

**Instruction Manual  
for  
FORMALDEHYDE GAS DETECTOR  
MODEL FP-30/FP-40**

**This instrument is sold and serviced by RKI Instruments, Union City, CA  
For questions, parts, or service please contact RKI at (800) 754-5165.**

**Please read and understand this instruction manual before operating this  
instrument.**

**Part Number: 71-0085RK**

**Revision: P3**

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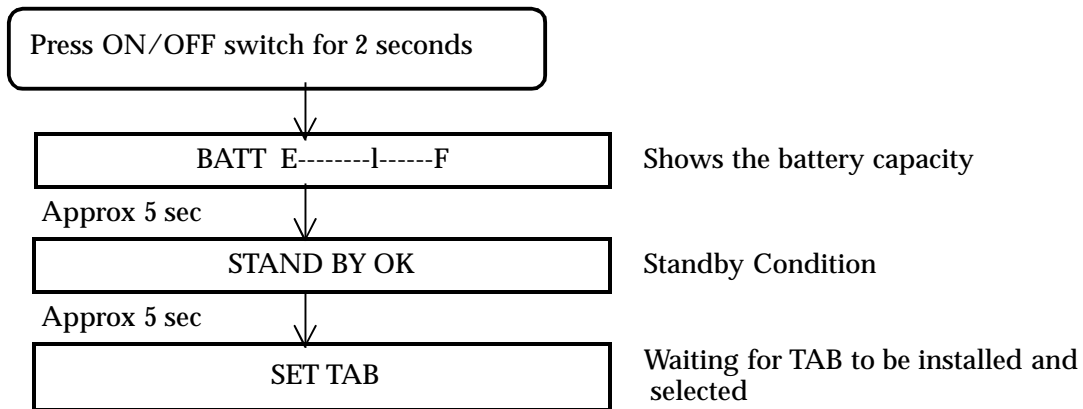
# 1 OPERATION

## 1.1 Start-Up Operation

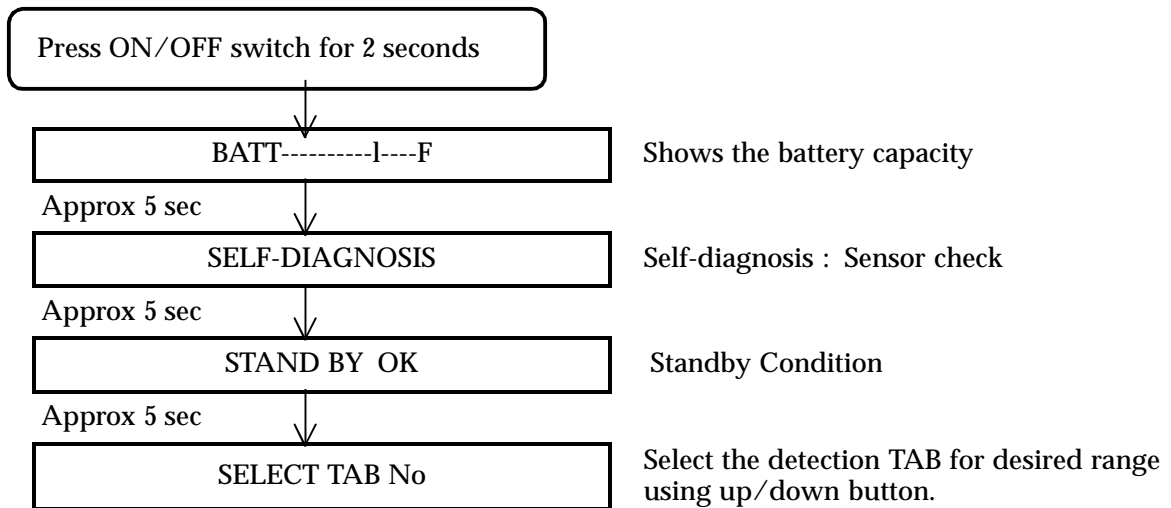
Press ON/OFF switch for 2 seconds to turn instrument on and start warm-up and self-diagnosis.

