



VORTEX FLOWMETER

MODEL EF73 STAINLESS STEEL

RELIABLE FLOW MEASURING SYSTEM FOR GAS, STEAM AND LIQUIDS

Features

High-performance vortex flowmeter with robust sensor for highly accurate volume or mass flow measurements of gasses, liquids, saturated and superheated steam.

1. DSC (Differential Switched Capacitance) sensor offers a wide measuring range, with a high resistance to thermal shock, vibration and water hammer.
2. Integrated flow computer calculates mass flow from measured volume flow and temperature variables.
3. Capable of simultaneous pulse (interval) and analog (instantaneous) output.
4. Requires no maintenance, has no moving parts, and experiences no zero point drift.
5. Low pressure drop through body.

Specifications

Meter Body / Sensor

Model		EF73
Connection		Flangeless Flanged
Size		DN 15, 25, 40, 50, 80, 100, 150 DN 15, 25, 40, 50, 80, 100, 150, 200, 250, 300
Connection Compatibilities		See details in the Dimensions section
Operating Pressure Range (barg)		0 – 49.6 (See the table to the right for details)
Temperature Range (°C)		-200 ¹⁾ – +400 (See the table to the right for details)
Applicable Fluid		Steam ²⁾ , Air ²⁾ , Water and others ^{2) 3)}
Accuracy	Volume Flow	Gas/Steam: ± 1% of reading (Re > 20 000), ± 1% of full scale (Re: 4 000 – 20 000) Liquid: ± 0.75% of reading (Re > 20 000) ± 0.75% of full scale (Re: 4 000 – 20 000)
	Mass Flow	Saturated ± 2% of reading ⁴⁾ (Re > 20 000) Steam: ± 2% of full scale ⁴⁾ (Re: 4 000 – 20 000)
Repeatability		Within 0.25% of reading
Vibration Resistance		At least 1G in all directions (10 – 500 Hz)
Mounting Position		No restriction with regards to meter accuracy

- 1) Subject to the limitations of fluid freezing point 2) For superheated steam, air and other gasses, an external pressure sensor and flow computer may be required if inlet pressure fluctuates
3) Do not use for toxic, flammable or otherwise hazardous fluids 4) +0.3% for remote version

Transmitter

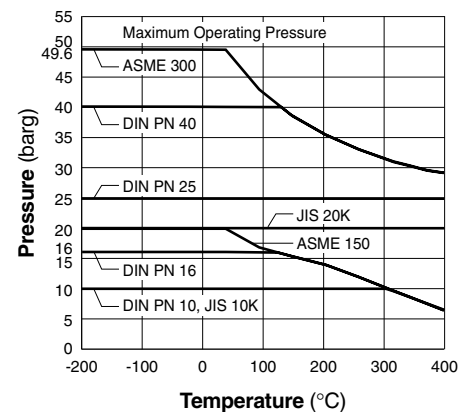
Explosion Class	Non-explosion proof
Ambient Temperature	Compact Type: -40 – +70 °C Remote Type: -40 – +80 °C
Ingress Resistance	IP 67 (NEMA 4X)
Output	Frequency (pulse) output: Open collector pulse (passive) Analog output: 4 – 20 mA DC
Power Source	12 – 36 V DC (24 V DC recommended)
Power Consumption	1.2 W DC (including sensor)
Power Line Connection	G(PF) ½
Field Wiring	2-wire System (2-conductor, shielded, at least 1.25 mm ²)
Load Line Resistance	Maximum 550Ω at 24 V



To avoid abnormal operation, accidents or serious injury, DO NOT use this product outside of the specification range. Local regulations may restrict the use of this product to below the conditions quoted.



Pressure/Temperature Operating Range

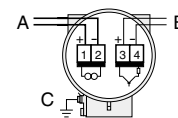


1 bar = 0.1 MPa

Reynolds Number (Re) Calculation:

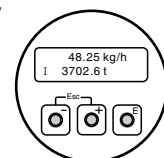
$$Re = \frac{d \times V}{\nu} \quad \begin{array}{l} d = \text{pipe diameter} \\ V = \text{velocity} \\ \nu = \text{viscosity} \end{array}$$

Transmitter Terminals



- A: Power supply/
current output
B: Optional frequency
output
C: Ground terminal
(for remote version)

