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Golden Rules CO.,Ltd

Air & Gas
Thermal Mass Flow Meter
Specialty Manufacture

KC-2600

Thermal Mass Flow Meter



The nation's development item, 100% domestic goods, Patent **NO.** 10-1660226

1. THERMAL MASS FLOW METER (Gases)

1-2 Inline type KC-2600 Series

Inline Type Thermal Mass Flowmeter



**Gas inline type
KC-2610GF
(IP67)**



**Gas inline type
KC-2620Ex
(IP66)**



**Gas inline MFM
KC-2610GM**



**Gas inline MFM
KC-2620Ex-GM**

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

Description

Golden Rules' KC-2600 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-2600 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.

The information contained herein is subject to change without notice.

Performance Specification

◆ Accuracy of Point Velocity

±1.0% of Reading (Option : ±0.5 % of RD)

Repeatability

±0.2 % of Full Scale

◆ Temperature Coefficient

±0.03 % Reading / ±(10 ~ 38) °C내에서 °C

±0.06 % Reading / ±(25 ~ 50) °C내에서 °C

◆ Pressure Drop

It can be ignored within ± 50 psig (3.4 bara).

◆ Response Time

1 second 63% of final velocity value

◆ Measuring Range

0.01 ~ 66.2 m/sec

◆ Function

Air, O₂, N₂, LNG, LPG Other Gas

Mass Flow Rates

Air Flow Ranges							
Pipe Size		Minimum		Maximum		Weight (kg)	
A	B	Scfm	Nm ³ /h	Scfm	Nm ³ /h	방폭	일반
8A	¼-inch	0.5	-0.7	9	14	5	3
15A	½-inch	2	3.0	40	60	5	3
20A	¾-inch	4	5.9	75	120	5	3
25A	1-inch	6	8.9	120	180	6	4
40A	1½-inch	15	22	280	440	7.2	5.2
50A	2-inch	23	33	470	680	8.6	6.6
80A	3-inch	50	74	1000	1500	11	9
100A	4-inch	90	130	1800	2700	16.2	14.2
150A	6-inch	200	300	4000	5900		
200A	8-inch	350	520	7000	10,000		

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

Operating Specification

◆ Fluid

Gases

◆ Pressure (limitation)

Compression Fittings : 508 psig (35 barg) option

150 lb Flange, JIS 10k RF PN16 DIN (-40 ~ 150) °C (-40 ~ 302) °F : 230 psig (15.9 barg)

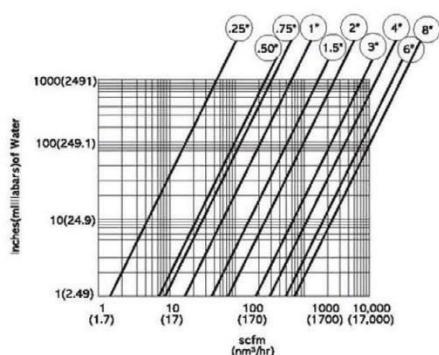
150 lb Flange, JIS 10k RF PN16 DIN 121 °C (250 °F) : 185 psig (12.8 barg)

150 lb Flange, JIS 10k RF PN16 DIN 400 °C (752 °F) : 155 psig (10.7 barg)

NPT -40 ~ 150 °C ((-40 ~ 302) °F) : 508 psig (35 barg)

High Pressure Retract Valve : 1000 psig (70 barg)

◆ Pressure Drop



◆ Fluid & Ambient temp'

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

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

◆ Input Power (selection)

DC24 V ±10 %, 200 mA

(100 ~ 240) V AC ±10 %, 10 watts

◆ Output Signal

Linear (4 ~ 20) mA & Pulse

◆ Display

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 Specification**◆ Wetted Part Mat'l**

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

Flow Body – 304SS (Option 316SS, 316LSS)

Enclosure

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

General-Area CASE (IP67)

◆ Electrical Connection

2 X ½"NPT or Exp Cable Gland(SS) 22C

◆ Mounting (selection)

¾" Compression Fitting과 ¾" Male NPT (Standard)

ANSI 150lb Flange, JIS 10k RF Flange (Option)