The program and instrument display function one of the following two ways:

If the detection TAB is not installed before start-up:



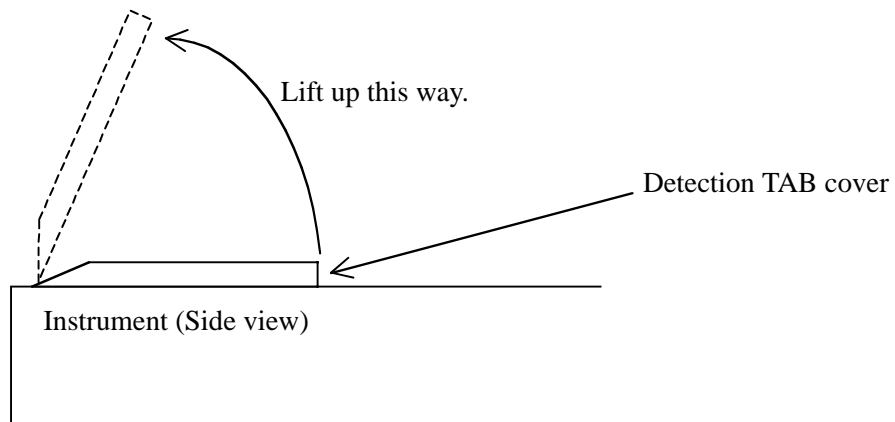
If the detection TAB is installed before start-up



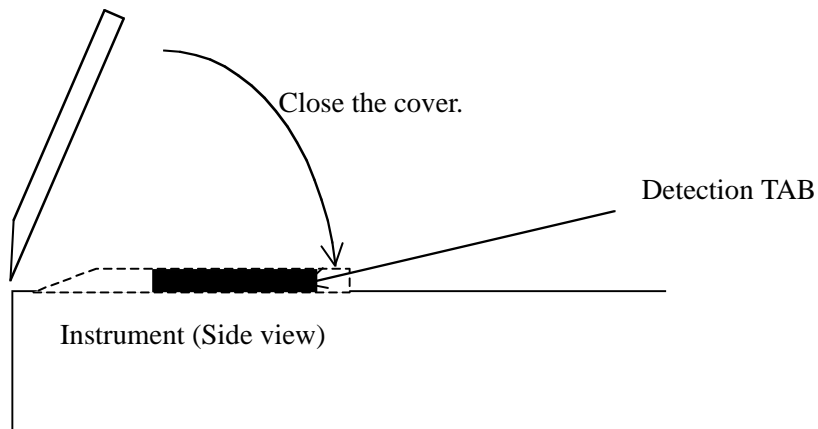
## 1.2 Installation of Detection Tab

The detection TAB comes packaged in a sealed foil wrapper. Remove it from the wrapper. The detection surface of the TAB is protected by a plastic cover that fits over the TAB. Remove this cover. The detection TAB must only be handled by its edges or backside. Do not touch the indented center section of the TAB.

1. Open the detection TAB cover.



2. Place the TAB into the slot under the cover, indented face down, and then close the cover slowly.



3. Press the center of detection TAB cover with finger to assure proper TAB seating.

### CAUTION

When closing the detection TAB cover, close it slowly to avoid pinching finger.

Do not allow the lid to slam shut since that may cause damage to the instrument.

