

**COSMOS**

# Semiconductor Gas Detector XPS-7II

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## Instruction Manual

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- Keep this manual for easy reference.
- Carefully read this manual prior to use.



**NEW COSMOS ELECTRIC CO., LTD.**

Instruction Manual No.  
XPS-7IIET (04)

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# 1 Introduction

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Thank you for purchasing the New Cosmos XPS-7II extractive-type portable semiconductor gas detector. To ensure safe and reliable operation, please read this instruction manual prior to use.




This product is intended for use in a semiconductor-manufacturing plant for the early detection of a gas leak. It can detect various semiconductor manufacturing gases just by switching the sensor unit.

This unit measures the gas concentration and simultaneously displays the measurement on its display. If the gas concentration level reaches a preset level, the unit will produce audio-visual alarms.

Carefully read this manual regardless of your experience with gas detectors. Do not use the product for other than the intended purpose or in a manner not described in this manual.


## Symbols Used in this Manual

This manual uses Danger, Warning, Caution and Note symbols to draw attention to procedures, materials, methods, and processes, which require particular attention.

 <b>DANGER</b>	Indicates an imminently hazardous situation that can result in death or serious injury.
 <b>WARNING</b>	Indicates a potentially hazardous situation that may result in death or serious injury.
 <b>CAUTION</b>	Indicates a hazardous situation that may result in minor injury or property damage.
<b>NOTE</b>	Provides advice/information on product handling.

## Safety Precautions

Follow the precautions below to ensure safe operation:

 <b>WARNING</b>	This product is not explosion-proof and should not be installed in a hazardous area.
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**CAUTION**

- This product is not drip-proof and should be kept away from water.
- Avoid strong mechanical shock, impact or vibration to the product, e.g., dropping or bumping. Failure to do so may impair its performance.
- Turn on the detector in clean air. Normal gas detection is not possible, and product's performance may be compromised if turned on in an atmosphere that may contain target or interfering gases.
- The service life of the sensor unit is six months. Before use, check that the sensor unit expiration date has not been reached. Use of expired sensor may cause inaccurate detection.
- Carry and use the detector with its face (LCD) facing upward to keep the sensor vertical.

Follow the precautions below for storage of the product:

**WARNING**

Do not leave the product in high temperature and humidity conditions for a long period of time. Doing so may compromise its performance.

**CAUTION**

- Avoid rapid change in temperature/humidity. Failure to do so may compromise the product's performance.
- Remove the sensor unit and batteries, if unused or stored for an extended period of time. The sensor unit can be kept ready for use if placed and energized (aging for sensor stability) in the EC-7 sensor stocker (sold separately).
- To store the detector with the sensor unit installed inside, follow the precautions below:
  - (1) The sensor unit should be kept in an upright position to prevent electrolyte leakage. Store the detector with its LCD facing upward.
  - (2) The sensor unit is being energized while installed in the detector, even though the detector is off, as long as the battery remains or power is supplied. Use the AC adapter to keep the detector powered.
- If the pump is left unused for an extended period of time, the grease inside the pump motor may harden, causing the motor to fail to run. Even if the product is unused for an extended period of time, turn on the detector once every six months to check whether it sucks air in.

## 2 Package Contents

A standard package consists of following items. If any items are missing or damaged, please contact New Cosmos or its authorized representative for replacement.

Item	Quantity
Gas detector	1
Shoulder strap	1
Gas sampling tube	1
Replacement filter element	2
Alkaline AA battery	4
Instruction manual (this document)	1
Inspection certificate	1

