

AD-8923-BCD

**Remote Controller
(BCD)**

INSTRUCTION MANUAL



1WMPD4002137

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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

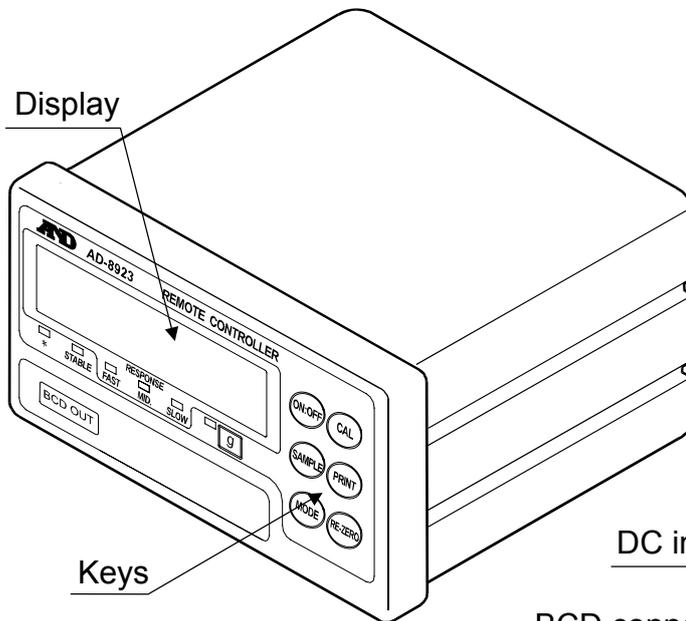
Connecting the AD-8923-BCD remote controller and the AD-4212C series production weighing unit will enable transmission of the weight data to a PLC using BCD.

- 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”

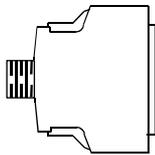
2. DESCRIPTION OF EACH PART



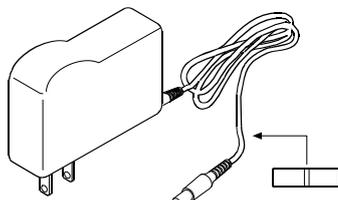
Display

Keys

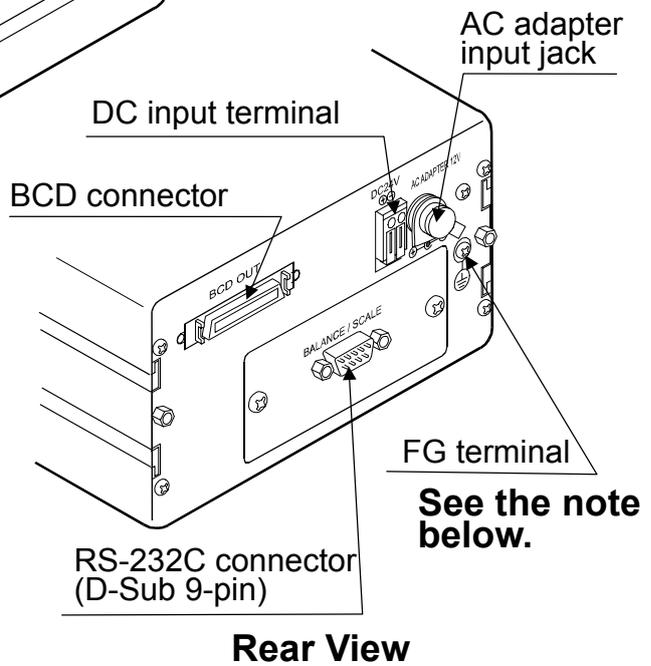
Accessories



BCD plug 1 pc.



