

EPSON

Epson Feeder Configurator Manual

Original instructions

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1. FOREWORD

1.1 FOREWORD

Thank you for purchasing our IF-A Series part feeder.

This manual provides the information necessary for correctly using the "Epson Feeder Configurator" utility software for the IF-A Series.

Please carefully read this manual and other related manuals before installing the Epson Feeder Configurator software.

Keep this manual handy for easy access at all times.

The part feeder is shipped to our customers only after being subjected to the strictest quality controls, tests, and inspections to certify its compliance with our high performance standards. Please note that the basic performance of the product will not be exhibited if our part feeder is used outside of the usage conditions and product specifications described in the manuals.

This manual describes possible dangers and consequences that we can foresee. Be sure to comply with safety precautions on this manual to use our part feeder safely and correctly.

1.2 TRADEMARKS

Microsoft, Windows, and Windows logo are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

Intel Core is a trademark of Intel Corporation.

All other company names, brand names, and product names are registered trademarks or trademarks of their respective companies.

1.3 Notation

Microsoft® Windows® 10 operating system

Microsoft® Windows® 11 operating system

In this manual, the above operating systems are referred to as Windows 10 and Windows 11, respectively. Windows 10 and Windows 11 are sometimes collectively referred to as Windows.

1.4 Terms of Use

No part of this instruction manual may be reproduced or reprinted in any form without express written permission.

The information in this document is subject to change without notice.

Please contact us if you find any errors in this document or if you have any questions about the information in this document.

1.5 Manufacturer

SEIKO EPSON CORPORATION

1.6 Contact Information

Contact information details are listed in the "Supplier" section in the following manual.

Note that the contact information may vary depending on your region.

"Safety Manual - Contact Information"

The Safety Manual is also available at the following site.

URL: <https://download.epson.biz/robots/>



2. Safety

2.1 Conventions

The following symbols are used in this manual to indicate important safety information. Be sure to read the descriptions shown with each symbol.

WARNING

This symbol indicates an imminently hazardous situation which, if operation is not performed properly, will result in death or serious injury.

WARNING

This symbol indicates a potentially hazardous situation which, if operation is not performed properly, could result in an injury due to electric shock.

CAUTION

This symbol indicates a potentially hazardous situation which, if operation is not performed properly, may result in a minor or moderate injury or in property damage only.

KEY POINTS

The "KEY POINTS" sections describe important information to be followed for operating the Robot system.

2.2 Safety Precautions

Anyone operating the system must follow the safety precautions described in the following manual:

"Safety Manual (Part Feeding)"

3. Overview of Epson Feeder Configurator

3.1 Software Overview

The Epson Feeder Configurator is an application for adjusting and configuring our IF-A Series part feeders (IF-A1520, IF-A2330, IF-A3540) to maximize their performance. It is not compatible with the IF Series part feeders (IF-80, IF-240, IF-380, IF-530).

The Epson Feeder Configurator allows the following operations:

- Vibration adjustment and vibration set creation and verification for the IF-A series.
- Set up to 25 vibration sets independently for each workpiece
- Create and verify up to 25 sequences.
- Digital I/O operation monitor
- Set the brightness and color of the backlight color
- Set up the optional hopper operation
- Set up the optional purge gate operation
- Send and receive commands to and from the feeder using the terminal screen
- Backup and restore the feeder unit's internal flash memory
- Update the firmware of the feeder
- Change the network settings of the feeder and perform communication tests
- Read and write vibration sets and sequences to files

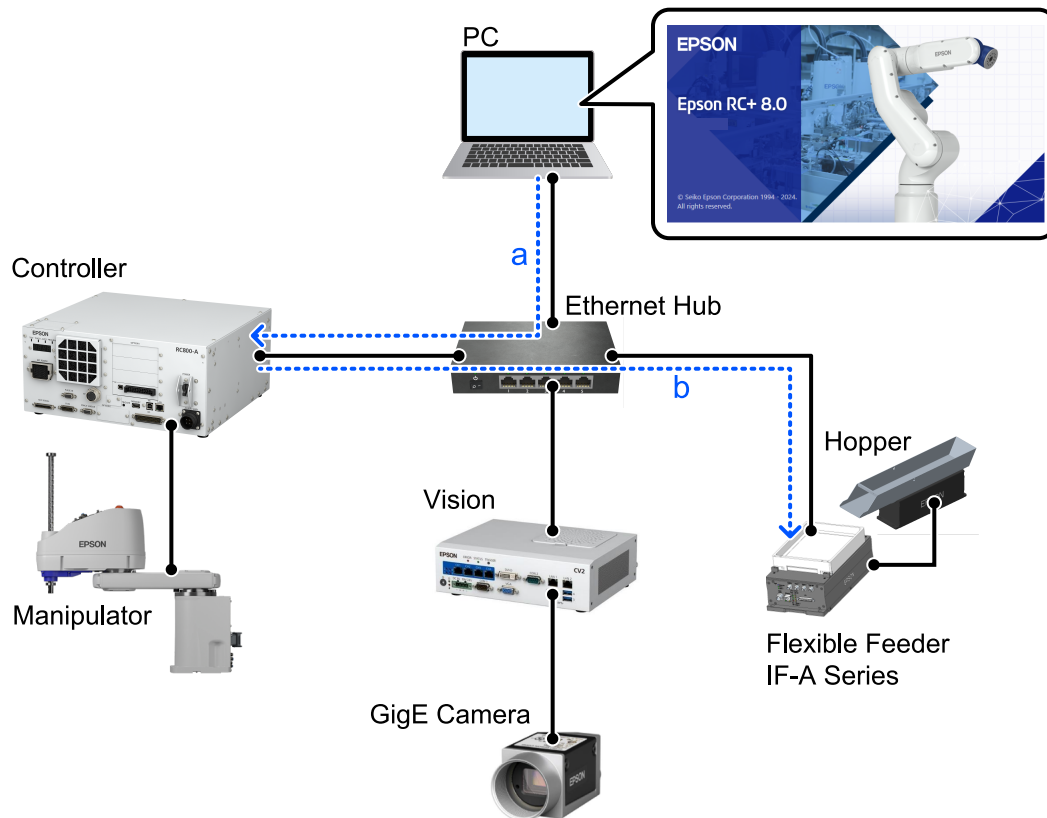
KEY POINTS

The images of screens shown in this manual are currently under development. The actual screens may differ in some places.

3.2 System Configuration Example of IF-A series

3.2.1 System Configuration when Combined with an Epson Robot Controller

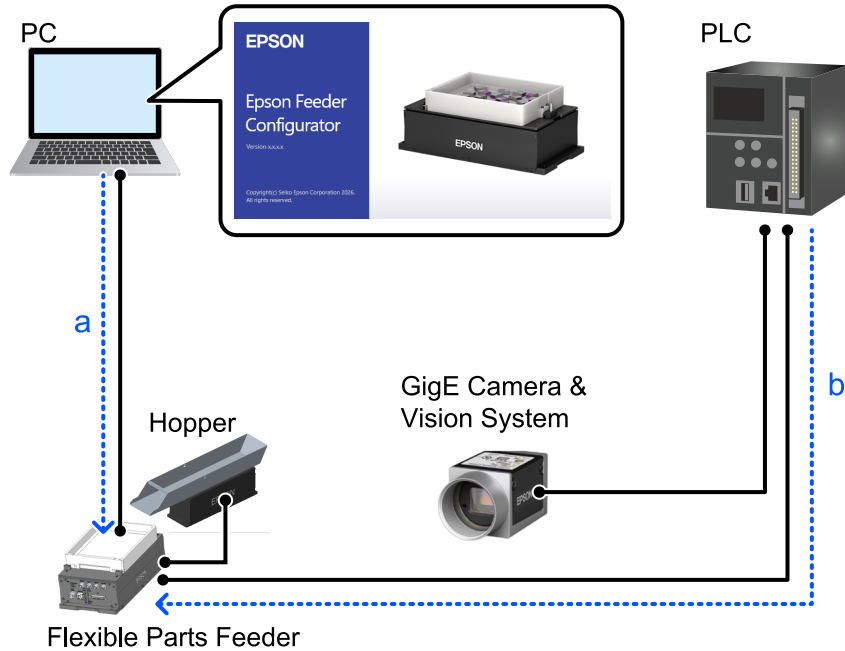
When using a combination of an Epson robot and feeder, each device can be controlled using Epson RC+. The parameters are set via the controller from Epson RC+.



- a: Control programs created with Epson RC+ are stored in the controller.
- b: The feeder is controlled by the controller.

3.2.2 System Configuration when Controlling with External Devices Such as PLCs

Before controlling a machine with an external device such as a PLC, use the Epson Feeder Configurator to perform tooling operations such as parameter adjustments. The feeder is controlled by the PLC during actual operation.



- a: The parameter is configured using the Epson Feeder Configurator.
- b: Devices such as the feeder and Vision System are controlled by external devices such as the PLC.

3.3 Basic Concepts of Epson Feeder Configurator

This section briefly describes several basic concepts for controlling a feeder using the Epson Feeder Configurator.

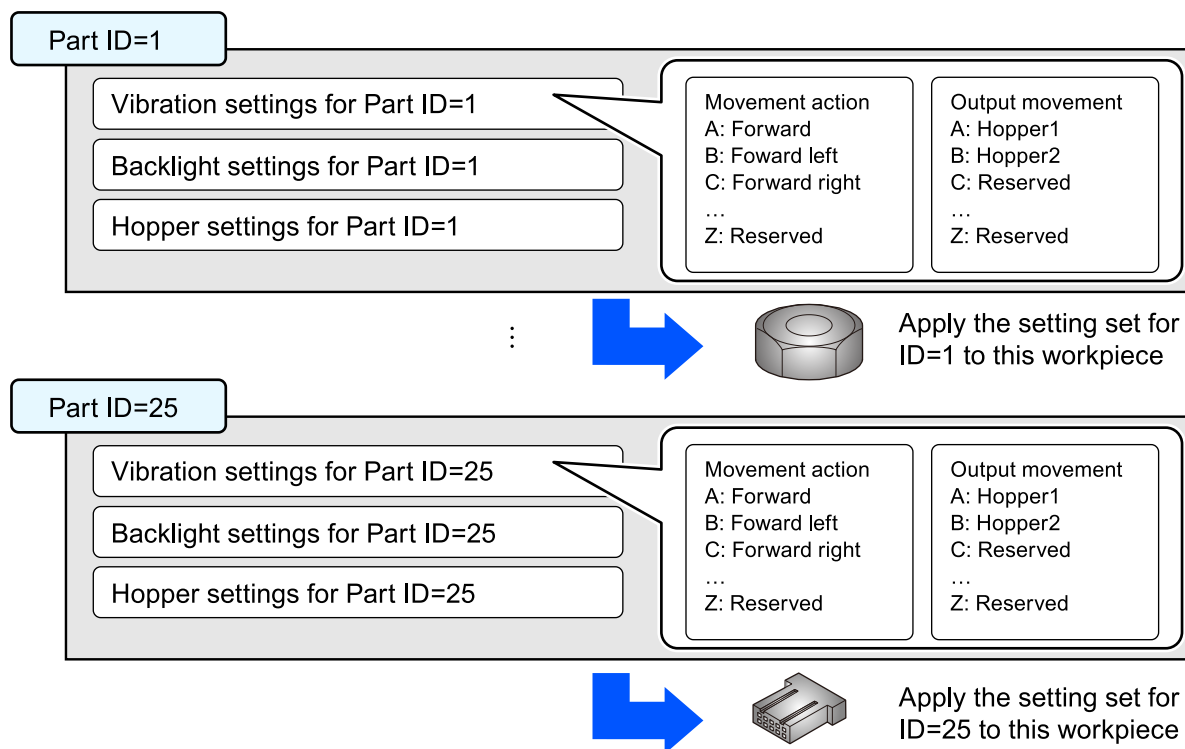
3.3.1 Parts

A part is a vibration set that combines the following settings into one.

- Vibration parameters comprising 26 movement actions
- Backlight settings
- Optional hopper settings
- Optional purge gate settings

With the IF-A Series, data for 26 parts can be stored in the feeder unit. Part 26 contains the default values. Since it is read-only, the user can configure 25 parts.

By adjusting each parameter in the parts in advance to suit the workpiece used, you can quickly change settings by simply switching the part during workpiece setup, which helps reduce downtime.



3.3.2 Movement Action

A movement action is a registered movement of a workpiece on the feeder. Up to 26 actions can be registered per part, from Actions A to Z.

Actions A through K have pre-defined default behaviors. Each action has preset parameters. You can adjust the action based on these preset values. Actions L through Z are user-defined areas. You can register the actions you want.

Action	Preset
A	Forward
B	Forward left
C	Forward right
D	Left
E	Right
F	Backward
G	Backward left
H	Backward right
I	Flip
J	Long axis centering
K	Short axis centering
L-Z	User definition

3.3.3 Output Movement

Output movements are registered hopper (optional) output settings.

Output	Movements
A	(Reserve) Hopper 1
B	(Reserve) Hopper 2
C-Z	User definition

3.3.4 Sequence

A sequence can register the order (sequence) in which movement actions, output movements, and opening and closing of the purge gate are executed. You can register up to seven actions in a single sequence. You can set up to 25 sequences on a single feeder.

Type	Operation	Duration mode	Custom value
None	(Not available)	(Not available)	(Not available)
Movement action	Actions A to Z	[Custom] or [Original]	Operation time: 100 to 30000 [ms]
Output movement	Hopper 1/Hopper 2	[Custom] or [Original]	Operation time: 100 to 30000 [ms]
Purge gate	Open/Close	(Not available)	(Not available)
Wait time	(Not available)	(Not available)	Wait time: 100 to 30000 [ms]

You can choose between [Custom] or [Original] for the duration of the movement action and output.

- If you select [Custom]: The [Custom value] set on the sequence screen will be the duration.
- If you select [Original]: The duration set in the vibration settings will be used.

KEY POINTS

A sequence is independent and not associated with a part number. Therefore, the sequence you create will be executed using the currently set part number. Check the part number before running the sequence.

Furthermore, by intentionally switching between parts such as part 01 and part 02, a single sequence can be reused with multiple part numbers.

3.3.5 File I/O

Epson Feeder Configurator allows you to export user-defined parameters to a file. You can also import that file. This makes it possible to use user-defined parameters in other projects or reuse parameters you've used before.

4. Preparing to Use the Epson Feeder Configurator

This section explains the steps to use Epson Feeder Configurator on your PC.

4.1 System Requirements

Prepare a PC that meets the following specification for the reliable use of the Epson Feeder Configurator.

	Required	Recommended
OS	- Windows 11 (excluding Home in S mode) - Windows 10 64-bit version (excluding S mode) * Not compatible with Windows on ARM or 32-bit versions of Windows.	Apply patches provided by Microsoft to always use the latest version.
CPU	CPU that runs the OS above	Intel Core i5 (8th generation or later)
Memory	Memory that runs the OS above	1 GB minimum free space
Storage	200 MB minimum free space	1 GB minimum free space
Screen resolution	XGA or above	XGA or above
LAN	Wired LAN terminal (RJ-45)	No Internet connection is required, but this app and the latest firmware may be released on the Epson download site.

4.2 Overview of Preparations Required Before Using Epson Feeder Configurator

This section explains the steps to start using Epson Feeder Configurator

Here, we provide an overview of how to use it. For details on each function, refer to the respective chapters.

1. Download and install the Epson Feeder Configurator from Epson's website.

Download the installer from the download page on Epson's website and start the installation.

Reference: [Installing the Epson Feeder Configurator](#)

2. Once the installation is complete, launch the Epson Feeder Configurator.

When using it for the first time, you will need to configure the Epson Feeder Configurator.

Reference: [Initial Setup of the Epson Feeder Configurator](#)

3. After the initial setup is complete, you can use the Epson Feeder Configurator.

This application cannot be used until activation is complete.

4.3 Installing the Epson Feeder Configurator

KEY POINTS

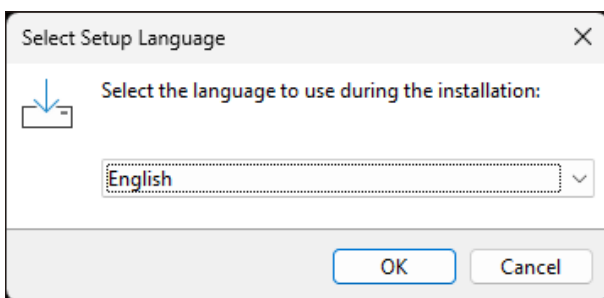
The Epson Feeder Configurator installer can be downloaded from Epson's website. For more information, please contact the supplier.

1. Run the installer Setup.exe you obtained.

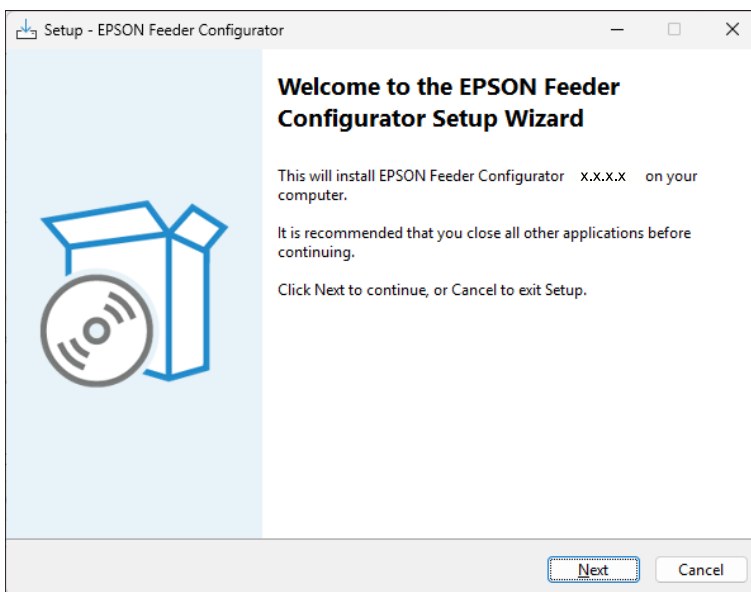
An error will occur if Epson Feeder Configurator is already installed and running.

Close the Epson Feeder Configurator and then reinstall it. In this case, reinstalling will reset all previously configured parameters and settings.

2. Choose which language to use for the installer.

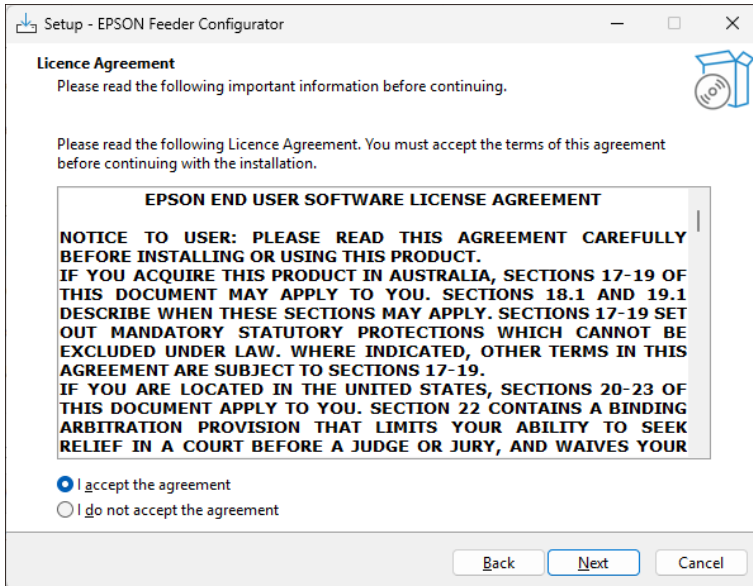


3. The Setup Wizard runs. Click [Next].

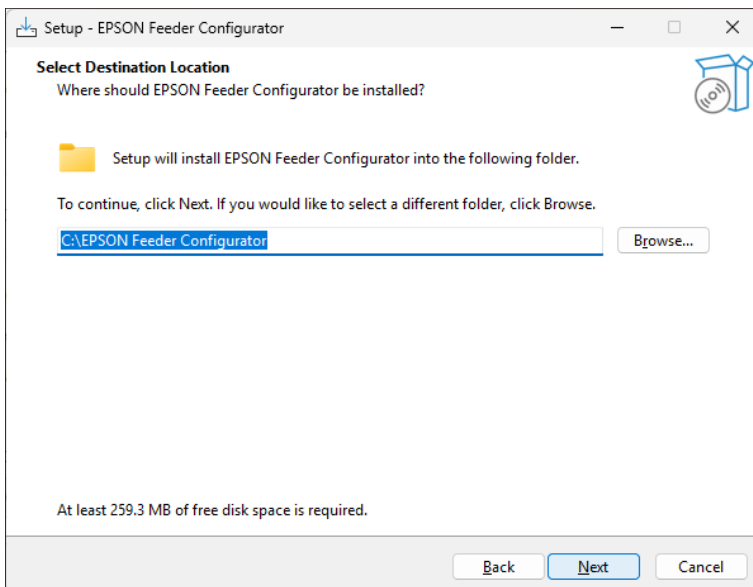


4. The license agreement appears.

Carefully read the contents. Select [I accept the agreement] only if you agree, and then click [Next].



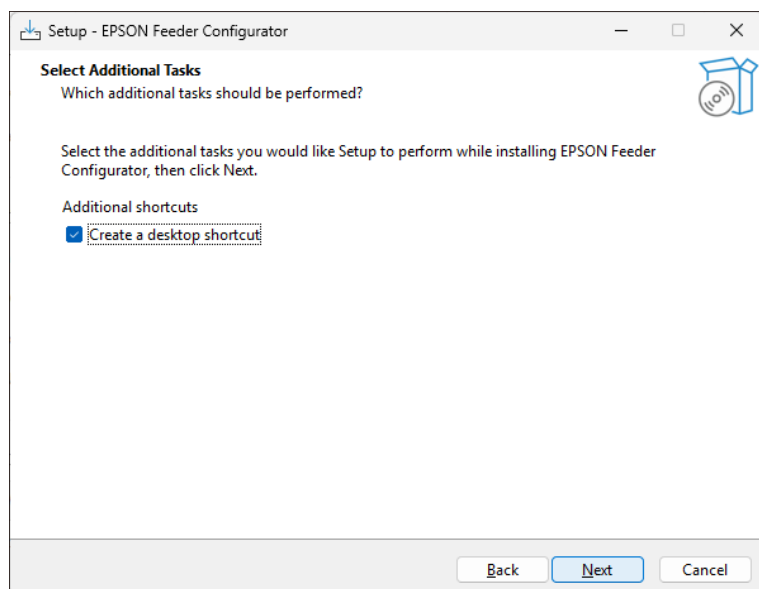
5. Specify where to install the Epson Feeder Configurator. If necessary, click the [Browse] button to change the installation location.



KEY POINTS

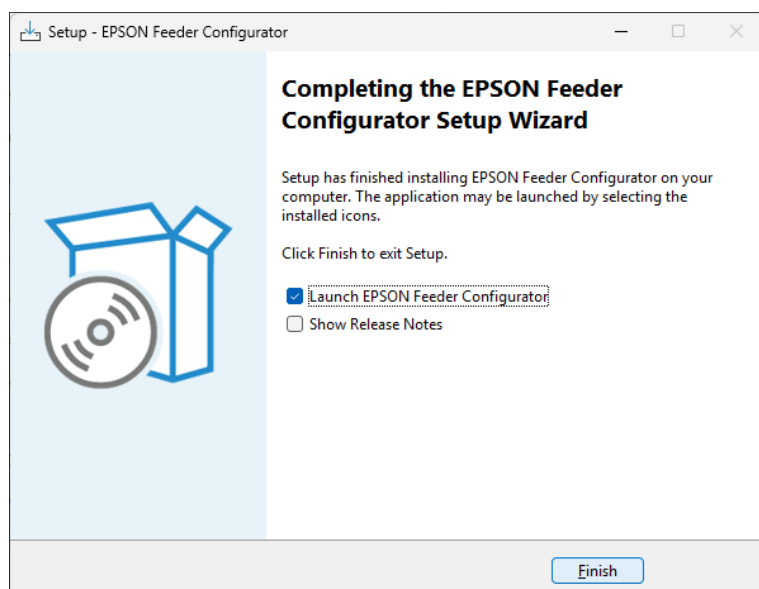
If you specify the same folder as the installation destination on a PC where Epson Feeder Configurator was previously installed, a dialog box notifies you that the installation folder already exists. Select [Yes] to overwrite the contents of the specified installation folder.

6. Select the tasks to execute and click the [Next] button.



Installation starts and the required files are copied.

7. The following screen appears when the installation is complete.



Select the actions you want to perform after the setup is complete, and click the [Finish] button.

KEY POINTS

The language setting selected for the installer is carried over to the language setting of the Epson Feeder Configurator. Select the link below for information about changing the language setting of the Epson Feeder Configurator.

[Changing the Language](#)

4.4 Uninstalling the Epson Feeder Configurator

The procedure to uninstall the Epson Feeder Configurator is described below.

1. Select [Epson Feeder Configurator] - [Uninstall] from the Windows Start menu.
2. A dialog box prompts you to confirm that you want to delete all Epson Feeder Configurator data. Select [Yes] to delete the data.

Uninstallation starts.

3. A screen appears when the uninstallation is complete. Click [OK].

KEY POINTS

- You can also uninstall the Epson Feeder Configurator using Apps in the Windows Settings.
- Files exported from this app are saved in `%userprofile%\Documents` by default (e.g. `C:\Users\ (username) \Documents`). This data is not deleted when you uninstall the Epson Feeder Configurator.
- Depending on the environment used, some files may remain in the installation folder. If necessary, delete them manually.

4.5 Initial Setup of the Epson Feeder Configurator

This explains the activation and configuration required when you first launch the Epson Feeder Configurator after installation.

1. Execute activation

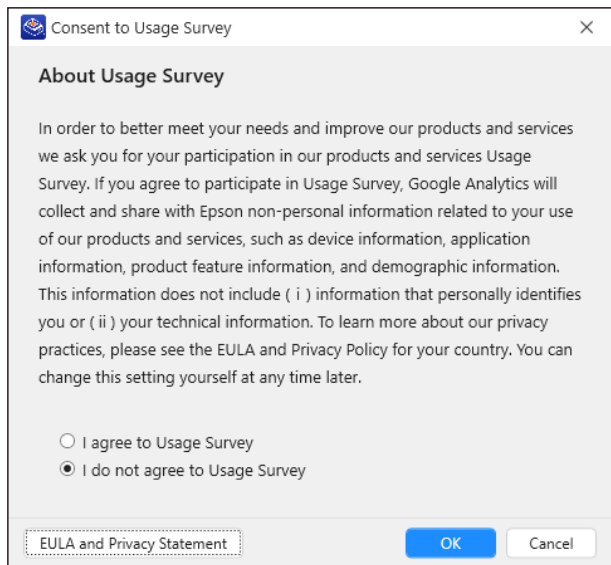
When you launch the Epson Feeder Configurator for the first time, an activation screen will appear. Follow the on-screen instructions to activate the device before use.

