

# Featuring the next-generation high-performance F Sensors to meet a wide range of global standards

Gas Detectors with Signal Converters

Model

## SD-3 Series

ATEX (European directive for equipment for potentially explosive atmospheres) certified

IECEX (IEC explosion-proof electrical equipment standard test) certified

Japan Ex (certificate of conformity for electrical equipment used in potentially explosive atmospheres) certified

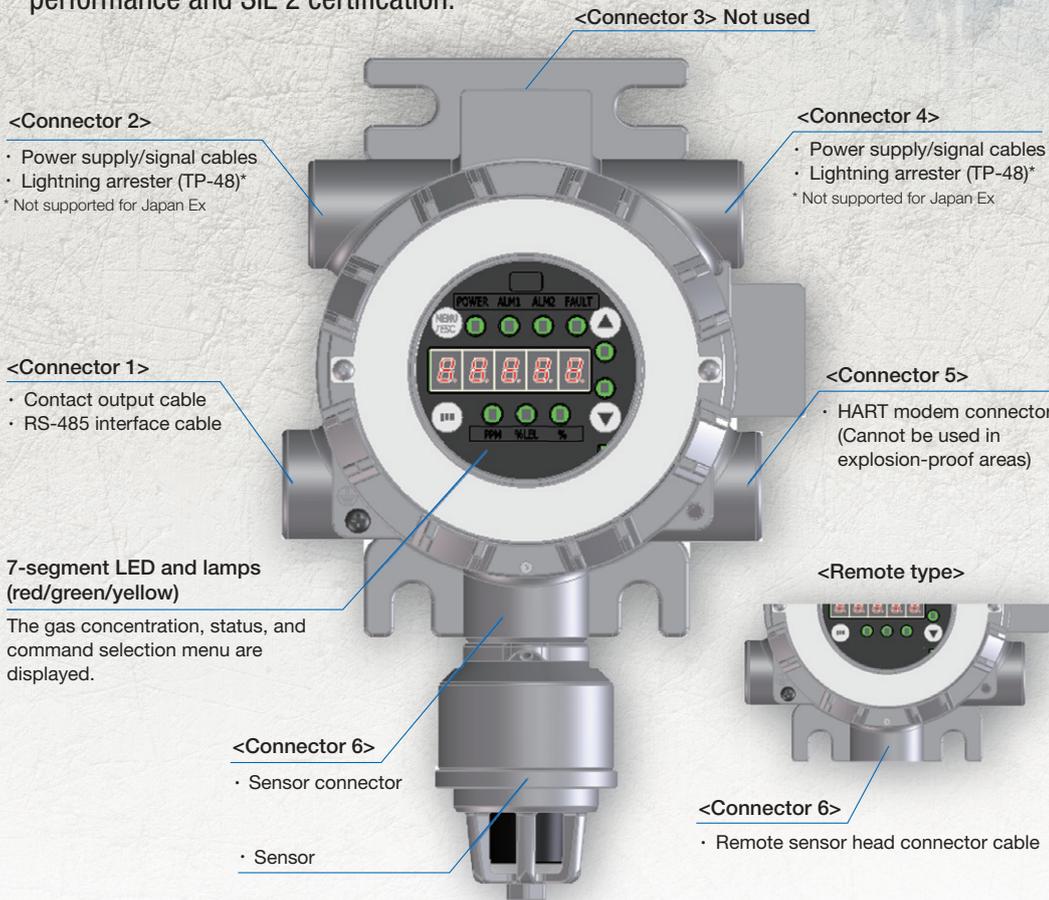
CE marking compliant

Functional safety standard certified



The SD-3 Series of fixed explosion-proof gas detectors detect combustible gas and toxic gas leaks and continuously monitor oxygen levels in the surrounding atmosphere.

These global products are certified explosion-proof in various countries and meet the requirements of various international standards, including IEC/EN performance and SIL 2 certification.



- 1 **Featuring the next-generation high-performance F Sensors**
  - Compatible with a wide range of toxic gases
  - Double range capability
- 2 **Wide range of output options**
- 3 **Suitable for a variety of uses and installation environments**
- 4 **Complies with wide range of global standards**
- 5 **Rugged housing**

## Features

### 7 Incorporates the next-generation high-performance F Sensors for dramatically improved functionality and performance

- 3-year sensor warranty
  - \* Specific sensors excluded. Assumes the sensor is maintained at least once a year.
- Operating temperature range: -40 °C to +70 °C
  - \* Specific sensors excluded. -20 °C to +70 °C for Japan Ex specifications
- IEC/EN performance compliance
  - \* Specific sensors excluded
- Sensor degradation and life assessment function
  - The degradation and life assessment function warns the user if the sensor needs to be replaced.

#### [Sensor degradation assessment]

The detection principle characteristics specific to each sensor are used to automatically diagnose sensor degradation (e.g., reduced zero point output and low electrolyte levels).

#### [Life assessment]

Diagnoses sensor life during calibration by predicting the sensor output reserve value based on past calibration history.

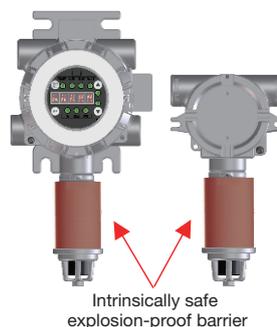
\* The sensor degradation and life assessment warning is output as a digital signal (HART or RS-485 communication).



### Compatible with a wide range of toxic gases

Devices in the SD-3EC Series lineup feature an intrinsically safe explosion-proof barrier integral construction (Flame-proof enclosure + intrinsically safe explosion-proof construction). This eliminates the need for sintered metal in the sensor and allows the detection of a wide range of highly adsorptive toxic gases.

\* Compatible models: SD-3ECB, SD-3DEC, and GD-3ECB  
For more information, refer to the F sensor list (with barrier).



### Double range capability (NC type)

Single device detects both low concentrations (ppm) and the lower explosive limit (LEL). It can measure a wide range of concentrations with greater accuracy.

\* Compatible with Modbus communication but not with HART communication  
\* Not SIL compliant

2

## Wide range of output options

The SD-3 Series also supports Modbus (RS-485) communication in addition to 4 to 20 mA output with HART. Three relay contacts are also available (ALARM1, ALARM2, and FAULT). Select any of the following three types to suit specific uses:

- ① 4 to 20 mA signal with HART communication [standard]
- ② 4 to 20 mA signal with HART communication + contact (3c) [optional]
- ③ 4 to 20 mA signal + Modbus (RS-485) communication [optional]

3

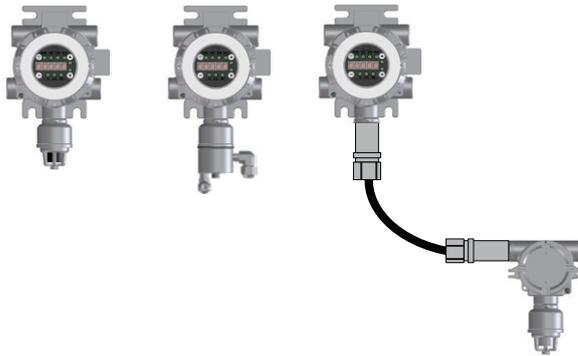
## Wide range of types to suit a variety of uses and installation environments

The SD-3 Series lineup includes diffusion type, suction type, remote type, and duct insertion type models. Select the optimal detection method to suit specific uses. Using a suction type model in conjunction with an external pump allows use in limited installation space and high places where maintenance work is not possible.

