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Golden Rules Co.,Ltd

AIR, GAS, STEAM, LIQUID

FN-Mass Flow Meters

Specialized manufacturer



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

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A. MASS FLOWMETER

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Compressure Air
FN-Mass Flow Meter
KC-7730A Series



The nation's development item, 100% domestic goods, Patent **NO.** 10-1606497

APPLICATION

◆ Simply select to suit the application

Application	Type	Mass Flowmeter	
		D/P-type	FN-MASS FLOWMETER
Object of Measurement	Liquid	○	
	Gas	○	
	Vaper steam	○	
Application	control	○	
	Monitor	○	
	Supply	○	
Operating condition	Temperature	Gas	- 40 to 100°C (Option:400°C)
		Liquid & Oil	-40 to 100°C(Option:400°C)
		Steam	-20 to 200°C(Option:400°C)
	Pressure	10 barg / 30 barg / Max 400 barg	
	Pressure loss	Negligible	
	Range ability	Large	
Installing condition	Bore	Ø10 to Ø500	
	Straight Pipe length	upstream	10 ~ 7D
		downstream	5 ~ 2D
	Piping work	Required	
	Explosion-proofing	○	
Performance	Accuracy	Gas	±0.5% F.S(Option: 0.1%)
		Liquid & Oil	±0.5% F.S(Option: 0.1%)
		Steam	±0.5% F.S(Option: 0.1%)
	Velocity	Gas	0.1~100 m/s
		Liquid & Oil	0.1~100 m/s
		Steam	0.1~100 m/s

01 FN-MASS FLOWMETER (Air)

1-2. D/P-type FN-Mass type KC-7730A Series

Features

5-for multi-measurement



Air type FN-Mass Flowmeter
KC-7730A Series

- Mixed gas Automatic Calculator (4~20mA input : Basic Mode)
- **Rate, integrated, volume, mass flow, temp', pressure, density indication**
- Input Power DC 24 V, < 100mA
- Output accuracy $\pm 0.1\%$, $\pm 2.5\ \mu\text{A}$ (4~20 mA, 4-Wire)
- Field validation of flowmeter calibration settings
Smart program interface (RS-485 standard)
- Direct mass measurement of the flow function eliminates the need for additional temperature and pressure compensation
- Simple signal Processing & calibration
- **Built-in flow function of compression coefficient, expansion coefficient, viscosity coefficient, direct calculation formula**
- Excellent reproducibility & long-term stability
- Best price-performance ratio
- Easy adaptable for different application or into housings
- No mechanical moved components
- **Greatly reduces upstream piping requirements (10-5D)**
- **Outstanding range ability (Turndown ratio 50:1)**
- 0.1-second response to changes in flow rate
- Measurement for compressed air only (max. 10 Barg)
- High temperature fluid measurement up to 400°C
- CE, Ex(IP67)

Description

Golden Rules' KC-7730A Series D/P type FN-Mass flowmeter accommodates the change measurement requirements and instrument-validation demands of fluid flow monitoring installations.

It is a LOK Fitting, Flange type, and it is a microprocessor commercially capable of measuring flow rate, adjusting flow rate, and diagnosing at the same time.

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 Rule's KC-7730A series is a product designed based on differential pressure mass flow measurement technology.

Golden Rule's KC-7730A series is a product designed based on differential pressure mass flow measurement technology, and is a built-in flow function that takes into account the compression coefficient, expansion coefficient, and viscosity coefficient. Enthalpy, etc. can be provided to the user.

Performance Specifications

◆ Accuracy of Point Velocity

±0.5% of F.S / ±0.5% of R.D
(Option : ±0.75% of R.D)

◆ Repeatability

±0.5% of Full Scale

◆ Sensor Accuracy

< 0.2% of span

◆ Turndown Ratio

35:1 (Option 50:1)

◆ Pressure Loss

0.1 ~ Below 0.3 Bar

◆ Response Time

0.1 second

◆ Measuring Range

0.1 ~ 100 m/sec

◆ Function

5-for multi-measurement : rate, total, volume, mass, density, temp', pressure, energy indication

Mass Flow Rates (Air)

Air Flow Ranges							
Pipe Size (배관경)		Minimum (최소)		Maximum (최대)		Weight (중량)	
A	B	Nm ³ /m	Nm ³ /h	Nm ³ /m	Nm ³ /h	방폭	일반
15A	1/2-inch	0.13	8.0	1.33	80	5kg	3kg
20A	3/4-inch	0.27	16	2.7	160	5kg	3kg
25A	1-inch	0.4	24	120	240	6kg	4kg
40A	1 1/2-inch	0.98	59	9.8	590	7.2kg	5.2kg
50A	2-inch	1.53	92	15.3	920	8.6kg	6.6kg
80A	3-inch	3.3	200	33.3	2000	11kg	9kg
100A	4-inch	5.83	350	58.3	3500	16.2kg	14.2kg
150A	6-inch	12.7	760	127	7600		
200A	8-inch	21.7	1300	217	13000		

Notes: Air & N2 flow standard conditions : 21°C(70°F) &
21°C(70°F) scfm:0°C Nm³/h 1Atm

Operating Specifications

◆ Fluid

Compressed, Below Air

◆ Input Power

DC 24 V ±10 %, < 100 mA

◆ Output Signal

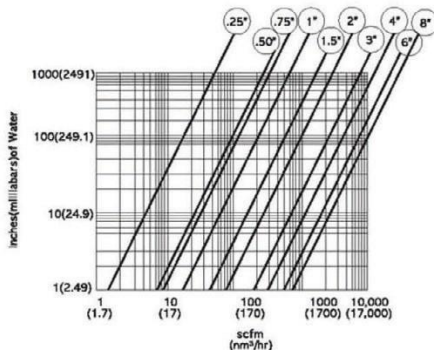
Linear 4 ~ 20 mA, 4Wire

RS-485S

Pulse (Option)

◆ Pressure Drop

15.5 kpa



◆ Fluid & Ambient temperature

Air : -40 ~ 100 °C (-40 ~ 212 °F) Option : 110 ~ 400°C (230 ~ 732 °F)

Pipe Temp' : Over 300 °C 이상 (572 °F)

Ambient : -4 ~ 185 °F (-20 ~ 85 °C) Option : -70 ~ 100 °C (-94 ~ 212 °F)

◆ Pressure (limitations)

Compression fitting : 500 psig (35 barg)

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

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

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

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

◆ Displays

Display instructions: instantaneous & integration, volume, mass measurement

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 0.1 sec / Correction factor setting 0.5 ~ 5 /

Zero & Span

◆ Totalizer

Flow rate and total oxygen point (0000. / 000.0/ 00.00 / 0.000)

Seven digits (9,999,999,99.9 Count) in engineering units Reset table by Software

◆ Software (Option)

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 Materials**

D/P Sensor – STS316 (Option : STS316L)

Flow inline Body – STS304 (Option : STS316, STS316L)

◆ Enclosure

Hazardous-Area Enclosure CASE (Ex d IIC T6 : IP67)

General-Area Enclosure CASE (IP67)

◆ Electrical Connections

2 X ½" PF or Exp Cable Gland(SS) 22C

◆ Mounting (Selection)

ANSI 150lb Flange, JIS 10k RF Flange, other

◆ Certification

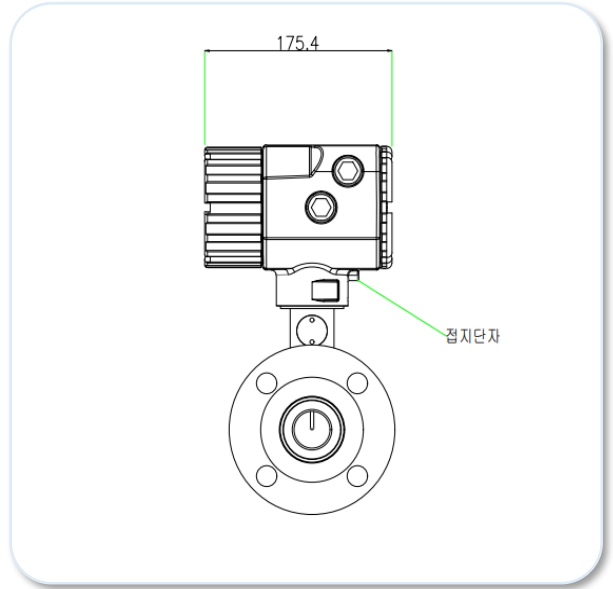
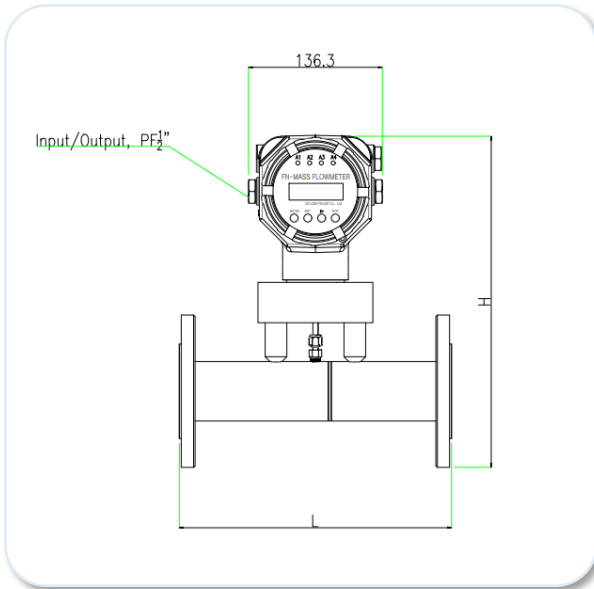
CE (CASE)

KCS Certificate

Atex Certificate

Ex (Ex d IIC T6)

Dimensional Spec & Chart KC-7730A



※ The shape of the sensor and housing manufacturers are subject to change

Unit : mm

Size	H	L
15A	375	300
20A	380	300
25A	390	300
32A	402	300
40A	406	300
50A	420	300
65A	442	300
80A	442	350
100A	451	400
125A	508	409
150A	540	451
200A	575	522
250A	626	602
300A	684	672

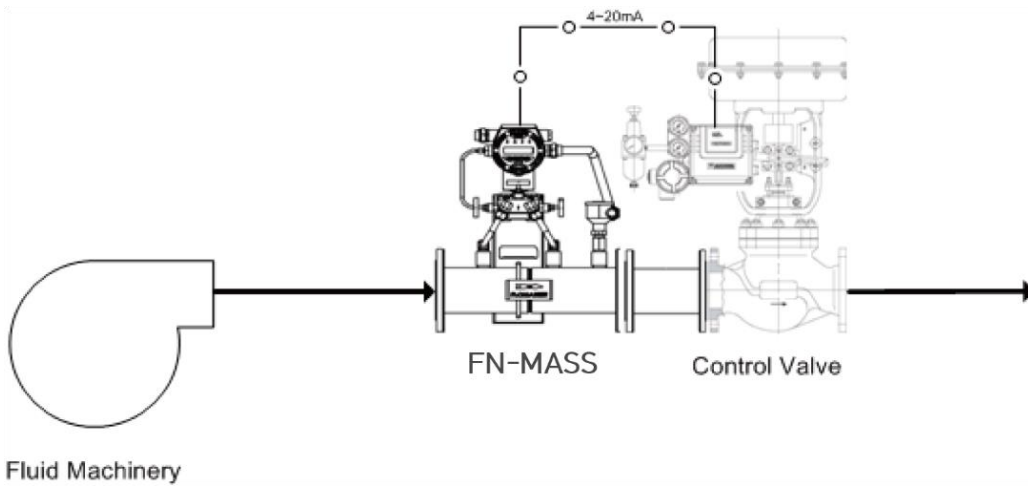
The D/P type FN-Mass flow meter realizes the following control with the current output signal.

01 – Mass flow(kg/h) Control

02 – Energy flow(MJ/h) Control

03 – Volume flow(m³/h) Control

04 – Pressure(kPa) Control



It responds to customers' needs with a fast response speed and can realize energy savings due to $\pm 0.5\%$ precision control, minimizing losses in industrial sites.

Piping Requirement (KC-7730A D/P type FN-Mass)

Straight Pipe Length Requirements at 1 atm			
Piping condition	KC-7730A 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.

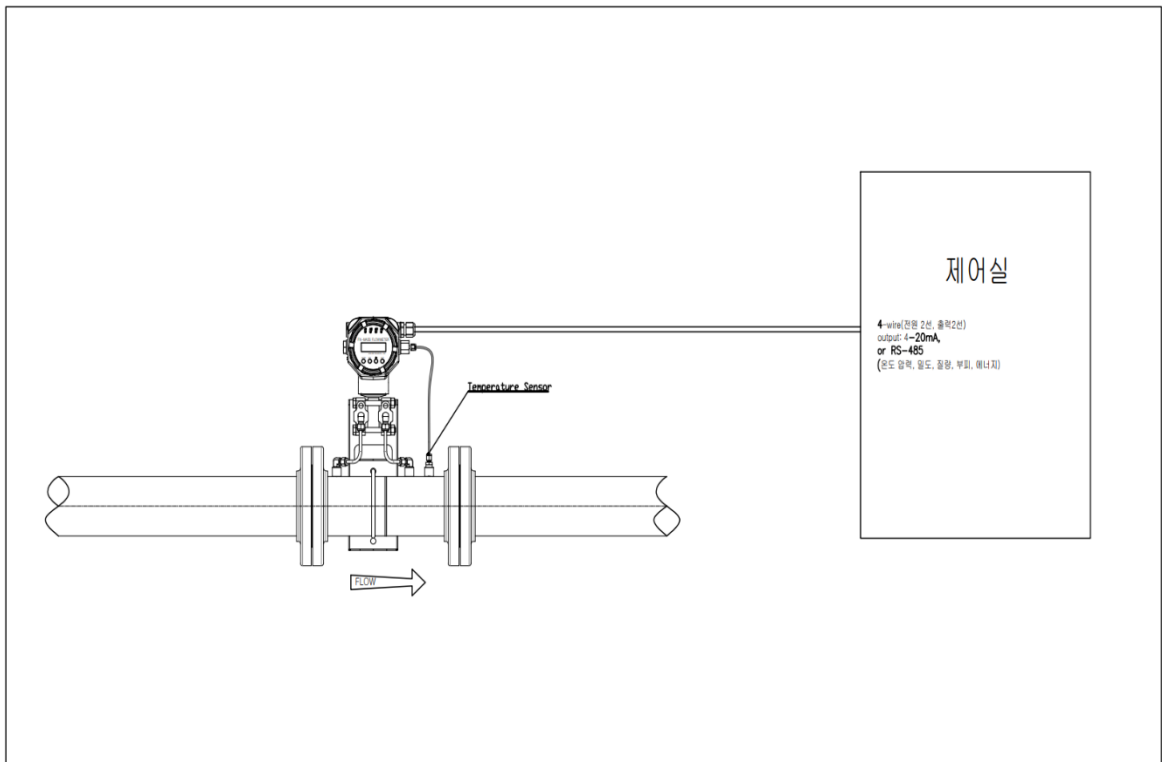
(3) For comparison purposes only. Table shows number of diameter(D) of upstream straight pipe length required for an ISO Standard 5167 Orifice plate with a beta ration of 0.7

(4) Consult factory for pressure effects.

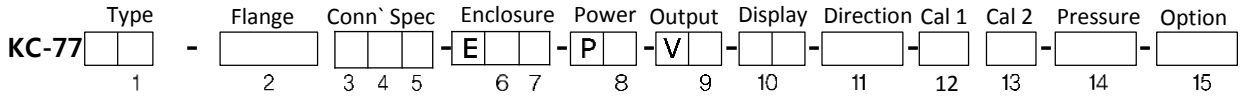
APPLICATION

◆ Overview and Advantages of All-In-One FN Mass

1. Significantly reduced installation construction cost.
2. Since it is a direct type FN mass flow meter, the accuracy is much higher than the existing differential pressure type ($\pm 0.1\%$ F.S)
3. Wide range of flow rate when measuring high temperature, high pressure and large flow rate (turndown ratio 35:1, Option 50:1)
4. Simultaneous monitoring of 5 data (flow rate, temperature, pressure, density, heat amount) by the central cancer monitoring panel with communication output
5. Easy to install as it is a temperature/pressure sensor/flow computer all-in-one mass flow meter



Order Code KC-7730A Series (FN-Mass Flowmeter)



Type	Code 1
Compressed Air	30A
Blower Air	30BA
Fuel Gas	30FG
Hazardous-Area Location Endosure	FM153B
Agency approved, customer specified	W

Connection form	Code 2
LOK : 3/8", 1/2", 3/4", 1"	L / V
Thread : 3/8", 1/2", 3/4", 1"	T
DIN / ANSI / JIS Flange	D / A / J
Agency approved, customer specified	W

Connection Spec' ^{1,3}	Code 3,4,5		
Size	DIN	150 lb	JIS 10k
1/2" (DN15)	D2	F2	J2
3/4" (DN20)	D3	F3	J3
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
4" (DN100)	D11	F11	J11
5" (DN125)	D12	F12	J12
6" (DN150)	D13	F13	J13
8" (DN200)	D15	F15	J15
10" (DN250)	D16	F16	J16
12" (DN300)	D17	F17	J17
Agency approved, customer specified	W		

Enclosure ⁵	Code 6,7
Hazardous-Area Location Enclosure	2
IP67	N2
Agency approved, customer specified	W

Input Power	Code 8
DC 24 V ±10 %, < 100 mA	2
AC 100-240 V ±10 %, 10 watts	3
Agency approved, customer specified	W

Output (Selection)	Code 9
DC 4-20mA, 4Wire (Std.)	1
RS-485S (Std.)	2
Agency approved, customer specified	W

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

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

Calibration 1 ⁹ (Air)	Code 12
Standard Calibration	A
Air, only for 3/8" and large pipe Size	
Compressed Air, only for 1" and large pipe size	D
Customer Calibration	B
Agency approved, customer specified	W

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

Pressure Limit	Code 14
Low pressure	L
Below 145 psig (10 barg)	
Agency approved, customer specified	W

Option	Code 15
Material : 316SS, 316LSS	H
Agency approved, customer specified	W



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All Gas
FN-Mass Flow Meter
KC-7730G Series



The nation's development item, 100% domestic goods, Patent **NO.** 10-1606497

01 FN-MASS FLOWMETER (All Gas)

1-3. D/P-type FN-Mass type KC-7730G Series



All Gas
KC-7730G

Features

- Mixed gas Automatic Calculator (4~20mA input : 8-Channel)
- **5-for multi-: Rate, integrated, volume, mass flow, temp', pressure, density**
- Input Power DC 24 V, < 100mA
- Output accuracy $\pm 0.1\%$, $\pm 2.5\ \mu\text{A}$ (4~20 mA, 4-Wire)
- Field validation of flowmeter calibration settings
Smart program interface (RS-485 standard)
- Direct mass measurement of the flow function eliminates the need for additional temperature and pressure compensation
- Simple signal Processing & calibration
- Built-in flow function of compression coefficient, expansion coefficient, viscosity coefficient, direct calculation formula
- Excellent reproducibility & long-term stability
- Best price-performance ratio
- Easy adaptable for different application or into housings
- No mechanical moved components
- Greatly reduces upstream piping requirements (10-5D)
- Outstanding range ability (Turndown ratio 35:1, Option 50:1)
- 0.1-second response to changes in flow rate
- High pressure fluid can be measured (up to 400 Barg)
- High temperature fluid measurement up to 400°C
- CE, Ex(IP67)

Description

Golden Rules' KC-7730G Series D/P type FN-Mass flowmeter accommodates the change measurement requirements and instrument-validation demands of fluid flow monitoring installations.