KEY POINTS

This application cannot be used until activation is complete.

2. Setting up usage survey

We ask for your cooperation in our usage survey to improve our products and services and better meet your needs. Review the instructions on the screen below, and if you agree, select [I agree to Usage Survey].



The dialog box is titled "Consent to Usage Survey" and contains the following text:

About Usage Survey

In order to better meet your needs and improve our products and services we ask you for your participation in our products and services Usage Survey. If you agree to participate in Usage Survey, Google Analytics will collect and share with Epson non-personal information related to your use of our products and services, such as device information, application information, product feature information, and demographic information. This information does not include (i) information that personally identifies you or (ii) your technical information. To learn more about our privacy practices, please see the EULA and Privacy Policy for your country. You can change this setting yourself at any time later.

☐ I agree to Usage Survey
☒ I do not agree to Usage Survey

At the bottom, there is a link "EULA and Privacy Statement", an "OK" button, and a "Cancel" button.

KEY POINTS

Your cooperation in our usage survey will help us improve our products and services. You can still use this application even if you do not participate.

5. Instructions for starting Epson Feeder Configurator

This section explains the basic steps to launch the Epson Feeder Configurator and adjust its parameters.

5.1 Overview From Startup to Use

1. Start the Epson Feeder Configurator

Reference: [Launching Applications](#)

2. Register or select the feeder to connect.

Select the feeder to connect from the registered feeders. If no feeders are registered, register a new one.

Reference: [Selecting a Feeder to Connect](#)

3. Using dry run mode

This application can be launched in dry-run mode even without connecting a feeder.

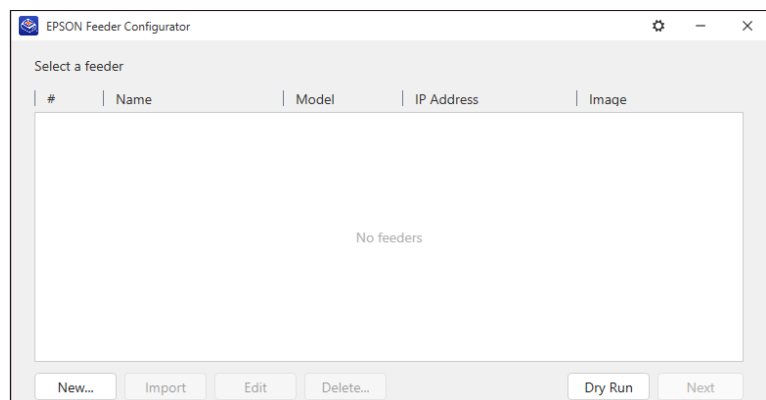
Reference: [Dry Run Mode](#)

5.2 Launching Applications

There are two ways to start the Epson Feeder Configurator.

- Double-click the [Epson Feeder Configurator] icon on the desktop.
- Select [Epson Feeder Configurator] - [Epson Feeder Configurator] from the Windows Start menu.

A splash screen appears momentarily, then the feeder model selection screen appears after a few seconds.

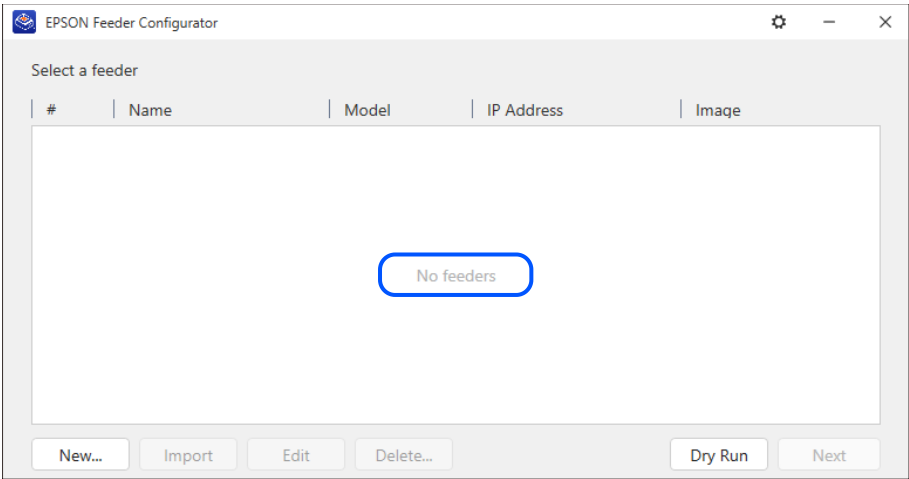


KEY POINTS

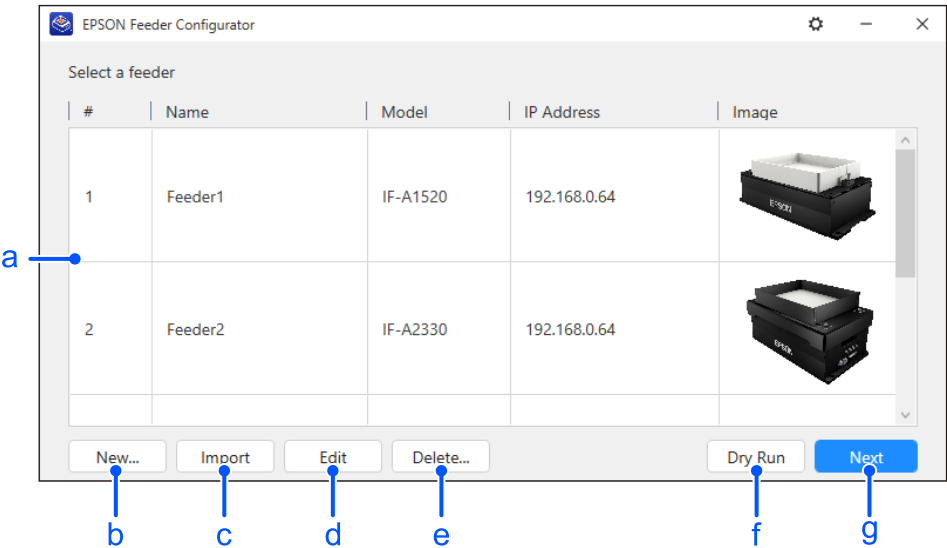
You cannot run multiple instances of the Epson Feeder Configurator on a single PC.

5.3 Selecting a Feeder to Connect

When you launch the Epson Feeder Configurator, a screen will appear where you can select the feeder to connect. If this is the first time you launch it, or if you haven't registered a feeder before, there will be no feeders to select, and "[No Feeders]" will be displayed.



If the registration information is available, a screen will appear allowing you to select a registered feeder.

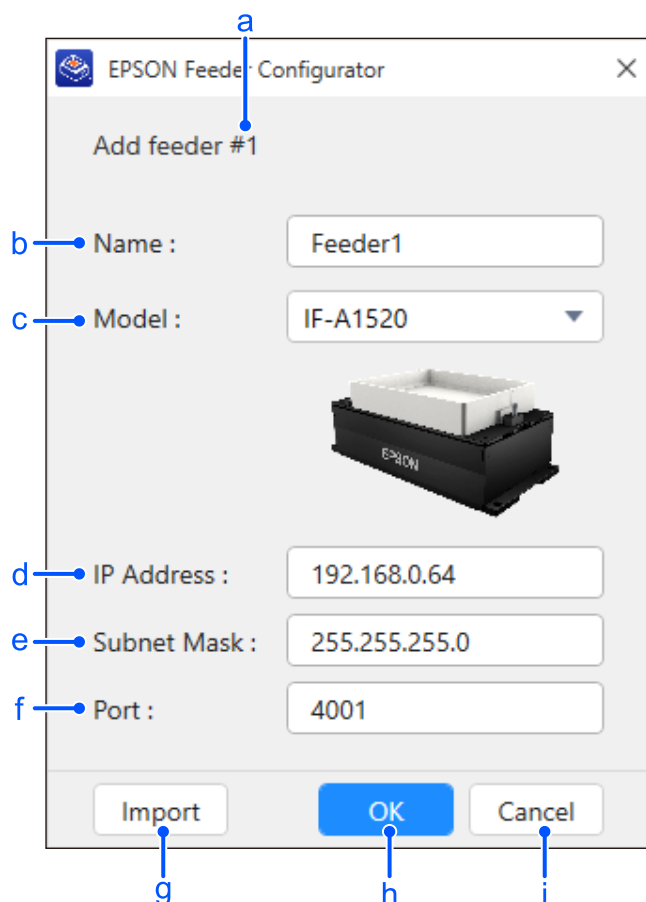


	Item	Description
a	List of registered feeders	Shows a list of the feeders registered in the Epson Feeder Configurator.
b	New...	Displays the [Add Feeder] dialog box to register a new feeder.
c	Import	You can reuse parameters used in other models. Select the file exported from the model you used and import the parameters.
d	Edit	Change the name and network settings of a previously registered feeder.
e	Delete	Deletes the selected feeder.
f	Dry run	Opens the main window in dry run mode. See below for more details. Dry Run Mode
g	Next	Displays the main window for the selected feeder.

 **KEY POINTS**

You cannot select more than one feeder at a time.

Click [New...] to register a new feeder. Enter the required information on the feeder addition screen and click [Save]. The feeder information is registered in the Epson Feeder Configurator.

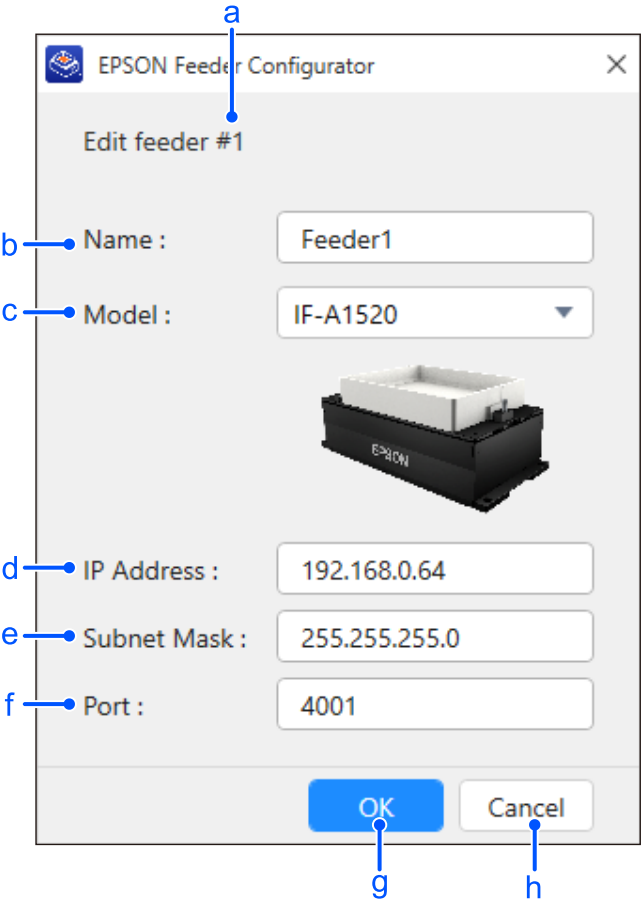


	Item	Description
a	Feeder number	The feeder number to be registered. The numbers from 1 to 8 are allocated automatically.
b	Name	You can specify any name you want for a feeder. - Up to 32 characters. - Only symbols “_” and “-” can be used. Spaces “ ” can be used, except at the beginning and end of the name.
c	Model	Select the feeder model.
d	IP Address	Specify the feeder IP address. Default: 192.168.0.64
e	Subnet Mask	Specify the feeder subnet mask. Default: 255.255.255.0
f	Port	Specify the feeder TCP port number. Default: 4001
g	Import	You can reuse parameters used in other models. Select the file exported from the model you used and import the parameters.
h	OK	Register the feeder using the entered details.
i	Cancel	Discard the entered information and return to the feeder model selection screen.

 **KEY POINTS**

- You can register up to 8 feeders.
- If the registration information is incorrect, you will not be able to connect to the feeder.

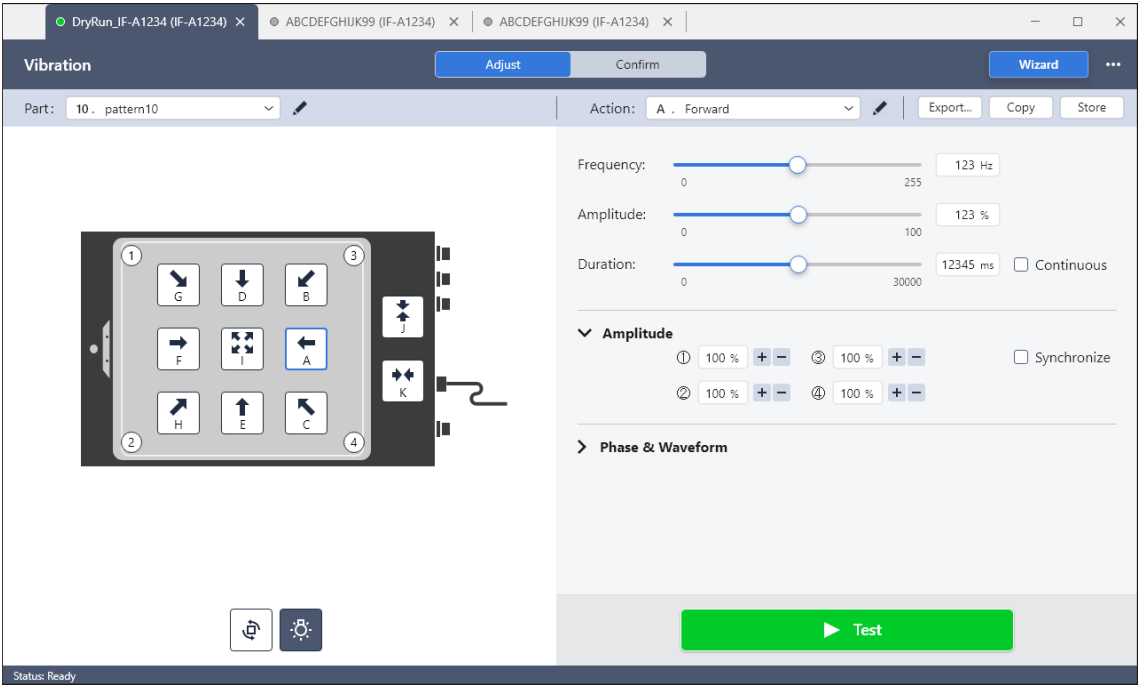
The registered feeder information can be edited. You can change the name, model, and network settings.



	Item	Description
a	Feeder number	The feeder number whose contents you want to change.
b	Name	You can specify any name you want for a feeder. ▪ Up to 32 characters. ▪ Only symbols “_” and “-” can be used. Spaces “ ” can be used, except at the beginning and end of the name.
c	Model	Select the feeder model.
d	IP Address	Specify the feeder IP address. Default: 192.168.0.64
e	Subnet Mask	Specify the feeder subnet mask. Default: 255.255.255.0
f	Port	Specify the feeder TCP port number. Default: 4001
g	OK	Register the feeder using the entered details.

	Item	Description
h	Cancel	Discard the entered information and return to the feeder model selection screen.

Once the selected feeder is correctly connected, the main screen will appear. In this screen, you can configure the feeder's operation.



Select the link below for details about the main window.

[Main Window](#)

5.4 Dry Run Mode

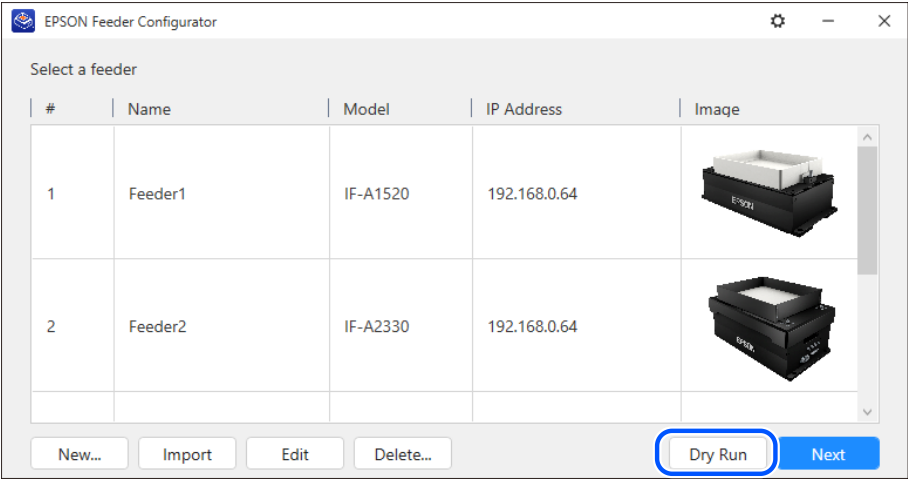
In dry run mode, you can launch the Epson Feeder Configurator offline, even if this application cannot connect to the feeder unit. This is intended for displaying each tab on the main screen and checking the functions of each tab.

The following functions are restricted in dry run mode.

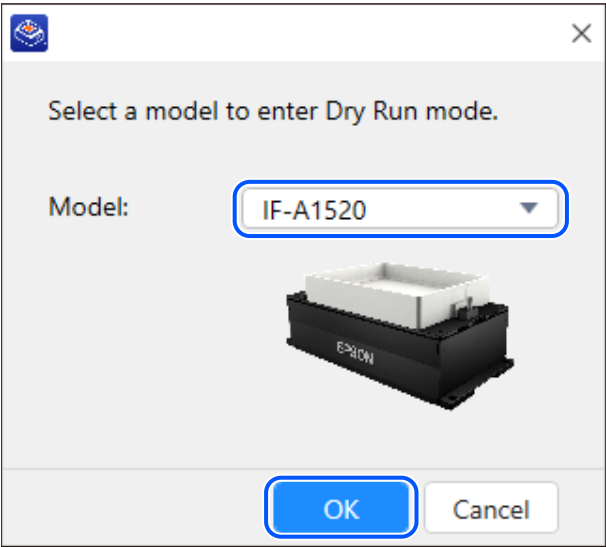
- Communication between the feeder unit and the application
- Running function tests (vibration, sequence, backlighting, hopper and purge gate) and saving parameters
- Saving and retrieving parameter values file
- Updating the firmware

Follow the procedure below to execute the dry run mode.

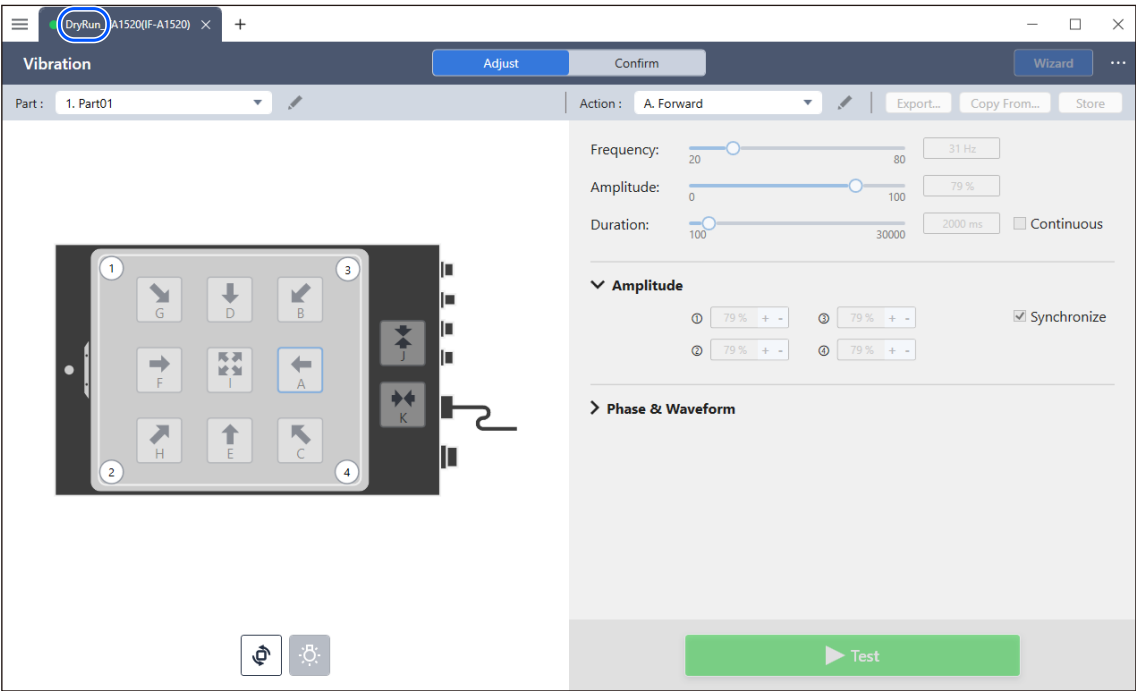
1. Click the [Dry Run] button on the feeder model selection screen.



2. Select the feeder model you want to display and click [OK].



3. The main window opens in dry mode. "Dry Run" appears at information of connected feeder.



To exit the dry run mode, do one of the following:

- Click the [+ (add device to connect)] button at the top of the screen, and then reconnect to the feeder on the feeder model selection screen.
- To exit the Epson Feeder Configurator, click the [× (close)] button in the upper right corner of the screen, or select [Exit] from the [... (options)] menu.

For information on the function to add connected devices, see below.

Main Window - Common Functions

6. Basic operation of the Epson Feeder Configurator

6.1 Basic operation of the Epson Feeder Configurator

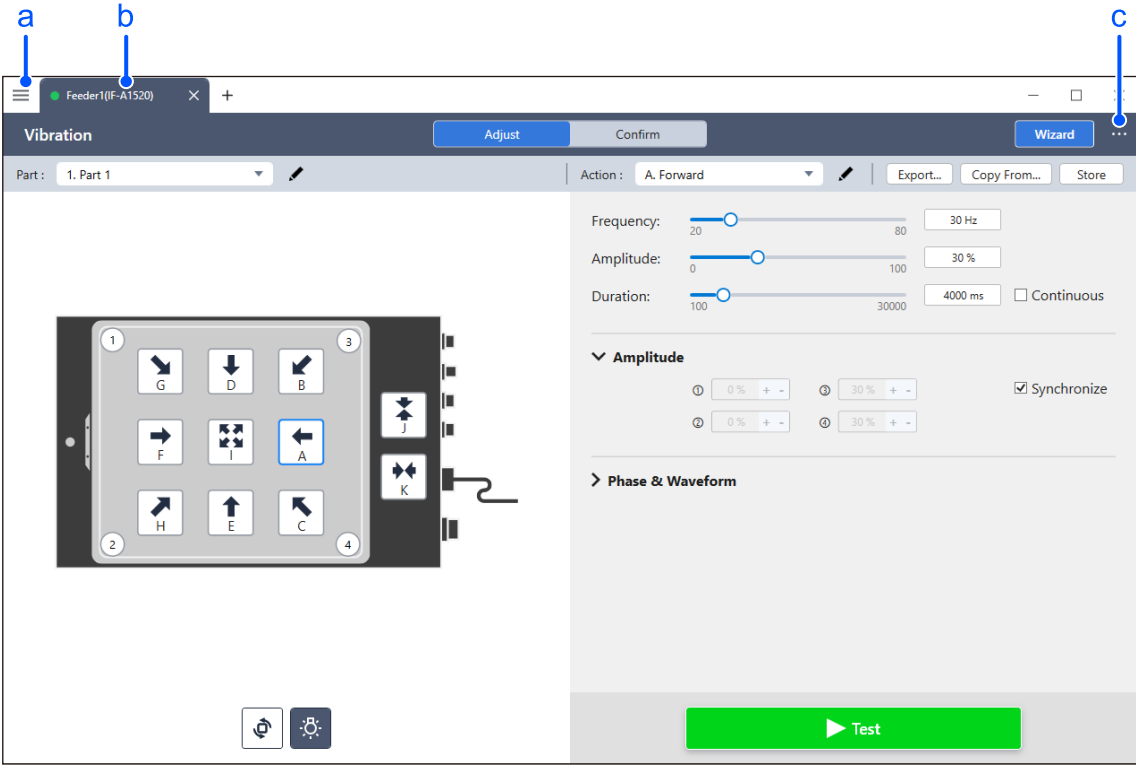
The Epson Feeder Configurator has the following seven main functions:

	Function name	Description
1	Vibration	Adjust and check the vibration parameters for each action. The vibration function has two modes: [Adjust Mode] for adjusting vibration parameters and [Confirm Mode] for reviewing the adjustments made. Important actions can be easily configured using the wizard.
2	Sequence	You can create and verify the sequence of movement actions, output actions, and the opening and closing of purge gates. The sequencing function has two modes: [Create Mode] for creating sequences and [Confirm Mode] for reviewing the sequences you have created.
3	Digital I/O	You can check and debug digital I/O interfaces. You can monitor the status of inputs and outputs.
4	Device Settings	You can configure the devices connected to the feeder unit (hopper, purge gate) and the backlight settings.
5	System Settings	You can configure and check the system settings.
6	Maintenance	You can perform maintenance on the feeder unit.
7	Terminal	You can display the terminal screen and send and receive dedicated commands with the IF-A series.

6.2 Main Window

6.2.1 Main Window - Common Functions

When you launch this application, the main window will be displayed. This section explains the functions common to all function screens. Regardless of which function screen you are viewing, these common functions are always displayed and accessible.

