

# HV-WP series HW-WP series

## INSTRUCTION MANUAL

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### 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

**AND**

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.

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# 1. Compliance

## 1.1.1. Compliance with FCC rules

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- 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

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- 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

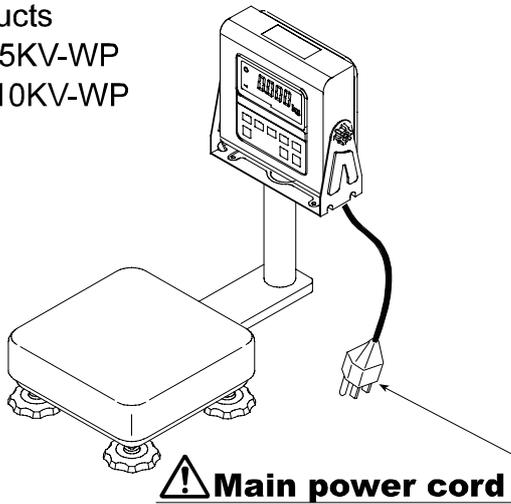
- These scales are designed to comply with IP-65 of IEC 529
- The HV-WP series is a platform scale with 1/3000 resolution, and has a "triple weighing range" function to select the weighing range.
- The HW-WP series is a platform scale with 1/10000 resolution.
- The scales have a fluorescent display so the weighing value can be read in dim light. This type uses the AC power line as a power source.
- 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 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 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 counts 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 ~ F 15)

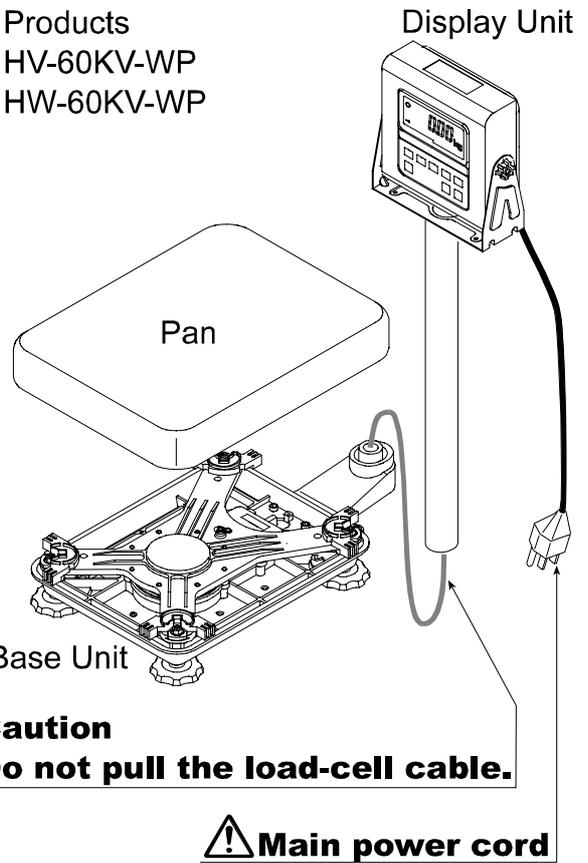


# 3. Unpacking

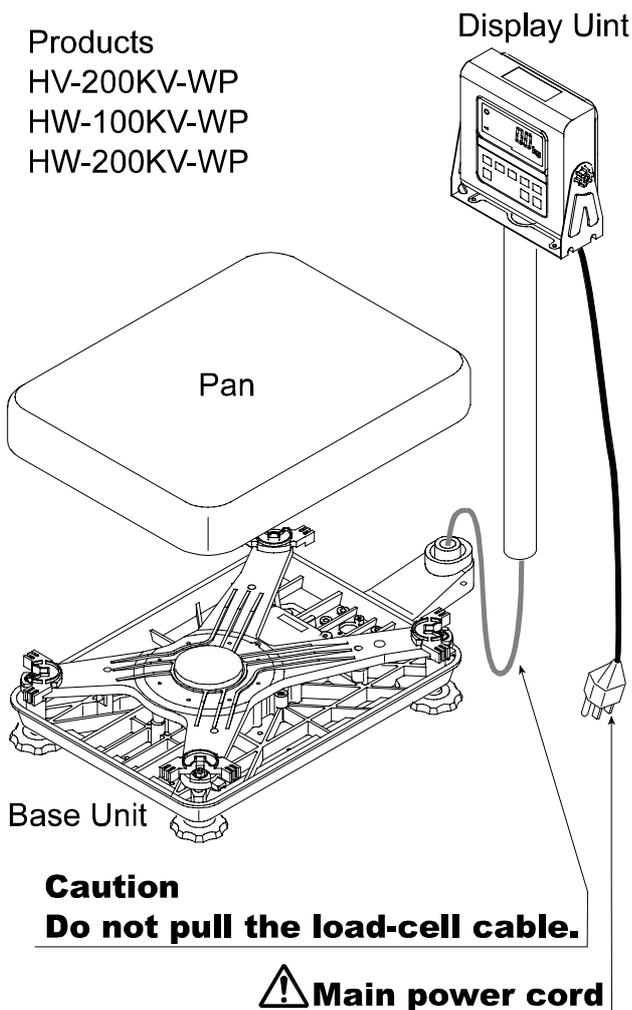
Products  
HV-15KV-WP  
HW-10KV-WP



Products  
HV-60KV-WP  
HW-60KV-WP



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



**Caution**  
**Do not pull the load-cell cable.**

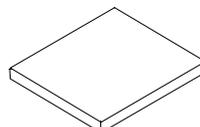
**Caution**  
Main power  
**Please confirm that the local voltage and receptacle type are correct for your scale.**

## All Accessories

Refer to the accessories list on the next page. The combination of accessories is according to the product.



3mm allen wrench



Instruction manual



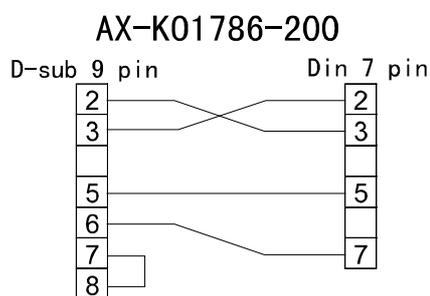
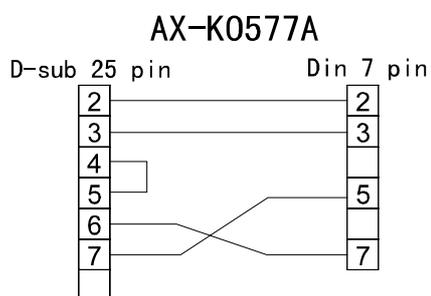
## 3.1. Accessories and Options list

### Accessories for the HV-WP series and HW-WP series

Products	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 with 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 RS-232C cable, D-sub 25 pin, 2m	
AX-KO1786-200 RS-232C cable, D-sub 9 pin, 2m	





## 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 are stable, the place to install the scale is a solid 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** or **TARE** switch before each weighing to prevent possible error.



### 4.3. Precautions for Storing the Scale

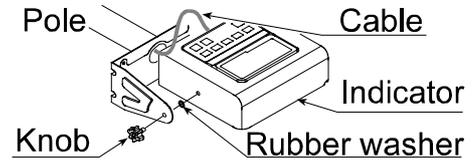
- Do not disassemble the scale.
- Do not use solvents to clean the scale.
- For best cleaning of the display unit, wipe with a dry lint free cloth or a lint free cloth which is moistened with warm water and a mild detergent.
- The base unit can be cleaned with gentle water jets while brushing the base unit. Weigh only after the unit is dry.
- Do not use a powerful water jet.



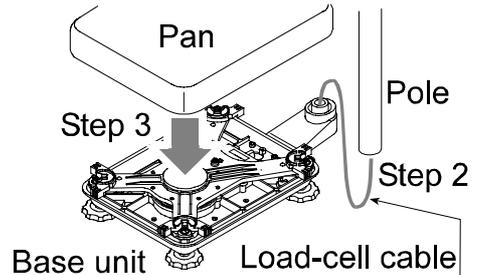
# 5. Installing the Scale

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

Step 1 Connect the indicator unit to the pole with the accessory knobs and rubber washers.

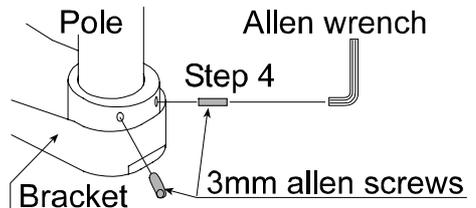


Step 2 Take the base unit and pole out, taking care that the load-cell cable is not pulled.



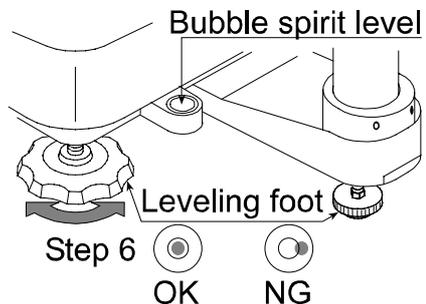
Step 3 Put the weighing pan on the base unit.

Step 4 Insert the remainder of the load cell cable into the pole. Attach the pole to the bracket of the base unit so as not to damage the load cell cable. Affix the pole to the bracket using two 3mm Allen screws.

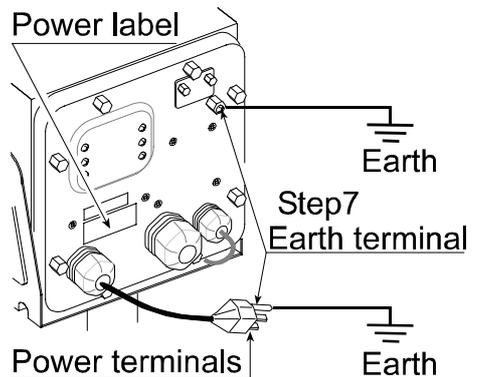


Step 5 Select the place for installing the scale. Also consider "4. Caution" on page 7.

Step 6 Adjust the level of the base unit by using the "Bubble spirit level" and "Leveling foot".



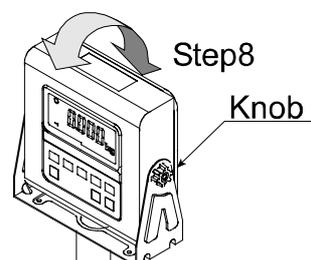
Step 7 Ground the scale using the earth terminal.



### 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 39.



## 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.
- Avoid dust, static electricity and high humidity (or drops) because the inside of the indicator unit is very sensitive.

### Procedure

Step 1 Remove the power plug from the receptacle.

Step 2 Open the rear cover of indicator unit.  
Disconnect the loadcell cable connector gently (perpendicularly, do not pull to the side).

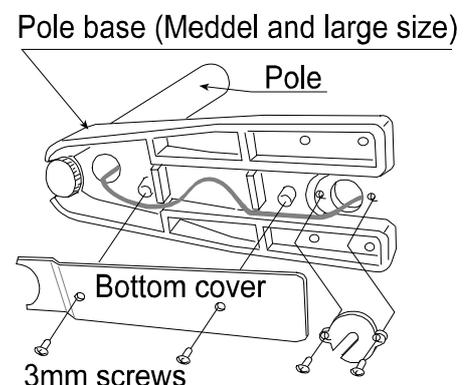
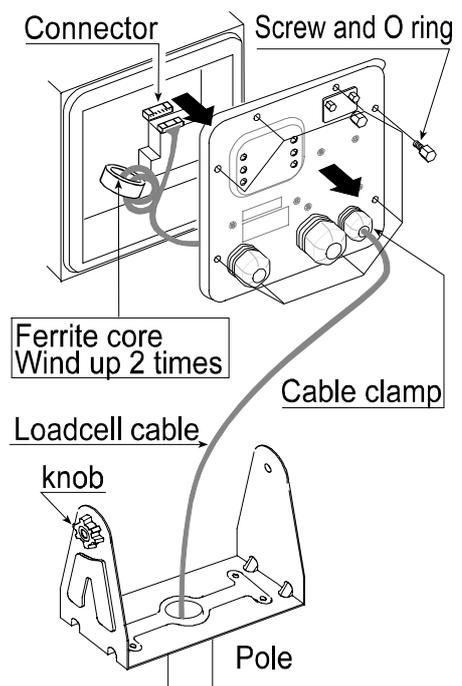
Step 3 Remove the ferrite core and cable clamp from the loadcell cable.

Step 4 Loosen the knobs to remove the indicator unit.

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

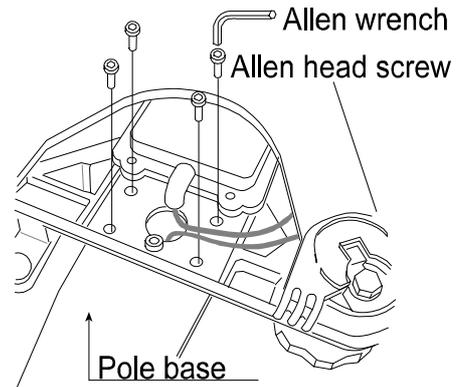
Step 6 Carefully remove the cable from the pole and pole base. Especially, use care with the HV-15KV-WP, HW-10KV-WP so that the connector is not pulled forcibly.

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 pole base from the base unit, requires the following allen wrench.

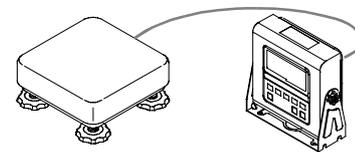
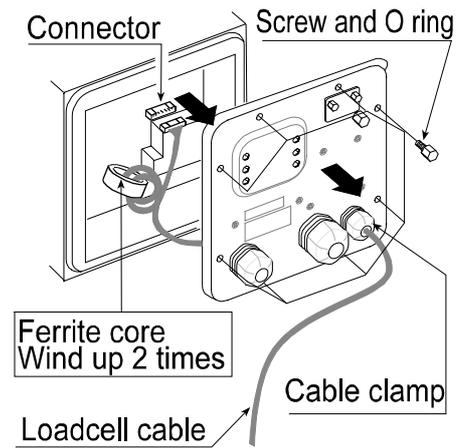
HV-15KV-WP, HV-60KV-WP, HW-10KV-WP, HW-60KV-WP	HV-200KV-WP, HW-100KV-WP, HW-200KV-WP
5mm Allen wrench	6mm Allen wrench



Step 9 Wind the cable through the ferrite core two times. Affix the cable to the rear cover using the cable clamp.

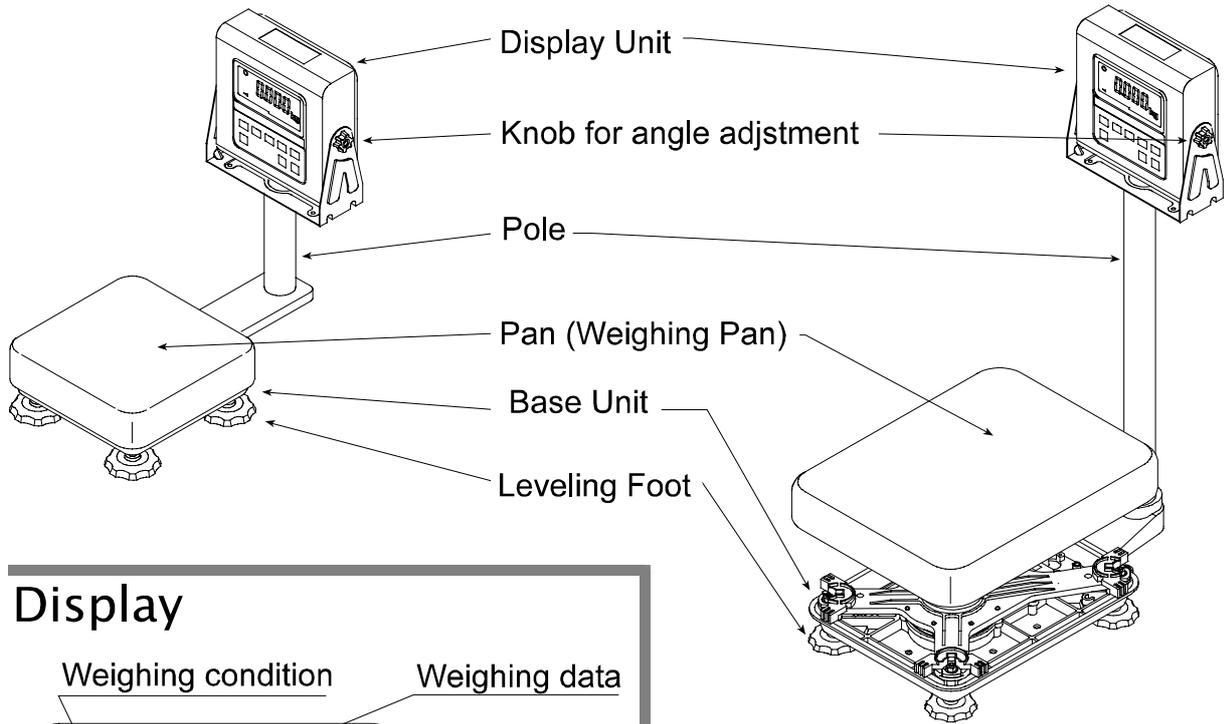
Step 10 Connect the cable to the connector. Close the rear cover.