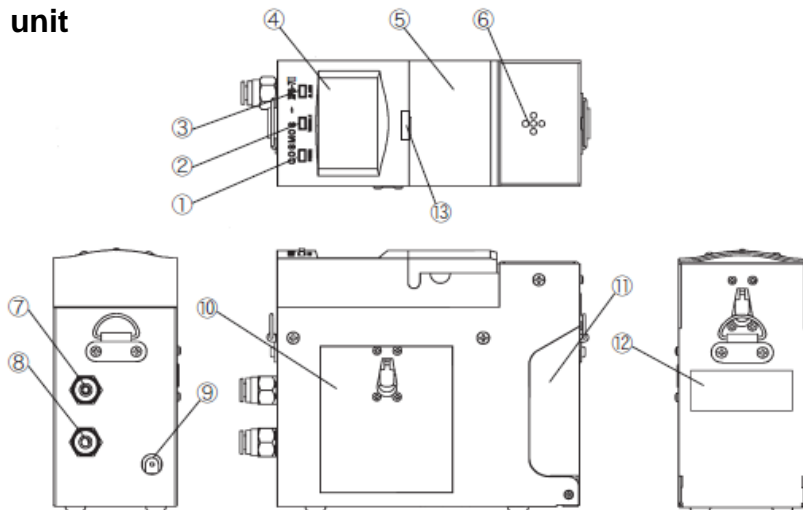
## 3 Sensor Unit Variations

Model	Target gas		Full scale	Alarm set value	
				1 <sup>st</sup> stage	2 <sup>nd</sup> stage
XDS-7NH	NH <sub>3</sub>	Ammonia	100ppm	12ppm	25ppm
XDS-7SH	SiH <sub>4</sub>	Silane	25ppm	2.5ppm	5ppm
XDS-7DC	SiH <sub>2</sub> Cl <sub>2</sub>	Dichlorosilane	25ppm	2.5ppm	5ppm
XDS-7AH	AsH <sub>3</sub>	Arsine	250ppb	25ppb	50ppb
XDS-7PH	PH <sub>3</sub>	Phosphine	1ppm	0.15ppm	0.3ppm
XDS-7BH	B <sub>2</sub> H <sub>6</sub>	Diborane	500ppb	50ppb	100ppb
XDS-7SE	H <sub>2</sub> Se	Hydrogen selenide	250ppb	25ppb	50ppb
XDS7GH	GeH <sub>4</sub>	Germane	1ppm	0.1ppm	0.2ppm
XDS-7CL	Cl <sub>2</sub>	Chlorine	5ppm	0.25ppm	0.5ppm
XDS-7CF	ClF <sub>3</sub>	Chlorine trifluoride	1ppm	0.05ppm	0.1ppm
XDS-7HC	HCl	Hydrogen chloride	25ppm	2.5ppm	5ppm
XDS-7HF	HF	Hydrogen fluoride	10ppm	1.5ppm	3ppm
XDS-7HB	HBr	Hydrogen bromide	10ppm	1.5ppm	3ppm
XDS-7NO	NO	Nitrogen monoxide	100ppm	12ppm	25ppm
XDS-7HS	H <sub>2</sub> S	Hydrogen sulfide	50ppm	5ppm	10ppm
XDS-7CO	CO	Carbon monoxide	250ppm	12.5ppm	25ppm
XDS-7DS	Si <sub>2</sub> H <sub>6</sub>	Disilane	25ppm	2.5ppm	5ppm
XDS-7F2	F <sub>2</sub>	Fluorine	5ppm	0.5ppm	1ppm
XDS-7OZ	O <sub>3</sub>	Ozone	1ppm	0.05ppm	0.1ppm
XDS-7NF	NF <sub>3</sub>	Nitrogen trifluoride	100ppm	5ppm	10ppm

For the target gas not in the table, please consult New Cosmos or its authorized representative.

