

Applications in Automotive Market and
Introduction to Gas Detectors and Alarms for
Safety and Security

Document contents

- **About Riken Keiki**
- **Why do we need gas detectors?**
Risks associated with toxic gases
- **Applications in automotive market**
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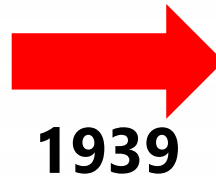


About Riken Keiki

About Riken Keiki



RIKEN



Riken Keiki



Headquarters
To be completed in September
2018 (conceptual drawing)

Riken Keiki was originally established to commercialize and sell detectors for preventing explosions in coal mines and on oil tankers.





**Methane gas measurements
in coal mine**



**Optical Gas
Indicator Model
3 (1939)**

Certification

National heritage of
analytical and scientific
instruments
2014

Company profile



Company name	Riken Keiki Co., Ltd.	
Established	March 15, 1939	
Location	Headquarters:	2-7-6 Azusawa Itabashi-Ku, Tokyo
	Development Center:	2-3 Minamisakae-cho, Kasukabe-shi, Saitama
Factories	Hakodate-shi, Hokkaido; Sakurai-shi, Nara (affiliated company)	

Headquarters



**To be completed in September 2018
(conceptual drawing)**

Development Center



About Riken Keiki



Headquarters (Itabashi-Ku, Tokyo)

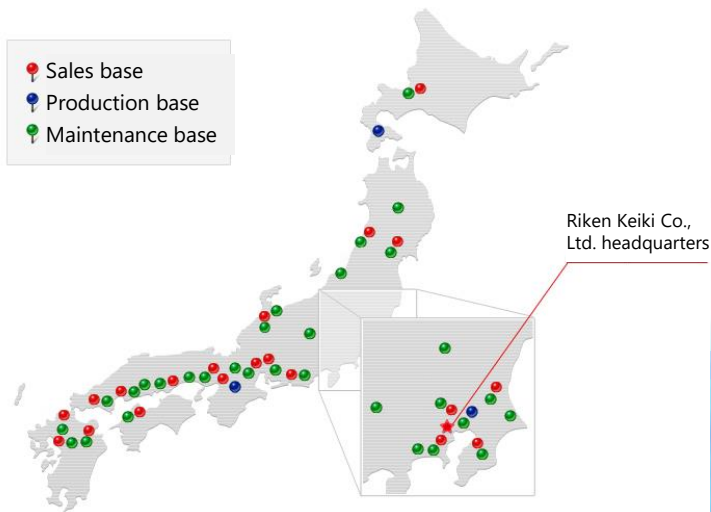


To be completed in September 2018
(conceptual drawing)

Development Center (Kasukabe-shi, Saitama)



Locations of sales offices ◆ Domestic ◆



◆ Global ◆



Company profile



Various bases	Domestic sales and branch offices: 20 locations Service stations: 32 locations Global bases: 7 locations
Major sales items	Combustible gas detectors and alarms Gas detectors and alarms designed to prevent oxygen deficiency accidents Toxic gas detectors and alarms Combined gas detectors and alarms Various measuring instruments for environmental measurements and other instruments
Capital	2,565.5 million yen
Number of employees	965 (non-consolidated), 1,127 (consolidated) * As of September 30, 2017

Hakodate Factory
(Hakodate-shi, Hokkaido)



Nara Factory
(Sakurai-shi, Nara)



Company history



1939	Riken Keiki Co., Ltd. established to produce and sell optical gas detectors, photoelasticity apparatuses, and other precision instruments invented and developed by RIKEN
1959	Start production and sale of combustible gas alarms and detectors (catalytic combustion type).
1967	Start production and sale of oxygen measuring instruments (OX-1).
1970	Start production and sale of monitoring tape type measuring instruments (FP-200).
1972	Start production and sale of non-dispersive infrared measuring instruments (RI-550).
1975	Start production and sale of electrochemical type measuring instruments (EC-231).
1986	Start production and sale of photoemission yield spectrometers (AC-1).
2009	70th anniversary of founding
2014	Start production and sale of portable X-ray diffractometers equipped with XRF (DF-01).
2015	Start production and sale of portable multi gas detectors (GX-6000), first product of its kind in Japan capable of housing photoionization detectors (PID).

Why Do We Need Gas Detectors? Risks Associated with Toxic Gases

Need for gas detectors (combustible gases)

- **Criteria set by United Nations' Globally Harmonized System of Classification and Labelling of Chemicals (GHS)**

According to the United Nations' Globally Harmonized System of Classification and Labelling of Chemicals (GHS), a combustible gas (or flammable gas) is defined as follows:

A combustible or flammable gas is a gas having an explosive (flammable) range when mixed with air under atmospheric conditions of 20°C and standard pressure of 101.3 kPa.

Gases falling under this definition are further subdivided into the following two categories based on the severity of the associated risk:

Category 1 (Danger: Extremely flammable gas)

Gases capable of igniting at 20°C and standard pressure of 101.3 kPa when occurring in a mixture of 13% or less by volume with air or having an explosive (flammable) range of at least 12% when mixed with air regardless of the lower explosion (flammable) limit

Category 2 (Warning: Flammable gas)

Gases, other than those in Category 1, which are gaseous at 20°C and a standard pressure of 101.3 kPa and have an explosive (flammable) range when mixed with air



We need gas detectors because flammable gas leaks can lead to explosions.

Need for gas detectors (definition of permissible concentration)

● Definition of permissible concentration

Even when workers are exposed to hazardous substances at work sites, no adverse health effects should emerge as long as the airborne concentration of the **hazardous** substance remains below the permissible concentration.

Recommended permissible concentrations have been set by the American Conference of Governmental Industrial Hygienists (ACGIH) and the Japan Society for Occupational Health. We use the **ACGIH** permissible concentrations.

● Types of permissible concentrations

• TWA (Time Weighted Average)

Time Weighted Average refers to time-weighted average concentrations over an 8-hour workday and 40-hour workweek of routine work to which workers may be repeatedly exposed without adverse health effects.

• STEL (Short Term Exposure Limit)

Short Term Exposure Limit refers to exposure that does not lead to adverse health effects if each exposure does not exceed 15 minutes, the number of daily exposures does not exceed four, and the exposures are separated by at least one hour.

• C (Ceiling value)

Ceiling Value refers to the upper limit that can never be exceeded.



We need gas detectors because leaks exceeding permissible concentrations can lead to accidents.

How human body reacts to oxygen-deficiency

O2 Concentration
21%



Symptoms
Natural air

O2 Concentration
18%



Symptoms
Limit level for not causing serious health problems. Continuous ventilation is required



O2 Concentration
16% - 12%

Symptoms
Rapid breathing,
Increase in pulse rate,
Loss of concentration,
Headache, Nausea,
Ear ringing



O2 Concentration
14% - 9%



Symptoms
Stupor, Headache,
Nausea, Cyanosis,
Faintness on the entire
body

O2 Concentration
10% - 6%

Symptoms
Comatose, Loss of consciousness,
Muscle spasm on the entire body



O2 Concentration
6% or less

Symptoms
Unconsciousness, Comatose,
Cessation of breathing,
Cardiac arrest, Die in 6 minutes



Effects of hydrogen sulfide (H₂S) on human body

Concentration (ppm)	Effects and Toxicity
0.025	Smell vaguely. (It varies according to the individual.)
0.3	Smell clearly.
3 - 5	Smell moderate degree of objectionable odor.
10	Lower-level to irritate eyes' mucus membranes.
20 - 40	A strong odor. Lower-level to irritate lungs' mucous membranes.
100	Sense of smell is impaired in 2 - 15 minutes. Eyes and respiratory tract are irritated in 1 hour. 8 - 48 hours continuous exposure can lead to death.
170 - 300	1 hour exposure is the limit for not causing serious health problems.
400 - 700	Life-threatening exposure in 0.5 - 1 hour.
800 - 900	Bring on loss of consciousness, cessation of breathing and death.
1000	Bring on immediate loss of consciousness and death.

