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Thermal Mass Flow Meter

Specialty Manufacture

Gases insertion type KC-2600GI



THERMAL MASS FLOW METER(Air & Gas) KC-2600GI

Features

- Rate & total, volume, mass flow indication
- Input Power DC 24 V or 100-240VAC
- Output accuracy $\pm 0.1\%$, $\pm 2.5\ \mu\text{A}$ (4~20 mA)
- Field validation of flowmeter calibration settings
Smart program interface (RS-485 standard)
- Direct mass flow monitoring eliminates need for
Temperature and pressure compensation
- Simple signal Processing & calibration
- Excellent reproducibility
- Excellent long-term stability
- Best price-performance ratio
- Easy adaptable for different application or into housings
- No mechanical moved components
- Greatly reduces upstream piping requirements (7-5D)
- Outstanding range ability (Turn down ratio 1000:1)
- 0.1-second response to changes in flow rate
- Ex(IP66), KC



General
insertion type
KC-2610GI
(IP67)



Ex-proof insertion
type
KC-2620EX
(IP66)



Separate insertion
KC-2610GI-R
(IP67)

weight	Explosion-proof	General insertion
	5.56kg	3.5kg

Product Introduction

Golden Rules' KC-2600GI Series Smart inline mass flowmeter accommodates the change measurement requirements and instrument-validation demands of fluid flow monitoring installations.

The versatile microprocessor-based transmitter integrates the function of flow measurement, flow-range adjustment, meter validation and diagnostics, in either a probe-mounted or remote housing.

Mass flow rate and totalized flow, as well as other configuration variables are displayed on the meter's optional 2X16 LCD panel. The programmable transmitter is easily configured via an RS-485 communication port and Golden Rules Smart interface software, or via the display and magnetic switches in the instrument panel.

The Golden Rules KC-2600GI Series allows you to configure or change the following parameters: flow range, totalize, time response, low flow cutoff and a calibration correction factor that compensates for flow profile flow variations. Golden Rules's Smart interface software guides you through a procedure to fully validate instrument performance. The meter is available with variety of input signal, mounting and packaging option.

THERMAL MASS FLOW METER(Air & Gas) KC-2600GI

Performance Specification

◆ Accuracy of Point Velocity

±0.5% of F.S

Repeatability

±0.2 % of Full Scale

◆ Temperature Coefficient

±0.03 % Reading / ±(10 ~ 38) °C

±0.06 % Reading / ±(25 ~ 50) °C

◆ Pressure Drop

It can be ignored within ± 50 psig (3.4 barg)

◆ Response Time

1 second 63% of final velocity value

◆ Measuring Range

0.01 ~ 66.2 m/sec

◆ Function

Rate & Total

Mass Flow Rates

Air Flow Ranges					
Pipe Size		Minimum		Maximum	
A	B	Scfm	Nm ³ /h	Scfm	Nm ³ /h
25A	1-inch	0-6	0-8.9	0-120	0-180
40A	1½-inch	0-15	0-22	0-280	0-440
50A	2-inch	0-23	0-33	0-470	0-680
80A	3-inch	0-50	0-74	0-1000	0-1500
100A	4-inch	0-90	0-130	0-1800	0-2700
150A	6-inch	0-200	0-300	0-4000	0-5900
200A	8-inch	0-350	0-520	0-7000	0-10,000

Notes: Air or N2 Flow Standard Condition :21°C(70°F) & 21°C(70°F) scfm:0°C, Nm³/h 1기압

Operating Specification

◆ Fluid

Gases (Air, O2, N2, LNG, LPG Other Gas)

◆ Pressure (limitation)

Compression Fittings : 508 psig (35 barg) option

150 lb Flange, JIS 10k RF PN16 (DN) : (-40 ~ 150) °F ((-40 ~ 65) °C)
: 230 psig (16 barg)

Low Pressure Retract Valve : 100 psig (7 barg)

High Pressure Retract Valve : 1000 psig (70 barg)

◆ Pressure Drop

It can be safely ignored for pipes over 3 inches.

