

OUTLINE

The **MASSMAX[®]** 7400 Coriolis mass flowmeter series consists of a popular single straight tube with low pressure loss and self-cleaning property, and the newly developed high-performance MMC400 converter.

Innovative sensing technologies have eliminated restrictions on installation, achieving accurate flow measurement with simple mounting.

Titanium is used for the measuring tube (wetted parts) as standard. Hastelloy[®] C22, Stainless Steel, and tantalum are available on request. With 7 connection sizes from 6 mm to 80 mm, the **MASSMAX[®]** 7400 covers various applications from small flow to large flow.

FEATURES

- ❑ Completely straight single measuring tube
- ❑ Simple installation saves space and cost without any restrictions
- ❑ High accuracy: $\pm 0.1\%$ of reading (+zero stability)
- ❑ Excellent zero stability and high vibration resistance
- ❑ Secondary pressure container made of Stainless Steel
- ❑ Simultaneous measurement of mass flow rate (instantaneous and totalized), density, and temperature with one instrument
- ❑ Compact type and remote type available
- ❑ ATEX- and TIS-certified explosionproof
- ❑ Titanium is used for wetted parts as standard. Hastelloy[®] C22, Stainless Steel, and tantalum are also available, covering a wide variety of applications.
- ❑ CE marking

STANDARD SPECIFICATIONS

- Measuring principle : Coriolis force
- Meter size : 06, 10, 15, 25, 40, 50, 80 (mm) *
- Measuring range :

Meter size*	kg/h		kg/min	
	Max. flow rate	Min. flow rate	Max. flow rate	Min. flow rate
06	1,230	12	20.5	0.205
10	3,500	35	58.3	0.583
15	14,600	146	243.3	2.433
25	44,800	448	746.7	7.467
40	120,000	1,200	2,000	20
50	234,000	2,340	3,900	39
80	560,000	5,600	9,333	93.33

* Hastelloy[®] C22 is available for Sizes 10 to 80, tantalum for Sizes 10 to 50, and Stainless Steel for Sizes 06 to 50.

- Enclosure : IP66/67 (IEC 60529)
- Ambient temperature : -40 to $+60^{\circ}\text{C}$ (compact type)
 -40 to $+65^{\circ}\text{C}$ (remote type)
See [Explosionproof] for the ambient temperature range of Ex types.



Fluid specifications

- Fluid: Liquids
- Fluid temperature and pressure:

	Measuring tube	Temperature*1	Pressure*2
T	Titanium	-40 to $+150^{\circ}\text{C}$	-0.1 to 10 MPa
H	Hastelloy [®] C22	0 to $+100^{\circ}\text{C}$	-0.1 to 5 MPa
S	Stainless steel (S31803)	0 to $+100^{\circ}\text{C}$	-0.1 to 5 MPa
A	Tantalum	0 to $+100^{\circ}\text{C}$	-0.1 to 5 MPa

See [Pressure and temperature rating table] for details.

*1 See [Explosionproof] for the ambient temperature range of Ex types.

*2 Pressure in this table means the allowable pressure range of the measuring tube. Note that the maximum operating pressure of the process is within the allowable pressure of the flange rating or the sensor housing. See [Pressure and temperature rating table] for details.

- Density: 500 to 2000 kg/m³

Sensor

- Process connection:
Flange : JIS10K/20K or equivalent
ASME Class 150/300 or equivalent, etc.
Sanitary fitting: ISO 2852 ferrule, etc. (optional)
- Materials:
Wetted parts:

Material	T	H*	S*	A*
Measuring tube	Titanium (ASTM Grade 9)	Hastelloy [®] C22	Stainless Steel (UNS S31803) Equivalent to JIS SUS329 J3L	Tantalum
Raised face of flange	Titanium (ASTM Grade 2)	Hastelloy [®] C22	Stainless Steel (UNS S31803) Equivalent to JIS SUS329 J3L	Tantalum

*Optional

Non Wetted Part :

- Flanges ; Stainless Steel 316 / 316L dual certified
- Outer cylinder (Protective housing)
; Stainless Steel 304 / 304L dual certified
Stainless Steel 316 / 316 L dual certified *
- * Optional

- Outer cylinder (Protective housing) allowable pressure
: 10 MPa at 20°C as standard.
PED qualified version of 6.3 or 10 MPa at 20°C are available as an option. See "Pressure and temperature rating table" for details.

Converter

- Housing material : Aluminum alloy (SS316L is optional)
- Painting : Siloxane coating
- Color : Gray for converter housing, jade green for converter cover and terminal cover
- Power supply : 100 V to 230 V AC (85 V to 253 V AC)
Option: 24 V DC (11 to 31 V DC)
Voltages in parentheses indicate the acceptable voltage range.
- Supply frequency : 48 to 63 Hz
- Power consumption : AC: Approx. 22 VA, DC: Approx. 12 W
- Grounding : Grounding resistance must be less than 100Ω for Non-ex types, less than 10Ω for Ex types
- Cable entry : G1/2 female adapter × 2 or 1/2 NPT female adapter × 2 or M20 × 1.5 female × 2 or G1/2 flameproof gasket adapter × 2 (for TIIS-Ex)
Note: Up to 3 cable entries can be provided.

Indication and outputs

- Display : Blue dot matrix LCD with backlight
128 × 64 pixels (59 × 31 mm)
Each of 4 screens shows data in up to 3 lines. Data include instantaneous mass flow rate (bar graph indication available), totalized mass flow, instantaneous volume flow rate, totalized volume flow rate, density, temperature, and instantaneous flow rate trend graph (percentage indication). Setting parameters and self-diagnosis results are also displayed.
- Units of instantaneous mass flow rate : kg/h, kg/min, kg/sec, t/h, and others
Forward and reverse flow directions are indicated with "+" or "-".
- Units of totalized mass flow rate : kg, t, g, and others
Totalization of flow rates in forward and reverse directions is possible.
- Units of density : g/cm³, kg/m³, and others
- Units of temperature : °C, and others
- Current output : 4–20 mA (max. 22 mA)
*Preparing for HART communication
Internal power supply: Load resistance is less than 1000Ω.
External power supply: Voltage is less than 32 V DC.
Select from among instantaneous mass flow rate, density, and temperature.
- Pulse output : Open collector output
Load rating : 32 V DC
20 mA or less (100 Hz < f ≤ 10 kHz)
Residual voltage at close <1.5 V (load current ≤ 1 mA)
<2.5 V (load current ≤ 10 mA)
<5 V (load current ≤ 20 mA)
100 mA or less (f ≤ 100 Hz)
Residual voltage at close <0.2 V (load current ≤ 10 mA)
<2 V (load current ≤ 100 mA)
- Output frequency : Max. 10 kHz
- Pulse rate : 36 to 36,000,000 pulse/h (0.01 Hz to 10 kHz)
- Pulse width : Selectable from:
(1) Automatic: Pulse width which makes duty 50% at full scale frequency
(2) Fixed duty ratio: Always 1:1
(3) Arbitrary setting: 0.05 to 2000 ms