Display

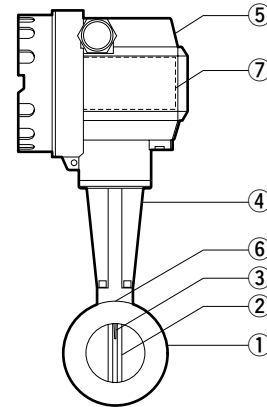


Sample
display

Specifications

No.	Description	Material*	DIN*	ASTM/AISI
①	Meter Body	Cast Stainless Steel SCS16A	1.4435	A351 Gr. CF3M
②	Bluff Body	Cast Stainless Steel SCS16A	1.4435	A351 Gr. CF3M
③	DSC Sensor (wetted parts)	Stainless Steel SUS316	1.4435	AISI316*
	DSC Sensor (non-wetted parts)	Stainless Steel SUS304	1.4301	AISI304*
④	Pipe Stand	Cast Stainless Steel SCS13A	1.4308	A351 Gr. CF8
⑤	Transmitter Housing	Die-cast Aluminum	-	-
⑥	Gasket	Graphite	-	-
⑦	Nameplate	-	-	-
⑧	Mounting Kit**	-	-	-
⑨	Remote Transmitter Mount***	Die-cast Aluminum	-	-
⑩	Connecting Cable (30 m)***	-	-	-

* Equivalent materials
 ** Flangeless model only, to ensure concentric installation; includes centering rings, threaded bolts, nuts, washers and flange gaskets
 *** Remote version only, see next page



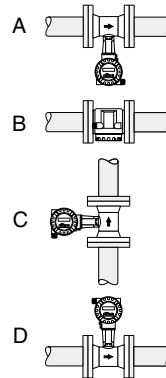
Piping Installation

Required Straight Piping

Piping Element	Piping Example and Required Length of Straight Piping	Remarks
Reducer		When there is a concentric reducer upstream of meter
Expansion Pipe		When there is a concentric expansion pipe upstream of meter
Elbow		When there is an elbow upstream of meter
		When there are two elbows horizontally upstream of meter
		When there are two elbows vertically (3-dimensional) upstream of meter
Control Valve, Globe Valve, etc.		When there is a factor that suddenly disturbs flow upstream of meter
Flow Conditioner (Rectifier)		When a flow conditioner is installed upstream of meter
Pressure Measurement Points		If used, a pressure measurement point is to be mounted downstream of the meter as shown

D = Nominal diameter of piping

Mounting Position

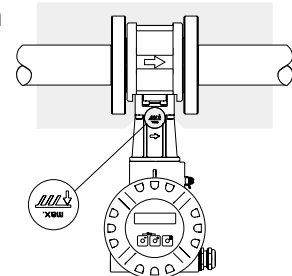


There is no restriction for mounting position (A – D) in regards to meter accuracy. However, special care is recommended for the following flow mediums:

- 1. High-temperature Fluids**
 For high-temperature fluids (steam, condensate), positions A, B or C should be selected to protect the transmitter from heat.
- 2. Liquids**
 To make sure the pipes are completely flooded with liquid, position C is recommended.

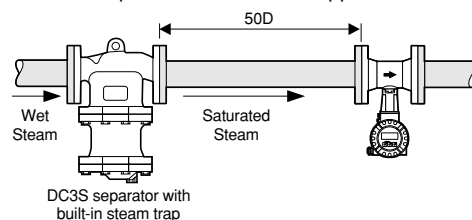
Pipeline Insulation

The pipe stand serves as a radiator and protects the electronics from overheating. Therefore, ensure that sufficient surface area remains exposed. Be sure not to insulate past the level marked "max." on the pipe stand.



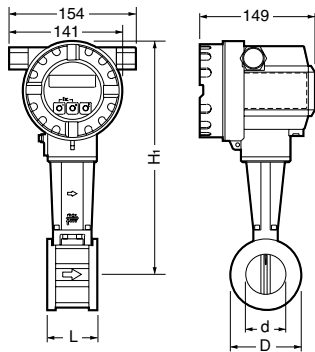
Ensuring Steam Quality

Wet steam has a higher density than saturated steam. Since the flowmeter mass flow calculations are based on saturated steam density, the actual mass flow of wet steam will be higher than shown by the flowmeter. The upstream installation of a separator (DC3S) is suggested to ensure steam quality and flowmeter accuracy. The proper separation and drainage of condensate is a recommended practice for all steam applications.

