

VersaFlow Mag 4000 Electromagnetic Flow Sensor Technical Datasheet

34-VF-03-01
September 2009

Specification

Standard solution for the process industry

The VersaFlow electromagnetic flow sensor is a process industry standard suitable for the most demanding applications.

Highlights

- Proven in the Process industries
- Robust and reliable
- More than 250,000 units operating in the field
- Works reliably under demanding conditions: High temperatures (up to 180°C / 356°F) and low conductivity (non-water from 1 $\mu\text{S}/\text{cm}$, water from 20 $\mu\text{S}/\text{cm}$)
- Quick to install and easy to operate
- Chemically resistant to a wide range of processes.
- Hazardous area versions available

Industries

- Chemicals
- Pulp & Paper
- Water
- Wastewater
- Minerals & Mining
- Iron, Steel & Metals
- Pharmaceuticals

Applications

- Clean liquids
- Slurries and pastes with high solids content
- Abrasive and aggressive products



Figure 1 – VersaFlow Electromagnetic Flow Sensor

Electromagnetic product range

VersaFlow converters are compatible with all sensors



TWM9000 Integral Mounted



TWM9000 Remote Mounted



TWM1000

All meters consist of a sensor and a converter, which may be mounted integral to the sensor, or remotely, either with a field mount kit, wall mount housing or a 19" rack mount module. See Specification 34-VF-03-02 (TWM9000) or 34-VF-03-24 (TWM1000) for converter details.

Technical Data

Nominal diameter	MM40						MM41						MM42						MM43													
ASME [inch]	1/10"	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	24"	28"	32"	36"	40"	48"	56"	64"	72"	80"
DN [mm]	2,5	4	6	10	15	20	25	32	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600	700	800	900	1000	1200	1400	1600	1800	2000

Nominal flange pressure

EN 1092-1 - PN40																																	
EN 1092-1 - PN25																																	
EN 1092-1 - PN16																																	
EN 1092-1 - PN10																																	
EN 1092-1 - PN6																																	
ISO insertion length																																	
ASME B16.5 - 150lbs RF																																	
ASME B16.5 - 300lbs RF																																	
ASME B16.5 - 600 lbs RF																																	
ASME B16.5 - 900lbs RF																																	
ASME B16.5 - 1500 lbs RF																																	
JIS10K																																	
JIS20K																																	
	DN > 2000 / 80" on request.																																
	DN 2.5-6(1/10" -1/4"): DN 10 or 15 (3/8" or 1/2") connection, SS Duplex (1.4462).																																
	With ASME B16.5 150 lbs RF flanges DN 700 - 1000 (28"- 40") ≤ 10 bar.																																
	With ASME B16.5 150 lbs RF flanges DN 1200 - 2000 (48"- 80") ≤ 6 bar.																																
	N.B. for vacuum load see separate table.																																

Liner

PTFE																																	
PFA																																	
ETFE																																	
PU (Iratane)																																	
Hardrubber (Ex only)																																	

Electrodes

Hastelloy C4																																	
Hastelloy B2																																	
Hastelloy C22																																	
Platinum																																	
Stainless steel 316 Ti (1.4571)																																	
Titanium																																	
Tantalum																																	
Low noise HC4																																	
LownoiseSS316Ti (1.4571)																																	
	N.B. Other materials on request.																																

■ standard ■ optional □ on request

Nominal diameter	MM40						MM41						MM42						MM43														
	ASME [inch]	1/10"	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	24"	28"	32"	36"	40"	48"	56"	64"	72"	80"
DN [mm]		2,5	4	6	10	15	20	25	32	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600	700	800	900	1000	1200	1400	1600	1800	2000

Grounding rings

Stainless steel 316 Ti (1.4571)*																																
Hastelloy C4**																																
Hastelloy B2**																																
Titanium**																																
Tantalum (ring Nr1 and Nr2 only)																																
*DN2.5-6:ringNr1 available; DN 10 - 2000: ring Nr1, 2 and 3 available.																																
** Ring Nr.1, 2 and 3 available.																																

