



Applications in Paper Manufacturing 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 paper manufacturing market**
- **Major examples of accidents**
- **Product information**
- **International agents**

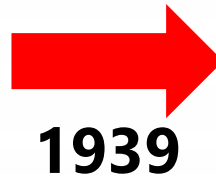


About Riken Keiki

About Riken Keiki



RIKEN

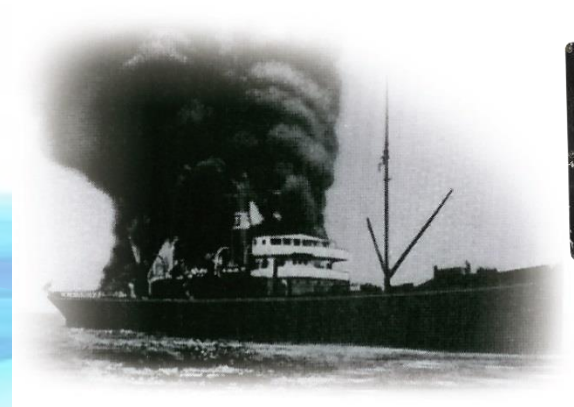


Riken Keiki



**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)

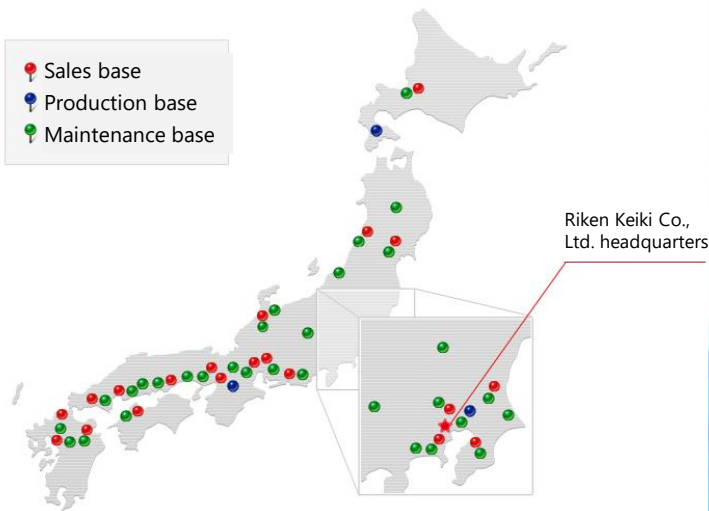


To be completed in September 2018
(conceptual drawing)

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).



RIKEN KEIKI

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

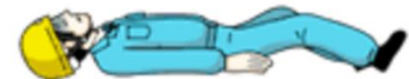
O2 Concentration
10% - 6%

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

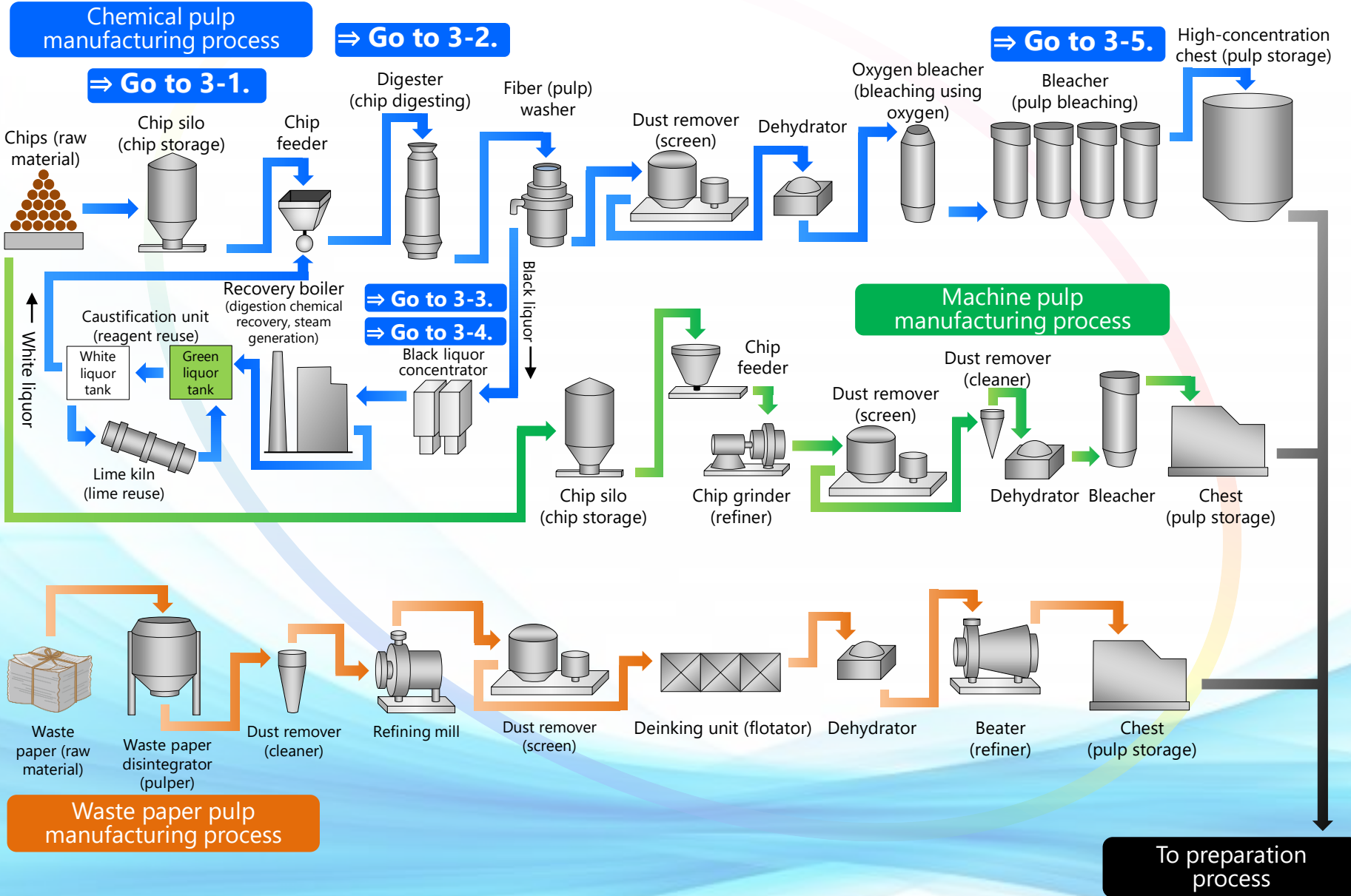
Concentration (ppm)	Effects and Toxicity
100	No noticeable effects even after breathing for a few hours.
200	A mild headache in around 1.5 hours.
400 - 500	Headache, nausea and ear ringing in around 1 hour.
600 - 1000	Loss of consciousness in around 1- 1.5 hours.
1500 - 2000	Headache, vertigo and disabling 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 Paper Manufacturing Market

