

FIS3092 series Gas sensor module SPECIFICATIONS

1st edition

Model No.	FIS3092 series
Product Name	Gas sensor module
Spec. No.	U-1703-XX
Issued on	December 11, 2019
Applied product	for general purposes



Document	Date	By
Created	March 9, 2017	Harumi Kuribayashi
Approved	March 9, 2017	Yasushi Kuroe
Issued		



SPECIFICATIONS		Nissha FIS, Inc.																				
Parts Name	Gas sensor module	Specification No.																				
Model	FIS3092 series	U-1703-XX																				
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SPECIFICATIONS		Nissha FIS, Inc.
Parts Name	Gas sensor module	Specification No.
Model	FIS3092 series	U-1703-XX
1. Scope This specification applies to gas sensor module, FIS3092 series. 2. Product name・model number Product name : Gas sensor module Model number: FIS3092 series Reference ; Code explanation) FIS 30 92 -YY ZZ -AA /BB (H) Sensor mounted direction (H) : Sensor is horizontally soldered, only NC types are available (blank) : Sensor is perpendicularly soldered Alarm concentration Alarm design value is shown in a one-100th ●YY=00 (blank) ●YY=99 2nd alarm output Alarm concentration Alarm design value is shown in a one-100th ●YY=00 alarm output ●YY=99 1st alarm output With or without case C4 : with waterproofing case NC : without case Type of the output -00 : Alarm point -99 : Gas concentration		

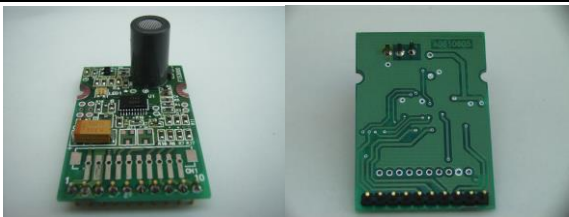
SPECIFICATIONS			Nissha FIS, Inc.
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Model FIS3092 series		U-1703-XX	

3. Absolute maximum ratings

Parameter	Symbol	Maximum Rating	Remark
Power supply voltage	VDD	-0.3V ~ 6.0V	
Input voltage	VIN	-0.3V ~ VDD+0.3V	
Output voltage	VOUT	-0.3V ~ VDD+0.3V	
High temperature	Ta	120℃ 10 seconds	
Operating temperature range	Top	-10 ~ 50℃	Without dew condensation
Storage temperature range	Tst	-40 ~ 60℃	Without dew condensation
Others	Should not be exposed to organic solvents such as IPA, and silicon compound.		

4. Recommended driving conditions

Parameter	Symbol	Condition	Remark
Power supply	VDD	DC5.0V±2%	
Average current consumption	Ip	35mA	Rush current 1A, during 0.17msec. every 5msec.
High-level IO voltage	VIOH	VDD×0.8~VDD	
Low-level IO voltage	VIOL	0V ~ VDD×0.2	Output current 5mA
Pre-heating time before gas alarm inspection		More than 24 hours	Pre-heating is unnecessary for easy inspection
Mounting direction		Permitted in any direction	

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5. External view		
without case, NC type		
Appearance		
Header Pin	Parts number : T10B-SQ, Manufacturing Corporation : JST Pin pitch : 2.54mm	
Dimensions	28×41×20 (H) mm	
Weight	5 g	
Mounting method	Solder pins to PCB. Fill two holes with screws or hot-melt adhesive.	
with case, C4 type		
Appearance		
Characteristic	The gas sensor module is put in a special waterproof case.	
Parts number of connector	Male connector on gas sensor module Parts number : BH10B-PASK, Manufacturing Corporation : JST Female connector Parts number : PAP-10V-S Manufacturing Corporation : JST	
Dimensions	31×44×20 (H) mm	
Weight	19 g	
Mounting method	Fix gas sensor module with φ 5mm screws to two existing holes.	