◆ Fluid & Ambient temp'

Gases : (-40 ~ 302) °F ((-40 ~ 150) °C)

Ambient : (-4 ~ 185) °F ((-20 ~ 85) °C)

Gas accumulation range

Up to 5 X 10⁻⁴ with helium gas

◆ Input Power (selection)

DC24 V ±10 %, 200 mA

100 ~ 240 V AC ±10 %, 10 watts (Option)

THERMAL MASS FLOW METER(Air & Gas) KC-2600GI

◆ Output Signal (Standard)

Linear (4 ~ 20) mA & Pulse

◆ Display

Alphanumeric 2 X 16 backlight LCD

Adjustable variables via remote control switch or Smart interface software

Adjustable : Full scale : (0 ~100) %

Flow: m³/h(m³), L/h(L), mL/h(mL), kg/h(kg)

Time response 1 ~ 7 sec / Correction factor setting 0.5 ~ 5 /

Zero & Span

◆ Totalizer

8- digits (99,999,999 Count) in engineering units Reset table by

Software or remote control switch

◆ Software

Smart interface Windows® -based Software 8MB RAM of RAM, preferred 16MB
of RS-485 communication

Additional features: Zero cut-off adjustment / Linearization adjustment / Save /
Load configuration / For meter validation

Physical specifications

◆ Wetted Materials

Sensor Probe – Ceramic + 303SS(Platinum) Option : 316SS, 316LSS

Protection Tube – 303SS (Option : 316SS, 316LSS)

◆ Enclosure

Hazardous-Area CASE (Ex d[ib] IIC T4 : IP66)

General-Area CASE (IP67)

◆ Electrical Connection

2 X ½"PF or Ex Cable Gland(SS) 22C

◆ Mounting (Selection)

¾" Compression Fitting & ¾" Male NPT (Standard)

ANSI 150lb Flange, JIS 10k RF Flange

¾" Compression Fitting & 1" Male NPT (Option)

Ball Valve System (Option)

◆ Certification

Ex (Ex d[ib] IIC T4)

CE (CASE)

KGS Certificate

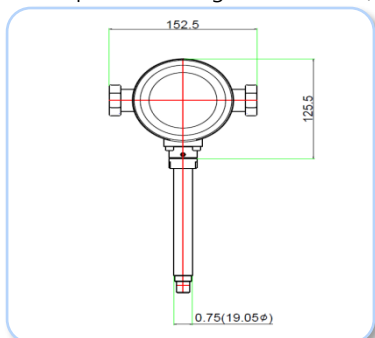
KC Certificate

THERMAL MASS FLOW METER(Air & Gas) KC-2600GI

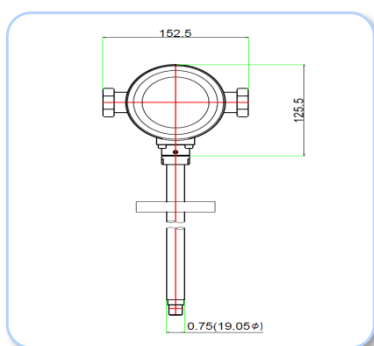
Dimensional Specification |

❖ General KC-2610GI(IP67)

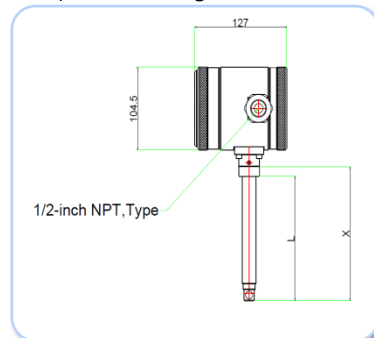
● Compression Fitting – Front View (EN2)



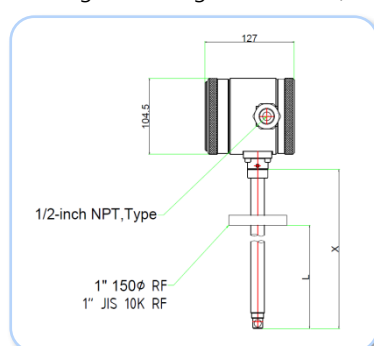
● Flange Mounting – Front View (EN2)



