AD-4329A

OP-02

INSTRUCTION MANUAL

Weighing Indicator

1WMPD4002801A

A&D Company, Limited

This is a hazard alert mark.

This mark informs you about the operation of the product.

Note This manual is subject to change without notice at any time to improve the product. No part of this manual may be photocopied, reproduced, or translated into another language without the prior written consent of A&D Company, Ltd.

Product specifications are subject to change without any obligation on the part of the manufacture.

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1. Compliance

1.1.1. Compliance with FCC Rules

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

1.1.2. Compliance with European Directive

CE This appliance complies with the statutory EMC (Electromagnetic Compatibility) directive 2004/108/EC and the Low Voltage Directive 2006/95/EC for safety of electrical equipment designed for certain voltages.

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

2. Introduction

- The AD-4329A is a compact weighing indicator that amplifies the signal from a load cell, converts it to digital data and displays it as a mass value.
- This indicator has the following performance:
  Input sensitivity: ..... 0.15 µV/division.
  Maximum display: ..... 10000 divisions (or 20000 divisions).
  Refresh rate of the display: ..... 10 times/second approximately.
  Input voltage range: ..... -35 mV ~ +35 mV.
- There are the following standard functions:
  - The upper/lower limit comparison to check a mass value.
  - The setpoint comparison for batching applications.
  - The accumulation function to totalize these mass values and to count the number of accumulations.
- There are the following standard interfaces:
  - The standard serial output for a printer.
  - The RS-232C serial interface to communicate with a computer.
    This interface can request weighing data, enter parameters and control the state of the indicator.
- The calibration function includes the following functions:
  - Setting of the minimum division (weighing interval) and the maximum capacity.
  - Zero and span calibration.
  - The weighing range function of the multi-interval weighing instrument (scale).
  - Digital linearization function.
  - Gravity compensation function.
- There are seven external input terminals controlled by the F function.
- The option OP-02 has three output relays used for the upper/lower limit comparison and setpoint comparison.

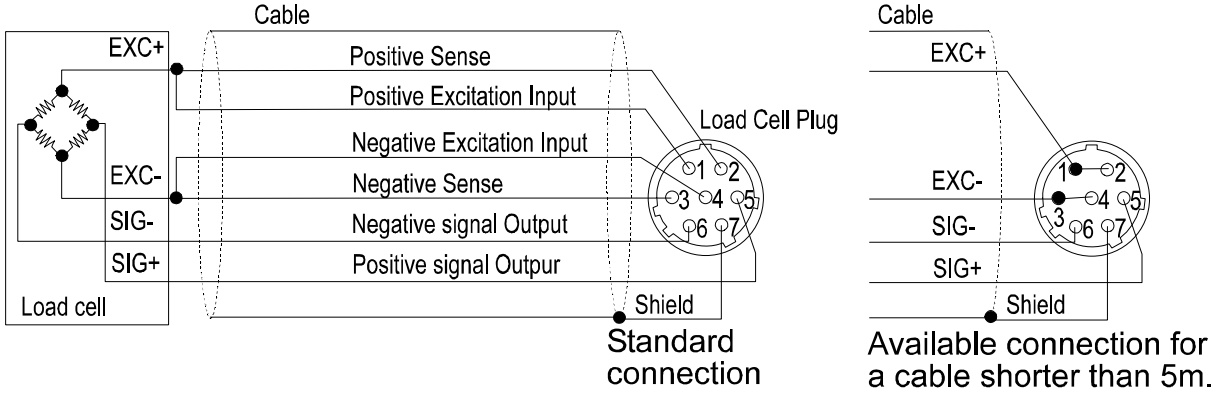
3. Installation and Precautions

3.1.1. Installation and Precautions

- The AD-4329A weighing indicator is a precision electronic instrument. Handle the indicator carefully.
- The operating temperature is -10℃ to +40℃ (14℉ to 104℉).
- Do not install the scale in direct sunlight.
- Misoperation or other problems may be caused by an unstable power source including momentary power failrue or instantaneous noise. Use a stable power source.
- ⚠ Do not connect the power cord before the installation is finished.
- ⚠ Please confirm that the local voltage and receptacle type are correct for your scale.
  The Operate/Standby key (I/O OPR/STB key) can not cut the power. The load cell and the internal circuit are supplied with power in the standby state.
- Use shielded cable for all connections. Connect the cable shields to the shield terminal or case as an earth terminal.
- Earth ground the indicator. Do not join the earth ground line with other electric power equipment. There is an earth ground terminal at the power cord receptacle.
- Do not install the scale in a place where it is apt to be charged with static electricity, or where the relative humidity is lower than 45%RH. Plastic and isolators are apt to be charged with static electricity.

3.1.2. The Load Cell Connections

- Connect the load cell wires to the connector (receptacle), at the rear panel, using the accessory load cell plug.
- It is possible to connect a 4 wire cable that 1pin-2pin and 3pin-4pin are shorted, if the distance between the indicator and a load cell is shorter than 5m.
- The output voltage of a load cell is a very sensitive signal. Space the load cell cable away from any noise source.
- It is possible to connect eight 350Ω load cells.
  The load cell drive is 5VDC ± 5% between EXC+ and EXC-, the maximum current 120mA.

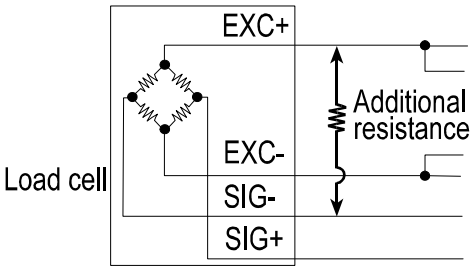


3.1.3. Adjustment of the Load Cell Output

Caution
- **Use a metal film resistor in the range of 50kΩ to 500kΩ with a good temperature coefficient, when adding a resistor to adjust a load cell output. Use as a large resistance value as possible in the range in which zero adjustment is possible. Solder this resistor at a point near the load cell or the indicator.**

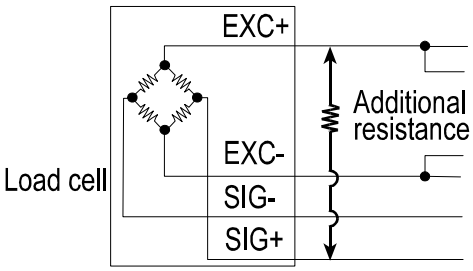
In Case of Reducing the Output Voltage

When the zero output is too large, add a resistor between EXC+ and SIG-.



In Case of Adding an Offset Voltage to the Output

When the zero output is too small, add a resistor between EXC+ and SIG+.



3.1.4. Verifying Load Cell Output and Input Sensitivity

The input sensitivity of the indicator is 0.15μV/division or more. Adapt to the following inequality, when you design a weighing instrument using the indicator and load cell(s).

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

Weighing instrument using one load cell.	$0.15 \le \frac{E*B*D}{A}$	A: Rated capacity of load cell [kg] B: Rated output [mV/V] D: Weighing interval [kg] E: Excitation voltage [mV] N: Number of load cells
Weighing instrument using multi-load cell	$0.15 \le \frac{E*B*D}{A*N}$	

Verification Example

Design:		$\frac{5000*3*0.05}{750} = 1 \ge 0.15$. Therefore, regard the instrument as a good design.
Load cell	N=1	
Rated capacity	A=750 [kg]	
Rated output	B=3 [mV/V]	
Excitation voltage	E=5000 [mV]	
Weighing interval	D=0.05 [kg]	
Weighing capacity	300 [kg]	

3.1.5. Installing the Option Board

Caution ❑ Do not remove screws without the following steps.

This is a procedure for the relay output board (OP-02).

Step 1 Remove the power cord and other cables from the indicator.

Step 2 Remove four screws and four bolts from the rear panel.

Step 3 Remove two slide-rails, one on each sides.

Step 4 Pull the rear panel and main board from the case. Then the connector between the main board and the display board may be disconnected smoothly.

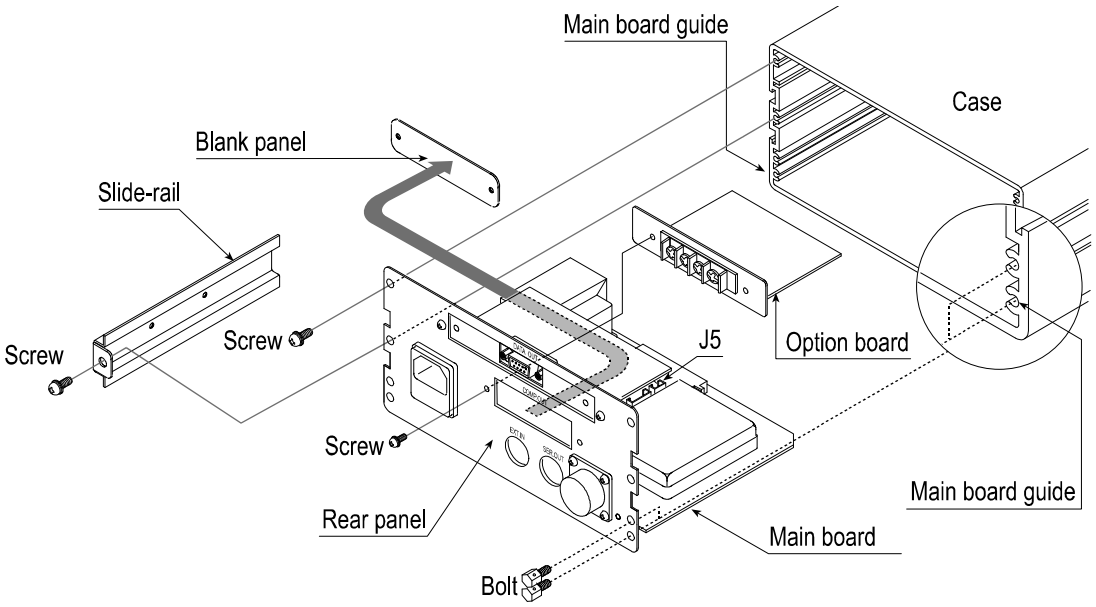
Step 5 Remove two screws and the small blank panel from the rear panel.

Step 6 Attach the option board using two screws.

Step 7 Connect the option cable connector to J5 on the main board.

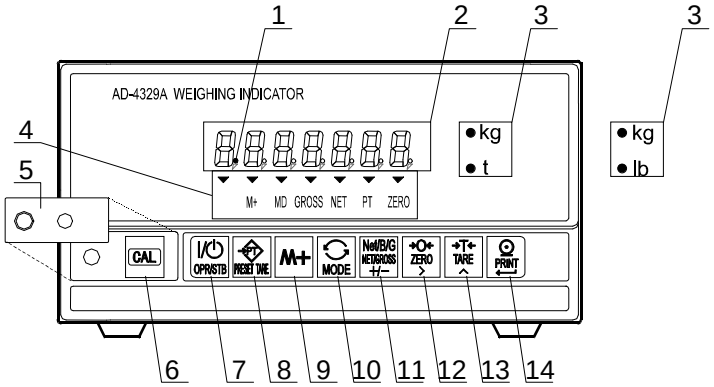
Step 8 Insert the main board into the both main board guides and insert it as before. Then the connector between the main board and the display board is re-connected. If the rear panel will not close completely, retry step 8 to insert the main board correctly.

Step 9 Attach both slide-rails. Fix the rear panel using four screws and four bolts as before.



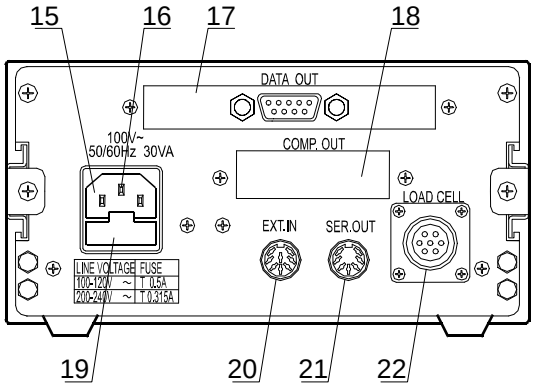
4. Description of Panels and symbols

4.1.1. Front Panel Description



No.	Name	Description
1	Standby indicator	The indicator lights at the standby state. This state means connecting the power cord and turning the display off.
2	Data display	Weighing data is displayed.
3	Weighing unit	A unit selected in the CF functions.
4	State indicator	The ▼ marks indicate kind of data and weighing state.
		M+ It lights when there is accumulation data. It is blinking when displaying accumulation data.
		MD The motion detection mark. It lights when motion is detected. It turns off while data is stabilized.
		GROSS It lights when displaying gross data.
		NET It lights when displaying net data.
		PT It lights while entering a preset tare parameter.
		ZERO It lights when displaying zero.
5	CAL cover	Calibration protection cover.
6	CAL key	Calibration key. The key to adjust the scale so that mass value is displayed correctly and to enter the CF functions.
7	Operate/Standby key	The key to turn the display on or off.
8	Preset tare key	The key to enter preset tare setting mode.
9	M+ (Accumulation) key	The key for the accumulation function. Refer to "8. Accumulation", CF11, F4 and F5.
10	Mode key	The key for the accumulation function and calibration. The key to select a unit of lb or kg.
11	Net/Gross key	The key to select net or gross.
	+/- key	The key to set the polarity of data while in the setting mode.
12	Zero key	The key to zero a current display.
	> key	The key to select a figure while in the setting mode.
13	Tare key	The key to perform tare.
	∧ key	The key to select a value while in the setting mode.
14	Print key	The key to output data.
	Enter key, ↩ key	The key to store current data while in the setting mode.

4.1.2. Rear Panel Description



No.	Name	Description
15	Power connector	Use accessory power cord. Please Confirm that the local voltage and receptacle type are correct for your scale.
16	Grounding terminal	
17	RS-232C interface	Refer to "12. RS-232C Interface" for the detail.
18	Blank panel	Option space (for relay output).
19	Fuse holder	Use 0.5A time lag fuse for AC100V to AC120V. Use 0.315A time lag fuse for AC200V to AC240V.
20	External input	Seven control inputs selected function by the F functions. Refer to F10 to 16.
21	Serial output	Printer port. Refer to "11. Standard Serial Data Output" for the details.
22	Load cell connector	Connect accessory load cell plug.