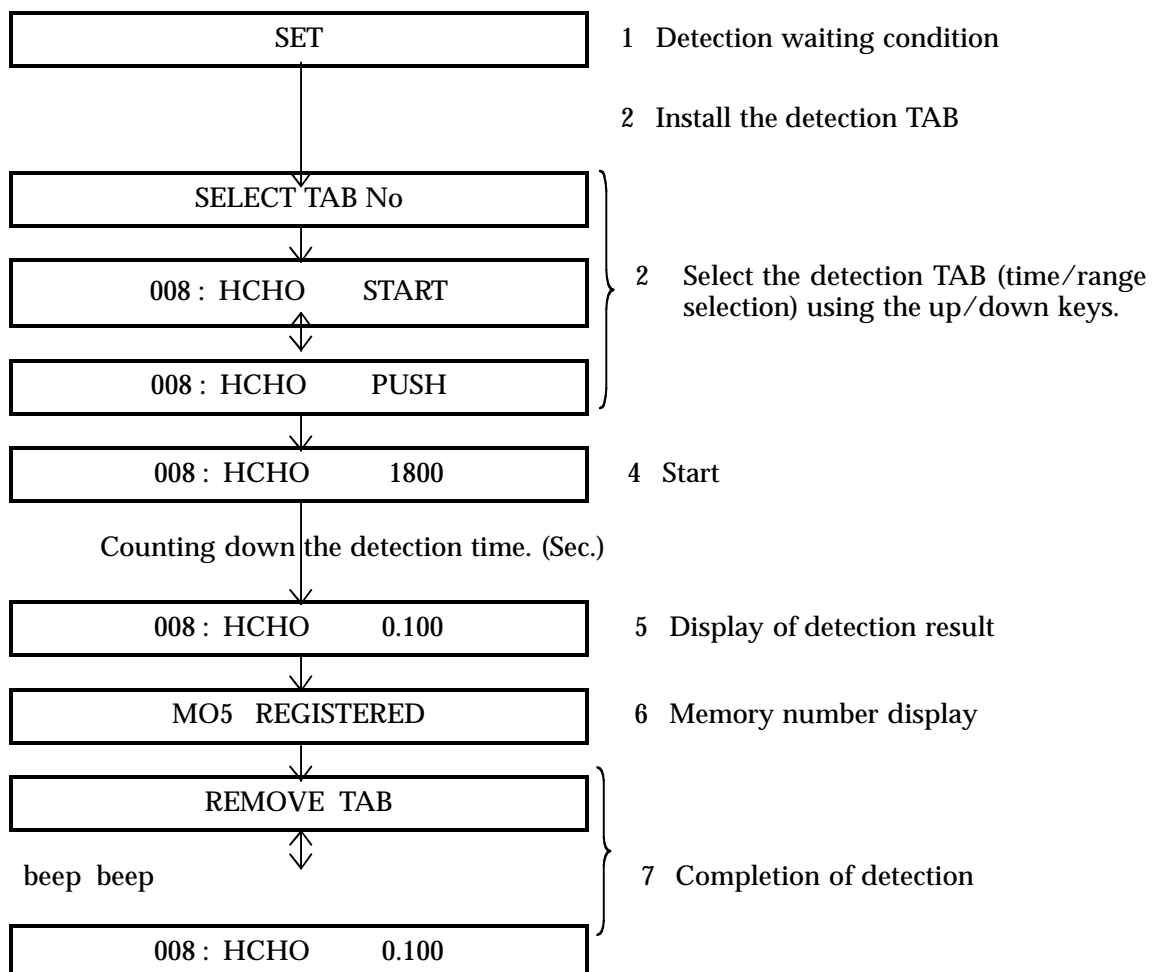
When installing the detection TAB, do not allow water drops or dust to get in the TAB port area.

## 1.3 Detection Method

### Gas detection

- Detection waiting condition  
The instrument waits in this mode until the detection TAB is installed.
- Installation of the detection TAB  
Install the detection TAB.
- Selection of the detection range  
Select the detection range by pressing up/down keys.
- Detection starts  
Press **START** switch to start the pump and start the detection cycle. Cycle is either 15 minutes or 30 minutes (as selected).
- Display of detection result  
After the detection cycle is completed, the average gas reading during the detection cycle is shown as the detection result.
- Display of memory number  
The number recorded for this reading in the memory is displayed.
- Completion of detection  
The gas reading and message will alternately be shown until the used detection tab is removed. Buzzer sounds every one second until used tab is removed.