¾" Compression Fitting과 1" Male NPT (Option)

Ball Valve System (Option)

◆ Certification

Ex (Ex d[ib] IIC T4)

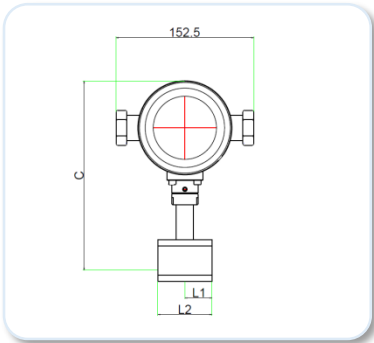
CE (CASE 전체)

KGS Certificate

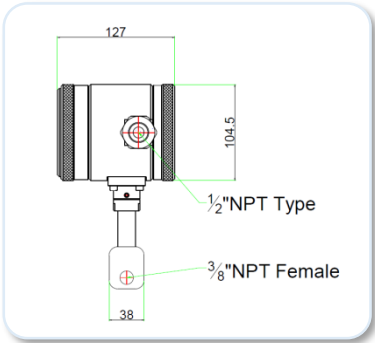
KC Certificate

Dimensional Specification & Chart I General type KC-2610BF (IP67)

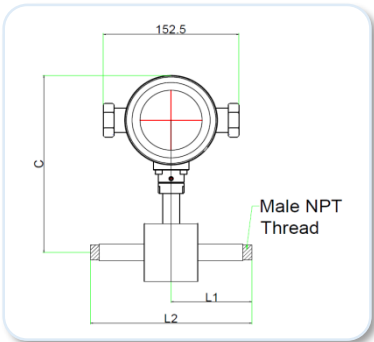
●1/4," 3/8" NPT – Front View (EN2)



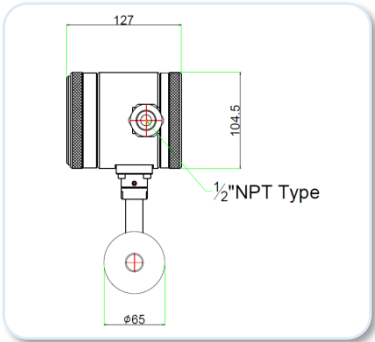
●Compression Fitting – Side View (EN2)



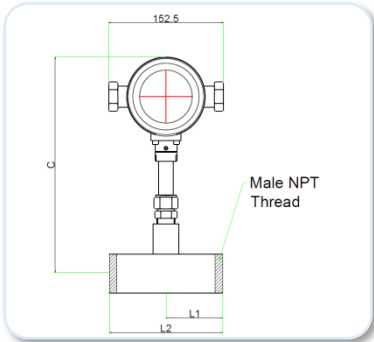
●1/2," 3/4" NPT – Front View (EN2)



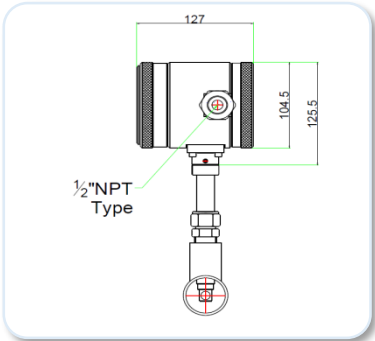
●1/2," 3/4" NPT – Side View (EN2)



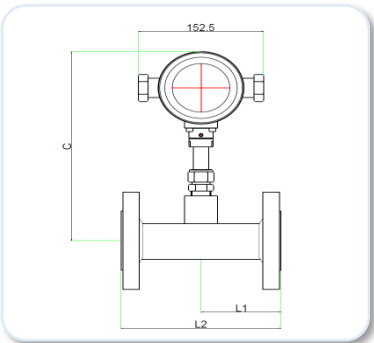
●1/4," 3/8" NPT – Front View (EN2)



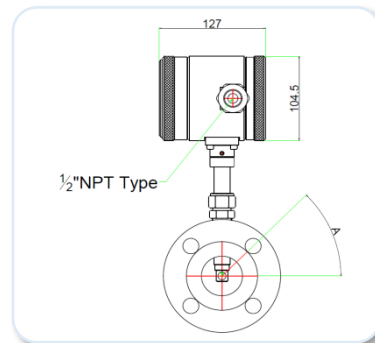
●Compression Fitting – Side View (EN2)