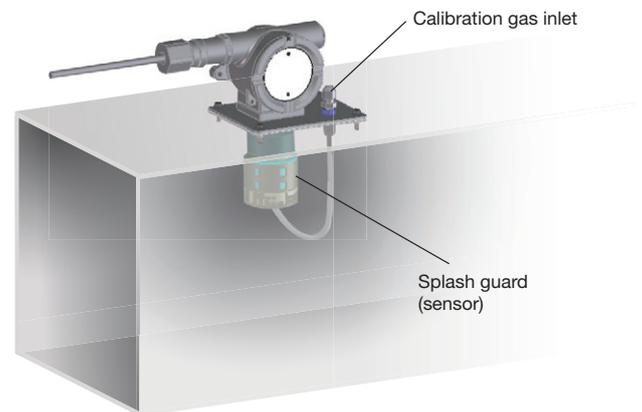
### [Remote type/Duct insertion type]

Use a remote sensor to allow sensor installation up to 20 m from the detector main unit. An optional duct mounting kit (sold separately) allows insertion inside a duct.

[Diffusion type] [Suction type] [Remote type]



[Duct insertion type]



4

## Complies with wide range of global standards

Explosion-proof certifications in different countries	ATEX/IECEX, Japan Ex, FM (US)*, cFM (Canada)*, Taiwanese explosion-proof (TS), Chinese explosion-proof
Performance*	Combustible gas: IEC/EN 60079-29-1, FM 6320, CSA C22.2 No. 60079-29-1, ANSI/FM/UL 60079-29-1 Toxic gas: EN 45544-3, FM 6340, ANSI/ISA 92.00.01    Oxygen: EN 50104
Miscellaneous	CE marking (ATEX Directive, EMC Directive, LVD Directive, RoHS Directive), SIL2 certification (IEC 61508), MED certification (pending), HART communication, Modbus communication

\* Compliance status varies depending on sensor. Please contact RIKEN KEIKI for more information.

5

## Rugged housing construction allows use even in harsh environments.

- Housing material: SCS14 stainless steel (equivalent to SUS316)
- Protection rating: Equivalent to IP66/67
- Wide range of operating temperatures (-40 °C to +70 °C)  
\* -20 °C to +70 °C for Japan Ex
- Extensive range of optional accessories: protective cover, splash guard, lightning arrester (not supported for Japan EX), various filters, etc.



With sunshade fitted



With splash guard fitted

## Detection principle and detection target gases by model

The SD-3 Series consists of the following models, which vary by sampling method and detection principle. Please select the appropriate model for the intended use.

### [List of detection target gases by model]

Model	Sampling method	Detection principle	Detection target gas			Nameplate color	Remarks	
			Combustible gas	Oxygen	Toxic gas			
SD-3RI	Diffusion type	IRF: Non-dispersive infrared type	○		○	Red		
SD-3DRI	Suction type							
SD-3NC	Diffusion type	NCF: New ceramic type (catalytic type)	○		○	Red		
SD-3DNC	Suction type							
SD-3GH	Diffusion type	SGF: Semiconductor type	○		○	Yellow		
SD-3DGH	Suction type							
SD-3GHS	Diffusion type							
SD-3DGHS	Suction type							
SD-3SP	Diffusion type	SHF: Hot-wire semiconductor type	○		○	Blue		
SD-3DSP	Suction type							
SD-3EC	Diffusion type	ESF: Electrochemical type			○	○	Yellow/silver	Toxic gas: Yellow certification plate Oxygen: Silver certification plate
SD-3DEC	Suction type							
SD-3ECS	Diffusion type							
SD-3DECS	Suction type							
SD-3ECB	Diffusion type					○	Yellow	With EC barrier*
SD-3DECB	Suction type							

\* Differs depending on detection target gas. For more information, refer to the F sensor list on the following page.

### [List of detection target gases by model (remote type)]

Model (Main unit)	SD-3SC
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Main unit model (Remote sensor unit)	Sampling method	Detection principle	Detection target gas			Nameplate color	Remarks	
			Combustible gas	Oxygen	Toxic gas			
GD-3RI	Diffusion type	IRF: Non-dispersive infrared type	○		○	Red		
GD-3NC		NCF: New ceramic type (catalytic type)	○			Red		
GD-3GH		SGF: Semiconductor type		○		○	Yellow	
GD-3GHS						○	Yellow	CS <sub>2</sub> (carbon disulfide) only
GD-3SP		SHF: Hot-wire semiconductor type	○		○	Blue		
GD-3EC		ESF: Electrochemical type			○	○	Yellow/silver	Toxic gas: Yellow certification plate Oxygen: Silver certification plate
GD-3ECS						○	Yellow	H <sub>2</sub> S (hydrogen sulfide) only
GD-3ECB						○	Yellow	With EC barrier*

\* Differs depending on detection target gas. For more information, refer to the F sensor list on the following page.

Certification plate: Red



Certification plate: Blue



Certification plate: Yellow



Certification plate: Silver



F sensor list

\* Please contact RIKEN KEIKI for information on other gas types and detection ranges.

