AD-4961-2KD-2035

CHECKWEIGHER

INSTRUCTION MANUAL

A&D Company, Limited

1WMPD4002855

WARNING DEFINITIONS

The warnings described in this manual have the following meanings:

⚠WARNING	A potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠CAUTION	A potentially hazardous situation which, if not avoided, may result in minor or moderate injury or damage to the instrument.
	This symbol indicates caution against electrical shock. Do not touch the part where the symbol is placed.
	This symbol indicates the ground terminal.
	This symbol indicates that an operation is prohibited.
Note	Information or cautions to use the device correctly.

The contents of this manual and the specifications of the instrument covered by this manual are subject to change for improvement without notice.

Contents

1. Introduction

1.1. Features

The AD-4961 is a checkweigher developed for checkweighing products.

Display

- Excellent and easy operability with 7-inch touch sensitive panel

Dustproof・waterproof construction

- Waterproof construction complying with IP65

Conveyor construction

- The gear-driven conveyor mechanism allows easy removal of conveyor and maintenance.

Functions

- The AD-4961 checkweigher divides the products into ten groups and can register a maximum of 100 products for each group (a total of 1000 products).
- Product images can be uploaded from USB memory.
- The user registration function is provided to assign a management level appropriate to each user. This ensures a safe operation of the system.
- Serial communication or TCP/IP communication allows communications with Modbus-enabled devices without using communications program.

External output/input

- General purpose input, rejector output, alarm output, RS-232C/RS-485 input/output TCP/IP are provided as standard

1.2. Safety Precautions

To use the AD-4961 checkweigher safely, read the following precautions before use.

⚠CAUTION

Hazard of rotating object

- Keep hands and fingers away from the rotating part while the checkweigher is running.
- If the product accumulates, falls over or spills on the checkweigher, stop the checkweigher immediately, turn the power off and take necessary actions.

Hazard of electrical shock

- Be sure to turn the power off before removing the display cover or control box cover for inspection.
- Keep the power turned off during the inspection.
- Turn the power on after the installation has been complete.

Precautions for installation

- Install the checkweigher on a solid surface away from sources of vibration.
- Install the checkweigher in an area where it is not exposed to direct sunlight.
- Install the checkweigher in an area where it is not subject to direct flow from the window, electric fan or air conditioner.

Grounding

- Be sure to ground the checkweigher to avoid electrical shock, fire or malfunction.

Precautions for use

- Do not apply shock or excessive external force to the infeed and weighing conveyors.
- Do not apply a load exceeding the weighing capacity to the weighing conveyor.
- Do not modify or disassemble the checkweigher. Do not change the parts.
- Be sure to level the checkweigher.
- Feed the product to be weighed into the checkweigher at a constant interval.

Cooling the checkweigher

To avoid the checkweigher overheat, be sure to allow enough clearance from other devices.

If the temperature surrounding the checkweigher exceeds the specified operating temperature range, take necessary measures such as cooling the checkweigher using a fan.

2. Description of Individual Parts

2.1. Whole View

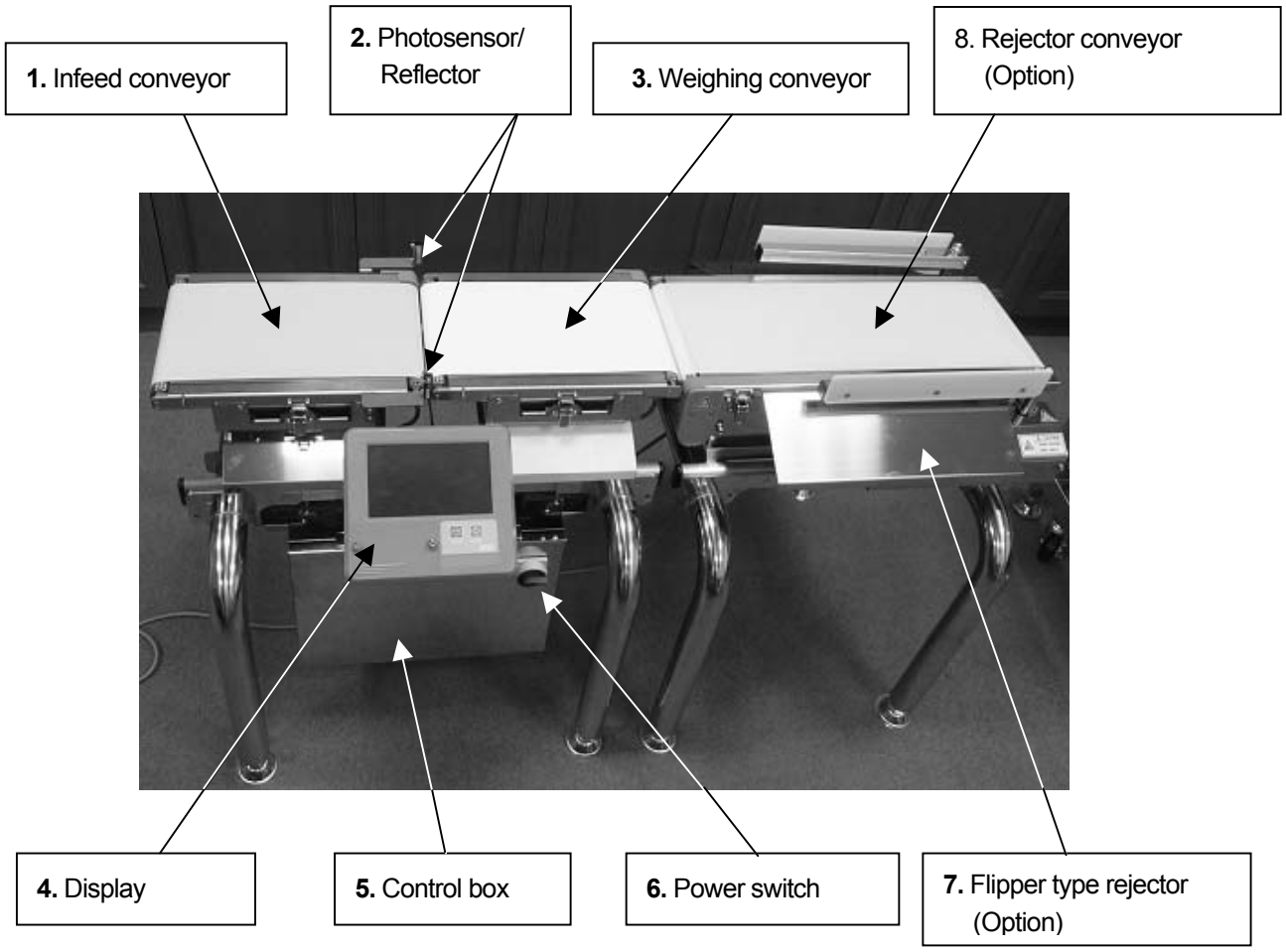


Fig.1 Whole view

No.	Name	Description
1	Infeed conveyor	Conveys the product to the weighing conveyor.
2	Photosensor/Reflector	Detects the product.
3	Weighing conveyor	Weighs the product.
4	Display	Used to operate the checkweigher and display various screens.
5	Control box	Used to control the weighing operation and connect to external devices.
6	Power switch	Turns the checkweigher on or off.
7	Rejector (Option)	Separates the product according to the weighing results.
8	Rejector conveyor (Option)	Conveys the weighed product.

2.2. Display

2.2.1. Description of individual parts

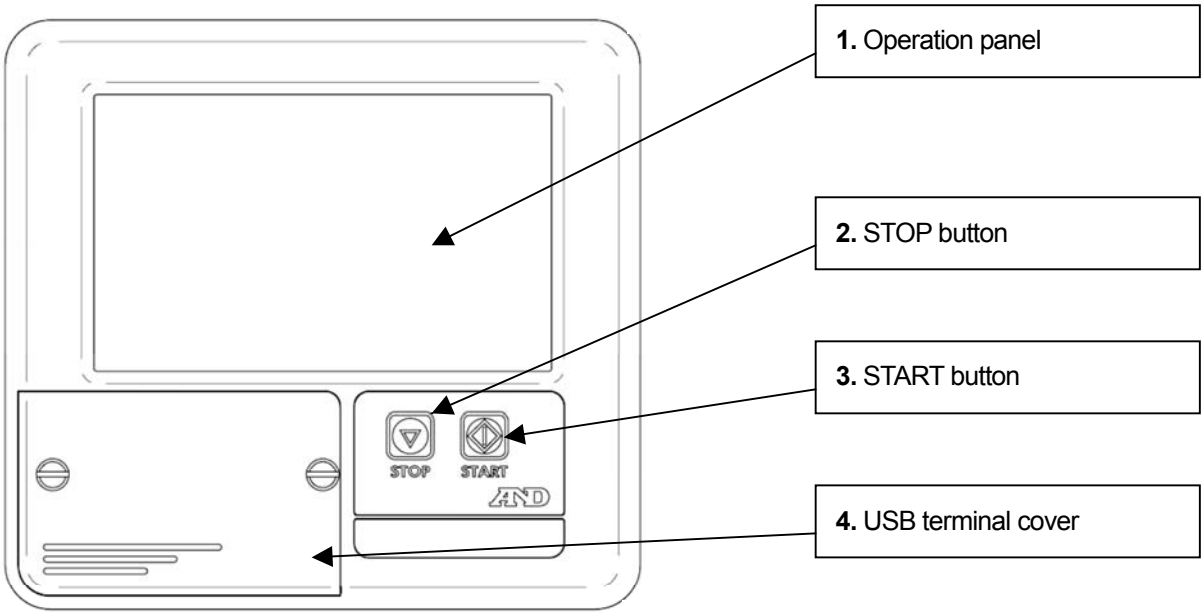


Fig.2 Display

No.	Name	Description
1	Operation panel	Displays the Weighing screen and other screens. Used to change the settings and operate the checkweigher.
2	STOP button	Finishes the weighing operation and stops the conveyor.
3	START button	Starts the weighing operation and starts the conveyor.
4	USB terminal cover	Waterproof cover for the USB terminal. A USB terminal is installed.

2.2.2. Connecting the USB memory

With the AD-4961 checkweigher, the USB memory can be used to register the product images and save the weighing data.

Remove the USB terminal cover on the display by turning the screws.
Insert the USB memory into the USB terminal

When the USB memory is recognized, the USB mark appears on the upper right side of the screen.

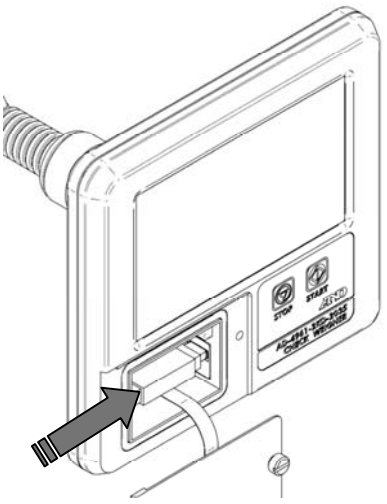


Fig.3 USB terminal

Note:
Only USB memory formatted in FAT32 can be used.
When a USB memory other than FAT32-formatted ones is used, format the memory before use.

When the USB mark does not appear even if the USB memory is inserted, refer to “3.3.2. Connecting the display” of the assembly guide and check the USB cable connection.
When the USB mark does not appear even if USB cable connection is correct, the file system may not be compatible. Refer to “7.1. Formatting the USB Memory” and format the USB memory.

2.3. Control Box

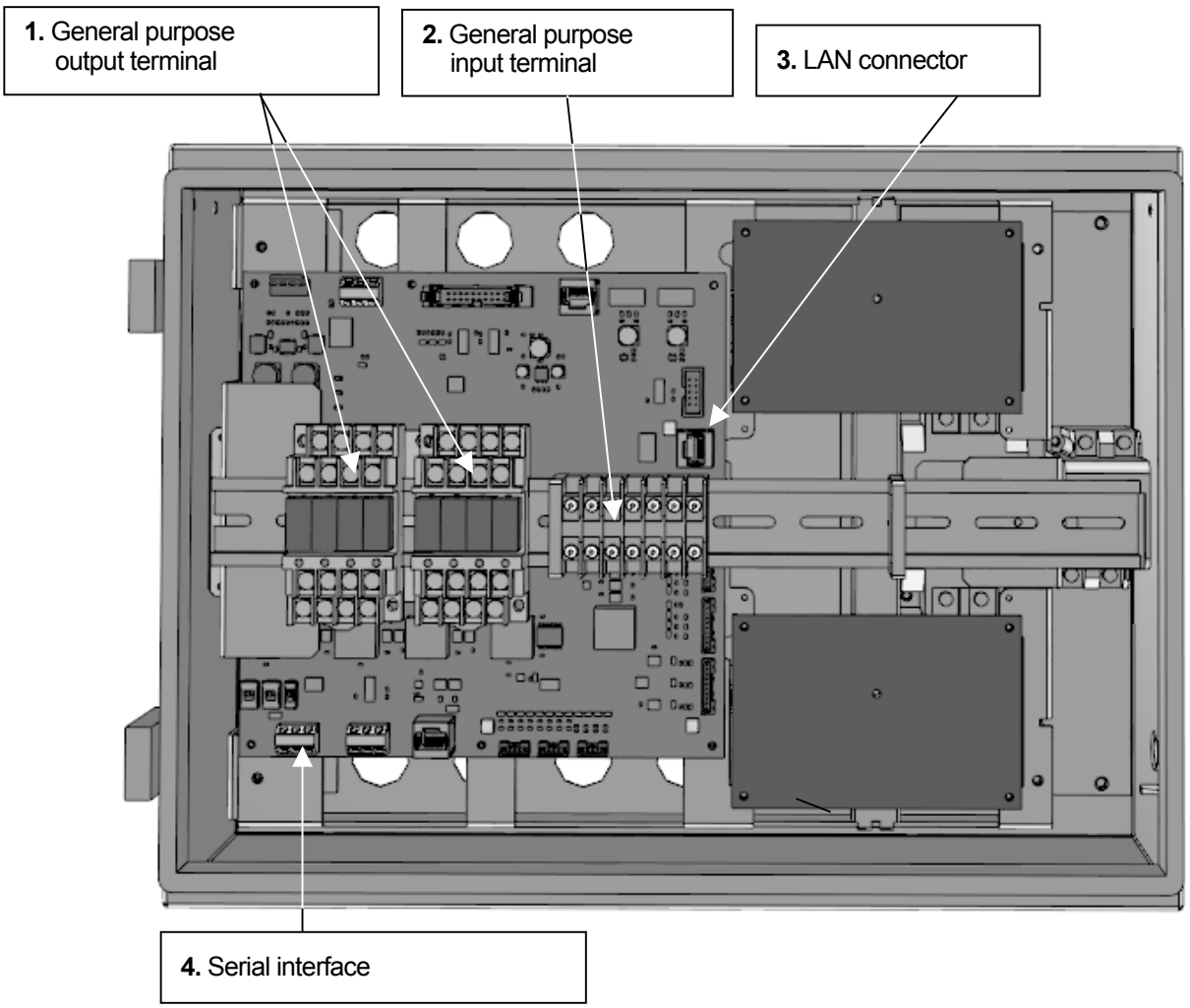


Fig.4 Control box

No.	Name	Description
1	General purpose output terminal	Outputs the weighing results.
2	General purpose input terminal	Inputs data from external devices.
3	LAN connector	Used to connect a printer or for Modbus communication.
4	Serial interface	Used for cyclic printing or for Modbus communication.

3. Operating the Screens

This chapter describes basic operations of the screens that appear on the operation panel.

3.1. Icons

This section describes the functions of the icons commonly used in various screens.

Other icons are described as they appear.

Icon	Name	Description
	HOME key	Returns to the Weighing screen.
	RETURN key	Returns to the previous screen. Returns to the Weighing screen when touched repeatedly.
	Left arrow key	Shifts the screen to the left when items are too many to display in one screen.
	Right arrow key	Shifts the screen to the right when items are too many to display in one screen.

3.2. Entering the Numerical Values

When a numerical value is required, the numerical value entry dialog box appears.

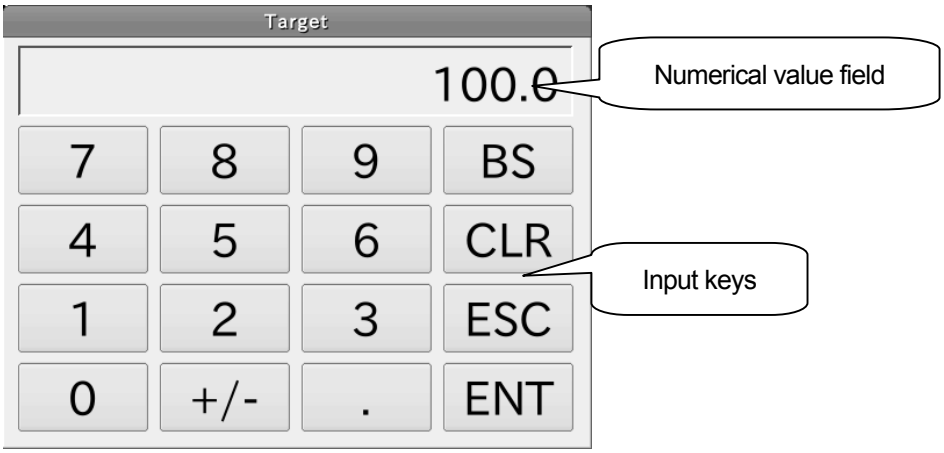


Fig.5 Numerical value entry dialog box

Name		Description
Numerical value field		Displays the value entered.
Input keys	BS key	Deletes a numerical value before the cursor.
	CLR key	Deletes all the numerical values entered.
	ESC key	Exits from the dialog box without confirming the value entered.
	ENT key	Confirms the value entered. The value out of the input range will not be confirmed.

3.3. Pulldown Selection

When an item selection is required, the pulldown selection dialog box appears.

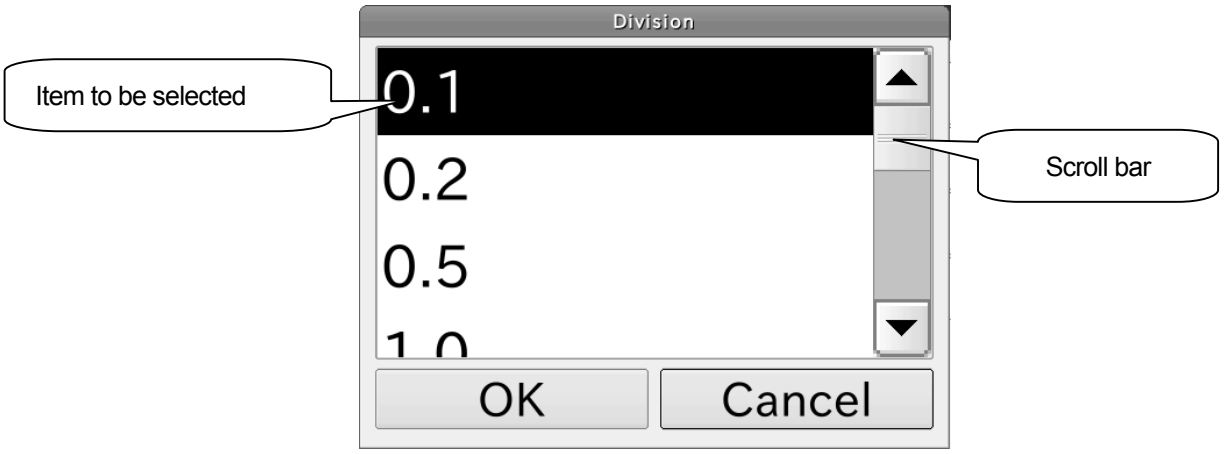


Fig. 6 Pulldown selection dialog box

1. Select an item and touch the OK button. The selected item is confirmed.

3.4. Entering the IP Address

When an IP address is required for the checkweigher or the printer, the IP Address entry dialog box appears.

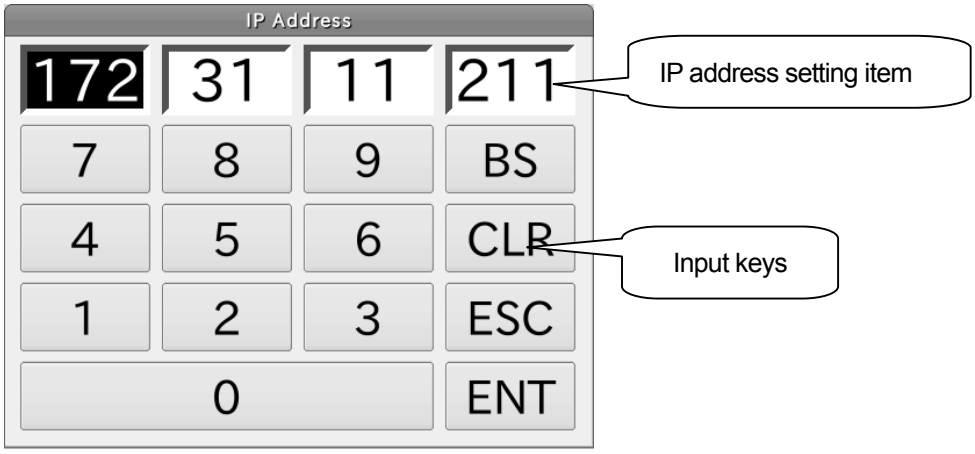


Fig.7 IP Address entry dialog box

Name		Description
IP address setting item		Selects the item to be set and enter numerical values.
Input keys	BS key	Deletes a numerical value before the cursor.
	CLR key	Deletes all the numerical values entered.
	ESC key	Exits from the dialog box without confirming the value entered.
	ENT key	Confirms the value entered as an IP address.

3.5. Entering the Characters

When a character is required, the character entry dialog box appears.

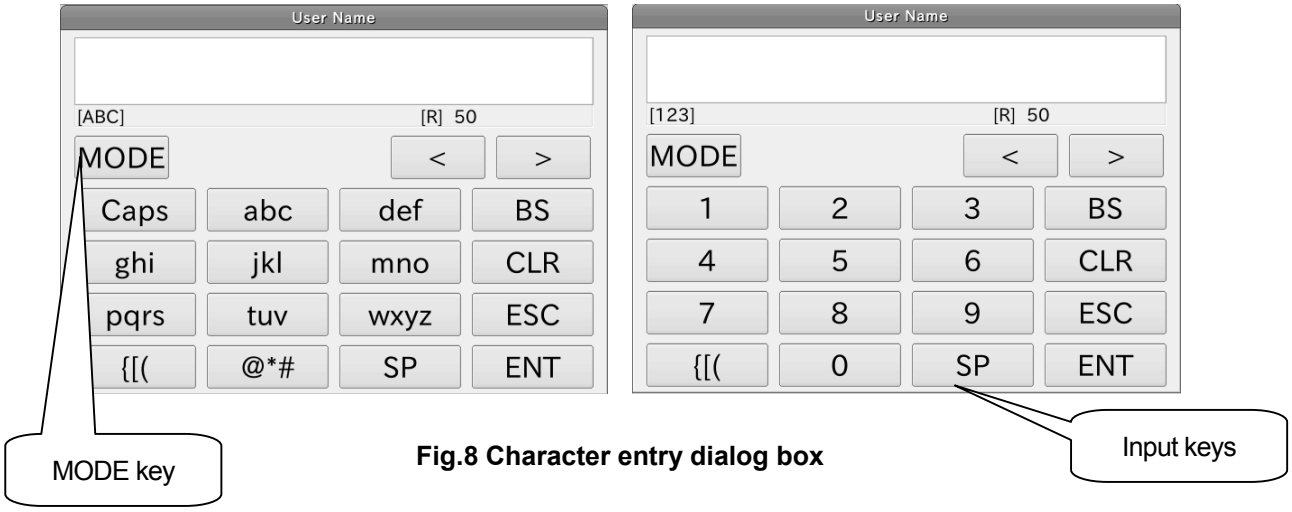


Fig.8 Character entry dialog box

Name		Description
MODE key		Switches the characters to be input.
Input keys	BS key	Deletes a character before the cursor.
	CLR key	Deletes all the characters entered.
	ESC key	Exits from the dialog box without confirming the characters entered.
	ENT key	Confirms the characters entered.

3.6. Entering the Password

When a password is required for a user login or user registration, the Password entry dialog box appears.

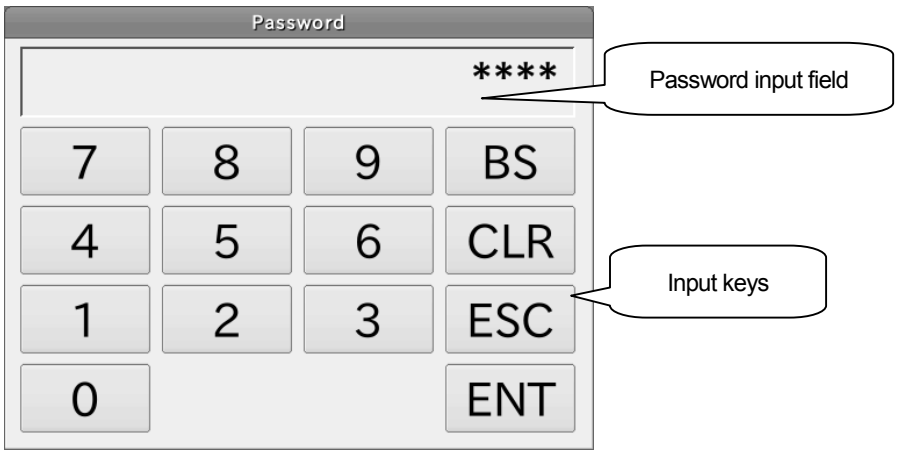


Fig.9 Password entry dialog box

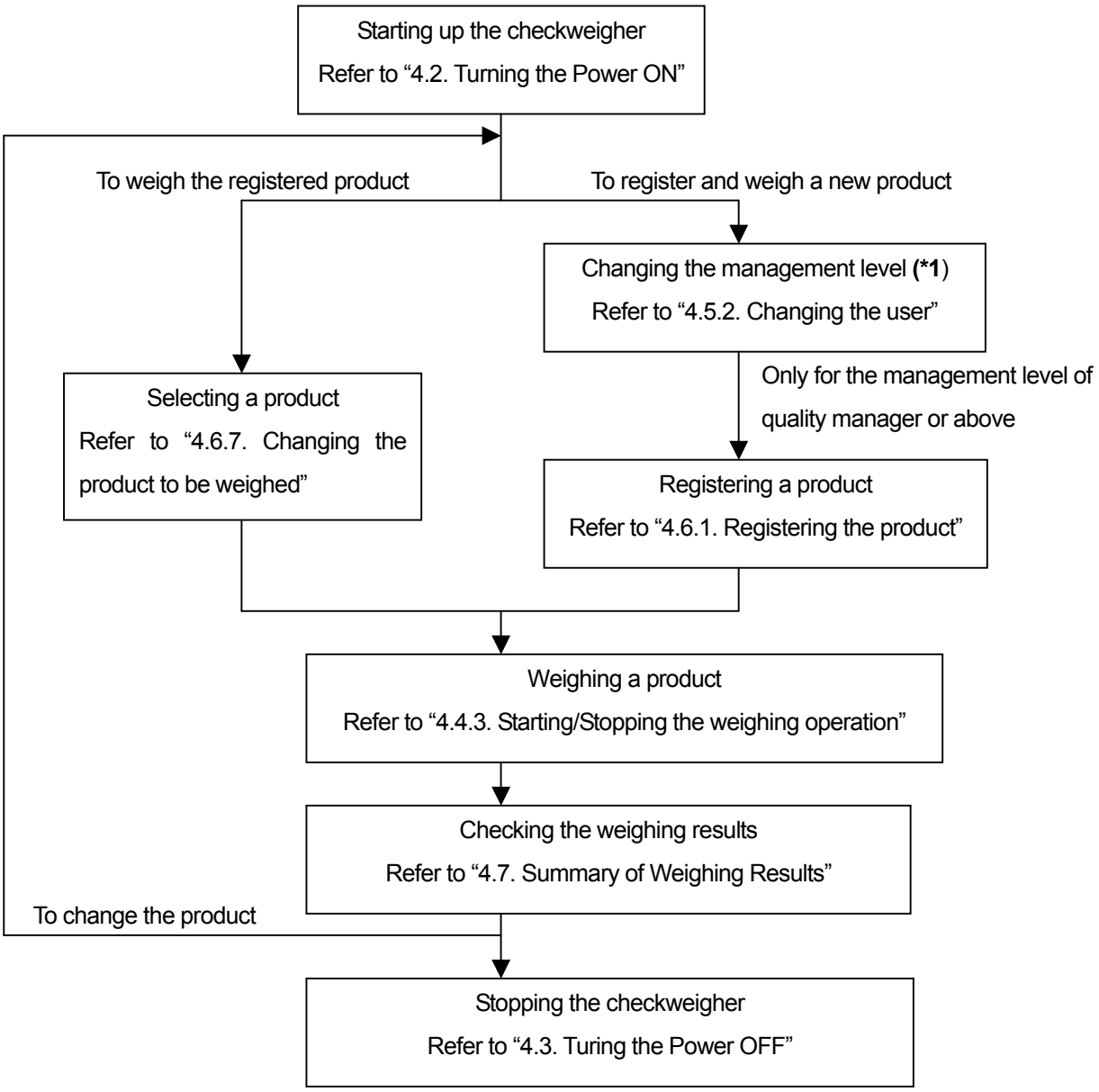
Name		Description
Password input field		The entered password will be indicated by ✻✻✻✻ (asterisks).
Input keys	BS key	Deletes a character before the cursor.
	CLR key	Deletes all the characters entered.
	ESC key	Exits from the dialog box without confirming the characters entered.
	ENT key	Confirms the characters entered as the password.

