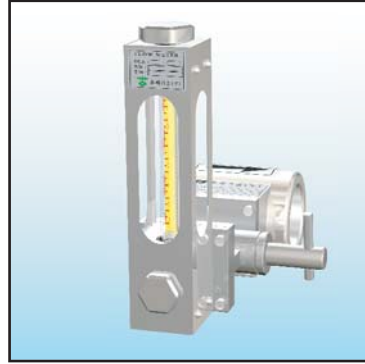
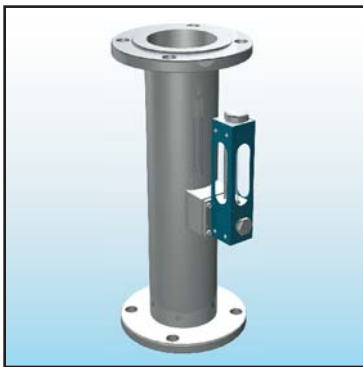


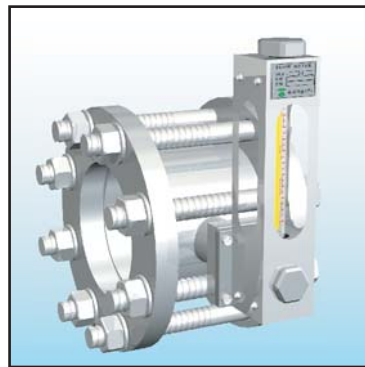
OLA-N



OLA-N-B-B



OLA-F



OLA-C



OLA-DP



OLE-F



## 오리피스유량계 (Orifice Flow Meter)

FTC<sup>®</sup>

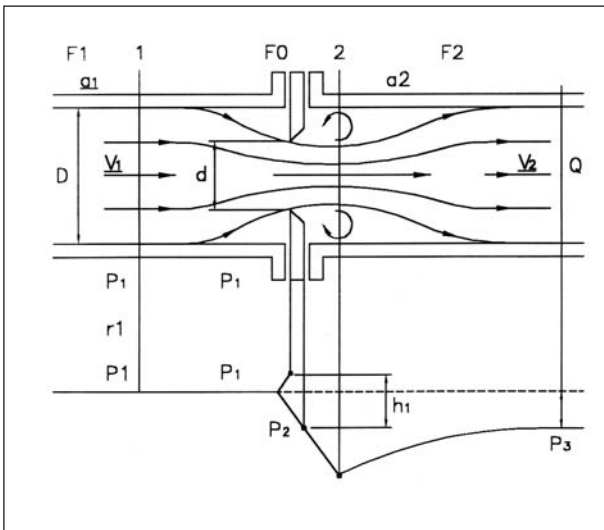


## ◆ 개요

유체의 유량을 측정할 때 유체가 흐르는 관로 사이에 조리기구 (오리피스)를 두어 유체가 기구 통과시에 발생하는 압력차를 이용하여 유량을 측정하는 방식으로 구조가 간단하며 취급하기가 쉽고, 소유량에서 대유량까지 측정이 가능한 장점을 가진 유량계입니다.

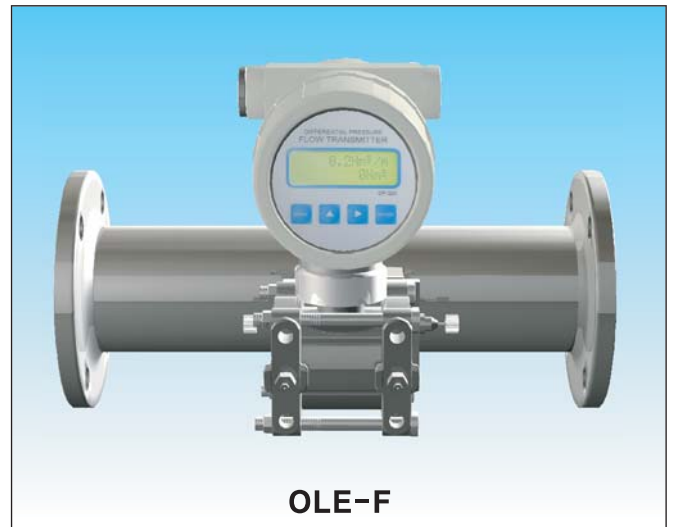
## ◆ 원리

유체가 흐르고 있는 관로의 중간에 오리피스(Orifice)를 설치하여 유체가 그 부분을 통과할 때는 유속이 빨라지고 베르누이 연속의 정리에 의하여 압력이 감소하는데 압력의 감소가 유량에 비례하는 원리에 따라 그 압력의 차(차압)를 측정하여 유량을 산출해내는 방식이며, 지시 부는 부유식 면적 유량계의 원리를 이용, 측정이 가능한 형태로 차압을 이용한 면적식 유량계라 할 수 있습니다.



## ◆ Principle and construction

The total flow rate can be obtained by measuring a bypass flow rate produced by differential pressure generated before and behind an orifice plate. Flow meter manufactured based on the above principle comprises of a base socket and cell block (flow rate indicator). Differential pressure is generated by the orifice plate installed inside the base socket and flow produced by the differential pressure is drawn to the cell block through an inflow chamber. In the cell block, fluid gets into a tapered tube via a strainer and moves the float up and down. The scale of total flow rate in the main tube is marked on the outer face of tapered tube with respect to the float position. Differential pressure generated before and behind the orifice plate in the main tube is virtually equal to that generated before and behind a small port in the cell block. The main flow and bypass flow are in proportion enabling to measure the flow rate.



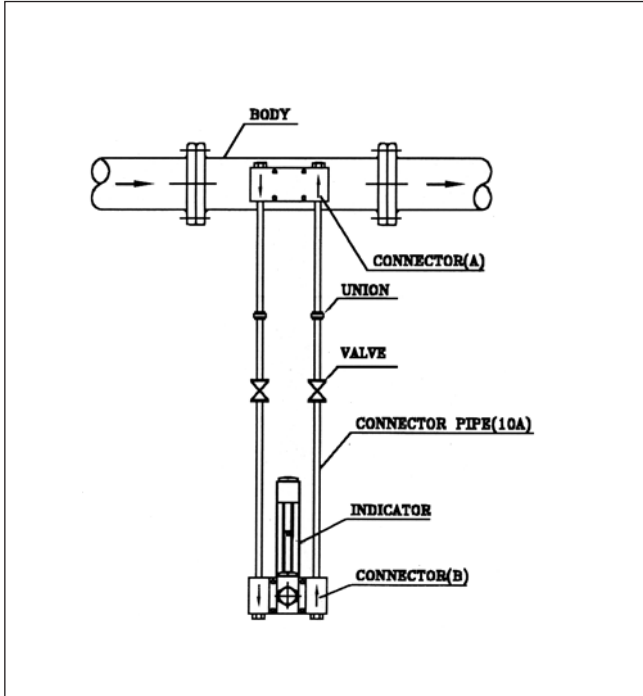
## ◆ 특징

1. 배관내의 순간유량을 간단, 명료하게 읽을 수 있다.
2. 구조가 간단하고 취급이 간편하다.
3. 소형으로 대유량 측정이 가능하다.
4. 배관에서 분리가 용이하다.
5. 유체의 방향에 대한 제약이 없다.
6. 유체의 흐름을 방해하지 않고, 계기부를 분해하여 청소가 가능하다.(Cock Valve)
7. 점검 보수가 용이하다.