Detection principle	Product No.	Sensor model	Gas name	Chemical formula	F.S.	1 digit	Calibration gas (replacement gas)	Operating temperature range (no sudden changes)	Operating humidity range (no condensation)	With/without barrier	FM explosion-proof	Remarks
IRF	6201 02	IRF-1301	Methane	CH <sub>4</sub>	100 %LEL	0.5 %LEL	CH <sub>4</sub>	-40 °C to 70 °C	95 %RH or less	-	○	
	6212 03	IRF-1303	Isobutane	C <sub>4</sub> H <sub>10</sub>	100 %LEL	0.5 %LEL	i-C <sub>4</sub> H <sub>10</sub>	-40 °C to 70 °C	95 %RH or less	-	-	
	6212 02	IRF-1317	Propane	C <sub>3</sub> H <sub>8</sub>	100 %LEL	0.5 %LEL	C <sub>3</sub> H <sub>8</sub> (i-C <sub>3</sub> H <sub>10</sub> )	-40 °C to 70 °C	95 %RH or less	-	○	
	6205 02	IRF-1435	Carbon dioxide	CO <sub>2</sub>	2,000 ppm	1 ppm	CO <sub>2</sub>	-40 °C to 70 °C	95 %RH or less	-	-	
	6205 03	IRF-1436	Carbon dioxide	CO <sub>2</sub>	5,000 ppm	10 ppm	CO <sub>2</sub>	-40 °C to 70 °C	95 %RH or less	-	-	
	6205 04	IRF-1433	Carbon dioxide	CO <sub>2</sub>	10,000 ppm	10 ppm	CO <sub>2</sub>	-40 °C to 70 °C	95 %RH or less	-	-	
	6205 12	IRF-1437	Carbon dioxide	CO <sub>2</sub>	2 vol%	0.005 vol%	CO <sub>2</sub>	-40 °C to 70 °C	95 %RH or less	-	-	
	6205 13	IRF-1438	Carbon dioxide	CO <sub>2</sub>	5 vol%	0.01 vol%	CO <sub>2</sub>	-40 °C to 70 °C	95 %RH or less	-	-	
	6205 14	IRF-1439	Carbon dioxide	CO <sub>2</sub>	10 vol%	0.01 vol%	CO <sub>2</sub>	-40 °C to 70 °C	95 %RH or less	-	-	
	6201 03	IRF-1334	Methane	CH <sub>4</sub>	100 vol%	0.5 vol%	CH <sub>4</sub>	-40 °C to 70 °C	95 %RH or less	-	-	
	6204 02	IRF-1315	Propane	C <sub>3</sub> H <sub>8</sub>	100 vol%	0.5 vol%	C <sub>3</sub> H <sub>8</sub>	-40 °C to 70 °C	95 %RH or less	-	○	
	6201 04	IRF-1316	Ethylene	C <sub>2</sub> H <sub>4</sub>	100 %LEL	0.5 %LEL	C <sub>2</sub> H <sub>4</sub> (CH <sub>4</sub> )	-40 °C to 70 °C	95 %RH or less	-	-	
	6213 02	IRF-1341	Isobutylene	C <sub>4</sub> H <sub>8</sub>	100 %LEL	0.5 %LEL	i-C <sub>4</sub> H <sub>8</sub> (i-C <sub>4</sub> H <sub>10</sub> )	-40 °C to 70 °C	95 %RH or less	-	-	
	6212 04	IRF-1308	Normal hexane	C <sub>6</sub> H <sub>14</sub>	100 %LEL	0.5 %LEL	n-C <sub>6</sub> H <sub>14</sub> (i-C <sub>6</sub> H <sub>14</sub> )	-40 °C to 70 °C	95 %RH or less	-	-	
	6201 05	IRF-1332	Butadiene	C <sub>4</sub> H <sub>6</sub>	100 %LEL	0.5 %LEL	C <sub>4</sub> H <sub>6</sub> (CH <sub>4</sub> )	-40 °C to 70 °C	95 %RH or less	-	-	
	6000 07	NCF-6318	Ethane	C <sub>2</sub> H <sub>6</sub>	100 %LEL	0.5 %LEL	C <sub>2</sub> H <sub>6</sub> (CH <sub>4</sub> )	-40 °C to 70 °C	95 %RH or less	-	-	
	6000 14	NCF-6318	Propane	C <sub>3</sub> H <sub>8</sub>	100 %LEL	0.5 %LEL	C <sub>3</sub> H <sub>8</sub> (CH <sub>4</sub> )	-40 °C to 70 °C	95 %RH or less	-	-	
	6000 19	NCF-6318	Methane	CH <sub>4</sub>	100 %LEL	0.5 %LEL	CH <sub>4</sub>	-40 °C to 70 °C	95 %RH or less	-	○	
6000 50	NCF-6318	Methane	CH <sub>4</sub>	100 %LEL	0.5 %LEL	CH <sub>4</sub>	-40 °C to 70 °C	95 %RH or less	-	○	For simultaneous hydrogen detection	
6000 20	NCF-6318	Methane	CH <sub>4</sub>	2 vol%	0.01 vol%	CH <sub>4</sub>	-40 °C to 70 °C	95 %RH or less	-	-		
6000 21	NCF-6318	Methane	CH <sub>4</sub>	20,000 ppm	100 ppm	CH <sub>4</sub>	-40 °C to 70 °C	95 %RH or less	-	-		
6000 45	NCF-6320	Hydrogen	H <sub>2</sub>	100 %LEL	0.5 %LEL	H <sub>2</sub>	-40 °C to 70 °C	95 %RH or less	-	-	Hydrogen selective	
6000 23	NCF-6320	Hydrogen	H <sub>2</sub>	2 vol%	0.01 vol%	H <sub>2</sub>	-40 °C to 70 °C	95 %RH or less	-	-	Hydrogen selective	
6000 24	NCF-6320	Hydrogen	H <sub>2</sub>	2,000 ppm	10 ppm	H <sub>2</sub>	-40 °C to 70 °C	95 %RH or less	-	-	Hydrogen selective	
