

Flow Measurement

SITRANS F O delta p - Primary differential pressure devices

Orifice plate with annular chamber

Application



Suitable for non-corrosive and corrosive gases, vapors and liquids; permissible operating temperature -10 to +400°C.

Design

- Two support rings with replaceable orifice disk form A, B or D (see types of primary differential pressure devices in "Technical description", "Function"); see Ordering data for materials
- Graphite gasket with noncorrosive metal foil insert between orifice disk and support ring outlet

Overall length

65 mm to DIN 19205

Nominal diameters

EN: DN 50 to DN 1000

ASME: 2 inch to 40 inch

Nominal pressure

EN: PN 6 to PN 100

ASME: class 150 to 600

Sealing face to the mating flanges

- Plane, sealing face turned, N10/N12 to DIN ISO 1302
- Plane, sealing face turned, N8 to DIN ISO 1302
- Plane, RF (raised faced) for version to ASME

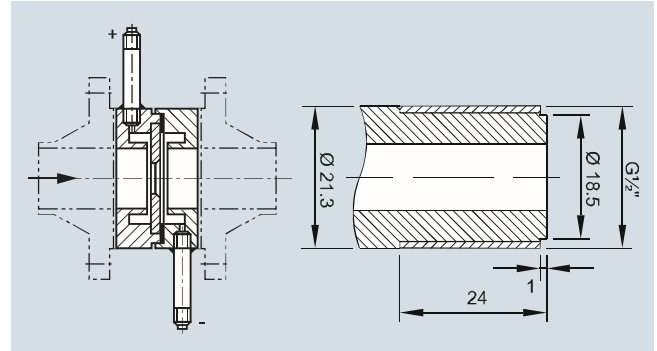
Tapping sockets

For the dimensions of the following tapping sockets, see "Function":

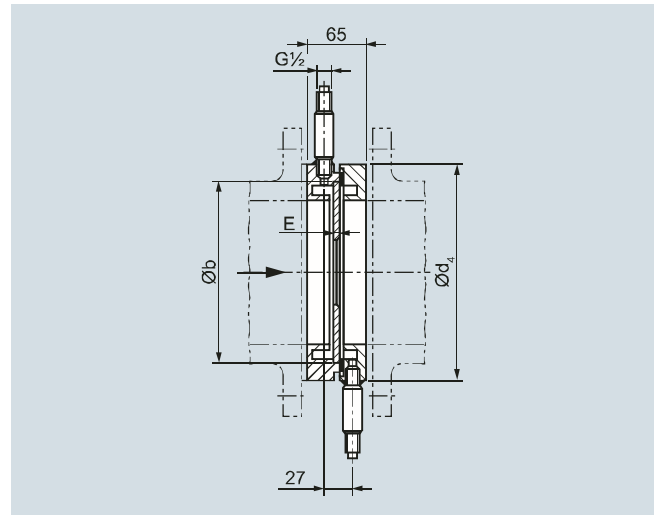
- With connection thread G $\frac{1}{2}$ DIN ISO 228/1, connection dimensions to DIN 19207 form V
- With threaded connection $\frac{1}{2}$ -14 NPT male, for version to ASME
- With \varnothing 12 mm pipe connection for pipe union with ferrule
- With welding connection \varnothing 21.3 mm

See "Technical description" and "Function" for position of the tapping sockets.

Dimensional drawings



Orifice plate with annular chamber (above); tapping socket with threaded connection (below), dimensions in mm



Tapping socket: Socket length is fixed in accordance with the pressure and nominal diameter (DIN 19 205, Part 2).

- Threaded connections of tapping sockets for liquids and gases up to PN 160, for steam up to PN 100, dimensions in mm

Versions for steam lines: See "Technical description", "Function" for position of the tapping sockets.

