

Thermal Mass Flowmeter

StaMass TMF100 - Inline

Introduction

The thermal mass flowmeter measures air/gas flow using the principle of convective heat transfer. The system utilizes two resistance temperature detectors (RTDs); an integrated circuit heats one to serve as the flow sensor, while the second acts as a reference sensor to establish the baseline gas temperature. The instrument maintains a constant temperature differential between these two elements. As medium pass across the heated sensor, they carry heat away from it, causing a cooling effect and subsequent energy loss. This temperature variance generates a highly accurate signal directly proportional to the medium velocity; a greater temperature difference indicates a higher flow rate.

Engineered around this principle, the Stein StaMass TMF100 thermal mass flowmeter is designed for general industrial applications. Customers benefit from its highly reliable performance, minimal pressure drop, wide turndown ratio, high repeatability, and straightforward installation and operation.



Characteristics

1/2" ... 4" / DN15 ... DN100

Accuracy: 1.5% of reading

Idea for low flow rate

High reliability

No pressure/temperature compensation needed

Easy to install and maintain

Applications

Water treatment

Chips manufacturing

Power plant

Versions

Integrated transmitter

Easy to install and operate.

Remote transmitter

Install the transmitter in the control room while sensor in field.

Specifications	
Measuring range	See measuring range below for details
Applicable medium	Air / Gas
Nominal diameter	1/2"...4" / DN15...DN100
Accuracy	1.5% of reading
Repeatability	±0.25% of reading
Operating voltage	85...230VAC; 18...36VDC
Output signal	Pulse + 4...20mA
	Pulse + 4...20mA with HART
	Modbus RS485
Operating pressure	See process connection in order code for details
Sensor material	316 stainless steel, Hastelloy C, Titanium
Transmitter housing material	Aluminum alloy
Flange material	Stainless steel
Response time	<100ms
Sensibility	<0.05m/s
Medium Temperature	-13...248°F / -25...120°C (Standard)
	-13...482°F / -25...250°C (High temperature)
Ambient Temperature	Sensor: -13...140°F / -25...60°C
Ambient Humidity	≤85%RH (68°F / 20°C)
Power consumption	Less than 20W
Electrical connection	M20 x 1.5
Process connection	Flange; Thread
Exproof	Exd II CT6 Gb
Protection class	Integrated type: IP65
	Remote type: IP65(transmitter), IP68(sensor)

Reference conditions of measurement accuracy

Ambient temperature	68°F / 20°C
Medium temperature	68°F / 20°C
Pressure	1 bar
Power	24VDC
Stability time	25 mins
Upstream straight pipeline	10 x pipe diameter
Downstream straight pipeline	5 x pipe diameter
Flow state	Uniform distribution

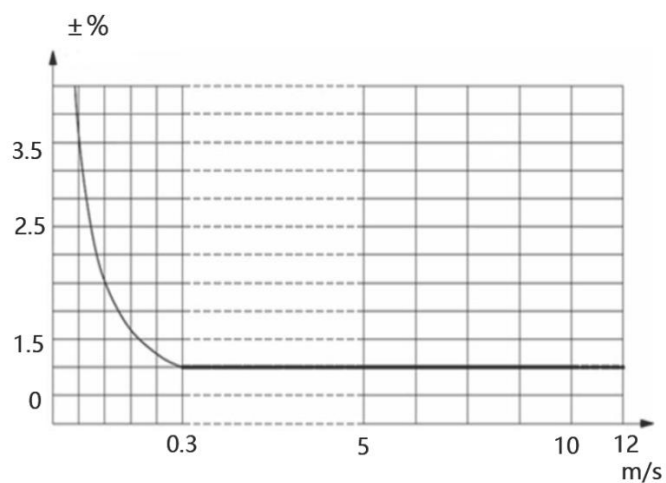
Features

Auto "ZERO" calibration	See manual for details
Self-monitoring and diagnostic	Monitor citation circuit, electrode and transmitter malfunction
Change flow direction real time	See manual for details
Bi-directional measurement	Measuring both forward and reverse flow
Flow rate unit selectable	Nm ³ /h, Nm ³ /min, NL/h, NL/min, t/h, t/m, kg/h, kg/m, g/s, SCFM.....
Damping time	0...32s programmable
Low flow cut off	Adjustable in 0-10%
Output	Relay, Pulse, 4-20mA, RS485, HART
Display	Instantaneous/accumulated flow rate, current, alarm, flow velocity

