

Orifice plate

Model : F100

Spec. sheet no. **FD01-01**

Description

Orifice plates are widely used for flow measurement as they provide the simplest and the most economical means of flow detection. Orifice plates are available in the concentric type that the round opening (Bore) of the orifice plate is positioned concentrically with the center of the pipe and the opening edge (Bore edge) is available either in the concentric square edge type (Sharp, square edge type) or in the quadrant edge type (Round edge type). Orifice plates are also available in the eccentric type that the opening of the orifice is shifted from the center of the pipe. They also are available in the segmental type that the opening is a circular segment and the orifice is comparable to a partially opened gate valve.



Specification

Orifice bore type

Concentric square edged orifice
Quadrant edged orifice
Eccentric orifice
Segmental orifice

Plate thickness

3, 6, 9 and 12 mm

Tab handle

Welded to orifice plate

Flow calculation standards

ISO 5167-1 and 2 2003
AGA-3
ASME MFC-3M and 14M
JIS Z 8762
BS 1042

Plate material

Standard : 304SS and 316L SS
Non-standard : Monel, Hastelloy C, Titanium and etc.

Drain and vent hole

Per ASME recommendations
Not drilled for orifice bores smaller than 25.4 mm

Flange ratings

JIS 10, 16, 20, 30, 40, and 63K
ANSI class 150, 300, 600, 900, 1,500 and 2,500 Lb

Markings

Upstream side of tab handle stamped "Upstream" and with bore type and size, line size, tag number and flange rating

Pressure taps

Flange taps
Corner taps
Vena contract taps
1D and ½D (Radius) taps
Pipe taps (2½D and 8D)

Special markings

Special marking may be furnished to meet special requirement

Orifice plate application summary

Orifice type	Fluid type					Nominal line size normally used	
	Gas and vapor		Liquid				
	Clean	Dirty	Clean	Dirty	Viscous	JIS (mm)	ANSI (inch)
Concentric - Square edge	E	X	E	O	X	40 ~ 1,500	1½ ~ 60
Concentric - Quadrant edge	X	X	E	O	E	40 ~ 250	1½ ~ 10
Eccentric - Square edge	O	O	O	E	X	100 ~ 350	4 ~ 14
Segmental - Square edge	O	O	O	E	X	100 ~ 350	4 ~ 14

Main order

Ordering information

1. Base model

F100 Orifice plate

2. Type

P1 Orifice plate

3. Line size

JIS	mm	ANSI	inch	DIN	mm
J015	15A	A001	½B	D015	15A
J020	20A	A002	¾B	D020	20A
J025	25A	A003	1B	D025	25A
J040	40A	A004	1½B	D040	40A
J050	50A	A005	2B	D050	50A
J065	65A	A006	2½B	D065	65A
J080	80A	A007	3B	D080	80A
J100	100A	A008	4B	D100	100A
J125	125A	A009	5B	D125	125A
J150	150A	A010	6B	D150	150A
J200	200A	A011	8B	D200	200A
J250	250A	A012	10B	D250	250A
J300	300A	A013	12B	D300	300A
J350	350A	A014	14B	D350	350A
J400	400A	A015	16B	D400	400A
J450	450A	A016	18B	D450	450A
J500	500A	A017	20B	D500	500A
J600	600A	A018	24B	D600	600A
J700	700A	A019	28B	D700	700A
J800	800A	A020	32B	D800	800A
J000	1,000A	A021	40B	D000	1,000A
XXXX	Other				

4. Bore type

C Concentric edge
E Eccentric
Q Quadrant edge
S Segmental

5. Flange rating

JIS	ANSI	DIN
J010 JIS 10K	A010 ANSI 150 Lb	P010 PN 10
J016 JIS 16K	A020 ANSI 300 Lb	P016 PN 16
J020 JIS 20K	A030 ANSI 600 Lb	P025 PN 25
J030 JIS 30K	A040 ANSI 900 Lb	P040 PN 40
J040 JIS 40K	A050 ANSI 1,500 Lb	
J063 JIS 63K	A060 ANSI 2,500 Lb	

6. Material

4 304SS
6 316L SS
H Hastelloy-C
M Monel
O Other

7. Drain / vent

D Drain (Not drilled for orifice bores smaller than 25.4 mm)
V Vent (Not drilled for orifice bores smaller than 25.4 mm)
N None

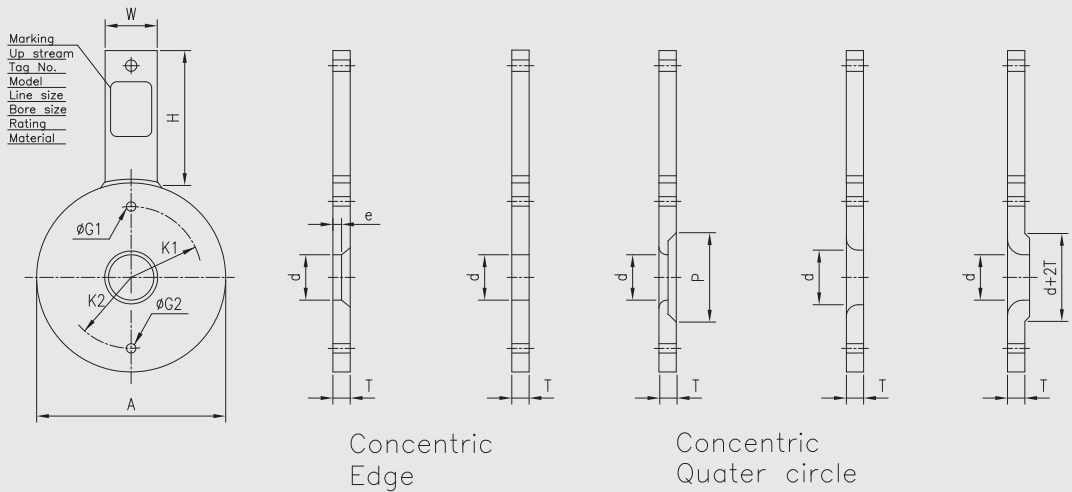
8. Options

O Other
N None

1	2	3	4	5	6	7	8
F100	P1	J150	C	J020	6	D	O

Sample ordering code

Dimension



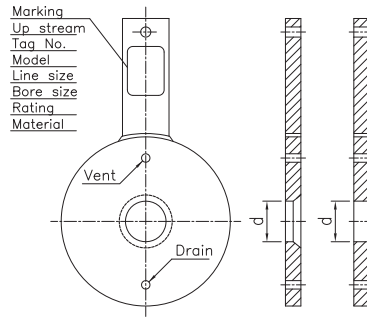
* d , $K1$, $K2$, $G1$, $G2$: Refer to Specification Sheet

unit : mm

Nominal Dia	Plate O.D.A						Plate THK' T	Edge e	Tap Handle	
	150#	300#	600#	900#	1500#	2500#			W	H
1/2B	47.8	53.8	53.8	63.6	63.6	69.9	3.0	—	25	95
3/4B	57.3	66.7	66.7	69.9	69.9	76.3	3.0	—	25	95
1B	66.5	73.0	73.0	79.4	79.4	85.8	3.0	0.5	25	95
1-1/2B	85.8	95.3	95.3	98.6	98.6	117.5	3.0	0.5	25	95
2B	104.6	111.1	111.1	142.8	142.8	146.1	3.0	0.5	25	95
2-1/2B	123.6	130.4	130.4	165.1	165.1	168.3	3.0	0.5	25	95
3B	136.6	149.1	149.1	168.3	174.6	196.9	3.0	1.0	25	95
4B	174.6	181.0	193.7	206.4	209.6	235.0	3.0	1.0	38	120
5B	197.0	216.0	241.5	247.7	260.4	279.5	3.0	1.5	38	120
6B	222.5	250.7	266.7	288.9	282.6	317.5	3.0	1.5	38	120
8B	279.5	308.0	320.7	358.8	352.4	387.4	3.0	1.5	38	120
10B	339.8	361.9	400.1	435.0	435.0	476.5	6.0	—	38	140
12B	409.8	422.3	457.3	498.5	520.7	549.5	6.0	—	38	140
14B	450.6	485.8	492.2	520.0	577.9	—	6.0	—	38	140
16B	514.1	539.8	565.2	574.7	641.4	—	6.0	—	38	160
18B	549.4	597.0	612.8	637.9	704.9	—	9.0	—	38	160
20B	606.4	654.1	682.6	698.5	755.7	—	9.0	—	38	190
22B	660.5	704.9	733.5	—	—	—	9.0	—	38	190
24B	617.8	774.7	790.6	838.2	901.7	—	9.0	—	38	190

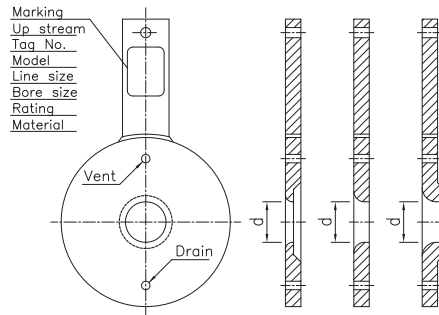
Concentric orifice plate

Simple-structured with high precision, this orifice plate can be easily mounted and dismantled. In strict conformance with applicable standards, it is precisely finished to have required shape, size, surface, roughness and flatness. For differential pressure measurement, it is combined with flange taps, vena contract taps or corner taps.



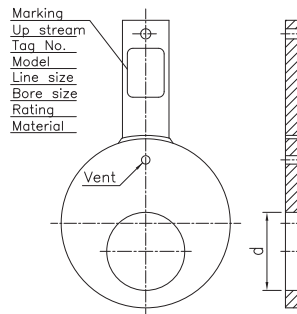
Quadrant edge orifice plate

The inlet edge of the bore of this orifice plate is rounded with a radius of a quarter circle. This orifice plate is principally used for measuring flow rates of low Reynolds numbers. Flange taps or corner taps are used.



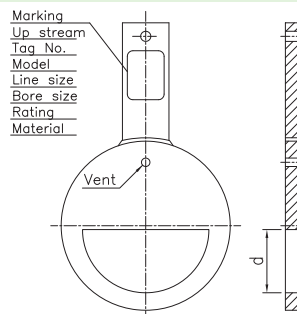
Eccentric orifice plate

For liquids containing solid particles that are liable to settle, or for vapors liable to deposit water condensate, this orifice plate is installed with its eccentric bore bottom flush with the bore bottom of the piping, so that the sedimentation of such inclusions is avoided. Likewise, for gases or vapors, it may be installed with its eccentric bore top flush with the bore top of the piping to avoid the stay of gas or vapor in its vicinity. Flange taps or vena contract taps are used with.



Segmental orifice plate

The vertical section of the bore of this orifice plate is a semicircle to perform the same function as the eccentric orifice plate. Used for the similar purposes. Flange taps or vena contract taps are employed to take out fluid pressures.



Orifice plate with ring

Model : F200

Spec. sheet no. FD02-01

Description

Orifice ring assemblies are used for flow measurement of smaller or medium sized pipes at lower pressure. Each assembly consists of one orifice plate and two orifice rings. Differential pressure is taken out in a corner tap system. Orifice block, which are of a unit-construction type and provide higher pressure ratings than the orifice ring assemblies, also are available.



Specification

Orifice bore type

Concentric square edged orifice
Quadrant edged orifice
Minimum quadrant edged orifice diameter 4.5 mm
Minimum quadrant edged radius 0.5 mm

Flow calculation standards

ISO 5167-1 and 2 2003
AGA-3
ASME MFC-3M and 14M
JIS Z 8762
BS 1042

Flange ratings

JIS 5, 10, 16, and 20K
ANSI (or JPI) 150 and 300 Lb
(Note: ANSI and JPI ring dimensions are identical)

Pressure taps

Corner taps

Plate thickness

3, 6, 9 and 12 mm

Tab handle

Welded to orifice plate

Pressure tab nipples

Pipe size : 15 mm ($\frac{1}{2}$ inch), Sch 40 and 80
Length : 75 and 150 mm
Tap connections : $\frac{1}{2}$ PT and $\frac{1}{2}$ NPT male
socket welding and butt welding
flange connection

Drain and vent hole

Per ASME recommendations
Not drilled for orifice bores smaller than 25.4 mm

Markings

Upstream side of tab handle stamped "Upstream" and with bore type and size, line size, tag number and flange rating.

Special markings

Special marking may be furnished to meet special requirements

Materials

Ring and pressure tap nipple : 304SS and 316SS
Plate : 304SS, 316L SS, Monel and other
Tab handle : 304SS and 316L SS

Gaskets

Material : Non-Asbestos and Teflon
Thickness : 1.5, 2.0 and 3.0 mm

Main order

Ordering information

1. Base model

F200 Orifice plate with ring

2. Type

P2 Orifice plate with ring

3. Line size

JIS	mm	ANSI	inch	DIN	mm
J015	15A	A001	½B	D015	15A
J020	20A	A002	¾B	D020	20A
J025	25A	A003	1B	D025	25A
J040	40A	A004	1½B	D040	40A
J050	50A	A005	2B	D050	50A
J065	65A	A006	2½B	D065	65A
J080	80A	A007	3B	D080	80A
J100	100A	A008	4B	D100	100A
J125	125A	A009	5B	D125	125A
J150	150A	A010	6B	D150	150A
J200	200A	A011	8B	D200	200A
J250	250A	A012	10B	D250	250A
J300	300A	A013	12B	D300	300A
J350	350A	A014	14B	D350	350A
J400	400A	A015	16B	D400	400A
J450	450A	A016	18B	D450	450A
J500	500A	A017	20B	D500	500A
J600	600A	A018	24B	D600	600A
J700	700A	A019	28B	D700	700A
J800	800A	A020	32B	D800	800A
J000	1,000A	A021	40B	D000	1,000A
XXXX	Other				

4. Bore type

C Concentric edge
E Eccentric
Q Quadrant edge
S Segmental

5. Flange rating

JIS		ANSI		DIN	
J010	JIS 10K	A010	ANSI 150 Lb	P010	PN 10
J016	JIS 16K	A020	ANSI 300 Lb	P016	PN 16
J020	JIS 20K	A030	ANSI 600 Lb	P025	PN 25
J030	JIS 30K	A040	ANSI 900 Lb	P040	PN 40
J040	JIS 40K	A050	ANSI 1,500 Lb		
J063	JIS 63K	A060	ANSI 2,500 Lb		

6. Plate material

4 304SS
6 316L SS
H Hastelloy-C
M Monel
O Other

7. Ring material

4 304SS
6 316L SS
0 Option

8. Drain / vent

D Drain (Not drilled for orifice bores smaller than 25.4 mm)
V Vent (Not drilled for orifice bores smaller than 25.4 mm)
N None

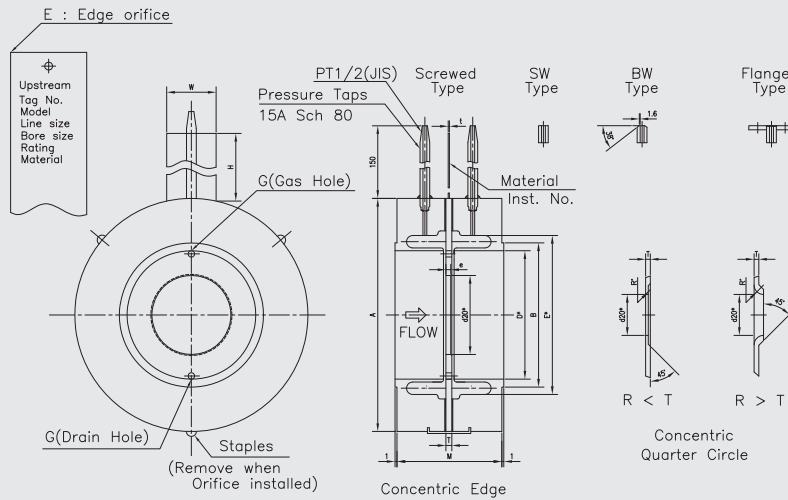
9. Options

1 Nipple (75L + 150L)
2 Nipple (150L + 150L)
3 Tap valve
N None

1	2	3	4	5	6	7	8	9
F200	P2	A005	C	A020	6	4	V	2

Sample ordering code

Dimension



*d20 : Orifice Dia.AT 20°C : Refer to orifice calculated sheet

D : Inside dia. of ring

E : Inside dia. of gasket

Ring orifices for FOR JIS 5K Flange

UNIT : mm

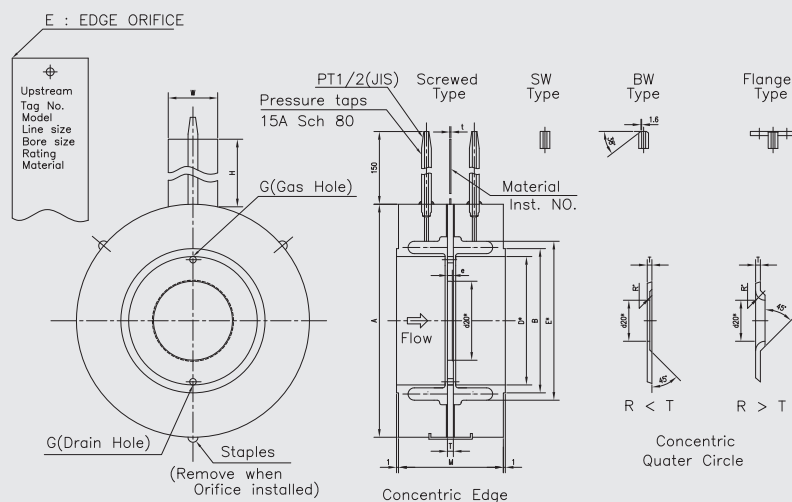
NOMINAL PIPE SIZE	OUTSIDE DIAM. OF RINGS AND PLATE A	DIAM OF GASKET STAY B	THICKNESS OF EDGES e	DIAM OF HOLE G	FACE TO FACE M	THICKNESS OF PLATE T	WIDTH OF TAB HANDLE W	HIGHT OF TAB HANDLE H	THICKNESS OF TAB HANDLE t
15	—	—	—	—	—	—	—	—	—
20	—	—	—	—	—	—	—	—	—
25	65	33	0.2~0.4	—	75	2	25	100	3
32	78	42	0.3~0.5	1.6	75	2	25	100	3
40	83	48	0.3~0.5	1.6	75	2	25	100	3
50	93	60	0.5~0.8	1.6	75	2	25	100	3
65	118	73	0.5~0.8	1.6	75	3	25	100	3
80	129	88	0.5~0.8	1.6	75	3	25	100	3
90	139	101	0.5~0.8	1.6	75	3	25	100	3
100	149	114	0.8~1.2	1.6	75	3	38	100	3
125	184	141	0.8~1.2	1.6	75	3	38	130	3
150	214	168	0.8~1.2	1.6	75	3	38	130	3
175	240	196	1.5~2.0	1.6	76	4	38	130	3
200	260	219	1.5~2.0	1.6	76	4	38	130	3
225	285	246	1.5~2.0	1.6	76	4	38	160	6
250	325	273	e = T	2.0	76	4	38	160	6
300	370	323	e = T	2.5	76	4	38	160	6

Ring orifices for JIS 10K Flange

UNIT : mm

NOMINAL PIPE SIZE	OUTSIDE DIAM. OF RINGS AND PLATE A	DIAM OF GASKET STAY B	THICKNESS OF EDGES e	DIAM OF HOLE G	FACE TO FACE M	THICKNESS OF PLATE T	WIDTH OF TAB HANDLE W	HIGHT OF TAB HANDLE H	THICKNESS OF TAB HANDLE t
15	58	21	0.2~0.3	—	75	2	25	100	3
20	63	27	0.2~0.4	—	75	2	25	100	3
25	74	33	0.2~0.4	—	75	2	25	100	3
32	84	42	0.3~0.5	1.6	75	2	25	100	3
40	89	48	0.3~0.5	1.6	75	2	25	100	3
50	104	60	0.5~0.8	1.6	75	2	25	100	3
65	124	73	0.5~0.8	1.6	75	3	25	100	3
80	134	88	0.5~0.8	1.6	75	3	25	100	3
90	144	101	0.5~0.8	1.6	75	3	25	100	3
100	159	114	0.8~1.2	1.6	75	3	38	100	3
125	190	141	0.8~1.2	1.6	75	3	38	130	3
150	220	168	0.8~1.2	1.6	75	3	38	130	3
175	245	196	1.5~2.0	1.6	76	4	38	130	3
200	270	219	1.5~2.0	1.6	76	4	38	130	3
225	290	246	1.5~2.0	1.6	76	4	38	160	6
250	333	273	e = T	2.0	76	4	38	160	6
300	378	323	e = T	2.5	76	4	38	160	6

Dimension



*d20 : Orifice Dia.AT 20°C : Refer to orifice calculated sheet

D : Inside dia. of ring

E : Inside dia. of gasket

Ring orifices for JIS 16K 20K Flange

UNIT : mm

Nominal Pipe Size	Outside Dia. of Ring and Plate A	Dia. of Gasket Slay B	Thickness of Edges e	Dia. of Hole C	Face to Face M	Thickness of Plate t	Width of Tab Handle W	Height of Tab Handle H	Thickness of Tab Handle t
15	58	21	0.2~0.3	—	75	2	25	100	3
20	63	27	0.2~0.4	—	75	2	25	100	3
25	74	33	0.2~0.4	—	75	2	25	100	3
32	84	42	0.3~0.5	1.6	75	2	25	100	3
40	89	48	0.3~0.5	1.6	75	2	25	100	3
50	104	60	0.5~0.8	1.6	75	2	25	100	3
65	124	73	0.5~0.8	1.6	75	3	25	100	3
80	140	88	0.5~0.8	1.6	75	3	25	100	3
90	150	101	0.5~0.8	1.6	75	3	25	100	3
100	165	114	0.8~1.2	1.6	75	3	38	100	3
125	203	141	0.8~1.2	1.6	75	3	38	130	3
150	238	168	0.8~1.2	1.6	75	3	38	130	3
200	283	219	1.5~2.0	1.6	76	4	38	130	3
250	356	273	e = T	2.0	76	4	38	130	3
300	406	323	e = T	2.5	76	4	38	160	6

Ring orifices JIS ANSI 150 Lb Flange

UNIT : mm

Nominal Pipe Size	Outside Dia. of Ring and Plate A	Dia. of Gasket Slay B	Thickness of Edges e	Dia. of Hole C	Face to Face M	Thickness of Plate t	Width of Tab Handle W	Height of Tab Handle H	Thickness of Tab Handle t
1/2	—	—	—	—	—	—	—	—	—
3/4	—	—	—	—	—	—	—	—	—
1	66.7	33	0.2~0.4	—	75	2	25	100	3
1 1/4	76.2	42	0.3~0.5	1.6	75	2	25	100	3
1 1/2	85.7	48	0.3~0.5	1.6	75	2	25	100	3
2	104.8	60	0.5~0.8	1.6	75	2	25	100	3
2 1/2	123.8	73	0.5~0.8	1.6	75	3	25	100	3
3	136.5	88	0.5~0.8	1.6	75	3	25	100	3
3 1/2	161.9	101	0.5~0.8	1.6	75	3	25	100	3
4	174.6	114	0.8~1.2	1.6	75	3	38	100	3
5	196.9	141	0.8~1.2	1.6	75	3	38	130	3
6	222.3	168	0.8~1.2	1.6	75	3	38	130	3
8	279.4	219	1.5~2.0	1.6	76	4	38	130	3
10	339.7	273	e = T	2.0	76	4	38	130	3
12	409.6	323	e = T	2.5	76	4	38	160	6

Ring type joint orifice plate

Model : F300

Spec. sheet no. **FD03-01**

Description

A holding ring assembly is a combination of a holder ring and an orifice plate designed for Ring type joint (RTJ) flanges of ANSI or JPI specifications. The holding ring has a function of holding the orifice plate and also a function as a gasket to prevent leakage of the process fluid.

This metallic sealing system is applicable to a fluid of high temperature and high pressure, the pressure tapping system is normally the flange tap type.



Specification

Orifice bore type

Concentric square edged orifice
Quadrant edged orifice

Flow calculation standards

ISO 5167-1 and 2 2003
AGA-3
ASME MFC-3M and 14M
JIS Z 8762
BS 1042

Flange ratings

ANSI class 300, 600, 900 and 1,500 Lb
Ring type joint (RTJ)

Pressure taps

Flange taps

Plate thickness

3, 6, 9 and 12 mm

Tab handle

Welded to ring

Holding ring

Riveted to plate
Types : Octagonal or oval

Drain and vent hole

Per ASME recommendations
Not drilled for orifice bores smaller than 25.4 mm

Markings

Upstream side of tab handle stamped with "Upstream" and with bore type and size, line size, tag number and flange rating

Special markings

Special marking may be furnished to meet Specific requirement

Materials

Plate : 304SS and 316L SS
Holding ring : Soft Iron, 304SS and 316SS
Rivets : 304SS and 316SS
Tab Handle : 304SS and 316SS

Nominal pipe sizes available

Orifice bore type	Pipe size	Pipe diameter given in the applicable standards
Concentric square edge	1½" ~ 14"	40 ~ 350 mm
Quadrant edge	1½" ~ 6"	40 ~ 150 mm

Main order

Ordering information

1. Base model

F300 Ring type joint orifice plate

2. Type

P3 Plate with holding ring (Oval type)
P4 Plate with holding ring (Octagonal type)

3. Line size

JIS	mm	ANSI	inch	DIN	mm
J015	15A	A001	½B	D015	15A
J020	20A	A002	¾B	D020	20A
J025	25A	A003	1B	D025	25A
J040	40A	A004	1½B	D040	40A
J050	50A	A005	2B	D050	50A
J065	65A	A006	2½B	D065	65A
J080	80A	A007	3B	D080	80A
J100	100A	A008	4B	D100	100A
J125	125A	A009	5B	D125	125A
J150	150A	A010	6B	D150	150A
J200	200A	A011	8B	D200	200A
J250	250A	A012	10B	D250	250A
J300	300A	A013	12B	D300	300A
J350	350A	A014	14B	D350	350A
J400	400A	A015	16B	D400	400A
J450	450A	A016	18B	D450	450A
J500	500A	A017	20B	D500	500A
J600	600A	A018	24B	D600	600A
J700	700A	A019	28B	D700	700A
J800	800A	A020	32B	D800	800A
J000	1,000A	A021	40B	D000	1,000A
XXXX	Other				

4. Bore type

C Concentric edge
E Eccentric
Q Quadrant edge
S Segmental

5. Flange rating

JIS		ANSI		DIN	
J010	JIS 10K	A010	ANSI 150 Lb	P010	PN 10
J016	JIS 16K	A020	ANSI 300 Lb	P016	PN 16
J020	JIS 20K	A030	ANSI 600 Lb	P025	PN 25
J030	JIS 30K	A040	ANSI 900 Lb	P040	PN 40
J040	JIS 40K	A050	ANSI 1,500 Lb		
J063	JIS 63K	A060	ANSI 2,500 Lb		

6. Plate material

4 304SS
6 316L SS
H Hastelloy-C
M Monel
O Other

7. Ring material

4 304SS
6 316L SS
H Hastelloy-C
M Monel
O Other

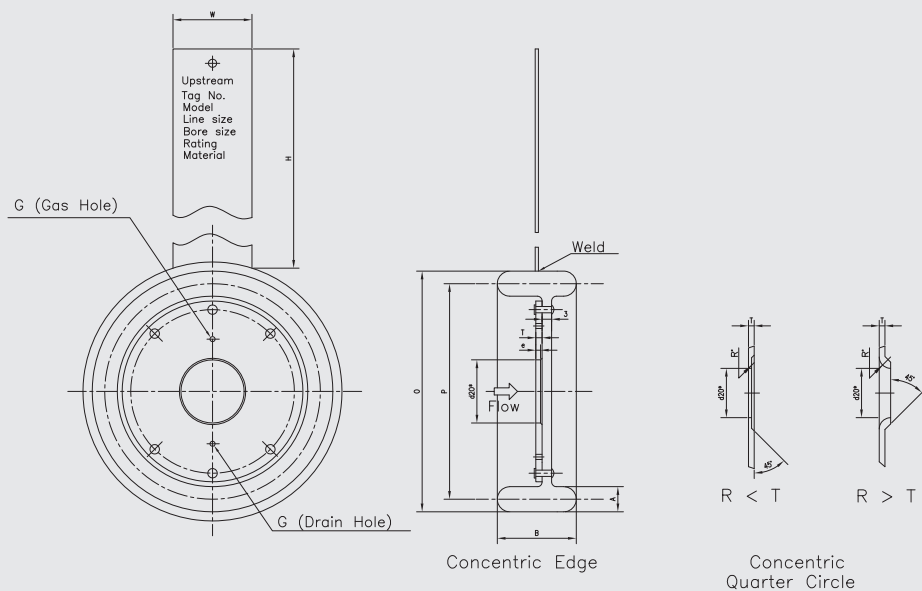
8. Drain / vent

D0 Drain (Not drilled for orifice bores smaller than 25.4 mm)
V0 Vent (Not drilled for orifice bores smaller than 25.4 mm)
N0 None

1	2	3	4	5	6	7	8
F300	P3	J150	C	J020	6	6	D0

Sample ordering code

Dimension



*d20 : Orifice dia.AT 20°C : Refer to orifice claculated sheet

For ANSI 300 (Oval type)

Nominal Pipe Size	HOLDING RING				Thickness of Edge e	Dia. of Hole G	Thickness of Plate T	Tab handle		
	Outside dia. D	Pitch dia. P	Width A	Hight B				Width W	Hight H	Thickness L
1 1/2	76.2	68.3	7.9	27	0.3~0.5	1.6	3	25	110	3
2	93.7	82.6	11.1	27	0.5~0.8	1.6	3	25	110	3
2 1/2	112.7	101.6	11.1	27	0.5~0.8	1.6	3	25	120	3
3	134.9	123.8	11.1	27	0.5~0.8	1.6	3	25	130	3
4	160.3	149.2	11.1	27	0.8~1.2	1.6	3	38	130	3
5	192.1	181.0	11.1	27	0.8~1.2	1.6	3	38	150	3
6	222.2	211.2	11.1	27	0.8~1.2	1.6	3	38	150	3
8	281	269.9	11.1	27	1.5~2.0	1.6	3	38	150	3
10	335	323.9	11.1	27	e = T	2.0	6	38	160	6
12	392.1	381.0	11.1	27	e = T	2.5	6	38	160	6
14	430.2	419.1	11.1	27	e = T	2.5	6	38	160	6

For ANSI 300 (Octagonal type)

Nominal Pipe Size	Holding Ring				Thickness of Edge e	Dia. of Hole G	Thickness of Plate T	Tab Handle		
	Outside dia. D	Pitch dia. P	Width A	Hight B				Width W	Hight H	Thickness L
1 1/2	76.2	68.3	7.9	27	0.3~0.5	1.6	3	25	110	3
2	93.7	82.6	11.1	27	0.5~0.8	1.6	3	25	110	3
2 1/2	112.7	101.6	11.1	27	0.5~0.8	1.6	3	25	120	3
3	134.9	123.8	11.1	27	0.5~0.8	1.6	3	25	130	3
4	160.3	149.2	11.1	27	0.8~1.2	1.6	3	38	130	3
5	192.1	181.0	11.1	27	0.8~1.2	1.6	3	38	150	3
6	222.2	211.2	11.1	27	0.8~1.2	1.6	3	38	150	3
8	281	269.9	11.1	27	1.5~2.0	1.6	3	38	150	3
10	335	323.9	11.1	27	e = T	2.0	6	38	160	6
12	392.1	381.0	11.1	27	e = T	2.5	6	38	160	6
14	430.2	419.1	11.1	27	e = T	2.5	6	38	160	6

Dimension for F300 series

For ANSI 600 (Oval type)

Nominal Pipe Size	HOLDING RING				Thickness of Edge e	Dia. of Hole G	Thickness of Plate T	Tab Handle		
	Outside Dia. D	Pitch Dia. d	Width A	Height B				Width W	Height H	Thickness t
1 1/2	76.2	68.3	7.9	27	0.3~0.5	1.6	3	25	110	3
2	93.7	82.6	11.1	27	0.5~0.8	1.6	3	25	110	3
2 1/2	112.7	101.6	11.1	27	0.5~0.8	1.6	3	25	130	3
3	134.9	123.8	11.1	27	0.5~0.8	1.6	3	25	130	3
4	160.3	149.2	11.1	27	0.8~1.2	1.6	3	38	130	3
5	192.1	181.0	11.1	27	0.8~1.2	1.6	3	38	150	3
6	222.2	211.2	11.1	27	0.8~1.2	1.6	3	38	150	3
8	281	269.9	11.1	27	1.5~2.0	1.6	3	38	150	3
10	335	323.9	11.1	27	e = T	2.0	6	38	160	6
12	392.1	381.0	11.1	27	e = T	2.5	6	38	160	6
14	430.2	419.1	11.1	27	e = T	2.5	6	38	160	6

FOR ANSI 600 (OCTAGONAL TYPE)

Nominal Pipe Size	Holding Ring				Thickness of Edge e	Dia. of Hole G	Thickness of Plate T	Tab Handle		
	Outside Dia. D	Pitch Dia. d	Width A	Height B				Width W	Height H	Thickness t
1 1/2	76.2	68.3	7.9	27	0.3~0.5	1.6	3	25	110	3
2	93.7	82.6	11.1	27	0.5~0.8	1.6	3	25	110	3
2 1/2	112.7	101.6	11.1	27	0.5~0.8	1.6	3	25	130	3
3	134.9	123.8	11.1	27	0.5~0.8	1.6	3	25	130	3
4	160.3	149.2	11.1	27	0.8~1.2	1.6	3	38	130	3
5	192.1	181.0	11.1	27	0.8~1.2	1.6	3	38	150	3
6	222.2	211.2	11.1	27	0.8~1.2	1.6	3	38	150	3
8	281	269.9	11.1	27	1.5~2.0	1.6	3	38	150	3
10	335	323.9	11.1	27	e = T	2.0	6	38	160	6
12	392.1	381.0	11.1	27	e = T	2.5	6	38	160	6
14	430.2	419.1	11.1	27	e = T	2.5	6	38	160	6

For ANSI 900 (Oval type)

Nominal Pipe Size	Holding Ring				Thickness of Edge e	Dia. of Hole G	Thickness of Plate T	Tab Handle		
	Outside Dia. D	Pitch Dia. d	Width A	Height B				Width W	Height H	Thickness t
1 1/2	76.2	68.3	7.9	27	0.3~0.5	1.6	3	25	110	3
2	106.4	95.3	11.1	27	0.5~0.8	1.6	3	25	110	3
2 1/2	119.1	108.0	11.1	27	0.5~0.8	1.6	3	25	130	3
3	134.9	123.8	11.1	27	0.5~0.8	1.6	3	25	130	3
4	160.3	149.2	11.1	27	0.8~1.2	1.6	3	38	130	3
5	192.1	181.0	11.1	27	0.8~1.2	1.6	3	38	150	3
6	222.2	211.2	11.1	27	0.8~1.2	1.6	3	38	150	3
8	281	269.9	11.1	27	1.5~2.0	1.6	3	38	150	3
10	335	323.9	11.1	27	e = T	2.0	3	38	160	3
12	392.1	381.0	11.1	27	e = T	2.5	6	38	160	6
14	430.2	419.1	15.9	32	e = T	2.5	6	38	160	6

For ANSI 900 (Octagonal type)

Nominal Pipe Size	Holding Ring				Thickness of Edge e	Dia. of Hole G	Thickness of Plate T	Tab Handle		
	Outside Dia. D	Pitch Dia. d	Width A	Height B				Width W	Height H	Thickness t
1 1/2	76.2	68.3	7.9	27	0.3~0.5	1.6	3	25	110	3
2	106.4	95.3	11.1	27	0.5~0.8	1.6	3	25	110	3
2 1/2	119.1	108.0	11.1	27	0.5~0.8	1.6	3	25	130	3
3	134.9	123.8	11.1	27	0.5~0.8	1.6	3	25	130	3
4	160.3	149.2	11.1	27	0.8~1.2	1.6	3	38	130	3
5	192.1	181.0	11.1	27	0.8~1.2	1.6	3	38	150	3
6	222.2	211.2	11.1	27	0.8~1.2	1.6	3	38	150	3
8	281	269.9	11.1	27	1.5~2.0	1.6	3	38	150	3
10	335	323.9	11.1	27	e = T	2.0	3	38	160	3
12	392.1	381.0	11.1	27	e = T	2.5	6	38	160	6
14	430.2	419.1	15.9	32	e = T	2.5	6	38	160	6

For ANSI 1,500 (Oval type)

Nominal Pipe Size	Holding Ring				Thickness of Edge e	Dia. of Hole G	Thickness of Plate T	Tab Handle		
	Outside Dia. D	Pitch Dia. d	Width A	Height B				Width W	Height H	Thickness t
1 1/2	76.2	68.3	7.9	27	0.3~0.5	1.6	3	25	110	3
2	106.4	95.3	11.1	27	0.5~0.8	1.6	3	25	110	3
2 1/2	119.1	108.0	11.1	27	0.5~0.8	1.6	3	25	130	3
3	147.6	136.5	11.1	27	0.5~0.8	1.6	3	25	130	3
4	173	161.9	11.1	27	0.8~1.2	1.6	3	38	130	3
5	204.8	193.7	11.1	27	0.8~1.2	1.6	3	38	150	3
6	223.9	211.2	12.7	27	0.8~1.2	1.6	3	38	150	3
8	285.8	269.9	15.9	27	1.5~2.0	1.6	3	38	160	3
10	339.8	323.9	15.9	27	e = T	2.0	3	38	160	3
12	403.2	381.0	22.2	27	e = T	2.5	6	38	190	6
14	444.5	419.1	25.4	32	e = T	2.5	6	38	190	6

For ANSI 1,500 (Octagonal type)

Nominal Pipe Size	Holding Ring				Thickness of Edge e	Dia. of Hole G	Thickness of Plate T	Tab Handle		
	Outside Dia. D	Pitch Dia. d	Width A	Height B				Width W	Height H	Thickness t
1 1/2	76.2	68.3	7.9	27	0.3~0.5	1.6	3	25	110	3
2	106.4	95.3	11.1	27	0.5~0.8	1.6	3	25	110	3
2 1/2	119.1	108.0	11.1	27	0.5~0.8	1.6	3	25	130	3
3	147.6	136.5	11.1	27	0.5~0.8	1.6	3	25	130	3
4	173	161.9	11.1	27	0.8~1.2	1.6	3	38	130	3
5	204.8	193.7	11.1	27	0.8~1.2	1.6	3	38	150	3
6	223.9	211.2	12.7	27	0.8~1.2	1.6	3	38	150	3
8	285.8	269.9	15.9	27	1.5~2.0	1.6	3	38	160	3
10	339.8	323.9	15.9	27	e = T	2.0	3	38	160	3
12	403.2	381.0	22.2	27	e = T	2.5	6	38	190	6
14	444.5	419.1	25.4	32	e = T	2.5	6	38	190	6

Restriction orifice plate

Model : F400 series

Spec. sheet no. **FD04-01**

Description

Restriction orifice plates are widely used for many applications within the industry. Although the design is very similar to an orifice plate, the function is different. Restriction plates are used to suit a number of different purposes including:

- Reduction in line pressure
- Control flow rates by restricting flow, regardless of downstream conditions

Design considerations

- Prevent critical flow
- Removal of cavitation
- Reduce noise levels

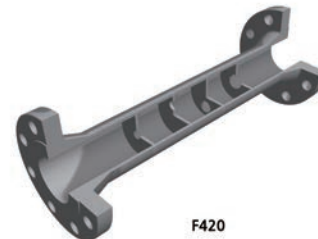
We offer a number of different restriction designs to suit the needs of your application

Configuration

- Restriction plates (Standard applications)
- Multi-hole restriction plates (Used to reduce noise)
- Multi-stage restriction units (Flanged / Butt-weld)
- Conical shaped restriction orifice (Eliminated damage caused by cavitation)

Benefits

- Proven design technology
- Products designed in accordance with R.W.Miller - Flow engineering handbook
- Plate thickness calculations designed in accordance with ASME B31.3
- Designs available to accommodate site restrictions and noise limitations
- Prevent critical flow or cavitation issues



Applications

- Hydrocarbon gas and liquids
- Controlled pressure reduction
- Blow-down service
- Pressure vessels
- Noise reduction

Key parameters

- Proven technology
- Prevent critical flow or cavitation issues
- Reduce site restrictions and noise levels

Standards

- R.W. Miller
- ASME B31.3
- ISA standard design

Specification

Line size

DN15 to DN1,800
1/2" ~ 72"

Designs

Restriction plate
Full-face restriction plate
Restriction carrier
Multi-hole restriction plate
Multi-stage restriction unit
Conical shaped plate

Reynolds number

Unlimited range

Plate and carrier material

Stainless steel
Duplex
Super duplex
6 Mo
Alloy 400
Inconel 625
Inconel 825
Hastelloy-C 276
Titanium
Others available on request

Installation method (Between)

Flanged (API / ASME)
Hubs
Carriers
Welded directly into piping
Multi-stage units supplied flanged or butt-weld

EAC

WISE®

| F400_01

Type of restriction orifice

Here is a description of a few common type of restriction orifice plate device used in oil and gas applications.

(a) Single stage restriction orifice (Model : F400)

A single stage restriction orifice is usually a plate or a block with a bore (Orifice) sized to the intended permanent loss of pressure. It is installed between the pipe flanges. Usually it is not a thin orifice plate; it is a thick orifice plate.



(b) Single stage multi-hole restriction orifice (Model : F410)

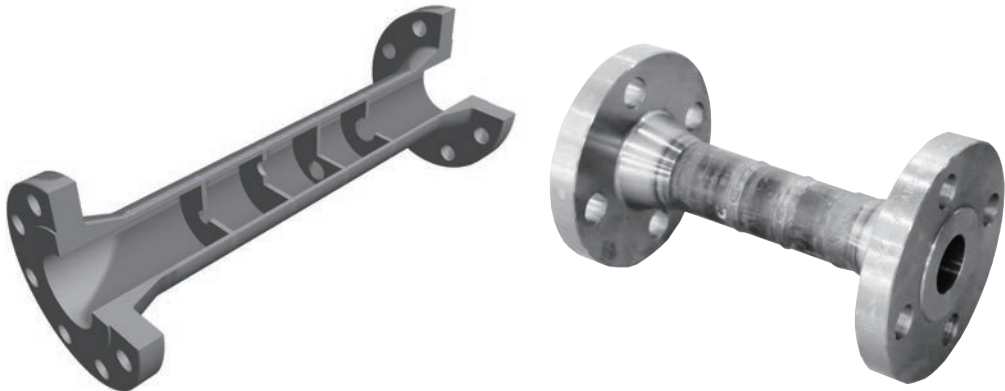
A single stage multi-hole restriction orifice plate is used to abate the noise generated by the device due to high velocity through the bore which offers restriction to the incoming fluid. The flow at the inlet is now channelled into several streams through the multiple holes and this reduces the noise which would be otherwise will be above the acceptable limit if a single hole device is used.



Type of restriction orifice

(c) Multi-stage restriction orifice plate assembly (Model : F420)

These devices are used where the pressure reduction ratio is very high and cannot be achieved by a single stage orifice plate. Thus a multistage device essentially consists of a number of single stage device built in a single spool. Like a single stage device it can be of single hole multistage design or multihole multistage design or combination of both.

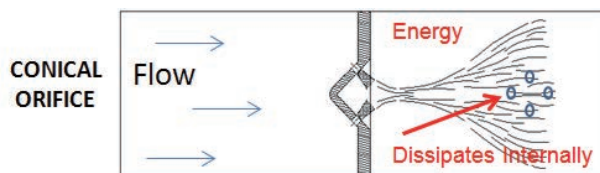


(d) Conical shaped restriction orifice plate (Model : F430)

Solve problems associated with orifice cavitation (Erosion, vibration, noise)

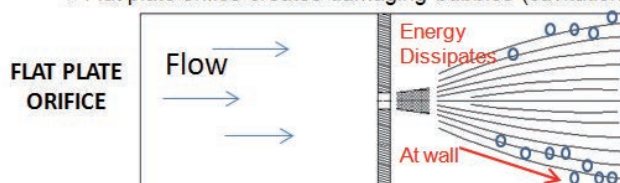
Eliminated damage caused by cavitation

- Energy dissipated inside the cone of the orifice, not at pipe wall
- Conical orifice allows energy to dissipate before striking pipe wall



Flow re-develops from the inside out, eliminating the effect of cavitation erosion and vibration.

