HV-WP series
HW-WP series

INSTRUCTION MANUAL

Waterproof Digital Platform Scale

HV-15KV-WP
HV-60KV-WP
HV-200KV-WP

HW-10KV-WP
HW-60KV-WP
HW-100KV-WP
HW-200KV-WP

A&D

A&D Company, Limited

⚠ This is a hazard alert mark.

This mark informs you about the operation of the product.

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

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

Contents

⬇ 1. Compliance

1.1.1. Compliance with FCC rules

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

1.1.2. Classification of protection provided by enclosures

❑ This equipment is designed to comply with the IP Code of IEC 529.
The "IP-65" code is explained as follows:

"IP"   International Protection.

"6"   Against ingress of solid foreign objects.
Dust-tight. No ingress of dust.

"5"   Against ingress of water with harmful effects.
Protected against water jets (no powerful jets). Water projected in jets against the enclosure from any direction shall have no harmful effects.
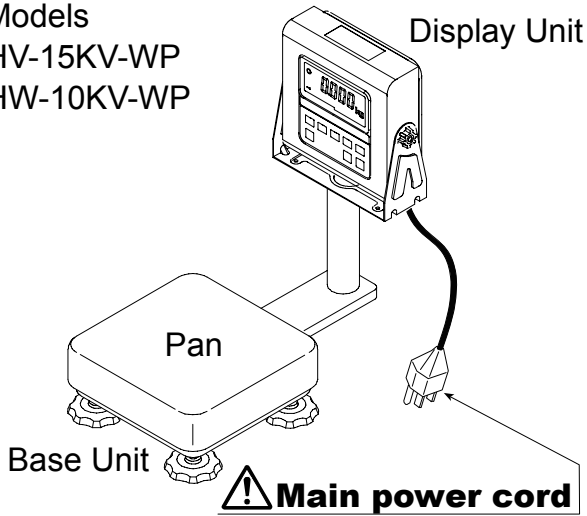
⬛ 2. Outline and Features

❑ These scales are designed to comply with IP-65 of IEC 529

❑ The HV-WP series is a platform scale with 1/3000 resolution, and has a "triple weighing range" function to select the weighing range.

❑ The HW-WP series is a platform scale with 1/10000 resolution.

❑ The scales have a fluorescent display so the weighing value can be read in dim light. This type uses the AC power line as a power source.

❑ Using the standard RS-232C serial interface, data can be output to a printer, and the scale can be controlled or can be set by a command from a personal computer.

❑ The counting mode function converts the total mass value (total weight) of articles to be counted, to a count, when each of these articles assume the same mass value.

❑ The scales can display the unit of percentage.

❑ The accumulation function accumulates each weighing value and counts the number of weighings using six figures.

❑ The comparator function compares the display value with the upper limit value (HI), lower limit value (LO) and displays the result. The result can be output by a buzzer if option OP-03 is installed.

❑ The simple batch function or full/dribble batch function can be used for filling up to a target mass value. The status of a weighing value can be output if option OP-03 or OP-04 is installed. The outputs are zero band, preliminary and final.

❑ Using the optional RS-422/RS-485 serial interface and a computer, up to 16 scales can be controled, if this option (OP-04) is installed in place of the RS-232C serial interface.

❑ The following parameters are stored in the product with no power supplied.

Unit mass of the counting mode
100% mass of the percentage mode
Total count and total mass of the accumulation function
Upper limit value and lower limit value of the upper / lower comparator function, Final value, preliminary value and zero band of the full / dribble batch function or Final value, preliminary value and zero band of the simple batch function
Calibration data
Parameters of the function table ($F\ 1 \sim F\ 17$)

⤓ 3. Unpacking

Models
HV-15KV-WP
HW-10KV-WP

Display Unit

Pan

Base Unit   ⚠ **Main power cord**

Models
HV-200KV-WP
HW-100KV-WP
HW-200KV-WP

Display Unit

Pan

Base Unit

Caution
Do not pull the load-cell cable.

⚠ **Main power cord**

Models
HV-60KV-WP
HW-60KV-WP

Display Unit

Pan

Base Unit
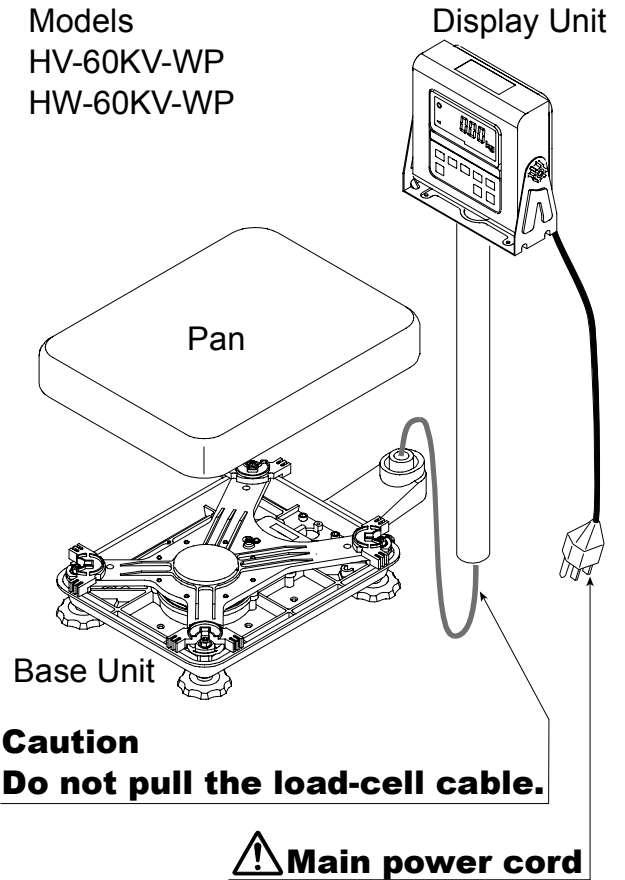
Caution
Do not pull the load-cell cable.
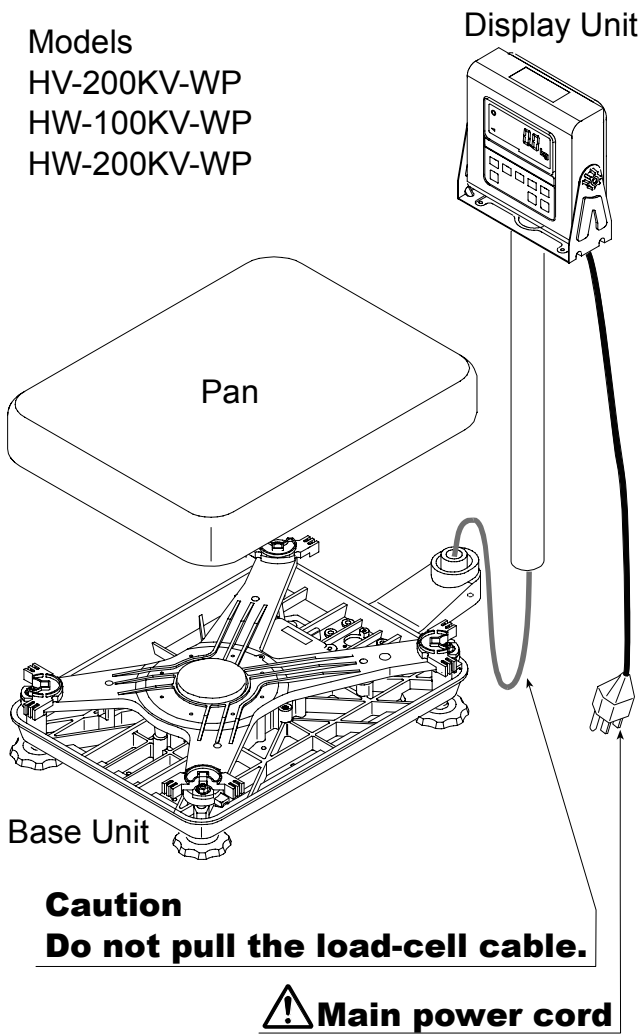
⚠ **Main power cord**

⚠ Main power
Please confirm that the local voltage and receptacle type are correct for your scale.

All Accessories
Refer to the accessries list on the next page. The combination of accessories is according to the scale model.

3mm allen wrench

Instruction manual
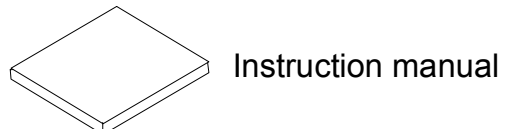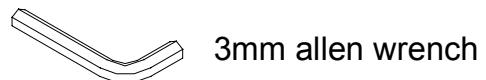
⬙ 3.1. Accessories and Options List

Accessories for the HV−WP series and HW−WP series

Models	Accessories
HV-15KV-WP HW-10KV-WP	Instruction manual
HV-60KV-WP HV-200KV-WP HW-60KV-WP HW-100KV-WP HW-200KV-WP	3mm Allen wrench Instruction manual

Options List

	Cable or option name	Accessories
OP-02	5m extension loadcell cable	Tapping screw M4x10
OP-03	RS-232C interface/ Relay output/ Buzzer	Connector JA:TCP0586
OP-04	RS-422/485 interface / Relay output	Connector TM:BLA9
OP-13	Roller conveyor for HV-200KV-WP, HW-100KV-WP and HW-200KV-WP	
OP-14	Roller conveyor for HV-60KV-WP and HW-60KV-WP	
AX-KO577A-200	RS-232C cable, D-sub 25 pin, 2m	
AX-KO1786-200	RS-232C cable, D-sub 9 pin, 2m	

AX-KO577A-200

D-sub 25 pin   Din 7 pin

```
 2 ─────────────── 2
 3 ─────────────── 3
 4 ┐
 5 ┘      ┌─────── 5
 6 ──┐  ┌─┘
 7 ──┼──┘──────── 7
```

AX-KO1786-200

D-sub 9 pin   Din 7 pin

```
 2 ──┐ ┌───────── 2
 3 ──┘ └───────── 3
 5 ─────────────── 5
 6 ──┐
 7 ──┼──────────── 7
 8 ──┘
```
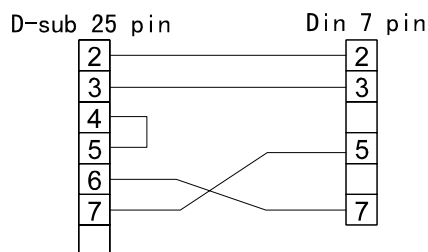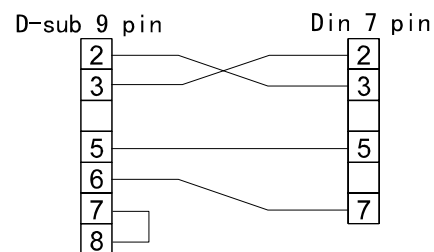
⊻ 4. Caution

⊻ 4.1. Precautions for Installing the Scale

⚠ ❑ Ground the scale, so that the user will not be subjected to an electric shock.
⚠ ❑ Do not handle the Main power cord with wet hands.
⚠ ❑ The AC plug is not water-resistant. Install it in an area where it does not get wet.
⚠ ❑ Do not install the scale where there is flammable or corrosive gas present.
  ❑ Do not install the scale under water.
  ❑ Do not pull, fold or arrange cables forcibly.

Consider the following conditions to get the most from your scale.
  ❑ The best operation is where the temperature and relative humidity is stable, the place to install the scale is a solid and level floor, there is no draft and the power source is stable.
  ❑ Do not install the scale in direct sunlight.
  ❑ Do not install the scale near heaters or air conditioners.
  ❑ Do not install the scale near equipment which produces magnetic fields.
  ❑ Do not install the scale in a place where it is apt to be charged with static electricity, or where the relative humidity is lower than 45%RH. Plastic and isolators are apt to be charged with static electricity.
  ❑ Do not use an unstable power source.

⊻ 4.2. Precautions for Operating the Scale

  ❑ Periodically ensure that the weighing value is correct.
  ❑ Calibrate the scale before using and after moving it to another location.
  ❑ Do not place anything on the weighing pan which is heavier than the weighing capacity
  ❑ Do not drop anything upon the weighing pan.
  ❑ Do not use a sharp instrument such as a pencil or ball-point pen to press the switches. Press the switches gently using only your finger.
  ❑ We recommend pressing the ZERO switch before each weighing to prevent possible error.
  ❑ Close the calibration switch cover and the display rear cover to keep waterproof.

⊻ 4.3. Precautions for Storing the Scale

  ❑ Do not disassemble the scale.
  ❑ Do not use solvents to clean the scale.
  ❑ For best cleaning of the display unit, wipe with a dry lint free cloth or a lint free cloth which is moistened with warm water and a mild detergent.
  ❑ Do not scratch the base unit with a brash.
  ❑ Do not use a powerful water jet.

⬇ 5. Installing the Scale

This procedure includes all of the steps for installing the HV-WP series and HW-WP series. Therefore, on some models, there are some unnecessary steps.

Step 1   Connect the indicator unit to the pole with the accesory knobs and rubber washers.
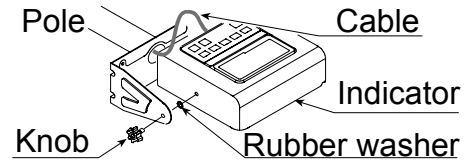
Step 2   Take the base unit and pole out, taking care that the load-cell cable is not pulled.
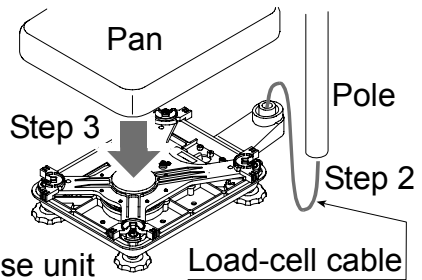
Step 3   Put the weighing pan on the base unit.

Step 4   Attach the pole to the bracket of the base unit so as not to damage the load cell cable. Insert the remainder of the load cell cable into the pole. Affix the pole to the bracket using two 3mm Allen screws.
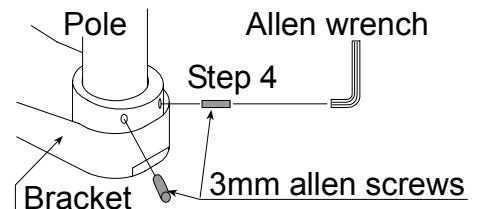
Step 5   Select the place for installing the scale. Also consider "4. Caution" on page 7.

Step 6   Adjust the level of the base unit by using the "Bubble spirit level" and "Leveling feet".
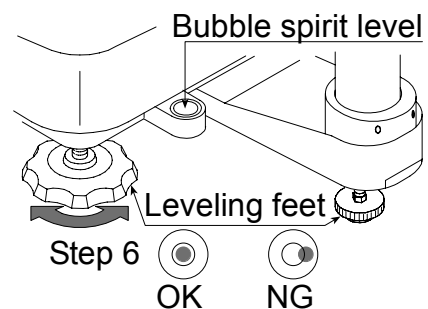
Step 7   Ground the scale using the earth terminal.

Caution

⚠   **Please confirm that the local voltage and the receptacle type are correct for your scale.**

Step 8   Adjust the angle of the indicator unit using the knobs on the side of indicator unit.
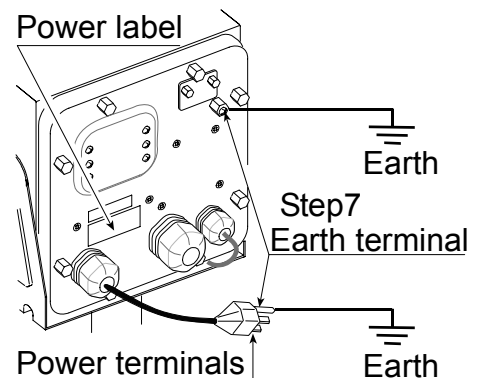
Step 9   Check the weighing accuracy. If the scale needs calibration, refer to "14. Calibration". on page 40.
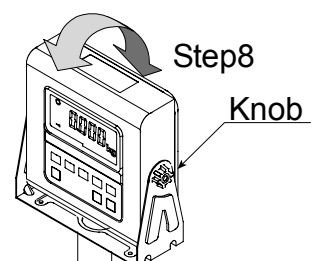
⏷ 5.1. Removing the Pole

Caution

⚠ ❑ **Remove the main power plug from the receptacle before removing the pole.**
❑ **When removing the loadcell cable, do not pull the loadcell cable connector forcibly and do not pull on the wires of the cable.**
❑ **Do not bend the cable forcibly. Use care so that the load cell cable does not touch the pan inside the base unit.**
❑ **Avoid dust, static electricity and high humidity (or drops) because the inside of the display unit is very sensitive.**

Procedure

Step 1 Remove the power plug from the receptacle.

Step 2 Open the rear cover of the display unit.
Disconnect the loadcell cable connector gently.

Step 3 Remove the ferrite core and cable clamp from the loadcell cable.

Step 4 Loosen the knobs to remove the display unit.

Step 5 Remove four 3mm screws from the bottom cover of the bracket for HV-60KV-WP, HV-200KV-WP, HW-60KV-WP, HW-100KV-WP, HW-200KV-WP.

Step 6 Carefully remove the load cell cable from the pole and the bracket. Especially, use care with the HV-15KV-WP, HW-10KV-WP so that the connector is not pulled forcibly.

Step 7 Arrange the cable so that it does not touch to the weighing pan in the base unit. The untied cable is at least 2m long. The optional extension loadcell cable (OP-02) is 5m long.
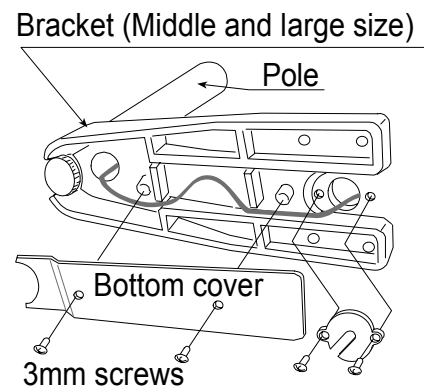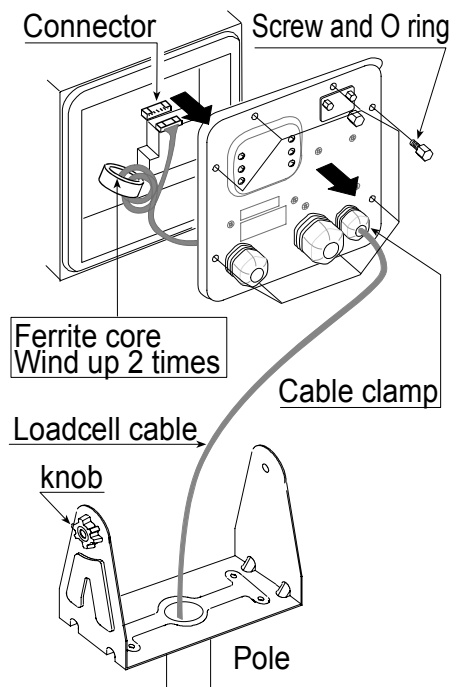
Step 8   Removing the bracket from the base unit, requires the following allen wrench.

HV-15KV-WP, HV-60KV-WP, HW-10KV-WP, HW-60KV-WP	HV-200KV-WP, HW-100KV-WP, HW-200KV-WP
5mm Allen wrench	6mm Allen wrench

Allen wrench
Allen head screw
Bracket
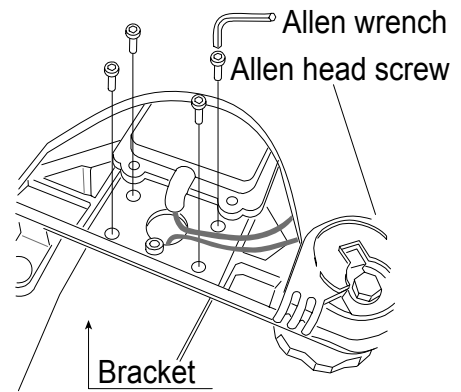
Step 9   Wind the cable through the ferrite core two times. Affix the cable to the rear cover using the cable clamp.