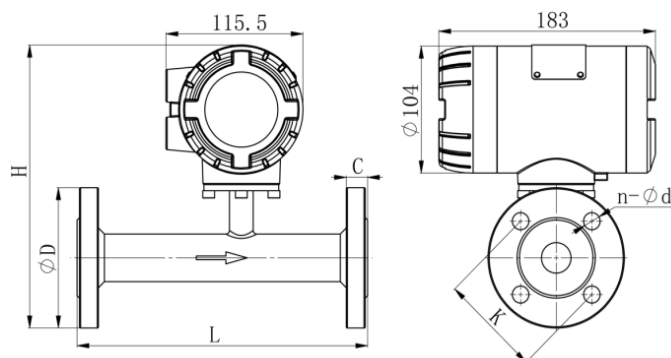
Flow Range

Inch	DN	Flow Range	
		SCFM	Nm ³ /h
1/2"	15	0.2...37.4	0.3...60
3/4"	20	0.3...68.5	0.5...110
1"	25	0.5...109	0.7...175
1-1/2"	40	1.3...280.3	2...450
2"	50	1.9...436.1	3...700
-	65	3.2...747.6	5...1200
3"	80	5...1121.5	8...1800
4"	100	7.5...1744.5	12...2800

Accuracy vs. Flow Velocity Curve



Dimensions in mm (Integrated transmitter)



Flange ANSI Class 150 (ASME B16.5)

Inch	L	H	D	C	K	n-Ød	Pressure Rating
1/2"	200	218	90	11.5	60.5	4-Ø16	Class 150
3/4"	200	228	100	13	70	4-Ø16	
1"	245	234	110	14.5	79.5	4-Ø16	
1-1/2"	245	320	130	17.5	98.5	4-Ø16	
2"	245	330	150	19.5	120.5	4-Ø18	
3"	300	359	190	24	152.5	4-Ø18	
4"	300	370	230	24	190.5	8-Ø18	

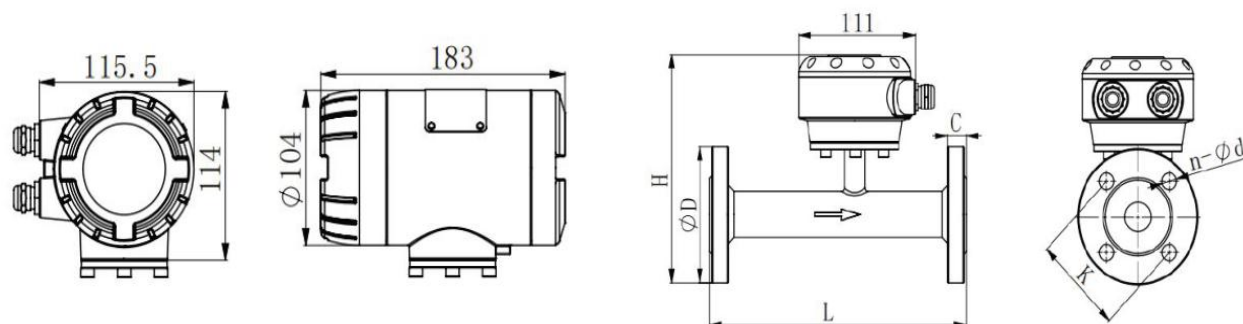
Flange ANSI Class 300 (ASME B16.5)

