



## BEST MEASUREMENT PERFORMANCE

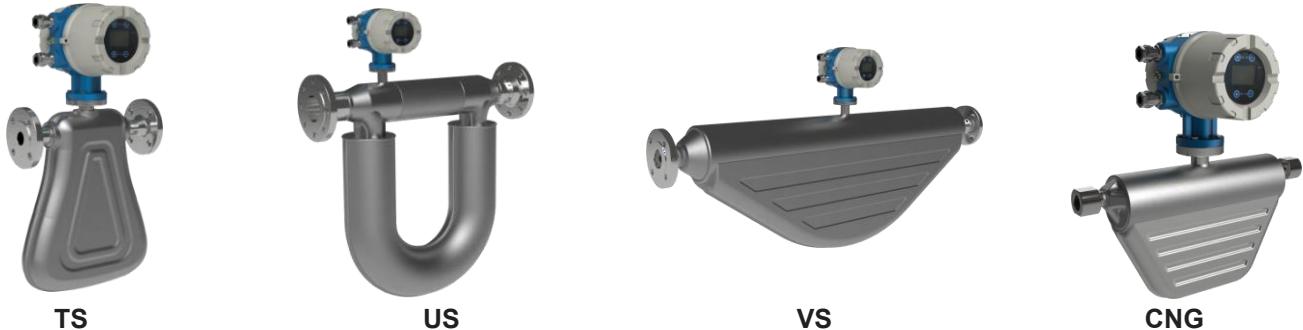
- Best measurement performance on liquid mass flow, and density measurements
- Optimum gas mass flow measurement
- Reliable two-phase flow measurement for the most complicate applications
- Excellent design to reduce installation cost and eliminate daily maintenance

## BEST FIT- FOR- APPLICATION

- Wide range of line size from DN1 to DN250
- Wide application coverage of hygienic, cryogenic, high pressure and high temperature
- Broad range of I/O outputs and expansive communication protocols

## OVERVIEW

Walsn Coriolis mass flowmeter (CMF) provides optimum mass flow, density and temperature measurement performance, and also calculate volume flow, total flow and fluid composition in real-time. Currently Walsn CMF meter has four series which are TS, US, VS and CNG; meanwhile each series has its own integral and remote types:



A typical Walsn CMF meter is made up of a flow sensor and a signal transmitter. Flow sensor is designed using two vibrated tubes, and signal transmitter is employed with digital signal processor (DSP), and dynamic vibration balance (DVB) circuit to deliver fast response but accurate measurement performance. In addition, in situ node-configuration, diagnostics and data recording are easily handled via HART or Modbus RTU communication.

## DESIGN & BENEFIT

- Delicate flow tube structure design
- Dedicated ASIC with digital signal processor (DSP)
- Dynamic vibration balance (DVB) technology employed
- 2-point compensation for temperature and process pressure respectively
- ✓ Amplify the impact of Coriolis force and deliver high sensitivity
- ✓ Guarantee the accurate measurement performance both on liquid and gas
- ✓ Enhance the measurement stability
- ✓ Improve the measurement performance

## APPLICATION

Walsn CMF meters are suitable for most complex and challenging environment for liquid, gas and slurry applications:

Process fluid	Typical application	Industries			
<ul style="list-style-type: none"> <li>● Liquid</li> <li>● Gas</li> <li>● Slurry</li> </ul>	<ul style="list-style-type: none"> <li>■ Custody Transfer</li> <li>■ Reactor Feed Ratio</li> <li>■ Density Measurement</li> <li>■ Batch Control</li> </ul>	<ul style="list-style-type: none"> <li>◆ Chemicals</li> <li>◆ Food &amp; Beverages</li> <li>◆ Machinery</li> <li>◆ Minerals &amp; Mining</li> <li>◆ Oil &amp; Gas</li> </ul>	<ul style="list-style-type: none"> <li>◆ Pharmaceuticals</li> <li>◆ Power Plant</li> <li>◆ Pulp &amp; Paper</li> <li>◆ Water</li> <li>◆ Waste Water</li> </ul>		

## **SENSOR MATERIAL**

The general selection of wetted parts and of non-wetted parts of a Walsn CMF meter is as follows:

Wetted part	Material	Non-Wetted part	Material
Flow tube	316L stainless steel	Sensor case	304 stainless steel
Flow splitter	316L stainless steel	Transmitter housing	Aluminum Die-Cast
Flange	316L stainless steel	Remote junction box	Aluminum Die-Cast

**Note:** For special material selection, please refer to [ORDERING INFORMATION](#) or contact our sales people for the details.

## **SENSOR SIZE**

Walsn CMF meters have developed from the size of DN5 to DN250. However, currently not full sizes are manufactured and available for the four series. Please refer to the following table for the details:

Line size	mm	inch	TS	US	CNG	VS
DN001	1	1/25		CMF-US-001		
DN002	2	1/12				CMF-VS-002
DN005	5	3/16				CMF-VS-005
DN010	10	3/8				CMF-VS-010
DN015	15	2/3	CMF-TS-015N CMF-TS-015H		CMF-CNG-015	CMF-VS-015
DN025	25	1	CMF-TS-025N CMF-TS-025H		CMF-CNG-025	CMF-VS-025
DN040	40	1-1/2		CMF-US-040N CMF-US-040H		
DN050	50	2		CMF-US-050N CMF-US-050H		
DN080	80	3		CMF-US-080N CMF-US-080H		
DN100	100	4		CMF-US-100N CMF-US-100H		
DN150	150	6		CMF-US-150N CMF-US-150H		
DN200	200	8		CMF-US-200N		
DN250	250	10		CMF-US-250N		

## **ACCURACY and REPEATABILITY**

### **Reference operating conditions**

For determining the performance capabilities of Walsn CMF meters, the following conditions need to be concerned:

- Flow measurement accuracy includes the combined effects of linearity, repeatability, hysteresis and other non-linearities
- Measurement performance is based on calibration with water as the process fluid at typical process conditions - 20 to 30°C and 200 to 400 KPa
- Measurement performance is based on collected frequency or pulse outputs by the flowmeter

## Accuracy and repeatability of liquids & slurries

Performance specification	Standard
Mass flow/volume flow accuracy	$\pm 0.10\%$ of rate
Mass flow/volume flow repeatability	$\leq 0.05\%$ of rate
Density accuracy	$\pm 0.0005 \text{ g/cm}^3 (0.5 \text{ kg/m}^3)$
Density repeatability	$\pm 0.0002 \text{ g/cm}^3 (0.2 \text{ kg/m}^3)$
Temperature accuracy	$\pm 1^\circ\text{C} (\pm 1.8^\circ\text{F})$
Temperature repeatability	$\pm 0.1^\circ\text{C} (\pm 0.18^\circ\text{F})$