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Orifice plate with annular chamber

Nominal diameter acc. to EN

DN	Inside diameter	External diameter d_4 / sealing face: plane, with recess or with groove.						
		PN 6	PN 10	PN 16	PN 25	PN 40	PN 63	PN 100
50	43 ... 55	96	107	107	107	107	113	119
65	59 ... 71	116	127	127	127	127	138	144
80	73 ... 85	132	142	142	142	142	148	154
100	90 ... 108	152	162	162	168	168	174	180
125	114 ... 132	182	192	192	194	194	210	217
150	142 ... 160	207	218	218	224	224	247	257
200	185 ... 211	262	273	273	284	290	309	324
250	237 ... 262	317	328	329	340	352	364	391
300	285 ... 314	373	378	384	400	417	424	458
350	328 ... 362	423	438	444	457	474	486	512
400	380 ... 408	473	489	495	514	546	543	–
500	477 ... 514	578	594	617	624	628	–	–
600	581 ... 610	679	695	734	731	–	–	–
700	686 ... 710	784	810	804	833	–	–	–
800	776 ... 810	890	917	911	942	–	–	–
900	876 ... 910	990	1017	1011	1042	–	–	–
1000	976 ... 1010	1090	1124	1128	1154	–	–	–

Orifice plates with annular chambers for installation between EN flanges to EN 1092-1, dimensions in mm and weights

DN	L				E	Weight (approx. in kg)	
	PN 6	PN 10 ... 25	PN 40	PN 63 ... 100		PN 6 ... 100	With smallest nominal pressure
50	79	79	79	79	2 ± 0.2	2.5	4.5
65	96	96	96	96	2 ± 0.2	3.4	6.4
80	115	115	115	115	4 ± 0.2	4.3	6.9
100	137	137	137	137	4 ± 0.25	4.7	8.6
125	164	164	164	164	4 ± 0.25	6.3	12.4
150	193	193	193	193	4 ± 0.29	7.0	17.0
200	247	247	247	247	4 ± 0.29	10.3	26.2
250	302	302	302	302	4 ± 0.32	13.1	36.6
300	354	354	354	354	4 ± 0.36	17.3	49.0
350	403	403	403	403	4 ± 0.4	25.0	63.0
400	452	452	452	452	4 ± 0.4	28.0	73.8
500	553	563	563	–	6 ± 0.4	36.2	65.9
600	659	659	–	–	6 ± 0.4	42.5	75.6
700	757	762	–	–	8 ± 0.4	51.8	89.5
800	869	875	–	–	8 ± 0.4	61.7	109
900	969	975	–	–	8 ± 0.4	68.3	123
1000	1071	1079	–	–	10 ± 0.4	74.0	148

Orifice plates with annular chambers for installation between EN flanges to EN 1092-1, dimensions in mm and weights (contd.)

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Orifice plate with annular chamber

Nominal diameter acc. to ASME

ASME	External diameter d4 / sealing face: Plane. RF (raised faced)			L			E	Weight (approx. in kg)	
	Class 150	Class 300	Class 600	Class 150	Class 300	Class 600		Class 150 ... 600	With smallest nominal pressure
2 inch	105	111	111	79	79	79	2±0.2	2.5	4.5
2½ inch	124	130	130	96	96	96	2±0.2	3.4	6.4
3 inch	137	149	149	115	115	115	4±0.2	4.3	6.9
4 inch	175	181	194	137	137	137	4±0.2	4.7	8.6
5 inch	197	216	241	164	164	164	4±0.25	6.3	12.4
6 inch	222	251	267	193	193	193	4±0.29	7.0	17.0
8 inch	279	308	321	247	247	247	4±0.29	10.3	26.2
10 inch	340	362	400	302	302	302	4±0.32	13.1	36.6
12 inch	410	422	457	354	354	354	4±0.36	17.3	49.0
14 inch	451	486	492	403	403	403	4±0.4	25.0	63.0
16 inch	514	540	565	452	452	452	4±0.4	28.0	73.8
20 inch	549	597	613	553	563	563	6±0.4	36.2	65.9
24 inch	717	775	790	659	659	–	6±0.4	42.5	75.6

Orifice plates with annular chambers for installation between ASME flanges to ASME B16.5, dimensions in mm and weights

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Orifice plate with annular chamber