- Status output : Open collector output
Load rating : 32 V DC, 100 mA or less
Residual voltage at close <0.2 V (load current ≤ 10 mA)
<2 V (load current ≤ 100 mA)
- Contents : Selectable from:
(1) No status output (default setting)
(2) Flow direction identification
(3) Flow over-range
(4) Totalization preset
(5) Range identification (when double ranges are used)
(6) Errors and measurement alarms for flow rate, density, temperature, and others
- Control input
Input voltage : 8 to 32 V DC (ON)/2.5 V DC, 0.4 mA or less (OFF)
Max. current : 6.5 mA (input voltage ≤ 24 V DC)
Max. current : 8.2 mA (input voltage ≤ 32 V DC)
Control target : Selectable from:
(1) No control input (default setting)
(2) Hold output
(3) Lock output at 0%
(4) Reset totalization counter
(5) Reset errors
(6) Range identification (when double ranges are used)
(7) Others
- Combination of outputs
Standard : 4–20 mA output × 1, pulse output × 1, status output × 1, control input × 1 (total 4 points)
Option 1 : 4–20 mA output × 2, pulse output × 1 (total 3 points)
Option 2 : 4–20 mA output × 3, pulse output × 1 (total 4 points)
Option 3 : 4–20 mA output × 2, status output or pulse output (selectable) × 2 (total 4 points)
See "Converter code" on page 13 for details.
- Low cut-off:
Current output and pulse output (can be set separately for each indication)
Range: 0 to 20% F.S. (0.1% step)
Hysteresis: 0 to 5% F.S. (0.1% step)
- Time constant:
Current output and pulse output (can be set separately for each indication)
Range: 0.0 to 100.0 sec (0.1 sec step)

Standard functions

- User-defined measuring units : Units for mass, volume, and time can be defined (max. 7 letters).
- Bi-directional flow measurement : Flow rates in both directions can be measured. Flow direction is output as status output.
- Self-diagnosis : Error messages and status messages are displayed.
Function : CPU, memory, software, hardware, output connection
Status : Over-range, count-over, power failure
Application : Oscillating balance of measuring tube, vibration energy, other sensor circuit diagnosis
- Testing : Built-in simulator of current and pulse outputs
Allows for loop check without calibrator.
- Infrared touch sensor: Four touch sensors enable data to be set from outside without the need for opening the cover.
These serve as pushbuttons while the cover is opened.

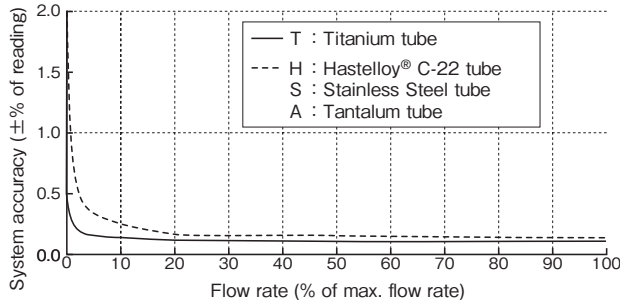
Accuracy (calibrated at the factory)

● Mass flow rate (pulse output)

Material symbol	T	H/S/A
Measuring tube	Titanium	Hastelloy® C22, Stainless Steel, tantalum
Accuracy	±0.1% of reading	
Zero stability	±0.004% of max. flow rate	±0.015% of max. flow rate

● Reference conditions: Water at 20°C, 0.1 MPa

System accuracy (accuracy + zero stability)



		System accuracy (±% of reading)	
Material symbol		T	H/S/A
Measuring tube		Titanium	Hastelloy® C22, Stainless Steel, tantalum
% of max. flow rate	100 %	0.104	0.115
	50 %	0.108	0.130
	20 %	0.12	0.175
	10 %	0.14	0.25
	5 %	0.18	0.4
	1 %	0.5	1.6

* Accuracy is not assured for flow rates less than 1% of max. flow rate.

Effects of changes in process conditions:

Fluid temperature

: ±0.002% of max. flow rate for each 1°C (titanium), and ±0.0075% of max. flow rate for each 1°C for other materials

Fluid pressure: ±0.015% of max. flow rate for each 0.1 MPa

These effects should be considered when process conditions change after zero adjustment.

● Density (indicated value)

Material symbol	T	H/S/A
Measuring tube	Titanium	Hastelloy® C22, Stainless Steel, tantalum
Meter size applicable to density measurement	15, 25, 40, 50, 80 *2	
Measuring range	500 to 2000 kg/m³	
Accuracy *1	±2kg/m³	
Accuracy (on-site calibration)	±0.5kg/m³	

*1 Calibration at the factory is optional.
*2 Tantalum is not available for Size 80.

● Temperature (indicated value)

Material symbol	T	H/S/A
Measuring tube	Titanium	Hastelloy® C22, Stainless Steel, tantalum
Measuring range	-40 to +150°C	0 to +100°C
Accuracy	±1°C	

Explosion Proof

● TIIS Technology Institute of Industrial Safety in Japan

(1) Compact type (Converter housing: Aluminium alloy)

Model: MMM7400C-JEx

a) Type of protection and class : Sensor Ex ia IIC T4
Converter Ex d [ia] IIC T4
Terminal box Ex d IIC T4

Ambient temperature : -20 to +50°C

Fluid temperature : -40 to +90°C

b) Type of protection and class : Sensor Ex ia IIC T3
Converter Ex d [ia] IIC T3
Terminal box Ex d IIC T3

Ambient temperature : -20 to +40°C

Fluid temperature : -40 to +150°C

(2) Remote type sensor

Model: MMS7000F-JEx

a) Type of protection and class : Ex ia IIC T4

Ambient temperature : -20 to +60°C

Fluid temperature : -40 to +90°C

b) Type of protection and class : Ex ia IIC T3

Ambient temperature : -20 to +50°C

Fluid temperature : -40 to +150°C

(3) Remote type converter (Converter housing: Aluminium alloy)

Model: MMC400F-JEx

Type of protection and class : Ex d [ia] IIC T6

Ambient temperature : -20 to +60°C

● ATEX

(1) Compact type (Converter housing: Aluminium alloy)

Model : MMM7400C-Ex

Type of protection and class : II 1/2(1)G Ex db ia [ia Ga] IIC T6...T1 Ga/Gb others

Temperature class	Fluid temperature	Max. surface temperature	Ambient temperature
T6-T1	-40°C to +65°C	80°C	-40°C to +40°C
T5-T1	-40°C to +80°C	95°C	
T4-T1	-40°C to +100°C	115°C	
T4-T1	-40°C to +115°C	130°C	
T3-T1	-40°C to +150°C	165°C	-40°C to +50°C
T4-T1	-40°C to +80°C	115°C	
T4-T1	-40°C to +115°C	130°C	
T3-T1	-40°C to +150°C	165°C	-40°C to +65°C
T4-T1	-40°C to +65°C	80°C	

(2) Remote type sensor

Model : MMS7000F-Ex

Type of protection and class: II 1 G Ex ia IIC T6...T1 Ga others

Temperature class	Fluid temperature	Max. surface temperature	Ambient temperature
T6-T1	-40°C to +65°C	80°C	-40°C to +40°C
T5-T1	-40°C to +80°C	95°C	
T4-T1	-40°C to +100°C	115°C	
T4-T1	-40°C to +115°C	130°C	
T3-T1	-40°C to +150°C	165°C	-40°C to +50°C
T5-T1	-40°C to +80°C	95°C	
T4-T1	-40°C to +100°C	115°C	
T4-T1	-40°C to +115°C	130°C	-40°C to +65°C
T3-T1	-40°C to +150°C	165°C	
T4-T1	-40°C to +100°C	115°C	
T3-T1	-40°C to +115°C	130°C	-40°C to +65°C
T3-T1	-40°C to +130°C	145°C	

(3) Remote type converter (Converter housing: Aluminium alloy)