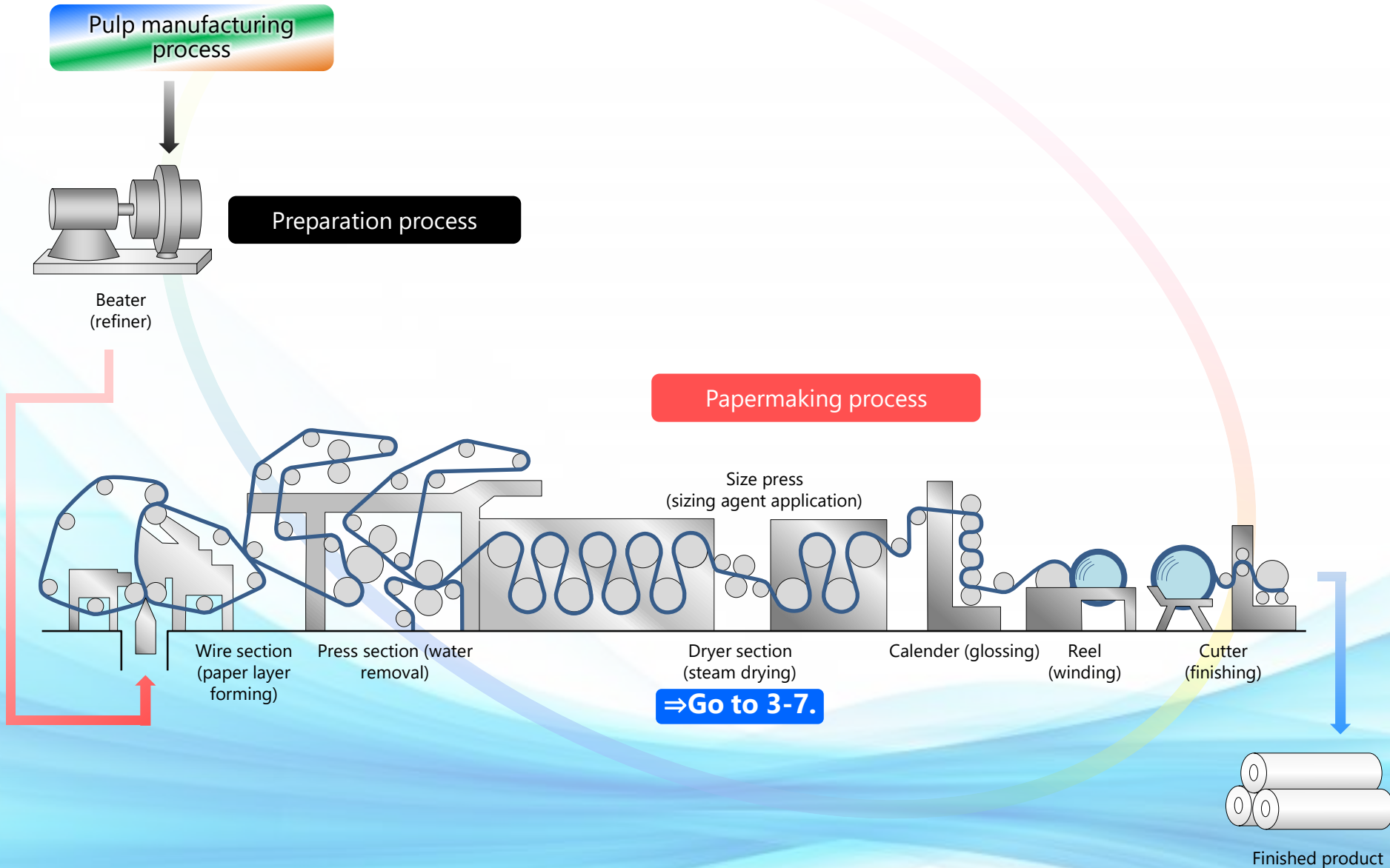
Applications in paper manufacturing market

- 1. Overview of processes for the paper manufacturing market (pulp manufacture)**
- 2. Overview of processes for the paper manufacturing market (preparation and papermaking)**
- 3. Details of individual processes for the paper manufacturing market**
 - 3-1: Chip silo**
 - 3-2: Digester**
 - 3-3: Ethanol manufacture**
 - 3-4: Recovery boiler**
 - 3-5: Bleacher (pulp bleaching)**
 - 3-6: Measurement of environmental parameters during pulp manufacturing process**
 - 3-7: Dryer section, solvent recovery unit, and deodorizer**
 - 3-8: Natural gas and LPG fueled boiler facility**

1. Overview of processes for the paper manufacturing market (pulp manufacture)



2. Overview of processes for the paper manufacturing market (preparation and papermaking)

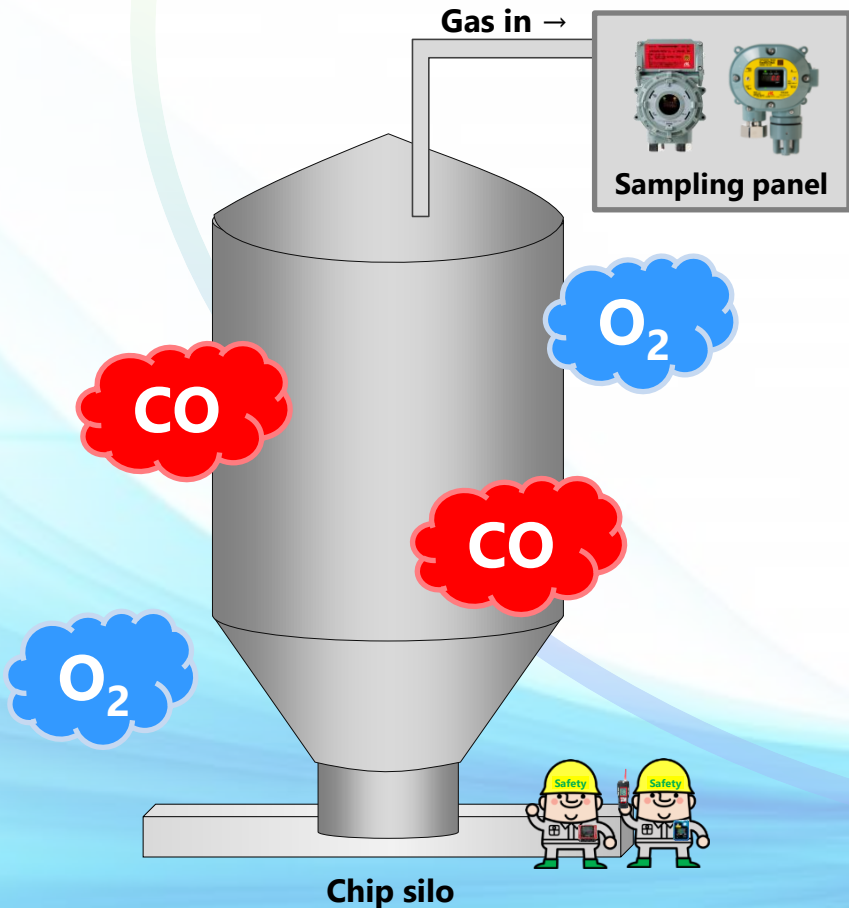


3-1: Chip silo

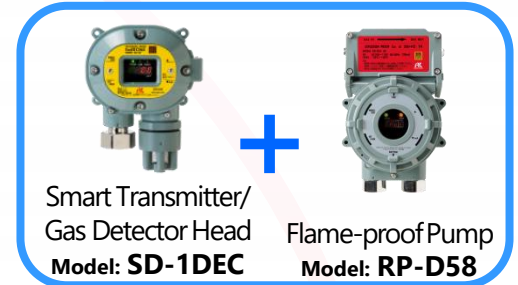
Description: The wood chips that make up the raw material for the pulp are temporarily stored in the chip silo.

