# AD-8923-BCD

## Remote Controller (BCD)

## INSTRUCTION MANUAL

A&D Company, Limited

1WMPD4002137B

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

.

# CONTENTS

# 1. INTRODUCTION

This manual describes how the AD-8923-BCD remote controller works and how to get the most out of it in terms of performance.
Read this manual thoroughly before using the AD-8923-BCD and keep it at hand for future reference.

## 1.1. Features

Connecting the AD-8923-BCD remote controller to a weighing instrument will enable transmission of RS-232C weight data from the weighing instrument to a PLC using BCD output.

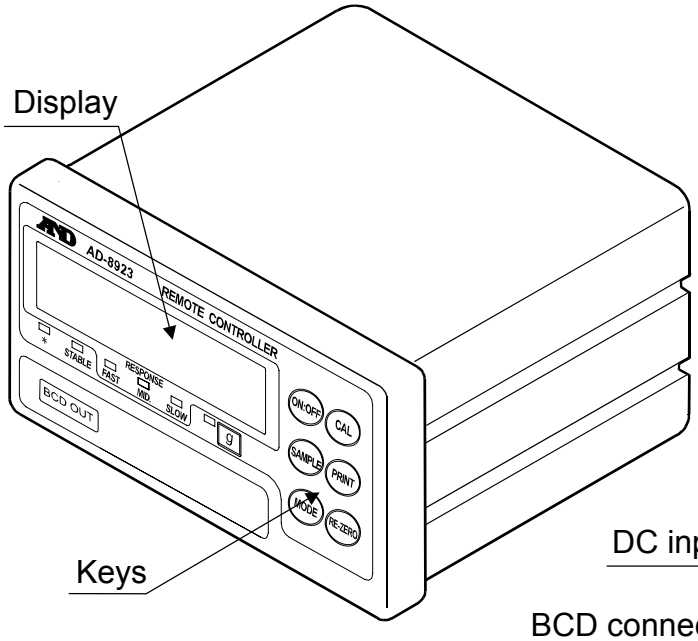
- Displays the weight data transmitted from the weighing instrument.
- Can change the weighing speed of the AD-4212C, calibrate the AD-4212C using an external calibration weight and share the power supply with the AD-4212C.

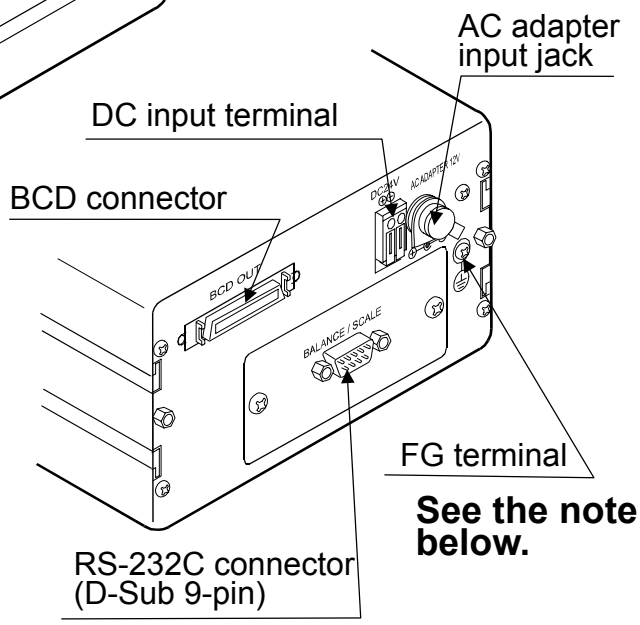
**Note**

- **When the AD-4212C is used as the weighing instrument, connecting power to either the AD-8923-BCD or the AD-4212C will supply power to both devices. Refer to "3.3. Turning the power on."**

- When connecting the AD-8923-BCD output, refer to "6. BCD OUTPUT CONNECTOR"

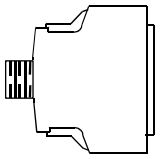
# 2. DESCRIPTION OF EACH PART



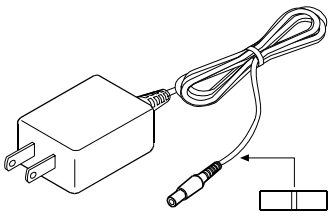




**Rear View**

**Accessories**



BCD plug 1 pc.



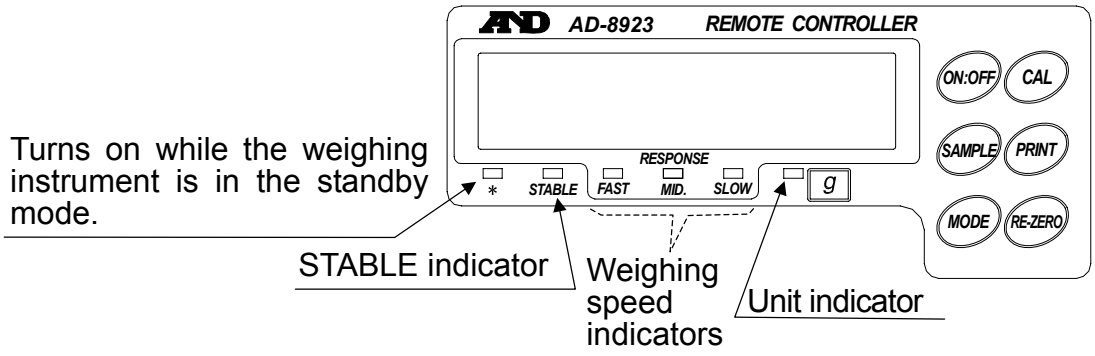
AC adapter 1 pc.

AD adapter ID label

**Note**

- **When the AD-8923-BCD is to be built into a weighing system, be sure to ground the FG terminal.**
- **Please confirm that the AC adapter type is correct for your local voltage and receptacle type.**

## 2.1. Display




- Displays the weight data received. When the unit is “g” (gram), the unit indicator turns on. If the balance outputs RS-232C weighing data that exceeds six digits, the AD-8923-BCD does not display the high-end digits.
- When the weight value is stable (the header of the weight data received is “ST”), the STABLE indicator turns on.
- If the AD-8923-BCD does not receive the weight data for two seconds or more, [ - - - - - ] is displayed (Bar display).
- Displays the AD-4212C weighing speed that is currently set, by turning on the weighing speed indicator. When connected to other instruments, the AD-8923-BCD weighing speed indicators have no function.

