Minebea intec
The true measure

Operating instructions

Weight indicator CSD-903

Translation of original operating instructions 949905090300 Edition 1.1.0 03/04/2022

Minebea Intec GmbH, Meiendorfer Str. 205 A, 22145 Hamburg, Germany
Phone: +49.40.67960.303 Fax: +49.40.67960.383

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 only be operated/installed 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

Thanks you for purchasing the Weight Indicator CSD-903.

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-903. 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). The temperature range of JIS B 7611-2 conformity is 10 °C to 40 °C.
- ▶ Environmental humidity: Less than 85 % R. H. or less (Non condensing)

2.3.2 Installing the instrument

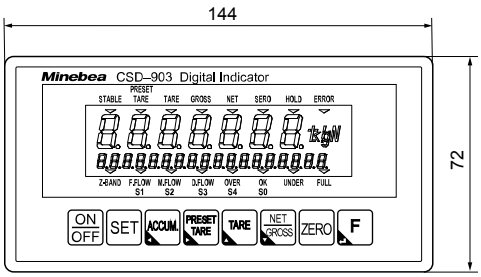
NOTICE

Warning of damage to property and/or the environment.

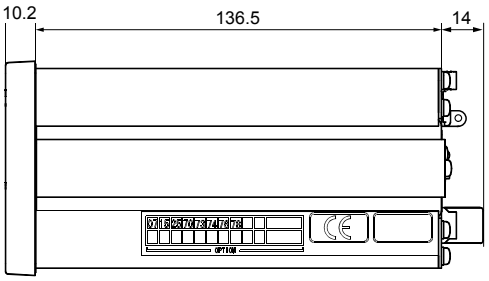
- ▶ Install CSD-903 based on the following dimensions.
- ▶ Ensure sufficient space around the instrument.

The following are the dimensions of CSD-903 and the clearance required.

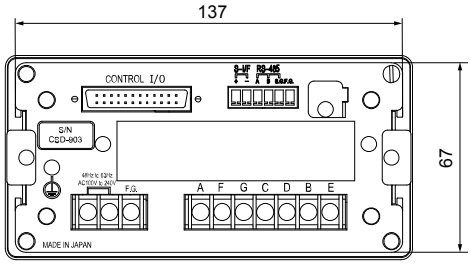
Front



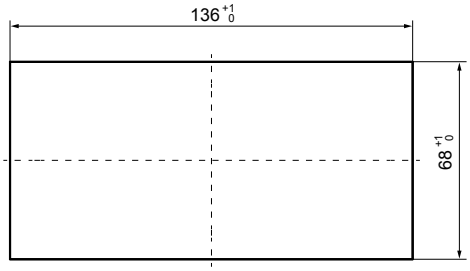
Side



Rear dimension



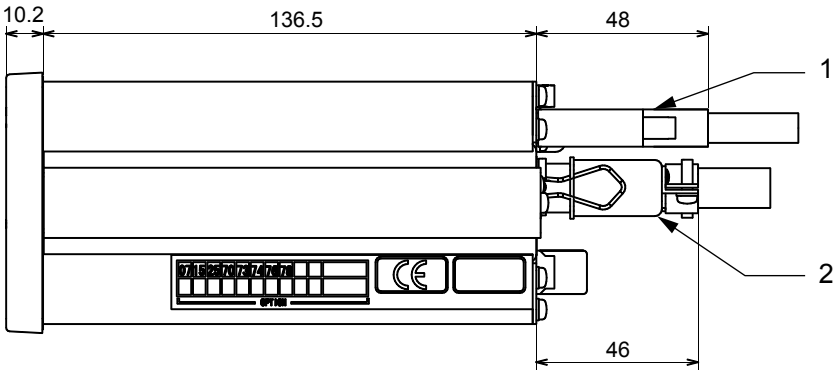
Panel cut



all dimensions in mm

The following are the side dimensions when BCD output (2) is connected.

Other connectors attached for external control input/output (1) have the same dimensions as the BCD output.



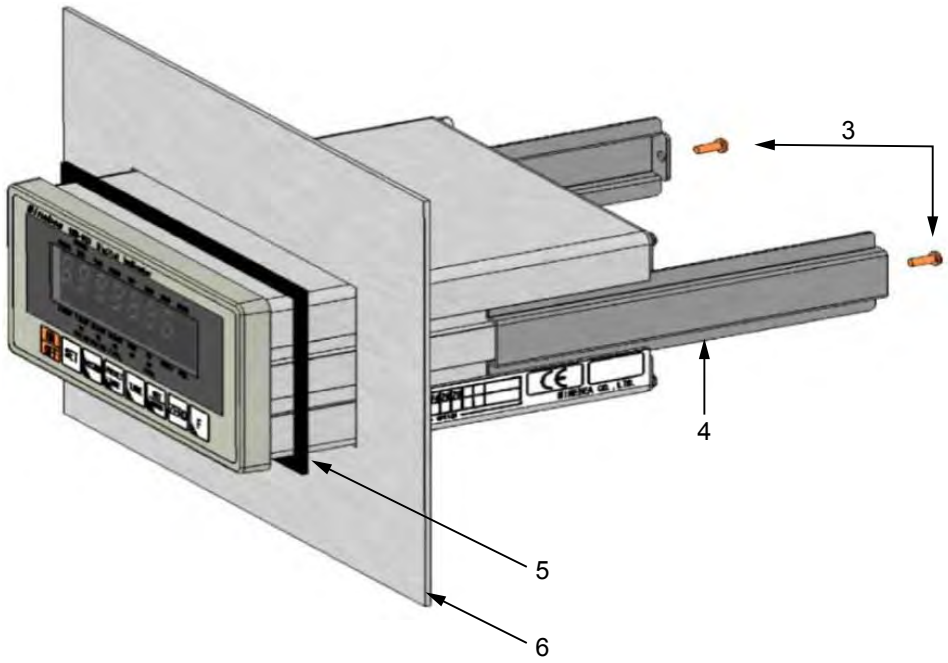
all dimensions in mm

Applicable environment

The CSD-903 may be used under humid or dusty conditions. In this case, insert the attached panel mount gasket attached between the control panel (cabinet) and the main body.

The panel mount gasket ensures the front panel section of CSD-903 is dustproof and waterproof in compliance with IP65 (International Protection Code).

Insert the panel mounting gasket carefully.



3	2× screw (M3×10)
4	Panel mounting metal
5	Panel mount gasket (dustproof/waterproof)
6	Control cabinet

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-903.

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

CSD-903 complies with the following standards.

EN61326: 2013	Electrical equipment for measurement, control and laboratory use - EMC requirements. Immunity test requirements for equipment intended for use in industrial locations.
EN61010: 2010	Safety requirements for electrical equipment for measurement, control, and laboratory use. Part1: General requirement.
EN50581: 2012	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances. (RoHS Directive)
	Annex C (Performance level H) of JIS B 7611-2:2015 [Non-automatic weighing instruments – Metrological and technical requirements and tests – Part 2: Measuring instruments used in transaction or certification]

Note:

The device running software Ver. 2.100 or later conforms with JIS standards.

⚠ CAUTION

Warning of personal injury and damage to property.

Strictly observe the following conditions of use to ensure that the device complies with the below standards. Otherwise, the device may not conform to the above standards.

- Shield processing: Use shielded cables for all cables other than the power cable. Refer to notes about methods of shield processing.
- Grounding: Ground the device using an individual ground using the protective ground terminal.

⚠ CAUTION

Warning of personal injury and damage to property.

Strictly observe the following conditions of use to ensure that the device complies with JIS standards. Otherwise, the device may not conform to the above standards.

- Setting Functions: As for the details of the function of the value of C Function and Function, refer to Chapter 7 and 9.

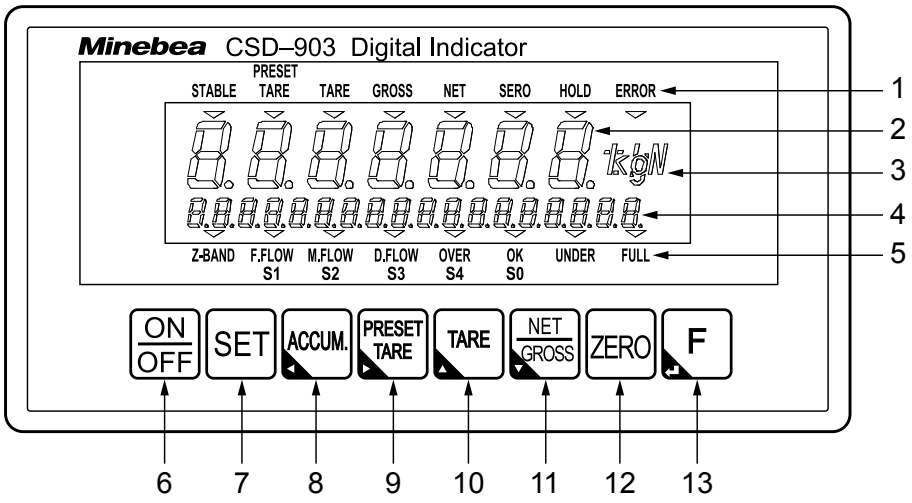
CF-03	[Condition of overload display] applies a value of 2.
CF-08	[Net weight sign inversion] applies a value of 0.
CF-11	[Effective range of zero set] applies a value of less than 02.
CF-13	[Data width of zero tracking] applies a value of less than 4% of maximum load.
CF-20	[Set the condition display stability detection while set mode 2 or preset tare weight] applies a value of 0.
CF-21	[Set the sub-display section unit display while set mode 2 or preset tare weight] applies a value of 0.
F-01	[Setting of digital filter] applies a value of more than 016.
F-02	[Setting of analog filter] applies a value of more than 01.
F-05	[Setting of stabilization filter] applies a value of more than 092.
F-06	[Data width of stabilization filter] applies a value of less than 020.
F-07	[Time width of stabilization filter] applies a value of more than 05.
F-10	[Stability detection data width] applies a value of more than 20.
F-11	[Stability detection time width] applies a value of more than 10.
F-15	[Operating condition of preset tare weight cancellation] applies a value of 0 or 1.

Note:

[OL] appears in the load data section in the event of overload. [–OL] appears in the load data section if gross weight is negative.

3 Names and functions of parts

3.1 Front panel



1	**Condition display section 1** Displays the CSD-903 condition. STABLE — Lights when the weighing operation is stable PRESET TARE — Blinks while setting preset tare weight cancellation WEIGHT — Lights when preset tare weight cancellation is set TARE WEIGHT — Lights when tare weight cancellation is executed GROSS WEIGHT — Lights when the load display is set to gross weight NET WEIGHT — Lights when the load display is set to net weight ZERO — Lights when the displayed load value is zero and within ±1/4 of the scale interval HOLD — Lights when the HOLD function is active ERROR — Lights when an ERROR signal is output
2	**Weight display section** Displays [Gross/Net weight value], [Over] and [Error]. Displays various preceding conditions and setting values.
3	**Unit display section** Displays the set weighing units [○]lights in the unit display in stand-by. The weight display is turned off.
4	**Sub display** Displays the set accumulation value, accumulation count and sequence operation (refer to Chapter 10.10).

5 **Condition display section 2**

Z-BAND	Lights when a gross weight or net weight load value is less than the set near zero Blinks during [Z-BAND] setting and selection
F. (Coarse) FLOW/S1	Lights when coarse flow output signal is ON in sequential mode
/PRELIM2	Lights when S1 output signal is ON in comparator mode 1 or 2 Blinks during PRELIM2 setting and selection
M. (Middle) FLOW/S2	Lights when middle flow output signal is ON in sequential mode
/PRELIM1	Lights when S2 output signal is ON in comparator mode 1 or 2 Blinks during PRELIM1 setting and selection
D. (Fine) FLOW/ S3	Lights when fine flow output signal is ON in sequential mode
/F. FALL (Over-shoot)	Lights when S3 output signal is ON in comparator mode 1 or 2 Blinks during F. FALL (Overshoot) setting and selection
OVER/S4	Lights when the judgment condition is OVER in sequential mode Lights when S4 output signal is ON in comparator mode 1 or 2 Blinks during OVER setting and selection
OK/S0	Lights when the judgment condition is OK in sequential mode
/FINAL	Lights when S0 output signal is ON in comparator mode 1 or 2 Blinks during FINAL setting and selection
UNDER	Lights when the judgment condition is UNDER in sequential mode Blinks during UNDER setting and selection
FULL	Lights when the judgment condition is FULL (Coarse) in sequential mode Blinks during FULL (Coarse) setting and selection

6 ON/OFF **Key**

Turns the display on and off. When the display is turning off, electric power is supplied internally to the indicator and the load cell. The display is in stand-by while turning off.

7 SET **Key**

Switches to function mode Reverts to former status.

8 ACCUM. **Key**

Accumulates the load value and carries up the set digit.

9 PRESET TARE **Key**

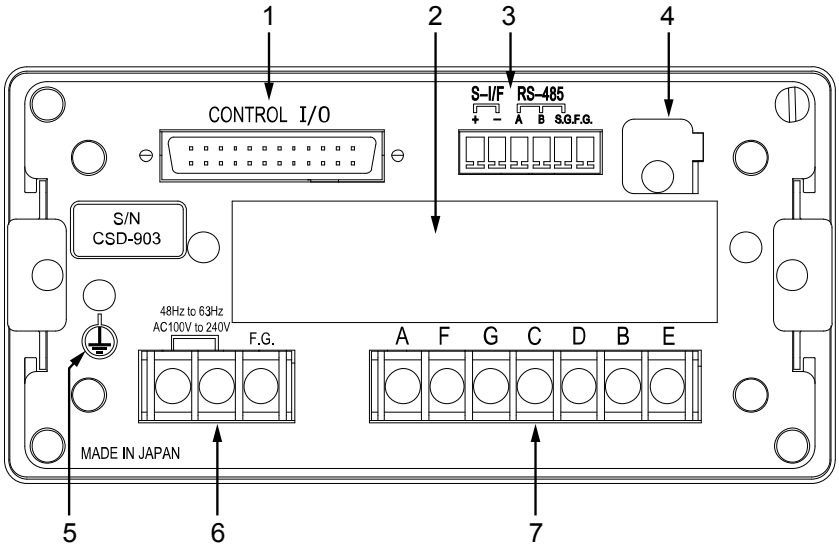
Sets preset tare weight cancellation.
Carries down the set digit.

10 TARE **Key**

Executes tare weight cancellation.
Raises the selected digit by 1.

11	NET GROSS **Key** Switches displayed data between gross weight and net weight. Lowers the selected digit by 1.
12	ZERO **Key** Saves the current load value as the zero point and sets the display to zero.
13	F **Key** Executes the function assigned to the F key. Can be selected from None, Print, Hold, Start of flow, Emergency stop, Zero clear, Tare weight clear, Accumulation clear, Shift to the setting mode of weighing mode and Forced inflow finish. Alternatively, assign data input and save the setting to the internal memory.

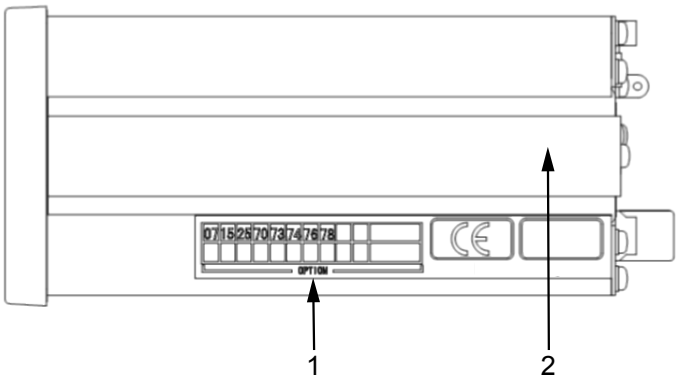
3.2 Rear panel



1	**External control I/O connector** Connects to an external control unit Up to 9 input and up to 13 output lines are available.
2	**Optional parts mounting section** An analog electric current output, analog voltage output, BCD output, RS-232C or RS-422/485 can be installed.
3	**RS-485 and 2-pin method serial interface terminals** RS-485 interface terminals connect with a host computer, etc., and 2-pin method serial interface terminals connect with a printer, an external display unit, etc.
4	**CAL switch section** Remove the cover to operate the CAL switch (calibration LOCK switch)

5	**Protected earth terminal** Be sure to connect a grounding wire to prevent noise, including static electricity. Only connect a grounding wire to this terminal. The power supply F.G. terminal is shared internally.
6	**Power supply terminals** Connections for power supply and ground
7	**Load cell terminals** Connects the signal line of the load cell Up to 6 load cells (350 Ω) can be connected when the bridge power supply is 10 V DC.

3.3 Side



1	**Model instructions stamp** Indicates the model number
2	**Panel metal mount** Use to connect the CSD-903 and the control panel

4 Wiring

This chapter describes how to connect load cells and power sources.

4.1 Precautions for wiring

- Connect wires with the device power off.
- Do not connect the AC power supply until all installation and wire connections are complete. The device has no ON/OFF switch for power supply.
- Do not drop the device or subject it to impacts because the terminal block of the rear panel is made by resin.
- Install and use the attached acrylic cover for the terminal boards.
- The tightening torque for screws on the terminal board are given in the table below.

Terminal board	Tightening torque for screws
Power supply Load cell	0.6 Nm

Applicable solderless terminals are as follows.

Terminal board	Solderless terminal width	Applicable solderless terminal (Oki)
Power supply Load cell	6.2 mm or less	O type 1.25-3 or Y type 1.25-3.5

- Please separate cables connected with the device as much as possible from noise sources such dynamic power lines and control I/O.
- Use dedicated conduit wiring. Do not share it with other lines.
- Use a D-class single grounding. Avoid sharing it with other power supply groundings.
- Use shielded cable for connection with external control I/O, and connect the shield with the F.G terminal of the power supply terminals.

4.2 Connection with load cells

The CSD-903 needs to be connected to a load cell to facilitate weighing.

Examples of CSD-903 connected with load cells are given below.

Note:

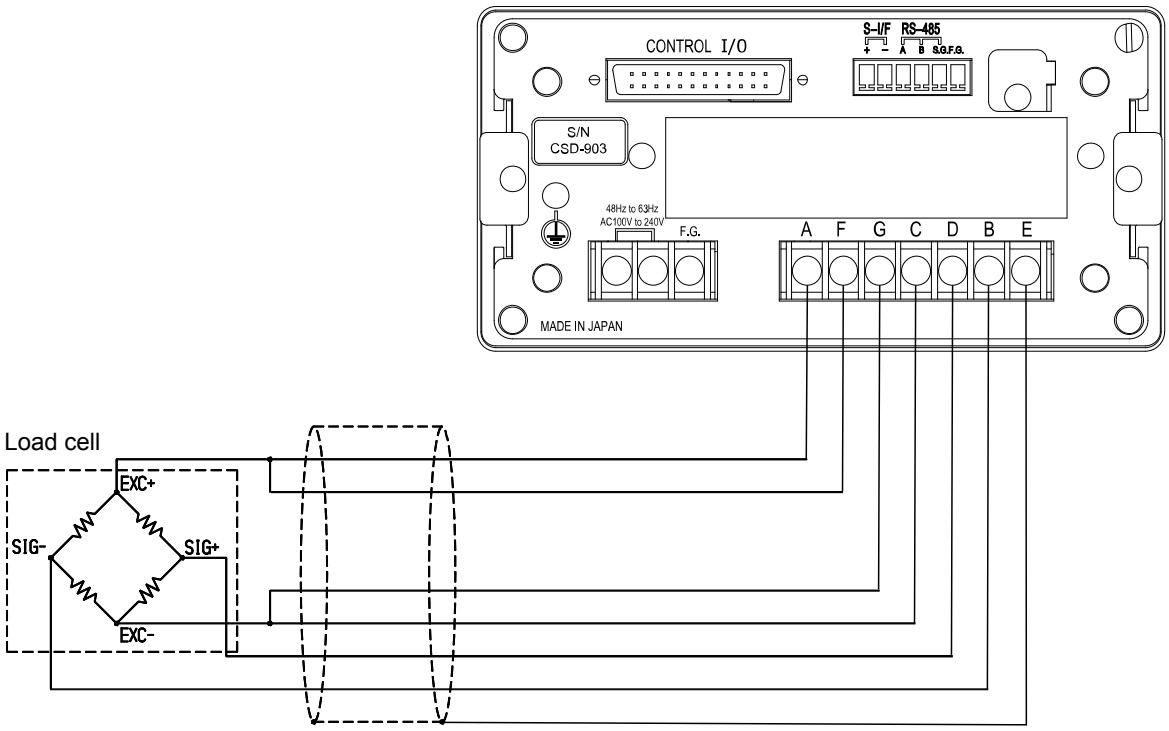
When a tension or tension/compression load cell is used in the direction of the tension and the + direction is displayed, connect the load cell input + to terminal B and the load cell input – to terminal D, respectively.

4.2.1 6-wire connection cable

Connect CSD-903 to a load cell using a 6-wire cable as follows.

Note:

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



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

Note:

- 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.

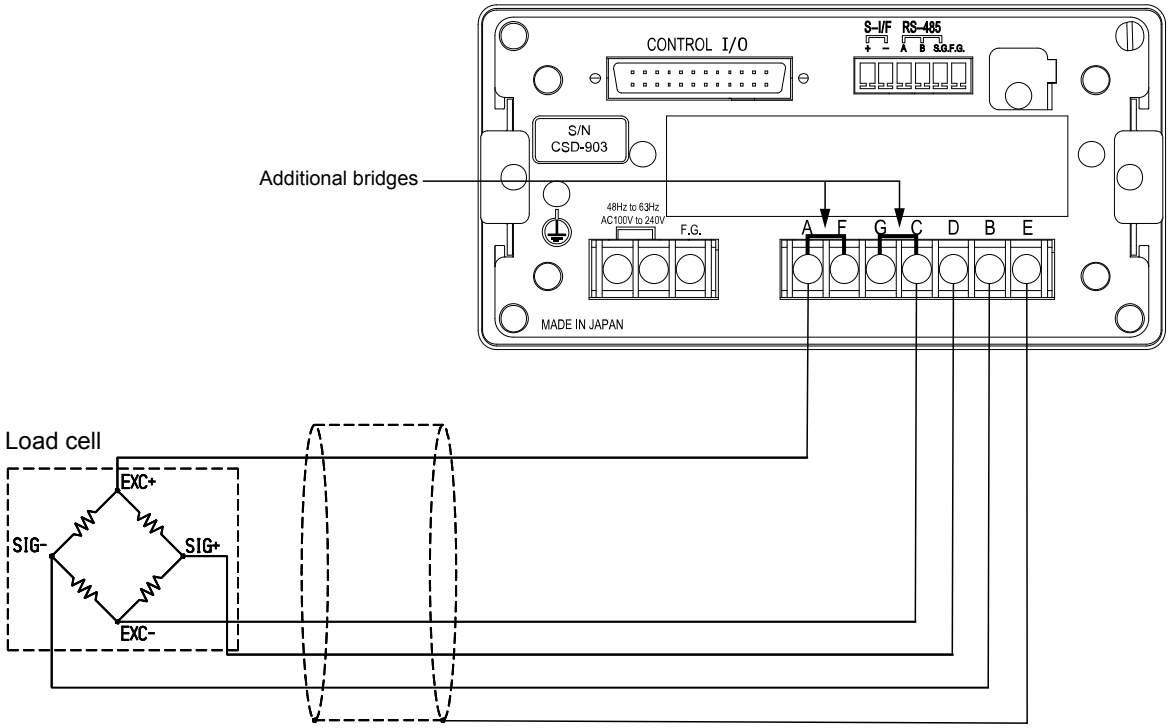
  If the wire colors are different from those of Minebea Intec standard cables, refer to the specifications of the load cell.
- If the 6-wire cable length ≥100 m: the resistance of the cable causes the remote sensing function to fail and accuracy may not be covered under warranty.

4.2.2 4-wire connection cable

Connect CSD-903 to a load cell using a 4-wire cable as follows.

Note:

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



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

Note:

- When using a 4-wire cable, be sure to short between **A**-**F** and **C**-**G** on terminal block with the additional bridges. This device will not operate normally if terminals **F** and **G** are used in their open state.
- If the 4-wire 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.

4.2.3 Connecting load cells in parallel

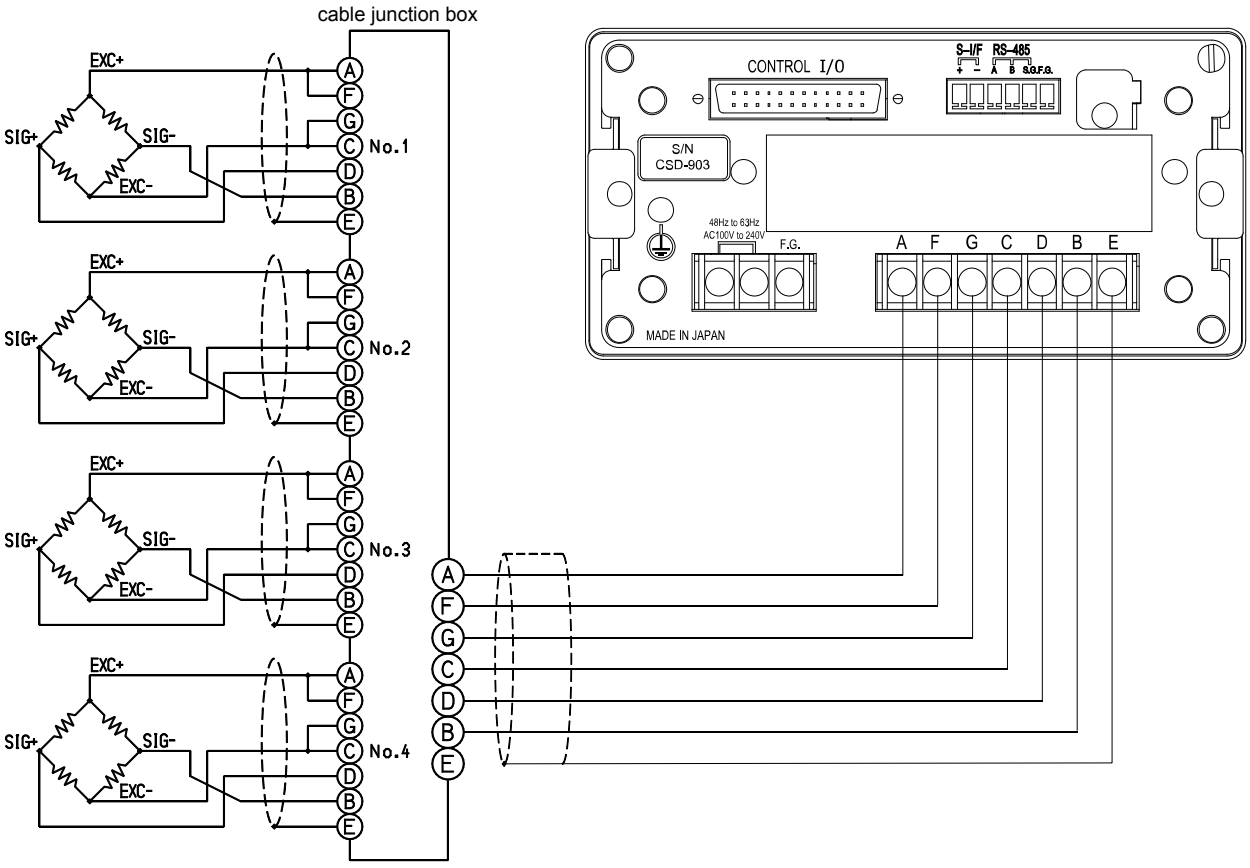
More than one load cell can be connected in parallel for use as a hopper scale or a truck scale. Cable junction box realizes easy parallel connection.

Note:

CSD-903 can make up to 6 parallel connections when the load cell is 350 Ω type. Please consult Minebea Intec as for a method over 5 parallel connections.

Note:

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

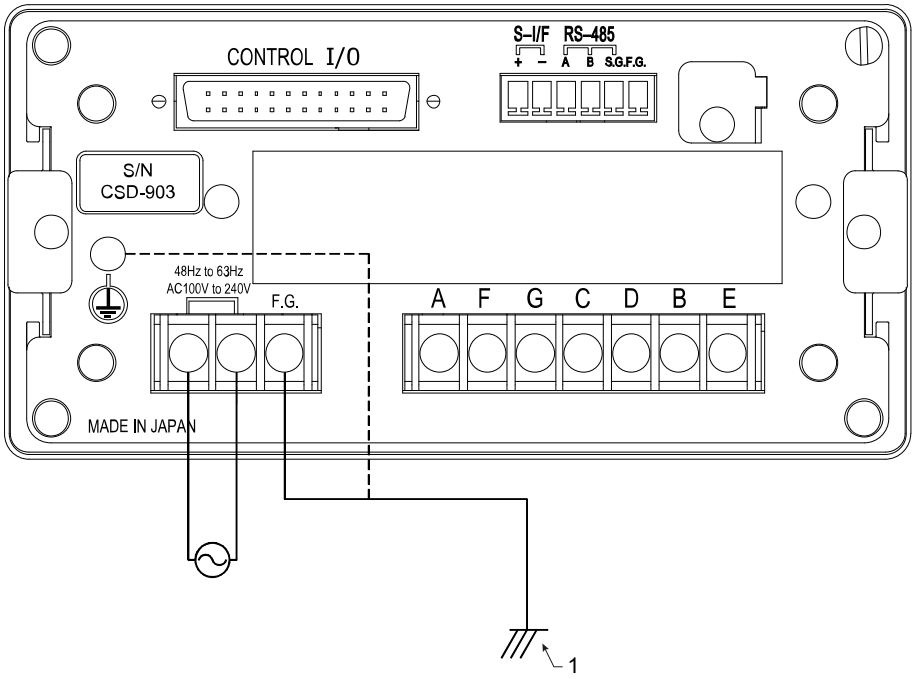


A	+ EXC	Load cell power supply V+	**red**
F	+ SEN	Sense S+	**white**
G	– SEN	Sense S–	**black**
C	– EXC	Load cell power supply V–	**blue**
D	+ SIG	Load cell signal (meas. voltage) M+	**green**
B	– SIG	Load cell signal (meas. voltage) M–	**gray**
E	SHIELD	Screen	**yellow**

4.3 Connection with power supply and the ground

Connect and ground the power supply with the terminals on the rear panel shown as below figure.

100 V AC to 240 V AC (Permissible range: 85 V AC to 264 V AC)



(1) D-class single grounding

⚠ CAUTION

Warning of personal injury.

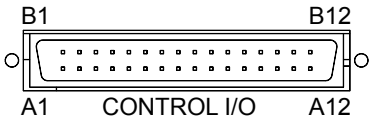
- ▶ Connect the power supply and the ground correctly as shown in the figures and use within the prescribed power supply conditions (refer to Chapter 21.2.4).
- ▶ Since the CSD-903 does not have a power switch, a circuit breaker, etc. may need to be installed.

Note:

- Grounding should be D-class single grounding. Otherwise, noise from other devices may cause malfunctions.
- Perform single grounding with a protective earth terminal to ensure the device is compatible with CE mark applicable standards and JIS standards.

4.4 Connecting the external control I/O

This function facilitates external control using the external control I/O connector on the rear panel. The external control input is executed by using a contact or open collector to bridge each input and COM 1 after wiring the connector.

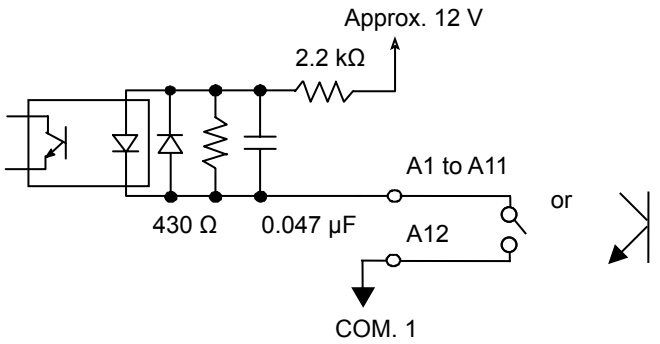


The external control output is an open collector output (Open collector rating: VCE = 35 V DC, IC = 40 mA DC at maximum).

The figure is an external control I/O connector.

The line from A1 to A12 is the input signal, and the line from B1 to B12 is the output signal.

4.4.1 Input connection



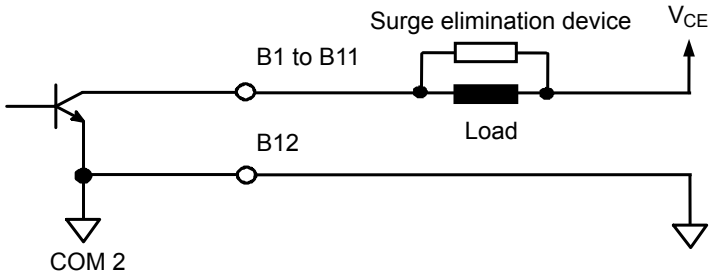
Applicable connector:
FCN-361J024-AU; Cover FCN-360C024-B (Fujitsu)

A1	Input 1
A2	Input 2
A3	Input 3
A4	Input 4
A5	Input 5
A6	Input 6
A7	Input 7
A8	Input 8
A9	Input 9
A10	COM 1

Note:

- For external control input recognition, there is a pulse input and level input, depending on setting parameter.
- The external control input common and the 2-pin method serial interface circuit common are connected.

4.4.2 Output connection



Open collector rating:
V_{CE} = 35 V DC, I_C = 40 mA DC

B1	Output 1
B2	Output 2
B3	Output 3
B4	Output 4
B5	Output 5
B6	Output 6
B7	Output 7
B8	Output 8
B9	Output 9
B10	Output 10
B11	Output 11
B12	Output 12
A12	Output 13
A11	COM 2

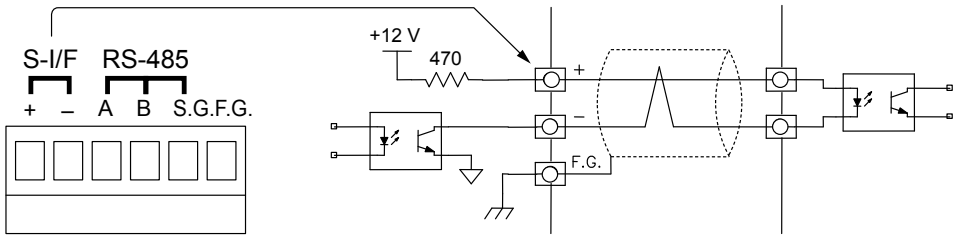
Note:

- The external control output common is insulated from the other commons.
- Connect a suitable surge elimination device for load protection from external control output.

4.5 Connecting to a 2-pin method serial interface

The 2-pin method serial interface is used to connect to printers, external display units, etc.

The 2-pin method serial interface is connected with +, - and F.G., as shown in the below figure.



Applicable plug: XW4B-06B-H1 (by OMRON)

CSD-903 internal equivalent circuit

2-pin method serial interface

corresponding equipment

Note:

- The length of the stripped wire cable tip is 7 mm.
- The tightening torque of terminal screws on the terminal block is 0.6 Nm.
- Use AWG28 to AWG16 connecting cable.
- Unipulse produce a "M252B" printer for equipment using a 2-pin method serial interface.
- Use 2-wire shielded cable if possible.

  The shield connects to the F.G. terminal.

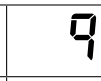
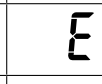
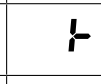
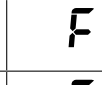
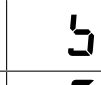
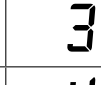
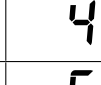
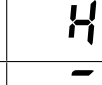
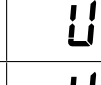
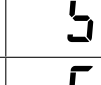
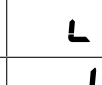
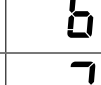
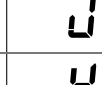
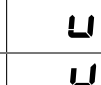
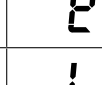
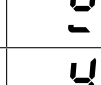
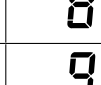
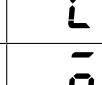
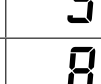
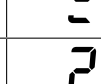
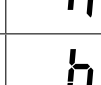
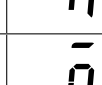
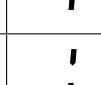
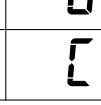
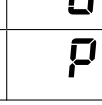
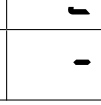
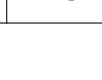
  The maximum shielded cable length is 100 m; For other cables it is 20 m.
- Up to 3 devices can be connected in parallel using the 2-pin method serial interface.

  Maximum output current : Approx. 20 mA DC
- The external control input common and the 2-pin method serial interface circuit common are connected.
- This internal circuit is insulated by a optocoupler.
- Connect the shield to the F.G. terminal on the terminal board of the RS-485 interface or 2-pin method serial interface when CSD-903 conforms to CE mark applicable standards or JIS standards.

5 Operating

5.1 Character display pattern

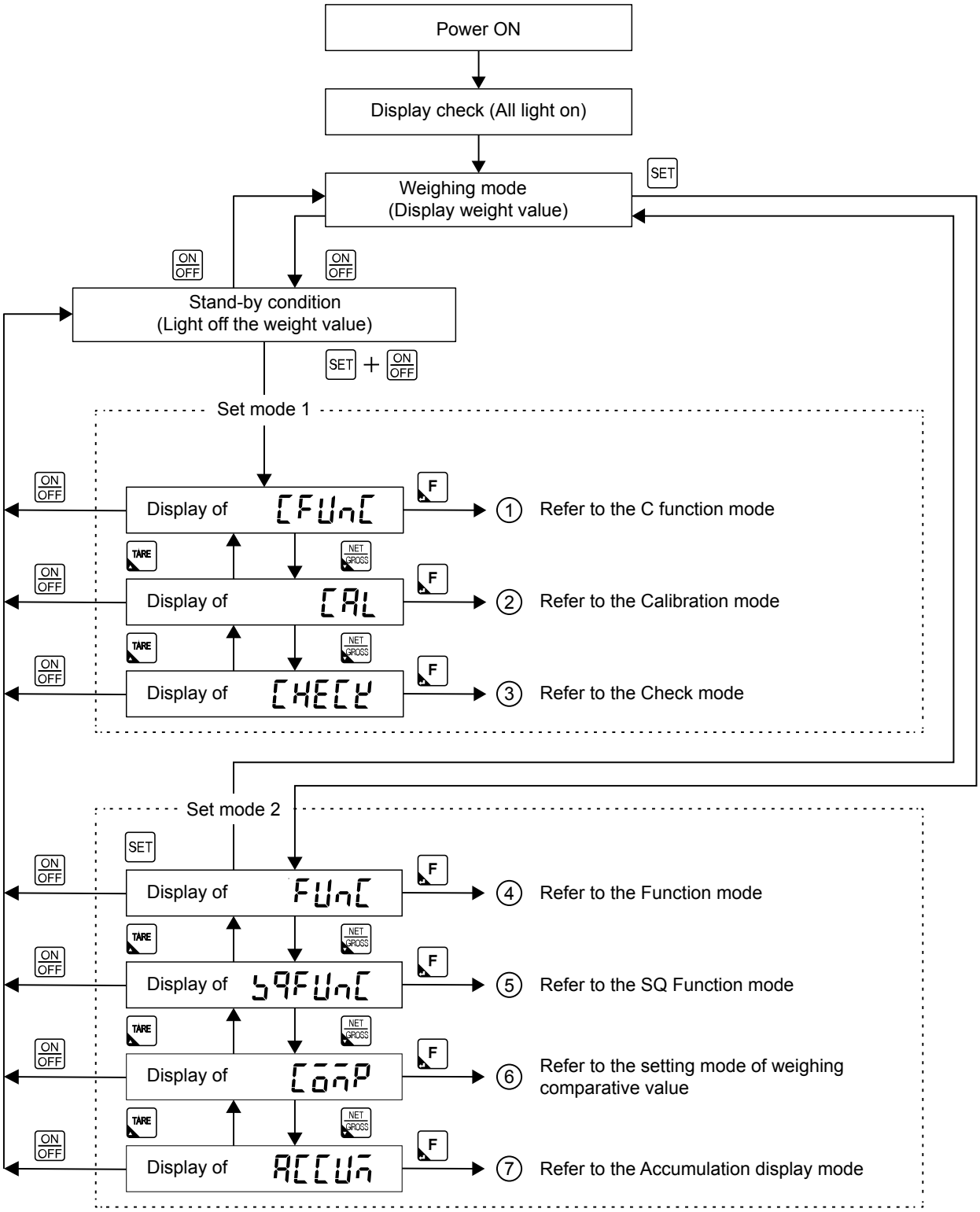
The display pattern in seven segments indicator of this device is shown in the table below.

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		-	

5.2 Mode changeover

The device has various modes, suited to different operating situations.

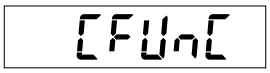
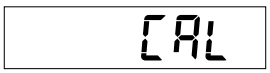
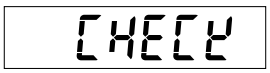
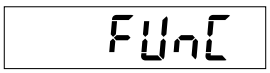
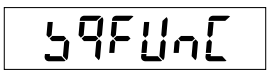
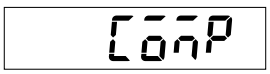
Change the mode by key operation.



Note:

When load cell output exceeds ±10% of maximum load and the display indicates that power-on-zero is valid, error indication [------] is displayed.

Press the [SET] key to force-switch to load display (refer to Chapter 8.9).

1	 [CFUNC]	**C function mode** Sets C function data to activate various functions related to calibration.
2	 [CAL]	**Calibration mode** Sets calibration data to display the signal from the load cell as an accurate load.
3	 [CHECK]	**Check mode** The ROM version, input/output operation, load cell output value, BCD output and analog output can be confirmed in check mode.
4	 [FUNC.]	**Function mode** Sets function data to activate various functions.
5	 [SQFUNC]	**SQ function mode** Sets SQ function data to activate various functions related to sequence operation.
6	 [COMP]	**Weighing mode** Sets comparison values for various weighing results in sequence weighing and comparison operation.
7	 [ACCUM]	**Accumulation display mode** Confirms the accumulation value and the accumulation times of all brands Press the [ZERO] key to clears the displayed accumulation value and accumulation times.

5.3 Function settings table

Make use of them in case that the customer has changed setting for the function.

C Function settings table

Function No.	Initial value	Customer's setting	Function No.	Initial value	Customer's setting
CF-01	0		CF-27	10	
CF-02	1		CF-28	9.797	
CF-03	2		CF-29	9.797	
CF-05	0		CF-40	0	
CF-07	0		CF-41	2	
CF-08	0		CF-42	003000	
CF-10	1		CF-43	3	
CF-11	02		CF-44	006000	
CF-12	1		CF-70	0	
CF-13	00		CF-71	000000	

Function No.	Initial value	Customer's setting	Function No.	Initial value	Customer's setting
CF-14	00		CF-72	010000	
CF-15	0		CF-90	1	
CF-16	0		CF-91	10000	
CF-17	0		CF-92	10000	
CF-18	000		CF-93	00000	
CF-20	0		CF-94	03000	
CF-21	0		CF-97	05	
CF-25	0		CF-98	–	
CF-26	10		CF-99	–	

SQ Function settings table

Function No.	Initial value	Customer's setting	Function No.	Initial value	Customer's setting
SQF-01	1		SQF-27	0	
SQF-02	0		SQF-30	0	
SQF-05	2		SQF-31	0000	
SQF-06	0		SQF-35	000	
SQF-07	0		SQF-36	0	
SQF-10	0000		SQF-37	0000	
SQF-15	0		SQF-38	0000	
SQF-16	0		SQF-40	0000	
SQF-17	0000		SQF-41	0	
SQF-18	0		SQF-45	0	
SQF-20	0000		SQF-46	0000	
SQF-21	0000		SQF-47	0000	
SQF-22	0000		SQF-48	0000	
SQF-24	0		SQF-49	0	
SQF-25	0		SQF-98	–	
SQF-26	00000		SQF-99	–	
MEMO					

Function setting table

Function No.	Initial value	Customer's setting	Function No.	Initial value	Customer's setting
F-01	16		F-48	0	

Function No.	Initial value	Customer's setting	Function No.	Initial value	Customer's setting
F-02	1		F-49	0	
F-04	0		F-50	000	
F-05	092		F-51	0	
F-06	020		F-52	0	
F-07	05		F-55	0	
F-08	0000		F-60	00	
F-09	0000		F-61	00	
F-10	020		F-62	00	
F-11	01		F-63	00	
F-15	1		F-64	00	
F-16	00		F-65	00	
F-17	0		F-66	00	
F-18	0001		F-67	00	
F-19	0		F-68	00	
F-20	0000		F-70	00	
F-21	0000		F-71	00	
F-22	0000		F-72	00	
F-23	0		F-73	00	
F-24	0		F-74	00	
F-25	00		F-75	00	
F-26	00		F-76	00	
F-30	0		F-77	00	
F-31	0		F-78	00	
F-32	0000		F-79	00	
F-33	1		F-80	00	
F-34	0		F-81	00	
F-37	0		F-82	00	
F-40	0		F-84	2	
F-41	0		F-85	01	
F-42	13020		F-86	0	
F-43	00		F-87	0	
F-44	0		F-90	–	
F-45	01		F-91	–	
F-46	0		F-99	–	

Function No.	Initial value	Customer's setting	Function No.	Initial value	Customer's setting
F-47	0				

Sub-display panel setting table (F-19)

Set value	Contents		Set value	Contents	
0	OFF		11	K	Brand (1 digit) / S1 (6 digits) / S3 (6 digits)
1	A	Brand (1 digit) / Accumulation times (6 digits) / Accumulation value (8 digits)	12	L	Brand (1 digit) / S1 (6 digits) / S4 (6 digits)
2	B	Brand (1 digit) / Accumulation times (6 digits) / Last accumulated data (6 digits)	13	M	Brand (1 digit) / S2 (6 digits) / S3 (6 digits)
3	C	Brand (1 digit) / Last accumulated data (6 digits) / Accumulation value (8 digits)	14	N	Brand (1 digit) / S2 (6 digits) / S4 (6 digits)
4	D	Brand (1 digit) / Last accumulated data (6 digits) / OK (6 digits)	15	O	Brand (1 digit) / S3 (6 digits) / S4 (6 digits)
5	E	Brand (1 digit) / Accumulation times (6 digits) / OK (6 digits)	16	P	Brand (1 digit) / OK (6 digits)
6	F	Brand (1 digit) / OK (6 digits) / Accumulation value (8 digits)	17	Q	Brand (1 digit) / Over (5 digits) / Under (5 digits)
7	G	Brand (1 digit) / Near zero (6 digits) / Full (6 digits)	18	R	Brand (1 digit) / Accumulation times (6 digits)
8		OK (6 digits) / Over (5 digits) / Under (5 digits)	19	S	Brand (1 digit) / Accumulation value (10 digits)
9	I	Brand (1 digit) / OK (6 digits) / Free fall (6 digits)	20	T	Brand (1 digit) / Last accumulated data (6 digits)
10	J	Brand (1 digit) / S1 (6 digits) / S2 (6 digits)			

6 Calibration

The operation of matching the device display with the weight on the load cell is called calibration.

It facilitates accurate display of the electrical signal from the load cell as a weight.

For example, calibration adjusts the display of the instrument to 100.00 precisely when a weight of 100 kg is placed on the load cell.

6.1 Calibration setting items

- Scale interval ([D-01], [02], [05], [10], [20], [50])

  The minimum unit of the weight value to be set is [1], [2], [5], [10], [20] or [50].

  Maximum load/Scale interval (Minimum scale division) is the display resolution.

- Maximum load ([DISP])

  This is the maximum weight to be able that can be weighed by the load cell.

- Calibration weight used in SPAN calibration ([LOAD])

  SPAN calibration can be executed with an arbitrary weight. The same setting as the maximum load is used if there is a maximum load value.

  Use a calibration weight that has mass of at least 2/3 of the maximum load in order to minimize calibration error.

- Zero point calibration ([ZERO])

  This procedure calibrates the zero point for weight with nothing on the load cell (status of initial load). Calibration methods comprise "Method by weighing operation (status of initial load)" and "Method by numeric input of load cell output voltage."

- SPAN calibration ([SPAN])

  This procedure calibrates the change in the electric signal from the load cell when a weight is placed on the load cell to the correct weighing value. Calibration methods comprise "Method by weighing operation (status of initial load)" and "Method by numeric input of load cell output voltage."

6.2 Parameters to be set where necessary after calibration

- Decimal point display position (C function: [CF-01])

  A decimal point is included on the weight display of this unit.

- Unit (C function: [CF-05])

  The unit is included on the weight display of this unit.

- Digital linearization ([LNR])

  This function compensates up to three points, excluding the zero and SPAN points, to reduce the weighing error (refer to Chapter 6.5).

- Automatic range switch (C function: [CF-40] to [CF-44])

  This is the setting for the second range or the third range [Multi scale interval scale]. The limit value and the scale interval within the each range are set (refer to Chapter 8.14).

- Gravity acceleration compensation (C function: [CF-25], [CF-25])

This function compensates for SPAN error by setting different gravity accelerations for the places of calibration and usage (refer to Chapter 8.13).

Note:

- Calibrate as necessary when the usage environment changes.
- Performance is effective at display resolution of 10 000 or less.

  Display resolution is the value into which maximum load is divided by the scale interval of the first range.
- Use a calibration weight for SPAN calibration that is 2/3 or more of the maximum load to reduce calibration error.

6.3 Calibration procedures

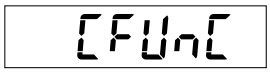
6.3.1 Calibration flow

Step 1	Connect to the load cell	Connect the load cell with the instrument.
	⇩	
Step 2	Turn on the power supply.	Power up the system.
	⇩	
Step 3	Set the bridge power supply. Refer to Chapter 8.5.	Set the bridge power supply.
	⇩	
Step 4	Leave for 10 min. after the power is turned on.	Energize the unit for about 10 min. to stabilize the unit and load cell.
	⇩	
Step 5	Switch to calibration mode. Refer to Chapter 6.3.2.	Switch to calibration mode.
	⇩	
Step 6	Set the scale interval. Refer to Chapter 6.3.3.	Set the scale interval.
	⇩	
Step 7	Set the maximum load. Refer to Chapter 6.3.4.	Set the maximum load.
	⇩	
Step 8	Set the mass for the weight. Refer to Chapter 6.3.5.	Set the mass of the weight on the load cell.
	⇩	
Step 9	Zero point calibration Refer to Chapter 6.3.6.	Execute zero point calibration with nothing on the load cell or by setting the output voltage of the load cell zero point.
	⇩	
Step 10	SPAN calibration Refer to Chapter 6.3.7.	Execute SPAN calibration with a weight on the load cell or by setting the output voltage of the load cell SPAN point.
	⇩	
Step 11	Quit calibration. Refer to Chapter 6.3.8.	Exit calibration mode.
	⇩	
	Carry out settings from step 12 as follows as necessary	
Step 12	Set the decimal point display position	Refer to Chapter 8.1.
Step 13	Set the units	Refer to Chapter 8.4.
Step 14	Digital linearization	Refer to Chapter 6.5.
Step 15	Automatic range switch	Refer to Chapter 8.14.
Step 16	Gravity acceleration	Refer to Chapter 8.13.