Step 10   Connect the cable to the connector. Close the rear cover.
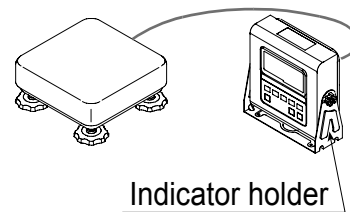
Indicator holder

(To be purchased separately as an option.)

Step 11   Confirm the accuracy of the scale.
   * An example of a scale installation after the pole has been removed and includes the optional Indicator holder
   Option…AX:043005266 (Indicator holder)

⬇ 5.2. Grounding the Scale

When using where there may be static electricity, ground the scale.
The grounding procedure depends on the scale model. Refer to the table below.
These procedures are only for grounding part of the scale.

Models	Refer to
HV-15KV-WP, HW-10KV-WP	Procedure A
HV-60KV-WP, HV-200KV-WP HW-60KV-WP, HW-100KV-WP, HW-200KV-WP	Procedure B

Procedure A
(HV-15KV-WP, HW-10KV-WP)

Secure the grounding cable using a M4 screw in the screw hole between the two hexagon bolts on the base unit bottom side. (Part of "⇨")

Base unit bottom side

Levering feet
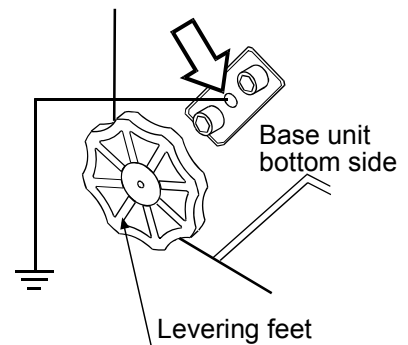
Procedure B
(HV-60KV-WP, HV-200KV-WP, HW-60KV-WP, HW-100KV-WP, HW-200KV-WP)

Secure the grounding cable using the screw that secures the under cover. (Part of "⇨")

Under cover

Base unit bottom side

▼ 6. Names

Models
HV-15KV-WP
HW-10KV-WP

Knob for
angle adjustment

Display Unit

Pole

Pan (Weighing Pan)

Base Unit

Leveling Foot
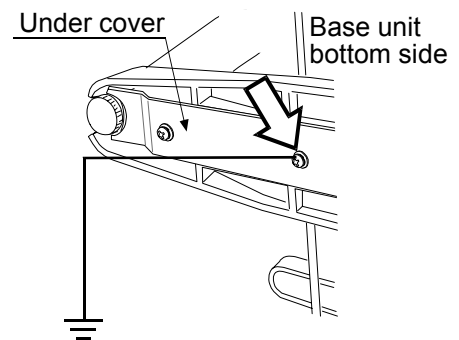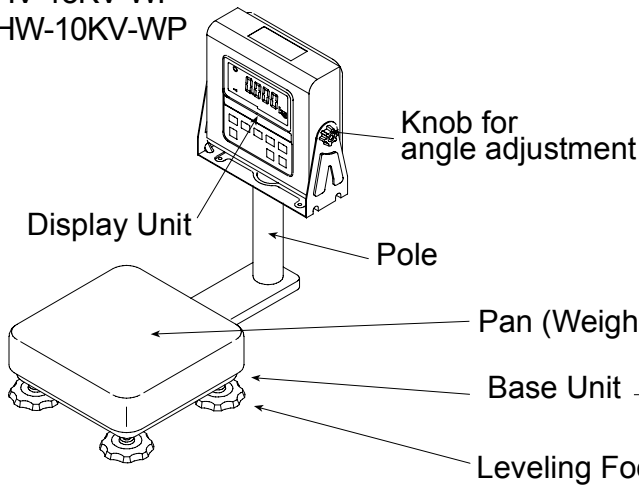
Models
HV-60KV-WP
HV-200KV-WP
HW-60KV-WP
HW-100KV-WP
HW-200KV-WP

Display Unit

Knob for
angle adjustment

Pole

Display

Weighing condition

Weighing data

Units

Indicator of
function

STABLE

NET
ZERO

pcs
oz
lb
kg
%

PT READY M+ 15kg 6kg 3kg

HI   OK   LO

A&D   CAP.   Max 3/6/15kg d=1/2/5g

F   SET   RANGE   MODE   PRINT
     R   ENTER   Q

ON/OFF   ZERO   TARE
I/Ø   →0←   →T←

Keys

NG   OK

Leveling Foot

Bubble Spirit Level

Leveling Foot

Rear of Indicator Unit

Knob for angle
adjustment

CAL switch is in a depth of 5cm.
Calibrating the scale to weigh correctly.
Use the proper OIML class calibration mass.

Inside of rear panel

RS-232C
DIN connector

Earth terminal

Cable clamp for load cell cable

Load cell cable

Cable clamp for option

Earth terminal

Main power cord

Power line terminal

Please Confirm that the local
voltage and receptacle type are
correct for your scale.

Display and Symbols	Meaning
STABLE O	Stability mark. When the current weighing value is stable, this mark is displayed, indicating a condition where the value is readable.
NET ZERO ◄	Zero point mark. With nothing on the weighing pan and pressing the ZERO switch, this mark is displayed. The zero point is a fundamental starting point to weigh anything.
NET ◄ ZERO	Net mark. Pressing the TARE switch, this mark is displayed with net display. Used to indicate that the mass of the container placed on the pan has been subtracted from the gross value.
▼ PT	Preset tare mark. Storing a tare with digital input, this mark blinks.
▼ M+	Accumulation mark. Using the accumulation function, this mark is displayed.
▼ READY	Ready mark for the full/dribble batch function. The meaning of the mark is as follows: ON The weighing value is within the zero-band. OFF The full/dribble batch process is above the zero-band. Blinking The start or end of the full/dribble batch process in not within the zero-band.
○ ○ ○ HI OK LO	The comparator indicator. ❑ Using the comparator function and comparing a weighing value with the upper and lower limits, the result is indicated. ❑ Using the full/dribble batch function, the full flow gate indicator is OK, the dribble flow gate indicator is HI and the zero band indicator is LO.
ex. HV-15KV-WP ▽ ▽ ▼ 15kg 6kg 3kg	The weighing range indicator for the HV-WP series. The current range is indicated.
Weighed mass value unit STABLE O ⌐0.000⌐ kg ZERO ◄	Example. Display of zero (zero point). With nothing on the weighing pan and pressing the ZERO switch, this mark is displayed. The zero point mark is displayed. The stability mark is displayed.
Unit of counting mode STABLE O 345 pcs	Example. Display of the counting mode. This mode uses the registered unit mass, and counts the amount of articles on the weighing pan. The unit is pcs.

Display and Symbols	Meaning
20 pieces Zero value STABLE O _20 0_ pcs	Example. Storing the unit mass of the counting mode. The unit mass is stored, using 20 pieces of samples. The zero value means that no articles are on the pan.
No zero value STABLE O _10 -_ pcs	Example. Storing the unit mass of the counting mode. The unit mass is stored, using 10 pieces of samples. The sign "-" means "weighing value is not zero".
STABLE O _130_ % Unit of percentage	Example. Percentage mode. This mode uses the registered 100% mass, and converts the weighing value to a percentage. The unit is %.
_F 1 0_ Item Parameter	Example. Display of the function table. This function table sets parameters of items. ENTER switch Selecting an item. ∧ and < switches Selecting the parameter of an item. ENTER switch Storing new parameters.
_123456_ kg PT	Example. Preset tare. Entering tare with digital input. < switch Selecting a figure. ∧ switch Selecting a number. ENTER switch Storing a new tare.
Fxied value kg	Example. Hold display The hold display is set using _F 12_ of the function table. When the value is "nearly-zero" or changes more than 25% +30 digits, the hold is canceled.
_-E_ kg	Weighing error. Check the base unit and weighing pan.
_E_ kg	Over load display. Remove the mass from the weighing pan.
-CAL E	Calibration error. The calibration mass is too light. Check the base unit and weighing pan.
CAL E	Calibration error. The calibration mass is too heavy. Check the base unit and weighing pan.

The "digit" is a unit of display, and is equivalent to the minimum measurable mass.
The " nearly-zero " is within ±5 digits from zero point in the unit of kg.

Display and Symbols	Meaning
Fixed display `- - - - - -`	Does not display zero when the scale is turned on. Remove anything that is on the weighing pan. Perform zero point calibration. Or The weight value is unstable due to drift or vibration when the scale is turned on. A breeze or vibration may be affecting the measurement. Check around the weighing pan.
Blinking ▼ M+	Accumulated data count.
Blinking ▼ M+ **kg**	Total mass value of the accumulated data.
Blinking HI	Comparator function, display is an upper limit. Full/dribble batch function, the display is a final value.
Blinking OK	Full/dribble batch function, the display is a preliminary value.
Blinking LO	Comparator function, display is a lower limit. Full/dribble batch function, the display is the zero band.
CAP. MAX. 3/6/15kg d=1/2/5g	Description of the weighing unit, weighing range and measurable minimum mass. Example: Displays the weight value by 5 g up to 15 kg. Displays the weight value by 2 g up to 6 kg. Displays the weight value by 1 g up to 3 kg.

▼ 6.2. Switches

Display and Symbols	Meaning
ON/OFF I/⏻	Display ON/ OFF switch. Note Standby status when power is connected.
ZERO →0←	ZERO switch. When there is nothing on the weighing pan and the ZERO switch is pressed, the scale displays the mass value of zero and the zero point mark. Net is canceled, if it is displayed.
TARE →T←	TARE switch. Canceling the mass of a receptacle, case, bag, etc. which is put on the weighing pan, and does not weigh its mass.
RANGE or SAMPLE	RANGE switch, SAMPLE switch. ❑ Changing weighing range for HV-WP series.(Refer to *F2*) ❑ Storing the unit mass, it is used to select a sample number. ❑ In the function table, it is used to select a parameter.

Display and Symbols	Meaning
SET ◆R◇ <	SET switch. Turns the comparator on/off. (Refer to $F6$) ❑ Counting mode, it is used to enter the mode to store the unit mass. ❑ Percentage mode, it is used to enter the mode to store the 100% mass. ❑ The full/dribble batch function, it is used as a start switch. ❑ For the preset tare and selecting a calibration mass, it is used to select a figure.
MODE ↻ ENTER	MODE switch. ❑ Changing the current unit. While setting modes, this switch is used for " storing a parameter and proceeding to the next step".
F	F switch. ❑ Full/dribble batch function, it is used to finish the process. (Refer to $F\ 10$) ❑ Hold switch. (Refer to $F\ 12$) ❑ Comparator function, selects polarity (+,-).
PRINT ☉	PRINT switch. ❑ Used to print or output data. (Refer to $F5$)
Display off ⬇ ZERO Press and hold →0← ON/OFF And press I/⏻	Used to enter the function table.
SET Press and hold ◆R◇ < TARE And press →T←	Used to enter the mode to set a preset tare.

7. Basic Operation

7.1. Turning the Scale on/off and Weighing

Step 1 Ground the scale using the earth terminal.

Step 2 Place nothing on the weighing pan.

Step 3 Confirm that local voltage and receptacle type adapt to your scale.

Step 4 The scale turns on/off using the ON/OFF switch alternately.

Step 5 Check the accuracy of weighing. If you calibrate the scale, perform it after turning the scale on for 30 minutes (warming up).

Step 6 Press the ZERO switch to display zero. (with nothing on the weighing pan.)

Step 7 Place an item on the weighing pan gently.

Step 8 You can read the mass value after the stability mark is displayed.

Step 9 Remove the item from the weighing pan.

Step 10 Turn the scale using the ON/OFF switch off.

Memo

□ With the power cord connected, the scale consumes only the power for standby status after turning off the scale. To shut down the power completely, disconnect the power cord.

Stable sign
Zero point sign
Earth terminal
Display ON/OFF switch
ZERO switch
Power line terminal
Main power cord
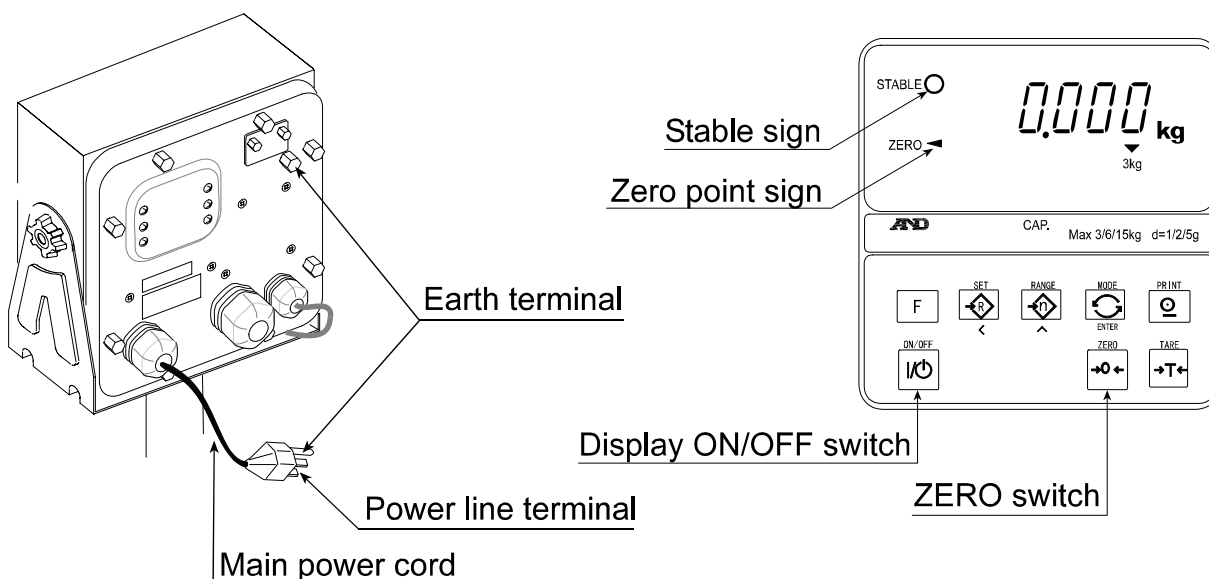
⚠ **Please confirm that the local voltage and receptacle type are correct for your scale.**

⚡ 7.2.   Tare (And Net Display)

"Tare" is used to cancel the mass of a container, receptacle, case, bag, etc. which is put on the weighing pan to contain the item to be weighed.

Caution
- **Using a tare value reduces the weighing range.**
- **The current tare value is reset by pressing the ZERO switch or turning the scale off. (Reset value is zero.)**
- **The preset tare value must be within the minimum weighing range for the HV-WP series.**

7.2.1.   The Way of Tare Input by Weighing

Step 1   Put the container item on the weighing pan.

Step 2   Wait for the stability mark to be displayed. Press the TARE switch. The display becomes zero and the net mark is displayed.

Step 3   It is now possible to put something into the container. Wait for the stability mark to be displayed and to read its net display.

Step 4   Remove all things on the weighing pan.

7.2.2.   The Way of Digital Input (Preset Tare)

Step 1   Press and hold the SET switch and press the TARE switch.
Then the blank or stored tare value is displayed. A blank display means that the tare value is zero (reset value), and ⚡PT blinks.

Step 2   Set the preset tare value by using the following switches.
    ∧ switch   Selecting the number of the figure.
    < switch   Selecting a figure.

Step 3   Press the ENTER switch to store the new preset tare value.
Then the scale displays a net value with the tare value subtracted from the gross weighing value.

Step 4   It is then possible to put something into the container. Wait for the stability mark to be displayed and to read its net.

Step 5   Remove all things from the weighing pan.

⬇ 7.3.   Weighing Range for the HV−WP Series

- ❑ This is the function to select a weighing range for the HV-WP series.
  The mass value is displayed within a selected range.
- ❑ Select automatic range ($F2$ 0) or manual range ($F2$ 1) in the function table.

Operation and Performance

Function table	Meaning and purpose
$F2$ 0	Automatic range ❑ The weighing range changes automatically, if the weighing value proceeds from narrow range to wide range when placing articles on the weighing pan. ❑ When there is nothing on the weighing pan and the zero point mark is displayed, it changes to the minimum range automatically. ❑ Press the [ZERO] switch to change to the minimum range, when there is nothing on the weighing pan and the zero point mark is not displayed due to net display or zero error.
$F2$ 1	Manual range ❑ Press the [RANGE] switch to expand the range. ❑ Press the [RANGE] switch to change to the minimum range, when there is nothing on the weighing pan and the zero point mark is displayed. ❑ Press the [ZERO] switch and the [RANGE] switch to change to the minimum range, when there is nothing on the weighing pan and the zero point mark is not displayed due to net display or zero error.

Weighing Range

Models	Weighing Range		
HV-15KV-WP	3kg,	6kg,	15kg
HV-60KV-WP	15kg,	30kg,	60kg
HV-200KV-WP	60kg,	150kg,	220kg

Pressing the ⎡MODE⎤ switch, the display changes as follows. Refer to function table $F\,3$ for units. Usable units are according to the factory settings.

Pound	**lb**

Ounce	**OZ**

Pound-Ounce	L **OZ**

If the law in your area premits, you may use all of the units. Also, some dealers may initially turn off units which are not regularly used.

Non metric units

Metric unit

Metric kg	**kg**

Counting Mode	**pcs**

Percentage Mode	**%**

Inactive Comparator ($F\,6$)
and
Inactive Accumulation Function ($F\,8\ \ 0$)

Either function is active.
Comparator ($F\,6\ \ 0 \sim F\,6\ \ 7$)
Simple Batch Function ($F\,6\ \ 8$)
Full/Dribble Batch Function ($F\,6\ \ 9$)
Accumulation Function ($F\,8\ \ 1$)

Accumulation Count	▼ M+

No Accumulation Data

Accumulation Value	▼ M+ **kg**

Active Simple Batch Function or
Active Full/Dribble Batch Function
($F\,6\ \ 8, F\,6\ \ 9$)

Active Comparator ($F\,6\ \ 0 \sim F\,6\ \ 7$)

Final value	● HI

Comparator Upper limit	● HI

Preliminary value	● OK

Comparator Lower limit	● LO

Zero band	● LO

Explanation

❑ The status of "Inactive comparator (_F6_)" is that comparator function (_F6 0_, _F6 2_, _F6 4_, _F6 6_) is selected and the comparator is not used. The "active" or "Inactive" (ON/OFF) for the comparator can be selected by pressing the [SET] switch alternately.

❑ The following parameters are stored in the same memory. Therefore, the functions can not be used at the same time. If you use each function, it will be necessary to select the function from the function table, to set the parameters of HI,OK and LO, to weigh it using the function.

	Indicator and Output		
	HI	OK	LO
Upper/Lower Comparator Function (_F6 0_ ~ _7_)	Upper limit		Lower limit
Simple Batch Function (_F6 8_)	Final value	Preliminary value	Zero band
Full/ Dribble Batch Function (_F6 9_)	Final value	Preliminary value	Zero band

8. Counting Mode

□ The counting mode is the function to convert the total mass value (total weight) of articles to a count, when each of these articles assume the same mass value.

□ It is necessary to store a unit mass to count articles.

□ Even if the AC adapter or the batteries is removed, the unit mass is maintained in non-volatile memory.

8.1. Storing a Unit Mass

Step 1 Press the MODE switch to display the unit pcs.

Step 2 Press the SET switch to enter the mode to store a unit mass.

Step 3 Press the ∧ switch to select the number of samples. The greater the quantity of samples, the greater the accuracy of the count.
5 pieces, 10 pieces, 20 pieces, 50 pieces, 100 pieces

Step 4 Put a container item on the weighing pan. Press the TARE switch.

Step 5 Put in samples of number selected at step 3. Press the ENTER switch to store it after the satbility mark is displayed. Then the count is displayed.

Caution

□ **When the sample is too light and it is not possible to calculate a unit mass, the scale displays Lo ut and returns to step 3. Increase the number of samples. It is necessary to have more than 5 digits in the unit of kg to weigh a sample.**

□ **When the unit mass is too light to store, the scale displays Lo ut. In this case, the unit mass will not be stored even if the number of samples is increased.**

□ **Pressing the ENTER switch after Lo ut is displayed, the next unit is displayed.**

Step 6 Remove all things from the weighing pan.