6000 25	NCF-6319	Isobutane	C <sub>4</sub> H <sub>10</sub>	100 %LEL	0.5 %LEL	i-C <sub>4</sub> H <sub>10</sub>	-40 °C to 70 °C	95 %RH or less	-	-		
6000 26	NCF-6319	Hydrogen	H <sub>2</sub>	2 vol%	0.01 vol%	H <sub>2</sub>	-40 °C to 70 °C	95 %RH or less	-	-		
6000 27	NCF-6319	Hydrogen	H <sub>2</sub>	100 %LEL	0.5 %LEL	H <sub>2</sub>	-40 °C to 70 °C	95 %RH or less	-	-		
6000 28	NCF-6319	Normal hexane	C <sub>6</sub> H <sub>14</sub>	2,000 ppm	10 ppm	n-C <sub>6</sub> H <sub>14</sub> (i-C <sub>6</sub> H <sub>14</sub> )	-40 °C to 70 °C	95 %RH or less	-	-		
6000 29	NCF-6319	Hydrogen	H <sub>2</sub>	1 vol%	0.01 vol%	H <sub>2</sub>	-40 °C to 70 °C	95 %RH or less	-	-		
6000 30	NCF-6319	Isopropyl alcohol	C <sub>3</sub> H <sub>8</sub> O	100 %LEL	0.5 %LEL	IPA (i-C <sub>3</sub> H <sub>10</sub> )	-40 °C to 70 °C	95 %RH or less	-	-		
6000 31	NCF-6319	Toluene	C <sub>7</sub> H <sub>8</sub>	100 %LEL	0.5 %LEL	C <sub>7</sub> H <sub>8</sub> (i-C <sub>7</sub> H <sub>10</sub> )	-40 °C to 70 °C	95 %RH or less	-	-		
6000 32	NCF-6319	Acetone	C <sub>3</sub> H <sub>6</sub> O	100 %LEL	0.5 %LEL	C <sub>3</sub> H <sub>6</sub> O (i-C <sub>3</sub> H <sub>10</sub> )	-40 °C to 70 °C	95 %RH or less	-	-		
6000 33	NCF-6319	Hydrogen	H <sub>2</sub>	4 vol%	0.02 vol%	H <sub>2</sub>	-40 °C to 70 °C	95 %RH or less	-	-		
6000 34	NCF-6319	N,N-dimethylacetamide	C <sub>4</sub> H <sub>9</sub> NO	4,000 ppm	20 ppm	DMAC (i-C <sub>4</sub> H <sub>10</sub> )	-40 °C to 70 °C	95 %RH or less	-	-		
6000 35	NCF-6319	Acetylene	C <sub>2</sub> H <sub>2</sub>	100 %LEL	0.5 %LEL	C <sub>2</sub> H <sub>2</sub> (i-C <sub>2</sub> H <sub>10</sub> )	-40 °C to 70 °C	95 %RH or less	-	-		
6000 36	NCF-6319	Ethylene	C <sub>2</sub> H <sub>4</sub>	100 %LEL	0.5 %LEL	C <sub>2</sub> H <sub>4</sub> (i-C <sub>2</sub> H <sub>10</sub> )	-40 °C to 70 °C	95 %RH or less	-	-		
6000 37	NCF-6319	Normal octane	C <sub>8</sub> H <sub>18</sub>	100 %LEL	0.5 %LEL	C <sub>8</sub> H <sub>18</sub> (i-C <sub>8</sub> H <sub>18</sub> )	-40 °C to 70 °C	95 %RH or less	-	-		
6000 38	NCF-6319	Ethyl alcohol	C <sub>2</sub> H <sub>5</sub> O	100 %LEL	0.5 %LEL	C <sub>2</sub> H <sub>5</sub> OH (i-C <sub>2</sub> H <sub>10</sub> )	-40 °C to 70 °C	95 %RH or less	-	-		
6000 39	NCF-6319	Methyl alcohol	CH <sub>3</sub> O	100 %LEL	0.5 %LEL	CH <sub>3</sub> OH (i-C <sub>2</sub> H <sub>10</sub> )	-40 °C to 70 °C	95 %RH or less	-	-		
6000 40	NCF-6319	Propylene	C <sub>3</sub> H <sub>6</sub>	100 %LEL	0.5 %LEL	C <sub>3</sub> H <sub>6</sub> (i-C <sub>3</sub> H <sub>10</sub> )	-40 °C to 70 °C	95 %RH or less	-	-		
6000 41	NCF-6319	Vinyl chloride	C <sub>2</sub> H <sub>3</sub> Cl	100 %LEL	0.5 %LEL	VCM (i-C <sub>2</sub> H <sub>10</sub> )	-40 °C to 70 °C	95 %RH or less	-	-		
6000 48	NCF-6319	Isobutylene	i-C <sub>4</sub> H <sub>8</sub>	100 %LEL	0.5 %LEL	i-C <sub>4</sub> H <sub>8</sub> (i-C <sub>4</sub> H <sub>10</sub> )	-40 °C to 70 °C	95 %RH or less	-	-		
6000 49	NCF-6319	Butadiene	C <sub>4</sub> H <sub>6</sub>	100 %LEL	0.5 %LEL	C <sub>4</sub> H <sub>6</sub> (i-C <sub>4</sub> H <sub>10</sub> )	-40 °C to 70 °C	95 %RH or less	-	-		
SGF	6030 04	SGF-8562	Carbonyl sulfide	COS	2,000 ppm	10 ppm	COS (C <sub>2</sub> H <sub>5</sub> OH)	-20 °C to 65 °C	20 to 95 %RH	-	-	
	6030 05	SGF-8562	Carbon disulfide	CS <sub>2</sub>	200 ppm	1 ppm	CS <sub>2</sub>	-20 °C to 47 °C	20 to 95 %RH	-	-	
	6030 06	SGF-8563	Ethylene oxide	C <sub>2</sub> H <sub>4</sub> O	100 ppm	1 ppm	EO	-20 °C to 65 °C	20 to 95 %RH	-	-	
6030 07	SGF-8562	Hydrogen sulfide	H <sub>2</sub> S	100 ppm	1 ppm	H <sub>2</sub> S	-20 °C to 65 °C	20 to 95 %RH	-	-		
SHF	6060 01	SHF-8601	Methane	CH <sub>4</sub>	5,000 ppm	25 ppm	CH <sub>4</sub>	-30 °C to 70 °C	20 to 95 %RH	-	-	