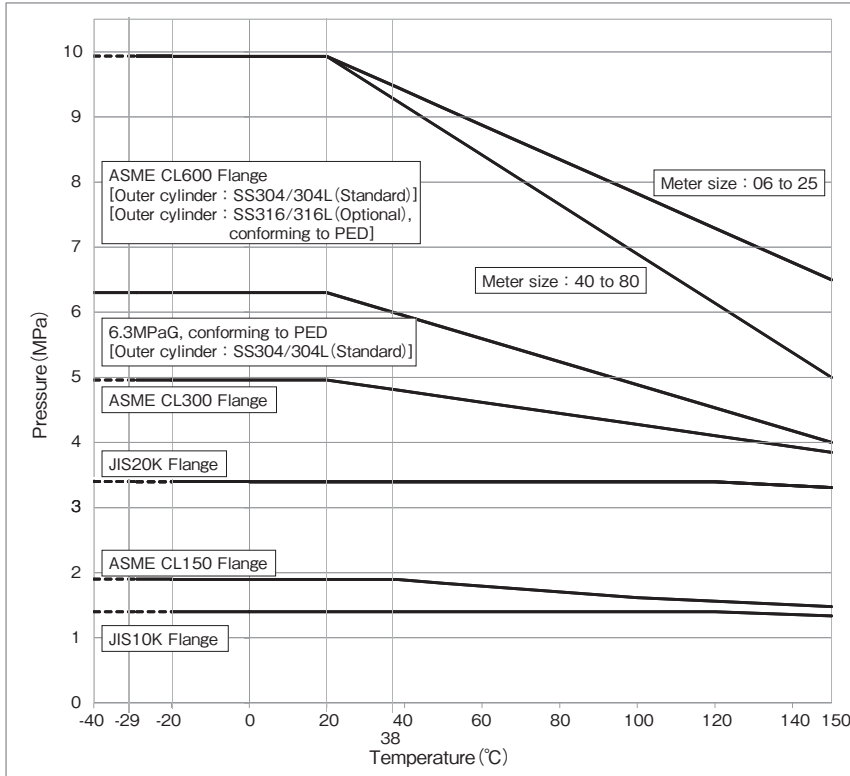
Model : MMC400F-Ex

Type of protection and class: II 2(1)G Ex db [ia Ga] IIC T6 Gb others

Ambient temperature : -40°C to +65°C

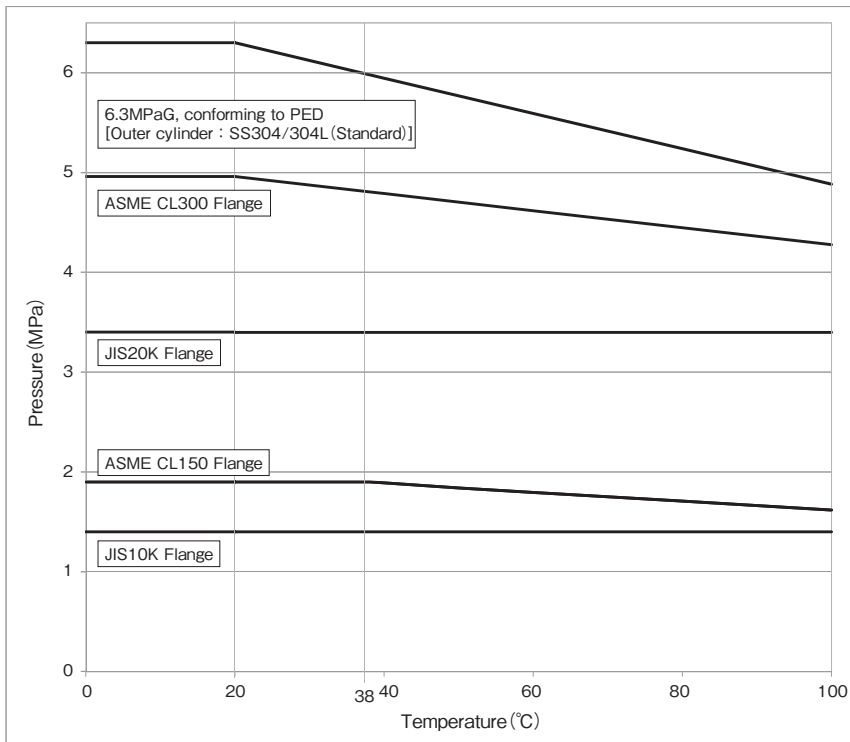
Pressure and temperature rating table

[The table below shows rating of the types with titanium measuring tube.]



Note: Consult TOKYO KEISO for other flange standards.

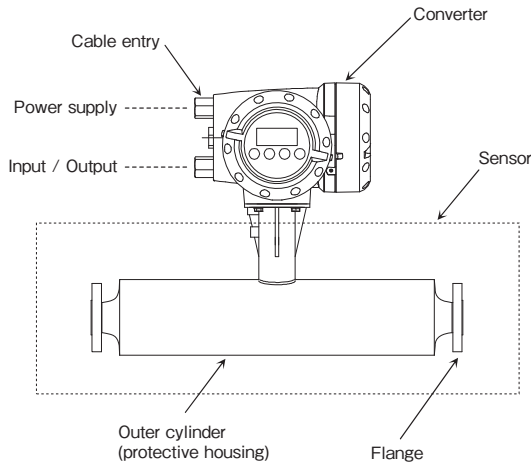
[The table below shows rating of the types with Hastelloy® C22, Stainless Steel, tantalum measuring tubes.]



Note: Consult TOKYO KEISO for other flange standards.

NAMES OF PARTS

[Compact type]



FLOW RANGE

Meter size	kg/h		kg/min	
	Max. flow rate	Min. flow rate	Max. flow rate	Min. flow rate
06	1,230	12	20.5	0.205
10	3,500	35	58.3	0.583
15	14,600	146	243.3	2.433
25	44,800	448	746.7	7.467
40	120,000	1,200	2,000	20
50	234,000	2,340	3,900	39
80	560,000	5,600	9,333	93.33

* Hastelloy® C22 is available for Sizes 10 to 80, tantalum for Sizes 10 to 50, and Stainless Steel for Sizes 06 to 50.

MEASURING TUBE DIMENSIONS

Meter size	Materials	Dimensions (mm)	
		Inside diameter	Wall thickness
06	T	5.53	0.41
	H	—	—
	S	5.53	0.41
10	T	8.56	0.60
	H	8.41	0.56
	S	8.40	0.56
15	T	14.8	0.60
	H/A	14.96	0.46
	S	14.96	0.46
25	T	23.98	0.71
	H/A	24.85	0.55/0.56
	S	24.85	0.55
40	T	36.28	0.91
	H/A	36.68	0.71
	S	36.68	0.71
50	T	48.32	1.24
	H/A	48.80	1.00
	S	48.26	1.00
80	T	68.80	2.10
	H	70.95	1.04
	S	—	—

T : Titanium
 H : Hastelloy® C22
 S : Stainless Steel
 A : Tantalum

PROCESS CONNECTION

● Flange connection

Meter size	Standard		Option
	Equiv. to JIS*1	Equiv. to ASME	Equiv. to JIS/ASME*2
06	10A 20K	1/2" class 150	15A 20K
10			1/2" class 300, 600
15	15A 20K	3/4" class 150	25A 20K 3/4" class 300, 600 1" class 150, 300, 600
25	25A 20K	1" class 150	40A 20K 1" class 300, 600 1-1/2" class 150, 300, 600
40	40A 20K	1-1/2" class 150	50A 10K 1-1/2" class 300, 600 2" class 150, 300, 600
50	50A 10K	2" class 150	80A 10K*3 2" class 300, 600 3" class 150, 300, 600*3
80	80A 10K	3" class 150	100A 10K*3 3" class 300, 600 4" class 150, 300, 600*3

*1 JIS20K flanges are provided for JIS 10A to 40A flanges as standard (dimensions of JIS20K flanges are equal to those of JIS10K except the flange thickness).