4. Basic Operations

This chapter describes the basic operations of the checkweigher.

4.1. Operation Outline

This section outlines the operations. The work flowchart below shows the daily operation. For details on each operation, refer to the relevant section.



***1**: For details about the user registration, refer to “4.5. Management Level and User Edition/Login.”
Before shipment, the user with the user name, Admin, and with the management level of Administrator has been registered.

4.2. Turning the Power ON

1. Turn the power switch 90 degrees clockwise to the ON (**I**) position.

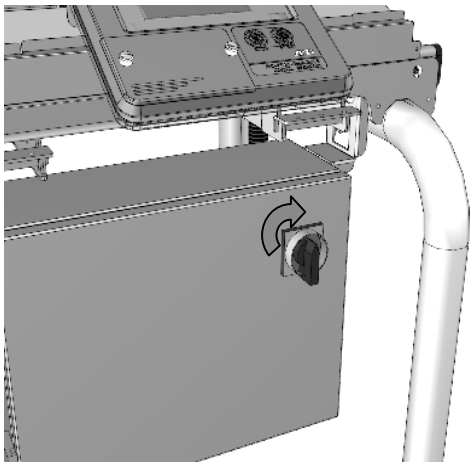


Fig.10 Power switch

2. After the checkweigher startup, the Weighing screen appears.

Fig.11 Weighing screen (Initial screen)

4.3. Turning the Power OFF

1. Turn the power switch 90 degrees counterclockwise to turn off and stop the checkweigher.

Note:

For emergency stop, perform the above operation.

In that case, before turning the power ON again, be sure to resolve the cause of the stop.

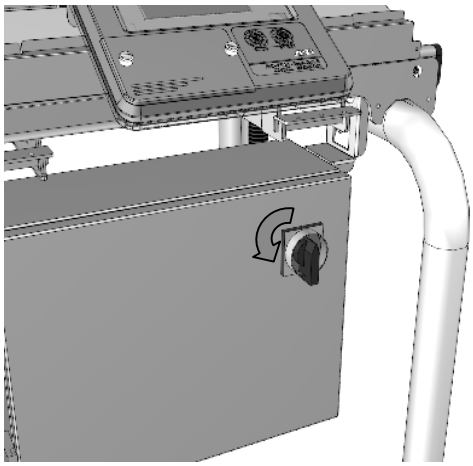


Fig.12 Power switch

4.4. Weighing Operation

This section describes the weighing operation.

Note:

This section is described under the assumption that the product has been registered and set beforehand.

For details about the product registration and setting, refer to “4.6. Selecting the Product / Changing the Detect Function Settings.”

4.4.1. Changing the weighing value display

In the Weighing screen, touch the display key 

to change the displaying size and contents of the weighing values.

Two types of weighing value displaying contents are available: regular and deviation.

The size has also two types: enlarged and reduced.

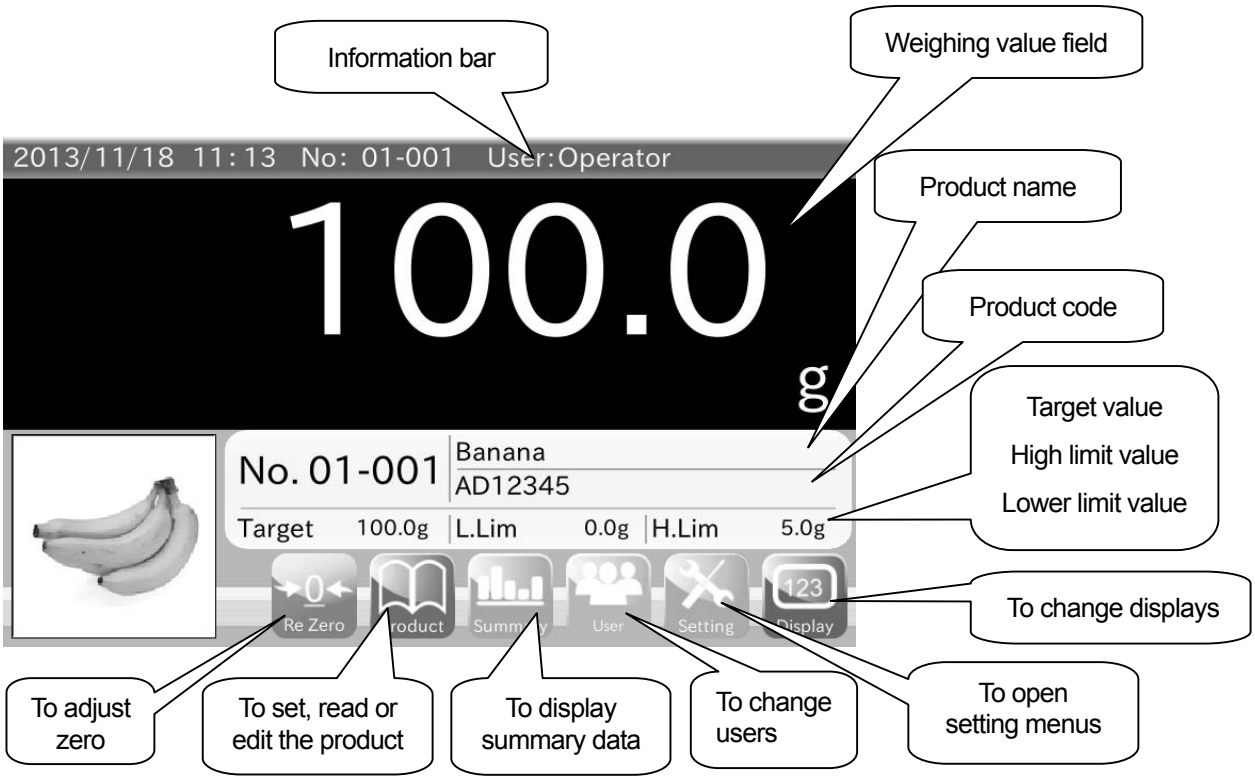


Fig.13 Display example (Enlarged regular display)

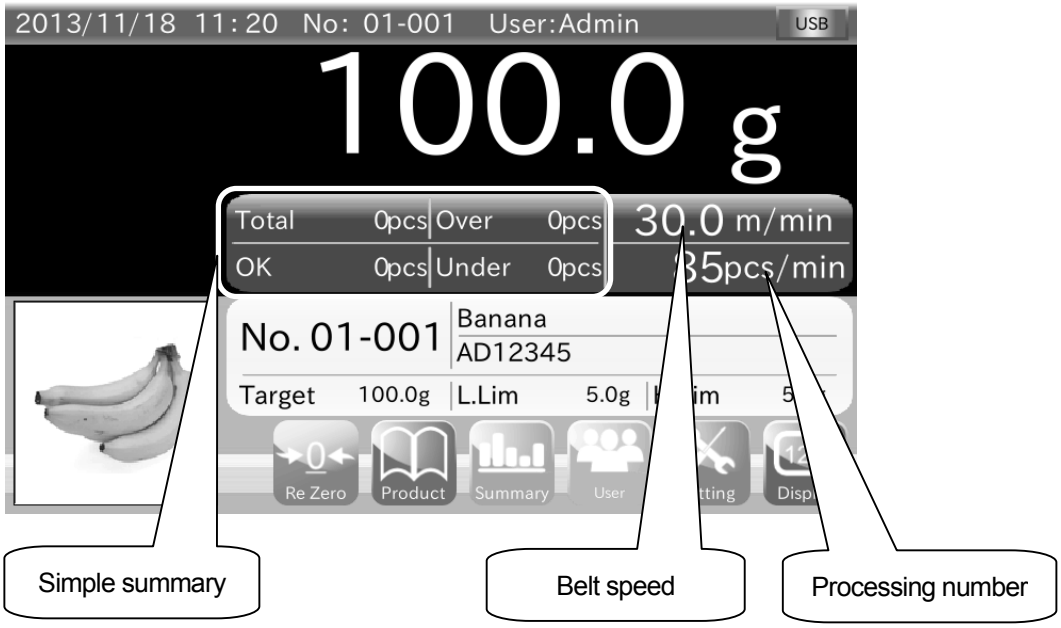


Fig.14 Display example (Reduced regular display)

The regular display displays the product weighing value as is, or the value with the tare value subtracted when the tare value is set.

The deviation display displays the difference between the product weighing value and the target value.
In the deviation display, the deviation mark DEV appears in the weighing value field of the Weighing screen.

The displaying order is as below:

Regular (Enlarged) → Regular (Reduced) → Deviation (Enlarged) → Deviation (Reduced)

4.4.2. Adjusting zero

If the weighing value is not zero (0) when the conveyor is stopped, touch the Re-Zero key Re Zero to perform zero adjustment to set the weighing value to zero.

When the weighing value exceeds the zero adjustment range when the conveyor is stopped, zero adjustment cannot be performed.
Causes of the above situation are:

- There may be foreign substances on the conveyor.
- Foreign substances are collected on the conveyor little by little. And zero adjustment is performed each time. Now the mass value of the collected foreign substances may exceed the zero adjustment range.
- The weighing conveyor may be in contact with the infeed conveyor or rejector conveyor.

- An excessive load is applied to the conveyor and the load cell is deformed.
- An upward excessive load is applied to the load cell, for example, raising the checkweigher by holding the conveyor, and the load cell is deformed.

If the weighing value is not zero even after the foreign substances are removed and zero adjustment is performed, calibration using a weight is required.
When the load cell is deformed within the usable range, calibration using a weight will set the weighing value to zero.
If the weighing value is not zero even after calibration using a weight, replace the weighing conveyor unit

Note:
For details about calibration using a weight, refer to “5.1. Calibrating the Checkweigher Using a Weight.”

4.4.3. Starting / Stopping the weighing operation

Press the START button on the display to move the conveyor to start a weighing operation.
Press the STOP button on the display to stop the conveyor to finish a weighing operation.

4.5. Management Level and User Edition/Login

With the checkweigher, users can be registered and the management level is assigned to each user to limit available operations.

This section describes the management level, user edition and login procedure.

Note:

- The checkweigher has default user information registered before shipment as follows:
  User name: Admin, Password: 0000 (four zeros), Management level: Administrator
- To edit a user, the management level of Administrator is required.
  To edit an unregistered user, log in by the default user Admin.
- In the user edition, users can be registered, changed or deleted.

4.5.1. Management level

The checkweigher has four stages of management level, “Administrator”, “Supervisor”, “Quality Manager” and “Operator”.

The detailed description of the management level is in the table below.

The operations available vary depending on the management level.

Assign an appropriate management level to each user to avoid unintentional operations and use the checkweigher safely.

The management level that appears when the power is turned on is Operator.

Management level	Operations authorized
Operator	Starting or finishing the weighing operation, displaying the Summary screen and selecting the product to be weighed
Supervisor	In addition to the Operator level operations, setting the product information and clearing the summary data
Quality Manager	In addition to the Supervisor level operations, setting the whole system
Administrator	In addition to the Quality Manager level operations, registering the user

Note:

- The management level of Operator indicates that the checkweigher has not been logged in by the user with the level of Supervisor or above.
  The user with the level of Operator cannot be registered, changed or deleted.

4.5.2. Changing the user

The management level that appears when the power is turned on is Operator.

To change the user, user login authentication is required.

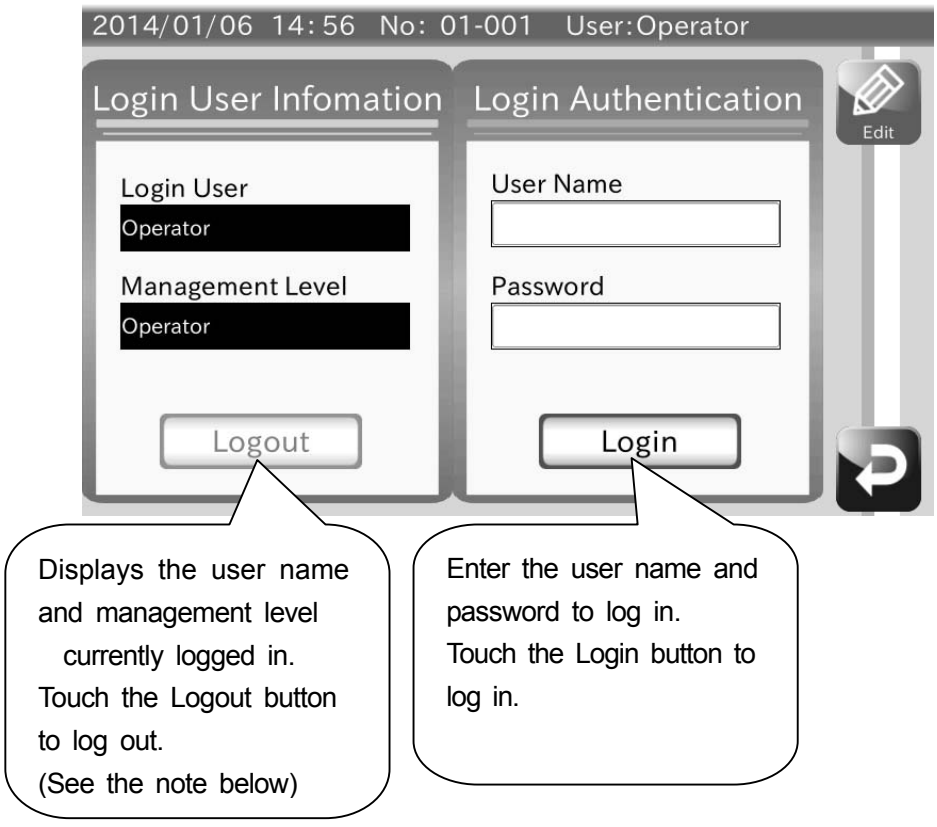
The user login authentication procedure is as follows:

Note:

The checkweigher has default user information registered as follows:

User name: Admin, Password: 0000 (four zeros), Management level: Administrator

1. In the Weighing screen, touch the User key  to open the User Login screen.



Note:

When the user is Operator, the logout operation is not available.

Fig.15 User Login screen

2. Enter the user name and password that are registered.

3. Touch the Login button to log in.

4. Touch the RETURN key  to return to the Weighing screen.

4.5.3. Registering the user

The user registration procedure is as follows:

1. In the User Login screen, touch the Edit key 

to open the User Edition screen.

Fig.16 User Edition screen

2. Select the Register User Name field and enter the user name to be registered.

3. Select the Register Password field and enter the four-digit password.

4. Select the Management level field and select an appropriate level for the user from Administrator, Quality Manager or Supervisor.

5. Touch the Register button.
   The registered user appears in the Users List field.

6. Touch the RETURN key  to return to the User Login screen.

4.5.4. Changing the user information

In the User Information Change screen, the contents of the user information registered can be changed.

The user information changing procedure is as follows:

1. In the User Login screen, touch the Edit key 

to open the User Edition screen.

2. Touch the Change key 

to open the User Selection screen.

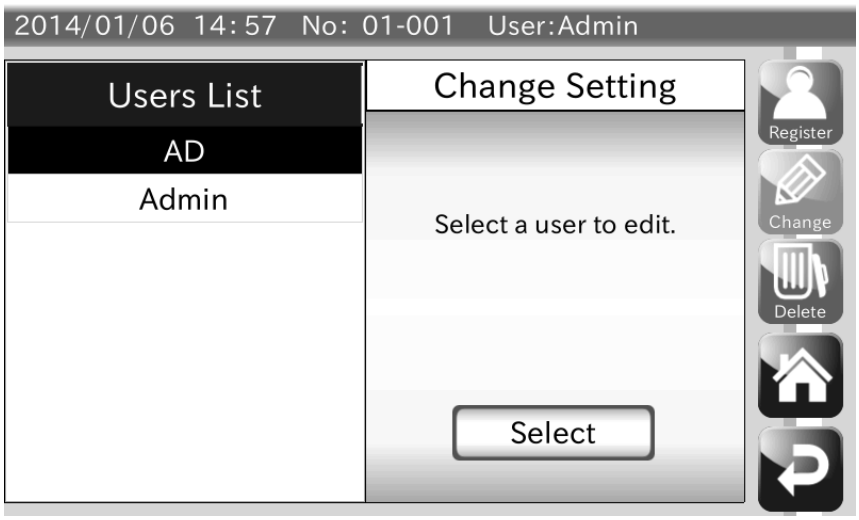


Fig.17 User Selection screen

3. Select the user to change from the Users List.

   Touch the Select button to open the User Information Change screen.

   Touch the Right arrow key to return to the User Selection screen.

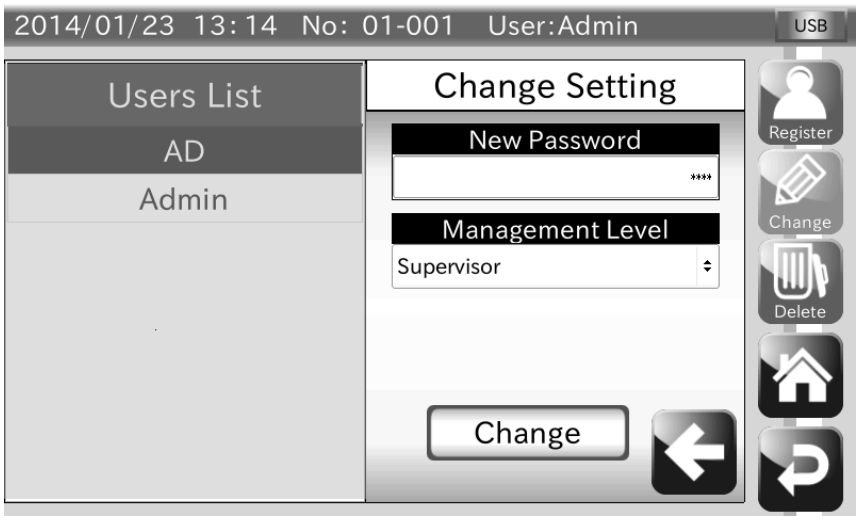


Fig.18 User Information Change screen

4. Select the New Password field and enter the new four-digit password.

5. Select the Management level field and select an appropriate level for the user from Administrator, Quality Manager or Supervisor.

6. Touch the Change button to confirm the new user settings.

4.5.5. Deleting the user

The user, either one selected user or all the registered users, can be deleted in the User Deletion screen.
The user deletion procedure is as follows:

Note

- The default user Admin or logged in user cannot be deleted.
- When the checkweigher is logged in by the user other than the default user Admin and all the registered users are deleted, the management level will be Operator automatically.

1. In the User Login screen, touch the Edit key 

to open the User Edition screen.

2. Touch the Delete key 

to open the User Deletion screen.

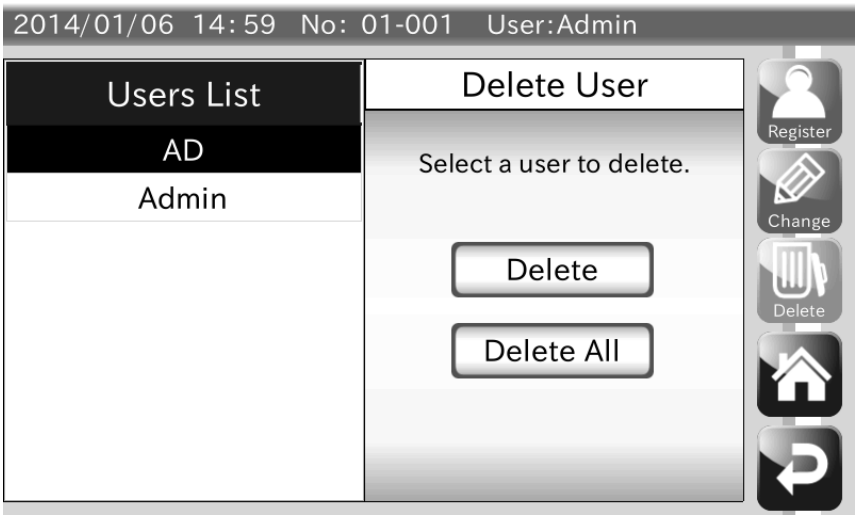


Fig.19 User Deletion screen

Deleting a selected user

1. Select a user to be deleted from the Users List.

2. Touch the Delete button to open the user deletion confirmation dialog box.
   Touch the Yes button to delete the selected user.

Fig.20 User deletion confirmation dialog box (A selected user)

3. The selected user will be deleted from the Users List.

Deleting all users

1. In the User Deletion screen, touch the Delete All button to open the user deletion confirmation dialog box.
   Touch the Yes button to delete all the registered users.

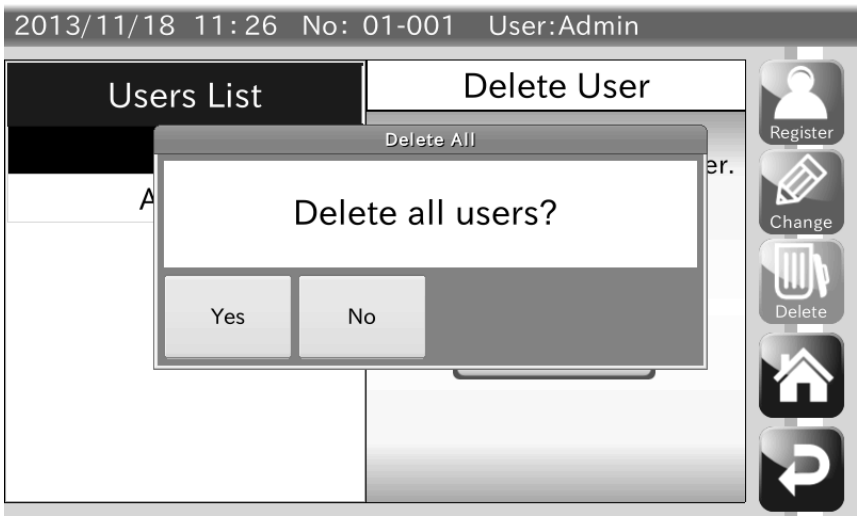


Fig.21 User deletion confirmation dialog box (All users)

2. All the registered users except Admin will be deleted form the Users List.

4.6. Selecting the Product / Changing the Detect Function Settings

This section describes the product selection and detect function settings changing procedures.

The product registration is available only for the management level of Quality Manager or above.

This section is described under the assumption that the checkweigher has been logged in by the user with the management level of Quality Manager.

Note:

About the setting values other than described in this section, refer to “8. Detailed Description of the Setting Values.”

During the operation, the setting will be saved each time it is changed.

To return to the previous screen during the operation, touch the RETURN key .

4.6.1. Registering the product

The product registration procedure is as follows:

1. In the Weighing screen, touch the Product key to open the Product Selection screen.
2. Enter the group No. (1 to 10).
   Touch the Left arrow key or Right arrow key to switch the Registration pages.
   Touch the product No. to be registered or enter the product No. in the Product No. field. The product field of the touched or entered product No. will turn orange to be ready for selection.

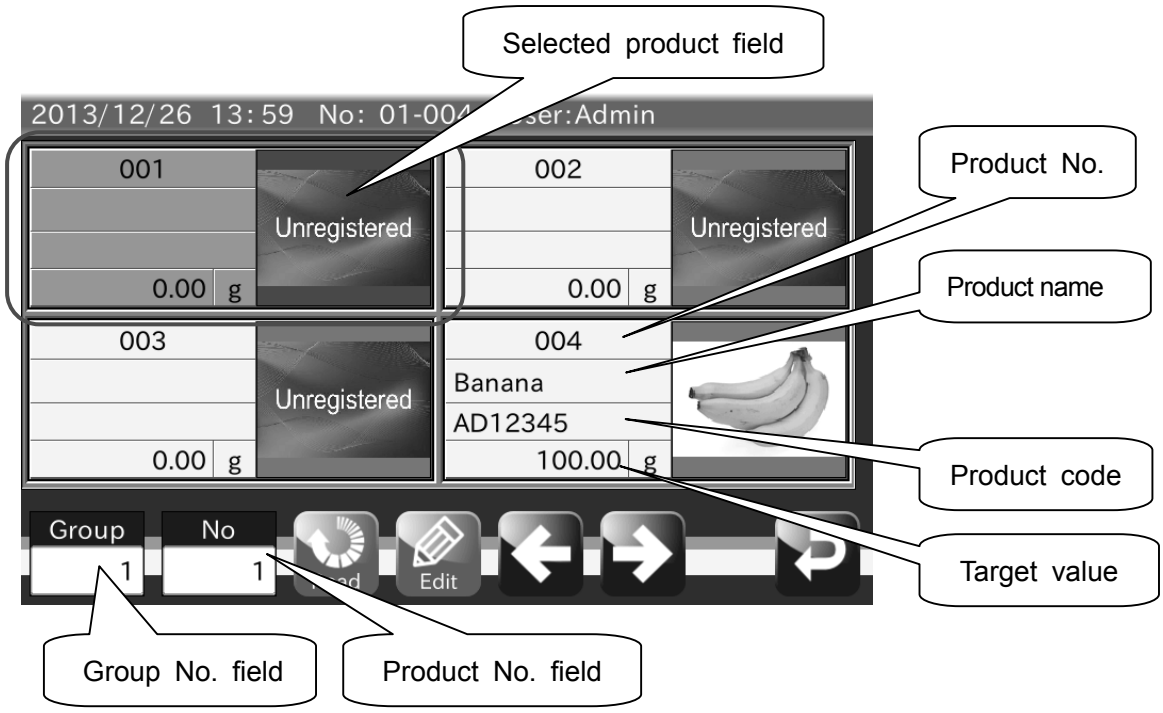


Fig.22 Product Selection screen

3. Touch the Edit key 

to register the product and open the Product Setting screen.

In the Product Setting screen, the product name or code is entered, the product image is registered and the settings are copied or deleted.