It is a LOK Fitting, Flange type, and it is a microprocessor commercially capable of measuring flow rate, adjusting flow rate, and diagnosing at the same time.

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 Rule's KC-7730G series is a product designed based on differential pressure mass flow measurement technology.

Golden Rule's KC-7730G series is a product designed based on differential pressure mass flow measurement technology. It is a built-in flow function that takes into account the compression coefficient, expansion coefficient, and viscosity coefficient rather than the conventional temperature and pressure correction method. Enthalpy, etc. can be provided to the user.

Performance Specifications

◆ Accuracy of Point Velocity

±0.5% of F.S / ±1.0% of R.D
(Option : ±0.1% of F.S / ±0.5% of R.D)

◆ Repeatability

±0.5% of Full Scale

◆ Sensor Accuracy

< 0.05% of span

◆ Turndown Ratio

35:1 (Option 50:1)

◆ Pressure Loss

0.1 ~ Below 0.3 Bar

◆ Response Time

0.1 second

◆ Measuring Range

0.1 ~ 100 m/sec

◆ Function

5-for multi-measurement : rate, total, volume, mass, density, temp', pressure, energy indication

Mass Flow Rates (Air) 1

Air Flow Ranges							
Pipe Size (배관경)		Minimum (최소)		Maximum (최대)		Weight (중량)	
A	B	Nm ³ /m	Nm ³ /h	Nm ³ /m	Nm ³ /h	방폭	일반
15A	1/2-inch	0.13	8.0	1.33	80	5kg	3kg
20A	3/4-inch	0.27	16	2.7	160	5kg	3kg
25A	1-inch	0.4	24	120	240	6kg	4kg
40A	1 1/2-inch	0.98	59	9.8	590	7.2kg	5.2kg
50A	2-inch	1.53	92	15.3	920	8.6kg	6.6kg
80A	3-inch	3.3	200	33.3	2000	11kg	9kg
100A	4-inch	5.83	350	58.3	3500	16.2kg	14.2kg
150A	6-inch	12.7	760	127	7600		
200A	8-inch	21.7	1300	217	13,000		

Notes: Air & N2 flow standard conditions : 21°C(70°F) &
21°C(70°F) scfm:0°C Nm³/h 1Atm

Operating Specifications

◆ Fluid

All Gas

◆ Input Power

DC 24 V ±10 %, < 100 Ma

100~240VAC ±10 %, < 10 Watts (Option)

◆ Output Signal

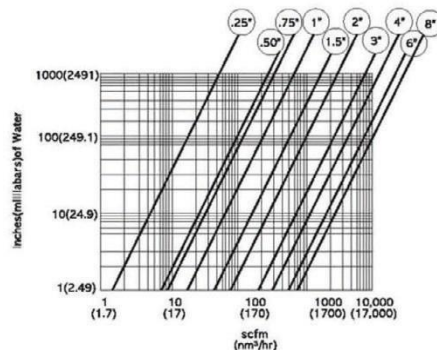
Linear 4 ~ 20 mA, 4Wire

RS-485S

Pulse (Option)

◆ Pressure Drop

15.5 kpa



Mass Flow Range 2

Air Flow Ranges							
Pipe Size		Nm ³ //min, SL/min		Nm ³ /h, kg/h		Spec'	
A	B	Min.	Max.	Min.	Max.	Fluid	Press'/Temp'
25A	1-inch	14.3 SL/min	500 SL/min				105-110KPa/ 40-60'
32A	2 ½"-inch			6.7 Nm ³ /h	74 Nm ³ /h		
40A	1 ½"-inch	142.9 SL/min	5,000 SL/min				105-110KPa/ 40-60'
50A	2-inch			14.3 Nm ³ /h 63 Nm ³ /h	500 Nm ³ /h 630 Nm ³ /h		105-110KPa/ 40-60 800 Kpa / 25°C
65A	2 ½"-inch			34.3 kg/h	1,200 kg/h		105-110KPa/ 40-60
80A	3-inch						
100A	4-inch			85.7 kg/h	3,000 kg/h		105-110KPa/ 40-60
150A	6-inch			217 kg/h	7,600 kg/h		105-110KPa/ 40-60
200A	8-inch						
250A	10-inch						
300A	12-inch	3.7 Nm ³ /min	135 Nm ³ /min	800 Nm ³ /h	8,000 Nm ³ /h		95-101 Kpa / 0.8 Bar 25°C

N ₂ , O ₂ Gas Flow Ranges							
Pipe Size		Nm ³ //min / kg/min		Nm ³ /h / kg/h		Spec'	
A	B	Min.	Max.	Min.	Max.	Fluid	Press'/Temp'
25A	1-inch	1.7 8.6	60 300	145	5,100	N ₂ Gas O ₂ Gas	7-8 Bar / 20-25°C 20 Bar / 20-25°C
32A	2 ¼"-inch			10 kg/h 14.3 kg/h	100 kg/h 500 kg/h	N ₂ Gas O ₂ Gas	6.5-7 Bar / 20°C 6.5-7 Bar / 20°C
40A	1 ½"-inch			18.6 kg/h	650 kg/h	O ₂ Gas	7 Bar / 20°C
50A	2-inch						
65A	2 ½"-inch			2.9 kg/h 50 kg/h	100 kg/h 500 kg/h	N ₂ Gas O ₂ Gas	6.5-7 Bar / 20°C 6.5-7 Bar / 20°C
80A	3-inch			4.6 30	160 1,500	O ₂ Gas	10KPa / 40°C 8.8 Bar / 25°C
100A	4-inch			70	1,200	N ₂	7.5 Bar / 25°C

LNG, LPG Flow Ranges							
Pipe Size		Nm ³ //min		Nm ³ /h		Spec'	
A	B	Min.	Max.	Min.	Max.	Fluid	Press'/Temp'
25A	1-inch	1.7	60	3.4	120	LNG LPG	6 Bar / 20-25°C 9 Bar / 25°C
40A	1 ½"-inch						
50A	2-inch			4.3	150	LNG	5 Bar / 20°C
80A	3-inch			4.6	160	LNG	10KPa / 40°C
100A	4-inch						

◆ Fluid & Ambient temperature

Gas : -40 ~ 100 °C (-40 ~ 212 °F) Option : 110 ~ 400°C (230 ~ 732 °F)

Pipe Temp' : Over 300 °C 이상 (572 °F)

Ambient : -4 ~ 185 °F (-20 ~ 85 °C) Option : -70 ~ 100 °C (-94 ~ 212 °F)

◆ Pressure (limitations)

Compression fitting : 500 psig (35 barg)

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

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

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

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

◆ Displays

Display instructions: instantaneous & integration, volume, mass measurement

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 0.1 sec / Correction factor setting 0.5 ~ 5 /

Zero & Span

◆ Totalizer

Flow rate and total oxygen point (0000. / 000.0/ 00.00 / 0.000)

Seven digits (9,999,999,99.9 Count) in engineering units Reset table by Software

◆ Software (Option)

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 Materials**

D/P Sensor – STS316 (Option : STS316L)

Flow inline Body – STS304 (Option : STS316, STS316L)

◆ Enclosure

Hazardous-Area Enclosure CASE (Ex d IIC T6 : IP67)

General-Area Enclosure CASE (IP67)

◆ Electrical Connections

2 X ½" PF or Exp Cable Gland(SS) 22C

◆ Mounting (Selection)

ANSI 150lb Flange, JIS 10k RF Flange, other

◆ Certification

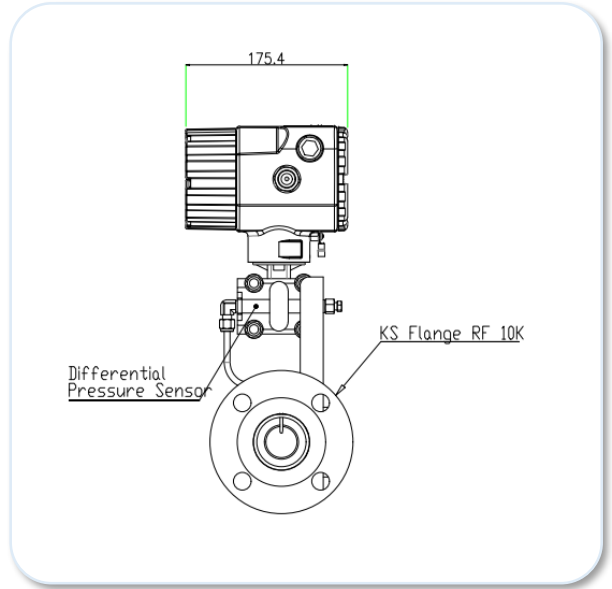
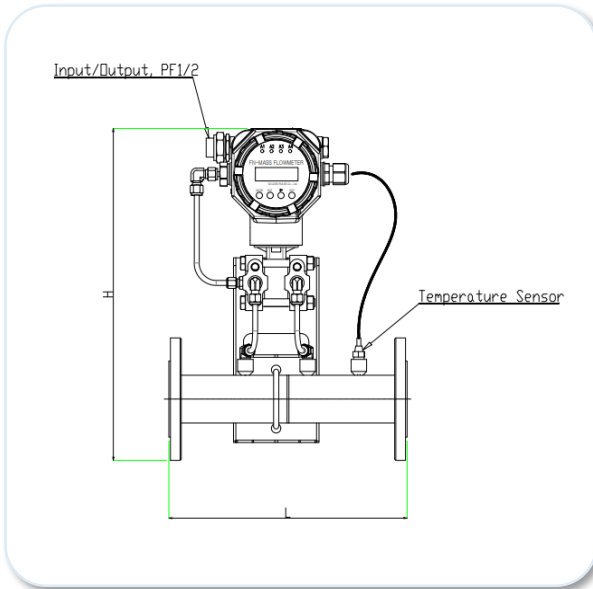
CE (CASE)

KCS Certificate

Atex Certificate

Ex (Ex d IIC T6)

Dimensional Spec& Chart KC-7730G



※ The shape of the sensor and Housing manufacturers are subject to change

Unit : mm

Size	H	L
15A	375	266
20A	380	266
25A	390	276
32A	402	276
40A	406	286
50A	420	306
65A	442	308
80A	442	328
100A	451	349
125A	508	409
150A	540	451
200A	575	522
250A	626	602
300A	684	672

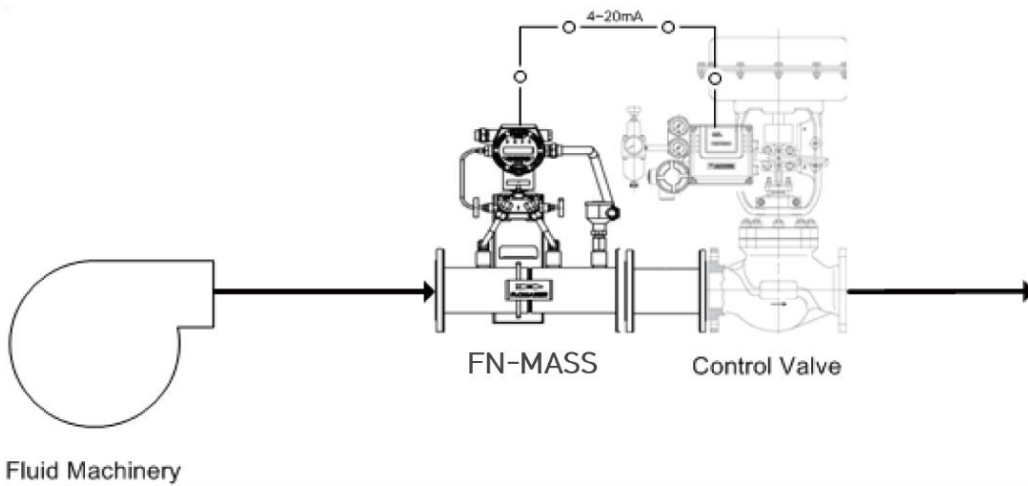
The D/P type FN-Mass flow meter realizes the following control with the current output signal.

01 – Mass flow(kg/h) Control

02 – Energy flow(MJ/h) Control

03 – Volume flow(m³/h) Control

04 – Pressure(kPa) Control



It responds to customers' needs with a fast response speed and can realize energy savings due to $\pm 0.5\%$ precision control, minimizing losses in industrial sites.

Piping Requirement (KC-7730G FN-Mass Flowmeter)

Straight Pipe Length Requirements at 1 atm			
Piping condition	KC-7730G 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.

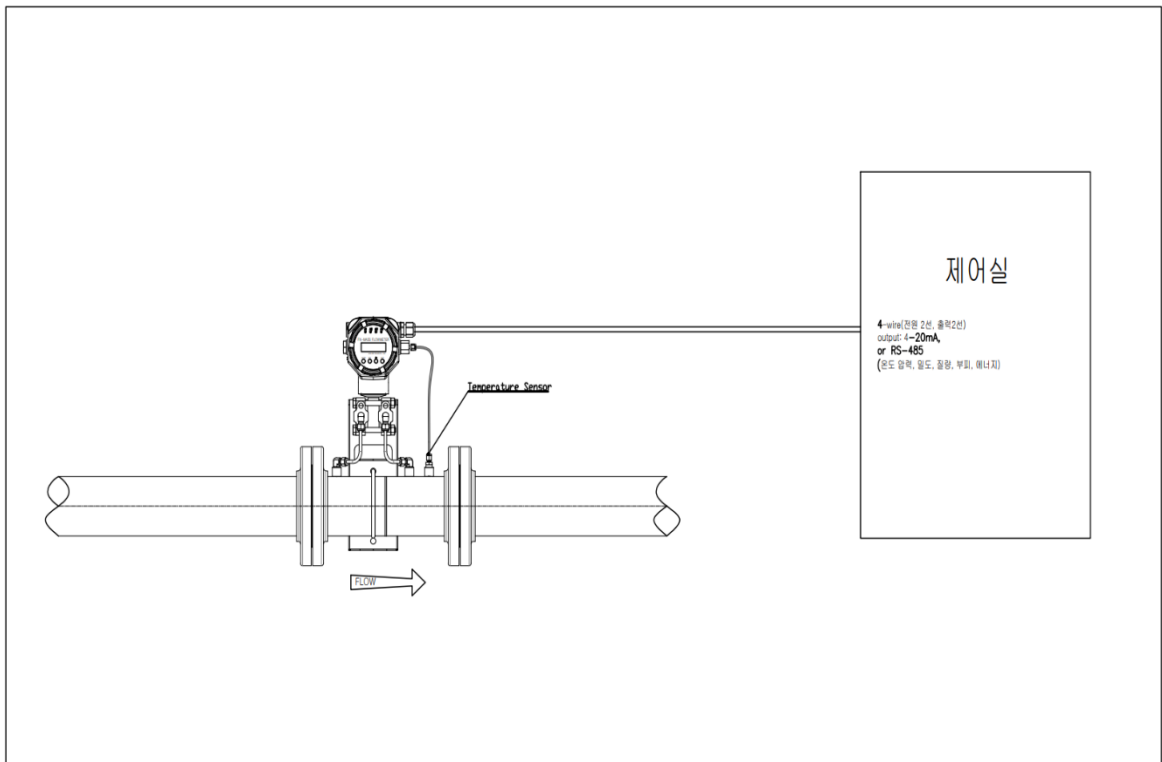
(3) For comparison purposes only. Table shows number of diameter(D) of upstream straight pipe length required for an ISO Standard 5167 Orifice plate with a beta ration of 0.7

(4) Consult factory for pressure effects.

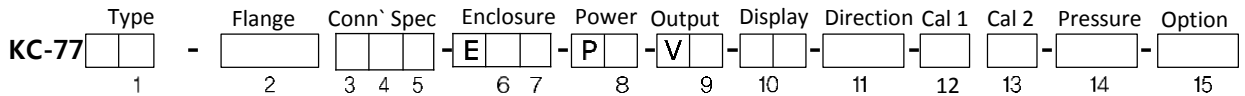
APPLICATION

◆ Overview and Advantages of All-In-One FN Mass Flow Meter

1. Significantly reduced installation construction cost.
2. Since it is a direct type FN mass flow meter, the accuracy is much higher than the existing differential pressure type ($\pm 0.1\%$ F.S)
3. Wide range of flow rate when measuring high temperature, high pressure and large flow rate (turndown ratio 35:1, Option 50:1)
4. Simultaneous monitoring of 5 data (flow rate, temperature, pressure, density, heat amount) by the central cancer monitoring panel with communication output
5. Easy to install as it is a temperature/pressure sensor/flow computer all-in-one mass flow meter



Order Code KC-7730G Series (FN –Mass Flowmeter)



Type	Code 1
All Gas	30G
Air	30A
Mixed gas	30M
Hazardous-Area Location Endosure	FM153B
Agency approved, customer specified	W

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

Connection Spec' ^{1,3}	Code 3,4,5		
Size	DIN	150 lb	JIS 10k
1/2" (DN15)	D2	F2	J2
3/4" (DN20)	D3	F3	J3
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
4" (DN100)	D11	F11	J11
5" (DN125)	D12	F12	J12
6" (DN150)	D13	F13	J13
8" (DN200)	D15	F15	J15
10" (DN250)	D16	F16	J16
12" (DN300)	D17	F17	J17
Agency approved, customer specified	W		

Enclosure ⁵	Code 6,7
Hazardous-Area Location Enclosure	2
IP67	N2
Agency approved, customer specified	W

Input Power	Code 8
DC 24 V ±10 %, 60 mA	2
AC 100-240 V ±10 %, 10 watts (옵션)	3
Agency approved, customer specified	W

Output (Selection)	Code 9
RS-485S & 4-20mA, 4Wire (Std.)	1
DC 4-20 mA , 2Wire (Option)	2
Agency approved, customer specified	W

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

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

Calibration ^{1,9} (Air)	Code 12
Standard Calibration	A
Air, only for 3/8" and large pipe Size	
Compressed Air, only for 1" and large pipe size	D
Customer Calibration	B
Agency approved, customer specified	W

Calibration ^{2,9} (Air)	Code 13
70 °F(21 °C) 14.7 psig (1.103 barg)	A
32 °F(0 °C) 14.7 psig (1.103 barg)	B
Agency approved, customer specified	W

Pressure Limit	Code 14
Low pressure	L
Below 145 psig (10 barg)	
Medium pressure	M
Below 435 psig (30 barg)	(Option)
High pressure	H
Below 5,801 psig (400 barg)	(Option)
Agency approved, customer specified	W

Option	Code 15
Material : 316SS, 316LSS	H
Agency approved, customer specified	W



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Golden Rules Co.,Ltd

Bio gas

FN-Mass Flow Meter KC-7730B Series



The nation's development item, 100% domestic goods, Patent **NO.** 10-1606497

01 FN-MASS FLOWMETER (Bio Gas)

1-4. FN-MASS KC-7730B Series

Features

- Mixed gas Automatic Calculator (4~20mA input : 8-Channel)
- **5-for multi-: Rate, integrated, volume, mass flow, temp', pressure, density**
- Input Power DC 24 V, < 100mA
- Output accuracy $\pm 0.1\%$, $\pm 2.5\ \mu\text{A}$ (4~20 mA, 4-Wire)
- Field validation of flowmeter calibration settings
Smart program interface (RS-485 standard)
- Direct mass measurement of the flow function eliminates the need for additional temperature and pressure compensation
- Simple signal Processing & calibration
- Built-in flow function of compression coefficient, expansion coefficient, viscosity coefficient, direct calculation formula
- Excellent reproducibility & long-term stability
- Best price-performance ratio
- Easy adaptable for different application or into housings
- No mechanical moved components
- Greatly reduces upstream piping requirements (10-5D)
- Outstanding range ability (Turndown ratio 35:1, Option 50:1)
- 0.1-second response to changes in flow rate
- High pressure fluid can be measured (up to 400 Barg)
- High temperature fluid measurement up to 400°C
- CE, Ex(IP67)



Bio Gas
KC-7730B

Description

Golden Rules' KC-7730B Series D/P type FN-Mass flowmeter accommodates the change measurement requirements and instrument-validation demands of fluid flow monitoring installations.

