

ZW120 & ZW220 Series

Averaging Pitot Tube Flowmeter



Advantages / Features

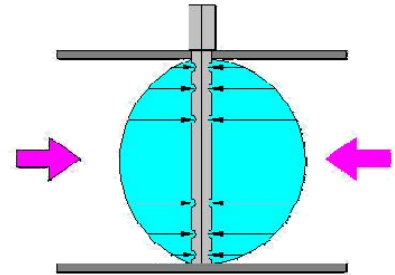
- Square sensor design reliable accuracy
- Energy saving due to low permanent Pressure loss
- Symmetrical probe for bi-directional flows
- Simple low cost installation
- No moving parts or sharp edges to wear
- Integral 3 valve manifold
- Multiple sensing ports on both up and down stream sides



Description

The averaging pitot tube is a differential pressure producing flow device that is suitable for liquid, gas and steam flow measurement in pipes and ducts.

ZW120 series is a self averaging pitot tube with multiple sensing ports on both the up and down stream sides of the sensor. The differential pressure across the averaging pitot tube is proportional to square of the fluid velocity.



Application

- Flow elements that create pressure differences
- Used to measure liquid level, air & steam flow
- Square sensing rod design, multiple sets of measurement holes on both sides of the sensing rod.
- Diamond-shaped cross-section, two-way symmetrical measuring hole.
- Generally used in conjunction with a differential pressure transmitter to convert the differential pressure signal into a flow signal.

ZW120 series averaging pitot tube incorporates two isolated plenum chambers in a single probe. It offers simple, low cost, ease of installation and energy saving due to its low permanent pressure loss. There are no moving parts or sharp edges to wear, so long term accuracy can be maintained.

The WZ120 series with its unique design has a number of significant Benefits over other averaging pitot tubes and flow meters which make It the right choice for many applications in the following industries:

- Power generation and nuclear power stations
- Building services & HVAC (heating ventilating and air conditioning)
- Chemical & petrochemical processing
- Gas processing and transmission
- Water & Waste
- Food & Beverage



Specifications

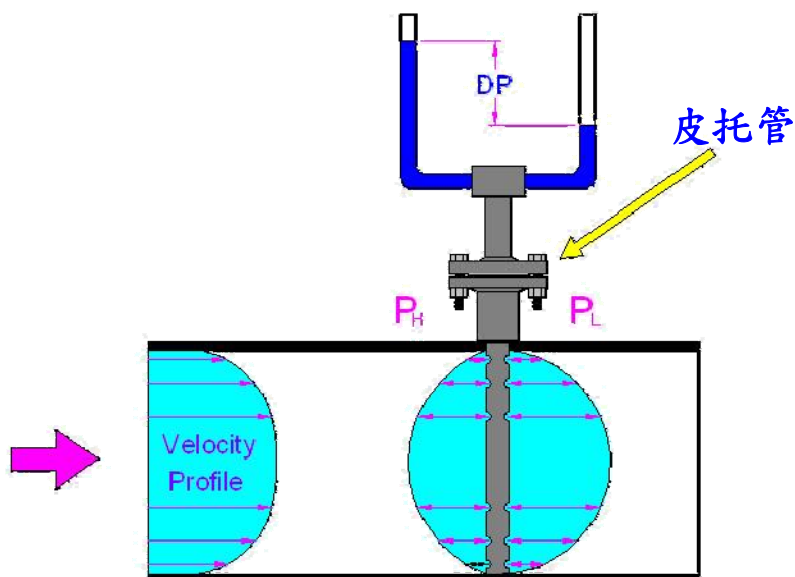
- Service Liquid · Gas and Steam
- Pipe size 1" to 40" (Larger size available on request)
- Sensor material 316SS
- Typical accuracy $\pm 1\%$ of FS
- Mounting hardware material C.S · 304SS · 316SS
- Instrument Connection 1/2" NPT
- Instrument valves 1/2" NPT ball valve or needle valve
- Opposite support C.S · 304SS or 316SS
- Sensor mounting 3/4" · 1" & 1-1/2" NPT or flange
- Mounting hardware thread weld or Flange stand-off nozzle
- Integral 3 valve manifold



