ANALOG OUTPUT/ CURRENT LOOP OPTION

INSTRUCTION MANUAL

HF series
HM series
HR series
HP series

The function of this product (HF / HM / HR series) is specialized at the factory.

A&D Company, Limited

1089-1A-IE-96.11.11

This is hazard alert mark.

This informs to you about the operation of the balance.

This is a notice about the operation of the balance.

Contents

Introduction

This option has an analog output and a current loop. The analog output, outputs a voltage value converted from the display value. The current loop is used when you output the display value to a printer or computer.
The analog output and current loop use a common connector.

The function of this product (HF series, HM series and HR series) is specialized upon installation at the factory.
Therefore, other options can not be installed in this product.
If this option is installed in an HP balance, it will not conform to IP-65.

Analog output

- There are two output modes. One mode outputs a voltage converted value of the selected figure on the display. The other mode outputs a voltage converted value of a range that is from zero to full scale.
- Output voltage ranges are form 0V to 1V or 0.2V to 1V. These ranges are selected by jumper pins on the option board.
- The analog output mode is selected by "C-7" of the C-parameters. This setting is stored in the balance memory even when power is removed.

Current loop

- The conditions of the current loop are set by "C-4", "C-5" of the C-parameters. These setting are stored in the balance memory even when power is removed. If you use AD-8121 printer, you need an AD-8121-01 option cable.

Unpacking

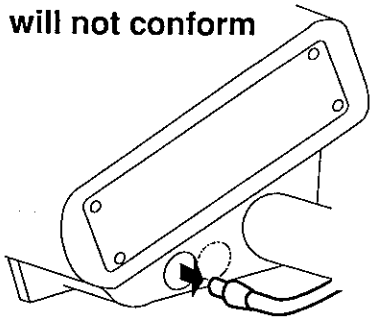
The contents of the package are as follows.

Option board---------- 1 (This is installed at the factory [HF,HM,HR])
7 pin DIN plug -------- 1
Screw driver ---------- 1
Manual ---------- 1

Installation

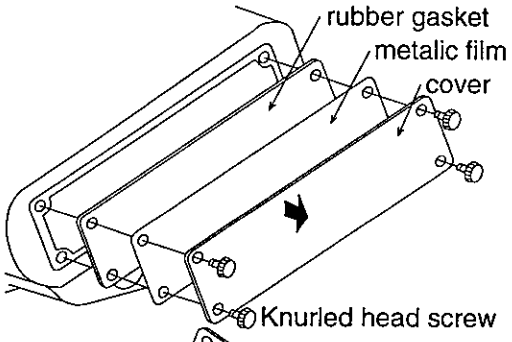
HP series

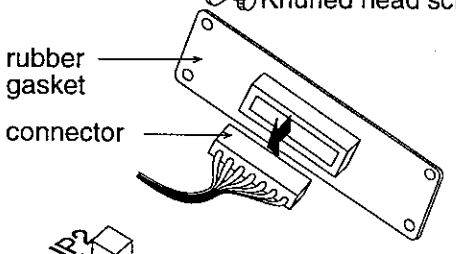
If this option is installed in the HP balance, it will not conform to IP-65.



1. Turn off the balance and disconnect the AC adaptor from the balance.

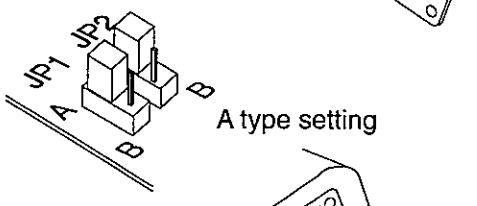
2. Remove four screws on the side of the balance display and detach the metallic film and cover. (When the panel is removed, a cable is connected from the inside of the balance) Remove the connector attached to the rubber gasket.



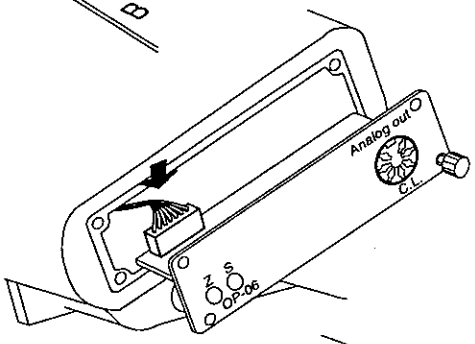


3. The output voltage range of the analog output is set by jumper pins {two places (JP1 and JP2)} on the board if there is a necessity.
Please refer to the explanation of " the analog output " for details.

Jumper pin	Voltage range
Side A	0v ~ 1V
Side B	0.2V ~ 1V

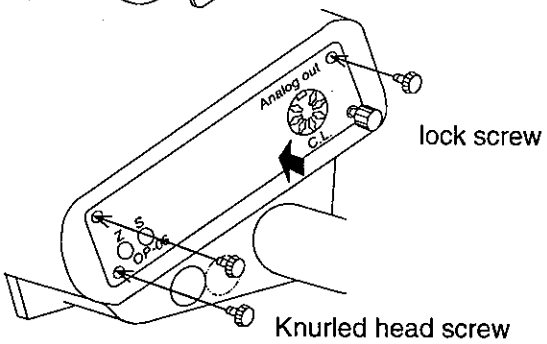


4. Insert the connector into the options jack.



5. Insert the option into the balance and install the lock screw.

6. Install the three Knurled head screws.

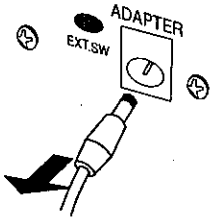


Remove the knurled head screws first when you remove the option from the HP balance, Then remove the lock screw .

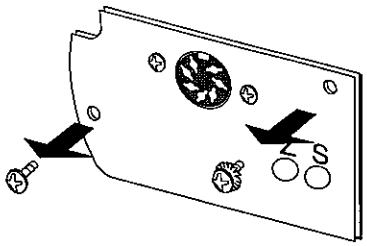
When the option is already installed. Use the following steps to switch the jumpers on the board.

HF, HM, HR series

1. Turn off the balance and remove the AC adapter. If the optional battery pack is installed, set the power switch on the battery option to the off position.

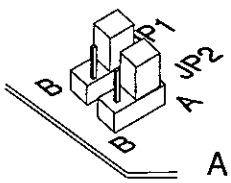


2. Remove two screws that hold the option unit.



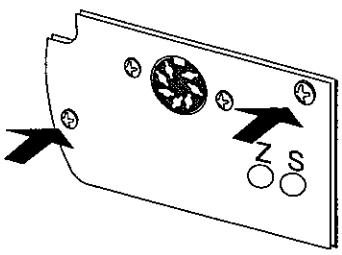
3. The output voltage range of the analog output is set using the jumper pins {two places (JP1 and JP2)} on the board.

Jumper	Range of voltage
A type setting	0 V ~ 1 V
B type setting	0.2 V ~ 1 V



A type setting

4. Install the option board using the screws removed in step 2.



Specifications

Analog output

Output impedance	Less than 100Ω
Linearity	Within ±0.3%
Range	0V ~ 1V or 0.2V ~ 1V
Connector	7 pin DIN connector
Pin connection	output pin 7
	GND pin 2

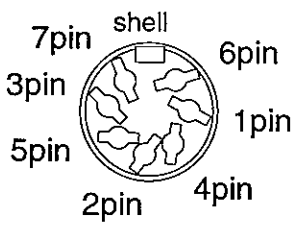
Current loop

Transmission system	20mA current loop (passive)
Transmission format	Asynchronous, transmission only
Baud rate	600, 1200, 2400, 4800, 9600 bps
Data	7 or 8 bits
Parity	Even, Odd (7 bit), None (8 bit)
Stop bit	1 bits
Code	ASCII
Maximum voltage	25V

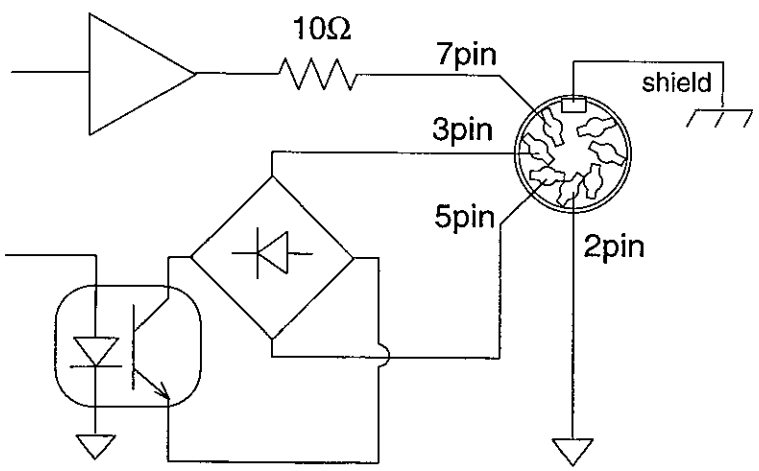
DATA	Current loop
1	20mA
0	0mA

Pin connection

Pin No.	Signal name	Description
1	N.C.	N/A
2	GND	Analog GND
3	loop	Current loop
4	N.C.	N/A
5	loop	Current loop
6	N.C.	N/A
7	Out	Analog output
shell	Frame GND	shield



Circuit



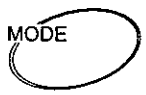
Function

These settings are stored in the balance until the next change even without power applied. The section, C-parameters keys and displays, explains how to change the parameters. The individual settings for each group are detailed in C-parameters settings.