Flanges

Steel 1.0460 (C 22,8)																																
Steel 1.0038 (RSt37-2)																																
Stainless steel 1.4306(304)																																
Stainless steel 1.4404 (316 L)																																
Stainless steel 1.4571 (316 Ti)																																

Materials

Measuring tube -stainless steel																																
Housing (polyurethane coated)																																
- Stainless steel Duplex (1.4462)																																
- GTW-S 30																																
- Sheet steel																																
-Stainless steel 304 (1.4306)																																
Connection box (F-versions only)																																
-Aluminum, polyurethane coated																																
-Stainless steel 304 (1.4306)																																
Other materials on request.																																

Protection category

IP 66/67 eq. NEMA 4/4X / 6																																
IP 68 field eq. NEMA 6P																																
IP 68 factory eq. NEMA6P																																
N.B. IP 68 is only available with a stainless steel connection box.																																

Nominal diameter	MM40					MM41										MM42						MM43										
	1/10"	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	24"	28"	32"	36"	40"	48"	56"	64"	72"	80"
ASME [inch]																																
DN [mm]																																

Approvals

Non - Ex																																
EEx zone 1/2																																
FM - class I div. 2																																
CSA-GP/class I div. 2																																
NEPSI zone 1																																
SAA - Aus Ex zone 1 / 2																																
TIIS - zone 1 / 2																																
Please note the approvals are for flow sensors only.																																

Versions

Compact+ TWM 9000 C																																
Separate+ TWM 9000 F, R, W																																
Compact/Separate TWM1000																																

Conductivity

Non-water	>10µS	min. 1 µS/cm (TWM 9000), min. 5 µS/cm (TWM 1000)
Water	min. 20 µS/cm	

■ standard ■ optional □ on request

Temperature range

Temperature range	Process [°C]		Ambient [°C]		Process [°F]		Ambient [°F]	
	min.	max.	min.	max.	min.	max.	min.	max.
PTFE								
Remote Converter (TWM 1000 or TWM 9000)	-40	180	-40	65	-40	356	-40	149
Compact with TWM 1000 or TWM 9000	-40	140	-40	65	-40	284	-40	149
PFA								
Remote Converter (TWM 1000 or TWM 9000)	-40	180	-40	65	-40	356	-40	149
Compact with TWM 1000 or TWM 9000	-40	140	-40	65	-40	284	-40	149
ETFE								
Remote Converter (TWM 1000 or TWM 9000)	-40	120	-40	65	-40	248	-40	149
Compact with TWM 1000 or TWM 9000	-40	120	-40	65	-40	248	-40	149
Hardrubber								
Remote Converter (TWM 1000 or TWM 9000)	-5	80	-25	65	23	176	-13	149
Compact with TWM 1000 or TWM 9000	-5	80	-40	65	23	176	-40	149
N.B. Hardrubber liner is available for Ex-versions only								
Irathane								
Remote Converter (TWM 1000 or TWM 9000)	-5	65	-25	65	23	149	-13	149
Compact with TWM 1000 or TWM 9000	-5	65	-40	65	23	149	-40	149

Dimensions and Weights

Nominal size		Dimensions [mm]						Approx. weight
DN	PN	L		H	W	Total (T)		[kg]
[mm]	[bar]	DIN	ISO			box	TWM9000	

DN2,5...20

2,5	40	130	-	142	90	220	299	3
4	40	130	-	142	90	220	299	3
6	40	130	-	142	90	220	299	3
10	40	150	-	106	90	184	263	6
15	40	150	200	106	95	184	263	6
20	40	150	200	158	105	236	315	7

DN25...150

25	40	150	200	140	115	218	297	5
32	40	150	200	157	140	235	314	6
40	40	150	200	166	150	244	323	7
50	40	200	200	186	165	264	343	11
65	16	200	200	200	185	278	357	9
80	40	200	200	209	200	287	366	14
100	16	250	250	237	220	315	394	15
125	16	250	250	266	250	344	423	19
150	16	300	300	300	285	378	457	27

DN200...600

200	10	350	350	361	340	439	518	34
250	10	400	450	408	395	486	565	48
300	10	500	500	458	445	536	615	58
350	10	500	550	510	505	588	667	78
400	10	600	600	568	565	646	725	101
450	10	600	-	618	615	696	775	111
500	10	600	-	671	670	749	828	130
600	10	600	-	781	780	859	938	165

