Minebea intec
The true measure

Operating instructions

Weighing Transmitter CSD-892/74, ../76

Translation of original operating instructions 949905089200 Edition 1.0.1 08/09/2019

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Foreword

Must be followed!

Any information in this document is subject to change without notice and does not represent a commitment on the part of Minebea Intec unless legally prescribed. This product should be operated/installed only by trained and qualified personnel. In correspondence concerning this product, the type, name, and release number/serial number as well as all license numbers relating to the product have to be cited.

Note

Table of contents

1 Introduction

1.1 Read the manual

- Please read this manual carefully and completely before using the product.
- This manual is part of the product. Keep it in a safe and easily accessible location.

1.2 This is what operating instructions look like

1. - n. are placed before steps that must be done in sequence.

▶ is placed before a step.

▷ describes the result of a step.

1.3 This is what lists look like

- indicates an item in a list.

1.4 This is what menu items and softkeys look like

[ ] frame menu items and softkeys.

Example:

[Start]- [Applications]- [Excel]

1.5 This is what the safety instructions look like

Signal words indicate the severity of the danger involved when measures for preventing hazards are not followed.

⚠ DANGER

Warning of personal injury

DANGER indicates death or severe, irreversible personal injury which will occur if the corresponding safety measures are not observed.

▶ Take the corresponding safety precautions.

⚠ WARNING

Warning of hazardous area and/or personal injury

WARNING indicates that death or severe, irreversible injury may occur if appropriate safety measures are not observed.

▶ Take the corresponding safety precautions.

⚠ CAUTION

Warning of personal injury.

CAUTION indicates that minor, reversible injury may occur if appropriate safety measures are not observed.

▶ Take the corresponding safety precautions.

NOTICE

Warning of damage to property and/or the environment.

NOTICE indicates that damage to property and/or the environment may occur if appropriate safety measures are not observed.

▶ Take the corresponding safety precautions.

Note:

User tips, useful information, and notes.

1.6 Hotline

Phone: +49.40.67960.444

Fax: +49.40.67960.474

eMail: help@minebea-intec.com

2 Safety instructions

2.1 General information

Thank you for purchasing the Weight Transmitter with RS-232C interface CSD-892/74, ../76 or with RS-422/485 interface .

This Operating instructions describes how to use the device and provides other useful information.

Incorrect handling may cause the device to malfunction.

Read this Operating instructions thoroughly in advance to ensure correct use.

Store this Operating instructions in a location that is readily accessible to end users.

Note:

Describes precautions and provides other information on operation and settings for the CSD-892/74, ../76. Read these indications to avoid malfunction.

2.2 Intended use

The device is intended for use of the analysis device for weighing functions.

Product operation, commissioning and maintenance must be performed by trained and qualified personnel who are aware of and able to deal with the related hazards and take suitable measures for self-protection.

The device reflects the state of the art.

The manufacturer does not accept any liability for damage caused by third-party system components or due to incorrect use of the product. The use of this product signifies recognition of the stipulations listed above.

2.3 For safe operation

2.3.1 Location of installation

NOTICE

Warning of damage to property and/or the environment.

Do not install in the following locations.

▶ To do so may damage the device.

- Places exposed to direct sunlight and/or high temperatures
- Places with high humidity
- Places where the device may be subject to vibrations or mechanical shocks
- Environments contaminated with dust and/or coarse particulates
- Environments containing corrosive gases or salt
- Environments subject to sudden temperature and/or humidity fluctuations
- Near devices that generate magnetic fields or electromagnetic waves
- Environments vulnerable to radioactivity or radioactive rays

- Laboratories or other environments where chemical reactions take place

Set up an operation control panel if the instrument is used in the following locations:

- Places exposed to water and/or spillages
- Places contaminated with dust and/or fine particles

NOTICE

Risk of malfunctions

Use the instrument under the following conditions of temperature and humidity.

▶ Environmental temperature: -10°C to 50°C (Preservation -20°C to 60°C).

▶ Environmental humidity: Less than 85 % R. H. or less (Non condensing)

2.3.2 Installing the instrument

If setting up two or more instruments, install them on the same panel with no clearance in between.

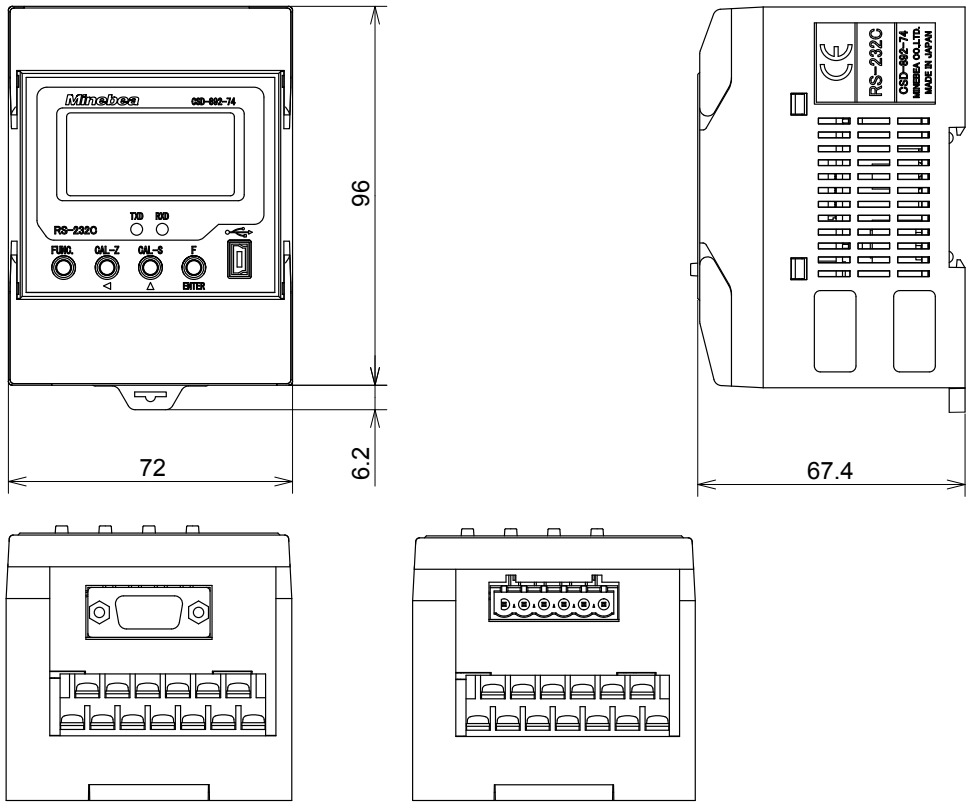
NOTICE

Warning of damage to property and/or the environment.

▶ Ensure sufficient space between this instrument and other devices.

Outer dimensions

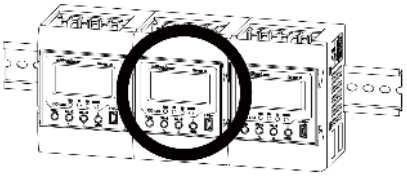
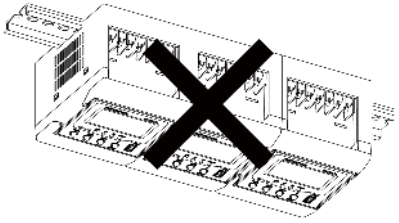
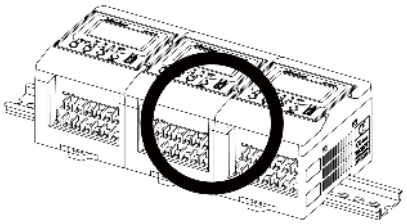
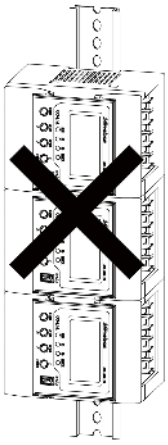
Front **Side**



all dimensions in mm

Direction of installation

If installing a control panel, set it up at the front so that the front panel that houses the display faces forward.

Front installation	Installation on ceiling
	
Upward installation	**Vertical installation**
	

2.3.3 Power supply

⚠ WARNING

Working on the instrument while it is switched on may have life-threatening consequences.

If the power is ON, the operator may get an electric shock or the device may be damaged.

- Check that the power supply is OFF when installing cables.
- Before switching on the power, check that the supplied power is identical to the device voltage/specifications. Please contact a Minebea Intec sales or service office if they do not match.
- Failing to check the above may cause damage to the device or result in electric shock.

⚠ WARNING

Working on an ungrounded instrument may have life-threatening consequences.

If the instrument is not grounded, the instrument may malfunction or the operator may receive an electric shock.

- It is essential to ground the device with grounding wire.

2.3.4 Operating precautions

⚠ CAUTION

Warning of personal injury and damage to property.

Incorrect wiring may falsify weighing results, lead to malfunction of the instrument, damage peripheral equipment or lead to critical accidents.

- ▶ Check that all wires are connected properly before use CSD-892/74, ../76.

NOTICE

Warning of damage to property.

Falsify weighing results, malfunction of the instrument or damage to peripheral equipment are possible.

- ▶ Calibrate the instrument before first-time use or when replacing the load cells.
- ▶ Recalibrate if problems persist after calibration.

NOTICE

Warning of damage to property.

Falsify weighing results, malfunction of the instrument or damage to peripheral equipment are possible.

- ▶ Do not change device settings during measurement.

NOTICE

Warning of damage to property.

Impact or shock may damage the instrument or cause electrical circuit failures.

- ▶ Protect the device from impact and shock. Do not strike the device with any other object.

NOTICE

Warning of damage to property and/or the environment.

Damage to the casing or the panel sheet, or impact to the instrument's environmental resistance or operational performance are possible.

- ▶ Do not remove the instrument casing, peel off the panel sheet or otherwise disassemble the device.
- ▶ Do not peel off the panel sheet.
- ▶ Do not otherwise disassemble the device.

Note:

The panel of the instrument is coated with a transparent protective sheet when shipped from the factory.

Remove the sheet prior to operating the instrument.

NOTICE

Warning of damage to property and/or the environment.

Damage to the casing or the panel sheet, or impact to the instrument's environmental resistance or operational performance are possible.

▶ Do not forcibly press the panel sheet against the instrument.

2.3.5 Conformed standards

This instrument complies with the following standards.

EN61326-1: 2013

"Electrical equipment for measurement, control and laboratory use — EMC requirements"

"Immunity test requirements for equipment intended for use in industrial locations"

NOTICE

Warning of damage to property.

When a USB interface is used, the relevant CE standards are not applicable.

▶ Strictly observe the following conditions. Otherwise, the device may not conform to the above standards.

- **Installation site**

  Set up in the control board and the operating panel if EMC solutions are applied.

- Power supply DC24 V

  Set up a power supply of DC24 V for the control board and operating panel if EMC solutions are applied.

  Use a "CE compatible product" for the DC24 V power supply.

- **Cable**

  Use shielded cables for all cables other than the power cable.

  Install the ferrite core in the load cell cable.

  Model E04SR401938 by Seiwa Electric Manufacturing Co., Ltd., or equivalent

- **Screen processing**

  Connect the screen of the load cell cable to the E terminal on the upper terminal block.

  Apply the following shield processing for CSD-892-74.

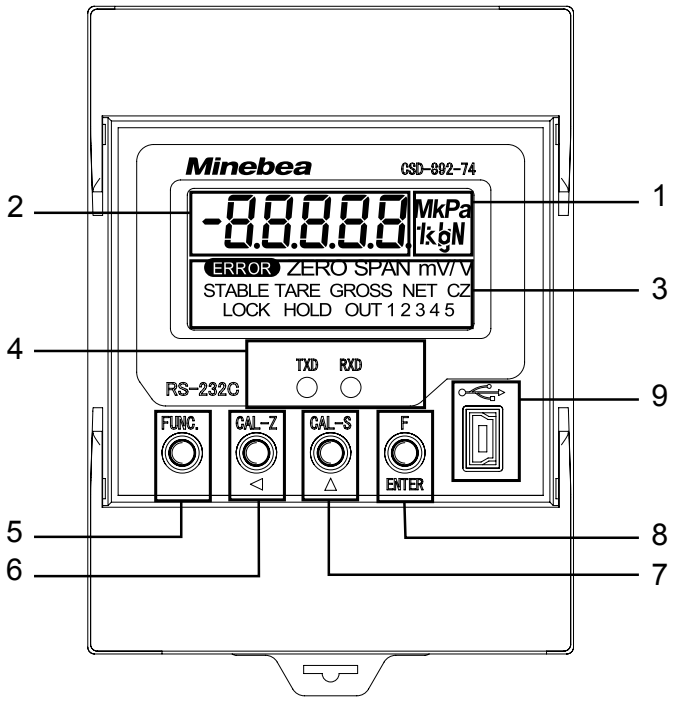
  - The screen must connect to the connector on the main body using the shielded cable for the connection of the RS-232C interface via the engagement screw of the RS-232C connector.
  - Select the shell of the RS-232C interface connector that applies EMI measures.
  - Apply the shield processing to the RS-232C interface cable and the external control I/O cable by the conduit piping, including the system control panel.

  Apply the following shield processing for CSD-892-76.

- Connect the screen of the RS-422/485 cable to the F.G. terminal on the lower terminal block.
- Apply the shield processing to the RS-422/-485 interface cable and the external control I/O cable by the conduit piping, including the system control panel.

3 Description and function of each part

3.1 Front panel



Legend

Pos.	Description
1	**Unit display** Displays the weight unit set.
2	**Load display** Displays the gross/net weight, overload and error. This displays the condition and setting value when performing various settings,

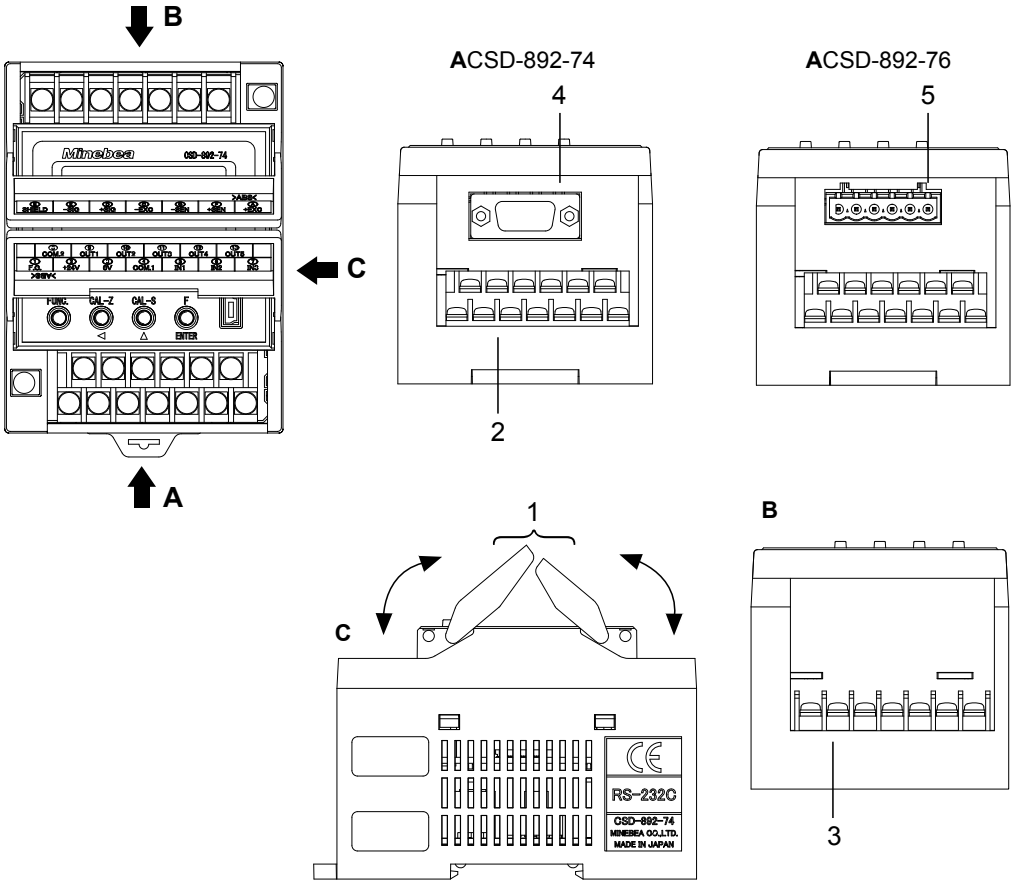
Pos.	Description
3	**Condition display** Displays the condition of the device. ZERO — Lights when ZERO is being calibrated. SPAN — Lights when SPAN is being calibrated. mV/V — Lights when mV/V value is displayed, for calibration by numeric input, monitoring of the load cell output value, etc. STABLE — Lights when the measured data is stable. TARE — Lights when the tare weight cancellation of net weight offset functions are operating. GROSS — Lights when the load display is set to gross. NET — Lights when the load display is set to net. CZ — Lights when the load displayed is zero and within ±1/4 of the scale interval. LOCK — Lights when the key lock is applied. HOLD — Lights when hold is applied. ERROR — Lights when an error signal is output. OUT1 ~ 5 — When the external control output is ON, the corresponding number lights.
4	**Status LED** The sending / receiving status is monitored with two LED. **Name of LED** — **Status display** TXD — Blinks during the transmission. RXD — Blinks during the receiving.
5	**FUNC. key** FUNC  Changes the device to function mode, then changes it to its state before setting various modes. Press and hold for at least 2 seconds to change to the simple calibration setting mode.
6	**CAL-Z/◄ key** CAL-Z  ◄ When setting the value, this increases the digit to be set Press and hold for at least 2 seconds to change to the simple calibration ZERO mode. Also, pressing and holding the [CAL-Z/◄] and [CAL-S/▲] keys together for at least 2 seconds changes to the simple calibration lock setting screen.
7	**CAL-S/▲ key** CAL-S  ▲ Raises the value of the selected digit by 1, when setting values. When setting the value, this increases the digit to be set press and hold for at least 2 seconds to change to the simple calibration SPAN mode.

Pos.	Description	
8	**F/ENTER key** 	Decide from the various data inputs, and store the set value to internal memory. Also executes the function assigned to the [F/ENTER] key (NONE, HOLD, ZERO set, ZERO clear, tare weight cancellation, tare weight cancellation clear, change between gross/net weight, change to COMP setting mode).
9	**USB interface connector** (mini-USB connector type-B) This is used for reading and writing the set data from the host. The dedicated driver software must be installed on the host side. Please download from our website. It may also be convenient to install and connect to your PC, the EzCTS_USB1 (optional PC software) for reading, writing, storing and printing set data.	

Note:

Please refer to Chapter 6.10.

3.2 Front panel upper and lower part



Legend

Pos.	Description
1	Terminal block cover 1, 2 These are the protective covers for the upper and lower terminal blocks. Open the cover before connecting, when wiring to the terminal blocks.
2	Power supply and external control input and output terminals (lower terminal block) Use for connection of a DC24 V power supply, connection wires, and for connection to an external control device. A maximum of 3 inputs and 5 outputs can be used for the external control input and output.
3	Load cell terminals (upper terminal block) Up to 4 load cells (350 Ω) can be connected in parallel.
4	RS-232C interface connector (for CSD-892-74) Use this connector for the connection with RS-232C interface.
5	RS-422/485 interface connector (for CSD-892-76) Use this connector for the connection with RS-422/485 interface.

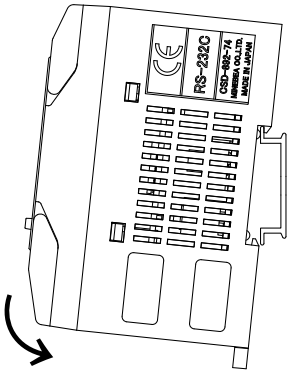
4 Installation and Wiring

4.1 Attaching to and Removing from a mounting rail

The device is designed for mounting rail installation (35 mm, as per DIN 46277).

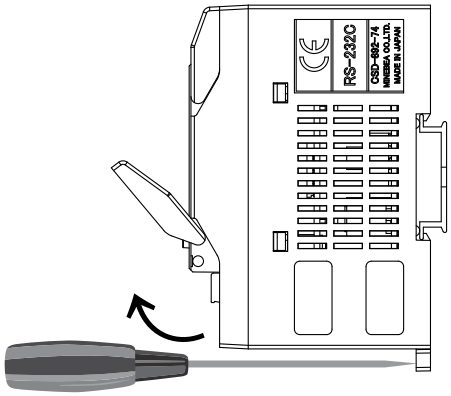
The procedures for attaching and removing are as follows.

4.1.1 Method of attachment to a mounting rail



1. Hang the device's upper claw on the upper side of the mounting rail (35 mm, as per DIN 46277).
2. Press the device into the mounting rail until you hear a click.
3. Check that the device is fixed securely.

4.1.2 Method of removing from a mounting rail



1. Check that the power supply and all cables are disconnected from the device.
2. Use a flathead screwdriver, pull the lower claw on the front downward, and remove from the mounting rail.

4.2 Points of note for connecting wires

- Be sure to connect wires while the device is not supplied with power.
- Do not connect the power supply until all installation and wire connections are complete. The device has no ON/OFF switch for power supply.
- Do not drop or subject the terminal block to powerful impact, as it is made of plastic.
- Please separate cables connected with the unit as much as possible from noise sources such dynamic power lines and control I/O.

- As dedicated wiring is used for conduit wiring, avoid sharing it with other lines.
- Please be sure to connect the ground wire. As it is a D-class single earth, avoid sharing it with the ground for a dynamic power supply system.
- The tightening torque of screws on the terminal block is 0.6 Nm.
- Applicable crimp terminal width 6.2 mm or less

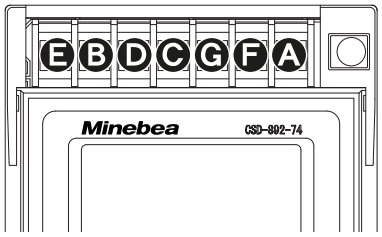
  (O-type 1.25-3 or Y-type 1.25-3.5)

4.3 Connection with load cells

This instrument can connect with load cells.
Please connect these via the upper terminal block.

Note:

The colors listed here apply for the Minebea Intec load cell and connection cables of type "PR ..."



Ⓐ	+ EXC	Load cell power supply V+	**red**
Ⓕ	+ SEN	Sense S+	**white**
Ⓖ	– SEN	Sense S–	**black**
Ⓒ	– EXC	Load cell power supply V–	**blue**
Ⓓ	+ SIG	Load cell signal (meas. voltage) M+	**green**
Ⓑ	– SIG	Load cell signal (meas. voltage) M–	**gray**
Ⓔ	SHIELD	Screen	**yellow**

Note:

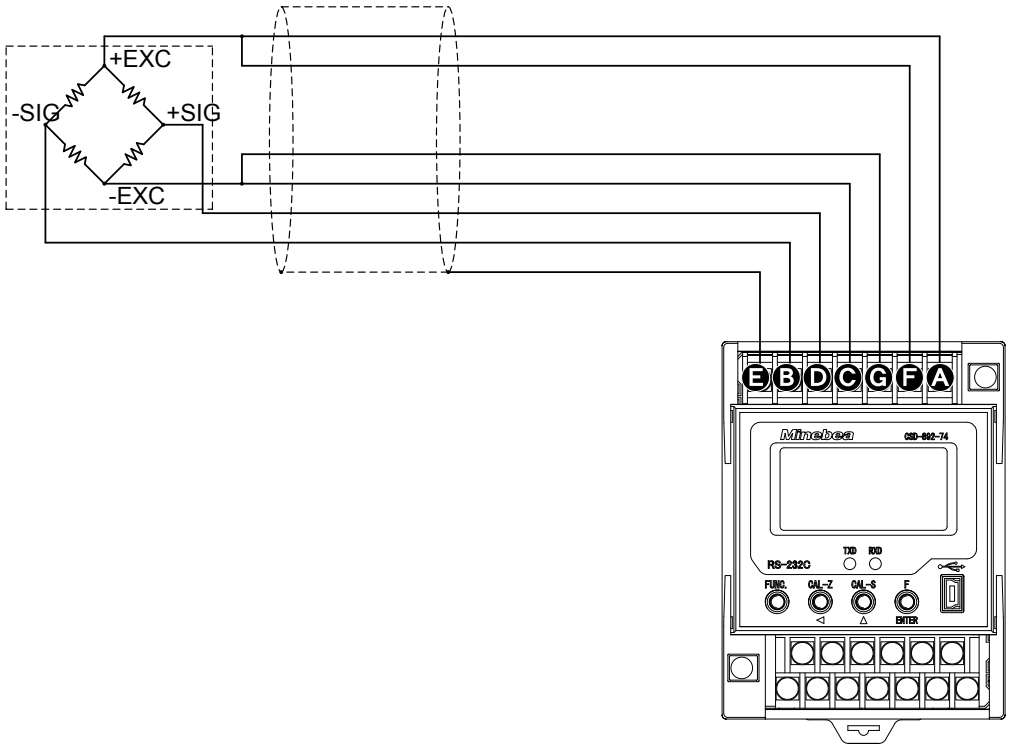
When a tension or tension/compression load cell is used in the direction of the tension, and the "+" direction is displayed, connect the load cell input + to terminal Ⓑ and the load cell input - to terminal Ⓓ respectively.

4.3.1 When using 6-wire connection cable

Note:

The colors listed here apply for the Minebea Intec load cell and connection cables of type "PR ..."

Load cell



Ⓐ	+ EXC	Load cell power supply V+	**red**
Ⓕ	+ SEN	Sense S+	**white**
Ⓖ	– SEN	Sense S–	**black**
Ⓒ	– EXC	Load cell power supply V–	**blue**
Ⓓ	+ SIG	Load cell signal (meas. voltage) M+	**green**
Ⓑ	– SIG	Load cell signal (meas. voltage) M–	**gray**
Ⓔ	SHIELD	Screen	**yellow**

Note:

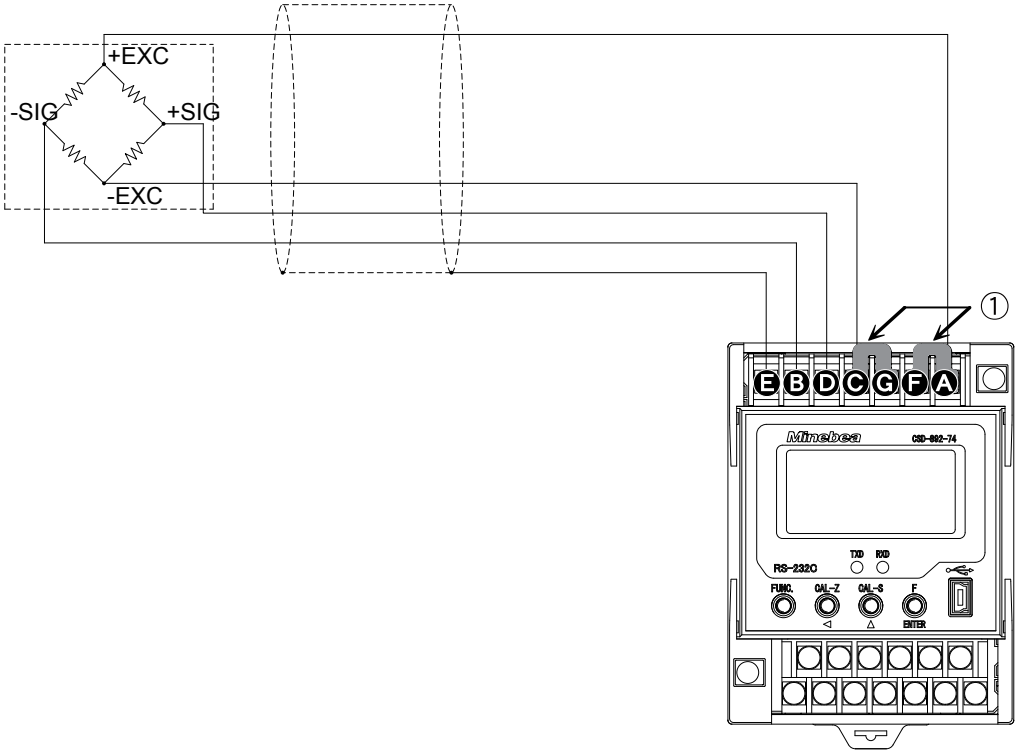
- Standard cable ≥100 m: It is possible that the resistance of the cable will cause the sense function of the device to not work correctly, resulting in accuracy outside of our guaranteed accuracy.
- Be sure to bridge Sense+ and Sense- close to the load cell.

  If bridged Sense+ and Sense- close to the device, the sense function will not work.

4.3.2 When using 4-wire connection cable

Note:

The colors listed here apply for the Minebea Intec load cell and connection cables of type "PR ..."



① Additional bridges

Ⓐ	+ EXC	Load cell power supply V+	**red**
Ⓕ	+ SEN	Sense S+	**white**
Ⓖ	– SEN	Sense S–	**black**
Ⓒ	– EXC	Load cell power supply V–	**blue**
Ⓓ	+ SIG	Load cell signal (meas. voltage) M+	**green**
Ⓑ	– SIG	Load cell signal (meas. voltage) M–	**gray**
Ⓔ	SHIELD	Screen	**yellow**

Note:

- When using a 4-wire cable, be sure to short between Ⓐ-Ⓕ and Ⓒ-Ⓖ on upper terminal block with the additional bridges. This device will not operate normally if terminals Ⓕ and Ⓖ are used in their open state.
- Standard cable ≥30 m: It is possible that the resistance of the cable will cause the input voltage of the device to decrease, resulting in accuracy outside of our guaranteed accuracy.
- If a zener barrier is to be used, connect it using the 4-wire cable method outlined above.

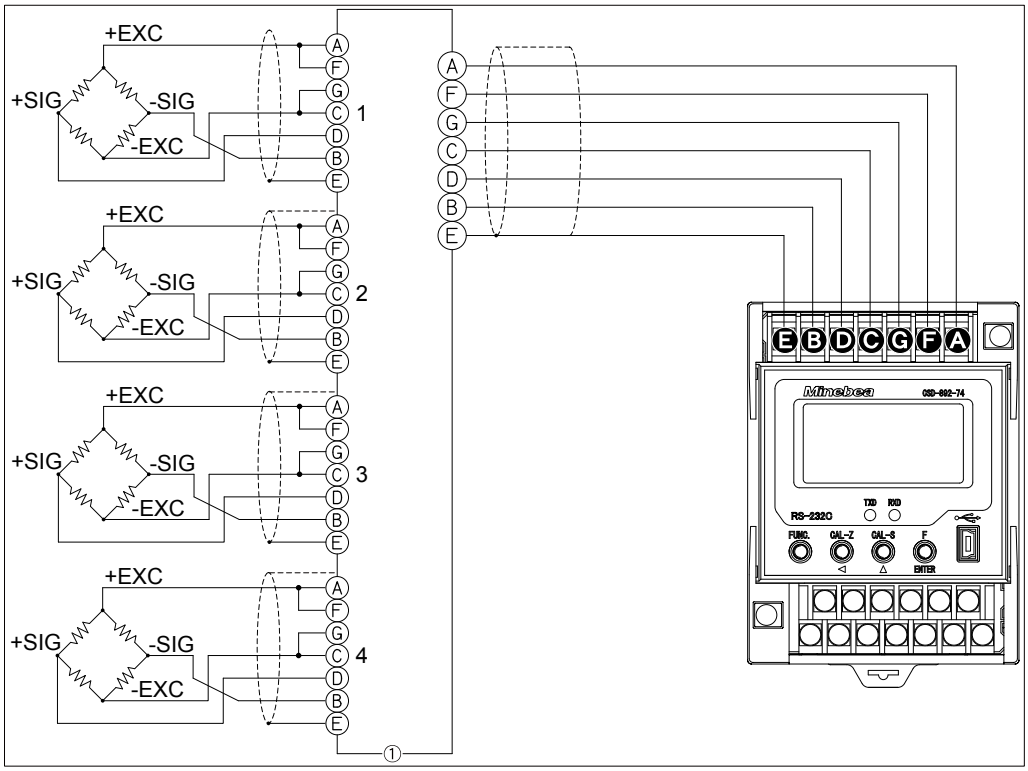
4.3.3 When load cells connected in parallel

Hopper scale, truck scale, etc, may be used when multiple load cells are used and connected in parallel.

Parallel connections can be easily used, through the use of cable junction boxes (accessories) .

Note:

The colors listed here apply for the Minebea Intec load cell and connection cables of type "PR ..."



① cable junction box

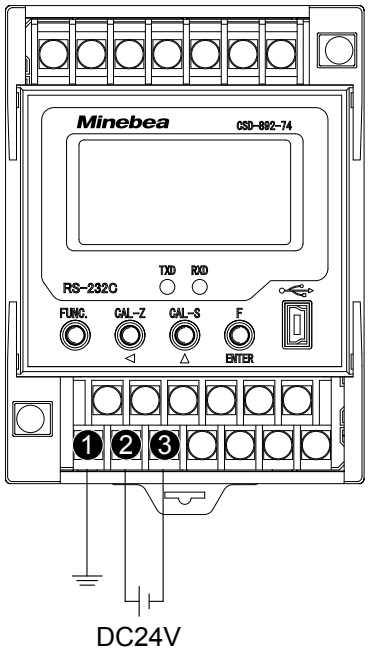
Ⓐ	+ EXC	Load cell power supply V+	**red**
Ⓕ	+ SEN	Sense S+	**white**
Ⓖ	– SEN	Sense S–	**black**
Ⓒ	– EXC	Load cell power supply V–	**blue**
Ⓓ	+ SIG	Load cell signal (meas. voltage) M+	**green**
Ⓑ	– SIG	Load cell signal (meas. voltage) M–	**gray**
Ⓔ	SHIELD	Screen	**yellow**

Note:

This device allows parallel connection of up to 4 load cells, if 350 Ω.

4.4 Connection of power supply and ground

Connect the power supply and ground to the terminal block at the bottom of the device as shown in the figure below.



❶	F.G.	Frame ground	D-class single earth
❷	+ 24 V	Power supply DC24 V	DC24V Permissible variable range: DC20.4 V ~ DC27.6 V
❸	0 V	Power supply DC0 V	

⚠ CAUTION

Warning of personal injury.

Use within the prescribed power supply conditions.

▶ Connect the power supply and the ground correctly as shown in the figures

Note:

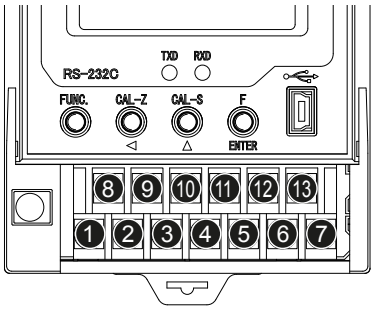
- To ground the device, use a D-class single earth. Otherwise, there is a possibility that the effect of noise from other devices may cause an unexpected malfunction.
- For details of the connection method when the device is subject to CE compatibility standards, please refer to Chapter 2.3.5.

4.5 Connection of an external control input/output

You can control the functions of the device externally, by an external control input/output terminal block (lower terminal block).

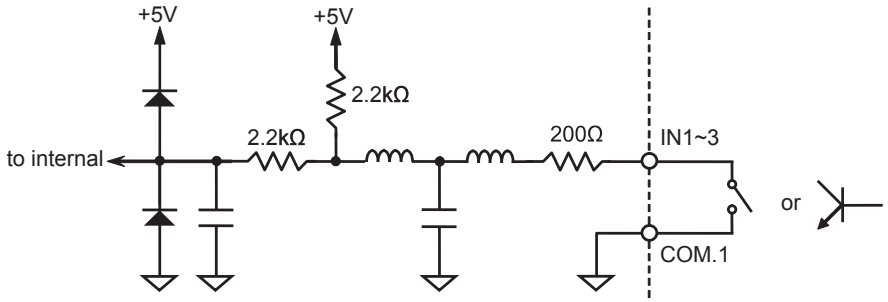
The external control input is executed by using a contact or open collector, to short each input and COM1. The external control output is an open collector output (Open collector rating VCE = DC35 V, IC = DC50 mA MAX).

For details of the connection method when the device is subject to CE compatibility standards, please refer to Chapter 2.3.5.



❶	F.G.	Housing ground	❿	OUT2	Output 2
❷	+ 24 V	Power supply 24 V DC	⓫	OUT3	Output 3
❸	0 V	Power supply 0 V DC	⓬	OUT4	Output 4
❹	COM.1	Common1 (for input)	⓭	OUT5	Output 5
❺	IN1	Input 1			
❻	IN2	Input 2			
❼	IN3	Input 3			
❽	COM.2	Common 2 (for output)			
❾	OUT1	Output 1			

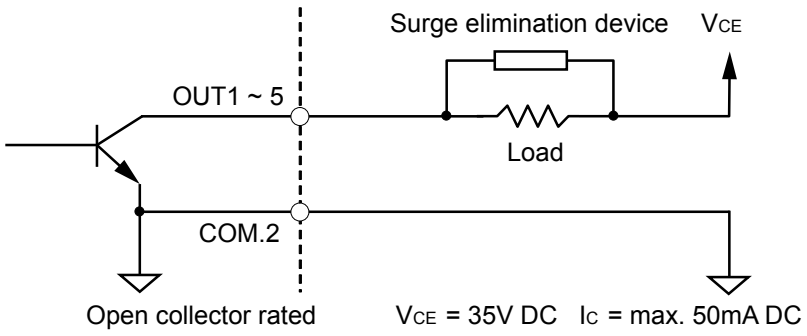
4.5.1 Input connection



Note:

- For external control input recognition, there is a pule input and level input, depending on setting parameter.
- For details of the external control input function, please refer to Chapter 10.9.1.
- The external control input COM.1 and external control output COM.2 are connected within the device.

4.5.2 Connection for output



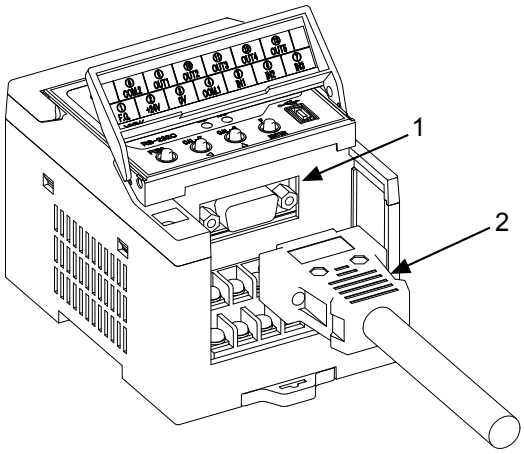
Note:

- For details of the external control output function, please refer to Chapter 10.9.2.
- The external control input COM.1 and external control output COM.2 are connected within the device.

4.6 Connecting to an interface

4.6.1 Connection with RS-232C interface (CSD-892-74)

- Use a shielded interface cable for connection to the host (PC, PLC) via the RS-232C interface.
- Use an EMC-protected RS-232C interface cable.
- Use an EMC-proof RS-232C plug connector.
- The wiring of the cable is straight.



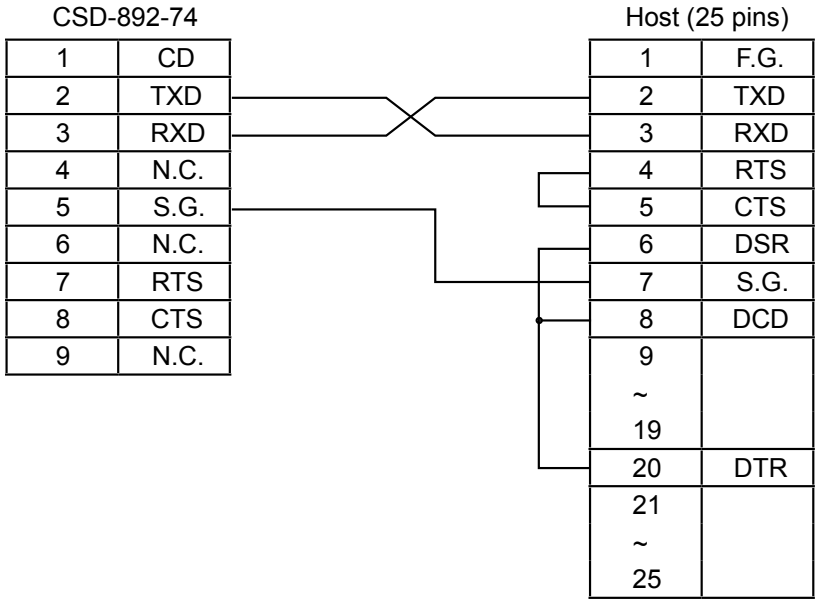
Pos.	Beschreibung
1	RS-232C interface D-Sub plug connector (male), 9-pin
2	RS-232C cable D-Sub plug connector (female), 9-pin

Pin No.	Signal name
1	CD
2	TXD
3	RXD
4	N.C.
5	S.G.
6	N.C.
7	RTS
8	CTS
9	N.C.

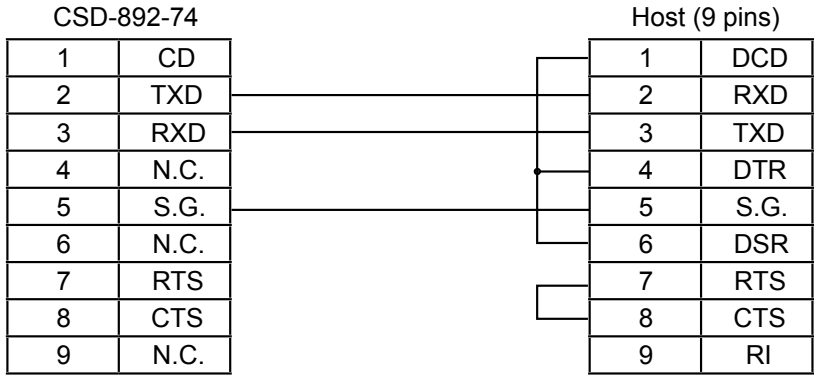
Note:

- Applicable plug connector for RS-232C interface is not attached.
- Cable length ≤15 m.

Wiring 1 of RS-232C



Wiring 2 of RS-232C



Note:

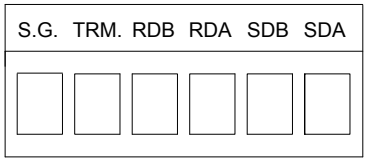
- Neither the flow X-control nor X-flow control is executed in this instrument.
- CTS/RTS signal is not used.

4.6.2 Connection with RS-422/485 interface (CSD-892-76)

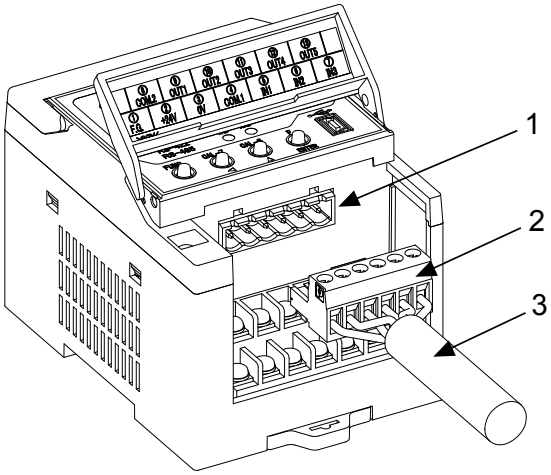
The cable is wired to attached connector for RS-422/485 interface, and connected as shown in the shown below.

- Stripped length of the cable tip is 6 mm.
- The tightening torque of terminal screws on the terminal block is 0.6 Nm.

- Use the twisted pair cable with the shield for the connection of RS-422/485 interface and connect the screen with F.G. terminal on the lower terminal block.
- When you connect the cable with CSD-892-76, please check the direction of upper/ lower sides of the plugconnector, and insert until it clicks into position.