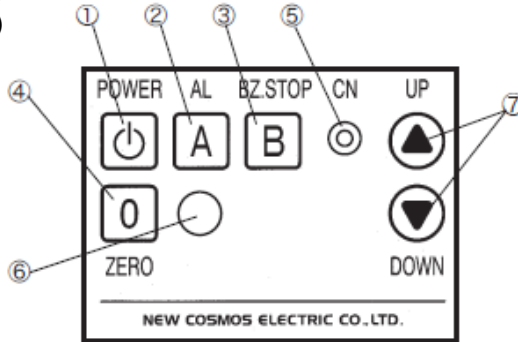
## 4 Unit Components

### Main unit



Item	Component name	Description/Function
1	Green POWER LED	Lit while in normal operation mode (gas-monitoring mode) and flashes while in warm-up cycle
2	Amber TROUBLE LED	Flashing indicates an internal failure is present
3	Red ALARM LED	When the gas concentration level exceeds the 1 <sup>st</sup> stage alarm set value, the ALARM LED starts flashing, and when it exceeds the 2 <sup>nd</sup> stage alarm set value, the ALARM LED flashes faster
4	LCD	Displays alarm notification, numeric gas concentration value, gas concentration on bar graph, sensor fault status, flow rate status, and battery level
5	Front cover	Pull by holding it by the sides, then slide down to access the operation buttons
6	Audio opening	Open for audio
7	Gas inlet port	Connects to the gas sampling tube. Outside dia.6mm
8	Gas outlet port	Discharges sampled gas. Outside dia.6mm
9	Adapter connector	Connects to a dedicated AC adapter
10	Battery cover	Cover for battery compartment
11	Sensor cover	Open for sensor unit installation
12	Sensor window	Check the sensor unit's model, target gas, and full scale thru this window
13	Red battery LED (behind the front cover)	Lights up when batteries are installed and the brightness increases when the battery is close to empty. Lights up when the cover is open while the detector is off

## Operation buttons (behind the front cover)



Item	Component name	Description/Function
1	POWER button	Press and hold to turn on/off the detector
2	AL button (to check the alarm set values)	Each press cycles through "1 <sup>st</sup> stage alarm set value", "2 <sup>nd</sup> stage alarm set value", and current gas concentration value on the LCD
3	BZ.STOP button	Press to mute the alarm audio
4	ZERO button	Press and hold to perform a zero adjustment
5	CN connector	Connects to the CA-7 communication adapter (sold separately) to collect logging data
6	Logger button	Used for data logging
7	▲(UP) and ▼(DOWN) buttons	Used for settings (e.g., log starting time entry)

## LCD

**Flow rate low icon**  
Lights up when flow rate is low

**1<sup>st</sup> and 2<sup>nd</sup> stage gas alarm icons**  
Lights up when the gas level reaches preset alarm value

**Sensor fault icon**  
Lights up when a sensor fault is detected

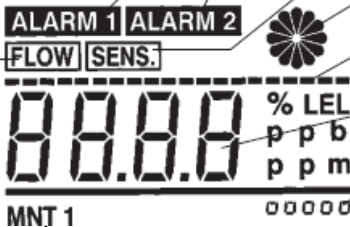
**Flow rate icon**  
Spins during normal operation and stops when flow rate is low

**Gas concentration on bar graph**  
One bar represents 5% of the full scale value. The bar graph value increases from left to right with the far right being full scale value

**Numeric gas concentration**

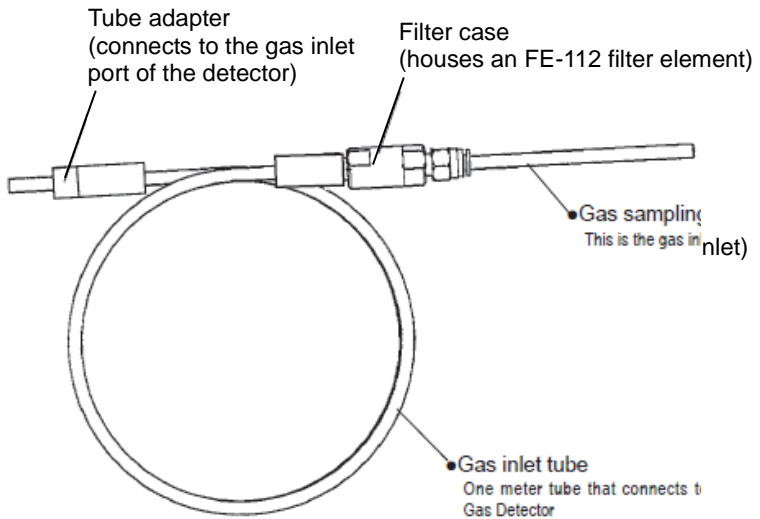
**Battery level indicator**

○○○○○ Full  
 ○○○○  
 ○○○  
 ○○  
 ○ Empty (flashing)



