AD54502

INSTRUCTION MANUAL

Multi Function Weighing Indicator



WM: PD4000243A



This is a hazard alert mark.



This mark informs you about the operation of the product.

Note

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Contents

1.	С	ompliance	
	1.1.1.	Compliance with FCC rules	4
	1.1.2.	Compliance with European Directives	
2.	0	Outline and Features	5
۷.	2.1.	Precaution	
	2.2.	Front Panel	_
	2.2.1.	Keys	
	2.2.1.		
	2.2.2.	Symbols Rear Panel	
	2.3.	Real Pallel	10
3.		nstallation	
	3.1.	Mounting Indicator	
	3.2.	Connecting Loadcell Cable	
	3.2.1.	Verifying Loadcell Output and Input Sensitivity	13
	3.3.	Wiring Power Cord	14
	3.4.	Installing Options	15
4.	В	asic Operation	16
•	4.1.	Key Operation Examples	
	4.1.1.	Standby Mode	
	4.1.2.	Cursor Operation	
	4.1.3.	Inputting Characters	
	4.1.4.	The Way of Calling a Code	
	4.1.5.	The Way of Entering a Correction Mode	
	4.1.6.	The Way of Entering a Confection Mode	
	4.1.0.	Status Chart (Mode map)	
	4.2.	Status Chart (Mode Map)	19
5.		alibration	
	5.1.	Actual Load Calibration (using a Mass)	
	5.2.	Digital Span (Calibration without a Mass)	
	5.3.	Gravity Acceleration Correction	
	5.3.1.	Gravity Acceleration Reference	23
	5.4.	Calibration Error	24
6.	А	pplications	25
	6.1.	Hopper Scale with Material Code	
	6.1.1.	Definition of a Material Code	
	6.1.2.	Recalling a Material Code	
	6.1.3.	Editing Principle Parameters of a Material Code	
	6.1.4.	Referring to the next Material Code	
	6.1.5.	Editing Full Parameters of a Material Code	20 27
	6.2.	Simple Hopper Scale with a Recipe Code	
	6.2.1.	Definition of a Recipe Code	
	6.2.2.	Using a Recipe Code	
	6.2.3.	Construction of a Recipe Code	
	6.2.4.	Recalling a Recipe Code	
	6.2.5.	Arranging Material Code in a Recipe Code	
	6.2.6.	Editing Full Parameters of a Recipe Code	3∠

	6.3.	System Design of a Hopper Scale	. 34
	6.3.1.	Operation and I/O Design	. 34
	6.3.2.	Design Example	. 34
7.		eighing Mode	
	7.1.1.	Contents of the Batch Weighing Mode	
	7.2.	Batch Weighing Mode	
	7.2.1.	Selection of Batch Weighing	
	7.3.	Built-in Automatic Program Mode	
	7.3.1.	Normal Batching of Built-in automatic program mode	
	7.3.2.	Loss-in-weigh of the Sequential Mode	. 42
	7.3.3.	Compensation Sequence	. 44
	7.3.4.	Initial Flow Sequence	. 46
	7.3.5.	Discharge Sequence	. 48
	7.3.6.	Recipe Sequence	
	7.3.7.	Automatic Selection of Supplying Hopper	. 52
	7.3.8.	Nozzle Control Sequence (vacuum cleaner)	
	7.3.9.	Mixing Sequence	
	7.3.10.	Safety Check Function	
	7.3.11.	Pause and Emergency Stop	
	7.3.12.	Restart Sequences from Pause	
	7.3.13.	Automatic Free Fall Compensation	
	7.3.14.	Real Time Free Fall Compensation	
	7.4.	Customer Programmed Control (Comparison Output)	
	7.4.1.	Normal Batching of the Customer Programmed Control Mode	
	7.4.2.	Loss-in-weigh of the Customer Programmed Control Mode	
	7.5.	Other Functions	
	7.5.1.	Re-Zero Operation	
	7.5.2.	Zero Tracking Function	
	7.5.2. 7.5.3.	Tare	
	7.5.3. 7.5.4.	Preset Tare (Fixed Tare Function)	
	7.5.4. 7.5.5.		
	7.5.5. 7.5.6.	Customizing the Function Key (Key Design)	
		Customizing the Sub Display	
	7.5.7.	Graphic Display	
	7.5.8.	Total Operation	
	7.5.9.	Undoing the Total Operation	
	7.5.10.	Clearing (Deleting) the Totaled Data	
	7.5.11.	Error Message and Alarm	
	7.5.12.	Graphic Status Indicator	
	7.5.13.	Memory Backup	. 73
_	ا ما	in the co	71
8.		terface	
	8.1.	Control I/O Function	
	8.1.1.	Interface Circuit	
	8.1.2.	Timing Chart	
	8.2.	Built-in RS-485 Interface	
	8.2.1.	Connection	
	8.2.2.	Settings of Parameters	
	8.2.3.	Timing Chart	
	8.2.4.	General Data Format	
	8.2.5.	A&D Data Format	
	8.2.6.	Address	
	8.2.7.	Command List	. 81

8.3.	Built-in Current Loop Output	84
8.3.1.	Connection	84
8.3.2.	Communication Modes	84
8.3.3.	Data Format	85
8.4.	BCD Output of Option OP-01	85
8.5.	Relay Output of Option OP-02	
8.6.	RS-422/485 Interface of Option OP-03	
8.7.	RS-232C Interface of Option OP-04	
8.8.	Parallel I/O of Option OP-05	
8.9.	Analog Output of Option OP-07	
0.0.	rulaiog Galpat of Gpuon Gr. or illinininininininin	
9. M	aintenance	96
9.1.1.	Basic Operation	
9.2.	Monitor Mode	
9.2.1.	Monitoring the Control I/O Function	
9.2.2.	Monitoring the Built-in RS-485 Interface	
9.2.3.	Monitoring the Built-in Current Loop Output	
9.2.4.	Monitoring the A/D Converter	
9.2.5.	Monitoring the BCD Output of OP-01	
9.2.6.	Monitoring the Relay Output of OP-02	
9.2.7.	Monitoring the RS-422/485 Interface of OP-03	
9.2.7.	Monitoring the RS-232C Interface of OP-04	
9.2.0. 9.2.9.	Monitoring the Parallel I/O of OP-05	
9.2.9. 9.2.10.	Monitoring the Analog Output of OP-07	
9.3.	Test Mode	99
9.3.1.	Testing the Control I/O Function	99
9.3.2.	Testing the Built-in RS-485 Interface	
9.3.3.	Testing the Built-in Current Loop Output	
9.3.4.	Testing the A/D Converter	
9.3.5.	Testing the BCD Output of OP-01	
9.3.6.	Testing the Relay Output of OP-02	100
9.3.7.	Testing the RS-422/485 Interface of OP-03	
9.3.8.	Testing the RS-232C Interface of OP-04	
9.3.9.	Testing the Parallel I/O of OP-05	
9.3.10.		
9.4.	Initializing Parameters	
9.5.	Remote Operation	104
	unction List	
10.1.1.	1	
10.1.2.		
10.2.	Referring Parameters	
10.3.	Parameter Settings	
10.4.	Parameter List	108
44		404
	pecifications	
11.1.	Dimensions	
11.2.	Accessories	137
10 5	oforonoo	400
	eferences	
12.1.	Abbreviations	
12.2.	ASCII Code for AD-4402	
12.3.	Index	140

1. Compliance

1.1.1. Compliance with FCC rules

Please note that this equipment generates, uses and can radiate radio frequency energy. This equipment has been tested and has been found to comply with the limits of a Class A computing device pursuant to Subpart J of Part 15 of FCC rules. These rules are designed to provide reasonable protection against interference when this equipment is operated in a commercial environment. If this unit is operated in a residential area it may cause some interference and under these circumstances the user would be required to take, at his own expense, whatever measures are necessary to eliminate the interference.

(FCC = Federal Communications Commission in the U.S.A.)

1.1.2. Compliance with European Directives

This appliance complies with the statutory EMC (Electromagnetic Compatibility) directive 89/336/EEC and the Low Voltage Directive 73/23/EEC for safety of electrical equipment designed for certain voltages.

Note: The displayed value may be adversely affected under extreme electromagnetic influences.

Page 4 AD-4402

2. Outline and Features

□ The AD-4402 is a multi-function weighing indicator for batch weighing and filling weighing. This indicator has control I/O for weighing sequence and options.

Large display

This indicator has a blue vacuum fluorescent display (VFD).

The character height of the main display is 18 mm.

Current weighing data, material names, setpoints (comparison references) and total data are displayed at the same time.

Operation guidance

Messages that assist current operation are displayed on the front panel and anyone could operate the indicator without instruction manuals.

Full weighing sequences

The AD-4402 can combine multiple materials and is equipped with the recipe function. Equipped with a filling nozzle and agitation sequence.

Using the forecast control function, the flow control can be performed that is equivalent to A/D conversion of 1000 times per second.

□ RS-485 interface

32 indicators can be connected to a programmable controller or a personal computer. These protocols are according to public formats.

Options

There are options of AC 250 V direct drive relay, serial interface, parallel interface, analog output and etc.

There are options of CC-Link, DeviceNet and PROFIBUS.

There are three expansion slots for options.

Check mode during operation

The monitor mode can confirm system status during operation.

The test mode can test the Input / Output interface.

Even if there is no monitor instrument, the interface can be confirmed.

Recipes and raw material data stored in the indicator

The recipe is described as combination of material codes and weights.

The material code is described as the weighing sequence parameters for a raw material.

Water-resistant panel

The classification code of the front panel is equivalent to IP-65 of IEC 529 using the accessory rubber packing. The "IP-65" code is explained as follows:

IP: International Protection.

Against ingress of solid foreign objects. 6:

Dust-tight. No ingress of dust.

Against ingress of water with harmful effects. 5:

> Protected against water jets (no powerful jets). Water projected in jets against the enclosure from any direction shall have no harmful effects.

2.1. Precaution

Before use, confirm the following articles for safe operation.

Grounding the indicator

Ground the indicator. The earth terminal \oplus is on the rear panel.

Separate this earth ground line from others, like ground line of a motor, inverter or a power source. Unless the indicator is grounded, it may cause the operator to receive an electric shock, cause operation error or catch fire

Use adequate power cord

Confirm the AC voltage and current of the power cord. If the voltage range of the cord is lower than the power line voltage, it may cause of a leak or catching fire. Use compression terminals to connect the power cord to the rear panel terminals.

Fuse

The fuse is installed to prevent the indicator from catching fire.

The indicator has equipped many safety circuits. Therefore, the fuse is not broken in normal operation. If the fuse is broken, do not replace the fuse and contact your local or A&D dealer. This trouble may cause of an electric discharge of thunder.

Splashing water

The indicator is not water-resistant. When the indicator is mounted to a panel with the accessory rubber seal, the front panel is equivalent to IP-65.

Flammable gas

Do not install the indicator in any flammable gas.

Heat radiation of the indicator

Space out instruments to radiate heat sufficiently.

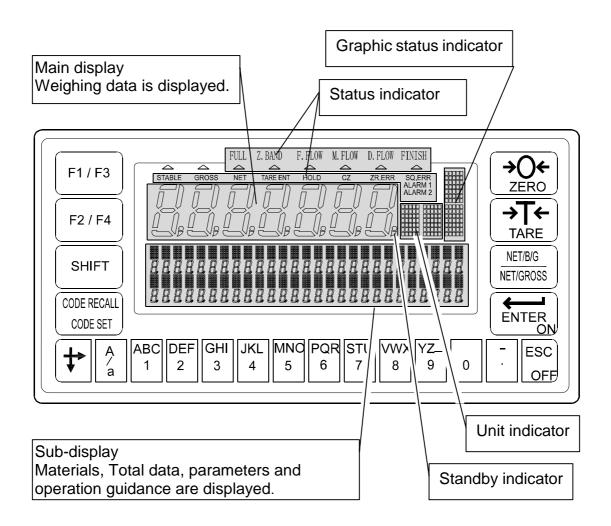
Removing the cover

Remove the power cord terminals from the power source before removing the cover to avoid receiving an electric shock.

Do not touch the internal circuit within 10 seconds after turning off the indicator to avoid receiving an electric shock.

Page 6 AD-4402

2.2. Front Panel



2.2.1. **Keys**

CODE RECALL CODE SET

Pressing this key, the key works as the **F1** key. F1/F3

Pressing the **SHIFT** key and this key, the key works as the **F3** key.

Pressing this key, the key works as the **F2** key. F2 / F4

Pressing the **SHIFT** key and this key, the key works as the **F4** key.

The key to select a function of a key. **SHIFT**

The key to open the material code or recipe code.

Pressing the **SHIFT** key and this key, the key works as the material

code edit kev.

Pressing the **ENTER** key and this key, the key works as the recipe

code edit key.



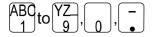
The key to move the cursor or scroll the function number.

Press and hold the **SHIFT** key and press the ** key to decrease the

code number.



The key to select alphabetical keys, upper keys, lower keys or numerical keys.



Alphanumeric keys.

ESC

The escape key. Pressing and holding the key more than three seconds in normal weighing mode, the display is turned off (standby mode).

The **ESC** key is used to undo the last key action and to return to the

last mode.

ENTER

The **ENTER** key for parameter settings.

The key to turn on the display.

Pressing this key and the + key, the key works as the menu key.

NET/B/G NET/GROSS

The key to select net or gross

→T← TARE

The tare key. The key is used to display the net value after that tare

weight is subtracted from the gross weighing.

→O+ ZERO The zero key. To zero the current weighing display.

2.2.2. Symbols

Main display Gross or net is displayed.

Sub display Code numbers, operation guidance, graph, setpoint and others are

displayed selectively.

Unit indicator The indicator that is displayed when the weighing unit is selected in

the calibration mode. Refer to section "5. Calibration".

Status indicator The current weighing status is displayed.

Graphic status indicator

The current weighing situation is displayed with symbols.

The classification number is displayed, when an error occurred or

an alarm is indicated.

STABLE With this sign illuminated, the current weighing display is stable.

GROSS The main display is the gross data, when this sign is illuminated.

NET The main display is the net data, when this sign is illuminated.

Page 8 AD-4402

TARE ENT Tare entered.

With the tare value stored, this sign is illuminated.

HOLD With the main display held, this sign is illuminated.

CZ Center of zero.

When the gross weight is in the center of the zero point, this sign is

illuminated.

ZR.ERR Zero error.

Error message for zeroing the gross data of the main display.

SQ.ERR The sequence error sign.

Indicates a weighing sequence error.

ALARM 1 An error sign for over load or emergency stop mode.

ALARM 2 A fatal error sign. Example: The wire from the loadcell is broken.

Standby indicator In the standby mode, all interfaces are turned off and only the

internal circuits work.

▲FULL When the gross data exceeds the full limit, this sign is illuminated.

▲Z. BAND The zero band sign.

When the gross data is within the range of the zero band (around

the zero point), this sign is illuminated.

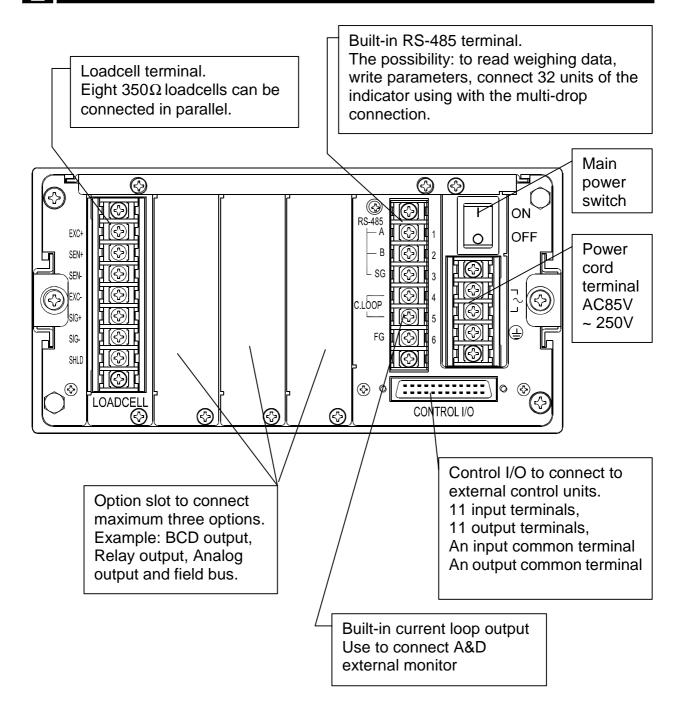
▲F.FLOW The full flow gate sign.

▲M.FLOW The medium flow gate sign.

▲D.FLOW The dribble flow gate sign.

▲FINISH The batch finish sign.

2.3. Rear Panel



Page 10 AD-4402



3. Installation

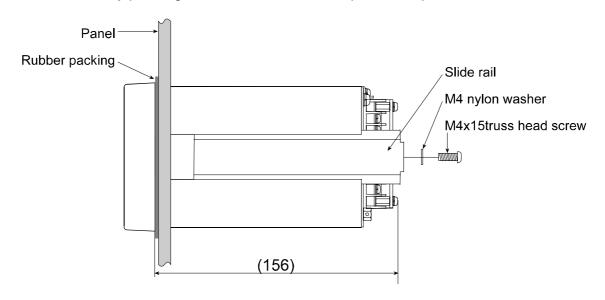
Caution

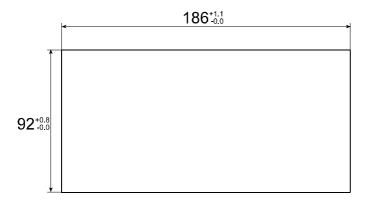
- Remove the power cord before installing the indicator and an option.
- □ Turn off peripheral devices before installing it.
- Insert the options before installing the indicator.



3.1. Mounting Indicator

- □ The indicator can be mounted on a panel using the slide rail.
- □ If the accessory packing rubber is used, the front panel is equivalent to IP-65 of IEC 529.





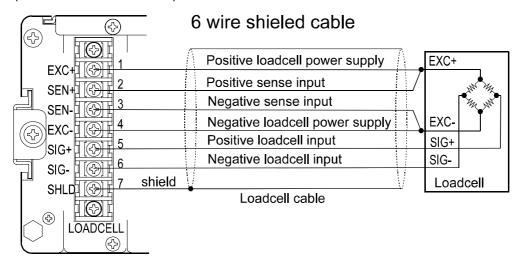
Panel Cutout size

X

3.2. Connecting Loadcell Cable

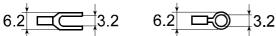
Caution

- Do not share the loadcell cable with noise-generating devices or power lines, beacuse the loadcell signal is very sensitive.
- We recommend that you use a 6 wire shielded cable to prevent loss of weighing precision.
- □ If the loadcell cable length is shorter than 5 m, you may use a 4 wire shielded cable with terminals 1 & 2 shorted (EXC+ & SEN+ shorted) and terminals 3 & 4 shorted (EXC- & SEN- shorted).



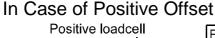
Adaptable Compression Terminal Parts

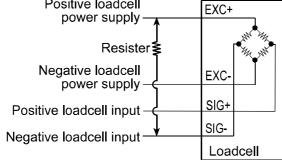
Use the appropriate compression terminal parts to attach the cables.



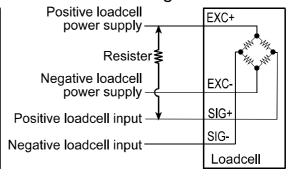
Loadcell Output Adjustment for Zero Calibration (Zero Point)

- $\ \square$ If the message "CERR2" is displayed, the zero point of zero calibration is too large.
- $\, \square \,$ If the message "CERR3" is displayed, the zero point of zero calibration is too small.
- \Box Use a resistor of more than 50 kΩ with low (good) temperature coefficient, when adding a resistor, to adjust the loadcell output, to the indicator terminals.





In Case of Negative Offset



Page 12 AD-4402

3.2.1. Verifying Loadcell Output and Input Sensitivity

The input sensitivity of the indicator is $0.3\mu V/division$ or more. Adapt to the following inequality, when you design a weighing instrument using the indicator and loadcell(s).

Caution

- A change in input voltage sensitivity is equivalent to a one division change of the display. Select as large an input voltage sensitivity voltage as possible so that the weighing interval becomes stable.
- □ Consider the leverage if a lever is used.

Weighing instrument using one loadcell.	$0.3 \le \frac{E * B * D}{A}$	A: Rated capacity of loadcell [kg] B: Rated output [mV/V]	
Weighing instrument using multi-loadcell	$0.3 \le \frac{E * B * D}{A * N}$	D:Weighing interval [kg] E:Excitation voltage [mV] N:Number of loadcells	

Verification Example

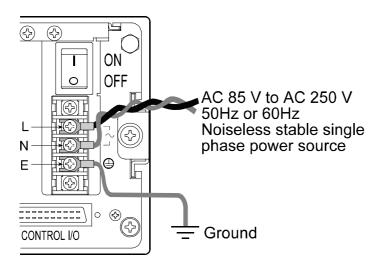
Design:		
Loadcell	N=1	
Rated capacity	A=750 [kg]	$\frac{5000*3*0.05}{750} = 1 \ge 0.3$. Therefore,
Rated output	B=3 [mV/V]	750 - 12 0.3 : Therefore,
Excitation voltage	E=5000 [mV]	regard the instrument as a good design.
Weighing interval	D=0.05 [kg]	
Weighing capacity	300 [kg]	



3.3. Wiring Power Cord

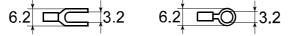
Caution

- Gorund the indicator using terminal E to avoid receiving an electric shock or an error due to discharge of static electricity.
- Do not share the ground wire with an electrical device that generates noise.
- Do not use an unstable power source.
- □ Do not share the power cord with a moter system (a noise-generating device) to avoid operation error.
- The power source can be from AC 85V to AC 250V with 50 Hz or 60 Hz.



Adaptable Compression Terminal Parts

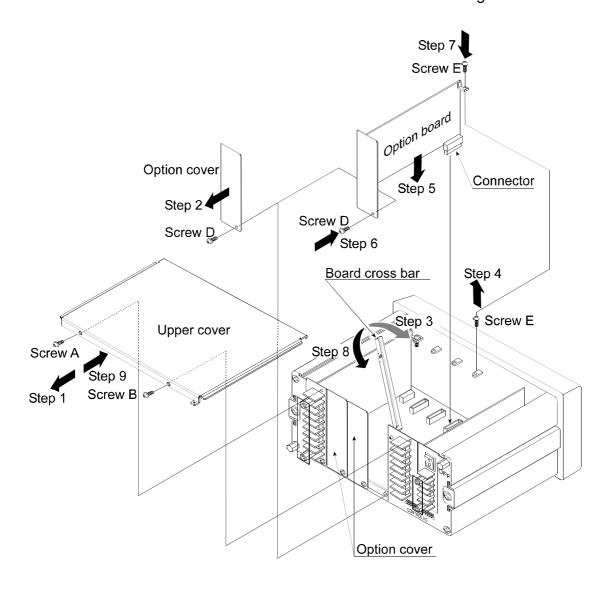
Use the appropriate compression terminal parts to attach the cables.



3.4. Installing Options

Caution

- Remove the power cord before the operation to install an option.
- Do not install the same options.
- Do not touch the internal parts within ten seconds after removing the power cord because you may receive an electric shock.
- Do not forget to tighten the screws. If a screw is not tightened, it may cause a short circuit or an error due to noise.
- □ Three option boards can be installed in the slots.
- □ Initialize the RAM data in accordance with section 9.4. Initializing Parameters.





4. Basic Operation



4.1. Key Operation Examples

This section describes the way of key operation.

4.1.1. Standby Mode

OFF Press and hold the **OFF** key about three seconds in the

weighing mode. Then the indicator enters the standby mode

and displays the standby indicator.

In the standby mode, All interface is turned off and only the

internal circuits work.

ON The **ON** key is used to turn on the indicator.

4.1.2. Cursor Operation

There is a cursor on a segment (an item) that is turned on and off.

SHIFT + Press and hold the SHIFT key and press the key to move the

cursor backward.

ENTER The **ENTER** key is used to enter the selected item.

The **ESC** key is used to return to the last mode and to undo the

last key operation.

4.1.3. Inputting Characters

A character can be input in a current segment (an item) in the appropriate mode.

A/a The A/a key is used to change numerical key, upper keys, lower

keys and alphabetical key.

Alphanumerical The alphanumerical keys and the ENTER key are used to

enter the parameters and to select a code number directly.

The ENTER key is used to specify the alphanumerical data.

ESC The **ESC** key is used to undo the last key operation and to

return to the last mode.

Page 16 AD-4402

4.1.4. The Way of Calling a Code

In Case of a Material Code:

Step 1 Suppose that the function parameter [59F - 8] to [0] is set.

Step 2 Press the CODE RECALL key in the weighing mode.

Step 3 Set the number of a material code with the following keys:

SHIFT +

Press and hold the SHIFT key and press the

key to decrease

the code number.

Numerical The numerical keys and the ENTER key is used to select a

code number directly and to enter the parameters.

ENTER The **ENTER** key is used to specify the number.

ESC The **ESC** key is used to undo the last key and to return to the

last mode.

In Case of a Recipe Code:

Step 1 Suppose that the function parameter [59F - 8] to [7] or [7] is set.

Step 2 Press the **CODE RECALL** key in the weighing mode.

Step 3 Set the number of a recipe code with the following keys:

†, SHIFT + **†**, Numerical, ENTER, ESC keys

4.1.5. The Way of Entering a Correction Mode

In Case of a Material Code:

- Step 1 Press and hold the **SHIFT** key and press the **CODE RECALL** key in the weighing mode.
- Step 2 Select the number of a material code using the following keys:
 - +, SHIFT + +, Numerical, ENTER, ESC keys
- Step 3 Edit some items of a material code using the **numerical** and **ENTER** keys.
- Step 4 Press the **ESC** key to return to the weighing mode.

In Case of a Recipe Code:

- Step 1 Press and hold the **ENTER** key and press the **CODE RECALL** key in the weighing mode.
- Step 2 Select the number of a recipe code using the following keys:
 - **→**, SHIFT + **→**, Alphanumerical, A/a, ENTER, ESC keys
- Step 3 Edit some items of a recipe code using **alphanumeric** and **ENTER** keys.
- Step 4 Press the **ESC** key to return to the weighing mode.