ZW120 measurement work

- The ZW120 series porous uniform velocity pitot tube is installed on the pipeline and generates a pressure difference when the fluid flows through it.
- The pressure difference (DP) is measured by a differential pressure instrument (differential pressure gauge, differential pressure transmitter...etc.)
- The pressure difference (DP) is proportional to the square of the flow velocity (Flow Velocity): $DP \propto V^2$
- $\sqrt{DP} \propto Q$

$$(1) DP = P_H - P_L \quad (2) \sqrt{DP} \propto Q$$

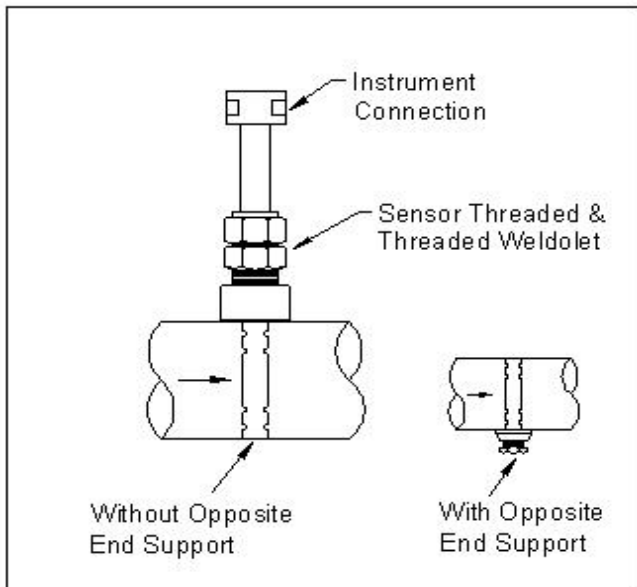


ZW Series Specifications

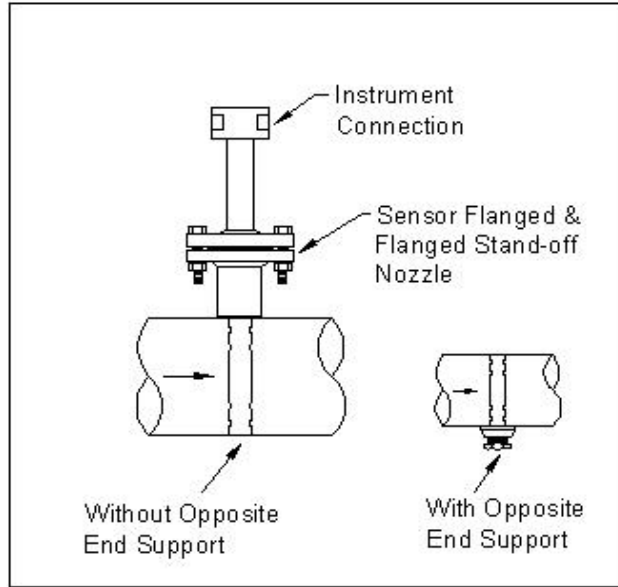
Application	Liquid, gas and steam
Pipe Size	1" to 40" (50 to 1000 mm)
Material	316SS
Sensor Type	
Type A	Line Size 2" to 6"
Type B	Line Size 4" to 16"
Type C	Line Size 12" to 40"
Sensor Mounting	Thread or flange
Type A	3/4"NPT or 3/4" flange
Type B	1"NPT or 1" flange
Type C	1-1/2"NPT or 1-1/2" Flange
Pressure Limits	150 to 600 psig according to specification of assembly flange

Temperature Limits	Depending on the material
Mounting Hardware	Threaded weldolet or flange stand-off nozzle
Material	C.S, 304SS, 316SS
Instrument Conn.	1/2"NPT
Instrument Valves	1/2"NPT Ball valve 1/2"NPT Needle valve
Material	Brass, C.S, 316SS
End Support	C.S, 304SS, 316SS

ZW120 Sensor - Threaded Mounting



ZW120 Sensor - Flanged Mounting



Sensor Type	Sensor Threaded & Threaded Weldolet	Instrument Connection
A	3/4"	1/2" NPT
B	1"	1/2" NPT
C	1-1/2"	1/2" NPT

Sensor Type	Sensor & Stand-off Nozzle Flange	Instrument Connection
A	3/4"	1/2" NPT
B	1"	1/2" NPT
C	1-1/2"	1/2" NPT

