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Golden Rules Co., Ltd

Compressor Air, N₂, O₂ Gas

NO READOUT TYPE

FN-MASS FLOWMETER

KC-7000N Series



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

01 FN-MASS FLOWMETER (Air, Gas)

1-1. FN-Mass type KC-7000N Series



FN-Mass Flowmeter
KC-7000N Series

Features

- **Flow Rate Accuracy** : $\pm 0.5\%$ of F.S
- **Measurement** : Mass(kg/h) / Volume(m³/h), Energy(MJ/h)
Standard volume(Sm³/h) / Dry mass(kg/h)
- **Total** : Mass(kg) / Volume(m³) / Energy(MJ) / Normal volume(Nm³)
- **Standard condition** : 20 °C / 101.325kpa / 60% RH
- **LED** : Sensor / Flow / System state
- **Case material** : Aluminum

Measuring Principle

- **Absolute and differential pressure sensor** : Digital output sensor
- Temperature sensor : RTD Pt100



FN-Mass Flow Transmitter
KC-7000T Series

Application

- **Air compressor** : 20 to 450 HP
- **Pipe size** : 15A(1/2B) ~ 300A (20B)
- **Connection** : ANSI / KS Flange
- **Pressure connection line** : Urethane hose 4mm

Description

Golden Rules' KC-7000N Series D/P type FN-Mass flowmeter accommodates the change measurement requirements and instrument-validation demands of fluid flow output 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.

The mass flow meter is a simple output type.

Golden Rule's KC-7000N 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

◆ **Flow rate Accuracy**

±0.5% of F.S / ±1.0% of R.D

◆ **Compensation & sensor Accuracy**

Digital temperature compensation

Temperature coefficients ±0.02% / 10K (%) of ± span : < 0.05%

◆ **Repeatability**

±0.5% of Full Scale

◆ **Sensor Accuracy**

< 0.2% of span

◆ **Turndown Ratio**

10:1 (Option 20:1)

◆ **Pressure Loss**

0.1 ~ Below 0.3 Bar

◆ **Response Time**

0.1 second

◆ **Measuring Range**

0.1 ~ 100 m/sec

Operating Specifications

◆ **Fluid**

Compressed Air, N2, O2 Gas

◆ **Input Power**

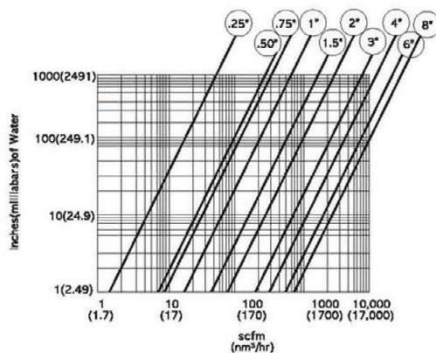
DC 24 V, 6V ~ 42V

◆ **Output Signal**

DC 4-20mA, 4-Wire : Flowrate (time unit : hour)

◆ **Pressure Drop**

15.5 kpa



◆ Fluid & Ambient temperature

Air : -40 ~ 100 °C

Ambient : -20 ~ 60 °C

◆ Pressure (limitations)

Compression fitting : 500 psig (35 barg)

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

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

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

NPT -40 ~ 150 °C : 508 psig (35 barg)

◆ Software

Digital RS-485 (115200 bps, ID 1-4) : Flowrate / Total / Temperature / Pressure

Physical Specification**◆ Wetted Materials**

D/P Sensor – 316SS (Option : 316LSS)

Flow inline Body – Steel

304SS (Option : 316SS, 316LSS)

◆ Enclosure

Geneal-Area Enclosure CASE (IP53)

◆ Electrical Connections

PG11(IN/OUT Port)

◆ Mounting (Selection)

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

◆ Certification

CE (준비중)

Orifice size :

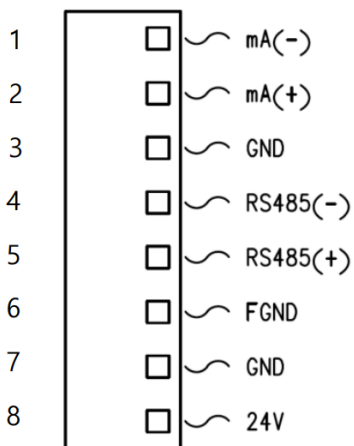
Compressor power(HP)	RS232 Console No.	20~30	40~60	75~100	125~150	200~250	300~450
Connection flange(10K)	-	25A	40A	50A	65A	80A	100A
Pipe inner diameter(mm)	5	27.2	42.6	53.5	70.3	83.1	108.3
Mass flowrate 20mA(kg/h)	b	290	370	1200	1930	2930	5050
Volume flowrate 20mA(m ³ /h)	d	33	75	140	217	330	570
Standard flowrate 20mA(Sm ³ /h)	f	240	550	1000	1600	2430	4200
Energy flowrate 20mA(MJ/h)	(h)	90	210	380	600	910	1570