Hazardous risks: Smoldering inside the enclosed chip silo poses oxygen deficiency and fire risks. The carbon monoxide (CO) generated by the smoldering poses poisoning risk.

⇒ Detecting CO to prevent fire and poisoning
Measuring oxygen concentrations to prevent oxygen deficiencies



Suction-type CO detector heads



Prework gas detectors



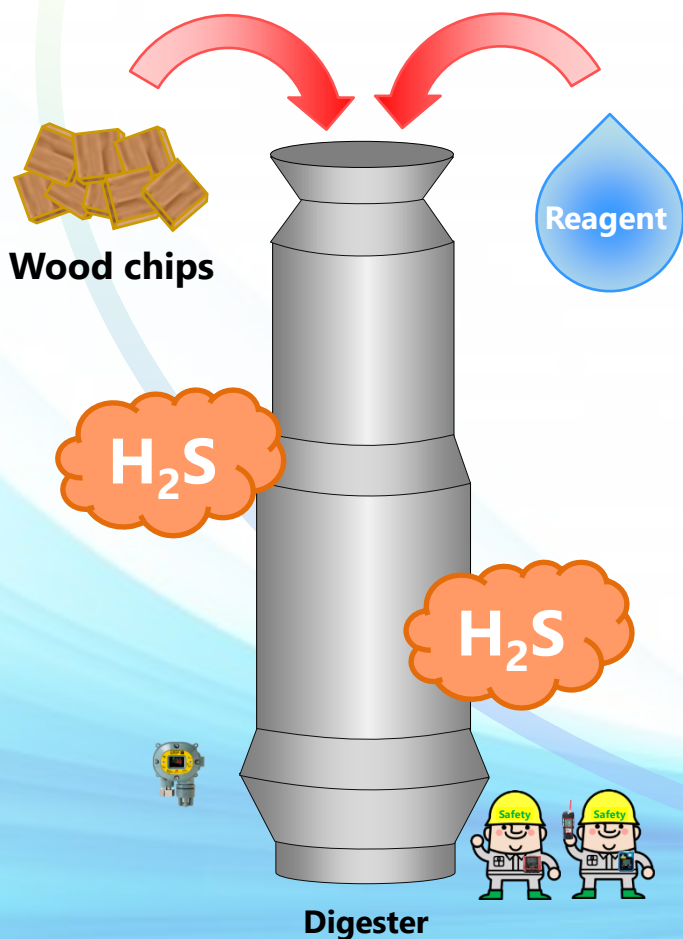
Personal gas detectors for workers



3-2: Digester

Description: Wood chips are supplied with the reagent to the digester and cooked at high temperature and pressure to extract the fibers (pulp). The main components of the reagents are caustic soda and sodium sulfide (Na_2S).

Hazardous risks: The Na_2S used to break down the wood chips poses poisoning risk due to the hydrogen sulfide (H_2S) generated by hydrolysis. ⇒ Detecting H_2S to prevent poisoning



H₂S detector head



Prework gas detectors



H₂S detectors for workers

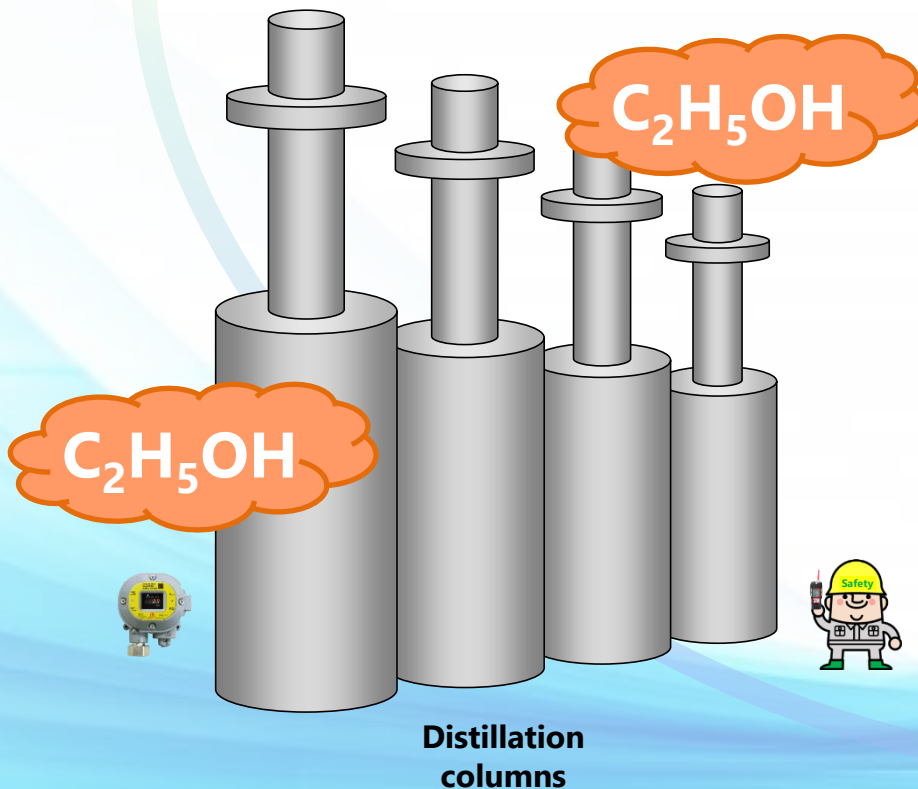


3-3: Ethanol manufacture

Description: The fibers (pulp) are washed in the washer, where the waste liquid, known as black liquor, is removed. This black liquor contains dissolved lignin (constituent bonding the wood fibers together) and other components. The biofuel ethanol is manufactured from black liquor.

Hazardous risks: Ethanol (C_2H_5OH) leaks from ethanol manufacture pose explosion and poisoning risks.

