



Instruction manual for RIKEN FORMALDEHYDE GAS DETECTOR MODEL FP-30

Caution

- Before operation, be sure to read this instruction manual.
- This operation must follow the instruction of this manual.
- When does the wrong operation which is not mentioned in the manual, it will be a cause for trouble.
- This cannot be used for other purpose than gas detection.
- In case of accidents caused by wrong operation, modification and repair without genuine parts, it is cautioned that they will be out of warranty.
- Riken Keiki cannot assume the responsibility for any accidents caused by operation error and other purpose use than the original.

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Outline

It is of our great pleasure to purchase and use our HCHO detector Model FP-30 this time.

This gas monitor is designed to detect PPM level gas concentration.

By this detection result, it is not to assure the warranty of life and safety.

This instruction manual is the guide book to use HCHO detector model FP-30 correctly. It is kindly requested to read this manual for the already experienced staffs as well as a beginner and operate this instrument after understanding this operation well.

For this improvement, the specifications are subject to change without notice. All or a part of this instruction manual is prohibited to copy or transcribe without our acceptance.

In this manual, the following headlines are used to carry out the safe and effective work in this instruction manual.

The definition of  DANGER  WARNING  CAUTION * NOTE



DANGER indicates an imminently hazardous situation which, if not avoid, will result in death or serious injury. This signal word is to be limited to the most extreme situation.



WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate inquiry. It may also be used to alert against unsafe practices.



This mark means the advice at the handling.

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1. Caution in operation

For this function maintenance and safety, it is required to keep the following warning and caution.

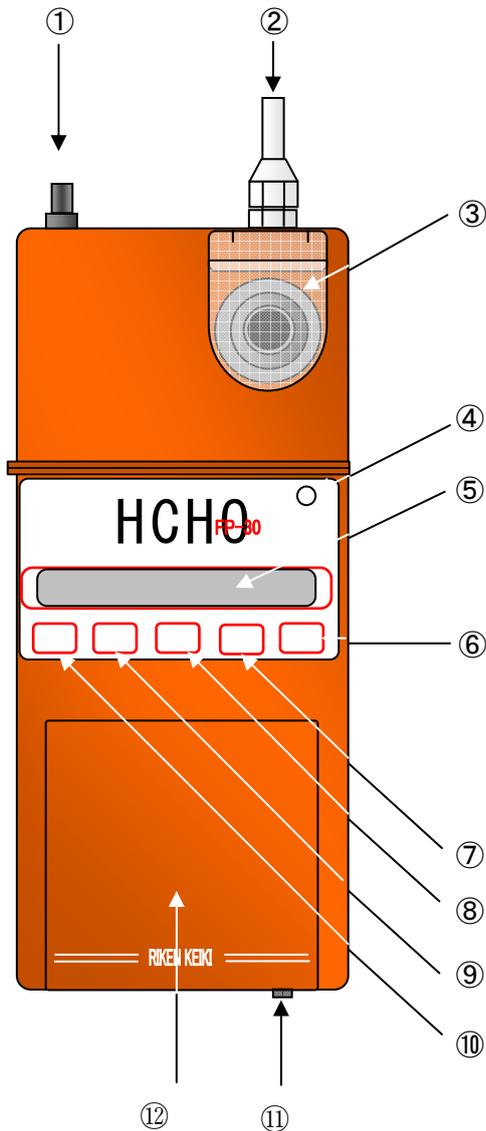
WARNING

- Do not modify or change circuit and structure etc. When modify or changed, the original function may not be maintained.
- Do not mix up metals and flammable foreign substance inside at TAB replacement time. When it is used as it stands, it will be a cause for the malfunction, electric shock and fire.