●1/2," 3/4" NPT – Front View (EN2)



●1/2," 3/4" NPT – Side View (EN2)



SIZE for NPT			
Size	C	L1	L2
1/4" & 3/8"	210.5	30	60
1/2"	210.5	90.7	181.4
3/4"	210.5	90.7	181.4
1"	272.5	101.5	203
1-1/2"	272.5	101.5	203
2"	272.5	101.5	203
3"	334.6	127	254
4"	334.6	127	254
6"	334.6		
8"	334.6		

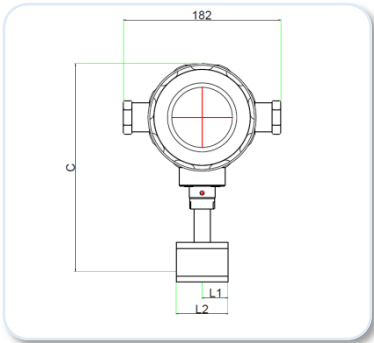
SIZE for ANSI 150# FLANGE				
Size	C	L1	L2	A
1/2"	210.5	101.5	203	45°
3/4"	210.5	101.5	203	45°

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

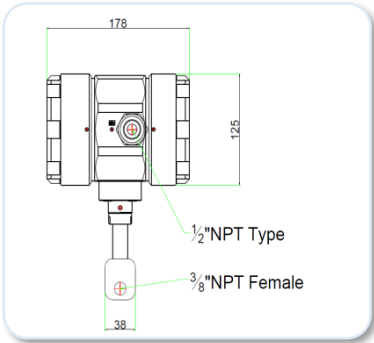
All dimensions are inches. Millimeters are in parentheses.

Dimensional Specification & Chart II Ex-proof KC-2620Ex

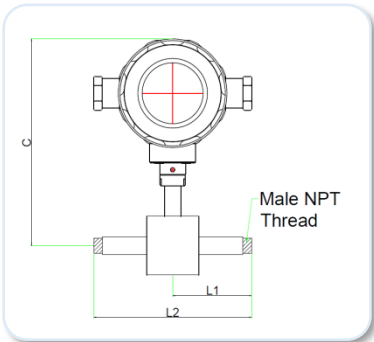
●1/4," 3/8" NPT – Front View (E2)



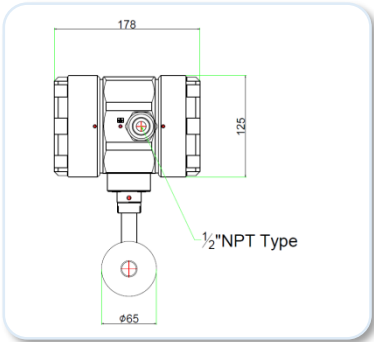
●Compression Fitting – Side View (E2)



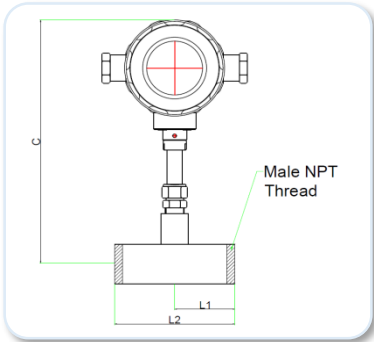
●1/2," 3/4" NPT – Front View (E2)



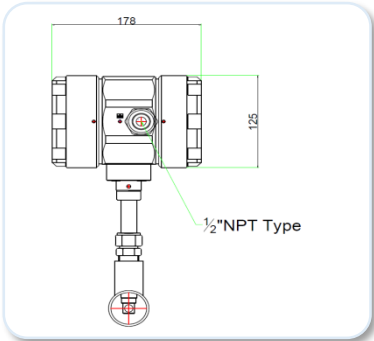
●1/2," 3/4" NPT – Side View (E2)