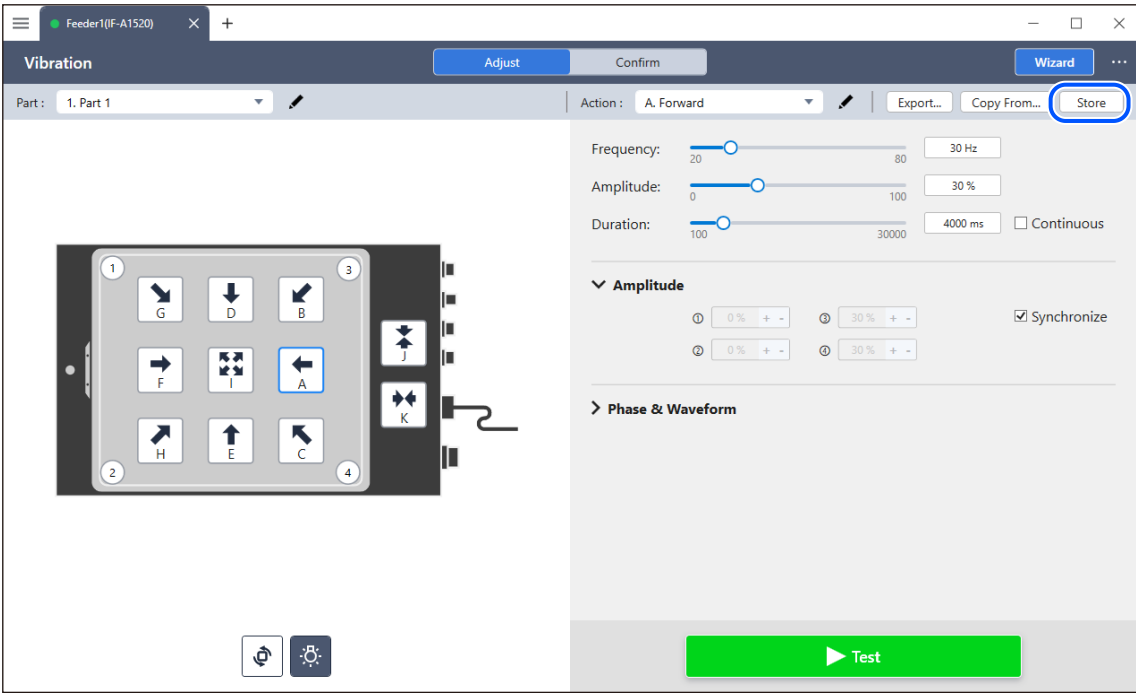


	Item	Description
a	☰ (Function Selection) Menu	This displays a menu for selecting the seven main functions of this application. Reference: ☰ (Function Selection) Menu
b	Information of connected feeder	Shows the information of the connected feeder. This application can connect to up to three feeders simultaneously. However, only the one displayed can actually be controlled.
c	... (Option) Menu	This displays a menu for selecting file operations, settings, and more. Reference: ... (Option) Menu

6.2.2 Basic Principles of Data Operation

The Epson Feeder Configurator allows you to adjust and check parameters for the IF-A series. Make sure you understand the basics of data storage and retrieval before using this application.

The data adjusted in this application will be sent to the feeder unit. You can operate the feeder based on the transmitted data and verify the adjustments. However, the transmitted data is not written to non-volatile memory at that time. Once the parameters are finalized, press the [Store] button to store the data in the device. The data will then be stored in the device's non-volatile memory.



 KEY POINTS

If you turn off the power to the device or switch the part ID without saving the data, the data will be lost.

6.3 Vibration

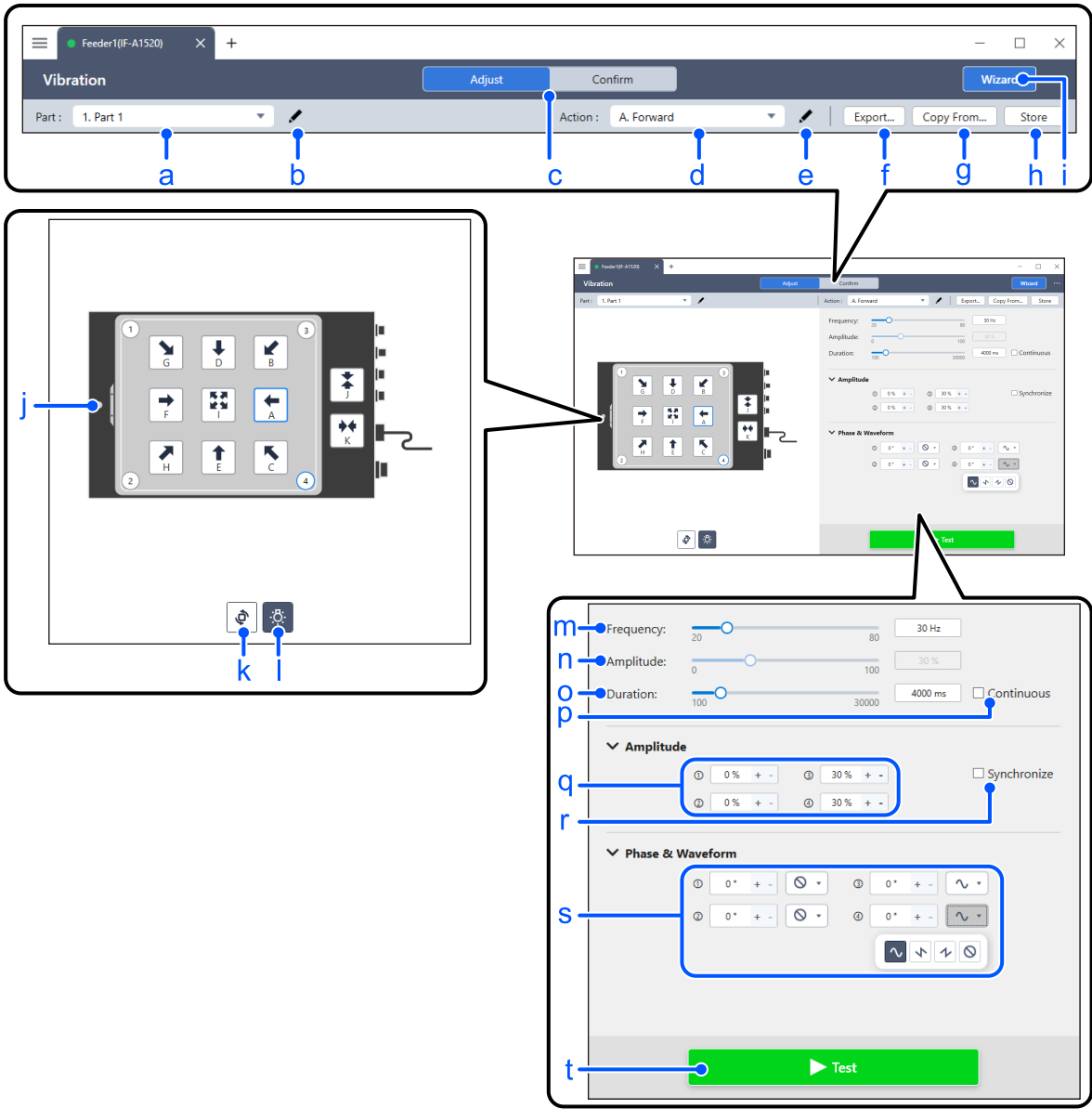
Set the vibration parameters. You can adjust and check each movement action set for each part. The vibration function has two modes: [Adjust Mode] for adjusting vibration parameters and [Confirm Mode] for reviewing the adjustments made.

Using the [Wizard] function, even those new to parameter adjustment can easily adjust vibration parameters.

6.3.1 Vibration - Adjust Mode

In adjustment mode, the focus is on adjusting vibration parameters. Immediately after startup, part ID=1 is selected. If part ID=1 is not set (initially, all parameters are 0), part ID=26 (default value) is copied.

Settings can be registered individually for each part. Part numbers can be selected from 01 to 26. Part 26 has a default value set and is read-only.



	Item	Description
a	Selecting the part	Select the part number you want to adjust or check from the drop-down list. You can choose from IDs 01 to 26. Part 26 contains the default values and is read-only.

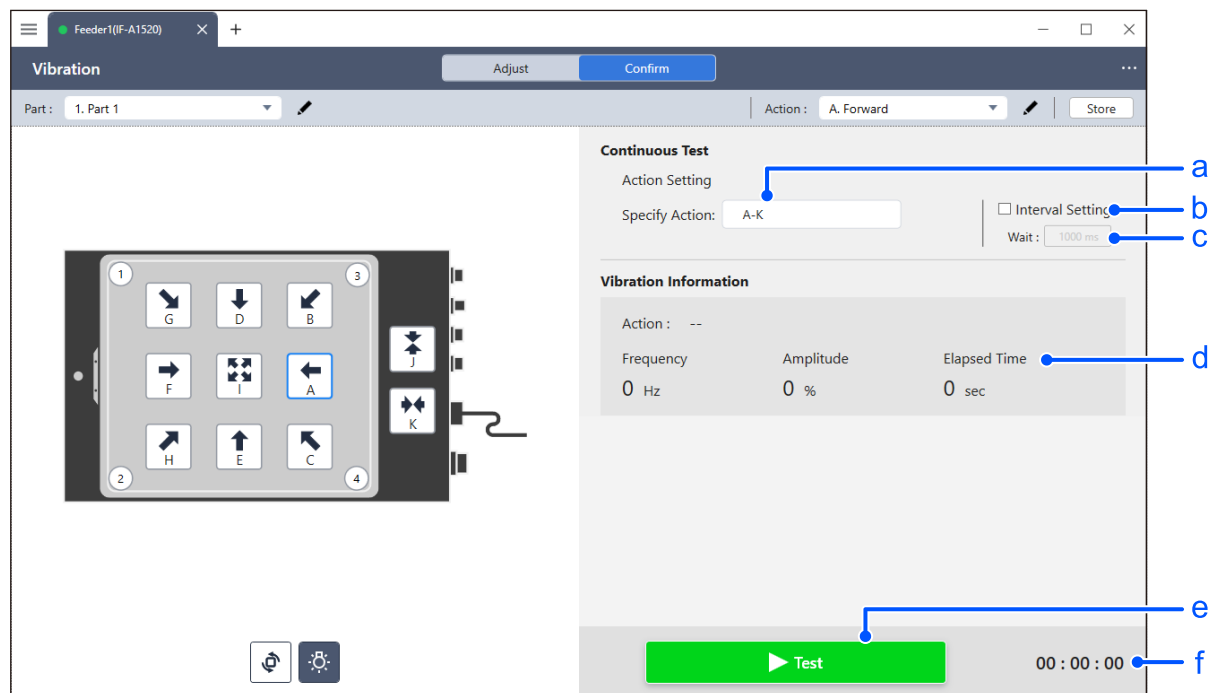
	Item	Description
b	Editing parts name	You can name the parts. They can be associated with other parts used by the user.
c	Selecting [Adjust]/[Confirm] mode	Select a mode to adjust or confirm the vibration parameters.
d	Selecting movement action	Select the action you want to adjust or check from the dropdown list. Actions can be selected from A through Z.
e	Editing movement action name	You can name the selected action
f	Export...	Adjusted parameters and settings information will be output to an external file.
g	Copy From...	When adjusting parameters, copy and use the parameters from other part IDs.
h	Store	During normal adjustment procedures, the adjusted parameters are not saved to the non-volatile memory within the feeder unit. Pressing the [Store] button will write the data to the device.
i	Wizard	The vibration adjustment wizard will begin. Reference: Vibration - Wizard Mode
j	Screen display: Action buttons A to K	Pressing any of the action buttons A through K will execute the corresponding action.
k	Rotate display	Rotates the orientation of the displayed IF-A series illustration by 180 degrees.
l	Backlight test	Quickly checks that the backlight turns on and off. Even if the backlight setting is 0%, the lighting test will be performed at 50% brightness.
m	Frequency	Specify the vibration frequency for the selected action using the slider or by entering a numerical value.
n	Amplitude	Specify the vibration amplitude for the selected action using the slider or by entering a numerical value.
o	Duration	Specify the duration of the selected action using a slider or a numerical value.
p	Continuous	When you check the checkbox, the selected action will be executed continuously (for a maximum of 30 seconds), regardless of the value set for the duration.
q	Amplitude (Individual settings for each motor)	Enter the amplitude for motors 1 to 4 as a numerical value or click the [+] and [-] buttons to increase or decrease the value. Setting range: 0 to 100 [%]
r	Synchronize	Deselect this checkbox to individually adjust the amplitude, phase, and waveform of the four motors.
s	Phase & Waveform (Individual settings for each motor)	- Phase: Set the phase of motors 1-4 by entering a numerical value or by increasing or decreasing it using the +/- buttons. Setting range: 0 to 359 [degrees] - Drive waveform: Select the drive waveform for motors 1-4 from sine wave/upper sawtooth wave/lower sawtooth wave/none.
t	Test	The vibration of the specified action will begin according to the set parameters. After the test starts, the button will switch to the test stop button.

KEY POINTS

The vibration, backlighting, hopper and purge gate parameters are saved as a single vibration set for each part. When importing or exporting parameters, all parameters are input and output at the same time.

6.3.2 Vibration - Confirm Mode

In [Confirm] mode, you can efficiently verify the parameters set in [Adjust] mode. In continuous testing mode, you can verify not just one action, but multiple specified actions in sequence.



	Item	Description
a	Action Setting	Specify the action you want to check. The actions can be specified in the following format: - Single specification: A - Multiple specifications: A, C, F - Range specification: A-D - Combined specification: A-C, E, G-J However, the following processing occurs: - Duplicate test items are combined into one. - Actions are executed in the specified order (not alphabetically).
b	Interval Setting	To set the switching interval of the action you want to monitor, check the check box. If you uncheck the check boxes, each action will be executed sequentially.
c	Wait	When the [Interval Setting] checkbox is selected, you can set the pause time when switching actions.
d	Vibration Information	Displays information about the currently running action.
e	Test	The confirmation of the specified sequence of actions will begin. After it starts, the button will switch to a stop button.

	Item	Description
f	Elapsed Time	This displays the elapsed time since the start of the test.

6.3.3 Vibration - Wizard Mode

In wizard mode, you set the parameters sequentially. Even those unfamiliar with parameter adjustment can easily adjust the important parameters.

The important parameters refer to the following three actions, which are primarily used in feeding:

- I: Flip
- J: Long Axis Centering
- K: Short Axis Centering

6.3.3.1 Wizard Flow

The wizard process is as follows:

1. Start the Wizard

Select the [Adjust] mode on the vibration screen and press the [Wizard] button.

2. Select the Part ID on the Welcome Screen

Once the Welcome screen appears, select the part ID you want to adjust.

3. K: Adjusting Short Axis Centering Parameters

First, adjust the short axis centering parameters. Adjust in the order of frequency, amplitude, and duration.

4. J: Adjusting Long Axis Centering Parameters

Next, adjust the long axis centering parameters. Similarly, adjust in the order of frequency, amplitude, and duration.

5. I: Adjusting the Flip Parameters

Finally, adjust the Flip parameters. Similarly, adjust in the order of frequency, amplitude, and duration.

6. Verify the Set Parameters and Complete Parameter Adjustment.

Once the Flip parameter adjustment is complete, the parameters you have set will be displayed. Review the information and press the [Finish] button to save the set parameters to the non-volatile memory inside the feeder unit.

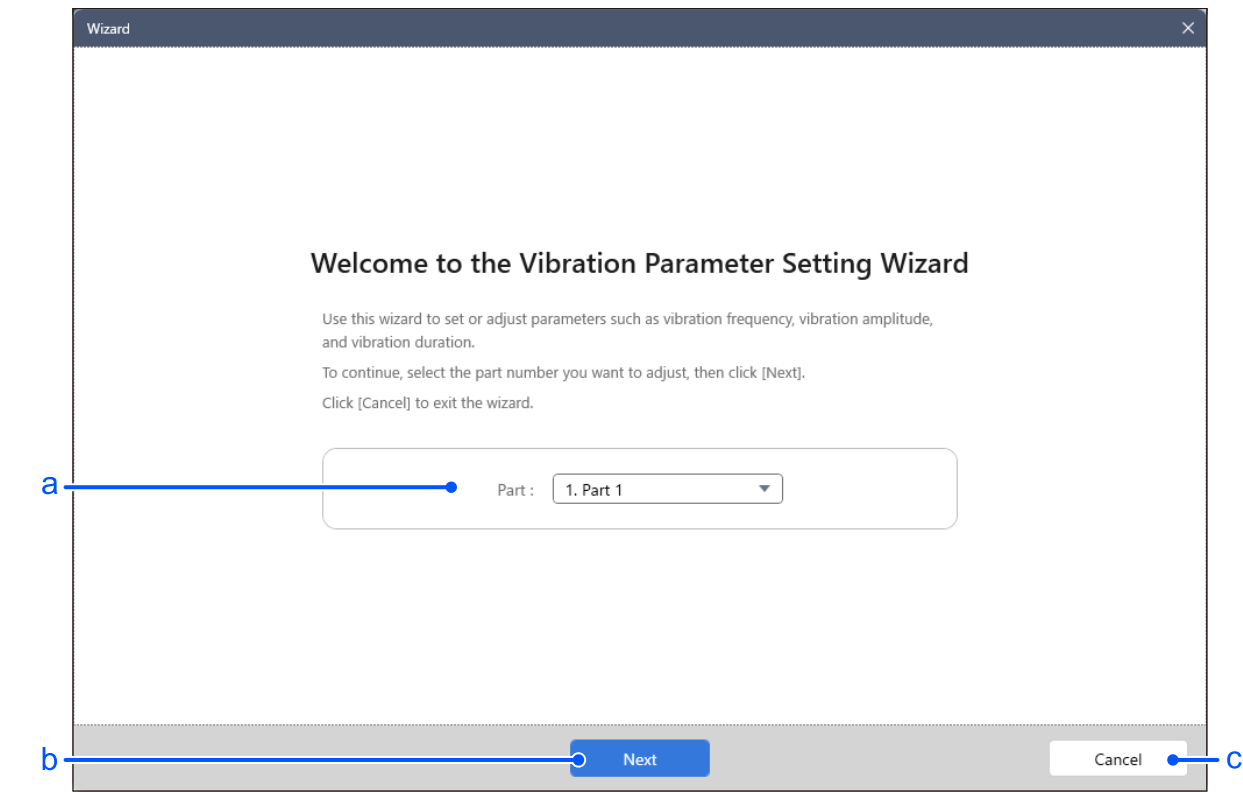
KEY POINTS

If you do not press the [Complete] button on the parameter confirmation screen, the adjusted parameters will not be saved to the device.

6.3.3.2 Detailed Wizard Instructions

1. Select the [Adjust] mode on the vibration screen and press the [Wizard] button.

The wizard will start, and the Welcome screen will appear. Select the part ID you want to adjust.

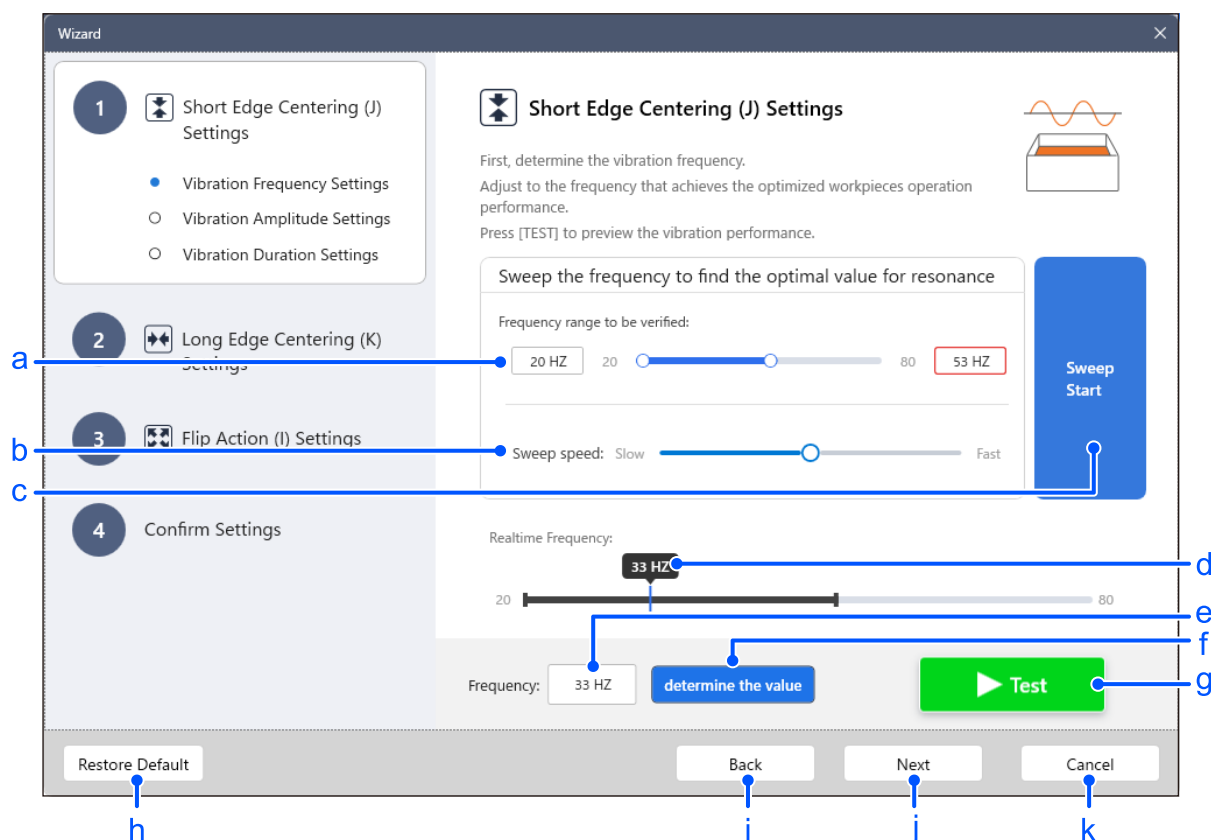


	Item	Description
a	Part ID Selection	Select the part ID you want to adjust from the dropdown list.
b	Next	Start wizard mode with the selected part ID.
c	Cancel	Cancel the wizard and close the screen.

2. K: Adjust the frequency parameter for Short Axis Centering.

Specify the frequency range to adjust and the sweep speed, then sweep to find the appropriate frequency. Start with a wide range and gradually narrow the range to find the optimal frequency.

Frequency adjustment screen

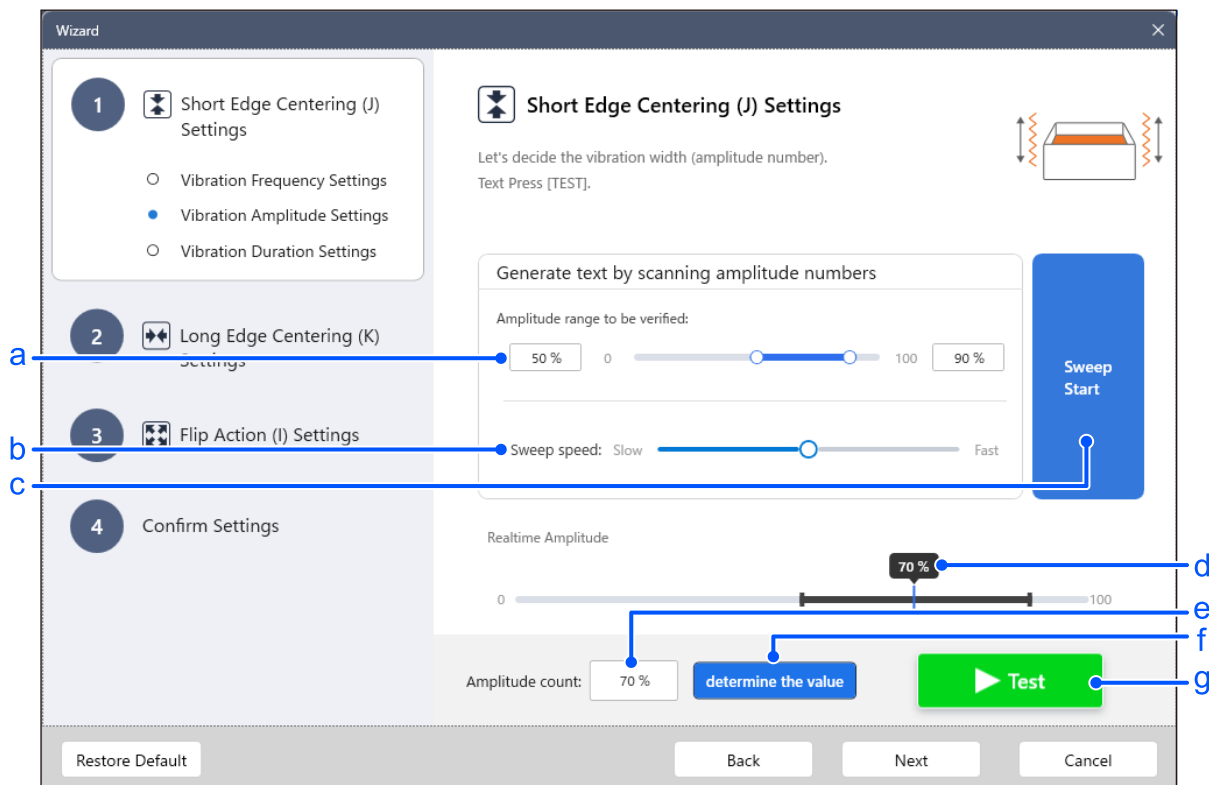


	Item	Description
a	Frequency range to be verified	Set the frequency range to adjust and confirm. Drag ○ or enter a numerical value directly into the text box to set the frequency range. It is not possible to reverse the high and low frequencies.
b	Sweep speed	The frequency is swept (changed smoothly and continuously) to search for the optimal frequency. A faster sweep speed allows you to check the setting range quickly, but it becomes more difficult to identify the optimal frequency. A slower sweep speed takes more time to check the setting range, but it becomes easier to identify the frequency.
c	Sweep Start / Stop	The sweep will begin with the set frequency range and sweep speed. After it starts, the button will switch to a stop button. When the stop button is pressed, the current frequency will be entered into the frequency text box.
d	Realtime Frequency	Displays the operating frequency.
e	Frequency	Enter the frequency you want to determine using this wizard. The default value is entered for the initial value. When you stop the sweep using the start/stop button, the frequency at the time of stopping will be entered.
f	Determine the value	Confirm the frequency entered in the frequency text box. After confirmation, press the test button to perform a test at that frequency.
g	Test	The vibration will be tested at the frequency entered in the frequency text box. You can check the frequency you selected with the sweep.
h	Restore Default	This resets the set frequency to its default value.
i	Back	Return to the previous step of the wizard.
j	Next	Proceed to the next step of the wizard.

	Item	Description
k	Cancel	Cancel the wizard. All configured parameters will be discarded.