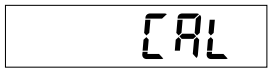
6.3.2 Switch to calibration mode


Stand-by condition

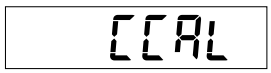
1. Press the [ON-OFF] key to move from normal weighing mode to the stand-by condition.


[CFUNC]

2. Press the [ON-OFF] key while pressing the [SET] key.
   ▷ [CFUNC] is displayed.
3. Press the [NET-GROSS WEIGHT] key.
   ▷ [CAL] is displayed.

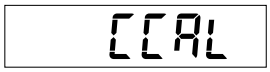

[CAL]

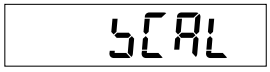
4. Press the [F] key.
   ▷ [CCAL] is displayed, and it enters calibration mode.


[CCAL]

▼ Set the scale interval

6.3.3 Set the scale interval


[CCAL]


[SCAL]

1. When [F] key is pressed twice from the [CCAL] display, [D-✶✶] is displayed.

   [✶✶] is the currently saved scale interval.

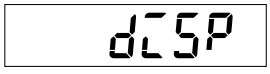
2. Select the scale interval from 1, 2, 5, 10, 20 and 50.

   [TARE WEIGHT] [NET-GROSS WEIGHT]: Selects the scale interval

   [SET]: Interrupts the setting and returns to the CCAL display

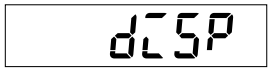
   [F]: The displayed value is memorized. Proceed to the next step.

   The scale interval to be used
3. Press the [F] key after setting


[DISP]

▼ Set maximum load

6.3.4 Set the maximum load



[DISP]

Saved maximum load

1. When [F] key is pressed from the [DISP] display, [01000] is displayed.

   If the maximum load has already been changed, the currently saved maximum load is displayed.

   [TARE WEIGHT] [NET-GROSS WEIGHT]: The changed digit value adjusts.

   [ACCUM] [PRESET TARE WEIGHT]: The changed digit is selected.

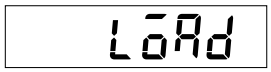
   [ZERO]: The value changes to [0].

   [SET]: Interrupts the setting and returns to the CCAL display

   [F]: The displayed value is saved. Proceed to the next step.

Changed maximum load

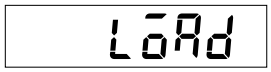
2. Press the [F] key after setting



[LOAD]

▼Set the weight mass

6.3.5 Setting the mass of the weight



[LOAD]

1. When [F] key is pressed from the[LOAD] display, [✶✶✶✶] is displayed.

   [✶✶✶✶] is the maximum load.

Weight mass equal to maximum load.

Set the mass of the weight on the load cell

The same setting as the maximum load is used if there is a maximum load value.

[TARE WEIGHT] [NET-GROSS WEIGHT]: The changed digit value adjusts.

[ACCUM] [PRESET TARE WEIGHT]: The changed digit is selected.

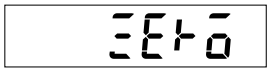
[ZERO]: The value changes to [0].

[SET]: Interrupts the setting and returns to the CCAL display

[F]: The displayed value is saved. Proceed to the next step.

Value of the load cell weight

2. Press the [F] key after setting



[ZERO]

▼ Zero point calibration

6.3.6 Zero point calibration

[ZERO] is displayed when SPAN calibration starts.

Select the zero calibration method

- Method by weight data (status of initial load) ⇨ Press the [F] key and execute the "Method by measuring data".

  Execute zero calibration with nothing on the load cell.

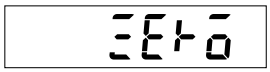
- Method by load cell numeric output ⇨ Press the [PRESET TARE WEIGHT] key and execute the "Method by numeric input".

  Execute zero calibration by inputting the output voltage value of the load cell when nothing is on the load cell.

6.3.6.1 Method by weight data

Method by weight data (status of initial load).

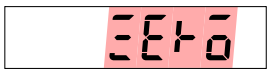
Ensure that the load cell is in an unladen state.



[ZERO]

1. Press the [F] key, with nothing on the load cell

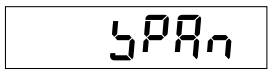
   Under the zero calibration



[ZERO]

2. Press the [F] key when the[ZERO] display blinks and the STABLE mark is lit.

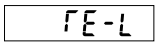
   ▷ The zero point is saved, and [SPAN] is displayed.



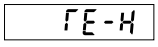
[SPAN]

▼ SPAN point calibration

Error display in zero point calibration



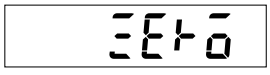
[TE-L]: The display blinks for about two seconds if load cell output is –2.5 mV/V or less (refer to Chapter 20.2.1).



[TE-H]: The display blinks for about two seconds if load cell output is 2.5 mV/V or more (refer to Chapter 20.2.1).

6.3.6.2 Method by numeric output

Calibration by inputting load cell output voltage.



[ZERO]

[Z MV]

1. When the[PRESET TARE WEIGHT] key is pressed, [Z MV] is displayed.
2. When the[F] key is pressed, [✶.✶✶✶✶✶] is displayed.

   [✶.✶✶✶✶✶] is the saved load cell output voltage.

mV/V

   Saved load cell output voltage.

   Set the load cell output voltage in mV/V corresponding to the measurement zero point.

   [TARE WEIGHT] [NET-GROSS WEIGHT]: The changed digit value adjusts.

   [ACCUM] [PRESET TARE WEIGHT]: The changed digit is selected.

   [ZERO]: The value changes to [0].

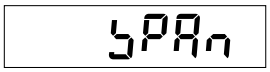
   [SET]: Interrupts the setting and returns to the CCAL display

   [F]: The displayed value is saved. Proceed to the next step.

mV/V

   Set the load cell output voltage:

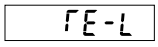
3. Press the [F] key after setting



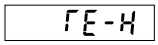
[SPAN]

   ▼ SPAN point calibration

Error display in zero point calibration:



[TE-L]: The display blinks for about two seconds if load cell output is –2.5 mV/V or less (refer to Chapter 20.2.1).



[TE-H]: The display blinks for about two seconds if load cell output is 2.5 mV/V or more (refer to Chapter 20.2.1).

6.3.7 SPAN calibration

[SPAN] is displayed when SPAN calibration starts.

Select the SPAN calibration method:

- Method by weight ⇨ Press the [F] key and execute "Method by weight".

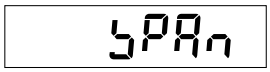
  Execute SPAN calibration with a weight on the load cell.

- Method by numeric output of load cell output ⇨ Press the [PRESET TARE WEIGHT] key and execute the "Method by numeric input".

  Execute SPAN calibration by inputting the difference between the output voltage of the load cell and measurement zero point (Setting described in Chapter 6.3.6) and the output voltage corresponding to the mass of the weight (Setting described in Chapter 6.3.5).

6.3.7.1 Method by weight

Place the weight corresponding to the mass on the load cell (Setting described in Chapter 6.3.5).

 [SPAN]

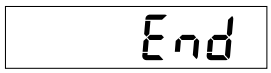
1. Press the[F] key with the weight on the load cell.

   Under the SPAN calibration

    [SPAN]

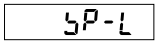
2. Press the [F] key when the[SPAN] display blinks and the STABLE mark is lit.

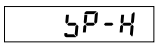
   ▷ [SPAN] is saved, and [END] is displayed.

    [END]

   ▼ End.

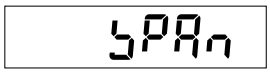
Error display in SPAN calibration:

 [SP-L]: The display blinks for about 2 seconds if ([Load cell output voltage at span point] – [Load cell output voltage at zero point]) ≤ 0.0 mV/V (refer to Chapter 20.2.1).

 [SP-H]: The display blinks for about two seconds if load cell output is 3.1 mV/V or more (refer to Chapter 20.2.1).

6.3.7.2 Method by numeric output

Calibration by inputting load cell output voltage.

 [SPAN]

 [Z MV]

1. When the[PRESET TARE WEIGHT] key is pressed, [Z MV] is displayed.
2. When the[F] key is pressed, [✶.✶✶✶✶✶] is displayed.

   [✶.✶✶✶✶✶] is the saved load cell output voltage.

   Set the value in mV/V to the difference between the measurement load cell output voltage zero point and the output voltage corresponding to the maximum load mass.

   Saved load cell output voltage:

    mV/V

   [TARE WEIGHT] [NET-GROSS WEIGHT]: The changed digit value adjusts.

   [ACCUM] [PRESET TARE WEIGHT]: The changed digit is selected.

   [ZERO]: The displayed value changes to zero.

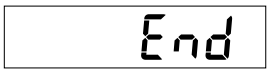
   [SET]: Interrupts the setting and returns to the CCAL display

   [F]: The displayed value is saved. Proceed to the next step.

Set the load cell output voltage:

mV/V

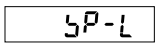
3. Press the [F] key after setting



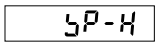
[END]

▼ End.

Error display in span calibration

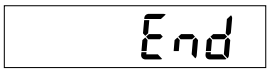


[SP-L]: The display blinks for about 2 seconds if ([Load cell output voltage at span point] – [Load cell output voltage at zero point]) ≤ 0.0 mV/V (refer to Chapter 20.2.1)



[SP-H]: The display blinks for about two seconds if load cell output is 3.1 mV/V or more (refer to Chapter 20.2.1).

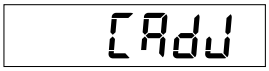
6.3.8 Quit calibration



[END]

[END] is displayed when SPAN calibration is complete.

1. Press the [F] key to quit calibration mode.
   ▷ The display changes to [CADJ.], and the set data is saved to the internal memory.



[CADJ]


Stand-by condition

2. Press the [ON-OFF] key to move to stand-by condition.

Note:

Set fine calibration for ZERO and SPAN, digital linearization, ZERO set and tare weight cancellation after completing calibration. Recalibration clears set data.

6.4 Fine calibration of zero and SPAN

This function executes fine calibration of zero and SPAN when there is a difference between the actual weight value and the weight.

6.4.1 Switch to zero and SPAN fine calibration mode

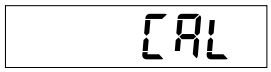
Weighing mode


Stand-by condition

1. Press the [ON-OFF] key to move from normal weighing mode to the stand-by condition.

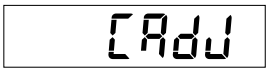
[CFUNC]

2. Press the[ON-OFF] key with the[SET] key. [CFUNC] is displayed.
3. Press the [NET-GROSS] key.
   ▷ [CAL] is displayed.


[CAL]

4. Press the[F] key.
   ▷ [CCAL] is displayed.


[CCAL]

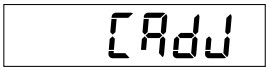

[CADJ]

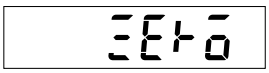
Zero fine calibration mode

5. Press the [NET-GROSS] key to display[CADJ]and move to zero fine calibration mode.

▼ Zero fine calibration

6.4.1.1 Zero fine calibration


[CADJ]


[ZERO]

1. Press the[F] key from the [CADJ] display to display [ZERO].

   If executing span calibration only, press the [NET-GROSS] key to proceed to "Span fine calibration" after [SPAN]is displayed.

2. Press the [F] key. The display changes to [✶✶✶✶✶.✶].

   [✶✶✶✶✶.✶] is the current measuring value. It can display up to 1/10 digit.

   Example: Without a decimal point 0 ~ 6000 –> 0.0 ~ 6000.0

   With a decimal point 0.0 ~ 600.0 –> 0.00 ~ 600.00

   Ensure that there is no weight on the load cell and set the display to ZERO.

   [TARE WEIGHT]: Increase the measuring value

   Increase continuously by holding down the key.

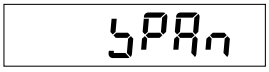
   [NET-GROSS]: Decrease the measuring value

   Decrease continuously by holding down the key.

   [SET]: Interrupts the setting and returns to [CADJ] display.

   [F]: Saves the displayed value and proceeds to the next step.

3. After zero fine calibration, press the [F] key.
   ▷ The display changes to [SPAN].



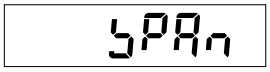
[SPAN]

Precedes operation of "Span fine calibration" if executing span fine calibration.

Otherwise, press the [NET-GROSS] key, and proceed to "Exit fine calibration mode" after [END]is displayed.

▼ Span fine calibration.

6.4.1.2 SPAN fine calibration



[SPAN]

Place a known weight (calibration weight) of less than the maximum load on the load cell.

1. [✶✶✶✶✶.✶] is displayed by pressing the [F] key.

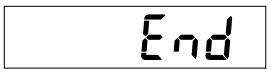
[✶✶✶✶✶.✶] is the current weight value. It can display up to 1/10 digit.

Set the display to the same value with the weight on the load cell.

[TARE WEIGHT]: Increase the value Increase continuously by holding down the key.

[NET-GROSS]: Decrease the value Decrease continuously by holding down the key.

Proceed to "Exit fine calibration mode" after SPAN fine calibration is complete.

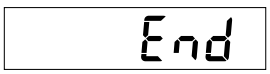


[END]

2. After [END]is displayed, press the [F] key.

▼ End.

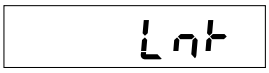
6.4.1.3 Completing fine calibration mode



[END]

1. Press the [F] key to quit zero and SPAN fine calibration mode.

▷ [LNR]is displayed.



[LNR]

The set data is saved to the internal memory.


Stand-by condition

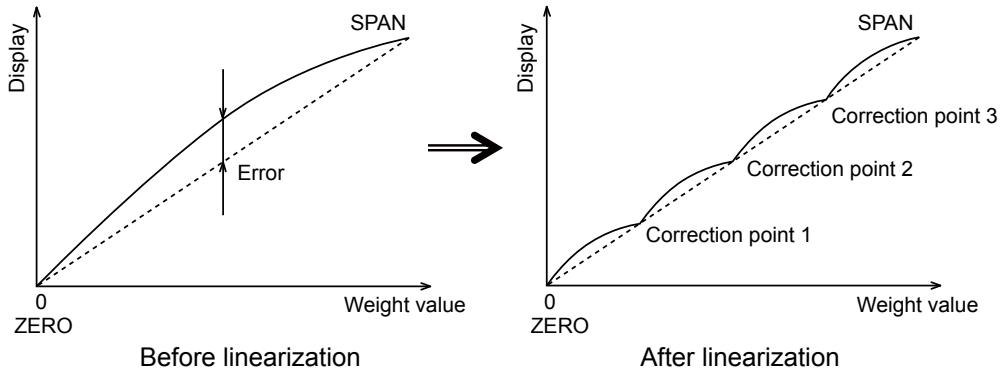
2. Press the [ON-OFF] key to move to the stand-by condition.

Zero and SPAN fine calibration is complete.

6.5 Digital linearization

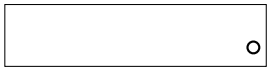
After calibration, a weighing error of several scale intervals may arise between ZERO and SPAN (maximum load) due to the influence of the load cell.

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

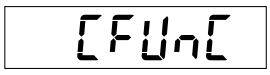


6.5.1 Switch to digital linearization mode

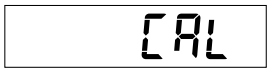
Weighing mode

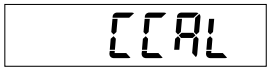

Stand-by condition

1. Set the condition from normal weighing mode to stand-by condition by pressing the [ON-OFF] key.

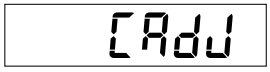

[CFUNC]

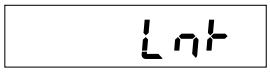
2. Press the [ON-OFF] key while pressing the [SET] key. [CFUNC] is displayed.


[CAL]


[CCAL]

3. Press the [F] key after pressing the [NET-GROSS] key. [CCAL] is displayed.


[CADJ]

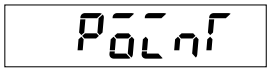

[LNR]

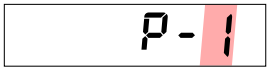
4. [LNR] is displayed after pressing the [NET-GROSS] key twice to enter digital linearization mode.

▼ Digital linearization mode

6.5.2 Setting digital linearization


[LNR]


[POINT]



[P-1]

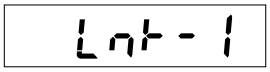
1. Pressing the [F] key twice from the[LNR] display to display[P-1].

   The display moves to [P-1] → [P-3] by pressing the [TARE WEIGHT] key. Select the numbers of the points for linearization compensation, and press the [F] key.

   [P-1]: Compensation by 1 point

   [P-2]: Compensation by 2 points

   [P-3]: Compensation by 3 points

   [LNR-1]

   Load the weight

2. After the display shows [LNR-1], load the weight of the point to be compensated on the load cell and press the [F] key.

   Confirm that the stability mark light is on.

3. When the weighing value blinks, press the [F] key after confirming the stability mark (▼) light is on.

   When the 100 digit of the weighing value blinks, set to the same value with the weight on the load cell.

   [TARE WEIGHT]: Increase the weighing value

   [NET-GROSS]: Decrease the weighing value

   [F]: The displayed value is memorized. Proceed to the next step.

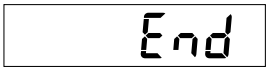
   [SET]: Interrupt the setting and return to the [LNR] display.

   The display moves to[LNR-2] when [P-2] is selected. Execute compensation for the second point.

   The display moves to[LNR-3] when [P-3] is selected. Execute compensation for the third point.

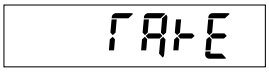
   Ensure that the value of weights [LNR-1] < [LNR-2] < [LNR-3].

4. Press the [F] key when compensation is complete for each point.
   ▷ [END] is displayed.

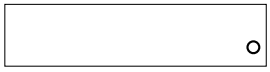
   

   [END]

5. Press the [F] key to complete digital linearization.
   ▷ [TARE WEIGHT] is displayed. The set data is saved to the internal memory.

   [TARE WEIGHT]

 Stand-by condition

6. Set to stand-by condition by pressing the [ON-OFF] key.
   ▷ The digital linearization is complete.

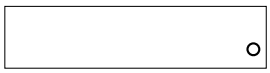
- Ensure that the value of weights to be compensated [LNR-1] < [LNR-2] < [LNR-3].
- The linearization compensation cannot be executed above the maximum load (refer to Chapter 20.2.1).
- Digital linearization compensation data can be cleared by C function CF-98 (refer to Chapter 8.16).

6.6 Calibration of zero point only

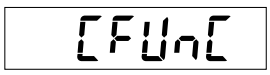
This function recalibrates the zero point only when the tare weight is changed, other than the load cell maximum load.

6.6.1 Switch to calibration mode by zero point

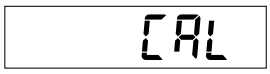
Weighing mode

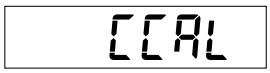
 Stand-by condition

1. Press the [ON-OFF] key to move from normal weighing mode to the stand-by condition.

 [CFUNC]

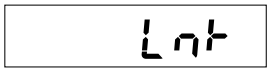
2. Press the[ON-OFF] key with the[SET] key. [CFUNC] is displayed.

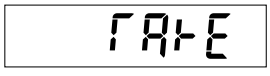
 [CAL]

 [CCAL]

3. Press the [F] key after pressing the [NET-GROSS] key. [CCAL] is displayed.

 [CADJ]

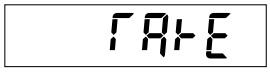
 [LNR]

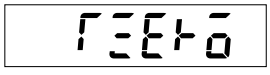
 [TARE WEIGHT]

4. [TARE WEIGHT] is displayed after the [NET-GROSS] key is pressed three times. The display switches to calibration mode of the zero point only.

▼Zero point only

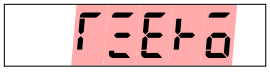
6.6.2 Calibration of the zero point only

 [TARE WEIGHT]

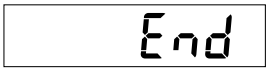
 [TZERO]

1. Switch the display to [TZERO] by pressing the [F] key on the [TARE WEIGHT]display.

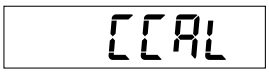
   Ensure that nothing is on the load cell other than the tare weight outside maximum load.

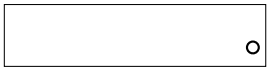
    [TZERO]

2. The display of [TZERO] blinks after pressing the [F] key and zero point calibration starts.
3. Press the [F] key when the stability mark light is on.
   ▷ Zero point calibration is complete.

    [END]

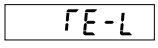
4. Press the [F] key to quit calibration mode for the zero point only.
   ▷ [CCAL] is displayed. The set data is saved to the internal memory.

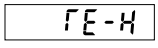
    [CCAL]

    Stand-by condition

5. Set to stand-by condition by pressing the [ON-OFF] key.
   ▷ Calibration of the zero point only is complete.

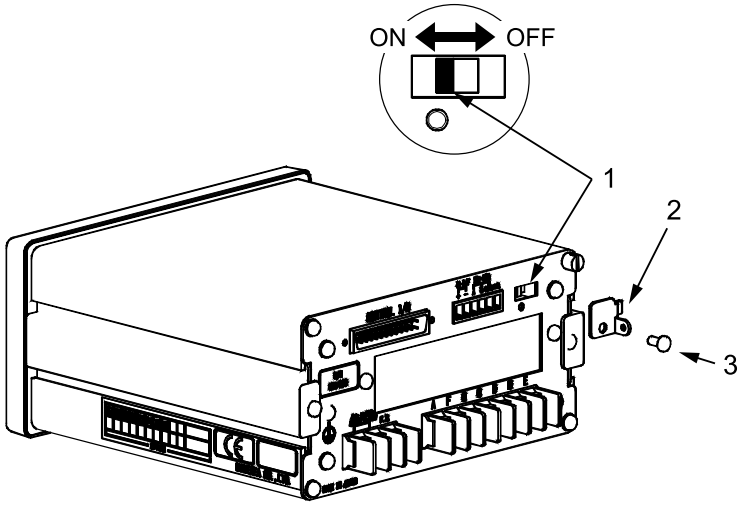
Error display in zero point calibration

 [TE-L]: The display blinks for about two seconds if load cell output is –2.5 mV/V or less (refer to Chapter 20.2.1).

 [TE-H]: The display blinks for about two seconds if load cell output is 2.5 mV/V or more (refer to Chapter 20.2.1).

6.7 CAL-switch

Lock calibration settings to protect them from changes. Use the CAL switch to lock the calibration settings.



The CAL switch (1) is located behind the cover (2) at the right of the RS-485 interface and 2-wire serial interface terminals on the rear panel.

2. Switch the CAL switch (1) ON.

   To release the lock, switch the CAL switch OFF.

Note:

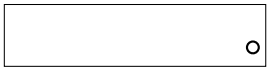
- When the CAL switch is in position ON, [CFUNC] and[CAL] modes cannot be used.
- When the CAL switch is in position ON, rewriting C function data by communication and communication calibration are disabled.

7 C function mode

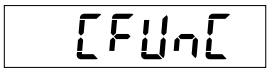
The various calibration functions become effective by setting the C function data.

7.1 C function mode setting method

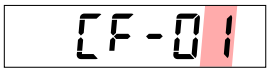
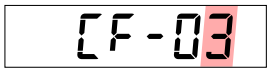
Weighing mode


Stand-by condition

1. Set the condition from normal weighing mode to stand-by condition by pressing the [ON-OFF] key.


[CFUNC]

2. Press the[ON-OFF] key with the[SET] key. [CFUNC] is displayed.


[CF-01], 
[CF-03]

3. [CF-01] is displayed by pressing the [F] key.

   Select C function number to be changed.

   [TARE WEIGHT] [NET-GROSS WEIGHT]: Adjust the value of the digit to be changed.

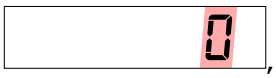
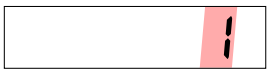
   [ACCUM] [PRESET TARE WEIGHT]: Select the changed digit.

   [ZERO]: Change the display value to [0].

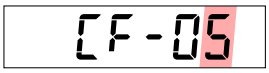
   [SET]: Return to the [CFUNC] display.

   [F]: Saves the displayed value and proceeds to the next step.

   [ON-OFF]: Quit C function mode without changing other settings.


, 

4. Press the [F] key to change the selected C function mode setting.
5. Press the [F] key.
   ▷ The changed content is registered. The following changed C function number is displayed.


[CF-05]

   Registration is complete.

   Repeat this process if another C function number setting is to be changed.


[CFUNC]

6. Press the [SET] key after registration is complete. [CFUNC] is displayed.


Stand-by condition

7. Set to stand-by condition by pressing the [ON-OFF] key.

7.2 C function data functions

Item	Function No.	Setting value	Contents
Decimal point display position	CF-01	0*	No decimal point
		1	1234.5
		2	123.45
		3	12.345
		4	1.2345
A/D sampling rate	CF-02	0	20 times/s
		1*	200 times/s
Overload display condition	CF-03	0	Greater than |maximum load +9D|
		1	When the amount exceeds maximum load ±110%
		2*	Less than –20D and larger than maximum load +9D
Unit	CF-05	0*	No unit
		1	g
		2	kg
		3	t
		4	lb
		5	N
		6	kN
Excitation	CF-07	0*	10 V DC
		1	5 V DC
		2	2.5 V DC
Net weight sign inversion	CF-08	0*	Net weight sign not inverted
		1	Net weight sign inverted
Zero set operating condition	CF-10	0	Operation when stable
		1*	Unconditional operation
Zero set effective range	CF-11	00 ~ 30	Unit: ±1% of maximum load
		02*	
Zero tracking target	CF-12	0	Gross weight and net weight (load display)
		1*	Gross weight (gross value display only)
Zero tracking data width	CF-13	00 ~ 99	Unit: 0.1; D 00: Zero tracking OFF
		01*	
Zero tracking time width	CF-14	00 ~ 99	Unit: 0.1 s 00: Zero tracking OFF
		00*	

Item	Function No.	Setting value	Contents
Power on zero operation	CF-15	0*	Invalid
		1	Valid
Tare weight cancellation operating condition	CF-16	0*	Operation when stable and 0 < gross weight ≤ maximum load
		1	Unconditional operation and 0 < gross weight ≤ maximum load
		2	Operation when stable and 0 < gross weight ≤ |maximum load|
		3	Unconditional operation and 0 < gross weight ≤ |maximum load|
Change of data storage destination	CF-17	0*	RAM
		1	EEPROM
Power on clear	CF-18	000 ~ 111 000*	0: Invalid 1: Valid 101: Tare weight cancellation data 102: Preset tare weight data 103: Zero set and zero tracking data
Stability detection during set mode 2 or preset tare weight set	CF-20	0*	Invalid
		1	Effective
Unit display in sub-display section during set mode 2 or preset tare weight set	CF-21	0*	Invalid
		1	Effective
Setting method for gravity acceleration compensation	CF-25	0*	Set the district number
		1	Set the numerical value for gravity acceleration
District number for place of use	CF-26 (Possible to set CF-25 = 0)	01 ~ 16	Unit: District
		10*	
District number for place of calibration	CF-27 (Possible to set CF-25 = 0)	01 ~ 16	Unit: District
		10*	
Gravity acceleration setting for place of use	CF-28 (Possible to set CF-25 = 1)	9.000 ~ 9.999 9.797*	Unit: m/s^2
Gravity acceleration setting for place of calibration	CF-29 (Possible to set CF-25 = 1)	9.000 ~ 9.999 9.797*	Unit: m/s^2
Range switch operation	CF-40	0*	Range change OFF
		1	Changeable between two ranges
		2	Changeable between three ranges

Item	Function No.	Setting value	Contents
Setting the scale interval of the second range	CF-41	0	1 scale interval
		1	2 scale interval
		2	5 scale interval
		3*	10 scale interval
		4	20 scale interval
		5	50 scale interval
Setting the boundary value for the second range	CF-42	000000 ~ 999999 003000*	
Setting the scale interval of the third range	CF-43	0	1 scale interval
		1	2 scale interval
		2	5 scale interval
		3*	10 scale interval
		4	20 scale interval
		5	50 scale interval
Setting the boundary value for the third range	CF-44	000000 ~ 999999 006000*	
Analog output target	CF-70	0*	Display interlock
		1	Gross weight
		2	Net weight
Display value at analog output of 4 mA DC (0 V DC)	CF-71	–999999 ~ 999999 000000*	Unit: 1 D
Display value at analog output of 20 mA DC (10 V DC)	CF-72	–999999 ~ 999999 010000*	Unit: 1 D
Calibration data for maximum capacity (reference)	CF-90	1*	
Calibration data for maximum load (reference)	CF-91	10000*	
Calibration data for weight (reference)	CF-92	10000*	
Calibration data for zero mV/V (reference)	CF-93	0.00000*	
Calibration data for span mV/V (reference)	CF-94	0.30000*	

Item	Function No.	Setting value	Contents
Stability detection duration during calibration	CF-97	00 ~ 99 05*	Unit: 0.1 s 00: Stability detection during calibration OFF
Digital linearization clear	CF-98		The data compensated by digital linearization is cleared.
Memory clear	CF-99		C function setting details returned to default setting.

* Indicates default setting

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.

The position of the decimal point can be selected from [Nothing], [1234.5], [123.45], [12.345] and[1.2345].

The default is [Nothing].

8.2 A/D sampling

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

The A/D sampling rate can be selected from [200 times/s] and[20 times/s].

The default is [200 times/s].

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.

[At the time of more than |weighing capacity + 9d|], [at the time of exceeding to the weighing capacity ±110 %] or [Exceeding to -20d ~ weighing capacity] can be selected.

Default is set to [Smaller than -20d and larger than weighing capacity + 9d].

8.4 Unit

Units are selected by C function CF-05.

The unit can be selected from [No unit], [g], [kg], [t], [lb], [N] and [kN].

The default is [No unit].

8.5 Excitation

Excitation is selected by C function CF-07.

The voltage (DC) excitation of the load cell can be selected from [DC10 V], [DC5 V] and [DC2.5 V].

The default is [DC10 V].

If a zener barrier is used, apply CSD-903 by selecting the excitation according to the below table.

System configuration	Excitation		
	10 V	5 V	2.5 V
1 load cell + Zener barrier	×	○	○
2 load cells + cable junction box + Zener barrier	×	×	○
3 load cells + cable junction box + Zener barrier	×	×	○
4 load cells + cable junction box + Zener barrier	×	×	○

System configuration	Excitation		
	10 V	5 V	2.5 V
5 load cells + cable junction box + Zener barrier	×	×	○
6 load cells + cable junction box + Zener barrier	×	×	×

○ Applicable; × Not applicable

The above examples use 6-wire cable and 350 Ω load cells.

8.6 Net weight sign reversal function

The net weight sign inversion function inverts the sign of the net weight display and external net weight data output, for example, in simple discharge mode.

The net weight sign inversion function makes the net weight display or external net weight data output positive by inverting the sign of the net weight using C function CF-08.

Net weight sign inversion can be selected from [Net weight sign not inverted] or [Net weight sign inverted].

The default is [Net weight sign not inverted].

8.7 Zero set

The ZERO set function stores the present measuring value as the zero point and calibrates the display to zero by pressing the [ZERO] key when the value indicated in the load display is the gross value and is within the zero set effective range.

8.7.1 Operating condition of ZERO set

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

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

[Operation under stable conditions] or [Unconditional operation] can be selected.

The default is [Operation under stable conditions].

8.7.2 Zero set effective range

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

Setting range: 00 – 30; Unit : ±1% of the weighing capacity (maximum load); 00: OFF

The default is [02].

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 or preset tare weight cancellation is executed, zero set is executed after clearing the tare weight cancellation and the preset tare weight cancellation.

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.

[Gross weight value or net weight value (for weight display)] or [Gross weight value (only with gross value display)] can be selected.

The default is [Gross weight value].

8.8.2 ZERO tracking data width

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

Setting range: 00-99; Unit: 0.1 D; 00: OFF

The default is [00].

8.8.3 ZERO tracking duration

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

Setting range: 00-99; Unit: 0.1 s; 00: OFF

The default is [00].

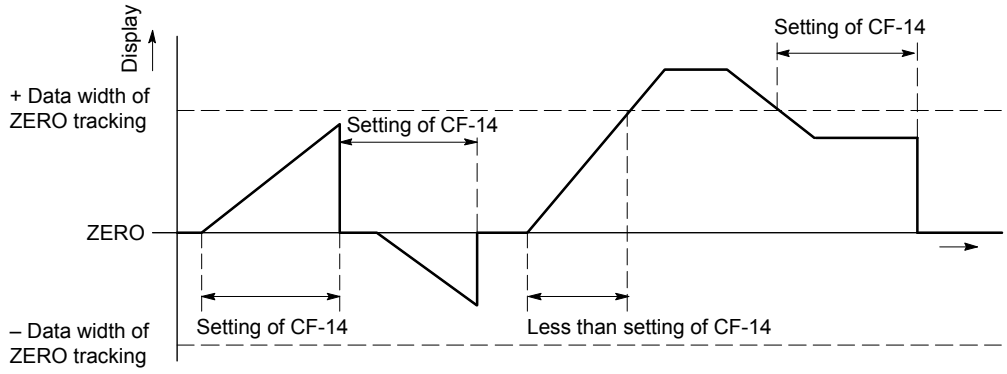
Example:

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× 0.5 × Scale interval

When the set value for C function CF-13 = 10 and the scale interval D = 5, then ZERO tracking data width = 10 × 0.5 × 5 D = 25 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

The operation of power on zero is selected by C function CF-15.

Power on zero operation is selected from [Effective] and [Invalid].

The default is [Invalid].

Note:

- Zero compensation is not accepted under the following conditions, when the setting of C function CF-15 is [Effective power on zero] and when power on zero is starting.

  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 and [- - - - - -] is displayed

  At this time, pressing the [SET] key 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 the [TARE WEIGHT] key to turn on the [TARE WEIGHT] and [NET WEIGHT] indicator in the condition display section. The display changes to zero.

Press[TARE WEIGHT] when the gross weight is zero to clear tare weight cancellation. After tare weight cancellation is cleared, [GROSS WEIGHT] lights in condition display section and the display switches to gross value.

8.10.1 Tare weight cancellation operating conditions

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

[Operation when stable and 0 < gross weight ≤ maximum load], [Operate unconditionally and 0 < gross weight ≤ maximum load], [Operation when stable and 0 < gross weight ≤ | maximum load |] and [Operate unconditionally and 0 < gross weight ≤ | maximum load |] can be selected.

The default is [Operation when stable and 0 < gross weight ≤ maximum load].

Note:

- Tare weight cancellation is not accepted when the gross weight value exceeds the first range.
- Preset tare weight cancellation is cleared and tare weight cancellation is executed if preset tare weight cancellation is executed. (Tare weight cancellation cannot be used together with preset tare weight cancellation.)
- When the zero set is executed with gross weight value display, tare weight cancellation is cleared.

8.11 Clear at power on

Setting clear at power on is selected by C function CF-18.

Clear at power on clears [Data of tare weight cancellation], [Data of preset tare weight cancellation] and [Data of zero set and zero tracking] when the power is turned on or when the display is turning on.

Setting: 000 to 111; 0 Invalid; 1: effective; Default: 000

10^0: Tare weight cancellation data

10^1: Preset tare weight cancellation data

10^2: Zero set and zero tracking data

8.12 Setting in set mode 2 or preset tare weight set

Proceed to set the unit display in the sub-display section and the stability detection in the condition display in set mode 2 or preset tare weight set.

8.12.1 Stability detection

Selection of whether stability detection is effective or invalid is made by C function CF-20.

The default is [Invalid].

8.12.2 Unit display in the sub-display section

Selection of whether the unit display in the sub-display section is effective or invalid is made by C function CF-21.

The default is [Invalid].

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.

[Set the district number] or [Set the numerical value of gravity acceleration] can be selected.

The default is [Set the district number].

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 the district number: 01 to 16

The default is 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.

The district number can be selected from 01 to 16

The default is 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

The default is [9.797].

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

The default is [9.797].

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

District No.	Acceleration (m/s^2)	Corresponding districts
7	9.800	Fukushima Prefecture, Ibaraki Prefecture, Niigata Prefecture
8	9.799	Tochigi Prefecture, Toyama Prefecture, Ishikawa Prefecture
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 Automatic range switch

The automatic range switch function switches automatically and displays the scale interval by the weighing data of the gross or net value by dividing the range of weighing to the maximum load into 2 or 3.

8.14.1 Setting the range switch operation

Range switch operation is selected by C function CF-40.

The range switch can be selected from [OFF (without range switch)], [Two range switch] and [Three range switch].

The default is [OFF].

8.14.2 Setting the scale interval of the second range

The scale interval of the second range is set by C function CF-41.

The scale interval can be selected from [1 scale interval], [2 scale interval], [5 scale interval], [10 scale interval], [20 scale interval] and [50 scale interval].

The default is [5 scale interval].

8.14.3 Setting the limit value for the second range

The limit value for the second range is set by C function CF-42.

Setting range: 0 to 999999

The default is [003000].

8.14.4 Setting the scale interval of the third range

The scale interval of the range is set by C function CF-43.

The scale interval can be selected from [1 scale interval], [2 scale interval], [5 scale interval], [10 scale interval], [20 scale interval] and [50 scale interval].

The default is [10 scale interval].

8.14.5 Setting the limit value for the third range

The limit value for the third range is set by C function CF-44.

Setting range: 0 to 999999

The default is [006000].

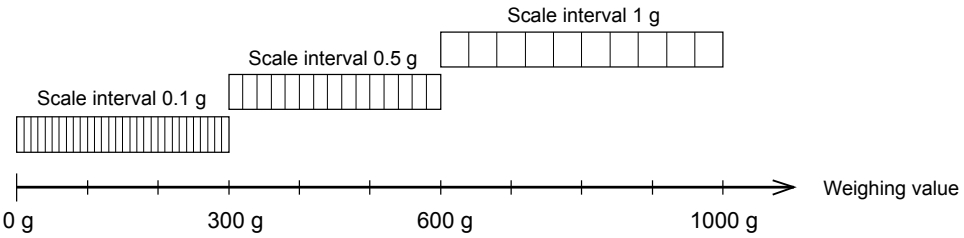
Example 1

Gross weight value

First range: 300.0 g (limit for the second range), scale interval 0.1 g (calibration scale interval)

Second range: 600.0 g (limit for the third range), scale interval 0.5 g (second range scale interval)

Third range: 1 000.0 g (maximum load), scale interval 1 g (third range scale interval)



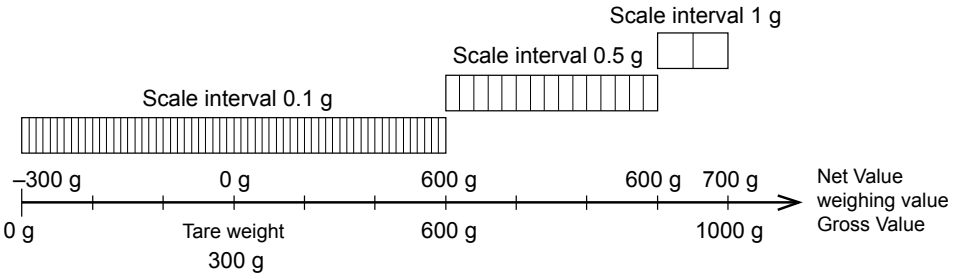
The weighing values from 0 to 300 g becomes the first range (scale interval 0.1 g).

The weighing values from 300 to 600 g becomes the second range (scale interval 0.5 g).

The weighing values from 600 to 1,000 g becomes the second range (scale interval 1 g).

Example 2

Net value cancelled 300 g tare weight set in Example 1



The weighing values from –300 to 300 g becomes the first range (scale interval 0.1 g).
The weighing values from 300 to 600 g becomes the second range (scale interval 0.5 g).
The weighing values from 600 to 700 g becomes the second range (scale interval 1 g).

Note:

- When only used only within the first range (C function CF-40: OFF), it is not necessary to set the range.
- Ensure that the scale interval of each range conforms to first range < second range < third range.
- Ensure the boundary value of each range conforms to second range ≤ third range ≤ maximum load.
- The range upper boundary within the second range is the maximum load to switch to two ranges.

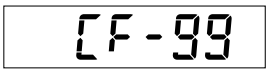
  The range upper boundary within the third range is the maximum load to switch to three ranges.
- The comparator setting and the preset tare weight cancellation setting become the scale interval for the first range.

8.15 Stability detection duration during calibration

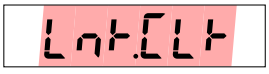
Stability detection duration calibration is set by C function CF-97.
Setting range: 00 to 99 (Unit: 0.1 s
The default is [05].

8.16 Digital linearization clear

Digital linearization compensation data can be cleared by C function CF-99.

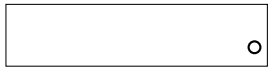


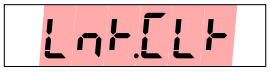
[CF-99]

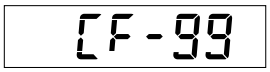


[LNR.CLR]

1. If the [F] key is pressed with[CF-99] displayed, [LNR.CLR] blinks.
2. Press the [ON-OFF] key to discontinue digital linearization.
   ▷ The display returns to stand-by condition, and digital linearization is not cleared.


Stand-by condition

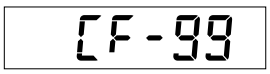

[LNR.CLR]


[CF-99]

3. [CF-99] is displayed if the [F] key is pressed while[LNR.CLR] blinks. Digital linearization is complete.

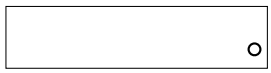
8.17 Memory clear

Memory clear is executed by C function CF-99. The C function settings returned to the default.

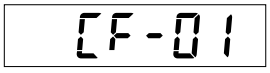

[CF-99]


[CF.CLR]

1. Press the [F] key when [CF-99] is displayed.
   ▷ [CF.CLR] blinks.
2. Press the [ON-OFF] key to discontinue memory clear.
   ▷ The display returns to stand-by mode, and memory clear is not executed.


Stand-by condition


[CF.CLR]


[CF-01]

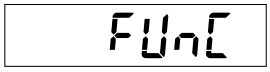
3. If the [F] key is pressed when [CF.CLR] is blinking, the display switches to [CF-01] and memory clear is complete.

9 Function mode

Various functions are activated by setting the function data.

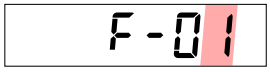
9.1 Function mode setting method

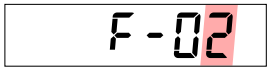
Weighing mode



[FUNC.]

1. Change from normal weighing mode to the [FUNC] display by the [SET] key.



[F-01],


[F-02]

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

   Select the function number to be changed.

   [TARE WEIGHT] [NET-GROSS WEIGHT]: Adjusts the value of the digit to be changed

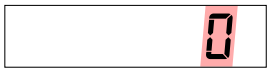
   [ACCUM] [PRESET TARE WEIGHT]: Selects the changed digit

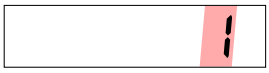
   [ZERO]: Changes the display value to [0].

   [SET]: Return to the [CFUNC] display.

   [F]: Saves the displayed value and proceeds to the next step.

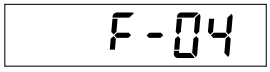
   [ON-OFF]: Quit C function mode without changing other settings.





   Press the [F] key. Set the value of the selected function number.

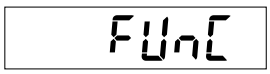
   Press the[F] key. The setting is registered. The following registered function number is displayed.



[F-04]

   Registration complete

   Select another function number and repeat this procedure.



[FUNC.]

3. Press the [SET] key after registration is complete to switch to the [FUNC] display.

   Press the [SET] key to switch to weighing mode.

   ▼ Weighing mode

Note:

Do not change in the setting during weighing because the A/D sampling rate decreases temporarily while rewriting the set value.

9.2 Details of function data

Item	Function No.	Setting	Contents
Digital filter setting	F-01	001 ~ 256 016	Unit: Moving average time 1 time)
Analog filter setting	F-02	0	2 Hz
		1*	4 Hz
		2	6 Hz
		3	8 Hz
		4	10 Hz
Display times	F-04	0*	4 times/s
		1	20 times/s
Stabilization filter setting	F-05	001 to 256 092*	Unit: Moving average time 1 time)
Stabilization filter data width	F-06	000 to 999 020*	Unit: 0.1 D 000: Stabilization filter OFF
Stabilization filter time width	F-07	00 to 99 05*	Unit: 0.1 s 00: Stabilization filter OFF
Lock key 1	F-08	0000 to 1111 0000*	0: Invalid 1: Valid 10^0: ON/OFF key 10^1: Setting key 10^2: Accumulation/◄ key 10^3: Tare weight set/► key
Lock key 2	F-09	0000 to 1111 0000*	0: Invalid 1: Valid 10^0: Tare weight cancellation/▲ key 10^1: Net or gross weight/▼ key 10^2: Zero set key 10^3: F/↵ key
Stability detection data width	F-10	000 to 999 020*	Unit: 0.1 D 00: Stabilization filter OFF
Stability detection time width	F-11	00 to 99 10*	Unit: 0.1 s 00: Stabilization filter OFF
Preset tare weight cancellation operating condition	F-15	0*	Invalid
		1	Effective
		2	Net weight offset operation

Item	Function No.	Setting	Contents
Automatic print operation	F-16	00 to 11 00*	10^0 digit: Manual print operation is effective only when stable 0: Effective only when stable 1: Always effective 10^1 digit: Automatic print operation 0: Automatic printing off 1: Automatic printing only when stable
HOLD operation	F-17	0*	Synchronized with Hold
		1	Synchronized with Inflow Finish
Hold target	F-18	0000 to 1111 0001	0: Invalid 1: Valid 10^0 digit: Display 10^1 digit: Comparison result 10^2 digit: CC-link interface 10^3 digit: Serial interface
Selection of sub-display section	F-19	0*	OFF
		1	A Brand (1 digit)/Accumulation times (6 digits)/Accumulation value (8 digits)
		2	B Brand (1 digit)/Accumulation times (6 digits)/Last accumulated data (6 digits)
		3	C Brand (1 digit)/Last accumulated data (6 digits)/Accumulation value (8 digits)
		4	D Brand (1 digit)/Last accumulated data (6 digits)/OK (6 digits)
		5	E Brand (1 digit)/Accumulation times (6 digits)/OK (6 digits)
		6	F Brand (1 digit)/OK (6 digits)/Accumulation value (8 digits)
		7	G Brand (1 digit)/Near zero (6 digits)/Full (6 digits)
		8	(No letter) OK (6 digits)/Over (5 digits)/Under (5 digits)
		9	I Brand (1 digit)/OK (6 digits)/Overshoot (6 digits)
		10	J Brand (1 digit)/S1 (6 digits)/S2 (6 digits)
		11	K Brand (1 digit)/S1 (6 digits)/S3 (6 digits)
		12	L Brand (1 digit)/S1 (6 digits)/S4 (6 digits)
		13	M Brand (1 digit)/S2 (6 digits)/S3 (6 digits)
		14	N Brand (1 digit)/S2 (6 digits)/S4 (6 digits)
		15	O Brand (1 digit)/S3 (6 digits)/S4 (6 digits)
		16	P Brand (1 digit)/OK (6 digits)

Item	Function No.	Setting	Contents
		17	Q Brand (1 digit)/Over (5 digits)/Under (5 digits)
		18	R Brand (1 digit)/Accumulation times (6 digits)
		19	S Brand (1 digit)/Accumulation value (10 digits)
		20	Brand (1 digit)/Last accumulated data (6 digits)
Comparator brand setting target	F-20	0*	Brand 0
		1	Brand 1
		2	Brand 2
		3	Brand 3
		4	Brand 4
		5	Brand 5
		6	Brand 6
		7	Brand 7
4-step check operation target	F-21	0000 to 1111 0000*	0: Display interlock
			1: Gross weight
			2: Net weight
			10^0 digit: Comparator S1
			10^1 digit: Comparator S2
			10^2 digit: Comparator S3
			10^3 digit: Comparator S4
4-step check operation target	F-22	0000 to 1111 0000*	0: OFF
			1: More than
			2: Less than
			10^0 digit: Comparator S1
			10^1 digit: Comparator S2
			10^2 digit: Comparator S3
			10^3 digit: Comparator S4
4-step check operation target S0	F-23	0*	Always OFF
		1	On when both of S1 and S2 output are OFF
		2	On when both of S1 and S3 output are OFF
		3	On when both of S1 and S4 output are OFF
		4	On when both of S2 and S3 output are OFF
		5	On when both of S2 and S4 output are OFF
		6	On when both of S3 and S4 output are OFF
		7	On when Gross weight ≥ Maximum load

Item	Function No.	Setting	Contents
Comparator hysteresis operation condition	F-24	0*	On delay
		1	Off delay
Comparator hysteresis data width	F-25	00 ~ 99 00*	Unit: 1 D 00: Hysteresis OFF
Comparator hysteresis time width	F-26	00 to 99 00*	Unit: 0.1 s 00: Hysteresis OFF
BCD output operation mode	F-30	0*	Stream
		1	Synchronized with print
		2	Synchronized with accumulation
		3	Synchronized with finish
BCD output target	F-31	0*	Display interlock
		1	Gross weight
		2	Net weight
		3	Tare weight
		4	Accumulation total
		5	Accumulation frequency
BCD output logic	F-32	0000 to 1111 0000*	0: Negative logic 1: Positive logic 10^0 digit: Data output logic (Load data and decimal point) 10^1 digit: Polarity logic 10^2 digit: Flag logic (ERROR, OVER, Stable, Gross weight) 10^3 digit: P.C. (Print command) logic
BCD P.C. (Print command) width	F-33	0	125 ms
		1*	25 ms
		2	5 ms
BCD output times	F-34	0*	4 times/s
		1	20 times/s
		2	100 times/s
S-I/F automatic print operation	F-37	0*	OFF
		1	Synchronized with print signal
		2	Synchronized with accumulation signal
		3	Synchronized with finish signal
RS-232C operating mode	F-40	0*	Command mode
		1	Stream mode
		2	Synchronized with finish signal

Item	Function No.	Setting	Contents
		3	Synchronized with accumulation signal
		4	Synchronized with print signal
RS-232C/422/485 output target	F-41 (RS-232C: Valid at F-40 = 1 or 4; RS-422/485: Valid at F-49 = 1)	0*	Display interlock
		1	Gross weight
		2	Net weight
		3	Load display data with status
RS-232C/422/485 communication specification	F-42	13020*	Data bit length 10^0 digit: 0* = 7 bit; 1 = 8 bit Parity 10^1 digit: 0 = No parity; 1 = Even parity; 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
RS-422/485 Address setting	F-43	00 to 31 00*	
RS-422/485 changeover	F-44	0*	RS-422
		1	RS-485
RS-485 reply data delay time	F-45	00 to 99 01*	Unit: 10 ms
RS-232C/422/485 transmission data decimal point	F-46	0*	None
		1	Present
Standard RS-485 operation	F-47	0*	Command mode
		1	Modbus mode
		2	Stream mode
		3	Synchronized with finish signal
		4	Synchronized with accumulation signal
		5	Synchronized with print signal
RS-485 output target	F-48 (Effective at F-47 = 2)	0*	Display interlock (HOLD at HOLD signal ON)
		1	Gross weight
		2	Net weight
		3	Conditional load display data

Item	Function No.	Setting	Contents
RS-422/485 operation mode	F-49	0*	Command mode
		1	Stream mode
Accumulation function operating condition	F-50	000 to 121 000*	Accumulation command operation 10^0 digit: 0 = only when stable; 1 = Always Automatic accumulation operation 10^1 digit: 0 = OFF 1 = Synchronizing with finish 2 = Automatic accumulation when stable Automatic accumulation condition 10^3 digit: 0 = In OK mode only 1 = Unconditional
Brand changeover	F-51	0*	Changeover by function
		1	Changeover by external control input
		2	Changeover by communication
Brand number	F-52	0*	Brand 0
		1	Brand 1
		2	Brand 2
		3	Brand 3
		4	Brand 4
		5	Brand 5
		6	Brand 6
		7	Brand 7
Setting F key operation	F-55	0*	OFF
		1	Print Input
		2	Hold Input
		3	Inflow start
		4	Emergency stop
		5	Zero clear
		6	Tare weight clear
		7	Accumulation clear
		8	Weighing comparison
		9	Forced inflow finish
External control INPUT1 operation setting (Settings 1 to 8 operate all the time; settings 9 to 27 operate only in weighing mode.)	F-60	0*	OFF
		1	[ON-OF] key operation
		2	[SET] key operation
		3	[ACCUM] key operation

Item	Function No.	Setting	Contents
		4	[PRESET TARE WEIGHT] key operation
		5	[TARE WEIGHT] key operation
		6	[NET-GROSS WEIGHT] key operation
		7	[ZERO] key operation
		8	[F] key operation
		9	Zero clear
		10	Tare weight clear
		11	Inflow start
		12	Discharge start
		13	Inflow/Discharge changeover ON: Discharge; OFF: Inflow
		14	Clears the last accumulated data
		15	Accumulation clear
		16	Error cancellation
		17	Print command
		18	Hold
		19	Emergency stop
		20	Manual overshoot compensation
		21	Net weight display
		22	Forced inflow finish
		23	Forced discharge finish
		24	Accumulation clear for all brands
		25	Brand No. 1
		26	Brand No. 2
		27	Brand No. 4
External control INPUT2 operation setting	F-61	Optional, in addition to F-60	
External control INPUT3 operation setting	F-62	Optional, in addition to F-60	
External control INPUT4 operation setting	F-63	Optional, in addition to F-60	
External control INPUT5 operation setting	F-64	Optional, in addition to F-60	
External control INPUT6 operation setting	F-65	Optional, in addition to F-60	
External control INPUT7 operation setting	F-66	Optional, in addition to F-60	

Item	Function No.	Setting	Contents
External control INPUT8 operation setting	F-67	Optional, in addition to F-60	
External control INPUT9 operation setting	F-68	Optional, in addition to F-60	
External control OUTPUT1 operation setting	F-70	00*	OFF
		01	Stable
		02	During tare weight cancellation
		03	Gross weight display
		04	Net weight display
		05	Zero
		06	During hold
		07	Error
		08	Abnormal weight
		09	Weighing sequence error
		10	Z-Band
		11	OK (S0)
		12	F. (Coarse) flow (S1)
		13	M. (Middle) flow (S2)
		14	D. (Fine) flow (S3)
		15	Over (S4)
		16	Under
		17	Full
		18	During weighing
		19	Finish weighing
		20	Discharge (between discharge gates)
		21	Finish discharge (between discharge gates)
		22	RUN
External control OUTPUT2 operation setting	F-71	Optional, in addition to F-70	
External control OUTPUT3 operation setting	F-72	Optional, in addition to F-70	
External control OUTPUT4 operation setting	F-73	Optional, in addition to F-70	
External control OUTPUT5 operation setting	F-74	Optional, in addition to F-70	
External control OUTPUT6 setting	F-75	Optional, in addition to F-70	

Item	Function No.	Setting Contents
External control OUTPUT7 operation setting	F-76	Optional, in addition to F-70
External control OUTPUT8 operation setting	F-77	Optional, in addition to F-70
External control OUTPUT9 operation setting	F-78	Optional, in addition to F-70
External control OUT-PUT10 operation setting	F-79	Optional, in addition to F-70
External control OUTPUT11 operation setting	F-80	Optional, in addition to F-70
External control OUT-PUT12 operation setting	F-81	Optional, in addition to F-70
External control OUT-PUT13 operation setting	F-82	Optional, in addition to F-70
Maintenance date	F-90	Do not use
Maintenance No.	F-91	Do not use
Memory clear	F-99	Function settings return to default.

