

Ellipse[®] Pitot Tube Meter

Annular Flanged

DESCRIPTION

The Ellipse® Annular Flanged Flow Meter is a multi-ported, selfaveraging differential pressure flow element for liquid and gas applications. The Ellipse flow meter is designed with a series of ports facing the upstream velocity pressures and flow sensing ports strategically located ahead of the trailing edge flow separation.

COMPONENTS

All sensors are furnished with 1/2 in. (12 mm) instrument valves, flanged mounting hardware (with the proper ratings), and ID tag as standard equipment. Available options include integral 3-valve or 5-valve transmitter mount manifold and integral RTD temperature sensor.

FEATURES

- Patented elliptical design
- Single point pipe entry for DP, temperature and static pressure
- No dampening software required
- Low pressure loss (typically 3% of DP in a 12 in. (304 mm) line) due to the patented aerodynamic profile
- NIST traceable calibration, optional independent labs
- Accuracy: ±0.75% of reading, repeatability: ±0.1% of reading
- Turndown Ratio: 17:1; no vacuum effects
- No moving part construction provides long, trouble-free service life
- True static pressure measurement rather than a calculated value
- Overcomes loss of accuracy caused by fluid separation at the sensor body

CONFIGURATION

The flow element has a two-piece construction: an elliptical shape and two 100% independent flow sensing chambers. This construction prevents signal degradation and mixing, and does not require dampening hardware or software. The impact velocity sensing holes (high pressure) are located along the leading edge and the true static sensing holes (low pressure) are on the exterior probe side. This does not generate any vortices or vacuum effects that impinge on the static pressure measurement sensing area and has a drag coefficient of 0.32 or less. Each flow sensor is complete with instrument shutoff valves with provisions to accept a transmitter or direct indicating meter. An identification tag is supplied with specific flow station measurement information, as required.



MAXIMUM ALLOWABLE DP (INCHES OF WATER COLUMN)

Pipe Size	Sing Prol	jle Supp pe Size (oort (in.)	Dou Pro	Double Suppor Probe Size (in.		
•	7/8	1-1/4	2-1/4	7/8	1-1/4	2-1/4	
2 in. (50.80 mm)	880		—	2380	380 —		
2-1/2 in. (63.50 mm)	525			1558			
3 in. (76.20 mm)	396	—	—	1283	—	_	
3-1/2 in. (88.90 mm)	283			1117			
4 in. (101.60 mm)	197	—	—	980	—	_	
5 in. (127.00 mm)	153			757			
6 in. (152.40 mm)	126	—	—	669	—	_	
8 in. (203.20 mm)	114	360		512			
10 in. (254.80 mm)	100	240	779	315	960	_	
12 in. (304.80 mm)	87	175	660	250	700	_	
14 in. (355.60 mm)	53	147	610	195	585	—	
16 in. (406.40 mm)	—	113	495	—	450	_	
18 in. (457.20 mm)	—	90	410	—	360	—	
20 in. (508.00 mm)	—	74	346	—	295	—	
24 in. (609.60 mm)	—	68	315	—	270	952	
26 in. (660.40 mm)	—	50	218	—	215	878	
30 in. (762.00 mm)	—	34	187	—	155	780	
32 in. (812.80 mm)	_		136	_		550	
36 in. (914.40 mm)	_		105			410	
42 in. (1066.80 mm)	_	_	85	_	_	350	



Product Data Sheet

SPECIFICATIONS

Applications	Air, liquids and gases				
Pipe Size	272 in. (501830 mm)				
Pressure	Vary per flange ratings				
Temperature	Vary per flange ratings				
Accuracy	±0.75% of reading				
Repeatability	±0.1%				
Turndown Ratio	17:1 with no vacuum effect				
Reynolds Number	>75,000: Maintains most accurate flow measurements <75,000: Consult factory for estimated results				
Resonance	If greater than 0.8, use double support per ASME PTC 19.3				

STANDARD COMPONENTS

Component	Specifications
Head	T-type
Connection	316 SS 1/4 in. or 1/2 in. FNPT
Fitting	CS 3000 lb. weld
Sensor Instrument Valves	ASTM A105 316/316L SS Ellipse (2 per sensor)
ID Tag	1/2 in., CS 316 SS with wire
Sensor Flange	150 lbs. 316/316L SS
Gasket	CS with SS spiral wound ring
Mounting Flange	CS 150 lbs. ASTM A105 with nuts and bolts

DIMENSIONS



	Probe L	ength	Probe Width
	Α	В	С
AF0	6.62 in. (168.1 mm)	3.13 in. (79.5 mm)	0.5 in. (12.7 mm)
AF	8.0 in. (203.2 mm)	3.13 in. (79.5 mm)	0.87 in. (22.1 mm)
AF1	8.75 in. (222.2 mm)	3.13 in. (79.5 mm)	1.25 in. (31.8 mm)
*AF2	13.92 in. (353.6 mm)	_	2.25 in. (57.2 mm)

PART NUMBER CONSTRUCTION



NOTE: Make sure that DP and Resonance are withing acceptable limits. (See chart in the Ellipse Brochure)

Ellipse® Annular Flanged PAF -									
7/8 in. DIAMETER			I		I	I		I	
PIPE SIZE	Δ								
2-1/2 in.	В								
3 in.	С								
3-1/2 in.	DE								
5 in.	F								
6 in.	G								
8 in.	н								
10 In. 12 in	J								
14 in.	ĸ								
16 in.	L								
18 in. 20 in	M								
24 in.	0								
30 in.	Р								
36 in.	Q]							
STD		Δ							
20		В							
30		С							
40		D							
60		E							
100		⊢ G					1		
120		н					1		
140		1							
160		J							
XH		ĸ							
5S		M							
10S		Ν							
40S		0							
80S		Р]						
Horizontal			А						
Vertical			В						
PROBE MATERIAL				4					
Monel®				2					
Inconel®				3					
Hastelloy®				4					
Other				Х					
1/2 in. NPT					А				
1/2 in. Socket					В				
TT3 (Integral 3-Valve Trans Mount - Max T	emp	225° F	-)		С				
TT5 (Integral 5-Valve Trans Mount - Max 1 (RTD is not available with Integral 5-Valve	Cemp Mani	225° F	F) RTD i	e roqui	D red se	lect			
"E" Transmitter Flange Connection and the	e app	ropriat	e mani	ifold va	alve un	der			
the Instrument Valve section below.)									
Transmitter Flange Connection					E				
1-1/4 in. RF Flange 150# CS						А			
1-1/4 in. RF Flange 300# CS						В			
1-1/4 in. RF Flange 600# CS						С			
1-1/4 In. RF Flange 900/1500# CS 1-1/4 in. RF Flange 150# SS						F			
1-1/4 in. RF Flange 300# SS						F			
1-1/4 in. RF Flange 600# SS						G			
1-1/4 in. RF Flange 900/1500# SS						Н			
A105 CS 3000#							1		
316/316L SS 3000#							2		
A105 CS 3000# w/Double Support							3		
Not Required							4		
INSTRUMENT VALVE							-	1	
1/2 in. Needle CS								Α	
1/2 In. Needle SS								В	
1/2 in. Gate SS								D	
Not Required								Ζ	
ONLY AVAILABLE WITH OPTION "E" UN	DER	INSTR	UMEN	IT COM	NEC	TION		-	
Fig x Fig 3-Valve Manifold CS - Max Temp	225	F F						F	
Fig x Fig 5-Valve Manifold CS - Max Temp	225	° F						G	
Flg x Flg 5-Valve Manifold SS - Max Temp	225	° F						H	
Customer Supplied Valve Manifold	hiah	or tom	n onti	20151				I	J
100 Ohm RTD 3-Wire w/Explosion Proof F	lead		ບັນດີ						1
100 Ohm RTD 3-Wire, Integral w/Aluminur	m He	ad							2
Not Required									Z
Stainless Steel ID Tag supplied as standard.									
Tag information must be included with order.									

NOTE: Make sure that DP and Resonance are withing acceptable limits. (See chart in the Ellipse Brochure)

Ellipse® Annular Flanged PAF1 -									
1-1/4 in. DIAMETER									
PIPE SIZE									
12 in.	J								
14 in.	ĸ								
16 IN. 18 in	L								
20 in	N								
24 in.	0								
30 in.	P								
36 in.	Q								
42 in.	R								
48 in.	S								
60 in.									
72 IN.	U								
STR									
20		B							
30		c							
40		D							
60		Е							
80		F							
100		G							
120		н						1	
140		I.						1	
160		J						1	
XH		ĸ						1	
XXH		L							
58		M							
105									
805		P							
PIPE ORIENTATION			1						
Horizontal			А						
Vertical			В						
PROBE MATERIAL									
316/316L SS				1					
Monel®				2					
				3					
Hastelloy®				4					
				7	1				
1/2 in. NPT					А				
1/2 in. Socket					В				
TT3 (Integral 3-Valve Trans Mount - Max	Temp 22	25° F)			С				
TT5 (Integral 5-Valve Trans Mount - Max	Temp 22	25° F)			D				
(RTD is not available with Integral 5-Valv	e Manifol	d. If R	TD is re	equirec	l, selec	t			
"E" Transmitter Flange Connection and th	he approp	oriate n	nanifol	d valve	under				
the Instrument Valve section below.)					-				
					E				
CONNECTION / FLANGE RATING									
1-1/2 in RE Flange 150# CS						А			
1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 300# CS						A B			
1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 300# CS 1-1/2 in. RF Flange 600# CS						A B C			
1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 300# CS 1-1/2 in. RF Flange 600# CS 1-1/2 in. RF Flange 900/1500# CS						A B C D			
1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 300# CS 1-1/2 in. RF Flange 600# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 150# SS						A B C D E			
1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 300# CS 1-1/2 in. RF Flange 600# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Flange 300# SS						A B C D E F			
1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 300# CS 1-1/2 in. RF Flange 600# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Flange 300# SS 1-1/2 in. RF Flange 600# SS						A B C D E F G			
1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 300# CS 1-1/2 in. RF Flange 600# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Flange 300# SS 1-1/2 in. RF Flange 600# SS 1-1/2 in. RF Flange 900/1500# SS						A B C D E F G H			
1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 300# CS 1-1/2 in. RF Flange 600# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Flange 300# SS 1-1/2 in. RF Flange 600# SS 1-1/2 in. RF Flange 900/1500# SS PIPE MOUNTING						A B C D E F G H			
1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 300# CS 1-1/2 in. RF Flange 600# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Flange 300# SS 1-1/2 in. RF Flange 900/1500# SS 1-1/2 in. RF Flange 900/1500# SS PIPE MOUNTING A 105 CS 3000# 346/345 CS 3000#						A B C D E F G H	1 2		
1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 300# CS 1-1/2 in. RF Flange 600# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Flange 300# SS 1-1/2 in. RF Flange 600# SS 1-1/2 in. RF Flange 900/1500# SS PIFE MOUNTING A105 CS 3000# 316/316L SS 3000#						A B C D E F G H	1 2 3		
1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 300# CS 1-1/2 in. RF Flange 600# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Flange 300# SS 1-1/2 in. RF Flange 600# SS 1-1/2 in. RF Flange 900/1500# SS PIFE MOUNTING A105 CS 3000# 316/316L SS 3000# w/Double Support 316/316L SS 3000# w/Double Support						A B C D E F G H	1 2 3 4		
1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 300# CS 1-1/2 in. RF Flange 600# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Flange 300# SS 1-1/2 in. RF Flange 600# SS 1-1/2 in. RF Flange 900/1500# SS PIPE MOUNTING A105 CS 3000# A105 CS 3000# A105 CS 3000# w/Double Support 316/316L SS 3000# w/Double Support 316/316L SS 3000# w/Double Support Not Required						A B C D E F G H	1 2 3 4 Z		
1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 300# CS 1-1/2 in. RF Flange 600# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Flange 300# SS 1-1/2 in. RF Flange 900/1500# SS 1-1/2 in. RF Flange 900/1500# SS 1-1/2 in. RF Flange 900/1500# SS PIPE MOUNTING A105 CS 3000# 316/316L SS 3000# A105 CS 3000# w/Double Support 316/316L SS 3000# w/Double Support Not Required INSTRUMENT VALVE						A B C D E F G H	1 2 3 4 Z		
1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 300# CS 1-1/2 in. RF Flange 600# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Flange 300# SS 1-1/2 in. RF Flange 900/1500# SS <u>PIPE MOUNTING</u> A105 CS 3000# w/Double Support 316/316L SS 3000# w/Double Support 316/316L SS 3000# w/Double Support Not Required <u>INSTRUMENT VALVE</u> 1/2 in. Needle CS						A B C D E F G H	1 2 3 4 Z	A	
1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 300# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Flange 300# SS 1-1/2 in. RF Flange 900/1500# SS 1-1/2 in. RF Flange 900/1500# SS PIPE MOUNTING A105 CS 3000# w/Double Support 316/316L SS 3000# w/Double Support 316/316L SS 3000# w/Double Support Not Required INSTRUMENT VALVE 1/2 in. Needle CS 1/2 in. Needle CS 1/2 in. Needle SS						A B C D E F G H	1 2 3 4 Z	AB	
1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 300# CS 1-1/2 in. RF Flange 600# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Flange 300# SS 1-1/2 in. RF Flange 900/1500# SS 1-1/2 in. RF Flange 900/1500# SS PIPE MOUNTING A105 CS 3000# A105 CS 3000# A105 CS 3000# w/Double Support 316/316L SS 3000# w/Double Support 316/316L SS 3000# w/Double Support Not Required INSTRUMENT VALVE 1/2 in. Needle CS 1/2 in. Needle CS 1/2 in. Gate CS						A B C D E F G H	1 2 3 4 Z	ABC	
1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 300# CS 1-1/2 in. RF Flange 600# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Flange 300# SS 1-1/2 in. RF Flange 900/1500# SS 1-1/2 in. RF Flange 900/1500# SS PIPE MOUNTING A105 CS 3000# 316/316L SS 3000# A105 CS 3000# w/Double Support 316/316L SS 3000# w/Double Support 316/316L SS 3000# w/Double Support 1/2 in. Needle CS 1/2 in. Needle CS 1/2 in. Gate CS 1/2 in. Gate SS Net Desvind						A B C D E F G H	1 2 3 4 Z	A B C D 7	
1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 300# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Flange 300# SS 1-1/2 in. RF Flange 600# SS 1-1/2 in. RF Flange 900/1500# SS PIPE MOUNTING A105 CS 3000# A105 CS 3000# A105 CS 3000# w/Double Support 316/316L SS 3000# A105 CS 3000# w/Double Support 316/316L SS 3000# MOT Required INSTRUMENT VALVE 1/2 in. Needle CS 1/2 in. Gate CS 1/2 in. Gate SS Not Required ONLY A VAUL & ENTED OPTION. "ETUCH			MENT	CON1		A B C D E F G H	1 2 3 4 Z	A B C D Z	
1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 300# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 300# SS 1-1/2 in. RF Flange 300# SS 1-1/2 in. RF Flange 900/1500# SS 1-1/2 in. RF Flange 900/1500# SS 1-1/2 in. RF Flange 900/1500# SS PIPE MOUNTING A105 CS 3000# A105 CS 300# A105 CS 30# A105 CS 30# A	JNDER IN	STRU	MENT	CONN	IECTIO	A B C D E F G H	1 2 3 4 Z	A B C D Z F	
1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 300# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Flange 300# SS 1-1/2 in. RF Flange 900/1500# SS 1-1/2 in. RF Flange 900/1500# SS PIPE MOUNTING A105 CS 3000# w/Double Support 316/316L SS 3000# A105 CS 3000# w/Double Support 316/316L SS 3000# MOLT ALVE 1/2 in. Needle CS 1/2 in. Needle CS 1/2 in. Needle SS 1/2 in. Gate CS 1/2 in. Gate SS Not Required ONLY AVAILABLE WITH OPTION "E" U Flg x Flg 3-Valve Manifold CS - Max Terr Flg x Flg 3-Valve Manifold CS - Max Terr	JNDER IN np 225° F np 225° F	STRU	MENT	CONN	IECTIO	A B C D E F G H	1 2 3 4 Z	A B C D Z E F	
1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 300# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Flange 300# SS 1-1/2 in. RF Flange 900/1500# SS 1-1/2 in. RF Flange 900/1500# SS 1-1/2 in. RF Flange 900/1500# SS PIPE MOUNTING A105 CS 3000# w/Double Support 316/316L SS 3000# w/Double Support 316/316L SS 3000# w/Double Support 316/316L SS 3000# w/Double Support Not Required INSTRUMENT VALVE 1/2 in. Needle CS 1/2 in. Needle CS 1/2 in. Needle SS 1/2 in. Gate CS 1/2 in. Gate SS Not Required ONLY AVAILABLE WITH OPTION "E" U Fig x Fig 3-Valve Manifold CS - Max Tem Fig x Fig 3-Valve Manifold CS - Max Tem Fig x Fig 3-Valve Manifold CS - Max Tem	JNDER IN np 225° F np 225° F np 225° F	STRU	MENT	CONN	IECTIC	A B C D E F G H	1 2 3 4 Z	A B C D Z E F G	
1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 300# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Flange 300# SS 1-1/2 in. RF Flange 900/1500# SS 1-1/2 in. RF Flange 900/1500# SS 1-1/2 in. RF Flange 900/1500# SS PIPE MOUNTING A105 CS 3000# w/Double Support 316/316L SS 3000# w/Double Support 316/316L SS 3000# w/Double Support 316/316L SS 3000# w/Double Support Not Required INSTRUMENT VALVE 1/2 in. Needle CS 1/2 in. Needle CS 1/2 in. Gate CS 1/2 in. Gate SS Not Required ONLY AVAILABLE WITH OPTION "E" U Flg x Flg 3-Valve Manifold CS - Max Terr Flg x Flg 3-Valve Manifold CS - Max Terr	JNDER IN np 225° F np 225° F np 225° F np 225° F	STRU	MENT	CONN	IECTIC	A B C D E F G H	1 2 3 4 Z	АВСОХ ЕГСЯ	
1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 300# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Flange 300# SS 1-1/2 in. RF Flange 300# SS 1-1/2 in. RF Flange 900/1500# SS PIPE MOUNTING A105 CS 3000# A105 CS 3000# A105 CS 3000# w/Double Support 316/316L SS 3000# MOS SUPPORT 1/2 in. Needle CS 1/2 in. Needle CS 1/2 in. Gate CS 1/2 in. Gate SS Not Required ONLY AVAILABLE WITH OPTION "E" U Fig x Fig 3-Valve Manifold CS - Max Terr Fig x Fig 5-Valve Manifold CS - Max Terr Fig x Fig 5-Valve Manifold CS - Max Terr Customer Supplied Valve Manifold	JNDER IN np 225° F np 225° F np 225° F np 225° F	STRU	MENT	CONN	IECTIC	A B C D E F G H	1 2 3 4 Z	A B C D Z E F G H I	
1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 300# CS 1-1/2 in. RF Flange 600# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Flange 300# SS 1-1/2 in. RF Flange 900/1500# SS 1-1/2 in. RF Flange 900/1500# SS 1-1/2 in. RF Flange 900/1500# SS PIFE MOUNTING A105 CS 3000# A105 CS 3000# A105 CS 3000# w/Double Support 316/316L SS 3000# A105 CS 3000# w/Double Support 316/316L SS 3000# MID at the second se	JNDER IN np 225° F np 225° F np 225° F np 225° F or higher	STRU	MENT		IECTIC	A B C D E F G H	1 2 3 4 Z	A B C D Z E F G H I	
1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 300# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Flange 300# SS 1-1/2 in. RF Flange 900/1500# SS 1/2 in. Needle SS 1/2 in. Needle CS 1/2 in. Needle SS 1/2 in. Gate SS Not Required ONLY AVAILABLE WITH OPTION "E" U Flg x Flg 3-Valve Manifold CS - Max Tem Flg x Flg 3-Valve Manifold CS - Max Tem Flg x Flg 5-Valve Manifold SS - M	JNDER IN np 225° F np 225° F np 225° F np 225° F or higher	STRU	MENT			A B C D E F G H	1 2 3 4 Z	A B C D Z E F G H I	1
1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 300# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Flange 300# SS 1-1/2 in. RF Flange 900/1500# SS 1-1/2 in. RF Flange 900/1500# SS PIPE MOUNTING A105 CS 3000# w/Double Support 316/316L SS 3000# A105 CS 3000# w/Double Support 316/316L SS 3000# w/Double Support 316/316L SS 3000# w/Double Support Not Required INSTRUMENT VALVE 1/2 in. Needle CS 1/2 in. Needle CS 1/2 in. Red SS 1/2 in. Gate CS 1/2 in. Gate SS Not Required ONLY AVAILABLE WITH OPTION "E" U Flg x Flg 3-Valve Manifold CS - Max Terr Flg x Flg 3-Valve Manifold CS - Max Terr Flg x Flg 5-Valve Manifold SS - Max Terr Flg x Flg 5-Valve Manifold SS - Max Terr Flg x Flg 5-Valve Manifold SS - Max Terr Customer Supplied Valve Manifold RTD (Max Tern 480° F. consult factory fc 100 Ohm RTD 3-Wire w/Explosion Proof 100 Ohm RTD 3-Wire, Integral w/Alumin Net Required	JNDER IN np 225° F np 225° F np 225° F np 225° F np 225° F or higher Head um Head	STRU	MENT	CONN (5)		A B C D E F G H	1 2 3 4 Z	A B C D Z E F G H I	1 2 7
1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 300# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Flange 300# SS 1-1/2 in. RF Flange 900/1500# SS 1-1/2 in. RF Flange 900/1500# SS 1-1/2 in. RF Flange 900/1500# SS PIPE MOUNTING A105 CS 3000# w/Double Support 316/316L SS 3000# A105 CS 3000# w/Double Support 316/316L SS 3000# w/Double Support Not Required INSTRUMENT VALVE 1/2 in. Needle CS 1/2 in. Needle CS 1/2 in. Needle CS 1/2 in. Gate CS 1/2 in. Gate CS 1/2 in. Gate SS Not Required ONLY AVAILABLE WITH OPTION "E" U Fig x Fig 3-Valve Manifold CS - Max Terr Fig x Fig 5-Valve Manifold SS - Max Terr Customer Supplied Valve Manifold SS - Max Terr Fig x Fig 5-Valve Manifold SS - Max Terr Fig x Fig 5-Valve Manifold SS - Max Terr Customer Supplied Valve Manifold CS - Max Terr Fig x Fig 5-Valve Manifold SS - Max Te	JNDER IN np 225° F np 225° F np 225° F np 225° F or higher Head um Head	STRU	MENT	CONN 15)	IECTIC	A B C D E F G H	1 2 3 4 Z	ABCDZ EFGHI	1 2 Z
1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 300# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Flange 300# SS 1-1/2 in. RF Flange 600# SS 1-1/2 in. RF Flange 900/1500# SS PIPE MOUNTING A105 CS 3000# w/Double Support 316/316L SS 3000# w/Double Support 316/316L SS 3000# w/Double Support 316/316L SS 3000# w/Double Support 105 CS 3000# w/Double Support 316/316L SS 3000# w/Double Support 11/2 in. Needle CS 1/2 in. Needle CS 1/2 in. Gate CS 1/2 in. Gate CS 1/2 in. Gate SS Not Required ONLY AVAILABLE WITH OPTION "E" U Flg x Flg 3-Valve Manifold CS - Max Terr Flg x Flg 3-Valve Manifold CS - Max Terr Flg x Flg 5-Valve Manifold CS - Max Terr Customer Supplied Valve Manifold RTD (Max Temp 480° F, consult factory fc 100 Ohm RTD 3-Wire, Integral w/Alumin Not Required Stainless Steel ID Tag supplied as standard.	JNDER IN np 225° F np 225° F np 225° F pr higher i Head um Head	STRU	MENT	CONN	IECTIC	A B C D E F G H	1 2 3 4 Z	A B C D Z E F G H I	1 2 Z
1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 300# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Flange 300# SS 1-1/2 in. RF Flange 300# SS 1-1/2 in. RF Flange 900/1500# SS PIPE MOUNTING A105 CS 3000# A105 CS 3000# w/Double Support 316/316L SS 3000# A105 CS 3000# w/Double Support 316/316L SS 3000# MOS REQUIRED INSTRUMENT VALVE 1/2 in. Needle CS 1/2 in. Gate CS 1/2 in. Gate SS Not Required ONLY AVAILABLE WITH OPTION "E" U Fig x Fig 3-Valve Manifold CS - Max Tem Fig x Fig 3-Valve Manifold CS - Max Tem Customer Supplied Valve Manifold RTD (Max Temp 480° F. consult factory fo 100 Ohm RTD 3-Wire, Integral w/Alumin Not Required Stainless Steel ID Tag supplied as standard. Tag information must be included with order.	JNDER IN np 225° F np 225° F np 225° F np 225° F or higher Head um Head	STRU	MENT	CONN (S)	IECTIC	A B C D E F G H	1 2 3 4 Z	A B C D Z E F G H I	1 2 2

