quickly.

Selection of Quick ejection mode

1 Push and hold "STRK" and "△" buttons at a time more than two (2) seconds.

Release the buttons after "STRK" lamp blinks. The drive unit operates at the quick ejection mode.

Note: Push "RUN/STOP" button to stop the drive unit and the operation returns to the normal operation.

Note: After setting up the item 2 to 4 below the two buttons can select the quick ejection mode.

Note: The same operation is possible on the linear feeder drive unit. Set it up following the procedure above.

Stroke set point on the quick ejection

2 Push "STRK"," PF/LF" and "SET/SAVE" button in order to choose alteration mode on the partsfeeder.

3 Set the stroke set point for quick ejection with "△" or "▽" button.

Note: The set point should not exceed the allowable maximum stroke of the drive unit.

4 Push "SET/SAVE" button to save the new set point.

`SP-F`
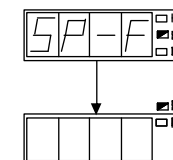
Saving the set point "SP-F" appears on the display while the set point is being saved.
The set point saved

Additional Functions

—Continued—

Set up for On- and Off-Delay times

"Overflow Function" detects that when the chute is filled up with work pieces and then stops the partsfeeder automatically.

To set up the overflow function, follow the procedure below.

For connection diagram of the overflow sensor please refer to "Connection of Overflow and Stroke Sensor and Power feeding plug".

Select the function code "on" for On-delay time or the code "oF" for Off-delay time. The time may be set within 0.2sec to 60 sec.

a. On-delay time is the time duration between the moments when the overflow sensor detects no work pieces on the chute or opens the contacts, and then the partsfeeder restarts. The delay time T1 may be 0.2 to 0.5 second that is recommended.

b. Off-delay time is the time duration between the moments when the overflow sensor detects full work piece on the chute or close the contacts, and then the partsfeeder stops. The delay time T2 may be 1.0 to 2.0 second that is recommended.

### Set up for Soft Start Ramp-up Time

Soft Start Ramp-up Time of a partsfeeder or a linear feeder depends on many factors such as the drive frequency, weight of the bowl or the chute, magnet core gap, etc.
If you need to adjust the rump-up time, select and adjust the function code "St" for the soft start ramp-up time. The ramp-up time may be 0.2 to 4 second.

Note: The actual ramp-up time may differ from the set point on the auto-tuning or the constant stroke mode depending on characteristic of the drive unit. To improve it, adjust the Control Gain "G". Larger gain makes the partsfeeder restart early and smaller gain makes it restart later.

Connection of Overflow and Stroke sensors and power feeding plug

Connection of the overflow sensor

a. The controller provides power supply, DC 12V max. 80 mA, to an overflow sensor between No.1 and No.3 pole of a three pole plug and socket attached on it.

b. Dry contacts or Open Collector, maximum sink current 10 mA, are connected to the No.2 and No.3 pole of the plug. If those poles are closed and then the partsfeeder stops or those are opened and then the partsfeeder runs.
   Open between No.2 and No.3 pole: On-delay motion
   Close between No.2 and No.3 pole: Off-delay motion
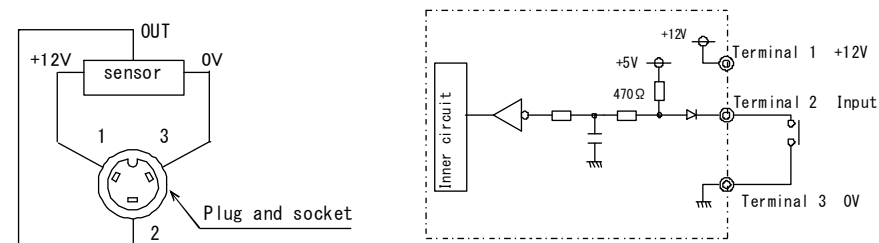
Connection of the stroke sensor for Partsfeeder/Linear feeder

The connection diagram is shown in the right drawing.