Effects of carbon monoxide (CO) on human body

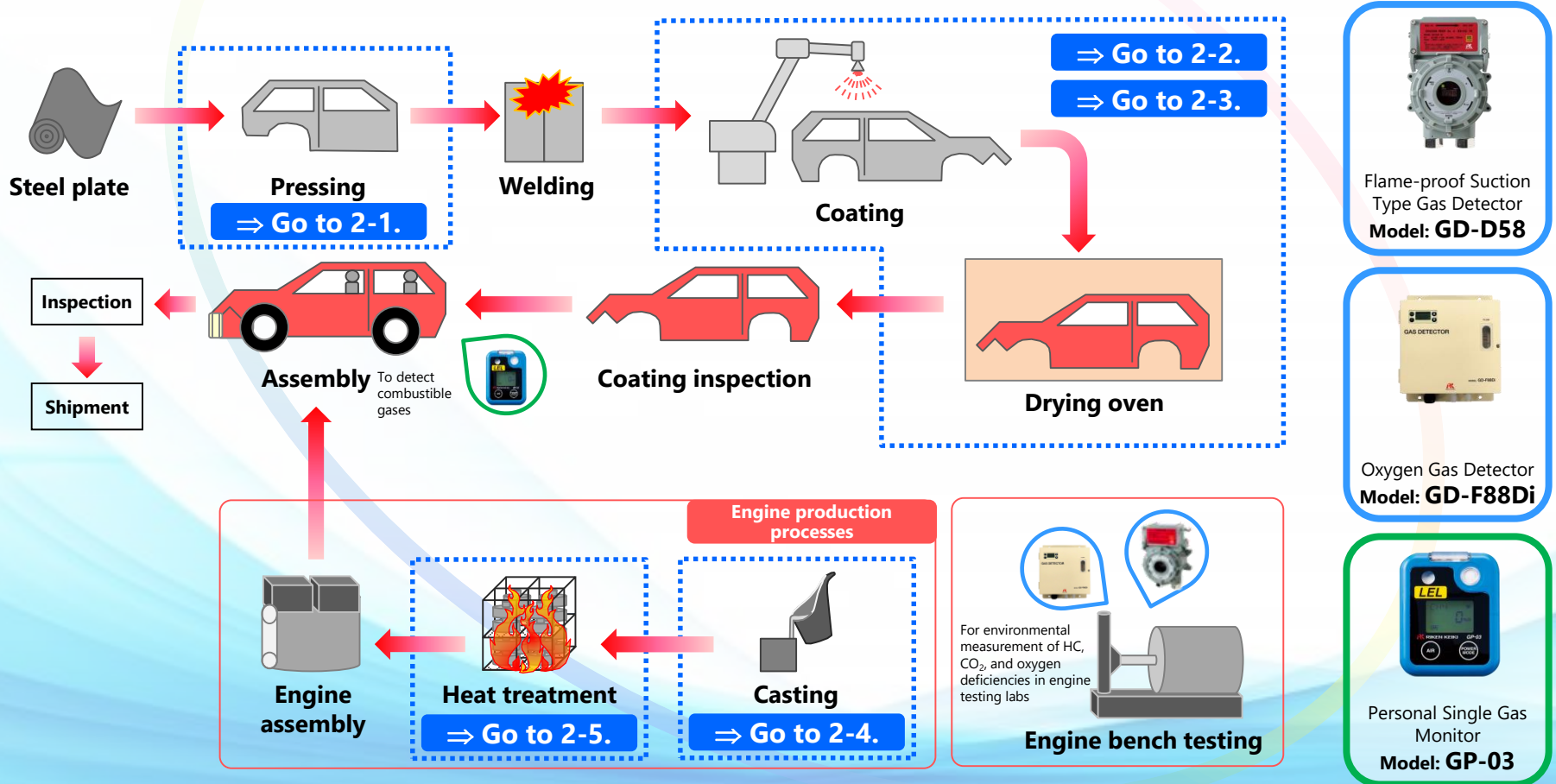
Concentration (ppm)	Effects and Toxicity
100	No noticeable effects even after breathing for a few hours.
200	A mild headache in around 1.5 hours.
400 - 500	Headache, nausea and ear ringing in around 1 hour.
600 - 1000	Loss of consciousness in around 1 - 1.5 hours.
1500 - 2000	Headache, vertigo and disabling nausea in around 0.5 - 1 hour, and losing consciousness.
3000 - 6000	Headache, vertigo, disabling nausea...etc. in a few minutes. 10 - 30 minutes exposure can lead to death.
10000	Bring on immediate loss of consciousness and death.

Applications in Automotive Market

1. Entire flow of processes at automobile manufacturing plant
2. Automobile manufacturing processes
 - 2-1: Pressing
 - 2-2: Coating and drying (1)
 - 2-3: Coating and drying (2)
 - 2-4: Casting
 - 2-5: Heat treatment
3. Laboratory
4. Engine laboratory and environmental testing laboratory
5. Vehicle testing laboratory
6. Test bench
7. Lithium battery production
8. Heating furnace

1. Entire flow of processes at automobile manufacturing plant

The figure below shows the risks posed by combustible and toxic gas leaks in automobile manufacturing processes and examples of gas detector and alarm installations.
The following pages discuss the details of each process.



2-1: Pressing

Description: In the pressing process, a large press machine or similar equipment is used to press the body.

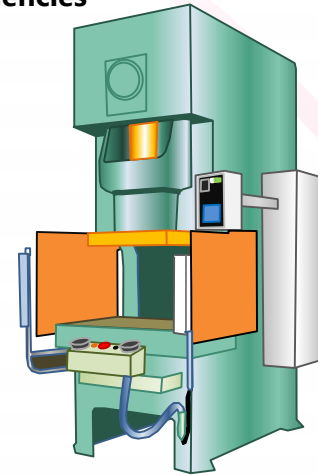
Hazardous risks: Fuel from the press machine may leak and cause oxygen deficiencies or explosions in the underground pit.

⇒ **Detecting combustible gases to prevent explosions**
Detecting oxygen concentration to prevent oxygen deficiencies

O₂ indicator



Multi-channel Gas Monitoring System
Model: **RM-5003**



Press machine

Fuel leaks
⇒ **Explosions**

Detector heads for oxygen deficiencies



Smart Transmitter/Gas Detector
Model: **SD-10X**



Oxygen Gas Detector Head
Model: **GD-F3A-1**

Personal gas detector for workers



Four Gas Personal Monitor
Model: **GX-2009**



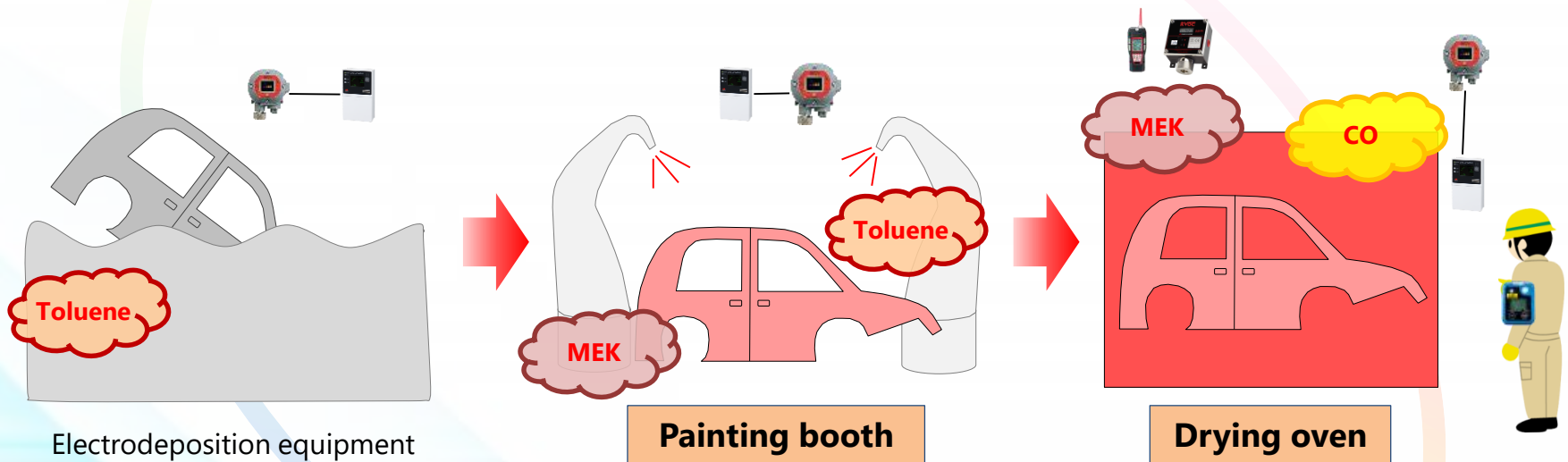
Underground pit ⇒ **oxygen deficiencies and explosions**

2-2: Coating and drying (1)

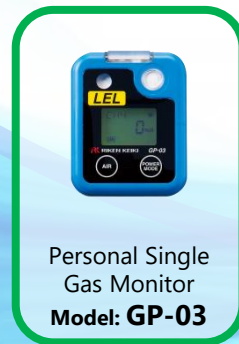
Description: Paint is applied in various ways in coating and drying processes. The body is coated by electrodeposition or spray painting and dried in a drying oven.