4.1.3. Other Displays and Symbols

0.	Standby display.
- - - - - -	Zero error when turning display on. If the MODE key is pressed, a current weighing value may be displayed.
Blank Decimal point	Over load display. Remove any load from the load cell immediately. It may cause damage to the indicator.
Err 12	Example of an error display.

4.1.4. Accessories and Option OP-02

Accessories	Instruction manual	1	
	Load cell plug	1	JM-NJC-207-PF
	Power cord	(1)	
	7pin Din connector	1	JA-TCP0576
	8pin Din connector	1	JA-TCP0586
	0.5A or 0.315A time lag fuse	1	FS-EAWK-500MA FS-EAWK-315MA
	Rubber foot	4	10-SJ-5023

Caution **Please Confirm that the receptacle type and local voltage is correct for your indicator (scale).**

Comparator relay output		OP-02		AD4329A-02
	Accessory	Cable	1	

5. Calibration

This weighing indicator, converts an input voltage from a load cell to the "mass" value, and displays it. Calibration is the adjustment function so that the scale (indicator) can weigh correctly.

5.1.1. Items of Calibration Mode

There are seven items in the calibration function.

Basic Items

The minimum division ..... Setting the weighing interval.

The maximum capacity ..... Setting the maximum display.

Zero calibration..... When unloading any weight on the weighing unit (there is nothing on the weighing pan), this function performs adjustment so as to display the zero point mark . Select an adjustment method from the "weighing input" or "digital input".

Comment This function is the fundamental starting point to weigh anything, and influences the performance of scale (indicator).

Span calibration..... The function to measure an input voltage variation by loading to the weighing unit correctly. Select an adjustment method from the "weighing arbitrary mass", "weighing capacity mass" or "digital input".

Optional Items (Sub-functions)

Range function..... The function for a multi-interval scale. Select "dual range scale" or "triple range scale". Each range has parameters of "weighing range" and "division"

Digital linearization function..... The function to revise a linearity deviation using weighing points. (up to three weighing points)

Gravity compensation function... The function to revise weighing error between the calibration location and another weighing location using gravity acceleration.

Caution

- **The maximum display is less than or equal to 10000 divisions. This number is calculated from the maximum capacity divided by the minimum division.**
- **Check the accuracy of weighing instrument periodically.**
- **Recommended mass, use a mass heavier than 2/3 maximum capacity.**

- **Calibrate the scale, if it is moved to another location or the environment has changed.**
- **It is not necessary to set the gravity acceleration correction, when calibrating the scale with a calibration mass at the place where the scale is used.**
- **Enter the stable weighing data while the MD mark is turned off. If unstable data is used, it may cause a weighing error. Arrange the condition using the F00 filter function.**
- **The span calibration needs the zero calibration data. We recommend that you perform the span calibration immediately after the zero calibration.**
- **Perform the digital linearization function immediately after the zero calibration. And perform the span calibration continuously.**
- **Select a decimal point and weighing unit at the CF function CF00, CF 01.**
- **If you use the dual or triple range function of the multi-interval scale, perform the "Range Function", "Zero Calibration" and "Span Calibration".**

5.2. Calibration Procedure

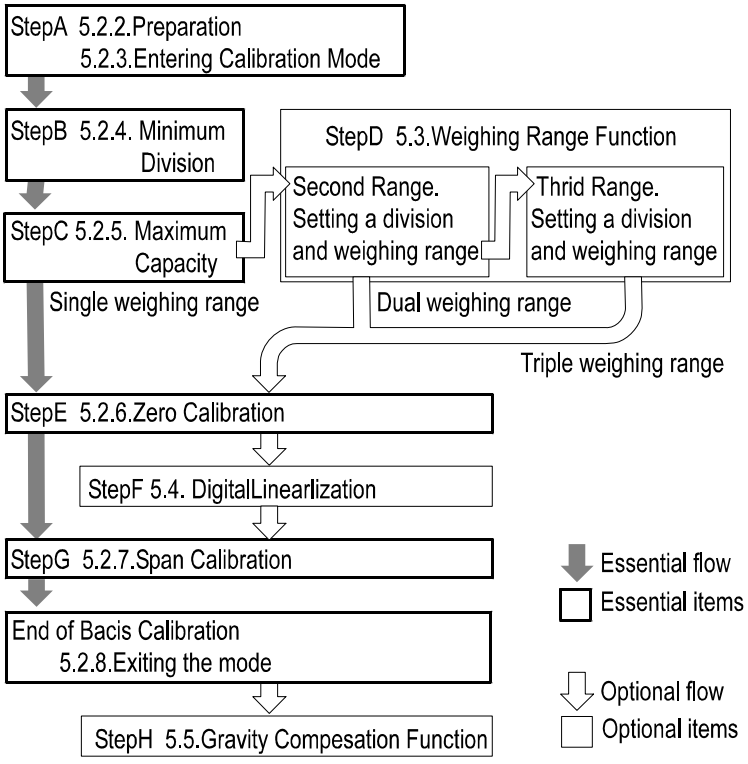
5.2.1. The Whole Procedure

Essential Items

Step A Preparation for calibration.
Step B Minimum division.
Step C Maximum capacity.
Step E Zero calibration.
Step G Span calibration

Optional Items

Step D Weighing range function. Perform this function just before zero calibration and span calibration.
Step F Digital linearization function. Perform this function after the zero calibration immediately. And perform the span calibration continuously.



Step H Gravity compensation function.
Perform this function after span calibration.

5.2.2. Preparation

Step 1 Keep the following conditions to calibrate the scale (indicator) correctly.

- Maintain a constant temperature, stable power and stable input voltage from the load cell.
- Avoid direct sunshine and in the neighborhood of an air conditioner.
- Do not install the scale (indicator) where there is a strong magnetic field.

Step 2 Turn the display on during 10 minutes.

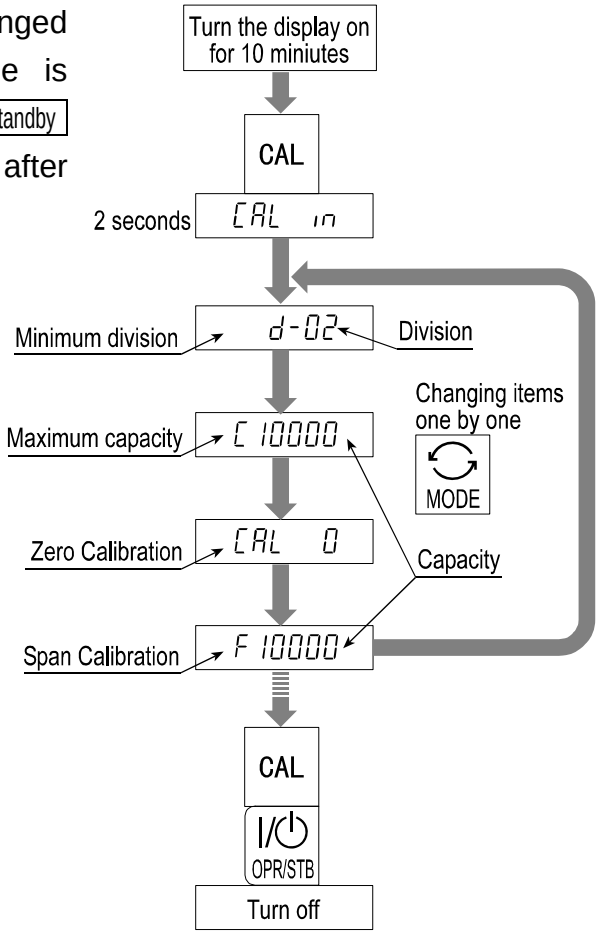
5.2.3. Entering the Calibration Mode

Step 3 Press the [CAL] key in the normal weighing mode. The [CAL in] is displayed for two seconds when entering the calibration mode.

[MODE] key .. Parameters are not revised and the next item is displayed.

[CAL] key ..... Parameters are stored in the indicator and [End] is displayed. Press the [Operate/Standby] key to turn the display off.

Press and hold the [NET/GROSS] key and press the [CAL] key ..... All parameters are not changed and the calibration mode is finished. Press the [Operate/Standby] key to turn the display off after displaying [CANCEL] .

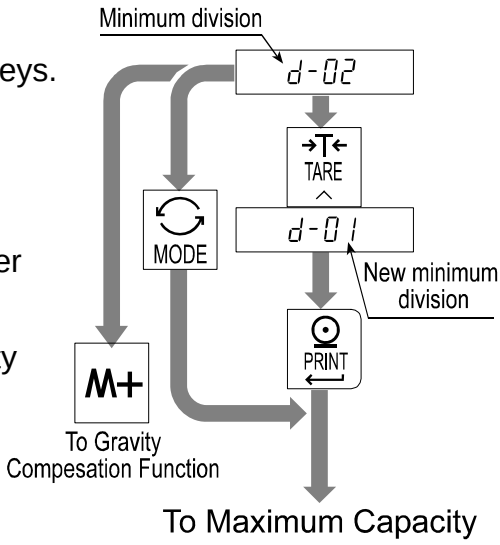


5.2.4. Minimum Division (Weighing Interval)

Step 4 Check the [d-xx] display. The xx is minimum division (01, 02, 05, 10, 20, 50).

Step 5 Select a minimum division using the following keys.

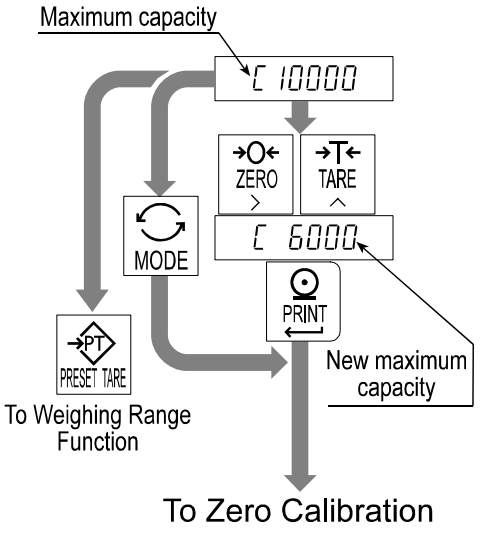
- [Λ] key ..... The key to select a parameter.
- [↵] key ..... The key to store a parameter and proceed to step 6.
- [MODE] key... The key not to change a parameter and proceed to step 6.
- [M+] key ..... The key to proceed to "5.5. Gravity Compensation Function".



5.2.5. Maximum Capacity

Step 6 Check the [C xxxx] display. The xxxx is current capacity. Select a new maximum capacity using the following keys.

- [>] key.....The key to select a figure.
- [Λ] key.....The key to select a number.
- [↵] key.....The key to store a parameter and proceed to step 7 (of the zero calibration).
- [MODE] key.....The key not to change a parameter and proceed to step 7 (of the zero calibration).
- [PRESET TARE] key .... The key to porceed to "5.3. Weighing Range Function".



5.2.6. Zero Calibration

Step 7 Check the [CAL 0] display.

Select a zero calibration method to adjust the zero point

Weighing input (Normal way)	The adjustment method with nothing on the weighing unit.	To step 8
Digital input	The numerical input to enter a load cell output voltage.	To step 9

Weighing Input

Step 8 Place nothing on the weighing unit. Press the [↵] key after the MD mark has turned off. Proceed to step10.

[MODE] key..... The key not to change the zero point data and proceed to step 10.

Caution Do not press the [↵] key while the MD mark is lit (detecting motion). Arrange the condition using the F00 filter function.

Digital Input

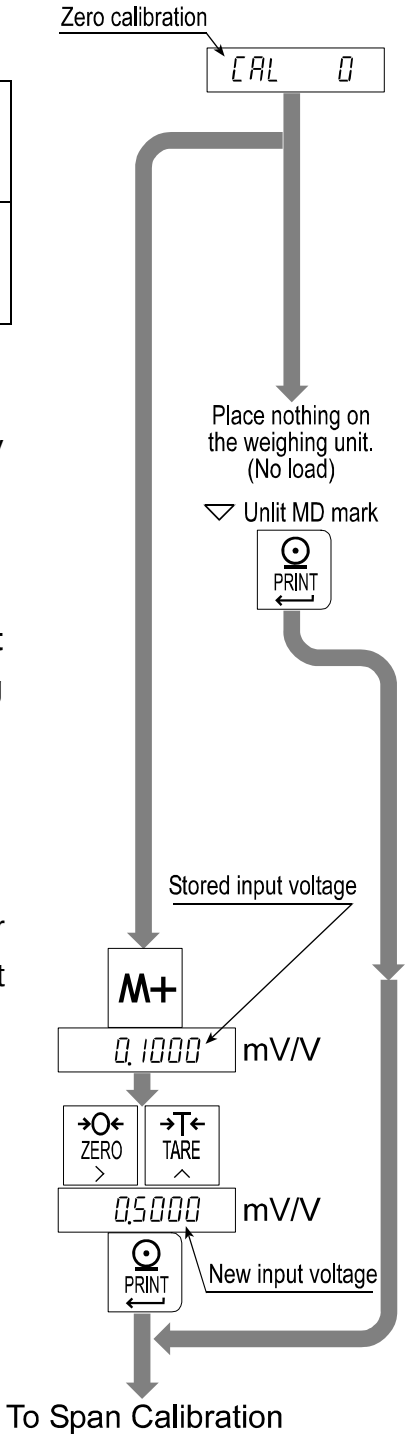
Step 9 Pressing the [M+] key, a stored input voltage parameter of the zero point is displayed in the unit of mV/V. Adjust the input voltage using the following keys.

[>] key ..... The key to select a figure.

[∧] key ..... The key to select a number.

[↵] key ..... The key to store the zero point parameter and proceed to step 10.

[MODE] key... The key not to change parameter and proceed to step 10.