## 2.2. Keys

- Operates the weighing instrument. For details, refer to “3.4. Operation”.
- To enter the function setting of the AD-8923-BCD, press the [CAL] key while holding down the [ON:OFF] key. For details, refer to “4. FUNCTION SETTING”.)

## 2.3. Connectors

- RS-232C connector ..... D-Sub 9-pin (male)
  Used for connection to the weighing unit. For the proper cable, refer to the instruction manual for the weighing instrument used.
- BCD connector ..... Half pitch 50-pin (female)
  Used for connecting the AD-8923-BCD to another instrument. For details, refer to “6. BCD OUTPUT CONNECTOR”.
- DC input terminal (24 DCV) / AC adapter input jack
  Either power supply can be used. For details, refer to “3.3. Turing the power on”.

# 3. CONNECTION

## 3.1. Setting the weighing instrument and the AD-8923-BCD

Set the following items so that the weighing instrument and the AD-8923-BCD have the same value for each item.

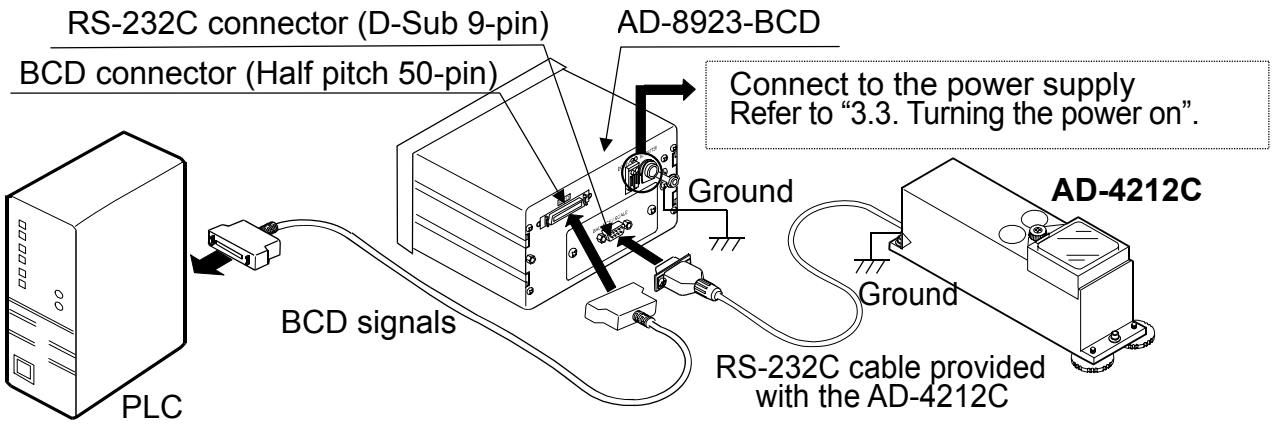
| Item | Weighing instrument | AD-8923-BCD |
|---|---|---|
| Baud rate | 600, 1200, 2400*, 4800, 9600, 19200 bps | |
| Data bits, parity | 7 bits EVEN* | |
| Stop bit | 1 bit* | |
| Terminator | <CR><LF>* | |
| Data format | A&D standard format | – |
| Communication control | No RTS/CTS control | – |
| Data output mode | Stream mode | – |

***** Factory setting for the AD-8923-BCD. The factory setting for the weighing instrument is the same unless otherwise specified.

## 3.2. Connecting the cables

Connect the cables using the connectors located on the rear of the AD-8923-BCD.

### Connection example to the AD-4212C and a PLC




**Note**

- **Be sure to ground the AD-4212C and the AD-8923-BCD.**

## 3.3. Turning the power on

As a power supply, an external 24-VDC power supply (24 VDC±10% / 700mA) or a 12-VDC AC adapter can be used.

**Note**

- **When the AD-4212C is used, connecting power to either the AD-8923-BCD or the AD-4212C will supply power to both devices. So, instead of the AD-8923-BCD, using the AC adapter on the AD-4212C will supply power to the AD-8923-BCD.**
  **If the power is connected to both, no problems occur because the power to be used is selected automatically.**

### When the external 24-VDC power supply is used

Connect an external 24-VDC power supply to the DC input terminal located on the rear of the AD-8923-BCD.

**Precautions on using the external power supply**

**⚠ CAUTION**

- Use a power supply within the rated voltage range (24 VDC±10%). Never use a power supply with a voltage exceeding the rated range.
  - It may cause damage or heat buildup.
  - The AD-8923-BCD may not function properly.
- Ground the FG terminal of the switching power supply used.
  - To avoid electrical shock and increase the system safety.
  - To increase the resistance against noises.

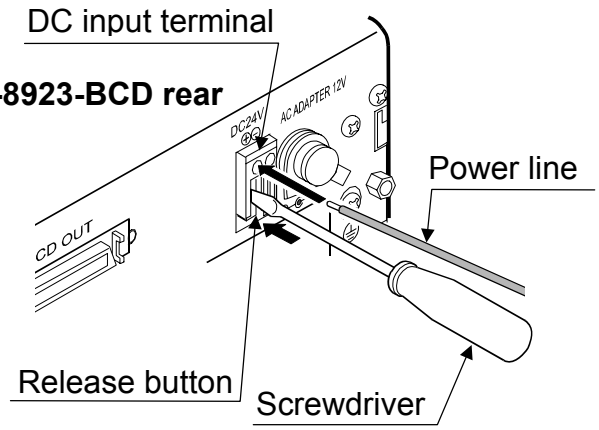
- Do not share the power line with other devices.
  - Strong noises introduced from other devices may cause damage to the AD-8923-BCD.
  - Inrush current from other devices may cause the AD-8923-BCD not to start up properly.
  - Circuit configuration of the AD-8923-BCD may affect other devices to prevent them from functioning properly.
- Select a switching power supply with a capacity of approximately 700mA for each AD-8923-BCD. Note that the AD-8923-BCD may not start up with a capacity less than 700mA.
  - If the power supply capacity is not sufficient, the AD-8923-BCD may not function properly.