* 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 256 (Unit: Moving average frequency of 1 time)
The default is [16 times].
Characteristic trends of the running average are shown in the table below.
Running average frequency: Low/High

Running average frequency	Low		High
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.
The frequency can be selected from [2 Hz], [4 Hz], [6 Hz], [8 Hz] and [10 Hz].
The default is [4 Hz].

10.3 Display frequency

The display frequency is selected by function F-04.
The display frequency can be selected from [4 times/s] and [20 times/s].
The default is [4 times/s].

10.4 Stabilization filter

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

10.4.1 Stabilization filter

The stabilization filter moving average frequency is selected by function F-05.
Setting range: 001 to 256; Unit: Moving average frequency of 1 time
The default is [92 times].

10.4.2 Stabilization filter data width

The stability detection data width is set by function F-06.
Setting range: 000 to 999; Unit: 0.1 D; 000: OFF
The default is [020].

10.4.3 Stabilization filter time range

The stability detection data range is set by function F-07.
The stabilization filter data width is set by function F-07.
Setting range: 00 to 99; Unit: 0.1 s; 00: OFF

The default is [05].

Example

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

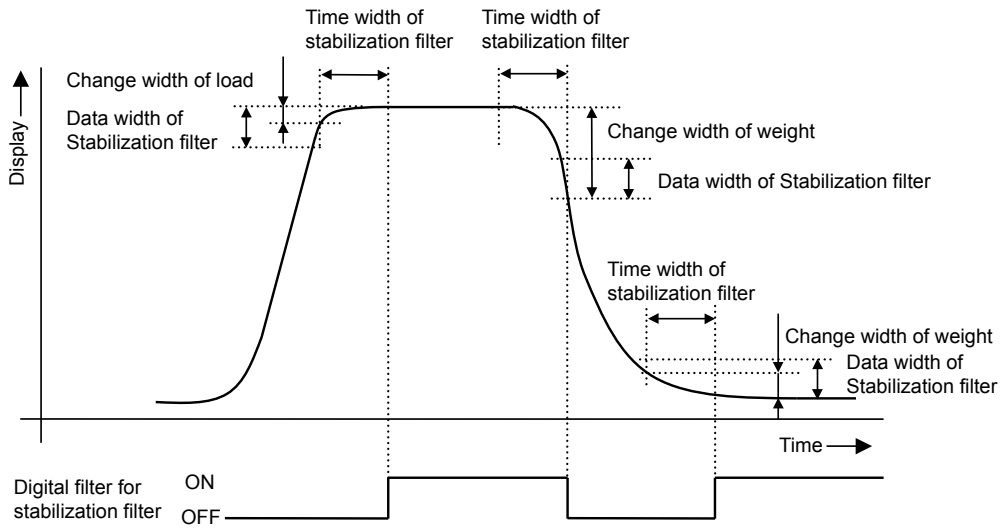
The stabilization filter data width for set value "n" is obtained as follows.

Stabilization filter data width = Set value of F-06 × scale interval

Setting of function F-06 is [10] and the scale interval is [D = 5].

Stabilization filter data width = 10 × 5 × 0.1 = 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)."

10.5 Key lock function

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

10.5.1 Key lock 1

Function F-08 sets whether key operation of [ON/OFF], [SET], [ACCUM./◀] and [PRESET TARE WEIGHT/▶] are[valid] or [invalid].

Setting range: 0000 to 1111; 0: Invalid; 1: Valid

10^0 digit: ON/OFF

10^1 digit: SET

10^2 digit: ACCUM./◀

10^3 digit: PRESET TARE WEIGHT/▶

10.5.2 Key lock 2

Function F-09 sets whether key operation of [TARE WEIGHT/▲], [NET/GROSS WEIGHT/▼], [ZERO] or [F/↵] are[valid] or [invalid].

Setting range: 0000 to 1111; 0: Invalid; 1: Valid

10^0 digit: TARE WEIGHT/▲

10^1 digit: NET/GROSS WEIGHT/▼

10^2 digit: ZERO

10^3 digit: F/↵

10.6 Stability detection

When the change width of the load display is within the data width set by function F-10, and when the condition continues for the time set by function F-11 or more, the stability detection is the function to judge the weighing value being stable.

Note:

When two range or three range switches have been selected by the automatic range switches, the time width of the stability detection execute the display conversion of the time width by the value of the first range scale interval (scale interval in the calibration).

10.6.1 Stability detection data width

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

Setting range: 000 to 999; Unit: 0.1 D; 0: OFF

The default is [020].

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

10.6.2 Duration of stability detection

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

Setting range: 00 to 99; Unit: 0.1 s; 0: OFF

The default is [10].

Note:

When two range or three range switches have been selected automatically, the stability detection data width executes data width display conversion by the first range scale interval (calibration scale interval).

10.7 Preset tare weight cancellation input

The preset tare weight cancellation function executes tare weight cancellation according to the digital input setting.

10.7.1 Preset tare weight cancellation operating condition

Preset tare weight cancellation can be from [Effective], [Invalid]and [Net weight offset operation] by function F-15.

The default is [Effective].

10.7.2 Preset tare weight cancellation input

Weighing mode

1. Press the [PRESET TARE] key from normal weighing mode to switch to the preset tare weight cancellation input display.

   As the currently saved value is displayed during tare weight cancellation setting, set the value of preset tare weight cancellation using the following keys.

   [TARE WEIGHT] [NET-GROSS WEIGHT]: Adjusts the value of the digit to be changed

   [ACCUM] [PRESET TARE WEIGHT]: Selects the changed digit

   [ZERO]: Changes the display value to [0].

   [SET]: The displayed value is not saved and the display returns to weighing mode.

   [F]: Saves the displayed value and proceeds to the next step.

   [ON-OFF]: Switches to stand-by condition without changing settings

2. Press the[F] key after executing changes.

   Preset tare weight cancellation is executed. The load display switches to Net weight = Gross weight – preset tare weight setting value. [PRESET] and [NET WEIGHT] light on the status display.

   ▼ Weighing mode

Note:

- If preset tare weight cancellation is [Effective] and automatic range switching is on, the setting range for preset tare weight cancellation input is within the first range.
- If preset tare weight cancellation is [Effective] and preset tare weight cancellation is executed while tare weight cancellation is being executed, tare weight cancellation is cancelled and preset tare weight cancellation is executed.
- If preset tare weight cancellation is [Effective] and zero set is executed with the gross weight displayed, preset tare weight cancellation is cleared.

10.7.3 Net weight offset operation

If preset tare weight cancellation is set as [Net weight offset operation] and zero set is executed with the gross weight displayed, net weight offset is not cleared.

The difference between gross weight and the net weight offset is the net weight.

Note:

If preset tare weight cancellation is set as [Net weight offset operation] and preset tare weight cancellation is executed while tare weight cancellation, net weight offset is not executed.

Tare weight cancellation is given priority over net weight offset.

10.8 Print command

Set print operation to manual or automatic. Manual print is used when print operation is executed by the [F] key or by using the external control I/O.

Automatic print is used to print every time the load on the load cell is measured using a 2-pin method serial interface, BCD output interface or RS-422/485 interface.

10.8.1 Print operation status

Print operation status is selected by function F-16.

Setting range: 00 to 11

10^0 digit: Manual print operation is effective only when stable

[0]: Effective only when stable [1]: Always effective

10^1 digit: Automatic print operation

[0]: Automatic printing off [1]: Automatic printing only when stable

[00] is the default. Print using “Print input” by[F] setting or external control I/O.

10.9 Hold

This function retains various load display data, comparison results, and serial interface data during weighing.

The hold signal is input by setting the [F] key to "hold" or by using an external control I/O.

10.9.1 HOLD operation

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

Hold operation status can be selected from [Synchronized with Hold] or [Synchronized with Inflow Finish].

The default is [Synchronized with Hold].

10.9.2 HOLD target

10.9.2.1 Load display value hold

Valid and invalid for load display value hold is selected by the 10^2 digit of F-18.

The default is [Valid].

Note:

[OL] or [OVF] is displayed if [OL] or [OVF] error occurs during load display value holding operation.

10.9.2.2 Comparison result hold

Valid and invalid for comparison result hold operation is selected by the 10^1 digit of F-18.

The default is [Invalid].

The simple mode and sequential mode hold targets the signals for [Full (Coarse) Flow], [Medium (Middle) Flow], [Dribble (Fine) Flow], [Over], [OK], [Under], [Full] and [Near Zero].

The hold targets of for 4-step check mode are the signals for[S1], [S2], [S3], [S4], [Full] and [Near Zero].

Note:

The condition display, I/O output, Standard RS-485, RS-232C, and RS-422/485 data corresponding to comparison result hold data is also held during the comparative result hold operation.

10.9.2.3 2-pin method serial interface hold

Valid and invalid for 2-pin method serial interface hold operation is selected by the 10^4 digit of F-18.

The default is [Invalid].

Hold targets are [Gross weight], [Net weight], [Tare weight cancellation value], [Gross weight condition], [Net weight condition], [Tare weight cancellation condition], [Stable condition], [Center zero condition] and [Force-finish tare weight condition].

Note:

The hold target data retains its hold condition even if the [OL] or [OVF] error occurs during 2-wire method serial interface hold operation. However,[OL] or [OVF] error can be detected by the [OVR] signal.

10.10 Sub-display section

Selects the value displayed in the sub-display section.

10.10.1 Sub-display section value selection

The value displayed in the sub-display section is selected by function F-19.

Setting range: 0 to 20

0:		OFF
1:	A	Brand (1 digit)/Accumulation times (6 digits)/Accumulation value (8 digits)
2:	B	Brand (1 digit)/Accumulation times (6 digits)/Last accumulated data (6 digits)
3:	C	Brand (1 digit)/Last accumulated data (6 digits)/Accumulation value (8 digits)

4:	D	Brand (1 digit)/Last accumulated data (6 digits)/OK (6 digits)
5:	E	Brand (1 digit)/Accumulation times (6 digits)/OK (6 digits)
6:	F	Brand (1 digit)/OK (6 digits)/Accumulation value (8 digits)
7:	G	Brand (1 digit)/Near zero (6 digits)/Full (6 digits)
8:		OK (6 digits)/Over (5 digits)/Under (5 digits)
9:	I	Brand (1 digit)/OK (6 digits)/Overshoot (6 digits)
10:	J	Brand (1 digit)/S1 (6 digits)/S2 (6 digits)
11:	K	Brand (1 digit)/S1 (6 digits)/S3 (6 digits)
12:	L	Brand (1 digit)/S1 (6 digits)/S4 (6 digits)
13:	M	Brand (1 digit)/S2 (6 digits)/S3 (6 digits)
14:	N	Brand (1 digit)/S2 (6 digits)/S4 (6 digits)
15:	O	Brand (1 digit)/S3 (6 digits)/S4 (6 digits)
16:	P	Brand (1 digit)/OK (6 digits)
17:	Q	Brand(1 digit)/Over (5 digits)/Under (5 digits)
18:	R	Brand (1 digit)/Accumulation times (6 digits)
19:	S	Brand (1 digit)/Accumulation value (10 digits)
20:	T	Brand (1 digit)/Last accumulated data (6 digits)

The default is [0: OFF].

10.11 Accumulation

The accumulation function accumulates weight data.

It saves accumulation times, updated accumulation data and accumulation values.

10.11.1 Accumulation function operating condition

The accumulation function operating condition function is selected by function F-50.

Setting range: 000 to 111

10^0 digit: Accumulation command operation [0] only under stable conditions; always [1]

10^1 digit: Automatic accumulating operation [0] OFF; [1] synchronized with end signal; [2] automatic accumulation under stable conditions

10^2 digit: Automatic accumulating operation[0] only if OK is lit; [1] unconditional operation

The default is [000].

10.11.2 Execute accumulation

10.11.2.1 Manual accumulation

When the value set for the 10^0 digit for F-50 is

0: Accumulation is executed by pressing the [ACCUM] key provided the stability sign of status display is lit.

1: Accumulation is executed by pressing the [ACCUM] key regardless of the OK lighting status.

10.11.2.2 Automatic accumulation

When the value set for the 10^1 digit for F-50 is

0: Automatic accumulation does not function;

1: Accumulation automatically synchronizes with the finish signal; and,

2: Accumulation functions automatically provided the stability sign of status display is lit.

The values for the 10^2 digit for F-50, provided that [1] and its 10^1 digit for F-50 have been set, is

0: Accumulation works automatically provided that the finish signal is output with OK lit in the status display; and,

1: Accumulation works automatically provided that the finish signal is output regardless of the OK lighting status.

Note:

- If results exceed the display range of the accumulation value or accumulation times, accumulation is not executed. [ACCUM.] blinks in the status display.
- Accumulation is prohibited if the result exceeds ±100 % of the maximum load.

10.11.3 Display range for accumulated value and count

The accumulation value display ranges from –9 999 999 999 to 9 999 999 999.

The accumulated count display ranges from 0 to 999 999.

The upper limit for accumulated value disregards the displayed decimal point.

Example: When the position of decimal point is 0.0, the upper limit of the accumulated value is 9 999 999 99.9.

Note:

When the accumulated value and the accumulated count exceed the display range, the additive of the count is not executed.

Clear the accumulated value and count if the sub-display is an error code.

10.11.4 Clear accumulation value and accumulation times

Clears the accumulation value and the accumulation times.

The four methods for accumulating data as follows.

- Press the [ZERO] key in accumulation display mode.
- Assign a[F] key to [Accumulation clear] by setting F-55.
- Clear all brand accumulation by setting the external control I/O.
- Clear all brand accumulation using SQ function SQF-98.

For details of accumulation display mode, refer to Chapter 5.2.

For details of SQ function setting, refer to Chapter 12.

10.12 Brands (Products)

Brand comparison values can be set for individual brand numbers.

Weighing is controlled using the various brand settings to ensure the target (OK) weight is achieved.

The CSD-903 can save up to 8 brands.

For details of brand settings, refer to Chapter 11.

10.12.1 Brand changeover

The brand number can be changed by function, external control input or communication.

The changeover method is enabled when brand number switching is selected using function F-51.

To change the brand number in EzCTS mode, set function F-51 to [0: Changeover by function]

Setting range: 0 to 3

0: Changeover by function

The brand number can be changed by the function F-52 setting.

To change the brand number using standard RS485, RS-232C and RS-422/485, use communication command [@007052].

For details of communication commands, refer to Chapter 18.3.12.

1: Changeover by external control input

Brand number changeover can only be enabled using external control input. If changeover by external control input is selected, refer to Chapter 10.14.

2: Changeover by communication

This enables brand number changeover using communication command [@0069].

For details of communication commands, refer to Chapter 18.3.12.

The default is [Changeover by key operation].

10.12.2 Brand number

The brand number enabled by measurement control is selected using function F-52.

Brand numbers 0 to 7 can be selected.

Default is set to [Brand No. 0].

10.13 F key settings

F key operation is selected by function F-55.

Setting range: 0 to 9

0:	OFF	No setting
1:	Print	Inputs the print signal
2:	Hold	Inputs the hold signal
3:	Inflow start	Inputs the inflow start signal
4:	Emergency stop	Inputs the emergency stop signal
5:	Zero clear	After zero set and zero tracking are executed, the display returns to its former status.

6:	Tare weight clear	Executes tare weight cancellation
7:	Accumulation clear	Clears the accumulation value and accumulation times
8:	Weighing comparison	Switches to check setting mode
9:	Forced inflow finish	Force-finishes weighing operation

10.14 External control I/O settings

Set the external control I/O. The I/O connecter is mounted on the rear panel of the device.

10.14.1 External control input setting method

The external control input operation is selected by functions F-60 to F68.

Setting range: 00 to 23

0: OFF	No setting
1: ON/OFF key	The same operation as the ON/OFF key
2: Setting key	The same operation as the setting key
3: Accumulation key	The same operation as the accumulation key
4: Preset tare weight key	The same operation as the preset tare weight key
5: Tare weight key	The same operation as the tare weight key
6: Gross/Net key	The same operation as the gross/net key
7: Zero key	The same operation as the zero key
8: F key	The same operation as the F key
9: Zero clear	After zero set and zero tracking are executed, the display returns to its former status.
10: Tare weight clear	After tare weight cancellation is executed, the display returns to its former status.
11: Inflow start	Inputs the inflow start signal
12: Discharge start	Inputs the discharge inflow signal
13: Inflow and discharge changeover	Switches the weighing mode between inflow and discharge (ON: Discharge; OFF: Inflow)
14: Clears the last accumulated data	Clears the last accumulated data
15: Accumulation clear	Clears the accumulation value and accumulation times
16: Error cancellation	Cancels the error
17: Print	Inputs the print signal
18: Hold	Inputs the hold signal
19: Emergency stop	Inputs the emergency signal
20: Manual overshoot compensation	Execute overshoot compensation
21: Net weight display	Displays changes to load display net weight

22: Force-finishes weighing operation	Inputs the signal to force-finish weighing operation
23: Force-finish flow	Inputs the signal to force-finish flow
24: Accumulation clear	Clears the accumulation value and the accumulation times of all brands
25: Brand 1	Inputs brand number using BCD code
26: Brand 2	Inputs brand number using BCD code
27: Brand 4	Inputs brand number using BCD code

The default is [OFF].

The following level input items are enabled with a bridge input of 50 ms or more.

- [13: Inflow and discharge changeover]
- [18: Hold]
- [21: Net weight display]

Other items are effective a pulse input of 50 ms or more.

10.14.2 External control output setting method

The external control output operation is selected by functions F-70 to F82.

Setting range: 00 to 22

0: OFF	No setting
1: STABLE	Output when stable
2: DURING TARE WEIGHT	Output during tare weight cancellation
3: GROSS WEIGHT DISPLAY	Output when gross weight is displayed
4: NET WEIGHT DISPLAY	Output when net weight is displayed
5: CENTER OF ZERO	Output in the zero point state
6: DURING HOLD	Output when hold is applied
7: ERROR	Output when an error occurs
8: ABNORMAL WEIGHT	Output when display is OL
9: WEIGHING Sequence	Output when a sequence error occurs
10: NEAR ZERO	Output in near zero state.
11: OK/S0	Lights when the judgment condition is OK in sequential mode Lights when S0 output signal is ON in check mode 1 or 2
12: F. (Coarse) FLOW/S1	Lights when coarse flow output signal is [ON] in sequential mode Lights when S1 output signal is[ON]in check mode 1 or 2
13: M. (Middle) FLOW/S2	Lights when middle flow output signal is [ON]in sequential mode Lights when S2 output signal is [ON]in check mode 1 or 2

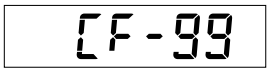
14: D. (Fine) FLOW/S3	Lights when fine flow output signal is [ON]in sequential mode Lights when S3 output signal is [ON]in check mode 1 or 2
15: OVER/S4	Lights when the judgment condition is over in sequential mode Lights when S4 output signal is [ON]in check mode 1 or 2
16: UNDER	Lights when the judgment condition is under in sequential mode
17: FULL	Lights when the judgment condition is full in sequential mode
18: During weighing	Output during weighing
19: INFLOW FINISH	Output on finishing weighing
20: DISCHARGE (GATE OPEN)	Output during discharge
21: DISCHARGE FINISH	Output on finishing discharge
22: RUN	Output in weighing mode

The default is [OFF].

10.15 Memory clear

Memory clear is executed by function F-99.

The function setting returns to the default setting.



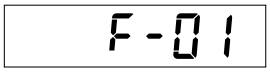
[CF-99]

[F.CLR]

1. If the [F] key is pressed with[CF-99] displayed, [LNR.CLR] blinks.
2. Press the [ON-OFF] key to discontinue memory clear.
   ▷ The display returns to stand-by mode, and digital linearization is not clear.is not executed.


Stand-by condition

[F.CLR]



[F-01]

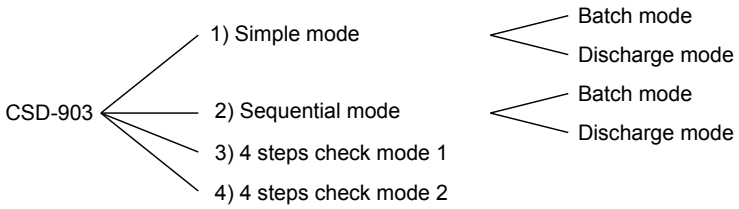
3. When [F.CLR] is blinking, press the [F] key to turn off the display and switch to [F-01] display. Memory clear is complete.

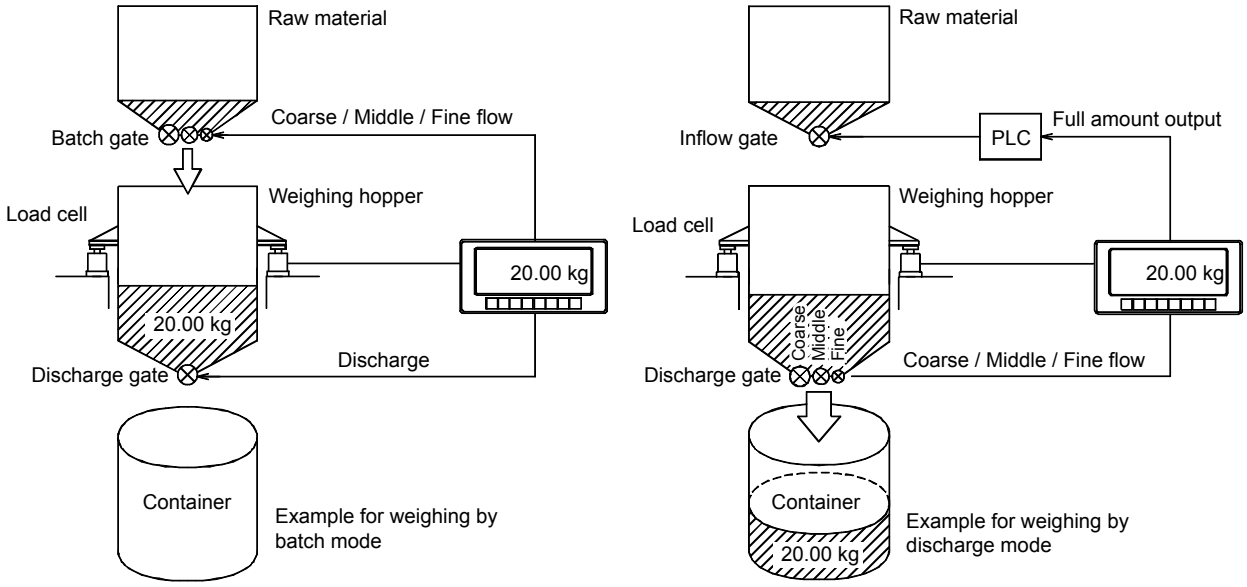
Note:

Do not clear the memory during weighing as it can result in malfunction.

11 Weighing mode

CSD-903 has four weighing modes. Refer to Chapter 11.1 for details on settings.
Set each weighing comparison value, refer to Chapter 11.2.
Furthermore, there are two control modes, [Simple mode], [Sequential mode].
Each includes an [Batching mode] and a [Discharge mode].





Note:

Control the supply of raw material to the weighing hopper while observing full 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 11.3.

- **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 11.4.

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

- **4-steps check mode 1**

  Compares a set value with the weighed value and outputs the comparative result.

  With 4-steps check mode 1, output turns ON or OFF depending on the [Under] or [Over] status after comparison of set value 1 with the weighed value.

  For more information refer to Chapter 11.5.

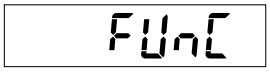
- **4-steps check mode 2**

  With 4-steps check mode 2, weighed values can be sorted because the output turns on when a weighed value is within two set points.

  For more information refer to Chapter 11.6.

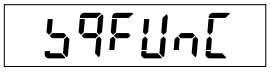
11.1 Weighing mode setting method

Weighing mode



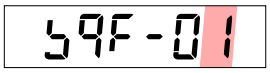
[FUNC.]

1. Change from normal weighing mode to the [FUNC] display by the [SET] key.

   [SQFUNC]

2. Press the [NET-GROSS WEIGHT] key to display [SQFUNC] and switch to SQ function mode.

   [SQF-01]

3. Press the [F] key[to display SQF-01].

   Select the SQ function number to be changed.

   [TARE WEIGHT] [NET-GROSS WEIGHT]: Adjust the value of the digit to be changed.

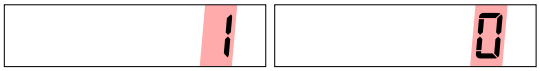
   [ACCUM] [PRESET TARE WEIGHT]: The changed digit is selected.

   [ZERO]: The displayed value changes to [0].

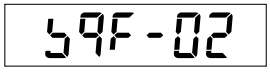
   [SET]: The display returns to [SQFUNC].

   [F]: The displayed value is saved. Proceed to the next step.

   [ON-OFF]: Quit SQ function mode without changing other settings.

4. Press the [F] key. Set the value of the selected [SQF-01].



[SQF-02]

5. Press the [F] key. The setting is registered. The following registered SQ function number is displayed.

   Select another SQ function number and repeat this procedure.

[SQFUNC]

6. Press the [SET] key after registration is complete to switch to the [SQFUNC] display.

   Press the [SET] key to switch to weighing mode.

   ▼ Weighing mode

Do not change in the setting during weighing because the A/D sampling rate decreases temporarily while rewriting the set value.

11.2 Setting mode

Set the value at which each weighing operation is executed in setting mode.

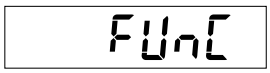
Setting vary with selected weighing mode.

11.2.1 Weighing comparison value 1 setting mode

Set the weighing comparison value for simple mode and sequential mode.

11.2.1.1 Setting method for weighing comparison value 1 setting mode

Weighing mode

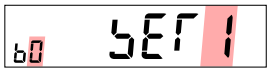


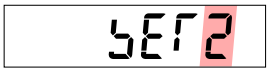
[FUNC.]

1. Change from normal weighing mode to the [FUNC] display by the [SET] key.

[COMP]

2. [COMP] is displayed after pressing the key [NET-GROSS WEIGHT] key twice to switch to weighing comparison value 1 setting mode.



[SET1],


[SET2]

3. Press the [F] key[to display SET1].

   The display corresponding to SET1 to SET8 and B0 to B7 blinks.

   [TARE WEIGHT] [NET-GROSS WEIGHT]: Adjust the value of the digit to be changed.

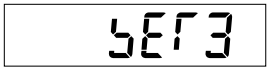
   [ACCUM] [PRESET TARE WEIGHT]: The changed digit is selected.

   [SET]: The display returns to [COMP].

   [F]: The displayed value is saved. Proceed to the next step.

4. Press the [F] key. Set the selected comparison value.

   The display corresponding to SET1 to SET8 blinks.



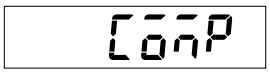
[SET3]

5. Press the [F] key. The setting is registered. The following registered weighing comparison value is displayed.

   Select the next weighing comparison value and follow the same procedure to continue.

6. Press the [SET] key after registration is complete to switch to the [SQFUNC] display.

   Press the [SET] key to switch to weighing mode.



[COMP]

▼ Weighing mode

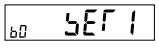
Note:

Do not change in the setting during weighing because the A/D sampling rate decreases temporarily while rewriting the set value. Please set the storage destination to Internal ROM to change the setting during weighing.

11.2.1.2 Weighing comparison value 1 data function

Item	Set data no.	Set value	Contents
FINAL	SET1	000000 to 999999 000000*	Unit: 1 D
FREEFALL (Overshoot)	SET2	–999999 to 999999 000000*	Unit: 1 D
PRELIMINARY 1	SET3	000000 to 999999 000000*	Unit: 1 D
PRELIMINARY 2	SET4	000000 to 999999 000000*	Unit: 1 D
OVER	SET5	000000 to 999999 000000*	Unit: 1 D
UNDER	SET6	000000 to 999999 000000*	Unit: 1 D
ZERO BAND	SET7	000000 to 999999 000000*	Unit: 1 D
FULL	SET8	000000 to 999999 000000*	Unit: 1 D

* Set as default

Brand number	Set the brand number. The brand number can be changed by pressing the [ACCUM] key or the [PRESET TARE WEIGHT] key when  is displayed. Setting range: 0 to 7; Unit: 1 D The default is [0].
FINAL	Sets the measurement target value Setting range: 000000 to 999999; Unit: 1 D The default is [000000].
FREEFALL (Overshoot)	Sets the overshoot target value Setting range: –999999 to 999999; Unit: 1 D The default is [000000]. In simple mode, D. (Fine) FLOW output is ON when the value of [FINAL (SET1) – F.FALL (Overshoot) (SET2)]is obtained; in sequential mode the D. (Fine) FLOW is OFF when the value of D. (Fine) FLOW is reached. When[FINAL ≤ F.FALL (Overshoot)], SQ.ERR 3 occurs when the start signal is input.
PRELIMINARY 1	Set the value of PRELIMINARY 1. Setting range: 000000 to 999999; Unit: 1 D The default is [000000]. In sequential mode, M. (Middle) FLOW output is ON when the value of [FINAL (SET1) – PRELIM 1(SET3)]is obtained; in simple mode the D. (Fine) FLOW is OFF when the value of M. (Middle) FLOW is reached. When the start signal is input and [FINAL ≤ F.FALL (Overshoot)], SQ.ERR 3 occurs. If one before ≥ 1 or the head is measured before the setting, weighing fixed quantity ≤ PRELIM1.
PRELIMINARY 2	Set the value of PRELIMINARY 2. Setting range: 000000 to 999999; Unit: 1 D The default is [000000]. In sequential mode, F. (Coarse) FLOW output is ON when the value of [FINAL (SET1) – PRELIM 2(SET4)]is obtained; in simple mode the F. (Coarse) FLOW is OFF when the value of [FINAL(SET1) – PRELIM 2(SET4)] is reached. When [FINAL ≥ PRELIM 2], [PRELIM 1 ≥ PRELIM 2] or [F. (Coarse) FLOW ≤ PRELIM 2], SQ.ERR 3 occurs when start signal is input.
OVER	Set the value of OVER. Setting range: 00000 to 99999; Unit: 1 D The default is [00000]. When weighing result [FINAL (SET1) + OVER (SET5)] is exceeded, over output turns on.
UNDER	Set the value of UNDER. Setting range: 00000 to 99999; Unit: 1 D The default is [00000]. When weighing result [FINAL (SET1) – OVER (SET6)] is exceeded, under output turns on.

ZERO BAND	Set the value of Near zero. Setting range: 00000 to 99999; Unit: 1 D The default is [00000]. When the weighing result is less than [FINAL (SET1) – OVER (SET5)], under output turns on.
FULL	Set the value of FULL. Setting range: 000000 to 999999; Unit: 1 D The default is [000000]. When the Gross weight or the Net weight exceeds the Full value, FULL output turns ON.

Note:

Set the storage destination to Internal RAM when the set value is continuously changed and the number of EEPROM rewrites might exceed 1 000 000.

11.2.2 Weighing comparison value 2 setting mode

The weighing comparison value used in the four steps of check modes 1 and 2.

11.2.2.1 Setting method for weighing comparison value 2 setting mode

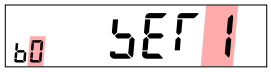
Weighing mode

[FUNC.]

1. Change from normal weighing mode to the [FUNC] display by the [SET] key.

[COMP]

2. [COMP] is displayed after pressing the key [NET-GROSS WEIGHT] key twice to switch to weighing comparison value 2 setting mode.



[B0] [SET1],


[S2]

3. Press the [F] key[to display SET1].

   The display corresponding to S1 to S8 and B0 to B7 blinks.

   [TARE WEIGHT] [NET-GROSS WEIGHT]: Adjust the value of the digit to be changed.

   [ACCUM] [PRESET TARE WEIGHT]: The changed digit is selected.

   [SET]: The display returns to [COMP].

   [F]: The displayed value is saved. Proceed to the next step.

4. Press the [F] key. Set the selected comparison value.

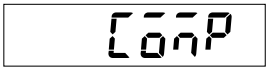
[S3]

5. Press the [F] key. The setting is registered. The following registered weighing comparison value is displayed.

   Select the next weighing comparison value and follow the same procedure to continue.

6. Press the [SET] key after registration is complete to switch to the [SQFUNC] display.

   Press the [SET] key to switch to weighing mode.

    [COMP]

   ▼ Weighing mode

Note:

Do not change in the setting during weighing because the A/D sampling rate decreases temporarily while rewriting the set value. Please set the storage destination to Internal ROM to change the setting during weighing.

11.2.2.2 Weighing comparison value 2 data function

Item	Set data no.	Set value	Contents
S1	S1	–999999 to 999999 000000*	Unit: 1 D
S2	S2	–999999 to 999999 000000*	Unit: 1 D
S3	S3	–999999 to 999999 000000*	Unit: 1 D
S4	S4	–999999 to 999999 000000*	Unit: 1 D
Near zero	SET7	000000 to 999999 000000*	Unit: 1 D
FULL	SET8	000000 to 999999 000000*	Unit: 1 D

* Set as default

Brand number	Set the brand number. The brand number can be changed by pressing the [ACCUM] key or the [PRESET TARE WEIGHT] key when  is displayed. Setting range: 0 to 7; Unit: 1 D The default is [0].
S1 to S4	Set the check value Setting range: –999999 to 999999; Unit: 1 D The default is [000000]. Refer to Chapter 11.6.1 and 11.6.2.

Near zero (ZERO BAND)	Sets the value to output the near zero signal. Setting range: 000000 to 999999; Unit: 1 D The default is [000000]. When the weighing result is less than (fixed value – over), under output turns on.
FULL	Set the value of FULL. Setting range: 000000 to 999999; Unit: 1 D The default is [000000]. When the Gross weight or the Net weight exceeds the Full value, FULL output turns ON.

Note:

Set the storage destination to Internal RAM when the set value is continuously changed and the number of EEPROM rewrites might exceed 1 000 000.

11.3 Simple mode

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

To set simple mode, refer to Chapter 11.7.2.

To set batching mode and discharge mode, refer to Chapter 11.7.2.

11.3.1 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.

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) – 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

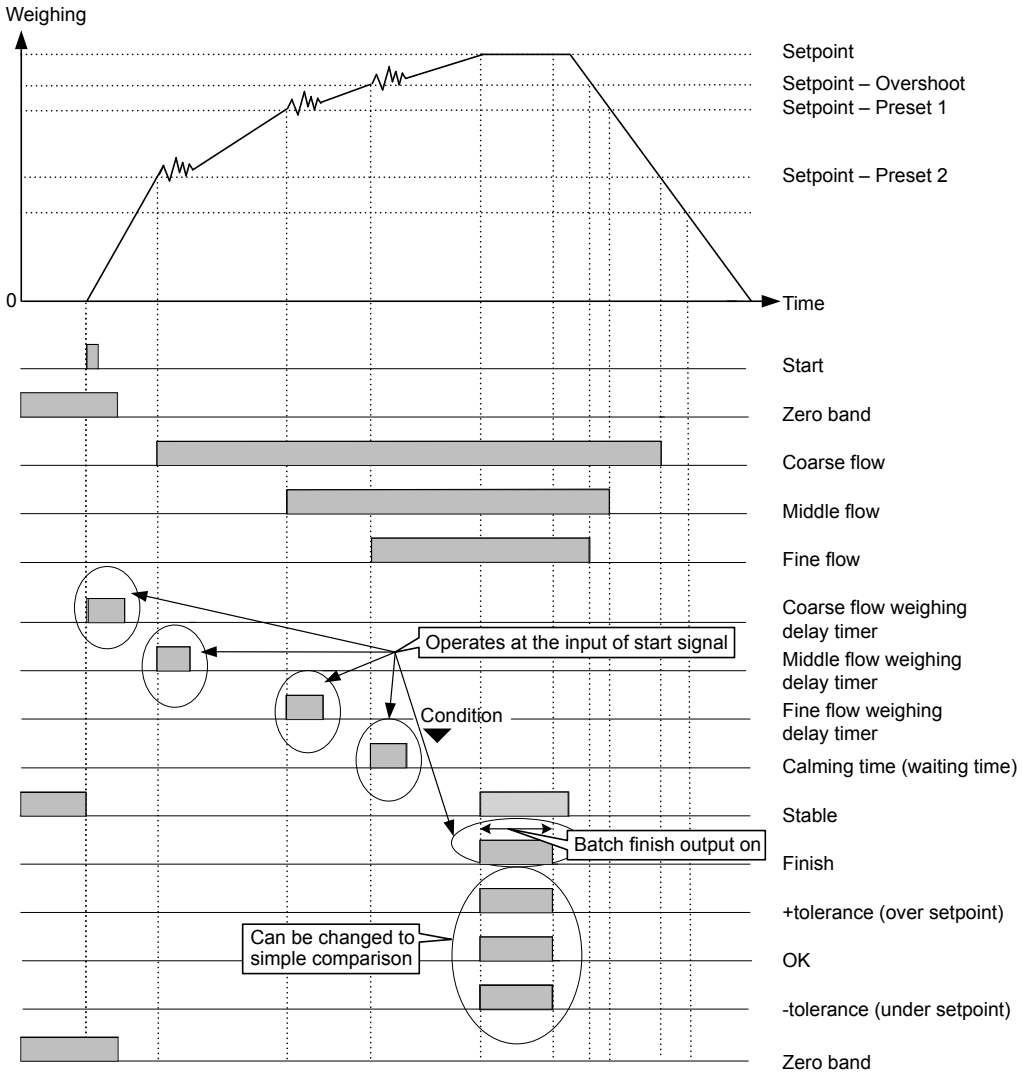
- When –net weight reaches [Final value – Prelim 2] Coarse flow turns ON. When the start signal is input, the comparison from Coarse inflow, Middle inflow and Fine inflow is prohibited during the Middle flow comparison.
- When the –net weight reaches[Final value – Prelim 1] Middle flow turns ON. When 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.
- Output for each comparison is synchronized with A/D sampling.



11.3.2 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
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) – 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)]

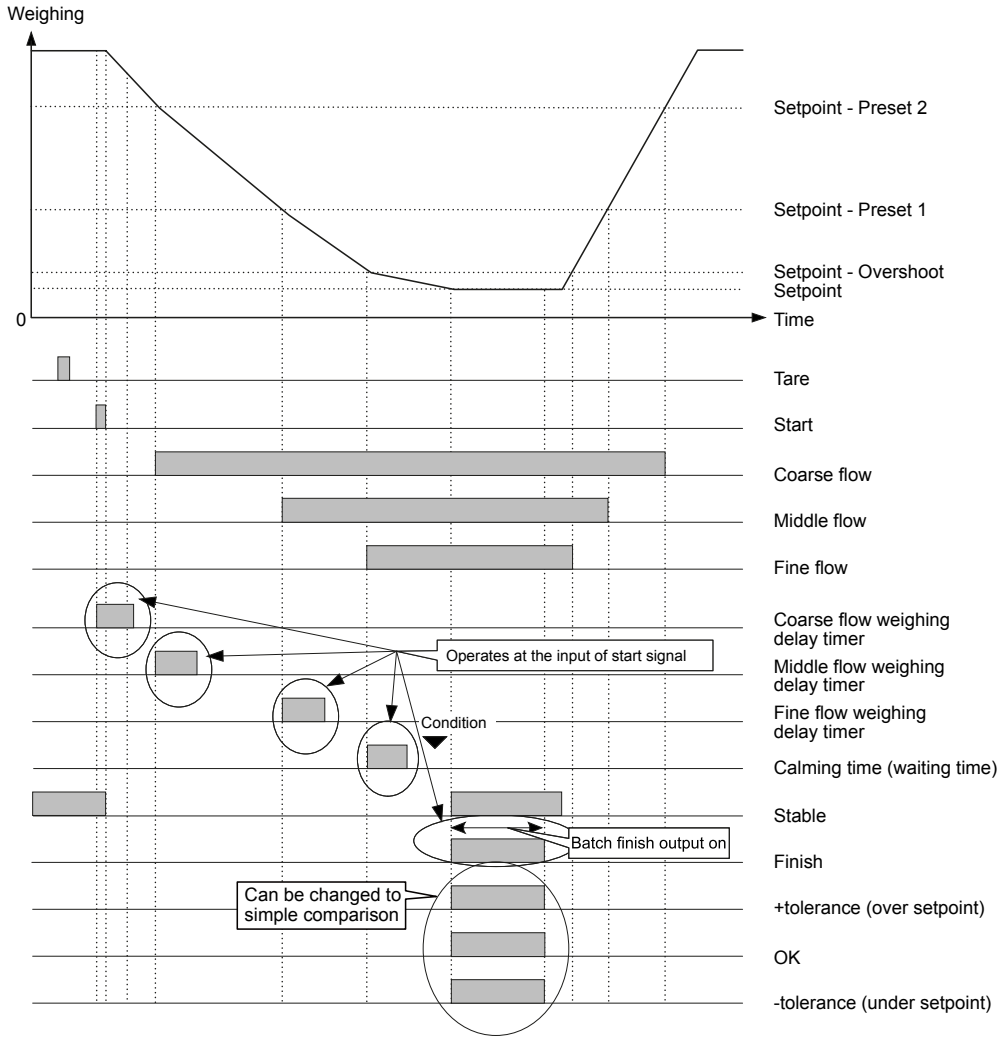
Operating explanations

- 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.
- Output for each comparison is synchronized with A/D sampling.



11.4 Sequential mode

Sequential mode includes sequential batch mode and sequential discharge mode.

Supplementary inflow, initial batching, nozzle batching and automatic overshoot compensation can be set if necessary.

11.4.1 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)]

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.

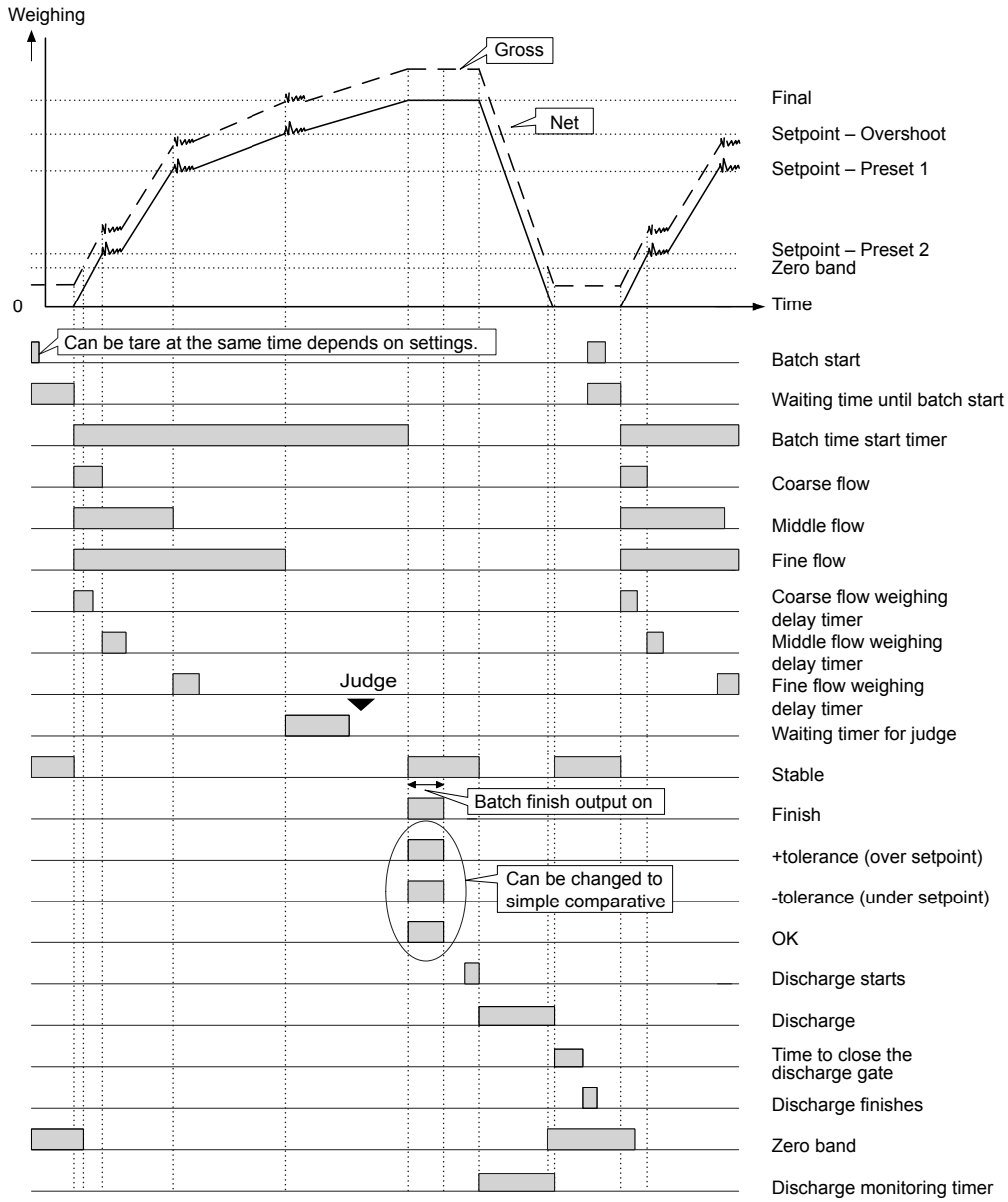
  Tare weight cancellation can be set to start at the same time as the start signal.
- When the net weight reaches [Final value – Prelim 2], Coarse flow turns OFF.
- When the net weight reaches [Final value – Prelim 1], Middle flow turns OFF.
- When the net weight reaches [Final value – Overshoot], Fine flow turns OFF.
  - 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 12.

Note:

Output for each comparison is synchronized with A/D sampling.



11.4.2 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.