5.2.7. Span Calibration

Step10 Check the [Fxxxx] display. The xxxx is a capacity.
Select a span calibration method to adjust the capacity.

Weighing a mass except the maximum capacity	The method to weigh a mass except the maximum capacity.	To step 11
Weighing maximum capacity	The method to weigh a mass equivalent to the maximum capacity.	To step 14
Digital input	The numerical input to enter a load cell output voltage.	To step 16

Weighing a Mass except the Maximum Capacity

Step11 Set a mass value using the follwing keys.
[>] key .... Key to select a figure.
[∧] key .... Key to select a number.

Step12 Place a mass equivalent to displayed value on the weighing unit.

Step13 Press the [↵] key after the MD mark turns off. Proceed to step 17.
[MODE] key .... The key not to change parameter and go back to step 4.
[CAL] key ..... The key not to change parameter and proceed to step 17.

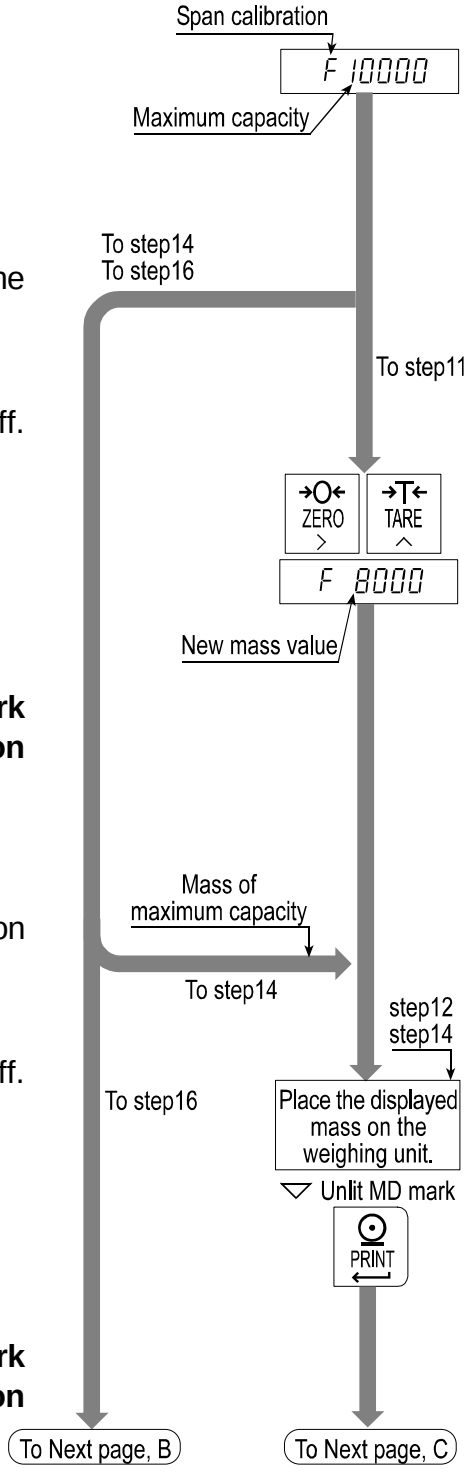
Caution Do not press the [↵] key while the MD mark is lit (detecting motion). Arrange the condition using the F00 filter function.

Weighing Capacity Mass

Step14 Place a mass equivalent to the maximum capacity on weighing unit.

Step15 Press the [↵] key after the MD mark turns off. Proceed to step 17.
[MODE] key .... The key not to change parameter and go back to step 4.
[CAL] key ..... The key not to change parameter and proceed to step 17.

Caution Do not press the [↵] key while the MD mark is lit (detecting motion). Arrange the condition using the F00 filter function.



Digital Input

Step16 Pressing the [M+] key, a stored input voltage parameter of the span is displayed in the unit of mV/V. Adjust the input voltage using the following keys.

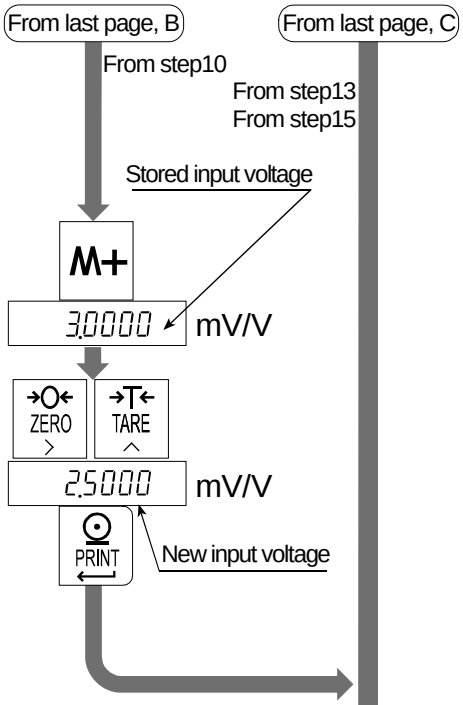
[>] key ..... The key to select a figure.

[^] key ..... The key to select a number.

[↵] key ..... The key to store the span parameter and proceed to step 17.

[MODE] key .. The key not to change parameter and go back to step 4.

[CAL] key ..... The key not to change parameter and proceed to step 17.



5.2.8. Exiting the Calibration Mode

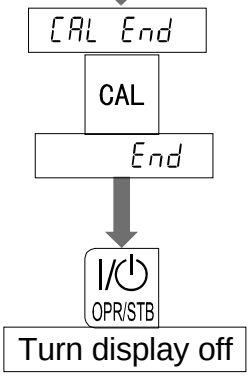
Step17 Check the [CAL End] display.

Use the following keys.

[CAL] key ..... Parameters are stored in the indicator and [End] is displayed. Proceed to step 18.

[MODE] key .. The key to memorize parameters temporarily. Proceed to the "Minimum Division Selection".

Press and hold the [NET/GROSS] key and press the [CAL] key
All parameters are not changed, [CANCEL] is displayed and the calibration mode is finished.



Step18 Press the [Operate/Standby] key to turn the display off.

5.3. Weighing Range Function

The weighing range function can select "single range", "dual range" and "triple range". Specify each weighing interval (division) for the multi-interval instrument. Each weighing interval is displayed according to a net value or gross value.

Caution
- **Using a single range, it is not necessary to perform this function.**
- **Perform the zero and span calibration after this function.**

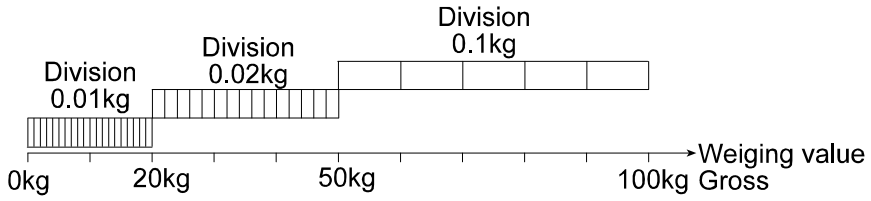
Example 1 The gross display.

Specified parameters:

First range	Range = 20.00kg, division 0.01kg
Second range	Range = 50.00kg, division 0.02kg
Third range	Range = 100.00kg (maximum capacity), division 0.1kg

Display

0kg to 20kg	:	The first range, division 0.01kg.
20kg to 50kg	:	The second range, division 0.02kg.
50kg to 100kg	:	The third range, division 0.1kg.



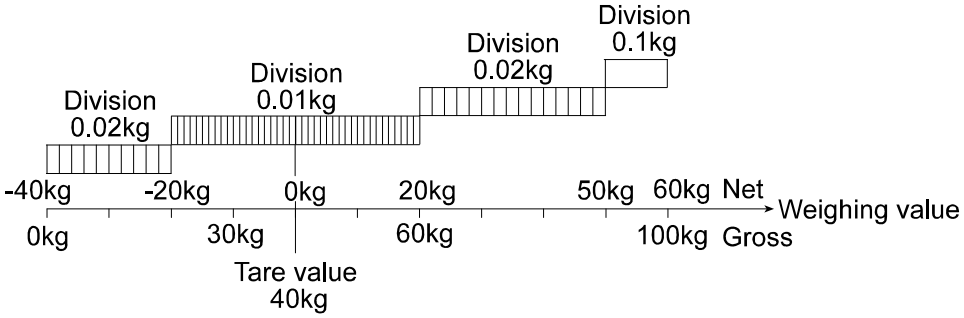
Example 2 The net display using a 40kg tare value.

Specified parameters:

The same parameters as example 1.

Display

-40kg to -20kg	:	The second range, division 0.02kg.
-20kg to 20kg	:	The first range, division 0.01kg.
20kg to 50kg	:	The second range, division 0.02kg.
50kg to 60kg	:	The third range, division 0.1kg.



5.3.1. Setting Division and Range

Consider the following rules to design the weighing range.

Rule 1 Select the division and range of each weighing range so as to fit the following inequality.

The first range < the second range < the third range

The division of next weighing range is automatically set bigger than division of lower weighing range. And the division can change.

Rule 2 When setting the dual range, the upper limit value of the second range becomes the maximum capacity.

When setting the triple weighing range, the upper limit value of the third range becomes the maximum capacity.

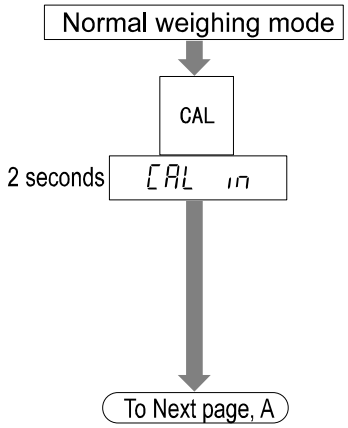
Rule 3 Select a resolution smaller than 10000. The resolution is a value divided the maximum capacity by the minimum division of the first range.

Mark to indicate the weighing range while this setting

▼ mark	First range	Second range	Third range
Net			ON
Gross	OFF		

Procedure

Step 1 Press the [CAL] key to enter the calibration mode.
Then [CAL in] is displayed for two seconds.



[MODE] key .. The parameters are not revised and the next item is displayed.

[CAL] key ..... Parameters are stored in the indicator and [End] is displayed. Press the [Operate/Standby] key to turn the display off.

Press and hold the [NET/GROSS] key and press the [CAL] key
All parameters are not changed and the calibration mode is finished. Press the [Operate/Standby] key to turn the display off after displaying [CANCEL] .

Setting First Weighing Range

Step 2 Select the minimum division of the first range when displaying [d-xx]. The xx is division.

[∧] key ..... The key to select the division.

[↵] key ..... The key to store the new division and proceed to step 3.

[MODE] key .. The key not to change division and proceed to step 3.

Step 3 Specify the range of the first range.

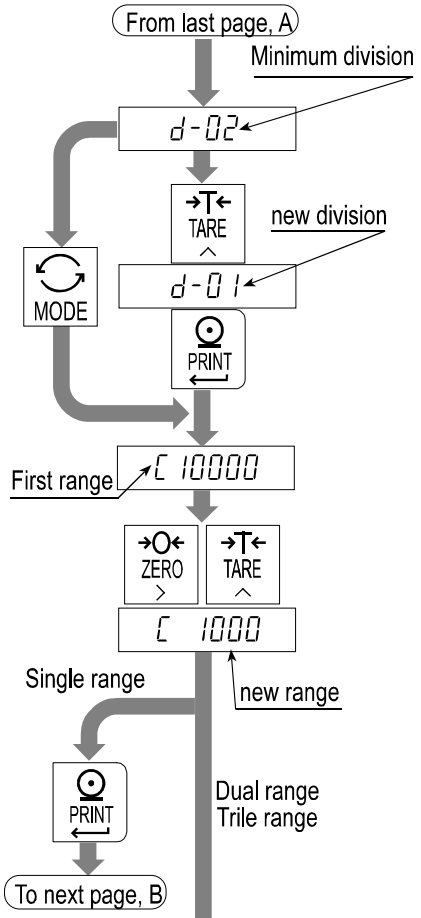
[>] key ..... The key to select a figure.

[∧] key ..... The key to select a number.

[PRESET TARE] key . The key to store the first range and proceed to step 4.

[↵] key ..... The key to store the value as the maximum capacity for the single range and proceed to step 10.

[MODE] key .. The key not to change the parameter and proceed to step 10.



Setting Second Range

Step 4 The ▼ mark is displayed at net. Select a way.

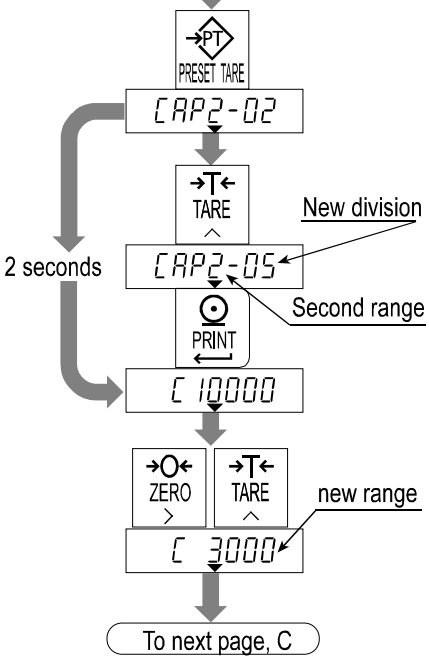
Case 1 If keeping the current second division, wait for displaying [Cxxxx] and proceed to step5. The xxxx is the range.

Case 2 If changing the second division, press the [∧] key while displaying [CAP2-xx]. The xx is division.

[∧] key ..... The key to select the division.

[↵] key ..... The key to store the new division and proceed to step 5.

[MODE] key .. The key not to change the division and proceed to step 5.



Step 5 Specify the range of the second range.

[>] key ..... The key to select a figure.