➤ Flat plate orifice creates damaging bubbles (cavitation) at pipe wall



Erosion, Vibration, Noise

Flow re-develops from the outside in. Cavitation at walls causes erosion and vibration.

Main order

Ordering information

1. Base model

F400	Single stage restriction orifice
F410	Single stage multi-hole restriction orifice
F420	Multi-stage restriction orifice
F430	Conical shaped restriction orifice

2. Line size

JIS	mm	ANSI	inch	DIN	mm
J015	15A	A001	½B	D015	15A
J020	20A	A002	¾B	D020	20A
J025	25A	A003	1B	D025	25A
J040	40A	A004	1½B	D040	40A
J050	50A	A005	2B	D050	50A
J065	65A	A006	2½B	D065	65A
J080	80A	A007	3B	D080	80A
J100	100A	A008	4B	D100	100A
J125	125A	A009	5B	D125	125A
J150	150A	A010	6B	D150	150A
J200	200A	A011	8B	D200	200A
J250	250A	A012	10B	D250	250A
J300	300A	A013	12B	D300	300A
J350	350A	A014	14B	D350	350A
J400	400A	A015	16B	D400	400A
J450	450A	A016	18B	D450	450A
J500	500A	A017	20B	D500	500A
J600	600A	A018	24B	D600	600A
J700	700A	A019	28B	D700	700A
J800	800A	A020	32B	D800	800A
J000	1,000A	A021	40B	D000	1,000A
XXXX	Other				

3. Bore type

C	Concentric edge
----------	-----------------

4. Flange rating

JIS		ANSI		DIN	
J010	JIS 10K	A010	ANSI 150 Lb	P010	PN 10
J016	JIS 16K	A020	ANSI 300 Lb	P016	PN 16
J020	JIS 20K	A030	ANSI 600 Lb	P025	PN 25
J030	JIS 30K	A040	ANSI 900 Lb	P040	PN 40
J040	JIS 40K	A050	ANSI 1,500 Lb		
J063	JIS 63K	A060	ANSI 2,500 Lb		
XXXX	Other				

5. Plate material

4	304SS
6	316L SS
H	Hastelloy-C
O	Other

6. Pipe material

C	304SS
N	316L SS
4	Hastelloy-C
5	Monel
O	Other

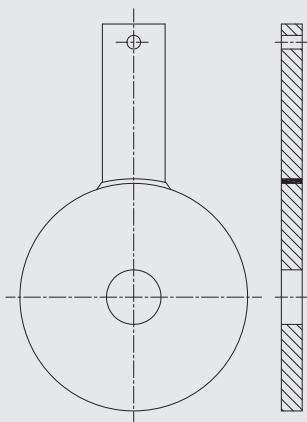
7. Options

F1	Flange included
NO	None

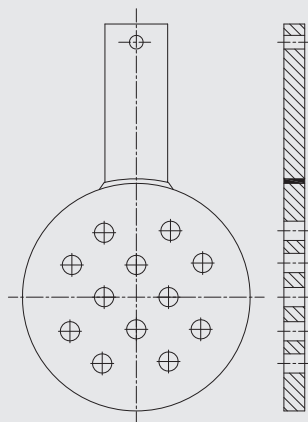
1	2	3	4	5	6	7
F400	J040	C	J010	4	C	NO

Sample ordering code

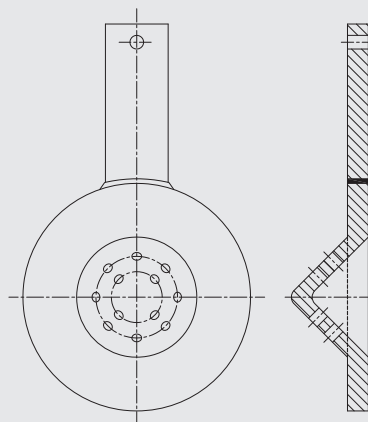
Dimension



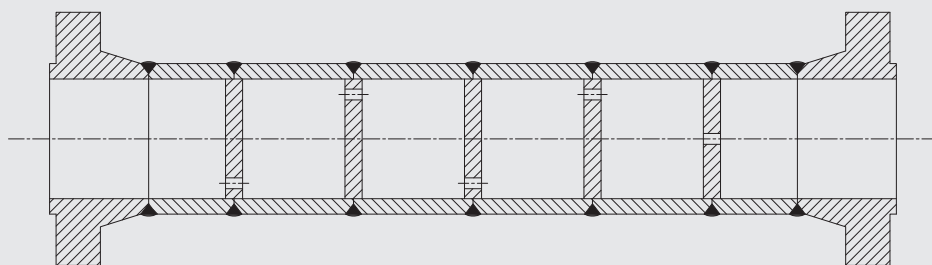
Model : F400



Model : F410



Model : F430



MODEL : F420

Orifice flange assembly

Model : F500

Spec. sheet no. **FD05-01**

Description

Orifice flange assembly is used in conjunction with orifice plate for flow measurement of smaller or medium size pipes at lower or medium pressure ranges. The flange connection is a RF type and the differential pressure tapping system is the flange taps.



Specification

Flange mounting type

Welding neck
Slip-on
Socket-weld
Ring-joint welding neck

Nominal diameter

25 ~ 600 mm
1" ~ 24"

Flange ratings

JIS 10, 20, 30, 40 and 63 K
ANSI (or JPI) 150, 300, 600 and 900 Lb RF

Flange material

A105, A182-F304, A182-F316, A182-F11,
A182-F22 and A350-LF2

Materials of bolts and nuts

Stud bolts : SNB7, A193-B7 and A194-B8
Nuts : S45C, A194-2H and A194-8
Jack bolts and nuts : S25C and A307

Gasket

Thickness : 4.5 mm
Material : Spiral wound gaskets

Piping connection method

ANSI 150 Lb : Insertion welding type (Slip-on type)
ANSI 300, 600 Lb : Butt welding type (Welding neck)
ANSI 900 Lb : Butt welding neck (Ring-joint WN)

Differential pressure piping connection

Select referring to the model number construction table

Orifice bore type

Concentric square edged orifice
Quadrant edged orifice
Eccentric orifice
Segmental orifice

Flow claculation standards

ISO 5167-1 and 2 2003
AGA-3
ASME MFC-3M (R.W Miller)
L.K. Spink
JIS Z 8762

Plate thickness

3,6,9 and 12 mm

Tab handle

Welded to orifice plate

Plate material

Standard : 304SS and 316L SS
Non-standard : Monel, Hastelloy B/C, Titanium etc.

Drain and vent hole

Per ASME recommendations
Not drilled for orifice bores smaller than 25.4 mm

Markings

Upstream side of tab handle stamped "Upstream" and with bore type and size, line size, tag number and flange rating

Special markings

Special marking may be furnished to meet special requirement

Main order

Ordering information

1. Base model

F500 Orifice flange assembly

2. Type

W Welding neck
O Socket-weld
S Slip on
J RTJ
K Other

3. Line size

JIS	mm	ANSI	inch	DIN	mm
J015	15A	A001	½B	D015	15A
J020	20A	A002	¾B	D020	20A
J025	25A	A003	1B	D025	25A
J040	40A	A004	1½B	D040	40A
J050	50A	A005	2B	D050	50A
J065	65A	A006	2½B	D065	65A
J080	80A	A007	3B	D080	80A
J100	100A	A008	4B	D100	100A
J125	125A	A009	5B	D125	125A
J150	150A	A010	6B	D150	150A
J200	200A	A011	8B	D200	200A
J250	250A	A012	10B	D250	250A
J300	300A	A013	12B	D300	300A
J350	350A	A014	14B	D350	350A
J400	400A	A015	16B	D400	400A
J450	450A	A016	18B	D450	450A
J500	500A	A017	20B	D500	500A
J600	600A	A018	24B	D600	600A
J700	700A	A019	28B	D700	700A
J800	800A	A020	32B	D800	800A
J000	1,000A	A021	40B	D000	1,000A
XXXX	Other				

4. Tap nipple

A ½" NPT(M) / 75L and 150L
B ½" NPT(M) / 150L and 150L
O Other
N None

5. Flange rating

JIS	ANSI	DIN
J010	JIS 10K	A010 ANSI 150 Lb
J016	JIS 16K	A020 ANSI 300 Lb
J020	JIS 20K	A030 ANSI 600 Lb
J030	JIS 30K	A040 ANSI 900 Lb
J040	JIS 40K	A050 ANSI 1,500 Lb
J063	JIS 63K	A060 ANSI 2,500 Lb
XXXX	Other	

6. Material

C A105
4 A182 F304
5 A182 F316
6 A182 F316L
Z Other

7. Bolt / Nuts material

1 B7 / 2H
2 B8 / 8
O Other

8. Gaskets material

N Non Asbestos 1.5T
T Teflon 1.5T
S Spiral wound 4.5T
O Other

9. Options 1 (Meter run)

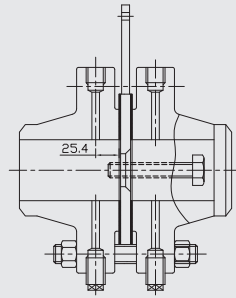
1 Flanged
2 Welded
3 None

10. Options 2 (Tab valve)

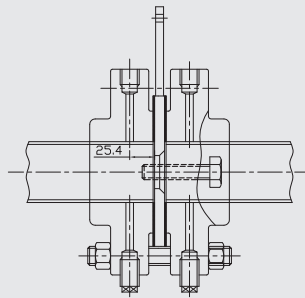
1 Yes
2 No

1	2	3	4	5	6	7	8	9	10
F500	W	A011	N	A020	C	1	N	1	1

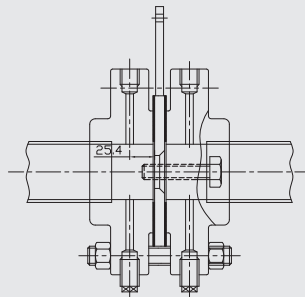
Sample ordering code



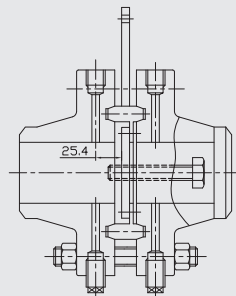
Model : F500-W



Model : F500-S



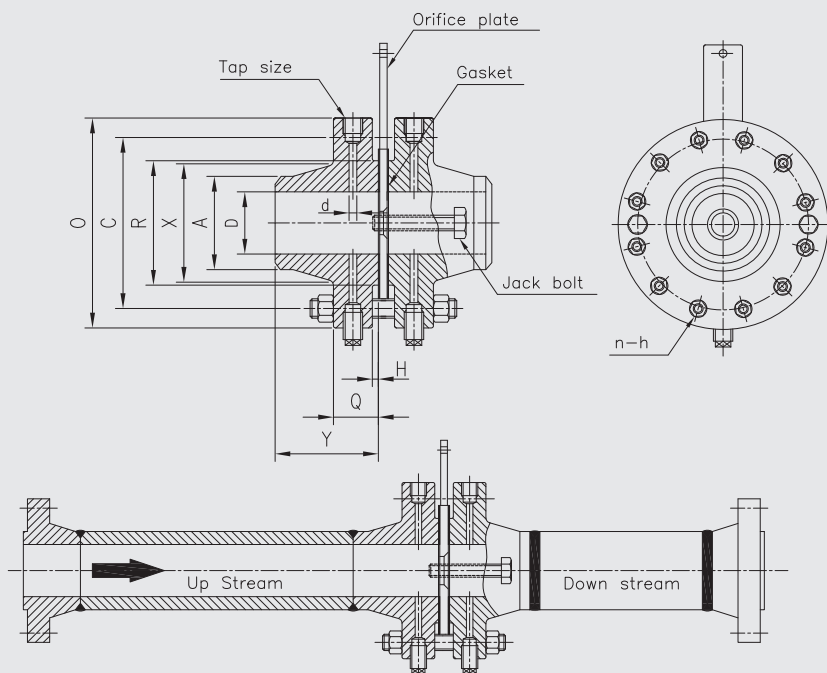
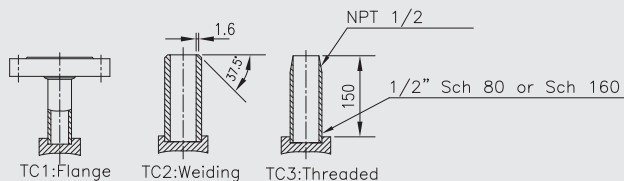
Model : F500-O



Model : F500-J

Dimension

Option : Tap Connection



For ANSI 300 Flanges

Nominal Pipe Size	Diam of Flange O	Thickness of Flange Q	D. of Hub of Wedge A	Diam of Hub X	Length Through Hub Y	Pitch Diam of Groove E	Depth of Groove F	Diam of Tap Holes d	Diam of Bolts Circle C	Number of Bolt	Bolt Size
1-1/2	155	38.1	48.3	69.9	85.9	68.3	6.4	6.4	114.3	4	3/4
2	165	38.1	60.5	84.1	85.9	82.6	7.9	6.4	127.0	8	5/8
2-1/2	191	38.1	73.2	100.1	88.9	101.6	7.9	6.4	149.4	8	3/4
3	210	38.1	88.9	117.3	88.9	123.8	7.9	9.5	168.1	8	3/4
4	254	38.1	114.3	146.1	91.9	149.2	7.9	12.7	200.2	8	3/4
5	279	38.1	141.2	177.8	101.6	181.0	7.9	12.7	235.0	8	3/4
6	318	38.1	168.4	206.2	100.1	211.1	7.9	12.7	269.7	12	3/4
8	381	41.1	219.2	260.4	111.3	269.9	7.9	12.7	330.2	12	8/7
10	445	47.8	273.1	320.5	117.3	323.9	7.9	12.7	387.4	12	1
12	521	50.8	323.9	374.7	130	381.0	7.9	12.7	450.9	16	1-1/8
14	584	53.8	355.6	425.5	142.7	419.1	7.9	12.7	514.4	16	1-1/8

For ANSI 900 Flanges

Nominal Pipe Size	Diam of Flange O	Thickness of Flange Q	D. of Hub of Wedge A	Diam of Hub X	Length Through Hub Y	Pitch Diam of Groove E	Depth of Groove F	Diam of Tap Holes d	Diam of Bolts Circle C	Number of Bolt	Bolt Size
1-1/2	178	44.5	48.3	69.9	95.3	68.3	6.4	6.4	124.0	4	1
2	216	44.5	60.5	104.6	108.0	95.3	7.9	6.4	165.1	8	7/8
2-1/2	244	47.5	73.2	124.0	111.1	108.0	7.9	6.4	190.5	8	1
3	241	44.5	88.9	127.0	108.0	123.8	7.9	9.5	190.5	8	7/8
4	292	50.9	114.3	158.8	120.7	149.2	7.9	12.7	235.0	8	1-1/8
5	349	57.2	141.2	190.5	133.4	181.0	7.9	12.7	279.4	8	1-1/4
6	381	62.0	168.4	235.0	146.1	211.1	7.9	12.7	317.5	12	1-1/8
8	470	69.9	219.2	298.5	168.5	269.9	7.9	12.7	393.7	12	1-3/8
10	546	76.3	273.1	368.3	190.6	323.9	7.9	12.7	469.9	16	1-3/8
12	610	85.6	323.9	419.1	206.6	381.0	7.9	12.7	533.4	20	1-3/8
14	641	92.3	355.6	450.9	219.3	419.1	11.1	12.7	568.8	20	1-1/2

For ANSI 600 Flanges

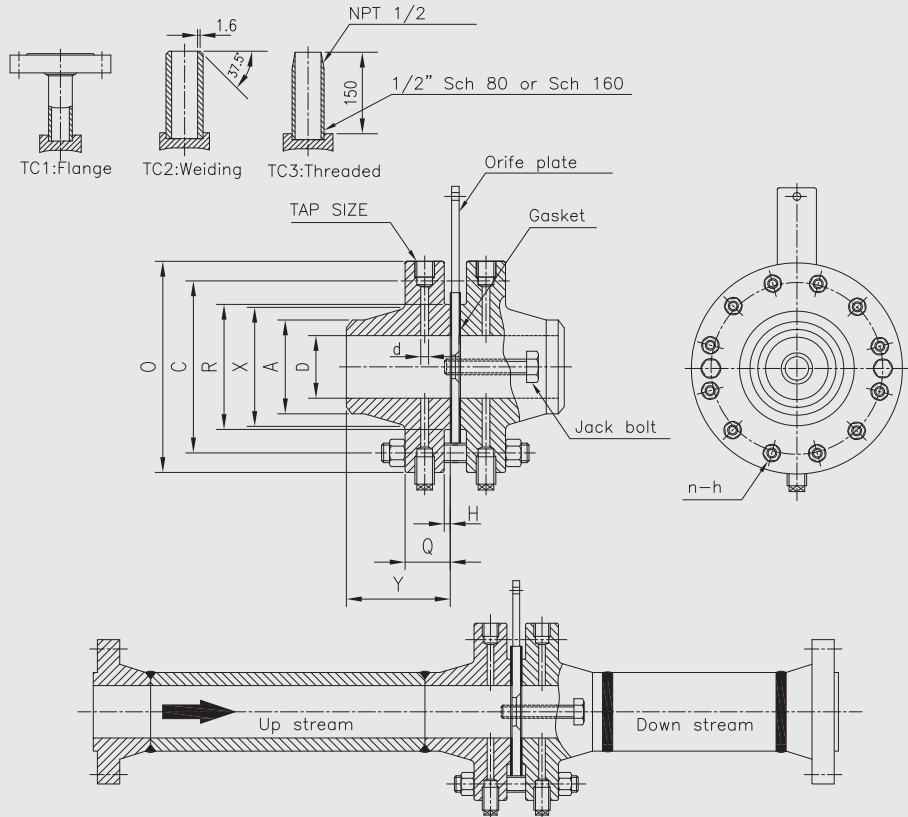
Nominal Pipe Size	Diam of Flange O	Thickness of Flange Q	D. of Hub of Wedge A	Diam of Hub X	Length Through Hub Y	Pitch Diam of Groove E	Depth of Groove F	Diam of Tap Holes d	Diam of Bolts Circle C	Number of Bolt	Bolt Size
1-1/2	155	38.1	48.3	69.9	85.9	68.3	6.4	6.4	114.3	4	3/4
2	165	38.1	60.5	84.1	85.9	82.6	7.9	6.4	127.0	8	5/8
2-1/2	191	38.1	73.2	100.1	88.9	101.6	7.9	6.4	149.4	8	3/4
3	210	38.1	88.9	117.3	88.9	123.8	7.9	9.5	168.1	8	3/4
4	273	44.5	114.3	152.4	108.0	149.2	7.9	12.7	215.9	8	7/8
5	330	50.9	141.2	189.0	120.7	181.0	7.9	12.7	266.7	8	1
6	356	54.2	168.4	222.3	123.7	211.1	7.9	12.7	292.1	12	1
8	419	62	219.2	273.1	139.8	269.9	7.9	12.7	349.3	12	1-1/8
10	508	69.9	273.1	342.9	158.8	323.9	7.9	12.7	431.8	16	1-1/4
12	559	72.9	323.9	400.1	161.8	381.0	7.9	12.7	489.0	20	1-1/4
14	603	76.3	355.6	431.8	171.5	419.1	7.9	12.7	527.1	20	1-3/8

For ANSI 1,500 Flanges

Nominal Pipe Size	Diam of Flange O	Thickness of Flange Q	D. of Hub of Wedge A	Diam of Hub X	Length Through Hub Y	Pitch Diam of Groove E	Depth of Groove F	Diam of Tap Holes d	Diam of Bolts Circle C	Number of Bolt	Bolt Size
1-1/2	178	44.5	48.3	69.9	95.3	68.3	6.4	6.4	124.0	4	1
2	216	44.5	60.5	104.6	108.0	95.3	7.9	6.4	165.1	8	7/8
2-1/2	244	47.5	73.2	124.0	111.1	108.0	7.9	6.4	190.5	8	1
3	267	54.2	88.9	133.4	123.7	136.5	7.9	9.5	203.2	8	1-1/8
4	311	60.2	114.3	162.1	130.4	161.9	7.9	12.7	241.3	8	1-1/4
5	375	79.6	141.2	196.9	161.8	193.7	7.9	12.7	292.1	8	1-1/2
6	394	89.0	168.4	228.6	177.9	211.1	9.5	12.7	317.5	12	1-3/8
8	483	98.4	219.2	292.1	219.3	269.9	11.1	12.7	393.7	12	1-5/8
10	584	114.4	273.1	368.3	260.4	323.9	11.1	12.7	482.6	12	1-7/8
12	673	130.4	323.9	450.9	288.8	381.0	14.3	12.7	571.5	16	2
14	749	139.8	355.6	495.3	304.9	419.1	15.9	12.7	635.0	16	2-1/4

Dimension

Option : Tap Connection



For JIS 10K Flanges

Nominal Pipe Size Inch/mm	Diag. of Flange O	Thickness of Flange Q	D of Hub of Wedge A	Diag. of Hub X	Length Through Hub Y	Diag. of Raised Face F	Height of Raised Face E	Diag. of Top Holes d	Diag. of Bolt Circle C	Number of Bolt	Bolt Size
1 25	125	38.1	34.0	50	80	70	1	6.4	70	4	M16
1 1/4 32	135	38.1	42.7	60	80	80	2	6.4	100	4	M16
1 1/2 40	140	38.1	48.6	66	83	85	2	6.4	105	4	M16
2 50	155	38.1	60.5	80	83	100	2	6.4	120	4	M16
2 1/2 65	175	38.1	76.3	98	86	120	2	6.4	140	4	M16
3 80	185	38.1	89.1	112	86	130	2	9.5	150	8	M16
3 1/2 90	195	38.1	101.6	122	86	140	2	9.5	160	8	M16
4 100	200	38.1	114.3	132	90	155	2	12.7	175	8	M16
5 125	250	38.1	139.8	160	95	185	2	12.7	210	8	M20
6 150	280	38.1	165.2	190	100	215	2	12.7	240	8	M20
8 200	330	38.1	216.3	238	110	265	2	12.7	290	12	M20
10 250	350	38.1	241.8	264	110	285	2	12.7	310	12	M20
12 300	445	38.1	318.5	346	120	370	3	12.7	400	16	M22
14 350	490	38.1	355.6	386	130	415	3	12.7	445	16	M22
16 400	560	38.1	406.4	442	130	475	3	12.7	510	16	M24

For JIS 30K Flanges

Nominal Pipe Size Inch/mm	Diag. of Flange O	Thickness of Flange Q	D of Hub of Wedge A	Diag. of Hub X	Length Through Hub Y	Diag. of Raised Face F	Height of Raised Face E	Diag. of Top Holes d	Diag. of Bolt Circle C	Number of Bolt	Bolt Size
1 25	130	38.1	34.0	54	83	70	1	6.4	95	4	M16
1 1/4 32	140	38.1	43.1	64	84	80	2	6.4	105	4	M16
1 1/2 40	160	38.1	49.1	70	86	90	2	6.4	120	4	M20
2 50	165	38.1	61.0	86	86	105	2	6.4	130	8	M16
2 1/2 65	200	38.1	76.9	104	90	130	2	6.4	160	8	M20
3 80	210	38.1	89.7	118	90	140	2	9.5	170	8	M20
3 1/2 90	230	38.1	102.3	130	90	150	2	9.5	185	8	M22
4 100	240	38.1	115.1	142	92	160	2	12.7	195	8	M22
5 125	275	38.1	140.7	172	102	195	2	12.7	230	8	M22
6 150	325	38.1	166.2	204	102	235	2	12.7	275	12	M24
8 200	370	42	217.5	256	112	280	2	12.7	320	12	M24
10 250	450	48	268.7	314	118	345	2	12.7	390	12	M30
12 300	515	52	320.0	370	130	405	3	12.7	450	16	M30
14 350	560	54	357.2	412	144	450	3	12.7	495	16	M30
16 400	630	60	408.3	468	150	510	3	12.7	560	16	M36

For JIS 16/20K Flanges

Nominal Pipe Size Inch/mm	Diag. of Flange O	Thickness of Flange Q	D of Hub of Wedge A	Diag. of Hub X	Length Through Hub Y	Diag. of Raised Face F	Height of Raised Face E	Diag. of Top Holes d	Diag. of Bolt Circle C	Number of Bolt	Bolt Size
1 25	125	38.1	34.0	50	80	70	1	6.4	90	4	M16
1 1/4 32	135	38.1	42.7	60	80	80	2	6.4	100	4	M16
1 1/2 40	140	38.1	48.6	66	83	85	2	6.4	105	4	M16
2 50	155	38.1	60.5	80	83	100	2	6.4	120	8	M16
2 1/2 65	175	38.1	76.3	98	86	120	2	6.4	140	8	M16
3 80	200	38.1	89.1	112	86	135	2	9.5	160	8	M20
3 1/2 90	210	38.1	101.6	124	86	145	2	9.5	170	8	M20
4 100	225	38.1	114.3	138	90	160	2	12.7	185	8	M20
5 125	270	38.1	139.8	170	95	195	2	12.7	225	8	M22
6 150	365	38.1	165.2	202	100	230	2	12.7	260	12	M22
8 200	350	38.1	216.3	252	110	275	2	12.7	305	12	M22
10 250	430	38.1	241.8	312	115	345	2	12.7	380	12	M24
12 300	480	38.1	318.5	364	120	395	3	12.7	430	16	M24
14 350	540	40	355.6	408	132	440	3	12.7	480	16	M30
16 400	605	46	406.4	456	138	495	3	12.7	540	16	M30

For JIS 40K Flanges

Nominal Pipe Size Inch/mm	Diag. of Flange O	Thickness of Flange Q	D of Hub of Wedge A	Diag. of Hub X	Length Through Hub Y	Diag. of Raised Face F	Height of Raised Face E	Diag. of Top Holes d	Diag. of Bolt Circle C	Number of Bolt	Bolt Size
1 25	130	38.1	34.4	54	83	70	1	6.4	95	4	M16
1 1/4 32	140	38.1	43.1	64	84	80	2	6.4	105	4	M16
1 1/2 40	160	38.1	49.1	70	86	90	2	6.4	120	4	M20
2 50	165	38.1	61.0	86	86	105	2	6.4	130	8	M20
2 1/2 65	200	38.1	76.9	104	90	130	2	6.4	160	8	M20
3 80	210	38.1	89.7	118	90	140	2	9.5	170	8	M20
3 1/2 90	230	38.1	102.3	130	90	150	2	9.5	185	8	M22
4 100	250	38.1	115.1	152	92	160	2	12.7	205	8	M22
5 125	300	40	140.7	192	104	200	2	12.7	250	8	M22
6 150	355	44	166.2	220	108	240	2	12.7	295	12	M30
8 200	405	50	217.5	270	120	290	2	12.7	345	12	M30
10 250	475	56	268.7	330	126	355	2	12.7	410	12	M30
12 300	540	60	320.0	380	138	410	3	12.7	470	16	M36
14 350	585	64	357.2	426	154	455	3	12.7	515	16	M36
16 400	645	70	408.3	476	160	515	3	12.7	570	16	M36

Integral flow orifice assembly

Model : F510

Spec. sheet no. **FD05-02**

Description

Integral orifice primary element utilizes a self centering orifice plate design to eliminate installation error. Enables highly accurate flow measurement in small line sizes. Available with a variety of process connections. Available in ½" to 1½" (15 ~ 40 mm) line sizes.



Principle

- Improves accuracy and repeatability
- Self-centering plate design eliminates installation errors that are magnified in small line sizes
- Precision honed pipe sections allow accuracy of up to ±0.75% of flow rate
- Installation flexibility with numerous process connections



Specification

Line size

Liquid : ½" (15 mm)

Gas : 1" (25 mm)

Steam : 1½" (40 mm)

- Maximum working pressure :
Pressure retention per ANSI B16.5 600 Lb or DIN PN100

Gaskets / O-rings

Glass filled PTFE

Orifice plate

316SS / 316L SS

Alloy C-276

Alloy 400

Orifice type

Square edge-orifice bore sizes

Body

316SS (CF8M), Material per ASTM A351

Pipe material (If applicable)

A312 Gr 316SS / 316L SS

B622 UNS N10276

Alloy C-276

Transmitter connections

2½" (54 mm) center to center.

Other transmitter spacing can be accommodated using the optional remote adapters and customer supplied impulse piping. DIN 19213 connections are available

Flange

A182 Gr 316SS / 316L SS

SB-564 UNS N10276

Alloy C-276

- Flange pressure limits are per ANSI B16.5
Flange face finish per ANSI B16.5, 125 to 250 RMS

Body bolts / Studs

ASTM A 193 Gr B8M studs

Note

Integral orifice bodies contain corner tapped pressure ports.

1. Base model**F510** Integral flow orifice assembly**2. Body material**

S 316SS (A351 CF8M)
T 304SS (A351 CF8)
H Hastelloy-C (A494 CW12MW)
O Others

3. Line size

1 ½" (15 mm)
2 ¾" (20 mm)
3 1" (25 mm)
4 1½" (40 mm)

4. Pipe ends

01 JIS 10K SORF	12 ANSI 600 Lb SORF
02 JIS 20K SORF	13 ANSI 150 Lb WNRF
03 JIS 30K SORF	14 ANSI 300 Lb WNRF
04 JIS 10K WNRF	15 ANSI 600 Lb WNRF
05 JIS 20K WNRF	16 ANSI 150 Lb RTJ
06 JIS 30K WNRF	17 ANSI 300 Lb RTJ
07 JIS 10K RTJ	18 ANSI 600 Lb RTJ
08 JIS 20K RTJ	20 NPT threaded
09 JIS 30K RTJ	21 Beveled
10 ANSI 150 Lb SORF	22 Others
11 ANSI 300 Lb SORF	

5. Orifice plate material

S 316L SS
H Hastelloy-C
M Monel
O Other

6. Mounting

D Direct
R Remote

7. Option

D DP transmitter
F Flow calibration
M 3 or 5 way manifold valve
N None

1	2	3	4	5	6	7
F510	S	1	10	S	D	D

Sample ordering code

Dimensional drawing

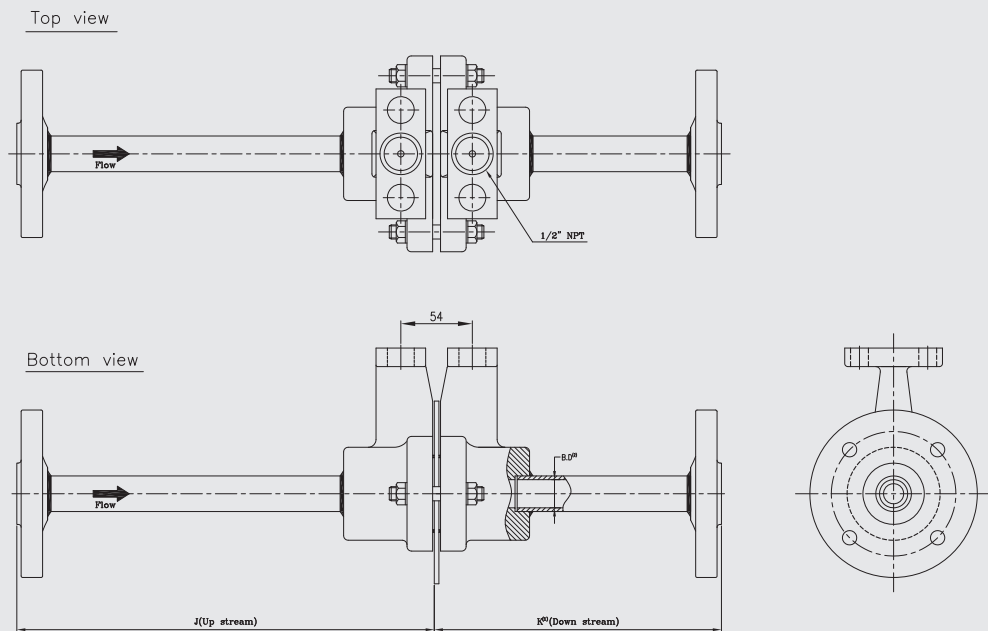


Table1. Integral orifice plate dimentional data

Dimension	Line size					
	1/2"	12.7 mm	1"	25.4 mm	1 1/2"	38.1 mm
J (Beveled / Threaded pipe ends)	12.54"	318.4 mm	20.24"	514.0 mm	28.44"	722.4 mm
J (RF slip-on, RTJ slip-on, RF-DIN slip-on)	12.62"	320.4 mm	20.32"	516.0 mm	28.52"	724.4 mm
J (RF150#, weld-nect)	14.37"	364.9 mm	22.37"	568.1 mm	30.82"	782.9 mm
J (RF300#, weld-nect)	14.56"	369.8 mm	22.63"	574.7 mm	31.06"	789.0 mm
J (RF600#, weld-nect)	14.81"	376.0 mm	22.88"	581.0 mm	31.38"	797.1 mm
K (RF slip-on, RTJ slip-on, RF-DIN slip-on) ⁽¹⁾	5.82"	147.8 mm	8.83"	224.2 mm	11.99"	304.6 mm
K (RF150#, weld-nect)	7.57"	192.3 mm	10.88"	276.3 mm	14.29"	363.1 mm
K (RF300#, weld-nect)	7.76"	197.1 mm	11.14"	282.9 mm	14.53"	369.2 mm
K (RF600#, weld-nect)	8.01"	203.4 mm	11.39"	289.2 mm	14.85"	377.2 mm
B.D.(Bore diameter) ⁽²⁾	0.664"	16.86 mm	1.097"	27.86 mm	1.567"	39.80 mm

(1) Downstream length shown here includes plate thickness of 0.162" (4.11 mm)

(2) B.D is diameter of the precision bored portion of the upstream and downstream piping.

Dimension

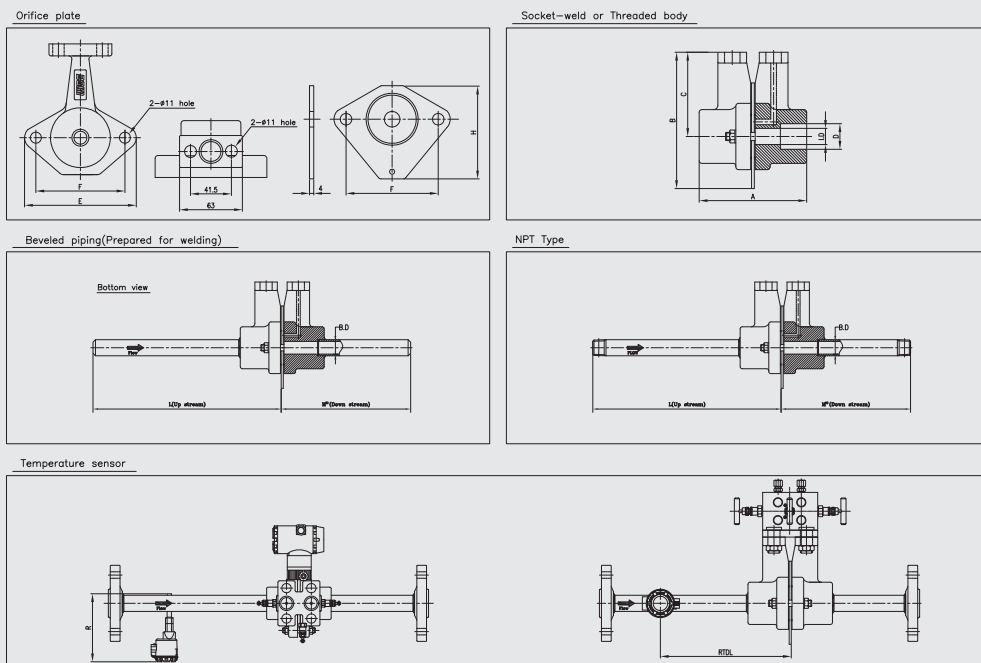


Table12. Integral orifice plate dimentional data

Dimension	Line size					
	1/2"	15 mm	1"	25 mm	1 1/2"	40 mm
A	3.4"	86 mm	3.8"	97 mm	4.5"	114 mm
B	4.7"	119.4 mm	5.2"	132 mm	5.9"	149.9 mm
C	3.0"	76 mm	3.3"	84 mm	3.7"	94 mm
D ⁽¹⁾	0.805"	20.45 mm	1.280"	32.51 mm	1.865"	47.37 mm
E	3.6"	91.66 mm	3.9"	99 mm	4.4"	112 mm
F	2.6"	66 mm	3.0"	76 mm	3.5"	89 mm
H	2.5"	64 mm	3.0"	76 mm	3.5"	89 mm
L	12.54"	318.4 mm	20.24"	514 mm	28.44"	722.4 mm
M	5.74"	145.7 mm	8.75"	222.2 mm	11.91"	302.6 mm
R	7.4"	187.96 mm	7.8"	198.12 mm	8.4"	213.36 mm
RTDL	3.11"	78.9 mm	5.25"	133.4 mm	7.50"	190.5 mm
B.D. (Bore diameter) ⁽²⁾	0.664"	16.87 mm	1.097"	27.86 mm	1.567"	39.80 mm
I.D. (Inside diameter)	0.622"	15.80 mm	1.049"	26.64 mm	1.500"	38.10 mm

- (1) To improve pipe perpendicularity for gasket sealing, socket diameter "D" is smaller than standard pipe O.D.
 Pipe O.D. must be machined smaller than socket diameter "D" to ensure proper fit.
- (2) B.D is diameter of the precision bored portion of the upstream and downstream piping.

Determination of differential pressure and orifice bore

Differential pressure

To calculate exact differential pressure produced at known flow rate, use one of the following equations:

$$\text{Liquid : } h = \text{gf} \left[\frac{q(\text{in U.S. gpm})}{5.668 \times Fa \times Fpv \times K \times d^2} \right]^2$$

$$\text{Gas : } h = \frac{GT_f}{P_f} \left[\frac{Q(\text{in scfh})}{7727 \times Fa \times Fpv \times K \times d^2 \times Y} \right]^2$$

$$\text{Steam : } h = V \left[\frac{W(\text{lb/hr})}{359 \times Fa \times K \times d^2 \times Y} \right]^2$$

d = Bore diameter in inches

Fa = Thermal expansion factor of orifice plate

G = Specific gravity of gas

Gf = Specific gravity of liquid at flow conditions

h = Differential pressure in in.H₂O

K = Flow coefficient

Pf = Process pressure in psia (psig + 14.7)

Q = Flow rate of gas

q = Flow rate of liquid

Tf = Process temperature in °R (°F + 460)

V = Specific volume of steam in cu ft/Lb

W = Flow rate of steam

Y = Gas expansion factor

Fpv = Gas super compressibility $Fpv = \sqrt{\frac{Zb}{ZF}}$

Zb = Basic compressibility

ZF = Flowing compressibility

Flow nozzle

Model : F600

Spec. sheet no. FD06-01

Description

The flow nozzles, more costly than other orifice due to their structure, are suited for determining the flow rates of fluids flowing at high temperature and high pressure. Under the same measuring conditions, a flow nozzle has a higher mechanical strength, can permit the flow of more than 60 percent great volume of a fluid, and can measure the flow rates of fluids containing solid particles less disturbed than an orifice having the same bore.

Thus, they are suited, in addition, for high speed flowing fluids. We can supply not only single flow nozzles, but also flow nozzles having welded short pipes on both their upstream and downstream sides.