### Display example



## NOTE

Only one type of detection TAB is used in the FP-30 & FP-40, but the TAB may be used for three different detection ranges. For the FP-30, select the TAB No. according to the desired detection range. The FP-40 can only be used for one detection range.

Detection range	Measuring time	TAB No.
0 - 0.4 ppm (FP-30)	30 min.	008
0 - 1.0 ppm (FP-30)	15 min.	009
0 - 0.6 ppm (FP-40)	3 min	010

## CAUTION

- Do not remove tab during detection.  
If TAB is removed during detection, the detection is interrupted, and that cycle cannot be restarted with a new TAB. The error message TAB is displayed. The old TAB must be discarded and replaced with a new one before a new cycle is started.
- When the detection range is changed for a new cycle, be sure to exhaust the inside gas by pre-sample drawing from the instrument (see Section 1.7 Preliminary Sample Draw Mode) to flush out any residual gas concentrations inside the unit. If high-density gas remains inside the FP-30 then it may affect the next gas detection cycle.
- Do not suck water or oil into the instrument since this will cause pump and instrument damage.
- When detecting gas, confirm that the pump is working by listening to the humming sound of the pump or confirming that the pump is sucking. If the pump is not sucking, no gas detection will occur.
- Do not block the gas outlet, or else an incorrect gas reading may result.

## 1.4 High Density Gas Detection

If high-density gas is detected, the instrument and any sample hose must be flushed out with fresh air before installing a new detection tablet. If a new detection tab is installed immediately without flushing the instrument (and sample hose) out with fresh air, the wrong answer will occur since detection will start immediately when the new tab is installed. (SEE PRELIMINARY SAMPLE DRAW, STEP 1.7)

## 1.5 Memory of Stored Gas Detection Results

### 1.5.1 Checking Stored Data

The past detection results can be displayed by pressing DATA switch when in the detection waiting condition or detection finished condition.

The detection results will be stored into the instrument memory (up to 99 readings maximum). The memory can be retrieved by using the UP and DOWN keys. When power is off, the memory is retained.

To return to the detection waiting condition or detection finished condition, press DATA switch again.

When the DATA switch is pressed, the most recent record is displayed.

M05 : HCHO	0.100
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The detection result memory can store only the past 99 readings. If the memory is full, the display will say:

DATA FULL
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For deletion of measuring results stored in memory, see the next page.

If there is no stored data, the display will say:

DATA EMPTY
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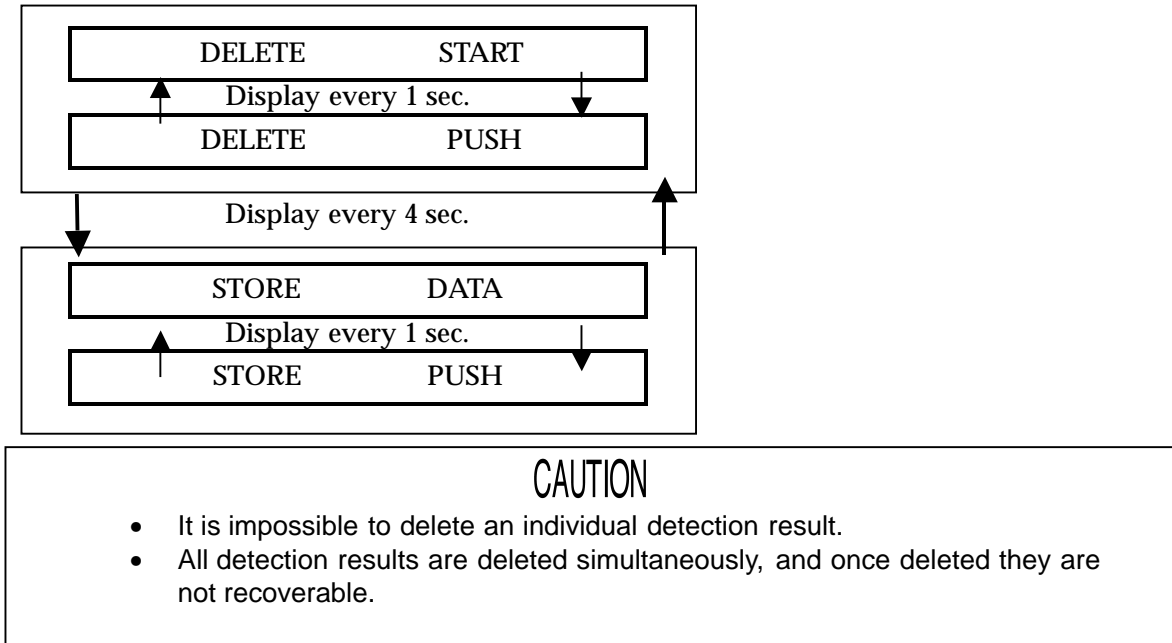
## 1.5.2 Deleting the Memory of Stored Detection Results

