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Golden Rules Co.,Ltd

Liquid, Oil, Gas

Coriolis Mass Flow Meter

KC-7740 Series



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

06 CORIOLIS MASS FLOWMETER (Liquid, Oil, Gas)

6-1. inline type KC-7740 Series

Coriolis Mass Flowmeter



Liquid, Oil, Gas
KC-7740 Series

Features

- Rate, integrated, volume, mass flow, temp', density indication
- Input Power AC 85 ~ 265V(50/60Hz), DC 18 ~ 36 V
- Output accuracy $\pm 0.005\%$ F.S, $\pm 2.5 \mu\text{A}$ (HART 4~20 mA)
- Field validation of flowmeter calibration settings
Smart program interface (RS-485 standard)
- Direct mass flow monitoring eliminates need for
Temperature and pressure compensation
- Simple signal Processing & calibration (5 ~ 8 calibration points)
- Excellent reproducibility
- Excellent long-term stability
- Best price-performance ratio
- Easy adaptable for different application or into housings
- No mechanical moved components
- Greatly reduces upstream piping requirements (10~5D)
- Outstanding range ability (Turn down ratio 20:1)
- 0.1-second response to changes in flow rate
- CE, IP65, IP67

Description

Golden Rules' KC-7740 Series Smart Coriolis 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-7740 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.

Performance Specifications

◆ **Accuracy of Point Velocity**

Gas & Liquid : F.S ±0.5%
 Liquid : F.S of ±0.2% (Option: ±0.1%)

◆ **Repeatability**

±0.25% ±0.1% ±0.05% of Full Scale

Density Measuring

Density range : 0.2 ~ 2.0 g/cm³
 Basic error : ±0.002 g/cm³
 Repeatability : 0.001 g/cm³

◆ **Response Time**

0.1 second

◆ **Measuring Range & Velocity**

5 ~ 200,000 kg/h & 0.2 ~ 3 m/sec

◆ **Function**

rate, total, volume, mass, density, temp'

▲ **Liquid Flow Range(kg/h)**

Size	Allowable flow range	Normal flow range for accuracy 0.1% & 0.15%	Normal flow range for accuracy 0.2% & 0.5%	Stability of zero point (kg/h)
0.1"	1.2 ... 120	10 ... 120	5 ... 120	0.004
1/2"	20 ... 3,000	200 ... 3,000	150 ... 3,000	0.3
1"	80 ... 8,000	600 ... 8,000	400 ... 8,000	0.8
1 1/2"	240 ... 24,000	2,400 ... 24,000	1,200 ... 32,000	3
2"	500 ... 36,000	5,000 ... 36,000	2,500 ... 36,000	5
3"	800 ... 120,000	8,000 ... 120,000	6,000 ... 140,000	12
4"	1,500 ... 200,000	15,000 ... 200,000	10,000 ... 200,000	20

Operating Specifications

◆ **Fluid**

Liquid, Oil, Gas ...

◆ **Input Power (Selection)**

AC 85~265V 50/60Hz, DC 18~36V

◆ **Output Signal (Selection)**

4~20mA & Impulse(0~10kHz, ±0.001% F.S/°C)

RS-485+Impulse+4~20mA

HART+Impulse+4~20 mA

(2x4~20mA for options)

◆ **압력 강하**

0.15 kpa

◆ Fluid & Ambient temperature

Gas & Liquid : -50 ~ +125 °C (-58 ~ 257 °F) Option : -50 ~ +250 °C (-58 ~ 482 °F)
Ambient : -40 ~ 55 °C (-40 ~ 131 °F)

◆ Pressure (limitations)

NPT : 500 psig (35 barg)
JIS 10K RF Flange, ANSI 150# RF Flange
(Option : max. 63 Bar)

◆ Displays

Alphanumeric 2 X 16 backlight LCD
Adjustable variables via remote control switch or Smart interface software
Adjustable : Full scale : (0 ~100) %
Flow: m³/h(m³), L/h(L), mL/h(mL), kg/h(kg)
Time response 1 ~ 7 sec / Correction factor setting 0.5 ~ 5 /
Zero & Span

◆ Totalizer

Seven digits (9,999,999.9 Count) in engineering units Reset table by
Software or remote control switch

◆ Software

Smart interface Windows® -based Software 8MB RAM of RAM, preferred 16MB
of RS-485 communication
Additional features: Zero cut-off adjustment / Linearization adjustment / Save /
Load configuration / For meter validation

Physical Specification**◆ Wetted Materials**

Measuring Tube – 316LSS
Body – 304LSS

◆ Enclosure

General-Area Enclosure CASE (IP67)

◆ Electrical Connections

2 X ½" PF

◆ Process Connection (Selection)