Ellipse [®] Annular Flanged	PAE2 -		1						1
2-1/4 in. DIAMETER									
<u>PIPE SIZE</u> 12 in	1								
12 in. 14 in.	J K								
16 in.	L								
18 in.	M	1							
20 in.	N								
24 in.	0)							
30 in.									
42 in.	R								
48 in.	S								
60 in.	Т								
72 in.	U								
SCHEDULE									
20		A B							
30		c							
40		D							
60		Е							
80		F							
100		G							
120		н							
140		1							
		ĸ							
ХХН			1						
5S		M	1						
10S		N							
40S		0	1						
80S		Р]						
<u>PIPE ORIENTATION</u>			^						
Vertical			B						
PROBE MATERIAL	-			1					
316/316L SS				1					
Monel®				2					
				3					
Hastelloy®				4					
INSTRUMENT CONNECTION				~					
1/2 in. NPT					А				
1/2 in. Socket					в				
TT3 (Integral 3-Valve Trans Mount - Max Temp 225° F)					С				
TT5 (Integral 5-Valve Trans Mount - Max Temp 225° F)					D				
(RTD is not available with Integral 5-Valve Manifold. If R	D is required, select								
the Instrument Valve section below.)									
Transmitter Flange Connection					Е				
CONNECTION / FLANGE RATING						-			
3 in. RF Flange 150# CS						Α			
3 in. RF Flange 300# CS						В			
3 In. RF Flange 600# CS						р			
3 in. RF Flange 150# SS						E			
3 in. RF Flange 300# SS						F			
3 in. RF Flange 600# SS						G			
3 in. RF Flange 900/1500# SS						Н	l		
A105 CS 3000#							1		
316/316L SS 3000#							2		
A105 CS 3000# w/Double Support							3		
316/316L SS 3000# w/Double Support							4		
Not Required							Ζ		
INSTRUMENT VALVE									
1/2 In. Needle CS 1/2 in. Needle SS								A R	
1/2 in. Gate CS								C	
1/2 in. Gate SS								Ď	
Not Required								Z	
ONLY AVAILABLE WITH OPTION "E" UNDER INSTRU	MENT CONNECTION	I						_	
Fig x Fig 3-Valve Manifold CS - Max Temp 225° F								E	
Flg x Flg 5-Valve Manifold CS - Max Temp 225° F								г G	
Flg x Flg 5-Valve Manifold SS - Max Temp 225° F								Н	
Customer Supplied Valve Manifold								<u> </u>	
RTD (Max Temp 480° F, consult factory for higher temp	options)								-
100 Ohm RTD 3-Wire w/Explosion Proof Head									1
100 (Jbm R II) 3-Wire Integral w/Aluminum Lood									2
Not Poquired									
Not Required									Z
Not Required Stainless Steel ID Tag supplied as standard. Tag information must be included with safet									Z
Not Required Stainless Steel ID Tag supplied as standard. Tag information must be included with order. NOTE		at to star		Dec. 1					Ζ

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Ellipse[®] Pitot Tube Meter

Annular Threaded Steam Flow Meter

DESCRIPTION

The Preso ELLIPSE® Annular Threaded Steam Flow Meter is a multi-ported, self averaging differential pressure flow element for steam applications. The Ellipse flow meter is designed with a series of ports facing the upstream velocity pressures and flow sensing ports strategically located ahead of the trailing edge flow separation.

COMPONENTS

All sensors are furnished with 1/2 in. instrument gate valves (class 800), threaded cross tees, threaded weld fitting, compression fitting, and ID tag as standard equipment. Available options include integral 3-valve or 5-valve transmitter mount manifold and integral RTD temperature sensor.

FEATURES

- Patented elliptical design
- Single point pipe entry for DP, temperature and static pressure
- No dampening software required
- Low pressure loss (typically 3% of DP in a 12 in. (304 mm) line) due to the patented aerodynamic profile
- NIST traceable calibration, optional independent labs
- Accuracy: ±0.75% of reading, repeatability: ±0.1% of reading
- Turndown Ratio: 17:1; no vacuum effects
- No moving part construction provides long, trouble-free service life
- True static pressure measurement rather than a calculated value
- Overcomes loss of accuracy caused by fluid separation at the sensor body

CONFIGURATION

The flow element has a two-piece construction: an elliptical shape and two 100% independent flow sensing chambers. This construction prevents signal degradation and mixing, and does not require dampening hardware or software. The impact velocity sensing holes (high pressure) are located along the leading edge and the true static sensing holes (low pressure) are on the exterior probe side. This does not generate any vortices or vacuum effects that impinge on the static pressure measurement sensing area and has a drag coefficient of 0.32 or less. Each flow sensor is complete with instrument shutoff valves with provisions to accept a transmitter or direct indicating meter. An identification tag is supplied with specific flow station measurement information, as required.





MAXIMUM ALLOWABLE DP (INCHES OF WATER COLUMN)

Pipe Size	Single Probe	Support Size (in.)	Double Support Probe Size (in.)			
	7/8	1-1/4	7/8	1-1/4		
2 in. (50.80 mm)	880	_	2380	—		
2-1/2 in. (63.50 mm)	525	—	1558	—		
3 in. (76.20 mm)	396	—	1283	_		
3-1/2 in. (88.90 mm)	283		1117	_		
4 in. (101.60 mm)	197	—	980	_		
5 in. (127.00 mm)	153	_	757	_		
6 in. (152.40 mm)	126		669	_		
8 in. (203.20 mm)	114	360	512	_		
10 in. (254.80 mm)	100	240	315	960		
12 in. (304.80 mm)	87	175	250	700		
14 in. (355.60 mm)	53	147	195	585		
16 in. (406.40 mm)	—	113	_	450		
18 in. (457.20 mm)	-	90	—	360		
20 in. (508.00 mm)	—	74	_	295		
24 in. (609.60 mm)	—	68	—	270		
26 in. (660.40 mm)	_	50	_	215		
30 in. (762.00 mm)	—	34	—	155		
32 in. (812.80 mm)	_					
36 in. (914.40 mm)	—		—	_		
42 in. (1066.80 mm)	_		_	_		

Product Data Sheet

SPECIFICATIONS

Applications	Steam
Pipe Size	248 in. (501220 mm)
Pressure	600 PSI (4100 kPa) max.
Temperature	480 F (250 C) max.
Accuracy	±0.75% of reading
Repeatability	±0.1%
Turndown Ratio	17:1 with no vacuum effect
Reynolds Number	>75,000: Maintains most accurate flow measurements <75,000: Consult factory for estimated results
Resonance	If greater than 0.8, use double support per ASME PTC 19.3

STANDARD COMPONENTS

Component	Specifications
Head	T-type
Connection	316 SS 1/4 in. or 1/2 in. FNPT
Compression Fitting	CS with SS ferrule
Weld Fitting	CS 3000 lb. — ASTM A105
Ellipse Sensor	316/316L SS
ID Tag	SS with wire

DIMENSIONS



PART NUMBER CONSTRUCTION

Ellipse® PAS -				Γ					
			//	·	I <u> </u>		/ <u></u>	I <u></u>	·
7/8 IN. DIAMETER									
PIPE SIZE	٨								
2 m. 2-1/2 in.	B								
3 in.	c								
3-1/2 in.	D								
4 in.	Е								
5 in.	F								
6 in.	G								
10 in	1								
12 in.	J								
14 in.	K								
<u>SCHEDULE</u>									
STD		A							
20		В							
30									
60		E							
80		F							
100		Ġ							
120		Н							
140		T							
160		J		1					
XH		ĸ							
XXH		L							
105		IVI N							
40S		Ö							
80S		Р							
PIPE ORIENTATION			-						
Horizontal			A						
			В	1					
316/316L SS				1					
Monel®				2					
Inconel®				3					
Hastelloy®				4					
Other				Х	1				
1/2 in NDT					^				
1/2 III. NP 1 1/2 in Socket					B				
TT3 (Integral 3-Valve Trans Mount - Ma	ax Temp	225° F	-)		c				
TT5 (Integral 5-Valve Trans Mount - Ma	Ix Temp	225° F	=)		D				
(RTD is not available with Integral 5-Va	lve Man	ifold. If	RTD	s requ	ired, se	elect			
"E" Transmitter Flange Connection and	the app	ropriat	e mani	fold va	lve und	der			
Transmitter Flange Connection					F				
					<u> </u>	1			
CS Compression Fitting w/SS Ferrule						Α			
SS Compression Fitting w/SS Ferrule						В]		
PIPE MOUNTING							4		
A105 CS 3000# 316/316L SS 3000#							1		
A105 CS 3000# w/Double Support							3		
316/316L SS 3000# w/Double Support							4		
Not Required							Z	L	
INSTRUMENT VALVE									
1/2 In. Gate CS W/Cross								A B	
Not Required								7	
ONLY AVAILABLE WITH OPTION "E"	UNDER	INSTR	RUME	NT CO	NNEC	ΓΙΟΝ		-	
Flg x Flg 3-Valve Manifold CS - Max Te	emp 225	°F						Е	
Flg x Flg 3-Valve Manifold SS - Max Te	mp 225	° F						F	
Fig x Fig 5-Valve Manifold CS - Max Te	mp 225	°F						G	
Fig X Fig 5-Valve Manifold S5 - Max Te Customer Supplied Valve Manifold	mp 225	F						-	
RTD (Max Temp 480° F. consult factory f	for hiah	er tem	p opti	ons)					1
100 Ohm RTD 3-Wire w/Explosion Proc	of Head								1
100 Ohm RTD 3-Wire, Integral w/Alumi	num He	ad							2
Not Required									Z
Stainless Steel ID Tag supplied as standard	d.								
Tag information must be included with orde	r.								

NOTE: Make sure that DP and Resonance are withing acceptable limits. (See chart in the Ellipse Brochure)

Ellipse® PAS1	-								
1-1/4 in. DIAMETER				. <u> </u>	. <u> </u>				<u>. </u>
PIPE SIZE									
12 in.	J								
14 IN.	ĸ								
18 in.	M								
20 in.	Ν								
24 in.	0								
30 IN.	P								
42 in.	R								
48 in.	S								
STD		٨							
20		В							
30		С							
40		D							
80									
100		G							
120		Н							
140		I.							
160		J							
XH		K							
XXH 5S		L							
10S		N							
40S		0							
80S		Р							
<u>PIPE ORIENTATION</u> Horizontal			Δ						
Vertical			В						
PROBE MATERIAL									
316/316L SS				1					
Monel®				2					
Hastelloy®				4					
Other				Х					
INSTRUMENT CONNECTION									
1/2 in. NPT					A				
TT3 (Integral 3-Valve Trans Mount - Max	Temp 225	°F)			ь С				
TT5 (Integral 5-Valve Trans Mount - Max	Temp 225	°F)			D				
(RTD is not available with Integral 5-Valv	e Manifold.	If RT	D is re	quired	select				
"E" Transmitter Flange Connection and the	he appropri	ate m	nanifolo	l valve	under				
Transmitter Flange Connection					Е				
CONNECTION									
CS Compression Fitting w/SS Ferrule						A			
SS Compression Fitting w/SS Ferrule						В	l		
A105 CS 3000#							1		
316/316L SS 3000#							2		
A105 CS 3000# w/Double Support							3		
316/316L SS 3000# w/Double Support Not Required							4 7		
INSTRUMENT VALVE							~	1	
1/2 in. Gate CS w/Cross								А	
1/2 in. Gate SS w/Cross								B	
ONLY AVAILABLE WITH OPTION "F" U	NDER INS	TRUM	/ENT (CONN	ECTIO	N		2	
Flg x Flg 3-Valve Manifold CS - Max Tem	p 225° F			• •	20			Е	
Flg x Flg 3-Valve Manifold SS - Max Tem	p 225° F							F	
Flg x Flg 5-Valve Manifold CS - Max Tem	ip 225° F							G	
Customer Supplied Valve Manifold	h 772. F							H	
RTD (Max Temp 480° F, consult factory for	or higher te	emp c	ption	<u>s)</u>					-
100 Ohm RTD 3-Wire w/Explosion Proof	Head								1
100 Ohm RTD 3-Wire, Integral w/Alumine	um Head								2
									۷
Stainless Steel ID Tag supplied as standard.									
ray information must be included with order.									

NOTE: Make sure that DP and Resonance are withing acceptable limits. (See chart in the Ellipse Brochure)

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Ellipse[®] Pitot Tube Meter

Annular Flanged Steam Flow Meter

DESCRIPTION

The Preso ELLIPSE® Annular Flanged Steam Flow Meter is a multi-ported, self averaging differential pressure flow element for steam applications. The Ellipse flow meter is designed with a series of ports facing the upstream velocity pressures and flow sensing ports strategically located ahead of the trailing edge flow separation.

CONFIGURATION

The flow element has a two-piece construction: an elliptical shape and two 100% independent flow sensing chambers. This construction prevents signal degradation and mixing, and does not require dampening hardware or software. The impact velocity sensing holes (high pressure) are located along the leading edge and the true static sensing holes (low pressure) are on the exterior probe side. This does not generate any vortices or vacuum effects that impinge on the static pressure measurement sensing area and has a drag coefficient of 0.32 or less. Each flow sensor is complete with instrument shutoff valves with provisions to accept a transmitter or direct indicating meter. An identification tag is supplied with specific flow station measurement information, as required.

COMPONENTS

All sensors are furnished with 1/2 in. instrument gate valves (with proper class rating), threaded cross tees, flanged mounting hardware (with proper class rating), and ID tag as standard equipment. Available options include integral 3-valve or 5-valve transmitter mount manifold and integral RTD temperature sensor.

FEATURES

- Patented elliptical design
- Single point pipe entry for DP, temperature and static pressure
- No dampening software required
- Low pressure loss (typically 3% of DP in a 12 in. (304 mm) line) due to the patented aerodynamic profile
- NIST traceable calibration, optional independent labs
- Accuracy: ±0.75% of reading, repeatability: ±0.1% of reading
- Turndown Ratio: 17:1; no vacuum effects
- No moving part construction provides long, trouble-free service life
- True static pressure measurement rather than a calculated value
- Overcomes loss of accuracy caused by fluid separation at the sensor body



MAXIMUM ALLOWABLE DP (INCHES OF WATER COLUMN)

Pipe Size	Sing Pro	gle Supp be Size	oort (in.)	Do Pre	uble Sup obe Size	port (in.)	
•	7/8	1-1/4	2-1/4	7/8	1-1/4	2-1/4	
2 in. (50.80 mm)	880		_	2380			
2-1/2 in. (63.50 mm)	525			1558		—	
3 in. (76.20 mm)	396	—	_	1283	—	—	
3-1/2 in. (88.90 mm)	283	—		1117		—	
4 in. (101.60 mm)	197	—	_	980	—	—	
5 in. (127.00 mm)	153			757		—	
6 in. (152.40 mm)	126	—	_	669	—	—	
8 in. (203.20 mm)	114	360	_	512		—	
10 in. (254.80 mm)	100	240	779	315	960	—	
12 in. (304.80 mm)	87	175	660	250	700	—	
14 in. (355.60 mm)	53	147	610	195	585	—	
16 in. (406.40 mm)	—	113	495	—	450	—	
18 in. (457.20 mm)	—	90	410	—	360	—	
20 in. (508.00 mm)	—	74	346	—	295	—	
24 in. (609.60 mm)	—	68	315	—	270	952	
26 in. (660.40 mm)	—	50	218	—	215	878	
30 in. (762.00 mm)	—	34	187	—	155	780	
32 in. (812.80 mm)	_		136	_	_	550	
36 in. (914.40 mm)	_		105	_	_	410	
42 in. (1066.80 mm)	_	_	85	_	_	350	

Product Data Sheet

SPECIFICATIONS

Applications	Steam
Pipe Size	248 in. (501220 mm)
Pressure	Vary per flange ratings
Temperature	Vary per flange ratings
Accuracy	±0.75% of reading
Repeatability	±0.1%
Turndown Ratio	17:1 with no vacuum effect
Reynolds Number	>75,000: Maintains most accurate flow measurements <75,000: Consult factory for estimated results
Resonance	If greater than 0.8, use double support per ASME PTC 19.3

STANDARD COMPONENTS

Component	Specifications
Head	T-type
Connection	316 SS 1/2 in. FNPT
Compression Fitting	CS with SS ferrule
Weld Fitting	CS 3000 lb. — ASTM A105
Ellipse Sensor	316/316L SS
ID Tag	SS with wire

DIMENSIONS



	Probe L	Probe Width	
	Α	В	С
ASF	11.63 in. (295.40 mm)	5.25 in. (133.35 mm)	0.87 in. (22.23 mm)
ASF1	11.63 in. (295.40 mm)	5.25 in. (133.35 mm)	1.25 in. (31.75 mm)
ASF2*	10.00 in. (254 mm)	5.25 in. (133.35 mm)	2.25 in. (57.15 mm)
ACED much	·		C

ASF2 probe design not pictured. Contact factory for more information.