Hazardous risks: Organic solvents used in the electrodeposition equipment and painting booth may cause explosions. CO poisoning may occur in the drying oven.

⇒ Detecting combustible gases to prevent explosions
Detecting CO to prevent poisoning



To monitor concentrations of VOCs and CO discharged from the drying oven



2-3: Coating and drying (2)

Description: Paint is applied in various ways in coating and drying processes. The body is coated by electrodeposition or spray painting and dried in a drying oven.

Hazardous risks: Organic solvents used in the painting booth, drying oven, and deodorizing furnace may result in explosions or poisoning.

⇒ Detecting organic solvents to prevent explosions and poisoning

OUT side measurement after waste gas combustion treatment

Detecting solvents in painting booth



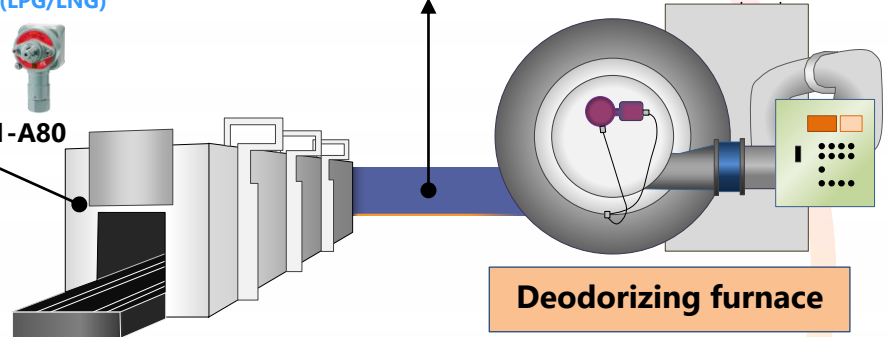
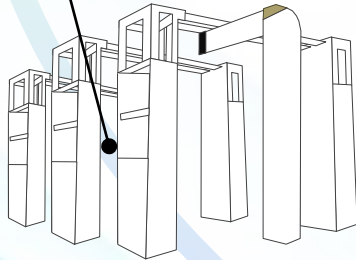
Detecting unburnt gas in drying oven (LPG/LNG)



IN side measurement before waste gas combustion treatment




Detecting burner leaks (LPG/LNG)



Painting booth



Drying oven

Multi-channel Gas Monitoring Systems
Model: RM-5000 series



The GD-A80 nameplate is blue.
Combustible/Toxic Gas Detector Heads
Model: GD-A80 series



Smart Transmitter/Gas Detector
Model: SD-1RI



Optical Interferometric Gas Analyzer
Model: FI-800



Portable Multi Gas Detector
Model: GX-6000



Safety



Four Gas Personal Monitor
Model: GX-2009

Environmental measurements before work

Personal gas detector for workers

2-4: Casting

Description: A casting machine is used to produce engines and other cast products. In a casting machine, fuel is supplied from the gas supply unit to the melting furnace to melt aluminum.

Hazardous risks: **LPG supplied to the casting machine may cause explosions. Oxygen deficiencies may occur in the underground pit.**

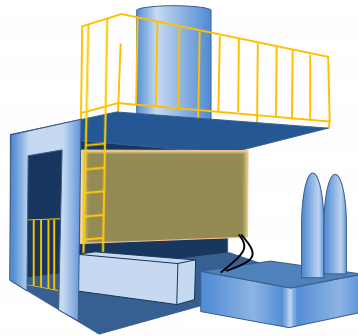
⇒ **Detecting organic solvents to prevent explosions and poisoning**

Casting machine control panel

O₂, CO, and LPG indicator

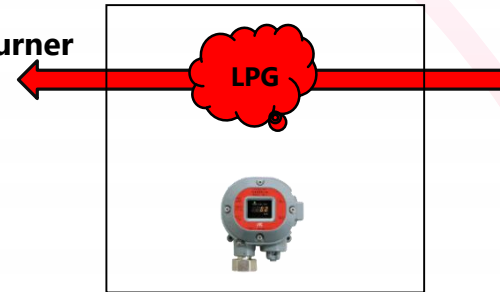


Casting machine



Gas supply unit

To burner



Detector head for oxygen deficiencies



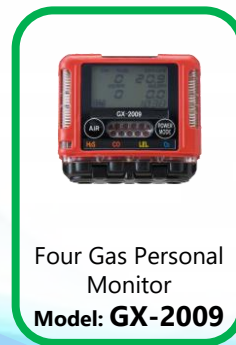
Detector head for CO



Detector head for LPG



Personal gas detector for workers



Underground pit

2-5: Heat treatment

Description: Automotive parts are heat-treated in the heat treatment process.

Hazardous risks: Explosions or poisoning may occur in heat treatment furnaces in which gases including LPG, LNG, and NH₃ are used.

⇒ Detecting combustible gases to prevent explosions
Detecting NH₃ to prevent poisoning

LPG and NH₃ indicators

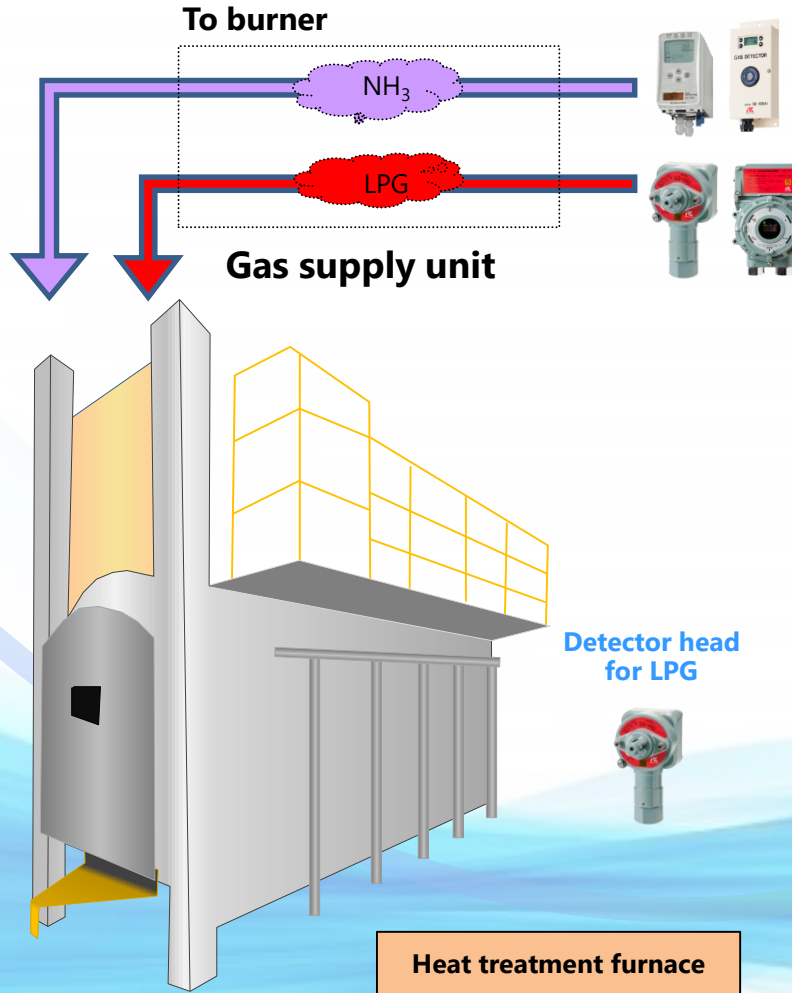


Multi-channel Gas Monitoring System
Model: GP-5001 (for LPG)
Model: RM-5003 (for NH₃)



Combustible Gas Detector
Model: GP-147

Heat treatment furnace control panel



Detector heads for NH₃



Smart Transmitter/
Gas Detector
Model: GD-70D



Toxic Gas Detector
Head
Model: GD-K88Ai

Detector heads for heat source (LPG/LNG)



