ViBRA
Measure the Future

High-Precision Tuning Fork Scale

F S 6 2 3
F S 3 2 0 2
F S 6 2 0 2
F S 1 5 0 0 1

Operation Manual

IMPORTANT

- To ensure safe and proper use of the balance, please read this manual carefully.
- After reading this manual, store it in a safe place near the balance, so you can review it as needed.

SHINKO DENSHI CO., LTD.

410027M21

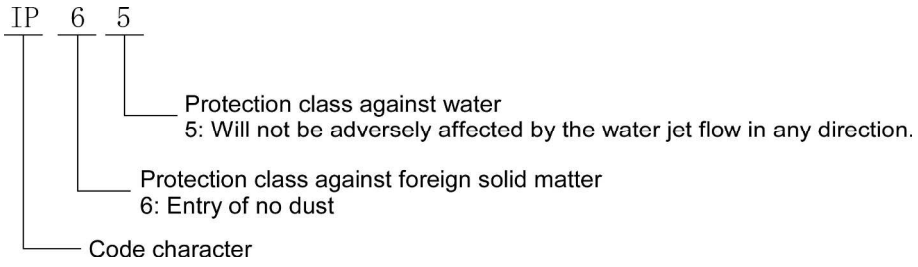
Preface

Thank you very much for having purchased a dust- and water-proof electronic scale, models FS623-15001.
This document describes important items to use the product safely.
Read this document carefully before use to correctly operate.

■About the dust- and water-proof structure

This scale is an electric device equipped with a dust- and water-proof structure.
(IPX5 is maintained when this scale is mounted in accordance with this manual.)

Protection class of a dust- and water-proof structure



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Important Notice

⚠ WARNING

- It should be known that this product contains potential danger. And so please be sure to observe this document when installing, operating or servicing this product.
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- Potential dangers are increasing in the industrial equipment industries due to the advent of new materials and processing methods, and speeding up of machines. It is impossible to foresee all situations related to these dangers. In addition, there are so many “impossible” and “don’ts” and so writing all of them in the operation manual is impossible. Therefore, it is safe to think that what is not written in the operation manual “cannot be performed” unless the operation manual positively writes “it is possible.” When performing installation, operation, maintenance or inspection of this product, not only observe what is written or indicated in this document or on the product surface but also pay adequate consideration to safety measures.
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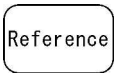
- Manufacturer: SHINKO DENSHI CO., LTD.
  Adress: 3-9-11 Yushima, Bunkyo-ku, Tokyo 113-0034 JAPAN

How to use this document

■Symbols used in this document

Understand the meaning of the following symbols and observe the instructions of this document.

Symbols	Meaning
	Used for the situation that invites an imminent risk of death or severe injury unless avoided.
	Used for the situation that invites a risk of death or serious injury unless avoided.
	Used for the situation that damages device/equipment, or destructs, deletes or overtypes data unless avoided.
	Used for the situation in which special care should be taken or specific information is emphasized.
	Used for reference information on operation
	Used for “Prohibition” items
	Used for “Mandatory” items requiring positive action
	Used for prohibition items to avoid “Electrical shock”.

■About this document

This document describes how to install the indicator section and scale section of the FS623-15001 (hereinafter referred to as “this product” or “the product”).
For how to operate the indicator section, please refer to the “FS Series Operation Manual”.
This document describes how to install alone.

■About how to read this document

This document consists of the following contents:

1. When beginning to use	Describes precautions, checking for samples contained in the box, the name and function of each section and the assembling and installation of the scale. Before installing and using the product for the first time, be sure to read this document.
2. How to maintain	Describes how to maintain this product.
Appendix	Provides necessary data such as the specifications of this product.

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1 Prior to use

1-1 Precautions

DANGER

	■ **Do not wet the AC adapter** That may cause an electric shock, short-circuiting or failure.
	■ **Do not connect the cables with its connector or jack being wet.** That may cause an electric shock, short-circuiting or failure.
	■ **Do not touch the electrode with a wet or dirty hand.** That may cause an electric shock, short-circuiting or failure.

WARNING

	■ **Do not disassemble or modify the product.** Doing so could result in injury, electric shock, fire and other accidents or failures. For inspection and adjustment, contact the retailer from whom the product was purchased.
	■ **Do not move the product with a sample to be weighed set on the scale.** That may cause the sample to fall from the weighing pan, leading to a bodily injury or destruction of the sample.
	■ **Do not connect to the main unit the power supply cord, scale cable, or communication cable with its connector or jack being wet.** That may cause an electric shock, short-circuiting or failure.
	■ **Do not use the product on an unstable table or a place that is subject to vibration.** That may cause the sample to fall from the weighing pan, leading to a bodily injury or destruction of the sample. Besides inaccurate weighing may result.
	■ **Do not place an unstable sample on the weighing pan.** The sample may fall down, giving rise to a danger. Put an unstable sample in a container (tare) before weighing it.
	■ **Do not use the product in an abnormal condition.** If it should happen that an abnormal event such as smoking or unusual odor occurs, ask the store where you purchased the product or our sales department for repair. Keeping using the product may result in an electric shock or fire. In addition, do not ever try to repair it for yourself, or very dangerous situation is likely to occur.
	■ **Connect the cables properly.** Improper connection of the cables will impair the IP65 protection.
	■ **Obey the MSDS.** Measurering dangerous materials such as flammable liquid could cause an explosion or fire.
	■ **Only use the dedicated AC adapter.** Use of other types of power or adapters may result in heat generation or malfunction of the scale.