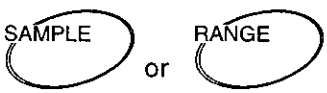
Group Number	Group	Item and Item Number						
		0	1	2	3	4	5	6
4	C-4 Data out	Pr int Data out mode	AP-P Auto print polarity	AP-b Auto print band	PAUSE Data pause	At-F Auto feed	Ar-d Zero after data out	inFo GLP output
5	C-5 Serial interface	bPS Baud rate	bt-Pr Length, Parity bit	Cr-LF Terminator	tYPE Data format	t-UP Receive time	E-Cod Error code	CtS CTS control
6	C-6							
7	C-7 Analog out	An Range of output	SEL Target figure					

Keys and displays

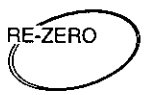
This mark is displayed when the parameter shown has been selected.



The [MODE] key is used to select the group of C-parameters.

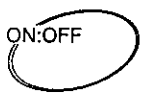


The [RANGE] key or [SAMPLE] is used to select the item from the group selected by the [MODE] key.



The [RE-ZERO] key is used to select a parameter for the item selected by the [MODE] key and [RANGE] key (or [SAMPLE]).

The [PRINT] key is used to save the new C-parameter settings and to exit to the weighing mode.



The [ON:OFF] key cancels the new C-parameter settings and turns the display off.

Internal Parameter setting

1. Turn the display off.

2. Press and hold the [RE-ZERO] key and press the [ON:OFF] key. Release both keys.

3. Press the [MODE] key (several times).
The balance enters the paramerter mode after displaying the softwarer version.
ex. The balance will display the parameter "C-0".

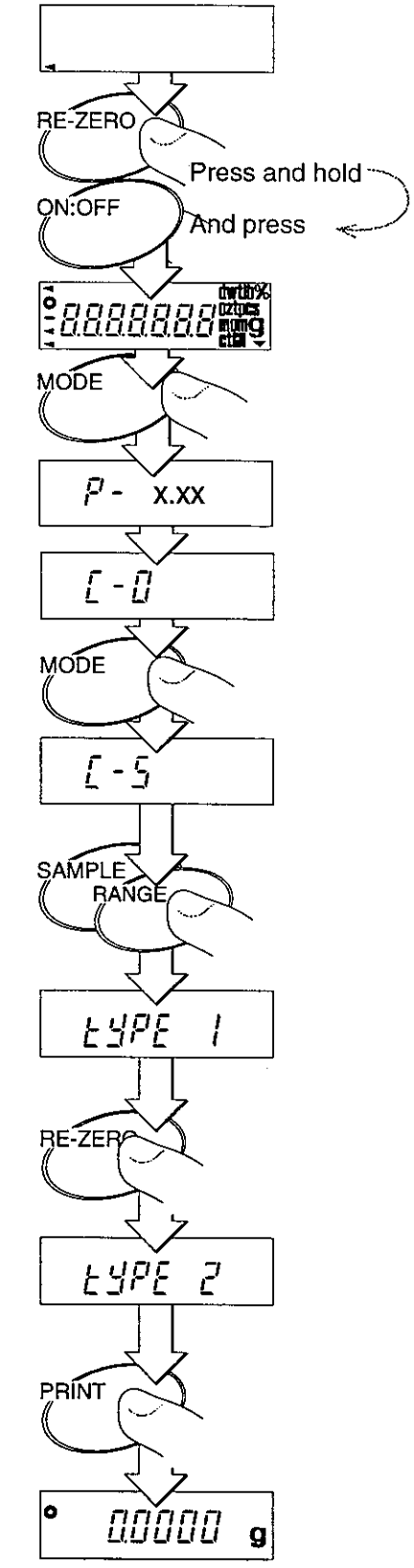
4. Press the [RANGE] key (or [SAMPLE]) several times, to select an item from the selected parameter group.
ex. The balance will display the parameter "C-5".

5. Press the [RE-ZERO] key (several times), to select the parameter of the selected item.
ex. The balance will display the parameter "tYPE".

5. Press the [ON:OFF] key (several times), to select the parameter of the selected item number.
ex. The balance will display the parameter "2".

6. Store the C-parameter set using the [PRINT] key. Then the balance will return to the normal weighing mode.

Example of HR SERIES

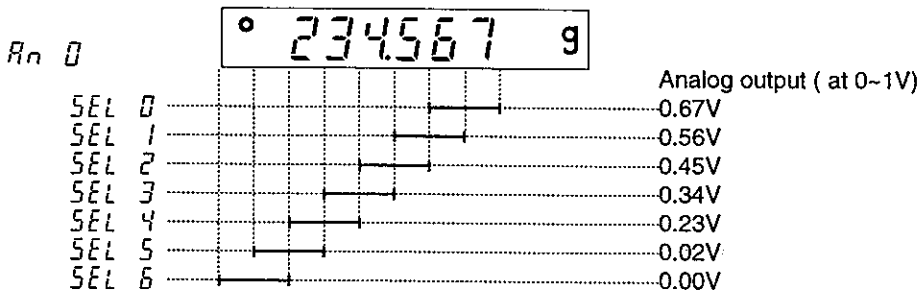


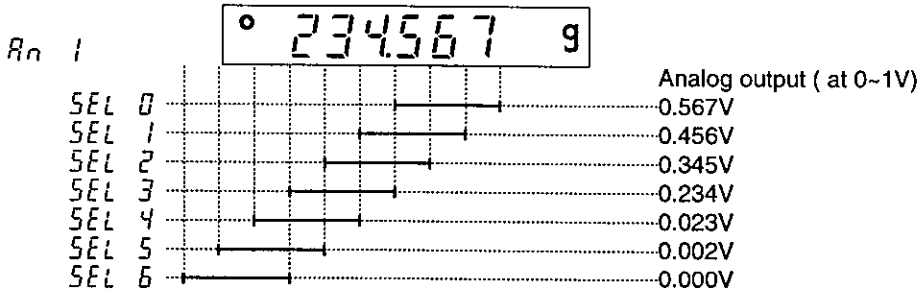
Analog out

C - 7 Analog out

	parameter	Meaning and use
An Range of output	0	2 figure output mode This mode outputs the voltage converted from the diplay value based on the minimum figure and is selected at SEL .
	1	3 figure output mode This mode outputs the voltage converted from the diplay value based on the minimum figure and is selected at SEL .
	*2	Net fullscal output mode As net weight is zero, Terminal outputs 0.000V. As net weight is full scale, Terminal outputs 1.000V. Terminal outputs 0.000V, if you press RE-ZERO key.
	3	Gross fullscal output mode As total weight is zero, Terminal outputs 0.000V. As total weight is full scale, Terminal outputs 1.000V. RE-ZERO operation does not influence the output. (But, if you weigh a very light tare weight, the balance updates the zero-point data. And, the display value isupdated also)
SEL Target figure		Meaning and use Selection of the minimum figure.
	*0	The selection of the minmum figure is the first figure.
	1	The selection of the minmum figure is the second figure.
	2	The selection of the minmum figure is the third figure.
	3	The selection of the minmum figure is the fourth figure.
	4	The selection of the minmum figure is the fifth figure.
	5	The selection of the minmum figure is the sixth figure.
	6	The selection of the minmum figure is the seventh figure.

* : factory setting





$An\ 2$ or $An\ 3$

Product	Full scale
HF-200 / G	200 g
HF-300 / G / GD	300 g
HF-320	300 g
HF-400	400 g
HF-1200 G / GD	1200 g
HF-2000 / G / GD	2000 g
HF-3000 / G / GD	3000 g
HF-3200	3000 g
HF-4000	4000 g
HF-6100	6000 g
HF-6000 / G / GD	6000 g
HF-8000	8000 g
HF-2000CT	400 g

Product	Full scale
HM-120	120 g
HM-200	200 g
HM-300	300 g
HM-202	200 g
HR-60	60 g
HR-120	120 g
HR-200	200 g
HR-300	300 g
HR-202	200 g
HR-300CT	60 g
HR-600CT	120 g

Product	Full scale
HP-12K	12 kg
HP-20K	20 kg
HP-22K	20 kg
HP-30K	30 kg
HP-40K	40 kg
HP-60K	60 kg
HP-100K	100 kg
HP-102K	100 kg

If HF-4000 displays 40g,
output is 0.01V at $An\ 2$.

$$1.000V \times \frac{40g}{4000g} = 0.01V$$

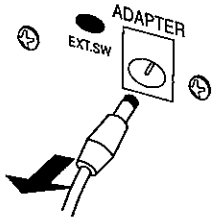
If HF-4000 displays 4100g,
output is 1.025V at $An\ 2$.

$$1.000V \times \frac{4100g}{4000g} = 1.025V$$

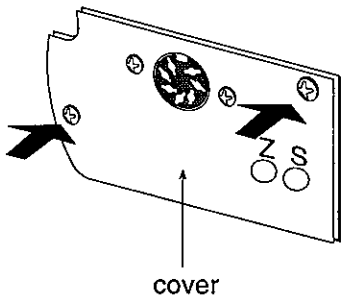
Analog output Setting

The range of voltage (Installation)

1. Disconnect the AC adaptor from the balance.
   Turn off the ON/OFF switch when the battery option is installed.



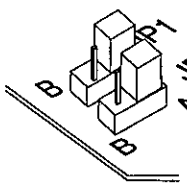
2. Remove the screws from the cover.