SDA	Differential output (+)	TxA
SDB	Differential output (-)	TxB
RDA	Differential output (+)	RxA
RDB	Differential output (-)	RxB
TRM.	Termination resistance	
S.G.	Signal name ground	GND

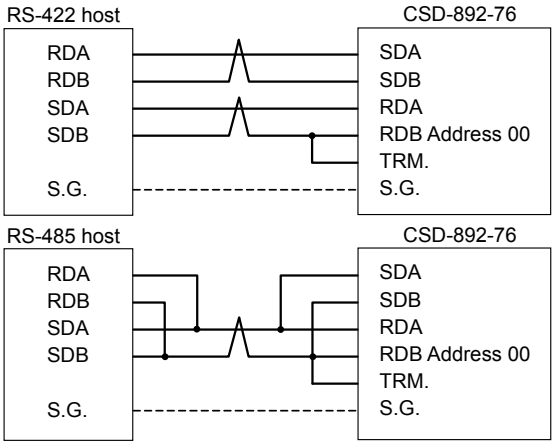


Pos.	Beschreibung
1	Connector for RS-422/485 interface
2	Attached plug connector (6-pin) for RS-422/485 interface
3	Twist pair cable with screen.

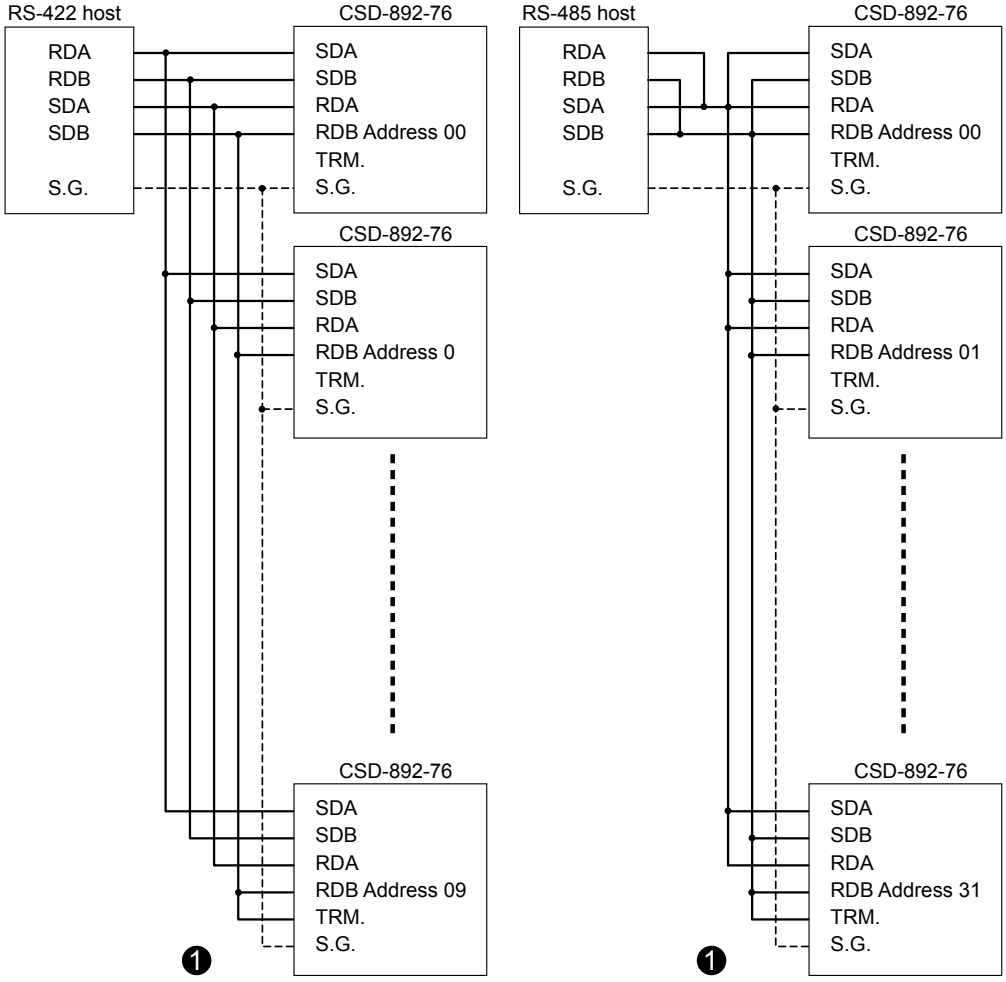
Note:

- Attached plug connector for RS-422/485 interface: e.g. by PHOENIX CONTACT.
- Please connect the internal terminal resistance after shortening between TRM terminal and RDB terminal by RS-422/485 connector which is the furthest from the host.
- Total cable length ≤1 km
- The proof stress against noise improves by using twisted pair cable withshield.

One to one connection



1 to n connection



❶ Connect the terminal resistance of CSD-892-76 that is the furthest from the host.

Note:

- Please connect S.G. terminal when S.G. is required by the communicating condition with the host.
- The polarity of the signal from the host computer has an opposite case by the equipment.
- The S.G. terminal might not exist according to the equipment at the host side.

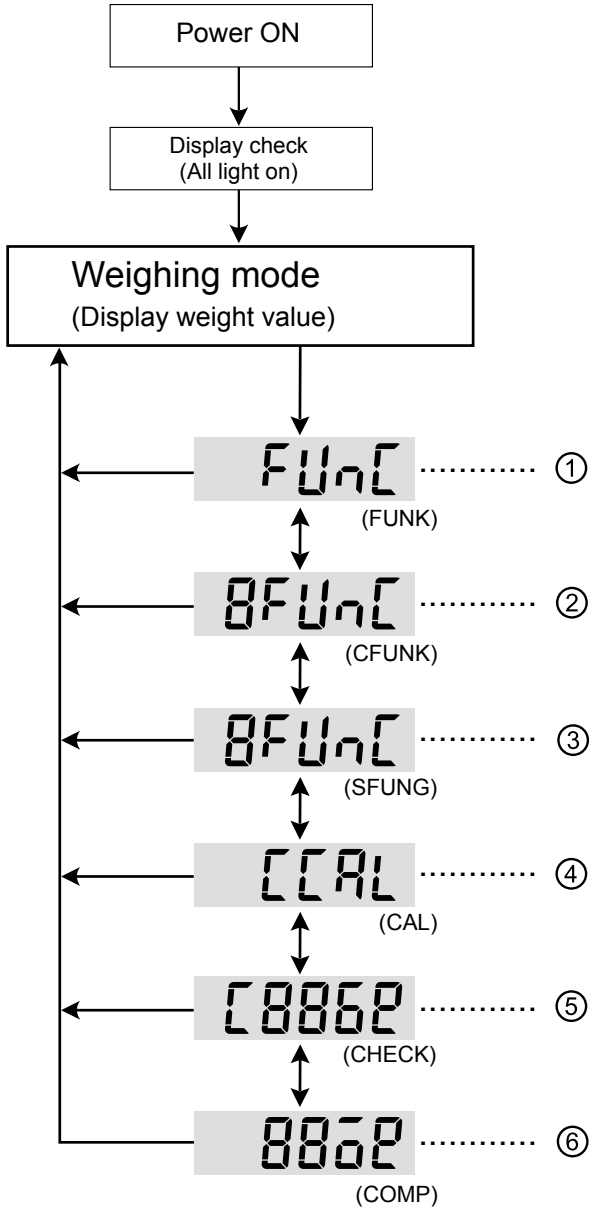
5 Operating

5.1 Operation mode change

The instrument has various modes according to the operating situation.

- Press the [FUNC.] key to select between weighing mode and function modes.
- Select the different modes with the [CAL-Z/◄] key und the [CAL-S/▲] key.
- Confirm the selected mode with the [F/ENTER] key.

For further information see Chapter 5.2.



Legend

Pos.	Description
①	For further information see Chapter 9.
②	For further information see Chapter 7.
③	For further information see Chapter 11.
④	For further information see Chapter 6.
⑤	For further information see Chapter 15.
⑥	For further information see Chapter 13.

Note:

----- "Error indication" will display when the "power-on-zero" function is active, and the load cell output exceeds ±10% of the maximum load (Max) after the power supply is turned on.

Similarly, when the load cell output is unstable, the display will fully light up (error indication).

If the [FUNC.] key is pressed as above-mentioned, the display will force the load display.

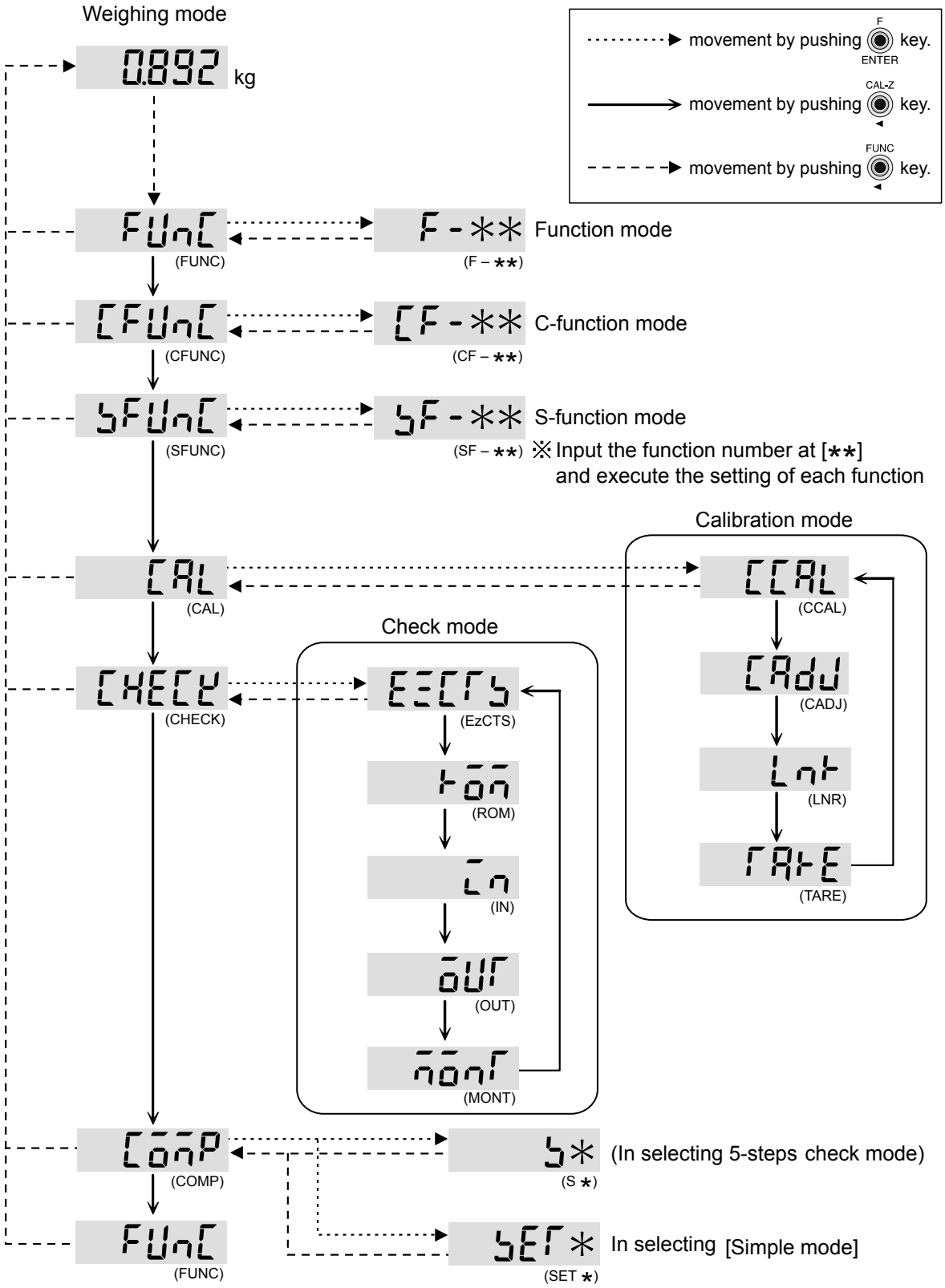
[FUNC.]

Function mode
The settings for the following functions and active/inactive are changed.

- Various filters
- Keylock
- Stability detection
- Net weight offset function
- Hold
- Action set for 5-step check mode
- Allocating a function to the [F/ENTER] key.
- Liquid crystal back light on time
- Various interfaces
- Function clear

 [CFUNC]	**C function mode** The settings for the following functions and active/inactive are changed. - Decimal point display position - A/D sampling - Overload display - Check operation display synchronization - Unit - Reversal of net weight sign - Zero set - Zero tracking - Power-on-zero - Tare weight cancellation - Gravity acceleration correction - Change of data storage destination - Digital linearization clear - Stability detection duration during calibration - C function clear
 [SFUNC]	**S function mode** The settings for the following functions and active/inactive are changed. - Weighing mode - Control mode - Check action signal - Check action near zero - Check action when "full" - S function clear
 [CAL]	**Calibration mode** Calibration is processed to display the electrical signal from the load cell as an accurate weight.
 [CHECK]	**Check mode** This operation checks the condition and movement of the unit. - Switch to EzCTS mode - Confirming the ROM version - Confirming the movement of the external control input/output/input - Confirming the load cell output value
 [COMP]	**Weighing mode (Setting mode)** Simple mode for weighing and check value for 5-step check mode is processed.

5.2 Display transition diagram



6 Calibration mode

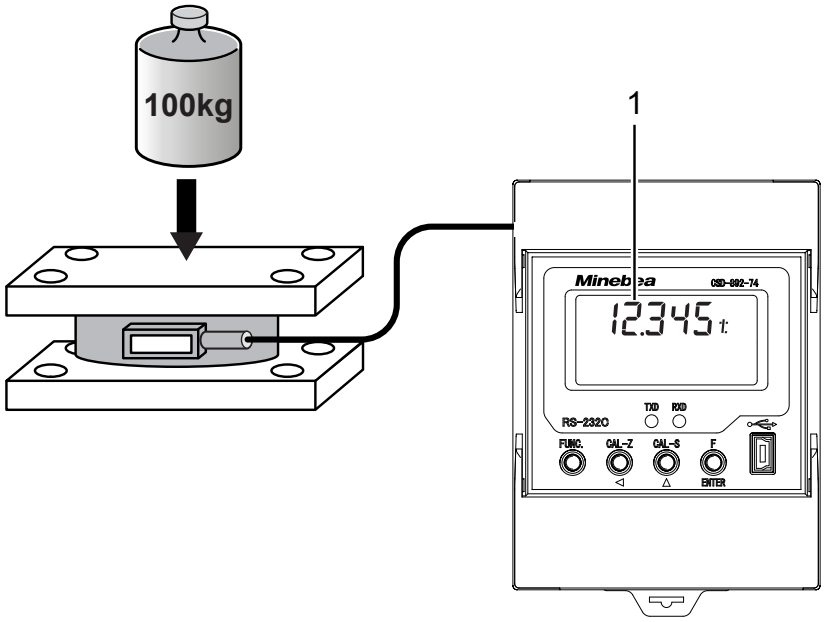
6.1 What is calibration?

Calibration is a necessary operation that brings the instrument's display in line with the load applied to its weighing part (load cell), in order that electrical signals from the weighing part are displayed as an accurate representation of the load.

Without calibration, a correct display and output are not possible. in which the load cell is used.

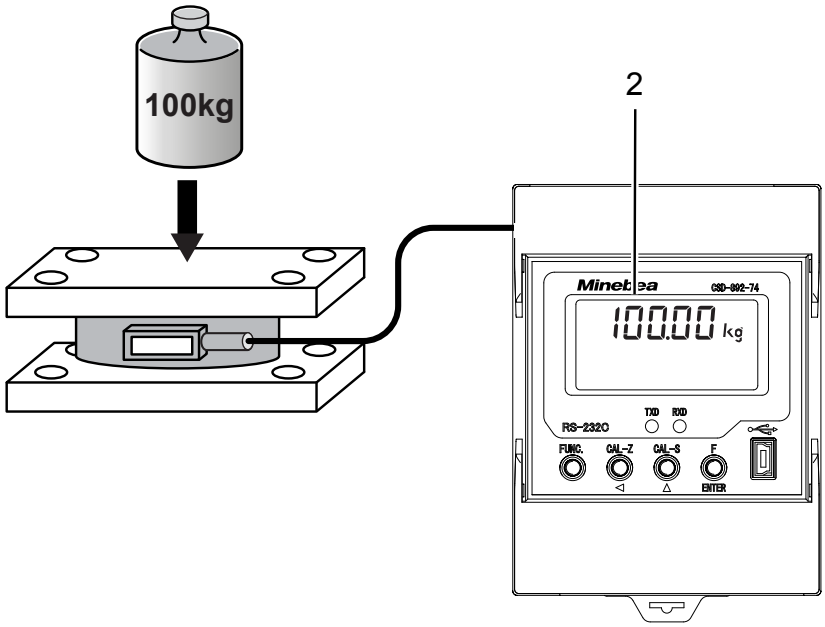
In the following example a weight of 100 kg is loaded on the weighing part (load cell).

Case where calibration has not been performed...



1	Neither the load value, the unit nor the decimal point position, etc. are correctly displayed.

When calibration is performed ...



2	The correct value is displayed for the load, while the unit and decimal point position are displayed as set.

6.2 Calibration procedure

Please refer to Chapter 6.6 for the actual steps.

1. Turn on power supply.

   After turning on 24 V DC, the device will power up for about 10 minutes to stabilize itself and the weighing part (load cell).

   CCAL [CCAL]

2. Switch to calibration mode.

   Switch from weighing mode to calibration mode.

   UnIT [UNIT]

3. Set the unit.

   Select the unit from [kg], [t], [lb], [N], [kN], [Pa], [kPa], [MPa], [OFF (none)] or [g].

   This is the only parameter that can be changed individually in C-function: CF-05.

   d.P. [D.P.]

4. Set the decimal point display position.

   Select the decimal point from [0] (none), [0.0], [0.00], [0.000] or [0.0000].

   This is the only parameter that can be changed individually in C-function: CF-01.

   SCAL [SCAL]

5. Set the scale interval.

   The scale interval is the minimum unit for weight values.

   Select from [1], [2], [5], [10], [20] or [50].

   Example: When set to "2," the display cycles through 2→4→6...

    [DISP]

6. Set the maximum load (Max).

   The maximum load is the maximum weight that can be measured.

    [LOAD]

7. Set the calibration weight.

   Set the calibration weight to be used in SPAN calibration. Use a weight that has mass of at least 2/3 of the maximum load (Max), in order to minimize calibration error. Input value of maximum load (Max) when there is no weight.

   (Actual load calibration)

    [ZERO]

8. ZERO Calibration by weight value

   ZERO is registered by entering the load cell output value when nothing is loaded on (initial condition including tare).

   OR

   (Electrical calibration)

    [Z MV]

9. ZERO calibration by numeric input.

   Perform ZERO calibration by numeric input. Use only under the specified conditions for this calibration method. For details, please refer to Chapter 6.3.

   (Actual load calibration)

    [SPAN]

10. SPAN calibration by weight.

    SPAN is registered by entering the load cell output value when a weight as set in step 7 is loaded on.

    (Electrical calibration)

     [S MV]

11. SPAN calibration by numeric input

    SPAN is registered by entering the load cell output value when a weight as set in step 7 is loaded on.

[END]

12. Calibration complete
    ▷ The calibration mode is complete. The set value is registered temporarily, until confirmed by pressing the [F/ENTER] key on [END] display. Set values are not stored if canceled before completion.

Note:

- If the usage environment is changed, please re-calibrate as necessary.
- When calibration has been performed by our company in combination with load cell, you will not be required to calibrate again.
- Perform calibration with actual load when a weight can be prepared that is at least 2/3 of the maximum load (Max). Accuracy of 1/1000 or greater can be expected due to the fact that this calibration is performed using an actual weighing system.
- SPAN calibration by numeric input (electrical calibration) is possible even when there is no weight.

6.3 Selection of calibration method

For ZERO calibration and SPAN calibration, the procedure differs depending on the usage conditions and whether a weight is used.

- ZERO calibration

  Under normal usage conditions, ZERO calibration is performed based on measurement values (actual load calibration).

  The ZERO is registered from the load cell output value read, when the tare or equivalent weight is loaded on the weighing part.

  ZERO calibration by numeric input (electrical calibration) can be performed only when the CSD-892/74, ../76 in use is replaced with another CSD-892/74, ../76, and when all of the following conditions are satisfied.

  - When the ZERO calibration data (mV/V values) of the CSD-892/74, ../76 prior to replacement remain.
  - When a condition where nothing can be loaded on the measuring part (initial condition including tare) is not possible.

- SPAN calibration

  SPAN calibration by weight (actual load calibration) is performed when there is a calibration weight. Use a weight that has mass of at least 2/3 of the maximum load (Max), in order to minimize calibration error. When there is no weight, SPAN calibration by numeric input (electrical calibration) is performed.

Note:

The accuracy of calibration by numeric input is about 1/1000. Be sure to perform calibration when an accuracy of 1/1000 or better is required.

6.4 Fine calibration and re-calibration

- Fine calibration of ZERO and SPAN

  This function is to execute the fine calibration of ZERO and SPAN when there is an error margin between the actual weighing value and the weight mass.

  Please refer to Chapter 6.7.

- Calibration of ZERO only

  This function is to execute the re-calibration of ZERO only, when the tare weight of the measuring part changes, beyond the maximum load (Max). Please refer to Chapter 6.7.1.2.

- Simple calibration

  This function is to execute an immediate shift to the setting screen or calibration screen of each item, when re-calibration is required, mainly due to a change in the measuring part. Please refer to Chapter 6.10.

6.5 Parameters to be set where necessary after calibration

- Digital linearization

  This function compensates up to 3 points, excluding the ZERO and SPAN, to minimize weighing errors.

  Please refer to Chapter 6.8.

- Gravity acceleration correction (C function: CF-25, CF-26)

  This function compensates for SPAN error, through the setting of gravitational acceleration for 2 different places, the place where the device is calibrated and where it will be used.

  Please refer to Chapter 8.13.

6.6 Details of calibration procedure

We will explain the calibration procedure for the device, when in its factory-shipped state.

Our explanation is based on an example, wherein the maximum display value is 6.000 t and the scale interval is 0.002 t.

6.6.1 Step 1 – Switch to calibration mode

Weighing mode

[FUNC.]

1. When in standard weighing mode, press the [FUNC.] key to display [FUNC.].

[CAL]

2. Press the [CAL-Z/◀] key three times. The display will change as follows. [FUNC.] - [CFUNC] - [SFUNC] - [CAL].

   ▷ [CAL] is displayed.

[CCAL]

3. Press[F/ENTER] key.
   ▷ [CCAL] is displayed, and it enters calibration mode.

↓ Setting of the unit

Note:

If the [FUNC.] key is pressed at or after step 2, any previously set values are canceled, and it returns to the [CCAL] display. Set values are not stored if canceled before completion.

6.6.2 Step 2 – Setting the unit

[CCAL],

1. When the [F/ENTER] key is pressed from the [CCAL] display.
   ▷ [UNIT] will be displayed.

[UNIT]

2. When the [F/ENTER] key is pressed from the [UNIT] display, [_____ kg] will be displayed.
   ▷ The unit currently stored will be displayed.

The stored unit.

Set [UNIT]

3. Select the unit using the [CAL-Z/◀] and [CAL-S/▲] keys.
   ▷ The unit display section will cycle through [OFF(none)], [g], [kg], [t], [lb], [N], [kN], [Pa], [kPa] or [MPa].

[D.P.]

4. After setting, press the [F/ENTER] key to display [D.P.]

↓ Setting the decimal point display position

6.6.3 Step 3 – Setting the decimal point display position

[D.P.],

1. When the [F/ENTER] key is pressed from the [D.P.] display, [0 t] will be displayed.
   ▷ The position of decimal point currently stored will be displayed.

The stored position

Set position

2. Select the position using the [CAL-Z/◀] and [CAL-S/▲] keys.
   ▷ The position of the decimal point will cycle through [0(none)], [0.0], [0.00], [0.000] and [0.0000].

[SCAL]

3. After setting, press the [F/ENTER] key to display [SCAL].

↓Setting of the scale interval

6.6.4 Step 4 – Setting the scale interval

[SCAL]

1. When the [F/ENTER] key is pressed from the [SCAL] display, [0.00 1 t] will be displayed.
   ▷ The scale interval currently stored will be displayed.

The stored scale interval

Set scale interval

2. Select the unit using the [CAL-Z/◀] and [CAL-S/▲] keys.
   ▷ The final 2 digits will cycle through [01], [02], [05], [10], [20] and [50].

[DISP]

3. After setting, press the [F/ENTER] key to display [DISP]

↓ Setting the maximum load (Max).

Note:

Example of display changes based on scale interval setting:

The load display will change through [0.002 t] - [0.004 t] - [0.006 t] , when the scale interval is set to [02] (When decimal point is set to [0.000] and unit is [t].).

6.6.5 Step 5 – Setting the maximum load (Max)

[DISP]

1. Press the [F/ENTER] key from the [DISP] display, [10.000] will be displayed.
   ▷ The maximum load (Max) currently stored will be displayed.

The stored maximum load (Max)

Set maximum load (Max)

2. Press the [CAL-Z/◀] key to select the digit to be changed.
3. Press the [CAL-S/▲] key to increment the value of the selected digit.

[LOAD]

4. After setting, press the [F/ENTER] key to display [LOAD].

↓ Setting the calibrating weight

6.6.6 Step 6 – Setting the calibrating weight

[LOAD]

1. When the [F/ENTER] key is pressed from the [LOAD] display, [06.000] will be displayed.
   ▷ The weight value currently stored will be displayed.

Weight value equal to maximum load (Max)

Set calibrating weight

2. Press the [CAL-Z/◀] key to select the digit to be changed.
3. Press the [CAL-S/▲] key to increment the value of the selected digit.

[ZERO]

4. After setting, press the [F/ENTER] key to display [ZERO].

↓ ZERO calibration

Note:

- Use a weight value for the calibrating weight that corresponds to at least 2/3 of the maximum load (Max).
- If it is possible to prepare the calibrating weight of the same weight value as maximum load (Max), then set "maximum load (Max) = calibrating weight".
- If SPAN is calibrated via the value input in step 8, set as "maximum load (Max) = calibrating weight".

Note:

Error display for maximum load (Max) or calibrating weight setting

- The Er-2 [ER-2] display will blink for about 2 seconds if calibration is set with "maximum load (Max) < calibrating weight".
- Please set each value such that "maximum load (Max) ≥ calibrating weight".

6.6.7 Step 7 – ZERO calibration by weight value

(Actual load calibration)

ZERO is registered by reading the load cell output value when nothing is loaded on (initial condition including tare).

Select the method of ZERO calibration referring to Chapter 6.3.

ZERO [ZERO]

1. Set the condition with nothing loaded on.

[ZERO]

2. Press the [F/ENTER] key when [ZERO] blinks, and the condition indicator [STABLE] is turned on.
   ▷ ZERO is stored, and [SPAN] is displayed.

SPAN [SPAN]

↓ SPAN calibration

6.6.8 Step 7 - ZERO calibration by numeric input

(Electronic calibration)

ZERO is registered by inputting the load cell output value corresponding to a load of zero.

This procedure is used only when a specific condition is met.

Select the method of ZERO calibration (see Chapter 6.3).

ZERO [ZERO], Z MW [Z MW]

1. By pressing the [ZERO] key, [Z MW] is displayed, and by pressing the[F/ENTER] key, the condition indicator mV/V is turned on, and [0.0000] mV/V is displayed.
   ▷ The stored load cell output value is displayed.

Stored load cell output value

Set load cell output value

2. Set the load cell output value corresponding to ZERO, in mV/V units.

   [CAL-Z/◀] Select the digit to be changed.

   [CAL-S/▲] Change the value of the selected digit.

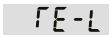
[SPAN]

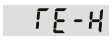
3. After setting, press the [F/ENTER] key to display [SPAN].

↓ SPAN calibration

Note:

Error display for ZERO calibration

- 

[TE-L] will blink for about 2 seconds when the output and input values of the load cell exceed the ZERO calibrating range on the minus side (when less than -2.5 mV/V).
- 

[TE-H] will blink for about 2 seconds when the output and input values of the load cell exceeds the ZERO calibrating range at minus side (when more than 2.5 mV/V).
- Confirm the rated capacity and the tare amount, etc., of the load cell, such that ZERO does not exceed the calibrating range.

6.6.9 Step 8 - SPAN calibration by weight

(Actual load calibration)

SPAN is registered by inputting the value obtained by subtracting the load cell output value for ZERO, from the expected load cell output value when a load at the maximum load (Max) is applied.

Select the method of SPAN calibration referring to Chapter 6.3

[SPAN]

1. Press the [F/ENTER] key while [SPAN] is displayed.
2. Load the weight corresponding to the mass set in step 6 onto the weighing part (load cell).

[SPAN]

3. Press the [F/ENTER] key after [SPAN] blinks and the condition indicator STABLE (stable) is turned on.
   ▷ SPAN is stored, and [END] is displayed.

[END]

↓ End of calibration

6.6.10 Step 8 - SPAN calibration by numeric input

(Electrical calibration)

SPAN is registered by inputting the value obtained by subtracting the load cell output value for ZERO, from the expected load cell output value when a load at the maximum load (Max) is applied.

Select the method of SPAN calibration referring to Chapter 6.3.

[SPAN],


[S MV]

1. pressing the [CAL-Z/◀] key will display [S MV], and then pressing the [F/ENTER] key will turn on the condition, mV/V, and [0.5000] mV/V will be displayed.
   ▷ The stored load cell output value will be displayed

mV/V

Stored load cell output value

mV/V

Set load cell output value

2. Set the value obtained by subtracting the output value corresponding with ZERO from the load cell output value corresponding to the set maximum load (Max), in units of mV/V.

   [CAL-Z/◀] Select the digit to be changed.

   [CAL-S/▲] Change the value of the selected digit.

[END]

3. After setting, press the [F/ENTER] key to display [END].

↓ End of calibration

Note:

Error display for SPAN calibration

- TE-L [TE-L] will blink for about 2 seconds when the output and input values of the load cell are not within the SPAN setting range, (when "Load cell output voltage at SPAN" - "Load cell output voltage at ZERO" ≤ 0.0 mV/V).
- TE-H [TE-H] will blink for about 2 seconds when the span width of the output and input values of the load cell (the range from ZERO to SPAN) exceeds the SPAN setting range (when greater than 3.1 mV/V).
- Confirm the rated capacity of the load cell and the mass of the weight so that SPAN does not exceed the setting range.

6.6.11 Step 9 – End of calibration

End [END],

[END] is displayed after the span calibration is finished.

1. Press[F/ENTER] key to complete the calibration mode.
   ▷ The display changes to [CADJ.], and the set data is stored to internal memory.

   CAdJ [CADJ]

2. Press the [FUNC.] key twice to return to weighing mode.

↓ Weighing mode

Note:

- The set value is registered temporarily, until confirmed by pressing the [F/ENTER] key on [END] display. The set value is not stored if calibration is canceled before the procedure is completed.
- Set the fine calibration of ZERO and SPAN, the digital linearization, the ZERO set and tare weight cancellation, after completing the calibration. If the calibration is revised, the above data are cleared.

Note:

Error display during weighing, after calibration is complete

- OL [OL] The indicator will light when the load display exceeds "(+ maximum load)+9d" or "+110 % of maximum load" (due to configuration of C function CF-03).
- -OL [-OL] The indicator will light when the load display falls below "(- maximum load) - 9d," "-110 % of maximum load" or below "-20d" (due to configuration of C function CF-03).

6.7 Fine calibration of ZERO and SPAN

This function fine-adjusts ZERO and SPAN when there is a margin of difference between the actual weighing value and the calibrating weight.

You can calibrate only ZERO or SPAN.

We explain the procedures for fine calibration of SPAN after the fine calibration of ZERO, as follows.

6.7.1 Details of procedure for fine calibration of ZERO and SPAN

6.7.1.1 Step 1 – Switch to ZERO and SPAN fine calibration mode

Weighing mode

[FUNC.]

1. Press the [FUNC.] key from the normal weighing mode to display [FUNC.].

[CAL]

2. Press the [CAL-Z/◄] key 3 times.
   ▷ The display will cycle as follows: [FUNC.] - [CFUNC] - [SFUNC] - [CAL] .

[CCAL]

3. Press the [F/ENTER] key to display [CCAL].

[CADJ]

4. Press the [CAL-Z/◄] key.
   ▷ The display will change to [CADJ] to switch to the fine calibration mode for ZERO and SPAN.

↓ Fine calibration of ZERO

6.7.1.2 Step 2 – To fine calibration of ZERO

[CADJ], 

[ZERO]

1. Press the [F/ENTER] key from the [CADJ] display.
   ▷ [ZERO] will be displayed.

, 

2. When the [F/ENTER] key is pressed, [0.007] will blink.
   ▷ The present weight value will be displayed.
3. Ensure that there is no load on the load cell, and set the display to [ZERO] accordingly.
4. Hold down these two keys, to decrease / increase the value continuously.

   [CAL-Z/◄] decrease the weight value.

   [CAL-S/▲] increase the weight value.

[SPAN]

5. Press the [F/ENTER] key after the fine calibration of ZERO to bring up the [SPAN] display.

↓ Fine calibration of SPAN

6.7.1.3 Step 3 – Fine calibration of SPAN

[SPAN]

1. By pressing the [F/ENTER] key from the [SPAN] display, [6.008] will blink.
   ▷ The current weight value will be displayed.

2. Place a calibrating weight on the load, a weight that is below the maximum load (Max).
3. Calibrate the device so that the displayed value is equal to the loaded weight (and adjust the display so that the value is equal to the mass of the weight.).

   Hold down these two keys, to decrease / increase the value continuously.

   [CAL-Z/◀] decrease the weight value.

   [CAL-S/▲] increase the weight value.

[END]

4. Press the [F/ENTER] key after fine calibration of SPAN to display [END].

↓ End of fine calibration of ZERO and SPAN

6.7.1.4 Step 4 – End of fine calibration of ZERO and SPAN

[END]

After the end of fine calibration for ZERO and SPAN, [END] is displayed.

1. Press the [F/ENTER] key to finish the calibration mode of ZERO and SPAN.
   ▷ [LNR] is displayed, and the setting data is stored to the internal memory.

[LNR]

2. Press the [FUNC.] key twice to return to weighing mode.

▼ Weighing mode

Note:

- The set value is registered temporarily, until it is confirmed by pressing the [F/ENTER] key on the [END] display.

  The set value is not stored if calibration is canceled before the procedure is completed.

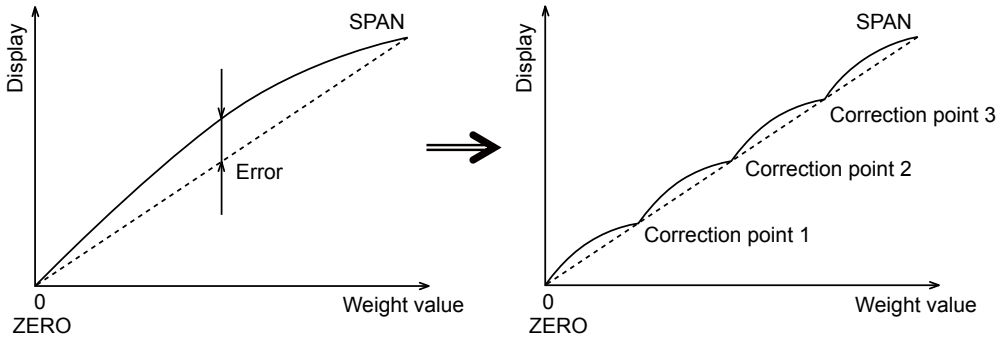
- The display of [ZERO], [SPAN] and [END] can be moved via the [CAL-Z/◀] key and [CAL-S/▲] key.

  Thus the fine calibration can only be executed for one of the entries. (The fine calibration can be executed only for arbitrary items.)

6.8 Digital linearization

After calibration, a weighing error of several scale intervals may arise between ZERO and SPAN (maximum load) due to the influence of the load cell.

Digital linearization is a function that compensates up to three points, excluding ZERO and SPAN, to reduce weighing error.



Before linearization

After linearization

6.8.1 Digital linearization mode setting procedure

6.8.1.1 Step 1 – Switch to digital linearization mode

Weighing mode

[FUNC.]

1. Press the [FUNC.] key in the normal weighing mode to display [FUNC.].

[CAL]

2. Press the [CAL-Z/◀] key 3 times. The display will cycle as follows: [FUNC.] - [CFUNC] - [SFUNC] - [CAL].

   ▷ The display will change to [CAL].

[CCAL]

3. Press the [F/ENTER] key to display [CCAL].

[LNR]

4. Press the [CAL-Z/◀] key twice: The display will cycle as follows: [CADJ] - [LNR] .
   ▷ The display will change to [LNR] to switch to digital linearization mode.

↓ Setting of digital linearization

6.8.1.2 Step 2 – Setting of digital linearization

[LNR]

1. Pressing the [F/ENTER] key twice from the [LNR] display.
   ▷ The display will cycle as follows: [LNR] - [POINT] - [P-1] .

[POINT]

2. Press the [CAL-S/▲] key from the [P-1] display.
   ▷ The display will cycle as follows: [P-2] - [P-3] , select the number of points for which you wish conduct linearization correction.
3. Press the [F/ENTER] key, to save the selection.
4. Press the [CAL-Z/◀] key to change the number of correction points.

[P-1]

[P-1]: Correction point 1

[P-2]: Correction point 2

[P-3]: Correction point 3

[LNR-1]

Load the weight

5. After the display shows [LNR-1], load the weight of the point to be corrected on the weighing part and press the [F/ENTER] key.

The weight value will blink. So check that the STABLE indicator turns on, and press the [F/ENTER] key.

The 10^0 to 10^1 digit of the weighing value will blink; adjust the display so that it shows the same value as the weight loaded on the weighing part.

[CAL-Z/◀] decrease the weighing value.

[CAL-S/▲] increase the weighing value.

[FUNC.] Interrupt the setting and return to the [LNR] display.

[F/ENTER] Store the displayed value and proceed to the next step.

[END]

[END] is displayed for [p-1].

Set by the same procedure as above when the number of correction points is [P-2] or [P-3].

6. Press the [F/ENTER] key to end the digital linearization mode.
   ▷ The display will show [TARE], and the set data will be stored to the internal memory.

[TARE]

Press the [FUNC.] key twice to return to the weighing mode.

↓ Weighing mode

Note:

- Set the weight value of the point to be corrected to [LNR-1] < [LNR-2] < [LNR-3].
- Linearization correction cannot be executed below zero or over the maximum load (Max).
- Please refer to Chapter 20 for details of error display.
- The digital linearization correction data can be cleared by the C function CF-98. Please refer to Chapter 8.16.

6.9 Calibration of ZERO only

This function is for recalibrating only of the ZERO, in cases such as when the tare amount of the weighing part is changed.

6.9.1 Step 1 – Switch to calibration mode only for ZERO

Weighing mode

[FUNC.]

1. Press the [FUNC.] key from the normal weighing mode to display [FUNC.].

[CAL]

2. Press the [CAL-Z/◄] key 3 times. The display will cycle as follows: [FUNC.] - [CFUNC] - [SFUNC] - [CAL].
   ▷ The display will change to [CAL].

[CCAL]

3. Press the [F/ENTER] key to display [CCAL].

[TARE]

4. Press the [CAL-Z/◀] key 3 times to cycle the display through [CCAL] - [CADJ] - [LNR] - [TARE].
   ▷ After the display reaches [TARE], the instrument will enter the calibration mode for ZERO only.

↓ Calibration mode for ZERO only

6.9.2 Step 2 – Calibration for ZERO only

Weighing mode

 [TARE],  [TZERO]

1. By pressing [FUNC.] key from the [TARE] display, [TZERO] will be displayed.
2. Set the condition with nothing loaded on the measuring part.

 [TZERO]

By pressing [F/ENTER] key, [TZERO] will blink and the calibration of ZERO will start.

Press the [F/ENTER] key after the condition indicator STABLE (stable) lights up.

 [END]

The calibration of ZERO is finished, and [END] is displayed.

3. Press[F/ENTER] key to close this mode.
   ▷ The display will show [TARE], and the set data will be stored to the internal memory.

 [CCAL]

4. Press the [FUNC.] key twice to return to the weighing mode.

↓ Weighing mode

Note:

Error display of ZERO calibration.

-  [TE-L] will blink for about 2 seconds when the output and input values of the load cell exceed the ZERO setting range on the minus side (when less than -2.5 mV/V).
-  [TE-H] will blink for about 2 seconds when the load cell output exceeds the ZERO setting range on the plus side (when more than 2.5 mV/V), or the value of "Registered SPAN + ZERO to be re-registered" exceed 3.1 mV/V.
- Confirm the rated capacity and the tare amount, etc., of the load cell, such that ZERO does not exceed the setting range.

6.10 Simple calibration

The setting screen and calibration screen for each item can be reached immediately, by pressing the [FUNC.], [CAL-Z/◄] or [CAL-S/▲] key for 2 or more seconds.

Note:

As the simple calibration function is locked when the instrument is factory shipped, and use the function after releasing the lock (refer to Chapter 6.10.1).

6.10.1 Simple calibration lock

Simple calibration can be prohibited or released by holding down the [CAL-Z/◄] key and CAL-S/ key at the same time for at least 2 seconds, and then using the [FUNC.], [CAL-Z/◄] and [CAL-S/▲] keys.

[LOCK1]

1. Press the [CAL-Z/◄] key and [CAL-S/▲] key at the same time for a short while from the normal weighing mode to display [LOCK1].

[LOCK0]

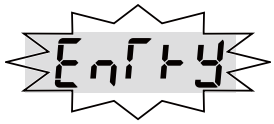
2. Select release or lock, and press the [F/ENTER] key.

   LoCK0 [LOCK0]: Lock release

   LoCK1 [LOCK1]: Lock

   [CAL-Z/◄], [CAL-S/▲] change the set value.

   [FUNC.] interrupt the setting procedure, and return to measurement mode.



[ENTRY]

3. [ENTRY] will blink for 2 seconds, after which the setting will be stored and the instrument will return to weighing mode.

Note:

- If the [FUNC.] key, [CAL-Z/◄] key, or [CAL-S/▲] key is pressed for a short while simple calibration is locked, LoCK [LOCK] will blink and you will be unable to enter setting mode, ZERO mode or SPAN mode screens.
- Return the simple calibration function to its locked state after use to prevent operational error.

6.10.2 Setting mode

By holding the [FUNC.] key for 2 or more seconds, you can set the unit, decimal point display position, scale interval, maximum load (Max), ZERO calibration and SPAN calibration (calibration by numeric input in both cases).

When the display blinks during item selection, and the item is confirmed with the [F/ENTER] key, the display will light up. Please refer to each step in chapter 6.6, for the detailed steps after item selection.

Weighing mode

[FUNC.]

Hold for 2 or more seconds

1. By holding the [FUNC.] key for 2 or more seconds in weighing mode, [FUNC.] will display and [UNIT] will blink.

   The device will then enter setting mode.

   [CAL-Z/◀], [CAL-S/▲] Change the setting item

   [F/ENTER] enter the setting item change display

   [FUNC.] interrupt the setting procedure, and return to the item selection display.

[UNIT] ➡ Chapter 6.6, step 2

[D.P.] ➡ Chapter 6.6, step 3

[SCAL] ➡ Chapter 6.6, step 4

[DISP] ➡ Chapter 6.6, step 5

[Z MV] ➡ Chapter 6.6, step 7

[S MV] ➡ Chapter 6.6, step 8

[END]

2. After finishing setting the necessary items, press the [F/ENTER] key on the [END] display.

[ENTRY]

[ENTRY] will blink for 2 seconds, after which all settings will be stored and the instrument will return to weighing mode.