Note: The length of the shield cable must be within 10 meters. If you want to extend it use a shield cable with superior high frequency characteristic.

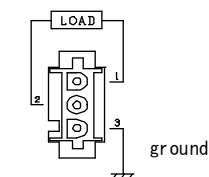Note: When soldering the leads do not mix up with the core for the shield.
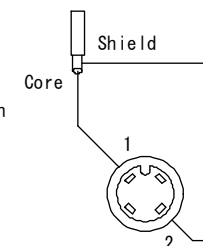
Connection of the Power feeding Plug for Partsfeeder/Linear feeder

The connection diagram for power feeding plug is shown in the right drawing.

Mounting of a stroke sensor on a partsfeeder

—Continued—

a. The stroke sensor must be mounted on in front of the leaf springs with a sensor support. The sensor support is screwed together with the leaf springs with the leaf spring fixing bolt on the base frame side or bottom. The bolt should be longer than usual by the thickness of the support.

b. The sensor must be off the leaf spring by 0.5mm and it is called the "air gap". Fix the cable with some slack to prevent secondary-excited vibration or to keep off any obstacle to break it.

c. Recommended stroke sensor is EH-305 Proximity Sensor by Keyence or GS-5S Proximity Sensor by Sunx.

Air gap 0.5mm
Slack
Moving frame
Stroke sensor
Leaf spring fixing bolt
Leaf spring fixing bolt
Base Frame
Sensor support
Spacer
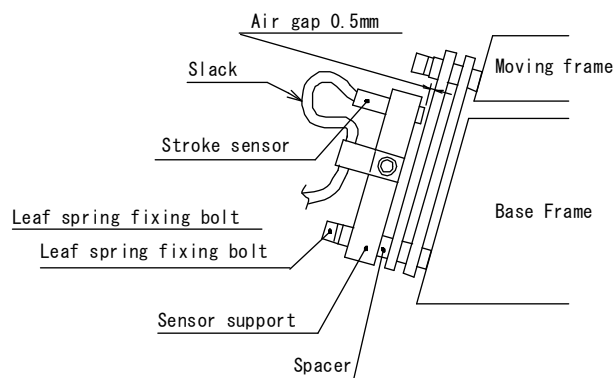
Function setting suits for the Stroke Sensor.

Please set the Function Code "SEnx" according to a phase of the air gap.

Set the "x = 1", in case the phase is synchronous, that means when the magnet on the drive unit pulls the moving frame down the air gap becomes narrow.

Set the "x = 0" in case the phase is reverse, that means when the magnet on the drive unit pulls the moving frame down the air gap becomes wide.

How to use Incoming/Output Signal Terminals

If you need frequent run and stop of the drive unit, taking out a signal synchronous to the operation or speed change signal please use the Incoming/Output signal plug and socket.

1 Q1
Q2
N1
N2
COM
P1
7 P2
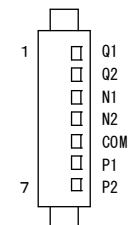
Manufacturer of the socket

Name	: JST Mfg. Co., Ltd.	Applicable wire	: 芯線 0.08～0.33mm
Receptacle housing	: Model SMR-07V-N		AWG #28 to #22
Pin contact	: BYM-001T-P0.6	Crimp tool	: YC-121R
	: SYM-001T-P0.6		

### Operation Synchronous Signal Terminals Q1 and Q2

The terminal Q1 and Q2 outputs the synchronous signal with running and stopping of the partsfeeder.

Inner circuit
LED「RUN」
Q1
Q2
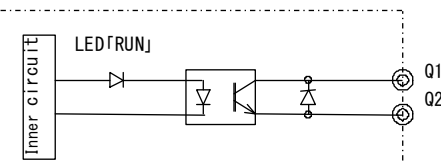
The output transistor is in the conduction state when the partsfeeder is running.
Maximum output voltage: DC 24 V
Maximum output current: 80 mA

Incoming Operation Signal Terminals P1 and P2

For running and stopping the partsfeeder with an incoming signal, close or open the terminals P1 and COM or P2 and COM respectively with an external relay with dry contacts or an open collector.