Ordering information – ZW120 Series Sensors

Model	Code	Description		
ZW120	Averaging Pitot Tube			
Sensor Type	A	Line Size 1" to 6" (50 to 150 mm)		
	B	Line Size 4" to 16" (100 to 400 mm)		
	C	Line Size 12" to 40" (300 to 1000 mm)		
Line Size	2"~40"	Line Size 2" to 40" (Inside Diameter and Wall Thickness, Please Specify)		
Pipe Mounting Type	T	Thread Type		
	F	Flange Type		
Pipe Orientation	H	Horizontal		
	V	Vertical		
Material of Sensor (Including Sensor Mounting Fitting)	S1	316SS		
	S2	Others		
Sensor Mounting Type Notes: 3/4" NPT & Flange For Sensor Type A 1" NPT & Flange For Sensor Type B 1-1/2" NPT & Flange For Sensor Type C	T01	3/4" NPT	F21	1"-150# RF
	T02	1" NPT	F22	1"-300# RF
	T03	1-1/2" NPT	F23	1"-600# RF
	F11	3/4"-150# RF	F31	1-1/2"-150# RF
	F12	3/4"-300# RF	F32	1-1/2"-300# RF
	F13	3/4"-600# RF	F33	1-1/2"-600# RF
	SP	Special		
	Mounting Hardware (Threaded Weldolet or Flange with Stand-off Nozzle) Notes: 3/4" NPT & Flange For Sensor Type A 1" NPT & Flange For Sensor Type B 1-1/2" NPT & Flange For Sensor Type C	T01	3/4" NPT	F21
T02		1" NPT	F22	1"-300# RF
T03		1-1/2" NPT	F23	1"-600# RF
F11		3/4"-150# RF	F31	1-1/2"-150# RF
F12		3/4"-300# RF	F32	1-1/2"-300# RF
F13		3/4"-600# RF	F33	1-1/2"-600# RF
SP		Special	N	None
Material of Mounting Hardware (Threaded Weldolet or Flange with Stand-off Nozzle)		CS	C.S	S2
	S1	304SS	N	None
Instrument Valves (one pair)	BV1	1/2" NPT Ball Valve, C.S		
	BV2	1/2" NPT Ball Valve, 316SS		
	NV1	1/2" NPT Needle Valve, Brass		
	NV2	1/2" NPT Needle Valve, 316SS		
	N	None		
Opposite End Support	CS	Carbon Steel		
	S1	304SS		
	S2	316SS		
	N	None		
Thermal Isolation	N	None		
	X	Isolation in mm		

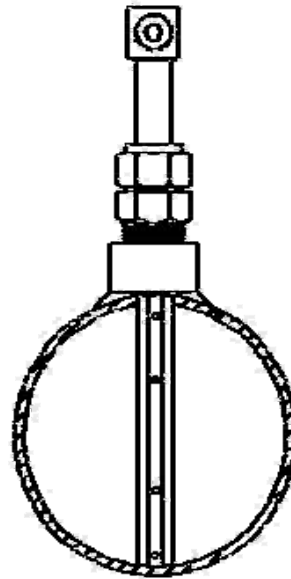
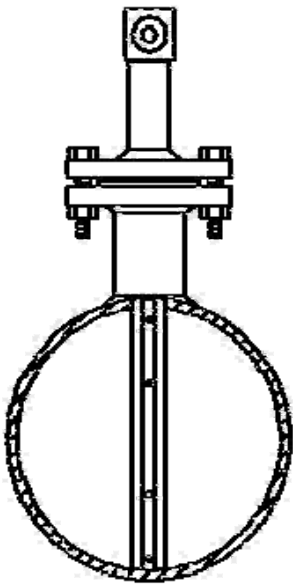
ZW120-A-4-F-H-S1-F11-F11-CS-BV1-N-N

