

COMPACT PROCESS GAS MONITOR



Quadrupole Mass Spectrometer
MICROPOL System

Ultra-Compact
process gas monitor.
Monitors trace gases,
responds quickly
to process shift and is easy
to install / maintain.

Quadrupole Mass Spectrometer

MICROPOLE System

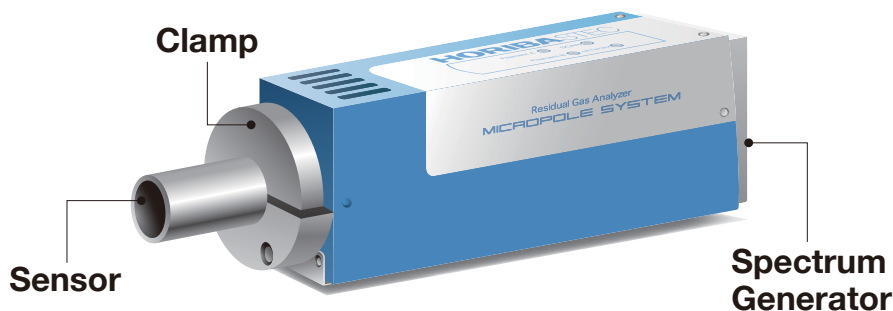
High performance, non-intrusive, easy-to-use design satisfies new needs for gas analysis in process equipment.

The MICROPOLE System was developed by HORIBA STEC for gas analysis and process control in vacuum chambers and in thin-film processes.

The ultra-compact design has nine quadrupoles in an array that is both lightweight and fast to respond to process changes.

- Process monitoring up to 3.8mTorr (depending on configuration)
- Ultra-compact sensor design
- Easy and fast installation



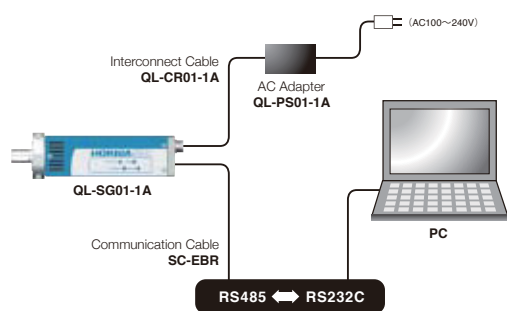


Specification Selection

Spectrum Generator	Sensor	Plasma Guard	Measurable Mass Range	Clamp
QL-SG01-065-1A	SMPA7-7-2 / 65 K	○	2-65AMU • Maximum operating pressure: 0.9Pa • Maximum output rising pressure: 0.5Pa • Minimum detectable partial pressure: 5.0×10^{-6} Pa (70eV) • Resolution: 1.2 ± 0.3 AMU	ISO-KF16 (NW16)
	SMPA7-7-2 / 65 C	○		CF34 (ICF34)
	MPA7-7-2 / 65 C	—		
QL-SG01-100-1A	SMPA7-5-2/100 K	○	2-100AMU • Maximum operating pressure: 0.6Pa • Maximum output rising pressure: 0.2Pa • Minimum detectable partial pressure: 5.0×10^{-6} Pa (70eV) • Resolution: 1.0 ± 0.3 AMU	ISO-KF16 (NW16)
	SMPA7-5-2/100 C	○		CF34 (ICF34)
	MPA7-5-2/100 C	—		
QL-SG01-300-1A	SMPA7-1-4/300 K	○	4-300AMU • Maximum operating pressure: 0.4Pa • Maximum output rising pressure: 0.2Pa • Minimum detectable partial pressure: 5.0×10^{-6} Pa (70eV) • Resolution: 1.8 ± 0.3 AMU	ISO-KF16 (NW16)
	SMPA7-1-4/300 C	○		CF34 (ICF34)
	MPA7-1-4/300 C	—		