**Note:** - Density range: 0.1 to 3.0 g/cm<sup>3</sup> (100 to 3,000kg/m<sup>3</sup>)  
 - Temperature range: -240 to +400°C (400 to 752°F)

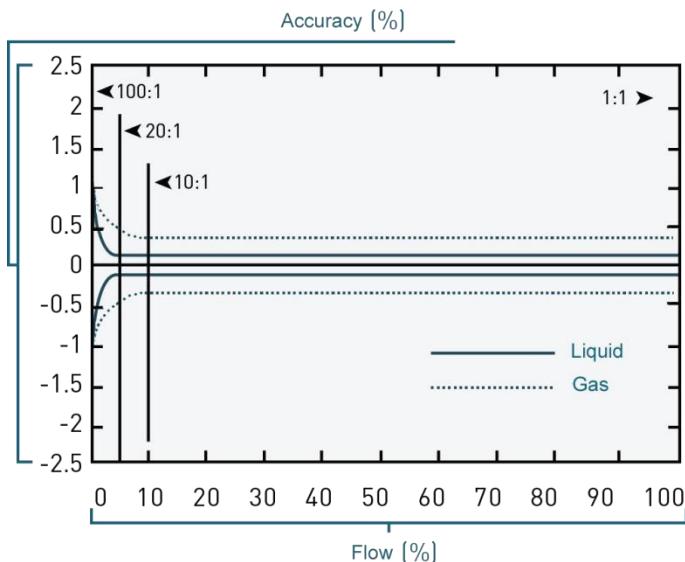
## Accuracy and repeatability of Gases

Performance Specification	Standard
Mass flow/volume flow accuracy	$\pm 0.35\%$ of rate
Mass flow/volume flow repeatability	$\leq 0.17\%$ of rate
Temperature accuracy	$\pm 1^\circ\text{C} (\pm 1.8^\circ\text{F})$
Temperature repeatability	$\pm 0.1^\circ\text{C} (\pm 0.18^\circ\text{F})$

**Note:** - Gas density: not applicable  
 - Temperature range: -240 to +400°C (400 to 752°F)

## Typical curve

The following figure and curve illustrate accuracy, repeatability and pressure loss for water:



Range ability	500:1	100:1	20:1	10:1	1:1
Accuracy of liquid ( $\pm \%$ )	2.5	0.8	0.1	0.1	0.1
Accuracy of gas ( $\pm \%$ )	2.5	1.5	0.5	0.35	0.35
Pressure loss					
Liquid (psi)	~0	~0	0.1	0.25	14.5
Liquid (bar)	~0	~0	0.01	0.02	1.0
Gas (psi)	0	0	0.1	0.35	15.0
Gas (bar)	0	0	0.01	0.02	1.03

## LIQUID FLOW RANGE

CMF series	Model	Liquid(Max. Flowrate)		K - gas coefficient
		lb/min	kg/h	
TS	CMF-TS-015N	37	1,000	90
	CMF-TS-015H	220	6,000	140
	CMF-TS-025N	220	6,000	140
	CMF-TS-025H	735	20,000	140
US	CMF-US-001N	0.6	16	60
	CMF-US-040N	735	20,000	140
	CMF-US-040H	1,100	30,000	140
	CMF-US-050N	1,100	30,000	140
	CMF-US-050H	2,200	60,000	160
	CMF-US-080N	2,200	60,000	160
	CMF-US-080H	6,600	180,000	215
	CMF-US-100N	3,700	100,000	200
	CMF-US-100H	10,300	280,000	230
	CMF-US-150N	11,000	300,000	230
	CMF-US-150H	23,515	640,000	240
	CMF-US-200N	40,425	1,100,000	250
	CMF-US-250N	66,000	1,800,000	300
CNG	CMF-CNG-015	220	6,000	120
	CMF-CNG-025	440	12,000	200
VS	CMF-VS-002	3	80	60
	CMF-VS-005	11	300	70
	CMF-VS-010	37	1,000	70
	CMF-VS-015	220	6,000	70
	CMF-VS-025	660	18,000	70

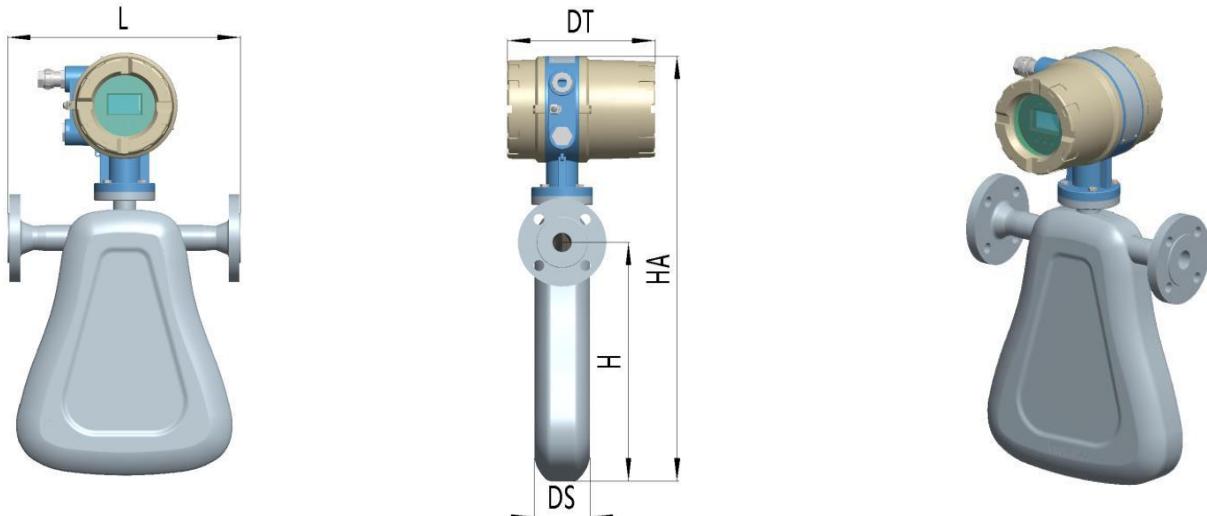
**Gas Flow Range = Liquid flow range × gas process density / K**

## DIMENSION

The following dimensional drawings provide a basic guideline for sizing and planning. The representative of a 316L stainless steel model fitted with ANSI 150 RF flange and T1 transmitter.