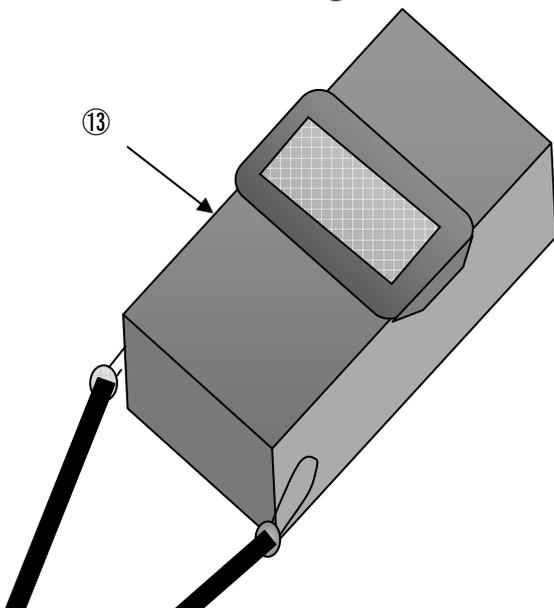
CAUTION

- Do not drop or throw.
As this is a fine instrument, the function could not be maintained by strong shock.
- Arrange that water could not be splashed directly.
As this is not drip-proof structure, it will be a cause for trouble due to the splashing of water.
- Do not use the walkie-talkie nearby.
When receive the electric noise, it may affect the reading of gas detection and will be a cause to damage the instrument.
- When ambient air or temperature is changed, it may affect the gas detection.
- When condensed, it is impossible to make normal measurement.
- When scrap this monitor after long use, and as this is not used with harmful materials, handle this as the general industrial scrap(Non-flammable goods).
- For detection TAB, handle it as general industrial scrap(Non-inflammable) as far as any special requirement is not made.

2. Name of each part



- ① Gas outlet
- ② Gas inlet
- ③ Detection T A B cover
When set the detection T A B, put up this cover and set the detection T A B.
- ④ Back lit window
By detecting ambient darkness, this display will automatically be lit.
- ⑤ Display unit (LCD)
This displays gas concentration etc.
- ⑥ ON / OFF Switch
This is used for power ON / OFF .
- ⑦ DATA Switch
This is used to refer the past detection data and current voltage.
- ⑧ ▼ Switch
This is used to decrease the input value.
- ⑨ ▲ Switch
This is used to increase the input value.
- ⑩ START Switch
This is used to start up the detection.
- ⑪ RS – 2 3 2 C output connector
- ⑫ Battery cover
- ⑬ Carrying case



3. Operation

Check item before operation

Instrument

- Check whether there is any damage on the display etc.

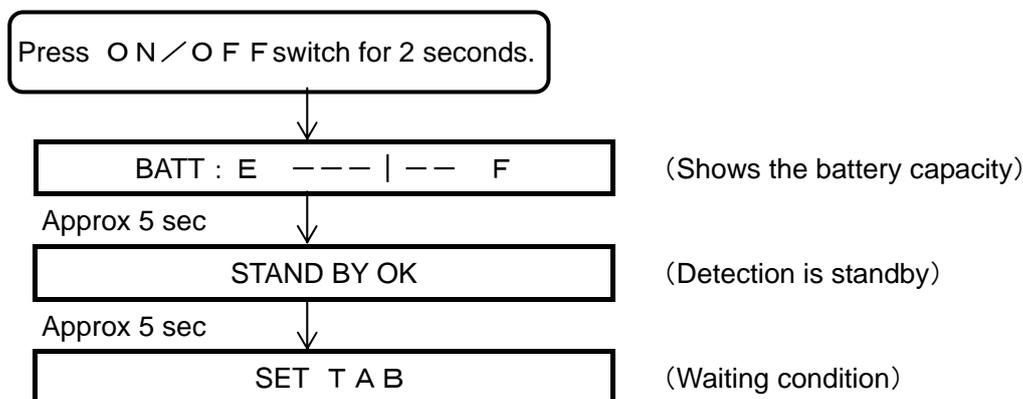
3-1. Preparation

- ① Install the battery in the instrument. (See the item 6 - 1 .)
- ② Put the instrument into carrying case.