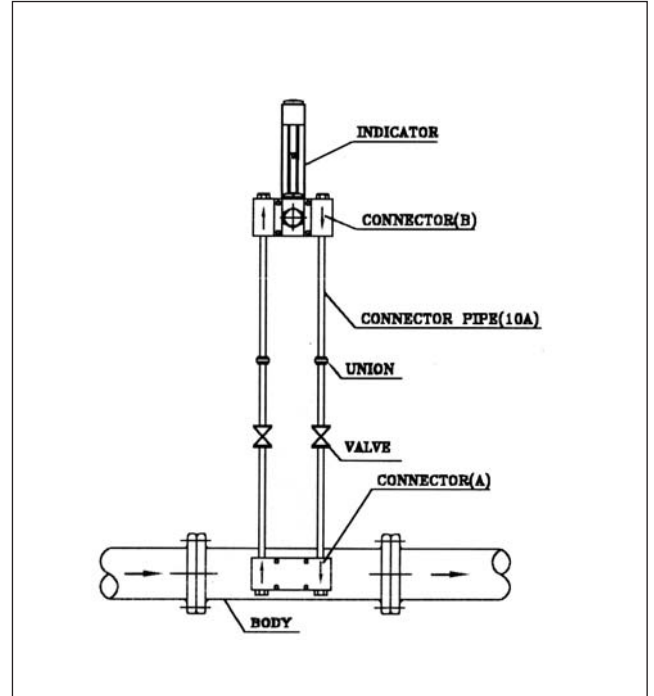
## ◆ Features

1. Easy and exact reading of the flowrate.
2. Simple structure and use.
3. Measurement of large flow rate is possible with small device.
4. Easy separation from pipe.
5. No restriction of the fluid direction.
6. Can be separated and cleaned without disturbing the flow of the fluid
7. Easy to check and repair.

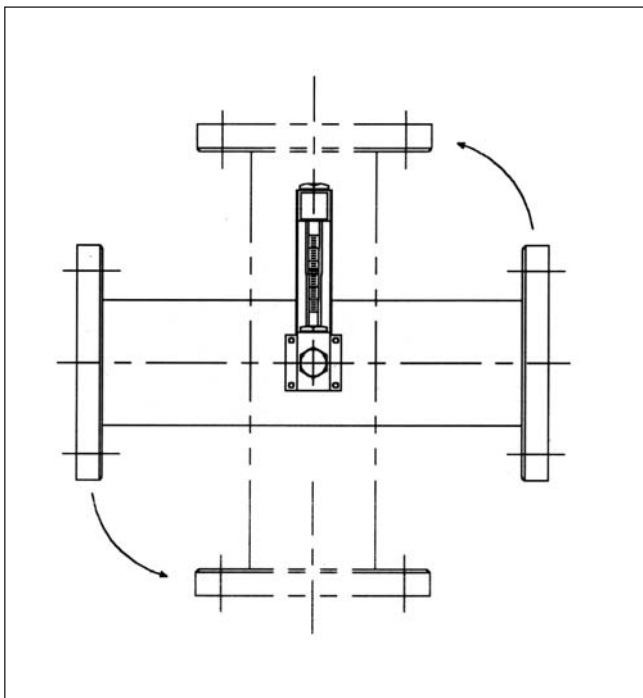
◆ 설치도 (Installation)



※ 측정관이 관독하기 어려운 위치에 있을 때 검지부를 읽기 쉬운 장소로 연결 취부할수 있습니다.

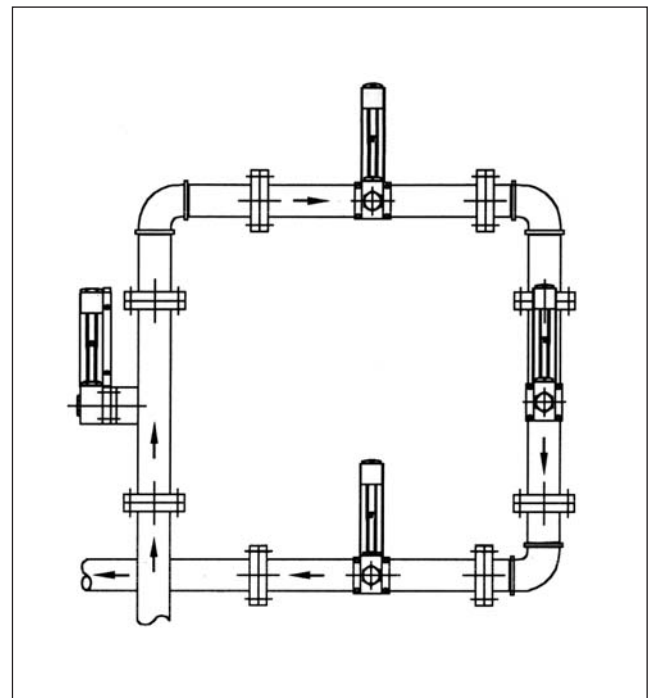


※ When the pipe is located at unreadable place, it is possible to connect indicator to readable place for easy reading.



※ OL-Series는 그림과 같이 유체의 방향에 따라 설치 할 수 있습니다.

※ OL-Series can be installed in the direction of the flow as shown above.



※ OL-Series는 그림과 같이 유체의 방향에 따라 4가지 방법으로 설치가 가능합니다.

※ OL-Series can be installed in 4-ways according to the direction of the flow as shown above.