Specification

Nozzle mounting types

Flange type

Weld-in type

Holding ring type

Flow calculation standards

- Long-radius flow nozzle
JIS Z 8762, ISO 5167-3, ASME MFC-3M
- ISA 1932, flow nozzle
ISO 5167-3 JIS Z 8762

Pressure taps

1D and ½D tap, throat tap

Nominal pipe sizes available

50 ~ 630 mm

2" ~ 25"

β Limit

$0.2 < \beta < 0.8$

(Low - beta) long - Radius nozzle $0.2 \leq \beta \leq 0.5$

(High - beta) long - Radius nozzle $0.25 \leq \beta \leq 0.8$

β : Ratio of throat to pipe diameter = $d/D0$

(d: Throat diameter)

Nozzle thicknesses

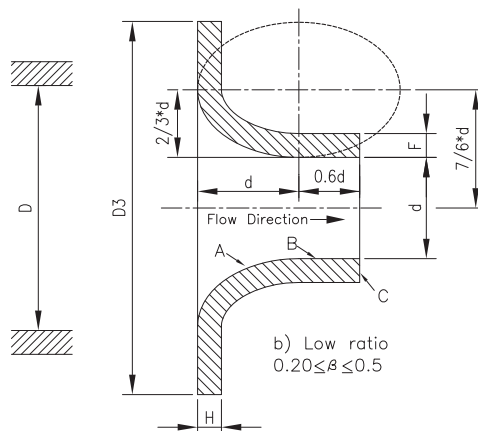
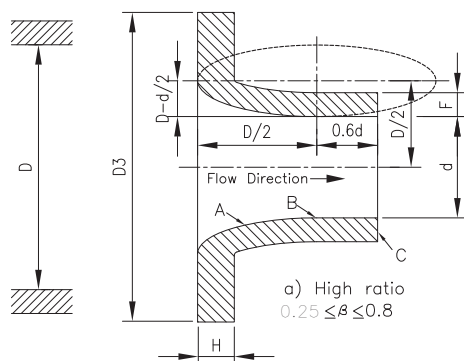
Maker standards

Material

A182-F11, F22, F91

A182-F304

A182-F316 / F316L



Main order

Ordering information

1. Base model

F600 Flow nozzle

2. Type

W Weld in
H Holding ring
F Flanged
O Other

3. Line size

JIS	mm	ANSI	inch	DIN	mm
J015	15A	A001	½B	D015	15A
J020	20A	A002	¾B	D020	20A
J025	25A	A003	1B	D025	25A
J040	40A	A004	1½B	D040	40A
J050	50A	A005	2B	D050	50A
J065	65A	A006	2½B	D065	65A
J080	80A	A007	3B	D080	80A
J100	100A	A008	4B	D100	100A
J125	125A	A009	5B	D125	125A
J150	150A	A010	6B	D150	150A
J200	200A	A011	8B	D200	200A
J250	250A	A012	10B	D250	250A
J300	300A	A013	12B	D300	300A
J350	350A	A014	14B	D350	350A
J400	400A	A015	16B	D400	400A
J450	450A	A016	18B	D450	450A
J500	500A	A017	20B	D500	500A
J600	600A	A018	24B	D600	600A
J700	700A	A019	28B	D700	700A
J800	800A	A020	32B	D800	800A
J000	1,000A	A021	40B	D000	1,000A
XXXX	Other				

4. Tap type

R Radius tap
T Throat tap

5. End connection

F Flanged
W Welded on

6. Element material

4 A182 F304
5 A182 F316
6 A182 F316L
7 A182 F91
Z Other

7. Pipe material

C1 A106 Gr.B
C2 A106 Gr.C
A1 A335 P11
A2 A335 P22
A3 A335 P91
XX Other

8. Holding ring material

A1 A182 F11
A2 A182 F22
A3 A182 F91
C1 A105
H4 A182 F304
H5 A182 F316
ZZ Other
NO None

9. Boss size

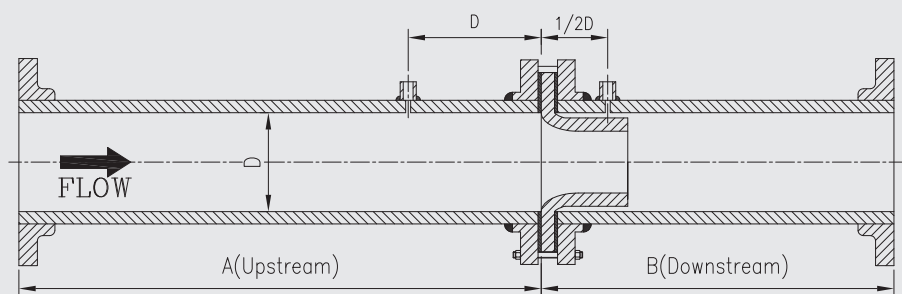
2S ½" S.W
3S ¾" S.W
4S 1" S.W
OH Other

10. Option

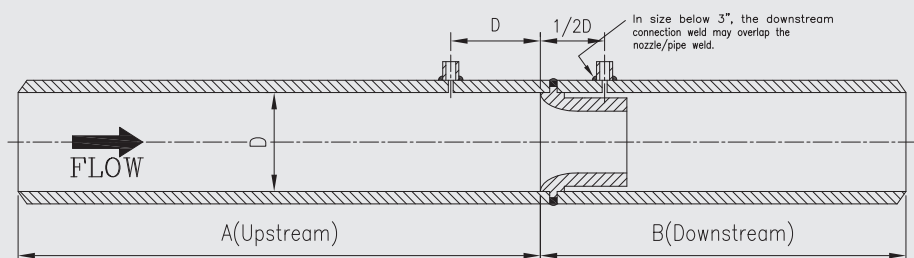
I Inspection pot
N None
O Other

1	2	3	4	5	6	7	8	9	10
F600	W	A014	R	W	5	C1	N0	3S	N

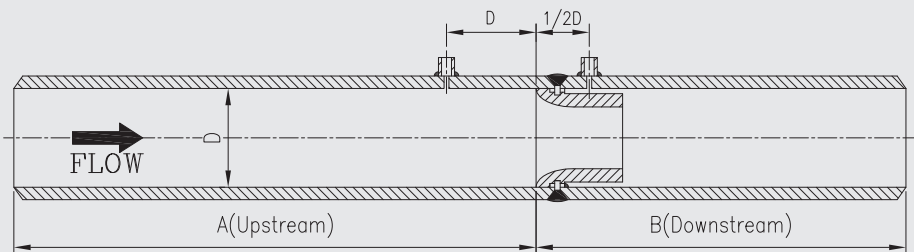
Sample ordering code



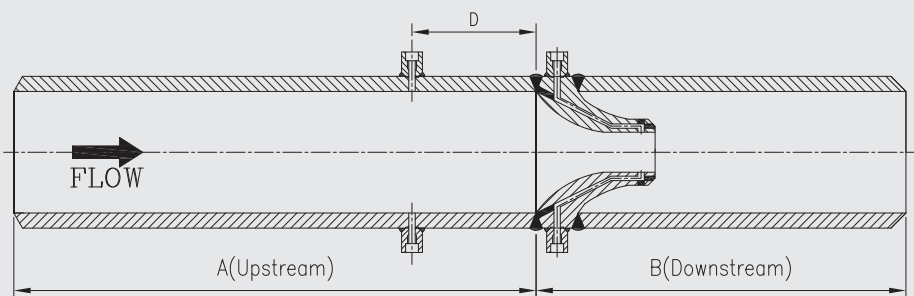
– Flange type –



– Weld in type –



– Holding ring type –



– Throat tap type –

Differential pressure and pressure loss

When a throttle element is interposed in a closed passage of fluid in piping, a difference is produced between the pressures upstream and downstream the throttle element as illustrated in Fig.1. This difference ($\Delta P = p_1 - p_2$) is called differential pressure. The fluid passing through the section 2 gradually regains its pressure as it flows downstream, but the downstream pressure cannot be recovered up to the upstream pressure, part of the pressure being lost. This loss is called a pressure loss (permanent pressure loss = p_3). The extent of this pressure loss depends on the type of throttle elements and their open area ratio, as shown in Fig.2 The relation between the flow rate and the differential pressure is given by:

$$Q = C \sqrt{\Delta P / \rho}$$

$$Q_n = C \sqrt{\Delta P * \rho / \rho_n}$$

$$W = C \sqrt{\Delta P * \rho}$$

Q (m³/h) : Volume rate of flow at density operating conditions

Q_n (Nm³/h) : Volume rate of flow at density base conditions

W (kg/h) : Weight rate of flow

ρ (kg/m³) : Density in operating conditions

ρ_n (kg/Nm³) : Density in base conditions

C : Constant coefficient

From the above, the relation between the flow rate and the differential pressure where the density is constant but the flow rate is variable is as listed in table 1. In other words, the flow rate is obtainable by measuring the differential pressure. When the density is variable (When the pressure and temperature are variable), the true flow rate can be given by compensating the variate of the density by the above equation (This however, is not applicable when the density varies to a great extent.)

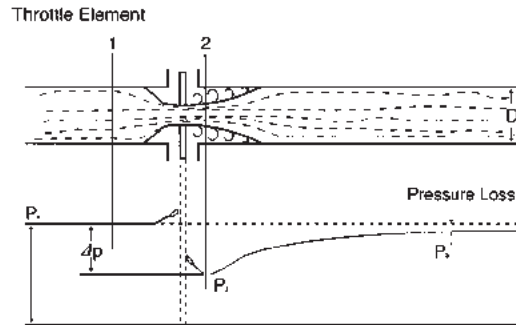


Fig.1

Table 1 : Relation between Flow Rate and Differential Pressure

Flow rate (%)	100	90	80	70	60	50	40	30	20	10	0
Differential pressure	100	81	64	49	36	25	16	9	4	1	0

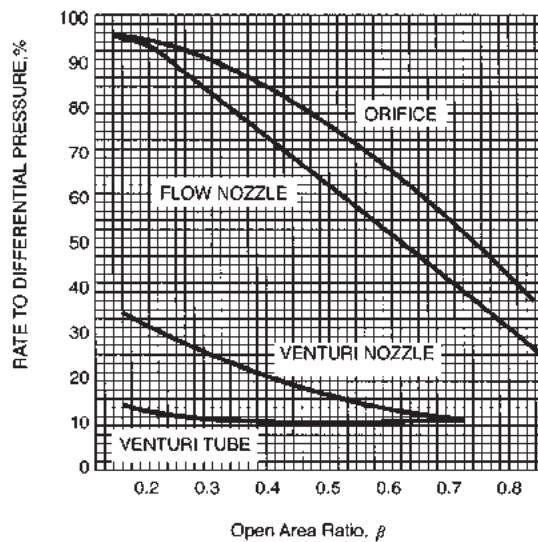


Fig.2

Venturi tube

Model : F700

Spec. sheet no. FD07-01

Description

The venturi tube is characterized by its tapered inlet and diverging outlet. This design greatly reduces head loss to the system when compared to an orifice plate, in fact, the venturi can handle 25 ~ 50 % more flow, than an orifice for comparable larger line size and lower head loss. The venturi is well suited for dirty fluids. There are no places for dirt to build up in the tube. Traditionally, the venturi tube has been used on low pressure gas flow, water and waste applications. Venturi tubes are generally constructed with the system of pressure taps which project radially into the pipe and feed into a common chamber known as a piazometer ring. This multiple tap arrangement provides an average pressure reading over the entire circumference of the element. As a result, the need for a long pipe runs is eliminated. A general rule is that a venturi tube requires only half the upstream and downstream runs of an orifice plate. The discharge coefficient of the venturi is constant and predictable to $\pm 1\%$ for pipe reynolds numbers greater than 100,000. Venturi elements are not as reliable at lower reynolds numbers (Figure 10). The venturi tube is a relatively high cost device. However, low pumping costs and reduced piping requirements can make it cost effective.



Specification

Venturi type

- Fabricated flange type
- Fabricated weld-on type
- Machined flange type
- Machined weld on type

Flow calculation standards

ISO 5167-4

Flange ratings

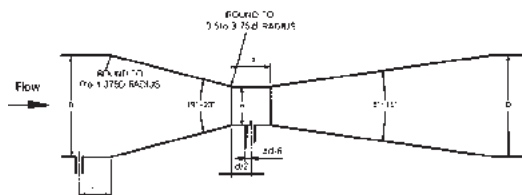
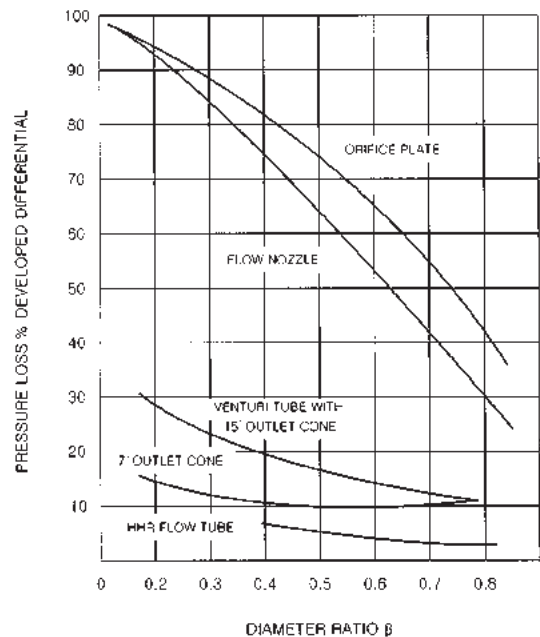
JIS 10, 16, 20, 30, 40 and 63K
ANSI class 150, 300, 600 and 900 Lb

Nominal pipe sizes available

50 ~ 1,200 mm
2" ~ 48"

Material

Carbon steel
304SS, 316SS and 316L SS



The Critical Dimension of the Classical Venturi Tube

Main order

Ordering information

1. Base model

F700 Venturi tube

2. Type

FF Fabricated flanged
FW Fabricated weld-on
MF Machined flanged
MW Machined weld-on

3. Line size

JIS	mm	ANSI	inch	DIN	mm
J015	15A	A001	½B	D015	15A
J020	20A	A002	¾B	D020	20A
J025	25A	A003	1B	D025	25A
J040	40A	A004	1½B	D040	40A
J050	50A	A005	2B	D050	50A
J065	65A	A006	2½B	D065	65A
J080	80A	A007	3B	D080	80A
J100	100A	A008	4B	D100	100A
J125	125A	A009	5B	D125	125A
J150	150A	A010	6B	D150	150A
J200	200A	A011	8B	D200	200A
J250	250A	A012	10B	D250	250A
J300	300A	A013	12B	D300	300A
J350	350A	A014	14B	D350	350A
J400	400A	A015	16B	D400	400A
J450	450A	A016	18B	D450	450A
J500	500A	A017	20B	D500	500A
J600	600A	A018	24B	D600	600A
J700	700A	A019	28B	D700	700A
J800	800A	A020	32B	D800	800A
J000	1,000A	A021	40B	D000	1,000A
XXXX	Other				

4. Body material

C Carbon steel
4 304SS
5 316SS
6 316L SS
O Other

5. Flange rating

JIS	ANSI	DIN
J010 JIS 10K	A010 ANSI 150 Lb	P010 PN 10
J016 JIS 16K	A020 ANSI 300 Lb	P016 PN 16
J020 JIS 20K	A030 ANSI 600 Lb	P025 PN 25
J030 JIS 30K	A040 ANSI 900 Lb	P040 PN 40
J040 JIS 40K	A050 ANSI 1,500 Lb	
J063 JIS 63K	A060 ANSI 2,500 Lb	
XXXX Other		

6. Flange material

A A105
S A182 F304
O Other
N None

7. Boss material

CS A105
S4 A182 F304
OH Other
NO None

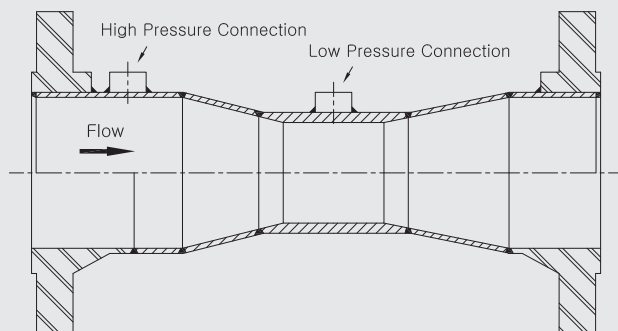
8. Option

O Other
N None

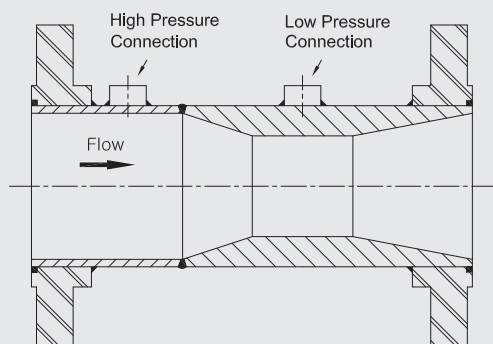
1	2	3	4	5	6	7	8	Sample ordering code
F700	FF	A016	4	A020	S	S4	N	

Dimension

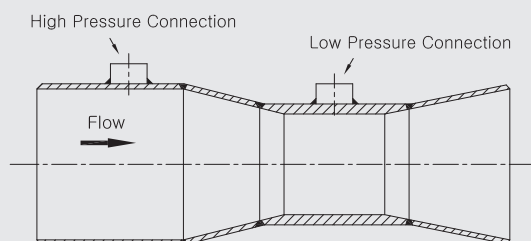
Fabricated flange type
Available in size 6" and larger
Model : F700-FF



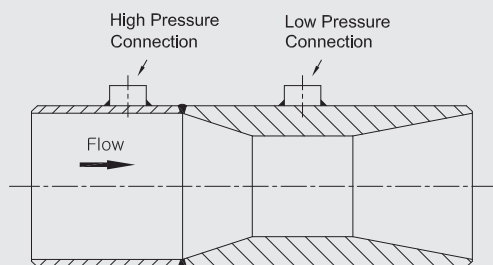
Machined flange type
Available in size 6" and smaller
Model : F700-MF



Fabricated weld-on type
Available in size 6" and larger
Model : F700-FW



Machined weld-on type
Model : F700-MW



Venturi cone

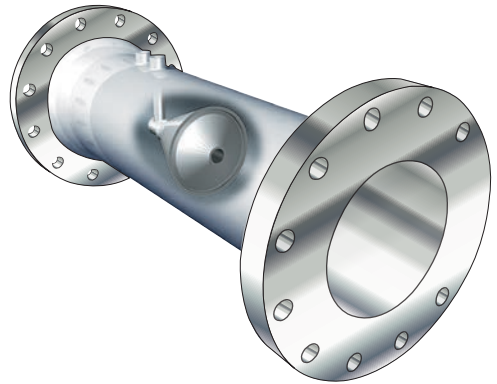
Model : F750

Spec. sheet no. **FD07-02**

Description

Venturi cone is an innovative flowmeter which offers the ability to measure a differential pressure and a flow rate. Venturi cone offers better accuracy, variety of ranges, flexible installation, and requires less maintenance. The key benefit of venturi cone is the unique design, the ability to provide a repeatable accuracy up to 0.5 % of rate under the most harsh flow conditions. Furthermore, it offers a wide range of reynolds numbers. Venturi cone offers an exceptional sizing flexibility, such as diameter $\frac{1}{2} \sim 120"$. Venturi cone assures a casting performance, with no moving parts to be replaced. Additionally, the contoured shape of the cone directs the flow without impacting the abrupt surface.

ER[CE



Specification

Accuracy

From ± 0.5 % of actual flow (Certain fluids and reynolds number applications require special calibrations to achieve this value.)

Repeatability

± 0.1 % or better

Flow ranges

10:1 and greater

Standard beta ratios

0.45 through 0.80, special betas available

Head loss

Varies with beta ratio and DP

Installation piping requirements

Typically 0 ~ 3 diameters upstream and 0 ~ 1 diameters downstream of the cone are required, depending on fittings valves in the adjacent pipeline

Materials of construction include

Duplex SS, 304SS or 316SS
Hastelloy C-276
Carbon steels
Special materials on request

Line sizes

0.5 ~ 120" or larger

End fittings

Flanged, threaded, hub or weld-end standard.
Others on request

Configurations

Precision flow tube

WISE[®]

Specification

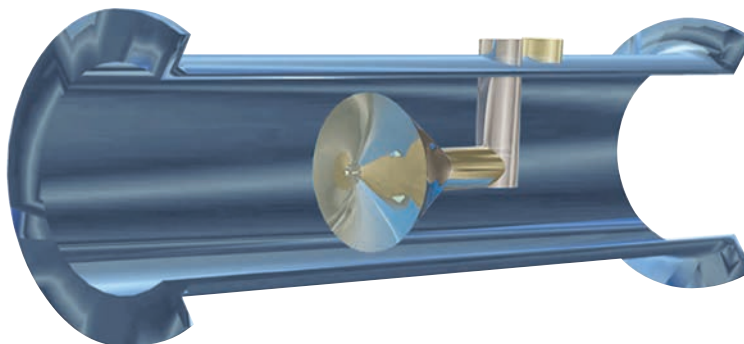
Approvals for the V-cone flowmeter

Calibrated for customer application.

ASME B31.3 construction available.

Meters in compliance with PED97/23/EC are available upon request.

ISO 9001:2000 certified quality management system



Venturi-cone flowmeter performance advantages

High accuracy

High repeatability

Minimum straight pipe requirement

Low head loss

Clean or dirty liquids, wet gases, slurries

Applications

Oil and gas production and delivery

Petroleum refining

Power / Co-generation

Chemical

1. Base model

F750 Venturi cone

2. Type

BE Beveled end
FE Flanged end

3. Line size

JIS	mm	ANSI	inch	DIN	mm
J015	15A	A001	½B	D015	15A
J020	20A	A002	¾B	D020	20A
J025	25A	A003	1B	D025	25A
J040	40A	A004	1½B	D040	40A
J050	50A	A005	2B	D050	50A
J065	65A	A006	2½B	D065	65A
J080	80A	A007	3B	D080	80A
J100	100A	A008	4B	D100	100A
J125	125A	A009	5B	D125	125A
J150	150A	A010	6B	D150	150A
J200	200A	A011	8B	D200	200A
J250	250A	A012	10B	D250	250A
J300	300A	A013	12B	D300	300A
J350	350A	A014	14B	D350	350A
J400	400A	A015	16B	D400	400A
J450	450A	A016	18B	D450	450A
J500	500A	A017	20B	D500	500A
J600	600A	A018	24B	D600	600A
J700	700A	A019	28B	D700	700A
J800	800A	A020	32B	D800	800A
J000	1,000A	A021	40B	D000	1,000A
XXXX	Other				

4. Body material

C Carbon steel
4 304SS
5 316SS
6 316L SS
O Other

5. Flange rating

JIS		ANSI		DIN	
J010	JIS 10K	A010	ANSI 150 Lb	P010	PN 10
J016	JIS 16K	A020	ANSI 300 Lb	P016	PN 16
J020	JIS 20K	A030	ANSI 600 Lb	P025	PN 25
J030	JIS 30K	A040	ANSI 900 Lb	P040	PN 40
J040	JIS 40K	A050	ANSI 1,500 Lb		
J063	JIS 63K	A060	ANSI 2,500 Lb		

6. Flange material

A A105
S 304SS
O Other
N None

7. Boss material

CS A105
S4 304SS
OH Other
NO None

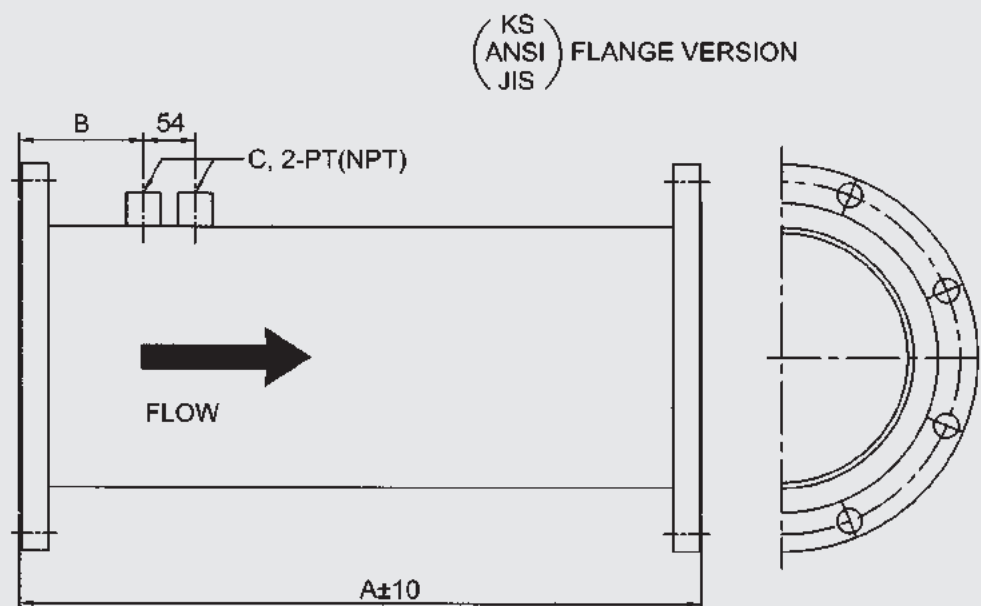
8. Option

O Other
N None

1	2	3	4	5	6	7	8
F750	FE	A016	4	A020	S	S4	N

Sample ordering code

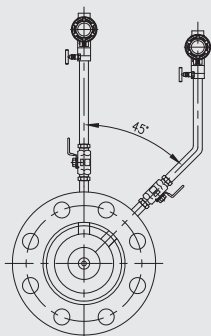
Dimension



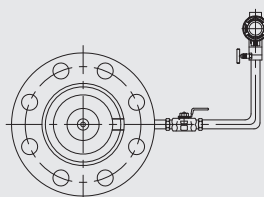
Model	Size	A(mm)	B(mm)	C(PT)
F750	15A	200	65	1/4
F750	20A	200	65	1/4
F750	25A	200	65	1/4
F750	40A	260	75	1/4
F750	50A	300	90	1/2
F750	65A	300	90	1/2
F750	80A	360	90	1/2
F750	100A	400	100	1/2
F750	125A	560	110	1/2
F750	150A	560	110	1/2
F750	200A	660	130	1/2
F750	250A	710	130	1/2
F750	300A	760	130	1/2
F750	350A	760	150	1/2
F750	400A	760	150	1/2
F750	450A	920	150	1/2
F750	500A	920	150	1/2
F750	600A	1220	150	1/2
F750	700A	1220	150	1/2
F750	750A	1525	150	1/2
F750	800A	1525	150	1/2
F750	900A	1525	150	1/2
F750	1000A	2030	150	1/2
F750	1200A	2030	150	1/2
F750	1500A	2540	150	1/2
F750	2000A	3050	150	1/2

Typical installation of venturi cone

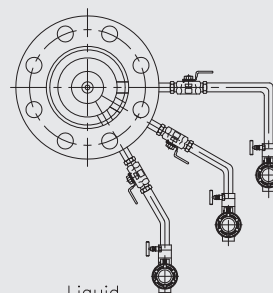
A: Horizontal pipe line



Wet gas

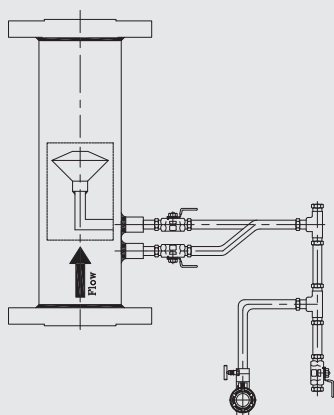


Dry gas

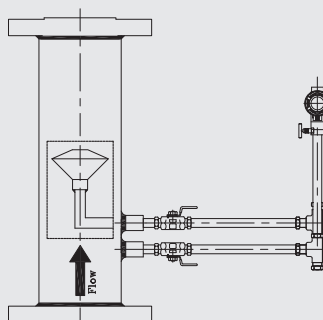


Liquid

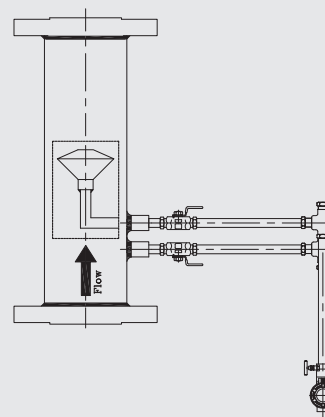
B: Vertical pipe line



Wet gas



Dry gas



Liquid

Averaging pitot tube

Model : F760

Spec. sheet no. **FD07-03**

Description

Averaging pitot tube is an energy saving device used to measuring the flow of liquids, gases and steam in pipes, stacks and rectangular ducts.

It provides high, long term stability with low permanent pressure loss.

Examples of their applications are precise volumetric flow measurement in batch processes, continuous measurement of liquid ingredients in the process industry, fuel, air, steam and gases as primary energy source as well as in control functions requiring a high degree of stability and repeatability.

EAC

Advantages

- Unique profile shape enables high flow rate turn down
- Dual averaging for better accuracy
- Short upstream and downstream straight pipe lengths
- Long term accuracy unaffected by wear



Specification

Measuring fluid

Liquid, Gas, Steam and etc.

Accuracy

±1 % of actual flow rate

Material

304SS, 316SS, 316L SS and Monel
Special materials are available

Pipe size

50 ~ 1,800 mm
2" ~ 72"

Repeatability

±0.1 % of actual flow rate or better

Max. working pressure

15 MPa

Max. working temperature

600 °C

Rangeability

10:1

WISE®

Main order

Ordering information

1. Base model

F760 Averaging pitot tube

2. Type of support

- 1 Single support
- 2 Double support

3. Line size

01	½"	12	10"
02	¾"	13	12"
03	1"	14	14"
04	1½"	15	16"
05	2"	16	18"
06	2½"	17	20"
07	3"	18	24"
08	4"	19	28"
09	5"	20	32"
10	6"	21	40"
11	8"	22	Other

4. Vessel connection size

01	25A 10K RF	11	1" 300 Lb RF
02	25A 20K RF	12	1" 600 Lb RF
03	25A 30K RF	13	1½" 150 Lb RF
04	40A 10K RF	14	1½" 300 Lb RF
05	40A 20K RF	15	1½" 600 Lb RF
06	40A 30K RF	16	2" 150 Lb RF
07	50A 10K RF	17	2" 300 Lb RF
08	50A 20K RF	18	2" 600 Lb RF
09	50A 30K RF	19	Other
10	1" 150 Lb RF	20	Welding

5. Probe material

- A** 304SS
- B** 316SS
- C** 316L SS
- D** Monel
- H** Hastelloy-C
- E** Other

6. Valve type

- B** Ball
- G** Gate
- L** Glove
- N** Needle
- O** None

7. Option

- O** Other
- N** None

1	2	3	4	5	6	7
F760	1	05	05	B	G	O

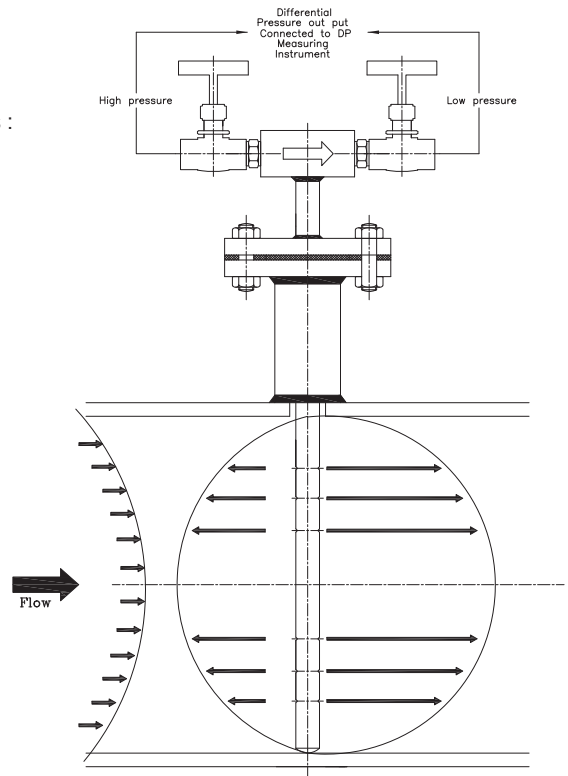
Sample ordering code

Measurement principal of pitot tube

Averaging pitot tubes are generally used for large line sizes or ducts where other primary devices become relatively expensive.

Averaging pitot tube comprises of following components :

- Outer impact tube
- Internal averaging tube
- Low pressure chamber
- Head



The outer impact tube has a number of pressure sensing holes facing upstream which are positioned at equal annular points in accordance with a loglinear distribution.

The total pressure developed at each upstream hole by the impact of the flowing medium are firstly averaged within the outer impact tube and then to a second order (and more accurately) averaged within the internal averaging tube.

This pressure is represented at the head as the high pressure component of the DP output.

The low pressure component is generated from a single sensing hole located on the downstream side of the outer impact tube.

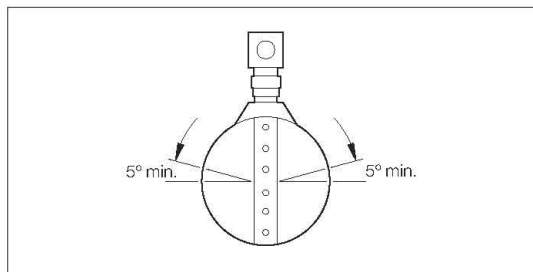
Stable flow coefficient which is the result of typical diamond shape, makes it a reliable flow measuring primary flow element.

Simple and inexpensive, long term accuracy within acceptable limits over wide range of flow, low permanent pressure loss and minimum operating cost makes it ideal choice of any design engineer.

Orientation in pipe

1. Horizontal pipe mounting - Gas

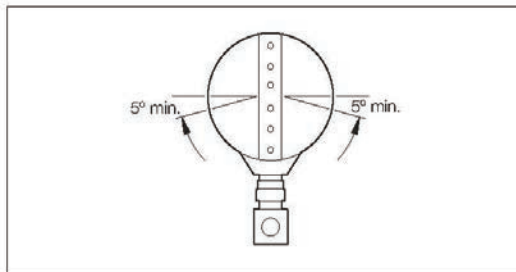
To ensure the instrument lines contain only gas, install APT with the instrument connections above the centre line of the pipe, at least 5° above the horizontal



<Horizontal pipe mounting - Gas>

2. Horizontal pipe mounting - Liquids

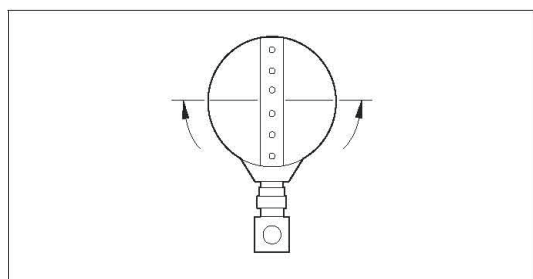
To ensure the instrument lines contain only the process liquid, install APT with the instrument connections below the centre line of the pipe, at least 5° below the horizontal



<Horizontal pipe mounting - Liquid>

3. Horizontal pipe mounting - Steam

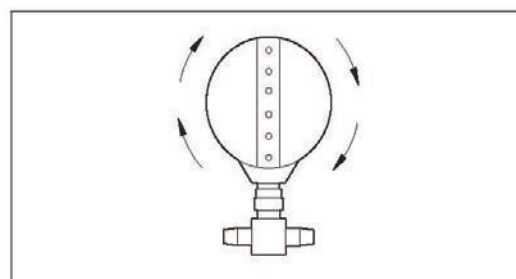
To ensure the instrument lines contain only steam, install APT with the instrument connections at or below the centre line of the pipe



<Horizontal pipe mounting - Steam>

4. Vertical pipe mounting - All applications

Any lateral - mounting angle is suitable

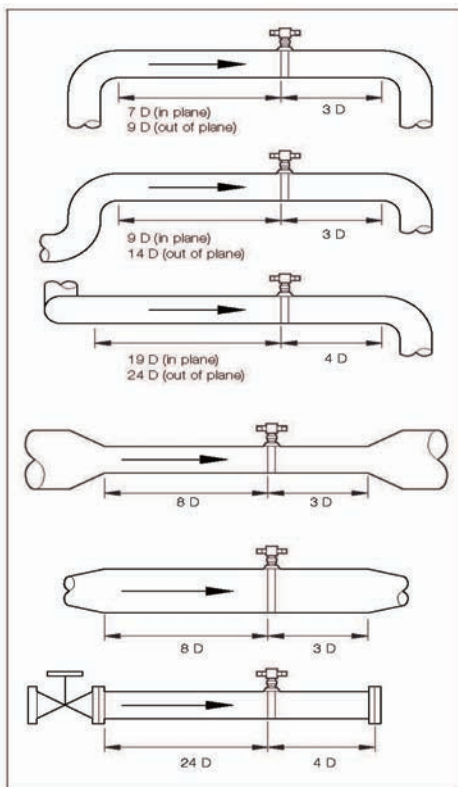


<Vertical pipe mounting - All applications>

Recommended straight run

In common with other differential pressure primary flow elements, averaging pitot tubes require a well developed flow profile. Disturbances created by various pipe configurations can reduce measurement accuracy. Recommended upstream and downstream straight pipe lengths are shown below, in terms of multiples of the pipe diameter.

Averaging pitot tubes installed with shorter pipe lengths can still provide an repeatable flow measurment.



Memo

Wedge meter

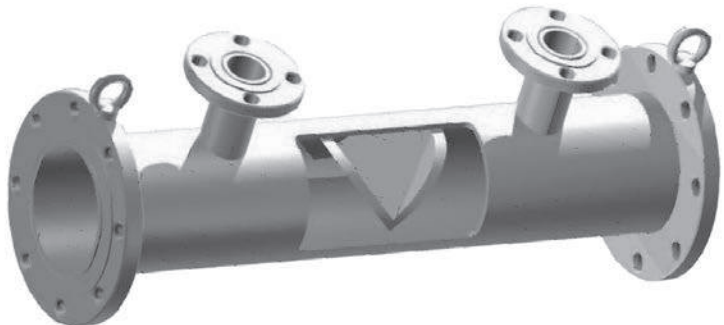
Model : F770

Spec. sheet no. FD07-04

Description

The flow element consists of a body and wedge flow restriction. This restriction creates a differential pressure in proportion to the square of the volumetric flow rate. The wedge restriction has no critical surface dimensions, or sharp edges, that will affect measurement accuracy as the result of normally expected wear.

EAC



Advantages

- Bi-directional flow
- High accuracy ± 0.5 % of actual flow rate
- Low Reynolds number measurement, $Rd500$
- Minimum upstream and downstream pipe measurement

Specification

Measuring fluid

Liquid, Gas and steam

Material

304SS, 316SS, 316L SS and Carbon steel
Special materials are available

Pipe size

0.5" ~ 24"

Wedge element standard H/D ratios

0.2, 0.3, 0.4, 0.5, 0.6 and 0.7

Accuracy

- Calibrated
 - 1" or larger : ± 0.5 % of actual flow when operated within the calibrated range
 - 0.5" : ± 0.75 % of actual flow when operated within the calibrated range
- Uncalibrated :
 - ± 5 % of actual flow when using nominal K_d^2 from sizing program. Applies to bi-directional flow
- Bi-directional :
 - Same as above when K_d^2 designated as reverse flow coefficient

Repeatability

± 0.2 %

Rangeability

10:1

1. Base model

F770 Wedge meter

2. DP connection

- 1 Chemical tee
- 2 ANSI 2"
- 3 ANSI 3"
- 4 ANSI 4"
- 5 Other

3. Line size

01	½"	10	6"
02	¾"	11	8"
03	1"	12	10"
04	1½"	13	12"
05	2"	14	14"
06	2½"	15	16"
07	3"	16	18"
08	4"	17	20"
09	5"	18	24"

4. Flange rating

01	ANSI 150 Lb SORF	07	ANSI 600 Lb WNRF
02	ANSI 300 Lb SORF	08	ANSI 900 Lb WNRF
03	ANSI 600 Lb SORF	09	ANSI 600 Lb WNRTJ
04	ANSI 900 Lb SORF	10	ANSI 900 Lb WNRTJ
05	ANSI 150 Lb WNRF	11	Other
06	ANSI 300 Lb WNRF		

5. Material

- A Carbon steel
- B 304SS
- C 316SS
- D 316L SS
- E Other

6. Calibration

- A Water calibration
- B None

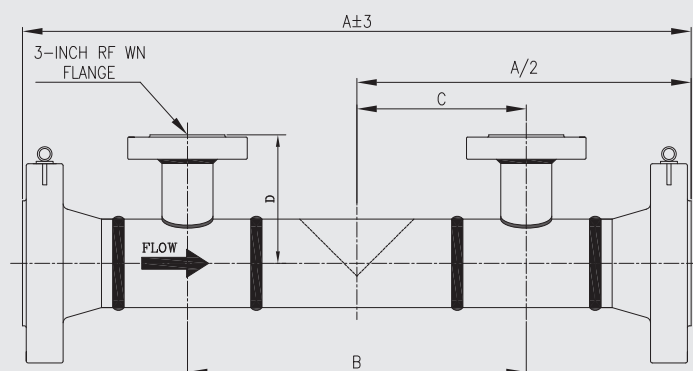
7. Option

- O Other
- N None

1	2	3	4	5	6	7
F770	1	05	05	B	A	O

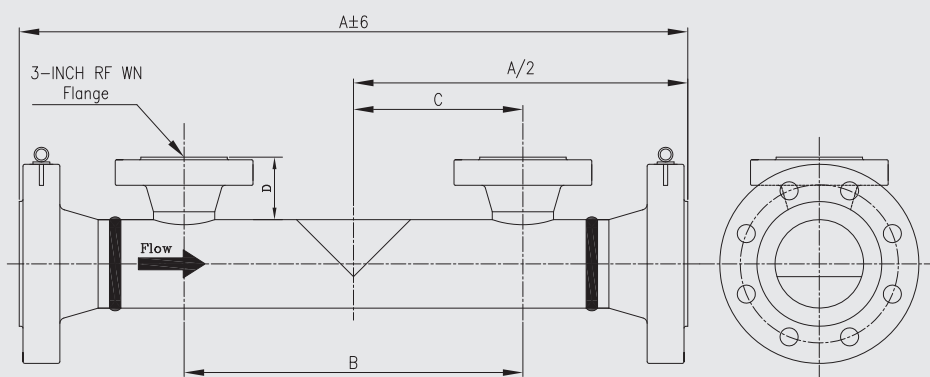
Sample ordering code

RF WN – Wedge dimensions and weights



Size 1-1/2", 2" and 3"

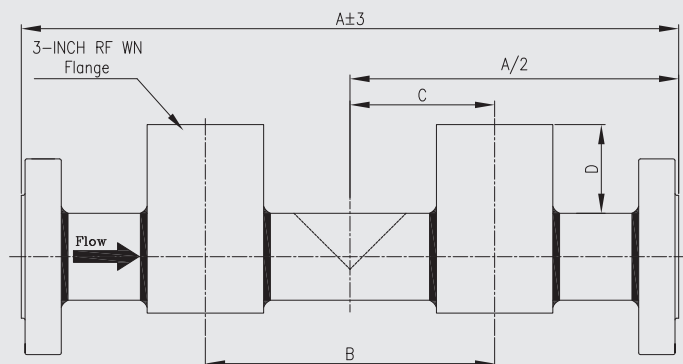
Pipe Size	A(mm)			B (mm)	C (mm)	D(mm)			Approximate weight LBS		
	Flange rating					Flange rating			Flange rating		
	150Lb	300Lb	600Lb			150Lb	300Lb	600Lb	150Lb	300Lb	600Lb
1-1/2"	530	540	560	292	146	208	214	212	55	61	71
2"	550	560	580	292	146	216	222	231	62	70	84
3"	620	640	660	312	156	156	166	175	78	92	102



Size 4" ~ 24"

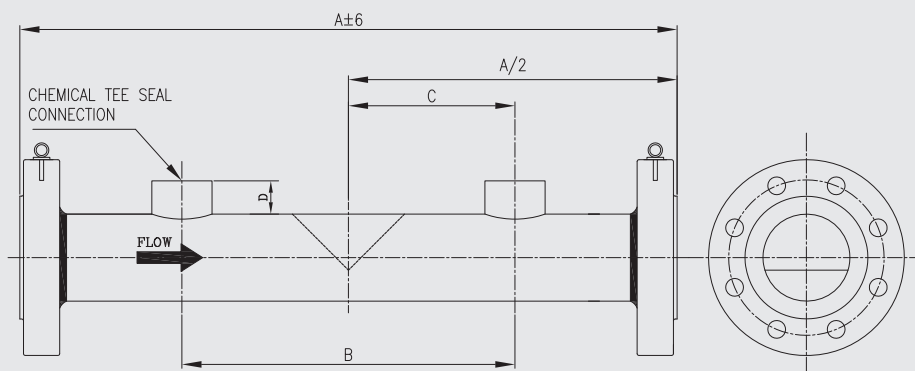
Pipe size	A (mm)	B (mm)	C (mm)	D(mm)			Approximate weight LBS		
				Flange rating			Flange rating		
				150Lb	300Lb	600Lb	150Lb	300Lb	600Lb
4"	760	380	190	62.9	79.2	89	85	105	130
6"	860	460	230	62.9	79.2	89	105	155	215
8"	920	520	260	62.9	79.2	89	140	205	320
10"	970	600	300	62.9	79.2	89	205	265	460
12"	1120	670	335	62.9	79.2	89	275	380	
14"	1170	710	355	62.9	79.2	89	345	505	
16"	1250	780	390	62.9	79.2	89	460	570	
18"	1320	850	425	62.9	79.2	89	510	760	
20"	1420	940	470	62.9	79.2	89	595	905	
24"	1570	1070	535	62.9	79.2	89	825	1015	

RF SO – Wedge dimensions and weights



Size 1/2" ~ 3"

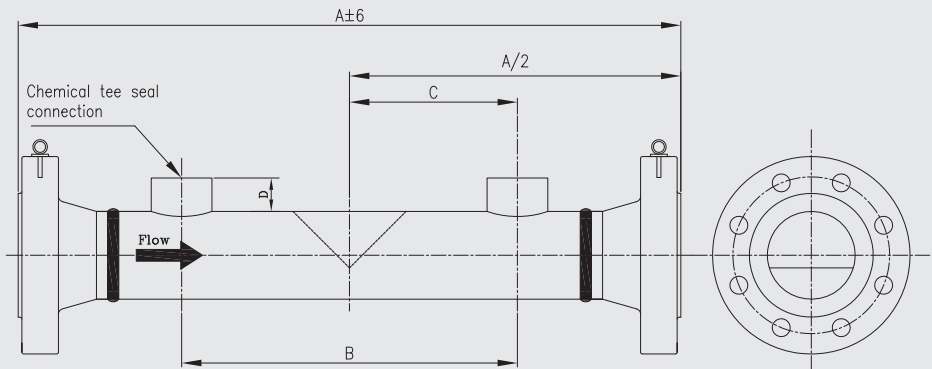
Pipe size	A (mm)	B (mm)	C (mm)	D (mm)	Approximate weight LBS		
					Flange rating		
					150Lb	300Lb	600Lb
1/2"	460	166	83	25.4	23	23	23
1"	480	180	90	38.1	26	29	30
1-1/2"	510	204	102	47.2	43	49	51
2"	530	212	106	57.1	51	55	59
3"	610	264	132	69.9	69	79	84



Size 4" ~ 24"

Pipe size	A (mm)	B (mm)	C (mm)	D (mm)	Approximate weight LBS		
					Flange rating		
					150Lb	300Lb	600Lb
4"	760	380	190	45	70	90	115
6"	860	460	230	45	90	140	185
8"	920	520	260	45	125	180	270
10"	970	600	300	45	180	250	420
12"	1120	670	335	45	260	365	
14"	1170	710	355	45	330	480	
16"	1250	780	390	45	445	545	
18"	1320	850	425	45	495	725	
20"	1420	940	470	45	580	880	
24"	1570	1070	535	45	810	985	

RF WN – Wedge dimensions and weights



Size 4" ~ 24"

Pipe size	A(mm)			B (mm)	C (mm)	D (mm)	Approximate weight LBS		
	Flange rating						Flange rating		
	150Lb	300Lb	600Lb				150Lb	300Lb	600Lb
4"	900	920	960	380	190	45	65	75	110
6"	1030	1050	1100	460	230	45	90	130	195
8"	1090	1110	1170	520	260	45	115	175	285
10"	1140	1170	1260	600	300	45	165	280	450
12"	1320	1350	1420	670	335	45	235	380	
14"	1400	1430	1490	710	355	45	310	625	
16"	1470	1510	1590	780	390	45	410	640	
18"	1570	1610	1680	850	425	45	500	810	
20"	1690	1720	1790	940	470	45	630	1005	
24"	1860	1890	1970	1070	535	45	870	1190	

Glass tube flowmeter flange connection

Model : F801

Spec. sheet no. **FD08-01**

Description

The rotameter's operation is based on the variable area principle : Fluid raises a float in a tapered tube, increasing the area for passage of the fluid. The height of the float is directly proportional to the flow rate.



