RIKEN KEIKI

# Usable even in hazardous atmospheres with hydrogen and acetylene present!

HART communication compatible

# Intelligent Gas Detector

| Detection target gases | Model |
|---|---|
| Combustible gases | SD-1 |
| | SD-1RI |
| Combustible gases/Toxic gases | SD-1GH |
| Carbon monoxide/hydrogen sulfide | SD-1EC |
| Oxygen | SD-1OX |

## SD-1 Series

ATEX
IECEx
TIIS (Japan Ex)
MED
SIL2

HART COMMUNICATION FOUNDATION

CE

## Extensive lineup of models for any location!



Oil refineries, plants producing basic petrochemical products



Service and utility tunnels, construction sites



Shipping and offshore facilities







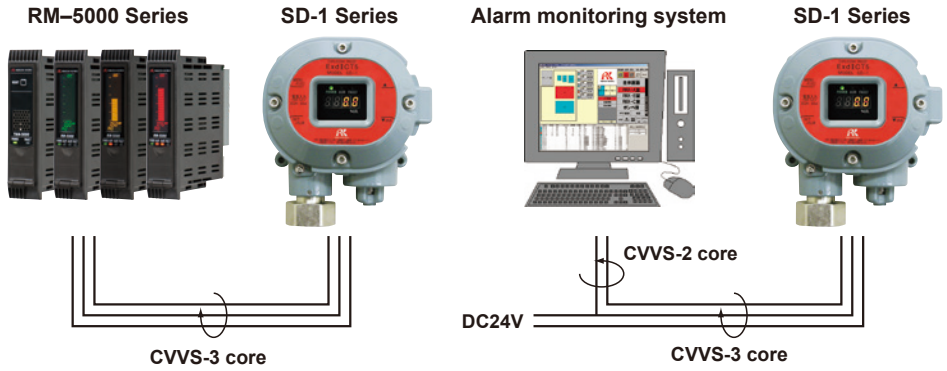



RIKEN KEIKI Co.,Ltd.

## Example of connection with indicator/alarm unit (e.g., RM-5000 series) and alarm monitoring system

### Create a secure workplace with a comprehensive system

The SD-1 series is a compact lightweight Intelligent Gas Detector ideal for deployment in refineries and petrochemical plants. The series includes an extensive lineup of models for detecting combustible gases, toxic gases (hydrogen sulfide/carbon monoxide), and oxygen. These devices also offer various functions and features, including HART communication and SIL2 certification. The rugged chassis and range of accessories makes this series ideal for the harshest environments. Connecting this product to indicator/alarm units at local safety points and upstream systems in centralized monitoring rooms or metering rooms helps establish comprehensive disaster prevention systems.




## Lineup

### For combustible gases



#### Specifications

| Model | SD-1 | | SD-1RI |
|---|---|---|---|
| Type | TYPE GP | TYPE NC | — |
| Detection principle | Catalytic combustion type | New ceramic type | Non-dispersive infrared type |
| Detection target gas | Combustible gas | | |
| Detection method | Diffusion type | | |
| Detection range | 0–100 % LEL | Depends on detection target gas. | 0–100 % LEL |
| Alarm setpoints | 25 % LEL (standard) | Depends on detection target gas. | 25 % LEL (standard) |
| Alarm accuracy (for identical conditions) | Within ±25 % of alarm setpoint | | |
| Alarm delay (for identical conditions) | Within 30 seconds after gas reaches 1 6 times the alarm setpoint | | |
| Alarm indications | Gas alarm: ALM LED lights up (red).<br>Fault alarm: FAULT LED lights up (yellow)/information displayed. | | |
| Transmission specifications*1 | 3-wire analog transmission 4–20 mA DC<br>(common cable for power and signal [power, signal, common]) | | |
| Gas concentration display | 4-digit 7-segment LED | | |
| Explosion-proof | Flame-proof enclosure | | |
| Explosion-proof class*2 | Japan Ex Ex d IIC T5 X | | Japan Ex Ex d IIC T6 X |
| | ATEX II 2G Ex db IIC T5 Gb<br>IECEx Ex db IIC T5 Gb | | ATEX II 2G Ex db IIC T6 Gb<br>IECEx Ex db IIC T6 Gb |
| Protection level | P65 equivalent | | |
| Operating temperature/ humidity range | Japan Ex -20°C – +53°C (no sudden changes), up to 95 % RH (no condensation)<br>ATEX/IECEx -20°C – +60°C (no sudden changes), up to 95 % RH (no condensation) | | |
| Power source | 24 V DC ± 10% | | |
| Power consumption | Max. 3 W | Max. 3 W | Max. 2 W |
| External dimensions | Approx. 148 mm (W) × 167 mm (H) × 88 mm (D) (excluding projections) | | |
| Weight | Approx. 2.0 kg | | |