Inner circuit
+5V
470Ω
P1
Dry contacts or an open collector
COM
Inner circuit
The same
P2
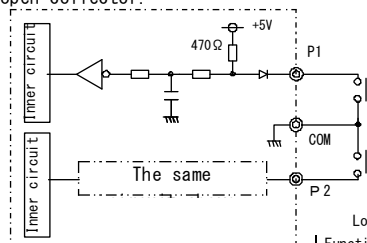
Logic of the contacts

Function "con x"	x = "0"	x = "1"
Open	Running	Stopping
Close	Stopping	Running

Input signal between "P1" and "COM" controls normally a partsfeeder and a linear feeder at the same time.
If you need separate control select and alter the function code" PLr x" which determines the operation mode of contact "P1" or "P2".
In the case incoming signal between" P1" and "COM" controls the partsfeeder and incoming signal between "P2" and "COM" controls the linear feeder.
The logic of the contacts may reverse with function code "con x" which determines operation timing of incoming signals "P1" and "P2". See the logic of the contacts on the left.
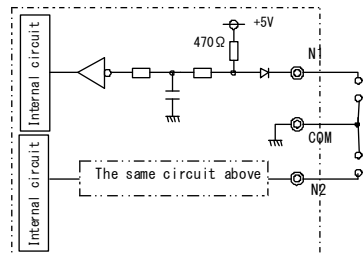
—Continued—

Incoming Speed Change Signal Terminal N1 and N2

☆速度切替信号入力
You may select one of four settings, setting No. 0 to No. 3 with a relay etc.

Dry contacts or an open collector

Selection of the operation speed

Select the Speed Setting No. with the incoming speed change signal "N1" and "N2"

Speed Setting No.	0	1	2	3
Terminals N1 and COM	Open	Close	Open	Close
Terminals N2 and COM	Open	Open	Close	Close

Setting and Saving of the Speed Setting Number

Set and save the setting No. 1 to 3 following the procedure bellow.
You must set the speed setting number on the same operation mode that is set on the setting No. 0 or no incoming signals on "N1" and" N2". See page 12 for the operation mode.

a. Adjust the stroke on the setting No. 0.
b. While the partsfeeder is running select the incoming speed change signal "N1" and "N2", open or close.
   New setting No. appears on the display as "SP–x", x = 1, 2 or 3, about one second.
   The drive frequency is as same as that is set on the No. 0.
   Note: You would change the incoming speed change signals while the partsfeeder is stopping the drive frequency get to upper limit of the drive frequency range. You have to adjust the drive frequency again.
c. Adjust the stroke of the partsfeeder or a linear feeder required.
d. Push "SET/SAVE" button to save the set point.
   Newly saved setting No. appears on the display as "SP-x", x = 1, 2 or3, about one second.

After saving the speed setting number you may select the required stroke with incoming speed change signals "N1" and "N2". The speed setting numbers 1 to 3 are storing the set points of Drive Frequency, Stroke/Output Voltage, Soft start Ramp-up Time, and On- and Off-delay Times.
If you alter the Drive Frequency on the speed setting No. 1 to 3 you have to stop the drive unit and then select the incoming speed change signals "N1" and "N2".

Trouble Shooting

First Checking Item	Remedy
● Does the resonant frequency of the partsfeeder match the driving frequency range of the controller?	●Review the function code and value. ●Readjust the resonant frequency of the drive unit with leaf springs
●Is the set point of the drive frequency range correct?	●Review the function code and value.
●Is the weight of a bowl or a chute too heavy for the drive unit?	●Reduce the weight with a decrease of thickness of a bowl or a chute. ●Narrow the magnet core gap of the drive unit.
●Does the air gap of the stroke sensor conform to the standard width? ●Are the leads of sensors connected properly?	●Adjust the air gap. ●Review the wiring at the plugs.