To delete the memory:

While in the data display screen described above in 1.5.1, press the **START** + **DATA** switches simultaneously. The message to delete the stored detection results is displayed.

Then, when **START** switch is pressed, all the stored detection results are deleted.

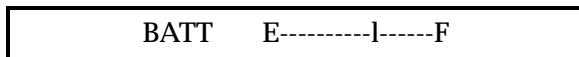
If **DATA** switch is pressed instead, the instrument will return to the previous condition without deleting the data.



## 1.6 Battery Voltage Check

By pressing **DATA** switch for 3 sec while in detection waiting condition or detection finished mode, the current battery voltage can be checked. If 20 seconds elapses without any switch being pressed while in the battery voltage check screen, the instrument will return to the state it was in, either detection standby condition or detection finished mode.

To return to the detection waiting or detection finished mode, press **DATA** switch again.



## 1.7 Preliminary Sample Draw Mode

When detection gas mode is changed, or if a high gas concentration was last detected with the instrument, it is possible the next gas detection test will be influenced by high-density gas remaining inside the instrument. To prevent this, it is necessary to flush the instrument using the preliminary sample-drawing mode.



Preliminary sample drawing method  
With detection TAB removed, press **START** switch.

Preliminary sample drawing is made for about 5 sec to flush out the previous sample, and the following message is displayed until completion.

Previous sample drawing

**CAUTION**  
Preliminary sample drawing must be done in fresh air , or in the air of the room  
you will check next.

## 1.8 Purge Cycle

When sample-drawing an adsorptive gas continuously, there is the possibility the gas will be adsorbed onto the inside of the tubing, especially if a high concentration of gas is encountered. If a high concentration of gas is encountered, the system must be purged in known fresh air before taking a reading. After purge, the gas detection cycle will start automatically.

Purging method

Mount the detection TAB, select the purge cycle by using UP and DOWN keys. A used TAB may be used for the purge cycle.

PURGE          S T A R T

PURGE          P U S H

When **START** switch is pressed, the purging starts. for 10 minutes

PURGE          600

Count down 600 sec.

When 10 min (600 sec.) passes, the purge cycle is finished and the unit is ready to start the next gas detection cycle.

REMOVE TAB

## 1.9 Completion of Detection

HOW TO TURN INSTRUMENT POWER OFF

To turn instrument off, press and hold **ON/OFF** switch for about 3 sec.

When pressing **ON/OFF** switch, the buzzer sounds about 9 times.

Also, if 5 minutes passes without any button being pressed, or when 5 minutes has elapsed since the last operation, the power will shut off automatically.

## 2 ABOUT THE DETECTION TAB

The Gas Detection Tablet is a unique detection method developed by our company. The tablet contains a paper impregnated with special chemicals that will darken if exposed to a specific gas.