AC adapter 1 pc. AD adapter ID label

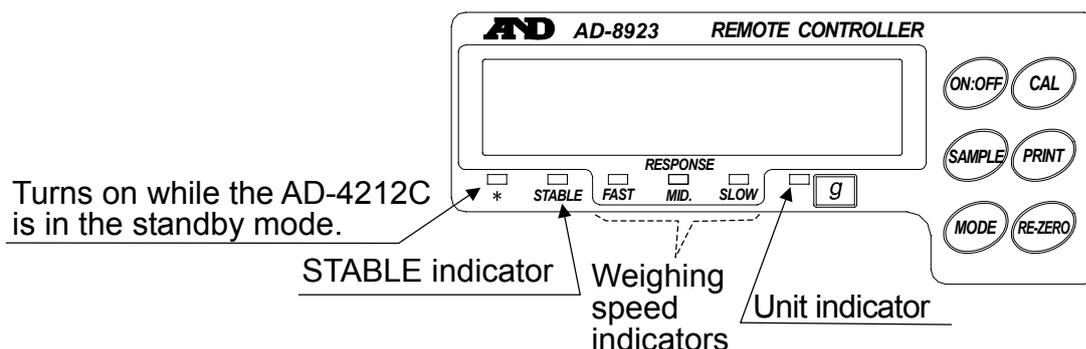


Rear View

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.
- 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 corresponding indicator.

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 to connect to the AD-4212C weighing unit. For details, refer to “5. RS-232C CONNECTOR”.
- 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.

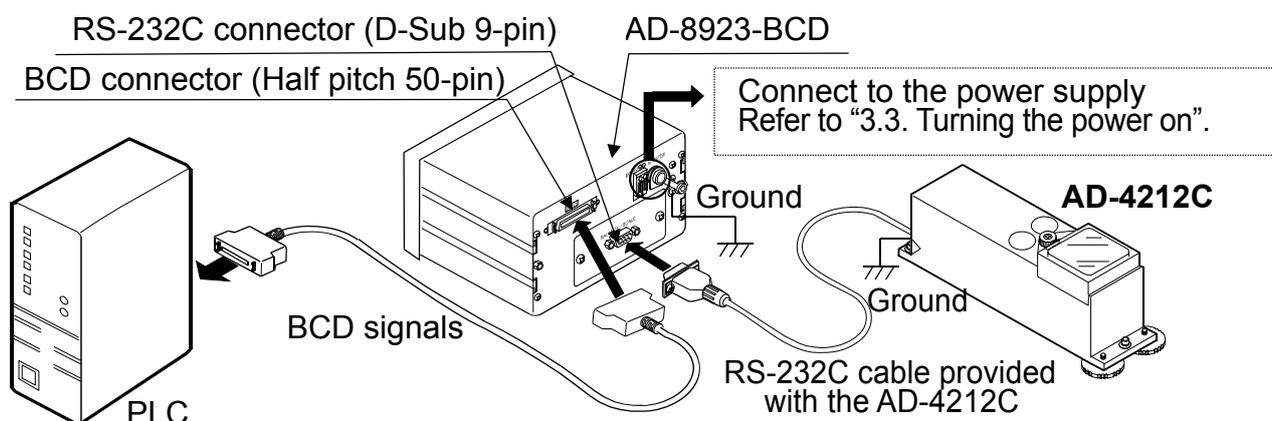
Item	Weighing instrument	AD-8923-BCD
Baud rate	600, 1200, 2400*, 4800, 9600, 19200 bps	
Data bits, parity	7 bits EVEN*	
Stop bit	1 bit*	
Terminator	<CR><LF>*	
Data format	A&D standard format	—
Communication control	No RTS/CTS control	—
Data output mode	Stream mode	—

* 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 \pm 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 \pm 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



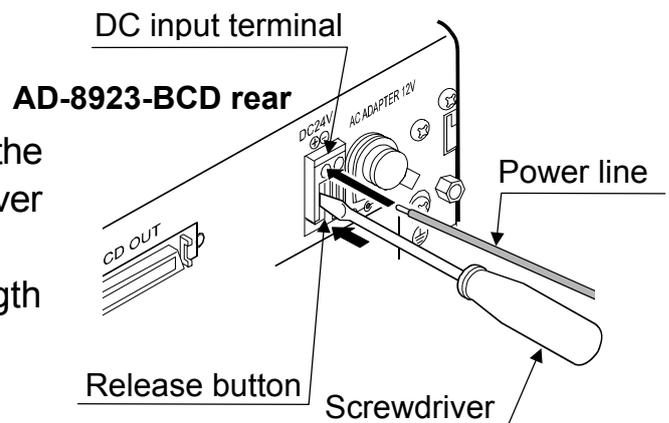
CAUTION

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 mm² (AWG 22) to 0.75 mm² (AWG 20)
Individual wire diameter $\phi 0.18$ mm or greater