4.1.6. The Way of Entering The Menu

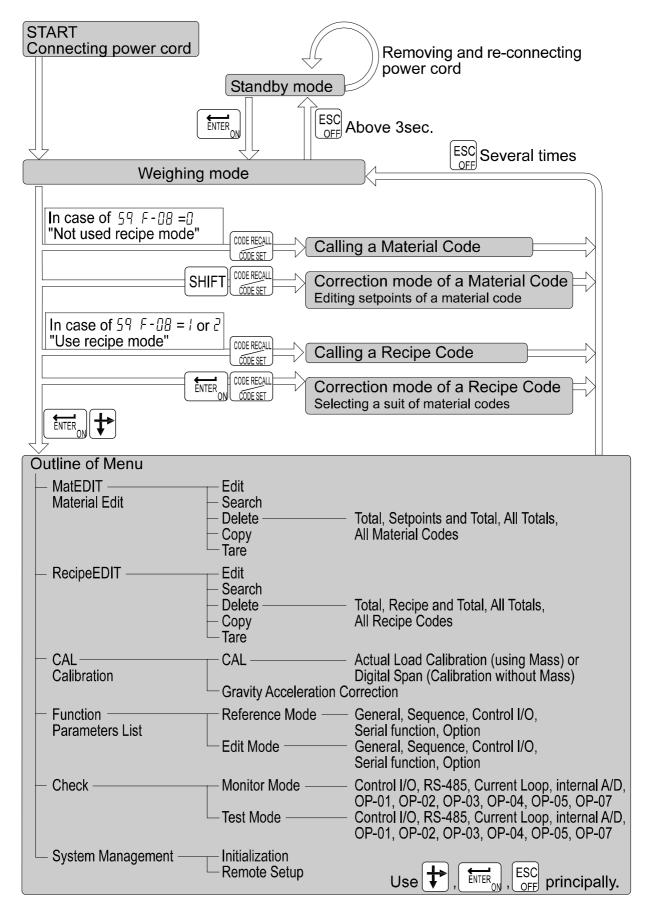
- Step 1 Press and hold the **ENTER** key and press the ** key in the weighing mode. Then the first layer of menu is displayed.
- Step 2 Use the following keys in the menu:

 +, SHIFT, Alphanumerical, A/a, ENTER, ESC keys
- Step 3 Press the **ESC** key several times to return to weighing mode.

Page 18 AD-4402



4.2. Status Chart (Mode map)





5. Calibration

- □ The indicator, which is connected to a loadcell unit, can weigh the "weight" value on the loadcell pan and display its "mass" value. The calibration function is used to adjust the displayed value so that the weighing system can weigh correctly.
- □ There are two ways of calibration. The "actual load calibration" uses a rated mass and zero output from the loadcell. The "digital span" inputs arbitrary values (calculated by hand). These methods are selected in the calibration procedure.
- □ There is a compensation function of the "gravity acceleration correction".

 This function is used, when a calibrated weighing system is moved to another place.
- □ The calibration parameters are stored in the indicator without any power supply.

Common Calibration Items

Unit The "g", "kg" and "t" or "lb" can be selected (lb: USA only).

Decimal point The decimal point can be selected from "not used" to "four

decimal places".

Minimum division The minimum division of the weighing display. Weighing capacity The maximum display of the weighing display.

Items for the "Actual Load Calibration"

Common items Unit, decimal point, minimum division and weighing capacity

Zero point adjustment A zero point output is used from the loadcell unit.

Span adjustment Rated mass is place on the weighing pan and is weighed.

The sensitivity is adjusted. This sensitivity is the same as "

sensitivity " of digital span.

Items for "Digital Span"

Common items

Unit, decimal point, minimum division and weighing capacity

loadcell unit.

Rated capacity The rated capacity of the loadcell is input. Sensitivity The sensitivity of the loadcell is input.

Caution

- □ When the CAL switch on the A/D board is "DISABLE", no calibration can be performed.
- Do not perform any calibration during a weighing sequence operation.
- Entering calibration mode during a weighing sequence operation, the weighing sequence operation is terminated. Calibrate the weighing system only when the weighing sequence operation has stopped
- □ The accuracy of the "Digital Span (Calibration without Mass)" is 1/1000.
- Do not use a "loadcell summing box", when the "digital span" is performed.
- It is necessary that the loadcell sensitivity is exactly known, if the "digital span" is used.

Page 20 AD-4402

5.1. Actual Load Calibration (using a Mass)

ESC key If you want to return to the weighing mode during the

calibration mode, press the ESC key anytime. It is

effective until the last displayed parameter.

Example: zero adjustment only, etc.

When the key is pressed, the procedure stores the **ENTER** key

current parameter and proceeds to the next step.

- Step 1 Press and hold the **ENTER** key and press the + key to display the menu in the weighing mode.
- Step 2 Press the + key twice to select the menu CAL. Press the **ENTER** key to enter the calibration mode.
- Step 3 Press the **ENTER** key to enter the menu CAL.
- Step 4 Select a unit using the numerical keys and press the **ENTER** key to store it.
- Step 5 Select a decimal point using the numerical keys and press the **ENTER** key to store it.
- Step 6 Select a minimum division using the numerical keys and press the **ENTER** key to store it.
- Step 7 Select a weighing capcity using the numerical keys and press the **ENTER** key to store it.
- Step 8 Perform the zero point adjustment. Place nothing on the weighing pan and press the **ENTER** key to store it after the **STABLE** indicator is displayed. Whether the **STABLE** indicator is displayed or not, if you want to store it, wait for ten seconds and press the ENTER key.
- Step 9 If the **F1** key is pressed, it will branch out to the digital span.
- Step 10 Specify a total mass value to place on the weighing pan using the numerical keys and press the ENTER key to store it.
- Step 11 Place the specifyed mass on the weighing pan and press the **ENTER** key to store it after the **STABLE** indicator is displayed. Whether the **STABLE** indicator is displayed or not, if you want to store it, wait for ten seconds and press the ENTER key.
- Step 12 Press the **ESC** key to return the weighing mode.

5.2. Digital Span (Calibration without a Mass)

ESC key If you want to return to the weighing mode during the

calibration mode, press the ESC key anytime. It is

effective until the last displayed parameter.

Example: zero adjustment only, etc.

When the key is pressed, the procedure stores the **ENTER** key

current parameter and proceeds to the next step.

- Step 1 Press and hold the **ENTER** key and press the + key to display the menu in the weighing mode.
- Step 2 Press the ** key twice to select the menu CAL. Press the **ENTER** key to enter the calibration mode.
- Step 3 Press the **ENTER** key to enter the menu CAL.
- Step 4 Select a unit using the numerical keys and press the **ENTER** key to store it.
- Step 5 Select a decimal point using the numerical keys and press the **ENTER** key to store it.
- Step 6 Select a minimum division using the numerical keys and press the **ENTER** key to store it.
- Step 7 Select a weighing capcity using the numerical keys and press the **ENTER** key to store it.
- Step 8 Press the **F1** key to proceed to the next step.
- Step 9 Store the zero point value. If you need a new the zero point value, input it using the numerical keys and press the **ENTER** key to store it. If you do not need a new the zero point value, press the **ENTER** key to preceed the next step.
- Step 10 Input the rated capacity of a loadcell using the numerical keys and press the **ENTER** key to store it.
- Step 11 Input the sensitivity of the loadcell in the unit of mV/V using the numerical keys and press the **ENTER** key to store it.
- Step 12 Press the **ESC** key to return the weighing mode.

Advise The digital span can be used for trimming of the actual load calibration using a mass.

Page 22 AD-4402

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5.3. Gravity Acceleration Correction

□ The function compensates for weighing error due to the difference of gravity acceleration.

G1 The place where the weighing system is calibrated.

G2 The place where the weighing system is used.

ESC key If you want to return to the weighing mode during the

calibration mode, press the **ESC** key anytime.

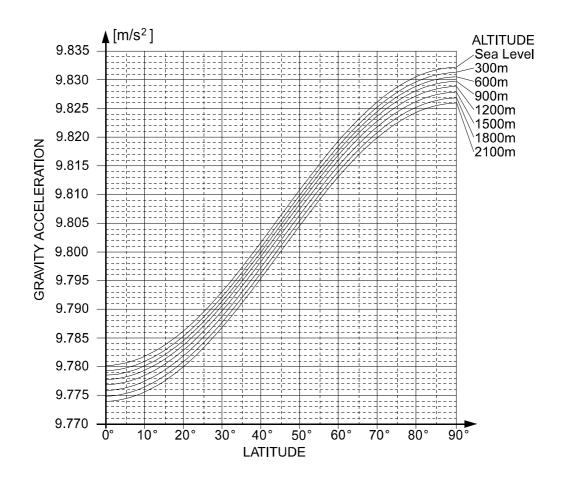
ENTER key When the key is pressed, the procedure stores a current

parameter and proceeds to next step.

- Step 1 Press and hold the **ENTER** key and press the ** key to display the menu in the weighing mode.
- Step 2 Press the ** key twice to select the menu CAL. Press the ENTER key to enter the calibration mode.
- Step 3 Select the menu ⊕ with the + key. Press the ENTER key to enter it.
- Step 4 Input the gravity acceleration at 1 using the numerical keys and press the **ENTER** key to store it.
- Step 4 Input the gravity acceleration at ©2 using the numerical keys and press the **ENTER** key to store it.
- Step 5 Press the **ESC** key to return the weighing mode.

5.3.1. Gravity Acceleration Reference

			T		
Amsterdam	9.813	m/s ²	Manila	9.784	m/s ²
Athens	9.800	m/s ²	Melbourne	9.800	m/s ²
Auckland NZ	9.799	m/s²	Mexico City	9.779	m/s ²
Bangkok	9.783	m/s²	Milan	9.806	m/s ²
Birmingham	9.813	m/s²	New York	9.802	m/s ²
Brussels	9.811	m/s ²	Oslo	9.819	m/s ²
Buenos Aires	9.797	m/s ²	Ottawa	9.806	m/s ²
Calcutta	9.788	m/s ²	Paris	9.809	m/s ²
Chicago	9.803	m/s ²	Rio de Janeiro	9.788	m/s ²
Copenhagen	9.815	m/s ²	Rome	9.803	m/s ²
Cyprus	9.797	m/s ²	San Francisco	9.800	m/s ²
Djakarta	9.781	m/s ²	Singapore	9.781	m/s ²
Frankfurt	9.810	m/s ²	Stockholm	9.818	m/s ²
Glasgow	9.816	m/s ²	Sydney	9.797	m/s ²
Havana	9.788	m/s ²	Tainan	9.788	m/s ²
Helsinki	9.819	m/s ²	Taipei	9.790	m/s ²
Kuwait	9.793	m/s ²	Tokyo	9.798	m/s ²
Lisbon	9.801	m/s ²	Vancouver, BC	9.809	m/s ²
London (Greenwich)	9.812	m/s ²	Washington DC	9.801	m/s ²
Los Angeles	9.796	m/s ²	Wellington NZ	9.803	m/s ²
Madrid	9.800	m/s ²	Zurich	9.807	m/s ²
			•		



5.4. Calibration Error

Error Code	Situation and Treatment
CERRI	Resolution (Weighing capacity / minimum division) exceeds the limitation.
	Increase minimum division or decrease weighing capacity.
CERR2	The initial load (no load output) is larger than 2mV/V.
	Check the loadcell cable.
CERRS	Negative loadcell output value.
	Check the loadcell cable.
CERR4	Mass value exceeds the weighing capacity.
	Use a mass within the weighing capacity. (Decrease mass value)
CERR5	Mass value is too light for the calibration.
	Increase mass value.
CERR6	The loadcell output to be equivalent to the minimum division is too small.
	Use a more rough minimum division.
CERR7	The polarity of the loadcell output is reversed.
	Check the loadcell cable.
CERRS	The mass value of the weighing capacity exceeds 3.2 mV/V.
	Confirm the mass and weighing capacity.
CERR9	Gravity acceleration is out of range.
	Correct the value within the range of 9.770 ~ 9.835 m/s ² .
CERR10 Zero output of the loadcell unit is out of range.	
	Trim the zero output within 0.0 ~ 2.0 mV/V.
CERR11	The loadcell output to be equivalent to minimum division is out of range.
	Trim the output within 0.0 ~ 3.2 mV/V.

Page 24 AD-4402



6. Applications

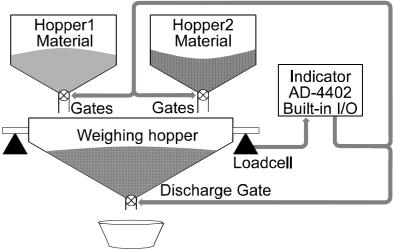


6.1. Hopper Scale with Material Code

In the section, applications are explained according to the right hopper scale that performs batch weighing using a material code.

An application is explained with mixing of materials using a recipe code.

The foundation of the hopper scale design is explained.



Examlpe: Basic Hopper Scale

6.1.1. Definition of a Material Code

- □ The material code is necessary to store the details before use. And the code is called with a code number in a weighing.
- □ The material code is used in the procedure that performs batch weighing or loss-in-weigh. As the result of the procedure, a constant weight of the material can be got.
- □ The material code consists of some index number (name) and some setpoints (comparison values) to get a constant weight of the material.
- □ The AD-4402 can store one hundred kinds of material codes.

6.1.2. Recalling a Material Code

The following steps explain how to recall the material code stored in the indicator. Suppose that the recipe code is not used. (The menu [Function] - [Function setting] - [Sequence] - [Basic] - [Recipe mode] is set to [59 F - 8] [0])

Caution

The material code can be recalled during the last weighing. But the code is in effect only after the batch finish (after finishing the last weighing).

- Step 1 Press the **CODE RECALL** key.

 Then the material code indicator blinks.
- Step 2 Enter the material code using the **numerical** keys

 The details of the material code are displayed in the sub-display.
- Step 3 Press the **ENTER** key to decide the code.

6.1.3. Editing Principle Parameters of a Material Code

You can edit the parameters of final weight, free fall etc. displayed on the sub-display during a weighing. Items of the sub-display can be selected at the menu [Function] - [Function setting] - [General] - [Sub-display].

Caution

If the flash memory is selected for memory backup ($\Box LHF-II$), the current batch weighting is stopped while editing them.

- Step 1 Press and hold the **SHIFT** key and press the **CODE RECALL** key. Then the material code blinks.
- Step 2 Enter the material code using the **numerical** keys

 The details of the material code are displayed on the sub-display.
- Step 3 Press the **ENTER** key to decide the code.
- Step 4 Select a parameter using the **★** key on the sub-display.
- Step 5 Enter the parameter using **numerical** keys and press the **ENTER** key to store it.
- Step 6 If you continue the change, proceed step 4 and 5.
- Step 7 If you want to finish the change, press the **ESC** key several times to return to the weighing mode.

6.1.4. Referring to the next Material Code

You can refer to next material code in the sequential mode that uses multiple material codes. Suppose that the recipe code is not used. (The menu [Function] - [Function setting] - [Sequence] - [Basic] - [Recipe mode] is set to $[59 \ F - B] \ [D]$)

- Step 1 Press the **CODE RECALL** key.

 Then principle parameters of the next material code are displayed in the sub-display.
- Step 2 Press the **ESC** key to return to current mode.

Page 26 AD-4402

6.1.5. Editing Full Parameters of a Material Code

□ A material code consists of the following parameters.

Name	Display Name	Display Symbol	Display Example	Memory
Material Code	Code	E a d E	11	
Material name	Mat Name		grain	
Material Hopper No.	Mat Horrer	Horrer	1	
Final	Final	Final	10.00 kg	
Free Fall	Free Fall	FFall	0.01 kg	
Preliminary	Preliminary	Plm	1.00 kg	Backed up
Optional Preliminary	OP.Preliminary	OPP1m	2.00 kg	RAM
Over	Over	Over	0.10 kg	(factory
Under	Undr	Undr	0.10 kg	setting)
Zero Band	Zero Band	0Band	0.02 kg	or
Full	Full	Full	0.05 kg	flash
Tare	Tare	Tare	5.00 kg	memory
Supplementary Flow Open Timer	SF open timer	SFOT	0.00 s	
Supplementary Flow Close Timer	SF close	SECT	0.0 s	
Automatic Free Fall Range	AFFC range	AFFC	0.00 kg	
Initial Dribble Flow	Initial DF	IDF	0.00 kg	
Initial Medium Flow	Initial MF	IMF	0.00 kg	
Total Weight	Tot	Tot	10.00 kg	Backed up
Total Count	Tot#	Tot#	1	RAM

- □ These parameters are stored in backup memory even without power.
- Refer to the backup method [@EHF 1/] of the function list.

Caution

If the flash memory is selected for memory backup [[]EHF - | |], the current built-in automatic program mode is stopped.

Edit a Material Code

- Step 1 Press and hold the **ENTER** key and press the ***** key. Then menu MatEdit blinks.
- Step 2 Press the **ENTER** key to enter the material code edit. Then menu **Edit** blinks.
- Step 3 Press the ENTER key to enter menu edit.
- Step 4 Select the material code using the **numerical** keys and press the **ENTER**.
- Step 5 Enter the material name using the **alpanumerical** keys and press the **ENTER** key.
- Step 5 Edit other parameters using the **numerical** keys, **ENTER** key and **+** key.
- Step 6 If you want to finish the change, press the **ESC** key several times to return to the weighing mode.

Search a Material Code

Use this menu to search for blank material code.

- Step 1 Press and hold the **ENTER** key and press the **★** key.
 - Then menu MatEdit blinks.
- Step 2 Press the * key to select menu Search. And press the ENTER key.
- Step 3 Then the message is displayed.
- Step 4 Press the **ENTER** key to preed next step. Then the result is displayed.
- Step 5 Press the **ESC** key several times to return to the weighing mode.

Delete a Material Code

The parameters of the material code can be reset in the following menu.

- Total value
- Setpoint and total
- All total
- All material code

Example of Deleting the Total Value

- Step 1 Press and hold the **ENTER** key and press the **★** key.

 Then menu MatEdit blinks.
- Step 2 Press the ** key to select menu Delete. And press the ENTER key.
- Step 3 Select menu Total using the * key. And press the ENTER key.
- Step 4 Enter the material code using the **numerical** keys and press the **ENTER** key.
- Step 5 Press the **ESC** key several times to return to the weighing mode.

Copy a Material Code

- □ The parameters of material code are copied. This copy includes a total weight value and times of total.
- Step 1 Press and hold the **ENTER** key and press the ***** key. Then menu MatEdit blinks.
- Step 2 Press the ** key to select menu Copy. And press the ENTER key.
- Step 4 Specify the original code number using the **numerical** keys and press the **ENTER** key.
- Step 5 Specify a duplicated code number using the **numerical** keys and press the **ENTER** key.
- Step 6 Press the **ESC** key several times to return to the weighing mode.

Page 28 AD-4402

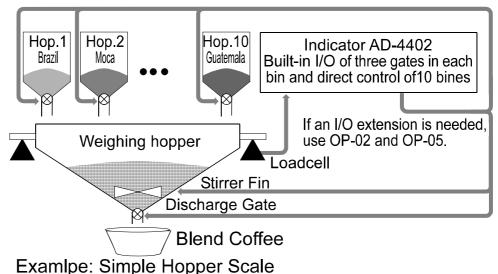
Tare of a Material Code

- Use to copy a current tare to the preset tare.
- Set the preset tare function [GEnF-I2] of the function list.
 - [$\Box E \cap F \Box = \Box$] [\Box] If the preset tare of the code is zero, the last tare value is in effect. (factory settings)
 - [$[E \cap F |Z]$] [I] If the preset tare of the code is zero, the tare value is reset.
- Step 1 Press and hold the **ENTER** key and press the ***** key. Then menu MatEdit blinks.
- Step 2 Press the ** key to select the menu Tare. And press the **ENTER** key.
- Step 4 Specify a code number using the **numerical** keys and press the **ENTER** key. Then the current tare value is copied to preset tare.
- Step 5 Press the **ESC** key several times to return to the weighing mode.

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6.2. Simple Hopper Scale with a Recipe Code

This section explains for the recipe code. The recipe code is used on a simple hopper scale to mix several materials that have preset final values. "The simple hopper scale" means that it does not control the ratio or the a weight of ingredient, but simply totals the preset final weight of the material code. Therefore, the recipe code is used to total the preset final weight of the material code.



Maximum 100 recipe codes. Recipe 3 <u>r[odE</u> Recipe 2 rlode a material code Special blend coffee Recipe 1 Code2 r[odE Brazil Blend coffee Final 200g Code10 Moca Final 50g Code42 In order of material code. Guatemala Maximum 10 codes. Final 10g

6.2.1. Definition of a Recipe Code

- A recipe code consists of multiple preset material codes.
 A maximum of ten material codes can be stored in a recipe code.
- □ A recipe code is used in order to total the final weight of the material code.
- □ The AD-4402 indicator can store one hundred recipe codes.
- The recipe code is necessary, to store the details before use.
 The code is called using a code number in a weighing sequence.
- □ The recipe code is used to total the preset final weight of the material code. If a recipe code is used in the batch weighing (or loss-in-weigh), you can get a weight that is the total preset final weight of the material code.
- □ The recipe sequence that uses a recipe code is also called a formula sequence.

Page 30 AD-4402

6.2.2. Using a Recipe Code

- □ Set the menu [Function] [Function setting] [Sequence] [Basic] [Recipe mode] to sequential mode ([59 F-8] to [/] or [2]), when the recipe code is used.
 - [59 F- 8] [1] Semi-automatic mixing sequence
 - [59 F-8] [2] Automatic mixing sequence

6.2.3. Construction of a Recipe Code

- □ The AD-4402 indicator can store one hundred recipe codes.
- A recipe code can store a maximum of ten material codes in the order of accumulating them.
- □ These parameters are stored in backup memory even without power.
- Refer to the backup method [@ŁĦF 1/] of the function list.

Caution

If the flash memory is selected for memory backup [@ĿĦF - | |], the current built-in automatic program mode is stopped.

Name	Display Symbol & Example	Memory	
Recipe code	rCodE	Backed up RAM	
Recipe name	Blend coffee	(factory setting)	
Material codes of maximum ten codes.	CodE	or	
It is stored in order to accumlate them.	LOGC I	flash memory	
Total Weight for a recipe code	RTot		
Total Weight for a recipe code	10.00	David a DAM	
Total Counts for a recipe code	RTot#	Backed up RAM	
Total Counts for a recipe code	1000		

6.2.4. Recalling a Recipe Code

□ The following steps are the explanation of how to recall the recipe code stored in the indicator. Suppose that the recipe code is used (The menu [Function] - [Function setting] - [Sequence] - [Basic] - [Recipe mode] is set to [59 F - 8] [1] or [2]).

Caution

The code can be recalled during the last weighing. But the code is in effect only after the batch finish (after finishing the last weighing).

- Step 1 Press the **CODE RECALL** key.
 - Then the recipe code blinks.
- Step 2 Enter the material code using the **numerical** keys

 The details of the recipe code are displayed in the sub-display.
- Step 3 Press the **ENTER** key to decide the code.

6.2.5. Arranging Material Code in a Recipe Code

- □ The way of arranging the material code described in a recipe code.
- Step 1 Press and hold the **ENTER** key and press the **CODE RECALL** key.
- Step 2 Select a recipe code number using the **numerical** keys and press the **ENTER** key. Then the first material code blinks.
- Step 3 Select a material code using the following keys.
 - + key, the **numerical** keys and the **SHIFT** key
- Step 4 Press the **ENTER** key to store it. Then the next code blinks.
- Step 5 Continue step 3 and 4 until the last material code is stored.
- Step 6 Press the **ESC** key several times to return to the weighing mode.

6.2.6. Editing Full Parameters of a Recipe Code

All parameters of the recipe code can be edited in this menu.

Edit the Name of a Recipe Code

- Step 1 Press and hold the **ENTER** key and press the ***** key. Press the ***** key. Then the menu RecipeEDIT blinks.
- Step 2 Press the ENTER key to edit the recipe code. Then the menu edit blinks.
- Step 3 Press the **ENTER** key to enter menu edit.
- Step 4 Select a recipe code using the **numerical** keys and press the **ENTER** key.
- Step 5 Name the recipe code using the **alpanumerical** keys and press the **ENTER** key.
- Step 6 If you have finished the change, press the **ESC** key several times to return to the weighing mode.

Search of a Recipe Code

Use this menu to search for blank material code.

- Step 1 Press and hold the **ENTER** key and press the ***** key.

 Press the ***** key. Then the menu RecipeDIT blinks.
- Step 2 Press the ** key to select the menu Search. And press the ENTER key.
- Step 3 Then the message is displayed.
- Step 4 Press the **ENTER** key to preed next step.
 Then the results are displayed.
- Step 5 Press the **ESC** key to return several times to weighing mode.

Delete of Recipe Code

The parameters of the recipe code can be reset in the following menu.

Page 32 AD-4402

- Total value
- Recipe total value
- All total values
- All Recipes

Example of Deleting a Total Value

- Step 1 Press and hold the **ENTER** key and press the **★** key.

 Then the menu RecipeEDIT blinks.
- Step 2 Press the

 key to select the menu Delete. And press the ENTER key.
- Step 3 Select the menu Total using the ***** key.

 And press the **ENTER** key.
- Step 4 Enter the recipe code using the **numerical** keys and press the **ENTER** key.
- Step 5 Press the **ESC** key to return several times to weighing mode.

Copying a Recipe Code

- □ The parameters of a recipe code are copied. This copy includes a total weight value and times of total.
- Set the preset tare function [$\frac{\Gamma}{\Gamma} \frac{\Gamma}{\Gamma} \frac{\Gamma}{\Gamma} \frac{\Gamma}{\Gamma}$] of the function list.
 - [$\Box E \cap F \Box = \Box$] [\Box] If the preset tare of the code is zero, the last tare value is in effect. (factory settings)
 - [[6EnF-12]] [[1]] If the preset tare of the code is zero, the tare value is reset.
- Step 1 Press and hold the **ENTER** key and press the ***** key. Then the menu RecipeEDIT blinks.
- Step 2 Press the * key to select the menu Copy. And press the ENTER key.
- Step 4 Specify the code number to copy using the **numerical** keys and press the **ENTER** key.
- Step 5 Specify the code number to copy data into using the **numerical** keys and press the **ENTER** key.
- Step 6 Press the **ESC** key several times to return to weighing mode.