DN700...2000

700	10	700	-	898	895	976	1055	248
800	10	800	-	1012	1015	1090	1169	331
900	10	900	-	1114	1115	1192	1271	430
1000	10	1000	-	1225	1230	1303	1382	507
1200	6	1200	-	1417	1405	1495	1574	555
1400	6	1400	-	1619	1630	1697	1776	765
1600	6	1600	-	1819	1830	1897	1976	1035
1800	6	1800	-	2027	2045	2105	2184	1470
2000	6	2000	-	2259	2265	2337	2416	1860

Nominal size		Dimensions 150lbs [mm]					Approx. weight
ASME	PN	Flow Sensor Only			Total (T)		[lb]
[inch]	[psi]	L	H	W	box	TWM9000	

DN0,1" ...0,75"

1/10"	284	5,12	5,59	3,5	8,66	11,69	6
1/8"	284	5,12	5,59	3,5	8,66	11,69	6
1/4"	284	5,12	5,59	3,5	8,66	11,69	6
3/8"	284	5,91	5,08	3,5	8,15	11,26	12
1/2"	284	5,91	5,08	3,5	8,15	11,26	12
3/4"	284	5,91	5,28	3,88	8,35	11,46	18

DN1" ...6"

1"	284	5,91	5,39	4,25	8,46	11,57	18
1 1/2"	284	5,91	6,1	5	9,17	12,28	22
2"	284	7,87	7,05	5,98	10,12	13,23	29
3"	284	7,87	8,03	7,5	11,1	14,21	37
4"	284	9,84	9,49	9	12,56	15,67	51
5"	284	9,84	10,55	10	13,62	16,73	60
6"	284	11,81	11,69	11	14,76	17,87	75

DN8" ...24"

8"	284	13,78	14,25	13,5	17,32	20,43	95
10"	284	15,75	16,3	16	19,37	22,48	143
12"	284	19,69	18,78	19	21,85	24,96	207
14"	284	27,56	20,67	21	23,74	26,85	284
16"	284	31,5	22,95	23,5	26,02	29,13	364
18"	284	31,5	24,72	25	27,8	30,91	410
20"	284	31,5	26,97	27,5	30,04	33,15	492
24"	284	31,5	31,38	32	34,45	37,56	675

Pressures are applicable at 20 °C (68 °F)

For higher temperatures, the pressure and temperature ratings are as per ASME B16.5 (up to 24") or ASME B16.47 (>24")

Nominal size		Dimensions 150lbs [mm]					Approx. weight
ASME	PN	Flow Sensor Only			Total (T)		[kg]
[inch]	[psi]	L	H	W	box	TWM9000	

DN0,1"...0,75"

1/10"	284	130	142	88,9	220	297	3
1/8"	284	130	142	88,9	220	297	3
1/4"	284	130	142	88,9	220	297	3
3/8"	284	150	129	88,9	207	286	6
1/2"	284	150	129	88,9	207	286	6
3/4"	284	150	134	98,6	212	291	8

DN1"...6"

1"	284	150	137	108	215	294	8
1 1/2"	284	150	155	127	233	312	10
2"	284	200	179	152	257	336	13
3"	284	200	204	190,5	282	361	17
4"	284	250	241	228,6	319	398	23
5"	284	250	268	254	346	425	27
6"	284	300	297	279,4	375	454	34

DN8"...24"

8"	284	350	362	342,9	440	519	43
10"	284	400	414	406,4	492	571	65
12"	284	500	477	482,6	555	634	94
14"	284	700	525	533,4	603	682	129
16"	284	800	583	596,9	661	740	165
18"	284	800	628	635	706	785	186
20"	284	800	685	698,5	763	842	223
24"	284	800	797	812,8	875	954	306
Pressures are applicable at 20 °C (68 °F)							
For higher temperatures, the pressure and temperature ratings are as per ASME B16.5 (up to 24") or ASME B16.47 (>24")							