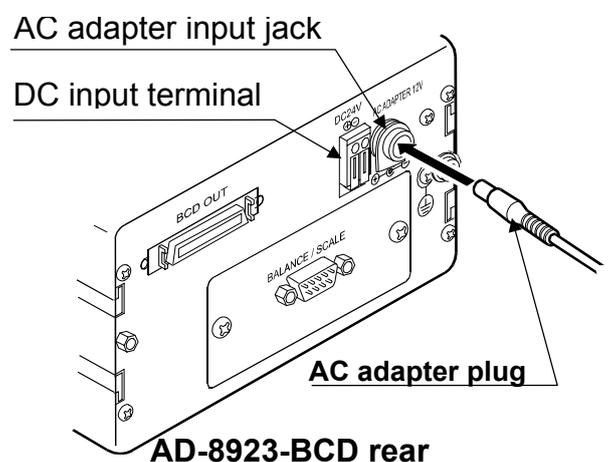
(2) Securing or removing the power line

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 AD-8923-BCD key functions when connected to a weighing instrument are listed below: (e.g. when the AD-4212C is connected)

Model	Keys of the AD-8923-BCD					
	ON:OFF	CAL	SAMPLE	PRINT	MODE	RE-ZERO
AD-4212C	Switches between the weighing mode and the standby mode.	Enters the calibration mode using a weight.	Switches the minimum display.	Used for the function setting mode and calibration mode.	Switches the weighing speed.	Sets the display to zero.

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



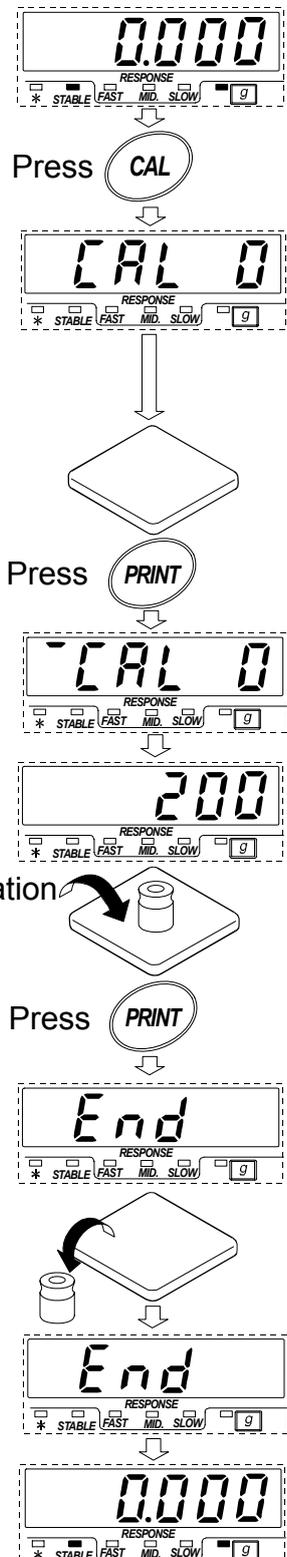
- This indicator means “the AD-4212C is measuring calibration data”. Do not allow vibration, drafts or other external disturbances to affect AD-4212C while this indicator is displayed.