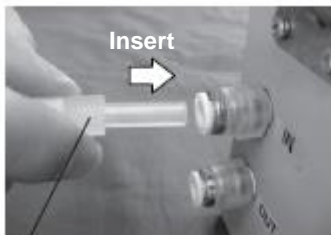
**Logging icon**  
Lights up when data logging is in progress.

# Gas sampling tube

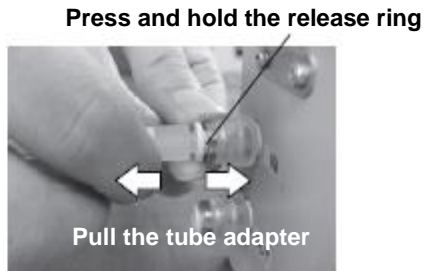


**Installation:** Push and insert the tube adapter of the gas sampling tube into the detector's gas inlet port. The tube adapter is automatically locked and sealed to the port when inserted. Ensure that it is securely connected by pulling it slightly.

**Removal:** Press and hold the release ring to unlock the tube adapter. While holding the release ring, pull out and remove the tube adapter from the detector's gas inlet port.



Tube adapter





## 5 Operation

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Perform a routine check (page 14) before use. Normal gas detection may not be possible without check, which will then fail gas leak detection.

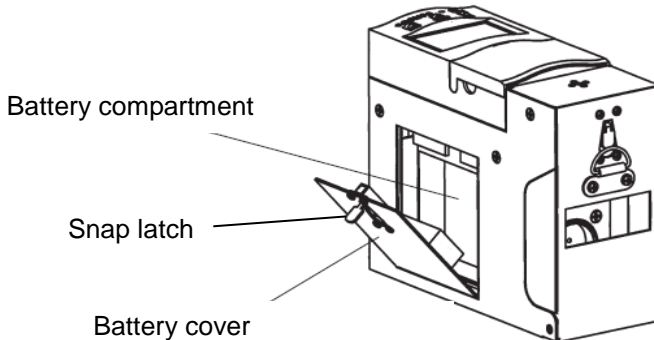


### CAUTION

- Turn on the detector in clean air. Normal gas detection is not possible, and product's performance may be compromised if turned on in an atmosphere that may contain target or interfering gases.
- Carry and use the detector with its face (LCD) facing upward to keep the sensor vertical.

### 5-1. Battery Installation

- (1) Lift and unlock the snap latch on the battery cover. Pull the cover forward. The cover is now removable.
- (2) Install the four alkaline AA batteries (provided) into the battery compartment. Correctly install by referring to the polarity marking inside the compartment.
- (3) Reinstall the battery cover and lock the snap latch.



### WARNING

Remove all contaminants (e.g., water, dust) from the product surface before opening the battery cover. The entry of contaminants may cause device failure.



### CAUTION

- Only use new batteries of the same brand and type for replacement.
- Replace all the four batteries at the same time.