**OLE** Series

OLE – Series (Model Selection Guide)

OLE - Series			
MODEL	CODE		DESCRIPTION
OLE	.....→		ORIFICE FLOW TRANSMITTER
Connection	F	.....→	FLANGE
	N	.....→	SCREW
	C	.....→	WELDING
Material	A	.....→	SS41
	B	.....→	SUS304
	C	.....→	SUS316
	D	.....→	SUS316L
	M	.....→	MC
	P	.....→	PVC
	X	.....→	Special [ 주1 ]
	T	.....→	Local, Total counter & DC 4~20 mA or pulse
	K	.....→	Connector
	Y	.....→	3 - Way V/V
	W	.....→	Seal - Port
	Ex	.....→	방폭형 ( Ex - Proof )

[ 주1 ] 별도협의

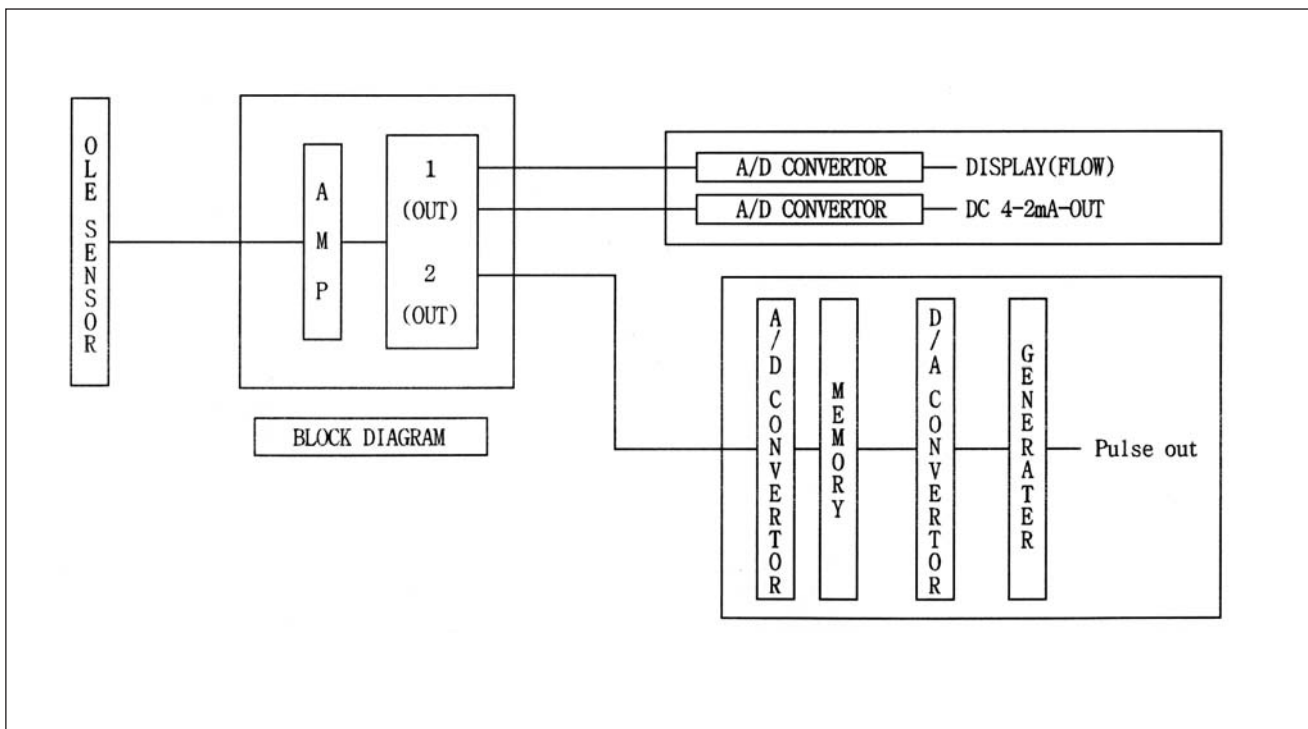
◆ 개요

차압식 유량 트랜스미터는 계기 Box 내부속에 적산계 또는 순간 유량계가 장착되어 있습니다. 파이프 내부에 오리피스판이 차압을 발생시키고 차압 트랜스 미터가 그 차압을 전기 신호로 변화시킵니다. 전기 신호는 유량에 비례하여 내보냅니다.

◆ 원리 (Principle)

◆ Description

Differential pressure flowrate transmitter has totalizer or instant flowrate meter inside the meter box. Orifice plate inside the pipe generates pressure difference and the transmitter converts it to electric signal. The electric signal is sent out in proportion to the flowrate.



◆ 표준 사양 (Specification)

§ General

- Differential Pressure Range : 0-15000mmH2O
- Line Pressure : 35Bar

§ Transmitter

- Memory : EEPROM, 10-Year Data Back-Up
- Display : 12-2 characters LCD with LED Back light
- Indicator : Flow Rate & Totalizer
- Ambient Temp. : 0-60°C
- Accuracy : ±0.5% Reading
- Repeatability : ±0.1% F.S
- Analog Out-Put : 4-20mA.DC-Digital Out-Put : Pulse
- Alarm Out-Put : High & Low
- Enclosure : Ex d IIB T6

§ Environmental

- Compensated Temp. Range : -17.7°C ~ 70°C
- Operating Temp. Range : -50°C ~ 120°C
- 1. Size : 10A~500A

§ Performance(27°C)

- Linearity : ±0.5% F.S
- Repeatability : ±0.1 F.S
- Hysteresis : ±0.5% F.S
- Thermal Effects : ±0.5% F.S

**OLA** Series

OLA – Series (Model Selection Guide)

OLA			
MODEL	CODE		DESCRIPTION
OLA	.....→		ORIFICE FLOW METER
Connection	F	.....→	FLANGE
	N	.....→	SCREW
	C	.....→	WELDING
Material	A	.....→	SS41
	B	.....→	SUS304
	C	.....→	SUS316
	D	.....→	SUS316L
	M	.....→	MC
	P	.....→	PVC
	X	.....→	Special [ 주1 ]
Option	B	.....→	Cock V / V
	Y	.....→	3 - Way V/V
	K	.....→	Connector
	W	.....→	Seal - Port
	F1	.....→	1-Point (Fiber)
	F2	.....→	2-Point (Fiber)
	DP	.....→	Flow Gauge
	E1	.....→	1-Point (DP 에만 해당)
	E2	.....→	2-Point (DP에만 해당)

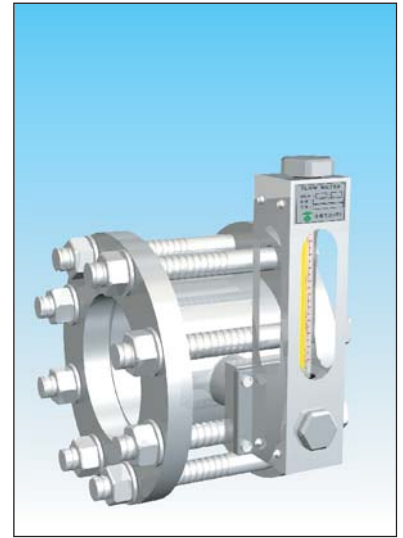
[주1] 별도협의



OLA-N



OLA-F



OLA-C

◆ 개요

이 유량계는 기체와 액체를 간단하게 측정할 수 있으며 구조가 간단합니다. 소유량부터 대유량까지 측정 할수 있으며 유량 방향에 제한이 없습니다.

◆ Description

These flow meters have simple structure and can easily measure flow of liquids and gases. They can measure from small amounts to large amounts of flow and have no restriction in direction of the flow.

