

# GENERAL GUIDANCE

6th Edition

Flowmeters  
and  
Levelmeters

Level Measurement  
Instruments

Flow Measurement  
Instruments

Related  
Instruments

# Contents

## FLOW MEASUREMENT AND CONTROL INSTRUMENTS

<b>Metal Tube Variable Area Flowmeter</b> .....	2	<b>Thermal Flowmeter</b> .....	14
Metal Tube Variable Area Flowmeter .....	2	TH series .....	14
Compact Type Metal Tube Variable Area Flowmeter (250 mm unified installation length) .....	2	SRT series .....	14
Metal Tube Variable Area Flowmeter for Micro Flow Measurement .....	3	<b>Thermal Mass Flowmeter</b> .....	15
<b>Direct Reading Type Flowmeter</b> .....	4	<b>Thermal Mass Flow Controller</b> .....	16
Glass Tube Variable Area Flowmeter .....	4	<b>Constant Flow Valve</b> .....	16
Resin Tube Variable Area Flowmeter .....	4	<b>Pitot Tube Flowmeter, Calorie Monitor (for Air conditioning application)</b> .....	17
<b>Sanitary Flowmeter</b> .....	5	<b>Flapper-type Flowmeter</b> .....	17
Metal Tube Variable Area Flowmeter for Sanitary Application .....	5	<b>Sight Glass</b> .....	17
Glass Tube Variable Area Flowmeter for Sanitary Application .....	5	<b>MAGMAX<sup>®</sup> Electromagnetic Flowmeter</b> .....	18
Electromagnetic Flowmeter for Sanitary Application .....	5	Compact Type Electromagnetic Flowmeter .....	18
<b>Purgemeter</b> .....	6	Battery-powered Electromagnetic Watermeter .....	18
<b>Flow Switch / Flow Monitor</b> .....	7	Separate Type Detector .....	19
<b>Flow Switch (for process use)</b> .....	7	Separate Type Converter .....	19
<b>Purge Set</b> .....	8	<b>SWIRLMAX<sup>®</sup> Vortex Flowmeter</b> .....	19
<b>Differential Pressure Flowmeter</b> .....	9	<b>MASSMAX<sup>®</sup> Coriolis Mass Flowmeter</b> .....	20
ORIFLOMETER <sup>®</sup> .....	9	<b>Flowmeter for Filling Machines</b> .....	20
V-Cone <sup>®</sup> Flowmeter .....	9	Coriolis Mass Flowmeter .....	20
Wafer-Cone <sup>®</sup> Flowmeter .....	9	Electromagnetic Flowmeter .....	20
<b>Ultrasonic Flowmeter (for built-in use)</b> .....	10	<b>Flow Measurement System for Automobile Bench Test</b> .....	21
Detector (Sensor) .....	10	Blow-by Gas Flowmeter .....	21
Converter .....	10	CNG Flow Measurement System .....	21
Integrated Type .....	10	Radiator Air Flow Measurement System .....	22
<b>Flow Controller (for built-in use)</b> .....	11	Flowmeter for Engine Cooling Water .....	22
All-in-one type .....	11	Flowmeter for Intake Air .....	22
Control Valve .....	11	<b>Custom-made Product</b> .....	23
Controller .....	11	Metal Tube Variable Area Flowmeter .....	23
<b>Ultrasonic Flowmeter (for process use)</b> .....	12	Metal Tube Variable Area Flowmeter for Micro Flow Measurement .....	24
Clamp-on Type .....	12	Metal Tube Variable Area Flowmeter for Sanitary Applications .....	24
Portable Clamp-on Type .....	12	Metal Tube Variable Area Flowmeter for Slurry Applications .....	24
<b>SONICMAX<sup>®</sup> 3-Beam In-line Type</b> .....	12	Glass Tube Variable Area Flowmeter .....	24
<b>Vortex Flow Sensor</b> .....	13	Purgemeter .....	24
<b>Turbine Flowmeter</b> .....	13	Flow Switch/Flow Monitor .....	24
Axial-flow Flowmeter .....	13	<b>Nominal flow rate of variable area flowmeters</b> .....	25
Mini-wheel / Mag-wheel / Manifold Mini-wheel Flowmeter .....	13		

## LEVEL MEASUREMENT AND CONTROL INSTRUMENTS

<b>Float Type Level Meter</b> .....	27	Capacitance Type Level Switch .....	31
Float & Tape Type Level Meter (Tank Gauge) .....	27	Relay Driver .....	31
Analog Transmitter .....	27	<b>Peripheral Instruments for Tank Gauging System</b> .....	32
Digital Transmitter .....	27	Receiver for Digital Tank Gauging System .....	32
Magnet Float Type Level Transmitter .....	28	Tank-side Indicator .....	32
Magnetostrictive Level Transmitter .....	28	Temperature Sensor for Tanks .....	32
MAG GAUGE Metal Tube Type Level Meter .....	28	<b>MICROCELL Weight Measurement System</b> .....	33
<b>Displacer Type Level Meter</b> .....	29	<b>Oil Leak Detector</b> .....	33
Servo-balancing Type Tank Gauge .....	29	<b>Level Gauge for LNG Tanks</b> .....	33
Torque Tube Type Level Meter .....	29	Servo-balancing Type Tank Gauge .....	33
Spring-balancing Type Level Meter .....	29	Density Meter .....	33
<b>Microwave Level Meter</b> .....	29	<b>Marine Use Tank Gauging Systems</b> .....	34
<b>Micropulse Level Meter</b> .....	30	Magnetic Float Type Level Gauge .....	34
<b>Ultrasonic Level Meter</b> .....	30	Radar Level Gauge .....	34
<b>Purge Type Level Meter</b> .....	30	High-level Alarming Device .....	34
<b>Level Switch</b> .....	31	Instrument for Control Rooms .....	35
Float Type / Displacer Type Level Switch .....	31		

## RELATED INSTRUMENTS

<b>Level Transmitter</b> .....	37	<b>Receiver</b> .....	37
<b>Differential Pressure / Pressure Transmitter</b> .....	37		


# FLOW MEASUREMENT AND CONTROL INSTRUMENTS

A wide variety of instruments are available for various flow measurement applications.


The following symbols are applicable to flow measurement and control instruments.


## Applicable fluids

 : For liquid measurement     : For gas measurement

 : For steam measurement

## Explosion-proof

 : Flameproof types available

 : Intrinsically safe types available

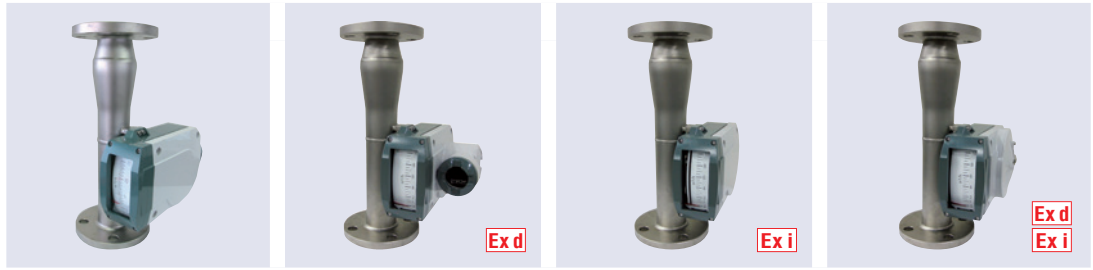
Contact us for instruments for certified high-pressure gas equipment.

# Metal Tube Variable Area Flowmeter

## Metal Tube Variable Area Flowmeter



### AM7000 series



Model	AM7000/L	AM7000/T	AM7000/R/N/M	AM7000/E/H/P
Fluid	Liquid, Gas, Steam			
Function	·Local indication	·Local indication ·Current output ·Local totalizer ·Pulse output ·Alarm output	·Local indication ·Alarm output ·R: Reed switch N: Proximity switch M: Micro switch	·Local indication ·E: Current output H: Current output + HART communication P: PROFIBUS PA
Measuring range (water)	Min. Max.	0.01 to 0.1 m <sup>3</sup> /h 15 to 150 m <sup>3</sup> /h		
Measuring range (air)	Min. Max.	0.3 to 3 m <sup>3</sup> /h (nor) 450 to 4500 m <sup>3</sup> /h (nor)		
Process connection	Flange: 15 mm to 150 mm (1/2" to 6")			
Standard material	SUS304, SUS316, SUS316L			
Available lining material	Rubber, Fluorocarbon resin, PVC, Glass			

## Compact Type Metal Tube Variable Area Flowmeter (250 mm unified installation length)

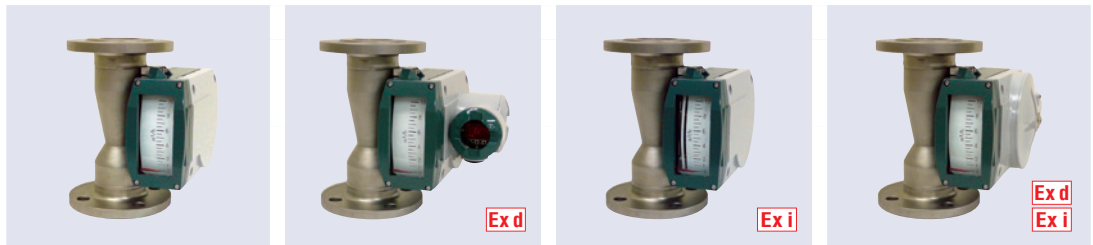


### NLZ series



Model	NLZ1000	NLZ2000
Fluid	Liquid, Gas, Steam	
Function	·Local indication ·Current output ·Alarm output ·HART communication ·FOUNDATION Fieldbus	
Measuring range (water)	Min. Max.	0.04 to 0.4 m <sup>3</sup> /h 10 to 100 m <sup>3</sup> /h
Measuring range (air)	Min. Max.	1.2 to 12 m <sup>3</sup> /h (nor) 60 to 600 m <sup>3</sup> /h (nor)
Process connection	Flange: 15 mm to 100 mm (1/2" to 4") for Liquid 15 mm to 80 mm (1/2" to 3") for Gas	
Standard material	316L SS, PTFE Lining	
Installation length	250 mm	

### AM9000 series



Model	AM9000/L	AM9000/T	AM9000/R/N/M	AM9000/E/H/P
Fluid	Liquid, Gas, Steam			
Function	·Local indication	·Local indication ·Current output ·Local totalizer ·Pulse output ·Alarm output	·Local indication ·Alarm output ·R: Reed switch N: Proximity switch M: Micro switch	·Local indication ·E: Current output H: Current output + HART communication P: PROFIBUS PA
Measuring range (water)	Min. Max.	3.5 to 35 L/h 20 to 200 m <sup>3</sup> /h		
Measuring range (air)	Min. Max.	0.1 to 1 m <sup>3</sup> /h (nor) 177 to 1770 m <sup>3</sup> /h (nor)		
Process connection	Flange: 15 mm to 150 mm (1/2" to 6") for Liquid 15 mm to 100 mm (1/2" to 4") for Gas			
Standard material	SCS16 / 316SS			
Installation length	250 mm (300 mm for connection size 125 mm (5") and 150 mm (6"))			

Metal Tube Variable Area Flowmeter for Micro Flow Measurement



AM3000/M-900 series



Model	<b>AM3000/E</b>		<b>AM3000/H</b>		<b>M-900</b>	<b>M-950</b>
Fluid	Liquid, Gas					
Function	·Local indication ·Current output		·Local indication ·Current output ·HART communication		·Local indication	·Local indication ·Alarm output (Reed switch)
Measuring range (water)	Min.	0.4 to 2 L/h				
	Max.	60 to 600 L/h				
Measuring range (air)	Min.	12 to 60 L/h (nor)				
	Max.	1700 to 17000 L/h (nor)				
Process connection	·Rc 1/4 to 3/4    ·Flange: 10 mm (3/8") to 25 mm (1")					
Standard material	SUS304, SUS316, SUS316L					
Option material	Titanium, MA276					

MA-900 series



Model	<b>MA-900</b>		<b>MA-950</b>		<b>MA-920</b>		
Fluid	Liquid, Gas						
Function	·Local indication		·Local indication ·Alarm output (Hall IC)		·Local indication (Digital display) ·Current output		
Measuring range (water)	Min.	0.1 to 0.5 L/h				0.6 to 3 L/h	
	Max.	60 to 600L/h				60 to 600 L/h	
Measuring range (air)	Min.	3 to 15 L/h (nor)				10 to 100 L/h (nor)	
	Max.	2.2 to 22 m <sup>3</sup> /h (nor)				2.2 to 22 m <sup>3</sup> /h (nor)	
Process connection	·Rc 1/4 to 3/4    ·Flange: 10 mm (3/8") to 25 mm (1")						
Standard material	SUS304, SUS316						

## Direct Reading Type Flowmeter

### Glass Tube Variable Area Flowmeter



#### R series



Model	R-101-E	R-751-E	R-101	R-751-R / R-751
Fluid	Liquid, Gas	Liquid	Liquid, Gas	
Function	·Local indication	·Local indication ·Alarm output (reed switch)	·Local indication	·Local indication ·Alarm output (reed switch)
Measuring range (water)	Min.	0.3 to 3 m <sup>3</sup> /h	0.9 to 9 L/h	7 to 70 L/h
	Max.	10 to 100 m <sup>3</sup> /h	5.2 to 52 m <sup>3</sup> /h	5 to 50 m <sup>3</sup> /h
Measuring range (air)	Min.	0.45 to 4.5 m <sup>3</sup> /h (nor)	15 to 150 L/h (nor)	0.3 to 3 m <sup>3</sup> /h (nor)
	Max.	110 to 1100 m <sup>3</sup> /h (nor)	100 to 1000 m <sup>3</sup> /h (nor)	16 to 160 m <sup>3</sup> /h (nor)
Process connection	Flange: 15 mm to 100 mm (1/2" to 4")	Flange: 25 mm to 100 mm (1" to 4")	Flange: 10 mm to 100 mm (3/8" to 4") for Liquid 10 mm to 50 mm (3/8" to 2") for Gas	
Standard material	SS400, SUS304, PVC, HT-PVC		FC200, SUS304, SUS316, SUS316L, PVC (10 mm to 20 mm)	

### Resin Tube Variable Area Flowmeter



#### AC/AC-T series

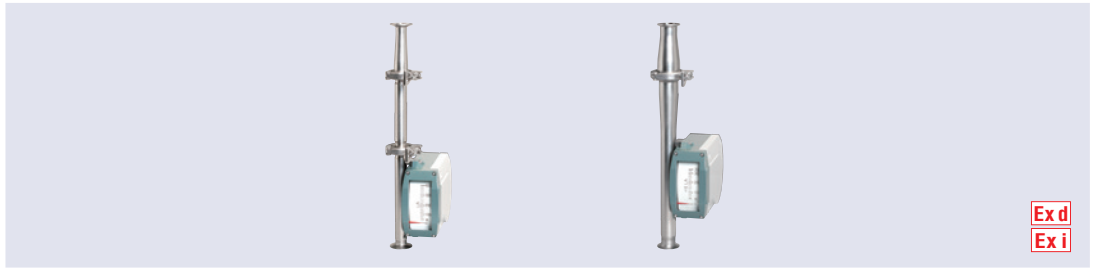


Model	AC (Small size)		AC (Medium size)		AC-T
Fluid	Liquid		Liquid		Liquid
Function	·Local indication	·Local indication ·Alarm output (Reed switch)	·Local indication	·Local indication ·Alarm output (Reed switch)	·Local indication
Measuring range (water)	Min.	0.1 to 1 L/min	0.4 to 4 m <sup>3</sup> /h		2 to 20 L/min
	Max.	10 to 100 L/min	2 to 20 m <sup>3</sup> /h		5 to 50 L/min
Process connection	·Rc ·TS socket ·Flange: 15 mm to 25 mm (1/2" to 1")		·Rc ·TS socket ·Flange: 40 mm, 50 mm (1-1/2", 2")		Rc 1/2, 3/4
Standard material	Body: PVC / Tapered tube: Acrylic resin				PVDF/PFA



Metal Tube Variable Area Flowmeter for Sanitary Application

AM7000/SR series



Ex d  
Ex i

Model	AM7000/SR	AM7000/T/SR	AM7000/R/N/M/SR	AM7000/E/H/P/SR
Fluid	Liquid			
Function	·Local indication	·Local indication ·Current output ·Local totalizer ·Pulse output ·Alarm output	·Local indication ·Alarm output ·R: Reed switch N: Proximity switch M: Micro switch	·Local indication ·E: Current output ·H: Current output + HART communication P: PROFIBUS PA
Measuring range (water)	Min.	0.01 to 0.1 m <sup>3</sup> /h		
	Max.	7 to 70 m <sup>3</sup> /h		
Process connection	1S to 4.5S			
Standard material	SUS304, SUS316, SUS316L			