### 1. ITS - Integral TS

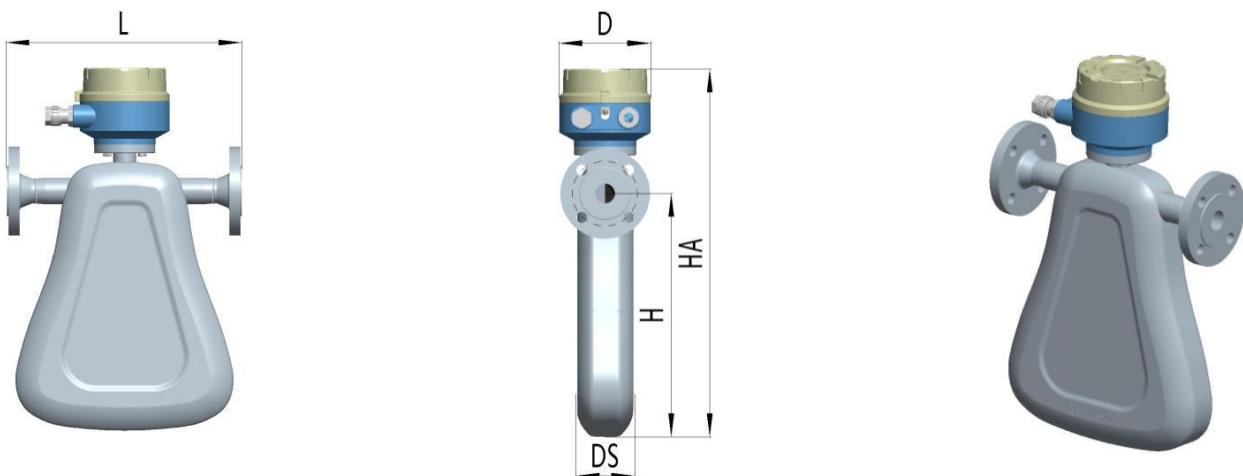
Unit: inch (mm)



Model	Line size	L	H	HA	DS	DT
CMF-TS-015N	1/2 (15)	10-1/16 (256)	9-1/16 (230)	18-15/16 (480)	2- 1/2 ( 64)	7-9/16 (192)
CMF-TS-015H	1/2 (15)	12 (304)	12-5/8 (320)	22-7/16 (570)	2-13/16 (72)	7-9/16 (192)
CMF-TS-025N	1 (25)	12 (304)	12-5/8 (320)	22-7/16 (570)	2-13/16 (72)	7-9/16 (192)
CMF-TS-025H	1 (25)	22-5/8 (574)	24-15/16 (622)	49-11/16 (795)	4- 3/4 ( 121)	7-9/16 (192)

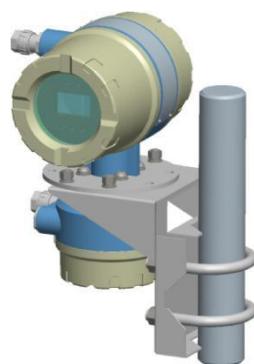
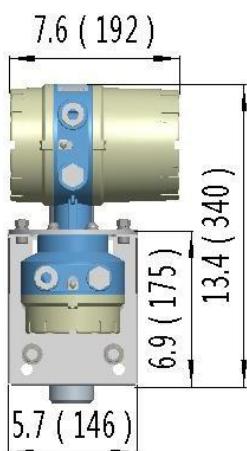
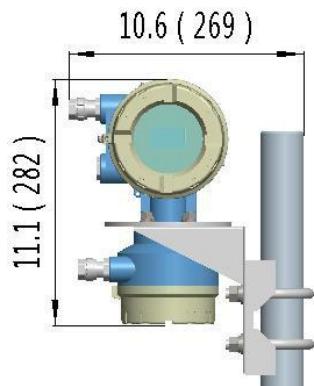
## 2. RTS - Remote TS

Unit: inch (mm)

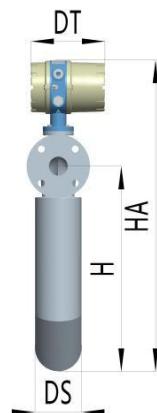


Model	Line size	L	H	HA	DS	D
CMF-TS-015N	1/2 (15)	10-1/16 (256)	9-1/16 (230)	15-5/8 (397)	2- 1/2 ( 64)	4-5/8 (117)
CMF-TS-015H	1/2 (15)	12 (304)	12-5/8 (320)	19-1/8 (485)	2-13/16 (72)	4-5/8 (117)
CMF-TS-025N	1 (25)	12 (304)	12-5/8 (320)	19-1/8 (485)	2-13/16 (72)	4-5/8 (117)
CMF-TS-025H	1 (25)	22-5/8 (574)	20-9/16 (522)	28-1/32 (712)	4- 3/4 ( 121)	4-5/8 (117)