It is a LOK Fitting, Flange type, and it is a microprocessor commercially capable of measuring flow rate, adjusting flow rate, and diagnosing at the same time.

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 Rule's KC-7730B series is a product designed based on differential pressure mass flow measurement technology.

Golden Rule's KC-7730B series is a product designed based on differential pressure mass flow measurement technology. It is a built-in flow function that takes into account the compression coefficient, expansion coefficient, and viscosity coefficient rather than the conventional temperature and pressure correction method. Enthalpy, etc. can be provided to the user.

Performance Specifications

- ◆ **Accuracy of Point Velocity**
 $\pm 0.5\%$ of F.S / $\pm 1.0\%$ of R.D
 (Option : $\pm 0.1\%$ of F.S / $\pm 0.5\%$ of R.D)
- ◆ **Repeatability**
 $\pm 0.5\%$ of Full Scale
- ◆ **Sensor Accuracy**
 $< 0.05\%$ of span
- ◆ **Turndown Ratio**
 35:1 (Option 50:1)
- ◆ **Pressure Loss**
 0.1 ~ Below 0.3 Bar
- ◆ **Response Time**
 0.1 second
- ◆ **Measuring Range**
 0.1 ~ 100 m/sec
- ◆ **Function**

5-for multi-measurement : rate, total, volume, mass, density, temp', pressure, energy indication

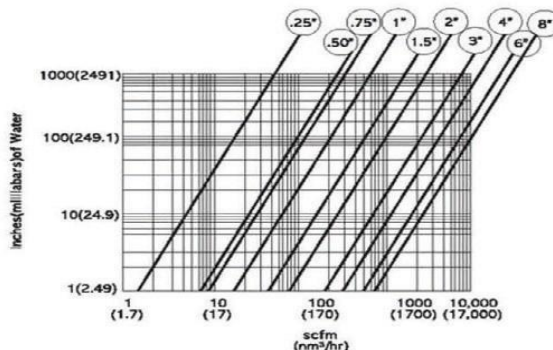
Mass Flow Rates (Bio gas)

Bio gas Flow Ranges				
Pipe Size		Minimum	Maximum	Pressure / Temp'
A	B	Nm ³ /h	Nm ³ /h	Pressure / Temp'
50A	2-inch	4.8	160 (digester)	250mmAq / 30-40°C
80A	3-inch	20	700 (generator)	1,250mmAq / 1,350mmAq / 1,500mmAq / 25-30°C
100A	4-inch	10	350 (digester) / 300 (digester)	250/300mmAq / 25-30°C
125A	5-inch	8.6	300 (generator)	1,500mmAq / 20-35°C
150A	6-inch	14.3	500 (digester)	200mmAq / 35-40°C
200A	8-inch	28.6	1,000 (digester)	250mmAq / 30°C

Notes: Air & N2 flow standard conditions : 21°C(70°F) & 21°C(70°F) scfm:0°C Nm³/h 1Atm

Operating Specifications

- ◆ **Fluid**
 Bio Gas, Mixed Gas
- ◆ **Input Power**
 DC 24 V $\pm 10\%$, < 100 mA
 100~240VAC $\pm 10\%$, < 10 Watts (Option)
- ◆ **Output Signal**
 Linear 4 ~ 20 mA, 4Wire
 RS-485S
- ◆ **Pressure Drop**
 15.5 kpa



◆ Fluid & Ambient temperature

Gas : -40 ~ 100 °C (-40 ~ 212 °F) Option : 110 ~ 400°C (230 ~ 732 °F)

Pipe Temp' : Over 300 °C 이상 (572 °F)

Ambient : -4 ~ 185 °F (-20 ~ 85 °C) Option : -70 ~ 100 °C (-94 ~ 212 °F)

◆ Pressure (limitations)

Compression fitting : 500 psig (35 barg)

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

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

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

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

◆ Displays

Display instructions: instantaneous & integration, volume, mass measurement

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 0.1 sec / Correction factor setting 0.5 ~ 5 /

Zero & Span

◆ Totalizer

Flow rate and total oxygen point (0000. / 000.0/ 00.00 / 0.000)

Seven digits (9,999,999,99.9 Count) in engineering units Reset table by Software

◆ Software (Option)

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 Materials**

D/P Sensor – 304SS (Option : 316SS, 316LSS)

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

◆ Enclosure

Hazardous-Area Enclosure CASE (Ex d IIC T6 : IP67)

General-Area Enclosure CASE (IP67)

◆ Electrical Connections

2 X ½" PF or Exp Cable Gland(SS) 22C

◆ Mounting (Selection)

ANSI 150lb Flange, JIS 10k RF Flange, other

◆ Certification

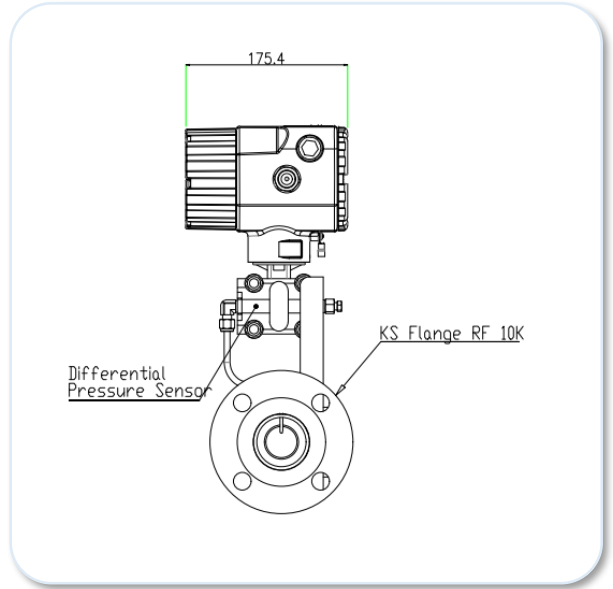
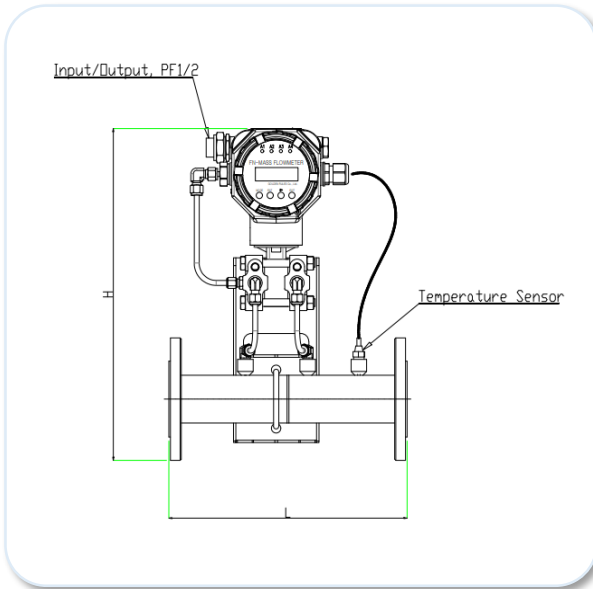
CE (CASE)

KCS Certificate

Atex Certificate

Ex (Ex d IIC T6)

Dimensional Spec & Chart KC-7730B



※ The shape of the sensor and housing manufacturers are subject to change

Unit : mm

Size	H	L
15A	375	300
20A	380	300
25A	390	300
32A	402	300
40A	406	300
50A	420	300
65A	442	300
80A	442	350
100A	451	400
125A	508	409
150A	540	451
200A	575	522
250A	626	602
300A	684	672

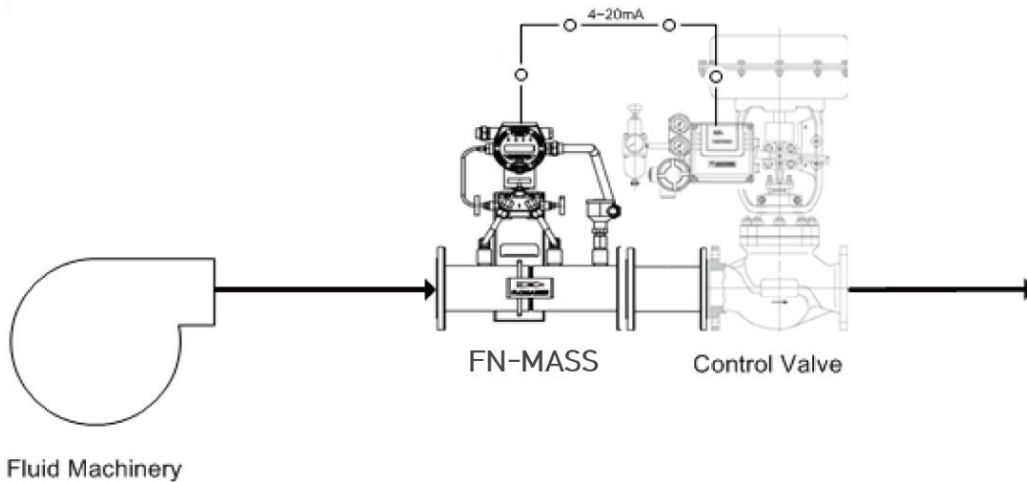
The D/P-Mass flow meter realizes the following control with the current output signal.

01 – Mass flow(kg/h) Control

02 – Energy flow(MJ/h) Control

03 – Volume flow(m³/h) Control

04 – Pressure(kPa) Control



It responds to customers' needs with a fast response speed and can realize energy savings due to $\pm 0.5\%$ precision control, minimizing losses in industrial sites.

Piping Requirement (KC-7730B D/P-Mass Flow meter)

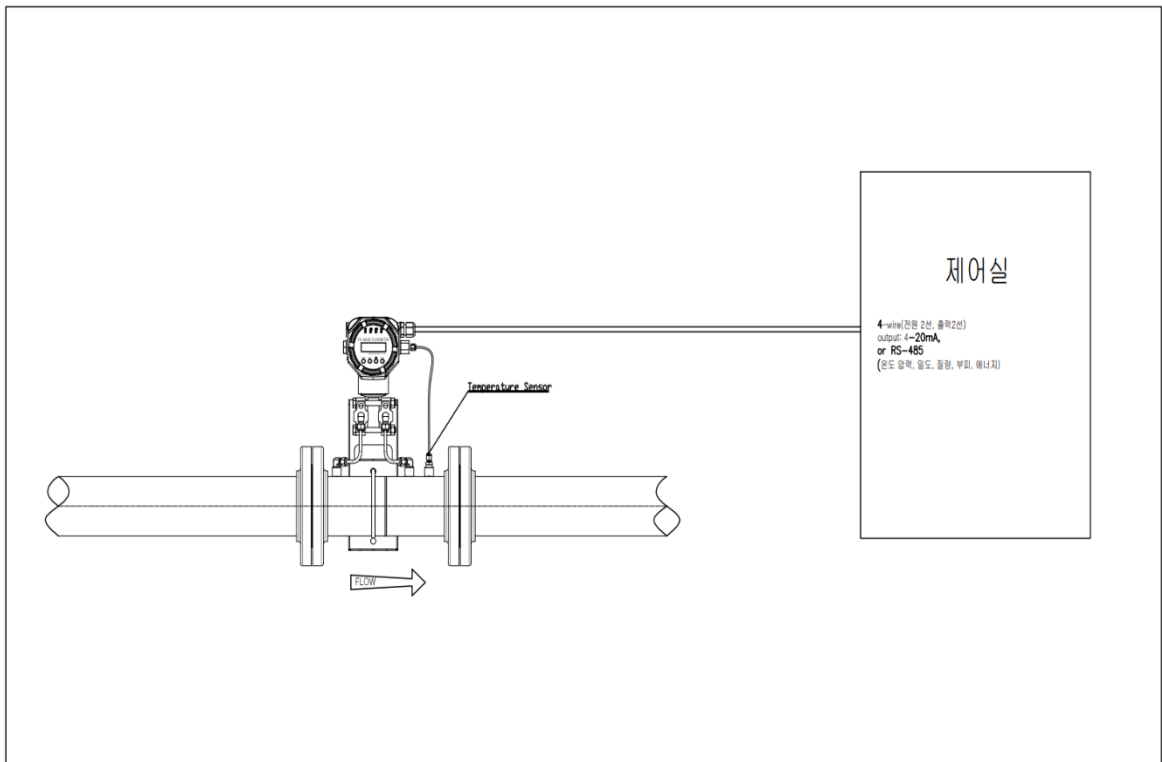
Straight Pipe Length Requirements at 1 atm			
Piping condition	KC-7730B Smart- IN™		Orifice Plate(3)
	Upstream(1)	Downstream(2)	
90° Elbow or T-Piece	10D	5D	28D
Reduction (4:1)	10D	5D	14D
Expansion (4:1)	10D	5D	30D
After Control Valve	10D	5D	32D
Two 90° Elbows (in same plane)	10D	5D	36D
Two 90° Elbows (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.

APPLICATION

◆ Overview and Advantages of All-In-One FN

1. Significantly reduced installation construction cost.
2. Since it is a direct type FN mass flow meter, the accuracy is much higher than the existing differential pressure type ($\pm 0.5\%$ F.S)
3. Wide range of flow rate when measuring high temperature, high pressure and large flow rate (turndown ratio 35:1, Option 50:1)
4. Simultaneous monitoring of 5 data (flow rate, temperature, pressure, density, heat amount) by the central cancer monitoring panel with communication output
5. Easy to install as it is a temperature/pressure sensor/flow computer all-in-one mass flow meter



Order Code KC-7730B Series (FN-Mass Flowmeter)

KC-77 - - **E** - **P** - **V** - - - - - - -

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

Type	Code 1
Orifice Plate	30B1
Flow Nozzle	30B2
Venturi Tube or Venturi Cone	30B3
Hazardous-Area Location Endosure	FM153B
Agency approved, customer specified	W

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

Connection Spec' ^{1,3}	Code 3,4,5		
Size	DIN	150 lb	JIS 10k
1/2" (DN15)	D2	F2	J2
3/4" (DN20)	D3	F3	J3
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
4" (DN100)	D11	F11	J11
5" (DN125)	D12	F12	J12
6" (DN150)	D13	F13	J13
8" (DN200)	D15	F15	J15
10" (DN250)	D16	F16	J16
12" (DN300)	D17	F17	J17
Agency approved, customer specified	W		

Enclosure ⁵	Code 6,7
Hazardous-Area Location Enclosure	2
IP67	N2
Agency approved, customer specified	W

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

Output (Selection)	Code 9
RS-485S & 4-20mA, 4Wire (Std.)	1
DC 4~20 mA , 2Wire (Option)	2
Agency approved, customer specified	W

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

Flow Direction	Code 11
Horizontal Left to Right or Vertical U P	1
Horizontal Right to Left or Vertical Down	2
Agency approved, customer specified	W

Calibration ^{1,9} (Air)	Code 12
Standard Calibration	A
Air, only for 3/8" and large pipe Size	
Compressed Air, only for 1" and large pipe size	D
Customer Calibration	B
Agency approved, customer specified	W

Calibration ^{2,9} (Air)	Code 13
70 °F(21 °C) 14.7 psig (1.103 barg)	A
32 °F(0 °C) 14.7 psig (1.103 barg)	B
Agency approved, customer specified	W

Pressure Limit	Code 14
Low pressure Below (20mmAq~ 300mmAq)	L
Medium pressure Below (300mmAq ~ 0.2 Bar)	M
High pressure Below (Max. 10 barg)	H
Agency approved, customer specified	W

Option	Code 15
Material : 316SS, 316LSS	H
Agency approved, customer specified	W



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Air, Flue gas, Bio gas, Exhaust gas

Pitot Tube-Mass Flow Meter KC-7730I Series



The nation's development item, 100% domestic goods, Patent **NO.** 10-1606497

1. Pitot Tube–MASS FLOWMETER (Air, Flue, Bio, Exhaust Gas)

1-5. KC-7730I FN-Mass Series



Pitot tube – Mass flowmeter
Model : KC-7730I

Feature

- Mixed gas Automatic Calculator (4~20mA input : 8-Channel)
- **5-for multi-: Rate, integrated, volume, mass flow, temp', press', density**
- Input Power DC 24 V, < 100mA
- Output accuracy $\pm 0.1\%$, $\pm 2.5\ \mu\text{A}$
- Field validation of flowmeter calibration settings
Smart program interface (RS-485 standard)
- Direct mass measurement of the flow function eliminates the need for additional temperature and pressure compensation
- Simple signal Processing & calibration
- Built-in flow function of compression coefficient, expansion coefficient, viscosity coefficient, direct calculation formula
- Excellent reproducibility & long-term stability
- Best price-performance ratio
- Easy adaptable for different application or into housings
- No mechanical moved components
- Greatly reduces upstream piping requirements (10-5D)
- Outstanding range ability (Turn down ratio 35:1)
- 0.1-second response to changes in flow rate
- High pressure fluid can be measured (up to 400 Barg)
- High temperature fluid measurement up to 400°C
- CE, Ex(IP67)

Description

Golden Rules' KC-7730I Series D/P type FN-Mass flowmeter accommodates the change measurement requirements and instrument-validation demands of fluid flow monitoring installations.

It is a Flange type, and it is a microprocessor commercially capable of measuring flow rate, adjusting flow rate, and diagnosing at the same time.

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 Rule's KC-7730I series is a product designed based on differential pressure mass flow measurement technology.

Golden Rule's KC-7730I series is a product designed based on differential pressure mass flow measurement technology, and is a built-in flow function that takes into account the compression coefficient, expansion coefficient, and viscosity coefficient. Enthalpy, etc. can be provided to the user.

The information contained herein is subject to change without notice.