Note:

The set value is registered temporarily, until confirmed by pressing the [F/ENTER] key on [END] display. Set values are not stored if canceled before completion.

6.10.3 ZERO mode

ZERO calibration is performed by pressing the CAL-Z/ key for at least 2 seconds, so the load cell output value at zero can be read.

Weighing mode

[ZERO]

1. If the [CAL-Z/◄] key is pressed for at least 2 seconds from the normal weighing mode, [ZERO] will blink.
2. Ensure that the load cell is in an unladen state.

   When the condition indicator STABLE (stable) blinks, press the [F/ENTER] key.

[ENTRY]

3. [ENTRY] will blink for 2 seconds, after which ZERO will be stored and the instrument will return to measurement mode.

Note:

- TE-L [TE-L] will blink for about 2 seconds when the load cell output and input values exceed the ZERO setting range on the minus side (when less than -2.5 mV/V)
- TE-H [TE-H] will blinks for about 2 seconds when the load cell output and input values exceed the ZERO setting range on the plus side (when more than 2.5 mV/V)
- Confirm the rated capacity and the tare amount, etc., of the load cell, to ensure that ZERO does not exceed the setting range.
- SP-H [SP-H] will continually blink when the value of (Registered SPAN + ZERO to be re-registered) is greater than 3.1 mV/V.
- Either continue to register the SPAN or redo the registration of ZERO.

6.10.4 SPAN mode

Maximum weight (Max), setting the calibration weight, and SPAN calibration by reading the load cell output value are executed by pressing the [CAL-Z/◄] key for at least 2 seconds.

Weighing mode

[DISP]

1. By pressing the [CAL-S/▲] key from the normal weighing mode, [DISP] will blink.

   Maximum load (Max) currently stored

2. By pressing the [F/ENTER] key from [DISP], [10.000] will be displayed.
   ▷ The maximum load (Max) currently stored will be displayed.

   Set maximum load (Max)

3. Set the maximum load (Max).

   [CAL-S/◀] select the digit to be changed.

   [CAL-Z/▲] change the selected digit.

   [FUNC.] interrupt the setting, and return to measurement mode.

   [F/ENTER] store the displayed value, and proceed to the next step.

[LOAD]

4. Press the [F/ENTER] key after setting to display [LOAD].

   Calibration weight for maximum load (Max)

5. Press the [F/ENTER] key from [LOAD] to display [06.000].
   ▷ The calibration weight currently stored will be displayed.

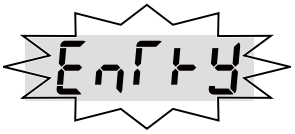
   Set calibration weight

6. Set the calibration weight. The key operation is the same as step 2.

[SPAN]

7. If the [F/ENTER] key is pressed after setting, [SPAN] will blink.
8. Put a weight corresponding to the weight value set in step 5 on the weighing part.

   Pressed the [F/ENTER] key after the condition indicator STABLE (stable) lights up.



[ENTRY]

9. [ENTRY] will blink for 2 seconds, after which all settings will be stored and the instrument will return to weighing mode.

7 C function mode

Calibration-related functions are set and changed between Active/Inactive, by setting the C function data.

7.1 C function mode setting method

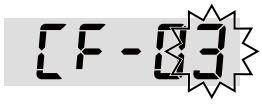
Weighing mode


[FUNC.]

1. Press the [FUNC.] key from the normal Weighing mode, to display [FUNC].


[CFUNC]

2. Press the [CAL-Z/◀] key to display [CFUNC] and enter C function mode.


[CF-01], 
[CF-03]

3. Press the [F/ENTER] key to display [CF-01].

   Select the C function number that you want to change.

   [CAL-S/◀] select the digit to be changed.

   [CAL-Z/▲] change the selected digit.

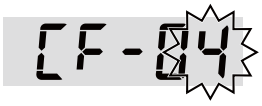
   [FUNC.] return to the [CFUNC] display.

   [F/ENTER] store the displayed value, and proceed to the next step.


, 

4. Press the [F/ENTER] key.

   Change the set value of that C function number that you selected. The key operation is the same as step 3.


[CF-04]

5. Press the [F/ENTER] key.

   ▷ The changed details are stored, and the next C function number is displayed.

   When you will change the setting of another C function, select the C function number to be changed in the same way as above.

   After storing to memory, press the [FUNC.] key to display [CFUNC].

6. Press the [FUNC.] key to return to the weighing mode.

7.2 C function data functions

Chapter	Item	Function no.	Set value	Details
8.1	Decimal point display position	CF-01	0*	No decimal point
			1	1234.5
			2	123.45
			3	12.345
			4	1.2345
8.2	A/D sampling rate	CF-02	0	50 times/s
			1	100 times/s
			2	250 times/s
			3*	500 times/s
8.3	Overload display condition	CF-03	0	When the amount exceeds (maximum load (Max) + 9d)
			1*	When the amount exceeds 110 % of maximum load (Max)
			2	When the amount exceeds –20d ~ (maximum load + 9d)
8.4	Weighing operation display synchronization	CF-04	0*	Not active
			1	Active
8.5	Unit	CF-05	0	No unit
			1	g
			2*	kg
			3	t
			4	lb
			5	N
			6	Pa
			7	kN
			8	kPa
			9	MPa
8.6	Function to reverse the sign of net weight	CF-08	0*	The reverse function of net weight sign is unavailable.
			1	The reverse function of net weighht sign is available.
8.7.1	ZERO set operation condition	CF-10	0	Operation in stable condition
			1*	Operating under no conditions

Chapter	Item	Function no.	Set value	Details
8.7.2	ZERO set effective range	CF-11	00~30	00 ~ 30 Unit: ±1 % of maximum load (Max) 00 : Zero set off
			02*	
8.8.1	ZERO tracking target	CF-12	0	0: Gross and net weight (against weight display)
			1*	1: Gross weight (only in the display of gross weight)
8.8.2	ZERO tracking data width	CF-13	000~999	000 ~ 999 (Unit: 0.1d)
			000*	000: Zero tracking off
8.8.3	ZERO tracking duration	CF-14	00~99	Unit: 0.1 s
			00*	00 : Zero tracking off
8.9.1	Power-on-ZERO operation	CF-15	0*	Not active
			1	Active
8.10.1	Tare weight cancellation operating condition	CF-16	0*	Operation when stable with 0 < gross weight≤ maximum load (Max)
			1	Operation under normal conditions with 0 < gross weight ≤ maximum load (Max)
			2	Operation when stable with gross weight ≤ maximum load (Max)
			3	Operation under normal conditions with gross weight ≤ maximum load (Max)
8.11	Change of data storage destination	CF-17	000~111 100*	0: Internal RAM 1: EEPROM 10^0: Zero set data 10^1: Tare weight cancellation 10^2: Simple mode setting data, and 5 steps control mode setting data
8.12	Stability detection during setting	CF-20	0*	Not active
			1	Active
8.13.1	Setting method for gravity acceleration correction value	CF-25	0*	Set the district number
			1	Set the numerical value for gravity acceleration (CF-28.29 active)
8.13.2	District number of place of usage	CF-26 (Can be set when CF25=0)	01~16	Unit: District
			10*	
8.13.3	District number for place of calibration	CF-27 (Can be set when CF25=0)	01~16	Unit: District
			10*	

Chapter	Item	Function no.	Set value	Details
8.13.2	Gravity acceleration value for place of use	CF-28 (Can be set when CF25=1)	9.000~ 9.999 9.797*	Unit : m/s^2
8.13.3	Gravity acceleration value for place of calibration	CF-29 (Can be set when CF25=1)	9.000~ 9.999 9.797*	Unit : m/s^2
8.14	Calibration data (for reference): Scale interval	CF-90		Factory settings: 1
8.14	Calibration data (for reference): maximum load (Max)	CF-91		Factory settings: 10000
8.14	Calibration data (for reference): Calibration weight	CF-92		Factory settings: 10000
8.14	Calibration data (for reference): ZERO mV/V value (for reference)	CF-93		Factory settings: 0.0000
8.14	Calibration data (for reference): SPAN mV/V value	CF-94		Factory settings: 0.5000
8.15	Stability detection duration during calibration	CF-97	00~99 05*	Unit: 0.1 s 00 : Stability detection during calibration OFF
8.16	Digital linearization clear	CF-98		The data compensated by digital linearization is cleared.
8.17	C function clear	CF-99		C function setting details returned to default settings.

* default settings

8 Various operations by C function data

8.1 Decimal point display position

The decimal point display position is selected by C function CF-01.

Setting range: 0 ~ 4	
0: None **Default**	1: 1234.5
2: 123.45	3: 12.345
4: 1.2345	

8.2 A/D sampling

The A/D sampling rate is selected by C function CF-02

Setting range: 0 to 3	
0: 50 times/s	1: 100 times/s
2: 250 times/s	3: 500 times/s **Default**

Note:

The A/D sampling rate decreases temporarily while data is written to EEPROM.

8.3 Overload display condition (OL, -OL display)

The overload display condition is selected by C function CF-03.

Setting range: 0 to 2
0: When the amount exceeds (maximum load + 9d)
1: When the amount exceeds ±110 % of maximum load (Max) **Default**
2: When the amount exceeds -20d ~ (maximum load + 9d)

8.4 Comparison operation display synchronization

"Active" or "Not active" is selected for comparison operation display synchronization by C function CF-04.

When "Not active" is selected, the comparison operation synchronizes with A/D sampling.

When "Active" is selected, it synchronizes with display.

Setting range: 0, 1:	
0: Not active **Default**	1: Active

8.5 Unit

Units are selected by C function CF-05.

Setting range: 0 :			
0: None	1: g	2: kg	Default
3: t	4: lb	5: N	
6: kN	7: Pa	8: kPa	
9: MPa			

8.6 Net weight sign reversal function

For example, the net weight display and the net weight data output externally are displayed as negative values, when in simple comparative discharge mode.

The net weight sign reversal function changes the net weight display and the net weight data output externally to positive values, by reversing the polarity of the net weight via C function CF-08.

Setting range: 0, 1:
0: No reversal of net weight sign Default
1: Reversal of net weight sign

8.7 Zero set

The ZERO set function saves the current weighing value as ZERO when the load display is the gross value and is within the ZERO set effective range. The display is set to ZERO. The ZERO set function is used by allocating it to the [F/ENTER] key (refer to function F-55) and pressing the F/ENTER key, or by allocating it to an external control input (refer to function F-60 ~ F-62).

8.7.1 Operating condition of ZERO set

ZERO set operating condition is selected by C function CF-10.

Setting range: 0, 1:
0: Operation at steady Default
1: Unconditional operation

8.7.2 Zero set effective range

The Zero set effective range is set by C function CF-11.

The effective range is shared by both Zero set and Zero tracking.

Setting range: 00 :	Default : 02
Unit: ±1 % of maximum load (Max)	OFF: 00

Note:

- When Zero compensation is executed within its effective range, with Zero set and Zero tracking, Zero set is not accepted.
- When tare weight cancellation is executed, Zero set is executed after tare weight cancellation is cleared.
- When the net weight offset function is executed, gross weight = 0, and net weight = (- net weight due to the net weight offset function).

8.8 ZERO tracking

The zero tracking function compensates the gradual zero drift under constant conditions and stabilizes the zero point.

8.8.1 ZERO tracking target

The ZERO tracking target is set by C function CF-12.

Setting range: 0, 1:
0: Gross weight and net weight (with respect to weight display)
1: Gross weight (when gross weight only is displayed) **Default**

8.8.2 ZERO tracking data width

The ZERO tracking data width is set by C function CF-13.

Setting range: 000 ~ 999	**Default**: 000
Unit: 0.1; D	OFF: 000

8.8.3 ZERO tracking duration

The ZERO tracking target is set by C function CF-14.

Setting range: 00 ~ 99	**Default**: 00
Unit: 0.1 s	OFF: 00

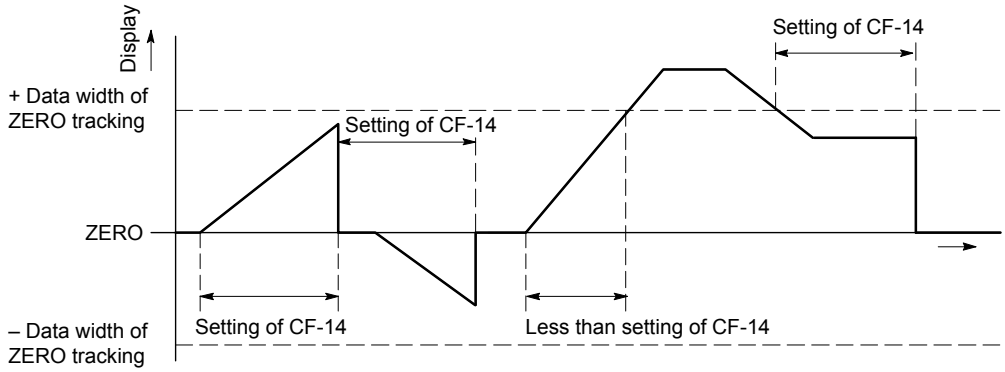
Example:

The data width over which ZERO tracking is executed is set by C function CF-13.

The ZERO tracking data width per set value [n] is obtained in the display conversion by the following formula.

ZERO tracking data width = Set value n for CF-13× 0.1 × Scale interval

When the set value for C function CF-13 = 10 and the scale interval D = 5, then ZERO tracking data width = 10 × 0.1 × 5 D = 5 D.



Note:

- ZERO tracking does not operate when the setting for either C function CF-13 or CF-14 is 0.
- Do not use ZERO tracking when the load fluctuates around zero.
- Note that ZERO tracking might become effective even if actual load change is rapid when the load change dampens due to the strength of the digital filter and the stabilization filter.
- ZERO tracking does not be operate when ZERO compensation is executed for the effective range with ZERO tracking and ZERO set.

8.9 Power on Zero

The power on Zero function sets the display to zero, if the condition is stable and the display is within ±10 % of the maximum load (Max), when the power is turned on and the display is on.

8.9.1 Power on ZERO operation

[ACTIVE] or [INACTIVE] can be selected for power on ZERO by C function CF-15.

Setting range: 0, 1:		
0: INACTIVE	**Default**	1: ACTIVE

Note:

- ZERO compensation is not accepted under the following conditions when the setting of C function CF-15 is [Power on zero effective] and the power is turning on.

  ① When the condition is not stable and the display remains fully lit

  ② When the weight value is outwith ±10% of the - - - - - maximum load In this case, press the [FUNC.] key to forces the load value to display.
- When power on ZERO is executed, tare weight cancellation, ZERO set and ZERO tracking data are all cleared.

8.10 Tare weight cancellation

Press [F/ENTER] key after allocating this function to [F/ENTER] to change the load display value to net weight display. TARE (Tare weight cancellation) and NET (Net weight) light in the condition display, and the display reads zero.

There are two methods for clearing tare weight cancellation.

- Allocate "tare weight cancellation" to the [F/ENTER] key. Then press the F/ENTER key when the gross weight is zero.
- Allocate "Tare weight cancellation clear" to the [F/ENTER] key. Press the F/ENTER key.

After tare weight cancellation is cleared, the display shows the gross weight. “Gross weight” GROSS lights.

Both "Tare weight cancellation" and "Tare weight cancellation clear" can be used through allocation to an external control input, as well as to the [F/ENTER] key.

8.10.1 Tare weight cancellation operating conditions

The operating conditions for tare weight cancellation are selected by C function CF-16.

Setting range: 0 ~ 3
0: Operation when stable with 0 < gross weight ≤ maximum load **Default**
1: Operation under normal conditions with 0 < gross weight ≤ maximum load
2: Operation when stable with gross weight ≤ maximum load
3: Operation under normal conditions with gross weight ≤ maximum load

Note:

- If ZERO set is executed, tare weight cancellation is cleared.
- When the net weight offset function is executed with tare weight cancellation applied, net weight offset is not implemented. (The tare weight cancellation function is given priority over the net amount offset function.)

8.11 Change of data storage destination

The data storage destination is set by C function CF-17. "Internal RAM" or "EEPROM" can be selected.

Setting range: 000 ~ 111	**Default** 1: 100
0: Internal RAM	1: EEPROM

Each digit of the set value corresponds with the following parameters. Select the storage destination for each digit.

- 10^0 digit: Zero set data
- 10^1 digit: Tare weight cancellation data
- 10^2 digit: Simple mode set data and 5 steps check mode set data

Example:

Setting value 001: Zero set data is stored in "EEPROM" and tare weight cancellation, simple mode and 5 steps check mode set data are stored in "Internal RAM."

Note:

- Please refer to Chapter 14 for details of the storage locations for data other than those mentioned above.
- Data stored in "Internal RAM" is not backed up.
- Set the storage destination to "internal RAM" when the set value is to be continuously changed, and there is a concern that the number of "EEPROM" rewrites might exceed approximately one million.
- Please do not change in the setting value during weighing because the A/D sampling rate decreases temporarily while rewriting the set values when the storage destination for setting data is "EEPROM". Be sure to set the storage destination to "internal RAM" if the set values are to be changed during measurement.

8.12 Stability detection during setting

Select "Active" or "Not active" for stability detection while setting the function, S function and various weighing modes, by C function CF-20.

Setting range: 0, 1:	
0: Not active **Default**	1: Active

8.13 Gravity acceleration compensation

A SPAN error arises due to difference in gravity acceleration if the places of calibration and usage differ.

The gravity acceleration compensation function compensates for SPAN error by setting different gravity accelerations for the places of calibration and usage. When the calibration place and the using place are the same, it is not necessary to compensate for gravity acceleration.

8.13.1 Setting method for gravity acceleration compensation value

The setting method for gravity acceleration compensation value is selected by C function CF-25.

Selectable range: 0, 1:
0: Set the district number **Default**
1: Set the numerical value for gravity acceleration

8.13.2 District number for place of use (when CF-25 = 0)

The district number for the place of use is set by C function CF-26.

Refer to the "Gravity acceleration compensation table (for reference)" in Chapter 8.13.5.

Setting range: 01 to 16	**Default** : District 10

8.13.3 District number for place of calibration (when CF-25:0)

The district number for the place of calibration is set by C function CF-27.
Refer to the "Gravity acceleration compensation table (for reference)" in Chapter 8.13.5.

Setting range: 01 to 16	**Default** : District 10

8.13.4 Acceleration due to gravity for place of use (when CF-25:1)

The gravity acceleration value for place of use is set by C function CF-28.
Refer to the "Gravity acceleration compensation table (for reference)" in Chapter 8.13.5.

Setting range: 9.000 to 9.999	**Default** : 9.797
Unit: m/s^2	

8.13.5 Acceleration due to gravity for calibration location (when CF-25:1)

The gravity acceleration value for the calibration place is set by C function CF-29.
Refer to the "Gravity acceleration compensation table (for reference)".

Setting range: 9.000 to 9.999	**Default** : 9.797
Unit: m/s^2	

Gravity acceleration compensation table (for reference)

District No.	Acceleration (m/s^2)	Corresponding districts
1	9.806	Kushiro, Kitami, Abashiri, Wakkanai, Monbetsu, Nemuro, jurisdiction of branch administrative offices of Souya, Rumoi, Abashiri, Nemuro, and Kushiro
2	9.805	Sapporo, Otaru, Asahikawa, Yubari, Iwamizawa, Biubai, Ashibetsu, Ebetsu-, Akahira, Shibetsu, Furano, Nayoro, Mikasa, Chitose, Takigawa, Sunagawa, Utashinai, Fukagawa, Eniwa, jurisdiction of branch administrative offices of Ishikari, Goboro and Kamikawa, and Sorachi
3	9.804	Hakodate, Muroran, Obihiro, Tomakomai, Noboribetsu, Date, jurisdiction of branch administrative offices of Toshima, Hinoyama, Tanshin, Hidaka and Tokachi
4	9.803	Aomori Prefecture
5	9.802	Iwate Prefecture, Akita Prefecture
6	9.801	Miyagi Prefecture, Yamagata Prefecture
7	9.800	Fukushima Prefecture, Ibaraki Prefecture, Niigata Prefecture
8	9.799	Tochigi Prefecture, Toyama Prefecture, Ishikawa Prefecture

District No.	Acceleration (m/s^2)	Corresponding districts
9	9.798	Gunma Prefecture, Saitama Prefecture, Chiba Prefecture, Tokyo (excluding the jurisdiction of the branch administrative offices Hachijojima and Ogasawara), Fukui Prefecture, Kyoto Prefecture, Tottori Prefecture, Shimane Prefecture
10	9.797	Aichi Prefecture, Mie Prefecture, Wakayama Prefecture, Shiga Prefecture, Osaka Prefecture, Hyogo Prefecture, Nara Prefecture, Okayama Prefecture, Hiroshima Prefecture, Yamaguchi Prefecture, Tokushima Prefecture, Kagawa Prefecture
11	9.796	Tokyo (jurisdiction of branch administrative office of Hachijojima only), Ehime Prefecture, Kochi Prefecture, Fukuoka Prefecture, Saga Prefecture, Nagasaki Prefecture, Oita Prefecture
12	9.795	Kumamoto Prefecture, Miyazaki Prefecture
13	9.794	Kagoshima Prefecture (excluding jurisdiction of branch administrative offices of Nase and Oshima)
14	9.793	Tokyo (jurisdiction of branch administrative office of Ogasawara only)
15	9.792	Kagoshima Prefecture (jurisdiction of branch administrative office of Nase and Oshima only)
16	9.791	Okinawa Prefecture

Note:

Confirm the details of gravitational acceleration using the service for gravity data on the websites of "Science chronology," the Geographical Survey Institute, etc.

(http://vldb.gsi.go.jp/sokuchi/gravity/grv_search/gravity.pl)

8.14 Calibration data (for reference)

You can look up the scale interval, maximum load (Max), calibration weight, Zero mV/V value and SPAN mV/V value set at present by using C functions CF-90 ~ CF-94.

8.15 Stability detection duration during calibration

Stability detection duration calibration is set by C function CF-97.

Setting range: 00 to 99	**Default** : 05
Unit: 0.1 s	

8.16 Digital linearization clear

The data set for digital linearization is cleared by C function CF-98.

[CF-98], 

[L.CLR]

1. By pressing the [F/ENTER] key when [CF-98] is displayed, [L.CLR] will blink.

 [CFUNC]

2. Press the [FUNC.] key at this time if you want to quit the digital linearization clear.
   ▷ [CFUNC] will be displayed, and digital linearization clear will not be executed.

 [L.CLR],  [CF-99]

3. By pressing [F/ENTER] key when [L.CLR] blinks, [CF-99] will be displayed, and the digital linearization clear operation will be completed.

8.17 C function clear

C function clear is executed by C function CF-99.

This will return the set value for the C function back to default.

 [CF-99],  [L.CLR]

1. By pressing the [F/ENTER] key when [CF-99] is displayed, [L.CLR] will blink.

 [CFUNC]

2. Press the [FUNC.] key at this time if you want to clear the memory.
   ▷ [CFUNC], will be displayed, and memory will not be cleared.

 [CF-CLR],  [CF-01]

3. By pressing the [F/ENTER] key while [CF-CLR] is blinking, [CF-01] will be displayed, and memory clear operation will be completed.

Note:

CF-90 ~ CF94 are C functions for looking up the calibration data; these are not cleared when memory is cleared.

9 Function mode

Various functions are activated by setting the function data.

9.1 Function mode setting method

Weighing mode

[FUNC.]

1. If the [FUNC.] key is pressed from normal weighing mode, the [FUNC.] will display, and the device will enter function mode.

[F-01],


[F-02]

2. Press the [F/ENTER] key to display [F-01].

   Select the function number that you want to change.

   [CAL-Z/◀] select the digit to be changed.

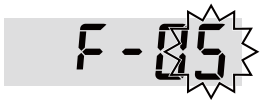
   [CAL-S/▲] change the selected digit.

   [FUNC.] return to the [FUNC.] display.

   [F/ENTER] store the displayed value, and proceed to the next step.

3. Press the [F/ENTER] key.

   Please select the setting value for the function number selected. The key operations are the same as step 2.



[F-05]

4. Press the [F/ENTER] key.

   ▷ Store the changed details and display the next function number.

   If another function number setting is to be changed, select the function number in question in the same way.

   When the [FUNC.] key is pressed after storage to memory is completed, [FUNC.] will be displayed.

[FUNC.]

5. Press the [FUNC.] key to return to weighing mode.

Note:

Please do not change the setting value during weighing, because the A/D sampling rate decreases temporarily while the value is being stored.

9.2 Details of function data

Chapter	Item	Function no.	Set value	Details
10.1	Digital filter	F-01	001 to 512 016*	Unit: Moving average 1 time
10.2	Analog filter	F-02	0	2 Hz
			1*	4 Hz
			2	6 Hz
			3	8 Hz
			4	10 Hz
10.3.1	Stabilization filter	F-05	001 to 512 092*	Unit: Moving average 1 time
10.3.2	Stabilization filter data width	F-06	0000 to 9999 0020*	Unit: 0.1D 0000: Stabilization filter OFF.
10.3.3	Stabilization filter time width	F-07	00 to 99 05*	Unit: 0.1 sec. 00: Stabilization filter OFF.
10.4.1	Independent key lock	F-08	0000 to 1111 0000*	0: Not active 1: Active 10^0 digit: [F/ENTER] key 10^1 digit: [CAL-S/▲] key 10^2 digit: [CAL-Z/◀] key 10^3 digit: "FUNC." key
10.5.1	Stability detection data width	F-10	000 to 999 020*	Unit: 0.1D 0000: Stability detection OFF.
10.5.2	Duration of stability detection	F-11	00 to 99 10*	Unit: 0.1 sec. 0000: Stability detection OFF.
10.6	Net weight offset function	F-15	00000 to 99999 00000*	00000: OFF
10.7.1	HOLD operation	F-17	0*	Synchronized with the HOLD signal.
			1	Synchronized with the inflow finish output.
10.7.2	HOLD target	F-18	000 to 111 111*	0: Not active 1: Active 10^0 digit: Display 10^1 digit: Comparison result

Chapter	Item	Function no.	Set value	Details
13.3.4	5-steps check mode operation target	F-21	00000 to 22222 00000*	0: Synchronized with display 1: Gross weight 2: Net weight 10^0 digit: Operating target of S0 10^1 digit: Operating target of S1 10^2 digit: Operating target of S2 10^2 digit: Operating target of S3 10^2 digit: Operating target of S4
13.3.3	5-steps check mode operation condition	F-22	00000 to 22222 00000*	0: OFF 1: Set value or more 2: Set value or less 10^0 digit: Operation of S0 10^1 digit: Operation of S1 10^2 digit: Operation of S2 10^2 digit: Operation of S3 10^2 digit: Operation of S4
13.3.5	Check mode hysteresis operation condition	F-24	0*	On-delay
			1	Off-delay
13.3.5	Check mode hysteresis data width	F-25	00 to 99 00*	Unit: 1D (00: Hysteresis OFF)
13.3.5	Check mode hysteresis time width	F-26	00 to 99 00*	Unit: 1 sec. (00: Hysteresis OFF)
16.3.3 16.3.3	Specifications for communication of RS-232C interface, RS-422/485 interface and USB interface.	F-42	13020*	Data bit length 10^0 digit: 0* = 7 bit, 1 = 8 bit Parity 10^1 digit : 0 = No parity, 1 = Evenparity, 2* = Odd parity Stop bit 10^2 digit: 0* = 1 bit, 1 = 2 bit Baud rate 10^3 digit : 0 = 1 200 bps, 1 = 2 400 bps, 2 = 4 800 bps, 3* = 9 600 bps, 4 = 19 200 bps, 5 = 38 400 bps Terminator 10^4 digit : 0 = CR, 1* = CR+LF
16.3.4	Setting of address for RS-422/485 interface effective only for CSD- 892-76 CSD-892-74 is fixed to [00] internally.	F-43	00 to 31 00*	The address of CSD-892-74 is fixed to 1 internally.

Chapter	Item	Function no.	Set value	Details
16.3.5	Changeover of RS-422/485 Effective only for CSD-892-76	F-44	0*	RS-422
			1	RS-485
16.3.6	Delay time of return data from RS-485 interface Effective only for CSD- 892-76	F-45	00 to 99 01*	Unit : 10 ms
16.3.7	Addition of decimal point to transmission data by RS-232C and RS-422/485 interface	F-46	0*	No decimal point
			1	with decimal point
16.3.1	Operation of RS-232C and RS-422/485 interface	F-47	0*	Command mode
			1	ModBus mode
			2	Stream mode
16.3.8	Output target of RS-232C and RS- 422/ 485 interface	F-48	0*	Displaysynchronization (HOLD when HOLD signal turns on.)
			1	Gross weight
			2	Net weight
			3	Conditional data of weight displayed
16.3.9	Digit of unit in RS-232C and RS-422/ 485 interface	F-49	0*	Unit : 2 digit
			1	Unit : 3 digit
10.8	Operation of [F/ENTER] key	F-55	00	No use
			01	HOLD
			02	ZERO set
			03	ZERO clear
			04	Tare weight cancellation
			05	Tare weight cancellation clear
			06	Change net / gross weight
			07	Change to weighing setting mode
			09	Batching start
			10	Emergency stop
			11	Forced batching finish
10.9.1	Operation of INPUT1 of external control input	F-60	00*	OFF
			01	ZERO set
			02	ZERO clear
			03	Tare weight cancellation

Chapter	Item	Function no.	Set value	Details
			04	Tare weight cancellation clear
			05	Change net / gross weight
			06	HOLD (Pulse)
			07	HOLD (Level)
			08	Display of net weight (Level: This displays the net weight when ON while gross weight is displayed.)
			09	Batch key lock (Level: This is activated when ON while weight display is displayed.)
			10	ERROR release
			11	Generic input 1
			12	Generic input 2
			13	Generic input 3
			14	Batching start
			15	Discharge start
			16	Emergency stop
			17	Manual overshoot correction
			18	Forced batching finish
			19	Forced discharge finish
10.9.1	External control input 2 operation	F-61	Selectable as well as F-60.	
10.9.1	External control input 2 operation	F-62	Selectable as well as F-60.	
10.9.2	External control output 1 operation	F-70	00*	OFF
			01	STABLE
			02	During tare weight cancellation
			03	Gross weight display
			04	Net weight display
			05	Center ZERO
			06	During HOLD
			07	ERROR
			08	CAPACITY EXCEED ERROR (max. weight error)
			09	NEAR ZERO (Empty)
			10	OK (S0)
			11	LARGE INFLOW (coarse flow) (S1)

Chapter	Item	Function no.	Set value	Details
			12	MEDIUM INFLOW (middle flow) (S2)
			13	SMALL INFLOW (fine flow) (S3)
			14	OVER (over setpoint) (S4)
			15	UNDER (under setpoint)
			16	FULL (Full)
			17	RUN (during weighing)
			18	Generic output 1
			19	Generic output 2
			20	Generic out put 3
			21	Weighing sequence error
			22	During weighing
			23	Batching finish
			24	Discharge (discharge valve open)
			25	Discharge finish (discharge valve)
10.9.2	External control output 2 operation	F-71	Selectable as well as F-70	
10.9.2	External control output 3 operation	F-72	Selectable as well as F-70	
10.9.2	External control output 4 operation	F-73	Selectable as well as F-70	
10.9.2	External control output 5 operation	F-74	Selectable as well as F-70	
10.9.3	External control output output logic	F-83	00000 to 11111 00000*	00000 ~ 11111 (0: Not active, 1: Active) 10^0 digit: Operation of OUTPUT1 10^1 digit: Operation of OUTPUT2 10^2 digit: Operation of OUTPUT3
10.10	Maintenance data	F-90	Do not use.	
10.10	Maintenance number	F-91	Do not use.	
10.11	Turning ON time of liquid crystal back light	F-95	00 to 60 00*	Unit : minute, 00 : Always turn on.
10.12	Function clear	F-99	The content of the function setting is returned to the default setting.	

* default settings

10 Various operations by function data

10.1 Digital filter

The digital filter function stabilizes A/D converted data by moving average processing.
The moving average rate is selected by function F-01.

Setting range: 001 to 512	**Default**: 016
Unit: 1 time	

Characteristic trends of the moving average are shown in the table below.

Moving average rate	Few		Many
Noise resistance	Sharp	⟷	STABLE
Response speed	Fast	⟷	Slow

10.2 Analog filter

The analog filter function cancels input signal noise.
The frequency is selected by function F-02.

Setting range: 0 to 4	
0: 2 Hz	1: 4 Hz **Default**
2: 6 Hz	3: 8 Hz
4: 10 Hz	

10.3 Stabilization filter

The stabilization filter function increases the digital filter when the load display change is fixed for longer than a prescribed time.

10.3.1 Stabilization filter

The stabilization filter moving average frequency is selected by function F-05.

Setting range: 001 to 512	**Default**: 092
Unit: 1 time	

10.3.2 Stabilization filter data width

The stability detection data width is set by function F-06.

Setting range: 0000 to 9999	**Default**: 0020
Unit: 0.1 D	OFF: 0000

10.3.3 Stabilization filter time range

The stability detection data range is set by function F-07.

Setting range: 00 to 99	Default : 05
Unit: 0.1 s	OFF: 00

Example:

The data width over which the stabilization filter is executed is selected by function F-06.

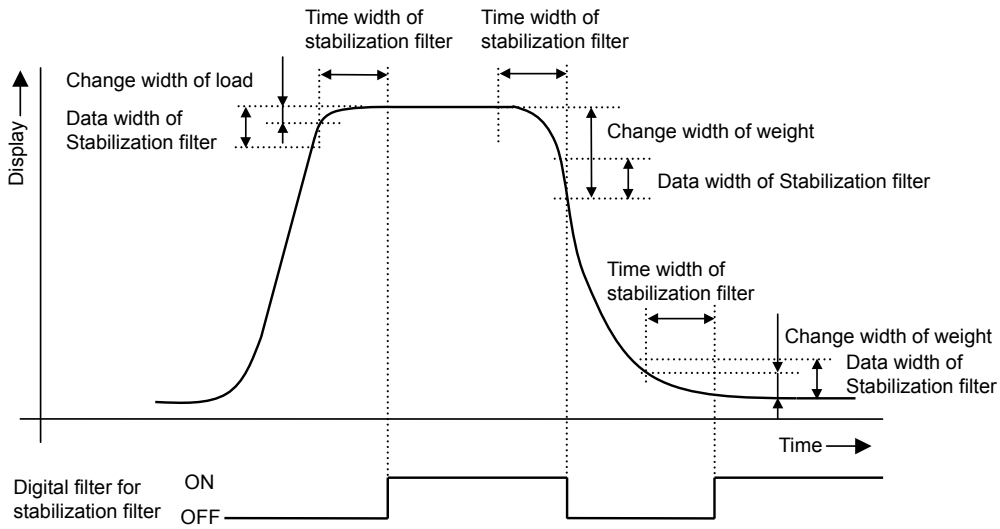
The stabilization filter data width for set value "n" is obtained as follows.

Stabilization filter data width = set value n for F-06 × scale interval

Setting of function F-06 is [0010] (1 D) and the scale interval is [D=05].

Stabilization filter data width = 1 × 5 = 5 D

Therefore, the stabilization filter set by function F-05 is active when the load display fluctuation is within the value set by function F-06 and this condition exceeds the time set by function F-07.



Note:

When the digital filter is set by function F-01, the moving average logic executes "moving average of stabilization filter (F-05)" after executing "moving average of digital filter (F-01)."

10.4 Key lock function

Key lock function restricts operation to prevent operational error for various front panel keys.

Condition indicator: LOCK Lights when a key lock function is active.

10.4.1 Individual key lock

ACTIVE and INACTIVE can be set for the [FUNC.] key, the [CAL-Z/◀] key, the [CAL-S/▲] key and the [F/ENTER] key by function F-08.

Setting range: 01 to 16	Default : 0000
0: INACTIVE	0 : INACTIVE

Each digit corresponds one of the following keys; ACTIVE or INACTIVE can be set for each.

- 10^0 digit: F/ENTER key
- 10^1 digit: CAL-S/ key
- 10^2 digit: CAL-Z/ key
- 10^3 digit: FUNC. key

Note:

- When [FUNC.] key operation is prohibited, press the [F/ENTER] key together with the [FUNC.] key to reactivate the [FUNC.] key.
- The above key lock release method cannot be used for inflow key lock by external control input.

10.4.2 Batch key lock

The batch key lock is set to "Active" or "Not active" by allocating "09 : Batch key lock" to the external control input, by setting functions F-60 ~ F-62.

All key operations are prohibited while inputting a signal of 50 ms or longer.

10.5 Stability detection

This function determines whether the weighing data is steady when the degree of change in the weight display is within the data width set by function F-10, and when that condition exceeds the time set by function F-11.

At this time, the condition display STABLE will light.

10.5.1 Stability detection data width

The stability detection data width is set by function F-10.

The display conversion data width is calculated as shown below.

Stability detection data width = Set value of F-10 × 0.1 × scale interval

The F-10 setting is [5] and the scale interval is [D = 2].

Data width stability detection = 5 × 0.1 × 2 = 1 D

10.5.2 Duration of stability detection

The stability detection time width is defined by function F-11.

Setting range: 00 to 99	Default: 10
Unit: 0.1 s	OFF: 00

10.6 Net weight offset function

When the tare amount is known, the net weight offset function sets the tare amount beforehand and offsets accordingly.

The value corresponding to the setting input digitally by function F-15 is subtracted from the gross weight and displayed as the net weight.

The condition display TARE lights when the net weight offset function is set to active.

When Zero set is executed while the net weight offset function is active, the gross weight = 0 and the net weight = (- amount set by the net weight offset function).

Setting range: 00000 ~ 99999	**Default** : 00000
	OFF: 00000

Note:

The net weight offset function does not work if that function is executed while tare weight cancellation is being executed.

The tare weight cancellation function is given priority over the net weight offset function.

10.7 Hold

This function retains the weighing value and comparison results during operation. The HOLD signal can be input by allocating the HOLD function to the[F/ENTER] key or by using an external control input.

Condition display HOLD Lights during hold

10.7.1 HOLD operation

The HOLD operating condition is selected by function F-17.

Setting range: 0 ~ 1	**Default** : 0
0: Synchronized with the HOLD signal	
1: Synchronized with the weighing finish output	

The operating condition of the HOLD function can be selected from (synchronized with HOLD signal) and (synchronized with weighing finish output).

10.7.2 HOLD target

The HOLD target is selected by function F-18.

Setting range: 000 to 111	**Default** : 111
0: INACTIVE	1 : ACTIVE

"ACTIVE" or "INACTIVE" can be selected individually because the digits correspond to "Display", "Comparison result" and "Gross/Net weight data of the Modbus interface".

- 10^0 digit: Display
- 10^1 digit: Comparison result

Note:

When the RS-232C interface and RS-422/485 interface output are in hold, set the output target to display synchronization by F-48.

10.8 Operation of F/ENTER

The operation of the [F/ENTER] key during weighing is allocated by function F-55.

Setting range: 00 :		Default : 08
00 :	None	
01:	Hold	Inputs the hold signal.
02:	Zero set	Executes the Zero set operation.
03:	Zero clear	When Zero set and Zero tracking have been executed, the display will return to the condition prior to the operation in question.
04:	Tare weight cancellation	Executes the tare weight cancellation operation.
05:	Tare weight cancellation clear	When tare weight cancellation has been executed, the display will returned to the condition prior to the operation.
06:	Change net/gross weight	Executes the change operation between gross and net display.
07:	Switch control setting mode	Switches to the setting screen for simple mode and 5-step check mode.
08:	Confirmation of address number	The address number is confirmed.
09:	Flow start	Inputs the flow start signal.
10:	Emergency stop	Inputs the emergency stop signal.
11:	Forced weighing finish	Input the force batch finish signal.

10.9 External control input and output

This sets the external control input and output.

10.9.1 External control input setting

The external control input operation is selected by setting functions F-60 ~ F62.

Setting range: ~	Default : 00
00 : OFF	No setting
01: Zero set	Executes the Zero set operation.
02: Zero clear	When Zero set and Zero tracking have been executed, the display will return to the condition prior to the operation in question.
03: Tare weight cancellation	Executes the tare weight cancellation operation.
04: Tare weight cancellation clear	When tare weight cancellation has been executed, the display will returned to the condition prior to the operation.
05: Change net/gross weight	Changes the display between net/gross weight.

06: Hold (pulse)	Changes between Hold ON/OFF when a 50 msec or longer signal is input.
07: Hold (level)	Sets Hold to ON during input when a 50 msec or longer signal is input.
08: Net weight display	Displays the net weight when in weighing mode.
09: Batch key lock	When a 50 msec or longer signal is input when on the weight display, all key operations are prohibited during input. In modes other than weighing, key operations are possible regardless of signal.
10: ERROR release	Releases the Zero set error or tare weight cancellation error.
14: Batch start	Inputs the batch start signal.
15: Discharge start	Inputs the discharge start signal.
16: Emergency stop	Inputs the emergency stop signal.
17: Overshoot correction	Applies overshoot correction.
18: Forced batch finish	Inputs the forced batch finish signal.
19: Forced discharge finish	Inputs the forced discharge finish signal.

The above mentioned [07 : HOLD (Level)], [08 : NET value display] and [09 : Key lock] are level input and become effective by the continuous short circuit of 50 ms or longer. Other items are pulse inputs, and become effective once by pulse width of 50 ms or longer.

Note:

Batch key lock by external control input differs from the individual key locks by function, in that, even if the [F/ENTER] key is pressed together with the [FUNC.] key, the [FUNC.] key cannot operate.

10.9.2 Setting of external control output

The external control input operation is selected by setting functions F-70 ~ F74.

Setting range: 00 ~ 25	**Default** : 00
00 : OFF	No setting
01: Stable	Output when stable.
02: During tare	Output with tare weight cancellation.
03: Gross display	Output when display is gross.
04: Net display	Output when display is net.
05: Center of Zero	Output in the ZERO point state.
06: During Hold	Output when HOLD operating.
07: Erroe	Output when an error occurs.
08: Weight abnormality	Output when the OL condition is met.

09: Near Zero	Output when in near zero state.
10: OK/S0	Output when the weight value is normal. Output when S0 output condition is satisfied, when weighing mode is set to 5-step check mode.
11: Coarse flow/S1	Output when coarse flow executed. Output when S1 output condition is satisfied, when weighing mode is set to 5-step check mode.
12: Middle flow/S2	Output when middle flow executed. Output when S2 output condition is satisfied, when weighing mode is set to 5-step check mode.
13: Fine flow/S3	Output when fine flow executed. Output when S3 output condition is satisfied, when weighing mode is set to 5-step check mode.
14: Over/S4	Output when the weight value is over setpoint. Output when S4 output condition is satisfied, when weighing mode is set to 5-step check mode.
15: Under	Output when the weight value is under setpoint.
16: Full	Output when the weighing value is full.
17: Run	Output when in weighing mode.
21: Weighing sequence error	Output when a sequence error arises.
22: During batch	Output when batching.
23: Batch finish	Output when batching is finished.
24: Discharge (discharge gate open)	Output when discharge executed.
25: Discharge finish	Output when discharge finished.

10.9.3 External control output logic

The external control input operation is selected by setting function F-83.

The external control output operates according to the set logic.

Setting range: 00000 ~ 11111	**Default** : 00000
0: Negative logic 1: Positive logic	

Each digit corresponds to OUTPUT1 ~ 5, to select the individual logic.