Counting mode pcs

STABLE ○ 5 0 pcs

SAMPLE RANGE

STABLE ○ 20 - pcs

Number of samples
A container(bowl)
Pan

STABLE ○ 20.0 pcs

Zeroing value

STABLE ○ 20 pcs
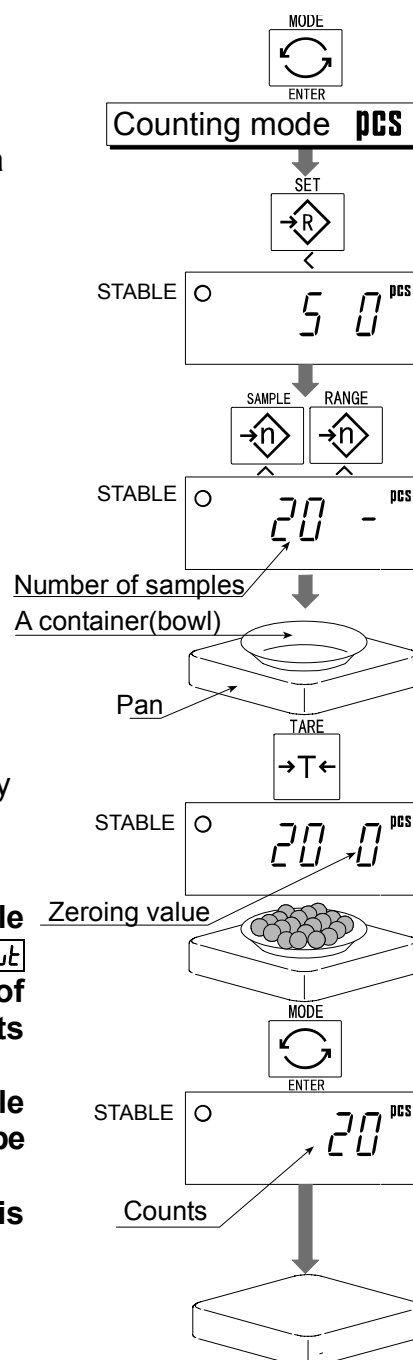
Counts

**Note
The pan shape depends on the scale model.**

⬇ 8.2. Counting the Number of Articles

Step 1 Press the [MODE] switch to display the unit ᴘᴄꜱ.

MODE
⟳
ENTER

| Counting mode ᴘᴄꜱ |

Step 2 Store the articles unit mass.
Refer to "8.1 Storing a Unit Mass"

| Storing a unit mass |

Step 3 Place the container item only on the weighing pan.
Press the [TARE] switch.

A container(bowl)

Pan

TARE
→T←

STABLE ○   ᴘᴄꜱ
                 0

Zeroing value

Step 4 Put articles in the container item and read the count.

STABLE ○   ᴘᴄꜱ
              135

Step 5 Remove all things from the weighing pan.
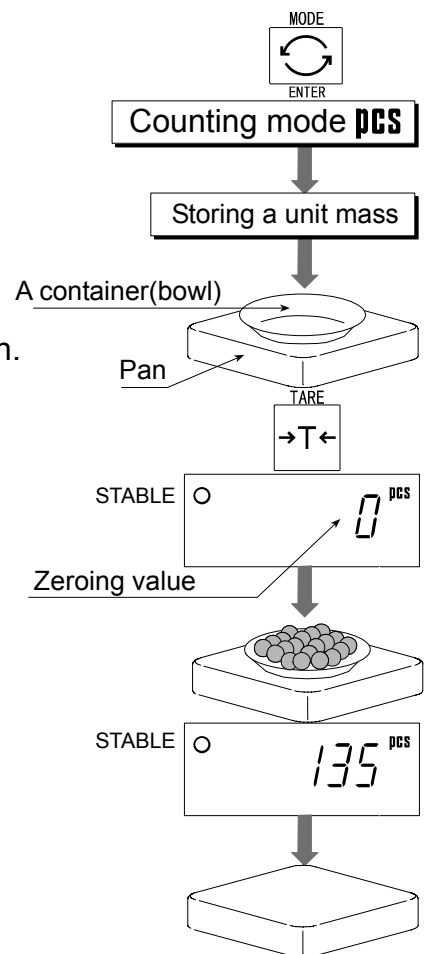
Note
The pan shape depends on the scale model.

⬇ 9. Percentage Mode

- ❑ The percent mode is the function to display a mass value in the unit of "%".

- ❑ Store a 100% mass value, in advance, to use this function.

- ❑ The 100% mass value is stored in the scale even if the power is removed.

⬇ 9.1. Storing a 100% Mass

Step 1 Press the MODE switch to display the unit %.

Step 2 Press the SET switch to enter the mode that stores a 100% mass.

Step 3 With nothing on the weighing pan, press the ZERO switch to display zero.

Step 4 Place the 100% mass on the weighing pan gently. Press the ENTER switch, to store the 100% mass after the stability mark is displayed. Then the percentage is displayed.

Caution
- ❑ **When the sample is too light and it is not possible to calculate a 100% mass, the scale displays Lo and returns to step 3.**
- ❑ **Pressing the ENTER switch after Lo is displayed, the next unit is displayed.**

Step 5 Remove all things from the weighing pan.

MODE

ENTER

| Percentage mode | % |

SET

STABLE ○   *100 -* %

Pan

ZERO

STABLE ○   *100 0* %

Zeroing value

100% mass

MODE

ENTER

STABLE ○   *100.0* %
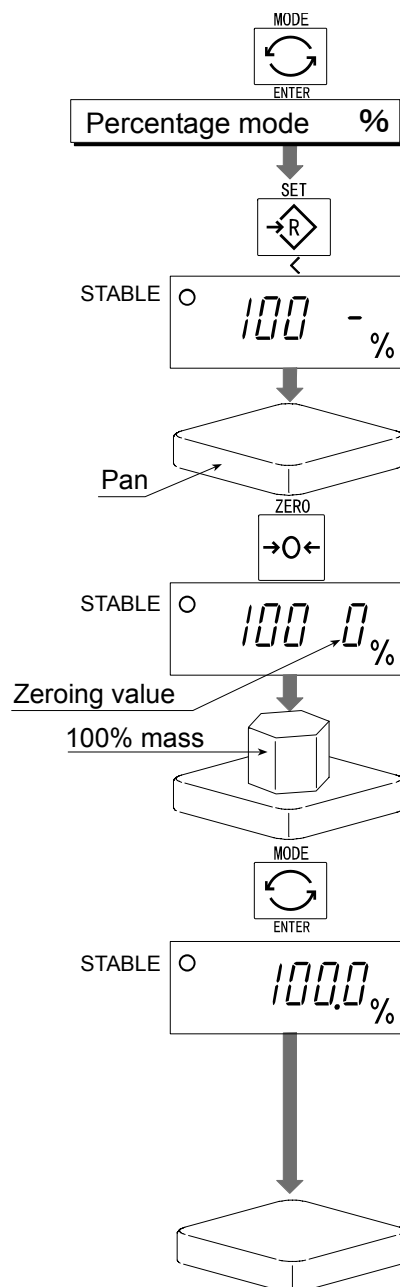
Note
The pan shape depends on the scale model.

⏬ 9.2. Reading Percentage

Step 1 Press the [MODE] switch to display the unit %.

Step 2 Store the 100% mass of the article.
Refer to "9.1 Storing a 100% Mass "

Step 3 If a container is needed, place the tare item only on the weighing pan and press the [TARE] switch.

Step 4 It is now possible to put something on the weighing pan and read the percentage.

Step 5 Remove all things from the weighing pan.

MODE
ENTER

Percentage mode %

Storing a 100% mass

A container(bowl)

Pan

TARE
→T←

STABLE O   0.0 %
Zeroing value

STABLE O   35.0 %
Percentage
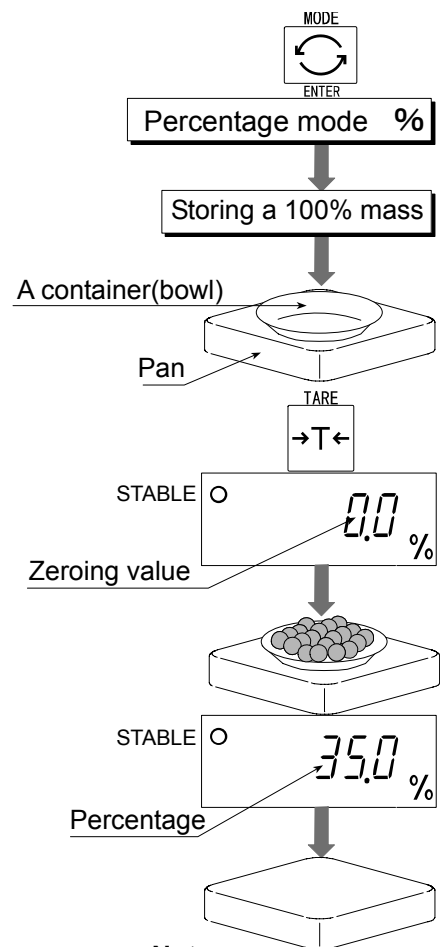
Note
The pan shape depends on the scale model.

⬇ 10. Accumulation Function

❑ This function counts the number of weighed items, calculates the total mass value and can display the number and accumulated mass value.

❑ The accumulation function is displayed with up to 6 digits. The balance can not display 7 or more digits, therefore the leading digits are not displayed.
Example: With 60K type, when importing the data of 17 accumulations of up to 60kg (60.000 X 17=1020.000), the balance displays this as "*020.000*".

❑ Set the parameters of the "accumulation function (F8)" in the function table, in advance, to use this function.

❑ The accumulation count and accumulated mass value are stored in the scale even if the power is removed.

Operation and Switches

❑ The display of the accumulation count has a blinking ▼M+ without a unit.

❑ The display of the accumulated mass value has a unit and a blinking ▼M+.

❑ Pressing the MODE switch, the accumulation count and accumulated mass value are displayed.

❑ Pressing the ZERO switch in the accumulation function (▼M+ is blinking), the current function resets. (The count and accumulated mass value become zero.)

Caution
The accumulation function can be used with the first weighing unit accumulated.

Parameter List and Word Definition

❑ The "nearly-zero" is within ± 5 digits from the zero point in the unit of kg.
❑ The "digit", a unit of display, is equivalent to the minimum measurable mass.
❑ The "zero point" is the fundamental starting point to weigh anything.

Function table	Meaning and purpose
F8 0	Accumulation function not used.
F8 1	The scale accumulates the data, if the F switch is pressed, when the display is a positive stable value without nearly-zero. The next accumulation can be performed after the display is nearly-zero or a negative value.
F8 2	The scale accumulates the data, if the F switch is pressed, when the display is a stable value and without nearly-zero. The next accumulation can be performed after the display is nearly-zero.
F8 3	When the display is a positive stable value and without nearly-zero, the scale accumulates the data automatically. The next accumulation can be performed after the display is nearly-zero or a negative value.

Function table	Meaning and purpose
F8 4	When the display is a stable value and without nearly-zero, the scale accumulates the data automatically. The next accumulation can be performed after the display is nearly-zero. Use Recording the number and mass of articles removed from the weighing pan. (Put the articles on the weighing pan. Press the TARE switch at each removal.)
F8 5	At each finish of the full/dribble batch function, the scale accumulates the data automatically. Use Packaging articles like a powder, it is used for recording the bag number and total mass.

⬇ 10.1. Preparation (Setting Parameters)

Step 1 Turn off the display.
Press the ON/OFF switch while the ZERO switch is pressed and held. The function table is displayed.

Display off
ZERO
→0← Press and hold
ON/OFF
I/⏻ Press

F 1 0

Function table

Step 2 Press the ENTER switch to display an item of the accumulation function (F8).

MODE
↻
ENTER

F 8 0

Step 3 Select a parameter of the accumulation function (F8 1 ~ F8 4) with the ∧ switch.

SAMPLE   RANGE
→n→   →n→
∧   ∧

F 8 2

Step 4 Press the ENTER switch and the F switch to display End . Press the ENTER switch to return to the normal weighing mode.

MODE
↻
ENTER

F

End

MODE
↻
ENTER

Weighing value
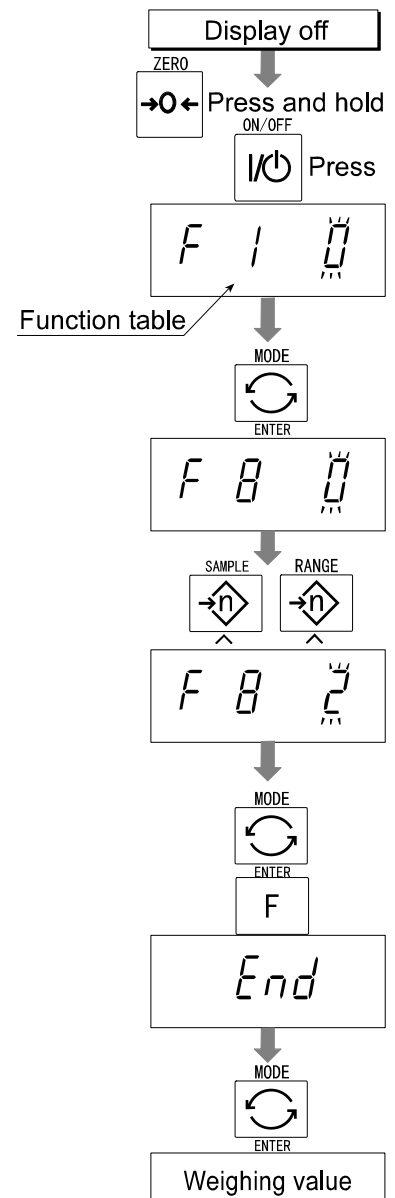
⬇ 10.2. Operation and Performance (Examples)

Example 1

Weighing each article, the scale makes the accumulation according to $\boxed{FB\ 3}$.

Step 1 Press the $\boxed{\text{MODE}}$ switch to display ▼M+ .

Step 2 Press the $\boxed{\text{ZERO}}$ switch to reset the accumulation data.

Step 3 Return to the kg mode using the $\boxed{\text{MODE}}$ switch.

Step 4 Put an article on the weighing pan. Wait for the stability mark to be displayed and the value to be blinking. Remove the article and press the $\boxed{\text{ZERO}}$ switch.

Step 5 Weigh additional articles using step 4.

Step 6 Press the $\boxed{\text{MODE}}$ switch to display the number of articles and total mass with ▼M+ .

Example 2

This example accumulates the articles that were removed from the weighing pan. The function parameter is set to $\boxed{FB\ 4}$.

Step 1 Enter into the kg mode using the $\boxed{\text{MODE}}$ switch.
Put all articles on the weighing pan and press the $\boxed{\text{TARE}}$ switch.

Step 2 Press the $\boxed{\text{MODE}}$ switch to display ▼M+ .

Step 3 Press the $\boxed{\text{ZERO}}$ switch to reset the accumulation data.
Retun to kg mode with the $\boxed{\text{MODE}}$ switch.

Step 4 Remove an article from the weighing pan. Wait for the stability mark to be displayed and the value to be blinking. Press the $\boxed{\text{TARE}}$ switch.

Step 5 Weigh additional articles using step 4.

Step 6 Press the $\boxed{\text{MODE}}$ switch to display the number of articles and total mass with ▼M+ .

⬇ 11. Upper/Lower Comparator Function

- This function compares a display value with the upper limit (HI), the lower limit (LO) and displays the result.

- Set the "comparator function ($\boxed{F6\ 0}$ ~ $\boxed{F6\ 7}$)" parameters, upper limit value (HI) and lower limit value (LO) in the function table, in advance, to use this function.

- Install option OP-03 or OP-04, to use the relay output of the comparator.

- Install option OP-03, to use the buzzer output of the comparator.

- The settings are stored in the scale even if the power is removed. (Refer to Caution on the next page.)

Comparator Indicators

Comparison results are displayed by indicators HI ᵒ OK ᵒ LO ᵒ.

Comparison Condition

Weighing value < lower limit value..................................LO is displayed and output.
Lower limit value ≦ weighing value ≦ upper limit value ...OK is displayed and output.
Upper limit value < weighing value ....HI is displayed and output.

Parameter List and Word Definition

- The decimal point is not displayed in the upper or lower limit value settings.
- The " nearly-zero " is within ±5 digits from the zero point in the unit of kg.
- The "digit", a unit of display, and is equivalent to the minimum measurable mass.
- The "zero point" is the fundamental starting point to weigh anything.

Function table	Meaning and purpose
F6 0	Pressing the $\boxed{SET}$ switch, the scale always compares the current display value. Press the $\boxed{SET}$ switch again to stop the comparison.
F6 1	The scale always compares the display value.
F6 2	Pressing the $\boxed{SET}$ switch, the scale always compares the display value if not nearly-zero.
F6 3	The scale always compares the display value if not nearly-zero.
F6 4	When the display value becomes stable after pressing the $\boxed{SET}$ switch, the scale compares the display value. It does not compare on an unstable condition. If the $\boxed{SET}$ switch is pressed again, the scale stops the comparison.
F6 5	When the display value is stable, the scale compares the display value. It does not compare on an unstable condition.
F6 6	When the display value becomes stable, while not nearly-zero, after pressing the $\boxed{SET}$ switch, the scale compares the display value. It does not compare on an unstable condition. If the $\boxed{SET}$ switch is pressed again, the scale stops the comparison.

Function table	Meaning and purpose
F6 7	When the display value becomes stable and not nearly-zero, the scale compares the value. It does not compare on an unstable condition.

Caution

- The upper limit value (HI) must be greater than the lower limit value (LO).
- The parameters of the upper limit value (HI) and the final value (HI) use the same memory. The parameters of the lower limit value (LO) and the preliminary value (OK) use the same memory.
- The upper/lower comparator function, the simple batch function and the full/dribble batch function can not be used at the same time because these parameters use common memory.

11.1. Preparation (Setting Parameters)

Step 1 Turn off the display.
Press the ON/OFF switch while the ZERO switch is pressed and held. The function table is displayed.

Display off

ZERO
→0← Press and hold
ON/OFF
I/〇 Press

F 1 0

Function table / MODE
↻
ENTER

Step 2 Press the ENTER switch to display an item of the comparator function (F6).

F 6 0

SAMPLE RANGE
→n→ →n→
^ ^

Step 3 Select a parameter of the comparator function (F6 0 ~ F6 7) with the ∧ switch.

F 6 7

MODE
↻
ENTER

Step 4 Press the ENTER switch and the F switch to display End . Press the the ENTER switch to return to the normal weighing mode.

F

End

MODE
↻
ENTER
Weighing value

(Next Page)
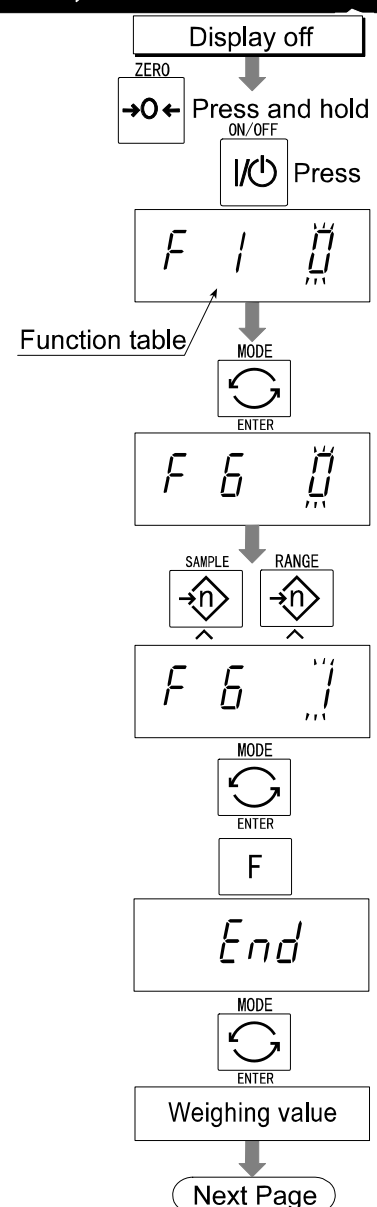
Step 5 If either of $F \bar{b} \; \theta$, $F \bar{b} \; \bar{c}$, $F \bar{b} \; Y$, $F \bar{b} \; \bar{b}$ has been selected, press the SET switch to use the comparator.