PART NUMBER CONSTRUCTION

Ellipse®									
7/8 in DIAMETER									
2 in	А								
2-1/2 in.	В								
3 in.	С								
3-1/2 in.	D								
4 in.	E								
5 IN. 6 in	F								
8 in.	н								
10 in.	I								
12 in.	J								
14 in.	K								
SCHEDULE									
20		R							
30		c							
40		D							
60		Е							
80		F							
100		G							
120		н							
140									
160		J							
XH		r.							
55		M							
10S		N							
40S		0							
80S		Ρ							
PIPE ORIENTATION									
Horizontal			A						
			D]					
316/316L SS				1					
Monel®				2					
Inconel®				3					
Hastelloy®				4					
Other				Х	l				
INSTRUMENT CONNECTION					^				
1/2 III. NP1 1/2 in Socket					B				
TT3 (Integral 3-Valve Trans Mount - Max	Temp 22	5° F)			c				
TT5 (Integral 5-Valve Trans Mount - Max	Temp 22	5° F)			D				
(RTD is not available with Integral 5-Valve	e Manifolo	d. If R	rD is re	equired	l, selec	t			
"E" Transmitter Flange Connection and the	e approp	riate n	nanifolo	d valve	under				
the Instrument Valve section below.)					E				
CONNECTION / FLANGE RATING					L				
1-1/4 in. RF Flange 150# CS						А			
1-1/4 in. RF Flange 300# CS						в			
1-1/4 in. RF Flange 600# CS						С			
1-1/4 in. RF Flange 900/1500# CS						D			
1-1/4 IN. RF Flange 150# SS						E			
1-1/4 in. RF Flange 600# SS						Ġ			
1-1/4 in. RF Flange 900/1500# SS						Ĥ			
PIPE MOUNTING							-		
A105 CS 3000#							1		
316/316L SS 3000#							2		
316/316L SS 3000# w/Double Support							3 ⊿		
Not Required							z		
INSTRUMENT VALVE								4	
1/2 in. Gate CS w/Cross								Α	
1/2 in. Gate SS w/Cross								В	
								Ζ	
Flg x Flg 3-Valve Manifold CS - Max Tem	225° F				-0100	•		E	
Flg x Flg 3-Valve Manifold SS - Max Temp	225° F							F	
FIg x FIg 5-Valve Manifold CS - Max Temp	225° F							G	
FIg x FIg 5-Valve Manifold SS - Max Temp	225° F							н	
Customer Supplied Valve Manifold	hick	Law		-1				I	1
100 Obm PTD 3 Wire w/Evologics Dreef	nigher t	emp o	options	5)					1
100 Ohm RTD 3-Wire Integral w/Aluminu	m Head								2
Not Required									z
Stainless Steel ID Tag supplied as standard									
Tag information must be included with order.									

NOTE: Make sure that DP and Resonance are withing acceptable limits. (See chart in the Ellipse Brochure)

Ellipse®	PASF1 -	1						1		1
1-1/4 in. DIAMETER		!					<u> </u>	I <u> </u>	I <u> </u>	<u></u>
12 in.		J								
14 in.		K								
18 in.		M								
20 in.	I	N								
24 in.	(0								
30 m. 36 in.	(2 2								
42 in.	I	R								
48 in.	:	S								
STD			^							
20		í	В							
30		(С							
40		[D							
80										
100		(G					1		
120		ł	н					1		
140								1		
160			J					1		
ХН		1						1		
5S		N	м					1		
10S		1	N							
40S		(D D							
PIPE ORIENTATION			Ρ							
Horizontal				А						
Vertical				В						
316/316LSS					1					
Monel®					2					
Inconel®					3					
Hastelloy®					4					
Other					^					
<u>Montonetti oonneonon</u>						٨				
1/2 in. NPT						A				
1/2 in. NPT 1/2 in. Socket						В				
1/2 in. NPT 1/2 in. Socket TT3 (Integral 3-Valve Trans Mount - Max Temp 225° F) TT5 (Integral 5-Valve Trans Mount - Max Temp 225° F)						B C				
1/2 in. NPT 1/2 in. Socket TT3 (Integral 3-Valve Trans Mount - Max Temp 225° F) TT5 (Integral 5-Valve Trans Mount - Max Temp 225° F) (RTD is not available with Integral 5-Valve Manifold. If RT	D is required, select					B C D				
1/2 in. NPT 1/2 in. Socket TT3 (Integral 3-Valve Trans Mount - Max Temp 225° F) TT5 (Integral 5-Valve Trans Mount - Max Temp 225° F) (RTD is not available with Integral 5-Valve Manifold. If RT "E" Transmitter Flange Connection and the appropriate m	D is required, select anifold valve under					B C D				
1/2 in. NPT 1/2 in. Socket TT3 (Integral 3-Valve Trans Mount - Max Temp 225° F) TT5 (Integral 5-Valve Trans Mount - Max Temp 225° F) (RTD is not available with Integral 5-Valve Manifold. If RT "E" Transmitter Flange Connection and the appropriate m the Instrument Valve section below.)	D is required, select anifold valve under					B C D				
1/2 in. NPT 1/2 in. Socket TT3 (Integral 3-Valve Trans Mount - Max Temp 225° F) TT5 (Integral 5-Valve Trans Mount - Max Temp 225° F) (RTD is not available with Integral 5-Valve Manifold. If RT "E" Transmitter Flange Connection and the appropriate m the Instrument Valve section below.) Transmitter Flange Connection CONNECTION / FLANCE RATING	D is required, select anifold valve under					B C D				
1/2 in. NPT 1/2 in. Socket TT3 (Integral 3-Valve Trans Mount - Max Temp 225° F) TT5 (Integral 5-Valve Trans Mount - Max Temp 225° F) (RTD is not available with Integral 5-Valve Manifold. If RT "E" Transmitter Flange Connection and the appropriate m the Instrument Valve section below.) Transmitter Flange Connection <u>CONNECTION / FLANGE RATING</u> 1-1/2 in. RF Flange 150# CS	D is required, select anifold valve under					B C D	A			
1/2 in. NPT 1/2 in. Socket TT3 (Integral 3-Valve Trans Mount - Max Temp 225° F) TT5 (Integral 5-Valve Trans Mount - Max Temp 225° F) (RTD is not available with Integral 5-Valve Manifold. If RT "E" Transmitter Flange Connection and the appropriate m the Instrument Valve section below.) Transmitter Flange Connection CONNECTION / FLANGE RATING 1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 300# CS 1-1/2 in. RF Flange 300# CS	D is required, select anifold valve under					B C D	AB			
1/2 in. NPT 1/2 in. Socket TT3 (Integral 3-Valve Trans Mount - Max Temp 225° F) TT5 (Integral 5-Valve Trans Mount - Max Temp 225° F) (RTD is not available with Integral 5-Valve Manifold. If RT "E" Transmitter Flange Connection and the appropriate m the Instrument Valve section below.) Transmitter Flange Connection CONNECTION / FLANGE RATING 1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 300# CS 1-1/2 in. RF Flange 000/1500# CS 1-1/2 in. RF Flange 000/1500# CS	D is required, select anifold valve under					B C D	A B C			
1/2 in. NPT 1/2 in. Socket TT3 (Integral 3-Valve Trans Mount - Max Temp 225° F) TT5 (Integral 5-Valve Trans Mount - Max Temp 225° F) (RTD is not available with Integral 5-Valve Manifold. If RT "E" Transmitter Flange Connection and the appropriate m the Instrument Valve section below.) Transmitter Flange Connection CONNECTION / FLANCE RATING 1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 300# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 150# SS	D is required, select anifold valve under					B C D	A B C D E			
1/2 in. NPT 1/2 in. Socket TT3 (Integral 3-Valve Trans Mount - Max Temp 225° F) TT5 (Integral 5-Valve Trans Mount - Max Temp 225° F) (RTD is not available with Integral 5-Valve Manifold. If RT "E" Transmitter Flange Connection and the appropriate m the Instrument Valve section below.) Transmitter Flange Connection CONNECTION / FLANCE RATING 1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 300# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Flange 300# SS	D is required, select anifold valve under					B C D	A B C D E F			
1/2 in. NPT 1/2 in. Socket TT3 (Integral 3-Valve Trans Mount - Max Temp 225° F) TT5 (Integral 5-Valve Trans Mount - Max Temp 225° F) (RTD is not available with Integral 5-Valve Manifold. If RT "E" Transmitter Flange Connection and the appropriate m the Instrument Valve section below.) Transmitter Flange Connection CONNECTION / FLANCE RATING 1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 300# CS 1-1/2 in. RF Flange 600# CS 1-1/2 in. RF Flange 500# CS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Flange 300# SS 1-1/2 in. RF Flange 300# SS 1-1/2 in. RF Flange 300# SS 1-1/2 in. RF Flange 600# SS	D is required, select anifold valve under					B C D E	A B C D E F G :			
1/2 in. NPT 1/2 in. Socket TT3 (Integral 3-Valve Trans Mount - Max Temp 225° F) TT5 (Integral 5-Valve Trans Mount - Max Temp 225° F) (RTD is not available with Integral 5-Valve Manifold. If RT "E" Transmitter Flange Connection and the appropriate m the Instrument Valve section below.) Transmitter Flange Connection CONNECTION / FLANCE RATING 1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 300# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Flange 300# SS 1-1/2 in. RF Flange 900# SS	D is required, select anifold valve under					E	A B C D E F G H			
1/2 in. NPT 1/2 in. Socket TT3 (Integral 3-Valve Trans Mount - Max Temp 225° F) TT5 (Integral 5-Valve Trans Mount - Max Temp 225° F) (RTD is not available with Integral 5-Valve Manifold. If RT "E" Transmitter Flange Connection and the appropriate m the Instrument Valve section below.) Transmitter Flange Connection CONNECTION / FLANCE RATING 1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 300# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Flange 300# SS 1-1/2 in. RF Flange 900# SS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Flange 300# SS 1-1/2 in. RF Flange 400# SS 1-1/2 in. RF Slange 300# SS 1-1/2 in. RF Slange 300# SS	D is required, select anifold valve under					E	A B C D E F G H	1		
1/2 in. NPT 1/2 in. Socket TT3 (Integral 3-Valve Trans Mount - Max Temp 225° F) TT5 (Integral 5-Valve Trans Mount - Max Temp 225° F) (RTD is not available with Integral 5-Valve Manifold. If RT "E" Transmitter Flange Connection and the appropriate m the Instrument Valve section below.) Transmitter Flange Connection CONNECTION / FLANCE RATING 1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 300# CS 1-1/2 in. RF Flange 900/1500# SS 1-1/2 in. RF Flange 900# SS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Flange 900# SS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Glange 900# SS	D is required, select anifold valve under					E	A B C D E F G H	1 2 2		
1/2 in. NPT 1/2 in. Socket TT3 (Integral 3-Valve Trans Mount - Max Temp 225° F) TT5 (Integral 5-Valve Trans Mount - Max Temp 225° F) (RTD is not available with Integral 5-Valve Manifold. If RT "E" Transmitter Flange Connection and the appropriate m the Instrument Valve section below.) Transmitter Flange Connection CONNECTION / FLANCE RATING 1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 300# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Flange 900/1500# SS 1-1/2 in. RF Flange 900# SS 1-1/2 in. RF Flange 600# SS 1-1/2 in. RF Flange 900/1500# SS 1-1/2 in. RF Flange 900/1500# SS 1-1/2 in. RF Flange 900/1500# SS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Flange 900/1500# SS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Flange 900/1500# SS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Slange 900/1500# SS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Flange 100# SS 1-1/2 in. RF Flange 10	D is required, select anifold valve under					E	A B C D E F G H	1 2 3 4		
1/2 in. NPT 1/2 in. Socket TT3 (Integral 3-Valve Trans Mount - Max Temp 225° F) TT5 (Integral 5-Valve Trans Mount - Max Temp 225° F) (RTD is not available with Integral 5-Valve Manifold. If RT "E" Transmitter Flange Connection and the appropriate m the Instrument Valve section below.) Transmitter Flange Connection CONNECTION / FLANCE RATING 1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 300# CS 1-1/2 in. RF Flange 900/1500# SS 1-1/2 in. RF Slange 900/1500# SS PIPE MOUNTING A105 CS 3000# A105 CS 3000# w/Double Support 316/316L SS 3000# w/Double Support Not Required	D is required, select anifold valve under					B C D	A B C D E F G H	1 2 3 4 Z		
1/2 in. NPT 1/2 in. Socket TT3 (Integral 3-Valve Trans Mount - Max Temp 225° F) TT5 (Integral 5-Valve Trans Mount - Max Temp 225° F) (RTD is not available with Integral 5-Valve Manifold. If RT "E" Transmitter Flange Connection and the appropriate m the Instrument Valve section below.) Transmitter Flange Connection CONNECTION / FLANCE RATING 1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 300# CS 1-1/2 in. RF Flange 900/1500# SS 1-1/2 in. RF Slange 900/1500# SS PIPE MOUNTING A105 CS 3000# A105 CS 3000# w/Double Support 316/316L SS 3000# w/Double Support Not Required INSTRUMENT VALVE	D is required, select anifold valve under					B C D	A B C D E F G H	1 2 3 4 Z		
1/2 in. NPT 1/2 in. Socket TT3 (Integral 3-Valve Trans Mount - Max Temp 225° F) TT5 (Integral 5-Valve Trans Mount - Max Temp 225° F) (RTD is not available with Integral 5-Valve Manifold. If RT "E" Transmitter Flange Connection and the appropriate m the Instrument Valve section below.) Transmitter Flange Connection CONNECTION / FLANGE RATING 1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 300# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 900/1500# SS 1-1/2 in. RF Socked A105 CS 3000# A105 CS 3000# A105 CS 3000# w/Double Support 316/316L SS 3000# w/Double Support Not Required INSTRUMENT VALVE 1/2 in. Gate CS w/Cross 1/2 in. Cate SS w/Cross	D is required, select anifold valve under					E	A B C D E F G H	1 2 3 4 Z	A	
1/2 in. NPT 1/2 in. Socket TT3 (Integral 3-Valve Trans Mount - Max Temp 225° F) TT5 (Integral 5-Valve Trans Mount - Max Temp 225° F) (RTD is not available with Integral 5-Valve Manifold. If RT "E" Transmitter Flange Connection and the appropriate m the Instrument Valve section below.) Transmitter Flange Connection CONNECTION / FLANGE RATING 1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 300# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 900/1500# SS 1-1/2 in. RF Socked A105 CS 3000# A105 CS 3000# A105 CS 3000# w/Double Support 316/316L SS 3000# w/Double Support Not Required INSTRUMENT VALVE 1/2 in. Gate CS w/Cross Not Required	D is required, select anifold valve under					E	A B C D E F G H	1 2 3 4 Z	A B Z	
1/2 in. NPT 1/2 in. Socket TT3 (Integral 3-Valve Trans Mount - Max Temp 225° F) TT5 (Integral 5-Valve Trans Mount - Max Temp 225° F) (RTD is not available with Integral 5-Valve Manifold. If RT "E" Transmitter Flange Connection and the appropriate m the Instrument Valve section below.) Transmitter Flange Connection CONNECTION / FLANGE RATING 1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 600# CS 1-1/2 in. RF Flange 900/1500# SS 1-1/2 in. RF Sockee A105 CS 3000# A105 CS 3000# A105 CS 3000# w/Double Support 316/316L SS 3000# w/Double Support Not Required IVSTRUMENT VALVE 1/2 in. Gate CS w/Cross Not Required ONLY AVAILABLE WITH OPTION "E" UNDER INSTRUM	D is required, select anifold valve under					E	A B C D E F G H	1 2 3 4 Z	A B Z	
1/2 in. NPT 1/2 in. Socket TT3 (Integral 3-Valve Trans Mount - Max Temp 225° F) TT5 (Integral 5-Valve Trans Mount - Max Temp 225° F) (RTD is not available with Integral 5-Valve Manifold. If RT "E" Transmitter Flange Connection and the appropriate m the Instrument Valve section below.) Transmitter Flange Connection CONNECTION / FLANGE RATING 1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 600# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 900/1500# SS 1-1/2 in. RF Socked A105 CS 3000# A105 CS 3000# w/Double Support 316/316L SS 3000# w/Double Support Not Required INSTRUMENT VALVE 1/2 in. Gate CS w/Cross Not Required ONLY AVAILABLE WITH OPTION "E" UNDER INSTRUM	D is required, select anifold valve under					E	A B C D E F G H	1 2 3 4 Z	A B Z E	
1/2 in. NPT 1/2 in. Socket TT3 (Integral 3-Valve Trans Mount - Max Temp 225° F) TT5 (Integral 5-Valve Trans Mount - Max Temp 225° F) (RTD is not available with Integral 5-Valve Manifold. If RT "E" Transmitter Flange Connection and the appropriate m the Instrument Valve section below.) Transmitter Flange Connection CONNECTION / FLANGE RATING 1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 300# CS 1-1/2 in. RF Flange 300# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 900/1500# SS PIPE MOUNTING A105 CS 3000# A105 CS 3000# A105 CS 3000# w/Double Support Not Required INSTRUMENT VALVE 1/2 in. Gate CS w/Cross Not Required ONLY AVAILABLE WITH OPTION "E" UNDER INSTRUM Flg x Flg 3-Valve Manifo	D is required, select anifold valve under					E	A B C D E F G H	1 2 3 4 Z	A B Z E F G	
1/2 in. NPT 1/2 in. Socket TT3 (Integral 3-Valve Trans Mount - Max Temp 225° F) TT5 (Integral 5-Valve Trans Mount - Max Temp 225° F) (RTD is not available with Integral 5-Valve Manifold. If RT "E" Transmitter Flange Connection and the appropriate m the Instrument Valve section below.) Transmitter Flange Connection CONNECTION / FLANGE RATING 1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 300# CS 1-1/2 in. RF Flange 900/1500# SS PIPE MOUNTING A105 CS 3000# A105 CS 3000# w/Double Support 316/316L SS 3000# A105 CS 3000# w/Double Support Not Required INSTRUMENT VALVE 1/2 in. Gate CS w/Cross Not Required ONLY AVAILABLE WITH OPTION "E" UNDER INSTRUM Flg X Flg 3-Valve Manifold CS - Max Temp 225° F	D is required, select anifold valve under					E	A B C D E F G H	1 2 3 4 Z	A B Z E F G H	
1/2 in. NPT 1/2 in. Socket TT3 (Integral 3-Valve Trans Mount - Max Temp 225° F) (RTD is not available with Integral 5-Valve Manifold. If RT "E" Transmitter Flange Connection and the appropriate m the Instrument Valve section below.) Transmitter Flange Connection CONNECTION / FLANGE RATING 1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 300# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 150# SS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 900/1500# CS 1-1/2 in. RF Flange 900/1500# SS PIPE MOUNTING A105 CS 3000# A105 CS 3000# w/Double Support 316/316L SS 3000# A105 CS 3000# w/Double Support 316/316L SS 3000# Mot Required INSTRUMENT VALVE 1/2 in. Gate CS w/Cross 1/2 in. Gate SS w/Cross Not Required ONLY AVAILABLE WITH OPTION "E" UNDER INSTRUM	D is required, select anifold valve under					E	A B C D E F G H	1 2 3 4 Z	A B Z E F G H I	
1/2 in. NPT 1/2 in. Socket TT3 (Integral 3-Valve Trans Mount - Max Temp 225° F) (RTD is not available with Integral 5-Valve Manifold. If RT "E" Transmitter Flange Connection and the appropriate m the Instrument Valve section below.) Transmitter Flange Connection CONNECTION / FLANGE RATING 1.1/2 in. RF Flange 150# CS 1.1/2 in. RF Flange 300# CS 1.1/2 in. RF Flange 900/1500# CS 1.1/2 in. RF Flange 150# SS 1.1/2 in. RF Flange 900/1500# CS 1.1/2 in. RF Flange 900/1500# CS 1.1/2 in. RF Flange 900/1500# CS 1.1/2 in. RF Flange 900/1500# SS PIPE MOUNTING A105 CS 3000# A105 CS 3000# w/Double Support 316/316L SS 3000# A105 CS 3000# w/Double Support 316/316L SS 3000# MSTRUMENT VALVE 1/2 in. Gate CS w/Cross Not Required ONLY AVAILABLE WITH OPTION "E" UNDER INSTRUM Flg x Flg 3-Valve Manifold CS - Max Temp 225° F Flg x Flg 3-Valv	D is required, select anifold valve under					E	A B C D E F G H	1 2 3 4 Z	A B Z E F G H I	
1/2 in. NPT 1/2 in. Socket TT3 (Integral 3-Valve Trans Mount - Max Temp 225° F) TT5 (Integral 5-Valve Trans Mount - Max Temp 225° F) (RTD is not available with Integral 5-Valve Manifold. If RT "E" Transmitter Flange Connection and the appropriate m the Instrument Valve section below.) Transmitter Flange Connection CONNECTION / FLANGE RATING 1-1/2 in. RF Flange 150# CS 1-1/2 in. RF Flange 300# CS 1-1/2 in. RF Flange 500# CS 1-1/2 in. RF Flange 100# SS 1-1/2 in. RF Flange 100# SS 1-1/2 in. RF Flange 900/1500# SS PIPE MOUNTING A105 CS 3000# A105 CS 3000# w/Double Support 316/316L SS 3000# A105 CS 3000# w/Double Support Not Required NSTRUMENT VALVE 1/2 in. Gate CS w/Cross 1/2 in. Gate SS w/Cross Not Required ONLY AVAILABLE WITH OPTION "E" UNDER INSTRUM Flg x Flg 3-Valve Manifold CS - M	D is required, select anifold valve under					E E	A B C D E F G H	1 2 3 4 Z	A B Z E F G H I	
 1/2 in. NPT 1/2 in. Socket TT3 (Integral 3-Valve Trans Mount - Max Temp 225° F) (RTD is not available with Integral 5-Valve Manifold. If RT "E" Transmitter Flange Connection and the appropriate m the Instrument Valve section below.) Transmitter Flange Connection CONNECTION / FLANGE RATING 1.1/2 in. RF Flange 150# CS 1.1/2 in. RF Flange 600# CS 1.1/2 in. RF Flange 600# CS 1.1/2 in. RF Flange 150# SS 1.1/2 in. RF Flange 150# SS 1.1/2 in. RF Flange 300# SS 1.1/2 in. RF Flange 900/1500# CS 1.1/2 in. RF Flange 900/1500# SS 1.1/2 in. Gate SS w/Cross 1.1/2 in. Gate CS w/Cross 1.1/2 in. Gate SS w/Cross Not Required ONLY AVAILABLE WITH OPTION "E" UNDER INSTRUM Flg x Flg 3-Valve Manifold CS - Max Temp 225° F Flg x Flg 3-Valve Manifold SS - Max Temp 225° F Flg x Flg 3-Valve Manifold SS - Max Temp 225° F Flg x Flg 5-Valve Manifold SS - Max Temp 225° F Flg x Flg 5-Valve Manifold SS - Max Temp 225° F Flg x Flg 5-Valve Manifold SS - Max Temp 225° F Flg x Flg 5-Valve Manifold SS - Max Temp 225° F Flg x Flg 5-Valve Manifold SS - Max Temp 225° F Flg x Flg 5-Valve Manifold SS - Max Temp 225° F Flg x Flg 5-Valve Manifold SS - Max Temp 225° F Flg x Flg 5-Valve Manifold SS - Max Temp 225° F Flg x Flg 5-Valve Manifold SS - Max Temp 225° F Flg X Flg 5-Valve Manifold	D is required, select anifold valve under					E	A B C D E F G H	1 2 3 4 Z	A B Z E F G H I	
1/2 in. NPT 1/2 in. Socket TT3 (Integral 3-Valve Trans Mount - Max Temp 225° F) (RTD is not available with Integral 5-Valve Manifold. If RT "E" Transmitter Flange Connection and the appropriate m the Instrument Valve section below.) Transmitter Flange Connection CONNECTION / FLANGE RATING 1.1/2 in. RF Flange 150# CS 1.1/2 in. RF Flange 300# CS 1.1/2 in. RF Flange 600# CS 1.1/2 in. RF Flange 150# SS 1.1/2 in. RF Flange 100# SS 1.1/2 in. RF Flange 900/1500# CS 1.1/2 in. RF Flange 900/1500# CS 1.1/2 in. RF Flange 900/1500# SS PIPE MOUNTING A105 CS 3000# A105 CS 3000# w/Double Support 316/316L SS 3000# A105 CS 3000# w/Double Support Not Required ONLY AVAILABLE WITH OPTION "E" UNDER INSTRUM Flg x Flg 3-Valve Manifold CS - Max Temp 225° F Flg x Flg 3-Valve Manifold SS - Max Temp 225° F Flg x Flg 3-Valve Manifold SS - Max Temp 225° F Flg x Flg 5-Valve Manifold SS - Max Temp 225° F Flg x F	D is required, select anifold valve under						A B C D E F G H	1 2 3 4 Z	A B Z E F G H I	
1/2 in. NPT 1/2 in. Socket TT3 (Integral 5-Valve Trans Mount - Max Temp 225° F) (RTD is not available with Integral 5-Valve Manifold. If RT "E" Transmitter Flange Connection and the appropriate m the Instrument Valve section below.) Transmitter Flange Connection CONNECTION / FLANGE RATING 1.1/2 in. RF Flange 150# CS 1.1/2 in. RF Flange 300# CS 1.1/2 in. RF Flange 900/1500# CS 1.1/2 in. RF Flange 150# SS 1.1/2 in. RF Flange 900/1500# CS 1.1/2 in. RF Flange 900/1500# CS 1.1/2 in. RF Flange 900/1500# CS 1.1/2 in. RF Flange 900/1500# SS PIPE MOUNTING A105 CS 3000# A105 CS 3000# w/Double Support 316/316L SS 3000# A105 CS 3000# w/Double Support Not Required NSTRUMENT VALVE 1/2 in. Gate CS w/Cross 1/2 in. Gate SS w/Cross Not Required ONLY AVAILABLE WITH OPTION "E" UNDER INSTRUM Flg x Flg 3-Valve Manifold CS - Max Temp 225° F Flg x Flg 3-Valve Manifold S	D is required, select anifold valve under					E	A B C D E F G H	1 2 3 4 Z	A B Z E F G H I	1 2 Z