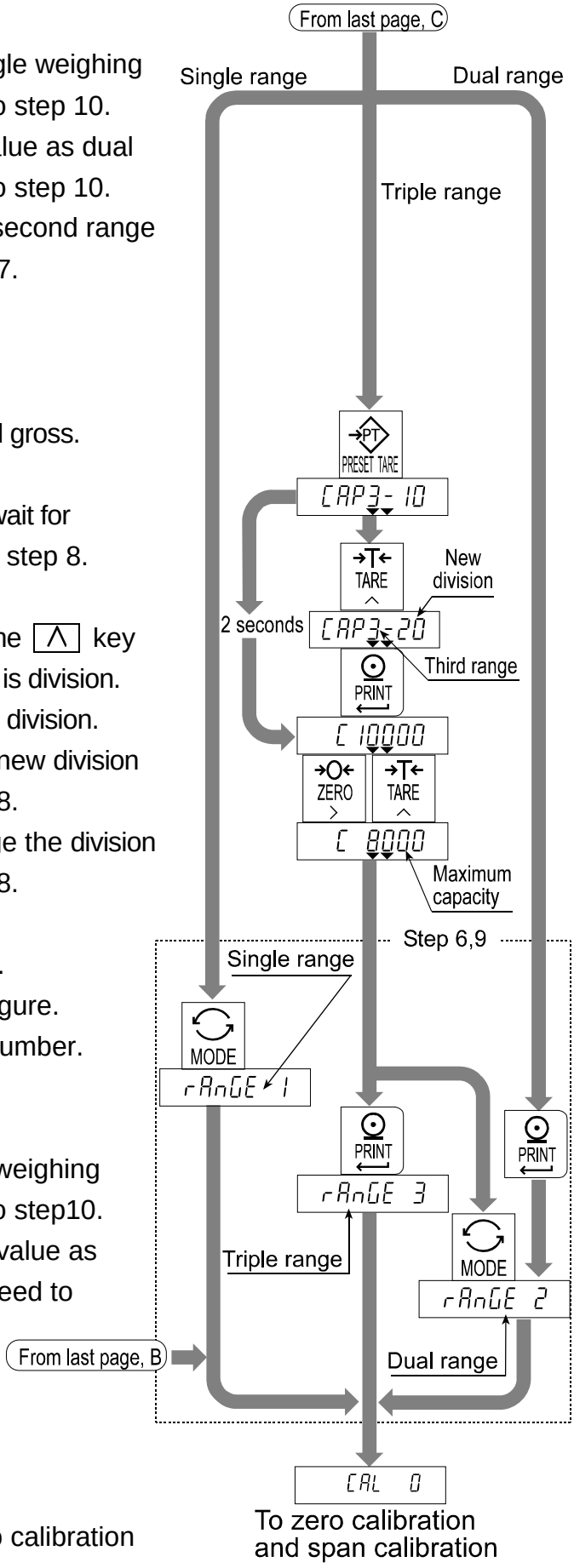
[∧] key ..... The key to select a number.

Step 6 Specify the weighing range.

[MODE] key .. The key to use a single weighing range and proceed to step 10.

[↵] key..... The key to store a value as dual range and proceed to step 10.

[PRESET TARE] key . The key to store the second range and proceed to step 7.



Setting Third Range

Step 7 The ▼ mark is displayed at net and gross. Select a way.

Case 1 If keeping the current third division, wait for displaying [Cxxxx] and proceed to step 8. The xxxx is the range.

Case 2 If changing the third division, press the [Λ] key while displaying [CAP3-xx]. The xx is division.

[Λ] key ..... The key to select the division.

[↵] key..... The key to store the new division and proceed to step 8.

[MODE] key .. The key not to change the division and proceed to step 8.

Step 8 Specify the range of the third range.

[>] key..... The key to select a figure.

[Λ] key ..... The key to select a number.

Step 9 Specify the weighing range.

[MODE] key .. The key to use dual weighing range and proceed to step10.

[↵] key..... The key to store the value as triple range and proceed to step10.

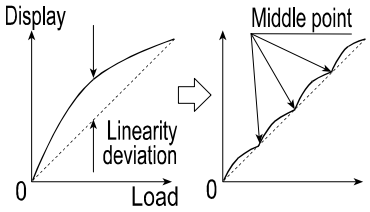
Step10 [CAL 0] is displayed. Perform zero calibration and span calibration from step7 at page 15 .

5.4. Digital Linearization Function

Even if the zero and span calibration have been completed, there may still remain some linearity deviation by the performance of the weighing unit. The digital linearization function can rectify and reduce the linearity deviation using weighing points during the zero and capacity setting. Up to three weighing points can be specified.

Caution
- **This function does not improve repeatability and hysteresis.**
- **Use the mass on the condition that Lnr 1 < Lnr 2 < Lnr 3.**
- **Do not press the [↵] key while the MD mark is lit.**

Middle point	Flash indication	▼ mark
First Point	Lnr 1	Net
Second Point	Lnr 2	Gross
Third Point	Lnr 3	Net and Gross



Step 1 Zero calibration has been finished and [Fxxxx] is displayed. (Start this procedure from step 10 of "5.2.7.Span Calibration")

Step 2 Press the [PRESET TARE] key to enter this digital linearization function.

Step 3 The value of the middle point is displayed after indicating [Lnr x]. x is 1, 2 or 3.

Step 4 Select a way.
- Press the [MODE] key to finish this function. Proceed to step 7 and other points are cleared (canceled).
- Select a middle point value using the following keys. Proceed to step 5.

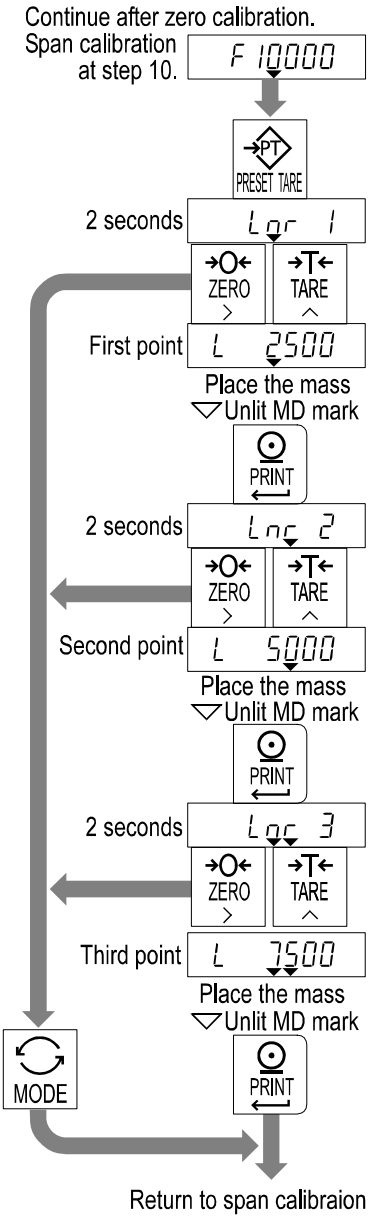
  [>] key.....The key to select a figure.

  [Λ] key.....The key to select a number.

Step 5 Place a mass equivalent to the displaying value on the weighing unit. Press the [↵] key after the MD mark has turned off. Proceed to step 6.

Step 6 If you add new middle point, proceed step 3, 4, 5. If you finish this function, proceed to step 7.

Step 7 Perform step 10 of "5.2.7.Span Calibration" on page 16 immediately.



5.5. Gravity Compensation Function

- If the scale is used at the calibration location, it is not necessary to perform this function.
- It may cause a weighing error, if there is a difference of gravity acceleration between the installed location and calibration location. This function specifies these gravity accelerations and corrects span error.

Caution ▫ **The decimal point is not displayed in the function. Ex. [9798] = 9.798 m/s^2**

Step 1 Press the [CAL] key in normal weighing mode. The [CAL in] is displayed for two seconds. Press the [M+] key to enter the gravity compensation function.

If you want to cancel the current procedure, press and hold the [NET/GROSS] key and press the [CAL] key. Then, all parameters are not changed and the calibration mode is finished. Press the [Operate/Standby] key to turn the display off after displaying [CANCEL] .

Step 2 The parameter [G1 xxxx] is displayed. Enter the gravity acceleration of the calibration location. The parameter xxxx is the gravity acceleration.

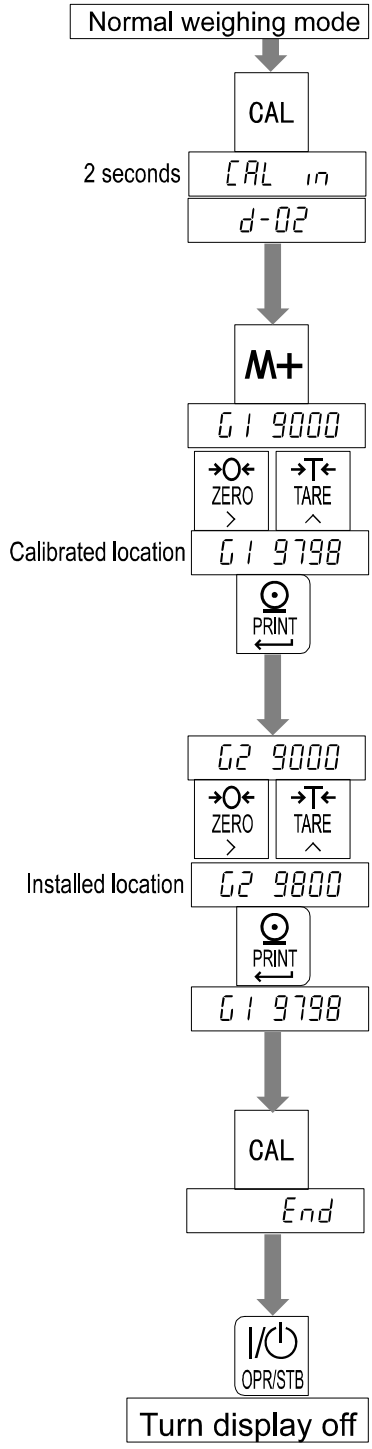
[>] key.....The key to select a figure.
[^] key.....The key to select a number.
[↵] key.....The key to store the new gravity acceleration and proceed to step 3.
[MODE] key .....The key not to change the value and proceed to step 3.

Step 3 The parameter [G2 xxxx] is displayed. Enter the gravity acceleration of the installed location. The parameter xxxx is the gravity acceleration.

[>] key.....The key to select a figure.
[^] key.....The key to select a number.
[↵] key.....The key to store the new gravity acceleration and proceed to step 4.
[MODE] key .....The key not to change the value and proceed to step 4.

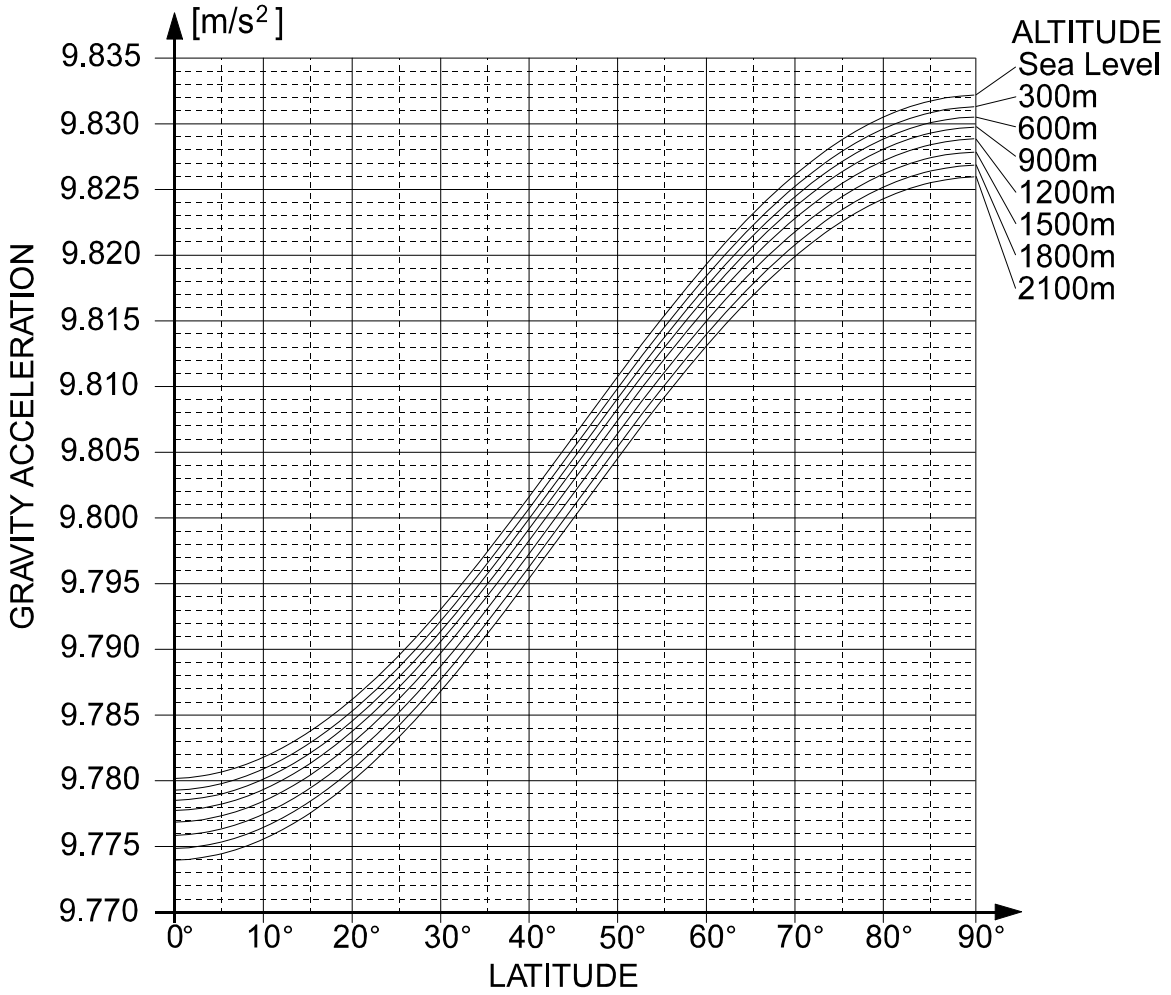
Step 4 Now [G1 xxxx] is displayed. Press the [CAL] key to store the parameters. The [End] is displayed. Proceed to step5.