3. Adjust the amplitude parameter.

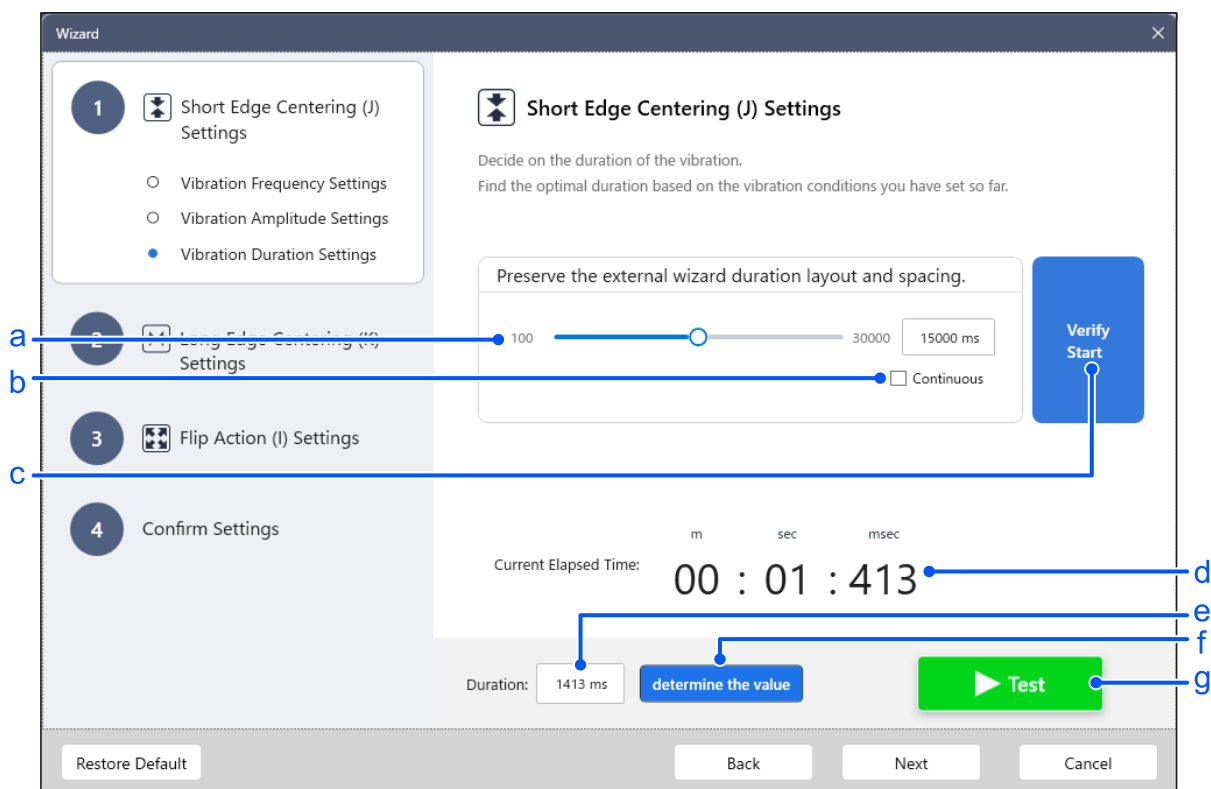
Amplitude adjustment screen



	Item	Description
a	Amplitude range to be verified	Set the amplitude range to adjust and check. Drag ○ or enter a numerical value directly into the text box to set the amplitude range. It is not possible to reverse the amplitude.
b	Sweep speed	The amplitude is swept (changed smoothly and continuously) to search for the optimal amplitude.
c	Sweep Start / Stop	The sweep will start with the set amplitude range and sweep speed. After it starts, the button will switch to a stop button. When you press the stop button, the amplitude at that moment will be entered into the amplitude text box.
d	Realtime Amplitude	Displays the amplitude during operation.
e	Amplitude	Enter the amplitude to be determined by this wizard. The default value is entered for the initial value. When you stop the sweep using the start/stop buttons, the amplitude at the time of stopping will be entered.
f	Determine the value	Confirm the amplitude entered in the amplitude text box. After confirming, press the test button to perform a test with that amplitude.
g	Test	The vibration will be tested using the amplitude entered in the amplitude text box. You can check the amplitude determined by the sweep.

4. Adjust the duration parameter.

Duration adjustment screen



	Item	Description
a	Setting the duration to be verified	Set the maximum duration for adjustment and confirmation. Drag ○ or enter a number directly into the text box to set the maximum duration.
b	Continuous	When the checkbox is checked, it will vibrate for up to 30 seconds, regardless of the set upper limit.
c	Verify Start / Stop	Vibration will begin. After it starts, the button will switch to a stop button. When you press the stop button, the current time will be entered into the duration text box.
d	Current Elapsed Time	This displays the elapsed time of the vibration.
e	Duration	Enter the duration to be determined by this wizard. The default value is pre-filled in the initial value field. When you stop the vibration using the start/stop buttons, the time at which it stopped will be entered.
f	Determine the value	Confirm the duration entered in the duration text box. After confirmation, press the test button to run the test with that duration.
g	Test	The vibration will be tested for the duration entered in the Duration text box. You can check the set duration.

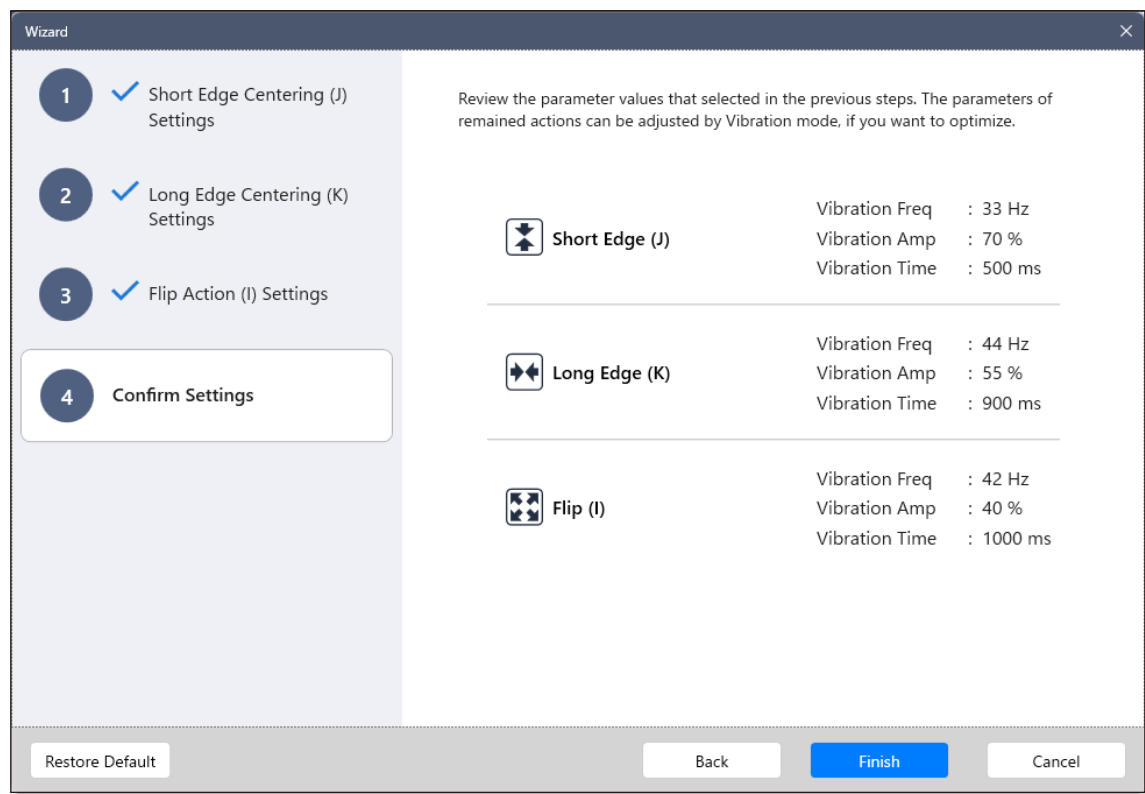
5. J: Adjust the Long Axis Centering parameters.

Adjust the parameters in the order of frequency, amplitude, and duration. The screen used is the same as for K: Short Axis Centering parameter adjustment.

6. I: Adjust the Flip parameters.

Adjust the parameters in the order of frequency, amplitude, and duration. The screen used is the same as for K: Short Axis Centering parameter adjustment.

7. The confirmation screen allows you to check the parameters you have adjusted so far.



8. Press the [Finish] button.

Pressing the [Finish] button will write the configured parameters to the feeder unit.

6.4 Sequence

A sequence can register the order (sequence) in which movement actions, output movements, and opening and closing of the purge gate are executed. You can also test the registered sequences.

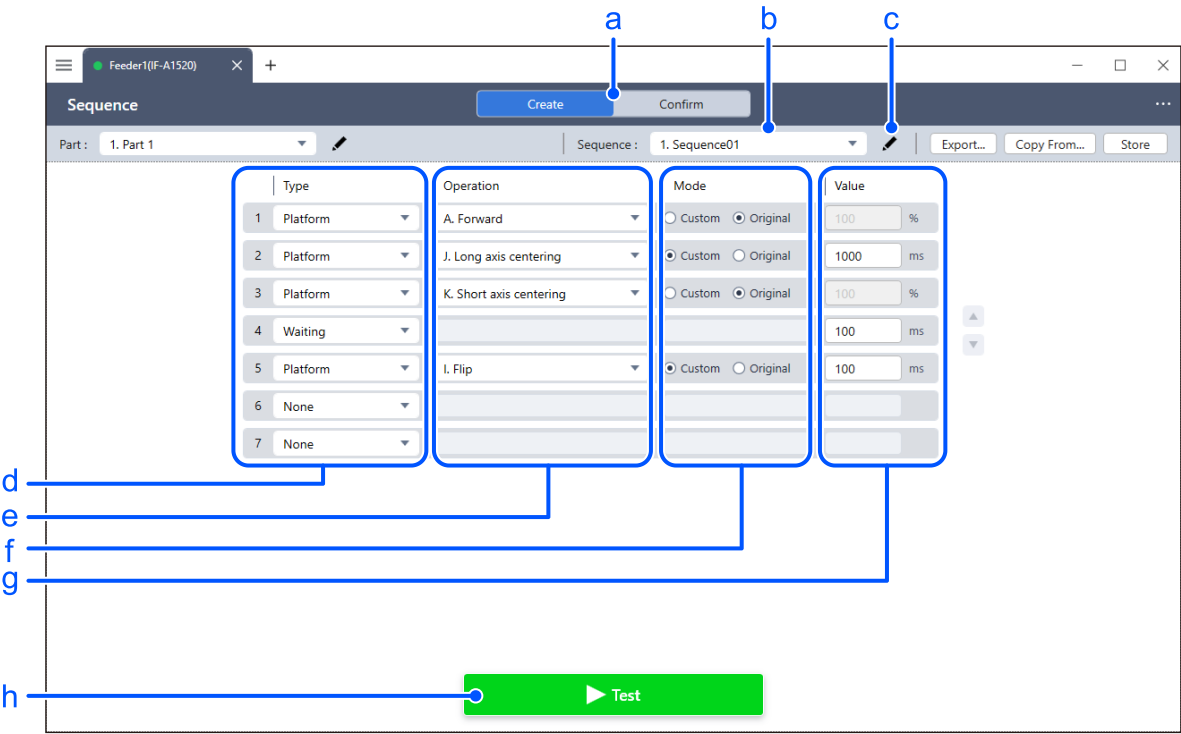
A sequence can contain up to seven editable actions. A single feeder can contain up to 26 sequences. Sequence number 26 contains a sample action. This sequence is read-only and cannot be modified or written to.

The following action types are available:

- [None]
- [Platform Vibration]
- [Output Activation]
- [Wait time]
- [Purge Gate]

6.4.1 Sequence - Create Mode

In sequence creation mode, you can use the functions necessary to register a sequence. Each action can have up to seven settings: type, operation, mode, and time value.



	Item	Description
a	[Create]/[Confirm]	Select a mode to create or review a sequence.
b	Selecting the Sequence	Select the sequence number you want to create from 01 to 26. Sequence number 26 contains sample actions and is read-only.
c	Edit sequence name	You can name the sequence.
d	Type	Select the type of operation. See the key points below for details.
e	Operation	Select the details of the operation. See the key points below for details.

	Item	Description
f	Mode	Select how to specify the duration of the operation. ▪ [Custom]: Uses the duration set in [Value]. ▪ [Original]: Uses the duration set in the parameter adjustment.
g	Value	Sets the duration. This option is available when [Custom] is selected in the [Mode].
h	Test	The selected sequence will be executed.

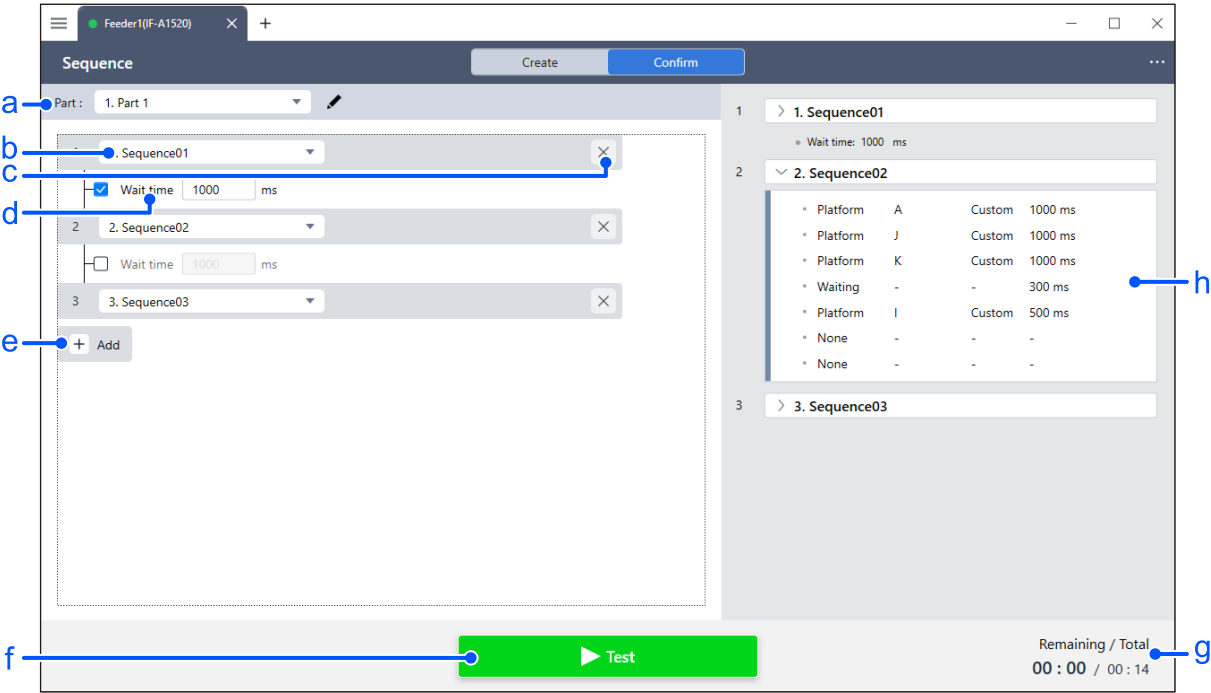
 **KEY POINTS**

The operations you can select for each action type are as follows:

Action type	Available operations
None	You cannot select an operation.
Platform Vibration	Select Action A-Z.
Output Activation	Select [Hopper 1] or [Hopper 2].
Wait Time	You can enter a waiting time in [Value].
Purge Gate	Select [Open] or [Close].

6.4.2 Sequence - Adjust Mode

In [Adjust] mode, you can efficiently review the sequences you have created. You can link the created sequences together and check their operation. You can also check the execution time and execution order of the sequences.



	Item	Description
a	Part ID Selection	Select the part ID on which to execute the sequence. Since the sequence information and part ID are not associated, the vibration will be executed using the part ID selected here.

	Item	Description
b	Selecting the Sequence	Select a sequence number from 01 to 26 to check the operation. Only created sequence numbers will be displayed as options.
c	Delete	Deletes the selected sequence.
d	Wait time	Turn this on to set a wait time. The program will wait for the time entered in the text box before proceeding.
e	Add	Add a sequence. When you first enter the sequence confirmation mode, only this button will be displayed. Press this button to add a sequence.
f	Test	The sequence set above will be executed. After it starts, the button will switch to a stop button.
g	Elapsed Time	It displays the elapsed time since the sequence started.
h	Sequence operation status	The left side of the screen displays the status of the sequence you've set, including the actions currently running, completed actions, and the next action to be executed.

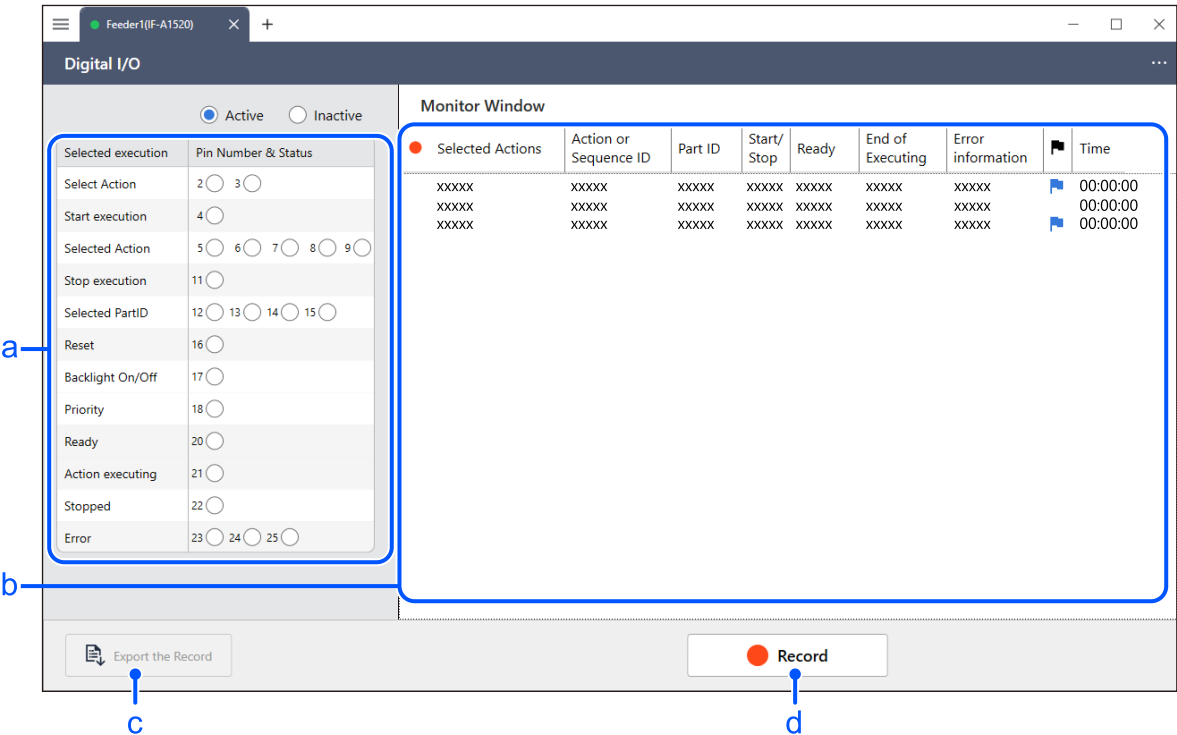
6.5 Digital I/O

You can check the status of digital I/O available on the IF-A series using Epson Feeder Configurator. For detailed specifications of the digital I/O, refer to the following.

Use in Combination with a PLC

Digital I/O is primarily controlled by devices such as PLCs that control I/O ports. Because it operates via I/O ports rather than being controlled by commands such as Ethernet, it offers intuitive control and reduced latency. However, debugging port control is not directly visible. This function allows you to check the status.

The digital I/O function not only allows you to check the input/output but also records it in a log file. Using the log file makes debugging easier.



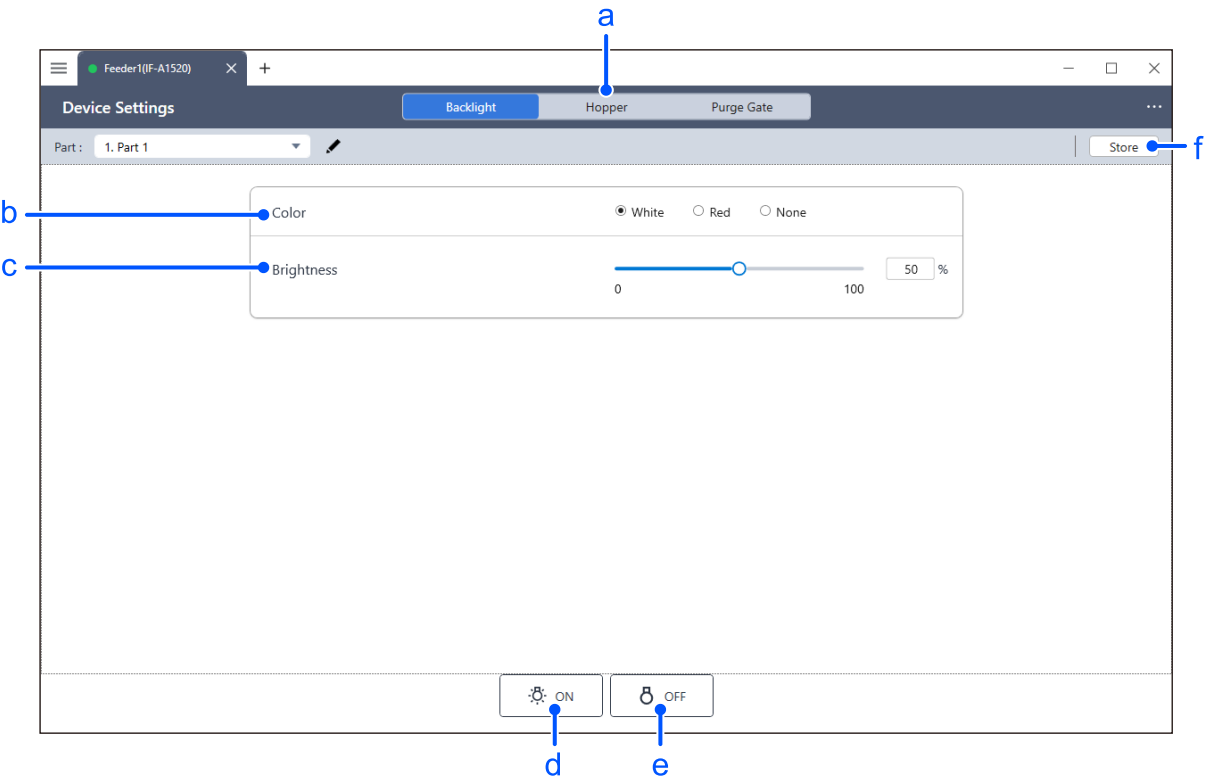
	Item	Description
a	I/O Port Status Display	Displays the input and output of I/O ports in real time. The display is separated by function, allowing you to check active I/O on a function-by-function basis.
b	Monitor Window	This window allows you to check the input and output of the I/O ports. It decodes and displays the I/O port information, allowing you to see how it is operating.
c	Export the Record	The log information recorded by clicking the [Record] button will be written to a text file.
d	Record	This button starts recording the I/O port information displayed in the monitor window. Writing to a log file allows you to review digital I/O control later.

6.6 Device Settings

You can configure the backlight, hopper, and purge gate devices. The device settings screen allows you to switch between the three devices using tabs.

6.6.1 Device Setting - Backlight

The color and brightness of the backlight built into the feeder unit can be set for each individual part. For example, you can switch the backlight settings for each part, such as setting one part to white with 50% brightness and another part to red with 60% brightness.

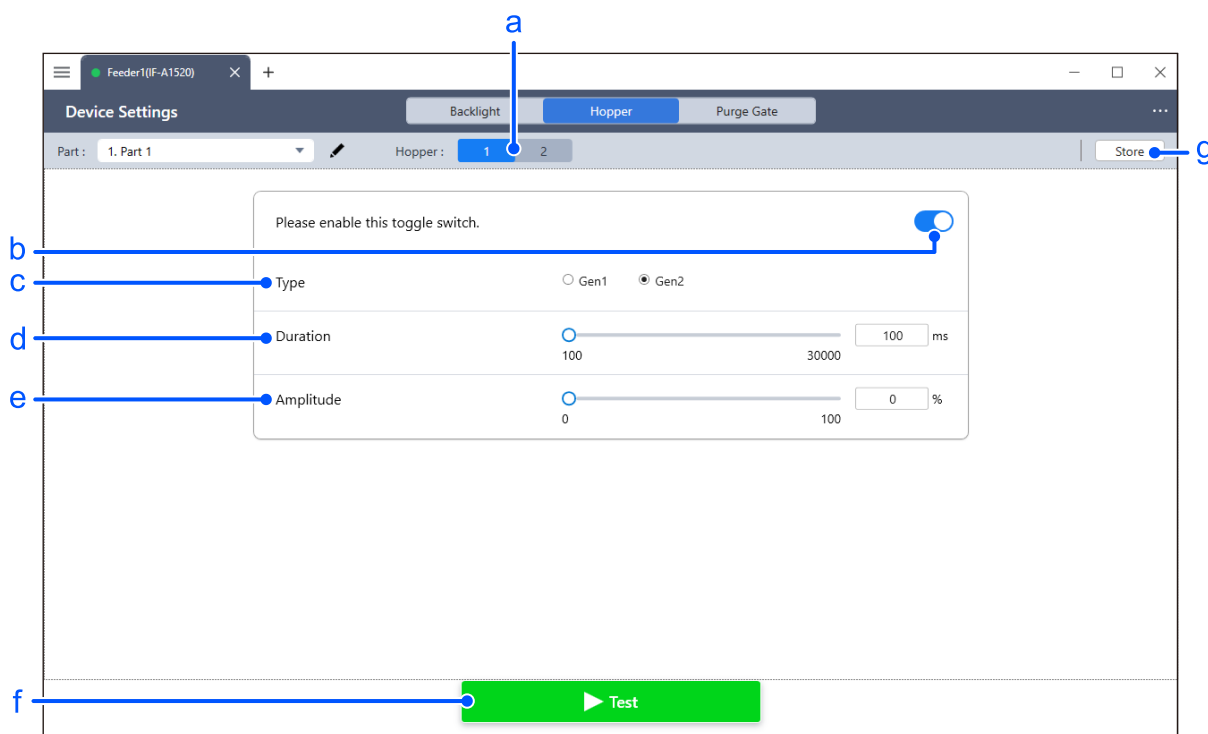


	Item	Description
a	Selecting the device	Select the device you want to configure from Backlight, Hopper, and Purge Gate.
b	Color	Select the backlight color.
c	Brightness	Specify the backlight brightness using a slider or text box. Setting range: 0 to 100 [%]
d	ON	Turns the backlight on.
e	OFF	Turns the backlight off.
f	Store	During normal adjustment procedures, the adjusted parameters are not saved to the non-volatile memory within the feeder unit. Pressing the [Store] button will write the data to the device.

6.6.2 Device Setting - Hopper

This page allows you to check the optional hopper settings and run testing. When using the Gen2 hopper, you can also configure the hopper parameters.