Nominal size		Dimensions 300lbs [inch]					Approx. weight
ASME	PN	Flow Sensor Only			Total (T)		[lb]
[inch]	[psi]	L	H	W	box	TWM9000	

DN0,1" ...0,75"

1/10"	741	5,12	5,59	3,75	8,66	11,69	6
1/8"	741	5,12	5,59	3,75	8,66	11,69	6
1/4"	741	5,12	5,59	3,75	8,66	11,69	6
3/8"	741	5,91	5,24	3,75	8,31	11,42	15
1/2"	741	5,91	5,24	3,75	8,31	11,42	15
3/4"	741	5,91	5,67	4,62	8,74	11,85	20

DN1" ...6"

1"	741	5,91	5,71	4,87	8,78	11,89	18
1 1/2"	741	7,87	6,65	6,13	9,72	12,83	20
2"	741	9,84	7,32	6,5	10,39	13,5	29
3"	741	9,84	8,43	8,25	11,5	14,61	37
4"	741	11,81	10	10	13,07	16,18	51
6"	741	12,6	12,44	12,5	15,51	18,62	79

DN8" ...24"

8"	741	15,75	15,04	15	18,11	21,22	157
10"	741	19,69	17,05	17,5	20,12	23,23	247
12"	741	23,62	20	20,5	23,07	26,18	375
14"	741	27,56	21,65	23	24,72	27,83	474
16"	741	31,5	23,98	25,5	27,05	30,16	639
20"	741	31,5	28,46	30,5	31,54	34,65	937
24"	741	31,5	33,39	36	36,46	39,57	1345

Pressures are applicable at 20 °C (68 °F)

For higher temperatures, the pressure and temperature ratings are as per ASME B16.5 (up to 24") or ASME B16.47 (>24")

Nominal size		Dimensions 300lbs [mm]					Approx. weight
ASME	PN	Flow Sensor Only			Total (T)		[kg]
[inch]	[psi]	L	H	W	box	TWM9000	

DN0,1"...0,75"

1/10"	741	130	142	95,2	220	297	3
1/8"	741	130	142	95,2	220	297	3
1/4"	741	130	142	95,2	220	297	3
3/8"	741	150	133	95,2	211	290	7
1/2"	741	150	133	95,2	211	290	7
3/4"	741	150	144	117,3	222	301	9

DN0,1"...6"

1"	741	150	145	123,8	223	302	8
1 1/2"	741	200	169	155,6	247	326	9
2"	741	250	186	165,1	264	343	13
3"	741	250	214	209,6	292	371	17
4"	741	300	254	254	332	411	23
6"	741	320	316	317,5	394	473	36

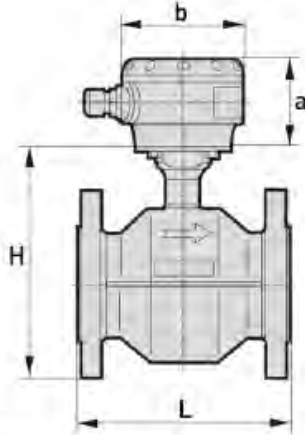
DN0,8"...24"

8"	741	400	382	381	460	539	71
10"	741	500	433	444,5	511	590	112
12"	741	600	508	520,7	586	665	170
14"	741	700	550	584,2	628	707	215
16"	741	800	609	647,7	687	766	290
20"	741	800	723	774,7	801	880	425
24"	741	800	848	914,4	926	1005	610

Pressures are applicable at 20 °C (68 °F)

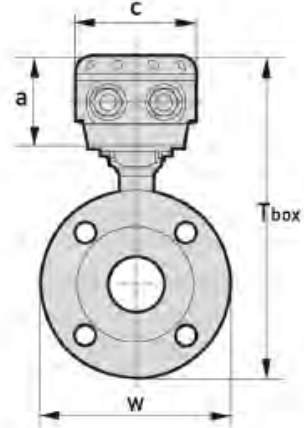
For higher temperatures, the pressure and temperature ratings are as per ASME B16.5 (up to 24") or ASME B16.47 (>24")

Frontview VersaFlow (w/TWM9000F)