◆ 표준사양

1. 구경 : 10A ~ 500A
2. 내압시험압력 : 20kgf/cm<sup>2</sup>
3. 최고사용온도 : 120°C
4. 정도 : ±1.0% of F.S
5. 설치 : 수직 배관 또는 수평 배관
6. 선택사양 : Cock Valve, 3-Way Valve, Seal-Port, 접점출력(2 접점까지 가능) 등

◆ Standard Specification

1. Size : 10A ~ 500A
2. Inner Pressure Test : 20 kgf/cm<sup>2</sup>
3. Max, Operation Temp' : 120°C
4. Accuracy : ± 1.0% of F.S
5. Installation : Vertically or Horizontally
6. Option : Cock Valve, 3-Way Valve, Seal-Port, Alarm (1 or 2 Point), Etc.

◆ 유지보수

1. 유량계를 설치 시에는 측정 관을 희망하는 유체방향에 맞추어 설치하여 주십시오.  
(오리피스에 표시된 화살표 방향과 일치하게 맞추면 됩니다.)
2. 계기부를 주기적으로 청소하여 주십시오. (Strainer 부)
3. 측정관의 접속시 직관부를 유지하여 주십시오.  
(Inlet = 3D~20D, Outlet = 3D ~ 5D)
4. 계기부 고장이나 청소시 By-Pass 기능을 추가 설치하여 주십시오.

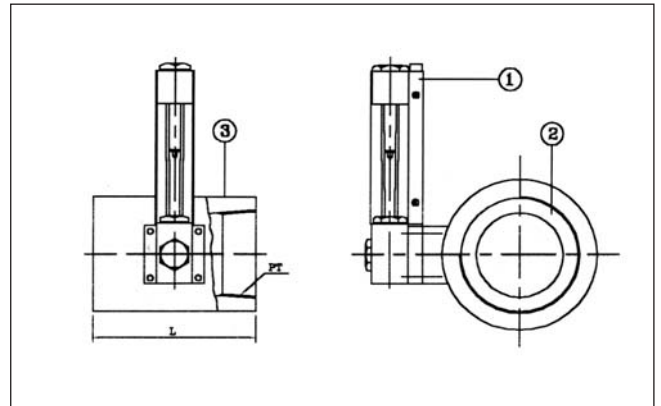
◆ Maintenance

1. When installing, install the meter in the direction corresponding to the flow direction.  
(In the direction that is indicated by the arrow in the orifice.)
2. Regular cleaning is required (Strainer)

OLA - N 구조 및 재질 규격 (Structure and material size OLA-N Series)



OLA - N



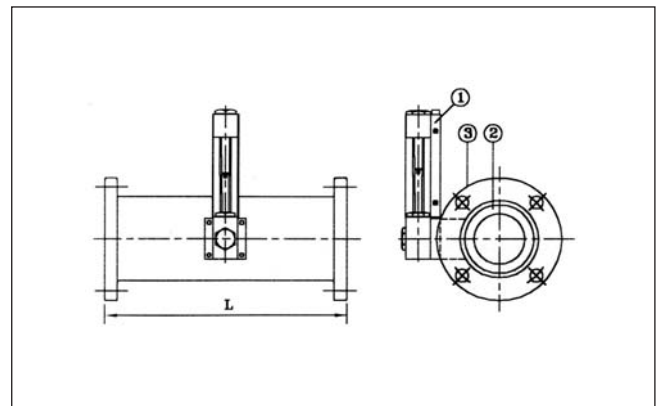
OLA - N

SIZE	L	SIZE	L	SIZE	L			
15A	3/8B	70	32A	1-1/4B	70	80A	3B	100
15A	1/2B	70	40A	1-1/2B	100	100A	4B	120
20A	3/4B	70	50A	2B	100	125A	5B	120
25A	1B	70	65A	2-1/2B	100			

PART NO.	TITLE	MATERIAL
1	Indicator	SUS304, SUS316
2	Orifice	SUS304, SUS316
3	Body	Mat'l Selection

OLA - F 구조 및 재질 규격 (Structure and material size OLA-F Series)

SIZE	L	
10A	3/8B	500
15A	1/2B	500
20A	3/4B	500
25A	1B	500
32A	1-1/4B	500
40A	1-1/2B	500
50A	2B	500
65A	2-1/2B	520
80A	3B	520
100A	4B	520
125A	5B	520
150A	6B	520
200A	8B	520
250A	10B	520
300A	12B	520
350A	14B	520
400A	16B	520
450A	18B	520
500A	20B	520



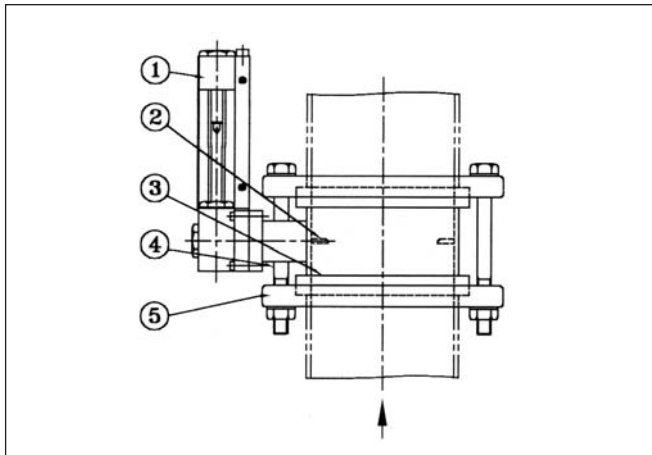
OLA - F

PART NO.	TITLE	MATERIAL
1	Indicator	SUS304, SUS316
2	Orifice	SUS304, SUS316
3	Body	Mat'l Selection
4	Bolt	SUS304
5	Flange	Mat'l Selection
6	Tube Cover	SUS304

OLA - C 구조 및 재질 규격 (Structure and material size OLA-C Series)

PART NO.	TITLE	MATERIAL
1	Indicator	SUS304, SUS316
2	Orifice	SUS304, SUS316
3	Body	Mat'l Selection
4	Bolt	SUS304
5	Flange	Mat'l Selection
6	Tube Cover	SUS304

SIZE		L (mm)
10A	3/8B	65
15A	1/2B	65
20A	3/4B	65
25A	1B	65
32A	1-1/4B	65
40A	1-1/2B	65
50A	2B	65
65A	2-1/2B	80
80A	3B	80
100A	4B	110
125A	5B	110
150A	6B	110
200A	8B	110
250A	10B	110
300A	12B	110
350A	14B	110
400A	16B	110
450A	18B	110
500A	20B	110



OLA - C

표준사양

SIZE		H <sub>2</sub> O (m <sup>3</sup> /h)		Air (Nm <sup>3</sup> /h) 760mmHg (A) 20°C	
		Flow rate	One scale	Flow rate	One Scale
10A	3/8B	0.1-0.5	0.02	0.8-4	0.2
15A	1/2B	0.2-1.0	0.02	2-10	0.5
20A	3/4B	0.5-2.5	0.1	5-25	1
25A	1B	1.0-5.0	0.2	10-50	2
32A	1 1/4B	1.2-6.4	0.2	12-60	2
40A	1 1/2B	2-10	0.5	20-100	5
50A	2B	4-20	1	40-200	10
65A	2 1/2B	6-32	2	60-300	20
80A	3B	8-42	2	80-400	20
100A	4B	16-80	5	160-800	50