**3. T1 Transmitter**  
Unit: inch (mm)



**4. IUS - Integral US**  
Unit: inch (mm)

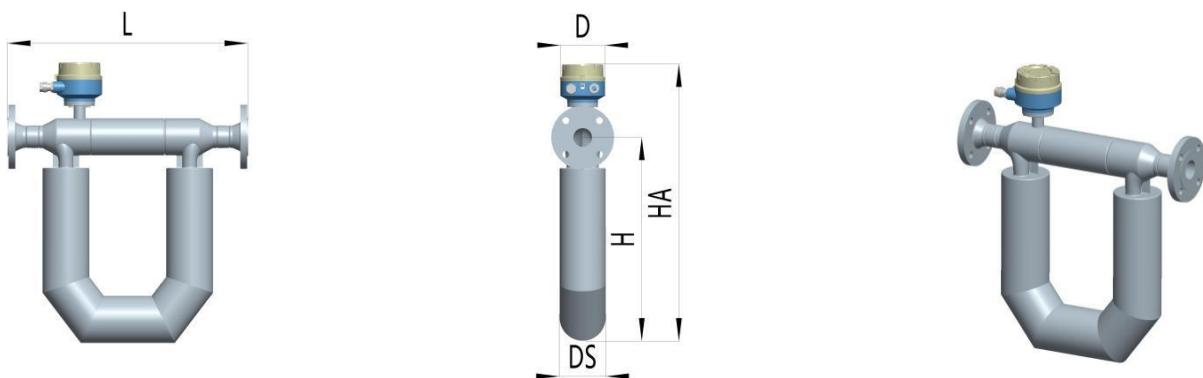


Model	Line size	L	H	HA	DS	DT
CMF-US-040N	1-1/2 (40)	22-5/8 (574)	20-9/16 (522)	31-9/32 (794)	4- 3/4 (121 )	7-9/16 (192)
CMF-US-040H	1-1/2 (40)	24-1/2 (622)	21-3/8 (542)	32-7/32 (817)	4- 3/4 (121 )	7-9/16 (192)
CMF-US-050N	2 (50)	24-1/2 (622)	21-3/8 (542)	32-7/32 (817)	4- 3/4 (121 )	7-9/16 (192)
CMF-US-050H	2 (50)	27-21/32 (702)	25-15/16 (658)	36-27/32 (936)	5- 29 / 32 (150 )	7-9/16 (192)
CMF-US-080N	3 (80)	30-1/16 (763)	26-11/16 (678)	38-5/32 (969)	5- 29 / 32 (150 )	7-9/16 (192)
CMF-US-080H	3 (80)	33-7/16 (850)	33-7/8 (861)	46-11/32 (1,177)	7- 23 / 32 (196 )	7-9/16 (192)
CMF-US-100N	4 (100)	32-1/4 (822)	28-29/32 (733)	41-5/32 (1,045)	5- 29 / 32 (150 )	7-9/16 (192)
CMF-US-100H	4 (100)	41-29/32 (1,064)	45-9/32 (1,150)	58-21/32 (1,490)	11 - 29 /32 (302 )	7-9/16 (192)

CMF-US-150N	<b>6</b> (150)	<b>45-11/16</b> (1,160)	<b>39-1/8</b> (994)	<b>52-13/32</b> (1,331)	<b>9- 21 / 32</b> (245 )	<b>7-9/16</b> (192)
CMF-US-150H	<b>6</b> (150)	<b>40-5/16</b> (1,240)	<b>49-1/2</b> (1,257)	<b>64-9/16</b> (1,627)	<b>12 - 27 /32</b> (326 )	<b>7-9/16</b> (192)
CMF-US-200N	<b>8</b> (200)	<b>49-15/16</b> (1,268)	<b>49-1/2</b> (1,257)	<b>64-9/16</b> (1,627)	<b>12 - 27 /32</b> (326 )	<b>7-9/16</b> (192)
CMF-US-250N	<b>10</b> (250)	<b>69-5/16</b> (1,760)	<b>68-15/16</b> (1,751)	<b>853/8</b> (2,168)	<b>17-1/8</b> (435)	<b>7-9/16</b> (192)

## 5. Remote US

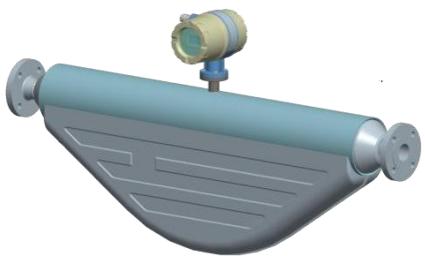
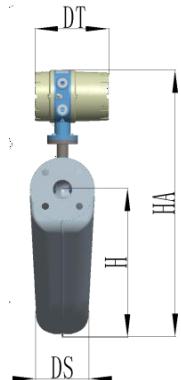
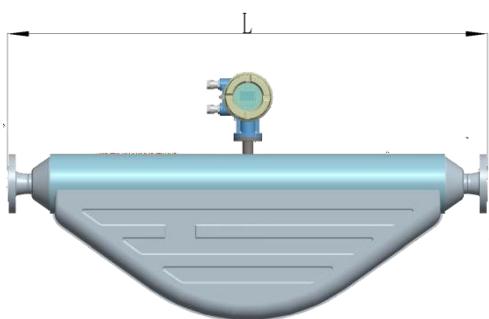
Unit: inch (mm)



Model	Line size	L	H	HA	DS	D
CMF-US-040N	<b>1-1/2</b> (40)	<b>22-5/8</b> (574)	<b>20-9/16</b> (522)	<b>28-1/32</b> (712)	<b>4- 3 / 4</b> (121 )	<b>4-5/8</b> (117)
CMF-US-040H	<b>1-1/2</b> (40)	<b>24-1/2</b> (622)	<b>21-3/8</b> (542)	<b>28-15/16</b> (735)	<b>4- 3 / 4</b> (121 )	<b>4-5/8</b> (117)
CMF-US-050N	<b>2</b> (50)	<b>24-1/2</b> (642)	<b>21-3/8</b> (542)	<b>28-15/16</b> (735)	<b>4- 3 / 4</b> (121 )	<b>4-5/8</b> (117)
CMF-US-050H	<b>2</b> (50)	<b>27 - 21 /32</b> (702 )	<b>25-15/16</b> (658)	<b>33-5/8</b> (854)	<b>5- 29 / 32</b> (150 )	<b>4-5/8</b> (117)
CMF-US-080N	<b>3</b> (80)	<b>30-1/16</b> (763)	<b>26-11/1</b> (678)	<b>34-15/16</b> (887)	<b>5- 29 / 32</b> (150 )	<b>4-5/8</b> (117)
CMF-US-080H	<b>3</b> (80)	<b>33-7/16</b> (850)	<b>33-7/8</b> (861 )	<b>43-1/8</b> (1,095)	<b>7- 23 / 32</b> (196 )	<b>4-5/8</b> (117)
CMF-US-100N	<b>4</b> (100)	<b>32-1/4</b> (822)	<b>28-29/32</b> (733)	<b>36-27/32</b> (963)	<b>5- 29 / 32</b> (150 )	<b>4-5/8</b> (117)
CMF-US-100H	<b>4</b> (100)	<b>41-29/32</b> (1,064 )	<b>45-9/32</b> (1,150)	<b>55-7/16</b> (1,408)	<b>11-29/32</b> (302 )	<b>4-5/8</b> (117)
CMF-US-150N	<b>6</b> (150)	<b>45-11/16</b> (1,160)	<b>39-1/8</b> (994)	<b>49-3/16</b> (1,249)	<b>9- 21 / 32</b> (245 )	<b>4-5/8</b> (117)
CMF-US-150H	<b>6</b> (150)	<b>40-5/16</b> (1,240)	<b>49-1/2</b> (1,257)	<b>60-13/16</b> (1,545)	<b>12-27/32</b> (326 )	<b>4-5/8</b> (117)
CMF-US-200N	<b>8</b> (200)	<b>49-15/16</b> (1,268)	<b>49-1/2</b> (1,257)	<b>60-13/16</b> (1,545)	<b>12-27/32</b> (326 )	<b>4-5/8</b> (117)
CMF-US-250N	<b>10</b> (250)	<b>69-5/16</b> (1,760)	<b>68-15/16</b> (1,751)	<b>82-1/8</b> (2,086)	<b>17-1/8</b> (435)	<b>4-5/8</b> (117)