Performance Specifications

◆ Accuracy of Point Velocity

±0.5% of F.S / ±1.0% of R.D
(Option : ±0.75% of R.D)

◆ Repeatability

±0.5% of Full Scale

◆ Sensor Accuracy

< 0.2% of span

◆ Turndown Ratio

35:1 (Option 50:1)

◆ Pressure Loss

0.1 ~ Below 0.3 Bar

◆ Response Time

0.1 second

◆ Measuring Range

0.1 ~ 100 m/sec

◆ Function

5-for multi-measurement :
rate, total, volume, mass, density, temp',
pressure, energy indication

Operating Specifications

◆ Fluid

Air, Flue, Bio, Exhaust Gas

◆ Input Power

DC 24 V ±10 %, < 100 mA

100~240VAC ±10 %, < 10 Watts (Option)

◆ Output Signal

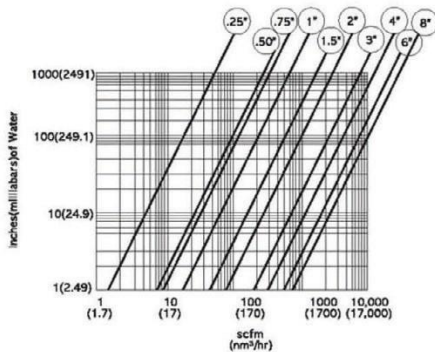
Linear 4 ~ 20 mA, 4Wire

RS-485S

Pulse (Option)

◆ Pressure Drop

15.5 kpa



Mass Flow Rates (Air)

Air Flow Ranges							
Pipe Size (배관경)		Minimum (최소)		Maximum (최대)		Weight (중량)	
A	B	Nm ³ /m	Nm ³ /h	Nm ³ /m	Nm ³ /h	방폭	일반
15A	1/2-inch	0.13	8.0	1.33	80	5kg	3kg
20A	3/4-inch	0.27	16	2.7	160	5kg	3kg
25A	1-inch	0.4	24	120	240	6kg	4kg
40A	1 1/2-inch	0.98	59	9.8	590	7.2kg	5.2kg
50A	2-inch	1.53	92	15.3	920	8.6kg	6.6kg
80A	3-inch	3.3	200	33.3	2000	11kg	9kg
100A	4-inch	5.83	350	58.3	3500	16.2kg	14.2kg
150A	6-inch	12.7	760	127	7600		
200A	8-inch	21.7	1300	217	13,000		

Mass Flow Rates (Bio gas)

Pipe Size (배관경)		Minimum (최소)	Maximum (최대)	Weight (중량)
A	B	Nm ³ /h	Nm ³ /h	방폭
50A	2-inch	4.8	160 (250mmAq)소화조	5.5kg
80A	3-inch	20	700 발전기 (1350,1250,1500mmAq)	6.5kg
100A	4-inch	10	350 (250mmAq)소화조 300 (300mmAq)소화조	7.5kg
125A	5-inch	8.6	300(1500mmAq)발전기	8.5kg
150A	6-inch	14.3	500(200mmAq)소화조	10.5kg
200A	8-inch	28.6	1,000(250mmAq)소화조	12.5kg

Notes: Air & N2 flow standard conditions :
21°C(70°F) & 21°C(70°F) scfm:0°C Nm³/h 1Atm

◆ Fluid & Ambient temperature

Gas : -40 ~ 100 °C (-40 ~ 212 °F) Option : 110 ~ 400°C (230 ~ 732 °F)

Pipe Temp' : Over 300 °C 이상 (572 °F)

Ambient : -4 ~ 185 °F (-20 ~ 85 °C) Option : -70 ~ 100 °C (-94 ~ 212 °F)

◆ Pressure (limitations)

Compression fitting : 500 psig (35 barg)

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

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

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

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

◆ Displays

Display instructions: instantaneous & integration, volume, mass measurement

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 0.1 sec / Correction factor setting 0.5 ~ 5 /

Zero & Span

◆ Totalizer

Flow rate and total oxygen point (0000. / 000.0/ 00.00 / 0.000)

Seven digits (9,999,999,99.9 Count) in engineering units Reset table by Software

◆ Software (Option)

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 Materials**

D/P Sensor – STS316 (Option : STS316L)

Flow inline Body – STS304 (Option : STS316, STS316LS)

◆ Enclosure

Hazardous-Area Enclosure CASE (Ex d IIC T6 : IP67)

General-Area Enclosure CASE (IP67)

◆ Electrical Connections

2 X ½" PF or Exp Cable Gland(SS) 22C

◆ Mounting (Selection)

ANSI 150lb Flange, JIS 10k RF Flange, other

◆ Certification

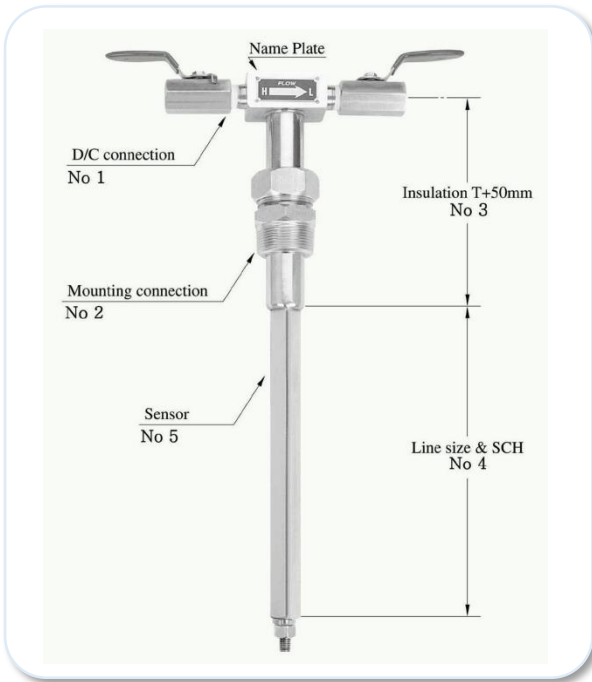
CE (CASE)

KCS Certificate

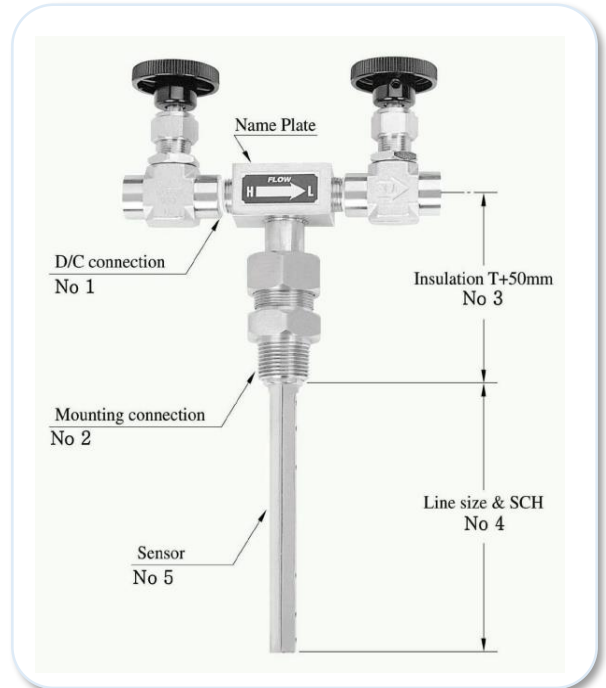
Atex Certificate

Ex (Ex d IIC T6)

Sensor name & installation drawing KC-7730I _ Pitot tube type

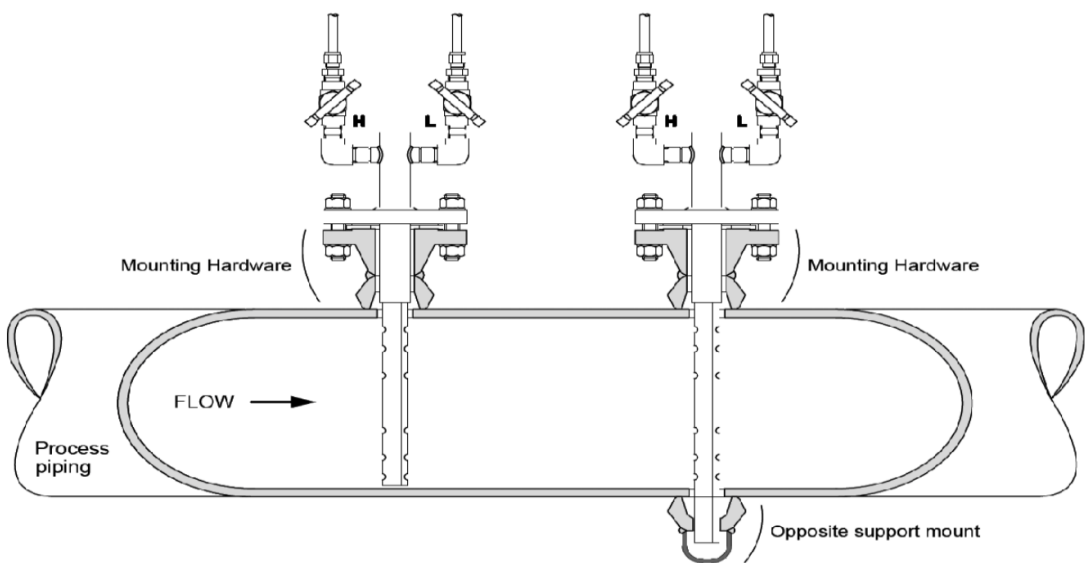


High pressure or Large diameter(18"~118")



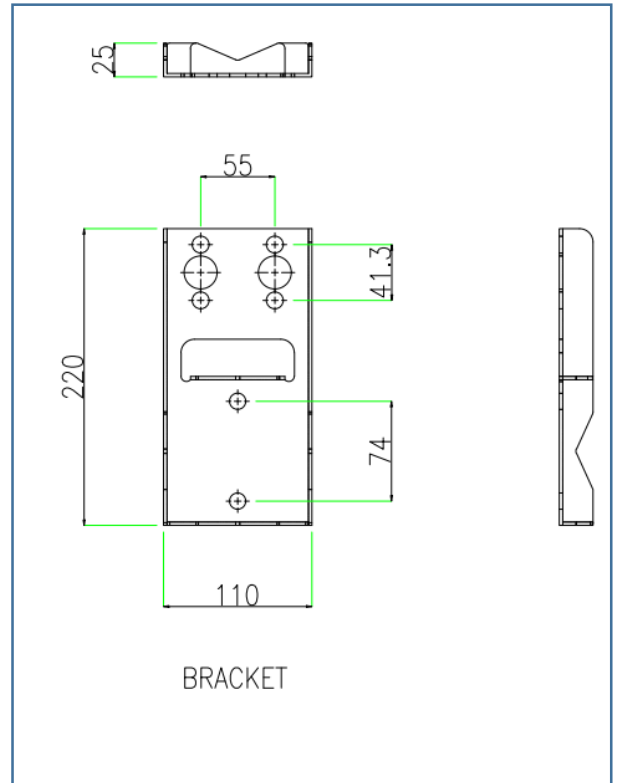
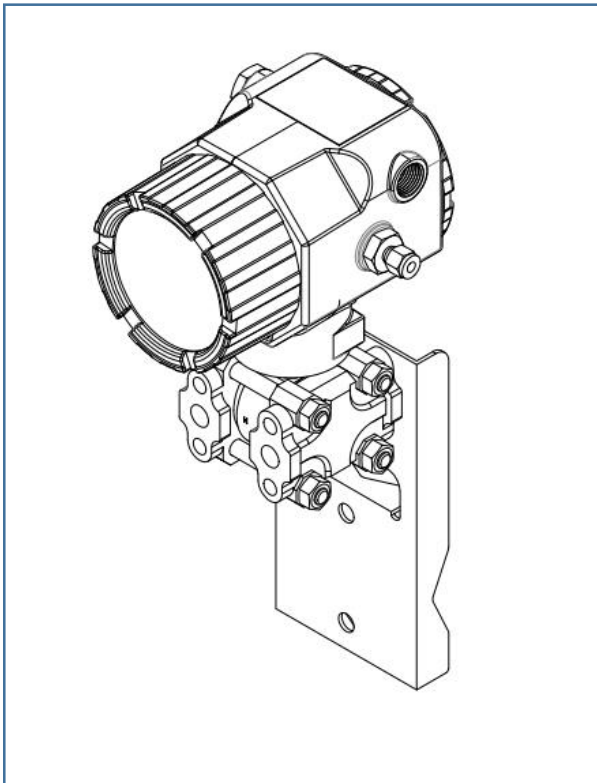
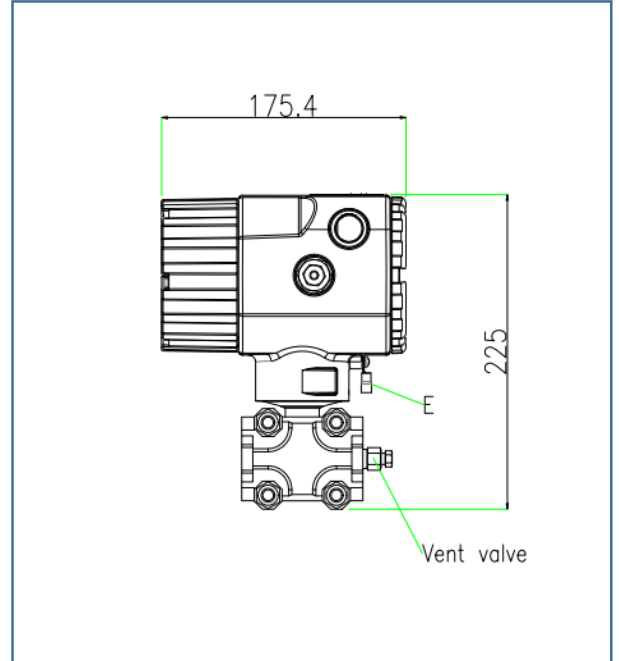
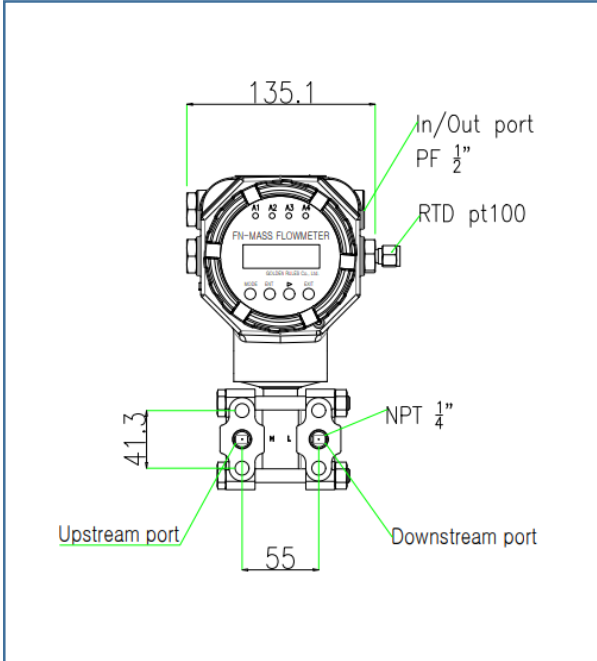
Low pressure or Small ~ Large diameter(3"~80")

※ The shape of the sensor may be changed according to the circumstances of the manufacturer. -> Refer to detail approval drawing



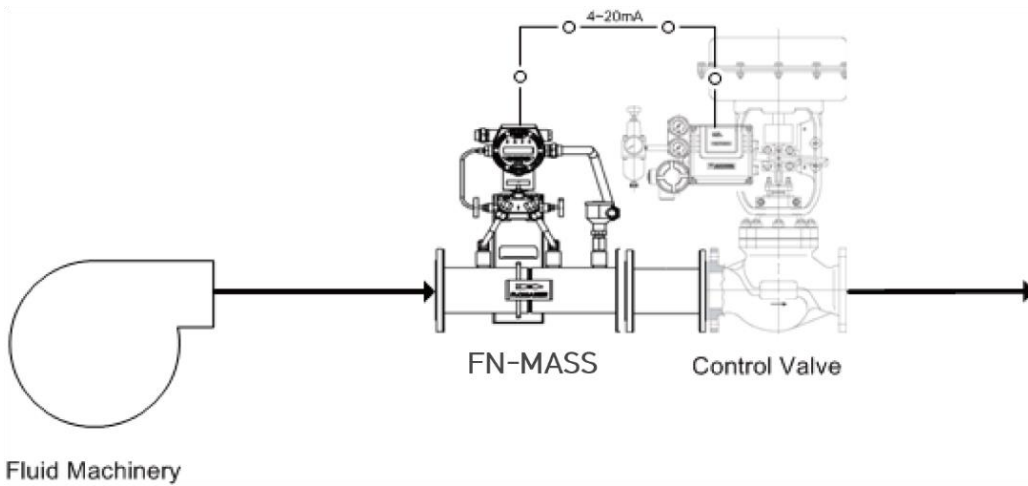
How to install small diameter and large diameter

Mass flow transmitter dimensions KC-6000 Series



The D/P-Mass flow meter realizes the following control with the current output signal.

- 01 – Mass flow(kg/h) Control
- 02 – Energy flow(MJ/h) Control
- 03 – Volume flow(m³/h) Control
- 04 – Pressure(kPa) Control



It responds to customers' needs with a fast response speed and can realize energy savings due to $\pm 0.5\%$ precision control, minimizing losses in industrial sites.

Piping Requirement (KC-7730I D/P –Mass Flowmeter)

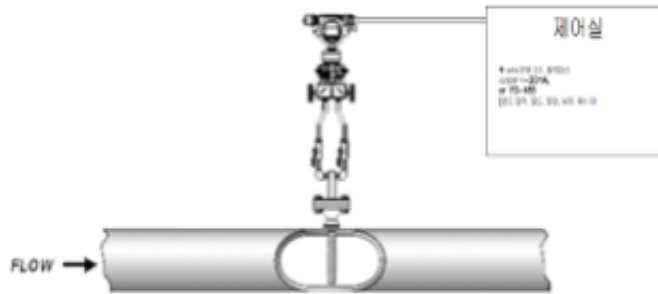
Straight Pipe Length Requirements at 1 atm			
Piping condition	KC-7730I Smart- IN™		Orifice Plate(3)
	Upstream(1)	Downstream(2)	
90° Elbow or T-Piece	10D	5D	28D
Reduction (4:1)	10D	5D	14D
Expansion (4:1)	10D	5D	30D
After Control Valve	10D	5D	32D
Two 90° Elbows (in same plane)	10D	5D	36D
Two 90° Elbows (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.

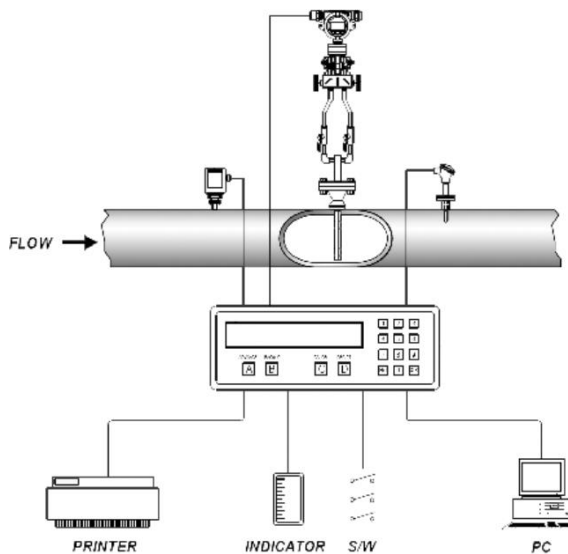
APPLICATION

Schematic diagram and advantages of all-in-one differential pressure mass flowmeter

1. The installation cost is greatly reduced.
2. Since it is a direct-type mass flow meter, the accuracy is much higher than that of the existing differential pressure type ($\pm 0.1\%$ F.S).
3. Simultaneous monitoring of 5 data (flow, temperature, pressure, density, heat quantity) by communication output in heavy-duty monitoring panel
4. Since it is a mass flow meter equipped with temperature and pressure sensors, there is no need to separately install it on the pipe.