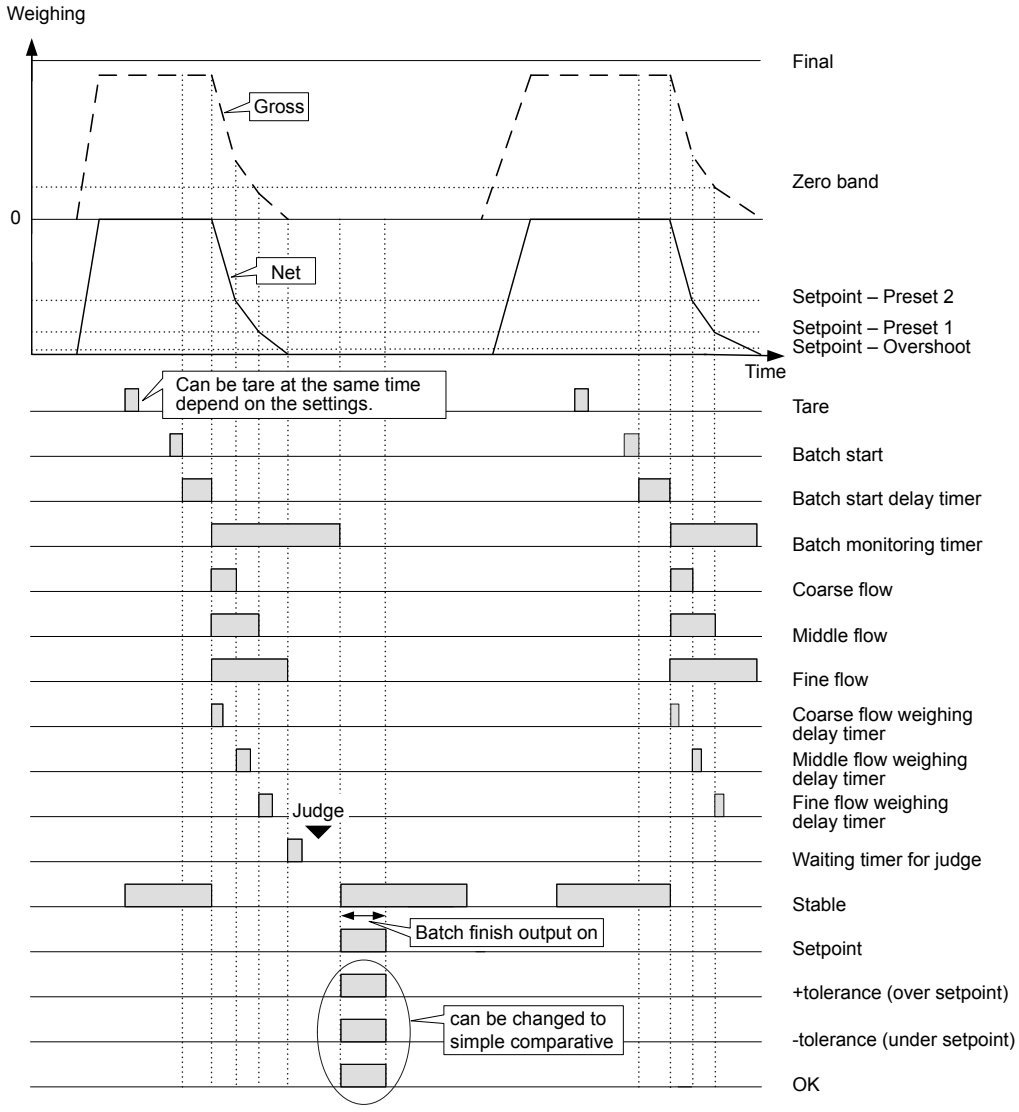
  Tare weight cancellation can be set to start at the same time as the start signal.
- When the net weight reaches [Final value – Prelim 2], Coarse flow turns OFF.
- When net weight reaches [Final value – Prelim 1], Middle flow turns OFF.
- When the net weight reaches [Final value – Overshoot], Fine flow 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 12.

Note:

Output for each comparison is synchronized with A/D sampling.



11.4.3 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 12.

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.

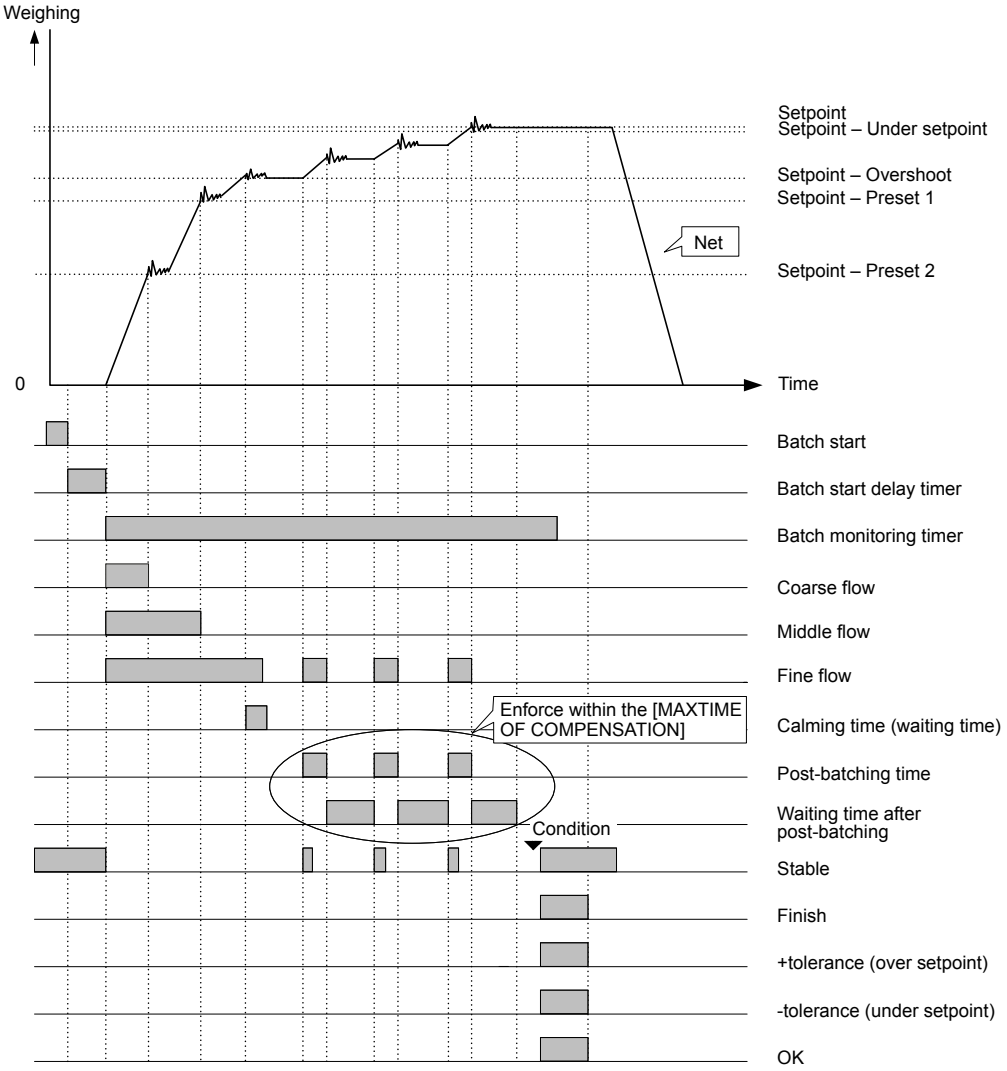
  Tare weight cancellation can be set to start at the same time as the start signal.
- When the net weight reaches [Final value – Prelim 2], Coarse flow turns OFF.
- When the net weight reaches [Final value – Prelim 1], Middle flow turns OFF.
- When the net weight reaches [Final value – Overshoot], Fine 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 12.

Note:

Output for each comparison is synchronized with A/D sampling.



11.4.4 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 12.

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:

Output for each comparison is synchronized with A/D sampling.

11.5 4-steps check mode 1

In 4-steps check mode 1, up to four comparison values and weighed values can be compared the results output.

Set function SQF-01 to [2] to use this mode.

The setting of each brand number for 4-steps check mode can be set by F-20.

Setting brand comparison targets (Targeted functions from F21 to F26)

Note:

Output for each comparison is synchronized with A/D sampling.

11.5.1 S1, S2, S3 and S4 comparison operation

Operating conditions for check modes for S1, S2, S3 and S4 can be selected from [Set value or more] and [Set value or less].

Select in function mode (F-22).

The default for S1, S2, S3 and S4 is [Set value or more].

Note:

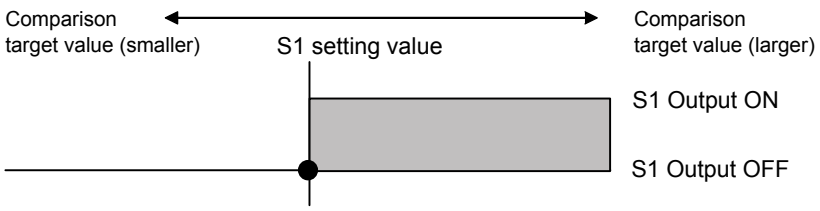
- The ON/OFF status for each output may differ depending on selection. If an inappropriate mode is selected, the ON/OFF status may be incorrect, leading to malfunction of peripheral instruments.
- The set points of S1, S2, S3, and S4 are shared between 4-steps check mode 1 and 4-steps check mode 2.

Operation at the comparison value for every comparison target and output operation in the case of S1 are shown below.

The same applies to S2, S3 and S4.

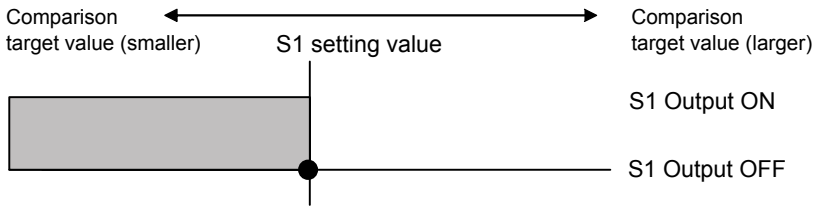
- [Set value or more] is selected.

  S1 output turns ON at S1 set value ≤ comparison value.



- [Set value or more] is selected.

  S1 output turns ON at S1 set value ≥ comparison value.



11.5.2 Comparison targets for S1, S2, S3 and S4 in check mode

The comparison targets for the check mode can be set individually for S1, S2, S3 and S4 to [Display interlock], [NET WEIGHT] or [GROSS WEIGHT].

Select in function mode (F-21).

The default for S1, S2, S3 and S4 is [Set value or more].

Note:

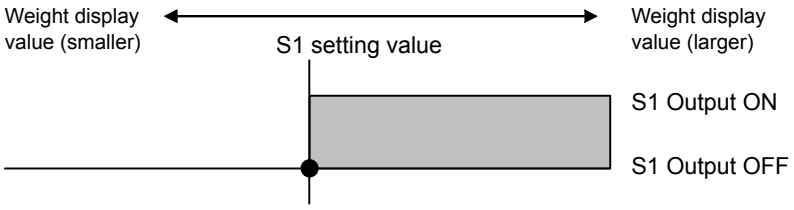
The ON/OFF status for each output may differ depending on selection. If an inappropriate mode is selected, the ON/OFF status may be incorrect, leading to malfunction of peripheral instruments.

Comparison value operation for every comparison target for S1 and output operation in the case of S1 are shown below.

The same applies to S2, S3 and S4.

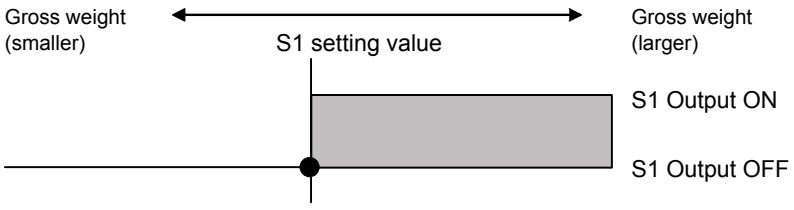
- [Display interlock] is selected

  S1 output turns ON at S1 set value ≤ load display value.



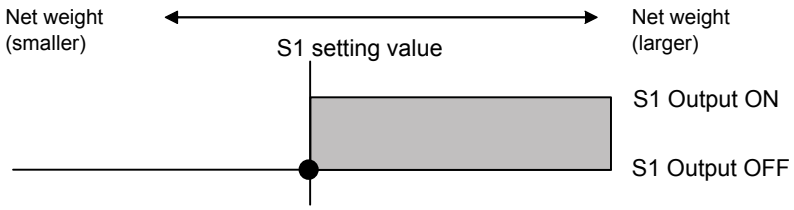
- [Gross weight] is selected.

  S1 output turns ON at S1 set value ≤ gross weight.



- [Net weight] is selected.

  S1 output turns ON at S1 set value ≤ net weight.



11.5.3 Operation of S0 in control mode

S0 can perform eight operations in this check mode.

Select in function mode (F-23).

The default is [Always off].

Note:

The ON/OFF status for each output may differ depending on selection. If an inappropriate mode is selected, the ON/OFF status may be incorrect, leading to malfunction of peripheral instruments.

S0 output operation is shown at the time F-23 setting.

Setting by F-23	Operation
0	Always OFF
1	Turns ON when S1 and S2 outputs are OFF
2	Turns ON when S1 and S3 outputs are OFF
3	Turns ON when S1 and S4 outputs are OFF
4	Turns ON when S2 and S3 outputs are OFF
5	Turns ON when S2 and S4 outputs are OFF
6	Turns ON when S3 and S4 outputs are OFF
7	Turns on when Gross weight ≥ Maximum load

Next, operation with S0 output set to [1] and F-23 from [1] to [6] is shown.

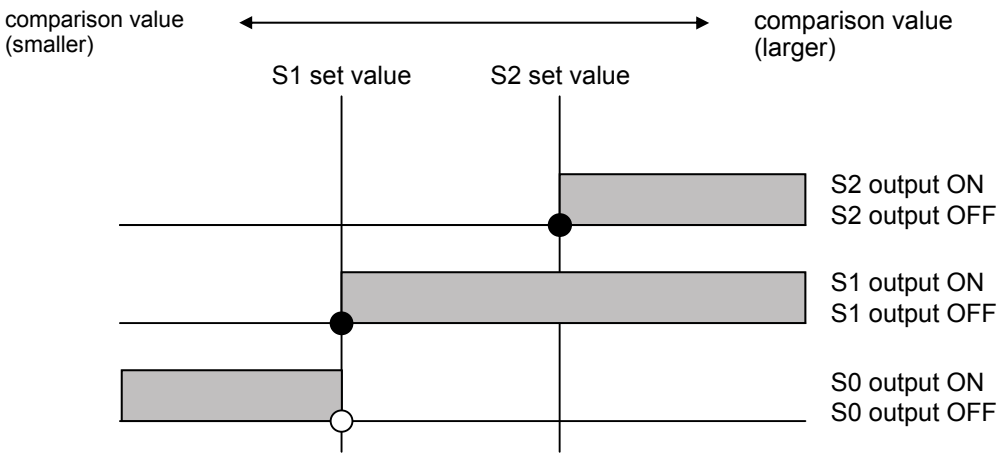
The same applies for [2] to [6] with F-23.

- When S1 and S2 are set to[Set value or more] with F-22

  S1 output turns ON when S1 set value ≤ comparison value.

  S2 output turns ON when S2 set value ≤ comparison value.

  S0 output turns ON when S1 set value > comparison value and S2 set value > comparison value.

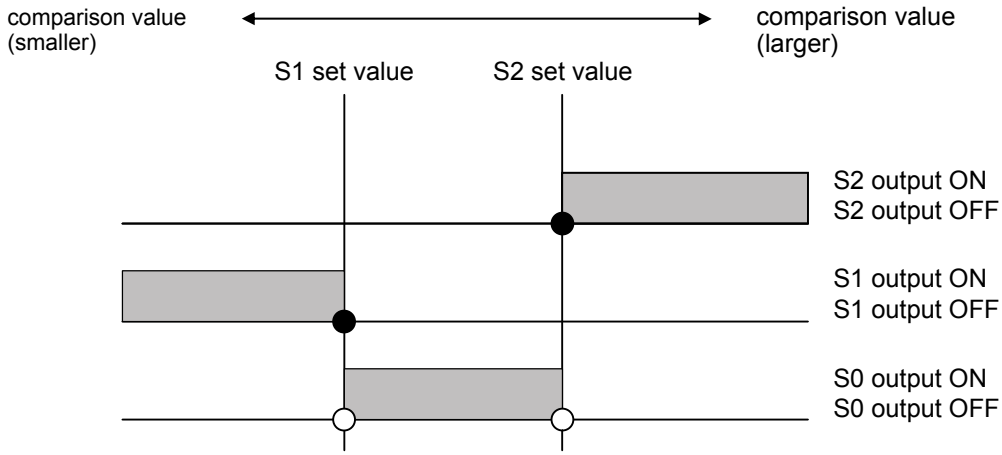


- When S1 is set to [Set value or less] and S2 to [Set value or more] with F-22

  S1 output turns ON when S1 set value ≥ comparison value.

  S2 output turns ON when S2 set value ≤ comparison value.

  S0 output turns ON when S1 set value > comparison value > S2 set value



Note:

Above figure shows the case where S1 set value < S2 set value.

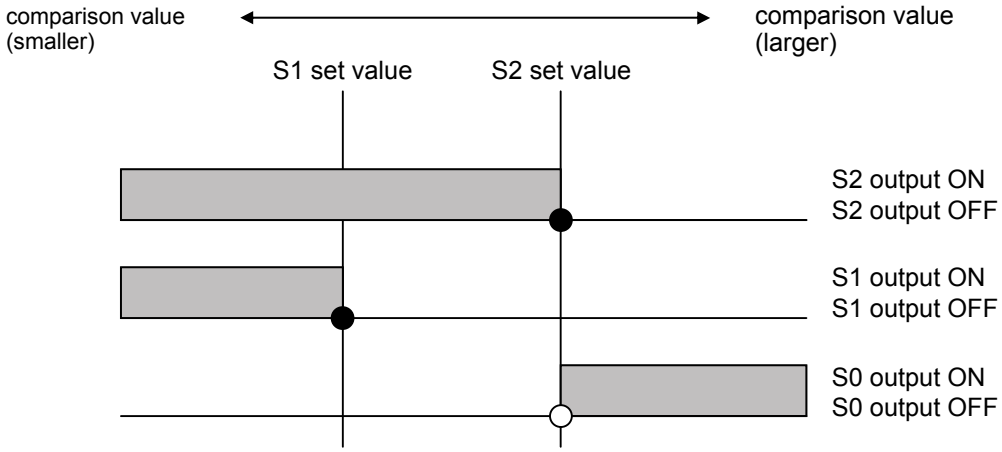
If S1 set value ≥ S2 set value, S0 output is always OFF.

- When S1 is set to [Set value or less] and S2 to [Set value or more] with F-22

  S1 output turns ON when S1 set value ≥ comparison value.

  S2 output turns ON when S2 set value ≤ comparison value.

  S0 output turns ON when S1 set value > comparison value > S2 set value



11.5.4 Hysteresis in check mode

S1, S2, S3 and S4 can be set to prevent output relay chattering.

Hysteresis can be used by combined data width and time width. Hysteresis direction can be selected from [OFF delay] and [ON delay].

Select in function mode. (F-24, F-25 and F-26 are related functions.)

The default is hysteresis [OFF].

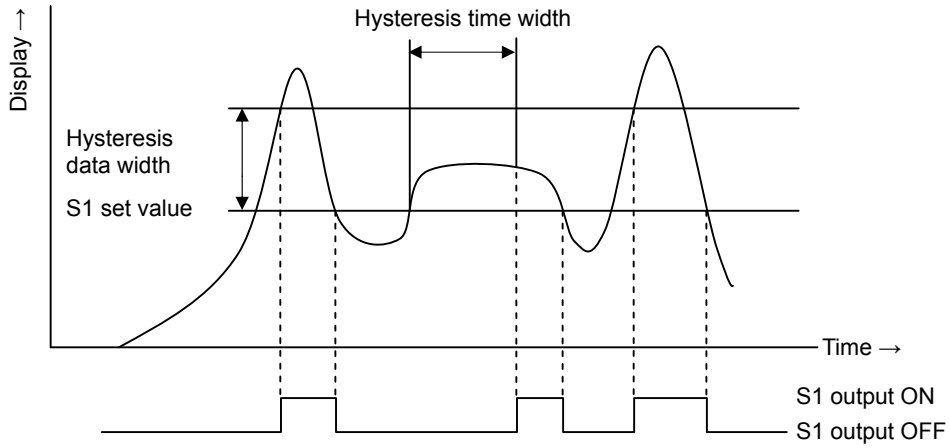
Note:

Output ON/OFF status may differ with hysteresis setting. If an inappropriate mode is selected, the ON/OFF status may be incorrect, leading to malfunction of peripheral instruments.

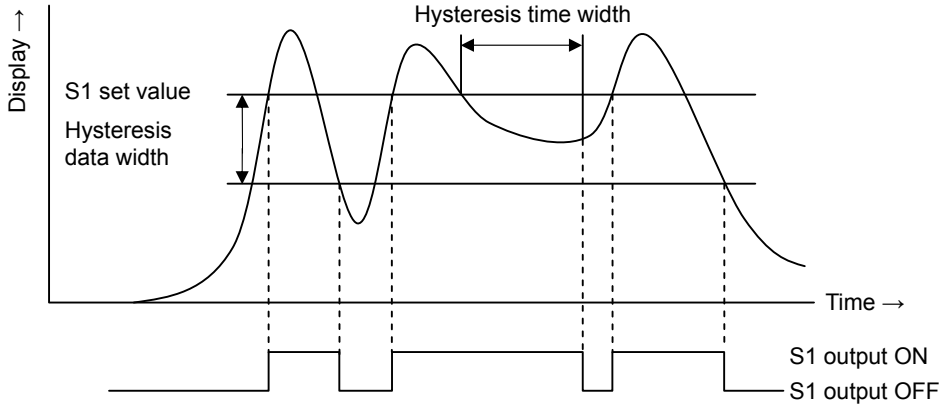
Operation at the judgment display section with hysteresis on in the case of S1 is shown below.

The same applies to [Normal mode] at S2, S3, S4 and S0:

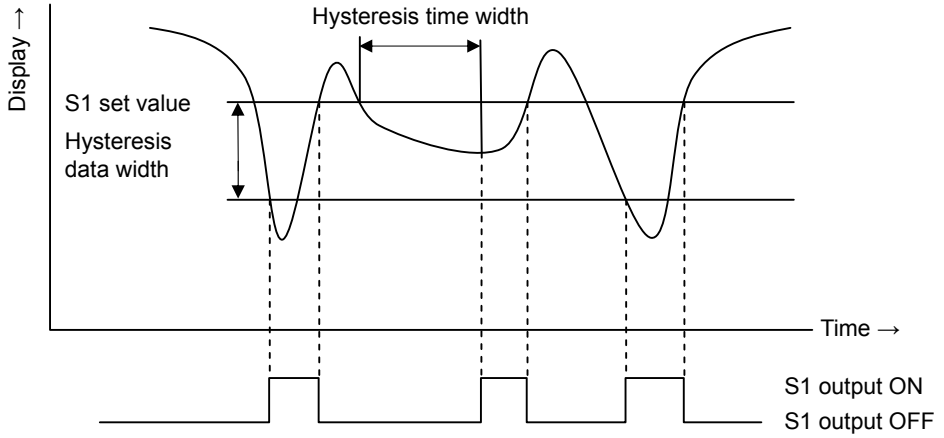
- When [Set value or more] is selected at S1 and hysteresis is set to[On delay]



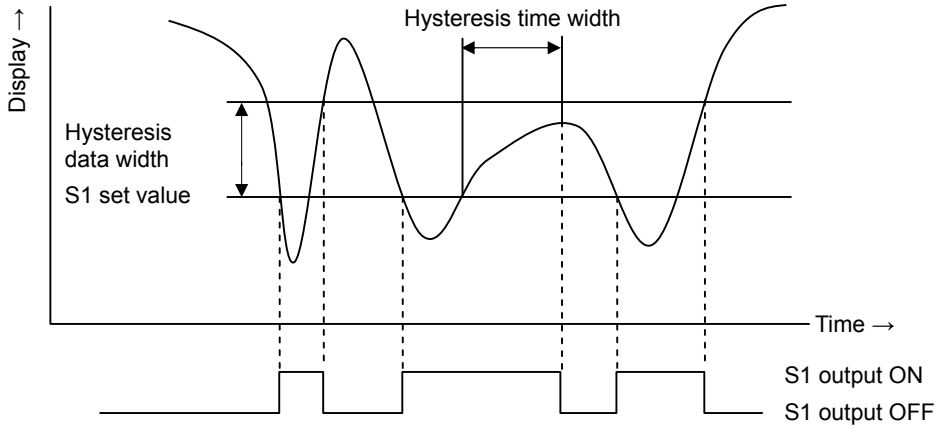
- When [Set value or more] is selected at S1 and hysteresis is set to[Off delay]



- When [Set value or more] is selected at S1 and hysteresis is set to[On delay]



- When [Set value or less] is selected at S1 and hysteresis is set to[Off delay]



11.6 4-steps check mode 2

When weighing in 4-steps check mode, comparison results from S0 to S4 are output when weighing value is within two set values after comparing the weighing value to the comparison value or less.

Set function SQF-01 to [3] to use this mode.

The setting of each brand number for 4-steps check mode can be set by F-20.

Setting brand comparison targets (Targeted functions from F21 to F26)

Note:

- The ON/OFF status for each output may differ depending on selection. If an inappropriate mode is selected, the ON/OFF status may be incorrect, leading to malfunction of peripheral instruments.
- The set points of S1, S2, S3, and S4 are shared between 4-steps check mode 1 and 4-steps check mode 2.
- Output for each comparison is synchronized with A/D sampling.

11.6.1 Comparison targets for S1, S2, S3 and S4 in check mode

The comparison targets for the check mode can be set individually for S1, S2, S3 and S4 to [Display interlock], [NET WEIGHT] or[GROSS WEIGHT]. Select in Function mode (F-21).

The default is [Display interlock] for S1, S2, S3 and S4.

11.6.2 S1, S2, S3 and S4 comparison operation

Operation of comparators S0, S1, S2, S3, and S4 in this mode are shown below.

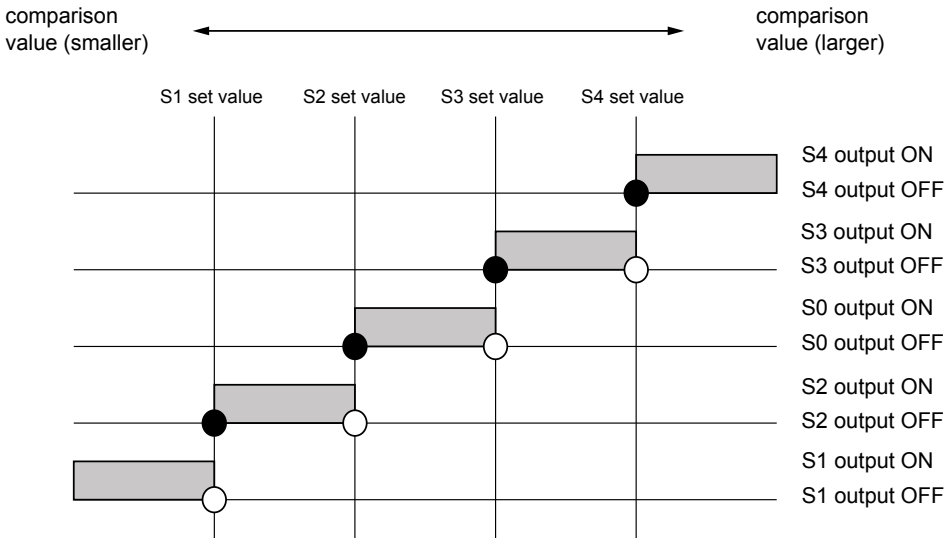
S1 output is ON provided that the comparison target value is less than the S1 set value.

S2 output turns ON when S1 set point ≤ comparison value < S2 set point.

S0 output turns ON when S2 set point ≤ comparison value < S3 set point.

S3 output turns ON when S3 set point ≤ comparison value < S4 set point.

S4 output turns ON when S4 set point ≤ comparison value < S4 set point.



11.6.3 Hysteresis in check mode

S1, S2, S3 and S4 can be set to prevent output relay chattering.

Hysteresis can be used by combined data width and time width. Hysteresis direction can be selected from [OFF delay] and[ON delay].

Select in function mode. (F-24, F-25 and F-26 are related functions.)

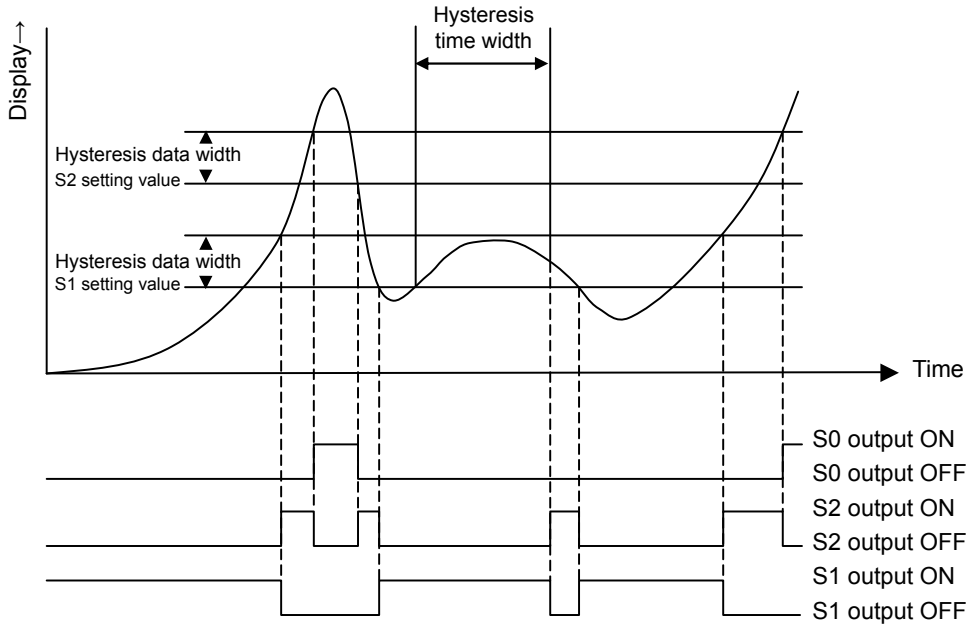
The default is hysteresis [OFF].

Note:

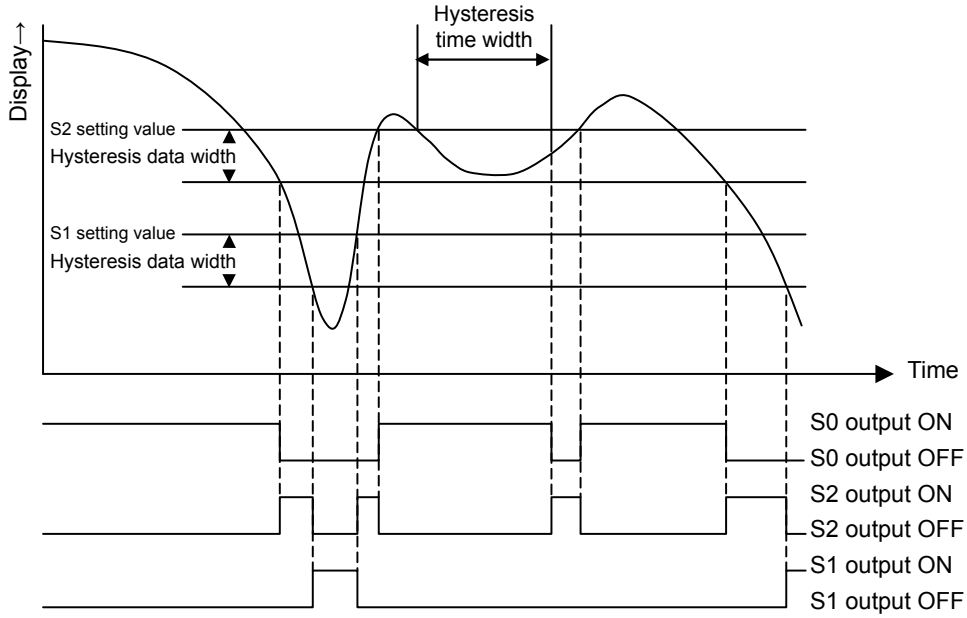
Output ON/OFF status may differ with hysteresis setting. If an inappropriate mode is selected, the ON/OFF status may be incorrect, leading to malfunction of peripheral instruments.

Operation at the judgment display section with hysteresis on in the case of S1 is shown below.

- When the hysteresis operation is set to [On delay]



- When the hysteresis operation is set to [Off delay]

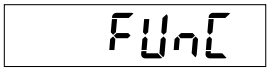


11.7 SQ function mode

Sets SQ function data to activate various functions related to sequence operation.

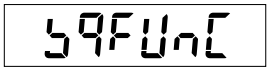
11.7.1 SQ function mode setting method

Weighing mode



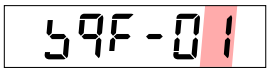
[FUNC.]

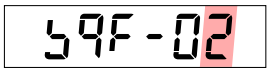
1. Change from normal weighing mode to the [FUNC] display by the [SET] key.



[SQFUNC]

2. Press the [NET-GROSS WEIGHT] key to display [SQFUNC] and switch to SQ function mode.



[SQF-01],


[SQF-02]

3. Press the [F] key[to display SQF-01].

   Select the SQ function number to be changed.

   [TARE WEIGHT] [NET-GROSS WEIGHT]: Adjust the value of the digit to be changed.

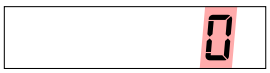
   [ACCUM] [PRESET TARE WEIGHT]: The changed digit is selected.

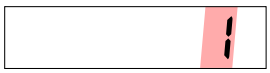
   [ZERO]: The displayed value changes to [0].

   [SET]: The display returns to [SQFUNC].

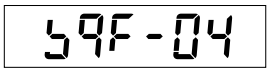
   [F]: The displayed value is saved. Proceed to the next step.

   [ON-OFF]: Quit SQ function mode without changing other settings.





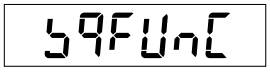
4. Press the [F]key. Set the value of the selected [SQF-01]function number.



[SQF-04]

5. Press the [F] key. The setting is registered. The following registered SQ function number is displayed.

   Select another SQ function number and repeat this procedure.



[SQFUNC]

6. Press the [SET] key after registration is complete to switch to the [SQFUNC] display.

   Press the [SET] key to switch to weighing mode.

   ▼ Weighing mode

Note:

Do not change in the setting during weighing because the A/D sampling rate decreases temporarily while rewriting the set value.

11.7.2 Function of SQ function data

Item	Function No.	Setting	Contents
Weighing mode	SQF-01	0	Simple mode
		1*	Sequential mode
		2	4-steps check mode 1
		3	4-steps check mode 2
Control mode	SQF-02	0*	Batch mode
		1	Discharge mode
		2	External input changeover
Comparison signal operation	SQF-05	0	Any time
		1	When stable
		2*	Synchronized with inflow finish
		3	Synchronized with inflow finish HOLD
Near zero comparison operation	SQF-06	0*	Gross weight
		1	Net weight
		2	OFF
		3	|Gross|
		4	|Net|
Full comparison operation	SQF-07	0*	Gross weight
		1	Net weight
		2	OFF
		3	|Gross|
		4	|Net|
Inflow Monitoring Timer	SQF-10	0000 to 9999 0000*	Unit: 1 s 0000: Inflow Monitoring Timer OFF
Start above Near Zero at the time of inflow start	SQF-15	0*	Invalid
		1	Effective
Automatic tare weight cancellation when inflow starts	SQF-16	0*	Invalid
		1	Effective
Inflow start delay timer	SQF-17	0000 to 9999 0000*	Unit: 1 s 0000: Inflow start delay timer OFF
Automatic tare weight after inflow start delay timer	SQF-18	0*	Invalid
		1	Effective
F. (Coarse) flow comparison stop timer	SQF-20	0000 to 9999 0000*	Unit: 0.01 s 0000: F. (Coarse) flow comparison stop timer OFF

Item	Function No.	Setting	Contents
M. (Middle) flow comparison stop timer	SQF-21	0000 to 9999 0000*	Unit: 0.01 s 0000: M. (Middle) flow comparison stop timer OFF
D. (Fine) flow comparison stop timer	SQF-22	0000 to 9999 0000*	Unit: 0.01 s 0000: D. (Fine) flow comparison stop timer OFF
Flow/Discharge brand setting target	SQF-24	0*	Brand No. 0
		1	Brand No. 1
		2	Brand No. 2
		3	Brand No. 3
		4	Brand No. 4
		5	Brand No. 5
		6	Brand No. 6
		7	Brand No. 7
Automatic overshoot compensation	SQF-25	0*	Invalid
		1	Effective
Automatic overshoot compensation activation width	SQF-26	00000 to 99999 00000*	Unit: 1 D 00000: Automatic overshoot compensation OFF
Save automatic overshoot value	SQF-27	0*	Invalid
		1	Effective
Judgment condition	SQF-30	0*	Judgment waiting time exceeded
		1	Judgment waiting time exceeded and stable condition
		2	Judgment waiting time exceeded or stable condition
Calming time (Waiting time)	SQF-31	0000 to 9999 0000*	Unit: 0.01 s 0000: Calming time OFF
Maximum time of post-batching	SQF-35	000 to 255 000*	Unit: 1 time 000: Post-batching OFF
Judgment condition after post-batching	SQF-36	0*	Judgment waiting time exceeded
		1	Judgment waiting time exceeded and stable condition
		2	Judgment waiting time exceeded or stable condition
Post-batching time	SQF-37	0000 to 9999 0000*	Unit: 0.01 s 0000: Post-batching OFF

Item	Function No.	Setting	Contents
Calming time after post-batching	SQF-38	0000 to 9999 0000*	Unit: 0.01 s 0000: Calming time after post-batching OFF
Output time for the inflow finish signal	SQF-40	0000 to 9999 0000*	Unit: 0.01 s 0000: Output time for inflow finish Signal OFF
Input finish output OFF	SQF-41	0*	No condition
		1	OL or unstable
		2	Near zero
Discharge start at inflow finish	SQF-45	0*	Invalid
		1	Effective
Discharge monitor timer	SQF-46	0000 to 9999 0000*	Unit: 1 s 0000: Discharge monitor OFF
Discharge gate close delay time	SQF-47	0000 to 9999 0000*	Unit: 0.01 s 0000: Discharge gate close delay time OFF
Discharge finish output time	SQF-48	0000 to 9999 0000*	Unit: 0.01 s 0000: Discharge finish output OFF
Tare weight cancellation clear at discharge finish	SQF-49	0*	Invalid
		1	Effective
Accumulation clear	SQF-98	Clears the accumulation value and the accumulation times of all brands	
Memory clear	SQF-99	SQ function settings will return to default	

* Default

12 Various SQ function data functions

12.1 Weighing mode

Weighing mode is selected by SQ function SQF-01.

Weighing mode can be selected from the [Simple comparison mode] (Simple mode), [Sequential mode], [4-steps comparator mode 1] (4-steps check mode 1) and [4-steps comparator mode 2] (4-steps check mode 2).

The default is [Sequential mode].

12.2 Control mode

Control mode can be selected by SQ function SQF-02.

Control mode can be selected from [Batch mode], [Discharge mode] and [External input changeover].

Select [External control changeover] to switch to [Batch mode] when the [BATCH/ DISCHARGE changeover] signal on the external control input is ON; Switch to [Discharge mode] when the [BATCH/DISCHARGE changeover] signal on the external control input is OFF.

The default is [Batch mode].

12.3 Comparison signal operation

The comparison signal operation condition of the is selected by SQ function SQF-05.

The comparison signal operation condition can be selected from [Any time], [In stable condition], [Synchronized with batch finish] and [HOLD at synchronizing with batch finish].

The default is [Synchronized with batch finish].

12.4 Near zero (ZERO BAND) comparison operation

The near zero signal operation condition is selected by SQ function SQF-06.

The near zero signal operation condition can be selected from [GROSS], [NET], [Comparison signal OFF] or [| GROSS | and | NET |].

The default is [GROSS WEIGHT].

12.5 Full comparison operation

The [FULL] signal operation condition is selected by SQ function SQF-07.

The [FULL] signal operation condition can be selected from [GROSS], [NET], [Comparison signal OFF], [| GROSS | and | NET|].

The default is [GROSS].

12.6 Batch Monitoring Timer

Sets the timer that monitors the time from start signal input to finish signal output by SQ function SQF-10.

Error occurs if the weighing time is longer than the set value.

Details of the error are as follows. When [CONTROL MODE] is set to [BATCH MODE], [SQERR 4] is displayed.

If [EXTERNAL] is selected, [SQERR 5] is displayed.

Setting range: 0000 to 9999; Unit: 1 s; 0000: OFF

The default is [0000]

12.7 Batch start time operation setting

12.7.1 Start above Near Zero at the time of batch start

Operation when input inflow start signal with weighing value exceeds [ZERO BAND] is selected by SQ function SQF-15.

When [Start above near zero at the time of batch start] is set to [Invalid] and the value exceeds [Near zero], error occurs and inflow does not start.

The default is [Invalid].

12.7.2 Automatic tare weight cancellation at batch start

Set the operation of automatic tare weight at batch start by SQ function SQF-16.

The default is [Invalid].

12.7.3 Batch start delay timer

Set the waiting time until the batch starts after the batch start signal is input, with SQ function SQF-17.

Setting range: 0000 to 9999; Unit: 1 s; 0000: OFF

The default is [0000]

12.7.4 Automatic tare weight after batch start delay timer

Set the operation of automatic tare weight cancellation after batch start delay timer by SQ function SQF-18.

The default is [Invalid].

12.8 F. (Coarse) flow comparison stop timer

Set the inhibition time for comparison between the setting value and weighing value for coarse flow at batch start.

Setting range: 0000 to 9999; Unit: 0.01s; 0000: OFF

The default is [0000].

12.9 M. (Middle) flow comparison stop timer

Set the inhibition time for comparison between the middle flow setting value and weighing value at middle flow finish.

Setting range: 0000 to 9999; Unit: 0.01s; 0000: OFF

The default is [0000].

12.10 D. (Fine) flow comparison stop timer

Set the inhibition time to compare the set value of D. (Fine) flow with the weighing value at M. (Middle) flow finish.

Setting range: 0000 to 9999; Unit: 0.01s; 0000: OFF

The default is [0000].

12.11 Flow/Discharge brand setting target

The Flow/discharge brand setting target is set by SQ function SQF-24.

SQF-26: SQF-37 Automatic overshoot compensation width; Post-batching time;

SQF-38: The calming time after post-batching can be set for each brand number selected as the flow/discharge brand setting target.

SQF-24: Flow/Discharge brand setting target setting is not save to the EEPROM. Returns to default when the power is turned off and back on again.

Setting range: 0 to 7

The default is [0].

12.12 Automatic overshoot correction

This function predicts the next overshoot based on former overshoot data and sets the overshoot value automatically during continuous weighing.

The next overshoot setting is based on the moving average value for data from 4 previous overshoots.

12.12.1 Automatic overshoot correction setting

Select the save automatic overshoot value by SQ function SQF-25.

The default is [Invalid].

12.12.2 Automatic overshoot correction width

Sets the width for automatic overshoot correction by SQ function SQF-26.

The width for automatic overshoot correction can be set for each brand number by SQF-24: Flow/discharge brand setting target.

Setting range: 00000 to 99999; Unit: 1 D; 00000: OFF

The default is [00000].

12.12.3 Save automatic overshoot value

Select the operation of save automatic overshoot value by SQ function SQF-27.

When save automatic overshoot value is set to[VALID], the value compensated by automatic overshoot correction is saved as the overshoot setting value (SET2).

The default is [Invalid].

12.13 Judgment condition

Sets the judgment condition for weighing finish by SQ function SQF-30.

The judgment condition at weighing finish can be selected from [Timer is up], [Stable and timer is up] and[Stable or timer is up].

The default is [Timer is up].

12.14 Calming time

Set the calming time after D. (Fine) flow finish by SQ function SQF-31.

Setting range: 0000 to 9999; Unit: 0.01s; 0000: OFF

The default is [0000].

12.15 Post-batching operation setting

Sets for the operation of post-batching.

12.15.1 Maximum time of post-batching

Set the maximum time for post-batching by S function SF-35.

Setting range: 000 to 255; Unit: 1 time; 000: OFF

The default is [000].

12.15.2 Judgment condition after post-batching

Set the judgment condition after post-batching by SQ function SF-36.

Judgment condition after post-batching can be selected from [Timer is up], [Stable and timer is up] and [Stable or timer is up].

The default is [Timer is up].

12.15.3 Post-batching time

The post-batching time is set by SQ function SQF-37.

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

Setting range: 0000 to 9999; Unit: 0.01s; 0000: Post-batching OFF

The default is [0000].

12.15.4 Calming time after post-batching

Set the calming time after post-batching by S function SF-38.

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

Setting range: 0000 to 9999; Unit: 0.01s; 0000: Post-batching OFF

The default is [0000].

12.16 Weighing finish output operation setting.

Sets the operation of weighing finish output.

12.16.1 Batch finish signal output time

Sets the batch finish output time by S function SF-40.

Setting range: 0000 to 9999; Unit: 0.01s; 0000: OFF

The default is [0000].

12.16.2 Batch finish output OFF

Set the condition for batch finish output to OFF by SQ function SQF-41.

The condition to set batch finish output to OFF can be selected from [No condition], [OL or unstable] and [Near zero].

When [No condition] is selected, the FINISH signal turns OFF when the [BATCH FINISH OUTPUT IN]time limit is reached or the next start signal is input.

When [OL or unstable] is selected, the FINISH signal turns OFF when the display switches to OL or –OL or when the stable signal output turns OFF.

When the [Near zero] is selected, the FINISH signal turns OFF when the near zero signal is output.

The default is [No condition].

12.17 Discharge operation setting after weighing finish

This sets the operation for discharge after weighing is finished.

12.17.1 Discharge start at weighing finish

Set the discharge operation to start when weighing finishes by SQ function SQF-45.

The default is [Invalid].

12.17.2 Discharge monitor timer

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

Setting range: 0000 to 9999; Unit: 1 s; 0000: OFF

The default is [0000].

12.17.3 Discharge gate close delay time

Set the time to gate closing when the weighing value fulfils the near zero condition by SQ function SQF-47.

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

Setting range: 0000 to 9999; Unit: 0.01s; 0000: OFF

The default is [0000].

12.17.4 Discharge finish output time

Set the output time for the discharge finish signal by SQ function SQF-48.

Setting range: 0000 to 9999; Unit: 0.01s; 0000: OFF

The default is [0000].

12.17.5 Tare weight cancellation at discharge finish

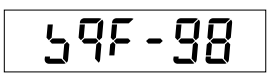
Set tare weight cancellation clear when discharge finishes by SQ function SQF-49.

The default is [Invalid].

12.18 Accumulation clear

C function clear is executed by S function CF-98.

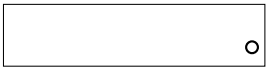
1. Clear the accumulation times and the accumulation value.



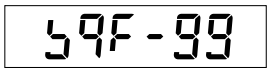
[SQF-98]

[ACCUCLR]

2. Press the [F] key to display[SQF-98]. [ACCUCLR] blinks.
3. Press the [ON-OFF] key to discontinue memory clear.
   ▷ The display switches to stand-by mode without clearing the memory.


Stand-by condition

[ACCUCLR]



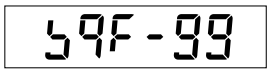
[SQF-99]

4. When [ACCUCLR] is blinking, press the [F] key to turn off the display and switch to [SQF-99] display. Memory clear is complete.

12.19 SQ function clear

SQ function clear is executed by SQ function F-99.

The SQ function setting returns to the default setting.



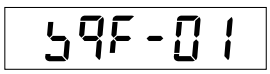
[SQF-99]

[SQF.CLR]

1. If the [F] key is pressed with [SQF-99] displayed, [SQF.CLR] blinks.
2. Press the [ON-OFF] key to discontinue memory clear.
   ▷ The display switches to stand-by mode without clearing the memory.


Stand-by condition

[SQF.CLR]



[SQF-01]

3. When [SQF.CLR]is blinking, press the [F] key to turn off the display and switch to [SQF-01] display. Memory clear is complete.

Note:

Do not clear the SQ function during weighing as it can result in malfunction.

13 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.

Moreover, RAM is backed up with the battery. The backup time is about ten years in the room temperature.

13.1 Data stored in internal RAM

- Tare weight cancellation data
- ZERO set data
- ZERO tracking data
- Preset tare weight cancellation data
- Accumulated value, Accumulated count data

13.2 Data stored in EEPROM

- Calibration data
- Function data
- C function data
- SQ function data
- Digital linearize data

13.3 Change the storage location for data

The storage target is selected by C function CF-17

The storage target can be selected from [RAM] and[EEPROM].

Storage locations are as follows.

[RAM] is the default.

- Weighing comparison value 1 setting data
- Weighing comparison value 2 setting data

Note:

- Set the storage destination to Internal RAM when the set value is continuously changed and the number of EEPROM rewrites might exceed 1 000 000.
- Do not change in the setting during weighing because the A/D sampling rate decreases temporarily while rewriting the set value.

  Set the storage destination to Internal RAM to facilitate changes setting values during weighing.

---

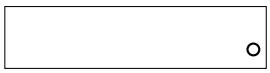
14 Check mode

In the check mode, the following confirmations can be made.

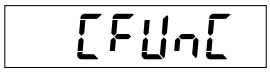
- EzCTS mode
- External control input operation
- Output voltage of the load cell
- Analog output (Option)
- ROM version
- External control output operation
- BCD output operation (Option)
- Confirmation of options

14.1 Check mode setting method

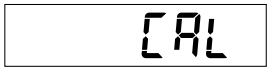
Weighing mode

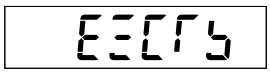

Stand-by condition

1. Set the condition from normal weighing mode to stand-by condition by pressing the [ON-OFF] key.


[CFUNC]

2. Press the [ON-OFF] key with the[SET] key. [CFUNC] is displayed.


[CAL]


[EZCTS]

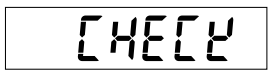
3. When the [F] key is pressed after the [NET-GROSS] key

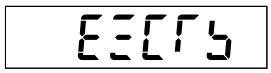
▷ The display switches to [EZCTS] and enters check mode.

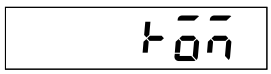
In check mode, if the any of the following are displayed the confirmation item can be switched using the [TARE WEIGHT] key or the [NET-GROSS WEIGHT] key.

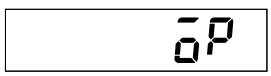
[TARE WEIGHT] [NET-GROSS WEIGHT]: Switching check mode items

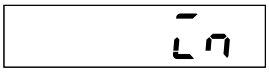
[ON-OFF]: Quit check mode

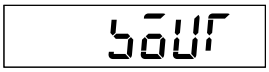

[CHECK] Check mode

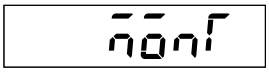

[EZCTS] ➡ refer to Chapter 14.2.

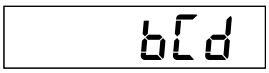

[ROM] ➡ refer to Chapter 14.3.

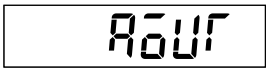

[OP] ➡ refer to Chapter 14.4.


[IN] ➡ refer to Chapter 14.5.