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10. Gas concentration output specifications

Gas concentration output is possible only for type YY=99, not type YY=00, gas concentration output range is as follows.

Model number	Detecting gas	Gas concentration output range
FIS3092-99 series	H ₂ S	0, 10-1000ppm

11. Malfunction output (MAL)

- Sensor is always checked for malfunction. In case of malfunction, LED(RED) and LED(GREEN) alternatively blink at intervals of 0.25 seconds.
- When the sensor recovers, malfunction signal is automatically cancelled.
- This terminal is connected to a pull-up resistor in the gas sensor module. If this terminal not use, it should be left.

12. RESET (RESET)

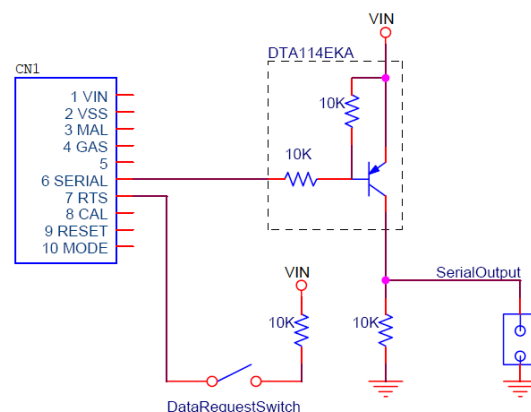
- By inputting "Low signal" the operation is reset and then re-started from the initial operation.
- This terminal is connected to a pull-up resistor in the gas sensor module. If this terminal not use, it should be left.

13. Non-use terminals (CAL) (MODE)

- These terminals are prepared only for FIS factory manufacturing. Do not use them for mass production in your factory.
- These terminals are connected to a pull-up resistor in the gas sensor module. It should be left.

14. Quality data (SERIAL) (RST)

- This terminal output is for the serial data such as the gas sensor signal for quality confirmation. Do not use this for mass-production and FIS does not guarantee this. This terminal does not connect to VDD and GND.
- There are two kinds of serial output of "Normal serial mode" and "Experiment serial mode". If this terminal is LOW(0V), it starts "Normal serial mode" at the time of power on, and input HI to RST terminal for more than 75 milliseconds this will release one set of the latest serial data. If this terminal is HI(5V), it starts "Experiment serial mode" at the time of power on, and continually flow the serial data every 0.2 seconds.
- Transmitting protocol: 9600bps, 8bit, none parity, stop bits 1, no flow control, 0 to 5V DC, ASCII, Active Hi
- Reverse the output of terminal (SERIAL) with a transistor to see the serial output in Hyper Terminal.



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15. Serial output specifications

15.1 Normal serial mode

※※Normal serial mode starts with terminal(RST) as LOW(0V) at the time of power on.

15.1.1 FIS3092-00NC-03 or FIS3092-00C4-03

【Contents of serial output】

Header	Byte No.	Value	Contents
TABS	0 – 3	4 byte ASCII string	Sensor data, 0~1024 (e.g. 1002)
	4	0x09	Tab
temp	5 – 7	3 byte ASCII string	Temperature, -40~+60 (e.g. +25)
	8	0x09	Tab
date	9 – 12	4 byte ASCII string	Used days, 0~9999
	13	0x09	Tab
AL1	14 – 15	2 byte ASCII string	The accumulation number of alarms, 0~99
	16	0x09	Tab
stat	17 – 18	2 byte ASCII string	Status code
	19 – 20	0x0D 0x0A	CR/LF

【An example of serial signal】

```

Rev RX.XX FIS3092-00ZZ-AA
Cal[abs] 800 0600
0000 0000 -02 0000
ABS temp date AL1 stat
1002 +25 0000 00 05
1002 +25 0000 00 05
1002 +25 0000 00 05
1002 +25 0000 00 05
1002 +25 0000 00 00
1002 +25 0000 00 00
1002 +25 0000 00 00