Typical ordering information

ZW120 Installation form

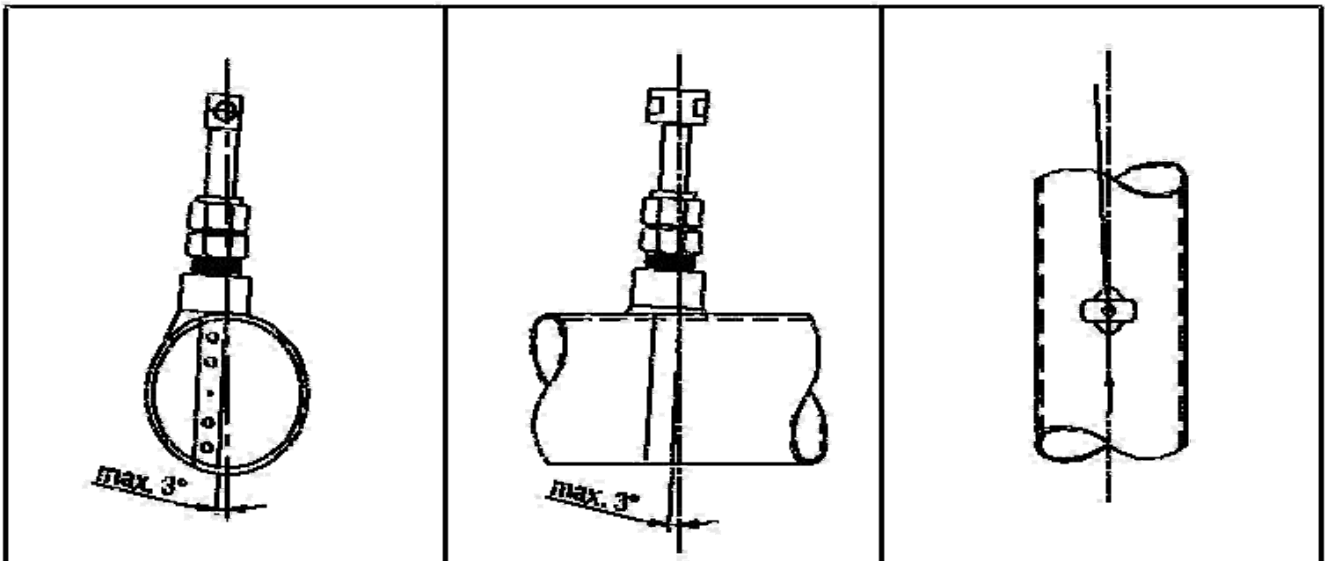
Flange – JIS & ANIS Standard flange

Threaded – $\frac{3}{4}$ "、1" & 1-1/2" NPT



ZW120 inclination

The pitot tube must be installed perpendicular to the pipeline, and only a maximum of 3 degrees of inclination is allowed.

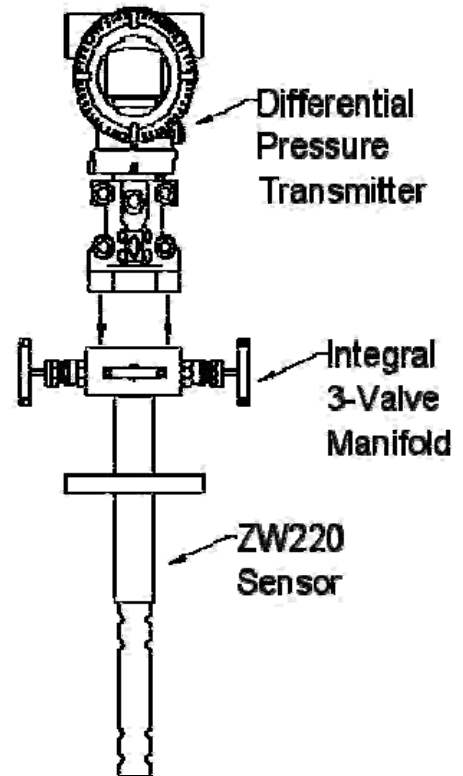


How it works

The ZW220 series flow sensor is a primary element device which produces a differential pressure (DP) which when inserted into a flow stream in a similar way to Orifice plates and Venturis.

The ZW220 series is typically connected to a Differential Pressure Transmitter, which converts the DP signal produced by the DP signal produced by the ZW220 series into a 4-20mA/HART signal which is proportional to flow rate.

Unlike the classic Pitot sensor, which is a single point device typically moved manually around the pipe to build up detail of the flow profile, the ZW220 series is a self averaging pitot tube with multiple ports or sensing holes on both the up and down stream sides of the sensor. These ports constantly average the flow profile to generate an accurate DP signal in on site flow conditions.