New concept mass flow method- all-in-one flow, temperature, pressure sensor and flow computer



Existing differential pressure method- Flow, temperature, pressure sensor, flow computer separate configuration

Order Code KC-7730I Series (Pitot tube-MASS FLOWMETER)

KC-7730I - -**E** -**P** -**V** - - - - - - -

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

Type	Code 1
Gas	30G
Mixed gas	30MX
Blower air	30BA
Hazardous-Area Location Endosure	FM153B
Agency approved, customer specified	W

Insert length ⁴	Code 2
6" (15 cm)	06
9"	09
12"	12
18"	18
24"	24
36"	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

Mounting	Code 3,4,5
None	0
Compression Fitting ² (3/4" tube X 3/4" Male NPT)	10
Threadlet (3/4" Female NPT) Specify pipe O.D. in parentheses	2()
Compression Fittings (IP67) (1/2" tube X 3/4" Male NPT)	3
Curved Duct Bracket (3/4" tube Compression Fitting) Specify duct O.D. in Parentheses	4()
Low Pressure Retract Valve Specify duct O.D. in parentheses	8()
Compression Fittings (3/4" tube X 1" Male NPT)	15()
Agency approved, customer spec'	W

Enclosure ⁵	Code 6,7
Hazardous-Area Location Enclosure	2
IP67 Integral or Remote	N2
Agency approved, customer specified	W

Input Power	Code 8
DC 24 V ±10 %, 60 mA	2
AC 100-240 V ±10 %, 10 watts	3
Agency approved, customer specified	W

Output Signal (Selection)	Code 9
RS-485S & 4-20mA, 4-Wire (Std.)	1
Pulse (Option)	2
Agency approved, customer specified	W

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

Flow Direcion	Code 11
Horizontal Left to Right or Vertical UP	1
Horizontal Right to Left or Vertical Down	2
Agency approved, customer specified	W

Calbration ¹⁹ (Gas)	Code 12
Standard Calibration (Small Size)	A
Air, only for 1/2" and large pipe Size	
Compressed Air, only for 2" and large pipe size	D
Customer Calibration	B
Agency approved, customer specified	W

Calbration ²⁹ (Gas)	Code 13
70 °F(21 °C) 14.7 psig (1.103 barg)	A
32 °F(0 °C) 14.7 psig (1.103 barg)	B
Agency approved, customer specified	W

Pressure Limit	Code 14
Low pressure Below 145 psig (10 barg)	L
Medium pressure Below 435 psig (30 barg)	M (Option)
High pressure Below 5,801 psig (400 barg)	H (Option)
Agency approved, customer specified	W

Option	Code 15
Air Purging System	Option
Pulse	Option
Agency approved, customer specified	W



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Golden Rules Co.,Ltd

H2, Special Gas

FN-Mass Flow Meter

KC-7730H(S)-FM153BEx Series



The nation's development item, 100% domestic goods, Patent **NO.** 10-1606497

01 FN-MASS FLOWMETER (H2 & Special Gas)

1-6. D/P type FN-Mass type KC-7730H-FM153BEx

Features

- Mixed gas Automatic Calculator (4~20mA input : Basic Mode)
- **5-for multi-: Rate, integrated, volume, mass flow, temp', pressure, density**
- Input Power DC 24 V, < 100mA
- Output accuracy $\pm 0.1\%$, $\pm 2.5\ \mu A$ (4~20 mA, 4-Wire)
- Field validation of flowmeter calibration settings
Smart program interface (RS-485 standard)
- Direct mass measurement of the flow function eliminates the need for additional temperature and pressure compensation
- Simple signal Processing & calibration
- **Built-in flow function of compression coefficient, expansion coefficient, viscosity coefficient, direct calculation formula**
- Excellent reproducibility & long-term stability
- Best price-performance ratio
- Easy adaptable for different application or into housings
- No mechanical moved components
- Greatly reduces upstream piping requirements (10-5D)
- Outstanding range ability (Turndown ratio 35:1, Option 50:1)
- 0.1-second response to changes in flow rate
- Hydrogen gas measurement for high pressure at hydrogen charging stations (max. 1380 Bar)
- High temperature fluid measurement up to 400°C
- CE, Ex(IP67)



H2,Special, Gas type
KC-7730H-FM153BEx

Description

Golden Rules' KC-7730H-FM153BEx Series D/P-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 Flange-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 remote switches in the instrument panel.

The Golden Rules KC-7730H-FM153BEx Series allows you to configure or change the following parameters : flow range, Totalize, time response, low flow cut-off 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 Specifications

◆ Accuracy of Point Velocity

±0.5% of F.S / ±1.0% of R.D
(Option: ±0.1% of F.S/±0.5% of R.D)

◆ Repeatability

±0.5% of Full Scale

◆ Sensor Accuracy

< 0.05% of span

◆ Turndown Ratio

35:1 (Option 50:1)

◆ Pressure Loss

0.1 ~ Below 0.3 Bar

◆ Response Time

0.1 second

◆ Measuring Range

0.1 ~ 100 m/sec

◆ Function

5-for multi-measurement :
rate, total, volume, mass, density,
temp', pressure, energy indication

Operating Specifications

◆ Fluid

H2, Special, Special Gas

◆ Input Power

DC 24 V ±10 %, < 100 mA
100~240VAC ±10 %, <10 Watts

◆ Output Signal

Linear 4 ~ 20 mA, 4Wire
RS-485
Pulse (Option)

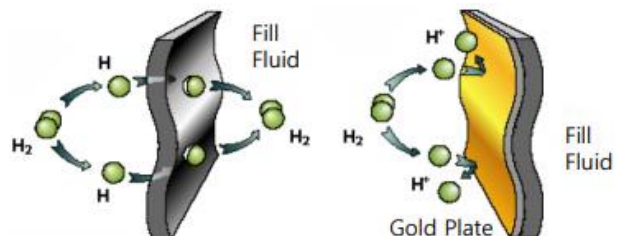
◆ Pressure Drop

15.5 kpa

Mass Flow Rates (H2 Gas)

Pipe Size		H2 Gas Flow Ranges				Fluid	Pressure/ Temp'
		NL/min		NM ³ /h			
		Kg/min		Kg/h			
A	B	최소	최대	최소	최대	Fluid	Press'/Temp'
10A	3/8-inch	5.7	200	0.34	12.00	H ₂	3-5Barg/20°C
10A	3/8-inch	4.3	150	0.28	9.00	H ₂	3-5Barg/20°C
10A	3/8-inch	33.0	666.7	2.0	40.00	H ₂	8.2Barg/25°C
10A	3/8-inch	50.0	416.6	3.0	25.00	H ₂	7Barg/20°C
15A	1/2-inch	300	5,000	18.0	300.0	H ₂	40Barg/95°C
15A	1/2-inch	55.0	1,520	3.30	91.20	H ₂	17-30Barg/20°C
15A	1/2-inch	285.7	10,000	17.14	600.0	H ₂	250Barg/20°C
15A	1/2-inch	23.83	833.3	1.43	50.00	H ₂	7Barg/25°C
15A	1/2-inch	2.38	83.33	0.14	5.00	H ₂	1-5Barg/20°C
15A	1/2-inch	66.66	2,333	4.0	140.00	H ₂	200Barg/100°C
20A	3/4-inch	23.83	833.3	1.43	50.00	H ₂ + Mix	7.3Barg/20°C
20A	3/4-inch	23.83	833.3	1.43	50.00	H ₂ + Mix	6.9Barg/20°C
20A	3/4-inch	9.52	333.3	0.60	20.00	H ₂	9.7Barg/40-90°C
20A	3/4-inch	47.61	1,666	2.90	100	H ₂	9.7Barg/40-90°C
20A	3/4-inch	0.05	1.16	2.00	70.00	H ₂	200Barg/40°C
25A	1-inch	23.83	833.3	1.43	50.00	H ₂	7Barg/25°C
50A	2-inch	0.12	4.20	7.20	252.0	H ₂	8.2Barg/200°C
50A	2-inch	100.0	3,500	6.00	210.5	H ₂	7.9Barg/150°C

Notes: Air & N2 flow standard conditions : 21°C(70°F) &
21°C(70°F) scfm:0°C Nm³/h 1Atm



◆ Fluid & Ambient temperature

Gas : -40 ~ 100 °C (-40 ~ 212 °F) Option : 110 ~ 400°C (230 ~ 732 °F)

Pipe Temp' : Over 300 °C 이상 (572 °F)

Ambient : -4 ~ 185 °F (-20 ~ 85 °C) Option : -70 ~ 100 °C (-94 ~ 212 °F)

◆ Pressure (limitations)

Compression fitting : 500 psig (35 barg)

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

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

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

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

◆ Displays

Display instructions: instantaneous & integration, volume, mass measurement

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 0.1 sec / Correction factor setting 0.5 ~ 5 /

Zero & Span

◆ Totalizer

Flow rate and total oxygen point (0000. / 000.0/ 00.00 / 0.000)

Seven digits (9,999,999,99.9 Count) in engineering units Reset table by Software

◆ Software (Option)

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 Materials**

D/P Sensor – STS316L+Plated gold(H₂ Gas), STS316L(Special Gas)

Flow inline Body – STS304 (Option : STS316, STS316L)

◆ Enclosure

Hazardous-Area Enclosure CASE (Ex d IIC T6 : IP67)

General-Area Enclosure CASE (IP67)

◆ Electrical Connections

2 X ½" PF or Exp Cable Gland(SS) 22C

◆ Mounting (Selection)

ANSI 150lb Flange, JIS 10k RF Flange, other

◆ Certification

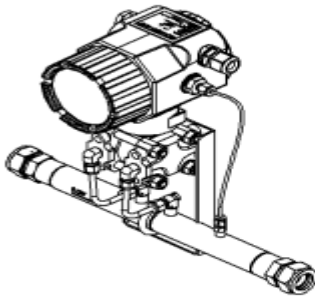
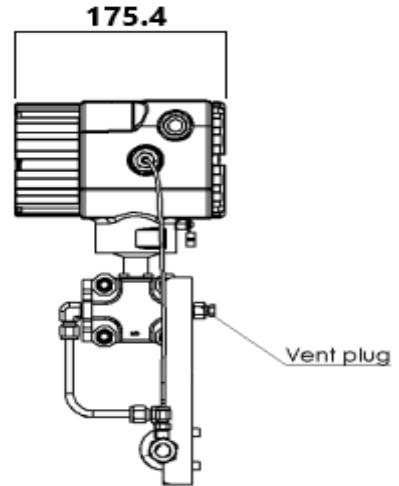
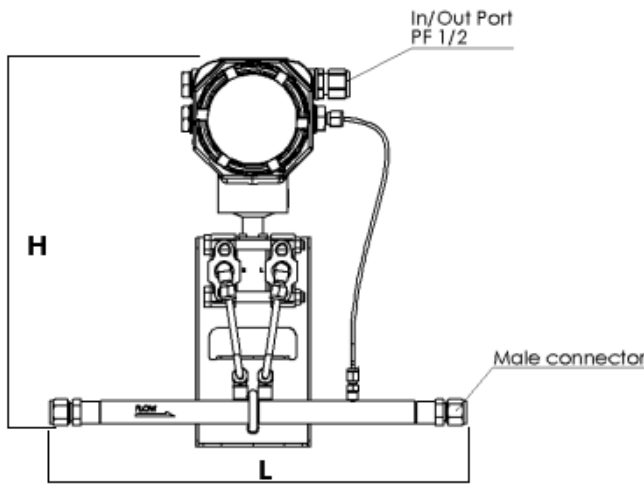
CE (CASE)

KCS Certificate

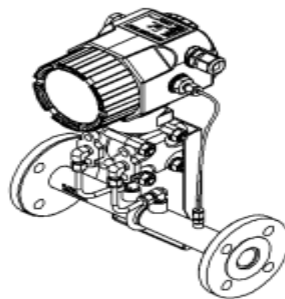
Atex Certificate

Ex (Ex d IIC T6)

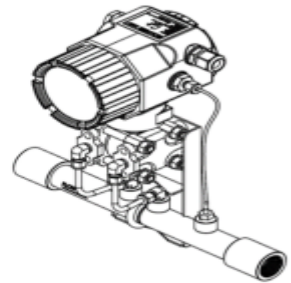
Dimensional Spec' & Chart KC-7730H-FM153BEx



LOK fitting



Flange



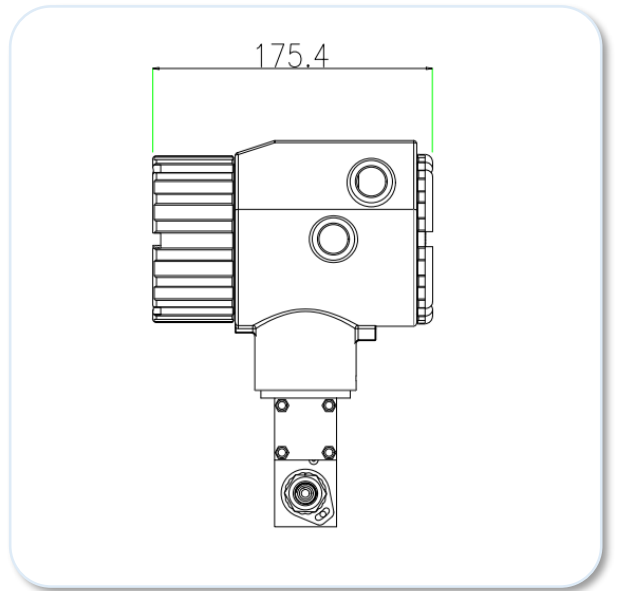
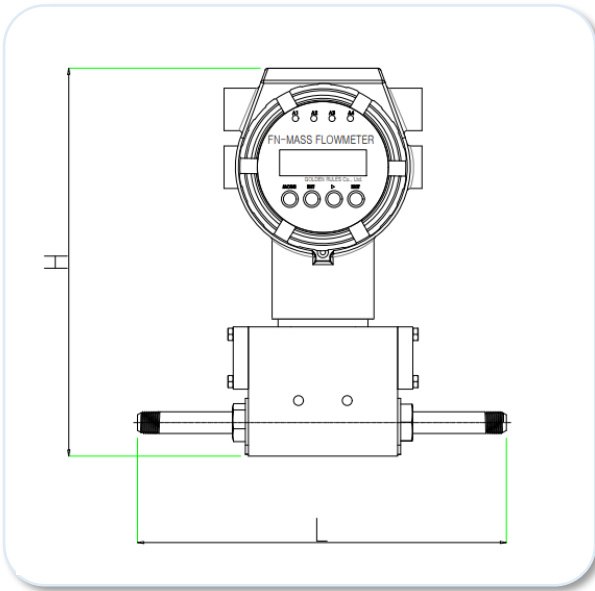
PT Female(Socket)

※ The shape of the sensor depends on the circumstances of the manufacturer. subject to change.
 -> Refer to the detailed approval drawing

unit : mm

Size	H	L
3/8" Thread / Lok	255.1	300
1/2" Lok / Flange	256.1 / 375	300
3/4" Lok / Flange	257.6	300
1" Flange	358.5	300
32A	402	300
40A	406	300
50A	420	300
65A	442	350
80A	442	400
100A	451	409
125A	508	451
150A	540	522
200A	575	602
250A	626	672

Dimensional Spec' & Chart For high pressure hydrogen filling station **Max 400 Bar**



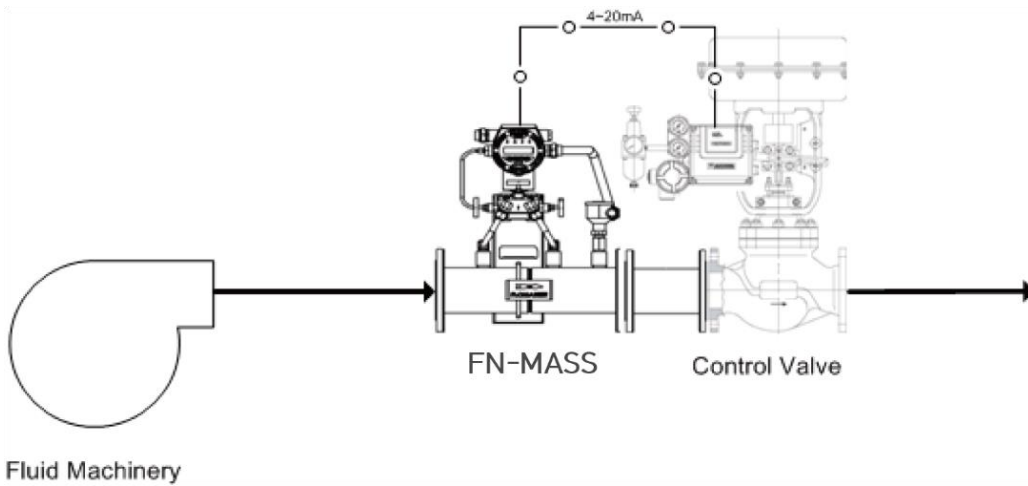
※ The shape of the sensor depends on the circumstances of the manufacturer. subject to change. -> Refer to the detailed approval drawing

unit : mm

Size	H	L
3/8" Cone&Thread tubing	255.1	300
1/2" Cone&Thread tubing	256.1 / 375	300
3/4" Cone&Thread tubing	257.6	300
1" Cone&Thread tubing	358.5	300

The D/P type FN-Mass flow meter realizes the following control with the current output signal.

- 01 – Mass flow(kg/h) Control
- 02 – Energy flow(MJ/h) Control
- 03 – Volume flow(m³/h) Control
- 04 – Pressure(kPa) Control



It responds to customers' needs with a fast response speed and can realize energy savings due to $\pm 0.5\%$ precision control, minimizing losses in industrial sites.

Piping Requirement (KC-7730H-FM153BEx)

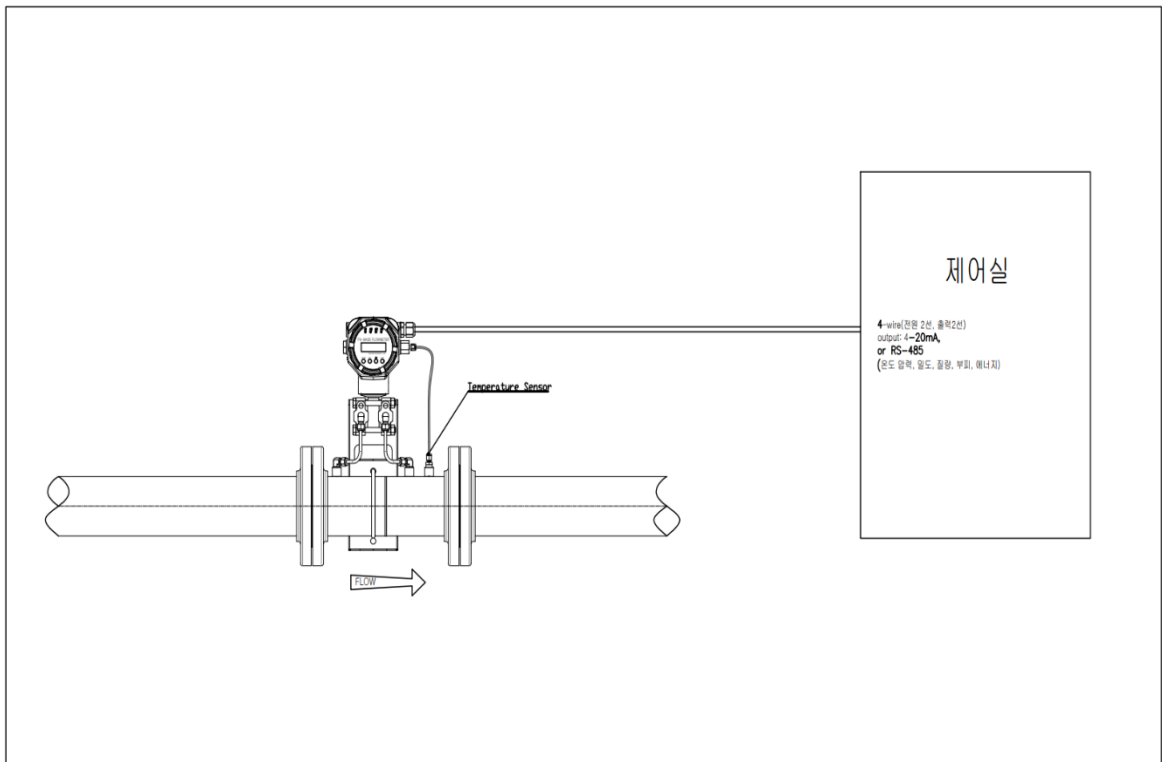
Straight Pipe Length Requirements at 1 atm			
Piping condition	KC-7730H-FM153BEx Smart-IN™		Orifice Plate(3)
	Upstream(1)	Downstream(2)	
90° Elbow or T-Piece	10D	5D	28D
Reduction (4:1)	10D	5D	14D
Expansion (4:1)	10D	5D	30D
After Control Valve	10D	5D	32D
Two 90° Elbows (in same plane)	10D	5D	36D
Two 90° 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.