```

【Meaning of data】

```

Rev          : Software number
Cal[abs]     : Sensor data at calibration
ABS          : Sensor data
temp         : Temperature
date        : Used days
AL1          : The accumulation number
              : of alarms
stat         : Status code

```

【Meaning of status code】

Stat	Contents
00	Normal serial mode
01	Experiment serial mode.
02	No gas detecting period (Switching of load resistance)
03	No gas detecting period (Switching of load resistance)
05	Warm up
21	Alarm
41	Sensor malfunction
44	Poisoned by silicon compound
91※1	If exposed to high concentration gas, the heater will stop.

※1 Not applied in FIS3051

SPECIFICATIONS		Nissha FIS, Inc.
Parts Name	Gas sensor module	Specification No.
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15..1.2 FIS3092-99NC-01/03 or FIS3092-99C4-01/03

【Contents of serial output】

Header	Byte No.	Value	Contents
GAS	0 – 3	4 byte ASCII string	Gas concentration ppm, (e.g. 0100)
	4	0x09	Tab
temp	5 – 7	3 byte ASCII string	Temperature, -40~+60 (e.g. +25)
	8	0x09	Tab
date	9 – 12	4 byte ASCII string	Used days, 0~9999
	13	0x09	Tab
AL1	14 – 15	2 byte ASCII string	The accumulation number of 1st alarms, 0~99
	16	0x09	Tab
AL2	14 – 15	2 byte ASCII string	The accumulation number of 2nd alarms, 0~99
	16	0x09	Tab
stat	17 – 18	2 byte ASCII string	Status code
	19 – 20	0x0D 0x0A	CR/LF

【An example of serial signal】

```

Rev RX.XX FIS30XX-YYZZ-AA/BB
Cal[abs] 800 700 600 400 0600
0000 0000 -02 0000
GAS temp date AL1 AL2 stat
0000 +25 0000 00 00 05
0000 +25 0000 00 00 05
0000 +25 0000 00 00 05
0000 +25 0000 00 00 05
0000 +25 0000 00 00 00
0000 +25 0000 00 00 00

```

【Meaning of data】

```

Rev      : Software number
Cal[abs] : Sensor data at calibration
GAS      : Gas concentration(%)
temp     : Temperature
date     : Used days
AL1      : The accumulation number of 1st alarms
AL2      : The accumulation number of 2nd alarms
stat     : Status code

```

【Meaning of status code】

Stat	Contents
00	Normal serial mode
01	Experiment serial mode.
02	No gas detecting period (Switching of load resistance)
03	No gas detecting period (Switching of load resistance)
05	Warm up
21	1st alarm
22	2nd alarm
41	Sensor malfunction
44	Poisoned by silicon compound
91※1	If exposed to high concentration gas, the heater will stop.

※1 Not applied in FIS3051

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15..2 Experiment serial mode

※※Experiment serial mode starts with terminal(RST) as HI(5V) at the time of power on.

15..2.1FIS3092-00NC-03 or FIS3092-00C4-03

【Contents of serial output】

header	Byte No.	Value	Contents
time	0 – 4	5 byte ASCII string	Sampling number of data (e.g. H0000)
	5	0x09	Tab
NO	6 – 9	4 byte ASCII string	Identification gas sensor module number (e.g. 0000)
	10	0x09	Tab
ABS	11 – 14	4 byte ASCII string	Sensor data, 0~1024 (e.g. 0739)
	15	0x09	Tab
TABS	16 – 19	4 byte ASCII string	Compensated sensor data, 0~1024 (e.g. 1010)
	20	0x09	Tab
temp	21 – 23	3 byte ASCII string	Temperature, -40~+60 (e.g. +25)
	24	0x09	Tab
data	25 – 28	4 byte ASCII string	Used days, 0~9999
	29	0x09	Tab
AL1	30 – 31	2 byte ASCII string	The accumulation number of alarms, 0~99
	32	0x09	Tab
stat	33 – 34	2 byte ASCII string	Status code
	35	0x09	Tab
	36 – 38	3 byte ASCII string	FIS management data
	39	0x09	Tab
	40 – 43	4 byte ASCII string	FIS management data
	44 – 45	0x0D 0x0A	CR/LF