Proper storage of the tablet is critical. If tablet is not stored correctly, the detection results will not be accurate.

### 2.1 Storage of Detection TAB

#### CAUTION

Detection TAB must be used within the storage period indicated on the package. Use of tablets beyond their expiration date can result in incorrect readings.

#### CAUTION

Leave detection TAB in its package until ready for use. Once a tablet is removed from its packet, it will begin drying out, and also it may respond to gas in the local environment causing error if used for any actual test.

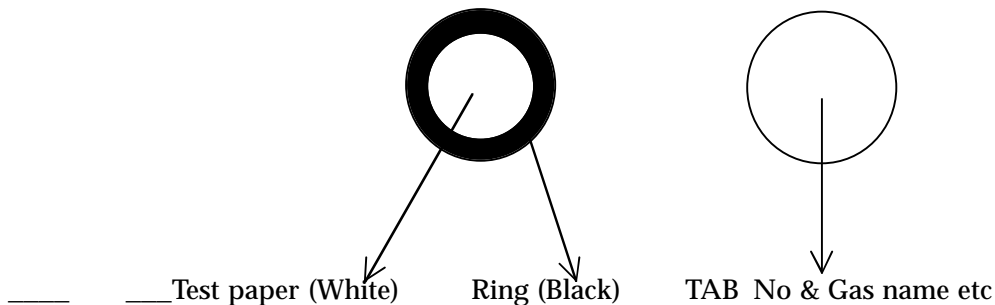
Follow the storage instructions on the detection TAB package. Detection tabs must be stored in a refrigerator for longest life.

If detection tab is removed from its package and not used right away, it must be discarded. It will give an incorrect reading if used later. Prolonged exposure to air or background gas will dry out the tablet or cause it to become discolored, either of which will cause an incorrect reading.

### 2.2 Handling of Detection TAB

#### CAUTION

Do not touch the test paper of the detection TAB.



Do not touch the test paper with your finger; this will cause an incorrect reading.

## CAUTION

Always use a new detection TAB for readings

For each gas test, be sure to use new detection TAB. TABS are intended for one time use only, and should not be opened until immediately before you intend to use them. If an already used TAB is attempted to be used, an error message "TAB" may be shown. But, even if the error message is not displayed, the detection result will not be correct if an old TAB is used.

## CAUTION

Use TAB immediately after removing from package.

After unpacking the detection TAB, it is subject to gas response and dust, which discolors the TAB due to response to the measured. To maintain accuracy, start measurement immediately after unpacking.

## CAUTION

Check that the number of the detection TAB corresponds to the TAB number of displayed on FP-30 during the Start Measurement display.

If the TAB used is not the same TAB number the instrument believes you are using, the reading will not be correct.

### 3 SELF DIAGNOSIS FUNCTION

A Self-diagnosis function is provided with this instrument.  
 Each self-diagnosis mode has a unique alarm, display, and buzzer sound.

#### Types 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	Continuous	FAIL
During gas detection	Low battery precaution	No sound	Flickering "B" at left
	Lower battery voltage	Continuous	REPLACE BATTERY
	Failure of pump connection	Continuous	PUMP FAILURE
	TAB detachment	No sound	RESET TAB
	Defective TAB	Continuous	TAB FAILURE and REPLACE TAB

## 4 MAINTENANCE

### 4.1 Battery Replacement

When replacing batteries, replace all 4 batteries at the same time.

- Turn power off.
- Remove the carrying case from instrument.
- Press the battery cover slightly and slide it off.
- Remove all 4 batteries and install the new batteries. **Take care to use correct polarity and battery type.**
- After replacing batteries, replace cover and carrying case.

### 4.2 Daily Check/Regular Check

Daily check

- Checking switches, display and body for any physical damage.
- Pump suction check. Is pump running sound normal ?
- Check battery voltage.
- Sensor check: Instrument performs a sensor check during warm up whenever first turned on.