- Be sure to add a noise filter on the front end of the switching power supply and ground the FG terminal.
  - This will increase the resistance against noises.
- Be sure to ground the FG terminal of the AD-8923-BCD and the AD-4212C.
  - This will increase the resistance against noises.

## Cable connection

**⚠ CAUTION**

**Before inserting the power line, make sure that the power to the AD-8923-BCD is turned off.**




(1) Inserting the power line

Press down the release button on the DC input terminal using a screwdriver and insert the power line.

The recommended stripping length for the power line is 10 mm.

Applicable wire range

- Single wire: $\phi$1.0 mm (AWG 26) to $\phi$1.2 mm (AWG 16)
- Twisted wire: 0.3 mm$^2$ (AWG 22) to 0.75 mm$^2$ (AWG 20)
  Individual wire diameter $\phi$0.18 mm or greater

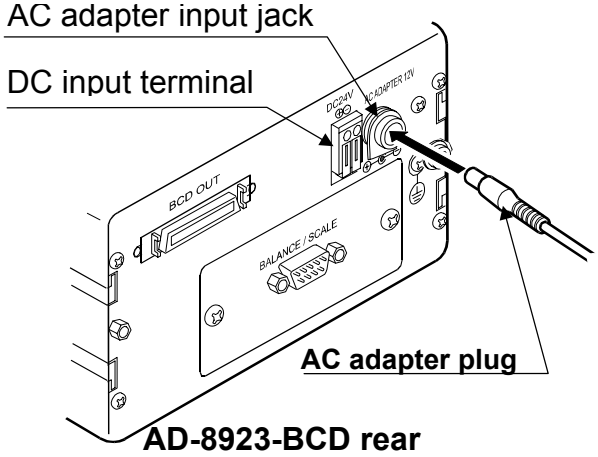
(2) Securing or removing the power line

To secure the power line, return the release button to the initial position using the screwdriver. The power line will be locked.

To remove the power line, press the release button again using the screwdriver, unlocking the power line.

### When the AC adapter is used

Insert the AC adapter plug into the AC adapter input jack located on the rear of the AD-8923-BCD and insert the AC adapter into an electrical outlet.



## 3.4. Operation

- Displays the data transmitted by the weighing instrument connected.
- The keys on the AD-8923-BCD can control the weighing instrument. The key operation depends on the weighing instrument connected. For details, refer to “Table 2” of “8-1 Applicable Instruments”.

## 3.5. Calibrating the AD-4212C

The following is the calibration procedure when the AD-4212C is connected. (A calibration weight is used.)

### Caution

- Do not allow vibration, drafts or temperature change to affect the AD-4212C during calibration.

### Caution on using an external calibration weight

- The accuracy of the weight can influence the accuracy of weighing. Select an appropriate weight as listed below.
  A calibration weight of 200 g (conforming to OIML, Class E2 or equivalent) is provided with the AD-4212C as a standard accessory.

| Weighing instrument | Usable calibration weight |
|---|---|
| AD-4212C-300 | 50g, 100g, **200 g**, 300g |
| AD-4212C-600 | 50g, 100g, **200 g**, 300g, 400 g, 500 g, 600 g |
| AD-4212C-3000 | 50g, 100g, **200 g**, 300g, 400 g, 500 g, 1000 g, 2000g, 3000g |
| AD-4212C-6000 | **200 g**, 500 g, 1000 g, 2000g, 3000g, 4000 g, 5000 g, 6000 g |

The calibration weight in bold type: factory setting

### Display

- This indicator means “the AD-4212C is measuring calibration data”. Do not allow vibration, drafts or other external disturbances to affect AD-4212C while this indicator is displayed.

## Calibration procedure

Calibrates the AD-4212C using the calibration weight.

### Operation

1. Warm up the AD-4212C for 30 minutes or more with nothing on the pan.

2. Press the CAL key. `CAL 0` is displayed.
   - If you want to cancel calibration, press the CAL key. The display will return to the weighing mode.
   - If you want to change the calibration mass value, press the SAMPLE key.
     Press the RE-ZERO key to select the mass value, and press the PRINT key to store it. `CAL 0` is displayed.

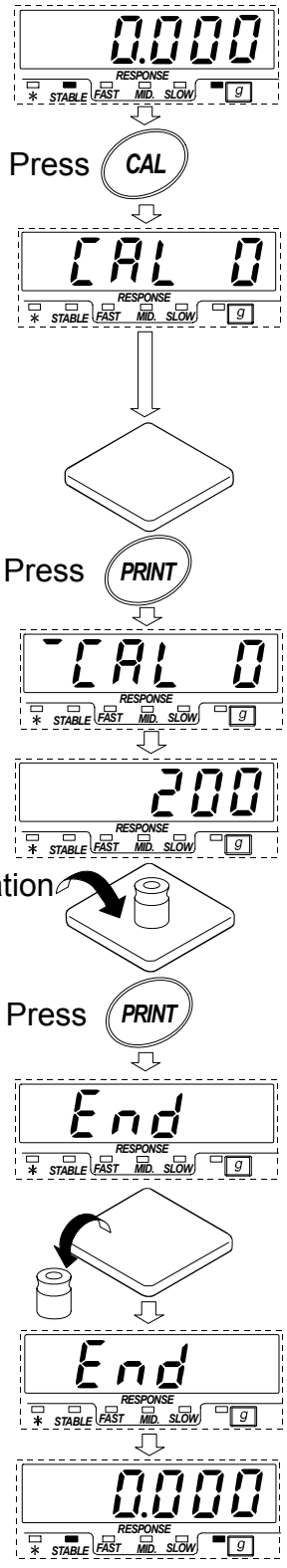
3. Confirm that there is nothing on the pan and press the PRINT key. The AD-4212C measures the zero point. Do not allow vibration or drafts to affect the AD-4212C.
   The calibration weight value is displayed.