Combustible Gas
Detector Head
Model: GD-A80



Flame-proof
Suction Type Gas
Detector
Model: GD-D58

Personal gas detector for workers



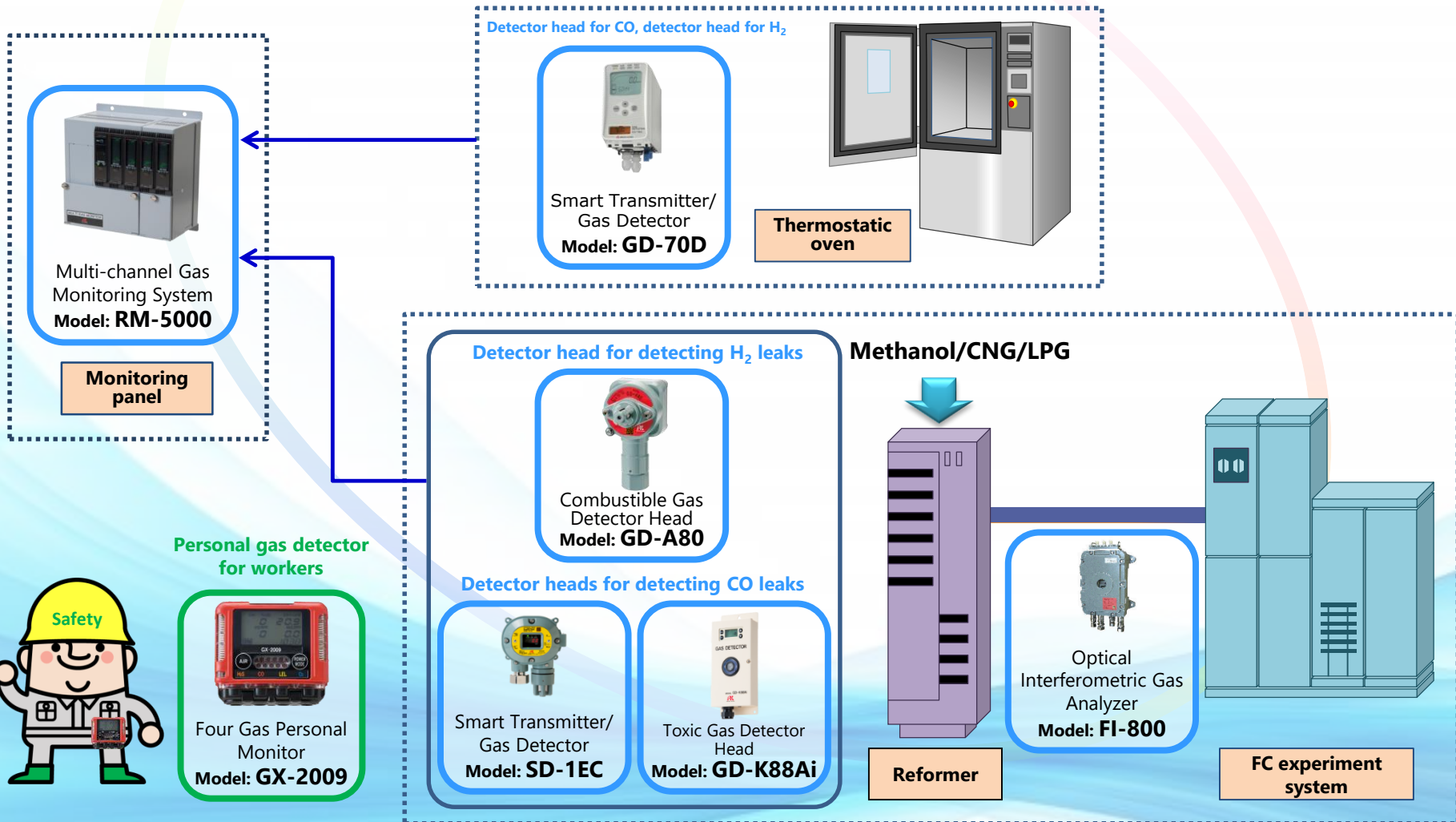
Four Gas Personal
Monitor
Model: GX-2009



3. Laboratory

Description: In laboratories, various parts are tested in thermostatic ovens and other equipment. FC experiment systems and reformers are also tested.

Hazardous risks: H₂ and fuel leaks from the FC experiment systems and reformers during experiments may cause explosions. The CO in the exhaust gas may lead to poisoning. ⇒ Detecting H₂ and other combustible gases to prevent explosions
Detecting CO to prevent poisoning



4. Engine laboratory and environmental testing laboratory

Description: Various tests are performed in engine and environmental testing labs, including engine experiments using actual vehicles and environmental tests.

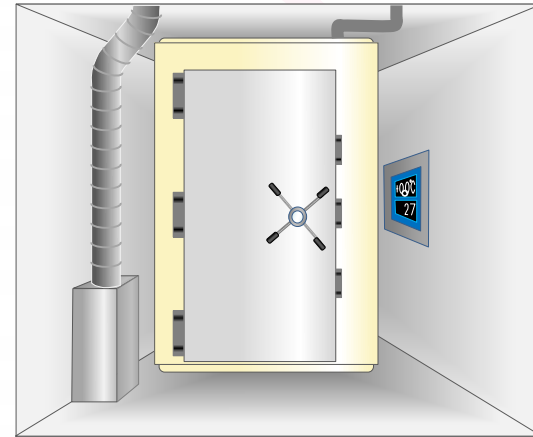
Hazardous risks: Fuel leaks from vehicles during tests in engine and environmental testing labs may cause explosions. CO in exhaust gas may lead to poisoning.

⇒ **Detecting combustible gases to prevent explosions**
Detecting CO to prevent poisoning

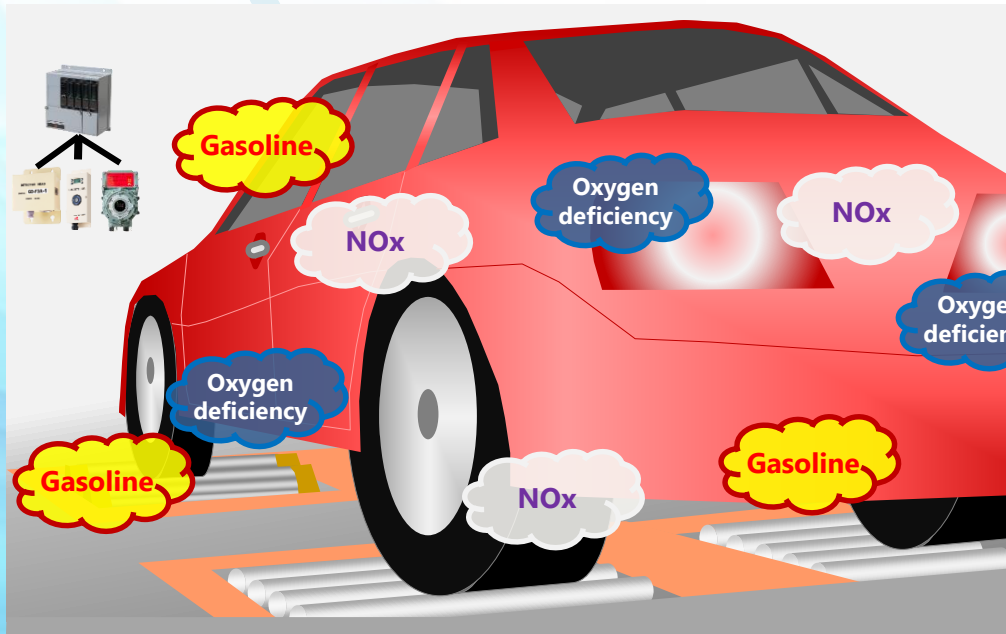
Diffusion type detector head for oxygen deficiencies

Diffusion type detector head for NOx

Suction type detector head for gasoline



Environmental testing laboratory



To detect residual gases before entering laboratory

To detect gasoline



5. Vehicle testing laboratory

Description: Driving tests are performed in the vehicle testing lab using actual vehicles.

Hazardous risks: Fuel leaks from the vehicle during tests in the vehicle testing laboratory may cause explosions. CO in the exhaust gas may lead to poisoning.