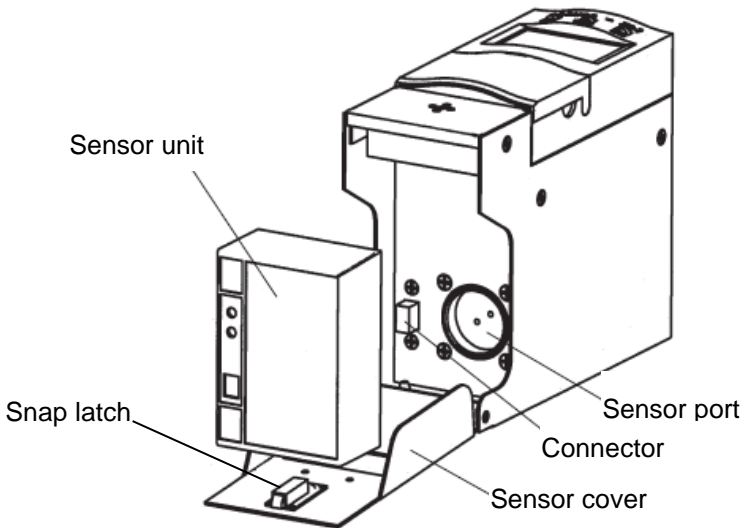
**NOTE**

Replace the batteries when

- (a) only one square □ (battery level indicator, page 5) is left flashing, indicating empty battery, while the unit is on,
- (b) pressing the POWER button does not turn on the unit, or
- (c) the red battery LED's brightness increases, indicating empty battery like (a) above, while the unit is off.

### 5-2. Sensor Unit Installation

- (1) Lift and unlock the snap latch on the sensor cover. Pull the cover forward. The cover is now open (this cover cannot be detached from the unit).
- (2) Install a sensor unit in the detector by engaging with the connector and sensor port on the detector.
- (3) Reinstall the sensor cover and lock the snap latch.



 **CAUTION**

- Normal gas detection is not possible, if the sensor unit is not securely connected to the detector, causing poor airtightness.
- Energize sensor units with an EC-7 sensor stocker (sold separately) before use. Normal gas detection is not possible if the sensor units are not sufficiently energized. Insufficient energization may cause a sensor fault alarm.
- Before regular sensor unit replacement, fully energize a new sensor unit (e.g., ex-factory unit) by installing it in an EC-7 sensor stocker (sold separately) or this detector.
- Only use XDS-7 series sensor unit for this detector. Others (e.g., CDS-7, COS-7, CHS-7) cannot be used.
- While installed in the detector, the sensor unit is being energized, even though the detector is off, as long as the battery remains or power is supplied. Use the AC adapter to keep the detector powered if the detector is stored with the sensor unit inside.

### 5-3. Power on

- (1) Press and hold the POWER button. The unit gives off a long beep. Then the green POWER LED starts flashing. The warm-up cycle (30-second self-test followed by automatic zero adjustment) starts.
- (2) When the warm-up cycle is completed, the flashing POWER LED becomes steady, indicating that the unit is ready for detection.

 **CAUTION**

- Zero adjustment (zeroing) is performed automatically when the detector is turned on. Turn on the detector in clean air to prevent incorrect zero adjustment. Incorrect zero adjustment will cause inaccurate detection.
- After turning off the detector, leave it for more than one second before turning it on again.

## 5-4. Detection

Put the short probe to the suspected leak point. When a gas leak is detected, the gas concentration value will be displayed on the LCD. If the gas concentration level exceeds the preset level, the red ALARM LED starts flashing and the detector starts beeping as shown in the table below.

The higher the gas concentration, the faster the detector beeps. Similarly, the closer the detector is to the leak point, the faster it beeps. When the concentration reaches the full scale value, a steady tone is played.

Gas concentration exceeds	Red ALARM LED	Audio alarm
1 <sup>st</sup> stage alarm set value	Flashes	No sound
2 <sup>nd</sup> stage alarm set value	Flashes fast	Beeps fast
F.S. value	Flashes faster	Steady tone



### CAUTION

- Avoid liquid seepage (e.g., water). Liquid entering the gas sampling tube or gas detector will impair proper gas detection, leading to a product failure.
- If the zero point drifts due to exposure to high concentration gas, etc., power cycle the detector or press and hold the ZERO button to perform a zero adjustment. Ensure that the zero adjustment is done in clean air.

## 5-5. Power off

Before turning off the detector, ensure that the reading shows zero in clean air by running the detector in clean air. Press and hold the POWER button to turn off the detector.