Ellipse®	PASE2									
Annular Flanged Steam	FASI 2									<u> </u>
<u>PIPE SIZE</u>										
12 IN.		J								
16 in.		L								
18 in.		M								
20 in.		Ν								
24 in.		0								
30 IN.		P 0								
42 in.		R								
48 in.		S								
SCHEDULE										
STD			Α							
20			В							
30			C							
60			F							
80			F							
100			G							
120			H							
140			Т							
160			J							
XH			ĸ							
5S			L							
10S			N							
40S			0							
80S			Р							
<u>PIPE ORIENTATION</u>										
Horizontal				A						
				D	-					
316/316L SS					1					
Monel®					2					
Inconel®					3					
Hastelloy®					4					
					X	1				
1/2 in NPT						А				
1/2 in. Socket						В				
TT3 (Integral 3-Valve Trans Mount - Max Temp 225° F)						С				
TT5 (Integral 5-Valve Trans Mount - Max Temp 225° F)						D				
(RTD is not available with Integral 5-Valve Manifold. If R	TD is required, select									
the Instrument Valve section below)	naniioid vaive under									
Transmitter Flange Connection						Е				
CONNECTION / FLANGE RATING										
3 in. RF Flange 150# CS							Α			
3 In. RF Flange 300# CS							В			
3 in. RF Flange 900/1500# CS							D			
3 in. RF Flange 150# SS							Ē			
3 in. RF Flange 300# SS							F			
3 in. RF Flange 600# SS							G			
3 In. RF Flange 900/1500# SS							Н	l		
A105 CS 3000#								1		
316/316L SS 3000#								2		
A105 CS 3000# w/Double Support								3		
316/316L SS 3000# w/Double Support								4		
Not Required								Z	J	
1/2 in Gate CS w/Cross									Δ	
1/2 in. Gate SS w/Cross									В	
Not Required									Ζ	
ONLY AVAILABLE WITH OPTION "E" UNDER INSTRU	MENT CONNECTIO	N							_	
Fig x Fig 3-Valve Manifold CS - Max Temp 225° F									Ë	
Fig x Fig 5-Valve Manifold CS - Max Temp 225° F Fig x Fig 5-Valve Manifold CS - Max Temp 225° F									г G	
Flg x Flg 5-Valve Manifold SS - Max Temp 225° F									Н	
Customer Supplied Valve Manifold										
RTD (Max Temp 480° F, consult factory for higher temp	options)									
100 Ohm RTD 3-Wire w/Explosion Proof Head										1
Not Required										2 7
										-
Stainless Steel ID Tag supplied as standard.										
			- <i>w</i>	- ·						
N() LE: Make sure that DP and Resonance are withing accent	table limite (See chai	مطاه صناه	Linco	Broch	uro)					

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Ellipse[®] Pitot Tube Meter

Annular Low Pressure Wet Tap Flow Meter

DESCRIPTION

The Ellipse® Annular Low Pressure Wet Tap Flow Meter is a multi-ported, self-averaging differential pressure flow element for liquid(without system shutdown), air and gas applications. The Ellipse flow meter is designed with a series of ports facing the upstream velocity pressures and flow sensing ports strategically located ahead of the trailing edge flow separation.

COMPONENTS

All sensors are furnished with 1/2 in. instrument valves, threaded weld fitting, threaded ball valve, threaded cage nipple, threaded compression fitting, and ID tag as standard equipment. Available options include integral 3-valve or 5-valve transmitter mount manifold and integral RTD temperature sensor.

FEATURES

- Single point pipe entry for DP, temperature and static pressure
- No dampening software required
- Low pressure loss (typically 3% of DP in a 12 in. (304 mm) line)
- Accuracy: ±0.75% of reading, repeatability: ±0.1% of reading
- Turndown Ratio: 17:1; no vacuum effects
- No moving part construction provides long, trouble-free service life
- True static pressure measurement rather than a calculated value
- Overcomes loss of accuracy caused by fluid separation at the sensor body

CONFIGURATION

The flow element has a two-piece construction: an elliptical shape and two 100% independent flow sensing chambers. This construction prevents signal degradation and mixing, and does not require dampening hardware or software. The impact velocity sensing holes (high pressure) are located along the leading edge and the true static sensing holes (low pressure) are on the exterior probe side. This does not generate any vortices or vacuum effects that impinge on the static pressure measurement sensing area and has a drag coefficient of 0.32 or less. Each flow sensor is complete with instrument shut off valves with provisions to accept a transmitter or direct indicating meter. An identification tag is supplied with specific flow station measurement information as required.



SPECIFICATIONS

Applications	Liquid (without system shutdown), air, gas
Pipe Sizes	248 inches (501220 mm)
Pressure	150 psi (1034 kPa) maximum
Temperature	150° F (66° C) maximum
Accuracy	±0.75% of reading
Repeatability	±0.1%
Turndown Ratio	17:1 with no vacuum effect
Reynolds	>75,000: Maintains most accurate flow measurements
Number	<75,000: Consult factory for estimated results
Resonance	If greater than 0.8, use double support.

STANDARD COMPONENTS

Component	Specifications
Head	T-type
Connection	316 SS 1/4 in. or 1/2 in. FNPT
Compression Fitting	CS with SS ferrule
Isolation Ball Valves	316 SS, NPT
Reducer Coupling	CD
Weld Fitting	CS 3000 lb, ASTM A105
Nipples	CS, schedule 40
Ellipse Sensor	316 SS
ID Tag	316 SS with wire
Instrument Valves	2 per sensor, 1/4 in. or 1/2 in., CS



Product Data Sheet

PART NUMBER CONSTRUCTION

Ellipse®	PAHR -										
7/8 in. DIAMETER				,,		, <u> </u>			, <u> </u>	, <u> </u>	
PIPE SIZE											
2 in.		A									
2-1/2 in.		B									
3-1/2 in.	i	D									
4 in.	I	Е									
5 in.		F									
8 in.		H									
10 in.		L									
12 in.		J									
16 in.		L									
18 in.	r	М									
20 in.	1	N									
30 in.		P									
36 in.		Q									
<u>SCHEDULE</u>											
20			B								
30			C								
40			D								
60			E								
100			G								
120			Н								
140			1								
хн			ĸ								
ХХН			L								
5S			M								
40S			N O								
80S			Ρ								
PIPE ORIENTATION Horizontal				Δ							
Vertical				В							
PROBE MATERIAL											
316/316L SS Monel®					1 2						
Inconel®					3						
Hastelloy®					4						
Other					~	J					
1/2 in. NPT						А					
1/2 in. Socket			-\			В					
TT5 (Integral 5-Valve Trans Mo	unt - Max Temp 22 unt - Max Temp 22	25° F 25° F	-) -)			D					
(RTD is not available with Integ	ral 5-Valve Manifol	d. If	RTD	is requ	ired, se	elect					
"E" Transmitter Flange Connect	tion and the approp	oriate	e man	ifold va	alve un	der					
Transmitter Flange Connection	:IOW.)					Е					
CONNECTION							•				
CS Compression Fitting w/SS F SS Compression Fitting w/SS F	errule						A B				
INSERTION MECHANISM	0.1010							1			
CS Nipple & SS Isolation Valve								A			
Other	Valve							х			
PIPE MOUNTING*									4		
A105 CS 3000#									1		
Not Required									ź		
INSTRUMENT VALVE										-	
1/2 in. Needle CS 1/2 in. Needle SS										A R	
Not Required										z	
ONLY AVAILABLE WITH OPTI	ON "E" UNDER IN	ISTF	RUME	NT CC	NNEC	TION				F	
Fig x Fig 3-valve Manifold CS - Fig x Fig 3-Valve Manifold SS -	Max Temp 225° F									F	
Flg x Flg 5-Valve Manifold CS -	Max Temp 225° F									G	
Flg x Flg 5-Valve Manifold SS -	Max Temp 225° F									н	
RTD (Max Temp 480° F, consult f	factory for higher	tem	p op	ions)						1	1
100 Ohm RTD 3-Wire w/Explos	ion Proof Head										1
100 Ohm RTD 3-Wire, Integral	w/Aluminum Head										2
	atapdard										۷.
Tag information must be included w	vith order.										

NOTE: Make sure that DP and Resonance are withing acceptable limits. (See chart in the Ellipse Brochure) *Double Supports are not recommended for Hot Tap / Wet Tap models.

Ellipse®	PAHR1										l I
Annular Low Pressure Wet Tap	PARKI -										
1-1/4 IN. DIAMETER											
<u>PIPE SIZE</u> 12 in		Л									
14 in.		ĸ									
16 in.		L									
18 in.		М									
20 in.		Ν									
24 in.		0									
30 in.		Р									
36 III. 42 in		Q									
42 III. 48 in		S									
40 in.		т									
72 in.		U									
SCHEDULE											
STD			А								
20			В								
30			С								
40			D								
60			E								
80			F			1					
100			G			1					
140			н								
160			ı J								
YH I			ĸ			1					
			1								
55			м								
10S			N								
40S			0								
80S			Р								
PIPE ORIENTATION											
Horizontal				A							
				В							
316/316L SS					1						
Monel®					2						
Inconel®					3						
Hastelloy®					4						
Other					Х						
INSTRUMENT CONNECTION											
1/2 in. NPT						Α					
1/2 in. Socket						В					
TT3 (Integral 3-Valve Trans Mount - Max Temp 225° F)						C					
(RTD is not evoluble with Integral 5 Value Manifold If RTC) is required coloct					D					
"F" Transmitter Flance Connection and the appropriate ma	nifold valve under										
the Instrument Valve section below.)											
Transmitter Flange Connection						Е					
CONNECTION							•				
CS Compression Fitting w/SS Ferrule							Α				
SS Compression Fitting w/SS Ferrule							В				
INSERTION MECHANISM											
US INIPPLE & SS Isolation Valve								A			
Other								X			
PIPE MOUNTING*											
A105 CS 3000#									1		
316/316L SS 3000#									2		
Not Required									Z	J	
INSTRUMENT VALVE											
1/2 in Needle SS										R	
1/2 in. Gate CS										C	
1/2 in. Gate SS										Ď	
Not Required										Ζ	
ONLY AVAILABLE WITH OPTION "E" UNDER INSTRUME	ENT CONNECTION										
FIg x FIg 3-Valve Manifold CS - Max Temp 225° F										Е	
FIg x FIg 3-Valve Manifold SS - Max Temp 225° F										F	
Fig x Fig 5-Valve Manifold CS - Max Temp 225° F										G	
Fig x Fig 5-Valve Manifold SS - Max Temp 225° F										н	
RTD (Max Temp 480° F, consult factory for higher temp on	tions)									1	-
100 Ohm RTD 3-Wire w/Explosion Proof Head											1
100 Ohm RTD 3-Wire, Integral w/Aluminum Head											2
Not Required											Z
Stainless Steel ID Tag supplied as standard											
Tag information must be included with order.											

NOTE: Make sure that DP and Resonance are withing acceptable limits. (See chart in the Ellipse Brochure) *Double Supports are not recommended for Hot Tap / Wet Tap models.

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Ellipse[®] Pitot Tube Meter

Annular High Pressure Hot Tap Flow Meter

DESCRIPTION

The Ellipse® Annular High Pressure Hot Tap Flow Meter is a multi-ported, self-averaging differential pressure flow element for air, liquid and gas applications. The Ellipse flow meter is designed with a series of ports facing the upstream velocity pressures and flow sensing ports strategically located ahead of the trailing edge flow separation.

COMPONENTS

All sensors are furnished with 1/2 in. instrument valves, threaded weld fitting, threaded ball valve, threaded insert/retract mechanism with rods, and ID tag as standard equipment. Available options include integral 3-valve or 5-valve transmitter mount manifold and integral RTD temperature sensor.

FEATURES

- Hot-tap model installs without system shutdown
- Single point pipe entry for DP, temperature and static pressure
- No dampening software required
- Low pressure loss (typically 3% of DP in a 12 in. (304 mm) line) due to the patented aerodynamic profile
- Optional NIST traceable calibration
- Accuracy: ±0.75% of reading, repeatability: ±0.1% of reading
- Turndown Ratio: 17:1; no vacuum effects
- No moving part construction provides long, trouble-free service life
- True static pressure measurement rather than a calculated value
- Overcomes loss of accuracy caused by fluid separation at the sensor body

CONFIGURATION

The flow element has a two-piece construction: an elliptical shape and two 100% independent flow sensing chambers. This construction prevents signal degradation and mixing, and does not require dampening hardware or software. The impact velocity sensing holes (high pressure) are located along the leading edge and the true static sensing holes (low pressure) are on the exterior probe side. This does not generate any vortices or vacuum effects that impinge on the static pressure measurement sensing area and has a drag coefficient of 0.32 or less. Each flow sensor is complete with instrument shutoff valves or optional integral manifold valve for direct transmitter mount. An identification tag is supplied with specific flow station measurement information, as required.





MAXIMUM ALLOWABLE DP (INCHES OF WATER COLUMN)

Pipe Size	Single S Probe Si	upport ize (in.)	Double Support Probe Size (in.)			
-	7/8	1-1/4	7/8	1-1/4		
2 in. (50.80 mm)	880	—	2380	—		
2-1/2 in. (63.50 mm)	525		1558	_		
3 in. (76.20 mm)	396	—	1283	—		
3-1/2 in. (88.90 mm)	283		1117	_		
4 in. (101.60 mm)	197	—	980	—		
5 in. (127.00 mm)	153		757	_		
6 in. (152.40 mm)	126	—	669	—		
8 in. (203.20 mm)	114	360	512	_		
10 in. (254.80 mm)	100	240	315	960		
12 in. (304.80 mm)	87	175	250	700		
14 in. (355.60 mm)	53	147	195	585		
16 in. (406.40 mm)	_	113	_	450		
18 in. (457.20 mm)	-	90	—	360		
20 in. (508.00 mm)	_	74	_	295		
24 in. (609.60 mm)	—	68	—	270		
26 in. (660.40 mm)	_	50	_	215		
30 in. (762.00 mm)	_	34	_	155		

Product Data Sheet

SPECIFICATIONS

Applications	Air, liquids and gases
Pipe Size	230 in. (50760 mm)
Pressure	800 PSI (5515 kPa) max. Consult factory for higher pressure
Temperature	800° F (426° C) max. Consult factory for higher temperature
Accuracy	±0.75% of reading
Repeatability	±0.1%
Turndown Ratio	17:1 with no vacuum effect
Reynolds Number	>75,000: Maintains most accurate flow measurements <75,000: Consult factory for estimated results
Resonance	Less than 0.8 but greater than 1.2. If greater than 0.8, use double support. System shutdown is required when the double support option is used. Select larger diameter Ellipse to avoid double support.