	6060 02	SHF-8601	Isobutane	C <sub>4</sub> H <sub>10</sub>	2,000 ppm	10 ppm	i-C <sub>4</sub> H <sub>10</sub>	-30 °C to 70 °C	20 to 95 %RH	-	-	
	6060 04	SHF-8601	Ethylene	C <sub>2</sub> H <sub>4</sub>	2,000 ppm	10 ppm	C <sub>2</sub> H <sub>4</sub>	-30 °C to 70 °C	20 to 95 %RH	-	-	
	6060 05	SHF-8601	Acetylene	C <sub>2</sub> H <sub>2</sub>	2,000 ppm	10 ppm	C <sub>2</sub> H <sub>2</sub>	-30 °C to 70 °C	20 to 95 %RH	-	-	
	6060 06	SHF-8601	Propylene	C <sub>3</sub> H <sub>6</sub>	2,000 ppm	10 ppm	C <sub>3</sub> H <sub>6</sub>	-30 °C to 70 °C	20 to 95 %RH	-	-	
	6060 07	SHF-8601	Normal hexane	C <sub>6</sub> H <sub>14</sub>	200 ppm	1 ppm	n-C <sub>6</sub> H <sub>14</sub>	-30 °C to 70 °C	20 to 95 %RH	-	-	
	6060 08	SHF-8601	Octane	C <sub>8</sub> H <sub>18</sub>	2,000 ppm	10 ppm	C <sub>8</sub> H <sub>18</sub>	-30 °C to 70 °C	20 to 95 %RH	-	-	
	6060 09	SHF-8601	Fluoromethane	CH <sub>3</sub> F	2,000 ppm	10 ppm	R-41	-30 °C to 70 °C	20 to 95 %RH	-	-	
	6060 10	SHF-8601	Difluoromethane	CH <sub>2</sub> F <sub>2</sub>	2,000 ppm	10 ppm	R-32	-30 °C to 70 °C	20 to 95 %RH	-	-	
	6060 11	SHF-8601	Difluoromethane	CH <sub>2</sub> F <sub>2</sub>	5,000 ppm	25 ppm	R-32	-30 °C to 70 °C	20 to 95 %RH	-	-	
	6060 12	SHF-8601	Isopropyl alcohol	C <sub>3</sub> H <sub>8</sub> O	2,000 ppm	10 ppm	IPA	-30 °C to 70 °C	20 to 95 %RH	-	-	
	6060 13	SHF-8601	Hexafluoro-1,3-butadiene	C <sub>4</sub> F <sub>6</sub>	2,000 ppm	10 ppm	C <sub>4</sub> F <sub>6</sub> (i-C <sub>4</sub> H <sub>10</sub> )	-30 °C to 70 °C	20 to 95 %RH	-	-	
	6060 14	SHF-8601	1,2-dichloroethylene	C <sub>2</sub> H <sub>2</sub> Cl <sub>2</sub>	600 ppm	5 ppm	C <sub>2</sub> H <sub>2</sub> Cl <sub>2</sub>	-30 °C to 70 °C	20 to 95 %RH	-	-	
	6060 18	SHF-8601	Carbon monoxide	CO	1,000 ppm	10 ppm	CO	0 °C to 70 °C	20 to 95 %RH	-	-	
	6060 15	SHF-8603	Hydrogen	H <sub>2</sub>	500 ppm	5 ppm	H <sub>2</sub>	-30 °C to 70 °C	20 to 95 %RH	-	-	Hydrogen selective
	6060 16	SHF-8603	Hydrogen	H <sub>2</sub>	1,000 ppm	10 ppm	H <sub>2</sub>	-30 °C to 70 °C	20 to 95 %RH	-	-	Hydrogen selective
	6060 03	SHF-8603	Hydrogen	H <sub>2</sub>	2,000 ppm	10 ppm	H <sub>2</sub>	-30 °C to 70 °C	20 to 95 %RH	-	-	Hydrogen selective
6060 17	SHF-8603	Deuterium	D <sub>2</sub>	2,000 ppm	10 ppm	D <sub>2</sub> (H <sub>2</sub> )	-30 °C to 70 °C	20 to 95 %RH	-	-	Hydrogen selective	
ESF	6100 28	ESF-A24RH	Hydrogen sulfide	H <sub>2</sub> S	30 ppm	0.2 ppm	H <sub>2</sub> S	-40 °C to 70 °C	40 to 95 %RH	×	-	High-humidity compatible sensor
	6100 04	ESF-A24R	Hydrogen sulfide	H <sub>2</sub> S	100 ppm	0.5 ppm	H <sub>2</sub> S	-40 °C to 70 °C	20 to 90 %RH	×	○	
	6100 06	ESF-A24A	Nitrogen dioxide	NO <sub>2</sub>	15 ppm	0.1 ppm	NO <sub>2</sub>	-40 °C to 70 °C	20 to 90 %RH	○	-	
	6100 34	ESF-X24P2	Oxygen	O <sub>2</sub>	25 %	0.1 %	N <sub>2</sub>	-40 °C to 70 °C*	20 to 90 %RH	×	-	
	6100 03	ESF-A24P	Carbon monoxide	CO	150 ppm	1 ppm	CO	-40 °C to 70 °C	20 to 90 %RH	×	-	
	6100 41	ESF-B22	Ammonia	NH <sub>3</sub>	75 ppm	0.5 ppm	NH <sub>3</sub>	-40 °C to 70 °C	30 to 80 %RH	○	-	
	6100 56	ESF-B22	Ammonia	NH <sub>3</sub>	150 ppm	0.5 ppm	NH <sub>3</sub>	-40 °C to 70 °C	30 to 80 %RH	○	-	
	6100 57	ESF-B22	Ammonia	NH <sub>3</sub>	400 ppm	1 ppm	NH <sub>3</sub>	-40 °C to 70 °C	30 to 80 %RH	○	-	
	6100 36	ESF-C92	Chlorine	Cl <sub>2</sub>	1.5 ppm	0.01 ppm	Cl <sub>2</sub>	-20 °C to 70 °C*	30 to 80 %RH	○	-	
	6100 58	ESF-C92	Chlorine	Cl <sub>2</sub>	3 ppm	0.02 ppm	Cl <sub>2</sub>	-20 °C to 70 °C*	30 to 80 %RH	○	-	
6100 59	ESF-C92	Chlorine	Cl <sub>2</sub>	10 ppm	0.1 ppm	Cl <sub>2</sub>	-20 °C to 70 °C*	30 to 80 %RH	○	-		