### CAUTION

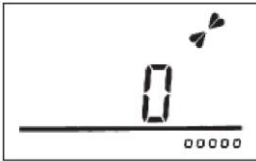
After detection of adsorptive gas (e.g., HF and F<sub>2</sub>), replace the filter element (FE-112) with a new one. Correct detection is not possible if the filter element is dirty.

## 6 Data Logging

The detector can log up to 22 hours of the measurement data. The log data can also be transferred to a pc by using data logger kit (sold separately, page 17).

### NOTE

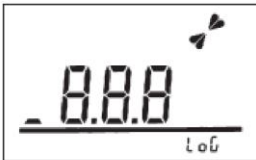
- Once data logging starts, the peak concentration value is logged every 10 seconds.
- The oldest events will be deleted to make room for the newest when the unit runs out of room for new ones.
- Pressing the POWER button to turn off the detector during data logging will automatically save the logged data. However, logged data will not be saved in case of power loss (e.g., power outage, battery removal).
- Logging date cannot be entered.
- Refer to the XPS7L data logger software's instruction manual (separate document) for the procedure to transfer log data to a pc.



First, enter the log starting time and then press and hold the ZERO button to start logging.



(1) During normal operation, press the ▼ button. "LoG" will appear on the right bottom corner of the LCD along with the log starting time entry screen.



(2) Press the logger button. Each of the four digits will flash one at a time. Enter the value for the flashing digit with the ▲ and ▼ buttons. Press the logger button for confirmation. Repeat this step four times to enter the four digits (log starting time).



For example, when you want to record 1:20 pm as the starting time, enter "13.20."



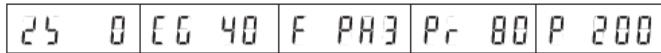
(3) Press and hold the ZERO button to start logging. "MNT1" appears on the left bottom corner of the LCD while logging is in progress.



(4) To end logging, press the BZ.STOP button. "MNT1" disappears and logging ends.

**NOTE**

Normally, the battery level indicator  $\square\square\square\square\square$  appears on the right bottom corner of the LCD. Press the  $\blacktriangle$  or  $\blacktriangledown$  button a few times and the values shown below will appear in place of the battery level indicator. These values are just the ex-factory parameters and are not for customer use. They do not affect the product operation or performance.



Pressing the  $\blacktriangle$  or  $\blacktriangledown$  button cycles through the following values:

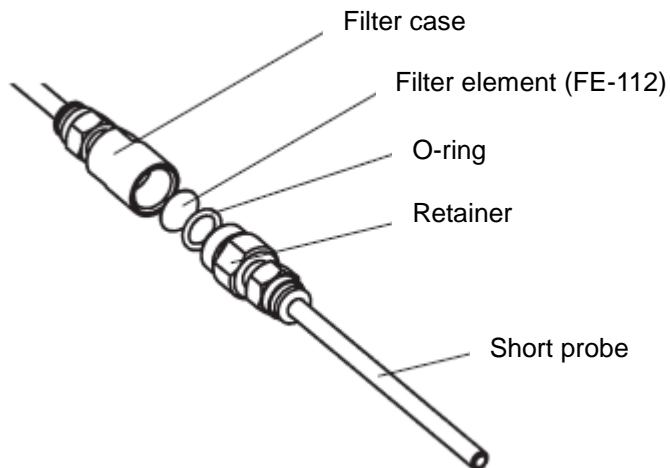


## 7 Filter Element Replacement

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Replace the filter element with a new one, if it is dirty or wet.

- (1) Turn the retainer and short probe as a whole counterclockwise to remove them from the filter case.
- (2) Remove the O-ring from the filter case.
- (3) Replace the filter element with a new one.
- (4) Reinstall the O-ring back onto the case.
- (5) Reinstall the retainer and short probe to the filter case.




### CAUTION

- To prevent the entry of contaminants (e.g., dust, water), turn off the gas detector before replacing the filter element.
- Ensure that the filter element is installed correctly. Any misalignment may compromise the detection and waterproof performance of the product.
- Contact New Cosmos or your New Cosmos representative for repair if water is observed inside the detector. Normal gas detection is not possible if water enters the detector through the filter element.