6.3. System Design of a Hopper Scale

6.3.1. Operation and I/O Design

In General, looking at an old type hopper scale design, the simplest indicator only displayed the weight value, other system devices communicated the control signal with each I/O interface. And the key operations and monitoring the system were controlled separately.

- □ The indicator AD-4402 has an I/O interface to control the system, sub-display to monitor system information, main display to display weighing data and keys to control the system, in one unit.
- □ The indicator is designed so as to be able to select arbitrary keys and terminals to control the system from the front panel keys and the I/O interface with the menu function. The function of keys and terminals can be designed in the same way.
- □ The system information of the sub-display can be selected in at the function list.

6.3.2. Design Example

Suppose that the I/O, keys and sub-display are as follows:

Batch start: F1 key, [OEHF- 2] [6] Emergency stop key: F2 key, [OEhF- 3] [13] [OutF- 1] [6] Dribble signal: terminal B1, [0066- 2] [14] Batch finish signal: terminal B2, [59 F- 8] [0] Not used recipe code Use default setting for the sub-display [506 F 1] [0]

Setup

- Step 1 Enter the function list.
- Step 2 Select the menu **F1** key.([Function] [Function setting] [General] [Other] [F1 key])
- Step 3 Select [6] of Batch start for the F1 key and store it.
- Step 4 Select [13] of Forced batch finish for the **F2** key and store it.
- Step 6 Select the menu terminal B1.

([Function] - [Function setting] - [Control I/O Function] - [Output] - [OUT (B1)])

- Step 8 Select [6] of Dribble flow for the terminal B1 and store it.
- Step 9 Select [14] of Batch finish for the terminal B2 and store it.
- Step 10 Set [6] of "Not used recipe code" at Recipe mode.

([Function] - [Function setting] - [Sequence] - [Basic] - [Recipe mode])

Step 11 Select [D] of the default menu and store it.

([Function] - [Function setting] - [General] - [Sub-display] - [Weighing display])

Step 12 Press the **ESC** key several times to return to the weinghing mode.

Operation and Response

- □ When the F1 key is pressed, a batch weighing is started and terminal B1 works.
- □ When the F2 key is pressed, batch weighing is stopped.
- □ When the final weight has been achieved, terminal B2 is turned on.

Page 34 AD-4402



7. Weighing Mode

7.1.1. Contents of the Batch Weighing Mode

Batch Weighing

Normal Batching Normal Batching using Built-in Automatic Program Mode Normal Batching using Customer Programmed Control Mode	Section 7.2 Section 7.3.1 Section 7.4.1
Loss-in-weigh	Section 7.2
Loss-in-weigh using Built-in Automatic Program Mode	Section 7.4.1
Loss-in-weigh using Customer Programmed Control Mode	Section 7.4.2

Selection of Batch Weighing Section 7.2.1

Controlled Output Signals

The type of signal output to control gates (valves) in batch weighing.

Built-in Automatic Program Mode Section 0

Customer Programmed Control Mode (Comparison Output) Section 7.4

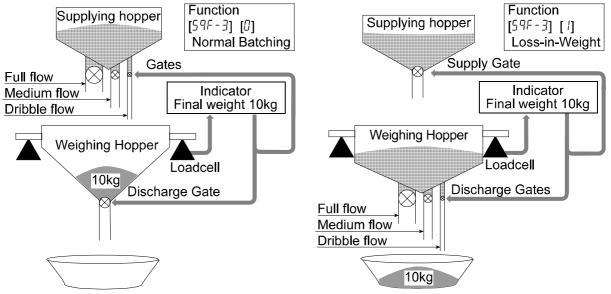
Partial Sequence of the Built-in Automatic Program Mode

Compensation Sequence	Section 7.3.3
Initial flow Sequence	Section 7.3.4
Discharge Sequence	Section 7.3.5
Recipe Sequence	Section 7.3.6
Automatic Selection of Supplying Hopper	Section 7.3.7
Nozzle Operation (vacuum cleaner)	Section 7.3.8
Mixing Sequence	Section 7.3.9
Safety Check Function	Section 7.3.10
Pause and Emergency Stop	Section 7.3.11
Restart Sequence	Section 7.3.12
Automatic Free Fall Compensation	Section 7.3.13
Real Time Free Fall Compensation	Section 7.3.14



7.2. Batch Weighing Mode

- □ This mode is used to get a (constant) final weight from a supplying hopper for the hopper scale and filling machine. And mode can be classified as normal batch weighing or loss-in-weigh.
- □ There are two control methods of the customer programmed control and built-in automatic program mode.



Example: Normal Batching

Examlpe: Loss-in-Weight

Normal Batching

- Normal batch weighing weighs the material charged into the hopper.
- □ Control gates (valves) can be used. (Full flow, medium flow and dribble flow)

Loss-in-weigh

- Loss-in-weigh weighs the material discharged from the hopper.
- □ Control gates (valves) can be used. (Full flow, medium flow and dribble flow)

Caution

Use PLC (programmable logic controller unit) to supply material into the weighing hopper and monitor the bulk of material in the hopper.

Page 36 AD-4402

7.2.1. Selection of Batch Weighing

Selection of Normal Batching or Loss-in-weigh

□ The mode can be selected at Loss-in-weigh in the Function list.

([Function] - [Function setting] - [Sequence] - [Basic] - [Current weighing])

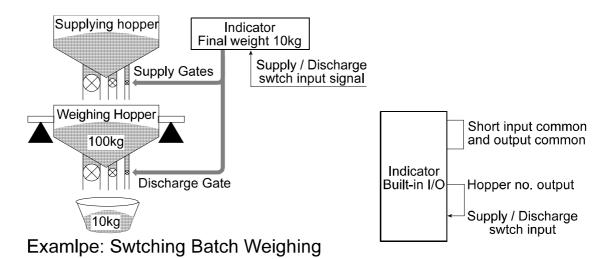
[59 F- 3] [0] Normal batch weighing

[59 F - 3] [/] Loss-in-weigh

[59 F - 3] [2] External selection (Normal batch weighing or Loss-in-weigh)

External Selection (Normal batch weighing or Loss-in-weigh)

- □ Normal batch weighing and Loss-in-weigh can be selected by a signal at the input terminal that is set to [9] of External switch control.
 - (The menu [Function] [Function setting] [Control I/O Function] [Input])
- □ Example of use: 100 kg of material is supplied to the hopper in the first step. It is subdivided into material of 10 kg.



Advise

If the mode is switched concerning a specified material only, set the hopper no. in the material code, short the hopper no. output line and the supply/discharge switch input line. Set the delay timer $[57 \ F-32]$ to "above 0.1sec.".

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Page 38 AD-4402

7.3. Built-in Automatic Program Mode

- □ The built-in automatic program mode directly outputs control signals (example: medium flow valve, batch finish) without a PLC.
- □ The built-in automatic program mode can include several partial sequences like an initial flow sequence, mixing sequence etc. into basic built-in automatic program mode.
- □ The power of the control I/O signal output is too small to drive a large valve directly. Use option relay output (OP-02) to drive them.
- □ If the number of control I/O terminals is not enough, use parallel option I/O (OP-05).

Forecast Control Function

□ This function forecasts a timing to close the dribble flow (valve) and realizes more precise weighing. The forecast method calculates the weighing value at some points between sampling data and compares it with the dribble setpoint. The effect is equivalent to using a high speed A/D converter. The sampling rate of this indicator is 100 [times/second]. But the ratio is equivalent to 1000 [times/second], when this function is used.

Caution

- If multiple supplying hopper is used (the recipe code is used), this mode can not be used.
 - Related section " 7.3.7. Automatic Selection of Supplying Hopper".
- □ Use a high speed high, precision valve like a direct voltage solenoid valve.
- Design the mechanical valve so as to minimize the delay time.

7.3.1. Normal Batching of Built-in automatic program mode

- Normal batch weighing weighs the material charged into the hopper.
- □ Control gates (valves) can be used. (Full flow, medium flow and dribble flow)

Concerning Parameters of the Function

Selecting normal batching of built-in automatic program mode.

```
[59 F- /] [2] Built-in automatic program mode [Function] - [Function setting] - [Sequence] - [Basic] - [Weighing mode]
```

Setting the display to automatically when starting the sequence.

```
[59 F-11] [Function] - [Function setting] - [Sequence] - [Control] - [Batch start settings]
```

Preventing vibration due to gate operation.

```
[59 F-33] [Function] - [Function setting] - [Sequence] - [Timer] - [Full flow comparison interrupt timer]
```

[59 F - 34] [Function] - [Function setting] - [Sequence] - [Timer] - [Medium flow comparison interrupt timer]

[59 F-35] [Function] - [Function setting] - [Sequence] - [Timer] - [Dribble flow comparison interrupt timer]

Sending an alarm signal when the sequence time over is.

Maximum weighing time between start and batch finish can be set. Error code [SQLERR 4] is displayed, when an error occurs. [Function] - [Function setting] - [Sequence] - [Timer] - [Batch monitoring timer]

Removing "stable" from comparison condition.

```
[59 F-13] [Function] - [Function setting] - [Sequence] - [Control] - [Eval condition]
```

Changing the timing of comparison.

```
[59 F-37] [Function] - [Function setting] - [Sequence] - [Timer] - [Eval delay timer]
```

Changing accuracy of comparison.

```
The time to average displayed value at batch finish can be set. The timing of batch finish delays for the time.

[Function] - [Function setting] - [Sequence] - [Timer] - [Average Eval time]
```

Changing the pulse width of batch finish output.

```
If zero is set to this, the output remains until next start signal.

[Function] - [Function setting] - [Sequence] - [Timer] - [Batch finish output on]
```

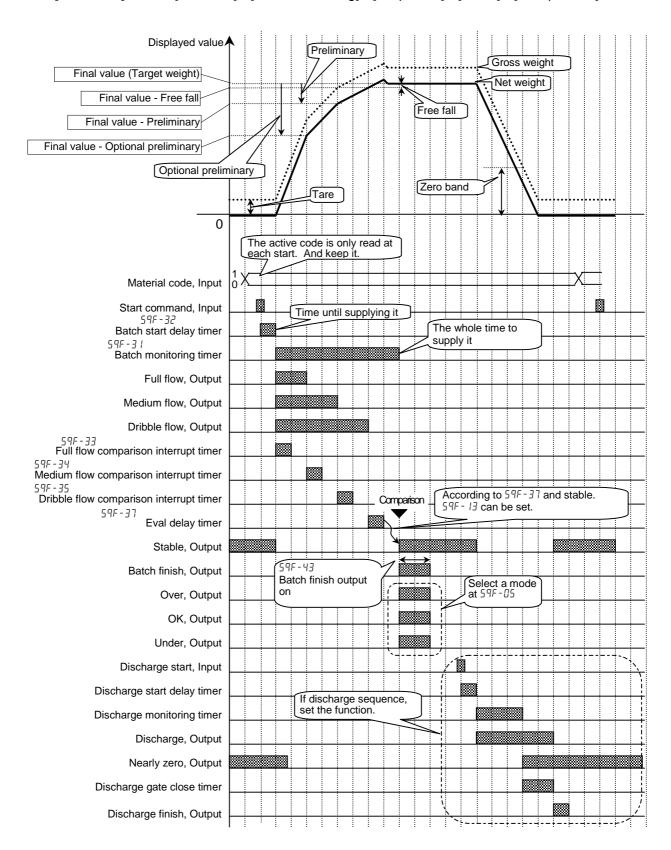
Mixing at batch finish.

[
$$59 F - 19$$
] [Function] - [Function setting] - [Sequence] - [Control] - [Batch finish action]

Discharging at batch finish.

Page 40 AD-4402

□ Using customer programmed control for OVER signal, OK signal and UNDER signal. [59 F - 5] [Function] - [Function setting] - [Sequence] - [Basic] - [Comparison]



Drawing: Normal Batching of Built-in automatic program mode

7.3.2. Loss-in-weigh of the Sequential Mode

- Loss-in-weigh weighs the material discharged from the hopper.
- □ Control gates (valves) can be used. (Full flow, medium flow and dribble flow)

Concerning Parameters of the Function

Selecting normal batching of built-in automatic program mode.

```
[59 F- /] [/] Built-in automatic program mode
[Function] - [Function setting] - [Sequence] - [Basic] - [Weighing mode]

[59 F- 3] [0] Mormal batch weighing
[Function] - [Function setting] - [Sequence] - [Basic] - [Loss-in-weigh]
```

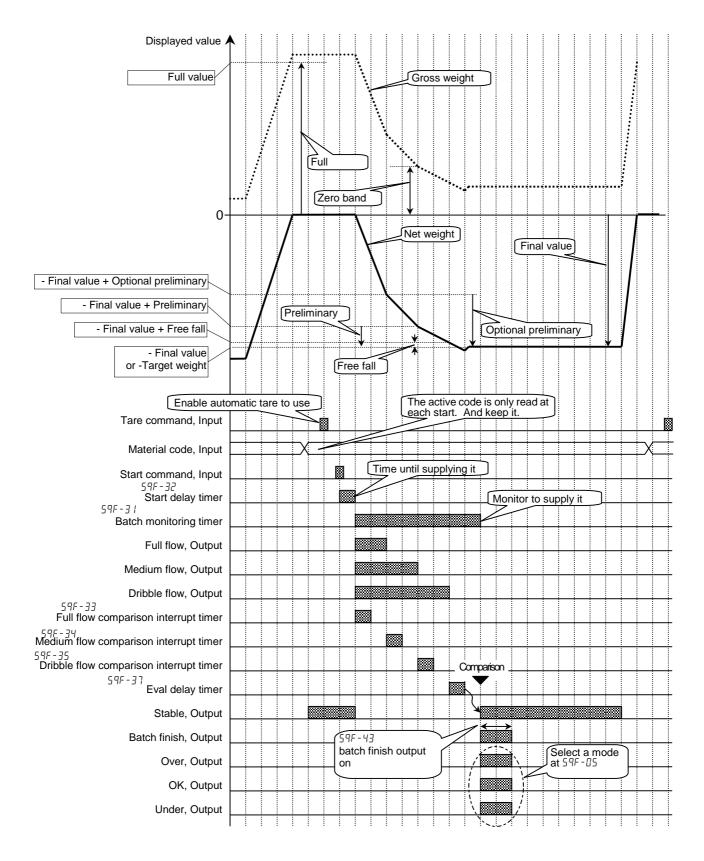
- □ Setting the display to zero automatically when starting the sequence.

 [59 F- | | Function | [Function setting] [Sequence] [Control] [Batch start settings]
- □ Switching normal batching and loss-in-weigh from the I/O interface.

- Checking whether is there enough remaining weight for one batch weighing.
 - [59 F-55] [7] When the remaining weight is under the final weight + zero band, the signal "zero band" is output.

 [Function] [Function setting] [Sequence] [Setpoint (Compared value)] [Add final value and zero band]
 - [59 F-56] [/] If this is set, when the hopper is filled fully, the signal "Full" is output. [Function] [Function setting] [Sequence] [Setpoint (Compared value)] [Add final value and full value]

Page 42 AD-4402



Drawing: Loss-in-weigh of Built-in automatic program mode

7.3.3. Compensation Sequence

□ The compensation sequence is used to make up (add) the material automatically, when the result of the current batch weighing is under weight.

Concerning Parameters of the Function

□ Storing a maximum repeat count of the compensation sequence.

[59 F-18]

If number is zero, this sequence is canceled. When the result is under weight after the sequence, An error SQ. ERR 2 is displayed. [Function] - [Function setting] - [Sequence] - [Control] - [Maximum number of compensation]

Setting the time to open the dribble gate.

Set the time for each material code.

[Function] - [Function setting] - [MatEDIT] - [Edit] - [SF flow open timer]

Setting the time to close the dribble gate.

Set the time for each material code.

When the displayed value is stable and under weight, the compensation is repeated. Take a longer time closing the gate, if it does not use a stable signal.

[Function] - [Function setting] - [MatEDIT] - [Edit.] - [SF flow close timer]

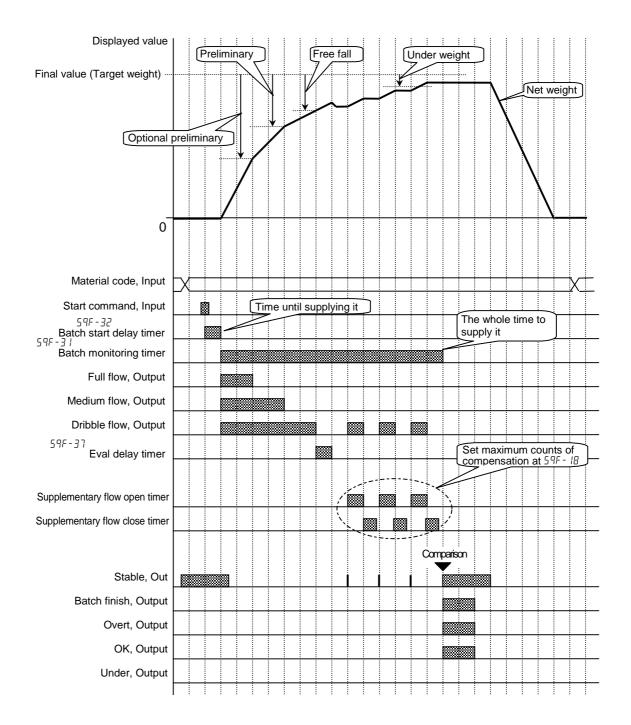
□ Removing the nozzle at this sequence, when the nozzle operation is used.

[59 F-12] [2] Mo:

Mozzle contact stop sequence

Factory setting is "not used". When it is necessary to shift up the nozzle to reduce a weighing error, use this parameter of [59 F - 12]. [Function] - [Function setting] - [Sequence] - [Control] - [Nozzle control]

Page 44 AD-4402



Drawing: Compensation Sequence

7.3.4. Initial Flow Sequence

□ The initial flow sequence is used to prevent the material from scattering before the batch weighing when a liquid or powder is weighed. When the sequence starts, the dribble gate is opened first, the medium gate is opened next and the full gate is opened last. The parameter can be set in each material code.

Concerning Parameters of the Function

Using this sequence to prevent the material from scattering.

Set the following parameters in each material code.

Initial DF (Initial dribble flow)
Initial MF (Initial medium flow)

Editing these parameters.

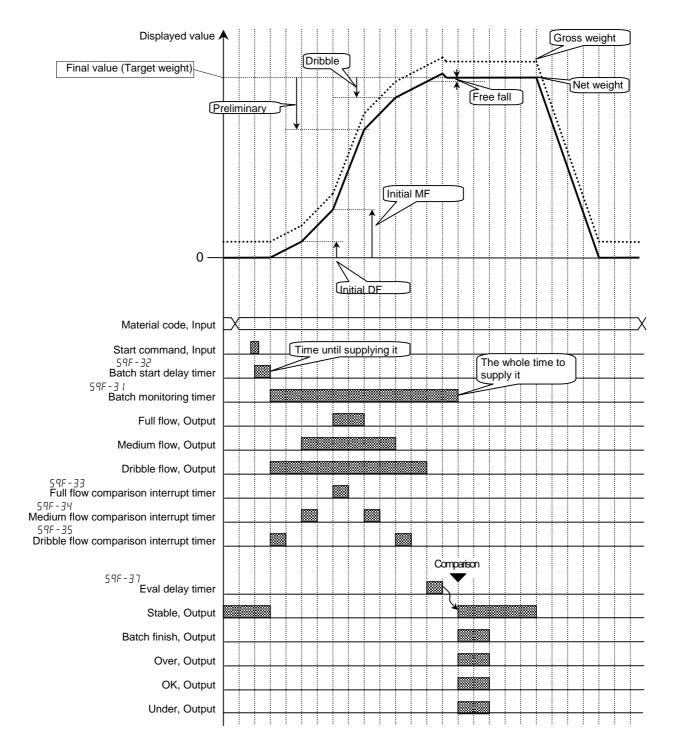
Edit the parameters in the function mode. [Function] - [Function setting] - [MatEDIT] - [Edit]

Inhibiting comparison during the sequence.

[59 F-35] Store the time of the dribble flow comparison inhibit timer. [Function] - [Function setting] - [Sequence] - [Timer] - [Dribble flow comparison interrupt timer]

[59 F-34] Store the time of the medium flow comparison inhibit timer. [Function] - [Function setting] - [Sequence] - [Timer] - [Medium flow comparison interrupt timer]

Page 46 AD-4402



Drawing: Initial Flow Sequence

7.3.5. Discharge Sequence

□ The discharge sequence is used to discharge the material from the hopper and clear the hopper after finishing a batch weighing.

Concerning Parameters of the Function

- □ Storing the time between receiving a start command and opening the discharge gate. [59 F-38] [Function] [Function setting] [Sequence] [Timer] [Discharge start delay timer]
- Using the alarm for the discharge time limit.

- □ Storing the time between cleared hopper and closing the gate.

 [59 F-40] [Function] [Function setting] [Sequence] [Timer] [Discharge gate close delay timer]
- □ Discharging it automatically when the weighing is finished.

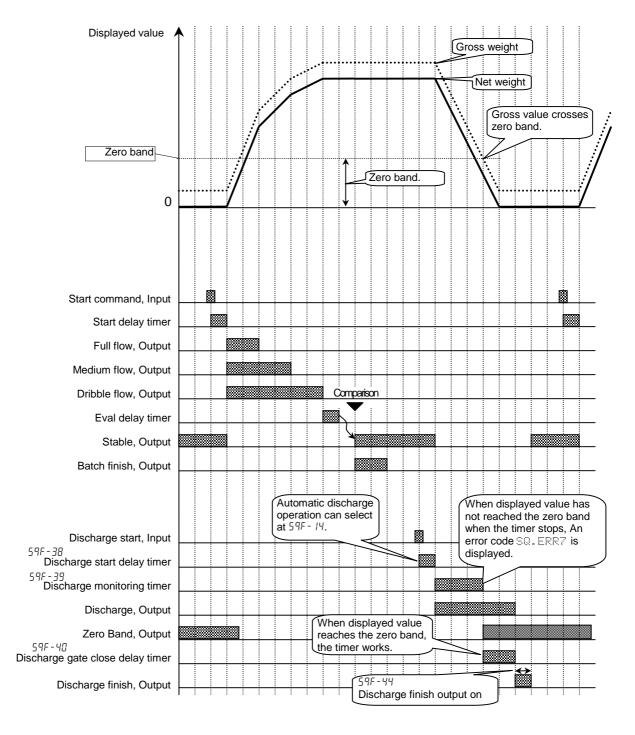
 [59 F-14] When the finish signal is turned off, the discharge start timer starts.

 [Function] [Function setting] [Sequence] [Control] [Batch finish action]
- Discharging it automatically when the mixing weighing is finished.

 [59 F-17] When the finish signal is turned off, the discharge start timer starts.

 [Function] [Function setting] [Sequence] [Control] [Recipe finish action]

Page 48 AD-4402



Drawing: Discharge Sequence

7.3.6. Recipe Sequence

- The recipe sequence mixes preset final weights of multiple materials that are stored in a recipe code. One hundred recipe codes can be stored in the indicator. A recipe code can store ten material codes and the order to mix them.
- □ There are the following two modes that can be selected at Regise mode.
 - Semi-automatic [59F-8] [/] The mode that uses (external) start commands for each material.
 - Automatic [59F 8] [2] The mode that does not need each start command. When an under weight occurs in a material, an error code SQ. ERR 2 is displayed and the sequence stops.

Concerning Parameters of the Function

Selecting normal batching of built-in automatic program mode.

```
[59 F- 8] Recipe mode

[59 F- 8] [/] Semi-automatic mode, or

[59 F- 8] [2] Automatic mode

[Function] - [Function setting] - [Sequence] - [Basic] - [Recipe mode]
```

- Setting the display to zero automatically when starting the recipe sequence.
 [59 F 1δ] [Function] [Function setting] [Sequence] [Control] [Recipe start action]
- □ Clearing tare values, mixing them and discharging them when finishing the recipe sequence.

```
[59 F- 17] [Function] - [Function setting] - [Sequence] - [Control] - [Recipe finish action]
```

Changing the width of the finish signal output of the recipe sequence.
[59 F-45] [Function] - [Function setting] - [Sequence] - [Timer] - [Recipe finish]

```
[59 F-45] [Function] - [Function setting] - [Sequence] - [Timer] - [Recipe finish output on]
```

Calculating totals in each recipe code.

```
[59 F-62] [Function] - [Function setting] - [Sequence] - [Total] - [Automatic recipe code total]
```

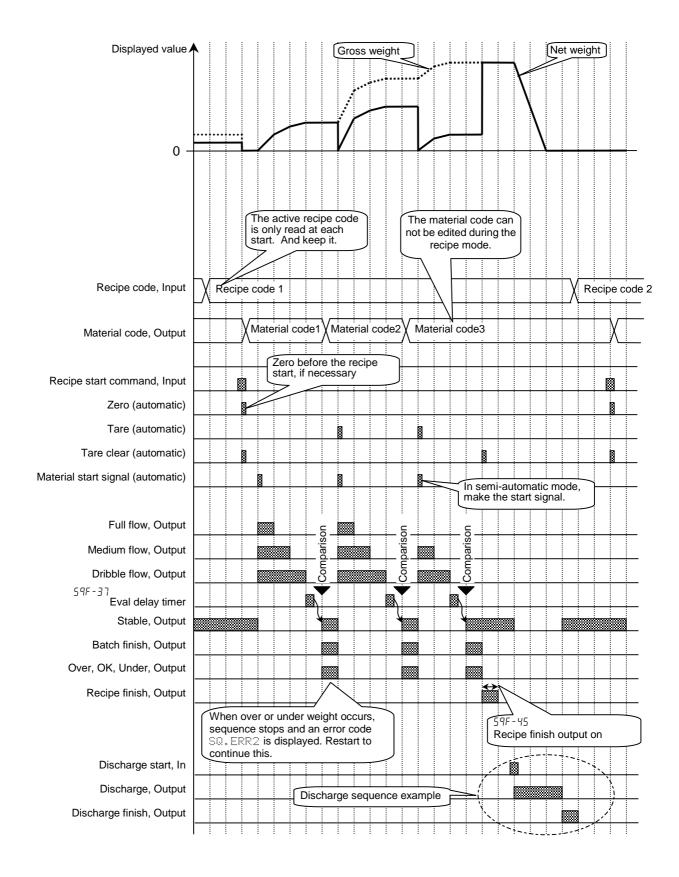
Weighing a single material code during a recipe sequence

When it is necessary to weigh the material code temporarily during a recipe sequence, use recipe prohibition command of the external I/O or OP-05. When the prohibition works, the material code can be used and total of the recipe is not total.