Note:

- Touching the Image button will open the Image Selection screen to register images saved in the USB memory. For details, refer to “4.6.9. Registering the product image.”
- Touching the Copy button will open the setting copy dialog box to copy the registered product settings into the current product No. For details, refer to “4.6.10. Copying the product settings.”
- Touching the Delete button will open the deletion confirmation dialog box to delete the registered product settings. For details, refer to “4.6.11. Deleting the product settings.”

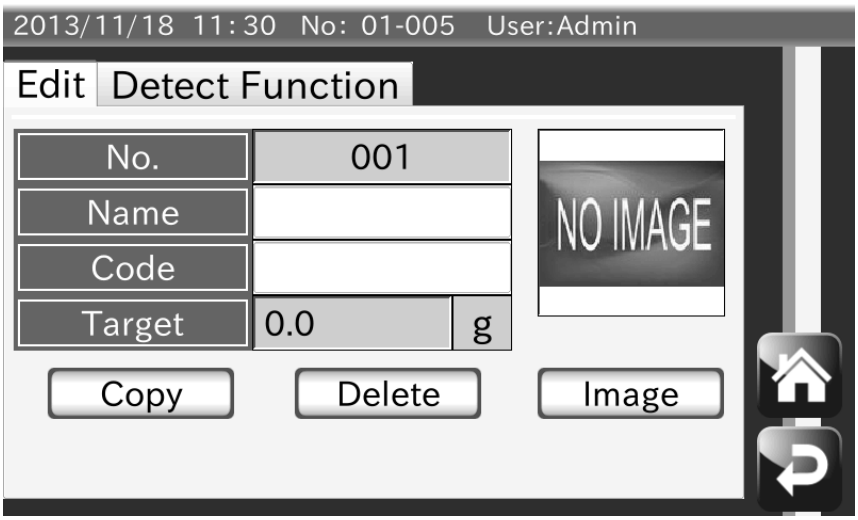


Fig.23 Product Setting screen (with the Edit tab selected)

4. Select the Detect Function tab to display the setting menu to select the setting to be changed.
For details about each setting, refer to the following sections.

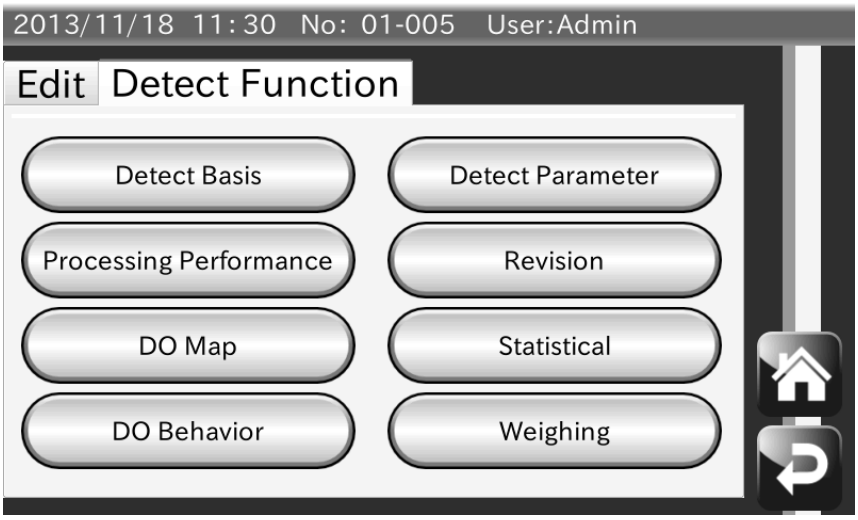


Fig.24 Product Setting screen (with the Detect Function tab selected)

4.6.2. Setting the target, high limit and lower limit values

The values used for detection are set.

1. Touch the Detect Basis button of the setting menu to open the screen below.

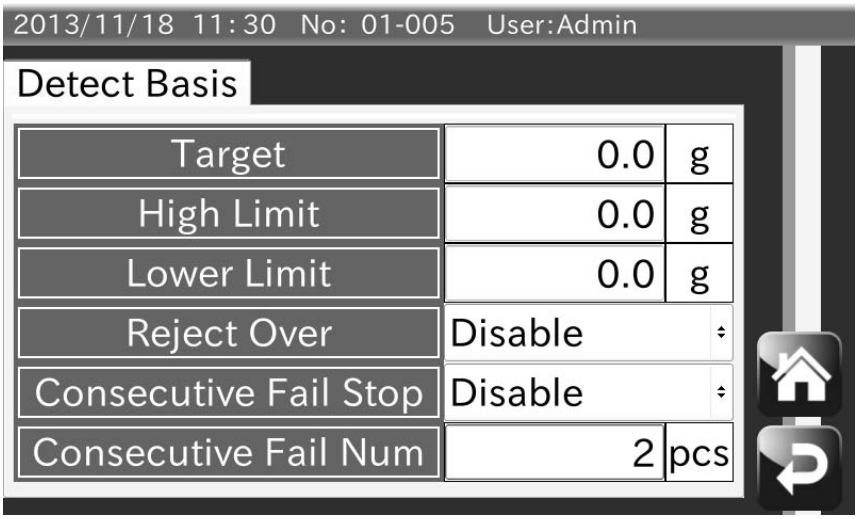


Fig.25 Detect Basis Setting screen

2. Select Target to enter the mass of the product to be weighed.

3. Select High Limit to enter the upper limit mass value of the product.
   Here, enter the value deviated from the target value.
   For example, when the target value is 100 g and the upper limit mass value is 150 g, enter 50 g in the High Limit field. (150 g –100 g=50 g)

4. Select Lower Limit to enter the lower limit mass value of the product.
   Here, enter the value deviated from the target value.
   For example, when the target value is 100 g and the lower limit mass value is 50 g, enter 50 g in the Lower Limit field. (100 g –50 g=50 g)

5. Touch the RETURN key  to return to the Product Setting screen.

4.6.3. Setting the product length, processing number and belt speed

The values related to the processing performance are set.

1. Touch the Processing Performance button of the setting menu to open the screen below.

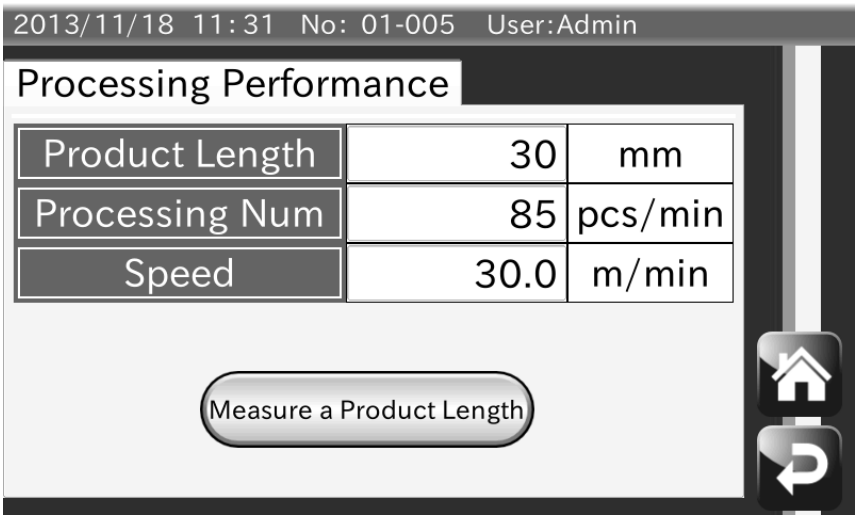


Fig.26 Processing Performance Setting screen

2. Select Product Length to enter the length of the product.
   Touching the Measure a Product Length button will measure the length of the product automatically. The products are actually fed and the average length is obtained to set as the product length.
   The product length is used to detect an unsplit product (The product length is longer than the specified product length).
   For details, refer to “4.6.8. Measuring the product length.”

3. Select Speed to enter the belt speed of the conveyor.
   Using the specified speed and the conveyor length, the processing number will be automatically calculated.

4. Touch the RETURN key  to return to the Product Setting screen.

4.6.4. Setting the tare value

The tare value is set.

1. Touch the Revision button of the setting menu to open the screen below.

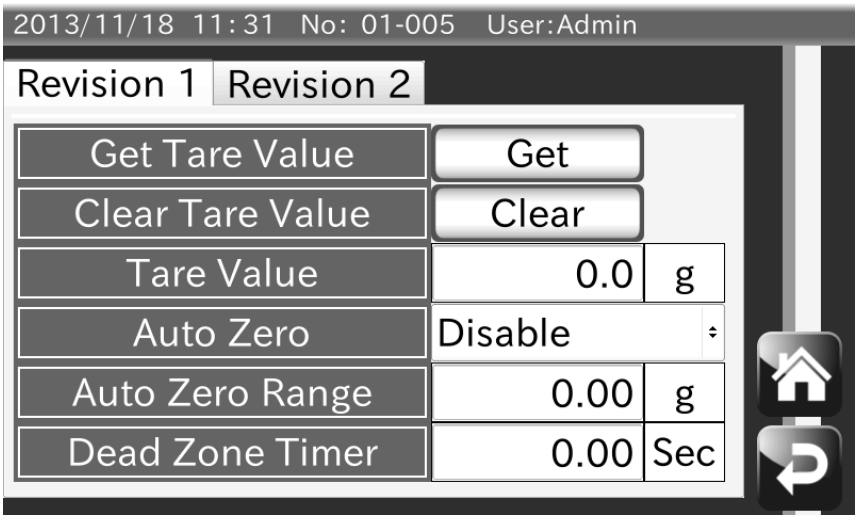


Fig.27 Revision Setting screen

2. Place a tare on the weighing conveyor and touch the Get button.
   The tare mass on the weighing conveyor will be set as the tare value.
   When the tare value is known, the value can be entered directly in the Tare Value field.
   To clear the tare mass, touch the Clear button.
   When the tare value has been set, the Tare mark TAR EN appears in the Weighing screen.

3. Touch the RETURN key to return to the Product Setting screen.

4.6.5. Setting the digital output (DO)

DO related items and whether or not to stop the conveyor according to the judgment result are set.

1. Touch the DO Map button of the setting menu to open the screen below.

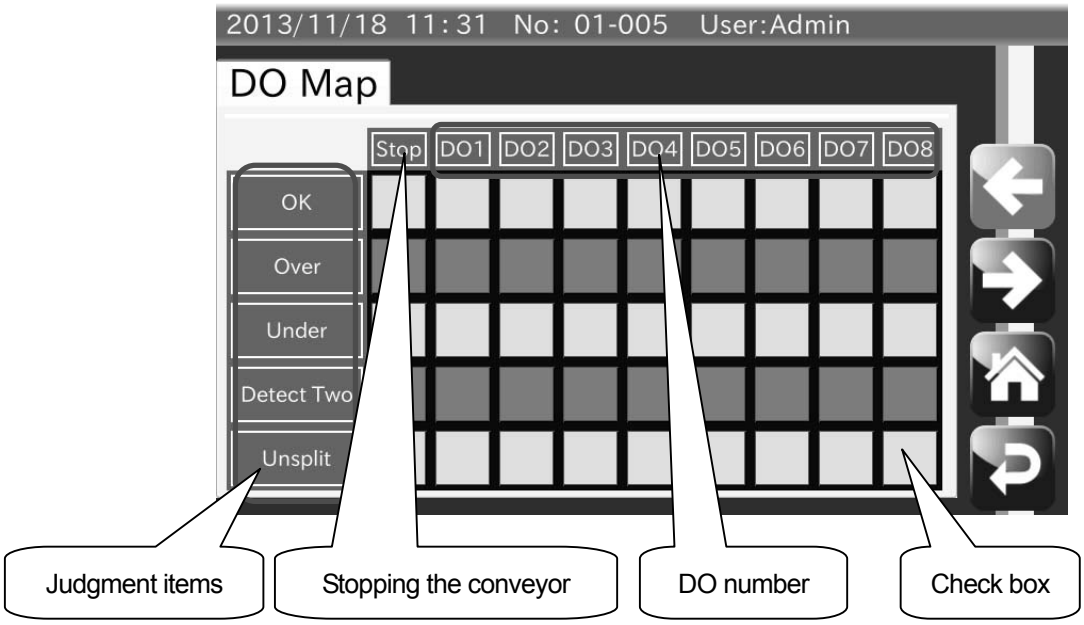


Fig.28 DO Map Setting screen

2. For each judgment item, touch the check box of the DO number to be output.
   For example, when the judgment is “Over” and a signal is to be output from DO1, touch the check box shown in the illustration below.

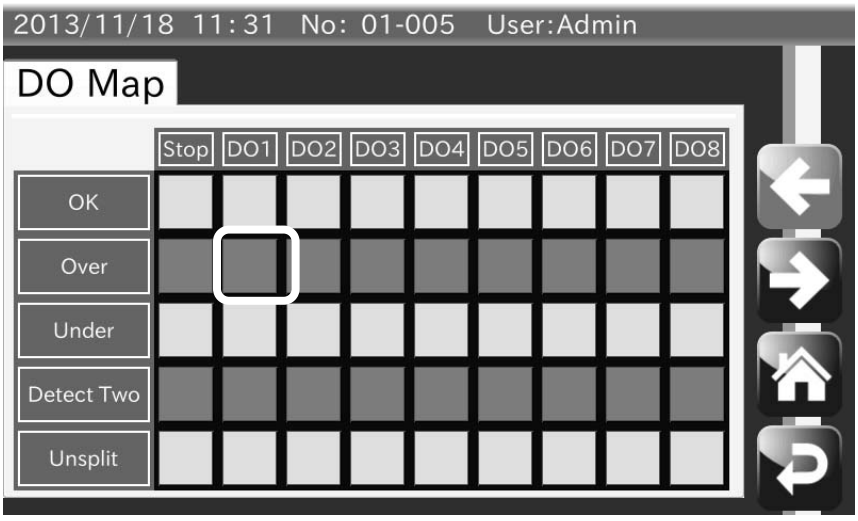


Fig.29 DO Map checking position example

When touched, the check mark  appears in the check box.

Touch the Left arrow key or Right arrow key to switch the judgment items.

3. When the product is weighed and the judgment item is judged, a signal will be output from the specified DO according to the delay time and hold time.
   For details about the delay and hold time, refer to “4.6.6. Setting the delay and hold time.”

4. When the Stop column is checked, the conveyor will stop according to the result of the specified judgment item.

5. Touch the RETURN key  to return to the Product Setting screen.

4.6.6. Setting the delay and hold time.

DO behavior after the judgment result is set.

Delay time is the time elapsed from judgment result output until a signal is output from the specified DO.

Hold time is the time a signal is being output from the specified DO.

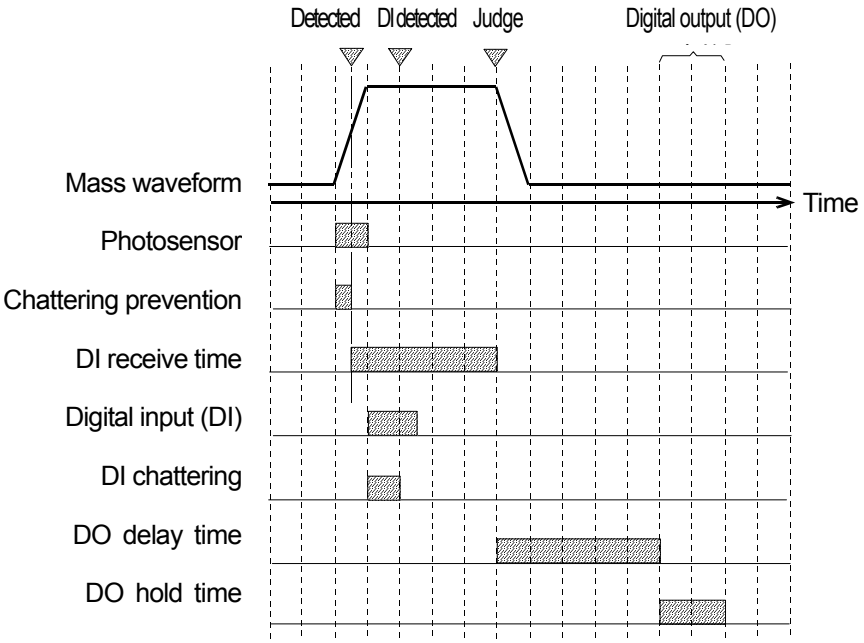


Fig.30 DI/DO timing chart

1. Touch the DO Behavior button of the setting menu to open the screen below.
   Touch the Left arrow key or Right arrow key to switch the judgment items.

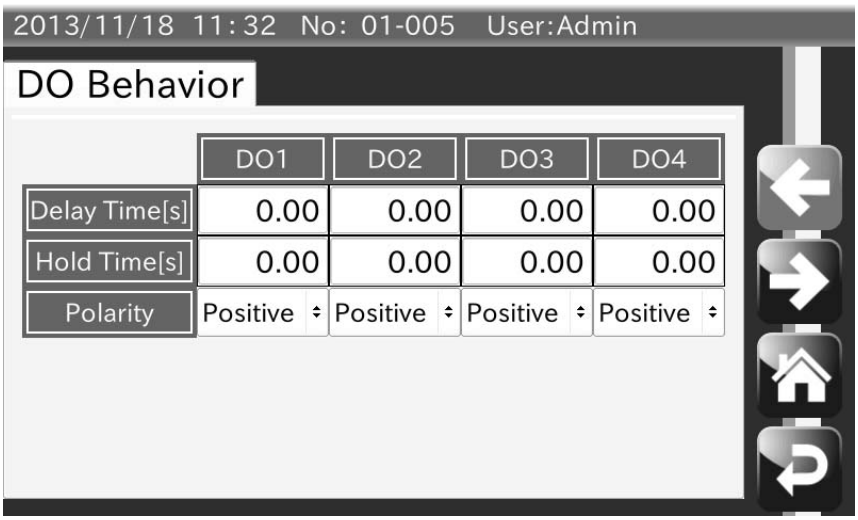


Fig.31 DO Behavior Setting screen

2. Select Delay Time to enter a delay time for each DO.
   e.g.: connecting DO1 to the flipper type rejector
   A basic delay time is the time a product moves from the weighing conveyor to the rejector.

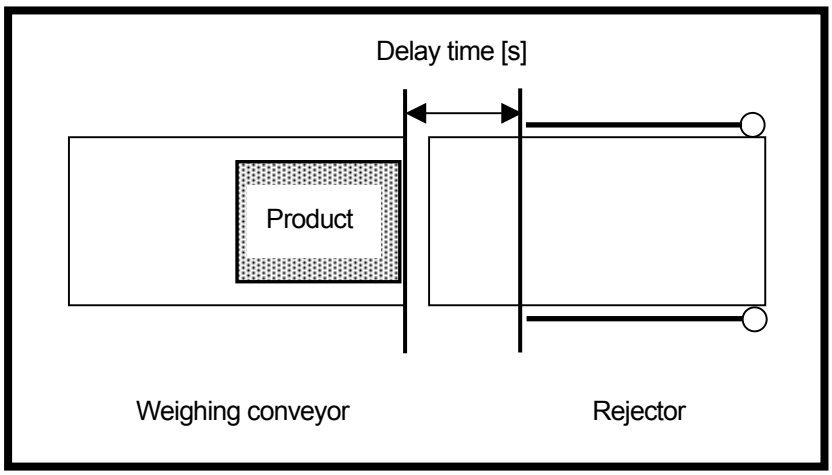


Fig.32 Delay time setting example

When the distance from the weighing conveyor to the rejector is 0.2 m and the belt speed is 30 m/min, the DO1 delay time will be 0.4 second. (0.2 m ÷ 30 m/min x 60 s = 0.4 s)
Note that the delay time may need to be fine adjusted depending on the swing time (setting of the speed controllers) of the rejector flipper arms.

3. Select Hold Time to enter a hold time for each DO.

4.6.7. Changing the product to be weighed

The product changing procedure is as follows:

1. In the Weighing screen, touch the Product key 

to open the Product Selection screen.
2. Enter the group No. (1 to 10).
   Touch the Left arrow key or Right arrow key to switch the Registration pages.
   Touch the product No. to be weighed or enter the product No. in the Product No. field. The product field of the touched or entered product No. will turn orange to be ready for selection.
3. Touch the Read key 

to read the settings of the selected product.

   When the Product Selection screen, Product Setting screen or each screen of “Detect Function Setting” is opened, product settings can be read by pressing the START button on the display.

   Note:
   Changing the product settings with the START button is available only when the selected product is different from the product to be weighed.
4. Touch the RETURN key  to return to the Product Selection screen.

e.g.: Changing the product settings with the START button

1. With the Product Selection screen, Product Setting screen or each screen of “Detect Function Setting” opened, press the START button to open the Reading Confirmation dialog box.

   Note:
   The Reading Confirmation dialog box can be disabled.
   For details, refer to “8.13.7. Reading Confirmation dialog.”
   With Reading Confirmation dialog box disabled, the product settings will be changed without confirmation.

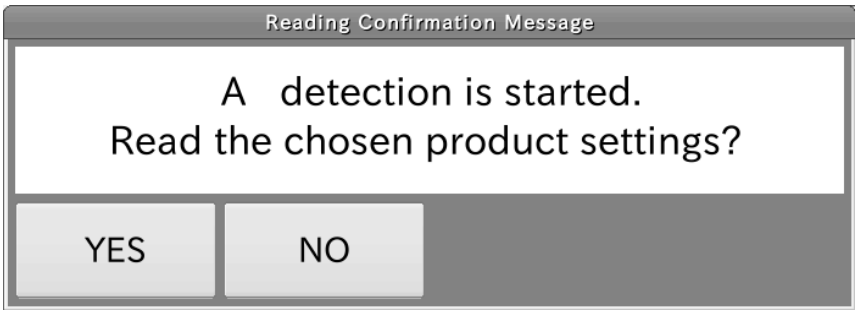


Fig.33 Reading Confirmation dialog box

2. Touch the YES button to change the settings and start weighing.
3. Touch the NO button to start weighing without changing the settings.

4.6.8. Measuring the product length

A product is fed on the conveyor and the photosensor measures the length of the product.
Repeat the procedure three times and the average of the three measurements is set as the product length.
The product length measurement procedure is as follows:

Note:
The length of a transparent product may not be measured.
Should this occur, enter the product length directly or adjust the sensor position or sensitivity.

1. Touch the Processing Performance button of the setting menu to open the Processing Performance Setting screen.
   Touch the Measure a Product Length button to open the screen below.

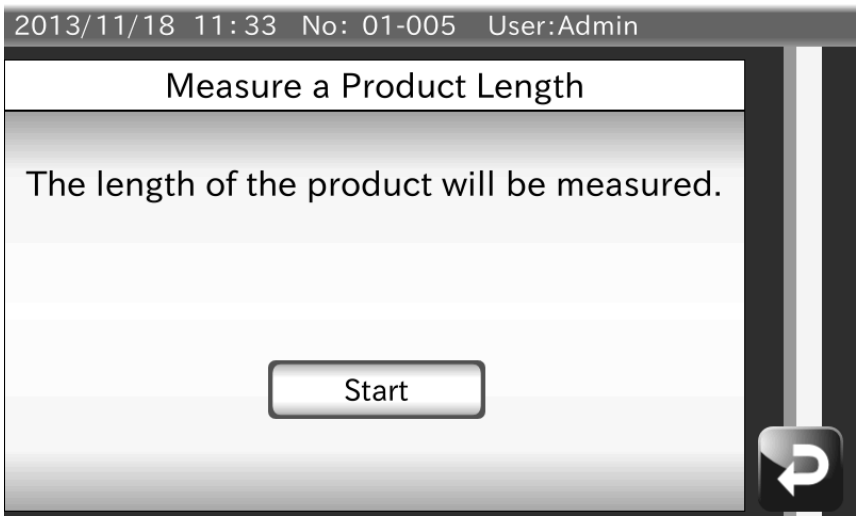


Fig.34 Product length measurement start screen

2. Touch the Start button to open the screen below.

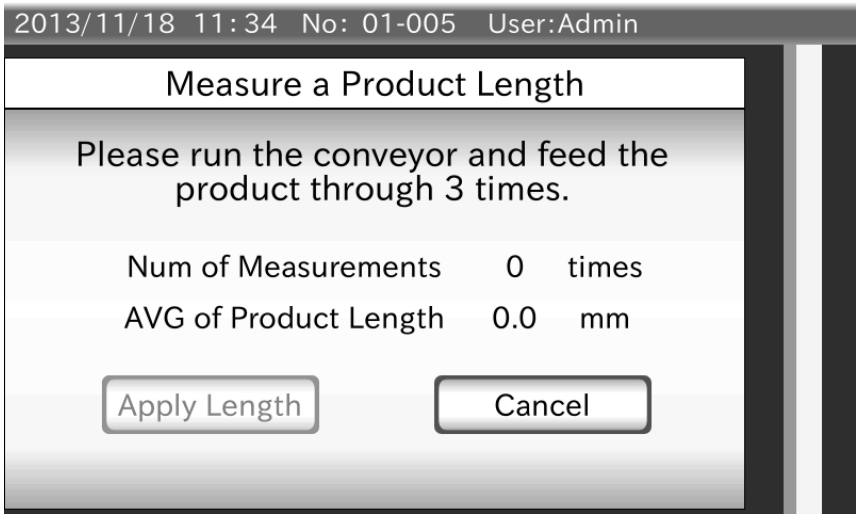


Fig.35 Product length measurement screen

Press the START button on the display to start the conveyor. Feed the product three times.
To cancel the measurement, touch the Cancel button.

3. When the measurement is complete, the screen below appears.

   Touch the Apply Length button to set the average product length as the product length.

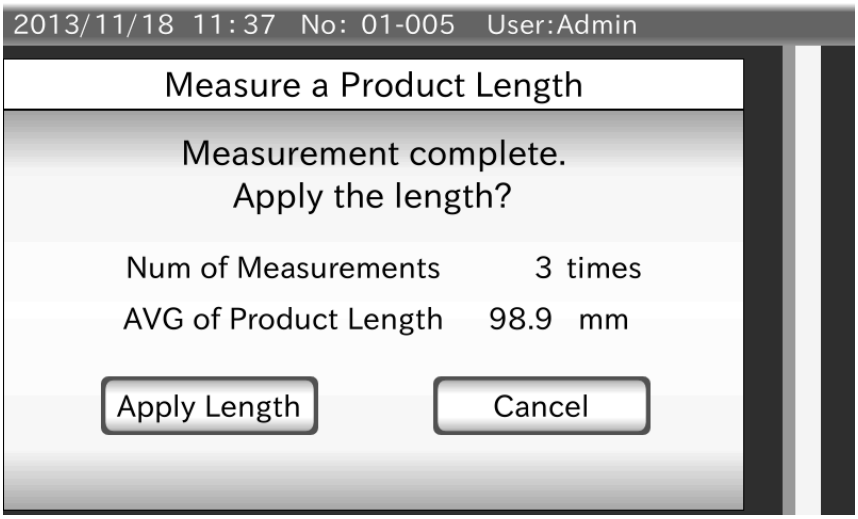


Fig.36 Product length measurement completion screen

4. The Product length measurement start screen appears.

   Touch the RETURN key  to return to the Processing Performance Setting screen.

   The measured length appears in the Product Length field.