Circuit protection :

- EMI filter / Snubber / Surge voltage / EDS

Primary device :

- Orifice plate / Flow nozzle / Venturi nozzle / Pitot tube
- Application orifice pipe : D-0.5D / Corner / Flange



Power wiring :

- 6 : Frame GND
- 7 : DC24V(-)
- 8 : DC24V(+)

Signal wiring :

- 1 : 4 to 20 mA (-)
- 2 : 4 to 20 mA (+)
- 3 : GND
- 4 : RS485 (-)
- 5 : RS485 (+)

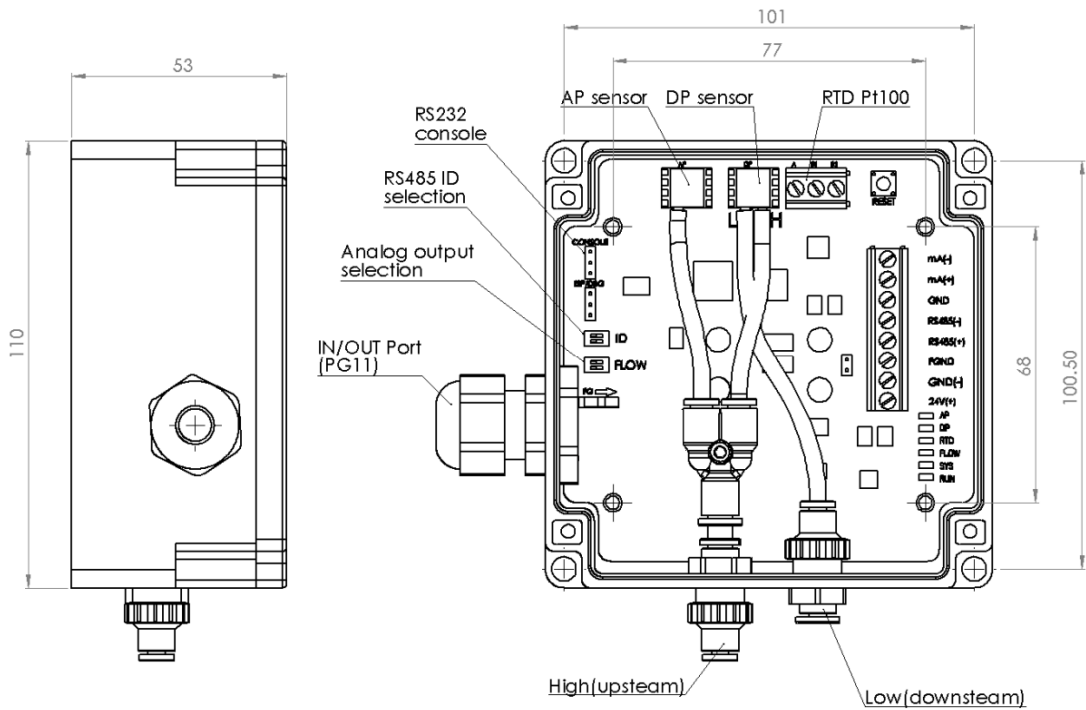
Outline :

Case size : 110 X 110 X 53

Case mounting hole size : 101 X 100.5 X M5

PCB size : 100 X 100

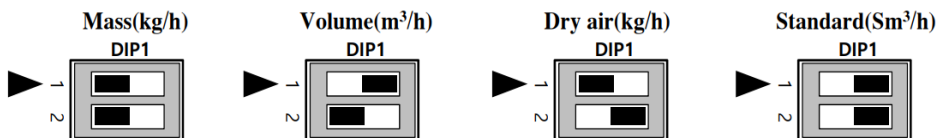
PCB mounting hole size : 77 X 68 X M4



RS485 ID selection :