□ Setting of the I/O.

```
[ In F-nn] [49] Recipe interrupt (Prohibition of recipe sequence) nn: terminal number of I/O.
[Function] - [Function setting] - [Control I/O] - [Input]
```

Page 50 AD-4402



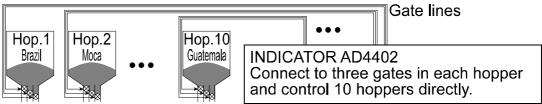
Drawing: Recipe Sequence

7.3.7. Automatic Selection of Supplying Hopper

When there are multiple supplying mats of materials, the indicator has to control these gates. There are the following two method to control them.

Case 1: Direct Gate Control

- □ The method that connects the gate control lines of supplying hoppers to the I/O terminals of the indicator and the indicator directly controls them.
- □ Three kinds of gates can be used in a supplying hopper. (Full, medium, dribble gate)
- □ Number of supplying hopper: **Ten hoppers** can be used.
- Preset material codes and recipe codes can be used.
- □ The selection of the supplying hopper is [MatEDIT] [Material code] [Material hopper]. The selection of the I/O terminals is [Function] [Function setting] [Control I/O Function] [Output].
- □ Even if a code is recalled during the sequence, the code does not work until the sequence finishes.
- □ When the number of I/O terminals is not enough, use relay output option (OP-02) and parallel I/O (OP-05).



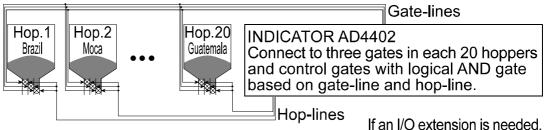
Example: Direct Gate Control

If an I/O extension is needed, use OP-02 and OP-05.

Case 2: Gate Control with Supplying Hopper Selection

The method:

- Make gate-lines that gates of a kind, in each supplying hopper are connected to the I/O terminal of the indicator in parallel.
- Make hop-lines that lines identified by each hopper are connected to the I/O terminal.
- The indicator can control any gate which the gate-line and hop-line are active.
 (logical AND gate)
- □ Three kinds of gates can be used in a supplying hopper. (Full, medium, dribble gate)
- Number of supplying hopper: Twenty hoppers can be used.
- Preset material codes and recipe codes can be used.
- □ The selection of the supplying hopper is [MatEDIT] [Material code] [Material hopper]. The selection of the I/O terminals is [Function] [Function setting] [Control I/O function] [Output].
- □ When number of I/O terminals is not enough, use relay output options (OP-02) and parallel I/O (OP-05).



Example: AND Gate Control

If an I/O extension is needed, use OP-02 and OP-05.

Page 52 AD-4402

7.3.8. Nozzle Control Sequence (vacuum cleaner)

The nozzle is used for filling a bottle with a liquid or powder. The procedure inserts the nozzle into the bottle automatically using the signal "nozzle down" before the weighing, weighs it and removes the nozzle when dribble flow is finished. Therefore, the result (comparison) of weighing is not affected.

Advise

In case of using the nozzle control sequence

[59 F-12] [Function] - [Function setting] - [Sequence] - [Control] - [Nozzle control]

□ In case of using the timer to ready nozzle.

[59 F-32] [Function] - [Function setting] - [Sequence] - [Timer - [Batch start delay timer]

In case of using the nozzle down

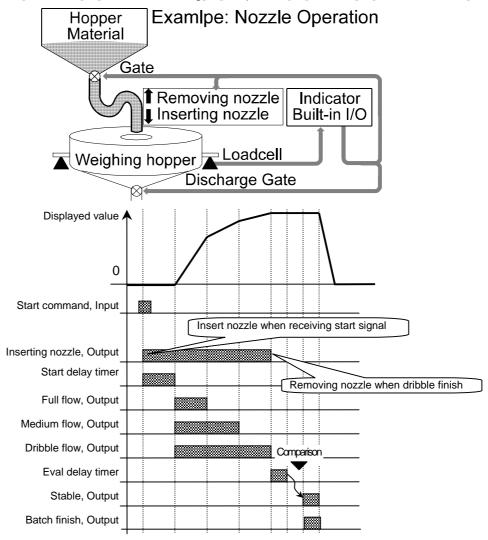
[0utF-nn] Nozzle down

nn: terminal number of the I/O.

[Function] - [Function setting] - [Control I/O] - [Output]

□ In case of compare it after shifting up nozzle

[59 F-12] [Function] - [Function setting] - [Sequence] - [Control] - [Nozzle control]



7.3.9. Mixing Sequence

□ The mixing sequence is used to mix or stir material. The signal is output from the I/O terminal set to mixing. The timing of batch finish, discharge finish and recipe finish can be selected.

Concerning Parameters of the Function

Using the mixing sequence

[0utF-nn] [12] Mixing

nn: terminal number of the I/O.

[Function] - [Function setting] - [Control I/O] - [Output]

Relay output (OP-02), parallel I/O (OP-05) can be used.

Mixing material at batch finish

[59 F-14] [Function] - [Function setting] - [Sequence] - [Control] - [Batch finish action]

Mixing material after discharge

[59 F-15] [Function] - [Function setting] - [Sequence] - [Control] - [Discharge finish action]

Mixing material at recipe finish

[59 F-17] [Function] - [Function setting] - [Sequence] - [Control] - [Recipe finish action]

Storing the time of mixing

[59 F-47] [Function] - [Function setting] - [Sequence] - [Timer] - [Mixing time output on]

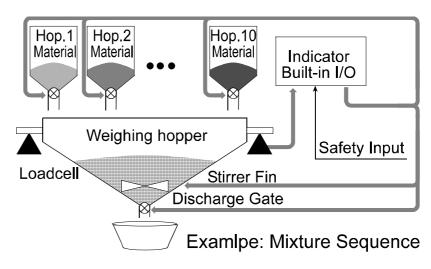
Safety check during mixing

[59 F-74] [Function] - [Function setting] - [Sequence] - [Safety] - [Mixing safety check]

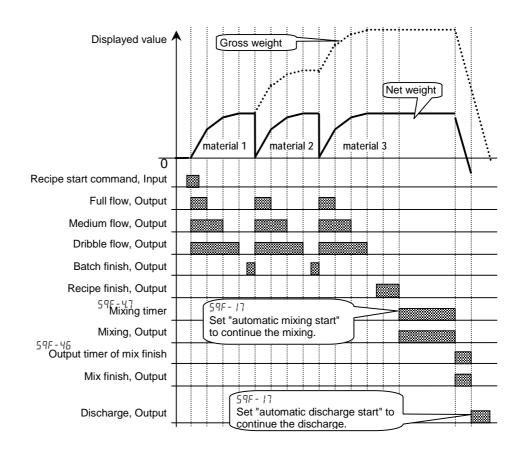
Advise

Safety check during mixing

When the specified input terminals at [59 F-74] are all ON, it supposes that the sequence is safe and is continued. If any terminal is OFF, an error code is output and sequence is stopped.



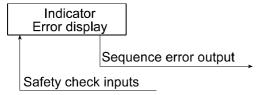
Page 54 AD-4402



7.3.10. Safety Check Function

- □ This function is used to stop the sequence when an error or an emergency happens.
- When the function works, an error code is displayed and an error signal is output from the preset I/O terminal that weighing sequence error [♂] is selected at [Function] - [Function setting] - [Control I/O] - [Output].
- □ The control inputs of the function, use the preset I/O terminals or OP-05 terminals that select safety check.
- □ In maximum, eight input terminals can be used.
- □ The safety check functions are as follows:

Code	Classification	Action		
59F-71	Condition of the start	Specify the safety confirmation		
59F - 72	Condition of the discharge	inputs on the I/O or OP-05.		
59F - 73	Condition of the recipe (compound)	When all inputs are not ON		
59F - 74	Condition of the mix	(active), the sequence is stopped		
59F - 75	Condition of the whole sequence	an error code is displayed.		



Examlpe: Safety check

7.3.11. Pause and Emergency Stop

- □ The pause input is used to stop the sequence temporarily.

 When the sequence pauses, SQLERR ② is displayed and an error code is output.
- □ The emergency stop input is used to stop the sequence.

 When the sequence is stopped, alarm1 is informed and No. □1 □ m 19 is displayed.

 When the emergency stop is canceled, the status moves to the pause (temporary stop).
- □ Refer to section "7.5.11.Error Message and Alarm" for the details.
- □ The I/O terminal and OP-05 terminal can be assigned to the pause input and emergency input.

Concerning Parameters of the Function

Selecting the I/O terminal as the pause input or the emergency input.

```
[In F-nn] [22] Pause (Temporary stop)
[In F-nn] [I3] Emergency Stop
nn: terminal number of I/O.
[Function] - [Function] - [Control I/O Function] - [Input]
```

□ Selecting the OP-05 terminal as the pause input or the emergency input.

```
[05 F-nn] [22] Pause (Temporary stop)
[05 F-nn] [13] Emergency Stop
nn: terminal number of I/O.
[Function] - [Function setting] - [slot kk]
kk: The slot number that OP-05 is installed in.
```

Page 56 AD-4402

7.3.12. Restart Sequences from Pause

- $\hfill\Box$ The restart input was used to start from the point that is stopped in the last sequence.
- □ The control inputs of the function use the preset I/O terminals or OP-05 terminals that select Restart.
- □ The action of the function is as follows:

When it stopped	Before the restart	Action of the restart	
During initial dribble flow		Start from initial dribble flow	
During initial medium flow		Start from initial medium flow	
During full flow	All gates are closed	Start from medium flow	
During medium flow	Start from dribble flow		
During dribble flow		Start from dribble flow	
Waiting batch finish signal		Waiting batch finish signal	
During compensation		Start from compensation	
During nozzle operation	Stopping the operation	Start from nozzle operation	
During mixing	Stopping the mixing	Start from the mixing	
During discharge	Stopping discharge	Start from discharge	
During recipe sequence	According to above list	According to above list	

7.3.13. Automatic Free Fall Compensation

□ This function arranges the free fall parameter using the average of the last four displayed values so as to get a more precise weighing.

Concerning Parameters of the Function

Using the automatic free fall compensation

```
[59 F-20] [/] Average of last 4 FFalls (free falls)
[Function] - [Function setting] - [Sequence] - [Control] - [Free fall compensation]
```

Using the automatic free fall effective bandwidth

[Function] - [Function setting] - [MatEDIT] - [Code No.] - [AFFC range] Refer to section 6.1.5. Editing Full Parameters of Material Code.

Using the manual free fall

```
[59 F-20] [0] No (Not used)
```

When using the signal from the I/O terminal to control free fall, use this. [Function] - [Function setting] - [Sequence] - [Control] - [Free fall compensation]

Storing the results of the automatic free fall compensation of each material.

```
[59 F- 9] [/] Change FFall
When using the flash memory, set to [0EHF- //] [2].
[Function] - [Function setting] - [Sequence] - [Basic] - [Material code, free fall value]
```

Advise

- □ When the automatic free fall compensation can not work.
 - Check the flux of dribble flow.
 - When the error (| result final value |) of displayed value is greater than this parameter, the function does not work.
 - □ Check that the dribble flow timer is to short.

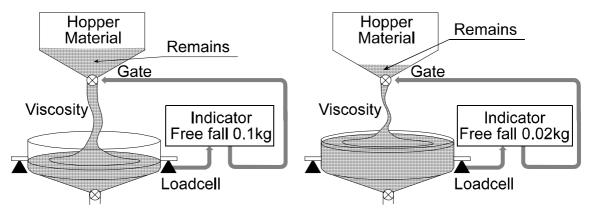
 When the timer is shorter than Dflow auto-FFall override [59 F-36], the function does not work.
- □ When the accuracy does not improve, even if automatic free fall compensation is used.
 - Check the stability of the dribble flow.
 When the dribble flow is unstable and the dribble flow timer is shorter, the function can not work correctly.
- □ When the result becomes over, even if automatic free fall compensation is used.
 - Remove between preliminary and free fall
 When the value of preliminary and free fall are near, medium flow only works to reach the final value and the dribble flow can not work.

Page 58 AD-4402

7.3.14. Real Time Free Fall Compensation

□ This function arranges the free fall parameter to get more precise weighing during the sequence (in real-time calculation).

Example: this function fits a liquid weighing (water, cement, tar) that flow rate is not constant due to temperature, viscosity and the remains.



Examlpe: Real Time Free Fall Comensation

Concerning Parameters of the Function

Using the real time free fall compensation.

Using the automatic free fall effective bandwidth

[Function] - [Function setting] - [MatEDIT] - [Code No.] - [AFFC range] Refer to section 6.1.5. Editing Full Parameters of Material Code.

□ Storing the results of the automatic free fall compensation of each material.

Advise

- □ When the accuracy does not improve, even if automatic free fall compensation is used.
- Check the stability of the dribble flow.
 If the material includes big lumps, when the dribble flow is unstable and irregular and when dribble flow timer is to short, this function can not work correctly.
- □ When the dribble flow timer is shorter than the Dflow auto—FFall override [59 F-36].

When the timer used the default value of each material code.

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Page 60 AD-4402

7.4. Customer Programmed Control (Comparison Output)

- □ The "customer programmed control mode" simply outputs the comparison results of the setpoints and the displayed value.
 - The setpoint: A preset standard value to compare with the displayed value.
- □ The comparison and output of the results are performed at each sampling time.
- □ If this function is used, a PLC (programmable logic controller unit) is needed for batch weighing on a hopper scale.
- □ The power of the control I/O signal output is too small to drive a large valve directly. Use relay output option (OP-02) to drive them.
- ☐ If the number of control I/O terminals is not enough, use the parallel I/O option (OP-05).

Caution

Initial flow sequence and compensation sequence can not be used in the "customer programmed control"

Advise

- Automatic free fall compensation and Total function If the start key is used, in the same as sequential mode, when three gates are closed, the Eval timer has worked and the displayed value becomes stable, the batch finish signal can be output.
- □ The start key is not necessary to compare displayed values basically.

7.4.1. Normal Batching of the Customer Programmed Control Mode

- □ This function outputs gate control signals that are derived from the compared setpoint and weighing data of the materials totaled in the hopper.
- □ When the weight increases above the setpoint, the gate control signal turns off. When the weight decreases under the setpoint, the gate control signal turns on.
- □ The weighing mode in this function is bi-directional. Therefore, the comparison is repeatable (reversible).

Concerning Parameters of the Function

Using normal batching of the comparison function

```
[59F- ] [] Customer programmed control [59F- 3] [] Normal batch weighing [Function] - [Function setting] - [Sequence] - [Basic]
```

Changing waiting time of judgment

```
[59F-37] Eval delay timer [Function] - [Function] - [Sequence] - [Timer]
```

Changing the pulse width of batch finish output

```
[59F-43] Batch finish output on
An arbitrary width can be set.

If zero is set, the output is kept until the next start.

[Function] - [Function setting] - [Sequence] - [Timer]
```

□ Using signals of "over", "OK" and "under" in the comparison function.

```
[59F- 5] Commanison
[Function] - [Function setting] - [Sequence] - [Basic]
```

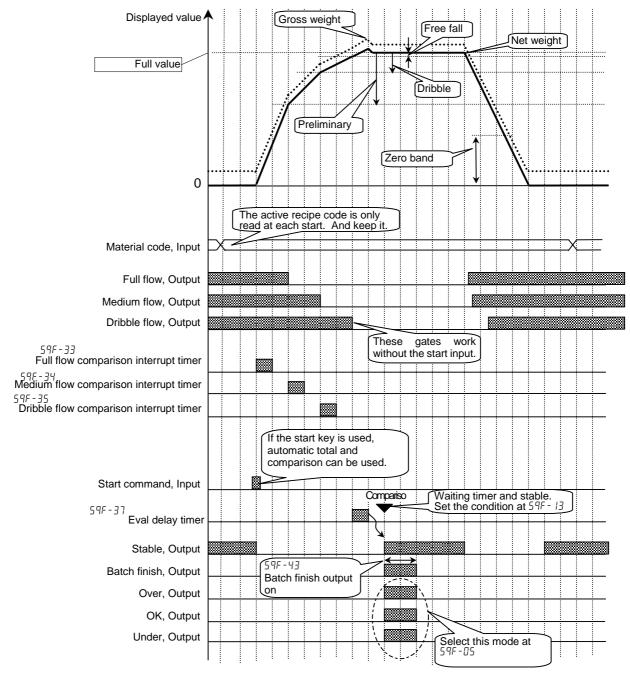
Changing the accuracy of the comparison

```
[59F-48] Averaging Eval time
The average time of batch finish output is set. The output of batch finish is delayed by the average time.
[Function] - [Function setting] - [Sequence] - [Timer]
```

Using manual free fall compensation

```
[In F-nn] [I0] Manual free fall compensation
[05 F-nn] [I0] Manual free fall compensation
nn: terminal number of the I/O.
The input to control free fall by an external PLC.
[Function] - [Function setting] - [Control I/O] - [Input]
```

Page 62 AD-4402



Drawing: Normal Batching of Comparison Function

7.4.2. Loss-in-weigh of the Customer Programmed Control Mode

- □ This function outputs gate control signals that are derived from the compared setpoint and weighing data of the materials from the hopper.
- When the weight decreases past the setpoint, the gate control signal turns off. When the weight increases past the setpoint, the gate control signal turns on.
- □ The weighing mode in this function is bi-directional. Therefore, the comparison is repeatable (reversible).

Concerning Parameters of the Function

Using loss-in-weigh of the comparison function

```
[59F- ] [] Customer programmed control [59F- 3] [] Loss-in-weigh [Function] - [Function] - [Sequence] - [Basic]
```

Using the external control switch for normal batch and loss-in-weigh.

```
[59F-3] [2] External exchange
If the external switch is used, connect it to the I/O terminals. This mode can use three gates.

[Function] - [Function setting] - [Sequence] - [Basic]
```

□ Checking whether there are remains from the last weighing operation in the hopper.

```
[59F-55] Add final value and zero band
When the remains reach a weight that is under the final value +
zero band, the zero band signal is output.

[Function] - [Function setting] - [Sequence] - [Setpoint (Compared value)]
```

Using the external switch

```
[In F-nn] [9] Supply switch control nn: terminal number of the I/O.
[Function] - [Function setting] - [Control I/O] - [Input]
```

□ Checking whether there are remains from the last weighing operation in the hopper.

```
[59F-56] Add final value and full value

When the final value + full value is less than the remains (gross) in the hopper, the full signal is output.

[Function] - [Function setting] - [Sequence] - [Setpoint (Compared value)]
```

Changing the accuracy of the comparison

```
[59F-48] Average time Eval time
The average time to criticize the weight.
[Function] - [Function setting] - [Sequence] - [Timer]
```

Using manual compensation

```
[In F-nn] [ID] Manual free fall compensation
[D5 F-nn] [ID] Manual free fall compensation
nn: terminal number of the I/O.
The input to control free fall by an external PLC.
[Function] - [Function setting] - [Control I/O Function] - [Input]
```

Page 64 AD-4402

Advise

□ Using the automatic switch of normal batch and loss-in-weigh.

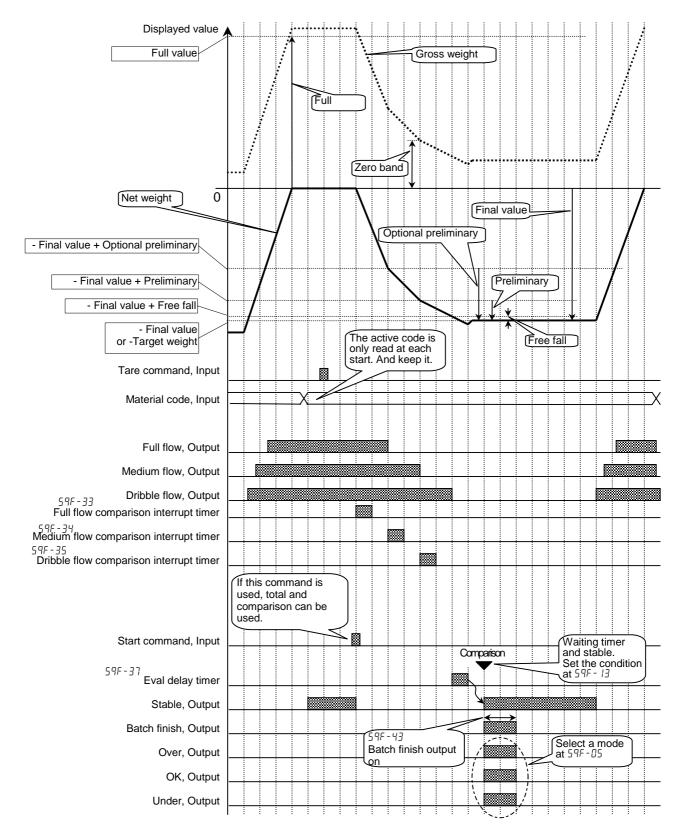
Specify the output terminal for the hopper number in the material code on the I/O.

Specify the input terminal to change the mode on the I/O. [In F-nn] [9]

Connect the output terminal to the input terminal.

Connect the output common terminal to the input common terminal.

Set the delay time above 0.1 second at $[59F - \dot{3}2]$ Batch start delay timer.



7.5. Other Functions

7.5.1. Re–Zero Operation

- □ Performing this function, a gross display is zeroed and the current displayed value is used as a standard point.
- □ The operation of the function can be performed from the front panel key, the input terminal of the I/O and command input.
- □ The adjustable range is based on the zero calibration and Zero range [δεηξ δ] of the function list. The range is displayed in the unit of percentage of the weighing capacity.
- □ The re-zero data is stored in memory even without power.
- □ Resetting the re-zero data, use the I/O terminal or the F1 ~ F4 key that is set to \mathbb{Z} ero \mathbb{Z} ero

nn: terminal number of I/O.

Caution

□ When the internal A/D converter is out of range, the re-zero operation be not performed and the error code ZR.ERR is displayed.

Concerning Parameters of the Function

Changing the range to do the re-zero operation.

```
[LEnF- 6] Zero range

The maximum range is 30% of the capacity.

[Function] - [Function setting] - [General] - [Weighing]
```

Using the prohibition of the re-zero operation in the unstable condition.

```
[GEnF-9] Tare and zero compensation at unstable status [Function] - [Function] - [General] - [Weighing]
```

Turning on the display, the re-zero function is used.

```
[GEnF-13] Clear mode at rower ON [Function] - [Function setting] - [General] - [Weighing]
```

7.5.2. Zero Tracking Function

□ This function automatically traces the weighing deviation at the nearly zero point and keeps the zero display of the gross display.

Concerning Parameters of the Function

Changing the time of zero tracking

```
[GEnF-7] Zero tracking time [Function] - [Function setting] - [General] - [Weighing]
```

Changing the range of zero tracking

```
[$\tilde{\mathbb{E}} \tilde{\mathbb{F}} = \tilde{\mathbb{E}} = \tilde{\m
```

7.5.3. Tare

□ The relation of the display is as follows:

Net = Gross - Tare

Concerning Parameters of the Function

Prohibiting tare during unstable weighing

[GEnF-9] Tare and zero compensation at unstable status [Function] - [Function] setting] - [General] - [Weighing]

Prohibiting tare during negative weighing

[GEnF-10] Tare at negative GROSS weight [Function] - [Function setting] - [General] - [Weighing]

Resetting tare at turning on the indicator

[GEnF-13] Clear mode at power ON [Function] - [Function setting] - [General] - [Weighing]

7.5.4. Preset Tare (Fixed Tare Function)

A preset tare can be stored in each material code.

Concerning Parameters of the Function

Using preset tare

[GenF-||] Freset tare
[Function] - [Function setting] - [General] - [Weighing]

Using preset tare for partial material code

[LEnF-12] Preset tare=0
[Function] - [Function setting] - [General] - [Weighing]

Classifying normal tare and preset tare on the serial data

[[EnF-07] Tare Header [Function] - [Function] - [General] - [Weighing]

7.5.5. Customizing the Function Key (Key Design)

Refer to 2.2.1. Keys of the front panel regarding key operation.

Refer to "10.4. Parameter List" of the function list regarding key function.

Concerning Parameters of the Function

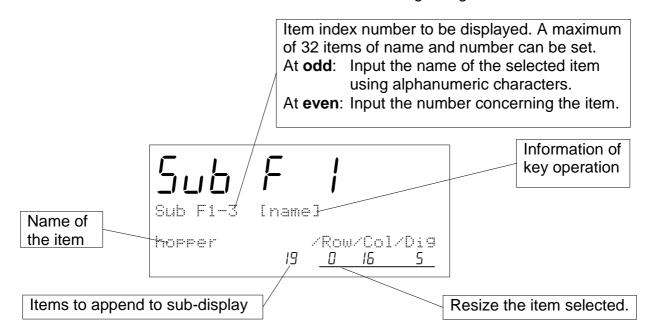
□ Setting F1, F2, F3 and F4 keys

[□ŁHF - □] to [□ŁHF - □]

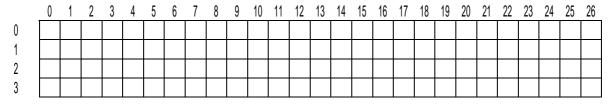
[Function] - [Function setting] - [General] - [Other]

7.5.6. Customizing the Sub Display

- □ Use the default sub-display pattern, if you want to reset it.
- □ Refer to "10.4. Parameter List" of the function list regarding these items.



Row and Colum Address



Row 0 and 2 are dot matrix display for alphanumerical charactor. Row 1 and 3 are 7-segment display for numerical charactor.