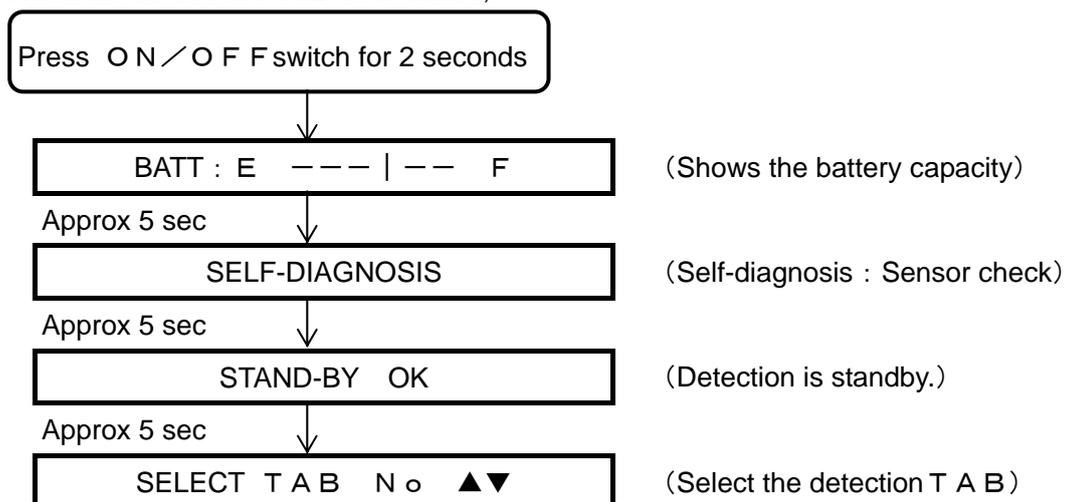
3-2. Start-up operation

When pressing **ON/OFF** switch for 2 sec on, the power gets on and self-diagnosis starts. Then, this gets to a waiting condition. The program until it gets to the waiting condition shall be as follows;

(1) When not attach the detection T A B ,



(2) When the detection T A B is attached,



CAUTION

Do not remove the detection T A B during self-diagnosis(sensor check). The self-diagnosis cannot be carried out correctly and the message of sensor fail shall be shown.

* NOTE

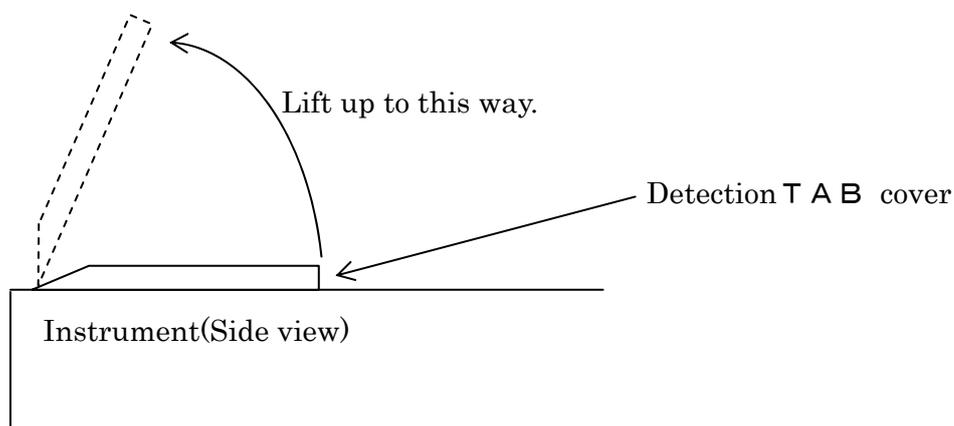
When turn on power with the detection T A B loaded in, the optical sensor is checked by the self-diagnostic function. Make the sensor check at its suitable time.

For sensor check, use new detection TAB. When use the used up TAB or much deteriorated TAB which passed for a long time after unpacking, the correct reading could not be carried out and there will be the possibility that sensor fail message could be shown.

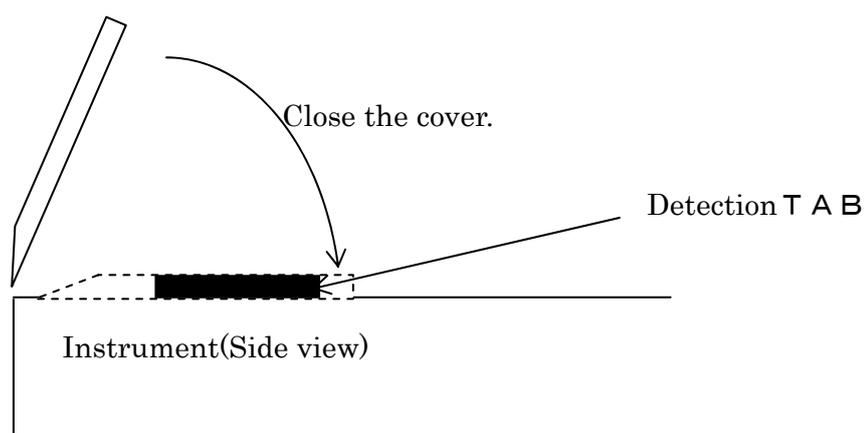
3-3. How to mount the detection T A B.