*1 Specify HART communication specification requirements when ordering.
*2 Specify explosion-proof specification requirements when ordering.

### For combustible gases/toxic gases



#### Specifications

| Model | SD-1GH |
|---|---|
| Detection principle | Semiconductor type |
| Detection target gas | For combustible gases/toxic gases |
| Detection method | Diffusion type |
| Detection range | Depends on detection target gas. |
| Alarm setpoints | Depends on detection target gas. |
| Alarm accuracy (for identical conditions) | Within ±25 % of alarm setpoint(combustible gases)<br>Within ±30 % of alarm setpoint (toxic gases) |
| Alarm delay (for identical conditions) | Within 30 or 60 seconds (depending on detection target gas) after gas reaches 1 6 times the alarm setpoint |
| Alarm indications | Gas alarm: ALM LED lights up (red).<br>Fault alarm: FAULT LED lights up (yellow)/information displayed. |
| Transmission specifications*1 | 3-wire analog transmission 4–20 mA DC<br>(common cable for power and signal [power, signal, common]) |
| Gas concentration display | 4-digit 7-segment LED |
| Explosion-proof | Flame-proof enclosure |
| Explosion-proof class*2 | Japan Ex Ex d IIC T5 X |
| | ATEX II 2G Ex db IIC T5 Gb<br>IECEx Ex db IIC T5 Gb |
| Protection level | IP65 equivalent |
| Operating temperature/ humidity range | Japan Ex -20°C – +53°C (no sudden changes), up to 95 % RH (no condensation)<br>ATEX/IECEx -20°C – +60°C (no sudden changes), up to 95 % RH (no condensation) |
| Power source | 24 V DC ± 10% |
| Power consumption | Max. 3.1 W |
| External dimensions | Approx. 148 mm (W) × 167 mm (H) × 88 mm (D) (excluding projections) |
| Weight | Approx. 2 0 kg |

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*2 Specify explosion-proof specification requirements when ordering.

# Functions

## Explosion-proof in hydrogen/acetylene environments

Flame-proof enclosures enable use as an explosion-proof product in hydrogen/acetylene environments.

## Waterproof/Dust-proof

Protection rating equivalent to IP65. Suitable for use in harsh environments.

## Compatible with HART communications

The product sends digital signals across general analog 4 - 20 mA output lines to allow data exchange over a broad range.

## Equipped with self-diagnostic function

The device performs self-diagnostics after power supply starts.
In the event of an error, instead of displaying the gas concentration, the product will display a fault description (error code) pointing to a potential cause of the problem.

## Supports gas detection by aspiration

Connecting the SD-1 Series suction cap (with gas flow inlet/outlet) to the product sensor allows gas detection by aspiration.

* Use for gas detection by aspiration requires a suction pump and aspirator unit (available separately), in addition to a power supply.