SIZE		H <sub>2</sub> O (m <sup>3</sup> /h)		Air (Nm <sup>3</sup> /h) 760mmHg (A) 20°C	
		Flow rate	One scale	Flow rate	One Scale
125A	5B	25-125	5	250-1250	50
150A	6B	35-180	10	350-1700	100
200A	8B	60-320	20	600-2800	200
250A	10B	90-480	20	900-5000	200
300A	12B	160-820	20	1600-7800	200
350A	14B	200-1000	50	2000-9500	500
400A	16B	300-1500	100	3000-14500	1000
450A	18B	400-2000	100	4000-19000	1000
500A	20B	500-2500	100	5000-24000	1000

※ 참조 : 기체의 압력과 온도는 1 atm, 20°C일때 입니다. 압력 P kgf/cm<sup>2</sup>G 일경우는 본표의 수치에  $\sqrt{P-1}$  를 곱해 주십시오.  
 (Note : The pressure and the temperature of the gas are 1 atm and 20°C. If pressure P is kgf/cm<sup>2</sup>G, multiply  $\sqrt{P-1}$  by the above rate. Please inquire for the rate not indicated)

## ◆ 개요 (OLA-DP)

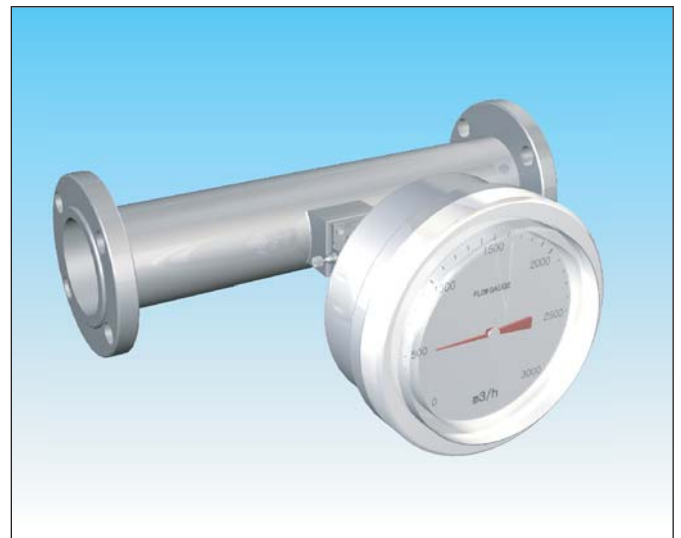
이 유량계는 차압에 의하여 순간 유량을 직접 측정할 수 있으며 지정된 유량 값에서 접점신호(옵션)을 내보낼 수 있는 유량계입니다.  
 Indicator부에 3-Way나 Cock Valve등을 취부 할수 있습니다.(옵션)  
 유량값이 아닌 차압 Scale 또는 % 등을 기입 가능합니다.

## ◆ Description OLA-DP

This flow meter can measure flowrate by differential pressure and can send contact signal option at presetted flow rate.  
 Can install 3-Way or cock valve in indicator section (option).  
 Differential pressure scale or % can be indicated.

## ◆ Standard Size

SIZE	L	SIZE	L	SIZE	L			
10A	3/8B	500	50A	2B	500	200A	8B	520
15A	1/2B	500	65A	2-1/2B	520	250A	10B	520
20A	3/4B	500	80A	3B	520	300A	12B	520
25A	1B	500	100A	4B	520	350A	14B	520
32A	1-1/4B	500	125A	5B	520	400A	16B	520
40A	1-1/2B	500	150A	6B	520	450A	18B	520
						500A	20B	520



**OLA - DP**

## ◆ Specification

Line Size : 10A ~ 500A  
 Fluid : Liquid & Gas  
 Pressure Rating : PN 0 MFR Standard  
 (Special DESIGN on Request)  
 Flange Connection : KS, JIS, ANSI, DIN  
 Measuring Principle : Orifice Differential Pressure  
 Accuracy :  $\pm 1.0\%$  Measured value  
 Fluid Temperature :  $-20^{\circ}\text{C} \sim 100^{\circ}\text{C}$   
 Installation : Vertically or Horizontally  
 Flow-Rate Range : 10 : 1

Measuring Range : See - Catalog Table  
 Material : Body&Flange - Stainless Steel  
 Transmitter Housing - Stainless Steel  
 3-Way Valve - Stainless Steel  
 Display : Analog  
 Output : 1 x SPDT, 2 x SPDT  
 Voltage : Max. 230VAC  
 Current : 0.5A  
 Enclosure : IP65

◆ ORIFICE PLATE

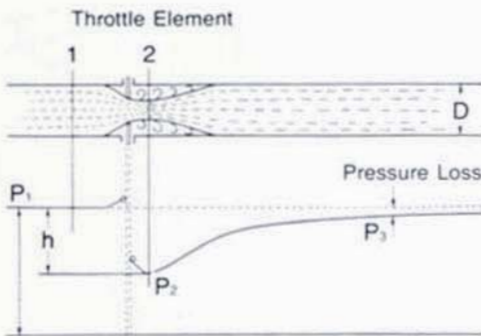


Fig.1

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 ( $h = p_1 - p_2$ ) 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 =  $p_1 - p_3$ )

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 :

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

$$Q = K\sqrt{\frac{h}{\gamma_1}} \dots\dots\dots(1)$$

$$Q_N = K\sqrt{\gamma_1 h} \frac{1}{\gamma_N} \dots\dots\dots(2)$$

$$W = K\sqrt{\gamma_1 h} \dots\dots\dots(3)$$

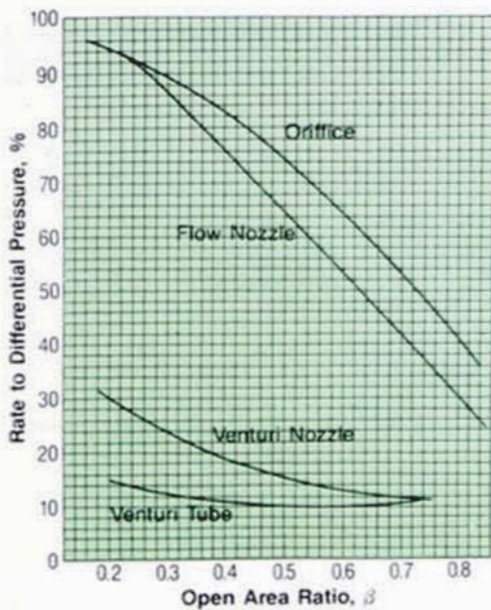


Fig. 2

- Q(m<sup>3</sup>/hr) : Volume Rate of Flow at Density in Operating Conditions
- Q<sub>N</sub>(Nm<sup>3</sup>/hr) : Volume Rate of Flow at Density in Basic Conditions
- W(kg/hr) : Differential Pressure
- h(kg/m<sup>2</sup>) : Weight Rate of Flow
- γ<sub>1</sub>(kg/m<sup>3</sup>) : Density in Operating Conditions
- γ<sub>N</sub>(kg/Nm<sup>3</sup>) : Density in Basic Conditions
- K : Coefficient(determined by type and size of throttle element)