Items to append to the sub-display

- 10 orbb	cira to the sas anspia,			
Number	Name and Number to Display the Item	Row size	Columsize	Figures
0	Not displayed	0 to 3	0 to26	1 to12
1	Material			
2	Hopper			
3	Final value			
4	Free fall			
5	Preliminary			
6	Optional preliminary			
7	Over			
8	Under			
9	Zero Band			
10	Full			
11	Tare			
12	Supplementary flow open timer			
13	Supplementary flow close timer			

Page 68 AD-4402

Number	Name and Number to Display the Item	Row size	Columsize	Figures
14	Automatic Free Fall Compensation			
15	Internal reserved			
16	Internal reserved			
17	Initial dribble flow			
18	Initial dribble flow			
19	Total weight			
20	Total count			
21	Recipe , r [ad [
22	Total weight for recipe mode			
23	Total counts for recipe mode			

Concerning Parameters of the Function

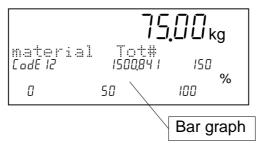
Setting the sub-display

[Function] - [Function setting] - [General] - [Sub-display]

7.5.7. Graphic Display

□ Use to display a bar-graph in the sub-display.

Example:



Concerning Parameters of the Function

Using the bar graph display

□ Selecting the ratio of the graph display

7.5.8. Total Operation

□ Total weight data and weighing count of each material code or recipe code.

Concerning Parameters of the Function

□ Using F1 ~ F4 key for total

[□ŁHF - 2] to [□ŁHF - 5]

[Function] - [Function setting] - [General] - [Other]

Using the I/O terminals for total

[In F-nn] nn: terminal number of the I/O.
[Function] - [Function setting] - [Control I/O] - [Input]

Using the parallel terminals for total

nn: terminal number of the option.
n: slot number installed the option.

[Function] - [Function setting] - [slot n] - [OP-05]

7.5.9. Undoing the Total Operation

Assign an operation input to undo the last result.
 Refer to "10.4. Parameter List" of the function list regarding key function.

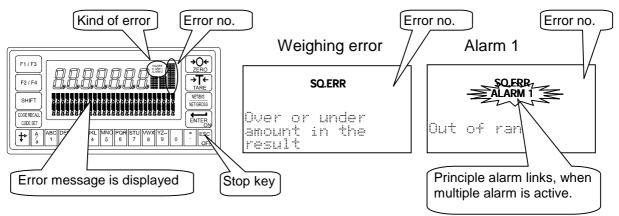
7.5.10. Clearing (Deleting) the Totaled Data

- □ Total data can be deleted (cleared) using the preset operation input.
- □ There are four types of clearing the data.
- Assign an operation input to undo the last result on the function list.
 Refer to "10.4. Parameter List" of the function list regarding key function.

Page 70 AD-4402

7.5.11. Error Message and Alarm

- When the indicator detects an error in the weighing system, an error message is displayed.
- □ When the indicator becomes a preset condition, it is announced with the preset alarm.



Kind of Alarm and Error

There is the following priority. Weighing sequence error < SQ. ERR

Zero error < Alarm 1 < Alarm 2
ZR. ERR ALARM 1 ALARM 2

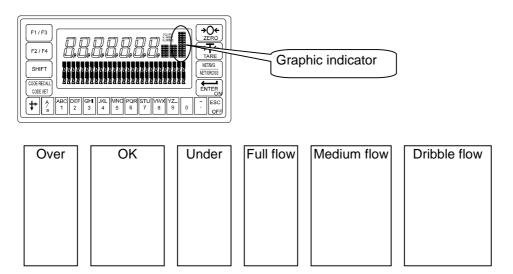
Kind	No.	Description					
	n the weighing can not continue, a message is displayed and the						
	sequ	ence is stoped. Cope with cause and restart the weighing.					
	0	The weighing sequence stoped.					
		Cope with cause and restart the sequence.					
	1	Safety check can not be completed.					
	_ '	Check the safety.					
	2	Under weight or over weight.					
		Compensate weight and restart.					
	3	There is a conflict in setpoint					
Weighing		Check setpoint					
sequence	4	Time over of batch weighing.					
error		Check the gate and remains of hopper.					
SQ.ERR	5	Time over of discharge.					
		Check the discharge gate.					
	6	The remains are not enough to weigh.					
		Add material.					
	7	When the batch is started, the weight is full already.					
		Nozzle is touching the hopper.					
	8	Check the nozzle.					
	9	There is no tare (vessel) on the weighing pan.					

Kind	No.	Description					
	When the displayed value can not be set to zero with re-zero or tare						
Zero error	the n	ne message is displayed.					
ZR.ERR	0	Dispaly can not be zeroed by zero compensation.					
Dispaly can not be zeroed by tare operation.							
	Whe	n the weighing value is out of range and emergency stop is					
Alarm 1	perfo	prmed, this symbol is displayed.					
ALARM 1	1	Weighing value is out of range.					
	9	Emergency stop has been performed.					
	It car	n not weigh. Check the weighing system.					
	Exar	nple: loadcell cable, connctors.					
	1	A/D converter is positve over count.					
Alarm 2	, I	Check the loadcell cable.					
ALARM 2	2	A/D converter is negative over count.					
		Check the loadcell cable.					
	4	RAM error.					
	+	Check the backup battery					

Page 72 AD-4402

7.5.12. Graphic Status Indicator

□ The indicator can display weighing status, result on the graphic indicator.



Concerning Parameters of the Function

Using the graphic indicator

[SubF- 5] Activity indicator

[Function] - [Function setting] - [General] - [Sub display]

7.5.13. Memory Backup

□ The indicator has two kinds of memory.

Flash memory The memory is used to store important data without power supplied

that the occurrence of re-writing them is seldom.

Life of re-writing them is approximately 100,000 times or more.

Data example: Calibration data, Function data

Backup RAM The memory is used to store temporary data that the occurrence of

re-writing them is often.

Life of the battery is approximately 10 years at 25 ℃, normal use

Data example: Tare value, total data, re-zero data

When re-writing data, the sequence is stopped.

□ Material code and recipe code can be stored in flash memory or backup RAM.

Concerning Parameters of the Function

Selecting the memory for material code or recipe code

[OŁHF-II] Save data

[Function] - [Function setting] - [General] - [Other]



8. Interface

8.1. Control I/O Function

Input terminals 11 lines that can select by the function Output terminals 11 lines that can be selected by the function

Open collector transister

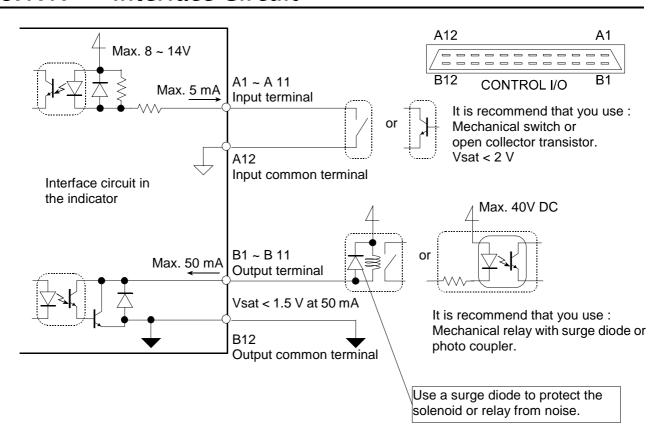
Input terminal

	Maximum	typ.
Input open voltage	14V DC	8 V DC
Input drive current	5 mA	3 mA
Saturation tolerance voltage	2 V DC	

Output terminal

	Maximum
Output voltage	40 V DC
Output current	50 mA
Saturation tolerance voltage	1.5 V at 50 mA

8.1.1. Interface Circuit



The function assigned to terminals

The function of the terminal can be assigned arbitrarily. Refer to "10.4. Parameter List" of the function list

8.1.2. Timing Chart

Caution

Keep the delay time to avoid abnormal-operation and noise. Keep the input signal more than 40 ms to avoid noise and chattering.

X

8.2. Built-in RS-485 Interface

- □ The RS-485 interface can use commands to control the indicator. The interface can read weighing data or parameters and store parameters in the indicator.
- □ The interface can connect a maximum of 32 units and a personal computer using a communication cable.
- Each unit is specified by an address appended to the command.

Transmission system EIA RS-485, Asynchronous, bi-directional, half-duplex

Data length 7 bits or 8 bits

Start bit 1 bit

Parity bit Odd, Even, not used

Stop bits 1 bit, 2 bits

Baud rate 600 bps, 1200 bps, 2400 bps, 4800 bps, 9600 bps, 19200

bps, 38400 bps

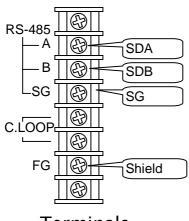
Line 2 wires (2-balanced wires)

Connection Max. 32 units
Character code ASCII code
Terminator CR, CR LF

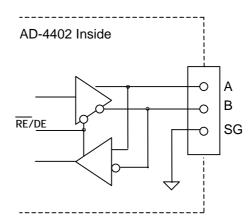
The way of Use and Notes

- □ When useing terminator, connect it between the SDA and SDB terminals using the accessory resistor.
- □ If there is no signal ground at the host computer, it is not necessry to use the SG terminal.
- □ If the shield cable is used, connect the FG teminal to the shield line.
- When connecting to RS-232C, Use AD-7491 or a converter of RS-232C/ RS-485 on a market.
- Use a multi-drop connection for command mode.
 Do not use a multi-drop connection in stream mode or jet stream mode.

8.2.1. Connection

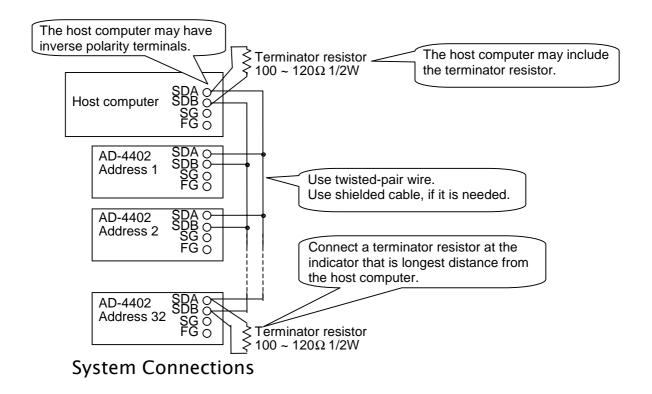


Terminals



Interface Circuit

Page 76 AD-4402

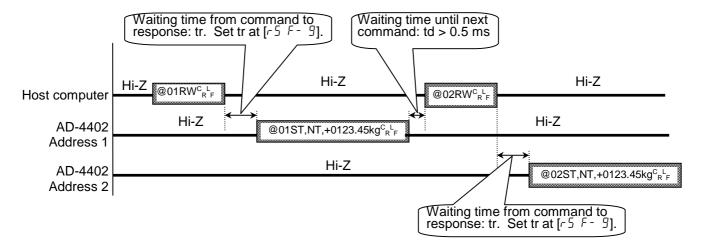


8.2.2. Settings of Parameters

Refer to the "10.4. Parameter List" of the function list.

8.2.3. Timing Chart

- □ Keep the delay time above 0.5 ms between the last response and the next command.
- □ Set response time (tr). [r5 F-9]
- Use a long delay time, when there is noise.
- □ Hi-Z: Hi impedance



Communication Modes

□ There are the following modes.

Stream Mode

The data is output at each display update. If the data can be not output completely due to a slow baud rate, the data is output at the next update.

Auto Print Mode

The data is printed at batch finish and recipe finish automatically.

Total Print Mode

When accumulating data or canceling the last result, the results of batch finish and recipe finish are printed.

Manual Print Mode

When the preset print key is pressed or terminal is connected, the data is output.

Command Mode

This mode is used to control the indicator, to store parameters and to read data or parameters.

Jet Steam Mode

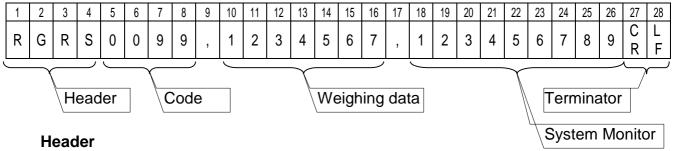
The weighing data and state is output 100 time/s. The data is the gross or net value. The format is the same as command RGRS or RNET.

Set the baud rate to 38400 bps.

Page 78 AD-4402

8.2.4. General Data Format

This format is used for the command mode and jet stream mode.



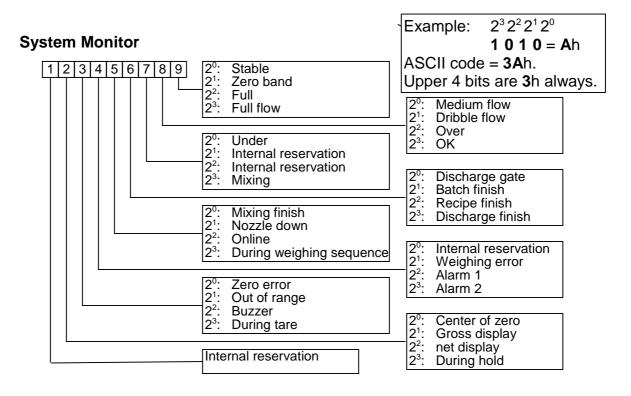
Command is echoed. The echoed command is 4 characters

Code

Material code or recipe code number. The code is 4 characters

Weighing data

Data uses BCD code, is 7 figures and does not include a decimal point. When data is negative, a minus sign is appended to the head.



Terminator

CR or CR + LF CR: **0D**h, LF: **0A**h

8.2.5. A&D Data Format

This format is used for stream mode, auto print mode and total print. This format is compatible to the AD-4325 indicator.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
S	Т	,	N	Т	,	+	0	0	1	2		3	4	k	g	CR	LF
Header 1 Header 2 Weighing data					ata			U	nit	Te	rmina	ntor	Y				

Header 1

ST Stable

US Unstable

LO Out of range

Header 2

GS Gross value

NT Net value

TR Tare value

Weighing data

Data uses BCD code, is 7 figures and includes a decimal point.

When data is negative, a minus sign is appended to the head.

When data is out of range, all numerical characters are space (20h).

Unit

kg, g or t

Terminator

CR or CR + LF

CR: **0D**h, LF: **0A**h

8.2.6. Address

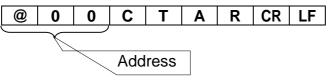
Set the address in [-5 F-8].

32 indicators can be connected to a computer.

There is no relation between communication mode [-5 F - 2] and address [-5 F - 8].

Broadcast Address

When address @oo is used, send a command to all indicators at the same time. Example:



Page 80 AD-4402

8.2.7. Command List

Monitor Commands

Name	Code	Description	
Dood displayed value	RDSP		
Read displayed value	RW		
Read gross data	RGRS		
Read net value	RNET		
Read tare value	RTAR		
Bood weighing regult	RFIN		
Read weighing result	RF		#1
Dood actaciat or	RSPTxxxx		
Read setpoint or	RSPT####		
Read comparison parameters	RSxx		#1
Read material code	RCODxxxx	To read the details of the code.	# 1
Read recipe code	RRCDxxxx	To read the details of the code.	# 1
Read total data of material	RTTLxxxx		
code	KIILXXXX		
Read total data of recipe	RRTLxxxx		
code	ININILXXXX		
Read error code	RERR		

xxxx: Material code or recipe code.

#1: Compatible command to AD4401, AD-4403 and AD4325.

Write Commands

Name	Code	Description
	WSPTxxxx	
Store cotrointe	WSPT%%%%	
Store setpoints Store comparison parameters	SSxx	#1
Store companson parameters	SA	To store optional preliminary and zero
	SA	band. #1
Store material code	WCODxxxx	To store all parameters of the code.
Store recipe code	WRCDxxxx	To store all parameters of the code.

xxxx: Material code or recipe code.

####: When reading an active material code or recipe code during the sequence, place four space codes (ASCII **20**h).

%%%: When storing new parameters to material code or recipe code that is recalled as next code in the sequence, place four space codes (ASCII **20**h).

#1: Compatible command to AD4401, AD-4403 and AD4325.

Control Commands

Name	Code	Description	
	CZER	,	
Make zero display	MZ		#1
Make zero clear	CCZR		
T	CTAR		
Tare	MT		#1
	CCTR		
Tare clear	СТ		#1
	CGRS		
Change to gross display	MG		#1
	CENT		
Change to net display	MN		#1
Call reactarial and	CCODxxxx		
Call material code	CCxx		#1
Call recipe code	CRCDxxxx		
Total command	CACC		
Total command	AM		#1
Company the allocation coult	CCAC		
Cancel the last result	CA		#1
Datab start	CBAT		
Batch start	BB		#1
Dischause start	CDSC		
Discharge start	BD		#1
Recipe start	CBLD		
Mixing start	CMIX		
Re-start	CRES		
Stop	CHLT		
Emergency step	CSTP		
Emergency stop	HB		#1
Clear total data of material	CDTLxxxx	Total data is set to 0.	
code	DTxx	Total data is set to 0.	#1
Clear total data of all	CETL	All total data is set to 0.	
material code	ET	All total data is set to 0.	#1
Clear total data of recipe	CDDTvaaa	Total data is act to 0	
code	CDRTxxxx	Total data is set to 0.	
Clear total data of all	CERT	All total data is set to 0.	
recipe code	CERT	All Iulai uala is sel lu u.	
Reset an error	CRER		
No operation	CNOP		

xxxx: Material code or recipe code.
#1: Compatible command to AD4401, AD-4403 and AD4325.

Page 82 AD-4402 Response Error Code

Response	Description	Note
?E	The format of command is not correct.	When an address is used,
VE	The data of command is not correct.	address is appended to the
IE	Indicator is busy.	response.

ASCII Code for AD-4402

The characters are special code for the name of material code and recipe code. Therefor, some characters are not the same as U.S. code.

		Lower bits								
		0	1	2	3	4	5	6	7	
	0			Space	0	@	Ρ	Space	р	
	1			!	1	Α	Q	а	q	
	2			"	2	В	R	b	r	
	3			#	3	С	S	С	S	
	4			\$	4	D	Τ	d	t	
	5			%	5	Е	J	е	u	
	6			&	6	F	>	f	V	
Upper bits	7			1	7	G	V	g	W	
Opper bits	8			(8	Н	Χ	h	X	
	9)	9	I	Υ	i	У	
	Α	LF		*	• •	J	Ζ	j	Z	
	В			+	•	K	[k	{	
	С			,	\	L	¥			
	D	CR		-	II	М]	m	}	
	Е				^	N	٨	n		
	F			/	?	0	1	0	0	



8.3. Built-in Current Loop Output

Transmission system EIA RS-232C, Asynchronous, bi-directional, half-duplex

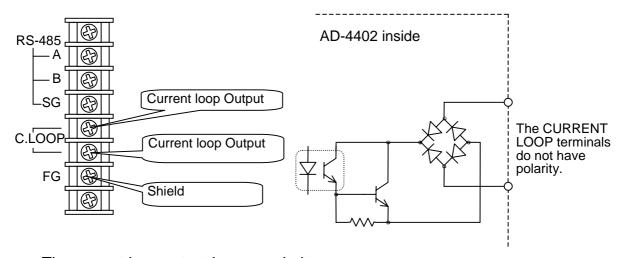
Current 1 = 20 mA, 0 = 0 mA, external DC current source

Data length 7 bits
Start bit 1 bit
Parity bit Even
Stop bits 1 bit

Baud rate 600 bps, 1200 bps, 2400 bps

Code ASCII code

8.3.1. Connection



The current loop output has no polarity.

Use an external DC current source.

Connect the FG terminal when using a shielded cable.

8.3.2. Communication Modes

There are the following modes.

Stream Mode

The data is output at every display update. If the data can not be output completely due to a slow baud rate, the data is output at the next update.

Auto Print Mode

The data is printed at batch finish and recipe finish automatically.

Manual Print Mode

When the preset print key is pressed or terminal is connected, data is output.

Total Print Mode

When accumulating it or canceling the last result, the results of batch finish and recipe finish are printed. When canceling the last results, the inverse polarity data is output.

Page 84 AD-4402

8.3.3. Data Format

The format is the same as A&D format of the built-in RS-485.

\searrow

8.4. BCD Output of Option OP-01

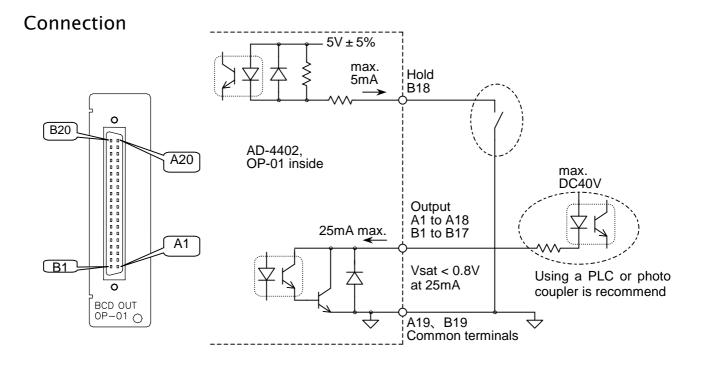
Output circuit Open collector transistor

Output voltage 40 V DC max.

Output saturation voltage 0.8 V at 25 mA

Input control Contact to common Input open voltage 5 V DC $\pm 5\%$

Input open voltage 5 v DC ±5% Input current 5 mA max. Threshold voltage 1.5 V max.



Terminals

When weighing display, gross display, net display or tare display $[\exists \ !F - \ !] [\ !, \ ?, \ 3, \ 4]$ is used, the function of the terminals are as follows:

A1	1	B1	2	Unit	Unit 1	Unit 2
A2	4	B2	8	blank	0	0
А3	10	B3	20	kg	0	0
A4	40	B4	80	t	0	1
A5	100	B5	200	g	1	1
A6	400	B6	800			
A7	1,000	B7	2,000			
A8	4,000	B8	8,000			
A9	10,000	B9	80,000			
A10	40,000	B10	80,000			
A11	100,000	B11	200,000			
A12	400,000	B12	800,000			
A13	Over	B13	Positive polarity			
A14	Stable	B14	Net			
A15	Decimal point 0.0	B15	Decimal point 0.0			
A16	Decimal point 000.0	B16	Decimal point 000.0			
A17	Unit 1	B17	Unit 2			
A18	Strobe		Hold input			
A19	Common ground		Common ground			
A20	Frame ground	B20	Frame ground			

When total weight and total count $[\mathcal{Q} \mid F - l]$ [5, \mathcal{B} , \mathcal{P} , \mathcal{B}] are used, the function of the terminals are as follows:

A1	1	B1	2
A2	4	B2	8
A3	10	B3	20
A4	40	B4	80
A5	100	B5	200
A6	400	B6	800
A7	1,000	B7	2,000
A8	4,000	B8	8,000
A9	10,000	B9	80,000
A10	40,000	B10	80,000
A11	100,000	B11	200,000
A12	400,000	B12	800,000
A13	1,000,000	B13	2,000,000
A14	4,000,000	B14	8,000,000
A15	10,000,000	B15	20,000,000
A16	40,000,000	B16	80,000,000
A17	Over	B17	Positive polarity
A18	Strobe	B18	Hold input
A19	Common ground	B19	Common ground
A20	Frame ground	B20	Frame ground

Page 86 AD-4402

When recipe code and material code [\square |F- |F- |F- |F- |F- |F| are used, the function of the terminals are as follows:

A1	Material code at	1	B1	Material code at	2
A2	weighing	4	B2	weighing sequence	8
А3	sequence	10	B3		20
A4		40	B4		80
A5	Referred	1	B5	Referred material code	2
A6	material code	4	B6		8
A7		10	B7		20
A8		40	B8		80
A9	Recipe code at	1	B9	Recipe code at	2
A10	weighing	4	B10	weighing sequence	8
A11	sequence	10	B11		20
A12		40	B12		80
A13	Referred recipe	1	B13	Referred recipe code	2
A14	code	4	B14		8
A15		10	B15		20
A16		40	B16		80
A17			B17		
A18	Strobe		B18	Hold input	
A19	Common ground		B19	Common ground	
A20	Frame ground		B20	Frame ground	

When Error and alarm $[\Box |F - |]$ $[|\Box]$ are used, the function of the terminals are as follows:

A1	Sequence error	1	B1	Sequence error	2
A2	number	4	B2	number	8
А3		Error	B3		
A4			B4		
A5	Zero error	1	B5	Zero error number	2
A6	number	4	B6		8
A7		Error	B7		
A8			B8		
A9	Alarm 1 number	1	B9	Alarm 1 number	2
A10		4	B10		8
A11		Error	B11		
A12			B12		
A13	Alarm 2 number	1	B13	Alarm 2 number	2
A14		4	B14		8
A15		Error	B15		
A16			B16		
A17			B17		
A18	Strobe		B18	Hold input	
A19	Common ground		B19	Common ground	
A20	Frame ground		B20	Frame ground	

Communication Modes

□ There are the following modes.

Stream Mode

The data is output at every display update. If the data can not be output completely due to slow baud rate, the data is output at the next update.

Auto Print Mode

The data is printed at batch finish and recipe finish automatically.

Manual Print Mode

When the preset print key is pressed or terminal is connected, data is output.

Total Print Mode

When accumulating it or canceling the last result, the results of batch finish and recipe finish are printed. When canceling the last results, the inverse polarity data is output.

Jet Steam Mode

The weighing data and state are output 100 time/s. The data is the gross or net value.

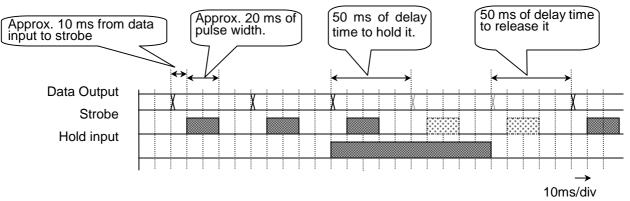
The format is the same as command RGRS or RNET.

Set baud rate to 38400 bps.