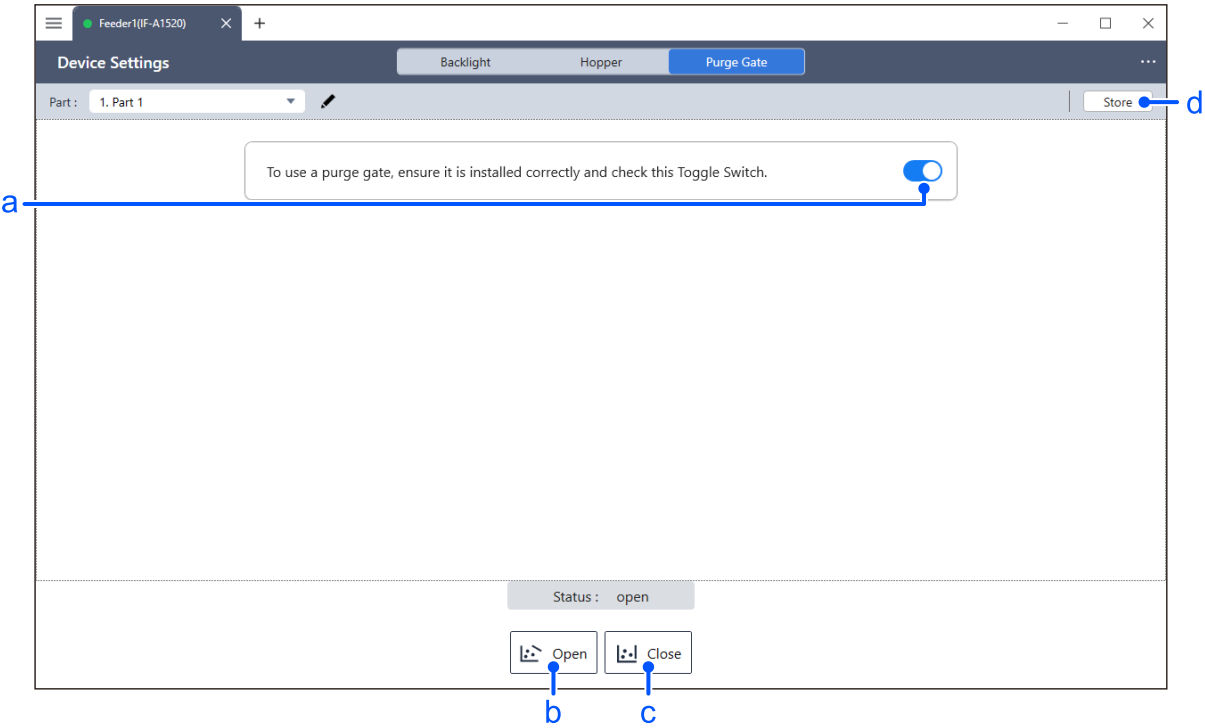
Up to two hoppers can be connected to one feeder. The two hoppers can be adjusted independently.



	Item	Description
a	Selecting the Hopper	Select the hopper (1/2) you want to configure/adjust.
b	Hopper Connection Status	This setting determines whether or not the hopper is installed. Ensure the hopper is connected correctly before turning it on.
c	Type	Select the hopper type as [Gen.1] or [Gen.2]. - Gen.1: A hopper type that controls the vibration with two values: On (24 VDC output) or Off (0 V). - Gen.2: A hopper type that controls the vibration amplitude with continuous values from 0 VDC (0% amplitude) to 10 VDC (100% amplitude).
d	Duration	Set the hopper vibration time using a slider or text box. Setting range: 100 to 30000 [ms]
e	Amplitude	If you select [Gen.2] in [Hopper Type Selection], you can set the hopper amplitude using a slider or text box. Setting range: 0 to 100 [%]
f	Test	Used to run the hopper operation test. Pressing this button will activate the hopper selected according to the settings. After the test starts, the button will switch to the test stop button.
g	Store	During normal adjustment procedures, the adjusted parameters are not saved to the non-volatile memory within the feeder unit. Pressing the [Store] button will write the data to the device.

6.6.3 Device Setting - Purge Gate

This page allows you to check the optional purge gate settings and run testing. You can configure whether or not to use a purge gate.



	Item	Description
a	Purge Gate Connection Status	This setting determines whether a purge gate is installed. Ensure the purge gate is correctly connected before turning it on.
b	Open	Open the purge gate.
c	Close	Close the purge gate.
d	Store	During normal adjustment procedures, the adjusted parameters are not saved to the non-volatile memory within the feeder unit. Pressing the [Store] button will write the data to the device.

 **KEY POINTS**

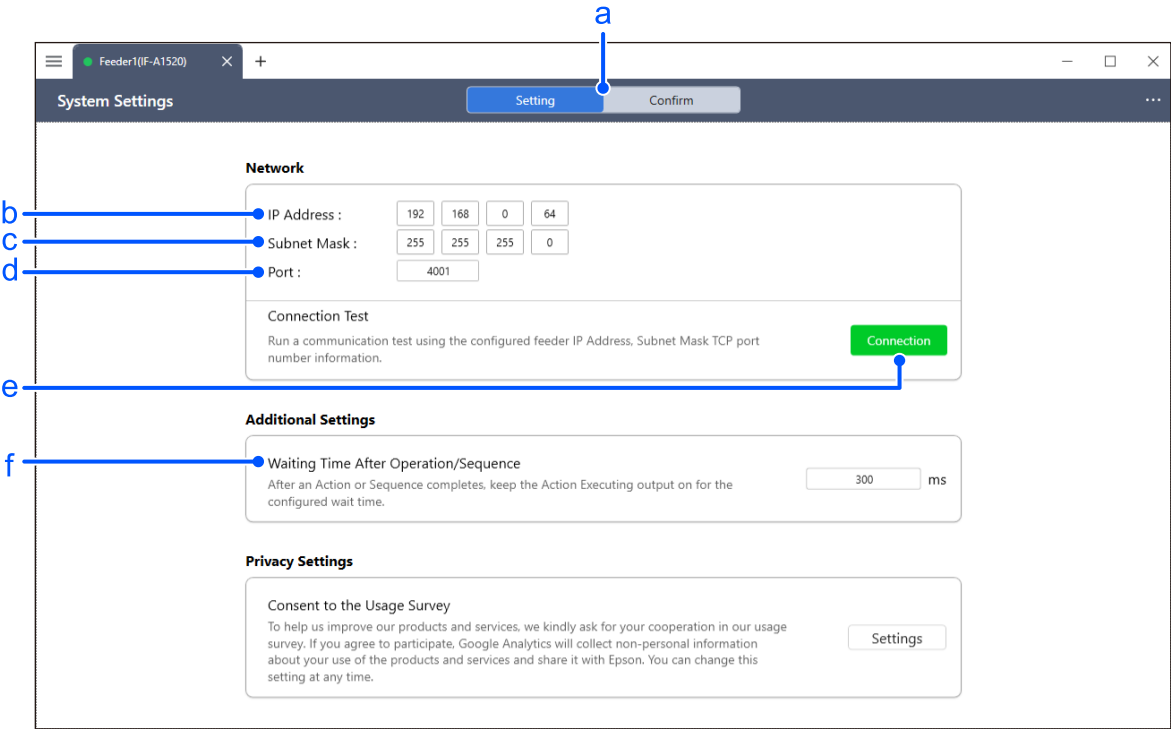
- The state of the purge gate is indicated by the output of the close sensor attached to the purge gate unit. If the purge gate is even slightly open, the close sensor does not detect that the purge gate is closed and [opened] is displayed.
- The vibration, backlighting, hopper and purge gate parameters are saved as a single vibration set for each part. When importing or exporting parameters, all parameters are input and output at the same time.

6.7 System Settings

You can check network settings and status. You can easily perform settings and checks by switching between [Setting] mode and [Confirm] mode.

6.7.1 System Setting - Setting Mode

In [Setting] mode, you can configure network settings and the post-operation delay.



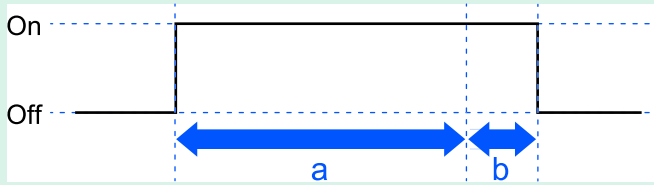
	Item	Description
a	[Setting]/[Confirm]	Select the mode to configure or the mode to verify.
b	IP Address	Specify the IP address of the feeder unit. Only private IP addresses can be used for IF-A series feeders.
c	Subnet Mask	Specify the subnet mask.
d	Port	Specify the TCP port number.
e	Connection Test	Clicking the [Connection Test] button will test the communication between the feeder unit and the Epson Feeder Configurator according to the specified network settings.
f	Wait time after operation/sequence	Specifies the wait time before turning OFF the [In Operation] signal of the Digital I/O connector mounted on the feeder unit after executing a movement action or sequence.

 **KEY POINTS**

- The initial network settings are as follows:
 - IP address: 192.168.0.64
 - Subnet mask: 255.255.255.0
 - Port number: 4001

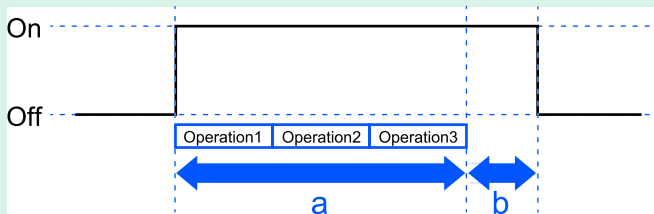
- When controlling the IF-A Series from an external device such as a PLC, excessive operating signals may cause the unit to not operate correctly. In this case, operation may improve if you set a wait time in [Wait time after operation/sequence].

The Action Executing (Out1) signal changes as follows.



- a: Movement action or hopper/purge gate operation execution
- b: Wait time after operation/sequence

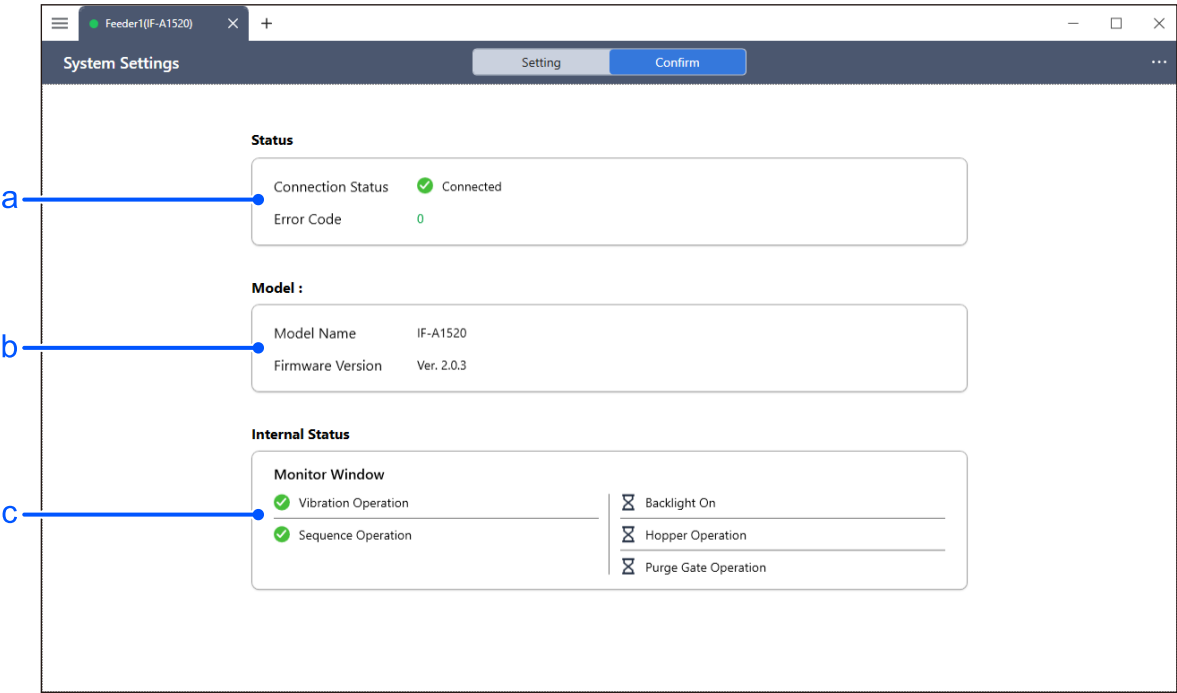
When executing a sequence, the [Wait time after operation/sequence] is added to the end of the sequence. It cannot be inserted between operations in the sequence.



- a: Sequence execution
- b: Wait time after operation/sequence
- Specify "0" if [Wait time after operation/sequence] is not required.
- [Wait time after operation/sequence] is saved separately from the vibration set containing the vibration and backlighting parameters. It can be imported and exported separately, independent of the vibration set.

6.7.2 System Setting - Confirm Mode

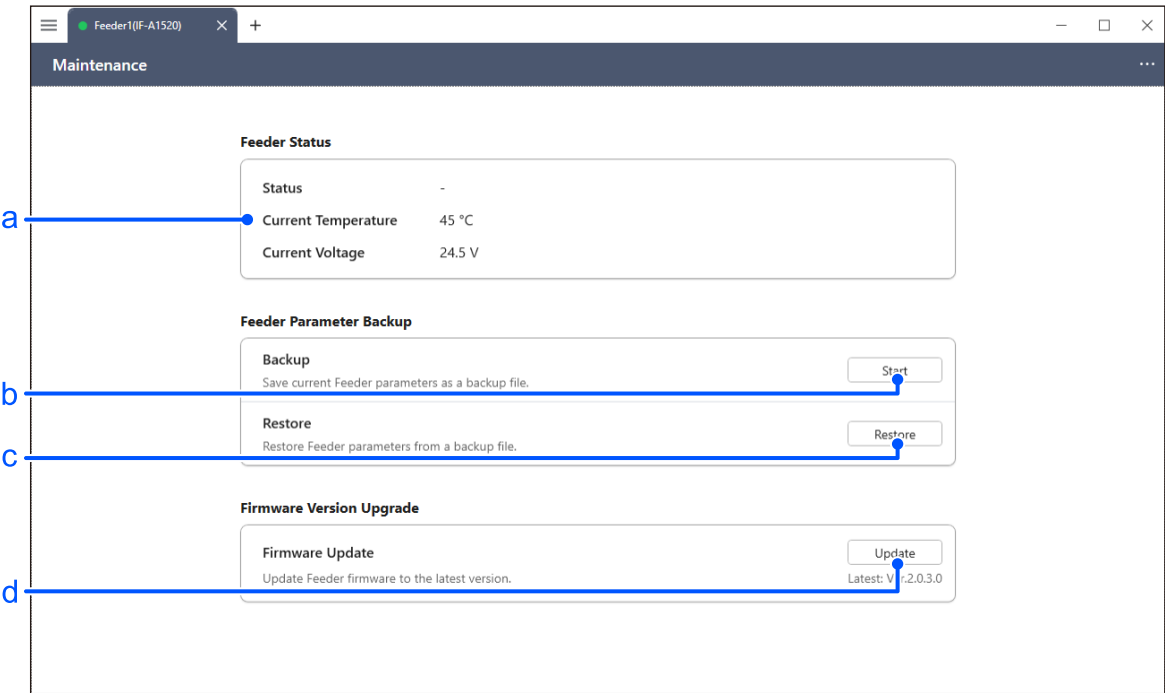
In [Confirm] mode, you can check the status and information of the feeder unit.



	Item	Description
a	Status	This displays the network connection status and any error codes received.
b	Model	Displays the model name and firmware version information.
c	Internal Status	Displays the internal status of the feeder unit.

6.8 Maintenance

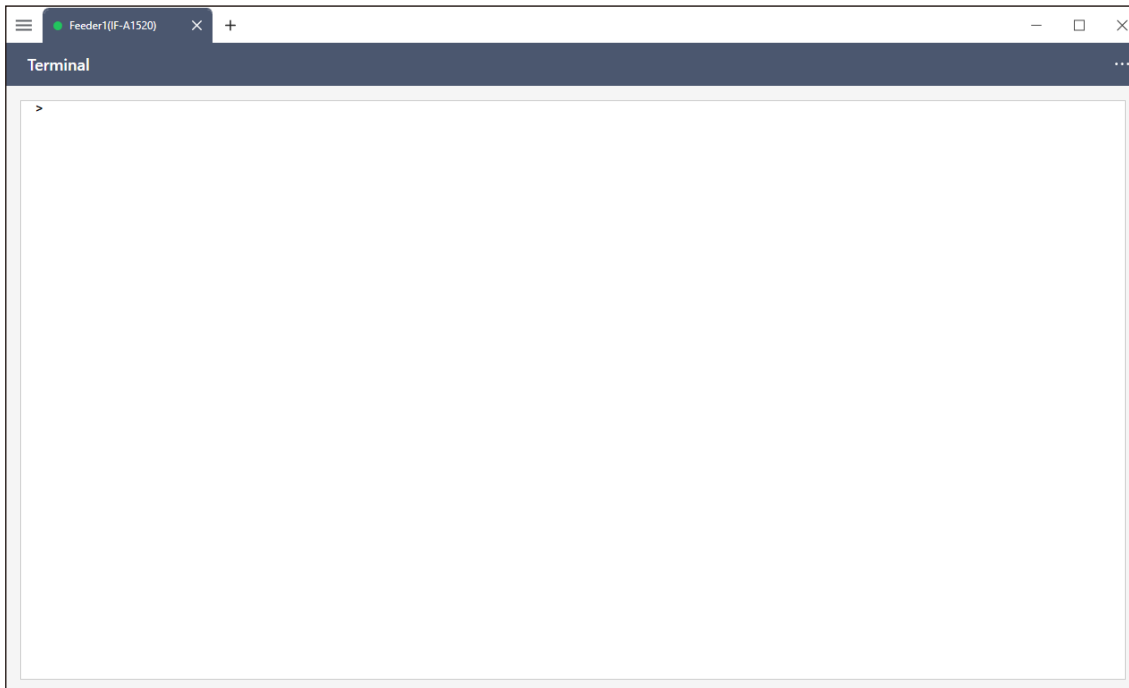
This allows you to perform maintenance operations on the IF-A series unit. The main maintenance functions include backing up parameters and settings stored in the feeder unit, restoring from backup files, and updating the firmware.



	Item	Description
a	Feeder Status	Displays the status of connected IF-A series feeders. Displays the current temperature and input voltage inside the feeder in real time.
b	Backup	Backs up parameters and settings stored inside the feeder unit and generates them as an external file.
c	Restore	Restores the backup file generated by [Backup] to the feeder unit.
d	Firmware Update	Updates the firmware of the feeder unit.

6.9 Terminal

This page can be used to open the terminal screen and to send and receive dedicated commands to and from the IF-A Series.



">" is displayed as a prompt at the top of the terminal screen. When a command is entered after the prompt, the reply from the feeder appears in the line below. An error is returned in red if the command contains a syntax error or an argument is out of range.

See below for details about the available commands.

Commands Available in the Terminal

KEY POINTS

- When you partially enter a command, candidates for the remaining characters are displayed (command completion). In this case, enter the command by selecting one of the candidates using the up and down keys on the keyboard and pressing the Tab key or by double-clicking the candidate with the mouse.

```
> FF_Load
```

```
FF_LoadFeederParam "Action$"  
FF_LoadHopperParam "Action$"  
FF_LoadParam Addr  
FF_LoadSequence Seq#,Act#
```

- As you enter arguments following the command string, candidates for the argument are displayed (syntax help).

```
> FF_Backlight 1,
```

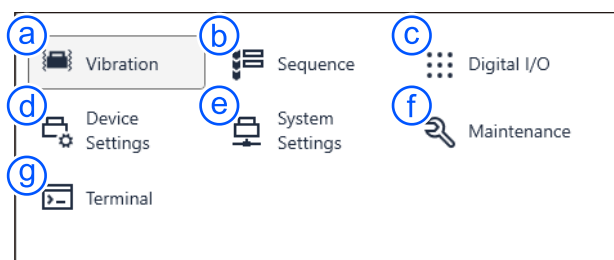
```
FF_Backlight Feeder#,[On|Off]  
FF_Backlight Feeder#
```

- To repeat a command you previously entered, move the cursor to the line containing the command and press Enter key.
- The entered command history is discarded when the application is closed.

7. Epson Feeder Configurator Menu

7.1 ≡ (Function Selection) Menu

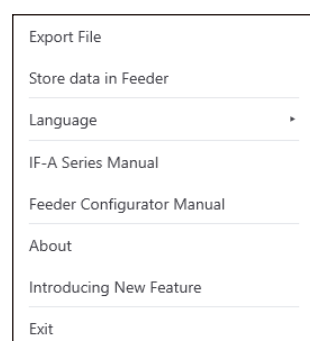
Select the functions you want to use from the seven main functions of Epson Feeder Configurator. After selecting a menu item, the following selection screen will appear.



	Item	Description
a	Vibration	Adjust and check the vibration parameters for each action. The vibration function has two modes: [Adjust Mode] for adjusting vibration parameters and [Confirm Mode] for reviewing the adjustments made. Important actions can be easily configured using the wizard.
b	Sequence	You can create and verify the sequence of movement actions, output actions, and the opening and closing of purge gates. The sequencing function has two modes: [Create Mode] for creating sequences and [Adjust Mode] for reviewing the sequences you have created.
c	Digital I/O	You can check and debug digital I/O interfaces. You can monitor the status of inputs and outputs.
d	Device Settings	You can configure the devices connected to the feeder unit (hopper, purge gate) and the backlight settings.
e	System Settings	You can configure and check the system settings.
f	Maintenance	You can perform maintenance on the feeder unit.
g	Terminal	You can display the terminal screen and send and receive dedicated commands with the IF-A series.

7.2 ... (Option) Menu

You can perform file operations, system operations, and settings using Epson Feeder Configurator. Pressing the button will display the following screen.



Item	Description
Export File	Outputs the vibration parameters, sequences, and various setting information as a file.
Store data in Feeder	The parameters set for the currently selected part ID will be stored to the feeder.
Language	Selects the language displayed by this application. Selecting a language will switch the displayed language.
IF-A Series Manual	Opens the IF-A Series Manual (PDF file).
Feeder Configurator Manual	Opens this manual.
About...	Displays the splash screen and Epson Feeder Configurator version information.
Exit	Exits the application.

KEY POINTS

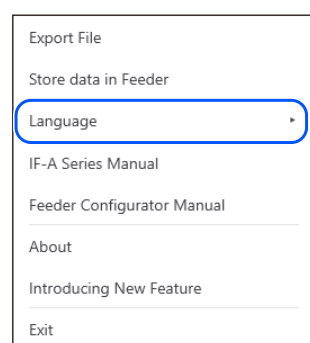
See below for details about importing and exporting files.

[File I/O](#)

7.2.1 Changing the Language

You can change the language used in Epson Feeder Configurator. By default, the language selected during installation is set.

To change the language, select it from the [...(Options)] menu - [Language]. The display will switch once selected. This setting will be retained even after you close Epson Feeder Configurator.



7.2.2 Help

Help information can be viewed from the Epson Feeder Configurator menu.

8. Advanced Operations of Epson Feeder Configurator

8.1 Example of Vibration Parameter Adjustment

The optimal vibration parameters vary depending on various conditions, such as the material, weight, and shape of the workpiece placed on the feeder, and the method of securing the feeder. This section explains the procedure for finding the optimal vibration values for your workpiece as easily as possible.

8.1.1 Using the Wizard Function

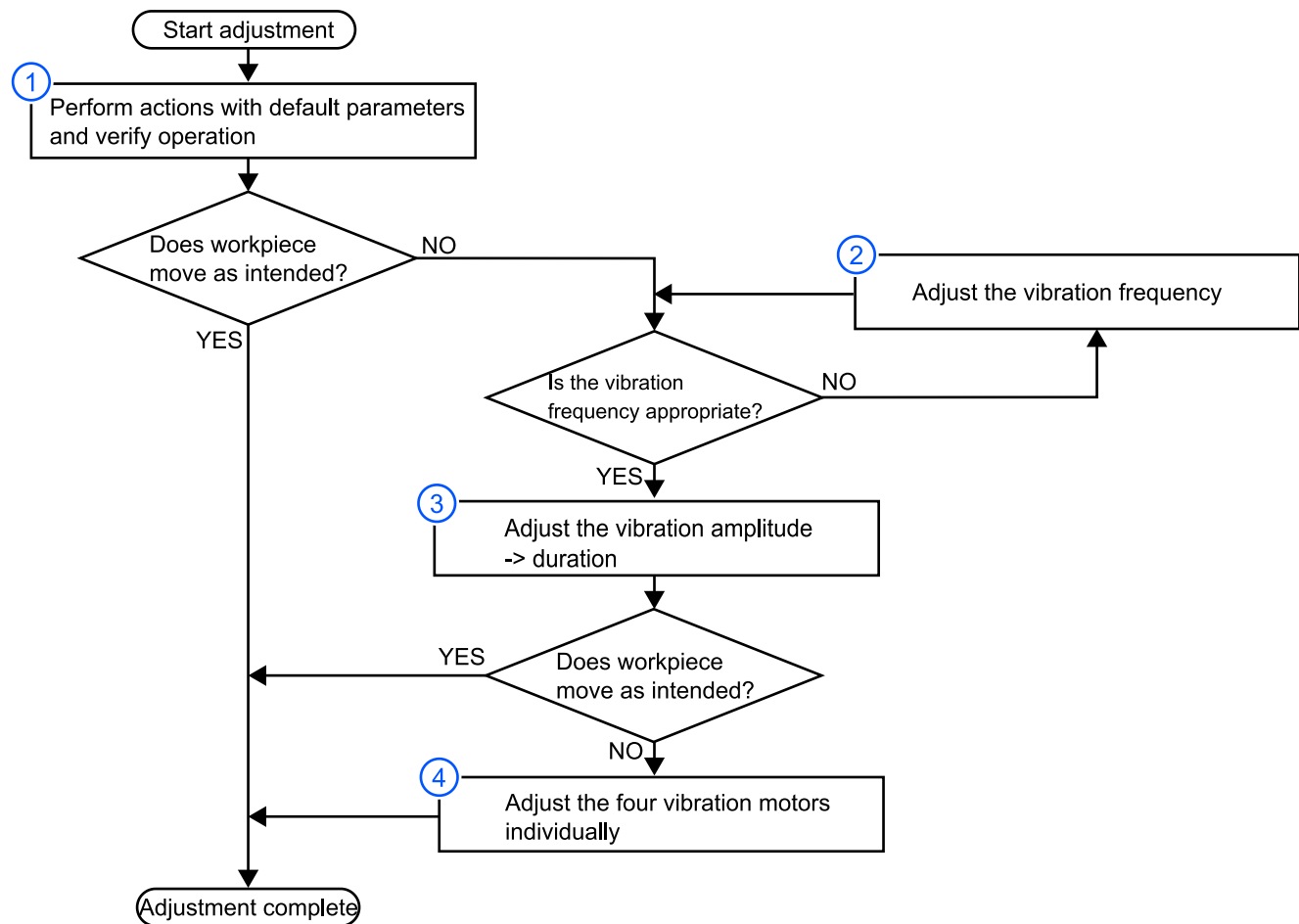
The wizard mode makes it easier to adjust and set vibration parameters. Using the wizard mode, you can easily adjust the parameters of important actions.