STANDARD COMPONENTS

Component	Specifications
Head	T-type
Connection	316 SS 1/4 in. or 1/2 in. FNPT
Fitting	CS 3000 lb. weld – ASTM A105
Ellipse Sensor	316/316L SS
Instrument Valves	2 per sensor, CS 1/4 in. or 1/2 in.
Sensor Flange	150 lbs 316/316L SS
Packing Chamber	CS with molythane or graphite packing gland
Packing Chamber Flange	CS 150 lb with SS cap
Isolation Ball Valve	316-SS, NPT threaded
Nuts and Bolts	CS threaded
Nipples	CS, schedule 40

DIMENSIONS



	AHL "A" Dimensions				AHL1 "A" Dimensio	Probe Width "C"			
Schedule	Pipe Size in. (mm)	Inserted in. (mm)	Retracted in. (mm)	Pipe Size in. (mm)	Inserted in. (mm)	Retracted in. (mm)	Model	C in. (mm)	
	2 (50.80)	29.5 (749.30)	38.5 (977.90)	12 (304.80)	42.125 (1069.98)	61.75 (1568.45)	AHL	0.875 (22.225)	
	2-1/2 (63.50)	30 (762.00)	39.5 (1003.30)	14 (355.60)	44.125 (1120.78)	65 (1651.00)	AHL1	1.25 (31.750)	
	3 (76.20)	30.5 (774.70)	40.5 (1028.70)	16 (406.40)	46.125 (1171.58)	69 (1752.60)	—	_	
	3-1/2 (88.90)	31 (787.40)	41.5 (1054.10)	18 (457.20)	48.125 (1222.38)	73 (1854.20)	—	_	
Chandand	4 (101.60)	31.5 (800.10)	42.5 (1079.50)	20 (508.00)	50.125 (1273.18)	77 (1955.80)	—	—	
Standard	5 (127.00)	32.5 (825.50)	44.5 (1130.30)	24 (609.60)	54.125 (1374.78)	85 (2159.00)	—	—	
Schedule	6 (152.40)	33.375 (847.725)	46.5 (1181.10)	30 (762.00)	60.125 (1527.18)	97 (2463.80)	—	—	
	8 (203.20)	35.375 (898.525)	50.5 (1282.70)	—	—	—	—	_	
	10 (254.80)	37.375 (949.325)	54.5 (1384.30)	—	_	—	—	_	
	12 (304.80)	39.375 (1000.13)	58.5 (1485.90)	—	—	—	—	_	
	14 (355.60)	41.375 (1050.93)	61.75 (1568.45)	_	_	_	_	_	

PART NUMBER CONSTRUCTION

Ellipse*										
Annular High Pressure Hot Tap	FARL -									·
										ĺ
<u>PIPE SIZE</u> 2 in	А									ĺ
2-1/2 in.	В									ĺ
3 in.	C									ĺ
3-1/2 In. 4 in.	E									ĺ
5 in.	F									ĺ
6 in.	G									ĺ
8 in.	н									ĺ
12 in.	J									ĺ
14 in.	к									ĺ
16 in. 18 in	L									ĺ
20 in.	N									ĺ
24 in.	0									ĺ
30 m.	Q									ĺ
SCHEDULE										ĺ
STD		A								ĺ
30		с В								ĺ
40		D								ĺ
60		Е								ĺ
80		F								ĺ
120		н								ĺ
140		Ļ								i i
160		J								l l
XH XXH		L								ĺ
5S		М								ĺ
10S		N								ĺ
405 80S		P								ĺ
PIPE ORIENTATION										ĺ
Horizontal			A							ĺ
PROBE MATERIAL			Б							ĺ
316/316L SS				1						ĺ
Monel® Inconel®				2						ĺ
Hastelloy®				4						ĺ
Other				Х						ĺ
INSTRUMENT CONNECTION					^					ĺ
1/2 in. Socket					В					ĺ
TT3 (Integral 3-Valve Trans Mount - Max Temp 225° F)					С					İ
TT5 (Integral 5-Valve Trans Mount - Max Temp 225° F) (RTD is not available with Integral 5-Valve Manifold, If RT	D is required select				D					ĺ
"E" Transmitter Flange Connection and the appropriate m	anifold valve under									İ
the Instrument Valve section below.)					-					ĺ
Insertion Mechanism / Isolation Ball Valve					E					ĺ
CS Cage Nipple & Rods						А				ĺ
SS Cage Nipple & Rods						B				ĺ
SS Gear Drive, Cage Nipple & Rods						D				ĺ
NOTE: SS Gear Drive - SS for Housing and Wetted Parts	s Only									ĺ
						Х				ĺ
Molythane (-65200° F, 140° F in water and high water-ba	ased fluids)						1			ĺ
Viton®/Fluorocarbon (-20° F to 400° F)							2			ĺ
Graphoil (1200° F) EPDM (-65 - 300° F - 400° F in steam)							3 4			ĺ
Fluoromyte (-65300° F)							5			i
Other							Х	I		
								1		i
A105 CS 3000#								2		
A105 CS 3000# 316/316L SS 3000#								3		
A105 CS 3000# 316/316L SS 3000# Supplied Seperately by Preso Not Required								7		ļ
A105 CS 3000# 316/316L SS 3000# Supplied Seperately by Preso Not Required INSTRUMENT VALVE								Z		
A 105 CS 3000# 316/316L SS 3000# Supplied Seperately by Preso Not Required INSTRUMENT VALVE 1/2 in. Needle CS								z	A	
A 105 CS 3000# 316/316L SS 3000# Supplied Seperately by Preso Not Required INSTRUMENT VALVE 1/2 in. Needle CS 1/2 in. Gete CS 1/2 in. Gete CS								Z	A B C	
A 105 CS 3000# 316/316L SS 3000# Supplied Seperately by Preso Not Required INSTRUMENT VALVE 1/2 in. Needle CS 1/2 in. Sedle SS 1/2 in. Gate SS 1/2 in. Gate SS								Z	A B C D	
A 105 CS 3000# 316/316L SS 3000# Supplied Seperately by Preso Not Required INSTRUMENT VALVE 1/2 in. Needle CS 1/2 in. Needle SS 1/2 in. Gate SS Not Required ON K 404 A DE EWETL COTION OF A DECE								Z	A B C D Z	
A 105 CS 3000# 316/316L SS 3000# Supplied Seperately by Preso Not Required INSTRUMENT VALVE 1/2 in. Needle CS 1/2 in. Needle SS 1/2 in. Gate SS 1/2 in. Gate SS Not Required ONLY AVAILABLE WITH OPTION "E" UNDER INSTRUM Fig x-Fig 3-Valve Manifold CS - Max Temp 225° F	IENT CONNECTION							Z	A B C D Z E	
A 105 CS 3000# 316/316L SS 3000# Supplied Seperately by Preso Not Required INSTRUMENT VALVE 1/2 in. Needle CS 1/2 in. Needle SS 1/2 in. Gate SS 1/2 in. Gate SS Not Required ONLY AVAILABLE WITH OPTION "E" UNDER INSTRUM Flg x Flg 3-Valve Manifold CS - Max Temp 225° F Flg x Flg 3-Valve Manifold SS - Max Temp 225° F								Z	A B C D Z E F	
A 105 CS 3000# 316/316L SS 3000# Supplied Seperately by Preso Not Required IVSTRUMENT VALVE 1/2 in. Needle CS 1/2 in. Needle SS 1/2 in. Gate SS Not Required ONLY AVAILABLE WITH OPTION "E" UNDER INSTRUM Flg x Flg 3-Valve Manifold CS - Max Temp 225" F Flg x Flg 3-Valve Manifold CS - Max Temp 225" F Flg x Flg 3-Valve Manifold CS - Max Temp 225" F Flg x Flg 5-Valve Manifold CS - Max Temp 225" F Flg x Flg 5-Valve Manifold CS - Max Temp 225" F Flg x Flg 5-Valve Manifold CS - Max Temp 225" F								Z	A B C D Z E F G	
A 105 CS 3000# 316/316L SS 3000# Supplied Seperately by Preso Not Required INSTRUMENT VALVE 1/2 in. Needle CS 1/2 in. Gate CS 1/2 in. Gate CS 1/2 in. Gate SS Not Required ONLY AVAILABLE WITH OPTION "E" UNDER INSTRUM Fig x Fig 3-Valve Manifold CS - Max Temp 225" F Fig x Fig 3-Valve Manifold CS - Max Temp 225" F Fig x Fig 5-Valve Manifold CS - Max Temp 225" F Fig x Fig 5-Valve Manifold CS - Max Temp 225" F Fig x Fig 5-Valve Manifold CS - Max Temp 225" F Fig x Fig 5-Valve Manifold CS - Max Temp 225" F Fig x Fig 5-Valve Manifold CS - Max Temp 225" F	IENT CONNECTION							Z	A B C D Z E F G H I	
A 105 CS 3000# 316/316L SS 3000# Supplied Seperately by Preso Not Required INSTRUMENT VALVE 1/2 in. Needle CS 1/2 in. Gate CS 1/2 in. Gate CS 1/2 in. Gate SS Not Required ONLY AVAILABLE WITH OPTION "E" UNDER INSTRUM Fig x Fig 3-Valve Manifold CS - Max Temp 225" F Fig x Fig 3-Valve Manifold CS - Max Temp 225" F Fig x Fig 5-Valve Manifold CS - Max Temp 225" F Fig x Fig 5-Valve Manifold CS - Max Temp 225" F Fig x Fig 5-Valve Manifold CS - Max Temp 225" F Fig x Fig 5-Valve Manifold CS - Max Temp 225" F Fig x Fig 5-Valve Manifold CS - Max Temp 225" F Customer Supplied Valve Manifold RTD (Max Temp 480" F, consult factory for higher temp of	IENT CONNECTION							Z	A B C D Z F G H I	
A 105 CS 3000# 316/316L SS 3000# Supplied Seperately by Preso Not Required INSTRUMENT VALVE 1/2 in. Needle CS 1/2 in. Gate CS 1/2 in. Gate CS 1/2 in. Gate CS 1/2 in. Gate SS Not Required ONLY A VAILABLE WITH OPTION "E" UNDER INSTRUM FIg x Fig 3-Valve Manifold CS - Max Temp 225° F Fig x Fig 3-Valve Manifold CS - Max Temp 225° F Fig x Fig 5-Valve Manifold CS - Max Temp 225° F Fig x Fig 5-Valve Manifold CS - Max Temp 225° F Fig x Fig 5-Valve Manifold SS - Max Temp 225° F Fig x Fig 5-Valve Manifold SS - Max Temp 225° F Customer Supplied Valve Manifold RTD (Max Temp 480° F, consult factory for higher temp o 100 Ohm RTD 3-Wire wExplosion Proof Head 100 Ohm RTD 3-Wire wIExplosion Proof Head	IENT CONNECTION							z	A B C D Z E F G H I	1 2
A 105 CS 3000# 316/316L SS 3000# Supplied Seperately by Preso Not Required INSTRUMENT VALVE 11/2 in. Needle CS 11/2 in. Gate CS 11/	MENT CONNECTION							<u>z</u>	A B C D Z E F G H I	1 2 Z
A 105 CS 3000# 316/316L SS 3000# Supplied Seperately by Preso Not Required INSTRUMENT VALVE 11/2 in. Needle CS 11/2 in. Needle SS 11/2 in. Gate SS 11/2 in. Gate SS 11/2 in. Gate SS 11/2 in. Gate SS Not Required ONLY A VAILABLE WITH OPTION "E" UNDER INSTRUM Fig x Fig 3-Valve Manifold CS - Max Temp 225° F Fig x Fig 3-Valve Manifold SS - Max Temp 225° F Fig x Fig 3-Valve Manifold SS - Max Temp 225° F Fig x Fig 5-Valve Manifold SS - Max Temp 225° F Fig x Fig 5-Valve Manifold SS - Max Temp 225° F Customer Supplied Valve Manifold SS - Max Temp 225° F Customer Supplied Valve Manifold RTD (Max Temp 480° F, consult factory for higher temp of 100 Ohm RTD 3-Wire w/Explosion Proof Head 100 Ohm RTD 3-Wire, Integral w/Aluminum Head Not Required Stainless Steel ID Tag supplied as standard.	IENT CONNECTION							z	A B C D Z E F G H I	1 2 Z
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Ellipse®											
Annular High Pressure Hot Tap 1-1/4 in. DIAMETER			<u> </u>			I <u> </u>		<u>اــــــا</u> ۱		I	· · ·
PIPE SIZE		1 L									
12 in.		J									
14 in. 16 in		K L									
18 in.		M									
20 in.		Ν									
24 in.		0									
30 in. 36 in		P 0									
42 in.		R									
48 in.		S									
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SCHEDULE											
STD			А								
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120			H								
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160			J								
XH			ĸ								
58			м								
10S			N								
40S 80S			P								
PIPE ORIENTATION			<u> </u>								
Horizontal				A							
PROBE MATERIAL				Б							
316/316L SS					1						
Monel®					2						
Hastelloy®					4						
Other					Х						
INSTRUMENT CONNECTION											
1/2 In. NPT 1/2 in. Socket						B					
TT3 (Integral 3-Valve Trans Mount - Max Temp 225° F)						C					
TT5 (Integral 5-Valve Trans Mount - Max Temp 225° F)						D					
(RTD is not available with integral 5-valve Manifold. If RTI "F" Transmitter Flange Connection and the appropriate ma	D is required, select anifold valve under										
the Instrument Valve section below.)											
Transmitter Flange Connection						E					
CS Cage Nipple & Rods							А				
SS Cage Nipple & Rods							В				
CS Gear Drive, Cage Nipple & Rods							C				
NOTE: SS Gear Drive - SS for Housing and Wetted Parts	Only						U				
Other							Х	l			
Molythane (-65200° F. 140° F in water and high water-b	ased fluids)							1			
Viton®/Fluorocarbon (-20400° F)	,							2			
Graphoil (1200° F)								3			
Fluoromyte (-65300° F)								5			
Other								Х	l		
A105 CS 3000#									1		
316/316L SS 3000#									2		
Supplied Seperately by Preso									3		
INSTRUMENT VALVE									2	I	
1/2 in. Needle CS										Α	
1/2 in. Needle SS 1/2 in. Gate CS										С	
1/2 in. Gate SS										Ď	
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Flg x Flg 3-Valve Manifold CS - Max Temp 225° F	ENT CONNECTION	N								Е	
Fig x Fig 3-Valve Manifold SS - Max Temp 225° F										F	
Flg x Flg 5-Valve Manifold CS - Max Temp 225° F										G L	
Customer Supplied Valve Manifold										н Г	
RTD (Max Temp 480° F, consult factory for higher temp of	otions)										•
100 Ohm RTD 3-Wire w/Explosion Proof Head											1
Not Required											ź
Stainless Steel ID Tag supplied as standard.											
Tag information must be included with order.											

NOTE: Make sure that DP and Resonance are withing acceptable limits. (See chart in the Ellipse Brochure) *Double Supports are not recommended for Hot Tap / Wet Tap models.

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Ellipse[®] Pitot Tube Meter

Annular Flanged Hot-tap Flow Meter

DESCRIPTION

The Ellipse® Annular Flanged Hot-tap Flow Meter is a multi-ported, self-averaging differential pressure flow element for saturated and superheated steam. The Ellipse flow meter is designed with a series of ports facing the upstream velocity pressures and flow sensing ports strategically located ahead of the trailing edge flow separation.

COMPONENTS

All sensors are furnished with 1/2 in. instrument valves, flanged mounting hardware (with the proper rating), flanged ball valve (with the proper rating), insert/retract mechanism with rods, and ID tag as standard equipment. Available options include integral 3-valve or 5-valve transmitter mount manifold and integral RTD temperature sensor.

CONFIGURATION

The flow element has a two-piece construction: an elliptical shape and two 100% independent flow sensing chambers. This construction prevents signal degradation and mixing, and does not require dampening hardware or software. The impact velocity sensing holes (high pressure) are located along the leading edge and the true static sensing holes (low pressure) are on the exterior probe side. This does not generate any vortices or vacuum effects that impinge on the static pressure measurement sensing area and has a drag coefficient of 0.32 or less. Each flow sensor is complete with instrument shut off valves with provisions to accept a transmitter or direct indicating meter. An identification tag is supplied with specific flow station measurement information as required.



FEATURES

- Patented elliptical design
- Single point pipe entry for DP, temperature and static pressure
- No dampening software required
- Low pressure loss (typically 3% of DP in a 12 in. (304 mm) line)
- Accuracy: ±0.75% of reading, repeatability: ±0.1% of reading
- Turndown Ratio: 17:1; no vacuum effects
- No moving part construction provides long, trouble-free service life
- True static pressure measurement rather than a calculated value
- Overcomes loss of accuracy caused by fluid separation at the sensor body



Product Data Sheet

SPECIFICATIONS

Applications	Saturated and superheated steam
Pipe Size	248 in. (501219 mm)
Pressure	Pressure and temperature depend on flange ratings, ANSI B16.5 standards
Temperature	800° F (427° C) Maximum
Flow Range	2.621,130 GPM
Gear Drive	Option available
Accuracy	±0.75% of reading
Repeatability	±0.1%
Turndown Ratio	17:1 with no vacuum effect
Reynolds	>75,000: Maintains most accurate flow measurements
Number	<75,000: Consult factory for estimated results

STANDARD COMPONENTS

Component	Specifications
Head	T-type
Connection	316 SS 1/4 in. or 1/2 in. FNPT
Fitting	CS 3000 lb weld - ASTM A105
Instrument Valves	2 per sensor , 316/316L SS Ellipse
ID Tag	316 SS with wire
Sensor Flange	150 lb 316/316L SS
Packing Chamber	CS with molythane or graphite packing gland
Packing Chamber Flange	CS 150 lb with SS cap
Isolation Ball Valve	316 SS, NPT threaded
Nuts and Bolts	CS threaded
Nipples	CS, schedule 40
Diameter	7/8 in., 1-1/4 in. or 2-1/4 in. diameters

OPTIONAL COMPONENTS

Component	Specifications
Rods, Bolts and Nuts	316 SS
Packing Chamber and Flange	316 SS
Spiral Wound Gasket	316 SS
300 lb., 600 lb. or Higher Flange Rating	CS or 316 SS ANSI B16.5
Temperature Port with RTD Output	—
Static Pressure Port	With SS plug

PART NUMBER CONSTRUCTION

Ellipse®	DAHE										
Annular Flanged Hot Tap	F ALL										
7/8 In. DIAMETER											
2 in.		А									
2-1/2 in.		В									
3 in.		C									
4 in.		E									
5 in.		F									
6 in.		G									
8 m. 10 in.		1									
12 in.		J									
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20 in.		N									
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SCHEDULE		ď									
STD			А								
20			B								
40			D								
60			Е								
80			F								
120			н								
140			1								
			ĸ								
XXH			L								
5S			м								
10S 40S			N								
403 80S			P								
PIPE ORIENTATION											
Vertical				B							
PROBE MATERIAL											
316/316L SS					1						
Inconel®					2						
Hastelloy®					4						
Other					Х						
1/2 in. NPT						А					
1/2 in. Socket						В					
TT3 (Integral 3-Valve Trans Mount - Max Temp 225° F)						C					
(RTD is not available with Integral 5-Valve Manifold. If RTD is	s required, select					D					
"E" Transmitter Flange Connection and the appropriate mani	fold valve under										
the Instrument Valve section below.) Transmitter Flance Connection						F					
INSERTION MECHANISM / ISOLATION BALL VALVE											
150# CS Cage Nipple & Rods							A				
600# CS Cage Nipple & Rods							C				
150# SS Cage Nipple & Rods							D				
300# SS Cage Nipple & Rods 600# SS Cage Nipple & Rods							E				
150# CS Gear Drive, Cage Nipple & Rods							G				
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600# CS Gear Drive, Cage Nipple & Rods 150# SS Gear Drive, Cage Nipple & Rods							J				
300# SS Gear Drive, Cage Nipple & Rods							ĸ				
600# SS Gear Drive, Cage Nipple & Rods	n h						L				
NOTE: SS Gear Drive - SS for Housing and Wetted Parts O Other	niy						х				
PACKING MATERIAL								-			
Molythane (-65200° F, 140° F in water and high water-bas Viton®/Fluorocarbon (-20400° F)	ea fluids)							1			
Graphoil (1200° F)								3			
EPDM (-65300° F, 400° F in steam)								4 F			
Other								X			
PIPE MOUNTING*											
A105 CS 3000# 316/316L SS 3000#									1		
Supplied Seperately by Preso									3		
Not Required									Ζ		
1/2 in Needle CS										Δ	
1/2 in. Needle SS										В	
1/2 in. Gate CS										C	
Not Required										z	
ONLY AVAILABLE WITH OPTION "E" UNDER INSTRUME	NT CONNECTIO	ON								_	
Fig x Fig 3-Valve Manifold CS - Max Temp 225° F Fig x Fig 3-Valve Manifold SS - Max Temp 225° F										F	
Flg x Flg 5-Valve Manifold CS - Max Temp 225° F										G	
Fig x Fig 5-Valve Manifold SS - Max Temp 225° F										н	
RTD (Max Temp 480° F, consult factory for higher temp opti	ions)									I	1
100 Ohm RTD 3-Wire w/Explosion Proof Head											1
100 Ohm RTD 3-Wire, Integral w/Aluminum Head											2
Stainless Steel ID Tag sunnlied as standard											~
Tag information must be included with order.											
NOTE: Make sure that DP and Resonance are withing acceptabl	le limits. (See cha	art in the	Ellipse	Broch	ure)						_
*Double Supports are not recommended for Hot Tap / We	et Tap models.				,						