System Configuration

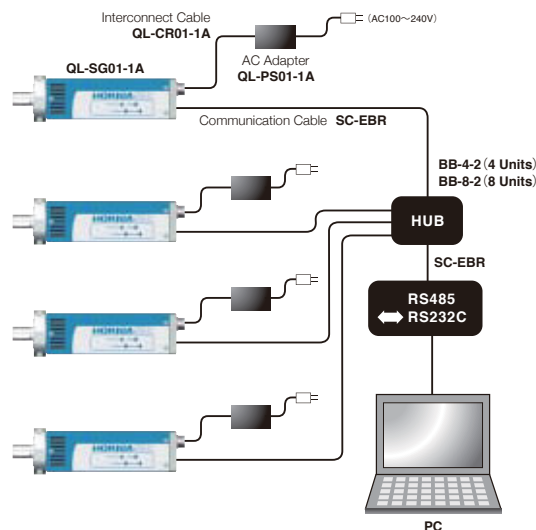
Single Monitoring



A Set of Single Monitoring

Necessary Item	Model	qty
Sensor	MPA7/SMPA7 series	1
QL-SG01	QL-SG01 series	1
Clamp	QL-LS01 or QL-LC01	1
Regular Cable	QL-CR01 series	1
AC Adapter	QL-PS01	1
Communication Cable	* recommended item	1
Converter	* recommended item	1
PC		1

Multiple Monitoring

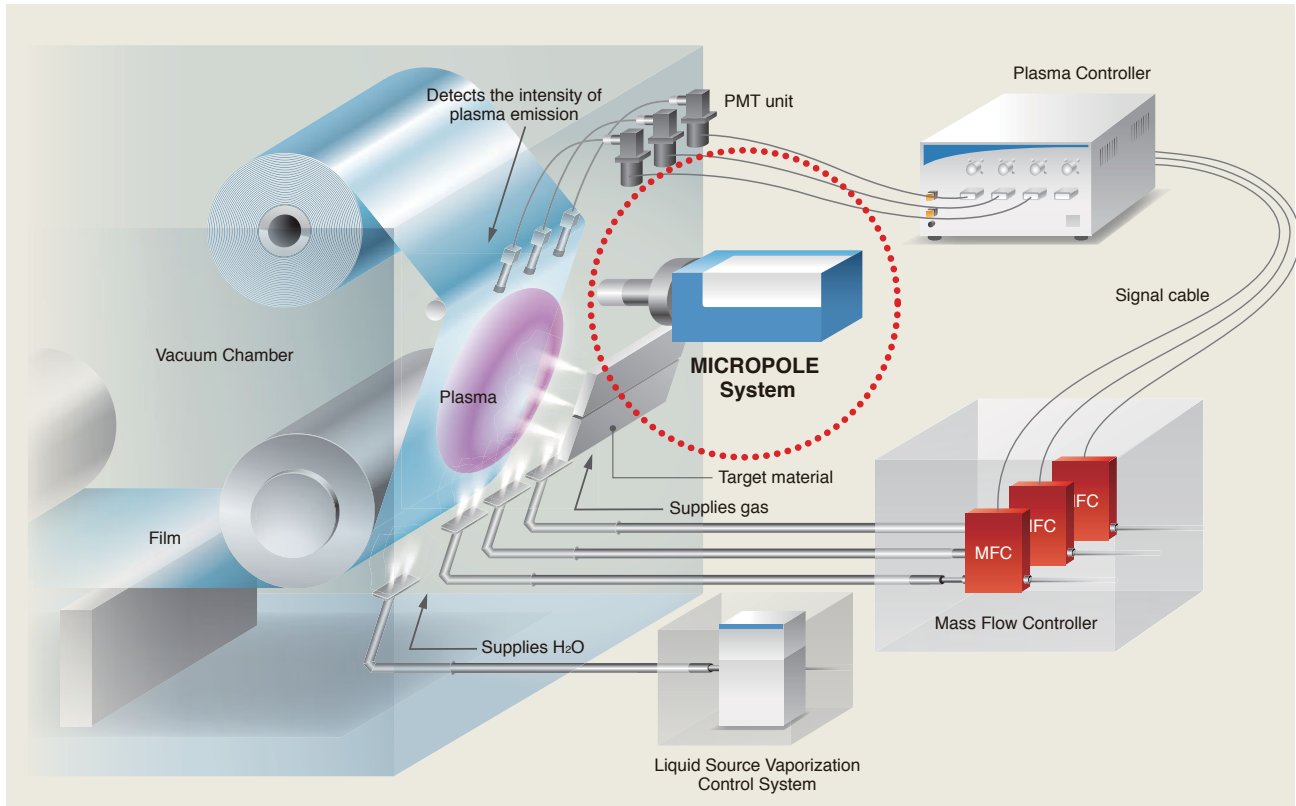


Setting up multiple MICROPOLE Systems (maximum 8 systems) is easily to use Communication Cables, RS232/485 adapters and a Communications Hub.