## 6. IVS - Integral VS

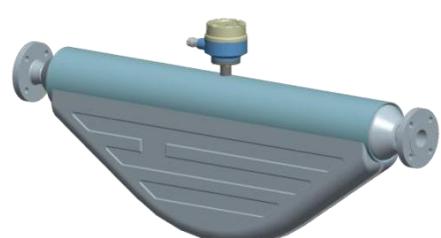
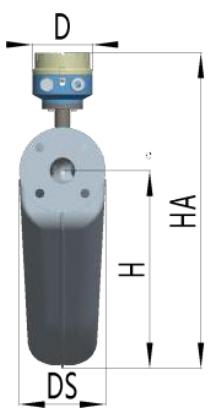
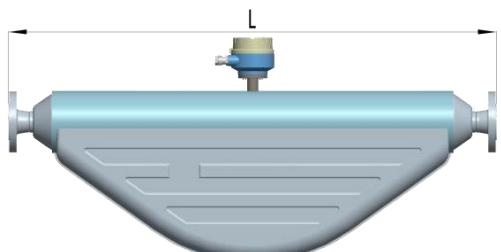
Unit: inch (mm)



Model	Line size	L	H	HA	DS	DT
CMF-VS-015	1/2 (15)	17-1/2 (444)	7-1/2 (190)	17-4/5 (452)	3-1/2 (89)	7-9/16 (192)
CMF-VS-025	1 (25)	17-1/2 (444)	7-1/2 (190)	17-4/5 (452)	3-1/2 (89)	7-9/16 (192)

## 7. RVS - Remote VS

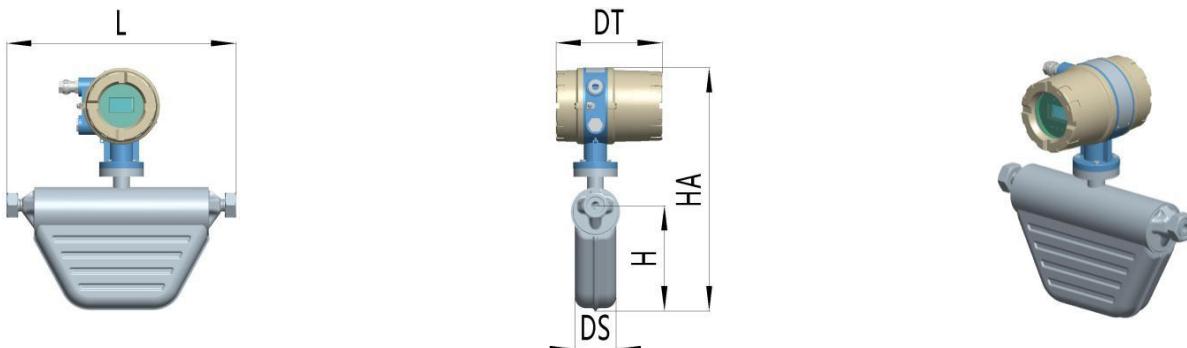
Unit: inch (mm)



Model	Line size	L	H	HA	DS	D
CMF-VS-015	1/2 (15)	17-1/2 (444)	7-1/2 (190)	14-9/16 (370)	3-1/2 (89)	4-5/8 (117)
CMF-VS-025	1 (25)	17-1/2 (444)	7-1/2 (190)	14-9/16 (370)	3-1/2 (89)	4-5/8 (117)

## 8. ICNG - Integral CNG

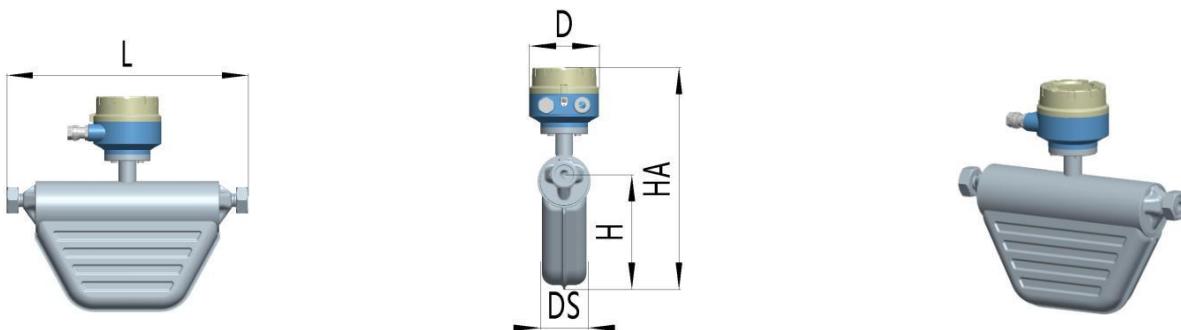
Unit: inch (mm)



Model	Line size	L	H	HA	DS	DT
CMF-CNG-015	1/2 (15)	16-3/8 (416)	7-1/2 (190)	17-13/16 (453)	2-15/16 (75)	7-9/16 (192)
CMF-CNG-025	1 (25)	18-1/8 (462)	8-15/16 (227)	19-1/2 (495)	3-3/4 (95)	7-9/16 (192)

## 9. RCNG - Remote CNG

Unit: inch (mm)



Model	Line size	L	H	HA	DS	D
CMF-CNG-015	1/2 (15)	16-3/8 (416)	7-1/2 (190)	14-9/16 (370)	2-15/16 (75)	4-5/8 (117)
CMF-CNG-025	1 (25)	18-1/8 (462)	8-15/16 (227)	16-1/4 (413)	3-3/4 (95)	4-5/8 (117)

## WEIGHT and PACKAGING

It's a good idea to get information on net weight, gross weight and packaging dimensions for a flowmeter when calculating transport cost. Net weight of a Walsn CMF meter varies depending on the model configuration, while gross weight also needs to consider packaging materials and dimensions. The following table lists net weight, gross weight, packaging material and dimensions on some common models:

### 1. ITS - Integral TS

Configuration based on 316L stainless steel flow tube, ANSI 150 RF flange and T1 transmitter

Model	Net weight		Material	Packaging size		Gross weight	
	lb	kg		inch	mm	lb	kg
CMF-TS-015N	20	9	Carton	24.80×17.32×11.41	630x440x290	27	12
CMF-TS-015H	29	13	Carton	24.80×17.32×11.41	630x440x290	35	16
CMF-TS-025N	31	14	Carton	24.80×17.32×11.41	630x440x290	37	17
CMF-TS-025H	66	30	Wood	36.22×28.35×20.47	920x720x520	117	53