For handling the detection T A B, see the item 4-2

① Open the detection T A B cover.



② After releasing finger used for mounting the T A B, close the cover slowly.



③ Press the center of detection TAB cover by finger.

CAUTION

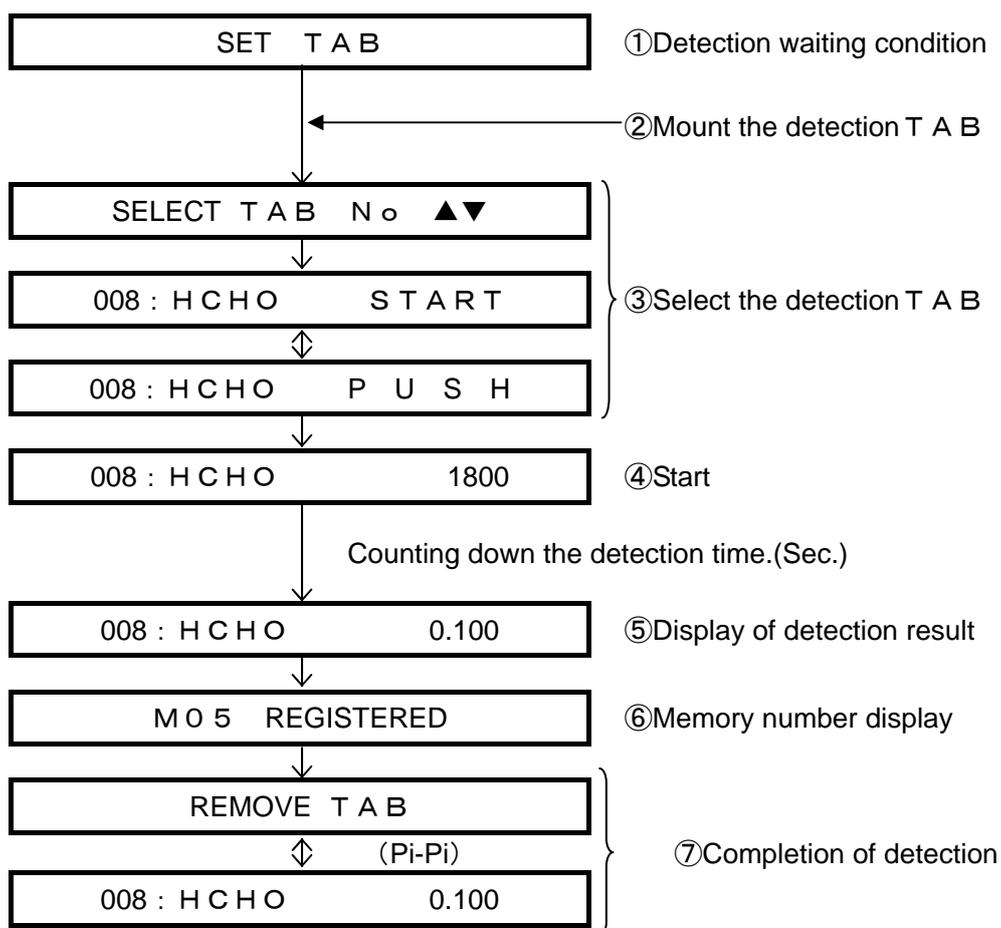
- When close the detection T A B cover, close it slowly so that the finger cannot be sandwiched.
If release the finger lifting the detection T A B cover suddenly, it may bring the damage of cover or injury. It is required to pay attention for it.
- When mount the detection T A B, it is required to pay attention that water drops or dust cannot be mixed up in from the mounting port.

3-4. Detection method

(1) Gas detection

- ① Detection waiting condition
This condition remain until the detection T A B is mounted.
- ② Mounting of the detection T A B
Mount the detection T A B.
- ③ Selection of the detection T A B.
Select the detection T A B by pressing ▲▼ key.
- ④ Detection starts
Press S T A R T switch and have detection gas sucked. Then, the gas is detected.
- ⑤ Display of detection result
The gas reading is shown as detection result.
- ⑥ Display of memory number
The number recorded in the memory is shown.
- ⑦ Completion of detection
The gas reading and message shall alternately be shown until the used up detection T A B is removed. (Buzzer sounds every one second)

— Display example —



* NOTE

FP-30 provides only one kind of TAB, but two measuring ranges. Select the TAB No. according to the measuring range.