\*1 Use within the range of 55 °C to 70 °C is limited to a cumulative total of one week. If used for extended periods in an environment outside the range of -25 °C to -55 °C, allow the product to sufficiently acclimatize to the operating environment before calibration.

\*2 The compliance status for SIL certification, FM explosion-proof, and other performance ratings varies depending on the sensor. Please contact RIKEN KEIKI for more information.



## [SD-3 Series Specifications]

Model	Diffusion type	SD-3RI	SD-3NC	SD-3GH	SD-3GHS	SD-3SP	SD-3EC	SD-3ECS	SD-3ECB	
	Suction type	SD-3DRI	SD-3DNC	SD-3DGH	SD-3DGHs	SD-3DSP	SD-3DEC	SD-3DECS	SD-3DECB	
Detection principle		Non-dispersive infrared type	New ceramic type (catalytic type)	Semiconductor type		Hot-wire semiconductor type	Electrochemical type			
Detection target gas	Combustible gas/toxic gas/oxygen; detection range depends on detection target gas.									
Display	7-segment LED (5 digits) and 3-color lamps (red/green/yellow)									
Sampling method	Diffusion/Suction (introduced via an external unit)									
Set flow rate	0.4 to 1.5 L/min									
Gas alarm type	Two-step alarm (H-HH or L-LL), L-LL available for O <sub>2</sub> specifications only									
Fault alarm/self-diagnosis	System abnormality (E-9)/sensor abnormality (E-1)									
Warning	Sensor life assessment/clock abnormality diagnosis/communication diagnosis/sensor warning									
Gas concentration output	Standard	Gas concentration output (4 to 20 mA with HART), 4 to 20 mA DC (non-insulated, linear output), load resistance 600 Ω or less, maximum resolution 250 divisions (depending on specifications)								
	Option	RS-485 (half duplex)								
Contact output (optional)	SPDT (2 alarms, 1 fault output operation), 250 V 2 A AC, 30 V 1 A DC (resistance load), minimum load 5 V 0.1 A DC									
Power source	24 V DC (18 to 30 V DC)									
Power consumption	Maximum 3.8 W	Maximum 4.5 W	Maximum 4.5 W	Maximum 4.5 W	Maximum 3.5 W	Maximum 2.8 W	Maximum 2.8 W	Maximum 3.1 W		
Cable connectors	Japan Ex: Pressure-proof seal cable glands (M20 × 1.5) (Compatible cable outer diameter 6.0 to 12.0 mm) / (M25 × 1.5) (Compatible cable outer diameter 12.0 to 16.0 mm) ATEX/IECEX: M25 × 1.5, adapters (option): NPT3/4, NPT1/2, M20 × 1.5									
Operating temperature/humidity range*1	Japan Ex: -20 °C to +70 °C (no sudden changes), ATEX/IECEX: -40 °C to +70 °C (no sudden changes), 0 to 95 %RH (no condensation) or, in accordance with sensor specifications if restrictions apply									
Housing material	SCS14 stainless steel (equivalent to SUS316)									
Protection level	IP66/67 equivalent									
External dimensions (excluding cable gland projections)	Diffusion type	Approximately 171 (W) × 277 (H) × 127 (D) mm							Approximately 171 (W) × 322 (H) × 127 (D) mm	
	Suction type	Approximately 171 (W) × 289 (H) × 127 (D) mm							Approximately 171 (W) × 334 (H) × 127 (D) mm	
Weight (excluding cable glands)	Diffusion type	Approximately 6.7 kg							Approximately 7.3 kg	
	Suction type	Approximately 7.0 kg							Approximately 7.6 kg	
Explosion-proof construction	Flame-proof enclosure								Flame-proof enclosure + Intrinsically safe explosion-proof construction	
Explosion-proof certification	ATEX	II 2 G Ex db IIC T6...T5 Gb	II 2 G Ex db IIC T5...T4 Gb	II 2 G Ex db IIC T5...T4 Gb	II 2 G Ex db IIC T6...T4 Gb	II 2 G Ex db IIC T5...T4 Gb	II 2 G Ex db IIC T4 Gb	II 2 G Ex db IIC T4 Gb	II 2 G Ex db ia IIC T4 Gb	
	IECEX	Ex db IIC T6...T5 Gb	Ex db IIC T5...T4 Gb	Ex db IIC T5...T4 Gb	Ex db IIC T6...T4 Gb	Ex db IIC T5...T4 Gb	Ex db IIC T4 Gb	Ex db IIC T4 Gb	Ex db ia IIC T4 Gb	
	Japan Ex	Ex db IIC T5 Gb	Ex db IIC T4 Gb	Ex db IIC T4 Gb	-	Ex db IIC T4 Gb	Ex db IIC T4 Gb	Ex db IIC T4 Gb	Ex db ia IIC T4 Gb	
Functional safety IEC 61508*2	SIL2 compliant (SIL3 compliant with redundancy)	SIL2 compliant (SIL3 compliant with redundancy)	-	-	-	-	SIL2 compliant (SIL3 compliant with redundancy)	SIL2 compliant (SIL3 compliant with redundancy)	SIL2 compliant (SIL3 compliant with redundancy)	
Certifications	CE marking									
Communication	HART communication (HART7), Modbus communication (RS-485)									

\*1 Operating temperature range for SD-3GHS and SD-3DGHs is -40 °C to +47 °C (no sudden changes).

\*2 Select SIL certified external units when used in conjunction with suction types. For information on target gases, refer to the F sensor list.

## [Remote type: SD-3SC + GD-3 Series Specifications]

Model	Main unit	SD-3SC								
	Remote sensor unit	GD-3RI	GD-3NC	GD-3GH	GD-3GHS	GD-3SP	GD-3EC	GD-3ECS	GD-3ECB	
Detection principle		Non-dispersive infrared type	New ceramic type (catalytic type)	Semiconductor type		Hot-wire semiconductor type	Electrochemical type			
Detection target gas	Combustible gas/toxic gas/oxygen; detection range depends on detection target gas.									
Display	7-segment LED (5 digits) and 3-color lamps (red/green/yellow)									
Sampling method	Diffusion type									
Gas alarm type	Two-step alarm (H-HH or L-LL), L-LL available for O <sub>2</sub> specifications only									
Fault alarm/self-diagnosis	System abnormality (E-9)/sensor abnormality (E-1/E-1A)									
Warning	Sensor life assessment/clock abnormality diagnosis/communication diagnosis/sensor warning									
Gas concentration output	Standard	Gas concentration output (4 to 20 mA with HART), 4 to 20 mA DC (non-insulated, linear output), load resistance 600 Ω or less, maximum resolution 250 divisions (depending on specifications)								
	Option	RS-485 (half duplex)								
Contact output (optional)	SPDT (2 alarms, 1 fault output operation), 250 V 2 A AC, 30 V 1 A DC (resistance load), minimum load 5 V 0.1 A DC									
Remote cable	Shielded twisted pair cable 1.25sq (1.308 mm <sup>2</sup> /AWG16), maximum 20 m between main unit (SD-3SC) and remote sensor unit (GD-3)									
Power source	24 V DC (18 to 30 V DC)									
Power consumption	Main unit	Maximum 5.0 W								
	Remote sensor unit	Maximum 1.2 W	Maximum 2.0 W	Maximum 2.0 W	Maximum 2.0 W	Maximum 1.0 W	Maximum 1.0 W	Maximum 1.0 W	Maximum 1.0 W	
Cable connectors	Japan Ex: Pressure-proof seal cable glands (M20 × 1.5) (Compatible cable outer diameter 6.0 to 12.0 mm) / (M25 × 1.5) (Compatible cable outer diameter 12.0 to 16.0 mm) ATEX/IECEX: M25 × 1.5, adapters (option): NPT3/4, NPT1/2, M20 × 1.5									
Operating temperature/humidity range*1	Japan Ex: -20 °C to +70 °C (no sudden changes), ATEX/IECEX: -40 °C to +70 °C (no sudden changes), 0 to 95 %RH (no condensation) or, in accordance with sensor specifications if restrictions apply									
Housing material	SCS14 stainless steel (equivalent to SUS316)									
Protection level	IP66/67 equivalent									
External dimensions (excluding cable gland projections)	Main unit	Approximately 171 (W) × 193 (H) × 127 (D) mm							Approximately 125 (W) × 240 (H) × 88 (D) mm	
	Remote sensor unit	Approximately 125 (W) × 195 (H) × 88 (D) mm							Approximately 125 (W) × 240 (H) × 88 (D) mm	
Weight (excluding cable glands)	Main unit	Approximately 6.0 kg								
	Remote sensor unit	Approximately 3.0 kg							Approximately 4.0 kg	
Explosion-proof construction	Main unit	Flame-proof enclosure								
	Remote sensor unit	Flame-proof enclosure								Flame-proof enclosure + Intrinsically safe explosion-proof construction
Explosion-proof certification	ATEX	II 2 G Ex db IIC T6...T5 Gb	II 2 G Ex db IIC T5...T4 Gb	II 2 G Ex db IIC T5...T4 Gb	II 2 G Ex db IIC T6...T4 Gb	II 2 G Ex db IIC T5...T4 Gb	II 2 G Ex db IIC T4 Gb	II 2 G Ex db IIC T4 Gb	II 2 G Ex db ia IIC T4 Gb	
	IECEX	Ex db IIC T6...T5 Gb	Ex db IIC T5...T4 Gb	Ex db IIC T5...T4 Gb	Ex db IIC T6...T4 Gb	Ex db IIC T5...T4 Gb	Ex db IIC T4 Gb	Ex db IIC T4 Gb	Ex db ia IIC T4 Gb	
	Japan Ex	Ex db IIC T5 Gb	Ex db IIC T4 Gb	Ex db IIC T4 Gb	-	Ex db IIC T4 Gb	Ex db IIC T4 Gb	Ex db IIC T4 Gb	Ex db ia IIC T4 Gb	
Functional safety IEC 61508*2	SIL2 compliant (SIL3 compliant with redundancy)	SIL2 compliant (SIL3 compliant with redundancy)	-	-	-	-	SIL2 compliant (SIL3 compliant with redundancy)	SIL2 compliant (SIL3 compliant with redundancy)	SIL2 compliant (SIL3 compliant with redundancy)	
Certifications	CE marking									
Communication	HART communication (HART7), Modbus communication (RS-485)									