See below for more information about the wizard mode.

Vibration - Wizard Mode

8.1.2 Adjusting Using the Vibration Function

This section describes the procedure for adjusting and setting parameters using the vibration function.



8.1.2.1 (1) Perform actions with default parameters and verify operation.

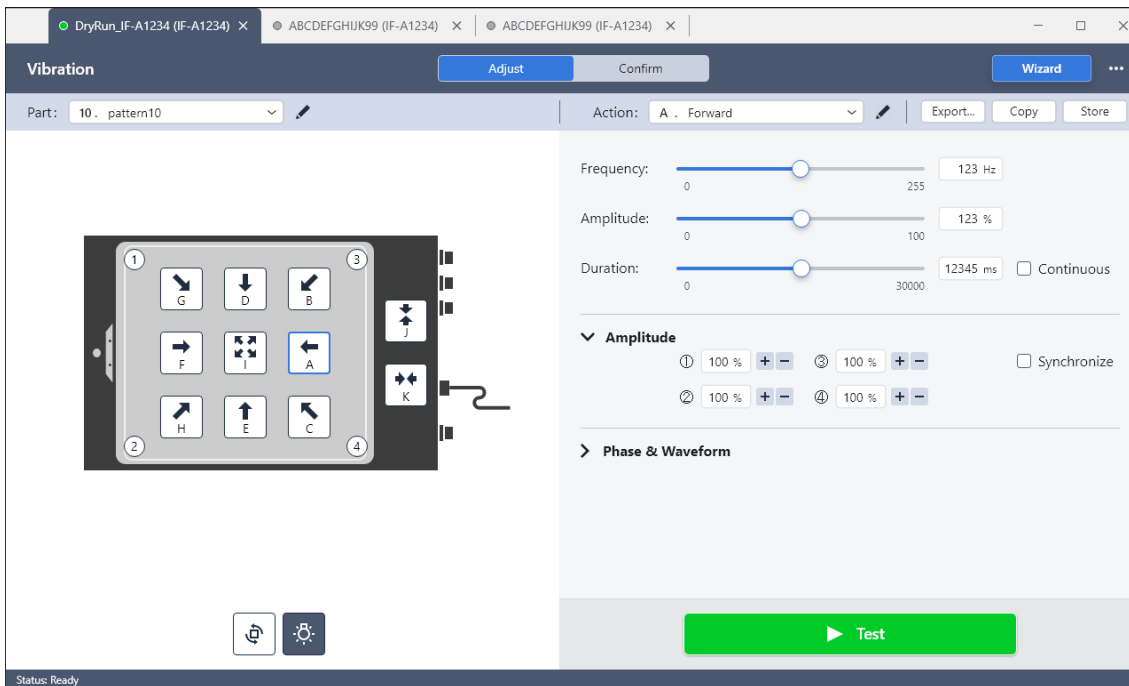
At the time of factory shipment, the default parameters are stored in part ID 26, which is saved in the flash memory of the feeder unit. The default parameters are values experimentally determined by our company to be suitable for multiple workpieces. They may not be optimal for all workpieces and conditions.

First, perform each movement action A to K using the default parameters and verify operation.

KEY POINTS

- The feeder vibrates. The vibrations may cause loud noises.
- The workpieces may fly off the platform. When operating the feeder for the first time, we recommend checking the operation with no workpieces or dummy parts.

1. Open the application. The [Vibration]-[Adjust] screen will be displayed.



2. Place the workpiece whose parameters you want to adjust onto the feeder platform.

3. Press the action buttons from A to K to vibrate the feeder and observe the movements of the workpieces.

- If the workpiece is moving at an appropriate speed in the direction of the arrows on each action button from A to K, you can use the default parameters.
- If you encounter problems such as "the amount of movement is too small," "the movement speed is too slow," or "the workpiece falls off the platform," adjust the parameters using the method described in the next section.

KEY POINTS

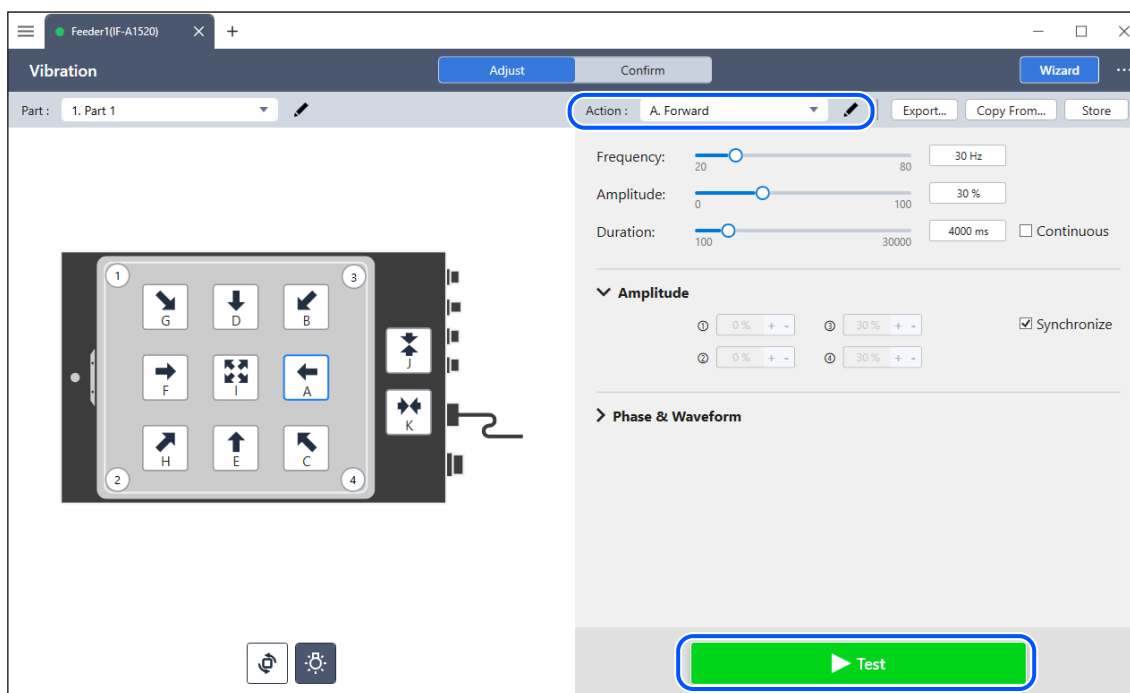
- If the default parameters have been overwritten, copy and use the read-only parameters stored in part ID 26. See below for details about how to copy the parameters.
Vibration - Adjust Mode
- If the orientation of the feeder as seen from the work area differs significantly from the orientation in which the feeder is installed, press the "Rotate display button" to rotate the display 180 degrees for easier viewing.

8.1.2.2 (2) Adjust the vibration frequency

If the workpieces do not move as intended with the default parameters, adjust the parameters as follows.

This section explains how to adjust the parameters using vibration action A Forward as an example.

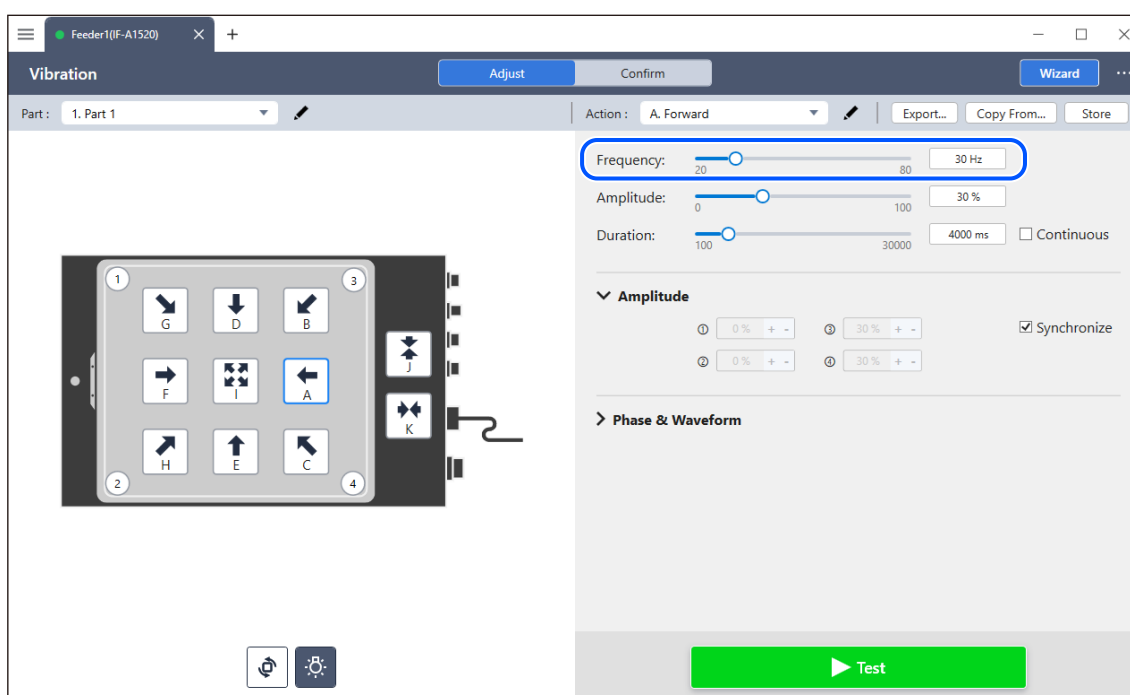
1. Select A Forward from the movement action selection menu.
2. Click the [Test] button.



KEY POINTS

Clicking action button A in the image will execute the movement action in a single operation without clicking the [Test] button.

3. Check if the vibration frequency is appropriate.



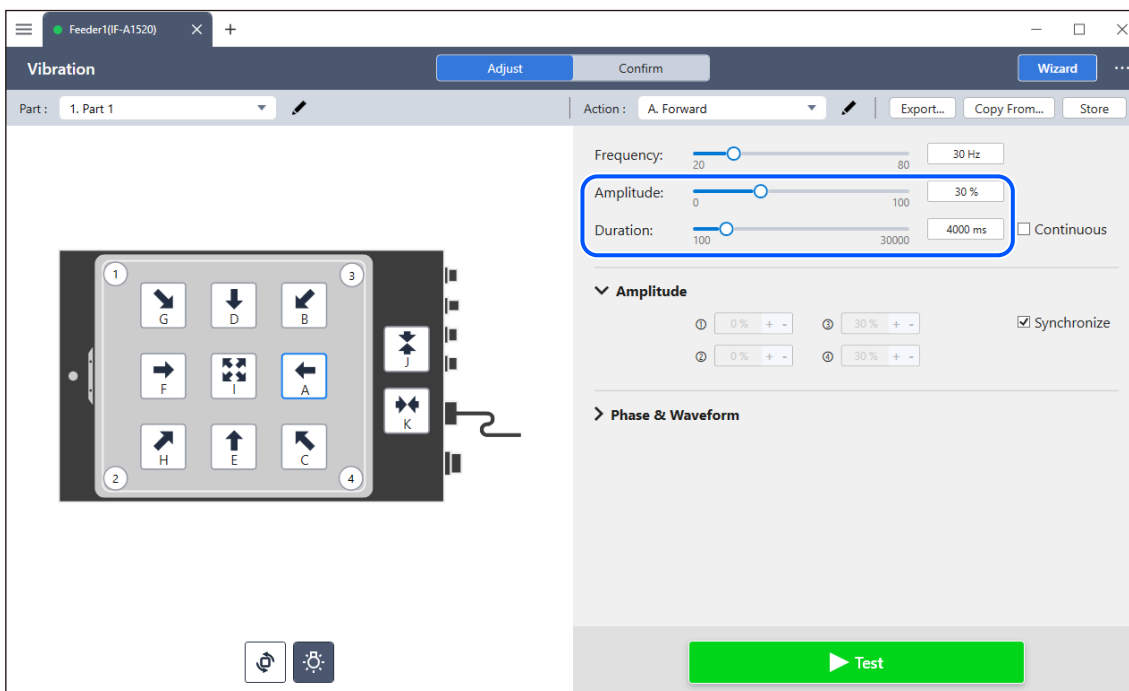
Find the appropriate frequency by slightly changing it from the default frequency.

KEY POINTS

At the resonant frequency, the vibration behavior changes abruptly. Significantly changing the frequency from the default makes optimal adjustment difficult. When you're unfamiliar with the process, it's recommended to change the frequency gradually.

8.1.2.3 (3) Adjust the vibration amplitude → duration.

1. Check if the vibration amplitude is appropriate. Adjusting the [Amplitude] will change how the workpiece bounces on the plate. Adjust the slider bar so that the workpiece bounces appropriately.
2. Adjust the duration. Adjust the duration using the slider bar so that the amount of workpiece movement is as expected.



KEY POINTS

- If a loud abnormal noise (GRRR sound) comes from the feeder, remove the workpieces. If the noise remains loud, the vibration amplitude is too strong. Reduce the vibration amplitude to a level where no abnormal noise is produced, as it could cause a breakdown or damage the operator's hearing. Adjusting the vibration frequency may also improve the situation.
- Checking the [Continuous] checkbox will cause continuous vibration. This makes it easier to adjust the vibration amplitude and frequency.

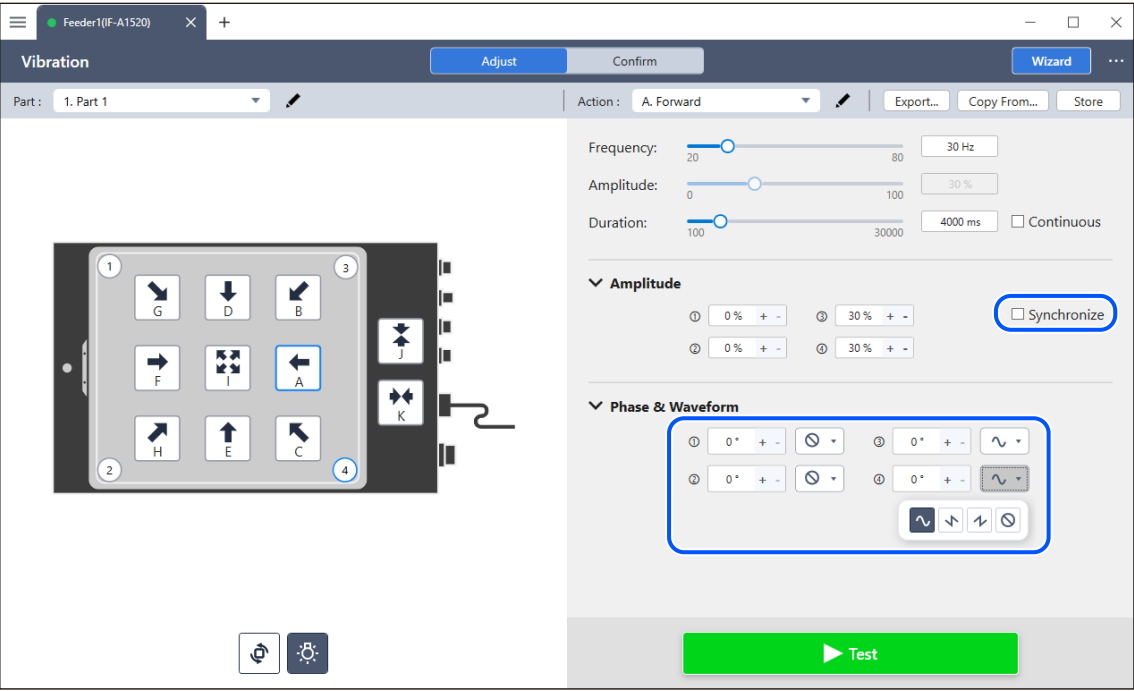
8.1.2.4 (4) Adjust the four vibration motors individually

To further fine-tune the action, we will explain how to adjust the four vibration motors individually.

 **KEY POINTS**

Setting the four motors individually can sometimes allow for more precise adjustment of the action's behavior. However, because the relationship between each parameter and the action's behavior can be difficult to understand, it may take some time to find the optimal parameters before you become familiar with the process.

1. Deselect the [Synchronize] checkbox. This allows you to individually set the vibration amplitude of the four motors.
2. Click the [Expand button] under [Phase & Waveform].



3. Check the movement of the workpiece while adjusting the vibration amplitude, phase, and drive waveform of each motor.

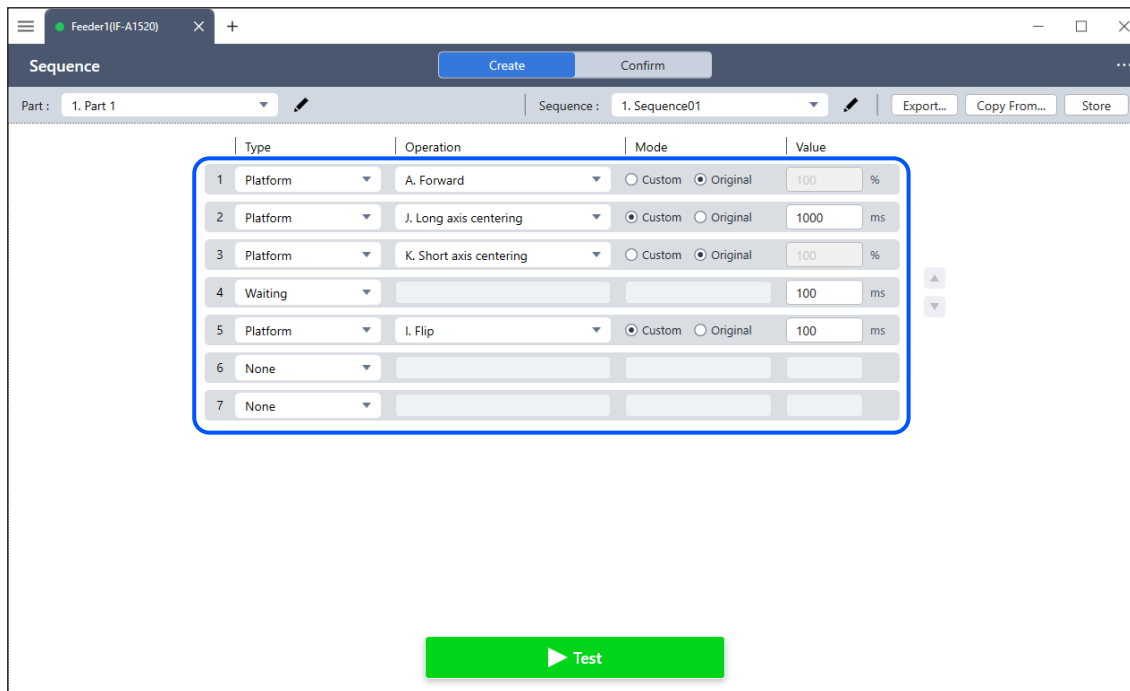
8.1.2.5 Procedure after Adjustment is Complete

- Once the workpiece is functioning as intended, perform the following steps:
- If [Continuous] was enabled, disable it to return to the original vibration time.
 - Click the [Vibration]-[Confirm] button to switch to check mode. In check mode, you can check the operation with the set parameters all at once.
 - Click the [Store] button to save the parameters to the feeder unit.
 - Use the export function to output the file as needed.

Adjust the other movement actions in the same way.

8.2 Examples of Creating Sequences

This section introduces some sample sequences that correspond to workpiece movements. In the following samples, the sequence number, type, operation, mode, and value are summarized in table format.



8.2.1 Sample 0: Movement Sample Registered in Sequence Number 26

The following operations are registered by default for sequence number 26. The workpiece is shifted forward, then centered along the long axis and short axis to bring it to the center. After waiting 300ms, a flipping motion is performed to scatter the workpiece.

Number	Type	Operation	Mode	Value
1	Platform Vibration	A: Forward	Customize	1000ms
2	Platform Vibration	J: Long axis centering	Customize	1000ms
3	Platform Vibration	K: Short axis centering	Customize	1000ms
4	Waiting Time	-	-	300ms
5	Platform Vibration	I: Flip	Customize	500ms
6-7	None	-	-	-

8.2.2 Sample 1: Gather the Workpieces in the Center and then Scatter them with Flip

This is an example of a sequence in which the workpieces are first gathered in the center and then flipped over.

Number	Type	Operation	Mode	Value
1	Platform Vibration	J: Long axis centering	Customize	1200ms
2	Platform Vibration	K: Short axis centering	Customize	1500ms
3	Platform Vibration	I: Flip	Customize	200ms
4-7	None	-	-	-

8.2.3 Sample 2: Supply Workpieces from Hopper 1

This is an example of a sequence that vibrates Hopper 1 for 2000 [ms].

Enable hopper 1 in advance. See below for more details.

Device Setting - Hopper

Number	Type	Operation	Mode	Value
1	Output Activation	A: Hopper1	Fixed	2000ms
2-7	None	-	-	-

8.2.4 Sample 3: Workpieces Are Fed from Hopper 1, Collected in the Center, and then Scattered

This is an example of a sequence that combines Sample 1 and Sample 2. The workpieces supplied from Hopper 1 are collected in the center of the feeder and flipped to make them easier for the robot to pick.

Number	Type	Operation	Mode	Value
1	Output Activation	A: Hopper1	Fixed	2000ms
2	Wait	-	-	300ms
3	Platform Vibration	J: Long axis centering	Fixed	1200ms
4	Platform Vibration	K: Short axis centering	Fixed	1500ms
5	Platform Vibration	I: Flip	Fixed	200ms
6-7	None	-	-	-

8.2.5 Sample 4: Discharging the Workpiece Using the Optional Purge Gate

This is an example of a sequence that opens the purge gate, discharges the workpiece, and closes the purge gate.

Enable the purge gate in advance. See below for more details.

Device Setting - Purge Gate

- The purge gate unit is assumed to be set to [Left Discharge].
- The purge gate [Open] and [Close] commands return control immediately without waiting for the operation to be completed (asynchronous control). Therefore, set a wait time after these commands.

Note that shortening the [Open] wait time in No.2 can be effective in shortening the takt time, as the workpiece will start being discharged before the purge gate is fully open.

Number	Type	Operation	Mode	Value
1	Purge Gate	Open	-	-
2	Waiting Time	-	-	3000ms
3	Platform Vibration	D: Left	Fixed	4000ms
4	Purge Gate	Close	-	-
5	Waiting Time	-	-	3000ms

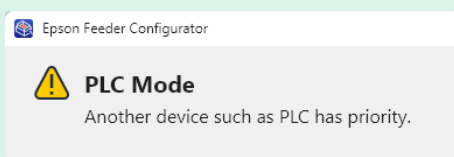
Number	Type	Operation	Mode	Value
6-7	None	-	-	-

8.3 Use in Combination with a PLC

The IF-A series features a D-Sub 25-pin digital I/O terminal. This terminal allows you to control the unit via port control from external devices such as PLCs.

KEY POINTS

When the Priority bit (In15) in the 25-pin D-Sub terminal connector is turned ON, the mode switches to "PLC mode" for control by an external device such as a PLC. While in PLC mode, the following dialog box will appear, and all buttons in Epson Feeder Configurator except for [Close App] and [Export File] will be disabled.



When controlling from Epson Feeder Configurator, turn off the Priority bit (In15) on the D-Sub25 pin.

8.3.1 Digital I/O (D-Sub 25-pin) pinout

Pin No.	Signal type	Signal name	Function, details	Additional information
1	Common	COM1	Input Com No.0-7	Input common: Can be connected to NPN or PNP
2	Input	In0 (LSB)	Select Operation	The type of operation is specified by combining the 2 input bits In0 and In1. See below for more details. Operation Type Selection
3	Input	In1		
4	Input	In2	Start Execution	Starts operation under external control.
5	Input	In3(LSB)	Action/Sequence Selection	The 5 input bits In3 to In7 are combined to specify the details of the operation (such as an action or sequence). See below for more details. Specifying the Operation Details
6	Input	In4		
7	Input	In5		
8	Input	In6		
9	Input	In7		
10	Common	COM2	Input Com No.8-15	Input common: Can be connected to NPN or PNP
11	Input	In8	Stop Execution	Stops the execution of the selected movement action or sequence. If this signal is ON, no action is executed even if Start Execution (In2) is turned ON.