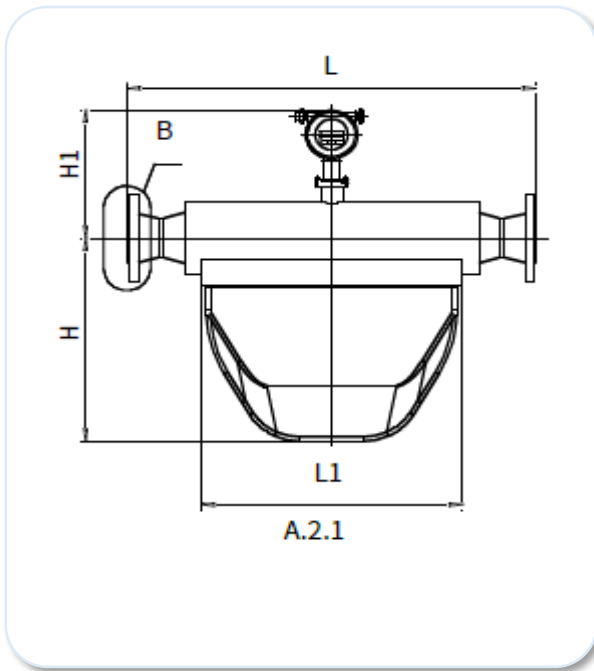
ANSI 150lb Flange, JIS 10k RF Flange, others

◆ Certification

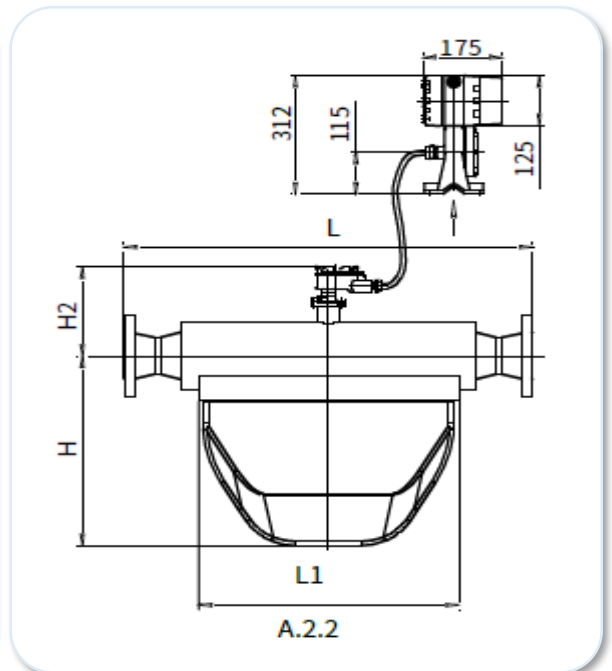
CE (All CASE)

Dimensional Spec' & Chart KC-7740

Unit : mm



Compact type(KC-7740)



Remote type(KC-7740-R)

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

Outline dimensions and weight

Process connection size	Figure	L(mm)		L1 (mm)	H (mm)	H1 (mm)	H2 (mm)	Cmax (mm)*	Weight(kg)	
		1.6 ... 4.0 MPa	6.3 MPa						A.2.1	A.2.2
DN10, 3/8 inch	A.2	360	374	240	180	290	220	95	10	13
DN15, 1/2 inch	A.2	400	414	280	184	290	220	115	11	14
DN25, 1 inch	A.2	500	536	360	250	300	230	150	15	18
DN40, 1 1/2 inch	A.2	600	634	460	300	310	240	165	30	33
DN50, 2 inch	A.2	800	828	640	410	320	250	205	35	38
DN80, 3 inch	A.2	900	928	700	490	350	280	416	75	78
DN100, 4 inch	A.2	1130	1156	860	660	370	290	440	132	135

*Overall height of the body, excluding transmitter

The Coriolis mass flow meter realizes the following control with the current output signal.

- 01 – Mass flow(kg/h) Control
- 02 – Density (g/cm²) Measuring
- 03 – Volume flow(m³/h) Control
- 04 – Temperature(kPa) Measuring

Applications :

Batch control / Blending / Process control / Filling and dosing / Loading and unloading / Custody transfer / Process gas measurement



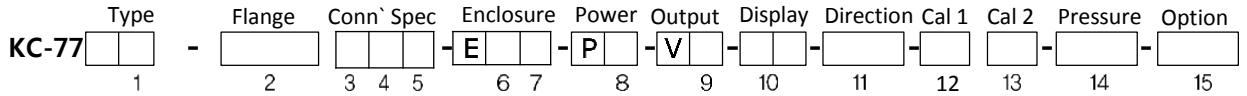
It responds to customers' needs with a fast response speed and can realize energy savings due to ± 0.1% F.S precision control, minimizing losses in industrial sites.