\*1 Operating temperature range for SD-3SC and GD-3GHS is -40 °C to +47 °C (no sudden changes).

\*2 For information on target gases, refer to the F sensor list.

## [Terminal specifications: Power supply + 4 to 20 mA signal (with HART communication)]

<Using 3-core cable>

Terminal No.	Power supply/signal cable connection
1	Power supply (+)
2	Common (Power supply (-), signal (-))
3	Signal (+)

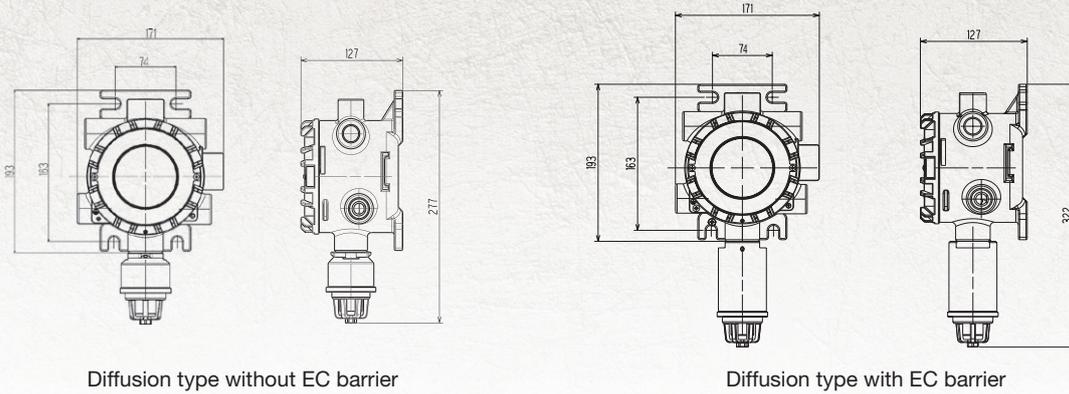
<Using 4-core cable>

Terminal No.	Power supply/signal cable connection
1	Power supply (+)
2	Power supply (-)
3	Signal (+)
4	Signal (-)

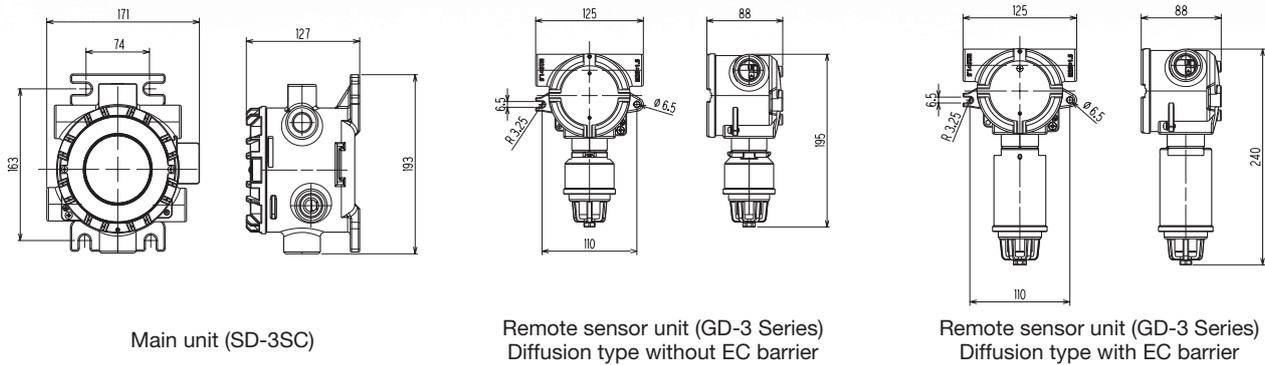
## [Terminal specifications: Contact output (3c)]

Terminal No.	Cable connection
1	N.O. (Normally open)
2	Common
3	N.C. (Normally closed)

SD-3 Series exterior drawings (excluding cable glands)



Remote type: SD-3SC + GD-3 Series exterior drawings (excluding cable glands)



Optional accessories

	<b>Part No.: 4283 9011 00</b> Calibration adapter (for IRF sensor) Calibration adapter for the SD-3RI <Materials> Body: PP, nipple: stainless steel/Teflon
	<b>Part No.: 4283 9012 70</b> Calibration adapter (for NCF/SGF/SHF sensors) Calibration adapter for the SD-3NC/GH/GHS/SP <Materials> Body: PP, nipple: stainless steel/Teflon
	<b>Part No.: 4283 9013 40</b> Calibration adapter (for ESF sensor) Calibration adapter for the SD-3EC/ECS/ECB <Materials> Body: PP, nipple: stainless steel/Teflon
	<b>Part No.: 4283 9019 80 (for wall)/4283 9045 60 (for pipe)</b> Protective cover Cover for protecting the SD-3 main unit <Material> SUS316
	<b>Part No.: 4283 9015 90</b> Sunshade Cover to minimize rise in temperature due to direct sunlight or radiant heat <Material> SUS316
	<b>Part No.: 4283 9018 10</b> Blanking plug M25 x 1.5 blanking plug <Material> Equivalent to SUS316
	<b>Part No.: 4283 9058 70</b> Adapter*4 Adapter for converting M25 x 1.5 threads to 1/2NPT threads <Material> Equivalent to SUS316
	<b>Part No.: 4283 9057 00</b> Adapter*4 Adapter for converting M25 x 1.5 threads to 3/4NPT threads <Material> Equivalent to SUS316
	<b>Part No.: 4283 9047 10</b> Adapter*4 Adapter for converting M25 x 1.5 threads to M20 x 1.5 threads <Material> Equivalent to SUS316
	<b>Part No.: 2905 2439 10</b> For HART communication Cable Connector cable used when connecting a HART modem
	<b>Part No.: 0717 0319 40</b> Tag plate with wire chain SUS316 tag plate
	<b>Part No.: 4283 9076 10</b> Splash guard (for IRF sensor) Cover for protecting sensors against water and dust *1 is marked on the underside of the guard. <Material> Resin