*2 ASME Class 600 flanges are provided only for material "T" (titanium).

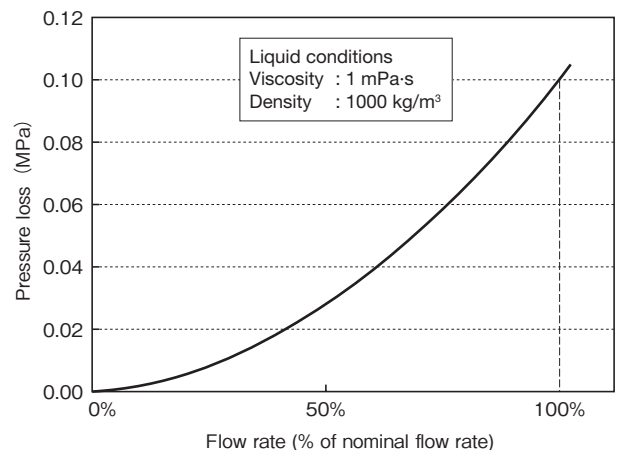
*3 For meter sizes of 50 and 80 mm, one rank larger flange connection is available only for titanium tubes.

● Sanitary fitting (optional)*4

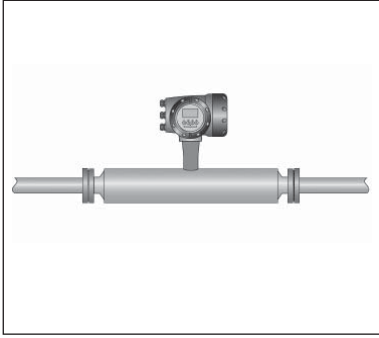
Meter size	Fitting
06	1/2" Tri-clamp
10	1/2" Tri-clamp
15	1" ISO 2852 ferrule (IDF-compliant) 1" Tri-clamp
25	1-1/2" ISO 2852 ferrule (IDF-compliant) 1-1/2" Tri-clamp
40	2" ISO 2852 ferrule (IDF-compliant) 2" Tri-clamp
50	3" ISO 2852 ferrule (IDF-compliant) 3" Tri-clamp
80	3" ISO 2852 ferrule (IDF-compliant) 3" Tri-clamp

*4 Sanitary fitting is provided only for material "T" (titanium) and material "S" (UNS S31803).

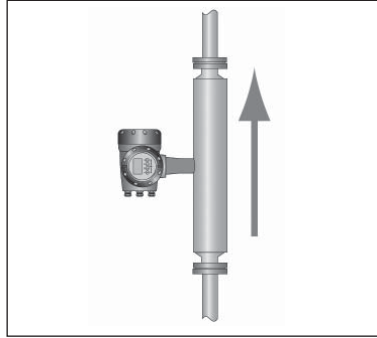
PRESSURE LOSS (TYPICAL VALUE)



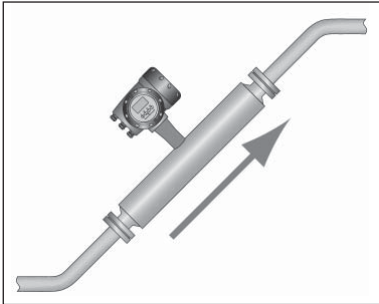
INSTALLATION NOTES



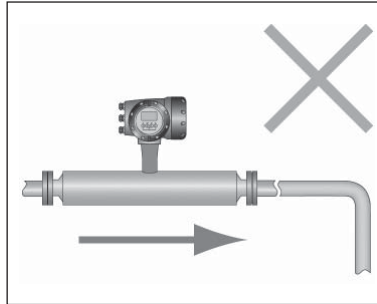
①When installing the flowmeter on the horizontal line, place the converter or the terminal box of remote type above the measuring tube.



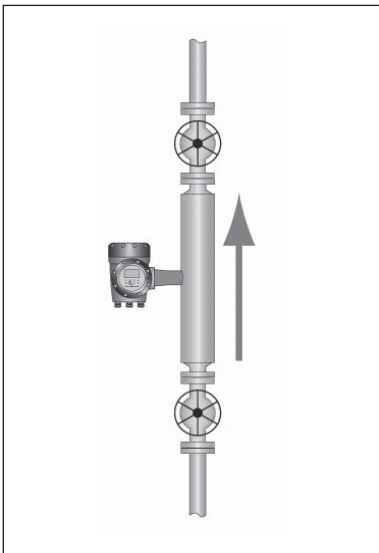
②When installing the flowmeter on the vertical line, install it in upward flow direction.



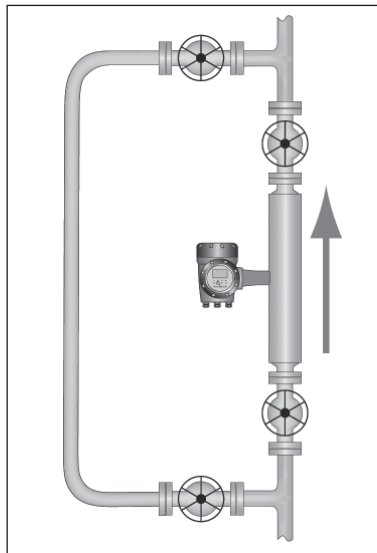
③When installing the flowmeter on the slant line with upward flow, place the converter or the terminal box of remote type above the measuring tube.



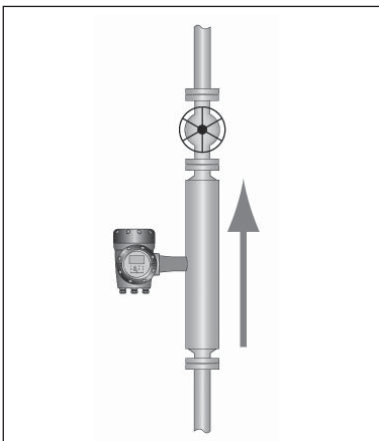
④When installing the flowmeter on the horizontal line, make the upstream and downstream pipings be filled with liquids. Do not bend these pipings downward at the vicinity of flowmeter. To avoid unnecessary accumulation of gasses, do not install the flowmeter on the upper part of associated pipings in such processes containing air or gas.



⑤When installing the flowmeter on the vertical line, provide with stop valves at both upstream and downstream to keep the flowmeter to be filled with liquids, which is necessary to perform zero adjustment.



⑥It is highly recommended to equip with bypass and stop valves for maintenance purpose.

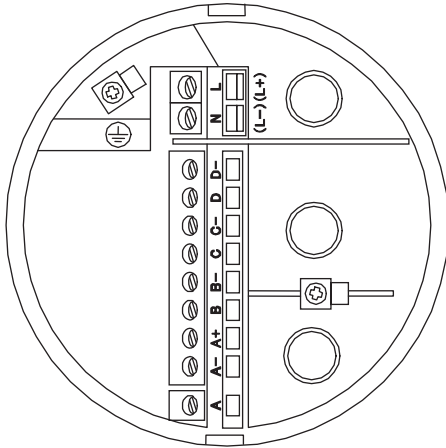


⑦Install a control valve downstream if required to avoid the cavitations caused by throttling of valve.