⚠ CAUTION

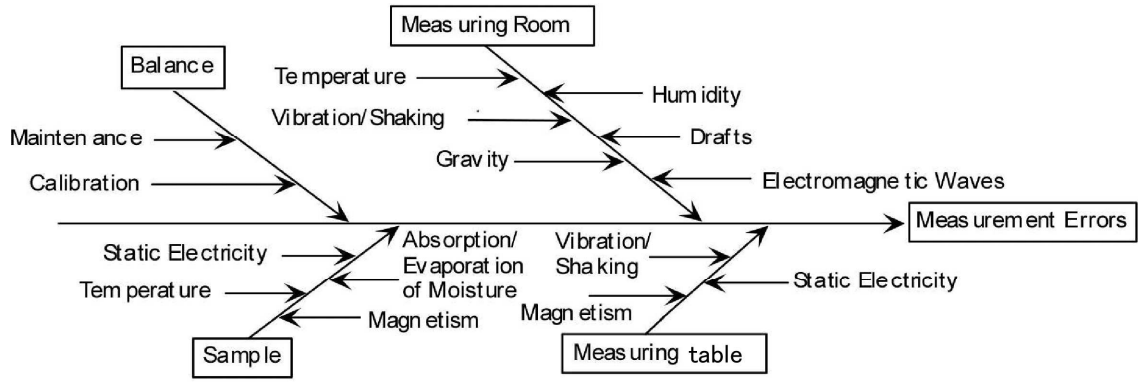
	■ Do not give a shock to the scale. It may cause breakage or failure. Place an article to be weighed softly.
	■ Do not let an overload situation (o-Err indication) continue. It may cause breakage or failure. Remove the sample to be weighed immediately.
	■ Do not use volatile solvent. Use of volatile solvent is likely to deform the main unit. Dirt on the main unit should be removed with a piece of dry cloth or cloth wet with small amount of neutral detergent.

Note

	■ Do not use the product where wind from an HVAC equipment directly applies. Accurate weighing may be impeded due to the fluctuation of surrounding temperature.
	■ Do not use the product where there is direct sun. Accurate weighing may be impeded due to the rise of internal temperature.
	■ Do not use the product where floor is soft. Accurate weighing may be impeded due to the tilting of the main unit when an object is placed on it.
	■ Do not use the product where there is violent fluctuation of surrounding temperature or humidity. Accurate weighing may possibly be impeded. Use within a temperature range of 5 to 40 °C and below a humidity of 85% RH.
	■ Do not use the product on an unstable table or a place that is subject to vibration. It may cause not only inaccurate weighing but also the sample to fall from the weighing pan, leading to a bodily injury.
	■ Be sure to make adjustment at the time of installation or changing a use place. There occurs an error in measurement value. For the sake of accurate measurement, be sure to make adjustment.
	■ Check for an error periodically. Use environment and chronological change cause an error in measured value, leading to an inaccurate measurement.
	■ Align the level of the scale without fail before use. Weighing with a slanted scale causes an error, leading to an inaccurate measurement. Put the scale on a robust place.

1-2 For more accurate measurement

To make more accurate measurement, it is necessary to lessen error-causing factors in measurement to the extent possible. Error-causing factors include not only an instrument error and performance of the scale itself but also the nature and condition of a specimen, measuring environment (vibration, temperature, humidity, etc.) and the like. These factors will directly affect measurement result in the case of a scale with high resolution capability.



Measurement Errors

1-2-1 Precautions related to measuring environment

Temperature/humidity	→	Try to keep the room temperature constant to the extent possible in order to avoid condensation and indication drift due to change in temperature.
	→	Low humidity is likely to cause generation of static electricity, resulting in inaccurate measurement.
Vibration/shaking	→	It is preferable to locate a measuring room on the first floor or the basement. The higher the room is, the larger the vibration and shaking become. Therefore a highly located room is not suitable for measurement. Rooms near the railway or road side should also be avoided.
Air draft	→	Places directly exposed to air current from an air-conditioner or to direct sun generate abrupt temperature change and resultantly cause unstable weight indication, and therefore, should be avoided.
Gravity	→	The latitude and altitude of a measuring location differentiate the gravity that affects a specimen, giving a different weight indication to the same specimen.
Electromagnetic wave	→	At a location where a strong electromagnetic wave generating object is in the proximity of a scale, the scale is affected by the electromagnetic wave, making the scale unable to indicate accurate weight, and therefore, such a location should be avoided.

1-2-2 Precautions related to measuring table

Vibration/shaking	→	Vibrations during measurement distabilizes the indication of measurement value, leading to inability to make accurate measurement. And so use of a measurement table that is robust and hardly affected by vibration is required (a vibration-proof structured table or concrete or stone-made table is suitable). In addition, placing a sheet of soft cloth or paper under the scale causes shaking or makes keeping horizontal attitude difficult, and therefore should be avoided.
	→	The measurement table should be installed in a position free from vibration to the extent possible. A corner rather than the center of a room is less affected by vibration and therefore more suitable for installation of the scale.
Magnetism/Static electricity	→	Use of the scale on the table that is subject to magnetism or static electricity should be avoided.

1-2-3 Precautions related to a specimen

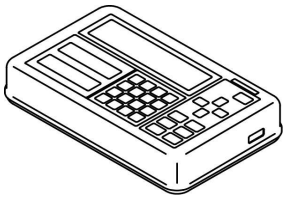
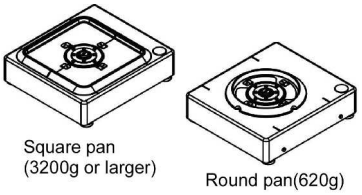
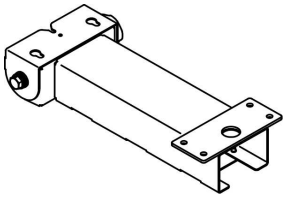
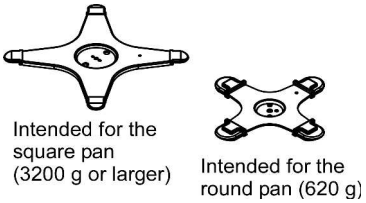
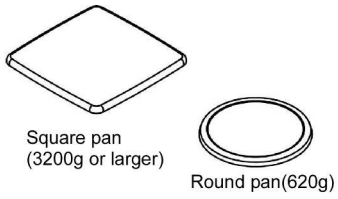
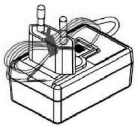
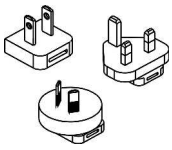
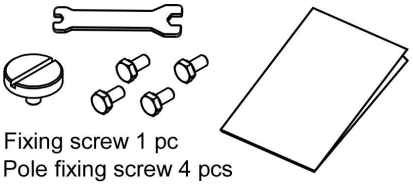
Static electricity	→	In general, synthetic resin- and glass-made specimens are high in electric insulation, and so easily charged electrically. Weighing an electrically charged specimen makes the indication value unstable, reducing the reproducibility of the test result. Therefore, neutralize an electrically charged specimen before measurement.
Magnetism	→	Specimens affected by magnetism show different weight in a different position of the weighing pan, reducing the reproducibility. When weighing a magnetized specimen, either eliminate the magnetism from the specimen or place a setting plate on the weighing pan to distance the specimen from the weighing mechanism of the scale so that the mechanism may not be affected by the magnetism.
Moisture absorption/Evaporation	→	Measuring a moist or evaporating (vaporizing) specimen increases or decreases the indication value of the scale continuously. When this is the case, put the specimen in a container equipped with a small mouth and closely seal the mouth before measurement.
Specimen temperature	→	Difference in temperature between the specimen and the windshield interior generates convection flow within the windshield, causing a measurement error. When the specimen temperature is excessively high or low, allow the specimen temperature to stabilize at the room temperature before measurement. Also, to prevent the convection flow from arising within the windshield, make the windshield interior temperature equal to the room temperature before measurement.
	→	Measurer’s body temperature also affects measurement result. Handle a specimen with tweezers instead of directly holding it with fingers and refrain from putting your hands directly in the windshield during measuring operation.