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B00# CS Gear Drive, Cage Nipple & Rods 1 150# SS Gear Drive, Cage Nipple & Rods K 600# SS Gear Drive, Cage Nipple & Rods L NOTE: SS Gear Drive, Cage Nipple & Rods L MOTE: SS Gear Drive, Cage Nipple & Rods L MOTE: SS Gear Drive - SS for Housing and Wetted Parts Only X Cher X Motythane (+5200* F, 140* F in water and high water-based fluids) 1 Viton®/Fluorocarbon (-20400* F) 2 Graphoil (1200* F) 3 EPDM (+65300* F, 400* F in steam) 4 Fluoromyte (-65300* F) 5 Other X PPE MOUNTING* 1 A105 (55 3000# 1 12 in. Needle CS 3 Not Required Z Vizin Needle CS B 1/2 in. Needle CS B 1/2 in. Needle CS D Not Required Z Vizin Needle CS D Not Required Z VOLY AVALLABLE WITH OPTION "E" UNDER INSTRUMENT CONNECTION E Fig x Fig 5-Valve Manifold CS - Max Temp 225* F F Fig x Fig 5-Valve Manifold	300# CS Gear Drive, Cage Nipple & Rods						н				
100 # 35 Gear Drive, Cage Nipple & Rods 5 000# SS Gear Drive, Cage Nipple & Rods L 000# SS Gear Drive, Cage Nipple & Rods L NOTE: SS Gear Drive, Cage Nipple & Rods L With the construction of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the start of the	600# CS Gear Drive, Cage Nipple & Rods										
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Tag information must be included with order. NOTE: Make sure that DP and Resonance are withing acceptable limits. (See chart in the Ellipse Brochure)	Stainless Steel ID Tag supplied as standard										
NOTE: Make sure that DP and Resonance are withing acceptable limits. (See chart in the Ellipse Brochure)	Tag information must be included with order.										
	NOTE: Make sure that DP and Resonance are withing accept	table limits. (See chart in	the Ell	ipse B	rochur	e)				-	-

*Double Supports are not recommended for Hot Tap / Wet Tap models.
	PAHF2 -	Т									
2-1/4 in. DIAMETER		<u></u>		I	I		I	I			
PIPE SIZE											
12 in.		J									
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16 m. 18 in.	1	N N									
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<u>SCHEDULE</u>		5									
STD			А								
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60			Е								
80			FG								
120			н								
140			1								
160			Ч								
XH			L								
5S			М								
10S 40S			N								
80S			P								
PIPE ORIENTATION											
Vertical				B							
PROBE MATERIAL											
316/316L SS Monel®					1						
Inconel®					3						
Hastelloy®					4						
Other INSTRUMENT CONNECTION					^						
1/2 in. NPT						А					
1/2 in. Socket						B					
TT5 (Integral 5-Valve Trans Mount - Max Temp 225° F)						D					
(RTD is not available with Integral 5-Valve Manifold. If R	TD is required, select										
"E" Transmitter Flange Connection and the appropriate r the Instrument Valve section below.)	nanifold valve under										
Transmitter Flange Connection						Е					
INSERTION MECHANISM / ISOLATION BALL VALVE 150# CS Cage Nipple & Rods							Α				
300# CS Cage Nipple & Rods							В				
600# CS Cage Nipple & Rods							С				
300# SS Cage Nipple & Rods							E				
600# SS Cage Nipple & Rods							F				
150# CS Gear Drive, Cage Nipple & Rods 300# CS Gear Drive, Cage Nipple & Rods							G H				
600# CS Gear Drive, Cage Nipple & Rods							ï				
150# SS Gear Drive, Cage Nipple & Rods							J				
600# SS Gear Drive, Cage Nipple & Rods							L				
NOTE: SS Gear Drive - SS for Housing and Wetted Part	s Only										
Other PACKING MATERIAL							Х				
Molythane (-65200° F, 140° F in water and high water-	based fluids)							1			
Viton®/Fluorocarbon (-20400° F)								2			
EPDM (-65300° F, 400° F in steam)								4			
Fluoromyte (-65300° F)								5			
Other PIPE MOUNTING*								X			
A105 CS 3000#									1		
316/316L SS 3000# Supplied Separately by Press									2		
Not Required									z		
INSTRUMENT VALVE											
1/2 in. Needle CS										B	
1/2 in. Gate CS										С	
1/2 in. Gate SS										D Z	
ONLY AVAILABLE WITH OPTION "E" UNDER INSTRU	MENT CONNECTION									-	
Flg x Flg 3-Valve Manifold CS - Max Temp 225° F										E	
Fig x Fig 3-Valve Manifold SS - Max Temp 225° F Fig x Fig 5-Valve Manifold CS - Max Temp 225° F										⊦ G	
Flg x Flg 5-Valve Manifold SS - Max Temp 225° F										Ĥ	
Customer Supplied Valve Manifold	ontions)									1	
100 Ohm RTD 3-Wire w/Explosion Proof Head	7200131										1
100 Ohm RTD 3-Wire, Integral w/Aluminum Head											2
Not Required											2
Stainless Steel ID Tag supplied as standard. Tag information must be included with order.											
NOTE: Make sure that DP and Resonance are withing acces	ntable limits (See chart	in th	e Elli	nse Br	ochure	0					

*Double Supports are not recommended for Hot Tap / Wet Tap models.

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Ellipse[®] Pitot Tube Meter

Annular Threaded Hot-tap Steam Flow Meter

DESCRIPTION

The Ellipse® Annular Threaded Hot-tap Steam Flow Meter is a multi-ported, self-averaging differential pressure flow element for saturated and super-heated steam applications. The Ellipse flow meter is designed with a series of ports facing the upstream velocity pressures and flow sensing ports strategically located ahead of the trailing edge flow separation.

COMPONENTS

All sensors are furnished with 1/2 in. instrument gate valves, threaded cross tees, threaded weld fitting, threaded gate valve, threaded insert/retract mechanism w/rods, and ID tag as standard equipment. Available options include integral 3-valve or 5-valve transmitter mount manifold and integral RTD temperature sensor.

FEATURES

- Hot-tap model installs without system shutdown
- Single point pipe entry for DP, temperature and static pressure
- No dampening software required
- Low pressure loss (typically 3% of DP in a 12 in. (304 mm) line) due to the patented aerodynamic profile
- Optional NIST traceable calibration
- Accuracy: ±0.75% of reading, repeatability: ±0.1% of reading
- Turndown Ratio: 17:1; no vacuum effects
- No moving part construction provides long, trouble-free service life
- True static pressure measurement rather than a calculated value
- Overcomes loss of accuracy caused by fluid separation at the sensor body

CONFIGURATION

The flow element has a two-piece construction: an elliptical shape and two 100% independent flow sensing chambers. This construction prevents signal degradation and mixing, and does not require dampening hardware or software. The impact velocity sensing holes (high pressure) are located along the leading edge and the true static sensing holes (low pressure) are on the exterior probe side. This does not generate any vortices or vacuum effects that impinge on the static pressure measurement sensing area and has a drag coefficient of 0.32 or less. Each flow sensor is complete with instrument shutoff valves or optional integral manifold valve for direct transmitter mount. An identification tag is supplied with specific flow station measurement information, as required.





MAXIMUM ALLOWABLE DP (INCHES OF WATER COLUMN)

	Single S	upport	Double Support			
Pipe Size	Probe S	ze (in.)	Probe :	size (in.)		
	7/8	1-1/4	7/8	1-1/4		
2 in. (50.80 mm)	880	_	2380	—		
2-1/2 in. (63.50 mm)	525		1558			
3 in. (76.20 mm)	396	—	1283	—		
3-1/2 in. (88.90 mm)	283	_	1117	_		
4 in. (101.60 mm)	197		980	_		
5 in. (127.00 mm)	153	_	757	_		
6 in. (152.40 mm)	126		669	_		
8 in. (203.20 mm)	114	360	512	_		
10 in. (254.80 mm)	100	240	315	960		
12 in. (304.80 mm)	87	175	250	700		
14 in. (355.60 mm)	53	147	195	585		
16 in. (406.40 mm)	_	113	_	450		
18 in. (457.20 mm)	-	90	—	360		
20 in. (508.00 mm)	_	74	_	295		
24 in. (609.60 mm)	_	68	_	270		

Product Data Sheet

SPECIFICATIONS

Applications	Saturated and super-heated steam
Pipe Size	224 in. (50610 mm)
Pressure	800 PSI (5515 kPa) max. Consult factory for higher pressure
Temperature	800° F (426° C) max. Consult factory for higher temperature
Accuracy	±0.75% of reading
Repeatability	±0.1%
Turndown Ratio	17:1 with no vacuum effect
Reynolds Number	>75,000: Maintains most accurate flow measurements <75,000: Consult factory for estimated results
Resonance	Less than 0.8 but greater than 1.2. If greater than 0.8, use double support. System shutdown is required when the double support option is used. Select larger diameter Ellipse to avoid double support.

STANDARD COMPONENTS

Component	Specifications
Head	T-type
Connection	316 SS 1/4 in. or 1/2 in. FNPT
Fitting	CS 3000 lb. weld – ASTM A105
Ellipse Sensor	316/316L SS
Instrument Valves	2 per sensor, CS 1/4 in. or 1/2 in.
Sensor Flange	150 lbs 316/316L SS
Packing Chamber	CS with molythane or graphite packing gland
Packing Chamber Flange	CS 150 lbs with SS cap
Isolation Ball Valve	316-SS, NPT threaded
Nuts and Bolts	CS threaded
Nipples	CS, schedule 40
ID Tag	316 SS with wire

DIMENSIONS



		AHS "A" Dimension	ns		AHS1 "A" Dimensio	ons	Prob	robe Width "C"		
Schedule	Pipe Size in. (mm)	Inserted in. (mm)	Retracted in. (mm)	Pipe Size in. (mm)	Inserted in. (mm)	Retracted in. (mm)	Model	C in. (mm)		
	2 (50.80)	29.5 (749.30)	38.5 (977.90)	12 (304.80)	42.125 (1069.98)	61.75 (1568.45)	AHS	0.875 (22.225)		
	2-1/2 (63.50)	30 (762.00)	39.5 (1003.30)	14 (355.60)	44.125 (1120.78)	65 (1651.00)	AHS1	1.25 (31.750)		
	3 (76.20)	30.5 (774.70)	40.5 (1028.70)	16 (406.40)	46.125 (1171.58)	69 (1752.60)	—	_		
Chandand	3-1/2 (88.90)	31 (787.40)	41.5 (1054.10)	18 (457.20)	48.125 (1222.38)	73 (1854.20)	—	_		
	4 (101.60)	31.5 (800.10)	42.5 (1079.50)	20 (508.00)	50.125 (1273.18)	77 (1955.80)	—	_		
Standard	5 (127.00)	32.5 (825.50)	44.5 (1130.30)	24 (609.60)	54.125 (1374.78)	85 (2159.00)	—	_		
Schedule	6 (152.40)	33.375 (847.725)	46.5 (1181.10)	—	_	—	_	_		
	8 (203.20)	35.375 (898.525)	50.5 (1282.70)	—	—	—	—	_		
	10 (254.80)	37.375 (949.325)	54.5 (1384.30)	—	_	—	—	_		
	12 (304.80)	39.375 (1000.13)	58.5 (1485.90)	—	—	—	—	_		
	14 (355.60)	41.375 (1050.93)	61.75 (1568.45)	_	_	_	_	_		

PART NUMBER CONSTRUCTION

Ellipse®	PAHS -										
Annular Threaded Hot-tap Steam	TANO										
<u>PIPE SIZE</u>		٨									
2 iii. 2-1/2 in		В									
3 in.		C									
3-1/2 in.		D									
4 in.		E									
5 in.		F									
6 IN.		G									
10 in		ï									
12 in.		J									
14 in.		К									
SCHEDULE											
STD			Α								
20			В								
30											
60			E								
80			F								
100			G								
120			н							1	
140			I.								
160			J							1	
XH			ĸ								
5S			L							1	
105			N N								
40S			0								
80S			Р								
PIPE ORIENTATION											
Horizontal				A							
PROBE MATERIAL				В	1						
316/316L SS					1						
Monel®					2						
Inconel®					3						
Hastelloy®					4						
					X						
1/2 in NPT						Α					
1/2 in. Socket						В					
TT3 (Integral 3-Valve Trans Mount - Max Temp 225° F)						С					
TT5 (Integral 5-Valve Trans Mount - Max Temp 225° F)						D					
(RTD is not available with Integral 5-Valve Manifold. If RTD	is required, selec	t									
E Transmitter Flange Connection and the appropriate matter the Instrument Valve section below)	inifold valve unde	r									
Transmitter Flange Connection						Е					
INSERTION MECHANISM / ISOLATION BALL VALVE							•				
CS Cage Nipple & Rods							A				
SS Cage Nipple & Rods							D				
SS Gear Drive, Cage Nipple & Rods							J				
NOTE: SS Gear Drive - SS for Housing and Wetted Parts	Only						Ũ				
Other							Х				
PACKING MATERIAL											
EPDM (-65300° F, 400° F in steam)								1		1	
Graphoil (1200° F)								2			
Fluoromyte (-65300° F)								4			
Other								Х		1	
PIPE MOUNTING*											
A105 CS 3000# 316/316L SS 3000#									1	1	
Supplied Separately by Preso									∠ 3	1	
Not Required									Z	1	
INSTRUMENT VALVE											
1/2 in. Gate CS w/Cross										A	
1/2 III. Gate SS W/Cross										В 7	
ONLY AVAILABLE WITH OPTION "E" UNDER INSTRUME		N								2	
Flg x Flg 3-Valve Manifold CS - Max Temp 225° F										Е	
FIg x FIg 3-Valve Manifold SS - Max Temp 225° F										F	
Fig x Fig 5-Valve Manifold CS - Max Temp 225° F										G	
Fig X Fig 5-Valve Manifold SS - Max Temp 225° F Customer Supplied Valve Manifold										H	
RTD (Max Temp 480° F, consult factory for higher temp on	tions)										1
100 Ohm RTD 3-Wire w/Explosion Proof Head											1
100 Ohm RTD 3-Wire, Integral w/Aluminum Head											2
Not Required											Z
Stainless Steel ID Tag supplied as standard.											
Tag information must be included with order.											
NOTE: Make auro that DD and Becomence are withing eccepte	blo limite (Soo of	ort in t	he Ellir	DOD Br	ochuro	`					

OTE: Make sure that DP and Resonance are withing acceptable limits. (See chart in *Double Supports are not recommended for Hot Tap / Wet Tap models.

Ellipse®	PAHS1 -										
1-1/4 in. DIAMETER		<u>ı </u>				<u> </u>			. <u> </u>	<u> </u>	
PIPE SIZE											
14 in. 16 in.		K L									
18 in.		М									
20 in. 24 in.		N O									
SCHEDULE											
STD 20			A B								
30			С								
40 60			D E								
80			F								
100			G H								
140			- I								
160 XH			J K								
ХХН			L								
5S 10S			M N								
40S			0								
80S PIPE ORIENTATION			Ρ								
Horizontal				A							
PROBE MATERIAL				В							
316/316L SS					1						
Inconel®					2 3						
Hastelloy®					4						
Other INSTRUMENT CONNECTION					Х						
1/2 in. NPT						А					
1/2 In. Socket TT3 (Integral 3-Valve Trans Mount - Max Temp 225° F)						В С					
TT5 (Integral 5-Valve Trans Mount - Max Temp 225° F)						D					
"E" Transmitter Flange Connection and the appropriate n	nanifold valve under	π									
the Instrument Valve section below.)						F					
INSERTION MECHANISM / ISOLATION BALL VALVE						E					
CS Cage Nipple & Rods							A R				
CS Gear Drive, Cage Nipple & Rods							C				
SS Gear Drive, Cage Nipple & Rods	s Only						D				
Other	o only						Х				
PACKING MATERIAL EPDM (-65300° F, 400° F in steam)								1			
Viton®/Fluorocarbon (-20400° F)								2			
Fluoromyte (-65300° F)								3 4			
								Х			
A105 CS 3000#									1		
316/316L SS 3000#									2		
Not Required									Z		
INSTRUMENT VALVE 1/2 in. Gate CS w/Cross										А	
1/2 in. Gate SS w/Cross										B	
Not Required ONLY AVAILABLE WITH OPTION "E" UNDER INSTRUM	MENT CONNECTIO	N								Z	
Flg x Flg 3-Valve Manifold CS - Max Temp 225° F										E	
Fig x Fig 3-Valve Manifold SS - Max Temp 225° F Fig x Fig 5-Valve Manifold CS - Max Temp 225° F										F G	
Fig x Fig 5-Valve Manifold SS - Max Temp 225° F										Ĥ	
Customer Supplied Valve Manifold <u>RTD (Max Temp 480° F, consult factory for higher temp of</u>	options)									1	1
100 Ohm RTD 3-Wire w/Explosion Proof Head											1
Not Required											Z Z
Stainless Steel ID Tag supplied as standard.											
I ag information must be included with order.											

NOTE: Make sure that DP and Resonance are withing acceptable limits. (See chart in the Ellipse Brochure) *Double Supports are not recommended for Hot Tap / Wet Tap models.

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Ellipse[®] Pitot Tube Meter

Annular Hot-tap Flanged Flow Meter

DESCRIPTION

The Ellipse® Annular Hot-tap Flanged Flow Meter is a multi-ported, self-averaging differential pressure flow element for saturated and super-heated steam. The Ellipse flow meter is designed with a series of ports facing the upstream velocity pressures and flow sensing ports strategically located ahead of the trailing edge flow separation.

CONFIGURATION

The flow element has a two-piece construction: an elliptical shape and two 100% independent flow sensing chambers. This construction prevents signal degradation and mixing, and does not require dampening hardware or software. The impact velocity sensing holes (high pressure) are located along the leading edge and the true static sensing holes (low pressure) are on the exterior probe side. This does not generate any vortices or vacuum effects that impinge on the static pressure measurement sensing area and has a drag coefficient of 0.32 or less. An identification tag is supplied with specific flow station measurement information, as required.

COMPONENTS

All sensors are furnished with 1/2 in. (12 mm) instrument valves, flanged mounting hardware (with the proper ratings), and ID tag as standard equipment. Available options include integral 3-valve or 5-valve transmitter mount manifold and integral RTD temperature sensor.



FEATURES

- Patented elliptical design
- Single point pipe entry for DP, temperature and static pressure
- No dampening software required
- Low pressure loss (typically 3% of DP in a 12 in. (304 mm) line) due to the patented aerodynamic profile
- NIST traceable calibration, optional independent labs
- Accuracy: ±0.75% of reading, repeatability: ±0.1% of reading
- Turndown Ratio: 17:1; no vacuum effects
- No moving part construction provides long, trouble-free service life
- True static pressure measurement rather than a calculated value
- Overcomes loss of accuracy caused by fluid separation at the sensor body



Product Data Sheet

STANDARD COMPONENTS

Component	Specifications
Head	T-type
Connection	316 SS 1/4 in. or 1/2 in. FNPT
Ellipse Sensor	316/316L SS
Instrument Valves	2 per sensor, 1/4 in. or 1/2 in. CS
ID Tag	316 SS with wire
Sensor Flange	150 lb 316/316L SS
Packing Chamber	CS with molythane or graphite packing gland
Packing Chamber Flange	CS 150 lb with SS cap
Isolation Ball Valve	316 SS, NPT threaded
Nuts and Bolts	CS threaded
Nipples	CS, schedule 40
Diameter	7/8 in., 1-1/4 in. or 2-1/4 in.

OPTIONAL COMPONENTS

Component	Specifications
Rods, Bolts and Nuts	316 SS
Packing Chamber and Flange	316 SS
Spiral Wound Gasket	316 SS
300 lb., 600 lb. or Higher Flange Rating	CS or 316 SS ANSI B16.5
Temperature Port with RTD Output	—
Static Pressure Port	With SS plug

SPECIFICATIONS

Applications	Steam
Pipe Size	272 in. (501830 mm)
Pressure	800° F (427° C) Maximum
Temperature	800° F (427° C) Maximum
Flow Range	2.634,340 GPM
Accuracy	±0.75% of reading
Repeatability	±0.1%
Turndown Ratio	17:1 with no vacuum effect
Reynolds Number	>75,000: Maintains most accurate flow measurements <75,000: Consult factory for estimated results

PART NUMBER MATRIX

	PAHZ -										
Annular Flanged Hot-tap Steam 7/8 in. DIAMETER	, <u>, , , , , , , , , , , , , , , , , , </u>					I		لـــــا			
2 in.		А									
2-1/2 in.		в									
3 in.		С									
3-1/2 m. 4 in.		E									
5 in.		F									
6 in.		G									
8 in.		н									
12 in.		J									
14 in.		к									
16 in.		L									
STD			^								
20			В								
30			С								
40			E								
80			F								
100			G								
120			н								
160			J								
ХН			к								
XXH			L								
55 10S			N N								
40S			0								
80S			Р								
Horizontal				А							
Vertical				В							
PROBE MATERIAL					1						
Monel®					2						
Inconel®					3						
Hastelloy®					4						
Other					X	J					
1/2 in. NPT						А					
1/2 in. Socket						В					
TT3 (Integral 3-Valve Trans Mount - Max Temp 225° F)						C D					
(RTD is not available with Integral 5-Valve Manifold. If RTD	is required, selec	t				U					
"E" Transmitter Flange Connection and the appropriate man	nifold valve under										
the Instrument Valve section below.)						F					
INSERTION MECHANISM / ISOLATION BALL VALVE											
150# CS Cage Nipple & Rods							A				
300# CS Cage Nipple & Rods 600# CS Cage Nipple & Rods							В				
150# SS Cage Nipple & Rods							D				
300# SS Cage Nipple & Rods							E				
600# SS Cage Nipple & Rods 150# CS Gear Drive, Cage Nipple & Rods							F				
300# CS Gear Drive, Cage Nipple & Rods							н				
600# CS Gear Drive, Cage Nipple & Rods							1				
150# SS Gear Drive, Cage Nipple & Rods							J				
600# SS Gear Drive, Cage Nipple & Rods							L				
NOTE: SS Gear Drive - SS for Housing and Wetted Parts C	Dnly										
Other							Х				
EPDM (-65300° F. 400° F in steam)								1			
Viton®/Fluorocarbon (-20400° F)								2			
Graphoil (1200° F)								3			
Other								4 X			
PIPE MOUNTING*											
A105 CS 3000#									1		
Supplied Seperately by Preso									∠ 3		
Not Required									Z		
INSTRUMENT VALVE										Δ	
1/2 in. Gate SS w/Cross										В	
Not Required										Z	
ONLY AVAILABLE WITH OPTION "E" UNDER INSTRUME	NT CONNECTIO	N								F	
Fig x Fig 3-valve Manifold CS - Max Temp 225° F Fig x Fig 3-Valve Manifold SS - Max Temp 225° F										F	
Flg x Flg 5-Valve Manifold CS - Max Temp 225° F										G	
Flg x Flg 5-Valve Manifold SS - Max Temp 225° F										H,	
Customer Supplied Valve Manifold RTD (Max Temp 480° F. consult factory for higher temp opti	ions)									I	J
100 Ohm RTD 3-Wire w/Explosion Proof Head											1
100 Ohm RTD 3-Wire, Integral w/Aluminum Head											2
											۷
Stainless Steel ID Tag supplied as standard. Tag information must be included with order.											
NOTE: Make sure that DP and Resonance are withing accental	ble limits (See ch	nart in	the FII	ipse Bi	ochur	a)					
and recontance are mining acceptat					uit	1					

*Double Supports are not recommended for Hot Tap / Wet Tap models.