Selection and ordering data	Article No.	Order code	Selection and ordering data	Article No.	Order code
Orifice plate with annular chambers	7 ME 1 1 1 0 -	- 1	Orifice plate with annular chambers	7 ME 1 1 1 0 -	- 1
for mounting between flanges					
Sealing faces to the mating flanges: plane.					
<u>Nominal diameter acc. to EN</u>					
DN 50			DN 350		
PN 6		1 GA	PN 6		2 HA
PN 10 ... PN 40		1 GE	PN 10		2 HB
PN 63		1 GF	PN 16		2 HC
PN 100		1 GG	PN 25		2 HD
DN 65			PN 40		2 HE
PN 6		1 HA	PN 63		2 HF
PN 10 ... PN 40		1 HE	PN 100		2 HG
PN 63		1 HF	DN 400		
PN 100		1 HG	PN 6		2 JA
DN 80			PN 10		2 JB
PN 6		1 JA	PN 16		2 JC
PN 10 ... PN 40		1 JE	PN 25		2 JD
PN 63		1 JF	PN 40		2 JE
PN 100		1 JG	PN 63		2 JF
DN 100			DN 500		
PN 6		2 AA	PN 6		2 KA
PN 10 and PN 16		2 AC	PN 10		2 KB
PN 25 and PN 40		2 AE	PN 16		2 KC
PN 63		2 AF	PN 25		2 KD
PN 100		2 AG	PN 40		2 KE
DN 125			DN 600		
PN 6		2 BA	PN 6		3 AA
PN 10 and PN 16		2 BC	PN 10		3 AB
PN 25 and PN 40		2 BE	PN 16		3 AC
PN 63		2 BF	PN 25		3 AD
PN 100		2 BG	DN 700		
DN 150			PN 6		3 BA
PN 6		2 CA	PN 10		3 BB
PN 10 and PN 16		2 CC	PN 16		3 BC
PN 25 and PN 40		2 CE	PN 25		3 BD
PN 63		2 CF	DN 800		
PN 100		2 CG	PN 6		3 CA
DN 200			PN 10		3 CB
PN 6		2 EA	PN 16		3 CC
PN 10 and PN 16		2 EC	PN 25		3 CD
PN 25		2 ED	DN 900		
PN 40		2 EE	PN 6		3 DA
PN 63		2 EF	PN 10		3 DB
PN 100		2 EG	PN 16		3 DC
DN 250			PN 25		3 DD
PN 6		2 FA	DN 1000		
PN 10		2 FB	PN 6		3 EA
PN 16		2 FC	PN 10		3 EB
PN 25		2 FD	PN 16		3 EC
PN 40		2 FE	PN 25		3 ED
PN 63		2 FF	<u>Nomin. diameter acc. to ASME</u>		
PN 100		2 FG	2 inch		
DN 300			Class 150		5 GA
PN 6		2 GA	Class 300		5 GB
PN 10		2 GB	Class 600		5 GC
PN 16		2 GC	2½ inch		
PN 25		2 GD	Class 150		5 HA
PN 40		2 GE	Class 300		5 HB
PN 63		2 GF	Class 600		5 HC
PN 100		2 GG	3 inch		
			Class 150		5 JA
			Class 300		5 JB
			Class 600		5 JC
			4 inch		
			Class 150		6 AA
			Class 300		6 AB
			Class 600		6 AC