Glass Tube Variable Area Flowmeter for Sanitary Application

R-101-SR series



Model	R-101-SR	R-101-SRE
Fluid	Liquid	
Function	·Local indication	
Measuring range (water)	Min.	0.025 to 0.25 m <sup>3</sup> /h
	Max.	760 to 7600 L/h
Process connection	1S to 2.5S	1S to 3S
Standard material	SUS304	
Optional material	SUS316, SUS316L	

Electromagnetic Flowmeter for Sanitary Application

MAGMAX®  
6000 series



Model	EGM6300C	
Fluid	Liquid	
Function	·Local indication ·Current output ·Local totalizer ·Pulse output	
Measuring range (water)	Min.	0 to 0.6 m <sup>3</sup> /h
	Max.	0 to 300 m <sup>3</sup> /h
Process connection	1S to 4S	
Standard material	PFA / Hastelloy® C	
Certification	EHEDG / 3A	

**P series**



Model	P-100		P-200		P-400		P-510		P-530		
Fluid	Liquid, Gas										
Function	·Local indication ·Alarm output		·Local indication ·Alarm output		·Local indication		·Local indication ·Alarm output		·Local indication ·Alarm output		
Measuring range (water)	Min.	5 to 50 mL/min						0.1 to 1 L/min		0.2 to 2 L/min	
	Max.	0.2 to 2 L/min						3 to 30 L/min		1 to 10 L/min	
Measuring range (air)	Min.	0.5 to 5 mL/min (nor)		5 to 50 mL/min (nor)		80 to 800 mL/min (nor)		2.5 to 25 L/min (nor)		10 to 50 L/min (nor)	
	Max.	5 to 50 L/min (nor)		6 to 60 L/min (nor)		6 to 60 L/min (nor)		60 to 600 L/min (nor)		50 to 250 L/min (nor)	
Process connection	Rc 1/8, Rc 1/4				Rc 1/4		Rc 3/8				
Standard material	SUS304/SUS316				SUS304/SUS316		SCS14/SUS304		SCS14/SUS304		
Installation length	115 mm		200 mm		200 mm		200 mm		150 mm		
Alarm	·UL-approved reed switch ·Optical alarm unit				-		·UL-approved reed switch ·Optical alarm unit		·UL-approved reed switch		

**P series**



Model	P-810		P-820		P-830		P-900		P-850		
Fluid	Gas, Liquid (equivalent to water)				Liquid (equivalent to water)		Gas, Liquid (equivalent to water)		Liquid, Gas		
Function	·Local indication ·Alarm output		·Local indication ·Alarm output		·Local indication ·Alarm output		·Local indication		·Local indication		
Measuring range (water)	Min.	5 to 50 mL/min		5 to 50 mL/min		0.1 to 1 L/min		5 to 50 mL/min		5 to 50 mL/min	
	Max.	0.2 to 2 L/min		0.2 to 2 L/min		1.5 to 7 L/min		0.25 to 2.5 L/min		0.1 to 1 L/min	
Measuring range (air)	Min.	5 to 50 mL/min (nor)		0.5 to 5 mL/min (nor)		-		80 to 800 mL/min (nor)		20 to 200 mL/min (nor)	
	Max.	6 to 60 L/min (nor)		6 to 60 L/min (nor)		-		6 to 60 L/min (nor)		2 to 20 L/min (nor)	
Process connection	Rc 1/4, 1/4" SW, 1/4" VCR				Rc 3/8, 3/8" SW		Rc 1/4, 1/4NPT		Rc 1/8		
Standard material	SCS14/SUS316		SCS14/SUS316		SCS14/SUS304		SUS304		SCS14/SUS304		
Installation length	224 mm		115 · 224 mm		76 mm		114 · 224 mm		80 mm		
Alarm	·Optical alarm unit		·UL-approved reed switch ·Optical alarm unit		·UL-approved reed switch		-		-		

**P series  
(for micro flow rates)**



Model	P-880	
Fluid	Gas	
Function	·Local indication	
Measuring range (water)	Min.	-
	Max.	-
Measuring range (air)	Min.	0.15 to 1.5 mL/min (nor)
	Max.	6 to 60 L/min (nor)
Process connection	Rc 1/4, 1/4" SW, 1/4" VCR	
Standard material	SCS14/SUS316	
Installation length	115-130-145 mm	
Alarm	-	



**P series (Resin)**



Model	P-060		P-620		XP	
Fluid	Liquid, Gas		Liquid		Liquid, Gas	
Function	·Local indication ·Alarm output		·Local indication ·Alarm output		·Local indication ·Alarm output	
Measuring range (water)	Min.	10 to 100 mL/min	0.1 to 1 L/min		0.02 to 0.1 L/min	
	Max.	1 to 10 L/min	1 to 10 L/min		0.2 to 1 L/min	
Measuring range (air)	Min.	0.2 to 2 L/min (nor)	-		0.1 to 1 L/min (nor)	
	Max.	30 to 300 L/min (nor)	-		2 to 20 L/min (nor)	
Process connection	Rc 1/8 to Rc 3/8		Rc 3/8, 3/8" SW, 3/8NPT		Rc 1/4	
Standard material	Acryl resin		Acryl resin		Polyacetal	
Installation length	84 mm		76 mm		80 mm	
Alarm	·UL-approved reed switch		·UL-approved reed switch		·Optical alarm unit	

**P-700 series (Fluorocarbon resin)**

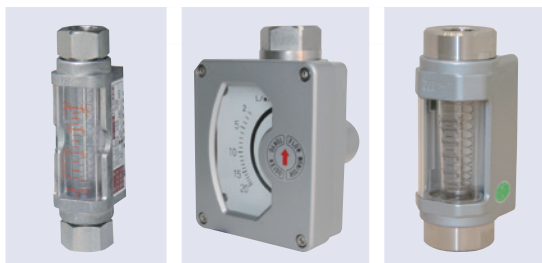


Model	P-771		P-772		P-773		P-710	
Fluid	Liquid		Liquid		Liquid		Liquid, Gas	
Function	·Local indication ·Alarm output		·Local indication ·Alarm output		·Local indication ·Alarm output		·Local indication ·Alarm output	
Measuring range (water)	Min.	3 to 15 mL/min	0.06 to 0.6 L/min		0.1 to 1 L/min		3 to 30 mL/min	
	Max.	0.2 to 2 L/min	4.5 to 45 L/min		1 to 10 L/min		0.4 to 2 L/min	
Measuring range (air)	Min.	-	-		-		50 to 500 mL/min (nor)	
	Max.	-	-		-		2 to 20 L/min (nor)	
Process connection	Rc 1/8, Tube end		Rc, NPT (1/2 · 3/4), Tube end		Rc, NPT (1/4 · 3/8), Tube end		Rc 1/8, Fitting	
Standard material	PFA		PFA		PFA		ETFE	
Installation length	80 mm		150 mm		115 mm		79 mm	
Alarm	·Optical alarm unit		·UL-approved reed switch ·Optical alarm unit		·UL-approved reed switch ·Optical alarm unit		·Optical alarm unit	

Note: Depending on specifications, Model P-772-U (with a valve) falls in "Valves or components thereof" listed in (ii) -7 of row 3 of Appended Table 1 of the Export Trade Control Order. Consult us for details.

**Flow Switch / Flow Monitor**

**FA series**



Model	FA-3000		FA4000		FA-6000	
Fluid	Liquid (equivalent to water)					
Function	·Local indication ·Alarm output		·Local indication ·Alarm output		·Local indication ·Alarm output	
Measuring range (water)	Min.	0.3 to 3 L/min	0.1 to 1 L/min		3 to 30 L/min	
	Max.	5 to 50 L/min	13 to 130 L/min		10 to 100 L/min	
Process connection	Rc 3/8 to Rc 1		Rc 1/2 to Rc 1-1/2		Rc 1/2 to Rc 1	
Standard material	Body	Acryl resin	SUS316		Acryl resin	
	Tapered tube	SUS304	SCS14		SCS14	
Fluid temperature	0 to 60°C		0 to 100°C		0 to 60°C	

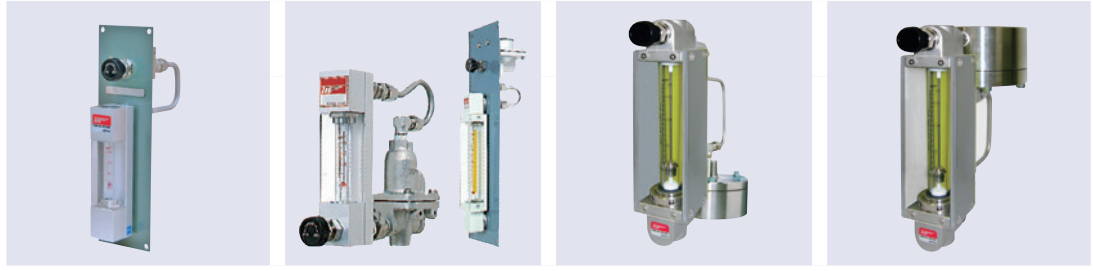
**Flow Switch (for process use)**

**F-740 series**



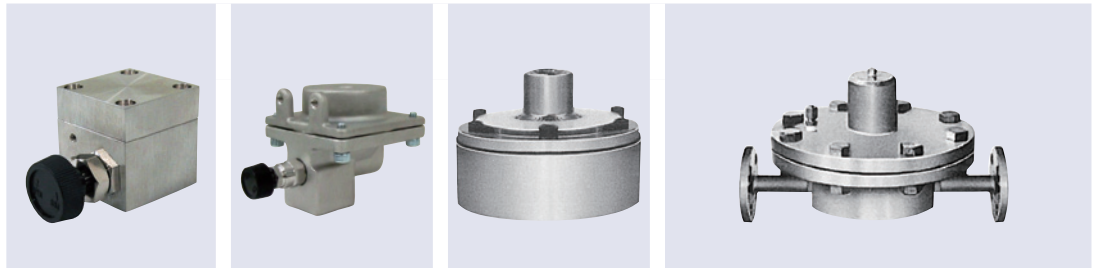
Model	F-740	
Fluid	Liquid (Viscosity: up to 5 mPa · s)	
Function	·Alarm output	
Alarm setting range (water)	Min.	Low alarm 0.1 to 2 m³/h High alarm 0.13 to 2 m³/h
	Max.	Low alarm 5 to 70 m³/h High alarm 6.5 to 70 m³/h
Process connection	Flange 15 mm to 150 mm	
Standard material	FC200, SCS14	

**CP series  
Purege Set**



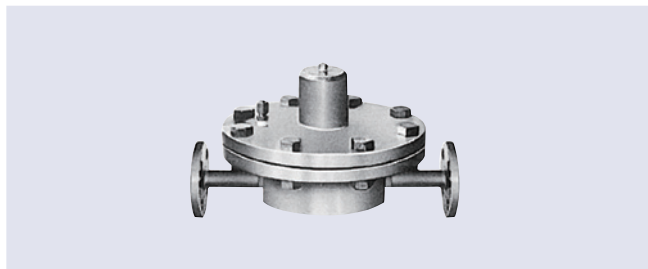
Model	Primary press. control	<b>CP-11-100, 200, 400</b>	<b>CP-21-100, 200, 400</b>	<b>CP-31-500</b>	<b>CP-41-500</b>
	Secondary press. control	<b>CP-12-100, 200, 400</b>	<b>CP-22-100, 200, 400</b>	<b>CP-32-500</b>	<b>CP-42-500</b>
Fluid		Gas		Liquid, Gas	
Flow control range (water)	Min.	-	5 to 50 mL/min	0.2 to 2 L/min	0.5 to 5 L/min
	Max.	-	0.2 to 2 L/min	0.5 to 5 L/min	1 to 10 L/min
Flow control range (air)	Min.	10 to 100 mL/min (nor)	0.1 to 1 L/min (nor)	5 to 50 L/min (nor)	15 to 150 L/min (nor)
	Max.	0.3 to 3 L/min (nor)	5 to 50 L/min (nor)	15 to 150 L/min (nor)	30 to 300 L/min (nor)
Process connection		Rc 1/8	Rc 1/4	Rc 3/8	Rc 1/2
Standard material		SUS304			
Controllable DP range		C-11: 0.03 to 0.3 MPa C-12: 0.05 to 0.3 MPa	0.06 to 0.4 MPa	0.1 to 0.5 MPa	0.1 to 0.6 MPa

**C series  
Constant flow valve**



Model	Primary press. control	<b>C-11</b>	<b>C-21</b>	<b>C-31</b>	<b>C-41</b>	<b>C-51</b>
	Secondary press. control	<b>C-12</b>	<b>C-22</b>	<b>C-32</b>	<b>C-42</b>	<b>C-52</b>
Fluid		Gas		Liquid, Gas		
Flow control range (water)	Min.	-	0.9 to 9 L/h	12 to 120 L/h	30 to 300 L/h	70 to 700 L/h
	Max.	-	12 to 120 L/h	30 to 300 L/h	70 to 700 L/h	120 to 1200 L/h
Flow control range (air)	Min.	10 to 100 mL/min (nor)	0.015 to 0.15 m <sup>3</sup> /h (nor)	0.36 to 3.6 m <sup>3</sup> /h (nor)	0.9 to 9 m <sup>3</sup> /h (nor)	2.1 to 21 m <sup>3</sup> /h (nor)
	Max.	0.3 to 3 L/min (nor)	0.36 to 3.6 m <sup>3</sup> /h (nor)	0.9 to 9 m <sup>3</sup> /h (nor)	2.1 to 21 m <sup>3</sup> /h (nor)	3.6 to 36 m <sup>3</sup> /h (nor)
Process connection		Rc 1/8	Rc 1/4	·Rc 3/8 ·Flange 15 mm (1/2")	·Rc 1/2 ·Flange 15 mm (1/2")	Flange 20 mm (3/4")
Standard material		SUS304	SCS14	SUS304		
Controllable DP range		0.03 to 0.3 MPa	0.06 to 0.4 MPa	0.1 to 0.5 MPa	0.1 to 0.6 MPa	

**C series  
Constant flow valve**



Model	Primary press. control	<b>C-61</b>	<b>C-71</b>	<b>C-81</b>
	Secondary press. control	<b>C-62</b>	<b>C-72</b>	<b>C-82</b>
Fluid		Liquid, Gas		
Flow control range (water)	Min.	120 to 1200 L/h	180 to 1800 L/h	300 to 3000 L/h
	Max.	180 to 1800 L/h	300 to 3000 L/h	1000 to 10000 L/h
Flow control range (air)	Min.	3.6 to 36 m <sup>3</sup> /h (nor)	5.4 to 54 m <sup>3</sup> /h (nor)	9 to 90 m <sup>3</sup> /h (nor)
	Max.	5.4 to 54 m <sup>3</sup> /h (nor)	9 to 90 m <sup>3</sup> /h (nor)	23 to 230 m <sup>3</sup> /h (nor)
Process connection		Flange 20 mm (3/4")	Flange 25 mm (1")	Flange 50 mm (2")
Standard material		SUS304		
Controllable DP range		0.1 to 0.6 MPa		