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

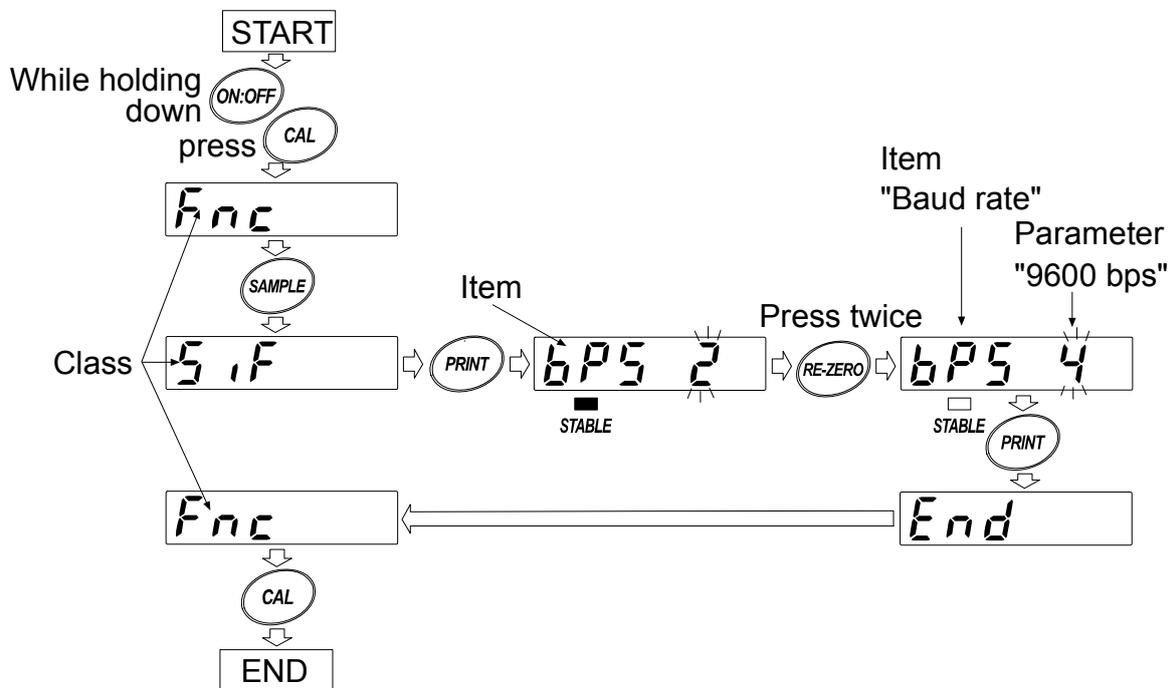
Function setting specifies the AD-8923-BCD performance. The parameters are stored in non-volatile memory, and are maintained even if the power line or AC adapter is removed.

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

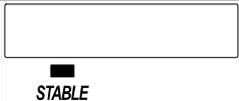
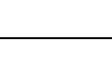
This example sets “Baud rate” to “9600 bps”.



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

	The STABLE indicator turns on to indicate that the parameter displayed is in effect.
	Selects a class or item.
	Changes the parameter.
	When a class is displayed, moves to an item in the class. When an item is displayed, stores the new parameter and displays the next class.
	When an item is displayed, cancels the new parameter and displays the next class. 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		
<i>F_{nc}</i> Environment Display	<i>dPP</i> Decimal point position	▪ -	Not fixed	Displays the decimal point position of the weight data received.
		0	Fixed	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”.
		}		
	5	Disabled	Disables the SAMPLE key function.	
<i>SAPL</i> Sample key function	▪ /			Enabled
<i>5 iF</i> Serial interface	<i>bP5</i> Baud rate	0	600 bps	Set the same value as that of the weighing instrument to be connected.
		1	1200 bps	
		▪ 2	2400 bps	
		3	4800 bps	
		4	9600 bps	
		5	19200 bps	

- 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.

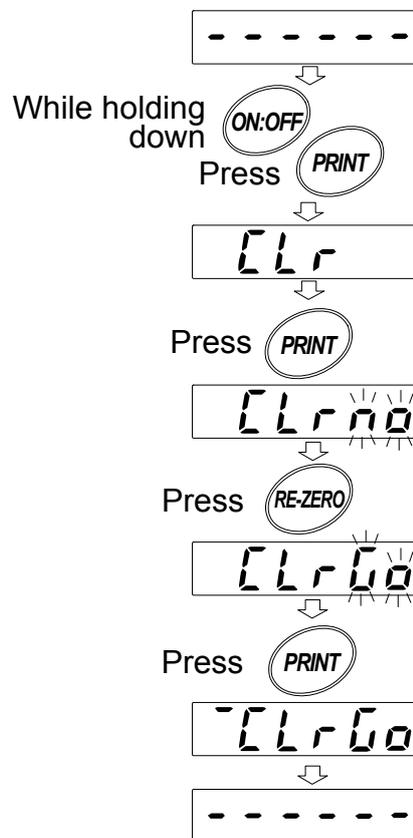
2 While holding down the ON:OFF key, press the PRINT key. [Lr is displayed.

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.