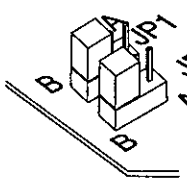
3. Select the output voltage range and set both jumper pins on the board.

Jumper pin	Voltage range
Side A	0v ~ 1V
Side B	0.2V ~ 1V

HF / HM / HR SERIES

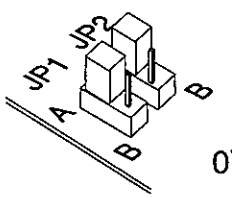


0V ~ 1V

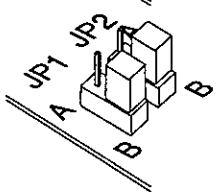


0.2V ~ 1V

HP SERIES



0V ~ 1V



0.2V ~ 1V

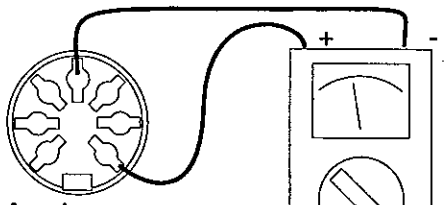
4. Insert the board in the balance and affix with screws removed in step 2.

Voltage adjustment

You are able to adjust the voltage using the adjustments "Z" and "S".
The adjustment "Z" is for zero point adjustment.
The adjustment "S" is for span adjustment.

Adjustment

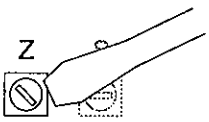
1. Set the jumpers as described earlier. Check with a voltmeter.



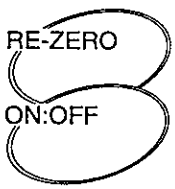
Analog out
Example of HF SERIES

2. Turn off the display.

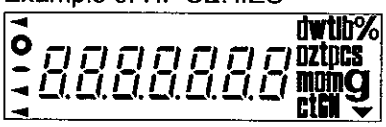
3. Adjust the voltage output to be "0V" (side A) or "0.2V" (side B) using the "Z" adjustment.



4. Press and hold the RE-ZERO key, press the ON:OFF key. The balance will display all segments.

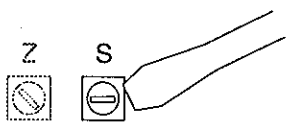


Example of HF SERIES



5. Release both RE-ZERO key and ON:OFF key.

6. Adjust the voltage output to be "1V" using the "S" adjustment.



7. Repeat from 2 to 6 until the correct voltage is output.

Fixed output

The voltage output is fixed in the following cases.

Case 1 The voltage output, outputs 0V (or 0.2V) when the balance is in the off state, in calibration mode or excluding the measurement state.

Case 2 During the state of RE-ZEROing, the balance outputs the voltage before pressing the RE-ZERO key in $An\ 3$ and holds it.

During the state of RE-ZEROing, the balance outputs the 0V (or 0.2V) in $An\ 0$, $An\ 1$ or $An\ 2$ and holds it.

RE-ZEROing : The action where the balance sets the display to zero.

Case 3 The voltage output, outputs 0V (0.2V) while displaying "-E".

Case 4 The following voltage is output according to the setting while displaying "E".

Product	$An\ 0$, $An\ 1$	$An\ 2$, $An\ 3$
HF-200 / G	1.000 V	1.050 V
HF-300 / G	1.000 V	1.033 V
HF-300 GD	1.000 V	1.037 V
HF-320	1.000 V	1.033 V
HF-400	1.000 V	1.025 V
HF-1200 G / GD	1.000 V	1.042 V
HF-2000 G / GD	1.000 V	1.050 V
HF-3000 / G	1.000 V	1.033 V
HF-3000 GD	1.000 V	1.037 V
HF-3200	1.000 V	1.033 V
HF-4000	1.000 V	1.025 V
HF-6100	1.000 V	1.017 V
HF-6000 / G / GD	1.000 V	1.017 V
HF-8000	1.000 V	1.013 V
HM-120	1.000 V	1.000 V
HM-200	1.000 V	1.050 V
HM-300	1.000 V	1.033 V
HM-202	1.000 V	1.050 V
HR-60	1.000 V	1.000 V
HR-120	1.000 V	1.000 V
HR-200	1.000 V	1.050 V
HR-300	1.000 V	1.033 V
HR-202	1.000 V	1.050 V
HR-300 CT	1.000 V	1.033 V
HR-600 CT	1.000 V	1.050 V

Product	$An\ 0$, $An\ 1$	$An\ 2$, $An\ 3$
HP-12K	1.000 V	1.000 V
HP-20K	1.000 V	1.050 V
HP-22K	1.000 V	1.050 V
HP-30K	1.000 V	1.033 V
HP-40K	1.000 V	1.025 V
HP-60K	1.000 V	1.017 V
HP-100K	1.000 V	1.010 V
HP-102K	1.000 V	1.010 V

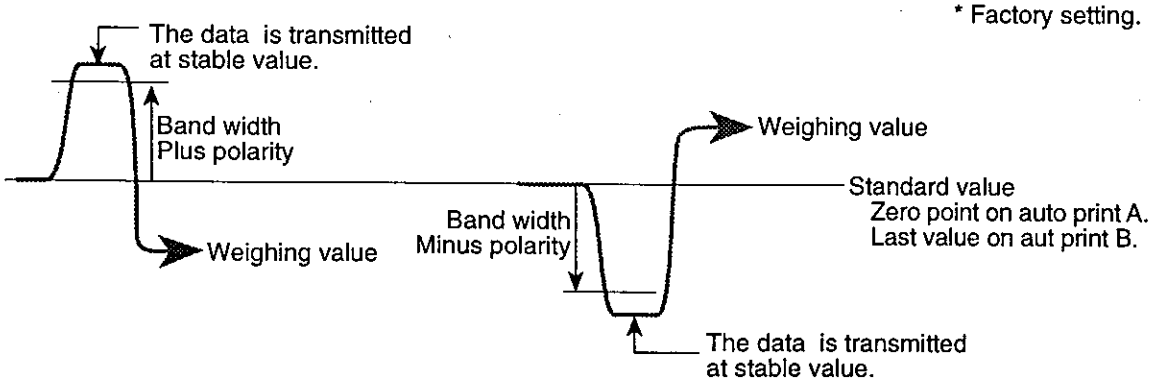
Current loop

C-parameter

C-4 Data out Settings for options 03 and 05

Pr int Data out mode	parameter	It is necessary to select the method and condition when data is transmitted. If you use auto print mode, please set both "Auto print polarity" and "Auto print band".	
	*0	PRINT key mode	PRINT key command is accepted only if the display is stable. The display will blink when data is transmitted.
	1	Auto print mode A	Data is transmitted when the display is stable and meets the conditions of "Auto print polarity" and "Auto print band". This standard value is the zero-point. Refer to the figure at the bottom of the page.
	2	Auto print mode B	Data is transmitted when display is stable and meets the condition of "Auto print polarity" and "Auto print band". This standard value is the last weighing data. Refer to the figure at the bottom of the page.
	3	Stream mode	Data is transmitted continuously.
AP-P Auto print polarity	parameter	This parameter sets the polarity condition from the standard value that weighing data is able to transmit.	
	*0	Data is able to be transmitted when the weighing data is more than the standard value. (It is called "Plus polarity")	
	1	Data is able to be transmitted when the weighing data is less than standard value. (It is called "Minus polarity")	
	2	Data is able to be transmitted when the weighing data is less than or more than the standard value. (It is called "Absolute polarity")	
AP-b Auto print band	parameter	This parameter sets the band width condition from the standard value that weighing data is able to transmit.	
	*0	Data is able to be transmitted when the weighing data deviates from the standard value more than 10 digits.	
	1	Data is able to be transmitted when the weighing data deviates from the standard value more than 100 digits.	
	2	Data is able to be transmitted when the weighing data deviates from the standard value more than 1000 digits.	

* Factory setting.



Case of plus polarity Case of minus polarity

C-4 *Continued*

PAUSE Data pause		Selects the use of a pause. If your printer requires a pause, set this to 1.
	*0	No pause.
	1	Using a pause. (1.5 second)
At-F Auto feed		Selects whether or not to use Auto feed after printing. (AD-8121)
	*0	Not using auto feed
	1	Using auto feed
Ar-d Automatically re-zero after data out		Selects whether to use auto re-zero after transmitting.
	*0	Not using re-zero
	1	Using re-zero
inFo GLP output		Function and output formt of GLP are selected.
	*0	Inactive setting of GLP.
	Other	Output format of GLP functions section. Refer to "GLP".