Measuring range	Measuring time	TAB No.
0~0.4 ppm	30 min.	008
0~1 ppm	15 min.	009

DANGER

The sucked gas may be the case of oxygen deficiency or toxic gas. Do not breathe in the gas exhausted from the gas outlet absolutely.
When senses such, exhaust it to the place where to judge the safety area

CAUTION

- Do not remove T A B during detection.
The detection is interrupted on the way and the detachment message of T A B is displayed. The detection re-starts.
Once the T A B is removed, the gas detection is interrupted even though it is re-mounted.
- When the detection gas is changed, be sure to exhaust the inside gas by pre-sample drawing from the instrument because the high density gas may remain inside of gas detector and remain inside and it may affect the next gas detection.(See the 3 – 5)
- Do not have water or oil sucked into instrument.
If it should be sucked, the internal pump and sensor may become impossible to use.
- When detect gas, check that pump is working or not.
This can be checked by the roaring sound of pump or sucking condition of gas inlet. When pump remains stopping, this cannot make gas detection.
- Do not block the gas outlet. It cannot make correct gas detection.

* NOTE

The suction time is different by the kind of detection T A B each.
When make the detection for formaldehyde based on WHO Room Environment Standard (0.08 ppm) , use the detection T A B No.008 (0~0.4 ppm) and make the average measurement for 30 minutes.

(2) High density gas detection

After detecting high density gas and when mount T A B immediately, it starts detection automatically.

When high density gas is deposited, gas and newly mounted detection T A B starts to react, this detects it automatically and starts to detect as the previously selected gas.



CAUTION

- To set the measuring gas at high gas density detection is as previous and do not mistake the kind of T A B.
- When cancel the high gas density, make preliminary sample-draw.
(See the 3-5)

(3) Check of gas detection result

The past detection result is displayed by pressing **D A T A** switch under the detection waiting condition and detection finishing condition.

The detection result is designed to store memory upto max 99 pcs of detection result and also, it can be used by changing over ▲▼ key. Then even if power should be off, the result memory is retained.

When return to the detection waiting condition and detection finishing condition, press **D A T A** switch again.

(i) When press **D A T A** switch, the most renewal record is displayed.

M O 5 : H C H O	0.100
-----------------	-------

③ The detection result cannot store memory at over 99 pcs. Below is the display at over 99 pcs memory.

When store new memory, delete the detection result.
For deletion of measuring result, see the next page.

DATA FULL

③The gas detection is not made at any time or it is the display that deletion was carried out.

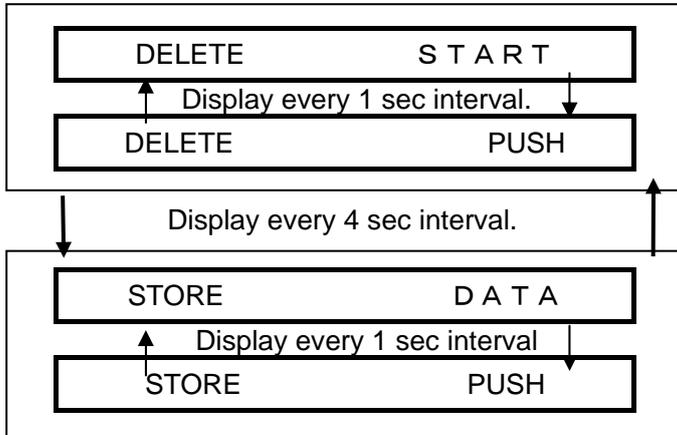
DATA EMPTY

(4) The deletion of measuring result

By pressing **S T A R T** + **D A T A** switches, all the past memory of detection result are cleared off. The message to delete the detection result is displayed.

When press **S T A R T** switch, all the detection result are deleted.

When press **D A T A** switch, the deletion cannot work and the previous condition is retained.



 CAUTION

- It is impossible to delete the individual detection result.
- The deletion of detection result is all carried out once and the deleted detection result cannot be recovered, take enough care at this point.