Trouble   Checking Item   :■ Turning on   □ Turning off ▰ Blinking

A. Feeder does not run
RUN ALM □ □
- 1: Fault wiring of the power source — See page 4
- 2: Lower voltage, supply the rated voltage Power source AC 100/110V±10%
- 3: Fuse FU1melts down in the inner circuit — See page 26

B. Feeder does not run
RUN ALM ▰ □
- 1: Stop by the incoming operation signal — See page 21
- 2: Overflow signal is working — See page 6 and 19

C. Feeder does not run
RUN ALM ■ □
- 1: Fault wiring to the feeder/Cable breaks — See page 4
- 2: Fault set point of Stroke — See page 8

D. Feeder does not run
RUN ALM □ ■
- 1: The stroke sensor is not working, removed or having broken lead — See page 20
- 2: Stop by over current protection — See Manual of the feeder
  - 2-1. Fault wiring/Any short circuit of the drive the "ALM" indicates.
  - 2-2. Drive frequency range is out of the resonant frequency of the drive unit
  - 2-3. The core gap of the drive unit is too wide

E. Stroke does not build up
- 1: Fault set point of Stroke — See page 8
- 2: Too wide core gap of the drive unit — See Manual of the feeder
- 3: Fault function set point for the Stroke Sensor
- 4: Feeder provides a bowl out of the specification

F. Stroke fluctuates
- 1: Fault wiring the shield cable at the plug — See page 19 and 20
- 2: Loose fitting of the bowl

G. Memory stores no set point
- 1: You did not save the new set point! — See page 10

Function Table

List of Function Code

| Function Code	Function name	Applicable Range	Factory Default PF	Factory Default LF	Reference Page
Ur / Urxx	Version Information	Program version	(Example) 3.0		Page 9
F / Fxxx	Drive Frequency Range	Full-wave Drive Unit: 90 to180Hz High-frequency Drive Unit: 180 to 360Hz	360	360	Page 12
Sen / SEnx	Direction of the Stroke Sensor	0: Reverse phase 1: Synchronous phase	0	0	Page 20
St / Stxx	Soft start Rump-up time	0.2 to 4 seconds	0.5	0.5	Page 18
on / onxx	On-delay time	0.2 to 60 seconds To set longer than 10 seconds the resolving power must be changed from o.1 to 1.	0.2		Page 18
oF / oFxx	Off-delay time	Ditto	0.2		Page 18
con / conx	Action Timing of Incoming operation signal	0: "P1" and "P2" is open for running 1: "P1" and "P2" is close for running	0		Page 21
PL r / PLrx	Operation mode by Incoming operation signal	0: Partsfeeder and linear feeder operate at a time 1: Partsfeeder and linear feeder operate separately	0		Page 21
H / Hxxx	Scaling of Stroke	Scaling coefficient: 1.00 to 5.00	1.00	1.00	Page 16
G / Gxxx	Control Gain	Gain: 0.01 to 9.00 Improve the stability and response of Soft start, etc. on the Auto-tuning mode and constant stroke mode.	1.00	1.00	Page 15 Page 18
mod / modx	Operation mode	0: Select automatically 1: Constant stroke mode	0	0	Page 15
E- / E-☐☐	Error information	Indicate error code according to the cause	E-		Page 25

"x" means a figure.

See "How to use initialize the set point" of page 10.