APPLICATION

◆ Overview and Advantages of All-In-One FN

1. Significantly reduced installation construction cost.
2. Since it is a direct type FN mass flow meter, the accuracy is much higher than the existing differential pressure type ($\pm 0.5\%$ F.S)
3. Wide range of flow rate when measuring high temperature, high pressure and large flow rate (turndown ratio 35:1, Option 50:1)
4. Simultaneous monitoring of 5 data (flow rate, temperature, pressure, density, heat amount) by the central cancer monitoring panel with communication output
5. Easy to install as it is a temperature/pressure sensor/flow computer all-in-one mass flow meter



Order Code KC-7730H-FM153BEx (FN-Mass Flowmeter)

KC-77 - - - - - - - - - - - -

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

Type	Code 1
H2 Gas 100% or H2 Mixture	30H
Special Gas	30S
High Pressure Gas	30H
Hazardous-Area Location Endosure	FM153B
Agency approved, customer specified	W

Connection form	Code 2
LOK : 3/8", 1/2", 3/4", 1"	L
VCR : 3/8", 1/2", 3/4", 1"	V
DIN / ANSI / JIS Flange	D / A / J
Agency approved, customer specified	W

Connection Spec' ^{1,3}	Code 3,4,5		
Size	DIN	150 lb	JIS 10k
1/2" (DN15)	D2	F2	J2
3/4" (DN20)	D3	F3	J3
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
4" (DN100)	D11	F11	J11
5" (DN125)	D12	F12	J12
6" (DN150)	D13	F13	J13
8" (DN200)	D15	F15	J15
10" (DN250)	D16	F16	J16
12" (DN300)	D17	F17	J17
Agency approved, customer specified	W		

Enclosure ⁵	Code 6,7
Hazardous-Area Location Enclosure	2
IP67	N2
Agency approved, customer specified	W

Input Power	Code 8
DC 24 V ±10 %, < 100 mA	2
AC 100-240 V ±10 %, 10 watts	3
Agency approved, customer specified	W

Output (Selection)	Code 9
RS-485S & 4-20mA, 4Wire (Std.)	1
Pulse (Option)	2
Agency approved, customer specified	W

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

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

Calibration ^{1,9} (Air)	Code 12
Standard Calibration	A
Air, only for 3/8" and large pipe Size	
Compressed Air, only for 1" and large pipe size	D
Customer Calibration	B
Agency approved, customer specified	W

Calibration ^{2,9} (Air)	Code 13
70 °F(21 °C) 14.7 psig (1.103 barg)	A
32 °F(0 °C) 14.7 psig (1.103 barg)	B
Agency approved, customer specified	W

Pressure Limit	Code 14
Low pressure	L
Below 290 psig (20 barg)	
Medium pressure	
Max. 3,626 psig (250 barg)	(Option)
High pressure	H
Max.. 6,527 psig (450 barg)	(Option)
Agency approved, customer specified	W

Option	Code 15
Mat'l : STS316L/ Temp' : 400°C	H
Agency approved, customer specified	W



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Golden Rules Co.,Ltd

Steam FN-Mass Flow Meter KC-7730S Series



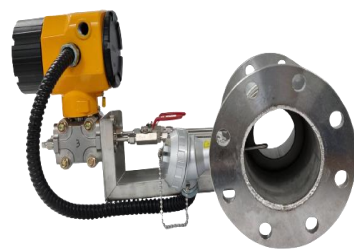
The nation's development item, 100% domestic goods, Patent NO. 10-1606497

01 FN-MASS FLOWMETER (STEAM)

1-7. D/P type FN-Mass type KC-7730S Series

Features

- **5-for multi-:** Rate, integrated, volume, mass flow, temp', pressure, density
- Input Power DC 24 V, < 100mA
- Output accuracy $\pm 0.1\%$, $\pm 2.5\ \mu\text{A}$ (4~20 mA, 4-Wire)
- Field validation of flowmeter calibration settings
Smart program interface (RS-485 standard)
- Direct mass measurement of the flow function eliminates the need for additional temperature and pressure compensation
- Simple signal Processing & calibration
- Built-in flow function of compression coefficient, expansion coefficient, viscosity coefficient, direct calculation formula
- Excellent reproducibility & long-term stability
- Best price-performance ratio
- Easy adaptable for different application or into housings
- No mechanical moved components
- Greatly reduces upstream piping requirements (10-5D)
- Outstanding range ability (Turndown ratio 35:1, Option 50:1)
- 0.1-second response to changes in flow rate
- High pressure fluid can be measured (up to 400 Barg)
- High temperature fluid measurement up to 400°C
- CE, Ex(IP67)



Steam
KC-7730S

Description

Golden Rules' KC-7730S Series D/P type FN-Mass flowmeter accommodates the change measurement Requirements and instrument-validation demands of fluid flow monitoring installations.

It is a LOK Fitting, Flange type, and it is a microprocessor commercially capable of measuring flow rate, adjusting flow rate, and diagnosing at the same time.

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 Rule's KC-7730S series is a product designed based on differential pressure mass flow measurement technology.

Golden Rule's KC-7730 series is a product designed based on differential pressure mass flow measurement technology. It is a built-in flow function that takes into account the compression coefficient, expansion coefficient, and viscosity coefficient rather than the conventional temperature and pressure correction method. Enthalpy, etc. can be provided to the user.

Performance Specifications

◆ **Accuracy of Point Velocity**

±0.5% of F.S / ±1.0% of R.D
 (Option : ±0.1% of F.S / ±0.5% of R.D)

◆ **Repeatability**

±0.5% of Full Scale

◆ **Sensor Accuracy**

< 0.05% of span

◆ **Turndown Ratio**

35:1 (Option 50:1)

◆ **Pressure Loss**

0.1 ~ Below 0.3 Bar

◆ **Response Time**

0.1 second

◆ **Measuring Range**

0.1 ~ 100 m/sec

◆ **Function**

5-for multi-measurement :

rate, total, volume, mass, density, temp', pressure, energy indication

Operating Specifications

◆ **Fluid**

Steam (Saturated, Super Heated)

◆ **Input Power**

DC 24 V ±10 %, < 100 mA

100~240VAC ±10 %, < 10 Watts (Option)

Output Signal

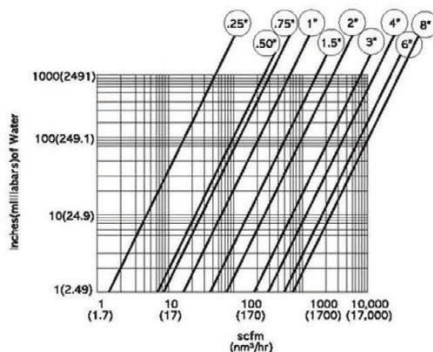
Linear 4 ~ 20 mA, 4Wire

RS-485S

Pulse (Option)

◆ **Process Drop**

15.5 kpa



Steam Flow Range							
Pipe Size		Pressure / Temp'		Flow Range (kg/h)		Flow Range (Ton/h)	
A	B	Barg	'C	Minimum	Maximum	Minimum	Maximum
25A	1-inch						
32A	1 1/4-inch						
40A	1 1/2-inch						
50A	2-inch	16-17	200-205	1,000	10,000		
65A	2 1/2-inch						
80A	3-inch	7.9	179.5	300	3,000		
100A	4-inch	7.9 7.0 2	179.5 190 133.2	200 700 75	2,000 7,000 750		
125A	5-inch	7.9	179.5	250	2,500		
150A	6-inch	2	133.2	300	3,000		
200A	8-inch	7.9 38	179.5 400	1,500	15,000	10	100
250A	10-inch	8 8	193 210	8,000	80,000	1.1	11
300A	12-inch	8	210	1,100	11,000	1.1	11
400A	16-inch	8	176	2,000	65,000		

The quality flow range of saturated steam

unit [kg/h]

Size (mm)		0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.5	2.0
Temperature(°C)		120.23	133.54	143.62	151.84	158.94	164.96	170.41	175.36	179.88	187.96	198.40	212.37
Density(kg/m³)		1.129	1.651	2.163	2.66	3.170	3.667	4.162	4.655	5.147	6.127	7.602	10.005
25A	Standard Low Limit	14	17	19	22	23	25	27	28	30	33	36	42
	Standard High Limit	140	170	190	220	230	250	270	280	300	330	360	420
32A	Standard Low Limit	26	30	34	38	41	44	47	50	52	57	63	73
	Standard High Limit	260	300	340	380	410	440	470	500	520	570	630	730
40A	Standard Low Limit	31	38	44	48	53	57	60	64	67	73	82	94
	Standard High Limit	310	380	440	480	530	570	600	640	670	730	820	940
50A	Standard Low Limit	52	63	73	81	88	95	101	107	112	122	136	157
	Standard High Limit	520	630	730	810	880	950	1010	1070	1120	1220	1360	1570
65A	Standard Low Limit	90	106	121	134	146	158	168	178	187	204	227	261
	Standard High Limit	900	1060	1210	1340	1460	1580	1680	1780	1870	2040	2270	2610
80A	Standard Low Limit	122	148	170	188	205	221	235	249	261	285	318	365
	Standard High Limit	1220	1480	1700	1880	2050	2210	2350	2490	2610	2850	3180	3650
100A	Standard Low Limit	175	212	242	269	293	315	336	355	374	408	454	522
	Standard High Limit	1750	2120	2420	2690	2930	3150	3360	3550	3740	4080	4540	5220
125A	Standard Low Limit	262	318	363	404	440	473	504	533	561	612	681	783
	Standard High Limit	2620	3180	3630	4040	4400	4730	5040	5330	5610	6120	6810	7830
150A	Standard Low Limit	300	423	484	538	596	631	672	711	747	815	908	1044
	Standard High Limit	3000	4230	4840	5380	5960	6310	6720	7110	7470	8150	9080	10440
200A	Standard Low Limit	700	846	969	1076	1173	1261	1344	1421	1494	1630	1815	2088
	Standard High Limit	7000	8460	9690	10760	11730	12610	13440	14210	14940	16300	18150	20880
250A	Standard Low Limit	1050	1269	1453	1641	1759	1892	2016	2132	2241	2245	2722	3132
	Standard High Limit	10500	12690	14530	16410	17590	18920	20160	21320	22410	22450	27220	31320
300A	Standard Low Limit	1750	2116	2422	2690	2932	3153	3369	3553	3736	4076	4536	5220
	Standard High Limit	17500	21160	24220	26900	29320	31530	33690	35530	37360	40760	45360	52200

◆ Fluid & Ambient temperature

Steam : -20 ~ 200 °C (-4 ~ 392 °F) Option : 210 ~ 400 °C (410 ~ 752 °F)

Pipe Temp' : Over 300 °C 이상 (572 °F)

Ambient : -4 ~ 185 °F (-20 ~ 85 °C) Option : -70 ~ 100 °C (-94 ~ 212 °F)

◆ Pressure (limitations)

Compression fitting : 500 psig (35 barg)

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

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

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

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

◆ Displays

Display instructions: instantaneous & integration, volume, mass measurement

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 0.1 sec / Correction factor setting 0.5 ~ 5 /

Zero & Span

◆ Totalizer

Flow rate and total oxygen point (0000. / 000.0/ 00.00 / 0.000)

Seven digits (9,999,999,99.9 Count) in engineering units Reset table by Software

◆ Software (Option)

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 Materials**

D/P Sensor – STS316 (Option : STS316L)

Flow inline Body – STS304 (Option : STS316, STS316L)

◆ Enclosure

Hazardous-Area Enclosure CASE (Ex d IIC T6 : IP67)

General-Area Enclosure CASE (IP67)

◆ Electrical Connections

2 X ½" PF or Exp Cable Gland(SS) 22C

◆ Mounting (Selection)

ANSI 150lb Flange, JIS 10k RF Flange, other

◆ Certification

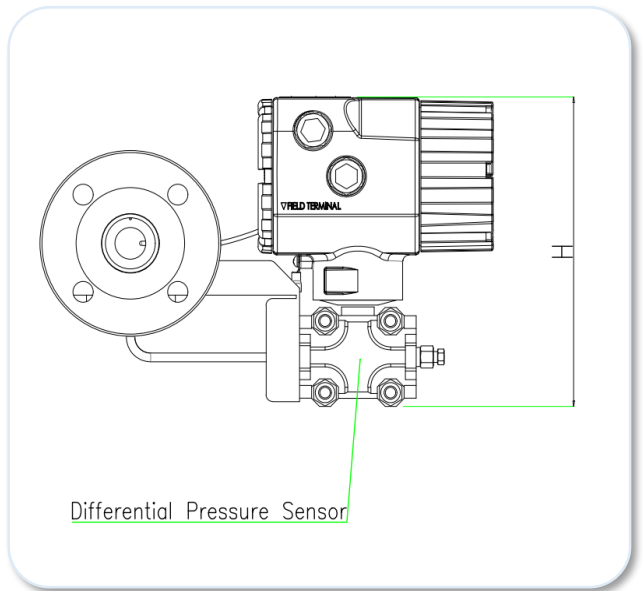
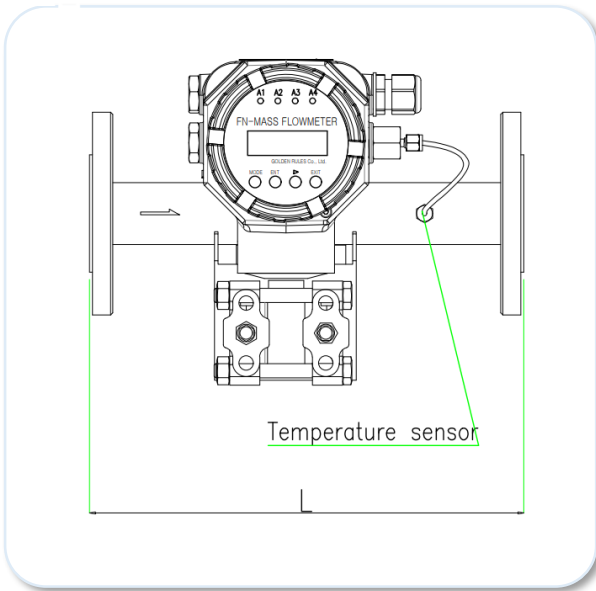
CE (CASE)

KCS Certificate

Atex Certificate

Ex (Ex d IIC T6)

Dimensional Spec' & Chart KC-7730S_Steam



※ The shape of the sensor and Housing manufacturers are subject to change

unit : mm

Size	D	L
15A	309	300
20A	309	300
25A	319	300
32A	319	300
40A	329	300
50A	339	300
65A	349	300
80A	369	350
100A	389	400
125A	409	409
150A	429	451
200A	449	522
250A	469	602
300A	499	672

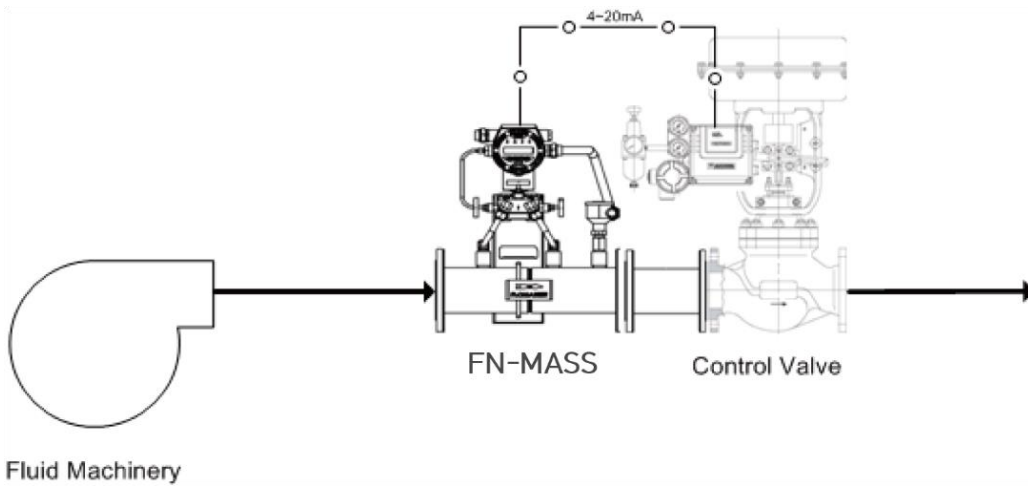
The D/P type FN-Mass flow meter realizes the following control with the current output signal.

01 – Mass flow(kg/h) Control

02 – Energy flow(MJ/h) Control

03 – Volume flow(m³/h) Control

04 – Pressure(kPa) Control



It responds to customers' needs with a fast response speed and can realize energy savings due to $\pm 0.5\%$ precision control, minimizing losses in industrial sites.

Piping Requirement (KC-7730S D/P type FN-Mass)

Straight Pipe Length Requirements at 1 atm			
Piping condition	KC-7730S 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.

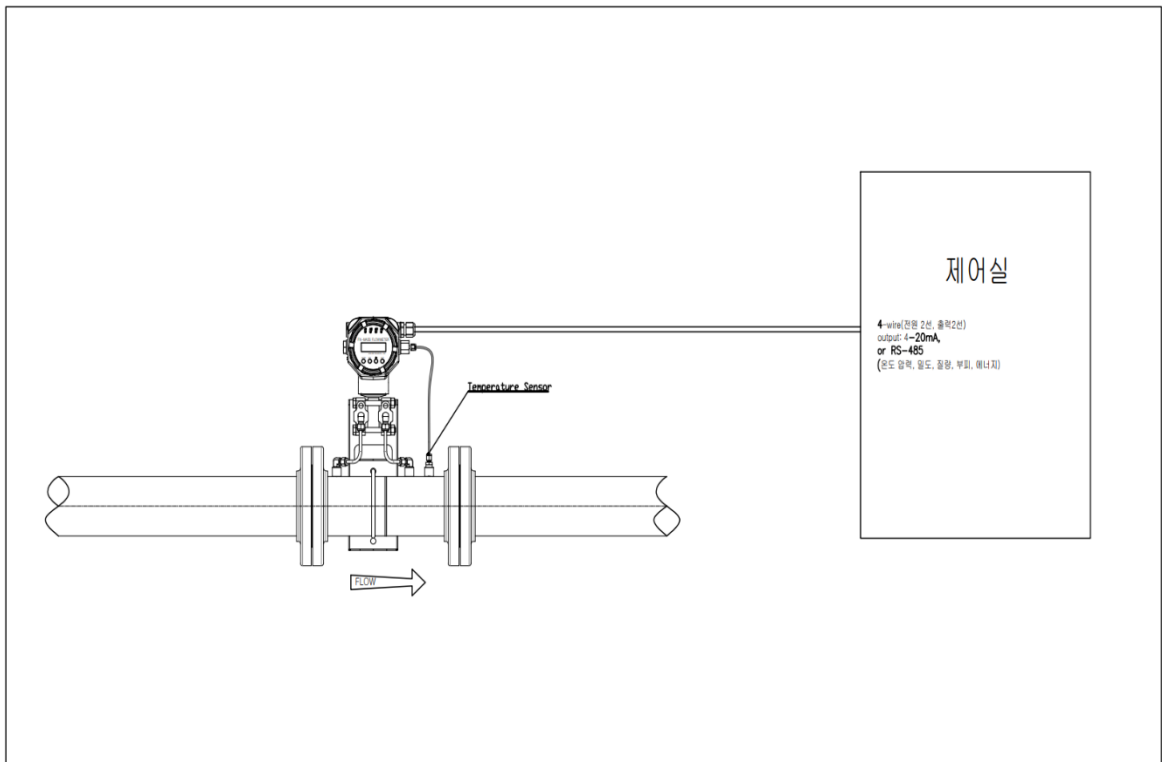
(3) For comparison purposes only. Table shows number of diameter(D) of upstream straight pipe length required for an ISO Standard 5167 Orifice plate with a beta ration of 0.7

(4) Consult factory for pressure effects.