# 8 Maintenance

## Routine Check (pre-use check)

Perform a routine check before each use.

	Check item	Action
Gas sampling tube	<ul style="list-style-type: none"> <li>• Check the gas sampling tube for any damage or wear</li> <li>• Check that the tube is securely connected to the detector; check for loose connections</li> </ul>	<ul style="list-style-type: none"> <li>• Replace with a new one if worn or damaged</li> <li>• Reconnect if any loose connections are found</li> </ul>
	<ul style="list-style-type: none"> <li>• Check that the filter element in the filter case is clean and dry</li> <li>• Check the filter element for clogging or discoloration</li> </ul>	<ul style="list-style-type: none"> <li>• Replace with a new one if dirty, discolored, or clogged</li> </ul>
Detector	<ul style="list-style-type: none"> <li>• Check the battery level indicator. If only one square  is left flashing, the battery is empty</li> </ul>	<ul style="list-style-type: none"> <li>• Replace all the four batteries with new ones (of the same brand and type), or</li> <li>• connect the AC adapter</li> </ul>
	<ul style="list-style-type: none"> <li>• Check that the tube adapter is securely connected to the detector's gas inlet port</li> </ul>	<ul style="list-style-type: none"> <li>• If disconnected or loose, push and insert the tube adapter into the inlet port</li> </ul>

## Annual Inspection

- Contact New Cosmos or your New Cosmos representative to perform an annual inspection. Perform it at least once a year to maintain the product accuracy.
- The sensor unit replacement cycle is six months.
- Remove the sensor unit from the gas detector before shipping for repair/inspection.
- Sensor unit should be kept in an upright position to prevent electrolyte leakage. When shipping the sensor unit, the shipping box's orientation should be taken care of.



### **Important Notice for Annual Inspection**

This product is a precision instrument. It is vital to perform periodical inspections to maintain the detector's performance and ensure safety. It is highly recommended that a maintenance contract with a local New Cosmos representative be made for the performance of scheduled annual inspections (once a year at least).

### **Cleaning**

If the detector is dirty, wipe it off with a soft dry cloth or with a moist cloth. Do not use any alcohol or detergent.

## 9 Troubleshooting

Before contacting us for service repair, perform basic troubleshooting using the table below. If the detector locks up (cannot be turned off), remove all batteries. After a few minutes, put the batteries back in and turn on the detector.

Symptom	Cause	Action	Reference
Pressing POWER button does not turn on the power	Battery orientation incorrect	Remove the batteries and reinsert them in the correct orientation	5-1. Batteries Installation (page 7)
	Battery depleted	Replace the batteries with new ones	
	No sensor unit installed	Install the sensor unit	5-2. Sensor Unit Installation (page 8)
Flow rate icon stops spinning (page 5), indicating a low flow rate	Filter clogged	Replace the filter element with a new one	7. Filter Element Replacement (page 13)
	Sampling tube bent or closed	Straighten the tube or remove the obstruction in the tube	—
Sensor fault icon is lit (page 5), indicating a sensor error	Sensor insufficiently energized	Fully energize sensor unit, then reinstall	5-2. Sensor Unit Installation (page 8)
	Sensor unit expired	Replace the sensor unit with a new one	

## 10 Consumable and Optional Parts (separately sold)

Part Name	Model	Remarks
Sensor unit	(XDS-7 series)	Sensor cartridge Refer to 3. Sensor Unit Variations list (page 3) for models Contact Cosmos or your New Cosmos representative for model selection
Filter element (x 10 pcs)	FE-112	Install in the filter case
AC adapter * (100-240VAC/6VDC)	—	Dedicated AC adapter when using 100-240VAC
Sensor stocker	EC-7	Can energize up to six sensor units at one time
Data logger software *	XPS7L	Required to transfer log data to a pc
Communication adapter *	CA-7	
Serial cross cable *	KRS-L09-2K	

\* Does not comply with CE marking.