- 10^0 digit : Operation of OUTPUT1
- 10^1 digit : Operation of OUTPUT2
- 10^2 digit : Operation of OUTPUT3
- 10^3 digit : Operation of OUTPUT4
- 10^4 digit : Operation of OUTPUT5

10.10 Maintenance date, maintenance number

F-90 and F-91 are functions we use for maintenance; please do not use them.

10.11 Liquid crystal back light on time

The liquid crystal back light on time is set by function F-95.

When the set time has passed since the last key was operated, the liquid crystal back light will be turned off.

Setting range: 00 ~ 60	Default: 00
Unit: 1 minute	Always lit 00

Note:

The back light is turned on again by pressing any key when the liquid crystal backlight is off.

10.12 Function clear

Function clear is executed by function F-99.

The set value of the function is returned to default.

 [F-99],  [F.CLR]

1. Press the [F/ENTER] key from the [F-99] display to start the [F.CLR] display blinking.
2. At this time, press the [FUNC.] key if you no longer want to clear memory.
   ▷ [FUNC.] will be displayed, and memory will not be cleared.

    [FUNC.]

    [F.CLR],  [F-01]
3. By pressing the [F/ENTER] key while the [F.CLR] display is blinking, [F-01] will display and the clear memory operation will be completed.

Note:

- F-90 and F-91 are our maintenance functions; they are not cleared when memory clear is performed.
- Do not perform function clear during weighing, because the A/D sampling rate decreases temporarily while function clear is being executed.

11 S function mode

Settings for changing the weighing mode, changing the control mode, executing the comparison signal, executing "NEAR ZERO" function and executing "FULL" function are set in S function mode. Please refer to Chapter 13 for details of the weighing mode and control mode.

11.1 S function mode setting method

Weighing mode

[FUNC.]

1. Press the [FUNC.] key from the normal weighing mode, to display [FUNC].

[SFUNC]

2. Press the [CAL-Z/◄] key twice.
   ▷ The display will cycle through [FUNC.] - [CFUNC] - [SFUNC] to enter into S function mode.

[SF-01],


[SF-02]

3. Press the [F/ENTER] key to display [SF-01].

   Select the function number that you want to change.

   [CAL-Z/◄] select the digit to be changed.

   [CAL-S/▲] change the value of the selected digit.

   [FUNC.] return to the [SFUNC] display.

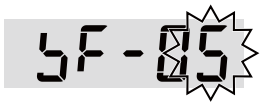
   [F/ENTER] store the displayed value, and proceed to the next step.

,


4. Press the [F/ENTER] key.

   Change the set value of the S function number that you selected.

   The operation of this key is as same as step 3.



[SF-05]

5. Press the [F/ENTER] key.
   ▷ The changed details are stored, and the next S function number is displayed.

   If another S function number setting is to be changed, select the function number in question in the same way.

[SFUNC]

6. After storing to memory, press the [FUNC.] key to display [SFUNC].
7. Press the [FUNC.] key again to return to weighing mode.

Note:

Please do not change the setting value during weighing, because the A/D sampling rate decreases temporarily while the value is being stored.

11.2 Functions of S function data

Chapter	Item	Function no.	Set value	Details
12.1	Weighing mode	SF-01	0	Simple mode
			1*	5-step check mode
			2	Sequential mode
12.2	Control mode	SF-02	0*	Batching
			1	Discharge
			2	External input change
12.3	Signal function	SF-05	0	Any time
			1*	In stable condition
			2	Synchronized with batching finish
			3	Synchronized with batching finish [Hold]
12.4	[Near Zero] function	SF-06	0*	Gross
			1	Net
			2	OFF
			3	(Gross)
			4	(Net)
12.5	[Full] function	SF-07	0*	Gross
			1	Net
			2	OFF
			3	(Gross)
			4	(Net)
12.6	Weighing time monitoring timer	SF-10	0000 ~ 9999 0000*	Unit: 1s 0000: Batching time monitoring timer OFF
12.7	Start via [Near Zero] (limit "Empty" at the time of batching start	SF-15	0*	Not active
			1	Active
12.7.1	Automatic tare weight cancellation after batching start	SF-16	0*	Not active
			1	Active

Chapter	Item	Function no.	Set value	Details
12.7.3	Batching start waiting time	SF-17	0000 ~ 9999 0000*	Unit: 1 s 0000: Batching start delay timer OFF
12.7.4	Automatic tare weight cancellation after batching start delay timer	SF-18	0*	Not active
			1	Active
12.8	Coarse flow weighing delay timer	SF-20	0000 ~ 9999 0000*	Unit: 0.01 s 0000: Coarse flow weighing delay timer OFF
12.9	Middle flow weighing delay timer	SF-21	0000 ~ 9999 0000*	Unit: 0.01 s 0000: Middle flow weighing delay timer OFF
12.10	Fine flow weighing delay timer	SF-22	0000 ~ 9999 0000*	Unit: 0.01 s 0000: Fine flow weighing delay timer OFF
12.11.1	Automatic overshoot correction	SF-25	0*	Not active
			1	Active
12.11.2	Automatic overshoot correction width	SF-26	00000 ~ 99999 00000*	Unit: 1D 00000: Automatic overshoot correction OFF
12.11.3	Store automatic overshoot correction value	SF-27	0*	Not active
			1	Active
12.12	Calming time (waiting time)	SF-30	0*	Waiting time is exceeded
			1	Waiting time is exceeded and condition is stable
			2	Waiting time is exceeded or condition is stable
12.13	Calming time (waiting time) setting	SF-31	0000 ~ 9999 0000*	Unit: 0.01 s 0000: Waiting time OFF
12.14.1	Number of post-batching	SF-35	000...255 000*	Unit: 1 time 000: Post-batching OFF
12.14.2	Condition for the finishing time of post-batching	SF-36	0*	Waiting time is exceeded
			1	Waiting time is exceeded and condition is stable
			2	Waiting time is exceeded or condition is stable
12.14.3	Post-batching time	SF-37	0000 ~ 9999 0000*	Unit: 0.01 s 0000: Post-batching OFF

Chapter	Item	Function no.	Set value	Details
12.14.4	Waiting time after post-batching	SF-38	0000 ~ 9999 0000*	Unit: 0.01 s 0000: Post-batching OFF
12.15.1	Output time of the batching finish signal	SF-40	0000 ~ 9999 0000*	Unit: 0.01 s 0000: Batching finish output OFF
12.15.2	Batching finish output OFF condition	SF-41	0*	No condition
			1	OL or stable output OFF
			2	Near Zero (Limit "Empty"
12.16.1	Discharge start when batching finishes	SF-45	0*	Not active
			1	Active
12.16.2	Discharge monitor timer	SF-46	0000 ~ 9999 0000*	Unit: 1 s 0000: Discharge monitor OFF
12.16.3	Delay time for closing the discharge valve	SF-47	0000 ~ 9999 0000*	Unit: 0.01 s 0000: Delay time for closing the discharge valve OFF
12.16.4	Output time for the discharge finish	SF-48	0000 ~ 9999 0000*	Unit: 0.01 s 0000: Output time for the discharge finish OFF
12.16.5	Tare weight cancellation clear when discharge finishes	SF-49	0*	Not active
			1	Active
12.17	S function clear	SF-99	S function settings will return to default	

* Set as default

12 Various operations by S function data

12.1 Weighing mode

The weughing mode is selected by setting S function SF-01.

Setting range: 0, 1, 2
0: Simple mode (batching/discharge)
1: 5-step check mode **Default**
2: Sequential mode (batching/discharge)

12.2 Control mode

The control mode (batching/discharge) is selected by setting S function SF-02.

Setting range: 0, 1:
0: Batching
1: Discharge **Default**

12.3 Signal function

The signal function is selected by the setting of S function SF-05.

Setting range: 0 ~ 3
0: Any time
1: In stable condition **Default**
2: Synchronized with the batching finish
3: Synchronized with the batching finish "Hold"

12.4 "Near Zero" function

"Near Zero" function is selected by setting S function SF-06.

Setting range: 0 ~ 4	
0: Gross **Default**	1: NET
2: Function OFF	3: (Gross)
4: (NET)	

12.5 "Full" function

The "Full" function is selected by setting S function SF-07.

Setting range: 0 ~ 4	
0: Gross **Default**	1: NET

2: Function OFF	3: (Gross)
4: (NET)	

12.6 Weighing time monitoring timer

Set a timer to monitor the time from the batching/discharge start signal output to the finish signal output, by setting S function SF-10.

If the weighing time is longer than the value set here, and error will be output.

The details of the error are as follows.

"batching" is selected for the "control mode": error "SE-4"

"discharge" is selected for the "control mode": error "SE-5"

Setting range: 0000-9999, Unit: 1 s, 0000: OFF

The default is set to "0000."

12.7 Batching start time setting

12.7.1 Start above Near Zero at the time of batching start

The setting is not "Near Zero" when the batching start signal is input by setting S function SF-15.

When "Not active" is selected, an error will be output and the batching will not start, if the batching start signal is input while not in a "Near Zero" condition.

12.7.2 Automatic tare weight cancellation at batching start

Set automatic tare weight cancellation when the batching start signal is input with S function SF-16.

The default is set to "Not active".

12.7.3 Batching start delay timer

Set the waiting time until the batching starts after the batching start signal is input, with S function SF-17.

Setting range: 0000 ~ 9999	
Unit: 1 s	**Default** 0000: OFF

12.7.4 Automatic tare weight cancellation after batching start delay timer

Set the operation of automatic tare weight cancellation after batching start delay timer by S function SF-18.

The default is set to "Not active".

12.8 Coarse flow weighing delay timer

Set the time over which the set point and weight value are not to be weighed at the start of coarse flow batching.

Setting range: 0000 ~ 9999	
Unit: 1 s	**Default** 0000: OFF

12.9 Middle flow weighing delay timer

Set the time over which the set point and weight value are not to be weighed at the end of coarse flow batching.

Setting range: 0000 ~ 9999	
Unit: 0.01 s	**Default** 0000: OFF

12.10 Fine flow weighing delay timer

Set the time over which the set point and weight value are not to be weighed at the end of middle flow batching.

Setting range: 0000 ~ 9999	
Unit: 0.01 s	**Default** 0000: OFF

12.11 Automatic overshoot correction

This function sets the overshoot correction value automatically by expecting the next overshoot correction value from the current overshoot correction value in continuous weighing mode.

The next overshoot correction value uses the moving averaged value from 4 previous overshoot correction values.

12.11.1 Setting of automatic overshoot correction

Set the operation of automatic overshoot correction by S function SF-25.

The default is set to "Not active".

12.11.2 Automatic overshoot correction width

Set the width for activation of automatic overshoot correction by S function SF-26.

The width for activation of automatic overshoot correction can be set for each grade number by setting SF-24: Batching/discharge grade setting target.

Setting range: 00000 ~ 99999	
Unit: 1 D	**Default** 00000: OFF

12.11.3 Store automatic overshoot correction value

Select the operation of save automatic overshoot correction value by S function SF-27.

When save automatic overshoot correction value is set to "Active", the value corrected by automatic overshoot correction is saved as the overshoot setting value (SET2).

The default is set to "Not active".

12.12 Calming time (waiting time)

Calming time is the waiting time before determining weight (finishing weighing).

This is set via S function SF-30.

The condition for the time of finishing weighing can be selected from "Waiting time exceeded", "Waiting time is exceeded and condition is stable" and "Waiting time is exceeded or condition is stable".

The default is set to "Waiting time is exceeded."

12.13 Calming time (waiting time) setting

Set the waiting time before finishing weighing by setting S function SF-31.

Setting range: 0000 ~ 9999	
Unit: 0.01 s	**Default** 0000: OFF

12.14 Post-batching operation setting

This sets the operation of post-batching.

12.14.1 Number of post-batching

Set the max. number for post-batching using S function SF-35.

Setting range: 000 ~ 255	
Unit: 1 time	**Default** 000: OFF

12.14.2 Condition for the finishing time of post-batching

Set the condition for the finishing time of the post-batching using the S function SF-36.

The condition for the finishing time of the post-batching can be selected from "Waiting time is exceeded", "Waiting time is exceeded and condition is stable" and "Waiting time is exceeded or condition is stable".

The default is set to "Waiting time is exceeded."

12.14.3 Post-batching time

Set the post-batching time by setting S function SF-37.

The post-batching time can be set for each grade number by setting SF-24: batching/ discharge target.

Setting range: 0000 ~ 9999	
Unit: 0.01 s	**Default** 0000: post-batching OFF

12.14.4 Waiting time after post-batching

Condition for the finishing time of post-batching

Set the waiting time after post-batching using S function SF-38.

The waiting time after post-batching can be set for each grade number using SF-24: batching/discharge grade setting target.

Setting range: 0000 ~ 9999	
Unit: 0.01 s	**Default** 0000: post-batching OFF

12.15 Set measuring finish output operation

This sets the operation of the measurement finish output signal.

12.15.1 Output time of the weighing finish signal

Set the output time for the weighing finish using S function SF-40.

Setting range: 0000 ~ 9999	
Unit: 0.01 s	**Default** 0000: OFF

12.15.2 Weighing finish output OFF condition

This condition to set the measurement finish output to OFF is set by S function SF-41.

This condition to set the measurement finish output to OFF can be selected from "no condition", "OL or stable output OFF" or "Near Zero".

When "no condition" is selected, the finish output will turn OFF, when the set time for weighing finish output is exceeded, or when the next start signal is input.

When "OL or stable output OFF" is selected, the finish output will turn OFF, when the display reads OL or –OL, or when the stable signal output turns OFF.

When "Near Zero" is selected, the finish output will turn OFF when Near Zero signal is output.

The default is set to "no condition."

12.16 Set Discharge after weighing finish

This sets the discharging after weighing is finished.

12.16.1 Discharge start when weighing finishes

Set the operation of discharge for the weighing finish using S function SF-45.

The default is set to "Not active".

12.16.2 Discharge monitor timer

Set the timer that monitors the time from discharge start to discharge finish by S function SF-46.

Setting range: 0000 ~ 9999	
Unit: 1 s	**Default** 0000: OFF

12.16.3 Delay time for closing the discharge valve

Set the time from the weight value fulfilling the "Near Zero" condition until the valve closes during discharge using S function SF-47.

Set the timer that monitors the time from discharge start to discharge finish by S function SF-46.

Setting range: 0000 ~ 9999	
Unit: 0.01 s	**Default** 0000: OFF

12.16.4 Output time for the discharge finish signal

Set the output time for the discharge finish using S function SF-48.

Setting range: 0000 ~ 9999	
Unit: 0.01 s	**Default** 0000: OFF

12.16.5 Tare weight cancellation clear when discharge finishes

Set "Tare weight cancellation clear when discharge finishes" using S function SF-49.
The default is set to "Not active".

12.17 S function clear

C function clear is executed by S function CF-99.
The setting content of S function is returned to default.

 [SF-99],  [SF.CLR]

1. By pressing the [F/ENTER] key when [SF-99] is displayed, [SF.CLR] will blink.
2. Plush the [FUNC.] key to discontinue memory clear.
   ▷ [SFUNC] will be displayed, and the memory will not be cleared.

    [SFUNC]

    [SF-01],  [SF.CLR]
3. By pressing the [F/ENTER] key while [SF-CLR] is blinking, [SF-01] will be displayed, and the memory clear operation will be completed.

Note:

Do not change the setting value during weighing, because the A/D sampling rate decreases temporarily while executing S function clear.

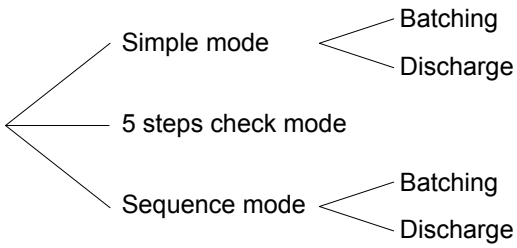
13 Weighing mode

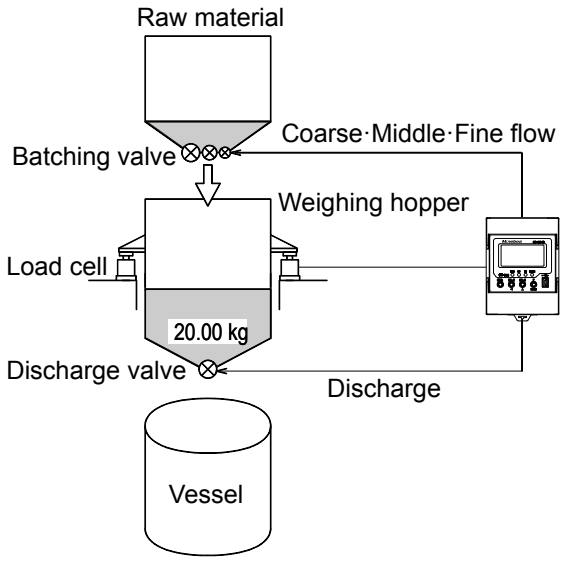
This device consists of three weighing modes. Information for choosing the mode see Chapter 13.1.

Set each weighing value with reference to Chapter 13.2.1.

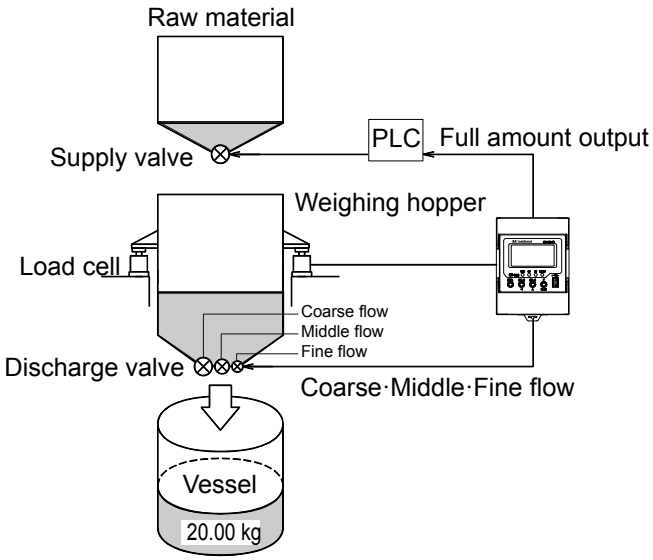
There are a further two control modes for "simple mode" and "sequential mode":

- Batching
- Discharge





Example for batching



Example for discharge

Note:

Control the supply of the raw material to the weighing hopper while observing the full amount output by PLC etc.

An outline of each mode is as follows.

- **Simple mode**

  The set value and measured value are compared, and when comparison results satisfy given conditions, the output turns on. PLC, etc., is required for such functions as gate control.

  For more information see Chapter 13.2.

- **Sequential mode**

  Comparison of the weight value and setting the order of the gate control, etc., can be performed without connecting an external PLC, etc.

  As a result, system construction that omits PLC is possible.

  In this mode, each output is turned ON, according to the value set by the ON limit of the start signal (OFF → ON). If the set value is compared with the measurement value, and the comparison result is satisfied, then the output goes OFF.

  In this mode, when an output turns OFF, it remains OFF until the finish signal is output, even if the comparison result is outside the relevant condition

  For more information refer to Chapter 13.4.

  This mode enables sequential control without connecting an external sequencer, etc.

- **5-steps check mode**

  The result of comparing the set value with weight value is output.

  After the weight value is compared with one of the set value, the setting of ON/OFF for output is decided based on the value above or below.

  Up to five comparison values can be from S0 to S4.

  For more information refer to Chapter 13.3.

13.1 Weighing mode selection method

Select either the simple mode or the 5-steps check mode.

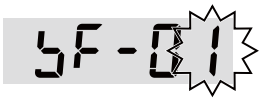
Weighing mode

[FUNC.]

1. Press the [FUNC.] key from the normal weighing mode, to display [FUNC].

[SFUNC]

2. Press the [CAL-Z/◀] key twice.
   ▷ The display will cycle through [FUNC.] - [CFUNC] - [SFUNC] to enter into S function mode.



[SF-01],


3. Press the [F/ENTER] key to display [SF-01].

   Set the setting value of S function SF-01 to [0] , [1] or [2] by pressing the [F/ENTER] key.

   Simple mode [0]

   5 step check mode [1]

   Sequencial mode: [2]

   [CAL-Z/◀] select the digit to be changed.

   [CAL-S/▲] change the value of the selected digit.

[FUNC.] return to the [SFUNC] display.

[F/ENTER] store the displayed value, and proceed to the next step.

[SF-02]

4. Press the [F/ENTER] key to store the updated details and display the next S function number.

   If another S function number setting is to be changed, select the function number in question in the same way.

[SFUNC]

5. After storing to memory, press the [FUNC.] key to display [SFUNC].
6. Press the [FUNC.] key again to return to weighing mode.

Note:

Please do not change the setting value during weighing, because the A/D sampling rate decreases temporarily while the value is being stored.

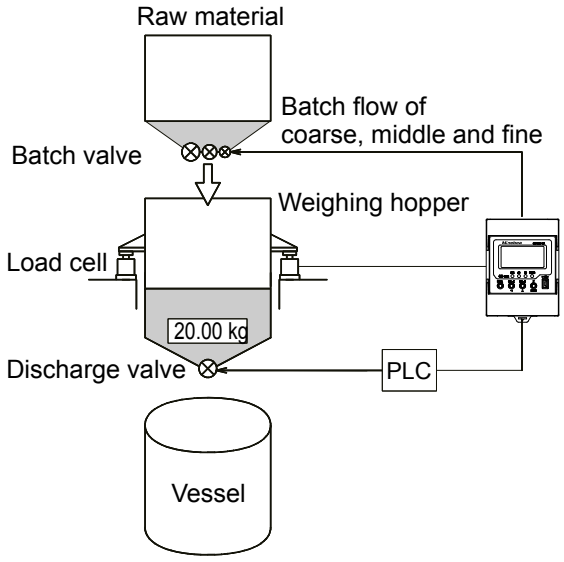
13.2 Simple mode

The sub-modes for simple mode are simple batching mode and simple discharge mode.

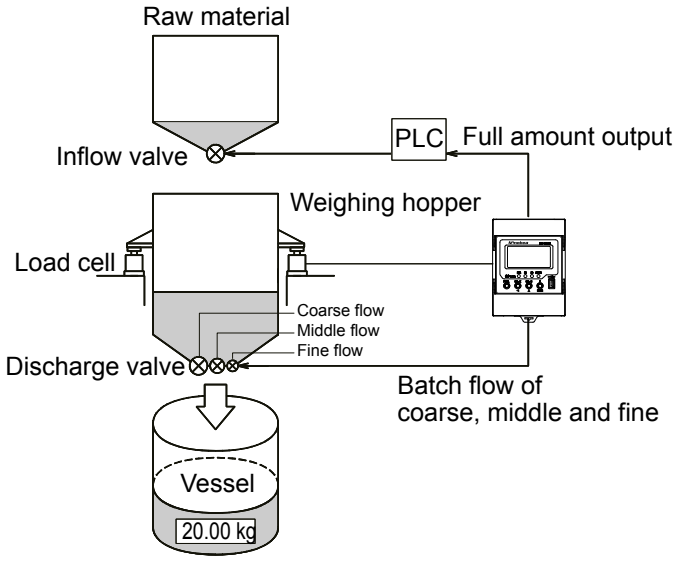
Select the setting value: Set S function SF-01 to 0 for simple mode.

For more Information refer to Chapter 13.

The setting parameters for simple mode and a weighing example for batch/discharge are given below.



Example for batch



Example for discharge

Note:

- Control the supply of raw material to the weighing hopper while observing full output by PLC, etc.
- PLC, etc., are required when a mode such as gate control is applied.

13.2.1 Setting of weighing values (COMP)

The setting of values used in single mode is executed.

Note:

Please execute after selecting a set value: [0] (Simple mode) using S function SF-01.

Weighing mode

[FUNC.]

1. Press the [FUNC.] key from the normal weighing mode, to display [FUNC].

[COMP],

[SET1]

2. Press the [CAL-Z/◀] key once.

   ▷ [COMP] displays and the device will enter into setting mode.

   By pressing [F/ENTER] key, [SET1] will blink.

[SET2],


3. After select the data number, [SET1] ~ [SET8], you want to change, and press the [F/ENTER] key.

   Please set the values for the weighing.

   [CAL-Z/◀] select the digit to be changed.

   [CAL-S/▲] change the value of the selected digit.

   [FUNC.] return to the [COMP] display.

   [F/ENTER] store the displayed value, and proceed to the next step.

,


[SET03]

4. Press the [F/ENTER] key to store the changed content and display the next data number.

If another S function number setting is to be changed, select the function number in question in the same way.

[COMP],

5. Press the[FUNC.] key after storing the memory, to display[COMP].
6. Press the [FUNC.] key again to return to weighing mode.

Note:

Please do not change the setting value during weighing, because the A/D sampling rate decreases temporarily while the value is being stored.

13.2.2 Setting parameters of single mode

Status display	Set data number	Setting value	Details
FINAL (setpoint)	SET1	00000 ~ 99999 00000*	Unit: 1D
FREE FALL (overshoot)	SET2	00000 ~ 99999 00000*	Unit: 1D
PRELIMINARY 1 (preset 1)	SET3	00000 ~ 99999 00000*	Unit: 1D
PRELIMINARY 2 (preset 2)	SET4	00000 ~ 99999 00000*	Unit: 1D
OVER (+tolerance)	SET5	00000 ~ 99999 00000*	Unit: 1D
UNDER (-tolerance)	SET6	00000 ~ 99999 00000*	Unit: 1D
NEAR ZERO	SET7	00000 ~ 99999 00000*	Unit: 1D
FULL	SET8	00000 ~ 99999 00000*	Unit: 1D

* Default

FIXED AMOUNT (Setpoint)

The setpoint is set by setting data number SET1.

Setting range: 00000 ~ 99999	**Default** : 00000
Unit: 1 D	

FREE FALL (Overshoot)

The value of overshoot is set by setting data number SET2.

The output of fine flow is turned on when the result reaches (setpoint (SET1) – overshoot (SET2)).

Setting range: 00000 ~ 99999	**Default** : 00000
Unit: 1 D	

PRELIMINARY 1 (Preset 1)

The value of preset 1 is set by setting data number SET3.

The output of middle flow is turned on when the result reaches (setpoint (SET1) – preset 1 (SET3)).

Setting range: 00000 ~ 99999	**Default** : 00000
Unit: 1 D	

PRELIMINARY 2 (Preset 2)

The value of preset 2 is set by setting data number SET4.

The output of coarse flow is turned on when the result reaches (setpoint (SET1) – preset 2 (SET4)).

Setting range: 00000 ~ 99999	**Default** : 00000
Unit: 1 D	

OVER (+tolerance)

The value of +tolerance (over setpoint) is set by setting data number SET5.

The output of OVER is turned ON when the result exceeds (setpoint (SET1) – OVER (SET5))

Setting range: 00000 ~ 99999	**Default** : 00000
Unit: 1 D	

UNDER (-tolerance)

The value of -tolerance (under setpoint) is set by setting data number SET6.

The output of UNDER is turned on when the result falls below (setpoint (SET1 – UNDER (SET6))

Setting range: 00000 ~ 99999	**Default** : 00000
Unit: 1 D	

NEAR ZERO (Empty)

The output value of the "NEAR ZERO" signal is set by setting data number SET7.

The output for "NEAR ZERO" is turned on when the operating target value selected by S function SF-06 (NEAR ZERO function) falls below the limit target value.

Setting range: 00000 ~ 99999	**Default** : 00000
Unit: 1 D	

FULL

The output value of the "FULL" signal is set by setting data number SET8.

The output for "FULL" is turned on when the operating target value selected by S function SF-07 (FULL function) exceeds the limit value.

Setting range: 00000 ~ 99999	**Default** : 00000
Unit: 1 D	

Note:

- Set the storage destination to "internal RAM" when the set value is to be continuously changed, and there is a concern that the number of "EEPROM" rewrites might exceed approximately one million.
- Please refer to Chapter 8.11 for details on how to set the storage destination.

13.2.3 Simple batch mode

Simple batch mode is an output mode. The results of comparing the weighing value increase for batching mode is compared to a set value to meet a judgment condition.

Set value: [0] "Batching mode" is selected by S function SF-02.

Judgment condition

Status display	Judgment condition
NEAR ZERO	?Gross weight or Net weight)? ≤ NEAR ZERO (SET7)
FULL (Coarse) FLOW	Net weight ≥ [Final (SET1) – Prelim 2 (SET4)]
MEDIUM (Middle) FLOW	Net weight ≥ [Final (SET1) – Prelim 1 (SET3)]
DRIBBLE (Fine) FLOW	Net weight ≥ [Final (SET1) – Prelim 1 (SET3)]
UNDER	Net weight < [Final (SET1) – Under (SET6)]
OVER	Net weight > [Final (SET1) + Over (SET5)]
OK	[Final (SET1) – Under (SET6) ≤ Net weight ≤ Final (SET1) + Over (SET5)]

Operating explanations

- When –net weight reaches [Final value – Prelim 2] Coarse flow turns ON. When the start signal is input, the comparison from Coarse inflow, Middle inflow and Fine inflow is prohibited during the Middle flow comparison.
- When the –net weight reaches[Final value – Prelim 1] Middle flow turns ON. When the start signal is input, the comparison from Coarse inflow, Middle inflow and Fine inflow is prohibited during the Fine flow comparison.
- When the net weight reaches [Final – Overshoot], Fine flow turns ON.

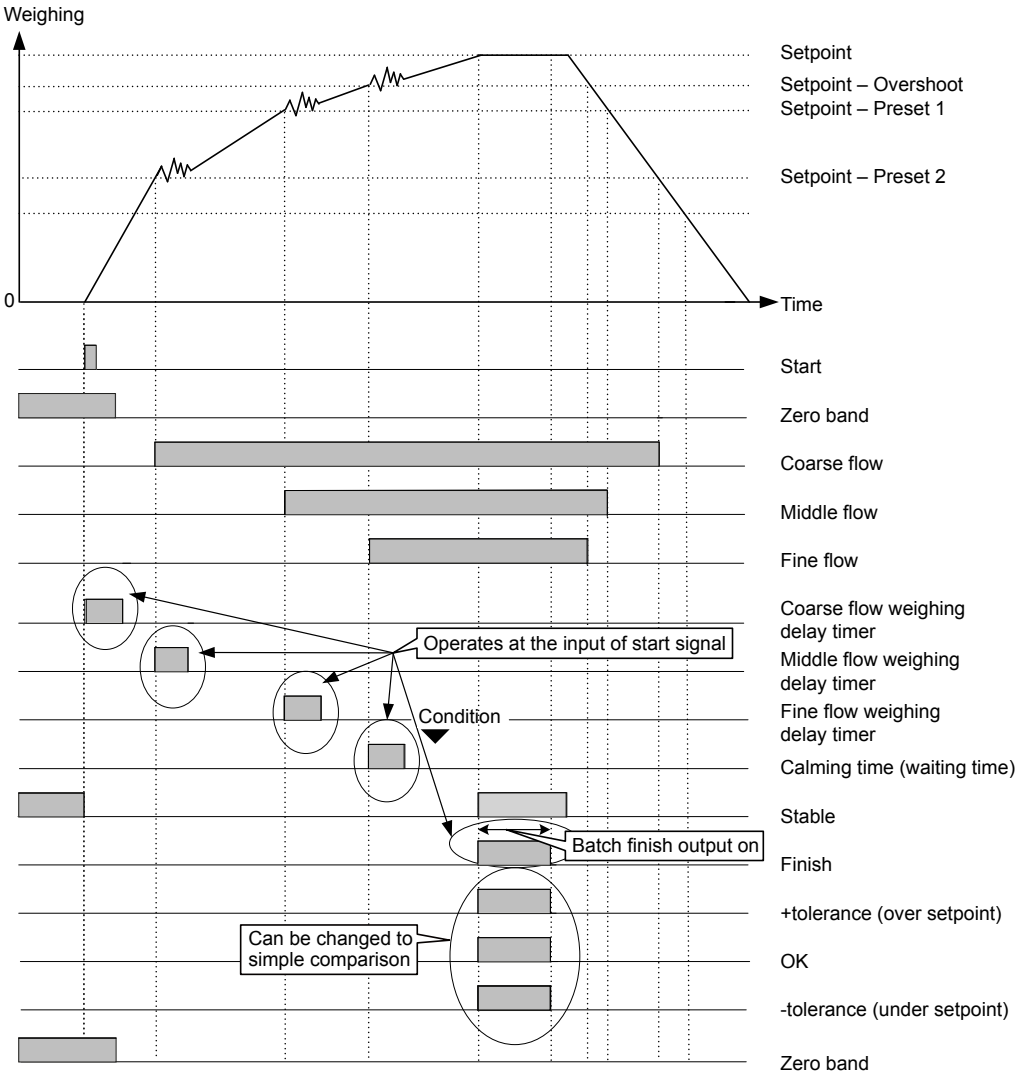
- When the start signal is used, the finish signal is output.
  - The comparative target of near zero and the comparative target of FULL value can be selected from Gross weight and Net weight.
  - Under, Over and OK operate with net weight.

    Comparison operation can be changed to simple operation.
  - When [Prelim 2 = 0]is set, Coarse flow turns OFF; when [Prelim 1 = 0], Middle flow turns OFF.

Note:

- If the start signal is not used, each condition display turns on and off according to the judgment condition shown above.
- The net weight sign can be reversed. Refer to Chapter 8.6.
- Comparison output is synchronized with the A/D sampling rate or the display.

  This selection is executed by C function CF-04. Refer to Chapter 8.4.



13.2.4 Simple discharge mode

Simple discharge mode outputs a judgment condition that is satisfied in comparison between the decrease in weighing amount for discharge of the weighed object and a set amount.

Judgment condition

Status display	Judgment condition
NEAR ZERO	|Gross weight or Net weight)| ≤ NEAR ZERO (SET7)
FULL (Coarse) FLOW	Net weight ≥ [Final (SET1) – Prelim 2 (SET4)]
MEDIUM (Middle) FLOW	Net weight ≥ [Final (SET1) – Prelim 1 (SET3)]
DRIBBLE (Fine) FLOW	Net weight ≥ [Final (SET1) – Prelim 1 (SET3)]
UNDER	Net weight < [Final (SET1) – Under (SET6)]
OVER	Net weight > [Final (SET1) + Over (SET5)]
OK	[Final (SET1) – Under (SET6) ≤ Net weight ≤ Final (SET1) + Over (SET5)]

Operating explanations

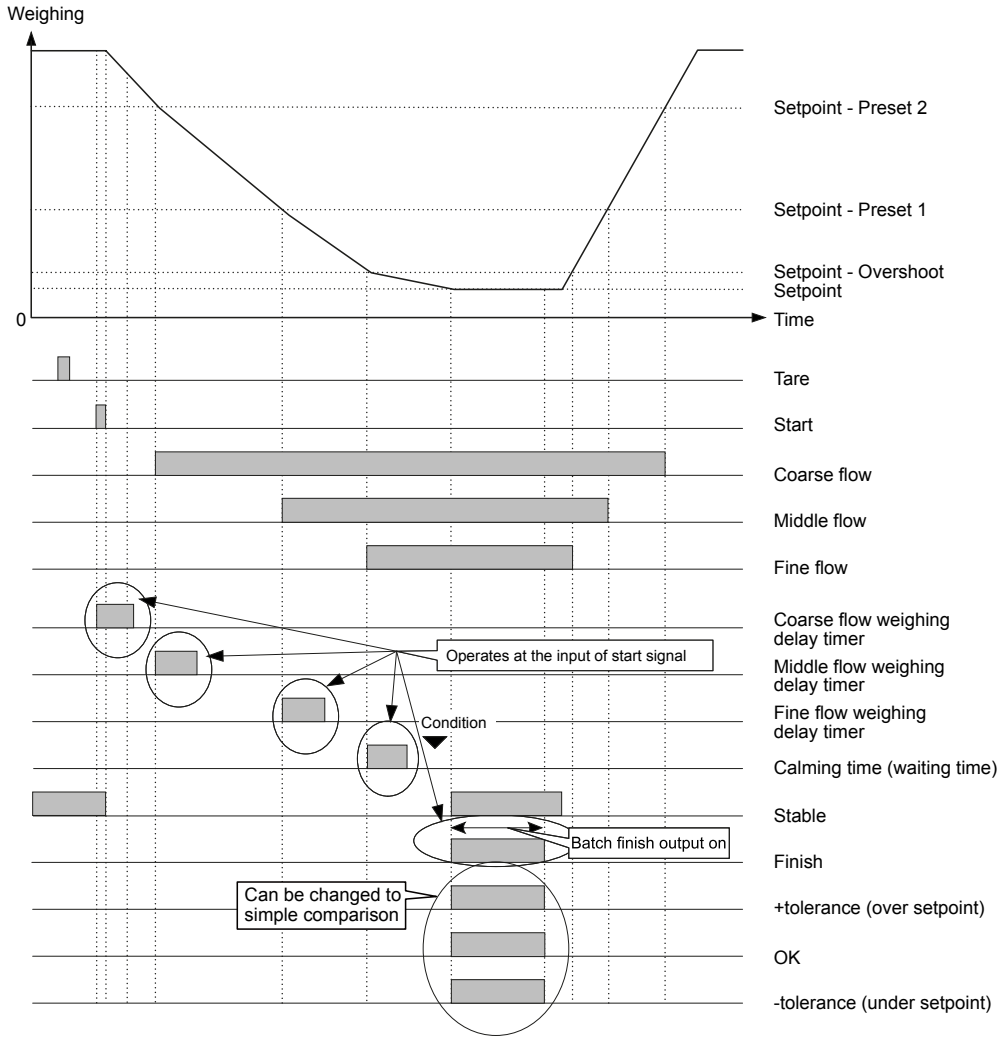
- When –net weight reaches [Final value – Prelim 2] Coarse flow turns ON. When the start signal is input, the comparison from Coarse flow, Middle flow and Fine flow is prohibited during the Middle flow comparison.
- When the –net weight reaches[Final value – Prelim 1] Middle flow turns ON. When the start signal is input, the comparison from Coarse flow, Middle flow and Fine flow is prohibited during the Fine flow comparison.
- When the net weight reaches [Final – Freefall], Fine flow turns ON.
- When the start signal is used, the finish signal is output.
  - The comparative target of near zero and the comparative target of FULL value can be selected from Gross weight and Net weight.
  - Under, Over and OK operate with net weight.

    Comparison operation can be changed to simple operation.
  - When [Prelim 2 = 0]is set, Coarse flow turns OFF; when [Prelim 1 = 0], Middle flow turns OFF.

Note:

- If the start signal is not used, each condition display turns on and off according to the judgment condition shown above.
- The net weight sign can be reversed. Refer to Chapter 8.6.
- Comparison output is synchronized with the A/D sampling rate or the display.

  This selection is executed by C function CF-04. Refer to Chapter 8.4.



13.3 5-steps check mode

Up to five weighing values are compared and the result output.

13.3.1 Setting of check value (COMP)

This sets the weighing values used in 5-steps check mode.

Note:

Please execute after selecting the set value: [1] (5-steps check mode) using S function SF-01.

Weighing mode

FUnC [FUNC.]

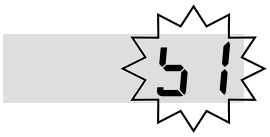
1. Press the [FUNC.] key in the normal measurement mode to display [FUNC.].

CoMP [COMP]


[S0]

2. Press the [CAL-Z/◀] key once.
   ▷ [COMP] will be displayed, and the device will enter comparison value setting mode.

   When the [F/ENTER] key is pressed, [S0] will blink.


[S1],


3. Press the [F/ENTER] key after selecting the number [S0] ~ [S4], SET7, SET8 you want to change.

   Set the value for the checking.

   [CAL-Z/◀] select the digit to be changed.

   [CAL-S/▲] change the value of the selected digit.

   [FUNC.] return to [COMP] display.

   [F/ENTER] store the displayed value, and proceed to the next step.


,

[S2]

   Registration complete

4. Press the [F/ENTER] key.
   ▷ The changed details will be stored and the next data number will be displayed.
5. If another data number setting is to be changed, select the data number in question in the same way.


[COMP]

6. Press the [FUNC.] key after storing the memory, to display [COMP].
7. Press the [FUNC.] key again to return to weighing mode.

Note:

Please do not change the setting value during weighing, because the A/D sampling rate decreases temporarily while the value is being stored.

13.3.2 5-steps check mode setting parameters

Status display	Set data number	Set value	Details
S0	S0	-99999 ~ 99999 00000*	Unit: 1D

Status display	Set data number	Set value	Details
S1	S1	-99999 ~ 99999 00000*	Unit: 1D
S2	S2	-99999 ~ 99999 00000*	Unit: 1D
S3	S3	-99999 ~ 99999 00000*	Unit: 1D
S4	S4	-99999 ~ 99999 00000*	Unit: 1D
NEAR ZERO (Empty	SET7	-99999 ~ 99999 00000*	Unit: 1D
FULL	SET8	-99999 ~ 99999 00000*	Unit: 1D

* Default

S0 ~ S4

Set data number: Set the value for executing comparison with S0 ~ S4.

For operation of the setting value, please refer to Chapter 13.3.3.

Setting range: 00000 ~ 99999	Default : 00000
Unit: 1 D	

NEAR ZERO (Empty)

The output value of the "NEAR ZERO" signal is set by setting data number SET7.

The output for "NEAR ZERO" is turned on when the operating target value selected by S function SF-06 (NEAR ZERO function) falls below the limit target value.

Setting range: 00000 ~ 99999	Default : 00000
Unit: 1 D	

FULL

The output value of the "FULL" signal is set by setting data number SET8.

The output for "FULL" is turned on when the operating target value selected by S function SF-07 (FULL function) exceeds the limit value.

Setting range: 00000 ~ 99999	Default : 00000
Unit: 1 D	

Note:

- Set the storage destination to "internal RAM" when the set value is to be continuously changed, and there is a concern that the number of "EEPROM" rewrites might exceed approximately one million.
- Please refer to Chapter 8.11 for details on how to set the storage destination.

13.3.3 Operating condition of comparator S0, S1, S2, S3 and S4

The comparator in this mode, S0, S1, S2, S3 and S4, the operating condition can be selected from "more than setting value" and "less than setting value".

These are selected by function F-22. For details, please refer to Chapter 9.2.

Default is selected as [OFF] for each of S0, S1, S2, S3 and S4.

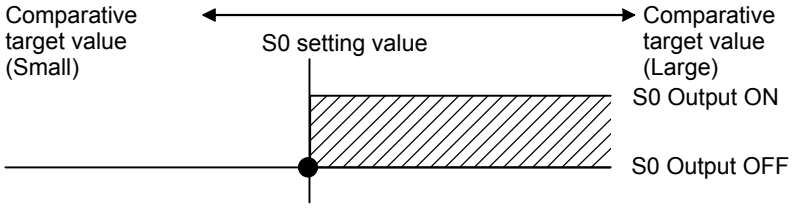
Note:

- The ON/OFF condition for each output differs depending on the operating condition of comparator. Please note that if the wrong operation is selected, the output ON/OFF condition will be inappropriate, and an unexpected failure will result due to a peripheral malfunction.
- The update of each comparison output is synchronized with either the A/D sampling rate or the display. This selection is executed by C function CF-04 "Comparative operation display synchronization."

The comparison value for each comparison target and output operation are indicated as follows, with S0 as an example. S1, S2, S3 and S4 operate in the same way.

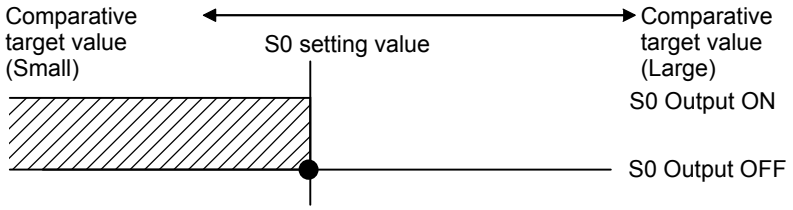
- (1) [More than setting value] is selected

  S0 output ON when S0 set value ≤ comparison target value.



