



# Safety and quality monitoring in the breweries by gas detectors

The application document



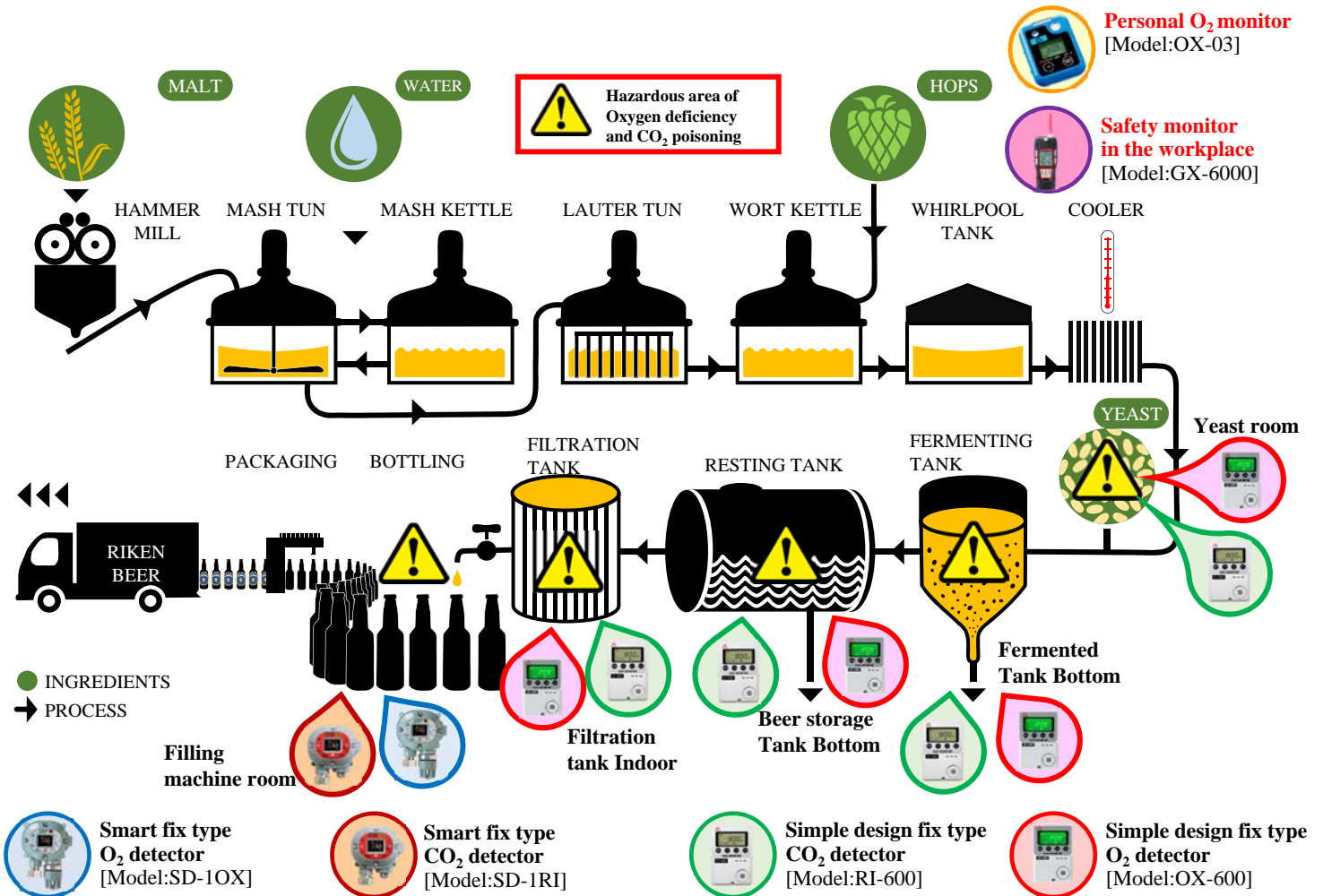
Riken Keiki are making contributions  
for good quality beer by gas detectors



# We are pleased to propose safety environments for workers to produce good quality beer

## Beer production process

The prime ingredients of beer are water, barley (malt) and hops. Put the malt in hot water to make the wort and ferment it in the tank. At that time, alcohol and carbon dioxide (CO<sub>2</sub>) are generated.



## Risk of oxygen deficiency and CO<sub>2</sub> poisoning

While normal atmosphere contains between 20.8 and 21 % oxygen, OSHA defines as oxygen deficient any atmosphere that contains less than 19.5 % oxygen. Various symptoms begin to experience in the human body when it is in an oxygen deficiency, and in the worst case it may lead to death.