1-2-4 Precautions related to the main unit of a scale

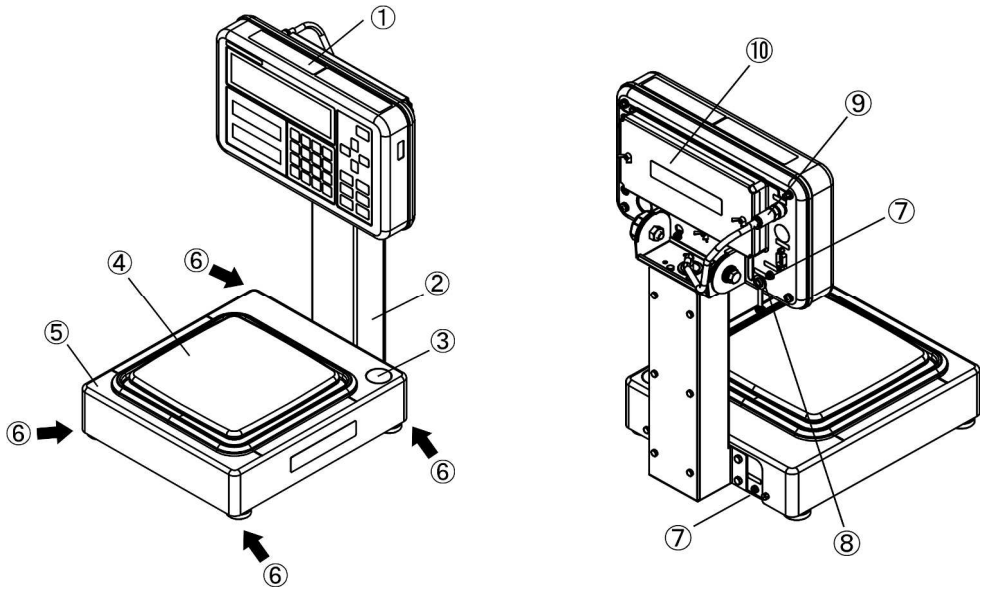
Operating precautions	→	A dust cover, if equipped, for the scale may possibly make the weight indication unstable due to static electricity charged on the cover at a low humidity. When this is the case, wipe the cover with wet cloth or use antistatic agent or use the scale with the cover removed.
	→	For more stable measurement, it is recommended to energize the scale for longer than 30 minutes and load the scale a few times with a weight equivalent to the weighing capacity before measurement.
Adjustment	→	Calibrate the scale periodically with an external adjustment weight. For the sake of precise calibration, use an external adjustment weight weighing nearly equal to the weighing capacity of the scale.
	→	Energize the scale for longer than 30 minutes and load the scale a few times with a weight equivalent to the weighing capacity before measurement
	→	Adjustment is also needed in the following cases: When using the scale for the first time, When using the scale after a long period of non-use, When changing a place of installation, and When there was a large change in temperature, humidity or atmospheric pressure.
Maintenance	→	Attachment of dirt such as powder or liquid to the weighing pan or pan base will cause measurement error or unstable weight indication. For that reason, frequent cleaning of the scale is required. In cleaning the scale, take care for the dust or liquid not to enter into the scale (mechanism).

1-3 Check for the articles contained in the box

The package box contains the following;
If anything missing or broken should be found, please inform the store where you purchased the product.

Part name	Q'ty	Part name	Q'ty
① Indicator 	1	② Base unit 	1 each
③ Pole 	1	④ Pan base (either a square or round pan) 	1
⑤ Weighing pan (either a square or round pan) 	1	⑥ AC adapter 	1
⑦ Adapter plug 	3	⑧ Accessories 	

1-4 Name and function of each section



①	Indicator	②	Pole
③	Level	④	Weighing pan
⑤	Scale	⑥	Adjustor
⑦	Enclosure grounding terminal	⑧	AC Adapter jack
⑨	Scale cable	⑩	Battery holder

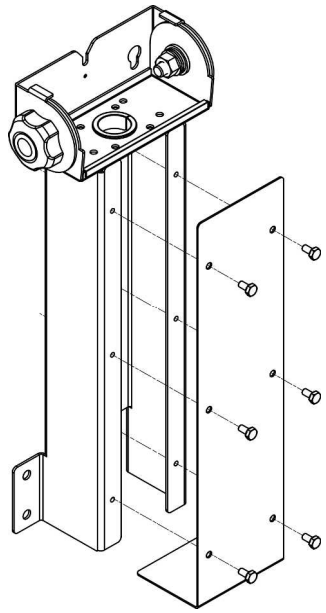
1-5 Assembling and installation of the product

DANGER	This product is heavy and require two or more people to carry or install. Carry the pan, pan base and base unit independently with care.