Either parameter is selected.
$F \bar{b} \; \theta$, $F \bar{b} \; \bar{c}$
$F \bar{b} \; Y$, $F \bar{b} \; \bar{b}$

SET

Step 6 Press the MODE switch to display the blinking HI.

MODE
ENTER
Blinking HI

Step 7 Set the upper limit value by using the following switches.

$\wedge$ switch	Selecting the number of a figure.
$<$ switch	Selecting a figure.
F switch	Selecting the polarity (+,-).

SET , SAMPLE RANGE , F

Upper limit value → 7000

MODE
ENTER
Blinking LO

Step 8 Press the ENTER switch to store the new parameter and display the blinking LO.

Step 9 Set the lower limit value by using the following switches.

$\wedge$ switch	Selecting the number of a figure.
$<$ switch	Selecting a figure.
F switch	Selecting the polarity (+,-).

SET , SAMPLE RANGE , F

Lower limit value → 6500

MODE
ENTER

Step 10 Press the ENTER switch to store the new parameters and display the weighing mode. If the lower limit value is greater than the upper limit value, the scale returns to step 7.

Weighing value and comparison result
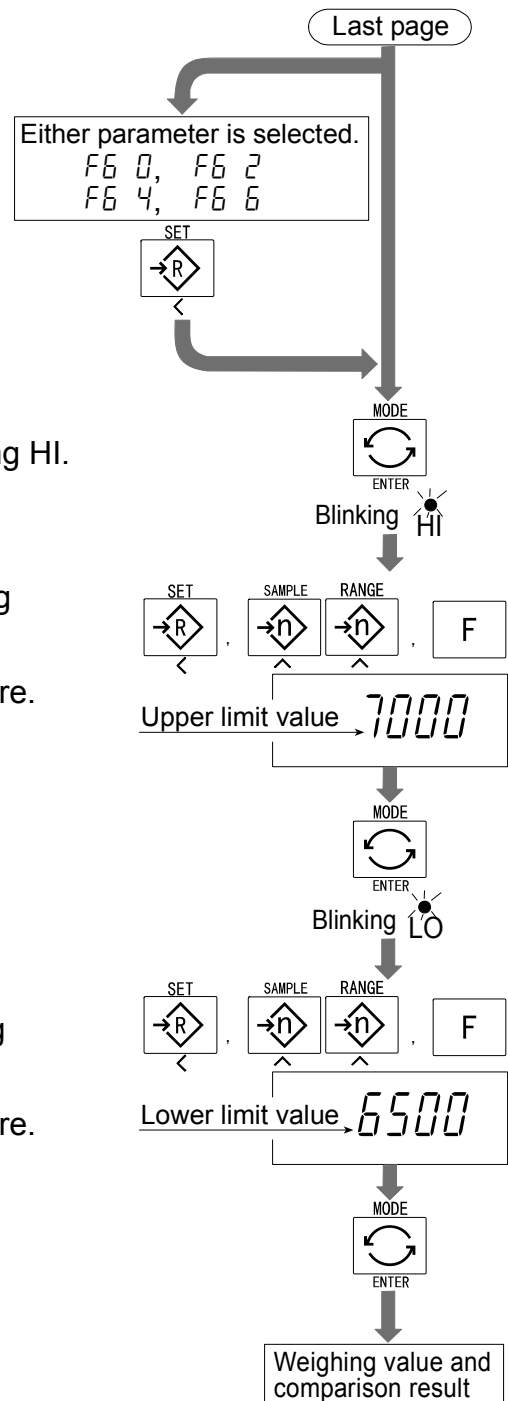
⬇ 11.2. Operation and Performance (Examples)

Example 1
This example is set as follows:
Function table | F6 1 | (The scale always compares the weight value even when the value is nearly-zero.)

Upper limit value (HI)   7.000kg
Lower limit value (LO)   6.500kg

Case
❑ The comparison starts at turning the scale on.

❑ When the current value is less than 6.500kg, LO is displayed.

❑ When the current value is 6.500kg to 7.000kg, OK is displayed.

❑ When the current value is greater than 7.000kg, HI is displayed.

Example 2
This example is set as follows:
Function table | F6 4 | (Pressing the SET switch, after the stability mark is displayed, the scale compares the current display value with the upper limit value and the lower limit value immediately.)

Upper limit value (HI)   2.000kg
Lower limit value (LO)   -1.000kg

Case
❑ Pressing the SET switch, the comparison is performed after displaying the stability mark.

❑ When the current value is less than -1.000kg, LO is displayed.

❑ When the current value is -1.000kg to 2.000kg, OK is displayed.

❑ When the current value is greater than 2.000kg, HI is displayed.

⬇ 12. Full/Dribble Batch Function

❑ This function changes the scale to a filling machine which subdivides a bulk product (like grain) into loads of predetermined and virtually constant mass.

❑ Set the parameters of the "comparator function ($\boxed{F6\ 9}$)", " full/dribble batch sub-function ($\boxed{F\ 10\ 0}$ ~ $\boxed{F\ 10\ 3}$)" in the function table, final value (HI), preliminary value (OK) and zero band (LO), in advance, to use this function.

❑ Install option OP-03 or OP-04, to use the relay output of the full/dribble batch function.

❑ In case of building up a filling machine with a scale and hopper, the performance and processing product of the system are assumed to be as follows:

❑ The settings are stored in the scale even if the power is removed. (Refer to Caution on the next page.)

Procedure
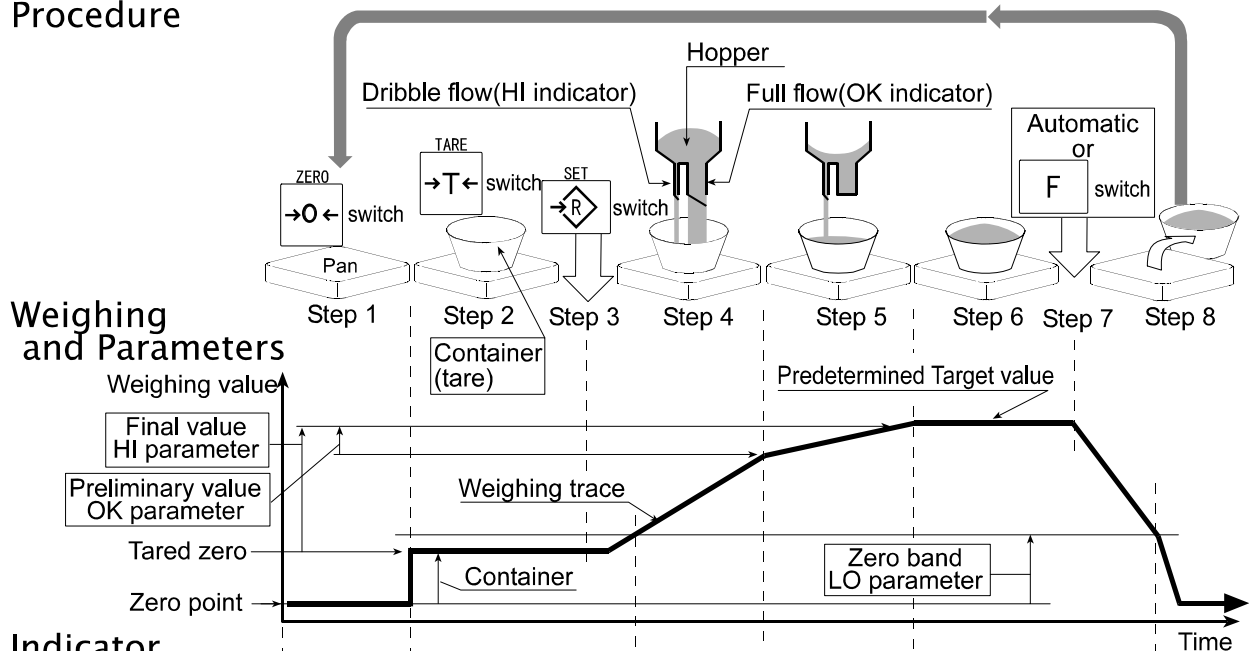
Indicator and Output

READY indicator	ON	OFF	OFF	Blinking	ON
Zero band, LO indicator	ON	OFF	OFF	OFF	ON
LO relay	Make	Break	Break	Break	Make
Full flow, OK indicator	OFF	ON	OFF	OFF	OFF
OK relay	Break	Make	Break	Break	Break
Dribble flow, HI indicator	OFF	ON	ON	OFF	OFF
HI relay	Break	Make	Make	Break	Break

	Zero band indicator/ LO relay output	Preliminary value indicator/ OK relay output	Final value indicator/ HI relay output
Gross < Zero band (Zero detection Level)	ON / Make	OFF / Break	OFF / Break
Net < Final - Preliminary	OFF / Break	ON / Make	ON / Make
Final - Preliminary ≦ Net < Final	OFF / Break	OFF / Break	ON / Make
Final ≦ Net	OFF / Break	OFF / Break	OFF / Break

Caution

- **The comparison of the full/dribble batch function is a one way sequence (not reversible). If the display value becomes less than the final value after the value reached a predetermined target value, neither HI nor LO is on.**
- **The parameters of the upper limit value (HI) and the final value (HI) use the same memory. The parameters of the lower limit value (LO) and the preliminary value (OK) use the same memory.**
- **The upper/lower comparator function, the simple batch function and the full/dribble batch function can not be used at the same time because these parameters use common memory.**
- **Set the zero band greater than the tare value.**

Operation

- Pressing the $\boxed{\text{SET}}$ switch, the scale starts the batch process.
- Selecting a parameter from $\boxed{F\ 10\ 0}$ or $\boxed{F\ 10\ 2}$ of the full/dribble batch sub-function, the $\boxed{F}$ switch works as the finish switch.

Parameter List and Word Definition

- The "gross" is a total weighing value where the tare value is not subtracted.
- The "net" is a measurement value with the tare value subtracted from the gross.
- The "zero band" is the zero detection level.
- The "zero point" is the fundamental starting point to weigh anything.

Comparator

Function table	Meaning and purpose
F6 9	Full/dribble batch function.

Full/dribble batch sub-function

Function table	Meaning and purpose
F 10 0	Reaching final value and pressing the $\boxed{F}$ switch, the current process is finished.
F 10 1	Reaching final value and displaying the stability mark, the current process is finished automatically.
F 10 2	Pressing the $\boxed{\text{SET}}$ switch, the scale automatically tares and starts the full/dribble batch process. Reaching final value and pressing the $\boxed{F}$ switch, the current process is finished.
F 10 3	Pressing the $\boxed{\text{SET}}$ switch, the scale automatically tares and starts the full/dribble batch process. Reaching final value and displaying the stability mark, the current process is finished.

Hold

Function table	Meaning and purpose
F 12 0	The hold function is not used.

12.1. Preparation (Setting Parameters)

Step 1 Turn off the display.
Press the ON/OFF switch while the ZERO switch is pressed and held. The function table is displayed.

Step 2 Press the ENTER switch to display an item of the comparator function (F6).

Step 3 Select a parameter of the full/dribble batch function (F6 9) with the ∧ switch.

Step 4 Press the ENTER switch to store the new parameter and display an item of the full/dribble batch sub-function (F10) .

Step 5 Select a parameter of the full/dribble batch sub-function (F10 0 ~ F10 3) with the ∧ switch.

Step 6 Press the ENTER switch and the F switch to display End .

Step 7 Press the ENTER switch to return to the normal weighing mode.

Display off

ZERO
→0← Press and hold
ON/OFF
I/⏻ Press

F 1 0
Function table

MODE
ENTER

F 6 0

SAMPLE RANGE
→n→ →n→

F 6 9
Full/dribble batch function

MODE
ENTER

F 10 0
Full/dribble batch sub-function

SAMPLE RANGE
→n→ →n→

F 10 3

MODE
ENTER

F

End

MODE
ENTER

Weighing value

(Next Page)
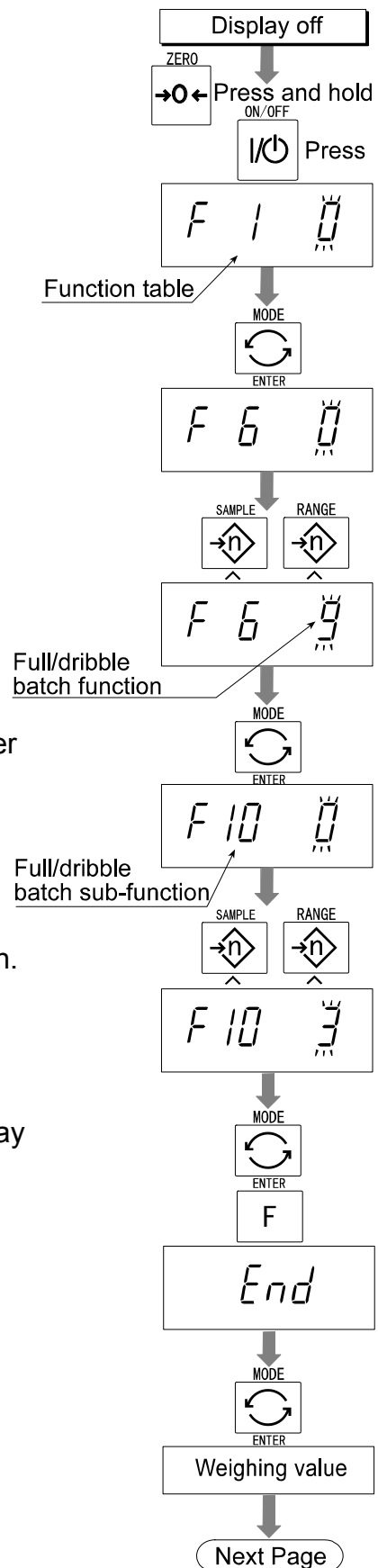
Step 8 Press the MODE switch to display the blinking HI (of the final value).

Step 9 Set the final value using the following switches.
∧ switch   Selecting the number of a figure.
< switch   Selecting a figure.

Step 10 Press the ENTER switch to store the new parameter and display the blinking OK (of preliminary value).

Step 11 Set the preliminary value using the following switches.
∧ switch   Selecting the number of a figure.
< switch   Selecting a figure.

Step 12 Press the ENTER switch to store the new parameter and display the blinking LO (of zero band).

Step 13 Set a zero band which is greater than the tare value, using the following switches.
∧ switch   Selecting the number of a figure.
< switch   Selecting a figure.

Step 14 Press the ENTER switch to store the new parameter and display the weighing mode.

Last page

MODE / ENTER

Blinking HI

SET, SAMPLE, RANGE

Final value → 2000

MODE / ENTER

Blinking OK

SET, SAMPLE, RANGE

Preliminary value → 0100

MODE / ENTER

Blinking LO

SET, SAMPLE, RANGE

Zero band → 0550

MODE / ENTER

Weighing value and comparison result
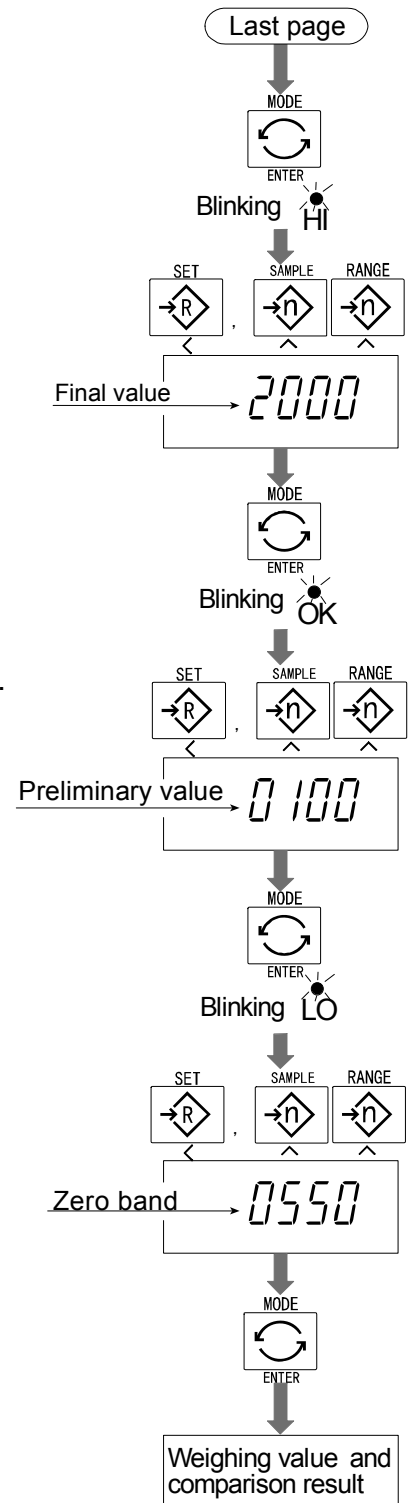
⬙ 13. Simple Batch Function

- ❑ This function compares a display value with the final value, preliminary value and zero band for the full/dribble batch function. The result is indicated by zero band (LO indicator), full flow (HI indicator) and dribble flow (OK indicator). Even if a weighing value includes increase and decrease, this function can compare it.

- ❑ Set the parameters of the "simple batch function ($\boxed{F6 \quad 8}$)", in the function table, final value (HI), preliminary value (OK) and zero band (LO), in advance, to use this function.

- ❑ Install option OP-03 or OP-04, to use the relay output of the comparison.

- ❑ Install option OP-03, to use the buzzer output of the comparator.

- ❑ The settings are stored in the scale even if the power is removed. (Refer to Caution on the next page.)

Weighing and Parameters
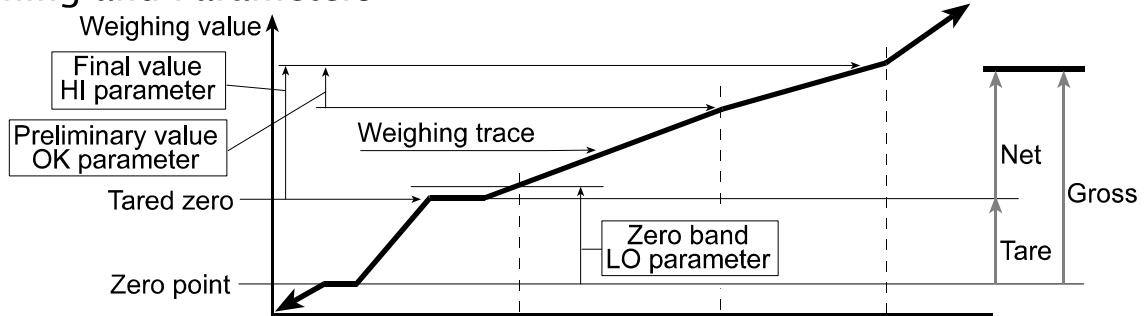
Indicator and Output

Zero band, LO indicator	ON	OFF	OFF	OFF
LO relay output	Make	Break	Break	Break
Preliminary, OK indicator	OFF	OFF	ON	ON
OK relay output	Break	Break	Make	Make
Final, HI indicator	OFF	OFF	OFF	ON
HI relay output	Break	Break	Break	Make

Comparison Condition

Gross $<$ Zero band ....LO is displayed and output.

Final - Preliminary $\leqq$ Net ....OK is displayed and output.

Final $\leqq$ Net ....OK, HI are displayed and output.

Parameter List and Word Definition

- ❑ The "gross" is a total measurement value where the tare value is not subtracted.
- ❑ The "net" is a measurement value with a tare value subtracted from the gross.
- ❑ The "tare" is an item put on the weighing pan and its mass is subtracted from the gross.
- ❑ The "zero band" is the zero detection level.
- ❑ The "zero point" is the fundamental starting point to weigh anything.

Function table	Meaning and purpose
$F6 \quad 8$	Simple batch function

Caution

❏ **The parameters of the upper limit value (HI) and a final value (HI) use the same memory. The parameters of the lower limit value (LO) and the preliminary value (OK) use the same memory.**

❏ **The upper/lower comparator function, the simple batch function and the full/dribble batch function can not be used at the same time because these parameters use common memory.**

⬇ 13.1. Preparation (Setting Parameters)

Step 1 Turn off the display.
Press the ON/OFF switch while the ZERO switch is pressed and held. The function table is displayed.

Display off

ZERO
→0← Press and hold
ON/OFF
I/⏻ Press

F 1 0

Function table

MODE
ENTER

Step 2 Press the ENTER switch to display an item of the comparator function (*F6*).