4. Place a calibration weight, of the weight value displayed, on the pan and press the PRINT key. The AD-4212C measures the calibration weight. Do not allow vibration or drafts to affect the AD-4212C.

5. `End` is displayed. Remove the weight from the pan.

6. The display will automatically return to the weighing mode.

7. Place the calibration weight on the pan and confirm that calibration was performed correctly. If not, check the ambient conditions such as drafts or vibration, and repeat steps 2 through 7.



# 4. FUNCTION SETTING

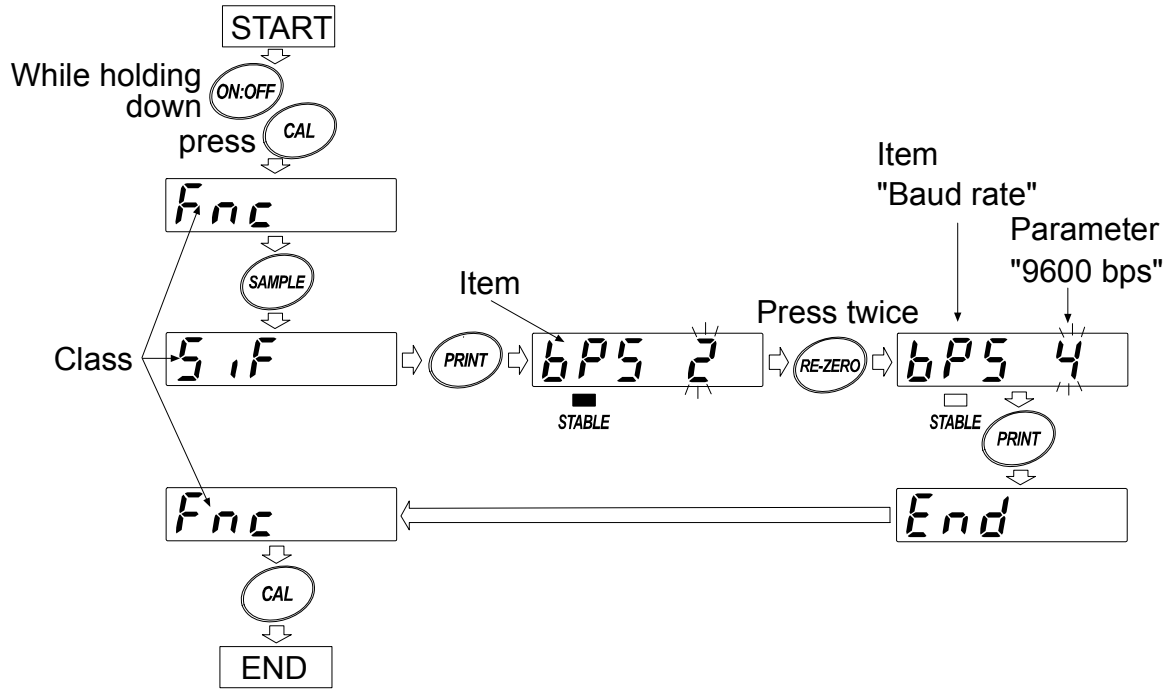
Function setting specifies the AD-8923-BCD performance. The parameters are stored in non-volatile memory, and are maintained even if the power line or AC adapter is removed.

The function setting menu consists of two layers. The first layer is the “Class” and the second layer is the “Item”. Each item stores a parameter.

Press the SAMPLE key to select an item and press the RE-ZERO key to change the parameter. Then, press the PRINT key to store the new parameter.

**Example**

This example sets “Baud rate” to “9600 bps”.




**Note**

- **The AD-8923-BCD may not function properly, depending on the settings and operating environment. Check the settings and change them as necessary.**

## 4.1. Display and keys

| | |
|---|---|
| STABLE | The STABLE indicator turns on to indicate that the parameter displayed is in effect. |
| SAMPLE | Selects a class or item. |
| RE-ZERO | Changes the parameter. |
| PRINT | When a class is displayed, moves to an item in the class.<br>When an item is displayed, stores the new parameter and displays the next class. |
| CAL | When an item is displayed, cancels the new parameter and displays the next class.<br>When a class is displayed, exits the function setting mode and returns to the weighing mode. |

## 4.2. Function table

| Class | Item and Parameter | | Description | |
|---|---|---|---|---|
| Fnc<br>Environment<br>Display | dPP<br>Decimal point position | ▪ -<br>0<br>~<br>5 | Not fixed<br>Fixed | Displays the decimal point position of the weight data received.<br>Fixes the decimal point at the set digit. Even if the minimum display is switched using the SAMPLE key, the decimal point position does not change. For details, refer to "6.2.Fixing of the Decimal Point Position". |
| | SAPL<br>Sample key function | 0<br>▪ 1 | Disabled<br>Enabled | Disables the SAMPLE key function.<br>Enables the SAMPLE key function. |
| SIF<br>Serial interface | bPS<br>Baud rate | 0<br>1<br>▪ 2<br>3<br>4<br>5 | 600 bps<br>1200 bps<br>2400 bps<br>4800 bps<br>9600 bps<br>19200 bps | Set the same value as that of the weighing instrument to be connected. |

▪ Factory setting

## 4.3. Initializing the AD-8923-BCD

Initialization restores the function settings of the AD-8923-BCD to factory settings.