Step 11 Confirm the accuracy of the scale.

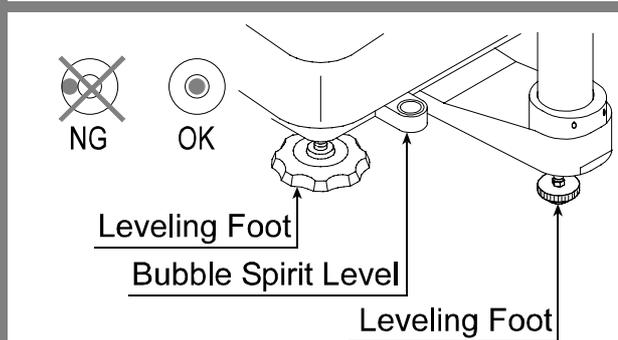
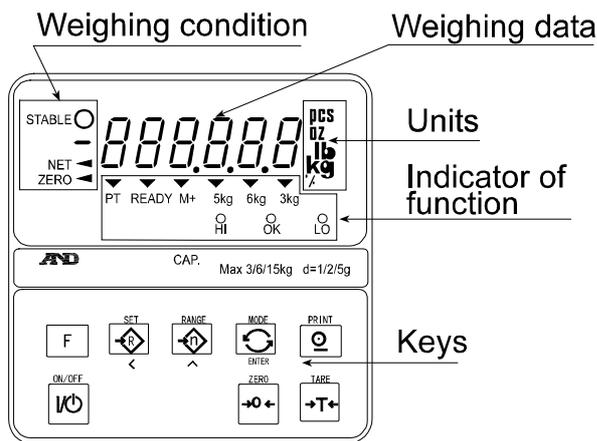




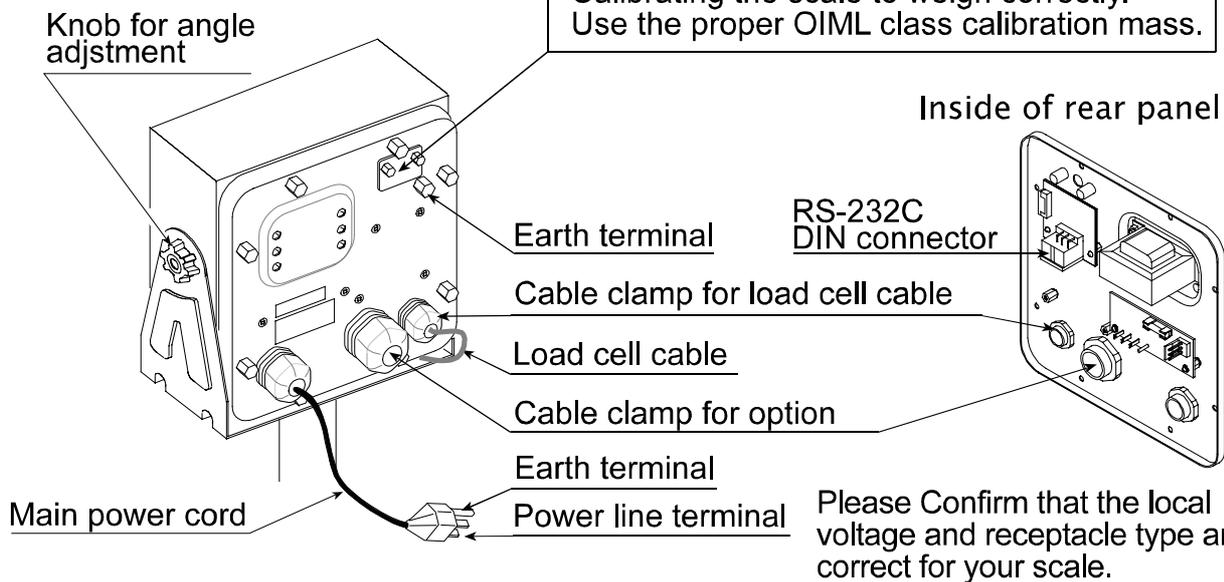
# 6. Names



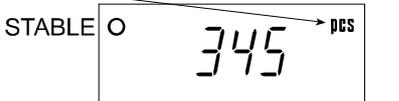
## Display

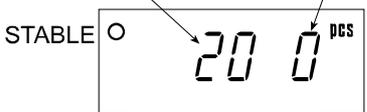
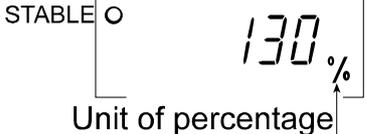
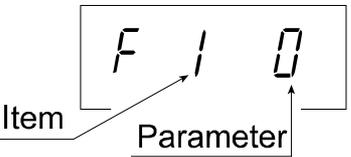
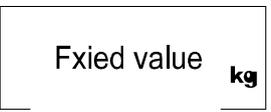
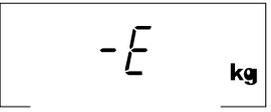
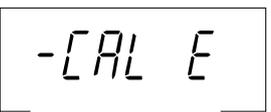


## Rear of Indicator Unit

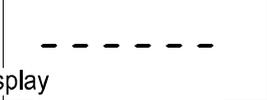
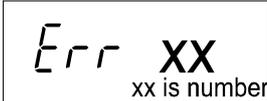


## 6.1. Display and Symbols

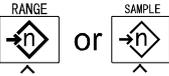
Display and Symbols	Meaning
	<p>Stability mark.</p> <p>When the current weighing value is stable, this mark is displayed, indicating a condition where the value is readable.</p>
	<p>Zero point mark.</p> <p>With nothing on the weighing pan and pressing the <b>ZERO</b> switch, this mark is displayed. The zero point is a fundamental starting point to weigh anything.</p>
	<p>Net mark.</p> <p>Pressing the <b>TARE</b> switch, this mark is displayed with net display.</p>
	<p>Preset tare mark.</p> <p>Storing a tare with digital input, this mark blinks.</p>
	<p>Accumulation mark.</p> <p>Using the accumulation function, this mark is displayed.</p>
	<p>Ready mark for the full/dribble batch function. The meaning of the mark is as follows:</p> <p>ON The weighing value is within the zero-band.</p> <p>OFF The full/dribble batch process is above the zero-band.</p> <p>Blinking The start or end of the full/dribble batch process above the zero-band.</p>
	<p>The comparator indicator.</p> <ul style="list-style-type: none"> <li>□ Using the comparator function and comparing a weighing value with the upper and lower limits, the result is indicated.</li> <li>□ 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.</li> </ul>
<p>ex. HV-15KV-WP    ▾    ▾    ▾</p> <p>15kg    6kg    3kg</p>	<p>The weighing range indicator for the HV-WP series.</p> <p>The current range is indicated.</p>
<p>Wieghed mass value    unit</p> 	<p>Example. Display of zero (zero point).</p> <p>With nothing on the weighing pan and pressing the <b>ZERO</b> switch, this mark is displayed.</p> <p>The zero point mark is displayed.</p> <p>The stability mark is displayed.</p>
<p>Unit of counting mode</p> 	<p>Example. Display of the counting mode.</p> <p>This mode uses the registered unit mass, and counts the amount of articles on the weighing pan. The unit is <b>PCS</b>.</p>

Display and Symbols	Meaning
<p>20 pieces      Zero point</p> 	<p>Example. Storing the unit mass of the counting mode. This is a display of zero point for the counting mode and uses 20 pieces for the registration.</p>
<p>No zero value</p> 	<p>Example. Storing the unit mass of the counting mode. The sign "-" means "weighing value is not zero". Sample number is 10 pieces.</p>
<p>Unit of percentage</p> 	<p>Example. Percentage mode. This mode uses the registered 100% mass, and converts the weighing value to a percentage. The unit is %.</p>
<p>Item      Parameter</p> 	<p>Example. Display of the function table. This function table sets parameters of items.</p> <ul style="list-style-type: none"> <li>&lt; switch      Selecting an item.</li> <li>^ switch      Selecting the parameter of an item.</li> <li>[ENTER] switch      Storing new parameters.</li> </ul>
	<p>Example. Preset tare. Entering tare with digital input.</p> <ul style="list-style-type: none"> <li>&lt; switch      Selecting a figure.</li> <li>^ switch      Selecting a number.</li> <li>[ENTER] switch      Storing a new tare.</li> </ul>
<p>Fixed value      kg</p> 	<p>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.</p>
	<p>Over load display. Remove the mass from the weighing pan.</p>
	<p>Weighing error. Check the base unit and weighing pan.</p>
	<p>Calibration error. The calibration mass is too light. Check the base unit and weighing pan.</p>
	<p>Calibration error. The calibration mass is too heavy. Check the base unit and weighing pan.</p>

The "nearly-zero" is within  $\pm 4$  digits from zero point in the unit of kg.

Display and Symbols	Meaning
 <p>Fixed display</p>	<p>An error where the weighing value is unstable due to drift, vibration or other, when turning on the scale. Check around the weighing pan. Check the connection of load cell cable.</p>
 <p>Fixed display</p>	<p>Remove anything that may be on the weighing pan. Check around weighing pan. Perform zero point calibration of the scale.</p>
 <p>xx is number</p>	<p>Error indication. Refer to "19 Maintenance".</p>
<p>Blinking</p> 	<p>Accumulated data count.</p>
<p>Blinking</p> 	<p>Total mass value of the accumulated data.</p>
<p>Blinking</p> 	<p>Comparator function, display is an upper limit. Full/dribble batch function, the display is a final value.</p>
<p>Blinking</p> 	<p>Full/dribble batch function, the display is a preliminary value.</p>
<p>Blinking</p> 	<p>Comparator function, display is a lower limit. Full/dribble batch function, the display is the zero band.</p>
<p>CAP. MAX. 3/6/15kg d=1/2/5g</p>	<p>Description of the weighing unit, weighing range and measurable minimum mass.</p>

## 6.2. Switches

Display and Symbols	Meaning
	<p>Display ON/ OFF switch. Note Standby status when power is connected.</p>
	<p>Zero switch. When there is nothing on the weighing pan and the <b>ZERO</b> switch is pressed, the scale displays the mass value of zero and the zero point mark. Net is canceled, if it is displayed.</p>
	<p>Tare switch. Canceling the mass of a receptacle, case, bag, etc. which is put on the weighing pan, and does not weigh its mass.</p>
	<p>Range switch, Sample switch.</p> <ul style="list-style-type: none"> <li>❑ Changing weighing range for HV-WP series.(Refer to F2)</li> <li>❑ Storing the unit mass, it is used to select a sample number.</li> <li>❑ In the function table, it is used to select a parameter.</li> </ul>

Display and Symbols	Meaning
	<p>Set switch. Turns the comparator on/off. (Refer to <i>F 6</i> )</p> <ul style="list-style-type: none"> <li>❑ Counting mode, it is used to enter the mode to store the unit mass.</li> <li>❑ Percentage mode, it is used to enter the mode to store the 100% mass.</li> <li>❑ The full/dribble batch function, it is used as a start switch.</li> <li>❑ For the preset tare and selecting a calibration mass, it is used to select a figure.</li> </ul>
	<p>Mode switch.</p> <ul style="list-style-type: none"> <li>❑ Changing the current unit. While setting modes, this switch is used for " storing a parameter and proceeding to the next step".</li> </ul>
	<p>F switch.</p> <ul style="list-style-type: none"> <li>❑ Full/dribble batch function, it is used to finish the process. (Refer to <i>F 10</i> )</li> <li>❑ Hold switch. (Refer to <i>F 12</i> )</li> <li>❑ Setting a preset tare, selects polarity (+,-).</li> </ul>
<p>Display off ↓ Press and hold  And press </p>	<p>Used to enter the function table.</p>
<p>Press and hold  And press </p>	<p>Used to enter the mode to set a preset tare.</p>



## 7. Basic Operation

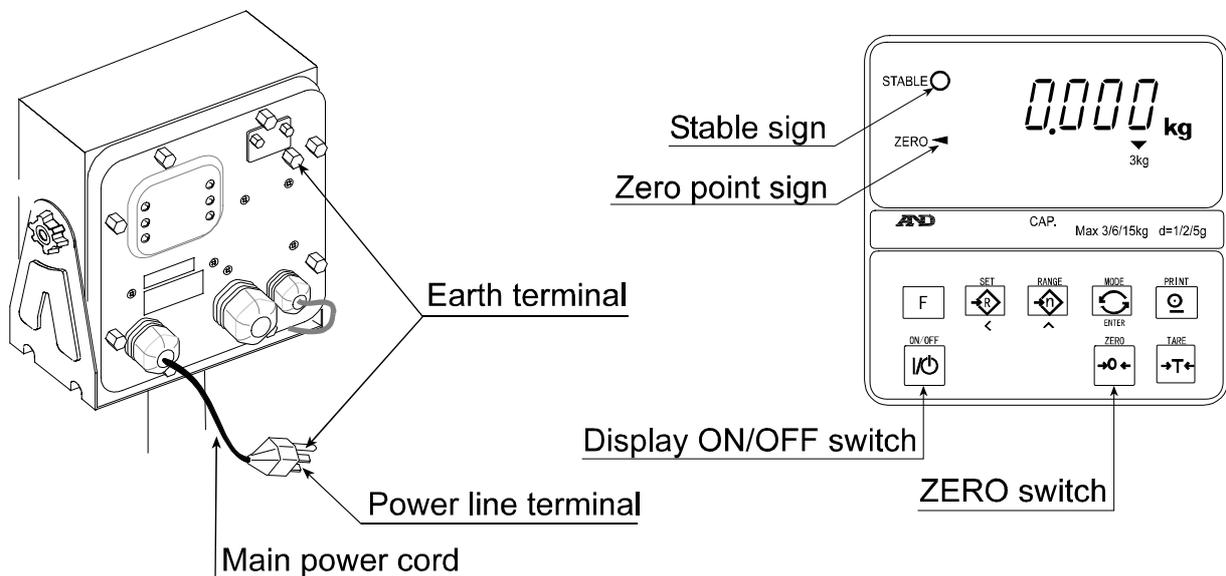


### 7.1. Turing the Scale on/off and Weighing

- 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.



**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 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 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** or **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.

**F** switch      Selecting the polarity (+,-).

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 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.
- There is the automatic range (F2 0) and manual range (F2 1) using the **RANGE** switch.