The sensor unit's expiration date is mentioned on its pouch. The warranty period for other consumables is one year from the date of purchase. The warranty scope is the same as that of the gas detector.

# 11 Warranty

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The warranty period is one (1) year from the date of purchase.

You are entitled to the limited warranty, if the product malfunctions due to a manufacturing defect during normal use in accordance with the instruction manual, specifications and labels.

## Warranty Scope

If the product fails or is found to be damaged due to a manufacturing defect during the warranty period, and used in accordance with the instruction manual and specifications, we will provide a free replacement and repair service. This warranty covers the New Cosmos product/parts only and not third-party product/parts.

## Warranty Exclusions

The following will be repaired at the cost of customer even during the warranty period.

- (1) Failures and damages incurred by incorrect use, deliberate acts or negligence of the user.
- (2) Failures and damages caused by disaster, earthquake, storm and flood, lightning, extreme climate, abnormal power supply voltage, excessive electromagnetic interferences, or other acts of God.
- (3) Failures and damages resulting from repair and/or modification by non-New Cosmos certified technicians.
- (4) Consumables and failures and damages resulting from improper consumable replacement.
- (5) Other failures and damages not attributable to the manufacturer.

# 12 Disposal

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Dispose of a used gas detector, sensor or battery as industrial waste in accordance with the applicable local laws and regulations.

## Battery disposal

Used batteries must be disposed of in accordance with the applicable laws and regulations. The Waste Electrical and Electronic Equipment (WEEE) directive (2012/19/EU) is intended to promote recycling of electrical and electronic equipment and their components at end of life. This symbol (crossed-out wheeled bin) indicates separate collection of waste electrical and electronic equipment in the EU countries. This product uses batteries. Batteries must be recycled or disposed of properly. At the end of its life, batteries must undergo separate collection and recycling from general or household waste. Please use the return and collection system available in your country for the disposal of the batteries.



## 13 Specifications

Target gas	Semiconductor manufacturing gases
Detection principle	Electrochemical Electrochemical (catalyst conversion) for XDS-7NF (NF <sub>3</sub> detection)
Gas sampling method	Extractive type (pump)
Detection range	As per delivery specifications
Gas concentration display	Four-digit on LCD
Indication accuracy *1	±10%F.S. except for XDS-7NF -30%F.S. to +10%F.S. for XDS-7NF
Response time *1	T60: Less than 60 seconds
Power supply	Alkaline AA battery x 4pcs or Dedicated AC adapter (100-240VAC/6VDC) *3
Continuous operating time*2	More than 12 hours except for XDS-7NF More than 8 hours for XDS-7NF (by alkaline AA batteries (Toshiba LR6AN) at 20°C, with no gas alarm)
Operating temperature and humidity	0 to +40°C, 30 to 85%RH No condensation. No rapid change in temperature/humidity
Dimensions	Approx. W62 × H150 × D128 mm (excluding protrusions)
Mass	Approx. 1.3 kg
Compliance	EMC directive (EMC: 2014/30/EU/SI 2016 No.1091) and RoHS directive ( 2011/65/EU+(EU)2015/863/SI 2012 No.3032 ) *3 *4

\*1. Under identical conditions.

\*2. The operating time (battery life) may vary depending on environment and conditions of use, storage period, battery manufacturer etc.

\*3. AC adapter, data logger software, communication adapter, and serial cross cable (page 17) do not comply with CE marking.

\*4. There are two types of EC-7 sensor stocker, global and domestic (for use in Japan). Global type is CE-marked.

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Additional copies of this instruction manual may be purchased.  
Contact New Cosmos or its authorized representative for ordering.  
The contents of this manual are subject to change without notice.

**Authorized representative:**

**Manufacturer:**

NEW COSMOS ELECTRIC CO., LTD.  
2-5-4 Mitsuya-naka, Yodogawa-ku,  
Osaka 532-0036, Japan  
[www.newcosmos-global.com/](http://www.newcosmos-global.com/)



**NEW COSMOS ELECTRIC CO., LTD.**