● Compression Fitting – Side View (EN2)

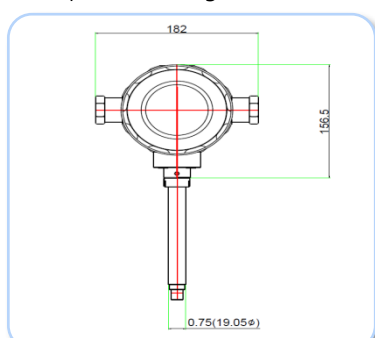


● Flange Mounting – Side View (EN2)

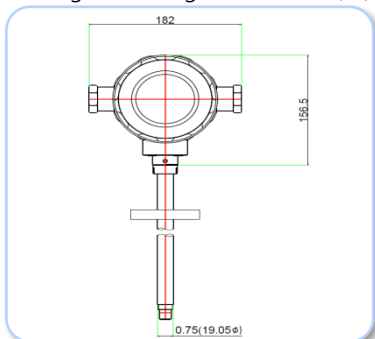


❖ Ex proof KC-2620Ex(IP66)

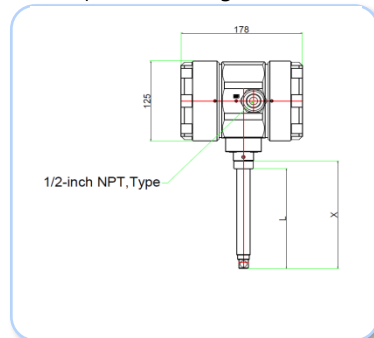
● Compression Fitting – Front View (E2)



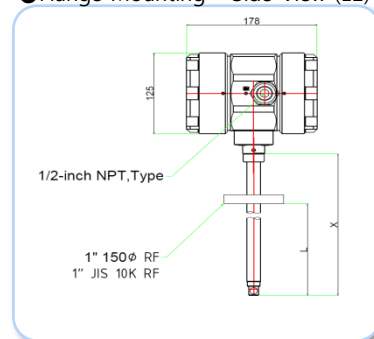
● Flange Mounting – Front View (E2)



● Compression Fitting – Side View (E2)



● Flange Mounting – Side View (E2)



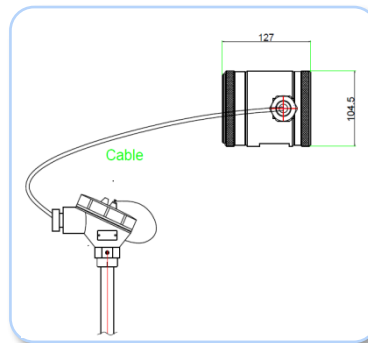
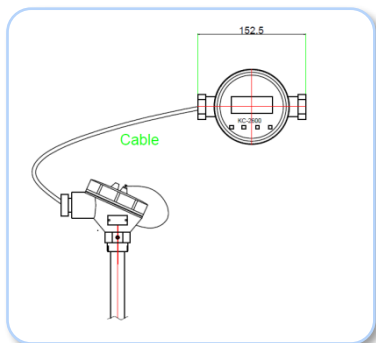
* The shape of the sensor and Housing manufacturers are Subject to Change

THERMAL MASS FLOW METER(Air & Gas) KC-2600GI

Dimensional Specification II

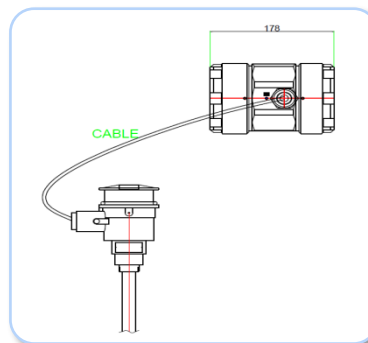
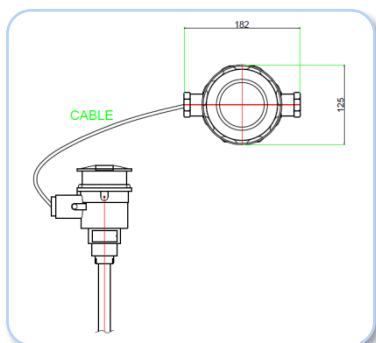
❖ General KC-2610GI-R