### 2. RTS - Remote TS

Configuration based on 316L stainless steel flow tube, ANSI 150 RF flange, T1 transmitter and 10m cable as a standard

Model	Net weight of Transmitter		Net weight of sensor		Material	Packaging size		Gross weight	
	lb	kg	lb	kg		inch	mm	lb	kg
CMF-TS-015N	12	5.4	16	7.1	Carton	26.38×23.03×14.37	670x585x365	34	15.3
CMF-TS-015H	12	5.4	26	12	Carton	26.38×23.03×14.37	670x585x365	46	20.3
CMF-TS-025N	12	5.4	26	12	Carton	26.38×23.03×14.37	670x585x365	47	21.3
CMF-TS-025H	12	5.4	64	29	Wood	36.22×28.35×20.47	920x720x520	126	57.3

### 3. IUS - Integral US

Configuration based on 316L stainless steel flow tube, ANSI 150 RF flange and T1 transmitter

Model	Net weight		Material	Packaging size		Gross weight	
	Ib	kg		inch	mm	Ib	kg
CMF-US-040N	68	31	Wood	36.22×28.35×20.47	920×720×520	119	54
CMF-US-040H	73	33	Wood	36.22×28.35×20.47	920×720×520	123	56
CMF-US-050N	77	35	Wood	36.22×28.35×20.47	920×720×520	128	58
CMF-US-050H	112	51	Wood	51.18×29.53×18.50	1300×750×470	212	96
CMF-US-080N	117	53	Wood	47.24×36.22×20.47	1200×920×520	216	98
CMF-US-080H	183	83	Wood	47.24×36.22×20.47	1200×920×520	282	128
CMF-US-100N	168	76	Wood	47.24×36.22×20.47	1200×920×520	268	121
CMF-US-100H	395	179	Wood	59.05×52.76×21.26	1500×1340×540	538	244
CMF-US-150N	406	184	Wood	59.05×52.76×21.26	1500×1340×540	549	249
CMF-US-150H	483	219	Wood	70.87×64.96×22.05	1800×1650×560	661	300
CMF-US-200N	520	236	Wood	70.87×64.96×22.05	1800×1650×560	697	316
CMF-US-250N	664	301	Wood	78.74×70.87×23.62	2000×1800×600	906	411

### 4. RUS - Remote US

Configuration based on 316L stainless steel flow tube, ANSI 150 RF flange, T1 transmitter and 10m cable as a standard

Model	Net weight of transmitter		Net weight of sensor		Material	Packaging size		Gross weight	
	Ib	kg	Ib	kg		inch	mm	Ib	kg
CMF-US-040N	12	5.4	64	29	Wood	36.22×28.35×20.47	920×720×520	126	57.3
CMF-US-040H	12	5.4	68	31	Wood	36.22×28.35×20.47	920×720×520	131	59.3
CMF-US-050N	12	5.4	73	33	Wood	36.22×28.35×20.47	920×720×520	135	61.3
CMF-US-050H	12	5.4	108	49	Wood	51.18×29.53×18.50	1300×750×470	219	99.3

CMF-US-080N	12	5.4	112	51	Wood	47.24×36.22×20.47	1200×920×520	223	101.3
CMF-US-080H	12	5.4	176	80	Wood	47.24×36.22×20.47	1200×920×520	287	130.3
CMF-US-100N	12	5.4	161	73	Wood	47.24×36.22×20.47	1200×920×520	272	123.3
CMF-US-100H	12	5.4	390	177	Wood	59.05×52.76×21.26	1500×1340×540	545	247.3
CMF-US-150N	12	5.4	401	182	Wood	59.05×52.76×21.26	1500×1340×540	556	252.3
CMF-US-150H	12	5.4	481	218	Wood	70.87×64.96×22.05	1800×1650×560	625	283.3
CMF-US-200N	12	5.4	534	242	Wood	70.87×64.96×22.05	1800×1650×560	722	327.3
CMF-US-250N	12	5.4	677	307	Wood	78.74×70.87×23.62	2000×1800×600	961	422.3

## 5. IVS - Integral VS

Configuration based on 316L stainless steel flow tube, ANSI 150 RF flange and T1 transmitter

Model	Net weight		Material	Packaging size		Gross weight	
	lb	kg		inch	mm	lb	kg
CMF-VS-015	27.12	12.3	Carton		22.83×17.32×12.6	580×440×320	
CMF-VS-025	27.12	12.3	Carton		22.83×17.32×12.6	580×440×320	

## 6. RVS - Remote VS

Configuration based on 316L stainless steel flow tube, ANSI 150 RF flange, T1 transmitter and 10m cable as a standard

Model	Net weight of transmitter		Net weight of sensor		Material	Packaging size		Gross weight	
	lb	kg	lb	kg		inch	mm	lb	kg
CMF-VS-015	12	5.4	21.8	9.9	Carton	22.83×17.32×12.6	580×440×320	59.5	27
CMF-VS-025	12	5.4	21.8	9.9	Carton	22.83×17.32×12.6	580×440×320	59.5	27

## 7. ICNG - Integral CNG

Configuration based on 316L stainless steel flow tube, NPT-female adapter and T1 transmitter

Model	Net weight		Material	Packaging size		Gross weight	
	lb	kg		inch	mm	lb	kg
CMF-CNG-015	46	21	Carton	22.83×17.32×12.6	580×440×320	53	24
CMF-CNG-025	57	26	Carton	22.83×17.32×12.6	580×440×320	64	29

## 8. RCNG - Remote CNG

Configuration based on 316L stainless steel flow tube, NPT female adapter, T1 transmitter and 10m cable as a standard

Model	Net weight of transmitter		Net weight of sensor		Material	Packaging size		Gross weight	
	lb	kg	lb	kg		inch	mm	lb	kg
CMF-CNG-015	12	5.4	42	19	Carton	22.83×17.32×12.6	580×440×320	60	27.3
CMF-CNG-025	12	5.4	53	24	Carton	22.83×17.32×12.6	580×440×320	71	32.3

## SENSOR INSTALLATION

Sensor installation has significant effect on the performance of a CMF meter. In general the installation should be chosen to ensure the flow tube which is always filled with the process fluid and to prevent accumulation of other media.