(5) Check of battery voltage

By pressing **D A T A** switch for 3 sec under detection waiting condition and detection completion, the current power voltage can be checked.

To return to the detection waiting condition or detection completion, press **D A T A** switch again.

Then, when do not press any switch for 20 seconds, the detection standby condition or detection completion condition shall return to gas readout display.

BATT : E --- I --- F

3-5. Preliminary sample-drawing

When change the detection gas, there is the possibility to influence the next gas detection by the high density gas deposited inside of instrument and then, it is required to exhaust through the preliminary sample-drawing.

- Preliminary sample drawing method

With detection T A B removed, press **S T A R T** switch.

The preliminary sample-drawing is made for about 5 sec and the following shall be displayed and wait until it is completed.

Previous sample drawing

 CAUTION

Carry out the preliminary sample drawing in fresh air.

* NOTE

Carry out the preliminary sample drawing at suitable time.

3-6. Purge

When sample-draw the adsorptive gas continuously, there is the possibility not to be able to measure it by the influence of gas adsorption inside of pipe(The reading may be higher than the actual gas.). Carry out the purging by fresh air for sure(not including the measuring gas) and starts gas detection after exhausting the gas adsorbed inside of pipe.

- Purging method

Mount the used T A B, select the purge by ▲▼ key.

PURGE	S T A R T
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PURGE	P U S H
-------	---------

- 、 When press

S T A R T

 switch, the purging starts. (for 10 minutes)

PURGE	6 0 0
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Count down 600 sec.

When 10 min passes, the auto purge is finished and starts next gas detection.

REMOVE T A B

3-7. Completion of detection

HOW TO MAKE POWER OFF

When hold pushing

O N / O F F

 switch for about 3 sec, the power will be off.

When hold pushing

O N / O F F

 switch, the buzzer sounds for about 9 times.

Then, when 5 min is passed from the last operation or no operating condition is continued for 5 min after completion of detection, the power will be off automatically.

4. About the detection T A B

This is the name of gas detection unit developed by us and this is designed to build in the special paper by letting gas contacted to the case using polypropylene material for environment.

Store the detection T A B based on the given storage method.

When do not store correctly, the capability of detection T A B is lost and the correct gas detection cannot be made.

After fully understanding the caution items of storage below, store the detection T A B.

4-1. The storage of detection T A B



CAUTION

Use up the detection T A B within the storage period described on the box.

The detection T A B which has passed the storage period is deteriorated and the given specification cannot be maintained.



CAUTION

Store the detection T A B not by taking it out from the package.

The storage place is different by the kind of detection T A B and store it into the storage place described in the packing box. Then, when unpack it once, it is impossible to store it again.

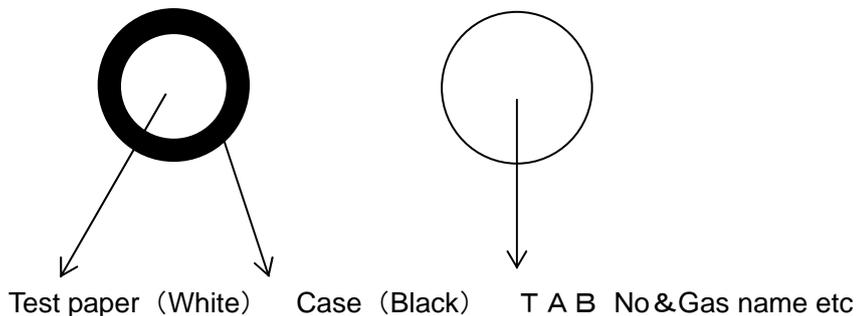
When leave it alone in air by storing through taking out from the package and in the condition with it fixed in model FP-30, the discolor of detection TAB will take place and the given function could not be maintained.

4-2. Handling of the detection T A B



CAUTION

Do not touch the test paper of the detection T A B.



For the part of test paper, a special reagent is coated and then, do not touch it by finger or things. If touched with test paper, the detection capability will go down.

When touched by finger, there is no influence directly to human body but it is required to wash it away by water cleanly.



CAUTION

For gas detection, be sure to use the new detection T A B.