ACGIH defines Threshold Limit Value (TLV, is the maximum average airborne concentration of a hazardous material to which healthy adult workers can be exposed during an 8-hour workday and 40 hour workweek – over a working lifetime – without experiencing significant adverse health effects) of CO<sub>2</sub> as 5000 ppm. Various symptoms being to experience in the human body when it is 5000 ppm and more, and in the worst case may lead to death.

We would like to propose various detectors to prevent oxygen deficiency and CO<sub>2</sub> poisoning for safety workers.

O <sub>2</sub> concentration in air	Symptoms	CO <sub>2</sub> concentration in air	Symptoms
20.9%	Oxygen level in atmosphere.	0.5%	No symptoms in 6 hours exposure
19.5%	Minimum acceptable oxygen level.	1~2%	Discomfort feeling
15~19%	Decreased ability to work strenuously. Impair coordination, Early symptoms.	3~4%	Respiration, pulse and blood pressure increases. Headache. Dizziness.
12~14%	Respiration increases. Poor judgment.	6%	Dyspnea
10~12%	Respiration increases. Lip blue.	7~10%	Unconsciousness in a few minutes. Death
8~10%	Mental failure. Fainting. Nausea. Unconsciousness. Vomiting		
6~8%	8 minutes – fatal. 6 minutes - 50% fatal. 4-5 minutes – possible recovery.		
4~6%	Coma in 40 seconds. Death.		

※ Exposure Guidelines for Residential Indoor Air Quality of the Ministry of Health in Canada mention guideline of CO<sub>2</sub>, 3500ppm as a long-term guideline

We are pleased to propose a continuous monitor suitable for safety and quality on each process.



## Continuous monitor (splash proof type) on beer production process

Model:SD-10X ( O<sub>2</sub> monitor)  
Model: SD-1RI (CO<sub>2</sub> Monitor)



Model : SD-10X

Model : SD-1RI

It can also be used in splashing places by applying a splash guard (option)



Splash guard  
Model:SGP-1  
(Applied for SD-1RI)

For more information, see the catalog.

Model	SD-10X	SD-1RI
Gas to be detected	Oxygen	Carbon-dioxide
Detection principle	Galvanic cell method	Non - dispersion type infrared absorption method
Detection range	0~25.0vol%	0 ~ 10000ppm ※There are also high-density specifications (customized: 0 to 10, 0 to 20vol %, etc.).Please contact us for details.
Alarm setpoint	18.0vol% [STD]	5000ppm [STD]
Detection method	Diffusion method	
Alarm contact	Alarm contact(Gas alarm or Trouble alarm or Gas · Alarm common alarm) No-voltage contact 1a or 1b	
Alarm display	[Gas alarm] ALM lamp on (red) [Fault alarm] FAULT lamp on (yellow)/detail display	
Explosion - proof / IP protection	Flame proof structure / IP65 equivalent	
Approvals	ATEX, IECEx, CE, TIIS	
Power supply	DC24V(DC17.0~26.4V)	
DIMENSIONS /WEIGHT	148(W)×208(H)×88(D)mm About 2.5kg (not included)	148(W)×161(H)×88(D)mm About 2.0 kg (excluding protrusions)
Operating temperature /humidity	-10~40°C (non-rapidly-vary) Less than 95%RH(non-condensing)	-20~+53(non-rapidly-vary) 95%RH maximum (non - condensing)

※Available to combine with the indication alarm unit Model: RM - 5000 or model: RM - 6000.

## Continuous monitor on beer production processes (non-splash proof type)

Model: OX-600 (O<sub>2</sub> Monitor)  
Model:RI-600 ( CO<sub>2</sub> monitor)



Model : OX-600

Model : RI-600

For more information, see the catalog.