⇒ Detecting C_2H_5OH to prevent explosions and poisoning



C_2H_5OH detector head



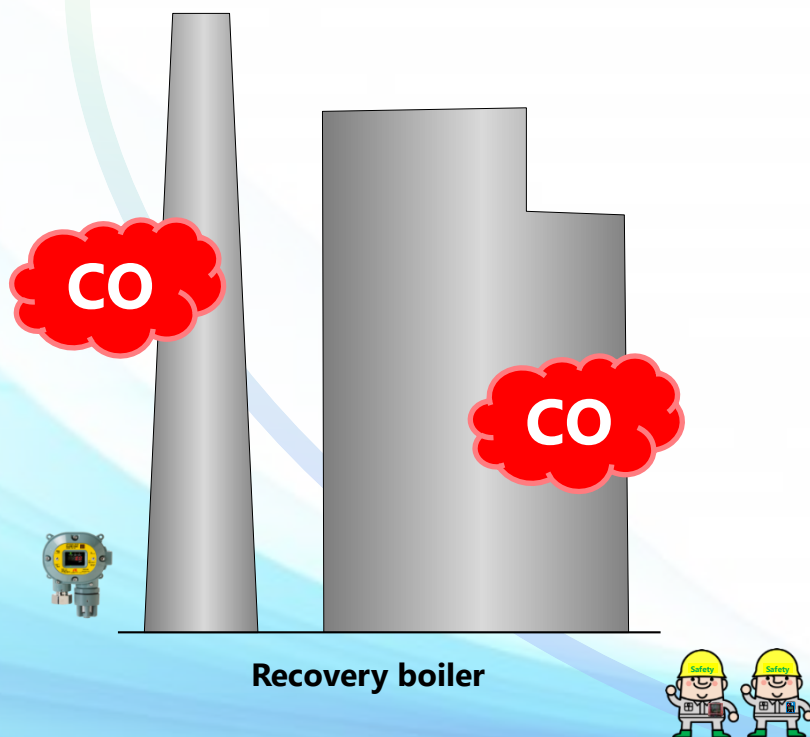
Prework gas detectors



3-4: Recovery boiler

Description: The black liquor produced after washing the fibers is concentrated in the concentrator, and the combustion in the recovery boiler generates steam of high temperature and high pressure.

Hazardous risks: Incomplete combustion inside the recovery boiler poses poisoning risk due to carbon monoxide (CO). ⇒ Detecting CO to prevent poisoning



CO detector heads



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



Indoor Carbon
Monoxide Monitor
Model: **EC-600**

CO gas detectors for workers



Personal Single Gas
Monitor
Model: **CO-03**



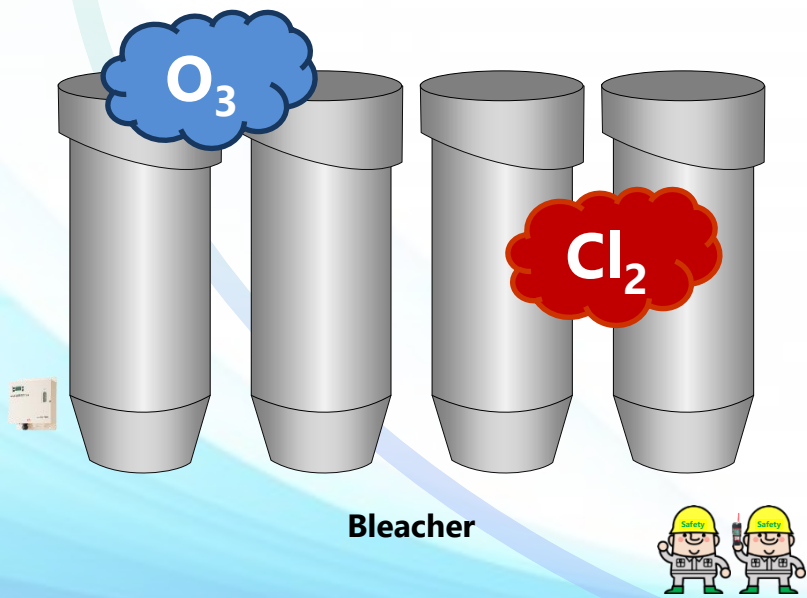
Four Gas Personal
Monitor
Model: **GX-2009**

3-5: Bleacher (pulp bleaching)

Description: Foreign matter such as sand and metal fragments are removed from the wood fiber by the dust removers (screen and cleaner) before additional bleaching in the bleacher. Bleaching involves chemicals such as chlorine dioxide (ClO_2), ozone (O_3), and chlorine (Cl_2).

Hazardous risks: Leaks of O_3 or Cl_2 used as bleaching agents pose poisoning risk.

⇒ Detecting O_3 and Cl_2 to prevent poisoning



O_3/Cl_2 detector heads



Prework Cl_2 detector



Prework Cl_2/O_3 detector



3-6: Measurement of environmental parameters during pulp manufacturing process

Description: The pulp manufacturing process generates four different odorous sulfur compounds: hydrogen sulfide (H_2S), methyl mercaptan (CH_3SH), methyl sulfide (C_2H_6S), and methyl disulfide ($C_2H_6S_2$).

Hazardous risks: The four sulfur compounds generated during pulp manufacture pose poisoning risk.