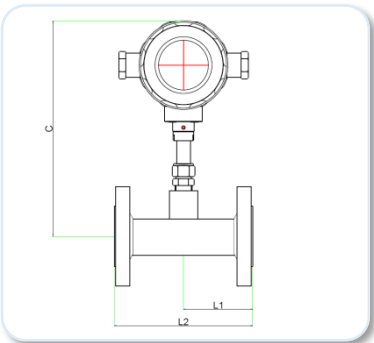
●1/4," 3/8" NPT – Front View (E2)



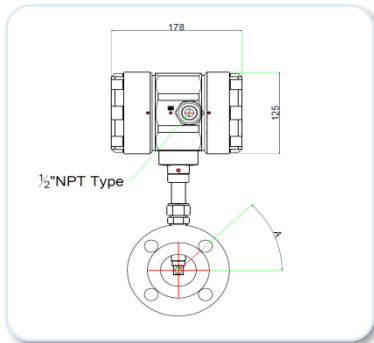
●Compression Fitting – Side View (E2)



●1/2," 3/4" NPT – Front View (E2)



●1/2," 3/4" NPT – Side View (E2)



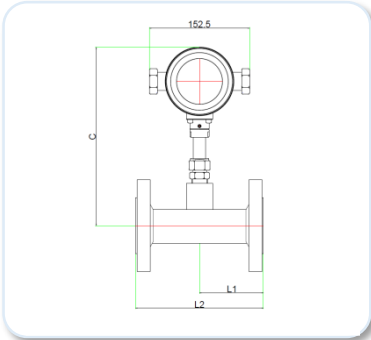
SIZE for NPT			
Size	C	L1	L2
1/4" & 3/8"	241.5	30	60
1/2"	241.5	90.7	181.4
3/4"	241.5	90.7	181.4
1"	283.5	101.5	203
1-1/2"	283.5	101.5	203
2"	283.5	101.5	203
3"	344.6	127	254
4"	344.6	127	254
6"	344.6		
8"	404.6		

SIZE for ANSI 150# FLANGE				
Size	C	L1	L2	A
1/2"	241.5	101.5	203	45°
3/4"	241.5	101.5	203	45°

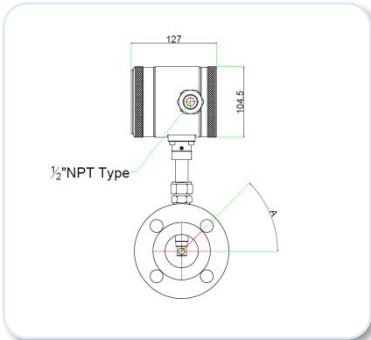
※ The shape of the sensor and Housing manufacturers are Subject to Change.

Dimensional Specification & Chart III KC-2610GF((IP67)

●1-1/2" ~ 8" – Front View (EN2)
150# Flange, JIS 10k RF Flange

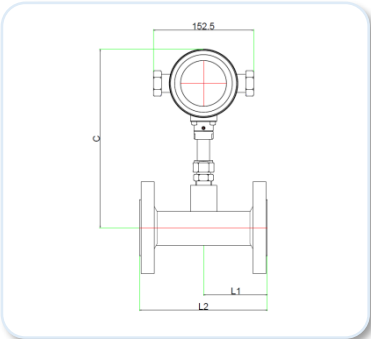


●1-1/2" ~ 8" – Side View (EN2)
150# Flange, JIS 10k RF Flange

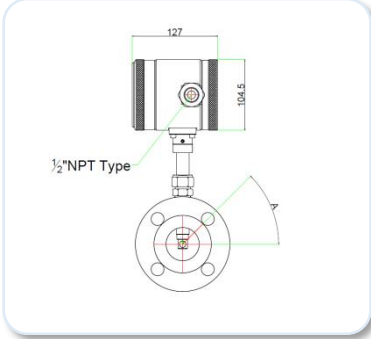


Size for ANSI 150# Flange				
Size	C	L1	L2	A
1-1/2"	283.5	101.5	203	45°
2"	283.5	101.5	203	45°
3"	344.6	101.5	203	45°
4"	344.6	127	254	22.5°
6"	344.6	127	254	22.5°
8"	404.6	127	254	22.5°