Specification

Process connection

Flanged

Pressure rating

Max.10 kgf/cm²

Size

15A ~ 100A
(65A ~ 100A)

Temperature rating

Max.120 °C

Material

Steel
304SS
316SS

Accuracy

±2.0 % of full scale
±1.0 % of full scale (Option)

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I F801_01

1. Base model**F801** Glass tube flowmeter flange connection**2. Flow direction type**

- D1** Bottom and top
D2 Bottom and top side
D3 Bottom side and top side
D4 Bottom side and top

3. Line size

JIS	mm	ANSI	inch	DIN	mm
J015	15A	A001	½B	D015	15A
J020	20A	A002	¾B	D020	20A
J025	25A	A003	1B	D025	25A
J040	40A	A004	1½B	D040	40A
J050	50A	A005	2B	D050	50A
J065	65A	A006	1½B	D065	65A
J080	80A	A007	3B	D080	80A
J100	100A	A008	4B	D100	100A
XXXX	Other				

4. Flange rating and connection type

J010 JIS 10K
A010 ANSI 150 Lb
P010 PN10
XXXX Other

5. Main material (See material table)

- A** Body material / Carbon steel
B Body material / 304SS
C Body material / 316SS
O Other

6. Float material

- A** Acetal
4 304SS
5 316SS
F PTFE
P PVC
O Other

7. Option

- 10** One point alarm
20 Two point alarm
NO None

1	2	3	4	5	6	7
F801	D1	J015	J010	4	5	NO

Sample ordering code

Flow chart

Float Size	Standard flow rate water (m³/h)		Measuring range				Pressure loss (mmH ₂ O)		Pressure rating (kgf/cm²)	Dimension (mm)
			Water (m³/h)		Air (Nm³/h)					L
	304SS	PVC	304SS	PVC	PVC acetal teflon	Aluminium 304SS	H ₂ O	Air		
15A	0.1 ~ 1	0.08 ~ 0.8	0.03 ~ 0.3 0.2 ~ 2	0.03 ~ 0.3 0.15 ~ 1.5	0.3 ~ 3 1.2 ~ 12	0.3 ~ 3 2 ~ 20	100	20	10	360
20A	0.15 ~ 1.5	0.12 ~ 1.2	0.03 ~ 0.3 0.2 ~ 2	0.03 ~ 0.3 0.15 ~ 1.5	0.3 ~ 3 2 ~ 20	0.3 ~ 3 3 ~ 30	200	30	10	360
25A	0.35 ~ 3.5	0.25 ~ 2.5	0.15 ~ 1.5 0.5 ~ 5	0.1 ~ 1 0.35 ~ 3.5	1 ~ 10 4 ~ 40	1.5 ~ 15 6 ~ 60	250	40	7	400
32A	0.6 ~ 6	0.45 ~ 4.5	0.3 ~ 3 0.7 ~ 7	0.25 ~ 2.5 0.6 ~ 6	2 ~ 20 7 ~ 70	3 ~ 30 10 ~ 100	300	50	7	420
40A	1 ~ 10	0.8 ~ 8	0.35 ~ 3.5 1.2 ~ 12	0.3 ~ 3 1.0 ~ 10	3 ~ 30 12 ~ 120	4.5 ~ 45 15 ~ 150	350	60	7	440
50A	1.5 ~ 15	1.2 ~ 12	1 ~ 10 2 ~ 20	0.8 ~ 8 1.5 ~ 15	3.5 ~ 35 15 ~ 150	5 ~ 50 2 ~ 200	400	100	5	480
65A	2.5 ~ 25	2 ~ 20	1.5 ~ 15 3 ~ 30	1.2 ~ 12 2.5 ~ 25	6 ~ 60 30 ~ 300	9 ~ 90 40 ~ 400	400	100	4	550
80A	4 ~ 40	3 ~ 30	2 ~ 20 5 ~ 50	1.6 ~ 16 4 ~ 40	10 ~ 100 50 ~ 500	15 ~ 150 70 ~ 700	500	150	3	620
100A	6 ~ 60	5 ~ 50	5 ~ 50 7 ~ 70	3 ~ 30 6 ~ 60	15 ~ 150 70 ~ 700	20 ~ 200 100 ~ 1,000	500	150	3	740

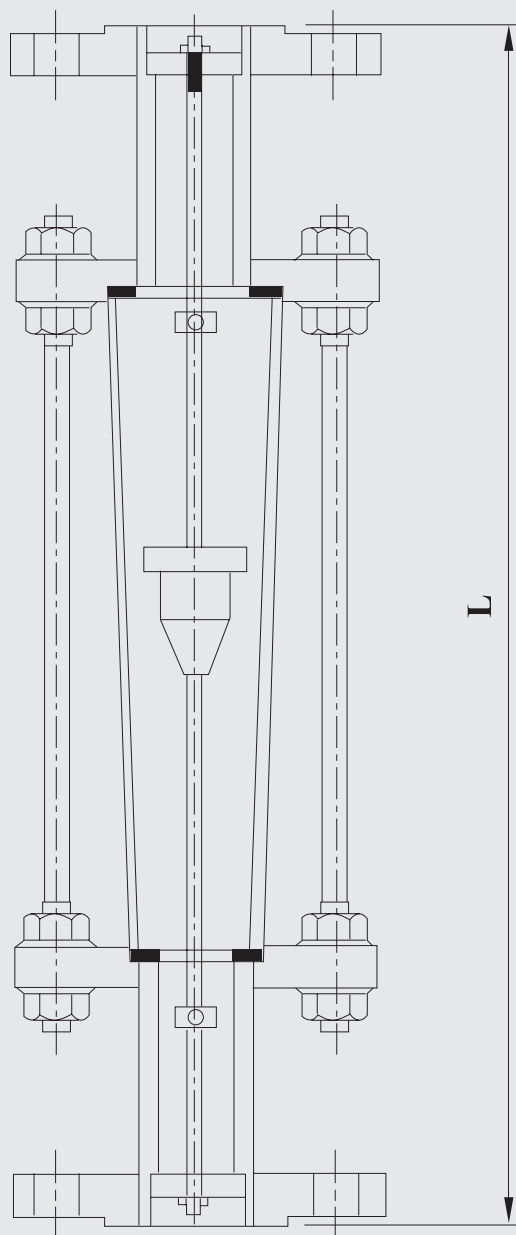
* When the size is larger than 65A, to be consulted with a maker

Material table

Part list	Material code		
	A	B	C
Body	Carbon steel	304SS	316SS
Flange	Carbon steel	304SS	316SS
Float	304SS / 316SS, PVC, Teflon, Acetal		
Taper tube	Pyrex glass		
Guide rod	304SS / 316SS		
Packing	NBR	NBR, Viton, EPDM	
Stay bolt	Carbon steel	304SS	
Nut	Carbon steel	304SS	

* Guide rod can be excluded as per flow rate

Dimension



Glass tube flowmeter screw connection

Model : F802

Spec. sheet no. **FD08-02**

Description

The rotameter's operation is based on the variable area principle : Fluid raises a float in a tapered tube, increasing the area for passage of the fluid. The height of the float is directly proportional to the flow rate.



Specification

Process connection

Screwed

Pressure rating

Max.10 kgf/cm²

Size

15A ~ 65A

Temperature rating

Max.120 °C

Material

Steel
304SS
316SS

Accuracy

±2.0 % of full scale
±1.0 % of full scale (Option)

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| F802_01

1. Base model**F802** Glass tube flowmeter screw connection**2. Flow direction type**

- D1** Bottom and top
D2 Bottom and top side
D3 Bottom side and top side

3. Line size

- T001** ½" (15A)
T002 ¾" (20A)
T003 1" (25A)
T004 1½" (40A)
T005 2" (50A)
T006 2½" (65A)
XXXX Other

4. Connection type

- TPTM** PT male
TPTF PT female
TNTM NPT male
TNTF NPT female
XXXX Other

5. Main material (See material table)

- A** Body material / Carbon steel
B Body material / 304SS
C Body material / 316SS
O Other

6. Float material

- A** Acetal
4 304SS
5 316SS
F PTFE
P PVC
O Other

7. Option

- 10** One point alarm
20 Two point alarm
NO None

1	2	3	4	5	6	7
F802	D2	T001	TPTM	A	5	NO

Sample ordering code

Flow chart

Float Size	Standard flow rate water (m³/h)		Measuring range				Pressure loss (mmH₂O)		Pressure rating (kgf/cm²)	Dimension (mm)
			Water (m³/h)		Air (Nm³/h)					L
	304SS	PVC	304SS	PVC	PVC acetal teflon	Aluminium 304SS	H₂O	Air		
15A	0.1 ~ 1	0.08 ~ 0.8	0.03 ~ 0.3 0.2 ~ 2	0.03 ~ 0.3 0.15 ~ 1.5	0.3 ~ 3 1.2 ~ 12	0.3 ~ 3 2 ~ 20	100	20	10	360
20A	0.15 ~ 1.5	0.12 ~ 1.2	0.03 ~ 0.3 0.2 ~ 2	0.03 ~ 0.3 0.15 ~ 1.5	0.3 ~ 3 2 ~ 20	0.3 ~ 3 3 ~ 30	200	30	10	360
25A	0.35 ~ 3.5	0.25 ~ 2.5	0.15 ~ 1.5 0.5 ~ 5	0.1 ~ 1 0.35 ~ 3.5	1 ~ 10 4 ~ 40	1.5 ~ 15 6 ~ 60	250	40	7	400
32A	0.6 ~ 6	0.45 ~ 4.5	0.3 ~ 3 0.7 ~ 7	0.25 ~ 2.5 0.6 ~ 6	2 ~ 20 7 ~ 70	3 ~ 30 10 ~ 100	300	50	7	420
40A	1 ~ 10	0.8 ~ 8	0.35 ~ 3.5 1.2 ~ 12	0.3 ~ 3 1.0 ~ 10	3 ~ 30 12 ~ 120	4.5 ~ 45 15 ~ 150	350	60	7	440
50A	1.5 ~ 15	1.2 ~ 12	1 ~ 10 2 ~ 20	0.8 ~ 8 1.5 ~ 15	3.5 ~ 35 15 ~ 150	5 ~ 50 2 ~ 200	40	100	5	480
65A	2.5 ~ 25	2 ~ 20	1.5 ~ 15 3 ~ 30	1.2 ~ 12 2.5 ~ 25	6 ~ 60 30 ~ 300	9 ~ 90 40 ~ 400	400	100	4	550

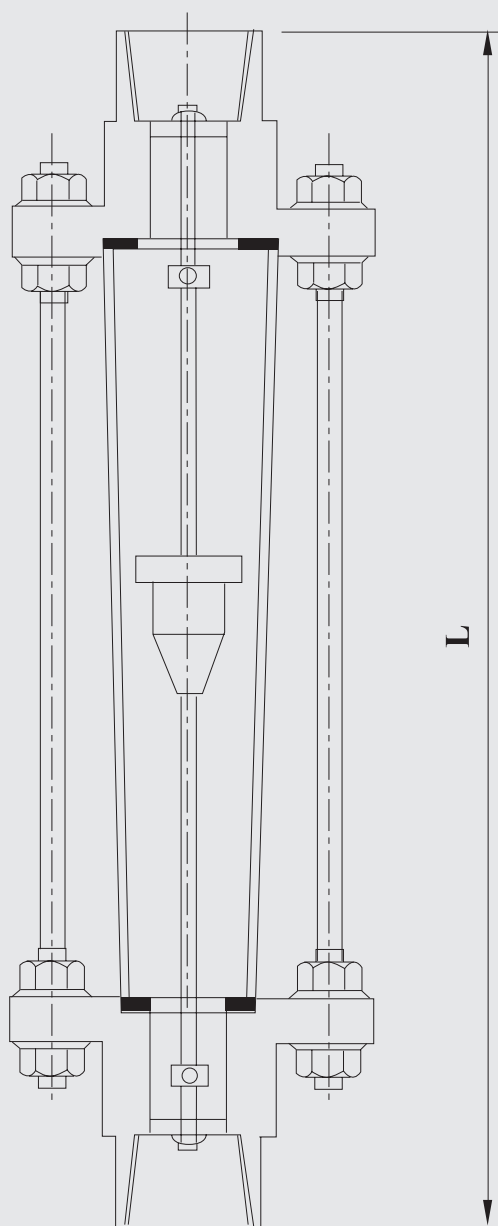
* When the size is larger than 65A, to be consulted with a maker

Material table

Part list	Material code		
	A	B	C
Body	Carbon steel	304SS	316SS
Flange	Carbon steel	304SS	316SS
Float	304SS / 316SS, PVC, Teflon, Acetal		
Taper tube	Pyrex glass		
Guide rod	304SS / 316SS		
Packing	NBR	NBR, Viton, EPDM	
Stay bolt	Carbon steel	304SS	
Nut	Carbon steel	304SS	

* Guide rod can be excluded as per flow rate

Dimension



Glass tube flowmeter

Model : F803

Spec. sheet no. FD08-03

Description

Rotameters with all plastic construction are available for applications where metal wetted parts cannot be tolerated, such as with deionized water or corrosives. With plastic end fittings, care must be taken in installation, not to distort the threads.



Specification

Process connection

Screwed
Flanged

Pressure rating

Max. 5 kgf/cm²

Size

15A ~ 65A
65A ~ 100A

Temperature rating

Max. 60 °C

Material

PVC

Accuracy

±2.0 % of full scale
±1.0 % of full scale (Option)

Main order

Ordering information

1. Base model

F803 Glass tube flowmeter

2. Flow direction type

D1 Bottom and top
D2 Bottom and top side
D3 Bottom side and top side

3. Line size

JIS	mm	ANSI	inch	DIN	mm
J015	15A	A001	½B	D015	15A
J020	20A	A002	¾B	D020	20A
J025	25A	A003	1B	D025	25A
J040	40A	A004	1½B	D040	40A
J050	50A	A005	2B	D050	50A
J065	65A	A006	1½B	D065	65A
J080	80A	A007	3B	D080	80A
J100	100A	A008	4B	D100	100A
XXXX	Other				

4. Screw type

TPTM PT male
TPTF PT female
TNTM NPT male
TNTF NPT female
XXXX Other

5. Flange rating and connection type

J010 JIS 10K
A010 ANSI 150 Lb
P010 PN10
XXXX Other

6. Body material (See material table)

P PVC

7. Float material

A Acetal
4 304SS
5 316SS
F PTFE
P PVC
O Other

8. Bolt and nut material

C Carbon steel
4 304SS

9. Option

1 One point alarm
2 Two point alarm
N None

1	2	3	4	5	6	7	8	9
F803	D2	J015	TPTM	J010	P	A	4	1

Sample ordering code

Flow chart

Float Size	Standard flow rate water (m³/h)		Measuring range				Pressure loss (mmH₂O)		Pressure rating (kgf/cm²)	Dimension (mm)
			Water (m³/h)		Air (Nm³/h)					
	304SS	PVC	304SS	PVC	PVC acetal teflon	Aluminium 304SS	H₂O	Air		L
15A	0.1 ~ 1	0.08 ~ 0.8	0.03 ~ 0.3 0.2 ~ 2	0.03 ~ 0.3 0.15 ~ 1.5	0.3 ~ 3 1.2 ~ 12	0.3 ~ 3 2 ~ 20	100	20	10	360
20A	0.15 ~ 1.5	0.12 ~ 1.2	0.03 ~ 0.3 0.2 ~ 2	0.03 ~ 0.3 0.15 ~ 1.5	0.3 ~ 3 2 ~ 20	0.3 ~ 3 3 ~ 30	200	30	10	360
25A	0.35 ~ 3.5	0.25 ~ 2.5	0.15 ~ 1.5 0.5 ~ 5	0.1 ~ 1 0.35 ~ 3.5	1 ~ 10 4 ~ 40	1.5 ~ 15 6 ~ 60	250	40	7	400
32A	0.6 ~ 6	0.45 ~ 4.5	0.3 ~ 3 0.7 ~ 7	0.25 ~ 2.5 0.6 ~ 6	2 ~ 20 7 ~ 70	3 ~ 30 10 ~ 100	300	50	7	420
40A	1 ~ 10	0.8 ~ 8	0.35 ~ 3.5 1.2 ~ 12	0.3 ~ 3 1.0 ~ 10	3 ~ 30 12 ~ 120	4.5 ~ 45 15 ~ 150	350	60	7	440
50A	1.5 ~ 15	1.2 ~ 12	1 ~ 10 2 ~ 20	0.8 ~ 8 1.5 ~ 15	3.5 ~ 35 15 ~ 150	5 ~ 50 2 ~ 200	400	100	5	480
65A	2.5 ~ 25	2 ~ 20	1.5 ~ 15 3 ~ 30	1.2 ~ 12 2.5 ~ 25	6 ~ 60 30 ~ 300	9 ~ 90 40 ~ 400	400	100	4	550

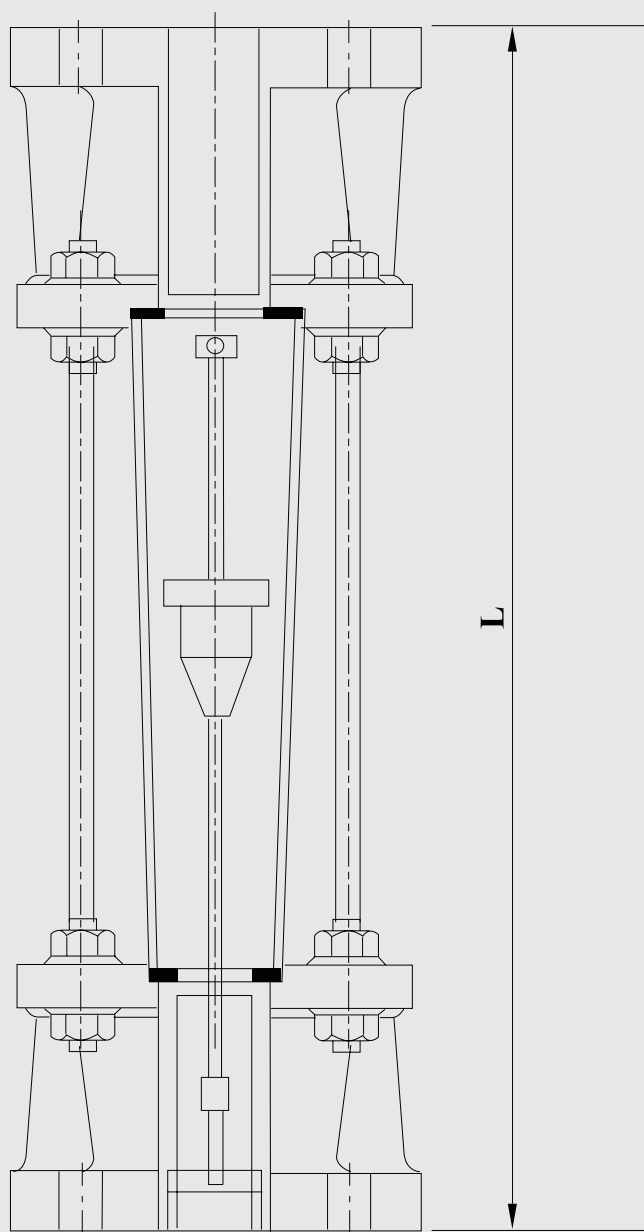
* When the size is larger than 65A, to be consulted with a maker

Material table

Part list	Material code
	P
Body	PVC
Flange	304SS
Float	304SS / 316SS, PVC, Teflon, Acetal
Taper tube	Pyrex glass
Guide rod	304SS / 316SS
Packing	NBR, Teflon, Viton, EPDM
Stay bolt	Steel, 304SS
Nut	Steel, 304SS

* Guide rod can be excluded as per flow rate

Dimension



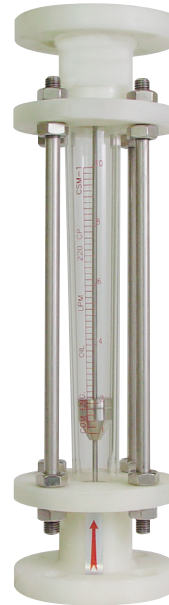
Glass tube flowmeter

Model : F804

Spec. sheet no. FD08-04

Description

Rotameters with all plastic construction are available for applications where metal wetted parts cannot be tolerated, such as with deionized water or corrosives. With plastic end fittings, care must be taken in installation, not to distort the threads.



Specification

Process connection

Screwed
Flanged

Pressure rating

Max.5 kgf/cm²

Size

15A ~ 65A
65A ~ 100A

Temperature rating

Max.80 °C

Material

PTFE

Accuracy

±2.0 % of full scale
±1.0 % of full scale (Option)

WISE[®]

I F804_01

Main order

Ordering information

1. Base model

F804 Glass tube flowmeter

2. Flow direction type

D1 Bottom and top
D2 Bottom and top side
D3 Bottom side and top side
D4 Bottom side and top

3. Line size

JIS	mm	ANSI	inch	DIN	mm
J015	15A	A001	½B	D015	15A
J020	20A	A002	¾B	D020	20A
J025	25A	A003	1B	D025	25A
J040	40A	A004	1½B	D040	40A
J050	50A	A005	2B	D050	50A
J065	65A	A006	1½B	D065	65A
J080	80A	A007	3B	D080	80A
J100	100A	A008	4B	D100	100A

4. Screw type

TPTM PT male
TPTF PT female
TNTM NPT male
TNTF NPT female
XXXX Other

4. Flange rating and connection type

J010 JIS 10K
A010 ANSI 150 Lb
P010 PN10
XXXX Other

5. Main material (See material table)

G PTFE

6. Float material

A Acetal
4 304SS
5 316SS
F PTFE
P PVC
O Other

7. Bolt and nut material

C Carbon steel
4 304SS

8. Option

1 One point alarm
2 Two point alarm
N None

1	2	3	4	5	6	7	8
F804	D2	J015	TNTM	G	5	C	1

Sample ordering code

Flow chart

Float Size	Standard flow rate water (m³/h)		Measuring range				Pressure loss (mmH₂O)		Pressure rating (kgf/cm²)	Dimension (mm)
			Water (m³/h)		Air (Nm³/h)					L
	304SS	PVC	304SS	PVC	PVC acetal teflon	Aluminium 304SS	H₂O	Air		
15A	0.1 ~ 1	0.08 ~ 0.8	0.03 ~ 0.3 0.2 ~ 2	0.03 ~ 0.3 0.15 ~ 1.5	0.3 ~ 3 1.2 ~ 12	0.3 ~ 3 2 ~ 20	100	20	5	360
20A	0.15 ~ 1.5	0.12 ~ 1.2	0.03 ~ 0.3 0.2 ~ 2	0.03 ~ 0.3 0.15 ~ 1.5	0.3 ~ 3 2 ~ 20	0.3 ~ 3 3 ~ 30	200	30	5	360
25A	0.35 ~ 3.5	0.25 ~ 2.5	0.15 ~ 1.5 0.5 ~ 5	0.1 ~ 1 0.35 ~ 3.5	1 ~ 10 4 ~ 40	1.5 ~ 15 6 ~ 60	250	40	4	400
32A	0.6 ~ 6	0.45 ~ 4.5	0.3 ~ 3 0.7 ~ 7	0.25 ~ 2.5 0.6 ~ 6	2 ~ 20 7 ~ 70	3 ~ 30 10 ~ 100	300	50	4	420
40A	1 ~ 10	0.8 ~ 8	0.35 ~ 3.5 1.2 ~ 12	0.3 ~ 3 1.0 ~ 10	3 ~ 30 12 ~ 120	4.5 ~ 45 15 ~ 150	350	60	4	440
50A	1.5 ~ 15	1.2 ~ 12	1 ~ 10 2 ~ 20	0.8 ~ 8 1.5 ~ 15	3.5 ~ 35 15 ~ 150	5 ~ 50 2 ~ 200	400	100	3	480
65A	2.5 ~ 25	2 ~ 20	1.5 ~ 15 3 ~ 30	1.2 ~ 12 2.5 ~ 25	6 ~ 60 30 ~ 300	9 ~ 90 40 ~ 400	400	100	3	550
80A	4 ~ 40	3 ~ 30	2 ~ 20 5 ~ 50	1.6 ~ 16 4 ~ 40	10 ~ 100 50 ~ 500	15 ~ 150 70 ~ 700	500	150	2	620
100A	6 ~ 60	5 ~ 50	5 ~ 50 7 ~ 70	3 ~ 30 6 ~ 60	15 ~ 150 70 ~ 700	20 ~ 200 100 ~ 1,000	500	150	2	740

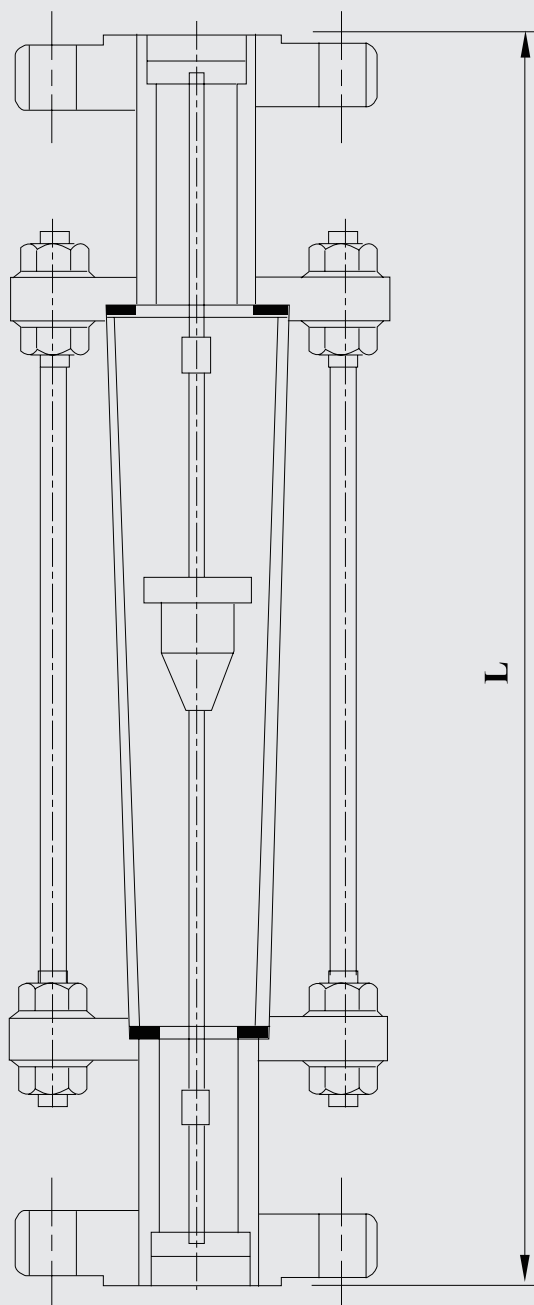
* When the size is larger than 65A, to be consulted with a maker

Material table

Part list	Material code
	G
Body	PTFE
Flange	PTFE
Float	PTFE
Taper tube	Pyrex glass
Guide rod	PTFE
Packing	PTFE, Viton, EPDM
Stay bolt	Steel, 304SS
Nut	Steel, 304SS

* Guide rod can be excluded as per flow rate

Dimension



Glass tube flowmeter

Model : F805

Spec. sheet no. **FD08-05**

Description

Teflon lined rotameters are also used in some designs due to high impact strength.
They are available for the service of corrosion resistance.



Specification

Process connection

Flanged

Pressure rating

Max.8 kgf/cm²

Size

15A ~ 65A
65A ~ 100A

Temperature rating

Max.80 °C

Material

Stainless steel + PTFE lined

Accuracy

±2.0 % of full scale
±1.0 % of full scale (Option)

WISE®

I F805_01

1. Base model**F805** Glass tube flowmeter**2. Flow direction type****D1** Bottom and top**3. Line size**

JIS	mm	ANSI	inch	DIN	mm
J015	15A	A001	½B	D015	15A
J020	20A	A002	¾B	D020	20A
J025	25A	A003	1B	D025	25A
J040	40A	A004	1½B	D040	40A
J050	50A	A005	2B	D050	50A
J065	65A	A006	1½B	D065	65A
J080	80A	A007	3B	D080	80A
XXXX	Other				

4. Flange rating and connection type

J010 JIS 10K
A010 ANSI 150 Lb
P010 PN10
XXXX Other

5. Main material (See material table)**L** Teflon lining (304SS + PTFE)**6. Float material****F** PTFE**7. Option**

10 One point alarm
20 Two point alarm
NO None

1	2	3	4	5	6	7
F805	D1	J015	J010	L	F	NO

Sample ordering code

Flow chart

Float Size	Standard flow rate water (m³/h)		Measuring range				Pressure loss (mmH₂O)		Pressure rating (kgf/cm²)	Dimension (mm)
			Water (m³/h)		Air (Nm³/h)					L
	304SS	PVC	304SS	PVC	PVC acetal teflon	Aluminium 304SS	H₂O	Air		
15A	0.1 ~ 1	0.08 ~ 0.8	0.03 ~ 0.3 0.2 ~ 2	0.03 ~ 0.3 0.15 ~ 1.5	0.3 ~ 3 1.2 ~ 12	0.3 ~ 3 2 ~ 20	100	20	8	360
20A	0.15 ~ 1.5	0.12 ~ 1.2	0.03 ~ 0.3 0.2 ~ 2	0.03 ~ 0.3 0.15 ~ 1.5	0.3 ~ 3 2 ~ 20	0.3 ~ 3 3 ~ 30	200	30	8	360
25A	0.35 ~ 3.5	0.25 ~ 2.5	0.15 ~ 1.5 0.5 ~ 5	0.1 ~ 1 0.35 ~ 3.5	1 ~ 10 4 ~ 40	1.5 ~ 15 6 ~ 60	250	40	7	400
32A	0.6 ~ 6	0.45 ~ 4.5	0.3 ~ 3 0.7 ~ 7	0.25 ~ 2.5 0.6 ~ 6	2 ~ 20 7 ~ 70	3 ~ 30 10 ~ 100	300	50	7	420
40A	1 ~ 10	0.8 ~ 8	0.35 ~ 3.5 1.2 ~ 12	0.3 ~ 3 1.0 ~ 10	3 ~ 30 12 ~ 120	4.5 ~ 45 15 ~ 150	350	60	6	440
50A	1.5 ~ 15	1.2 ~ 12	1 ~ 10 2 ~ 20	0.8 ~ 8 1.5 ~ 15	3.5 ~ 35 15 ~ 150	5 ~ 50 2 ~ 200	400	100	5	480
65A	2.5 ~ 25	2 ~ 20	1.5 ~ 15 3 ~ 30	1.2 ~ 12 2.5 ~ 25	6 ~ 60 30 ~ 300	9 ~ 90 40 ~ 400	400	100	5	550
80A	4 ~ 40	3 ~ 30	2 ~ 20 5 ~ 50	1.6 ~ 16 4 ~ 40	10 ~ 100 50 ~ 500	15 ~ 150 70 ~ 700	500	150	3	620

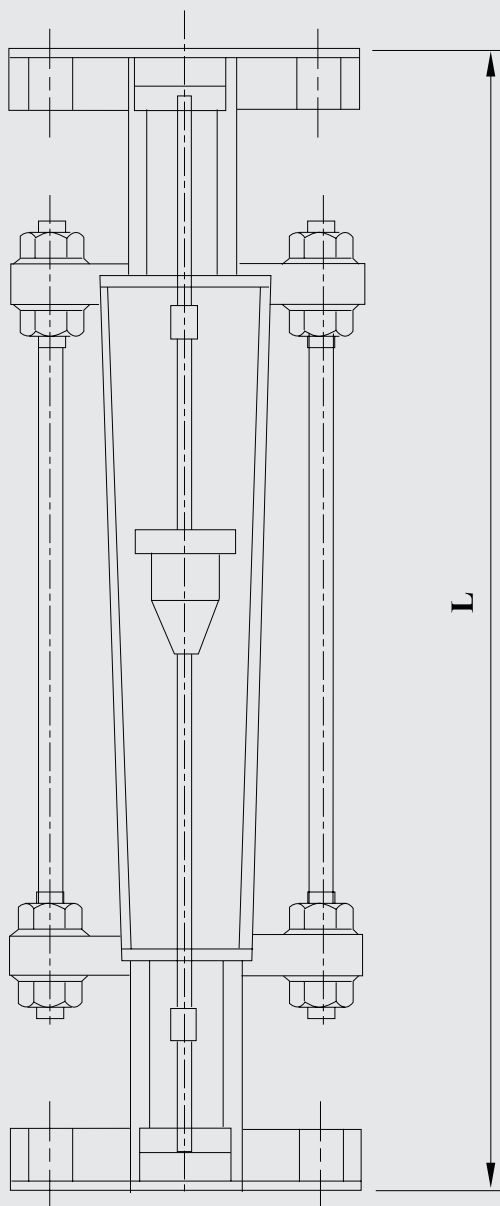
* When the size is larger than 65A, to be consulted with a maker

Material table

Part list	Material code
	L
Body	Stainless steel + Teflon lining
Flange	Stainless steel + Teflon lining
Float	Teflon
Taper tube	Pyrex glass
Guide rod	Stainless steel + Teflon lining
Packing	Teflon, Viton, EPDM
Stay bolt	304SS
Nut	304SS

* Guide rod can be excluded as per flow rate

Dimension



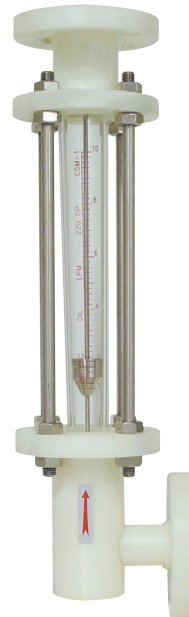
Glass tube flowmeter

Model : F806

Spec. sheet no. FD08-06

Description

Rotameters with all plastic construction are available for applications where metal wetted parts cannot be tolerated, such as with deionized water or corrosives. With plastic end fittings, care must be taken in installation, not to distort the threads.



Specification

Process connection

Screwed
Flanged

Pressure rating

Max.5 kgf/cm²

Size

15A ~ 65A
65A ~ 100A

Temperature rating

Max.60 °C

Material

PE
PP

Accuracy

±2.0 % of full scale
±1.0 % of full scale (Option)

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| F806_01

Main order

Ordering information

1. Base model

F806 Glass tube flowmeter

2. Flow direction type

D1 Bottom and top
D2 Bottom and top side
D3 Bottom side and top side
D4 Bottom side and top

3. Line size

JIS	mm	ANSI	inch	DIN	mm
J015	15A	A001	½B	D015	15A
J020	20A	A002	¾B	D020	20A
J025	25A	A003	1B	D025	25A
J040	40A	A004	1½B	D040	40A
J050	50A	A005	2B	D050	50A
J065	65A	A006	1½B	D065	65A
J080	80A	A007	3B	D080	80A
J100	100A	A008	4B	D100	100A
XXXX	Other				

4. Flange rating and connection type

J010 JIS 10K
A010 ANSI 150 Lb
P010 PN10
XXXX Other

5. Main material

H Body material / PE
I Body material / PP

6. Float material

A Acetal
4 304SS
5 316SS
F PTFE
P PVC
O Other

7. Bolt and nut material

C Carbon steel
4 304SS

8. Option

1 One point alarm
2 Two point alarm
N None

1	2	3	4	5	6	7	8
F806	D2	J015	J010	H	5	C	1

Sample ordering code

Flow chart

Float Size	Standard flow rate water (m³/h)		Measuring range				Pressure loss (mmH₂O)		Pressure rating (kgf/cm²)	Dimension (mm)	
			Water (m³/h)		Air (Nm³/h)						
	304SS	PVC	304SS	PVC	PVC acetal teflon	Aluminium 304SS	H₂O	Air		M	N
15A	0.1 ~ 1	0.08 ~ 0.8	0.03 ~ 0.3 0.2 ~ 2	0.03 ~ 0.3 0.15 ~ 1.5	0.3 ~ 3 1.2 ~ 12	0.3 ~ 3 2 ~ 20	100	20	5	370	70
20A	0.15 ~ 1.5	0.12 ~ 1.2	0.03 ~ 0.3 0.2 ~ 2	0.03 ~ 0.3 0.15 ~ 1.5	0.3 ~ 3 2 ~ 20	0.3 ~ 3 3 ~ 30	200	30	5	370	70
25A	0.35 ~ 3.5	0.25 ~ 2.5	0.15 ~ 1.5 0.5 ~ 5	0.1 ~ 1 0.35 ~ 3.5	1 ~ 10 4 ~ 40	1.5 ~ 15 6 ~ 60	250	40	4	410	80
32A	0.6 ~ 6	0.45 ~ 4.5	0.3 ~ 3 0.7 ~ 7	0.25 ~ 2.5 0.6 ~ 6	2 ~ 20 7 ~ 70	3 ~ 30 10 ~ 100	300	50	4	430	80
40A	1 ~ 10	0.8 ~ 8	0.35 ~ 3.5 1.2 ~ 12	0.3 ~ 3 1.0 ~ 10	3 ~ 30 12 ~ 120	4.5 ~ 45 15 ~ 150	350	60	4	450	100
50A	1.5 ~ 15	1.2 ~ 12	1 ~ 10 2 ~ 20	0.8 ~ 8 1.5 ~ 15	3.5 ~ 35 15 ~ 150	5 ~ 50 2 ~ 200	400	100	3	500	100
65A	2.5 ~ 25	2 ~ 20	1.5 ~ 15 3 ~ 30	1.2 ~ 12 2.5 ~ 25	6 ~ 60 30 ~ 300	9 ~ 90 40 ~ 400	400	100	3	580	120
80A	4 ~ 40	3 ~ 30	2 ~ 20 5 ~ 50	1.6 ~ 16 4 ~ 40	10 ~ 100 50 ~ 500	15 ~ 150 70 ~ 700	500	150	2	660	130
100A	6 ~ 60	5 ~ 50	5 ~ 50 7 ~ 70	3 ~ 30 6 ~ 60	15 ~ 150 70 ~ 700	20 ~ 200 100 ~ 1,000	500	150	2	790	150

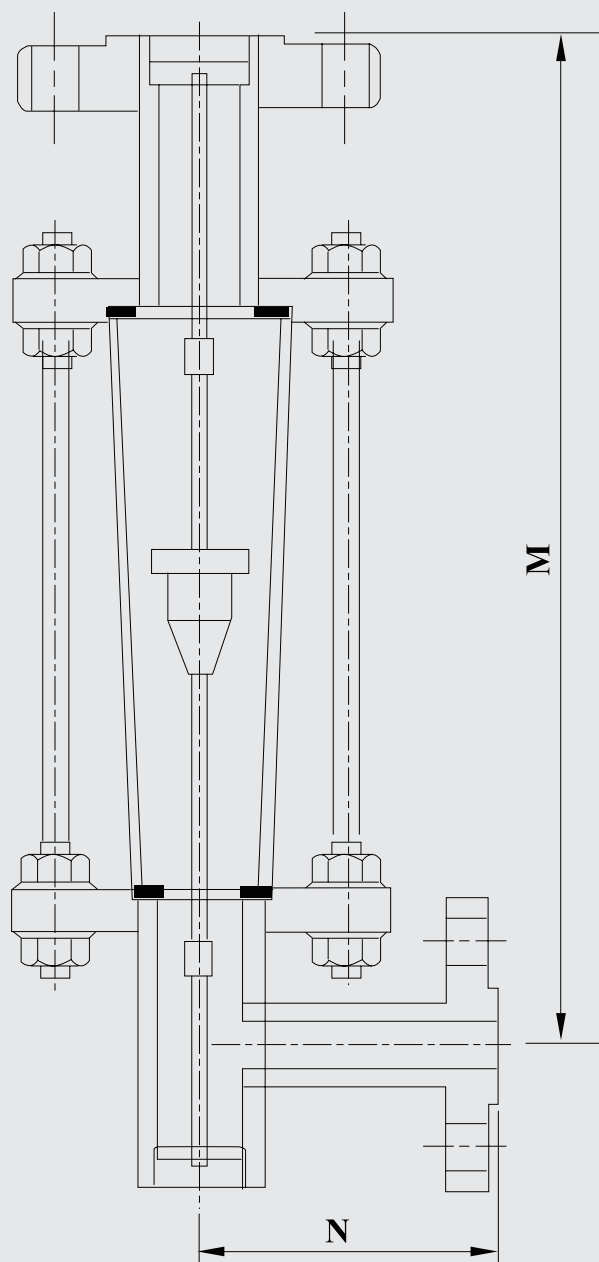
* When the size is larger than 65A, to be consulted with a maker

Material table

Part list	Material code	
	H	I
Body	PE	PP
Flange	PE	PP
Float	PE, PP, PVC, Acetal, 316SS, Teflon	
Taper tube	Pyrex glass	
Guide rod	PVC, Teflon, 316SS	
Packing	NBR, Teflon, Viton, EPDM	
Stay bolt	Steel, 304SS	
Nut	Steel, 304SS	

* Guide rod can be excluded as per flow rate

Dimension



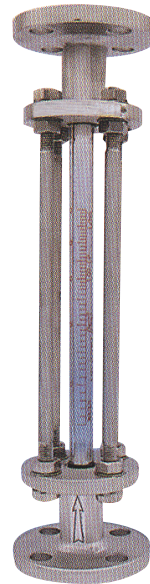
Glass tube flowmeter

Model : F807

Spec. sheet no. FD08-07

Description

Glass tube rotameters without guide rod are easy for maintenance and replacement. They are typically constructed for the application for low flow rate



Specification

Process connection

Screwed
Flanged

Pressure rating

Max.10 kgf/cm²

Size

10A ~ 50A

Temperature rating

Max.60°C

Material

Steel
304SS
316SS

Accuracy

±2.0% of full scale
±1.0 % of full scale (Option)

Main order

Ordering information

1. Base model

F807 Glass tube flowmeter

2. Flow direction type

D1 Bottom and top
D2 Bottom and top side
D3 Bottom side and top side

3. Line size

JIS	mm	ANSI	inch	DIN	mm
J015	15A	A001	½B	D015	15A
J020	20A	A002	¾B	D020	20A
J025	25A	A003	1B	D025	25A
J040	40A	A004	1½B	D040	40A
J050	50A	A005	2B	D050	50A
XXXX	Other	XXXX	Other		

4. Screw type

T001 ½" (15A)
T002 ¾" (20A)
T003 1" (25A)
T004 1½" (40A)
T005 2" (50A)

5. Flange rating and connection type

J010 JIS 10K
A010 ANSI 150 Lb
P010 PN10
TPTM PT male
TPTF PT female
TNTM NPT male
TNTF NPT female
XXXX Other

6. Main material (See material table)

A Body material / Carbon steel
B Body material / 304SS
C Body material / 316SS
O Other

7. Float material

A Acetal
4 304SS
5 316SS
F PTFE
P PVC
O Other

8. Option

10 One point alarm
20 Two point alarm
NO None

1	2	3	4	5	6	7	8
F807	D2	J015	T001	J010	A	4	NO

Sample ordering code

Flow chart

Float Size	Standard flow rate water (m³/h)		Measuring range				Pressure loss (mmH ₂ O)		Pressure rating (kgf/cm²)	Dimension (mm)
			Water (m³/h)		Air (Nm³/h)					L
	304SS	PVC	304SS	PVC	PVC acetal teflon	Aluminium 304SS	H ₂ O	Air		
10A	6 ~ 60	4 ~ 40	1 ~ 10 10 ~ 100	1 ~ 10 6 ~ 60	0.01 ~ 0.1 0.1 ~ 1	0.01 ~ 0.1 0.15 ~ 1.5	100	20	10	360
15A	20 ~ 200	15 ~ 150	10 ~ 100 70 ~ 700	6 ~ 60 15 ~ 150	0.1 ~ 1 0.2 ~ 2	0.15 ~ 1.5 0.3 ~ 3	100	20	10	360
20A	70 ~ 700	60 ~ 600	10 ~ 100 70 ~ 700	6 ~ 60 60 ~ 600	0.1 ~ 1 0.7 ~ 7	0.15 ~ 0.15 1 ~ 10	200	30	7	360
25A	100 ~ 1,000	80 ~ 800	80 ~ 800 120 ~ 1,200	60 ~ 600 100 ~ 1,000	0.8 ~ 8 1.2 ~ 12	1 ~ 18 1.8 ~ 18	200	30	7	400
32A	200 ~ 2,000	150 ~ 1,500	120 ~ 1,200 200 ~ 2,000	100 ~ 1,000 180 ~ 1,800	1.2 ~ 12 2 ~ 20	1.8 ~ 30 3 ~ 30	220	35	7	420
40A	300 ~ 3,000	200 ~ 2,000	200 ~ 2,000 300 ~ 3,000	150 ~ 1,500 250 ~ 2,500	2 ~ 20 3 ~ 30	3 ~ 30 4.5 ~ 45	280	45	5	440
50A	400 ~ 4,000	300 ~ 3,000	300 ~ 3,000 450 ~ 4,500	250 ~ 2,500 350 ~ 3,500	3 ~ 30 4.5 ~ 45	4.5 ~ 45 6 ~ 60	300	50	4	460

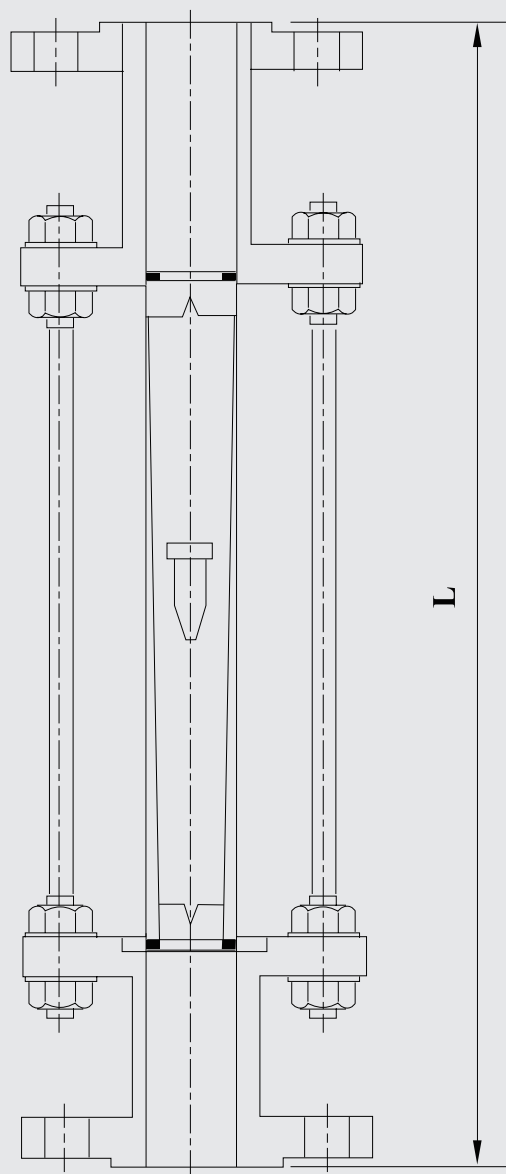
* When the size is larger than 65A, to be consulted with a maker

Material table

Part list	Material code		
	A	B	C
Body	Carbon steel	304SS	316SS
Flange	Carbon steel	304SS	316SS
Float	304SS / 316SS, PVC, Teflon, Acetal		
Taper tube	Pyrex glass		
Guide rod	304SS / 316SS		
Packing	NBR	NBR, Viton, EPDM	
Stay bolt	Carbon steel	304SS	
Nut	Carbon steel	304SS	

* Guide rod can be excluded as per flow rate

Dimension



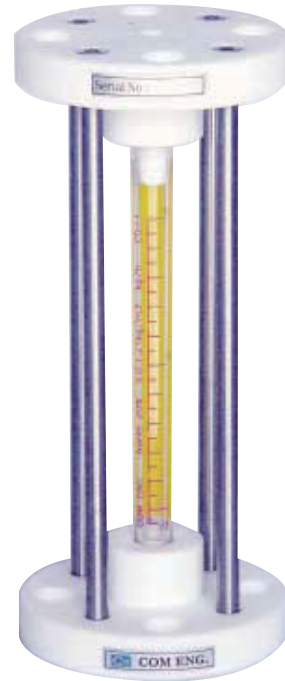
Glass tube flowmeter

Model : F808

Spec. sheet no. **FD08-08**

Description

Glass tube rotameters with small dimension are designed to be used where the installation space is limited.