Piping Requirement (KC-7740 inline type)

Straight Pipe Length Requirements at 1 atm			
Piping condition	KC-7740 Smart- IN™		Orifice Plate(3)
	Upstream(1)	Downstream(2)	
90° Elbow or T-Piece	10D	5D	28D
Reduction (4:1)	10D	5D	14D
Expansion (4:1)	10D	5D	30D
After Control Valve	10D	5D	32D
Two 90° Elbows (in same plane)	10D	5D	36D
Two 90° Elbows (in same plane)	10D	5D	62D

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

Order Code KC-7740GF Series (inline type)



Type	Code 1
Water	40WF
Oil	40OF
Corrosive or Gas	40GF
Agency approved, customer specified	W

Input power	Code 8
DC 18 ~ 36V	2
AC 85 ~ 265V, 60Hz	3

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

Output Signal	Code 2
4-20mA & Impulse	1
RS-485+Impulse+4-20mA	2
HART+Impulse+4-20mA	3
Agency approved, customer specified	W

Calibration 2 ⁹ (Water)	Code 13
64.4 °F(18 °C) 14.7 psig (1.103 barg)	A
32 °F(0 °C) 14.7 psig (1.103 barg)	B
Agency approved, customer specified	W

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

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

Pressure Limit	Code 14
230 psi (16 bar)	1
360 psi (25 bar)	2
580 psi (40 bar)	3
915 psi (63 bar)	4

Connection Spec' 1,3	Code 3,4,5		
Size	DIN	150 lb	JIS 10k
0.1" (DN3)	D1	F1	J1
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

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

Option	Code 15
Agency approved, customer specified	W

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

Enclosure ⁵	Code 6,7
IP65 (Option: IP67)	N2
Remote IP67 with Junction Box	N4(Ft)
Agency approved, customer specified	W

Calibration 1 ⁹ (Water)	Code 12
Standard Calibration	A
Water, only for 2" and small pipe Size	
Water, only for 2" and large pipe size	D
Customer Calibration	B
Water	
Agency approved, customer specified	W

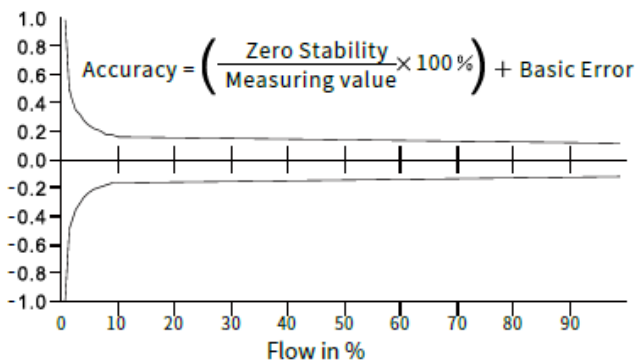
Flow Measurement Principle

■ Coriolis Mass Flow Sensing

Golden Rule's unique Coriolis Mass Flow meter guarantees the outstanding accuracy of industrial flow meters, and robustness and reliability in the case of high pressure/high pressure.

Coriolis Mass Flow Meter uses two parallel arranged pipes which are rotated at their resonant frequency by coils. Any mass flow passing through the tubes will generate Coriolis forces which appear whenever a mass moves radially in a rotating system. The forces have opposed effects on the inlet and outlet sides, they slightly deform the pipes. The excursion of the pipes is detected by sensors on the inlet and outlet side. The phase shift between the rotation frequencies of both pipes are proportional to the mass flow rate. The resonant frequency of both pipes changes in accordance with the density of the medium. This effect determines the density. Using one sensor density and temperature can also be measured for compensation purposes.

Accuracy



The diagram shows typical values. Individual values may be taken from the calibration records supplied with each meter.

Additional Option (ILAC/TAF) Test Report I



Additional option: (ILAC / TAF) Test report - Standard calibration laboratory (TAF accreditation: 3032, complying with ISO / IEC 17025)
TAF has mutual recognition arrangement with ILAC MRA

Project	Measurand level or range
Flow meters	Flow rate: 2.4 ... 30 m ³ /h (40.0 ... 500.0 L/min)
	Flow velocity: 0.2 ... 3 m/s
	8 basic points (8 basic points on average or specified by customer)

APPLICATION

◆ Simply select to suit the application

Application	Type		Mass Flowmeter	
			Coriolis Mass	
Object of Measurement	Liquid		O	
	Gas		O	
	Vaper		O	
	steam		X	
Application	control		O	
	Monitor		O	
	Supply		O	
Operating condition	Temperature		Gas	- 50 to 250°C
			Liquid	-50 to 250°C
			Oil	-50 to 250°C
	Pressure		Max 63 barg	
	Pressure loss		Negligible	
	Range ability		Large	
Installing condition	Bore		Ø4 to Ø100	
	Straight	upstream	10D	
	Pipe length	downstream	5D	
	Piping work		Required	
	Explosion-proofing		O	
Performance	Accuracy		Gas	±0.5% F.S (Option: 0.1%)
			Liquid	±0.5% F.S (Option: 0.1%)
			Oil	±0.5% F.S (Option: 0.1%)
	Velocity		Gas	0.5~200,000 kg/h
			Liquid	5~200,000 kg/h
			Oil	5~200,000 kg/h



Golden Rules

• GOLDEN RULES

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Gases & Liquid & Steam
Mass & Total Flowmeter
Specialized manufacturer

Distributor

Certified in accordance with

KC Q ISO 9001 : 2015

KC Q ISO 14001 : 2015

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