⇒ Detecting combustible gases to prevent explosions
Detecting CO to prevent poisoning

Detector heads for CO

Detector heads for HC

Detector head for H₂



Multi-channel Gas Monitoring System
Model: RM-5000

Monitoring panel



Smart Transmitter/
Gas Detector
Model: SD-1EC



Toxic Gas Detector
Head
Model: GD-K88Ai



Combustible Gas
Detector Head
Model: GD-A80



Smart Transmitter/
Gas Detector
Model: SD-1

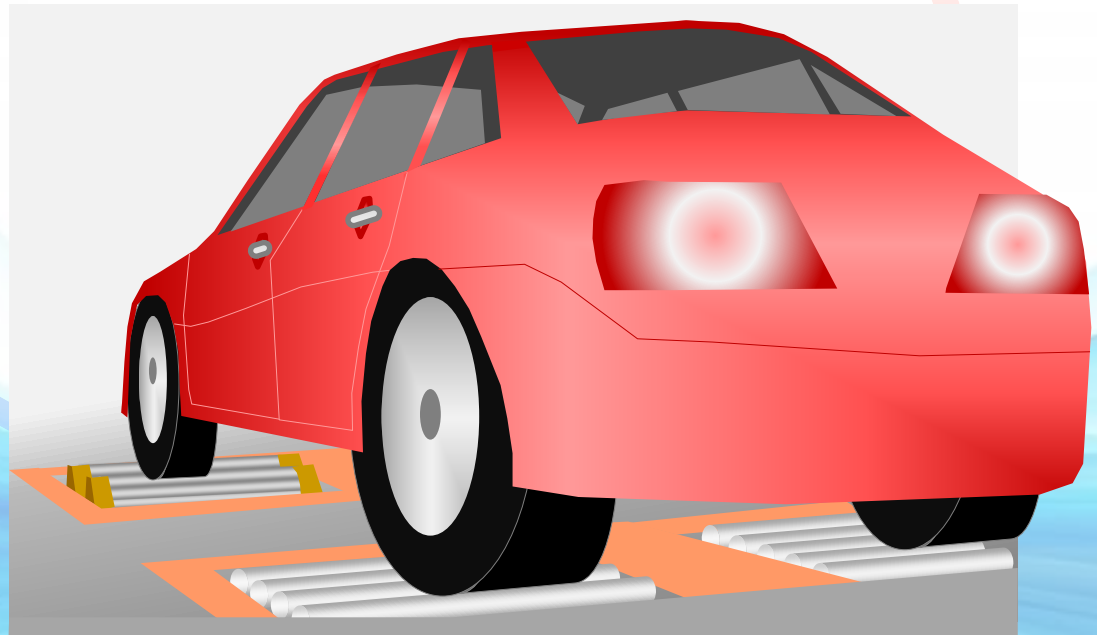


Flame-proof
Suction Type Gas
Detector
Model: GD-D58

Personal gas
detector for workers



Four Gas Personal
Monitor
Model: GX-2009

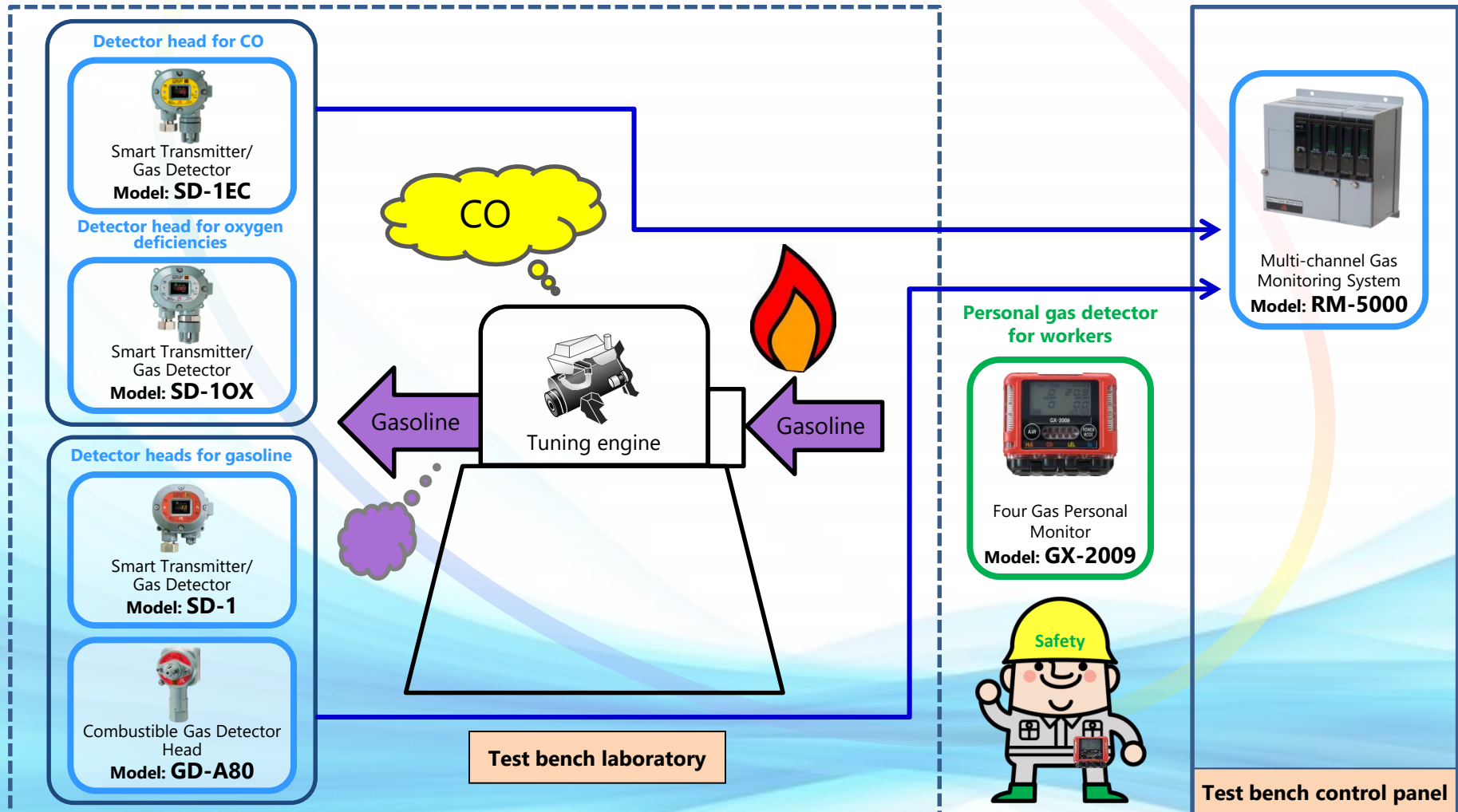


6. Test bench

Description: Performance and durability tests of a tuning engine are performed in the test bench lab.

Hazardous risks: Engine fuel leaks can generate combustable gases and may cause explosions.
CO in the exhaust gas from engine combustion may lead to poisoning.
Oxygen deficiencies may occur during work in a closed space (for example, underground pits).

⇒ Detecting combustable gases to prevent explosions
Detecting CO to prevent poisoning
Detecting oxygen concentration to prevent oxygen deficiencies



7. Lithium battery production

Description: Lithium battery production processes involve electrode coating and electrolyte injection.

Hazardous risks: Electrode coating processes can generate explosive NMP (N-methylpyrrolidone). Electrolyte injection processes can generate explosive DMC (dimethyl carbonate). Such gases may explode or generate oxygen deficiencies.

⇒ NMP and DMC detectors to prevent explosions
Measuring oxygen concentration to prevent oxygen deficiencies

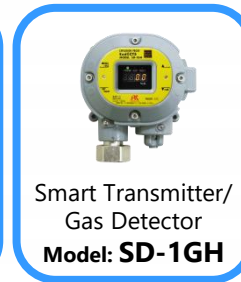
Personal gas detector
for workers



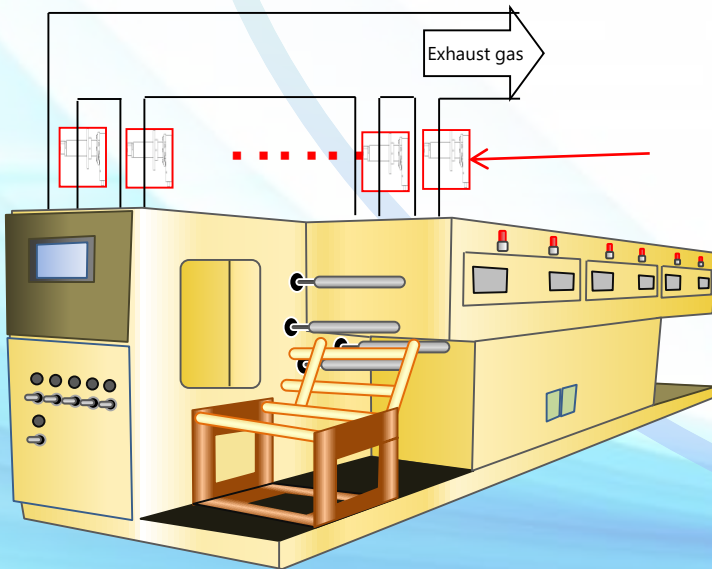
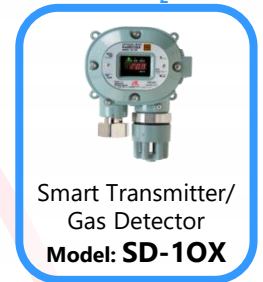
Environmental measurements
before work