* Factory setting.

C-5 Serial Interface Settings for options 03 and 05.

bPS Baud rate		Parameter definition and use.
	0	600 baud
	1	1200 baud
	*2	2400 baud
	3	4800 baud
	4	9600 baud
bt-Pr Parity bit		Parameter definition and use.
	*0	7 bits, Even parity check
	1	7 bits, Odd parity check
	2	8 bits, no parity check
Cr-LF Terminator		Parameter definition and use. (Common setting to both transmitting and receiving.)
	*0	C_R, L_F
	1	C_R
tYPE Data format		Selects a weighing data format. Refer to the book for the option used.
	*0	A&D standard
	1	Dump print format
	2	KF format
	3	MT format
	4	NU format. **Some models can not select this format .**
t-UP Receive time	This setting is not necessory for current loop.	
E-Cod Error code		
CtS CTS control		Selects the use of the control lines CTS and RTS. **Set this parameter to CtS 0 always.**
	*0	Not using CTS or RTS.
	1	Using CTS and RTS. Keep the RTS line (active) high while the computer receives data. The balance will set CTS low if it is busy.

* Factory setting.

Data out

There are four modes to control the transmission of the weighing data.

Key Mode

When you press the [PRINT] key , the balance transmits the weighing data when the display is stable (the stability indicator is on). When the data is transmitted the display will blink one time.

C-4Pr int 0 ..... Print key mode

Auto-print Mode A

The balance transmits the weighing data when the display is stable (the stability indicator is on), meets the conditions of "Auto-print polarity" and "Auto-print band". The reference for the auto-print band is the zero point. When the data is transmitted the display will blink one time.

C-4Pr int 1 ..... Auto-print mode A

C-4AP-P X ..... Auto-print polarity X = 0, 1, 2

C-4AP-b X ..... Auto-print band X = 0, 1, 2

Auto-print Mode B

The balance transmits the weighing data when the display is stable (the stability indicator is on), meets the conditions of "Auto-print polarity" and "Auto-print band". The reference for the auto-print band is the last weighing data printed. When the data is transmitted the display will blink one time.

C-4Pr int 2 ..... Auto-print mode B

C-4AP-P X ..... Auto-print polarity X = 0, 1, 2

C-4AP-b X ..... Auto-print band X = 0, 1, 2

Stream Mode

The balance transmits the weighing data continuously.

C-ISPEEd X ..... Display update rate. X = 0, 1, 2 or 0, 1

C-SbPS X ..... Baud rate. X = 0, 1, 2, 3, 4

CAUTION:

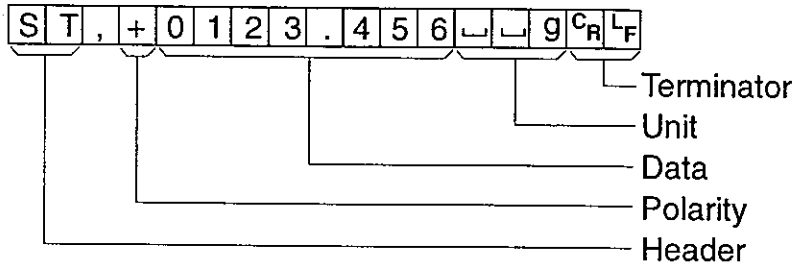
When the baud rate is set to 600 or 1200bps and the refresh rate of the display is set to high speed, the balance is unable to transmit all of the displayed data.

Data format

There are five formats for transmission of the weighing data. The setting of C-5 type selects the data format. Terminator can use CR or CR-LF when C-5 CR-LF is selected.

A&D Standard Format type 0

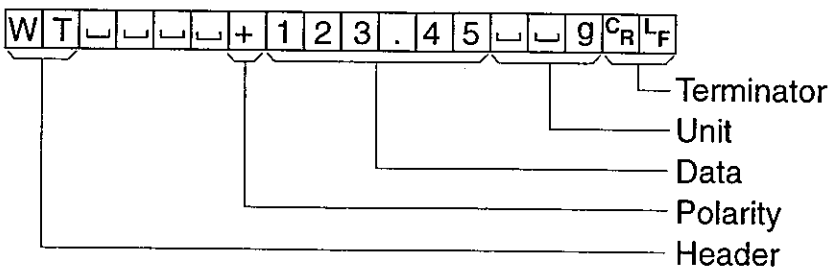
This format is used when the peripheral equipment is capable of receiving A&D format. If an AD-8121 is to be used and you are sending a 15 character data string (excluding the terminator), set the printer to mode 1 or 2.



- A two character header indicates the status of the stability.
- The weighing data (with leading zeros) plus sign and decimal point, followed by a three character "unit of weight" make up the body of the data.
- A terminator consisting of C_R, L_F to indicate to the peripheral equipment that all of the data has been sent.
- Header: Stable header is [S][T], Stable header for counting mode is [Q][T]
  Unstable header is [U][S]
  Overload header is [O][L]

Dump Print Format type 1

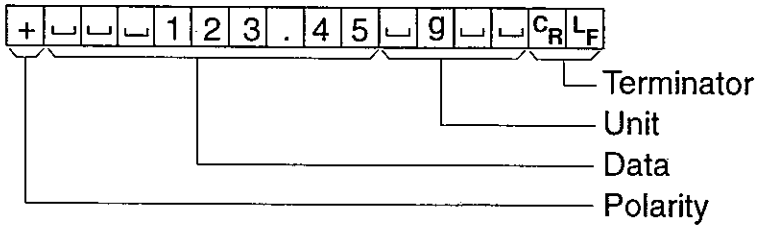
This format is used when the peripheral equipment is not capable of receiving A&D format. If an AD-8121 is to be used and you receive a 16 character data string (excluding the terminator), set the printer to mode 3.



- A two character header indicates the status of the stability if not overloaded.
- The weighing data (with leading zeros replaced by spaces) plus sign and decimal point, followed by a three character "unit of weight" make up the body of the data. When weighing is zero, this value suppresses leading sign.
- A terminator consisting of C_R, L_F to indicate to the peripheral equipment that all of the data has been sent.
- Header: Stable header is [W][T], Stable header for counting mode is [Q][T]
  Unstable header is [U][S]

KF Format type 2

This is the Karl-Fischer moisture meter format and is used when the peripheral equipment can not communicate using A&D format.

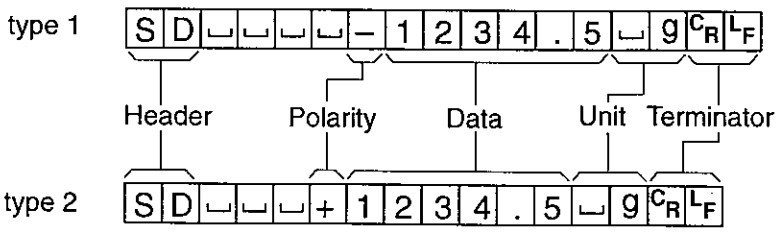


- The data consists of 14 characters (excluding the terminator).
- The sign of the weighing data is first if the balance is not in overload. The sign is omitted if the balance is at zero.
- The sign is followed by the weighing data (with leading zeros replaced by spaces) and decimal point. The weight data is followed by the unit if the balance is stable.
- A terminator consisting of C_R, L_F to indicate to the peripheral equipment that all of the data has been sent.
- The unit is present when stable. Example " g " ␣ g ␣ ␣
  The unit is not present when unstable. ␣ ␣ ␣ ␣

MT Format type 3

There are two type MT format depended on model and software version.
The software version will be displayed when the balance enters the parameter mode.

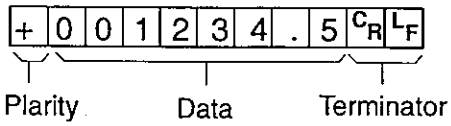
Model	Software version	MT format
HP series	1.00	Type 1
HR-202/300 HM series	1.10 ~	Type 2
HR-60/120/200	1.00 ~ 2.05	Type 1
HF- series	2.10 ~	Type 2



- The weighing data is proceeded by a header of two characters. If stable, one character and a space are transmitted.
- The minus sign will be next if the weighing data is negative. The sign is omitted if the weighing data is positive or at zero. Leading zeros are replaced by spaces.
- If the balance is in overload, the weighing data is omitted.
- Header: Stable header is S ␣
  Overload header is S I

NU Format type 4

- The Numerical format



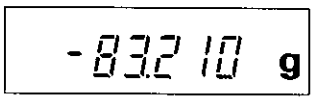
- The information transmitted consists of sign (+,-) and weighing data followed by the terminator.
- The weighing data length is eight figures including the decimal point.
- When the weighing data is zero, the polarity sign is plus.