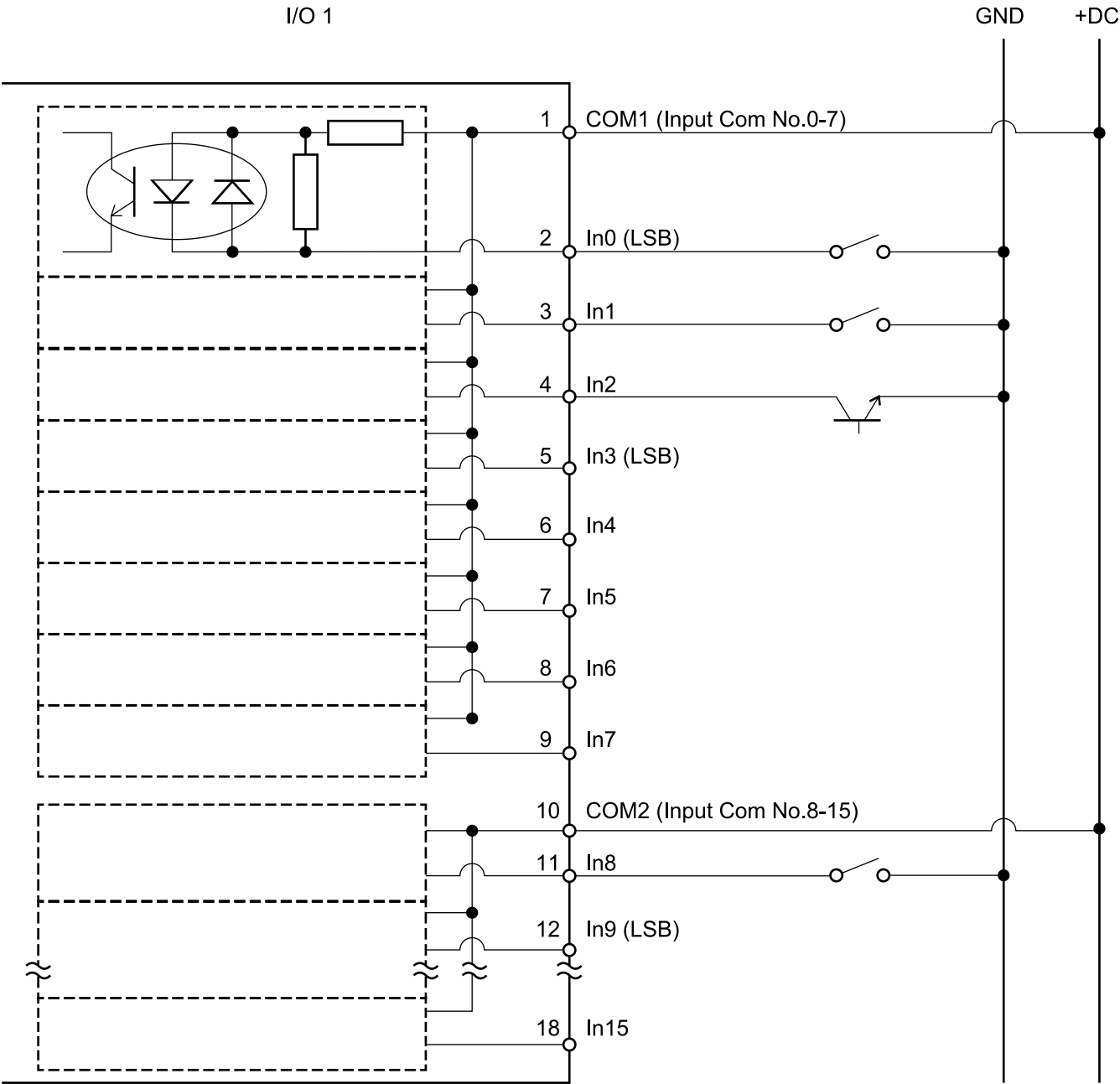
Pin No.	Signal type	Signal name	Function, details	Additional information
12	Input	In9 (LSB)	PartID	The part ID is specified by combining the 4 input bits In9 to In12. See below for more details. Selecting the Part ID
13	Input	In10		
14	Input	In11		
15	Input	In12		
16	Input	In13	Reset	Resets the error signal and stop signal.
17	Input	In14	Backlight	Turns the backlight on and off. This signal is not the camera trigger input.
18	Input	In15	Priority	Sets the priority. This signal must be set ON to control from an external device.
19	Common	COM3	Output COM	Output common: Can be connected to NPN or PNP
20	Output	Out0	Ready	Turns OFF when the operation starts and ON when it ends.
21	Output	Out1	Action Executing	Turns ON when the operation starts, and turns OFF when wait time after operation elapses after the operation ends. See below for details about the wait time. System Setting - Setting Mode
22	Output	Out2	Stopped	Indicates that the operation was stopped by the Stop signal.
23	Output	Out3 (LSB)	Error Code	An error code is output by combining the 3 output bits Out3 to Out5. See below for more details. Error Output
24	Output	Out4		
25	Output	Out5		

8.3.2 Wiring the 25-pin D-Sub Connector Pins

The digital inputs and outputs conform to the following safety standards.

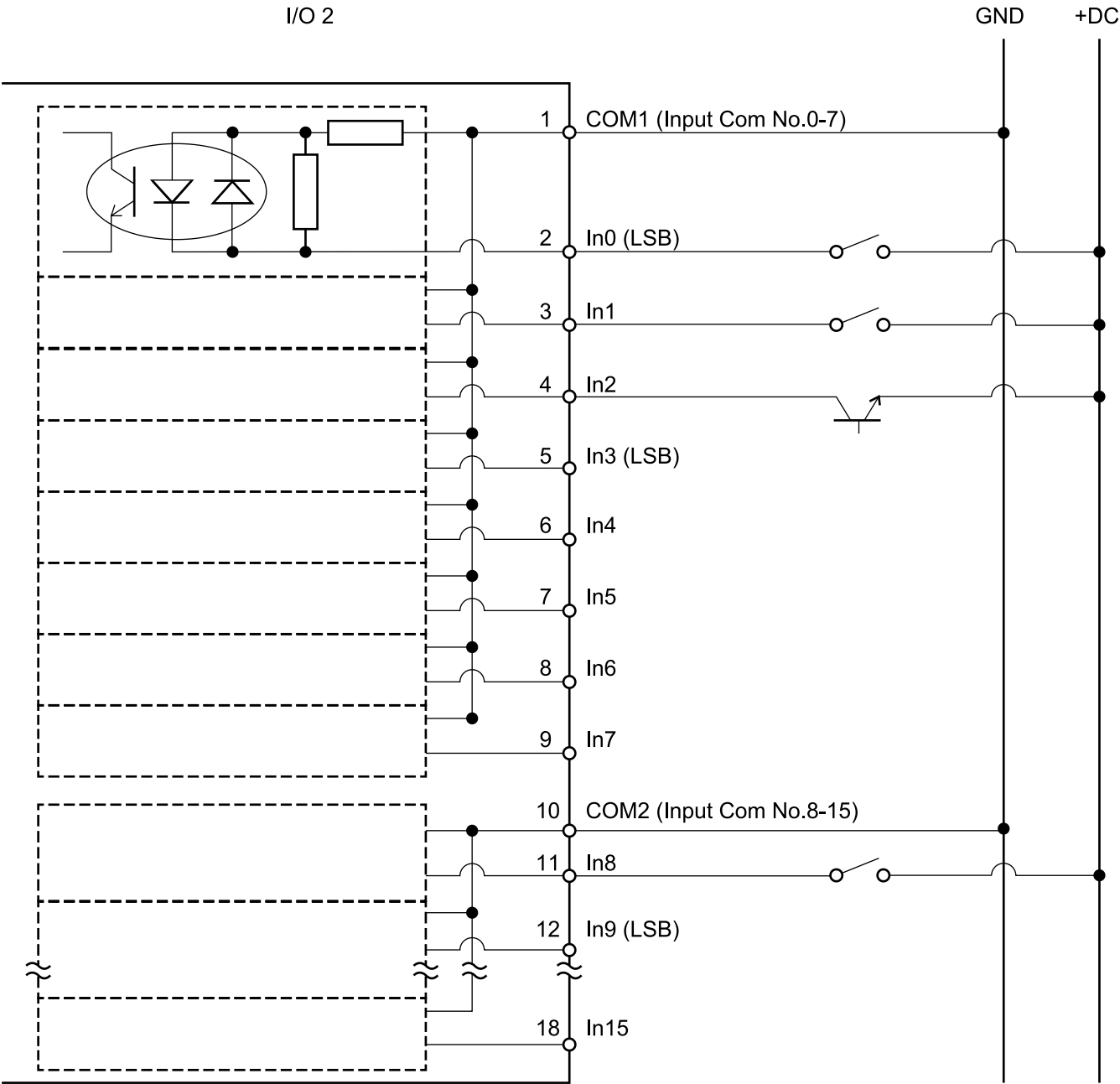
- IEC 61131-2 (PLC safety standard) digital output (max. 0.5 A)
- IEC 61131-2 (PLC safety standard) Type-1 digital input

Input Circuit Drawing and Wiring Example 1

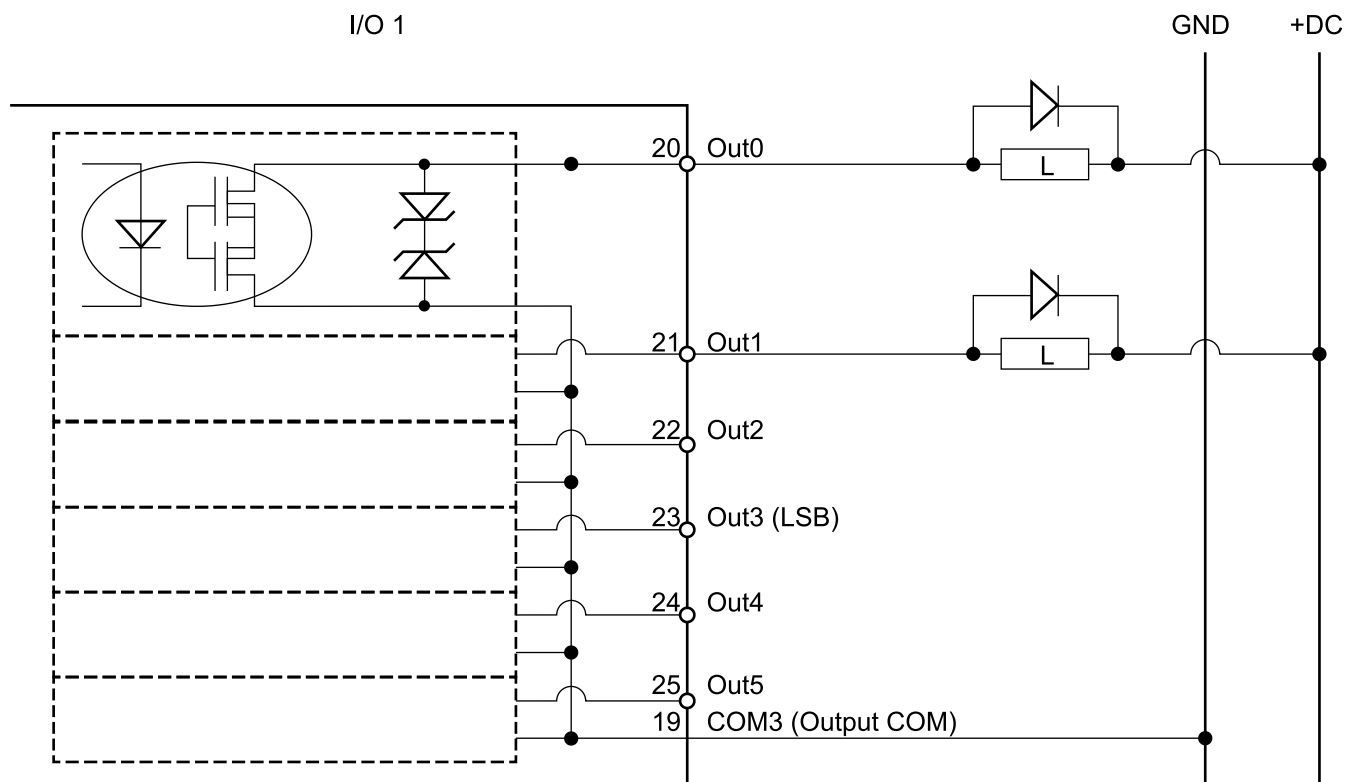


* The dashed box shows the same circuit.

Input Circuit Drawing and Wiring Example 2

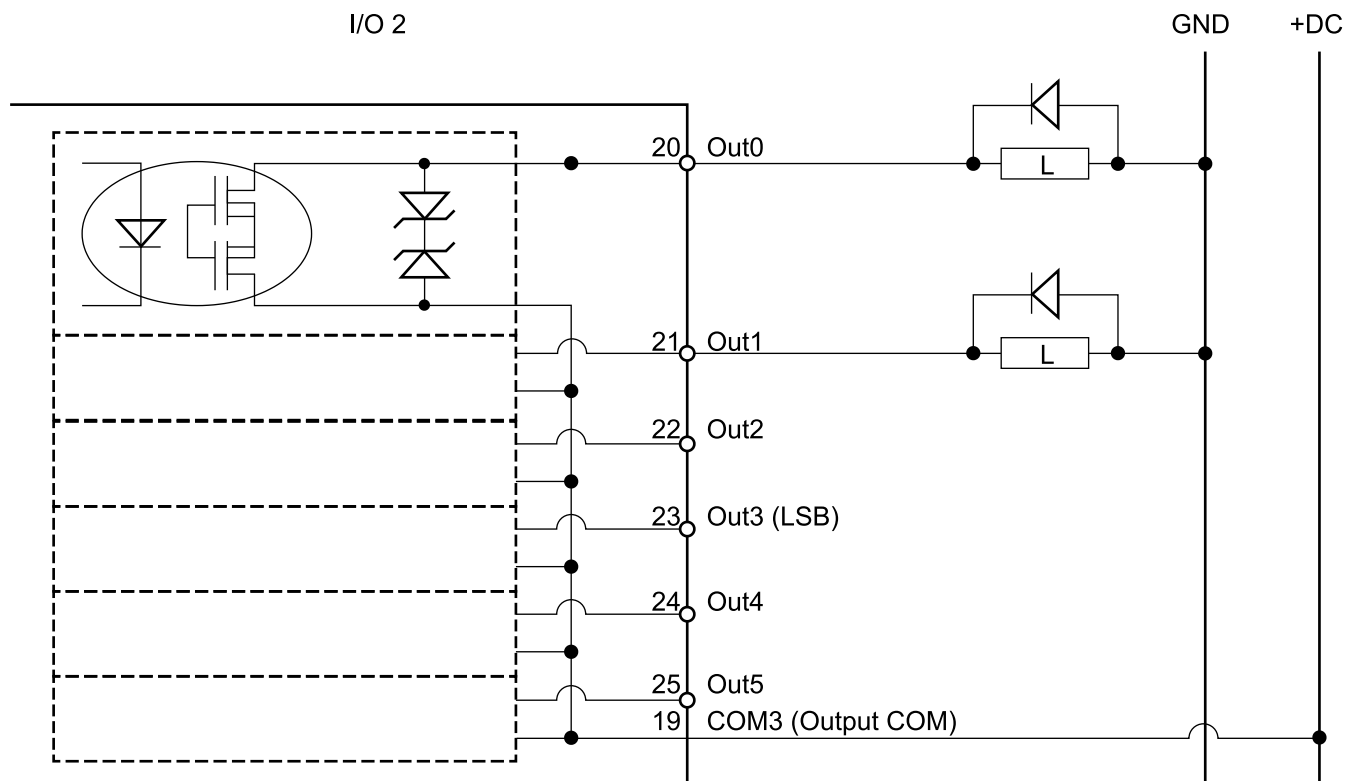


* The dashed box shows the same circuit.

Output Circuit Drawing and Wiring Example 1: Sink type (NPN)

* The dashed box shows the same circuit.

L: Load

Output Circuit Drawing and Wiring Example 2: Source type (PNP)

* The dashed box shows the same circuit.

L: Load

8.3.3 Operation Type Selection

The type of operation is specified by combining the two input bits, In0 and In1.

In0	In1	Selected operation type
0	0	Feeder vibration
1	0	Sequence
0	1	Hopper
1	1	Purge gate

8.3.4 Selecting the Part ID

The part ID is specified by combining the 4 input bits In9 to In12. Part IDs 17 to 26 cannot be selected.

In9(LSB)	In10	In11	In12	Part ID
0	0	0	0	PartID01
1	0	0	0	PartID02
0	1	0	0	PartID03
1	1	0	0	PartID04
...	...	...	...	...
1	1	1	1	PartID16

8.3.5 Specifying the Operation Details

The specific operation is specified for the operation type selected by the two input bits, In0 and In1.

8.3.5.1 Selecting Feeder Vibration (movement action)

If you select [Feeder Vibration], you specify the movement action A to Z by combining the 5 input bits In3 to In7.

In3(LSB)	In4	In5	In6	In7	Action	Movement action
0	0	0	0	0	A	Forward
1	0	0	0	0	B	Forward left
0	1	0	0	0	C	Forward right
1	1	0	0	0	D	Left
0	0	1	0	0	E	Right
1	0	1	0	0	F	Backward
0	1	1	0	0	G	Backward left
1	1	1	0	0	H	Backward right

In3(LSB)	In4	In5	In6	In7	Action	Movement action
0	0	0	1	0	I	Flip
1	0	0	1	0	J	Long Axis Centering
0	1	0	1	0	K	Short Axis Centering
1	1	0	1	0	L	User definition
...	...	...	...	...	...	...
1	0	0	1	1	Z	User definition
0	1	0	1	1	-	(Reserve)
...	...	...	...	...	...	...
1	1	1	1	1	-	(Reserve)

8.3.5.2 Selecting the Sequence

If you select [Sequence], specify the sequence 1-26 by combining the 5 input bits In3 to In7.

In3(LSB)	In4	In5	In6	In7	Sequence number
0	0	0	0	0	Sequence 1
1	0	0	0	0	Sequence 2
0	1	0	0	0	Sequence 3
...	...	...	...	...	...
1	0	0	1	1	Sequence 26
0	1	0	1	1	(Reserve)
...	...	...	...	...	...
1	1	1	1	1	(Reserve)

8.3.5.3 Selecting the Hopper

If you select [Hopper], specify the hopper by combining the 5 input bits In3 to In7.

In3(LSB)	In4	In5	In6	In7	Hopper
0	0	0	0	0	Hopper 1
1	0	0	0	0	Hopper 2
0	1	0	0	0	(Reserve)
...	...	...	...	...	...
1	1	1	1	1	(Reserve)

8.3.5.4 Selecting Purge Gate Operation

If you select [Purge Gate], specify the purge gate operation by combining the 5 input bits In3 to In7.

In3(LSB)	In4	In5	In6	In7	Purge gate operation
0	0	0	0	0	(Reserve)
...	...	...	...	...	...
0	1	0	0	0	(Reserve)
1	1	0	0	0	Open the purge gate
0	0	1	0	0	Close the purge gate
1	0	1	0	0	(Reserve)
...	...	...	...	...	...
1	1	1	1	1	(Reserve)

8.3.5.5 Error Output

The error is indicated as a combination of 3 output bits Out3 to Out5.

Out3(LSB)	Out4	Out5	Decimal	Error details
0	0	0	00	No error
1	0	0	01	Temperature error
0	1	0	02	S-power supply error
1	1	0	03	S-power supply cut
0	0	1	04	Motor driver error
1	0	1	05	Purge gate timeout (did not close within time)
0	1	1	06	Backlight timeout
1	1	1	07	Failed to write to flash memory

KEY POINTS

The "Decimal" value corresponds to the error code number. See below for details and remedies.

[Error Code List](#)

8.3.6 General Flow of Control via the D-Sub Terminal

The general flow of control via external control is as follows. Steps 1 to 5 can be performed in any order, but must be performed before step 6.

1. Set the Priority bit (In15) to 1: ON.

Exclusive control is performed so that commands from the Ethernet are not accepted.

2. The type of operation is specified by combining the 2 input bits In0 and In1.
3. The part ID is specified by combining the 4 input bits In9 to In12.

4. The 5 input bits In3 to In7 are combined to specify the details of the operation (such as an action or sequence).
5. Verify that the Ready bit (Out0) is 1: ON.

0: If Off, another operation is currently running. Wait until the operation is finished.
6. Set the Start Execution bit (In2) to 1: ON.

Operation starts.
7. To complete the operation, set the Stop Execution bit (In8) to 1: On.
8. After the operation is complete, check the output signals and error codes to determine whether or not the operation was successful.
9. To turn on the backlight, set the Backlight bit (In14) to 1: On. The Backlight bit (In14) is a toggle switch. To turn off the backlight, set the Backlight bit (In14) back to 1: On.
10. When imaging with a vision camera, ensure the Action Executing bit (Out1) is set to 0: Off before performing the imaging operation.
11. If necessary, return the Priority bit (In15) to 0: Off.

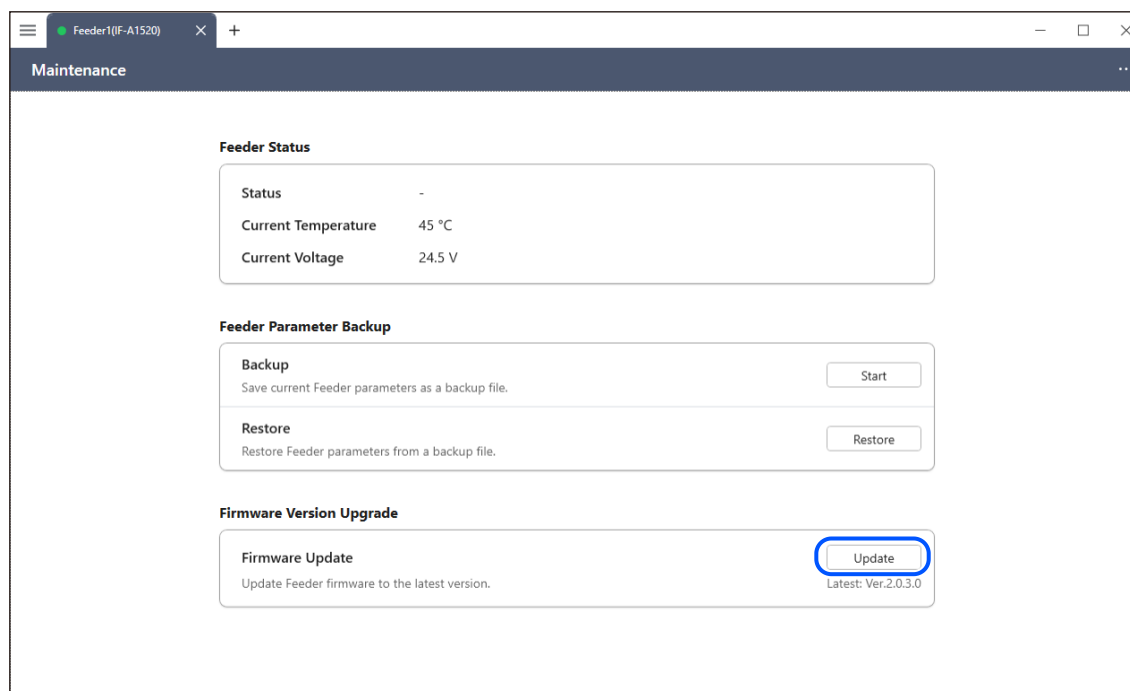
8.4 Updating Firmware

The firmware of the feeder unit may be updated to fix bugs or add new features. You can update to the latest firmware using the firmware update function.

KEY POINTS

- The currently installed firmware version is displayed in the [System Settings] section of the Epson Feeder Configurator. See below for more details.
System Setting - Confirm Mode
- The update wizard will always be displayed in English, regardless of the language setting in Epson Feeder Configurator.

1. Open Epson Feeder Configurator and open [Maintenance].
2. Click the [Update] button next to the firmware version.



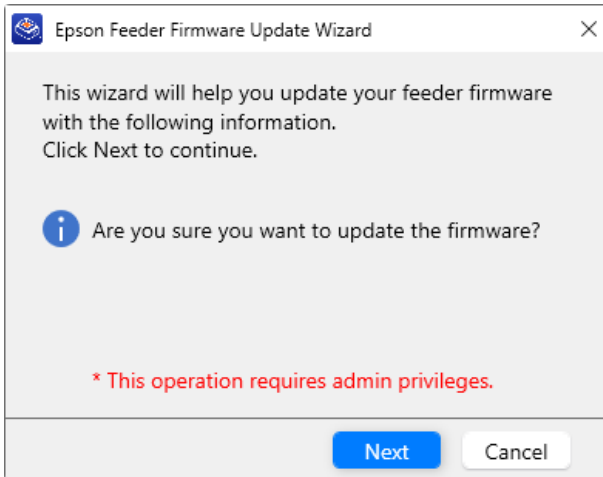
KEY POINTS

- If there are unsaved parameters, a dialog box will appear asking if you want to save them. If there are no problems, select [Yes] to save the parameters in the feeder unit. Saving may take several seconds to several tens of seconds.
- It may take about 10 seconds for the Update Wizard to start.

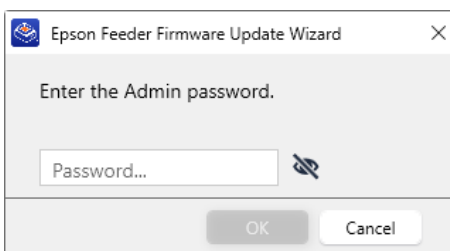
3. The Update Wizard opens. Review the content, and only select [I agree to the EULA terms and conditions] if you agree, then click [Next].



4. Click [Next] to start the firmware update.



5. Enter your password in the password entry screen and click [OK].



KEY POINTS

- The default password is "12345678".
- When the default password is entered, a dialog box to change the password appears. Enter a new password 2 times.

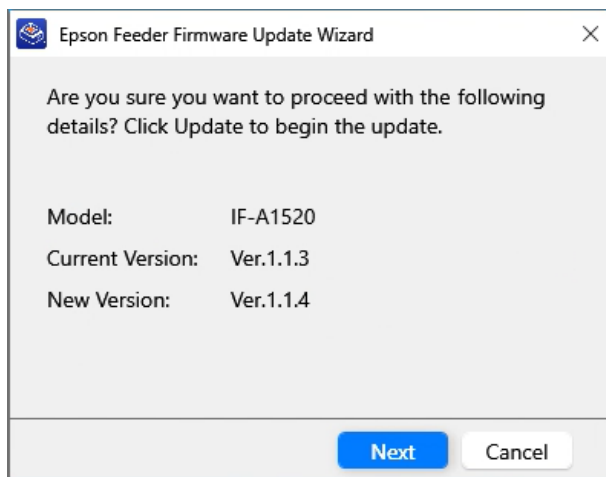


- The password must be 1 to 16 alphanumeric characters. You cannot use the same password as the default password.
- Be sure to write down the changed password so you don't forget it.

6. Select the items to update and click [Next]. By default, all items are selected.

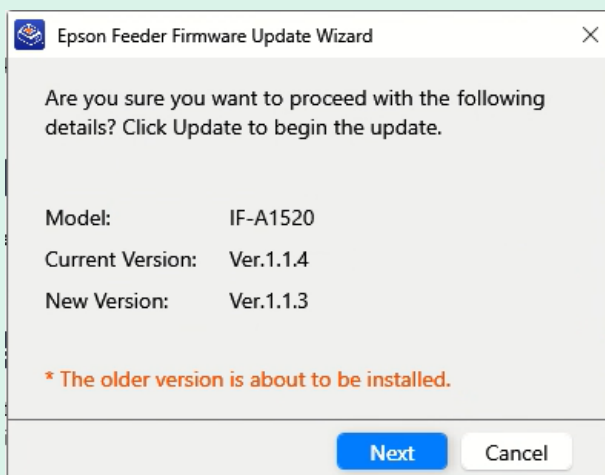
- Firmware: Updates the feeder's firmware (executable file).
- Vibration parameters: Resets the vibration/sequence parameters stored in the feeder to their default values.
- Global setting parameters: Resets the internal parameters to their default values. Default values may change after the firmware update.

7. The update details are displayed. If there are no problems, click [Next].



KEY POINTS

If you attempt to install an older version of firmware than is already installed, a warning message "*** The older version is about to be installed.**" appears.