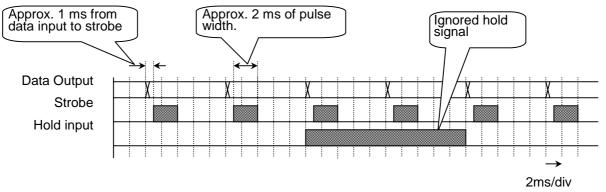
When slow baud rate is 1/2ⁿ times 38400 bps, the same data is output 2ⁿ times

Timing Chart

When **normal output** $[3 \ F - 3] \neq 5$ is used



When **jet steam mode** output [(| F -]] = 5 is used



Page 88 AD-4402



8.5. Relay Output of Option OP-02

Rated load 250 V AC, 3 A

30 V DC, 3 A

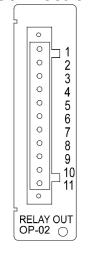
Current at common terminal Max. 10A DC

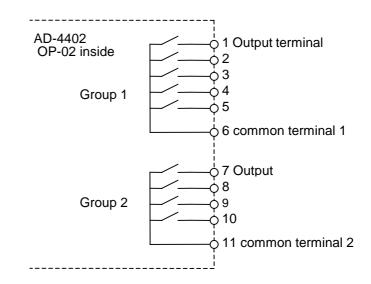
Minimum load 100 mV 100 μA

Life 20,000,000 times or more at no load

100,000 times or more at rated load

Connection





Terminal List

Refer to "10.4. Parameter List" of the function list.



8.6. RS-422/485 Interface of Option OP-03

- □ The RS-422/485 interface can use commands to control the indicator. The interface can read weighing data or parameters or store parameters to the indicator.
- □ The interface can connect a maximum of 32 units and a personal computer using a communication cable.
- The unit is specified by an address appended to the command.
- □ RS-485 can use 2-wire or 4- wire.
- ☐ The command and format are the same as the built-in RS-485.

Transmission system EIA RS-422 / 485,

Asynchronous, bi-directional, half-duplex

Data length 7 bits or 8 bits

Start bit 1 bit

Parity bit Odd, Even, not used

Stop bits 1 bit, 2 bits

Baud rate 600 bps, 1200 bps, 2400 bps, 4800 bps, 9600 bps, 19200

bps, 38400 bps(Jet stream mode)

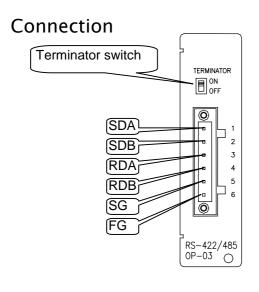
Line RS-422: 4 wires

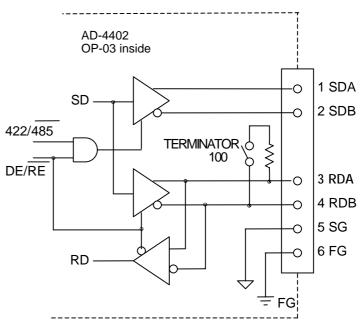
RS-485: 2 wires or 4 wires

Connection Max. 32 units
Character code ASCII code
Terminator CR, CR LF

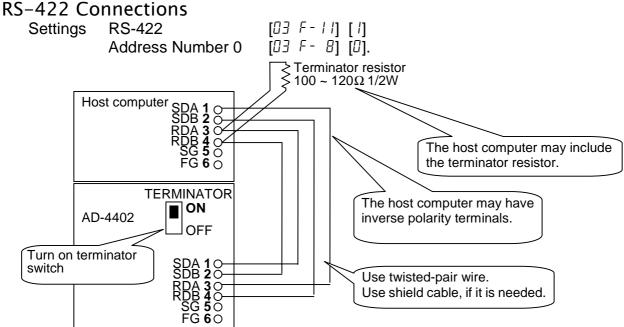
Caution

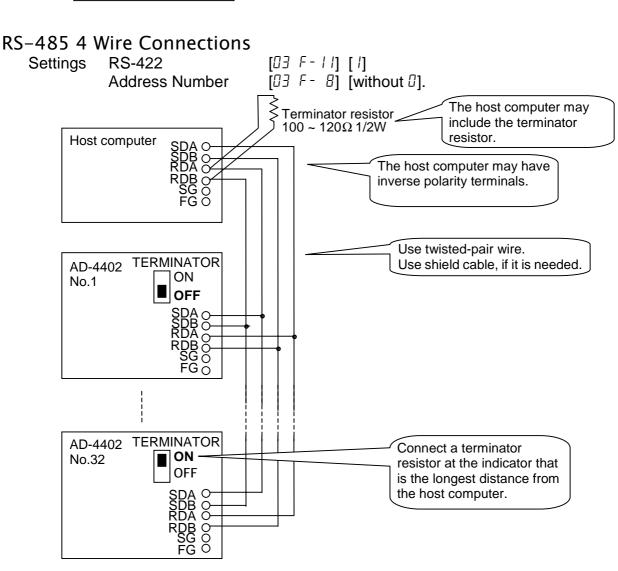
Either option OP-03 or OP-04 can install



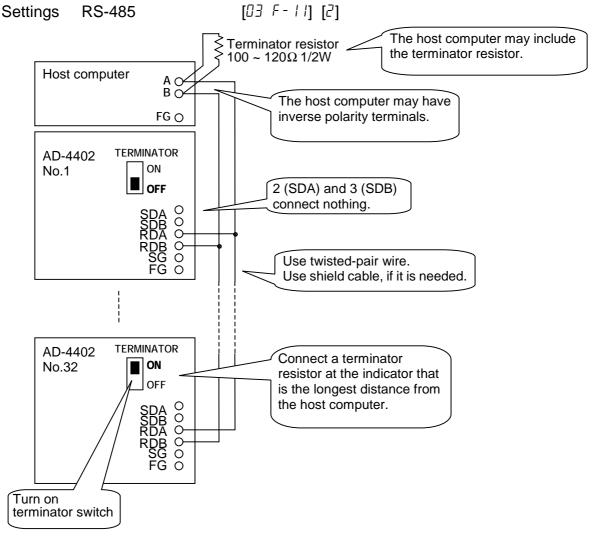


Page 90 AD-4402





RS-485 2 Wire Connections

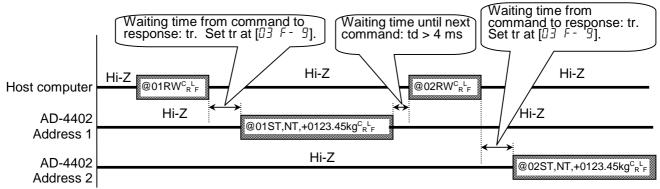


Settings of Parameters

Refer to "10.4. Parameter List" of the function list.

Timing Chart

- □ Keep the delay time above 0.5 ms between the last response and the next command.
- \square Set response time (tr). [$\square \exists F 9$] \square \exists F 9] + 50 ms
- Use a long delay time, when there is noise.
- Use 4 ms or more from the output finish to receiveing the next command
- □ Hi-Z: Hi impedance



Page 92 AD-4402



8.7. RS-232C Interface of Option OP-04

- □ The RS-232C are used to connect to the DEC (modem).
- □ The command and parameters of RS-232C is the same as the built-in RS-485.

Transmission system EIA RS-232C,

Asynchronous, bi-directional, half-duplex

Data length 7 bits ot 8 bits

Start bit 1 bit

Parity bit Odd, Even, not used

Stop bits 1 bit, 2 bits

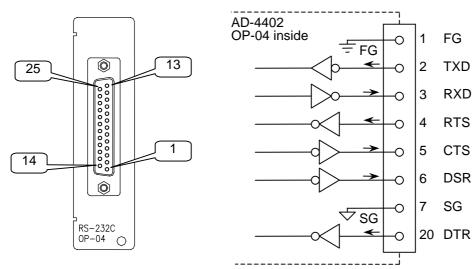
Baud rate 600 bps, 1200 bps, 2400 bps, 4800 bps, 9600 bps, 19200

bps

Caution

Either option OP-03 or OP-04 can be installed.

Connection



Settings of Parameters

Refer to "10.4. Parameter List" of the function list.



8.8. Parallel I/O of Option OP-05

- □ Use this option to extend the I/O terminals
- □ The function, settings, interface circuit and timing chart of the option is the same as the built-in I/O terminal.

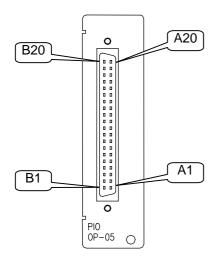
Input control Contact to common

Input open voltage 7 ~ 11 V DC Input current 5 mA max. Input threshold voltage 2 V max.

Output circuit Open collector transistor

Output voltage 40 V DC max. Output saturation voltage 1.5 V at 50 mA

Connection



A1 ~ A16	Input terminals	
A17		
A18	Input common	
A19		
A20	Frame ground	
B1 ~ B16	Output terminals	
B17		
B18	Output common	
B19		
B20	Frame ground	

Terminal List

Refer to "10.4. Parameter List" of the function list.

Caution

Do not assign the same function to multiple input terminals and keys.

Page 94 AD-4402

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8.9. Analog Output of Option OP-07

□ This option outputs DC current that is proportion to the display value. Factory adjusted to 4 mA output at zero display and 20 mA output at full scale.

Analog output Contact to ground Output voltage 11 V DC min. Adaptable resistance $0 \Omega \sim 500 \Omega$

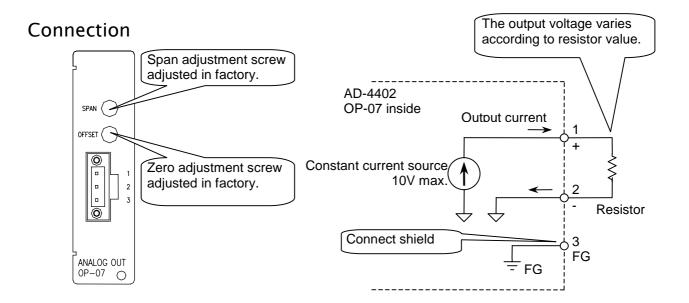
Update ratio 100 times per second with Sampling frequncy divider

[GEnF- 3]

Zero temperature coefficient ± 150 ppm/°C max. Span temperature coefficient ± 150 ppm/°C max.

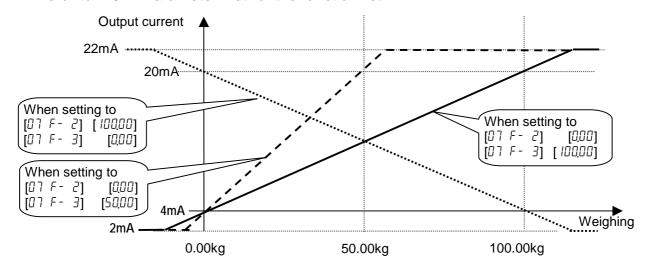
Non-linearlity 0.1% max.

Resolution Smaller value of either 1/40000 or resolution of display



Settings of Parameters

Refer to "10.4. Parameter List" of the function list.





9. Maintenance

9.1.1. Basic Operation

To enter the maintenance function Press and hold the **ENTER** key and press the *****

key in the weighing mode.

Select the menumaintenance using the + key

and the **ENTER** key.

To select an address of the parameter The +, SHIFT + +, ENTER, ESC keys.

To change the parameter The ♣, SHIFT + ♣, Alphanumerical, ENTER,

ESC keys.

To exit the mode

(To return to the weighing mode)

The **ESC** key.



9.2. Monitor Mode

□ The monitor mode is used to check the indicator during the weighing sequence.

9.2.1. Monitoring the Control I/O Function

Used to monitor the status of the I/O terminals.

When [LEnF- /] is slow, it may not display all data.

UNTROL 20010001000 Input terminal A1

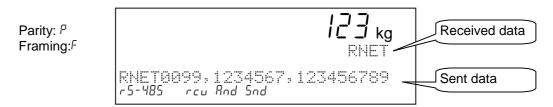
R | 00110100001

B | 00110100001

Couput terminal B1

9.2.2. Monitoring the Built-in RS-485 Interface

□ The current communication data is displayed.



Page 96 AD-4402

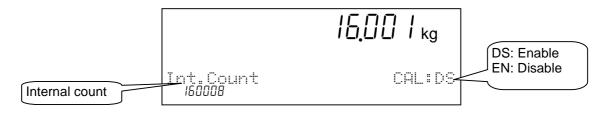
9.2.3. Monitoring the Built-in Current Loop Output

The current communication data is displayed.



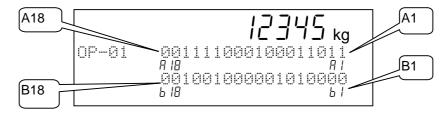
9.2.4. Monitoring the A/D Converter

The current A/D converter data is displayed.



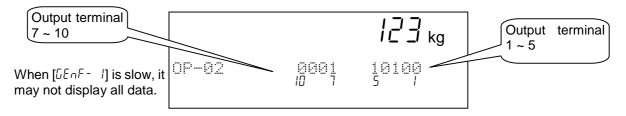
9.2.5. Monitoring the BCD Output of OP-01

□ The current BCD output data is displayed.



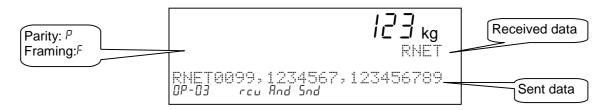
9.2.6. Monitoring the Relay Output of OP-02

The status of the current relay outputs is displayed.



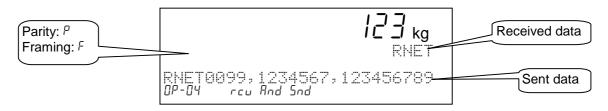
9.2.7. Monitoring the RS-422/485 Interface of OP-03

The current communication data is displayed.



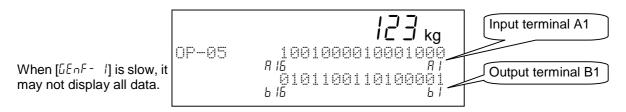
9.2.8. Monitoring the RS-232C Interface of OP-04

□ The current communication data is displayed.



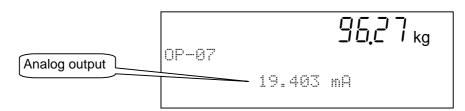
9.2.9. Monitoring the Parallel I/O of OP-05

□ The status of current parallel I/O is displayed.



9.2.10. Monitoring the Analog Output of OP-07

□ The current communication data is displayed.



Page 98 AD-4402

9.3. Test Mode

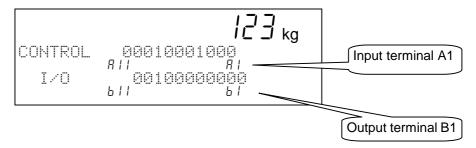
- The test mode is used to check the indicator and weighing system with a test signal.
- When the test mode is used, the weighing sequence is stopped.

Caution

□ The test mode outputs a test signal. Therfore, the devices connected to system are influenced and it may cause mis-operation.

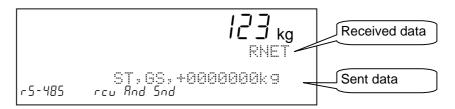
9.3.1. Testing the Control I/O Function

□ Tests the output of the I/O terminals. An active output of level "1" shifts for each terminal.



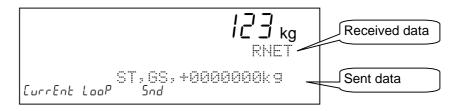
9.3.2. Testing the Built-in RS-485 Interface

□ When pressing the **ENTER** key each time, the test data "ST,GS,+0000000kg CR LF" is output.



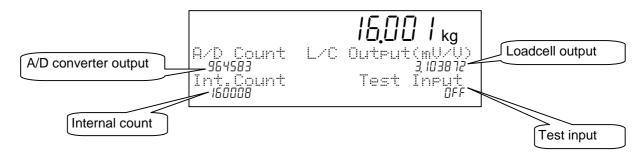
9.3.3. Testing the Built-in Current Loop Output

□ When pressing the **ENTER** key each time, the test data "ST,GS,+0000000kg CR LF" is output.



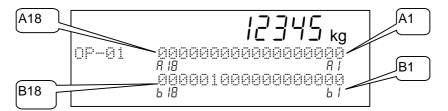
9.3.4. Testing the A/D Converter

- □ The A/D converter data is displayed.
- □ When pressing the **ENTER** key, a test voltage can be input to the A/D converter.



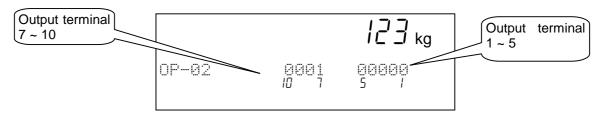
9.3.5. Testing the BCD Output of OP-01

Tests the output of the terminals. An active output of level "1" shifts for each terminal.



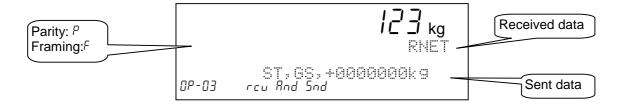
9.3.6. Testing the Relay Output of OP-02

□ Tests the output of the terminals. An active output of level "1" shifts for each terminal.



9.3.7. Testing the RS-422/485 Interface of OP-03

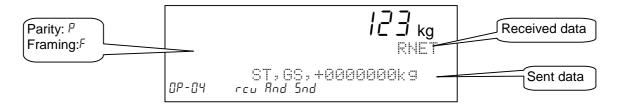
□ When pressing the **ENTER** key each time, the test data "ST,GS,+0000000kg CR LF" is output.



Page 100 AD-4402

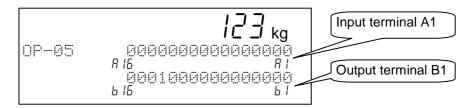
9.3.8. Testing the RS-232C Interface of OP-04

□ When pressing the **ENTER** key each time, the test data "ST,GS,+0000000kg CR LF" is output.



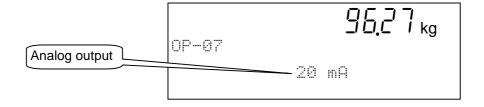
9.3.9. Testing the Parallel I/O of OP-05

□ Test the output of the terminals. An active output of level "1" shifts for each terminal.



9.3.10. Testing the Analog Output of OP-07

- □ When pressing the 1 key, the output current is increased.
- When pressing the 2 key, the output current is decreased.



9.4. Initializing Parameters

- □ This function initializes the parameters stored in the indicator.
- □ The parameters are stored in the flash memory and backup RAM.

Caution

- □ There are reset functions that require re-calibration of the indicator
- □ Note where the parameters are stored.

Kinds of intialization mode

Kinds of intialization	Description				
Initializing RAM	The backup RAM is reset. Zero point of the gross display, tare value zeroes.				
Initializing material code or recipe code	Material code and recipe code is reset.				
Initializing the function list	Resets parameters of the function list in flash memory.				
Initializing caribration data	Resets parameters of calibration data in flash memory. If this function is used, calibrate the indicator.				
Initializing all parameters	Resets all parameters, calibrate the indicator.s				

The location of the parameters and objects of initialization mode

						terial ode		cipe de		
			Zero	Tare	Material code	Total data	Recipe code	Total data	Function list	Calibration data
Backup RAM		0	0	0	0	0	0			
Location Flash memory		Flash memory			0		0		0	0
Initializing RAM		0	0							
Initializing material code or recipe code Initializing the function list Initializing caribration data				0	0	0	0			
Initializing the function list								0		
initializing caribration data									0	
Initializing all parameters		0	0	0	0	0	0	0	0	

Prucedure

Caution

- Do not initialize them while in operation. Cut off the power supply of other systems. When initializing the indicator, the output may change.
- □ When initializing the indicator, do not turn it off before it is reset.

To enter initialization

- Step 1 Press and hold the **ENTER** key and press the ** key to display the menu in a weighing mode.
- Step 2 Select the menu "Initialization" using the * key, ENTER key and ESC key. Category address: [Maintenance] [Initialization]

To enter initialization

Step 1 Select the menu initialization using the ** key, ENTER key and ESC key.

Menu: RAM / Code / Function / CAL / All

- Step 2 Select "yes" to initialize them using the + key, ENTER key.
- Step 3 Wait for the indicator to reset.

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9.5. Remote Operation

- □ This mode can read and write the parameters of the function list, data of the material code and recipe code and calibration data.
- □ The built-in RS-485, RS-422/485 (OP-03) or RS-232C (OP-04) is used for remote operation.
- □ It is necessary to install the **remote setup program** in the computer or controller before use. Refer to http://www.aandd.co.jp
- Refer to the instruction manual for details of the program.

Caution

Do not down load data during a weighing operation. Remove all connections to prevent an irregular operation. Maintain the power supply during the remote operation.

Entering the Remote Operation Mode

- Step 1 Press and hold the **ENTER** key and press the **★** key.
- Step 2 Press the ** key to select menu remote operation. And press the **ENTER** key.

Advise

The following RS-232C to RS-485 converter can be used. AD-7491, or other converters on the market.

Page 104 AD-4402



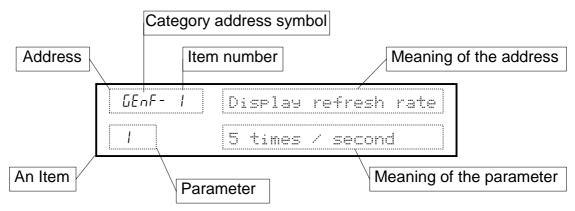
10. Function List

- □ The function list stores parameters to control the indicator.
- □ The parameters are stored in an item even without power supplied.
- □ An item is classified by a category address, and is further classified by an item number.
 - Refer to "10.1.2. Outline of the Function List".
- □ The category address has a symbol for the 7-segments display
- □ There are two kind of the function modes to operate the function list.
 - Parameter settings This mode is used to change the parameter.
 - Referring parameters This mode is used to refer the parameter in the

weighing sequence.

Example of an item:

Category address: [Function] - [Function setting] - [General] - [Weighing]



Caution

When entering Parameter settings of the function mode, the current weighing sequence is stopped.

10.1.1. **Operation Keys**

To enter the function list	Press and hold the ENTER key and press the * key in the weighing mode. Select the menu Function using the * key and the ENTER key.
To select the parameter address	The ‡ →, SHIFT + ‡ →, ENTER , ESC keys.
To change the parameter	The → , SHIFT + → , Alphanumerical , ENTER , ESC keys.
To store it and exit the function list (To return to weighing mode)	The ESC key.

10.1.2. Outline of the Function List

Category Address	Start Item		
unction	,		
Function reference			
General			
Weight	GEnF- I		
Sub display	Sub F I		
Other	othF- I		
Sequence			
Basic	59 F- I		
Control	59 F-11		
Timer	59 F-31		
Setroint (Comparison value)	59 F-51		
Total (Accumulation)	59 F-61		
Safety	59 F-71		
Co <u>ntrol I/O</u>			
Input	In F- I		
Outeut	Outf- I		
Se <u>rial interface</u>			
Current Loop	EL F- I		
RS-485	r5 F- 1		
Ortion			
Sloti			
Slot2	Refer to options below.		
Function setting			
The same as the "Function ref	erence".		

Options

<u> </u>	.101	13		
C	ateg	ory Address	Start Item	
OF	tic	on		·
	Sl	ot nn (nn: Slo	t number for th	ne option to be installed in)
		BCD output,	OP-01	0 F-
		Relay output,	OP-02	02 F- I
		RS-422/485,	OP-03	03 F- I
		RS-232C,	OP-04	04 F- I
		Parallel I/O,	OP-05	05 F- I
		Analog output,	OP-07	07 F- I

Page 106 AD-4402

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10.2. Referring Parameters

- Use this mode to refer to the parameter in the weighing sequence.
- □ The mode can change the parameters concerning the digital filter and weighing sequence timers in the weighing sequence.

```
[GEnF- 2] Digital filtering [Function] - [Function] - [Function setting] - [General] - [Weighing]

[GEnF- 3] Sampling frequency divisor [Function] - [Function setting] - [General] - [Weighing]

[59 F-3] to [59 F-48] Weighing sequence timers [Function] - [Function setting] - [Sequence] - [Timer]
```



10.3. Parameter Settings

- Use this mode to change the parameters.
- □ The weighing sequence and the I/O interfaces are stopped and closed during this mode.
- New parameters are effective after returning to the weighing mode.

10.4. Parameter List

Category address: [Function] - [Function setting] - [General] - [Weighing]

	less. [i dilection] = [i	runction setting) – [General] – [Wei		
Category		5	Range	D ()
address	Name	Descriptions	and	Default
symbol			choices	
GEnF- 1	Display refresh rate	1: Five times per second	1 to 2	2
000	Display Tellesi Tale	2: Ten times per second	1 10 2	_
		0: Not used Select 3dB band for two		
		1: 11 Hz low pass filters.		
		2: 8.0 Hz	0 to 99	
			0 10 99	
		3: 5.6 Hz A/D converter		
GEnF- 2	Digital filter	4: 4.0 Hz		4 8
	3	5: 2.8 Hz ▼		
		6: 2.0 Hz First filter		
		7: 1.4 Hz		
		8: 1.0 Hz Second filter		
		9: 0.7 Hz		
	Sampling	Use to decrease the cut-off frequency of	_	_
<u> </u>	frequency divider	the digital filter.	0 to 10	1
			0.0 to	
6Enf- 4	Stability detection	The detection condition concerning		1.0 s
	time	satblility.	9.9 s	
GEnF- 5	Stability detection	0.0 : stable at anytime.	0.0 to	2.0 d
00.111	band width		9.9 d	2.0 G
		The range to zero the gross display.		
GEnF- 6	Zero Range	Center of range is zero calibration.	0 to 30 %	5 %
	_	Unit: percentage of weighing capacity.		
		The function automatically traces the	0.0 to	
GEnF- 7	Zero tracking time	weighing deviation at nearly zero	9.9 s	0.0 s
	Zero tracking band	point and keeps zero display of gross	0.0 to	
GEnF- 8	_	1.		0.0 d
	width	display.	9.9 d	
	Tare and zero	When unstable weghing, whether zero		
GEnF- 9	compensation at	or tare command is used.	0 to 1	1
3	unstable status	0 :Disabled		•
	นารเลมเช รเลเนร	1 :Enabled		
		When negative weghing, whether tare		
	Tare at negative	command is used.		
GEnF - 10	GROSS weight	0 :Prohibit tare.	0 to 1	1
	J. COOO Worgin	1 :Permission to tare.		
' '	Dung of tour	Preset tare of material code	0.45.4	
6EnF-11	Preset tare	0 :Not used	0 to 1	1
		1:Use		
		1: If tare value of material code is zero,		
	Preset tare =0	the last tare value is used.	4 45 0	
GEnF - 12	choice	2: If tare value of material code is zero,	1 to 2	1
		Tare is set to zero.		
	<u> </u>			

Category address symbol	Name	Descriptions	Range and choices	Default
GEnF - 13	Clear mode at power ON	The action at turning the indicator on. First bit: Zero Second bit: Zero clear Third bit: Tare Fourth bit: Tare clear 0: Not used 1: Use	0000 to 1111	0000
GEnF-14	Hold function	1: Hold2: Hold at batch finish3: Hold at recipe finish	1 to 3	1

s : secondd: digit

Category address: [Function] - [Function setting] - [General] - [Sub-display]

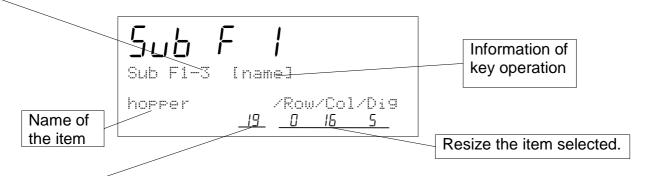
Category address symbol	Name	Descriptions	Range and choices	Default
5UbF - 1	Weighing display	D: Basic format Custom format	0 to 1	0

When custom format is used (When [5UbF-l][l]), set items to be displayed in the sub-display.