**Operation**

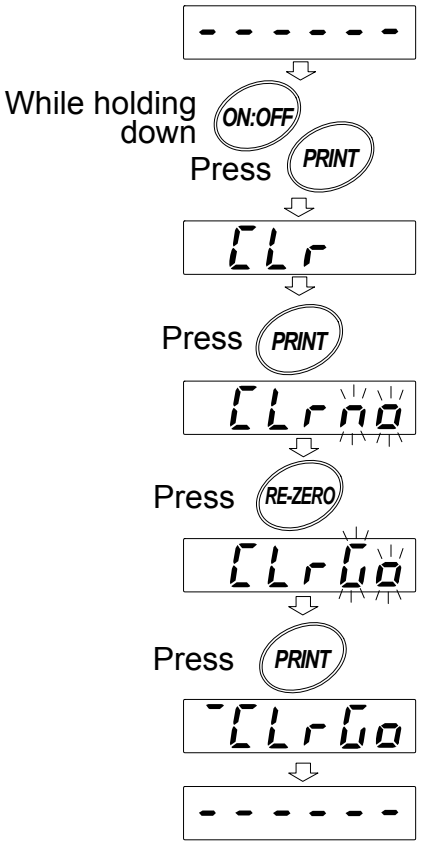
1 Turn the power on. [- - - - -] or weighing mode display appears.

2 While holding down the [ON:OFF] key, press the [PRINT] key. [CLr] is displayed.

3 Press the [PRINT] key.
To cancel this operation, press the [CAL] key

4 Press the [RE-ZERO] key to select "Go".

5 Press the [PRINT] key to perform initialization.
After initialization, [- - - - -] or weighing mode display appears.




.

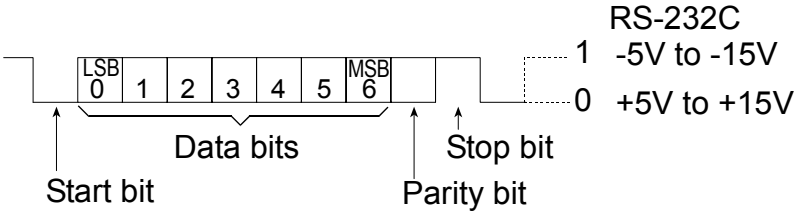
# 5. RS-232C CONNECTOR

The RS-232C cable provided with the AD-4212C can be connected directly.

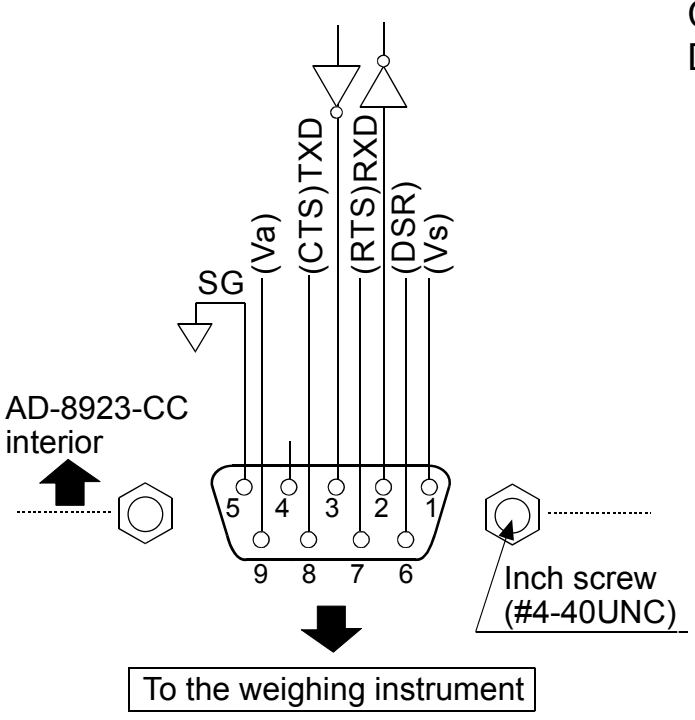
## 5.1. RS-232C serial interface specifications

### RS-232C

Transmission system : EIA RS-232C
Transmission form : Asynchronous, bi-directional, half duplex
Data format : Baud rate : 600, 1200, 2400, 4800, 9600, 19200 bps
Data bits : 7 or 8 bits
Parity : EVEN, ODD (Data bits 7 bits)
NONE (Data bits 8 bits)
Stop bits : 1 bit or 2 bits
Code : ASCII
Terminator : <CR> or <CR><LF>




### Circuit




Connection to the weighing instrument
D-Sub 9-pin

| Pin No. | Signal name | Direction | Description |
|---|---|---|---|
| 1 | (Vs) | – | Used internally |
| 2 | RXD | Input | Receive data |
| 3 | TXD | Output | Transmit data |
| 4 | – | – | N.C. |
| 5 | SG | – | Signal ground |
| 6 | (DSR) | – | Used internally |
| 7 | (RTS) | – | Used internally |
| 8 | (CTS) | – | Used internally |
| 9 | (Va) | – | Used internally |

(The AD-8923-BCD is a DTE device. Connect to a DCE device such as the AD-4212C, using a straight through cable.)

**Note**

- **When the user prepares a cable, do not connect to the pins that are used internally.**

# 6. BCD OUTPUT CONNECTOR

Outputs the weighing data received from the weighing instrument in BCD format, along with the polarity (+/-) and the data status (stable/unstable and over (E display)).
Using the STROBE signal, the data can be read easily. BUSY input enables the data to be held or prevents data refreshing during the reading operation.
Contact inputs are RE-ZERO and ON/OFF. They have same function as the key switches on the front panel.

## 6.1. Connector Pin No and Specifications

**I/O connector of the rear panel**


### Pin assignments and I/O logic

| Output pin assignments | | | |
|---|---|---|---|
| Pin No. | Signal | | |
| 26 | 1 | $10^0$ | Data |
| 27 | 2 | | |
| 28 | 4 | | |
| 29 | 8 | | |
| 39 | 1 | $10^1$ | |
| 40 | 2 | | |
| 41 | 4 | | |
| 42 | 8 | | |
| 12 | 1 | $10^2$ | |
| 13 | 2 | | |
| 14 | 4 | | |
| 15 | 8 | | |
| 16 | 1 | $10^3$ | |
| 17 | 2 | | |
| 18 | 4 | | |
| 19 | 8 | | |
| 20 | 1 | $10^4$ | |
| 21 | 2 | | |
| 22 | 4 | | |
| 23 | 8 | | |
| 46 | 1 | $10^5$ | |
| 47 | 2 | | |
| 48 | 4 | | |
| 49 | 8 | | |
| 24 | 1 | $10^6$ | |
| 25 | 2 | | |
| 30 | 4 | | |
| 31 | 8 | | |
| 32 | 1 | $10^7$ | |
| 33 | 2 | | |
| 34 | 4 | | |
| 35 | 8 | | |
| 50 | Polarity | | Status |
| 45 | Stability | | |
| 44 | Over | | |
| 43 | Strobe | | Controlling signals |
| 1 | Output signal GND | | |
| Housing | Frame ground | | |