8. The firmware is loaded.

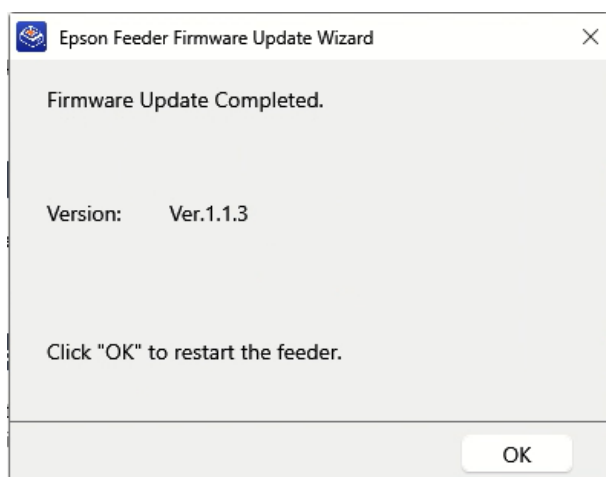
It takes about 10 seconds to load the firmware.

CAUTION

Do not turn off the power to the feeder unit under any circumstances while the following screen is displayed. Also, if the connection with the PC is lost, writing the firmware may fail and the feeder may not subsequently start up.



9. The Update Wizard completion screen appears. Click [OK] to automatically restart the feeder unit.



9. Commands Available in the Terminal

9.1 FF_Backlight

Controls the backlight.

Format

FF_Backlight Setting value

Parameter

- Setting value
 - 0: Turns the backlight off
 - 1: Turns the backlight on

Returned value

- 1/0: The same value as the setting value is returned as ACK.

Example of use

Turn the feeder backlight on.

Returns "1" as ACK.

```
> FF_Backlight 1
1
```

9.2 FF_Backlight Function

Acquires the backlight status.

Format

FF_Backlight

Parameter

None

Returned value

- 1: Backlighting is on
- 0: Backlighting is off

Example of use

Acquire the feeder backlight status.

The returned value "0" indicates that the backlight is off.

```
> FF_Backlight  
0
```

9.3 FF_BacklightColor

Controls the backlight color.

Format

FF_BacklightColor Setting value

Parameter

- Setting value
 - 1: Set the backlight color to red.
 - 5: Set the backlight color to white.
 - 99: Set no backlight color.

Returned value

- 1/5/99: The same value as the setting value is returned as ACK.

Example of use

Set the feeder backlight color to red.

Returns "1" as ACK.

```
> FF_BacklightColor 1  
1
```

9.4 FF_BacklightColor Function

Acquires the backlight color.

Format

FF_BacklightColor

Parameter

None

Returned value

- 1: Backlight color is red
- 5: Backlight color is white
- 99: No backlight color

Example of use

Acquire the backlight color for the feeder.

The returned value "1" indicates that the backlight color is red.

```
> FF_BacklightColor  
1
```

9.5 FF_CurrentState Function

Acquires the internal temperature, voltage and current status of the feeder.

Format

FF_CurrentState Setting values

Parameter

- Setting value: Specifies the value to acquire.
 - FC_TEMP: Acquires the internal temperature of the feeder.
 - FC_INTVOLT: Acquires the input voltage.
 - FC_INTCURRENT: Acquires the input current.

Returned value

Setting value	Returned value
FC_TEMP	■ Element 1: Motor drive temperature (in 0.1°C increments)
FC_INTVOLT	■ Element 1: Power1 input voltage (0 to 65535, 0.1 V increments) ■ Element 2: Power2 available (0: No/1: Yes)
FC_INTCURRENT	■ Element 1: Power1 input current (0 to 65535, 0.1 A increments) ■ Element 2: Power2 input current (0 to 65535, 0.1 A increments) ■ Element 3: Motor 1 input current (0 to 65535, 0.1 A increments) ■ Element 4: Motor 2 input current (0 to 65535, 0.1 A increments) ■ Element 5: Motor 3 input current (0 to 65535, 0.1 A increments) ■ Element 6: Motor 4 input current (0 to 65535, 0.1 A increments)

Example of use

Acquire the internal temperature of the feeder.

The returned value "425" indicates that the internal temperature is 42.5°C.

```
> FF_CurrentState FC_TEMP
425
```

Acquire the input voltage.

The first returned element "243" indicates 24.3 V. The second returned element "1" indicates that Power2 is present.

```
> FF_CurrentState FC_INTVOLT
243, 1
```

Acquire the input current.

The Power1 (5.2 A), Power2 (2.3 A), Motor 1 (2.5 A), Motor 2 (2.5 A), Motor 3 (2.6 A), and Motor 4 (2.5 A) current values are shown in order.

```
> FF_CurrentState FC_INTCURRENT
52, 23, 25, 25, 26, 25
```

9.6 FF_Digital_IO Function

Acquires the digital I/O status.

Format

FF_Digital_IO Setting value 1, Setting value 2

Parameter

- Setting value 1: Specifies digital input or digital output.
 - FC_DIOOUTPUT: Acquires the digital output.
 - FC_DIOINPUT: Acquires the digital input.
- Setting value 2: Specifies I/O number.
 - A: Acquires all the inputs and outputs.
 - 0 to 5: Acquires the specified digital output.
 - 0 to 15: Acquires the specified digital input.

Returned value

- 0: Disabled
- 1: Enabled

Example of use

Acquire the status of all digital outputs.

The returned third element "1" indicates that only output 3 is enabled.

```
> FF_Digital_IO FC_DIOOUTPUT, A  
0, 0, 1, 0, 0
```

Acquires the digital input 2 status.

The returned value "1" indicates that it is enabled.

```
> FF_Digital_IO FC_DIOINPUT, 2  
1
```

9.7 FF_Feeder

Controls the feeder movement action.

Format

FF_Feeder "Movement action", Setting value

Parameter

- Movement action
 - A to Z: Specify the symbol for the movement action.
- Setting value
 - (Not specified): Continuously run the specified action for the default duration.
 - 0: Continuously run the specified action.
 - 1 to 30000: Run the specified action for the specified duration.
 - ?: Acquire the feeder status.

Returned value

Setting value	Returned value
(Not specified)	The default duration is returned.
0	0 is returned.
1-30000	The same value as the setting value is returned.
?	▪ 1: Feeder stopped ▪ 3: Feeder operating

Example of use

The following controls are executed in order.

- Continue movement action A for the default time.
- Perform movement action B continuously.
- Perform movement action C for 1000 ms.
- Acquire the current feeder status for movement action D. The returned value "1" indicates that the feeder is stopped.

```
> FF_Feeder "A"
0
> FF_Feeder "B", 0
0
> FF_Feeder "C", 1000
1000
> FF_Feeder "D", ?
1
```

9.8 FF_Feeder Function

Acquires the currently selected movement action.

Format

FF_Feeder

Parameter

None

Returned value

- A to Z: Returns the selected movement action.

Example of use

Acquires the currently selected movement action.

The returned value "A" indicates the selected movement action.

```
> FF_Feeder  
A
```

9.9 FF_FlashState Function

Acquires the status of the feeder flash memory.

Format

FF_FlashState Setting value

Parameter

- Setting value: Specifies the data area of the flash memory to be acquired.
 - FC_ALL: All data areas
 - FC_GLOBAL_PARAMS: Global parameters data area
 - FC_SEQUENCE: Sequences data area
 - FC_CURRENT_PART: Data area for selected part
 - FC_Part: Parts data area
 - FC_AllwFactory: Entire data area for initial data
 - FC_PartwFactory: Data area for initial parts data

Returned value

- 0: Operation complete
- 1: Operation in progress
- 16: Flash operation busy
- 128: Operation requires a password

Example of use

Acquire the status of the flash memory.

The returned value "0" indicates that operation is complete.

```
> FF_FlashState FC_ALL  
0
```

9.10 FF_Hopper

Controls the hopper output movement.

Format

FF_Hopper "Hopper output operation", setting value

Parameter

- Hopper output movement
 - A to Z: Specify the symbol for the hopper output movement.
- Setting value
 - (Not specified): Continuously run the specified action for the default duration.
 - 0: Continuously run the specified action.
 - 1 to 30000: Run the specified action for the specified duration.
 - ?: Acquire the hopper status.

Returned value

Setting value	Returned value
(Not specified)	The default duration is returned.
0	0 is returned.
1-30000	The same value as the setting value is returned.
?	▪ 1: Hopper stopped ▪ 3: Hopper operating

Example of use

The following controls are executed in order.

- Continue hopper output movement A for the default duration.
- Run hopper output movement B continuously.
- Run hopper output movement C for 1000 ms.
- Acquire the current hopper status for hopper output movement D. The returned value "1" indicates that the hopper is stopped.

```
> FF_Hopper "A"
0
> FF_Hopper "B", 0
0
> FF_Hopper "C", 1000
1000
> FF_Hopper "D", ?
1
```

9.11 FF_Hopper Function

Acquires the output movement of the currently selected hopper.

Format

FF_Hopper

Parameter

None

Returned value

- A to Z: Returns the output movement of the selected hopper.

Example of use

Acquires the output movement of the currently selected hopper.

The returned value "A" indicates the selected output movement.

```
> FF_Hopper  
A
```

9.12 FF_ReadFeederParam

Reads the vibration parameters for movement actions A to Z from the feeder flash memory.

Format

FF_ReadFeederParam "Movement action"

Parameter

- Movement action
 - A to Z: Specify the symbol for the movement action.

Returned value

Element order	Description
1	Motor 1 amplitude (0 to 100[%])
2	Motor 1 frequency (0 to 250 [Hz])
3	Motor 1 phase (0 to 359 [degrees])
4	Motor 1 waveform (0: None, 1: Sine wave, 2: Upper sawtooth wave, 3: Lower sawtooth wave)
5	Motor 2 amplitude (0 to 100[%])
...	...
15	Motor 4 phase (0 to 359 [degrees])
16	Motor 4 waveform (0: None, 1: Sine wave, 2: Upper sawtooth wave, 3: Lower sawtooth wave)
17	Duration (0 to 30000 [ms])

Example of use

Read the vibration parameters for movement action "A".

The returned values are delimited by commas.

```
> FF_ReadFeederParam "A"
30, 50, 0, 1, 30, 50, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 1000
```

9.13 FF_ReadHopperParam

Reads the parameters for hopper output movements A to Z from the feeder flash memory.

Format

FF_ReadHopperParam "Hopper output movement"

Parameter

- Hopper output movement
 - A to Z: Specify the symbol for the hopper output movement.

Returned value

Element order	Description
1	Output 1 enabled/disabled (0: disabled, 1: enabled)
2	Output 1 amplitude (0 to 100[%])
3	Output 2 enabled/disabled (0: disabled, 1: enabled)
4	Output 2 amplitude (0 to 100[%])
5	Duration (0 to 30000 [ms])

Example of use

Read the parameters for hopper output movement "A".

The returned values are delimited by commas.

```
> FF_ReadHopperParam "A"  
1, 0, 0, 100, 1000
```

9.14 FF_ReadParam

The parameters stored at the specified address are read from the feeder's flash memory.

Format

FF_ReadParam Address

Parameter

- Address: Specifies the address to read.

Returned value

- Parameters: The parameters stored at the specified address will be returned.

Example of use

Read the parameters stored at address "300".

The returned value "50" indicates the read parameter.

```
> FF_ReadParam 300  
50
```

9.15 FF_ReadSequence

Reads the sequence parameters from the feeder flash memory using the specified sequence ID and operation number.

Format

FF_ReadSequence Operation number, Sequence ID

Parameter

- Operation number
 - 1 to 7: Specifies the operation number.
- Sequence ID
 - 1 to 26: Specifies the sequence ID.

Returned value

Element order	Description
1	Operation number (same as value specified in parameter)
2	Type ▪ 0: None ▪ 1: Platform Vibration ▪ 2: Output Activation ▪ 3: Waiting Time ▪ 4: Purge Gate
3	Operation ▪ A to Z: Platform Vibration or Output Activation action ▪ 0/1: Purge gate status (0: Closed/1: Open)
4	Continuation mode ▪ 0 (Fixed)
5	Duration ▪ 0 to 30000 [ms]
6	PartCntMax (not used, so "0" always returned)
7	Sequence ID (same as value specified in parameter)

Example of use

Read the sequence parameters for sequence ID "3" and operation number "2".

The returned values are delimited by commas.

```
> FF_ReadSequence 2, 3  
2, 1, C, 0, 1000, 0, 3
```

9.16 FF_ParamState Function

Acquires whether the vibration parameter settings have been changed.

Format

FF_ParamState

Parameter

None

Returned value

- 1: Settings have been changed
- 2: Settings have not been changed

Example of use

Check whether the vibration parameter settings have been changed.

The returned value "1" indicates that the settings have been changed.

```
> FF_ParamState  
1
```

9.17 FF_Part

Selects a part.

Format

FF_Part Setting value

Parameter

- Setting value
 - 1 to 26: Specifies the part ID

Returned value

- 1 to 26: The same value as the setting value is returned as ACK.

Example of use

Select part 3.

Returns "3" as ACK.

```
> FF_Part 3  
3
```

9.18 FF_Part Function

Acquires the part that is selected.

Format

FF_Part

Parameter

None

Returned value

- 1 to 26: Currently selected part ID

Example of use

Acquires the part ID.

The returned value "2" indicates the part ID.

```
> FF_Part  
2
```

9.19 FF_PurgeGate

Controls the purge gate.

Format

FF_PurgeGate Setting value

Parameter

- Setting value
 - 0: Closes the purge gate.
 - 1: Opens the purge gate.

Returned value

- 0: Operation successful
- -1: Operation failed

Example of use

Close the purge gate.

The returned value "-1" indicates that the operation failed.

```
> FF_PurgeGate 0  
-1
```

9.20 FF_PurgeGate Function

Acquires the purge gate status.

Format

FF_PurgeGate

Parameter

None

Returned value

- 0: Purge gate is closed
- 1: Purge gate is open (not closed)

Example of use

Acquires the purge gate status.

The returned value "0" indicates that the purge gate is closed.

```
> FF_PurgeGate  
0
```

KEY POINTS

The state of the purge gate is indicated by the output of the close sensor attached to the purge gate unit. If the purge gate is even slightly open, the close sensor does not detect that the purge gate is closed and it will be determined to be open (not closed).

9.21 FF_Remain Function

Acquires the time remaining before the specified process terminates.

Format

FF_Remain Setting value

Parameter

- Setting value: Specifies the value to acquire.
 - FC_BACKLIGHT: Acquire the remaining time for the backlight to be on.
 - FC_FEEDER: Acquire the remaining feeder operation time.
 - FC_HOPPER: Acquire the remaining hopper operation time.
 - FC_SEQUENCE: Acquire the remaining time for the sequence.

Returned value

- Time remaining: Returns the time remaining for the operation in ms.
- -1: Continuous operation is specified

Example of use

Acquire the remaining time for the backlight to remain on.

The returned value "123" indicates that the remaining time is 123 ms.

```
> FF_Remain FC_BACKLIGHT  
123
```

9.22 FF_RunSequence

Runs a sequence.

Format

FF_RunSequence Number of parts, Part count limit, Center of mass X, Center of mass Y, Sequence ID

Parameter

- Number of parts: Specifies the number of parts on the feeder.
- Part count limit: Specifies the upper limit of the number of parts.
- Center of mass X, Center of mass Y: Specifies the center of mass of the part. Can be omitted if the sequence does not include a centering movement action.
- Sequence ID: Specify the sequence ID to run. If not specified, the currently selected sequence is run.

Returned value

- Operation time: Returns the actual operating time. This is calculated by adding a delay of 60 ms to the total operation time of each step in the sequence.

Example of use

Run sequence 1 using the following conditions.

- Number of parts on the feeder is 55
- Part count limit is 100
- Center of mass is 0, 0

The returned value "1000" indicates that the operation time is 1000 ms.

```
> FF_RunSequence 55, 100, 0, 0, 1  
1000
```

9.23 FF_Store

Writes data and parameters to the feeder flash memory.

Format

FF_Store Setting value

Parameter

- Setting value: Specifies the value to write.
 - FC_ALL: Write all data.
 - FC_GLOBAL_PARAMS: Write the global parameters.
 - FC_SEQUENCE: Write the sequence.
 - FC_CURRENT_PART: Write the parameters for the selected part.

Returned value

- 0: Operation successful
- -1: Operation failed

Example of use

Write all the data to the feeder flash memory.

The returned value "0" indicates that the operation was successful.

```
> FF_Store FC_ALL  
0
```

9.24 FF_WriteFeederParam

Writes the vibration parameters for movement actions A to Z to the feeder flash memory.

Format

FF_WriteFeederParam "Movement action" Setting value 1, Setting value 2, ..., Setting value 17

Parameter

- Movement action
 - A to Z: Specify the symbol for the movement action.
- Setting value
 - Setting value 1: Motor 1 amplitude (0 to 100[%])
 - Setting value 2: Motor 1 frequency (0 to 250 [Hz])
 - Setting value 3: Motor 1 phase (0 to 359 [degrees])
 - Setting value 4: Motor 1 waveform (0: None, 1: Sine wave, 2: Upper sawtooth wave, 3: Lower sawtooth wave)
 - Setting value 5: Motor 2 amplitude (0 to 100[%])
 - ...
 - Setting value 15: Motor 4 phase (0 to 359 [degrees])
 - Setting value 16: Motor 4 waveform (0: None, 1: Sine wave, 2: Upper sawtooth wave, 3: Lower sawtooth wave)
 - Setting value 17: Duration (0 to 30000 [ms])

Returned value

- 0: Operation successful
- -1: Operation failed

Example of use

Write the vibration parameters for movement action "A".

The returned value "0" indicates that the operation was successful.

```
> FF_WriteFeederParam "A" 30, 50, 0, 1, 30, 50, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 1000  
0
```

9.25 FF_WriteHopperParam

Writes the parameters for hopper output movements A to Z to the feeder flash memory.

Format

FF_WriteHopperParam "Hopper output movement" Setting value 1, Setting value 2, ..., Setting value 5

Parameter

- Hopper output movement
 - A to Z: Specify the symbol for the hopper output movement.
- Setting value
 - Setting value 1: Output 1 enabled/disabled (0: disabled, 1: enabled)
 - Setting value 2: Output 1 amplitude (0 to 100[%])
 - Setting value 3: Output 2 enabled/disabled (0: disabled, 1: enabled)
 - Setting value 4: Output 2 amplitude (0 to 100[%])
 - Setting value 5: Duration (0 to 30000 [ms])

Returned value

- 0: Operation successful
- -1: Operation failed

Example of use

Write the parameters for hopper output movement "A".

The returned value "0" indicates that the operation was successful.

```
> FF_WriteHopperParam "A" 1, 0, 0, 100, 1000  
0
```

9.26 FF_WriteParam

Writes a parameter to the specified address of the feeder flash memory.

Format

FF_WriteParam Address, Setting value

Parameter

- Address: Specifies the address where the file will be written.
- Setting Value: Specifies the value to write.

Returned value

- 0: Operation successful
- -1: Operation failed

Example of use

Write the parameter "90" to address "301".

The returned value "0" indicates that the operation was successful.

```
> FF_WriteParam 301, 90  
0
```

9.27 FF_WriteSequence

Writes the sequence parameters to the feeder flash memory using the specified sequence ID and operation number.

Format

FF_WriteSequence Operation number, Sequence ID, Setting value 1, Setting value 2, ..., Setting value 5

Parameter

- Operation number
 - 1 to 7: Specifies the operation number.
- Sequence ID
 - 1 to 26: Specifies the sequence ID.
- Setting value
 - Setting value 1: Type
 - 0: None
 - 1: Platform Vibration
 - 2: Output Activation
 - 3: Waiting Time
 - 4: Purge Gate
 - Setting value 2: Operation
 - A to Z: Platform Vibration or Output Activation action
 - 0/1: Purge gate status (0: Closed/1: Open)
 - Setting value 3: Continuation mode
 - 0: Fixed
 - Setting value 4: Duration
 - 0 to 30000 [ms]
 - Setting value 5: PartCntMax
 - 0: Not used, so "0" always returned

Returned value

- 0: Operation successful
- -1: Operation failed

Example of use

Write the sequence parameters for sequence ID "1" and operation number "2".

The returned value "0" indicates that the operation was successful.

```
> FF_WriteSequence 2, 1, 1, C, 0, 1000, 0  
0
```

9.28 FF_Sequence

Selects a sequence.

Format

FF_Sequence Setting value

Parameter

- Setting value
 - 1 to 26: Specifies the part ID

Returned value

- 1 to 26: The same value as the setting value is returned as ACK.

Example of use

Select sequence 3.

Returns "3" as ACK.

```
> FF_Sequence 3
3
```

9.29 FF_Sequence Function

Acquires the selected sequence.

Format

FF_Sequence

Parameter

None

Returned value

- 1 to 26: Currently selected sequence ID

Example of use

Acquires the sequence ID.

The returned value "2" indicates the sequence ID.

```
> FF_Sequence  
2
```

9.30 FF_SmartCenter

Performs the smart centering operation.

Format

FF_SmartCenter Center of mass X, Center of mass Y

Parameter

- Center of mass X, Center of mass Y: Specifies the center of mass of the part

Returned value

- Default operation time: The default operation time is returned.

Example of use

Perform the smart centering operation using the following conditions.

- Center of mass is 100, -100

The returned value "800" indicates that the default operation time is 800 ms.

```
> FF_SmartCenter 100, -100  
800
```

9.31 FF_Stop

Stops the feeder or hopper operation or the sequence in progress.

Format

FF_Stop Setting value

Parameter

- Setting value: Specifies what to stop.
 - FC_FEEDER: Stop the feeder vibration.
 - FC_HOPPER: Stop the hopper vibration.
 - FC_SEQUENCE: Stop the sequence.

Returned value

- 0: Operation successful
- -1: Operation failed

Example of use

Stop the feeder or hopper operation or the sequence in progress.

The returned value "0" indicates that the operation was successful or "-1" indicates that the operation failed.

```
> FF_Stop FC_FEEDER
0
> FF_Stop FC_HOPPER
-1
> FF_Stop FC_SEQUENCE
0
```

9.32 FF_Version Function

Acquires and displays the firmware version.

Format

FF_Version

Parameter

None

Returned value

- MODEL_VERSION: The feeder model and firmware version are returned, concatenated with "_".

Example of use

Displays the firmware version.

The returned value "IF-A1520_Ver.2.4.3" indicates the firmware version of the model.

```
> FF_Version  
IF-A1520_Ver.2.4.3
```

10. Troubleshooting

10.1 Error Code List

The table below describes the error codes displayed in the [Error Code] section of the [Configuration] tab, along with their meanings and remedies.

Error code	Error character string	Description and remedy
00	No error	No error has occurred. Keep using the unit.
01	Temperature error	Abnormal heating in the unit. Stop operation for a while and allow the unit to cool down. Leave enough space around the unit to prevent heat from building up. If this error occurs repeatedly, it may be a malfunction.
02	S-Power supply error	The S-Power supply is abnormal. Check the power supply.
03	S-Power supply cut	There is no S-Power supply. Check the power supply.
04	Motor driver error	The motor driver is abnormal. Check that no excessive force is being applied to the top surface of the unit. If this error occurs repeatedly, it may be a malfunction.
05	Purge gate timeout	The purge gate did not fully close in time. Foreign object may be caught in the purge section or the purge gate unit may be broken.
06	Backlight timeout	An abnormality occurred in the backlight control. This may be a malfunction.
07	Failed to write to flash memory	Writing failed to the flash memory in the unit. If this error occurs repeatedly, it may be a malfunction.
21	Firmware updater: Cannot connect to feeder.	Check the communication between the feeder and PC.
22	Firmware updater: Wrong model.	The selected model does not match the model the firmware updater is trying to update.
23	Firmware updater: Firmware file abnormal.	The firmware file may be corrupted. Obtain new updater.
24	Firmware updater: Process aborted due to user action.	This may occur if the operation was interrupted during a firmware update. As the unit may no longer function properly, perform the update process again.
25	Firmware updater: Operation failed.	The firmware update failed. Obtain new updater. If this failure occurs again, the unit may be malfunctioning.
26	Firmware updater: Wrong argument.	The argument values specified in the firmware updater are incorrect.
36	Firmware updater: Unknown error.	The firmware update failed due to an unexpected error. If this error occurs repeatedly, the unit may be malfunctioning.
40	Communication has been lost.	Communication was lost between the feeder and the PC. Check the communication.
41	The part file is abnormal.	The part file (*.fps) you are trying to import may be corrupted.
42	The sequence file is abnormal.	The sequence file (*.fss) you are trying to import may be corrupted.

Error code	Error character string	Description and remedy
43	The setting file is abnormal.	The setting file (*.ini) you are trying to import may be corrupted.

10.2 Feeder Troubleshooting

If the problem persists after taking these measures, the device may be broken.

Contact your dealer or the manufacturer.

10.2.1 Noisy Feeder

As the feeder is device that moves workpieces using vibrations, it makes a noise.

- It is not abnormal for the feeder to make a low, muffled buzzing sound when there are no workpieces on it.
- If you hear a loud, high-pitched knocking noise (GRRR sound), the vibration amplitude may be too strong. Review the vibration settings.
- The actuator makes a noise when opening and closing the optional purge gate, but this is not a malfunction.
- When workpieces are placed on the platform, the workpieces make a noise when they collide with each other.

10.2.2 Feeder Stops Working/Does Not Vibrate

- To protect the feeder unit, the feeder will stop operating after a certain period of time even if [Continuous] is selected. This is not a malfunction.
- If the vibration is set as below, the feeder may not vibrate or may only vibrate slightly. Check the settings.
 - The vibration amplitude is set to an extremely small value around 0[%].
 - The vibration time is set to an extremely small value around 100 [ms].
 - The drive waveform is set to [None].
- Try switching the part number or changing to a different movement action. Also, try adjusting the vibration parameters. If the feeder still does not work properly, the unit may have malfunctioned.

10.2.3 Backlight Does Not Light

- Make sure that the backlight color is set correctly.
- Make sure that the backlight brightness is not set to a very low value around 0[%].
- The backlight settings can be changed for each part. Make sure that the part number you are configuring matches the part number you want to use.

10.2.4 Optional Hopper Does Not Work

- Make sure that the hopper is connected properly.
- Make sure that [Hopper Connection] is checked.

Device Setting - Hopper

- (When [Gen.2] is selected) Make sure that the hopper amplitude is not set to an extremely small value around 0[%].
- Make sure that the hopper operation time is not set to an extremely small value around 100 [ms].

- The hopper settings can be changed for each part. Make sure that the part number you are configuring matches the part number you want to use.

10.2.5 Purge Gate Does Not Work

- Make sure that the purge gate is connected properly.
- Make sure that the [Purge gate installed] option is checked.

Device Setting - Purge Gate

- Make sure that no foreign object is caught in the purge section.

10.2.6 No PLC Control

- Make sure that the I/Os are connected properly.
- Make sure the Priority bit (In15) is set to 1: ON. Control from an external device is only enabled when the Priority bit (In15) is ON.