**CR/CAM series  
Purege Set**



# Differential Pressure Flowmeter

## ORIFLOMETER®



### O/HDT series

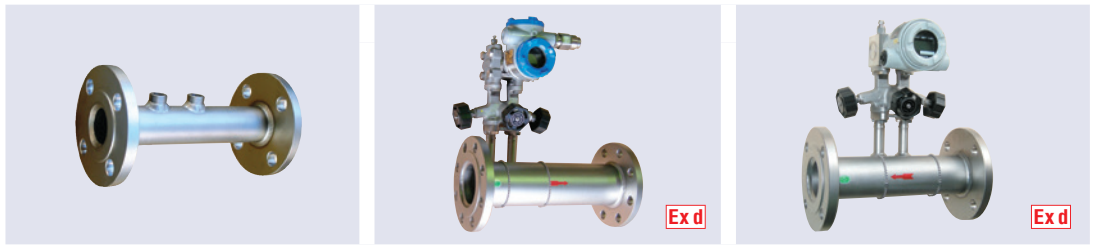


Model	O-180	O-680	O-780	HDT1000	O-100	O7000
Fluid	Liquid (Viscosity: up to 3 mPa·s), Gas				Liquid, Gas	
Function	·Local indication	·Local indication ·Alarm output (Optical alarm unit)	·Local indication ·Alarm output (Reed switch)	·Local indication ·Alarm output ·Current output ·Pulse output ·Battery-powered	·Local indication ·Alarm output	·Local indication ·Alarm output ·Current output ·Pulse output
Standard DP (Liquid)	15 kPa		20 kPa	–	30 kPa	40 kPa
Measuring range (water)	Min.	0.03 to 0.15 m³/h		0.23 to 2.3 m³/h	5 to 25 m³/h	0.8 to 3 m³/h
	Max.	300 to 1500 m³/h		106 to 1060 m³/h	400 to 2000 m³/h	500 to 2000 m³/h
Standard DP (Gas)	5 kPa		20 kPa	–	10 kPa	40 kPa
Measuring range (air)	Min.	0.46 to 2.3 m³/h (nor)		0.34 to 3.4 m³/h (nor)	6.8 to 34 m³/h (nor)	20 to 80 m³/h (nor)
	Max.	4600 to 23000 m³/h (nor)		9000 (13500) to 45000 m³/h (nor)	1720 to 17200 m³/h (nor)	6600 to 33000 m³/h (nor)
Process connection	·Rc 3/8 to Rc 4 ·Flange / Wafer 10 mm to 500 mm (3/8" to 20")			·Rc 1/2 to Rc 4 ·Flange / Wafer 15 mm to 300 mm (1/2" to 12")	D-D/2 tap: 100 mm to 500 mm (4" to 20") Corner tap, Fflange tap: 50 mm to 500 mm (2" to 20") Vena contracta tap: 200 mm to 500 mm (8" to 20")	
Standard material	Measuring pipe	SGP, SUS304, SUS316, PVC, HT-PVC		SUS304	SS400, SUS304, SUS316	
	Indicator	SCS14, PVC, HT-PVC				

## V-Cone® Flowmeter



### V series

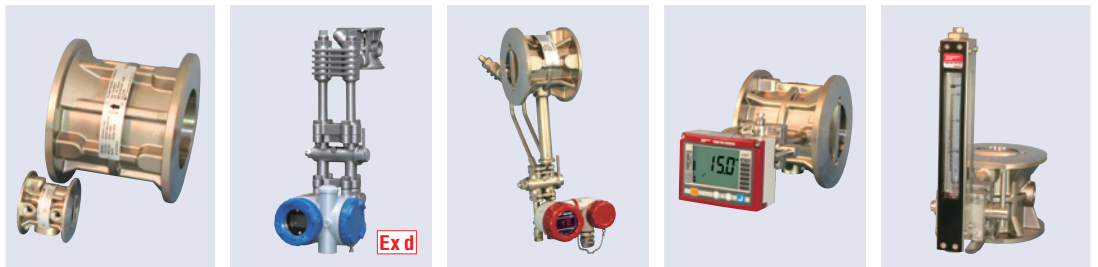


Model	VC	VD	VM
Fluid		·Steam, Liquid, Gas	·Gas, Saturated steam
Function	Differential pressure port: Rc 1/2 or Rc 1/4	·Local indication ·Current output	·Local indication ·Current output ·Mass flow
Measuring range (water)	Min.	0.4 to 3.47 m³/h	–
	Max.	112 to 1245 m³/h	–
Measuring range (air)	Min.	–	7 to 71 m³/h (nor)
	Max.	–	300 to 32859 m³/h (nor)
Measuring range (Saturated steam)	Min.	–	6 to 65 kg/h
	Max.	–	2600 to 28315 kg/h
Process connection	Flange 15 mm to 400 mm (1/2" to 16")	Flange 15 mm to 300 mm (1/2" to 12")	
Standard material	SUS304		

## Wafer-Cone® Flowmeter



### V series Wafer type



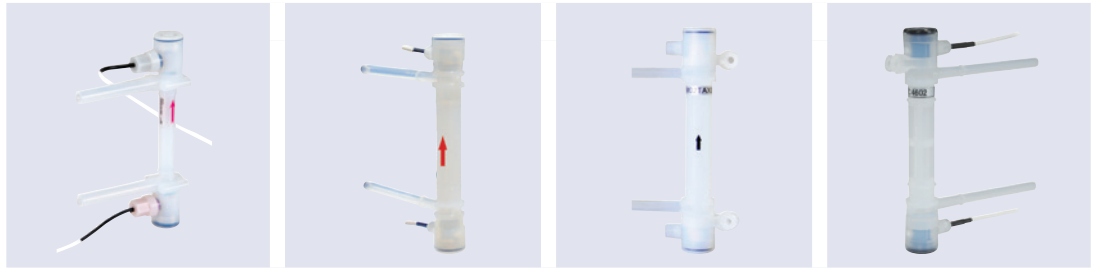
Model	VH	VT	VNT	VDT	VTW
Fluid		Liquid, Gas, Saturated steam		Liquid, Gas	Liquid
Function	Differential pressure port: Rc 1/4 or Rc 1/8	·Local indication ·Current output	·Local indication ·Totalizer ·Current output ·Pulse output	·Local indication ·Current output ·Battery-powered	·Local indication
Measuring range (water)	Min.	0.4 to 5.5 m³/h			0.26 to 1.3 m³/h
	Max.	9 to 119.73 m³/h			18 to 90 m³/h
Measuring range (air)	Min.	6 to 77 m³/h (nor)			–
	Max.	120 to 1587 m³/h (nor)		750 to 7500 m³/h (nor)	–
Measuring range (Saturated steam)	Min.	8 to 103 kg/h		–	–
	Max.	170 to 2421 kg/h		–	–
Process connection	Wafer: 25 mm to 100 mm (1" to 4")				
Standard material	SCS14A				

## Ultrasonic Flowmeter (for built-in use)

### Detector (Sensor)



#### UCUF® series



Model	UCUF-E		UCUF-M		UCUF-02M		UCUF-04MT		
Fluid	Liquid								
Measuring range (water)	Min.	0 to 50 mL/min				0 to 10 mL/min		-	
	Max.	0 to 8 L/min		0 to 80 L/min		0 to 100 mL/min		0 to 2 L/min	
Process connection	Tube end: 3/8"		Tube end: 1/4" to 1"		Tube end: 1/4" to 1"				
Standard material	PFA								

\*Max. fluid temperature for UCUF-04MT is 180°C.

### Converter

#### SFC series

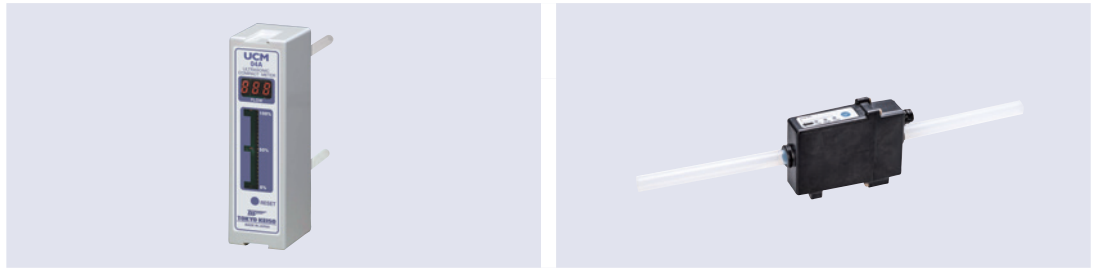


Model	SFC4000	SFC2000	SFC3000	SFC-900	SFC-010L	SFC-010T	SFC-011J	
Power supply	24 V DC							
Output	Flow rate	-4 to 20 mA DC -0 to 10 mA DC		4 to 20 mA DC		-4 to 20 mA DC -0 to 20 mA DC	-4 to 20 mA DC -1 to 5 V DC	4 to 20 mA DC
	Pulse	Open collector: 0 to 1000 Hz max.						
	Alarm	2 points	-	2 points		-		
Communication	RS485 (Protocol: MODBUS)							
Applicable Detector (Sensor)	UCUF-K, UCUF-M, UCUF-E	UCUF-K, UCUF-M	UCUF-K, UCUF-M, UCUF-E	UCUF-K, UCUF-M	UCUF-02M	UCUF-04MT	UCUF-M	

### Integrated Type



#### UCM®/UCF series

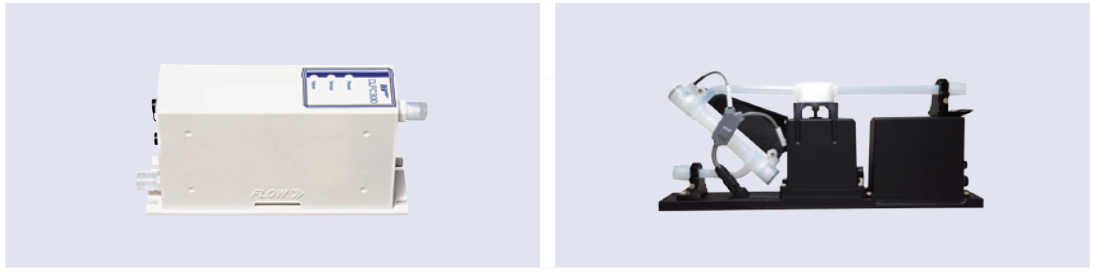


Model	UCM-04A/06A		UCF006	
Power supply	24 V DC			
Fluid	Liquid		Water	
Function	-Flow rate indication -Analog output		-Analog output -Pulse output	
Measuring range (water)	Min.	0 to 0.2 L/min		0 to 8 L/min
	Max.	0 to 8 L/min		
Process connection	Tube end: 1/4", 3/8"		Tube end: 3/8"	
Standard material	PFA			



All-in-one type

CLFC® series



All-in-one Flow Controller with a ultrasonic flowmeter · a control valve and a controller

Model	<b>CLFC300</b>	<b>CLFC500</b>
Power supply	24 V DC	
Fluid	Liquid	
Flow control range (water)	2.5 to 25 mL/min	
Min.	200 to 2000 mL/min	300 to 3000 mL/min
Max.		
Process connection	SUPER300 Type PILLAR FITTING	
Standard material	PFA, PTFE	
Setting input	4 to 20 mA DC	
MV (flow rate) output	4 to 20 mA DC	

Control Valve

FCV series



Model	<b>FCV-3000</b>	<b>FCV-3000T</b>	<b>FCV-1000S</b>
Fluid	Liquid		
Flow control range (water)	2.5 to 25 mL/min	–	0.2 to 2 L/min
Min.	200 to 2000 mL/min	50 to 500 mL/min	1 to 10 L/min
Max.			
Process connection	Tube end: ø6.35 × ø4.35	Tube end: ø4 × ø2.8	Tube end: ø9.53 × ø6.35 Tube end: ø12.7 × ø9.53
Standard material	PTFE, PFA	THV	PCTFE, PTFE, PFA

Controller

FCA series



Model	<b>FCA-3100</b>	<b>FCA-3200</b>	<b>FCA-3300</b>
Power supply	24 V DC		
Function	·Flow rate indication ·Voltage output ·Alarm output		
PV (flow rate) input	4 to 20 mA DC	0 to 10 V DC	0 to 5 V DC
Setting input	1 to 5 V DC	0 to 10 V DC	0 to 5 V DC
MV (flow rate) output	1 to 5 V DC	0 to 10 V DC	0 to 5 V DC



Clamp-on Type

UL300  
UL6000  
series



Model		General purpose · for small pipe sizes	General purpose · for small and medium pipe sizes	High-performance · for small to large pipe sizes
Fluid		<b>UL330</b>	<b>UL350</b>	<b>UL6300</b>
Function		<ul style="list-style-type: none"> <li>·Flow rate indication</li> <li>·Totalizer</li> <li>·Current output</li> <li>·Pulse output</li> <li>·Status output</li> </ul>	Liquid <ul style="list-style-type: none"> <li>·Flow rate indication</li> <li>·Totalizer</li> <li>·Current output</li> <li>·Pulse output</li> <li>·Status output</li> <li>·RS485 (optional)</li> </ul>	<ul style="list-style-type: none"> <li>·Flow rate indication</li> <li>·Totalizer</li> <li>·Bar graph</li> <li>·Current output (HART)</li> <li>·Pulse output</li> <li>·Status output</li> </ul>
Measuring range (flow velocity)	Min.	0 to 0.3 m/s	0 to 0.3 m/s	0 to 0.5m/s
	Max.	0 to 10 m/s	0 to 10 m/s	0 to 20m/s
Measurable pipe size		25 mm to 400 mm (1" to 16")	25 mm to 1000 mm (1" to 40")	15 mm to 4000 mm (1/2" to 160")
Pipe material		Metal, Resin	Metal, Resin, Polyethylene lining	

Portable Clamp-on Type

UL6400 series



Model		<b>UL6400</b>
Fluid		Liquid
Function		<ul style="list-style-type: none"> <li>·Flow rate indication</li> <li>·Totalizer</li> <li>·Flow velocity indication</li> <li>·Bar graph</li> </ul>
Measuring range (flow velocity)	Min.	0 to 0.5m/s
	Max.	0 to 20m/s
Measurable pipe size		15 mm to 1500 mm (1/2" to 60") (Pipe O.D. ≥20 mm)
Pipe material		Metal, Resin, Polyethylene lining

3-Beam In-line Type

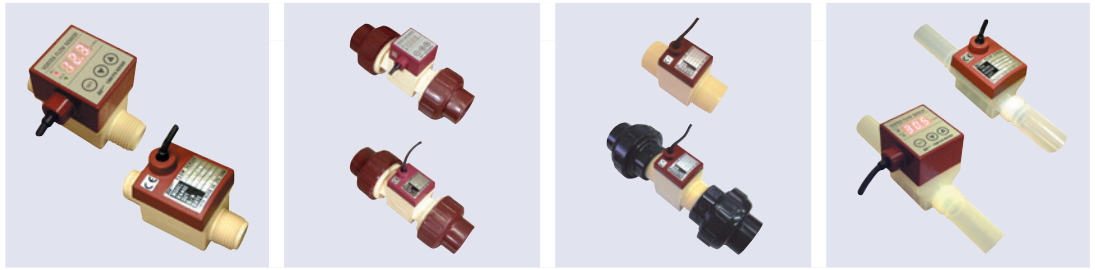
SONICMAX®  
UL3400 series



Model		<b>UL3400</b>
Fluid		Liquid
Function		<ul style="list-style-type: none"> <li>·Flow rate Indication</li> <li>·Totalizer</li> <li>·Current output</li> <li>·Pulse output</li> <li>·Status output</li> </ul>
Measuring range (flow velocity)	Min.	0 to 0.3 m/s
	Max.	0 to 20 m/s
Process connection		Flange: 25 mm to 2000 mm (1" to 80")
Standard material		316L SS



VF series



Model	<b>VF-2000</b>		<b>VF-2200</b>		<b>VF-2300</b>		<b>VF-3000</b>	
Fluid	Liquid (low viscosity)							
Type / Function	·Current output type ·Pulse output type ·Flow rate indication + Current/Alarm output type							
Measuring range (water)	Min.	0.5 to 4 L/min	10 to 100 L/min		-		0.3 to 2.5 L/min	
	Max.	4 to 40 L/min	10 to 150 L/min		25 to 250 L/min		15 to 150 L/min	
Process connection	R3/8 to 1/2		·TS socket DN25 (1") ·Rc 1 ·Flange 25 mm (1")		·TS socket DN30 ·R 1-1/4 ·Flange 40 mm (1-1/2")		Tube end: 3/8" to 1"	
Standard material	PPS resin		PPS resin /PVC				New PFA	

Turbine Flowmeter



Axial-flow Flowmeter

TW series



Model	<b>TW-080/TW-090</b>	
Fluid	Liquid	
Function	·Voltage output ·Pulse output	
Measuring range (water)	Min.	0.2 to 2 L/min
	Max.	2 to 20 L/min
Process connection	Rc 1/4, 3/8	
Standard material	SCS14	

Mini-wheel / Mag-wheel / Manifold Mini-wheel Flowmeter

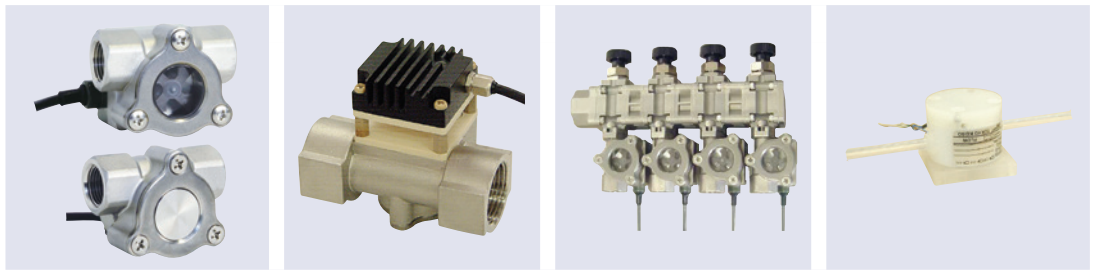
W series



Model	<b>W-200</b>		<b>W-500</b>	
Fluid	Liquid			
Function	·Current output ·Voltage output ·Pulse output		·Local indication ·Current output ·Pulse output	
Measuring range (water)	Min.	0.3 to 1 L/min	0.7 to 3.5 m <sup>3</sup> /h	
	Max.	5 to 50 L/min	50 to 400 m <sup>3</sup> /h	
Process connection	Rc 1/4 to 1/2		·Rc 1/2 to 1 ·Flange 15 mm to 200 mm	
Standard material	P.P./ PVC SUS316		SUS304 SUS316/ PVC	