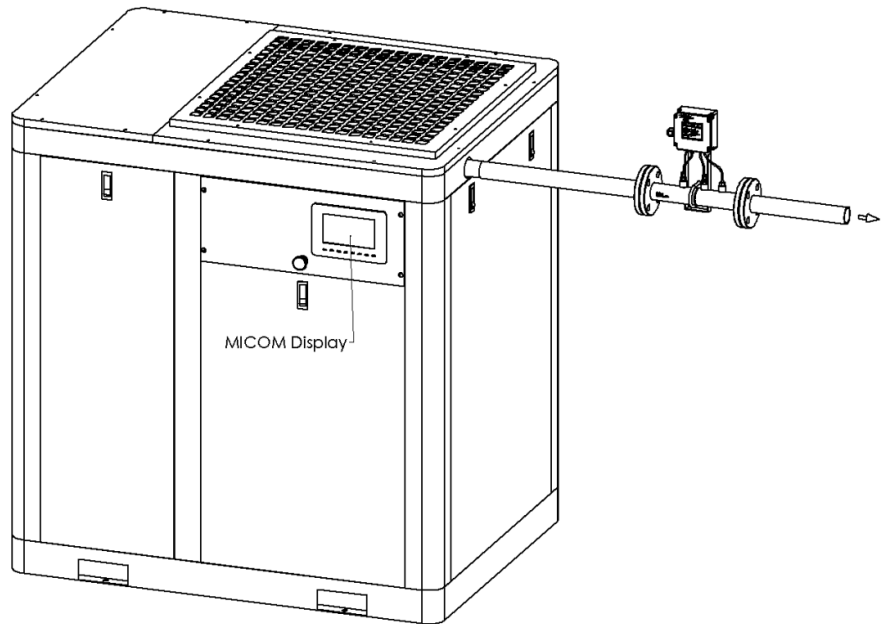


4 to 20 mA FLOW selection :

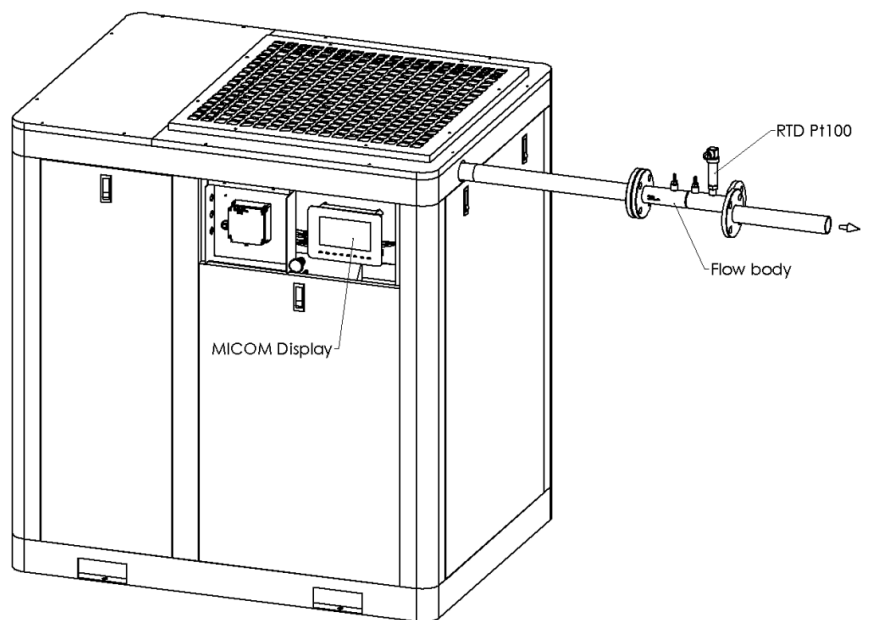


Installation :