- (2) [Less than setting value] is selected

  S0 output ON when S0 set value ≥ comparison target value.



13.3.4 Check S0, S1, S2, S3 and S4 operating target

The operating target for the comparator in this mode, S0, S1, S2, S3 and S4 individually can be selected from

[display synchronization], [gross weight] and [net weight]. These are selected by function F-21. For details, please refer to Chapter 9.2.

Default is selected as [Display synchronization] for each of S0, S1, S2, S3 and S4.

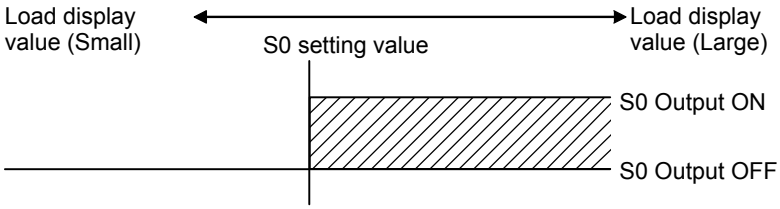
Note:

- The ON/OFF condition for each output differs depending on the operating condition of comparator. Please note that if the wrong operation is selected, the output ON/OFF condition will be inappropriate, and an unexpected failure will result due to a peripheral malfunction.
- The update of each comparison output is synchronized with either the A/D sampling rate or the display. This selection is executed by C function CF-04, please refer to Chapter 8.4.

The comparison value for each comparison target and output operation are indicated as follows, with S0 as an example. S1, S2, S3 and S4 operate in the same way.

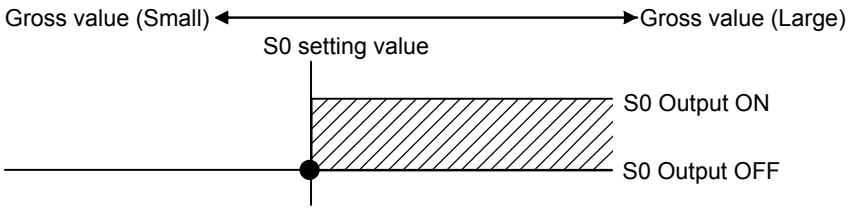
- (1) [Display synchronization] is selected

  S0 output ON when S0 set value ≤ load display value.



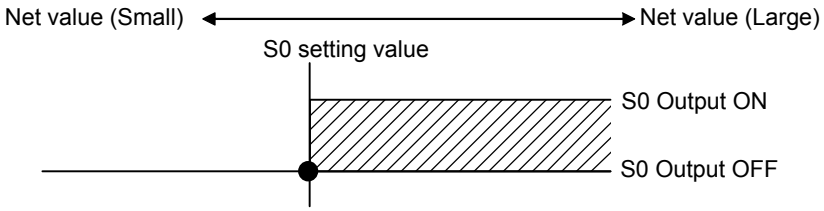
- (2) [Gross weight] is selected

  S0 output ON when S0 set value ≥ gross weight.



- (3) [Net weight] is selected

  S0 output ON when S0 set value ≥ net weight.



13.3.5 Comparator hysteresis

Hysteresis can be set to prevent chattering by the various outputs, for S0, S1, S2, S3 and S4. Phenomenon where ON/OFF is repeated quickly when the signal changes.

Hysteresis combines and data width setting and time range setting. The activation trend for hysteresis can be selected from either [off delay] or [on delay]. These are selected in the function modes [comparator hysteresis operating condition], [comparator hysteresis data width] and [comparator hysteresis time range] (related functions F-24, F-25 and F-26, refer to Chapter 9.2).

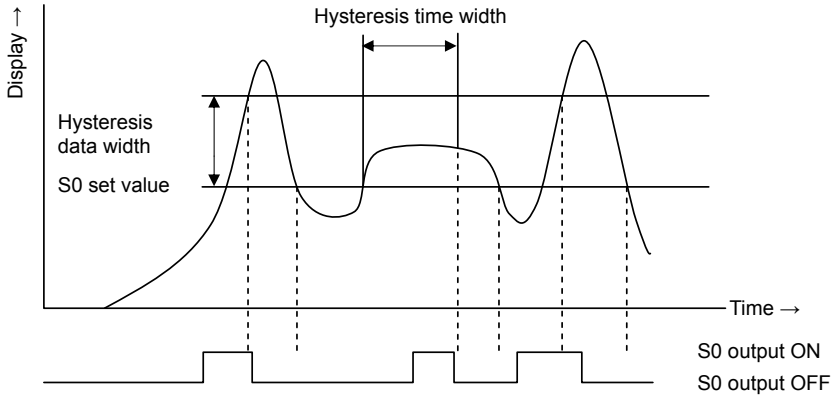
Default is set to [on delay] and hysteresis [OFF].

Note:

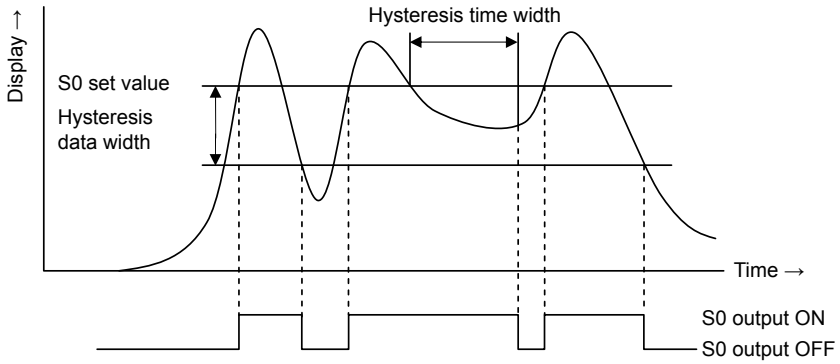
The ON/OFF condition for each output differs depending on the operating condition of comparator. Please note that if the wrong operation is selected, the output ON/OFF condition will be inappropriate, and an unexpected failure will result due to a peripheral malfunction.

The operation of each output when comparator hysteresis is set is indicated as follows, with S0 as an example. S1, S2, S3 and S4 operate in the same way.

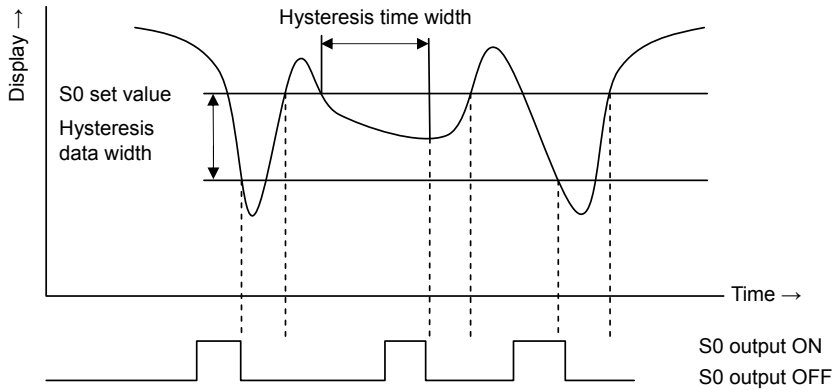
- When operation by [more than setting value] is selected for S0, and the activation trend for hysteresis is set to [on delay].



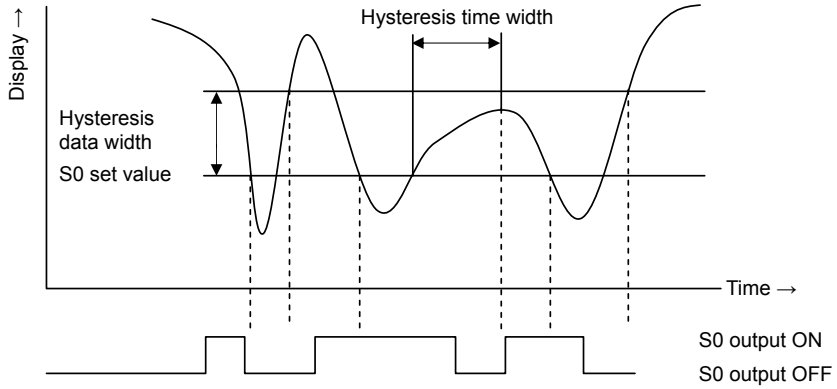
- When operation by [more than setting value] is selected for S0, and the activation trend for hysteresis is set to [on delay].



- When operation by [more than setting value] is selected for S0, and the activation trend for hysteresis is set to [off delay].



- When operation by [less than setting value] is selected for S0, and the activation trend for hysteresis is set to [on delay].



13.4 Sequential mode

Sequential mode includes sequential batch mode and sequential discharge mode.

Supplementary inflow and automatic overshoot compensation can be set if necessary.

13.4.1 Sequential batch mode (batch in)

Sequential batch mode controls the weighing sequence depending on the increase in weighing value during raw material inflow.

Judgment condition

Status display	Judgment condition
Z-BAND	|Gross weight or (Net weight)| ≤ ZERO BAND (SET7).
F. (Coarse) FLOW	Net weight ≥ [Final (SET1) – Prelim 2 (SET4)]
M. (Middle) FLOW	Net weight ≥ [Final (SET1) – Prelim 1 (SET3)]
D. (Fine) FLOW	Net weight ≥ [Final (SET1) – Overshoot (SET2)]
UNDER	Net weight < [Final (SET1) – Under (SET6)]
OVER	Net weight > [Final (SET1) + Over (SET5)]
OK	[Final (SET1) – Under (SET6) ≤ Net weight ≤ Final (SET1) + Over (SET5)]

Operating explanations

- When the start signal is input, Coarse flow, Middle flow and Fine flow turn on.

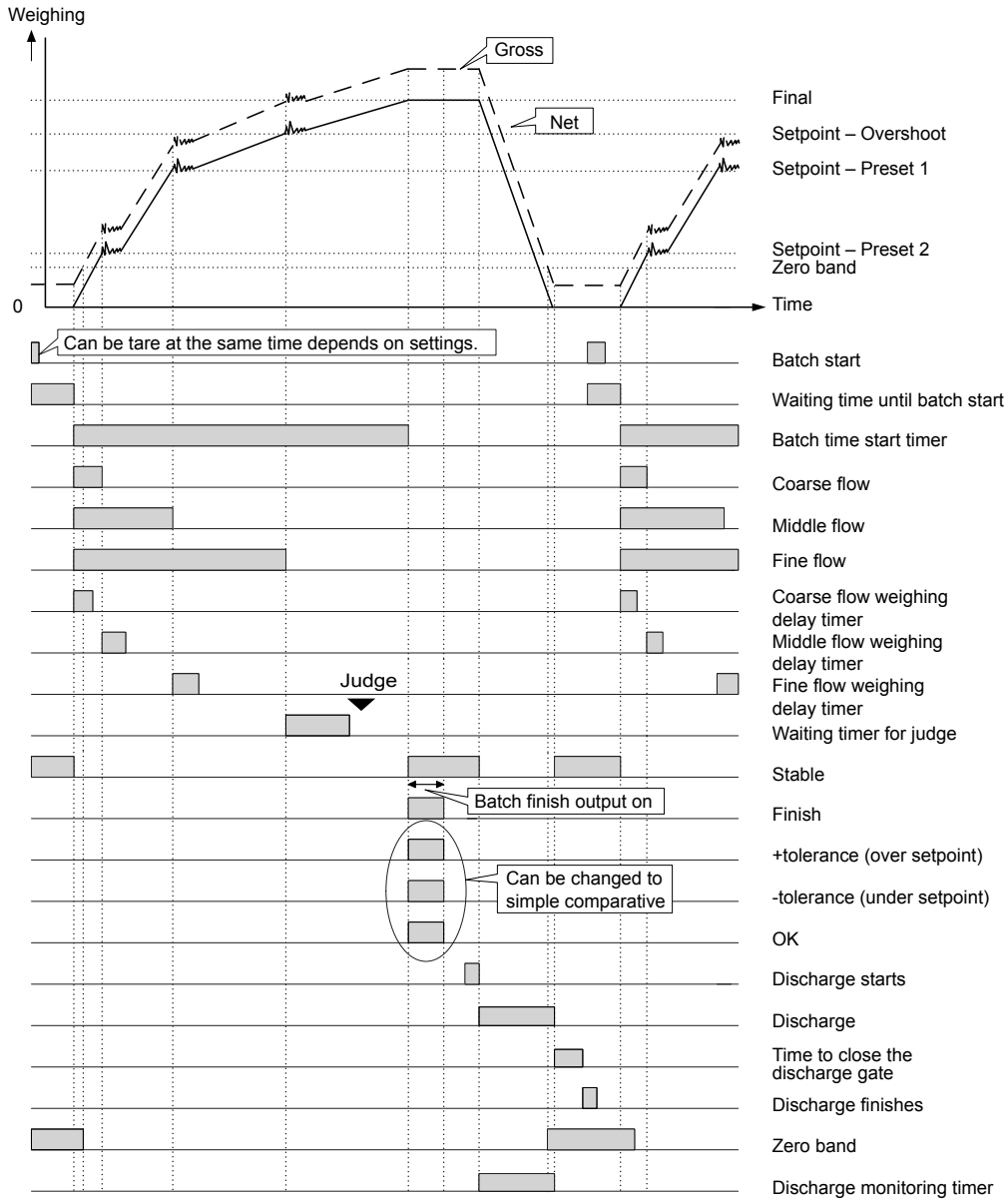
  Tare weight cancellation can be set to start at the same time as the start signal.
- When the net weight reaches [Final value – Prelim 2], Coarse flow turns OFF.
- When the net weight reaches [Final value – Prelim 1], Middle flow turns OFF.
- When the net weight reaches [Final value – Overshoot], Fine flow turns OFF.
  - The comparison target of near zero can be selected from Gross weight and Net weight.
  - Near Zero is a simple operation.
  - After turning off, Coarse flow, Middle flow and Fine flow never turn on before the next start signal input.
  - Under, Over and OK operate with net weight.

    Comparison operation can be changed to simple operation.
  - When [Prelim 2 = 0]is set, Coarse flow turns OFF; when [Prelim 1 = 0], Middle flow turns OFF.
  - When automatic tare weight cancellation is operated at the time of flow start, set to [Effective] for [Automatic tare weight cancellation at time of flow start].

    Refer to Chapter 11.2.

Note:

Comparison output is synchronized with the A/D sampling rate or the display.



13.4.2 Sequential batch mode (batch out)

Sequential batch mode controls the weighing sequence depending on the decrease of the weight value or on the time during batching out.

Judgment condition

Status display	Judgment condition
Z-BAND	|Gross weight or (Net weight)| ≤ ZERO BAND (SET7).
F. (Coarse) FLOW	–Net weight ≥ [Final (SET1) – Prelim 2 (SET4)]
M. (Middle) FLOW	–Net weight ≥ [Final (SET1) – Prelim 1 (SET3)]
D. (Fine) FLOW	–Net weight ≥ [Final (SET1) – Overshoot (SET2)]
UNDER	–Net weight < [Final (SET1) – Under (SET6)]
OVER	–Net weight > [Final (SET1) + Over (SET5)]

Status display	Judgment condition
OK	[Final (SET1) – Under (SET6) ≤ Net weight ≤ Final (SET1) + Over (SET5)]

Operating explanations

- Coarse flow, Middle flow and Fine flow turn on when the start signal is input.

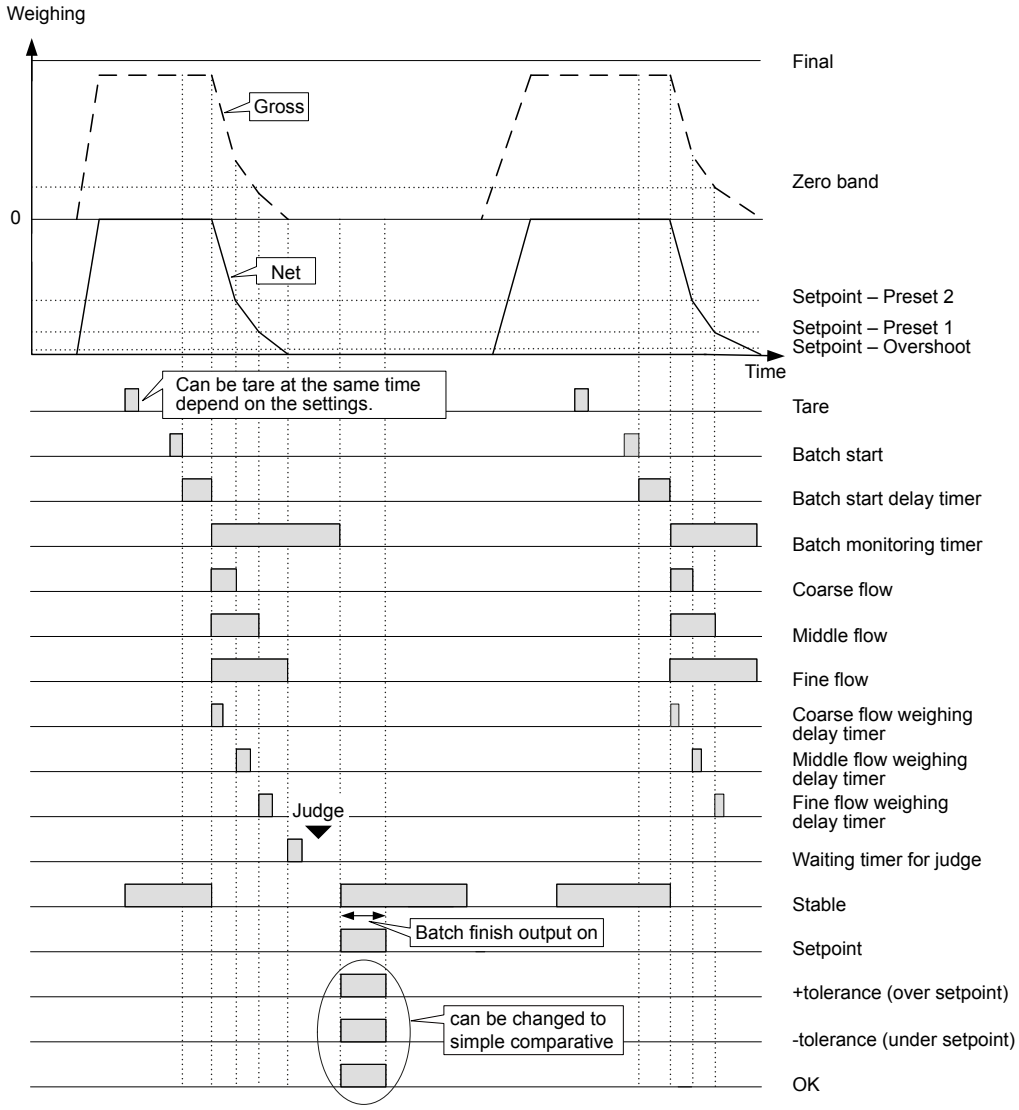
  Tare weight cancellation can be set to start at the same time as the start signal.
- When the net weight reaches [Final value – Prelim 2], Coarse flow turns OFF.
- When net weight reaches [Final value – Prelim 1], Middle flow turns OFF.
- When the net weight reaches [Final value – Overshoot], Fine flow turns OFF.
  - The comparison target of near zero can be selected from Gross weight and Net weight.
  - Near Zero is a simple operation.
  - After turning off, Coarse flow, Middle flow and Fine flow never turn on before the next start signal input.
  - Under, Over and OK operate with net weight.

    Comparison operation can be changed to simple operation.
  - When [Prelim 2 = 0]is set, Coarse flow turns OFF; when [Prelim 1 = 0], Middle flow turns OFF.
  - When automatic tare weight cancellation is operated at the time of flow start, set to [Effective] for [Automatic tare weight cancellation at time of flow start].

    Refer to Chapter 11.2.

Note:

Comparison output is synchronized with the A/D sampling rate or the display.



13.4.3 Supplementary batch (discharge) mode

Supplementary batch (discharge) turns on fine inflow automatically for a fixed period of time when the batch (discharge) weight is insufficient in sequential batch (discharge) mode.

To apply supplementary batch (discharge), set [Maximum times of supplementary flow], [Time of supplementary batch] and [Waiting time after supplementary batch].

Refer to Chapter 11.2.

Judgment condition

Status display	Judgment condition
Z-BAND	|Gross weight or (Net weight)| ≤ ZERO BAND (SET7).
F. (Coarse) FLOW	Net weight ≥ [Final (SET1) – Prelim 2 (SET4)]
M. (Middle) FLOW	Net weight ≥ [Final (SET1) – Prelim 1 (SET3)]
D. (Fine) FLOW	Net weight ≥ [Final (SET1) – Overshoot (SET2)]
UNDER	Net weight < [Final (SET1) – Under (SET6)]

Status display	Judgment condition
OVER	Net weight > [Final (SET1) + Over (SET5)]
OK	[Final (SET1) – Under (SET6) ≤ Net weight ≤ Final (SET1) + Over (SET5)]

Operating explanations

- When the start signal is input, Coarse flow, Middle flow and Fine flow turn on.

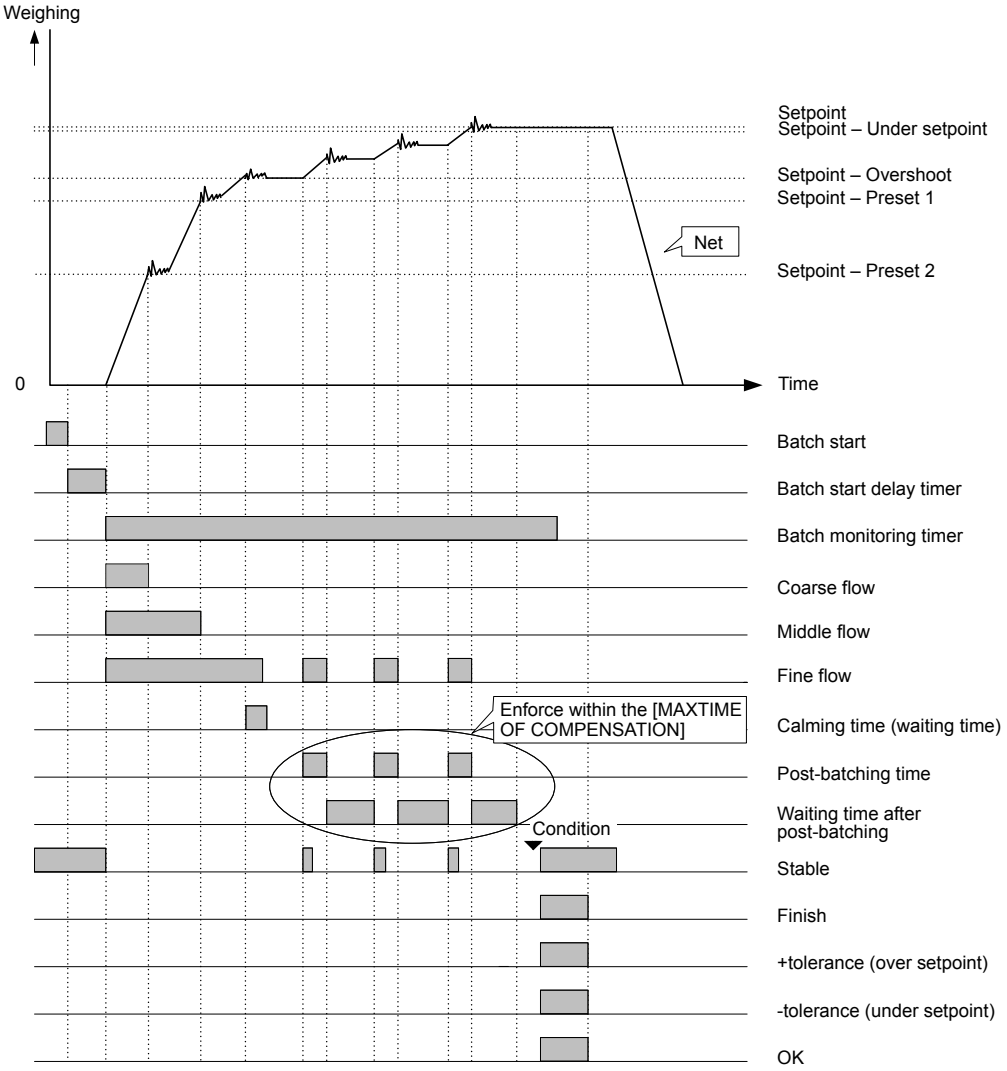
  Tare weight cancellation can be set to start at the same time as the start signal.
- When the net weight reaches [Final value – Prelim 2], Coarse flow turns OFF.
- When the net weight reaches [Final value – Prelim 1], Middle flow turns OFF.
- When the net weight reaches [Final value – Overshoot], Fine flow turns OFF.
- After fine flow is complete, supplementary inflow starts when the [Under]signal is output in stable time. The time of the supplementary inflow is set by S function (SF-35).
- Supplementary flow is executed up to the maximum number of times set. Supplementary flow finishes when the under signal outputs the same or more times than the set value.
- Sequence error SQ ERR2 occurs if the Under signal is output despite supplementary inflow for the set maximum number of times.
  - The comparison target of near zero can be selected from Gross weight and Net weight.
  - Near Zero is a simple operation.
  - After turning off, Coarse flow, Middle flow and Fine flow never turn on before the next start signal input.
  - Under, Over and OK operate with net weight.

    Comparison operation can be changed to simple operation.
  - When [Prelim 2 = 0]is set, Coarse flow turns OFF; when [Prelim 1 = 0], Middle flow turns OFF.
  - When automatic tare weight cancellation is operated at the inflow start time, set to [Effective] for [Automatic tare weight cancellation at inflow start].

    Refer to Chapter 11.2.

Note:

Comparison output is synchronized with the A/D sampling rate or the display.



13.4.4 Automatic overshoot compensation

This function sets the overshoot value automatically by anticipating the next overshoot value from the actual overshoot value in continuous weighing operation.

The next overshoot set data uses the moving average value for data from 4 previous overshoots.

When using this function, set automatic overshoot compensation to [VALID] and set the value of [Automatic Free Fall effective width].

Refer to Chapter 11.2.

When batch error (= |weighed value - FINAL value|) exceeds the automatic overshoot effective width set value, it is treated as invalid data and automatic overshoot calculation is not performed.

Automatic overshoot is not calculated if the value of automatic overshoot effective width is 0.

Automatic overshoot compensation is cleared by changing the set value or when the power supply is turned OFF.

Note:

Comparison output is synchronized with the A/D sampling rate or the display.

14 Storage location of setting data

In this unit, each data is recorded in RAM and EEPROM as follows:
The data in EEPROM can be stored almost permanent due to nonvolatile.

14.1 Data stored in internal RAM

- Tare weight cancellation data
- ZERO set data
- ZERO tracking data

Note:

- Tare weight cancellation data and ZERO set data can also be stored to EEPROM.
- Data stored in internal RAM is not backed up.

14.2 Data stored in EEPROM

- Calibration data
- Function data
- C function data
- S function data
- Digital linearization data
- Simple mode setting data: FINAL (Setpoint), FREE FALL (Overshoot), PRE-FIXED AMOUNT 1 (Preset 1), PRE-FIXED AMOUNT 2 Preset 2), OVER (Over setpoint),UNDER (Under setpoint), ZERO BAND (Near zero), FULL (Full)
- 5-step check mode setting data (S0, S1, S2, S3, S4, ZERO BAND (Near Zero) and FULL (Full))

Note:

Simple mode setting data and 5-step check mode setting data can also be stored to internal RAM.

14.3 Change the storage location for data

- ZERO set data
- Tare weight cancellation data
- Simple mode setting data
- 5-step check mode setting data

For the above-mentioned data, you can select the storage destination from "internal RAM" or "EEPROM."

The storage location for the data is set by C function CF-17, see Chapter 8.11.

Default has set to [Internal RAM] for ZERO set data and Tare weight cancellation data, and [EEPROM] for set data of simple mode and 5-steps control mode.

Note:

- Set the storage destination to [Internal RAM] if the set value changes continuously, leading to concerns that the number of EEPROM rewrites might exceed 1 000 000.
- Do not change in the setting value during weighing because the A/D sampling rate decreases temporarily while rewriting the set values when the storage destination for setting data is [EEPROM].
- Set the storage destination to [Internal RAM] if you wish to change the setting value during weighing, refer to Chapter 8.11 for details on how to set the storage destination.

15 Check mode

The following can be checked in check mode:

- Switch to EzCTS mode
- Confirmation of ROM version
- Confirmation of external control input operation
- Confirmation of external control output operation
- Confirmation of load cell output voltage

15.1 Check mode setting method

Measurement mode

 [FUNC.]

1. Press the [FUNC.] key in the normal weighing mode to display [FUNC.].
2. Press [CAL-S/▲] key twice.
   ▷ The display will cycle through [FUNC.] - [COMP] - [CHECK] to enter into check mode.
3. Press the [F/ENTER] key to display [EZCTS].
4. Use the [CAL-Z/◀] key and [CAL-S/▲] key to change the item that you want to confirm.

   [CAL-Z/◀], [CAL-S/▲] change the check mode parameter.

   [FUNC.] interrupt confirmation and return to either [CHECK] display or the item selection display.

   [F/ENTER] select the item and proceed to the next step.

 [CHECK] Check mode

 [EZCTS], see Chapter 15.2

 [ROM], see Chapter 15.3

 [IN], see Chapter 15.4

 [OUT], see Chapter 15.5

 [MONT], see Chapter 15.6

15.2 EzCTS mode

EzCTS is an application for personal computers (optional extra EzCTS_USB1), which allows the function data of this device to be easily read and written. It is useful for maintenance and data back-up.

[EZCTS]

1. Press the [F/ENTER] key from the [EZCTS] display to start the [EZCTS] display blinking.

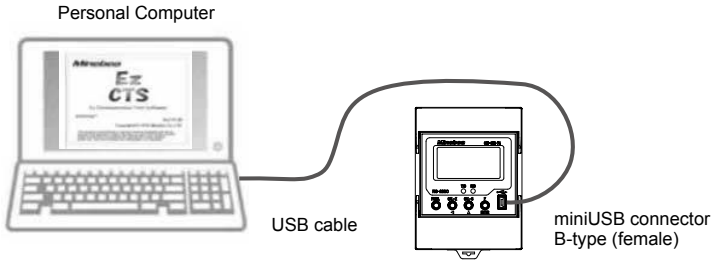
   EzCTS can be used while the display is blinking, and the function can read and write the data by communicating with a personal computer.

   Use this mode for reading and writing data set using our optional application EzCTS.

[ROM]

2. Press the [F/ENTER] key after reading/writing the set data is complete.
   ▷ [ROM] will be displayed and the EzCTS mode will end.

Connecting example using EzCTS



Note:

- When in EzCTS mode, this device does not reply to commands not used with EzCTS.
- When in EzCTS mode, this device does not operate in any way other than EzCTS communication.
- For details of communication with personal computers, please refer to Chapter 17.1.
- If the EzCTS is used before switching to EzCTS mode: error command 01 will be returned by the device.

15.3 Confirmation of ROM version

[ROM]

[V1.000]

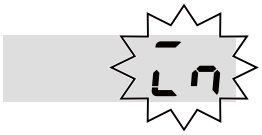
1. By pressing the [F/ENTER] key from the [ROM] display, it will blink with the ROM version.


[IN]

2. Press the [F/ENTER] key after confirming the ROM version.
   ▷ [IN] will be displayed, and confirmation of the ROM version will end.

15.4 Confirmation of external control input


[IN]


[IN]

Confirm by external input ON/OFF

1. Press the [F/ENTER] key from the [IN] display to start the [IN] display blinking.

   At this time, the ON/OFF condition of the external control input signal can be confirmed in the condition display.

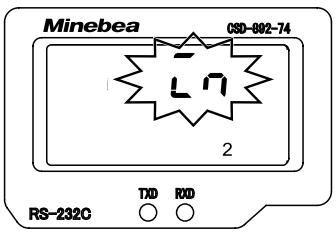
   When each input terminal of the external control input (lower terminal block) is ON, each condition display will light [1 ~ 3].


[OUT]

2. After confirming the external control input, press the [F/ENTER] key.
   ▷ [OUT] will be displayed, and the confirmation of external control input is finished.

Example:

Pin no.	Condition display
INPUT1	[1] lights
INPUT2	[2] lights
INPUT3	[3] lights



When COM.1 and INPUT2 in the lower terminal block are short-circuited, and ON is input, [2] will light in the condition display.

15.5 Confirmation of external control output

[OUT]

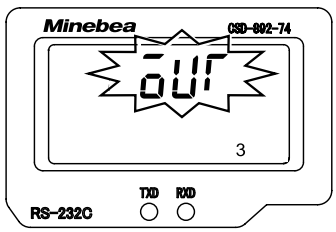
1. Press the [F/ENTER] key from the [OUT] display to start the [OUT] display blinking.

   At this time, use the [CAL-Z/◀] and [CAL-S/▲] keys, to change the condition display "OUT1 ~ OUT5" and set the corresponding external control output (lower terminal block) to ON.

[MONT]

2. After confirming the external control output, press the [F/ENTER] key.
   ▷ [MONT] will be displayed, and the confirmation of external control output is finished.

Pin no.	Condition display
OUTPUT1	[1] lights
OUTPUT2	[2] lights
OUTPUT3	[3] lights
OUTPUT4	[4] lights
OUTPUT5	[5] lights



Example:
When OUTPUT3 is turned on by the above operation, [3] will light in the condition display, and ON will be output from the lower terminal block OUTPUT3 by the open collector output.

15.6 Confirmation of load cell output voltage (monitor mode)

In the confirmation of the load cell output voltage, the load currently applied to the load cell is converted to mV/V and displayed.

If a load cell with an unknown output voltage is used, it must be calibrated.

A known load must be applied to determine the tare weight and the max. capacity of the load cell using this function.

[MONT]

1. By pressing the [F/ENTER] key from the [MONT] display, the present load cell output voltage value will be displayed, and blink.

    [EZCTS]

2. After confirming the external control output voltage, press the [F/ENTER] key.
   ▷ [EZCTS] will display, and the monitor mode will close.

Note:

The load cell output voltage value displayed is a reference value. The displayed accuracy is approximately 0.5%.

What happens at this time?

When the weight display does not indicate a normal value and does not stabilize, the cause can be found by checking each item in the following steps, and using the monitor mode.

- When the weight display does not indicate a normal value:
  - ① Does the output value exceed ±3.1 mV/V?

→ Yes...	Advance to ②.
→ No...	Calibrate again following the procedure of Chapter 6).

  - ② Does the output value exceed ±3.1mV/V, when Ⓑ and Ⓓ are bridged in the upper terminal block?

→ Yes...	Please contact Minebea Intec with details.
→ No...	It may be a failure or disconnection of the load cell.

- When the load display is not stable:
  - Is the output value stable when the load cell is disconnected, and Ⓐ and Ⓕ and Ⓑ, Ⓒ, Ⓓ, Ⓖ are bridged in the upper terminal block?

→ Yes...	It may be the influence of a source of noise such as the inverter. Please recheck the condition of the wiring, and if there is no change, contact Minebea Intec.
→ No...	Please contact Minebea Intec with details.

16 RS-232C and RS-422/485 interface

16.1 RS-232C interface specification (CSD-892-74)CSD-892/74, ../76

Item	Specification
Communication method	Half duplex
Synchronizing method	Start-stop
Baud rate	Selection: 1 200, 2 400, 4 800, 9 600, 19 200 and 38 400 bps
Data bit length	Selection: 7 bit, 8 bit
Parity bit	Selection: No parity, Even parity, Odd parity
Stop bit	Selection: 1 bit, 2 bit
Terminator	Selection: CR+LF, CR
Communication data	ASCII code
Cable length	≤15 m
Status LED	TXD, RXD

16.2 RS-422/485 interface specification (CSD-892-76)CSD-892/74, ../76

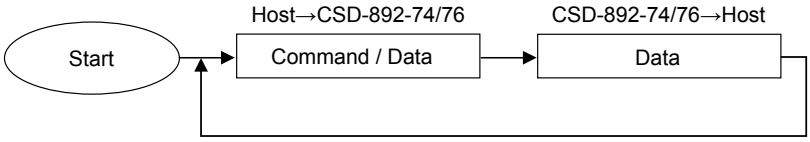
Item	Specification
Communication method	Half duplex
Synchronizing method	Start-stop
Baud rate	Selection: 1 200, 2 400, 4 800, 9 600, 19 200 and 38 400 bps
Data bit length	Selection: 7 bit, 8 bit
Parity bit	Selection: No parity, Even parity, Odd parity
Stop bit	Selection: 1 bit, 2 bit
Terminator	Selection: CR+LF, CR
Communication data	ASCII code
Cable length	≤1 km
Address	Selection: 0 to 31
Connectable units	Up to 32 units in Modbus (in RS-422 mode, select from 0 to 9; up to 10 units) Up to 32 units maximum (RS-422: 10 units)
Termination resistance	Built-in (select by bridging the terminal block) Built-in (Yes/No can be selected by the connection of terminal boards.)
Status LED	TXD, RXD

16.3 Operation mode

Select from Command mode, ModBus mode and Stream mode. Each mode is explained below.

Command mode

Data is sent back from the device to the host by sending command/data provided by the host (personal computer) to the device according to the command/data. Execute communication according to the following procedure.



Note:

- Neither flow control nor X-flow control is executed by the device.
- Communication operation is an interactive mode.
- CTS/RTS signal is not used.

ModBus mode

This mode is the serial interface using communication by RS-232C interface and RS-422/485 interface.

Communication with equipment that supports the ModBus communication can be carried out without an application.

ModBus is a registered trademark of Modicon, Inc. (AEG Schneider Automation International S.A.S.), refer to Chapter 16.7.

Stream mode

This mode continues to output the latest data of the output target selected by function F-48, RS-232C interface and RS-422/485 interface output targets. However, the output frequency depends on the baud rate setting, refer to Chapter 9.

16.3.1 Operation mode

Operation mode is selected by function F-40.

Setting range: 0 or 1	
0 : Command mode **Default**	1 : ModBus mode
2 : Stream mode	

16.3.2 Output target in stream mode

The output target in stream mode is selected by function F-41.

Output target is effective when the set value: [1] is selected by function F-40.

Setting range: 0 to 3	
0: Display interlocked **Default**	1: Gross weight
2: Net weight	3: Load display data with condition

16.3.3 Communication specifications

Communication specifications are selected by function F-42.

Setting range: 00000 to 15121 – 13020 **Default**

Function No.	Set value	Details
F-42	00000 to 15121	0 0 0 0 0 Data bit length 0 : 7 bit, 1 : 8 bit Parity bit 0 : No parity 1 : Even parity 2 : Odd parity Stop bit 0 : 1 bit, 1 : 2 bit Baud rate 0 : 1 200 bps, 1 : 2,400 bps 2 : 4 800 bps, 3 : 9 600 bps 4 : 19 200 bps 5 : 38 400 bps Terminator 0 : CR, 1 : CR + LF

16.3.4 Address settings for the RS-422/485 interface

The address of the RS-422/485 interface is set by function F-43.

Setting range: 00 to 31	**Default** : 00

16.3.5 Changeover of RS-422/485

The changeover of RS-422 and RS-485 is executed by the setting of function F-44.

Setting range : 0, 1	
0 : RS-422 **Default**	1 : RS-485

16.3.6 Delay time for RS-485 return data

Return data can be delayed at the CSD-892/74, ../76side when the host-side transmission terminal has low impedance after host-side communication is complete.

Delay time for return data from the RS-485 interface is set by function F-45.

Setting range: 00 to 99	**Default** : 01
Unit: 10 ms	

16.3.7 Addition of decimal point to transmission data

Select whether to use a decimal point in transmission by function F-46.

If function F-46 is set to 1 (with decimal point), the decimal point is inserted at the decimal point display position specified by C function CF-01 "Decimal point display position".

Setting range: 0 or 1	
0: No decimal point; **Default**	1: With decimal point

16.3.8 Output target of RS-232C interface and RS-422/485 interface

The output target is selected by the setting of function F-48

Setting range : 0 ~ 3	
0 : Display synchronization **Default**	1 : Gross weight
2 : Net weight	3 : Weight display data with the status

16.3.9 Number of digits for unit

The number of digits for the unit of transmission data is set by function F-49.

This becomes effective when the set value: [3] is selected by function F-48.

Setting range: 0 or 1	
0: 2 digits for unit **Default**	1: 3 digits for unit

16.4 Command data format

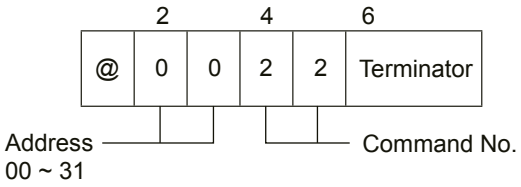
Note:

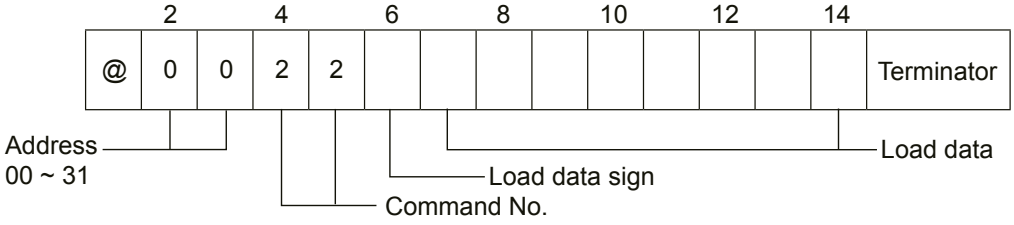
- The weight data enters from the right.
- The sign of "-" for minus and "+" for plus is entered.
- Zero suppression is performed on the weight data.
- The decimal point is set in a specified position when the decimal point position is set with F-46 and when decimal point is specified with CF-01.
- "OL" is displayed on the load data part when there is an overload. "-OL" is displayed on the load data part when the gross weight is negative.
- The empty parts are all spaces.
- The address is fixed to [00] for the data of CSD-892-74.

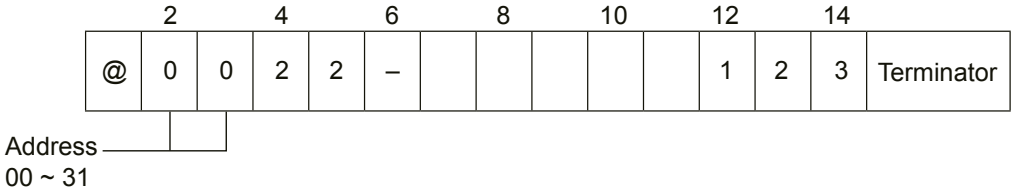
16.4.1 Reading load data (host → device)

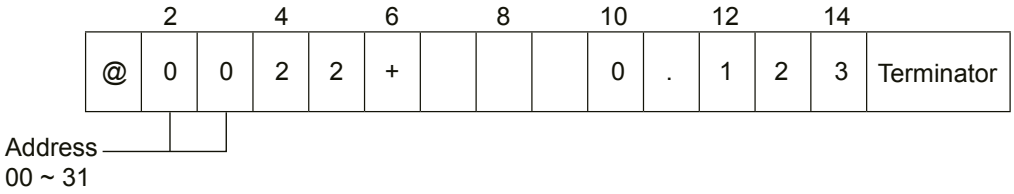
Command number 20 ~ 23

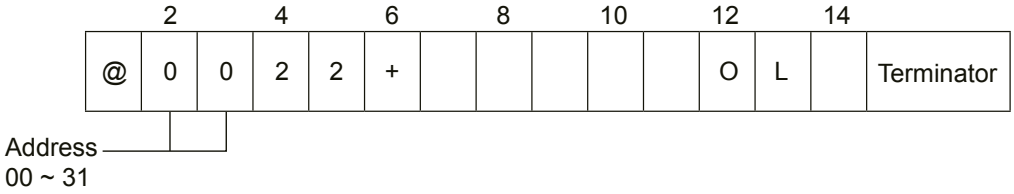
Command No.	Operation
20	Reading load data
21	Reading gross weight
22	Reading net weight
23	Reading tare weight
26	Reading load data with condition
Each data synchronizes with A/D sampling.	