Mini-wheel / Mag-wheel / Manifold Mini-wheel Flowmeter

W series



Model	<b>W-2000/2000N</b>		<b>W-3000</b>		<b>MU-1000</b>		<b>W-800</b>	
Fluid	Liquid		Liquid		Cooling water		Liquid	
Function	·Current output ·Pulse output		·Pulse output		·Current output ·Pulse output		·Pulse output	
Measuring range (water)	Min.	0.5 to 3 L/min	6 to 60 L/min		0.6 to 3 L/min		0.04 to 0.2 L/min	
	Max.				2 to 20 L/min		5 to 50 L/min	
Process connection	Rc 3/8 to 3/4				Rc 3/8		Tube end Rc 1/4 to 3/4	
Standard material			SCS14				PFA (PTFE)	



TH series

TH-Detector



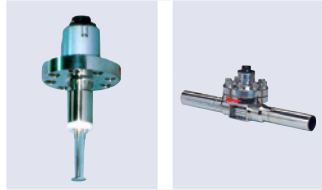
Model		Insertion type <b>TH-1100</b>	Flange type <b>TH-1200</b>	Insertion type (Variable length) <b>TH-1400</b>	Small size <b>TH-1700</b>	Built-in straightener type <b>TH-1800</b>
Fluid		Gas				
Measuring range (air)	Min.	0 to 45 m <sup>3</sup> /h (nor)	0 to 45 m <sup>3</sup> /h (nor)	0 to 45 m <sup>3</sup> /h (nor)	0 to 250 L/min (nor)	0 to 10 L/min (nor)
	Max.	0 to 680000 m <sup>3</sup> /h (nor)	0 to 7000 m <sup>3</sup> /h (nor)	0 to 680000 m <sup>3</sup> /h (nor)	0 to 14000 L/min (nor)	0 to 5800 L/min (nor)
Operating temperature	Standard type	80°C Max.				
	High-temp. type	240°C Max.			180°C Max.	
Process connection / Process pipe size		Flange: 50 mm to 1500 mm (2" to 60")	Flange: 50 mm to 150 mm (2" to 6")	Flange: 50 mm to 1500 mm (2" to 60")	Flange: 15 mm to 50 mm (1/2" to 2")	Rc 3/8 to 1 Flange: 15 mm to 50 mm (1/2" to 2")
Standard material		SUS304, SUS316, SUS316L				

TH-Detector



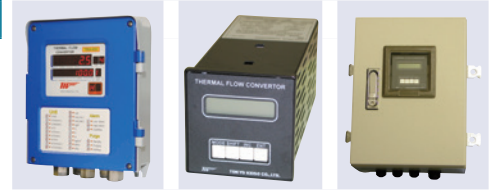
Model		Insertion type <b>TH-1100-SP</b>		<b>TH-3200-SP</b>	<b>TH-3100</b>	Insertion type <b>TH-3200</b>		<b>TH-3300</b>
Fluid		Gas						
Measuring range (air)	Min.	0 to 120 m <sup>3</sup> /h (nor)		0 to 260 m <sup>3</sup> /h (nor)	0 to 80 m <sup>3</sup> /h (nor)	0 to 60 m <sup>3</sup> /h (nor)		
	Max.	0 to 390000 m <sup>3</sup> /h (nor)				0 to 380000 m <sup>3</sup> /h (nor)		
Operating temperature	Standard type	80°C Max.		550°C Max.	550°C Max.		-196°C to 0°C	
	High-temp. type	240°C Max.						
Process connection / Process pipe size		Flange: 50 mm to 1500 mm (2" to 60")			Flange: 80 mm to 1500 mm (3" to 60")	Flange: 65 mm to 1500 mm (2-1/2" to 60")		
Standard material		SUS304, SUS316, SUS316L						

TH-HQ Detector Polished (EP) type



Model		Insertion type <b>TH-1100-HQ</b>	In-line welding type <b>TH-1500-HQ</b>
Fluid		Gas	
Measuring range (air)	Min.	0 to 50 m <sup>3</sup> /h (nor)	0 to 260 L/min (nor)
	Max.	0 to 3300 m <sup>3</sup> /h (nor)	0 to 4500 L/min (nor)
Operating temperature		120°C Max.	
Process connection / Process pipe size		Flange: 120°C Max.	Flange: 15 mm to 25 mm
Standard material		SUS316L	

TRX-Converter



Model		<b>TRX-600</b>	<b>TRX-700</b>	<b>TRX-900</b>
Power supply		100, 110, 115, 200, 220, 240 VAC	96 to 264 VAC	
Function		<ul style="list-style-type: none"> <li>Flow rate</li> <li>Totalizer</li> <li>Temperature</li> <li>Temp. compensation</li> <li>Purge control</li> </ul>	<ul style="list-style-type: none"> <li>Flow rate</li> <li>Totalizer</li> <li>Alarm contact output</li> <li>Bar graph indication</li> <li>Temperature / pressure compensation</li> </ul>	
Output		<ul style="list-style-type: none"> <li>Current output</li> <li>Pulse output (Photo MOS open collector)</li> <li>RS-485</li> </ul>	<ul style="list-style-type: none"> <li>Current output</li> <li>Alarm output</li> <li>Pulse output (open collector)</li> <li>RS-485</li> </ul>	
Cable length		50 m Max.	100 m Max.	
Housing		Waterproof (for outdoor use)	Panel mount (for indoor use)	Waterproof (for outdoor use)

SRT series

Compact & Separate type

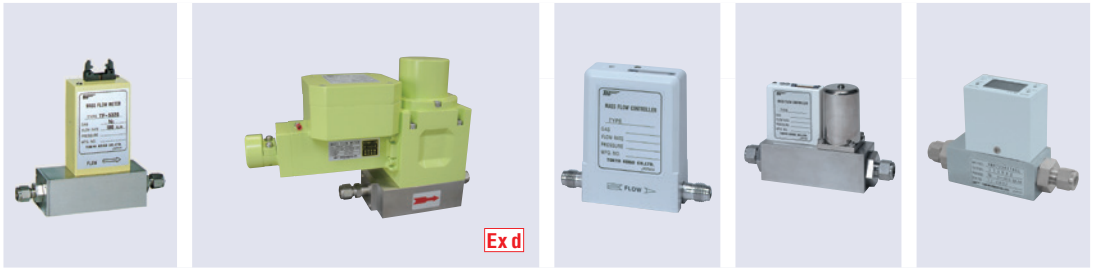


Model		Insertion type <b>SRT1100</b>	In-line type (medium size) <b>SRT1200</b>	In-line type (small size) <b>SRT1300</b>		
Fluid		Gas				
Function		-Local indication	-Analog output	-Pulse output	-Alarm output	-RS-485
Measuring range (air)	Min.	0 to 60 m <sup>3</sup> /h (nor)	0 to 40 m <sup>3</sup> /h (nor)	0 to 2.5 m <sup>3</sup> /h (nor)		
	Max.	0 to 890000 m <sup>3</sup> /h (nor)	0 to 10000 m <sup>3</sup> /h (nor)	0 to 300 m <sup>3</sup> /h (nor)		
Operating temperature		120°C Max.				
Process connection / Process pipe size		Flange: 50 mm to 1500 mm (2" to 60")	Flange: 40 mm to 150 mm (1-1/2" to 6")	Rc 3/8 to 1 Flange: 10 mm to 25 mm (3/8" to 1")		
Standard material		SUS316, SUS316L				





**TF series  
HM series**



Ex d

Model	<b>TF-5000/TF-6000</b>	<b>EP-TF-5300</b>	<b>H-EP-TF-5300</b>	<b>HM1000</b>	<b>HM5000</b>	<b>HM9700A</b>
Fluid	Gas			Gas		
Function	·Voltage output			·Voltage output		·Local indication ·Current output ·Alarm output
Measuring range (air)	Min.	0 to 5 mL/min (nor)		0 to 5 mL/min (nor)		1 to 20 L/min (nor)
	Max.	0 to 500 L/min (nor)		0 to 20 L/min (nor)	0 to 400 L/min (nor)	10 to 200 L/min (nor)
Process connection	Rc 1/4 to 1	Rc 1/4 to 3/4		1/4" SW	1/4" to 1/2" SW	
Standard material	SUS316			SUS316		

**TF series**



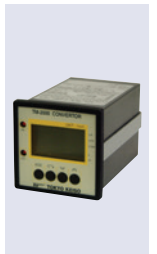
Model	Small to Large flow <b>TF-1000</b>	Compact type <b>TF-900</b>	High performance <b>TF-4000</b>	Compact type <b>TF-600</b>	Indicator / valve built-in <b>TF-600D/600V</b>
Fluid	Gas	Air, N <sub>2</sub> , O <sub>2</sub>	Air, N <sub>2</sub> , O <sub>2</sub>	Air, N <sub>2</sub>	
Function	·Voltage output ·Current output	·Voltage output	·Local indication ·Totalizer ·Current output ·RS-485 ·Pulse output ·Alarm output	·Voltage output	·Local indication ·Voltage output ·Pulse output ·Alarm output ·RS-485
Measuring range (air)	Min.	0 to 2 L/min (nor)	0 to 10 L/min (nor)	0 to 2 L/min (nor)	0 to 5 L/min (nor)
	Max.	0 to 1000 L/min (nor)	0 to 100 L/min (nor)	0 to 1000 L/min (nor)	0 to 100 L/min (nor)
Process connection	Rc 1/4 to 1	Rc 1/4	Rc 1/4 to 3/4	Rc 1/4	Rc 1/4 to 3/4
Standard material	SUS316	SCS14 Polyacetal	SCS14	SCS14, SUS316	

**TF series**



Model	Rotatable indicator type, for large flow rates <b>TF-4100</b>	Flow rate, Totalizer, Alarm indication + output <b>TF-2000N</b>		For medium to large flow rate <b>TF-2261N</b>
Fluid	Air, N <sub>2</sub>	Gas	Air, N <sub>2</sub>	Air, N <sub>2</sub>
Function	·Local indication ·Current output ·Voltage output ·Pulse output ·Alarm output ·RS-485	·Local indication ·Current output ·Pulse output ·Alarm output	·Local indication ·Current output ·Pulse output ·Alarm output	·Current output
Measuring range (air)	Min.	0 to 4000 L/min (nor)	0 to 2 L/min (nor)	0 to 80 m <sup>3</sup> /h (nor)
	Max.	0 to 16000 L/min (nor)	0 to 750 m <sup>3</sup> /h (nor)	0 to 1500 m <sup>3</sup> /h (nor)
Process connection	Rc 1 to 2	·Rc 1/4 to 2 ·Flange 15 mm to 80 mm	·Rc 1 to 2 ·Flange 25 mm to 80 mm	
Standard material	A6061-T6, SCS13	SUS316	SUS304, SUS316	

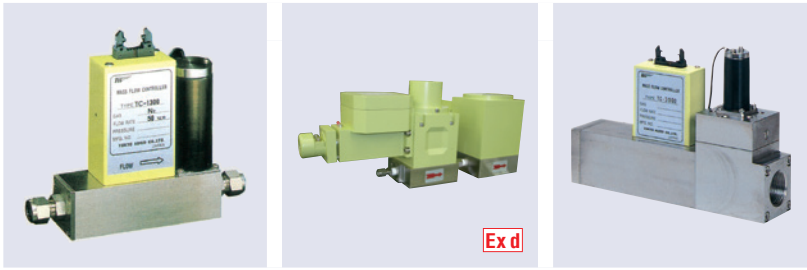
**Converter for TF series**



Type	<b>TM-2000</b>
Applicable instrument	·TF-900 ·TF-1000 ·TF-5000/6000 ·(H-) EP-TF-5300
Function	·Flow rate indication ·Totalizer ·Analog output ·Pulse output



TC series



Ex d

Model	TC-1000/2000	EP-TC-1000/2000 V	TC-3000
Fluid	Gas		
Function	-Flow rate control -Voltage output		-Flow rate control -4 to 20 mADC -0 to 5 VDC
Measuring range (air)	Min.	0 to 5m L/min (nor)	
	Max.	0 to 500 L/min (nor)	0 to 100 L/min (nor)
Process connection	Rc, SW 1/4" to 1"	Rc, SW, VCR 1/4" or 3/8"	Rc 1/4 to 1
Standard material	SUS316		

HM series



Converter for TC series



Model	HM1000	HM5000
Fluid	Gas	
Function	-Flow rate control	-Voltage output
Measuring range (air)	Min.	0 to 2 L/min (nor)
	Max.	0 to 20 L/min (nor)
Process connection	1/4" SW	1/4" to 1/2" SW
Standard material	SUS316	

Type	TM-1400
Power supply	85 to 240 V AC
Applicable instrument	-TC-1000 -TC-2000 -TC-3000 -EP-TC-1000/2000V
Function	-Flow rate indication -Analog output -Pulse output -Flow rate setting

Constant Flow Valve

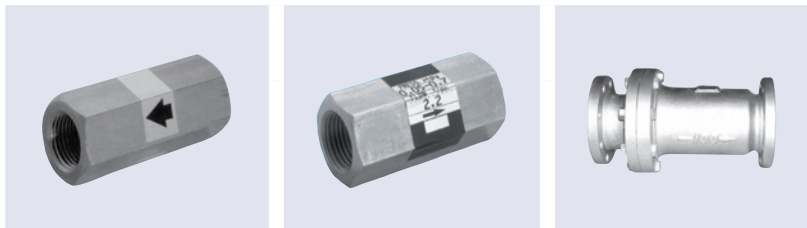


CX series



Model	CX-1101	CX-1500	CX-1510	CX-2000
Fluid	Liquid	Gas	Water	Liquid
Flow range (water/air)	Min.	3 to 10 L/min	5 to 13 m <sup>3</sup> /h (nor)	0.7 to 1.1 m <sup>3</sup> /h
	Max.	25 to 70 L/min	600 to 1000 m <sup>3</sup> /h (nor)	22 to 60 m <sup>3</sup> /h
Process connection	Rc 1/2 to 1-1/2	-Rc (NPT) 1/2 to 2 -Flange 15 mm to 150 mm (1/2" to 6")	-Rc (NPT) 1/2 to 2 -Flange 15 mm to 100 mm (1/2" to 4")	Flange 15 mm to 100 mm (1/2" to 4")

FPC/RSP/NSPW series



Model	FPC	RSP	NSPW/NFFW/NFF-S
Fluid	Water	Water	Liquid
Flow range (water)	Min.	0.7 to 2 L/min	5 to 20 L/min
	Max.	4 to 7 L/min	0.6 to 9 L/min
Process connection	Rc 1/4 to 1/2	Rc 3/8, Rc 1/2	-Rc 3/8 to 1 -Flange 32 mm to 80 mm (1-1/4" to 3")

## Pitot Tube Flowmeter, Calorie Monitor (for Air conditioning application)



### CFW/CDT series



Model	CFW1000	CFW2000	CDT1000	CDT2000	CDT3000
Fluid	Water, Cold water, Hot water				
Function	·Local indication	·Local indication ·Detachable	·Local indication ·Alarm output ·Current output ·Battery powered	·Local indication ·Detachable ·Battery powered	·Local indication ·Alarm output ·Current output ·Calorie monitor
Measuring range (water)	Min.	12 to 100 L/min	5 to 50 L/min		0.3 to 3 m <sup>3</sup> /h
	Max.	4500 to 35000 L/min	1600 to 16000 L/min		100 to 1000 m <sup>3</sup> /h
Process pipe size	20 mm to 450 mm (3/4" to 18")				
Standard material	SUS316 / C3604				