- Remote Mount Junction Box – Front View (EN4)
- Remote Mount Junction Box – Side View (EN4)



❖ Ex proof KC-2620Ex-R

- Remote Mount Junction Box – Front View (E4)
- Remote Mount Junction Box – Side View (E4)



Length Chart		
Code	L	X
L06	6.0 (152.4)	7.5 (190.5)
L09	9.0 (228.6)	10.5 (266.7)
L13	13.0 (330.2)	14.5 (368.3)
L18	18.0 (457.2)	19.5 (495.3)
L24	24.0 (609.6)	25.5 (647.7)
L36	36.0 (914.4)	37.5 (952.5)

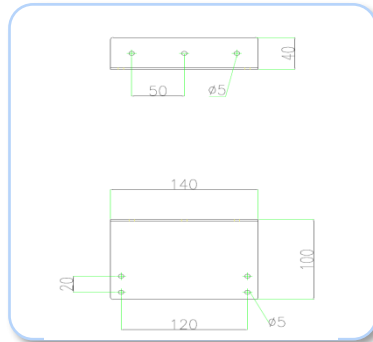
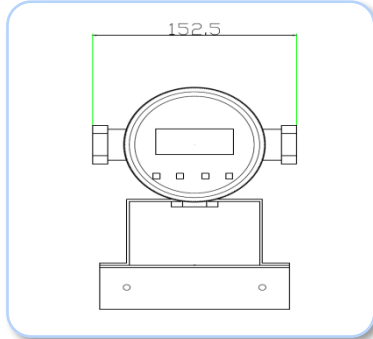
※ The shape of the sensor and Housing manufacturers are Subject to Change.

THERMAL MASS FLOW METER(Air & Gas) KC-2600GI

Dimensional Specification III

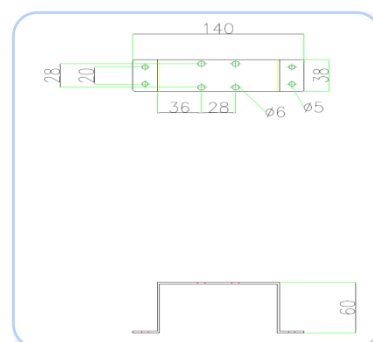
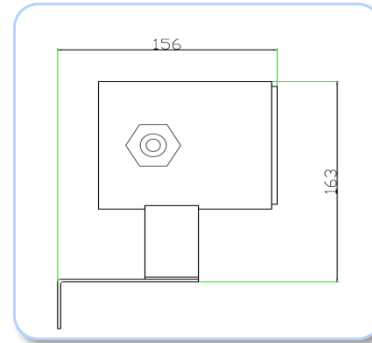
❖ General KC-2610GI-R

● Remote Rear Bracket Electronics (EN4)



Panel mounting bracket 1

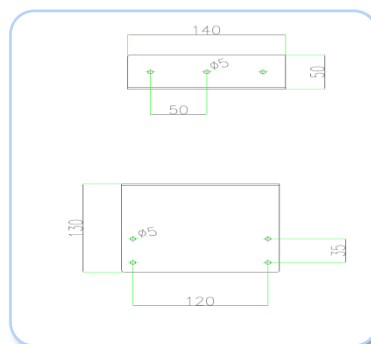
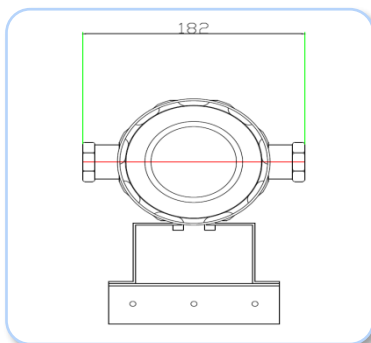
● Remote Side Bracket Mounted Electronics (EN4)