### Operation and Performance

Function table	Meaning and purpose
F2 0	<p>Automatic range</p> <ul style="list-style-type: none"> <li>□ The weighing range changes automatically, if the weighing value proceeds from narrow range to wide range when placing articles on the weighing pan.</li> <li>□ When there is nothing on the weighing pan and the zero point mark is displayed, it changes to the minimum range automatically.</li> <li>□ Press the <b>ZERO</b> 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.</li> </ul>
F2 1	<p>Manual range</p> <ul style="list-style-type: none"> <li>□ Press the <b>RANGE</b> switch to expand the range.</li> <li>□ Press the <b>RANGE</b> switch to change to the minimum range, when there is nothing on the weighing pan and the zero point mark is displayed.</li> <li>□ Press the <b>ZERO</b> switch and the <b>RANGE</b> 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.</li> </ul>

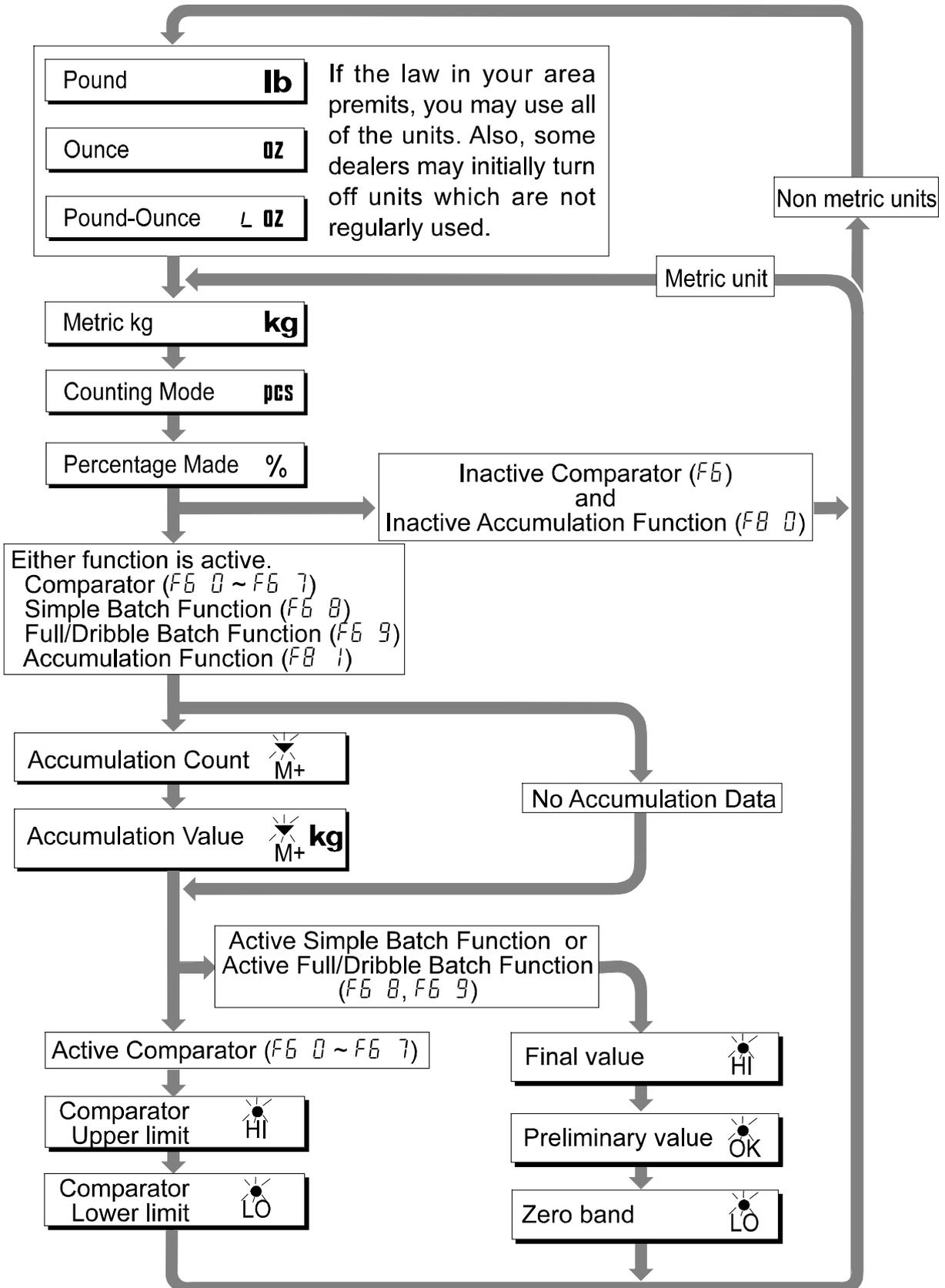
### Weighing Range

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



## 7.4. Mode Switch (Changing Unit and Mode)

Pressing the **MODE** switch, the display changes as follows. Refer to function table *F3* for units. Usable units are according to the factory settings.



## 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.

	Memory address / 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.



### 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

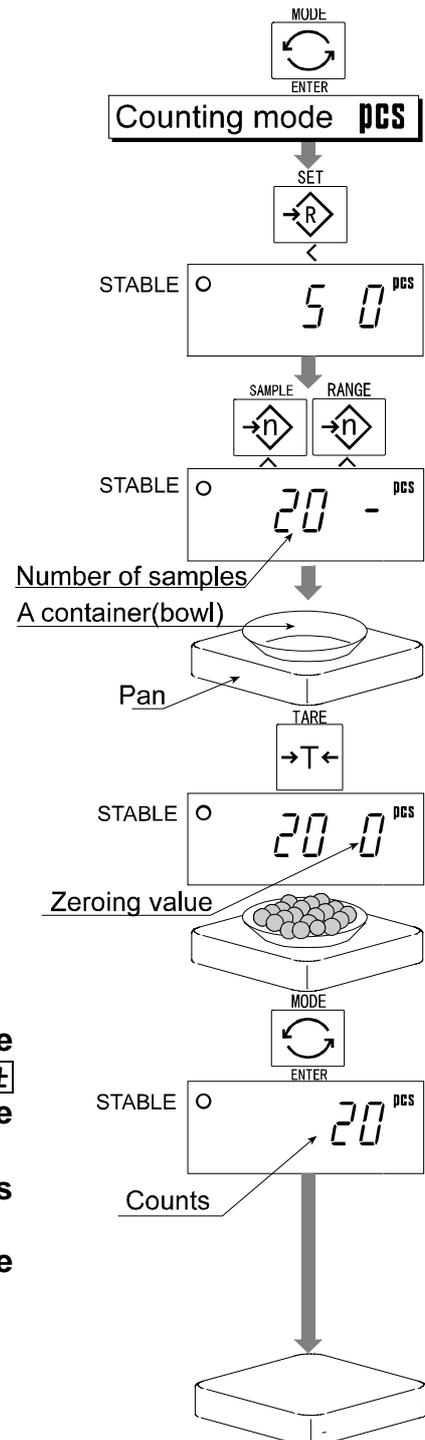
Step 4 Put a container item on the weighing pan.  
Press the **TARE** switch.

Step 5 Put in samples of number selected at step 3.  
Press the **ENTER** switch to store it after the stability 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. It is necessary to have more than 5 digits in the unit of kg to weigh a sample.
- Pressing the **ENTER** switch after **Lo ut** is displayed, the next unit is displayed.
- When the unit mass is too light to store, the scale displays **Lo ut**.

Step 4 Remove all things from the weighing pan.



## 8.2. Counting the number of articles

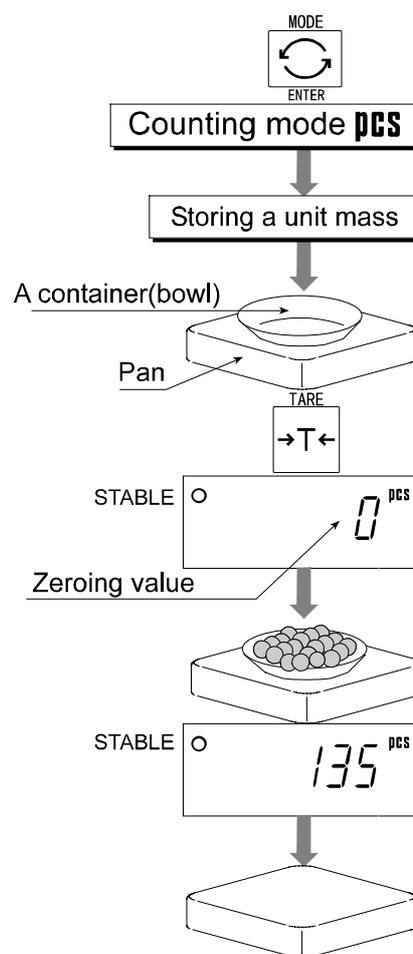
Step 1 Press the **MODE** switch to display the unit **pcs**.

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

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

Step 5 Put articles in the container item and read the count.

Step 6 Remove all things from the weighing pan.





## 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.



### 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.

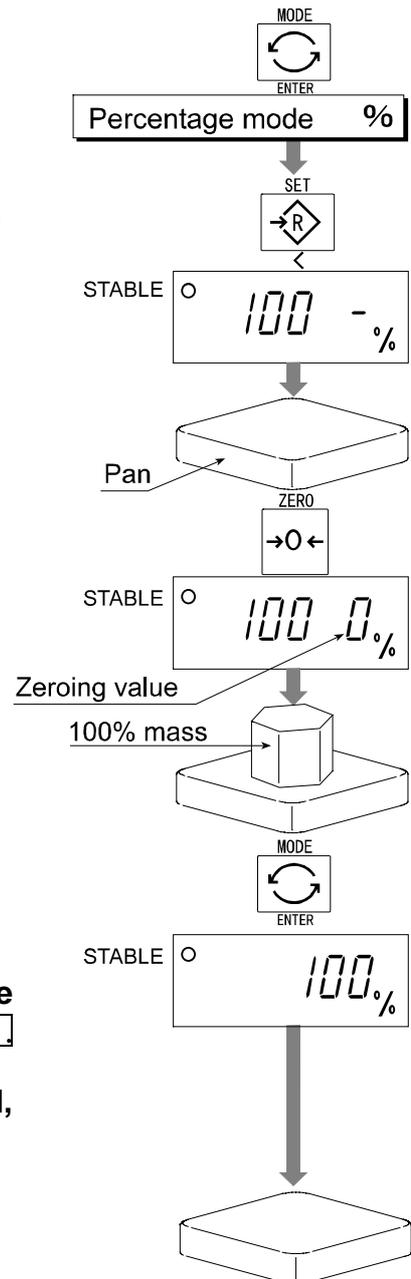
Step 3 With nothing on the weighing pan, press the **[ZERO]** switch to display zero.

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.

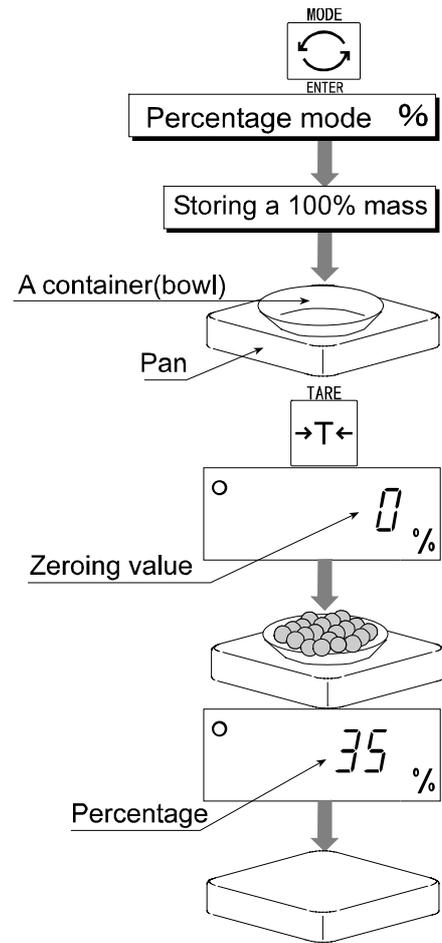
Step 5 Remove all things from the weighing pan.





## 9.2. Reading percentage

- Step 1 Press the **MODE** switch to display the unit %.
- Step 2 Store the unit 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.





# 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.
- Set the parameters of the "accumulation function (  $\boxed{FB}$  )" in the function table, in advance, to use this function.
- Set the parameters of the "print mode (  $\boxed{FG}$  )" in the function table, in advance, to use the built-in printer.

## Operation and Switches

- The display of the accumulation count has a blinking  $\overline{M}+$  without a unit.
- The display of the accumulation value has a unit and a blinking  $\overline{M}+$ .
- Pressing the  $\boxed{\text{MODE}}$  switch, the accumulation count and accumulation value are displayed.
- Pressing the  $\boxed{\text{ZERO}}$  switch in the accumulation function (  $\overline{M}+$  is blinking), the current function resets. (The count and accumulated value become zero.)
- When the optional built-in printer is installed and the  $\boxed{\text{PRINT}}$  switch is pressed, the accumulated data, date and data number are printed. The date is set at function table  $\boxed{F16}$ .

## Caution

**The accumulation function can be used with the first weighing unit accumulated.  
This function can display a maximum of six figures.**

## Parameter List and Word Definition

- The "nearly-zero" is within  $\pm 4$  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
$FB\ 0$	Accumulation function not used.
$FB\ 1$	The scale accumulates the data, if the $\boxed{F}$ 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.
$FB\ 2$	The scale accumulates the data, if the $\boxed{F}$ 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.
$FB\ 3$	When the display is a positive stable value, 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
FB 4	When the display is a stable value, 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 <b>TARE</b> switch at each removal.)
FB 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.

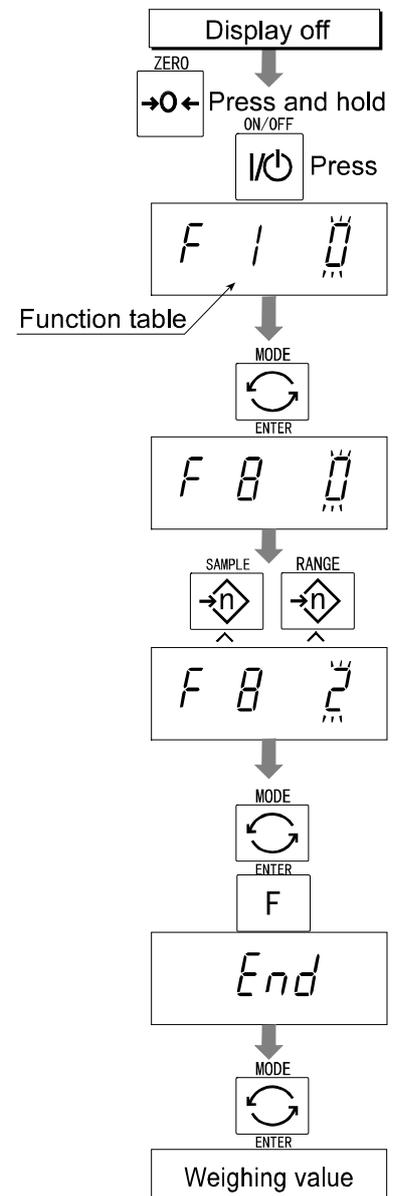
Press the **ON/OFF** switch while the **ZERO** switch is pressed and held. The function table is displayed.

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

Step 3 Select a parameter of the accumulation function ( **FB 1** ~ **FB 4** ) with the **▲** switch.

Step 4 Press the **ENTER** switch to store the new parameter.

Press the **F** switch and the **ENTER** switch to exit from the function table. Then the scale displays the weighing mode.





## 10.2. Operation and Performance (Examples)

### Example 1

Weighing each article, the scale makes the accumulation according to **FB 3**.

Step 1 Press the **MODE** switch to display **M+**.

Step 2 Press the **ZERO** switch to reset the accumulation data.

Step 3 Return to the kg mode using the **MODE** switch.

Press the **ZERO** switch with nothing on the weighing pan.

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 **ZERO** switch.

Step 5 Weigh additional articles using step 4.

Step 6 Press the **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 **FB 4**.

Step 1 Enter into the kg mode using the **MODE** switch.

Put all articles on the weighing pan and press the **TARE** switch.

Step 2 Press the **MODE** switch to display **M+**.

Step 3 Press the **ZERO** switch to reset the accumulation data.

Return to kg mode with the **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 **TARE** switch.

Step 5 Weigh additional articles using step 4.

Step 6 Press the **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 (  $\boxed{F6 0} \sim \boxed{F6 7}$  )" 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.

## Comparator Sign

Comparison results are displayed by indicators  $\overset{\circ}{\text{HI}}$   $\overset{\circ}{\text{OK}}$   $\overset{\circ}{\text{LO}}$ .

## Comparison Condition

Weighing value < lower limit value ..... LO is displayed and output.

Lower limit value  $\leq$  weighing value  $\leq$  upper limit value .. OK is displayed and output.

Upper limit value < weighing value..... HI is displayed and output.

## Parameter List and Word Definition

- The "nearly-zero" is within  $\pm 4$  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 $\boxed{\text{SET}}$ switch, the scale always compares the current display value.
$F6 1$	The scale always compares the display value.
$F6 2$	Pressing the $\boxed{\text{SET}}$ 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 $\boxed{\text{SET}}$ switch, the scale compares the display value. It does not compare on an unstable condition. If the $\boxed{\text{SET}}$ 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 $\boxed{\text{SET}}$ switch, the scale compares the display value. It does not compare on an unstable condition. If the $\boxed{\text{SET}}$ 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.

## 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 zero band (LO) 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.

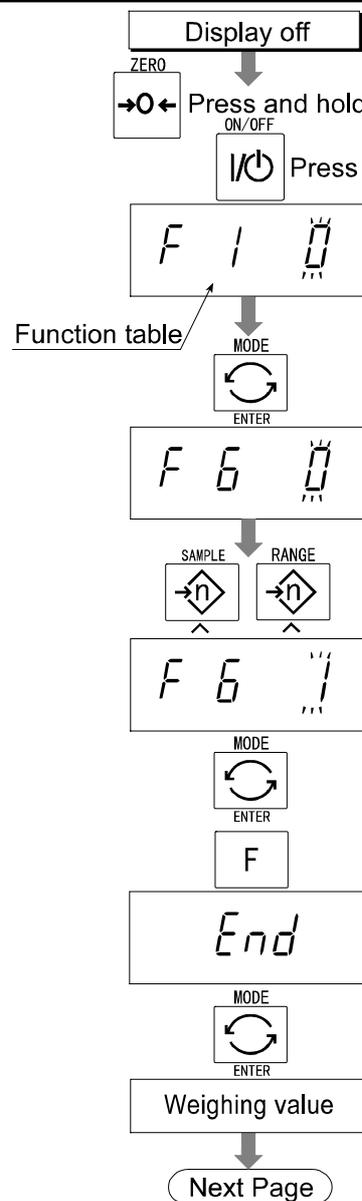
Press the **ON/OFF** switch while the **ZERO** switch is pressed and held. The function table is displayed.

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

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

Step 4 Press the **ENTER** switch to store the new parameter.

Step 5 Press the **F** switch and the **ENTER** switch to exit from the function table. Then the scale displays the weighing mode.