Step 5 Press the [Operate/Standby] key to turn display off.



5.5.1. The Gravity Acceleration Table

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



5.6. Calibration Error Code List

Exiting from the calibration error

MODE key .. The key to return the point occurred an error. Retry the operation.

Press and hold the NET/GROSS key and press the CAL key

All parameters are not changed, the CAnCEL is displayed and the calibration mode is finished.

Error Code List

If an error has occurred during calibration mode, the following code is displayed.

Error code	Description
Err 0	In multi-interval scale. The last division is set to maximum (d-50). Therefore the next division can not be entered.
Err 1	Resolution exceeds 10000. (Resolution = maximum capacity/ minimum division) Reduce maximum capacity or increase minimum division.
Err 2 Err 3	Load cell output is too large or too small at zero calibration. Check the weighing unit and load cell. Refer to "3.1.4.Verifying Load Cell Output and Input Sensitivity".
Err 4	Measuring calibration mass (or entering digital input), the value exceeded maximum capacity. Reduce calibration mass (or digital input).
Err 5	Selected calibration mass is smaller than minimum division.
Err 6	New input sensitivity is less than 0.15 μV/division. Increase input sensitivity. Refer to "3.1.4.Verifying Load Cell Output and Input Sensitivity".
Err 7	Placing mass on the weighing unit, the load cell output becomes a negative value. Check the load cell cable connections and the direction of load cell mounting.
Err 8	Load cell output exceeds the input range before maximum capacity. Adjust zero balance referring to "3.1.4.Verifying Load Cell Output and Input Sensitivity". Replace with a load cell designed smaller output. Reduce maximum capacity.
Err 9	The weighed value is out of the input range at zero calibration or span calibration. Check the weighing unit and cables.
Err 12	The last weighing range is larger than next weighing range.
Err 13	Incorrect mass is selected at the digital linearization function. Select mass of the following relation. Lnr 1 < Lnr 2 < Lnr 3.
G Err	An unacceptable value was selected in the gravity acceleration function. Exit this error using the Operate/Standby key.

6. Functions

There are two parameters list for the F-functions and CF-functions. These functions control the indicator. The parameters of each function are stored in the EEPROM, and are not lost even if the AC power supply is disconnected.

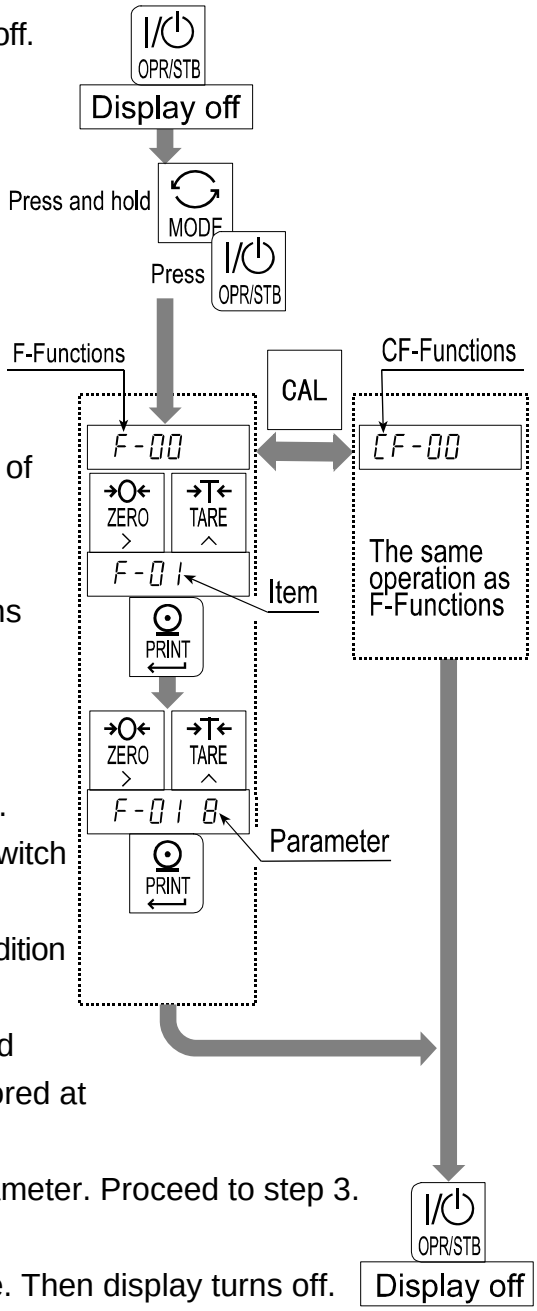
F-functions: These parameters can always be changed and are used for internal settings.

CF-functions: If you accept a certificated approval of the weighing instruments, the CAL cover must be sealed. Therfore, accepting this approval, these parameters of the CF-function can not be changed.

6.1. Changing the Function Settings

Step 1 Press the [Operate/Standby] key to turn the display off.

Step 2 Press and hold the [MODE] key and press the [Operate/Standby] key. The [F-00] is displayed.



Operating Item

Step 3 Select an item using the following keys.

[>] key..... The key to select a figure.

[^] key..... The key to select a number.

[↵] key..... The key to display a parameter of the selected item.
Proceed to step 4.

[CAL] key .. The key to exchange F-functions and CF-functions.

Operating parameter

Step 4 Select a parameter using the following keys.

[>] key..... The key to select a figure or a switch (at F-06 and F-46).

[^] key..... The key to select a value (or condition at F-06).

[↵] key..... The key to store a parameter and proceed to step 3. (all switch stored at F-06)

[MODE] key. The key not to change the parameter. Proceed to step 3.

Step 5 Press the [Operate/Standby] key to exit the mode. Then display turns off.

6.2. F-Functions

Digital Filter

Item	Parameter	Description	
F-00 Filter Motion / Averaging time	0	2 d/ 1.6s	If weak filter is set, the response will be fast, but will be more sensitive to external influences such as vibration.
	1	4 d/ 1.6s	
	2	8 d/ 1.6s	
	3	16 d/ 1.6s	
	4	32 d/ 1.6s	
	5	64 d/ 1.6s	
	6	128 d/ 1.6s	
	7	2 d/ 3.2s	
	*8	4 d/ 3.2s	
	9	8 d/ 3.2s	
	10	16 d/ 3.2s	
	11	32 d/ 3.2s	
	12	64 d/ 3.2s	
	13	128 d/ 3.2s	
F-01 Zero tracking	0	OFF	This function traces the weighing value drifting around zero point slowly, displayed as zero. If a strong parameter is set, a very small zero drift may be not detected. If CF-03 is 1, the 0, 1, 6 or 7 can be selected only. If CF-03 is 1, the initial setting sets 7.
	1	0.5 d/ 1s	
	2	1.0 d/ 1s	
	3	1.5 d/ 1s	
	4	2.0 d/ 1s	
	5	2.5 d/ 1s	
	6	0.5 d/ 2s	
	7	1.0 d/ 2s	
	*8	1.5 d/ 2s	
	9	2.0 d/ 2s	
	10	2.5 d/ 2s	
F-02 MD mark Motion detection condition	0	No motion detection	The function to set the condition of judgment whether a weighing value is unstable or stable. The [ZERO] key and [TARE] key has effective in the stable state. If these keys need in the unstable state, set to F-02 0. In case of CF-03 1, F-02 6 or F-02 7 can be selected only. (Internal setting is 6.)
	1	0.5 d/ 0.5s	
	2	1.0 d/ 0.5s	
	3	2.0 d/ 0.5s	
	4	3.0 d/ 0.5s	
	5	4.0 d/ 0.5s	
	6	0.5 d/ 1s	
	7	1.0 d/ 1s	
	*8	2.0 d/ 1s	
	9	3.0 d/ 1s	
	10	4.0 d/ 1s	

d: division (weighing interval) of first range.

s: second.

*: factory settings (Initial settings).

Display

Item	Parameter	Description	
F-03 Display update rate	*0	10 times/s	The selection in the unstable condition.
	1	5 times/s	
F-04 Accumulation Mode	*0	Manual + only	The selection for the way of adding data and kind of data.
	1	Manual + / –	
	2	Automatic + only	
	3	Automatic + / –	
F-05 Inhibit region for accumulation	0	Add data anytime	The selection of the inhibit region for accumulation
	*1	Above ±5 d	
	2	Above ±10 d	
	3	Above ±20 d	
	4	Above ±50 d	
F-06 Disabling keys	20	*0 enable / 1 disable — ∧ key 1 ON/OFF key 2 Preset tare key 3 M+ key 4 Mode key 5 Net/Gross key 6 Zero key 7 Tare key 8 Print key — > key	A key is selected by the left parameter A key condition is selected by the right parameter: When specifying 1 at the right parameter, this key does not work. Use the function to avoid mis-operation of 8 keys on the front panel without CAL key.

External Input

Item	Parameter	Description
F-10 EXT1 Function selection of external input	*0	Not used (No function)
	1	Zero key
	2	Tare key
	3	Print key, ↤ key
	4	Operate/Standby key
	5	M+ key
	6	Net/Gross key
	7	Mode key
	8	Gross display when shorting terminal.
	9	Accumulation data display when shorting terminal.
	10	Over signal. Gross over and display data are output.
	11	All keys are enable when shorting terminal.
F-11 EXT2	The same as F-10	
F-12 EXT3	The same as F-10	

F-13 EXT4	The same as F-10
F-14 EXT5	The same as F-10
F-15 EXT6	The same as F-10
F-16 EXT7	The same as F-10

d: division (weighing interval) of first range.

*: factory settings (Initial settings).

s: second.

Comparator

Item	Parameter	Description	
F-20 Comparator function	*0	Not used	
	1	Upper/lower limit comparison. Set F-21, too.	
	2	Setpoint comparison	
F-21 Comparator mode. Condition to compare data.	*0	All data, always	When F-20 is 1, F-21 is effective.
	1	Stable data	
	2	Data exceeding +5d	
	3	Stable data exceeding +5d	
	4	Data exceeding -5d to +5d	
	5	Stable data exceeding -5d to +5d	

Standard Serial Output

Item	Parameter	Description	
F-30 Output Data	*0	Displayed data	
	1	Gross data	
	2	Net data	
	3	Tare value	
	4	Gross data / Net data / Tare value	
F-31 Output mode	*0	Stream mode	
	1	Auto print mode	
	2	Manual print mode	
F-32 Auto-print condition	*0	Positive data only	
	1	Positive and negative data	
F-33 Delay for continual data	*0	Not used	In case of F-310, the F-33 is ineffective.
	1	Approximately 2 seconds	
F-34 Baud rate	0	600 bps	
	1	1200 bps	
	*2	2400 bps	

bps: bit per second.

d: division (weighing interval) of first range.

*: factory settings (Initial settings).

RS-232C Interface

Item	Parameter	Description	
F-40 Output Data	*0	Displayed data	
	1	Gross data	
	2	Net data	
	3	Tare value	
	4	Gross data / Net data / Tare value	
F-41 Output mode	*0	Stream mode	
	1	Auto print mode	
	2	Manual print mode	
	3	Command mode (no address)	
	4	Command mode with address	
F-42 Auto-print condition	*0	Positive data only	
	1	Positive and negative data	
F-43 Delay for continual data	*0	Not used	In case of F-410, the F-43 is ineffective.
	1	Approximately 2 seconds	
F-44 Baud rate	0	600 bps	
	1	1200 bps	
	*2	2400 bps	
	3	4800 bps	
	4	9600 bps	
F-45 Data format	*0	Format 1	Refer to "12.1.2.Data Format"
	1	Format 2	
F-46 Address	00 to 99	Factory setting is 00. When F-41 4 is not selected, F-46 is ineffective.	

bps: bit per second.

*: factory settings (Initial settings).

Description of "Stream Mode"

Object F-310, F-410

Operation Data is output in every sampling (when refreshing the display).
Use this mode to output data to an external display (Data may not be output due to timing of the baud rate and internal sampling rate). If data is printed with pressing the PRINT key on the printer, use the stream mode.

Description of "Auto Print Mode"

Object F-311, F-411

Operation When weighing data varies from the "inhibition region of output" to the "permission region of output", the stable data is just output once. If you use this mode, set F-02 except 0.

- ❑ When weighing (and removing) each object and printing the data, use this mode.
- ❑ In case of F-320 or, F-420
  "Inhibition region of output" ≦ +5d.
  +5d < "permission region of output".

- ❑ In case of F-321 or, F-421
  -5d ≤ "inhibition region of output" ≦ +5d.
  "Permission region of output" < -5d, +5d < "permission region of output".

d: division (weighing interval) of first range.

Description of "Manual Print"

Object F-312, F-412

Operation When pressing the PRINT key, the stable weighing data is just output once

Description of "Delay for continual data"

Object F-33, F-43

Operation This function can be used in the "Auto print mode" and "Manual print mode"
When using a non-buffered printer like the AD-8121, set to F-331 and F-431.