Ellipse®					<u> </u>					1
Annular Flanged Hot-tap Steam	PAHZ1 -									I
										1
<u>PIPE SIZE</u>	٨									
14 in.	В									
16 in.	С									
18 in.	D									1
20 in.	E									
24 in.	F									
30 in.	G									
36 In.	н									
42 IN. 48 in	1									
60 in.	ĸ									
72 in.	L									
SCHEDULE		•								
STD		А								
20		В								
30		C								
40 60		F								
80		-								
100		G								
120		Ĥ								1
140		Т								1
160		J								1
XH		к								1
XXH		L								1
55 105		iVI N								1
40S		0								1
80S		P								1
PIPE ORIENTATION										
Horizontal			A							
Vertical			В							
316/316L SS				1						
Monel®				2						
Inconel®				3						
Hastelloy®				4						
Other				Х						
INSTRUMENT CONNECTION					-					
1/2 in. NPT					A					
1/2 III. SOCKET TT3 (Integral 3-)/alve Trans Mount - May Temp 225°	E)				Ċ					
TT5 (Integral 5-Valve Trans Mount - Max Temp 225°	F)				D					
(RTD is not available with Integral 5-Valve Manifold.	If RTD is required, select									
"E" Transmitter Flange Connection and the appropria	te manifold valve under									
the Instrument Valve section below.)					_					
Transmitter Flange Connection					E					
150# CS Cage Nipple & Rods						Δ				
300# CS Cage Nipple & Rods						B				
600# CS Cage Nipple & Rods						c				
150# SS Cage Nipple & Rods						D				
300# SS Cage Nipple & Rods						Е				
600# SS Cage Nipple & Rods						F				
150# CS Gear Drive, Cage Nipple & Rods						н				
600# CS Gear Drive, Cage Nipple & Rods						ï				
150# SS Gear Drive, Cage Nipple & Rods						Ĵ				1
300# SS Gear Drive, Cage Nipple & Rods						К				1
600# SS Gear Drive, Cage Nipple & Rods						L				1
NOTE: SS Gear Drive - SS for Housing and Wetted P Other	arts Unly					v				1
PACKING MATERIAL						^	J			1
EPDM (-65300° F, 400° F in steam)							1			1
Viton®/Fluorocarbon (-20400° F)							2			1
Graphoil (1200° F)							3			1
Fluoromyte (-65300° F)							4			1
							Х	1		1
A105 CS 3000#								1		1
316/316L SS 3000#								2		1
Supplied Seperately by Preso								3		1
Not Required								Z	l	1
INSTRUMENT VALVE										1
1/2 ID. Gate CS W/Cross									R	1
Not Required									Z	1
ONLY AVAILABLE WITH OPTION "E" UNDER INST	RUMENT CONNECTION	1							-	1
Flg x Flg 3-Valve Manifold CS - Max Temp 225° F									Е	1
Flg x Flg 3-Valve Manifold SS - Max Temp 225° F									F	1
Fig x Fig 5-Valve Manifold CS - Max Temp 225° F									G	1
Fig x Fig 5-Valve Manifold SS - Max Temp 225° F									н	1
RTD (Max Temp 480° F. consult factory for higher ten	np options)								1	L
100 Ohm RTD 3-Wire w/Explosion Proof Head	- spaces									1
100 Ohm RTD 3-Wire, Integral w/Aluminum Head										2
Not Required										Z
Stainless Steel ID Tag supplied as standard.										
Tag information must be included with order										
rag mornator must be included with order.										

NOTE: Make sure that DP and Resonance are withing acceptable limits. (See chart i *Double Supports are not recommended for Hot Tap / Wet Tap models.

Ellipse®	DA1170					-	1				1
Annular Flanged Hot-tap Steam	PAHZZ -										
<u>PIPE SIZE</u> 12 in		Δ									
14 in.		В									
16 in.		С									
18 in.		D									
20 in.		E									
24 in.		F									
30 in.		G									
36 IN.		н									
42 m. 48 in		J									
60 in.		ĸ									
72 in.		L									
<u>SCHEDULE</u>											
STD			А								
20			В								
30											
60			E								
80			F								
100			G								
120			н								
140			1								
160			J								
XH			ĸ								
5S			M								
10S			N								
40S			0								
80S			Р								
PIPE ORIENTATION											
Horizontal				A							
				Б	J						
316/316L SS					1						
Monel®					2						
Inconel®					3						
Hastelloy®					4						
Other					Х						
INSTRUMENT CONNECTION						^					
1/2 III. NP1 1/2 in Socket						В					
TT3 (Integral 3-Valve Trans Mount - Max Temp 225° F)						c					
TT5 (Integral 5-Valve Trans Mount - Max Temp 225° F)						D					
(RTD is not available with Integral 5-Valve Manifold. If RTD	is required, select	t									
"E" Transmitter Flange Connection and the appropriate man	ifold valve under										
the Instrument Valve section below.)						E					
INSERTION MECHANISM / ISOLATION BALL VALVE						E	l				
150# CS Cage Nipple & Rods							А				
300# CS Cage Nipple & Rods							в				
600# CS Cage Nipple & Rods							С				
150# SS Cage Nipple & Rods							D				
300# SS Cage Nipple & Rods							E				
150# CS Gear Drive, Cage Nipple & Rods							Ġ				
300# CS Gear Drive, Cage Nipple & Rods							н				
600# CS Gear Drive, Cage Nipple & Rods							I.				
150# SS Gear Drive, Cage Nipple & Rods							J				
300# SS Gear Drive, Cage Nipple & Rods							ĸ				
NOTE: SS Gear Drive, Cage Nipple & Rods	inly						L				
Other							х				
PACKING MATERIAL								-			
EPDM (-65300° F, 400° F in steam)								1			
Viton®/Fluorocarbon (-20400° F)								2			
Grapholi (1200° F) Fluoromyte (-65 - 300° F)								3 4			
Other								x			
PIPE MOUNTING*									-		
A105 CS 3000#									1		
316/316L SS 3000#									2		
Supplied Seperately by Preso Not Required									3 7		
INSTRUMENT VALVE									-		
1/2 in. Gate CS w/Cross										А	
1/2 in. Gate SS w/Cross										В	
Not Required										Z	
UNLY AVAILABLE WITH OPTION "E" UNDER INSTRUME	NT CONNECTION	N								F	
Fig x Fig 3-Valve Manifold SS - Max Temp 225° F										F	
Flg x Flg 5-Valve Manifold CS - Max Temp 225° F										G	
Flg x Flg 5-Valve Manifold SS - Max Temp 225° F										н	
Customer Supplied Valve Manifold										I	l
RTD (Max Temp 480° F, consult factory for higher temp opti	ons)										4
100 Ohm RTD 3-Wire Integral w/Aluminum Head											1
Not Required											ź
Stainlass Steel ID Tag supplied as steedard											
Tag information must be included with order.											

NOTE: Make sure that DP and Resonance are withing acceptable limits. (See chart in the Ellipse Brochure) *Double Supports are not recommended for Hot Tap / Wet Tap models.

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Ellipse[®] Pitot Tube Meter

BAR Ellipse

DESCRIPTION

The Preso ELLIPSE[®] Model BAR (Annular Commercial) is a multi-ported, self averaging differential pressure type ELLIPSE[®] flow element.

CONFIGURATION

The flow element has a two-piece construction: an elliptical shape and two 100% independent flow sensing chambers. This construction prevents signal degradation and mixing, and does not require dampening hardware or software. The impact velocity sensing holes are located along the leading edge and the true static sensing holes are on the exterior probe side. This does not generate any vortices or vacuum effects that impinge on the static pressure measurement sensing area and has a drag coefficient of 0.32 or less. Each flow sensor is complete with instrument shutoff valves with provisions to accept a transmitter or direct indicating meter. An identification tag is supplied with specific flow station measurement information, as required.

ACCURACY AND REPEATABILITY

The accuracy of the flow element is within $\pm 0.75\%$ with a repeatability of $\pm 0.1\%$ and turndown ratio of 17:1 in the corresponding and appropriate range of Reynolds' Numbers. Certified, independent test data is available from NIST laboratories in similar line sizes as well as in liquids and gases.

APPLICABLE FLUIDS

Liquids and gases.

COMPONENTS

All sensors are furnished with 1/4 in. instrument ball valves, threaded weld fitting, compression fitting, and ID tag as standard equipment. Quick connect fittings are available as an option.



FEATURES

- No separation effects on the low (static) pressure
- Turndown ratio of 17:1
- No vacuum effects
- No vortex generation
- Very high repeatability
- Accuracy of ±0.75% uncalibrated
- Low drag coefficient



PTT-DS-00788-EN-03 (September 2017)

Product Data Sheet

METER SPECIFICATIONS

Name	Specification
Probe Construction	316 Stainless steel
Head	"Y" type, brass 1/8 in. FNPT
Pipe Mounting	3000# CS thread-o-let
Instrument Valves	1/4 in. SAE flare brass ball type
ID Tag	Polycarbonate
Temperature Maximum *	250° F (120° C)
Pressure Maximum *	400 PSIG (2760 kPa)

* For higher pressure and temperature application please consult factory

PIPE SIZE SPECIFICATIONS

BAR Pipe Size (in.)	ELLIPSE size (in.)	Sensor Connection
25	1/2	1/2 in. Brass compression with SS ferrule
612	7/8	1 in. CS compression with SS ferrule
1424	1-1/4	1-1/4 in. Brass compression with SS ferrule

DIMENSIONS

Size	Model	B in. (mm)	C in. (mm)	D in. (mm)	E Ellipse in. (mm)	F in. (mm)	App. Weight Ibs (kg)
2 in.	PBARAXXXX	0.5 (12.70)	0.625 (15.875)	0.5 (12.70)	0.5 (12.70)	0.375 (9.525)	2 (0.91)
2-1/2 in.	PBARBXXXX	0.5 (12.70)	0.625 (15.875)	0.5 (12.70)	0.5 (12.70)	0.375 (9.525)	3 (1.36)
3 in.	PBARCXXXX	0.5 (12.70)	0.625 (15.875)	0.5 (12.70)	0.5 (12.70)	0.375 (9.525)	3 (1.36)
3-1/2 in.	PBARDXXXX	0.5 (12.70)	0.625 (15.875)	0.5 (12.70)	0.5 (12.70)	0.375 (9.525)	3.5 (1.59)
4 in.	PBAREXXXX	0.5 (12.70)	0.625 (15.875)	0.5 (12.70)	0.5 (12.70)	0.375 (9.525)	3.5 (1.59)
5 in.	PBARFXXXX	0.5 (12.70)	0.625 (15.875)	0.5 (12.70)	0.5 (12.70)	0.375 (9.525)	4 (1.81)
6 in.	PBARGXXXX	1 (25.40)	1.125 (28.575)	1 (25.40)	0.875 (22.225)	0.5 (12.70)	4.5 (2.04)
8 in.	PBARHXXXX	1 (25.40)	1.125 (28.575)	1 (25.40)	0.875 (22.225)	0.5 (12.70)	4.5 (2.04)
10 in.	PBARIXXXX	1 (25.40)	1.125 (28.575)	1 (25.40)	0.875 (22.225)	0.5 (12.70)	5 (2.27)
12 in.	PBARJXXXX	1 (25.40)	1.125 (28.575)	1 (25.40)	0.875 (22.225)	0.5 (12.70)	5.5 (2.49)
14 in.	PBARKXXXX	1.25 (31.75)	1.375 (34.925)	1.25 (31.75)	1.25 (31.75)	0.875 (22.225)	6.5 (2.95)
16 in.	PBARLXXXX	1.25 (31.75)	1.375 (34.925)	1.25 (31.75)	1.25 (31.75)	0.875 (22.225)	7 (3.18)
18 in.	PBARMXXXX	1.25 (31.75)	1.375 (34.925)	1.25 (31.75)	1.25 (31.75)	0.875 (22.225)	7.5 (3.40)
20 in.	PBARNXXXX	1.25 (31.75)	1.375 (34.925)	1.25 (31.75)	1.25 (31.75)	0.875 (22.225)	8 (3.63)
24 in.	PBAROXXXX	1.25 (31.75)	1.375 (34.925)	1.25 (31.75)	1.25 (31.75)	0.875 (22.225)	9 (4.08)



PART NUMBER MATRIX



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Ellipse[®] Pitot Tube Meter

BHL Annular Hot Tap Dual Rod

DESCRIPTION

The Preso ELLIPSE® Model BHL (Annular Hot Tap Dual Rod) is a multi-ported, self averaging differential pressure flow element.

CONFIGURATION

The flow element has a two piece construction: an elliptical shape and two 100% independent flow sensing chambers. This construction prevents signal degradation and mixing, and does not require dampening hardware or software. The impact velocity sensing holes are located along the leading edge and the true static sensing holes are on the exterior probe side. This does not generate any vortices or vacuum effects that impinge on the static pressure measurement sensing area and has a drag coefficient of 0.32 or less. Each flow sensor is complete with instrument shutoff valves with provisions to accept a transmitter or direct indicating meter. An identification tag is supplied with specific flow station measurement information, as required.

ACCURACY & REPEATABILITY

The accuracy of the flow element is within $\pm 0.75\%$ with a repeatability of $\pm 0.1\%$ and turndown ratio of 17:1 in the corresponding and appropriate range of Reynolds' Numbers. Certified, independent test data is available from NIST laboratories in similar line sizes as well as in liquids and gases.

APPLICABLE FLUIDS

Liquids and gases.

COMPONENTS

All sensors are furnished with 1/4 in. instrument ball valves, threaded weld fitting, threaded ball valve, threaded insert/retract mechanism with rods, and ID tag as standard equipment. Available options include: Integral 3-valve or 5-valve transmitter mount manifold and integral RTD temperature sensor.



FEATURES

- No separation effects on the low (static) pressure
- Turndown ratio of 17:1
- No vacuum effects
- No vortex generation
- Very high repeatability
- Accuracy of ±0.75% uncalibrated
- Low drag coefficient



PTT-DS-00789-EN-03 (September 2017)

Product Data Sheet

SPECIFICATIONS

Name	Specification
Probe Construction	316 Stainless steel
Head	"Y" type, brass 1/8 in. FNPT
Instrument Valves	1/4 in. SAE flare brass ball type
Packing Gland	Molythane with CS cage nipple & close nipple
Retract Assembly	CS rods, nuts & bolts
ID Tag	Polycarbonate
Temperature Maximum *	250° F (120° C)
Pressure Maximum *	400 PSIG (2760 kPa)

* For higher pressure and temperature application please consult factory

PIPE SIZE SPECIFICATIONS

BHL Pipe Size (in.)	ELLIPSE size (in.)	Pipe Mounting	Isolating Valve
25	1/2	3/4 in. 3000# CS thread-o-let	3/4 in. Bronze ball valve
612	7/8	1-1/4 in. 3000# CS thread-o-let	1-1/4 in. Bronze ball valve
1424	1-1/4	1-1/2 in. 3000# CS thread-o-let	1-1/2 in. Bronze ball valve

MODEL SELECTOR



SUBMITTAL DATA

		A	В	с	D	E
SIZE	MODEL	HEIGHT	NPT	DIA	DIA	ELLIPSE
		inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)
2 in.	PBHLAXXXX	22.75 (577.9)	0.75 (19)	0.625 (15.8)	0.5 (12.7)	0.5 (12.7)
2-1/2 in.	PBHLBXXXX	24.25 (616)	0.75 (19)	0.625 (15.8)	0.5 (12.7)	0.5 (12.7)
3 in.	PBHLCXXXX	23.75 (603.2)	0.75 (19)	0.625 (15.8)	0.5 (12.7)	0.5 (12.7)
3-1/2 in.	PBHLDXXXX	24.25 (616)	0.75 (19)	0.625 (15.8)	0.5 (12.7)	0.5 (12.7)
4 in.	PBHLEXXXX	24.25 (616)	0.75 (19)	0.625 (15.8)	0.5 (12.7)	0.5 (12.7)
5 in.	PBHLFXXXX	25.75 (654)	0.75 (19)	0.625 (15.8)	0.5 (12.7)	0.5 (12.7)
6 in.	PBHLGXXXX	33 (838.2)	1.25 (31.7)	1.0 (25.4)	1.0 (25.4)	0.875 (22.2)
8 in.	PBHLHXXXX	35 (889)	1.25 (31.7)	1.0 (25.4)	1.0 (25.4)	0.875 (22.2)
10 in.	PBHLIXXXX	37 (939.8)	1.25 (31.7)	1.0 (25.4)	1.0 (25.4)	0.875 (22.2)
12 in.	PBHLJXXXX	39 (990.6)	1.25 (31.7)	1.0 (25.4)	1.0 (25.4)	0.875 (22.2)
14 in.	PBHLKXXXX	44 (1117.6)	1.5 (38.1)	1.25 (31.7)	1.25 (31.7)	1.25 (31.7)
16 in.	PBHLLXXXX	46 (1168.4)	1.5 (38.1)	1.25 (31.7)	1.25 (31.7)	1.25 (31.7)
18 in.	PBHLMXXXX	48 (1219.2)	1.5 (38.1)	1.25 (31.7)	1.25 (31.7)	1.25 (31.7)
20 in.	PBHLNXXXX	50 (1270)	1.5 (38.1)	1.25 (31.7)	1.25 (31.7)	1.25 (31.7)
24 in.	PBHLOXXXX	54 (1371.6)	1.5 (38.1)	1.25 (31.7)	1.25 (31.7)	1.25 (31.7)



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Ellipse[®] Pitot Tube Meter

BHR Annular Wet Tap with Safety Chain

DESCRIPTION

The Preso ELLIPSE[®] Model BAR (Annular Commercial) is a multi-ported, self averaging differential pressure type ELLIPSE flow element.

CONFIGURATION

The flow element has a two-piece construction: an elliptical shape and two 100% independent flow sensing chambers. This construction prevents signal degradation and mixing, and does not require dampening hardware or software. The impact velocity sensing holes are located along the leading edge and the true static sensing holes are on the exterior probe side. This does not generate any vortices or vacuum effects that impinge on the static pressure measurement sensing area and has a drag coefficient of 0.32 or less. Each flow sensor is complete with instrument shutoff valves with provisions to accept a transmitter or direct indicating meter. An identification tag is supplied with specific flow station measurement information, as required.

ACCURACY AND REPEATABILITY

The accuracy of the flow element is within $\pm 0.75\%$ with a repeatability of $\pm 0.1\%$ and turndown ratio of 17:1 in the corresponding and appropriate range of Reynolds' Numbers. Certified, independent test data is available from NIST laboratories in similar line sizes as well as in liquids and gases.

APPLICABLE FLUIDS

Liquids and gases.

COMPONENTS

All sensors are furnished with 1/4 in. instrument ball valves, threaded weld fitting, threaded ball valve, threaded cage nipple, threaded compression fitting, and ID tag as standard equipment. Integral 3-valve or 5 valve transmitter mound manifold and integral RTD temperature sensor are available as options.