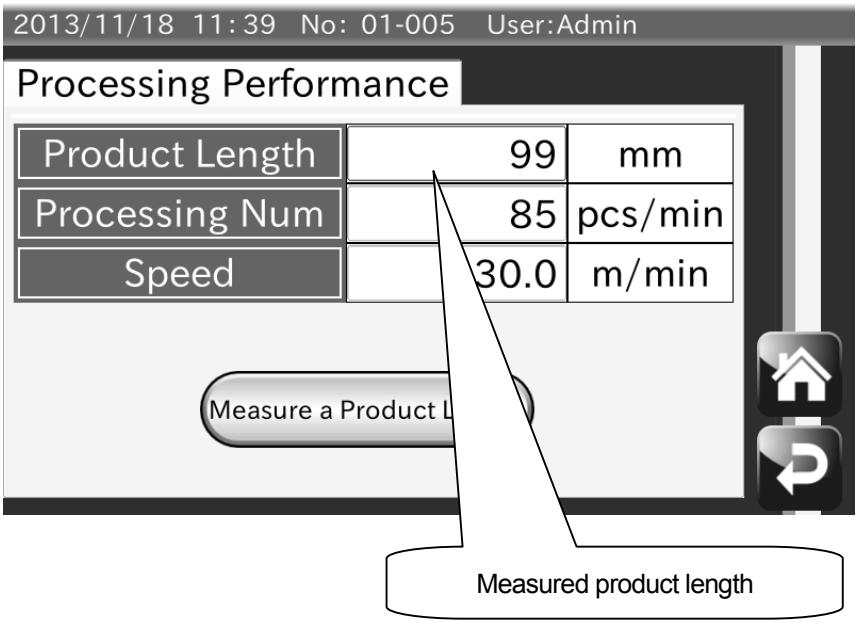


Fig.37 Processing Performance Setting screen after product length setting

4.6.9. Registering the product image

The product image registration procedure is as follows:

Note:

- Images must be saved in USB memory beforehand.
- Image file names with spaces cannot be registered.
- Images that can be registered are JPEG files.
- For details about connecting the USB memory, refer to “2.2.2. Connecting the USB memory.”
- For details about formatting the USB memory, refer to “7.1. Formatting the USB Memory.”

1. Open the Product Setting screen (Edit tab).

2. Insert the USB memory into the USB terminal located on the display.

3. Touch the Image button to open the screen below.

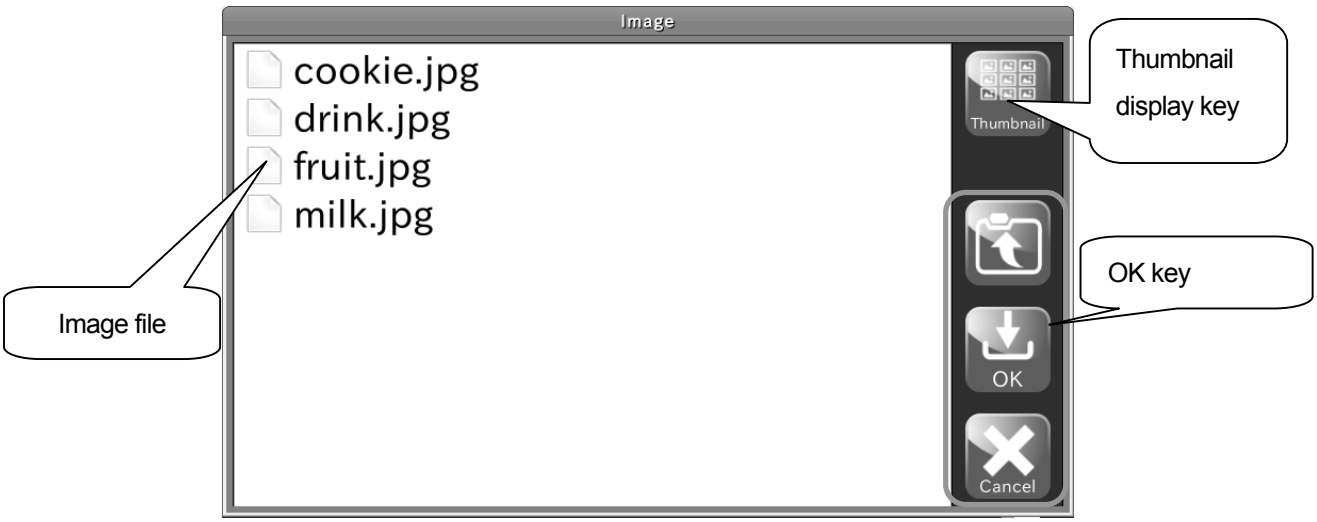


Fig.38 Image Selection screen

4. Touch the image folder name to open the folder.

   Touch the Return key  to return to the previous display or Cancel key 

to cancel the image selection.

   To display the thumbnail, touch the Thumbnail key 

.

5. Touch the image file to select.

6. Touch the OK key  to register the selected product image.

   The registered product image will appear in the Product Setting screen (Edit tab).

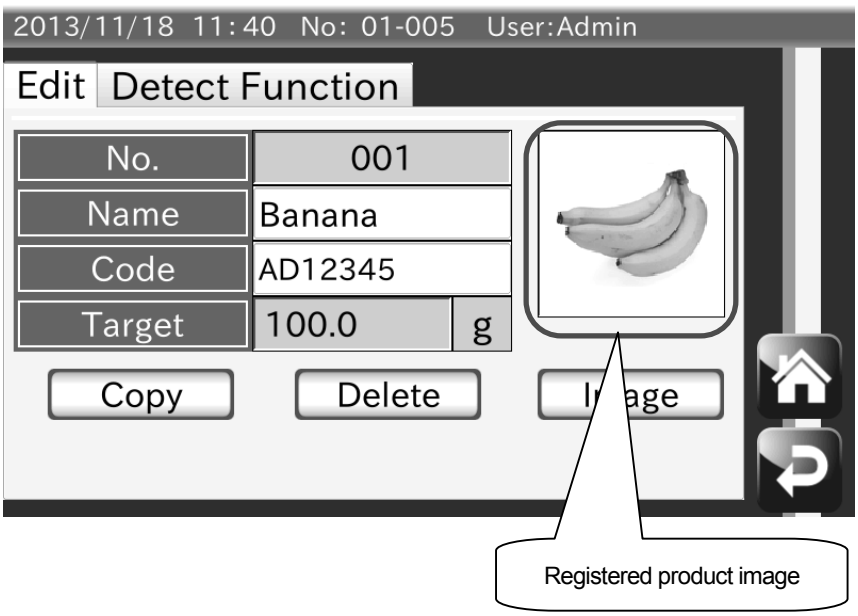


Fig.39 Registered product image example

4.6.10. Copying the product settings

The settings of the registered product can be copied to another product number.

The product setting copying procedure is as follows:

1. Open the Product Setting screen (Edit tab).

2. Touch the Copy button to open the dialog below.

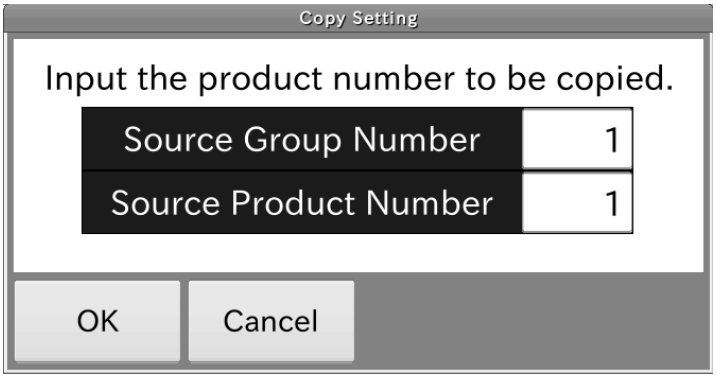


Fig.40 Copy Setting dialog box

4. Select Source Group Number to enter the source group number.

5. Select Source Product Number to enter the source product number.

6. Touch the OK button to copy the specified product settings.

4.6.11. Deleting the product settings

The registered product settings can be deleted.

The product setting deletion procedure is as follows:

1. Open the Product Setting screen (Edit tab).

2. Touch the Delete button to open the dialog below.
   Touch the Yes button to delete the registered product settings.

Fig.41 Setting deletion confirmation dialog box

4. The settings of the product will be deleted and the product will be unregistered.

4.7. Summary of Weighing Results

This section describes the weighing result summary.

Note:

- Histograms, control charts and summary results can be output to the USB memory or printer.
  For details, refer to “6. Output.”
- Only USB memory formatted in FAT32 can be used.
  For details about the USB memory formatting procedure, refer to “7.1. Formatting the USB Memory.”

4.7.1. Weighing history

In the Weighing screen, touch the Summary key 

to open the Weighing History screen.

In the Weighing History screen, a maximum of 100 weighing results can be displayed.

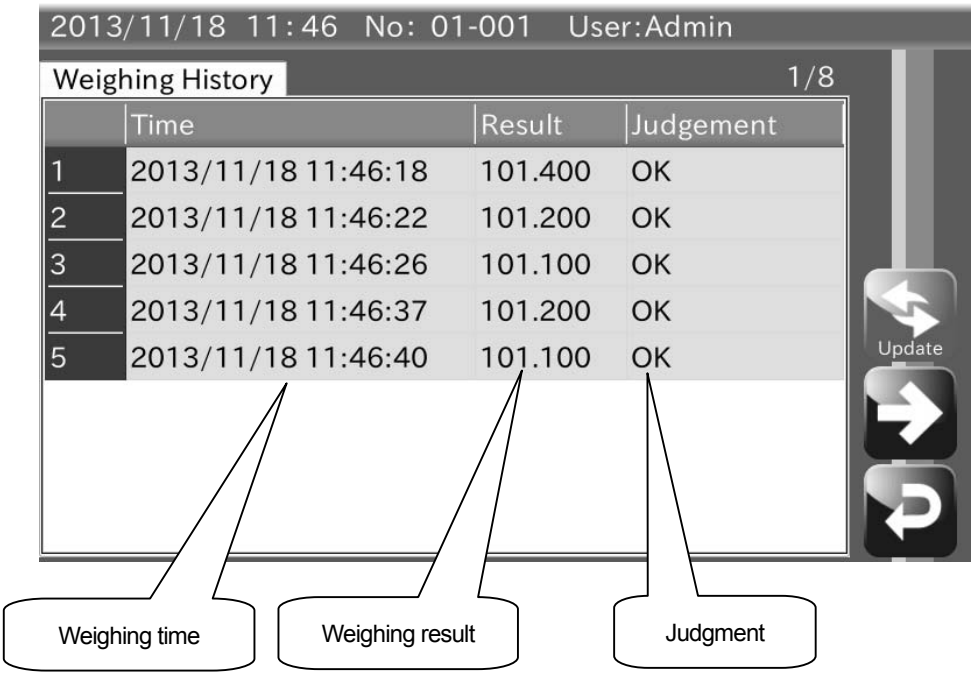


Fig.42 Weighing History screen

Touch the Update key 

to update the displaying contents to display the newest history.

Touch the Right arrow key 
to go to the Histogram screen.

Touch the RETURN key 
to return to the Weighing screen.

4.7.2. Histogram

A histogram displays the frequency distribution of the total weighing results (all summary) (including the failed products) of the selected product number.

To display or print a histogram, the target value and class width must be set beforehand.

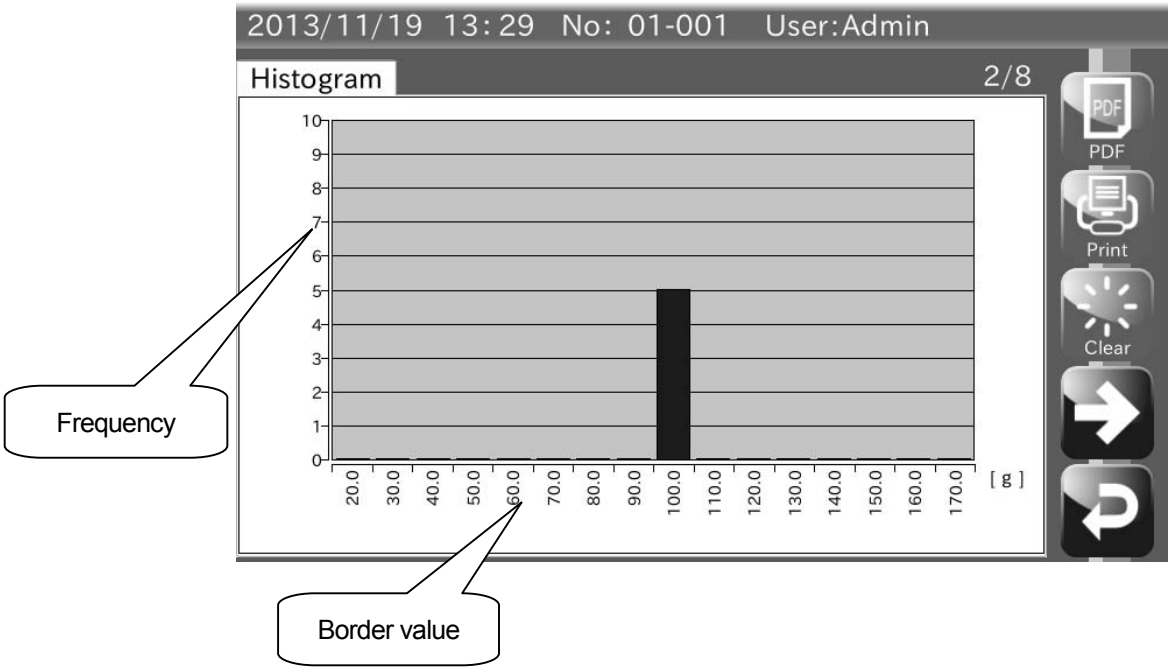


Fig.43 Histogram screen

The relation between the border value and class width is shown in the table on the next page.

The target value is placed in class No.9 and frequency is counted for each class.

Clearing a graph is available only for the management level of Supervisor or above.

Note:

Even if the target value is changed during the summary process, the summary will be based on the class width calculated using the former target value.

Touch the Clear key 

to clear the summary process. The class width will be the one calculated using the new target value.

When the class width is changed, the graph data is deleted automatically and the class width will be updated.

Note:

For details, refer to “8.2.1. Target value” and “8.7.5. Class width.”

Relation between the border value and the class width

Target value: S, Class width: k

Class No	Border value	Class width
1	-	$w<W_2$
2	$W_2=S-7k$	$W_2 \leqq w<W_3$
3	$W_3=S-6k$	$W_3 \leqq w<W_4$
4	$W_4=S-5k$	$W_4 \leqq w<W_5$
5	$W_5=S-4k$	$W_5 \leqq w<W_6$
6	$W_6=S-3k$	$W_6 \leqq w<W_7$
7	$W_7=S-2k$	$W_7 \leqq w<W_8$
8	$W_8=S-k$	$W_8 \leqq w<W_9$
9	$W_9=S$	$W_9 \leqq w<W_{10}$
10	$W_{10}=S+k$	$W_{10} \leqq w<W_{11}$
11	$W_{11}=S+2k$	$W_{11} \leqq w<W_{12}$
12	$W_{12}=S+3k$	$W_{12} \leqq w<W_{13}$
13	$W_{13}=S+4k$	$W_{13} \leqq w<W_{14}$
14	$W_{14}=S+5k$	$W_{14} \leqq w<W_{15}$
15	$W_{15}=S+6k$	$W_{15} \leqq w<W_{16}$
16	$W_{16}=S+7k$	$W_{16} \leqq w$

With USB connected, touch the PDF key 

to output the histogram.

With a printer connected, touch the Print key 

to output the histogram to the printer.

Touch the Right arrow key 
to go to the $\bar{x}$ Control Chart screen.

Touch the RETURN key 
to return to the Weighing screen.

4.7.3. $\overline{\overline{X}}$ control chart

$\overline{\overline{X}}$ control chart is displayed based on the number of samples, sample size (sub samples) and the setting value of $\overline{\overline{X}}$.

When $\overline{\overline{X}}$ is set, a graph is displayed according to $\overline{\overline{X}}$.

When $\overline{\overline{X}}$ is set to 0, $\overline{\overline{X}}$ is calculated using the weighing data acquired for a control chart to display a graph.

Take the number of data corresponding to the sample size (sub samples) out of the number of samples, as control chart data. A control chart is made using the data.

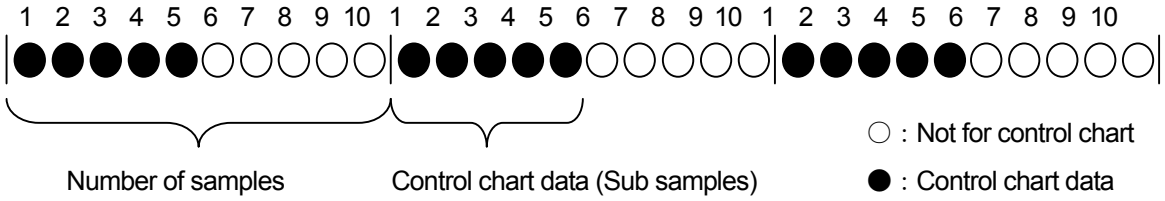
Note:

For details on the number of samples, sample size (sub samples) and $\overline{\overline{X}}$ setting, refer to “8.7.1. Number of samples”, “8.7.2. Sample size (sub samples)” and “8.7.3. $\overline{\overline{X}}$.”

e.g.:

When the number of samples is 10 and the sample size (sub samples) is 5:

Out of 10 data that is set as the number of samples, the first five is used to make a control chart.



The illustration below is an example $\overline{x}$ control chart.

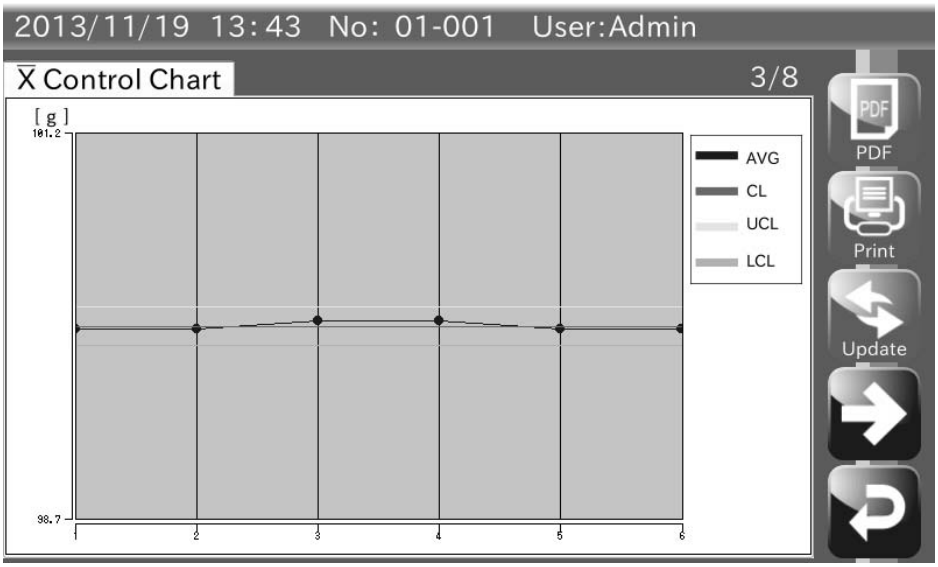


Fig.44 $\overline{X}$ Control Chart screen

Touch the Update key  to display the newest control chart.

With USB connected, touch the PDF key  to output control charts ($\overline{X}$ control chart, R control chart).

With a printer connected, touch the Print key  to output control charts to the printer ($\overline{X}$ control chart, R control chart).

Touch the Right arrow key  to go to the R Control Chart screen.

Touch the RETURN key  to return to the Weighing screen.

4.7.4. R control chart

R control chart is displayed based on the number of samples, sample size (sub samples) and the setting value of $\overline{R}$.

When $\overline{R}$ is set, a graph is displayed according to $\overline{R}$.

When $\overline{R}$ is set to 0, $\overline{R}$ is calculated using the weighing data acquired for a control chart to display a graph.

Note:

For details on $\overline{R}$ setting, refer to "8.7.4. $\overline{R}$."

The illustration below is an example R control chart.

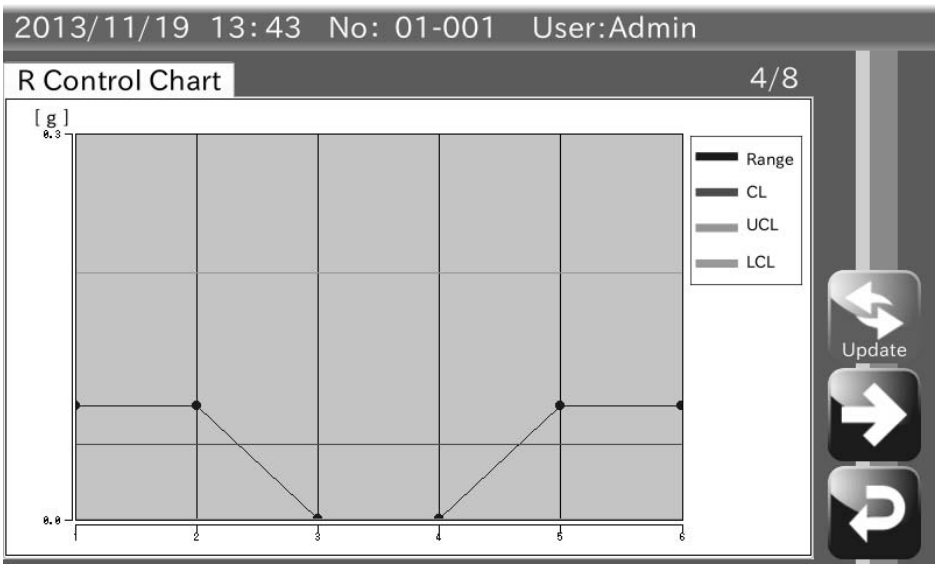


Fig.45 R Control Chart screen

Touch the Update key  to display the newest control chart.

Touch the Right arrow key  to go to the All Summary screen.

Touch the RETURN key  to return to the Weighing screen.

4.7.5. All summary

All summary is the summary of total weighing results including the failed products.

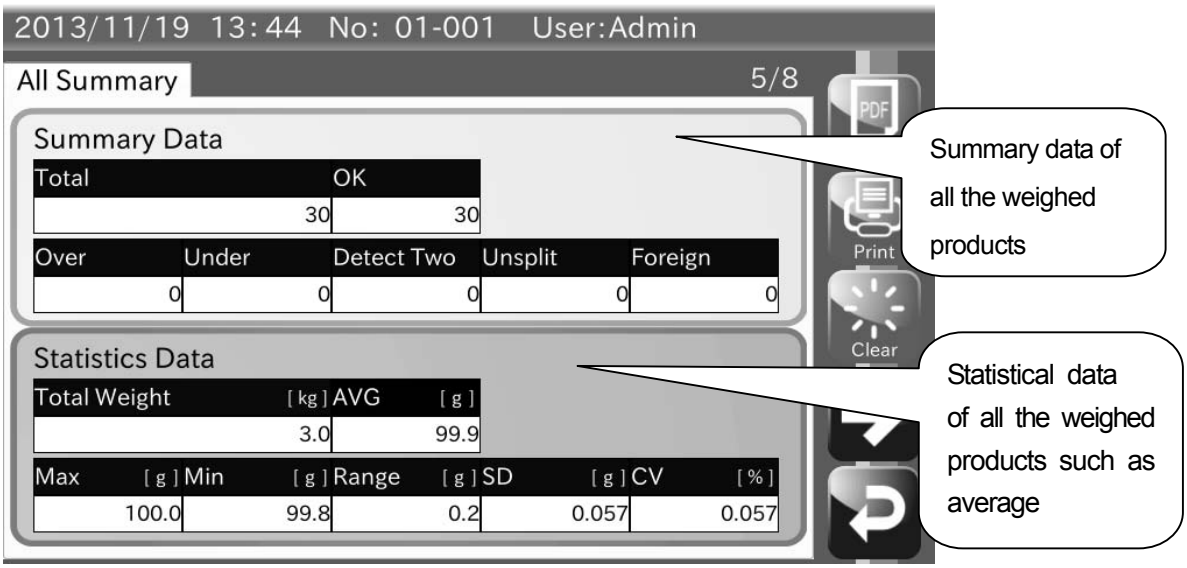


Fig.46 All Summary screen

Touch the Clear key  to clear all summary data.

With USB connected, touch the PDF key  to output the summary results.

With a printer connected, touch the Print key  to output the summary results to the printer.

Note:

Summary results include data of all summary, OK summary, number of samples summary and number of OK samples summary.

Touch the Right arrow key  to go to the OK Summary screen.

Touch the RETURN key  to return to the Weighing screen.

4.7.6. OK summary

OK summary is the summary of the weighing results of the passed products (OK) of the currently selected product number.

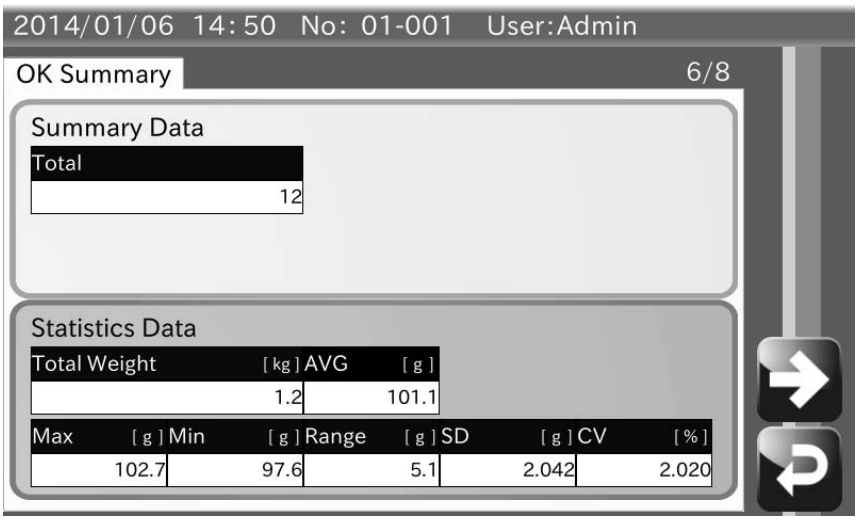


Fig.47 OK Summary screen

Touch the Right arrow key  to go to the Number of Samples Summary screen.

Touch the RETURN key  to return to the Weighing screen.

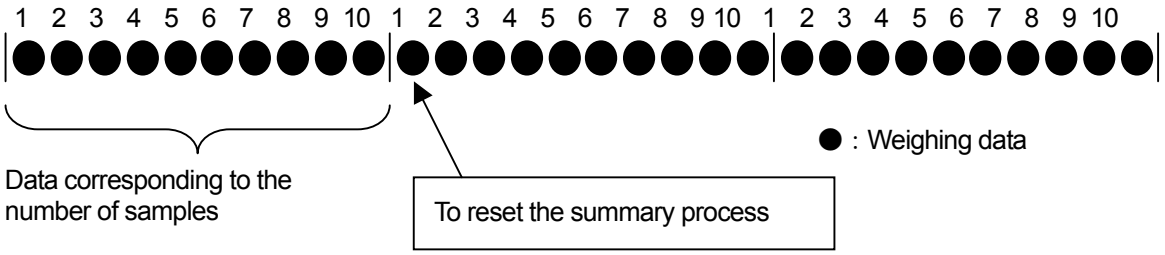
4.7.7. Number of samples summary

Number of samples summary is the summary of the weighing results per the specified sample number of the currently selected product. This summary includes the failed products.