6.3. CF-Functions

Item	Parameter	Description
CF-00 Decimal point position	0	None Example: 12345
	* 1	First figure Example: 1234.5
	2	Second figure Example: 123.45
	3	Third figure Example: 12.345
CF-01 Weighing unit	* 0	kg
	1	t
	2	lb
	3	lb/kg alternately
CF-02 Zero range Turning display on, the range to zero display.	* 0	±2% of CAP, Tare limit is 100 % CAP
	1	±10% of CAP, Tare limit is 100 % CAP
	2	±3% of CAP, Tare limit is 50 % CAP
	3	±4% of CAP, Tare limit is 50 % CAP
CF-03 Zero track width, motion detection condition	* 0	No limitation
	1	Use limitation at F-01 0, 1, 6, 7 and F-02 6, 7 only.
CF-04 Zero tracking	0	Gross when displaying gross.
	1	Gross
	* 2	Gross or Net when displaying net.
CF-05 Power-on zero	* 0	Not to zero when turning display on.
	1	To zero when turning display on.
CF-06 To inhibit preset tare	* 0	To permit preset tare.
	1	To inhibit preset tare. (Ineffective preset tare key)
CF-07 Data output of tare	* 0	According to F-30, F-40.
	1	Using preset tare value and output net, a tare value is output on manual mode or auto print mode (In CF-09 2, a tare value is output at all mode except command).
CF-08 Output on over load and unstable state.	* 0	Not to output data at unstable value or over load. It is effective in key mode.
	1	To output data always.
CF-09 Header 2	* 0 1 2	Gross / Net / Tare / Preset tare * 0: GS / NT / TR / PT 1: GS / NT / TR / PT 2: G␣ / N␣ / T␣ / PT
CF-10 Figure number of unit for format 1 and decimal point	* 0	Two figures . (dot) — Format 1 on standard serial data output and RS-232C interface. Decimal point is effective at format 1 and 2.
	1	Three figures . (dot)
	2	Two figures , (comma)
	3	Three figures , (comma)
CF-11 Accumulation function	* 0	Not used (Ineffective)
	1	Use (Effective)

CAP : maximum capacity

7. Tare

- The function is used to display a net value with the container weight subtracted from the total weight, if you put an object into a container to weigh it.
- There are two methods for the "weighing tare weight" and "digital input of tare weight".
- Using the RS-232C interface, you can perform digital input from external equipment.

Caution
- **When turning the display off with CF-05 1, the tare value is cleared.**
- **When turning the power off, the tare value is cleared.**

7.1.1. Weighing Tare

Operation Put the tare on the weighing unit. Press the [TARE] key to store the tare weight after the MD mark turns off. The dispaly changes to net.

Caution
- **When displaying a negative gross value, tare can not be used.**

7.1.2. Digital Input

Caution
- **The input value is rounded off to the unit of division (weighing interval).**
- **In case of CF-05 1(power-on zero), the display value will be zeroed when turning the display on.**
- **When using a multi-interval scale, usable input range is the first range.**
- **In case of CF-06 1(To inhibit preset tare), preset tare can not be used.**

Step 1 Press the [PRESET TARE] key to display the stored tare value.
When tare is cleared or is not used, the value is zero.

Step 2 Enter a new tare value using the following keys.
[>] key.....The key to select a figure.
[∧] key.....The key to select a number.
[↵] key.....The key to store a new tare value.
The net is displayed.

7.1.3. Clearing Tare

- When pressing the [TARE] key while gross is zero, tare is cleared and gross is displayed.
- When zeroing with the [ZERO] key, tare is cleared.

8. Accumulation

The function accumulates weighing data and stores sum of weight and count of weighing. Data is stored in the EEPROM, and is not lost even if the AC power supply is disconnected.

8.1.1. Preparation and Specification

Set the following parameters to use the accumulation function.

- Select CF-11 1 for the CF-function so that the accumulation function becomes effective.
- Specify the method of accumulation and data at F-04 of the F-function.
- Specify the inhibit range for accumulation at F-05 of the F-function.

Selection of Accumulation Mode, F-04 of the F-function

- There are two methods of manual accumulation, with the M+ key operation and automatic accumulation.
- The accumulation data can select "positive data only" or "both polarity data".

Accumulation Mode	F-04	Data to accumulate
Manual accumulation mode	F-04 0	Positive data only
	F-04 1	Both polarity data
Automatic accumulation mode	F-04 2	Positive data only
	F-04 3	Both polarity data

Accumulation Condition, F-05 of the F-function

- In case of manual accumulation mode, press the M+ key to accumulate weighing data when the MD mark turned off.
- Data can be accumulated after weighing value becomes to the "inhibition region of output". When connecting power cord and truning display on, the accumulation mode makes the same action.

Inhibition region for accumulation	F-05	Description
Add data anytime	F-05 0	Stable data can be used anytime
Above ±5 d	F-05 1	Factory setting
Above ±10 d	F-05 2	
Above ±20 d	F-05 3	
Above ±50 d	F-05 4	

Caution
- **Do not set to F-05 0 for the automatic accumulation mode**
- **If setting to F-05 0, it may add the same data two times or more.**

Limitation of Accumulation Count and Total

- The limitation of accumulation count is 999999.
  The limitation of total is ±999999 ignoring the decimal point.
- If exceeding these limitations, data is not accumulated.
  Example: Setting the decimal point to second a figure like "0.0", the limitation is "99999.9".

8.1.2. Display and Operation

Action of Accumulating Data

- When accumulating data, the display blinks once.
  If storing accumulation data, the M+ mark is displayed.

Caution ▫ **This function can not accumulate different unit data. Specify a unit before use.**

Display of Accumulation Data

- When setting to CF-11 1 (Effective accumulation function) and pressing the [MODE] key, the [totAL] is displayed and the total data is displayed with the M+ mark blinking . If the [MODE] key is pressed again, the weighing data is displayed.
- The total data can be output. Refer to "Output of Accumulation Data"
- If "lb/kg" of CF-013 is selected, the display of "lb", "kg" and "total" is exchanged with the [MODE] key in order.

Undoing the Accumulation Data

- The last weighing data can be deduced from the accumulation data unless new data is accumulated.

Step 1 Press the [MODE] key to display [totAL] and accumulation data.

Step 2 Press and hold the [M+] key more than 3 seconds. The display blinks once and the last accumulation data before accumlating last weighing data is displayed.

Caution ▫ **External input can not be used.**

Clearing the Accumulation Data

Step 1 Press the [MODE] key to display [totAL] and accumulation data.

Step 2 Press and hold the [ZERO] key more than 3 seconds. The display blinks once and the accumulation data is cleared.

Caution ▫ **External input can not be used.**

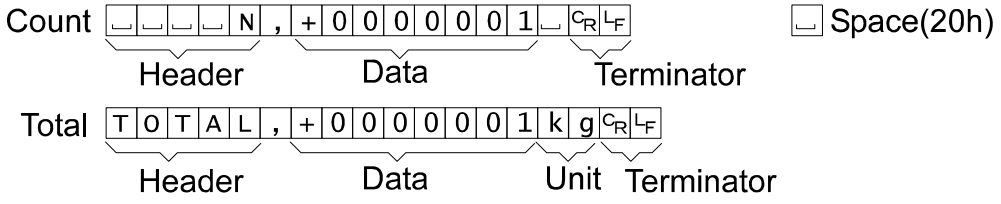
Output of Accumulation Data

- Accumulation data can be output to the standard serial output and RS-232C interface using the manual print mode.

Step 1 Press the [MODE] key to display [totAL] and accumulation data.

Step 2 Pressing the [PRINT] key, the count and total of accumulation data are output in order.

Example:



9. Comparison

- This function has the "upper / lower comparison" and the "setpoint comparison". They compare the weighing data with preset parameters and can output the result of the comparison to the relay-outputs of OP-02.
- Set the F-function the F-20 and F-21 to use these comparisons.

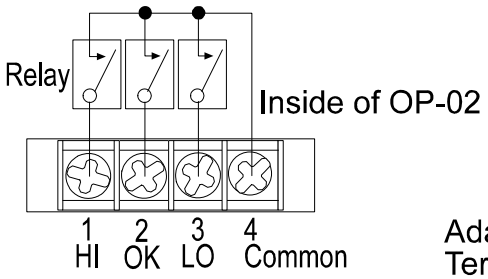
Caution
- **The result can only be output using relay-outputs, and is not displayed.**
- **The setpoint comparison can be used for normal batching, but can not be used for loss-in-weight.**

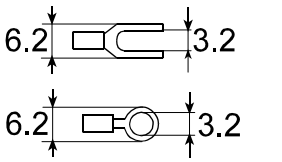
9.1. Comparator Output Relay (OP-02)

- This relay option outputs the result of comparison controled by the F-function F-20 (comparator function) and F-21 (comparator mode).

Specifications

Maximum voltage	250V AC or 30V DC
Maximum current	3A (resistive load)
Contact life	100,000 times (resistive load)
Adaptable terminal type	M3
Circuit and pin layout	





Adaptable Compression Terminal

9.2. Upper/Lower Limit Comparison

- This function compares the weighing data with the upper limit value and lower limit value, and outputs the result to the three relays of HI, OK and LO. Use this comparison when judging whether a weight is proper.
- Set to the F-function F-20 1 to use this upper/ lower limit comparison.
- Select a parameter of the F-function F-21 for the comprison condition.
- Specify the upper and lower limit values.
- When inputting the upper value and lower limit value, it is not necessary to input the F-function F-20 and F-21 again unless changing the F-function.

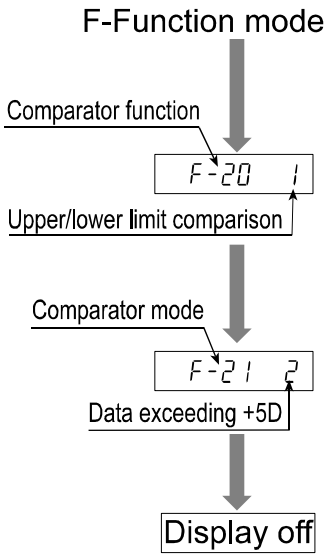
9.2.1. Selecting Upper/Lower Limit Comparison

Step 1 Press the [Operate/Standby] key to turn the display off.
Press and hold the [MODE] key and press the [Operate/Standby] key to enter the F-function mode.

Step 2 Select [F-20 1] (upper/lower limit comparison).

Step 3 Select comparison mode at [F-21] using the following keys.
[∧] key ..... The key to select a parameter.
[↵] key ..... The key to store the parameter.

Step 4 Turn the display off using the [Operate/Standby] key.



Reference

F-20 Comparator function

F-20 0	Not used
F-20 1	Upper/lower limit comparison.
F-20 2	Setpoint comparison

F-21 Comparator mode

F-21 0	All data, Always
F-21 1	Stable data
F-21 2	Data exceeding +5d
F-21 3	Stable data exceeding +5d
F-21 4	Data exceeding -5d to +5d
F-21 5	Stable data exceeding -5d to +5d

9.2.2. Condition formula for Comparison

Comparison is performed based on the following formula.

State Name	Condition Formula
HI (Over)	Upper limit value < Display value
OK (GO)	Lower limit value ≦ Display value ≦ Upper limit value
LO (Under)	Display value < Lower limit value

- The decimal point is not considered. Example: If the upper limit value is 10.0, input 100.
- These parameters are stored in the EEPROM, and are not lost even if the AC power is disconnected.
- When the display value becomes an over load (positive over), HI (over) is outout.
  When the display value becomes an under load (negative over), LO (under) is output.
- The upper limit value and lower limit value can be set to a negative value.
- This function compares the upper limit value first.
- This function does not check the relation of upper limit value and lower limit value.

9.2.3. Setting Upper/Lower Limit Values

Step 1 Press the [Operate/Standby] key to turn the display off.

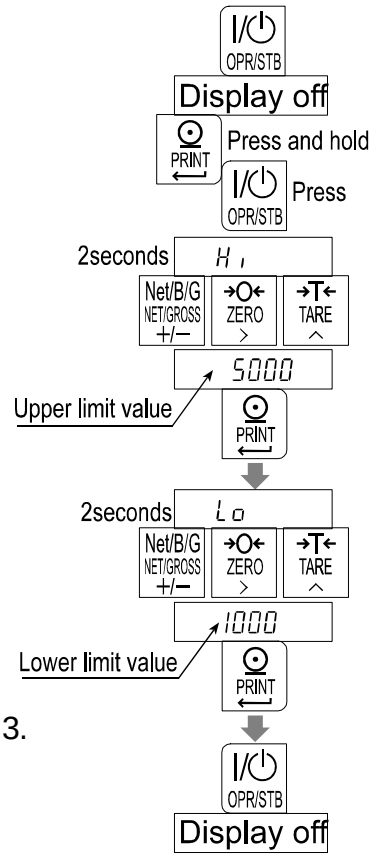
Step 2 Press and hold the [PRINT] key and press the [Operate/Standby] key to display .[Hi] for two seconds.

Step 3 Set the upper limit value (HI) using the following keys.

- [>] key..... The key to select a figure.
- [∧] key..... The key to select a number.
- [+/-] key..... The key to select plus or minus.
- [↵] key..... The key to store the parameter and proceed to step 4.
- [MODE] key . The key not to change the parameter and proceed to step 4.

Step 4 [Lo] is displayed for two seconds.
Set the lower limit value (LO) using the same keys as step 3.

Step 5 Turn the dsiplay off using the [Operate/Standby] key.



9.2.4. Example

F-function: F-20 1 (Upper/lower limit comparison),
F-21 2 (Data exceeding +5d)
Upper linit value: 5000
Lower linit value: 1000

Result

Condition Formula	Range	HI (Over)	OK (GO)	LO (Under)
5000 < Display value	~ 5001	ON		OFF
1000 ≦ Display value ≦ 5000	5000 ~ 1000		ON	
5 < Display value < 1000	999 ~ 6			ON
Display value ≦ 5	5 ~	OFF		

9.3. Setpoint Comparison

- This function includes the weighing sequence and uses for getting preset target weight.
- There are four parameters of "Final", "Preliminary", "Free fall" and "Zero band" to use the setpoint comparison.
- The result of the sequence is output to three relays.
- When inputting these parameters, it is not necessary to input the F-function F-20 again unless changing the F-function.