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16. LED output specifications

- The following is common to all model numbers and specifications

Item	Contents
Initial operation	LED(GREEN) blinks at an interval of 0.5 seconds and LED(RED) off.
Normal operation	LED(GREEN) lights, and LED(RED) off.
Malfunction	LED(GREEN) and LED(RED) alternatively blink at an interval of 0.25 seconds.

- In case of FIS3092- 00ZZ-AA

Item	Contents
alarm	LED(GREEN) and LED(RED) blinks at the same interval of 1 second (ORANGE blink)

- In case of FIS3092- 99ZZ-AA/BB

Item	Contents
1st alarm	LED(GREEN) and LED(RED) blinks at the same interval of 1 second (ORANGE blink)
2nd alarm	LED(GREEN) and LED(RED) blinks at the same interval of 0.5 second (ORANGE blink)

17. Mechanical characteristics

No.	Parameter	Contents, conditions	Criteria
1	Tensile strength	Tensile strength between gas sensor and PCB, and between connector and PCB	More than 9.8N (1kgf)
2	Vibration	Acceleration: 1.3G Frequency range: 5 to 500Hz Condition of changing the sweep: Logarithmic Direction of vibration: 3 dimensions (X, Y, Z) Duration of sweep: 40min Duration time : 1hr in each direction	Should satisfy the alarm specifications.
3	Drop and impact	Drop from a height of 1m Floor material: Concrete Number of drops: 3 times	Should satisfy the alarm specifications.

SPECIFICATIONS

Nissha FIS, Inc.

Parts Name Gas sensor module

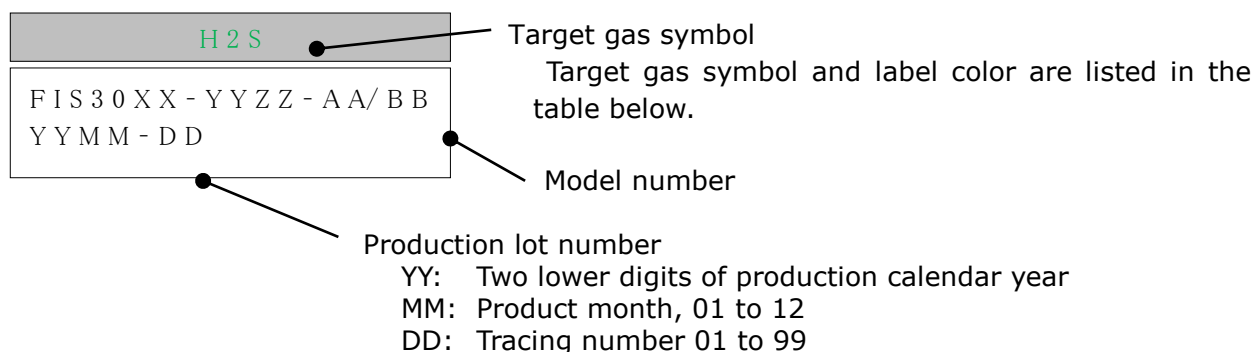
Specification No.

Model FIS3092 series

U-1703-XX

18. Label

A label as below is attached to the gas sensor module.



Model number	Target gas symbol	label color
FIS3092-YYZZ-AA/BB	H2S	Gray

19. Anti-humidity material

Anti-humidity material is applied to gas sensor module where necessary.