Specification

Process connection

Flanged

Pressure rating

Max.8 kgf/cm²

Size

15A ~ 50A

Temperature rating

Max.120 °C

Material

Steel
304SS
316SS

Accuracy

±2.0 % of full scale
±1.0 % of full scale (Option)

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| F808_01

1. Base model**F808** Glass tube flowmeter**2. Flow direction type****D1** Bottom and top**3. Line size**

JIS	mm	ANSI	inch	DIN	mm
J015	15A	A001	½B	D015	15A
J020	20A	A002	¾B	D020	20A
J025	25A	A003	1B	D025	25A
J040	40A	A004	1½B	D040	40A
J050	50A	A005	2B	D050	50A
XXXX	Other				

4. Flange rating and connection type

J010 JIS 10K
A010 ANSI 150 Lb
P010 PN10
XXXX Other

5. Main material (See material table)

A Body material / Carbon steel
B Body material / 304SS
C Body material / 316SS
O Other

6. Float material

A Acetal
4 304SS
5 316SS
F PTFE
P PVC
O Other

7. Option

10 One point alarm
20 Two point alarm
NO None

1	2	3	4	5	6	7
F808	D1	J015	J010	A	5	NO

Sample ordering code

Flow chart

	Standard flow rate water (m³/h)		Measuring range				Pressure loss (mmH₂O)		Pressure rating (kgf/cm²)	Dimension (mm)
			Water (m³/h)		Air (Nm³/h)					L
Float Size	304SS	PVC	304SS	PVC	PVC acetal teflon	Aluminium 304SS	H₂O	Air		
15A	0.1 ~ 1	0.08 ~ 0.8	0.03 ~ 0.3 0.2 ~ 2	0.03 ~ 0.3 0.15 ~ 1.5	0.3 ~ 3 1.2 ~ 12	0.3 ~ 3 2 ~ 20	100	20	8	254
20A	0.15 ~ 1.5	0.12 ~ 1.2	0.03 ~ 0.3 0.2 ~ 2	0.03 ~ 0.3 0.15 ~ 1.5	0.3 ~ 3 2 ~ 20	0.3 ~ 3 3 ~ 30	200	30	8	254
25A	0.35 ~ 3.5	0.25 ~ 2.5	0.15 ~ 1.5 0.5 ~ 5	0.1 ~ 1 0.35 ~ 3.5	1 ~ 10 4 ~ 40	1.5 ~ 15 6 ~ 60	250	40	5	290
32A	0.6 ~ 6	0.45 ~ 4.5	0.3 ~ 3 0.7 ~ 7	0.25 ~ 2.5 0.6 ~ 6	2 ~ 20 7 ~ 70	3 ~ 30 10 ~ 100	300	50	5	290
40A	1 ~ 10	0.8 ~ 8	0.35 ~ 3.5 1.2 ~ 12	0.3 ~ 3 1.0 ~ 10	3 ~ 30 12 ~ 120	4.5 ~ 45 15 ~ 150	350	60	5	300
50A	1.5 ~ 15	1.2 ~ 12	1 ~ 10 2 ~ 20	0.8 ~ 8 1.5 ~ 15	3.5 ~ 35 15 ~ 150	5 ~ 50 2 ~ 200	400	100	4	320

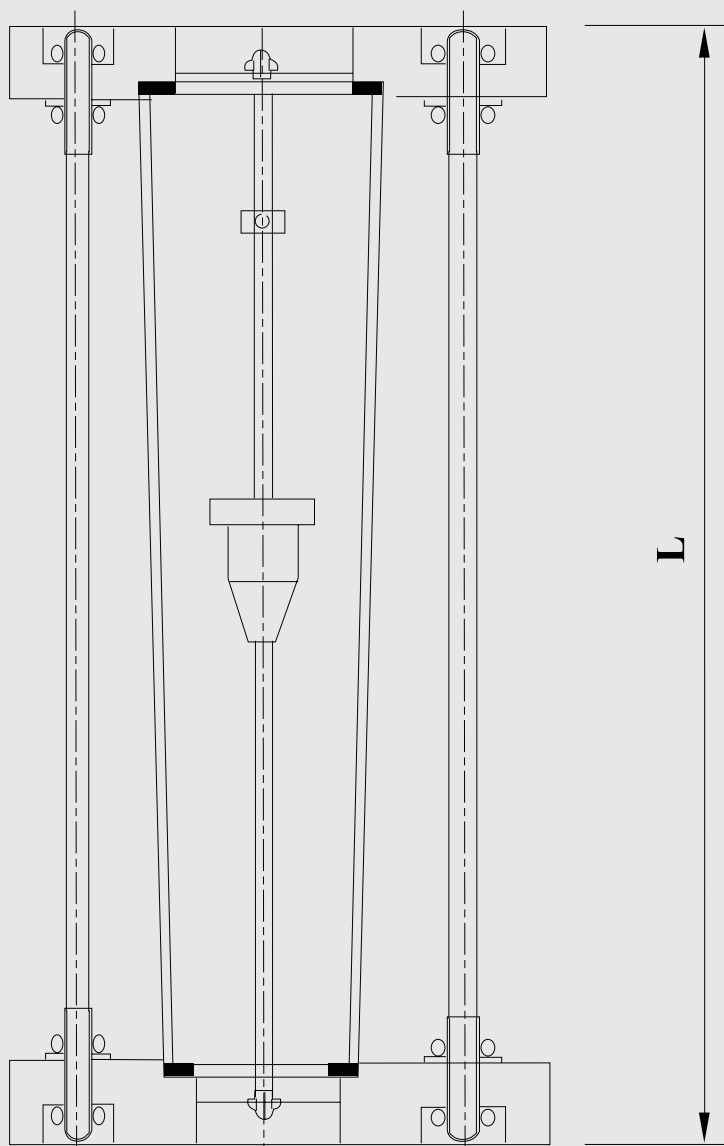
* When the size is larger than 65A, to be consulted with a maker

Material table

Part list	Material code		
	A	B	C
Flange	Carbon steel	304SS	316SS
Float	304SS / 316SS, PVC, Teflon, Acetal		
Taper tube	Pyrex glass		
Guide rod	304SS / 316SS		
Packing	NBR	NBR, Viton, EPDM	
Stay bolt	Carbon steel	304SS	
Nut	Carbon steel	304SS	

* Guide rod can be excluded as per flow rate

Dimension



Glass tube flowmeter

Model : F809

Spec. sheet no. **FD08-09**

Description

Glass tube rotameters with protection cover are another design to protect glass from an external affects.



Specification

Process connection

Screwed
Flanged

Pressure rating

Max.10 kgf/cm²

Size

15A ~ 65A
65A ~ 100A

Temperature rating

Max.120 °C

Material

Steel
304SS
316SS

Accuracy

±2.0 % of full scale
±1.0 % of full scale (Option)

WISE®

| F809_01

Main order

Ordering information

1. Base model

F809 Glass tube flowmeter

2. Flow direction type

D1 Bottom and top
D2 Bottom and top side
D3 Bottom side and top side
D4 Bottom side and top

3. Line size

JIS	mm	ANSI	inch	DIN	mm
J015	15A	A001	½B	D015	15A
J020	20A	A002	¾B	D020	20A
J025	25A	A003	1B	D025	25A
J040	40A	A004	1½B	D040	40A
J050	50A	A005	2B	D050	50A
J065	65A	A006	1½B	D065	65A
J080	80A	A007	3B	D080	80A
J100	100A	A008	4B	D100	100A

4. Screw type

T001 ½" (15A)
T002 ¾" (20A)
T003 1" (25A)
T004 1½" (40A)
T005 2" (50A)
T006 2½" (65A)
T007 3"
T008 4"
XXXX Other

5. Flange rating and connection type

J010 JIS 10K
A010 ANSI 150 Lb
P010 PN10
TPTM PT male
TPTF PT female
TNTM NPT male
TNTF NPT female
XXXX Other

6. Main material (See material table)

A Body material / Carbon steel
B Body material / 304SS
C Body material / 316SS
O Other

7. Float material

A Acetal
4 304SS
5 316SS
F PTFE
P PVC
O Other

8. Option

OP One point alarm
TP Two point alarm
NO None

1	2	3	4	5	6	7	8
F809	D2	J015	T001	J010	A	5	NO

Sample ordering code

Flow chart

Float Size	Standard flow rate water (m³/h)		Measuring range				Pressure loss (mmH₂O)		Pressure rating (kgf/cm²)	Dimension (mm)
			Water (m³/h)		Air (Nm³/h)					L
	304SS	PVC	304SS	PVC	PVC acetal teflon	Aluminium 304SS	H₂O	Air		
15A	0.1 ~ 1	0.08 ~ 0.8	0.03 ~ 0.3 0.2 ~ 2	0.03 ~ 0.3 0.15 ~ 1.5	0.3 ~ 3 1.2 ~ 12	0.3 ~ 3 2 ~ 20	100	20	10	360
20A	0.15 ~ 1.5	0.12 ~ 1.2	0.03 ~ 0.3 0.2 ~ 2	0.03 ~ 0.3 0.15 ~ 1.5	0.3 ~ 3 2 ~ 20	0.3 ~ 3 3 ~ 30	200	30	10	360
25A	0.35 ~ 3.5	0.25 ~ 2.5	0.15 ~ 1.5 0.5 ~ 5	0.1 ~ 1 0.35 ~ 3.5	1 ~ 10 4 ~ 40	1.5 ~ 15 6 ~ 60	250	40	7	400
32A	0.6 ~ 6	0.45 ~ 4.5	0.3 ~ 3 0.7 ~ 7	0.25 ~ 2.5 0.6 ~ 6	2 ~ 20 7 ~ 70	3 ~ 30 10 ~ 100	300	50	7	420
40A	1 ~ 10	0.8 ~ 8	0.35 ~ 3.5 1.2 ~ 12	0.3 ~ 3 1.0 ~ 10	3 ~ 30 12 ~ 120	4.5 ~ 45 15 ~ 150	350	60	7	440
50A	1.5 ~ 15	1.2 ~ 12	1 ~ 10 2 ~ 20	0.8 ~ 8 1.5 ~ 15	3.5 ~ 35 15 ~ 150	5 ~ 50 2 ~ 200	400	100	5	480
65A	2.5 ~ 25	2 ~ 20	1.5 ~ 15 3 ~ 30	1.2 ~ 12 2.5 ~ 25	6 ~ 60 30 ~ 300	9 ~ 90 40 ~ 400	400	100	4	550
80A	4 ~ 40	3 ~ 30	2 ~ 20 5 ~ 50	1.6 ~ 16 4 ~ 40	10 ~ 100 50 ~ 500	15 ~ 150 70 ~ 700	500	150	3	620
100A	6 ~ 60	5 ~ 50	5 ~ 50 7 ~ 70	3 ~ 30 6 ~ 60	15 ~ 150 70 ~ 700	20 ~ 200 100 ~ 1,000	500	150	3	740

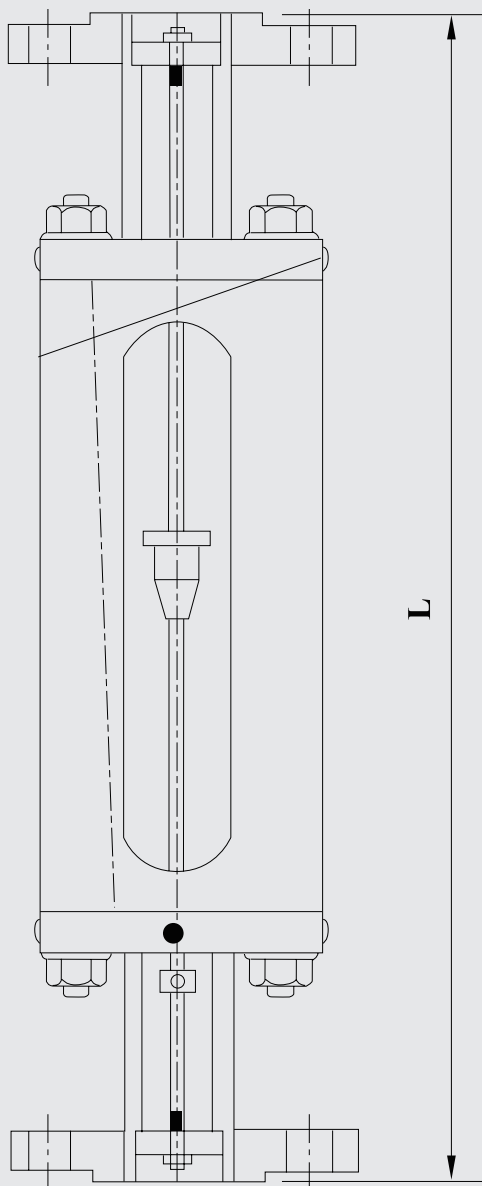
* When the size is larger than 65A, to be consulted with a maker

Material table

Part list	Material code		
	A	B	C
Body	Carbon steel	304SS	316SS
Flange	Carbon steel	304SS	316SS
Float	304SS / 316SS, PVC, Teflon, Acetal		
Taper tube	Pyrex glass		
Guide rod	304SS / 316SS		
Packing	NBR	NBR, Viton, EPDM	
Stay bolt	Carbon steel	304SS	
Nut	Carbon steel	304SS	

* Guide rod can be excluded as per flow rate

Dimension



Glass tube flowmeter with flow control valve

Model : F810

Spec. sheet no. **FD08-10**

Description

It has an additional function by adding contact switches to operate on/off valve or activate alarm.



Specification

Process connection

Screwed
Flanged

Pressure rating

Max. 10 kgf/cm²

Size

15A ~ 65A

Temperature rating

Max. 120°C

Material

Steel
304SS
316SS

Accuracy

±2.0% of full scale
±1.0 % of full scale (Option)

WISE®

| F810_01

Main order

Ordering information

1. Base model

F810 Glass tube flowmeter with flow control valve

2. Flow direction type

D1 Bottom and top
D2 Bottom and top side
D3 Bottom side and top side

3. Line size

JIS	mm	ANSI	inch	DIN	mm
J015	15A	A001	½B	D015	15A
J020	20A	A002	¾B	D020	20A
J025	25A	A003	1B	D025	25A
J040	40A	A004	1½B	D040	40A
J050	50A	A005	2B	D050	50A
J065	65A	A006	2½B	D060	60A

4. Screw type

T001 ½" (15A)
T002 ¾" (20A)
T003 1" (25A)
T004 1½" (40A)
T005 2" (50A)
XXXX Other

5. Flange rating and connection type

J010 JIS 10K
A010 ANSI 150 Lb
P010 PN10
TPTM PT male
TNTM NPT male
XXXX Other

6. Main material (See material table)

A Body material / Carbon steel
B Body material / 304SS
C Body material / 316SS
O Other

7. Float material

A Acetal
4 304SS
5 316SS
F PTFE
P PVC
O Other

8. Option

10 One point alarm
20 Two point alarm
NO None

1	2	3	4	5	6	7	8
F810	D2	J015	T001	J010	B	4	NO

Sample ordering code

Flow chart

	Standard flow rate water (m³/h)		Measuring range				Pressure loss (mmH₂O)		Pressure rating (kgf/cm²)	Dimension (mm)
			Water (m³/h)		Air (Nm³/h)					L
Float Size	304SS	PVC	304SS	PVC	PVC acetal teflon	Aluminium 304SS	H₂O	Air		
15A	0.1 ~ 1	0.08 ~ 0.8	0.03 ~ 0.3 0.2 ~ 2	0.03 ~ 0.3 0.15 ~ 1.5	0.3 ~ 3 1.2 ~ 12	0.3 ~ 3 2 ~ 20	100	20	10	460
20A	0.15 ~ 1.5	0.12 ~ 1.2	0.03 ~ 0.3 0.2 ~ 2	0.03 ~ 0.3 0.15 ~ 1.5	0.3 ~ 3 2 ~ 20	0.3 ~ 3 3 ~ 30	200	30	10	460
25A	0.35 ~ 3.5	0.25 ~ 2.5	0.15 ~ 1.5 0.5 ~ 5	0.1 ~ 1 0.35 ~ 3.5	1 ~ 10 4 ~ 40	1.5 ~ 15 6 ~ 60	250	40	7	500
32A	0.6 ~ 6	0.45 ~ 4.5	0.3 ~ 3 0.7 ~ 7	0.25 ~ 2.5 0.6 ~ 6	2 ~ 20 7 ~ 70	3 ~ 30 10 ~ 100	300	50	7	570
40A	1 ~ 10	0.8 ~ 8	0.35 ~ 3.5 1.2 ~ 12	0.3 ~ 3 1.0 ~ 10	3 ~ 30 12 ~ 120	4.5 ~ 45 15 ~ 150	350	60	7	590
50A	1.5 ~ 15	1.2 ~ 12	1 ~ 10 2 ~ 20	0.8 ~ 8 1.5 ~ 15	3.5 ~ 35 15 ~ 150	5 ~ 50 2 ~ 200	400	100	5	630
65A	2.5 ~ 25	2 ~ 20	1.5 ~ 15 3 ~ 30	1.2 ~ 12 2.5 ~ 25	6 ~ 60 30 ~ 300	9 ~ 90 40 ~ 400	400	100	4	750

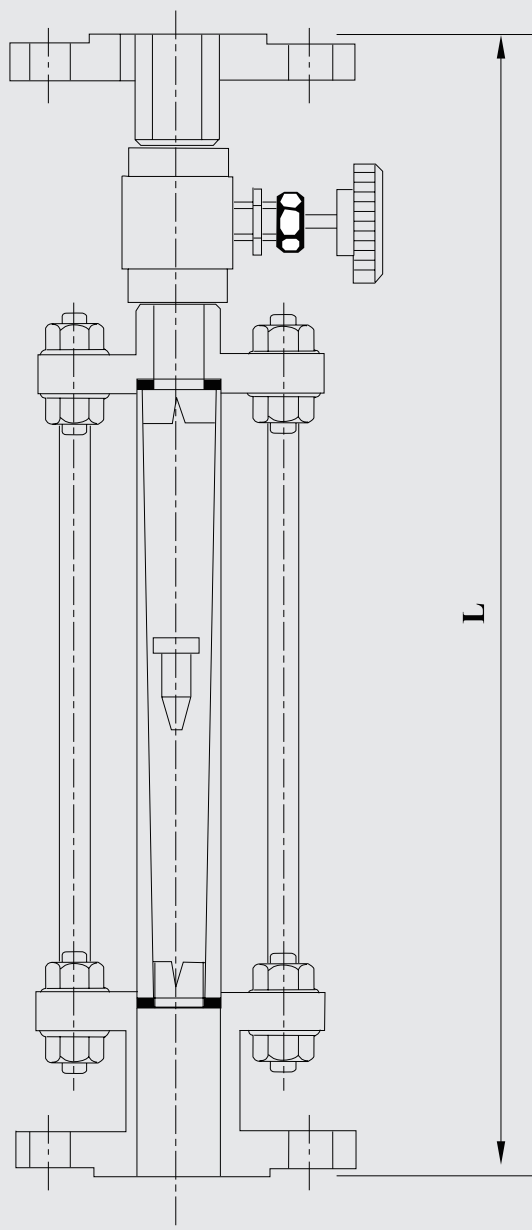
* When the size is larger than 65A, to be consulted with a maker

Material table

Part list	Material code		
	A	B	C
Body	Carbon steel	304SS	316SS
Flange	Carbon steel	304SS	316SS
Float	304SS / 316SS, PVC, Teflon, Acetal		
Taper tube	Pyrex glass		
Packing	NBR	NBR, Viton, EPDM	
Stay bolt	Carbon steel	304SS	
Nut	Carbon steel	304SS	
Valve	Carbon steel	304SS / 316SS	

* Guide rod can be excluded as per flow rate

Dimension



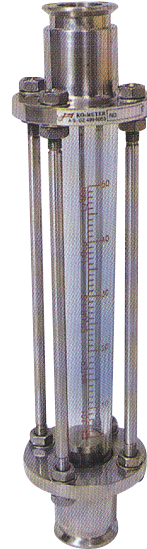
Sanitary type glass tube flowmeter

Model : F811

Spec. sheet no. FD08-11

Description

It is designed for sanitary applications in food, beverage and pharmaceuticals.



Specification

Process connection

Flanged
(Clamp type)

Pressure rating

Max. 7 kgf/cm²

Size

1S ~ 3S (IDF)

Temperature rating

Max. 80 °C

Material

304SS
316SS

Accuracy

±2.0 % of full scale
±1.0 % of full scale (Option)

WISE[®]

| F811_01

1. Base model**F811** Sanitary type glass tube flowmeter**2. Flow direction type****D1** Bottom and top**3. Line size****S010** 1S**S020** 1½S**S030** 2S**S040** 2½S**S050** 3S**XXXX** Other**4. Flange rating and connection type****C010** Clamp type**5. Main material (See material table)****B** Body material / 304SS**C** Body material / 316SS**6. Float material****A** Acetal**4** 304SS**5** 316SS**T** Teflon**O** Other**7. Option****10** One point alarm**20** Two point alarm**NO** None

1	2	3	4	5	6	7
F811	D1	S010	C010	B	5	NO

Sample ordering code

Flow chart

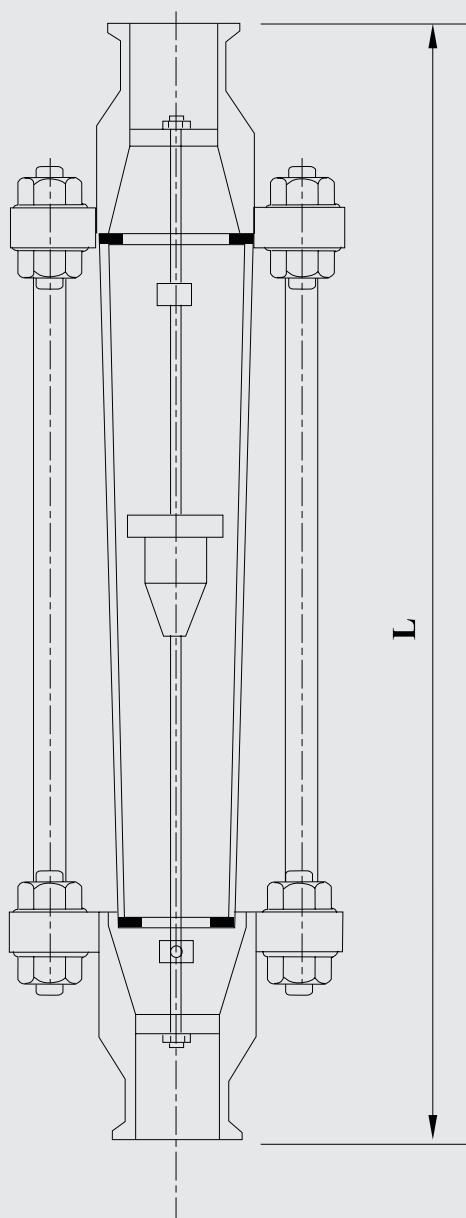
Size \ Float		Standard flow rate water (m³/h)	Measuring range			Pressure loss (mmH₂O)		Pressure rating (kgf/cm²)	Dimension (mm)
			Water (m³/h)	Air (Nm³/h)		H₂O	Air		L
		304SS	304SS	PVC acetal teflon	Aluminium 304SS				
1S	50.5	0.35 ~ 3.5	0.15 ~ 1.5 0.4 ~ 4	1 ~ 10 4 ~ 40	1.5 ~ 15 6 ~ 60	250	40	7	400
1½S	50.5	0.8 ~ 8	0.35 ~ 3.5 1 ~ 10	2 ~ 20 8 ~ 80	3 ~ 30 10 ~ 100	350	60	6	420
2S	64	1.2 ~ 12	0.8 ~ 8 1.5 ~ 15	3 ~ 30 12 ~ 120	4.5 ~ 45 15 ~ 150	400	100	6	440
2½S	77.5	2 ~ 20	1.2 ~ 12 2.5 ~ 25	6 ~ 60 20 ~ 200	8 ~ 80 30 ~ 300	400	100	5	460
3S	91.0	3 ~ 30	2 ~ 20 4 ~ 40	8 ~ 80 30 ~ 300	10 ~ 100 40 ~ 400	500	100	4	520

Material table

Part list	Material code	
	B	C
Body	304SS	316SS
Flange	304SS	316SS
Float	304SS / 316SS, Teflon, Acetal	
Taper tube	Pyrex glass	
Guide rod	304SS	316SS
Packing	NBR, Teflon, EPDM, Acetal	
Stay bolt	304SS	
Nut	304SS	

* Guide rod can be excluded as per flow rate

Dimension



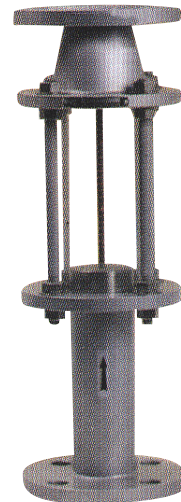
Large size glass tube flowmeter

Model : F812

Spec. sheet no. **FD08-12**

Description

The float moves up and down due to the differential pressure between upstream and downstream of the float.
The flow rate is proportional to the flowing area.
It is especially suitable for large size pipes.



Specification

Process connection

Flanged

Pressure rating

Max. 7 kgf/cm²

Size

65A ~ 200A

Temperature rating

Max. 120 °C

Material

Steel
304SS
316SS

Accuracy

±3.0 % of full scale
±1.0 % of full scale (Option)

WISE[®]

| F812_01

1. Base model**F812** Large size glass tube flowmeter**2. Flow direction type****D1** Bottom and top**3. Line size**

JIS	mm	ANSI	inch	DIN	mm
J065	65A	A006	2½B	D065	65A
J080	80A	A007	3B	D080	80A
J100	100A	A008	4B	D100	100A
J125	125A	A009	5B	D125	125A
J150	150A	A010	6B	D150	150A
J200	200A	A011	8B	D200	200A
XXXX	Other				

4. Flange rating and connection type

J010 JIS 10K
A010 ANSI 150 Lb
P010 PN10
XXXX Other

5. Main material (See material table)

B Body material / 304SS
C Body material / 316SS
D Body material / 316L SS

6. Float material

4 304SS
5 316SS
6 316L SS

7. Option

10 One point alarm
20 Two point alarm
NO None

1	2	3	4	5	6	7
F812	D1	J065	J010	B	5	NO

Sample ordering code

Flow chart

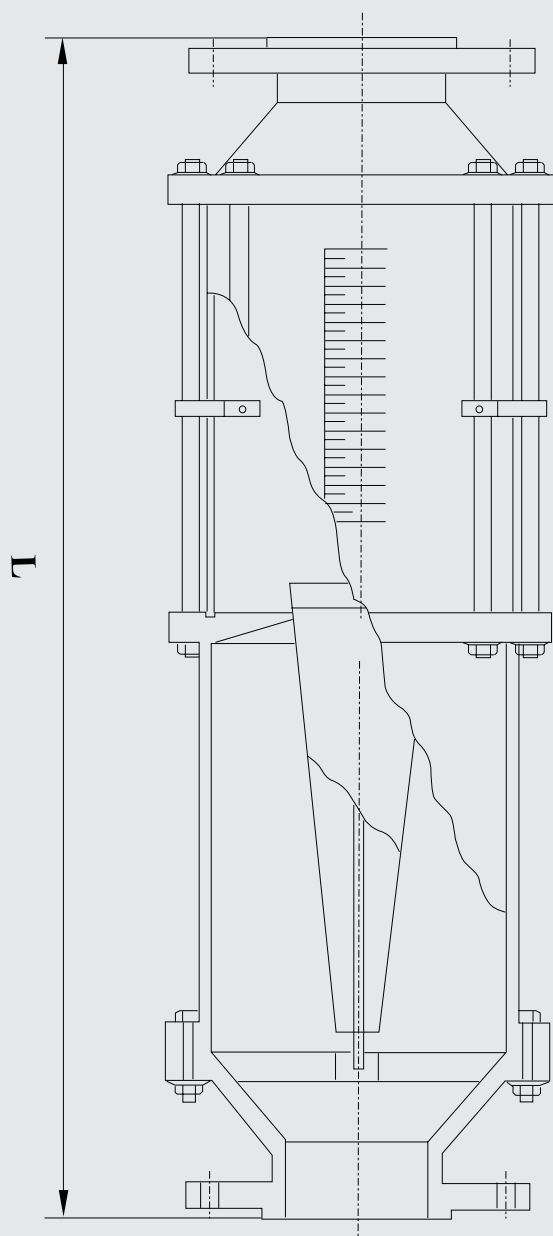
Size	Flow rate H ₂ O (m ³ /h)	Measuring range liquid (m ³ /h)	Pressure loss (mmH ₂ O)	Max. pressure (kgf/cm ²)	Dimension (mm)
65A	2.5 ~ 25	1.5 ~ 30	400	5	470
80A	4 ~ 40	2 ~ 50	500	4	530
100A	6 ~ 60	5 ~ 70	500	3	600
125A	10 ~ 100	7 ~ 120	600	3	600
150A	14 ~ 140	12 ~ 150	600	3	600
200A	20 ~ 200	15 ~ 280	700	3	700

Material table

Part list	Material code		
	B	C	D
Body	304SS	316SS	316L SS
Flange	304SS	316SS	316L SS
Float	304SS, 316SS, 316L SS		
Guide rod	304SS, 316SS		
Packing	NBR, Viton, EPDM, Teflon		
Tube	Tempered glass / Acryl (Option with protective cover)		
Column	304SS		
Nut	304SS		

* Guide rod can be excluded as per flow rate

Dimension



Orifice flowmeter

Model : F820

Spec. sheet no. FD08-13

Description

It has an orifice at the inlet. A flow rate can be obtained by measuring a bypass flow rate produced by differential pressure generated before and behind an orifice plate.



Specification

Process connection

Flanged

Pressure rating

STD. 10 kgf/cm²
Max. 20 kgf/cm²

Size

15A ~ 500A

Temperature rating

STD. 120 °C
Max. 200 °C

Material

Steel
304SS
316SS

Accuracy

±3.0 % of full scale
±1.0 % of full scale (Option)

Main order

Ordering information

1. Base model

F820 Orifice flowmeter

2. Flow direction type

D1 Bottom and top
D3 Bottom side and top side
D5 Side and side
D6 Top and bottom

3. Line size

JIS	mm	ANSI	inch	DIN	mm
J015	15A	A001	½B	D015	15A
J020	20A	A002	¾B	D020	20A
J025	25A	A003	1B	D025	25A
J040	40A	A004	1½B	D040	40A
J050	50A	A005	2B	D050	50A
J065	65A	A006	2½B	D065	65A
J080	80A	A007	3B	D080	80A
J100	100A	A008	4B	D100	100A
J125	125A	A009	5B	D125	125A
J150	150A	A010	6B	D150	150A
J200	200A	A011	8B	D200	200A
J250	250A	A012	10B	D250	250A
J300	300A	A013	12B	D300	300A
J350	350A	A014	14B	D350	350A
J400	400A	A015	16B	D400	400A
J450	450A	A016	18B	D450	450A
J500	500A	A017	20B	D500	500A
XXXX	Other				

4. Flange rating

JIS		ANSI		DIN	
J010	JIS 10K	A010	ANSI 150 Lb	P010	PN 10
J020	JIS 20K	A020	ANSI 300 Lb	P020	PN 16
ZZZZ	Other				

5. Main material (See material table)

B Body material / 304SS
C Body material / 316SS
D Body material / 316L SS
O Other

6. Float material

4 304SS
6 316L SS

7. Option

10 One point alarm
20 Two point alarm
NO None

1	2	3	4	5	6	7
F820	D1	J015	J010	5	NO	NO

Sample ordering code

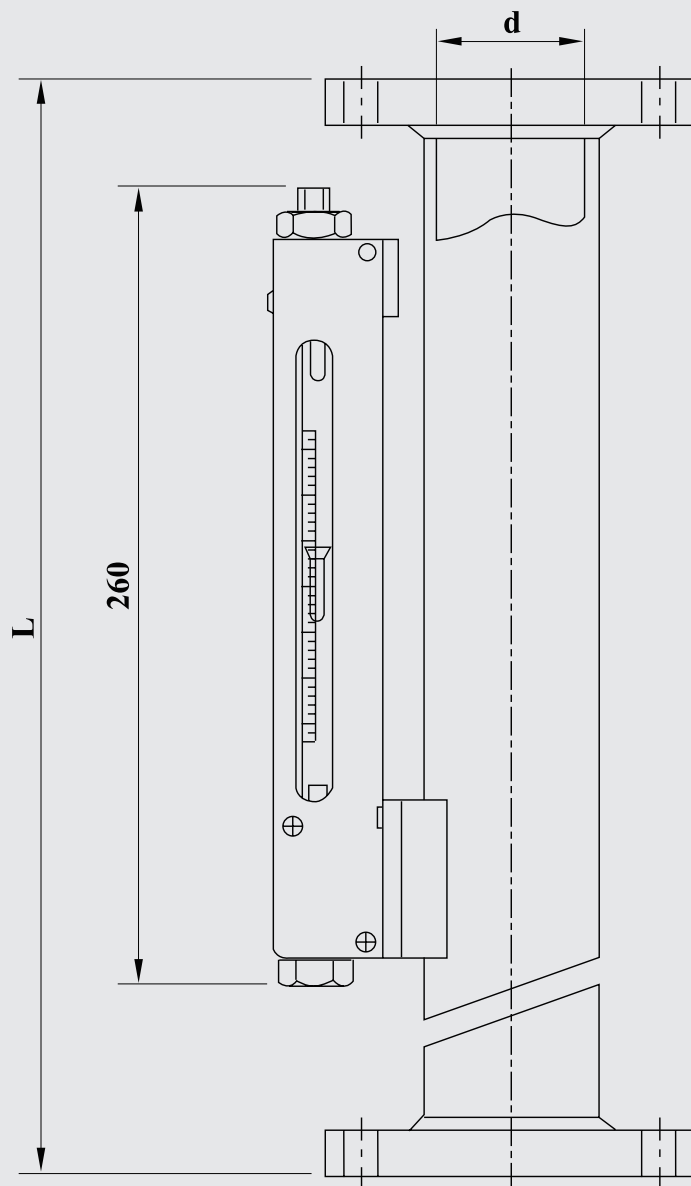
Flow chart

Size		Measuring range				Length	Weight
		Water (m³/h)		Air (Nm³/h)			
A	B	Flow rate	One scale	Flow rate	One scale	L (mm)	W (kg)
15A	½B	0.18 ~ 0.96	0.02	2 ~ 9.2	0.2	520	3.6
20A	¾B	0.45 ~ 2.4	0.05	5 ~ 23	0.5	520	4.2
25A	1B	0.8 ~ 4.2	0.1	8 ~ 40	1	520	5.4
32A	1¼B	1.2 ~ 6.4	0.2	12 ~ 60	2	520	6.7
40A	1½B	1.8 ~ 9.4	0.2	18 ~ 90	2	520	7.1
50A	2B	3.5 ~ 18.5	0.5	35 ~ 175	5	520	8.5
65A	2½B	6 ~ 32	1	60 ~ 300	10	540	11.4
80A	3B	8 ~ 42	1	80 ~ 400	10	540	12
100A	4B	16 ~ 80	2	160 ~ 800	20	540	15.5
125A	5B	25 ~ 125	5	250 ~ 1,250	50	540	20
150A	6B	35 ~ 180	5	350 ~ 1,700	50	540	27
200A	8B	60 ~ 320	10	600 ~ 2,800	50	540	35
250A	10B	90 ~ 480	10	900 ~ 5,000	100	540	50
300A	12B	160 ~ 820	20	1,600 ~ 7,800	200	540	61
350A	14B	200 ~ 1,000	20	2,000 ~ 9,500	200	540	74
400A	16B	300 ~ 1,500	50	3,000 ~ 14,500	500	540	93
450A	18B	400 ~ 2,000	50	4,000 ~ 19,000	500	540	119
500A	20B	500 ~ 2,500	50	5,000 ~ 24,000	500	540	130

Material table

Part list	Material code		
	B	C	D
Body	304SS	316SS	316L SS
Block	304SS	316SS	316L SS
Indicator	AL die cast		
Taper tube	304SS, 316SS		
Float	304SS, 316SS		
Flange	304SS	316SS	316L SS

Dimension



Metal tube flowmeter

Model : F821

Spec. sheet no. FD08-14

Description

Metal tube rotameter is basically a variable area flow meter. The differential pressure across the annulus area is constant and the flowrate is measured as a function of the position of annulus area created by float position. The position of the float is sensed by a magnet and indicated on the dial in terms of flowrate.