Step 6 If either of **F6 0**, **F6 2**, **F6 4**, **F6 6** has been selected, press the **SET** switch to use the comparator.

Step 7 Press the **MODE** switch to display the blinking HI.

Step 8 Set the upper limit value by using the following switches.

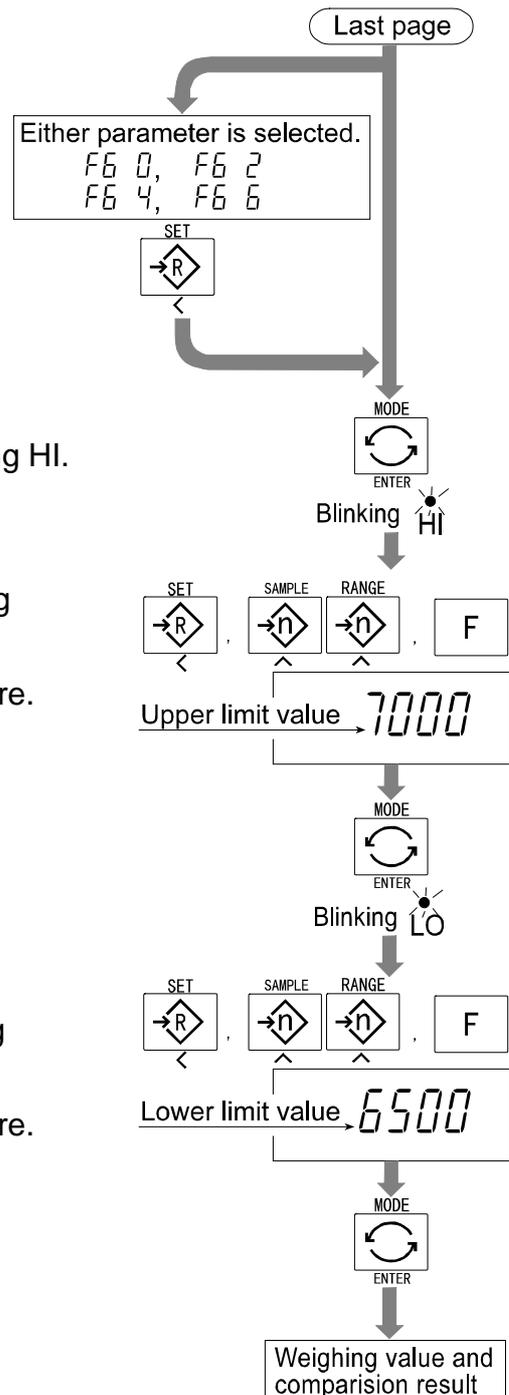
- ▲** switch      Selecting the number of a figure.
- <** switch      Selecting a figure.
- F** switch      Selecting the polarity (+,-).

Step 9 Press the **ENTER** switch to store the new parameter and display the blinking LO.

Step 10 Set the lower limit value by using the following switches.

- ▲** switch      Selecting the number of a figure.
- <** switch      Selecting a figure.
- F** switch      Selecting the polarity (+,-).

Step 11 Press the **ENTER** switch to store the new parameters and display the weighing mode.





## 11.2. Operation and Performance (Examples)

### Example 1

This example is set as follows:

Function table	<input type="text" value="F6 3"/>	(If the current display value is not nearly-zero, the scale compares the display value with the upper limit value and the lower limit value immediately.)
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	<input type="text" value="F6 4"/>	(Pressing the <input type="text" value="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

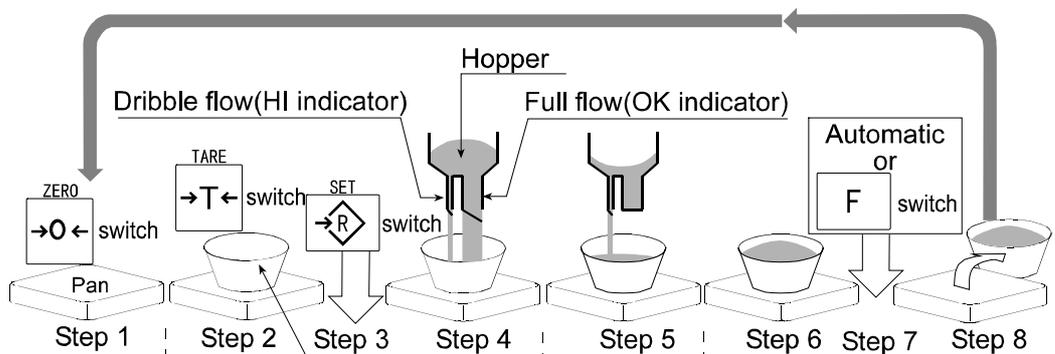
- Pressing the  switch, the comparison is performed after displaying the stability mark.
- When the current value is less than -1.000kg, LO is displayed.
- When the current value is -1.000kg to 2.000kg, OK is displayed.
- When the current value is greater than 2.000kg, HI is displayed.



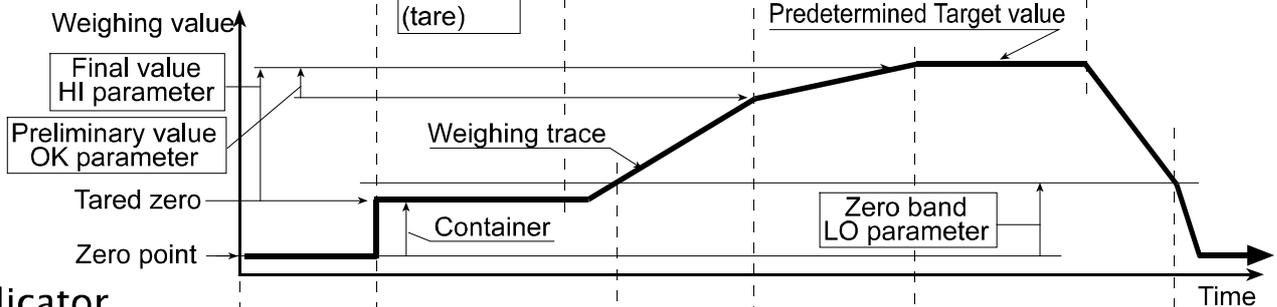
# 12. Full/Dribble Batch Function

- 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 (  $\boxed{F69}$  )", " full/dribble batch sub-function (  $\boxed{F100} \sim \boxed{F103}$  )" 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:

## Procedure



## Weighing and Parameters



## 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 or 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 zero band (LO) 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 **SET** switch, the scale starts the batch process.
- Selecting a parameter from **F 10 0** or **F 10 2** of the full/dribble batch sub-function, the **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
<i>F 9</i>	Full/dribble batch function.

### Full/dribble batch sub-function

Function table	Meaning and purpose
<i>F 10 0</i>	Reaching final value and pressing the <b>F</b> switch, the current process is finished.
<i>F 10 1</i>	Reaching final value and displaying the stability mark, the current process is finished automatically.
<i>F 10 2</i>	Pressing the <b>SET</b> switch, the scale automatically tares and starts the full/dribble batch process. Reaching final value and pressing the <b>F</b> switch, the current process is finished.
<i>F 10 3</i>	Pressing the <b>SET</b> 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
<i>F 12 0</i>	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]** ).

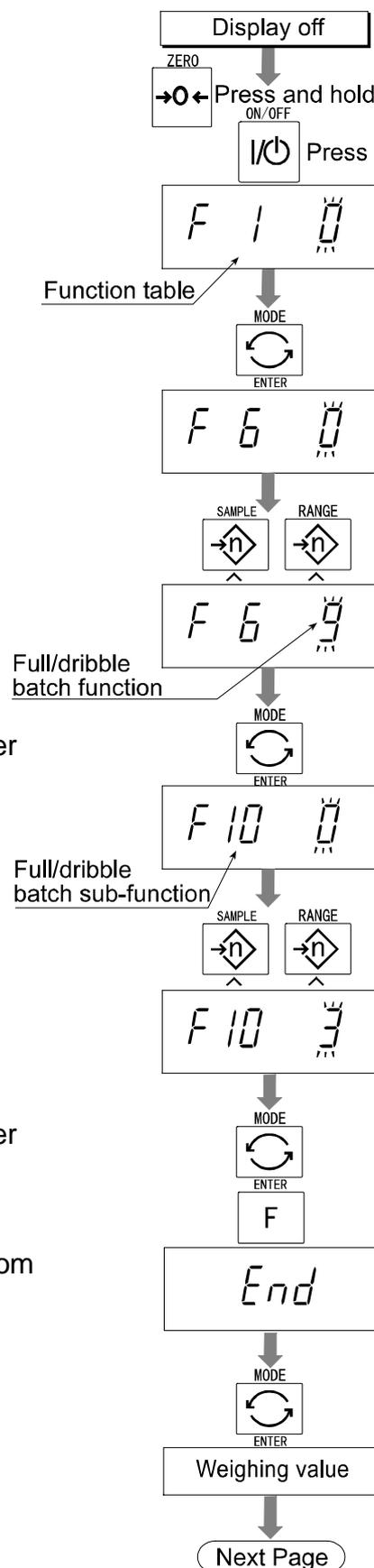
Step 3 Select a parameter of the full/dribble batch function ( **[F6 9]** ) with the **[^]** switch.

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 to store the new parameter

Step 7 Press the **[F]** switch and the **[ENTER]** switch to exit from the function table. Then the scale displays the weighing mode.



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.

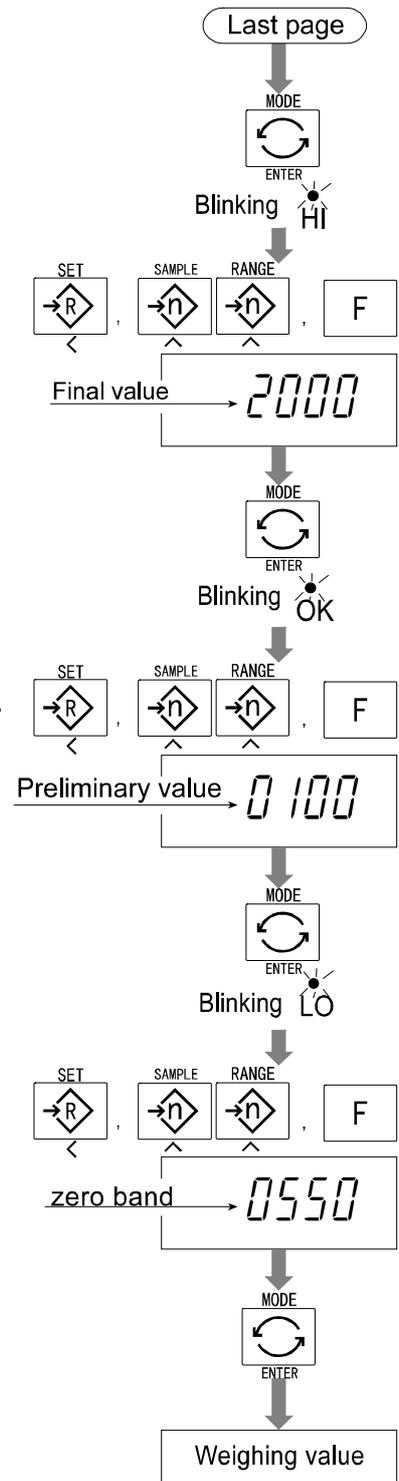
Step 12 Press the **ENTER** switch to store the new parameter and display the blinking LO (of zero band).

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.

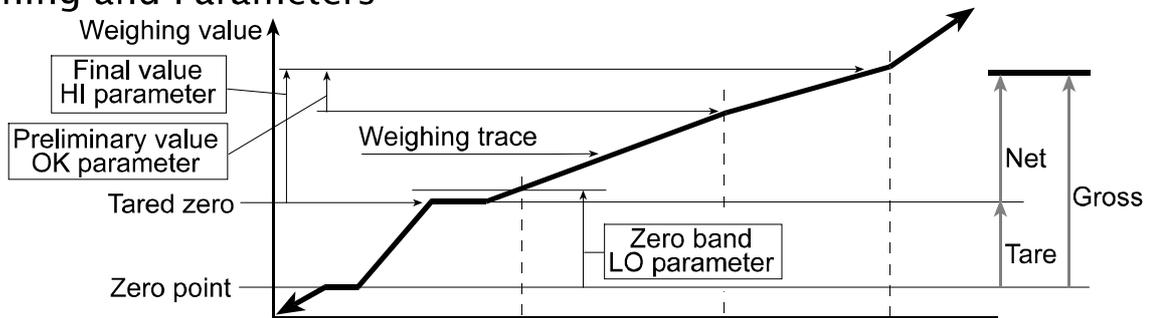




# 13. Simple Batch Function

- 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 (  $\boxed{FG\ B}$  )", 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.

## 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  $\leq$  Net ..... OK is displayed and output.
- Final  $\leq$  Net ..... OK, HI is 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
$FG\ B$	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 zero band (LO) 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.

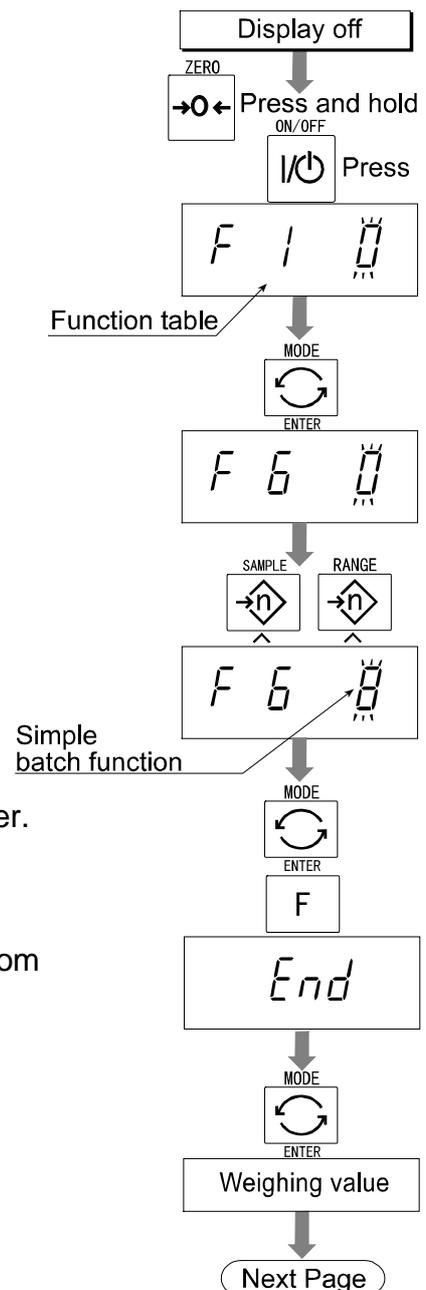
Press the **ON/OFF** switch while the **ZERO** switch is pressed and held. The function table is displayed.

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

Step 3 Select a parameter of the simple batch function ( **F6B** ) with the **∧** switch.

Step 4 Press the **ENTER** switch to store the new parameter.

Step 5 Press the **F** switch and the **ENTER** switch to exit from the function table. Then the scale displays the weighing mode.



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

Step 7 Set the final value using the following switches.

**▲** switch      Selecting the number of a figure.

**<** switch      Selecting a figure.

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

Step 9 Set the preliminary value using the following switches.

**▲** switch      Selecting the number of a figure.

**<** switch      Selecting a figure.

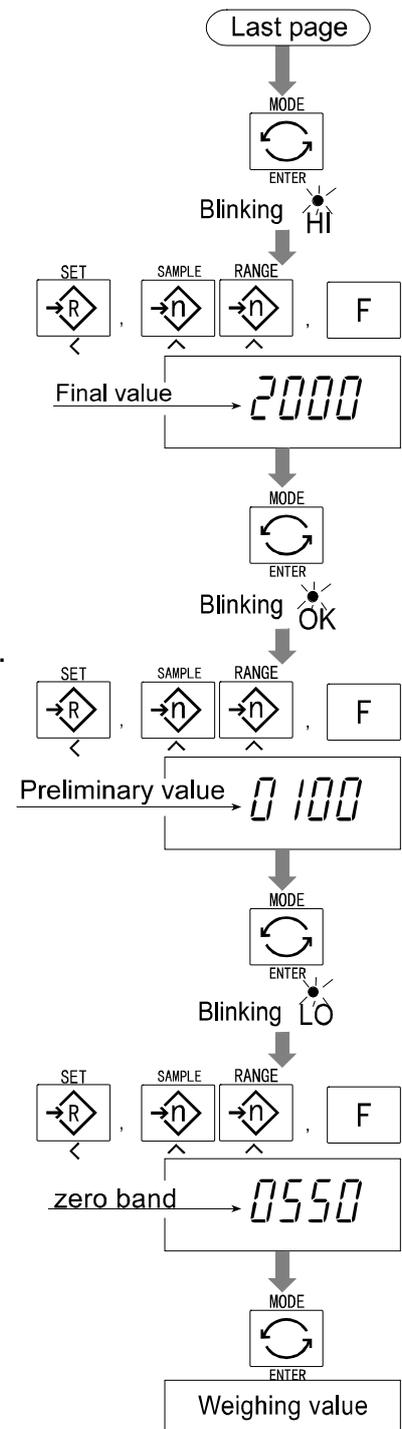
Step 10 Press the **ENTER** switch to store the new parameter and display the blinking LO (of zero band).