Data format example

STABLE

A&D	S	T	,	+	0	0	0	0	.	0	0	0	␣	␣	g	C_R L_F
D.P.	W	T	␣	␣	␣	␣	␣	␣	0	.	0	0	0	␣	␣	g	C_R L_F
KF	␣	␣	␣	␣	␣	0	.	0	0	0	␣	g	␣	␣	C_R	L_F	
MT type 1	S	␣	␣	␣	␣	␣	␣	␣	0	.	0	0	0	␣	g	C_R	L_F
MT type 2	S	␣	␣	␣	␣	␣	␣	0	.	0	0	0	␣	g	C_R	L_F	
NU	+	0	0	0	0	.	0	0	0	C_R	L_F						

UN-STABLE



A&D	U	S	,	−	0	0	8	3	.	2	1	0	␣	␣	g	C_R L_F
D.P.	U	S	␣	␣	␣	␣	−	8	3	.	2	1	0	␣	␣	g	C_R L_F
KF	−	␣	␣	␣	8	3	.	2	1	0	␣	␣	␣	␣	C_R	L_F	
MT type 1	S	D	␣	␣	␣	␣	−	8	3	.	2	1	0	␣	g	C_R	L_F
MT type 2	S	D	␣	␣	␣	−	8	3	.	2	1	0	␣	g	C_R	L_F	
NU	−	0	0	8	3	.	2	1	0	C_R	L_F						

OVERLOAD

Positive error

A&D	O	L	,	+	9	9	9	9	9	9	9	E	+	1	9	C_R L_F
D.P.	␣	␣	␣	␣	␣	␣	␣	␣	E	␣	␣	␣	␣	␣	␣	C_R L_F
KF	␣	␣	␣	␣	␣	␣	H	␣	␣	␣	␣	␣	␣	␣	C_R	L_F	
MT type 1	S	I	+	C_R	L_F											
MT type 2	S	I	+	C_R	L_F											
NU	+	9	9	9	9	9	9	9	C_R	L_F						

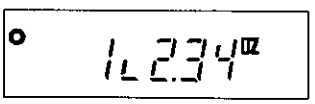
OVERLOAD

Negative error

A&D	O	L	,	−	9	9	9	9	9	9	9	E	+	1	9	C_R L_F
D.P.	␣	␣	␣	␣	␣	␣	␣	−	E	␣	␣	␣	␣	␣	␣	C_R L_F
KF	␣	␣	␣	␣	␣	␣	L	␣	␣	␣	␣	␣	␣	␣	C_R	L_F	
MT type 1	S	I	−	C_R	L_F											
MT type 2	S	I	−	C_R	L_F											
NU	−	9	9	9	9	9	9	9	C_R	L_F						

Pound Ounce

When unit `Pound ounce` is displayed, the balance converts the `Pound ounce` into Ounce and transmits the display value.
1 pound = 16 ounce
ex. When the balance displays 1 pound 2.34 ounce,
The data is 18.34 ounce.



A&D	S	T	,	+	0	0	0	1	8	.	3	4	␣	o	z	C_R L_F

Unit and display sign			A&D	D.P.	KF	MT
g	g	g	␣␣g	␣␣g	␣g␣␣	␣g
mg	mg		␣mg	␣mg	␣mg␣	␣mg
kg		kg	␣kg	␣kg	␣kg␣	␣kg
Counting mode	pcs	cnt	␣PC	␣PC	␣pcs	␣PCS
Precent mode	%	Pct	␣␣%	␣␣%	␣%␣␣	␣%
Ounce (Avoir)	oz	OZ	␣oz	␣oz	␣oz␣	␣oz
Pound	lb	Lb	␣1b	␣1b	␣1b␣	␣1b
Pound Ounce	L oz	L OZ	␣oz	␣oz	␣oz␣	␣oz
Troy Ounce	ozt	OZt	ozt	ozt	␣ozt	␣ozt
Metric Carat	ct	ct	␣ct	␣ct	␣ct␣	␣ct
Momme	mom	mm	mom	mom	␣mom	␣mo
Pennyweight	dwt	dwt	dwt	dwt	␣dwt	␣dwt
Grain	GN		␣GN	␣GN	␣gr␣	␣GN
Tael (HK general,Sing.)	tl	TL	␣TL	␣TL	␣t1s	␣t1
Tael (HK, jewelry)	tl	TL	␣TL	␣TL	␣t1h	␣t1
Tael (China)	tl	TL	␣TL	␣TL	␣t1t	␣t1
Tael (Taiwan)	tl	TL	␣TL	␣TL	␣t1c	␣t1
Tola (India)	t	t	␣␣t	␣␣t	␣to1	␣t
Messghal	m	MS	mes	mes	␣MS␣	␣m
Animal mode	g	A-g	␣␣g	␣␣g	␣g␣␣	␣g
		Akg	␣kg	␣kg	␣kg␣	␣kg

UNITS *(HF series does not have milidram ,*
HF,HR,HM series does not have kilogram,
HF -G series can not change the unit ,
HR series, HM series can not selesct pound or animal weighing modes
HP series does not have miligram and grain mode)

NU format does not have unit.

␣ Space, ASCII 20H
$^{C}_{R}$ Carriage Return, ASCII 0DH
$^{L}_{F}$ Line Feed, ASCII 0AH

Connection to an AD-8121

The following balance functions must be set to use the AD-8121 printer

"C" function	Settings
C-4 Print 0, 1, 2, 3	Select a print mode
C-4 AP-P 0, 1, 2	Select the polarity for the auto-print mode
C-4 AP-b 0, 1, 2	Set the auto-print band
C-4 PAUSE 0, 1	Select a pause mode
C-5 bPS 2	Select "2400bps"
C-5 bt-Pr 0	Select "7 bits, Even parity check"
C-5 Cr-LF 0	Select "CR, LF"
C-5 tYPE 0, 1	Select "A&D Standard format" or "Dump print format"
C-5 CtS 0	Select "Not using CTS and RTS"

It is necessary that the AD-8121 OP-01 cable be used to connect the AD-8121 printer.

GLP

The balance can output GLP (Good Laboratory Practices) data to a printer or peripheral equipment.

The GLP function depends upon the software version that is installed in the balance. The following table describes the relation between products and software. How to access the software version is described on the next page.

"Calibration test" is the function that confirms the balance calibration and weighing precision. This function outputs the weighing and calibration mass values before use. The HM series can use this function with internal mass or external mass.

If you use an AD-8121 printer, Set parameters as follows :
Refer to section "Connection to peripheral equipment" for proper connection.
Set the AD-8121 to MODE 3.
Set the AD-8121 date and time.

When you use equipment other than the AD-8121, baud rate, parity bit, terminator and data format can be set in C-5 of C-parameter setting. When C-4 PUSE 1 is selected. The interval time for each data set output takes approx. 1.5 second.

The ID number that is included in the GLP data can be changed. Refer to the instruments Instruction manual for the method of changing the ID number.

Confirm your model and software version. Function and operation are different depending upon the model and software version.

Software Version

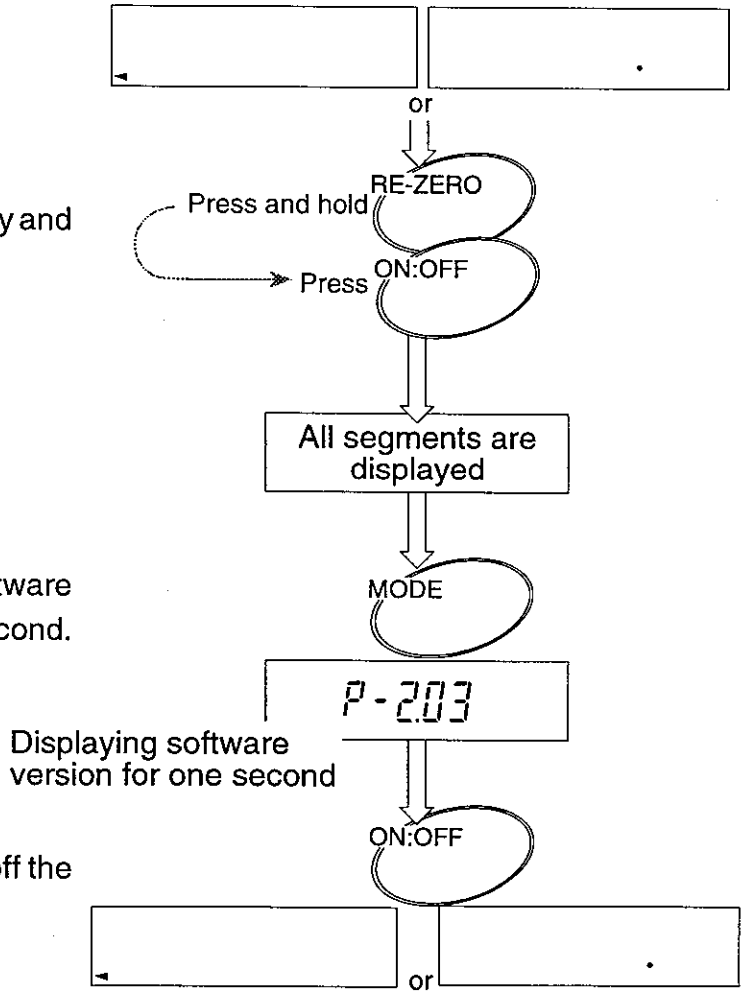
Use this procedure to confirm the software version.