### 1. Typical installations recommended



Upright installation for liquid



Inverted installation for gas



Flagpole installation for slurry

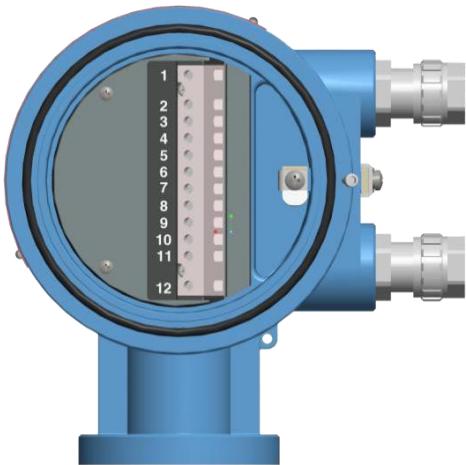
2. Upright installation is recommended if the process fluid is a liquid, and the process fluid is easily vaporized. Upright installation prevents the accumulation of vapor or air in the sensor.

3. Inverted installation is recommended if the process fluid is a liquid with entrained solids, or if the process fluid is a gas which may condense. Inverted installation prevents higher density media from accumulating in the flow tubes
4. Flagpole installation is a compromise. It is recommended if the process fluid is a slurry mixture, or if the pipe is to be purged with gas or steam

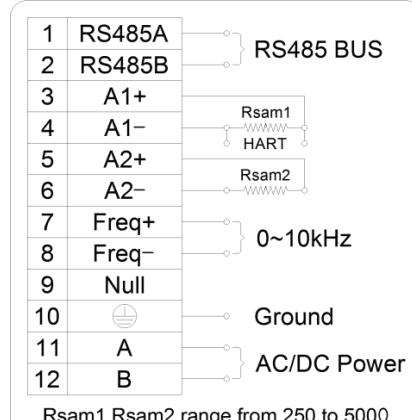
## **WIRING**

### **1. Internal wiring for Integral CMF meter**

- Between sensor & transmitter is complete before it leaves the factory
- Customers do not need to do wiring on site after installation
- T1 transmitter layout and terminals illustrated below



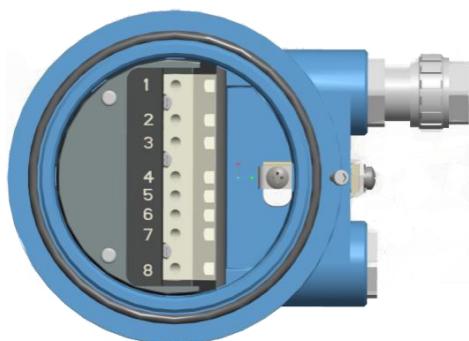
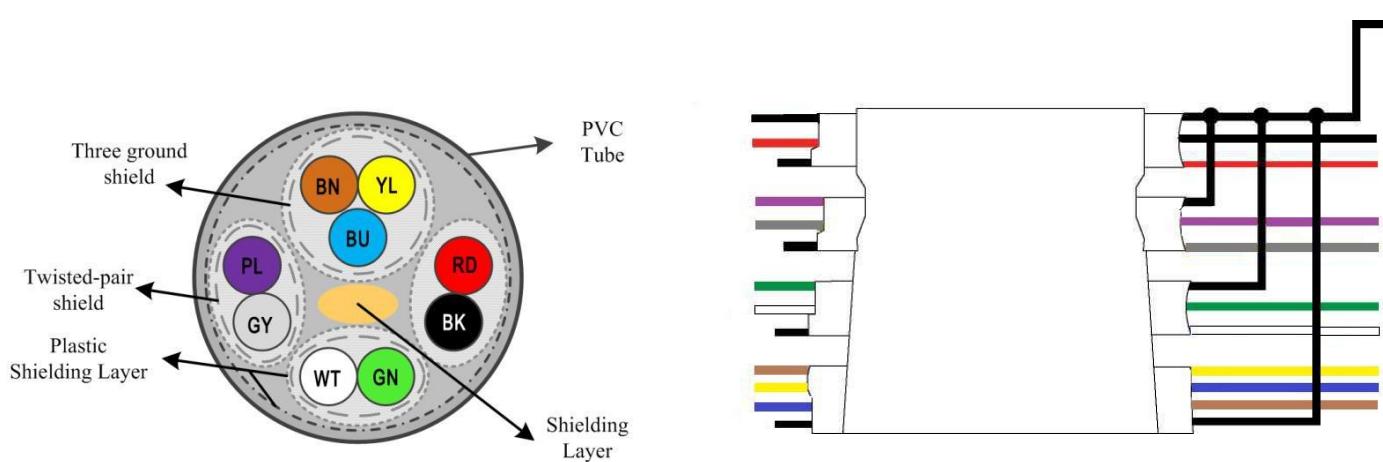
T1 transmitter terminal layout



T1 transmitter terminals

### **2. Cable wiring for Remote CMF meter**

- Only using Walsn dedicated 9-wire cable to connect flow sensor to transmitter
- Customer needs to do wiring job on site after sensor installation
- On site, wires connected to terminals of the remote junction box; meanwhile, on transmitter side, wires connected to the transmitter terminals
- Standard cable length is 10m, and the longest cable is less than 100m
- Walsn dedicated 9-wire cable illustrated below



Terminal layout of Remote junction box

Label	Definition	Description	Cable color
1	D+	Drive signal+	Red
2	D-	Drive signal-	Black
3	L+	Left pick up signal+	Purple
4	GND	Pick up signal ground	Grey+Green
5	R+	Right pick up signal+	White
6	TI	Temperature current	Brown
7	TEMP	Temperature pick up	Yellow
8	TGND	Temperature ground	Blue
Non		Shielding ground	Non

Terminals of Remote junction box

## GROUNDING

### 1. Grounding through sensor terminal

- If the process piping is grounded, the sensor can be grounded directly to the pipe system

### 2. Grounding through transmitter terminal

- If the pipeline is not conductive or otherwise ungrounded, the transmitter grounding terminal can be directly connected with the instrument protection grounding point

## SPECIFICATION

<b>Accuracy</b>	Liquid: ±0.10%, ±0.15%, ±0.20% Gas: ±0.35%
<b>Repeatability</b>	0.05%
<b>Line size</b>	DN5 to DN250
<b>Pressure rating</b>	4MPa, 10MPa
<b>Process connection</b>	304 stainless steel 316L stainless steel Hastelloy C22
<b>Flow tube</b>	316stainless steel Hastelloy C22
<b>Enclosure rating</b>	IP67
<b>Conduit connection</b>	M20×1.5, 1/2" NPT
<b>Process temperature</b>	-40 to +356°F (-40 to +180°C) with LCD display -40 to +662°F (-40 to +350°C) without LCD display
<b>Meter type</b>	Integral or remote For remote type, the standard cable length: 10m
<b>Signal output</b>	Frequency: 0 to 10KHz Analog: 4-20mA, Error: ≤ ±0.002mA Communication: HART or Modbus RTU over 485
<b>Approval and certification</b>	CSA, CE, PCEC