Detector heads
for DMC



Detector head
for O₂

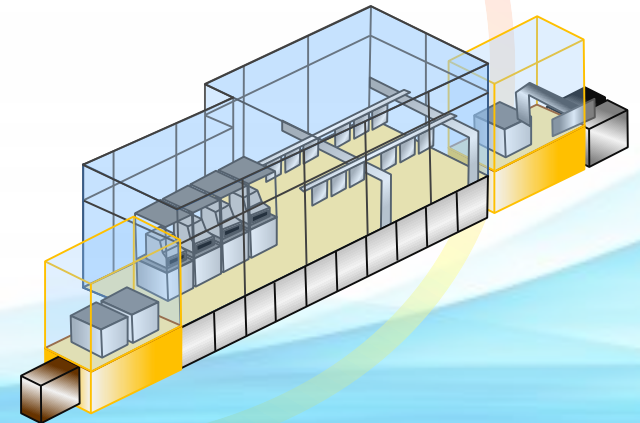


Electrode coating

NMP monitor



Detector head
for NMP



Electrolyte injection

8. Heating furnace

Description: Heating furnaces are used to heat steel materials in automobile manufacturing.

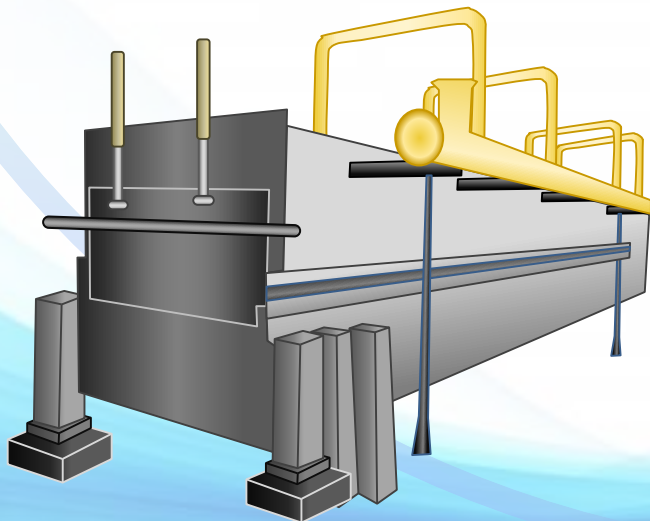
Hazardous risks: Since fluctuations in the calorific value of the supplied fuel affect burner performance significantly, the calorific value must be controlled. Fuel (LNG) leaks and CO generation near the heating furnace may lead to explosions or poisoning.

⇒ **Controlling calorific value with a calorimeter**
Detecting CO to prevent poisoning
Detecting combustible gases to prevent explosions

[Background of adoption]
 Particularly in countries other than Japan, LNG is purchased from multiple suppliers. Use of shale gas and other fuels is expected to increase in the future. Since fluctuations in calorific value affect burner performance significantly, OHC is also installed in the heating furnace to control calorific value.



Explosion-proof
Calorimeter
Model: **OHC-800**
(for LNG)



Gas supply facility

LNG

To burner

Heating furnace

Heating furnace
control panel



Multi-channel Gas
Monitoring System
Model: **RM-5000**
(for CO/LPG)



Combustible Gas
Detector
Model: **GP-147**
(for LNG)

Detector heads for CO around furnace



Smart Transmitter/
Gas Detector
Model: **SD-1EC**



Toxic Gas Detector
Head
Model: **GD-K88Ai**

Detector heads for LNG around gas supply facility and furnace



Combustible Gas
Detector Head
Model: **GD-A80**



Smart Transmitter/
Gas Detector
Model: **SD-1**

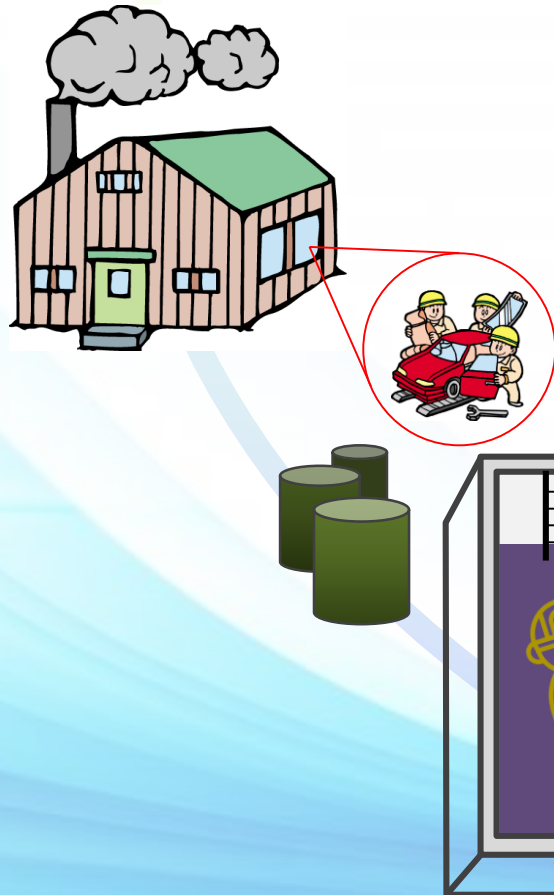


Flame-proof
Suction Type Gas
Detector
Model: **SD-D58**

Major Examples of Accidents

Prepared by extracting and processing materials from the Safety at Work Site (Ministry of Health, Labour and Welfare: <http://anzeninfo.mhlw.go.jp/index.html>)

Case of acute organic solvent poisoning during cleaning of degreasing tank with trichloroethylene



[Location of accident]

Trichloroethylene cleaning tank in a factory polishing automotive parts and providing metal surface treatment

[Cause of accident]

A worker who entered the trichloroethylene tank to remove deposits from the inner wall with waste cloth soaked with trichloroethylene was found to have collapsed in a crouching position on the stand in the trichloroethylene tank.

[Damage/injuries]

The worker was rescued immediately and transferred to the hospital. However, he died the next day without regaining consciousness.



Wearing gas detectors on a routine basis enables early detection of toxic gas leaks and improves work safety.

Case of organic solvent poisoning during cleaning of paint film removal/cleaning tank for painting jigs for automotive parts

[Location of accident]

Removal/cleaning tank for painting jigs in an automotive parts manufacturing plant

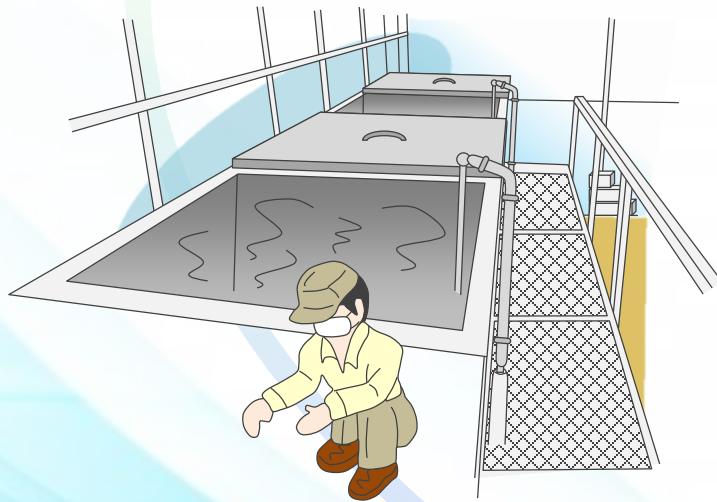
[Cause of accident]

The victim entered the removal/cleaning tank at around 3:30 pm on the day of the accident to remove paint film sludge.

He entered the bottom of the tank and gathered and discharged sediment from the tank. He was poisoned around 4:10 pm after discharging sediment three times.

[Damage/injuries]

When the victim was found, he was found crouching and unconscious in the bottom of the washing tank. He was taken to the hospital by ambulance, treated, and regained consciousness approximately 2 hours and 10 minutes after the incident.



Wearing gas detectors on a routine basis enables early detection of toxic gas leaks and improves work safety.