APPLICATION

◆ Overview and Advantages of All-In-One FN

1. Significantly reduced installation construction cost.
2. Since it is a direct type FN mass flow meter, the accuracy is much higher than the existing differential pressure type ($\pm 0.1\%$ F.S)
3. Wide range of flow rate when measuring high temperature, high pressure and large flow rate (turndown ratio 50:1)
4. Simultaneous monitoring of 5 data (flow rate, temperature, pressure, density, heat amount) by the central cancer monitoring panel with communication output
5. Easy to install as it is a temperature/pressure sensor/flow computer all-in-one mass flow meter



Order Code KC-7730S Series (D/P type FN-Mass Flowmeter)

KC-77 - - **E** - **P** - **V** - - - - - - -

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

Type	Code 1
Steam	30S
Hazardous-Area Location Endosure	FM153B
Agency approved, customer specified	W

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

Connection Spec' 1,3	Code 3,4,5		
Size	DIN	150 lb	JIS 10k
1/2" (DN15)	D2	F2	J2
3/4" (DN20)	D3	F3	J3
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
4" (DN100)	D11	F11	J11
5" (DN125)	D12	F12	J12
6" (DN150)	D13	F13	J13
8" (DN200)	D15	F15	J15
10" (DN250)	D16	F16	J16
12" (DN300)	D17	F17	J17
Agency approved, customer specified	W		

Enclosure ⁵	Code 6,7
Hazardous-Area Location Enclosure	2
IP67	N2
Agency approved, customer specified	W

Input Power	Code 8
DC 24 V ±10 %, < 100 mA	2
AC 100-240 V ±10 %, 10 watts	3
Agency approved, customer specified	W

Output (Selection)	Code 9
RS-485S & 4-20mA, 4Wire (Std.)	1
Pulse (Option)	2
Agency approved, customer specified	W

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

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

Calibration 1 ⁹ (Air)	Code 12
Standard Calibration	A
Air, only for 3/8" and large pipe Size	
Compressed Air, only for 1" and large pipe size	D
Customer Calibration	B
Agency approved, customer specified	W

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

Pressure Limit	Code 14
Low pressure Below 145 psig (10 barg)	L
Medium pressure Below 435 psig (30 barg)	M (Option)
High pressure Below 5,801 psig (400 barg)	H (Option)
Agency approved, customer specified	W

Option	Code 15
Material : 316SS, 316LSS	H
Agency approved, customer specified	W



www.goldenrules.co.kr

Golden Rules Co.,Ltd

Liquid, Oil

FN-Mass Flow Meter

KC-7730L Series



The nation's development item, 100% domestic goods, Patent **NO.** 10-1606497

01 FN-MASS FLOWMETER (Liquid, Oil)

1-8. D/P-type FN-Mass type KC-7730 Series

Features

- **5-for Multi-Measurement**
- Mixed gas Automatic Calculator (4~20mA input : Basic Mode)
- **Rate, integrated, volume, mass flow, temp', pressure, density indication**
- Input Power DC 24 V, < 100mA
- Output accuracy $\pm 0.1\%$, $\pm 2.5\ \mu A$ (4~20 mA, 4-Wire)
- Field validation of flowmeter calibration settings
Smart program interface (RS-485 standard)
- Direct mass measurement of the flow function eliminates the need for additional temperature and pressure compensation
- Simple signal Processing & calibration
- Built-in flow function of compression coefficient, expansion coefficient, viscosity coefficient, direct calculation formula
- Excellent reproducibility & long-term stability
- Best price-performance ratio
- Easy adaptable for different application or into housings
- No mechanical moved components
- Greatly reduces upstream piping requirements (10-5D)
- Outstanding range ability (Turndown ratio 35:1, Option 50:1)
- 0.1-second response to changes in flow rate
- High pressure fluid can be measured (up to 400 Barg)
- High temperature fluid measurement up to 400°C
- CE, Ex(IP67)



Liquid, Oil type
KC-7730L

Description

Golden Rules' KC-7730L Series D/P type FN-Mass flowmeter accommodates the change measurement Requirements and instrument-validation demands of fluid flow monitoring installations.

It is a LOK Fitting, Flange type, and it is a microprocessor commercially capable of measuring flow rate, adjusting flow rate, and diagnosing at the same time.

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 & Golden Rule's KC-7730L series is a product designed based on differential pressure mass flow measurement technology.

Golden Rule's KC-7730 series is a product designed based on differential pressure mass flow measurement technology. It is a built-in flow function that takes into account the compression coefficient, expansion coefficient, and viscosity coefficient rather than the conventional temperature and pressure correction method. Enthalpy, etc. can be provided to the user.

Performance Specifications

◆ **Accuracy of Point Velocity**

±0.5% of F.S / ±1.0% of R.D
(Option : ±0.1% of F.S/±0.5% of R.D)

◆ **Repeatability**

±0.5% of Full Scale

◆ **Sensor Accuracy**

< 0.05% of span

◆ **Turndown Ratio**

35:1 (Option 50:1)

◆ **Pressure Loss**

0.1 ~ Below 0.3 Bar

◆ **Response Time**

0.1 second

◆ **Measuring Range**

0.1 ~ 100 m/sec

◆ **Function**

5-for multi-measurement :
rate, total, volume, mass, density,
temp', pressure, energy indication

Operating Specifications

◆ **Fluid**

Liquid, Oil

◆ **Input Power**

DC 24 V ±10 %, < 100 mA
100~240VAC ±10 %

◆ **Output Signal**

Linear 4 ~ 20 mA, 4Wire
RS-485
Pulse (Option)

◆ **Pressure Drop**

15.5 kpa

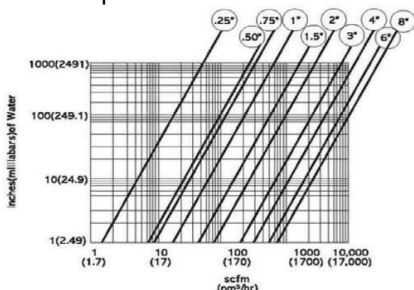


Table Flow Velocity vs. Flow Volume Unit : m³/h, L/min, L/h

Pipe Size		L/min (L/h)		m ³ /h		Fluid	Pressure /Temp'
A	B	최소	최대	최소	최대	Oil/Liquid	Press'/Temp'
15A	½-inch	0.83	8.83	0.05	0.53	JP-8	5.2Bar/110°C
15A	½-inch	1.00	10.00	0.06	0.60	Mixed Liquid	1Bar/60°C
15A	½-inch	0.71 (42.85)	25.00 (1,500)	0.04	1.50	Diesel	0.1Bar/20°C
20A	¾-inch	1.42 (85.71)	50.00 (3,000)	0.08	3.00	Diesel	0.1Bar/20°C
20A	¾-inch	4.33	41.70	0.26	2.50	JP-8	2Bar/150°C
20A	¾-inch	8.66	83.30	0.52	5.00	JP-8	2.5Bar/150°C
25A	1-inch	4.66	166.7	0.28	10.00	Liquid	1Bar/60°C
25A	1-inch	0.83	33.30	0.05	2.00	Ethanol	3Bar/30°C
25A	1-inch	3.33	33.30	0.20	2.00	Liquid	0.9Bar/50°C
32A	1 1/4-inch	2.57	90.00	0.15	5.40	Kerosene	4~10Bar/-15~20°C
40A	1 1/2-inch	10.00	100.0	0.60	6.00	Liquid	2Bar/60°C
40A	1 1/2-inch	1.33	50.00	0.08	3.00	Water	3Bar/60°C
40A	1 1/2-inch	4.00	140.0	0.24	8.40	Kerosene	4~10Bar/-15~20°C
50A	2-inch	2.33	83.30	0.14	5.00	Water	2Bar/60°C
50A	2-inch	9.42	330.0	0.56	19.80	Kerosene	4~10Bar/-15~20°C
65A	2 1/2-inch	19.00	666.7	1.14	40.00	JP-8	5.2Bar/110°C
80A	2-inch	22.85	800.0	1.37	48.00	Kerosene	4~10Bar/-15~20°C
80A	3-inch	23.83	833.3	0.8	8.00	Liquid	0.83Bar/60°C
80A	3-inch	28.50	1,000	1.71	60.00	Ethylene Glycol	4Bar/20°C
80A	3-inch	28.50	1,000	1.71	60.00	JP-8	2Bar/150°C
80A	3-inch	56.66	2,000	3.40	120.0	Water	3Bar/20°C
100A	4-inch	4.74	1,600	2.74	96.00	Kerosene	4~10Bar/-15~20°C
100A	4-inch	4.74	1,600	2.74	104.0	JP-8	5.2Bar/110°C
125A	5-inch	85.66	3,000	5.14	180.0	JP-8	5.2Bar/110°C

Refer to the chart and look for the meter for a range of 10m/s to the Specified full scale (upper limit range). Select a full scale speed of 1 to 3 m/s. Ensure that the overall flow rate used during the final design phase is maintained. Within a 10m/s radius of the current flow

◆ Fluid & Ambient temperature

Liquid : -40 ~ 100 °C (-40 ~ 212 °F) Option : 110 ~ 400°C (230 ~ 732 °F)

Pipe Temp' : Over 300 °C 이상 (572 °F)

Ambient : -4 ~ 185 °F (-20 ~ 85 °C) Option : -70 ~ 100 °C (-94 ~ 212 °F)

◆ Pressure (limitations)

Compression fitting : 500 psig (35 barg)

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

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

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

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

◆ Displays

Display instructions: instantaneous & integration, volume, mass measurement

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 0.1 sec / Correction factor setting 0.5 ~ 5 /

Zero & Span

◆ Totalizer

Flow rate and total oxygen point (0000. / 000.0/ 00.00 / 0.000)

Seven digits (9,999,999,99.9 Count) in engineering units Reset table by Software

◆ Software (Option)

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 Materials**

D/P Sensor – STS316 (Option : STS316L)

Flow inline Body – STS304 (Option : STS316, STS316LS)

◆ Enclosure

Hazardous-Area Enclosure CASE (Ex d IIC T6 : IP67)

General-Area Enclosure CASE (IP67)

◆ Electrical Connections

2 X ½" PF or Exp Cable Gland(SS) 22C

◆ Mounting (Selection)

ANSI 150lb Flange, JIS 10k RF Flange, other

◆ Certification

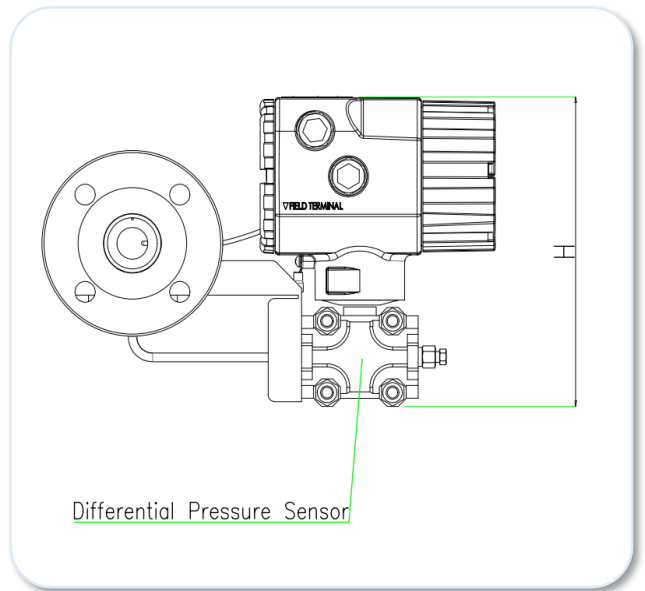
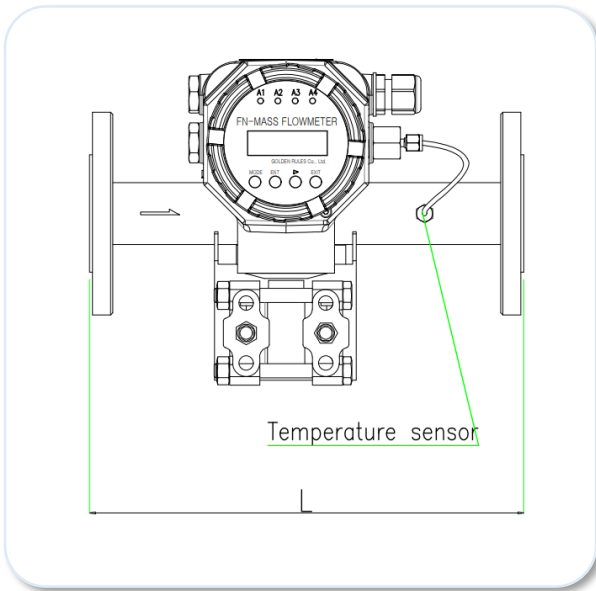
CE (CASE)

KCS Certificate

Atex Certificate

Ex (Ex d IIC T6)

Dimensional Spec' & Chart KC-7730L_ Liquid, Oil



※ The shape of the sensor and Housing manufacturers are subject to change

unit : mm

Size	D	L
15A	309	300
20A	309	300
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40A	329	300
50A	339	300
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100A	389	400
125A	409	409
150A	429	451
200A	449	522
250A	469	602
300A	499	672

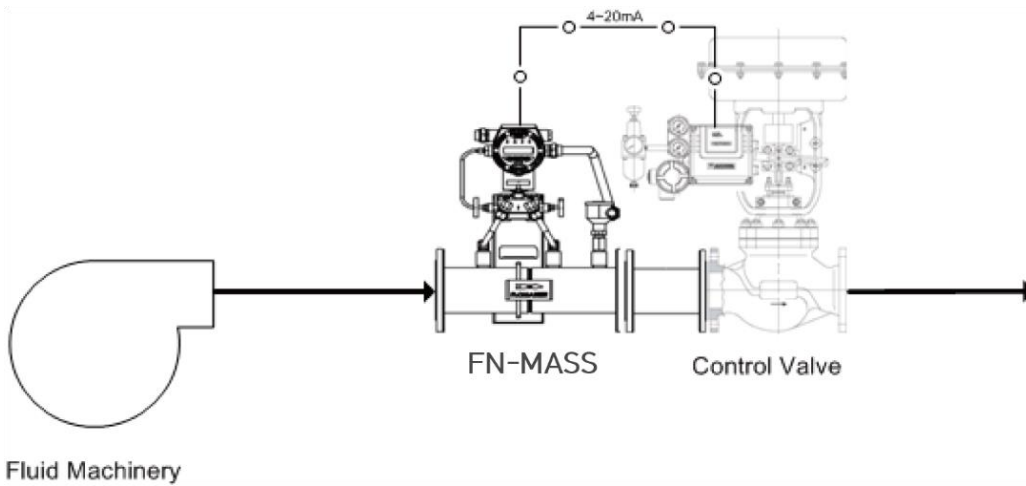
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01 – Mass flow(kg/h) Control

02 – Energy flow(MJ/h) Control

03 – Volume flow(m³/h) Control

04 – Pressure(kPa) Control



It responds to customers' needs with a fast response speed and can realize energy savings due to $\pm 0.5\%$ precision control, minimizing losses in industrial sites.

Piping Requirement (KC-7730L D/P-Mass)

Straight Pipe Length Requirements at 1 atm			
Piping condition	KC-7730L 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.

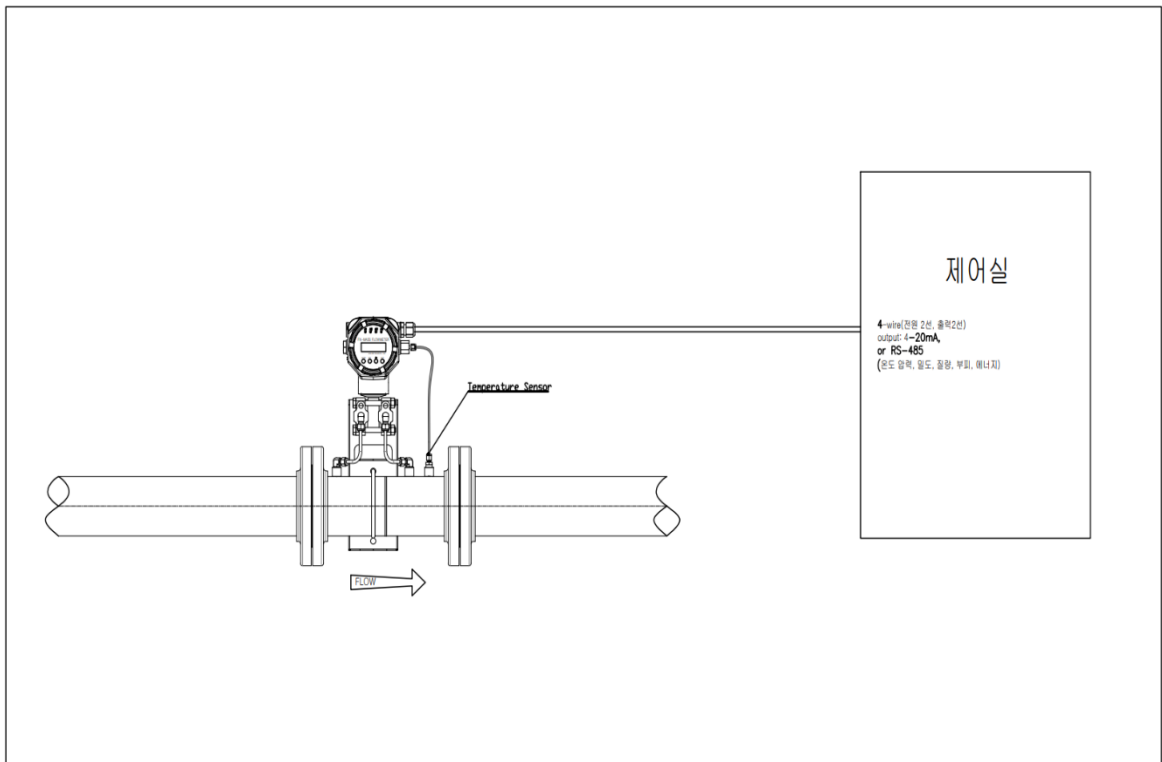
(3) For comparison purposes only. Table shows number of diameter(D) of upstream straight pipe length required for an ISO Standard 5167 Orifice plate with a beta ration of 0.7

(4) Consult factory for pressure effects.