20. Notes

1. When the gas sensor module is used for mass-production, connect an electrolytic capacitor (more than 470 uF) to power supply line (VIN). Rush current 1A flows through during 0.17milliseconds every 5milliseconds.
2. When more than two gas sensor modules are connected to a single power supply for incoming inspection or other purposes, connect an electrolytic capacitor (More than 470 uF) to all the gas sensor module power supply line (VIN), one capacitor to one line.
3. Keep any paints, solvents, and silicone bonding agents away from the gas sensor module to prevent the malfunction.

21. Related documents

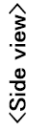
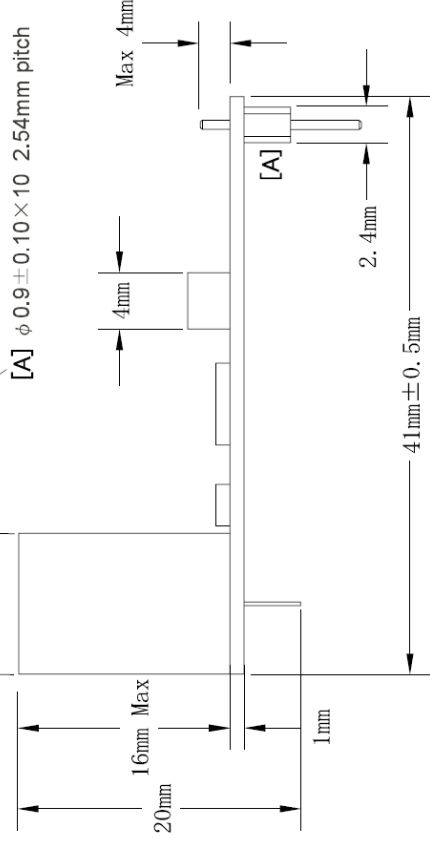
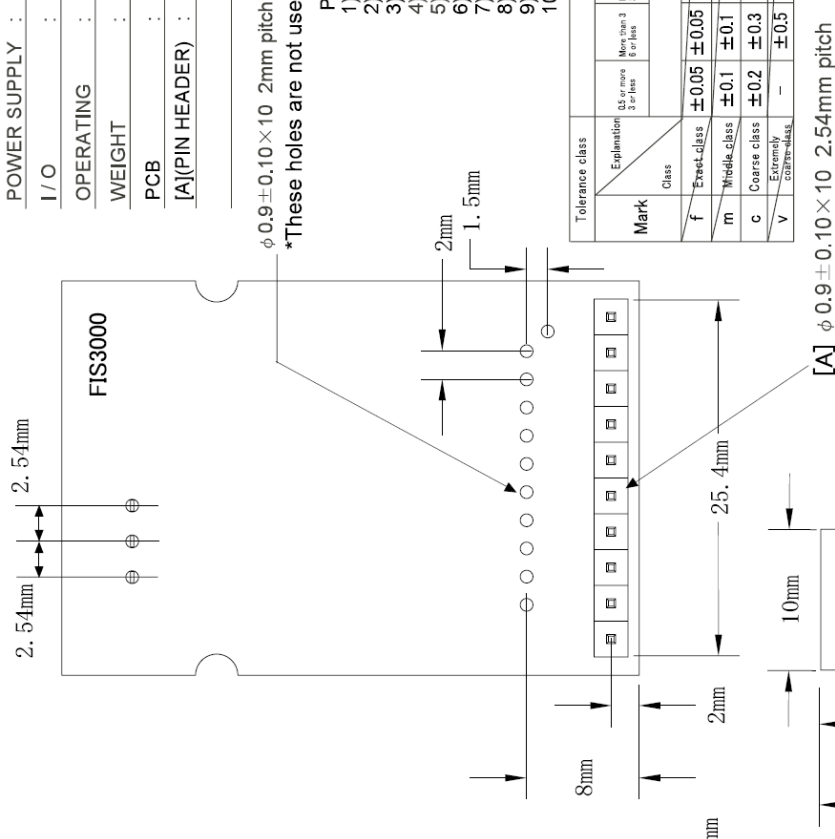
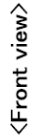
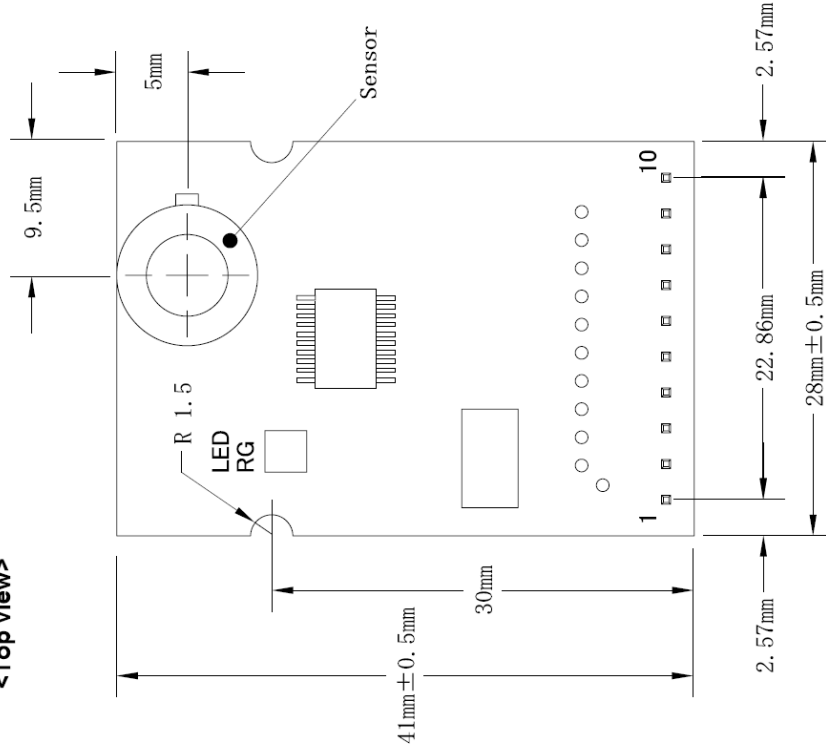
1. Product drawing : (as per enclosure)
2. Circuit drawing : (as per enclosure)