Step 11 Set the zero band 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 weighing mode.



## 13.2. Operation and Performance (Examples)

Step 1 Select the parameter **F6 B** 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.



# 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.

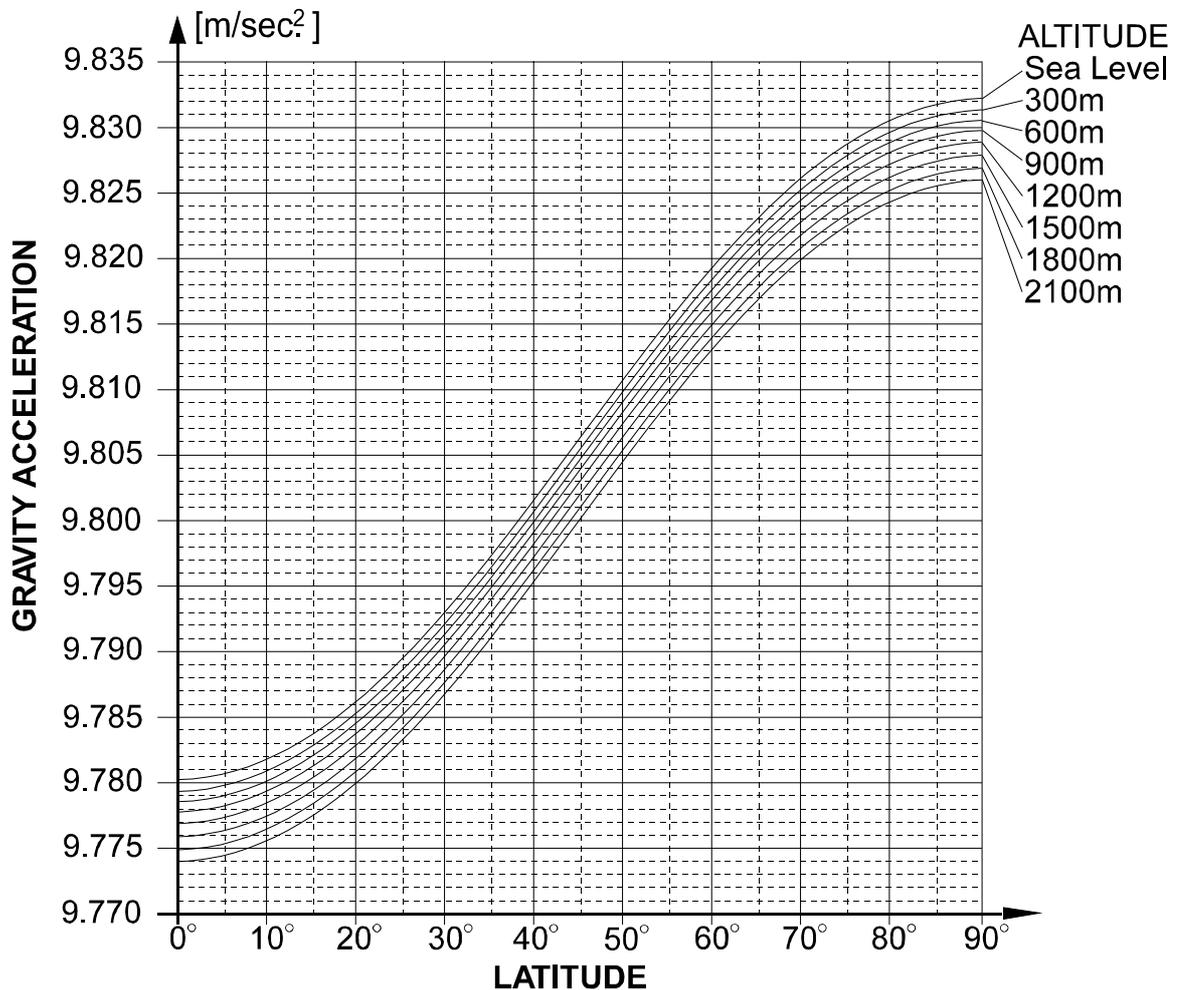
Comment Span means the range of weighing capacity. Use a calibration mass heavier than two thirds of the weighing capacity.

## Caution

- **Calibrate the HV-WP series using a mass of the OIML class M1 or equivalent.**
- **Calibrate the HW-WP series using a mass of the OIML class F2 or equivalent.**
- **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

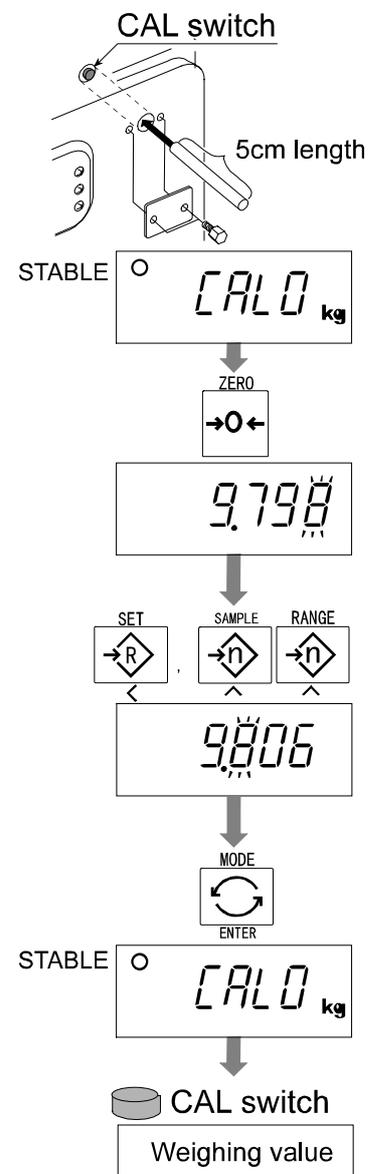
Amsterdam	9.813 m/s <sup>2</sup>	Manila	9.784 m/s <sup>2</sup>
Athens	9.800 m/s <sup>2</sup>	Melbourne	9.800 m/s <sup>2</sup>
Auckland NZ	9.799 m/s <sup>2</sup>	Mexico City	9.779 m/s <sup>2</sup>
Bangkok	9.783 m/s <sup>2</sup>	Milan	9.806 m/s <sup>2</sup>
Birmingham	9.813 m/s <sup>2</sup>	New York	9.802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



## 14.2. The Complete Calibration Procedure

### 14.2.1. Gravity Acceleration Correction

- Step 1 Turn on the display.  
Open the 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.
- 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.
- 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 magnetic fields or direct sunlight.  
Consider section "4. Caution".
- Step 7 Display normal weighing for at least 30 minutes to warm up the scale.

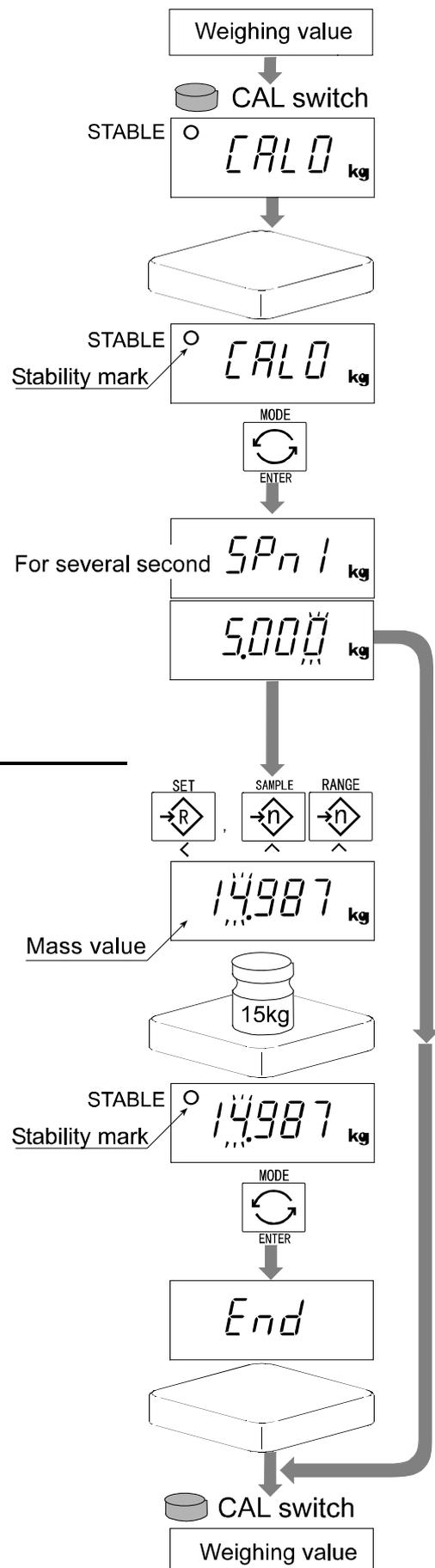
## 14.2.3. Calibration of the Zero Point

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 l** 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 product.)

**▲** 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.

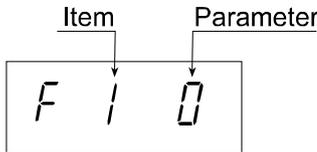
Step 13 The scale displays **End** at the finish. Remove the mass from the weighing pan.

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



# 15. The Function Table

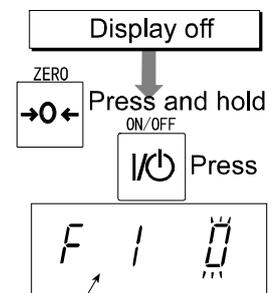
- ❑ The function table is the function to store and refer items that determine the performance of the scale. Each item has a parameter.
- ❑ The parameters are maintained even without power applied.



## 15.1. The Procedure for Setting Parameters

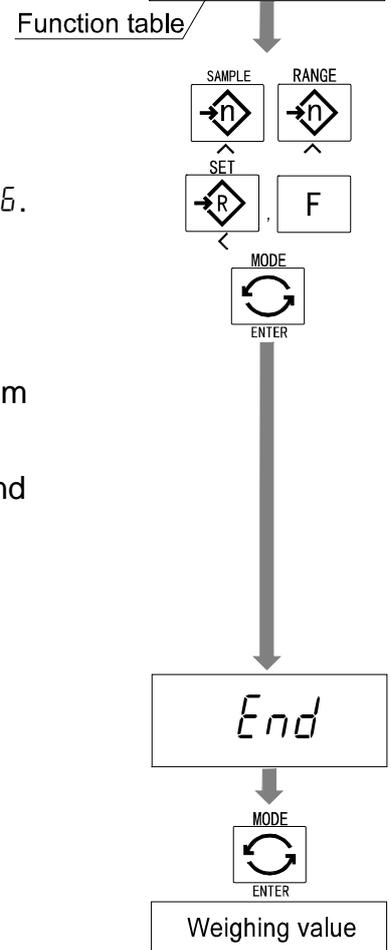
Step 1 Turn off the display.

Press the **ON/OFF** switch while the **ZERO** switch is pressed and held. The function table is displayed.



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

- ▲** switch      Selecting the parameter of an item.  
Selecting the number of a figure at *F 15*.
- <** switch      Selecting a figure at *F 15*.
- F** switch      Proceeding to the end of the table without storing the parameter.
- ENTER** switch      Storing a parameter for the current item and proceeding to the next item.  
Returning to normal mode from the end of the table.



Step 3 Press the **ENTER** switch to return to the normal mode, when **End** is displayed.

Note Pressing the **ENTER** switch at step 2, the parameter is stored in the scale.



## 15.2. Parameter List

Item	Display	Meaning and purpose
Automatic display OFF		Turns the display OFF automatically.
	F1 0	No automatic display OFF
	F1 1	Automatic display OFF
Weighing range		Selects the way of changing weighing range for HV-WP series.
	F2 0 #	Automatic range
	F2 1	Manual range using the <b>[RANGE]</b> 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		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 <b>[PRINT]</b> 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		
	F6 0 #	Pressing the <b>[SET]</b> switch, the scale always compares the current display value.
	F6 1	The scale always compares the display value.
	F6 2	Pressing the <b>[SET]</b> switch, the scale always compares the display value when not nearly-zero.
	F6 3	The scale always compares the display value when not nearly-zero.
F6 4	When the display value becomes stable after pressing the <b>[SET]</b> switch, the scale compares the display value. It does not compare on an unstable condition. If the <b>[SET]</b> switch is pressed again, the scale stops the comparison.	

The "#" is factory settings. The "nearly-zero" is within  $\pm 4$  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.
	F6 8	Simple batch function. (Refer to section 13.)
	F6 9	Full/dribble batch function. (Refer to section 12.)
The condition of the buzzer on option OP-03 by comparator function or full/dribble batch function.		
Buzzer	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.	
The condition of the accumulation function		
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, the scale accumulates the data automatically. Next accumulation can be performed after the display becomes nearly-zero or a negative value.
	F8 4	When the display becomes a stable value, the scale accumulates the data automatically. Next accumulation can be performed 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  $\pm 4$  digits from zero point in the unit of kg.

Item	Display	Meaning and purpose
Full/Dribble batch sub-function	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 1 # ~ 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 and 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	Selection of readability and response by averaging the weighing value.	
	F 13 0 #	Normal weighing.
	F 13 1	Scale for a person's weight.
	F 13 2	Animal weighing.
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 16	Not used.

The "#" is factory settings

The "nearly-zero" is within  $\pm 4$  digits from zero point in the unit of kg.

The "digit", a unit of display, is equivalent to the minimum measurable mass.



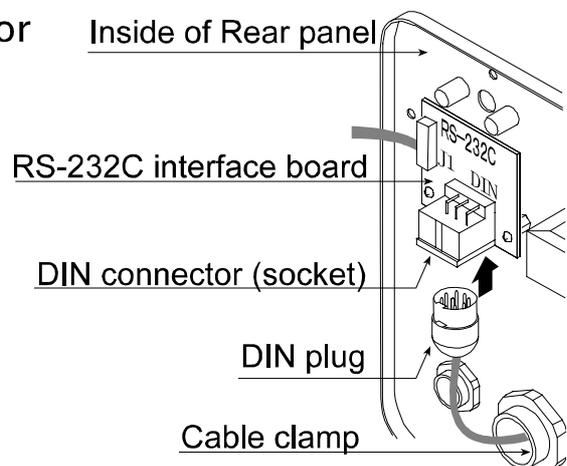
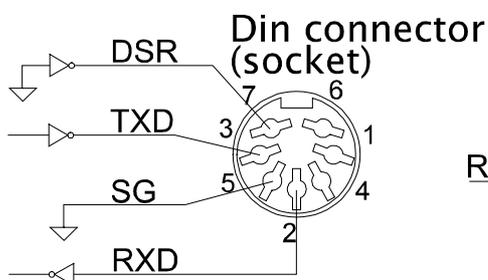
# 16. RS-232C Serial Interface

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      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

- Circuits

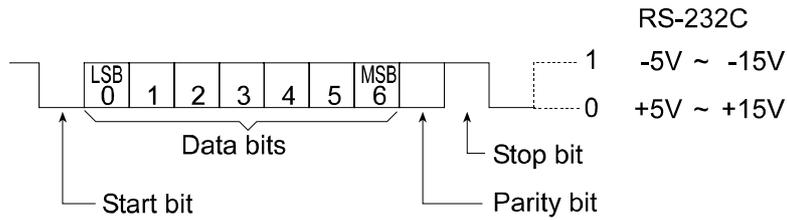


- Adaptable connector      DIN 7pin, (TCP0576)



# 16.1. Data Format

## Bit Format



## Format 1

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

Stable weighing data	<b>S</b> <b>T</b>	Unstable weighing data	<b>U</b> <b>S</b>
Stable counting data	<b>Q</b> <b>T</b>	Out of range ( Over)	<b>O</b> <b>L</b>
- 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** **C****R** **L****F**  
 Header     Weighing value     unit     Terminator

Counting mode     **Q****T**, + 0 0 0 0 3 0 0 0 **P C** **C****R** **L****F**  
 Header     Weighing value     unit     Terminator

Percentage mode     **S****T**, + 0 0 0 3 0 0 . 0 **%** **C****R** **L****F**  
 Header     Weighing value     unit     Terminator

Out of range     **O****L**, + 9 9 9 9 9 . 9 9 **k g** **C****R** **L****F**  
 Header     ↑ Polarity

- Definition of symbols
 

CR (carriage return)	<b>C</b> <b>R</b>	LF (line feed)	<b>L</b> <b>F</b>
0Dh		0Ah	
Space	<b> </b>		
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 data consists of 7 characters in the counting mode.
- 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, percentage mode or accumulation function, the overflow is ignored.**