●DIN Flange – Front View (EN2)



●DIN Flange – Side View (EN2)

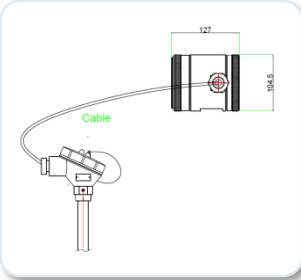


Size for PN16 DN Flange			
Size	C	L1	L2
DN40	283.5	101.5	203
DN50	283.5	101.5	203
DN80	344.6	101.5	203
DN100	344.6	127	254
DN150	344.6	127	254
DN200	404.6	127	254

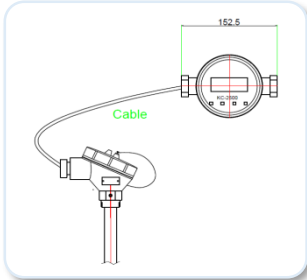
Dimensional Specification & Chart III KC-2620Ex (Ex-proof)

General Remot type KC-2610GF-R

●Remote Mount Junction Box – Front View(EN4)

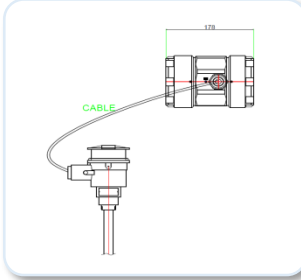


●Remote Mount Junction Box – Side View(EN4)

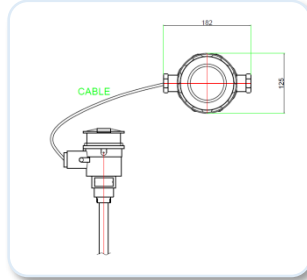


Ex-proof Remote type KC-2620Ex-R

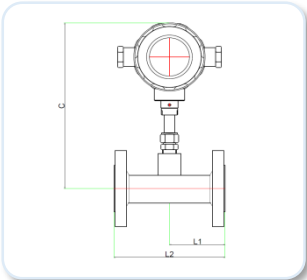
●Remote Mount Junction Box – Front View(E4)



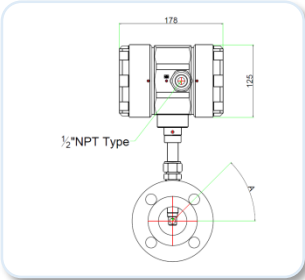
●Remote Mount Junction Box – Side View(E4)



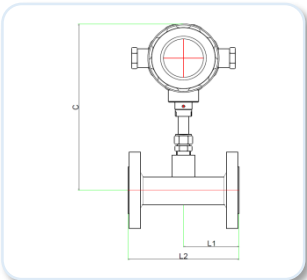
●1-1/2" ~ 8" – Front View(E2)
150# Flange, JIS 10k RF Flange



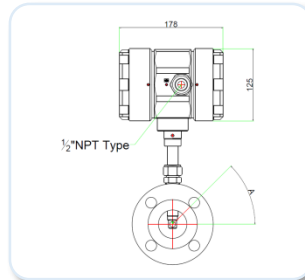
●1-1/2" ~ 8" – Side View(E2)
150# Flange, JIS 10k RF Flange



●DIN Flange – Front View(E2)



●DIN Flange – Side View(E2)

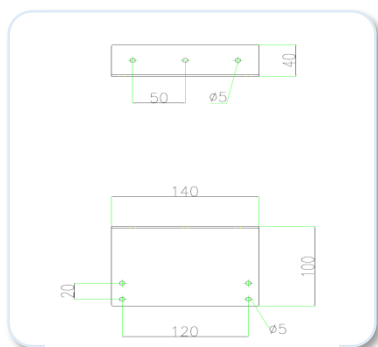
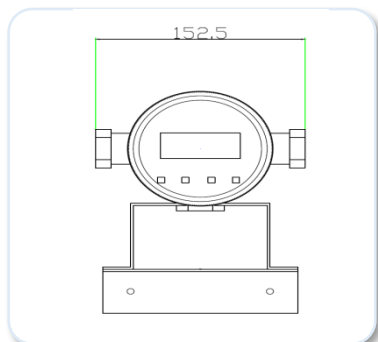


※ The shape of the sensor and Housing manufacturers are Subject to Change.