FEATURES

- No separation effects on the low (static) pressure
- Turndown ratio of 17:1
- No vacuum effects
- No vortex generation
- Very high repeatability
- Accuracy of ±0.75% uncalibrated
- Low drag coefficient



Product Data Sheet

METER SPECIFICATIONS

Name	Specification
Probe Construction	316 Stainless steel
Head	"Y" type, brass 1/8 in. FNPT
Instrument Valves	1/4 in. SAE flare brass ball type
Retract Assembly	Wet tap
ID Tag	Polycarbonate
Temperature Maximum *	120° F (49° C)
Pressure Maximum *	75 PSIG (517 kPa)

* For higher pressure and temperature application please consult factory

PIPE SIZE SPECIFICATIONS

BHR Pipe Size	ELLIPSE size	Sensor Connection	Pipe Mounting	Isolating Valve
25 in.	1/2 in.	1/2 in. Brass compression with SS ferrule	3/4 in. 3000# CS thread-o-let	3/4 in. Bronze ball valve
612 in.	7/8 in.	1 in. CS compression with SS ferrule	1-1/4 in. 3000# CS thread-o-let	1-1/4 in. Bronze ball valve
1424 in.	1-1/4 in.	1-1/4 in. Brass compression with SS ferrule	1-1/2 in. 3000# CS thread-o-let	1-1/2 in. Bronze ball valve

DIMENSIONS

Size	Model	A Height in. (mm)	B NPT in. (mm)	C DIA in. (mm)	D DIA in. (mm)	E Ellipse in. (mm)
2 in.	PBHRAXXXX	12 (304.80)	0.75 (19.05)	0.625 (15.875)	0.5 (12.70)	0.5 (12.70)
2-1/2 in.	PBHRBXXXX	12.5 (317.50)	0.75 (19.05)	0.625 (15.875)	0.5 (12.70)	0.5 (12.70)
3 in.	PBHRCXXXX	13 (330.20)	0.75 (19.05)	0.625 (15.875)	0.5 (12.70)	0.5 (12.70)
3-1/2 in.	PBHRDXXXX	13.5 (342.90)	0.75 (19.05)	0.625 (15.875)	0.5 (12.70)	0.5 (12.70)
4 in.	PBHREXXXX	14 (355.60)	0.75 (19.05)	0.625 (15.875)	0.5 (12.70)	0.5 (12.70)
5 in.	PBHRFXXXX	15 (381.00)	0.75 (19.05)	0.625 (15.875)	0.5 (12.70)	0.5 (12.70)
6 in.	PBHRGXXXX	23.5 (596.90)	1.25 (31.75)	1.125 (28.575)	1.0 (25.4)	0.875 (22.225)
8 in.	PBHRHXXXX	25.5 (647.70)	1.25 (31.75)	1.125 (28.575)	1.0 (25.4)	0.875 (22.225)
10 in.	PBHRIXXXX	27.375 (695.325)	1.25 (31.75)	1.125 (28.575)	1.0 (25.4)	0.875 (22.225)
12 in.	PBHRJXXXX	27.375 (695.325)	1.25 (31.75)	1.125 (28.575)	1.0 (25.4)	0.875 (22.225)
14 in.	PBHRKXXXX	31.625 (803.275)	1.5 (38.10)	1.375 (34.925)	1.25 (31.75)	1.25 (31.75)
16 in.	PBHRLXXXX	33.625 (854.075)	1.5 (38.10)	1.375 (34.925)	1.25 (31.75)	1.25 (31.75)
18 in.	PBHRMXXXX	35.625 (904.875)	1.5 (38.10)	1.375 (34.925)	1.25 (31.75)	1.25 (31.75)
20 in.	PBHRNXXXX	37.625 (955.675)	1.5 (38.10)	1.375 (34.925)	1.25 (31.75)	1.25 (31.75)
24 in.	PBHROXXXX	41.625 (1057.28)	1.5 (38.10)	1.375 (34.925)	1.25 (31.75)	1.25 (31.75)



PART NUMBER MATRIX



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 México | Badger Meter de las Americas, S.A. de C.V. | Pedro Luis Ogazón N°32 | Esq. Angelina N°24 | Colonia Guadalupe Inn | CP 01050 | México, DF | México | +52-55-5662-0882

 Europe, Eastern Europe Branch Office (for Poland, Latvia, Lithuania, Estonia, Ukraine, Belarus) | Badger Meter Europe | ul. Korfantego 6 | 44-193 Knurów | Poland | +48-32-236-8787

 Europe, Middle East and Africa | Badger Meter Europe | PO Box 341442 | Dubai Silicon Oasis, Head Quarter Building, Wing C, Office #C209 | Dubai / UAE | +971-4-371 2503

 Slovakia | Badger Meter Slovakia s.r.o. | Racianska 109/8 | 831 02 Bratislava, Slovakia | +421-2-44 63 83 01

 Asia Pacific | Badger Meter | 80 Marine Parade Rd | 21-06 Parkway Parade | 50ingapore 449269 | +65-63464836

 China | Badger Meter | 7-1202 | 99 Hangzhong Road | Minhang District | Shanghai | China 201101 | +86-21-5763 5412

 Switzerland | Badger Meter Swiss AG | Mittelholzerstrasse 8 | 3006 Bern | Switzerland | +41-31-932 01 11



Ellipse[®] Flow Meter

Annular Regular

DESCRIPTION

The Ellipse® Annular Regular Flow Meter is a multi-ported, selfaveraging differential pressure flow element for liquid and gas applications. The Ellipse flow meter is designed with a series of ports facing the upstream velocity pressures and flow sensing ports strategically located ahead of the trailing edge flow separation.

COMPONENTS

All sensors are furnished with 1/2 in. (12 mm) instrument valves, flanged mounting hardware (with the proper ratings), and ID tag as standard equipment. Available options include integral 3-valve or 5-valve transmitter mount manifold and integral RTD temperature sensor.

FEATURES

- Patented elliptical design
- Single point pipe entry for DP, temperature and static pressure
- No dampening software required
- Low pressure loss (typically 3% of DP in a 12 in. (304 mm) line) due to the patented aerodynamic profile
- NIST traceable calibration, optional independent labs
- Accuracy: ±0.75% of reading, repeatability: ±0.1% of reading
- Turndown Ratio: 17:1; no vacuum effects
- No moving part construction provides long, trouble-free service life
- True static pressure measurement rather than a calculated value
- Overcomes loss of accuracy caused by fluid separation at the sensor body

CONFIGURATION

The flow element has a two-piece construction: an elliptical shape and two 100% independent flow sensing chambers. This construction prevents signal degradation and mixing, and does not require dampening hardware or software. The impact velocity sensing holes (high pressure) are located along the leading edge and the true static sensing holes (low pressure) are on the exterior probe side. This does not generate any vortices or vacuum effects that impinge on the static pressure measurement sensing area and has a drag coefficient of 0.32 or less. Each flow sensor is complete with instrument shutoff valves with provisions to accept a transmitter or direct indicating meter. An identification tag is supplied with specific flow station measurement information, as required.





MAXIMUM ALLOWABLE DP (INCHES OF WATER COLUMN)

Pipe Size	Single Support Probe Size (in.)		Double Su Siz	upport Probe ze (in.)	
in. (mm)	7/8	1-1/4	7/8	1-1/4	
2 (50.80)	880	_	2380	_	
2-1/2 (63.50)	525	_	1558	_	
3 (76.20)	396	_	1283		
3-1/2 (88.90)	283	_	1117		
4 (101.60)	197	_	980	_	
5 (127.00)	153		757		
6 (152.40)	126	_	669	_	
8 (203.20)	114	360	512	_	
10 (254.80)	100	240	315	960	
12 (304.80)	87	175	250	700	
14 (355.60)	53	147	195	585	
16 (406.40)	_	113	_	450	
18 (457.20)	_	90	_	360	
20 (508.00)	—	74	_	295	
24 (609.60)	_	68	_	270	
26 (660.40)	_	50	_	215	
30 (762.00)	—	34	_	155	
32 (812.80)	—		_	_	
36 (914.40)	_	_	_	_	
42 (1066.80)	_	_		_	

Product Data Sheet

SPECIFICATIONS

Applications	Liquids and gases
Pipe Size	272 in. (501830 mm)
Pressure	800 PSI (5515 kPa) max.
Temperature	800° F(426° C) max.
Accuracy	±0.75% of reading
Repeatability	±0.1%
Turndown Ratio	17:1 with no vacuum effect
Reynolds Number	>75,000: Maintains most accurate flow measurements <75,000: Consult factory for estimated results
Resonance	If greater than 0.8, use double support

STANDARD COMPONENTS

Component	Specifications
Head	T-type
Connection	316 SS 1/4 in. or 1/2 in. FNPT
Compression Fitting	CS 3000 lb. with SS ferrule
Weld Fitting	CS 3000 lb. – ASTM A105
Instrument Valves	2 per sensor, 316/316L SS Ellipse – 1/4 in. CS
ID Tag	316 SS with wire

DIMENSIONS



	Probe L	Probe Width			
	A	В	с		
ARO	4.19 in. (106.38 mm)	2.25 in. (57.15 mm)	0.50 in. (12.70 mm)		
AR	6.63 in. (168.28 mm)	3.13 in. (79.38 mm)	0.87 in. (22.10 mm)		
AR1	6.63 in. (168.28 mm)	3.13 in. (79.38 mm)	1.25 in. (31.75 mm)		

PART NUMBER CONSTRUCTION

Ellipse [®] Annular Regular	PAR0 -								
1/2 in. DIAMETER									
<u>PIPE SIZE</u>									
2 in.		A							
2-1/2 in.		В							
3 in.		С							
3-1/2 in.		D							
4 in.		E							
5 in.		F							
SCHEDULE									
SID			A						
20			В						
30									
40									
80									
80			г С						
120			ц						
140			1						
160									
хн			ĸ						
59									
105			IVI NI						
405									
405 80S			P						
			-	J					
Horizontal				^					
Nertical				R					
				D	J				
					1				
Monol®					2				
					2				
Hastellov®					3				
Other					Y Y				
					Λ	1			
1/4 in. NPT						А			
CONNECTION									
SS Compression Fitting w/SS Ferrule							А		
PIPE MOUNTING									
A105 CS 3000#								1	
316/316L SS 3000#								2	
316/316L SS 150# Coupling								3	
A105 CS 3000# w/Double Support								4	
316/316L SS 150# Coupling w/Double Support								5	
316/316L SS 3000# w/Double Support								6	
Not Required								Z	
INSTRUMENT VALVE								_	
1/4 in. Needle CS									А
1/4 in. Needle SS									в
Not Required									z

"CF" - Consult Factory

Stainless Steel ID Tag supplied as standard. Tag information must be included with order.

Transmitter mount not available for Model AR0. Please see Model AR

NOTE: Make sure that DP and Resonance are withing acceptable limits. (See chart in the Ellipse Brochure)

					_					
Ellipse® Annular Regular	PAR -									
7/8 in. DIAMETER			1	l			I	I	I	1
PIPE SIZE										
2 in. 2 1/2 in		A B								
3 in.		c								
3-1/2 in.		D								
4 in. 5 in.		F								
6 in.		G								
8 in. 10 in		н								
12 in.		J								
14 in.		ĸ								
18 in.		M								
20 in.		Ν								
24 in. 30 in		O P								
36 in.		Q								
SCHEDULE										
STD			A							
30			с							
40			D							
60			E							
80			F							
120			H							
140			I							
160			J							
XH XXH			r I							
5S			М							
10S			N							
40S 80S			P							
PIPE ORIENTATION			-							
Horizontal				A						
PROBE MATERIAL				Б						
316/316L SS					1					
Monel®					2					
Hastelloy®					4					
Other					Х					
INSTRUMENT CONNECTION						٨				
1/2 in. Socket						B				
TT3 (Integral 3-Valve Trans Mount - Max Temp 225° F)						С				
TT5 (Integral 5-Valve Trans Mount - Max Temp 225° F) (PTD is not available with Integral 5-Valve Manifold, If PT	D is required a	alact				D				
"E" Transmitter Flange Connection and the appropriate m	anifold valve ur	nder								
the Instrument Valve section below.)						_				
Transmitter Flange Connection						E	l			
CS Compression Fitting w/SS Ferrule							А			
SS Compression Fitting w/SS Ferrule							В	l		
A105 CS 3000#								1		
316/316L SS 3000#								2		
316/316L SS 150# Coupling								3		
316/316L SS 150# Coupling w/Double Support								4 5		
316/316L SS 3000# w/Double Support								6		
Not Required								Z]	
1/4 in. Needle CS									А	
1/4 in. Needle SS									В	
NOT REQUIRED ONLY AVAILABLE WITH OPTION "F" LINDER INSTRUM									Z	
Flg x Flg 3-Valve Manifold CS - Max Temp 225° F	III CONNEC								Е	
Flg x Flg 3-Valve Manifold SS - Max Temp 225° F									F	
Fig x Fig 5-Valve Manifold CS - Max Temp 225° F Fig x Fig 5-Valve Manifold SS - Max Temp 225° F									G H	
Customer Supplied Valve Manifold									1	
RTD (Max Temp 480° F, consult factory for higher temp of	options)									4
100 Onm KTD 3-Wire w/Explosion Proof Head 100 Ohm RTD 3-Wire, Integral w/Aluminum Head										1 2
Not Required										z

Stainless Steel ID Tag supplied as standard. Tag information must be included with order.

NOTE: Make sure that DP and Resonance are withing acceptable limits. (See chart in the Ellipse Brochure)
Filinse® Appular Regular	-							
1-1/4 in. DIAMETER		1	1	i <u> </u>			1	
PIPE SIZE								
12 in.	J							
14 in. 16 in	ĸ							
18 in.	M							
20 in.	N							
24 in.	0							
30 in.	Р							
36 in.	Q							
42 III. 48 in	к S							
60 in.	т							
72 in.	U							
SCHEDULE								
STD	A	4						
20	E	3						
40	с Г	5						
60	E							
80	F	-						
100	C	3						
120	F	1						
140	I							
160	с. И							
	r	`						
55	L.	1						
10S	1	1						
40S	C)						
80S	F	>						
PIPE ORIENTATION		۸						
Vertical		B						
PROBE MATERIAL								
316/316L SS			1					
Monel®			2					
Inconel® Hastellov®			3					
Other			x					
INSTRUMENT CONNECTION			~	1				
1/2 in. NPT				Α				
1/2 in. Socket				В				
TT3 (Integral 3-Valve Trans Mount - I	Max Temp 225°	F)		C				
(RTD is not available with Integral 5-)	viax Temp 225 Jaive Manifold I	г) f RTD is	require	d seler	4			
"E" Transmitter Flange Connection a	nd the appropria	te manif	old valv	e under				
the Instrument Valve section below.)								
Transmitter Flange Connection				Е				
CONNECTION					٨			
SS Compression Fitting W/SS Ferrule	9				B			
PIPE MOUNTING	,				2	1		
A105 CS 3000#						1		
316/316L SS 3000#						2		
316/316L SS 150# Coupling						3		
316/316L SS 150# Coupling w/Double	le Support					4 5		
316/316L SS 3000# w/Double Suppo	ort					6		
Not Required						Ζ	l	
INSTRUMENT VALVE								
1/4 In. Needle CS							A	
Not Required							Z	
ONLY AVAILABLE WITH OPTION "I	E" UNDER INST	RUMEN	IT CON	NECTIO	ЛС		_	
Flg x Flg 3-Valve Manifold CS - Max	Temp 225° F						Е	
Flg x Flg 3-Valve Manifold SS - Max	Temp 225° F						F	
Fig x Fig 5-Valve Manifold CS - Max	1 emp 225° F						ы ы	
Customer Supplied Valve Manifold	1 ettih 229. L						1	
RTD (Max Temp 480° F, consult factor	ry for higher ter	np optic	ons)				•	•
100 Ohm RTD 3-Wire w/Explosion P	roof Head	-						1
100 Ohm RTD 3-Wire, Integral w/Alu	minum Head							2
Not Required								Z

Stainless Steel ID Tag supplied as standard. Tag information must be included with order.

NOTE: Make sure that DP and Resonance are withing acceptable limits. (See chart in the Ellipse Brochure)

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Ellipse[®] Pitot Tube Meter

BIN Round

DESCRIPTION

The BIN is a highly reliable averaging pitot tube which generates a pressure differential between its upstream (stagnation) ports and its downstream (static) ports that is proportional to the flow rate squared. It can be used to measure liquid or air in pipe sizes 2...24 in. An opposite support is supplied standard on pipe sizes 8 in. and larger.

FEATURES

- Accuracy ±3%
- Easy low-cost installation ideal for retrofits
- Very low pressure drop
- Bi-directional flow measurement capability

SPECIFICATIONS

Name	Specification
Probe Construction	316 Stainless steel
Head	"Y" type, brass 1/8 in. FNPT
Pipe Mounting	3000# CS thread-o-let
Instrument Valves	1/4 in. SAE flare brass ball type
ID Tag	Polycarbonate
Temperature Maximum *	250° F (120° C)
Pressure Maximum *	400 PSIG (2760 kPa)

* For higher pressure and temperature application please consult factory









SUBMITTAL DATA

		А	B C		D	D E		Ann Weight	
Size	Model	Height	NPT DIM		OD	NPT	NPT	App. weight	
		in. (mm)	in. (mm) in. (mm)		in. (mm)	in. (mm)	in. (mm)	IDS (KG)	
2 in.	PBINAXXXX	8.25 (209.55)	0.25 (6.35)	0.625 (15.80)	0.3125 (7.90)	_	_	1 (0.45)	
2-1/2 in.	PBINBXXXX	8.25 (209.55)	0.25 (6.35)	0.625 (15.80)	0.3125 (7.90)	—	_	1 (0.45)	
3 in.	PBINCXXXX	8 (203.20)	0.25 (6.35)	0.625 (15.80)	0.3125 (7.90)		_	1 (0.45)	
3-1/2 in.	PBINDXXXX	8.25 (209.55)	0.25 (6.35)	0.625 (15.80)	0.3125 (7.90)	—	—	1 (0.45)	
4 in.	PBINEXXXX	8.25 (209.55)	0.25 (6.35)	0.625 (15.80)	0.3125 (7.90)		—	1 (0.45)	
5 in.	PBINFXXXX	8.75 (222.25)	0.375 (9.50)	0.625 (15.80)	0.375 (9.50)		_	1.25 (0.57)	
6 in.	PBINGXXXX	8.75 (222.25)	0.375 (9.50)	1.125 (28.50)	0.375 (9.50)	—	—	1.25 (0.57)	
8 in.	PBINHXXXX	8.38 (212.90)	0.375 (9.50)	1.125 (28.50)	0.375 (9.50)	0.25 (6.35)	0.25 (6.35)	1.5 (0.68)	
10 in.	PBINIXXXX	8.38 (212.90)	0.375 (9.50)	1.125 (28.50)	0.375 (9.50)	0.25 (6.35)	0.25 (6.35)	1.5 (0.68)	
12 in.	PBINJXXXX	9.38 (238.30)	0.5 (12.70)	1.125 (28.50)	0.5 (12.70)	0.375 (9.50)	0.375 (9.50)	2 (0.91)	
14 in.	PBINKXXXX	10.25 (260.35)	1 (25.40)	1.375 (34.90)	1 (25.40)	1 (25.40)	1 (25.40)	4.25 (1.93)	
16 in.	PBINLXXXX	10.38 (263.65)	1 (25.40)	1.375 (34.90)	1 (25.40)	1 (25.40)	1 (25.40)	4.25 (1.93)	
18 in.	PBINMXXXX	10.38 (263.65)	1 (25.40)	1.375 (34.90)	1 (25.40)	1 (25.40)	1 (25.40)	4.5 (2.05)	
20 in.	PBINNXXXX	10.25 (260.35)	1 (25.40)	1.375 (34.90)	1 (25.40)	1 (25.40)	1 (25.40)	4.5 (2.05)	
24 in.	PBINOXXXX	10.25 (260.35)	1 (25.40)	1.375 (34.90)	1 (25.40)	1 (25.40)	1 (25.40)	4.5 (2.05)	



September 2017

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The Americas | Badger Meter | 4545 West Brown Deer Rd | PO Box 245036 | Milwaukee, WI 53224-9536 | 800-876-3837 | 414-355-0400 México | Badger Meter de las Americas, S.A. de C.V. | Pedro Luis Ogazón N°32 | Esq. Angelina N°24 | Colonia Guadalupe Inn | CP 01050 | México, DF | México | +52-55-5662-0882 Europe, Eastern Europe Branch Office (for Poland, Latvia, Lithuania, Estonia, Ukraine, Belarus) | Badger Meter Europe | U. Korfantego 6 | 44-193 Knurów | Poland | +48-32-236-8787 Europe, Middle East and Africa | Badger Meter Europa GmbH | Nurtinger Str 76 | 72639 Neuffen | Germany | +49-7025-9208-0 Europe, Middle East Branch Office | Badger Meter Europe | PO Box 341442 | Dubai Silicon Oasis, Head Quarter Building, Wing C, Office #C209 | Dubai / UAE | +971-4-371 2503 Slovakia | Badger Meter Slovakia s.r.o. | Racianska 109/B | 831 02 Bratislava, Slovakia | +421-2-44 63 83 01 Asia Pacific | Badger Meter | 80 Marine Parade Rd | 21-06 Parkway Parade | Singapore 449269 | +65-63464836 China | Badger Meter | <7-1202 | 99 Hangzhong Road | Minhang District | Shanghai | China 201101 | +86-21-5763 5412 Switzerland | Badger Meter Swiss AG | Mittelholzerstrasse 8 | 3006 Bern | Switzerland | +41-31-932 01 11 Legacy Document Number: Form #4-25-28