Specification

Alarm sensor

Reed switch

Power

DC 24 V

Contact output

High or low setpoint

Contact accuracy

±3.0 % of full scale

±1.0 % of full scale (Option)

Contact type

1 SPDT, 2 SPDT

Output

4 ~ 20 mA.DC

Contact rating

AC 220 V 0.5 A

Operating temperature

Max. 300 °C

Wiring

2 wire

1. Base model**F821** Metal tube flowmeter**2. Flow direction type****D1** Bottom and top**3. Line size**

JIS	mm	ANSI	inch	DIN	mm
J015	15A	A001	½B	D015	15A
J020	20A	A002	¾B	D020	20A
J025	25A	A003	1B	D025	25A
J040	40A	A004	1½B	D040	40A
J050	50A	A005	2B	D050	50A
J065	65A	A006	2½B	D065	65A
J080	80A	A007	3B	D080	80A
J100	100A	A008	4B	D100	100A
XXXX	Other				

4. Flange rating and connection type

J010 JIS 10K
A010 ANSI 150 Lb
P010 PN10
TPTM PT male
TNTM NPT male
XXXX Other

5. Main material (See material table)

B Body material / 304SS
C Body material / 316SS
O Other

6. Indicator and contact

LC Local indicator
L1 Local indicator with 1-SPDT alarm
L2 Local indicator with 2-SPDT alarm
LS Local indicator with current output (4~20 mA.DC)
LP Local indicator with current output and pulse output
OH Other

7. Option

10 One point alarm
20 Two point alarm
NO None
PG Micro purge type

1	2	3	4	5	6	7
F821	D1	J015	J010	B	LC	NO

Sample ordering code

Flow chart

Size		H ₂ O flow rate (m ³ /h)	Ranges		Pressure loss (mmH ₂ O)	Dimension L (mm)
			Liquid (m ³ /h)	Air (m ³ /h)		
15A	½B	0.1 ~ 1	0.03 ~ 0.3 0.15 ~ 1.5	0.3 ~ 3 2 ~ 20	500	250
20A	¾B	0.15 ~ 1.5	0.03 ~ 0.3 0.2 ~ 2	0.3 ~ 3 3 ~ 30	500	250
25A	1B	0.35 ~ 3.5	0.15 ~ 1.5 0.5 ~ 5	1.5 ~ 15 6 ~ 60	500	250
32A	1¼B	0.6 ~ 6	0.3 ~ 3 0.7 ~ 7	3 ~ 30 10 ~ 100	500	250
40A	1½B	0.1 ~ 10	0.4 ~ 4 1.5 ~ 15	1.5 ~ 45 15 ~ 150	700	250
50A	2B	1.5 ~ 15	1 ~ 10 2 ~ 20	5 ~ 50 20 ~ 200	500	250
65A	2½B	2.5 ~ 25	1.5 ~ 15 3 ~ 30	9 ~ 90 40 ~ 400	600	250
80A	3B	4.0 ~ 40	2 ~ 20 5 ~ 50	15 ~ 150 70 ~ 700	700	250
100A	4B	6.0 ~ 60	5 ~ 50 7 ~ 70	20 ~ 200 100 ~ 1,000	900	375

* When the size is larger than 65A, to be consulted with a maker

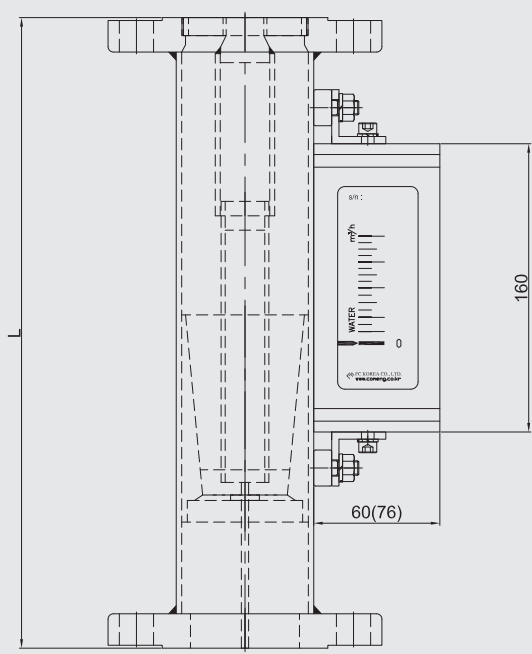
Flow chart_Micro purge type

Size	Flow range		Length (mm)
	H ₂ O (L/h)	Gas (Nm ³ /h)	
8A	5 ~ 50	0.5 ~ 5	200
10A	10 ~ 100	1 ~ 10	200
15A	20 ~ 200	2 ~ 20	200
20A	40 ~ 400	3 ~ 30	250
25A	60 ~ 600	5 ~ 50	250

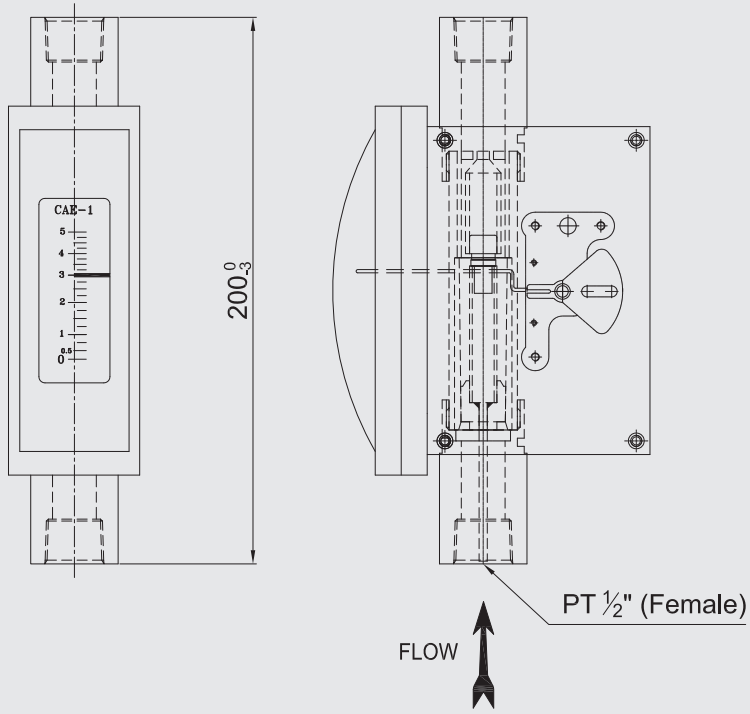
Material table

Part list	Material code	
	B	C
Body	304SS	316SS
Flange	304SS	316SS
Float	304SS	316SS
Taper tube	304SS	316SS
Magnet rod	304SS + Alnico	316SS + Alnico
Lower stopper	304SS	316SS
Guide	304SS	316SS
Indicator	AL	

Dimension



FLOW ↑



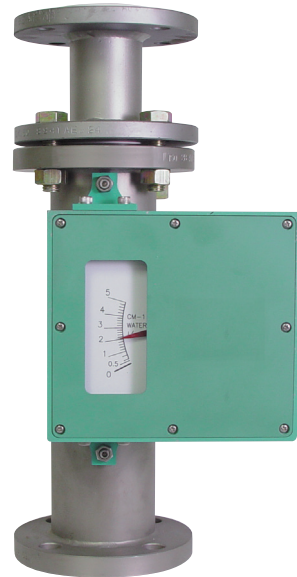
Metal tube flowmeter with teflon lining

Model : F822

Spec. sheet no. **FD08-15**

Description

It has an excellent corrosion resistance by teflon lining in inner section.



Specification

Process connection

Flanged

Pressure rating

Max. 15 kgf/cm²

Size

15A ~ 100A

Temperature rating

Max. 120 °C

Material

304SS with teflon lining

Accuracy

±3.0 % of full scale

±1.0 % of full scale (Option)

WISE®

| F822_01

1. Base model**F822** Metal tube flowmeter with teflon lining**2. Flow direction type****D1** Bottom and top**3. Line size**

JIS	mm	ANSI	inch	DIN	mm
J015	15A	A001	½B	D015	15A
J020	20A	A002	¾B	D020	20A
J025	25A	A003	1B	D025	25A
J040	40A	A004	1½B	D040	40A
J050	50A	A005	2B	D050	50A
J065	65A	A006	2½B	D065	65A
J080	80A	A007	3B	D080	80A
J100	100A	A008	4B	D100	100A
XXXX	Other				

4. Flange rating and connection type

J010 JIS 10K
A010 ANSI 150 Lb
P010 PN10
XXXX Other

5. Main material (See material table)

B Body material / 304SS
O Other

6. Indicator and contact

LC Local indicator
L1 Local indicator with 1-SPDT alarm
L2 Local indicator with 2-SPDT alarm
LS Local indicator with current output (4~20 mA.DC)
LP Local indicator with current output and pulse output
OH Other

7. Option**NO** None

1	2	3	4	5	6	7
F822	D1	J015	J010	B	LC	NO

Sample ordering code

Flow chart

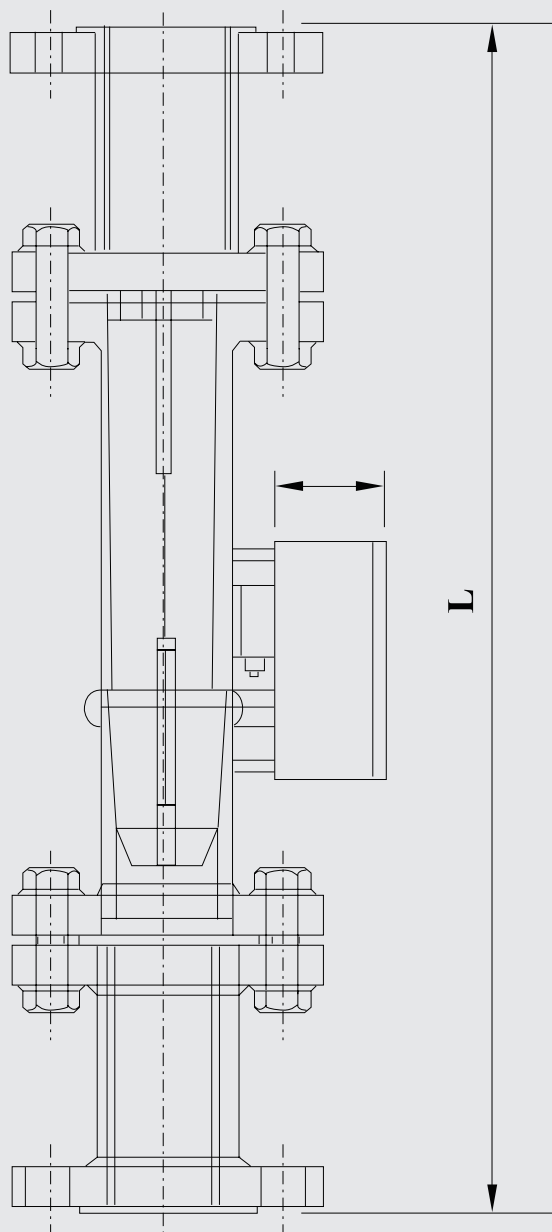
Size		H ₂ O flow rate (m ³ /h)	Ranges		Pressure loss (mmH ₂ O)	Dimension L (mm)
			Liquid (m ³ /h)	Air (m ³ /h)		
15A	½B	0.8 ~ 8	0.03 ~ 0.3 0.1 ~ 1	0.3 ~ 3 1.2 ~ 12	8	375
20A	¾B	0.12 ~ 1.2	0.08 ~ 0.8 0.15 ~ 1.5	0.8 ~ 8 1.5 ~ 15	8	375
25A	1B	0.25 ~ 2.5	0.15 ~ 1.5 0.35 ~ 3.5	1.5 ~ 15 3.5 ~ 35	7	375
32A	1¼B	0.45 ~ 4.5	0.3 ~ 3 0.6 ~ 6	3.5 ~ 35 6 ~ 60	6	375
40A	1½B	0.8 ~ 8	0.5 ~ 5 1 ~ 10	5 ~ 50 10 ~ 100	5	375
50A	2B	1.2 ~ 12	0.8 ~ 8 1.5 ~ 15	10 ~ 100 15 ~ 150	4	375

* When the size is larger than 65A, to be consulted with a maker

Material table

Part list	Material code
	B
Body	304SS + PTFE
Flange	304SS + PTFE
Float	304SS + PTFE
Taper tube	PTFE
Magnet rod	304SS (Alnico) + PTFE
Lower stopper	PTFE
Collar	PTFE
Guide	304SS + PTFE
Upper stopper	PTFE
Indicator	Aluminium
(Terminal box)	Aluminium

Dimension



Metal tube flowmeter

Model : F823

Spec. sheet no. FD08-16

Description

It is suitable for the measurement in a high temperature and pressure depending on the flow rate. The float will assume a certain vertical position in the tube. The float position is transmitted by a magnetic coupling system to the scale.



Specification

Process connection

Flanged

Pressure rating

STD. 10 kgf/cm²
Max. 20 kgf/cm²

Size

15A ~ 200A

Temperature rating

STD. 120 °C
Max. 200 °C

Material

Steel
304SS
316SS

Accuracy

±3.0 % of full scale
±1.0 % of full scale (Option)

WISE[®]

| F823_01

1. Base model**F823** Metal tube flowmeter**2. Flow direction type****D1** Bottom and top**3. Line size**

JIS	mm	ANSI	inch	DIN	mm
J015	15A	A001	½B	D015	15A
J020	20A	A002	¾B	D020	20A
J025	25A	A003	1B	D025	25A
J040	40A	A004	1½B	D040	40A
J050	50A	A005	2B	D050	50A
J065	65A	A006	2½B	D065	65A
J080	80A	A007	3B	D080	80A
J100	100A	A008	4B	D100	100A
J125	125A	A009	5B	D125	125A
J150	150A	A010	6B	D150	150A
J200	200A	A011	8B	D200	200A
XXXX	Other				

4. Flange rating and connection type

J010 JIS 10K
A010 ANSI 150 Lb
P010 PN10
XXXX Other

5. Main material (See material table)

B Body material / 304SS
C Body material / 316SS
D Body material / 316L SS
O Other

6. Indicator and contact

LC Local indicator
L1 Local indicator with 1-SPDT alarm
L2 Local indicator with 2-SPDT alarm
LS Local indicator with current output (4~20 mA.DC)
LP Local indicator with current output and pulse output
OH Other

7. Option**NO** None

1	2	3	4	5	6	7
F823	D1	J015	J010	B	LC	NO

Sample ordering code

Flow chart

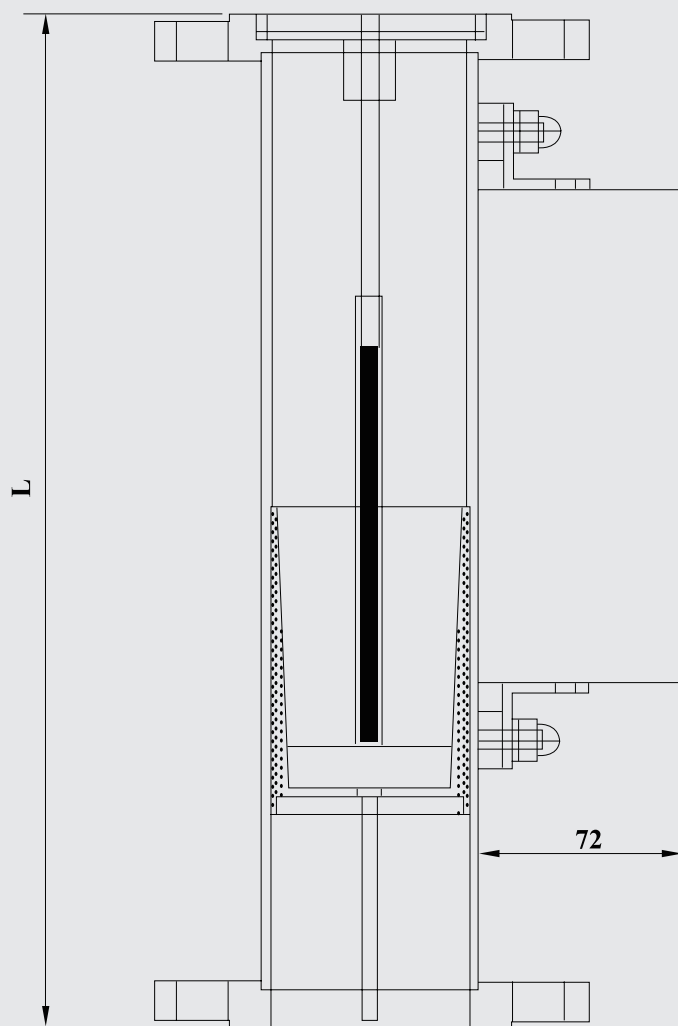
Size		H ₂ O flow rate (m ³ /h)	Ranges		Pressure loss (mmH ₂ O)	Dimension L (mm)
			Liquid (m ³ /h)	Gas (Nm ³ /h)		
15A	½B	0.1 ~ 1	0.02 ~ 0.2 0.2 ~ 2	0.6 ~ 6 3 ~ 30	600	350
20A	¾B	0.2 ~ 2	0.08 ~ 0.8 0.35 ~ 3.5	1.6 ~ 16 5 ~ 50	600	350
25A	1B	0.4 ~ 4	0.1 ~ 1 0.6 ~ 6	2 ~ 20 9 ~ 90	600	350
32A	1¼B	0.6 ~ 6	0.1 ~ 1 1 ~ 10	2 ~ 20 15 ~ 150	600	350
40A	1½B	0.8 ~ 8	0.2 ~ 2 1.5 ~ 15	4 ~ 40 20 ~ 200	800	350
50A	2B	1.5 ~ 15	0.5 ~ 5 2.5 ~ 25	6 ~ 60 40 ~ 400	800	350
65A	2½B	2.5 ~ 25	0.8 ~ 8 4 ~ 40	10 ~ 100 60 ~ 600	800	400
80A	3B	4.0 ~ 40	1.2 ~ 12 5 ~ 50	12 ~ 120 80 ~ 800	800	500
100A	4B	6.0 ~ 60	2.5 ~ 25 9 ~ 90	25 ~ 250 120 ~ 1,200	1,000	500
125A	5B	10 ~ 100	4 ~ 40 15 ~ 150	40 ~ 400 200 ~ 2,000	1,100	600
150A	6B	14 ~ 140	6 ~ 60 20 ~ 200	60 ~ 600 300 ~ 3,000	1,200	700
200A	8B	20 ~ 200	10 ~ 100 28 ~ 280	100 ~ 1,000 400 ~ 4,000	1,500	800

* When the size is larger than 65A, to be consulted with a maker

Material table

Part list	Material code		
	B	C	D
Body	304SS	316SS	316L SS
Flange	304SS	316SS	316L SS
Float	304SS	316SS	316L SS
Support	304SS	316SS	316L SS
Magnet rod	304SS + Alnico	316SS + Alnico	316L SS + Alnico
Stopper	304SS	316SS	316L SS
Taper tube	304SS	316SS	316L SS
Guide	304SS	316SS	316L SS
Cap	304SS		
Indicator	Aluminium		
Packing	NBR, Viton, Teflon		

Dimension



Metal tube flowmeter

Model : F824

Spec. sheet no. FD08-17

Description

It is suitable for the measurement in a high temperature and pressure depending on the flow rate. The float will assume a certain vertical position in the tube. The float position is transmitted by a magnetic coupling system to the scale.



Specification

Process connection

Flanged

Pressure rating

STD. 10 kgf/cm²
Max. 60 kgf/cm²

Size

15A ~ 200A

Temperature rating

STD. 120 °C
Max. 300 °C

Material

304SS
316SS
316L SS

Accuracy

±3.0 % of full scale
±1.0 % of full scale (Option)

1. Base model**F824** Metal tube flowmeter**2. Flow direction type****D2** Bottom and top side**3. Line size**

JIS	mm	ANSI	inch	DIN	mm
J015	15A	A001	½B	D015	15A
J020	20A	A002	¾B	D020	20A
J025	25A	A003	1B	D025	25A
J040	40A	A004	1½B	D040	40A
J050	50A	A005	2B	D050	50A
J065	65A	A006	2½B	D065	65A
J080	80A	A007	3B	D080	80A
J100	100A	A008	4B	D100	100A
J125	125A	A009	5B	D125	125A
J150	150A	A010	6B	D150	150A
J200	200A	A011	8B	D200	200A
XXXX	Other				

4. Flange rating and connection type

J010 JIS 10K
A010 ANSI 150 Lb
P010 PN10
XXXX Other

5. Main material (See material table)

B Body material / 304SS
C Body material / 316SS
D Body material / 316L SS
O Other

6. Indicator and contact

LC Local indicator
L1 Local indicator with 1-SPDT alarm
L2 Local indicator with 2-SPDT alarm
LS Local indicator with current output (4~20 mA.DC)
LP Local indicator with current output and pulse output
OH Other

7. Option**NO** None

1	2	3	4	5	6	7
F824	D2	A003	A010	B	LC	NO

Sample ordering code

Flow chart

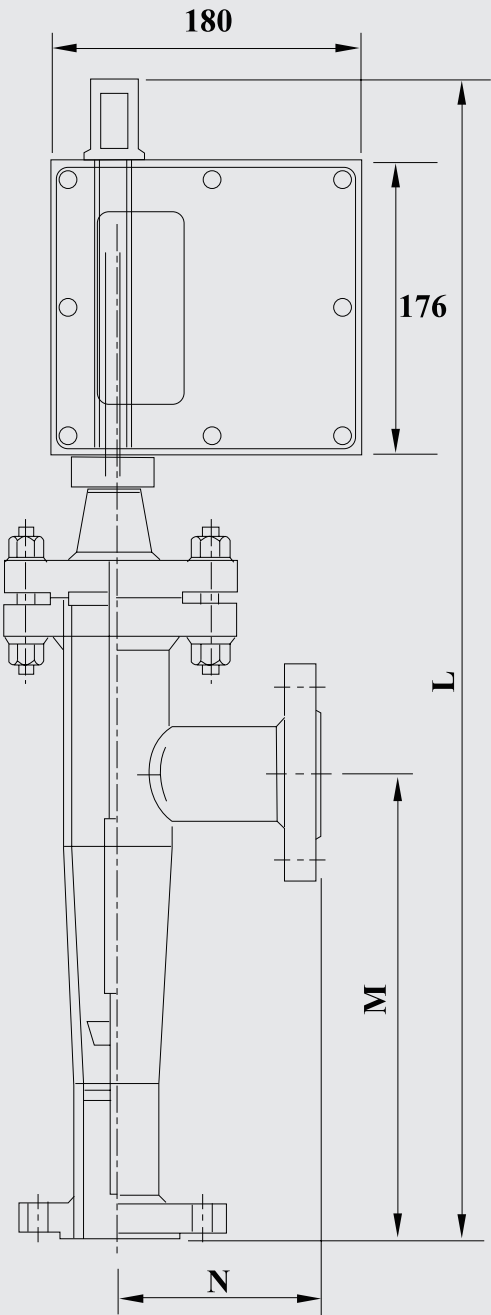
Size		H ₂ O flow rate (m ³ /h)	Ranges		Pressure loss (mmH ₂ O)	Dimension (mm)		
			Liquid (m ³ /h)	Gas (Nm ³ /h)		M	N	L
15A	½B	0.1 ~ 1	0.02 ~ 0.2 0.2 ~ 2	0.6 ~ 6 3 ~ 30	600	390	80	735
20A	¾B	0.2 ~ 2	0.08 ~ 0.8 0.35 ~ 3.5	1.6 ~ 16 5 ~ 50	600	390	80	735
25A	1B	0.4 ~ 4	0.1 ~ 1 0.6 ~ 6	2 ~ 20 9 ~ 90	600	390	100	775
32A	1¼B	0.6 ~ 6	0.1 ~ 1 1 ~ 10	2 ~ 20 15 ~ 150	600	410	100	775
40A	1½B	0.8 ~ 8	0.2 ~ 2 1.5 ~ 15	4 ~ 40 20 ~ 200	800	410	100	775
50A	2B	1.5 ~ 15	0.5 ~ 5 2.5 ~ 25	6 ~ 60 40 ~ 400	800	470	120	845
65A	2½B	2.5 ~ 25	0.8 ~ 8 4 ~ 40	10 ~ 100 60 ~ 600	800	490	150	865
80A	3B	4.0 ~ 40	1.2 ~ 12 5 ~ 50	12 ~ 120 80 ~ 800	800	540	150	935
100A	4B	6.0 ~ 60	2.5 ~ 25 9 ~ 90	25 ~ 250 120 ~ 1,200	1,000	590	180	1,015
125A	5B	10 ~ 100	4 ~ 40 15 ~ 150	40 ~ 400 200 ~ 2,000	1,100	640	220	1,065
150A	6B	14 ~ 140	6 ~ 60 20 ~ 200	60 ~ 600 300 ~ 3,000	1,200	690	240	1,125
200A	8B	20 ~ 200	10 ~ 100 28 ~ 280	100 ~ 1,000 400 ~ 4,000	1,500	750	260	1,170

* When the size is larger than 65A, to be consulted with a maker

Material table

Part list	Material code		
	B	C	D
Body	304SS	316SS	316L SS
Flange	304SS	316SS	316L SS
Float	304SS	316SS	316L SS
Support	304SS	316SS	316L SS
Magnet rod	304SS + Alnico	316SS + Alnico	316L SS + Alnico
Stopper	304SS	316SS	316L SS
Taper tube	304SS	316SS	316L SS
Guide	304SS	316SS	316L SS
Cap	304SS		
Indicator	Aluminium		
Packing	NBR, Viton, Teflon		

Dimension



Metal tube flowmeter

Model : F825

Spec. sheet no. **FD08-18**

Description

It is suitable for the measurement in a high temperature and pressure depending on the flow rate. The float will assume a certain vertical position in the tube. The float position is transmitted by a magnetic coupling system to the scale.



Specification

Process connection

Flanged

Pressure rating

STD. 10 kgf/cm²
Max. 60 kgf/cm²

Size

15A ~ 200A

Temperature rating

STD. 120 °C
Max. 300 °C

Material

304SS
316SS
316L SS

Accuracy

±3.0 % of full scale
±1.0 % of full scale (Option)

WISE[®]

| F825_01

1. Base model**F825** Metal tube flowmeter**2. Flow direction type****D3** Bottom side and top side**3. Line size**

JIS	mm	ANSI	inch	DIN	mm
J015	15A	A001	½B	D015	15A
J020	20A	A002	¾B	D020	20A
J025	25A	A003	1B	D025	25A
J040	40A	A004	1½B	D040	40A
J050	50A	A005	2B	D050	50A
J065	65A	A006	2½B	D065	65A
J080	80A	A007	3B	D080	80A
J100	100A	A008	4B	D100	100A
J125	125A	A009	5B	D125	125A
J150	150A	A010	6B	D150	150A
J200	200A	A011	8B	D200	200A
XXXX	Other				

4. Flange rating and connection type

J010 JIS 10K
A010 ANSI 150 Lb
P010 PN10
XXXX Other

5. Main material (See material table)

B Body material / 304SS
C Body material / 316SS
D Body material / 316L SS
O Other

6. Indicator and contact

LC Local indicator
L1 Local indicator with 1-SPDT alarm
L2 Local indicator with 2-SPDT alarm
LS Local indicator with current output (4~20 mA.DC)
LP Local indicator with current output and pulse output
OH Other

7. Option**NO** None

1	2	3	4	5	6	7
F825	D3	J080	J010	C	LC	NO

Sample ordering code

Flow chart

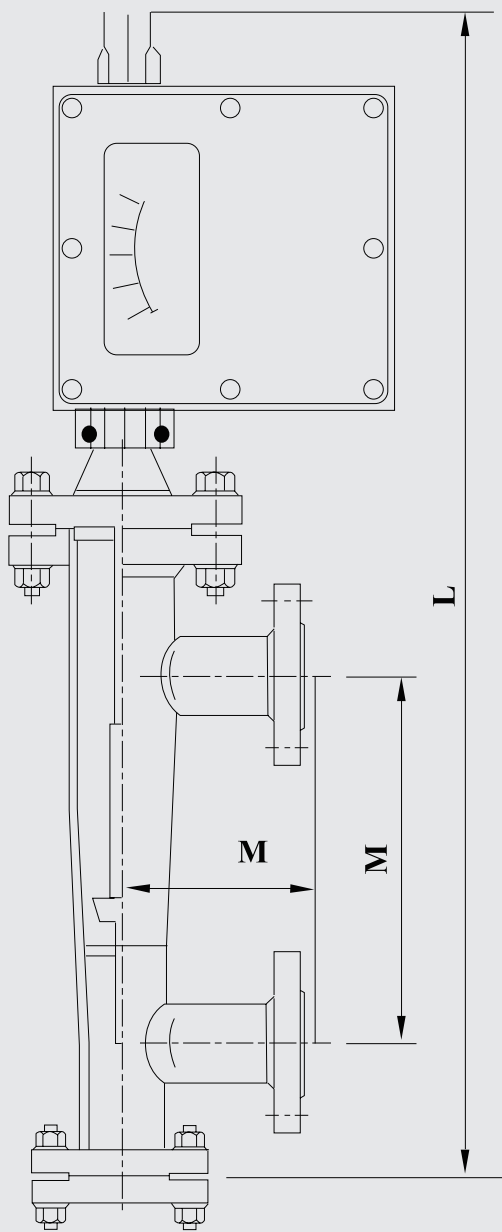
Size		H ₂ O flow rate (m ³ /h)	Ranges		Pressure loss (mmH ₂ O)	Dimension (mm)		
			Liquid (m ³ /h)	Gas (Nm ³ /h)		M	N	L
15A	½B	0.1 ~ 1	0.02 ~ 0.2 0.2 ~ 2	0.6 ~ 6 3 ~ 30	600	390	80	735
20A	¾B	0.2 ~ 2	0.08 ~ 0.8 0.35 ~ 3.5	1.6 ~ 16 5 ~ 50	600	390	80	735
25A	1B	0.4 ~ 4	0.1 ~ 1 0.6 ~ 6	2 ~ 20 9 ~ 90	600	390	100	775
32A	1¼B	0.6 ~ 6	0.1 ~ 1 1 ~ 10	2 ~ 20 15 ~ 150	600	410	100	775
40A	1½B	0.8 ~ 8	0.2 ~ 2 1.5 ~ 15	4 ~ 40 20 ~ 200	800	410	100	775
50A	2B	1.5 ~ 15	0.5 ~ 5 2.5 ~ 25	6 ~ 60 40 ~ 400	800	470	120	845
65A	2½B	2.5 ~ 25	0.8 ~ 8 4 ~ 40	10 ~ 100 60 ~ 600	800	490	150	865
80A	3B	4.0 ~ 40	1.2 ~ 12 5 ~ 50	12 ~ 120 80 ~ 800	800	540	150	935
100A	4B	6.0 ~ 60	2.5 ~ 25 9 ~ 90	25 ~ 250 120 ~ 1,200	1,000	590	180	1,015
125A	5B	10 ~ 100	4 ~ 40 15 ~ 150	40 ~ 400 200 ~ 2,000	1,100	640	220	1,065
150A	6B	14 ~ 140	6 ~ 60 20 ~ 200	60 ~ 600 300 ~ 3,000	1,200	690	240	1,125
200A	8B	20 ~ 200	10 ~ 100 28 ~ 280	100 ~ 1,000 400 ~ 4,000	1,500	750	260	1,170

* When the size is larger than 65A, to be consulted with a maker

Material table

Part list	Material code		
	B	C	D
Body	304SS	316SS	316L SS
Flange	304SS	316SS	316L SS
Float	304SS	316SS	316L SS
Support	304SS	316SS	316L SS
Magnet rod	304SS + Alnico	316SS + Alnico	316L SS + Alnico
Stopper	304SS	316SS	316L SS
Taper tube	304SS	316SS	316L SS
Guide	304SS	316SS	316L SS
Cap	304SS		
Indicator	Aluminium		
Packing	NBR, Viton, Teflon		

Dimension



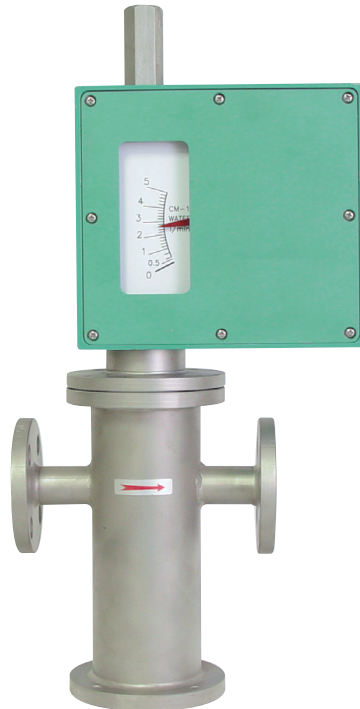
Metal tube flowmeter

Model : F826

Spec. sheet no. **FD08-19**

Description

It is suitable for the measurement in a high temperature and pressure depending on the flow rate. The float will assume a certain vertical position in the tube. The float position is transmitted by a magnetic coupling system to the scale.



Specification

Process connection

Flanged

Pressure rating

STD. 10 kgf/cm²
Max. 60 kgf/cm²

Size

15A ~ 200A

Temperature rating

STD. 120 °C
Max. 300 °C

Material

304SS
316SS
316L SS

Accuracy

±3.0 % of full scale
±1.0 % of full scale (Option)

WISE®

| F826_01

1. Base model**F826** Metal tube flowmeter**2. Flow direction type****D5** Side and side**3. Line size**

JIS	mm	ANSI	inch	DIN	mm
J015	15A	A001	½B	D015	15A
J020	20A	A002	¾B	D020	20A
J025	25A	A003	1B	D025	25A
J040	40A	A004	1½B	D040	40A
J050	50A	A005	2B	D050	50A
J065	65A	A006	2½B	D065	65A
J080	80A	A007	3B	D080	80A
J100	100A	A008	4B	D100	100A
J125	125A	A009	5B	D125	125A
J150	150A	A010	6B	D150	150A
J200	200A	A011	8B	D200	200A
XXXX	Other				

4. Flange rating and connection type

J010 JIS 10K
A010 ANSI 150 Lb
P010 PN10
XXXX Other

5. Main material (See material table)

B Body material / 304SS
C Body material / 316SS
D Body material / 316L SS
O Other

6. Indicator and contact

LC Local indicator
L1 Local indicator with 1-SPDT alarm
L2 Local indicator with 2-SPDT alarm
LS Local indicator with current output (4~20 mA.DC)
LP Local indicator with current output and pulse output
OH Other

7. Option**NO** None

1	2	3	4	5	6	7
F826	D5	J080	J010	C	LC	NO

Sample ordering code

Flow chart

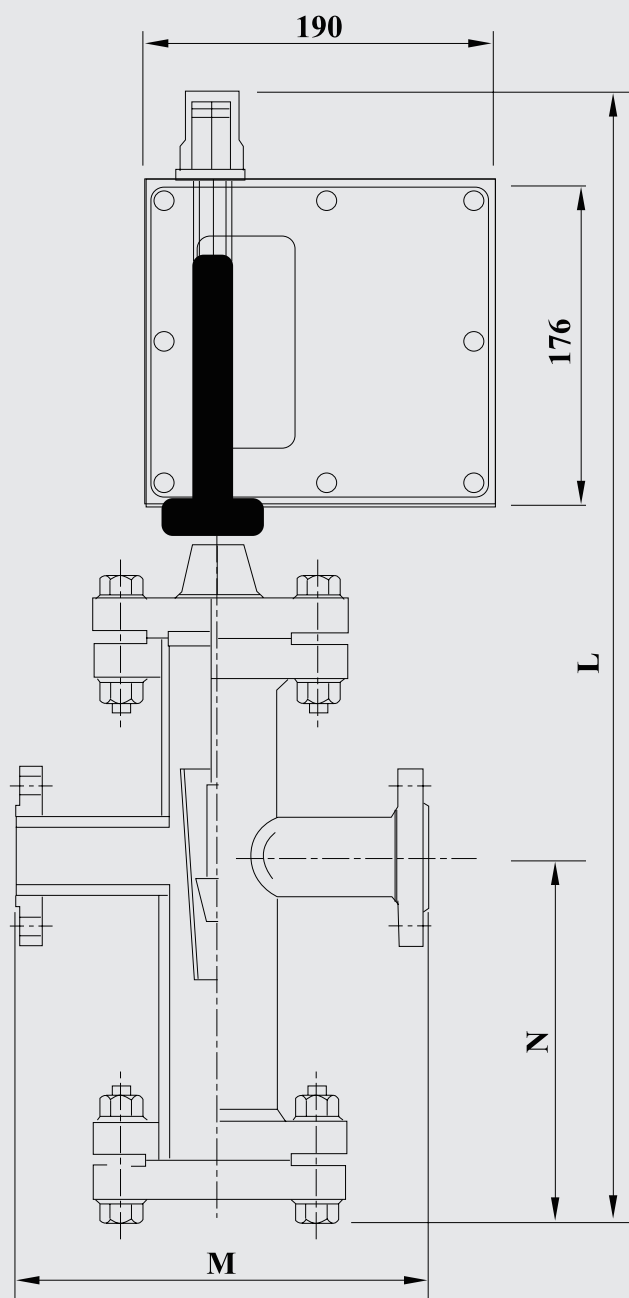
Size		H ₂ O flow rate (m ³ /h)	Ranges		Pressure loss (mmH ₂ O)	Dimension (mm)		
			Liquid (m ³ /h)	Gas (Nm ³ /h)		M	N	L
15A	½B	0.1 ~ 1	0.02 ~ 0.2 0.2 ~ 2	0.6 ~ 6 3 ~ 30	600	160	160	440
20A	¾B	0.2 ~ 2	0.08 ~ 0.8 0.35 ~ 3.5	1.6 ~ 16 5 ~ 50	600	160	160	500
25A	1B	0.4 ~ 4	0.1 ~ 1 0.6 ~ 6	2 ~ 20 9 ~ 90	600	180	170	500
32A	1¼B	0.6 ~ 6	0.1 ~ 1 1 ~ 10	2 ~ 20 15 ~ 150	600	240	180	520
40A	1½B	0.8 ~ 8	0.2 ~ 2 1.5 ~ 15	4 ~ 40 20 ~ 200	800	240	180	520
50A	2B	1.5 ~ 15	0.5 ~ 5 2.5 ~ 25	6 ~ 60 40 ~ 400	800	260	220	550
65A	2½B	2.5 ~ 25	0.8 ~ 8 4 ~ 40	10 ~ 100 60 ~ 600	800	340	220	580
80A	3B	4.0 ~ 40	1.2 ~ 12 5 ~ 50	12 ~ 120 80 ~ 800	800	360	240	620
100A	4B	6.0 ~ 60	2.5 ~ 25 9 ~ 90	25 ~ 250 120 ~ 1,200	1,000	360	280	660
125A	5B	10 ~ 100	4 ~ 40 15 ~ 150	40 ~ 400 200 ~ 2,000	1,100	440	320	700
150A	6B	14 ~ 140	6 ~ 60 20 ~ 200	60 ~ 600 300 ~ 3,000	1,200	440	320	750
200A	8B	20 ~ 200	10 ~ 100 28 ~ 280	100 ~ 1,000 400 ~ 4,000	1,500	480	320	800

* When the size is larger than 65A, to be consulted with a maker

Material table

Part list	Material code		
	B	C	D
Body	304SS	316SS	316L SS
Flange	304SS	316SS	316L SS
Float	304SS	316SS	316L SS
Support	304SS	316SS	316L SS
Magnet rod	304SS + alnico	316SS + alnico	316L SS + alnico
Stopper	304SS	316SS	316L SS
Taper tube	304SS	316SS	316L SS
Guide	304SS	316SS	316L SS
Cap	304SS		
Indicator	Aluminium		
Packing	NBR, Viton, Teflon		

Dimension



Metal tube flowmeter

Model : F827

Spec. sheet no. **FD08-20**

Description

Metal tube rotameter with cooling pin is another design to protect it from a high temperature application as it loses magnetism on high temperature fluid (300 °C).



Specification

Process connection

Flanged

Pressure rating

STD. 10 kgf/cm²
Max. 20 kgf/cm²

Size

15A ~ 200A

Temperature rating

STD. 200 °C
Max. 300 °C

Material

304SS
316SS
316L SS

Accuracy

±2.0 % of full scale
±1.0 % of full scale (Option)

WISE®

| F827_01

1. Base model**F827** Metal tube flowmeter**2. Flow direction type**

D2 Bottom and top side
D3 Bottom side and top side
D5 Side and side

3. Line size

JIS	mm	ANSI	inch	DIN	mm
J015	15A	A001	½B	D015	15A
J020	20A	A002	¾B	D020	20A
J025	25A	A003	1B	D025	25A
J040	40A	A004	1½B	D040	40A
J050	50A	A005	2B	D050	50A
J065	65A	A006	2½B	D065	65A
J080	80A	A007	3B	D080	80A
J100	100A	A008	4B	D100	100A
J125	125A	A009	5B	D125	125A
J150	150A	A010	6B	D150	150A
J200	200A	A011	8B	D200	200A
XXXX	Other				

4. Flange rating and connection type

J010 JIS 10K
A010 ANSI 150 Lb
P010 PN10
XXXX Other

5. Main material (See material table)

B Body material / 304SS
C Body material / 316SS
D Body material / 316L SS
O Other

6. Indicator and contact

LC Local indicator
L1 Local indicator with 1-SPDT alarm
L2 Local indicator with 2-SPDT alarm
LS Local indicator with current output (4~20 mA.DC)
LP Local indicator with current output and pulse output
OH Other

7. Option**NO** None

1	2	3	4	5	6	7
F827	D5	J080	J010	B	LC	NO

Sample ordering code

Flow chart

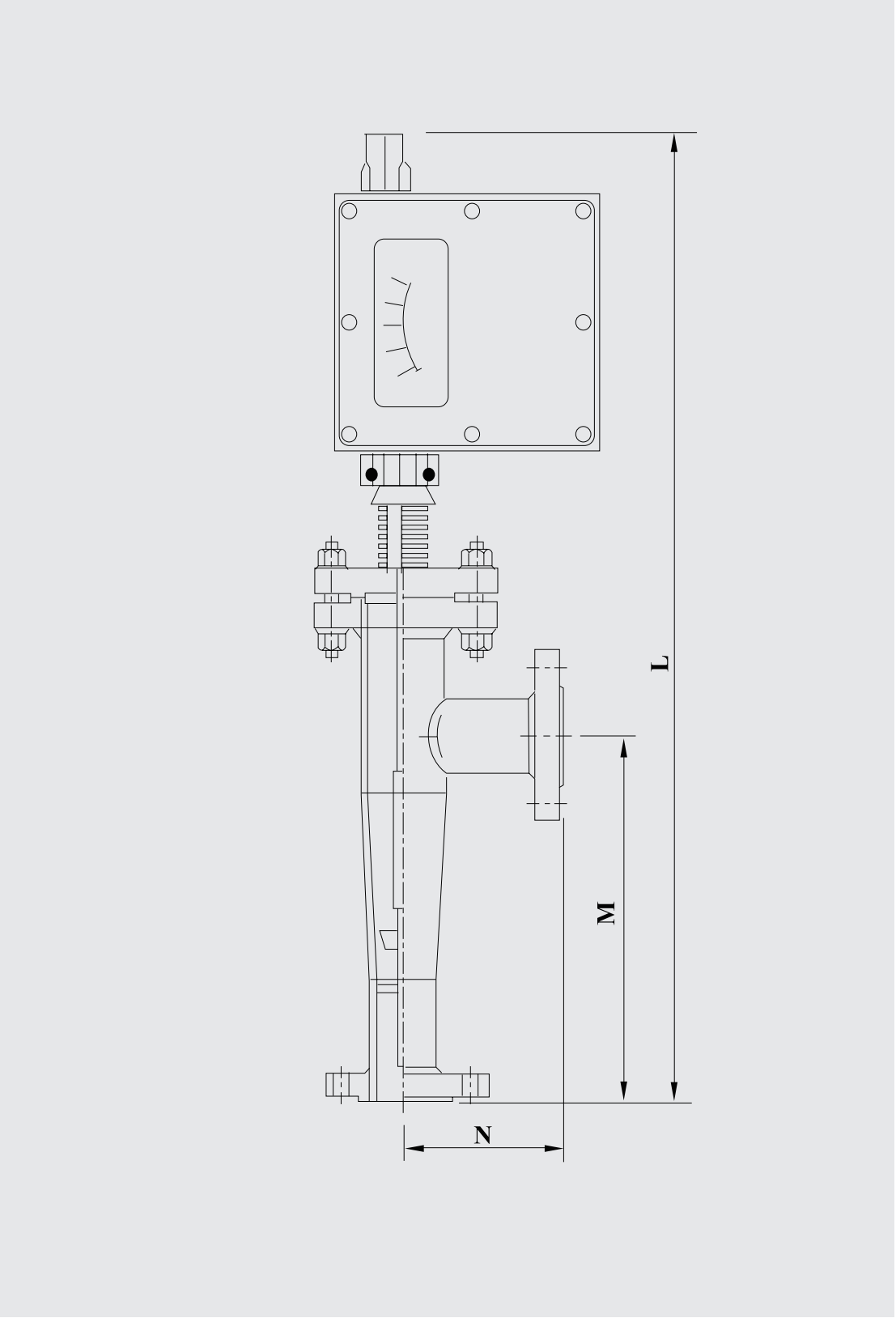
Size		H ₂ O flow rate (m ³ /h)	Ranges		Pressure loss (mmH ₂ O)	Dimension (mm)		
			Liquid (m ³ /h)	Gas (Nm ³ /h)		M	N	L
15A	½B	0.1 ~ 1	0.02 ~ 0.2 0.2 ~ 2	0.6 ~ 6 3 ~ 30	600	390	100	750
20A	¾B	0.2 ~ 2	0.08 ~ 0.8 0.35 ~ 3.5	1.6 ~ 16 5 ~ 50	600	390	100	750
25A	1B	0.4 ~ 4	0.1 ~ 1 0.6 ~ 6	2 ~ 20 9 ~ 90	600	390	100	770
32A	1¼B	0.6 ~ 6	0.1 ~ 1 1 ~ 10	2 ~ 20 15 ~ 150	600	410	100	770
40A	1½B	0.8 ~ 8	0.2 ~ 2 1.5 ~ 15	4 ~ 40 20 ~ 200	800	410	100	770
50A	2B	1.5 ~ 15	0.5 ~ 5 2.5 ~ 25	6 ~ 60 40 ~ 400	800	470	100	780
65A	2½B	2.5 ~ 25	0.8 ~ 8 4 ~ 40	10 ~ 100 60 ~ 600	800	490	150	880
80A	3B	4.0 ~ 40	1.2 ~ 12 5 ~ 50	12 ~ 120 80 ~ 800	800	540	150	920
100A	4B	6.0 ~ 60	2.5 ~ 25 9 ~ 90	25 ~ 250 120 ~ 1,200	1,000	590	150	940
125A	5B	10 ~ 100	4 ~ 40 15 ~ 150	40 ~ 400 200 ~ 2,000	1,100	640	250	960
150A	6B	14 ~ 140	6 ~ 60 20 ~ 200	60 ~ 600 300 ~ 3,000	1,200	690	250	1,070
200A	8B	20 ~ 200	10 ~ 100 28 ~ 280	100 ~ 1,000 400 ~ 4,000	1,500	740	250	1,150

* When the size is larger than 65A, to be consulted with a maker

Material table

Part list	Material code		
	B	C	D
Body	304SS	316SS	316L SS
Flange	304SS	316SS	316L SS
Float	304SS	316SS	316L SS
Support	304SS	316SS	316L SS
Magnet rod	304SS + Alnico	316SS + Alnico	316L SS + Alnico
Stopper	304SS	316SS	316L SS
Taper tube	304SS	316SS	316L SS
Guide	304SS	316SS	316L SS
Cap	304SS		
Indicator	Aluminium		
Packing	NBR, Viton, Teflon		

Dimension



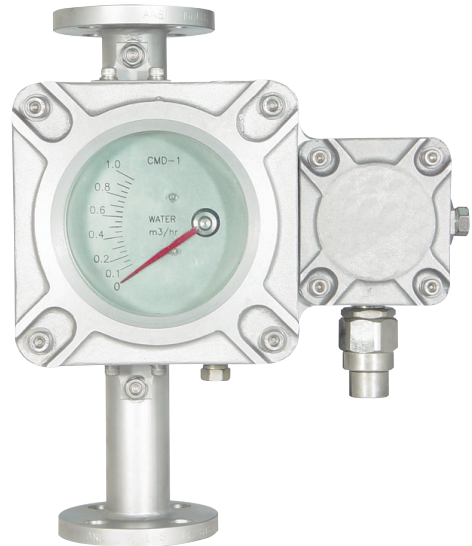
Explosion proof type metal tube flowmeter

Model : F828

Spec. sheet no. **FD08-21**

Description

It is certified one (Ex d IIC T5) by KTL in Korea and suitable for hazardous area. Direct reading and transmission can be selected over a wide range flow rates to suit each particular liquid and gas being measured.