Data in the unit of kg	<table style="border-collapse: collapse; text-align: center;"> <tr> <td style="border: 1px solid black; padding: 2px 5px;">S</td> <td style="border: 1px solid black; padding: 2px 5px;">T</td> <td style="border: 1px solid black; padding: 2px 5px;">,</td> <td style="border: 1px solid black; padding: 2px 5px;">+</td> <td style="border: 1px solid black; padding: 2px 5px;">0</td> <td style="border: 1px solid black; padding: 2px 5px;">0</td> <td style="border: 1px solid black; padding: 2px 5px;">2</td> <td style="border: 1px solid black; padding: 2px 5px;">.</td> <td style="border: 1px solid black; padding: 2px 5px;">4</td> <td style="border: 1px solid black; padding: 2px 5px;">0</td> <td style="border: 1px solid black; padding: 2px 5px;">k</td> <td style="border: 1px solid black; padding: 2px 5px;">g</td> <td style="border: 1px solid black; padding: 2px 5px;">C<sub>R</sub></td> <td style="border: 1px solid black; padding: 2px 5px;">L<sub>F</sub></td> </tr> <tr> <td colspan="2" style="border: none;">Header</td> <td colspan="5" style="border: none;">Weighing value</td> <td colspan="2" style="border: none;">unit</td> <td colspan="2" style="border: none;">Terminator</td> </tr> </table>	S	T	,	+	0	0	2	.	4	0	k	g	C <sub>R</sub>	L <sub>F</sub>	Header		Weighing value					unit		Terminator			
S	T	,	+	0	0	2	.	4	0	k	g	C <sub>R</sub>	L <sub>F</sub>															
Header		Weighing value					unit		Terminator																			
Counting mode	<table style="border-collapse: collapse; text-align: center;"> <tr> <td style="border: 1px solid black; padding: 2px 5px;">Q</td> <td style="border: 1px solid black; padding: 2px 5px;">T</td> <td style="border: 1px solid black; padding: 2px 5px;">,</td> <td style="border: 1px solid black; padding: 2px 5px;">+</td> <td style="border: 1px solid black; padding: 2px 5px;">0</td> <td style="border: 1px solid black; padding: 2px 5px;">0</td> <td style="border: 1px solid black; padding: 2px 5px;">3</td> <td style="border: 1px solid black; padding: 2px 5px;">0</td> <td style="border: 1px solid black; padding: 2px 5px;">0</td> <td style="border: 1px solid black; padding: 2px 5px;">0</td> <td style="border: 1px solid black; padding: 2px 5px;">P</td> <td style="border: 1px solid black; padding: 2px 5px;">C</td> <td style="border: 1px solid black; padding: 2px 5px;">C<sub>R</sub></td> <td style="border: 1px solid black; padding: 2px 5px;">L<sub>F</sub></td> </tr> <tr> <td colspan="2" style="border: none;">Header</td> <td colspan="5" style="border: none;">Weighing value</td> <td colspan="2" style="border: none;">unit</td> <td colspan="2" style="border: none;">Terminator</td> </tr> </table>	Q	T	,	+	0	0	3	0	0	0	P	C	C <sub>R</sub>	L <sub>F</sub>	Header		Weighing value					unit		Terminator			
Q	T	,	+	0	0	3	0	0	0	P	C	C <sub>R</sub>	L <sub>F</sub>															
Header		Weighing value					unit		Terminator																			
Percentage mode	<table style="border-collapse: collapse; text-align: center;"> <tr> <td style="border: 1px solid black; padding: 2px 5px;">S</td> <td style="border: 1px solid black; padding: 2px 5px;">T</td> <td style="border: 1px solid black; padding: 2px 5px;">,</td> <td style="border: 1px solid black; padding: 2px 5px;">+</td> <td style="border: 1px solid black; padding: 2px 5px;">0</td> <td style="border: 1px solid black; padding: 2px 5px;">3</td> <td style="border: 1px solid black; padding: 2px 5px;">0</td> <td style="border: 1px solid black; padding: 2px 5px;">0</td> <td style="border: 1px solid black; padding: 2px 5px;">.</td> <td style="border: 1px solid black; padding: 2px 5px;">0</td> <td style="border: 1px solid black; padding: 2px 5px;">_</td> <td style="border: 1px solid black; padding: 2px 5px;">%</td> <td style="border: 1px solid black; padding: 2px 5px;">C<sub>R</sub></td> <td style="border: 1px solid black; padding: 2px 5px;">L<sub>F</sub></td> </tr> <tr> <td colspan="2" style="border: none;">Header</td> <td colspan="5" style="border: none;">Weighing value</td> <td colspan="2" style="border: none;">unit</td> <td colspan="2" style="border: none;">Terminator</td> </tr> </table>	S	T	,	+	0	3	0	0	.	0	_	%	C <sub>R</sub>	L <sub>F</sub>	Header		Weighing value					unit		Terminator			
S	T	,	+	0	3	0	0	.	0	_	%	C <sub>R</sub>	L <sub>F</sub>															
Header		Weighing value					unit		Terminator																			
Out of range	<table style="border-collapse: collapse; text-align: center;"> <tr> <td style="border: 1px solid black; padding: 2px 5px;">O</td> <td style="border: 1px solid black; padding: 2px 5px;">L</td> <td style="border: 1px solid black; padding: 2px 5px;">,</td> <td style="border: 1px solid black; padding: 2px 5px;">+</td> <td style="border: 1px solid black; padding: 2px 5px;">9</td> <td style="border: 1px solid black; padding: 2px 5px;">9</td> <td style="border: 1px solid black; padding: 2px 5px;">9</td> <td style="border: 1px solid black; padding: 2px 5px;">.</td> <td style="border: 1px solid black; padding: 2px 5px;">9</td> <td style="border: 1px solid black; padding: 2px 5px;">9</td> <td style="border: 1px solid black; padding: 2px 5px;">k</td> <td style="border: 1px solid black; padding: 2px 5px;">g</td> <td style="border: 1px solid black; padding: 2px 5px;">C<sub>R</sub></td> <td style="border: 1px solid black; padding: 2px 5px;">L<sub>F</sub></td> </tr> <tr> <td colspan="2" style="border: none;">Header</td> <td colspan="2" style="border: none;">Polarity</td> <td colspan="5" style="border: none;"></td> <td colspan="2" style="border: none;"></td> <td colspan="2" style="border: none;"></td> </tr> </table>	O	L	,	+	9	9	9	.	9	9	k	g	C <sub>R</sub>	L <sub>F</sub>	Header		Polarity										
O	L	,	+	9	9	9	.	9	9	k	g	C <sub>R</sub>	L <sub>F</sub>															
Header		Polarity																										

- Definition of symbols
 

CR (carriage return)	C <sub>R</sub>	LF (line feed)	L <sub>F</sub>
0Dh		0Ah	
Space	_		
20h			



## 16.2. Stream Mode

- 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 Normal weighing	Approximately 7 times/s while the display is unstable, Approximately 4 times/s when the display is stable
F 13 1 A person's weight	Approximately 4 times/s
F 13 1 Animal weighing	

### 16.2.1. Preparation and Performance (Examples)

Step 1 Turn off the display.

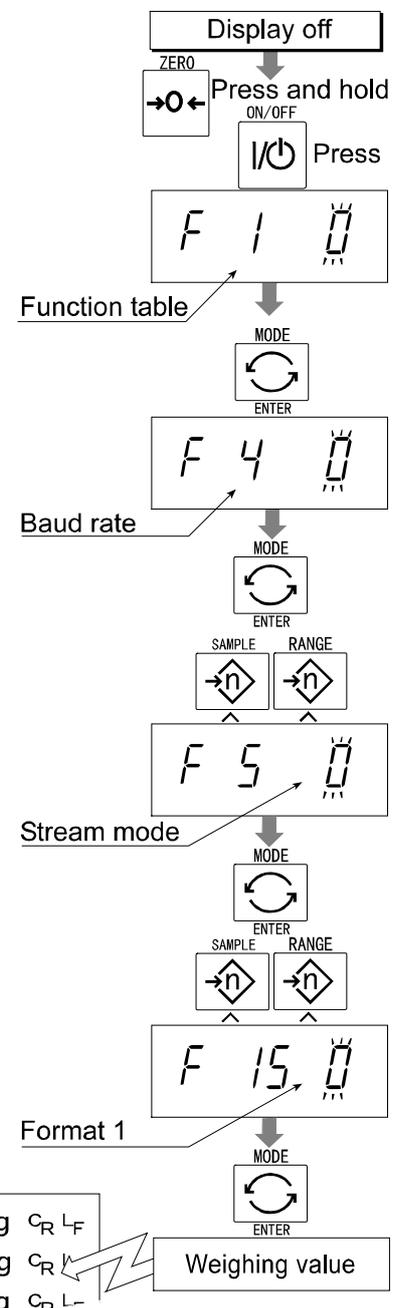
Press the **ON/OFF** switch while the **ZERO** switch is pressed and held. The function table is displayed.

Step 2 Select a parameter for the "baud rate ( F4 )" using the **ENTER** and **▲** switches.

Step 3 Select "stream mode ( F5 )" of "output" using the **ENTER** and **▲** switches.

Step 4 Select "format 1 ( F15 )" of "format" using the **ENTER** and **▲** switches.

Step 5 Press the **ENTER** switch to store the new parameters. The scale returns the normal weighing and outputs the data continuously.



ST,0000.0000\_kg C<sub>R</sub> L<sub>F</sub>  
 US,0010.645\_kg C<sub>R</sub> L<sub>F</sub>  
 644\_kg C<sub>D</sub> L<sub>F</sub>

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 ( F 15 0 )"

#### Data output

The current weighing data is output.

Template Q

Command Q<sup>C<sub>R</sub></sup>L<sub>F</sub>

Reply ST,+00012.40\_kg<sup>C<sub>R</sub></sup>L<sub>F</sub>

#### Selection of mode and unit

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

Template U

Command U<sup>C<sub>R</sub></sup>L<sub>F</sub>

Reply 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 Z<sup>C<sub>R</sub></sup>L<sub>F</sub>

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 TARE switch.

Template T

Command T<sup>C<sub>R</sub></sup>L<sub>F</sub>

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 CT<sup>C<sub>R</sub></sup>L<sub>F</sub>

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 net mark is displayed.

Template PT, [parameter]  
Command 

P	T	,	+	0	0	1	2	0	C <sub>R</sub>	L <sub>F</sub>
---	---	---	---	---	---	---	---	---	----------------	----------------

  
Reply Net is displayed.

## Upper limit value

An upper limit value is stored.

Template HI, [parameter]  
Command 

H	I	,	+	0	1	2	0	0	C <sub>R</sub>	L <sub>F</sub>
---	---	---	---	---	---	---	---	---	----------------	----------------

  
Reply The upper limit value is stored.

## Lower limit value

A lower limit value is stored.

Template LO, [parameter]  
Command 

L	O	,	-	0	0	4	0	0	C <sub>R</sub>	L <sub>F</sub>
---	---	---	---	---	---	---	---	---	----------------	----------------

  
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 <sub>R</sub>	L <sub>F</sub>
---	----------------	----------------

  
Reply 

A	,	+	0	2	3	1	2	.	4	0	_	k	g	C <sub>R</sub>	L <sub>F</sub>
---	---	---	---	---	---	---	---	---	---	---	---	---	---	----------------	----------------

## Accumulation count output

The number of accumulated data is output.

Template N  
Command 

N	C <sub>R</sub>	L <sub>F</sub>
---	----------------	----------------

  
Reply 

N	,	+	0	0	0	0	0	1	4	0	_	_	_	C <sub>R</sub>	L <sub>F</sub>
---	---	---	---	---	---	---	---	---	---	---	---	---	---	----------------	----------------

## Reset of Accumulation data and number

The data and number of accumulations become zero.

Template CA  
Command 

C	A	C <sub>R</sub>	L <sub>F</sub>
---	---	----------------	----------------

  
Reply The data and number of accumulations become zero.

## Final value

The final value is stored.

Template S0, [parameter]

Command 

S	0	,	+	0	2	0	0	0	C <sub>R</sub>	L <sub>F</sub>
---	---	---	---	---	---	---	---	---	----------------	----------------

Reply The value is stored.

## Preliminary value

The preliminary value is stored.

Template S1, [parameter]

Command 

S	1	,	+	0	0	2	0	0	C <sub>R</sub>	L <sub>F</sub>
---	---	---	---	---	---	---	---	---	----------------	----------------

Reply The value is stored.

## Zero band

The zero band is stored.

Template S2, [parameter]

Command 

S	2	,	+	0	0	5	0	0	C <sub>R</sub>	L <sub>F</sub>
---	---	---	---	---	---	---	---	---	----------------	----------------

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.

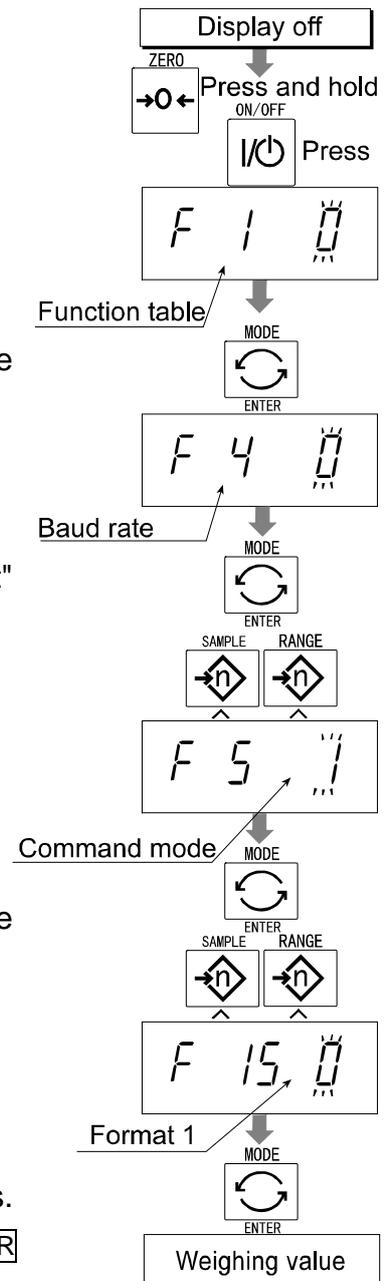
Step 2 Select a parameter for the "baud rate ( **F4** )" using the **ENTER** and **▲** switches.

Step 3 Select "command mode ( **F5 1** )" for the "output" using the **ENTER** and **▲** switches.

Step 4 Select "format 1 ( **F15 0** )" for the "format" using the **ENTER** and **▲** switches.

Step 5 Press the **ENTER** switch to store the new parameters. Return to the normal weighing mode using the **ENTER** switch.

Step 6 Receiving a command, the scale replies.