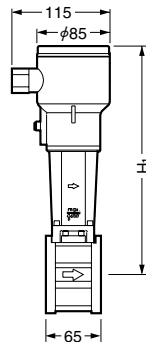


Dimensions

● **EF73 Flangeless Compact Version**



Remote Version

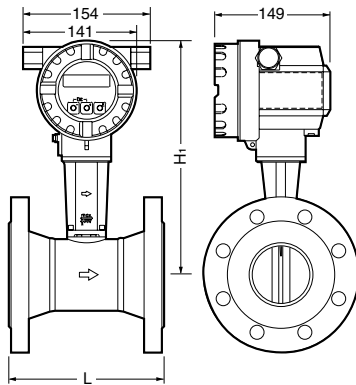


EF73 Flangeless* (mm)

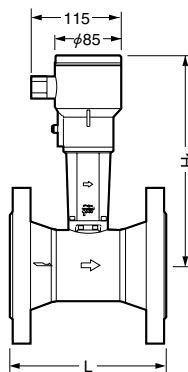
DN	L	φD	φd	H ₁		Weight** (kg)
				Compact	Remote	
15	65	45	17	276	246	3.0
25		64	28	286	256	3.2
40		82	42	294	264	3.8
50		92	54	301	271	4.1
80		127	80	315	285	5.5
100		157	105	328	298	6.5
150		216	157	354	324	9.0

* Compatible with DIN 2501 PN10/16, 25/40, ASME class 150, 300, and JIS 10K/20K flange standards
 ** Weight is for compact version

● **EF73 Flanged Compact Version**



Remote Version

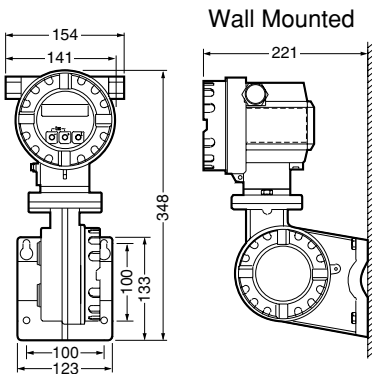


EF73 Flanged (mm)

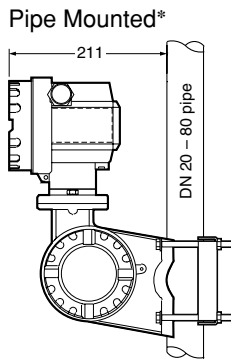
DN	L						H ₁	Weight* (kg)
	DIN 2501				ASME Class			
	PN10	PN16	PN25	PN40	150RF	300RF		
15	—	—	200	200	200	200	277 (247)	5.5
25	—	—					284 (254)	7.5
40	—	—					292 (262)	11
50	—	—					299 (269)	13
80	—	—	312 (282)	21				
100	—	250	250	250	250	250	324 (294)	28
150	—	300	300	300	300	300	348 (318)	52
200	300	300	300	300	300	300	377 (347)	73
250	380	380	380	380	380	380	404 (374)	112
300	450	450	450	450	450	450	427 (397)	159

Other standards available, but weight may vary
 * Weight is for compact version, PN 40
 () Remote version

● **EF73 Remote Transmitter**

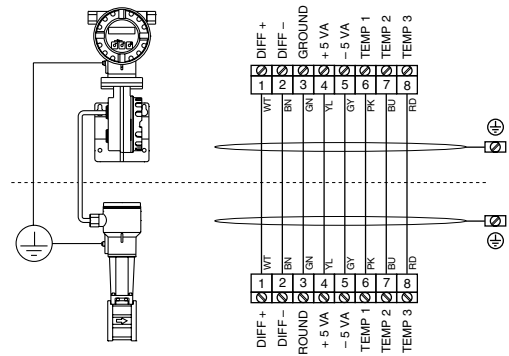


Remote transmitter weight: 3.5 kg



* Requires optional parts

Remote Transmitter to Sensor Wiring

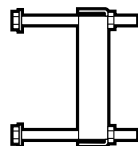


Options

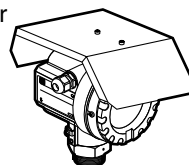
① Pipe Mounting Kit

Suitable for DN 20 – 80 pipe.

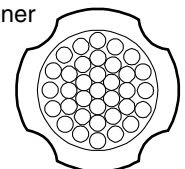
(Includes bracket, threaded bolts and nuts.)



② Sunshade for Transmitter



③ Flow Conditioner



Flow Rate for Saturated Steam

● **EF73 Flangeless**

(Unit: kg/h)