Dimensional Specification & Chart V

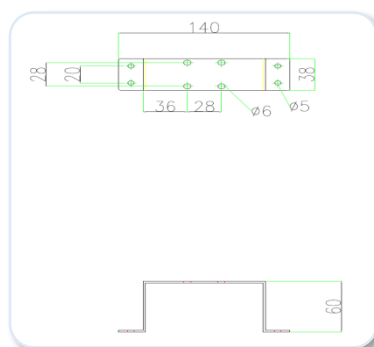
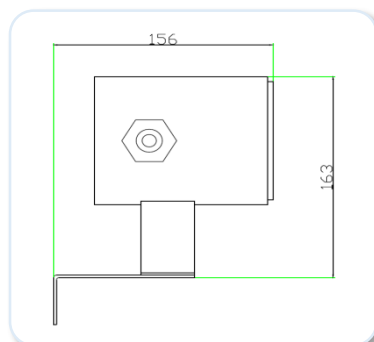
♣ General Remote type KC-2610GF-R

● Remote Rear Bracket Electronics (EN4)



● panel mounting bracket 1

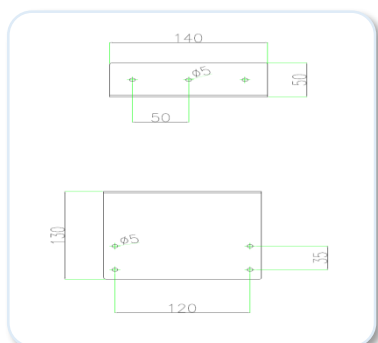
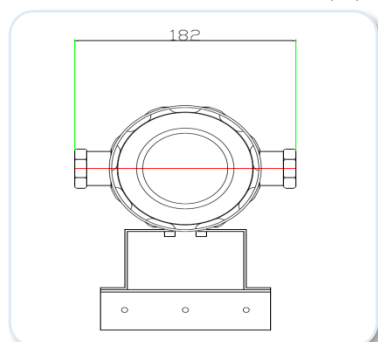
● Remote Side Bracket Mounted Electronics (EN4)



● panel mounting bracket 2

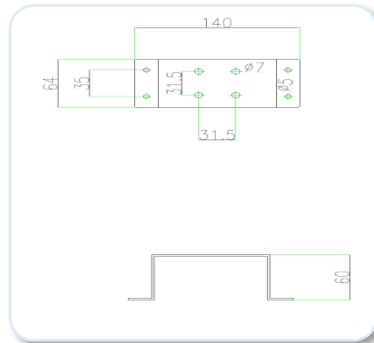
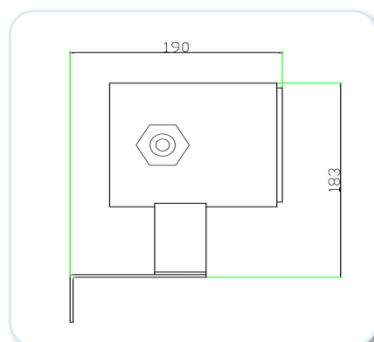
♣ Ex-proof Remote type KC-2620Ex-R

● Remote Rear Bracket Electronics (E4)



● panel mounting bracket 1

● Remote Side Bracket Mounted Electronics (E4)



● panel mounting bracket 2

Low Pressure Ball Valve Dimensional & Specification

●Side View

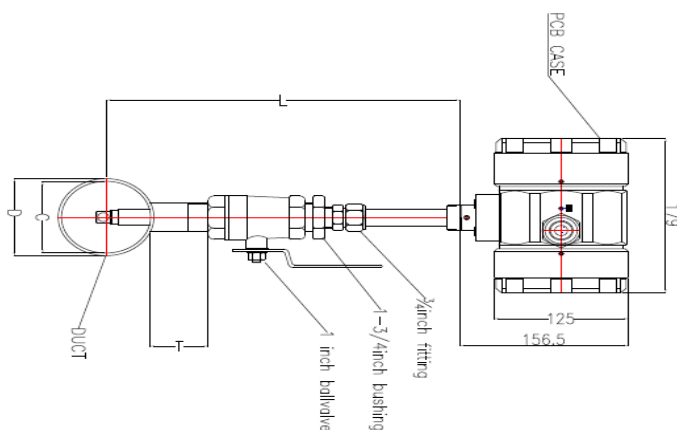
VARIABLE

L = Normal Probe Length

D = Duct O.D

C = Duct I.D

T = Height of "Threadolet" or
Customer provided weldolet



±0.25 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.