1-5-1 How to mount the pole and the indicator

Note When not using the pole, proceed to step 5.

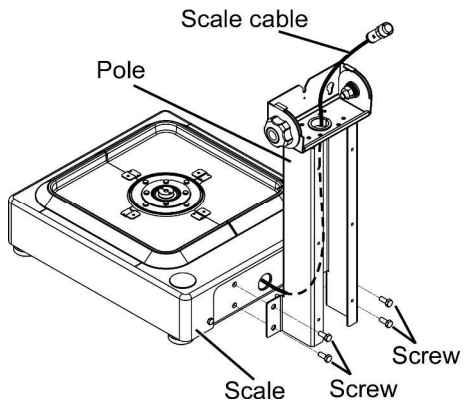
1 Remove the pole cover.



(1)
Remove six screws from the pole with a spanner which comes with the scale.

(2)
Remove the pole cover.

2 Mount the pole on the scale.

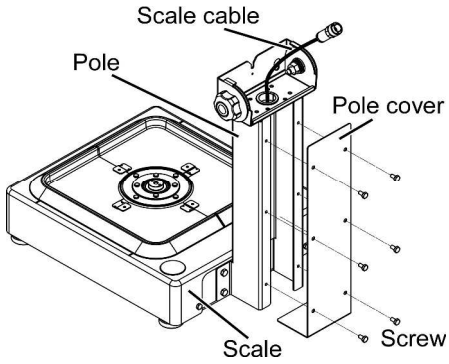


(1)
Put the scale cable that comes out of the scale through the pole.

(2)
Fix the pole and the scale with the attached screws temporarily.

(3)
Tighten the screws to fix the pole securely with the spanner which comes with the scale.

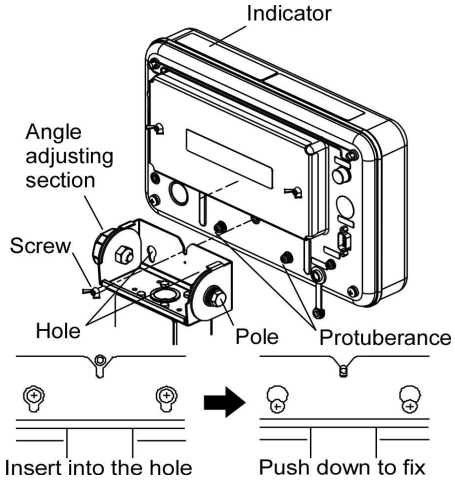
3 Mount the pole cover.



(1)
Mount the pole cover with the removed six screws temporarily.

(2)
Tighten the screws with the spanner which comes with the scale to fix the pole cover.

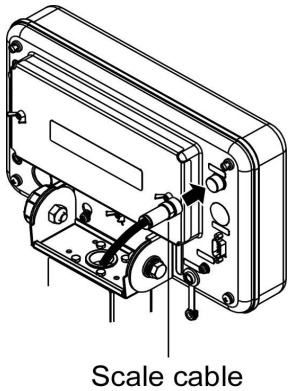
4 Mount the indicator on the pole.



(1)
Put two protuberances located in the lower portion of the back of the indicator into the holes of the angle adjusting section, and then push down the indicator.

(2)
Fix the indicator with screws.

5 Connect the scale cables to the indicator.



(1)
Tighten the connector screw to fix.

Reference

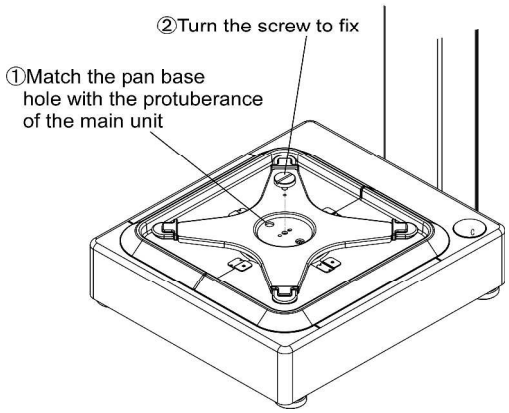
When not using the pole, connect the scale cable directly to the indicator.

CAUTION

Tighten the cable securely for protection against dust and water.

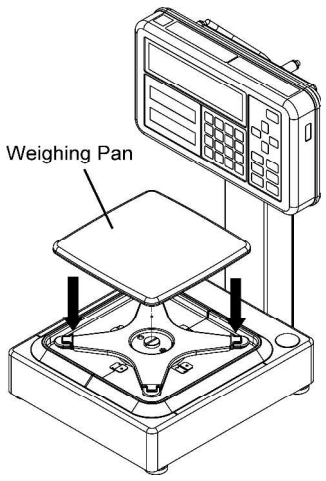
1-5-2 Mounting of the pan base and the weighing pan

1 Mount the pan base on the scale.



(1)
Put the pan base on the main unit with the pan base hole matched up with the protuberance of the main unit, and then turn the screw with a coin or the like to fix it. Do not turn it excessively.

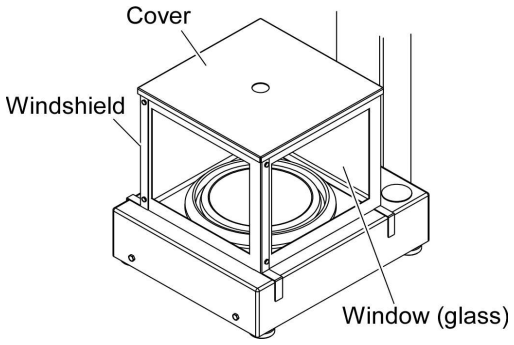
2 Mount the weighing pan.



(1)
Place the weighing pan on the pan base.