Error Code (Protection)

Code	Name of Code	Error and Remedy
E-oL / E-oL	Trip by Over Current	The error is annunciated when output current is more than the rated current. Turn power off and check the drive frequency and model of the drive unit.
E-SU / E-SU	Abnormal voltage for Over Flow Sensor	The error is annunciated when the DC power source is lower than 12V. Check any short circuit and fault polarity. Where terminals +12V and 0V are short circuited the display goes off.
E-HU / E-HU	Abnormal input voltage/Higher voltage	The error is annunciated when the voltage of the power source is far off the rated voltage. Check the power source.
E-LU / E-LU	Abnormal input voltage/Lower voltage	
E-oP / E-oP	EE-PROM Readout Error	The error is annunciated when the internal memory is out of order.
E-md / E-md	Mode Error	The error is annunciated when the operation mode set on the Speed Change Signal 1, 2 and 3 is different from that on the Speed Change Signal 0. Follow the Speed Change Signal 0.
E-SE / E-SE	Error by the stroke sensor	The error is annunciated when no stroke sensor is set on the constant stroke mode.

Outline dimensions
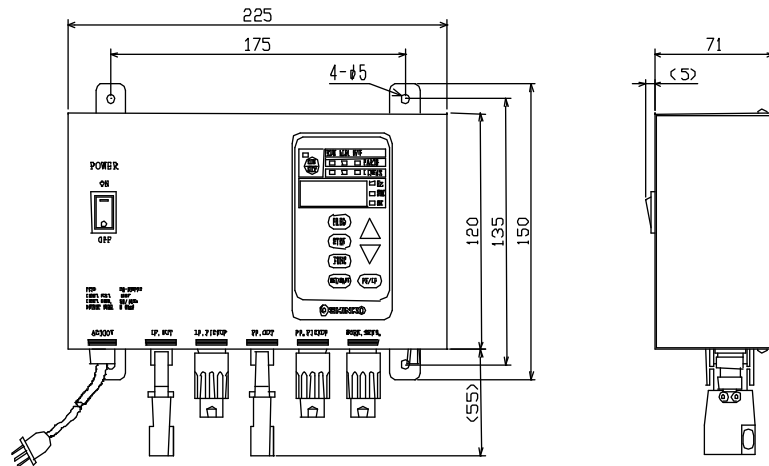
Model of Accessories

部品名	Model		Manufacturer
	On the Controller	On the Load	
Feeding power and Plug socket — Connector/Plug-Cap	1-480701-0-3P	1-480700-0-3P	AMP
Pin Contact-Socket	350689-1	350690-1	AMP
Strain relief	—————	641763-1	AMP
Crosshead Tapping screw	—————	4 × 8	—————
Plug and socket for overflow sensor	CN-70AJ3P	CN-70AP3P	Sato Parts
Plug and Socket for stroke sensor	CN-70AJ2P	CN-70AP2P	Sato Parts
Incoming/output signal Plug and Socket — Plug housing/Receptacle housing	SMP-07V-NC	SMR-07V-N	JST Mfg. Co., Ltd.
Socket contact/Pin contact	SHF-001T-0.8BS	BYM-001T-P0.6	JST Mfg. Co., Ltd.
		SYM-001T-P0.6	
Fuse (FU1)	FGMB 2A	None	Fuji Terminal Industry
Stroke Sensor	—————	EH-305 (GS-5S)	Keyense (Sunx)

Specifications

Model		C9-03VFTC	
Power Supply Voltage		AC100~230V±10%　50/60Hz	
Output	Control Type	Pulse Width Modulation	
	Voltage	0 to 95V	
	No. of vibration	90 to 180Hz/180 to 360Hz	
	Max. current	Partsfeeder	0.6A
		Linear feeder	0.6A
Operation Mode	Auto-tuning Mode	The output drive frequency chases the resonant frequency of the drive unit automatically and the controller controls the stroke constant.	
	Constant Voltage Mode	The controller outputs preset constant voltage to the drive unit.	
	Constant Stroke Mode	The controller controls the stroke of the partsfeeder constant.	
Additional Functions	Quick Ejection Mode	The controller increases temporarily the stroke of a drive unit to eject work pieces in the bowl.	
	Speed Change	An incoming signal selects any stroke set point out of four preset values.	
	Run/stop Operation	An incoming signal runs or stops the partsfeeder.	
	Output Signal	An output synchronous signal with running and stopping of the partsfeeder.	
	Soft Start	Ramp-up time 0.2 to 4 seconds	
	On- and Off-Delay	Delay time 0.2 to 4.0 seconds	
	Power Supply for Sensor	DC 12V Max current 80mA　With a 3 poled plug and socket	
Applicable Condition	Noise Resistance	1000V or more	
	Ambient Temperature	0 to 40 degree Celsius	
	Ambient Moisture	10 to 90 %RH　No condensation allowed	
	Color of Case	Gray or S2-1006 by JPMA (JAPAN PAINT MANUFACTURERS ASSOCIATION)	
	Outline Dimensions	W225 x H150 x D70 without plugs	
	Total Mass	2.4kg	