F 6 0

SAMPLE   RANGE
→n>   →n>

Step 3 Select a parameter of the simple batch function (*F6 8*) with the ∧ switch.

F 6 8

Simple batch function

MODE
ENTER

Step 4 Press the ENTER switch and the F switch to display *End* .

F

End

MODE
ENTER

Step 5 Press the ENTER switch to return to the normal weighing mode.

Weighing value

(Next Page)

Step 6 Press the MODE switch to display the blinking HI (of the final value).

MODE
ENTER
Blinking HI

Step 7 Set the final value using the following switches.
∧ switch   Selecting the number of a figure.
< switch   Selecting a figure.

SET , SAMPLE RANGE

Final value → 2000

Step 8 Press the ENTER switch to store the new parameter and display the blinking OK (of preliminary value).

MODE
ENTER
Blinking OK

Step 9 Set the preliminary value using the following switches.
∧ switch   Selecting the number of a figure.
< switch   Selecting a figure.

SET , SAMPLE RANGE

Preliminary value → 0100

Step 10 Press the ENTER switch to store the new parameter and display the blinking LO (of zero band).

MODE
ENTER
Blinking LO

Step 11 Set the zero band using the following switches.
∧ switch   Selecting the number of a figure.
< switch   Selecting a figure.

SET , SAMPLE RANGE

Zero band → 0550

Step 12 Press the ENTER switch to store the new parameter and display the weighing mode.

MODE
ENTER
Weighing value and comparison result
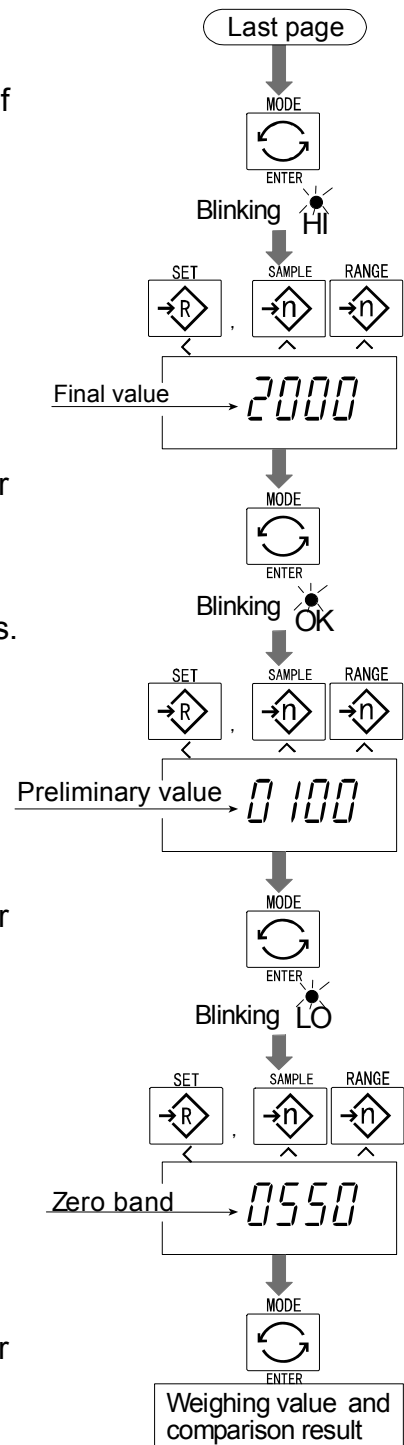
⏬ 13.2. Operation and Performance (Examples)

Step 1 Select the parameter $\boxed{F6\ 8}$ of the function table.
Step 2 Set the parameters of the final value, preliminary value and zero band.
Step 3 The comparison result is always displayed.
Comparison Condition

Gross	$<$	Zero band	LO is displayed and output.
Final - Preliminary	$\leqq$	Net	OK is displayed and output.
Final	$\leqq$	Net	OK, HI are displayed and output.

⬇ 14. Calibration (Adjusting the Scale)

❑ The scale is an instrument which measures the "weight" and displays its "mass" value. Calibration is the adjustment function so that the scale can weigh correctly.

❑ There are three steps to calibration.

Gravity Acceleration Correction ... When a calibrated scale is moved to a distant place, the scale can correctly weigh anything by revising to a new local gravity acceleration. Refer to the "Gravity Acceleration Table" on the next page.

Calibration of the Zero Point .... When there is nothing on the weighing pan, it is the function that performs adjustment so as to display the zero point mark .

Comment   The zero point, is the fundamental starting point to weigh anything, influences the performance of scale.

Span Calibration............................. The function that adjusts the span with a calibrated mass so the scale can accurately weigh anything within the weighing capacity.

Comment   Span means the range of weighing capacity. Use a calibration mass heavier than two thirds of the weighing capacity.

Caution
❑ **Periodically check the accuracy of weighing. Calibrate the scale, if it is moved to another location or the environment has changed.**
❑ **It is not necessary to set the gravity acceleration correction, when calibrating the scale with a calibration mass at the place where the scale is to be used.**

14.1.1.   The Gravity Acceleration Table

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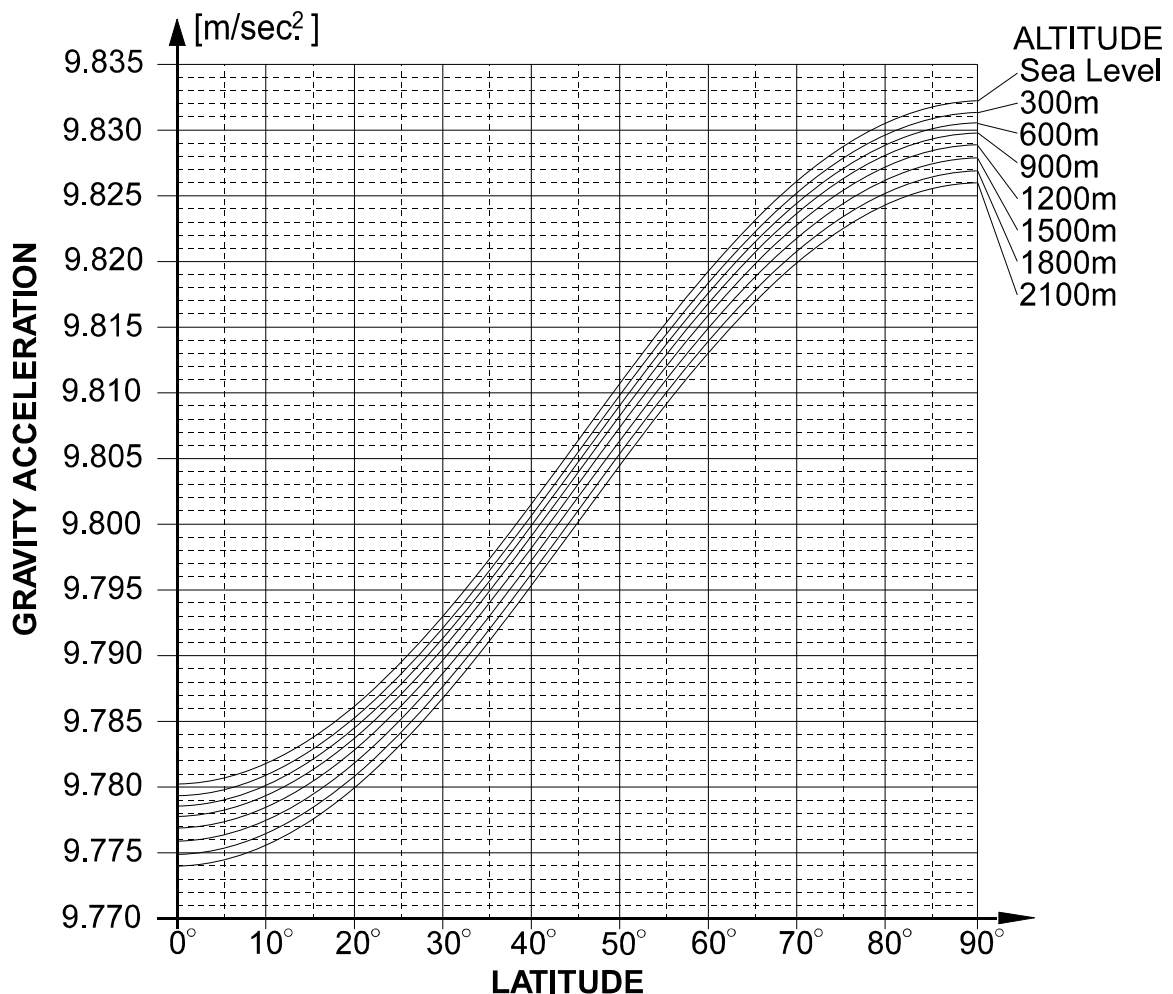
14.2.1. Gravity Acceleration Correction

Step 1 Turn on the display.
Open the rear cover of the display unit.
Press and hold the CAL switch, it is in the depth of 5cm, to enter the calibration mode.
Then CAL 0 is displayed.

CAL switch

5cm length

STABLE ○ CALO kg

ZERO →0←

9.798

SET →R< , SAMPLE →n^ RANGE →n^

9.806
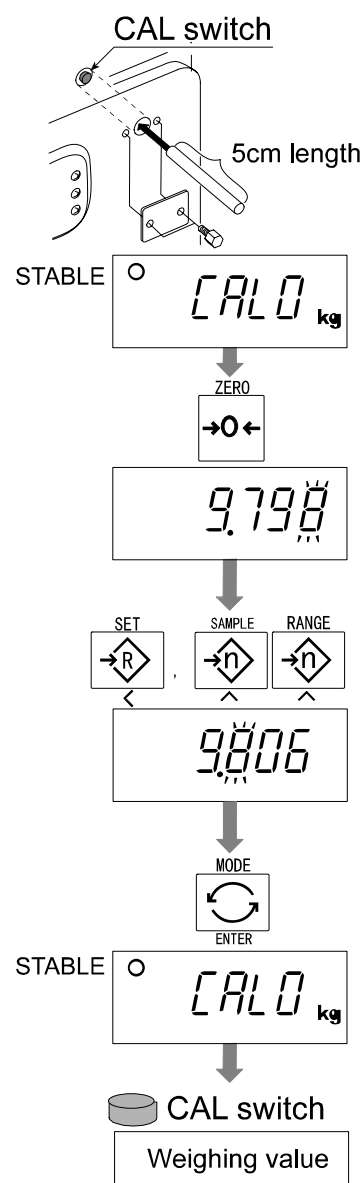
MODE ↻ ENTER

Step 2 Press the ZERO switch to enter the gravity acceleration correction mode.

Step 3 Set your local gravity acceleration using the following switches.
∧ switch   Selecting the number of a figure.
< switch   Selecting a figure.

Step 4 Press the ENTER switch to store the new value.
Then CAL 0 is displayed.

STABLE ○ CALO kg

CAL switch

Weighing value

Step 5 Press the CAL switch again. Then the scale returns to the normal weighing mode.

14.2.2. Preparation

Step 6 Confirm the environmental conditions as follows:
Maintain a constant temperature and stable power.
Install the scale on a solid floor where there is no draft, vibration, strong magetic fields or direct sunlight.
Consider section "4. Caution".

Step 7 Display normal weighing for at least 30 minutes to warm up the scale.

14.2.3. Calibration of the Zero Point

Step 8   Press and hold the CAL switch to enter the calibration mode after displaying normal weighing for 30 minutes.
Then CAL 0 is displayed.

Step 9   With nothing on the weighing pan, press the ENTER switch while the stable mark is displayed. The scale stores the current condition as the zero point.

Step 10 The scale displays SPn 1 for several seconds. Finishing the calibration mode at this stage, proceed to step 14.
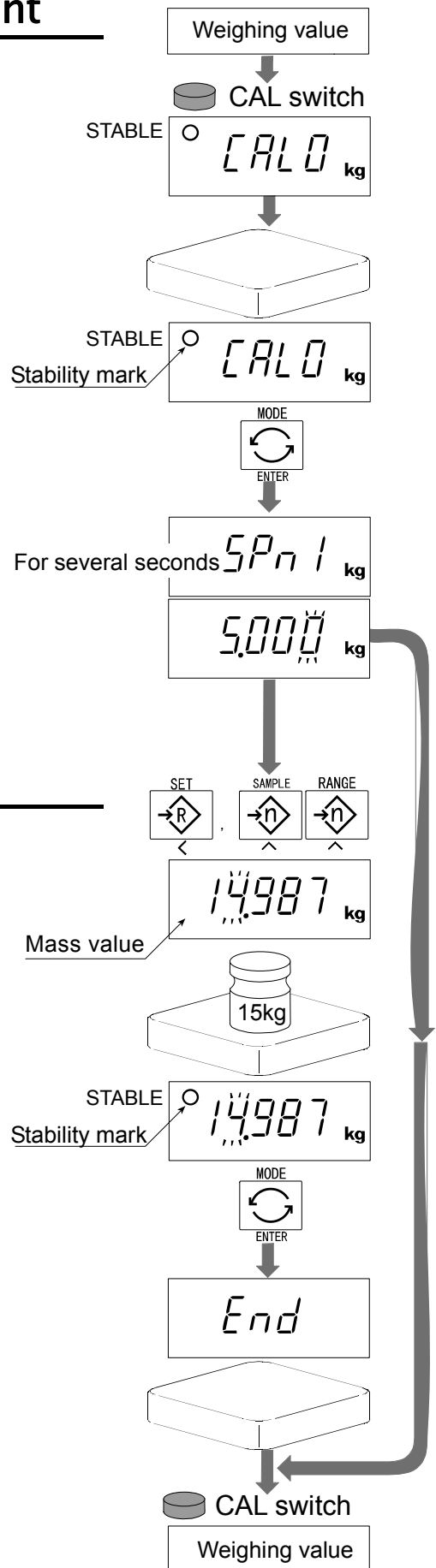
14.2.4. Span Calibration

Step 11 Set the value of the calibration mass using the following switches. (This initial value is according to each model.)
∧ switch   Selecting the number of a figure.
< switch   Selecting a figure.

Step 12 Place the mass on the weighing pan which was set at step 11, press the ENTER switch while the stable mark is displayed. The scale then calculates the span and stores it.

Step 13 The scale displays End at the finish. Remove the mass from the weighing pan.

Step 14 Press the CAL switch to return to the normal weighing mode.

Weighing value

CAL switch

STABLE ○ CALO kg

STABLE ○ CALO kg
Stability mark

MODE / ENTER

For several seconds SPn 1 kg

5.000 kg

SET SAMPLE RANGE
→R , →n →n
<   ^   ^

14.987 kg
Mass value

15kg

STABLE ○ 14.987 kg
Stability mark

MODE / ENTER

End

CAL switch

Weighing value

Note
The pan shape depends on the scale model.

⏬ 15. The Function Table

❑ The function table is the function to store and refer items that determine the performance of the scale. Each item has a parameter.
❑ The parameters are maintained even without power applied.

Item   Parameter

$$F\ 1\ 0$$
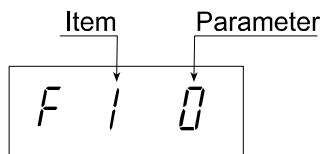
⏬ 15.1. The Procedure for Setting Parameters

Step 1   Turn off the display.
Press the ON/OFF switch while the ZERO switch is pressed and held. The function table is displayed.

Display off

ZERO →0← Press and hold
ON/OFF
I/🔘 Press

$$F\ 1\ 0$$

Function table

Step 2   Set parameters for each item using the following switches.

∧ switch	Selecting the parameter of an item.
< switch	Selecting a figure.
F switch	Proceeding to Step 3 without storing the parameter.
ENTER switch	Storing a parameter for the current item and proceeding to the next item.

SAMPLE   RANGE
→n→   →n→
^   ^
SET
→R→ , F
<
MODE
🔄
ENTER

Step 3   When the end of the table is reached, End is displayed.

Step 4   Press the ENTER switch to store the new parameters and return to the normal weighing mode.

$$End$$

MODE
🔄
ENTER

Weighing value
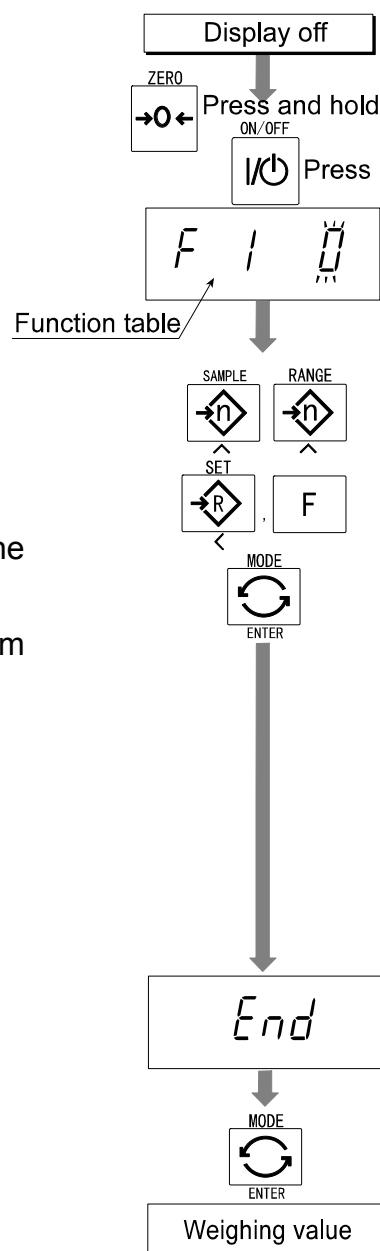
⬇ 15.2. Parameter List

Item	Display	Meaning and purpose
	F 1	Not used
Weighing range		Selects the way of changing weighing range for HV-WP series.
	F2 0 #	Automatic range
	F2 1	Manual range using the RANGE switch.
Unit		Selection of the first unit at the time when the scale turns on.
	F3 0 #	Kg
	F3 1	Lb
	F3 2	Oz
	F3 3	lb-oz
Baud rate		Selects the transmission rate of the serial interface (RS-232C/ 422/485).
	F4 0 #	2400bps
	F4 1	4800bps
	F4 2	9600bps
Output mode		Mode selection for the serial interface (RS-232C/ 422/485).
	F5 0 #	Stream mode. (Refer to "16.2 Stream Mode")
	F5 1	Command mode. (Refer to "16.3 Command Mode")
	F5 2	Data is output, when the PRINT switch is pressed.
	F5 3	Auto-print + When the display becomes a positive stable value without nearly-zero, the scale outputs the data automatically. Next output can be performed after the display becomes nearly-zero or a negative value.
	F5 4	Auto-print +/- When the display becomes a stable value without nearly-zero, the scale outputs the data automatically. Next output can be performed after the display becomes nearly-zero.
	F5 5	At each finish of full/dribble batch function, the data is output.
Comparator		Selects the comparator mode.
	F6 0 #	Pressing the SET switch, the scale always compares the current display value. Press the SET switch again to stop the comparison.
	F6 1	The scale always compares the display value.
	F6 2	Pressing the SET switch, the scale always compares the display value when not nearly-zero. Press the SET switch again to stop the comparison.
	F6 3	The scale always compares the display value when not nearly-zero.
	F6 4	When the display value becomes stable after pressing the SET switch, the scale compares the display value. It does not compare on an unstable condition. If the SET switch is pressed again, the scale stops the comparison.

The "#" is factory settings. The "nearly-zero" is within ± 5 digits from zero point in the unit of kg.