POINT 1

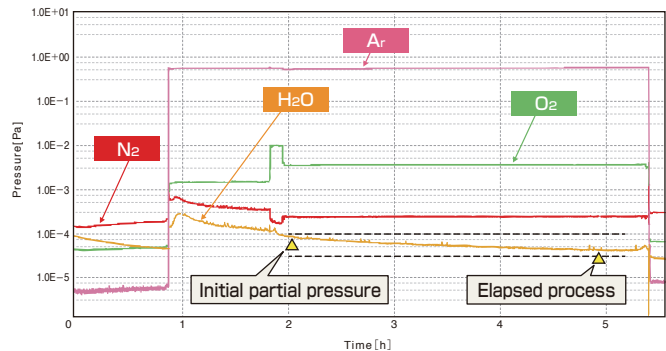
In dry-coating applications, **MICROPOLE Systems** are used to monitor the process environment to ensure a consistent sputtering process.

Example Production process of functional thin films



In dry coating applications, moisture levels in the process environment are critical. Using the MICROPOLE System to monitor the partial pressure of H₂O in conjunction with other available HORIBA components for closed loop process control, ensures a stable moisture level and resulting repeatable and high quality coatings.

■ Process gas monitoring date



► Related Products

Plasma Controller RU-1000

Plasma Emissions Monitor identifies process shifts and can be used to make automatic modifications to the delivery of gases, thereby ensuring a stable process



Mass Flow Controller SEC-N100 series

Digital Mass Flow Controller for repeatable and accurate delivery of Process Gases



Compact Baking System LSC series

Vapor Delivery System ensures consistent generation and delivery of critical process chemistries for coatings

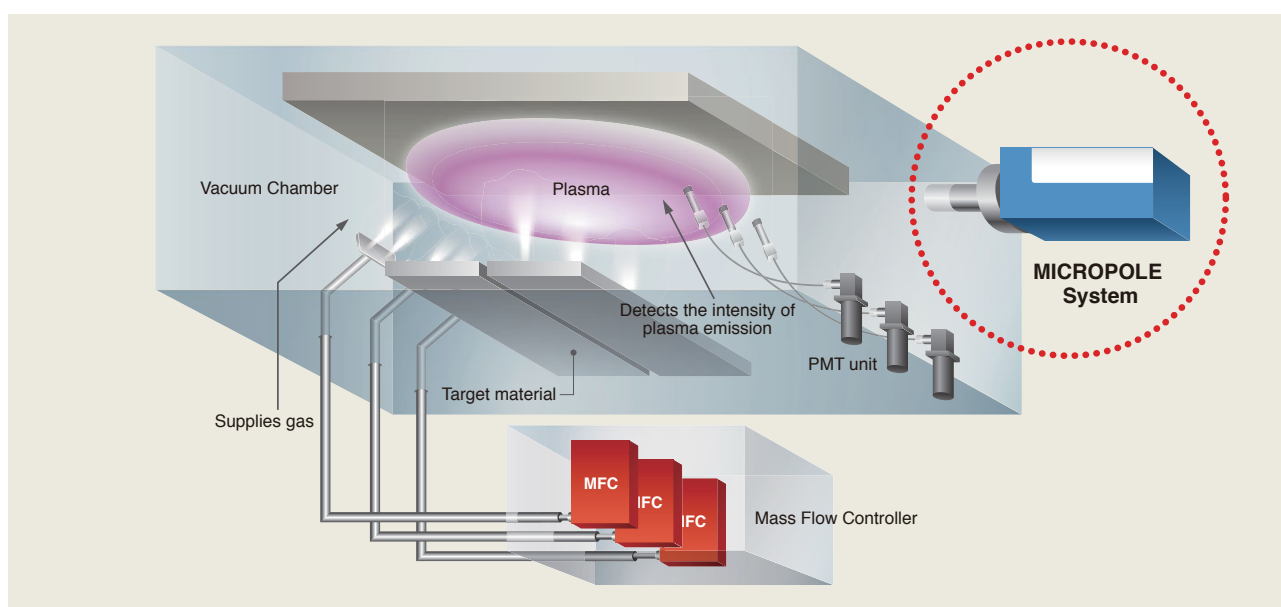


POINT 2

For thin film applications like PVD and CVD, MICROPOLE Systems are used to monitor the process environment before and during deposition. By monitoring the process environment, users can increase throughput by optimizing process run times and ensure process repeatability.