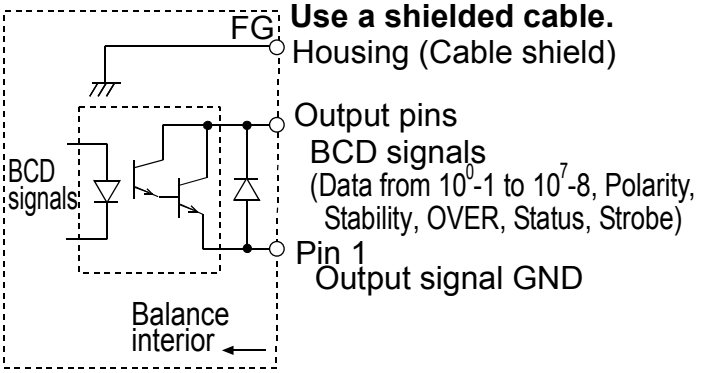
| Input pin assignments | | |
|---|---|---|
| Pin No. | Signal | |
| 7 | BUSY | |
| 9 | RE-ZERO | Switch |
| 5 | ON/OFF | |
| 3 | Input signal GND | |
| 11 | Do not use | |

-The pins, which are not specified, have no connection. (2, 4, 6, 8, 10, 36, 38 pin)

Output logic

| Output logic (Factory settings) | | |
|---|---|---|
| Data | Ⅰ | ON |
| Polarity | Positive or zero | ON |
| Stability | Stabilization indicator ON | ON |
| Over | E, -E | ON |
| Strobe | Changing data | ON* |
| Status | Weighing state | ON |

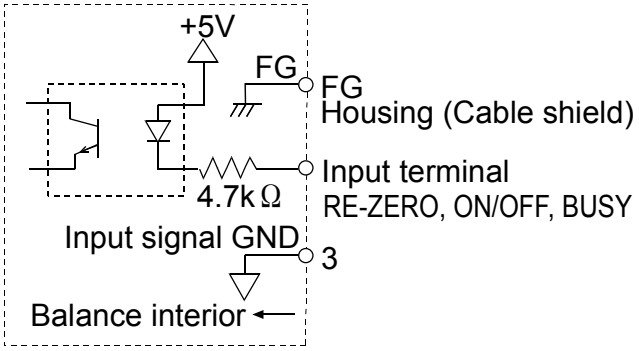
* When changing OFF→ON, replaces the data.
- All output, open collector; withstand voltage 30 V; no pull-up resistor; low-level output current 10 mA



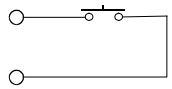
Input logic

| | |
|---|---|
| BUSY | Data will be held during ON (when connected to input signal GND). |
| Switch input | Switch will be performed with ON (when connected to input signal GND). |

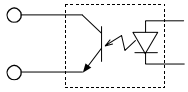
- All input, no voltage contact or open collector (connected to 5 V internally)




(1)When a switch is used




(2) When a photocoupler is used




(Upon switch-ON, make the voltage between the input terminal and the input signal GND terminal 0.2V or less)

## Plug (Provided)

| Part name | Product number | Manufacturer |
|---|---|---|
| Over mold cover | DX30M-50-CV | Hirose Electric |
| Plug unit (Soldered type) | DX40M-50P | |

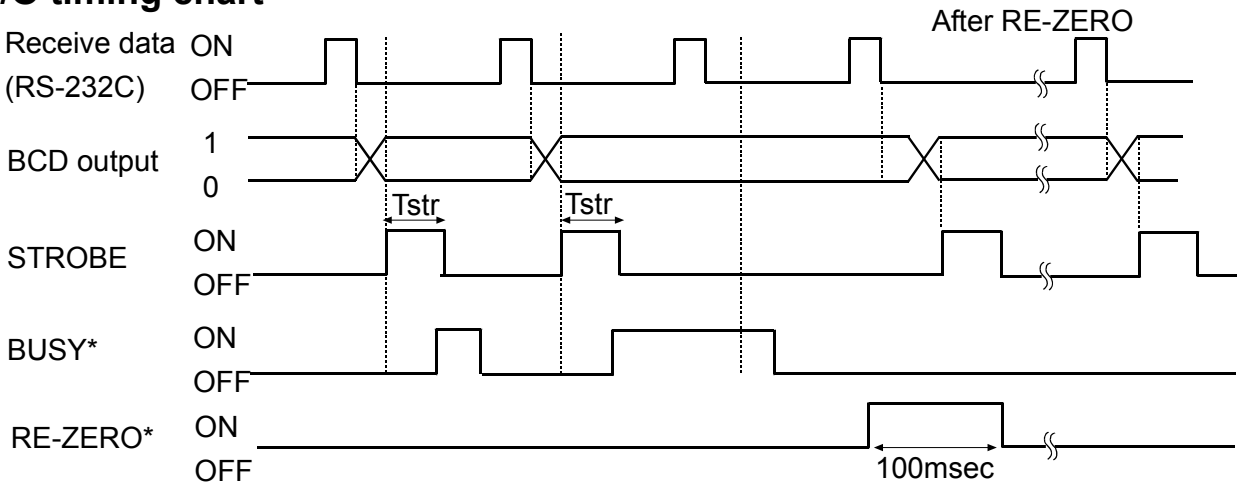
**Note: The products above are subject to be replaced with the equivalent.**

## Cable

| | |
|---|---|
| Wire size | AWG #28 |
| Core configuration | 7/0.127 |
| O.D. of insulator | 0.58 |