When use the used-up T A B or T A B whose time is elapsed after unpacking, the correct detection cannot be made. The message of error T A B may be shown. Even if the error message could not be displayed, the detection result could not be correct. Then if it is a new T A B and the detection T A B which influences the gas in air, there will be the possibility to influence the function.

The caution at this point is required.



CAUTION

After unpacking, start gas detection swiftly.

After unpacking the detection T A B, it is subject to the interfering gas and dust which discolors in response to measuring gas and its reagent. To maintain the given function, start measurement immediately after unpacking.



CAUTION

Set the detection T A B correctly.

When do not fix the detection T A B to F P - 3 0 correctly, the given function cannot be performed.



CAUTION

Check that the number of the detection T A B corresponds to the number of T A B described on F P - 3 0 and start measurement.

When the T A B number of detection gas selected by FP-30 cannot correspond to T A B number of installed detection T A B, measuring time differs and the given function cannot be maintained, and the care for it should be taken.



CAUTION

Do not use the used up T A B.

Carry out one gas detection by 1 pce T A B. Even if the detection readout is 0 p p m and use the same detection T A B again, the accurate gas detection cannot be assured.

5. Self diagnosis function

Self-diagnosis function provided with this instrument shall be followings.
Each alarm is provided with alarm display and buzzer sound.

- Kind of self-diagnosis and alarm pattern

	Self diagnosis	Buzzer	Display
Power on	Low battery voltage	Continuous	REPLACE BATTERY
	System error	No sound	SYSTEM ERROR
	Sensor failure	Continuos	FAIL
At gas detection time	Low battery precaution	No sound	Flickering B in left
	Lower battery voltage	Continuous	REPLACE BATTERY
	Failure of pump connection	Continuous	PUMP FAILURE
	T A B detachment	No sound	RESET T A B
	Defective T A B	Continuous	T A B FAILURE ↓↑ REPLACE T A B

6. Maintenance

6-1. Replacement of battery

When make battery change, change all 4 pcs batteries with new ones.

- (1) Check that the power is off.
When the power is on, turn off the power.
- (2) Remove the carrying case from instrument.
- (3) By pressing slightly the battery cover, it is slid.
- (4) Remove 4 pcs batteries and mount the new battery by taking care of polarity of battery.
- (5) After having finished replacing the battery, make it in the reverse procedure as now.



CAUTION

- Check that it is non-hazardous zone free from the explosive gas when replacing battery.
- Be sure to use the designated battery.
- When remove the battery, remove it from the polarity of (+) and when mount it from the polarity of (−), it is easy to replace.

6 – 2. Daily check · Regular check

(1) Daily check

- Checking of switches, display and body (Is there any damage on the switches, display units and panel ?)
- Pump suction check (Is pump running sound normal ? Is there any abnormal sound ?)
- Battery voltage check
- Sensor check

When start the first detection, recommend to do sensor check.(See the item 3 – 2 .)

(2) Regular maintenance

Once in a year, it is recommended to request the maintenance check to the manufacturer. Contact the service agent or Riken Keiki.

6 – 3. Replacement of parts

The following parts have the life and it is recommended to replace regularly.

Pump : About 1 year
Sensor : About 5 years



Caution

- The life of parts differs by environment and frequency applied. For example, when operate where there is a plenty of dirt and dust, the pressure variation and excessively high and low temperature and humidity, it will be a cause to make short life. Keep this operation from those places.
- When replace with new sensors, it is required to make calibration. For the sensitivity adjustment, it is required to equip the calibration gas and tools.

6 – 4. Storage and treatment after no use for a long time

Store it where there is no sun drought and dry room.

When do not use for over 1 month, remove the battery from the instrument and store.

7. Trouble shooting

This trouble shooting cannot cover all the malfunction causes. The most frequent causes for trouble are considered and described simply to help the most frequent cause research.