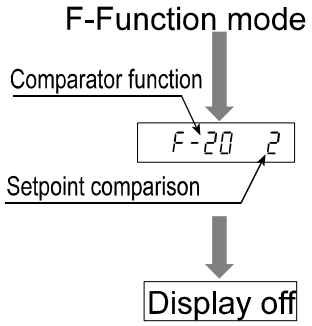
Caution - **This function is normal batching only and can not perform loss-in-weight.**

9.3.1. Selecting Setpoint Comparison

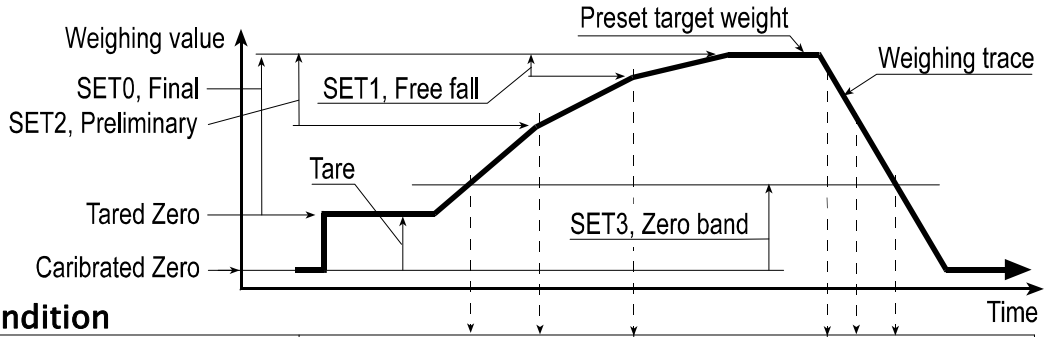
Step 1 Press the [Operate/Standby] key to turn display off. Press and hold the [MODE] key and press the [Operate/Standby] key to enter the F-function mode.

Step 2 Select [F-20 2] (setpoint comparison).

Step 3 Turn the display off using the [Operate/Standby] key.



9.3.2. Description of Input parameters and Outputs



Output and Condition

Relay HI, Net≧ (Final - Free fall)	OFF (Break)	ON (Make)	OFF (Break)
Relay OK, Net≧ (Final - Preliminary)	OFF (Break)	ON (Make)	OFF (Break)
Relay LO, Gross < Zero band	ON (Make)	OFF (Break)	ON (Make)

Parameters List

SET0	Final	Set a preset target weight.
SET1	Free fall	Set a corrective value related to closing the dribble flow gate.
SET2	Preliminary	Set a begining point to use the dribble flow gate only.
SET3	Zero band	Set a value to regard as nearly zero.

9.3.3. Setting the Parameters of Setpoint Comparison

Step 1 Press the [Operate/Standby] key to turn the display off.

Step 2 Press and hold the [PRINT] key and press the [Operate/Standby] key to display .[SEt 0] for two seconds.

Step 3 Set the "Final" using the following keys.

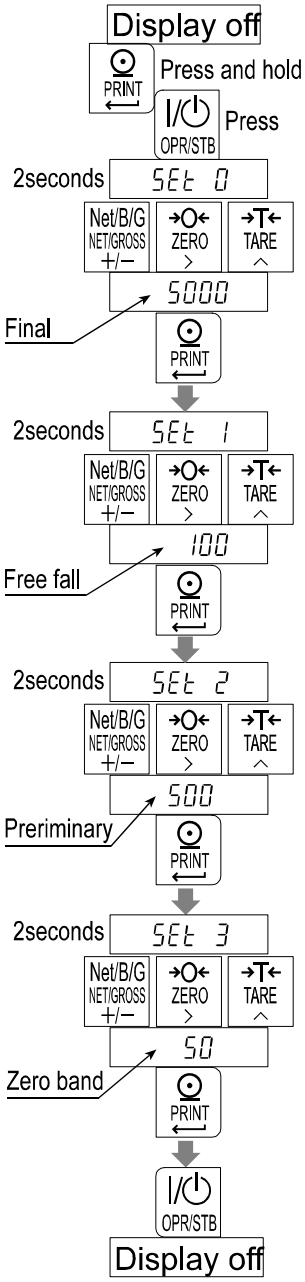
- [>] key..... The key to select a figure.
- [∧] key..... The key to select a number.
- [+/-] key..... The key to select plus or minus.
- [↵] key..... The key to store the parameter and proceed to next step.
- [MODE] key.. The key not to change the parameter and proceed to next step.

Step 4 [SEt 1] is displayed for two seconds.
Set the "Free fall" using the same keys as step3.

Step 5 [SEt 2] is displayed for two seconds.
Set the "Preliminary" using the same keys as step3.

Step 6 [SEt 3] is displayed for two seconds.
Set the "Zero band" using the same keys as step3.

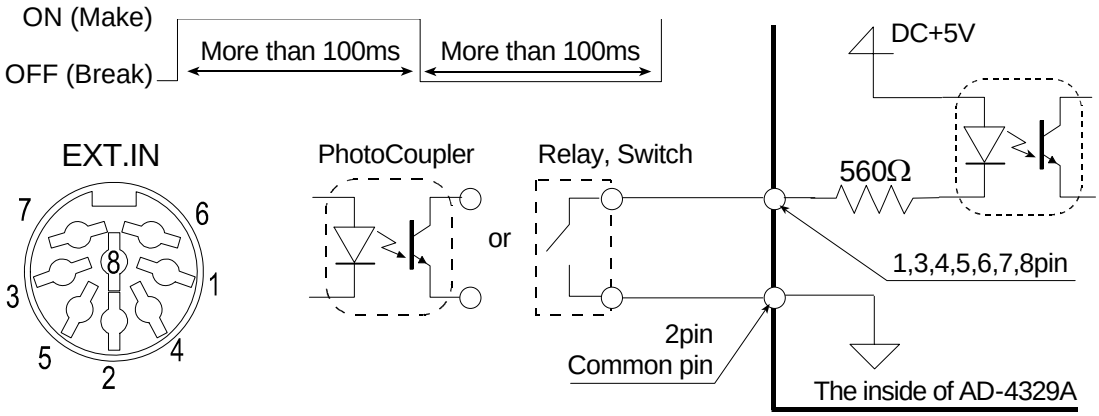
Step 7 Turn the display off using the [Operate/Standby] key.



10. External Control Input

- The connector "EXT.IN" can be used to control the indicator from an external terminal like a front panel key operation.
- Set the external control function at F-10 ~ F-17 of the F-Function.
- When shorting each function pin and common pin, the indicator makes the action.

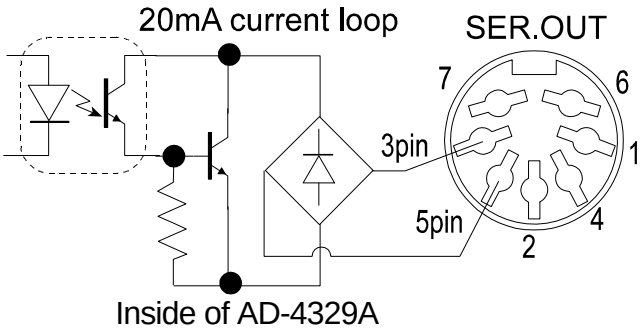
Caution ▫ **Keep a signal width more than 100 ms for the On-time and Off-time.**



Pin No.	F-Function	Parameter	Description
1 pin	F-10 EXT1	0	Not used (No function)
		1	Zero key
		2	Tare key
		3	Print key, ↩ key
		4	Operate/Standby key
		5	M+ key
		6	Net/Gross key
		7	Mode key
		8	Gross display when shorting terminal.
		9	Accumulation data display when shorting terminal.
		10	Over signal. Gross over and display data are output.
		11	All keys are enable when shorting terminal.
2 pin		Common pin for EXT1 ~ EXT7.	
3 pin	F-11 EXT2	The same as F-10	
4 pin	F-12 EXT3	The same as F-10	
5 pin	F-13 EXT4	The same as F-10	
6 pin	F-14 EXT5	The same as F-10	
7 pin	F-15 EXT6	The same as F-10	
8 pin	F-16 EXT7	The same as F-10	
Case		Shield.	

11. Standard Serial Data Output (SER.OUT)

- The standard serial data output can be used to output the data to an A&D printer and a display unit.
- Set the F-30 ~ F-34 of the F-Functions to use this output.
- When using a non-buffered printer like the AD-8117, AD-8117A and AD-8121 etc, the printer can not receive data while printing. Therfore, set to F-33 1 for the manual print mode or auto print mode.



Inside of AD-4329A

Pin No.	Signal
3 pin	Current loop
5 pin	
Other pins	Not used
Case	Shield

Related Functions

	F-Function	Description
Output Data	F-30 0	Displayed data
	F-30 1	Gross data
	F-30 2	Net data
	F-30 3	Tare value
	F-30 4	Gross data / Net data / Tare value

Output mode	F-Function	Description
Stream mode	F-31 0	Description of "Stream Mode" at page 31
Auto print mode	F-30 1	Description of "Auto Print Mode" at page 31
Manual print mode	F-30 2	When pressing the PRINT key each time, the data is output once.

Auto-print condition	F-Function	Description
Positive data only	F-32 0	"Inhibition region of output" ≦ +5d. +5d < "permission region of output".
Positive and negative data	F-32 1	-5d ≦ "inhibition region of output" ≦ +5d. "Permission region of output" < -5d, +5d < "permission region of output".

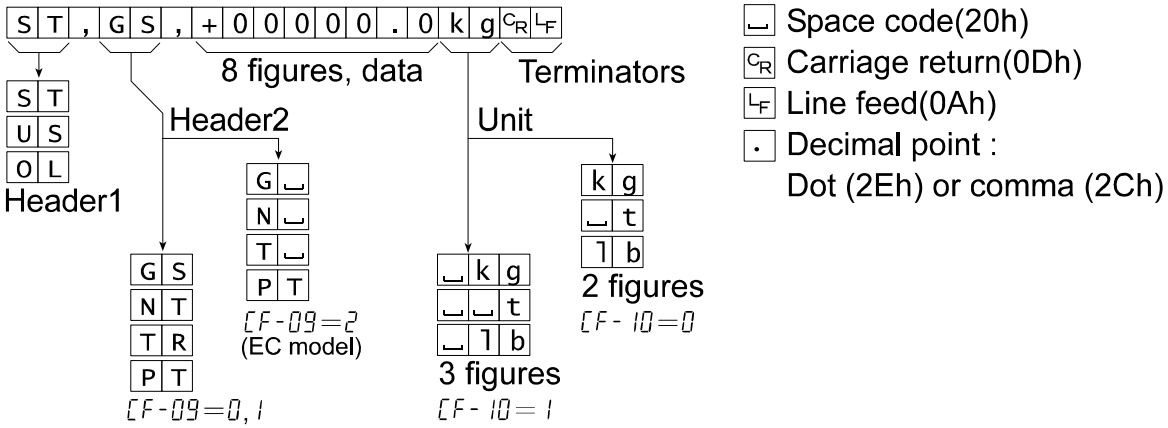
	F-Function	Description
Delay for continual data	F-33 0	Not used
	F-33 1	Approximately 2 seconds
Baud rate	F-34	600 bps, 1200 bps, 2400 bps

CF-Function	Description
CF-07 Data output of tare	
CF-08 Output on over load and unstable state.	Use or not used
CF-09 Format of Header	Selection of TR, PT, GS, NT, T, G and N
CF-10 Figure number of unit, decimal point	Two figures or three figures, dot or comma

11.1.1. Data Format

- The data format of this SER.OUT is the same as the format 1 of the RS-232C interface.

  Refer to "12.1.2. Data Fromat" of RS-232C interface at page 45, if you need details.



Header 1

ST Stable weighing data.

US Unstable weighing data.

OL Overload (Out of range).

Header 2

GS or G␣ Gross data.

NT or N␣ Net data

TR or T␣ Tare data.

PT Preset tare data.

Data

The first of the data bits is the polarity whether "+" or "-".

When data is zero, the polarity is "+".

Format is 8 figures (bits) including polarity and decimal point (dot or comma).

In case of "out of range", the data bits of format 1 are replaced by spaces except the decimal point.

In case of "out of range", the data bits of the format 2 are replaced by all 9's

Unit

Function CF-10 is used in common with RS-232C and standard serial data output.

In case of CF-10 0 or 2, the unit length is 2 figures.

In case of CF-10 1, or 3, the unit length is 3 figures. Depending on circumstances, an A&D printer may not work correctly.

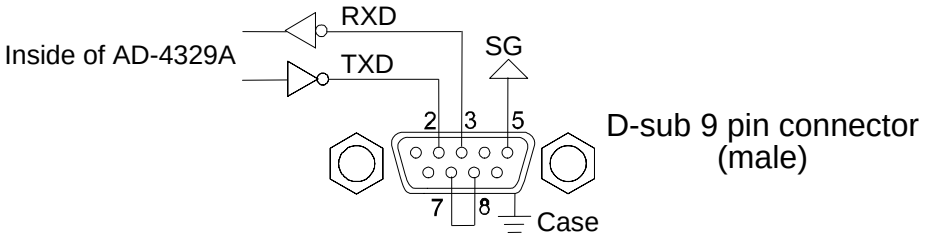
12. RS-232C Interface

12.1.1. Specification

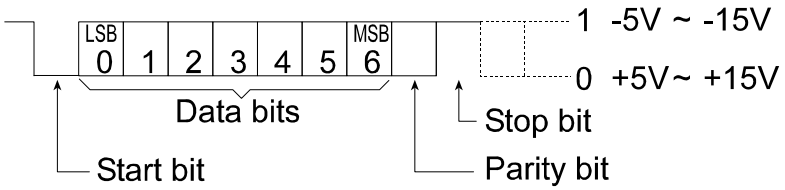
Transmission	Asynchronous, bi-directional, half-duplex
Baud rate	600, 1200, 2400, 4800, 9600 bps
Data bits	7 bits
Parity bits	1 bit, Even
Start bit	1 bit
Stop bit	1 bit
Code	ASCII
Terminator	CR LF (CR: 0Dh, LF: 0Ah)
Connector	D-sub 9 pin connector

Circuit and Pin Connection

Pin No.	Signal name	Direction	Description
2	TXD	Output	Transmission data
3	RXD	Input	Received data
5	SG	-	Signal ground
7	RTS	-	7 pin and 8 pin are connected internally.
8	CTS		
1,4,6,9			Not used (No connection)
Shell			Shield



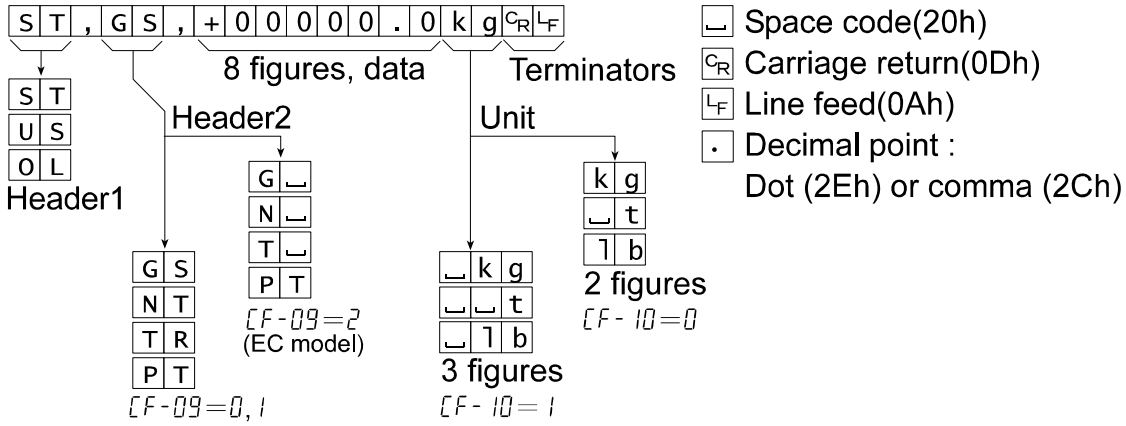
Bit Format



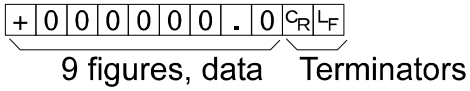
12.1.2. Data Format

- There are two type of data format selected at F-Function F-45.
- The standard serial data output (SER.OUT) uses format 1.