Piping Requirement (KC-2600GF inline type)

Straight Pipe Length Requirements at 1 atm			
Piping condition	KC-2600 Smart- IN™		Orifice Plate(3)
	Upstream(1)	Downstream(2)	
90° Elbow or T-Piece	10D	5D	28D
Reduction (4:1)	10D	5D	14D
Expansion (4:1)	10D	5D	30D
After Control Valve	10D	5D	32D
Two 90° Elbows (in same plane)	10D	5D	36D
Two 90° Elbows (in same plane)	10D	5D	62D

- Note :
- (1) Number of diameters (D) of straight pipe required between upstream disturbance and the flowmeter.
 - (2) Number of diameters (D) of straight pipe required downstream of the flowmeter.
 - (3) For comparison purposes only. Table shows number of diameter(D) of upstream straight pipe length required for an ISO Standard 5167 Orifice plate with a beta ration of 0.7
 - (4) Consult factory for pressure effects.

Order Code KC-2600GF Series (Gases inline type)

KC-26 - - E - P - V - - - - - - -

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Type	Code 1
IP67 or IP65	10GF
Hazardous-Area Location Enclosure	20Ex
MFM (IP67)	10GM

Input Power	Code 8
DC 24 V ±10 %, 200 mA	2
AC 100 ~ 240 V ±10 % (옵션)	3
Agency approved, customer specified	W

Calibration 2 ⁹	Code 13
70 °F(21 °C) 14.7 psig (1.103 barg)	A
32 °F(0 °C) 1 atm (76 mmHg)	B
Agency approved, customer specified	W

Connection type	Code 2
DIN Flange	D
ANSI Flange	A
JIS Flange	J
Agency approved, customer specified	W

Output Signal	Code 9
RS-485S	1
Pulse	3
DC 4~20 mA,	4
Agency approved, customer specified	W

Pressure limit	Code 14
Low pressure Below 43 psig (3 barg)	L
Medium pressure Below 145 psig (10 barg)	M
High pressure Below 725 psig (50 barg)	H (option)

Connection Spec' 1,3	Code 3,4,5		
Size	DIN	150 lb	JIS 10k
1" (DN25)	D4	F4	J4
1-1/4" (DN32)	D5	F5	J5
1-1/2" (DN40)	D6	F6	J6
2" (DN50)	D7	F7	J7
2-1/2" (DN65)	D8	F8	J8
3" (DN80)	D9	F9	J9
3-1/2" (DN90)	D10	F10	J10
4" (DN100)	D11	F11	J11
5" (DN125)	D12	F12	J12
6" (DN150)	D13	F13	J13
7" (DN175)	D14	F14	J14
8" (DN200)	D15	F15	J15
10" (DN250)	D16	F16	J16
12" (DN300)	D17	F17	J17
Agency approved, customer specified	W		

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

Option	Code 15
Agency approved, customer specified	W

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

Flow Direction	Code 11
Horizontal Free or Vertical UP	1
Horizontal Free or Vertical Down	2
Agency approved, customer specified	W

Calibration 1 ⁹	Code 12
Standard Calibration	A
Air, only for 3" and large pipe size	
Compressed Air, only for 3" and large pipe size	D
Customer Calibration	B
Air	
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

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



Golden Rules

• GOLDEN RULES

www.goldenrules.co.kr

GAS & LIQUID

Mass & Total flowmeter

Specialized manufacturer

Distributor

Certified in accordance with

KC Q ISO 9001 : 2015

KC Q ISO 14001 : 2015

 (주)골든룰