1. Turn off the balance.

2. Press and hold the [RE-ZERO] key and press the [ON:OFF] key.

3. Press the [MODE] key. The software version is displayed for one second.

4. Press the [ON:OFF] key to turn off the balance.

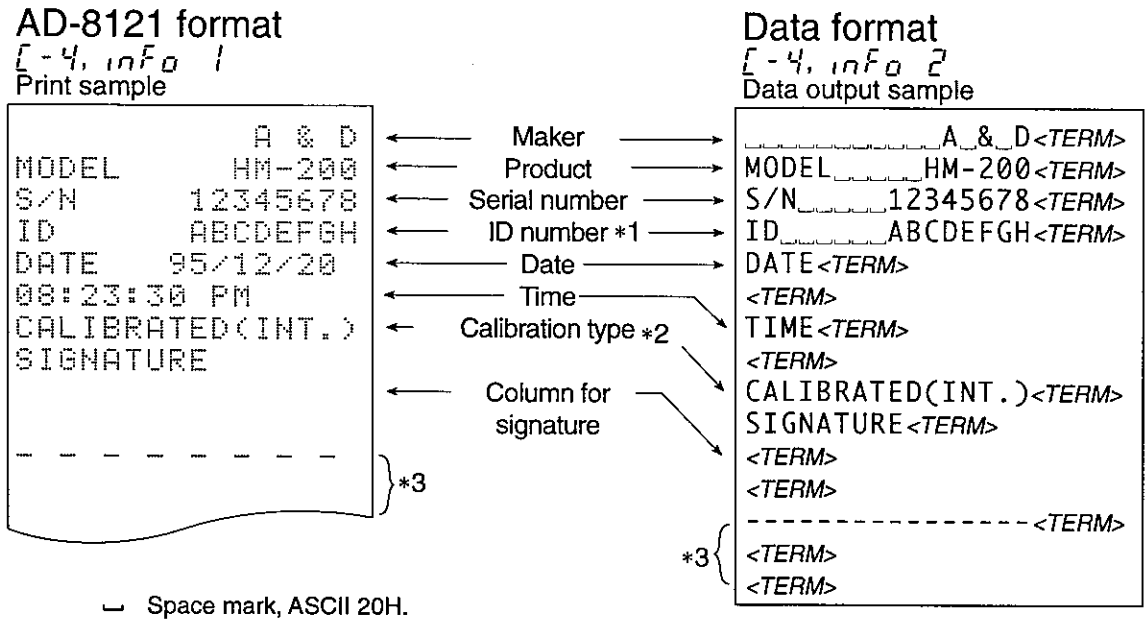


Function

- The "Calibration report" can be output after the balance performs calibration.
- The "Calibration test report" can be output after the balance performs the calibration test.
- The "Start block" and "End block" can be output for GLP data.

Format

Calibration report, In case of using internal calibration mass



␣ Space mark, ASCII 20H.

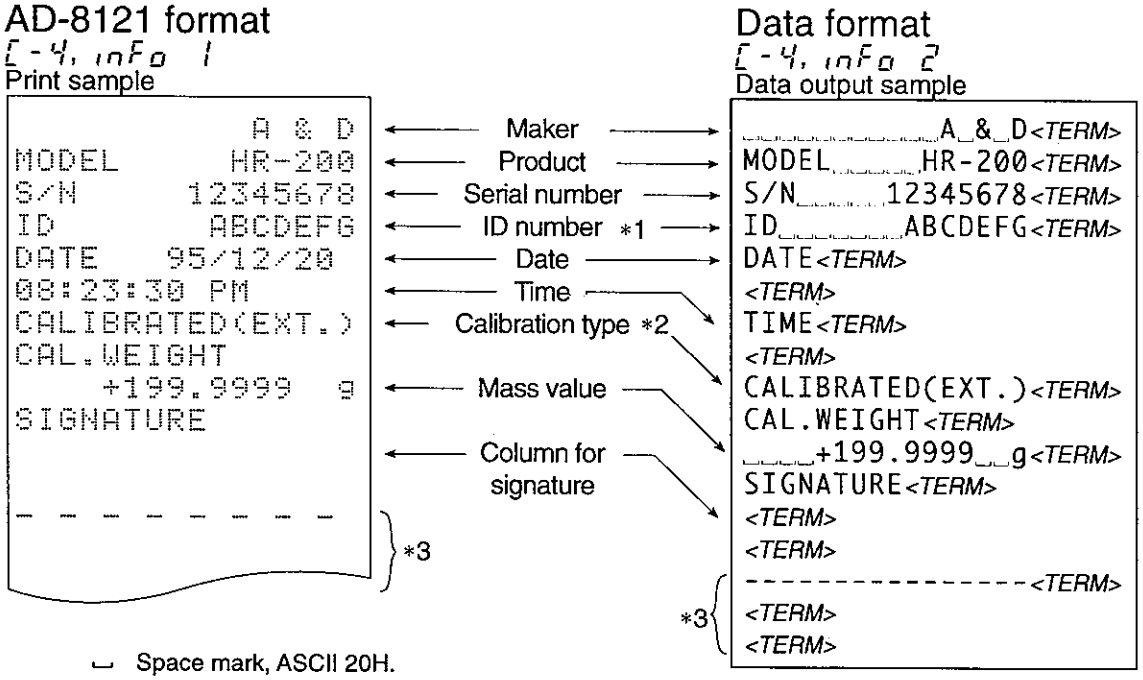
<TERM> Terminator mark, CR LF or CR. The terminator that is set at C-5, Cr-LF.

CR Carrige return mark, ASCII 0DH

LF Line feed mark, ASCII 0AH

Example of HM-200

Calibration report , In case of calibrating zero point and maximum capacity



␣ Space mark, ASCII 20H.

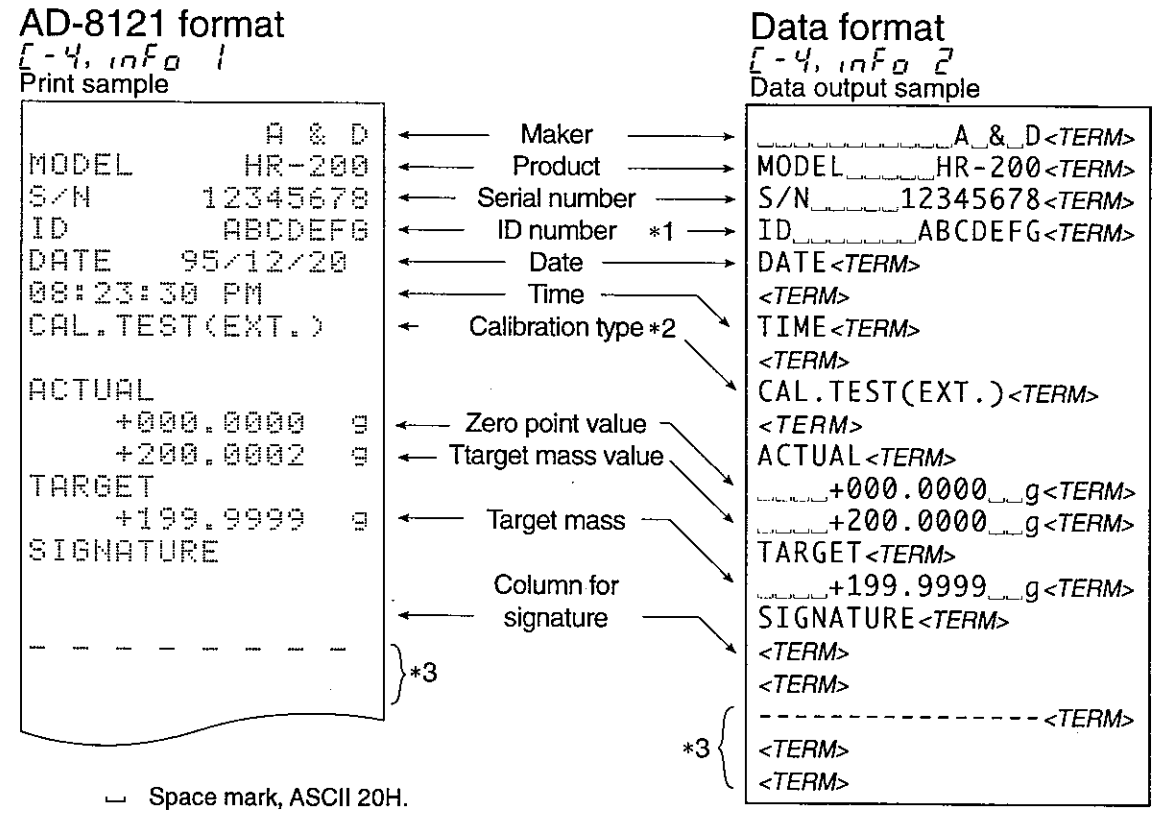
<TERM> Terminator mark, CR LF or CR. The terminator that is set at C-5, Cr-LF.