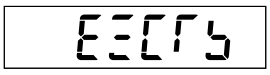

[SOUT] ➡ refer to Chapter 14.6.


[MONT] ➡ refer to Chapter 14.7.


[BCD] ➡ refer to Chapter 14.8 (if installed).


[AOUT] ➡ refer to Chapter 14.9 (if installed).

14.2 EzCTS mode


[EZCTS]

▶ The display blinks when the key is pressed.

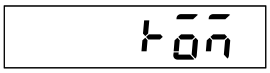

[EZCTS]

EzCTS can be used while the display is blinking.

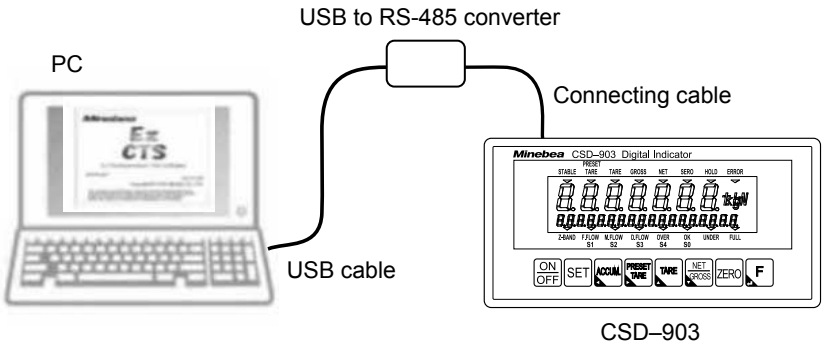
In communication with a PC, EzCTS can read and write function data.

In this case, the standard RS-485 interface is effective.

The process of reading and writing set data by a PC is carried out with optional installed EzCTS software in this mode.


[ROM]

▼ Confirmation of ROM version



EzCTS is a PC application.

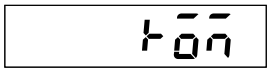
EzCTS can read and write function data more easily than CSD-903.

It is useful for maintenance and data back-up.

Note:

- In EzCTS mode, do not connect with applications other than EzCTS by the standard RS-485 line.
- Commands not used by EzCTS are not returned from CSD-903 in EzCTS mode.
- Only EzCTS communication functions in this mode.

14.3 Confirmation of ROM version


[ROM]

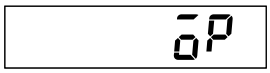

[V1.000]

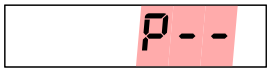
▶ When the [F] key is pressed from the[ROM] display, the ROM version blinks.


[OP]

▼ Confirmation of options

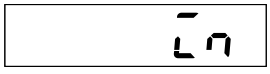
14.4 Confirmation of options


[OP]


[P - -]

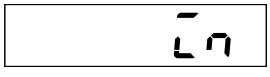
▶ When the [F] key is pressed from the[OP] display, the installed option blinks.

Display	Combination of optional products
P--	No output
P07	Current output
P25	Voltage output
P15	BCD output
P74	RS-232C interface
P76	RS-422/485 interface


[IN]

▼ Confirmation of external control input

14.5 Confirmation of external control input


[IN]

Confirmation by external input ON/OFF

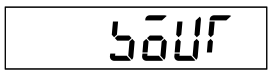
[IN]

▶ When the [F] key is pressed from the[IN] display, [IN] blinks.

The external control input signal ON/OFF status can be confirmed in the status display section.

The status display lights when each external control input connector input is turned on.

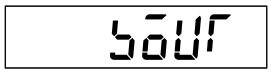
Pin No.	Condition
INPUT1	STABLE
INPUT2	PRESET TARE WEIGHT
INPUT3	TARE WEIGHT
INPUT4	GROSS WEIGHT
INPUT5	NET WEIGHT
INPUT6	ZERO
INPUT7	HOLD
INPUT8	ERROR
INPUT9	Z-BAND



[SOUT]

▼ Confirmation of contact output

14.6 Confirmation of external control output



[SOUT]

[SOUT]

▶ Press the [F] key on the[SOUT] display. The [SOUT] display blinks and the [Stable mark] lights. External control OUTPUT1 is output.

The position of the [▼] mark moves when the [TARE WEIGHT] key and the [NET-GROSS WEIGHT] key are operated. The corresponding external control output is turned on.

[TARE WEIGHT] [NET-GROSS WEIGHT]: Switching contact outputs

[ON-OFF]: Quit check mode

Condition	Pin No.
STABLE	OUTPUT1
PRESET TARE WEIGHT	OUTPUT2
TARE WEIGHT	OUTPUT3
GROSS WEIGHT	OUTPUT4

Condition	Pin No.
NET WEIGHT	OUTPUT5
ZERO	OUTPUT6
HOLD	OUTPUT7
ERROR	OUTPUT8
Z-BAND	OUTPUT9
F. (Coarse) FLOW/S1	OUTPUT10
M. (Middle) FLOW/S2	OUTPUT11
D. (Fine) FLOW/S3	OUTPUT12
OVER/S4	OUTPUT13

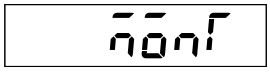

[MONT]

▼ Confirmation of load cell output voltage

14.7 Confirmation of load cell output voltage

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

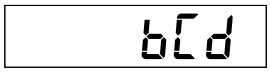
If an unknown load cell is used, execute calibration based on the load cell output value with an actual weight for the tare weight and maximum load.


[MONT]

▶ Press the [F/ENTER] key from the [MONT] display. The current load cell output voltage display blinks.

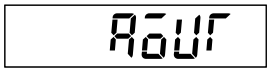
[ON-OFF]: Quit check mode

With BCD output


[BCD]

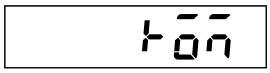
Confirmation of BCD output

With analog output


[AOUT]

Confirmation of analog output

No BCD or analog output


[ROM]

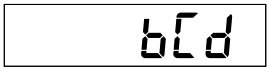
Confirmation of ROM version

Note:

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

14.8 Confirmation of BCD output

(When BCD output is applied)



[BCD]

▶ Press the [F] key from the[BCD] display. [0000000] is displayed, and the 100 digit blinks.

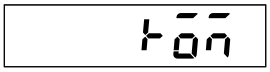
The display value is output from the BCD output.

The BCD output also changes when the display is changed with the keys listed below.

[TARE WEIGHT] [NET-GROSS WEIGHT]: Adjust the value of the digit to be changed.

[ACCUM] [PRESET TARE WEIGHT]: Select the changed digit.

[ON-OFF]: Quit check mode



[ROM]

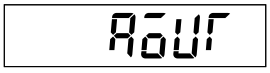
▼ Confirmation of ROM version

Note:

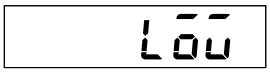
Confirmation of BCD output is not executed if BCD output is not installed.

14.9 Confirmation of analog output

(When analog output is applied)

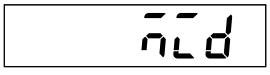


[AOUT]

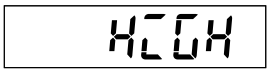


[LOW]

▶ Press the [F] key from the[AOUT] display. [LOW] is displayed and an analog output of 4 mA DC (0 V DC) is applied.



[MID]

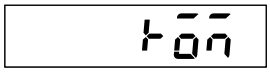


[HIGH]

If the keys listed below are used, an analog output of 12 mA DC (5 V DC) is output for [MID] display and an analog output of 20 mA DC (10 V DC) is output for [HIGH] display.

[TARE WEIGHT] [NET-GROSS WEIGHT]: Switching analog outputs

[ON-OFF]: Quit check mode



[ROM]


Stand-by condition

Note:

Confirmation of analog output is not executed if analog output is not installed.

15 2-pin method serial interface (S-I/F)

15.1 Interface specification

Specification	Contents
Baud rate	600 bps
Data length	8 bit
Parity bit	Odd number
Stop bit	1 bit
Start bit	1 bit
Sending date	Binary code and BCD

15.2 Data format

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
INTERVAL	F1	F2	F3	LEN	FUN1	FUN2	ST1	ST2	OVR	ERR	G1	G2	G3	N1	N2	N3	T1	T2	T3	BCC

1. INTERVAL — Space for 15 bit(25 ms) or more (MARK SIGNAL)
2. F1 to F3 — 0FFH code
3. LEN — 11H code
4. FUN1 — Print status
5. FUN2 — 00H code
6. ST1 — Condition
7. ST2 — Condition
8. OVR — 00H code
9. ERR — Condition
10. G1 to G3 — GROSS data
11. N1 to N3 — NET data
12. T1 to T3 — TARE data
13. BCC — Block Checking Character from LEN to T3

1) FUN1

7	6	5	4	3	2	1	0

Printing status

2) ST1

7	6	5	4	3	2	1	0

On [1] means NET display
On [1] means GROSS display

3) ST2

7	6	5	4	3	2	1	0

On [1] means preset tare is valid

4) GROSS data / NET data / TARE data

G1/N1/T1 G2/N2/T2 G3/N3/T3

DP	10^4	10^3	10^2	10^1	10^0

Load data and BCD data

7	6	4	5

On [1] means minus
Decimal point

7	6	Decimal point
0	0	None
0	1	10^1
1	0	10^2
1	1	10^3

Note:

- Only during the measurement mode, the output of serial data is done.
- The output of the data of S-I/F stops when the maximum display is set to six digits. Set the maximum display within five digits when you use S-I/F.
- The output of the data of S-I/F stops when decimal point is from digits. Set the decimal point less than three digits when you use S-I/F
- Refer to Chapter 4.5.

15.3 Explanation of format data

- Automatic print bit [FUN1: bit 0]

  This bit can be used as a trigger at receiving side of the instrument with 2-pin method serial interface.

- Display bit [ST1:bit 7, bit 6]

  Bit 7: Put [1] when the display of the instrument is gross weight.

  Bit 6: Put [1] when the display of the instrument is net weight.

15.4 Explanation of output type

- Stream mode

  Keep outputting the data of gross weight and the net weight in constant intervals.

- Print signal operation

  Print signal operation is selected by function F-37 and can be selected from [OFF], [Synchronizing with print signal], [Synchronizing with accumulation signal], and [Synchronizing with finish signal].

  When [Synchronizing with print signal] is selected, send with [1] set to the automatic print bit on the FUN1 of output format synchronized with the [F] key, the external control input, or automatic printing.

  When [Synchronizing with accumulation signal] is selected, send with [1] set to the automatic print bit on the FUN1 of output format when [Accumulation command] is input by the function F-50 setting, key, or external control input.

  When [Synchronizing with finish signal] is selected, send with [1] set to the automatic print bit on the FUN1 of output format when [Forced batch finish] is input by the [F] key or external control input or synchronized with the batch finish signal.

  Default is set to [OFF].

Note:

The automatic print bit is usually 0.

16 Standard RS-485 Communication

16.1 Specifications for standard RS-485 communications

Specification	Contents
Transmission method	Half duplex
Synchronous system	Start-stop synchronization
Baud rate	Can be selected from 1 200 bps, 2 400 bps, 4 800 bps, 9 600 bps, 19 200 bps and 38 400 bps
Data bit length	Can be selected from 7 bit and 8 bit
Parity bit	Can be selected from No parity, Even parity and Odd parity
Stop bit	Can be selected from 1 bit and 2 bit
Terminator	Can be selected from CR+LF and CR
Transmission data	ASCII code
Cable length	About 1 km
Address	Can be selected from [0] to [31]
Number of connected units	32 units maximum (1 unit in stream mode)

Note:

Standard RS-485 communication and ModBus communication cannot be linked with optional RS-232C communication, RS-422 communication or RS-485 communication.

16.2 Data format

Refer to Chapter 18.3.12 for the data format.

16.3 Standard RS-485 communication settings

16.3.1 Operation mode

The standard RS-485 communication operation mode is selected by function F-47.

The operation mode can be selected from [Command mode], [Stream mode], [Synchronized with finish], [Synchronized with accumulation signal], [Synchronized with print signal] and [Modbus].

The default is [Command mode], refer to Chapter 17 for more information.

1	Command mode Data is sent back from CSD-903 to the host according to the command/data sent toCSD-903 by the host (personal computer, sequencer, etc.).
2	Stream mode When RS-485 is used, this mode continues to output the latest data of the output target selected by function F-47. Note that output frequency depends on the baud rate setting.

3	Synchronized with print signal Data is output synchronized with the print signal (F key, external control input or automatic print).
4	Synchronized with accumulation signal Data is output when [Accumulation command] is input by function F-50 setting, key or external control input.
5	Synchronized with finish signal Data is output when [Forced inflow finish] is input by the [ACCUM] key or external control input, or synchronized with the inflow finish signal.

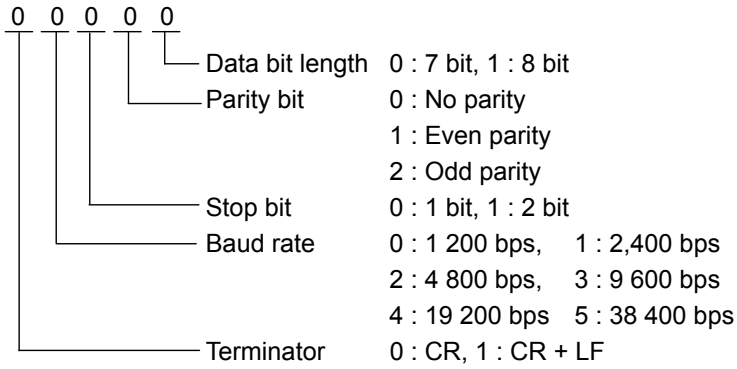
Note:

the RS-485 interface continues to output data at a fixed rate when stream mode is selected.

Control cannot be carried out by the host.

16.3.2 Specifications of communication by RS-485

RS-485 communication specifications are selected by function F-42.

Function No.	Set value	Details
F-42	00000 to 13121	

The default is [13020]

16.3.3 RS-485 address setting

The address of the RS-422/485 interface is set by function F-43.

Setting range: 00 to 31

The default is [00].

16.3.4 Delay time of RS-485 return data

Return data from the CSD-903 side can be delayed when the transmitting terminal on the host side enters a state of low impedance.

Delay time for return data from the RS-485 interface is set by function F-45.

Setting range: 00 to 99; Unit: 10 ms

The default is [01].

16.3.5 RS-485 transmission data decimal point detection

Transmission data decimal point detection for RS-485 is selected by function F-46.

The default is [No decimal point].

16.3.6 RS-485 interface stream mode output target

The output target is selected by the function F-48.

The output target can be selected from [Display interlock], [Gross weight], [Net weight] and [Conditional load display data].

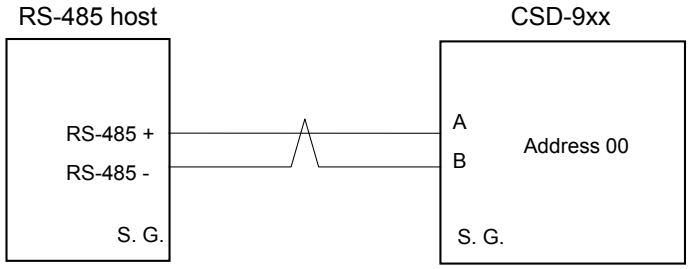
The default is [Display interlock].

Note:

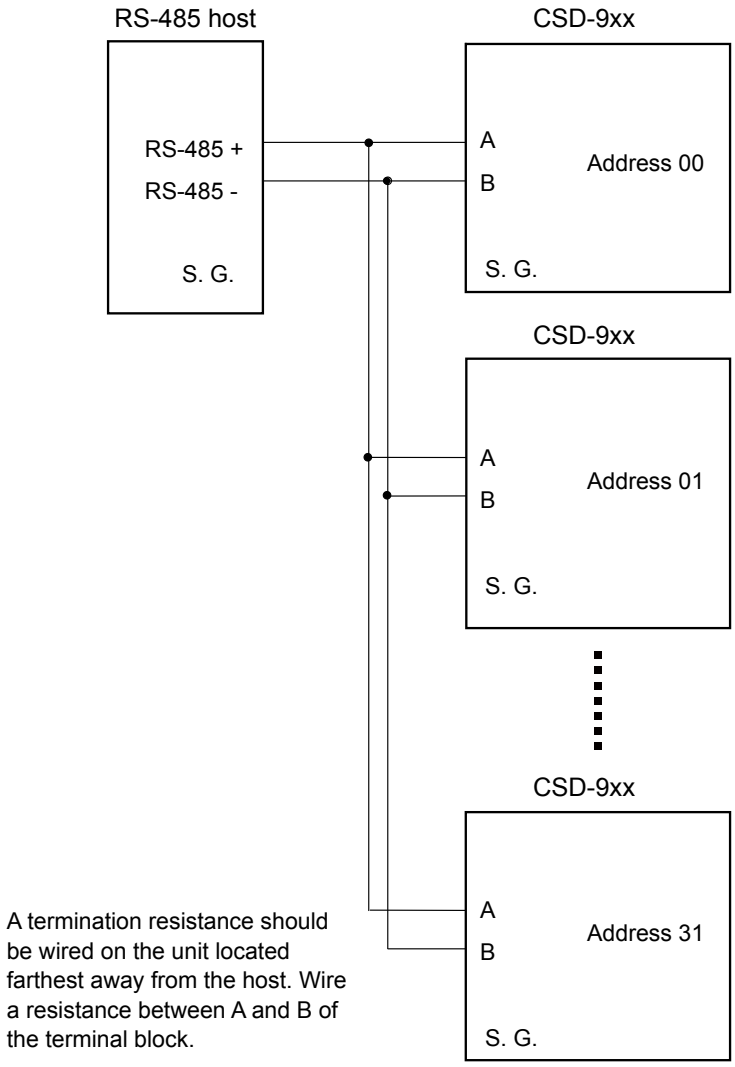
Function F-48 is effective when function F-47 is set to [2].

16.4 Connecting method

16.4.1 One to one



16.4.2 One to N



Note:

- Connect the S.G. terminal if necessary, depending on communication status with the host.
- The polarity of the host computer signal may be reversed depending on the unit.
- There may be no S.G. terminal on the host side.
- Connect with twisted pair cables.
- The S.G of the standard RS-485 interface is connected to the internal common.

17 ModBus communication

ModBus communication is a serial interface that uses standard RS-485 communications.

Communication with an instrument supported by ModBus communication can be carried out without an application.

- Modbus is a registered trademark of Modicon, Inc. -

Data communication with CSD-903 does not require a communication protocol application because it operates with the mapped memory operation shown in the table below.

Carry out the settings as shown below, referring to Chapter 16.3.

Standard RS-485 communications hardware should be used.

Moreover, decimal point addition, termination and communication delay time settings are invalid as they are irrelevant to ModBus operation.

Item	Set value
Operation mode	ModBus
Baud rate	Can be selected from 1 200, 2 400, 4 800, 9 600, 19 200 and 38 400 bps
Data bit	8 bit
Parity bit	Can be selected from [No parity], [Even parity] and [Odd parity]
Stop bit	Can be selected from 1 bit and 2 bit
Address	Select one from 0 to 31 Note that 0 is a broadcast address.

Note:

- The standard RS-485 interface and ModBus communication cannot be used when RS-232C, RS-422 or RS-485 are installed if optional RS-232C communication, RS-422 communication and RS-485 communication are not interlocked.
- Function F-45 is used if the value is more than [01].
- Set the delay time to 5 ms or more on the host side.
- To use the brand number in ModBus communication holding register [53249], set function F-51 to [2]. To use the F-52 brand selection settings [57447 to 57448], set function F-51 to [0].

Output coil (bit read/write reference No. 0)

Address	Data name
1	ZERO
2	ZERO CLEAR
3	TARE WEIGHT
4	TARE WEIGHT CLEAR

Address	Data name
5	INFLOW START
6	UNUSED
7	DISCHARGE START
8	UNUSED
9	MANUAL OVERSHOOT COMPENSATION
10	ACCUMULATION COMMAND
11	CLEAR THE LAST ACCUMULATED DATA
12	UNUSED
13	UNUSED
14	EMERGENCY STOP
15	UNUSED
16	FORCED INFLOW FINISH
17	UNUSED
18	FORCED DISCHARGE FINISH
19	ERROR RESET
20	CHANGE OF HOLD/HOLD RELEASE
21	PRINT COMMAND
22	GROSS/NET WEIGHT CHANGEOVER
23	ALL BRAND ACCUMULATION CLEAR
24	UNUSED

Input status (bit read reference No. 1)

Address	Data name
17	STABLE
18	NEAR ZERO
19	FULL
20	FULL (Coarse) FLOW/S1
21	MEDIUM (Middle) FLOW/S2
22	SMALL (Fine) INFLOW/S3
23	OVER/S4
24	OK/S0
25	UNDER
26 to 28	UNUSED
29	DISCHARGE
30	INFLOW FINISH

Address	Data name
31	UNUSED
32	DISCHARGE FINISH
33 to 35	UNUSED
36	DURING WEIGHING SEQUENCE
37	UNUSED
38	WEIGHING SEQUENCE ERROR
39	ABNORMAL WEIGHT
40	ZERO ERROR
41	ERROR
42	UNUSED
43	DURING TARE WEIGHT
44	PRESET TARE WEIGHT
45	CENTER OF ZERO
46	GROSS WEIGHT DISPLAY
47	NET WEIGHT DISPLAY
48	HOLD
49	BRAND NO. 0 ACCUMULATION ERROR
50 to 304	UNUSED
305	BRAND NO. 1 ACCUMULATION ERROR
306 to 560	UNUSED
561	BRAND NO. 2 ACCUMULATION ERROR
562 to 816	UNUSED
817	BRAND NO. 3 ACCUMULATION ERROR
818 to 1072	UNUSED
1073	BRAND NO. 4 ACCUMULATION ERROR
1074 to 1328	UNUSED
1329	BRAND NO. 5 ACCUMULATION ERROR
1330 to 1584	UNUSED
1585	BRAND NO. 6 ACCUMULATION ERROR
1586 to 1840	UNUSED
1841	BRAND NO. 7 ACCUMULATION ERROR

Input registration (word read/write reference No. 3)

Address	Data name
1	DECIMAL POINT

Address	Data name
2	UNIT
3 to 4	TARE WEIGHT
5 to 6	GROSS WEIGHT
7 to 8	NET WEIGHT
9 to 11	UNUSED
12	SEQUENCE ERROR NUMBER
13	ABNORMAL WEIGHT
14	ZERO ERROR
15	ERROR
16	UNUSED
33 to 34	BRAND NO. 0 ACCUMULATION VALUE (8 digits)
35 to 36	BRAND NO. 0 ACCUMULATION TIMES
37 to 40	BRAND NO. 0 ACCUMULATION VALUE (10 digits)
41 to 50	UNUSED
51	STATUS
52	STATUS ERROR CODE
53 to 54	TARE WEIGHT
55	STATUS
56	STATUS ERROR CODE
57 to 58	GROSS WEIGHT
59	STATUS
60	STATUS ERROR CODE
61 to 62	NET WEIGHT
63	STATUS
64	STATUS ERROR CODE
65 to 98	UNUSED
99	SOFTWARE VERSION
100 to 288	UNUSED
289	BRAND NO. 1 ACCUMULATION TIMES
291 to 294	BRAND NO. 1 ACCUMULATION VALUE (10 digits)
295 to 544	UNUSED
545 to 546	BRAND NO. 2 ACCUMULATION TIMES
547 to 550	BRAND NO. 2 ACCUMULATION VALUE (10 digits)
551 to 800	UNUSED
801 to 802	BRAND NO. 3 ACCUMULATION TIMES

Address	Data name
803 to 806	BRAND NO. 3 ACCUMULATION VALUE (10 digits)
807 to 1056	UNUSED
1057 to 1058	BRAND NO. 4 ACCUMULATION TIMES
1059 to 1062	BRAND NO. 4 ACCUMULATION VALUE (10 digits)
1063 to 1312	UNUSED
1313 to 1314	BRAND NO. 5 ACCUMULATION TIMES
1315 to 1318	BRAND NO. 5 ACCUMULATION VALUE (10 digits)
1319 to 1568	UNUSED
1569 to 1570	BRAND NO. 6 ACCUMULATION TIMES
1571 to 1574	BRAND NO. 6 ACCUMULATION VALUE (10 digits)
1575 to 1824	UNUSED
1825 to 1826	BRAND NO. 7 ACCUMULATION TIMES
1827 to 1830	BRAND NO. 7 ACCUMULATION VALUE (10 digits)

- SEQUENCE ERROR NUMBER

  A number is written to input register address 12 when a sequence error occurs.

Number	Details	Action
1	Force-finish by an emergency stop during weighing	Check the cause of the emergency stop, reset the error and restart.
3	Insufficient, despite post-batching	Change post-batching time and maximum number of post-batching times, and restart.
4	Contradictory comparison values	Check the settings to eliminate the cause of the contradiction.
5	Flow time exceeds the time limit.	Check for flow gate blockages.
6	Discharge time exceeds the time limit.	Check for discharge gate blockages.
7	The gross weight is less than the final weighing value in discharge mode.	Check for flow gate blockages.
8	If the net weight is greater than or equal to the (final value – overshoot) at the start	Empty the container
10	If weighing starts while START is [Effective] other than for NEAR ZERO, and there is no container is on the load cell	Check that the container is in position

- Status

  Status is written as bits to input register addresses 51, 55, 59 and 63.

Bit	Details
Bit 15	STABLE
Bit 14	TARE WEIGHT CANCELLATION SETTING
Bit 13	TARE WEIGHT CANCELLATION
Bit 12	GROSS WEIGHT
Bit 11	NET WEIGHT
Bit 10	CENTER OF ZERO
Bit 9	HOLD
Bit 8	ERROR
Bit 7	NEAR ZERO
Bit 6	FULL (Coarse) FLOW/S1
Bit 5	MEDIUM (Middle) FLOW/S2
Bit 4	SMALL (Fine) INFLOW/S3
Bit 3	OVER/S4
Bit 2	OK/S0
Bit 1	UNDER
Bit 0	FULL

- Status error codes

  Status error codes are written as numbers to input register addresses 52, 56, 60 and 64.

Number	Details
1	If zero setting was performed outside the valid zero setting range
2	If an unlisted number was selected for C function or function setting
4	A/D conversion error
8	If tare weight cancellation was performed outside the tare weight cancellation operation range
10	Lights when the weight display exceeds [(–weighing value) – 9 D], exceeds [–110% of weighing value], or exceeds [–20 D] (depending on C function CF-03 setting).
11	Lights when the weight display exceeds [(+weighing capacity) + 9 D] or exceeds [+110% of weighing capacity] (depending on C function CF-03 setting).
12	A/D converter input negative overload
13	A/D converter input positive overload

Number	Details
20	If the load cell output and numerical input is equal to or less than –2.5 mV/V and exceeds the zero calibration range on the negative side during calibration
21	If the load cell output and numerical input is equal to or more than 2.5 mV/V and exceeds the zero calibration range on the positive side during calibration
22	If the load cell output and numerical input is less than 0 mV/V and does not reach the span calibration range during calibration
23	If the load cell output and numerical input is more than 3.1 mV/V and exceeds the span calibration range during calibration
31	EEPROM writing error

Hold registration (word read/write reference No. 4)

Address	Data name
1 to 9	UNUSED
11 to 12	FINAL/S1
13 to 14	OVERSHOOT/S4
15 to 16	PRIOR TO FIXED VALUE 1/S3
17 to 18	PRIOR TO FIXED VALUE 2/S2
19 to 20	OVER
21 to 22	UNDER
23 to 24	NEAR ZERO
25 to 26	FULL
27 to 28	PRESET TARE WIGHT
29 to 30	POST-BATCHING TIME
31 to 32	CALMING TIME AFTER POST-BATCHING
33 to 34	BRAND NO. 1 AUTOMATIC OVERSHOOT COMPENSATION
35 to 265	UNUSED
267 to 268	BRAND NO. 1 FINAL/S1
269 to 270	BRAND NO. 1 OVERSHOOT/S4
271 to 272	BRAND NO. 1 PRIOR TO FIXED VALUE 1/S3
273 to 274	BRAND NO. 1 PRIOR TO FIXED VALUE 2/S2
275 to 276	BRAND NO. 1 OVER
277 to 278	BRAND NO. 1 UNDER
279 to 280	BRAND NO. 1 NEAR ZERO
281 to 282	BRAND NO. 1 FULL
283 to 284	UNUSED

Address	Data name
285 to 286	BRAND NO. 1 POST-BATCHING TIME
287 to 288	BRAND NO. 1 CALMING TIME AFTER POST-BATCHING
289 to 290	BRAND NO. 1 AUTOMATIC OVERSHOOT COMPENSATION
291 to 522	UNUSED
523 to 524	BRAND NO. 2 FINAL/S1
525 to 526	BRAND NO. 2 OVERSHOOT/S4
527 to 528	BRAND NO. 2 PRIOR TO FIXED VALUE 1/S3
529 to 530	BRAND NO. 2 PRIOR TO FIXED VALUE 2/S2
531 to 532	BRAND NO. 2 OVER
533 to 534	BRAND NO. 2 UNDER
535 to 536	BRAND NO. 2 NEAR ZERO
537 to 538	BRAND NO. 2 FULL
539 to 540	UNUSED
541 to 542	BRAND NO. 2 POST-BATCHING TIME
543 to 544	BRAND NO. 2 CALMING TIME AFTER POST-BATCHING
545 to 546	BRAND NO. 2 AUTOMATIC OVERSHOOT COMPENSATION
547 to 778	UNUSED
779 to 780	BRAND NO. 3 FINAL/S1
781 to 782	BRAND NO. 3 OVERSHOOT/S4
783 to 784	BRAND NO. 3 PRIOR TO FIXED VALUE 1/S3
785 to 786	BRAND NO. 3 PRIOR TO FIXED VALUE 2/S2
787 to 788	BRAND NO. 3 OVER
789 to 790	BRAND NO. 3 UNDER
791 to 792	BRAND NO. 3 NEAR ZERO
793 to 794	BRAND NO. 3 FULL
795 to 796	UNUSED
797 to 798	BRAND NO. 3 POST-BATCHING TIME
799 to 800	BRAND NO. 3 CALMING TIME AFTER POST-BATCHING
801 to 802	BRAND NO. 3 AUTOMATIC OVERSHOOT COMPENSATION
803 to 1034	UNUSED
1035 to 1036	BRAND NO. 4 FINAL/S1
1037 to 1038	BRAND NO. 4 OVERSHOOT/S4
1039 to 1040	BRAND NO. 4 PRIOR TO FIXED VALUE 1/S3
1041 to 1042	BRAND NO. 4 PRIOR TO FIXED VALUE 2/S2
1043 to 1044	BRAND NO. 4 OVER

Address	Data name
1045 to 1046	BRAND NO. 4 UNDER
1047 to 1048	BRAND NO. 4 NEAR ZERO
1049 to 1050	BRAND NO. 4 FULL
1051 to 1052	UNUSED
1053 to 1054	BRAND NO. 4 CALMING TIME AFTER POST-BATCHING
1055 to 1056	BRAND NO. 4 CALMING TIME AFTER POST-BATCHING
1057 to 1058	BRAND NO. 4 AUTOMATIC OVERSHOOT COMPENSATION
1059 to 1290	UNUSED
1291 to 1292	BRAND NO. 5 FINAL/S1
1293 to 1294	BRAND NO. 5 OVERSHOOT/S4
1295 to 1296	BRAND NO. 5 PRIOR TO FIXED VALUE 1/S3
1297 to 1298	BRAND NO. 5 PRIOR TO FIXED VALUE 2/S2
1299 to 1300	BRAND NO. 5 OVER
1301 to 1302	BRAND NO. 5 UNDER
1303 to 1304	BRAND NO. 5 NEAR ZERO
1305 to 1306	BRAND NO. 5 FULL
1307 to 1308	UNUSED
1309 to 1310	BRAND NO. 5 POST-BATCHING TIME
1311 to 1312	BRAND NO. 5 CALMING TIME AFTER POST-BATCHING
1313 to 1314	BRAND NO. 5 AUTOMATIC OVERSHOOT COMPENSATION
1315 to 1546	UNUSED
1547 to 1548	BRAND NO. 6 FINAL/S1
1549 to 1550	BRAND NO. 6 OVERSHOOT/S4
1551 to 1552	BRAND NO. 6 PRIOR TO FIXED VALUE 1/S3
1553 to 1554	BRAND NO. 6 PRIOR TO FIXED VALUE 2/S2
1555 to 1556	BRAND NO. 6 OVER
1557 to 1558	BRAND NO. 6 UNDER
1559 to 1560	BRAND NO. 6 NEAR ZERO
1561 to 1562	BRAND NO. 6 FULL
1563 to 1564	UNUSED
1565 to 1566	BRAND NO. 6 POST-BATCHING TIME
1567 to 1568	BRAND NO. 6 CALMING TIME AFTER POST-BATCHING
1569 to 1570	BRAND NO. 6 AUTOMATIC OVERSHOOT COMPENSATION
1571 to 1802	UNUSED
1803 to 1804	BRAND NO. 7 FINAL/S1

Address	Data name
1805 to 1806	BRAND NO. 7 OVERSHOOT/S4
1807 to 1808	BRAND NO. 7 PRIOR TO FIXED VALUE 1/S3
1809 to 1810	BRAND NO. 7 PRIOR TO FIXED VALUE 2/S2
1811 to 1812	BRAND NO. 7 OVER
1813 to 1814	BRAND NO. 7 UNDER
1815 to 1816	BRAND NO. 7 NEAR ZERO
1817 to 1818	BRAND NO. 7 FULL
1819 to 1820	UNUSED
1821 to 1822	BRAND NO. 7 POST-BATCHING TIME
1823 to 1824	BRAND NO. 7 CALMING TIME AFTER POST-BATCHING
1825 to 1826	BRAND NO. 7 AUTOMATIC OVERSHOOT COMPENSATION
1827 to 53248	UNUSED
53249	BRAND NUMBER
53250 to 56832	UNUSED
56833	OPERATION MODE
56834	UNUSED
56835 to 56836	SCALE INTERVAL SETTING
56837 to 56838	MAXIMUM LOAD SETTING
56839 to 56840	WEIGHT MASS SETTING
56841 to 56842	REGISTER ZERO POINT LOAD CELL OUTPUT VALUE
56843 to 56844	REGISTER SPAN POINT LOAD CELL OUTPUT VALUE
56845	ACTUAL WEIGHT CALIBRATION STABILITY CONFIRMATION
56846	ACTUAL WEIGHT CALIBRATION ZERO POINT REGISTRATION
56847	ACTUAL WEIGHT CALIBRATION SPAN POINT REGISTRATION
56848	CALIBRATION FINISH
56849	ZERO POINT FINE CALIBRATION
56850	SPAN POINT FINE CALIBRATION
56851 to 56852	POINT 1 WEIGHT
56853 to 56854	POINT 2 WEIGHT
56855 to 56856	POINT 3 WEIGHT
56857 to 56858	FINE CALIBRATION MODE, LOAD DISPLAY
56859 to 57344	UNUSED
57345 to 57346	F-01 DIGITAL FILTER SETTING
57347 to 57348	F-02 ANALOG FILTER SETTING
57349 to 573450	UNUSED

Address	Data name
57351 to 57352	F-04 DISPLAY TIMES
57353 to 57354	F-05 STABILIZATION FILTER SETTING
57355 to 57356	F-06 STABILIZATION FILTER DATA WIDTH
57357 to 57358	F-07 STABILIZATION FILTER TIME WIDTH
57359 to 57360	F-08 KEY LOCK 1
57361 to 57362	F-09 KEY LOCK 2
57363 to 57364	F-10 STABILITY DETECTION DATA WIDTH
57365 to 57366	F-11 STABILITY DETECTION TIME WIDTH
57367 to 57372	UNUSED
57373 to 57374	F-15 OPERATING CONDITION OF PRESET TARE WEIGHT CANCELLATION
57375 to 57376	F-16 PRINT OPERATION
57377 to 57378	F-17 HOLD OPERATION
57379 to 57380	F-18 HOLD TARGET
57381 to 57382	F-19 SELECTION OF SUB-DISPLAY SECTION
57383 to 57384	F-20 4-STEP CHECK BRAND SETTING TARGET
57385 to 57386	F-21 4-STEP CHECK OPERATION TARGET
57387 to 57388	F-22 4-STEP CHECK OPERATION CONDITIONS
57389 to 57390	F-23 4-STEP CHECK S0 OPERATION
57391 to 57392	F-24 COMPARATOR HYSTERESIS OPERATING CONDITIONS
57393 to 57394	F-25 COMPARATOR HYSTERESIS DATA WIDTH
57395 to 57396	F-26 COMPARATOR HYSTERESIS TIME WIDTH
57397 to 57402	UNUSED
57403 to 57404	F-30 BCD OUTPUT OPERATION MODE
57405 to 57406	F-31 BCD OUTPUT TARGET
57407 to 57408	F-32 BCD OUTPUT LOGIC
57409 to 57410	F-33 BCD PC WIDTH
57411 to 57412	F-34 BCD OUTPUT TIMES
57413 to 57416	UNUSED
57417 to 57418	F-37 SI/F PRINT OPERATION
57419 to 57422	UNUSED
57423 to 57424	F-40 RS232C OPERATION MODE (Reference)
57425 to 57426	F-41 RS-232C/422/485 OUTPUT TARGET (Valid if F-40 = 1 to 4 for RS-232C, F-49 for RS-422/485) (Reference)
57427 to 57428	F-42 RS-232C/422/485 COMMUNICATION SPECIFICATION (Reference)

Address	Data name
57429 to 57430	F-43 RS-422/485 ADDRESS SETTING (Reference)
57431 to 57432	F-44 RS-422/485 CHANGEOVER (Reference)
57433 to 57434	F-45 RS-485 REPLY DATA DELAY TIME (Reference)
57435 to 57436	F-46 RS-232C/422/485 TRANSMISSION DATA DECIMAL POINT (Reference)
57437 to 57438	F-47 STANDARD RS-485 OPERATION (Reference)
57439 to 57440	F-48 STANDARD RS-485 OUTPUT TARGET (Reference)
57441 to 57442	F-49 RS-422/485 OPERATION MODE (Reference)
57443 to 57444	F-50 ACCUMULATION FUNCTION OPERATING CONDITIONS
57445 to 57446	F-51 TARGET OF BRAND CHANGEOVER
57447 to 57448	F-52 BRAND SELECTION SETTING
57449 to 57452	UNUSED
57453 to 57454	F-55 F KEY OPERATION SETTING
57455 to 57462	UNUSED
57463 to 57464	F-60 EXTERNAL CONTROL INPUT 1 OPERATION SETTING
57465 to 57466	F-61 EXTERNAL CONTROL INPUT 2 OPERATION SETTING
57467 to 57468	F-62 EXTERNAL CONTROL INPUT 3 OPERATION SETTING
57469 to 57470	F-63 EXTERNAL CONTROL INPUT 4 OPERATION SETTING
57471 to 57472	F-64 EXTERNAL CONTROL INPUT 5 OPERATION SETTING
57473 to 57474	F-65 EXTERNAL CONTROL INPUT 6 OPERATION SETTING
57475 to 57476	F-66 EXTERNAL CONTROL INPUT 7 OPERATION SETTING
57477 to 57478	F-67 EXTERNAL CONTROL INPUT 8 OPERATION SETTING
57479 to 57480	F-68 EXTERNAL CONTROL INPUT 9 OPERATION SETTING
57481 to 57482	UNUSED
57483 to 57484	F-70 EXTERNAL CONTROL OUTPUT 1 OPERATION SETTING
57485 to 57486	F-71 EXTERNAL CONTROL OUTPUT 2 OPERATION SETTING
57487 to 57488	F-72 EXTERNAL CONTROL OUTPUT 3 OPERATION SETTING
57489 to 57490	F-73 EXTERNAL CONTROL OUTPUT 4 OPERATION SETTING
57491 to 57492	F-74 EXTERNAL CONTROL OUTPUT 5 OPERATION SETTING
57493 to 57494	F-75 EXTERNAL CONTROL OUTPUT 6 OPERATION SETTING
57495 to 57496	F-76 EXTERNAL CONTROL OUTPUT 7 OPERATION SETTING
57497 to 57498	F-77 EXTERNAL CONTROL OUTPUT 8 OPERATION SETTING
57499 to 57500	F-78 EXTERNAL CONTROL OUTPUT 9 OPERATION SETTING
57501 to 57502	F-79 EXTERNAL CONTROL OUTPUT 10 OPERATION SETTING
57503 to 57504	F-80 EXTERNAL CONTROL OUTPUT 11 OPERATION SETTING

Address	Data name
57505 to 57506	F-81 EXTERNAL CONTROL OUTPUT 12 OPERATION SETTING
57507 to 57508	F-82 EXTERNAL CONTROL OUTPUT 13 OPERATION SETTING
57509 to 57510	UNUSED
57511 to 57712	F-84 CC-LINK OCCUPIED STATIONS
57513 to 57514	F-85 CC-LINK STATION NUMBER SETTING
57515 to 57516	F-86 CC-LINK BAUD RATE SETTING
57517 to 57518	F-87 CC-LINK 32-BIT DATA FORMAT
57519 to 57522	UNUSED
57523 to 57524	F-90 MAINTENANCE DATE
57525 to 57526	F-91 MAINTENANCE NUMBER
57527 to 57856	UNUSED
57857 to 57858	CF-01 DECIMAL DISPLAY POSITION
57859 to 57860	CF-02 AD SAMPLING
57861 to 57862	CF-03 OVER DISPLAY CONDITIONS
57863 to 57864	UNUSED
57865 to 57866	CF-05 UNIT
57867 to 57870	UNUSED
57871 to 57872	CF-08 NET WEIGHT SIGN INVERSION
57873 to 57874	UNUSED
57875 to 67876	CF-10 ZERO SETTING OPERATING CONDITIONS
57877 to 57878	CF-11 ZERO SETTING VALIDITY RANGE
57879 to 57880	CF-12 ZERO TRACKING TARGET
57881 to 57882	CF-13 ZERO TRACKING DATA WIDTH
57883 to 57884	CF-14 ZERO TRACKING TIME WIDTH
57885 to 57886	CF-15 POWER ON ZERO OPERATION
57887 to 57888	C-16 TARE WEIGHT CANCELLATION OPERATING CONDITIONS
57889 to 57890	CF-17 DATA SAVE DESTINATION CHANGEOVER
57891 to 57892	CF-18 POWER ON CLEAR
57893 to 57894	UNUSED
57895 to 57896	CF-20 SETTING MODE 2, STABILITY DETECTION DURING PRESET TARE WEIGHT CANCELLATION SETTING
57897 to 57898	CF-21 SETTING MODE 2, SUB-DISPLAY SECTION UNIT DISPLAY DURING PRESET TARE WEIGHT CANCELLATION SETTING
57899 to 57904	UNUSED

Address	Data name
57905 to 57906	CF-25 GRAVITATIONAL ACCELERATION COMPENSATION VALUE SETTING METHOD
57907 to 57908	CF-26 AREA CODE OF USAGE LOCATION
57909 to 57910	CF-27 AREA CODE OF CALIBRATION LOCATION
57911 to 57912	CF-28 GRAVITATIONAL ACCELERATION VALUE SETTING FOR USAGE LOCATION
57913 to 57914	CF-29 GRAVITATIONAL ACCELERATION VALUE SETTING FOR CALIBRATION LOCATION
57915 to 57934	UNUSED
57935 to 57936	CF-40 RANGE CHANGEOVER OPERATION
57937 to 57398	CF-41 SECOND RANGE SCALE INTERVAL SETTING
57939 to 57940	CF-42 SECOND RANGE BOUNDARY SETTING
57941 to 57492	CF-43 THIRD RANGE SCALE INTERVAL SETTING
57943 to 57944	CF-44 THIRD RANGE BOUNDARY SETTING
57945 to 57992	UNUSED
57995 to 57996	CF-70 ANALOG OUTPUT TARGET
57997 to 57998	CF-71 DISPLAY VALUE FOR ANALOG OUTPUT OF 4 mA DC (0 V DC)
57999 to 58000	CF-72 DISPLAY VALUE FOR ANALOG OUTPUT OF 20 mA DC (10 V DC)
58001 to 58034	UNUSED
58035 to 58036	CF-90 CALIBRATION DATA SCALE INTERVAL (Reference use)
58037 to 58038	CF-91 CALIBRATION DATA MAXIMUM LOAD (Reference)
58039 to 58040	CF-92 CALIBRATION DATA WEIGHT (Reference)
58041 to 58042	CF-93 CALIBRATION ZERO mV/V VALUE (Reference)
58043 to 58044	CF-94 CALIBRATION SPAN mV/V VALUE (Reference)
58045 to 58048	UNUSED
58049 to 58050	CF-97 STABILITY DETECTION TIME WIDTH DURING CALIBRATION
58051 to 58368	UNUSED
58369 to 58370	SQF-01 WEIGHING MODE
58371 to 58372	SQF-02 CONTROL MODE
58373 to 58376	UNUSED
58377 to 58378	SQF-05 COMPARISON SIGNAL OPERATION
58379 to 58380	SQF-06 NEAR ZERO COMPARISON OPERATION
58381 to 58382	SQF-07 FULL COMPARISON OPERATION
58383 to 58386	UNUSED

Address	Data name
58387 to 58388	SQF-10 WEIGHING TIME MONITORING TIMER
58389 to 58396	UNUSED
58397 to 58398	SQF-15 EFFECTIVE OVER NEAR ZERO AT FLOW START
58399 to 58400	SQF-16 AUTOMATIC TARE WEIGHT AT FLOW START
58401 to 58402	SQF-17 WAITING TIME FOR FLOW START
58403 to 58404	SQF-18 AUTOMATIC TARE WEIGHT AFTER WAITING FOR FLOW START
58405 to 58406	UNUSED
58407 to 58408	SQF-20 FULL (Coarse) FLOW COMPARISON PROHIBITED TIME
58409 to 58410	SQF-21 MEDIUM (Middle) FLOW COMPARISON PROHIBITED TIME
58411 to 58412	SQF-22 DRIBBLE (Fine) FLOW COMPARISON PROHIBITED TIME
58413 to 58414	UNUSED
58415 to 58416	SQF-24 INFLOW/DISCHARGE BRAND SETTING TARGET
58417 to 58418	SQF-25 AUTOMATIC OVERSHOOT COMPENSATION OPERATION
58419 to 58420	SQF-26 AUTOMATIC OVERSHOOT COMPENSATION VALIDITY WIDTH
58421 to 58422	SQF-27 AUTOMATICOVERSHOOT SAVE
58423 to 58426	UNUSED
58427 to 58428	SQF-23 JUDGE CONDITION
58429 to 58430	SQF-31 CALMING TIME
58431 to 58436	UNUSED
58437 to 58438	SQF-35 MAXIMUM NUMBER OF POST-BATCHING TIMES
58439 to 58440	SQF-36 JUDGE CONDITION AFTER POST-BATCHING
58441 to 58442	SQF-37 POST-BATCHING TIME
58443 to 58444	SQF-38 CALMING TIME AFTER POST-BATCHING
58445 to 58446	UNUSED
58447 to 58448	SQF-40 INFLOW FINISH OUTPUT TIME
58449 to 58450	SQF-41 INFLOW FINISH OUTPUT OFF CONDITION
58451 to 58456	UNUSED
58457 to 58458	SQF-45 DISCHARGE START ON INFLOW FINISH
58459 to 58460	SQF-46 DISCHARGE TIME MONITORING TIMER
58461 to 58462	SQF-47 WAITING TIME FOR DISCHARGE GATE CLOSE
58463 to 58464	SQF-48 DISCHARGE FINISH OUTPUT TIME

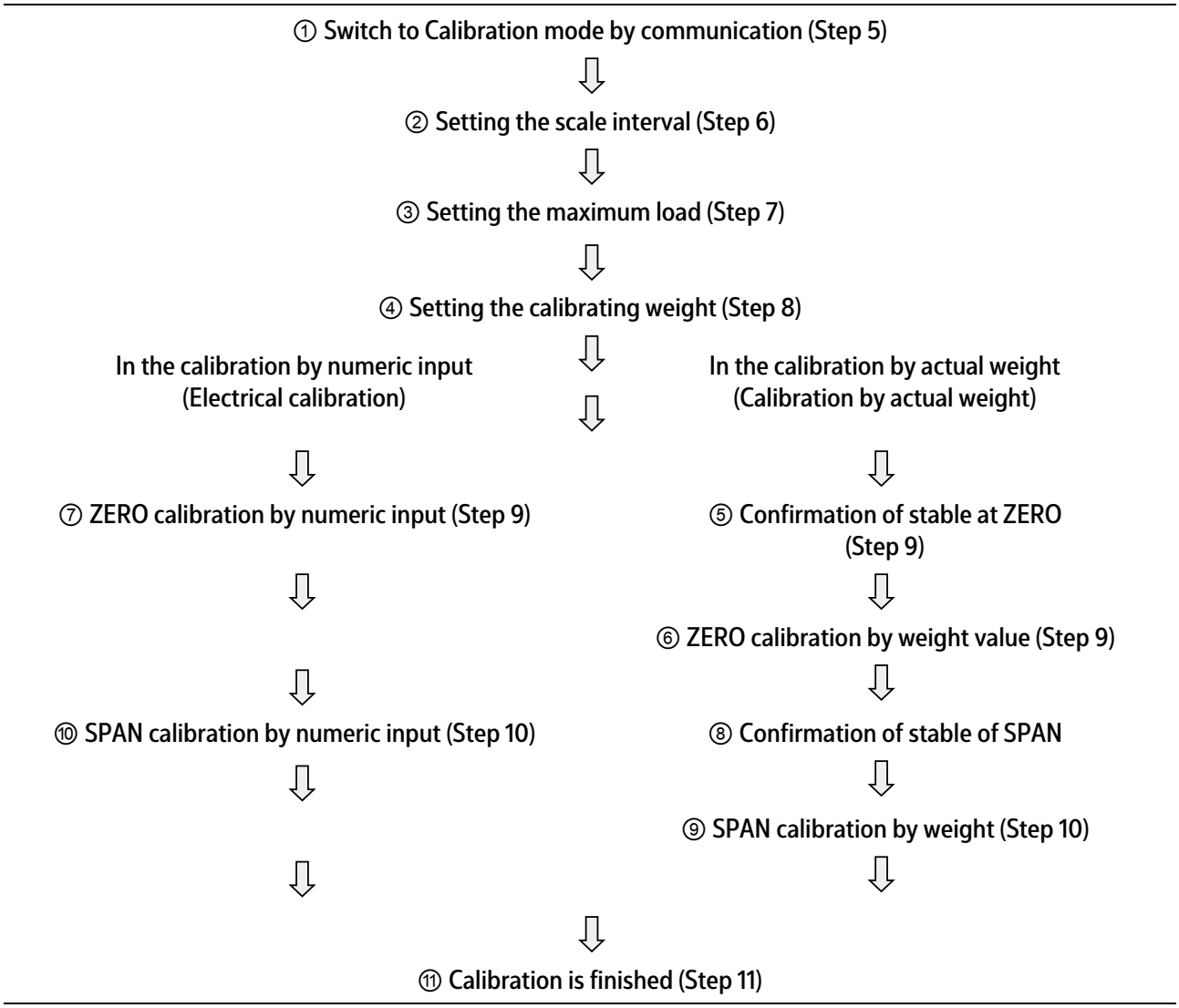
Address	Data name
58465 to 58466	SQF-49 TARE WEIGHT CLEAR ON DISCHARGE FINISH

17.1 Calibration by transmission through ModBus interface

Proceed the setting according to the following fow chart in this calibration.