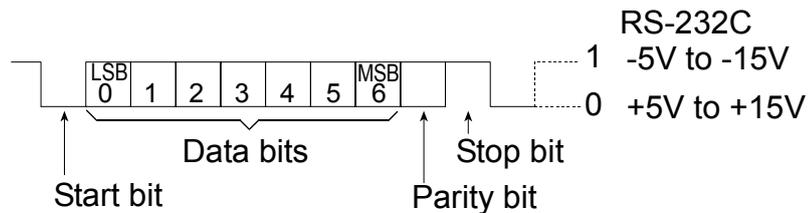
5. RS-232C CONNECTOR

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

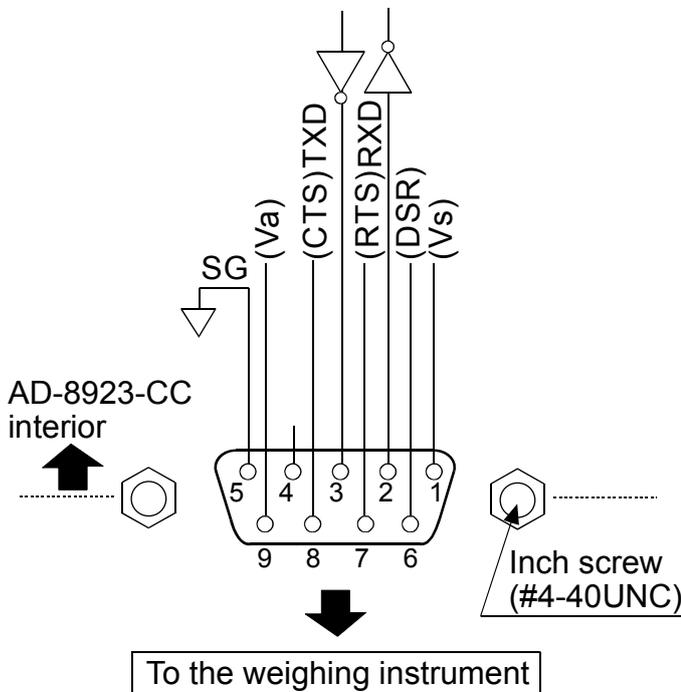
5.1. RS-232C serial interface specifications

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

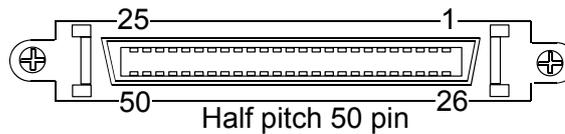
Outputs the weighing data received from the weighing instrument in BCD format, along with the polarity (+/-) and the data status (stable/unstable and over (E display)).

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	

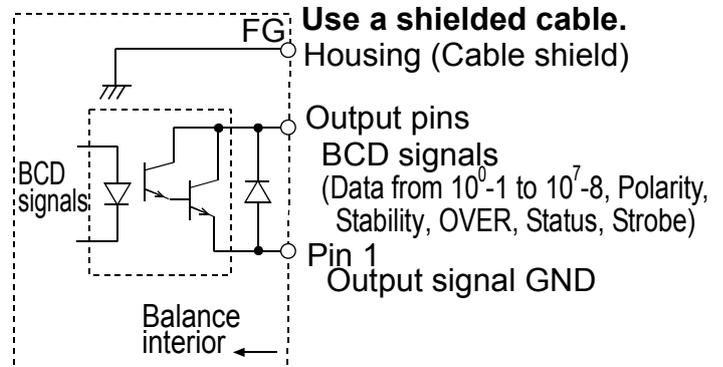
-The pins, which are not specified, have no connection.
(2, 4, 6, 8, 10, 36, 38 pin)

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 \rightarrow ON, replaces the data.