22. Timing chart

The timing chart is non-disclosure for the Nissha FIS know-how and Nissha FIS intellectual property protection.

23. Quality assurance

This product shall keep basic performance as a gas sensor module for a period of 7 years.



Tolerance class		Division of basic size							
Mark	Explanation	Tolerance							
	Class	More than 3 0.5 or more 3 or less	More than 3 8 or less	More than 3 30 or less	More than 30 120 or less	More than 120 400 or less	More than 400 2000 or less	More than 2000 4000 or less	
f	Exact class	± 0.05	± 0.05	± 0.1	± 0.15	± 0.2	± 0.3	± 0.5	—
m	Whole class	± 0.1	± 0.1	± 0.2	± 0.3	± 0.5	± 0.8	± 1.2	± 2
c	Coarse class	± 0.2	± 0.3	± 0.5	± 0.8	± 1.2	± 2	± 3	± 4
v	Extremely coarse class	—	± 0.5	± 1	± 1.5	± 2.5	± 4	± 6	± 8

Pin	Specification
1	VDD (Power supply)
2	VSS (GND)
3	MAL (Malfunction output)
4	AL1 (Alarm output)
5	AL2 (Alarm output)
6	SERIAL (Non-use)
7	RST (Non-use)
8	CAL (Non-use)
9	RESET (Non-use)
10	MODE (Non-use)

T10B-SQ(JST)

APPLICATION	:	SENSOR MODULE
GAS SENSOR	:	SB SERIES
POWER SUPPLY	:	5.0VDC +/- 2%
I/O	:	0V / 5VDC
OPERATING	:	-10°C to +50°C
WEIGHT	:	5 g
PCB	:	FR-4 28X41 1.0t 94V-0
[A](PIN HEADER)	:	T10B-SQ(JST)