Item	Display	Meaning and purpose
Comparator	F6 5	When the display value becomes stable, the scale compares the display value. It does not compare on an unstable condition.
	F6 6	When the display value becomes stable when not nearly-zero after pressing the SET switch, the scale compares the display value. It does not compare on an unstable condition. If the SET switch is pressed again, the scale stops the comparison.
	F6 7	When the display value becomes stable when not nearly-zero, the scale compares the value. It does not compare on an unstable condition.
	F6 8	Simple batch function. (Refer to section 13.)
	F6 9	Full/dribble batch function. (Refer to section 12.)
Buzzer		The condition of the buzzer on option OP-03 by comparator function or full/dribble batch function.
	F7 0 #	No buzzer.
	F7 1	The buzzer sounds at LO.
	F7 2	The buzzer sounds at OK.
	F7 3	The buzzer sounds at LO and OK.
	F7 4	The buzzer sounds at HI.
	F7 5	The buzzer sounds at LO and HI.
	F7 6	The buzzer sounds at OK and HI.
	F7 7	The buzzer sounds at LO, OK and HI.
	F7 8	The buzzer sounds at finishing the full/dribble batch process.
Accumulation function		The condition of the accumulation function
	F8 0 #	Accumulation function not used.
	F8 1	The scale accumulates the data, if the F switch is pressed, when the display becomes a positive stable value without nearly-zero. Next accumulation can be performed after the display becomes nearly-zero or a negative value.
	F8 2	The scale accumulates the data, if the F switch is pressed, when the display becomes a stable value without nearly-zero. Next accumulation can be performed after the display becomes nearly-zero.
	F8 3	When the display becomes a positive stable value without nearly-zero, the scale accumulates the data automatically. Next accumulation can be performed after the display becomes nearly-zero or a negative value. Use　After weighing the first unit sample, one after another, it records the total count and total weight value.
	F8 4	When the display becomes a stable value without nearly-zero, the scale accumulates the data automatically. Next accumulation can be preformed after the display becomes nearly-zero. Use　Recording number and mass of articles removed from the weighing pan. (Put articles on the weighing pan. Press TARE switch at each removal.)
	F8 5	At each finish of the full/dribble batch function, the scale accumulates the data automatically. Use　Packing articles like a powder. used for recording the bag number and total mass.

The "#" is factory settings. The "nearly-zero" is within ± 5 digits from zero point in the unit of kg.

Item	Display	Meaning and purpose
	F9	Not used
Full/Dribble batch sub-func-ti on		The details of the full/dribble batch function (F6 9)
	F 10 0 #	Reaching final value and pressing the F switch, the current process is finished.
	F 10 1	Reaching final value and displaying the stability mark, the current process is finished automatically.
	F 10 2	Pressing the SET switch, the scale automatically tares and starts the full/dribble batch process. Reaching final value and pressing the F switch, the current process is finished.
	F 10 3	Pressing the SET switch, the scale automatically tares and starts the full/dribble batch process. Reaching final value and displaying the stability mark, the current process is finished.
Address		Address for RS-422 / RS-485 for option OP-04
	F 11 00# F 11 01 ~ F 11 99	Use This address can be set from 01 to 99. It is possible for a computer to control the scale assigned an address. (RS-232C should be set to "00".)
Hold		The function to hold the current display value. When the value becomes nearly-zero or the weighing value changes more than 25% +30 digits, hold display is canceled.
	F 12 0 #	Not used
	F 12 1	The hold function is ON or OFF alternately by the F switch.
	F 12 2	Displaying the stability mark, the display is held.
Averaging		Selects readability and response.
	F 13 0 #	Fast response, sensitive value
	F 13 1	⇕
	F 13 2	Slow response, stable value
Precision of unit mass		Selects a storable minimum unit mass in the counting mode.
	F 14 0 #	Stores a unit mass in the unit of a digit.
	F 14 1	Stores a unit mass in the unit of one eighth digit.
	F 14 2	Stores a unit mass, if the total of the sample mass is greater than 5 digits.
Format		Refer to "16.1. Data Format".
	F 15 0 #	Format 1. (A&D general format for scales, balances)
	F 15 1	Format 2. (Older HV-A/ HW-A format)
	F 15 2	Not used
	F 15 3	Format 1 (Return command is available for all commands.)
	F 16	Not used.
	F 17	The function number "F 17" is not displayed. When displaying 000000, press the ENTER switch to cancel.

The "#" is factory settings
The "nearly-zero" is within ±5 digits from zero point in the unit of kg.
The "digit", a unit of display, is equivalent to the minimum measurable mass.
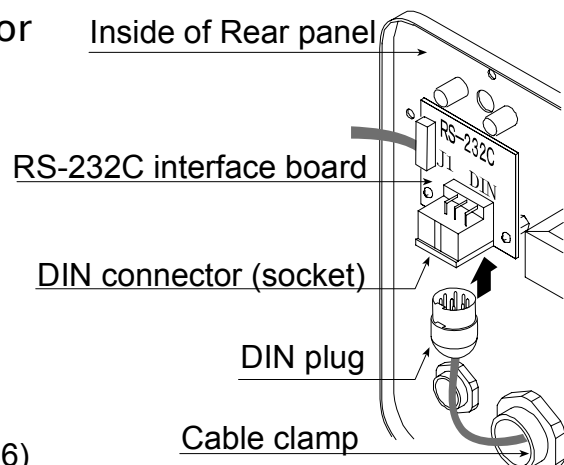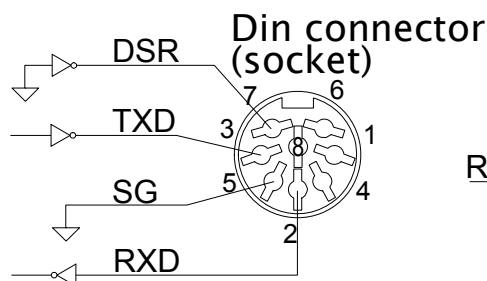
16.RS−232C Serial Interface

Note When the RS-232C serial interface is used, be sure to set the "Address ($F11$) " to "(00)".

- The RS-232C interface has the following two modes.
  Stream mode   Outputs data continuously and can be used for printing data.
  Command mode   Controls the scale using commands from a computer.

- Set the parameters for the "Baud rate ($F4$)", " Output mode ($F5$)" and " Format ($F15$)", in the function table, in advance.

- There are option cables as follows:
  AX-KO577A-200   RS-232C cable, D-sub 25 pin, 2m
  AX-KO1786-200   RS-232C cable, D-sub 9 pin, 2m

- Transmission system   EIA RS-232C
- Transmission   Asynchronous, bi-directional, half-duplex
- Data format   Baud rate: 2400, 4800, 9600 bps
                          Data: 7 bits
                          Parity: 1 bit, Even
                          Start bit   1 bit
                          Stop bit   1 bit
                          Code   ASCII
                          Terminator   CR LF   (CR: 0Dh, LF: 0Ah)
- Pin connections

Pin No.	Signal name	Direction	Description
1	-		
2	RXD	Input	Receive data
3	TXD	Output	Transmit data
4	-		
5	SG	-	Signal ground
6	-		
7	DSR	Output	Data set ready
8	-	-	

- Circuits

- Adaptable connector   DIN 8pin, (TCP0586)

16.1. Data Format

Bit Format

RS-232C
1 −5V ~ −15V
0 +5V ~ +15V

LSB 0 1 2 3 4 5 MSB 6

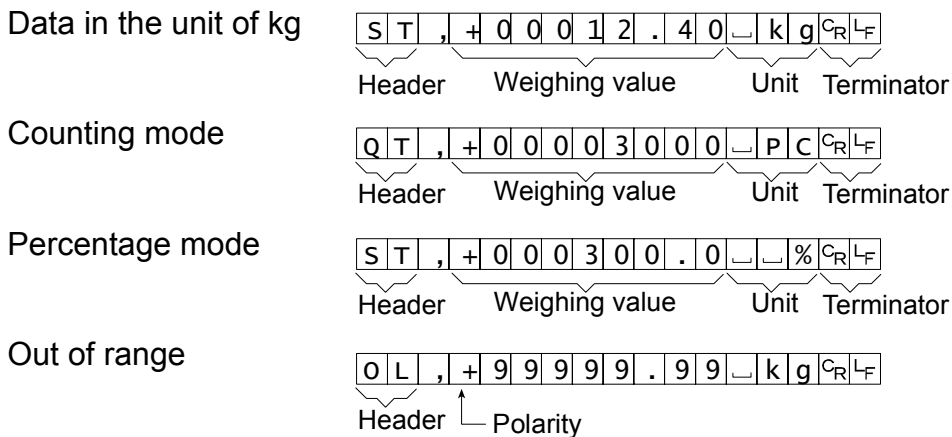Data bits — Start bit — Parity bit — Stop bit
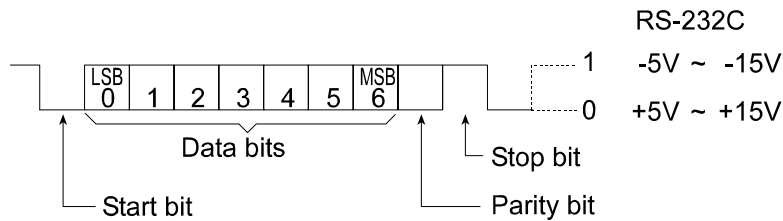
Format 1

□ There are four headers for the type of data and weighing condition.

| Stable weighing data | S T | Unstable weighing data | U S |
| Stable counting data | Q T | Out of range (Over) | O L |

□ The weighing data consists of 9 characters including decimal point and polarity.

□ The polarity is always output.

□ There are three units. The unit is 3 characters.

□ In case of "out of range", numbers become all 9's.

□ The terminator is always output as CR LF.

Data in the unit of kg

S T , + 0 0 0 1 2 . 4 0 ␣ k g CR LF

Header — Weighing value — Unit — Terminator

Counting mode

Q T , + 0 0 0 0 3 0 0 0 ␣ P C CR LF

Header — Weighing value — Unit — Terminator

Percentage mode

S T , + 0 0 0 3 0 0 . 0 ␣ ␣ % CR LF

Header — Weighing value — Unit — Terminator

Out of range

O L , + 9 9 9 9 9 . 9 9 ␣ k g CR LF

Header — Polarity

□ Definition of symbols

CR (carriage return)   CR   LF (line feed)   LF
0Dh   0Ah

Space   ␣
20h

Format 2

- There are four headers for the type of data and weighing condition.

  Stable weighing data   `S T`   Unstable weighing data   `U S`

  Stable counting data   `Q T`   Out of range   `O L`

- The weighing data consists of 7 characters including decimal point and polarity.

- The polarity is always output.

- There are three units. The unit is 2 characters.

- In case of "out of range", numbers become all 9's.

- The terminator is always output as CR LF.

Caution

When the data is longer than 7 characters in the counting, precentage mode or accumulation function, the overflow is ignored.

Data in the unit of kg   `S T , + 0 0 2 . 4 0 k g CR LF`

Header   Weighing value   Unit   Terminator

Counting mode   `Q T , + 0 0 3 0 0 0 P C CR LF`

Header   Weighing value   Unit   Terminator

Percentage mode   `S T , + 0 3 0 0 . 0 ␣ % CR LF`

Header   Weighing value   Unit   Terminator

Out of range   `O L , + 9 9 9 . 9 9 k g CR LF`

Header   Polarity

- Definition of symbols

  CR (carriage return)   `CR`   LF (line feed)   `LF`
  0Dh   0Ah

  Space   `␣`
  20h

❑ The scale outputs the current display data at the time when refreshing the display. The scale does not output data while in the setting mode.

Averaging of function table		Refresh rate
F 13 0	Fast response Sensitive value	Approximately 7 times/s while the display is unstable, Approximately 4 times/s when the display is stable
F 13 1	⇕	Approximately 4 times/s
F 13 2	Slow response Stable value	

16.2.1. Preparation and Performance (Examples)

Step 1 Turn off the display.
Press the ON/OFF switch while the ZERO switch is pressed and held. The function table is displayed.

Step 2 Press the ENTER switch to display F4 ("Baud rate"). Select a parameter of "Baud rate" with the ∧ switch.

Step 3 Press the ENTER switch to display F5 ("Output mode").
Select "Stream mode (F5 0)" with the ∧ switch.

Step 4 Press the ENTER switch to display F 15 ("Format"). Select "Format 1 (F 15 0)" with the ∧ switch.

Step 5 Press the ENTER switch to display End.

Step 6 Press the ENTER switch to store the new parameters. The scale returns to the normal weighing mode and outputs the data continuously.

Display off
ZERO →O← Press and hold ON/OFF
I/⏻ Press

F 1 0
Function table

MODE
ENTER
SAMPLE →n RANGE →n

F 4 0
Baud rate

MODE
ENTER
SAMPLE →n RANGE →n

F 5 0
Stream mode

MODE
ENTER
SAMPLE →n RANGE →n

F 15 0
Format 1

MODE
ENTER

End
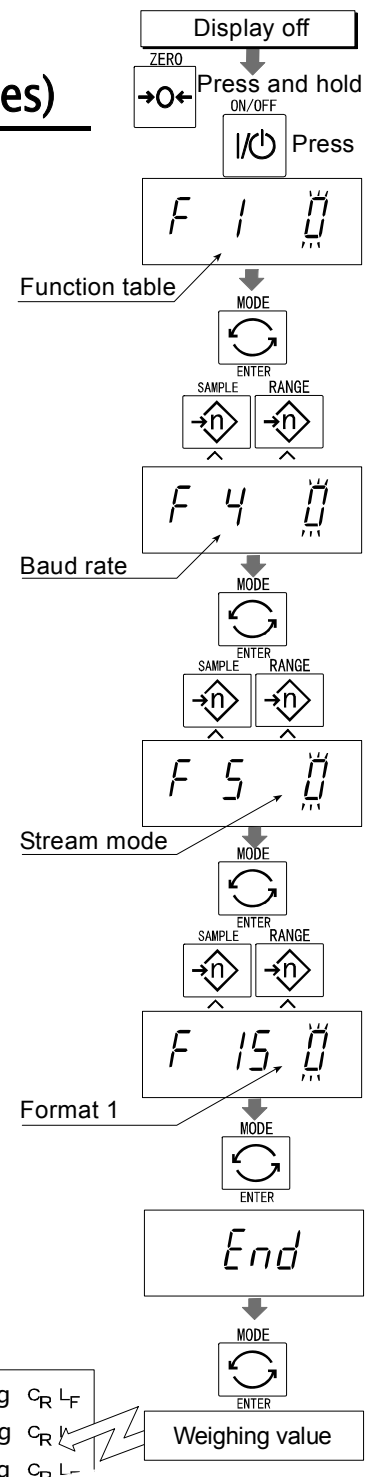
MODE
ENTER

ST,0000.000‿kg cR LF
US,0010.645‿kg cR LF
‿544‿kg cR LF

Weighing value

⬇ 16.3. Command Mode

❑ The command mode is the function which can perform "output data", "controlling the scale" and "setting parameters" by a command transmitted from a computer

Caution   Allow at least 500 milliseconds between commands.

16.3.1. Command List

The following explanation uses "Format 1 ($\boxed{F\ 15\ 0}$)"

Data output
The current weighing data is output.
Template   Q
Command $\boxed{Q}\boxed{C_R}\boxed{L_F}$
Reply $\boxed{S}\boxed{T}\boxed{,}\boxed{+}\boxed{0}\boxed{0}\boxed{0}\boxed{1}\boxed{2}\boxed{.}\boxed{4}\boxed{0}\boxed{\sqcup}\boxed{k}\boxed{g}\boxed{C_R}\boxed{L_F}$

Selection of mode and unit
Selects the mode and unit. This is the same as the $\boxed{\text{MODE}}$ switch.
Template   U
Command $\boxed{U}\boxed{C_R}\boxed{L_F}$
Reply   The scale changes mode and unit.

Zero
The current mass value is set to the zero point.
This is the same as the $\boxed{\text{ZERO}}$ switch.
Template   Z
Command $\boxed{Z}\boxed{C_R}\boxed{L_F}$
Reply   The mass value becomes zero and the zero point mark is displayed.

Tare
The current mass value is set to zero after placing a tare (container, receptacle, case, etc) and the net value is displayed. This is the same as the $\boxed{\text{TARE}}$ switch.
Template   T
Command $\boxed{T}\boxed{C_R}\boxed{L_F}$
Reply   The current mass value becomes zero and the net mark is displayed.

Cancel of tare
The display value becomes the gross and the net mark is turned off. (The tare value becomes zero.)
Template   CT
Command $\boxed{C}\boxed{T}\boxed{C_R}\boxed{L_F}$
Reply   Gross is displayed and the net mark is turned off.

Preset tare

The tare value is set and the net value is displayed. The set value is a 5 digit numerical value with a polarity sign and does not contain a decimal point.

Template   PT, [parameter]
Command   `P T , + 0 0 1 2 0 C_R L_F`
Reply   Net is displayed and the net mark is displayed.

Upper limit value

An upper limit value is stored. The set value is a 5 digit numerical value with a polarity sign and does not contain a decimal point.

Template   HI, [parameter]
Command   `H I , + 0 1 2 0 0 C_R L_F`
Reply   The upper limit value is stored.

Caution   The upper limit value must be greater than the lower limit value.

Lower limit value

A lower limit value is stored. The set value is a 5 digit numerical value with a polarity sign and does not contain a decimal point.

Template   LO, [parameter]
Command   `L O , – 0 0 4 0 0 C_R L_F`
Reply   The lower limit value is stored.

Caution   The lower limit value must be less than the upper limit value.

Accumulation data output

The accumulated data is output.

Template   A
Command   `A C_R L_F`
Reply   `A , + 0 2 3 1 2 . 4 0 ␣ k g C_R L_F`

Accumulation count output

The number of accumulated data is output.

Template   N
Command   `N C_R L_F`
Reply   `N , + 0 0 0 0 0 0 1 4 0 ␣ ␣ ␣ C_R L_F`

Reset of Accumulation data and Accumulation count

The data and number of accumulations become zero.

Template   CA
Command   `C A C_R L_F`
Reply   The data and number of accumulations become zero.

Final value

The final value is stored. The set value is a 5 digit numerical value with a polarity sign and does not contain a decimal point.

Template   S0, [parameter]

Command   `S 0 , + 0 2 0 0 0` ᶜᴿ ᴸꜰ

Reply   The value is stored.

Preliminary value

The preliminary value is stored. The set value is a 5 digit numerical value with a polarity sign and does not contain a decimal point.

Template   S1, [parameter]

Command   `S 1 , + 0 0 2 0 0` ᶜᴿ ᴸꜰ

Reply   The value is stored.

Zero band

The zero band is stored. The set value is a 5 digit numerical value with a polarity sign and does not contain a decimal point.

Template   S2, [parameter]

Command   `S 2 , + 0 0 5 0 0` ᶜᴿ ᴸꜰ

Reply   The value is stored.

16.3.2.   Example of Setting Parameters

Step 1 Turn off the display.
Press the ON/OFF switch while the ZERO switch is pressed and held. The function table is displayed.

Step 2 Press the ENTER switch to display F4 ("Baud rate").
Select a parameter of "Baud rate" with the ∧ switch.

Step 3 Press the ENTER switch to display F5 ("Output mode").
Select "Command mode (F5 1)" with the ∧ switch.

Step 4 Press the ENTER switch to display F15 ("Format").
Select "Format 1 (F15 0)" with the ∧ switch.

Step 5 Press the ENTER switch to display End.

Step 6 Press the ENTER switch to store the new parameters.
The scale returns to the normal weighing mode.

Step 7 When the computer transmits a command, the scale replies.

Display off

ZERO →O← Press and hold ON/OFF

I/Ø Press

F 1 0

Function table — MODE / ENTER

SAMPLE →n←   RANGE →n←

F 4 0

Baud rate — MODE / ENTER

SAMPLE →n←   RANGE →n←

F 5 1

Command mode — MODE / ENTER

SAMPLE →n←   RANGE →n←

F 15 0

Format 1 — MODE / ENTER

End

MODE / ENTER

Weighing value

---
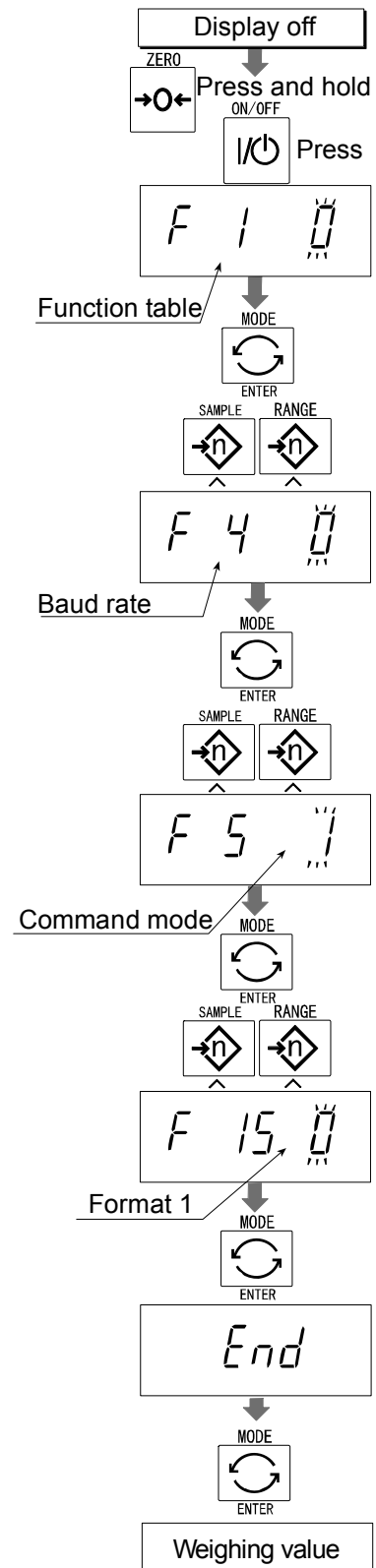
17. Options

17.1. Extension Cable (OP-02)

- This cable is used for installing the indicator away from the base unit.
- This loadcell cable is 5m long.
- Refer tos " 5.1. Removing the Pole" for the way to remove the pole.