Symptom(Message)	Cause	Treatment
Low battery (REPLACE BATTERY)	Battery voltage is dropped.	According to the battery replacement procedure, replace them with new ones. (See the item 6 – 1)
Sensor failure (FAIL)	Excessive shock such as falling down or throwing away or used for a long time.	Turn on power again and repeat the sensor check. When not recover, contact the nearest agent.
	Remove the detection T A B during sensor check.	Return T A B and turn on the power. Re-check the sensor.
Pump contact failure (PUMP FAILURE)	Excessive shock such as dropping or throwing on to instrument or used for a long time.	Make power on again. When not recover, contact the nearest agent or Riken Keiki.
System error of instrument (SYSTEM ERROR)	Influenced by the excessive noise.	Make power on again. After make power on and system error appears, contact the nearest agent or Riken Keiki.
Detachment of T A B (RESET T A B.)	Remove T A B.	After gas detection completion, arrange to remove T A B.
Failure of T A B. (T A B FAILURE) (REPLACE T A B)	The initial condition of T A B is not normal.	Use new T A B.
Power cannot be on.	No battery put in Battery consumed up much The polarity of battery is wrong.	See the batter replacement and mount correctly. (See the item 6 – 1.)
	The time to press ON/OFF switch is too short.	Hold pressing for approx. 2 sec. (Until displayed)
Pump cannot work.	The battery capacity is too low.	Replace battery(See 6 – 1) and make power on again.
Sample cannot be drawn	The sampling hose is disconnected or clogged.	Check the connection of sampling hose or clogging.

8. Specifications

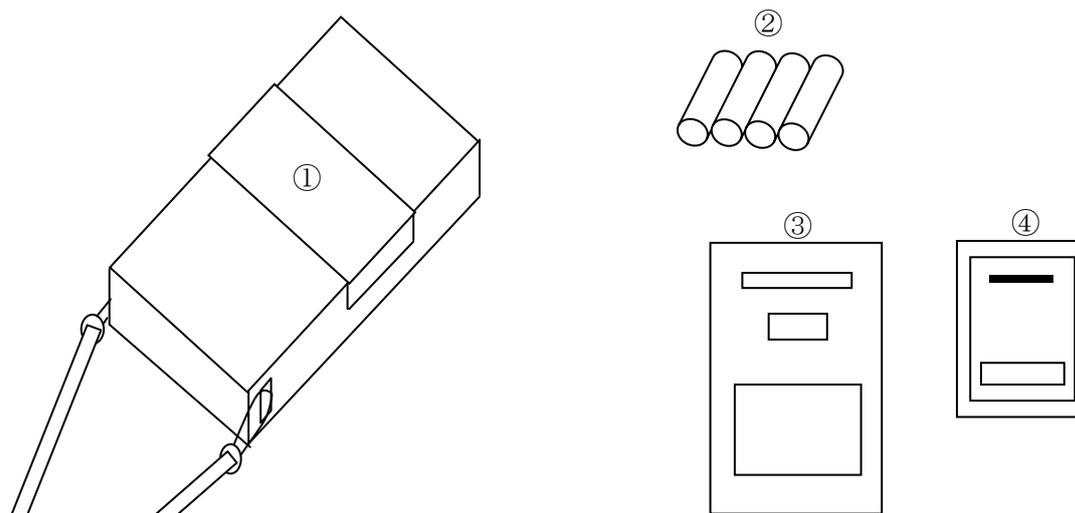
8-1. Specifications

Model	FP-30
Detection principle	Photoelectric photometry method
Display method	Digital display by LCD.
Sampling method	Sample-drawing by pump
Memory function	Detection point : 99 points (Automatic recording after detection)
Ambient temp	Below -10~40°C、90%RH (Non-condensing)
Power source	AA size Dry battery 4 pcs
Continuous duty	Approx 12 hours (Alkaline battery, no alarm at no illumination and 20°C)
Explosion proof	Non-explosion proof
Dimensions	Approx. 85(W)×190(H)×40(D)mm (Instrument except projection parts)
Weight	Approx. 550g (Including instrument and battery)

8-2. Accessories

Standard accessories :

- ① Carrying case ② AA size battery
 ③ Instruction manual ④ Test certificate ⑤ Detection T A B(20 pcs/pk)



Optional accessories :

- ① Tripod ② Dust filter
 ③ Software for data logger ④ Exclusive cable for data logger

9. Detection principle

When blowing gas onto the detection T A B, the paper soaked with illuminating agent and assembled into T A B emits illumination by chemical reaction.

For example when formaldehyde(HCHO) contacts the paper, reagent immersed in the paper and HCHO make compounds, and emits illumination from white to yellow color.

This is taken as the change of light reflecting beam which marks the degree of this illuminant. The change ratio of intensity for this reflective light beam shall be taken as response value. Previously by calculating the working curve, the gas concentration can be determined from the response value.