When weighing the specified sample number is complete, the summary process will be reset.

e.g.:

When the number of samples is 10:



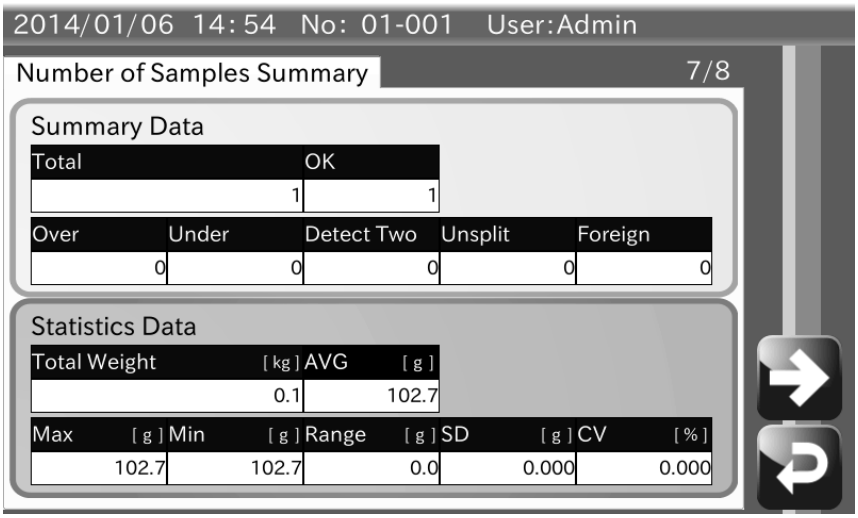


Fig.48 Number of Samples Summary screen

Touch the Right arrow key  to go to the Number of OK Samples Summary screen.

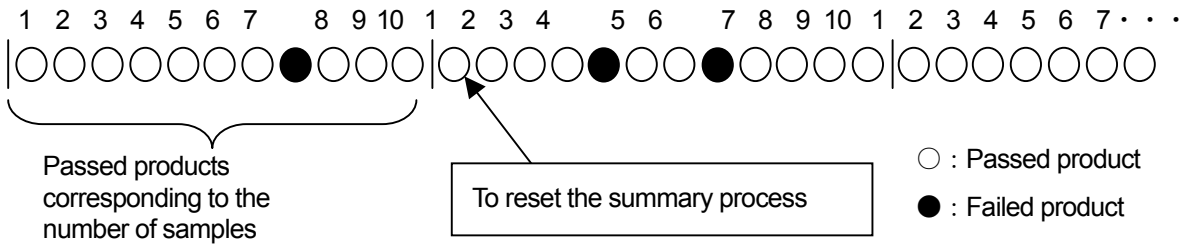
Touch the RETURN key  to return to the Weighing screen.

4.7.8. Number of OK samples summary

Number of OK samples summary is the summary of the passed products as many as the specified sample number. When weighing the passed products as many as the specified sample number is complete, the summary process will be reset.

e.g.:

When the number of samples is 10:



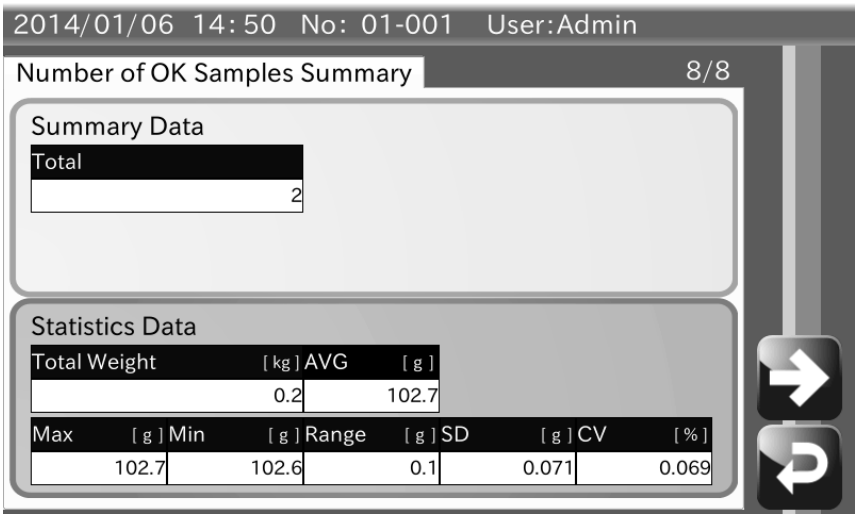


Fig.49 Number of OK Samples Summary screen

Touch the Right arrow key  to go to the Weighing History screen.

Touch the RETURN key  to return to the Weighing screen.

5. Adjustment Operations

This chapter describes operations related to adjusting the AD-4961-2KD-2035 checkweigher.

5.1. Calibrating the Checkweigher Using a Weight

The checkweigher calibration procedure is as follows:

1. Log in by the management level of Quality Manager or above.
2. In the Weighing screen, touch the Setting key 

to open the Common Setting screen.
3. Select the Balance tab and touch the Cal button to open the Calibration screen.

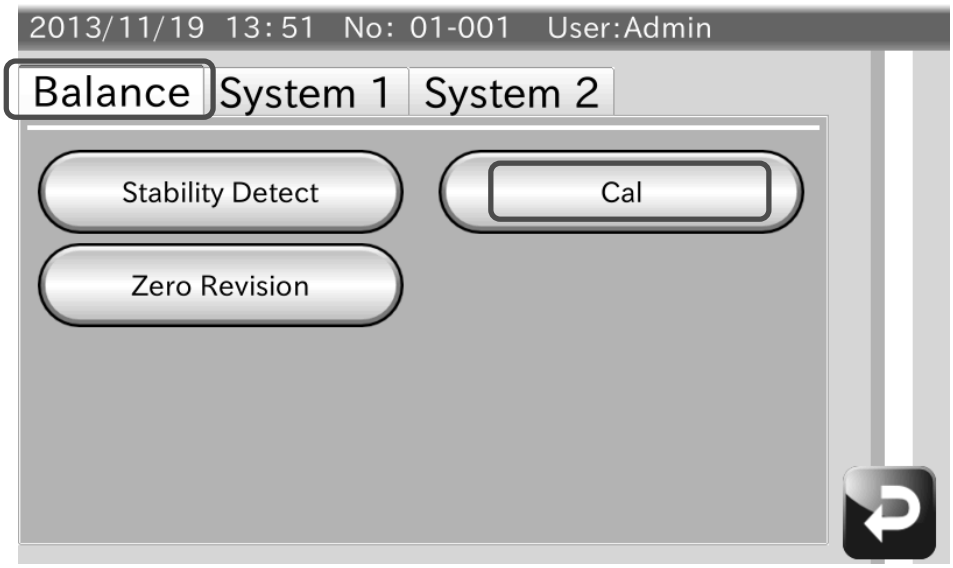


Fig.50 Common Setting screen (with Balance tab selected)

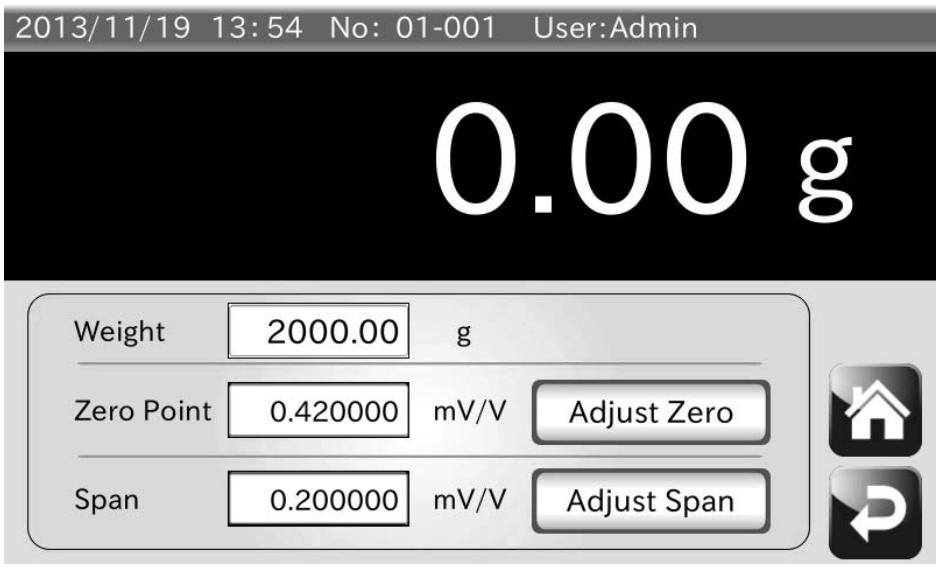


Fig.51 Calibration screen

4. Place nothing on the weighing conveyor and touch the Adjust zero button to set the zero point.
   When the zero point is known, the zero point value can be entered directly in the Zero point field.

5. Enter the mass of the calibration weight in the Weight field.

6. Place the calibration weight on the weighing conveyor and touch the Adjust span button to set the span value.
   When the span value is known, the span value (in mV/V to 2 kg) can be entered directly in the Span field.

7. Touch the RETURN key  to return to the Common Setting screen.

5.2. Adjusting the Belt Speed

Belt speed adjustment is required when the actual belt speed is different from the speed that is set in the Processing Performance Setting screen. (Refer to “4.6.3. Setting the product length, processing number and belt speed.)
Belt speed adjustment adjusts the speed of the infeed conveyor, weighing conveyor and rejector conveyor.
The belt speed adjustment procedure is as follows:

Note:

- A speedometer is required for the belt speed adjustment and must be prepared by the user.
- Belt speed adjustment cannot be performed during operation.
- Adjust the speed of the rejector conveyor only when the rejector is connected to the checkweigher.

1. Log in by the management level of Quality Manager or above.
2. In the Weighing screen, touch the Setting key 

to open the Common Setting screen.
3. Select the System 1 tab and touch the Main Unit button to open the Main Unit Setting screen.

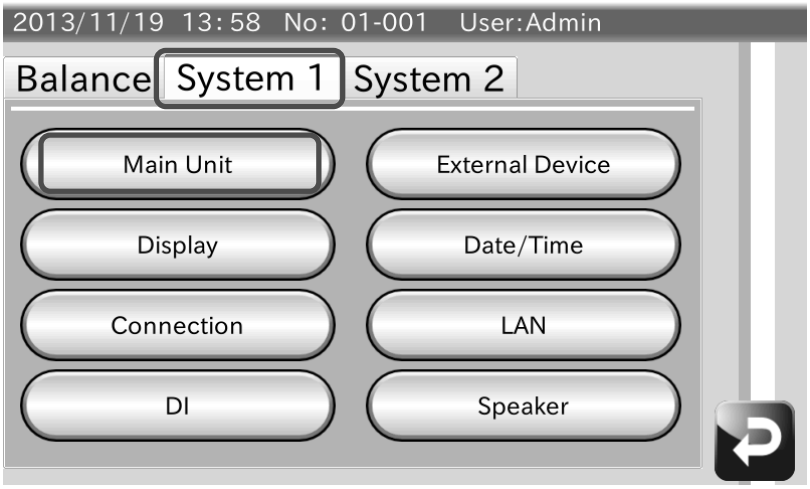


Fig.52 Common Setting screen (with System 1 tab selected)

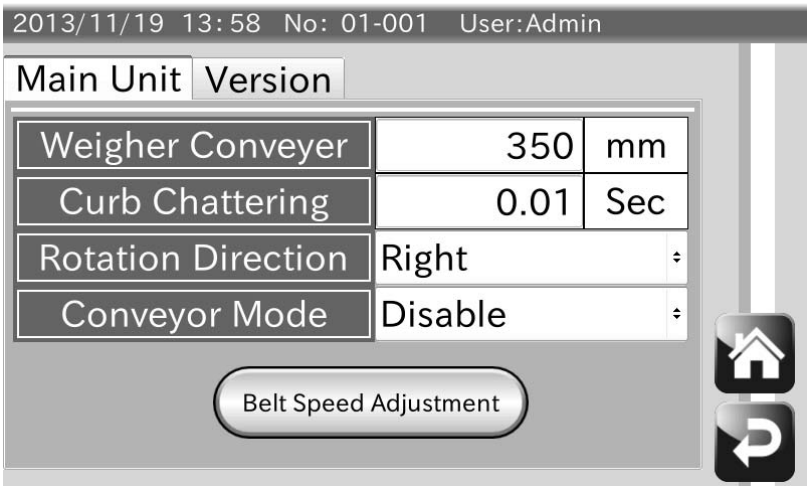


Fig.53 Main Unit Setting screen

4. Touch the Belt Speed Adjustment button to open the Belt Speed Adjustment dialog box.
   Touch the OK button to open the Belt Speed Adjustment screen.

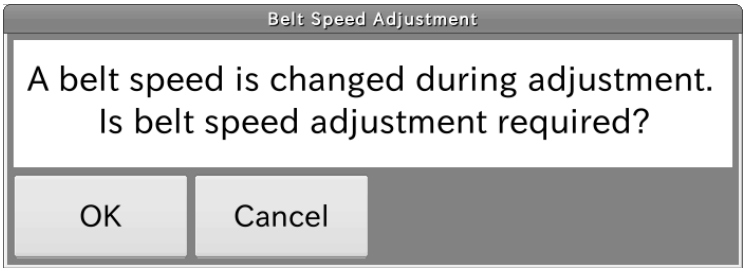


Fig.54 Belt Speed Adjustment dialog box

5. Touch the Left arrow key or Right arrow key to select the conveyor.

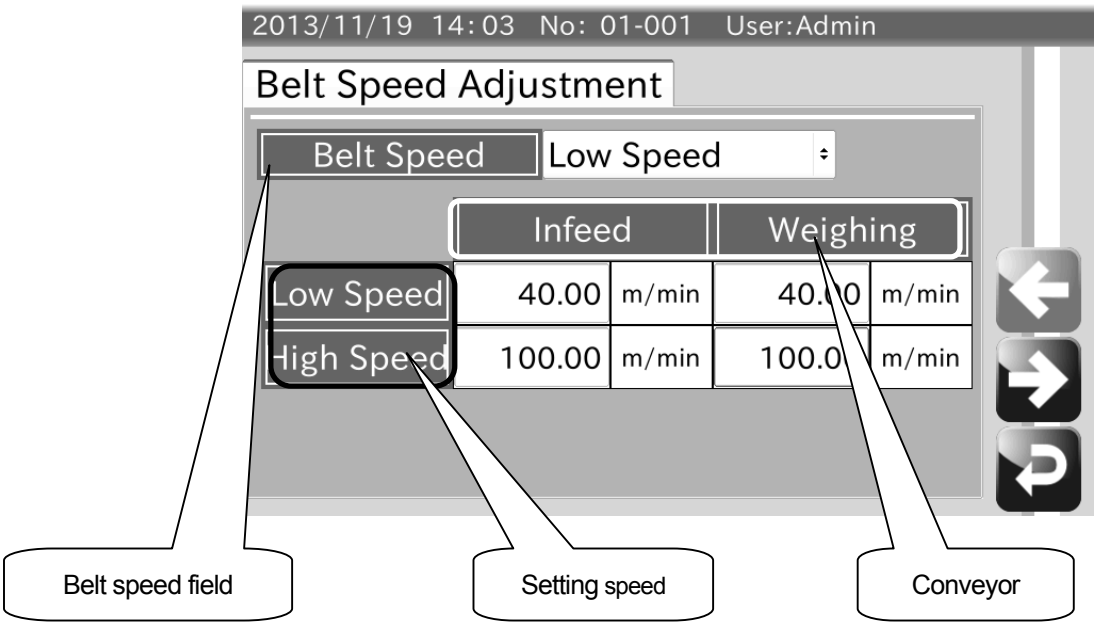


Fig.55 Belt Speed Adjustment screen

6. Touch the Belt Speed to select Low Speed.

7. Press the START button on the display to start the conveyor. Use the speedometer to measure the speed.

8. Enter the measured speed in the Low Speed field of the selected conveyor.
   For example, when the low speed and infeed conveyor are selected and the measured speed is 40m/min, enter 40 in the field shown below.

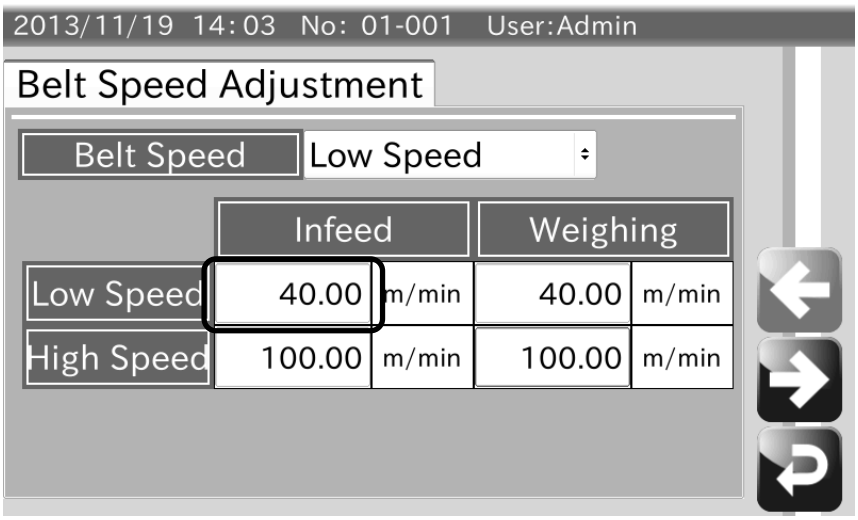


Fig.56 Belt speed adjustment example

9. Touch the Belt Speed to select High Speed.
   Press the START button on the display to start the conveyor. Use the speedometer to measure the speed.
   Enter the measured speed in the High Speed field of the selected conveyor.
   The belt speed will be adjusted using the entered speed values.
10. Touch the RETURN key  to return to the Main Unit Setting screen.

5.3. Setting the Date/Time

The date and time of the checkweigher can be corrected.

The date/time setting procedure is as follows:

1. Log in by the management level of Quality Manager or above.
2. In the Weighing screen, touch the Setting key 

to open the Common Setting screen.
4. Select the System 1 tab and touch the Date/Time button to open the Date/Time Setting screen.

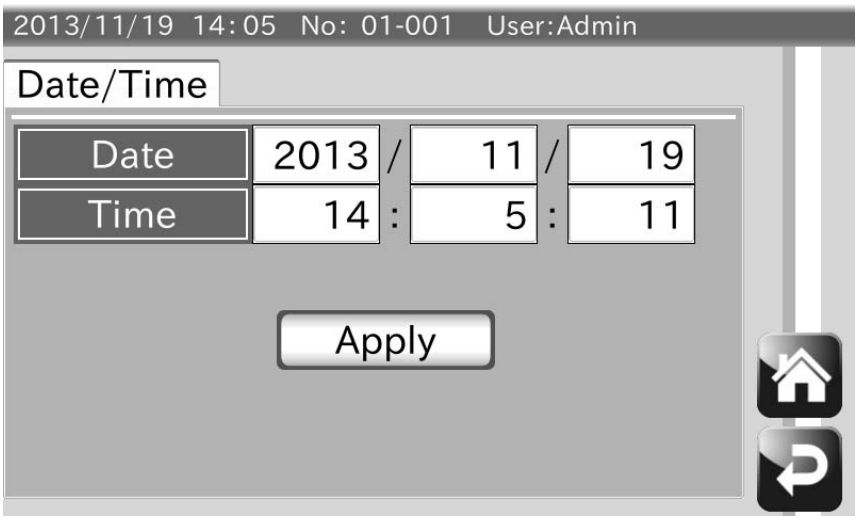


Fig.57 Date/Time Setting screen

4. Enter year, month and day in the Date field.
5. Enter hour, minute and second in the Time field.
6. Touch the Apply button.
   The date/time confirmation dialog box will appear. Touch the YES button to confirm the date and time.

Fig.58 Date/time confirmation dialog box

7. Touch the RETURN key  to return to the Common Setting screen.

5.4. Setting LAN

The LAN setting procedure is as follows:

1. Log in by the management level of Quality Manager or above.
2. In the Weighing screen, touch the Setting key 

to open the Common Setting screen.
3. Select the System 1 tab and touch the LAN button to open the LAN Setting screen.

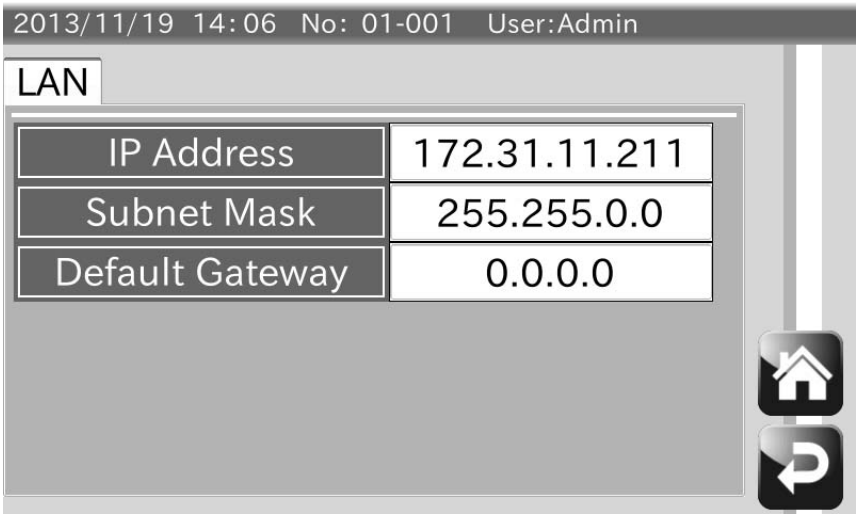


Fig.59 LAN Setting screen

5. Set the IP address, subnet mask and default gateway.

6. Turn the power off. Turn the power on again to apply the LAN settings.

6. Output

The checkweigher can output the data to the USB memory or printer.

6.1. Outputting to the USB memory

Data that can be output to the USB memory are weighing history, histogram, control chart and summary results.

Note:

- Only USB memory formatted in FAT32 can be used.
- During access to the USB memory, do not remove the memory. Files may be destroyed.
- For details about USB memory connection, refer to “2.2.2. Connecting the USB memory.”
- For details about USB memory formatting procedure, refer to “7.1 Formatting the USB memory.”

6.1.1. Outputting the weighing history

The weighing history that is output to the USB memory is saved in the memory root in CSV format with the file name “Weight_Result.csv”.

The weighing history outputting procedure is as follows:

1. Insert the USB memory into the USB terminal on the display.

2. When the USB memory is recognized, the USB mark appears on the upper right side of the screen.

   Confirm that the USB memory is connected and start weighing.

3. During weighing, the weighing history is saved in the USB memory.

4. After weighing, press and hold the USB mark until the USB mark disappears. Confirm that the USB mark has disappeared and remove the USB memory.

6.1.2. Weighing history output example

The format of the weighing history that is output to the USB memory is as follows

“Date, time (hour : minute : second, 10 millisecond), product No., weighing result, judgment”

The output example is shown below.

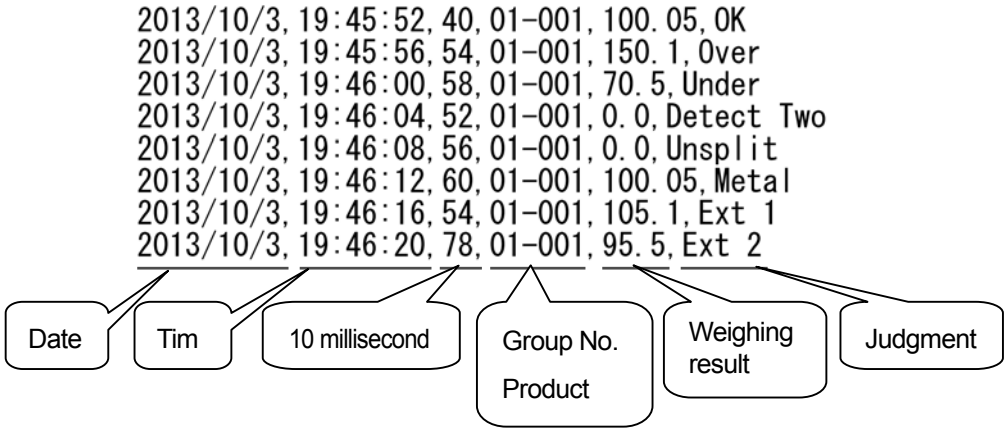


Fig.60 Weighing history output example

Description of the output judgment results is shown below.

Judgment results	Description
OK	Passed
Over	Overweight
Under	Underweight
Detect Two	The next product is conveyed to the weighing conveyor before the weighing value of the previous product is confirmed.
Unsplit	The product length is longer than the specified product length.
Metal	Metal detected
Ext 1	External 1
Ext 2	External 2

6.1.3. Outputting the histogram, control chart, summary results PDF files

The histogram, control chart and summary results can be output to the USB memory as PDF files.

The PDF file outputting procedure is as follows:

Note:
For contents of histogram, control chart and summary results that are output to the USB memory, refer to “6.2.2.” to “6.2.4.”

1. Insert the USB memory into the USB terminal on the display.

2. Confirm that the USB memory is connected and start weighing.

3. After weighing, display the summary results screen to be saved.
   For summary results screens, refer to “4.7. Summary of Weighing Results.”

4. Touch the PDF key  in each summary results screen to output the PDF file to the USB memory.

6.2. Outputting to the Printer

The histogram, control chart and summary results can be output to the printer.

Note:

- For a printer output, a PostScript printer is required.
- This chapter is described under the assumption that a printer has been connected.
  For details about a printer connection, refer to “7.3. Connecting a Printer.”

6.2.1. Outputting to the printer

The printer outputting procedure is as follows:

1. Perform weighing and display the summary results screen to be output to the printer.
2. Touch the Print key 

in each summary results screen to open the printer setting dialog box.

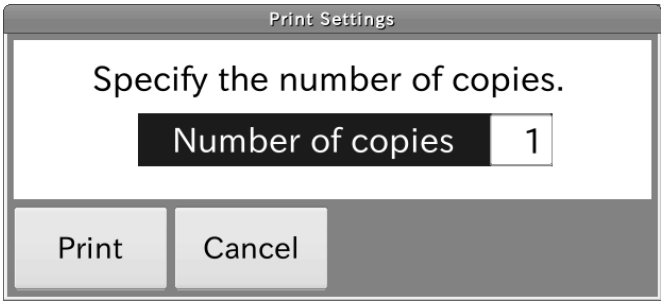


Fig.61 Printer setting dialog box

3. Select the Number of sets field and enter the number of copies to be printed.
4. Touch the Print button to output the data to the printer.

6.2.2. Histogram printing example

A histogram printing example is shown below.

A PDF file that is output to the USB memory looks the same.