CR Carrige return mark, ASCII 0DH

LF Line feed mark, ASCII 0AH

Example of HR-200

Calibration test report



␣ Space mark, ASCII 20H.

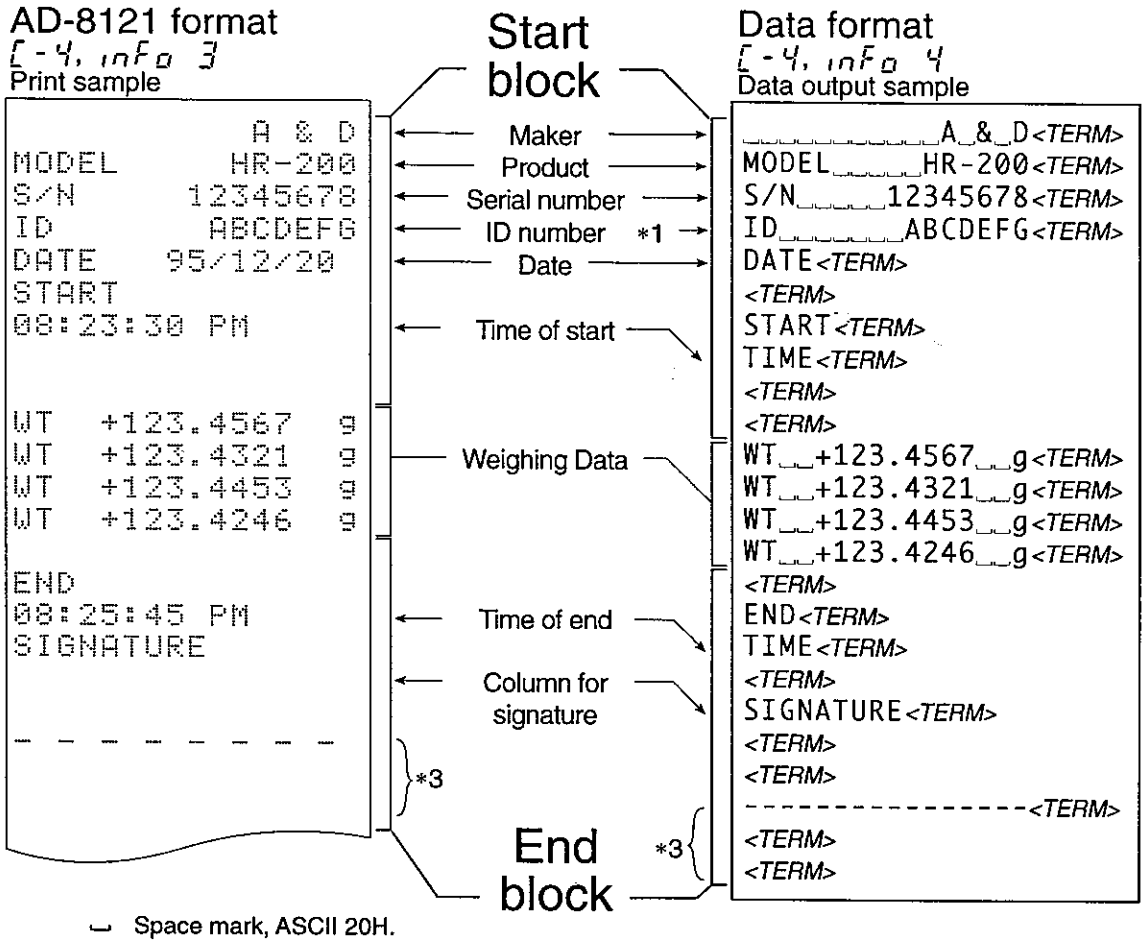
<TERM> Terminator mark, CR LF or CR. The terminator that is set at C-5, Cr-LF.

CR Carrige return mark, ASCII 0DH

LF Line feed mark, ASCII 0AH

Example of HR-200

Start block and End block



␣ Space mark, ASCII 20H.

<TERM> Terminator mark, CR LF or CR. The terminator that is set at C-5, Cr-LF.

CR Carrige return mark, ASCII 0DH

LF Line feed mark, ASCII 0AH

Example of HR-200

*1 HR-202/300 and HM series is 8 figures, Other product is 7 figures.

*2 INT. means calibration using internal calibration mass.
EXT. means calibration using external calibration mass.
CAL0 means zero-point calibration.

*3 The following products can not use this format.

Product	Software version
HR-60/120/200 HF series	2.10 ~ 2.13
HR-202/300 HM series	1.00 ~ 1.20
HP series	1.10

Parameter

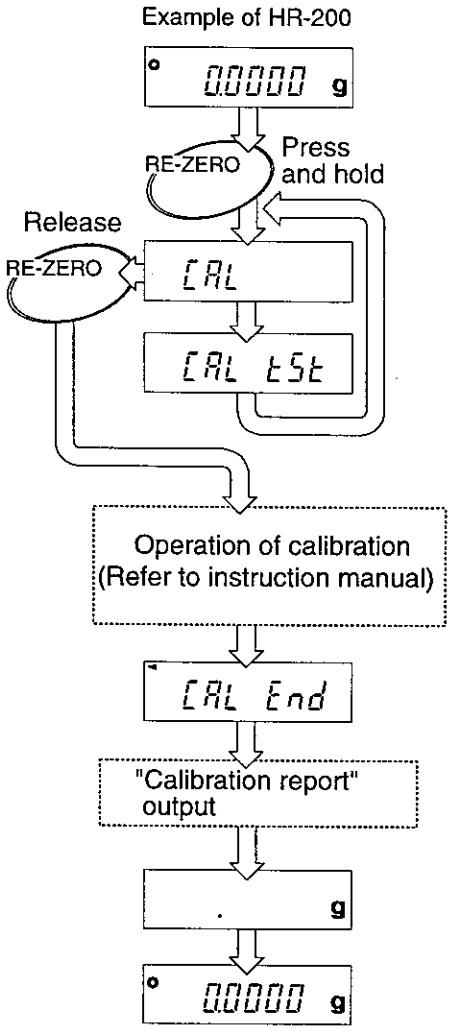
C-4 Data putput

* factory setting

	Parameter	Function and output format of GLP are selected.
inFo GLP output	*0	Inactive setting of GLP.
	1	AD-8121 format
	2	Data format

Set the parameter to C-4, inFo 1, when GLP data is output to an AD-8121.
Set the parameter to C-4, inFo 2, when GLP data is output to other than AD-8121.

Output procedure for the "Calibration report" If C-4, inFo 1 or 2 is selected.



1 Press and hold the RE-ZERO key. Release the RE-ZERO key when CAL is displayed.
(The balance changes menu items at two second intervals while the RE-ZERO key is pressed and held. The balance branches to the mode that is displayed when the RE-ZERO key is released.)

2 Remove the mass from the pan when the balance displays CAL End. The Calibration report is output finishing this mode.

Output procedure for the "Calibration test"
If C-4, inFo 1 or 2 is selected. (In case of using external mass)

1. Press and hold the [RE-ZERO] key. Release the [RE-ZERO] key when CAL tSt is displayed.
(The balance changes menu items at two second intervals while the [RE-ZERO] key is pressed and held. The balance branches to the mode that is displayed when the [RE-ZERO] key is released.)

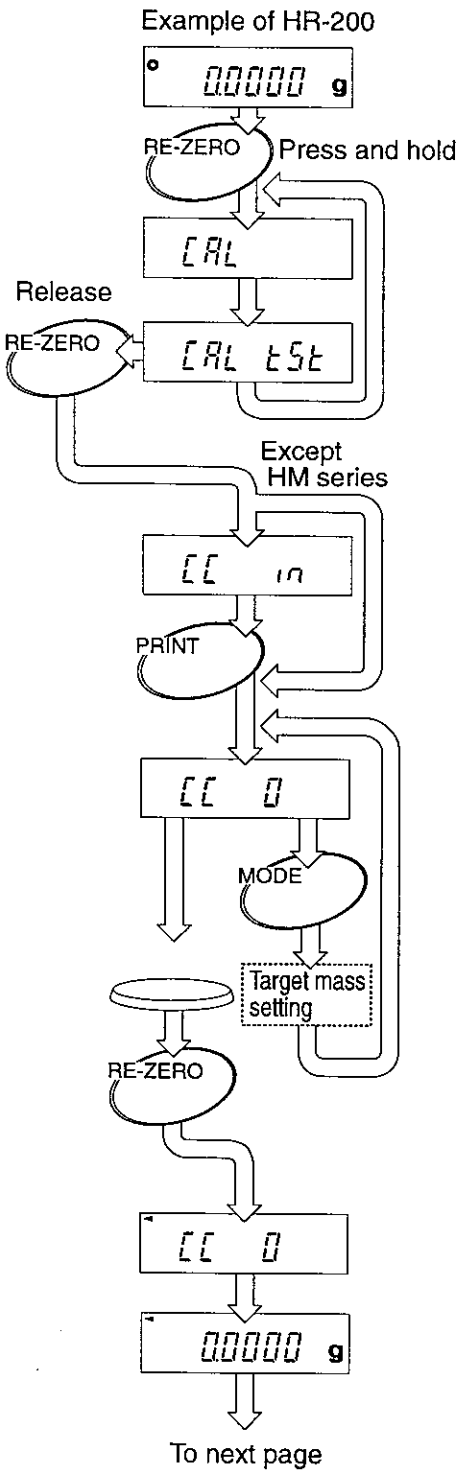
2. Proceed to step 3 except HM series. CC in is displayed in this step for HM series. Press the [PRINT] key to proceed next step.