⇒ Detecting four sulfur compounds to detect odor sources and prevent poisoning

$CH_3SH/C_2H_6S/C_2H_6S_2$
detector head

H_2S detector head



Fixed PID VOC Monitor
Model: **RVOC**

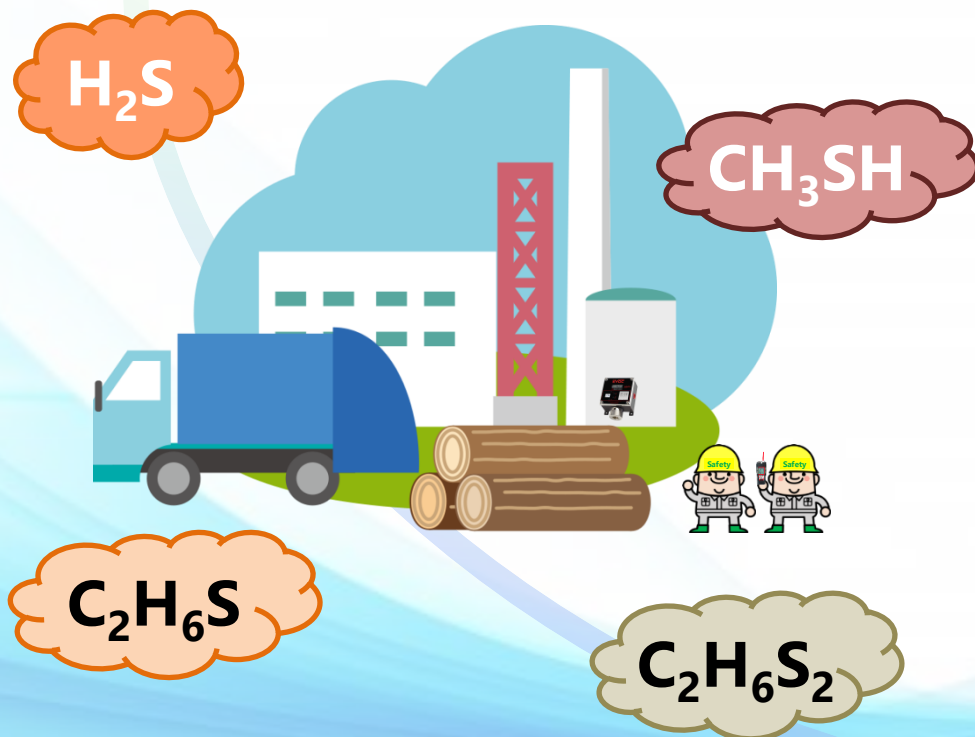


Highly Sensitive Toxic Gas Monitor
Model: **FP-300**

Prework $H_2S/CH_3SH/C_2H_6S/C_2H_6S_2$
detector



Portable Multi Gas Detector
Model: **GX-6000**



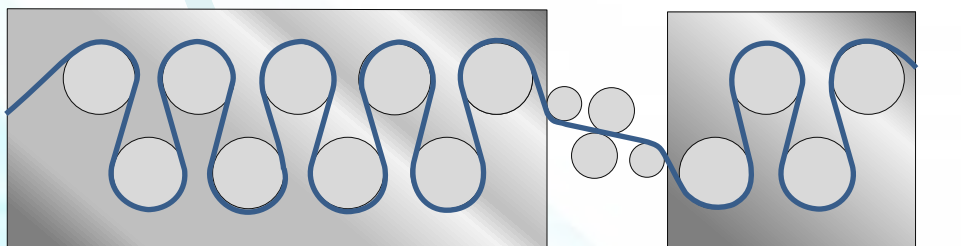
3-7: Dryer section, solvent recovery unit, and deodorizer

Description: In the dryer section (paper-drying process), the paper is brought into contact with steel cylinders heated by steam and dried to achieve the desired water content. This process also involves equipment used to recover solvents generated during the paper manufacturing process and a deodorizer.

Hazardous risks: The volatile organic compound (VOC) solvent gas generated when drying coated paper poses poisoning and explosion risks. Waste gas from the solvent recovery unit and deodorizer poses poisoning and explosion risks.

- ⇒ Measuring VOC to prevent poisoning and explosions
- ⇒ Preventing poisoning and explosions due to VOC and measuring source gas concentrations to improve efficiency

VOC



Dryer section

VOC

Prework VOC detectors



VOC detector heads

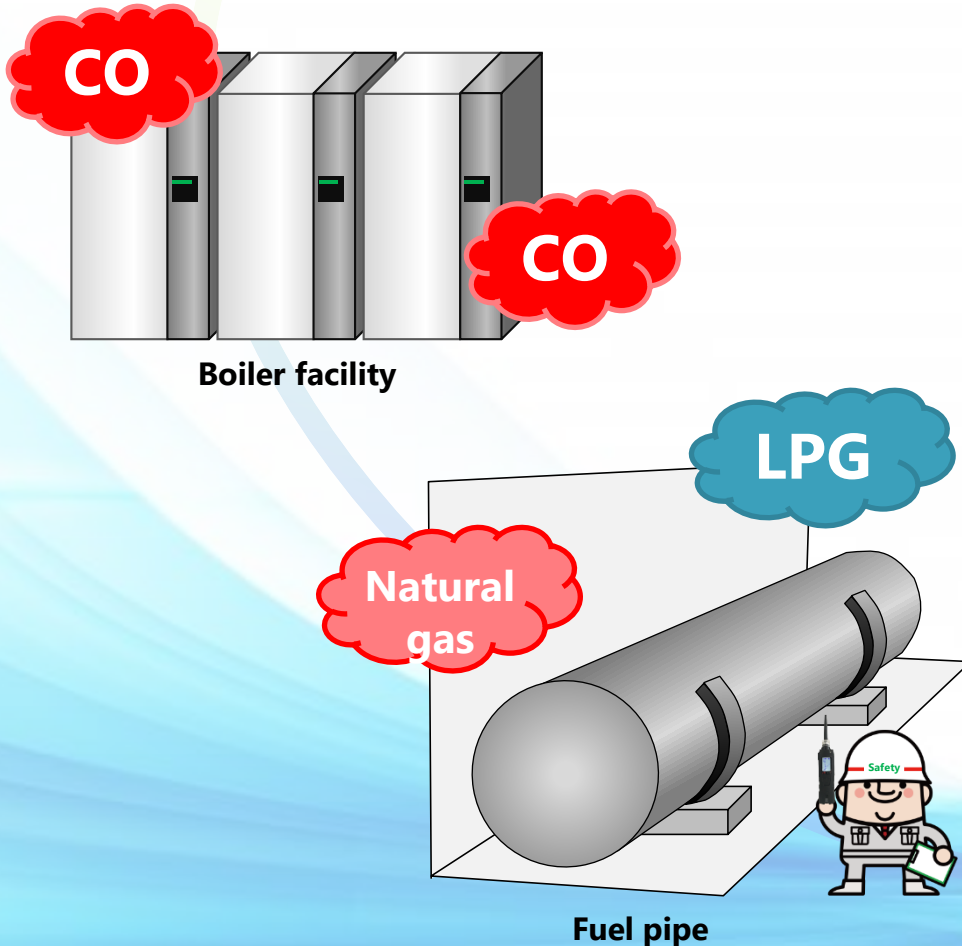


3-8: Natural gas and LPG fueled boiler facility

Description: Paper manufacturing plants may include a boiler facility fueled by natural gas or LPG.

Hazardous risks: The carbon monoxide (CO) generated by incomplete combustion inside the boiler facility poses poisoning risk. Leaks of natural gas or LPG from fuel pipes pose explosion risk.

- ⇒ Detecting CO to prevent poisoning
- ⇒ Detecting LPG leaks to prevent explosions



CO detector heads



Natural gas/LPG leak detector



CO gas detectors for workers



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 inhalation of chlorine dioxide gas vaporizing from wastewater in drain channel inside paper manufacturing plant

[Location of accident]

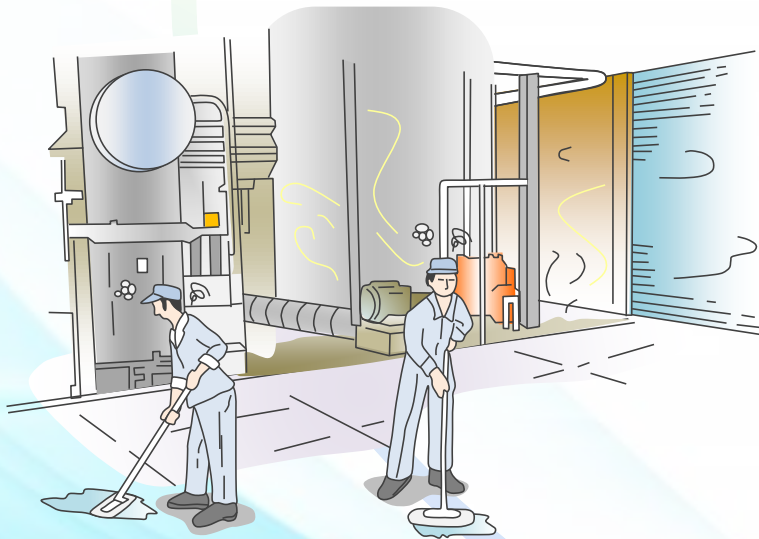
The accident occurred near a pulp liquid storage tank used in a pulp manufacturing process at a paper manufacturing plant.