Product Information



RIKEN KEIKI



GP-03

(For combustible gases)

OX-03

(For oxygen)

HS-03

(For hydrogen sulfide)

CO-03

(For carbon monoxide)

Personal Single Gas Monitors

Model: 03 series

Features

- Models for use with rechargeable batteries have been added to the product line.
- Standard protective covers protect the main unit from scratches, dirt, and shock.
- Compact, lightweight design doesn't interfere with work.
- Inherently safe and explosion-proof enclosure is ideal for use in hazardous locations.



RIKEN KEIKI



Features

- Suitable for use as an explosion-proof product, even in a hydrogen/acetylene atmosphere
- IP 67 equivalent protection for safe use in outdoor work
- Three alarm lamps and two alarm buzzers oriented in different directions to alert both the operator and those in surrounding areas
- 95+ dB buzzer audible even in the noisiest surroundings
- Simultaneous display of gas concentrations of four components on large LCD screen
- Also equipped with clock display and data logger functions

Four Gas Personal Monitor

Model: GX-2009

Portable Multi Gas
Detector

**Model:
GX-6000**



Features

- A single unit can simultaneously display up to six types of gases, including VOCs. This is the first product of its kind from a Japanese manufacturer.
- The PID sensor enables measurements of more than 200 types of chemical substances subject to regulation.
- Ideal for checking the risks and hazards of chemical substances as required under the Industrial Safety and Health Act
- Support for multilingual display (Japanese, English, French, Spanish, etc.)
- Equipped with convenient new functions, including panic alarm and LED flashlight



Portable Combustible Gas Detector

Model: GP-1000

Features

- A single unit with a gas type switching function can detect 25 types of combustible gases.
- The intrinsically safe explosion-proof enclosure (explosion-proof rating: Exia II CT4) enables measurement in Zone 0 Hazardous Areas at continuous risk of explosions.
- Protection rating equivalent to IP 67 ensures secure outdoor work.
- Once a cartridge-type filter (available separately) is attached to the standard probe, the probe can be customized for hydrogen sulfide removal or silicon removal based on the measurement environment.



RIKEN KEIKI



GD-A80

(For combustible gases)



GD-A80V

GD-A80S*

(For combustible or toxic gases)

* The GD-A80S nameplate is blue.

Combustible/
Toxic Gas Detector Heads

Model:

GD-A80 series

Features

- Explosion-proof rating Exd II CT4 allows use in hydrogen and acetylene atmospheres.
- Suction type and aspirator suction type operations are supported.
(* A pump unit and a power supply [available separately] are required.)
- The GD-A80-70 is also provided as a combustible gas detector head for use in high-temperature environments up to 70°C (normally 53°C).



RIKEN KEIKI



SD-1

SD-1RI

(For combustible
gases)

SD-1GH

(For combustible/
toxic gases)

SD-1EC

(For carbon monoxide/
hydrogen sulfide)

SD-10X

(For oxygen)

Smart Transmitter/
Gas Detectors

Model: SD-1 series

Features

- Suitable for use as an explosion-proof product, even in a hydrogen/acetylene atmosphere
- Waterproof/dustproof enclosure (IP 65 equivalent) allows deployment in severe environments.
- Supports HART Communication Protocol, allowing transmission of more information over legacy analog 4-20 mA connection.
 - * Excluding SD-1 (TYPE NC)
- SD-1RI, SD-1EC, and SD-10X are SIL 2 certified in all parts of the functional safety standard, marking a first for Japanese manufacturers.
- Using the suction cap for the SD-1 series and connecting the detector to a suction pump or an aspirator unit enables suction type operation.



RIKEN KEIKI



SD-2500

(With concentration display)

GD-A2400

(Without concentration display)

Features

- Detects high-boiling point solvent, N-methyl-2-pyrrolidone (NMP), evaporated in a dry facility.
- Direct insertion into the furnace allows accurate measurements of concentrations at the center of the exhaust duct.
- The furnace insertion section can be used in temperatures ranging from 0°C to + 160°C
- The SD-2500 features an integrated structure combining the main unit and display unit, eliminating the need for a dedicated indicator unit.
- Easy, straightforward operation by applying the control key

Flame-proof Furnace Safety Monitor

Model: SD-2500

Model: GD-A2400



RIKEN KEIKI



SD-D58

(With concentration indicator)



GD-D58

(Without concentration indicator)

Features

- Suitable for use as an explosion proof product even in hydrogen atmospheres
- Equipped with automatic flow rate abnormality detection function
- Integrated assemblies of replacement parts improve maintainability.
- Dustproof/waterproof enclosure (IP 67 equivalent)
- One-person maintenance possible

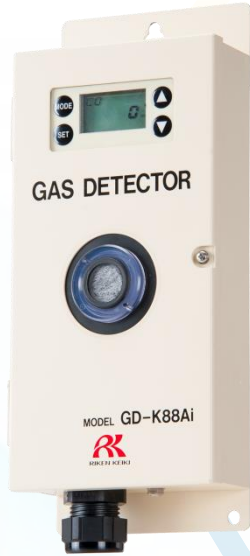
Flame-proof Suction Type Gas Detector

Model : SD-D58

Model : GD-D58



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[Diffusion type]

GD-K88Ai (for toxic gases)

GD-F88Ai (for oxygen)

[Suction type]

GD-K88Di (for toxic gases)

GD-F88Di (for oxygen)

Intrinsically safe explosion-proof enclosure
Oxygen/Toxic Gas Detector Heads

Model: GD-88 series

Features

- Two-wire gas detector head
Allows direct transmission to the control system.
- Equipped with pressure correction sensor resistant to changes in atmospheric pressure (GD-F88Ai, GD-F88Di)
- Built-in aspirator (optional)
Conventional external unit replaced by built-in unit (GD-K88Ai, GD-K88Di)
- Corrosive gas resistant enclosure
SUS enclosure available if requested by customer
- Intrinsically safe explosion-proof enclosure combined with barrier



Features

- Compact, lightweight design allows installation anywhere.
- Drip-proof enclosure allows installation outdoors.
- The easily installed GD-F3A-SC-A is equipped with a signal converter for 4 mA to 20 mA transmission. Also allows long-distance transmission (up to 2.0 km).

Oxygen Gas Detector Head

Model: GD-F3A-A



Features

- No warmup required
- Fast response
- Long-term stability
- Simple operation with easy-to-read digital display
- No sensitivity degradation in the presence of silicone
- Equipped with temperature and atmospheric pressure correction functions

Optical Interferometric Gas
Analyzer

Model: FI-800



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Explosion-proof Calorimeter

Model: OHC-800

Features

- Incorporates Riken Keiki's unique "optsonic" calculation method (Japanese Patent No. 518483). Resistant to influence from incombustible gases for high-precision measurements
- Fast response at 90% response within 5 seconds
- High repetition accuracy within ± 0.02 MJ/m³
- Hydrogen explosion-proof enclosure (Exd IIB + H₂T4) required for calorimeters allows installation in dangerous areas.
- Excellent temperature characteristics, with temperature change of 0.10 MJ/m³ or less per day
- Calorific value/specific gravity/Wobbe index switchable with key operation, eliminating troublesome calculations



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Features

- Adopts universal design independent of detection principle to allow shared use of the main unit.
- Power consumption reduced by 20% compared to past models (for constant potential electrolysis type)
- Reusable parts
- Allows recycling of constituent materials to reduce environmental impact.
- Design complies with various international regulations.
- Complies with CE requirements under RoHS Directive.

Smart Transmitter/Gas Detector

Model: GD-70D



Features

- Easy-to-read three-color LCD display recognizable from a distance
- Single-point indicator/alarm unit
- Lock-in specification selectable (optional)
- RS-485 communication support (optional)

Single-Channel Gas Monitors

Model:
RM-6000 series



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Features

- Option to use a back-up power supply can be selected individually for each detector head.
- Capable of leak monitoring at hydrogen stations
- Capable of early detection of hydrogen leaks (ppm) and explosion prevention (% LEL)
- Improved visibility with green and red two-color LCD and bar meter display
- Gas leaks and failures indicated by voice alarms (optional)

Combustible Gas Detector

Model: GP-147



Features

- Many types of gas detector heads available
- Gas concentrations are displayed in two ways: bar meter and digital display
- High-contrast three-color LCD improves visibility of detected state.
- Equipped with RS-485 communication function (optional)

Multi-channel Gas Monitoring Systems

Model:

RM-5000 series



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Features

- Equipped with photoionization detector (PID) optimum for VOC detection
Support for three measurement ranges (0-10/100/1,000 ppm)
Sensor structure resists effects of humidity and keeps foreign materials away from lamp.
Measurement cycles configurable up to 5 minutes and 50 seconds at intervals of 10 seconds (Default: 1 minute)
- Various functions with high working efficiency
Easily installed in control system (4-20 mA output)
Switchable type (RVOC-10s) models are available.