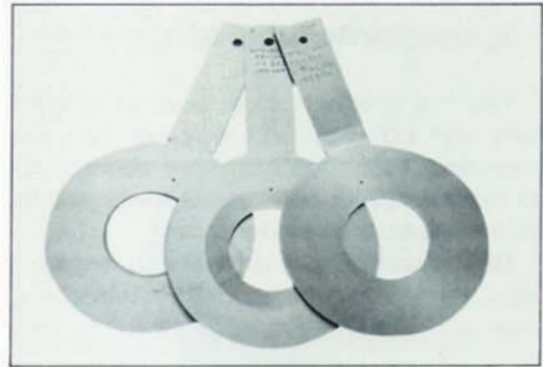
From the above, the relation between the flow rate and the differential pressure where the density is constant but the flow rate is variable is as listed in Table 1. In other words, the flow rate is obtainable by measuring the differential pressure. When the density is variable(when the pressure and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

◆ ORIFICE PLATE

**DESCRIPTION**

Orifice plates have a disadvantage of permitting a greater pressure loss than other throttle elements(flow nozzles, venturi tubes, etc.) but are most popularly used because of their simpler shape, easier manufacturability, lower cost and higher reliability.

The types of orifice plates include concentric orifice plate, eccentric orifice plate, segmental orifice plate, quarter-circle orifice plate and square orifice plate, etc.



**SPECIFICATION**

**Orifice Bore Type :**

- Concentric Square Edged Orifices
- Quadrant Edged Orifices
- Eccentric Orifices
- Segmental Orifices
- Minimum quadrant edged orifice diameter 4.5mm.
- Minimum quadrant edge radius 0.5mm.

**Flow calculation standards :**

- Concentric Square Edged Orifices : JIS Z 8762-1969(ISO R541-1967)
- 1D-1/2D(radius) tap and 2.5D-8D (pipe) tap are as per "ASME Fluid Meters, Their Theory and Application, 5th Edition, 1959."
- Eccentric orifices : ASME Fluid Meters, Their Theory and Application, 5th Edition, 1959
- Segmental orifices : ASME Fluid Meters, Their Theory and Application, 5th Edition, 1959
- Note : JIS Z 8762-1969 flow data used to calculate orifice bores is identical to that of ISO R 541-1967.

**Flange Ratings :**

- JIS 2, 5, 10, 16, 20, 30, 40 and 63kg/cm<sup>2</sup>
- ANSI Class 150, 300, 600 and 900(RF)
- (Note : Flange dimensions are identical between ANSI and JPI.)

**Pressure Taps :**

- Flange Tap
- corner tap
- vena contracta tap
- 1D And 1/2D(Radius) tap

**Plate Thicknesses :** 2, 3, 4, 5, 6, 9, 10 12 mm

**Tab Handle :** Welded to orifice plate.

**Materials : Plate :** JIS SUS 304 or JIS SUS 316 stainless steel.

**Drain and Vent Hole :** Per ASME recommendations. Not drilled for orifice bores smaller than 25.4mm.

**Markings :** Upstream side of tab handle stamped "UPSTREAM" and with bore type and size, line size, tag number, quadrant edge radius and flange rating. Downstream side of tab handle stamped with orifice material and serial number.

**Special Markings :** Special marking may be furnished to meet specific requirements.

◆ ORIFICE PLATE

TYPES

● CONCENTRIC (Fig. 3)

This has special features such as simple structure, high accuracy, and easy mounting and dismounting. The orifice plates are correctly finished to the dimensions, surface roughness, and flatness to the applicable standard.

Differential pressure is measured through flange taps, vena contracta taps, radius taps, or corner taps.

● ECCENTRIC (Fig. 4)

For liquids containing solid particles that are likely to sediment or for vapors likely to deposit water condensate, this orifice plate is used with its eccentric bore bottom flush with the bottom of the piping inside surface 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 contracta taps are used for this orifice plate.

● SEGMENTAL (Fig. 5)

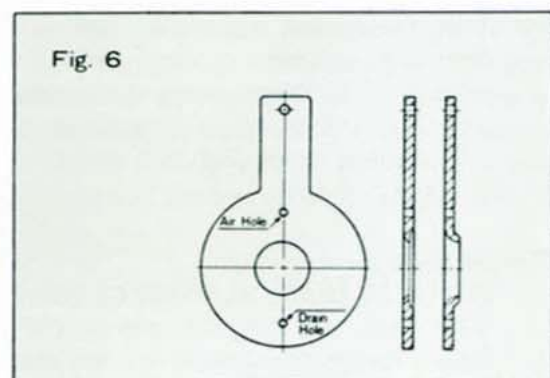
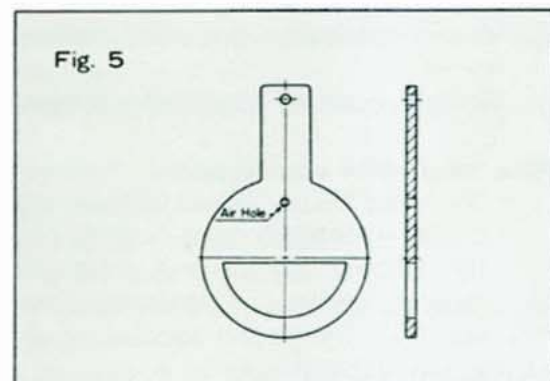
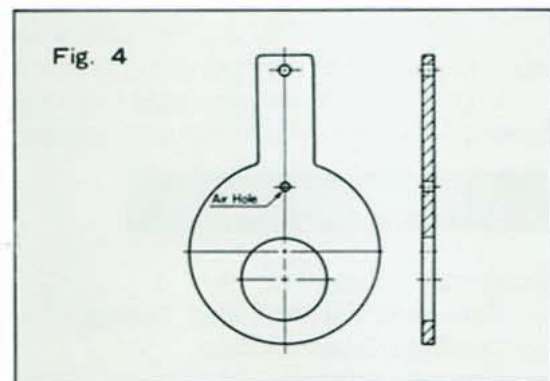
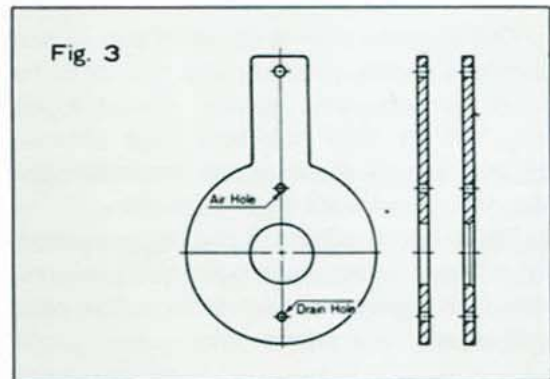
The bore of this orifice plate is a semicircle to perform the same function as the eccentric orifice plate. This is used for the similar purposes.