PRODUCT NAME

FIS30XX-YYNC

SCALE	UNIT
FREE	
DRAWN	CHECKED
Y.KUROE	S.MATSUMOTO
8/MAR/2017	

Fis

JAPAN

Connector Pin Specification

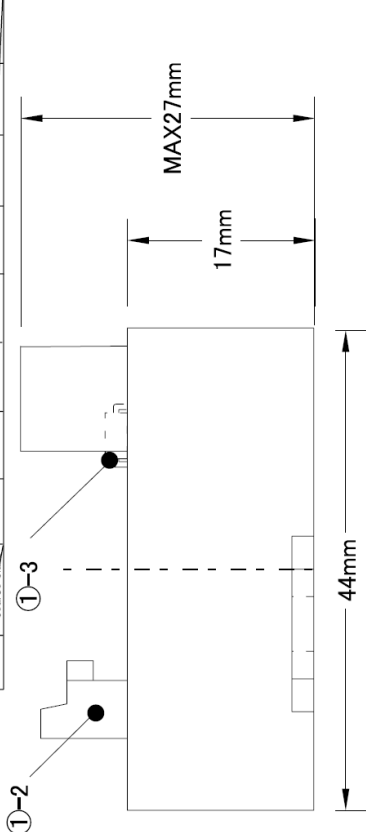
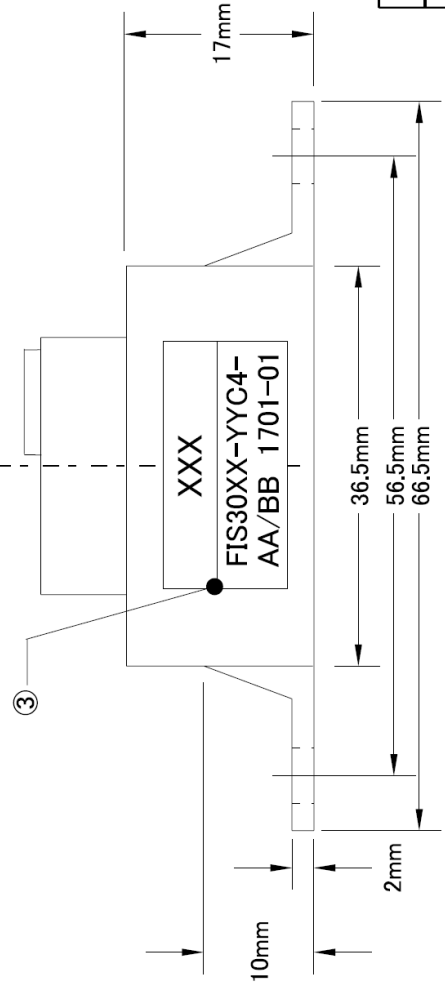
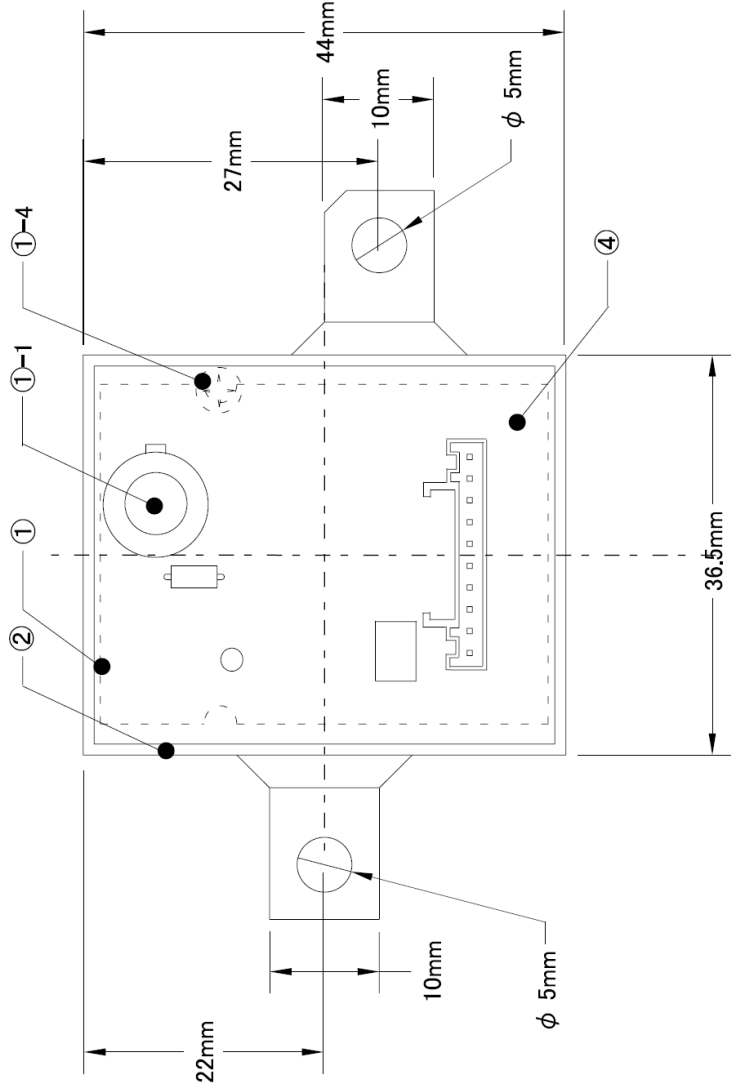
- 1) VDD (Power supply)
- 2) VSS (GND)
- 3) MAL (Malfunction output)
- 4) AL1 (Alarm output)
- 5) AL2 (Alarm output)
- 6) SERIAL (Non-use)
- 7) RST (Non-use)
- 8) CAL (Non-use)
- 9) RESET (Non-use)
- 10) MODE (Non-use)