1-5-3 Mounting of the windshield (Option)

1 Place the windshield on the scale.

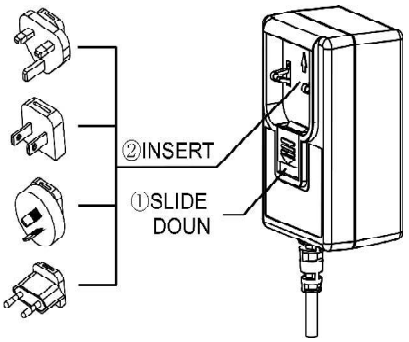


CAUTION

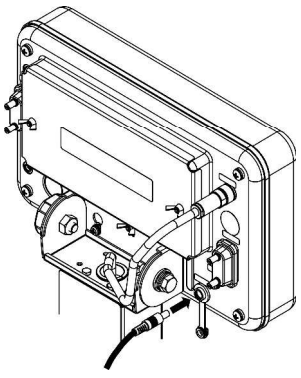
- Place it very gently so as not to give a shock to the scale.
- The cover is only placed, requiring care not to drop it by mistake when doing so.
- The windows of the windshield sides are made of glass, requiring care in handling not to break it due to a shock.

1-5-4 Assembly of the AC adapter

1 Put the AC adapter plug to the AC adapter.



2 Connect the AC adapter jack.



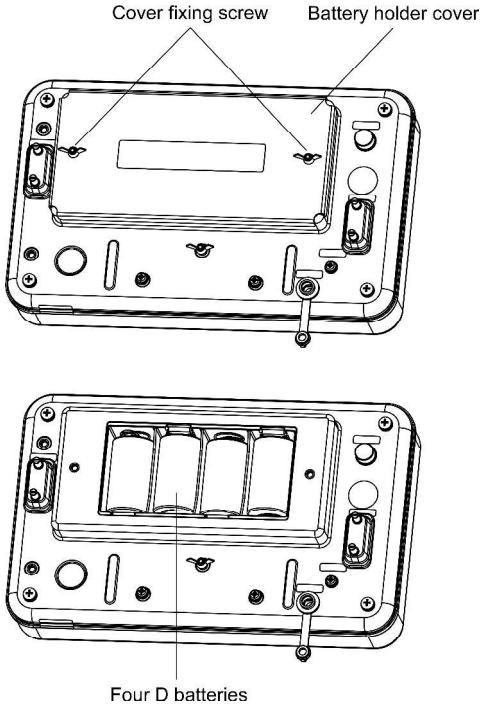
CAUTION

To maintain a dust–and water-proof structure, inserted it all the way.

1-5-5 Installation of batteries

CAUTION	1. Remove the AC adaper jack. 2. Alkaline, manganese or nickel hydride batteries can be used with the product. 3. Take care to ensure you insert batteries with the positive and negative poles correctly inserted, and be careful about short circuits.Such mishandling could damage the batteries, or cause the balance to fail or ignite. 4. Do not mix old and new batteries, or batteries of different types or manufacturers. Doing so is dangerous. 5. If the balance is not going to be used for a long time, store it with the batteries removed. 6. Do not use the batteries that leak. 7. Observe the precautions printed on the batteries. 8. Dispose of batteries in accordance with local regulations.

1 Remove the indicator battery holder cover and install the batteries.



(1)
Remove the two cover fixing screws from the back of the indicator and then remove the battery holder cover.

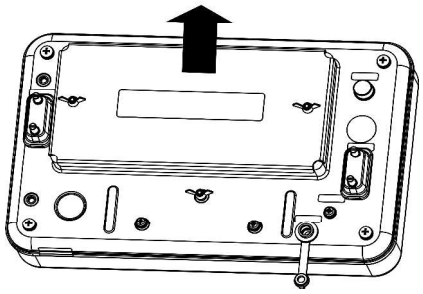
(2)
Place four new D batteries in the correct directions after checking the polarity.
(+ and -)

Note

There is no battery charging circuit in this product. Please charge the Nickel - metal hydride batteries prior to use with a battery charger.

2 Use the screws to fix the battery holder cover and fix the indicator to the angle adjusting section.

The warning label should face up ward



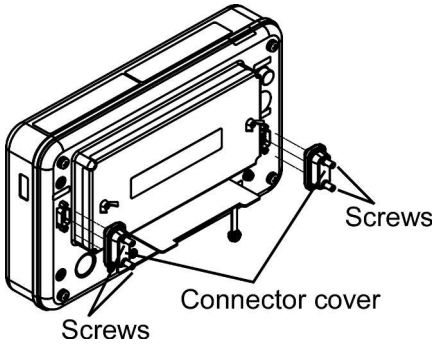
(1)
Put the battery holder cover on and use the cover fixing screws to fix it.

(2)
Attach the indicator to the angle adjusting section and use the indicator fixing screws to fix the indicator.

> **CAUTION**
> Attach the battery holder cover, so that the letters on the warning label face up ward.

1-5-6 Connection of communication cables

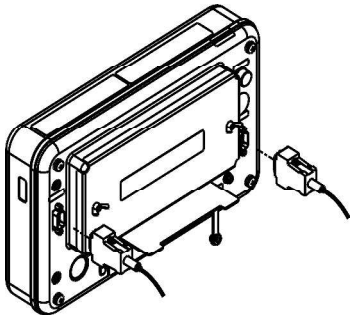
1 Remove the connector cover.



(1)
Loosen the screws of the connector cover.

(2)
Remove the connector cover from the indicator.

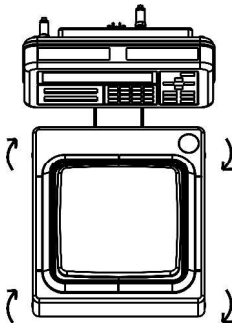
2 Connect dust- and water-proof RS232C cable.



> **CAUTION**
> To maintain IP65, use the specified dust-and water-proof RS232C cable. Please contact to our local daler.