[Cause of accident]

Chlorine dioxide vapors generated from wastewater draining during the bleaching process resulted in an incident as workers cleaned up pulp liquid sprayed from the top of the pulp liquid storage tank onto the floor on the first to third levels.

[Damage/injuries]

Workers reported feeling unwell and were administered oxygen after experiencing breathing difficulties. When their condition failed to improve, they were taken to the hospital. They were diagnosed with mediastinal emphysema and hospitalized.



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

Case of hydrogen sulfide poisoning at pulp manufacturing plant

[Location of accident]

The incident occurred near a dissolving tank at a pulp manufacturing plant.

[Cause of accident]

The alkali solution valve was closed to acid-wash the calcium carbonate buildup on the heater used to heat the alkali solution. Granulated sulfamic acid was added to warm water inside the dissolving tank to adjust the acid cleaning solution. The alkali solution valve was not fully closed during the washing procedure, allowing the sulfamic acid to react with the alkali solution and generating hydrogen sulfide. The worker and supervisor inhaled hydrogen sulfide and lost consciousness.

[Damage/injuries]

Both victims regained consciousness quickly but were taken to the hospital by ambulance. There, they were diagnosed with hydrogen sulfide poisoning.



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

Product Information



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

- Explosion-proof products that can be used in hydrogen/acetylene atmospheres
- 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 connections.
- * 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.



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SD-D58

(With concentration display)



GD-D58

(Without concentration display)

Flame-proof Suction Type
Gas Detectors

Model: SD-D58

Model: GD-D58

Features

- Explosion-proof product suitable for use even in hydrogen atmospheres
- Includes automatic abnormal flow-rate detection feature.
- Features modular replacement components for ease of maintenance.
- Dustproof/waterproof construction (Protection rating: IP 67 equivalent)
- Maintenance requires a single worker.
- The RP-D58 is also available as an explosion-proof pump.



Portable Multi
Gas Monitor

Model:
GX-8000

Features

- Compact, lightweight design for portability
- Exia II CT4X certified for hydrogen explosion-proof compatibility
- IP 67 protection rating for peace of mind, even in harsh environments
- Powerful suction capacity with high flow-rate pump
- Large easy-to-read screen with backlight
- Bright high-visibility lamps and loud, audible alarm
- Simultaneous digital readout and analog bar indicator concentration display
- Compatible with dedicated waist belt (optional) to greatly improve fit and security during use

Type list

Components	Type	Gas types
5-component	TYPE A	HC/CH ₄ (%LEL, vol%), O ₂ , H ₂ S, CO
4-component	TYPE B	HC/CH ₄ (%LEL), O ₂ , H ₂ S, CO
3-component	TYPE C	HC/CH ₄ /C ₂ H ₂ (%LEL), O ₂ , H ₂ S
	TYPE D	HC/CH ₄ (%LEL), O ₂ , CO
	TYPE E	HC/CH ₄ /H ₂ (%LEL, vol%), O ₂
2-component	TYPE F	HC/CH ₄ /C ₂ H ₂ (%LEL), O ₂
	TYPE G	H ₂ (%LEL), O ₂

Portable
Multi Gas Detector

Model:
GX-6000



Features

- A single unit can simultaneously display up to six types of gases, including VOCs. This product is the first of its kind from a Japanese manufacturer.
- The PID sensor enables measurements of more than 200 types of target chemical substances.
- 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



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



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Four Gas Personal Monitor

Model:

GX-2009

Features

- Explosion-proof product that can be used in hydrogen/acetylene atmospheres
- Protection rating equivalent to IP 67 ensures safe use for outdoor work.
- Three-direction alarm lamps and two-direction alarm buzzers to alert both the carrier and those in surrounding areas
- Buzzer volume of 95 dB or more can be clearly heard even in noisy factory environments.
- Simultaneous display of gas concentrations of up to four components on large LCD screen
- Also equipped with clock display and data logger functions

Type list

Components	Type	Gas types
4-component	TYPE A/H/T	O ₂ , LEL, H ₂ S, CO
3-component	TYPE B/H/T	O ₂ , LEL, H ₂ S
	TYPE C/T	O ₂ , LEL, CO
2-component	TYPE D/T	O ₂ , LEL
	TYPE E/H/T	O ₂ , H ₂ S
	TYPE F/T	O ₂ , CO
	TYPE I/T	LEL, CO
	TYPE J	H ₂ S, SO ₂



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Fixed PID
VOC Monitor

Model:
RVOC

Features

- Photoionization detector ideally suited for VOC detection
Supports three different measurement ranges (0-10 ppm, 100 ppm, 1,000 ppm).
Sensor design resists humidity and keeps the lamp from fouling.
Measurement cycles can be set to up to 5 minutes and 50 seconds in 10-second intervals.
(Default: 1 minute)
- Functions to improve work efficiency
Easy integration with control systems (4 mA to 20 mA output)
Also supports switchable type (RVOC-10s).



Features

- LCD screen illuminates in green, orange, or red depending on operating status for easy visibility.
- Choice of three power sources to suit operating environments: AC power, DC power, or battery
- Allows measurements at distances of up to 20 m with optional remote sensor.

Indoor Carbon
Monoxide Monitor

Model:
EC-600



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Portable Toxic Gas Monitor

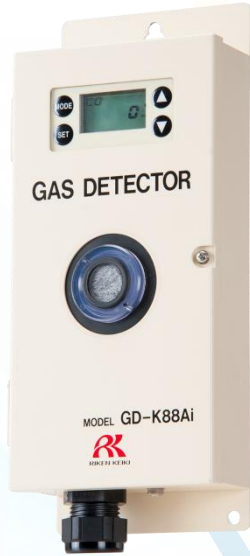
Model:
SC-8000

Features

- Inherently safe explosion-proof construction
- Detects a wide range of different gases
- Dustproof and waterproof for use in all types of environments
- Adjustable alarm volume
- Easy-to-read dual display (digital/analog)
- Selectable target gas detection



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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)

Inherently Safe Explosion-proof Construction
Oxygen/Toxic Gas Detector Heads

Model: GD-88 series

Features

- Two-wire gas detector
Transmits directly to control systems.
- Includes pressure correction sensor to minimize the effects of variations in atmospheric pressure. (GD-F88Ai, GD-F88Di)
- Built-in aspirator (optional)
Built-in type changed from previous external units (GD-K88Ai, GD-K88Di)
- Designed to resist corrosive gases
SUS enclosure can be specified at customer's request.
- Inherently safe explosion-proof construction in combination with safety barrier