DN	15		25		40		50		80		100		150		Temp (°C)
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
0.5	4.4	30	13	140	33	325	53	527	119	1187	203	2023	454	4531	111.6
1	5.0	40	14	183	38	424	61	689	136	1551	232	2643	519	5919	120.4
2	6.0	58	17	267	45	620	73	1006	165	2263	280	3856	627	8636	133.7
3	6.9	76	20	350	52	811	84	1316	188	2962	320	5047	717	11303	143.7
4	7.6	94	22	432	58	1000	93	1623	209	3652	356	6223	796	13936	151.9
5	8.3	112	24	512	63	1187	101	1927	228	4336	387	7388	867	16545	158.9
6	8.9	130	25	593	67	1373	109	2229	245	5015	417	8545	932	19136	165.0
7	9.5	147	27	673	72	1558	116	2529	261	5691	444	9697	993	21714	170.5
8	10	165	28	752	76	1743	123	2828	276	6364	469	10843	1050	24282	175.4
9	11	182	30	832	80	1927	129	3127	290	7035	493	11987	1104	26843	179.9
10	11	199	31	911	83	2110	135	3424	303	7705	516	13128	1156	29398	184.1
12	12	234	34	1069	90	2476	146	4018	328	9042	559	15406	1252	34499	191.6
15	14	286	37	1306	100	3025	162	4909	363	11046	618	18820	1384	42143	201.4
20	15	373	42	1702	114	3942	184	6397	414	14394	706	24525	1579	54918	214.9
25	17	460	47	2101	126	4866	205	7897	460	17768	784	30274	1755	67791	226.1
30	19	549	51	2505	137	5801	224	9413	502	21180	856	36087	1916	80810	235.7

● **EF73 Flanged**

(Unit: kg/h)

DN	15		25		40		50		80		100		150		200		250		300		Temp (°C)
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
0.5	3.1	21	9.4	108	27	267	45	446	101	1001	174	1735	396	3947	759	7577	1196	11945	1715	17133	111.6
1	3.5	28	11	142	31	349	52	583	115	1308	199	2266	452	5156	867	9897	1367	15603	1960	22380	120.4
2	4.3	41	13	207	37	510	62	850	139	1909	240	3307	546	7523	1047	14442	1651	22767	2368	32655	133.7
3	4.9	54	15	271	43	667	71	1113	159	2498	275	4328	624	9846	1198	18901	1889	29796	2709	42738	143.7
4	5.4	66	17	334	47	823	79	1372	176	3080	305	5336	693	12140	1330	23304	2097	36737	3008	52694	151.9
5	5.9	79	18	397	52	977	86	1629	192	3657	332	6335	755	14412	1450	27667	2285	43614	3277	62558	158.9
6	6.3	91	20	459	56	1130	92	1885	207	4230	357	7328	812	16669	1559	32000	2457	50445	3524	72356	165.0
7	6.7	103	21	521	59	1282	98	2139	220	4800	381	8315	865	18915	1661	36311	2618	57241	3754	82103	170.5
8	7.1	116	22	583	63	1434	104	2392	233	5368	403	9298	915	21152	1756	40605	2768	64010	3970	91813	175.4
9	7.5	128	23	645	66	1585	109	2644	245	5934	423	10279	962	23383	1846	44887	2910	70761	4174	101496	179.9
10	7.8	140	24	706	69	1736	114	2896	256	6499	443	11257	1007	25609	1932	49160	3046	77497	4368	111158	184.1
12	8.5	164	26	829	74	2038	124	3398	277	7626	480	13211	1091	30053	2093	57690	3299	90944	4732	130446	191.6
15	9.4	201	29	1012	82	2489	137	4151	306	9316	530	16138	1205	36712	2313	70473	3646	111095	5230	159349	201.4
20	11	262	33	1319	94	3244	156	5410	350	12140	605	21030	1376	47839	2641	91835	4162	144769	5970	207649	214.9
25	12	323	37	1629	104	4005	173	6678	388	14986	672	25960	1529	59054	2934	113363	4625	178705	6633	256326	226.1
30	13	386	40	1942	114	4774	189	7961	424	17864	734	30945	1669	70394	3203	135132	5049	213023	7242	305549	235.7

1 bar = 0.1 MPa

Flow Rate for Air and Water

(Unit: m³/h)

Model	EF73 Flangeless				EF73 Flanged			
	Air (0 °C, atmospheric pressure)		Water (20 °C)		Air (0 °C, atmospheric pressure)		Water (20 °C)	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
15	4.1	35	0.19	6.9	2.9	24	0.16	4.9
25	12	161	0.41	19	8.9	125	0.32	15
40	31	374	1.11	44	26	307	0.91	36
50	50	606	1.80	72	43	513	1.52	61
80	113	1365	4.04	163	95	1151	3.41	138
100	191	2326	6.88	279	164	1995	5.90	239
150	428	5210	15.4	625	373	4538	13.5	544
200	-	-	-	-	715	8712	25.8	1045
250	-	-	-	-	1127	13735	40.6	1648
300	-	-	-	-	1617	19700	58.3	2364

Contact TLV for the flow rates of other fluids.

Manufacturer

ISO 9001/ISO 14001