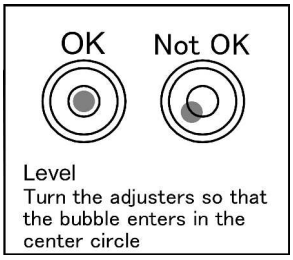
1-5-7 Leveling

1 Release the transportation lock of the adjuster.



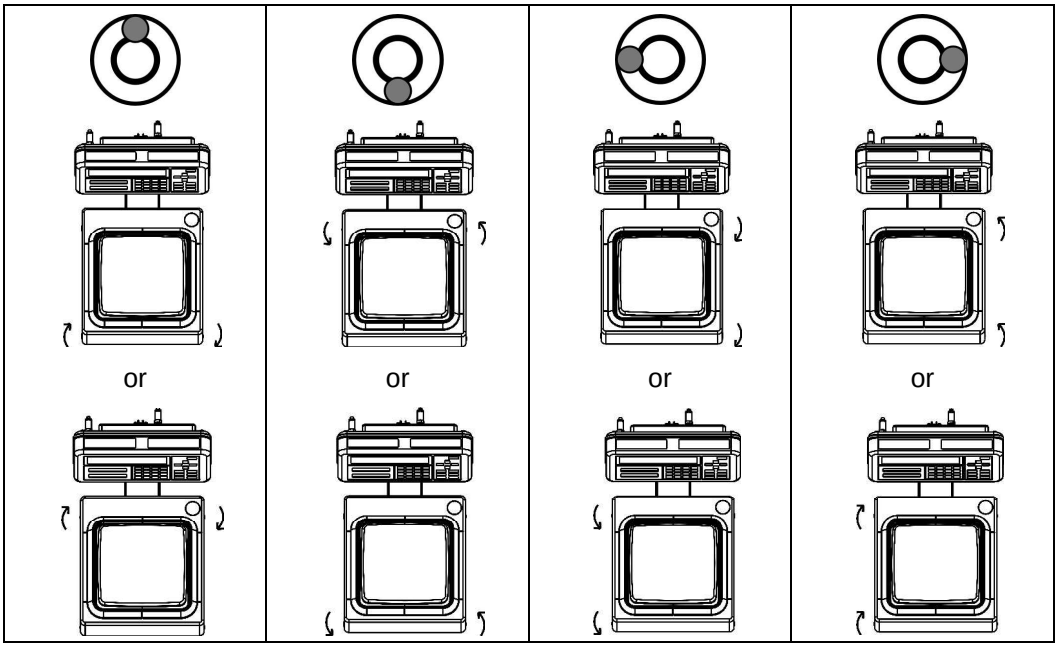
(1)
At the time of shipment, the adjusters provided at the four corners of the bottom are locked. Turn them in the direction shown in the figure on the left to loosen them.

2 Level the scale.



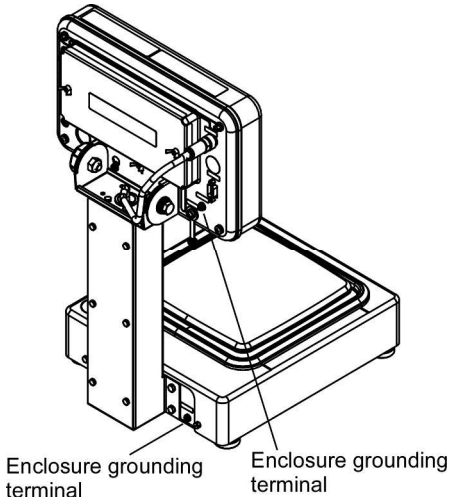
(1)
While watching the level, turn the adjusters provided on the bottom to level the main unit.
(2)
Bring the bubble enters in the center circle as shown in the figure on the left.
(3)
When having leveled the main unit, slightly push the four corners of the scale to make sure that there is no rattle.

Turn the adjusters as shown below depending on the position of the bubble in the level.



1-5-8 Grounding

1 Connect a grounding terminal.



(1)
Ground the Enclosure grounding terminal(s) for the enclosure(s).

Note

Grounding terminal may be connected when there is influence by electrostatic.

2 How to maintain

Keep the following in mind in maintaining this product.

2-1 Maintenance method

Wipe dirt with dry and soft cloth off the main unit and the indicator section.

2-2 Maintenance method in the case of heavy soil

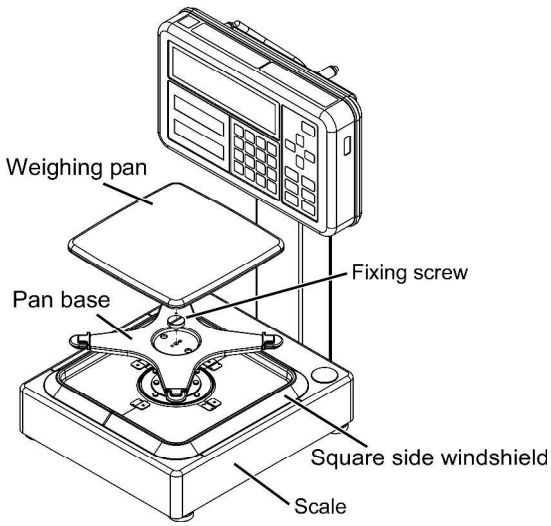
In the case of heavy soil, remove the weighing pan and/or the indicator section and clean it with a piece of cloth slightly wet with neutral detergent or solvent. In the case of being extremely dirtied, wash the dirt off and then wipe it adequately with dry cloth.
To remove the indicator section from the weighing section, refer to “Assembling and installation of the scale.”

CAUTION	Removing a part other than the one referred to in this document will impair the function of the main unit, leading to a failure. Please note that we will not take any responsibility for the consequence resulting from such removal. When washing with water, take care not to submerge the weighing section and indicator section.

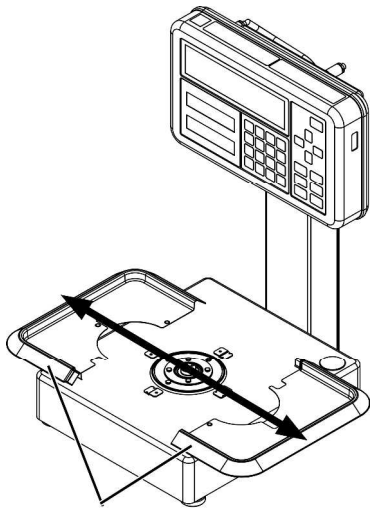
2-2-1 How to remove the side windshield (Square pan)

1 Remove the weighing pan and the pan base from the scale.

(1)
Remove in the order of the weighing pan, the fixing screw and the pan base.