ZW220 Series Sensors

Specifications

- Service Liquid · Gas and Steam
- Pipe size 2" to 40" (Larger size available on request)
- Sensor material 316SS
- Typical accuracy $\pm 1\%$ of FS
- Mounting hardware material C.S · 304SS · 316SS
- Instrument Connection 1/2" NPT
- Instrument valves 1/2" NPT ball valve or needle valve
- Opposite support C.S · 304SS or 316SS
- Sensor mounting 3/4" · 1" & 1-1/2" NPT or flange
- Mounting hardware thread weld or Flange stand-off nozzle
- Integral 3 valve manifold

Ordering information – ZW220 Series Sensors

Model	Code	Description			
ZW220		Direct Mount Averaging Pitot Tube Flowmeter			
Head Type	IVM	With Integral 3-valve manifold			
Sensor Type	B	Line Size 4" to 16" (100 to 400 mm)			
	C	Line Size 12" to 40" (300 to 1000 mm)			
Line Size	4"~40"	Line Size 4" to 40" (Inside Diameter and Wall Thickness, Please Specify)			
Pipe Mounting Type	F	Flange Type			
Pipe Orientation	H	Horizontal			
	V	Vertical			
Material of Sensor (Including Sensor Mounting Fitting)	S1	316SS			
	S2	Others			
Sensor Mounting Type Notes: 1" Flange For Sensor Type B 1-1/2" Flange For Sensor Type C	F21T	1"-150#RF	F31	1-1/2"-150#RF	
	F223	1"-300#RF	F32	1-1/2"-300#RF	
	F23	1"-600#RF	F33	1-1/2"-600#RF	
	SP21	Special			
Mounting Hardware (Flange with Stand-off Nozzle) Notes: 1" Flange For Sensor Type B 1-1/2" Flange For Sensor Type C	F21	1"-150#RF	F31	1-1/2"-150#RF	
	F222	1"-300#RF	F32	1-1/2"-300#RF	
	F23	1"-600#RF	F33	1-1/2"-600#RF	
	SP	Special	N	None	
Material of Mounting Hardware (Flange with Stand-off Nozzle)	CS	Carbon Steel			
	S1	304SS			
	S2	316SS			
	N	None			
Opposite End Support	CS	Carbon Steel			
	S1	304SS			
	S2	316SS			
	N	None			

Accessory:

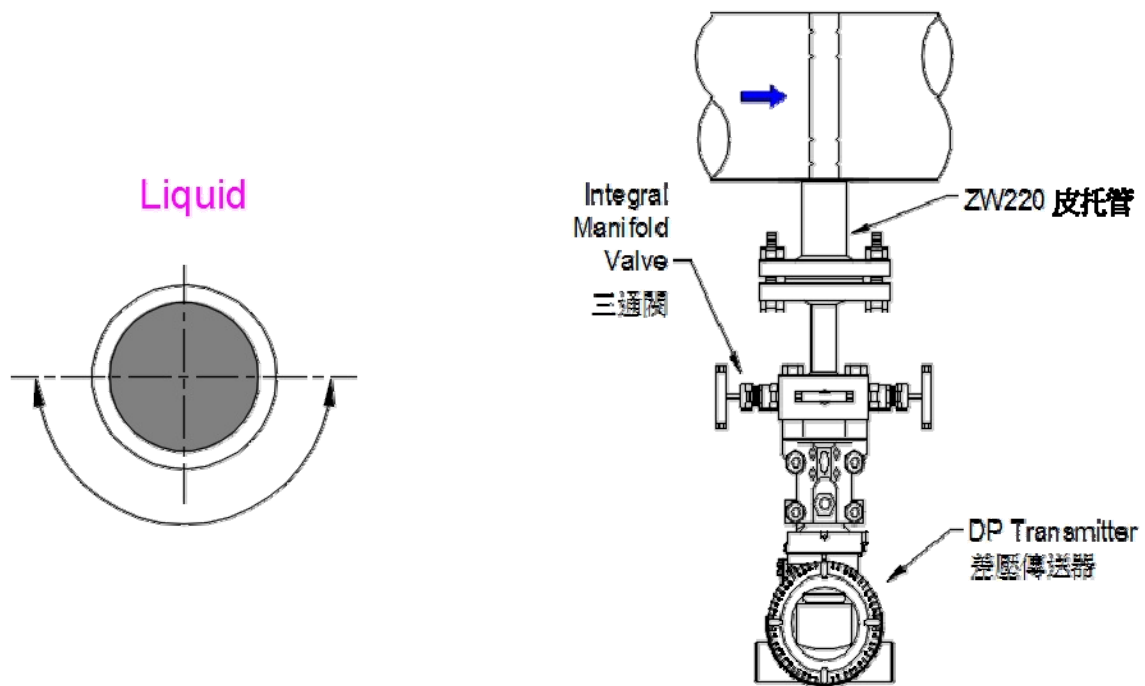
Differential Pressure Transmitter: Yokogawa EJA Series or others