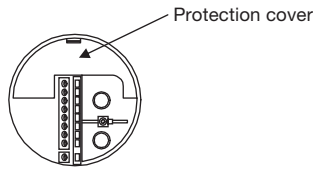
ELECTRICAL CONNECTION

I/O terminals of MMC400C/F converters

- Current output × 1, pulse output × 1, status output × 1, control input × 1 (as standard)



The power supply terminal block has a protection cover.



Terminals	Description
L/L+	L and N for AC power supply
N/L-	L+ and L- for DC power supply
⊕	Grounding

Terminals	Polarity	Description (Standard)
D-	-	Pulse or status output
D	+	
C-	-	Status output
C	+	
B-	-	Control input or status output
B	+	
A+	+	Current output (4–20 mA/internal power supply)
A-	-	
A	-	

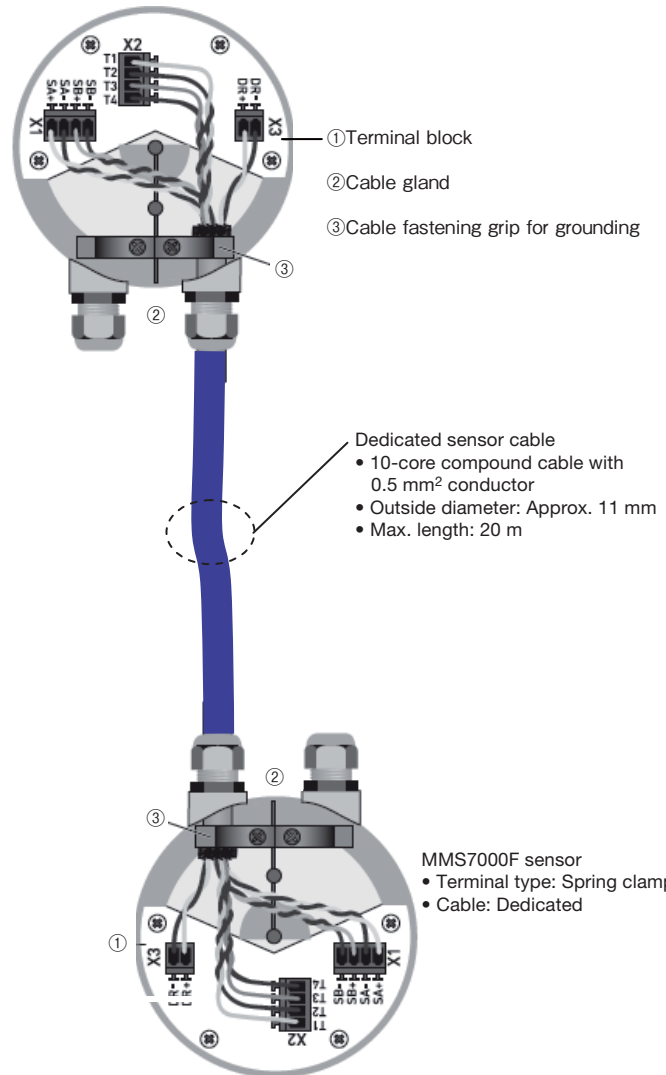
- Terminal type : Plug-in type screw terminal
- Wire cross section : 0.5 to 2.5 mm²
- Cable outside diameter : 7 to 12 mm

- Connection diagram for optional outputs (modular I/O print circuit)

Converter specifications		Option 1: Current output × 2, pulse or status output × 1 (6A8)	Option 2: Current output × 3, pulse or status output × 1 (6AA)	Option 3: Current output × 2, pulse or status output × 2 (6AE)
Terminal	D-	Pulse or status output	Pulse or status output	Pulse or status output 1
	D			
	C-	Current output No. 1 (internal power supply)	Current output No. 1 (internal power supply)	Current output No. 1 (internal power supply)
	C			
	B-	Current output No. 2 (internal power supply)	Current output No. 2 (internal power supply)	Pulse or status output No. 2
	B			
A+				
A-	Current output No. 2 (internal power supply)	Current output No. 3 (internal power supply)	Current output No. 2 (internal power supply)	
A	+			

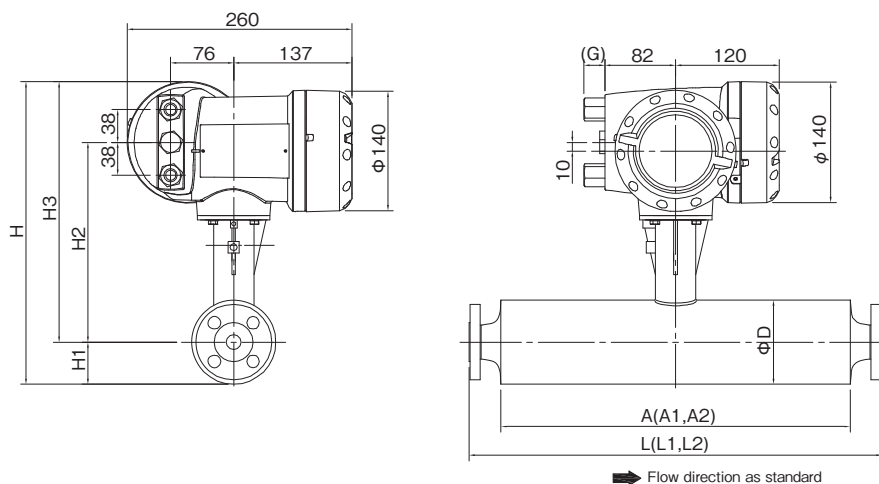
Cable for connecting the remote type MMS7000F sensor and MMC400F converter

- MMC400F converter
- Terminal type: Spring clamp
 - Cable: Dedicated



DIMENSIONS

- MMM7400C Compact type mass flowmeter with flange connection

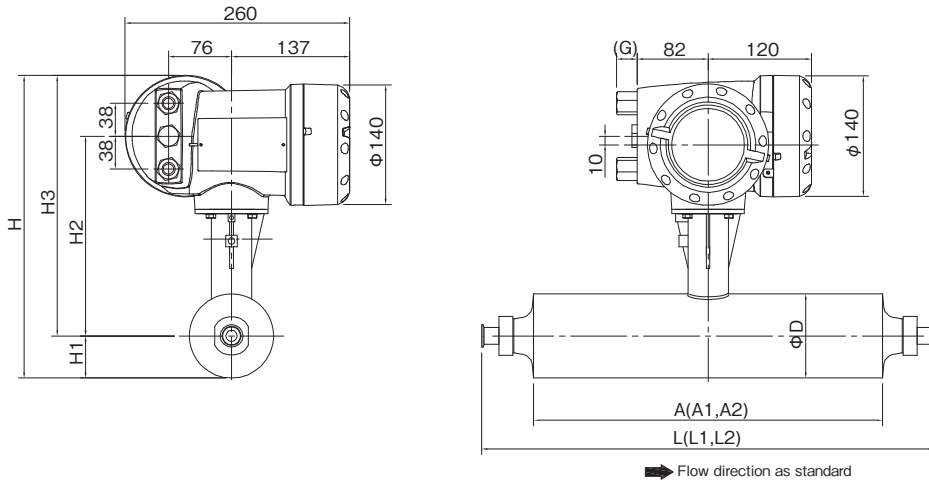


Meter size	Dimensions (mm)									Approx. mass (kg)
	L		A		H	H1	H2	H3	φD	
	L1	L2	A1	A2						
06	420	—	335	—	362	51	241	311	102	17.5
10	510	557	413	—	362	51	241	311	102	21.5
15	548	633	450	525	362	51	241	311	102	24.5
25	700	800	598	688	376	58	248	318	115	36.5
40	925	1075	796	936	430	85	275	345	170	81.5
50	1101	1281	948	1118	480	110	300	370	220	146.5
80	1460	—	1274	—	534	137	327	397	274	261.5

1. Face-to-face dimension (L) is for standard flanges. L1 and A1 are for titanium, Hastelloy® C22, and Stainless Steel while L2 and A2 are for tantalum.
2. H and H1 are the height from the bottom of the outer cylinder.
3. Length "G": 26 mm for G1/2 female adapter, 1/2 NPT female adapter and Water-Proof gland.
85 mm for TIIS explosionproof construction.