APPLICATION

◆ Overview and Advantages of All-In-One FN

1. Significantly reduced installation construction cost.
2. Since it is a direct type FN mass flow meter, the accuracy is much higher than the existing differential pressure type ($\pm 0.5\%$ F.S)
3. Wide range of flow rate when measuring high temperature, high pressure and large flow rate (turndown ratio 35:1, Option 50:1)
4. Simultaneous monitoring of 5 data (flow rate, temperature, pressure, density, heat amount) by the central cancer monitoring panel with communication output
5. Easy to install as it is a temperature/pressure sensor/flow computer all-in-one mass flow meter



Order Code KC-7730L Series (FN-Mass Flowmeter)

KC-77 - - **E** - **P** - **V** - - - - - -

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

Type	Code 1
Liquid	30L
Chemical Liquid	30C
Oil	30O
Hazardous-Area Location Endosure	FM153B
Agency approved, customer specified	W

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

Connection Spec' ^{1,3}	Code 3,4,5		
Size	DIN	150 lb	JIS 10k
1/2" (DN15)	D2	F2	J2
3/4" (DN20)	D3	F3	J3
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
4" (DN100)	D11	F11	J11
5" (DN125)	D12	F12	J12
6" (DN150)	D13	F13	J13
8" (DN200)	D15	F15	J15
10" (DN250)	D16	F16	J16
12" (DN300)	D17	F17	J17
Agency approved, customer specified	W		

Enclosure ⁵	Code 6,7
Hazardous-Area Location Enclosure	2
IP67	N2
Agency approved, customer specified	W

Input Power	Code 8
DC 24 V ±10 %, 60 mA	2
AC 100-240 V ±10 %, 10 watts (옵션)	3
Agency approved, customer specified	W

Output (Selection)	Code 9
RS-485S & 4-20mA, 4Wire (Std.)	1
Pulse (Option)	2
Agency approved, customer specified	W

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

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

Calibration ^{1,9} (Air)	Code 12
Standard Calibration	A
Air, only for 3/8" and large pipe Size	
Compressed Air, only for 1" and large pipe size	D
Customer Calibration	B
Agency approved, customer specified	W

Calibration ^{2,9} (Air)	Code 13
70 °F(21 °C) 14.7 psig (1.103 barg)	A
32 °F(0 °C) 14.7 psig (1.103 barg)	B
Agency approved, customer specified	W

Pressure Limit	Code 14
Low pressure	L
Below 145 psig (10 barg)	
Medium pressure	M
Below 435 psig (30 barg)	(Option)
High pressure	H
Below 5,801 psig (400 barg)	(Option)
Agency approved, customer specified	W

Option	Code 15
Material : 316SS, 316LSS	H
Agency approved, customer specified	W

FLOW MEASUREMENT PRINCIPLE

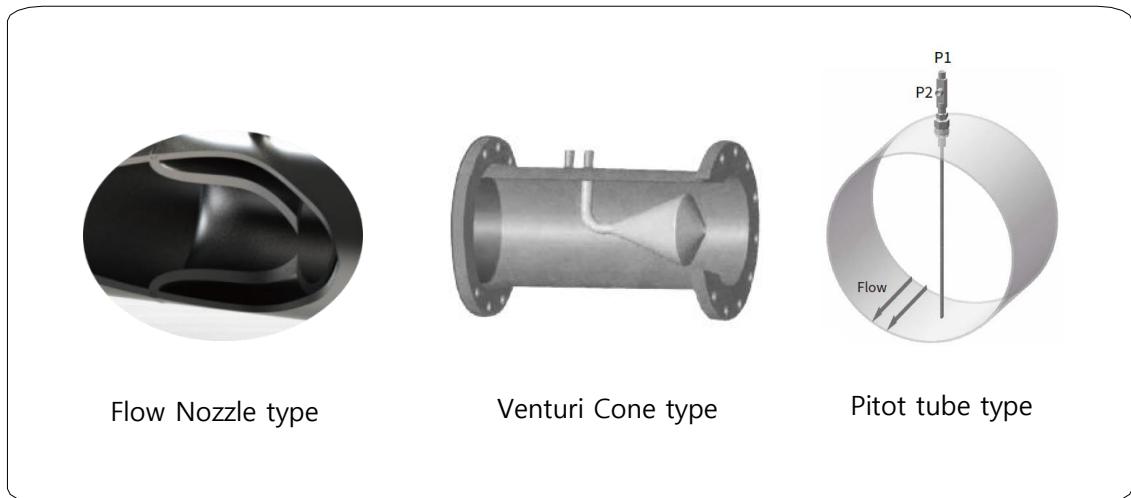
■ D/P type

FN mass flow sensor (orifice, flow nozzle, venturi nozzle, pitot)

Orifice piping pipe standard: D-0.5D / Corner / Flange

Absolute pressure and differential pressure sensor: STS316, STS316L

Temperature sensor : RTD Pt100 (3-wire)



KC-7730 Series Measurement Sensor

Golden Rule's unique FN-Mass Flow meter guarantees excellent accuracy of industrial flowmeters, and robustness and reliability in the case of high pressure and high pressure.

As a differential pressure measurement method, the sensor is a new mass flow meter that uses an orifice plate, flow nozzle, Venturi, V-Cone, Pitot tube to measure the flow rate by using a proprietary patented technology while minimizing pressure loss.

It is a new-concept mass flow transmitter that derives flow through high-level calculations under the conditions of variable physical properties of real fluids.

It is a measuring instrument that is capable of engineering in demanding conditions at industrial sites and is developed with domestic proprietary technology to minimize industrial loss and secure technological freedom, and to have excellent accuracy and stability.

In addition, it can be used in various fluids, and supplements the required intuition of the existing differential pressure flowmeter through various experimental data to maintain the desired degree in the short intuition.

By configuring the communication network (RS-485), you can monitor the progress of the mass flow meter, and install an automatic valve to control the mass flow of user settings.

The flow nozzle and orifice are manufactured according to ISO-5167 standard and ISO-9001 quality management system.

Flow Calculator

Term	Real gas	Perfect gas
Equation of state	$pV = ZRT$	$pV = RT$
Compressibility factor	Z	$Z = 1$
Isothermal deviation factor	$Y = \frac{p}{V} \left(\frac{\partial V}{\partial p} \right)_T = 1 - \frac{p}{Z} \left(\frac{\partial Z}{\partial p} \right)_T$	$Y = 1$
Isobaric deviation factor	$X = \frac{T}{V} \left(\frac{\partial V}{\partial T} \right)_p = 1 - \frac{T}{Z} \left(\frac{\partial Z}{\partial T} \right)_p$	$X = 0$
Isentropic exponent (κ)	$\kappa = -\frac{V}{p} \left(\frac{\partial p}{\partial V} \right)_s = \frac{\gamma}{Y}$	$\kappa = \gamma = \frac{c_p}{c_v}$

Gas expansion coefficient

$$\varepsilon = \sqrt{\left(\frac{\kappa \tau^{2/\kappa}}{\kappa - 1} \right) \left(\frac{1 - \beta^4}{1 - \beta^4 \tau^{2/\kappa}} \right) \left(\frac{1 - \tau^{(\kappa-1)/\kappa}}{1 - \tau} \right)}$$

κ = isentropic exponent

τ = pressure ratio

β = diameter ratio

Flow Calculator

$$q_m = \frac{C}{\sqrt{1 - \beta^4}} \varepsilon \frac{\pi}{4} d^2 \sqrt{2 \Delta p \rho_1}$$

$$q_v = \frac{q_m}{\rho_1}$$

q_m = mass flow rate [kg/s]

q_v = volumetric flow rate [m³/s]

ρ_1 = upstream density [kg/m³]

Δp = differential pressure [Pa]

APPLICATION

◆ Simply select to suit the application

Application	Type	Mass Flowmeter	
		D/P-type	FN-MASS FLOWMETER
Object of Measurement	Liquid	○	
	Gas	○	
	Vaper	○	
	steam	○	
Application	control	○	
	Monitor	○	
	Supply	○	
Operating condition	Temperature	Gas	- 40 to 100°C (Option:400°C)
		Liquid & Oil	-40 to 100°C(Option:400°C)
		Steam	-20 to 200°C(Option:400°C)
	Pressure	10 barg / 30 barg / Max 450 barg	
	Pressure loss	Negligible	
Range ability	Large		
Installing condition	Bore		Ø10 to Ø300
	Straight Pipe length	upstream	10 ~ 7D
		downstream	5 ~ 2D
	Piping work		Required
	Explosion-proofing		○
Performance	Accuracy	Gas	±0.5% F.S(Option: 0.1%)
		Liquid & Oil	±0.5% F.S(Option: 0.1%)
		Steam	±0.5% F.S(Option: 0.1%)
	10 barg / 30 barg / Max 450 barg	Gas	0.1~100 m/s
		Liquid & Oil	0.1~100 m/s
Steam		0.1~100 m/s	

Delivery performance ~ 345 EA

Client	Enduser	Model
The Yoon Synergy	The Yoon Synergy	FN-MASS KC-7730A, Compressed Air
ILJIN AIR TECH	ILJIN AIR TECH	FN-MASS KC-7730A, Compressed Air
COMP KOREA	COMP KOREA	FN-MASS KC-7730A, Compressed Air ~ 17EA
Daejeon Urban Railway Corporation	Yuseong Hot Spring Pumping Station	FN-MASS KC-7730L, Water
BELTECH CO.,LTD	BELTECH LAP	FN-MASS KC-7730L, Water
Korea Institute of Machinery and Materials	Korea Institute of Machinery and Materials	KC-7730G-FM153BEx, 25A, LPG
Sepratech Co., Ltd.	Hanwha Ulsan Plant	FN-MASS KC-7730A, Compressed Air ~ 4EA
GTC CO., LTD.	GTC CO., LTD.	FN-MASS KC-7730A, Compressed Air ~ 12EA
Bugang Tech	Icheon (Remnant Corpse Disposal System)	KC-7730G-FM153BEx, 25A, LPG
BELTECH CO.,LTD	Beltech test league	FN-MASS KC-7730A, Compressed Air ~ 4EA
Sambu General Machinery	Sambu General Machinery	FN-MASS KC-7730A, Compressed Air
Gyeongsan Paper	Gyeongsan Paper	KC-7730S-FM153BEx, 250A, Steam
Act Co., Ltd.	Act Co., Ltd.	FN-MASS KC-7730A, Compressed Air ~ 10EA
SEON BO INDUSTRY	Busan (Gupyeong 2nd Factory)	FN-MASS KC-7730A, Compressed Air
Korea Institute of Machinery and Materials	Cheonan, Chungcheongnam-do (Puritech)	KC-7730G-FM153BEx,40A,O2 Gas ~ 4EA
Korea Institute of Machinery and Materials	Cheonan, Chungcheongnam-do (Puritech)	FN-MASS KC-7730A, Compressed Air ~ 4EA
TURBO MAN	Iksan, Jeollabuk-do (Hite Jujeong)	KC-7730L-FM153BEx, 25A, Ethanol
Pukyong National University	YONDANG CAMPUS	FN-MASS KC-7730A, Compressed Air
DONGIL CNE	Hanwha Onsan Plant	FN-MASS KC-7730A, Compressed Air
Kunyoung Machinery	Kunyoung Machinery	FN-MASS KC-7730A, Air ~ 10EA
SUNHWAN ENG	Kunyoung Machinery	KC-7730OP-FM153BEx, 50A, NG
SEA ANTLE	SEA ANTLE	FN-MASS KC-7730A, Compressed Air ~ 2EA
COMP KOREA	COMPRESSURED AIR	FN-MASS KC-7730A, Compressed Air ~ 3EA
FINETECH	FINETECH	FN-MASS KC-7730A, Compressed Air ~ 15EA
ILJIN MATERIAL	IKSAN PLANT	FN-MASS KC-7730A, Compressed Air ~ 2EA
PURITECH	PURITECH	FN-MASS KC-7730A, Compressed Air ~ 4EA
J KEISIS CO.,LTD,	J KEISIS CO.,LTD.	FN-MASS KC-7730A, Compressed Air ~ 22EA
JUNG WOO FLOW	JUNG WOO FLOW	FN-MASS KC-7730A, Compressed Air ~ 3EA
Kunyoung Machinery	Kunyoung Machinery	FN-MASS KC-7730A, Compressed Air ~ 10EA
Wonkwang valve	STX ENGINE	KC-7730H-FM153B-G050-H2 Mixture
Kunyoung Machinery	Kunyoung Machinery	FN-MASS KC-7730GF, Compressed Air ~ 10EA
VPE KOREA	VPE KOREA	FN-MASS KC-7730GF, Compressed Air
Kunyoung Machinery	Kunyoung Machinery	FN-MASS KC-7730GF, Compressed Air ~ 20EA
Kunyoung Machinery	Kunyoung Machinery	FN-MASS KC-7730GF, Compressed Air ~ 30EA
Kunyoung Machinery	Kunyoung Machinery	FN-MASS KC-7730GF, Compressed Air ~ 30EA
BOYN E&M CO.,LTD.	Urban Railroad Corporation	FN-MASS KC-7730GF, Compressed Air
Kukdong Jeyeon	Kukdong Jeyeon	FN-MASS KC-7730WF, Water
Kukdong Jeyeon	Kukdong Jeyeon	KC-7730L-FM153B-G080-Ethylene Glycol
Korea Aerospace Research Institute	Korea Aerospace Research Institute	FN-MASS KC-7730G-FM153B, H2 Mixture ~ 3EA
LG ELECTRONICS	Cheongju Factory	FN-MASS KC-7730S, 스팀,100A,125A,200A ~ 3EA
LG ELECTRONICS	Cheongju Factory	FN-MASS KC-7730G-FM153BEx,LNG,50A(2),65A(2),80A(1),100A,125A,150A ~ 8EA
Kunyoung Machinery	Kunyoung Machinery	FN-MASS KC-7730GF, Compressed Air
SAMSUNG ELECTRONICS	For precise measurement of gas accumulation	KC-7730GF O2-65A, N2-32A ~ 2EA
Korea Water Resources Corporation	Korea Water Resources Corporation	FN-MASS KC-7730SF 25A Steam, Water ~ 2EA
Chungbuk Sewage Treatment Plant	For testing of water and wastewater facilities	KC-7730B-FM153BEx, 300A, 350A, Bio gas~ 2EA
Innowill Co.,Ltd.	Korea Energy Research Institute	FN-MASS KC-7730GF,100A,50A,Blower Air ~ 2EA

Client	Enduser	Model
INFORAD CO.,LTD.	Korea Energy Research Institute For vacuum pump precision flow test	FN-MASS KC-7730OP 공기 25A, 40A
Korea Energy Research Institute	Hydrogen charging station 1st and 2nd plants	KC-7730G-FM153B, H2 Mixture, 50A, 8.2barg 25.2-252 kg/h, 200°C
INNO WILL CO.,LTD.	Korea Energy Research Institute	FN-MASS KC-7730OP 50A, 65A, AIR ~ 2EA
Toray Advanced Materials.	For precise measurement of gas accumulation	FN-MASS KC-7730OP-FM153B ~ 2EA O2-65A, N2-32A
Energy Technology Evaluation Institute	Ammonia decomposition hydrogen production purification system	FN MASS KC-7730OP-FM153B ~ 2EA 20A,NH3 Mix, 7.43barg, 20A-H2 Mix, 6.93barg
Korea Aerospace Industries' Sacheon site	Korean fighter KF-21 fuel system integrated rig test equipment	FN MASS KC-7730OP-FM153B ~ 12EA JP-5,100A(2),15A(3), Liquid, 20A(6),32A(1)
Energy Technology Evaluation Institute	Alkaline water electrolysis for BOP hydrogen measurement	FN-MASS KC-7730OP-FM153B, ½", 5Nm3/h
KEPCO Electric Power Research Institute (Daejeon)	For precision measurement of hydrogen generators	FN-MASS KC-7730OP-FM153B 3/8", 200 LPM, 3-5 Barg
POSCO KWANG YANG	Nitrogen gas purification system	FN-MASS KC-7730OP, 150A, 5,000Nm3/h
POSCO Pohang Stainless Steel 3	For precise measurement of gas cutters	KC-7730OP-FM153B, 25A, LNG, O2 ~ 2EA
SK Innovation	For precise measurement of hydrogen gas	KC-7730H-FM153BEx, ½", 55-1520LPM, Nor17 Max 30Barg
Guri Sewage Treatment Plant	For precise measurement of biogas consumption	KC-7730G-FM153BEx, Bio gas, 80A ~ 3EA
INNO WILL CO.,LTD.	Korea Energy Research Institute	FN-MASS KC-7730OP 150A, AIR
Haesung DS Co., Ltd. Changwon Headquarters	For precision measurement of semiconductor plasma process and hydrogen generator	KC-7730H-FM153BEx, 3/8",15-150LPM,3-5Barg
Uljin Livestock Manure Treatment Plant	For precision measurement of biogas for supply to generators	KC-7730B, Bio Gas, 50~500mmH2O,,40~60°C 100A-800Nm3/h, 80A-500Nm3/h ~ 3EA
LS Cable & System / POSCO R&D Center	For precise measurement of LNG consumption	LNG,80A,160Nm3/h,31°C,30Kpa,24V.RS-485~ 6EA
POSCO R&D Center	1For sintering steam research project	KC-7730S,Steam,250A,8-80Ton/h,193°C,8BAR
POSCO KWANG YANG	For precise steam measurement	KC-7730S,Steam,100A,7000kg/h,190°C,7Bar
Lithium Plus Geumsan Plant	Sodium hydroxide crystallization facility pjt for semiconductor fuel cell	KC-7730S,Steam,200A,150A,100A ~ 6EA KC-7730L,Liquid,80A,40A,25A ~ 10EA
Hyundai Motor	For precision testing of hydrogen generator	KC-7730H-FM153BEx, H2,3/8",2-40m3/h,8.2Barg ~ 2EA
LG Energy Solution	Danil Gaschem Co., Ltd., for precise measurement of nitrogen gas	KC-7730G,N2 Gas,7.5Bar,70-1200Nm3/h,25°C
ECO PRO CO.,LTD.	For air precision measurement in laboratory test facilities	KC-7730G,Air,300A,130m3/min,95-101Kpa,25°C
Eumseong Livestock Manure Treatment Plant	For precision measurement of biogas for supply to generators	KC-7730B, Bio Gas, 50~300mmH2O,,40~60°C 125A-125Nm3/h, 208Nm3/h ~ 3EA
Posco Pohang	For precision measurement of air lines	KC-7730G,50A,800Kpa,25°C,63-630Nm3/h
Water Resources Corporation	Membrane filter for precise measurement of air	KC-7730G,300A,25°C,0.8Bar,800-8000Nm3/h
Daejeon Techno Park Hydrogen Electric Vehicle	For precise measurement of hydrogen gas at hydrogen charging stations	KC-7730H-FM153BEx, H2 GAS, ½", 1~10Nm3/min, 20°C, 250Bar
Ulsan Sewage Treatment Plant	For precise steam line measurement	KC-7730S-FM153BEx, Steam, 50A, 1~10Ton/h, 205°C, 17Bar
Korea Land & Housing CorporationHwaseong Dongtan 2 Clean Energy C	For precision measurement of biogas trade	KC-7730B-FM153BEx, Bio gas, 250mmAq, 30~40°C, 50A, 20-200Nm3/h ~ 2EA 100A, 28~280Nm3/h ~ 1EA
Hyundai Motor	Hydrogen equipment, for precise measurement of hydrogen gas	KC-7730H-FM153BEx, 10A, H2 GAS, 5000SLPM -50~95°C, 40BAR ~ 3EA
Posco Pohang	For precision measurement of air lines	KC-7730G,50A,800Kpa,25°C,63-630Nm3/h ~ 3EA
Maeil Dairies Gochang Cheese Factory	For Steam EMS System Project	KC-7730S,80A,125A179°C,7.9BAR ~ 2EA
ECO PRO CO., LTD.	For O2 Gas trading	KC-7730-FM153B, 80A, O2 Gas, 30-1,500Nm3/h 25°C, 8.8 Bar
Hyundai Rotem Tongyeong Hydrogen Refueling Station	For hydrogen gas trading	KC-7730H-FM153B,20A,2-70kg/h,40°C,200Bar~ 3EA
Gunpo Biomass Plant	for biogas trade	KC-7730B-FM153B,200A,120-4,200Nm3/h
Environmental Facility Management Co., Ltd.	For biogas trade	KC-7730B-FM153BEx, Bio gas, 250mmAq, 20~30°C, 100A, 10-300Nm3/h ~ 3EA
KEPCO Research Institute	For hydrogen generator measurement	KC-7730H-FM153B,20A-20Nm3/h,100Nm3/h,40- 90°C,9.7Bar, 15A-140Nm3/h, 100°C, 200Bar ~ 3EA



Golden Rules

• GOLDEN RULES

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Air, Gas, Steam, Liquid

Mass Flowmeter

Specialty Manufacture

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Certified in accordance with

KC Q ISO 9001 : 2015

KC Q ISO 14001 : 2015

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