ZW220-IVM-B-4-F-H-S1-F21-F21-CS-N

Typical ordering information

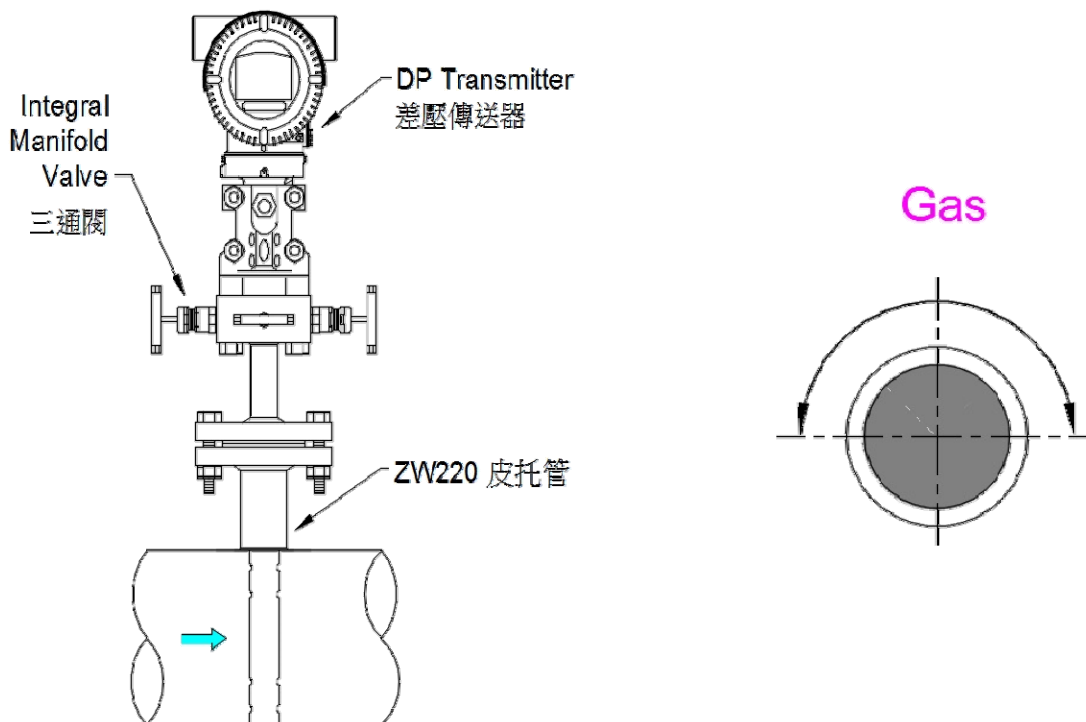
ZW220 Installation – Liquid (Horizontal Pipe)