Panel mounting bracket 2

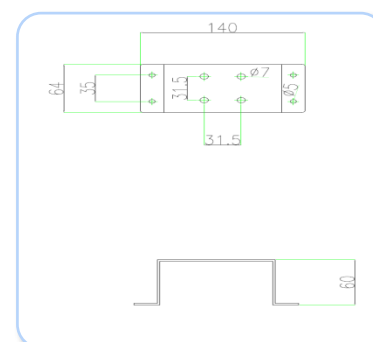
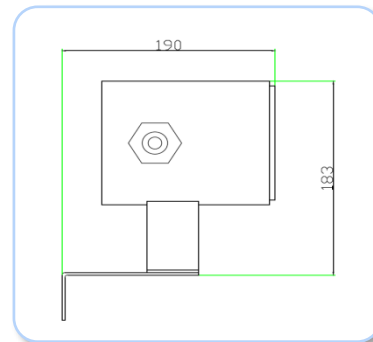
❖ Ex proof KC-2620Ex-R

● Remote Rear Bracket Electronics (E4)



Panel mounting bracket 1

● Remote Side Bracket Mounted Electronics (E4)

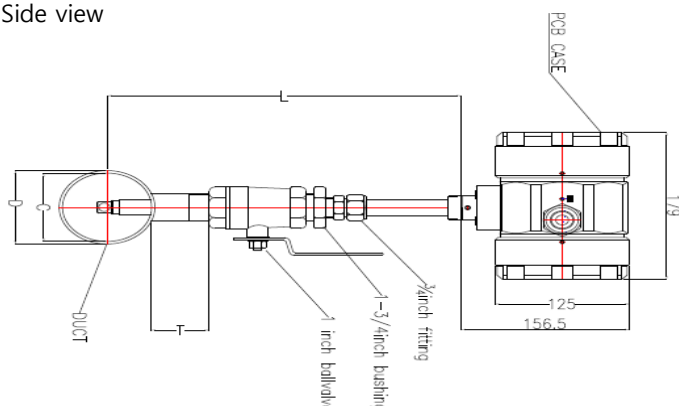


Panel mounting bracket 2

THERMAL MASS FLOW METER(Air & Gas) KC-2600GI

Low Pressure Ball Valve Dimensional

● Side view



VARIABLE

L = Normal Probe Length

D = Duct O.D

C = Duct I.D

T = Height of "Threadolet" or Customer provided weldolet

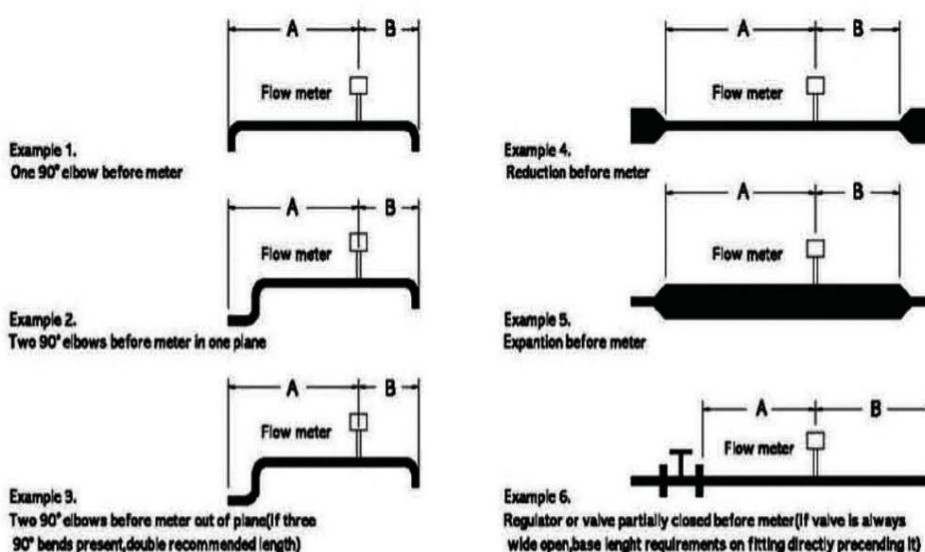
All dimensions are inches. Millimeters are in parentheses.