DIMENSIONS

- MMM7400C compact type mass flowmeter with sanitary connection



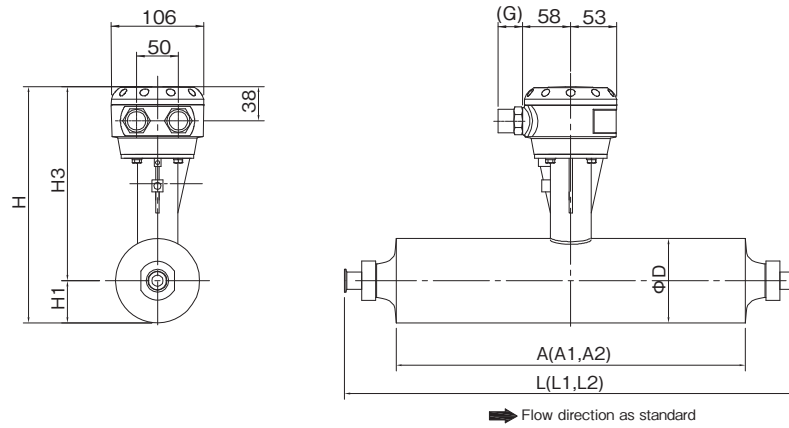
Meter size	Dimensions (mm)						Approx. mass (kg)
	A	H	H1	H2	H3	φD	
06	335	362	51	241	311	102	17.5
10	413	362	51	241	311	102	21.5
15	450	362	51	241	311	102	24.5
25	598	376	58	248	318	115	36.5
40	796	430	85	275	345	170	81.5
50	948	480	110	300	370	220	146.5
80	1274	534	137	327	397	274	261.5

- H and H1 are the height from the bottom of the outer cylinder.
- Length "G": 26 mm for G1/2 female adapter, 1/2 NPT female adapter and Water-Proof gland.
85 mm for TIIS explosionproof construction.

Meter size	Model	Connection standards and specifications	L (mm)
06	KR	1/2" Tri-clamp (welding type)	480
10	KR	1/2" Tri-clamp (welding type)	558
15	MS	1" Tri-clamp (adapter type)	665
	MU	1" ISO 2852 ferrule (adapter type, IDF-compliant)	665
25	NR	1-1/2" Tri-clamp (welding type)	816
	NS	1-1/2" Tri-clamp (adapter type)	855
	NT	1-1/2" ISO 2852 ferrule (welding type, IDF-compliant)	816
	NU	1-1/2" ISO 2852 ferrule (adapter type, IDF-compliant)	855
40	PR	2" Tri-clamp (welding type)	1043
	PS	2" Tri-clamp (adapter type)	1077
	PT	2" ISO 2852 ferrule (welding type, IDF-compliant)	1043
	PU	2" ISO 2852 ferrule (adapter type, IDF-compliant)	1077
50	RR	3" Tri-clamp (welding type)	1305
	RS	3" Tri-clamp (adapter type)	1355
	RT	3" ISO 2852 ferrule (welding type, IDF-compliant)	1305
	RU	3" ISO 2852 ferrule (adapter type, IDF-compliant)	1355
80	RR	3" Tri-clamp (welding type)	1527
	RT	3" ISO 2852 ferrule (welding type, IDF-compliant)	1527

Sanitary fitting is provided only for material "T" (titanium) and material "S" (UNS S31803).

- MMM7400C compact type mass flowmeter with sanitary connection



Meter size	Dimensions (mm)					Approx. mass (kg)
	A	H	H1	H3	φD	
06	335	282	51	231	102	15.5
10	413	282	51	231	102	19.5
15	450	282	51	231	102	22.5
25	598	295	58	237	115	34.5
40	796	350	85	265	170	79.5
50	948	400	110	290	220	144.5
80	1274	454	137	317	274	259.5

1. H and H1 are the height from the bottom of the outer cylinder.
2. Length "G": 26 mm for Water-Proof gland.

MODEL AND SPECIFICATION CODES

Measuring tube material: "T" (titanium) (as standard)

[Model Code]

Specifications	Compact type (Sensor +Converter)		Remote type	
			Sensor	Converter
General purpose (non explosionproof)	MMM7400C-T□□		MMS7000F-T□□	MMC400F
TIIS explosionproof	MMM7400C-JEx-T□□		MMS7000F-JEx-T□□	MMC400F-JEx
ATEX explosionproof	MMM7400C-Ex-T□□		MMS7000F-Ex-T□□	MMC400F-Ex

Note: TIIS explosionproof is certified by Technology Institute of Industrial Safety in Japan. □□: 06 to 80 are assigned as size codes.

(Sensor Code)

Sensor Spec. Code	VE	4	T	0	Description						Std.	
Sensor Code	VE				MMS 7000 Sensor (Single Straight Measuring Tube)						○	
Meter Size	11											○
	12											○
	13											○
	14											○
	15											○
	16											○
	17											○
(Fixed code)	4											○
Measuring Tube Material	T											○
Measuring Tube Surface Finish	0											○
	1											○
	2											○
Process Connection	TH											○
	UH											○
	VH											○
	WH											○
	XG											○
	XH											○
	YG											○
	YH											○
	ZG											○
	ZH											○
	KD											○
	KE											○
	KF											○
	LD											○
	LE											○
	LF											○
	MD											○
	ME											○
	MF											○
	ND											○
	NE											○
	NF											○
	PD											○
	PE											○
	PF											○
	RD											○
	RE											○
	RF											○
	SD											○
	SE											○
	SF											○
	KR											○
	LR											○
	MU											○
NR											○	
NS											○	
NT											○	
NU											○	
PR											○	
PS											○	
PT											○	
PU											○	
RR											○	
RS											○	
RT											○	
RU											○	
(Fixed code)	0											○
Outer cylinder *	G											○
	H											○
	O											○
	A											○
	B											○
Heating Jacket	0											○
	2											○
Explosionproof Approvals	0											○
	1											○
	9											○
Sanitary Approvals ※1 "Measuring tube surface finish Ra=0.8 μm" is mandatory	0											○
	2											○
Type	0											○
	1											○
	2											○
Calibration	0											○
	1											○
	A											○
	B											○
	D											○
Degreasing	0											○
	1											○
Special specifications	(Blank)											○
	/ Z											○

Note: Special requirements not included in the above coding system should be designated by adding "/Z" at the end of the code. Consult us for the availability of such requirements before ordering.

* Codes "G" and "H" are recommended for services in the food industry and waste water treatment, which do not require pressure resistance.

Codes "O", "A" and "B" comply with the EU pressure equipment directive (PED). These are recommended for services in the oil and chemical industries and high-pressure processes which require pressure resistance and higher safety.