Caution
- **Calibrate the scale after connecting this cable.**
- **Do not connect more than two extension cables.**

Extension cable
Connect to the indicator.
Connect to the front connector
on the connector board.

Connector case

Packing C

Cap

Tapping screw
M4x10 of accessory

Connector board

The loadcell cable from the base unit.
Connect to the rear connector on the
connector board.

Attachment

5m extension cable

2m loadcell cable (at least).

Indicator

Base unit

Indicator holder

To be purchased separately as an option.
AX:043005266

Note
The pan shape depends
on the scale model.

17.2. RS-232C/ Relay Output/ Buzzer (OP-03)

Note   When the OP-03 is used, be sure to set the "Address ($\boxed{F11}$) " to "($\boxed{00}$)".

- ☐ This option replaces the standard RS-232C interface, refer to "16. RS-232C Serial Interface" for specification of RS-232C.

- ☐ The following option cables can be used, when you do not use the relay output.
  AX-KO577A-200   RS-232C cable, D-sub 25 pin, 2 m
  AX-KO1786-200   RS-232C cable, D-sub 9 pin, 2 m

- ☐ Pin connections

Pin No.	Signal name	Direction	Description
1	HI	Output	Relay output of HI
2	RXD	Input	Receive data
3	TXD	Output	Transmit data
4	LO	Output	Relay output of LO
5	SG	-	Signal ground (RS-232C)
6	OK	Output	Relay output of OK
7	DSR	Output	Data set ready
8	COM	-	Relay common terminal

- ☐ Adaptable connector   DIN 8pin, JA:TCP0586 (of accessory)

- ☐ Circuits
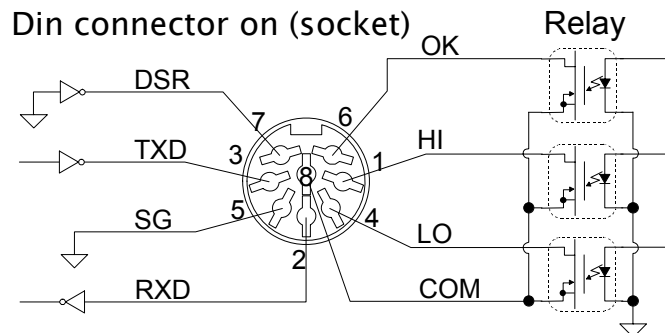
- ☐ Relay   Solid-state-relay   Maximum voltage   DC50V
  Maximum current   DC100mA
  Maximum resistance   8 Ω

17.2.1.   Installing the OP-03

Caution **Do not pull on the connected cables while opening the rear panel.**

Step 1   Remove the plastic panel from the option board.

Step 2   Remove eight pairs of screws and O rings from the indicator unit. Open the rear panel of the unit.

Step 3   Remove the standard interface board from the indicator unit. Install the option board at the same position.

Step 4   Connect the cable to the J1 connector on the option board.

Step 5   Connect the DIN plug to the option board.

Step 6   Close and secure the rear panel using the screws and O rings removed at step 2.

3mm screws

Step1

Plastic panel

Step2
Screws and O rings

Inside of rear panel

Step4

RS-232C
J1
DIN

OP-03
J1 DIN

Step3

Step5

Step3
3mm screws

DIN connector plug

Cable clamp for option
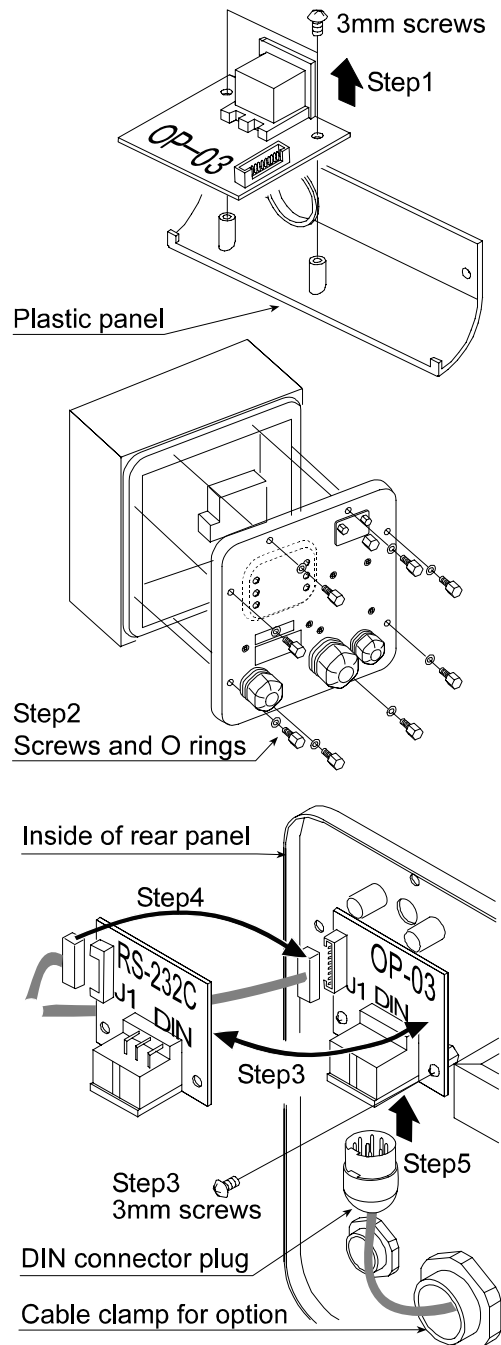
17.3. RS-422/ RS-485 / Relay Output (OP-04)

❏ Replacing the standard RS-232C interface with this option, the RS-422/ RS-485 interface can connect up to 16 scales and control them from a computer.

❏ The RS-422/ RS-485 interface has the following two modes.
Stream mode　　　Outputs data continuosly.
Command mode　　Controls the scale using commands from a computer.

❏ Set the parameters for the "Baud rate ($F4$)", " Output mode ($F5$)", "Address ($F11$)", " Format ($F15$)", in the function table, in advance.

❏ Transmission system　　　EIA RS-422/ RS-485
❏ Transmission　　　Asynchronous, bi-directional, half-duplex
❏ Data format　　　Baud rate:　　2400, 4800, 9600 bps
　　　　　　　　　　　Data:　　　　7 bits
　　　　　　　　　　　Parity:　　　1 bit, Even
　　　　　　　　　　　Start bit　　1 bit
　　　　　　　　　　　Stop bit　　1 bit
　　　　　　　　　　　Code　　　　ASCII
　　　　　　　　　　　Terminator　CR LF　(CR: 0Dh, LF: 0Ah)

❏ Address　　　01 ~ 99　　　Address parameter ($F11$) of the function table.

❏ Relay　　　Solid-state-relay
　　　　　　　Maximum voltage　　　DC50V
　　　　　　　Maximum current　　　DC100mA
　　　　　　　Maximum resistance　8 Ω

❏ Adaptable connector　　　TM:BLA9 (of accessory)

❏ Pin connections

Pin No.	Signal name	Direction	Description
1	SDA	Output	RS-422/485 transmission A terminal
2	SDB	Output	RS-422/485 transmission B terminal
3	RDA	Input	RS-422/485 receive A terminal
4	RDB	Input	RS-422/485 receive B terminal
5	TRM	-	120Ω terminator
6	HI	Output	Relay output of HI
7	OK	Output	Relay output of OK
8	LO	Output	Relay output of LO
9	COM	-	Relay common terminal

□   Circuits

RS-422 input
RS-485 input

5V

47kΩ

47kΩ

4.7kΩ

4.7kΩ

RS-485 output
RS-422 output

120Ω

Relay

HI

OK

LO

1	2	3	4	5	6	7	8	9
SDA	SDB	RDA	RDB	TRM	HI	OK	LO	COM

RS-422/485 terminal | Relay output
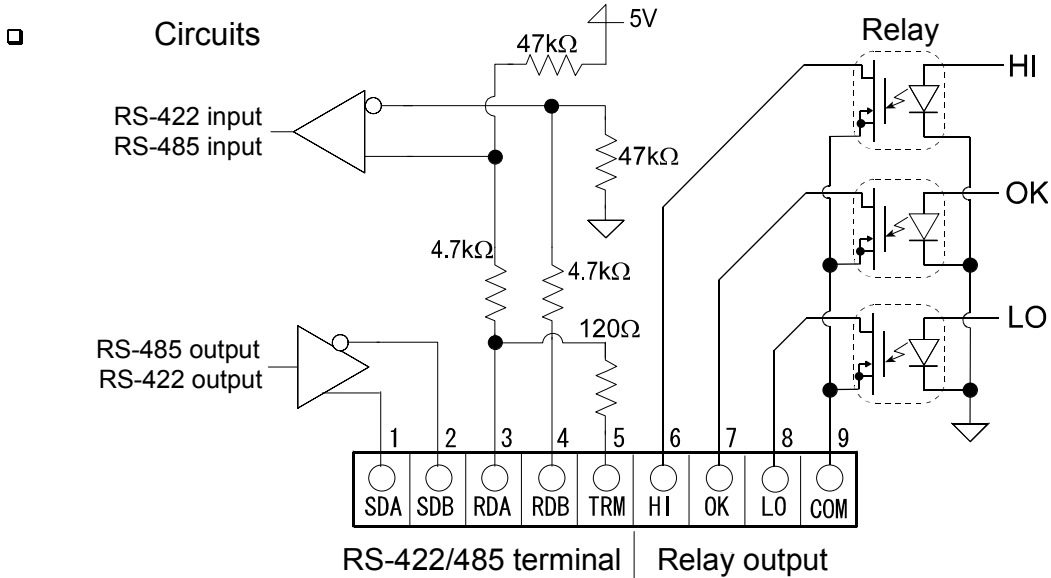
Selection switch for the RS-422/ RS-485 interface

Selects either of RS-422 or RS-485 interface using a switch on the board.

17.3.1.   Installing the OP-04

Caution Do not pull on the connected cables while opening the rear panel.

Step 1   Remove eight pairs of screws and O rings from the indicator unit. Open the rear panel of the unit.

Step 2   Remove the standard interface board from the indicator unit. Install the option board at the same position.
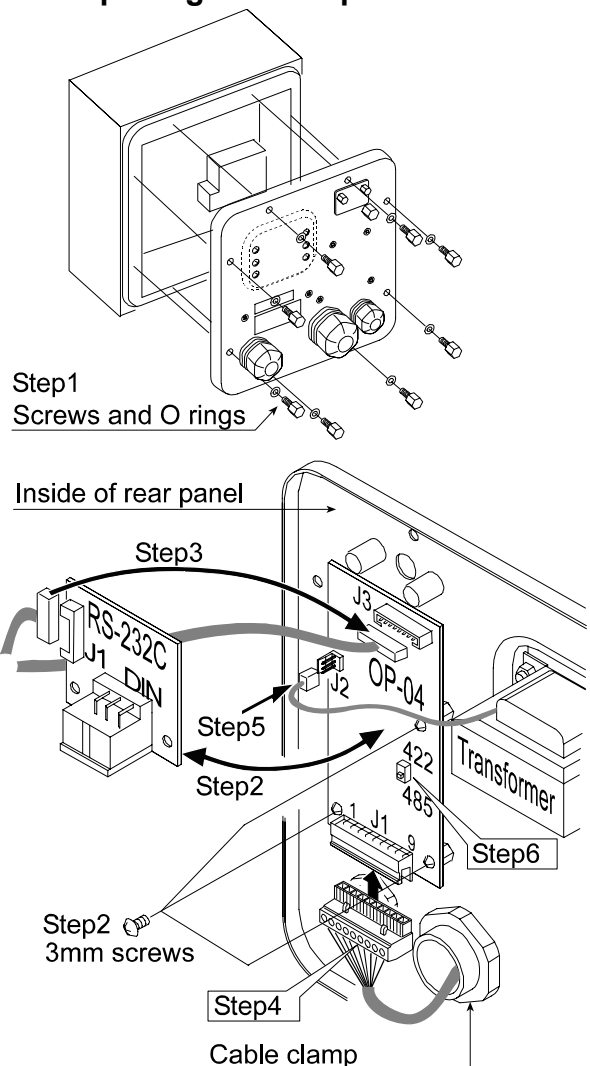
Step 3   Connect the cable to the J3 connector on the option board.

Step 4   Wire the connector for J1 and connect it to the option board.

Step 5   Connect a cable from the transformer to the J2 connector.

Step 6   Set a interface type with the switch.

Step 7   Close and secure the rear panel using the screws and O rings removed at step 1.

Step1
Screws and O rings
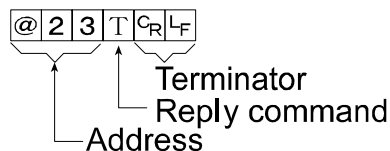
Inside of rear panel

Step3

RS-232C

J1

DIN

J3

J2

OP-04

Step5

Step2

422

485

Transformer

Step6

J1

Step2
3mm screws

Step4

Cable clamp

An example of connection

The polarities (A,B) of the host computer signal depends on the computer model.

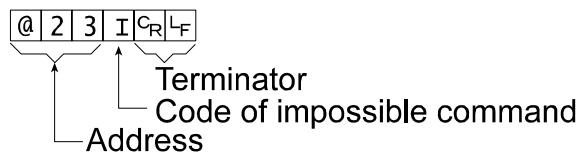Connect the terminator to the ones farthest from the host computer.
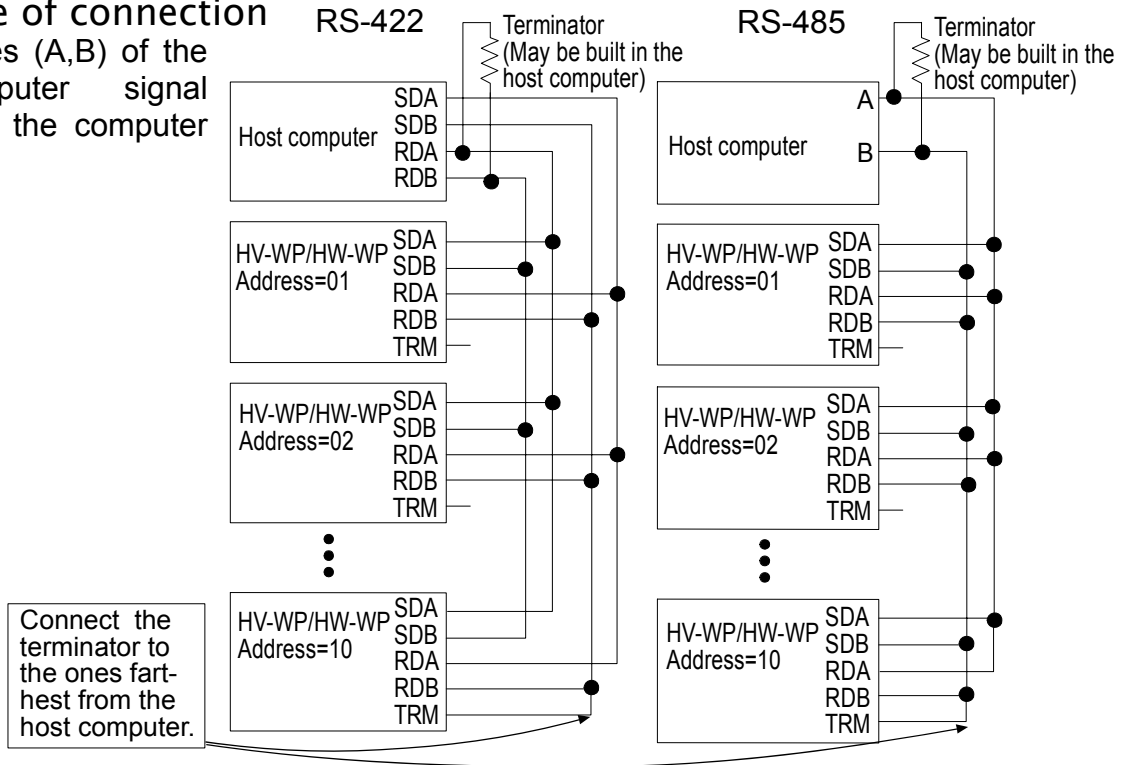
17.3.2.   Communication Format

❑ Commands consist of an address and the same command as for the RS-232C.
❑ The address of the equipment is inserted in the first part of the command.
❑ Commands return the same command when the communication format is $\boxed{F\ 15\ 3}$ and there is no data transmitted.
❑ If the address is 23, the reply is as follows:

Normal response

$\boxed{@|2|3|T|^C_R|^L_F}$

Terminator
Reply command
Address

Impossible command response

$\boxed{@|2|3|I|^C_R|^L_F}$

Terminator
Code of impossible command
Address

Undefined command response

$\boxed{@|2|3|?|^C_R|^L_F}$

Terminator
undefine code
Address

Bit format

Differential (A - B)	
1	-2V ~ -5V
0	+2V ~ +5V

LSB 0 1 2 3 4 5 MSB 6
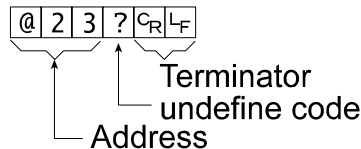
Data bits
Start bit
Stop bit
Parity bit
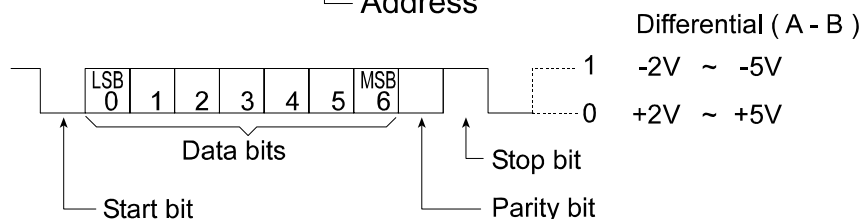
17.3.3. Command List

The following explanation uses "Format 1 ($F15\ 3$)" assuming 23 as the address.

Data output

The current weighing data is output.

Template   Q
Command   @ 2 3 Q C_RL_F
Reply   @ 2 3 S T , + 0 0 0 1 2 . 4 0 ␣ k g C_RL_F

Selection of mode and unit

Selects the mode and unit. This is the same as the [MODE] switch.

Template   U
Command   @ 2 3 U C_RL_F
Reply   @ 2 3 U C_RL_F
               The scale changes mode and unit.

Zero

The current mass value is set to the zero point.
This is the same as the [ZERO] switch.

Template   Z
Command   @ 2 3 Z C_RL_F
Reply   @ 2 3 Z C_RL_F
               The mass value becomes zero and the zero point mark is displayed.

Tare

The current mass value becomes zero after placing a tare (receptacle, case, etc) and the net is displayed. This is the same as the [TARE] switch.

Template   T
Command   @ 2 3 T C_RL_F
Reply   @ 2 3 T C_RL_F
               The current mass value becomes zero and the net mark is displayed.

Cancel of tare

The display value becomes the gross and the net mark is turned off. (The tare value becomes zero.)

Template   CT
Command   @ 2 3 C T C_RL_F
Reply   @ 2 3 C T C_RL_F
               Gross is displayed and the net mark is turned off.