**Note: Use a shielded cable. Connect the shield to the connector case.**

## I/O timing chart

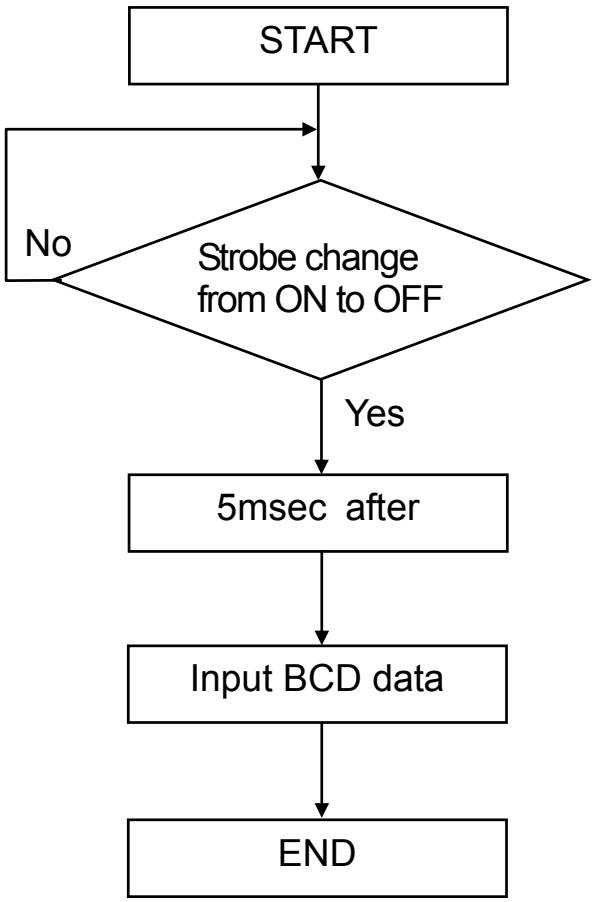



The factory setting of Tstr (Strobe pulse width) is approx. 10 msec. The BCD data should be acquired approximately 5 msec after the strobe changes from ON to OFF.

* -"All input pins ON", is the condition, where all input signals are connected to GND (Pin 3).
- When inputting RE-ZERO for 100 msec, the weighing instrument maintains the re-zero state.

## Flow chart for inputting data

When inputting BCD data, follow the flow chart listed below.



## 6.2. Fixing of the Decimal Point Position

The AD-8923-BCD can set the display digit and the BCD output digit by setting dPP of the function.
When fixing the decimal point position, the BCD output digit does not change if changing the minimum display digit by pressing the SAMPLE key.

**Example 1）When not fixing the decimal point position.（dPP -）**
**[Factory setting]**

| Key | Balance output | AD-8923-BCD display | BCD output |
|---|---|---|---|
| SAMPLE | S T , + 0 0 1 2 3 . 4 6 ␣ ␣ g CR LF | 123.46 RESPONSE * STABLE FAST MID. SLOW g | 00012346 |
| | S T , + 0 1 2 3 . 4 5 6 ␣ ␣ g CR LF | 123.456 RESPONSE * STABLE FAST MID. SLOW g | 00123456 |

**Note**

- ␣ **: space 20h**
- **When changing the minimum display digit by pressing SAMPLE key, the BCD shifts the output left and adds the last digit.**

**Example 2）When fixing the decimal point at the third digit position.（dPP 3）**

| Key | Balance output | AD-8923-BCD display | BCD output |
|---|---|---|---|
| SAMPLE | S T , + 0 0 1 2 3 . 4 6 ␣ ␣ g CR LF | 123.46 RESPONSE * STABLE FAST MID. SLOW g | 00123460 |
| | S T , + 0 1 2 3 . 4 5 6 ␣ ␣ g CR LF | 123.456 RESPONSE * STABLE FAST MID. SLOW g | 00123456 |

**Note**

- ␣ **: space 20h**
- **When changing the minimum display digit by pressing SAMPLE key, the BCD output does not change the number of digits.**
- **If the balance outputs RS-232C weighing data that exceeds six digits, the AD-8923-BCD does not display the high-end digits.**

# 7. TROUBLESHOOTING

| Symptom | Description |
|---|---|
| Error 10 appears. | Communication settings of the AD-8923-BCD do not match with those of the weighing instrument.<br><br>Check the settings such as baud rate and parity and correct them as necessary.<br>For details, refer to “3.1. Setting the weighing instrument and the AD-8923-BCD”. |
| ----- (Bar display) remains and the weight value is not displayed. | • Is the data output mode of the weighing instrument set to “stream mode”?<br>In a mode other than “stream mode”, the weight values are displayed only when they are transmitted.<br><br>• Check if the communication settings are correct.<br><br>• Check if the cables are the correct type and are not damaged. |
| The display flickers. | Electrical noise may cause this symptom.<br><br>Ground the FG terminal located on the rear of the AD-8923-BCD. |

# 8. SPECIFICATIONS

| | |
|---|---|
| Power supply | : External 24-VDC power supply (24 VDC±10% / 700mA)<br>or<br>AC adapter (Output: 12 VDC / 1A)<br>**Please confirm that the AC adapter type is correct for your local voltage and receptacle type.** |
| Transmission system | : RS-232C, BCD |
| Communications connector | : D-Sub 9-pin (male) (RS-232C connector to the weighing instrument)<br>Half pitch 50-pin (female) (BCD connector) |
| External dimensions | : 144 (W) X 110 (D) X 72 (H) mm |
| Mass | : Approx. 620 g |
| Standard accessories | : BCD plug 1 pc. |

## 8.1. Applicable Instruments

The AD-8923-BCD functions in two ways as follows, depending on the weighing instrument used:

- A remote controller that displays the weighing data and remotely controls the weighing instrument.
- A remote display that displays the weighing data.