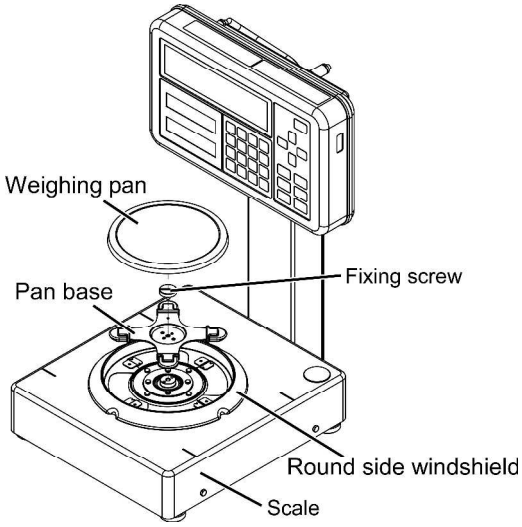
2 Remove the square side windshield.



(1)
Open the square side windshield right and left to remove it.

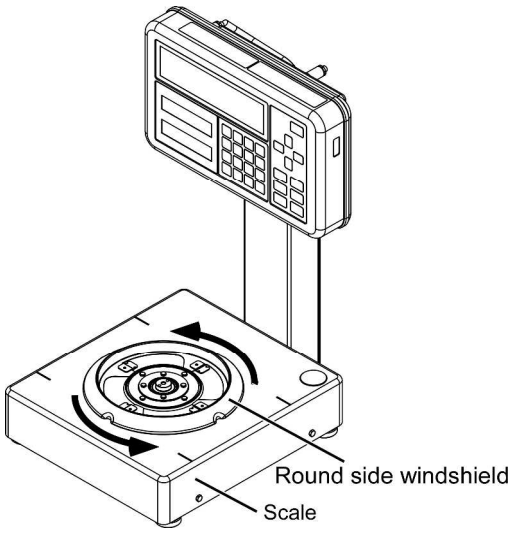
2-2-2 How to remove the side windshield (Round pan)

1 Remove the weighing pan and the pan base from the scale.

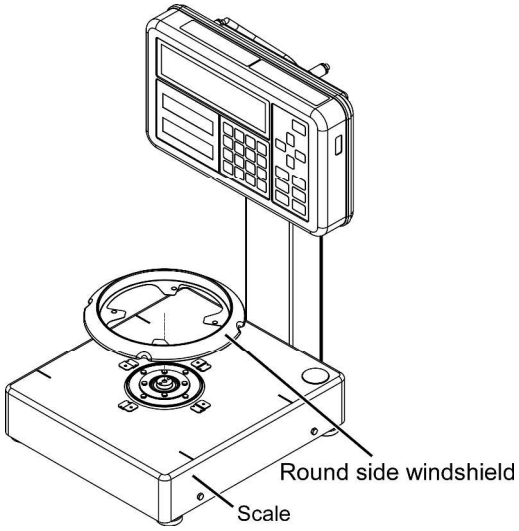


(1)
Remove in the order of the weighing pan, the fixing screw and the pan base.

2 Remove the round side windshield.



(1)
Turn the round side windshield counterclockwise.



(2)
Remove the round side windshield.

Appendix

Appendix 1 Specification

1-1 Basic specification

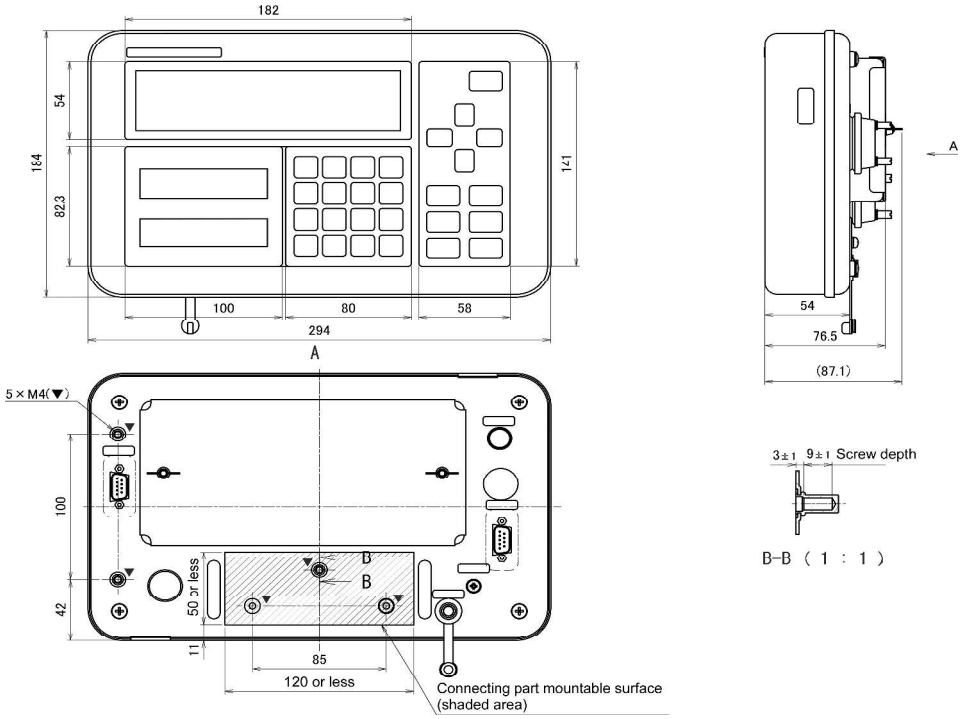
Model name	Max (g)	e (g)	d (g)	Weighing pan size (mm)	Connectable weight indicator section	Power source
FS623	620	0.01	0.001	ϕ 140	i02 i03	Dedicated AC Adapter
FS3202	3200	0.1	0.01	□190		
FS6202	6200	0.1	0.01			Battery Four D batteries
FS15001	15000	1	0.1			