## Flapper-type Flowmeter



### STK/K series

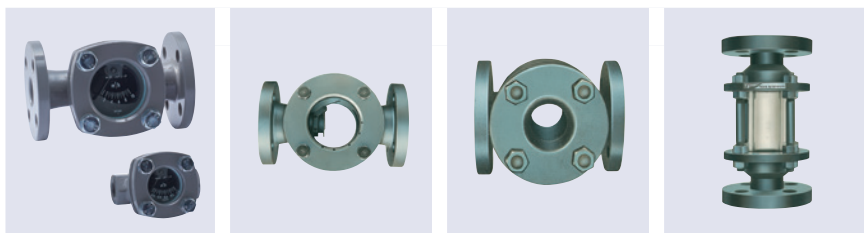


Model	STK2000	STK7400	K-200	K-740
Fluid	Liquid			
Function	·Local indication	·Local indication ·Alarm output	·Local indication	·Local indication ·Alarm output
Measuring range (water)	Min.	0.3 to 1.5 m <sup>3</sup> /h	0.2 to 1 m <sup>3</sup> /h	0.12 to 0.6 m <sup>3</sup> /h
	Max.	120 to 600 m <sup>3</sup> /h	60 to 300 m <sup>3</sup> /h	60 to 300 m <sup>3</sup> /h
Process connection	Flange 15 mm to 300 mm (1/2" to 12")		Flange 20 mm to 300 mm (3/4" to 12")	Flange 15 mm to 300 mm (1/2" to 12")
Standard material	SS400, SGP SCS14, SUS304, PVC		FC200, SUS304, SUS316 FC200 (SGP)/ Glass lining (only for K-500: 25 mm to 100 mm (1" to 4"))	FC200 SCS13, SCS14

## Sight Glass



### STK/K series



Model	STK4000	K-400	K-500	K-600
Fluid	Liquid			
Function	·Local indication			
Measuring range (water)	Min.	0.16 to 0.6 m <sup>3</sup> /h	0.06 to 0.3 m <sup>3</sup> /h	-
	Max.	120 to 600 m <sup>3</sup> /h	30 to 150 m <sup>3</sup> /h	-
Process connection	·Rc 1/2 to 3/4 ·Flange 25 mm to 300 mm (1" to 12")	Flange 15 mm to 150 mm (1/2" to 6")		Flange 15 mm to 125 mm (1/2" to 5")
Standard material	FCD450, SS400 SCS14, SUS304	FC200, SUS304, SUS316 FC200 (SGP)/ Glass lining (only for K-500: 25 mm to 100 mm (1" to 4"))		SS400 / SGP SUS304, SUS316



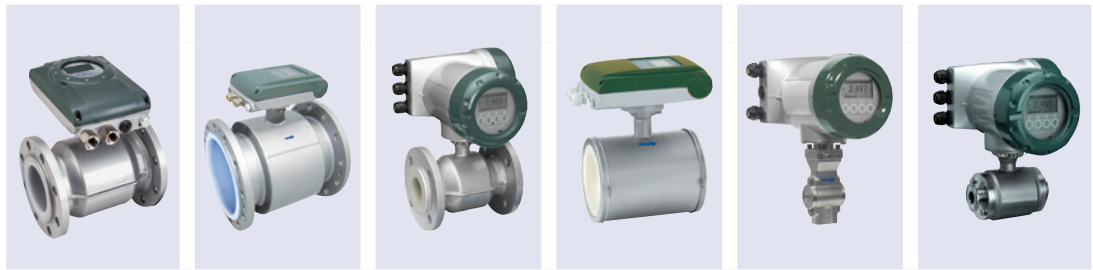
**Compact Type Electromagnetic Flowmeter**

**EGM series**



	PFA Lining (Meter size 10 mm to 150 mm)			Hard rubber / Polypropylene (PP) Lining (Meter size 25 mm to 1000 mm)		
<b>Model</b>	<b>EGM1050C</b>	<b>EGM1100C</b>	<b>EGM1300C</b>	<b>EGM2050C</b>	<b>EGM2100C</b>	<b>EGM2300C</b>
<b>Fluid</b>	Conductive liquids					
<b>Function</b>	·Flow rate indication		·Totalizer	·Current output (HART)	·Pulse output	·Status output
<b>Measuring range</b>	<b>Min.</b>	0 to 0.09 m <sup>3</sup> /h			0 to 0.6 m <sup>3</sup> /h	
	<b>Max.</b>	0 to 700 m <sup>3</sup> /h			0 to 33000 m <sup>3</sup> /h	
<b>Process connection</b>	Wafer 10 mm to 150 mm (3/8" to 6")			Flange 25 mm to 1000 mm (1" to 40")		
<b>Standard material</b>	PFA / Hastelloy® C			Polypropylene (PP) · Hard rubber / Hastelloy® C		

**EGM series**



	PFA or other Lining (Meter size 10 mm to 1000 mm)			Ceramic type (Meter size 2.5 mm to 100 mm)		Sanitary type (Meter size 25 mm to 100 mm)
<b>Model</b>	<b>EGM4050C</b>	<b>EGM4100C</b>	<b>EGM4300C</b>	<b>EGM5100C</b>	<b>EGM5300C</b>	<b>EGM6300C</b>
<b>Fluid</b>	Conductive liquids					
<b>Function</b>	·Flow rate indication		·Totalizer	·Current output (HART)	·Pulse output	·Status output
<b>Measuring range</b>	<b>Min.</b>	0 to 0.09 m <sup>3</sup> /h			0 to 0.01 m <sup>3</sup> /h	
	<b>Max.</b>	0 to 33000 m <sup>3</sup> /h			0 to 300 m <sup>3</sup> /h	
<b>Process connection</b>	Flange 10 mm to 1000 mm (1" to 40")			Wafer 10 mm to 100 mm (3/8" to 4")		Sanitary joint 1S to 4S
<b>Standard material</b>	PFA · PTFE · ETFE / Hastelloy® C			Zirconia ceramic · Alumina ceramic/Platinum		PFA / Hastelloy® C / 316SS

**EGM series**



	Capacitive type (Meter size 25 mm to 100 mm)		Electromagnetic flow switch (Meter size 10 to 150 mm)	Electromagnetic flow switch (Meter size 10 to 300 mm)
<b>Model</b>	<b>EGM7300C</b>		<b>EGM1300CS</b>	<b>EGM2300CS</b>
<b>Fluid</b>	Conductive liquids			
<b>Function</b>	·Flow rate indication ·Totalizer ·Current output (HART) ·Pulse output ·Status output		·Flow rate indication ·Totalizer ·Alarm output (Dry contact)	
	<b>Measuring range</b>	0 to 0.6 m <sup>3</sup> /h 0 to 300 m <sup>3</sup> /h	0 to 0.09 m <sup>3</sup> /h 0 to 700 m <sup>3</sup> /h	0 to 0.6 m <sup>3</sup> /h 0 to 3000 m <sup>3</sup> /h
<b>Process connection</b>	Wafer 25 mm to 100 mm (1" to 4")		Wafer 10 mm to 150 mm (3/8" to 6")	Flange 25 mm to 300 mm (1" to 12")
<b>Standard material</b>	Zirconia ceramic Alumina ceramic		PFA/ Hastelloy® C	PP · Hard rubber / Hastelloy® C

**Battery-powered Electromagnetic Watermeter**

**ETM series**



<b>Model</b>	<b>ETM3070</b>	
<b>Fluid</b>	Water (50 µS/cm or more)	
<b>Function</b>	·Flow rate indication ·Totalizer ·Pulse output	
<b>Measuring range</b>	<b>Min.</b>	0 to 0.9 m <sup>3</sup> /h
	<b>Max.</b>	0 to 1000 m <sup>3</sup> /h
<b>Process connection</b>	Flange 25 mm to 200 mm (1" to 8")	
<b>Standard material</b>	Rilsan (Polyamide resin) / 304SS	

**Separate Type Detector**

**EGS series**



		PFA Lining (Meter size 10 mm to 150 mm)	Hard rubber / PP Lining (Meter size 25 mm to 1000 mm)	PFA or other Lining (Meter size 10 mm to 1000 mm)	Ceramic type (Meter size 2.5 mm to 100 mm)
		<b>EGS1000</b>	<b>EGS2000</b>	<b>EGS4000</b>	<b>EGS5000</b>
Model		Conductive liquids			
Fluid					
Measuring range	Min.	0 to 0.09 m <sup>3</sup> /h	0 to 0.6 m <sup>3</sup> /h	0 to 0.09 m <sup>3</sup> /h	0 to 0.01 m <sup>3</sup> /h
	Max.	0 to 700 m <sup>3</sup> /h	0 to 33000 m <sup>3</sup> /h	0 to 33000 m <sup>3</sup> /h	0 to 300 m <sup>3</sup> /h
Process connection		Wafer 10 mm to 150 mm (3/8" to 6")	Flange 25 mm to 1000 mm (1" to 40")	Flange 25 mm to 1000 mm (1" to 40")	Wafer 10 mm to 100 mm (3/8" to 4")
Standard material		PFA / Hastelloy® C	Polypropylene (PP) · Hard rubber / Hastelloy® C	PFA · PTFE · ETFE / Hastelloy® C	Zirconia ceramic Alumina ceramic / Platinum

**Separate Type Converter**

**EGC series**



		Standard type		High-performance type	
		<b>EGC050W</b>	<b>EGC100W</b>	<b>EGC300F/W</b>	
Model		100 to 230 V AC / 24 V DC			
Power supply		·Flow rate indication ·Totalizer ·Current output (HART) ·Pulse output ·Status output			
Function		EGS/MGS/IFS series Electromagnetic flow detectors			
Applicable instrument					

**SWIRLMAX® Vortex Flowmeter**



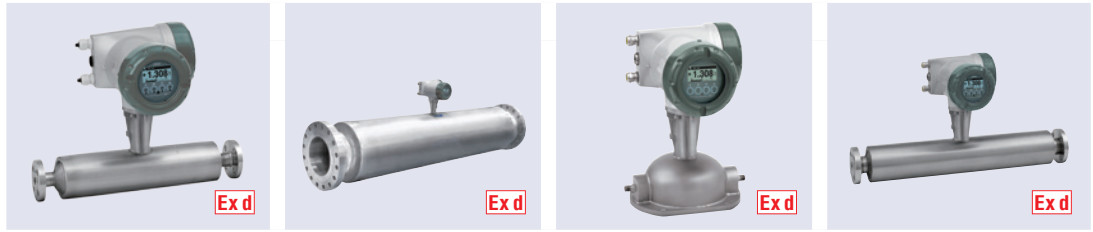
**VFM series**



		<b>VFM4200C</b>
Model		Gas, Liquid, Steam
Fluid		·Local indication ·Current output ·Pulse output
Function		
Measuring range (water /20°C)	Min.	0.91 m <sup>3</sup> /h
	Max.	1772 m <sup>3</sup> /h
Measuring range (air /0 MPa)	Min.	12.1 m <sup>3</sup> /h (nor)
	Max.	25250 m <sup>3</sup> /h (nor)
Measuring range (saturated steam /0.1 MPa)	Min.	11.8 kg/h
	Max.	22996 kg/h
Process connection		Flange 15 mm to 300 mm (1/2" to 12") Wafer 15 mm to 100 mm (1/2" to 4")
Standard material		316L SS



**MMM series**



		Straight twin tube (Meter size 15 mm to 50 mm)	Straight twin tube (Meter size 10 mm to 250 mm)	Single tube (Meter size 1 mm to 4 mm)	Straight single tube (Meter size 6 mm to 80 mm)
<b>Model</b>		<b>MMM1400C</b>	<b>MMM2400C</b>	<b>MMM3400C</b>	<b>MMM7400C</b>
<b>Fluid</b>		Liquid			
<b>Function</b>		<ul style="list-style-type: none"> <li>·Flow rate indication</li> <li>·Totalizer</li> <li>·Current output (HART)</li> <li>·Pulse output</li> <li>·Status output</li> <li>·Density measurement (for 15 mm or larger meter sizes)</li> </ul>			
<b>Measuring range</b>	Min.	48 kg/h	1560 kg/h	0.3 kg/h	12 kg/h
	Max.	125000 kg/h	2300000 kg/h	450 kg/h	560000 kg/h
<b>Process connection</b>		Flange 15 mm to 80 mm (1/2" to 3")	Flange 100 mm to 300 mm (4" to 12")	1/4 NPT male	Flange 10 mm to 100 mm (3/8" to 4")
<b>Standard material</b>		ASTM UNS S31803 / 316L SS		316L SS	Titanium · Hastelloy <sup>®</sup> C22

**MMM series**



Twin tube  
(Meter size 8 mm to 100 mm)

<b>Model</b>		<b>MMM6400C</b>
<b>Fluid</b>		Liquid, Gas
<b>Function</b>		<ul style="list-style-type: none"> <li>·Flow rate indication</li> <li>·Totalizer</li> <li>·Current output (HART)</li> <li>·Pulse output</li> <li>·Status output</li> <li>·Density measurement (for 15 mm or larger meter sizes)</li> </ul>
<b>Measuring range</b>	Min.	5 kg/h
	Max.	175,000 kg/h
<b>Process connection</b>		Flange 10 mm to 100 mm (3/8" to 4")
<b>Standard material</b>		316/316L SS (dual certified)

**Flowmeter for Filling Machines**



**Coriolis Mass Flowmeter**

**MMM series**

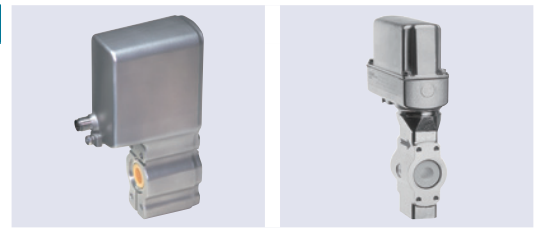


Twin tube  
(Meter size 10 mm, 15 mm)

<b>Model</b>		<b>MMM4011C</b>
<b>Fluid</b>		Liquid
<b>Function</b>		·Pulse output
<b>Recommended filling conditions</b>	<b>Flow rate</b>	10 mm: 15 to 370 g/sec 15 mm: 50 to 1200 g/sec
	<b>Min. filling volume</b>	10 mm: 23 g 15 mm: 75 g
	<b>Min. filling time</b>	1.5 s
<b>Process connection</b>		Sanitary joint: 10 mm to 15 mm (3/8" to 1/2")
<b>Standard material</b>		316L SS

**Electromagnetic Flowmeter**

**EGM series**



Ceramic type  
(Meter size 10 mm, 15 mm)

Ceramic type  
(Meter size 2.5mm to 40 mm)

<b>Model</b>		<b>EGM5500C</b>	<b>EGM5015C</b>
<b>Fluid</b>		Conductive liquids	
<b>Function</b>		·Pulse output	
<b>Recommended filling conditions</b>	<b>Flow rate</b>	10 mm: 60 to 200 mL/sec 15 mm: 150 to 600 mL/sec	2.5 mm: 3 to 10 mL/sec 40 mm: 1000 to 3000 mL/sec
	<b>Min. filling volume</b>	10 mm: 100 mL 15 mm: 200 mL	2.5 mm: 10 mL 40 mm: 1500 mL
	<b>Min. filling time</b>	1.5 s	-
<b>Process connection</b>		Wafer: 10 mm to 15 mm (3/8" to 1/2")	Wafer: 10 mm to 40 mm (3/8" to 1-1/2")
<b>Standard material</b>		Zirconia ceramic / Platinum	Zirconia ceramic Alumina ceramic / Platinum

## Blow-by Gas Flowmeter



### BF series

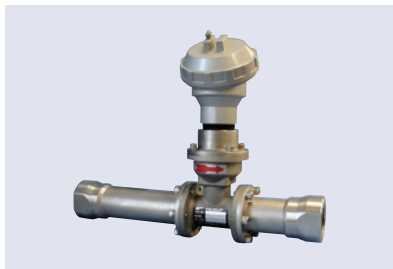


Model		BF-2000S	BF-4000S
Fluid		Gas	
Measuring range (air)	Min.	20 to 200 L/min (nor)	10 to 100 L/min (nor)
	Max.	20 to 300 L/min (nor)	10 to 150 L/min (nor)
Temperature		0 to 60°C	
Pressure loss		200 Pa at 200 L/min (nor)	200 Pa at 100 L/min (nor)
Power supply		Standard: 100 V AC Option: 110 V to 240 V AC	
Output		·4 to 20 mA DC or 1 to 5 V DC ·Serial (RS485) ·Flow alarm	·Pulse ·Differential pressure alarm
Process connection		Rc 1-1/2	Rc 1
Accuracy		1.5% R.D (20 L/min (nor) or higher) 1.5% FS (20 L/min (nor) or lower)	1.5% R.D (10 L/min (nor) or higher) 1.5% FS (10 L/min (nor) or lower)

## CNG Flow Measurement System



### TH series Detector



Model		TH-1800-T
Fluid		CNG
Function		·Local indication ·Current output
Measuring range	Min.	5 to 365 L/min (nor)
	Max.	45 to 3795 L/min (nor)
Protection category		Equivalent to IP65
Process connection		·Rc 1/2 to 1 ·Flange: 15 mm to 50 mm (1/2" to 2")
Accuracy		±1% R.D (Flow range 5 to 100%)
Standard material		SUS304/ Fluororubber
Option material		SUS316/ Fluororubber
Converter		TRX-700-CNG

### TRX series Converter

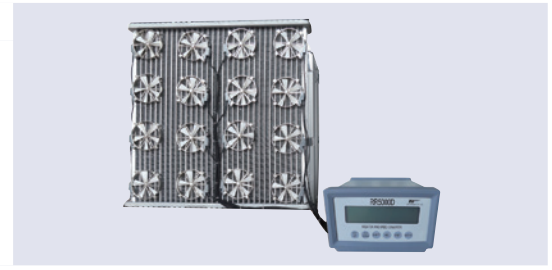


Model		TRX-700-CNG
Function		·Flow indication ·Temperature indication or Total flow (continuous)
Power supply		90 to 264 V AC
Output		·4 to 20 mA DC or 1 to 5 V DC ·RS485 ·Flow alarm
Cable length		10 m (100 m Max.)