Model	OX-600	RI-600
Gas to be detected	Oxygen	Carbon-dioxide
Detection principle	Galvanic cell method	Non - dispersion type infrared absorption method
Detection range /Alarm setpoint	0~25vol% :1st 19vol%(L)/2nd 18vol%(LL)[STD]	0~10000ppm :1st 1000ppm 2nd 1000ppm [STD]
	0~50vol% :1st 18vol%(L)/2nd 25vol%(H) [STD]	~Recommended range for Breweries~ 0~2vol% :1st 1.0vol% 2nd 1.0vol% [STD] 0~5vol% :1st 2.5vol% 2nd 2.5vol%[STD]
Detection method	Diffusion method(Spread or remote sensing)	Diffusion method
Alarm type	Gas alarm / failure alarm	
Alarm display	Lamp light/buzzer/content display	
Explosion - proof / IP protection	Non-explosion proof structure / Non-IP protection(Non-splash proof structure)	
Approvals	CE	
Power supply	AC100V ± 10% or DC24V ± 10% Dry cell (AA alkaline dry cell x 2)	AC100V ± 10% or DC24V ± 10%
DIMENSIONS /WEIGHT	Main unit :Approx. 80(W)x120(H)x 35.5(D)mm Remote sensor :Approx. 40(W)x96(H)x35.5(D)mm (projection portions excluded)	Approx. 80(W)x120(H)x 35.5(D)mm AC specification:Approx.200g DC specification:Approx.180g
Operating temperature /humidity	-10~40 C (at a constant condition) Below 90%RH (Non-condensing) ※Atmospheric pressure (80kPa~105kPa)	0~40 C (at a constant condition) Below 90%RH (Non-condensing)

### OX-600

- High visibility with 3 color LED
- Regardless of installation place by selectable power supply (AC, DC or Dry battery)

### RI-600

- Selectable high concentration CO<sub>2</sub>, 0-2 vol% and 0-5vol%
- Selectable power supply (AC or DC)

We are pleased to propose gas detectors for safety monitoring as personal and portable



## Safety monitoring in the workplace

Model : GX-6000



- ◆ A single unit can simultaneously measure up to 6 gases  
⇒ Suitable for safety patrol in the breweries
- ◆ A single unit can measure each gases in the breweries

### (Measurement example)

- Ethanol (Manufacturing facilities)
- Carbon dioxide (Manufacturing facilities)
- Oxygen (Confined space)
- Hydrogen sulfide (wastewater treatment facility)
- Methane (wastewater treatment facility / fuel facility)
- Ammonia (refrigeration air-conditioning facility)

**[Spec.]** \* Refer to catalogue for more detail

Gas to be detected	Combustible gas / oxygen / various toxic gases /VOC, etc.
Detection principle	New ceramic (CH <sub>4</sub> or i-C <sub>4</sub> H <sub>10</sub> ) Galvanic cell type (O <sub>2</sub> ) Non-dispersion type infrared absorption (CO <sub>2</sub> ) PID (700 kinds of VOC's including ethanol) Electrochemical type ( H <sub>2</sub> S/CO/NH <sub>3</sub> /CL <sub>2</sub> , etc.)
Detection range	Refer to catalog
Detection method	Pump suction type
Alarm type	Gas alarm / failure alarm / panic alarm Mandown alarm
Alarm display	The lamp flashes / buzzer continuous modulation sounding / gas concentration display /Alarm contents flashing / vibration
Explosion-proof	Ex ia IIC T4 Ga (ATEX/IECEX)
IP protection	IP67 equivalent
Approvals	TIIS ATEX IECEx CE
Power supply	lithium - ion battery unit or Alkaline Battery unit (AA alkaline dry battery x 3)
DIMENSIONS /WEIGHT	Approx. 70 (W) x 201 (H) x 54 (D) mm Approx. 500 g (When BUL-6000 is used) Approx. 450 g (When BUD-6000 is used)
Operating temperature /humidity	-20 to +50°C Below 95% RH (Non-condensing)

## The safety of the operator

Model : OX-03 ( 03 series)



- ◆ Compact and lightweight design as stress-free  
⇒ Suitable for personal oxygen concentration monitoring in confined space of breweries

**[Spec. of OX-03]** \* Refer to catalogue for more detail

Gas to be detected	Oxygen
Detection principle	Galvanic cell type
Detection range	0~40.0vol%
Preset alarms	1st : 19.5% 2nd : 18.0% OVER : 40.0%
Detection method	The diffusion equation
Alarm type	Gas alarm / failure alarm
Alarm display	The lamp flashes / intermittent buzzer / gas concentration display flashes / vibration
Explosion-proof	Alkaline dry battery version : Exia II CT4 Ni-MH battery version : Exia II CT3
IP protection	IP67 equivalent
Approvals	TIIS ATEX IECEx CE
Power supply	2 AAA size Alkaline battery (Optional AAA size Ni-MH battery [Eneloop])
DIMENSIONS /WEIGHT	About 54 ( W ) × 67 ( H ) × 24 ( D ) mm (not included) Approximately 80g
Operating temperature /humidity	-20 to +50°C Below 95% RH (Non-condensing)

### Various model for each hazardous area



GP-03 (CH<sub>4</sub> or HC)    OX-03 (O<sub>2</sub>)    HS-03 (H<sub>2</sub>S)    CO-03 (CO)

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