Applicable drive unit of Shinko Electric	Linear feeder model		Partsfeeder model		
	LF-02	LF-04	ME-08	HME-08	HME-14Z
	LFB-02	LFB-04	ME-14	HME-14	HSE-14Z
	HLFB-02	HLFB-04	SE-14	HSE-14	

Guarantee

Shinko Electric shall undertake, under its sole discretion and free of charge, to remedy any defect affecting the fitness for use which is due to a deficiency in design, material and workmanship. The above obligations shall only apply to such defects that appear within one year as of the shipment from Shinko Electric.

The one year means working 8 hours per day by 365 days per year.

Shinko shall, at its choice:
- a. Ship the defective product or part back Shinko for repairing: If Shinko arranges this term the customer shall bear the costs of transportation.
- b. Supply the replacement of the defective part ex work.

Out of Guarantee

Customer shall bear or Shinko shall not bear the costs for the following terms as out of the guarantee:

Any and all damage and/or loss and/or costs for repair of the Shinko's product caused by natural disaster and fire, and power supply that is out of the specifications.
- a. Any and all damage and/or loss and/or costs for repair of the Shinko's product caused by customer's violation of the instructions including mal-handling. The violation voids any and all the guarantee.
- b. Any and all damage and/or loss and/or costs for repair of the Shinko's product caused by alteration and/or disassembly performed by customer without Shinko's prior consent in writing.
- c. Any and all damage and/or loss and/or costs for repair of equipment supplied by customer.

This instruction manual will be revised for improvement without notice.

Sales offices

SINFONIA TECHNOLOGY CO., LTD.

Company name was changed from SHINKO ELECTRIC CO.,LTD. as of April 2009

Tokyo Headquarters
Shiba NBF Tower, 1-30, Shiba-daimon 1-chome, Minato-ku, Tokyo, 105-8564, Japan
International Sales Division
TEL: +81-3-5473-1864   FAX: +81-3-5473-1845
Parts Feeder Sales Department
TEL: +81-3-5473-1837   FAX: +81-3-5473-1847
URL: http://www.sinfo-t.jp/eng/

SINFONIA TECHNOLOGY (SINGAPORE) PTE. LTD.

Company name was changed from SHINKO DENKI SINGAPORE PTE. LTD. as of January 2009

101 Cecil Street #13-12 Tong Eng Building Singapore 069533
TEL: +65-6223-6122   FAX: +65-6225-2729
URL: http://www.sinfo-t.jp/ssp/

SINFONIA TECHNOLOGY (THAILAND) CO., LTD.

Company name was changed from THAI PARTS FEEDER CO., LTD. as of July 2008

406 Moo 2 Bangpoo Industrial Estate (Soi 2 c) Sukhumvit Road Tambol
Bangpoomai, Amphur Muangsamutprakarn, Samutprakarn, Thailand 10280
TEL: +66-2323-3553   FAX: +66-2709-4070
URL: http://www.sinfo-t.jp/stt/

SINFONIA TECHNOLOGY CO., LTD.

http://www.sinfo-t.jp