Radiator Air Flow Measurement System



RF series



	RF-1000 series	RF-2000 series
	<b>Propeller sensor</b>	<b>Propeller sensor</b>
Model	RS-1038 / RS-1050	RS-1050-IR
Sensor type	Optical sensor with optical cable	Infra-Red sensor with electrical cable
Measuring range	RS-1038: 0.5 to 30 m/s RS-1050: 0.4 to 30 m/s	0.4 to 30 m/s
Temperature	0 to 120°C (100°C in continuous operation)	-40 to 120°C (100°C in continuous operation)
Accuracy	RS-1038: ± (1.5% of R.D + 0.05 m/s) at 0.5 to 20 m/s RS-1050: ± (1% of R.D + 0.05 m/s) at 0.4 to 20 m/s	± (1% of R.D + 0.05 m/s) at 0.4 to 20 m/s
Sensor diameter	RS-1038: approx. 40 mm RS-1050: approx. 64 mm	approx. 69 mm
	<b>Converter</b>	<b>Converter</b>
Model	RR-5000B	RR5000D
Power supply	12 V DC	12 to 24 V DC
Measuring channel	8 ch	16 ch
Output	-5 to 5 V DC	0 to 5 V DC
Accuracy	Frequency output: ± 1 Hz Analog output: ± 0.6% R.D. ± 0.01 V	Frequency output: ± 1 Hz Analog output: ± 0.6% R.D. ± 0.01 V
Communication	RS485 (RS232 converter + Wind1 required)	RS485, CAN network

Flowmeter for Engine Cooling Water



EF series



Detector/Converter Separate type

Model		EF-AUTO
Fluid		Conductive liquids
Measuring range	Min.	0 to 1 L/min
	Max.	0 to 1400 L/min
Temperature		-20 to 180°C
Pressure		0 to 1 MPa
Process connection		Hose fitting 6 mm to 50 mm (1/4" to 2")
Power supply		100 to 230 V AC
Output		4 to 20 mA DC
Protection category		Equivalent to IP65
Material		Zirconia ceramic, alumina ceramic

Flowmeter for Intake Air



GFM series



Detector/Converter Integrated type

Model		OPTISONIC 7300
Fluid		Air
Measuring range	Min.	12 to 300 m³/h
	Max.	88 to 3530 m³/h
Temperature		-20 to 100°C
Pressure		Atmospheric pressure
Process connection		Flange: 65 mm to 250 mm (2-1/2" to 10")
Power supply		100 V AC
Output		4 to 20 mA DC
Protection category		IP66



Metal Tube Variable Area Flowmeter

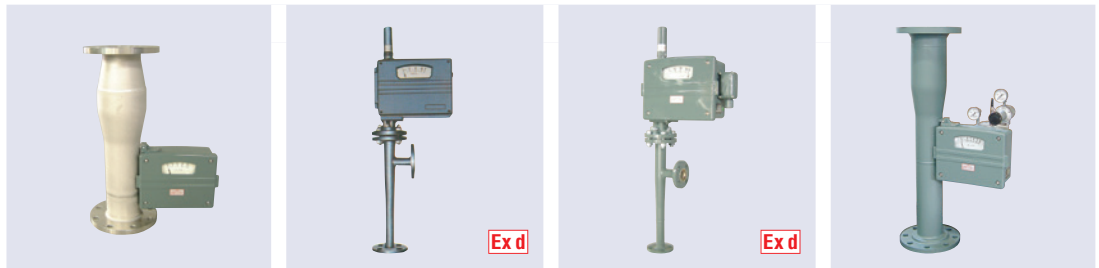


AM-1000 series



Model		<b>AM-1400</b>	<b>AM-1520</b>	<b>AM-1740</b>	<b>AM-1690</b>	<b>AM-1310</b>
Fluid		Liquid, Gas, Steam				
Function		-Local indication	-Local indication -Current output	-Local indication -Alarm output	-Local indication -Totalizer -Pulse output	-Local indication -Pneumatic output
Measuring range (water)	Min.	0.01 to 0.1 m <sup>3</sup> /h				
	Max.	15 to 150 m <sup>3</sup> /h				
Measuring range (air)	Min.	0.35 to 3.5 m <sup>3</sup> /h (nor)				
	Max.	450 to 4500 m <sup>3</sup> /h (nor)				
Process connection		Flange: 15 mm to 150 mm (1/2" to 6")				
Standard material		SUS304, SUS316, SUS316L				
Available lining material		Rubber, fluorocarbon resin, PVC, glass				

M series




Model		<b>M-400</b>	<b>M-520</b>	<b>M-740</b>	<b>M-310</b>
Fluid		Liquid, Gas, Steam			
Function		-Local indication	-Local indication -Current output	-Local indication -Alarm output	-Local indication -Pneumatic output
Measuring range (water)	Min.	0.01 to 0.1 m <sup>3</sup> /h			
	Max.	80 to 800 m <sup>3</sup> /h			
Measuring range (air)	Min.	0.3 to 3 m <sup>3</sup> /h (nor)			
	Max.	560 to 5590 m <sup>3</sup> /h (nor)			
Process connection		Flange: 15 mm to 300 mm (1/2" to 12")			
Standard material		SUS304, SUS316, SUS316L			
Available lining material		Rubber, fluorocarbon resin, PVC, glass			

A series




Model		<b>A-102</b>	<b>A-103-D</b>	<b>A-750</b>
Fluid		Liquid	Gas	Liquid, Gas
Function		-Local indication		-Local indication -Alarm output (Reed switch)
Measuring range (water)	Min.	0.01 to 0.1 m <sup>3</sup> /h	-	0.01 to 0.1 m <sup>3</sup> /h
	Max.	20 to 200 m <sup>3</sup> /h	-	20 to 200 m <sup>3</sup> /h
Measuring range (air)	Min.	-	0.3 to 3 m <sup>3</sup> /h (nor)	0.3 to 3 m <sup>3</sup> /h (nor)
	Max.	-	640 to 6400 m <sup>3</sup> /h (nor)	640 to 6400 m <sup>3</sup> /h (nor)
Process connection		Flange: 15 mm to 150 mm (1/2" to 6")		
Standard material		SS400, SUS304, SUS316		



### Metal Tube Variable Area Flowmeter for Micro Flow Measurement

<b>M-910 series</b>		
<b>M-910</b>		
Fluid: Liquid, Gas		
Function: ·Local indication ·Pneumatic output		
Measuring range (water)	Min.	0.4 to 2 L/h
	Max.	30 to 300 L/h
Measuring range (air)	Min.	12 to 60 L/h (nor)
	Max.	170 to 8500 L/h (nor)
Process connection: Rc 1/4 to 3/4 Flange: 10 mm to 25 mm (3/8" to 1")		
Standard material: SUS304, SUS316, SUS316L		
Optional material: Titanium, MA276		


### Metal Tube Variable Area Flowmeter for Sanitary Applications

<b>AM-1000-SR series</b>						
<b>AM-1000-SR series</b>						
Model		<b>AM-1401-SR</b>	<b>AM-1311-SR</b>	<b>AM-1521-SR</b>	<b>AM-1691-SR</b>	<b>AM-1741-SR</b>
Fluid		Liquid				
Function		·Local indication	·Local indication ·Pneumatic output	·Local indication ·Current output	·Local indication ·Totalizer ·Pulse output	·Local indication ·Alarm output
Measuring range (water)	Min.	0.01 to 0.1 m <sup>3</sup> /h				
	Max.	7 to 70 m <sup>3</sup> /h				
Process connection		1S to 4.5 S				
Standard material		SUS304, SUS316, SUS316L				


### Metal Tube Variable Area Flowmeter for Slurry Applications

<b>AS/S series</b>			
<b>AS/S series</b>		<b>AS-1000</b>	<b>S-102/S-752</b>
Fluid: Liquid			
Function: ·Local indication ·Totalizer ·Current output ·Pulse output ·Alarm output ·Pneumatic output ·Local indication ·Alarm output (Reed switch)			
Measuring range (water)	Min.	0.02 to 0.1 m <sup>3</sup> /h	0.04 to 0.2 m <sup>3</sup> /h
	Max.	30 to 150 m <sup>3</sup> /h	38 to 190 m <sup>3</sup> /h
Process connection: Flange: 15 mm to 150 mm (1/2" to 6")			
Standard material: SUS304, SUS316, SUS316L PVC (for 25 mm to 150 mm)			



### Glass Tube Variable Area Flowmeter

<b>R-105-RK</b>		
<b>R-105-RK</b>		
Model		<b>R-105-RK</b>
Fluid		Gas
Function		·Local indication
Measuring range (air)	Min.	0.11 to 1.1 m <sup>3</sup> /h (nor)
	Max.	11 to 110 m <sup>3</sup> /h (nor)
Process connection		Rc 3/8 to 2
Standard material		Aluminum /SUS304

### Purgemeter

<b>P series</b>		
<b>P series</b>		
Model		<b>P-520</b>
Fluid		Liquid
Function		·Local indication ·Alarm output
Measuring range (water)	Min.	1 to 10 L/min
	Max.	12 to 60 L/min
Process connection		Rc 1/2
Standard material		PVC, PTFE
Installation length		150 mm
Alarm		·UL-approved reed switch ·Optical alarm unit

### Flow Switch/Flow Monitor

<b>FA series</b>			
<b>FA series</b>			
Model		<b>FA-1000</b>	<b>FA-5000</b>
Fluid		Liquid (equivalent to water)	Liquid (equivalent to water)
Function		·Local indication ·Alarm output	·Local indication
Measuring range (water)	Min.	0.1 to 1 L/min	1 to 10 L/min
	Max.	10 to 100 L/min	10 to 50 L/min
Process connection		Rc 1/4 to 1-1/2	Rc 3/4
Standard material	Tapered tube	SUS304	Acryl resin
	Body	ADC12 (Housing)	SCS13
Fluid temperature		0 to 100°C	0 to 50°C

Note: Depending on specifications, Model P-520-L (with a fluorocarbon resin valve) falls in "Valves or components thereof" listed in (ii) -7 of row 3 of Appended Table 1 of the Export Trade Control Order. Consult us for details.

# Nominal flow rate of variable area flowmeters

In this catalog, the following fluids are used for the measuring range of each model.

Liquid: Water with a density of 1.0 g/cm<sup>3</sup> and a viscosity of 1.0 mPa·s

Gas: Air at 0°C, 0 MPa (1 atm)

If actual operating conditions differ from the above, correct the values with the formulas given below.

## For gas measurement

Correct the value considering the density, pressure, and temperature of the measuring gas.

1. When the flow rate is indicated in the normal condition

$$Q_{\text{air}} = Q_0 \times \sqrt{\frac{\rho_0}{1.293}} \times \sqrt{\frac{273+T_0}{273}} \times \sqrt{\frac{0.1013}{0.1013+P_0}}$$

$Q_{\text{air}}$  : Corrected flow rate

$Q_0$  : Flow rate of the measuring gas in actual conditions

(Flow rate in normal conditions: 0°C, 0 MPa)

$\rho_0$  : Density of the measuring gas (kg/m<sup>3</sup> (nor))

$T_0$  : Fluid temperature (°C)

$P_0$  : Fluid pressure (MPa)

2. When the flow rate is indicated in operating conditions

$$Q_{\text{air}} = Q_0 \times \sqrt{\frac{\rho_0}{1.293}} \times \sqrt{\frac{273}{273+T_0}} \times \sqrt{\frac{0.1013+P_0}{0.1013}}$$

$Q_{\text{air}}$  : Corrected flow rate

$Q_0$  : Flow rate of the measuring gas in actual conditions

(Flow rate in operating conditions:  $T_0$ °C,  $P_0$  MPa)

$\rho_0$  : Density of the measuring gas (kg/m<sup>3</sup> (nor))

$T_0$  : Fluid temperature (°C)

$P_0$  : Fluid pressure (MPa)

## For liquid measurement

When the density of the measuring liquid is not 1.0 g/cm<sup>3</sup>

$$Q = Q_0 \times \sqrt{\frac{\rho_0(\rho_1-1)}{(\rho_1-\rho_0)}}$$

$Q$  : Corrected flow rate

$Q_0$  : Flow rate of the measuring liquid

$\rho_0$  : Density of the measuring liquid (g/cm<sup>3</sup>)

$\rho_1$  : Density of the float (g/cm<sup>3</sup>)

## Table of float density

Float material	Fluorocarbon resin	Glass	Ruby	PVC	Stainless steel	Titanium	MA276 (equivalent to Hastelloy C)	Stainless steel AM7000
Density (g/cm <sup>3</sup> )	2.2	2.67	4	1.45	7.9	4.5	8.2	7.7
Applicable instrument	Glass tube flowmeter						Metal tube flowmeter	

Note: 1. Some models have weights in the float, which increases the density.

2. Some models will be affected by fluids with a viscosity of 1 mPa·s or larger. See the respective product catalogs.

## Properties of gases

	Gas	Molecular formula	Density: kg/m <sup>3</sup> (nor) at 0°C, 0 MPa	Viscosity (mPa·s)		Gas	Molecular formula	Density: kg/m <sup>3</sup> (nor) at 0°C, 0 MPa	Viscosity (mPa·s)		
				at 0°C	at 20°C				at 0°C	at 20°C	
Inorganic compounds	Ammonia	NH <sub>3</sub>	0.7713	0.0093	0.0100	Organic compounds	Acetylene	C <sub>2</sub> H <sub>2</sub>	1.171	0.0096	0.0102
	Argon	Ar	1.783	0.0212	0.0222		Acetone	C <sub>3</sub> H <sub>6</sub> O	2.593	0.0066	–
	Nitrous oxide	N <sub>2</sub> O	1.988	0.0137	0.0146		Isobutane	C <sub>4</sub> H <sub>10</sub>	2.595	0.0069	0.0074
	Nitrogen oxide	NO	1.340	0.0179	0.0188		Isopropyl alcohol	C <sub>3</sub> H <sub>8</sub> O	2.683	0.0070	–
	Carbon monoxide	CO	1.250	0.0166	0.0177		Ethanol	C <sub>2</sub> H <sub>6</sub> O	2.057	0.0075	–
	Carbon dioxide	CO <sub>2</sub>	1.977	0.0138	0.0147		Ethane	C <sub>2</sub> H <sub>6</sub>	1.356	0.0086	0.0092
	Sulfurous acid gas	SO <sub>2</sub>	2.927	0.0116	0.0126		Ethyl ether	C <sub>4</sub> H <sub>10</sub> O	3.309	0.0068	–
	Hydrogen chloride	HCl	1.639	0.0131	0.0143		Ethylene	C <sub>2</sub> H <sub>4</sub>	1.260	0.0094	0.0101
	Chloride	Cl <sub>2</sub>	3.214	0.0123	0.0132		Ethyl chloride	C <sub>2</sub> H <sub>5</sub> Cl	2.880	0.0094	–
	Air (AIR)	(AIR)	1.293	0.0171	0.0181		Methyl chloride	CH <sub>3</sub> Cl	2.308	0.0098	0.0106
	Oxygen	O <sub>2</sub>	1.429	0.0192	0.0203		Methylene chloride	CH <sub>2</sub> Cl <sub>2</sub>	3.792	0.0091	0.0099
	Cyanogen	C <sub>2</sub> N <sub>2</sub>	2.335	0.0093	–		Chloroform	CHCl <sub>3</sub>	5.329	0.0093	0.0100
	Hydrogen bromide	HBr	3.645	0.0170	–		Butane	C <sub>4</sub> H <sub>10</sub>	2.703	0.0069	0.0074
	Bromine	Br <sub>2</sub>	7.139	0.0146	0.0153		Propane	C <sub>3</sub> H <sub>8</sub>	2.020	0.0075	0.0080
	Hydrogen	H <sub>2</sub>	0.08994	0.0084	0.0088		Propyl alcohol	C <sub>3</sub> H <sub>8</sub> O	2.683	0.0068	–
Nitrogen	N <sub>2</sub>	1.251	0.0166	0.0175	Propylene	C <sub>3</sub> H <sub>6</sub>	1.879	0.0078	0.0084		
Fluorine	F <sub>2</sub>	1.696	–	–	Hexane	C <sub>6</sub> H <sub>14</sub>	3.847	0.0059	–		
Hydrogen sulfide	H <sub>2</sub> S	1.539	0.0117	0.0124	Benzene	C <sub>6</sub> H <sub>6</sub>	3.488	0.0068	0.0074		
Helium	He	0.1785	0.0186	0.0196	Pentane	C <sub>5</sub> H <sub>12</sub>	3.221	0.0062	–		
					Methanol	CH <sub>4</sub> O	1.430	0.0087	–		
					Methane	CH <sub>4</sub>	0.7168	0.0102	0.0108		
					Methyl ether	C <sub>2</sub> H <sub>6</sub> O	2.057	0.0085	0.0091		
					Utility gas	13A	0.8407	–	0.0105		

# LEVEL MEASUREMENT AND CONTROL INSTRUMENTS

A wide variety of instruments are available for various level measurement applications.