## 17. Options

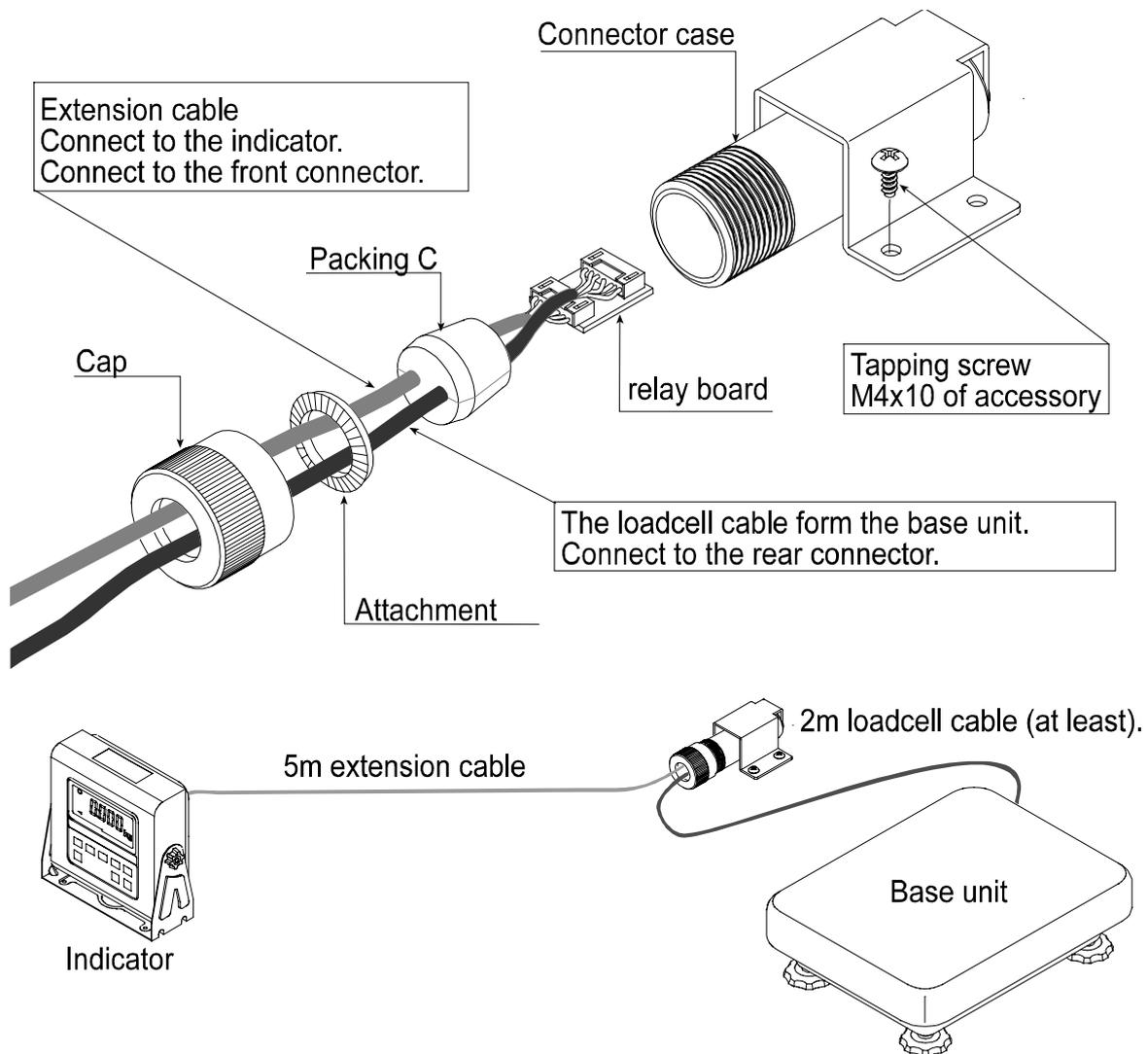


### 17.1. Extension cable (OP-02)

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

#### Caution

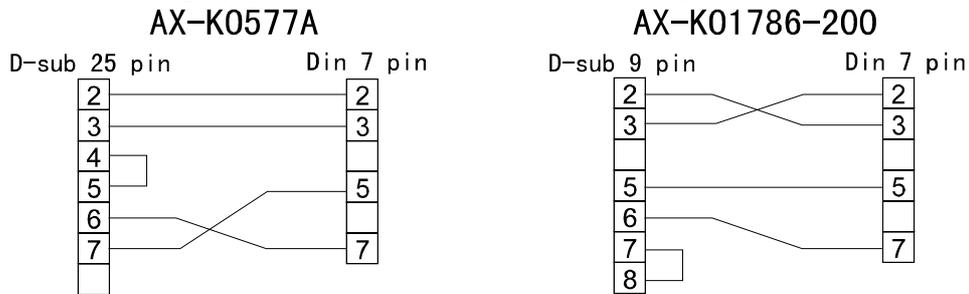
- **Calibrate the scale after connecting this cable.**
- **Do not connect more than two extension cables.**



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

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

- This option replaces the 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.

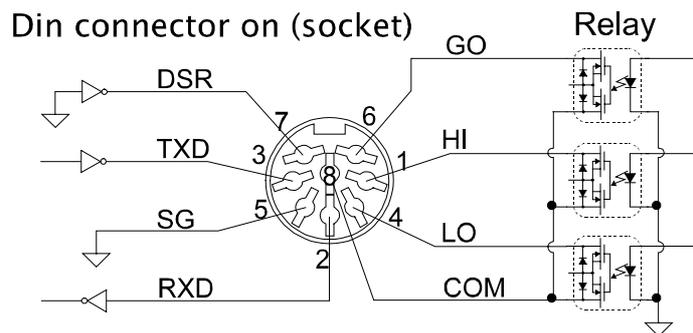


- Pin connections

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

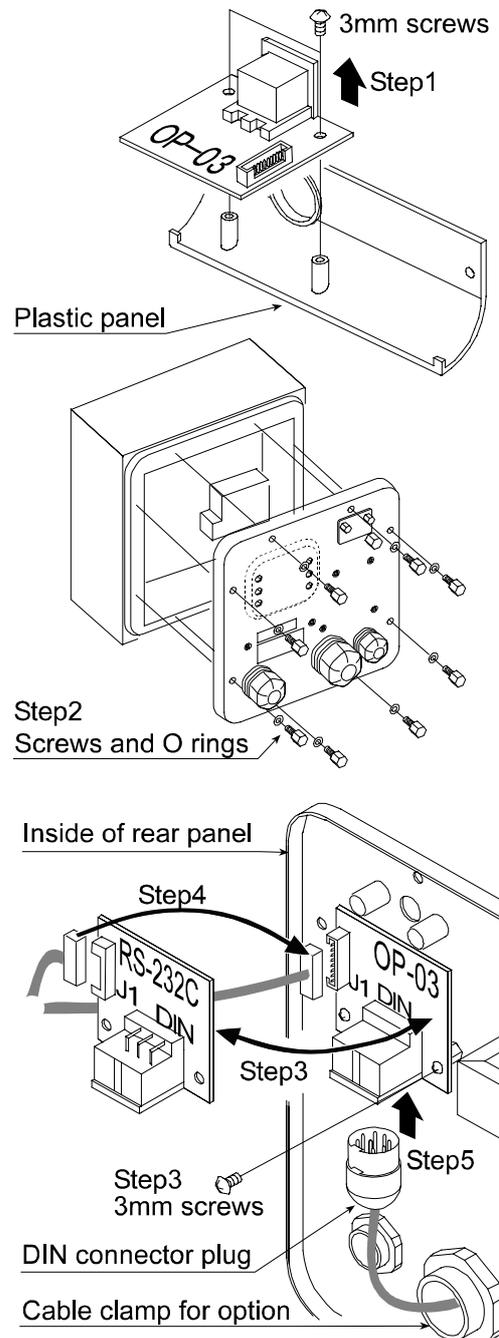


- Relay      Solid-state-relay      Maximum voltage      DC50V  
    Maximum current      DC100mA  
    Maximum resistance      8 Ω

## 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.



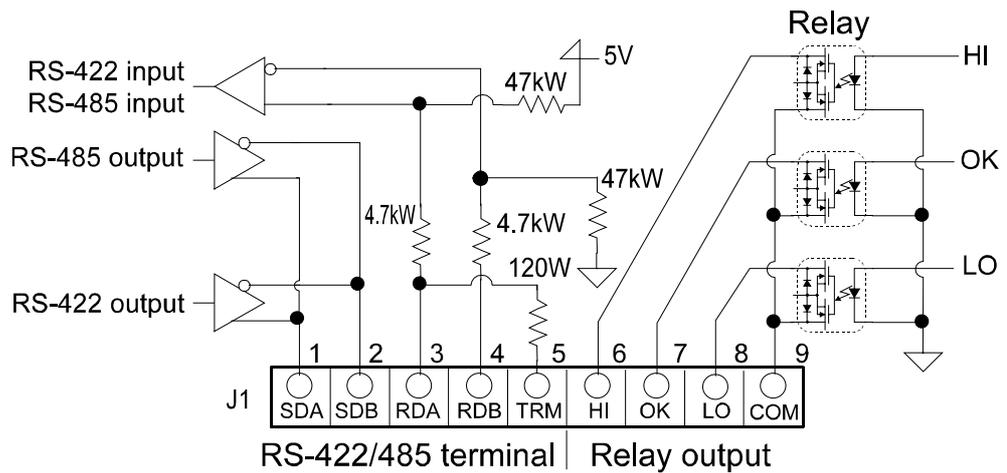


## 17.3. RS-422 / RS-485 / Relay output (OP-04)

- Replacing the 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.
  - Steam mode            Outputs data countinuously.
  - Command mode       Controls the scale using commad from a computer.
- Set the parameters for the "Baud rate ( F4 )", " Output mode ( F5 )" and " 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



### 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.

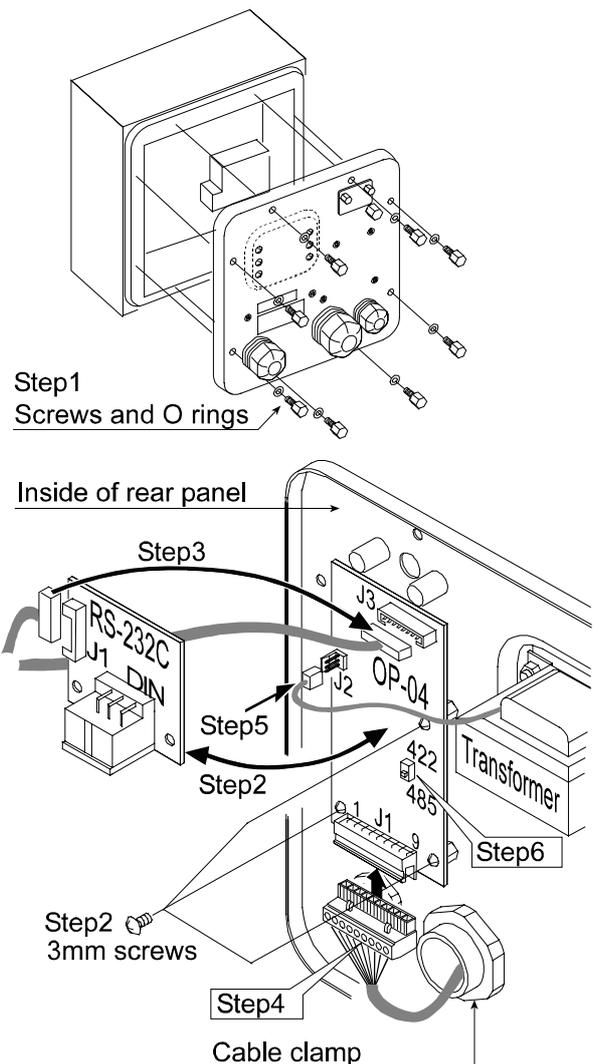
Step 3 Connect the cable to the J3 connector on the option board.

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.

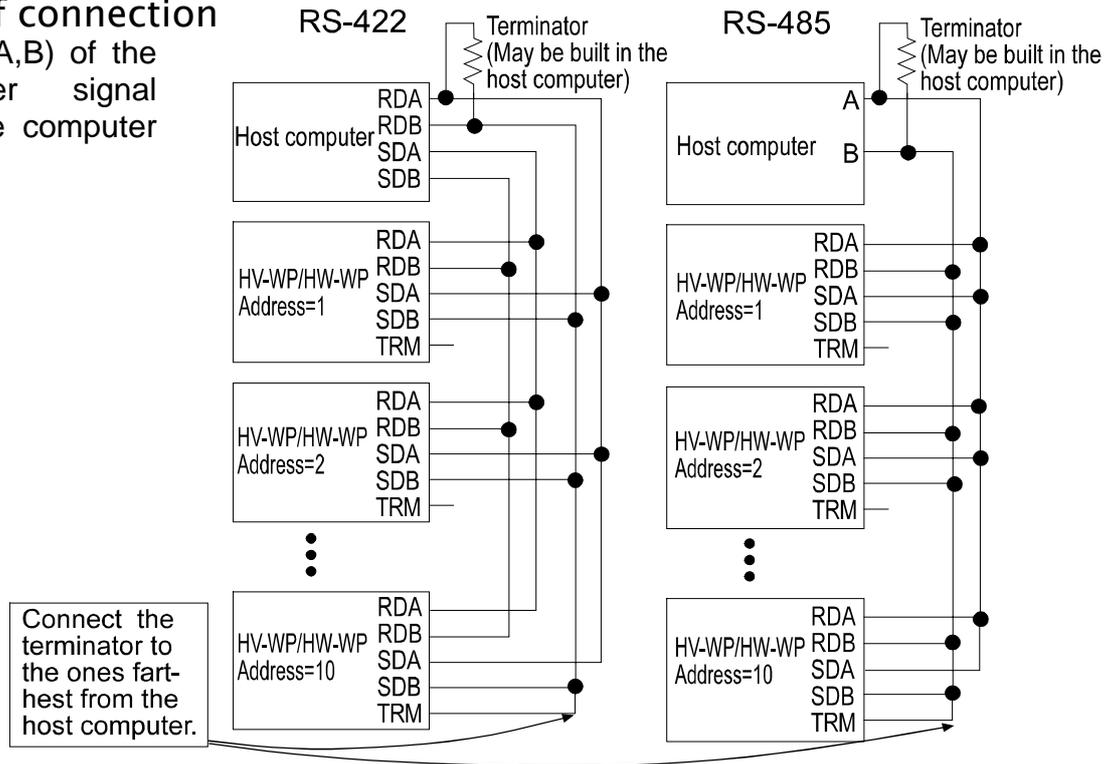
Step 6 Set a interface type with the switch.

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



## An example of connection

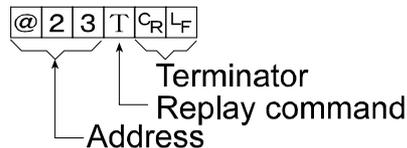
The polarities (A,B) of the host computer signal depends on the computer model.



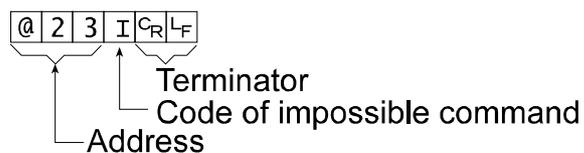
## 17.3.2. Communication Format

- Commands consist of an address and the same command as for the RS-232C.
- Commands return the same command when there is no data transmitted.
- If the address is 23, the replay is as follows:

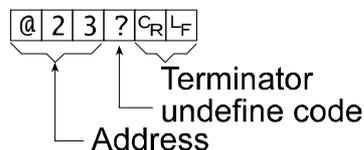
Normal response



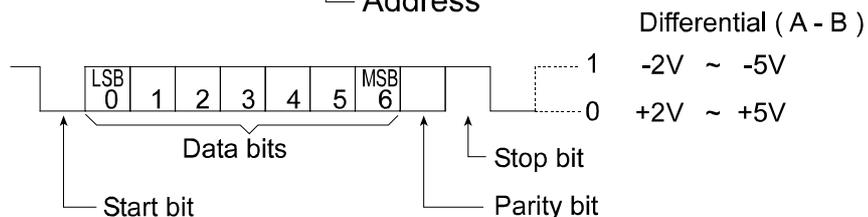
Impossible command response



Undefined command response



Bit format



## 17.3.3. Command List

---

The following explanation uses "format 1 ( 

F	15	0
---	----	---

 )" assuming 23 as the address.

### Data output

The current weighing data is output.

Template Q

Command 

@	2	3	Q	C <sub>R</sub>	L <sub>F</sub>
---	---	---	---	----------------	----------------

Reply 

@	2	3	S	T	,	+	0	0	0	1	2	.	4	0	┌	k	g	C <sub>R</sub>	L <sub>F</sub>
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	----------------	----------------

### 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 <sub>R</sub>	L <sub>F</sub>
---	---	---	---	----------------	----------------

Reply 

@	2	3	U	C <sub>R</sub>	L <sub>F</sub>
---	---	---	---	----------------	----------------

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 <sub>R</sub>	L <sub>F</sub>
---	---	---	---	----------------	----------------

Reply 

@	2	3	Z	C <sub>R</sub>	L <sub>F</sub>
---	---	---	---	----------------	----------------

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 <sub>R</sub>	L <sub>F</sub>
---	---	---	---	----------------	----------------

Reply 

@	2	3	T	C <sub>R</sub>	L <sub>F</sub>
---	---	---	---	----------------	----------------

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 <sub>R</sub>	L <sub>F</sub>
---	---	---	---	---	----------------	----------------

Reply 

@	2	3	C	T	C <sub>R</sub>	L <sub>F</sub>
---	---	---	---	---	----------------	----------------

Gross is displayed and the net mark is turned off.

### Preset tare

The tare value is set and the net value is displayed. The net mark is displayed.

Template PT, [parameter]

Command 

@	2	3	P	T	,	+	0	0	1	2	0	C <sub>R</sub>	L <sub>F</sub>
---	---	---	---	---	---	---	---	---	---	---	---	----------------	----------------

Reply 

@	2	3	P	T	,	+	0	0	1	2	0	C <sub>R</sub>	L <sub>F</sub>
---	---	---	---	---	---	---	---	---	---	---	---	----------------	----------------

Net is displayed.

### Upper limit value

An upper limit value is stored.

Template HI, [parameter]

Command 

@	2	3	H	I	,	+	0	3	2	1	0	C <sub>R</sub>	L <sub>F</sub>
---	---	---	---	---	---	---	---	---	---	---	---	----------------	----------------

Reply 

@	2	3	H	I	,	+	0	3	2	1	0	C <sub>R</sub>	L <sub>F</sub>
---	---	---	---	---	---	---	---	---	---	---	---	----------------	----------------

The upper limit value is stored.

## Lower limit value

A lower limit value is stored.