Item index number to be displayed. 32 items of name and number can be set in maximum.

Odd: Input the name of the selected item using alphanumeric characters.

Even: Input the number concerning the item.



Number	Name and Number to Display the Item	Row size	Columsize	Figures
0	Not displayed			
1	Material			
2	Hopper			
3	Final			
4	Free fall			
5	Preliminary			
6	Optional preliminary			
7	Over			
8	Under			
9	Zero Band			
10	Full (full filling)	0 to 3	0 to26	1 to12
11	Tare			
12	Supplementary flow open timer	0 10 3	0 1020	1 1012
13	Supplementary flow close timer			
14	Automatic Free Fall Compensation			
15	Internal reserved			
16	Internal reserved			
17	IDF at initial flow sequence			
18	MDF at initial flow sequence			
19	Total weight			
20	Total count			
21	Recipe , r [ad [
22	Total weight for recipe mode			
23	Total count for recipe mode			

Category address: [Function] - [Function setting] - [General] - [Sub-display]

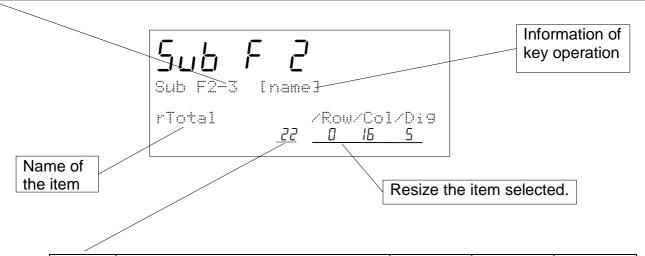
Category address symbol	Name	Descriptions	Range and choices	Default
5UbF- 2	Recipe display	Basic format Custom format	0 to 1	0

When custom format is used (When [5UbF - 2][l]), set items to be displayed in the sub-display.

Item index number to be displayed. 32 items of name and number can be set in maximum.

Odd: Input the name of the selected item using alphanumeric characters.

Even: Input the number concerning the item.



Number	Name and Number to Display the Item	Row size	Columsize	Figures
0	Not displayed			
22	22 Total weight for recipe mode		0 to26	1 to12
23 Total count for recipe mode		1		

Category address: [Function] - [Function setting] - [General] - [Sub-display]

Category address symbol	Name	Descriptions	Range and choices	Default
Sub F 1 Sub F 2	Refer to previous pa	ges.		
Sub F 3	Bar graph location	0: Hide 1: Upper side. 2: Lower side.	0 to 2	0
5ub F 4	Ratio of graph display	 Gross weight to capacity. Net weight to final value. 	0 to 2	1
5ub F S	Activity indicator	0: Off (Not used) 1: On (Use)	0 to 1	1

Category address: [Function] - [Function setting] - [General] - [Others]

caregor, aus		direction sections [etc.		
Category			Range	
address	Name	Descriptions	and	Default
symbol			choices	
oŁhF- l	Key lock	Set the action of each key. Bit 1: F1 key Bit 2: F2 key Bit 3: F3 key Bit 4: F4 key Bit 5: Code recall key Bit 6: Code set key Bit 7: Not defined Bit 8: Zero key Bit 9: Tare key Bit 10: Net / Gross key Bit 11: Not defined Bit 12: Off key O: Unlock 1: Lock	0000000 00000 to 1111111 11111	00000 00000 00

Category address symbol	Name	Descriptions	Range and choices	Default
othF- 2	F1 key function	 0: Not used 1: Display exchange (current weighing / recipe) 2: Manual print 3: Hold 4: Zero clear (to be zero) 5: Tare clear (to be zero) 6: Batch start 		
othF- 3	F2 key function	7: Recipe start 8: Discharge 9: Mixing 10: Pause 11: Internal reseved 12: Restart 13: Forced batch finish 14: Forced recipe finish	0 to 24	0
othF- 4	F3 key function	 15: Forced discharge finish 16: Total command 17: Manual free fall compensation 18: Cancel the last result 19: Error reset 20: Clear the total weight and count for each material code. 		
oŁhF- 5	F4 key function	21: Clear the total weight and count for each recipe code.22: Clear all total data for material codes.23: Clear all total data for recipe codes.24: Clear all total data of material code and recipe code.		
othF- 6	Parallel I/O Buzzer	Buzzer output is 2 s. Beep is 0.2 s used in Contolol I/O, OP-02, OP-05. Bit 1: Beep (Click sound) Bit 2: Over Bit 3: OK Bit 4: Under Bit 5: Zero band Bit 6: Bach finish Bit 7: Discharge finish Bit 8: Recipe finish Bit 9: Mixing finish Bit 10: Weighing sequence in process Bit 11: Full (Full filling) Bit 12: Stable condition Bit 13: Weighing sequence error Bit 14: Alarm 1 Bit 15: Alarm 2 Bit 16: Zero error O: Off (Not used: Open) 1: On (Use: Short or Open)	0000000 0000000 00 to 1111111 1111111	10000 00000 00000 0

Category address symbol	Name	Descriptions	Range and choices	Default
othF- 7	Tare Header	Use for the current loop output or RS-485 of serial interface. This parameter can not be used in command mode or stream mode. O: All tare header of tare is "TR" 1: Use "PT" for preset tare header and "T" of tare header	0 to 1	0
oŁhF- 8	Preset tare printing with net weight	Use for the current loop output or RS-485 interface at net display. This parameter can not be used in command mode or stream mode. O: No (Preset tare not output) 1: Yes (To output preset tare)	0 to 1	0
oŁhF- 9	Printing when unstable condition	Use for the current loop output or RS-485 interface at "out of range" or "unstable condition". 0: No 1: Yes	0 to 1	0
oŁhF- 10	Repeat lock	The function to avoid key operation error. Bit 0: Total Bit 1: Manual print operaton 0: Unlock 1: Lock (Cancel duplicated command input)	00 to 11	00
oŁhF-II	Save data	Select a backup method for material code and recipe code. 0: Store in RAM 1: Store in flash memory	1 to 2	1

Category address: [Function] - [Function setting] - [Sequence] - [Basic]

	ress. [i direction] [i	unction setting] - [sequence] - [b	<u>-</u>	1
Category address symbol	Name	Descriptions	Range and choices	Default
59 F- I	Weighing mode	 Customer programmed control mode Built-in automatic program mode 	1 to 2	2
59 F- 3	Loss-in-weigh	0: Normal batch weighing1: Loss-in-weigh2: External exchange	0 to 2	0
59 F- 4	Setpoint comparison	Comparison with internal count Comparison with display count	1 to 2	1
59 F- 5	Comparison	O: Always output Stable condition At batch finish	0 to 2	2
59 F- 7	Output of zero band	0: Gross <= Zero band 1: Gross <= Zero band	1 to 2	1
59 F- 8	Recipe mode	0: recipe sequence not used1: Semi-automatic mode2: Automatic mode	0 to 2	0
59 F- 9	Material code, free fall value	The selection to store free fall value on the automatic free fall compensation or realtime free fall compensation. O: No change Even if automatic free fall compensation is used, parameter of the free fall stored in the material code is not changed. 1: Change free fall value The result is stored in the parameter of the free fall in the material code.	0 to 1	0

Category address: [Function] - [Function setting] - [Sequence] - [Control]

caregory and	icss. [Fulletion]	i unction setting [sequence] [e	Ontrol	
Category address symbol	Name	Descriptions	Range and choices	Default
59 F-11	Batch start settings	Select an action at starting the weighing sequence. Bit 1: When loading it above zero band, start the sequence. Bit 2: Not used Bit 3: Automatic tare at the starting sequence 0: No (Does not work) 1: Yes (Works)	000 to 111	000
59 F-12	Nozzle control	Bit 1: Use nozzle control. "Nozzle down" operation signal is output at starting the sequence. Bit 2: Nozzle contact stop sequence Use start delay timer to prevent weighing error at touching the hopper. Bit 3: "Nozzle up" after compensate. 0: No (Not used) 1: Yes (Use)	000 to 111	000
59 F-13	Eval conditions	After dribble flow, select the stablility condition of comparison. Refer to Evaluation of Compare when time is up. 1: Stable and timer is up. 2: Stable or timer is up. Compare when weighing is stable or the time is up.	0 to 2	1

Page 116 AD-4402

Category address: [Function] - [Function setting] - [Sequence] - [Control]

category add	ress. [i unction] – [i	- [Cartion setting] - [Sequence] - [C	_	
Category			Range	
address	Name	Descriptions	and	Default
symbol		'	choices	
59 F- 14	Batch finish actions	Select an action at batch finish. Bit 1: Auto-start mixing	00 to	00
		0: No (Not used)		
		1: Yes (Use)		
59 F-15	Discharge finish actions	Select an action at discharge finish. Bit 1: Auto-clear tare (Clear tare automatically) Bit 2: Start mixing (Start mixing automatically)	00 to 11	00
		0: No (Not used)		
		1: Yes (Use)		
59 F-16	Recipe start actions	Selection of re-zeroing at recipe start. 0: No (Not used) 1: Yes (Use)	0 to 1	1
59 F-17	Recipe finish actions	Select an action at recipe finish. Bit 1: Auto-clear tare	000 to 111	000
		1: Yes (Use)		
59 F-18	Maximum number of compensation	Set the number of compensation flow. When 0 is set, there is no flow.	0 to 255	0
59 F-19	Comparison flow Eval	Set the condition with compensation close timer and stability. 0: Timer is up Comparison when compensation close timer is up. 1: Stable and timer is up. Comparison after stable mark and compensation close timer is up. 2: Stable or timer is up. Comparison after stable mark or compensation close timer is up.	0 to 2	0
59 F-20	Free fall compensation	O: No (Not used) 1: Average of last four free fall times. 2: Real time free fall compensation	0 to 2	0

Category address symbol	Name	Descriptions	Range and choices	Default
59 F-21	Batch finish output off	O: Off at next start (Turning off until next start) 1: Off at over or unstable. (Turning off when "out of range" or "unstable condition") 2: Off at zero band. (Turning off at zero band)	0 to 2	0

Category address: [Function] - [Function setting] - [Sequence] - [Timer]

Category address symbol	Name	Descriptions	Range and choices	Default
59 F-31	Batch monitoring timer	Set the upper limit of the time of sequence. If the sequence is not finnished, sequence error SQ = ERR4 is displayed. If 0 is set, the timer does not work.	0 to 65535 s	0 s
59 F-32	Batch start delay timer	Set the delay time between start operation and the flow start	0.0 to 65535 s	0.0 s
59 F-33	Full flow comparison interrupt timer	The timer to prevent weighing error due to vibration of open/close operation. While the timer is not up, the	0.0 to 25.5 s	0.0 s
59 F-34	Medium flow comparison interrupt timer	comparison does not work.	0.0 to 25.5 s	0.0 s
59 F-35	Dribble flow comparison interrupt timer		0.0 to 25.5 s	0.0 s
59 F-36	Dribble flow auto- Free Fall override	Set the time until the dribble flow can start. Use to prevent compensation error of automatic free fall compensation or real time free fall compensation.	0.0 to 25.5 s	3.0 s
59 F-37	Eval delay timer	Set the time between closing dribble flow and comparing the result. Refer to Eval conditions [59 F-13]	0.1to 25.5 s	0.1 s
59 F-38	Discharge start delay timer	Set the time between operating discharge start and opening the discahrge gate	0.0 to 25.5 s	0.0 s

Category address symbol	Name	Descriptions	Range and choices	Default
59 F-39	Discharge monitoring timer	Set the time limit to discarge it When time is up and displayed value is not zero band, sequence error SQ.ERRS is displayed. If 0 is set, the timer does not work.	0 to 65535 s	0 s
59 F-40	Discharge gate close delay timer	Set the waiting time from reaching to zero band to closing discharge gate for gross.	0.1 to 25.5 s	0.1 s
59 F-43	Batch finish output on	Set the active (ON) time of the batch finish signal. If 0 is set, output is kept until next sequence.	0.00 to 2.55 s	0.00 s
59 F-44	Discharge finish output on	Set the active (ON) time of the ON for the discharge signal.	0.00 to 2.55 s	0.00 s
59 F-45	Recipe finish output on	Set the active (ON) time of the ON for the recipe finish signal.	0.00 to 2.55 s	0.00 s
59 F-46	Mixing finish output on	Set the active (ON) time of the ON for the mixing finish signal.	0.00 to 2.55 s	0.00 s
59 F-47	Mixing time output on	Set the active (ON) time of the ON for the mixing time signal.	0 to 255 s	0 s
59 F-48	Averaging Eval time	Set the time to average the result. This time controls precision of the result. Refer to Eval delay timer [59 F-37] and Eval conditions [59 F-13].	00.0 to 2.55 s	0.00 s

s: second d: digit

Category address: [Function] - [Function setting] - [Sequence] - [Setpoint]

Calegory add	ress. [Function] - [r	-unction setting] - [sequence] - [se	ιροπι	
Category address symbol	Name	Descriptions	Range and choices	Default
59 F-51	Code recall method	Key operation (including serial interface, field bus) Parallel interface (Digital switch) External switch	1 to 3	1
59 F-53	Hide elements of material code	Select the parameter to hide of material code. Bit 1: Free fall Bit 2: Preliminary Bit 3: Optional preliminary Bit 4: Over Bit 5: Under Bit 6: Zero band Bit 7: Full Bit 8: Tare Bit 9: Compensation flow open timer Bit 10: Compensation flow close timer Bit 11: AFFC range Bit 12: Initial dribble flow Bit 13: Initial dribble flow 0: Show 1: Hide	0000000 000000 to 1111111 111111	00000 00000 000
59 F-55	Add Final value and zero band	0: No (Not added) 1: Yes (Add)	0 to 1	1
59 F-56	Add Final value and Full value	0: No (Not added) 1: Yes (Add)	0 to 1	1

Category address: [Function] - [Function setting] - [Sequence] - [Total]

category address. [runction] = [runction setting] = [sequence] = [rotal]					
Category address symbol	Name	Descriptions	Range and choices	Default	
59 F-61	Automaic material code total	Not totaled automatically Auto-total OK results To total OK result automatically Auto-total all results To total all result automatically	0 to 2	0	
59 F-62	Automaic recipe code total	0: No (Not totaled) 1: Yes (Total the result)	0 to 1	0	

Page 120 AD-4402

Category address: [Function] - [Function setting] - [Sequence] - [Safety]

Default d to the copped				
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opped				
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100000				
essage				
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Bit 4: Safety input 4				
Bit 5: Safety input 5				
Bit 6: Safety input 6 Bit 7: Safety input 7				
Bit 8: Safety input 8				
00000				
000				

Category address: [Function] - [Function setting] - [Control I/O Function] - [Input]

The list to assign the function for the input terminal of the I/O

No.Function descriptionReadNo.Function description0No function-26Clear totals of active recode1ZeroEdge27Clear totals of all reciped2Zero clearEdge28Safety check input 13TareEdge29Safety check input 24Tare clearEdge30Safety check input 35Batch startEdge31Safety check input 46Recipe startEdge32Safety check input 57Discharge startEdge33Safety check input 68MixtingEdge34Safety check input 7External switch controlLevel35Safety check input 890: Normal bach 1: Loss-in-weighLevel35Safety check input 810Manual free fall compensationEdge36Forced batch finish11Total commandEdge37Forced recipe finish12Cancel the last resultEdge38Forced discharge finish	ecipe Edge
1 Zero Edge 27 Clear totals of all recip 2 Zero clear Edge 28 Safety check input 1 3 Tare Edge 29 Safety check input 2 4 Tare clear Edge 30 Safety check input 3 5 Batch start Edge 31 Safety check input 4 6 Recipe start Edge 32 Safety check input 5 7 Discharge start Edge 33 Safety check input 6 8 Mixting Edge 34 Safety check input 6 8 Mixting Edge 34 Safety check input 7 External switch control Level 35 Safety check input 8 9 0: Normal bach 1: Loss-in-weigh 10 Manual free fall compensation Edge 36 Forced batch finish 11 Total command Edge 37 Forced recipe finish	Level
1ZeroEdge27Clear totals of all recip2Zero clearEdge28Safety check input 13TareEdge29Safety check input 24Tare clearEdge30Safety check input 35Batch startEdge31Safety check input 46Recipe startEdge32Safety check input 57Discharge startEdge33Safety check input 68MixtingEdge34Safety check input 7External switch controlLevel35Safety check input 890: Normal bach 1: Loss-in-weighLevel36Forced batch finish10Manual free fall compensationEdge36Forced recipe finish	Level Level Level Level Level Level
2Zero clearEdge28Safety check input 13TareEdge29Safety check input 24Tare clearEdge30Safety check input 35Batch startEdge31Safety check input 46Recipe startEdge32Safety check input 57Discharge startEdge33Safety check input 68MixtingEdge34Safety check input 7External switch controlLevel35Safety check input 890: Normal bach 1: Loss-in-weighLevel36Forced batch finish10Manual free fall compensationEdge36Forced recipe finish11Total commandEdge37Forced recipe finish	Level Level Level Level Level Level
3 Tare Edge 29 Safety check input 2 4 Tare clear Edge 30 Safety check input 3 5 Batch start Edge 31 Safety check input 4 6 Recipe start Edge 32 Safety check input 5 7 Discharge start Edge 33 Safety check input 6 8 Mixting Edge 34 Safety check input 7 External switch control Level 35 Safety check input 8 9 0: Normal bach 1: Loss-in-weigh 10 Manual free fall compensation Edge 36 Forced batch finish 11 Total command Edge 37 Forced recipe finish	Level Level Level Level Level
4 Tare clear Edge 30 Safety check input 3 5 Batch start Edge 31 Safety check input 4 6 Recipe start Edge 32 Safety check input 5 7 Discharge start Edge 33 Safety check input 6 8 Mixting Edge 34 Safety check input 7 External switch control Level 35 Safety check input 8 9 0: Normal bach 1: Loss-in-weigh 10 Manual free fall compensation Edge 36 Forced batch finish 11 Total command Edge 37 Forced recipe finish	Level Level Level
5 Batch start Edge 31 Safety check input 4 6 Recipe start Edge 32 Safety check input 5 7 Discharge start Edge 33 Safety check input 6 8 Mixting Edge 34 Safety check input 7 External switch control Level 35 Safety check input 8 9 0: Normal bach 1: Loss-in-weigh Edge 36 Forced batch finish 11 Total command Edge 37 Forced recipe finish	Level Level Level
6 Recipe start Edge 32 Safety check input 5 7 Discharge start Edge 33 Safety check input 6 8 Mixting Edge 34 Safety check input 7 External switch control Level 35 Safety check input 8 9 0: Normal bach 1: Loss-in-weigh Edge 36 Forced batch finish 11 Total command Edge 37 Forced recipe finish	Level Level
7 Discharge start Edge 33 Safety check input 6 8 Mixting Edge 34 Safety check input 7 External switch control Level 35 Safety check input 8 9 0: Normal bach 1: Loss-in-weigh Edge 36 Forced batch finish 11 Total command Edge 37 Forced recipe finish	Level
8 Mixting Edge 34 Safety check input 7 External switch control Level 35 Safety check input 8 9 0: Normal bach 1: Loss-in-weigh 10 Manual free fall compensation Edge 36 Forced batch finish 11 Total command Edge 37 Forced recipe finish	
External switch control 9	Level
9 0: Normal bach 1: Loss-in-weigh 10 Manual free fall compensation Edge 36 Forced batch finish 11 Total command Edge 37 Forced recipe finish	
1: Loss-in-weighEdge36Forced batch finish10Manual free fall compensationEdge37Forced recipe finish11Total commandEdge37Forced recipe finish	Level
10Manual free fall compensationEdge36Forced batch finish11Total commandEdge37Forced recipe finish	
11 Total command Edge 37 Forced recipe finish	
	Edge
12 Cancel the last result Edge 38 Forced discharge finish	Edge
	h Edge
13 Emergency stop Level 39 Manual full flow	Level
14 Material / Recipe code, BCD 1 Level 40 Manual medium flow	Level
15 Material / Recipe code, BCD 2 Level 41 Manual dribble flow	Level
16 Material / Recipe code, Level 42 Manual discharge BCD 4	Level
17 Material / Recipe code, Level 43 Manual mixing BCD 8	Level
18 Material / Recipe code, Level 44 Error reset BCD 10	Edge
19 Material / Recipe code, Level 45 Hold BCD 20	Level
20 Material / Recipe code, Level 46 Key unlock BCD 40	Level
21 Material / Recipe code, BCD 80 Level 47 Manual print command	d Edge
22 Pause Edge 48 Code recall external switch OFF: key, ON: digital	
23 Restart Edge 49 Recipe interrupt	Level
Clear totals of active material Edge 50 Net / gross code	Edge
25 Clear totals of all material code Edge	

Page 122 AD-4402

Input terminals of the I/O and default functions

	111111111111111111111111111111111111111	arra acra		
Category address symbol	Terminal na	ıme	Default choices	Defau It No.
In F- I	Input terminal	A1	Zero	1
In F- 2	Input terminal	A2	Tare	3
In F- 3	Input terminal	A3	Tare clear	4
In F- Y	Input terminal	A4	Batch start	5
In F- 5	Input terminal	A5	Emergency stop	13
In F- 6	Input terminal	A6	Material / Recipe code, BCD 1	14
In F- 7	Input terminal	A7	Material / Recipe code, BCD 2	15
In F- 8	Input terminal	A8	Material / Recipe code, BCD 4	16
In F- 9	Input terminal	A9	Pause	22
In F-10	Input terminal A	\10	Restart	23
In F-11	Input terminal A	\11	Error reset	44

Category address: [Function] - [Function setting] - [Control I/O Function] - [Output]

The list to assign the function for the output terminal of the I/O

	ne list to assign the function i	1	•		
No.	Function description	No.	Function description	No.	Function description
0	No function	30	Gross display	60	Material hopper 2 DF
1	Stable	31	Net display	61	Material hopper 3 FF
2	Zero band	32	During hold	62	Material hopper 3 MF
3	Full (Full filling)	33	Internal reservation	63	Material hopper 3 DF
4	Full flow	34	Internal reservation	64	Material hopper 4 FF
5	Medium flow	35	Material hopper 1	65	Material hopper 4 MF
6	Dribble flow	36	Material hopper 2	66	Material hopper 4 DF
7	Over	37	Material hopper 3	67	Material hopper 5 FF
8	OK	38	Material hopper 4	68	Material hopper 5 MF
9	Under	39	Material hopper 5	69	Material hopper 5 DF
10	Internal reservation	40	Material hopper 6	70	Material hopper 6 FF
11	Internal reservation	41	Material hopper 7	71	Material hopper 6 MF
12	Mixing	42	Material hopper 8	72	Material hopper 6 DF
13	Discharge (Open the dscharge gate)	43	Material hopper 9	73	Material hopper 7 FF
14	Batch finish	44	Material hopper 10	74	Material hopper 7 MF
15	Recipe finish	45	Material hopper 11	75	Material hopper 7 DF
16	Discharge finish	46	Material hopper 12	76	Material hopper 8 FF
17	Mixing finish	47	Material hopper 13	77	Material hopper 8 MF
18	Nozzle down	48	Material hopper 14	78	Material hopper 8 DF
	Online. If sequence is	49	Material hopper 15	79	Material hopper 9 FF
19	enabled, 0.5 sec. pulse is				
	output.				
20	Weighing sequence in	50	Material hopper 16	80	Material hopper 9 MF
20	process				
	Input acknowledge.	51	Material hopper 17	81	Material hopper 9 DF
21	If there is a input signal, 0.5				
	sec. pulse is output.				
22	Weighing sequence error	52	Material hopper 18	82	Material hopper10 FF
23	Alram 1	53	Material hopper 19	83	Material hopper10 MF
24	Alram 2	54	Material hopper 20	84	Material hopper10 DF
25	Zero error	55	Material hopper 1 FF		
26	Capacity exceeded	56	Material hopper 1 MF		
20	(Out of range)				
27	Buzzer	57	Material hopper 1 DF		
28	During tare	58	Material hopper 2 FF		
29	Center of zero	59	Material hopper 2 MF		

Full flow: FF
Medium flow: MF
Dribble flow: DF

Page 124 AD-4402

Output terminals of the I/O and default functions

Category address symbol	Terminal name	Default choices	Defau It No.
Outf- 1	Output terminal B1	Zero band	2
Outf- 2	Output terminal B2	Full flow	4
Outf- 3	Output terminal B3	Medium flow	5
Outf- 4	Output terminal B4	Dribble flow	6
Outf- S	Output terminal B5	Over	7
OutF- 6	Output terminal B6	OK	8
Outf- 7	Output terminal B7	Under	9
Outf-8	Output terminal B8	Batch finish	14
Outf- 9	Output terminal B9	Weighing sequence error	22
Out F - 10	Output terminal B10	Alarm 1	23
Out F - 11	Output terminal B11	Alarm 2	24