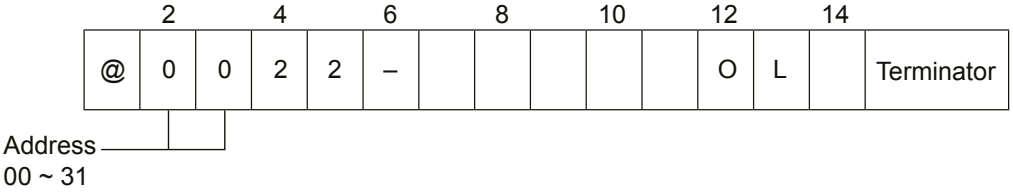




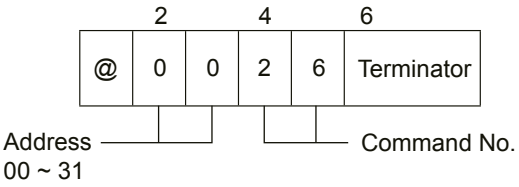






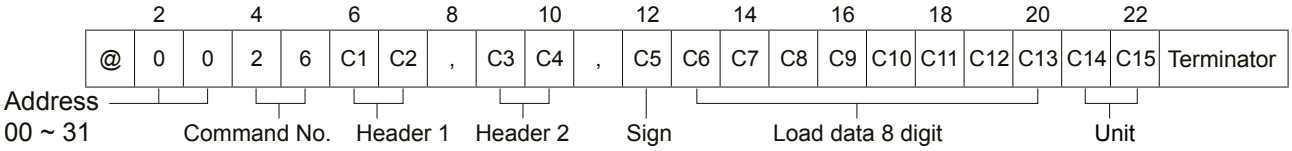


Command number 26



Return (device → host)

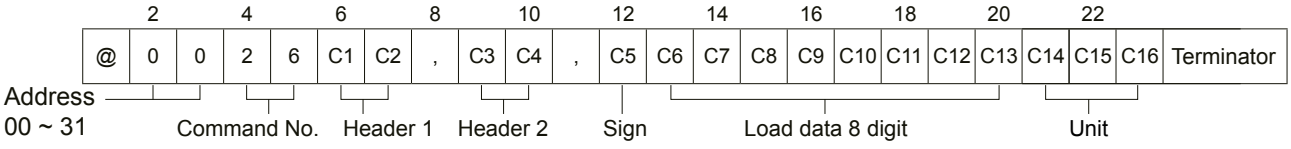
When the set number of digits for the unit is 2 (F-49 = 0)



Function			Function			Sign		Load data (8 digits)								Unit		
C1	C2	Details	C3	C4	Details	C5	Details	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	Details
O	L	Overload	N	T	Net weight	+	Positive						1	2	3		g	Gram
S	T	Stable	G	S	Gross weight	–	Negative				0	.	1	2	3	k	g	Kilogram
U	S	Unstable											O	L			t	Ton
																l	b	Pound
																	N	Newton
																k	N	Kilo Newton
																	P	Pascal
																k	P	Kilo Pascal
																M	P	Mega Pascal

Return (host → device)

When the set number of digits for the unit is 3 (F-49 = 1)

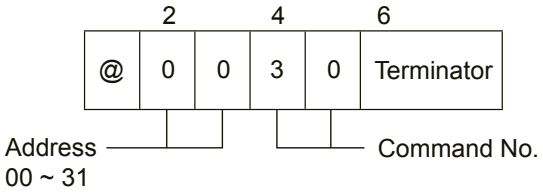


Function			Function			Sign		Load data (8 digits)									Unit		
C1	C2	Details	C3	C4	Details	C5	Details	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16	Details
O	L	Overload	N	T	Net weight	+	Positive						1	2	3			g	Gram

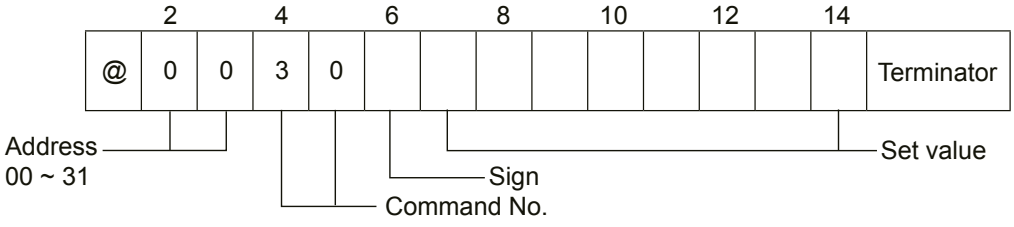
Function	Function	Sign	Load data (8 digits)	Unit	
S T Stable	G S Gross weight	– Negative	0 . 1 2 3	k g	Kilogram
U S Unstable			O L	t	Ton
				l b	Pound
				N	Newton
				k N	Kilo Newton
				P a	Pascal
				k P a	Kilo Pascal
				M P a	Mega Pascal

16.4.2 Reading weighing setting data (host → device)

Command No.	Operation
30	Reading FIXED AMOUNT (SET1)
31	Reading FREE FALL (Overshoot) (SET2)
32	Reading PRE-FIXED AMOUNT 1 (SET3)
33	Reading PRE-FIXED AMOUNT 2 (SET4)
34	Reading OVER (SET5)
35	Reading INSUFFICIENT (Under) (SET6)
36	Reading FULL (SET8)
37	Reading NEAR ZERO (SET7)



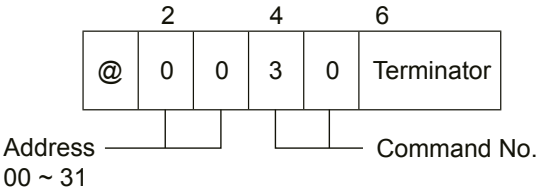
Return (host → device)



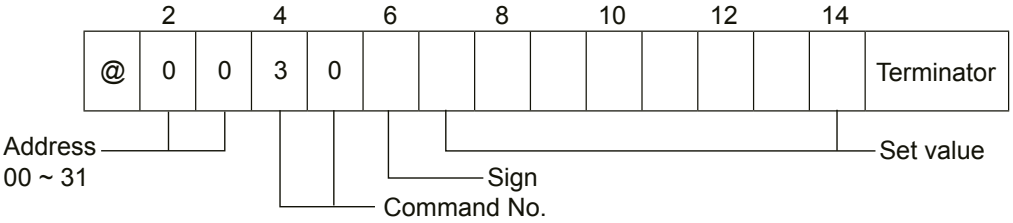
16.4.3 Reading comparison setting data for weighing (host → device)

Command No.	Operation
30	Reading S1 setting value
31	Reading S4 setting value

Command No.	Operation
32	Reading S3 setting value
33	Reading S2 setting value
34	Reading S0 setting value
36	Reading FULL (SET8)
37	Reading NEAR ZERO (SET7)

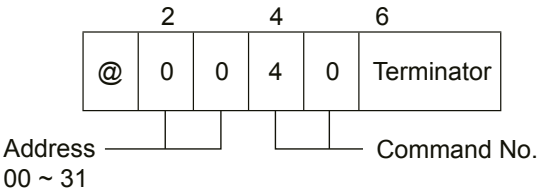


Return (device → host)

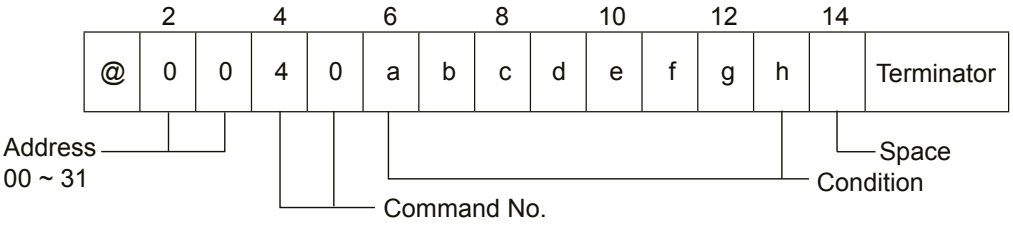


16.4.4 Reading condition 1 (host → device)

Command No.	Operation
40	Reading condition 1



Return (device → host)

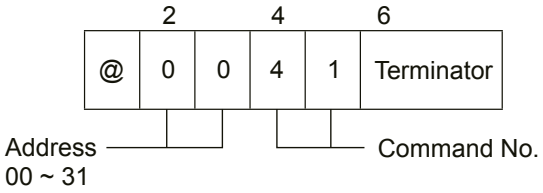


a: STABLE	(1) = ON; (0) = OFF
b: Not used	(0) = Fixed
c: TARE WEIGHT	(1) = ON; (0) = OFF
d: GROSS WEIGHT	(1) = ON; (0) = OFF

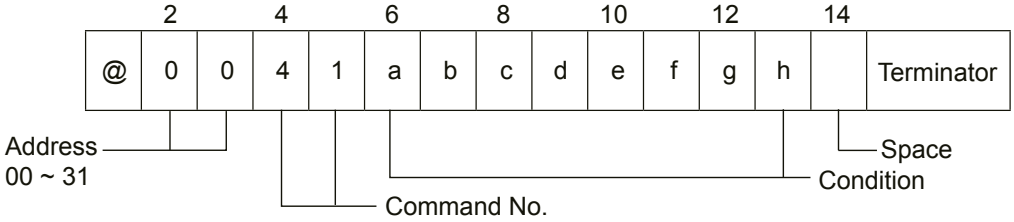
e: NET WEIGHT	(1) = ON; (0) = OFF
f: ZERO	(1) = ON; (0) = OFF
g: HOLD	(1) = ON; (0) = OFF
h: ERROR	(1) = ON; (0) = OFF

16.4.5 Reading condition 2 (host → device)

Command No.	Operation
41	Reading condition 2



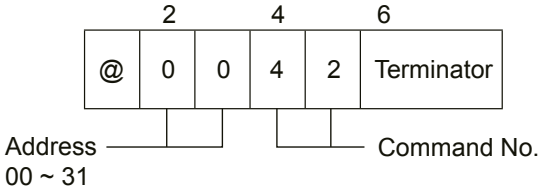
Return (device → host)



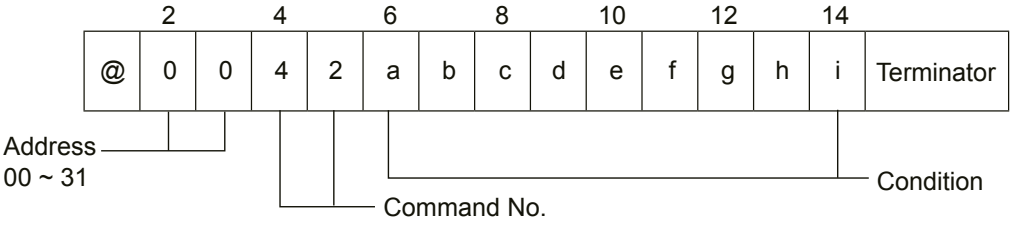
a: NEAR ZERO	(1) = ON; (0) = OFF
b: LARGE (Coarse) INFLOW/S1	(1) = ON; (0) = OFF
c: MEDIUM (Middle) INFLOW/S2	(1) = ON; (0) = OFF
d: SMALL (Fine) INFLOW/S3	(1) = ON; (0) = OFF
e: OVER/S4	(1) = ON; (0) = OFF
f: OK/S0	(1) = ON; (0) = OFF
g: UNDER	(1) = ON; (0) = OFF
h: FULL	(1) = ON; (0) = OFF

16.4.6 Reading condition 3 (host → device)

Command No.	Operation
42	Reading condition 3



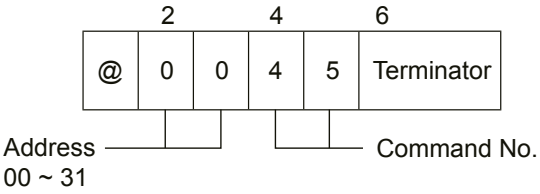
Return (device → host)



a: N.C.	
b: DISCHARGE (GATE OPEN)	(1) = ON; (0) = OFF
c: INFLOW FINISH	(1) = ON; (0) = OFF
d: N.C.	
e: DISCHARGE FINISH	(1) = ON; (0) = OFF
f: N.C.	
g: N.C.	
h: During weighing	(1) = ON; (0) = OFF
i: Sequence error	(0) = No error; (1 ~ a) = Sequence error number
Refer to “20 Sequence error."	

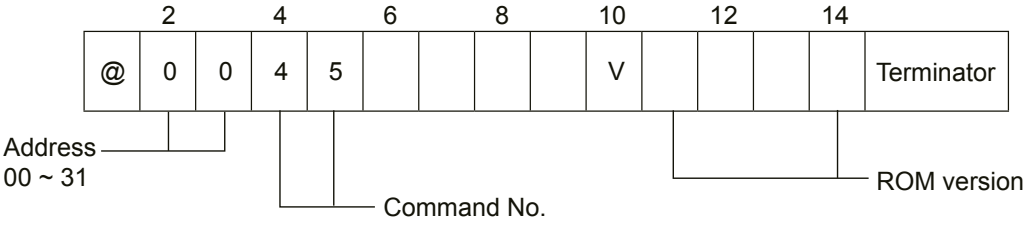
16.4.7 Reading ROM version (host → device)

Command No.	Operation
45	Reading ROM version



Under normal operation

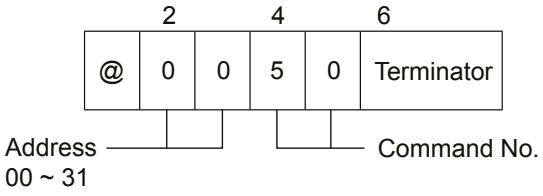
Return (device → host)



16.4.8 Change of condition (host → device)

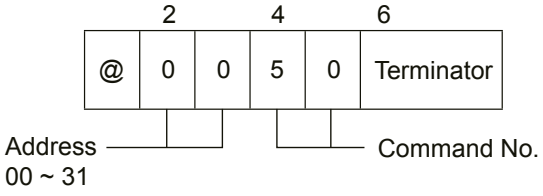
Command No.	Operation
50	Display gross weight

Command No.	Operation
51	Display net weight
52	ZERO
53	ZERO clear
54	Tare weight cancellation
55	Tare weight cancellation clear
5I	Error cancellation
56	Inflow start
58	Discharge (gate) start
5J	Emergency stop



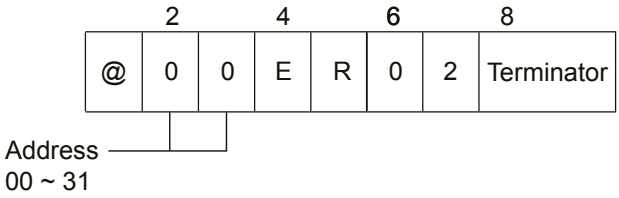
Under normal operation

Return (device → host)



Under abnormal operation

Return (device → host)



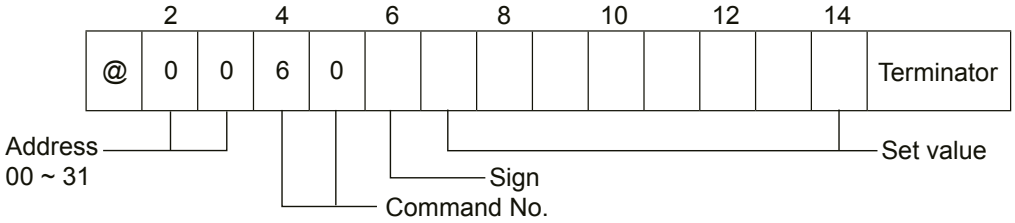
Note:

Error transmission conditions are as follows:

- Cannot execute ZERO set outside the effective range for Command 52 zero set
- Cannot apply tare weight cancellation with display ±OL for Command 54 tare weight cancellation

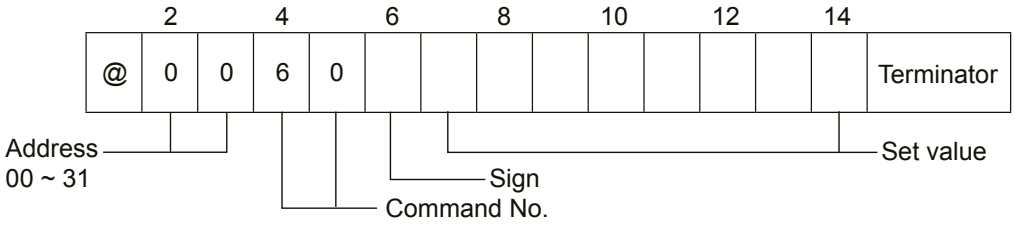
16.4.9 Writing weighing setting data (host → device)

Command No.	Operation
60	Writing FIXED AMOUNT (SET1)
61	Writing FREE FALL (Overshoot) (SET2)
62	Writing PRE-FIXED AMOUNT1 (SET3)
63	Writing PRE-FIXED AMOUNT2 (SET4)
64	Writing OVER (SET5)
65	Writing INSUFFICIENT (Under) (SET6)
66	Writing FULL (SET8)
67	Writing NEAR ZERO (SET7)



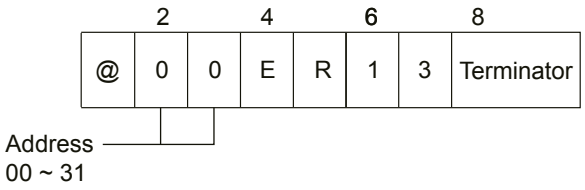
Under normal operation

Return (device → host)



Under abnormal operation

Return (device → host)



Note:

- Load data enters from the right.
- Do not add a decimal point.
- Set the storage destination to Internal RAM when the set value continuously changes, leading to concerns that the number of EEPROM rewrites might exceed 1,000,000.
- Do not change in the setting value during weighing because the A/D sampling rate decreases temporarily while rewriting the set values when the storage destination for setting data is EEPROM. Set the storage destination to Internal RAM to facilitate changes setting values during weighing.

  Refer to Chapter 14.

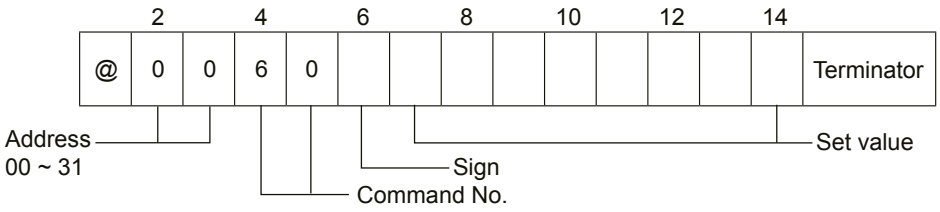
Note:

Error transmission conditions are as follows:

- A value that exceeds the regular value is set.
- A non-numerical character is set.
- A character other than + or - is set under Sign.

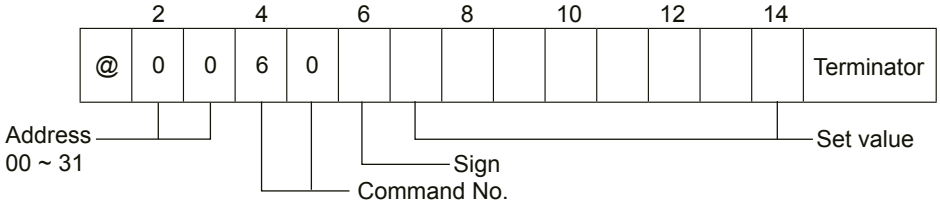
16.4.10 Writing comparison set data (host → device)

Command No.	Operation
60	Writing S1 setting value
61	Writing S4 setting value
62	Writing S5 setting value
63	Writing S2 setting value
64	Writing S0 setting value
66	Writing FULL (SET8)
67	Writing NEAR ZERO (SET7)



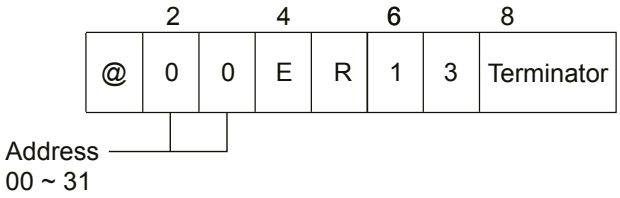
Under normal operation

Return (device → host)



Under abnormal operation

Return (device → host)



Note:

- Load data enters from the right.
- Do not add a decimal point.
- Set the storage destination to Internal RAM when the set value continuously changes, leading to concerns that the number of EEPROM rewrites might exceed 1,000,000.
- Do not change in the setting value during weighing because the A/D sampling rate decreases temporarily while rewriting the set values when the storage destination for setting data is EEPROM. Set the storage destination to Internal RAM to facilitate changes setting values during weighing.

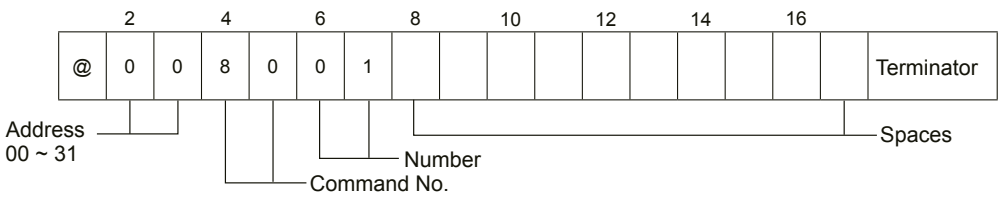
  Refer to “6.11 Change of data storage destination."

Note:

Error transmission conditions are as follows:

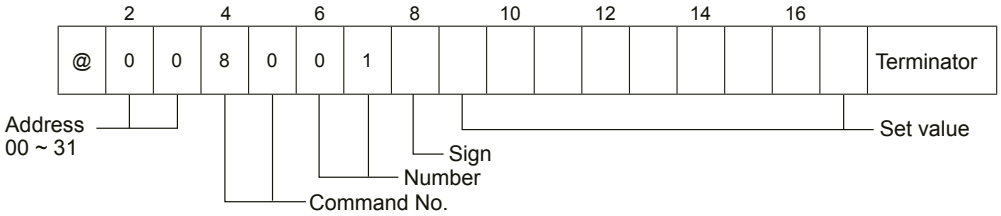
- A value that exceeds the regular value is set.
- A non-numerical character is set.
- A character other than + or - is set under Sign.

16.4.11 Reading the set value (host → device)



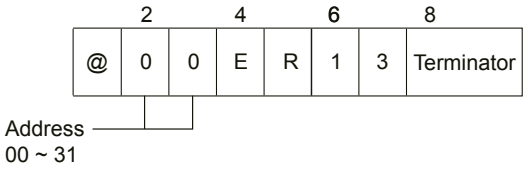
Under normal operation

Return (device → host)



Under abnormal operation

Return (device → host)



Note:

- Load data enters from the right.
- Do not add a decimal point.
- Do not change the setting value during weighing, because the A/D sampling rate decreases temporarily while the value is being stored.

16.4.11.1 Reading of command table

Command name	Command	Number	Return command set value
Digital filter	70	01	001 ~ 512 (Unit: Moving average time 1 time)
Analog filter	70	02	0: 2 Hz, 1: 4 Hz, 2: 6 Hz, 3: 8 Hz, 4: 10 Hz
Stabilization filter	70	05	001 ~ 512 (Unit: moving average 1 time)
Stabilization filter data width	70	06	0000 ~ 9999 (Unit: 0.1d)
Stabilization filter time width	70	07	00 ~ 99 (Unit: 0.1 s)
Indipendent key lock	70	08	0000 ~ 1111 (0: Not active, 1: Active) 10^0 digit: [F/ENTER] key 10^1 digit: [CAL-S/▲] key 10^2 digit: [CAL-Z/◀] key 10^3 digit: [FUNC.] key
Stability detection data width	70	10	000 ~ 999 (Unit: 0.1d)
Stability detection time width	70	11	00 ~ 99 (Unit: 0.1 s)
Net weight offset function	70	15	00000 ~ 99999 (Unit : 1d)
HOLD operation	70	17	0: Synchronize with the HOLD signal 1: Synchronize with the batch finish signal

Command name	Command	Number	Return command set value
HOLD target	70	18	000 ~ 111 (0: Not active, 1: Active) 10^1 digit: Weight result 10^2 digit: Display
5-step check mode operation target	70	21	00000 ~ 22222 (0: Display interlock, 1: Gross, 2: Net 10^0 digit: S0 operation target 10^1 digit: S1 operation target 10^2 digit: S2 operation target 10^3 digit: S3 operation target 10^4 digit: S4 operation target
5-step check mode operation condition	70	22	00000 ~ 22222 (0: OFF, 1: OVER, 2: INSUFFICIENT) 10^0 digit: S0 operation 10^1 digit: S1 operation 10^2 digit: S2 operation 10^3 digit: S3 operation 10^4 digit: S4 operation
Check mode hysteresis operation condition	70	24	0: On-delay, 1: Off-delay
Check mode hysteresis data width	70	25	00 ~ 99 (Unit: 1d)
Check mode hysteresis time width	70	26	00 ~ 99 (Unit: 0.1 s)
Specifications for communication of RS- 232C interface, RS- 422/ 485 interface and USB interface.	70	42	0000 ~ 15121 10^0 digit: Data bit length 0: 7 bit, 1: 8bit 10^1 digit: Parity 0 = No parity, 1 = Even, 2 = Odd 10^2 digit: Stop bit 0 = 1 bit, 1 = 2bit 10^3 digit: Baud rate 0 = 1 200 bps, 1 = 2 400 bps, 2 = 4 800 bps, 3 = 9 600 bps, 4 = 19 200 bps, 5 = 38 400 bps 10^4 digit: Terminator 0 = CR, 1 = CR+LF
Address setting of RS-422/485 interface	70	43	00~31
Changeover of RS-422/485 interface	70	44	0 : RS-422, 1 : RS-485
Delay time of return data from RS-485 interface	70	45	00~99 (Unit : 10 ms)
Add a decimal point on transmission data for RS-232C interface and RS-422/485 interface	70	46	0: No decimal point, 1: With decimal point
Output target of RS-232C interface and RS-422/485 interface	70	47	0 : Command mode, 1 : ModBus mode, 2 : Stream mode

Command name	Command	Number	Return command set value
Output target of RS-232C interface and RS-422/485 interface	70	48	0 : Display synchronization, 1 : Gross amount, 2 : Net amount, 3 : Load display data with the condition
Numbers of digits for unit in RS-232C and RS-422/485	70	49	0: Unit 2 digit, 1: Unit 3 digit

Note:

- Please change "7*" in the above mentioned command part to "8*" at the time of writing.
- The number of 40 ~ 49 is only read because these relate to the transmission setting.

Command name	Command	Number	Return command set value
Operation of [F/ENTER] key	70	55	0: No use, 1: HOLD, 2: ZERO set, 3: ZERO clear, 4: Tare weight cancellation, 5: Tare weight cancellation clear, 6: Change of Net/Gross, 7: Change to weighing setting mode 9: Batching start 10: Emergency stop 11: Forced batching finish
External control input 1 operation	70	60	00: OFF, 01: ZERO set, 02: ZERO clear, 01: Tare weight cancellation, 03: Tare weight cancellation clear, 05: Change net/gross weight, 06: HOLD (pulse), 07: HOLD (level), 08: Display of net weight (Level: This displays the net weight when ON while gross weight is displayed.) 09: Batch key lock (Level: This is activated when ON while weight display is displayed.) 10: ERROR release 14: Batching start 15: Discharge start 16: Emergency stop 17: Manual overshoot correction 18: Forced batching finish 19: Forced discharge finish
External control input 2 operation	70	61	Selectable as well as F-60.
External control input 3 operation	70	62	Selectable as well as F-60.

Command name	Command	Number	Return command set value
External control output 1 operation	70	70	00: OFF, 01: Stable, 02: During tare weight cancellation, 03: Gross weight display, 04: Net weight display, 05: Center ZERO, 06: During HOLD, 07: ERROR, 08: CAPACITY EXCEED ERROR (max. weight error), 09: NEAR ZERO, 10: OK (S0), 11: Coarse flow (S1), 12: Middle flow (S2), 13: Fine flow (S3), 14: Over setpoint (+tolerance) (S4), 15: Under setpoint (-tolerance), 16: FULL, 17: RUN (during weighing) 21: Weighing sequence error 22: During weighing 23: Batching finish 24: Discharge (discharge valve open) 25: Discharge finish (discharge valve)
External control output 2 operation	70	71	Selectable as well as F-70.
External control output 3 operation	70	72	Selectable as well as F-70.
External control output 4 operation	70	73	Selectable as well as F-70.
External control output 5 operation	70	74	Selectable as well as F-70.
External control output logic	70	83	00000 ~ 11111 (0: Negative logic, 1: Positive logic) 10^0 digit: OUTPUT1 operation 10^1 digit: OUTPUT2 operation 10^2 digit: OUTPUT3 operation

Note:

- Please change "7*" in the above mentioned command part to "8*" at the time of writing.

Command name	Command	Number	Return command set value
Date of maintenance	70	90	Do not use.
Maintenance number	70	91	Do not use.
Liquid crystal backlight ON time	70	95	00 ~ 60 (Unit: minute)

Note:

- Please change "7*" in the above mentioned command part to "8*" at the time of writing.

Command name	Command	Number	Return command set value
Decimal point display position	71	01	0: No decimal point, 1: 1234.5, 2: 123.45, 3: 12.345, 4: 1.2345
A/D sampling rate	71	02	0: 50 times/s, 1: 100 times/s, 2: 250 times/s, 3: 500 times/s
Overload display condition	71	03	0: When the amount exceeds (maximum load + 9d) 1: When the amount exceeds ±110 of maximum load (Max) 2: When the amount exceeds -20D ~ (maximum load + 9d)
Weighing operation display synchronization	71	04	0: Not active, 1: Active
Unit	71	05	0: No unit, 1: g, 2: kg, 3: t, 4: lb, 5: N, 6: kN, 7: Pa, 8: kPa, 9: MPa
Function to reverse the sign of net weight	71	08	0 : The reverse function of net weight sign is unavailable. 1 : The reverse function of net weighht sign is available.
ZERO set operation condition	71	10	0: Operation in stable condition, 1: Operating under no conditions
ZERO set effective range	71	11	00 ~ 30 Unit: ±1 % of maximum load (Max) 00 : Zero set off
ZERO tracking target	71	12	0: Gross and net weight (against weight display) 1: Gross weight (only in the display of gross weight)
ZERO tracking data width	71	13	000 ~ 999 Unit: 0.1d 000: Zero tracking off
ZERO tracking duration	71	14	00 ~ 99 Unit: 0.1 s 00 : Zero tracking off
Power-on-ZERO operation	71	15	0: Not active, 1: Active

Command name	Command	Number	Return command set value
Operating condition of tare weight cancellation	71	16	0: Operation when stable with 0 < gross weight≤ maximum load (Max) 1: Operation under normal conditions with 0 < gross weight ≤ maximum load (Max) 2: Operation when stable with gross weight ≤ maximum load (Max) 3: Operation under normal conditions with gross weight ≤ maximum load (Max)
Change of data storage destination	71	17	0: Internal RAM, 1: EEPROM 10^0: Zero set data 10^1: Tare weight cancellation 10^2: Simple mode setting data, and 5 steps control mode setting data
Stability detection during setting	71	20	0: Not active, 1: Active
Setting method for gravity acceleration correction value	71	25	0: Set the district number 1: Set the numeric value of gravity acceleration (CF-28, 29 active)
District number of place of usage	71	26	01 ~ 16 (Unit: district)
District number for place of calibration	71	27	01 ~ 16 (Unit: district)
Gravity acceleration value for place of usage	71	28	9.000 ~ 9.999 (unit: m/s^2)
Gravity acceleration value for place of calibration	71	29	9.000 ~ 9.999 (unit: m/s^2)
Calibration data (for reference): Scale interval	71	90	0: 1 scale interval, 1 : 2 scale interval, 2: 5 scale interval, 3: 10 scale interval, 4: 20 scale interval, 5: 50 scale interval,
Calibration data (for reference): Maximum load (Max)	71	91	00000 ~ 99999
Calibration data (for reference): Calibration weight	71	92	00000 ~ 99999
Calibration data (for reference): ZERO mV/V value	71	93	-3.1000 ~ 3.1000
Calibration data (for reference): SPAN mV/V value	71	94	-3.1000 ~ 3.1000
Stability detecting duration during calibration	71	97	00 ~ 99 (Unit: 0.1 s)

Note:

- Please change "7*" in the above mentioned command part to "8*" at the time of writing.
- The number of (90) ~ (94) is only read because of the items relating to calibration.

Command name	Command	Number	Return command set value
Weighing mode	72	01	0: Simple mode, 1: Sequential mode 2: 5-step check mode 1 3: 5-step check mode 2
Control mode	72	02	0: Batching mode, 1: Discharge mode 2: External input change
Signal function	72	05	0: Any time, 1: In stable condition 2: Synchronized with batching finish 3: Synchronized with batching finish [Hold]
[NEAR ZERO] function	72	06	0: Gross, 1: Net, 2: OFF, 3: (Gross), 4: (Net)
[FULL] function	72	07	0: Gross, 1: Net, 2: OFF, 3: (Gross), 4: (Net)
Batching time monitoring timer	72	10	0000 ~ 9999: Unit: 1 s 0000: Batching monitoring timer OFF
Start via [Near Zero] (limit "Empty" at the time of batching start	72	15	0: Not active, 1: Active
Automatic tare weight cancellation when batching starts	72	16	0: Not active, 1: Active
Batching start waiting time	72	17	0000 ~ 9999: Unit: 1 s 0000: Batching start delay timer OFF
Automatic tare weight cancellation after batching start delay timer	72	18	0: Not active, 1: Active
Coarse flow measuring delay timer	72	20	0000 ~ 9999: Unit: 0.01 s 0000: Coarse flow measuring delay timer OFF
Middle flow measuring delay timer	72	21	0000 ~ 9999: Unit: 0.01 s 0000: Middle flow measuring delay timer OFF
Fine flow measuring delay timer	72	22	0000 ~ 9999: Unit: 0.01 s 0000: Fine flow measuring delay timer OFF
Automatic overshoot correction	72	25	0: Not active, 1: Active
Automatic overshoot correction width	72	26	00000 ~ 99999: Unit: 1D 00000: Automatic free fall compensation OFF
Store automatic overshoot correction value	72	27	0: Not active, 1: Active
Calming time (waiting time)	72	30	0: Waiting time is exceeded, 1: Waiting time is exceeded and condition is stable 2: Waiting time is exceeded or condition is stable

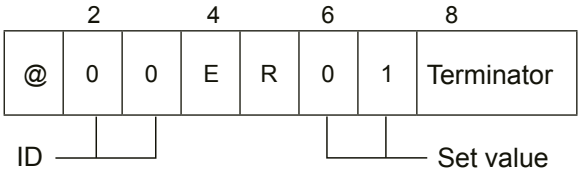
Command name	Command	Number	Return command set value
Calming time (waiting time) setting	72	31	0000 ~ 9999: Unit: 0.01 s 0000: Waiting time OFF
Maximum number of post-batching	72	35	000 ~ 255: Unit: 1 time 000: Post-batching OFF
Condition for the finishing time of post-batching	72	36	0: Waiting time is exceeded, 1: Waiting time is exceeded and condition is stable, 2: Waiting time is exceeded or condition is stable
Post-batching time	72	37	0000 ~ 9999: Unit: 0.01 s 0000: Post-batching OFF
Waiting time after post-batching	72	38	0000 ~ 9999: Unit: 0.01 s 0000: Post-batching OFF
Output time of the batching finish signal	72	40	0000 ~ 9999: Unit: 0.01 s 0000: Batching finish output OFF
Batching finish output OFF condition	72	41	0: No condition, 1: OL or unstable, 2: Near Zero (Empty)
Discharge start when inflow finishes	72	45	0: Not active, 1: Active
Discharge monitor timer	72	46	0000 ~ 9999: Unit: 1 s 0000: Discharge monitor OFF
Delay time for closing the discharge valve	72	47	0000 ~ 9999: Unit: 0.01 s 0000: Discharge gate close delay time OFF
Output time for the discharge finish	72	48	0000 ~ 9999: Unit: 0.01 s 0000: Discharge finish output OFF
Tare weight cancellation clear when discharge finishes	72	49	0: Not active, 1: Active

Note:

- Please change "7*" in the above mentioned command part to "8*" at the time of writing.

16.4.12 Communication error processing

The device replies with the error command to the host side when a communication or execution error occurs.



Error Command No.	Details	Remarks
01	Non-executable condition error	Calibration mode, C function mode, check mode and power-on-ZERO are non-executable conditions
02	Other errors by the device	The receiving command cannot be executed.
10	Parity error	Parity cannot be detected.
11	Fleming error	The stop bit cannot be detected.
12	Overrun error	The receiving command cannot be read.
13	Data code and data length error	The receiving data code and data length do not correspond.
14	No pertinent command	The receiving command does not correspond.
20	ZERO calibration error	ZERO set value is less than –2.5 mV/V.
21	ZERO calibration error	The ZERO set value is more than 2.5 mV/V.
22	SPAN calibration error	The SPAN set value and ZERO set value are less than 0.0 mV/V.
23	SPAN calibration error	The SPAN set value is more than 3.1 mV/V

Note:

- The error command is not returned if the address and completion code (terminator) cannot be detected.
- Deal with this on the host side if the communication error command is returned from the device.

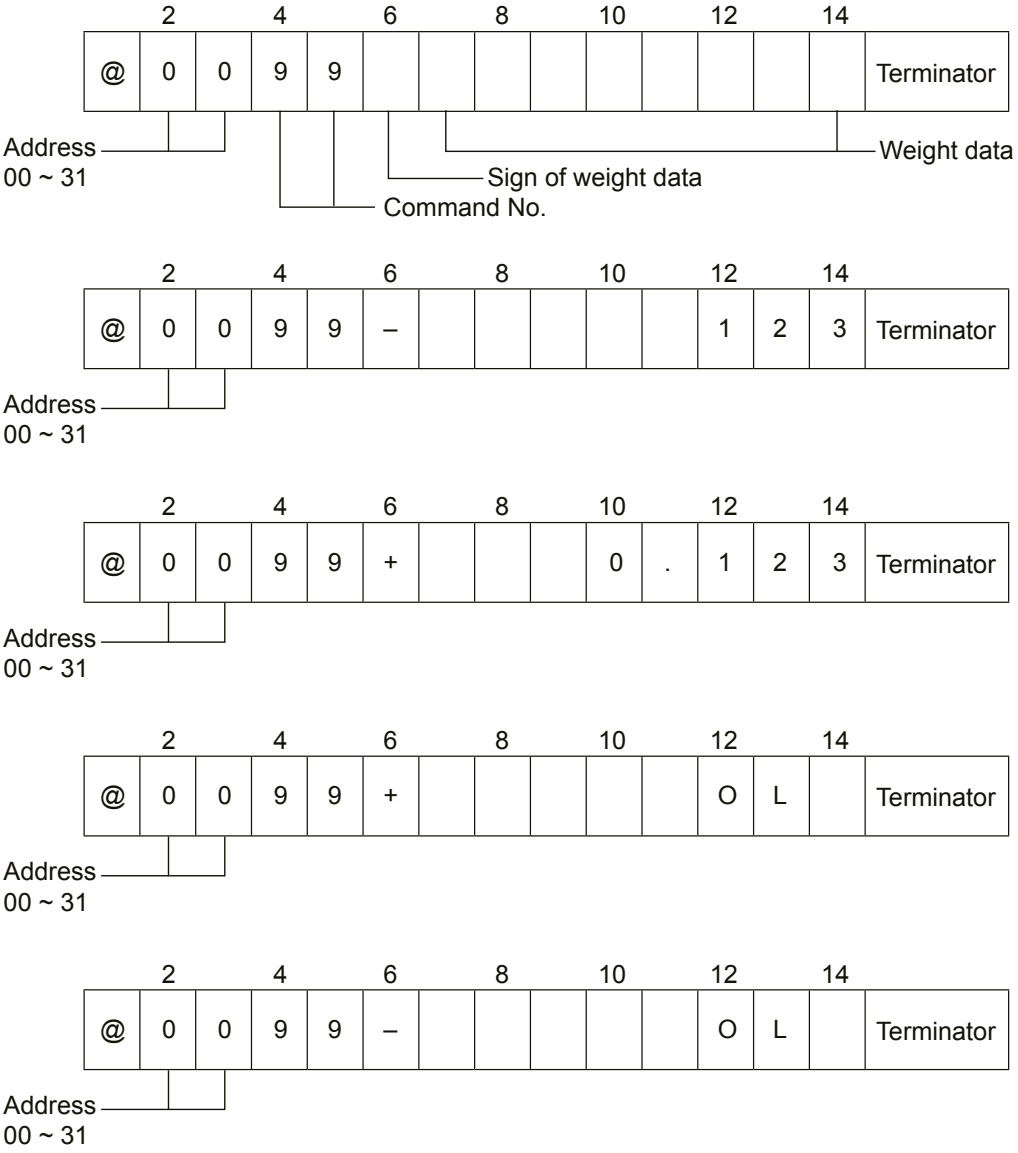
16.5 Data format for stream mode

Note:

- The sign of "-" for minus and "+" for plus is entered.
- Zero suppression is performed on the load data.
- The decimal point is set in a specified position when the decimal point position is set with F-46 and when decimal point is specified with CF-01.
- "OL" is displayed on the load data part when there is an overload. "-OL" is output for the weight data part when gross weight is negative.
- The empty parts are all spaces.

16.5.1 When the setting of function F-41 is "Gross weight" or "Net weight"

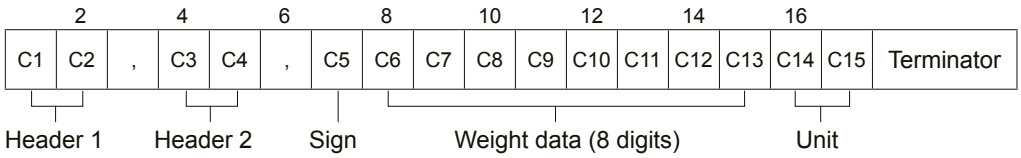
(device → host)



16.5.2 When "Weight display data with condition" is set by function F-41

Return (device → host)

When the set number of digits for the unit is 2 (F-49 = 0).

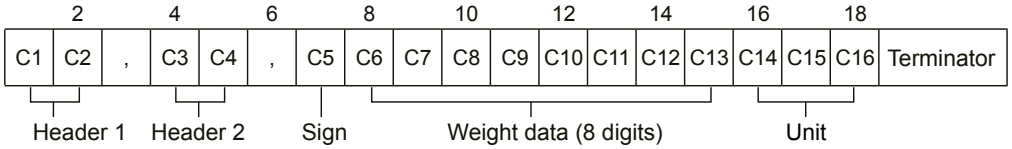


Header 1		Header 1		Sign		Weight data (8 digits)								Unit		
C1	C2	Details	C3 C4	Details	C5	Details	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	Details
O	L	Overload	N	T	Net weight	+	Plus					1	2	3		g	Gram

Header 1			Header 1			Sign		Weight data (8 digits)							Unit		
S	T	Stable	G	S	Gross weight	-	Minus				0	.	1	2	3	k	g	Kilogram
U	S	Unstable											O	L			t	Ton
																l	b	Pound
																	N	Newton
																k	N	Kilo Newton
																	P	Pascal
																k	P	Kilo Pascal
																M	P	Mega Pascal

Return (host → device)

When the set number of digits for the unit is 3 (F-49 = 1).