Flange taps or vena contracta taps are employed to take out fluid pressures.

● QUARTERANT (Fig. 6)

The inlet edge of the bore of this orifice plate is rounded to a quarter circle. This orifice plate is principally used for measuring flow rates of low Reynolds Numbers.

Flange taps or corner taps are used.



◆ ORIFICE PLATE WITH RING

**DESCRIPTION**

Orifice Ring Assemblies are used for flow measurement of smaller or medium sized pipes at lower pressures. Each assembly consists of one orifice plate and two orifice rings. Differential pressures are taken out in a corner tap system.

Orifice Blocks, which are of a unit-construction type and provide higher pressure ratings than the Orifice Ring Assemblies, also are available. Differential pressures are taken out in a corner tap system.



**SPECIFICATION**

**Orifice Bore Type :**

- Concentric Square Edged Orifices
- Quadrant Edged Orifices
- Minimum quadrant edged orifice diameter 4.5mm.
- Minimum quadrant edge radius 0.5mm.

**Flow calculation standards :**

- Concentric Square Edged orifices : JIS Z 8762-1969(ISO R541-1967)
- Notes :
  - JIS Z 8762-1969 flow data used to calculate orifice bores is identical to that of ISO R 541-1967.

**Flange ratings :**

- JIS 5, 10, 16, 20kg/cm<sup>2</sup>
- ANSI(or JPI) 150LB
- (Note : ANSI and JPI ring dimensions are identical.)

**Pressure Taps :** Corner taps

**Plate Thicknesses :** 2, 3, 4, 5, 6, 9, 10mm

**Tab Handle :** Welded to orifice plate.

- Pressure Tap Nipples :** 15mm(1/2inch) Sch 80.
- Length : 150mm
- Tap Connections : PT1/2 or 1/2NPT male, socket weld, butt weld or flange. (Flange rating to be the same as the of the process pipeline.)

**Drain and Vent Hole :** Per ASME recommendations. Not drilled for orifice bores smaller than 25.4mm.

**Markings :** Upstream side of tab handle stamped "UPSTREAM" and with bore type and size, line size, tag number, quadrant edge radius and flange rating. Downstream side of tab handle stamped with orifice material and serial number.

**Special Markings :** Special markings may be furnished to meet specific requirements.

**Materials :**

- Ring and Pressure Tap Nipple : Carbon Steel, SUS 304 or SUS 316 stainless steel.
- Plate : SUS 304 or SUS 316 stainless steel
- Tab Handle : SUS 304 or SUS 316 stainless steel

**Gasket :**

- Material : Asbestos
- Thickness : 1.5-mm

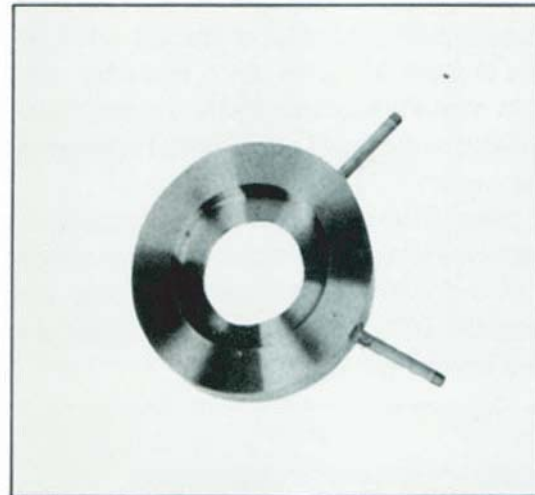
◆ ORIFICE PLATE WITH INTEGRAL RING

DESCRIPTION

Orifice Plate with integral Ring is a differential pressure type primary device used to produce a fluid flow restriction in a pipeline. The differential pressure across the orifice plate is proportional to the square of the fluid velocity. The differential pressure is applied to the integral pressure taps through single holes in the corner formed by the ring wall and the orifice plate.

The orifice plate with ring is cut and shaped from one block of metal. The pressure tap nipples are welded to the orifice plate and ring.

Orifice Plate with integral Ring is suitable for high pressure and temperature service applications and is similar to Orifice Plate with Ring.



SPECIFICATIONS

**Orifice Bore Type :** Concentric Square Edged Orifices. quadrant edged orifices.

**Flow Calculation Standards :**

Concentric Square Edge Orifice : JIS Z 8762-1969(ISO R541-1967)

Note : JIS Z 8762-1969 flow data used to calculate orifice bores is identical to that of ISO R541-1967.

**Flange Ratings :** JIS 30, 40 and 63kg/cm<sup>2</sup>  
ANSI Class 300, 600 and 900(RF)

**Pressure Taps :** Single hole type corner taps. annular chamber type corner taps.

**Nominal Pipe Sizes :** 15 to 400mm(½to 16 inches.)

**Pressure Tap Nipple :** 15mm(½inch)Sch 80  
Length : 150mm

**Tap Connections :** PT½ or ½NPT male, socket weld, butt weld or flange. (Flange rating to be the same as that of the process pipeline.) Angle between two taps is a straight angle.

**Plate and Nipple Materials :**

SUS 304 stainless steel  
SUS 316 stainless steel

**Markings :** Ring rim stamped with tag number, bore size, flow direction, material, line size, flange rating and serial number.

◆ ORIFICE PLATE WITH HOLDING RING

**DESCRIPTION**

The Holder 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 holder 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 normally is of the flange tap type.



**SPECIFICATIONS**

**Orifice Bore Type :**

- Concentric Square Edged Orifices
- Quadrant Edged Orifices

**Flow Calculation Standard :**

Concentric Square Edge orifices : JIS Z 8762-1969(ISO R541-1967)  
 Note : JIS Z 8762-1969 flow data used to calculate orifice bores is identical to that of ISO R 541-1967.

**Flange Ratings :**

ANSI 300, 600, 900 and 1500 lb. ring joining(RJ)

**Pressure Taps :** Flange taps

**Plate Thicknesses :** 2, 3, 4, 5, 6, 9mm

**Tab Handle :** Welded to ring

**Holding Ring :** Riveted to plate.  
 Octagonal or oval.

**Drain and Vent Hole :** Per ASME recommendations. Not drilled for orifice bores smaller than 25.4mm.

**Markings :** Upstream side of tab handle stamped with "UPSTREAM" and with bore type and size, line size, tag number, quadrant edge radius and flange rating. Downstream side of tab handle stamped with orifice and ring material, and serial number.