## For hydrogen sulfide/carbon monoxide



### Specifications

| Model | SD-1EC |
|---|---|
| Detection principle | Electrochemical type |
| Detection target gas | Hydrogen sulfide/carbon monoxide |
| Detection method | Diffusion type |
| Detection range | Hydrogen sulfide: 0–30 ppm　Carbon monoxide: 0–75 ppm |
| Alarm setpoints | Depends on detection target gas. |
| Alarm accuracy (for identical conditions) | Within ±30 % of alarm setpoint |
| Alarm delay (for identical conditions) | Within 30 seconds after gas reaches 1.6 times the alarm setpoint |
| Alarm indications | Gas alarm: ALM LED lights up (red).<br>Fault alarm: FAULT LED lights up (yellow)/information displayed. |
| Transmission specifications*1 | 3-wire analog transmission 4–20 mA DC<br>(common cable for power and signal [power, signal, common]) |
| Gas concentration display | 4-digit 7-segment LED |
| Explosion-proof | Flame-proof enclosure |
| Explosion-proof class*2 | Japan Ex　Ex d IIC T6 X<br>ATEX　II 2G Ex db IIC T6 Gb<br>IECEx　Ex db IIC T6 Gb |
| Protection level | P65 equivalent |
| Operating temperature/ humidity range | -10°C – +40°C (no sudden changes), up to 30 – 80 % RH (no condensation) |
| Power source | 24 V DC ± 10% |
| Power consumption | Max. 1.1 W |
| External dimensions | Approx. 148 mm (W) × 203 mm (H) × 88 mm (D) (excluding projections) |
| Weight | Approx. 2 2 kg |

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*2 Specify explosion-proof specification requirements when ordering.

## For oxygen



### Specifications

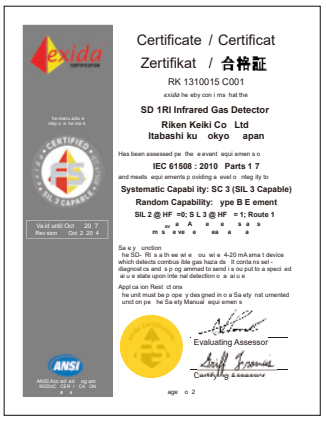
| Model | SD-1OX |
|---|---|
| Detection principle | Galvanic cell type |
| Detection target gas | Oxygen |
| Detection method | Diffusion type |
| Detection range | 0–25 0 vol% |
| Alarm setpoints | 18.0 vol% |
| Alarm accuracy (for identical conditions) | The difference between the alarm setpoint and the concentration reading when the alarm is triggered is 0. |
| Alarm delay (for identical conditions) | Within five seconds after detecting a 10 to 11 vol% gas for oxygen deficiency alarm |
| Alarm indications | Gas alarm: ALM LED lights up (red).<br>Fault alarm: FAULT LED lights up (yellow)/information displayed. |
| Transmission specifications*1 | 3-wire analog transmission 4–20 mA DC<br>(common cable for power and signal [power, signal, common]) |
| Gas concentration display | 4-digit 7-segment LED |
| Explosion-proof | Flame-proof enclosure |
| Explosion-proof class*2 | Japan Ex　Ex d IIC T6 X<br>ATEX　II 2G Ex db IIC T6 Gb<br>IECEx　Ex db IIC T6 Gb |
| Protection level | IP65 equivalent |
| Operating temperature/ humidity range | -10°C – +40°C (no sudden changes), up to 95 % RH (no condensation) |
| Power source | 24 V DC ± 10% |
| Power consumption | Max. 1.1 W |
| External dimensions | Approx. 148 mm (W) × 208 mm (H) × 88 mm (D) (excluding projections) |
| Weight | Approx. 2.5 kg |

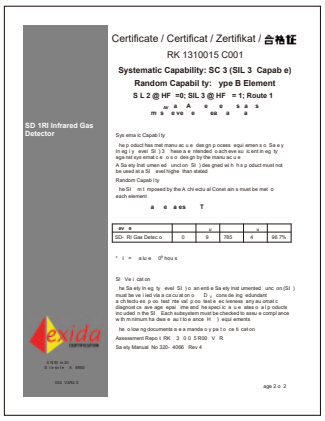
*1 Specify HART communication specification requirements when ordering.
*2 Specify explosion-proof specification requirements when ordering.