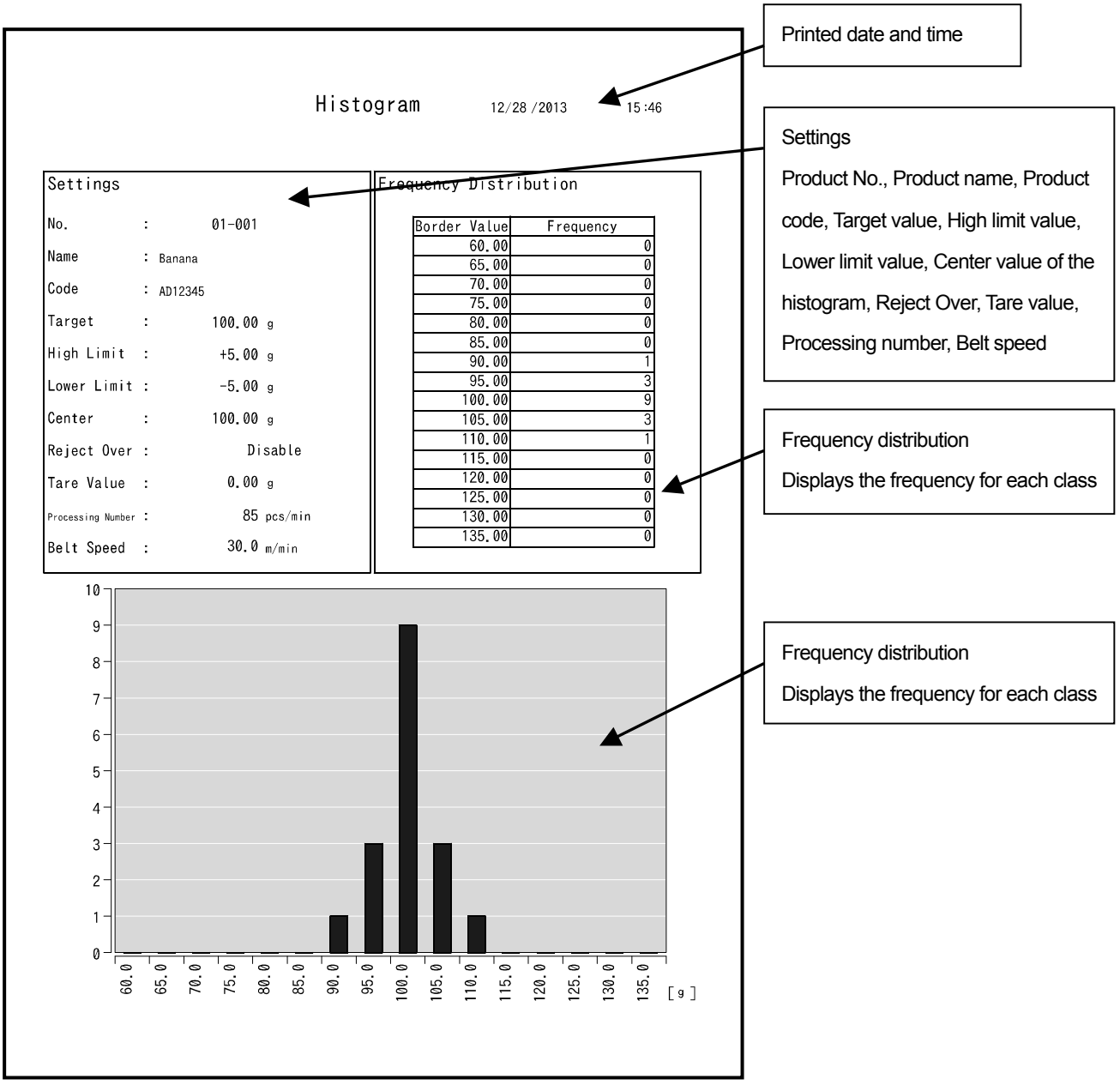


Fig.62 Histogram

6.2.3. Control chart printing example

A control chart printing example is shown below.

A PDF file that is output to the USB memory looks the same.

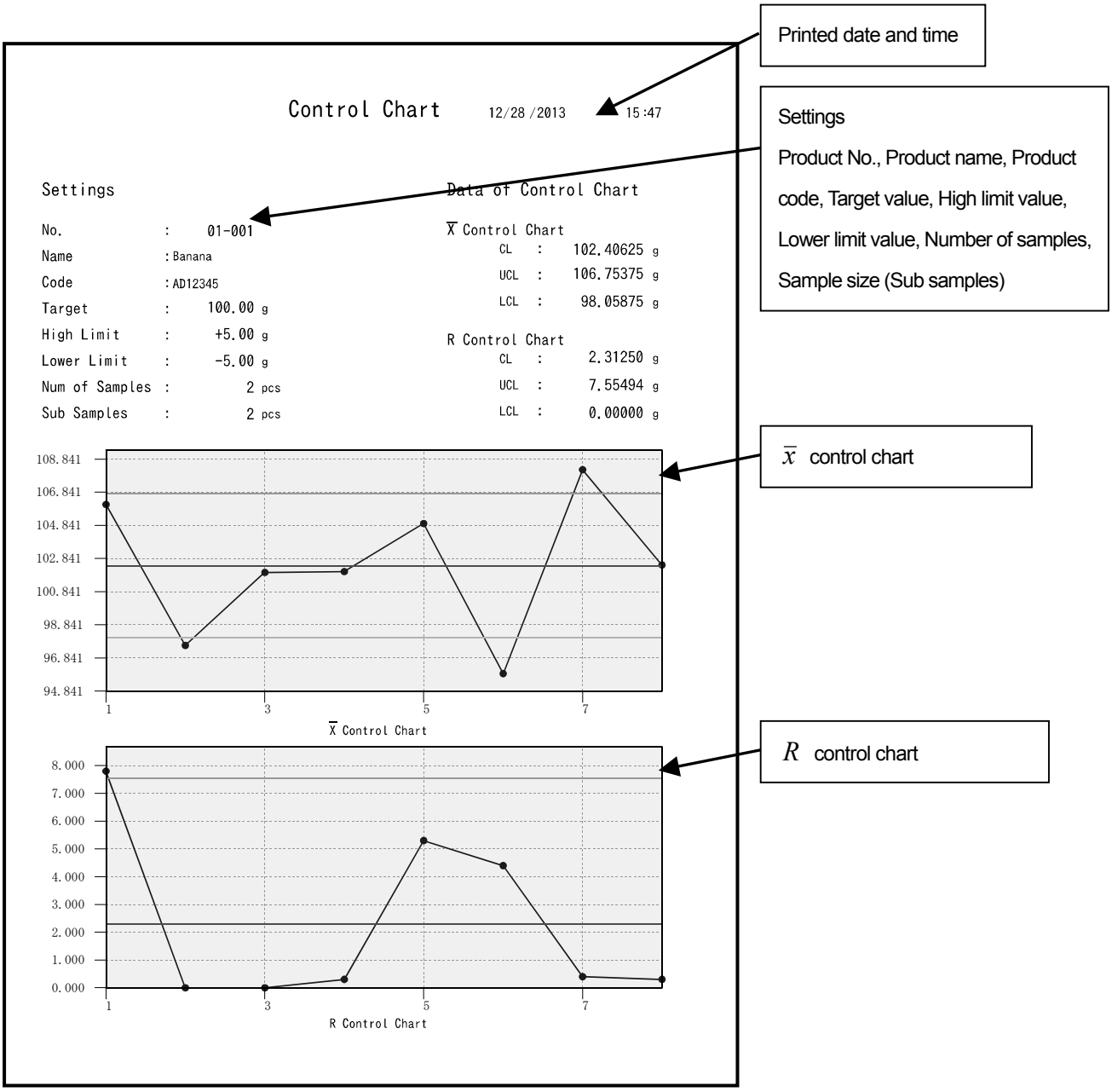
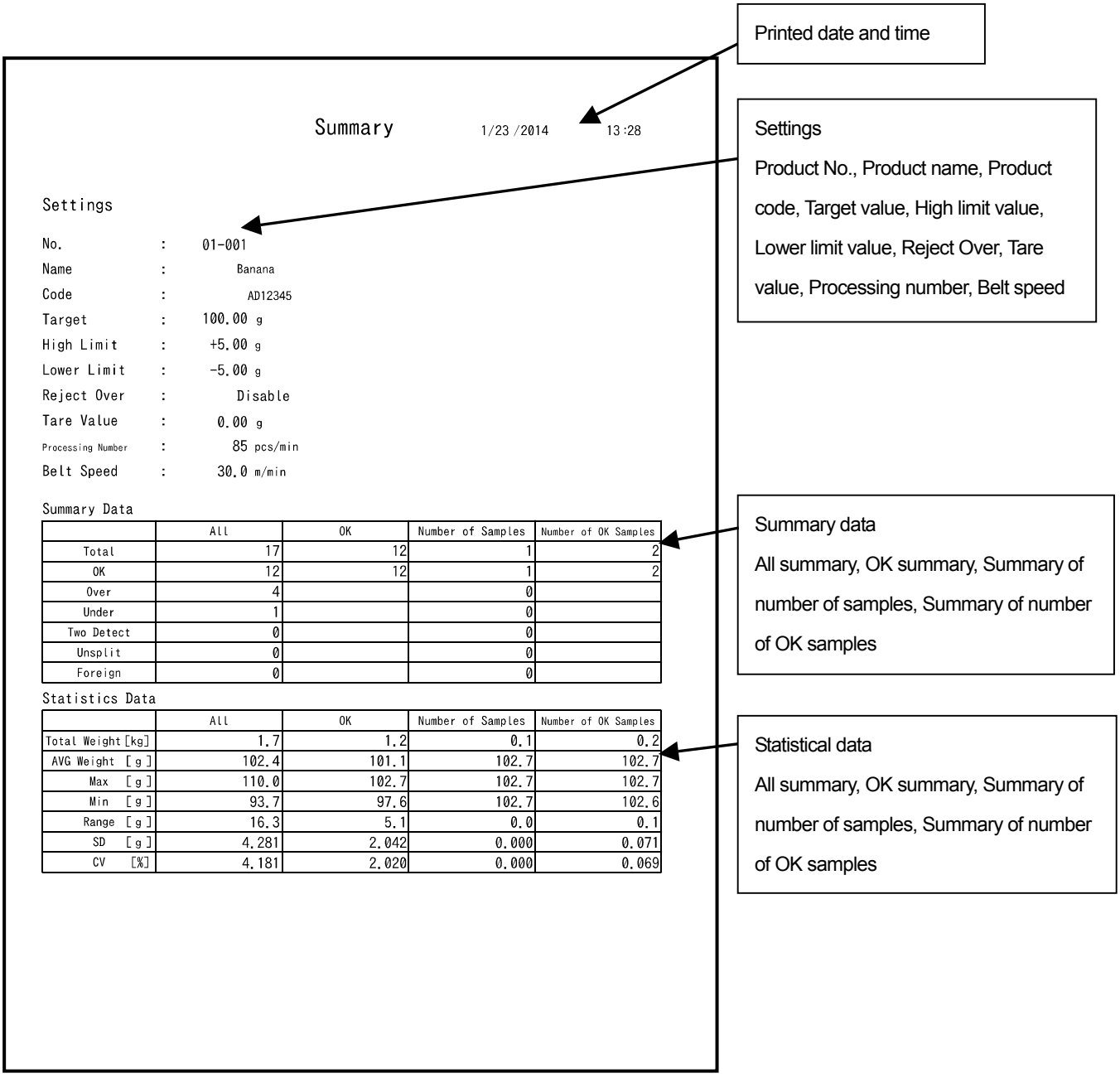


Fig.63 Control chart

6.2.4. Summary results printing example

A summary results printing example is shown below.

A PDF file that is output to the USB memory looks the same.



Summary 1/23 /2014 13:28

Settings

No.	:	01-001
Name	:	Banana
Code	:	AD12345
Target	:	100.00 g
High Limit	:	+5.00 g
Lower Limit	:	-5.00 g
Reject Over	:	Disable
Tare Value	:	0.00 g
Processing Number	:	85 pcs/min
Belt Speed	:	30.0 m/min

Summary Data

	All	OK	Number of Samples	Number of OK Samples
Total	17	12	1	2
OK	12	12	1	2
Over	4		0	
Under	1		0	
Two Detect	0		0	
Unsplit	0		0	
Foreign	0		0	

Statistics Data

	All	OK	Number of Samples	Number of OK Samples
Total Weight [kg]	1.7	1.2	0.1	0.2
AVG Weight [g]	102.4	101.1	102.7	102.7
Max [g]	110.0	102.7	102.7	102.7
Min [g]	93.7	97.6	102.7	102.6
Range [g]	16.3	5.1	0.0	0.1
SD [g]	4.281	2.042	0.000	0.071
CV [%]	4.181	2.020	0.000	0.069

Fig.64 Summary

7. External Devices

7.1. Formatting the USB Memory

This section describes the USB memory formatting procedure.

Caution:

Formatting the USB memory will delete all the data saved in the memory.

The deleted data will not be restored. Before formatting, save necessary data into other media such as a personal computer.

The USB memory formatting procedure is as follows:

1. Log in by the management level of Quality Manager or above.

2. Insert the USB memory into the USB terminal on the display.

3. When the USB memory is recognized, the USB mark appears on the upper right side of the screen.

4. In the Weighing screen, touch the Setting key 

to open the Common Setting screen.

5. Select the System 2 tab and touch the USB Memory button.

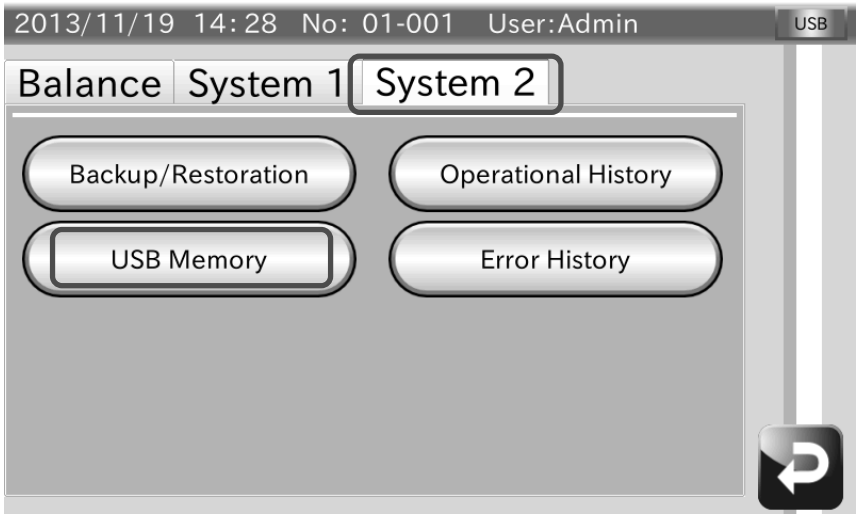


Fig.65 Common Setting screen (with System 2 tab selected)

6. The USB Memory screen opens.

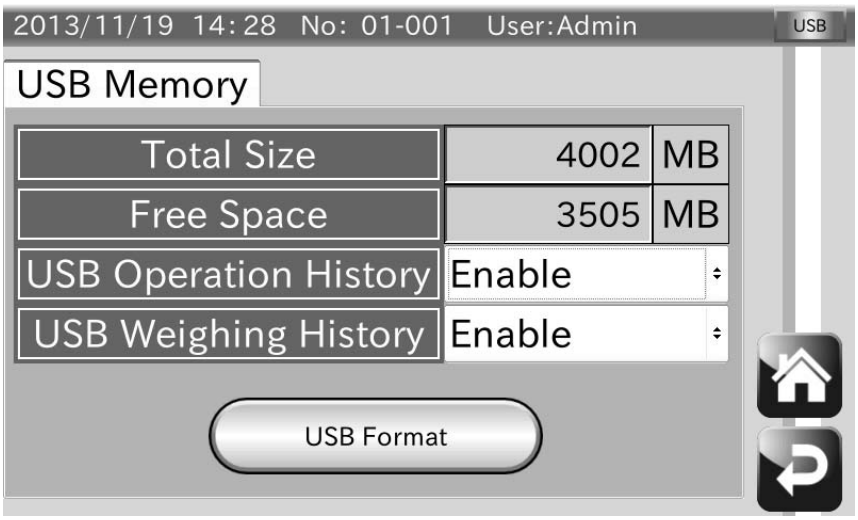


Fig.66 USB Memory screen

7. Touch the USB Format button. The confirmation dialog box opens. Touch the OK button to format the USB memory.
8. When formatting is complete, touch the RETURN key  to return to the Common Setting screen.

7.2. Connecting a LAN

The LAN connection is used when Modbus communication is performed using Modbus/TCP.
Insert one end of a commercially available LAN cable into the LAN connector located on the control box. And insert the other end of the cable into the LAN connector on a Modbus master device or into the Ethernet hub connected to a Modbus master device.

Note:
When Modbus communication is to be performed using Modbus/TCP, LAN settings on the checkweigher are required.
For details about LAN settings, refer to “5.4. Setting LAN.”

7.3. Connecting a Printer

A printer is used to print graphs and summary results.
For printer connection, two methods are available, LAN connection and USB connection.

Note
- For printing, a PostScript printer is required.
- When connecting a printer on LAN, inquire your system administrator.
- For information on IP address setting to the printer, refer to the printer manual.
- When using a printer, set LAN settings, printer IP address (only for LAN connection) and printer connection method.
- For details on LAN setting, refer to “5.4. Setting LAN.”
- For details on printer IP address and connection method, refer to “8.16.3. Printer IP address” and “8.16.4. Printer connection method.”

7.3.1. LAN connection

Insert one end of a commercially available LAN cable into the LAN connector located on the control box. And insert the other end of the cable into the LAN connector on a printer or into the Ethernet hub connected to a printer.

7.3.2. USB connection

Insert one end of a commercially available USB cable into the USB terminal located on the display. And insert the other end of the cable into the USB connector on a printer.

7.4. Connecting to the Serial Interface

The serial interface on the checkweigher is compatible with RS-232 and RS-485 standards. RS-232 and RS-485 are on the same screw terminal. Select one to use.

For the connector position, refer to “2.3. Control Box.”

The enlarged view of the interface is shown below.

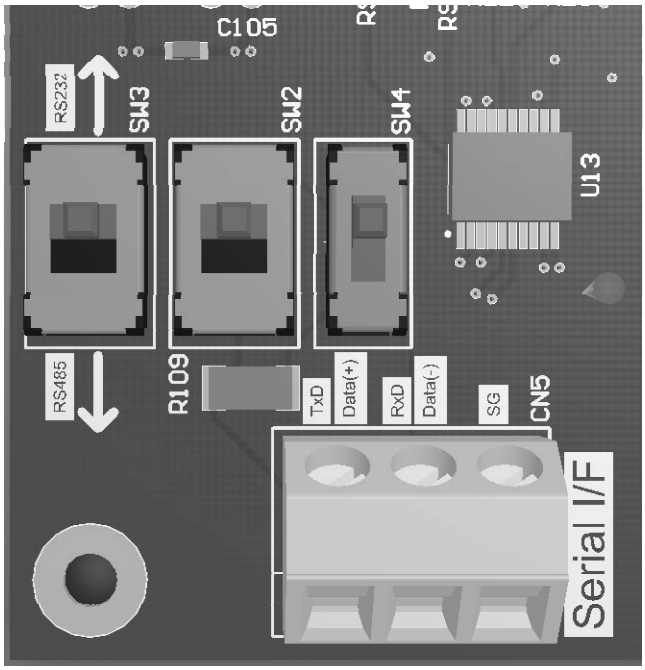


Fig.67 Enlarged view of the serial interface

7.4.1. Setting SWs

To use RS-485, turn SW2、SW3 and SW4 to the side labeled as RS485.

To use RS-232, turn SW2、SW3 and SW4 to the side labeled as RS232.

7.4.2. Inserting a cable

Insert a cable into the CN5 terminal labeled as Serial I/F and secure it with a screw.

When using RS-232, TxD is sending from the AD-4961 and RxD is receiving from an external device.

8. Detailed Description of the Setting Values

Setting values in the Product Setting screen and Common Setting screens are shown below.

List of product settings

Product Setting screen	Edit tab	Product name	
		Product code	
	Detect Function tab	Detect Basis (Judgment basis)	Target value
			High limit value
			Lower limit value
			Reject Over
			Consecutive fail stop
			Consecutive fail number
		Processing Performance	Product length
			Processing number
			Speed
		DO Map	OK
			Over
			Under
			Detect two
			Unsplit
			Metal
			Ext 1
			Ext 2
			Belt in motion
			Belt stopped
		DO Behavior	Delay time
			Hold time
			Polarity
		Detect Parameter	Auto mode
			Judgment timer
			Filter
			Averaging number
		Revision	Tare value
			Auto zero
			Auto zero range
			Dead zone timer
			Monitoring timer
			Averaging time
			Dynamic compensation
			Dynamic compensation value
		Statistical	Yes
			Sample size (sub samples)
			$\overline{x}$
			$\overline{R}$
			Class width
		Weighing	Weighing capacity
			Decimal point position
			Minimum division
			Unit

List of common settings

Common Setting screen	Balance tab	Stability Detect	Stable mass range
			Stable time range
		Zero Revision	Zero tracking mass range
			Zero tracking time range
		Cal	Calibration weight value
			Zero point
			Span
	System 1 tab	Main Unit	Weighing conveyor length
			Curb chattering
			Rotation direction
			Conveyor mode
		Display	Language
			Mass display mode
			Negative mass value
			Display data
			Standby mode
			Brightness
			Reading confirmation dialog
		Connection	Serial mode
			Output mode
			Modbus
			Slave address
			Baud rate
			Parity
			Stop bits
			Data bits
			Flow control
		DI	DI1
			DI2
			DI3
			DI4
			DI5
			DI6
			DI7
			DI8
			Delay time
			Chattering
			Polarity
		External Device	Monitor the rejector
			Metal detector
			Printer IP address
			Printer connection
		Date/Time	Date
			Time
		LAN	IP address
			Subnet mask
			Default gateway
		Speaker	Volume
			Weighing starting/stopping sound
			Failure detection sound
	System 2 tab	Save/Restore	
		Operational history	
		Failure history	
		USB memory	Operational history output
			Weighing history output

8.1. Product Name/Product Code

8.1.1. Product name

Enter the name with a maximum of 12 characters to display in the Weighing and Product Setting screens.

8.1.2. Product code

Enter the product code name with a maximum of 20 characters to display in the Weighing and Product Setting screens.

8.2. Judgment Basis

8.2.1. Target value

Enter the mass of the product to be weighed as the target value.
For details, refer to “4.6.2. Setting the target, high limit and lower limit values.”

8.2.2. High limit value

Enter the upper limit value of the product to be weighed.
For details, refer to “4.6.2. Setting the target, high limit and lower limit values.”

8.2.3. Lower limit value

Enter the lower limit value of the product to be weighed.
For details, refer to “4.6.2. Setting the target, high limit and lower limit values.”

8.2.4. Reject Over

“Reject Over” is the setting to treat an overweight product as OK.
When “Enable” is selected for “Reject Over”, the Reject Over mark 

appears in the Weighing screen.

8.2.5. Consecutive fail stop

“Consecutive fail stop” is the setting to stop the checkweigher automatically when failed products as many as what is set as “Consecutive fail number” occur in succession.
When “Enable” is selected for “Consecutive fail stop”, the checkweigher will stop automatically.

8.2.6. Consecutive fail number

Enter the number of failed products to occur in succession to stop the checkweigher automatically.

8.2.7. Product length

Enter the length of the product to be weighed.
The product length is used to detect an unsplit product (The product length is longer than the specified product length).
Touching the Measure a Product Length button in the Processing Performance Setting screen will measure the length of the product automatically. For details, refer to “4.6.8. Measuring the product length.”

8.2.8. Processing number

Enter the number of products to weigh in one minute.
When the number is entered, the belt speed will be calculated automatically using the value and the weighing conveyor length.

8.2.9. Speed

Enter the belt speed of the conveyor.
When the speed is entered, the processing number will be calculated automatically using the speed and the weighing conveyor length.

8.3. DO Map

DO map sets whether or not to stop the conveyor according to the judgment result and DO related items.
For details, refer to “4.6.5. Setting the digital output (DO).”
DO map only will not activate the output circuit. Be sure to set DO behavior as described in “8.4. DO Behavior.”

8.3.1. Outputting requirements

OK: Outputs when the weighing result is OK.

Over: Outputs when the weighing result is overweight.

Under: Outputs when the weighing result is underweight.

Detect Two: Outputs when next product is conveyed to the weighing conveyor before the weighing value of the previous product is confirmed.

Unsplit: Outputs when the product length is longer than the specified product length.

Metal: Outputs when the input to DI, which is assigned to metal detection, is confirmed.

External 1: Outputs when the input to DI, which is assigned to external 1, is confirmed.

External 2: Outputs when the input to DI, which is assigned to external 2, is confirmed.

Belt in motion: Outputs when the belt is moving.

Belt stopped: Outputs when the belt is stopped.

In Modbus setting, assignment to each bit (4 bytes) is shown below. Set the bit to assign to 1.

High-order bit Low-order bit

31 to10	9	8	7	6	5	4	3	2	1	0
0	Belt stopped	Belt in motion	External 2	External 1	Metal	Unsplit	Detect Two	Under	Over	OK

e.g.: To assign Metal, Under and Over to DO1

$2^5+2^2+2^1=38$ (DEC)

Have a 4-byte access to address 40051 and write 38(DEC).

8.4. DO Behavior

8.4.1. Delay time

Enter the time elapsed from judgment result output until a signal is output from the specified DO.
For details, refer to “4.6.6. Setting the delay and hold time.”

8.4.2. Hold time

Enter the time a signal is being output from the specified DO.
For details, refer to “4.6.6. Setting the delay and hold time.”

8.4.3. Polarity

Set the polarity of a signal from DO.
Positive: When a signal is output from DO, the device on contact a turns on. The Modbus setting is 0.
Negative: When a signal is output from DO, the device on contact b turns on. The Modbus setting is 1.

8.5. Detect Parameter

Displays the parameters used for weighing. The values will be changed automatically. Do not attempt to change them. Only the A&D service personnel is allowed to do it.

Caution:

Changing the parameter values may cause the checkweigher malfunction.

8.6. Revision

8.6.1. Tare value

The tare value is used to obtain the net weight of the product.
For details, refer to “4.6.4. Setting the tare value.”

8.6.2. Auto zero

Performs zero adjustment automatically when “Enable” is selected for “Auto Zero”.
When conditions of auto zero range, dead zone timer and monitoring timer are met while the conveyor is moving, the mass values obtained during the averaging time are averaged. Using the average value as zero, zero adjustment is performed automatically.

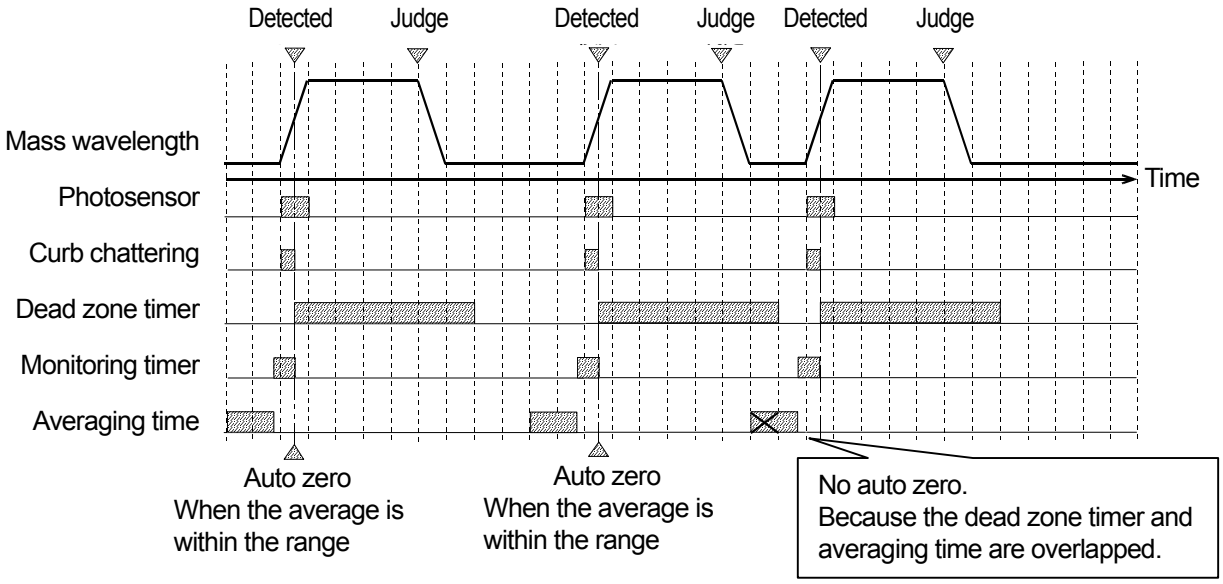


Fig.68 Auto zero timing chart

8.6.3. Auto zero range

Enter the range to perform auto zero adjustment.
When “Enable” is selected for “Auto zero” and the average mass value during the averaging time is within the auto zero range, auto zero adjustment is performed.

8.6.4. Dead zone timer

Enter the duration to prohibit auto zero adjustment after auto zero adjustment.