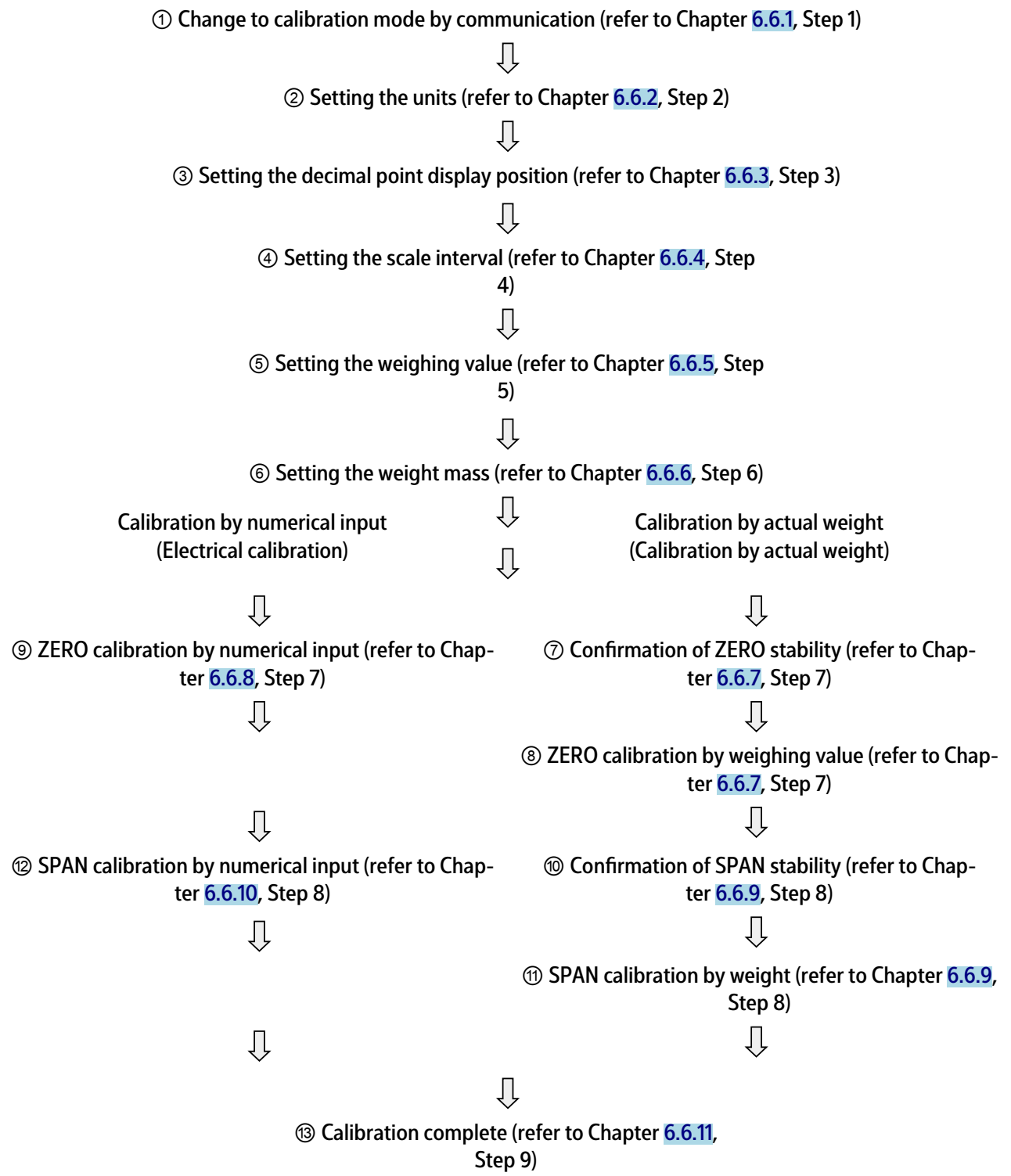
Header 1			Header 1			Sign		Weight data (8 digits)							Unit		
C1	C2	Details	C3	C4	Details	C5	Details	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16	Details
O	L	Overload	N	T	Net weight	+	Plus						1	2	3			g	Gram
S	T	Stable	G	S	Gross weight	-	Minus				0	.	1	2	3		k	g	Kilogram
U	S	Unstable											O	L				t	Ton
																	l	b	Pound
																		N	Newton
																	k	N	Kilo Newton
																	P	a	Pascal
																k	P	a	Kilo Pascal
																M	P	a	Mega Pascal

16.6 Calibration by RS-232C and RS-422/485 interface

16.6.1 Calibration procedures

Procedures for calibration by communication are shown in the following flowchart.

Each item of the flowchart corresponds to a procedure from Chapter 6.6.


① Change to calibration mode by communication (refer to Chapter 6.6.1, Step 1)
② Setting the units (refer to Chapter 6.6.2, Step 2)
③ Setting the decimal point display position (refer to Chapter 6.6.3, Step 3)
④ Setting the scale interval (refer to Chapter 6.6.4, Step 4)
⑤ Setting the weighing value (refer to Chapter 6.6.5, Step 5)
⑥ Setting the weight mass (refer to Chapter 6.6.6, Step 6)
Calibration by numerical input (Electrical calibration)
Calibration by actual weight (Calibration by actual weight)
⑨ ZERO calibration by numerical input (refer to Chapter 6.6.8, Step 7)
⑦ Confirmation of ZERO stability (refer to Chapter 6.6.7, Step 7)
⑧ ZERO calibration by weighing value (refer to Chapter 6.6.7, Step 7)
⑫ SPAN calibration by numerical input (refer to Chapter 6.6.10, Step 8)
⑩ Confirmation of SPAN stability (refer to Chapter 6.6.9, Step 8)
⑪ SPAN calibration by weight (refer to Chapter 6.6.9, Step 8)
⑬ Calibration complete (refer to Chapter 6.6.11, Step 9)

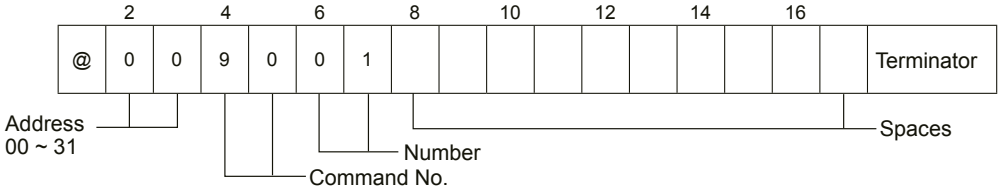
Note:

- When calibrating by transmission, -rS- (-RS-) is displayed.
- Refer to Chapter 16.4 for details of error commands during calibration by communication.
- When calibration is force finished, all data returns to its condition prior to calibration without saving.
- Be sure to register the data for calibration with a weight after confirming the condition is stable.

Note:

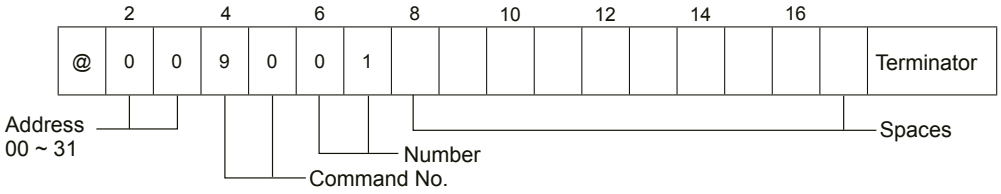
- Load data enters from the right.
- "-" is entered for negative values and "+" for positive values.
- Zero suppression is performed on the load data.
- Do not insert a decimal point in set data during calibration by communication.
- OL is displayed in the load data section in case of overload; –OL is displayed in the load data section if the gross weight is negative.
- The empty parts are all spaces.

16.6.1.1 Switch to communication calibration mode (host → device)



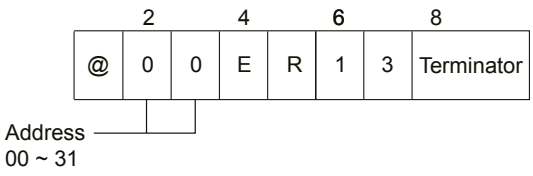
Under normal operation

Return (device → host)



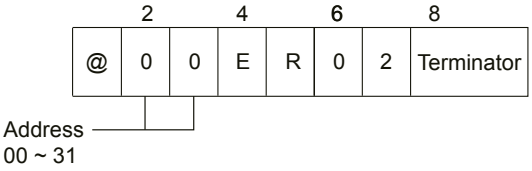
Under abnormal operation

Return (device → host)

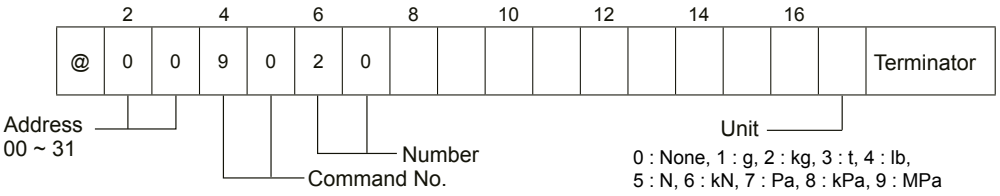


When the calibration lock is active

Return (device → host)

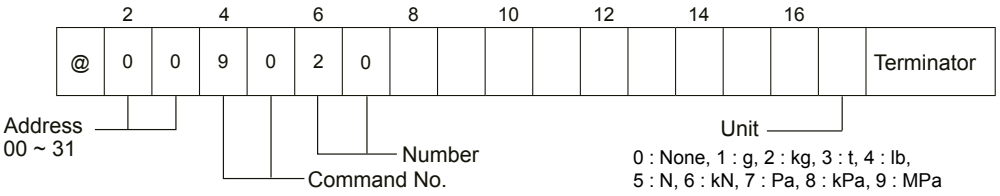


16.6.1.2 Setting of units (host → device)



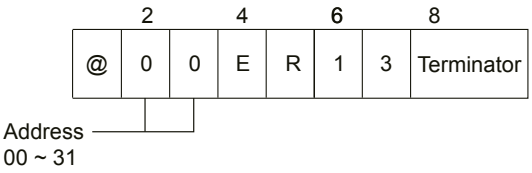
In normal operation

Return (device → host)

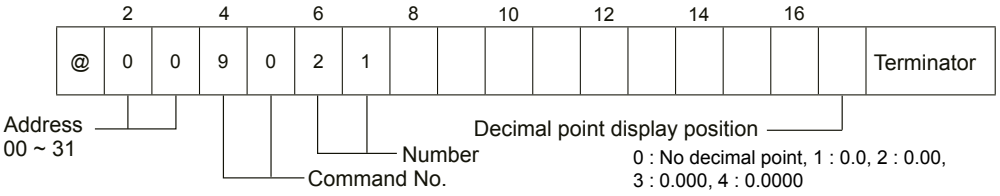


In abnormal operation

Return (device → host)

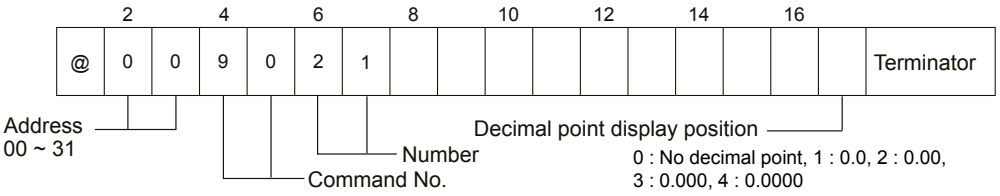


16.6.1.3 Setting of decimal point position (host → device)



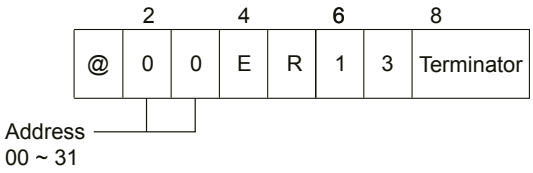
In normal operation

Return (device → host)

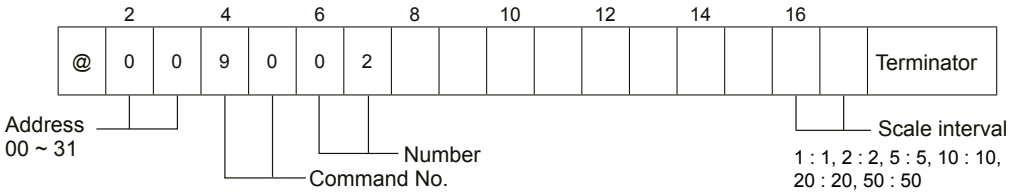


In abnormal operation

Return (device → host)

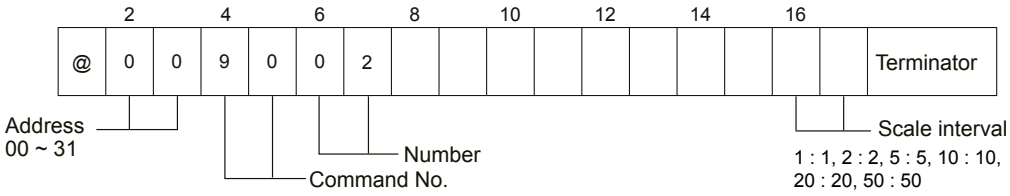


16.6.1.4 Setting the scale interval (host → device)



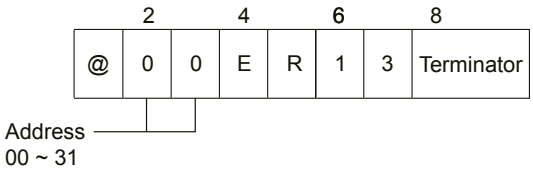
Under normal operation

Return (device → host)

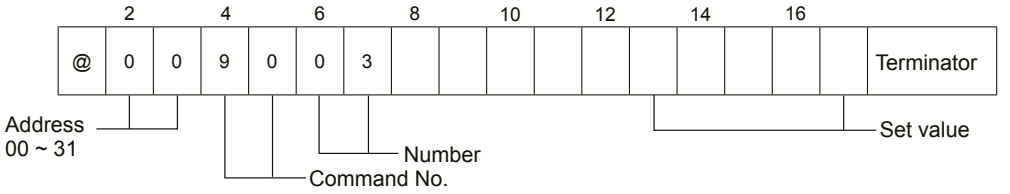


Under abnormal operation

Return (device → host)

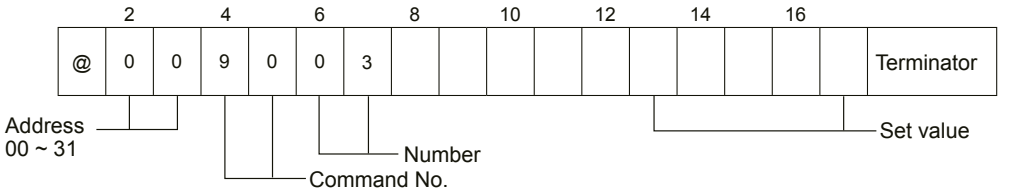


16.6.1.5 Setting the maximum load (host → device)



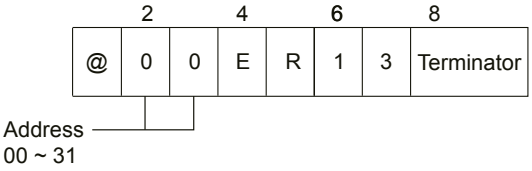
Under normal operation

Return (device → host)

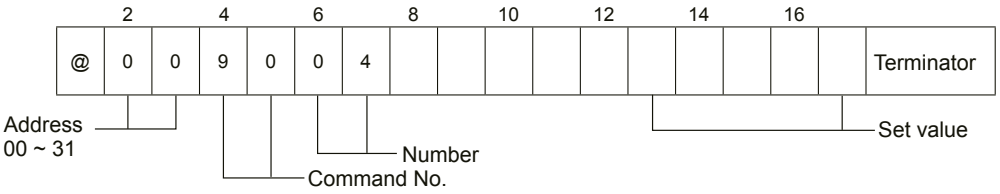


Under abnormal operation

Return (device → host)

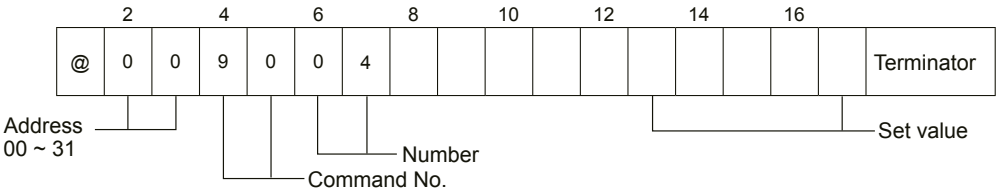


16.6.1.6 Set the mass of the weight (host → device)



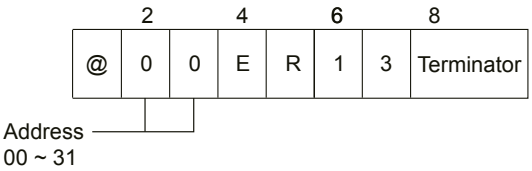
Under normal operation

Return (device → host)

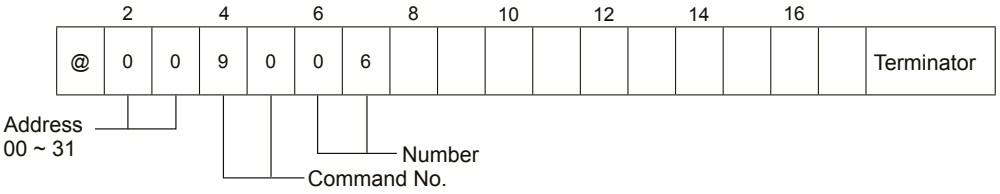


Under abnormal operation

Return (device → host)

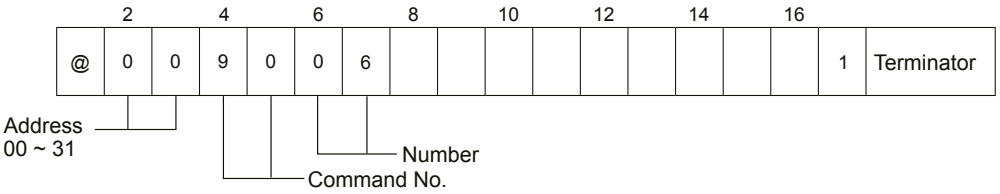


16.6.1.7 Confirmation of ZERO stability (host → device)



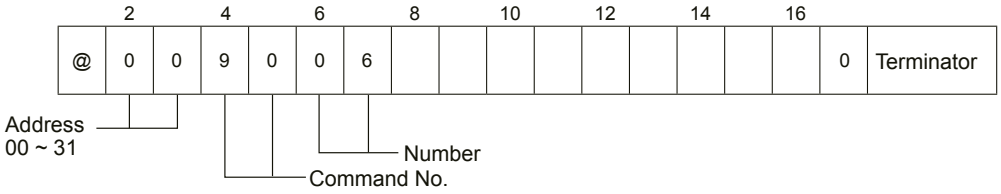
Under normal conditions

Return (device → host)

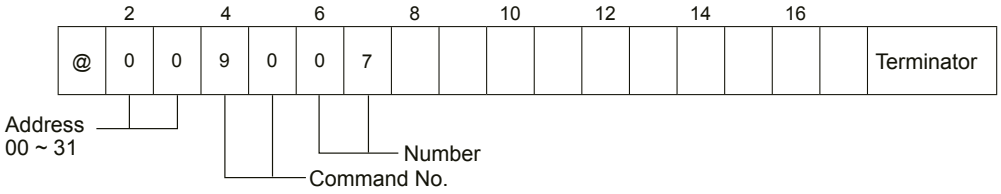


Under unstable conditions

Return (device → host)

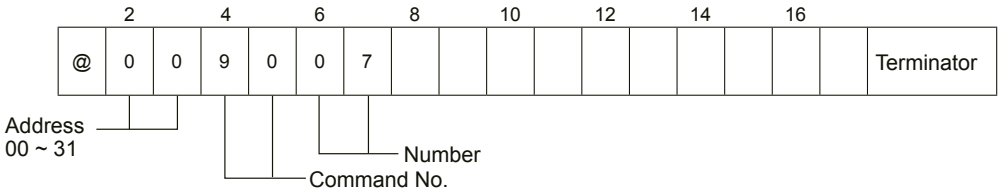


16.6.1.8 Switch to communication calibration mode (host → device)



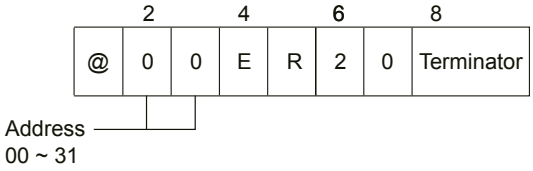
Under normal operation

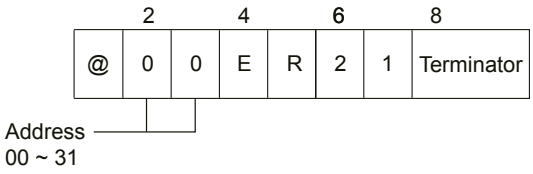
Return (device → host)



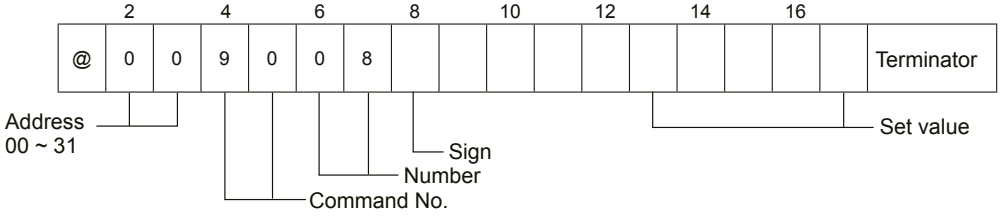
Under abnormal operation

Return (device → host)



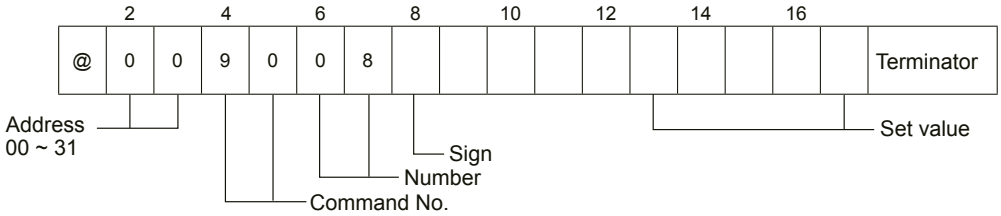


16.6.1.9 ZERO calibration by numeric input (host → device)



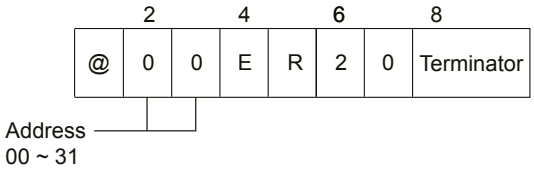
Under normal operation

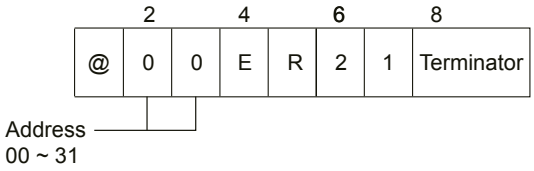
Return (device → host)



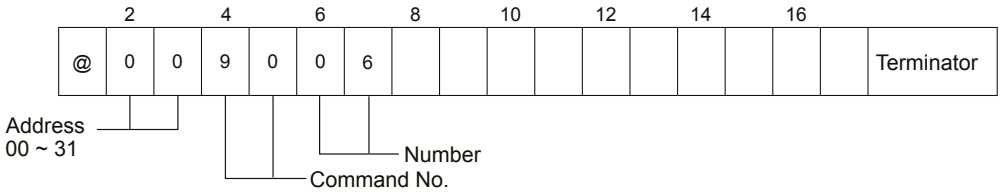
Under abnormal operation

Return (device → host)



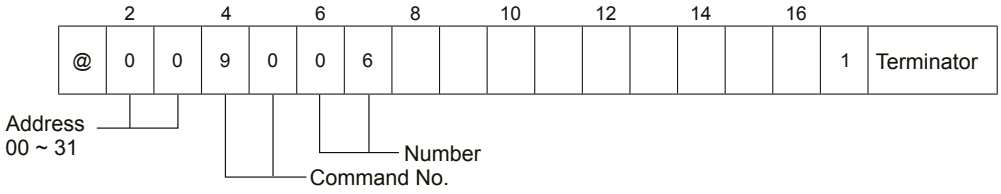


16.6.1.10 Confirmation of SPAN stability (host → device)



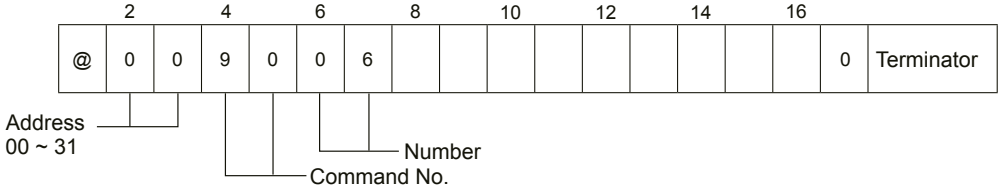
Under stable conditions

Return (device → host)

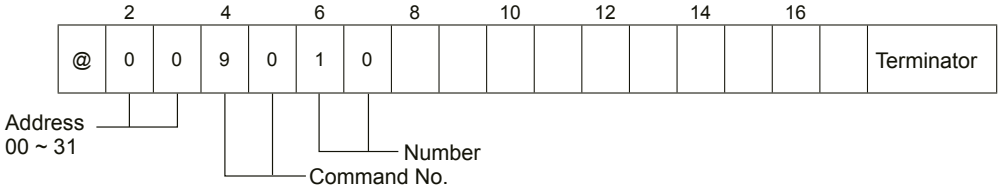


Under unstable conditions

Return (device → host)

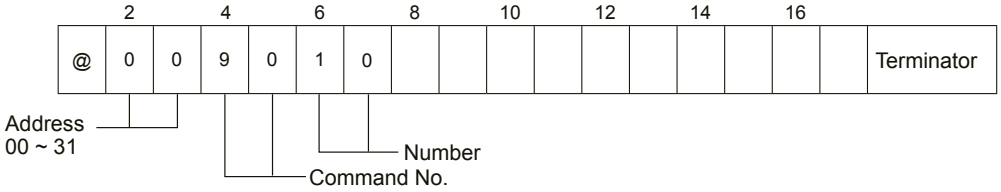


16.6.1.11 SPAN calibration by weight (host → device)



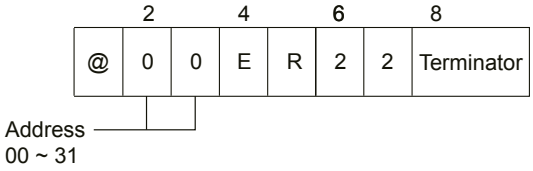
Under normal operation

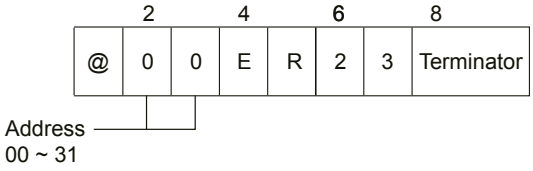
Return (device → host)



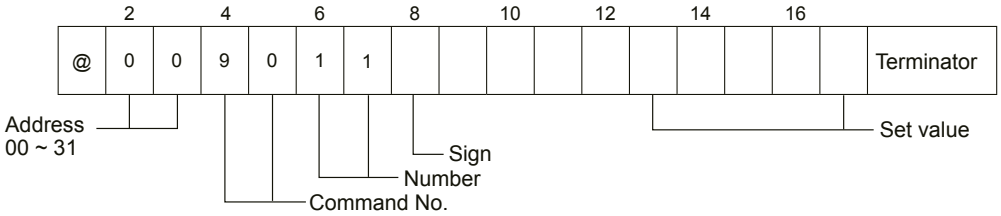
Under abnormal operation

Return (device → host)



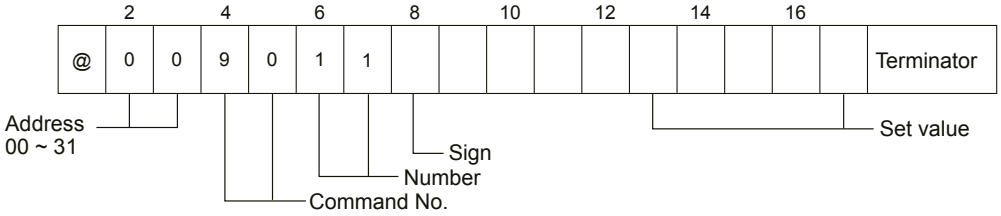


16.6.1.12 SPAN calibration by numeric input (host → device)



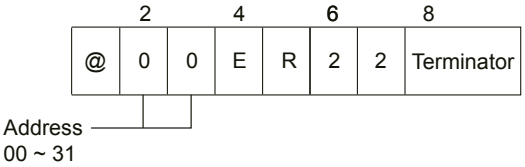
Under normal operation

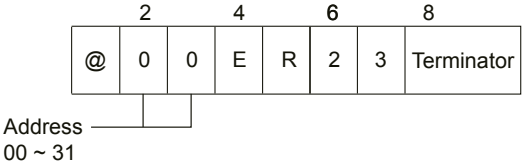
Return (device → host)



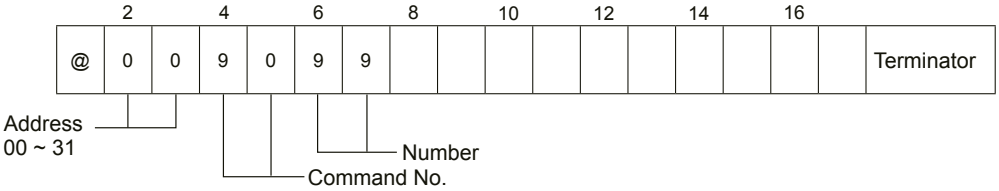
Under abnormal operation

Return (device → host)



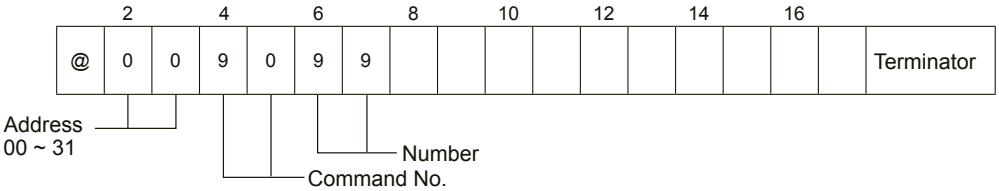


16.6.1.13 Finish calibration (host → device)



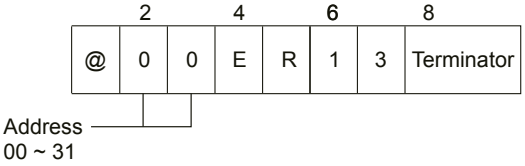
Under normal operation

Return (device → host)

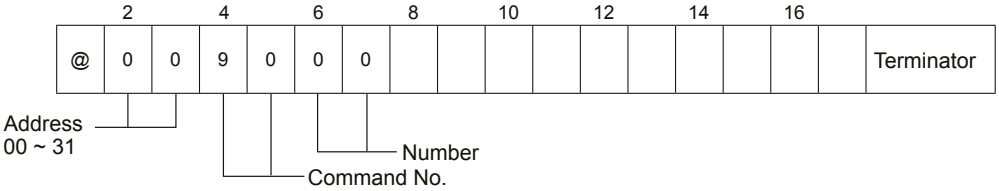


Under abnormal operation

Return (device → host)

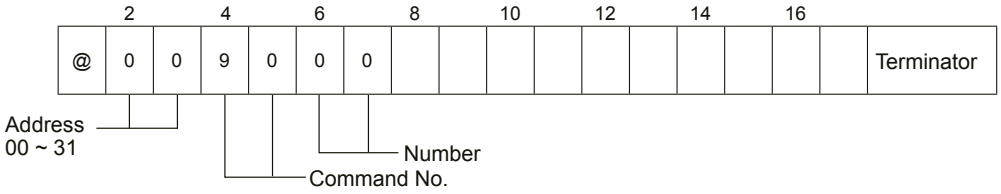


16.6.1.14 Calibration force finish (host → device)



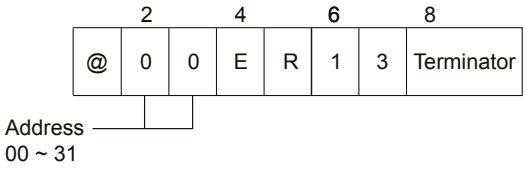
Under normal operation

Return (device → host)



Under abnormal operation

Return (device → host)



16.6.2 Calibration for the zero point only

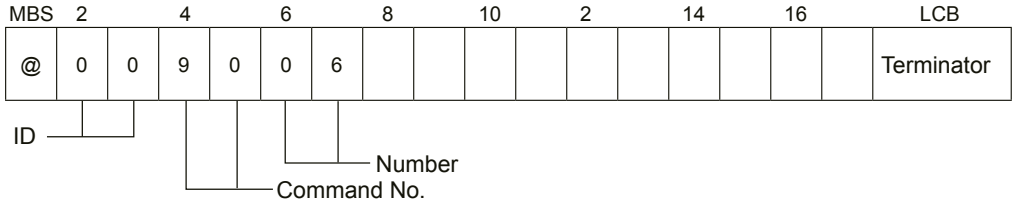
This function calibrates only the zero point again.

16.6.2.1 Stability confirmation

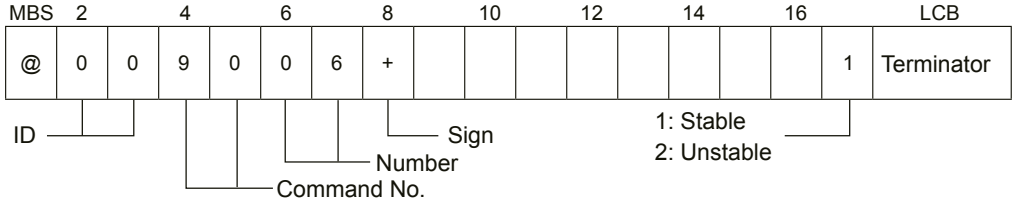
Note:

- Only the display where the weight value is displayed can be operated.
- Besides, execution not possible error will be returned.

Receiving command



Return command in normal condition

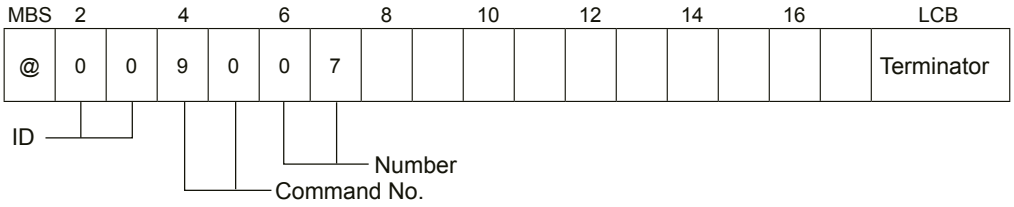


16.6.2.2 Register the zero point (actual load)

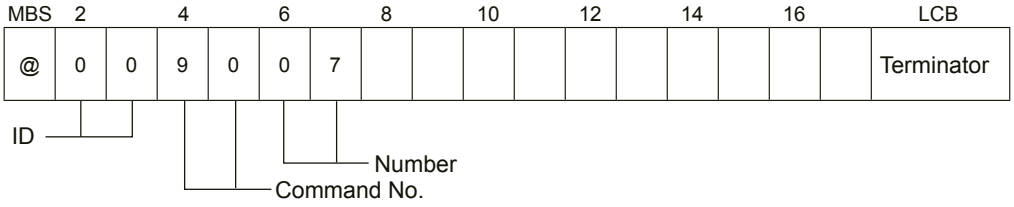
Note:

- Only the display where the weight value is displayed can be operated.
- Besides, execution not possible error will be returned.

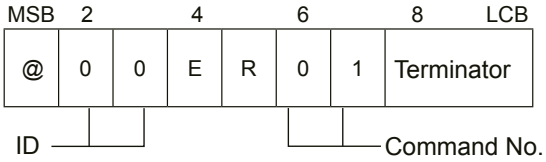
Receiving command



Return command in normal condition



At abnormal operation



Command no.	Description	Details
20	Calibration error	Tare weight in calibration is less than the specified value.
21	Calibration error	Tare weight in calibration is more than the specified value.
23	Calibration error	Actual weight in calibration is more than the specified value.

16.6.3 Calibration for SPAN point only

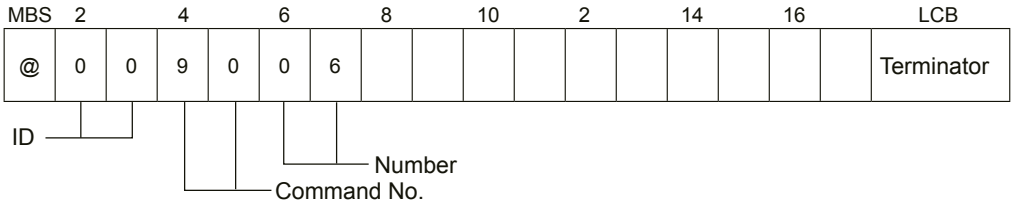
This function calibrates only the SPAN point again.

16.6.3.1 Stable confirmation of SPAN point

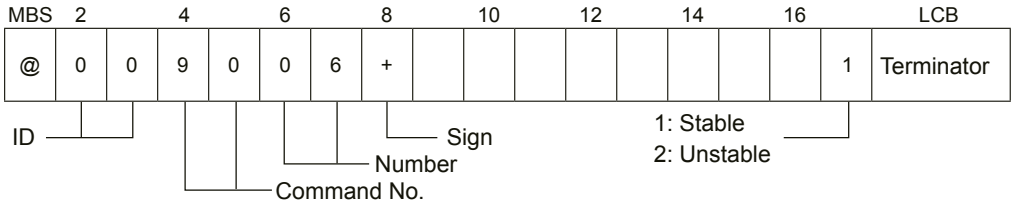
Note:

- Only the display where the weight value is displayed can be operated.
- Besides, execution not possible error will be returned.

Receiving command



Return command in normal condition

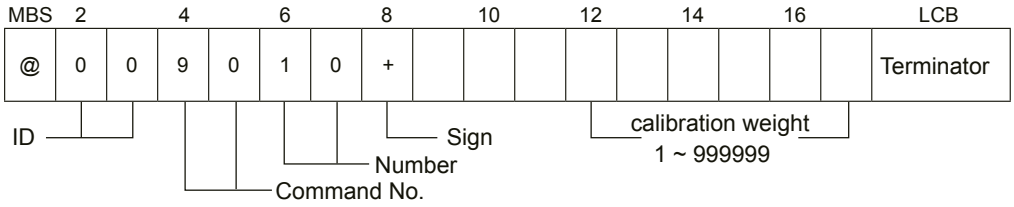


16.6.3.2 Register the SPAN point

Note:

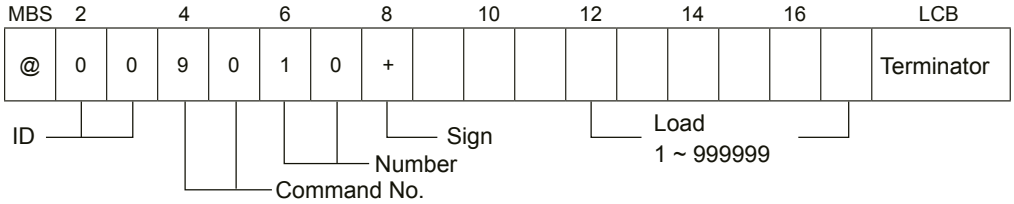
- Only the display where the weight value is displayed can be operated.
- Besides, execution not possible error will be returned.

Receiving command

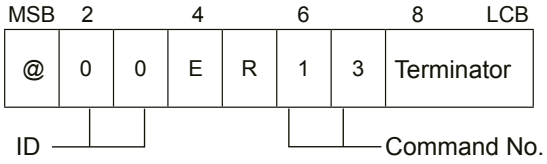


- The set value enters from the right.
- The set value performs zero suppress.
- Maximum load (Max) ≥ calibration weight.

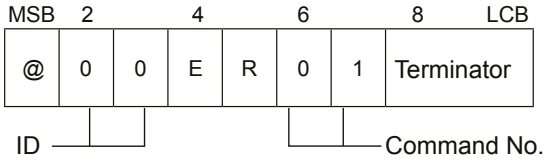
Return command in normal condition



Return command at the setting error



Calibration error

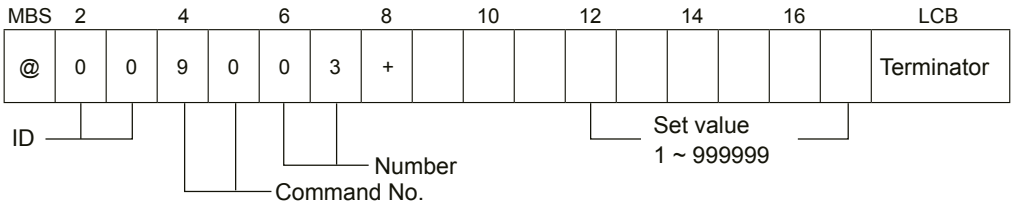


Command no.	Description	Details
22	Calibration error	Actual weight in calibration is less than the specified value.
23	Calibration error	Actual weight in calibration is more than the specified value.

16.6.4 Calibration for maximum load (Max) only

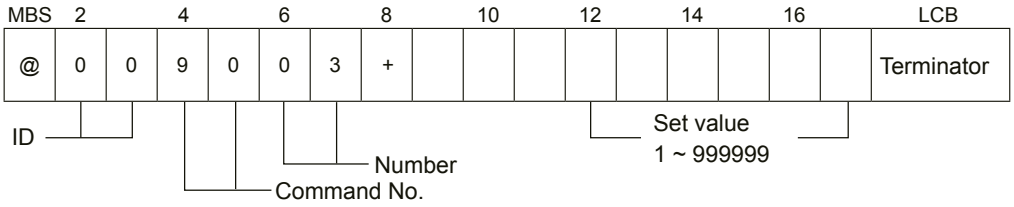
This function calibrates only the maximum load (Max) again.

Receiving command

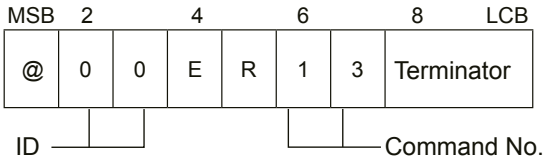


- The set value enters from the right.
- The set value performs zero suppress.

Return command in normal condition



Return command at the setting error



16.7 ModBus mode

This is a serial interface using a RS-232C interface and RS-422/485 interface. The equipment that supports the ModBus communication can be communicated without the program.

Modbus is the registered trademark of Modicon Inc. (AEG Schneider Automation International S.A.S.).

The data communication with CSD-892/74, ../76 should not create the program for the protocol because the communication is executed by operating the memory mapped as below tables.

Please set the parameter when you use the ModBus mode, please refer to Chapter 16.3.1.

Moreover, the setting for adding a decimal point and termination becomes invalid because the operation of ModBus is irrelevant.