All drawings save a ± 0.25 inch(6.4 mm) tolerance. Certified and available be on request.

Upstream & Downstream dimension (KC-2600GI insertion)

Select an installation that minimize possible distortion in the flow profile, Valves, elbows, control valves and other piping components may cause flow disturbances. Check your specific piping condition against the examples shown below.

In order to achieve accurateness and repeatable performance install the flow meter using the recommended number of straight run pipe diameters upstream and downstream of the sensor.



Example	A-Upstream(1)Requirements	B-Downstream(2)Requirements
1	10~7D	5~3D
2	15~10D	5~3D
3	20~15D	10~5D
4	10~7D	5~3D
5	20~15D	10~5D
6	20~15D	5~3D

(1)Number of diameter(D)of straight pipe required between upstream disturbance and the flow meter.
(2)Number of diameter(D)of straight pipe required downstream of the flow meter.

THERMAL MASS FLOW METER(Air & Gas) KC-2600GI

Order Code KC-2600GI Series (Gas Insertion type)

Type Length Conn` Spec Enclosure Power Output Display Direction Cal1 Cal2 Pressure Option
KC-26 - L - M - E - P - V - - - - - -
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Type	Code 1	Input Power	Code 8	Calibration 2 ⁹	Code 13
IP65 or IP67	10 GI	DC 24 V ±10 %, 200 mA	2	70 °F(21 °C) 14.7 psig (1.103 barg)	A
Hazardous-Area Location Enclosure	20 Ex	AC 100 ~ 240 V ±10 % (option)	3	32 °F(0 °C) 14.7 psig (1.103 barg)	B
Agency approved, customer specified	W	Agency approved, customer specified	W	Agency approved, customer specified	W

Length ⁴	Code 2,3	Output Signal	Code 9	Pressure Limit	Code 14
6" (15 cm)	06	RS-485, 4-20mA, Pulse (Std.)	1	Low pressure Below 43 psig (3 barg)	L
9" (23 cm)	09	HART,RS-485,4-20mA,Pulse (Option)	3	Medium pressure Below 232 psig (16 barg)	M
12" (30 cm)	12	Relay,RS-485,4-20mA,Pulse(option)	4	High pressure Below 363 psig (25 barg)	H (option)
18" (46 cm)	18	Agency approved, customer specified	W	Agency approved, customer specified	W
24" (61 cm)	24				
36" (92 cm)	36				
Special Length	(in)				
Probe with 2" JIS 10k RF Flange	(in)-M5				
High pressure with Retractor Valve	(in)-M9				
Agency approved, customer specified	W				

Flow Display	Code 10
No Readout	NR
Digital Display	DD
Agency approved, customer specified	WW

Option	Code 15
Agency approved, customer specified	W

Connection Specification	Code 4,5
None	0
Compression Fitting2 (IP67) (¾" Tube X ¾" Male NPT)	10
Compression Fitting (IP65) (¾" Tube X ½" Male NPT)	3
Low Pressure Retractor Valve Specify Duct O.D in parentheses	8()
Compression Fittings (½" Tube X ½" Male NPT)	15()
Compression Fittings (½" Tube X ¾" Male NPT)	15()
Agency approved, customer specified	W

Enclosure ⁵	Code 6,7
Hazardous-Area Location Enclosure	2
Remote Hazardous-Area Location Endosure(Only with Ex Meter)	3(Ft)
Remote Hazardous-Area Location Endosure(Only with Junction Box)	4(Ft)
IP65 or IP67	N2
Remote IP65 with Junction Box	N4(Ft)
Agency approved, customer specified	W

Direction	Code 9
Horizontal Left -> Right or Vertical Up	1
Horizontal Right -> Left or Vertical Up	2
Horizontal Free or Vertical Up	3
Agency approved, customer specified	W