1-2 Common specification

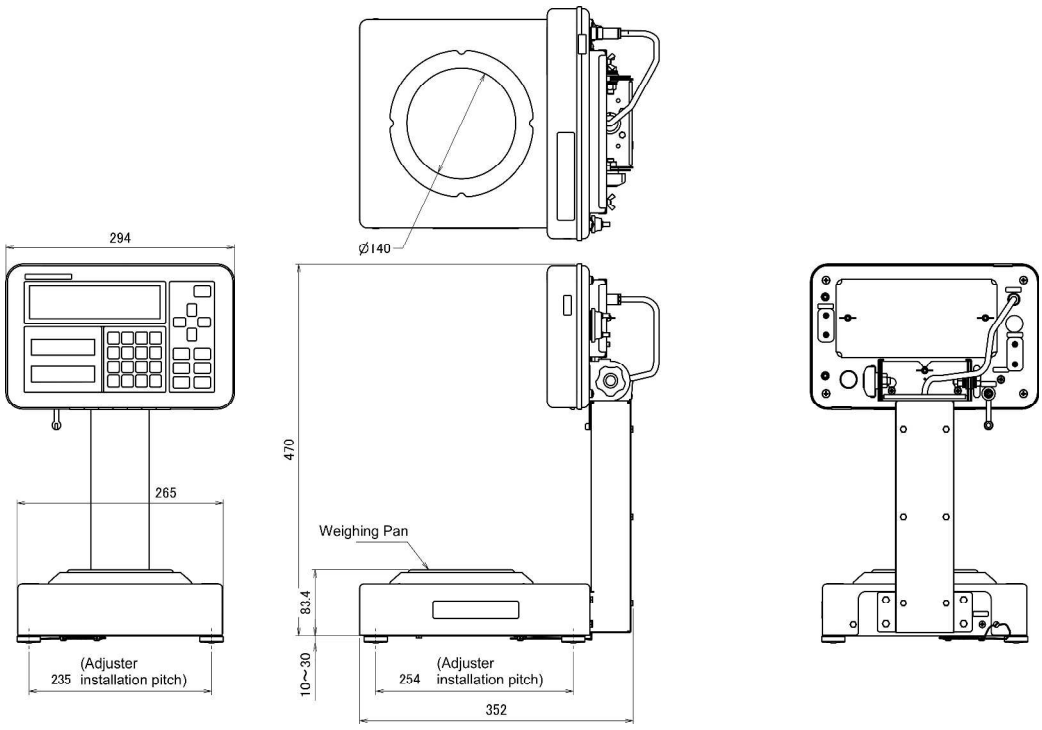
Weighing system	Tuning fork vibration type		
Protection class	IP65		
Main unit weight (NET)	Scale section	FS623	Approx 5.4 kg
		FS3202 - 15001	Approx 5.8 kg
	Indicator section	i02	Approx 1.7 kg
		i03	Approx 1.8 kg
Package weight (GROSS)	FS623		Approx 10.1 kg
	FS3202 - 15001		Approx 10.5 kg
Standard cable length	Scale cable		1m
Operating temperature and humidity	Temperature: +5 °C - +40 °C Humidity: 85% RH or lower (no condensation)		
Altitude	2,000 m or less above sea level		
Pollution degree	2		
Location of use	Indoor use only		
Interface	D-sub 9P RS-232C-1 D-sub 9P RS-232C-2		
Power	AC adapter drive: Dedicated AC adaper, Battery drive: D batteries x 4		
Ratings	AC adapter jack: 6VDC / 1A Battery box: 4 - 6VDC		
Option	FJ pole stand FJ table stand Glass windshield, size S, M and L		

1-3 Outline drawing

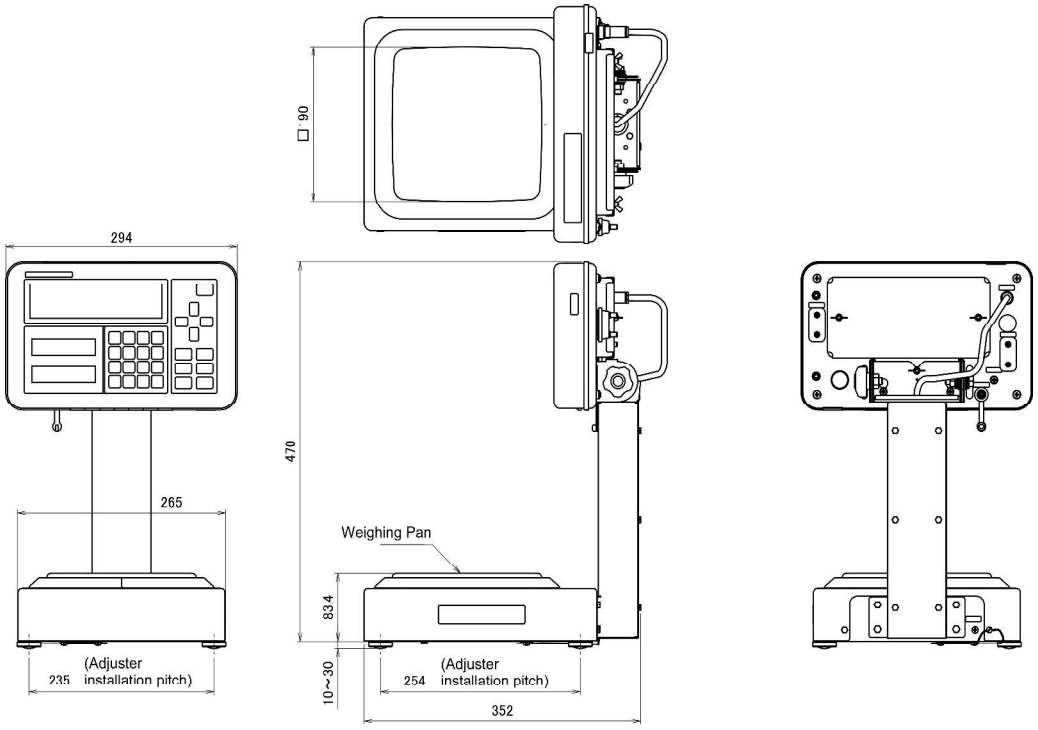
■Indicator section



■FS623



■FS3202 - 15001



(Memo)