Install ZW220 flow meter above the horizontal centerline of the pipe

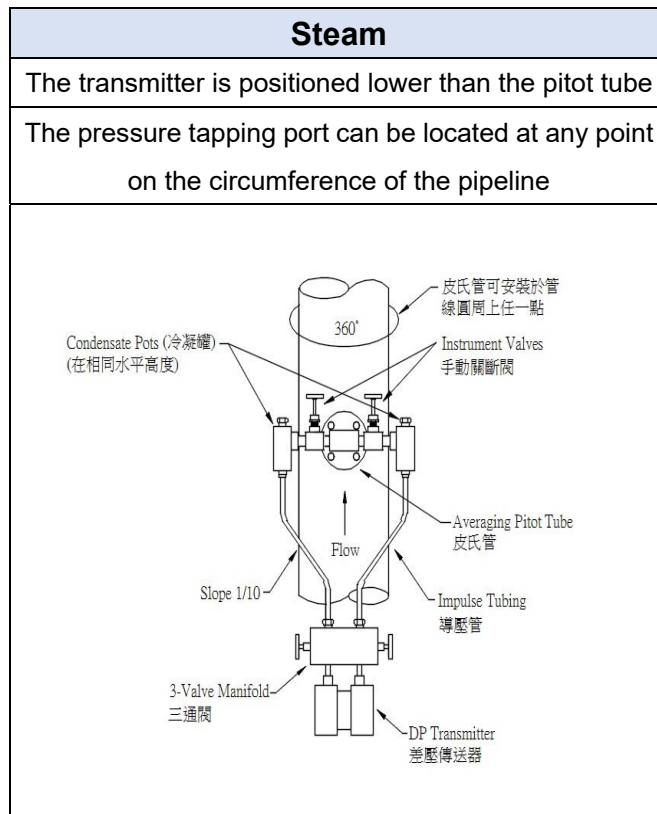
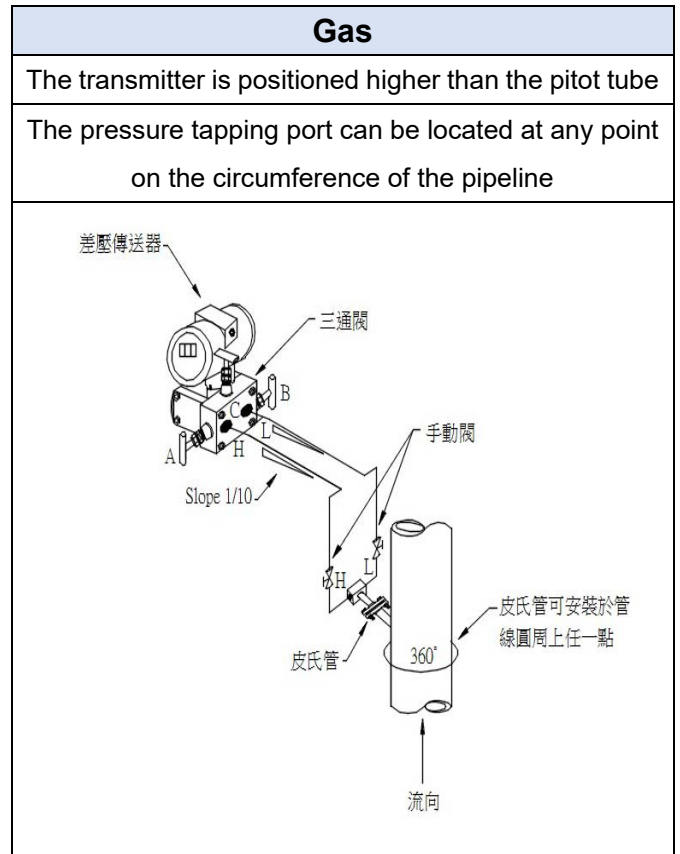
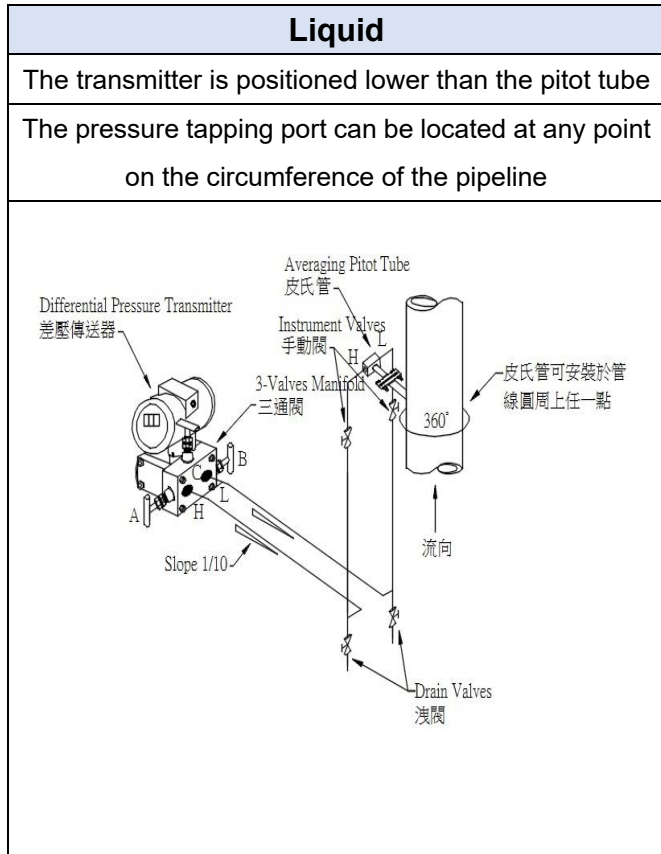