	<b>Part No.: 4283 9077 80</b> Splash guard (for NCF/SGF/SHF sensors) Cover for protecting sensors against water and dust *2 is marked on the underside of the guard. <Material> Resin
	<b>Part No.: 4283 9078 50</b> Splash guard (for ESF sensor) Cover for protecting sensors against water and dust *3 is marked on the underside of the guard. <Material> Resin
	<b>Part No.: 4383 0030 20</b> Silicone removal filter (SI-8)*1 Filter for SD-3NC/GH/GHS/SP for removing trace amounts of silicone from the air. This can extend sensor life.*2
	<b>Part No.: 4383 0040 10</b> Activated carbon filter (CF-8304)*1 Filter for SD-3NC/GH/GHS/SP for removing trace amounts of silicone from the air. Fitting the filter extends the sensor service life. The silicone removal capability of this filter exceeds that of the silicone removal filter.*3 It can also be used to remove interference gas. This minimizes interference effects from gases other than the detection target gas.
	<b>Part No.: 4262 9674 10 (for GD-3RI) 4262 9675 90 (for GD-3NC/GH/SP) 4262 9676 60 (for GD-3EC)</b> Duct mounting kit Kit for installing the remote sensor head inside a duct <Material> SUS316
	<b>Part No.: 4283 9055 50</b> Lightning arrester*4 (TP48-3-N-NDI) Device for limiting instantaneous overvoltage due to lightning With adapter (M25 x 1.5 → 1/2NPT)
	<b>Part No.: 4283 9056 20</b> Lightning arrester*4 (TP48-4-N-NDI) Device for limiting instantaneous overvoltage due to lightning With adapter (M25 x 1.5 → 1/2NPT)
	<b>Part No.: 2564 0125 10</b> Fuse Littelfuse fuse (1.25 A, 100 V DC)
	<b>Part No.: 4283 9046 30</b> U-bolt components U bolt, spring washer, and hex nut used for mounting the main unit on a pole (size: 50A (2B)) <Material> SUS316
	<b>Part No.: 4283 4319 20</b> GD-3 mounting bracket Bracket used for mounting the GD-3 with splash guard fitted to a wall
	<b>Part No.: 4283 9162 60</b> Waterproof cap Waterproof cap to protect the sensor with a rating equivalent to IP66/67 <Material> Resin*5, 6

\*1 We recommend fitting a splash guard when using a filter.  
 \*2 Installing the silicone removal filter will limit the target gases that can be detected.  
 \*3 The range of target gases that can be detected will be more limited than when the silicone removal filter is fitted.  
 \*4 Not supported for Japan Ex  
 \*5 Compatible sensors: ESF (H2S), IRF, SGF (CS2), SHF  
 \*6 Performance specifications will not be met with the waterproof cap in place.

## Accessories

	Name	Quantity	Part No.	Description
	Control key	*	4286 9200 80	Key used to operate the product
	Operating lever	×1	2594 0481 90	Tool used to connect cables to the terminal plate
	Hex key wrench (2 across flats)	*	1510 5020 40	Tool used to tighten M4 hex socket set screws

\* The number will differ depending on the number of units purchased. 1 to 10 units: ×1, 11 to 20 units: ×2, 21 to 50 units: ×3, 51 or more units: ×4

## Order information

SD-3 ① ② (③ ④ ⑤ ⑥ ⑦ ⑧)

Explosion-proof application type

[Remote type: Main unit (SD-3SC) + Sensor unit (GD-3 Series)]

SD-3SC (③ ④ ⑤ ⑥ ⑦ ⑧)

GD-3 ②

① Diffusion type/suction type selection	
Blank	Diffusion
D	Suction type (introduced via an external unit)
② Sensor type selection	
RI	Non-dispersive infrared absorption type
NC	New ceramic type (catalytic type)
GH	Semiconductor type
GHS	Semiconductor type (selectable for CS <sub>2</sub> only) <sup>*5</sup>
SP	Hot-wire semiconductor type
EC	Electrochemical type (selectable for CO/O <sub>2</sub> only)
ECS	Electrochemical type (selectable for H <sub>2</sub> S only)
ECB	Electrochemical type (selectable for gases other than CO/O <sub>2</sub> /H <sub>2</sub> S)
③ Cable connectors (See diagram on right.)	
0	Connector 1 + Connector 2
1	Connector 1 + Connector 2 + Connector 4 + Connector 5
④ Explosion-proof	
1	ATEX/IECEX
2	FM (US) [Zone] <sup>*1 *2</sup>
3	Japan Ex <sup>*5</sup>
4	cFM (Canada) [Zone] <sup>*1 *2</sup>
5	-
6	Taiwanese explosion-proof (TS)
7	Chinese explosion-proof

⑤ Functional safety IEC 61508	
0	N/A
1	SIL <sup>*1 *3</sup>
⑥ Certifications	
0	N/A
1	EN performance <sup>*1 *3</sup>
2	US/Canada performance <sup>*1 *3</sup>
3	IEC performance <sup>*1 *3</sup>

⑦ Range setting	
0	Single range
1	Double range + 4-16 (selectable with NC only) <sup>*4</sup>
2	Double range + L4-20 (selectable with NC only) <sup>*4</sup>
3	Double range + H4-20 (selectable with NC only) <sup>*4</sup>
⑧ Output type selection	
0	4 to 20 mA with HART
1	4 to 20 mA with HART + contact (3c)
2	4 to 20 mA + RS-485

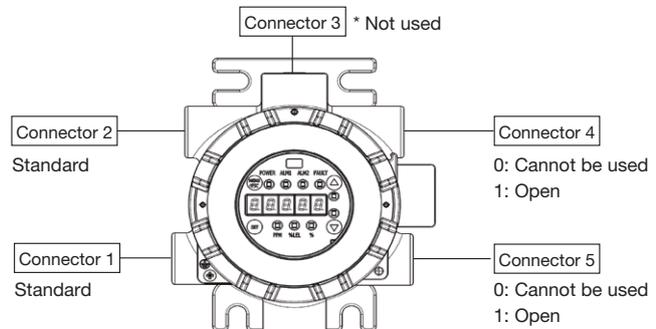
\*1 Compliance status varies depending on sensor. Please contact RIKEN KEIKI for more information.

\*2 When FM (US) or cFM (Canada) is selected, select 2 for "⑥ Certifications".

\*3 When SIL or performance certification is selected, 1 to 3 are not available for "⑦ Range setting".

\*4 HART communication is not available when double range is selected.

\*5 Japan Ex is not available when GHS is selected.



Example: Cable connectors

\* Connectors must always be blanked off with blanking plugs (sold separately) when not in use.

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\* The contents described in this catalog are subject to change without notice according to the performance improvement.

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