The following symbols are applicable to level measurement and control instruments.

## Explosion-proof

**Ex d** : Flameproof types available      **Ex i** : Intrinsically safe types available

Contact us for instruments for bonded tanks and high-pressure applications.

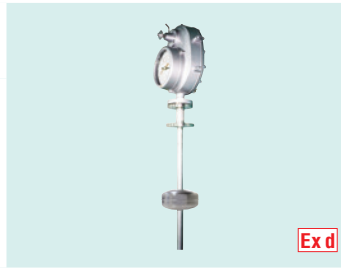
## Float Type Level Meter

### Float & Tape Type Level Meter (Tank Gauge)

#### FT/FP-1000 series FT-2000 series



Ex d



Ex d

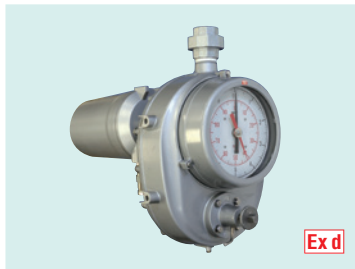


Ex d

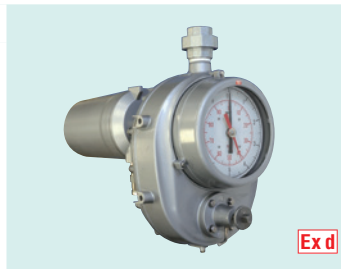
Model	<b>FT-1000</b>	<b>FP-1000</b>	<b>FT-2000</b>
Function	·Local indication	·Current output ·Alarm output	·Pneumatic output ·Digital output
Measuring range	3 m		
	30 m	10 m	30 m
Temperature (at the wetted parts)	-196 to 400°C	0 to 150°C	-196 to 400°C
Pressure	Standard: For low pressure applications Option: For high pressure applications		
Accuracy	± 3 mm	±10 mm	±1.5 mm
Process connection	·Rc 1-1/2 ·Flange 40 mm (1-1/2")		
Standard float material	SUS304		
Optional float material	SUS316, SUS316L, PVC		SUS316, SUS316L

### Analog Transmitter

#### TR/AT series



Ex d



Ex d



Model	<b>TR-210, TR-221 to 226</b>	<b>TR-101 to 106</b>	<b>AT-101W</b>
Power supply / Supply air	24 V DC	-	Pneumatic pressure: 0.14 MPa
Function	·Current output ·Alarm output	·Alarm output	·Pneumatic output
Output	4 to 20 mA DC	Alarm contact: 1 to 6 points	Pneumatic output: 20 to 100 kPa

### Digital Transmitter

#### DM4N series



Model	<b>DM4N-1</b>	<b>DM4N-2</b>	<b>DM4N-3</b>
Power supply	20 to 35 V DC	85 to 264 V AC	
Function	Digital output: Level · Temperature · Alarm		
Communication	One-way communication	Two-way communication	One-way communication
Measuring range	0 to 40 m, 0 to 60 m		

**Magnet Float Type Level Transmitter**

**FP-7100 series**



<b>Model</b>		<b>FP-7100</b>
<b>Power supply</b>		24 V DC
<b>Function</b>		Level measurement
<b>Output</b>		4 to 20 mA DC
<b>Measuring range</b>	Min.	300 mm
	Max.	5000 mm
<b>Temperature (at the wetted parts)</b>		<ul style="list-style-type: none"> <li>·SUS + 0 to 100°C</li> <li>·PVC + 0 to 60°C</li> <li>·PFA + 0 to 100°C</li> </ul>
<b>Pressure</b>		1 MPa max. (0.2 MPa max. for resin)
<b>Process connection</b>		Flange: 80 mm to 200 mm (3" to 8")
<b>Wetted parts material</b>		SUS304, SUS316, SUS316L, PVC, PFA

**Magnetostrictive Level Transmitter**

**FGY1000**



<b>Model</b>		<b>FGY1000</b>
<b>Power supply</b>		24 V DC
<b>Function</b>		Level measurement, interface measurement
<b>Output</b>		4 to 20 mA DC (2-wire system)/HART (Rev.7)
<b>Measuring range</b>	Min.	250 mm
	Max.	7500 mm
<b>Temperature (at the wetted parts)</b>		<ul style="list-style-type: none"> <li>·SUS: -40 to 125°C</li> <li>·PVC: 0 to 60°C</li> <li>·PFA: 0 to 100°C</li> </ul>
<b>Pressure</b>		2 MPa max.
<b>Process connection</b>		Flange: 50 mm to 200 mm (2" to 8"), Ferrule: 2.5 S to 6.5 S, Screw: R2, G2
<b>Wetted parts material</b>		SUS304, SUS316, SUS316L, Titanium, NW0276, PVC, PFA (tubing)

**LT series**



<b>Model</b>		<b>LT-321</b>
<b>Power supply</b>		24 V DC
<b>Function</b>		Level measurement
<b>Output</b>		4 to 20 mA DC (4-wire system)
<b>Measuring range</b>	Min.	250 mm
	Max.	5000 mm
<b>Temperature (at the wetted parts)</b>		<ul style="list-style-type: none"> <li>·SUS: -40 to 125°C</li> <li>·PVC: 0 to 60°C</li> <li>·PFA: 0 to 100°C</li> </ul>
<b>Pressure</b>		2 MPa max.
<b>Process connection</b>		Flange: 50 mm to 125 mm (2" to 5")
<b>Wetted parts material</b>		SUS304, SUS316, SUS316L, PVC, PFA

**MAG GAUGE Metal Tube Type Level Meter**

**FM series**



<b>Model</b>		<b>FM-1000</b>	<b>FM-3100</b>
<b>Function</b>		<ul style="list-style-type: none"> <li>·Local indication</li> <li>·Alarm output</li> <li>·4 to 20 mA DC</li> <li>·Alarm output + 4 to 20 mA DC</li> </ul>	<ul style="list-style-type: none"> <li>·Local indication</li> <li>·Alarm output</li> </ul>
<b>Measuring range</b>	Min.	250 mm	250 mm
	Max.	4830 mm	2000 mm
<b>Temperature (at the wetted parts)</b>		-10 to 120°C (350°C Max.)	-10 to 120°C
<b>Pressure</b>		20 MPa max.	1 MPa max.
<b>Process connection</b>		Flange 25 mm (1") (standard)	Flange 10 mm to 25 mm (3/8" to 1")
<b>Chamber material</b>		<ul style="list-style-type: none"> <li>·SUS304, SUS316, SUS316L</li> <li>·PVC (HT-PVC)</li> <li>·SUS + PVC lining</li> <li>·SUS + ETFE lining</li> <li>·SUS + PFA lining</li> <li>·SUS + PTFE lining</li> <li>·SUS + Glass lining</li> </ul>	SUS304, SUS316, SUS316L

## Displacer Type Level Meter

### Servo-balancing Type Tank Gauge

#### FW9000NN series



Ex d

Model	<b>FW9000NN</b>	
Power supply	100 to 240 V AC	
Function	·Digital output ·Current output	
Measuring range	Min.	5 m
	Max.	60 m
Temperature (at the wetted parts)	-200 to 300°C	
Pressure	·Atmospheric (Low pressure version) ·3 MPa max. (High pressure version)	
Process connection	Flange: 80 mm to 150 mm (3" to 6")	
Pressurized parts material	Low press. version	AC2A, SCS13, SCS14
	High press. version	SCS13, SCS14

### Torque Tube Type Level Meter

#### FST series



Ex d  
Ex i

Model	<b>FST4000</b>	
Power supply	8 to 40 V DC	
Function	·Level measurement ·Interface measurement ·Density measurement	
Output	4 to 20 mA DC	
Measuring range	Min.	300 mm
	Max.	3000 mm
Temperature (at the connect. part)	-196 to 450°C	
Pressure	ASME Class 150 to 2500	
Process connection	Flange: 40 mm to 100 mm (1-1/2" to 4")	
Displacer material	SUS304, SUS316, SUS316L, NW0276, MONEL, PVC	

### Spring-balancing Type Level Meter

#### FS series



Ex d

Model	<b>FS-110</b>	<b>FS-115</b>	<b>FS-313</b>	<b>FS-512</b>	<b>FS-517</b>
Function	·Local indication	·Local indication ·Alarm output	·Local indication ·Pneumatic output 20 to 100 kPa	·Local indication ·Current output	·Local indication ·Current output ·Alarm output
	Level measurement · Interface measurement · Density measurement				
Power supply / Supply air	-	-	0.14 MPa	12 to 30 V DC	
Measuring range	Min.	300 mm			
	Max.	3000 mm			
Temperature (at the wetted parts)	-10 to 150°C (-40 to 350°C)				
Pressure	9.8 MPa max.				
Process connection	Flange: 80 mm to 125 mm (3" to 5")				
Displacer material	SUS304, SUS316, SUS316L, MA276, PVC				

## Microwave Level Meter

#### TLR series



Model	<b>TLR7400</b>	<b>TLR7500</b>	<b>TLR5200</b>
Measuring object	Liquid, Paste, Slurry	Liquid, Paste, Slurry	Liquid, Paste, Slurry
Frequency band	24 GHz	80 GHz	10 GHz
Output/Power supply	2-wire, 4 to 20 mA DC / 24V DC		
Measuring range	Min.	0.2 m	1.0 m
	Max.	100 m	30 m
Liquid temperature	-50 to 200°C		
Pressure	· Horn antenna: 0 kPa (abs) to 4 MPa · Drop antenna: 0 kPa (abs) to 4 MPa	· Lens antenna: 0 kPa (abs) to 4 MPa	· Metal horn antenna: 0 kPa (abs) to 4 MPa · Wave horn antenna: 0 kPa (abs) to 1.6 MPa
Wetted part material	SS316L: Process connection, metal horn antenna PTFE, PEEK: Drop antenna	SS316L: Process connection PEEK: Lens antenna	SS316L: Process connection, metal horn antenna PTFE, PP: Wave horn antenna
Process connection	G1-1/2 Flange 40 mm to 200 mm	G3/4 to G3 Flange 40 mm to 200 mm	G1- to 1/2 Flange 50 mm to 200 mm

## Micropulse Level Meter

### TGR/TGF series



Model	TGR3000	TGF2200	TGR4500	TGF1100
Measuring object	Liquid, Slurry, Granules		Liquid	Liquid, Slurry, Granules
Output	4 to 20 mA DC			
Power supply	24 V DC			
Measuring range	Min.	-	-	-
	Max.	-Single rod: 3 m -Twin rod: 3 m -Single cable: 35 m -Twin cable: 8 m -Coaxial: 3 m	-Single rod: 1 m -Twin rod: 1 m -Single cable: 1 m -Twin cable: 1 m -Coaxial: 0.6 m -Single rod: 6 m -Twin rod: 3 m -Single cable: 40 m -Twin cable: 28 m -Coaxial: 6 m	-Single rod: 3 m -Single cable: 24 m -Twin cable: 24 m -Coaxial: 3 m
Temperature (process)	-40 to 200°C	-Single cable: -50 to 200°C -Others: -30 to 150°C	-Single rod, Twin cable: -30 to 200°C -Twin cable: -30 to 150°C	-50 to 100°C
Pressure	0 kPa (abs) to 4 MPa		1.6 MPa max.	0 kPa (abs) to 1.6 MPa
Wetted part material	SS316L	SS316L	SS316	SS316L
Probe material	SS316L	-SS316: Cable -PVDF: Single rod sheath -SS316L: Rod, Coaxial -Hastelloy C-22: Single cable, Coaxial	SS316	SS316, SS316L
Process connection	G 3/4 to 1-1/2, 3/4 to 1-1/2 NPT Flange: 40 mm to 100 mm	G 1/2 to 1-1/2, 1/2 to 1-1/2 NPT Flange 40 mm to 200 mm	G 1 to 1-1/2 1 to 1-1/2 NPT	G 3/4 to 1, 3/4 to 1 NPT

## Ultrasonic Level Meter

### UW series



Model	UW3200	UW5000
Measuring object	Liquid, Slurry	Liquid, Slurry, Powder, Granule, Gravel
Power supply	12 to 24 V DC	100 to 240 V AC
Output	4 to 20 mA DC	4 to 20 mA DC
Measuring range	0.3 to 10 m	0 to 5 m (min.) 0 to 60 m (max.)

## Purge Type Level Meter

### CP series Purge



Model	CP-22-100-B
Supply fluid	Air, N <sub>2</sub>
Supply pressure	0.3 to 0.99 MPa
Standard flow range	0.12 to 1.2 L/min (std) (20°C, 1 atm)
Mounting type	-Panel mount type -U-bolt mount type -Box type -Dual type
Panel material	Sheet steel, SUS304

### PGT Bubbler tube



Model	PGT
Measuring object	Liquid
Max. measuring length	-Stainless st.: 16000 mm -PVC: 4000 mm
Process connection	-Fixed flange: 10 mm to 25 mm JIS10K -Sliding flange: 15 mm to 40 mm JIS10K
Purge connection	Rc 1/4
Material	SUS304, SUS316 PVC



## Level Switch

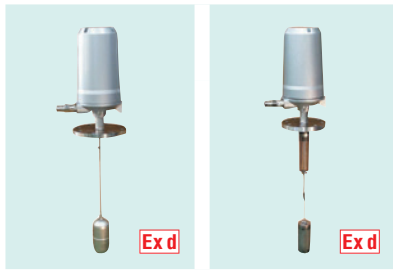
### Float Type / Displacer Type Level Switch

#### FP-4000 series



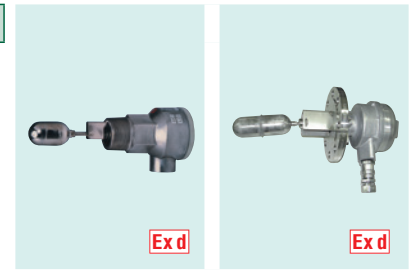
Model	<b>FP-4000</b>	<b>FP-4100</b>	<b>FP-4200</b>
Alarm	1 to 5 points	1 to 6 points	
Max. length of guide pipe	·4.9 m for stainless steel model ·3.9 m for Ex-proof model and resin model		
Contact switch	Reed switch		
Temperature (at the wetted parts)	-5 to 100°C (for stainless steel model)		-5 to 80°C (for stainless steel model)
Pressure	0.66 MPa max.		0.13 MPa max.
Process connection	Flange 50 mm (2")		Flange 80 mm (3")
Float material	SUS304, SUS316, SUS316L, PVC, HT-PVC, PP, PFA	SUS304, SUS316 SUS316L, PVC, HT-PVC, PP, PFA	SUS304, SUS316, SUS316L, PVC, HT-PVC, PP, PTFE, PFA

#### FR series FS series



	Float type	Spring-balancing Displacer type
Model	<b>FR-6000</b>	<b>FS-100</b>
Alarm	1 point	1, 2, 3 or 4 points
Contact switch	Micro switch	Micro switch
Temperature (at the wetted parts, for stainless steel model)	-25 to +400°C	-60 to +400°C
Pressure	up to JIS20K, ASME300	4.9 MPa max.
Process connection	Flange 100 mm (4")	Flange 80 mm to 150 mm (3" to 8")
Float material	SUS316, SUS316L	SUS316, SUS316L, TP340