Direct installation outside the air compressor



KC-7000N and flow body remote installation

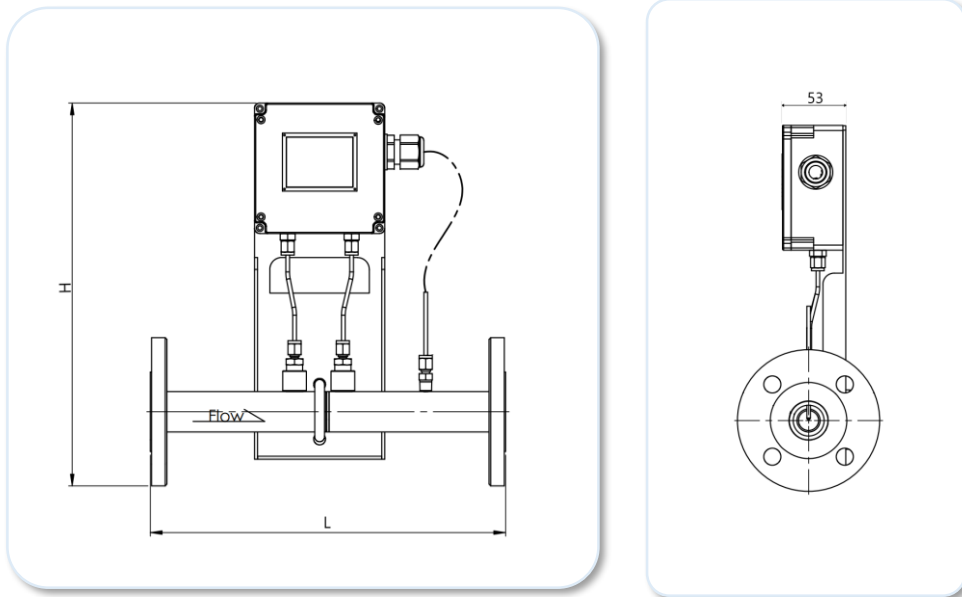


MODBUS RTU :

RS-485(2-wire) : 115200 bps, 8n

ADDR	PARAMETER	ISO	US	FORMAT	WIDTH	R/W
0x1000	Absolut pressure	kPa	psi	2 decimal	4	RO
0x1018	Differential pressure	kPa	psi	3 decimal	4	RO
0x1028	Temperature	°C	F	1 decimal	4	RO
0x106C	Mass flowrate	kg/h kg/min	lb/h lb/min	2 decimal	4	RO
0x1070	Volume flowrate	m ³ /h m ³ /min	ft ³ /h ft ³ /min	2 decimal	4	RO
0x1074	Energy flowrate	kJ/s	-	2 decimal	4	RO
0x1078	Normal flowrate	Nm ³ /h Nm ³ /min	Nft ³ /h Nft ³ /min	2 decimal	4	RO
0x1080	Total mass	kg	lb	2 decimal	4	RO
0x1084	Total volume	m ³	ft ³	2 decimal	4	RO
0x1088	Total energy	MJ	-	2 decimal	4	RO
0x108C	Total Normal volume	Nm ³	Nft ³	2 decimal	4	RO
0xA000	Absolut pressure	kPa	psi	2 decimal	4	RO
	Temperature	°C	F	1 decimal	4	RO
	Normal flowrate	Nm ³ /h Nm ³ /min	Nft ³ /h Nft ³ /min	2 decimal	4	RO
	Total normal volume	Nm ³	Nft ³	2 decimal	4	RO
0x4004	Unit change	ISO US		Integer	2	RW
0x4008	Time unit change	hour min		Integer	2	RW
0x9088	Molecular weight	-	-	6 decimal	4	RO
0x90A8	Isentropic Expansion	-	-	6 decimal	4	RO
0x90AC	Density	kg/m ³	-	6 decimal	4	RO
0x90B0	Viscosity	μPa s	-	6 decimal	4	RO
0x90B4	Enthalpy	kJ/kg	-	6 decimal	4	RO
0x90B8	Compressibility factor	-	-	6 decimal	4	RO
0x4038	Set zero offset	-	-	-	2	WO
0x403C	Clear total flow	-	-	-	2	WO

Dimensional Spec & Chart KC-7000N

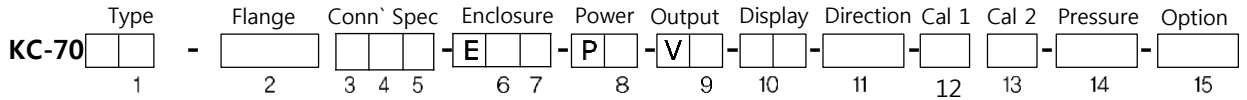


※ The shape of the sensor and housing manufacturers are subject to change

Unit : mm

Size	H	L
15A	287	300
20A	290	300
25A	302	300
32A	307	300
40A	310	300
50A	317	300
65A	327	300
80A	333	350
100A	346	400
125A	366	409
150A	411	451
200A	465	522
250A	550	602
300A	580	672

Order Code KC-7000N Series (Non display type FN-Mass Flowmeter)



Type	Code 1
FN-Mass Flowmeter	00N
FN Mass Flow Transmitter only	00T
Agency approved, customer specified	W

Connection form	Code 2
LOK : ½", ¾", 1"	L
SCREW : ½", ¾", 1"	S
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
Integral type	N2
Remote type	N4
Agency approved, customer specified	W

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

Flow Direction	Code 11
Horizontal Left to Right or Vertical UP	1
Horizontal Right to Left or Vertical UP	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



Golden Rules

• GOLDEN RULES

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Air & Gas & Steam & Liquid

Mass Flowmeter

Specialized manufacturer

Distributor

Certified in accordance with

KC Q ISO 9001 : 2015

KC Q ISO 14001 : 2015

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