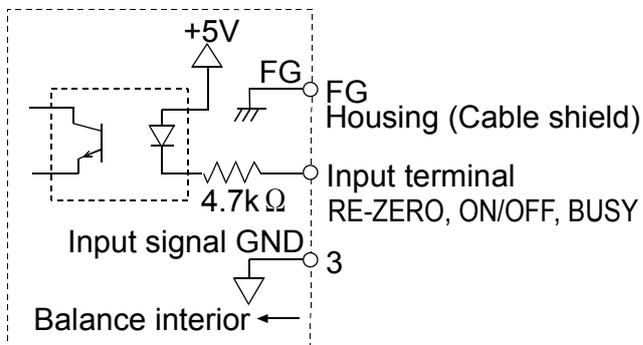
- All output, open collector; withstand voltage 30 V; no pull-up resistor; low-level output current 10 mA



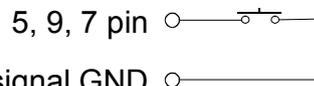
Input logic

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	

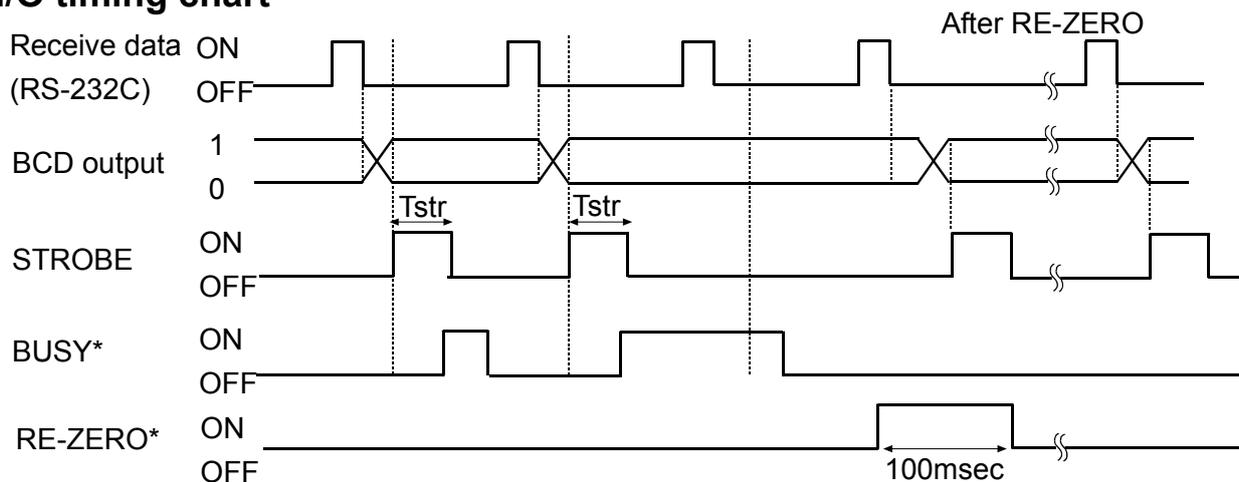
Note: The products above are subject to be replaced with the equivalent.

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.

6.2. Fixing of the Decimal Point Position

The AD-8923-BCD can set the display digit and the BCD output digit by setting d^{PP} 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. ($d^{PP} -$) [Factory setting]

Key	Balance output	AD-8923-BCD display	BCD output
	S T , + 0 0 1 2 3 . 4 6 , _ _ g C _R L _F		00012346
	S T , + 0 1 2 3 . 4 5 6 , _ _ g C _R L _F		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. ($d^{PP} 3$)

Key	Balance output	AD-8923-BCD display	BCD output
	S T , + 0 0 1 2 3 . 4 6 , _ _ g C _R L _F		00123460
	S T , + 0 1 2 3 . 4 5 6 , _ _ g C _R L _F		00123456

Note

- _ : space 20h
- When changing the minimum display digit by pressing **SAMPLE** key, the BCD output does not change the number of digits.