Available key operations depend on the weighing instrument used. (Refer to “Table 2”)

Table 1 Applicable weighing instruments and what is required

| Weighing instrument | What is required to connect to a weighing instrument | |
|---|---|---|
| | Option for the instrument | Communications cable (Length 2 m) |
| AD-4212C | None (D-Sub 9-pin) | None (Use the cable provided for AD-4212C) * |
| AD-4212A/B, GX, GF, GX-K, GF-K, GP, FP, GR, HR, MC | None (D-Sub 25-pin) | AX-KO1710-200 |
| EK-*i*, EW-*i*, FC-*i*, FC-S*i*, GH, HR-*i*, FZ-*i*, FX-*i,* BM, HR-AZ, HR-A | None (D-Sub 9-pin) | AX-KO2466-200 |
| EK-G, EK-H, ET-W, EW-G | OP-03 (D-Sub 25-pin) | AX-KO1710-200 |
| HV-G, HV-WP, HW-G, HW-WP | None (DIN 7-pin) | AX-KO1786-200 |
| FG | OP-03 (DIN 7-pin) | AX-KO1786-200 |
| FS, FS-KL | OP-03 (DIN 8-pin) | AX-KO1786-200 |
| FG-L, FG-M | OP-23 (DIN 8-pin) | AX-KO1786-200 |

**Note (*) - When connecting to the AD-4212C, use the cable provided as a standard accessory for the AD-4212C.**

**- The part number for standard accessory cable for the AD-4212C is AX-KO3590-1000 (10m).**

Table 2 Applicable weighing instruments and key operations

<table>
<tr><th rowspan="2">Weighing instrument</th><th colspan="6">AD-8923-BCD key</th></tr>
<tr><th>ON:OFF</th><th>CAL</th><th>SAMPLE</th><th>PRINT</th><th>MODE</th><th>RE-ZERO</th></tr>
<tr><td>AD-4212C</td><td rowspan="4">Turns the weighing instrument display on or off. *1</td><td rowspan="2">Calibrates using the external mass. *4</td><td rowspan="3">Switches the minimum display. *2</td><td rowspan="4">When setting, decide the operation.</td><td>Switches the response characteristic.</td><td rowspan="4">Sets the display to zero.</td></tr>
<tr><td>AD-4212A/B, GF, GF-K, HR, HR-i, FX-i, HR-A</td><td rowspan="3">Switches the unit displayed. *3</td></tr>
<tr><td>GX, GX-K, GP, GH, FZ-i, MC, BM, HR-AZ</td><td rowspan="2">Calibrates using the internal mass.</td></tr>
<tr><td>GR</td><td>—</td></tr>
<tr><td>EK-i, EW-i, EK-G, EW-G, FC-i, FC-Si, FG, FG-L, FG-M, FP, FS, FS-KL, HV-G, HV-WP, HW-G, HW-WP</td><td colspan="6">*5</td></tr>
</table>

**Note: "—" in the table indicates that the key operation is not available.**

***1: Switching the standby or weighing mode is available for the AD-4212C.**

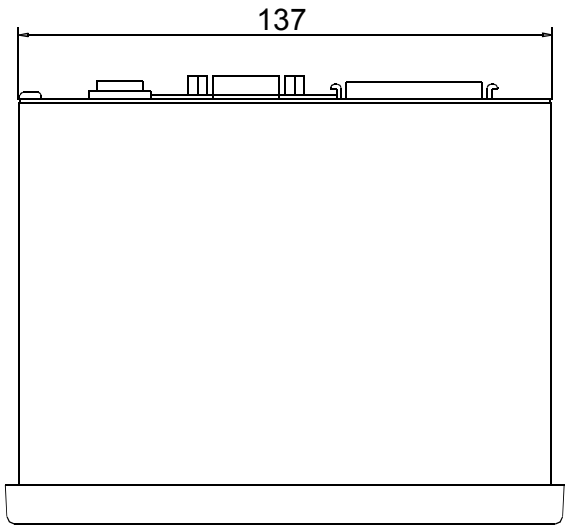
***2: Not available for the counting mode or percent mode**

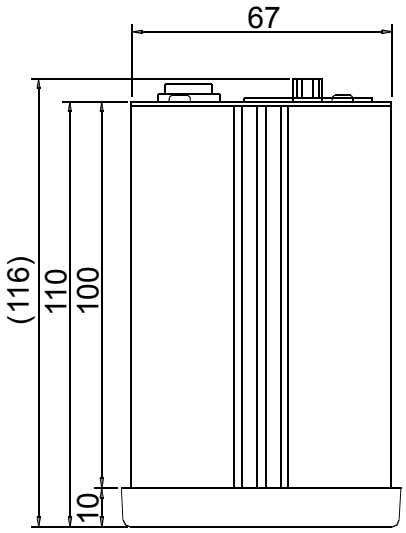
***3: Not available for the AD-4212**

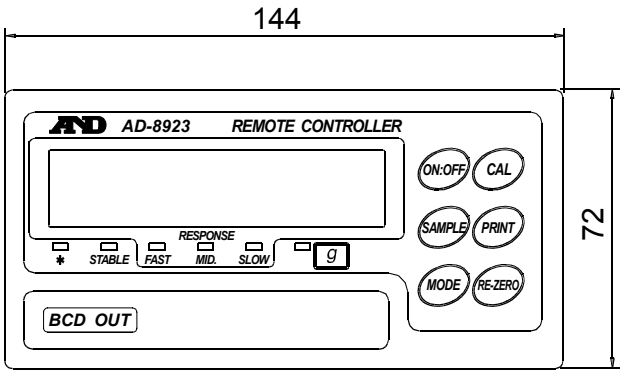
***4: The AD-8923-BCD displays "------". Use the display on the balance.**

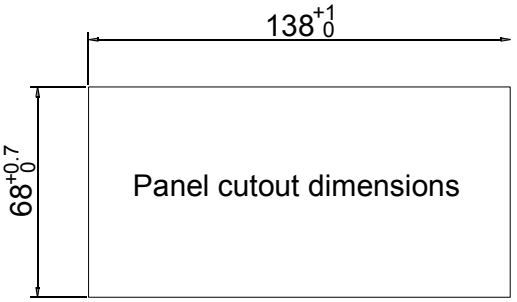
***5: Do not operate by using the key on the AD-8923-BCD.**

# 9. EXTERNAL DIMENSIONS




Panel cutout dimensions when panel mounted

Unit: mm

# MEMO

# MEMO