Fixed PID VOC Monitor

Model: RVOC

International Agents



RIKEN KEIKI

International Agents



North America

South America

Asia and Pacific

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Europe

Middle East

Africa

International agents (table of contents)

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THE NETHERLANDS

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Turkey

U.K.

Middle East

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Israel

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MS. HIDEKO NAKAYAMA

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PERSON : Mr. German Rosas
WEBSITE : <http://preventgas.com.ar/>

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PERSON : Mr. Max Muñoz Moran

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PERSON : Alejandra Palominos (Marketing Manager)
WEBSITE : <http://www.electronicmarine.cl>

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microsur

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FAX : 598-2410-1128

E-MAIL : microsur@microsur.org

PERSON : Dra.Nermys Hernandez

WEBSITE : <http://www.microsur.org>

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COMMERCIAL BUILDING NO.55, LINPING N.ROAD, HONGKOU DISTRICT,
SHANGHAI, 200086 CHINA

SALES DEPARTMENT OFFICE : ROOM1106 DALIAN LEE WAN HOTEL NO.8,
MINZHU SQUARE, ZHONGSHAN DISTRICT, DALIAN, LIAONING, 116001
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FAX : 86-411-8212-3833

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dl101@rkkc.net (Ms. Qu shuai)
dl102@rkkc.net (Ms. Xu fei)

WEBSITE : <http://www.rikenkeiki.asia>

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ADDRESS : 23, HWAJEONSANDAN 2-RO 134,
GANGSEO-GU, BUSAN, 46741 KOREA
TEL : 82-51-712-9900 FAX: 82-51-518-7736
E-MAIL : master@rikenkeiki.co.kr PERSON: MR.SUN-GU,LEE
WEBSITE :
(KOREAN) <http://rikenkeiki.co.kr/bn/>
(ENGLISH) <http://rikenkeiki.co.kr/bn/english/>

HIGH INTEGRATED TECHNOLOGY, INC.

ADDRESS : 72, SEGYOSANDAN-RO, PYEONGTAEK-SI,
GYEONGGI-DO, 17843, KOREA
TEL : 82-31-650-7000 FAX: 82-31-650-7007
E-MAIL : info@hitinc.co.kr PERSON: MR.HYUNG-SIL, KIM
WEBSITE :
(KOREAN) <http://www.hitinc.co.kr/>
(ENGLISH) http://www.hitinc.co.kr/?strMode=company_e/company



International agents (TAIWAN)

RIKEN KEIKI TAIWAN CO., LTD. HEAD OFFICE

ADDRESS : NO.87, YANGMING RD., SHANHUA JEN, TAINAN, 741, TAIWAN
TEL : 886-6-581-1224
FAX : 886-6-581-1250
E-MAIL : episys@ms22.hinet.net
PERSON : MR. SEITARO TAKAHASHI (PRESIDENT)
WEBSITE : <http://www.rikenkeiki.com.tw/admin/news/front/news.php>

RIKEN KEIKI TAIWAN CO., LTD. TAICHUNG BRANCH

ADDRESS : NO.2, ALY.14, LN.150-30, SEC.3, XITUN RD., XITUN DIST., TAICHUNG CITY 407,
TAIWAN
TEL : 886-4-2462-5386
FAX : 886-4-2462-5508
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PERSON : MR. WU WEN CHENG

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R K INSTRUMENTS (S) PTE LTD

ADDRESS : 102F PASIR PANJANG ROAD #03-11, CITILINK WAREHOUSE COMPLEX
SINGAPORE 118530

TEL : 65-6275-3398

FAX : 65-6275-3387

E-MAIL : rk@rkinstruments.com.sg

PERSON : MR. BERNARD QUEK (PRESIDENT)

WEBSITE : <http://www.rkinstruments.com.sg/>



International agents (MALAYSIA)

KINETICS SYSTEMS MALAYSIA SDN. BHD.

ADDRESS : 12A, JALAN RINGGIT 23/11 , SECTION 23, 40300 SHAH ALAM, SELANGOR
DARUL EHSAN MALAYSIA

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FAX : 603-5542-2289

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PERSON : MR. CHOOI CHOON KEET
(GENERAL MANAGER)

WEBSITE : <http://www.kinetics.net/>



International agents (INDONESIA)

PT. PRATAMA GRAHA SEMESTA

ADDRESS : KOMPLEKS LODAN CENTER BLOK H-11 JL. LODAN RAYA NO.2 ANCOL - PADEMANGAN
JAKARTA UTARA 14430 INDONESIA

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FAX : 62-21-6900657

E-MAIL : sales@ptpgs.co.id

PERSON : MR. FRENGKY TOMBOKAN



PT. CENTRADINDO UNITRAS (FOR PERTAMINA & MARINE SECTOR)

ADDRESS : COMPLEX PERKANTORAN DUTA HARAPAN INDAH JL. KAPUK MUARA RAYA BLOK SS
NO.3 JAKARTA UTARA 14460 INDONESIA

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FAX : 62-21-6623594

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TAIYO GASES CO., LTD.

ADDRESS : 17TH FLOOR SERM-MIT TOWER, 159 SUKHUMVIT 21 ROAD, NORTH
KLONGTOEY, WATTANA, BANGKOK 10110 THAILAND

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FAX : 66-2-260-2690

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VIKHROLI(W) MUMBAI-400 083 INDIA

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FAX : 91-22-6796-9991

E-MAIL : tritec@vsnl.com

PERSON : MR. NARESH SHARMA MR. JIGNESH SHAH

WEBSITE : <http://www.tritech.in/>



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E-MAIL : info@vina-gasdetector.vn

PERSON : MR. CAO MINH LOI (Director)

WEBSITE : <http://vina-gasdetector.vn/>



International agents (PHILIPPINES)

PILIPINAS TRADE GAS, INC. (PTGI)

ADDRESS : 23RD FLOOR ONE CORPORATE CENTER DONA JULIA VARGAS AVE.,
CORNER MERALCO AVENUE, ORTIGAS CENTER PASING CITY,
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PERSON : MR. S. HARA (PRESIDENT)
MR. GERRY C. GUECO (IN CHARGE)



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FAX : 61-7-3481-9088

E-MAIL : sales@controlequipment.com.au

PERSON : MR. GREG LOVE (GENERAL MANAGER)

WEBSITE : <http://www.controlequipment.com.au/>



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PERSON : MR. SHINTARO ONO(Managing Director)

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PERSON : MR. JOHN ZERVOUDAKIS

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PERSON : MR. SEBASTIAN KELDERMAN AND MR. MARKUS FRANK

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PERSON : MR. DAG MAARTMANN

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34420 ISTANBUL, TURKEY

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FAX : +90-212-243-5704

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FAX : +44 1296 624955

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PERSON : MR. R.H.C. WORTHINGTON

WEBSITE : <http://weatherall-uk.com/>



International agents (U.A.E.)

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FAX : +971-4-5519973

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I.S.L. ENTERPRISES (PTY) LTD.

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FAX : +27-21-930-2043

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E-MAIL : tairiku@tairiku-trading.co.jp

PERSON : MR. MORITA

WEBSITE : <http://www.tairiku-trading.co.jp/?lang=en>

OOO"TAIRIKU MOSCOW LTD."

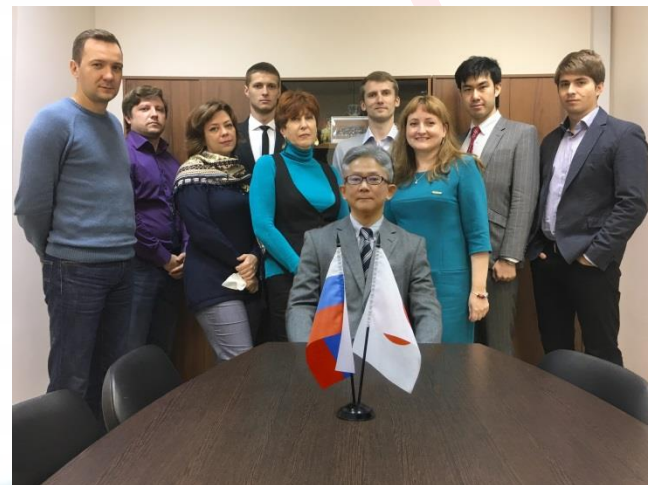
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PERSON : MR. ALPEEV M.A., (MANAGER)





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