ZW220 Installation – Gas (Horizontal Pipe)

Install ZW220 flow meter below the horizontal centerline of the pipe



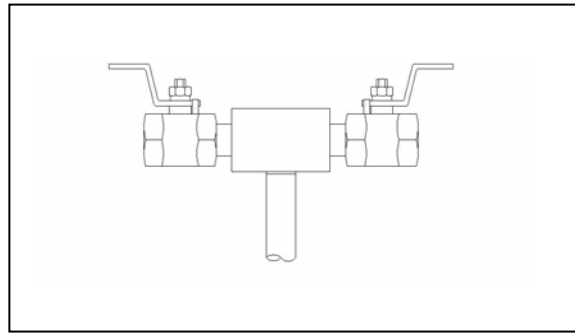
ZW Series Installation – Vertical Pipe



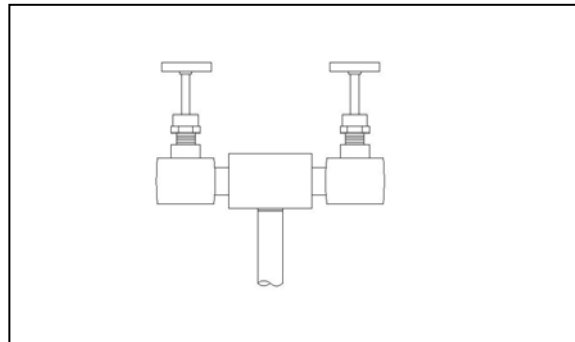
Instrument Valves

Code	Specifications
BV1	<p>1/2"NPT Ball Valve, Carbon Steel</p> <p>Pressure Rating: 800 Psig @ 100°F (55 bar @ 38°C)</p> <p>Temperature Rating: -29°C to 205°C with PTFE Packing</p>
BV2	<p>1/2"NPT Ball Valve, 316SS</p> <p>Pressure Rating: 800 Psig @ 100°F (55 bar @ 38°C)</p> <p>Temperature Rating: -29°C to 205°C with PTFE Packing</p>
NV1	<p>1/2"NPT Needle Valve, Brass</p> <p>Pressure Rating: 3000 Psig @ 100°F (206 bar @ 38°C)</p> <p>Temperature Rating: -45°C to 232°C with PTFE Packing</p> <p>Optional: -45°C to 315°C with PEEK Packing</p>
NV2	<p>1/2"NPT Needle Valve, 316SS</p> <p>Pressure Rating: 6000 Psig @ 100°F (413 bar @ 38°C)</p> <p>Temperature Rating: -45°C to 232°C with PTFE Packing</p> <p>Optional: -45°C to 315°C with PEEK Packing</p>

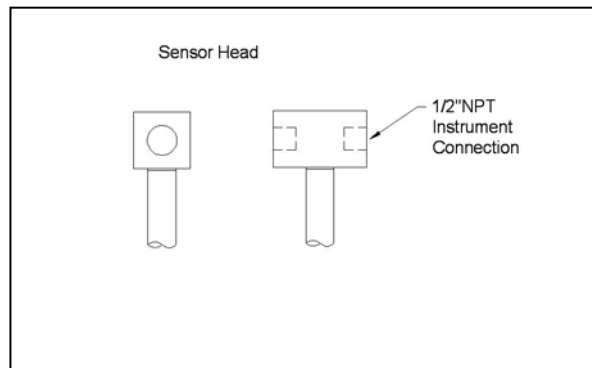
With Ball Valve



With Needle Valve



Without Valve



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