Format 1



Format 2



Header 1

ST Stable weighing data.

US Unstable weighing data.

OL Overload (Out of range).

Header 2

GS or G␣ Gross data.

NT or N␣ Net data

TR or T␣ Tare data.

PT Preset tare data.

Data

The first of the data bits is the polarity whether "+" or "-".

When data is zero, the polarity is "+".

Format 1 is 8 figures (bits) including polarity and decimal point(dot or comma).

Format 2 is 9 figures (bits) including polarity and decimal point(dot or comma).

In case of "out of range", the data bits of format 1 are replaced by spaces except the decimal point.

In case of "out of range", the data bits of the format 2 are replaced by all 9's

Unit

Function CF-10 is used in common with RS-232C and standard serial data output.

In case of CF-10 0 or 2, the unit length is 2 figures.

In case of CF-10 1 or 3, the unit length is 3 figures. Depending on circumstances, an A&D printer may not work correctly.

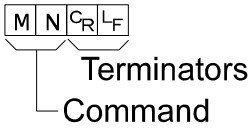
12.1.3. Command Format

Explanation of Command

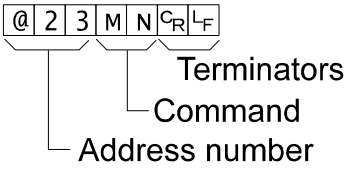
- When performing a command, the received command or replay data is sent back.
- When the received command can not be performed such as the "busy" state, the code " I " is sent back. In this case, insert a delay time. Electrical noise may be the cause of this error.
- When receiving an undefined command (unknown command), the code "?" is sent back.
- Optional addresses can be appened to a command. The form of address is "@address" and this address is two figures specified at F-Function F-46.

Example: Command is "Display net value". Address is 23.

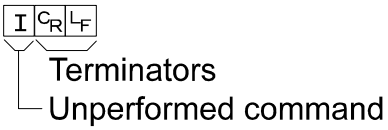
Sending a command



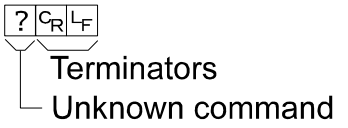
Sending a command with address



Unperformed command reply



Unknown command reply



␣ Space code(20H)
CR Carriage return(0Dh)
LF Line feed(0Ah)

12.1.4. Command to Request Data

Request Data

When receiving this command, Display data is sent back immediately.

Templete RW

Command R W CR LF

Reply S T , G S , + 0 0 1 2 3 . 0 k g CR LF

12.1.5. Commands to Control the Indicator

Zero Display

The current display is set to the zero point.

Templete MZ

Command | M | Z | CR | LF |

Reply | M | Z | CR | LF |

Tare

The current display is set to zero of the net value.

Templete MT

Command | M | T | CR | LF |

Reply | M | T | CR | LF |

Clear Tare Value

The tare value is cleared and the gross value is displayed.

Templete CT

Command | C | T | CR | LF |

Reply | C | T | CR | LF |

Display Gross Value

The gross value is displayed.

Templete MG

Command | M | G | CR | LF |

Reply | M | G | CR | LF |

Display Net Value

The net value is displayed.

Templete MN

Command | M | N | CR | LF |

Reply | M | N | CR | LF |

12.1.6. Commands to Set Parameters

Set Preset Tare

The preset tare value is set. The decimal point is not necessary because of according to display.

Templete PT, [value]

Command | P | T | , | + | 2 | 1 | 3 | CR | LF |

Reply | P | T | , | + | 2 | 1 | 3 | CR | LF |

Set Upper Limit Value

Set the upper limit value of the upper/lower limit comparison. The decimal point is not necessary because of according to display.

Templete HI, [value]

Command | H | I | , | + | 5 | 0 | 0 | 0 | CR | LF |

Reply | H | I | , | + | 5 | 0 | 0 | 0 | CR | LF |

Set Lower Limit Value

Set the lower limit value of the upper/lower limit comparison. The decimal point is not necessary because of according to display.

Templete LO, [value]

Command | L | O | , | - | 5 | 6 | 0 | CR | LF |

Reply | L | O | , | - | 5 | 6 | 0 | CR | LF |

Set Final Value

Set the final value of the setpoint comparison. The decimal point is not necessary because of according to display.

Templete S0, [value]

Command | S | 0 | , | + | 7 | 0 | 0 | 0 | CR | LF |

Reply | S | 0 | , | + | 7 | 0 | 0 | 0 | CR | LF |

Set Free Fall Value

Set the free fall value of the setpoint comparison. The decimal point is not necessary because of according to display.

Templete S1, [value]

Command | S | 1 | , | + | 1 | 6 | 0 | CR | LF |

Reply | S | 1 | , | + | 1 | 6 | 0 | CR | LF |

Set Preliminary Value

Set the preliminary value of the setpoint comparison. The decimal point is not necessary because of according to display.

Templete S2, [value]

Command | S | 2 | , | + | 8 | 5 | 0 | CR | LF |

Reply | S | 2 | , | + | 8 | 5 | 0 | CR | LF |

Set Zero band

Set the zero band value of the setpoint comparison. The decimal point is not necessary because of according to display.

Templete S3, [value]

Command | S | 3 | , | + | 7 | 4 | 8 | CR | LF |

Reply | S | 3 | , | + | 7 | 4 | 8 | CR | LF |

12.1.7. Related Functions

	F-Function	Description
Output Data	F-40 0	Displayed data
	F-40 1	Gross data
	F-40 2	Net data
	F-40 3	Tare value
	F-40 4	Gross data / Net data / Tare value

Output mode	F-Function	Description
Stream mode	F-41 0	Description of "Stream Mode" at page 31
Auto print mode	F-40 1	Description of "Auto Print Mode" at page 31
Manual print mode	F-40 2	When pressing the PRINT key each time, the data is output once.
Command mode (no address)	F-40 3	Refer to "12.1.3.Command Format" of RS-232C interface.
Command mode with address	F-40 4	

Auto-print condition	F-Function	Description
Positive data only	F-42 0	"Inhibition region of output" ≦ +5d. +5d < "permission region of output".
Positive and negative data	F-42 1	-5d ≦ "inhibition region of output" ≦ +5d. "Permission region of output" < -5d, +5d < "permission region of output".

	F-Function	Description
Delay for continual data	F-43 0	Not used
	F-43 1	Approximately 2 seconds
Baud rate	F-44	600 bps, 1200 bps, 2400 bps, 4800 bps, 9600 bps
Data format	F-45	Refer to "12.1.2.Data Format" of RS-232C interface.
F-46 Address	00 to 99	Factory setting is 00. When F-41 4 is not selected, F-46 is ineffective.

CF-Function	Description
CF-07 Data output of tare	
CF-08 Output on over load and unstable state.	Use or not used
CF-09 Format of Header	Selection of TR, PT, GS, NT, T, G and N
CF-10 Figure number of unit, decimal point	Two figures or three figures, dot or comma
CF-11 Accumulation function	Effective or ineffective

13. Specifications

Analog Input and A/D Conversion

Input sensitivity		0.15 μV/division
Input signal range		-35 mV to +35 mV
Load cell excitation voltage		5VDC ±5%, 120 mA with sense voltage input
Load cell drive capacity		Maximum 8 x 350 Ω load cells
Temperature coefficient	Zero	±0.02 μV/°C (typ.) ±0.1 μV/°C (max.)
	Span	±3ppm/°C (typ.) ±15ppm/°C (max.)
Non-Linearity		0.005 % of full scale
Maximum input noise		0.15 μVp-p (typ.)
Input impedance		10 MΩ or more
A/D conversion method		Delta-sigma method
A/D resolution count		16,000,000 counts
A/D conversion rate		Approximately 10 times/s
Maximum display resolution		10000 (permissible 20000)

Digital Section

Measurement display		7 segment, vacuum fluorescent display tube
	Character color	Cobalt-blue
	Character height	13 mm
State indicator		
	Symbol color	Cobalt-blue
	Symbol	Minus sign, Zero point, Motion detect, Gross, Net, Preset tare, Storing accumulation data
Unit		
	Character color	Green
	Unit	kg, t, lb

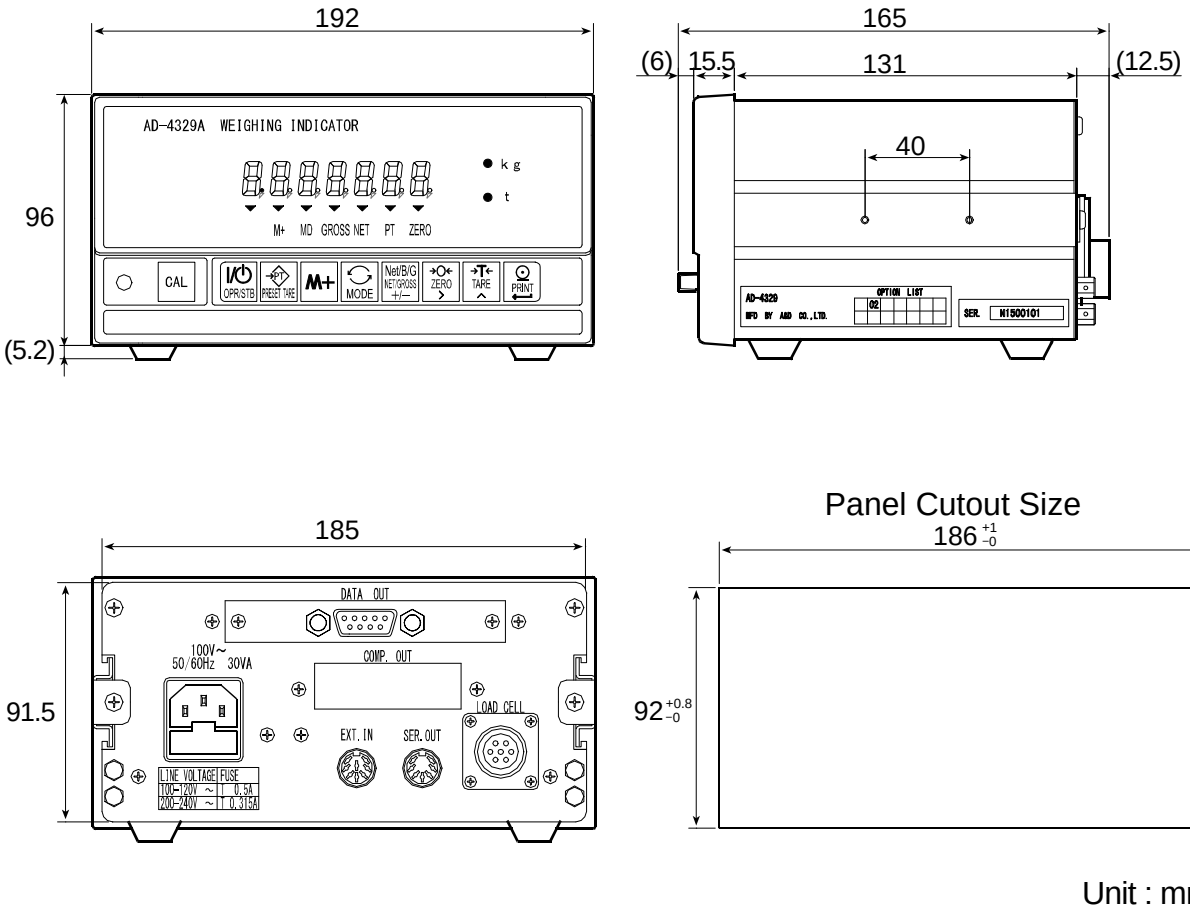
Interface

External Control Input	7 contact input terminals selected functions
Standard serial data output	Exclusive output for A&D peripherals
RS-232C interface	Serial interface for communication
Relay output	3 point
	Capacity: 250V AC, 30V DC, maximum current 3A (resistive load)
	Comparison mode selection
	HI, GO, LO output for upper/lower limit comparison
	Zero band, preliminary, free fall, final for setpoint comparison

General

Power supply	Selection by internal connector from 100V AC, 120V AC, 200V AC and 220V AC to 240V AC, +10% to -15%, 45Hz to 65Hz
Power consumption	Approximately 30VA
Operation temperature	-10℃ to +40℃ (14℉ to 104℉)
Operation humidity	85% R.H. (no condensation)
Mass	1.8 kg approximately
Dimensions	192(W) x 96(H) x 165(D) mm
Accessories	Refer to "4.1.4.Accessories and Option OP-02"

13.1. Dimensions



Unit : mm