Item	Set value
Operational mode	Modbus mode
Baud rate	Selectable from 1 200, 2 400, 4 800, 9 600, 19 200 or 38 400 bps.
Data bit	8 bit
Parity bit	Selectable from No parity, Even parity or Odd parity
Stop bit	Selectable from 1 bit or 2 bit
Address	When CSD-892-74 : Address is fixed to 1. When CSD-892-76 : Select one from 00 to 31 by the setting of function F-43. However, 00 is a broadcast address.

Note:

- Set [01] or more to the setting of function F-45 for CSD-892-76.
- Set the delay time of 2 ms or more to the host side.

Output coil (bit reading / writing reference No. 0)

Address	Data name	Address	Data name
1	Zero	19	Error reset
2	Zero clear	20	Changeover of HOLD and HOLD release
3	Tare weight cancellation	21	No use
4	Tare weight cancellation clear	22	Changeover of Gross amount and Net amount
5 to 18	No use	23 to 32	No use

Input status (Bit Reading Reference No.1)

Address	Data name	Address	Data name
17	Stable	40	Zero error
18	Zero Band	41	Error
19	Full	42	No use
20	Coarse flow /S1	43	During tare
21	Middle flow / S2	44	No use
22	Fine flow / S3	45	Center zero
23	Over setpoint (+tolerance) / S4	46	No use
24	OK / S0	47	No use
25	Under setpoint (-tolerance)	48	During hold

Address	Data name	Address	Data name
26 to 38	No use	49 to 64	No use
39	Abnormal weight		

Input register (Word Reading Reference No.3)

Address	Data name	Address	Data name
1	Position of decimal point	53	Tare weight
2	Unit	55	Status
3	Tare weight	56	Status error code
5	Gross weight	57	Gross weight
7	Net weight	59	Status
9 to 12	No use	60	Status error code
13	Abnormal weight	61	Net weight
14	Zero error	63	Status
15	Error	64	Status error code
16 to 50	No use	65 to 98	No use
51	Status	99	Version of software
52	Status error code	100	No use

Holding register (Word Reading / Writing Reference No.4)

Address	Data name
1 to 9	No use
11 to 12	Setpoint / S1
13 to 14	Overshoot / S4
15 to 16	Preset 1 / S3
17 to 18	Preset 2 / S2
19 to 20	Over setpoint (+tolerance)
21 to 22	Under setpoint (-tolerance)
23 to 24	Zero Band
25 to 26	Full
27 to 37	No use
51	Operational mode
52	No use
61 to 62	Scale interval
63 to 64	Set of maxximum load (Max)
65 to 66	Set of calibration weight
67 to 68	Registration of output value of load cell at zero point

Address	Data name
69 to 70	Registration of output value of load cell at SPAN point
71	Stable confirmation in actual weight calibration
72	Zero point registration in actual weight calibration
73	SPAN point registration in actual weight calibration
74	Finish the calibration
75	Fine adjustment at zero point
76	Fine adjustment at SPAN point
77 to 78	Load value at POINT1
79 to 80	Load value at POINT2
81 to 82	Load value at POINT3
83 to 84	Fine adjustment mode
85	No use
57345 to 57346	F-01 Setting of digital filter
57347 to 57348	F-02 Setting of analog filter
57349 to 57352	No use
57353 to 57354	F-05 Setting of stabilization filter
57355 to 57356	F-06 Stabilization filter data width
57357 to 57358	F-07 Stabilization filter time width
57359 to 57360	F-08 Independent key lock
57361 to 57362	No use
57363 to 57364	F-10 Stability detection data width
57365 to 57366	F-11 Duration of stability detection
57367 to 57368	No use
57369 to 57370	No use
57371 to 57372	No use
57373 to 57374	F-15 Net weight offset function
57375 to 57376	No use
57377 to 57378	No use
57379 to 57380	F-18 Holding target
57381 to 57382	No use
57383 to 57384	No use
57385 to 57386	F-21 5-step check mode operation
57387 to 57388	F-22 5-step check mode operation condition
57389 to 57390	No use
57391 to 57392	F-24 Check mode hysteresis operation condition

Address	Data name
57393 to 57394	F-25 Check mode hysteresis data width
57395 to 57396	F-26 Check mode hysteresis time width
57397 to 57426	No use
57427 to 57428	F-42 Setting of Communication through USB interface for RS-232C and RS-422/485
57429 to 57430	F-43 Setting of address for RS-422/485 interface
57431 to 57432	F-44 Change of RS-422/485 interface
57433 to 57434	F-45 Delay time of return data for RS-485 interface
57435 to 57436	F-46 Addition of decimal point for RS-232C interface and RS-422/485 interface
57437 to 57438	F-47 Operation for RS-232C interface and RS-422/485 interface
57439 to 57440	F-48 Output target for RS-232C interface and RS-422/485 interface
57441 to 57442	F-49 Number of digit for unit for RS-232C interface and RS-422/485 interface
57443 to 57451	No use
57453 to 57454	F-55 Setting of operation for F/Enter key
57455 to 57462	No use
57463 to 57464	F-60 Operation of INPUT1 for external control input
57465 to 57466	F-61 Operation of INPUT2 for external control input
57467 to 57468	F-62 Operation of INPUT3 for external control input
57469 to 57482	No use
57483 to 57484	F-70 Operation of OUTPUT1 for external control output
57485 to 57486	F-71 Operation of OUTPUT2 for external control output
57487 to 57488	F-72 Operation of OUTPUT3 for external control output
57489 to 57490	F-73 Operation of OUTPUT4 for external control output
57491 to 57492	F-74 Operation of OUTPUT5 for external control output
57493 to 57508	No use
57509 to 57510	F-83 Logic of output
57511 to 57522	No use
57527 to 57528	F-90 Maintenance date
57525 to 57526	F-91 Input of maintenance number
57527 to 57532	No use
57533 to 57534	F-95 On time of back light for liquid crystal
57535 to 57543	No use
57857 to 57858	CF-01 Display position of decimal point

Address	Data name
57859 to 57860	CF-02 AD sampling
57861 to 57862	CF-03 Condition of overload condition
57863 to 57864	CF-04 Display synchronization of comparison operation
57865 to 57866	CF-05 Unit
57867 to 57870	No use
57871 to 57874	CF-08 Reverse function of sign for net amount
57875 to 57876	CF-10 Operating condition of zero set
57877 to 57878	CF-11 Effective range of zero set
57879 to 57880	CF-12 Target of zero tracking
57881 to 57882	CF-13 Data width of zero tracking
57883 to 57884	CF-14 Time width of zero tracking
57885 to 57886	CF-15 Power-On zero operation
57887 to 57888	CF-16 Operating condition of tare weight cancellation
57889 to 57890	CF-17 Changeover of data storing place
57891 to 57894	No use
57895 to 57896	CF-20 Stability detection during setting
57897 to 57904	No use
57905 to 57906	CF-25 Setting method of compensation value for gravity acceleration.
57907 to 57908	CF-26 District number of using place
57909 to 57910	CF-27 District number of calibration place
57911 to 57912	CF-28 Gravity acceleration value of using place
57913 to 57914	CF-29 Gravity acceleration value of calibration place
57915 to 58034	No use
58035 to 58036	CF-90 Scale interval of calibration data (for reference)
58037 to 58038	CF-91 Weighing capacity of calibration data (for reference)
58039 to 58040	CF-92 Mass of weight of calibration data (for reference)
58041 to 58042	CF-93 Zero mV/V of calibration data (for reference)
58043 to 58044	CF-94 Span mV/V of calibration data (for reference)
58045 to 58048	No use
58049 to 58050	CF-97 Time width for detecting stability during calibration
58051 to 58055	No use
58369 to 58370	SQF-01 Weighing mode
58371 to 58372	SQF-02 Control mode
58373 to 58376	No use

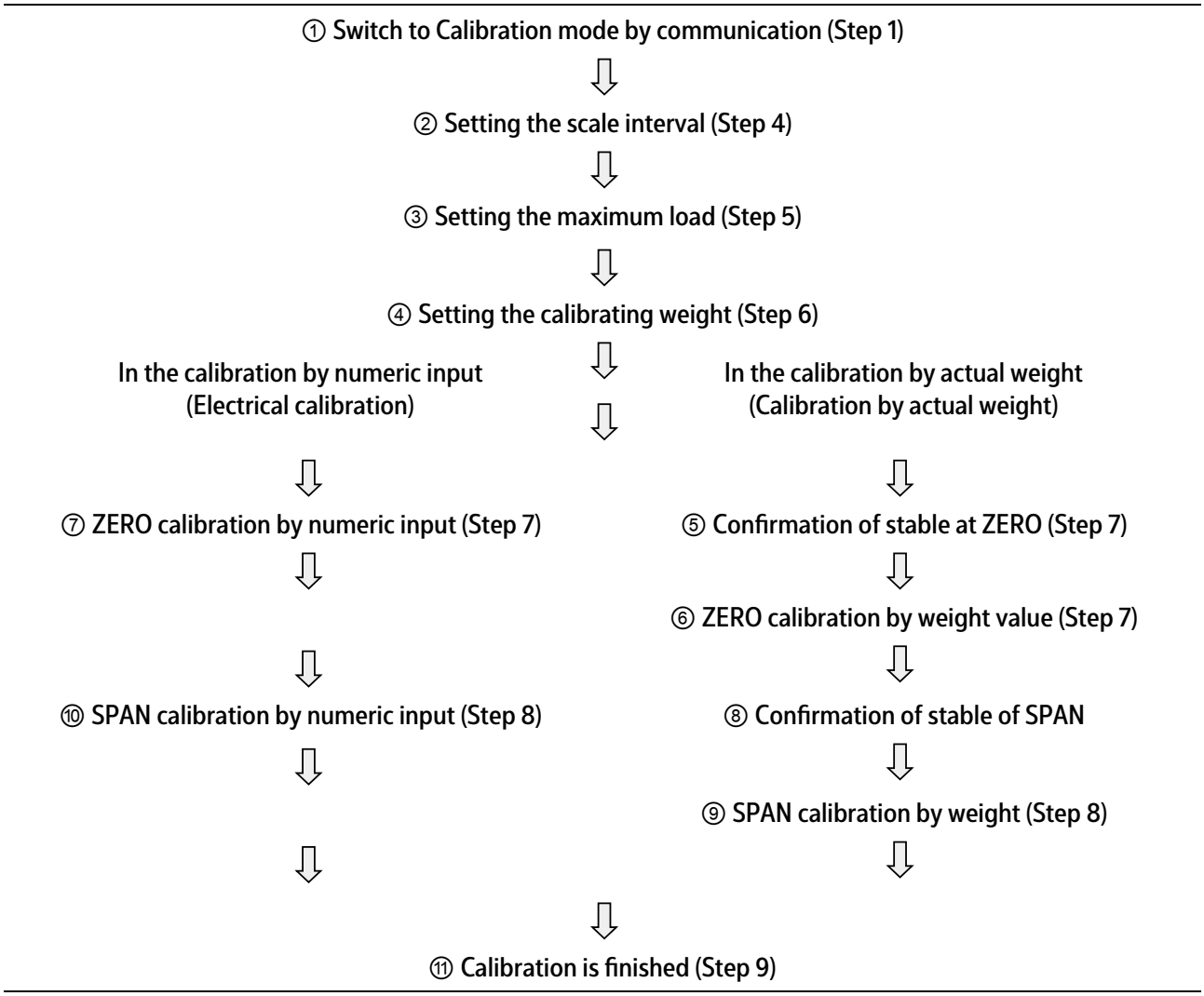
Address	Data name
58377 to 58378	SQF-05 Comparison signal operation
58379 to 58380	SQF-06 Zero Band
58381 to 58382	SQF-07 Full
58383 to 58566	No use

16.8 Calibration by transmission through ModBus interface

Proceed the setting according to the following fow chart in this calibration.

16.8.1 Calibration mode

Each item of the flow chart corresponds to each procedure described in Chapter 6.6.



Note:

- While executing the calibration by transmission, -RS (-RS) is displayed.
- When the calibration is compulsorily finished, all the data returns to the condition before the calibration without executing the registration.
- Please register the data for the calibration with the weight after confirming the stable condition without fail.

16.8.1.1 Change to calibration mode by communication

Input [9] at holding register address 51 to switch to calibration mode.

16.8.1.2 Setting the scale interval

The scale interval is written in holding register address 61 to 62.

Scale interval: Can be selected from 1, 2, 5, 10, 20 and 50

Error outside the setting range

When data outside the setting range is entered, the following codes are set.

Condition	Error code	Contents
Illegal data	0x03	When data outside the setting range is entered

16.8.1.3 Set the maximum load

The maximum load is written in holding register address 63 to 64.

Setting range: 1 to 99999

Error outside the setting range

When data outside the setting range is entered, the following codes are set.

Condition	Error code	Contents
Illegal data	0x03	When data outside the setting range is entered

16.8.1.4 Set the weight mass

Mass of weight is written in holding register address 65 to 66.

Setting range: 1 to 99999

However, data is below the maximum load.

Error outside the setting range

When data outside the setting range is entered, the following codes are set.

Condition	Error code	Contents
Illegal data	0x03	When data outside the setting range is entered

16.8.1.5 Confirm zero stability (actual weight)

Stable/Unstable is read from holding register address 71.

0: Unstable

1: Stable

16.8.1.6 Zero calibration by weighing value

The load cell output value is registered in holding register address 72 as the zero point.

[1] is written in holding register address 72.

[1] is automatically rewritten as [0] after writing is completed.

Setting range: 1

TE-L error

[20] (TE-L) is written in input register address 52 when the read load cell output value is less than –2.5 mV/V, which exceeds the range of zero calibration on the negative side.

Condition	Error code	Contents
TE-L	–	Zero point < –2.5 mV/V

TE-H error

[21] (TE-H) is written in input register address 52 when the read load cell output value is more than 2.5 mV/V, which exceeds the range of zero calibration on the positive side.

Condition	Error code	Contents
TE-H	–	(2.5 mV/V) < (Zero point)

Error outside the setting range

When data outside the setting range is entered, the following codes are set.

Condition	Error code	Contents
Illegal data	0x03	When data outside [1] is written

16.8.1.7 Zero calibration by numerical input

Zero is registered by setting unit mV/V amount in holding register address 67 to 68.

Setting range : -25 000 to 25 000 (–2.5 mV/V to 2.5 mV/V)

TE-L error

[20] (TE-L) is written in input register address 52 when the read load cell output value is less than –2.5 mV/V, which exceeds the range of zero calibration on the negative side.

Condition	Error code	Contents
TE-L	–	Zero point mV/V value < –25 000

TE-H error

[21] (TE-H) is written in input register address 52 when the read load cell output value is more than 2.5 mV/V, which exceeds the range of zero calibration on the positive side.

Condition	Error code	Contents
TE-H	–	25 000 < Zero point mV/V value

Error outside the setting range

When data outside the setting range is entered, the following codes are set.

Condition	Error code	Contents
Illegal data	0x03	When a value outside -25 000 to 25 000 is written.

16.8.1.8 Confirm the SPAN stability (actual weight)

Stable/Unstable is read from holding register address 71.

0: Unstable

1: Stable

16.8.1.9 SPAN calibration by weighing value

The load cell output value is registered in holding register address 72 as the SPAN point.

[1] is written in holding register address 73.

[1] is automatically rewritten as [0] after writing is completed.

Setting range: 1

SP-L error

[22] (SP-L) is written in input register address 52 when the read load cell output value is 0 mV/V or less, which is outside the range of zero calibration on the negative side.

Condition	Error code	Contents
SP-L	–	SPAN point – Zero point ≤ 0.0 mV/V

SP-H error

[23] (SP-H) is written in input register address 52 when the read load cell output value is more than 3.1 mV/V, which exceeds the range of zero calibration on the positive side.

Condition	Error code	Contents
SP-H	–	3.1 mV/V < Span point – Zero point 3.1 mV/V < SPAN point

Error outside the setting range

When data outside the setting range is entered, the following codes are set.

Condition	Error code	Contents
Illegal data	0x03	When data outside [1] is written

16.8.1.10 SPAN calibration by numerical input

SPAN is registered by setting unit mV/V amount in holding register address 69 to 70.

Setting range: 1 to 31000 (0.0001 mV/V to 3.1 mV/V)

SP-L error

[22] (SP-L) is written in input register address 52 when the input load cell output value is 0 mV/V or less, which is less than the range of zero calibration on the negative side.

Condition	Error code	Contents
SP-L	–	SPAN point – Zero point ≤ 0.0 mV/V

SP-H error

[23] (SP-H) is written in input register address 52 when the read load cell output value is more than 3.1 mV/V, which exceeds the range of zero calibration on the positive side.

Condition	Error code	Contents
SP-H	–	3.1 mV/V < SPAN point – Zero point 3.1 mV/V < SPAN point

Error outside the setting range

When data outside the setting range is entered, the following codes are set.

Condition	Error code	Contents
Illegal data	0x03	When data outside [1 to 31 000] is written.

16.8.1.11 Finish calibration

Calibration data, such as zero point and the span point, that is registered temporarily is stored in holding register address 74 and the device returns to weighing mode.

[1] is written in holding register address 74.

[1] is automatically rewritten as [0] after writing is completed.

Error outside the setting range

When data outside the setting range is entered, the following codes are set.

Condition	Error code	Contents
Illegal data	0x03	When data outside [1] is written

16.8.1.12 Calibration forced finish

When [0] is written in holding register address 51 during calibration, calibration is discontinued without saving the calibration data that is registered temporarily, and the device returns to weighing mode.

16.8.2 Zero and SPAN fine calibration mode

Each item of the flow chart corresponds to each procedure described in Chapter 6.7.

① Change to Zero point and SPAN point fine calibration mode (Step 1)

⇩

② Zero point fine calibration (Step 2)

⇩

③ SPAN point fine calibration (Step 3)

⇩

④ Finish Zero point and SPAN point fine calibration (Step 4)

Note:

- Calibrating by transmission -rS- (-RS-) is displayed.
- When the calibration is force finished, all data returns to its condition prior to calibration without registration.
- Be sure to register the data for calibration with a weight after confirming the condition is stable.

16.8.2.1 Change to Zero point and SPAN point fine calibration mode

Shift to Zero point and SPAN point fine calibration mode by writing [10] in holding register address 51.

16.8.2.2 Zero point fine calibration

Calibrate the display to zero after ensuring that there is nothing on the load cell.

Execute fine calibration after writing the data shown in below table in holding register address 75.

	Holding register address 75entry
Fine calibration on the positive side	1
Coarse calibration on the positive side	10
Fine calibration the negative side	–1
Coarse calibration on the negative side	–10

TE-L error

[20] (TE-L) is written in input register address 52 when the read load cell output value is less than –2.5 mV/V, which is outside the range of zero calibration on the negative side.

Condition	Error code	Contents
TE-L	–	Zero point < –2.5 mV/V

TE-H error

[21] (TE-H) is written in input register address 52 when the read load cell output value is more than 2.5 mV/V, which exceeds the range of zero calibration on the positive side.

Condition	Error code	Contents
TE-H	–	2.5 mV/V < Zero point 3.1 mV/V < SPAN point

Error outside the setting range

When data outside the setting range is entered, the following codes are set.

Condition	Error code	Contents
Illegal data	0×10^3	When data outside [1], [10], [–1] and [–10] is written.

16.8.2.3 SPAN fine calibration

Calibrate the display for the weight mass after placing a weight below the maximum load on the load cell.

Execute fine calibration after writing the data shown in below table in holding register address 76.

	Holding register address 75entry
Fine calibration on the positive side	1
Coarse calibration on the positive side	10
Fine calibration the negative side	–1
Coarse calibration on the negative side	–10

SP-L error

[22] (SP-L) is written in input register address 52 when the input load cell output value is 0 mV/V or less, which is less than the range of zero calibration on the negative side.

Condition	Error code	Contents
SP-L	–	SPAN point – Zero point ≤ 0.0 mV/V

SP-H error

[23] (SP-H) is written in input register address 52 when the read load cell output value is more than 3.1 mV/V, which exceeds the range of zero calibration on the positive side.

Condition	Error code	Contents
SP-H	–	3.1 mV/V < Span point – Zero point 3.1 mV/V < SPAN point

Error outside the setting range

When data outside the setting range is entered, the following codes are set.

Condition	Error code	Contents
Illegal data	0×10^3	When data outside [1], [10], [–1] and[–10] is written.

16.8.2.4 Finish Zero point and Span point fine calibration

Updated data for Zero point and the Span point is registered temporarily is saved in holding register address 74. The device returns to weighing mode.

[1] is written in holding register address 74.

[1] is automatically rewritten as [0] after writing is complete.

Error outside the setting range

When data outside the setting range is entered, the following codes are set.

Condition	Error code	Contents
Illegal data	0×10^3	When data outside [1] is written

16.8.2.5 Calibration force finish

When [0] is written in holding register address 51 during calibration, calibration is discontinued without saving the calibration data that is registered temporarily, and the device returns to weighing mode.

16.8.3 Calibration mode for digital linearization

Each item of the flow chart corresponds to each procedure described in Chapter 6.8.

① Change to digital linearization mode (Step 1)

⇩

② Compensation at point 1 (Step 2)

⇩

② Compensation at point 2 (Step 2)

⇩

② Compensation at point 3 (Step 2)

⇩

⑤ Quit digital linearization mode (Step 2)

Note:

- Calibrating by transmission -RS- (-RS-) is displayed.
- When the calibration is force finished, all data returns to its condition prior to calibration without registration.
- Be sure to register the data for calibration with a weight after confirming the condition is stable.

16.8.3.1 Switch to digital linearization mode

Switch to digital linearization mode by writing [11] in holding register address 51.

16.8.3.2 Compensation at point 1

After putting the weight for the point to be compensated on the load cell, the weight at point No.1 is set and registered in holding register address 77 to 78.

Setting range: 1 to maximum display value

LN-L error

[24] (LN-L) is written in input register address 52 when input load value is lower than the zero point.

Condition	Error code	Contents
LN-L	–	Value at Point 1 < Zero point

LN-H error

[25] (LN-H) is written in input register address 52 when input load value is higher than the maximum load.

Condition	Error code	Contents
LN-H	–	SPAN point < Value at point 1

Error outside the setting range

When data outside the setting range is entered, the following codes are set.

Condition	Error code	Contents
Illegal data	0×10^3	When data outside [1] to [maximum display value] is written.

16.8.3.3 Compensation at point 2

After putting the weight for the point to be compensated on the load cell, the weight at point 2 is set and registered in holding register address 79 to 80.

Setting range: 1 to maximum display value

LN-L error

[24] (LN-L) is written in input register address 52 when input load value is higher than the maximum load.

Condition	Error code	Contents
LN-L	–	Value at point No.2 < Value at point 1

LN-H error

[25] (LN-H) is written in input register address 52 when input load value is higher than the maximum load.

Condition	Error code	Contents
LN-H	–	SPAN point < Value at point 2

Error outside the setting range

When data outside the setting range is entered, the following codes are set.

Condition	Error code	Contents
Illegal data	0×10^3	When data outside [1] to [maximum display value] is written.

16.8.3.4 Compensation at point 3

After putting the weight for the point to be compensated on the load cell, the weight at point No.3 is set and registered in holding register address 81 to 82.

Setting range: 1 to maximum display value

LN-L error

[24] (LN-L) is written in input register address 52 when input load value is higher than the maximum load.

Condition	Error code	Contents
LN-L	–	Value at point 3 < Value at point 2

LN-H error

[25] (LN-H) is written in input register address 52 when input load value is higher than the maximum load.

Condition	Error code	Contents
LN-H	–	SPAN point < Value at point 3

Error outside the setting range

When data outside the setting range is entered, the following codes are set.

Condition	Error code	Contents
Illegal data	0×10^3	When data outside [1] to [maximum display value] is written.

16.8.3.5 Quit digital linearization mode

Updated data for Zero point and the SPAN point is registered temporarily in holding register address 74. The device returns to weighing mode.

[1] is written in holding register address 74.

[1] is automatically rewritten as [0] after writing is complete.

Error outside the setting range

When data outside the setting range is entered, the following codes are set.

Condition	Error code	Contents
Illegal data	0×10^3	When data outside [1] is written

16.8.3.6 Calibration force finish

When [0] is written in holding register address 51 during calibration, calibration is discontinued without saving the calibration data that is registered temporarily, and the device returns to weighing mode.

17 Calibration by USB (RS-232C) interface

17.1 Specifications of interface

It will be necessary to install special driver software from our website to the host side in order to use the USB (RS- 232C) interface.

Moreover, the USB cable must be less than 5 m in length.

Specifications	Details
Standard	Conforming to USB 2.0 (can also be used with equipment having the USB 1.1 standard.
Output connector	mini USB connector B type (female)
Communication method	Half duplex
Synchronizing method	Start-stop synchronization method
Baud rate	Selectable from 1 200, 2 400, 4 800, 9 600, 19 200 or 38 400 bps
Data bit length	Selectable from 7 bit or 8 bit
Parity bit	Selectable from none, even or odd.
Stop bit	Selectable from 1 bit or 2 bit.
Terminator	Selectable from CR+LF or CR
Communication data	ASCII code

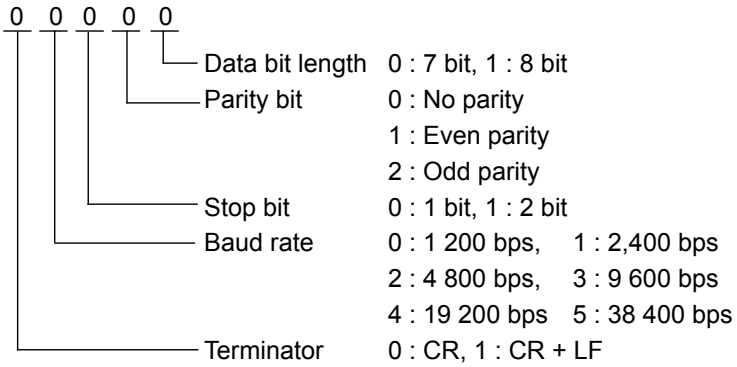
Note:

- When USB (RS-232C) interface is used, the CE standard is not applicable.
- The host must be a PC (personal computer).
- The error command is transmitted without communication when in calibration mode, check mode and when setting C function.
- Only in the EzCTS mode, this interface can be used (see Chapter 15.2).

17.2 Communication specifications

Communication specifications are selected by function F-42.

Setting range: 00000 to 15121 – 13020 **Default**

Function No.	Set value	Details
F-42	00000 to 15121	

18 Troubleshooting

Please check the contents of the reference item when the following abnormal operation occurs while using the device. Please contact us or our sales agents when there is no corresponding item, and when the abnormal operation is not improved even after countermeasures have been taken.

18.1 Basic section

Event	Please check here.	Chapter
Display does not light	Is the power supply voltage in the permissible variable range (20.4 V DC to 27.6 V DC)?	–
	Is the power supply cable correctly connected?	4.4
When the load display does not indicate a normal value and it indicates "OL" or "-OL."	Is the load cell cable correctly connected?	4.3.2, 4.3.1
	Has calibration been executed? If not yet executed, please proceed with calibration.	6
	Is the bridged voltage normal? Please measure the voltage between A-C after bridging across A-F and A-C, while not connected to a load cell. (Specification value: DC5 V±0.25 V)	–
	Is the input from the load cell normal? Please confirm the input from the load cell via monitoring mode	15.6
The display is not steady.	Is the condition of the weight on the load cell steady?	–
	Is the bridged voltage normal? Please measure the voltage between A-C after bridging across A-F and A-C, while not connected to a load cell. (Specification value: 5 V DC ± 0.25 V)	–
	Is the input from the load cell steady? Please confirm the input from the load cell via monitoring mode	15.6
	Is the setting of various filters being executed? Please set various filters if necessary.	10.1, 10.2, 10.3
The display wobbles temporarily.	Are you setting a function, etc., or executing a memory clear? Please do not operate these while weighing.	–
The LCD back light goes out.	Is the power supply voltage in the permissible variable range (20.4 V DC to 27.6 V DC)?	–
	Is the ON time for the LCD back light set?	10.11
A key operation is not accepted.	Is either an individual key lock or the batch key lock set?	10.4.1, 10.4.2
The simple calibration function is not accepted.	Is the simple calibration lock not set to on?	6.10.1

18.2 External control I/O

Event	Please check here	Chapter
A simple calibration mode setting is not displayed.	Is the measurement mode set instead to 5-step check mode?	13.1
A 5-step check mode setting is not displayed.	Is measurement mode set instead to simple calibration mode?	13.1
The external control input does not operate.	Is the equipment in question correctly connected?	4.5
	Is the allocation of external control output correctly set?	10.9.1
	Is a signal of 50 ms or more set for the pulse input?	–
	Is the signal input at a level input of 50 ms or more continuously?	–
The external control output does not operate.	Is the equipment in question correctly connected?	4.5
	Is the allocation of external control output correctly set?	10.9.2
	Is the setting of measurement value / comparison value within the appropriate range?	13.2 13.3
	Are the voltage and the electric current for an open collector used within the specification values? Vce = DC35 V, Ic = DC50 mA max.	4.5
The logic of an external output is not suitable. You want to reverse the logic.	Please execute an external control output logic change.	10.9.3

18.3 RS-232C interface

Event	Please confirm here.	Chapter
The communication is not normal.	Is the cable for RS-232C connected correctly?	4.6.1
	Is the communication protocol correctly set?	16.1
	Is command/data correctly set?	16.4
The host specifies the fow control.	Change the fow control at host from valid to invalid.	–
The value intended in the stream mode is not transmitted.	Select the output target in the stream mode.	16.3.3

18.4 RS-422/485 interface

Event	Please confirm here	Chapter
The communication is not normal.	Is the cable for RS-422/485 interface connected correctly?	4.6.2
	Is the number of address correctly set?	16.3.1
	Is the communication protocol correctly set?	16.2

Event	Please confirm here	Chapter
	Is command/data correctly set?	16.4
The host specifies the fow control.	Change the fow control at host from valid to invalid.	–
The changeover of RS-422/485 interface is correctly set.	Changeover the RS-422/485 interface correctly.	16.3.4
The interval between receiving and sending of host command for RS-485 interface is less than 1 ms.	Please maintain the interval between receiving and sending of host command for 1 ms or more.	–
Is the setting of the return delay time appropriate against the host's response in RS-485 interface?	There is a possibility not to response because host's response is slow. Please expand the reply delay time of CSD-892/74, ../76.	16.3.6

18.5 USB interface

Event	Please check here.	Chapter
Communication is not normal.	Is the USB driver installed on the host side? Please download the USB driver from our home page, and install it into PC.	–
	Can the USB port be normally recognized on the host side? Please download the "USB interface driver install manual" from our website, and check the details.	17.1, 16.3.3
	Is the length of USB cable under 5 m?	–

18.6 EzCTS

Event	Please check here.	Chapter
Communication is not normal.	Is your PC (personal computer) correctly connected to the device?	15
	Has the device been switched to EzCTS mode?	15.1, 15.2

19 Specifications

19.1 Analog specifications

Bridge power supply		5 V DC ± 0.25 V up to 60 mA, with sensing
Load cell		Up to 4 load cells (350 ohm) can be connected.
Input sensitivity		0.15 µV/d or more (d = minimum scale) 0.2 µV/d (when applying CE standard.)
Input range		-3.1 mV/V ~ 3.1 mV/V
ZERO setting range		± 2.5 mV/V
Non-Linearity		0.01 %F.S.
Temp. coefficient	ZERO	± 0.2 µV/°C (when calibrating by an input sensitivity of 0.15 µV/d or higher.)
	Sensitivity	±0.001 5 %F.S./°C (when calibrating by an input sensitivity of 0.15 µV/d or higher.)
Input noise		±0.2 µVp-p or less (with default settings for analog filter, digital filter and stabilization filter.)
Analog filter		Approx. 4 Hz (can be changed to 2 Hz, 6 Hz, 8 Hz or 10 Hz)
A/D sampling		500 times/s (can be changed to 250 times/s, 100 times/s or 50 times/s.)
A/D internal resolution		24 bits

19.2 Digital specifications

Load display	Display range	-99 999 to 99 999
	Display increment	1 (can be changed to 2, 5, 10, 20 or 50)
	Display unit	FSTN liquid crystal (with umber color LED back light.)
	Over displays	For minus over "-OL" and plus over "OL"
	AD value over display	Minus over "-OVF" and plus over "OVF"
Condition display		ZERO, SPAN, mV/V, STABLE, TARE, GROSS, NET, CZ, LOCK, HOLD, ERROR
Display range		4 times/s
Judgment display		OUT1, 2, 3, 4, 5
Decimal point display		Can be changed from no display, through 10^1, 10^2 ,10^3 or 10^4.
Unit display		Can be changed from no display, through g, kg, t, N, kN, lb, Pa, kPa or MPa.

19.3 Interface

External control input	3 functions can be arbitrarily selected from the following. OFF, ZERO set, ZERO clear, Tare weight cancellation, Tare weight cancellation clear, HOLD, NET WEIGHT, GROSS WEIGHT Above are for pulse input, and effective only once at a pulse width of 50 ms or longer. Hold, net weight display (when ON, the net weight will be displayed when the gross weight is shown.) Above are for level input, and effective during short input of 50 ms or more.
External control output	5 functions can be arbitrarily selected from the following. OFF, RUN, STABLE, DURING TARE WEIGHT CANCELLATION, GROSS WEIGHT DISPLAY, NET WEIGHT DISPLAY, CENTER ZERO, DURING HOLD, ERROR, ABNORMAL WEIGHT, NEAR ZERO, OK (S0), LARGE INFLOW (S1), MEDIUM INFLOW (S2), SMALL INFLOW (S3), OVER (S4), INSUFFICIENT, FULL.
RS-232C interface (CSD-892-74)	Baudrate : Selectable from 1 200, 2 400, 4 800, 9 600, 19 200 or 38 400 bps. Data bit length : Selectable from 7 bit or 8 bit. Parity bit : Selectable from no parity, even parity or odd parity. Stop bit : Selectable from 1 bit or 2 bit Terminator : Selectable from CR or CF+LF. Transmission method : Half duplex Synchronizing method : Start-stop synchronized method Sending data : ASCII code
RS-422/485 interface (CSD-892-76)	Baudrate : Selectable from 1 200, 2 400, 4 800, 9 600, 19 200 or 38 400 bps. Data bit length : Selectable from 7 bit or 8 bit. Parity bit : Selectable from no parity, even parity or odd parity. Stop bit : Selectable from 1 bit or 2 bit Terminator : Selectable from CR or CF+LF. Transmission method : Half duplex Synchronizing method : Start-stop synchronized method Address : Selectable from the address of 0 to 31. Sending data : ASCII code, Cable length : within 1 km Connectable unit : Up to 32 units (RS-422 interface : Up to 10 units) Termination resistance : Built-in (With or without is selectable by the connection in terminal board.), Status LED (TXD, RXD) is attached. Changeover of RS-422 interface and RS-485 interface is set by function.
USB interface	Conforms to USB2.0 (can also use USB1.1 standard) Connector: mini USB B type (female)

19.4 General specifications

Operating temp./ humidity range	Temperature	-10 °C to 50 °C
	Humidity	85 % RH or lower (non-condensing.)
Storage temperature range		-20 °C to 60 °C
Power supply 24 V DC	Voltage	24 V DC (permissible variable range 20.4 V DC to 27.6 V DC)
	Consumption	Approx. 2.4W (at DC24 V)
Outer dimensions		72 mm (W) x 96 mm (H) x 67.4 mm (D)
Weight		Approx. 260 g

19.5 Specifications at time of shipping

SPAN calibration	10 000 display at input of 0.5 mV/V
Maximum scale interval	1

19.6 Accessories

Quick guide	
Bridge, for bridging between A-F and C-G	2 pieces
Connector for RS-422/485.	1 piece (MSTB 2.5/6-ST-5.08 made by PHOENIX CONTACT) (Attached only for CSD-892-76)

20 Error displays

Er-0	ER-0	ZERO set error ERROR display will blink if you execute ZERO set under conditions wherein this is not possible. The [F/ENTER] key will continue the [ER-0] display blinking. The error condition will be canceled with the [F/ENTER] key, and the device will return to its condition before the error was displayed.
Er-1	ER-1	This will blink for about 2 seconds if a function number is selected that does not exist while setting a C function, function or S function. At the same time ERROR will light. (This excludes when setting a C function.)
Er-2	ER-2	This will blink for about 2 seconds if the compensation value is either greater than the maximum load (Max) or lower than ZERO, when you set "maximum load (DISP) < weight value (LOAD)" during calibration, or when adjusting the digital linearization compensation value.
Er-3	ER-3	A/D conversion error. Please contact Minebea Intec with details.
Er-7	ER-7	Tare weight cancellation error. ERROR display will blink if you execute tare weight cancellation under conditions wherein this is not possible. The [F/ENTER] key will continue the [ER-7] display blinking. The error condition will be canceled with the [F/ENTER] key, and the device will return to its condition before the error was displayed.
Er-8	ER-8	This will blink for about 2 seconds if a value is selected that is outside of the setting range, when setting a C function, function or S function. At the same time ERROR will light.
Er-E	ER-E	EEPROM writing error. Please contact Minebea Intec with details.
Er-r	ER-R	EEPROM reading error. Please contact Minebea Intec with details.
rE-L	TE-L	This will blink for about 2 seconds if the load cell output or input value is less than -2.5 mV/V and below the ZERO calibration range on the minus side, during calibration.
rE-H	TE-H	This will blink for about 2 seconds if the load cell output or input value is greater than 2.5 mV/V and exceeds the ZERO calibration range on the plus side.
SP-L	SP-L	This will blink for about 2 seconds if the load cell output or input value is less than 0 mV/V and does not reach within the SPAN calibration range.
SP-H	SP-H	This will blink for about 2 seconds if the SPAN width of the load cell output or input value is greater than 3.1 mV/V and exceeds the SPAN calibration range. With simple calibration, the error display will continue to blink and weighing will not be possible even after returning to the weighing mode. The error will be released after recalibration within the correct range.
Ln-L	LN-L	This will blink for about 2 seconds if the weight value is lower than ZERO or the condition LNR-1 < LNR-2 < LNR-3 is not satisfied, when registering the weight value for digital linearization.

	LN-H	This will blink for about 2 seconds if the weight value is higher than the maximum load (Max), when registering the weight value for digital linearization.
	–	(When C function CF-15 is active.) This displays when the power supply is turned on in the condition that the load cell output exceeds ±10 % of the maximum load (Max). Press the [FUNC.] key when [–––––] is displayed, to force the load display.
	OL	ERROR The display will light when the weight display exceeds "(+ maximum load) + 9D" or "+110 % of weight value." (By the setting of C function CF-03.)
	-OL	ERROR The display will light when the weight display exceeds "(- maximum load) – 9D" or "-110 % of the weight value." (By the setting of C function CF-03.)
	OVF	Plus over of A/D conversion input. This lights on with ERROR.
	-OVF	Minus over of A/D conversion input. This lights on with ERROR.
	–	(When C function CF-15 is active.) All segments light when stability is not detected when the power is ON. Press the [FUNC.] key when all lights are lit, to force the weight display.
	HOLD	This lights when the power is turned on while the HOLD signal is ON. By canceling the HOLD signal, the weight will display.
	SE-0	When emergency stop is input to force a stop during weighing ERR will blink. The [F/ENTER] key will continue [SE-0] blinking.
	SE-2	When there is shortage even after the post-batching, ERR becomes a blinking display. The [F/ENTER] key will continue [SE-2] blinking.
	SE-3	When there is contradiction in the magnitude correction of the comparison value, the ERR display will blink. The [F/ENTER] key will continue [SE-3] blinking.
	SE-4	When the flow time exceeds the time limit, the ERR display will blink. The [F/ENTER] key will continue "SE-4" blinking.
	SE-5	When the discharge time exceeds the time limit, the ERR display will blink. The [F/ENTER] key will continue [SE-5] blinking.
	SE-6	When gross weight < setpoint during discharge control, the ERR display will blink. The [F/ENTER] key will continue [SE-6] blinking.
	SE-7	When net weight > (setpoint - overshoot) at the start, the ERR display will blink. The [F/ENTER] key will continue [SE-7] blinking.
	SE-9	When the weighing starts with the "start except ZERO BAND" condition set to "ACTIVE", and the holder is not placed on the load cell, the ERR display will blink. The error condition is canceled by the [F/ENTER] key, and the device will return to its condition before the error was displayed.

21 Warranty

21.1 Warranty

The instrument is covered by a warranty for a period of one year from the date of delivery. Please contact our sales office or the sales agent from which you purchased, if repairs and/or after service is required during warranty period.

21.2 Repair

Before asking for a repair, please check once again that the connection, settings and adjustments for the instrument have been properly completed.

Especially, please check whether the strain gauge transducers are disconnected or cut off.

If after checking, there still may be a defect in the device, please contact a Minebea Intec sales or service office.

21.3 Lifetime of parts in use

There is a lifetime for parts used with this instrument.

The standard lifetime is as follows, although it may change depending on the use and the ambient conditions, etc.

Name of part	Applications	Standard lifetime
Back light of LED	Display	Approx. 50 000 hours (environmental temperature : 50°C)
EEPROM	Record of set data	Approx. 1 000 000 times for writing to EEPROM
Electrolytic capacitor	For elimination from input noise from the power supply	Approx. 10 years (environmental temperature : 20°C)

22 Displayed character patterns

The display patterns on the liquid crystal for this device are as shown in the table below.

0		D		Q	
1		E		R	
2		F		S	
3		G		T	
4		H		U	
5		I		V	
6		J		W	
7		K		X	
8		L		Y	
9		M		Z	
A		N		?	
B		O		!	
C		P		-	

23 Function settings table

Please use this table when a customer changes the settings of functions.

C Function settings table

Function No.	Initial value	Customer's setting	Function No.	Initial value	Customer's setting
CF-01	0		CF-20	0	
CF-02	3		CF-25	0	
CF-03	1		CF-26	10	
CF-04	0		CF-27	10	
CF-05	2		CF-28	9.797	
CF-08	0		CF-29	9.797	
CF-10	1		CF-90	1	
CF-11	02		CF-91	10000	
CF-12	1		CF-92	10000	
CF-13	000		CF-93	0.0000	
CF-14	00		CF-94	0.5000	
CF-15	0		CF-97	05	
CF-16	0		CF-98	---	
CF-17	00		CF-99	---	

Function setting table

Function No.	Initial value	Customer's setting	Function No.	Initial value	Customer's setting
F-01	016		F-48	0	
F-02	1		F-49	0	
F-05	092		F-55	8	
F-06	0020		F-60	00	
F-07	05		F-61	00	
F-08	0000		F-62	00	
F-10	020		F-70	00	
F-11	10		F-71	00	
F-15	00000		F-72	00	
F-18	111		F-73	00	
F-21	00000		F-74	00	
F-22	00000		F-83	00000	
F-24	0		F-84	2	

Function No.	Initial value	Customer's setting	Function No.	Initial value	Customer's setting
F-25	00		F-85	01	
F-26	00		F-86	0	
F-42	13020		F-87	0	
F-43	00		F-90	---	
F-44	0		F-91	---	
F-45	01		F-95	00	
F-46	0		F-99	---	
F-47	0				

S function settings table

Function No.	Initial value	Customer's setting	Function No.	Initial value	Customer's setting
SF-01	1		SF-27	0	
SF-02	0		SF-30	0	
SF-05	1		SF-31	0000	
SF-06	0		SF-35	000	
SF-07	0		SF-36	0	
SF-10	0000		SF-37	0000	
SF-15	0		SF-38	0000	
SF-16	0		SF-40	0000	
SF-17	0000		SF-41	0	
SF-18	0		SF-45	0	
SF-20	0000		SF-46	0000	
SF-21	0000		SF-47	0000	
SF-22	0000		SF-48	0000	
SF-25	0		SF-49	0	
SF-26	00000		SF-99	---	

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