[Converter Code]

Converter spec. code	VE	53	4					2	0	0	2				0	0		Description	Std.	
Converter code	VE	53																MMC400 converter	○	
(Fixed code)			4															Always 4	○	
Type			4															Compact type	○	
			H															Remote type		
Power supply			A															100 to 230 V AC	○	
			1															12 to 24 V DC		
Explosionproof Approval			0															Without	○	
			1															ATEX explosionproof		
			9															TIIS explosionproof		
Cable entries for input, output, and power supply			0															M20×1.5 female for ATEX explosionproof		
			4															1/2 NPT female adapter		
			5															G1/2 female adapter	○	
			6															Waterproof gland		
			9															G1/2 flameproof gasket adapter for TIIS explosionproof		
Language for indication			2															English	○	
(Fixed code)							0	0										Always 00	○	
Converter housing											1							Aluminum alloy	○	
											2							SS316L (compact type)		
											3							SS316L (remote type)		
(Fixed code)											2							Always 2	○	
Output											1	0	0					4-20 mA×1, pulse×1, status×1, control input×1	○	
											6	A	8					4-20mA×2, pulse or status×1 (selectable)		
											6	A	A					4-20 mA×3, pulse or status×1 (selectable)		
											6	A	E					4-20 mA×2, pulse or status×2 (selectable)		
Measurement																0		Mass flow rate, density, temperature as standard	○	
(Fixed code)																	0		Always 0	○
Sensor cable																	0		Without (compact type)	○
																	4		5 m cable (only for remote type)	
																	1		10 m cable (only for remote type)	
																	5		20 m cable (only for remote type)	
Special specifications																	(Blank)		Without	
																	/ Z		Special	

Note: Special requirements not included in the above coding system should be designated by adding "/Z" at the end of the code. Consult us for the availability of such requirements before ordering.

Measuring tube material: "H" (Hastelloy® C22) (optional)

[Model Code]

Specifications	Compact type (Sensor +Converter)	Remote type	
		Sensor	Converter
General purpose (non explosionproof)	MMM7400C-H□□	MMS7000F-H□□	MMC400F
TIIS explosionproof	MMM7400C-JEx-H□□	MMS7000F-JEx-H□□	MMC400F-JEx
ATEX explosionproof	MMM7400C-Ex-H□□	MMS7000F-Ex-H□□	MMC400F-Ex

Note: TIIS explosionproof is certified by Technology Institute of Industrial Safety in Japan.

□□: 10 to 80 are assigned as size codes.

[Sensor Code]

Sensor Spec. Code	VE	4	H	0	0	Description						Std.
Sensor Code	VE					MMS7000 Sensor (Single Straight Measuring Tube)						○
Meter Size	32					Meter size 10						○
	33					Meter size 15						○
	34					Meter size 25						○
	35					Meter size 40						○
	36					Meter size 50						○
	37					Meter size 80						○
(Fixed code)	4					Always 4						○
Measuring Tube Material	H					Hastelloy® C22						○
Measuring Tube Surface Finish	0					Standard						○
Process Connection	TH					10A JIS 20K Flanges						○
	UH					15A JIS 20K Flanges						▲
	VH					25A JIS 20K Flanges						▲
	WH					40A JIS 20K Flanges						▲
	XG					50A JIS 10K Flanges						▲
	XH					50A JIS 20K Flanges						▲
	YG					80A JIS 10K Flanges						○
	YH					80A JIS 20K Flanges						▲
	KD					1/2" ASME class 150 Flanges						△
	KE					1/2" ASME class 300 Flanges						▲
	LD					3/4" ASME class 150 Flanges						△
	LE					3/4" ASME class 300 Flanges						▲
	MD					1" ASME class 150 Flanges						▲
	ME					1" ASME class 300 Flanges						▲
	ND					1-1/2" ASME class 150 Flanges						▲
	NE					1-1/2" ASME class 300 Flanges						▲
	PD					2" ASME class 150 Flanges						▲
	PE					2" ASME class 300 Flanges						▲
RD					3" ASME class 150 Flanges						△	
RE					3" ASME class 300 Flanges						▲	
(Fixed code)	0					Always 0						○
Outer cylinder *	G					SS304/304L dual certified						○
	H					SS316/316L dual certified						○
	0					SS304/304L dual certified Allowable pressure: 6.3 MPa at 20°C, conforming to PED						○
	A					SS316/316L dual certified Allowable pressure: 6.3 MPa at 20°C, conforming to PED						○
Heating Jacket	0					Without						○
	2					Heating jacket with connection size 1/2NPT female						○
Explosionproof Approvals	0					Without						○
	1					ATEX						○
	9					TIIS						○
Sanitary Approvals	0				Without						○	
Type	0					Compact type						○
	1					Remote type with aluminum terminal box						○
	2					Remote type with Stainless Steel terminal box						○
Calibration	0					Standard 3-point flow calibration						○
	1					5-point flow calibration						○
	A					3-point flow calibration + density calibration (for Sizes 15 to 80)						○
	B					5-point flow calibration + density calibration (for Sizes 15 to 80)						○
Degreasing	0					Without						○
	1					Degreasing wetted parts						○
Special specifications	(Blank)					Without						○
	/Z					Special						○

Note: Special requirements not included in the above coding system should be designated by adding "/Z" at the end of the code. Consult us for the availability of such requirements before ordering.

* Codes "G" and "H" are recommended for services in the food industry and waste water treatment, which do not require pressure resistance.

Codes "0" and "A" comply with the EU pressure equipment directive (PED). These are recommended for services in the oil and chemical industries and high-pressure processes which require pressure resistance and higher safety.

[Converter Code]

See "Converter Code" on page 13.

Measuring tube material: "S" Stainless Steel (UNS S31803) (optional)

[Model Code]

Specifications	Compact type (Sensor +Converter)	Remote type	
		Sensor	Converter
General purpose (non explosionproof)	MMM7400C-S□□	MMS7000F-S□□	MMC400F
TIIS explosionproof	MMM7400C-JEx-S□□	MMS7000F-JEx-S□□	MMC400F-JEx
ATEX explosionproof	MMM7400C-Ex-S□□	MMS7000F-Ex-S□□	MMC400F-Ex

Note: TIIS explosionproof is certified by Technology Institute of Industrial Safety in Japan. □□: 06 to 50 are assigned as size codes.

[Sensor Code]