17.1.1 Calibration mode

Each item of the flow chart corresponds to each procedure described in Chapter 6.3.1.



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.

17.1.1.1 Change to calibration mode by communication

Input [9] at holding register address 56833 to switch to calibration mode.

17.1.1.2 Setting the scale interval

The scale interval is written in holding register address 56835 to 56836.

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

17.1.1.3 Set the maximum load

The maximum load is written in holding register address 56837 to 56838.

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

17.1.1.4 Set the weight mass

Mass of weight is written in holding register address 56839 to 56840.

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

17.1.1.5 Confirm zero stability (actual weight)

Stable/Unstable is read from holding register address 56845.

0: Unstable

1: Stable

17.1.1.6 Zero calibration by weighing value

The load cell output value is registered in holding register address 56846 as the zero point.

[1] is written in holding register address 56846.

[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	0x03	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	0x03	(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

17.1.1.7 Zero calibration by numerical input

Zero is registered by setting unit mV/V amount in holding register address 56841 to 56842.

Setting range : -250 000 to 250 000 (–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 < –250 000

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	–	250 000 < 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 -250 000 to 250 000 is written.

17.1.1.8 Confirm the SPAN stability (actual weight)

Stable/Unstable is read from holding register address 56845.

0: Unstable

1: Stable

17.1.1.9 SPAN calibration by weighing value

The load cell output value is registered in holding register address 56847 as the SPAN point.

[1] is written in holding register address 56847.

[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

17.1.1.10 SPAN calibration by numerical input

SPAN is registered by setting unit mV/V amount in holding register address 56843 to 56844.

Setting range: 1 to 310 000 (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 310 000] is written.

17.1.1.11 Finish calibration

Calibration data, such as zero point and the span point, that is registered temporarily is stored in holding register address 56848 and the device returns to weighing mode.

[1] is written in holding register address 56848.

[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

17.1.1.12 Calibration forced finish

When [0] is written in holding register address 56833 during calibration, calibration is discontinued without saving the calibration data that is registered temporarily, and the device returns to weighing mode.

17.1.2 Zero and SPAN fine calibration mode

Each item of the flow chart corresponds to each procedure described in Chapter 6.4.

① Change to Zero point and SPAN point fine calibration mode

⇩

② Zero stability check

⇩

③ SPAN point fine calibration

⇩

④ SPAN stability check

⇩

⑤ SPAN point fine calibration

⇩

⑥ Finish Zero point and SPAN point fine calibration

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.

17.1.2.1 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 56833.

17.1.2.2 Zero stability check

The weighing values are read from holding register addresses 56857 to 56858.

Stable/Unstable is read from holding register address 56845 with no load on the load cell.

0: Unstable

1: Stable

17.1.2.3 Zero point fine calibration

Zero the load values from holding register addresses 56857 to 56858.

Execute fine calibration after writing the data shown in below table in holding register address 56849.

	Holding register address 56849entry
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	0×10^3	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	0×10^3	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.

17.1.2.4 SPAN stability check

The weight values are read from holding register addresses 56857 to 56858.

Place weights not exceeding the maximum load on the load cell. Stable/Unstable is read from holding register address 56845.

0: Unstable

1: Stable

17.1.2.5 SPAN fine calibration

Calibrate the display to match the weight loaded on the load cell.

Execute fine calibration after writing the data shown in below table in holding register address 56850.

	Holding register address 56850entry
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	0×10^3	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	0×10^3	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.

17.1.2.6 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 56848. The device returns to weighing mode.

[1] is written in holding register address 56848.

[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

17.1.2.7 Calibration force finish

When [0] is written in holding register address 56833 during calibration, calibration is discontinued without saving the calibration data that is registered temporarily, and the device returns to weighing mode.

17.1.3 Calibration mode for digital linearization

Each item of the flow chart corresponds to each procedure described in Chapter 6.5.

① Change to digital linearization mode

⇩

② Compensation at point

⇩

② Compensation at point 1

⇩

② Compensation at point 2

⇩

⑤ Compensation at point 2

⇩

⑥ Stability check at point 3

⇩

⑤ Compensation at point 3

⇩

⑤ Quit digital linearization mode

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.

17.1.3.1 Switch to digital linearization mode

Switch to digital linearization mode by writing [11] in holding register address 56833.

17.1.3.2 Stability check at point 1

Place weights not exceeding the maximum load on the load cell. Stable/Unstable is read from holding register address 56845.

0: Unstable

1: Stable

17.1.3.3 Compensation at point 1

The weight at point 1 is set and registered in holding register address 56851 to 56852.

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.

17.1.3.4 Stability check at point 2

Place weights not exceeding the maximum load on the load cell. Stable/Unstable is read from holding register address 56845.

0: Unstable

1: Stable

17.1.3.5 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 56853 to 56854.

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 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.

17.1.3.6 Stability check at point 3

Place weights not exceeding the maximum load on the load cell. Stable/Unstable is read from holding register address 56845.

0: Unstable

1: Stable

17.1.3.7 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 56855 to 56856.

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 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.

17.1.3.8 Quit digital linearization mode

Updated data for Zero point and the SPAN point is registered temporarily in holding register address 56848. The device returns to weighing mode.

[1] is written in holding register address 56848.

[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

17.1.3.9 Calibration force finish

When [0] is written in holding register address 56833 during calibration, calibration is discontinued without saving the calibration data that is registered temporarily, and the device returns to weighing mode.

17.1.4 Calibration of Zero point only

Each item of the flow chart corresponds to each procedure described in Chapter 6.6.

① Changing to Zero point only calibration mode

⇩

② Zero stability check

⇩

③ Zero calibration using weight

⇩

④ Finish Zero point only calibration mode

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.

17.1.4.1 Changing to Zero point only calibration mode

Write 12 in maintenance address 56853 and proceed to Zero point only calibration mode

17.1.4.2 Zero stability check

Stable/Unstable is read from holding register address 56845 with no load on the load cell.

0: Unstable

1: Stable

17.1.4.3 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 complete.

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 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

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.

17.1.4.4 Changing to Zero point only calibration mode

Calibration data, such as zero point and the span point, that is registered temporarily is stored in holding register address 56848 and the device returns to weighing mode.

[1] is written in holding register address 56848.

[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.

17.1.4.5 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.

18 Options

18.1 Analog output

18.1.1 Current output specifications (model: CSD-903-P07)

Specification	Content
Output	4 mA DC to 20 mA DC
Load characteristic	510 Ω or less
Non linearity	Within 0.02 % F. S.
Resolution	1/12 000 or more
Over range	[-OL] displayed at approx. 2.4 mA DC [OL] displayed at approx. 21.6 mA DC
Output rate	4 times/s, 20 times/s

18.1.2 Voltage output specifications (model: CSD-903-P25)

Specifications	Content
Output	0 V DC to 10 V DC
Load characteristics	5 kΩ or more
Non linearity	Within 0.02 % F. S.
Resolution	1/12 000 or more
Over range	[-OL] displayed at approx. -1 V [OL] displayed at approx. 11 V
Output rate	4 times/s, 20 times/s

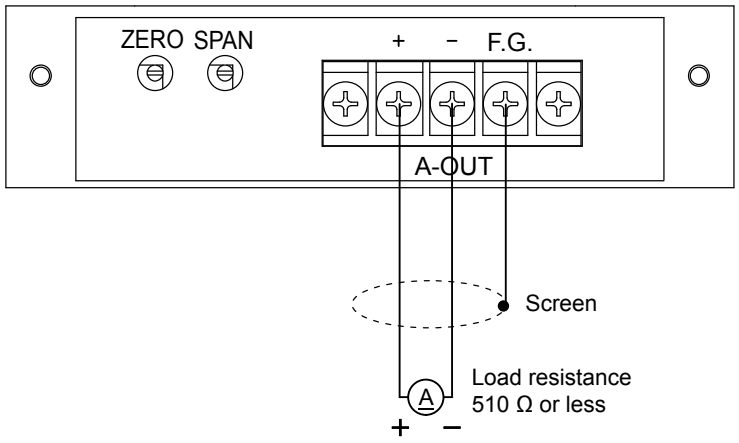
Note:

- The analog output of this unit executes rewriting the output synchronizing with the display.
- The internal circuit is insulated with optocoupler.
- After turning on the power supply, the analog output has the output variable factor.

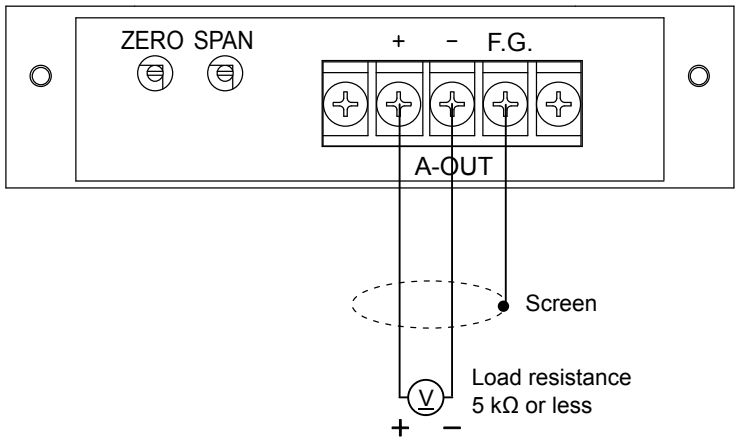
  Please turn on the power supply for about one hour before to use it in stable condition.

18.1.3 Connection of analog output

- Current output



- Voltage output



Note:

- Use shielded cable and connect the shield to the F.G. terminal.
- To conform with CE mark or JIS standards, use shielded cable and connect the shield to the F.G. terminal.

18.1.4 Analog output target

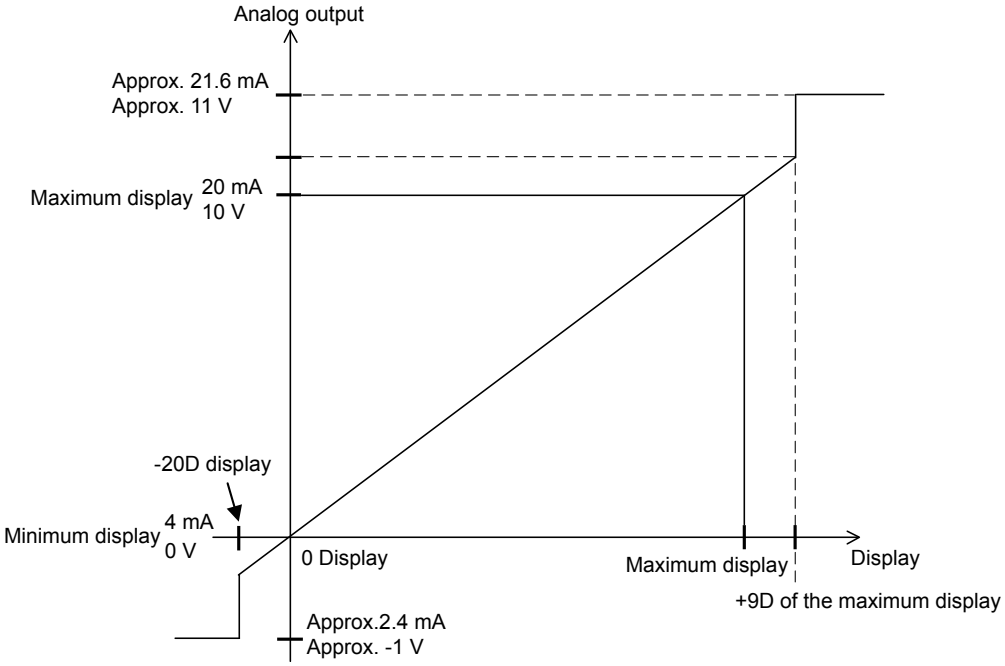
The analog output target is selected by C function CF-70.

The analog output target can be selected from [Display interlock], [Gross value] and [Net value].

The default is [Display interlock].

18.1.5 Scaling of analog output

The analog output is set as the minimum value to the maximum value from 0 to 10 000 by setting CF-71 and CF-72.



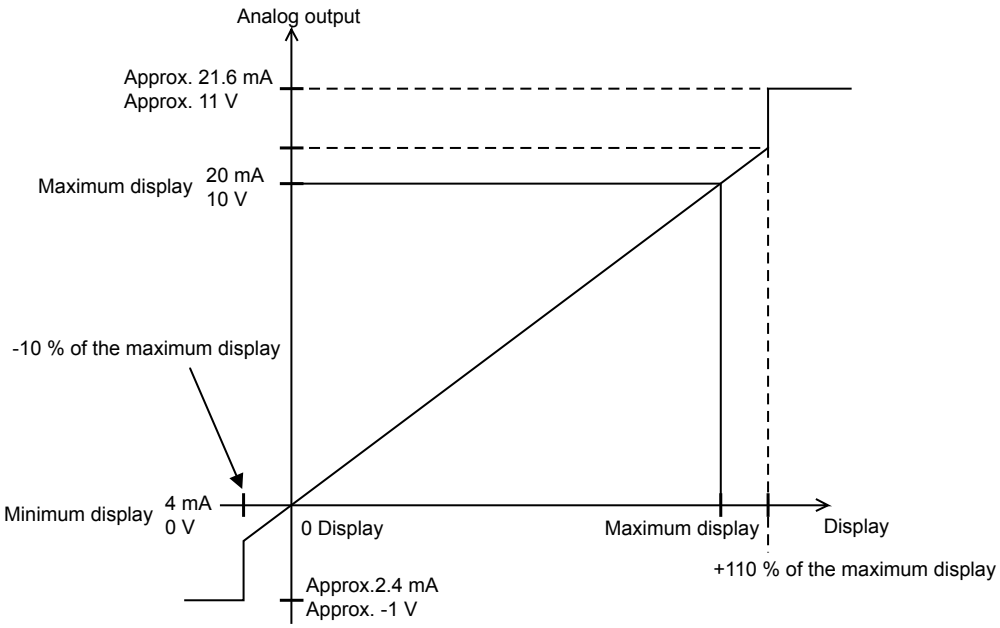
CF-71 sets the display when the minimum value is output.

CF-72 sets the display when the maximum value is output.

Note:

- The CF-72 setting must not exceed the maximum load, as described in Chapter 6.
- The CF-71 setting must be less than the CF-72 setting.

Set CF-03 to 0 or 1 for analog output scaling.



CF-71 sets the display when the minimum value is output.

CF-72 sets the display when the maximum value is output.

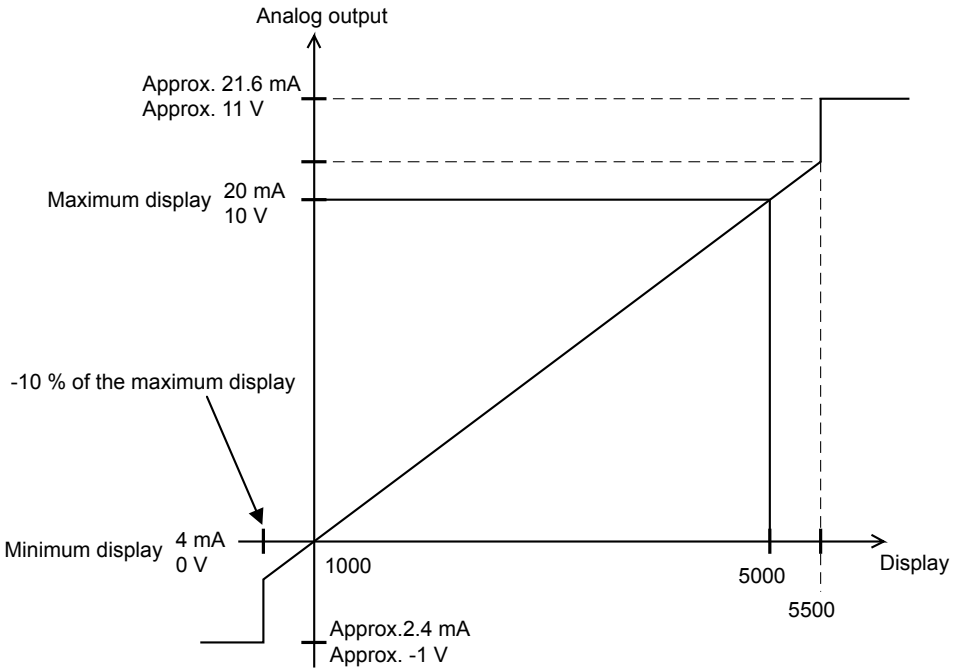
Example:

CF-71: Set to 1 000

CF-72: Set to 5 000

The maximum value is output when the display is 5 000.

The minimum value is output when the display is 1 000.



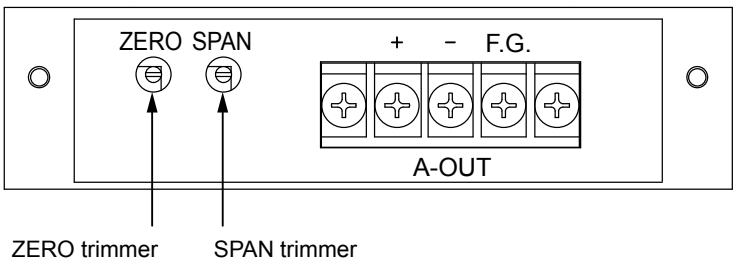
Note:

- The CF-72 setting must not exceed the maximum load, as described in Chapter 6.
- The CF-71 setting must be less than the CF-72 setting.

18.1.6 Analog output fine calibration

After the analog output scaling is executed by setting C function CF-71 and CF-72, the fine adjustment is executed by the trimmer ZERO and the trimmer SPAN.

The fine adjustment range is approx. ±10 % of full scale.



18.2 BCD output

18.2.1 Specifications (model CSD-903-P15)

The BCD output specifications are given below.

Specifications	I/O	Content
BCD data	Output	8 digit parallel output
POL. (Polarity)	Output	ON for negative polarity output, OFF for positive polarity output
P.C. (Print command)	Output	ON for a certain length of time after BCD output is converted
ERROR	Output	ON when the error occurs.
OVER	Output	ON synchronizing with the OL display (Over load).
Decimal point 10^1, decimal point 10^2, decimal point 10^3, decimal point 10^4	Output	ON synchronizing with the decimal point display setting.
Stable	Output	ON when stability is detected.
Gross value	Output	ON when the BCD output is gross weight
HOLD	Input	BCD output hold
BCD-ENABLE	Input	BCD-related output is forcibly set to high impedance.

18.2.2 Operation mode of BCD output

The operation mode of BCD output is selected by the setting of function F-30.

The operation mode of BCD output can be selected from [Stream mode], [Synchronizing with print], [Synchronizing with accumulation] and [Synchronizing with finish].

Default is set to [Stream mode].

18.2.3 BCD output target

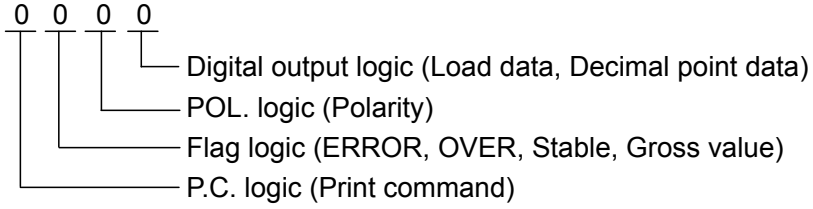
The BCD output target is selected by the function F-31 setting.

Function No.	Set value	Contents
F-31	0	Display interlock
	1	Gross weight
	2	Net weight
	3	Tare weight
	4	Accumulated total value
	5	Accumulated count

The default is [0].

18.2.4 Logic of BCD output

The logic of BCD output is selected by the setting of function F-32.

Function no.	Set value	Contents
F-32	0000 to 1111	 0 : Negative logic 1 : Positive logic

Default is set to [0].

18.2.5 Width of P.C. (Print command)

The print command width is selected by the function F-33 setting.
Print command width can be selected from [125 ms], [25 ms] and [5 ms].
The default is [25 ms].

Note:

The print command is unstable during start-up due to BCD data conversion.

Be sure to read the correct print command BCD data.

18.2.6 BCD output times

BCD output times is selected by the function F-34 setting.
BCD output times is selected from [100 times/s], [20 times/s] and [4 times/s].
The default is [4 times/s].

18.2.7 Pin assignment of the BCD output

Pin No.	Input/Output	BCD code		Pin No.	Input/Output	BCD code	
1	Output	1	10^0	26	Output	1	10^5
2	Output	2		27	Output	2	
3	Output	4		28	Output	4	
4	Output	8		29	Output	8	
5	Output	1	10^1	30	Output	1	10^6
6	Output	2		31	Output	2	
7	Output	4		32	Output	4	
8	Output	8		33	Output	8	
9	Output	1	10^2	34	Output	1	10^7
10	Output	2		35	Output	2	

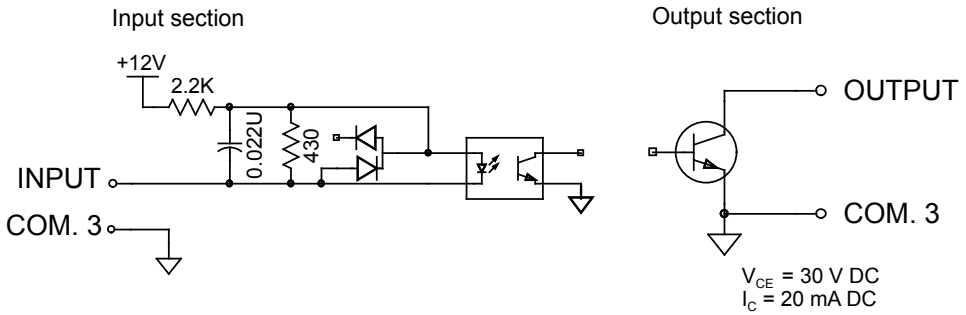
Pin No.	Input/Output	BCD code		Pin No.	Input/Output	BCD code
11	Output	4		36	Output	4
12	Output	8		37	Output	8
13	Output	1	10^3	38	Output	Decimal point 10^1
14	Output	2		39	Output	Decimal point 10^2
15	Output	4		40	Output	Decimal point 10^3
16	Output	8		41	Output	Decimal point 10^4
17	Output	1	10^4	42	Output	Stable
18	Output	2		43	–	N.C.
19	Output	4		44	Output	Gross value
20	Output	8		45	Input	BCD-ENABLE
21	–	N.C.		46	Output	OVER
22	–	N.C.		47	Output	P.C.
23	Output	POL.		48	Output	P.C.
24	–	COM.3		49	Input	HOLD
25	Output	ERROR		50	–	COM.3

Applicable plug: 57-30500 (DDK)

Note:

- Do not connect with N.C. pin.
- The external control input COM (two pins) and the COM for BCD output are common.
- The internal circuit and optocoupler is insulated.
- The output is turned off except for the measurement mode.
- To suit the instrument with the CE conformity or applied JIS standard, use a shielded cable and connectors attached metallic shells. Shield and connector's metallic shell parts are attached directly.

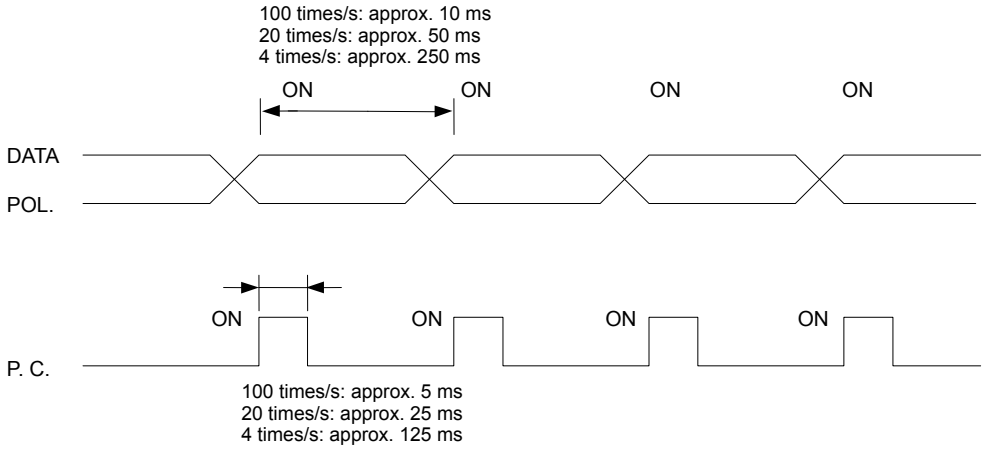
18.2.8 I/O equivalent circuits



18.2.9 Timing chart

The following chart shows the BCD output timing.

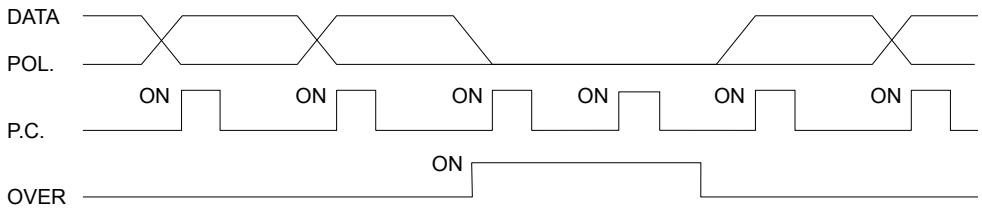
Example 1: Normal



Note:

When P.C., DATA and POL. are all output, the output transistor switch turns ON (negative logic).

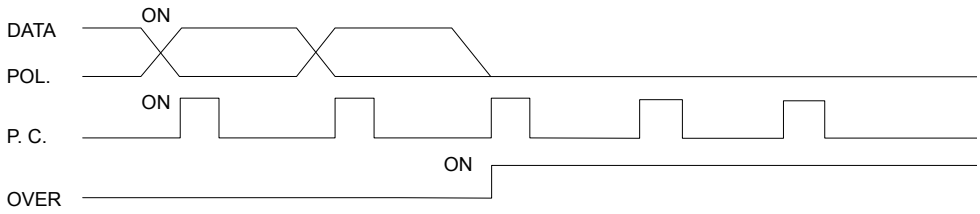
Example 2: Data overload status



Note:

When P.C., DATA and POL. are all output, the output transistor switch turns ON (negative logic). For all DATA, the output transistor turns OFF (positive logic) when OVER is output. (However, POL. is normally OFF for [OL] and ON for [–OL]).

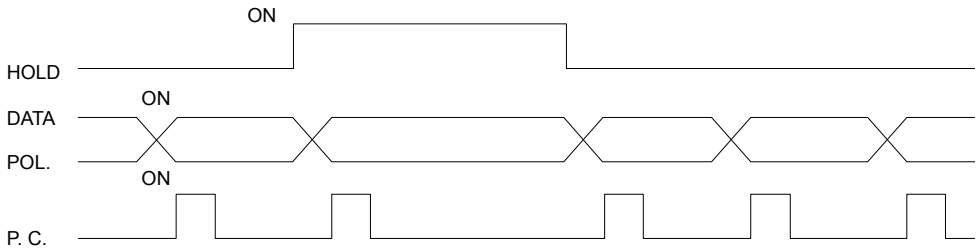
Example 3: When an error occurs



Note:

When P.C., DATA and POL. are all output, the output transistor switch turns ON (negative logic). When ERROR is output, all DATA and POL. output transistors turn OFF (positive logic).

Example 4: When the HOLD signal is input



Note:

- In this case, HOLD signal input operation is executed after a bridge of 100 ms or more.
- When the HOLD signal is input, the P.C. output transistor turns OFF (positive logic). The P.C. HOLD signal turns OFF after one-shot operation.

18.2.10 Output condition

Output logic setting	Output data	Transistor state	Pin-to-COM level when an external voltage is applied
Negative logic	Yes	ON	L
	No	OFF	H
Positive logic	Yes	OFF	H
	No	ON	L

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

18.3.1 RS-232C interface specification (P/N: CSD-903-P74)

Item	Specification
Communication method	Half duplex

Item	Specification
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
Input/output monitor	LED (TXD and RXD)

18.3.2 RS-422/485 interface specification (P/N: CSD-903-P76)

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
No. of connectable unit	Up to 32 units maximum (RS-422: 10 units)
Termination resistance	Built-in (Yes/No can be selected by the connection of terminal boards.)
Input/output monitor	LED (TXD and RXD)

18.3.3 Operation mode of RS-232C and RS-422/485

The RS-232C operation mode is selected by function F-40.

RS-232C operation mode can be selected from [Command mode], [Stream mode] and [Synchronized with print].

The default is [Command mode].

RS-422/485 operation mode is selected by function F-49.

RS-422/485 operation mode can be selected from [Command mode] and [Stream mode].

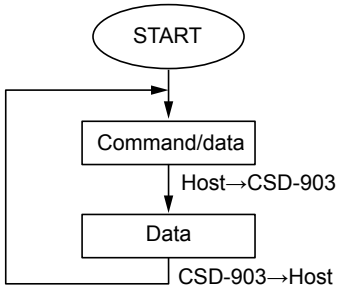
The default is [Command mode].

Note:

Data is output at constant intervals in stream mode. Host-side control is disabled.

Command mode

Data is sent back from CSD-903 to the host according to the command/data sent to CSD-903 by the host (personal computer, sequencer, etc.). Execute communication according to the following procedure.



Stream mode

When RS-232C or RS-422/485 are used, this mode continues to output the latest data of the output target selected by function F-41. However, the output frequency depends on the baud rate setting.

Synchronized with print

When RS-232C is used, output target data selected by function F-41 is output synchronized with the print signal (F key, external control input and automatic print).

Note:

- Communication can only be executed in weighing mode. An error code is transmitted if other modes are used.
- This mode does not respond in stand-by condition.
- CSD-903 has no flow control.
- CTS/RTS signal is not used.
- X-flow control is not executed by the device.
- Communication operation is an interactive mode.

18.3.4 Output target synchronized with RS-232C print for RS-232C and RS-422/485

RS-232C and RS-422/485 output targets are selected by function F-41.

RS-232C and RS-422/485 output targets can be selected from [Display interlock], [Gross weight], [Net weight] and [Conditional load display data].

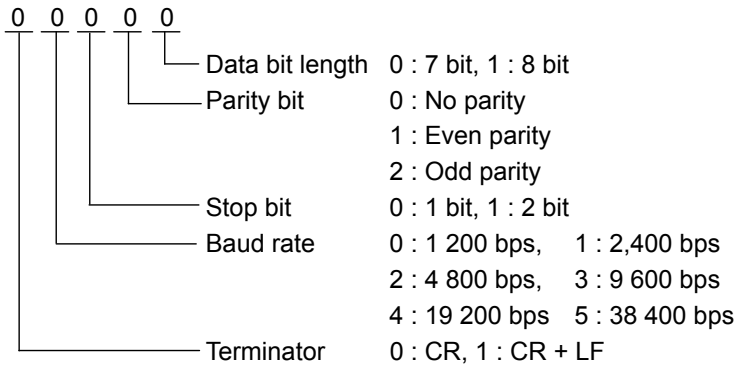
The default is [Display interlock].

Note:

- If an RS-232C interface is installed, function F-41 is valid if F-40 is set to [1 to 4].
- If an RS422/485 interface is installed, function F-41 is valid if F-49 is set to [1].

18.3.5 Communication specifications by RS-232C and RS-422/485

RS-232C and RS-422/485 communication specifications are selected by function F-42.
The default is [13020]

Function No.	Set value	Details
F-42	00000 to 15121	

18.3.6 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

18.3.7 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

18.3.8 Delay time for RS-485 return data

Return data can be delayed at the CSD-903side 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: 0 to 9	Default : 01
Unit: 0.1 s	

18.3.9 Transmission data decimal point usage for RS-232C and RS-422/485

Transmission data decimal point usage for RS-232C is selected by function F-46.
The default is [0].

18.3.10 Pin assignment of the RS-232C interface

Pin assignment of the RS-232C interface is given below.

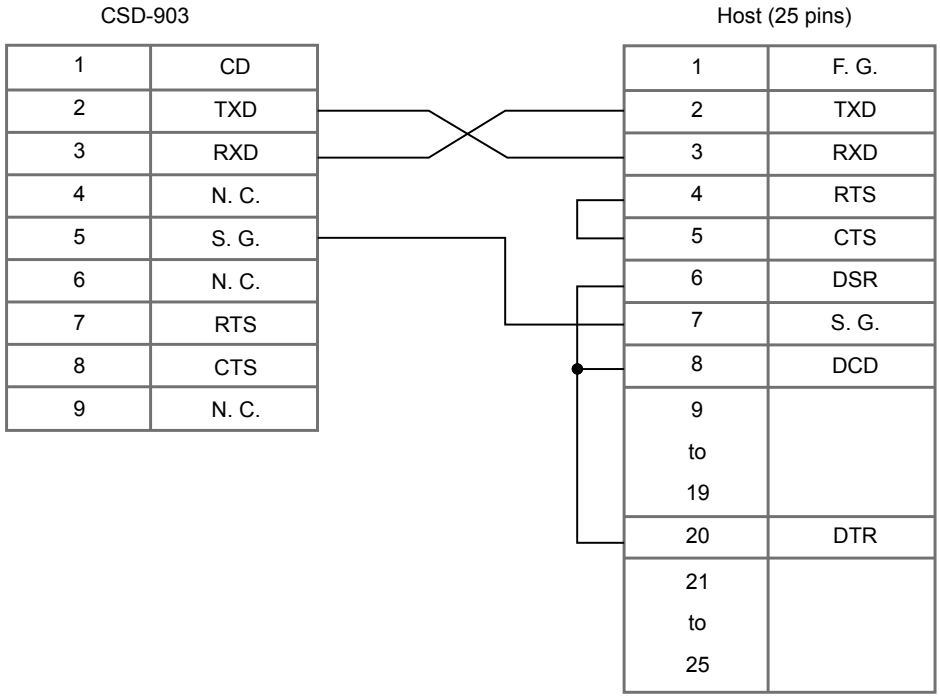
Pin number	Signal name
1	CD
2	TXD
3	RXD
4	N. C.
5	S. G.
6	N. C.
7	RTS
8	CTS
9	N. C.

Plug: DE-9S-NR (JAE) or equivalent (not included)

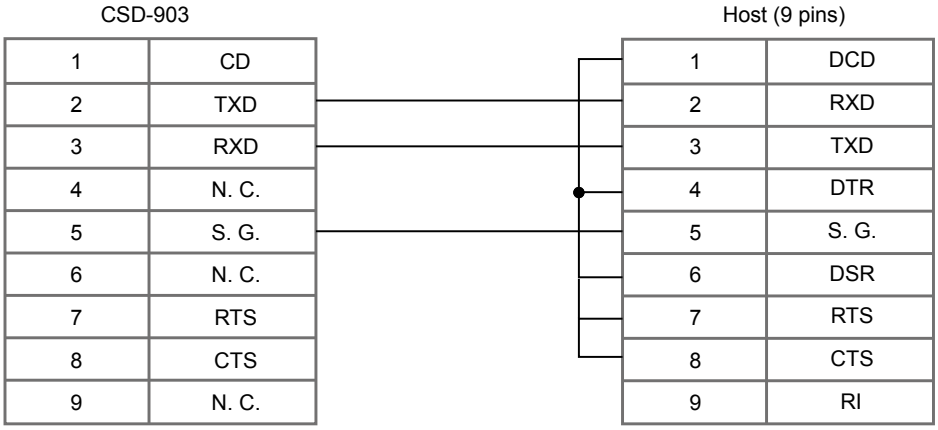
Note:

- The screws for the fixing base of plug at the connector of RS-232C interface is inch type thread.
- Do not connect with N.C. pin.
- The internal circuit and optocoupler is insulated.
- The external control in put COM. (two pins) and S.G. for RS-232C are common.
- The internal circuit and photo-coupler is insulated.
- To suit the instrument with the CE conformity or applied JIS standard, please use a shielded cable and connectors attached metallic shells. Shield and connector's metallic shell parts are attached directly.

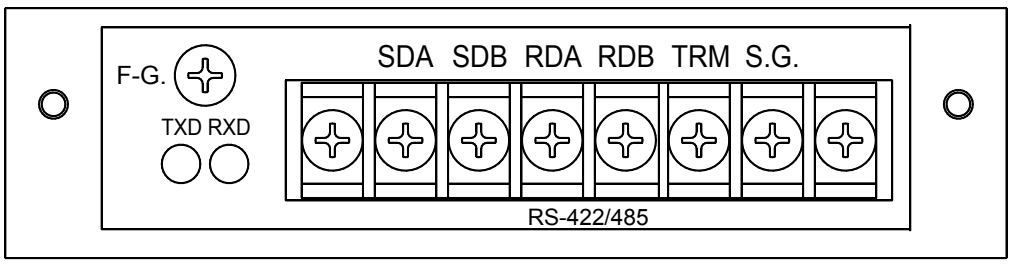
Wiring example 1:



Wiring example 2:



18.3.11 Pin assignment of the 422/485 interface



SDA	Difference output (+)
SDB	Difference output (–)
RDA	Difference input (+)

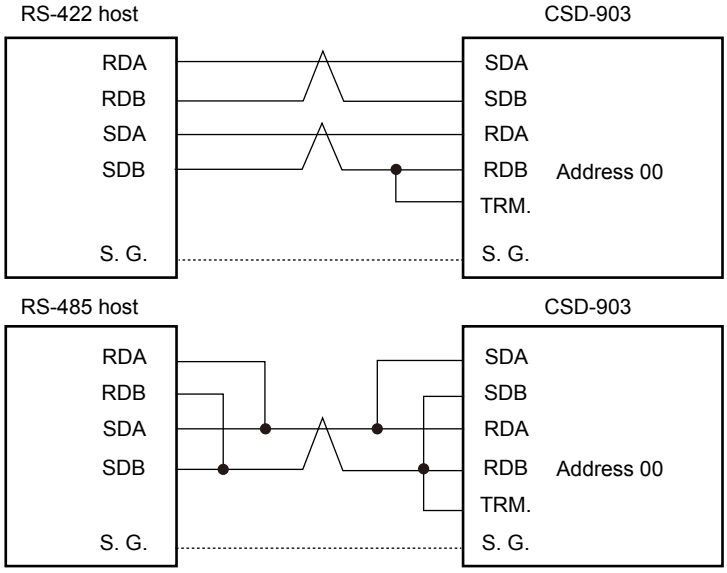
RDB	Difference input (–)
TRM	Cable end resistance
S.G.	Signal ground

Note:

- Please connect the internal terminating resistance by shortening between the TRM terminal and RDB terminal which is the furthest from the host. (personal computer, sequencer, etc).
- For the connection, we recommend to apply twisted pair wires.
- The external control input COM. (two pins) and the S.G. for RS-422/485 are common.
- Internal circuit and photo-coupler is insulated.
- To suit the instrument with the CE conformity or applied JIS standard, please use a shielded cable and connect the shield to the serial interface output terminal board.

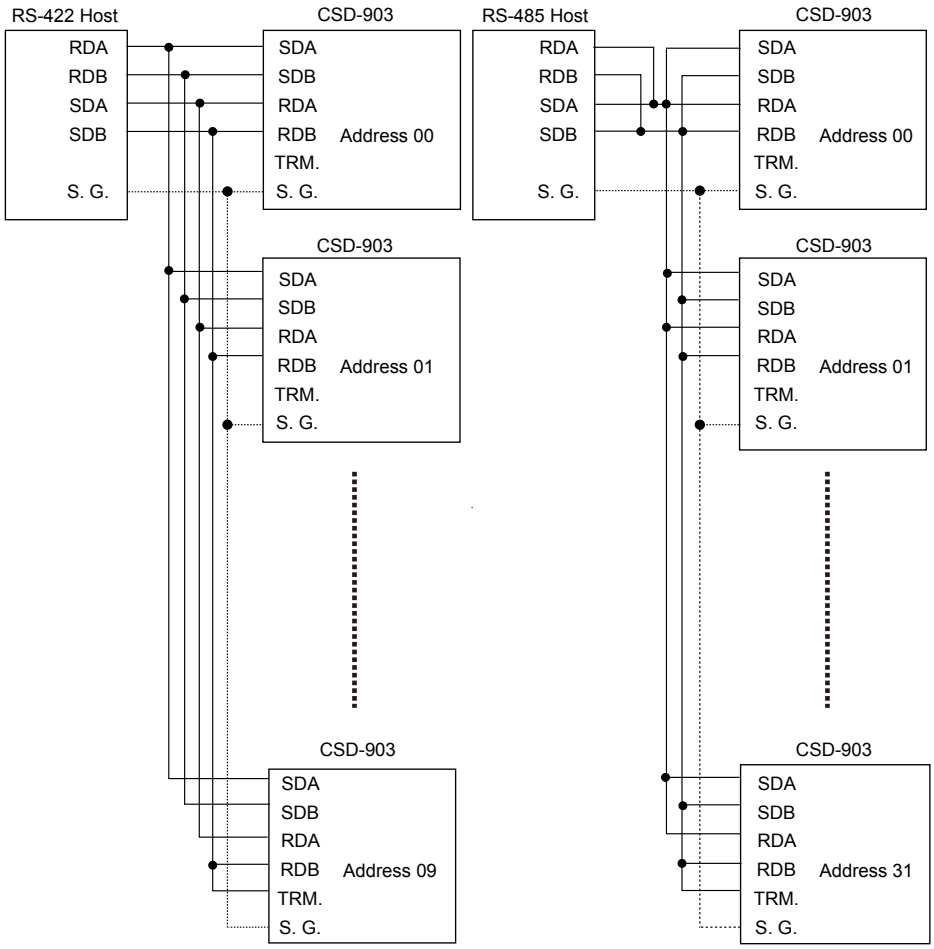
18.3.11.1 Connecting with CSD-903

The procedure to connect the CSD-903 with the RS-422/485 interface is given below.



18.3.11.2 Connecting multiple CSD-903s

The procedure to connect multiple CSD-903s with an RS-422/485 interface is given below.



Connect the cable end resistance at the remote place from the host.
Connect the terminal resistance at the furthest from the host

Note:

- There may have no S.G depends on the equipment on the host side.
- The polarity of the signal of the host computer may have an opposite case depending on the instrument.
- Depending on the instrument at the side of host, there may have the case of no SG terminal.
- For the connection, we recommend you to use twist pair wires.

18.3.12 Data format of command mode

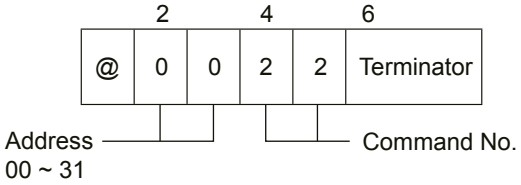
Note:

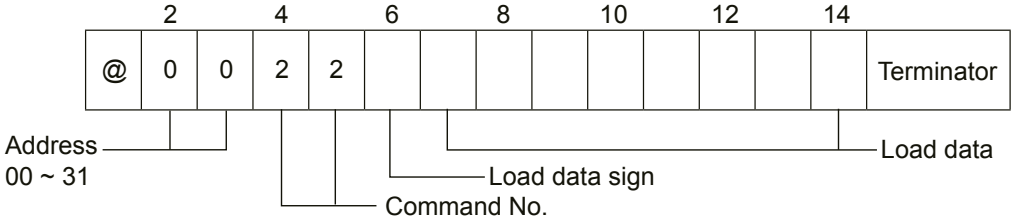
- The address is fixed at [00] for the RS-232C interface.
- Load data enters from the right.
- [–] is entered for negative values and [+] for positive values.
- Zero suppression is performed on the load data.
- The decimal point is set in a specified position when the decimal point position is set with F-46 and when decimal point is specified with CF-01.
- 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.
- The empty parts are all spaces.
- The command number 24 accumulation value readout (8 digits) display ranges from –19 999 999 to 99 999 999. The command number 27 accumulation value readout (10 digits) display ranges from –9 999 999 999 to 9 999 999 999.

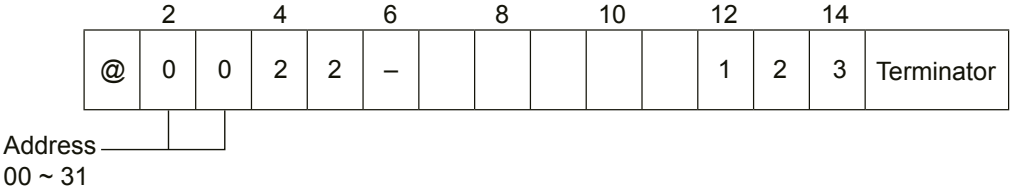
18.3.12.1 Reading load data (host → device)

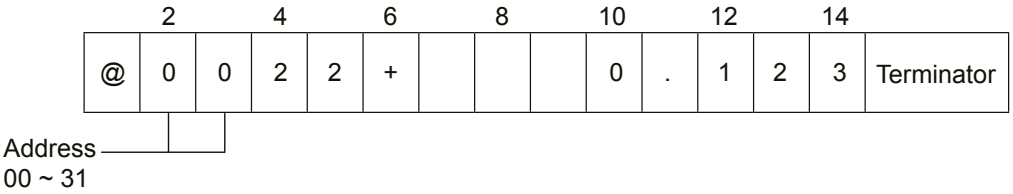
Command number 20 ~ 25

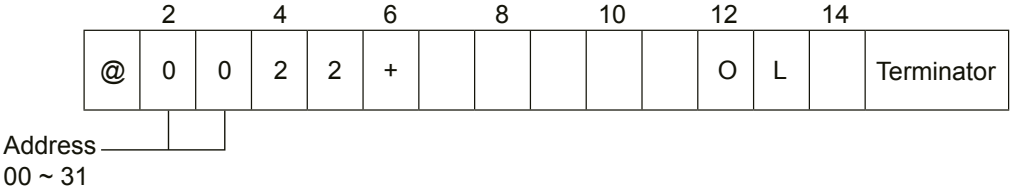
Command No.	Operation
20	Reading load data
21	Reading gross weight
22	Reading net weight
23	Reading tare weight
24	Reading accumulation value (8 digits)
25	Reading accumulation times
26	Reading conditional load display data
27	Reading accumulation value (10 digits)

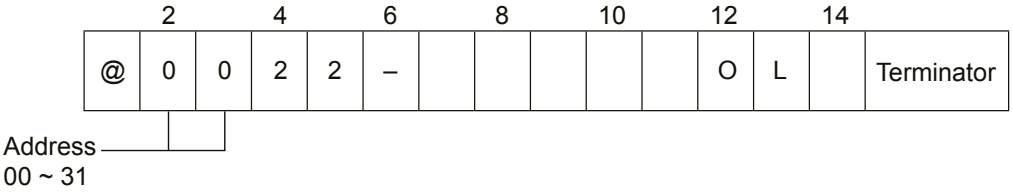




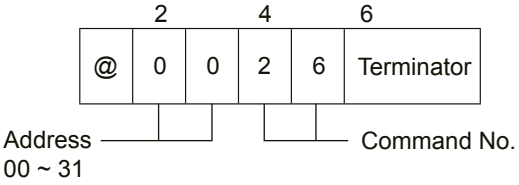




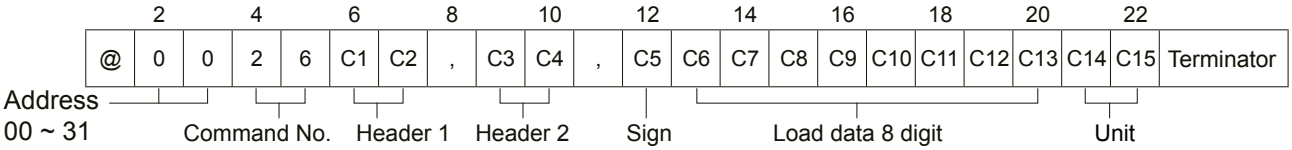




Command number 26



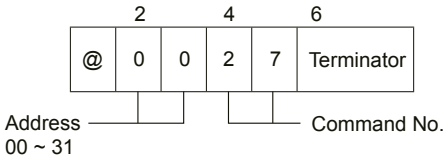
Return (device → host)



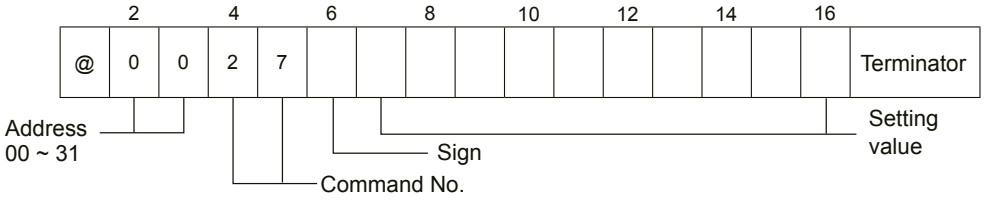
Function			Function			Sign		Load data (8 digits)								Unit		
C1	C2	Details	C3	C4	Details	C5	Details	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	Details
O	L	Overload	N	T	Net weight	+	Positive						1	2	3		g	Gram
S	T	Stable	G	S	Gross weight	–	Negative				0	.	1	2	3	k	g	Kilogram
U	S	Unstable											O	L			t	Ton
																l	b	Pound
																	N	Newton

Function	Function	Sign	Load data (8 digits)	Unit		
				k	N	Kilo Newton

Command number 27

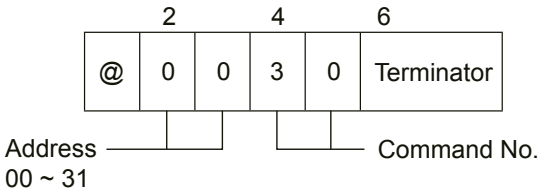


Return (device → host)

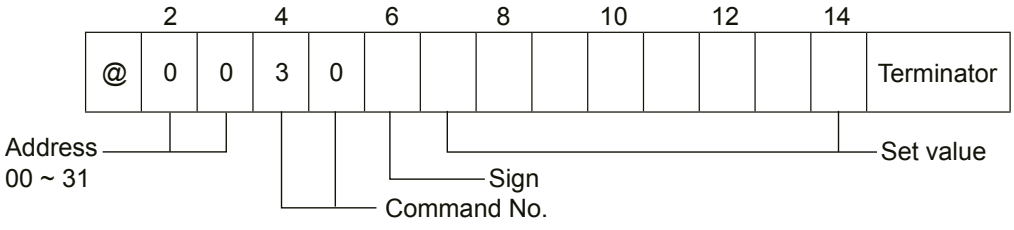


18.3.12.2 Reading weighing setting data (host → device)

Command No.	Operation
30	Reading fixed value (SET1)
31	Reading preset tare weight
32	Reading overshoot (SET2)
33	Reading prior to fixed value 1 (SET3)
34	Reading prior to fixed value 2 (SET4)
35	Reading over (SET5)
36	Reading under (SET6)
37	Reading FULL (SET8)
38	Reading near zero (SET7)
39	Reading effective brand number
3A	Reading setting brand number

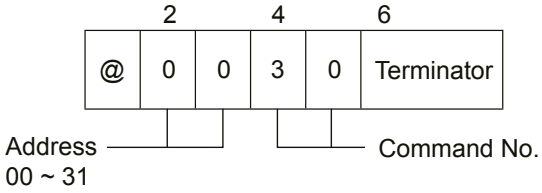


Return (host → device)

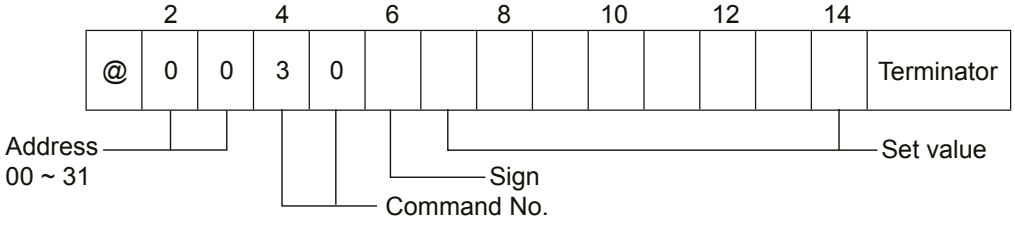


18.3.12.3 Reading comparison data (host → device)

Command No.	Operation
30	Reading S1 setting
31	Reading S4 setting
32	Reading S3 setting
33	Reading S2 setting
36	Reading full
37	Reading near zero
38	Reading tare weight
39	Reading effective brand number
3A	Reading setting brand number

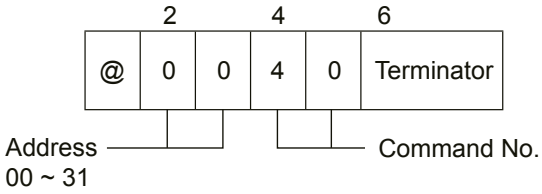


Return (device → host)

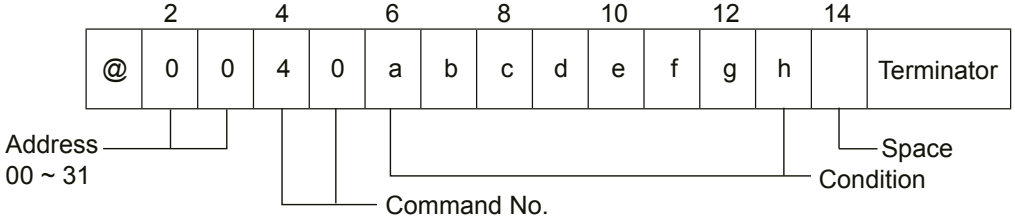


18.3.12.4 Reading condition 1 (host → device)

Command No.	Operation
40	Reading condition 1



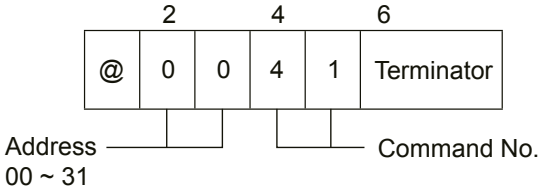
Return (device → host)



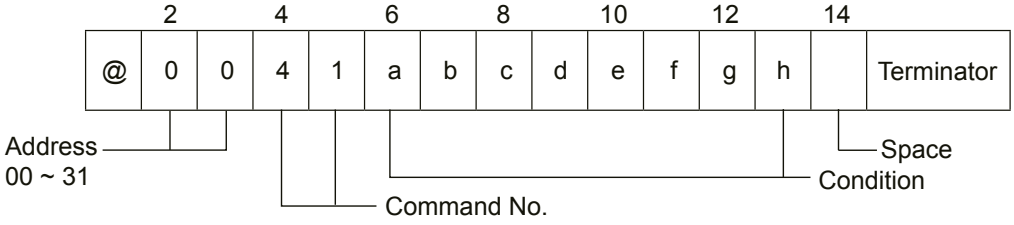
a: Accumulate	[1] = ON; [0] = OFF
b: Preset tare weight	[1] = ON; [0] = OFF
c: Tare weight	[1] = ON; [0] = OFF
d: Gross weight	[1] = ON; [0] = OFF
e: Net weight	[1] = ON; [0] = OFF
f: Center of Zero	[1] = ON; [0] = OFF
g: Hold	[1] = ON; [0] = OFF
h: ERROR	[1] = ON; [0] = OFF

18.3.12.5 Reading condition 2 (host → device)

Command No.	Operation
41	Reading condition 2



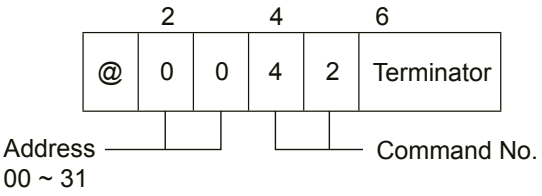
Return (device → host)



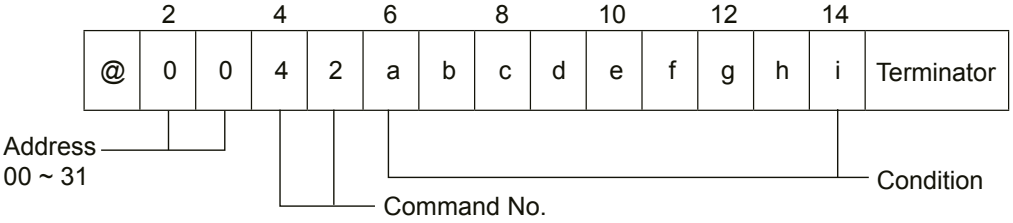
a: Near zero	[1] = ON; [0] = OFF
b: F. (Coarse) Flow/S1	[1] = ON; [0] = OFF
c: M. (Middle) Flow/S2	[1] = ON; [0] = OFF
d: D. (Fine) Flow/S3	[1] = ON; [0] = OFF
e: Over/S4	[1] = ON; [0] = OFF
f: OK/S0	[1] = ON; [0] = OFF
g: Under	[1] = ON; [0] = OFF
h: Full	[1] = ON; [0] = OFF

18.3.12.6 Reading condition 3 (host → device)

Command No.	Operation
42	Reading condition 3



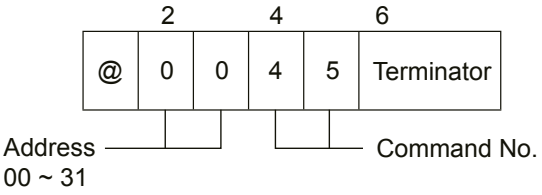
Return (device → host)



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 No.
Refer to "20 Sequence error."	