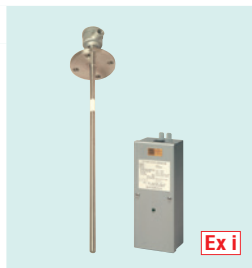
#### FB series



	Float type	Float type
Model	<b>FB-5000</b>	<b>FB-7000</b>
Alarm	1 point	1 point
Contact switch	Reed switch	Micro switch
Temperature (at the wetted parts)	-5 to +90°C	-170 to +400°C
Pressure	2 MPa max.	4 MPa max.
Process connection	R 1-1/2 Flange 40 mm (1-1/2")	Flange 80 mm (3")
Float material	SUS316	SUS316L

### Capacitance Type Level Switch

#### CA-1000 series



Model	<b>CA-1000</b>	<b>CA-1000S</b>
Alarm	1 point	
Temperature (at the wetted parts)	-10 to 300°C	
Pressure	1 MPa max.	
Process connection	Flange: 25mm (1")	
Probe material	SUS304, SUS316, SUS316L	

### Relay Driver

#### RD series



Model	<b>RD-1000</b>
Function	A relay unit to increase electric contact capacity of level switches and other contacts
Combination instrument	Combination with level switches
Power supply	100 / 200 V AC
Output	1 contact

## Peripheral Instruments for Tank Gauging System

### Receiver for Digital Tank Gauging System

#### CATAMS® series



Model	CATAMS	NMR5000	IFX-20000	DIR-530
Function	Tank data monitoring software	Tank Data Receiver	Interface unit	Tank data receiver
Main display mode	<ul style="list-style-type: none"> <li>· Calibration with 12 different screens</li> <li>· Real-time tank data</li> <li>· Data after loading/unloading</li> <li>· Data of all tanks</li> <li>· Liquid level in the bar graph</li> <li>· Data history</li> <li>· Error codes and details</li> <li>· Alarm record</li> <li>· Others</li> </ul>	<ul style="list-style-type: none"> <li>· Main menu</li> <li>· One tank</li> <li>· Tank lists</li> <li>· Tank status</li> <li>· Tank graphs</li> <li>· History</li> <li>· Slot status</li> </ul>	-	<ul style="list-style-type: none"> <li>· For constant monitoring of a single tank</li> <li>· For small tank yards with a few tanks</li> <li>· Interface for host systems</li> </ul>
Power supply	Depending on PC specifications	100 to 240 V AC	90 to 240 V AC	85 to 250 V AC
Host interface	<ul style="list-style-type: none"> <li>· RS-232</li> <li>· LAN</li> <li>· Others</li> </ul>	<ul style="list-style-type: none"> <li>· RS-232C</li> <li>· Parallel</li> <li>· LAN</li> <li>· Others</li> </ul>	RS-232C or LAN 2 ch	RS-232C or RS-485 Others
Number of transmitters	-	255 max.	Max. 32 transmitters per unit (up to 8 units)	16 max.
Communication	-	-	<ul style="list-style-type: none"> <li>· 1 way</li> <li>· 2 way</li> <li>· Communication with third-party products</li> </ul>	<ul style="list-style-type: none"> <li>· 1 way</li> <li>· 2 way</li> </ul>

### Tank-side Indicator

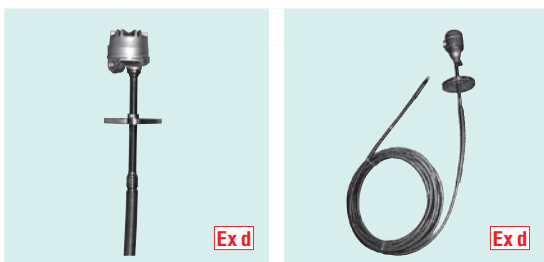
#### DIR series



Model	<b>DIR-110NN</b>
Function	Tank-side indication
Indication	<ul style="list-style-type: none"> <li>· Liquid level</li> <li>· Temperature</li> <li>· Other statuses</li> </ul>
Power supply	100 to 240 V AC
Output	Relay contact (6 points)
Applicable tank gauge	FW9000NN

### Temperature Sensor for Tanks

#### AT series



Model	ATM	ATS
Function	Averaging temperature sensor	Multi-spot type averaging temperature sensor
Measuring range	0 to 100°C	
Probe length	30 m max.	
Number of elements	16 max.	
Process connection	Flange: 40 mm to 100 mm (1-1/2" to 4")	

## MICROCELL Weight Measurement System

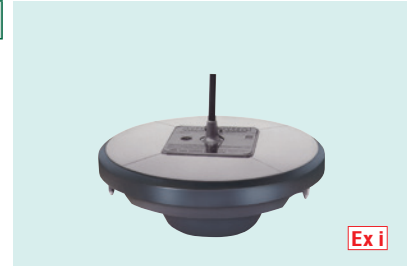
### SVS series



Model	<b>SVS2000</b>
Measuring method	MICROCELL
Measuring object	·Direct measurement of product mass in vessels ·Measuring object: Silo, hopper, etc.
Power supply	100 V AC
Output	4 to 20 mA DC

## Oil Leak Detector

### CSR series



Model	<b>CSR-3005/AS-40</b>
Measuring method	Capacitance type
Measuring object	Floated oil
Power supply	100 / 200 V AC
Output	Contact output
Measuring range	3 to 5 mm oil layer

## Level Gauge for LNG Tanks

### Servo-balancing Type Tank Gauge

#### FW9000NN series



Model	<b>FW9000NN</b>	
Power supply	100 to 240 V AC	
Output	·Digital output ·Current output	
Measuring range	Min.	5 m
	Max.	60 m
Temperature (at the wetted parts)	-200 to 300°C	
Pressure	·Atmospheric (Low pressure version) ·3 MPa max. (High pressure version)	
Process connection	Flange: 80 mm to 150 mm (3" to 6")	
Pressurized parts material	SCS13, SCS14	

#### FW-2200 series



		All-wire type
Model	<b>FW-2200</b>	
Power supply		100 V AC (standard)
Output		Digital output
Measuring range	Min.	30 m
	Max.	60 m
Temperature (at the wetted parts)		-200 to 80°C
Pressure		2 MPa max.
Process connection		Flange: 40 mm (1-1/2")
Pressurized parts material		SCS13, SCS14

## Density Meter

### LNG Density meter



Model	<b>01146</b>
Power supply	85 to 240 V AC
Output	RS485 / 20 mA loop (Modbus protocol)
Measuring range	·Density measurement: 400 to 1000 kg/m <sup>3</sup> ·Liquid level measurement: 0 to 100 m ·Temperature measurement: -200 to +100°C
Temperature (at the wetted parts)	-200 to 65°C
Pressure	350 mbar max.
Process connection	6" ASME 150
Sensor head material	316L SS

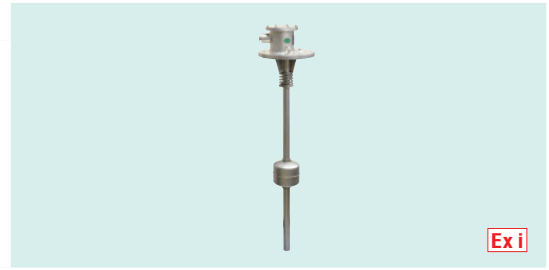
## Marine Use Tank Gauging Systems

### Magnetic Float Type Level Gauge

#### SPT series



Ex i



Ex i

Model	SPT3500N	SPT-7200
Measuring method	·Level: Magnetic float (Hall IC) ·Temperature: Pt 1000 RTD ·Pressure: Ceramic sensor	·Level: Magnetic float (reed switch) ·Temperature: Pt 100 RTD
Measuring object	Level, temperature, and pressure of liquid cargo	Level and temperature of liquid cargo
Indication	2-Line LCD with backlight (Separate indicator is available)	-
Output	2-wire system for power supply and serial BCD signal	Resistance output
Measuring range	·Level: 35 m max. ·Temperature: -25 to 115°C ·Pressure: 80 to 200 kPa	·Level: 25 m max. ·Temperature: -25 to 105°C
Accuracy	·Level: ±20 mm (Precision type: ± 10 mm) ·Temperature: ±1.5°C ·Pressure: ±0.5% F.S.	·Level: ±1% F.S. ·Temperature: ±2°C
Standard material	·Guide pipe: SUS304 ·Flange: SUS304 ·Float: SUS316L	·Guide pipe: SUS304 ·Flange: SUS304 ·Float: SUS316L
Optional material	·Guide pipe: SUS316 / SUS316L ·Flange: SUS316 / SUS316L ·Float: TP340 (LPG specification)	·Guide pipe: SUS316, SUS316L ·Flange: SUS316, SUS316L
Explosion proof	EX ia IIC T6...T4	Ex ia IIC T5, Temperature: I3nG5

### Radar Level Gauge

#### TA series



Model	TA840
Method	Radar
Measuring range	0.5 to 42 m
Resolution	0.1 mm
Accuracy	± 10 mm
Application	For cargo tank
Communication	RS485
Standard material	316L SS
Explosion proof	Intrinsically safe (ATEX)

### High-level Alarming Device

#### FP/MIA series



Ex i

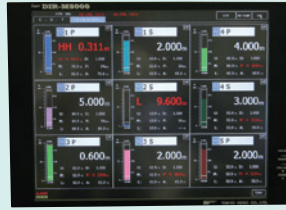


Ex i

Model	FP-7000	MIA-LIDEC
Method	Float type level switch	Acoustic wave type level switch
Sensor	Reed switch	Piezo-electric element
Contact signal	2 points detection (high level and overflow)	Current signal (18 mA in normal conditions/ 6 mA in alarm conditions)
Accuracy	± 10 mm	± 10 mm
Application	·Cargo, slop and fuel tanks ·Bilge alarm ·Cargo and slop tanks, wash-proof	Liquid level detection: High alarm Overflow alarm
Power supply	-	18 to 28 V DC (2-wire)
Standard material	·Float: SUS316 ·Guide pipe: SUS304, SUS316 SUS316L	·Sensor: SUS316L ·Support: SUS304, SUS316, SUS316L
Construction	·Non-explosion-proof ·Intrinsically safe (Ex ia IIC T6)	·Non-explosion-proof ·Intrinsically safe (Ex ia IIC T6)

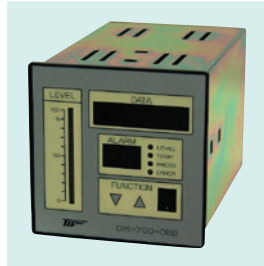
Instrument for Control Rooms

Super DIR series Receiver



Model	<b>Super DIR-M3200</b>	<b>Super DIR-M8000</b>	<b>CALTIS II Windows</b>
LCD display	10.4" touch panel	·10.4" touch panel ·19" touch panel	Delivery: ·Pre-installed PC (or CD-ROM for software only)
Power supply	24VDC		
Max. number of input sensors	32 units (up to 16 units in case of including 4 to 20 mA sensors)	80 units (32 units of SPT-3500 + 48 units of other sensors)	
Connecting instrument (input)	·TA840 ·SPT-3500 ·SPT-7200 ·Others: Level, temperature, and pressure sensors, etc.	·Super DIR-M8000-IF interface unit (SPT-3500, level, temperature, and pressure sensors, etc.)	-
Connecting instrument (output)	·RS232C/RS485/LAN	·Super DIR-M8000-IF interface unit ·LAN-RS232C/RS485	

TAN series DIR series



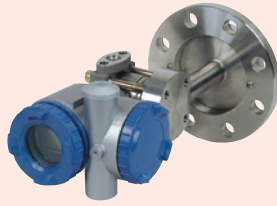
Model	<b>TAN-M1600-RP</b>	<b>DIR-700-DB II</b>
Function	Annunciator unit	Multi-monitor for cargo tanks
Power supply	24 V DC	24 V DC
Output / Indication	Output ·Contact output for buzzers ·CPU trouble self-diagnosis contact output ·Contact output for external alarm lamps	Indication ·Bar graph of level ·Cargo data digital (selectable) ·Alarm status ·Error ·Selected function ·2-color LEDs for identifying alarm locations
Number of input	16	-
Input signal	·Non-voltage contact ·Open collector contact	RS232C (from Super M series)

# RELATED INSTRUMENTS

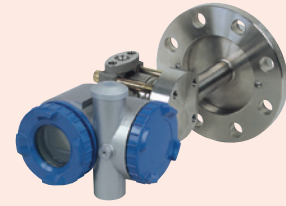


## Level Transmitter

### FCX-AIII series



Ex d  
Ex i



Ex d  
Ex i

Model		FKE	FKY
Measuring object		Liquid	Liquid
Function		·Local indication ·4 to 20 mA (2-wire)	·Local indication ·4 to 20 mA (2-wire)
Measuring range	Min.	0.32 kPa	3 kPa
	Max.	500 kPa	500 kPa
Process connection		Flange: 80 mm, 100 mm (3", 4")	Flange: 40 mm, 50 mm (1-1/2", 2")
Standard material		SUS316	SUS316

## Differential Pressure / Pressure Transmitter

### FCX-A III series



Ex d  
Ex i



Ex d  
Ex i



Ex d  
Ex i

Model		FKC	FKG	FKX
Measuring object		Liquid, Gas, Steam	Liquid, Gas, Steam	Liquid, Gas, Steam
Function		·Local indication ·4 to 20 mA (2-wire)	·Local indication ·4 to 20 mA (2-wire)	·Local indication ·4 to 20 mA (2-wire)
Measuring range	Min.	0.1 kPa	1.3 kPa	3 kPa
	Max.	3000 kPa	50000 kPa	500 kPa
Process connection		Rc 1/4	Rc 1/4	Flange: 40 mm, 50 mm (1-1/2", 2")
Standard material		SUS316	SUS316	SUS316

### DT series



Model		DT
Measuring object		Liquid, Gas
Function		·Local indication ·Current output ·Pulse output
Measuring range	Min.	1 kPa
	Max.	50 kPa
Process connection		Rc 1/4
Standard material		SUS316

## Receiver

### IR/RR series



Model	IR4600	IR-6000	IR1600	RR930N	RR940N
Power supply	·85 to 264 V AC ·12 to 24 V DC	·85 to 264 V AC ·24 V DC	24 V DC	10 to 27 V DC	10 to 27 V DC
Function / Indication	·Flow rate ·Totalizer ·Extraction of square root	·Flow rate ·Totalizer	·Flow rate ·Totalizer	·Flow rate ·Totalizer	·Flow rate ·Totalizer
Input	·Open collector pulse ·4 to 20 mA DC ·1 to 5 V DC ·0 to 5 V DC (optional) ·Voltage pulse	·Open collector pulse ·4 to 20 mA DC ·1 to 5 V DC ·0 to 5 V DC (optional) ·Voltage pulse	·Open collector pulse ·Voltage pulse	·Open collector pulse	·Open collector pulse
Output	·4 to 20 mA DC ·Pulse ·Alarm	·4 to 20 mA DC ·Pulse ·Alarm	·Alarm ·4 to 20 mA DC (optional)	Re-output of pulse	Selectable from 4 to 20 mA DC or Voltage pulse
Power supply for the sensor	24 V DC	24 V DC	12 V DC	12 V DC	12 V DC

## Products

---

### Flow Measurement and Control Instruments

- Metal tube variable area flowmeter
- Purgemeter
- Flow switch / Flow monitor
- Ultrasonic flowmeter
- Coriolis mass flowmeter
- Thermal flowmeter
- Turbine flowmeter
- Constant flow valve
- Flow measurement system for automobile bench test
- Direct reading type variable area flowmeter
- Purge set
- Differential pressure flowmeter (Orifice type, V-Cone)
- Electromagnetic flowmeter
- Vortex flowmeter
- Thermal mass flowmeter/controller
- Flowmeter for air conditioning
- Sight glass

### Level Measurement and Control Instruments

- Float-tape type level meter
- Magnetostrictive level transmitter
- Torque tube type level meter
- Purge type level meter
- Microwave level meter
- Ultrasonic level meter
- Tank gauging system
- Magnet float type level meter
- Metal tube type level meter
- Servo-balancing displacer type level gauge
- Spring-balancing displacer type level meter
- Micro pulse meter
- Level switch
- Marine cargo monitoring system

### Related instruments

- Pressure transmitter
- Level transmitter
- Differential pressure transmitter
- Receiver

Individual catalogues or Technical Guidances are available for all the products introduced in this general guidance.  
Contact our agency or TOKYO KEISO.

\* Specification is subject to change without notice.

**TIV TOKYO KEISO CO., LTD.**

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

URL : <http://www.tokyokeiso.co.jp>

Certification

- ISO 9001
- ISO 14001

SG-1009-E0

FEB 2019 K