Example

- Residual gas analysis of sputtering device
- Leak monitoring of sputtering device
- Residual gas analysis of CVD device after cleaning

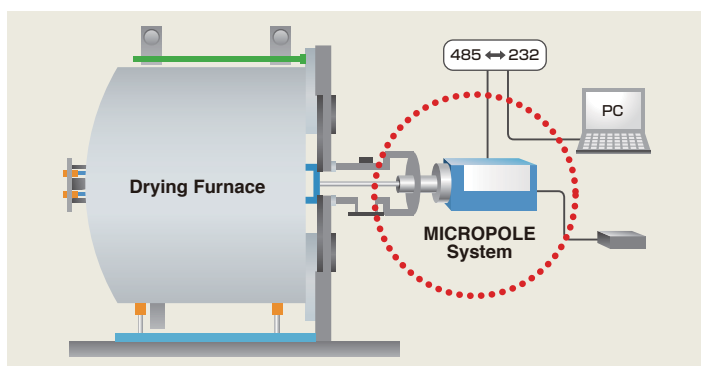


POINT 3

In vacuum drying applications, MICROPOLE Systems are used to monitor process moisture and any elution gases. This data allows users to ensure process efficiency.

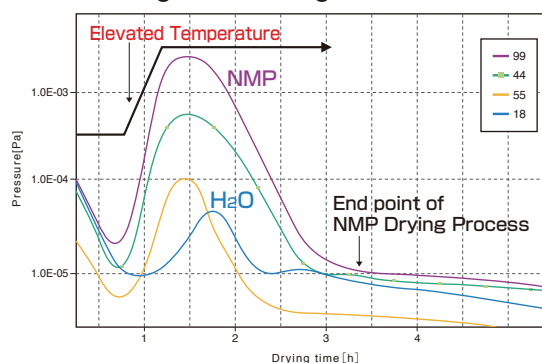
Example

Detecting the end points of electric double layer capacitors and lithium-ion capacitors in vacuum drying



* We also offer suggestions about differential pumping system.

■ Process gas monitoring data



Sensor[RoHS compliant]	[MPA7 / SMPA7]			[SMPA7]
Sensor type	Analyzer [Sensor Type:7-2/65]	Analyzer [Sensor Type:5-2/100]	Analyzer [Sensor Type:1-4/300]	Analyzer [Sensor Type:1-2/100]
Maximum output rising pressure (N ₂)	0.5Pa	0.2Pa	0.2Pa	0.1Pa
Maximum operating pressure (N ₂)	0.9Pa	0.6Pa	0.4Pa	0.1Pa
Minimum detectable partial pressure (N ₂)	5×10 ⁻⁶ Pa (70eV)	5×10 ⁻⁶ Pa (70eV)	5×10 ⁻⁶ Pa (70eV)	5×10 ⁻⁶ Pa (70eV)
Resolution (FWHM: N ₂)	1.2±0.3 AMU	1.0±0.3 AMU	1.8±0.3 AMU	1.5±0.3 AMU
Maximum bake out temperature (SG removed)	350 °C			350 °C
Maximum bake out temperature (SG installed)	150 °C			150 °C
Mounting flange	M P A : [C]CF34 (ICF 34) SMPA : [C]CF34 (ICF 34), [K]ISO-KF16 (NW 16)			[C]CF 34 (ICF 34), [K]ISO-KF16 (NW 16)
Mass	M P A : CF34 Flange 50 g SMPA : ISO-KF16 Flange 50 g SMPA : CF34 Flange 70 g			ISO-KF16 Flange 50 g, CF34 Flange 70 g
Filament	Y ₂ O ₃ /Ir 2pcs			3% Re/W 2pcs
RoHS	Complied			Complied

* Micropole Analyzer has 2 types (MPA/SMPA). SMPA is protected by a mesh on the vacuum fitting, designed to extend the lifetime of sensor in harsh environment such as plasma processes.