Intelligent
Gas Detector

Model:
GD-70D

Features

- Standardized body unit with universal design for any detection principle
- Uses reusable components.
- Made of recyclable materials to reduce environmental burdens
- Designed to comply with a wide range of international standards
- Complies with RoHS Directive and CE Marking requirements.
- Supports various communication systems.
 - Standard instrumentation signal analog transmission (4-20 mA) DC system (GD-70D)
 - DC power-line carrier system using the same wiring for power and communication (GD-70D-NT)
 - Ethernet system using PoE hub (GD-70D-EA)



Highly Sensitive
Toxic Gas Monitor

**Model:
FP-300**

Features

- High selectivity with minimal interference from other gases
- Rapidly detects even minute environmental fluctuations.
(Detects at ppb levels.)
- Cassette type for easy tape replacement
(Uses micro cassette)



Features

- A single unit can measure up to eight different gas types.
- Two selectable suction methods
Automatic suction using built-in pump or manual suction using hand aspirator
- Includes intermittent measurement mode (with automatic suction only).
Records concentrations against time to allow monitoring of gas concentration trends on the main unit.
- Large easy-to-read LCD screen
Clear display showing measured gas type, gas concentration, measurement units, and battery level

Optical Gas Indicator

Model:
FI-8000



Features

- Zero warmup time
- Rapid response
- Long-term consistency
- Easy operation and easy-to-read digital display
- No sensitivity degradation due to silicone
- Includes temperature and atmospheric pressure correction functions.

Gas Analyzer

Model:
FI-800



RIKEN KEIKI



Features

- Zero warmup time
- Rapid response
- Long-term consistency
- Easy operation and easy-to-read digital display
- No sensitivity degradation due to silicone
- Includes temperature and atmospheric pressure correction functions.

Compact Solvent
Gas Monitor

Model:
FI-815A



RIKEN KEIKI



Portable
Gas Leak Checker

Model: SP-220
TYPE ML

Features

- Reliably and rapidly detects minute town gas and LPG gas leaks.
- Compact and lightweight with sturdy housing
- Built-in filter for improved sensor durability
- Includes data-logging function.
(Records up to 256 time/date and gas concentration readings.)
- Includes LED light for accurate measurements even in dark locations.

International Agents



RIKEN KEIKI

International Agents



North America

South America

Asia and Pacific

Russia and Central Asia

Europe

Middle East

Africa

International agents (table of contents)

North America

U.S.A.

South America

Brazil

Argentina

Peru

Chile

Uruguay

Asia and Pacific

China

South Korea

Taiwan

Singapore

Malaysia

Indonesia

Thailand

India

Vietnam

Philippines

Australia

Europe

Germany

Greece

THE NETHERLANDS

Norway

Turkey

U.K.

Middle East

U.A.E.

Israel

Africa

South Africa

Russia and Central Asia

Russia

International agents (U.S.A.)

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PERSON : MR. BOB PELLISSIER (PRESIDENT)
MRS. SANDRA GALLAGHER (VICE PRESIDENT)

WEBSITE : <http://www.rkiinstruments.com/>

International agents (BRAZIL)

HIDEO NAKAYAMA IMP. EXP. COM. E INDUSTRIA LTDA

ADDRESS : RUA SANTA AMÉLIA, 33 PRACA DA BANDEIRA
RIO DE JANEIRO RJ CEP: 20.260-030 BRAZIL

TEL : +55-21-2590-3496

FAX : +55-21-2270-6390

E-MAIL : hideko@nakayama.com.br

PERSON : MR. HIDEO NAKAYAMA (PRESIDENT)

MS. HIDEKO NAKAYAMA



International agents (ARGENTINA)

Prevent Gas SA

ADDRESS : INCLAN 4185 (C1258ABK) CIUDAD DE BUENOS AIRES, ARGENTINA
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FAX : +54-11-4925-6342
E-MAIL : ventas@preventgas.com.ar
PERSON : Mr. German Rosas
WEBSITE : <http://preventgas.com.ar/>

HUBERG SUDAMÉRICA S.A.

ADDRESS : ERASMO (CALLE 79) 1047 (B1650HOE) VILLA PIAGGIO
SAN MARTÍN, BUENOS AIRES, ARGENTINA
TEL : +54-11-4713-6068
FAX : +54-11-4713-6072
E-MAIL : arguello.juan@huberg.com
PERSON : MR. JUAN IGNACIO ARGUELLO
WEBSITE : <http://www.huberg.com.ar>



International agents (PERU)

RESET ELECTRONICA Y SISTEMAS S.R.L.

ADDRESS : Calle Martin de Murua 150 Of. 1004 - 1005
Edificio Plexus San Miguel Business Center
San Miguel - Lima 32, PERU

TEL : +51-1-6367303

FAX :

E-MAIL : enquiries@resetnaval.com

PERSON : Mr. Max Muñoz Moran

WEBSITE : <http://www.resetnaval.com/>

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RESET ELECTRONICA Y SISTEMAS S.R.L.

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TEL : +51-1-6367303

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E-MAIL : enquiries@resetnaval.com

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International agents (CHILE)

Electronic Marine Ltd

ADDRESS : Uruguay 556 of 404 Valparaiso, CHILE
TEL : 56-32-2220050
FAX : 56-32-2593135
E-MAIL : marketing@electronicmarine.cl
PERSON : Alejandra Palominos (Marketing Manager)
WEBSITE : <http://www.electronicmarine.cl>

International agents (URUGUAY)

microsur

ADDRESS : Carlos María Morales 934, 11200 Montevideo, Uruguay

TEL : 598-2410-1128

FAX : 598-2410-1128

E-MAIL : microsur@microsur.org

PERSON : Dra.Nermys Hernandez

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

International agents (CHINA)

RIKEN KEIKI COMMERCIAL(SHANGHAI) CO., LTD.

ADDRESS : HEAD OFFICE : ROOM4A SHANGHAI WATANABE INTERNATIONAL
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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TEL : 86-411-8212-3832

FAX : 86-411-8212-3833

E-MAIL : dl@rkkc.net (Ms. Sun Jun)
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dl102@rkkc.net (Ms. Xu fei)

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

International agents (KOREA)

RIKEN KEIKI KOREA CO., LTD.

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
E-MAIL : johnny@rikenkeiki.com.tw
PERSON : MR. WU WEN CHENG

International agents (SINGAPORE)

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

TEL : 603-5542-2288

FAX : 603-5542-2289

E-MAIL : ck.chooi@kinetics.net

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

TEL : 62-21-6900656

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

TEL : 62-21-6624347

FAX : 62-21-6623594

E-MAIL : centradindo.unitras@gmail.com

PERSON : MR. DJOHAN DAHLIAN (MANAGING DIRECTOR)

International agents (THAILAND)

TAIYO GASES CO., LTD.