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Selection and ordering data	Article No.	Order code	Selection and ordering data	Article No.	Order code
Orifice plate with annular chambers	7 ME 1 1 1 0 -	- 1	Orifice plate with annular chambers	7 ME 1 1 1 0 -	- 1
5 inch			Tapping sockets		
Class 150	6 BA		with threaded connection G½; for liquids and gases PN 160, for steam PN 100		
Class 300	6 BB		• Opposite one another, straight		A
Class 600	6 BC		• Opposite one another, bent- up, for vertical pipelines		B
6 inch			• Arranged on one side, for horizontal pipelines		C
Class 150	6 CA		With threaded connection ½-14 NPT male		
Class 300	6 CB		• Opposite one another, straight		Q
Class 600	6 CC		• Opposite one another, bent- up, for vertical pipelines		R
8 inch			• Arranged on one side, for horizontal pipelines		S
Class 150	6 EA		With pipe Ø 12 mm for pipe union with ferrule, max. 200 °C permissible		
Class 300	6 EB		• Opposite one another, straight		J
Class 600	6 EC		• Opposite one another, bent- up, for vertical pipelines		K
10 inch			• Arranged on one side, for horizontal pipelines		L
Class 150	6 FA		With welding connection Ø 21.3 mm for liquids and gases PN 100 ... PN 400, for steam PN 100		
Class 300	6 FB		• Opposite one another, straight		D
Class 600	6 FC		• Opposite one another, bent- up, for vertical pipelines		E
12 inch			• Arranged on one side, for horizontal pipelines		F
Class 150	6 GA		Shape of orifice disk aper- ture		
Class 300	6 GB		For flow in one direction (see figure "Shapes of orifice disk aperture")		
Class 600	6 GC		• Orifice plate form A		A
14 inch			• Quarter-circle nozzle form B		B
Class 150	6 HA		For flow in both directions		
Class 300	6 HB		• Cylindrical orifice plate form D		D
Class 600	6 HC		Manufactured according to pressure equipment directive		
16 inch			None ¹⁾		0
Class 150	6 JA		According to Article 3, Para- graph 3		1
Class 300	6 JB		Design data Y31 to Y35 neces- sary		
Class 600	6 JC		According to category 1, 2, 3 with CE marking and EC decla- ration of conformity		5
20 inch			Design data Y31 to Y35 neces- sary		
Class 150	6 KA				
Class 300	6 KB				
Class 600	6 KC				
24 inch					
Class 150	7 AA				
Class 300	7 AB				
Class 600	7 AC				
Special version					
Specify Order code and plain text	9 AA 0 0	H 1 Y			
Nominal diameter: ..., nominal pressure: ..., material no.: ... and material name: ...					
Material for non-corrosive media					
Support rings made of P265GH, material no. 1.0425; tapping sockets made of P235GH, material no. 1.0345; orifice disk made of material no. 1.4404, permissible oper- ating temperature -10 to +400 °C	1 2				
Material for corrosive media					
Support rings, tapping sockets and orifice disk made of X 2 CrNiMo 17- 12-2, material No. 1.4404; per- missible operating temp. -10 to +400 °C	1 5				

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Selection and ordering data	Order code
Further designs Add "-Z" to Article No. and specify Order code(s) and plain text.	
With Siemens calculation protocol Specify in plain text: No.: ... e. g. no.: 110025240101, Attach calculation protocol to the order	Y21
With third-party calculation Specify in plain text: No.: ... Attach calculation protocol to the order	Y22
Orifice plate without calculation Specify in plain text: Diameter of orifice disk aperture d = ... mm Internal diameter of pipe D=... mm Radius of quarter-circle nozzle r = ... mm	Y01
Design data according to Pressure equipment directive 97/23/EC	
Name of medium Specify in plain text: Medium: e. g. natural gas	Y31
Aggregate state Specify in plain text: Aggregate state: Liquid or gaseous	Y32
Fluid group Specify in plain text: Fluid group: Group 1: hazardous explosive fluid or Group 2: All other fluids	Y33
Max. permissible pressure Specify in plain text: PS = ... in bar or PSI	Y34
Max. permissible temperature Specify in plain text: TS = ... in °C or °F	Y35
Orifice plate degreased for oxygen measurements	
• DN 50 (2") ... DN 150 (6")	A12
• DN 200 (8") ... DN 400 (16")	A13
• DN 500 (20") ... DN 1000 (40")	A14
Material certificate Acceptance test certificate to EN 10204-3.1	C01
Cold water pressure test 1.5 x PN, with acceptance test certificate EN 10204	D11
Orifice disk including gasket	on request
Sealing face of orifice plate with recess or groove	on request

Note on ordering

The "calculation protocol" released by the customer with Order code Y21 or Y22 must be attached to the order as an appendix or the statement "orifice plate without calculation" will be made with Order code Y01.

Scope of delivery

Two support rings with tapping sockets, one orifice disk, one gasket between orifice disk and support ring.
Graphite (99.85%) flat gasket with foil insert (1.4401, 0.1 mm). Application for liquids, steam, gases, liquid gases, acids, hydrocarbons, oils and oil products.

Accessories

See "SITRANS P measuring instruments for pressure".