8.6.5. Monitoring timer

Enter the duration to prohibit auto zero adjustment after the product is cleared of the weighing conveyor.
This is to avoid auto zero adjustment while the timing of the product to be cleared of the weighing conveyor is uncertain, for example, packed products, or while the checkweigher condition is unstable with vibrations left on the conveyor or rejector movement.

8.6.6. Averaging time

Enter the time to average the mass values obtained during the duration to be used for auto zero adjustment.

8.6.7. Dynamic compensation

Makes compensation when the mass obtained when the conveyor is stopped is different from the mass obtained when the conveyor is moving.
When “Enable” is selected for “Dynamic compensation”, the Dynamic Compensation mark D.COM appears in the Weighing screen and dynamic compensation will be performed.

8.6.8. Dynamic compensation value

Enter the value to be used for dynamic compensation.

8.7. Statistical

8.7.1. Number of samples

Enter the number of samples to be used for generating control charts and summary results.

8.7.2. Sample size (Sub samples)

Enter the number of samples to be used to obtain the average for the control chart.

8.7.3. $\overline{\overline{X}}$

Enter the average for the $\overline{X}$ control chart.

When the $\overline{\overline{X}}$ value is not 0, the $\overline{X}$ control chart is generated based on the value.

8.7.4. $\overline{R}$

Enter the average for the R control chart.

When the $\overline{R}$ value is not 0, the R control chart is generated based on the value.

8.7.5. Class width

Enter the class width for the histogram.

When the class width is changed, the histogram data will be updated.

8.8. Weighing Capacity

8.8.1. Weighing capacity

Enter the weighing capacity.

Modbus setting is 0: 2000 g and 1: 500 g.

8.8.2. Decimal point position

Set the decimal point position for the mass value.

When the weighing capacity is 2000 g, “0.00” cannot be selected.

8.8.3. Minimum division

Set the minimum division for the mass value.

8.8.4. Unit

Set the unit of measure for the mass value.

8.9. Stability Detect

8.9.1. Stable mass range

Enter the mass range to detect stability.

8.9.2. Stable time range

Enter the time range to detect stability.

8.10. Zero Revision

8.10.1. Zero adjustment range

Enter the range to adjust zero.

When the actual mass value is not within the range, zero adjustment or zero tracking will not be performed.

8.10.2. Zero tracking mass range

Zero tracking is a function to perform zero adjustment automatically while the conveyor is stopped.

Enter the mass range to perform zero tracking.

The zero tracking mass range is 0.0 g, zero tracking will not be performed.

When the total mass value while the conveyor is stopped is within the zero range in a certain duration (zero tracking time range), zero tracking will be performed.

8.10.3. Zero tracking time range

Enter the time range to perform zero tracking.

When the total mass value while the conveyor is stopped is within a certain range (zero tracking mass range) in the zero tracking time range, zero tracking will be performed.

For example, when the zero adjustment range is 10 g, zero tracking mass range is 5 g and zero tracking time range is 3 seconds, zero tracking will be performed when the actual mass value is 0±10 g and the total mass value is within 0±5 g for 3 seconds.

8.11. Calibration

For details, refer to “5.1. Calibrating the Checkweigher Using a Weight.”

8.11.1. Calibration weight value

Enter the calibration weight value to be used for calibration.

8.11.2. Zero point

Enter the zero point value in mV/V.

8.11.3. Span

Enter the span value at 2 kg in mV/V.

8.12. Main Unit

8.12.1. Weighing conveyor length

Enter the weighing conveyor length.

Do not attempt to change the value. Only the A&D service personnel is allowed to do it.

8.12.2. Curb chattering

Enter the time to prevent the photosensor chattering.

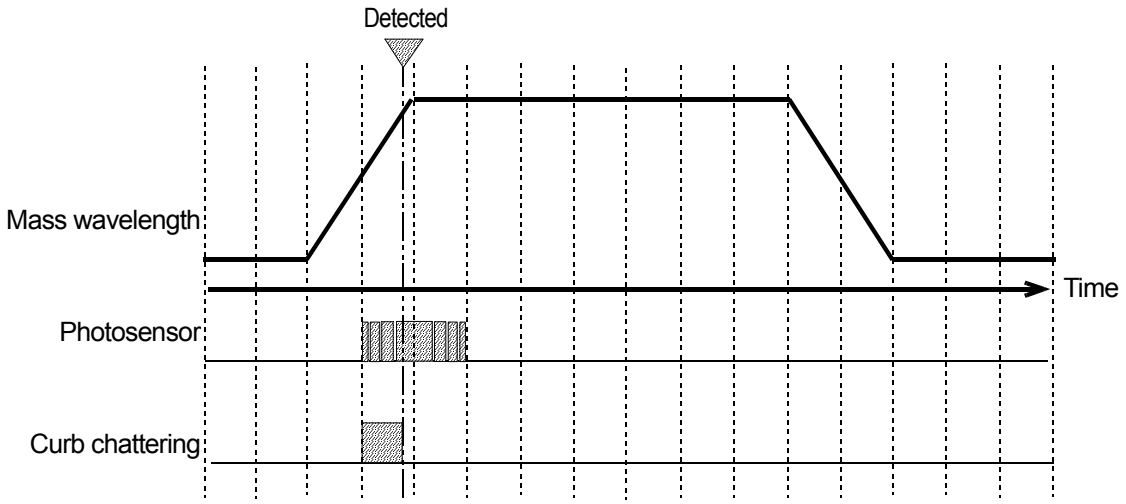


Fig.69 Chattering timing chart

8.12.3. Rotation direction

Set the rotation direction of the conveyor.

8.12.4. Conveyor mode

The conveyor mode is a function to move the conveyor without weighing when “Enable” is selected for “Conveyor Mode.”

8.13. Display

8.13.1. Language

Set the displaying language, Japanese or English.

8.13.2. Mass display mode

Set how to display the mass value when weighing.

Each mode is as follows:

1. Holding the weighing result

   When a product passes through the photosensor and weighing is started, the displayed mass value changes.

   When the weighing is complete, the displayed mass value is fixed to the weighing result.

2. Weighing result

   Only the weighing result is displayed.

3. Current value

   The mass value of the product currently placed on the weighing conveyor is displayed.

8.13.3. Negative mass value

Set whether or not to display the negative mass value.

When “Hide” is selected and the mass value is negative, the weighing value field in the screen will be blank.

8.13.4. Displaying data selection

Set the data to be displayed in the weighing value field.

8.13.5. Standby mode

Set the time to be elapsed before turning the display off when no operation is performed.

8.13.6. Brightness

Set the brightness of the operation panel.

8.13.7. Reading Confirmation dialog

When the START button is pressed while the Product Setting screen of the product different from the product currently read is displayed, the product settings of the product currently displayed will be read and start weighing.

Set whether or not to display the dialog to prevent the product currently read from being changed.

8.14. Connection

8.14.1. Serial mode

Set the serial communication mode.

Note:
To perform serial communication, the checkweigher must be connected to the serial interface.
For details, refer to “7.4. Connecting to the Serial Interface.”

Each mode is as follows:

1. Disable
   Select to disable the serial communication.

2. Cyclic printing
   Set when a printer for cyclic printing is connected.
   When “Cyclic printing” is selected, data for cyclic printing will be output through serial communication.

3. A&D format
   Data is output in A&D format as shown below.

A&D format
The weighing data is fixed to 15 characters excluding terminators <CR><LF>.
The first two characters are the header to indicate the status of the weighing value.
The polarity sign is placed before the data. If the data is zero, the plus sign is used.

Output example

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
S	T	,	+	0	0	0	1	2	.	3	4	5		g

Header　Data　Unit

Stable

S	T	,	+	0	0	0	1	2	.	3	4	5		g

Unstable

U	S	,	+	0	0	0	0	5	.	4	3	2		g

Overloaded (positive)

O	L	,	+	9	9	9	9	9	9	9	E	+	1	9

Overloaded (negative)

O	L	,	-	9	9	9	9	9	9	9	E	+	1	9

8.14.2. Output mode

Set the output mode when “A&D format” is selected for “Serial mode.”
Each mode is as follows:

1. Current value
   Outputs the current mass value.
2. Weighing results
   Outputs the weighing results when the judgment is complete.
3. In sync with the display
   Outputs the displayed content in the weighing value field.

8.14.3. Modbus

Set Modbus communication.
When the settings are changed, restart the checkweigher to confirm the changes.
For details, refer to “9. Modbus Communication.”
Each setting is as follows:

1. Disable
   Select to disable Modbus communication.
2. Modbus/RTU
   Set when Modbus communication is performed through serial communication.
3. Modbus/TCP
   Set when Modbus communication is performed using TCP.

8.14.4. Slave address

Enter the slave address of the checkweigher for Modbus communication.

8.14.5. Baud rate

Set the serial communication baud rate.

8.14.6. Parity

Set the serial communication parity.

8.14.7. Stop bits

Set the serial communication stop bits.

8.14.8. Data bits

Set the serial communication data bits.

8.14.9. Flow control

Set the serial communication flow control.

8.15. Digital Input (DI)

DI is accepted when the pulse is entered for the duration of “curb chattering”+20 msec or more in the DI receive time shown in the timing chart below.

Judgment is performed when the product is beginning to clear of the weighing conveyor.

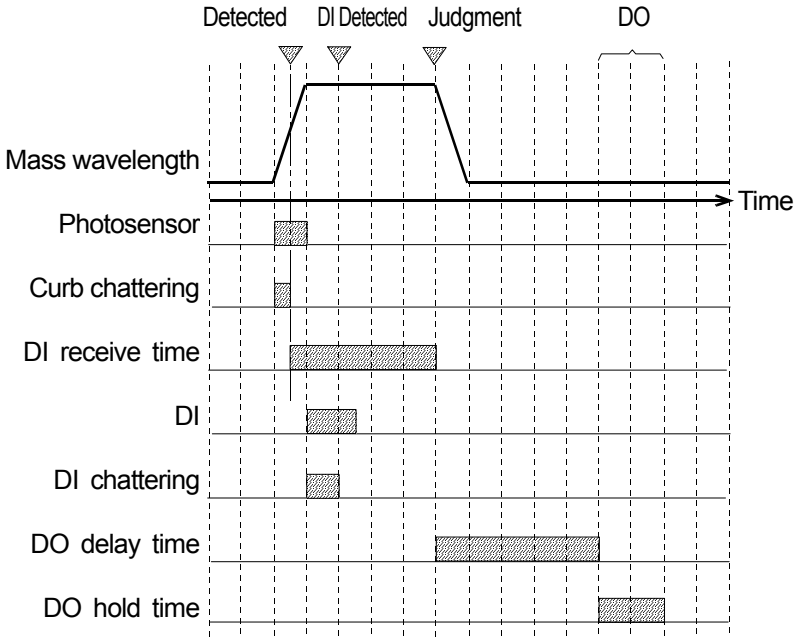


Fig.70 DI/DO timing chart

8.15.1. DI1 to DI8

Set functions for each DI using the pulldown menu.

DI1 to DI4 are assigned to the terminals in the control box and Modbus input register.

DI5 to DI9 are assigned to Modbus input register only.

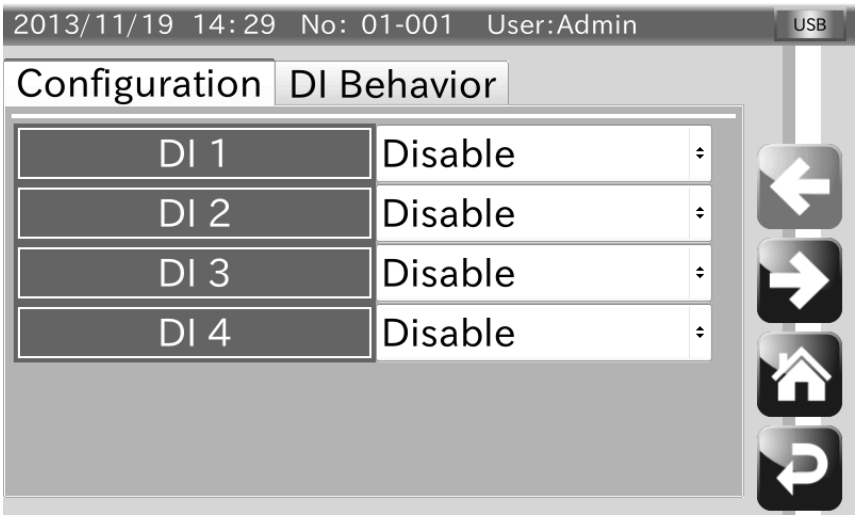


Fig.71 DI screen

Setting items are as follows:

(1) Disable

Select to disable the function. The Modbus setting is 0.

(2) Weighing start

Select to assign the start weighing signal. The Modbus setting is 1.

(3) Weighing stop

Select to assign the stop weighing signal. The Modbus setting is 2.

(4) Weighing start/stop

Select to assign the start/stop weighing signal.

When the input signal is High (or Low), weighing will start and when the input signal is Low (or High), weighing will stop. The Modbus setting is 3.

(5) Belt stop release

This is a function to undo the belt stop from external devices when the belt is stopped according to "consecutive fail stop" or DO map settings.

Even if undone, the belt remains stopped. To start weighing again, press the START button.

The Modbus setting is 4.

(6) Summary clear

Select to assign clearing summary. The Modbus setting is 5.

(7) External NG1

Select to assign external NG1. The Modbus setting is 6.

(8) External NG2

Select to assign external NG2. The Modbus setting is 7.

(9) Metal detect

Select to assign metal detection. The Modbus setting is 8.

(10) DO1 to DO8 Forced behavior

Select to function DO forcibly. The Modbus settings of DO1 to DO8 are 9 to 16.

8.15.2. Delay time

Enter the delay time for DI1 to DI4 input signals.
Set the delay time when the device that is connected to DI has no function to delay signal outputs.
Set the time so that a signal from the external device is input within the DI receive time of the DI timing chart.

8.15.3. Chattering

Enter the time to prevent chattering of DI1 to DI4 input signals.

8.15.4. Polarity

Set the polarity of DI1 to DI4 input signals. DI5 to DI8 input signals are positive.
Positive: When the device on contact a turns on, DI signal is received. The Modbus setting is 0.
Negative: When the device on contact b turns on, DI signal is received. The Modbus setting is 1.

8.16. External Devices

8.16.1. Monitoring the rejector

When the AD-4981 Flipper Type Rejector or AD-4982 Conveyor Drop Type Rejector is connected to the checkweigher, the checkweigher monitors the behavior of the rejector.

8.16.2. With metal detector

Reserved for expansion. Do not change.

8.16.3. Printer IP address

Enter the IP address of the printer that is connected to the checkweigher.

8.16.4. Printer connection method

Set the connection method of the printer that is connected to the checkweigher.
The Modbus setting is 0: USB and1: LAN.

8.17. Date/Time

8.17.1. Date

Set the date (year, month and day) for the checkweigher clock.
For details, refer to “5.3. Setting the Date/Time.”

8.17.2. Time

Set the time (hour, minute and second) for the checkweigher clock.
For details, refer to “5.3. Setting the Date/Time.”

8.18. LAN

When the settings are changed, restart the checkweigher to confirm the changes.

8.18.1. IP address

Set the IP address of the checkweigher.

8.18.2. Subnet mask

Set the subnet mask of the checkweigher.

8.18.3. Default gateway

Set the default gateway of the checkweigher.

8.19. Speaker

8.19.1. Volume

Set the volume of the checkweigher speaker.

8.19.2. Start/Stop sound

Set whether or not to generate the sound when weighing is started or stopped.

8.19.3. Fail judgment sound

Set whether or not to generate the sound when the judgment is “fail”.

8.20. USB Memory

8.20.1. Operational history

Set whether or not to output the operational history to the USB memory connected.

8.20.2. Weighing history

Set whether or not to output the weighing history to the USB memory connected.

9. Modbus Communication

Modbus is a communications protocol developed by Modicon.

Using this, communication with Modbus enabled devices can be performed without special programs.

With the checkweigher, Modbus RTU (a serial communication protocol using the RS-232 or RS-485) and Modbus TCP (which serial communication is expanded to TCP/IP) can be used.

Using Modbus communication, setting changes, reading the summary data, writing DI and reading the DO status can be performed.

Note:

- Only the settings of the product selected for weighing can be changed by Modbus communication.
- When group numbers or product numbers are changed by Modbus communication, the new settings will be read. When the number has not been registered, it will be registered before reading.
- When group numbers or product numbers are changed by Modbus communication, several seconds are required to confirm the changes.
- In Modbus communication, the simultaneity of data is not guaranteed.
  When, for example, all the data of the address map are read, the time of those data may not be the same.
  For weighing results, data for each weighing may not necessarily read.
- When data is written to the holding register by Modbus communication, the information bar on the upper side of the screen flashes in green.
- For connection when Modbus/TCP or Modbus/RTU is used, refer to “7.2. Connecting a LAN” and “7.4. Connecting to the Serial Interface.”
- To use Modbus/TCP, the LAN setting of the checkweigher is required. For details, refer to “5.4. Setting LAN.”

9.1. Modbus RTU

1. In the Connection Setting screen, touch the Connection Mode tab to open the screen shown below.
   Select “Modbus” to set “Modbus/RTU.”

Note:

- When the “Modbus” setting is changed, restart the checkweigher to confirm the change.
- When “Modbus” is set to Modbus/RTU, the setting for the serial mode will be ignored.

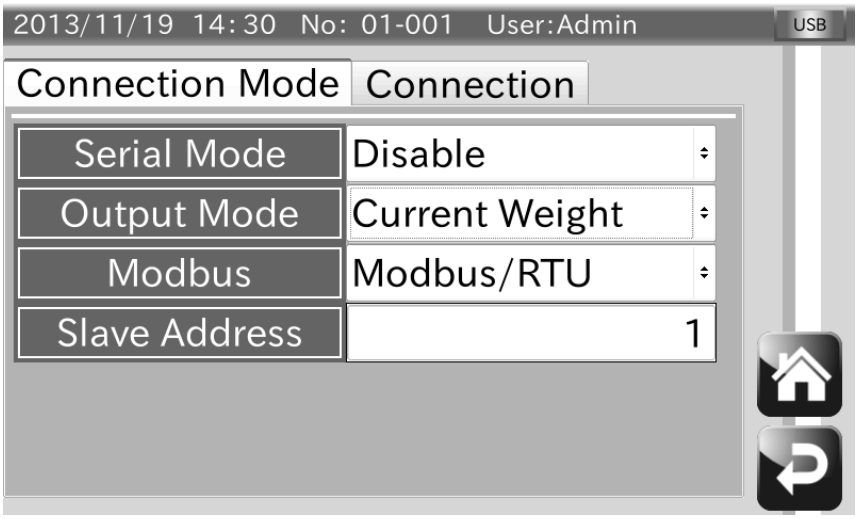


Fig.72 Connection Setting screen (with Connection Mode tab selected)

2. Enter the slave address.

3. Touch the Connection tab to open the screen to set the serial communication.
   Set “Data bits” to 8.
   For details about serial communication settings, refer to “8.14. Connection.”

4. Connect to the serial interface to start communication.

9.2. Modbus TCP

1. In the Connection Setting screen, touch the Connection Mode tab.
   Select “Modbus” to set “Modbus/TCP.”

Note:

- When the “Modbus” setting is changed, restart the checkweigher to confirm the change.

2. Enter the slave address.

3. Connect the LAN cable to start communication.

9.3. Reference Number

In Modbus communications, a reference number and an address are used to instruct the checkweigher or read the data.

Data types and reference numbers are listed in the table below.

Data type	Reference number	Description
Output coil	0	Read and write bit data Used to control DI1 to DI8.
Input status	1	Read only bit data Used to monitor DI and DO.
Input register	3	Read only Word data Used to read weighing values and summary data.
Holding register	4	Read and write Word data Used to change the settings or read the product settings.

9.4. Address

The Modbus communication address is listed in the tables below.

Output coil

Address	Name
00001	DI1
00002	DI2
00003	DI3
00004	DI4
00005	DI5
00006	DI6
00007	DI7
00008	DI8

Input status

Address	Name
10001	DI 1 (Indicates the DI1 status on the hardware contact input TB3.)
10002	DI 2 (Indicates the DI2 status on the hardware contact input TB3.)
10003	DI 3 (Indicates the DI3 status on the hardware contact input TB3.)
10004	DI 4 (Indicates the DI4 status on the hardware contact input TB3.)
10005	Reserved for expansion. Do not use.
10006	Reserved for expansion. Do not use.
10007	Reserved for expansion. Do not use.
10008	Reserved for expansion. Do not use.
10009	Reserved for expansion. Do not use.
10010	Reserved for expansion. Do not use.
10011	Reserved for expansion. Do not use.
10012	Reserved for expansion. Do not use.
10013	Reserved for expansion. Do not use.
10014	Reserved for expansion. Do not use.
10015	Reserved for expansion. Do not use.
10016	Reserved for expansion. Do not use.
10017	Reserved for expansion. Do not use.
10018	Reserved for expansion. Do not use.
10019	Reserved for expansion. Do not use.
10020	Reserved for expansion. Do not use.
10021	Reserved for expansion. Do not use.
10022	Reserved for expansion. Do not use.
10023	Reserved for expansion. Do not use.
10024	Reserved for expansion. Do not use.
10025	Reserved for expansion. Do not use.
10026	Reserved for expansion. Do not use.
10027	Reserved for expansion. Do not use.
10028	Reserved for expansion. Do not use.
10029	Reserved for expansion. Do not use.
10030	Reserved for expansion. Do not use.
10031	Reserved for expansion. Do not use.
10032	Reserved for expansion. Do not use.
10033	DI Status 1 (Indicates the status of the function assigned to DI1) *
10034	DI Status 2 (Indicates the status of the function assigned to DI2) *
10035	DI Status 3 (Indicates the status of the function assigned to DI3) *
10036	DI Status 4 (Indicates the status of the function assigned to DI4) *
10037	DI Status 5 (Indicates the status of the function assigned to DI5) *
10038	DI Status 6 (Indicates the status of the function assigned to DI6) *
10039	DI Status 7 (Indicates the status of the function assigned to DI7) *
10040	DI Status 8 (Indicates the status of the function assigned to DI8) *

Input status (continued)

10041	Reserved for expansion. Do not use.
10042	Reserved for expansion. Do not use.
10043	Reserved for expansion. Do not use.
10044	Reserved for expansion. Do not use.
10045	Reserved for expansion. Do not use.
10046	Reserved for expansion. Do not use.
10047	Reserved for expansion. Do not use.
10048	Reserved for expansion. Do not use.
10049	Reserved for expansion. Do not use.
10050	Reserved for expansion. Do not use.
10051	Reserved for expansion. Do not use.
10052	Reserved for expansion. Do not use.
10053	Reserved for expansion. Do not use.
10054	Reserved for expansion. Do not use.
10055	Reserved for expansion. Do not use.
10056	Reserved for expansion. Do not use.
10057	Reserved for expansion. Do not use.
10058	Reserved for expansion. Do not use.
10059	Reserved for expansion. Do not use.
10060	Reserved for expansion. Do not use.
10061	Reserved for expansion. Do not use.
10062	Reserved for expansion. Do not use.
10063	Reserved for expansion. Do not use.
10064	Reserved for expansion. Do not use.
10065	DO 1
10066	DO 2
10067	DO 3
10068	DO 4
10069	DO 5
10070	DO 6
10071	DO 7
10072	DO 8

* DI status1 to 8

Indicates the operation status of DI1 to DI 8.

DI1 to DI4 are assigned to the hardware and the Modbus output coil simultaneously and DI status of DI1 to DI4 indicates the operation status of the hardware and Modbus output coil.