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

TEL : 66-2-260-2691

FAX : 66-2-260-2690

E-MAIL : hato@taiyogases.th.com

PERSON : MR. KAZUNARI HATO

WEBSITE : <http://www.taiyogases.th.com/>

International agents (INDIA)

TRITECH

ADDRESS : 121,VEENA INDUSTRIAL ESTATE, OPP.FITWELL HOUSE, L.B.S.MARG,
VIKHROLI(W) MUMBAI-400 083 INDIA

TEL : 91-22-2577-7288, 6796-9990

FAX : 91-22-6796-9991

E-MAIL : tritec@vsnl.com

PERSON : MR. NARESH SHARMA MR. JIGNESH SHAH

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



International agents (VIETNAM)

VIETNAM GAS DETECTOR ONE MEMBER CO., LTD.

ADDRESS : 79 Ly Chinh Thang St, ward 8, Dist 3, HCMC, Vietnam

TEL : +84-(0)28-35262986 / 35262987

FAX : +84-(0)28-35262980

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,
PHILIPPINES

TEL : 632-635-7320

FAX : 632-635-7322

E-MAIL : gerry.gueco@yahoo.com.ph

PERSON : MR. S. HARA (PRESIDENT)
MR. GERRY C. GUECO (IN CHARGE)



International agents (AUSTRALIA)

CONTROL EQUIPMENT PTY. LTD.

ADDRESS : UNIT 1/3 DEAKIN STREET, BRENDALE QLD 4500, AUSTRALIA

TEL : 61-7-3481-9000

FAX : 61-7-3481-9088

E-MAIL : sales@controlequipment.com.au

PERSON : MR. GREG LOVE (GENERAL MANAGER)

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



International agents (GERMANY)

RIKEN KEIKI GmbH

ADDRESS : Theodor-Heuss-Allee 112, 60486 Frankfurt am Main, Germany

TEL : +49-6966-7741-460, 461

E-MAIL : s-ono@rikenkeikigmbh.de

PERSON : MR. SHINTARO ONO(Managing Director)

WEBSITE : <http://www.rikenkeiki.com/de/>



International agents (GREECE)

ZERVOUDAKIS MARINE SUPPLIES LTD.

ADDRESS : 31, MILOU STREET, PIRAEUS 18545, GREECE

TEL : +30-210-4623700

FAX : +30-210-4627900

E-MAIL : zerv@otenet.gr

PERSON : MR. JOHN ZERVOUDAKIS

WEBSITE : <http://www.zervoudakis.gr/>



International agents (THE NETHERLANDS)

GMS Instruments B.V.

ADDRESS : Driemanssteeweg 190, 3084 CB, Rotterdam, The Netherlands

TEL : +31102938860

E-MAIL : sales@gms-instruments.nl

PERSON : MR. SEBASTIAN KELDERMAN AND MR. MARKUS FRANK

WEBSITE : <http://gms-instruments.nl/>

International agents (NORWAY)

MARTIN BRUUSGAARD & CO. AS.

ADDRESS : LOKKETANGEN 20A, 1337 SANDVIKA NORWAY
P.O. BOX 3, 1301 SANDVIKA NORWAY

TEL : +47-6754-9330

FAX : +47-6754-9331

E-MAIL : dag@bruusgaard.no

PERSON : MR. DAG MAARTMANN

WEBSITE : <http://www.bruusgaard.no/>



International agents (TURKEY)

DOGANAK COLL. CO.

ADDRESS : KARAKOY, OKCUMUSA CADDESİ, IPEK ÇIKMAZI,
BOGAZICI HAN NO:6 KAT:2
34420 ISTANBUL, TURKEY

TEL : +90-212-244-5318 / 245-2512

FAX : +90-212-243-5704

E-MAIL : doganak@doganak.com

PERSON : MR. MEHMET ALI AKYUZ

WEBSITE : <http://www.doganak.com/>



International agents (U.K.)

WEATHERALL EQUIPMENT & INSTRUMENTS LTD.

ADDRESS : UNIT 1 STATION APPROACH, WENDOVER AYLESBURY,
BUCKS HP22 6BN ENGLAND

TEL : +44 1296 622180

FAX : +44 1296 624955

E-MAIL : sales@weatherall-uk.com

PERSON : MR. R.H.C. WORTHINGTON

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



International agents (U.A.E.)

METRO MAC

ADDRESS : WS 104, DUBAI MARITIME CITY (DMC), DUBAI, U.A.E.
P.O.BOX: 13485 DUBAI U.A.E.

TEL : +971-4-5636100

FAX : +971-4-5519973

E-MAIL : sales@metromac.com

PERSON : MR. K.K. KUTTY
(MANAGING DIRECTOR)

WEBSITE : <http://www.metromac.com/>



International agents (ISRAEL)

MODCON SYSTEMS LTD.

ADDRESS : MODCON HOUSE M. BORNSHTEIN ST.,
SOUTH AKKO INDUSTRIAL PARK, 24222 ISRAEL

TEL : +972-4-9553955

FAX : +972-4-9553956

E-MAIL : gregorys@modcon.co.il

PERSON : MR. GREGORY SHAHNOVSKY

WEBSITE : <http://www.modcon-systems.com/>



International agents (SOUTH AFRICA)

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

ADDRESS : 29 KLOSSER STREET PAROW 7500 SOUTH AFRICA
P.O.BOX 72 PAROW 7499 SOUTH AFRICA

TEL : +27-21-930-2354

FAX : +27-21-930-2043

E-MAIL : istvanisl@xsinet.co.za

PERSON : MR. I.S. LADANYI



International agents (RUSSIA) **TAIRIKU TRADING CO., LTD.**

ADDRESS : Head office in Tokyo, Japan KAJITANI DAIICHI BUILDING, 21-10,
SHINKAWA 2-CHOME, CHUO-KU, TOKYO 104-0033, JAPAN

TEL : +81-3-6222-0194 FAX: +81-3-6222-0201

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

PERSON : MR. MORITA

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

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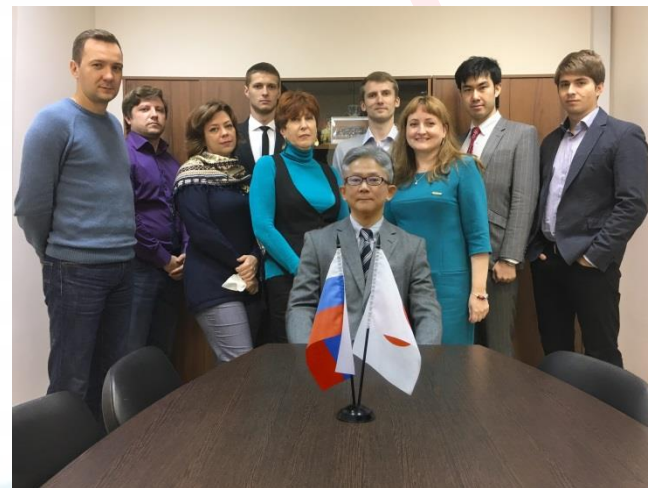
ADDRESS : RUSSIAN FEDERATION, 119049,
MOSCOW, KOROVY VAL STREET,7,
BUILDING 1, FLOOR 2,OFFICE 12

TEL : +7-495-237-18-82 +7-495-237-19-26

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E-MAIL : tairiku.alpeev@co.ru, ofistrk@online.ru

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