Sensor Spec. Code	VE	4	S	0	Description										Std.				
Sensor Code	VE																		
Meter Size	21																MMS7000 Sensor (Single Straight Measuring Tube)	○	
	22																Meter size 06	○	
	23																Meter size 10	○	
	24																Meter size 15	○	
	25																Meter size 25	○	
	26																Meter size 40	○	
																	Meter size 50	○	
(Fixed code)	4																Always 4	○ : Standard	
Measuring Tube Material		S															Stainless Steel UNS S31803	△ : Semi-standard	
Measuring Tube Surface Finish		0															Standard	▲ : Option	
		1															Polished Ra=0.5 μm (only for sanitary connection)		
		2															Polished Ra=0.8 μm (only for sanitary connection)	06 10 15 25 40 50	
Process Connection																	10A JIS 20K Flanges	○ ○ - - - ○	
																	15A JIS 20K Flanges	▲ ▲ ○ - - ○	
																	25A JIS 20K Flanges	- - ▲ ○ - - ○	
																	40A JIS 20K Flanges	- - - ▲ ○ - ○	
																	50A JIS 10K Flanges	- - - - ▲ ○ ○	
																	50A JIS 20K Flanges	- - - - ▲ ▲	
																	1/2" ASME class 150 Flanges	△ △ △ - - -	
																	1/2" ASME class 300 Flanges	▲ ▲ ▲ - - -	
																	3/4" ASME class 150 Flanges	- - △ - - -	
																	3/4" ASME class 300 Flanges	- - ▲ - - -	
																	1" ASME class 150 Flanges	- - ▲ △ - -	
																	1" ASME class 300 Flanges	- - ▲ ▲ - -	
																	1-1/2" ASME class 150 Flanges	- - - ▲ △ -	
																	1-1/2" ASME class 300 Flanges	- - - ▲ ▲ -	
																	2" ASME class 150 Flanges	- - - - ▲ △	
																	2" ASME class 300 Flanges	- - - - ▲ ▲	
																	1/2" Tri-clamp (welding type)	▲ ▲ - - - -	
																	3/4" Tri-clamp (welding type)	- - ▲ - - -	
																	1" ISO2852 Ferrule (adapter type)	- - ▲ - - -	
																	1-1/2" Tri-clamp (welding type)	- - - ▲ - -	
																	1-1/2" Tri-clamp (adapter type)	- - - ▲ - -	
																	1-1/2" ISO2852 Ferrule (welding type)	- - - ▲ - -	
																	1-1/2" ISO2852 Ferrule (adapter type)	- - - ▲ - -	
																	2" Tri-clamp (welding type)	- - - - ▲ -	
																	2" Tri-clamp (adapter type)	- - - - ▲ -	
																	2" ISO2852 Ferrule (welding type)	- - - - ▲ -	
																	2" ISO2852 Ferrule (adapter type)	- - - - ▲ -	
																	3" Tri-clamp (welding type)	- - - - ▲	
																	3" Tri-clamp (adapter type)	- - - - ▲	
																	3" ISO2852 Ferrule (welding type)	- - - - ▲	
																	3" ISO2852 Ferrule (adapter type)	- - - - ▲	
(Fixed code)		0															Always 0	○	
Outer cylinder *																	G	SS304/304L dual certified	○
																	H	SS316/316L dual certified	
																	O	SS304/304L dual certified Allowable pressure: 6.3 MPa at 20°C, conforming to PED	
																	A	SS316/316L dual certified Allowable pressure: 6.3 MPa at 20°C, conforming to PED	
Heating Jacket																	0	Without	○
																	2	Heating jacket with connection size 1/2NPT female (not available for Sizes 06 and 10)	
Explosionproof Approvals																	0	Without	○
																	1	ATEX	
																	9	TIIS	
Sanitary Approvals																	0	Without	○
																	1	EHEDG (European Hygienic Equipment Design Group) ※1	
																	2	3A (American Dairy Approval) ※1	
																	3	ASME Bioprocessing Equipment Standard ※2	
Type																	0	Compact type	○
																	1	Remote type with aluminum terminal box	
																	2	Remote type with Stainless Steel terminal box	
Calibration																	0	Standard 3-point flow calibration	○
																	1	5-point flow calibration	
																	A	3-point flow calibration + density calibration (for Sizes 15 to 50)	
																	B	5-point flow calibration + density calibration (for Sizes 15 to 50)	
																	D	5-point flow calibration + UKAS calibration (for Sizes 15 to 50)	
Degreasing																	0	Without	○
																	1	Degreasing wetted parts	
Special specifications																	(Blank)	Without	
																	/ Z	Special	

Note: Special requirements not included in the above coding system should be designated by adding "/Z" at the end of the code. Consult us for the availability of such requirements before ordering.

* Codes "G" and "H" are recommended for services in the food industry and waste water treatment, which do not require pressure resistance.
Codes "O" and "A" comply with the EU pressure equipment directive (PED). These are recommended for services in the oil and chemical industries and high-pressure processes which require pressure resistance and higher safety.

[Converter Code]

See "Converter Code" on page 13.

Measuring tube material: "A" (tantalum) (optional)

[Model Code]

Specifications	Compact type (Sensor +Converter)	Remote type	
		Sensor	Converter
General purpose (non explosionproof)	MMM7400C-A□□	MMS7000F-A□□	MMC400F
TIIS explosionproof	MMM7400C-JEx-A□□	MMS7000F-JEx-A□□	MMC400F-JEx
ATEX explosionproof	MMM7400C-Ex-A□□	MMS7000F-Ex-A□□	MMC400F-Ex

Note: TIIS explosionproof is certified by Technology Institute of Industrial Safety in Japan. □□: 10 to 50 are assigned as size codes.

[Sensor Code]

Sensor Spec. Code	VE	4	A		0						Description	Std.
Sensor Code	VE										MMS7000 Sensor (Single Straight Measuring Tube)	○
Meter Size	32										Meter size 10	○
	33										Meter size 15	○
	34										Meter size 25	○
	35										Meter size 40	○
	36										Meter size 50	○
(Fixed code)	4										Always 4	○
Measuring Tube Material		A									Tantalum	○
Measuring Tube Surface Finish		0									Standard	○
Process Connection			TH								10A JIS 20K Flanges	○
			UH								15A JIS 20K Flanges	▲
			VH								25A JIS 20K Flanges	○
			WH								40A JIS 20K Flanges	○
			XG								50A JIS 10K Flanges	○
			KD								1/2" ASME class 150 Flanges	△
			KE								1/2" ASME class 300 Flanges	▲
			LD								3/4" ASME class 150 Flanges	△
			LE								3/4" ASME class 300 Flanges	▲
			MD								1" ASME class 150 Flanges	△
			ME								1" ASME class 300 Flanges	▲
			ND								1-1/2" ASME class 150 Flanges	△
			NE								1-1/2" ASME class 300 Flanges	▲
			PD								2" ASME class 150 Flanges	△
			PE								2" ASME class 300 Flanges	▲
(Fixed code)		0									Always 0	○
Outer cylinder *			H								SS316/316L dual certified	○
			A								SS316/316L dual certified Allowable pressure: 6.3 MPa at 20°C, conforming to PED	○
Heating Jacket					0						Without	○
						2					Heating jacket with connection size 1/2NPT female (not available for Size 10)	○
Explosionproof Approvals					0						Without	○
						1					ATEX	○
						9					TIIS	○
Sanitary Approvals					0						Without	○
Type					0						Compact type	○
						1					Remote type with aluminum terminal box	○
						2					Remote type with Stainless Steel terminal box	○
Calibration					0						Standard 3-point flow calibration	○
						1					5-point flow calibration	○
						A					3-point flow calibration + density calibration (for Sizes 15 to 50)	○
						B					5-point flow calibration + density calibration (for Sizes 15 to 50)	○
Degreasing						0					Without	○
						1					Degreasing wetted parts	○
Special specifications								(Blank)			Without	○
								/Z			Special	○

Note: Special requirements not included in the above coding system should be designated by adding "/Z" at the end of the code. Consult us for the availability of such requirements before ordering.

* Code "H" is recommended for services in the food industry and waste water treatment, which do not require pressure resistance.

Code "A" complies with the EU pressure equipment directive (PED). This is recommended for services in the oil and chemical industries and high-pressure processes which require pressure resistance and higher safety.

[Converter Code]

See "Converter Code" on page 13.

STANDARD ACCESSORIES

- Data sheet for setting : 1 set
- Instruction manual : 1 set

OPTIONS

- Waterproof cable gland for G1/2 cable connection (code: WG)
- Number of cable entries for external connection: 3 (code: 3G)
- U bolt for 2" pipe installation (code: PM)

* Specification is subject to change without notice.



Head Office : Shiba Toho Building, 1-7-24 Shibakoen, Minato-ku, Tokyo 105-8558
 Tel : +81-3-3431-1625 (KEY) ; Fax : +81-3-3433-4922
 e-mail : overseas.sales@tokyokeiso.co.jp ; URL : http://www.tokyokeiso.co.jp