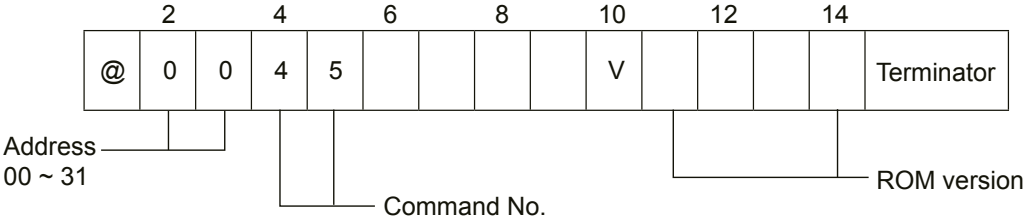
18.3.12.7 Reading ROM version (host → device)

Command No.	Operation
45	Reading ROM version



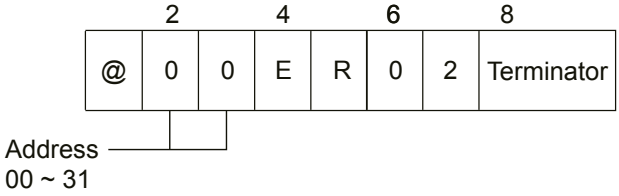
Under normal operation

Return (device → host)



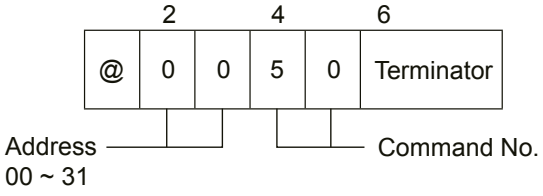
Under abnormal operation

Return (device → host)



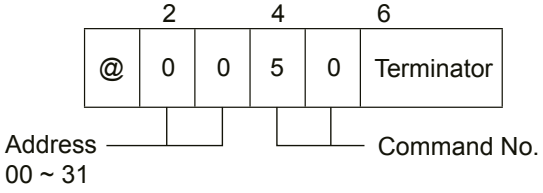
18.3.12.8 Change of condition (host → device)

Command No.	Operation
50	GROSS WEIGHT DISPLAY
51	NET WEIGHT DISPLAY
52	ZERO
53	Zero clear
54	Tare weight
55	Tare weight clear
56	Inflow start
58	Discharge start
5C	Accumulation command
5D	Clear the last accumulation data
5E	Accumulation clear
5F	Accumulation clear for all brands
5I	Error cancellation
5J	Emergency stop



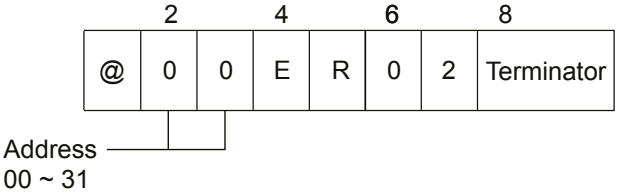
Under normal operation

Return (device → host)



Under abnormal operation

Return (device → host)



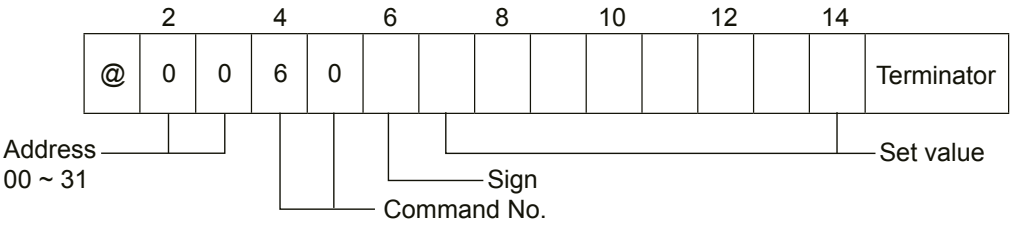
Note:

Error is transmitted under the following conditions:

- 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
- Cannot execute accumulation because of accumulation overload when the accumulation Command 5C is executed

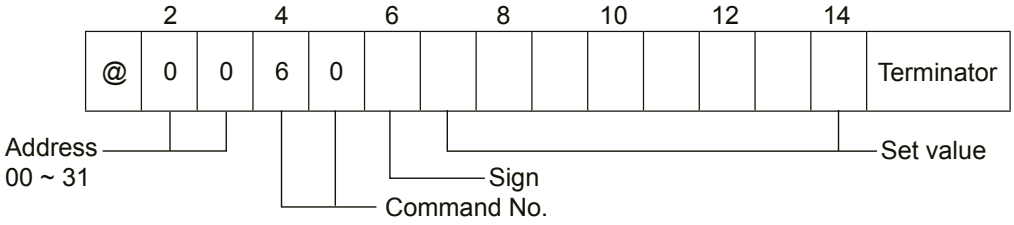
18.3.12.9 Writing weighing setting data (host → device)

Command No.	Operation
60	Writing fixed value (SET1)
61	Writing overshoot (SET2)
62	Writing prior to fixed value 1 (SET3)
63	Writing prior to fixed value 2 (SET4)
64	Writing over (SET5)
65	Writing under (SET6)
66	Writing FULL (SET8)
67	Writing NEAR ZERO (SET7)
68	Writing tare weight
69	Writing effective brand number
6A	Writing setting brand number



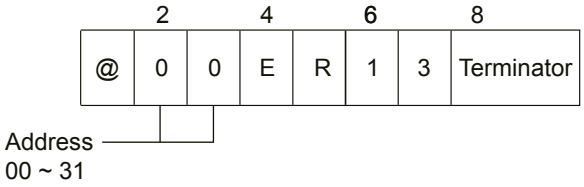
Under normal operation

Return (device → host)



Under abnormal operation

Return (device → host)



Note:

- Values are entered from the right.
- Do not add a decimal point.
- Set the storage destination to Internal RAM when the set value is continuously changed and the number of EEPROM rewrites might exceed 1 000 000.
- Do not change in the setting during weighing because the A/D sampling rate decreases temporarily while rewriting the set value. Set the storage destination to Internal RAM to facilitate changes setting values during weighing.
- To write the effective brand number for [Command 69], set function F-51 to [2].
- Weighing setting data writing allows the setting to be changed for the brand number selected by [Command 6A].

Note:

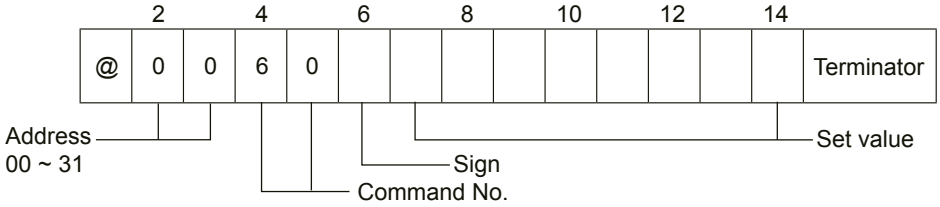
The error transmission condition is as follows:

- There is a disagreement in scale interval.
- A value that exceeds the regular value is set
- A non-numerical character is set.
- A character other than + or - is set under Sign.

18.3.12.10 Writing comparison set data (host → device)

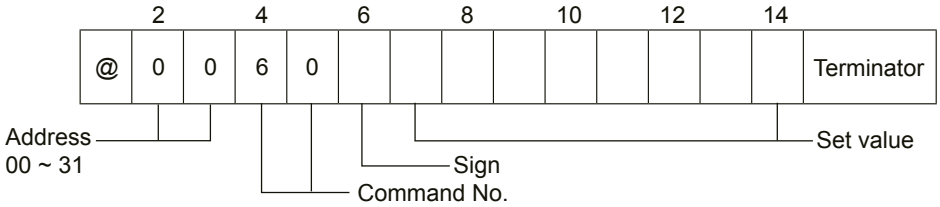
Command No.	Operation
60	Writing S1 setting
61	Writing S4 setting

Command No.	Operation
62	Writing S5 setting
63	Writing S2 setting
66	Writing full
67	Writing near zero
68	Writing tare weight
69	Writing effective brand number
6A	Writing setting brand number



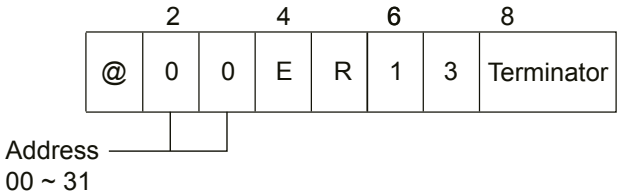
Under normal operation

Return (device → host)



Under abnormal operation

Return (device → host)



Note:

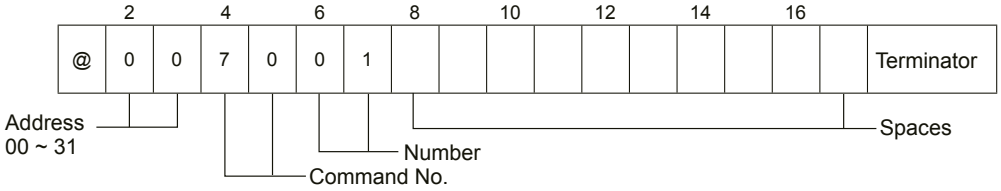
- Values are entered from the right.
- Do not add a decimal point.
- Set the storage destination to Internal RAM when the set value is continuously changed and the number of EEPROM rewrites might exceed 1,000,000.
- Do not change in the setting during weighing because the A/D sampling rate decreases temporarily while rewriting the set value. Set the storage destination to Internal RAM to facilitate changes setting values during weighing.
- To write the effective brand number for [Command 69], set function F-51 to [2].
- Weighing setting data writing allows the setting to be changed for the brand number selected by [Command 6A].

Note:

The error transmission condition is as follows:

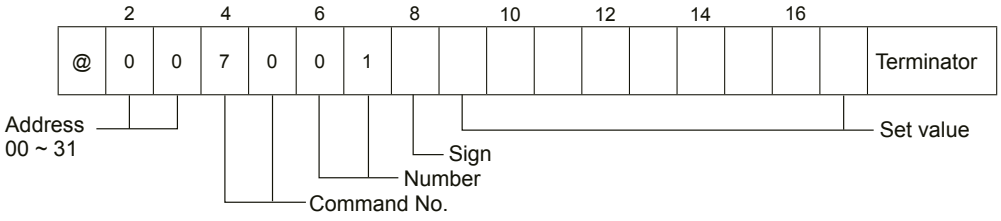
- There is a disagreement in scale interval.
- A value that exceeds the regular value is set
- A non-numerical character is set.
- A character other than + or - is set under Sign.

18.3.12.11 Reading the set value (host → device)



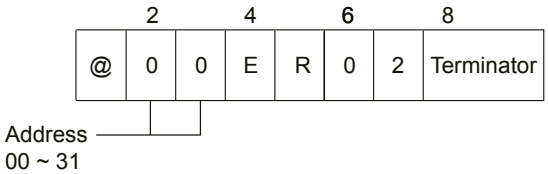
Under normal operation

Return (device → host)

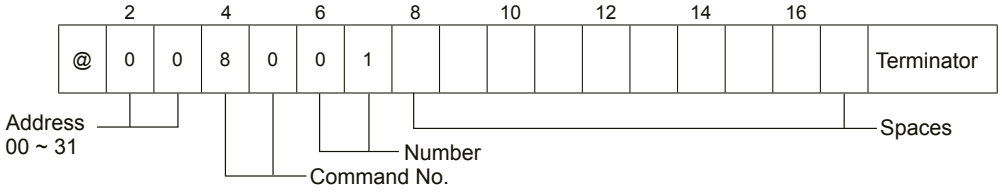


Under abnormal operation

Return (device → host)

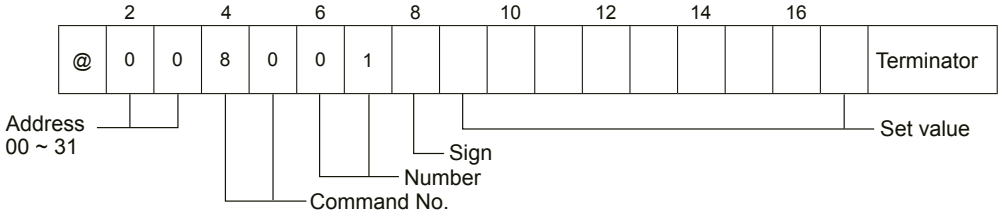


18.3.12.12 Writing set values (host → device)



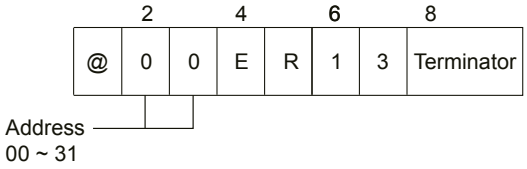
Under normal operation

Return (device → host)



Under abnormal operation

Return (device → host)



Note:

- Values are entered from the right.
- Do not add a decimal point.
- Do not change in the setting during weighing because the A/D sampling rate decreases temporarily while rewriting the set value.

18.3.12.12.1 Reading commands

Item	Function No.	Number	Return command set value
Digital filter setting	70	01	1 to 256 (Unit : Moving average time, 1 time)
Analog filter setting	70	02	0: 2 Hz; 1: 4 Hz; 2: 6 Hz; 3: 8 Hz; 4: 10 Hz
Display time	70	04	0: 4 times/s; 1: 20 times/s
Stabilization filter setting	70	05	1 to 256 (Unit : Moving average time, 1 time)
Stabilization filter data width	70	06	0 to 999 (Unit: 0.1 D)
Stabilization filter time width	70	07	00 to 99; Unit: 0.1 s)

Item	Function No.	Number	Return command set value
Lock key 1	70	08	0000 to 1111 (0 : Invalid; 1: Valid) 10^0: ON/OFF key 10^1: Setting key 10^2: Accumulation key 10^3: Tare weight set key
Lock key 2	70	09	0000 to 1111 (0 : Invalid; 1: Valid) 10^0: Tare weight cancellation key 10^1: Net or gross weight key 10^2: Zero set key 10^3: F key
Stability detection data width	70	10	000 to 999 (Unit: 0.1 D)
Stability detection time	70	11	00 to 99; Unit: 0.1 s)
Preset tare weight cancellation operating condition	70	15	0: Effective; 1: Invalid
Automatic print operation	70	16	00 to 11 10^0: Manual print operation only when stable 0: Effective only when stable 1: Always effective 10^1: Automatic print operation 0: Automatic printing off 1: Automatic printing only when stable
Hold operation	70	17	0: Synchronized with Hold 1: Synchronized with Inflow Finish
Hold target	70	18	0000 to 1111 (0: Invalid; 1: Valid) 10^0: Display 10^1: Comparison result 10^2: CC-Link interface 10^3: Serial interface

Item	Function No.	Number	Return command set value
Sub-display section	70	19	0: OFF 1: A Brand (1 digit)/Accumulation times (6 digits)/Accumulation value (8 digits) 2: B Brand (1 digit)/Accumulation times (6 digits)/Last accumulation data (6 digits) 3: C Brand (1 digit)/Last accumulation data (6 digits)/Accumulation value (8 digits) 4: D Brand (1 digit)/Last accumulation data (6 digits)/OK (6 digits) 5: E Brand (1 digit)/Accumulation times (6 digits)/OK (6 digits) 6: F Brand (1 digit)/OK (6 digits)/Accumulation value (8 digits) 7: G Brand (1 digit)/Near zero (6 digits)/Full (6 digits) 8: OK (6 digits)/Over (5 digits)/Under (5 digits) 9: I Brand (1 digit)/OK (6 digits)/Overshoot (6 digits) 10: J Brand (1 digit)/S1 (6 digits)/S2 (6 digits) 11: K Brand (1 digit)/S1 (6 digits)/S3 (6 digits) 12: L Brand (1 digit)/S1 (6 digits)/S4 (6 digits) 13: M Brand (1 digit)/S2 (6 digits)/S3 (6 digits) 14: N Brand (1 digit)/S2 (6 digits)/S4 (6 digits) 15: O Brand (1 digit)/S3 (6 digits)/S4 (6 digits) 16: P Brand (1 digit)/OK (6 digits) 17: Q Brand (1 digit)/Over (5 digits)/Under (5 digits) 18: R Brand (1 digit)/Accumulation times (6 digits) 19: S Brand (1 digit)/Accumulation value (10 digits) 20: T Brand (1 digit)/Last accumulation data (6 digits)
Comparator brand setting target	70	20	0 to 7
4-step check operation target	70	21	0000 to 1111 (0: Display interlock; 1: Gross weight; 2: Net weight) 10^0: Comparator S1 operation target 10^1: Comparator S2 operation target 10^3: Comparator S3 operation target 10^4: Comparator S4 operation target
4-step check operation condition	70	22	0000 to 1111 (0: OFF; 1: More than; 2: Less than) 10^0: Comparator S1 operation condition 10^1: Comparator S2 operation condition 10^3: Comparator S3 operation condition 10^4: Comparator S4 operation condition

Item	Function No.	Number	Return command set value
4-step check S0 operation condition	70	23	0: Always OFF 1: On when both S1 and S2 outputs are OFF 2: On when both S1 and S3 outputs are OFF 3: On when both S1 and S4 outputs are OFF 4: On when both S2 and S3 outputs are OFF 5: On when both S2 and S4 outputs are OFF 6: On when both S3 and S4 outputs are OFF 7: On when Gross weight ≥ Maximum load
Comparator hysteresis operation condition	70	24	0: On delay; 1: Off delay
Comparator hysteresis data width	70	25	00 to 99; Unit: 1 D)
Comparator hysteresis time width	70	26	00 to 99; Unit: 0.1 s)
BCD output operation mode	70	30	0: Stream 1: SYNC. WITH PRINT 2: SYNC. WITH ACCUM 3: SYNC. WITH FINISH
BCD output target	70	31	0: Display interlock; 1: Gross value; 2: Net weight; 3: Tare weight; 4: Accumulation total 5: Accumulation frequency
BCD output logic	70	32	0000 to 1111 (0: Negative logic; 1: Positive logic) 10^0: Data output logic (Weighing operation and Decimal point) 10^1: Polarity logic 10^2: Flag logic (ERROR, OVER, STABLE, GROSS WEIGHT) 10^3: P.C. logic
BCD P.C. (Print command)	70	33	0: 125 ms; 1: 25 ms; 2: 5 ms
BCD output time	70	34	0: 4 times/s; 1: 20 times/s; 0: 4 times/s; 1: 20 times/s
S-I/F automatic print operation	70	37	0: OFF; 1: SYNC. WITH PRINT; 2: SYNC. WITH ACCUM; 3: SYNC. WITH FINISH
RS-232C operating mode	70	40	0: Command mode; 1: Stream 2: SYNC. WITH PRINT; 3: SYNC. WITH ACCUM 4: SYNC. WITH FINISH
RS-232C output target	70	41	0: Display interlock; 1: Gross value; 2: Net weight 3: Load display data with condition

Item	Function No.	Number	Return command set value
RS-2332C/422/485 communication specification	70	42	00000 to 15121 10^0: Data bit length 0: 7bit; 1: 8 bit 10^1: Parity 0: No parity; 1: Even parity; 2: Odd parity 10^2: Stop bit 0: 1bit; 1: 2 bit 10^3: 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: Terminator 0: CR; 1: CR+LF
RS-422/485 Address setting	70	43	00 to 31
RS-422/485 changeover	70	44	0: RS-422; 1: RS-485
RS-485 reply data delay time	70	45	00 to 99; Unit: 10 ms)
RS-232C/422/485 transmission data decimal point usage	70	46	0: None; 1: Present
Standard RS-485 operation	70	47	0: Command mode; 1: Modbus mode 2: Stream mode; 3: Synchronized with finish signal; 4: Synchronized with accumulation signal; 5: Synchronized with print signal
Standard RS-485 output target	70	48	0: Display interlock; 1: Gross weight; 2: Net weight; 3: Conditional displayed data
RS-422/RS-485 operation mode	70	49	0: Command mode; 1: Stream mode
Accumulation function operating condition	70	50	000 to 121 10^0: Accumulation command operation 0: Only when stable; 1: Always 10^1: Automatic accumulation operation 0: OFF; 1: Synchronized with finish; 2: Automatic accumulation function 10^2: Automatic accumulation condition 0: Only in OK mode; 1: No condition
Brand changeover target	70	51	0: Changeover by function 1: Changeover by external control input 2: Changeover by communication
Brand number	70	52	0 to 7
Setting F key operation	70	55	0: OFF; 1: Print Input; 2: Hold Input; 3: Inflow start; 4: Emergency stop; 5: Zero clear; 6: Tare weight clear; 7: Accumulation clear; 8: Weighing comparison; 9: Forced inflow finish

Item	Function No.	Number	Return command set value
External control input INPUT1 operation setting	70	60	0: OFF 1: [ON-OFF] key operation 2: [SET] key operation 3: [ACCUM] key operation 4: [PRESET TARE WEIGHT] key operation 5: [TARE WEIGHT] key operation 6: [NET-GROSS WEIGHT] key operation 7: [ZERO] key operation 8: [F] key operation 9: Zero clear 10: Tare weight clear 11: Inflow start 12: Discharge start 13: Inflow/Discharge changeover ON: Discharge; OFF: Inflow 14: Clear the last accumulation data 15: Accumulation clear 16: Error cancellation 17: Print command 18: Hold 19: Emergency stop 20: Manual overshoot compensation 21: Net weight display 22: Forced inflow finish 23: Forced discharge finish 24: Accumulation clear for all brands 25: Brand No. 1 26: Brand No. 2 27: Brand No. 4
External control INPUT2 operation setting	70	61	Optional, in addition to F-60
External control INPUT3 operation setting	70	62	Optional, in addition to F-60
External control INPUT4 operation setting	70	63	Optional, in addition to F-60
External control INPUT5 operation setting	70	64	Optional, in addition to F-60
External control INPUT6 operation setting	70	65	Optional, in addition to F-60
External control INPUT7 operation setting	70	66	Optional, in addition to F-60
External control INPUT8 operation setting	70	67	Optional, in addition to F-60
External control INPUT9 operation setting	70	68	Optional, in addition to F-60

Item	Function No.	Number	Return command set value
External control OUTPUT1 operation setting	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: Abnormal weight; 09: Weighing sequence error; 10: Z-Band; 11: OK (S0); 12: Coarse flow (S1); 13: Middle flow (S2); 14: Fine flow (S3); 15: Over (S4); 16: Under; 17: Full; 18: During weighing; 19: Finish weighing; 20: Discharge (between discharge gates); 21: Finish discharge (between discharge gates); 22: RUN
External control OUTPUT2 operation setting	70	71	Optional, in addition to F-70
External control OUTPUT3 operation setting	70	72	Optional, in addition to F-70
External control OUTPUT4 operation setting	70	73	Optional, in addition to F-70
External control OUTPUT5 operation setting	70	74	Optional, in addition to F-70
External control OUTPUT6 operation setting	70	75	Optional, in addition to F-70
External control OUTPUT7 operation setting	70	76	Optional, in addition to F-70
External control OUTPUT8 operation setting	70	77	Optional, in addition to F-70
External control OUTPUT9 operation setting	70	78	Optional, in addition to F-70
External control OUTPUT10 operation setting	70	79	Optional, in addition to F-70
External control OUTPUT11 operation setting	70	80	Optional, in addition to F-70
External control OUTPUT12 operation setting	70	81	Optional, in addition to F-70
External control OUTPUT13 operation setting	70	82	Optional, in addition to F-70
Maintenance date	70	90	Do not use
Maintenance No.	70	91	Do not use
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: 20 times/s; 1: 200 times/s

Item	Function No.	Number	Return command set value
Overload display condition	71	03	0: Greater than | maximum load + 9 D | 1: When the amount exceeds maximum load ±110% 2: Less than –20 D and larger than maximum load +9 D
Unit	71	05	0: No unit; 1: g; 2: kg; 3: t; 4: lb; 5: N; 6: kN
Bridge power supply	71	07	0: 10 V DC; 1: 5 V DC, 2: 2.5 V DC
Zero set operating condition	71	10	0: Operation when stable 1: Unconditional operation
Zero set effective range	71	11	00 to 30 (Unit : ±1% of maximum load)
Zero tracking target	71	12	0: Gross weight and net weight (load display) 1: Gross weight (gross weight display only)
ZERO tracking data width	71	13	00 to 99; Unit: 0.1 D)
Zero tracking time width	71	14	00 to 99; Unit: 0.1 s)
Power on zero operation	71	15	0: Invalid; 1: Effective
Tare weight cancellation operating condition	71	16	0: Operation when stable and 0 < GROSS WEIGHT ≤ MAXIMUM LOAD 1: Unconditional operation and 0 < GROSS WEIGHT ≤ MAXIMUM LOAD 2: Operation when stable and 0 < GROSS WEIGHT ≤| MAXIMUM LOAD| 3: Unconditional operation and 0 < GROSS WEIGHT ≤| MAXIMUM LOAD|
Date saved	71	17	0: RAM; 1: EEPROM
Power on clear	71	18	000 to 111 (0: Invalid; 1: Effective) 10^1: Tare weight cancellation data 10^2: Preset tare weight cancellation data 10^3: Zero set and zero tracking data
Setting method for gravity acceleration compensation	71	25	0: Set the district number 1: Set the numerical value for gravity acceleration
District number for place of use	71	26	01 to 16 (Unit: District)
District number for place of calibration	71	27	01 to 16 (Unit: District)
Gravity acceleration setting for place of use	71	28	9.000 to 9.999 (Unit: m/s^2)
Gravity acceleration setting for place of calibration	71	29	9.000 to 9.999 (Unit: m/s^2)

Item	Function No.	Number	Return command set value
Range switch operation	71	40	0: Range change OFF; 1: Can be changed between two ranges; 2: Can be changed between three ranges
Setting the scale interval of the second range	71	41	0: 1 scale interval; 1: 2 scale interval; 2: 5 scale interval; 3: 10 scale interval; 4: 20 scale interval; 5: 50 scale interval
Setting the boundary value for the second range	71	42	000000 to 999999
Setting the scale interval of the third range	71	43	0: 1 scale interval; 1: 2 scale interval; 2: 5 scale interval; 3: 10 scale interval; 4: 20 scale interval; 5: 50 scale interval
Setting the boundary value for the third range	71	44	000000 to 999999
Analog output target	71	70	0: Display interlock; 1: Gross value; 2: Net weight
Display value at analog output of 4 mA DC (0 V DC)	71	71	–999999 to 999999
Display value at analog output of 20 mA DC (10 V DC)	71	72	–999999 to 999999
Calibration data for scale interval (Reference)	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 maximum load (Reference)	71	91	000000 to 999999
Calibration data for weight (Reference)	71	92	000000 to 999999
Calibration data for zero mV/V (Reference)	71	93	–3.1000 to 3.1000 (Unit: 0.00001 mV/V)
Calibration data for span mV/V (Reference)	71	94	–0.00001 to 3.1000 (Unit: 0.00001 mV/V)
Stability detection time width at calibration	71	97	00 to 99; Unit: 0.1 s)
Weighing mode	72	01	0: Simple mode 1: Sequential mode 2: 4-step check mode 1 3: 4-step check mode 2
Control mode	72	02	0: Batching mode; 1: Discharge mode; 2: 2: External input changeover
Comparison signal operation	72	05	0: ANY TIME; 1: IN STABLE MODE; 2: SYNC. WITH INFLOW FIN; 3: INFLOW FIN + HOLD

Item	Function No.	Number	Return command set value
Near zero comparison operation	72	06	0: Gross weight; 1: Net weight; 2: OFF; 3: |Gross weight|; 4 : |Net weight|
Full comparison operation	72	07	0: Gross weight; 1: Net weight; 2: OFF; 3: |Gross weight|; 4 : |Net weight|
Inflow Monitoring Timer	72	10	0000 to 9999 (Unit: 1 s)
Start above Near Zero at inflow start	72	15	0: Invalid; 1: Effective
Automatic tare weight cancellation at inflow start	72	16	0: Invalid; 1: Effective
Inflow start delay timer	72	17	0000 to 9999 (Unit: 1 s)
Automatic tare weight after inflow start delay timer	72	18	0: Invalid; 1: Effective
F. (Coarse) flow comparison stop timer	72	20	0000 to 9999 (Unit: 0.01 s)
M. (Middle) flow comparison stop timer	72	21	0000 to 9999 (Unit: 0.01 s)
D. (Fine) flow comparison stop timer	72	22	0000 to 9999 (Unit: 0.01 s)
Automatic overshoot compensation	72	25	0: Invalid; 1: Effective
Automatic overshoot compensation width	72	26	00000 to 99999 (Unit : 1 D)
Judgment condition	72	30	0: Calming time exceeded 1: Calming time exceeded and stable condition 2: Stable or timer is up
Calming time	72	31	0000 to 9999 (Unit: 0.01 s)
Maximum time of post-batching	72	35	000 to 255 (Unit : 1 time)
Judgment condition after post-batching	72	36	0: Calming time exceeded 1: Calming time exceeded and stable condition 2: Stable or timer is up
Post-batching time	72	37	0000 to 9999 (Unit: 0.01 s)
Calming time after post-batching	72	38	0000 to 9999 (Unit: 0.01 s)
Inflow finish signal output time	72	40	0000 to 9999 (Unit: 0.01 s)
Inflow finish output OFF	72	41	0: No condition 1: OL or unstable 2: Near zero
Discharge start at inflow finish	72	45	0: Invalid; 1: Effective

Item	Function No.	Number	Return command set value
Discharge monitor timer	72	46	0000 to 9999 (Unit: 0.01 s)
Discharge gate close delay time	72	47	0000 to 9999 (Unit: 0.01 s)
Discharge finish output time	72	48	0000 to 9999 (Unit: 0.01 s)
Tare weight cancellation at discharge finish	72	49	0: Invalid; 1: Effective

Note:

Change [7*] of abovementioned command to [8*] at the time of writing.

Items [40] to [47] are only read-only.

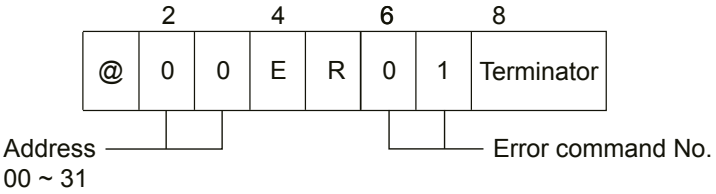
When calibration lock is valid, command [71] is read-only.

The data setting values [90] to [97] are read-only as they are calibration items.

Writing switches to commands [7*] to [8*].

18.3.12.13 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 error	In calibration mode, function mode or check mode
02	Other errors for this unit	The receiving command cannot be executed.
10	Parity error	Parity detection error
11	Fleming error	Stop bit detection error
12	Overrun error	Receiving command read error
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	Error display for zero calibration	The load cell output voltage is –2.5 mV/V or less.
21	Error display for zero calibration	The load cell output voltage is 2.5 mV/V or more.
22	Error display for span calibration	The difference in load cell output voltage between span point and zero point is 0.0 mV/V or less.

Error Command No.	Details	Remarks
23	Error display for span calibration	The load cell output voltage is 3.1 mV/V or more.

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.

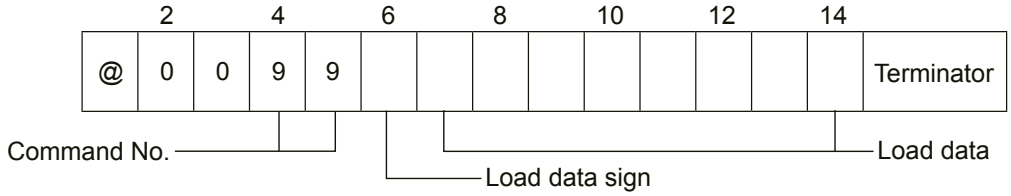
18.3.13 Data format synchronizing with data format in stream mode

Note:

- Load data is entered from the right.
- [–] is entered for negative values and [+] for positive values.
- 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.
- The blank parts are all spaces.

18.3.13.1 When the setting of function F-41 (RS-232C/422/485) or function F-48 (standard RS-485) is set to (LOAD DISPLAY), (GROSS), or (NET)

Return (device → Host)



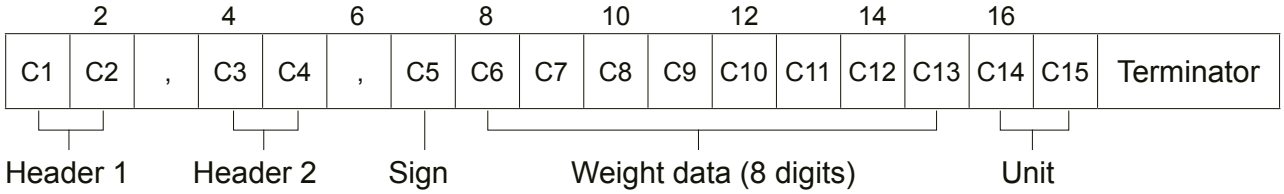
2	4	6	8	10	12	14	
@ 0	0	9	9	–		1 2	3 Terminator

2	4	6	8	10	12	14	
@ 0	0	9	9	+		0 . 1	2 3 Terminator

2	4	6	8	10	12	14	
@ 0	0	9	9	+			O L Terminator

2	4	6	8	10	12	14	
@ 0	0	9	9	–			O L Terminator

18.3.13.2 When the setting by function F-41 (RS-232C/422/485) or function F-48 (standard RS-485) is set to (Conditional weight display data)



Header 1			Header 2			Sign		Load data (8 digits)								Unit		
C1	C2	Description	C3	C4	Description	C5	Description	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	Description
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	Kilonewton

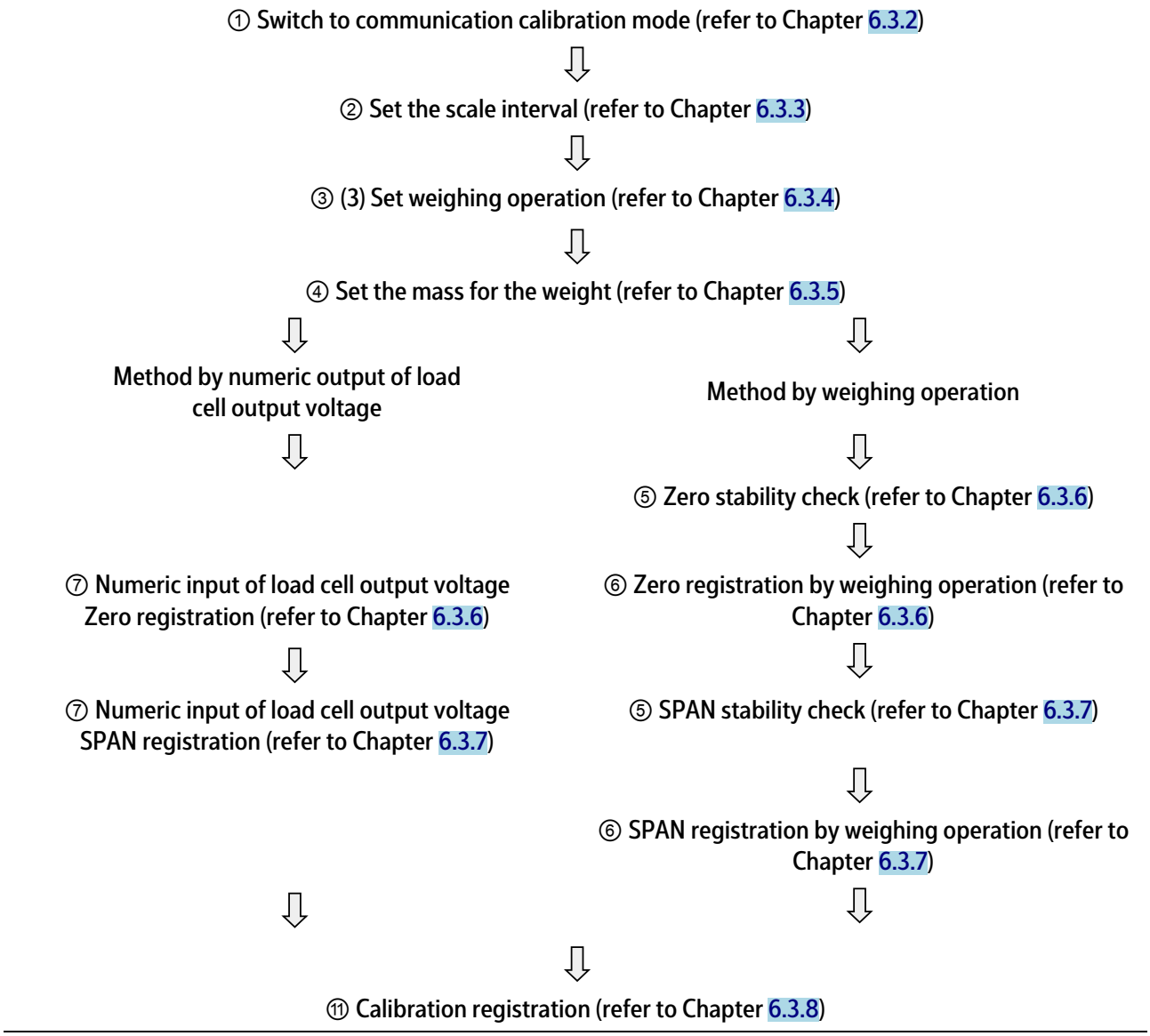
18.3.14 Data format communication calibration

Note:

- The address becomes [00] fixation for the RS-232C interface.
- The load data enters from the right.
- The sign of [–] for minus and [+] for plus is entered.
- The load data performs zero suppress.
- The decimal point adheres to a specified position when the decimal point is set with F-46 and when decimal point is specified with CF-01.
- [OL] is appeared in the load data section at the over load. [-OL] is appeared in the load data section at the condition of gross value is minus.
- The empty sections are all spaces.
- When the calibration is locked (CAL-switch), the communication-based calibration is not possible.

18.3.14.1 Calibration procedures

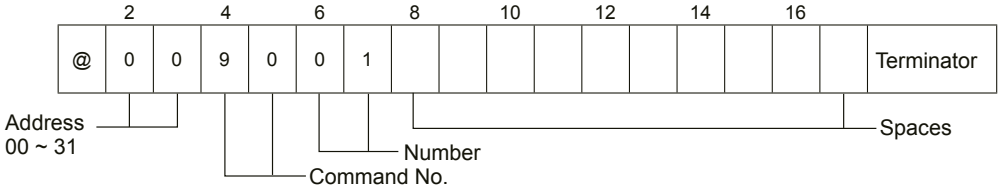
Procedures for calibration by communication are shown in the following flowchart.
Each item of the flowchart corresponds to a procedure from Chapter 6.3.1.



Note:

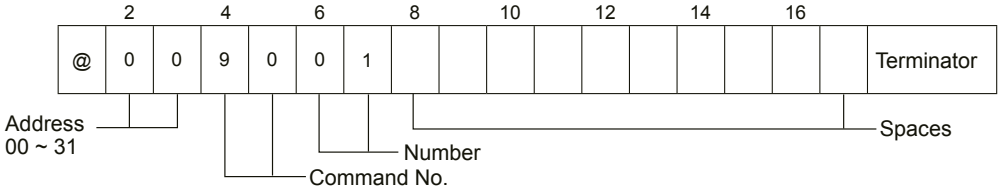
- CSD-903 displays -rS- (-RS-) during communication calibration.
- When calibration is force finished, all data returns to its condition prior to calibration without saving.
- In the case calibration by weighing value registration, register after confirming stability.