## APPROVAL and CERTIFICATION

### Profibus



### Certificate No.: Z02175

- Testing and certification of PROFIBUS and PROFINET products

CPA

Certificate No.: 2018F124-13

- Certificate of Approval of Measuring Instrument



SIL

Certificate No.: II170220 WE0Q16

- Functional safety verification



CSA



PCEC



Certificate No.: 21717186

- Safety Requirements for Electrical Equipment for Measurement

Certificate No.: CE16. 2171

- Conformity Certificate of Explosion Proof Ex d ib II C T6 G6

## ORDERING INFORMATION (1/4)

Code	Product Description	Notes
CMF	Mass flow meter	
Code	Tube	Notes
TS	T type tube	Upon on pressure loss requirements and
US	U type tube	process fluid
VS	V type tube	
CNG	Dedicated CNG sensor	
Code	Certification	Notes
S	No	Based on explosion-proof requirements
H	Yes	CSA / PCEC / ATEX / IEC
Code	Sensor Type and Cable Length	Notes

000	Integral type (I)	
005~100	Remote type (D) , Cable with 15ft to 300ft (5m to100m) Standard cable = 30 ft (10m) for remote type	
Code	Line Size	Notes
	3/16, 3/8, 1/2, 3/4, 1, 1-1/2, 2, 3, 4, 6, 8,10, 12, 14, 16 inch	
001~250		Upon on flow rate DN5, 10, 15, 20, 25, 40, 50, 80, 100, 150, 200, 250mm
Code	Accuracy	Notes
0	±0.2%	
1	±0.15%	
2	±0.1%	T2/T3 only
3	±0.35%G	Gas
4	±0.5%G	Gas
5	±0.25%G	Gas
Code	Material of Flow Tube	Notes
1	316L Stainless steel	
2	Titanium	
3	Hastelloy C22	Upon on process fluid
9	Customer specify	

## ORDERING INFORMATION (2/4)

Code	Pressure Rating of Flow Tube	Notes
L01	CLASS 150# (1.6MPa)	
L02	CLASS 300# (2.5MPa)	
L04	CLASS 300# (4.0MPa)	
M06	CLASS 400# (6.3MPa)	
M10	CLASS 600# (10MPa)	
H16	CLASS 900# (16MPa)	Based on process pressure
H25	CLASS 1500# (25MPa)	
H32	CLASS 2500# (32MPa)	
H40	CLASS 2500# (40MPa)	
X	Customer specify	
Code	Process Connection Material	Notes

1	304 stainless steel	
2	316L stainless steel	
3	Titanium	Upon on process fluid and customer's requirements, usually matching electrode material
4	Hastelloy C22	
9	Customer specify	

Code	Process Connection Standard	Notes
A0	ASME B16.5 (ANSI) Class 150	
A1	ASME B16.5 (ANSI) Class 300	
A2	ASME B16.5 (ANSI) Class 600	
A3	ASME B16.5 (ANSI) Class 900	
A4	ASME B16.5 (ANSI) Class 1500	Upon on process piping system
B0	JIS B2220 10K	
B1	JIS B2220 20K	
B2	JIS B2220 40K	
B3	JIS B2220 63K	
C0	GB/T 9115 PN 2.5 MPa	
C1	GB/T 9115 PN 4.0 MPa	
C2	GB/T 9115 PN 6.3 MPa	
C3	GB/T 9115 PN 10 MPa	
C4	GB/T 9115 PN 16 MPa	
C5	GB/T 9115 PN 1.6 MPa	

## ORDERING INFORMATION (3/4)

Code	Process Connection Standard	Notes
D0	EN 1092-1 (DIN) PN 16	
D1	EN 1092-1 (DIN) PN 25	
D2	EN 1092-1 (DIN) PN 40	
D3	EN 1092-1 (DIN) PN 63	
D4	EN 1092-1 (DIN) PN 100	
D5	EN 1092-1 (DIN) PN 160	
E0	HG/T 20592 PN 2.5 MPa	
E1	HG/T 20592 PN 4.0 MPa	
E2	HG/T 20592 PN 6.3 MPa	
E3	HG/T 20592 PN 10 MPa	

E4	HG/T 20592 PN 16 MPa
E5	HG/T 20592 PN 1.6 MPa
H0	HG/T 20615 Class 150
H1	HG/T 20615 Class 300
H2	HG/T 20615 Class 600
H3	HG/T 20615 Class 900
H4	HG/T 20615 Class 1500
F1	Sanitary fitting (compatible with Tri-Clamp)
F2	DIN 11851-SI(mm)
F3	DIN 11851-US (inch)
F4	DIN 11864-1 Form A (sanitary) connection
F5	DIN 11864-2 Form A flange plate with slotted connection
F6	SMS 1145 (sanitary) connection
G4	1/2" NPT-F
G5	3/4" NPT-F
G6	1/2" Flange
X0	Customer specify

## ORDERING INFORMATION (4/4)

Code	Process Temperature of Sensor	Notes
1	-58 to +356°F (-50 to +180°C)	
4	-58 to +266°F (-50 to +130°C)	
5	-58 to +482°F (-50 to +250°C)	
9	Customer specify	

Code	Enclosure Rating	Notes
1	IP65	
2	IP67	Based on application environment (such as indoor, outdoor, buried)
3	IP68	

Code	Power Supply	Notes
0	85VAC ~ 265VAC 50/60Hz	
1	24VDC	Upon on customer's requirements
2	Self-switching (22VDC/AC~245VDC/AC, 50/60Hz)	

Code	Output Display	Notes

0	Without display, without keypad	Upon on customer's requirements
1	With display, and keypad	
Code	Output Signal	Notes
0	Analog + Pulse/Frequency	
1	Analog+ Pulse/Frequency + HART	
2	Analog+ Pulse/Frequency + RS485	
3	Analog+ Pulse/Frequency+ Profibus	
Code	Batch Control	Notes
N	Without batch control	Upon on customer's requirements
Y	With batch control	
Code	Conduit Connection	Notes
N	1/2"NPT	
M	M20×1.5	
P	3/4"NPT	Upon on customer's requirements
X	Customer specify	
Code	QIG Language	Notes
E	English	Currently only English language is available for the international market
C	Chinese	
Code	Dedicated Option	Notes
N	Standard capacity	
H	High capacity	Must be verified
Code	Transmitter Version	Notes
T1	Transmitter, version 1.0	