## SIL2-certified for all aspects of the functional safety standard—a first for Japanese manufacturers

The growing importance of safety within the processing industry has generated demand for devices certified to be compliant with the IEC 61508 functional safety standard. Functional safety certification seeks to promote the development of safe systems with lower risks by dividing system safety into levels based on the likelihood of faults that would lead to system stoppages.

With the SD-1 series, Riken Keiki becomes the first manufacturer of gas detectors in Japan to be certified to comply with SIL2 levels in all aspects of the IEC 61508:2010 functional safety certification.


Certificate / Certificat
Zertifikat / 合格証
RK 1310015 C001
SD 1RI Infrared Gas Detector
Riken Keiki Co Ltd
Itabashi ku okyo apan
IEC 61508 : 2010 Parts 1 7
Systematic Capabi ity: SC 3 (SIL 3 Capable)
Random Capability: ype B E ement
SIL 2 @ HF =0; S L 3 @ HF = 1; Route 1
Evaluating Assessor


Certificate / Certificat / Zertifikat / 合格証
RK 1310015 C001
Systematic Capability: SC 3 (SIL 3 Capab e)
Random Capabil ty: ype B Element
S L 2 @ HF =0; SIL 3 @ HF = 1; Route 1
SD 1RI Infrared Gas Detector

## Explosion-proof/Certifications/Functionality

| Model | | SD-1 | | | | SD-1RI | | | SD-1GH | | SD-1EC | | | SD-1OX | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type | | TYPE GP | TYPE GP H | TYPE NC | TYPE NC H | — | TYPE H | TYPE HS | — | TYPE H | — | TYPE H | TYPE HS | — | TYPE H | TYPE HS |
| Explosion-proof | Explosion-proof construction | Flame-proof enclosure | | | | | | | | | | | | | | |
| | Japan Ex | Ex d IIC T5 X | | | | Ex d IIC T6 X | | | Ex d IIC T5 X | | Ex d IIC T6 X | | | Ex d IIC T6 X | | |
| | ATEX | II 2G Ex db IIC T5 Gb | | | | II 2G Ex db IIC T6 Gb | | | II 2G Ex db IIC T5 Gb | | II 2G Ex db IIC T6 Gb | | | II 2G Ex db IIC T6 Gb | | |
| | ECEx | Ex db IIC T5 Gb | | | | Ex db IIC T6 Gb | | | Ex db IIC T5 Gb | | Ex db IIC T6 Gb | | | Ex db IIC T6 Gb | | |
| Certifications | CE marking | Compliant | | | | | | | | | | | | | | |
| | MED*1 | ○ | — | — | — | — | | *2 | — | — | — | — | — | *2 | | |
| | S L | — | | — | | — | — | S L2 | — | | — | — | S L2 | — | — | SIL2 |
| Communication functiona ity | HART communication | — | HART 7 | — | HART 7 | — | HART 7 | | — | HART 7 | — | HART 7 | | — | HART 7 | |

*1 Depends on gas type.

***2 MED-compliant models are also available. (4 - 20 mA, no contact)**

## Optional accessories (sold separately)

| Model | | SD-1 | SD-1RI | SD-1GH | SD-1EC | SD-1OX | Applications |
|---|---|---|---|---|---|---|---|
| Optional accessories (sold separately) | Sunshade (for mounting on wall or pipe) | ○ | ○ | ○ | ○ | ○ | This cover minimizes rising temperatures in the main unit due to exposure to direct sunlight or radiant heat. |
| | Protective cover (for mounting on wall or pipe) | ○ | ○ | ○ | ○ | ○ | Cover for protecting main unit |
| | Display cover | ○ | ○ | ○ | ○ | ○ | Sunshade for the display section |
| | Calibration adapter | ○ | ○ | ○ | ○ | ○ | Calibration adapter |
| | Solvent protection cover | ○ | ○ | ○ | ○ | ○ | Solvent protection cover for the display section. |
| | U-bolt unit | ○ | ○ | ○ | ○ | ○ | Kit for mounting main unit to 2B pole |
| | Round splash-proof cap | ○ | ○ | ○ | — | — | Splash-proof cover for the sensor section. |


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