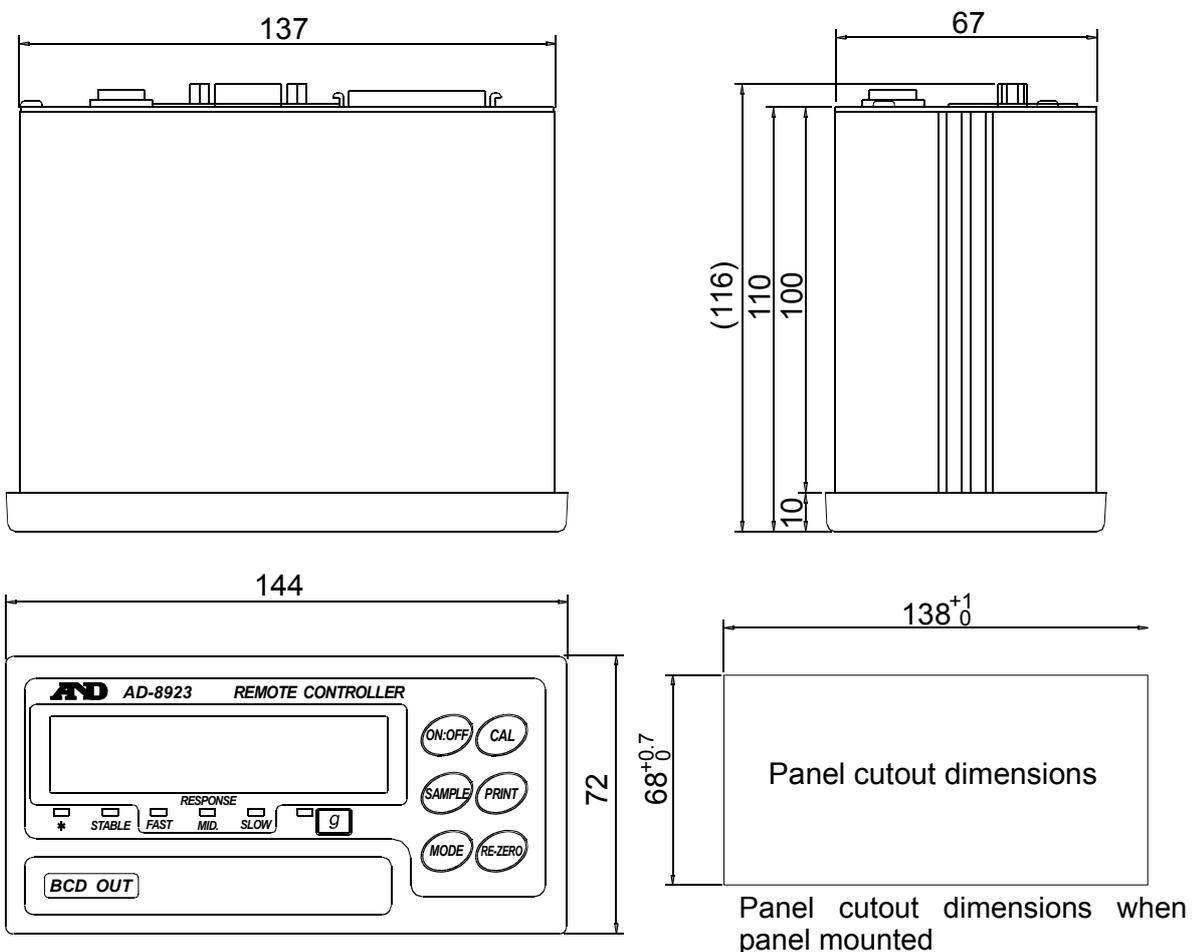
7. TROUBLESHOOTING

Symptom	Description
<div style="border: 1px solid black; display: inline-block; padding: 2px;">Error 10</div> appears.	<p>Communication settings of the AD-8923-BCD do not match with those of the weighing instrument.</p> <p>Check the settings such as baud rate and parity and correct them as necessary. For details, refer to “3.1. Setting the weighing instrument and the AD-8923-BCD”.</p>
<div style="border: 1px solid black; display: inline-block; padding: 2px;">- - - - -</div> (Bar display) remains and the weight value is not displayed.	<ul style="list-style-type: none"> • Is the data output mode of the weighing instrument set to “stream mode”? In a mode other than “stream mode”, the weight values are displayed only when they are transmitted. • Check if the communication settings are correct. • Check if the cables are the correct type and are not damaged.
The display flickers.	<p>Electrical noise may cause this symptom.</p> <p>Ground the FG terminal located on the rear of the AD-8923-BCD.</p>

8. SPECIFICATIONS

Power supply	: External 24-VDC power supply (24 VDC \pm 10% / 700mA) or AC adapter (Output: 12 VDC / 300mA) 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) Half pitch 50-pin (female) (BCD connector)
External dimensions	: 144 (W) X 110 (D) X 72 (H) mm
Mass	: Approx. 1.0 kg
Standard accessories	: BCD plug 1 pc.

9. EXTERNAL DIMENSIONS



Unit: mm