APPLICATION	: SENSOR MODULE
GAS SENSOR	: SB SERIES
POWER SUPPLY	: 5.0VDC +/- 2%
I / O	: 0V / 5VDC
OPERATING TEMP	: -10°C to +50°C
WEIGHT	: Approx. 19g

RoHS Compliant

PARTS NAME	SPECIFICATION	FLAME RETARDANT
① PCB ASSY	28mm x 41mm 1.0T FR-4	INORGANIC CHEMICAL
①-1 SENSOR	SB SERIES	INORGANIC CHEMICAL
①-2 CONNECTOR	JST BH10B-PASK-1	BROMINE CHEMICAL
①-3 THERMISTOR	10KΩ 3960K	
①-4 SCREW	M2.6-6mm 1pc.	
② CASE	ABS, GLAY	INORGANIC CHEMICAL
③ LABEL	WOODFREE PAPER	
④ POTTING MATERIAL	URETHANE BLACK	INORGANIC CHEMICAL BROMINE CHEMICAL AND PHOSPHORUS CHEMICAL

Division of basic size					
Tolerance class	0.5 or more 3 or less	More than 3 6 or less	More than 6 30 or less	More than 30 120 or less	More than 120 400 or less
Mark	Explanation	More than 3 6 or less	More than 6 30 or less	More than 30 120 or less	More than 120 400 or less
f	Exact class	±0.05	±0.1	±0.15	±0.2
m	Medium class	±0.1	±0.2	±0.3	±0.5
c	Coarse class	±0.2	±0.3	±0.5	±0.8
v	Extremely coarse class	-	±0.5	±1	±1.5



DESIGNED		Y.KUROE		30-JAN-2017		FIS30XX-YYC4	
REVISION RECORD		DRAWN		CHECKED		SCALE	
LTR		DATE		Free Scale		JAPAN	