### 4.3 Replacement of Parts

The following parts have a limited life and it is recommended that they be replaced regularly.

Pump : About 1 year (field replaceable)  
Sensor : About 5 years (factory replaceable only. Requires special tools and calibration)

### 4.4 Storage and Treatment After Long Term Storage

Store in a cool dry place and out of direct sunlight.  
If storing for a long period, remove batteries before storage.

## 5 TROUBLE SHOOTING

This trouble-shooting guide cannot cover all possible malfunctions. The most likely problems and causes are listed below.

Symptom (Message)	Cause	Treatment
Low battery (REPLACE BATTERY)	Battery voltage is low.	Replace Batteries
Sensor failure (FAIL)	Excessive shock such as dropping, or extensive use for a long time.	Turn on power again and repeat the sensor check. If it does not recover, return to factory for repair.
	Remove the detection TAB during sensor check.	Replace TAB and turn on the power. Re-check the sensor.
Pump failure (PUMP FAILURE)	Excessive shock such as dropping, or extensive use for a long time.	Turn power on again. If not recovered, replace pump or return unit to factory for repair.
System error of instrument (SYSTEM ERROR)	Possible influence by high EMI or RFI signal, or other electrical problem.	Turn power on again. If not recovered, return to factory for repair.
Detachment of TAB (RESET TAB)	Remove TAB.	Remove /replace tab after gas detection cycle is complete.
Failure of TAB. (TAB FAILURE) (REPLACE TAB)	The initial condition of TAB is not normal.	Use new TAB.
Power will not turn on.	Batteries need replacement or no batteries installed. Battery polarity is wrong.	Replace or install batteries correctly.
	On/Off switch not held long enough.	Press switch for approx. 2 sec. (Until instrument turns on)
Pump not working.	The battery capacity is too low.	Replace batteries and try again.
Sample cannot be drawn	The sampling hose is disconnected or clogged.	Check the connection of sampling hose. Check for clogged hose.

## 6 SPECIFICATIONS

### 6.1 Specifications

Model	FP-30, FP-40
Detection principle	Photoelectric photometry method
Display method	Digital display by LCD.
Sampling method	Sample-drawing by pump
Memory function	99 points logged. (Automatic recording after detection)
Ambient temp	-10 to +40 C, 90% RH (Non-condensing)
Power source	AA size Dry battery, 4 ea.
Continuous duty	Approx. 12 hours (with Alkaline battery, no alarm or illumination and at 20 C)
Regulatory	NOT explosion proof or intrinsically safe.
Dimensions	Approx. 85(W) x 190(H) x 40(D) mm (not including instrument protrusions)
Weight	Approx. 550g (Including instrument and batteries)

### 6.2 Accessories

#### Standard accessories:

- Carrying case
- AA size battery
- 1 pack of 20 tablets
- Instruction manual

#### Optional accessories

- Additional detection tablets (20 / pack)
- Software for data logger
- Exclusive cable for data logger

### 6.3 Spare Parts List

Part Number	Description
65-TAB-008	Detection TAB, type 008/009/010
71-0085RK	Operator's Manual (this document)

## 6.4 7 DETECTION PRINCIPLE

The Gas detection TAB test paper is treated with special chemicals and an illuminating agent. When gas is blown onto the TAB paper face, the paper emits illumination by chemical reaction, and this causes the paper to change color. The amount of color change is determined by the level of formaldehyde exposure, and the time of exposure.

For example, when formaldehyde (HCHO) contacts the paper, chemicals impregnated into the paper combine with HCHO to form compounds, and these compounds change the paper from white to yellow color.

The instrument creates a light beam that reflects off the test paper at the end of the detection cycle. The intensity of the light beam is affected by the color or darkness of the detection TAB paper, and this intensity is measured by a light sensor. The level of light intensity measured is correlated (from an exposure curve stored in the instrument) to a particular level of Formaldehyde exposure to the tab. This concentration is then displayed at the end of the detection cycle.