Spectrum Generator [QL-SG01-065-1A] [QL-SG01-100-1A] [QL-SG01-300-1A]			
Spectrum generator type	QL-SG01-065-1A	QL-SG01-100-1A	QL-SG01-300-1A
Mass range	2-65 AMU	2-100 AMU	4-300 AMU
Mass filter type	Quadrupole		
Detector	Faraday cup		
Measurement scan speed (data update at baseline scan)	1 sec/scan for 1 gas (10 sec/scan for 10 gases)		
Ionization voltage	43 eV or 70 eV selectable		
Operating temperature	15 - 45 °C		
Operating humidity	30 - 80 %RH (not condensing)		
Mass (with special clamp for SMPA type sensor)	575 g		
Dimension	W149 x D47 x H62 (mm)		
Communication and baud rate	RS485, 9.6k / 19.2k / 38.4 kbps		
Power input	DC 24V +/-5%, 100mVpp, 70VA		
Connector type (power supply)	Round Type Connector: PRC03-23A10-4M		
CE marking	EMC directive: EN61326-2-3		
RoHS	Complied		

* 1Btype: With interlock function

Power Supply Unit[QL-PS01-1A]	
Input	AC : 100 - 240 V, 50/60Hz
Output	DC : 24V
Operating temperature	15 - 45 °C
Operating humidity	30 - 80 %RH (not condensing)
Dimension	W70 x D130 x H92 (mm)
Mass	700 g

Special Cables	
[QL-CR01-M-1A] Between SG and Power supply	Length*: 3, 5, 10 m
[SC-EBR] Between SG and PC (RJ45 connector)	Length: 3, 10 m
[QL-TA01] For external input	Length: 3, 5 m

* Do not use the attached cable set (power supply cable) with other products.
* Please use a power supply cable set conforming to the local standards.

Special Clamps	
[QL-LC] CF34 (ICF34) flange for MPA sensor	Mass: 140 g
[QL-LS] For SMPA sensor	Mass: 190 g

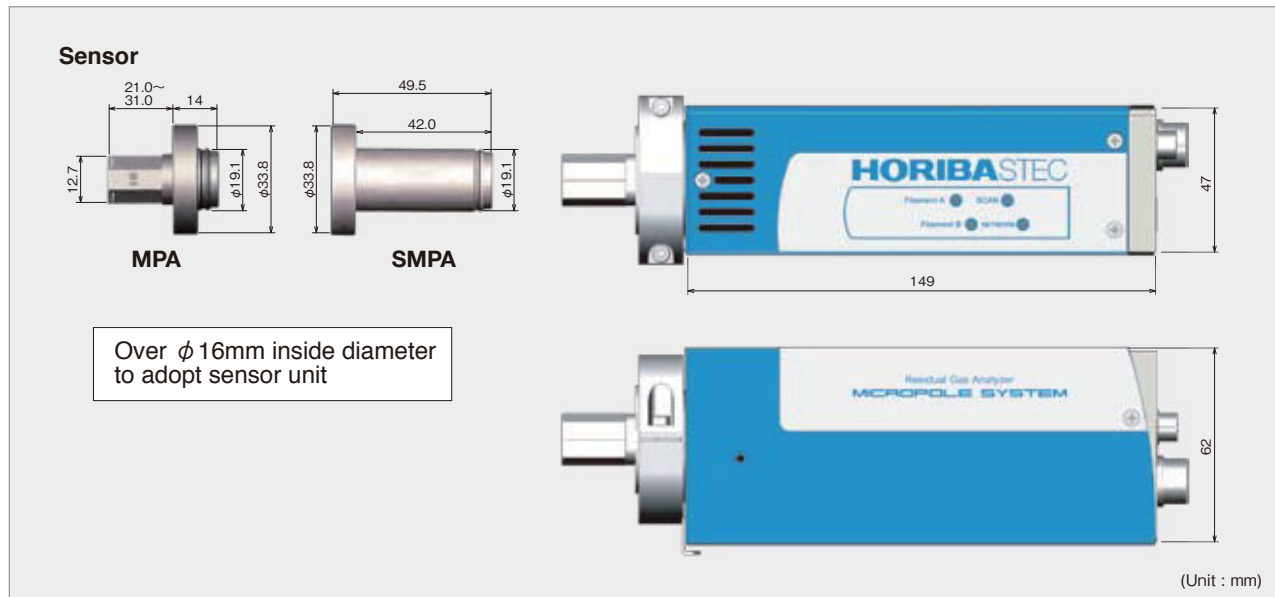
* Please let us know if you'd like to install into your device.

Data can be transferred to PCs for the visual display of analysis results.