Inch	L	H	D	C	K	n-Ød	Pressure Rating
1/2"	200	221	95	14.5	66.5	4-Ø16	Class 300
3/4"	200	238	120	16	82.5	4-Ø18	
1"	245	242	125	17.5	89	4-Ø18	
1-1/2"	245	333	155	21	114.5	4-Ø22	
2"	245	338	165	22.5	127	8-Ø18	

Flange EN 1092-1

DN	L	H	D	C	K	n- Ø d	Pressure Rating
15	200	215	95	14	65	4-Ø14	PN40
20	200	225	105	16	75	4-Ø14	
25	245	231	115	16	85	4-Ø14	
40	245	310	150	18	110	4-Ø18	
50	245	322	165	20	125	4-Ø18	
65	300	340	185	20	145	4-Ø18	PN16
80	300	354	200	20	160	8-Ø18	
100	300	375	220	22	180	8-Ø18	

Dimension in mm (Remote transmitter)



Flange ANSI Class 150 (ASME B16.5)

Size	L	H	D	C	K	n-Ød	Pressure Rating
1/2"	200	161	90	11.5	60.5	4-Ø16	Class 150
3/4"	200	171	100	13	70	4-Ø16	
1"	245	177	110	14.5	79.5	4-Ø16	
1-1/2"	245	207	130	17.5	98.5	4-Ø16	
2"	245	215	150	19.5	120.5	4-Ø18	
3"	300	227	190	24	152.5	4-Ø18	
4"	300	254	230	24	190.5	8-Ø18	

Flange ANSI Class 300 (ASME B16.5)

Size	L	H	D	C	K	n-Ød	Pressure Rating
1/2"	200	164	95	14.5	66.5	4-Ø16	Class 300
3/4"	200	181	120	16	82.5	4-Ø18	
1"	245	185	125	17.5	89	4-Ø18	
1-1/2"	245	220	155	21	114.5	4-Ø22	
2"	245	223	165	22.5	127	8-Ø18	

Flange EN 1092-1

DN	L	H	D	C	K	n- Ø d	Pressure Rating
15	200	158	95	14	65	4-Ø14	PN40
20	200	168	105	16	75	4-Ø14	
25	245	174	115	16	85	4-Ø14	
40	245	197	150	18	110	4-Ø18	
50	245	207	165	20	125	4-Ø18	
65	300	217	185	20	145	4-Ø18	PN16
80	300	222	200	20	160	8-Ø18	
100	300	259	220	22	180	8-Ø18	

Order Code

Example: TMF100-F15AKS5ADP0FA150

1. TMF100-

F	Integral transmitter
R	Remote transmitter

2. Size

15	1/2" (DN15)
20	3/4" (DN20)
25	1" (DN25)
40	1-1/2" (DN40)
50	2" (DN50)
65	DN65
80	3" (DN80)
100	4" (DN100)

* Note: The DN65 is not applicable to ASME flange standards.

3. Output1

A	Pulse 4...20mA
H	Pulse 4...20mA with HART
R	Modbus RS485

4. Sensor material

K	316L Stainless steel
C	Hastelloy C
T	Titanium

5. Body material

S	304 stainless steel
L	316L stainless steel

6. Protection class

5	IP65
7	IP68 (available to remote type only)

7. Temperature

A	-13...248°F / -25...120°C (Standard)
B	-13...482°F / -25...250°C (High temperature)

8. Power supply

D	18...36VDC
T	85...230VAC

9. Ex-proof

P	Non-hazardous area
E	Hazardous area

10. Connectivity from Sensor to Remote Transmitter

0	Select 0 for integral transmitter
5	Cable length: 5m / 16ft Custom cable length: 2-50m (6.5...164ft)

11. Process connection

FA150	Flange: ANSI Class 150 (ASME B16.5)
FA300	Flange: ANSI Class 300 (ASME B16.5)
FU	Flange: EN 1092-1 (See dimensions for pressure rating)
TN	NPT Male thread (up to 2" / DN50)
TG	BSPP Male thread (up to 2" / DN50)
S	Other connection / pressure rating on request