3. The target value has an initial value. If you need another value, press the [MODE] key. The target mass value can be changed to a new value by the same means as setting a calibration mass value. Refer to the instruction manual. This initial value is as follows :

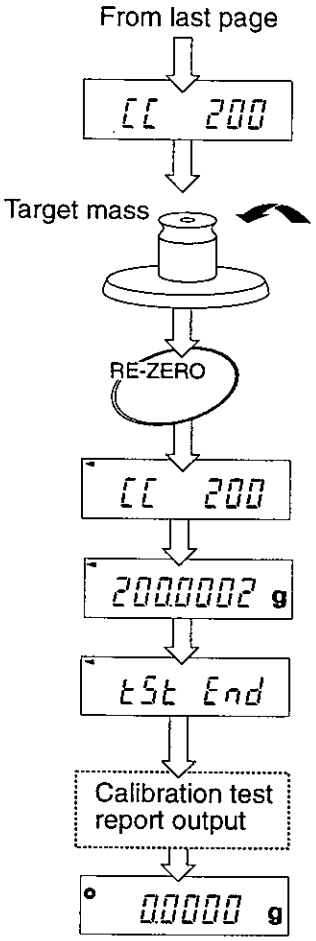
Product	Software version	Initial value
HR-60 /120 / 200 HR-300CT / 600CT HF series	2.10 ~ 2.13	Target mass value is reset to the factory setting when the balance enters into calibration test.
HP series	1.10	
HR-60 /120 / 200 HR-300CT / 600CT HF series	2.20 ~	The balance keeps the last calibration mass value. Target mass uses this value.
HR-202 / 300 HM series	1.00~	
HP series	2.00~	

4. Confirm that there is nothing on the pan.

5. Press the [RE-ZERO] key. The balance weighs the zero-point data.

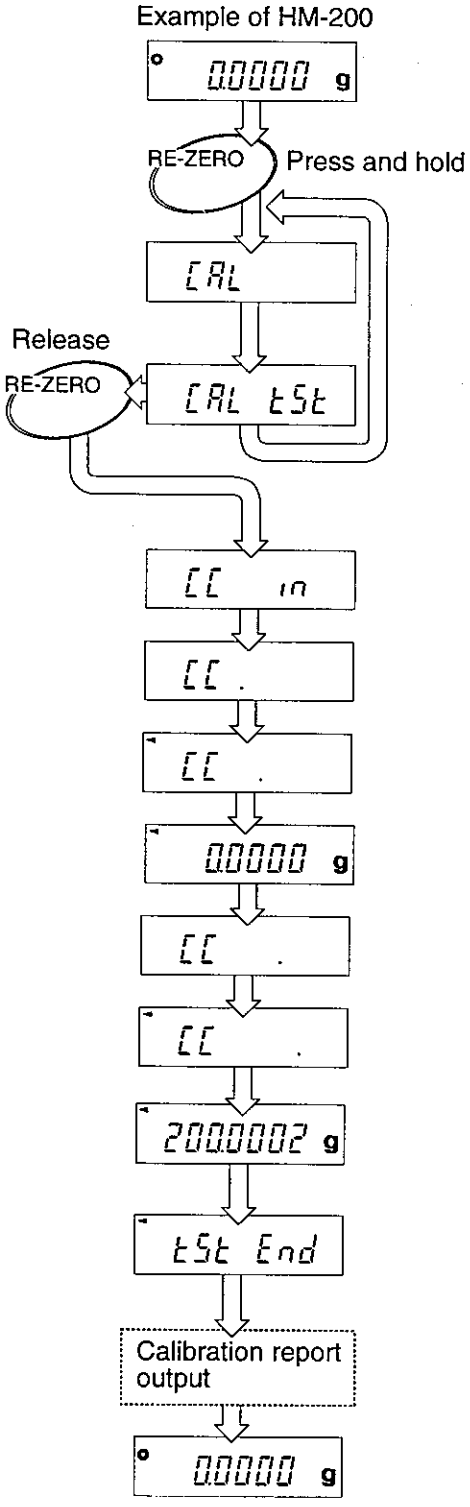


6 Place the target mass on the pan and press the [RE-ZERO] key. The balance weighs the mass value and outputs the "Calibration test report".



7 Remove the mass form the pan. The balance will return to the normal weighing mode.

Output procedure for the "Calibration report"
If using an internal mass and selecting C-4, inFo 1 or 2.
(HM series only)



1. Press and hold the [RE-ZERO] key. Release the [RE-ZERO] key when CAL tSt is displayed.
(The balance changes menu items at two second intervals while the [RE-ZERO] key is pressed and held. The balance branches to the mode that is displayed when the [RE-ZERO] key is released.)

2. The balance weighs the zero-point data.

3. The balance places internal mass on the pan, weighs this mass, displays the weighing value.

4. Calibration test report is output.
The balance will return to the normal weighing mode.

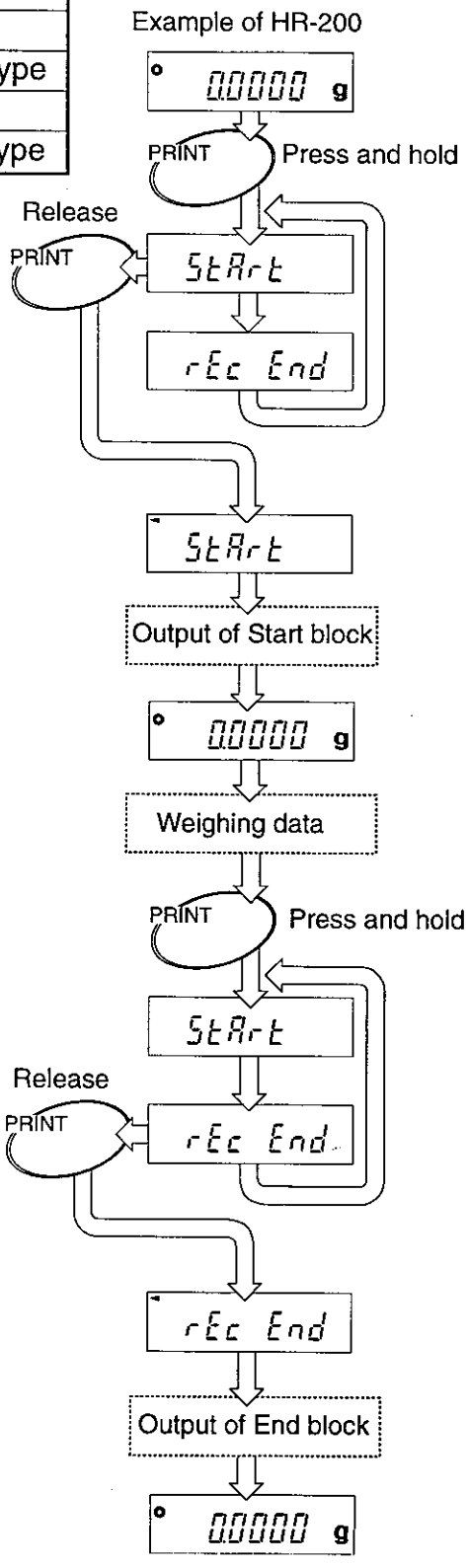
Output procedure for the "Start block" and "End block"

If C-4, inFo 1 or 2 is selected.

This procedure is explained as a series of operations.

There are two operation types, "manual type" and "sequential type" as follows :

Product	Software version	Type
HR-60 /120 / 200	2.10 ~ 2.13	Manual type
HR-300CT / 600CT HF series	2.20 ~	Sequential type
HR-202/ 300 HM series	1.00 ~ 1.20	Manual type
	1.30 ~	Sequential type
HP series	1.10	Manual type
	2.00 ~	Sequential type



Start block (manual type)

1. Press and hold the [PRINT] key. Release the [PRINT] key when StArt is displayed. The balance will output the Start block.
(The balance changes menu items at one second intervals while the [PRINT] key is pressed and held. The balance branches to the mode that is displayed when the [PRINT] key is released.)

2. The balance can output the weighing data by pressing the [PRINT] key or data output mode.

End block (manual type)

3. Press and hold the [PRINT] key. Release the [RE-ZERO] key when rEc End is displayed. The balance outputs the End block.

Start block (sequential type)

1. Press and hold the [PRINT] key until StArt is displayed.
(If the [PRINT] key is pressed and held once more, end block is output.)

2. The balance can output the weighing data by pressing the [PRINT] key or data output mode.

End block (sequential type)

3. Press and hold the [PRINT] key until rEc End is displayed.
(If the [PRINT] key is pressed and held once more, start block is output.)

Example of HR-200