18.3.14.1.1 Switch to communication calibration mode (host → device)



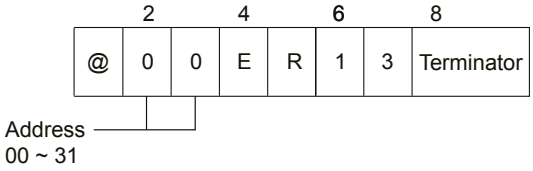
Under normal operation

Return (device → host)



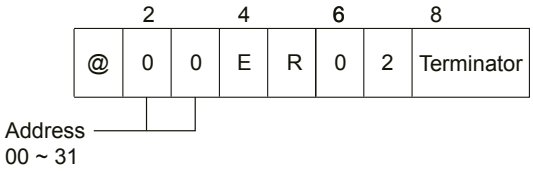
Under abnormal operation

Return (device → host)

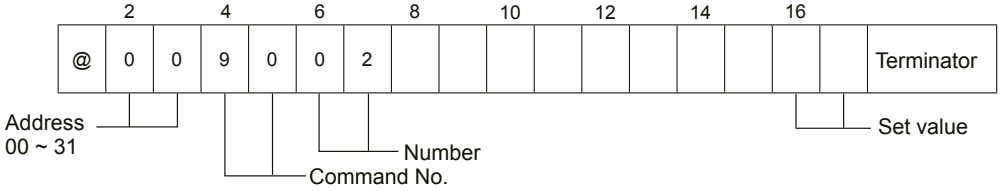


Effective calibration LOCK

Return (device → host)

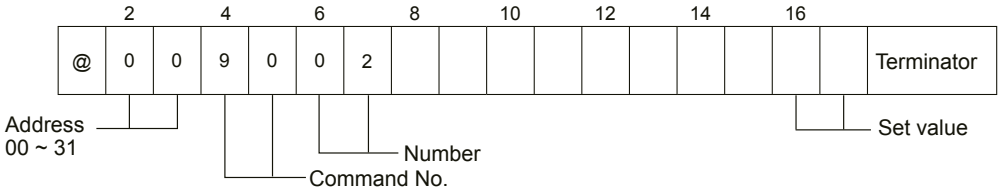


18.3.14.1.2 Setting the scale interval (host → device)



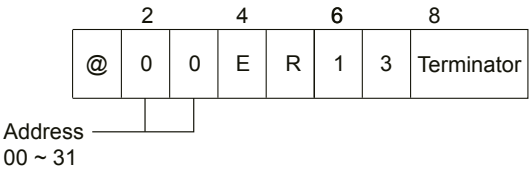
Under normal operation

Return (device → host)

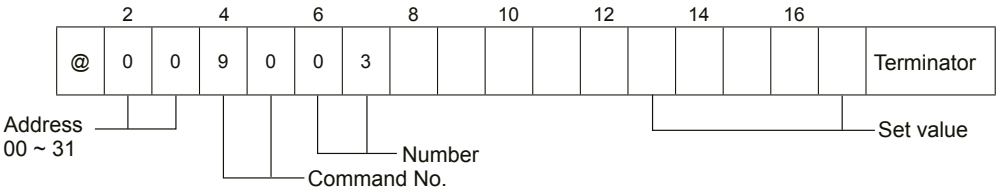


Under abnormal operation

Return (device → host)

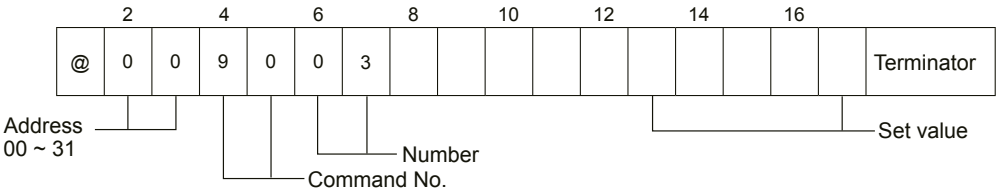


18.3.14.1.3 Setting the maximum load (host → device)



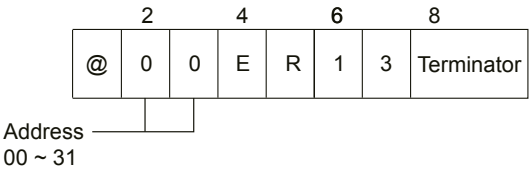
Under normal operation

Return (device → host)

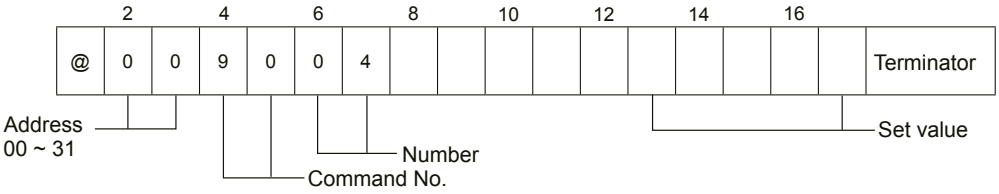


Under abnormal operation

Return (device → host)

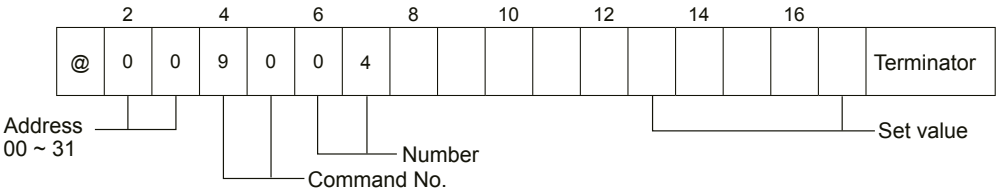


18.3.14.1.4 Set the mass of the weight (host → device)



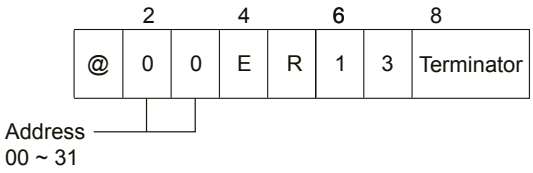
Under normal operation

Return (device → host)

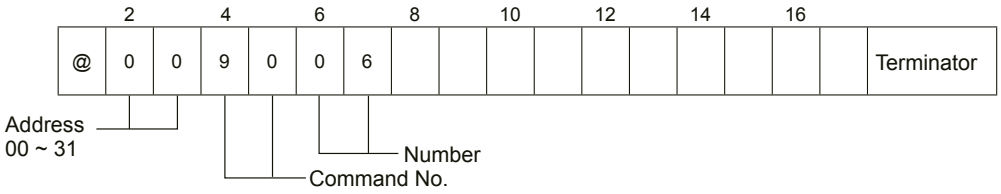


Under abnormal operation

Return (device → host)

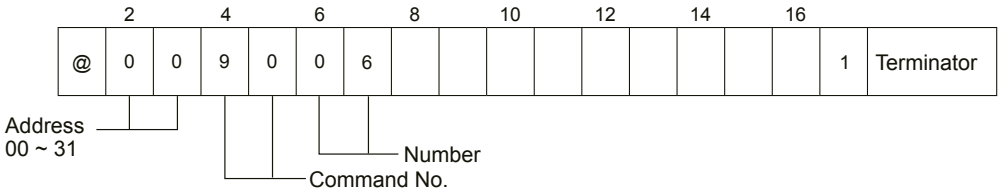


18.3.14.1.5 Zero point stability check (host → device)



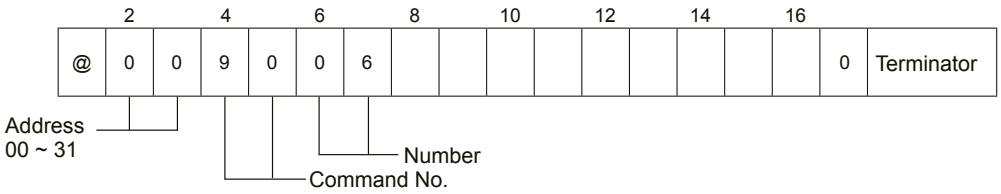
Under normal conditions

Return (device → host)

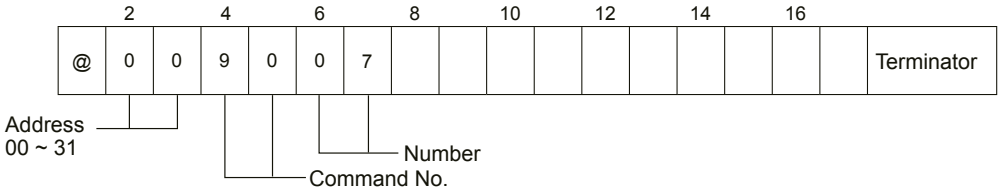


Under unstable conditions

Return (device → host)

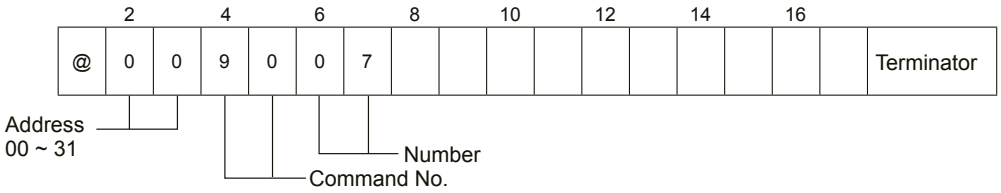


18.3.14.1.6 Zero point registration by weighing operation (host → device)



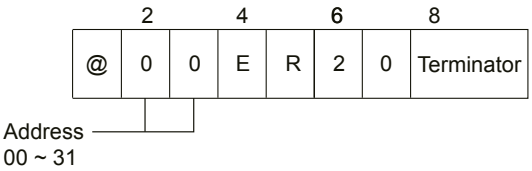
Under normal operation

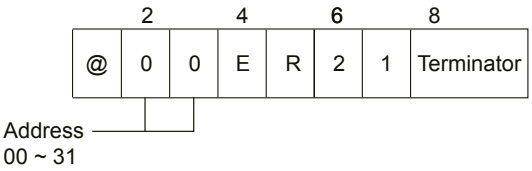
Return (device → host)



Under abnormal operation

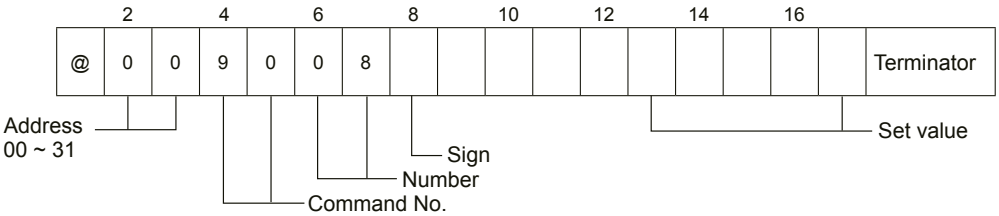
Return (device → host)





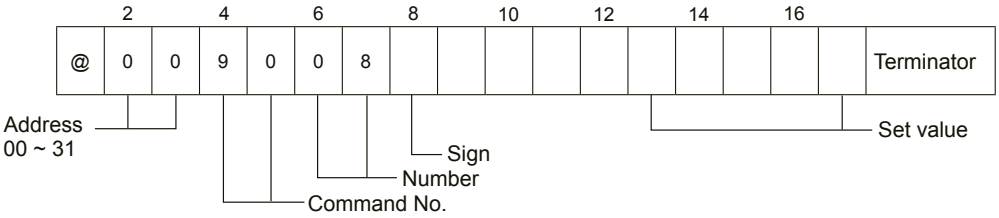
18.3.14.1.7 Numeric input of the load cell output voltage zero point registration (host → device)

18.3.14.1.7.1 ZERO calibration by numeric input (host → device)



Under normal operation

Return (device → host)

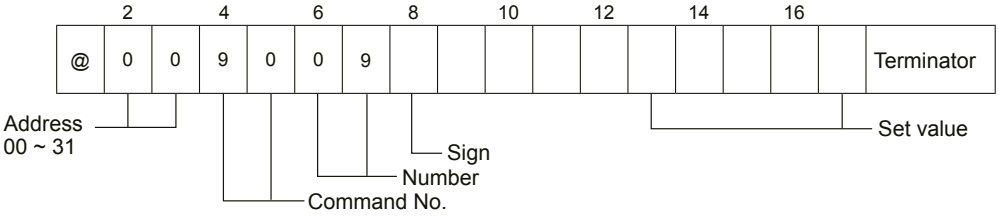


Note:

Setting the forth decimal point digit

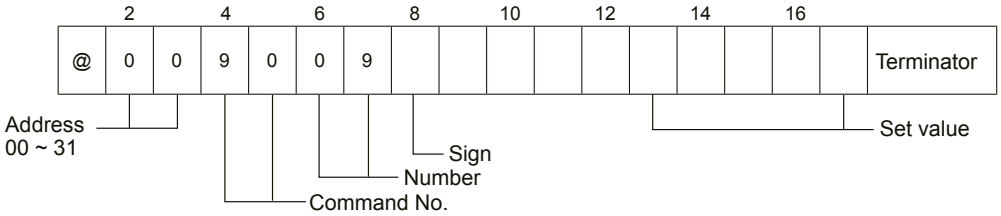
Example: Input data =10001 → 1.0001 mV/V

18.3.14.1.7.2 Setting the fifth decimal point digit



Under normal operation

Return (device → host)



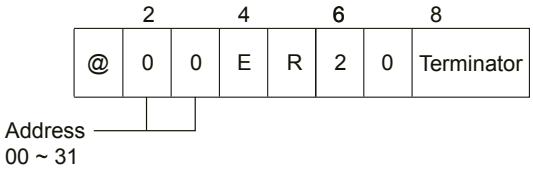
Note:

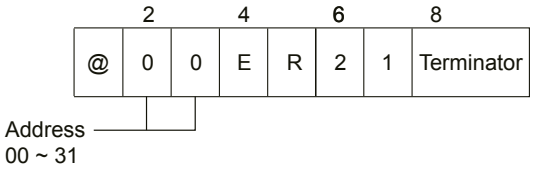
Setting the fifth decimal point digit

Example: Input data =100001 → 1.00001 mV/V

Under abnormal operation

Return (device → host)





Note:

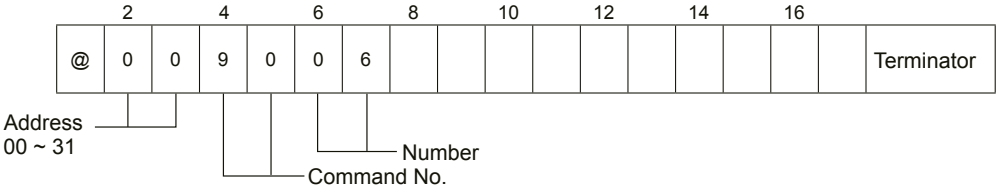
- A command to register mV/V of five digits after the decimal point for ZERO (No. 09) and SPAN (No. 12) to boost calibration has been available since ROM Ver. 2.300.

  When registering mV/V values for ZERO and SPAN, use the command that registers mV/V five digits after the decimal point for ZERO (No. 09) and SPAN (No.12).

- Continue to use the current command if the instrument is incorporated in a system that already uses mV/V four digits after the decimal point for ZERO (No. 08) and SPAN (No. 11).

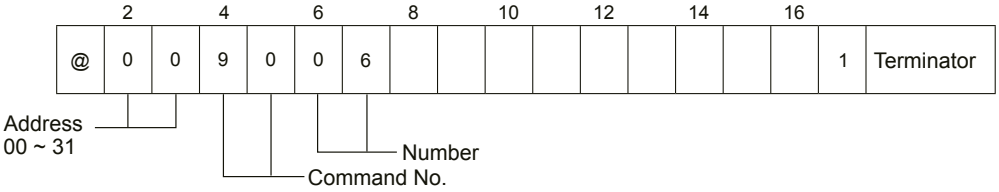
  Note that error in the set digit number may occur if the command is changed to five digits after the decimal point to register ZERO point (No.9) and SPAN point (No.12) as mV/V.

18.3.14.1.8 SPAN point stability check (host → device)



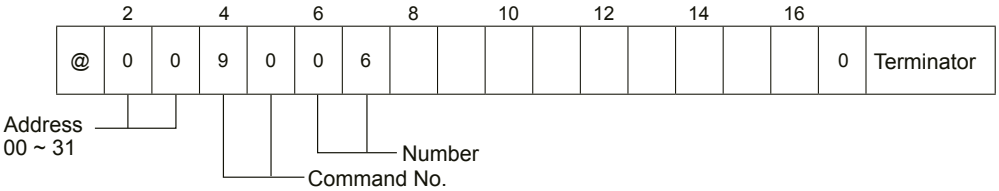
Under stable conditions

Return (device → host)

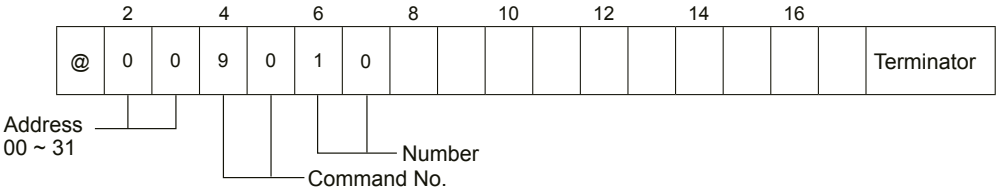


Under unstable conditions

Return (device → host)

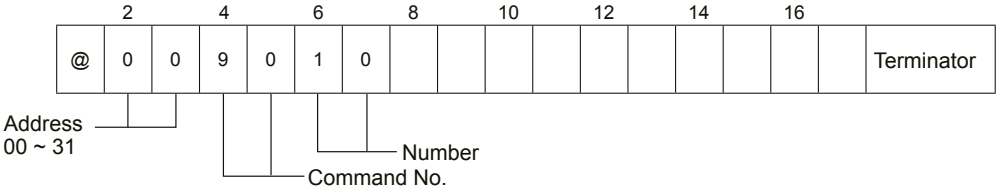


18.3.14.1.9 SPAN calibration by weight (host → device)



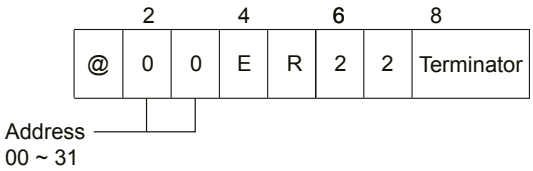
Under normal operation

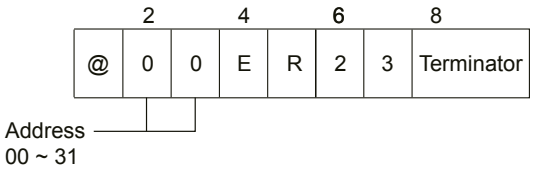
Return (device → host)



Under abnormal operation

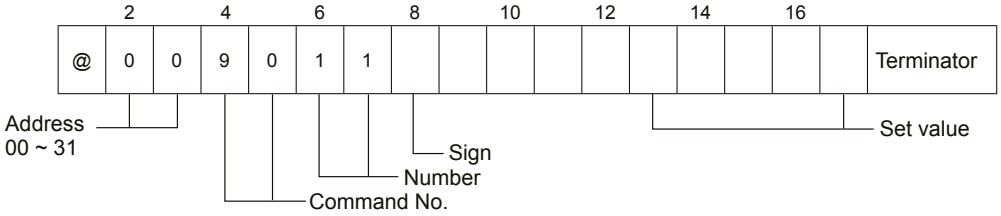
Return (device → host)





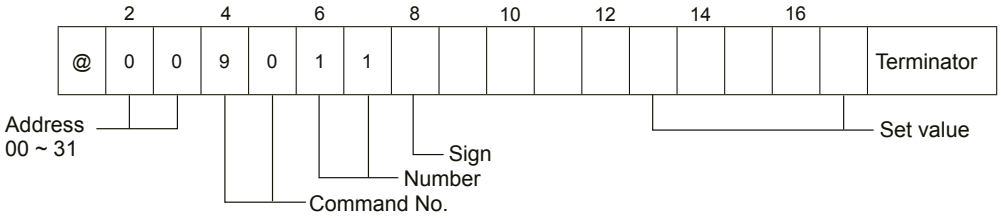
18.3.14.1.10 Numeric input of the load cell output voltage SPAN point registration (host → device)

18.3.14.1.10.1 SPAN calibration by numeric input (host → device)



Under normal operation

Return (device → host)

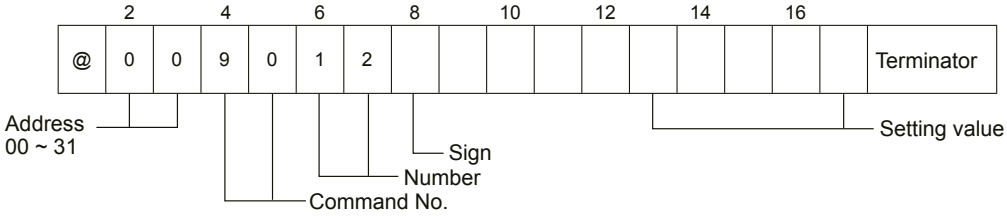


Note:

Setting the forth decimal point digit

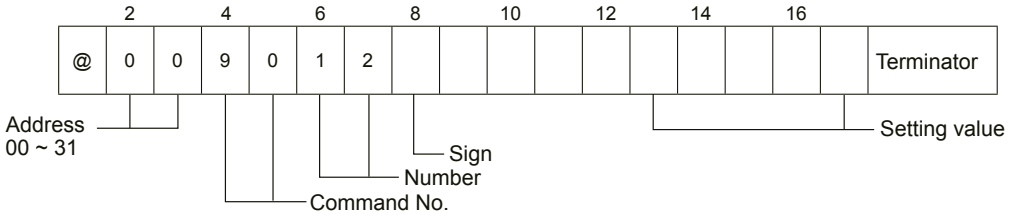
Example: Input data =10001 → 1.0001 mV/V

18.3.14.1.10.2 Setting the fifth decimal point digit



Under normal operation

Return (device → host)



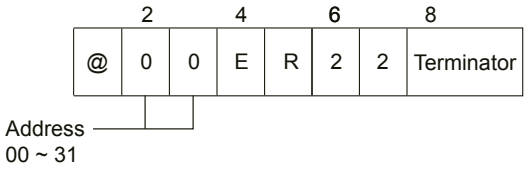
Note:

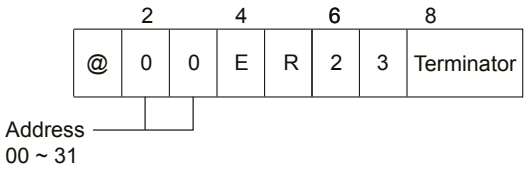
Setting the fifth decimal point digit

Example: Input data =100001 → 1.00001 mV/V

Under abnormal operation

Return (device → host)





Note:

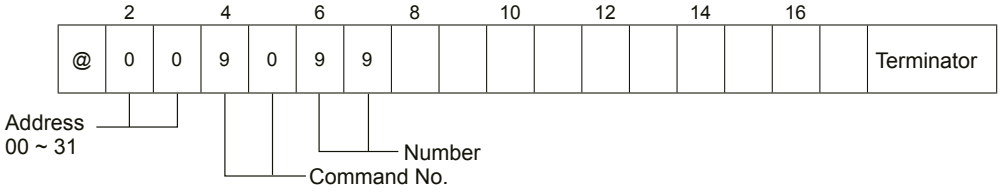
- A command to register mV/V of five digits after the decimal point for ZERO (No. 09) and SPAN (No. 12) to boost calibration has been available since ROM Ver. 2.300.

  When registering mV/V values for ZERO and SPAN, use the command that registers mV/V five digits after the decimal point for ZERO (No. 09) and SPAN (No.12).

- Continue to use the current command if the instrument is incorporated in a system that already uses mV/V four digits after the decimal point for ZERO (No. 08) and SPAN (No. 11).

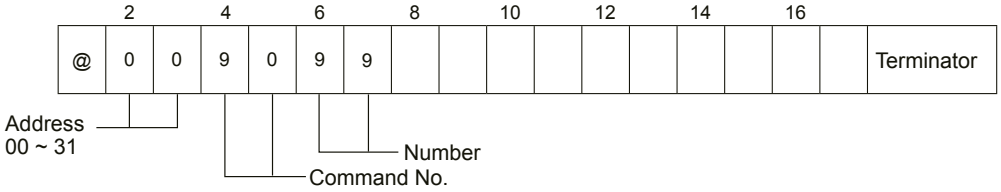
  Note that error in the set digit number may occur if the command is changed to five digits after the decimal point to register ZERO point (No.9) and SPAN point (No.12) as mV/V.

18.3.14.1.11 Finish calibration (host → device)



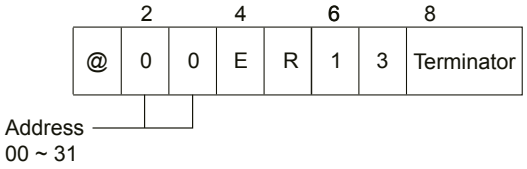
Under normal operation

Return (device → host)

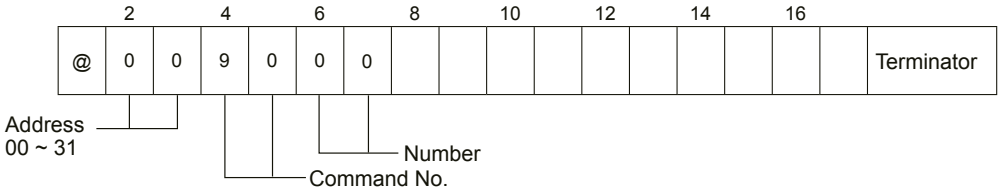


Under abnormal operation

Return (device → host)

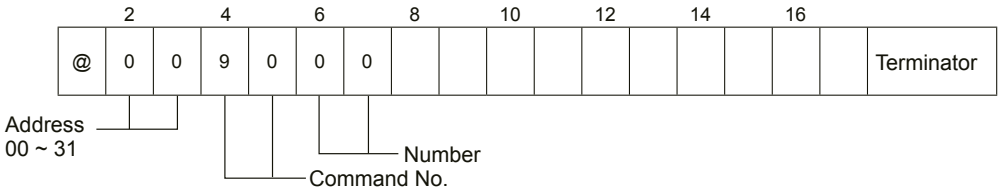


18.3.14.1.12 Calibration force finish (host → device)



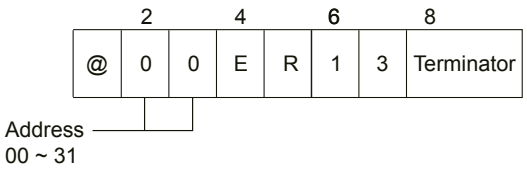
Under normal operation

Return (device → host)



Under abnormal operation

Return (device → host)



19 Maintenance

This chapter describes maintenance of the CSD-903.

19.1 Lifetime of used parts

The parts used in the instrument will have lifetime. It may differ depending to application method and environmental conditions, the rough standard of lifetime of each shall be as follows:

Name of Part	Application	Rough standard of lifetime
Display module	Display	Approx. 45 000 hours (Environmental temperature : 50°C)
EEPROM	Record of set data	Write to EEPROM, one million times
Electrolytic capacitor	For smoothing switching power supply	Approx. 10 years (Environmental temperature : 20°C)
Battery	Back up of RAM	Approx. 10 years (Environmental temperature : 20°C)

Display module

When using CSD-903 at the ambient temperature of approx. 50 °C, the display will flicker is about 45 000 hours, and the phenomenon of the luminance's decreasing.

EEPROM

When writing is made to EEPROM more than the time of lifetime, you can't write to the data any more, so exchange shall be required.

Electrolytic capacitor

It may be influenced largely by some applied conditions such as environmental temperature and so on.

Battery

It may be influenced largely by some applied condition such as environmental temperature and so on, but the lifetime shall be for approx. 10 years in room temperature at 20 °C.

19.2 Replacing the fuse

⚠ WARNING

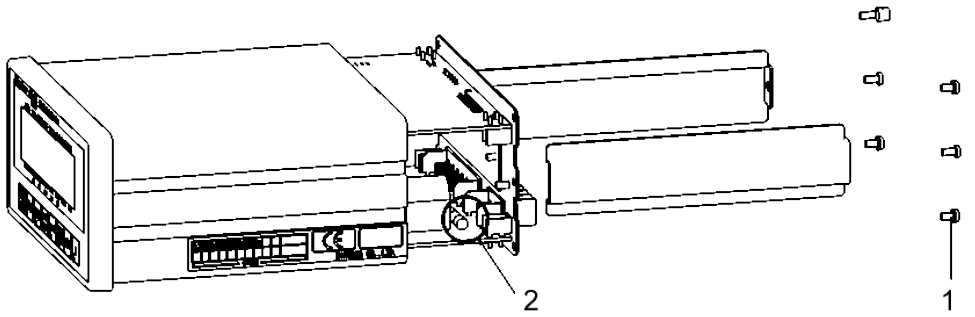
Damage from overheating.

The use of repaired fuses and bypassing the fuse holder is prohibited.

Incorrect fuse installation or inappropriate fuse capacity will result in malfunction.

- ▶ Before replacing the fuse, be sure to turn OFF the power to CSD-903.
- ▶ Only the time lag Fuse (2.5A) is permissible.

1. Turn off the power supply to the unit



1	Installation screws for rear panel
2	Time lag fuse (2,5 A)

2. Remove the 6 screws (1) on the rear panel
3. Remove the contents in the case direction holding the rear panel
4. Replace the fuse (2) installed on the circuit board
5. After replacing the fuse, insert the rear panel into the case
6. Remove the 6 screws (1) on the rear panel. Check that the rear panel and the case are attached securely.

Note:

If a rear panel is not securely attached to the case, the display may not light or the keys may not function.

20 Troubleshooting

This chapter describes corrective measures to be taken in the event of abnormal operation or if an error message is displayed.

When abnormal point(s) is/are found during the operation of the instrument, check by the following procedures.

Moreover, when you cannot find applicable item or solve the symptom of trouble even after you have taken some measures, contact with Minebea Intec.

20.1 Execute trouble shooting

Execute troubleshooting.		
↓		
↓		
Does supply power voltage satisfy the specifications?	→ No→	Supply power source suitable for the specifications.
↓		
Yes		
↓		
Display is wrong.	→ Yes →	To check of the display.
↓		
No		
↓		
Measurement operation is wrong.	→ Yes →	To the measuring operation check.
↓		
No		
↓		
Operation of standard communication is wrong.	→ Yes →	To the standard communication check.
↓		
No		
↓		
The external control I/O does not operate.	→ Yes →	To check the external control I/O.
↓		
No		
↓		
Operations of options is/are wrong.	→ Yes →	To check options.
↓		
Yes		
↓		
Inform Minebea Intec about the contens of failure and situation at site in details.		

Check of display

↓

Display the load. → No → Fuse is broken. → Yes → Replace fuse.

↓ ↓

Yes No*

↓

[OL] display? → Yes → ①

↓

No

↓

[-OL] display? → Yes → ①

↓

No

↓

Display fluctuates abnormally. → Yes → ②

↓

No

↓

*

Inform Minebea Intec about the contens of failure and situation at site in details.

①

↓

1. Remove the connection cable for the load cell from the terminal block for load cells.
2. Measure the voltage between A-C after short-circuiting A-F and C-G of terminal block.
   Set the load cell tester to DC voltage measurement.

↓

The voltage between A and C is stable in the set value of excitation voltage. → No → Contact Minebea Intec.

↓

Yes

↓

1. Reconnect the load cell to the terminal block.
2. Confirm the output voltage of the load cell, refer to Chapter 14.6.

↓

Monitoring display exceeds the range from -3.1 mV/V to 3.1 mV/V → Yes → Shorten between B and D in the connector

↓

No

↓

Re-calibrate according to the procedures in Chapter 6.

↓

Monitoring display exceeds the range from -3.1 mV/V to 3.1 mV/V → No → Following causes can be considered.

- The load cell input exceeds the range of -3.1 mV/V to 3.1 mV/V.
- The load cell is boken, e.g. due to overloading.
- The signal wire to the load cell is not connected.

↓

Yes

↓

Same condition → Yes → Inform Minebea Intec about the contens of failure and situation at site in details.

↓

No

↓

Start weighing

②

↓

1. Remove the connection cable for the load cell from the terminal block for load cells.
2. Measure the voltage between A-C after short-circuiting A-F and C-G of terminal block.
   Set the load cell tester to DC voltage measurement.

↓

The voltage between A and C is stable in the set value of excitation voltage. → No → Inform Minebea Intec about the contens of failure and situation at site in details.

↓

Yes

↓

1. Shorten the B, D and C in the connector.
2. Confirm the output voltage of the load cell, refer to Chapter 14.6.

↓

The display stabilizes with the optional value. → No → Inform Minebea Intec about the contens of failure and situation at site in details.

↓

Yes

↓

1. Check the wiring status, refer to Chapter 4.
2. Check whether interference sources are present, e.g. converter.

↓

↓

Same condition → No → Start weighing

↓

Yes

↓

Inform Minebea Intec about the contens of failure and situation at site in details.

Weighing operation check ↓ Is the setting of I/O correct?	→ No →	Set the I/O correct, refer to Chapter 10.14.
↓ Yes ↓ Is set value for each BRAND and RECIPE is suitable?	→ No →	Set the weighing comparison value, refer to Chapter 11.2.
↓ Yes ↓ Is the intended operation made?	→ No →	Set the operation of weighing, refer from Chapter 11.3 to 11.7.2.
↓ Yes ↓ Inform Minebea Intec about the contens of failure and situation at site in details.		

Standard communication check		
↓		
The communication of serial interface is wrong.	→ Yes →	To serial interface communication check.
↓		
No		
↓		
Standard RS-485 and Modbus are wrong.	→ Yes→	Inform Minebea Intec about the contens of failure and situation at site in details.
↓		
No		
↓		
Correct connecting?	→ No →	Connect surely with the external equipment, refer to Chapter 16.4.
↓		
Yes		
↓		
The address No. is correctly set.	→ No →	Set the address No. correctly, refer to Chapter 16.3.3.
↓		
Yes		
↓		
The communication protocol is correctly set.	→ No →	Set it correctly according to the specifications for host.
↓		
Yes		
↓		
Setting of command/data is correct.	→ No →	Make use of correct command/data, refer to Chapter 18.3.12.
↓		
Yes		
↓		
The host specifies the flow control.	→ Yes →	Set the flow control from [NONE] to [YES].
↓		
No		
↓		
The interval from the command receipt of host to send is 1 ms or more.	→ Yes →	The interval from the command receipt of host to send should be set as 1ms or more.
↓		
No		
↓		
Is the appropriate setting for the response delay time to the response of host?	→ No →	There is a possibility not to be able to respond in case of the host's response is slow. Enlarge the response delay time of the instrument.
↓		
Yes		
↓		
Inform Minebea Intec about the contens of failure and situation at site in details.		

Serial interface Communication check		
↓		
Correct connecting?	→ No →	Connect wires surely with external equipment, refer to Chapter 4.5.
↓		
Yes		
↓		
The communication protocol is correctly set.	→ No →	Set it correctly, refer to Chapter 15.2.
↓		
Yes		
↓		
The target of print signal operation is correctly set.	→ No →	Use the correct command/data, refer to Chapter 15.4.
↓		
Yes		
↓		
Inform Minebea Intec about the contens of failure and situation at site in details.		

External control I/O check.		
↓		
Connecting wiring are corrected?	→ No →	Connecting surely, refer to Chapter 4.4.
↓		
Yes		
↓		
The external control I/O is set?	→ No →	Set the external control I/O.
↓		
Yes		
↓		
External control input is wrong.	→ Yes →	Inform Minebea Intec about the contens of failure and situation at site in details.
↓		
No		
↓		
50 ms or more of input signal is set for the pulse input.	→ No →	Set the pulse input value 50 ms or more.
↓		
Yes		
↓		
50 ms or more of input signal for the item of Level input.	→ No →	Set the pulse input value 50 ms or more.
↓		
Yes		
↓		
Inform Minebea Intec about the contens of failure and situation at site in details.		

Check on options		
↓		
The analog output operation is wrong.	→ Yes →	To the analog output check.
↓		
No		
↓		
The BCD output is wrong.	→ Yes →	To the BCD output check.
↓		
No		
↓		
RS-232C is wrong.	→ Yes →	To the RS-232C check.
↓		
No		
↓		
RS-422 is wrong.	→ Yes →	To the RS-422 check.
↓		
No		
↓		
RS-485 is wrong.	→ Yes →	To the RS-485 check.
↓		
No		
↓		
Inform Minebea Intec about the contens of failure and situation at site in details.		

Analog output check		
↓		
Correct connecting?	→ No →	Connect wires surely, refer to Chapter 18.1.3.
↓		
Yes		
↓		
Voltage output load resistance is 5 KΩ or more. Current output load resistance is 510 Ω or less.	→ No →	Make the load resistance suitable for the specifications.
↓		
Yes		
↓		
Confirm the setting concerning the analog output.		
↓		
Correctly set.	→ No →	Set correctly, refer to Chapter 18.1.
↓		
Yes		
↓		
Inform Minebea Intec about the contens of failure and situation at site in details.		

BCD output check		
↓		
Correct connecting?	→ No →	Connect wires surely with an external equipment, refer to Chapter 18.2.7.
↓		
Yes		
↓		
Except for the BCD are outputted.	→ Yes →	Match the setting concerning the BCD output to the specification of external equipment connected, refer to Chapter 18.2.1.
↓		
No		
↓		
The intended value is not outputted.	→ Yes →	Select the target of BCD output, refer to Chapter 18.2.3.
↓		
No		
↓		
The BCD output does not change.	→ Yes →	Make the HOLD input opened.
↓		
No		
↓		
Inform Minebea Intec about the contens of failure and situation at site in details.		

RS-232C check		
↓		
Correct connecting?	→ No →	Connect wires surely with an external equipment, refer to Chapter 18.3.10.
↓		
Yes		
↓		
The Communication protocol is correctly. set.	→ Yes →	Set it according to the host's specifications, refer to Chapter 18.3.1.
↓		
No		
↓		
Command/data is set suitably.	→ Yes →	Use the correct command/data, refer to Chapter 18.3.12.
↓		
No		
↓		
The host specifies the flow control.	→ Yes →	Set the flow control from [YES] to [NONE].
↓		
No		
↓		
In Stream mode, intended value is not sent.	→ Yes →	Select the output target in the Stream mode.
↓		
No		
↓		
Inform Minebea Intec about the contens of failure and situation at site in details.		

RS-422C check		
↓		
Correct connecting?	→ No →	Connect wires surely with external equipment, refer to Chapter 18.3.11.
↓		
Yes		
↓		
The address number is correctly set.	→ No →	Set the address number correctly, refer to Chapter 18.3.6.
↓		
Yes		
↓		
The communication protocol is correctly set.	→ No →	Match the setting of function correctly to the specification of the host according.
↓		
Yes		
↓		
Command/data is correctly set.	→ No. →	Use the correct command/data, refer to Chapter 18.3.12.
↓		
Yes		
↓		
The host specifies the flow control.	→ Yes →	Set the flow control from [YES] to [NONE].
↓		
No		
↓		
The change of RS-422/485 is properly set.	→ No →	Make the change of RS-422/485 correctly.
↓		
Yes		
↓		
Inform Minebea Intec about the contens of failure and situation at site in details.		

RS-485 check		
↓		
Correct connecting?	→ No →	Connect wires surely with an external equipment, refer to Chapter 18.3.11.
↓		
Yes		
↓		
The address number is correctly set.	→ No →	Set the address number correctly, refer to Chapter 18.3.6.
↓		
Yes		
↓		
The communication protocol is correctly set.	→ No →	Set according to the specifications of host.
↓		
Yes		
↓		
Command/data is set properly.	→ No →	Use the correct command/data, refer to Chapter 18.3.12.
↓		
Yes		
↓		
The host specifies the flow control.	→ Yes →	Set the flow control from [YES] to [NONE].
↓		
No		
↓		
The change of RS-422/485 is correctly set.	→ No →	Switch RS-422/485 correctly.
↓		
Yes		
↓		
The interval from the command receipt of host to send is 1 ms or more.	→ Yes →	Set the interval from the command receipt of host to send is 1ms or more.
↓		
No		
↓		
Is it appropriate setting for the response delay time to the response of host?	→ No →	There is a possibility not to be able to respond because the host's response is slow. Enlarge the response delay time of the instrument.
↓		
Yes		
↓		
Inform Minebea Intec about the contens of failure and situation at site in details.		

20.2 Error display and buzzer sound

20.2.1 Error display

Er-1	Blinks for about 2 seconds when the C function or function is set and no number is selected.
Er-2	Blinks for about 2 seconds during calibration if [Maximum load (DISP)] < [Mass weight value (LOAD)].
Er-3	A/D conversion error. Contact Minebea Intec.
Er-E	EEPROM writing error. Contact Minebea Intec.
Er-r	EEPROM reading error. Contact Minebea Intec.
rE-L	Blinks for about 2 seconds during calibration if load cell output and numeric input are –2.5 mV/V or less and outwith the zero calibration range on the negative side.
rE-H	Blinks for about 2 seconds during calibration if load cell output and numeric input are 2.5 mV/V or more and exceed the zero calibration range on the positive side.
SP-L	Blinks for about 2 seconds during calibration if load cell output and numeric input are –0 mV/V or less and outwith the span calibration range on the negative side.
SP-H	Blinks for about 2 seconds during calibration if load cell output and numeric input are 3.1 mV/V or more and exceed the span calibration range on the positive side.
Ln-L	Blinks for about 2 seconds during digital linearization compensation if and load cell output is low.
Ln-H	Blinks for about 2 seconds during digital linearization compensation if and load cell output is high.
-------	(When C function CF-15 [Power on zero operation] is effective) Displayed when the power is turned on or the display is ON if load cell output exceeds ± 10 % of maximum load. Press the [SET] key with [- - - - - - -] displayed to force-switch to weight display.
OL	Lights if the load display exceeds [+Maximum load + 9 D] or exceeds [+110% of maximum load] (Set by C function CF-03.).
-OL	Lights if the load display exceeds [–Maximum load – 9 D], exceeds [–110% of maximum load], or exceeds [–20 D] (Set by C function CF-03.).
OUF	The A/D load cell input is positive overload.

-oUF	The A/D load cell input is negative overload.
All lights	Blinks if accumulation value or accumulation times exceed the display range.
bAtL	Battery LO error. Contact Minebea Intec.
Et-b	Backup data corrupted. Contact Minebea Intec.

20.2.2 Error sub-display

Error code	Contents	Actions
Et-ZEto	ZERO set is executed out of range.	Execute ZERO set within its operational range.
Et-tAtE	TARE WEIGHT is executed out of range.	Execute TARE WEIGHT within its operational range.
Et-ACCU	The accumulation value and the accumulation number exceed the display range.	Clear the accumulation count when the accumulation display blinks.

Note:

Sequence error sub-display blinks until sequence error is released.

Press the [F] key to release sequence error.

20.2.3 Sequence error display

Error code	Error No.	Contents	Actions
SqEtt-0	1	A forced temporary stoppage has occurred due to inputting a temporary stop while weighing.	Check the cause of the temporary stoppage and restart
SqEtt-2	3	The load value is insufficient, even if post-batching is executed.	Change the time and maximum times of post-batching and restart
SqEtt-3	4	The comparison values are contradictory.	Check the settings and resolve the contradiction
SqEtt-4	5	Inflow time exceeds the time limit.	Check the inflow gate for obstructions
SqEtt-5	6	Discharge time exceeds the time limit.	Check the discharge gate for obstructions.

Error code	Error No.	Contents	Actions
SEQ ERR-6	7	The gross weight is less than the final weighing value in discharge mode.	Add the BRAND
SEQ ERR-7	8	Net weight > Final value – overshoot	Empty the container
SEQ ERR-9	9	Weighing begins with "Start above near zero" set to [VALID]; however, there is no container on the load cell.	Check whether there is a container on the load cell.

Note:

Sequence error sub-display blinks until sequence error is released.

Press the [F] key to release sequence error.

21 Appendix

This chapter provides supplementary information about CSD-903, such as menu lists, customer service, and data communication formats.

21.1 Customer service

Warranty

The device warranty period is one year from the date of delivery.

Consult Minebea Intec sales office or point of purchase for repairs or customer service during the warranty period.

Repair

Before requesting a repair, check once again that all of the wiring/settings/adjustments are correct.

In particular, check the load cell for disconnected and/or broken wires. If the problem persists, contact Minebea Intec sales office or point of purchase to request repair service.

21.2 Specifications

21.2.1 Analog specifications

Bridge power supply		10 V DC ± 0.5 V (5 V, 2.5 V) within 180 mA, with remote sensing
Applicable load cell		Up to 6 load cells (350 Ω) can be in parallel.
Input sensitivity		0.2 µV/d or more (d = minimum scale interval)
Input range		-3.1 mV/V to 3.1 mV/V
Zero setting range		± 2.5 mV/V
Non linearity		0.01 % F.S.
Influence due to temperature change	Zero point	± 0.2 µV/°C (calibrated at an input sensitivity of 0.2 µV/d or more)
	Sensitivity	± 0.000 8 %F.S./°C (calibrated at an input sensitivity of 0.2 µV/d or more.)
Input noise		± 0.2 µVp-p or less (calibrated at an input sensitivity of 0.2 µV/d or more).
Analog filter		Approx. 4 Hz (can be changed to 2 Hz, 6 Hz, 8 Hz, 10 Hz or 100 Hz)
A/D sampling		200 times/s (Changeable to 20 times/s.)
A/D internal resolution		24 bits

21.2.2 Display specifications

Load display	Display range	The accumulation value display range is from –9 999 999 9999 to 9 999 999 999, and accumulation times is from 0 to 999 999.

	Display increment	1 (can be changed to 2, 5, 10, 20 or 50)
	Display unit	7-segment green colored fluorescent display tube with character's height 11.55 mm, 7 digits
	Overload display	[–OL] display for negative overload, [OL] display for positive overload
	AD value overload display	[–OVF] display for negative overload, [OVF] display for positive overload
Sub-display	Display range	Accumulation total display -19 999 999 to 99 999 999, Accumulation times 0 to 999 999.
	Display unit	7-segment green fluorescent display tube with character height 5 mm, 18 digits
	Display details	OFF (Changeable: Brand/Accumulation times/Accumulation value, Brand/Accumulation times/Last accumulated data, Brand/Last accumulated data/Accumulation value, Brand/Last accumulated data/OK, Brand/Accumulation times/OK, Brand/OK/Accumulation value, Brand/Near zero/Full, OK/Over/Under, Brand/OK/Overshoot, Brand/S1/S2, Brand/S1/S3, Brand/S1/S4, Brand/S2/S3, Brand/S2/S4, Brand/S3/S4, Brand/OK, Brand/Over/Under, Brand/Accumulation times, Brand/Accumulation value or Brand/Last accumulated data)
Condition display		STABLE, PRE. TARE WEIGHT, TARE WEIGHT, GROSS WEIGHT, NET WEIGHT, CZ, HOLD, ERROR, Z-BAND OK/S0, F. (Coarse) FLOW/S1, M. (Middle) FLOW/S2, D. (Fine) FLOW/S3, OVER/S4, UNDER, FULL
Display rate		4 times/s (can be changed to 20 times/s)
Decimal point display		Changeable: No display, 10^1, 10^2, 10^3, and 10^4
Unit display		Changeable: No display, g, kg, t , N, kN or lb

21.2.3 Interfaces

External control input	Any 9 functions can be selected from the following: OFF, [ON/OFF] key operation, [SET] key operation, [ACCUM.] key operation, [PRESET TARE WEIGHT/] key operation, [TARE WEIGHT/▲] key operation, [NET/GROSS WEIGHT/▼] key operation, [ZERO] key operation, [F/] key operation, Zero clear, Tare weight clear, Flow start, Discharge start, Clear last accumulated data, Accumulation clear, Error cancellation, Print command, Emergency stop, All brand accumulation clear The above functions are valid one time at a pulse width is 50 ms or more. Flow/Discharge changeover, Hold, Net weight display, Brand No. 1, Brand No. 2, Brand No. 4 The above functions are valid at a bridge input of 50 ms or more.
External control output	13 functions can be selected from the following: OFF, RUN, Stable, During tare weight cancellation, Display gross weight, Display net weight, Center zero, During hold, Error, Abnormal weight, Measurement sequence error, Z-Band, OK (S0), F (Coarse) flow (S1), M (Middle) flow (S2), Fine flow (S3), Over (S4), Under, Full, During weighing, Finish weighing, Discharge (between the discharge gates), Finish discharge (between the discharge gates)
Standard 2-pin method serial interface	2-pin method serial interface Baud rate: 600 bps Data bit length: 8 bit Parity bit: Odd Stop bit: 1 bit Start bit: 1 bit Transmission data: Binary code (BCD) The internal circuit and optocoupler are insulated. External control input and common are connected.

Standard RS-485 interface	Baud rate: Can be selected from 1 200, 2 400, 4 800, 9 600, 19 200 and 38 400 bps Data bit length: Can be selected from 7 bit and 8 bit Parity bit: Can be selected from none, even and odd Stop bit: Can be selected from 1 bit and 2 bit Terminator: Can be selected from CR+LF and CR Communication method: Half duplex Synchronization method: Start-stop synchronous method Address: Select one from 0 to 31 Communication data: ASCII code Cable length: Approx. 1 km Connectable units: 32 units maximum Termination resistance: External Data transfer mode: Command, Modbus, Stream, Synchronized with finish, Synchronized with accumulation, Synchronized with print Internal circuit and common are connected.
BCD output (Sold separately)	Output 8-digit BCD, parallel output with polarity (POL.) applied (ON for negative output, and OFF for positive output); P.C. (Print command) ON a fixed time after BCD output conversion is complete ERROR ON when various errors occur OVER, STABLE, Gross weight: ON when BCD output is gross weight Above are open collector output. VCE = 30 V DC, IC = 20 mA DC at maximum input HOLD: Holding BCD output; BCD-ENABLE: Compulsorily off for BCD output (High-impedance) Above are for level input and effective during bridge input of 100 ms or more.
RS-232C (Sold separately)	Baud rate: Can be selected from 1 200, 2 400, 4 800, 9 600, 19 200 and 38 400 bps Data bit length: Can be selected from 7 bit and 8 bit Parity bit: Can be selected from none, even and odd Stop bit: Can be selected from 1 bit and 2 bit Terminator: Can be selected from CR+LF and CR Communication method: Half duplex Synchronization method: Start-stop synchronous method Communication data: ASCII code

RS-422/485 (Sold separately)	Baud rate: Can be selected from 1 200, 2 400, 4 800, 9 600, 19 200 and 38 400 bps Data bit length: Can be selected from 7 bit and 8 bit Parity bit: Can be selected from none, even and odd Stop bit: Can be selected from 1 bit and 2 bit Terminator: Can be selected from CR+LF and CR Communication method: Half duplex Synchronization method: Start-stop synchronous method Address: Can be selected from 0 to 31 Transmission data: ASCII code Cable length: Approx. 1 km Connectable units: 32 units maximum (RS-422: 10 units) Terminal resistance: Internal (Detects connection of terminal board) Input/output monitor with LED RS-422/485 changeover: Set by function
Current output (Sold separately)	Output: 4 mA to 20 mA DC Load resistance: 510 Ω or less Resoulution: 1/12 000 or more Non-linearity: 0.02% F.S. Overload range: Approx. 2.4 mA DC for [–OL] display and approx. 21.6 mA DC for [OL] display Output times: 4 times/s, 20 times/s (Synchronized to display times) The internal circuit and photocoupler are insulated. Effect of temperature Zero point: ±0.005 % F.S./°C Sensitivity: ±0.01 % F.S./°C
Voltage output (Sold separately)	Output: 0 V to 10 V DC Load resistance: 5 kΩ or more Resoulution: 1/12 000 or more Non-linearity: 0.02 % F.S. Overload range: Approx. –1 V DC for [–OL] display and approx. 11 V DC for [OL] display Output times: 4 times/s, 20 times/s (Synchronized to display times) The internal circuit and optocoupler are insulated. Effect of temperature Zero point: ±0.015 % F.S./°C Sensitivity: ±0.015 % F.S./°C

21.2.4 General specifications

Operating temperature range	Temperature	-10 °C to 50 °C The temperature span of JIS B 7611-2 conformity is -10 °C to 40 °C
	Humidity	85 % RH or less (Non condensing.)

Storage temperature range		-20 °C to 60 °C
Power supply	Power-supply voltage	100 V AC to 240 V AC (Permissible variation: 85 V AC to 264 V AC)
	Power supply frequency	50/60 Hz
	Power consumption	Approx. 10 VA (without options, at 100 V AC) Approx. 18 VA (with options at 100 V AC)
External dimensions (W × H × D)		144 mm × 72 mm × <146.7 mm (excludes protruding parts)
Weight		Approx. 1.0 kg (without options)

21.2.5 Standard shipping specifications

Bridge power supply	10 V DC
SPAN calibration	10 000 display at 0.3 mV/V input
Scale interval	1

21.2.6 Accessories

Operating instructions	1 piece
Time-lag fuse (2.5 A)	1 piece
I/O connector for external control	1 piece (Connector: FCN-361J024-AU; Connector cover: FCN360C024-B)
Standard communication connector	1 piece (Plug: XW4B-06B1-H1)
Bridge for A-F and C-G	2 pieces
Panel mounting gasket	1 piece
BCD output connector	1 piece (only included if the optional BCD output is installed)

21.3 Data format of command mode

Note:

- The address is fixed at [00] for the RS-232C interface.
- Load data enters from the right.
- [–] is entered for negative values and [+] for positive values.
- 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.
- 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.
- The empty parts are all spaces.
- The command number 24 accumulation value readout (8 digits) display ranges from –19 999 999 to 99 999 999. The command number 27 accumulation value readout (10 digits) display ranges from –9 999 999 999 to 9 999 999 999.

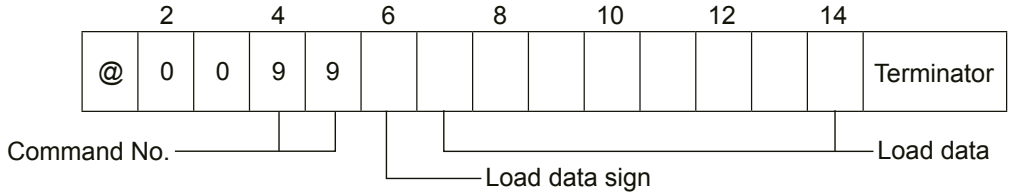
21.3.1 Data format synchronizing with data format in stream mode

Note:

- Load data is entered from the right.
- [–] is entered for negative values and [+] for positive values.
- 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.
- The blank parts are all spaces.

21.3.1.1 When the setting of function F-41 (RS-232C/422/485) or function F-48 (standard RS-485) is set to (LOAD DISPLAY), (GROSS), or (NET)

Return (device → Host)



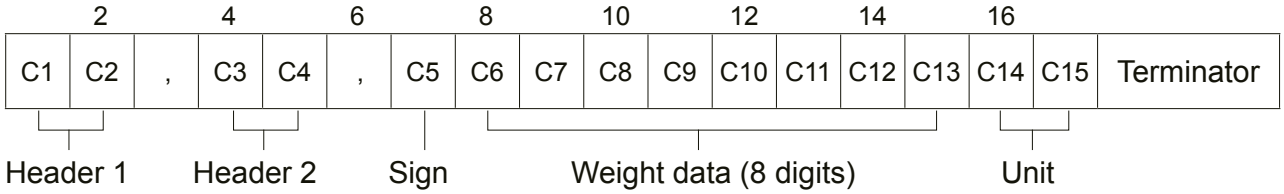
2	4	6	8	10	12	14	
@ 0	0	9	9	–		1 2	3 Terminator

2	4	6	8	10	12	14	
@ 0	0	9	9	+		0 . 1	2 3 Terminator

2	4	6	8	10	12	14	
@ 0	0	9	9	+			O L Terminator

2	4	6	8	10	12	14	
@ 0	0	9	9	–			O L Terminator

21.3.1.2 When the setting by function F-41 (RS-232C/422/485) or function F-48 (standard RS-485) is set to (Conditional weight display data)



Header 1			Header 2			Sign		Load data (8 digits)									Unit		
C1	C2	Description	C3	C4	Description	C5	Description	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	Description
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	Kilonewton

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www.minebea-intec.com

Minebea intec
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