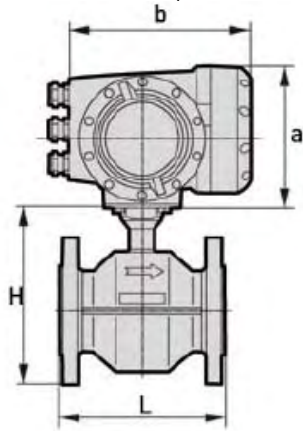
a = 77 mm / 3,1"
b = 106 mm / 4,2"

Sideview VersaFlow (w/TWM9000F)



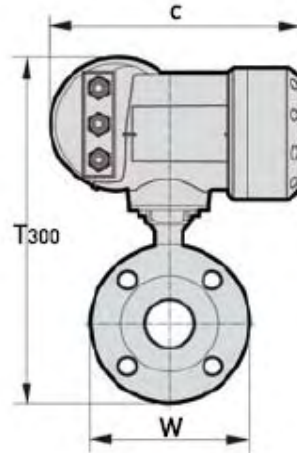
a = 77 mm / 3,1"
c = 106 mm / 4,2"

Frontview VersaFlow (w/TWM9000C)



a = 155 mm / 6,1"
b = 202 mm / 7,8"

Sideview VersaFlow (w/TWM9000C)



c = 260 mm / 10,2"

Note: For Sensor with TWM1000 Converter refer to Specification 36-VF-03-24

Vacuum Load

Liner	Diameter [mm]	Max. pressure [bar]	Vacuum load in mbar abs. at a process temperature [°C] of ...								
			40	60	70	80	90	100	120	140	180
PFA	DN 2.5 - 150	50	0	0	0	0	0	0	0	0	0
Hardrubber	DN 200 - 300	150	250	400	400	400	-	-	-	-	-
	DN 350 - 3000	150	500	600	600	600	-	-	-	-	-
ETFE	DN 200 - 2000	150	100	100	100	100	100	100	100	-	-
PTFE	DN 10 - 20	50	0	0	0	0	0	0	500	750	1000
	DN 200 - 300	50	500	750	1000	1000	1000	1000	1000	1000	1000
	DN 350 - 600	50	800	1000	1000	1000	1000	1000	1000	1000	1000
PU	DN 200 - 1800	1500	500	600	-	-	-	-	-	-	-

Liner	Diameter [inch]	Max. pressure [psi]	Vacuum load in psia at a process temperature [°F] of ...								
			104	140	158	176	194	212	248	284	356
PFA	1/10" - 6"	725	0	0	0	0	0	0	0	0	0
Hardrubber	8" - 12"	2176	3,6	5,8	5,8	5,8	-	-	-	-	-
	14" - 120"	2176	7,3	8,7	8,7	8,7	-	-	-	-	-
ETFE	8" - 72"	2176	1,5	1,5	1,5	1,5	1,5	1,5	1,5	-	-
PTFE	3/8" - 3/4"	725	0	0	0	0	0	0	7,3	10,9	14,5
	8" - 12"	725	7,3	10,9	14,5	14,5	14,5	14,5	14,5	14,5	14,5
	14" - 24"	725	11,6	14,5	14,5	14,5	14,5	14,5	14,5	14,5	14,5
PU	8" - 72"	21756	7,3	8,7	-	-	-	-	-	-	-

Vacuum Load

PFA	1/10" - 6"	725	0	0	0	0	0	0	0	0	0
Hardrubber	8" - 12"	2176	3,6	5,8	5,8	5,8	-	-	-	-	-
	14" - 120"	2176	7,3	8,7	8,7	8,7	-	-	-	-	-
ETFE	8" - 72"	2176	1,5	1,5	1,5	1,5	1,5	1,5	1,5	-	-
PTFE	3/8" - 3/4"	725	0	0	0	0	0	0	7,3	10,9	14,5
	8" - 12"	725	7,3	10,9	14,5	14,5	14,5	14,5	14,5	14,5	14,5
	14" - 24"	725	11,6	14,5	14,5	14,5	14,5	14,5	14,5	14,5	14,5
PU	8" - 72"	21756	7,3	8,7	-	-	-	-	-	-	-