Input register

Address	Name	Size	Output range
30001	Checkweigher IP address 1 (high-order)	2 bytes	0 - 255
30002	Checkweigher IP address 2	2 bytes	0 - 255
30003	Checkweigher IP address 3	2 bytes	0 - 255
30004	Checkweigher IP address 4 (low-order)	2 bytes	0 - 255
30005	Checkweigher subnet mask 1 (high-order)	2 bytes	0 - 255
30006	Checkweigher subnet mask 2	2 bytes	0 - 255
30007	Checkweigher subnet mask 3	2 bytes	0 - 255
30008	Checkweigher subnet mask 4	2 bytes	0 - 255
30009	Checkweigher default gateway 1 (high-order)	2 bytes	0 - 255
30010	Checkweigher default gateway 2	2 bytes	0 - 255
30011	Checkweigher default gateway 3	2 bytes	0 - 255
30012	Checkweigher default gateway 4 (low-order)	2 bytes	0 - 255
30013	Printer connection	2 bytes	0 - 1
30014	Printer IP address 1 (high-order)	2 bytes	0 - 255
30015	Printer IP address 2	2 bytes	0 - 255
30016	Printer IP address 3	2 bytes	0 - 255
30017	Printer IP address 4 (low-order)	2 bytes	0 - 255
30018	Serial communication setting	2 bytes	0 - 2
30019	Baud rate	2 bytes	0 - 5
30020	Parity	2 bytes	0 - 2
30021	Data bits	2 bytes	0 - 1
30022	Stop bits	2 bytes	0 - 1
30023	Modbus setting	2 bytes	0 - 2
30024	Slave address	2 bytes	1 - 247
30025	Baud rate	2 bytes	0 - 5
30026	Parity	2 bytes	0 - 2
30027	Stop bits	2 bytes	0 - 1
30028	Rotation direction	2 bytes	0 - 1
30029	Weighing conveyor low speed	4 bytes	0.00 - 999.00
30031	Weighing conveyor high speed	4 bytes	0.00 - 999.00
30033	Rejector conveyor low speed	4 bytes	0.00 - 999.00
30035	Rejector conveyor high speed	4 bytes	0.00 - 999.0
30037	Infeed conveyor low speed	4 bytes	0.00 - 999.00
30039	Infeed conveyor high speed	4 bytes	0.00 - 999.00
30041	Zero point	4 bytes	0.000000 - 9.999999
30043	Span	4 bytes	0.000000 - 9.999999
30045	All summary Total	4 bytes	0 - 9999999
30047	All summary OK	4 bytes	0 - 9999999
30049	All summary Over	4 bytes	0 - 9999999
30051	All summary Under	4 bytes	0 - 9999999

Input register (continued)

30053	All summary Detect two	4 bytes	0 - 9999999
30055	All summary Unsplit	4 bytes	0 - 9999999
30057	All summary Foreign	4 bytes	0 - 9999999
30059	All summary Total weight	4 bytes	0 - 9999.999
30061	All summary Average weight	4 bytes	0 - 9999.999
30063	All summary Maximum	4 bytes	0 - 9999.999
30065	All summary Minimum	4 bytes	0 - 9999.999
30067	All summary Range	4 bytes	0 - 9999.999
30069	All summary Standard deviation	4 bytes	0 - 1.00000
30071	All summary Coefficient of variation	2 bytes	0 - 99.99
30072	OK summary Total	4 bytes	0 - 9999999
30074	OK summary Total weight	4 bytes	0 - 9999.999
30076	OK summary Average weight	4 bytes	0 - 9999.999
30078	OK summary Maximum	4 bytes	0 - 9999.999
30080	OK summary Minimum	4 bytes	0 - 9999.999
30082	OK summary Range	4 bytes	0 - 9999.999
30084	OK summary Standard deviation	4 bytes	0 - 1.00000
30086	OK summary Coefficient of variation	2 bytes	0 - 99.99
30087	Number of samples summary Total	4 bytes	0 - 9999999
30089	Number of samples summary OK	4 bytes	0 - 9999999
30091	Number of samples summary Over	4 bytes	0 - 9999999
30093	Number of samples summary Under	4 bytes	0 - 9999999
30095	Number of samples summary Detect two	4 bytes	0 - 9999999
30097	Number of samples summary Unsplit	4 bytes	0 - 9999999
30099	Number of samples summary Foreign	4 bytes	0 - 9999999
30101	Number of samples summary Total weight	4 bytes	0 - 9999.999
30103	Number of samples summary Average weight	4 bytes	0 - 9999.999
30105	Number of samples summary Maximum	4 bytes	0 - 9999.999
30107	Number of samples summary Minimum	4 bytes	0 - 9999.999
30109	Number of samples summary Range	4 bytes	0 - 9999.999
30111	Number of samples summary Standard deviation	4 bytes	0 - 1.00000
30113	Number of samples summary Coefficient of variation	2 bytes	0 - 99.99
30114	Number of OK samples summary Total	4 bytes	0 - 9999999
30116	Number of OK samples summary Total weight	4 bytes	0 - 9999.999
30118	Number of OK samples summary Average weight	4 bytes	0 - 9999.999
30120	Number of OK samples summary Maximum	4 bytes	0 - 9999.999
30122	Number of OK samples summary Minimum	4 bytes	0 - 9999.999
30124	Number of OK samples summary Range	4 bytes	0 - 9999.999
30126	Number of OK samples summary Standard deviation	4 bytes	0 - 1.00000
30128	Number of OK samples summary Coefficient of variation	2 bytes	0 - 99.99
30129	Weighing result	4 bytes	0 - 9999.999

Holding register

Address	Name	Size	Output range
40001	Product No.	2 bytes	1 - 100
40002	Group No.	2 bytes	1 - 10
40003	Language	2 bytes	0 - 1
40004	Standby mode	2 bytes	0 - 99
40005	DI 1 setting	2 bytes	0 - 8
40006	DI 2 setting	2 bytes	0 - 8
40007	DI 3 setting	2 bytes	0 - 8
40008	DI 4 setting	2 bytes	0 - 8
40009	DI 5 setting	2 bytes	0 - 8
40010	DI 6 setting	2 bytes	0 - 8
40011	DI 7 setting	2 bytes	0 - 8
40012	DI 8 setting	2 bytes	0 - 8
40013	Reserved for expansion. Do not use.	2 bytes	
40014	Reserved for expansion. Do not use.	2 bytes	
40015	Reserved for expansion. Do not use.	2 bytes	
40016	Reserved for expansion. Do not use.	2 bytes	
40017	Reserved for expansion. Do not use.	2 bytes	
40018	Reserved for expansion. Do not use.	2 bytes	
40019	Reserved for expansion. Do not use.	2 bytes	
40020	Reserved for expansion. Do not use.	2 bytes	
40021	Reserved for expansion. Do not use.	2 bytes	
40022	Reserved for expansion. Do not use.	2 bytes	
40023	Reserved for expansion. Do not use.	2 bytes	
40024	Reserved for expansion. Do not use.	2 bytes	
40025	Reserved for expansion. Do not use.	2 bytes	
40026	Reserved for expansion. Do not use.	2 bytes	
40027	Reserved for expansion. Do not use.	2 bytes	
40028	Reserved for expansion. Do not use.	2 bytes	
40029	Reserved for expansion. Do not use.	2 bytes	
40030	Reserved for expansion. Do not use.	2 bytes	
40031	Reserved for expansion. Do not use.	2 bytes	
40032	Reserved for expansion. Do not use.	2 bytes	
40033	Reserved for expansion. Do not use.	2 bytes	
40034	Reserved for expansion. Do not use.	2 bytes	
40035	Reserved for expansion. Do not use.	2 bytes	
40036	Reserved for expansion. Do not use.	2 bytes	
40037	DI 1 Chattering	2 bytes	0.00 - 9.99
40038	DI 2 Chattering	2 bytes	0.00 - 9.99
40039	DI 3 Chattering	2 bytes	0.00 - 9.99
40040	DI 4 Chattering	2 bytes	0.00 - 9.99
40041	DI 1 Delay time	2 bytes	0.0 - 300.00
40042	DI 2 Delay time	2 bytes	0.0 - 300.00

Holding register (continued)

40043	DI 3 Delay time	2 bytes	0.0 - 300.00
40044	DI 4 Delay time	2 bytes	0.0 - 300.00
40045	DI 1 Polarity	2 bytes	0 - 1
40046	DI 2 Polarity	2 bytes	0 - 1
40047	DI 3 Polarity	2 bytes	0 - 1
40048	DI 4 Polarity	2 bytes	0 - 1
40049	Stop setting	4 bytes	0 - 4294967296
40051	DO 1 setting	4 bytes	0 - 4294967296
40053	DO 2 setting	4 bytes	0 - 4294967296
40055	DO 3 setting	4 bytes	0 - 4294967296
40057	DO 4 setting	4 bytes	0 - 4294967296
40059	DO 5 setting	4 bytes	0 - 4294967296
40061	DO 6 setting	4 bytes	0 - 4294967296
40063	DO 7 setting	4 bytes	0 - 4294967296
40065	DO 8 setting	4 bytes	0 - 4294967296
40067	DO 1 delay time	2 bytes	0.0 - 300.00
40068	DO 2 delay time	2 bytes	0.0 - 300.00
40069	DO 3 delay time	2 bytes	0.0 - 300.00
40070	DO 4 delay time	2 bytes	0.0 - 300.00
40071	DO 5 delay time	2 bytes	0.0 - 300.00
40072	DO 6 delay time	2 bytes	0.0 - 300.00
40073	DO 7 delay time	2 bytes	0.0 - 300.00
40074	DO 8 delay time	2 bytes	0.0 - 300.00
40075	DO 1 hold time	2 bytes	0.0 - 300.00
40076	DO 2 hold time	2 bytes	0.0 - 300.00
40077	DO 3 hold time	2 bytes	0.0 - 300.00
40078	DO 4 hold time	2 bytes	0.0 - 300.00
40079	DO 5 hold time	2 bytes	0.0 - 300.00
40080	DO 6 hold time	2 bytes	0.0 - 300.00
40081	DO 7 hold time	2 bytes	0.0 - 300.00
40082	DO 8 hold time	2 bytes	0.0 - 300.00
40083	DO 1 Polarity	2 bytes	0 - 1
40084	DO 2 Polarity	2 bytes	0 - 1
40085	DO 3 Polarity	2 bytes	0 - 1
40086	DO 4 Polarity	2 bytes	0 - 1
40087	DO 5 Polarity	2 bytes	0 - 1
40088	DO 6 Polarity	2 bytes	0 - 1
40089	DO 7 Polarity	2 bytes	0 - 1
40090	DO 8 Polarity	2 bytes	0 - 1
40091	Curb chattering	2 bytes	0 - 99.99
40092	Reserved for expansion. Do not use.	2 bytes	
40093	Consecutive fail stop	2 bytes	0 - 1
40094	Consecutive fail number	2 bytes	0 - 9999
40095	Speaker volume	2 bytes	0 - 10

Holding register (continued)

40096	NG sound ON/OFF	2 bytes	0 - 1
40097	Start/Stop sound ON/OFF	2 bytes	0 - 1
40098	Reserved for expansion. Do not use.	2 bytes	
40099	Stable mass range	4 bytes	0.00 - 9999.99
40101	Stable time range	2 bytes	0.0 - 999.9
40102	Zero tracking mass range	4 bytes	0.00 - 9999.99
40104	Zero tracking time range	2 bytes	0.0 - 999.9
40105	Calibration weight value	4 bytes	0.00 - 9999.99
40107	Mass display mode	2 bytes	0 - 2
40108	Negative display mode	2 bytes	0 - 1
40109	Display data	2 bytes	0 - 1
40110	Output mode	2 bytes	0 - 2
40111	Reserved for expansion. Do not use.	2 bytes	
40112	Target	4 bytes	0.000 - 2000.00
40114	High limit	4 bytes	0.000 - 2000.00
40116	Lower limit	4 bytes	0.000 - 2000.00
40118	Reject Over	2 bytes	0 - 1
40119	Product length	2 bytes	0 - 999
40120	Processing number	2 bytes	1 - 320
40121	Speed	2 bytes	0 - 120.0
40122	Reserved for expansion. Do not use.	2 bytes	
40123	Reserved for expansion. Do not use.	2 bytes	
40124	Reserved for expansion. Do not use.	2 bytes	
40125	Tare value	4 bytes	0.00 - 2000.00
40127	Auto zero	2 bytes	0 - 1
40128	Auto zero range	4 bytes	0.00 - 9999.99
40130	Auto zero dead zone timer	2 bytes	0 - 99.99
40131	Dynamic compensation	2 bytes	0 - 1
40132	Dynamic compensation value	4 bytes	0.00000 - 9.99999
40134	Number of samples	2 bytes	1 - 9999
40135	Sample size (sub samples)	2 bytes	1 - 9999
40136	$\overline{X}$	4 bytes	0.00 - 999.99
40138	$\overline{R}$	4 bytes	0.00 - 999.99
40140	Class width	4 bytes	0.00 - 999.99
40142	Weighing capacity	2 bytes	0 - 1
40143	Minimum division	2 bytes	0 - 9
40144	Decimal point position	2 bytes	0 - 3
40145	Reserved for expansion. Do not use.	2 bytes	
40146	Reserved for expansion. Do not use.	2 bytes	

10. General Purpose External Input/Output

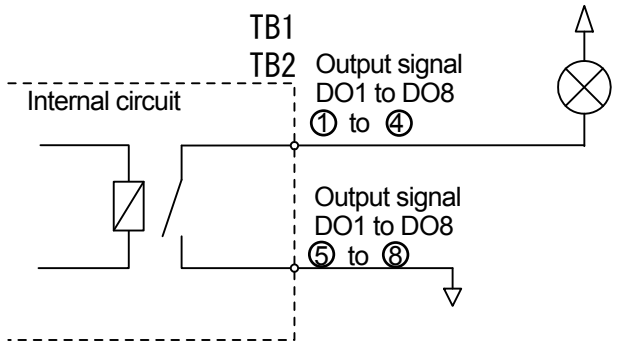
This chapter describes the general purpose external input/output.

For details about DO setting and DI setting, refer to “8.4. DO Behavior” and “8.15. Digital Input (DI)” respectively.

Output circuit	Relay contact output 8 points
Rated load	Resistive load (cosφ=1) 250 VAC 5 A / 30 VDC 5 A Inductive load (cosφ=0.4 L/R=7 ms) 250 VAC 2 A / 30VDC 2 A
Rated current	5 A
Maximum contact voltage	380 VAC / 125 VDC
Maximum contact current	5 A
Input circuit	Non-voltage input 4 points
Input open voltage	4.5 to 5.5 V
Short circuit current	2 mA max.
OFF current	0.6 mA or less
ON voltage	1 V or less

10.1. Connection

Output circuit



Input circuit

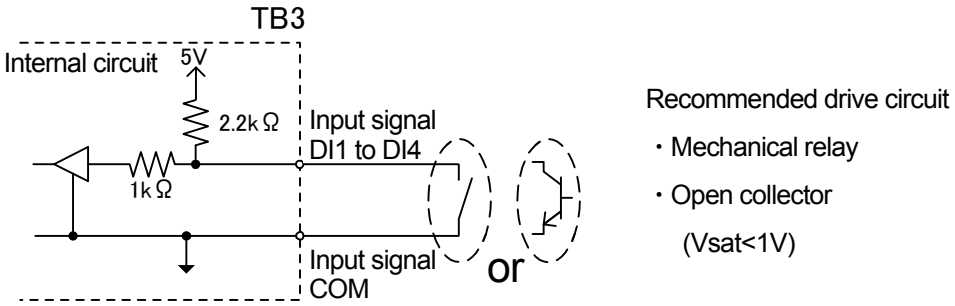


Fig.73 Input/Output circuit example

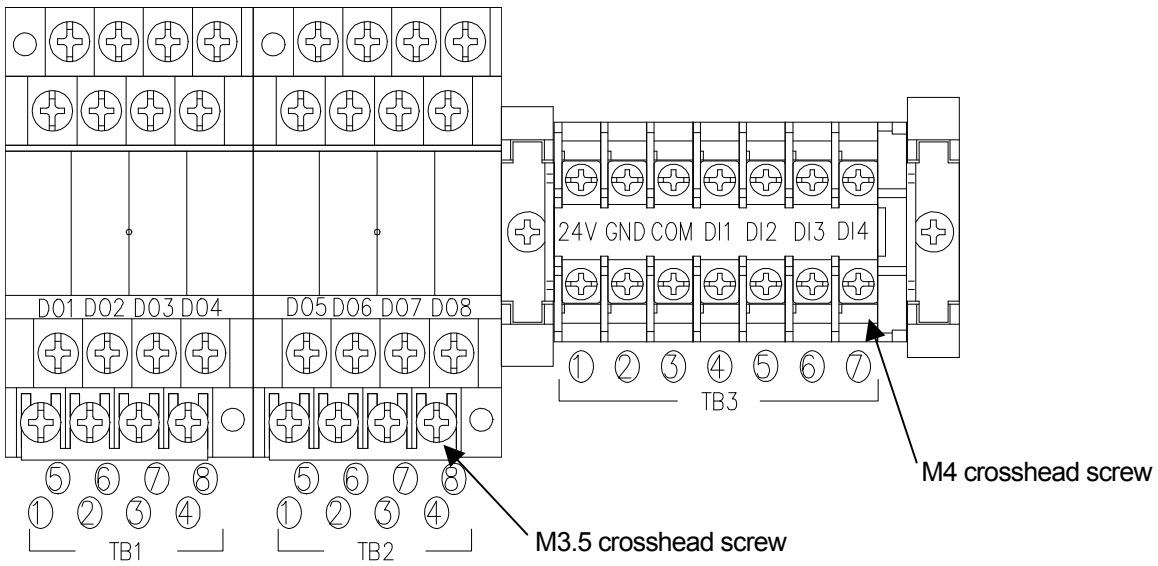


Fig.74 General purpose input/output terminal block

10.2. Terminal Arrangement

Terminal No.		Signal
TB1	①	Output signal DO1
	⑤	
	②	Output signal DO2
	⑥	
	③	Output signal DO3
	⑦	
	④	Output signal DO4
	⑧	

Terminal No.		Signal
TB2	①	Output signal DO5
	⑤	
	②	Output signal DO6
	⑥	
	③	Output signal DO7
	⑦	
	④	Output signal DO8
	⑧	

Terminal number		Signal
TB3	①	24 V Power supply output
	②	24 V Power supply ground
	③	Input signal COM
	④	Input signal DI1
	⑤	Input signal DI2
	⑥	Input signal DI3
	⑦	Input signal DI4

Note:

The 24-V power supply ① and ② of TB3 are power supply terminals for an external device.

11. Maintenance

11.1. Checkweigher Errors

When an error occurs in the checkweigher, the error message appears in the screen.
Should this occur, refer to the list of error messages shown below and take appropriate measures.

11.1.1. List of error messages

Error message	Probable cause	Remedial action
Calibration error The mass value of the calibration weight is not within the span adjustment range.	The mass value of the calibration weight is different from the value set in the Calibration screen.	Use the correct calibration weight to adjust span again.
	The calibration weight is not placed on the conveyor correctly.	Place the calibration weight on the center of the conveyor and adjust span again.
	An object is placed on the weighing conveyor, or is in contact with the conveyor.	Remove the object and adjust span again.
Photosensor error The photosensor has been under the light-blocked condition for a certain time.	An object exists between the photosensor and the reflector.	Remove the object.
	The photosensor optical axis is not correct.	Adjust the photosensor sensitivity.
Weighing conveyor stopped An error signal is input from the motor driver.	The motor is overloaded.	Two seconds after the stop, “belt stop release” functions. Remove the cause of overload.
Infeed conveyor stopped An error signal is input from the motor driver.	The motor is overloaded.	Two seconds after the stop, “belt stop release” functions. Remove the cause of overload.
Rejector conveyor stopped An error signal is input from the motor driver.	The motor is overloaded.	Two seconds after the stop, “belt stop release” functions. Remove the cause of overload.
Printer connection error Failed in communication with the printer.	The printer is not connected correctly.	Check the connection between the checkweigher and printer.

11.2. Storing the System Data

The checkweigher system data (all the registered product setting, balance setting, system setting, user setting, statistical data for each product and operational history) can be saved in the USB memory.
The saved data can be used as backup to restore when necessary data is unintentionally deleted.
Save the system data regularly.

1. Log in by the management level of Quality Manager or above.

2. Insert the USB memory into the USB terminal on the display.

3. When the USB memory is recognized, the USB mark appears on the upper right side of the screen.

4. In the Weighing screen, touch the Setting key 

to open the Common Setting screen.

5. Select the System 2 tab and touch the Backup/Restoration button.

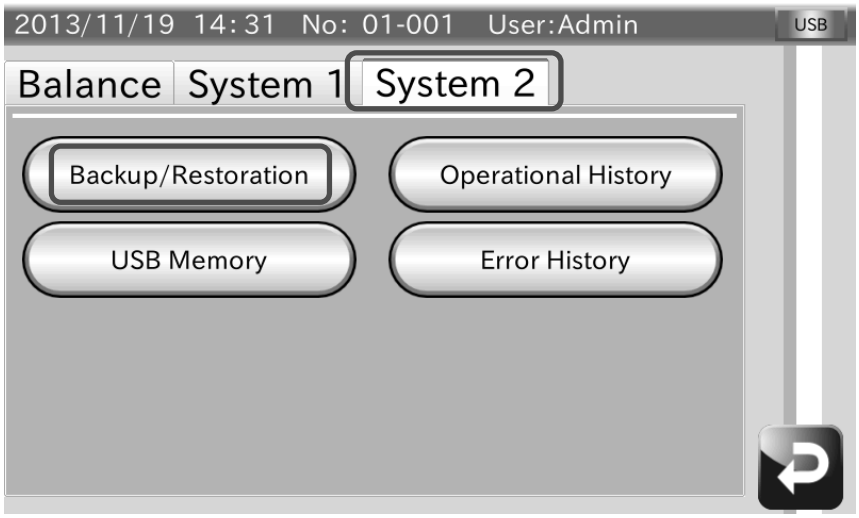


Fig.75 Common Setting screen (with System 2 tab selected)

6. The Backup/Restoration screen appears. Touch the Backup button.

Fig.76 Backup/Restoration screen

7. The confirmation dialog box appears. Touch the YES button to store the system data in the USB memory.
8. When the backup operation is complete, touch the HOME key  to return to the Weighing screen.

Note:

The system data is saved in the directory with the directory name “Year month day time minute AD4961.”

For example, when the system data is stored at 16:55, on September 3, 2013, the directory name will be 201309031655AD4961.

Caution:

Do not change the directory. The data may not be restored correctly.

11.3. Restoring the System Data

The system data restoration procedure is as follows:

Caution:

Use much care when performing data restoration. The data that is obtained after the system data is saved will be lost when data restoration is performed.

1. Log in by the management level of Quality Manager or above.

2. Insert the USB memory with the backup system data saved into the USB terminal on the display.

3. When the USB memory is recognized, the USB mark appears on the upper right side of the screen.

4. In the Weighing screen, touch the Setting key 

to open the Common Setting screen.

5. Select the System 2 tab and touch the Backup/Restoration button.

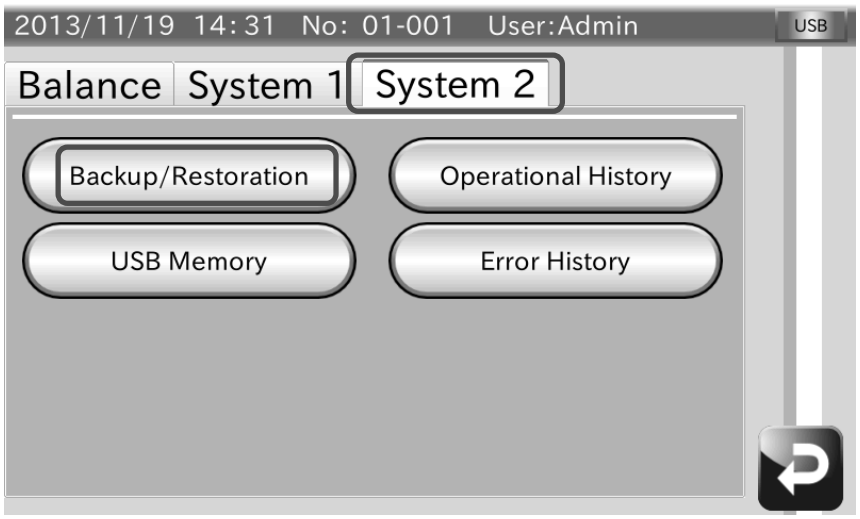


Fig.77 Common Setting screen (with System 2 tab selected)

6. The Backup/Restoration screen appears. Touch the Restoration button.

Fig.78 Backup/Restoration screen

7. The restoration dialog box appears. Select the directory in which the backup system data is saved and touch the OK key 

.

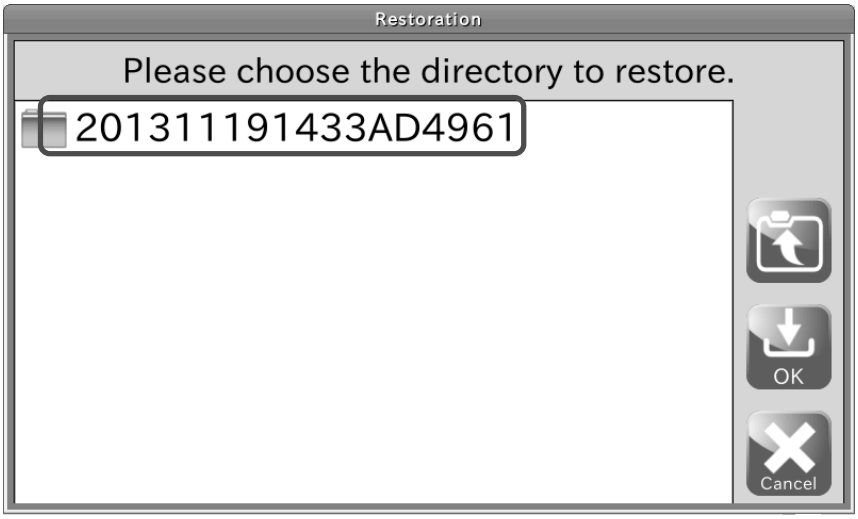


Fig.79 Restoration dialog box

8. The confirmation dialog box appears. Touch the YES button to restore the system data.
9. When the restoration operation is complete, touch the HOME key  to return to the Weighing screen.

11.4. Initializing the System Data

All the checkweigher system data can be initialized.
Initialization will delete all the data saved in the checkweigher and cause the checkweigher malfunction.
Do not attempt to initialize the system data. Only the A&D service personnel is allowed to do it.

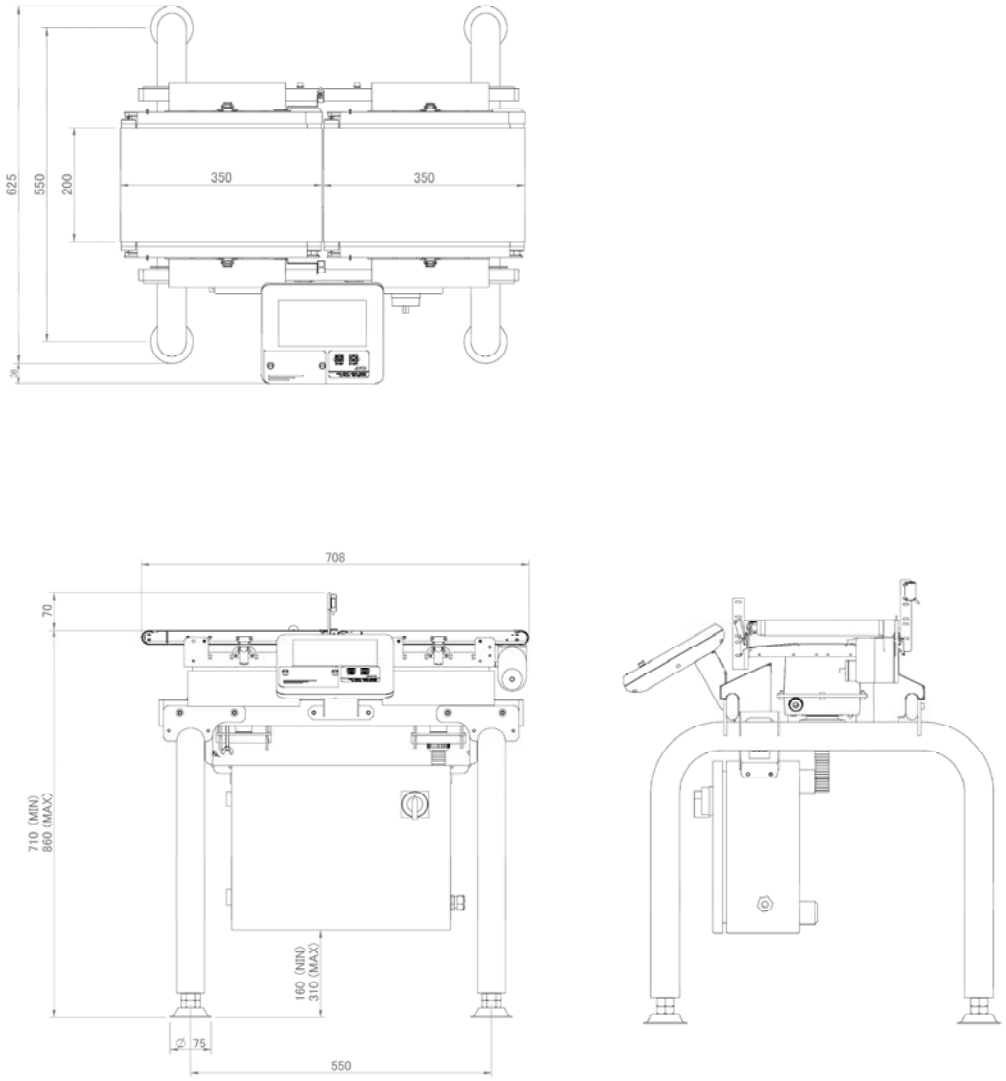
12. Specifications

Model	AD4961-2KD-2035
Weighing capacity	2000 g (switching between 500 g and 2000 g)
Resolution	0.01 g (500 g) / 0.1 g (2000 g)
Accuracy (3σ) *1	0.08 g (500 g) / 0.18 g (2000 g)
Throughput	320 pcs/minute
Conveyor belt width	200 mm
Weighing conveyor length	350 mm
Transport medium	Urethane belt
Belt speed	15 to 120 m/min (can be set in 1 m/min)
Dimensions of product to be weighed	Length: 30 to 300 mm
	Width: 200 mm max.
Weighing sensor	Strain gauge load cell
Display	7inch touch panel color display
Operation method	Touch panel (WVGA), Key switch
Number of registered products	1000 products (10 groups x100 products)
Communication function	Modbus TCP / Modbus RTU / RS232C (Metal detector) / TCP/IP (PostScript printer) / USB (USB memory, data storage and image import use)
External input	Non-voltage contact input 4 points
External output	Relay contact output 8 points
Dust/water resistance	IP65 compliant
Operation temperature range	-5 to 40 °C
Operation humidity	85% RH or less, no condensation
Power supply	Single phase　100 to 240 VAC (+10% / -15%)、50/60Hz 180VA
External dimensions *2	W: 700 mm　D: 660 mm　H: 710 to 860 mm
Weight *2	Approx. 35 kg
Material	Display: ABS resin Conveyor unit: Aluminum (alumite coating) and ABC resin Control box: Stainless steel Frame: Stainless steel

*1 Depends on the shape and condition of the product, and installation environment.

*2 Values without a rejector

13. External Dimensions



Unit: mm

Fig.80 External dimensions

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