Specification

Process connection

Flanged

Pressure rating

STD. 10 kgf/cm²

Max. 60 kgf/cm²

Size

15A ~ 200A

Temperature rating

STD. 120 °C

Max. 300 °C

Material

304SS

316SS

Accuracy

±3.0 % of full scale

±1.0 % of full scale (Option)

WISE®

| F828_01

1. Base model**F828** Explosion proof type metal tube flowmeter**2. Flow direction type****D1** Bottom and top**3. Line size**

JIS	mm	ANSI	inch	DIN	mm
J015	15A	A001	½B	D015	15A
J020	20A	A002	¾B	D020	20A
J025	25A	A003	1B	D025	25A
J040	40A	A004	1½B	D040	40A
J050	50A	A005	2B	D050	50A
J065	65A	A006	2½B	D065	65A
J080	80A	A007	3B	D080	80A
J100	100A	A008	4B	D100	100A
XXXX	Other				

4. Flange rating and connection type

J010 JIS 10K
A010 ANSI 150 Lb
P010 PN10
XXXX Other

5. Main material (See material table)

B Body material / 304SS
C Body material / 316SS
O Other

6. Indicator and contact

LC Local indicator
L1 Local indicator with 1-SPDT alarm
L2 Local indicator with 2-SPDT alarm
LS Local indicator with current output (4~20 mA.DC)
LP Local indicator with current output and pulse output
OH Other

7. Option**NO** None

1	2	3	4	5	6	7
F828	D1	A003	A010	B	L1	NO

Sample ordering code

Flow chart

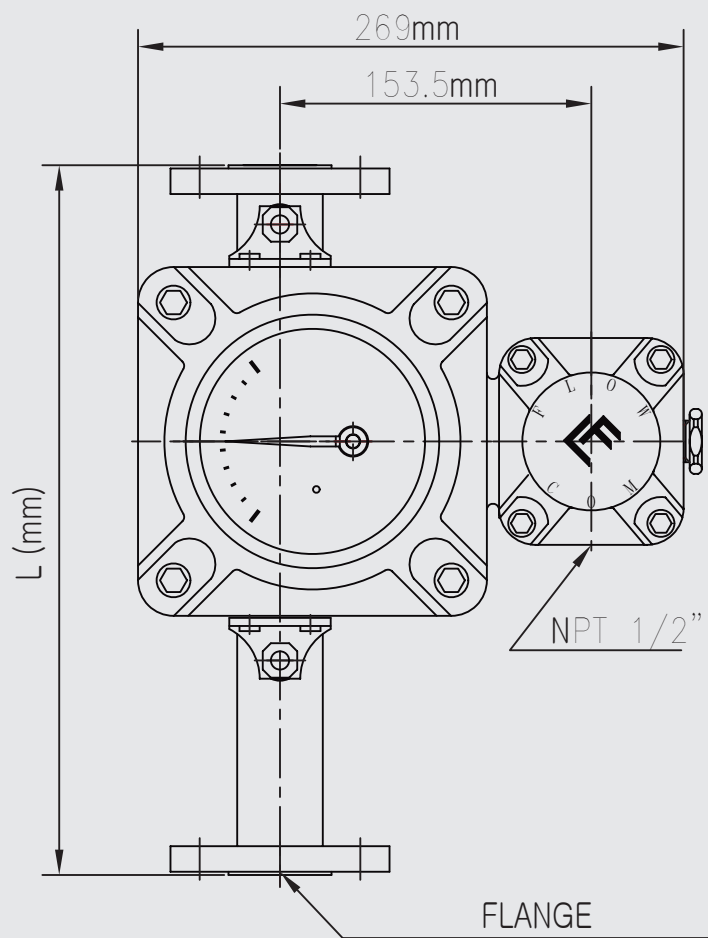
Size		H ₂ O flow rate (m ³ /h)	Ranges		Pressure loss (mmH ₂ O)	Dimension L (mm)
			Liquid (m ³ /h)	Gas (Nm ³ /h)		
15A	½B	0.1 ~ 1	0.02 ~ 0.2 0.2 ~ 2	0.6 ~ 6 3 ~ 30	600	350
20A	¾B	0.2 ~ 2	0.08 ~ 0.8 0.35 ~ 3.5	1.6 ~ 16 5 ~ 50	600	350
25A	1B	0.4 ~ 4	0.1 ~ 1 0.6 ~ 6	2 ~ 20 9 ~ 90	600	350
32A	1¼B	0.6 ~ 6	0.1 ~ 1 1 ~ 10	2 ~ 20 15 ~ 150	600	350
40A	1½B	0.8 ~ 8	0.2 ~ 2 1.5 ~ 15	4 ~ 40 20 ~ 200	800	350
50A	2B	1.5 ~ 15	0.5 ~ 5 2.5 ~ 25	6 ~ 60 40 ~ 400	800	350
65A	2½B	2.5 ~ 25	0.8 ~ 8 4 ~ 40	10 ~ 100 60 ~ 600	800	400
80A	3B	4.0 ~ 40	1.2 ~ 12 5 ~ 50	12 ~ 120 80 ~ 800	800	500
100A	4B	6.0 ~ 60	2.5 ~ 25 9 ~ 90	25 ~ 250 120 ~ 1,200	1,000	500
125A	5B	10 ~ 100	4 ~ 40 15 ~ 150	40 ~ 400 200 ~ 2,000	1,100	600
150A	6B	14 ~ 140	6 ~ 60 20 ~ 200	60 ~ 600 300 ~ 3,000	1,200	700
200A	8B	20 ~ 200	10 ~ 100 28 ~ 280	100 ~ 1,000 400 ~ 4,000	1,500	800

* When the size is larger than 65A, to be consulted with a maker

Material table

Part list	Material	
	B	C
Body	304SS	316SS
Flange	304SS	316SS
Float	304SS	316SS
Support	304SS	316SS
Magnet rod	304SS + Alnico	316SS + Alnico
Stopper	304SS	316SS
Taper tube	304SS	316SS
Guide stopper	304SS	316SS
Indicator	Aluminium	
Terminal box	Aluminium	

Dimension



Flow switch and sight flowmeter

Model : F850

Spec. sheet no. FD08-22

Description

It is flapper type sight glass and available for measuring flow rate through the both sides.

It is suitable for direct visual inspection of liquid.



Specification

Process connection

Flanged
Screwed

Pressure rating

STD. 10 kgf/cm²
Max. 60 kgf/cm²

Size

10A ~ 300A
350A ~ 500A

Temperature rating

STD. 120 °C
Max. 300 °C

Material

304SS
316SS
316L SS

Accuracy

±5.0 % of full scale

Main order

Ordering information

1. Base model

F850 Flow switch and sight flowmeter

2. Flow direction type

D1 Bottom and top
D5 Side and side
D6 Top and bottom

3. Line size

JIS	mm	ANSI	inch	DIN	mm
J015	15A	A001	½B	D015	15A
J020	20A	A002	¾B	D020	20A
J025	25A	A003	1B	D025	25A
J040	40A	A004	1½B	D040	40A
J050	50A	A005	2B	D050	50A
J065	65A	A006	2½B	D065	65A
J080	80A	A007	3B	D080	80A
J100	100A	A008	4B	D100	100A
J125	125A	A009	5B	D125	125A
J150	150A	A010	6B	D150	150A
J200	200A	A011	8B	D200	200A
J250	250A	A012	10B	D250	250A
J300	300A	A013	12B	D300	300A
XXXX	Other				

4. Screw type

T001 ½" (15A)
T002 ¾" (20A)
T003 1" (25A)
T004 1½" (40A)
T005 2" (50A)

5. Flange rating and connection type

J010 JIS 10K
A010 ANSI 150 Lb
P010 PN10
TPTM PT male
TPTF PT female
TNTM NPT male
TNTF NPT female
XXXX Other

6. Main material (See material table)

B Body material / 304SS
C Body material / 316SS
D Body material / 316L SS
O Other

7. Packing material

E EPDM
T Teflon
N NBR
V Viton
O Other

1	2	3	4	5	6	7
F850	D1	J015	T003	J010	D	N

Sample ordering code

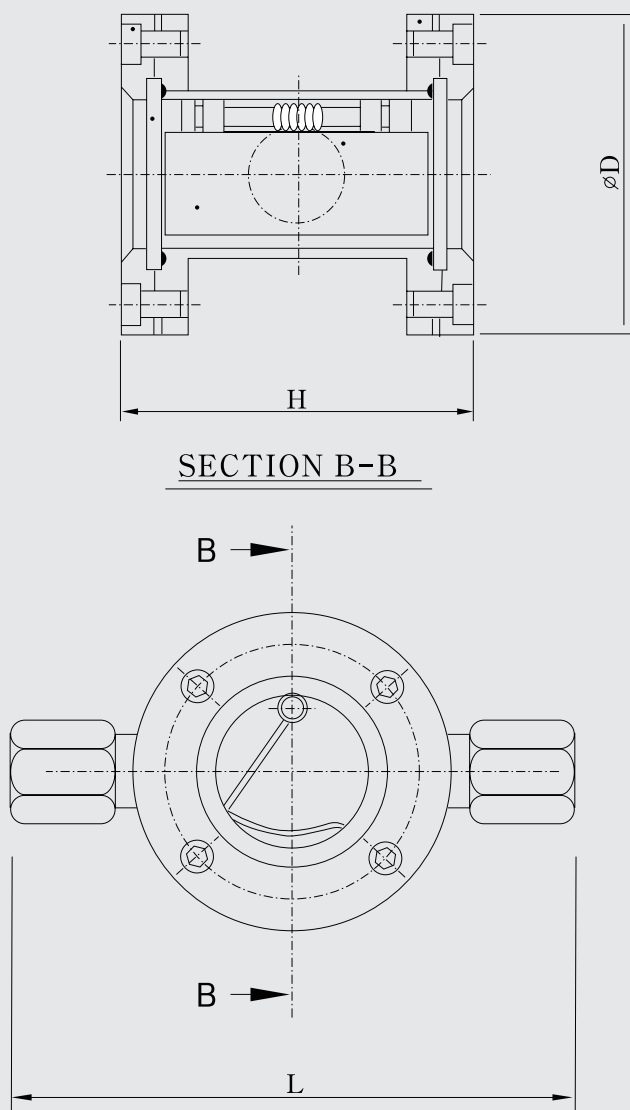
Flow chart

Size		Measuring ranges		"L" Dimension (mm)	
		Water (m³/h)	Air (Nm³/h)	Flange type	Screw type
15A	½B	0.1 ~ 0.5 0.4 ~ 2	6 ~ 30 12 ~ 60	220	150
20A	¾B	0.1 ~ 0.5 0.4 ~ 2	6 ~ 30 12 ~ 60	220	160
25A	1B	0.2 ~ 1 1 ~ 5	12 ~ 60 30 ~ 150	220	180
32A	1¼B	0.2 ~ 1 1 ~ 5	12 ~ 60 30 ~ 150	220	200
40A	1½B	0.4 ~ 2 2 ~ 10	16 ~ 80 30 ~ 300	220	200
50A	2B	0.6 ~ 3 3 ~ 15	20 ~ 100 90 ~ 450	220	220
65A	2½B	1.2 ~ 6 6 ~ 30	60 ~ 300 180 ~ 900	260	220
80A	3B	1.6 ~ 8 8 ~ 40	120 ~ 600 240 ~ 1,200	300	
100A	4B	3 ~ 15 16 ~ 80	180 ~ 900 400 ~ 2,000	330	
125A	5B	4 ~ 20 20 ~ 100	200 ~ 1,000 600 ~ 3,000	380	
150A	6B	6 ~ 30 30 ~ 150	240 ~ 1,200 900 ~ 4,500	480	
200A	8B	12 ~ 60 60 ~ 300	300 ~ 1,500 1,800 ~ 9,000	650	
250A	10B	16 ~ 80 80 ~ 400	600 ~ 3,000 2,400 ~ 12,000	680	
300A	12B	20 ~ 100 100 ~ 500	900 ~ 4,500 3,000 ~ 15,000	720	

* When the size is larger than 65A, to be consulted with a maker

Material table

Part list	Material code		
	B	C	D
Cover	304SS	316SS	316L SS
Packing	NBR, EPDM, Viton, Teflon		
Body	304SS	316SS	316L SS
Shaft	304SS	316SS	316L SS
Spring	304SS	316SS	316L SS
Stopper	304SS	316SS	316L SS
Flapper	304SS	316SS	316L SS
Sight glass	Tempered, pyrex		



See through type sight glass

Model : S100 series

Spec. sheet no. SD01-01

Description

Sight glass is used to observe the direction of flow, color and clarity of liquid through a window. Sight glass is available to mount pipeline, such as flanged, screwed and sanitary clamp connections.



Connections

Screw end

Max. pressure

2.9 MPa

Max. temperature

300 °C

Glass

Tempered

Body material

A216 WCB

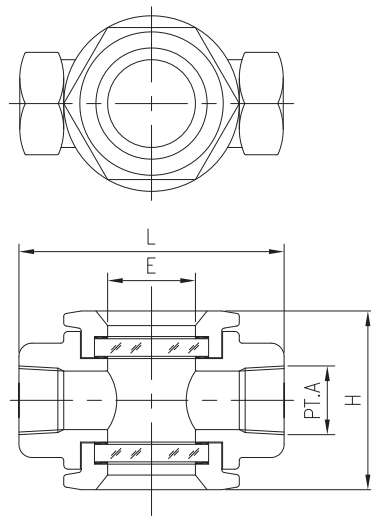
A351 CF8

A351 CF8M

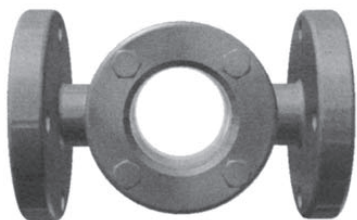
A106 Gr.B

Dimension

Size A(")	L	H (Approx.)	E
8 (1/4)	120	105	50
10 (3/4)	120	105	50
15 (1/2)	120	105	50
20 (3/4)	120	105	50
25 (1)	140	115	50
32 (1 1/4)	160	130	65
40 (1 1/2)	160	130	65
50 (2)	180	140	80



Model : S110



Connections

Flanged end

Max. pressure

2.9 MPa

Max. temperature

300 °C

Glass

Tempered

Body material

A216 WCB

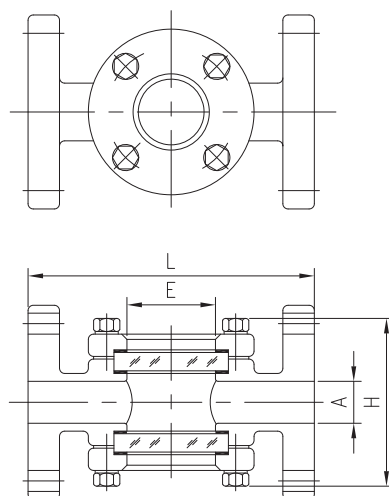
A351 CF8

A351 CF8M

A106 Gr.B

Dimension

Size A(")	L	H (Approx.)	E
15 (1/2)	160	130	40
20 (3/4)	160	130	40
25 (1)	170	135	50
32 (1 1/4)	200	160	65
40 (1 1/2)	200	160	65
50 (2)	220	175	75
65 (2 1/2)	270	200	105
80 (3)	270	200	105
100 (4)	320	240	130
125 (5)	380	280	170
150 (6)	420	310	200
200 (8)	500	370	260



1. Base model

S100	See through type (Screwed)
S110	See through type (Flanged)

2. Line size

JIS	mm	ANSI	inch	DIN	mm
J015	15A	A001	½B	D015	15A
J020	20A	A002	¾B	D020	20A
J025	25A	A003	1B	D025	25A
J040	40A	A004	1½B	D040	40A
J050	50A	A005	2B	D050	50A
J065	65A	A006	2½B	D065	65A
J080	80A	A007	3B	D080	80A
J100	100A	A008	4B	D100	100A
J125	125A	A009	5B	D125	125A
J150	150A	A010	6B	D150	150A
J200	200A	A011	8B	D200	200A
		XXXX	Other		

3. Glass material

T	Tempered
O	Other

4. Flange rating code

JIS		ANSI		PN	
J010	JIS 10K	A010	ANSI 150 Lb	P010	10 bar
J020	JIS 20K	A020	ANSI 300 Lb	P016	16 bar
XXXX	None	OXXX	Other		

5. Screwed connection

A	NPT (F)
J	PT (F)
N	None

6. Gaskets material

N	Non-asbestos
T	Teflon
O	Other

7. Body material

C	Carbon steel (A216 WCB)
4	304SS (A351 CF8)
6	316SS (A351 CF8M)
O	Other

1	2	3	4	5	6	7
S100	J040	T	J010	N	T	C

Sample ordering code

Flapper type sight glass

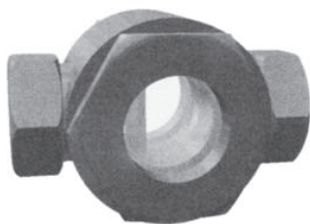
Model : S200 series

Spec. sheet no. SD02-01

Description

Sight glass with flapper can check the state of fluid flow by opening and closing the flapper.

Model : S200



Connections

Screwed end

Max. pressure

2.9 MPa

Max. temperature

300 °C

Glass

Tempered

Body material

A216 WCB

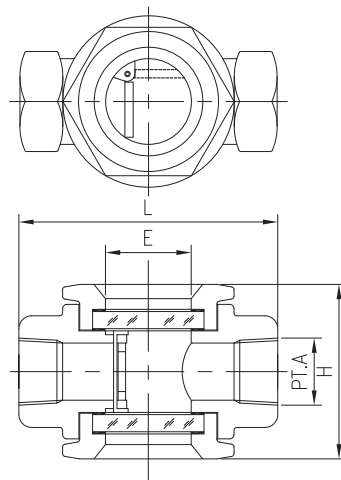
A351 CF8

A351 CF8M

A106 Gr.B

Dimension

Size A(")	L	H (Approx.)	E
8 (3/4)	120	105	50
10 (3/4)	120	105	50
15 (1/2)	120	105	50
20 (3/4)	120	105	50
25 (1)	140	115	50
32 (1 1/4)	160	130	65
40 (1 1/2)	160	130	65
50 (2)	180	140	80



Model : S210



Connections

Flanged end

Max. pressure

2.9 MPa

Max. temperature

300 °C

Glass

Tempered

Body material

A216 WCB

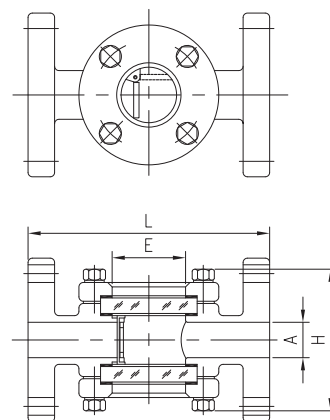
A351 CF8

A351 CF8M

A106 Gr.B

Dimension

Size A(")	L	H (Approx.)	E
15 (1/2)	160	130	40
20 (3/4)	160	130	40
25 (1)	170	135	50
32 (1 1/4)	200	160	65
40 (1 1/2)	200	160	65
50 (2)	220	175	75
65 (2 1/2)	270	200	105
80 (3)	270	200	105
100 (4)	320	240	130
125 (5)	380	280	170
150 (6)	420	310	200
200 (8)	500	370	260



1. Base model

S200	Flapper type (Screwed)
S210	Flapper type (Flanged)

2. Line size

JIS	mm	ANSI	inch	DIN	mm
J015	15A	A001	½B	D015	15A
J020	20A	A002	¾B	D020	20A
J025	25A	A003	1B	D025	25A
J040	40A	A004	1½B	D040	40A
J050	50A	A005	2B	D050	50A
J065	65A	A006	2½B	D065	65A
J080	80A	A007	3B	D080	80A
J100	100A	A008	4B	D100	100A
J125	125A	A009	5B	D125	125A
J150	150A	A010	6B	D150	150A
J200	200A	A011	8B	D200	200A
		XXXX	Other		

3. Glass material

T	Tempered
O	Other

4. Flange rating code

JIS		ANSI		PN	
J010	JIS 10K	A010	ANSI 150 Lb	P010	10 bar
J020	JIS 20K	A020	ANSI 300 Lb	P016	16 bar
XXXX	None	OXXX	Other		

5. Screwed connection

A	NPT (F)
J	PT (F)
N	None

6. Gaskets material

N	Non-asbestos
T	Teflon
O	Other

7. Body material

C	Carbon steel (A216 WCB)
4	304SS (A351 CF8)
6	316SS (A351 CF8M)
O	Other

1	2	3	4	5	6	7
S200	J025	T	J010	N	T	6

Sample ordering code

Ball type sight glass

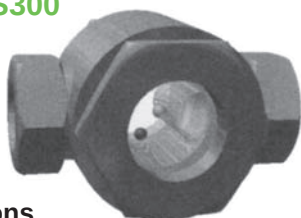
Model : S300 series

Spec. sheet no. SD03-01

Description

Sight glass with balls can check the fluid flow by observing motion of balls.

Model : S300



Connections

Screwed end

Max. pressure

2.9 MPa

Max. temperature

100 °C

Glass

Tempered

Body material

A216 WCB

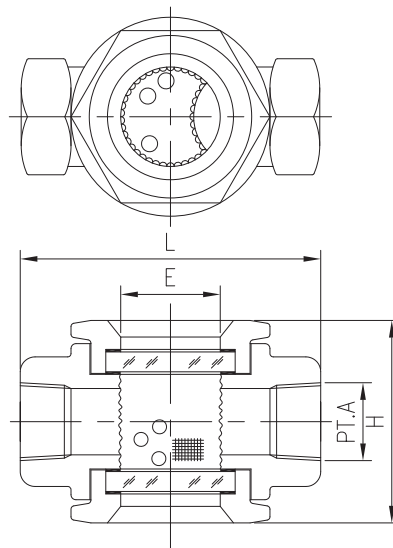
A351 CF8

A351 CF8M

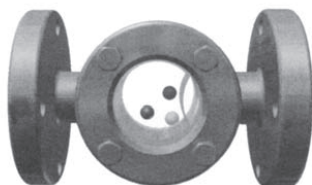
A106 Gr.B

Dimension

Size A(")	L	H (Approx.)	E
8 (¼)	120	105	50
10 (¾)	120	105	50
15 (½)	120	105	50
20 (¾)	120	105	50
25 (1)	140	115	50
32 (1¼)	160	130	65
40 (1½)	160	130	65
50 (2)	180	140	80



Model : S310



Connections

Flanged end

Max. pressure

2.9 MPa

Max. temperature

100 °C

Glass

Tempered

Body material

A216 WCB

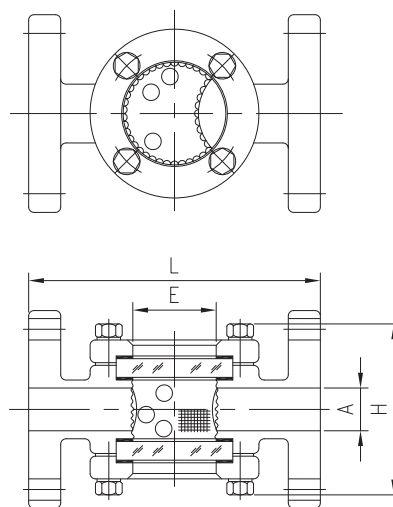
A351 CF8

A351 CF8M

A106 Gr.B

Dimension

Size A(")	L	H (Approx.)	E
15 (½)	155	125	40
20 (¾)	155	125	40
25 (1)	170	135	50
32 (1¼)	200	155	65
40 (1½)	200	155	65
50 (2)	220	170	75
65 (2½)	270	205	105
80 (3)	270	205	105
100 (4)	320	235	130
125 (5)	380	280	170
150 (6)	420	330	200
200 (8)	500	380	260



1. Base model

S300	Ball type (Screwed) sight glass
S310	Ball type (Flanged) sight glass

2. Line size

JIS	mm	ANSI	inch	DIN	mm
J015	15A	A001	½B	D015	15A
J020	20A	A002	¾B	D020	20A
J025	25A	A003	1B	D025	25A
J040	40A	A004	1½B	D040	40A
J050	50A	A005	2B	D050	50A
J065	65A	A006	2½B	D065	65A
J080	80A	A007	3B	D080	80A
J100	100A	A008	4B	D100	100A
J125	125A	A009	5B	D125	125A
J150	150A	A010	6B	D150	150A
J200	200A	A011	8B	D200	200A
		0XXX	Other		

3. Glass material

T	Tempered
O	Other

4. Flange rating code

JIS		ANSI		PN	
J010	JIS 10K	A010	ANSI 150 Lb	P010	10 bar
J020	JIS 20K	A020	ANSI 300 Lb	P016	16 bar
XXXX	None	0XXX	Other		

5. Screwed connection

A	NPT (F)
J	PT (F)
N	None

6. Gaskets material

N	Non-asbestos
T	Teflon
O	Other

7. Body material

C	Carbon steel (A216 WCB)
4	304SS (A351 CF8)
6	316SS (A351 CF8M)
O	Other

1	2	3	4	5	6	7
S300	A007	T	A010	N	T	4

Sample ordering code

Lantern type sight glass

Model : S400 series

Spec. sheet no. SD04-01

Description

Lantern sight glass is used for low pressure, and can check the state of fluid flow from any direction.

Model : S400



Connections

Flanged end

Max. pressure

0.7 MPa

Max. temperature

100 °C

Glass

Tempered

Body material

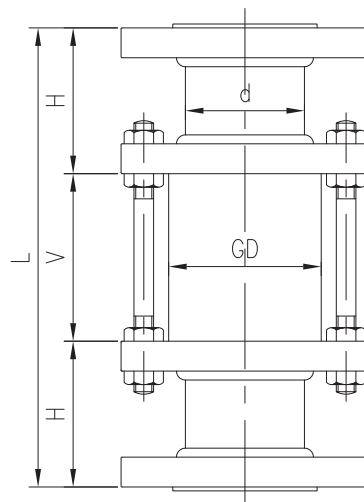
Carbon steel (Steel plate)

304SS (Stainless steel plate)

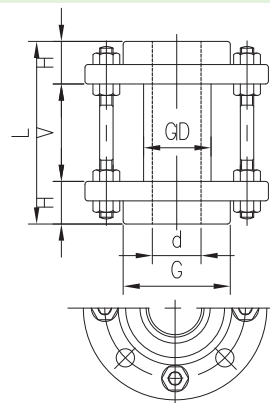
316SS (Stainless steel plate)

Dimension

Size A(")	L	E
15 (½)	220	80
20 (¾)	220	80
25 (1)	220	80
32 (1¼)	220	80
40 (1½)	220	80
50 (2)	240	80
65 (2½)	240	80
80 (3)	240	80
100 (4)	260	80
125 (5)	280	80
150 (6)	280	80
200 (8)	280	80



Model : S410



Connections

Flanged end

Max. pressure

0.7 MPa

Max. temperature

100 °C

Glass

Tempered

Body material

Carbon steel (Steel plate)

304SS (Stainless steel plate)

316SS (Stainless steel plate)

Dimension

Size	L	V	GD	D	G
15	150	80	35	15	40
20	150	80	40	20	50
25	150	80	45	25	60
40	150	80	60	40	75
50	150	80	70	50	90
65	150	80	85	65	110
80	150	80	100	80	120
100	150	80	125	100	145
125	150	80	150	125	175
150	150	80	180	150	210
200	150	80	230	200	260

unit : mm

1. Base model

S400	Lantern type (Long) sight glass
S410	Lantern type (Short) sight glass

2. Line size

JIS	mm	ANSI	inch	DIN	mm
J015	15A	A001	½B	D015	15A
J020	20A	A002	¾B	D020	20A
J025	25A	A003	1B	D025	25A
J040	40A	A004	1½B	D040	40A
J050	50A	A005	2B	D050	50A
J065	65A	A006	2½B	D065	65A
J080	80A	A007	3B	D080	80A
J100	100A	A008	4B	D100	100A
J125	125A	A009	5B	D125	125A
J150	150A	A010	6B	D150	150A
J200	200A	A011	8B	D200	200A
		XXXX	Other		

3. Glass material

T	Tempered
O	Other

4. Flange rating code

JIS		ANSI		PN	
J010	JIS 10K	A010	ANSI 150 Lb	P010	10 bar
J020	JIS 20K	A020	ANSI 300 Lb	P016	16 bar
XXXX	None				

5. Gaskets material

N	Non-Asbestos
T	Teflon
O	Other

6. Body material

C	Carbon steel (A216 WCB)
4	304SS (A351 CF8)
6	316SS (A351 CF8M)
O	Other

1	2	3	4	5	6
S400	J100	T	A010	N	6

Sample ordering code

Turbine flowmeter

Model : F901

Spec. sheet no. FD09-01

Description

It offers a high accuracy and repeatable measurement under the most demanding conditions of oil and gas custody transfer applications. High accurate measurement is achieved by using a bladed rotor that turns at a speed proportional to rate of flow. The rotation of the rotor is sensed by electrical pickoffs mounted on the meter body, generating a pulsing voltage. The total number of pulses collected over a period of time represents the metered volume.



Power supply type

Specification

Process connection

Flanged
Screwed

Pressure rating

STD. 10 kgf/cm²
Max. 350 kgf/cm² (Option)

Size

10A ~ 250A

Temperature rating

STD. 120 °C
Max. 200 °C (Option)

Accuracy

±1.0 % of full scale

Material

304SS
316SS
316L SS

Enclosure

Ex d IIB T6

1. Base model

F901 Tubine flowmeter

2. Line size

JIS	mm	ANSI	inch	DIN	mm
J015	15A	A001	½B	D015	15A
J020	20A	A002	¾B	D020	20A
J025	25A	A003	1B	D025	25A
J040	40A	A004	1½B	D040	40A
J050	50A	A005	2B	D050	50A
J065	65A	A006	2½B	D065	65A
J080	80A	A007	3B	D080	80A
J100	100A	A008	4B	D100	100A
J125	125A	A009	5B	D125	125A
J150	150A	A010	6B	D150	150A
J200	200A	A011	8B	D200	200A
J250	250A	A012	10B	D250	250A
XXXX	Other				

3. Flange rating

JIS		ANSI		DIN	
J010	JIS 10K	A010	ANSI 150 Lb	P010	PN 10
J016	JIS 16K	A020	ANSI 300 Lb	P016	PN 16
J020	JIS 20K	A030	ANSI 600 Lb	P020	PN 20
J030	JIS 30K	A040	ANSI 900 Lb	P025	PN 25
J040	JIS 40K	A050	ANSI 1,500 Lb	P040	PN 40
ZZZZ	Other				

4. Main material (See material table)

B Body material / 304SS
C Body material / 316SS
D Body material / 316L SS
O Other

5. Power supply

P10 DC 24 V (4 wire system)
P20 AC 110 ~ 220 V (50 ~ 60 Hz)

6. Contact

OP One point alarm
TP Two point alarm
OT Other

7. Option

NO None

1	2	3	4	5	6	7
F901	J100	J016	B	P10	OP	NO

Sample ordering code

Flow chart

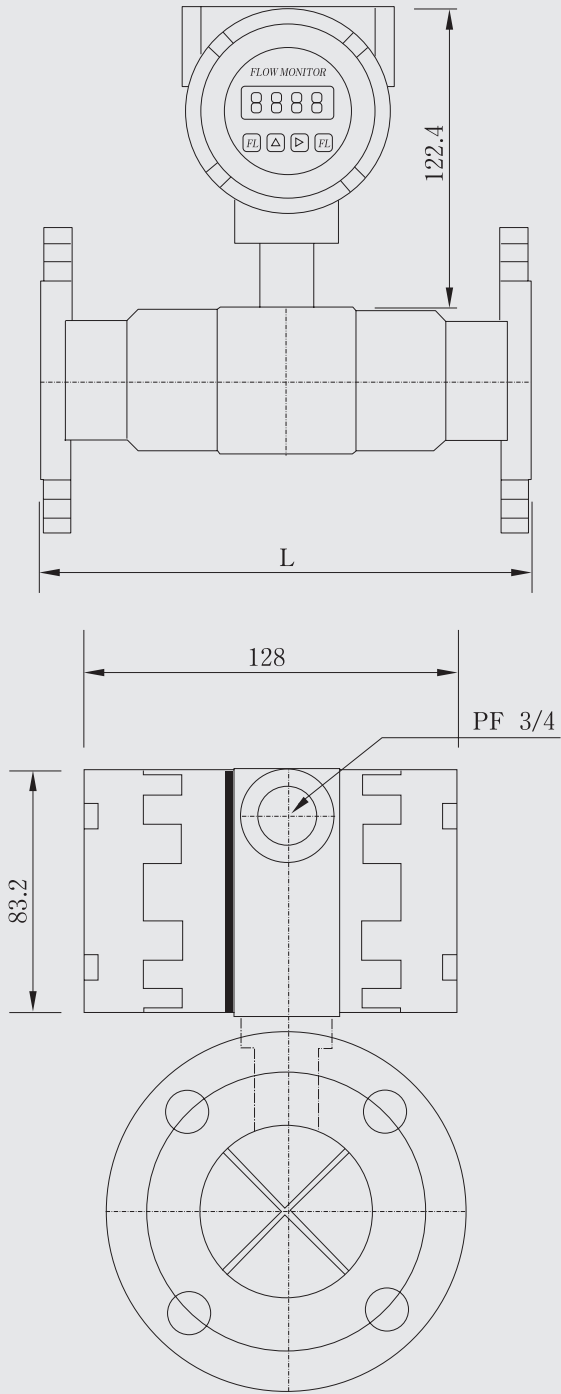
Size		Liquid flow rate (m ³ /h)	Length (mm)
10A	$\frac{3}{8}$ B	0.04 ~ 0.25	120
15A	$\frac{1}{2}$ B	0.4 ~ 4.0	150
20A	$\frac{3}{4}$ B	0.6 ~ 6.0	150
25A	1B	1.0 ~ 10	200
40A	1 $\frac{1}{2}$ B	2.0 ~ 20	250
50A	2B	4.0 ~ 40	250
80A	3B	10 ~ 100	300
100A	3B	20 ~ 200	330
150A	6B	30 ~ 300	330
200A	8B	50 ~ 500	360
250A	10B	100 ~ 1,000	360

* When the size is larger than 65A, to be consulted with a maker

Material

Part list	Material		
	B	C	D
Body	304SS	316SS	316L SS
Flange	304SS	316SS	316L SS
Rotor support	316SS	316SS	316SS
Rotor	Tungsten carbide (CD4MC II SUS)		
Rotor shaft	Tungsten carbide		

Dimension



Turbine flowmeter

Model : F902

Spec. sheet no. FD09-02

Description

It is 2 wire turbine flow transmitter specially used for various industrial application and operated by battery with life time, 3 ~ 4 years. The flowing media engages a vaned rotor causing it to rotate at an angular velocity proportional to flow rate.



Specification

Process connection

Flanged
Screwed

Pressure rating

STD. 10 kgf/cm²
Max. 350 kgf/cm² (Option)

Size

10A ~ 250A

Temperature rating

STD. 120 °C
Max. 200 °C (Option)

Material

304SS
316SS
316L SS

Accuracy

±1.0 % of full scale

1. Base model**F902** Tubine flowmeter**2. Line size**

JIS	mm	ANSI	inch	DIN	mm
J015	15A	A001	½B	D015	15A
J020	20A	A002	¾B	D020	20A
J025	25A	A003	1B	D025	25A
J040	40A	A004	1½B	D040	40A
J050	50A	A005	2B	D050	50A
J065	65A	A006	2½B	D065	65A
J080	80A	A007	3B	D080	80A
J100	100A	A008	4B	D100	100A
J125	125A	A009	5B	D125	125A
J150	150A	A010	6B	D150	150A
J200	200A	A011	8B	D200	200A
J250	250A	A012	10B	D250	250A
XXXX	Other				

3. Flange rating

JIS		ANSI		DIN	
J010	JIS 10K	A010	ANSI 150 Lb	P010	PN 10
J016	JIS 16K	A020	ANSI 300 Lb	P016	PN 16
J020	JIS 20K	A030	ANSI 600 Lb	P020	PN 20
J030	JIS 30K	A040	ANSI 900 Lb	P025	PN 25
J040	JIS 40K	A050	ANSI 1,500 Lb	P040	PN 40
ZZZZ	Other				

4. Main material (See material table)

- B** Body material / 304SS
C Body material / 316SS
D Body material / 316L SS
O Other

5. Option**NO** None

1	2	3	4	5	Sample ordering code
F902	J100	J016	B	NO	

Flow chart

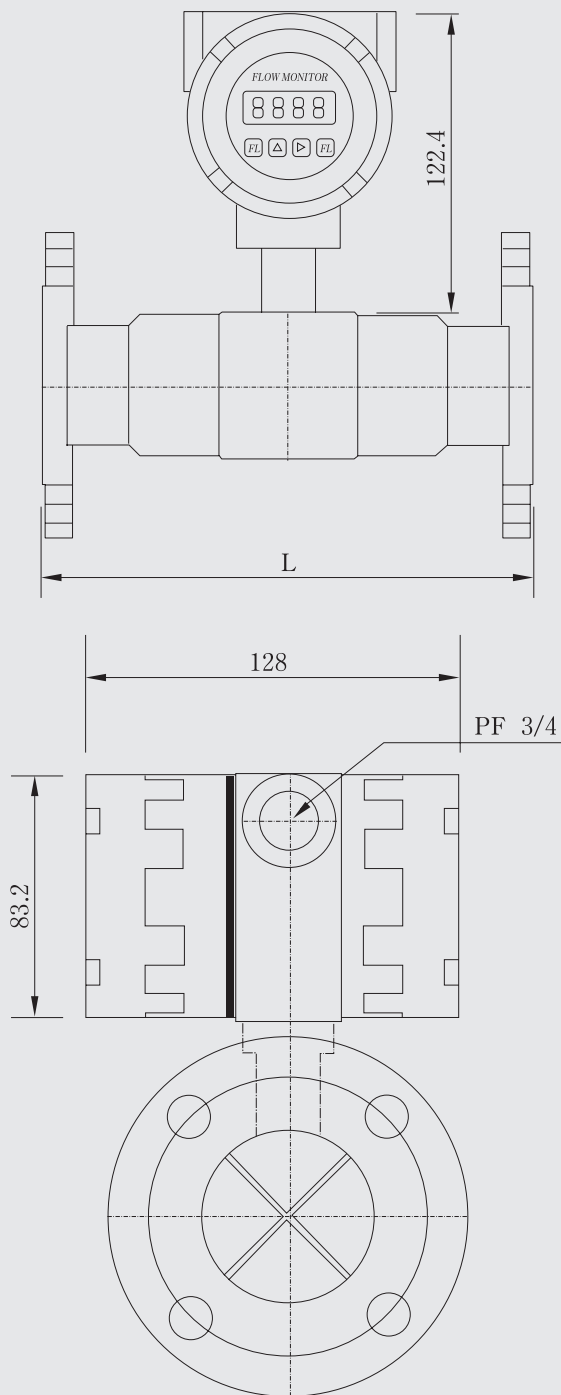
Size		Liquid flow rate (m ³ /h)	Length (mm)
10A	$\frac{3}{8}$ B	0.04 ~ 0.25	120
15A	$\frac{1}{2}$ B	0.4 ~ 4.0	150
20A	$\frac{3}{4}$ B	0.6 ~ 6.0	150
25A	1B	1.0 ~ 10	200
40A	1 $\frac{1}{2}$ B	2.0 ~ 20	250
50A	2B	4.0 ~ 40	250
80A	3B	10 ~ 100	300
100A	3B	20 ~ 200	330
150A	6B	30 ~ 300	330
200A	8B	50 ~ 500	360
250A	10B	100 ~ 1,000	

* When the size is larger than 65A, to be consulted with a maker

Material table

Part list	Material code	
	B	C
Body	304SS	316SS
Flange	304SS	316SS
Rotor support	316SS	316SS
Rotor	Tungsten carbide (CD4MC II SUS)	
Rotor shaft	Tungsten carbide	

Dimension



Electromagnetic Flowmeters Combined type

Model : F950



Electromagnetic Flowmeters Separated type

Model : F951

Electromagnetic Flowmeters

Combined type

Model : F950

Spec. sheet no. FD09-03

Description

The Electromagnetic Flowmeter can be used to accurately measure the flowrate of liquids, paper pulp, slurry and mineral slurry which has an electrical conductivity greater than 10 $\mu\text{S}/\text{cm}$.

F950 is a flow measurement system in a compact design which integrates the primary and signal converter.

Applications

- Facilities in water supply, sewerage, agricultural water, industrial water and waste water
- Petrochemical, alkali salt, chemicals and coolant process.
- Circulating water like cement sludge, coal sludge
- Spoke water, waste water, coolant in pulp, paper mill
- Coolant, seawater circulating, in ship building factories



Sensor & Transmitter



Grounding Ring
(Accessory)

Specification

Type

Combined type

Size

15 ~ 1,000A ($\frac{3}{8}$ "~40")

Process connection

Flange type [ANSI, ASME, DIN, JIS, KS, ETC.]

Measuring range

0.2 - 10 m/s

Accuracy

$\pm 0.5\%$ F.S (15 ~ 800A)

$\pm 1.0\%$ F.S (900A ~ : It needs for site calibration.)