Template LO, [parameter]

Command @ 2 3 L 0 , - 0 0 4 0 0 C<sub>R</sub> L<sub>F</sub>

Reply @ 2 3 L 0 , - 0 0 4 0 0 C<sub>R</sub> L<sub>F</sub>

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 @ 2 3 A C<sub>R</sub> L<sub>F</sub>

Reply @ 2 3 A , + 0 0 0 0 1 2 . 4 0 \_ \_ k g C<sub>R</sub> L<sub>F</sub>

## Accumulation count output

The number of accumulated data is output.

Template N

Command @ 2 3 N C<sub>R</sub> L<sub>F</sub>

Reply @ 2 3 N , + 0 0 0 0 0 0 1 4 0 \_ \_ \_ C<sub>R</sub> L<sub>F</sub>

## Reset of Accumulation data and number

The data and number of accumulations become zero.

Template CA

Command @ 2 3 C A C<sub>R</sub> L<sub>F</sub>

Reply @ 2 3 C A C<sub>R</sub> L<sub>F</sub>

The data and number of accumulations become zero.

## Final value

The final value is stored.

Template S0, [parameter]

Command @ 2 3 S 0 , + 0 2 0 0 0 C<sub>R</sub> L<sub>F</sub>

Reply @ 2 3 S 0 , + 0 2 0 0 0 C<sub>R</sub> L<sub>F</sub>

The value is stored.

## Preliminary value

The preliminary value is stored.

Template S1, [parameter]

Command @ 2 3 S 1 , + 0 0 2 0 0 C<sub>R</sub> L<sub>F</sub>

Reply @ 2 3 S 1 , + 0 0 2 0 0 C<sub>R</sub> L<sub>F</sub>

The value is stored.

## Zero band

The zero band is stored.

Template S2, [parameter]

Command @ 2 3 S 2 , + 0 0 0 5 0 C<sub>R</sub> L<sub>F</sub>

Reply @ 2 3 S 2 , + 0 0 0 5 0 C<sub>R</sub> L<sub>F</sub>

The value is stored.

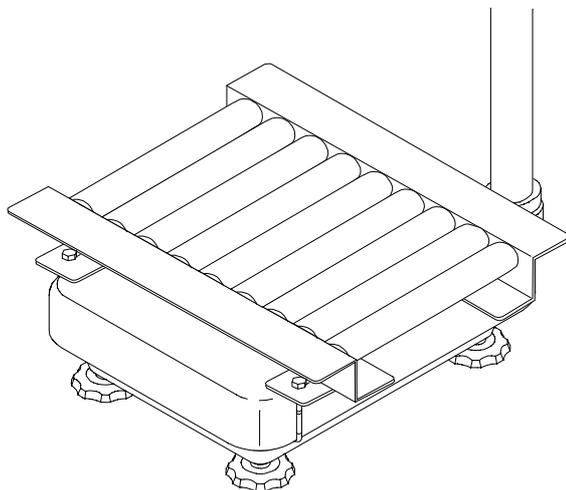


## 17.4. Roller Conveyor (OP-13, OP-14)

### OP-13

This option can be used with the following products.

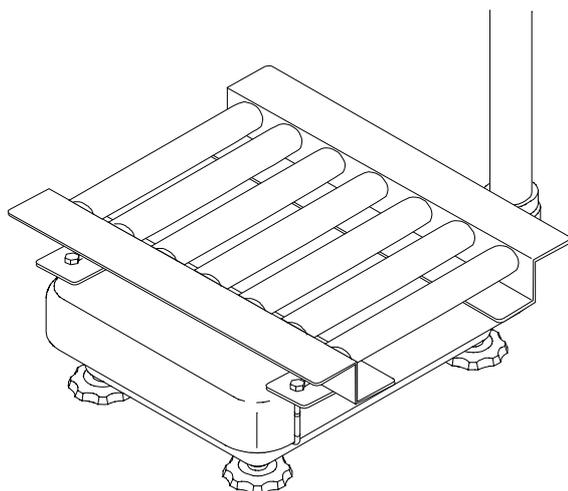
HV-200KV-WP,  
HW-100KV-WP,  
HW-200KV-WP



### OP-14

This option can be used with the following products.

HV-60KV-WP,  
HW-60KV-WP





# 18. Specification

## HV-WP series

Product	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 [units]	5 (can be changed to 10, 20, 50, 100)								
Max. count number [units]	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

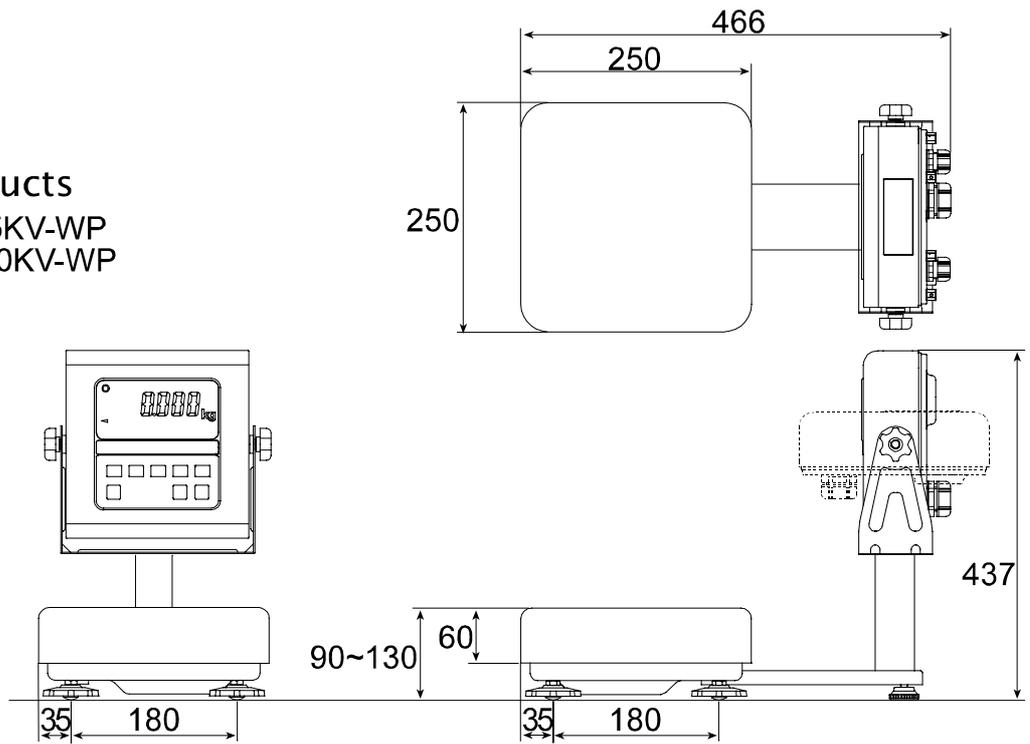
Product	HW-10KV-WP	HW-60KV-WP	HW-100KV-WP	HW-200KV-WP
Weighing Capacity [kg]	10	60	100	220
Min. weighing (1 digit) [g]	1	5	10	20
Weighing Capacity [lb] #	20	150	200	500
Min. weighing (1 digit) [lb] #	0.002	0.01	0.02	0.05
Weighing Capacity [oz] #	320	2400	3200	8000
Min. weighing (1 digit) [oz] #	0.05	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 [units]	5 (can be changed to 10, 20, 50, 100)			
Max. count number [units]	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/°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

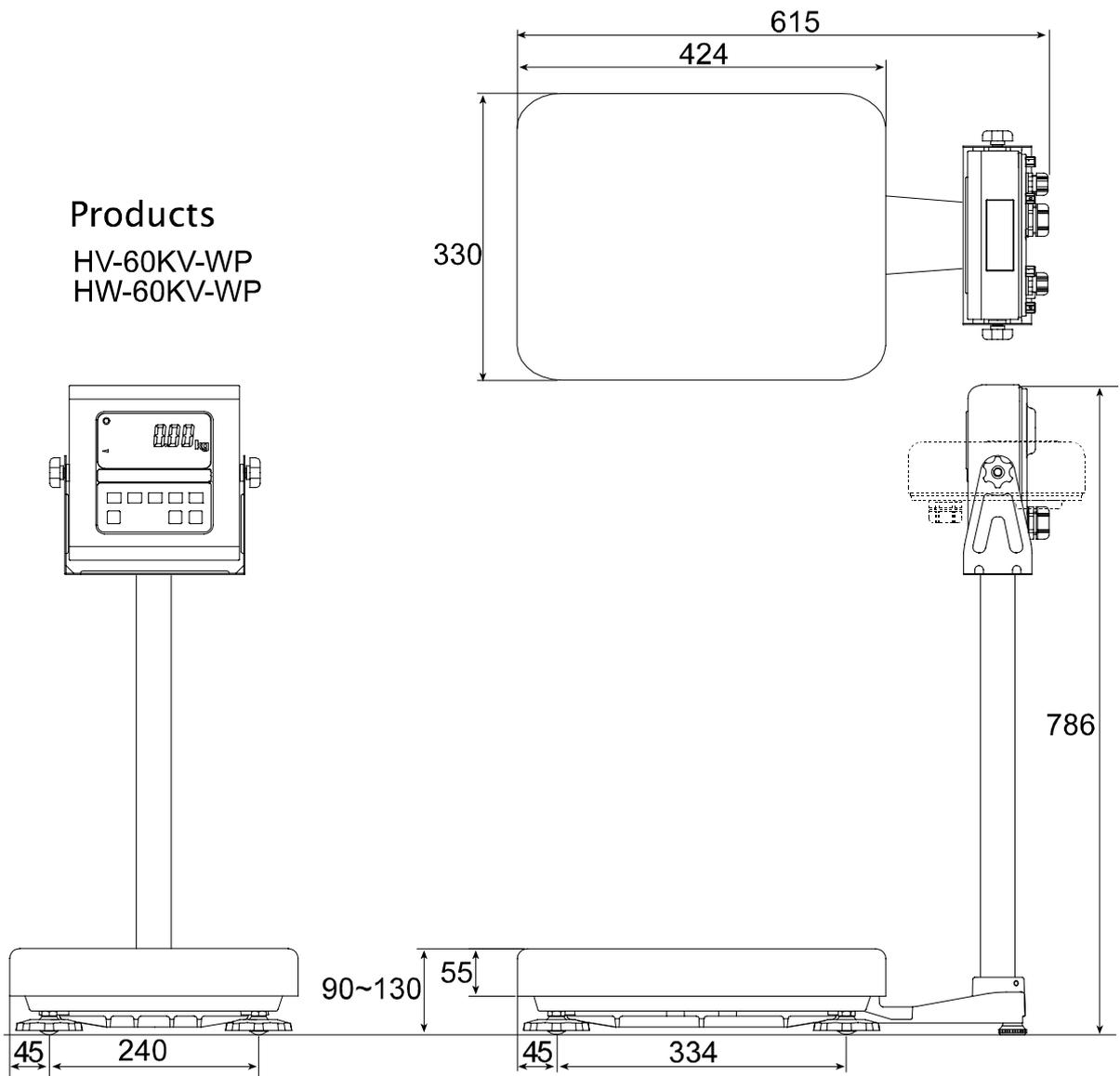
## Products

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



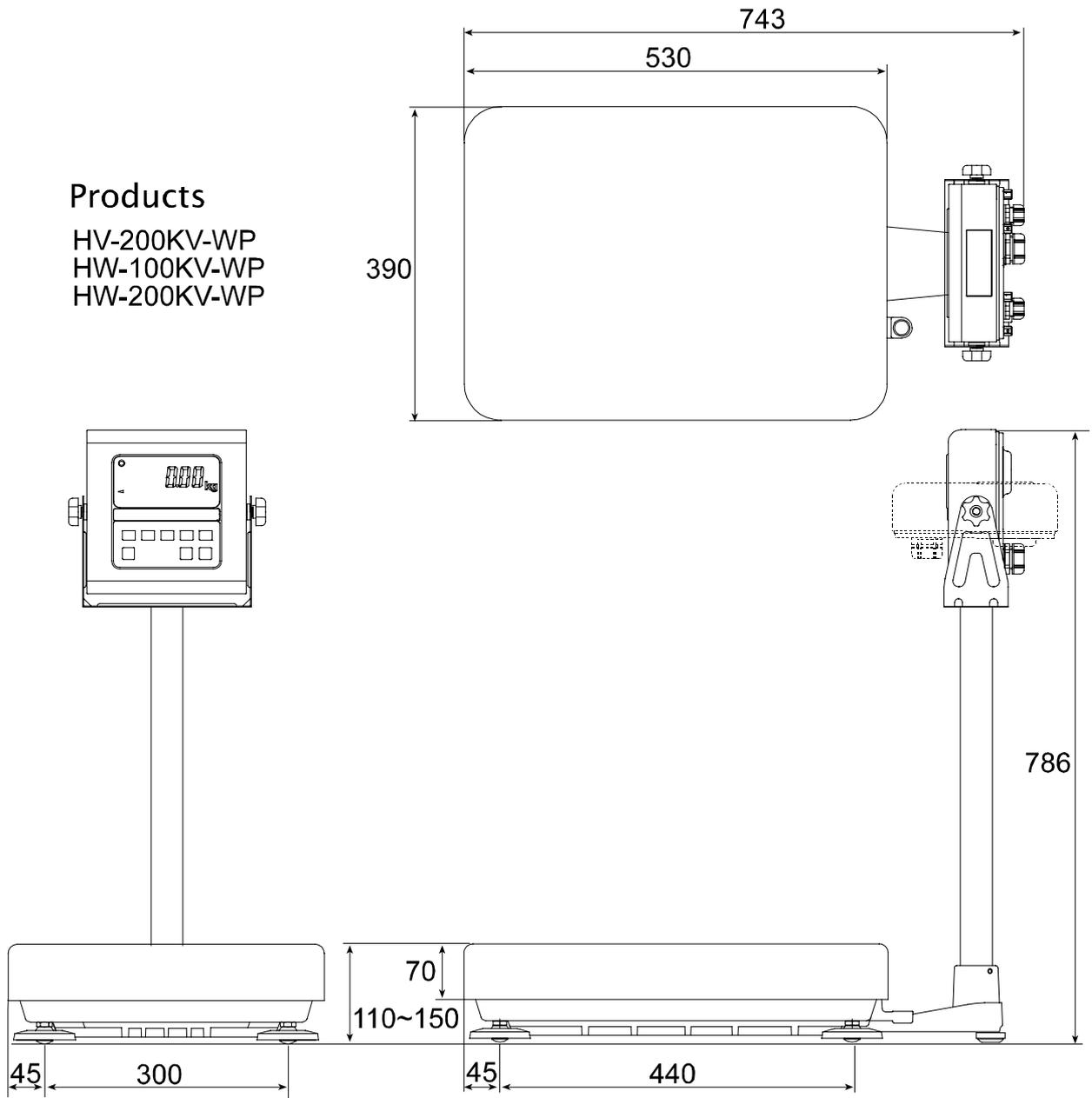
## Products

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



### Products

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





## 19. Maintenance

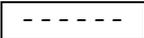
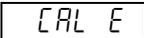
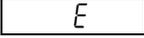
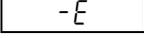
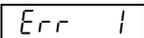
- Refer to "4. Caution" for use.
- Refer to "6.1. Display and Symbols " and corresponding mode for displayed error code.
- Refer to "14. Calibration (Adjusting Scale)" for precision weighing.
- Periodically check the accuracy of weighing. Calibrate the scale, if it is moved to another location or the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

### 19.1.1. 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.



## 19.2. Check points Before Calling Maintenance Service

In this situation	Confirm these items
Nothing displayed. Scale does not turn on.	<ul style="list-style-type: none"> <li>□ Is the AC power cord properly connected?</li> <li>□ Is the AC power the correct voltage ?</li> </ul>
The scale does not display zero at first.	<ul style="list-style-type: none"> <li>□ Check around the weighing pan.</li> <li>□ Is there anything on the weighing pan.</li> </ul>
 is displayed and does not proceed.	<ul style="list-style-type: none"> <li>□ The weighing value is unstable due to drift, vibration or other.</li> <li>□ Check around the weighing pan.</li> <li>□ Check the load cell cable connection.</li> </ul>
 is displayed and does not proceed.	<ul style="list-style-type: none"> <li>□ Check around the weighing pan. Remove anything that is on the weighing pan.</li> <li>□ Make zero point calibration of the scale.</li> </ul>
 is displayed	<ul style="list-style-type: none"> <li>□ Calibration error that meaning "Too heavy".</li> </ul>
 is displayed	<ul style="list-style-type: none"> <li>□ Calibration error that meaning "Too light".</li> </ul>
 is displayed	<ul style="list-style-type: none"> <li>□ Weighing error that meaning "Over load".</li> </ul>
 is displayed	<ul style="list-style-type: none"> <li>□ Weighing error that meaning "Under load".</li> </ul>
Fixed display	<ul style="list-style-type: none"> <li>□ Do you use the "hold function".</li> <li>□ Turn off scale and it on.</li> </ul>
 is displayed	<ul style="list-style-type: none"> <li>□ It an error occurs. Contact yours local A&amp;D dealer to repair the product.</li> </ul>

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