Calibration 1 ⁹	Code 12
Standard Calibration	A
Air, only for 3" and large pipe size	A
Compressed Air, only for 3" and large pipe size	D
Customer Calibration	B
Air	B
Air equivalency (Digester Gas, Flue, Gas etc.)	C
Nitrogen, Helium, Argon, Carbon Dioxide Compressed Air or Digester Gas	E
Hydrocarbon (Natural Gas, Methane, Ethane, Propane etc.)	F
Hydrogen or Hydrogen Mixture	G
Agency approved, customer specified	W

Note

- Flange is tapped and threaded on the compression fitting
- The male connector is permanently tightened with ferrule of two combined materials
- Flange must be ANSI or DIN specification
- Maximum length is 60-inch(1524mm)
- Enclosure required for agency approvals, T6 rate at 40°C
- Wire resistance must be less than 8 ohms
- Turndown ratio is 100:1 min. & 1000:1 max.
- SFPS is the abbreviation for standard feet per second at 14.7psia(1.01 bar(a) & 70°F (21.1°C)
- Customer specified calibration must not exceed temperature & pressure limitations of the 2610GI, 2620Ex Series products specifications

THERMAL MASS FLOW METER(Air & Gas) KC-2600GI

Flow measurement principle



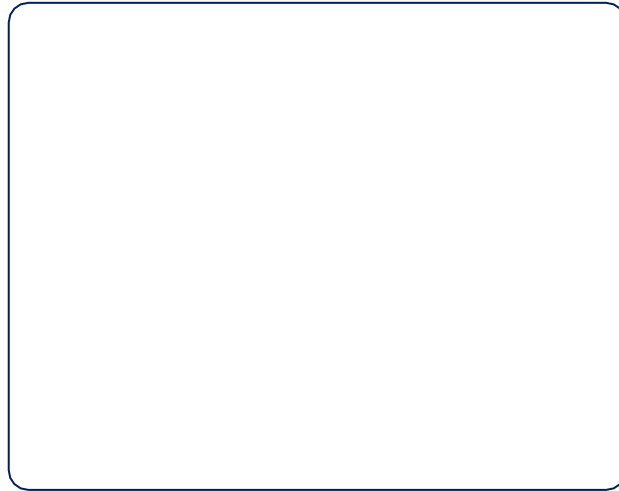
**KC-2600 Series
Thermal Mass Sensor**

Golden Rule's unique Mass Flow probe ensures exceptional accuracy, robustness, and reliability in industrial flow meters. The Mass Flow sensor consists of two sensing elements: a flow rate sensor and a temperature sensor that automatically compensates for gas temperature changes. The new device incorporates two temperature-sensitive platinum resistors on a single chip. The high-ohm resistor is used to measure the reference temperature, while the low-ohm resistor acts as a heater. By using a bridge circuit, the different resistance values of the two elements generate different levels of self-heating. Self-heating depends on the supply voltage, mass flow, and the medium in which the sensor is located. Higher voltage increases self-heating, while higher flow rates increase cooling. If self-heating is continuously maintained by a suitable controller, the voltage will increase with higher flow rates, enabling mass flow measurement.

◆Simply select to suit the application

Application	Type		Mass Flowmeter	
			Thermal	
Object of Measurement	Liquid		X	
	Gas		O	
	Vaper		X	
	steam		X	
Application	control		X	
	Monitor		O	
	Supply		X	
Operating condition	Temperature		Gas	– 40 to 150°C
	Pressure		Max 100bar	
	Pressure loss		Negligible	
	Range ability		Large	
Installing condition	Bore		Ø8 to Ø6,000	
	Straight Pipe length	upstream	7D	
		downstream	3D	
	Piping work		Required	
	Explosion-proofing		O	
Performance	Accuracy		Gas	±0.5% F.S
	Velocity		Gas	0.1~100 m/s

**Air & Gas & Steam & Liquid
Mass Flowmeter
Specialized Manufacturer**



Certified in accordance with

KC Q ISO 9001 : 2015

KC Q ISO 14001 : 2015

GOLDEN RULES Co.,Ltd