Preset tare

The tare value is set and the net value is displayed. The set value is a 5 digit numerical value with a polarity sign and does not contain a decimal point.

Template   PT, [parameter]
Command   @ 2 3 P T , + 0 0 1 2 0 C_RL_F
Reply   @ 2 3 P T , + 0 0 1 2 0 C_RL_F
               Net is displayed and the net mark is displayed.

Upper limit value

An upper limit value is stored. The set value is a 5 digit numerical value with a polarity sign and does not contain a decimal point.

Template   HI, [parameter]
Command   @ 2 3 H I , + 0 3 2 1 0 C_RL_F
Reply   @ 2 3 H I , + 0 3 2 1 0 C_RL_F
               The upper limit value is stored.

Caution   **The upper limit value must be greater than the lower limit value.**

Lower limit value

A lower limit value is stored. The set value is a 5 digit numerical value with a polarity sign and does not contain a decimal point.

Template   LO, [parameter]
Command   `@23LO,-00400`CR LF
Reply   `@23LO,-00400`CR LF
          The lower limit value is stored.

Caution   **The lower limit value must be less than the upper limit value.**

Accumulation data output

The accumulated data is output.

Template   A
Command   `@23A`CR LF
Reply   `@23A,+000012.40 kg`CR LF

Accumulation count output

The number of accumulated data is output.

Template   N
Command   `@23N`CR LF
Reply   `@23N,+00000140   `CR LF

Reset of Accumulation data and number

The data and number of accumulations become zero.

Template   CA
Command   `@23CA`CR LF
Reply   `@23CA`CR LF
          The data and number of accumulations become zero.

Final value

The final value is stored. The set value is a 5 digit numerical value with a polarity sign and does not contain a decimal point.

Template   S0, [parameter]
Command   `@23S0,+02000`CR LF
Reply   `@23S0,+02000`CR LF
          The value is stored.

Preliminary value

The preliminary value is stored. The set value is a 5 digit numerical value with a polarity sign and does not contain a decimal point.

Template   S1, [parameter]
Command   `@23S1,+00200`CR LF
Reply   `@23S1,+00200`CR LF
          The value is stored.

Zero band

The zero band is stored. The set value is a 5 digit numerical value with a polarity sign and does not contain a decimal point.

Template   S2, [parameter]
Command   `@23S2,+00050`CR LF
Reply   `@23S2,+00050`CR LF
          The value is stored.

Caution   - **When installing the roller conveyor, calibrate the scale again if necessary.**
- **When installing the roller conveyor, if not calibrating the scale again, the weighing capacity of the scale decreases by the weight of the roller conveyor**

OP–13
This option can be used with the following models.
    HV-200KV-WP,
    HW-100KV-WP,
    HW-200KV-WP
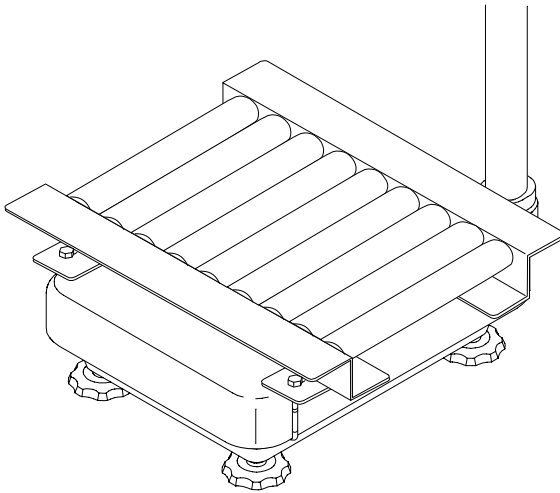
OP–14
This option can be used with the following models.
    HV-60KV-WP,
    HW-60KV-WP

⏬ 18. Specification

HV-WP series

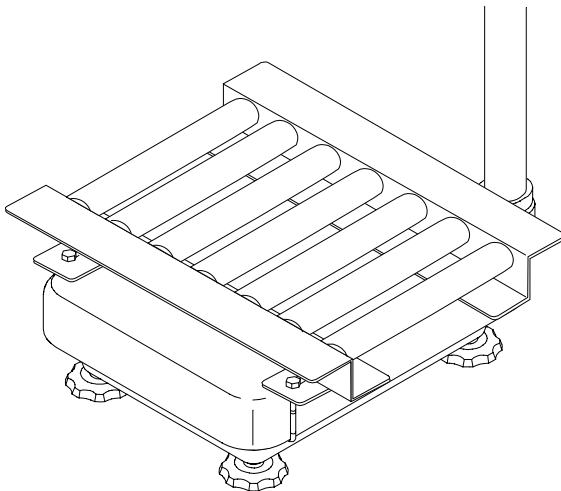| Models	HV-15KV-WP			HV-60KV-WP			HV-200KV-WP		
Weighing Capacity [kg]	3	6	15	15	30	60	60	150	220
Min. weighing (1 digit) [g]	1	2	5	5	10	20	20	50	100
Weighing Capacity [lb] #	6	15	30	30	60	150	150	300	500
Min. weighing (1 digit) [lb] #	0.002	0.005	0.01	0.01	0.02	0.05	0.05	0.1	0.2
Weighing Capacity [oz] #	96	240	480	480	960	2400	2400	4800	8000
Min. weighing (1 digit) [oz] #	0.05	0.1	0.2	0.2	0.5	1	1	2	5
Weighing Capacity [lb_oz] #	30 lb			---					
Min. weighing (1 digit) [lb_oz] #	0.1 oz								
Number of samples in counting mode [pieces]	5（can be changed to 10、20、50、100）								
Max. count number [pieces]	15,000			12,000			11,000		
Display	7 segment fluorescent display, Character height 20mm								
Repeatability [g]	±1	±2	±5	±5	±10	±20	±20	±50	±100
Linearity [g]	±1	±2	±5	±5	±10	±20	±20	±50	±100
Span drift	20ppm/°C typ. (5°C ~ 35°C)								
Power rating	230V AC (+10%-15%) 50/60Hz 20VA, Fuse T200mA or 120V AC (+10%-15%) 50/60Hz 20VA, Fuse T315mA								
Power source	Please confirm that the local voltage and receptacle type are correct for your scale.(50Hz/ 60Hz)								
Ambient temperature and humidity	-10°C ~ 40°C, Less than 85%R.H. (Do not allow condensation)								
Weighing pan size [mm]	250 x 250			330 x 424			390 x 530		
Dimension [mm] Width x Depth x Height	250 x 466 x 377			330 x 615 x 786			390 x 700 x 786		
Mass of scale [kg]	8			13			19		

＃ : If the law in your area allows, you can use these units.

HW-WP series

Models	HW-10KV-WP	HW-60KV-WP	HW-100KV-WP	HW-200KV-WP
Weighing Capacity [kg]	10	60	100	220
Min. weighing (1 digit) [g]	1	5	10	20
Weighing Capacity [lb] #	20	150	200	500
Min. weighing (1 digit) [lb] #	0.002	0.01	0.02	0.05
Weighing Capacity [oz] #	320	2400	3200	8000
Min. weighing (1 digit) [oz] #	0.05	0.2	0.5	1
Weighing Capacity [lb_oz] #	20 lb	---		
Min. weighing (1 digit) [lb_oz] #	0.1 oz			
Number of samples in counting mode [pieces]	5（can be changed to 10、20、50、100）			
Max. count number [pieces]	10,000	12,000	10,000	11,000
Display	7 segment fluorescent display, Character height 20mm			
Repeatability [g]	±2	±10	±20	±40
Linearity [g]	±2	±10	±20	±40
Span drift	20ppm/$^\circ$C typ. (5°C ~ 35°C)			
Power rating	230V AC (+10%-15%) 50/60Hz 20VA, Fuse T200mA or 120V AC (+10%-15%) 50/60Hz 20VA, Fuse T315mA			
Power source	Please confirm that the local voltage and receptacle type are correct for your scale.(50Hz/ 60Hz)			
Ambient temperature and humidity	-10°C ~ 40°C, Less than 85%R.H. (Do not allow condensation)			
Weighing pan size [mm]	250 x 250	330 x 424	390 x 530	390 x 530
Dimension [mm] Width x Depth x Height	250 x 466 x 437	330 x 615 x 786	390 x 700 x 786	390 x 700 x 786
Mass of scale [kg]	8	13	19	19

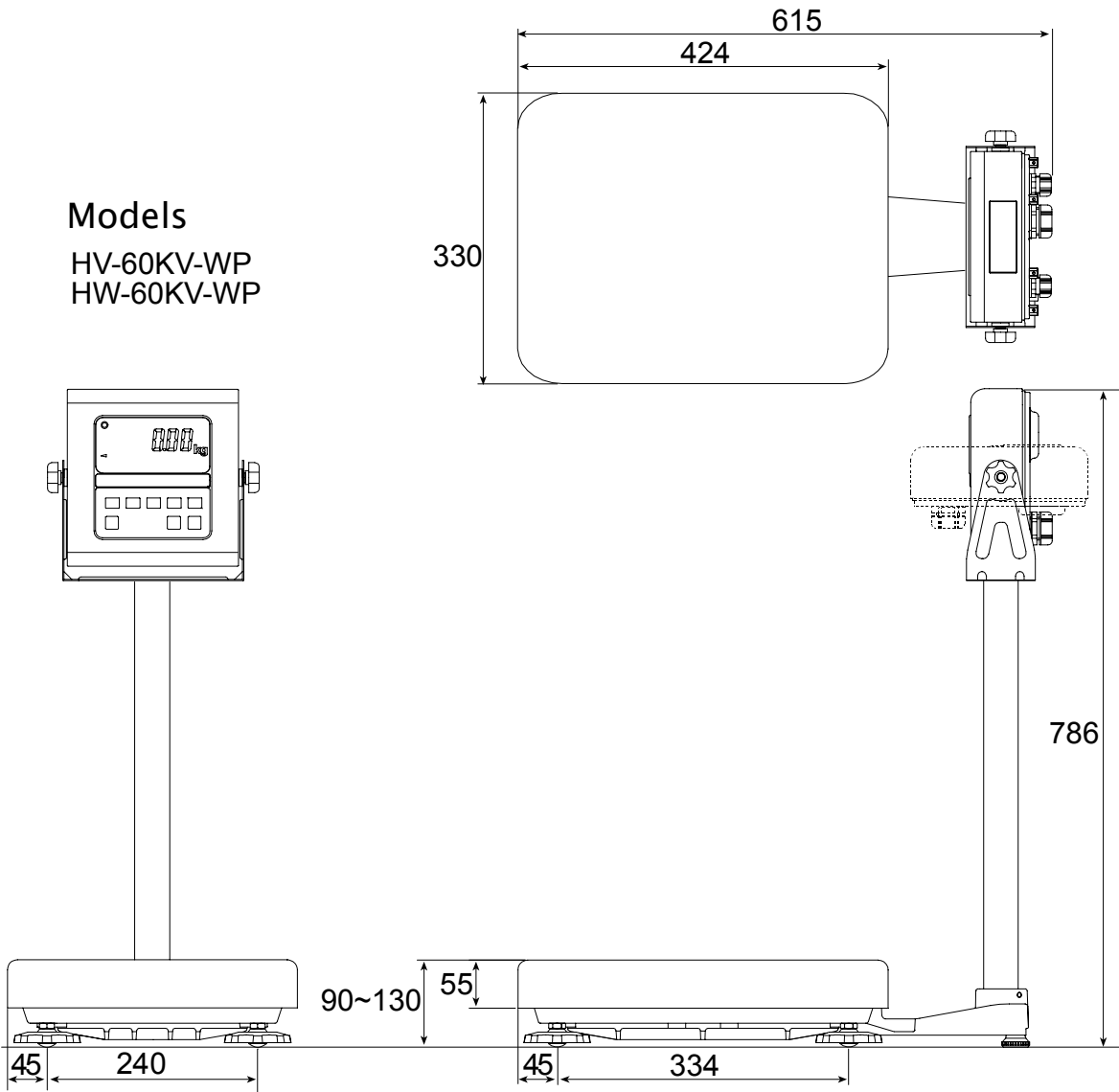＃ : If the law in your area allows, you can use these units.
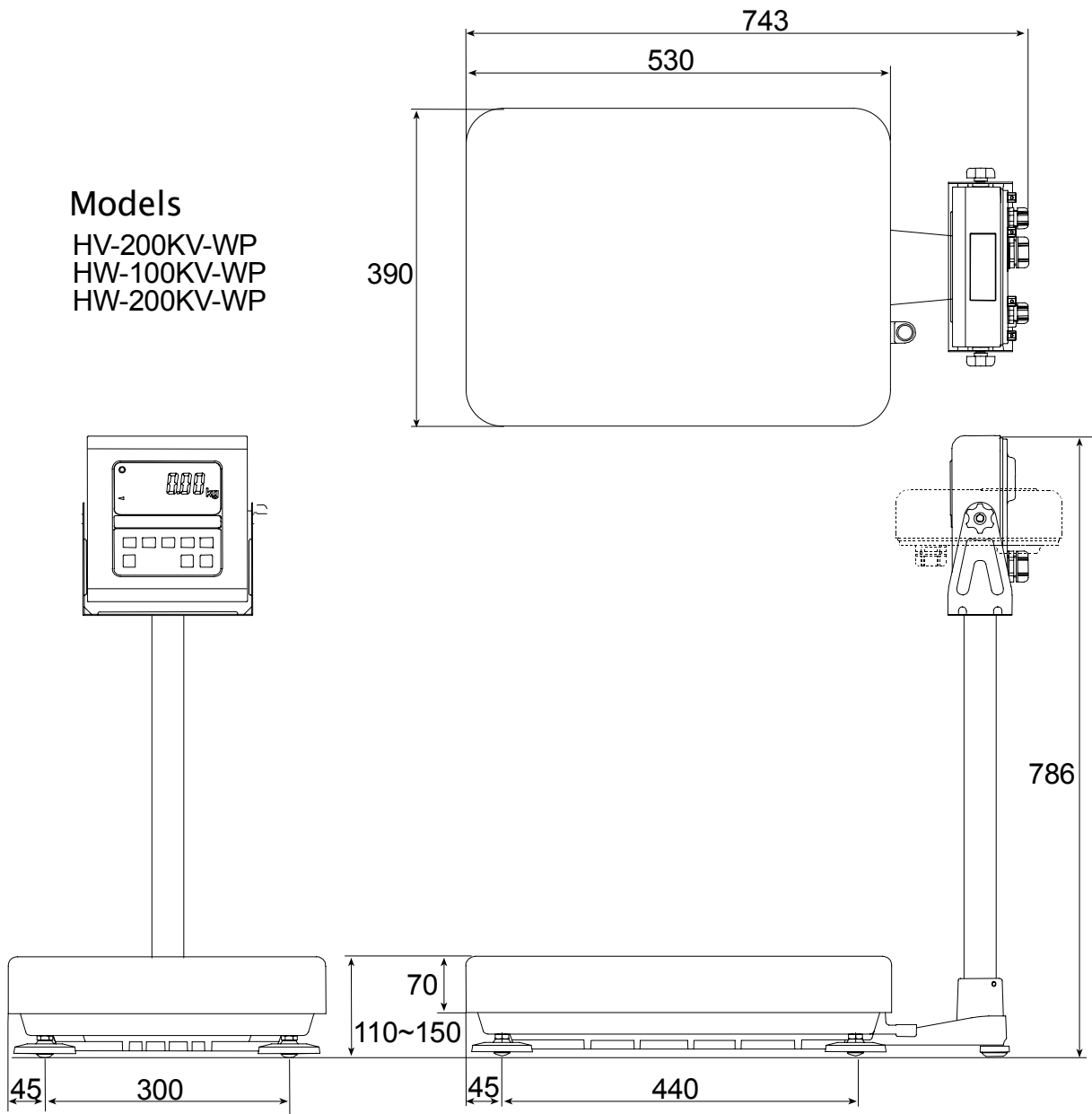
Dimensions

Models
HV-15KV-WP
HW-10KV-WP

466

250

250

90~130

60

35   180

35   180

437

Models
HV-60KV-WP
HW-60KV-WP

615

424

330

90~130

55

45   240

45   334

786

Models

HV-200KV-WP
HW-100KV-WP
HW-200KV-WP

743

530

390

786

70

110~150

45

300

45

440
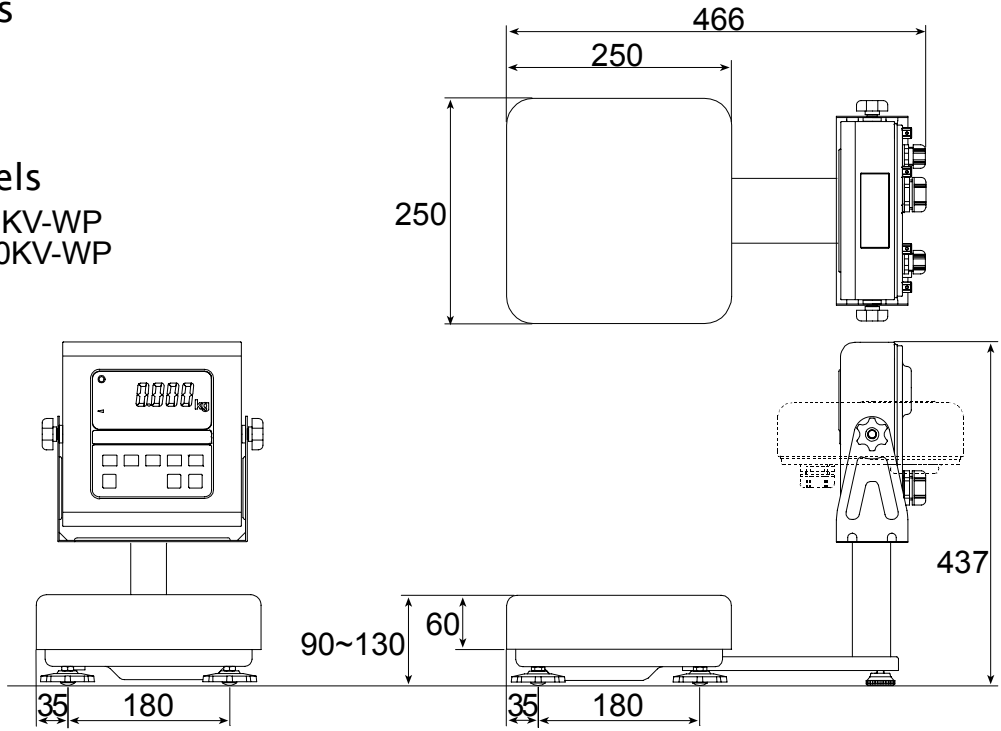
19. Maintenance

- Refer to "4. Caution" for use.
- Refer to "6.1. Display and Symbols " and corresponding mode for displayed error code.
- Refer to "14. Calibration (Adjusting the Scale)" for precision weighing.
- Periodically check the accuracy of weighing. Calibrate the scale, if it is moved to another location or the environment has changed.

19.1.   Check Points Before Calling Maintenance Service

In this situation	Confirm these items
Nothing displayed. Scale does not turn on.	□ Is the AC power cord properly connected? □ Is the AC power the correct voltage ?
The scale does not display zero at first.	□ Check around the weighing pan. □ Is there anything on the weighing pan. □ Perform zero point calibration.
` ------ ` is displayed and does not proceed.	□ The weight value is unstable due to drift, vibration or other. A breeze or vibration may be affecting the measurement. Check around the weighing pan. □ Check the connection of load cell cable. □ No zero display when the display is turned on. Remove anything that is on the pan. □ Perform zero point calibration.
` CAL E ` is displayed	□ Calibration error that meaning "Too heavy".
` -CAL E ` is displayed	□ Calibration error that meaning "Too light".
` E ` is displayed	□ Weighing error that meaning "Over load".
` -E ` is displayed	□ Weighing error that meaning "Under load".
Fixed display	□ Do you use the "hold function" ? □ Turn off scale and turn it on.

19.1.1.   Repair

Do not disassemble/ assemble the scale without an authorized service engineer. It may cause an electric shock or damage to the scale, etc. In this case, repair is not covered under warranty. Contact your local A&D dealer if your scale needs service or repair.

MEMO

HV-WP/HW-WP Series

MEMO

MEMO