Lining

Standard : Hard rubber (0 ~ 60 °C)

Option : Teflon (-10 ~ 160 °C) Max. 600A

Ambient temperature

-10 ~ 60 °C

Conductivity

Standard : $\geq 10\ \mu\text{S}/\text{cm}$

Option : $\geq 5\ \mu\text{S}/\text{cm}$

Power supply

Standard : AC 85 ~ 250 V, 50 ~ 60 Hz

Option : DC 24 V [2-Wire Loop Power]

Power consumption

Max. 15 VA

Display

LCD Display with back light

Flowrate : 5-Digit Display

Total : 9-Digit Display

Output

Analog : DC 4 ~ 20 mA (Isolated) - Active

Pulse : Open collector pulse

Communication : RS485

Protection class

Standard : Weather Proof - IP66

Option : Ex-Proof (Ex d IIC T5_IP66)

Special feature

Self check

Empty pipe

Enable to reverse flow direction

Data logging

Error message

WISE[®]

| F950 F951_03

Main order

Ordering information

1. Base model

F950 Electromagnetic flowmeter Combined type

2. Meter size

A	15A (½")	O	350A (14")
B	20A (¾")	P	400A (16")
C	25A (1")	Q	450A (18")
D	32A (1¼")	R	500A (20")
E	40A (1½")	S	550A (22")
F	50A (2")	T	600A (24")
G	65A (2½")	U	650A (26")
H	80A (3")	V	700A (28")
I	100A (4")	W	750A (30")
J	125A (5")	X	800A (32")
K	150A (6")	Y	900A (36")
L	200A (8")	Z	1000A (40")
M	250A (10")	1	Other
N	300A (12")		

3. Connection flange

A	ANSI 150 Lb	H	KS 10K
B	ANSI 300 Lb	I	KS 16K
C	ASME 150 Lb	J	KS 20K
D	ASME 300 Lb	K	DIN PN 10
E	JIS 10K	L	DIN PN 16
F	JIS 16K	M	DIN PN 20
G	JIS 20K	O	Other

Sample ordering code

1	2	3	4	5	6	7
F950	I	A	1	1	1	1

4. Electrode material

- 1 Titanium
- 2 316L SS
- 3 Hastelloy-C
- 4 Platinum Iridium
- 5 Tantalum
- 6 Other

5. Ground ring material

- 1 None
- 2 316L SS
- 3 Hastelloy-C
- 4 Platinum Iridium
- 5 Titanium
- 6 Tantalum
- 7 Other

6. Lining material

- 1 Hard rubber (Flange : A105)
- 2 PTFE (Flange : A182 F304)
- 3 Other
(Hard Rubber w/Flange : A182 F304
PTFE w/Flange : A182 F316, etc.)

7. Protection class

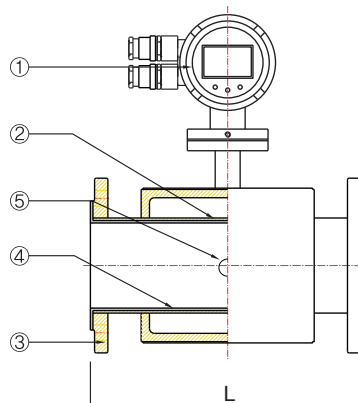
- 1 Weather Proof : IP66
- 2 Ex-Proof : Ex d IIC T5 (IP66)

* Example Specification

- 1 Connection : 4" ANSI 150Lb RF
- 2 Electrode Material : Titanium
- 3 Ground Ring : None
- 4 Lining Material : Hard Rubber (Flange : A105)
- 5 Weather Proof : IP66

Standard material

No.	Description	Material
1	Head	Cast Aluminium
2	Body	304SS
3	Flange	Standard : Carbon steel Option : 304SS, etc.
4	Lining	Standard : Hard Rubber Option : Teflon
5	Electrode	Standard : Titanium Option : 316L SS Hastelloy-C Platinum Iridium Tantalum



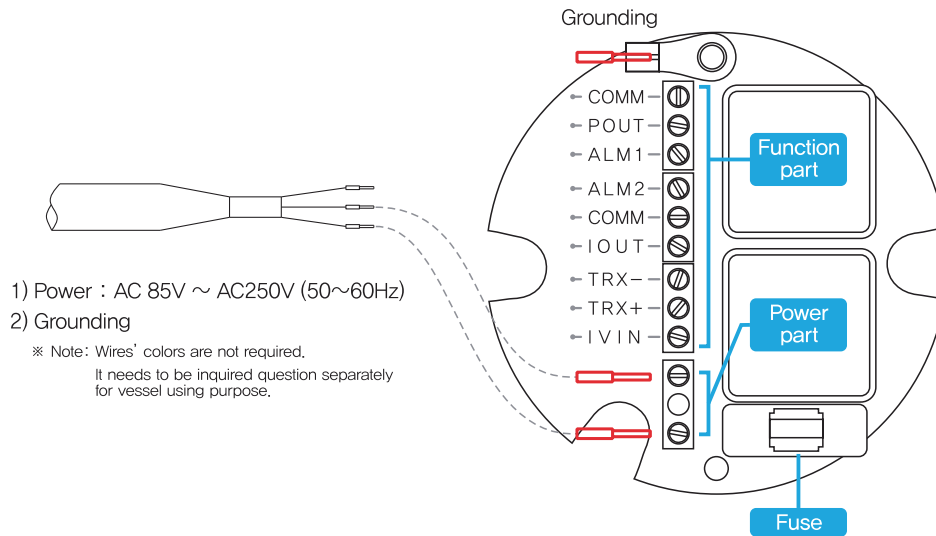
WISE®

F950 F951_04 |

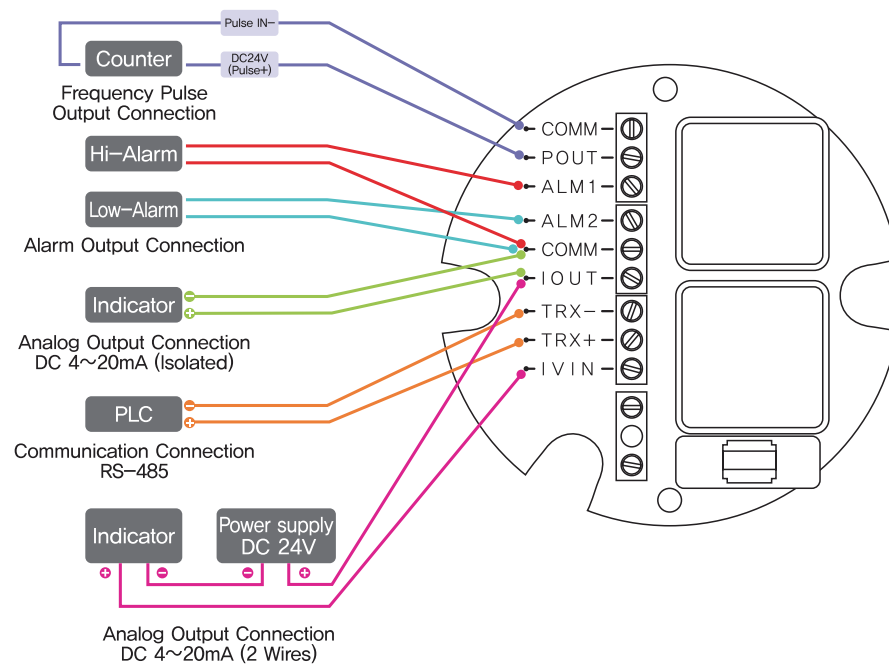
Wiring

Description for PCB connection functions

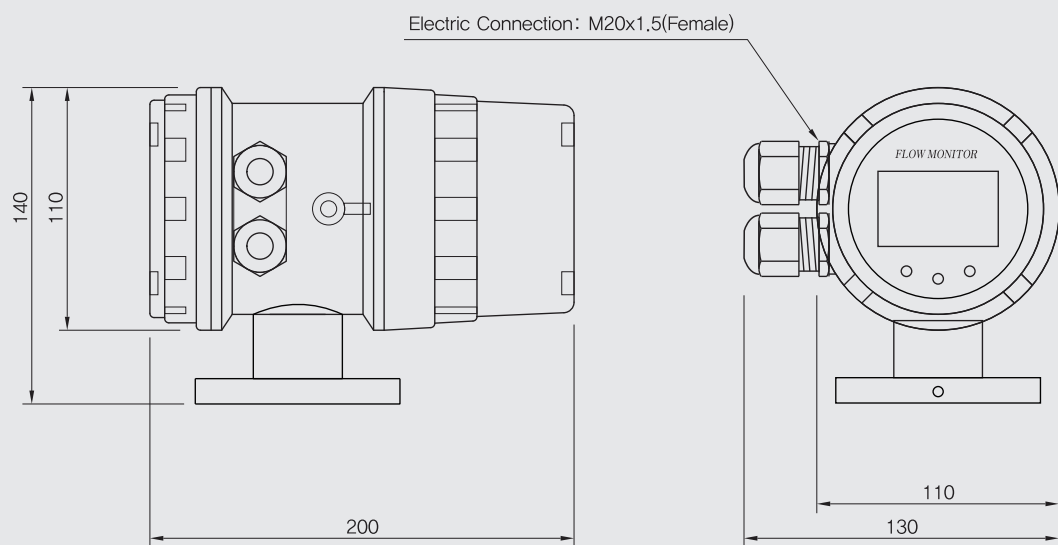
COMM	Frequency and Pulse
POUT	Frequency (Pulse) Output for Bi-directional Flow
ALM1	Alarm Output for Upper Limit
ALM2	Alarm Output for Low Limit
COMM	Current and Alarm Common
IOUT	Current Output for Flux (Two Routes Out) Isolated
TRX-	- Communication Signal Input
TRX+	+ Communication Signal Input
IVIN	External DC Power 24 V
LN-	Power Supply (AC Power)
LN+	Power Supply (AC Power)



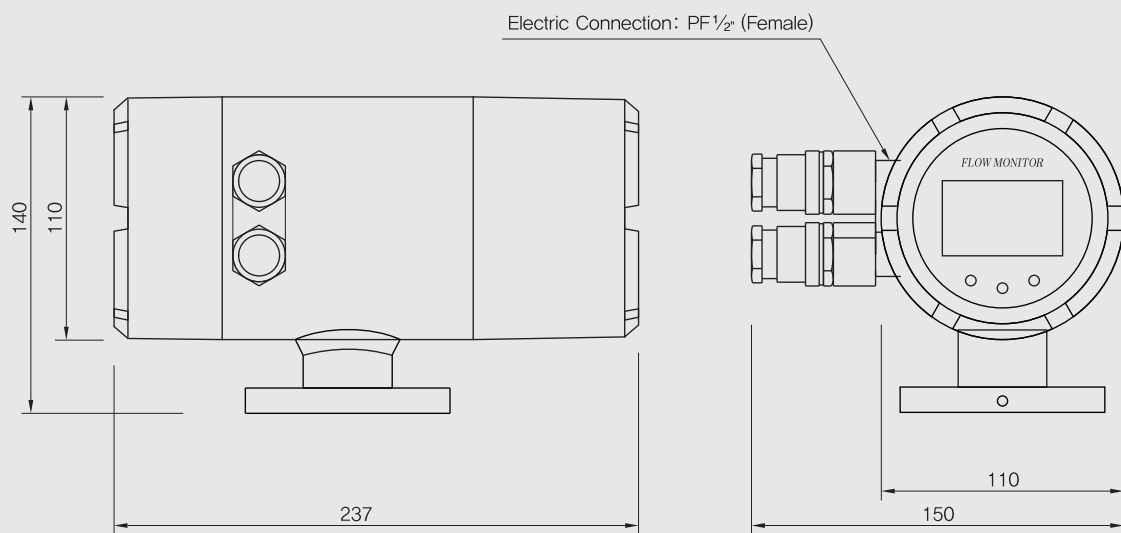
Controller wiring connection function



Dimension



Normal combined type



Ex-proof combined type

Electromagnetic Flowmeters

Separated Type

Model : F951

Spec. sheet no. FD09-04

Description

The electromagnetic flowmeter can be used to accurately measure the flowrate of liquids, paper pulp, slurry and mineral slurry which has an electrical conductivity greater than 10 $\mu\text{S}/\text{cm}$.

F951 is a flow measurement system consists of a flowmeter primary and remote mounted converter.

Applications

- Facilities in water supply, sewerage, agricultural water, industrial water and waste water
- Petrochemical, alkali salt, chemicals and coolant process.
- Circulating water like cement sludge, coal sludge
- Spoke water, waste water, coolant in pulp, paper mill
- Coolant, seawater circulating, in ship building factories



Specification

Type

Separate type

Power consumption

Max. 15 VA

Size

15 ~ 1,000A ($\frac{1}{2}$ ~ 40")

Display

LCD Display with back light
Flowrate : 5-Digit Display
Total : 9-Digit Display

Process connection

Flange type [ANSI, ASME, DIN, JIS, KS, ETC.]

Measuring range

0.2 ~ 10 m/s

Output

Analog : DC 4 ~ 20 mA (Isolated) - Active
Pulse : Open collector pulse
Communication : RS485

Accuracy

$\pm 0.5\%$ Full scale (15 ~ 800A)
 $\pm 1.0\%$ Full scale (900A ~ : It needs for site calibration.)

Protection class

Weather Proof : IP67

Lining

Standard : Hard rubber (0 ~ 60 °C)
Option : Teflon (-10 ~ 160 °C) Max. 600A

Special feature

Self check
Empty pipe
Enable to reverse flow direction
Data logging
Error message

Ambient temperature

-10 ~ 60 °C

Conductivity

Standard : $\geq 10 \mu\text{S}/\text{cm}$
Option : $\geq 5 \mu\text{S}/\text{cm}$

Electrode signal cable

Standard length : 5 M
Option : Max. 30 M

Power supply

Standard : AC 85 ~ 250 V, 50 ~ 60 Hz
Option : DC 24 V [2-wire Loop power]

Main order

Ordering information

1. Base model

F951 Electro-Magnetic flowmeter Separated type

2. Meter size

A	15A (½")	O	350A (14")
B	20A (¾")	P	400A (16")
C	25A (1")	Q	450A (18")
D	32A (1¼")	R	500A (20")
E	40A (1½")	S	550A (22")
F	50A (2")	T	600A (24")
G	65A (2½")	U	650A (26")
H	80A (3")	V	700A (28")
I	100A (4")	W	750A (30")
J	125A (5")	X	800A (32")
K	150A (6")	Y	900A (36")
L	200A (8")	Z	1000A (40")
M	250A (10")	1	Other
N	300A (12")		

3. Connection flange

A	ANSI 150 Lb	H	KS 10K
B	ANSI 300 Lb	I	KS 16K
C	ASME 150 Lb	J	KS 20K
D	ASME 300 Lb	K	DIN PN 10
E	JIS 10K	L	DIN PN 16
F	JIS 16K	M	DIN PN 20
G	JIS 20K	O	Other

4. Electrode material

- 1 Titanium
- 2 316L SS
- 3 Hastelloy-C
- 4 Platinum Iridium
- 5 Tantalum
- 6 Other

Sample ordering code

1	2	3	4	5	6	7	8
F951	I	A	1	1	1	1	1

5. Ground ring material

- 1 None
- 2 316L SS
- 3 Hastelloy C
- 4 Platinum Iridium
- 5 Titanium
- 6 Tantalum
- 7 Other

6. Lining material

- 1 Hard rubber (Flange : A105)
- 2 PTFE (Flange : A182 F304)
- 3 Other
(Hard Rubber w/Flange : A182 F304,
PTFE w/Flange : A182 F316, etc.)

7. Protection class

- 1 Weather Proof : IP67

8. Excitation and signal cable

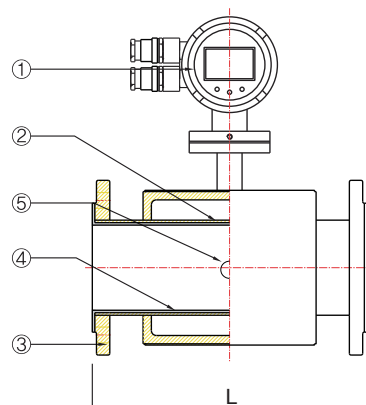
- 1 5 M
- 2 10 M
- 3 20 M
- 4 Other (Max. 30 M)

* Example Specification

- 1 Connection : 4" ANSI 150Lb RF
- 2 Electrode Material : Titanium
- 3 Ground Ring : None
- 4 Lining Material : Hard Rubber (Flange : A105)
- 5 Weather Proof : IP67

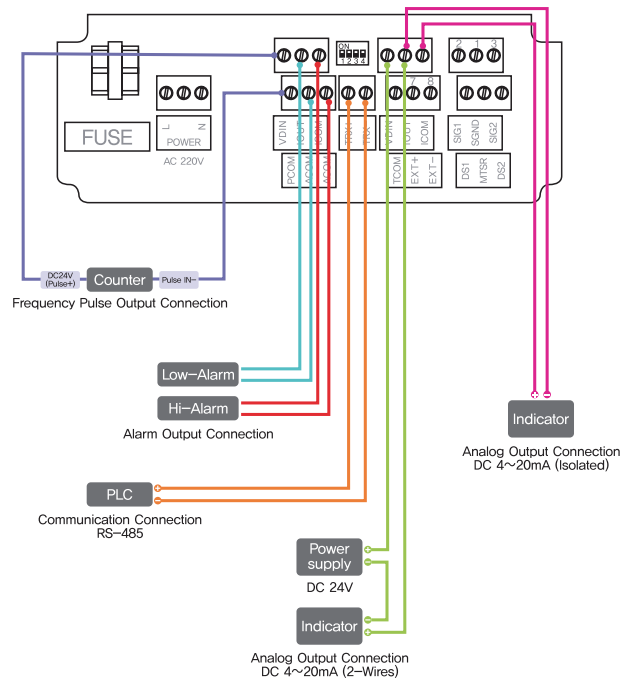
Standard material

No.	Part list	Material
1	Head	Cast Aluminium
2	Body	304SS
3	Flange	Standard : Carbon steel Option : 304SS, etc.
4	Lining	Standard : Hard Rubber Option : Teflon
5	Electrode	Standard : Titanium Option : 316L SS Hastelloy-C Platinum Iridium Tantalum

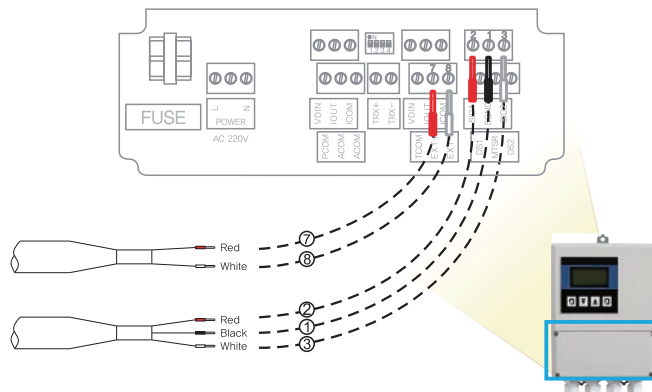


Wiring

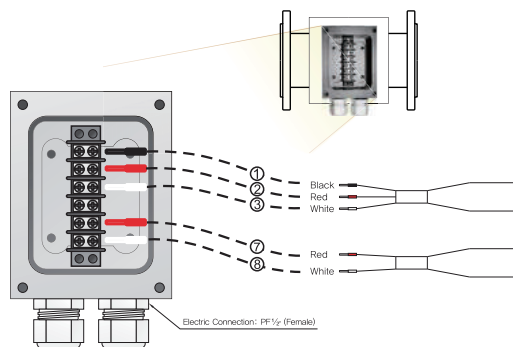
Controller wiring connection function



Wiring connection on sensor to converter

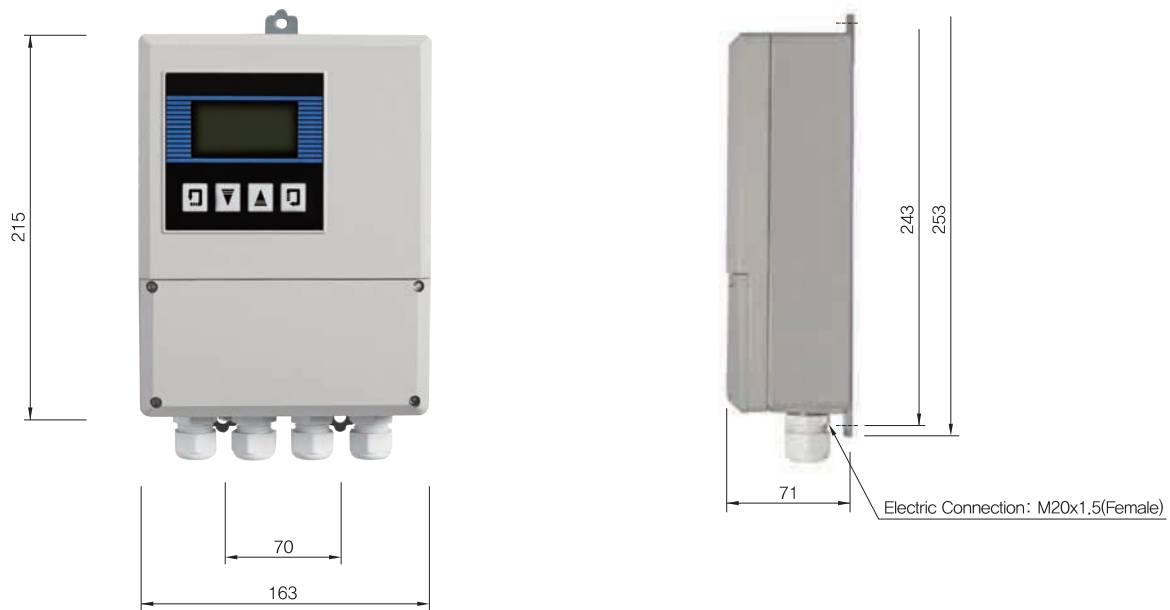


Wiring connection on sensor

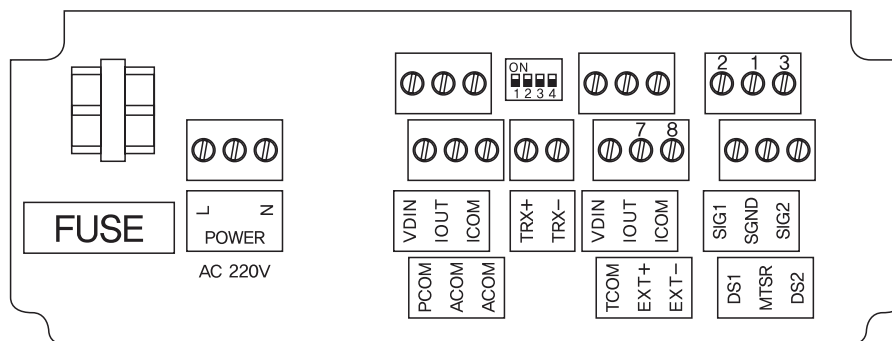


Dimension

Converter dimension



Converter wiring diagram



- 1) Power : AC 85 ~ 250 V (50 ~ 60 Hz) / DC 24 V
- 2) Analogue output : DC 4 ~ 20 mA (Isolated)
- 3) Pulse output : Open collector pulses
- 4) Alarm output : Hi and Low alarm output
- 5) Network function (Option) : RS-485

Principle of Electromagnetic Flowmeter

Principle of operation

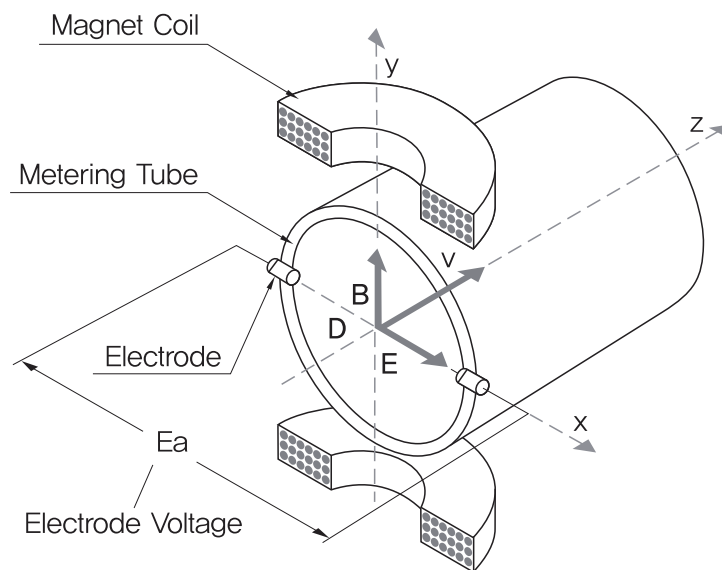
The electromagnetic flowmeters are the ideal flowmeters for metering the flow of all liquids, slurries and sludges that have a specific minimum electrical conductivity. These flowmeters measure accurately, create no additional pressure drop, contain no moving or protruding parts, are wear free and corrosion resistant. Installations are possible in any existing piping system.

The electromagnetic flowmeters has proven itself over many decades and is the preferred flowmeter in the Chemical, Pharmaceutical and Cosmetic Industries. Municipal Water and Waste Water treatment facilities and in the Food and Paper industries.

Measurement operation

Faraday's Laws of induction form the basis for the electromagnetic flowmeter which states that a voltage is generated in a conductor as it moves through a magnetic field.

This principle is applied to a conductive fluid which flows through the meter tube perpendicular to the direction of the magnetic field. (see the figure 1.)



E = Electrode Voltage
B = Magnetic Induction
D = Electrode Distance
V = Average Flow Velocity
qv = Volume Flowrate

$$E_a \sim B \cdot D \cdot v$$

$$qv = \frac{D^2 \pi}{4} \cdot v$$

$$E_a \sim qv$$

Figure 1. Basic operating principle of an Electromagnetic Flowmeter

The voltage induced in the fluid is measured by two electrodes located diametrically opposite to each other. This electrode voltage "Ea" is proportional to the magnetic induction "B", the electrode distance "D" and the average flow velocity "V". Nothing that the magnetic induction "B" and the electrode distance "D" are constant values indicates that a proportionality exists between the electrode voltage "Ea" and the average flow velocity "V". From the equation for calculating the volume flowrate "Ea~qv", it follows that the signal voltage is linear and proportional to the volumetric flowrate.

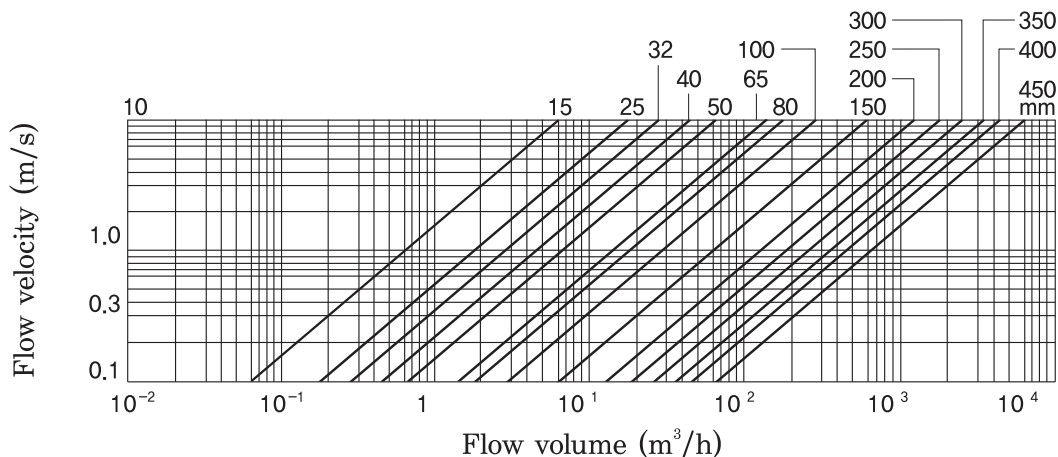
Measuring range

In the normal industry application it is better to set the measured medium speed as 2~4m/s.
Under the special situation the minimum speed should be more than 0.2m/s and maximum speed less than 8m/s.
If there are solid granules in liquid the usual speed should be less than 3m/s for purpose to avoid the over-attrition between lining and electrical poles.

For viscid liquid the speed can choose as 2m/s the fast flow speed makes for the automatic elimination of obstructive substances glued on poles, therefore improve the inspection's preciseness.

Size (mm)	Flow range				Dimension "L" (mm)	Max. Working Pressure (bar)	Approx Weight (Kg)
	Minimum		Maximum				
	Velocity (m/s)	Flow rate (m³/h)	Velocity (m/s)	Flow rate (m³/h)			
15A		0.19		6.35			7
20A		0.34		11.29			7
25A		0.53		17.64			8
32A		0.87		28.91	200	40	8
40A		1.36		45.71			9
50A		2.12		70.58			10
65A		3.58		119.28			11
80A		5.43		180.68			13
100A		8.48		282.32	250		17
125A		13.25		441.12		16	20
150A	0.2	19.08	10.0	636.21	300		30
200A		33.91		1,129.27	350		41
250A		52.99		1,764.48	400		58
300A		76.30		2,540.86	500		70
350A		103.86		3,458.39			82
400A		135.65		4,517.08			106
450A		171.68		5,716.93	600	10	116
500A		211.95		7,057.94			130
600A		305.21		10,163.43			185
700A		415.42		13,833.55	700		230
800A		542.59		18,068.31	800		300
900A		686.72		22,867.71	900		380
1000A		847.80		28,231.74	1,000	6	480

Graph Illustration of diameter, Flow speed and Volume of flowmeter



Grounding

General information on ground connections

Observe the following items when grounding the device ;

- The flowmeter grounding is one of the most important things for flowmeter installation.
- For plastic pipes or pipes with insulating lining, the grounding is provided by the grounding ring.
- When stray potentials are present, install a grounding ring upstream and downstream of the flowmeter sensor.
- For measurement-related reasons the potential in the station ground and in the pipeline should be identical.

※ Important Notice

If the flowmeter sensor is installed in plastic or earthenware pipelines, or in pipelines with an insulating lining, transient current may flow through the grounding electrode in special cases.

In the long term, it may destroy the sensor, since the ground electrode will turn in degrade electrochemically.

In these special cases the connection to the ground must be performed using grounding plates.

Install a grounding ring upstream and downstream of the device in this case.

Metal pipe with fixed flanges

Use a copper wire (at least 2.5 mm²) to establish the ground connection between the sensor, the pipeline flanges and an appropriate grounding point.

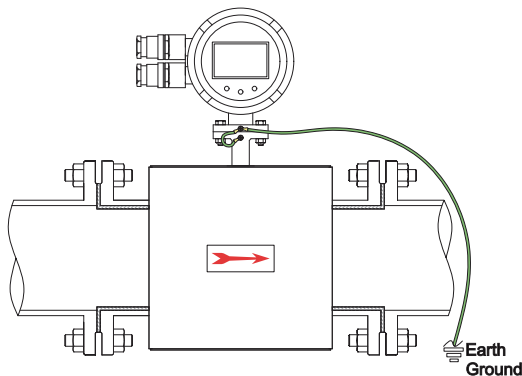


Figure 2. Metal pipe, without liner
(Over 50A sizes)

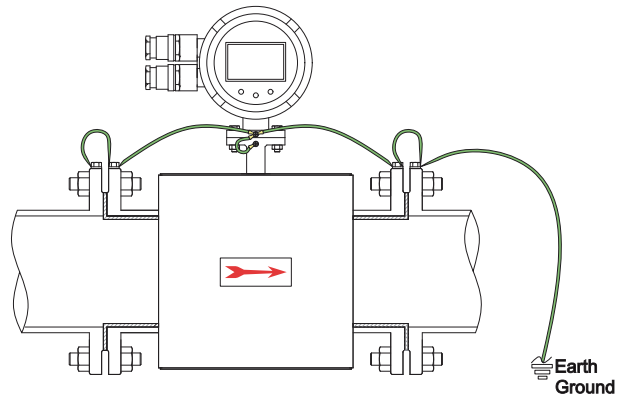


Figure 3. Metal pipe, without liner
(From 10 to 40A sizes)

Plastic pipes, non-metallic pipes or pipes with insulating liner

For plastic pipes or pipes with insulating lining, the ground for the measuring agent is provided by the grounding ring. If grounding electrodes are used the grounding ring is not necessary.

- Install the flowmeter sensor with grounding ring in the pipeline.
 - Connect the terminal lug for the grounding ring and grounding connection on the flowmeter sensor with the grounding strap.
 - Use a copper wire (min. 2.5 mm²) to link the ground connection to a suitable grounding point.
- ※ It is essential to use this grounding method in an electrolysis process at a plating factory.

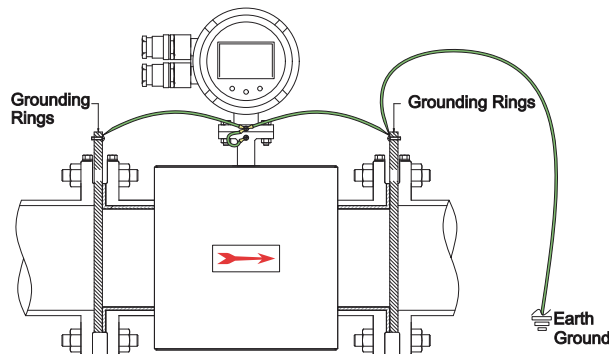


Figure 4. Plastic pipes, non-metallic pipes or pipes with insulating liner

Grounding

Ground for pipes with flexible connection

For pipes with flexible connection, it should be welded M16 or 1/4 sized bolts on both sides of the pipes as shown the figure 5 to get proper ground results.

Make sure to use a copper wire (min. 2.5 mm²) to link the ground connection to a suitable grounding point.

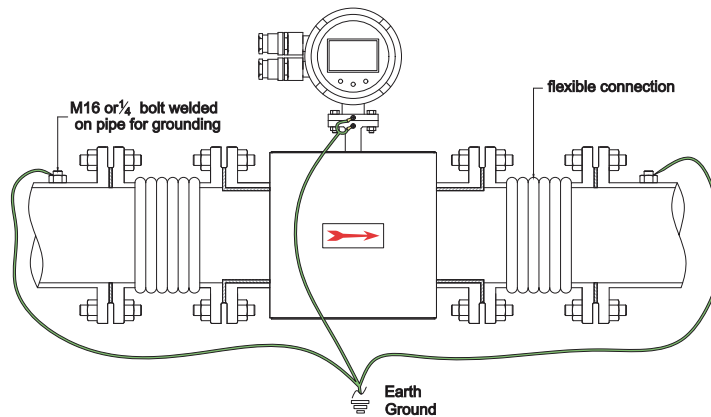
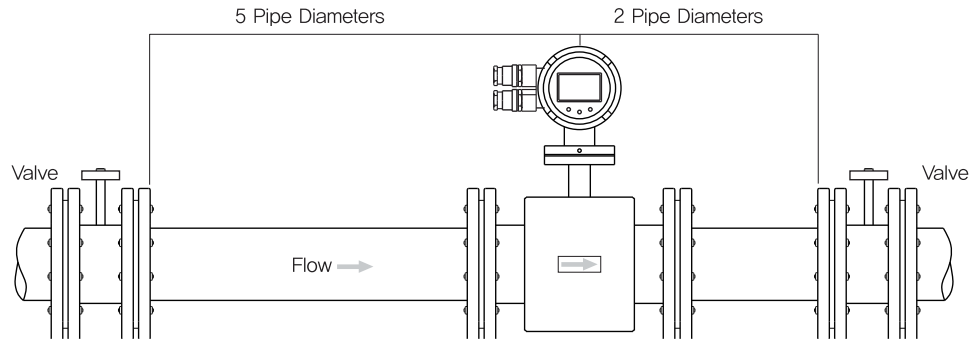


Figure 5. Ground for pipes with flexible connection

Piping installation

Upstream downstream piping installation methods (Standard)

To ensure specific accuracy over widely varying process conditions install the flowtube with a minimum of five straight upstream and two pipe diameters downstream from the electrode plan as shown below.

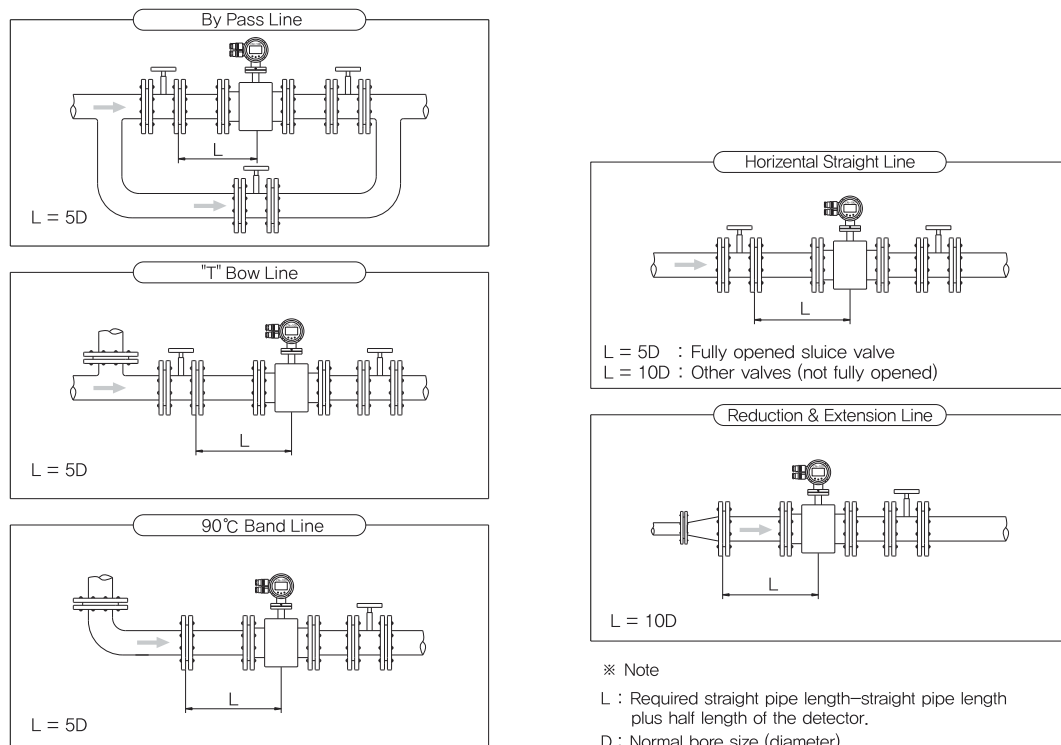


Upstream and Downstream straight pipe diameter

※ Note : It can be measured a correct flowrate only when a detector is full with fluid inside completely.
Make sure to operate it with fluid in full inside.

Required pipe length in piping connections

If various joints are used upstream of the detector outlet the straight pipe length as show in figure below is required.



The figure above required straight pipe length on the upstream side

Ultrasonic liquid flow meter

Clamp-on type

Model : U100 Series

Spec. sheet no. UD01-01

Description

WISE aquasonic U100 series clamp-on ultrasonic transit time flow meters are highly accurate, compact and economic flow measurement instruments. These are used for all pipes and fluids that can be penetrated by ultrasonic wave. WISE aquasonic measuring method is non-intrusive with no moving parts so it has no pressure drop and energy loss.



Advantages

- 1 % accuracy clamp-on liquid flowmeter for industrial applications
- Easy and quick installation
- Temperature compensation
- Wide turn-down ratio over 100:1
- No flow-stop for Zero-calibration
- Versatile external input / output interfaces
- One time calibration
- Minimal maintenance

Specification

Fluid

Ultrasonically conductive fluids
Pure water, Clean water
Waste water, Industrial water
River and sea water, etc.

Fluid temperature range

-40 ~ +160 °C

Measurement method

Correlation transit time

Pipe size

DN15 ~ DN6000

Range

0.2 ~ 15 m/s

Accuracy

1 % for greater than 0.3 m/s

Non-linearity

±0.1 %

Repeatability

±0.25 %

Protection class

Weather proof (IP65)

Display

2 Line x 16 character LCD with Backlight

Keypad

4 keypad buttons

Power supply

AC 85 ~ 260 V / DC 24 V (Option)
Less than 15 W

Output

DC 4 ~ 20 mA
RS-485
Pulse (Option)

Main order

Ordering information

1. Base model

U100 Ultrasonic liquid flow meter clamp-on type

2. Sensor

- S** Small size 10 ~ 100 mm Pipe
M Middle size 50 ~ 700 mm Pipe
L Large size 300 ~ 6000 mm Pipe

3. Power

- 1** AC 85 ~ 260 V
2 DC 24 V

4. Output

- 1** DC 4 ~ 20 mA, RS-485
2 DC 4 ~ 20 mA, RS-485, Pulse

5. Mounting

- 1** Wall mount
2 Pipe mount

6. Signal cable (m)

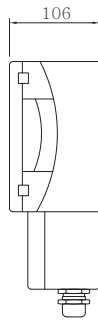
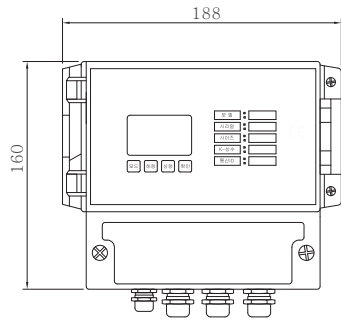
- 1** 10
2 20
3 30

1	2	3	4	5	6
U	M	1	2	1	1

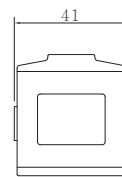
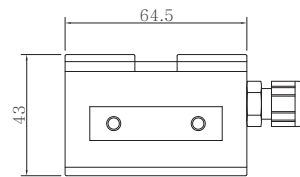
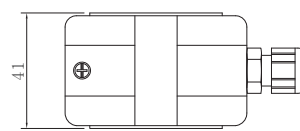
Sample ordering code

Electrical connection

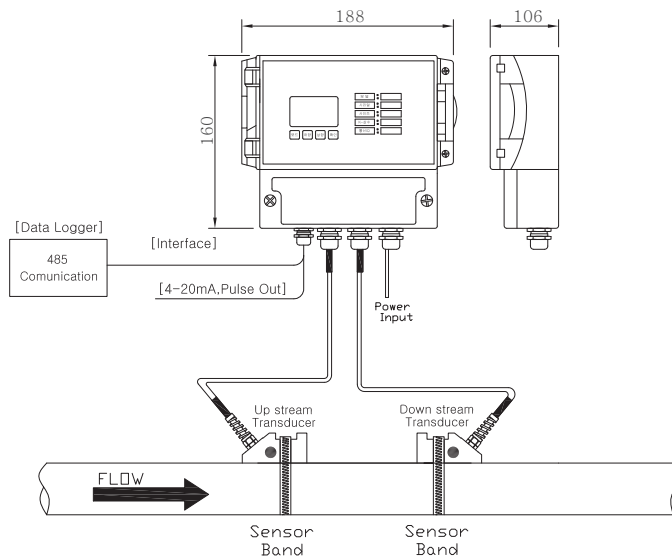
Transmitter



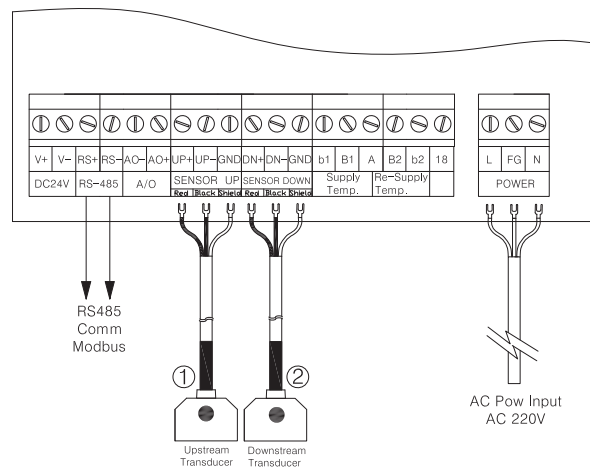
Sensor



Install



Wiring



Memo