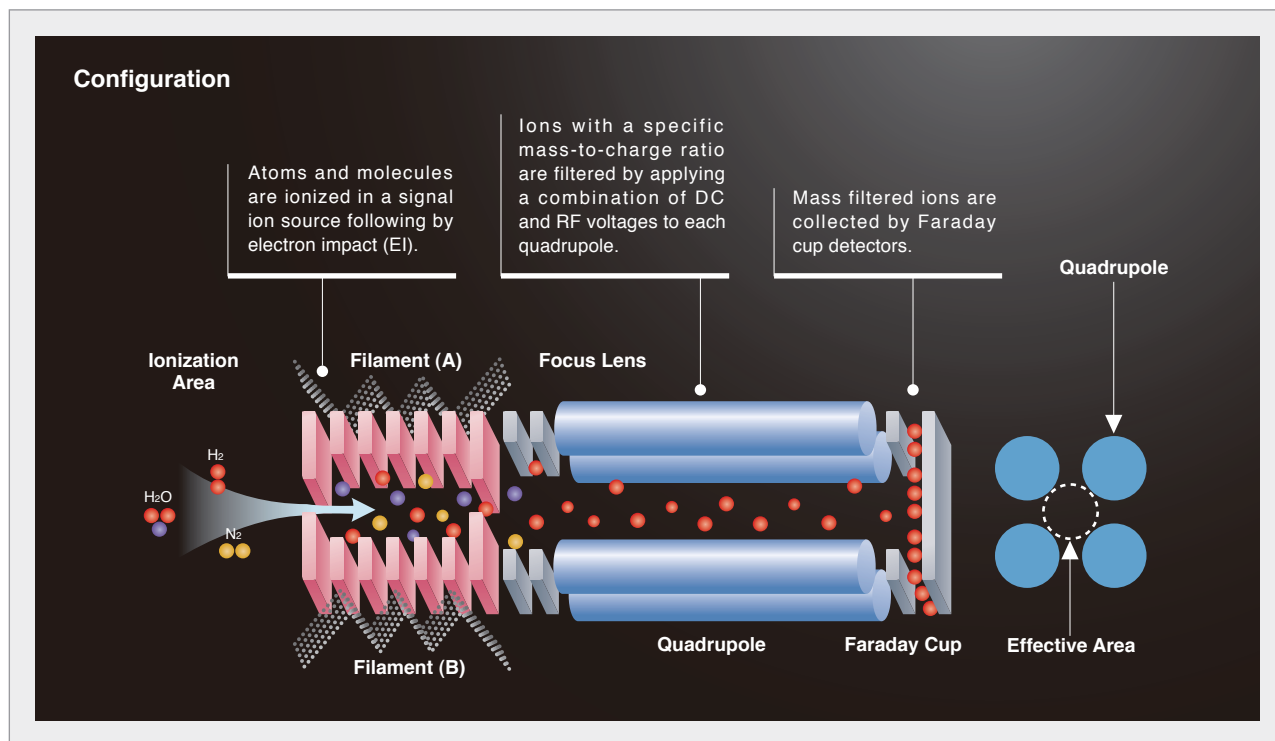
Software[QL-MS01]	
Software (for PC)	"MICROPOLE SCANNER" QL-MS01
OS	Windows® XP, Vista(.NET Framework Ver.2 or higher is required)
Simultaneously controllable systems (by PC)	Maximum 8 units from a single PC
Display	Bar, Trend, Analog, 3D(Analog+Time scale)
Measurement mode	Full, Selected, Single
Display unit	Pa, Torr, mBar, Ampere
Display scale	Linear, Logarithmic
Date save	It can be converted to CSV file format.
Recommendation of PC	Pentium 1.6GHz or higher, RAM: 1GB or more, HDD: 2GB or more

* Windows is a registered trademark of Microsoft Corporation in the United States and other countries.

External Dimensions



Measurement principle





Applying to the EU RoHS Directive : This products is compliant with the restriction of the designated 6 hazardous substances(*).
(*) lead, cadmium, mercury, hexavalent chromium, polybrominated biphenyls (PBB) and polybrominated diphenyl ethers (PBDE)

Using lead-free soldering : Lead-free soldering is used for mounting components of printed circuit boards.

- Many countries consider the reinforcement of regulations concerning the risk caused by lead to human body and the environment

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HORIBASTECH
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Please read the operation manual before using this product
to ensure safe and proper handling of the product.

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