Category address: [Function] - [Function setting] - [Serial] - [RS-485]

Category aud	ress. [Function] = [<u> -Function_setting] </u>	[כפ	1
Category			Range	
address	Name	Descriptions	and	Default
symbol		'	choices	
r5 F- I	Output data	When jet stream mode of communication mode [r 5 F - 2] is used, 1, 2 or 3 can be selected. And if freeze mode is used in jet stream mode, output is stoped. 1: Displayed value 2: Gross value 3: Net value 4: Tare value 5: Gross value/ Net value/ Tare value 6: Displayed value with material code 7: Gross value with material code 8: Net value with material code 9: Tare value with material code 10: Gross value/ Net value/ Tare value	1 to 10	1
r5 F- 2	Communication mode	with material code 1: Stream mode 2: Auto print mode 3: Manual print mode 4: Print at total 5: Jet stream mode 6: Command mode	1 to 6	6
r5 F- 3	Baud rate	1: 600 bps 2: 1200 bps 3: 2400 bps 4: 4800 bps 5: 9600 bps 6: 19200 bps 7: 38400 bps (command mode can not be selected)	1 to 7	5
r5 F- 4	Parity check	0: Not used 1: Odd 2: Even	0 to 2	0
r5 F- 5	Character length	7: 7 bits 8: 8 bits	7, 8	8
r5 F- 6	Stop bits	1: 1 bit 2: 2:bits	1 to 2	1
r5 F- 7	Terminator	1: CR	1 to 2	2
r5 F- 8	Address	0: Address not used 1 to 99: Address used	0 to 99	0
-5 F- 9	Response timer	Set the waiting timer from receiving command to transmitting a response.	0.0 to 25.5 s	0.0 s

Category address: [Function] - [Function setting] - [Serial] - [Current loop]

category add	icss. [i direction] [i direction secting [serial] [earre	int loop]	
Category address symbol	Name	Descriptions	Range and choices	Default
EL F- I	Output data	 Displayed value Gross value Net value Tare value Gross value/ Net value/ Tare value Displayed value with material code Gross value with material code Net value with material code Tare value with material code Gross value/ Net value/ Tare value with material code 	1 to 10	1
CL F- 2	Communication mode	 Stream mode Auto print mode Manual print mode Print at total Jet Stream mode 	1 to 4	1
[L F- 3	Baud rate	1: 600 bps 2: 1200 bps 3: 2400 bps	1 to 3	3
[L F- 4	Burst rate of continuous output	Set the burst time when gross, net or tare is output continuously. Stream mode uses 0.0 s .	0.00 to 2.55 s	0.00 s

s: Second

Category address: [Function] - [Function setting] - [Option] - [slotn] - [OP-01]

OP-01: Option BCD Output

slot n : slot number

Category address symbol	Name	Descriptions	Range and choices	Default
0 F-	Out put data	 Displayed value Gross value Net value Tare value Current material code total Current material code total # Current recipe code total Current recipe code total # Current material code and recipe code Error alarm No. 	1 to 10	1
0 F- 3	Communication mode	 Stream mode Auto print mode Manual print mode Print at total Jet stream mode (each sampling) 	1 to 5	1
01F-4	Output logic	Positive logic Negative logic	1 to 2	2

Page 128 AD-4402

Category address: [Function] - [Function setting] - [Option] - [slotn] - [OP-02]

OP-02: Option Output Relay Output

slot n : slot number

Category					Range	
address	Name		Desc	riptions	and	Default
symbol					choices	
02 F- I	Output terminal	1	Material hopper 1	Medium flow	0 to 84	56
02 F- 2	Output terminal	2	Material hopper1	Dribble flow	0 to 84	57
02 F- 3	Output terminal	3	Material hopper 2	Medium flow	0 to 84	59
02 F- 4	Output terminal	4	Material hopper 2	Dribble flow	0 to 84	60
02 F- 5	Output terminal	5	Material hopper 3	Medium flow	0 to 84	62
02 F- 7	Output terminal	7	Material hopper 3	Dribble flow	0 to 84	63
02 F- 8	Output terminal	8	Material hopper 4	Medium flow	0 to 84	65
02 F- 9	Output terminal	9	Material hopper 4	Dribble flow	0 to 84	66
02 F-10	Output terminal	10	Material hopper 5	Medium flow	0 to 84	69

Default parameters are set to double gates hopper

Category address: [Function] – [Function setting] – [Option] – [slotn] – [OP–03] or [Function] – [Function setting] – [Option] – [slotn] – [OP–04]

OP-03: Option RS-422 / 485 Serial Interface

OP-04: Option RS-232C Serial Interface

slot n : slot number

	T		slot n : slot	number
Category address symbol	Name	Descriptions	Range and choices	Default
03 F- I 04 F- I	Output data	When jet stream mode of coummnication mode [r 5 F - 2] is used, 1, 2 or 3 can be selected. And if freeze mode is used in jet stream mode, output is stoped. 1: Displayed value 2: Gross value 3: Net value 4: Tare value 5: Gross value/ Net value/ Tare value 6: Displayed value with material code 7: Gross value with material code 8: Net value with material code 9: Tare value with material code 10: Gross value/ Net value/ Tare value with material code	1 to 10	1
03 F- 2 04 F- 2	Communication mode	 Stream mode Auto print mode Manual print mode Print at total Jet stream mode Command mode 	1 to 6	6
03 F- 3 04 F- 3	Baud rate	1: 600 bps 2: 1200 bps 3: 2400 bps 4: 4800 bps 5: 9600 bps 6: 19200 bps 7: 38400 bps (Command mode can not be selected)	1 to 7	5
03 F- 4 04 F- 4	Parity check	0: Not used 1: Odd 2: Even	0 to 2	0
03 F- S 04 F- S	Charactor length	7: 7 bits 8: 8 bits	7, 8	8
03 F- 6 04 F- 6	Stop bits	1: 1 bit 2: 2:bits	1 to 2	1
03 F- 7	Terminator	1: CR CR: 0Dh	1 to 2	2

Category address symbol	Name	Descriptions	Range and choices	Default
04 F- 7		2: CR LF LF: 0Ah		
03 F- 8 04 F- 8	Address	0: Address is not used 1 to 99: Address is used	0 to 99	0
03 F- 9	Response timer	Set the waiting timer from receiving command to transmitting a response.	0.00 to 2.55 s	0.00 s
03 F-II	RS-422 / 485 switch	1: RS-422 2: RS-485	1 to 2	1

Category address: [Function] - [Function setting] - [Option] - [slotn] - [OP-05]

OP-05: Option Parallel input / output

slot n : slot number

Category				Range	
address	Name		Descriptions	and	Default
symbol				choices	
05 F- I	Input terminal	A1		0 to 50	0
OS F- 2	Input terminal	A2	Set the number of the function.	0 to 50	0
OS F- 3	Input terminal	АЗ		0 to 50	0
05 F- Y	Input terminal	A4	Caution	0 to 50	0
05 F- 5	Input terminal	A5	Avoid selecting the same function	0 to 50	0
05 F- 6	Input terminal	A6	for multiple terminals and keys.	0 to 50	0
05 F- 7	Input terminal	A7		0 to 50	0
05 F- 8	Input terminal	A8		0 to 50	0
05 F- 9	Input terminal	A9		0 to 50	0
05 F-10	Input terminal	A10		0 to 50	0
05 F-II	Input terminal	A11		0 to 50	0
OS F-12	Input terminal	A12		0 to 50	0
OS F-13	Input terminal	A13		0 to 50	0
05 F-14	Input terminal	A14		0 to 50	0
05 F-15	Input terminal	A15		0 to 50	0
OS F-16	Input terminal	A16		0 to 50	0

	1				1	1
Category					Range	
address	Name		Desci	riptions	and	Default
symbol					choices	
05 F-17	Input terminal	B1	Material hopper 1	Medium flow	0 to 84	56
OS F-18	Input terminal	B2	Material hopper 1	Dribble flow	0 to 84	57
05 F-19	Input terminal	В3	Material hopper 2	Medium flow	0 to 84	59
05 F-20	Input terminal	B4	Material hopper 2	Dribble flow	0 to 84	60
05 F-21	Input terminal	B5	Material hopper 3	Medium flow	0 to 84	62
OS F-22	Input terminal	B6	Material hopper 3	Dribble flow	0 to 84	63
OS F-23	Input terminal	B7	Material hopper 4	Medium flow	0 to 84	65
05 F-24	Input terminal	B8	Material hopper 4	Dribble flow	0 to 84	66
OS F-25	Input terminal	B9	Material hopper 5	Medium flow	0 to 84	68
OS F-26	Input terminal	B10	Material hopper 5	Dribble flow	0 to 50	69
05 F-27	Input terminal	B11	Material hopper 6	Medium flow	0 to 50	71
OS F-28	Input terminal	B12	Material hopper 6	Dribble flow	0 to 50	72
OS F-29	Input terminal	B13	Material hopper 7	Medium flow	0 to 50	74
05 F-30	Input terminal	B14	Material hopper 7	Dribble flow	0 to 50	75
05 F-31	Input terminal	B15	Material hopper 8	Medium flow	0 to 50	77
OS F-32	Input terminal	B16	Material hopper 8	Dribble flow	0 to 50	78

Page 132 AD-4402

Category address: [Function] - [Function setting] - [Option] - [slotn] - [OP-07]

OP-07: Option Analog Output

slot n : slot number

Category address symbol	Name	Descriptions	Range and choices	Default
07 F- I	Out put data	 Displayed value Gross value Net value 	1 to 3	1
07 F- 2	Weight at 4 mA	Set the weight value when 4 mA is output.	-999999 to 9999999	0
07 F- 3	Weight at 20 mA	Set the weight value when 20 mA is output.	-999999 to 9999999	16000

11. Specifications

General

Power supply 85 to 250 VAC, 50 or 60Hz, (Stable power source)

Power consumption Approximately 30 VA

Physical dimensions 192 (W) x 96 (H) x 135 (D) mm

Weight Approximately 1.8 kg

Panel cutout size $186 \times 92 \text{ mm}$ Operation temperature $-5 \text{ }^{\circ}\text{C}$ to $40 \text{ }^{\circ}\text{C}$

Battery life of backup RAM typ. 10 years at 25 °C. 5 years at 40 °C.

Analog to Digital Unit

Input sensitivity Up to 0.3 μ V / digit

Zero adjustment range 0 to 2 mV /V (0 to 20 mV) Measuerment range 0 to 3.2 mV /V (0 to 32 mV)

Input impedance $10 \text{ M}\Omega$

Loadcell excitation voltage 10 V DC ±5%

Maximum loadcells 8 pieces in parallel with 350Ω loadcell

Span temperature coefficient 8 ppm/ ℃

Zero temperature coefficient $0.2 \mu V + 8 ppm/ ^{\circ}C$ of dead load typ.

 $\begin{array}{lll} \mbox{Non-linearity} & 0.01 \mbox{ \% of F. S.} \\ \mbox{Input noise} & \mbox{Below} \ {}^\pm\!0.3 \ \mu\mbox{Vp-p} \\ \mbox{A/D conversion} & \Delta\mbox{-}\Sigma \mbox{ conversion} \end{array}$

A/D resolution Approximately 1/1,000,000

Maximum display 16000 (to be able cancel limitation)

Sampling rate 100 times per second

Digital span function Loadcell offset, calibration using key operation to enter

the sensitivity, resolution 1/1000

Re-calibration at A/D board replacement

Omissible (resolution 1/500)

Backup method A/D data: EEPROM

Calibration: Flash memory Function: Flash memory

Material code data: Backup RAM or flash memory Recipe code data Backup RAM or flash memory

Display

Main display Fluorescent display, cobalt blue, height: 18mm, 7seg., 7 figures

Sub-display Fluorescent display, cobalt blue, height: 5mm,

7seg., 54 figures and 5x7 dots, 54 figures

State indicator
Unit indicator
Symbols

Fluorescent display, cobalt blue, 8△ pieces, 10 symbols, 5x7 dots
Fluorescent display, cobalt blue, height: 11mm, 5x7 dots, 2 figures
Fluorescent display, cobalt blue, height: 11mm, 5x7 dots, 2 figures

Page 134 AD-4402

Weighing

Weighing mode Built-in automatic program mode:

Normal batch weighing, loss-in-weigh

Customer program control mode:

Normal batch weighing, loss-in-weigh

Elements of built-in automatic program mode

Compensation Sequence Initial flow sequence Discharge Sequence Recipe Sequence

Automatic Selection of Supplying Hopper Nozzle Control Sequence (vacuum cleaner)

Mixing Sequence Safety Check Function Pause and Emergency Stop

Restart Sequence

Automatic Free Fall Compensation Real Time Free Fall Compensation

Code data

Max. number of material codes 100 codes

Elements of the material code Name, hopper No., Final value, free fall, preliminary,

optional preliminary, over, under, total count, total weight,

tare value, compensation open timer, compensation

close timer

Max. number of recipe code 100 codes

Elements of the recipe code Name, material codes (max. 10, in mixing order), total

count, total weight

Connectors and interfaces

Power supply terminal, Loadcell terminal, Standard I/O terminal, Standard RS-485 interface, Current loop, keys and display

Standard I/O terminal

Refer to "8.1. Control I/O Function".

Standard RS-485 interface

Refer to "8.2. Built-in RS-485 Interface".

Current loop

Refer to "8.3. Built-in Current Loop Output".

BCD Output of Option OP-01

Refer to "8.4. BCD Output of Option, OP-01".

Relay Output of Option OP-02

Refer to "8.5. Relay Output of Option OP-02".

RS-422/485 Interface of Option OP-03

Refer to "8.6. RS-422/485 Interface of Option OP-03".

RS-232C Interface of Option OP-04

Refer to "8.7. RS-232C Interface of Option OP-04".

Parallel I/O of Option OP-05

Refer to "8.8. Parallel I/O of Option OP-05".

Analog Output of Option OP-07

Refer to "8.9. Analog Output of Option OP-07".

CC Link interface of Option OP-20

Refer to OP-20 instruction manual regarding the details.

DeviceNet interface of Option OP-21

Refer to OP-21 instruction manual regarding the details.

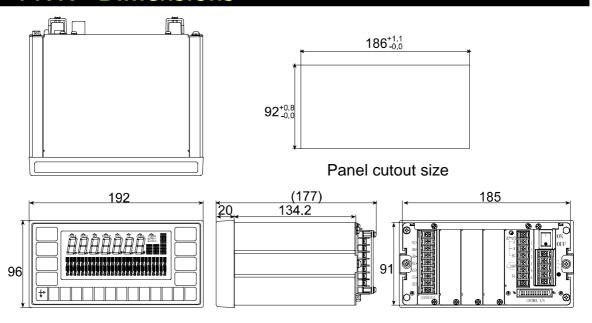
PROFIBUS interface of Option OP-22

Refer to OP-22 instruction manual regarding the details.

Page 136 AD-4402



11.1. Dimensions



X

11.2. Accessories

Capacity label	1
I/O connector	1
I/O connector cover	1
RS-485, terminator resistor 100 Ω	1
Cover of power supply terminal	1
Cover of RS-485 and current loop	
Cover of loadcell teminal	1
Rubber packing for mounting to panel	1



12. References



12.1. Abbreviations

optional

#	counts	OPP1m	Optional Preliminary
#Tot	total count	P I/O	parallel I/O
ØBand	zero band	Plm	Preliminary
ØT	tare is not used	PLC	programmable logic controller unit
ADC	Analog to digital converter	PT	preset tare
AFFC	active free fall compensation	RTot	recipe total
Brate	baud rate	RTot#	recipe total count
CZ	center of zero	SF	supplemental flow (compensation
d	division		flow)
DFlow	dribble flow	SFOT	Supplementary Flow Open Timer
Eval	evaluation, (criteria)	SFCT	Supplementary Flow Close Timer
FFall	free fall	T	tare
FFlow	full flow	TC .	Tare clear
FNC	function	RTot RTot#	recipe total recipe total count
GS	gross	SF	supplemental flow (compensation
Нор.	Hopper		flow)
I/O	input / output	SFOT	Supplementary Flow Open Timer Supplementary Flow Close Timer
IDF	initial dribble flow	SFCT T	tare
IFF	initial medium flow	ŤC	Tare clear
<u></u>	loadcell	Tot	Total Weight
LC	loadcell	Tot# TR	Total Count tare
MCode	material code	w/	with
MFlow	medium flow	w/Ø	with zero
Neg	negative	WGT WGTTot	weight weight total
NT	net	ZR	zero
NWT	net weight		

Page 138 AD-4402



12.2. ASCII Code for AD-4402

These characters are special code for the name of material code and recipe code. Therefor, some characters are not the same as U.S. code.

				L	ower b	its			
		0	1	2	3	4	5	6	7
	0			Space	0	@	Р	Space	р
	1			!	1	Α	Q	а	q
	2			II .	2	В	R	b	r
	3			#	3	С	S	С	S
	4			\$	4	D	Τ	d	t
	5			%	5	Е	כ	е	u
	6			&	6	F	V	f	V
Linnar bita	7			1	7	G	W	g	W
Upper bits	8			(8	Н	Χ	h	Х
	9)	9	I	Υ	i	У
	Α	LF		*	:	J	Z	j	Z
	В			+	,	K	[k	{
	С			,	<	L	¥	I	
	D	CR		-	II	М]	m	}
	Е				^	N	٨	n	
	F			/	?	0		0	0



₹ 12.3. Index

#138
#Tot138
[Control I/O] - [Input]122
[Control I/O] - [Output]124
[General] - [Others]112
[General] - [Sub-display]110
[General] - [Weighing]108
[OP-01]128
[OP-02]129
[OP-03]
[OP-04]
[OP-05]
[OP-07]
[Sequence] - [Basic]115
[Sequence] - [Control]
[Sequence] - [Safety]
[Sequence] - [Setpoint]
[Sequence] - [Timer]
[Sequence] - [Total]120
[Serial] - [Current loop]127
[Serial] - [RS-485]126
+
, CURSOR key8
CODE RECALL
, CODE RECALL key17
ENTER key
ENTER key
ESC
OFF, ESC key8, 21, 22
[F1 / F3]
F1 / F3, F1 key, F3 key
F2 / F4
T '
, FZ Key, F4 Key
F2 / F4, F2 key, F4 key7, 113
SHIFT
SHIFT, SHIFT key7
SHIFT, SHIFT key
SHIFT 7 . Standby indicator 9 →T← TARE , TARE key 8 ZERO ZERO key
SHIFT 7 . Standby indicator 9 →T← TARE 128 →O+ ZERO 2 □ F 128
SHIFT key
SHIFT key 7 . Standby indicator 9 →T← TARE 8 →O+ ZERO 8 □ I F 128 □ I F 128 □ I F 129 □ I F 129 □ I F 130 □ I F 130
SHIFT key
SHIFT key
SHIFT 7 . Standby indicator 9 →T← TARE TARE 18 →O+ 2ERO ZERO 128 02 F 129 03 F 130 04 F 130 05 F 132 07 F 133
SHIFT 7 . Standby indicator 9 →T← TARE TARE 18 JOC 2ERO RERO 128 RERO 129 RERO 130
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actual load calibration	
ADC	138
ÄFFC	138
alarm	71
analog output	
ASCII code	139
auto print mode 78	
backuped RAM	
batch weighing	25, 35
baud rate 76, 84	l, 90, 93
BCD output	.85, 128
BCD terminals	86
Brate	
built-in automatic program mode 35,	
buzzer	
calibration	
capacity	
category address	
CERRÍ	
CERR 10	
CERR11	24
CERR2	24
CERR3	24
CERRA	
CERR6	
~=!\!\\\\	24 24
CERR7	24
CERRS	
CERR9	
[L F	127
clear	70
clearcommand mode	70
	70 78
command modecommunication modes	70 78 78
command modecommunication modescomparison output	70 78 78
command modecommunication modescomparison outputcompensation	70 78 61 58, 59
command mode	70 78 61 58, 59
command mode	70 78 61 58, 59 44
command mode	70 78 61 58, 59 44
command mode	70 78 61 58, 59 44 84
command mode	70 78 61 58, 59 44 84 84
command mode	70 78 61 58, 59 44 84 84 84
command mode	70 78 61 58, 59 44 84 84 84
command mode	70 78 61 58, 59 44 84 84 84
command mode	70 78 61 58, 59 44 84 64, 115 9, 138 138 9, 93
command mode	70 78 61 58, 59 44 84 9, 138 9, 138 9, 93
command mode	70 78 61 58, 59 44 84 9, 138 9, 138 9, 138
command mode	70786158, 594484
command mode	70786158, 594484
command mode	70786158, 5944849 1, 90, 932070138
command mode	70786158, 5944849 1, 90, 9320701382020
command mode	70786158, 5944849, 1389, 138207073
command mode	70786158, 59449, 1389 I, 90, 93207013870
command mode	70786158, 59449, 1389 I, 90, 932048
command mode	70786158, 594484
command mode	70786158, 5944849, 1389 I, 90, 932070138207056
command mode	70786158, 5944849 1389 1, 90, 932070138205656565656
command mode	70786158, 59449, 1389707070707070707070

FFall	138	orver	73
FFlow	138	oŁhF	112
FINISH	9	Outf	125
flash memory	73	output terminals	74
FNC		P 1/0	138
forecast control function	39	Parallel I/O	132
free fall	58, 59	parameters	105
FULL		parity bit	76, 84, 90, 93
full flow		pause	
fuse	6	<u> </u>	
G1		P1m	
gate_control		power consumption	
GEnF		power cord	
graphic display		power source	·
graphic indicator		preset tare	
gravity acceleration correction		PT	
gross		real time free fall compensation.	
<u>6</u> S		recipe code	
Header		recipe mode	
Hide elements		recipe sequence	
Hop		relay output	
hopper scale		restart	
I/O		re-zero	
I/O terminals		r5 F	
IDF		RS-232C RS-422	
indication items		RS-485	
initial flow sequence		RTot	
input terminals		RTot#	
intialization		safety check	
IP-65		sampling rate	
jet steam mode		SEN	
key design		SEN+	
		sensitivity	
		setpoint	
loadcell		SF	
loadcell excitation voltage		ŠFCT	
loss-in-weigh		ŠFŌT	
M.FLOW		span adjustment	
manual print mode		59 F	
mass		start bit	76, 84, 90, 93
material code	25, 135	stop bits	
maximum display	134	stream mode	78, 84, 88
MCode	138	sub-display	68
measuerment range	134	SUbF	
memory	73	summing box	20
menu		supplying hopper	
MFlow		T	
mixing sequence		tare	
mode map		TC	
monitor mode		terminal E	
Neg		terminal parts	·
net		terminator	
normal batch		test mode	
normal batching		Tot	
nozzle		Tot#	
NT		total	
NUT		total print mode	
OFF		TR	
OK	-	under	
		undo unit	
OFFIm		viscosity	
~: i ±!!!	130	v100031ty	

W/	
w/0	138
water-resistant panel	5
weighing status	
weight	20
WGŤ	138
WGTTot	138

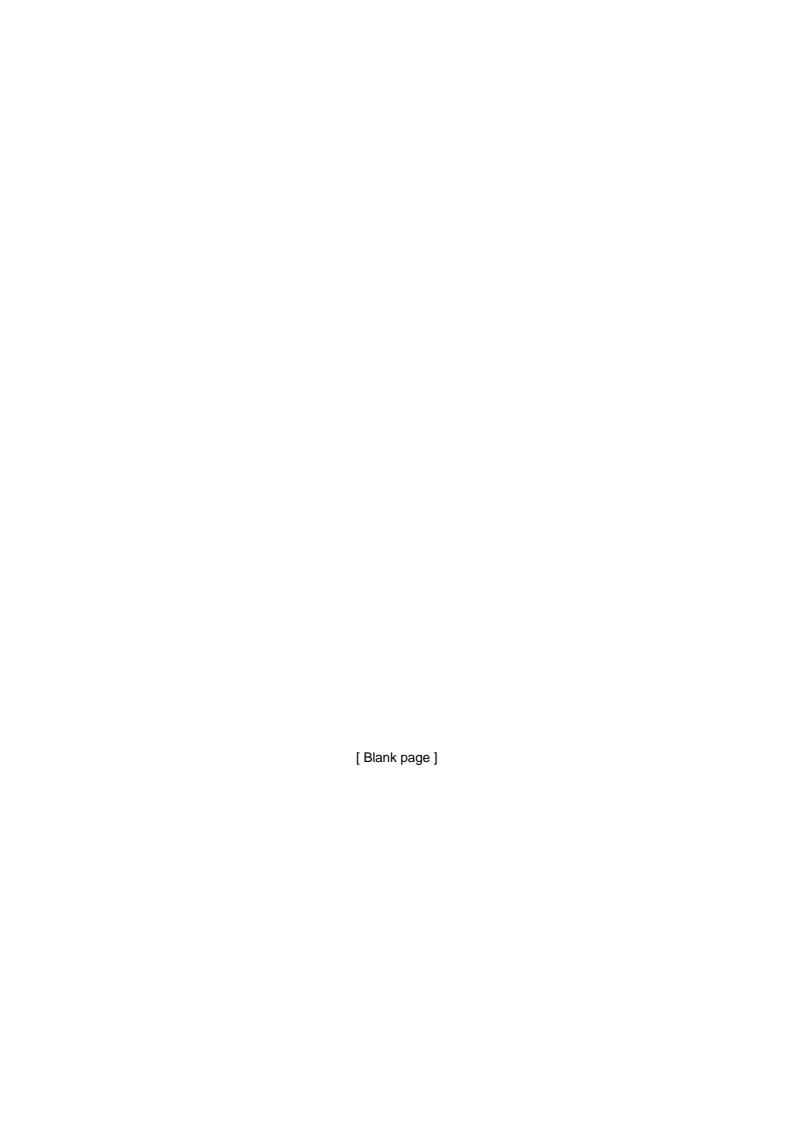
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zero range	134
zero tracking	
ZR	
7R FRR	a

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