**Special Markings :** Special markings may be furnished to meet specific requirements.

**Materials :**

- Plate : SUS 304 or SUS 316 stainless steel
- Holding Ring : carbon steel, SUS 304 or SUS 316 stainless steel
- Rivets : SUS 304 or SUS 316 stainless steel
- Tab : Handle : SUS 304 or SUS 316 stainless steel

**Nominal Pipe Sizes Available :**

Orifice Bore Type	Pipe Sizes	Pipe Diameter Given in the Applicable Standards
Concentric Square Edge	1½ inches to 14 inches	50 to 760mm
Quadrant Edge	1½ inches to 6 inches	25 to 150mm

◆ ORIFICE FLANGE ASSEMBLIES

**DESCRIPTION**

Orifice Flange Assemblies are used in conjunction with Orifice Plates for flow measurement of smaller or medium size pipes at lower or medium pressure ranges. The flange connection is of an RF type and the differential pressure tapping system is with flange taps.



**SPECIFICATIONS**

**Orifice Flanges types :** Slip-on welding neck.  
ring-joint welding neck

**Nominal diameters :**  
25mm(1 inch) to 500mm(20 inches)

**Flange rating :**  
JIS 10, 20, 30kg/cm<sup>2</sup>RF  
ANSI(or JPI) 150, 300, 600 lb RF

**Flange material :**  
carbon steel  
SUS 304 · SUS 316

**Materials of bolts and nuts :**  
STUD BOLTS : SNB7  
Nuts : S45C  
Jack bolts and nuts : S25C

**Gaskets :**  
Thickness : 1.5mm  
Material : Asbestos sheet gasket  
Vortex gaskets and other special types

**Piping connection method :**  
JIS 10kg/cm<sup>2</sup> : Insertion welding type (slip-on type)  
JIS 20, 30kg/cm<sup>2</sup>, ANSI and JPI : Butt welding type(welded neck)

**Differential pressure piping connection :**  
Select referring to the model number construction table.

**Flange Ratings and Facings.**

Mounting	Standard	Flange Rating and Facing
Slip-on	JIS	10 and 16kg/cm <sup>2</sup> (PF) 20kg/cm <sup>2</sup> (RF)
	ANSI	Class 150 and 300(RF)
Welding neck	JIS	10, 16 and 20kg/cm <sup>2</sup> RF
	ANSI	Class 150, 300, 600 and 900 RF
Welding neck	ANSI	Class 300, 600, 900 and 1500 ring-joint(RJ)
Slip-on	JIS	5, 10 and 16kg/cm <sup>2</sup> PF 20kg/cm <sup>2</sup> RF
	ANSI	Class 150 and 300 RF
Welding neck	JIS	10, 16, 20, 30, 40 and 63kg/cm <sup>2</sup> RF
	ANSI	Class 150, 300, 600 and 900 RF

◆ ORIFICE FLANGE ASSEMBLIES

TYPES

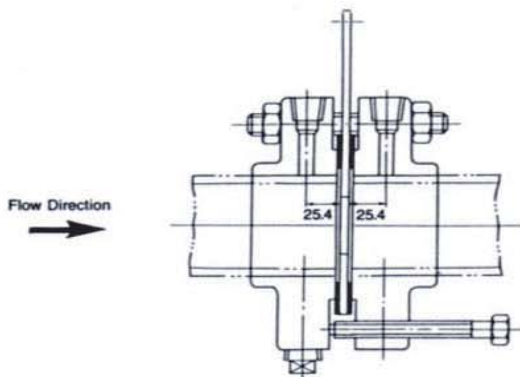


Fig. 7 SO-RF

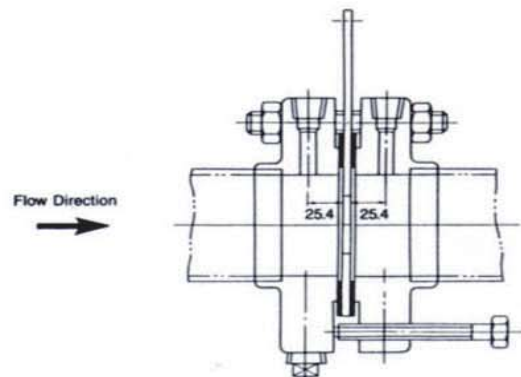


Fig. 8 SW-RF

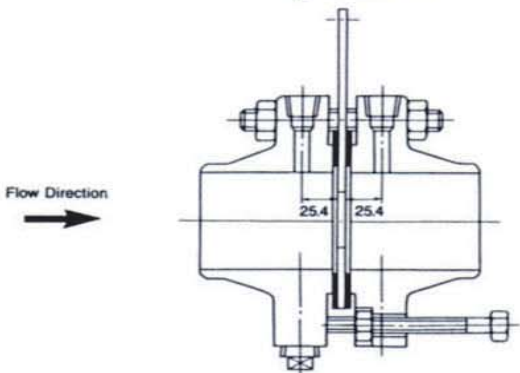


Fig. 9 WN-RF

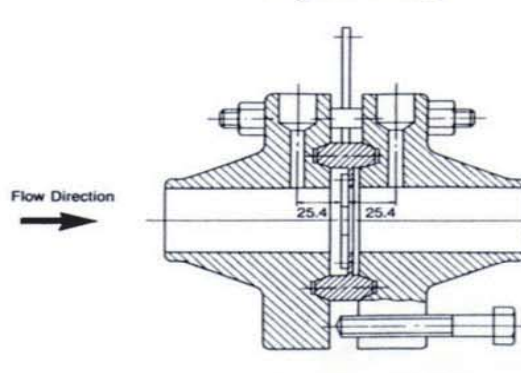


Fig. 10 WN-RJ

Slip-On Flanges (Fig. 7)

The slip-on flange has a low hub because the pipe slips into the flange prior to welding. It is welded both inside and out to provide sufficient strength and prevent leakage. Slip-on flanges are all bored slightly larger than the O.D. of the matching pipe. They are preferred over welding neck flanges by many users due to their lower initial cost, but final installation cost is probably not much less than that of the welding neck flange because of the additional welding involved.

Socket Welding Flanges (Fig. 8)

The socket welding flange is similar to a slip-on flange except it has a bore and a counterbore dimension. The counterbore is slightly larger than the O.D. of the matching pipe, allowing the pipe to be inserted into the flange similar to a slip-on flange. The diameter of the smaller bore is the same as the I.D. of the matching pipe. A restriction is built into the bottom of the bore which sets as a shoulder for the pipe to rest on. This eliminates any restriction in flow when using a socket welding flange.

Welding Neck Flanges (Fig. 9)

The welding neck-flange is normally referred to as the "high hub" flange. It is designed to transfer stresses to the pipe, thereby reducing high stress concentrations at the base of the flange. The welding neck flange is the best designed butt-welded flange of those currently available because of its inherent structural value. It is expensive because of the design.