

STEEMCO-MAS Flowmeter for Steam

Typical Applications

The STEEMCO-MAS flow meters measure the mass flow of superheated steam within the process industries, including chemical, petro-chemical, pharmaceutical and the power industry.

Mass flow of saturated steam is measured with STEEMCO flowmeter and multi variable transmitter without temperature input.

The STEEMCO-MAS is based on the principle of measuring velocity, the static pressure and the temperature in the pipe line. The electronics computerise the mass flow by using the 3 measured values.

The STEEMCO-MAS flow meters are backed by international standards covering flow calculation, manufacturing tolerances, accuracy and installation requirements.

This type of bare bone technology is world wide accepted and supported by millions of successful installations.

Features

The STEEMCO-MAS flow meter features are:

Standardised product based on well proven technology.

Compact design.

Simple construction.

Standardised construction means low inventory.

No moving parts.

Not sensitive to vibrations.

The electronics delivers output signal linear to mass flow

Digital indicator for local mass flow reading.

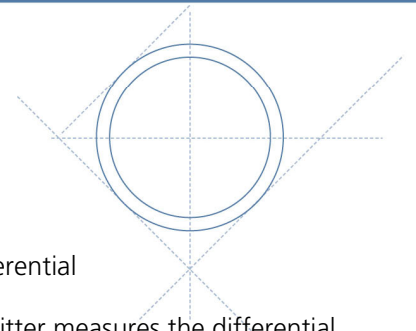
High accuracy.

Wide rangeability.

Easy to install.

Easy to re-calibrate.





Construction

The STEEMCO-MAS flow meter consists of a primary element based on the differential pressure principle, a condensing pot arrangement, a 3(5)-way manifold valve, a multi variable transmitter and a temperature sensor. The multi variable transmitter measures the differential pressure and the static pressure and has an input connection to the temperature sensor. The flow computer housed in the transmitter performs the dynamic flow calculation.

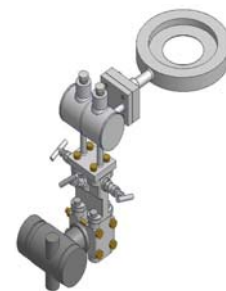
The STEEMCO-MAS flow meter is mounted between flanges in sizes from DN 40 (1½") to DN 400 (16") in pressure ratings up to PN 40 (300 lbs). Other sizes and pressure ratings on request.

Accessories

Remote electronic indicator with LCD is available for local flow indication and if required check/change of flow rate (differential pressure).

Principle of measurement

The STEEMCO-MAS is a mass flow meter
A restriction in a pipe line changes the value of the



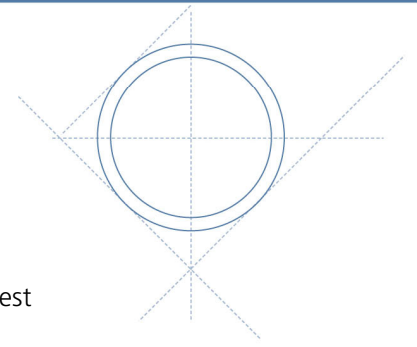
different energies.

Based on the law of energy balance developed by Bernoulli the sum of energies remains constant.

Increases the velocity in the pipe line decreases the pressure in the restriction.

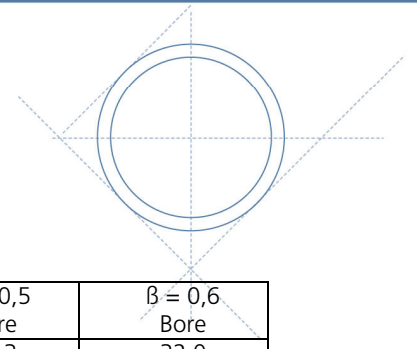
The pressure differential between the inlet pressure and the pressure in the restriction is measured expressing the flow velocity.

The static pressure and the temperature is measured. When the physical values of the fluid is known and the inner pipe diameter is established the electronics calculate the flow rate. The flow rate is expressed in an analogue signal 4 - 20 mA or signal for digital communication.



Technical data

Sizes	: DN 40 - DN 400, 1½" - 16", larger sizes on request
Pressure rating	: up to PN 40, 300 lbs, higher pressure ratings on request
Temperature	: Process : up to 400°C,
Mounting style	: Between flanges according to DIN or ANSI standards
Flange facing	: flat face (standard), raised face, DIN 2512 N, DIN 2513 R
Overall length	: 120 mm
Material	: Stainless steel AISI 316, others on request
Design and calculation standards	: ISO 5167, ASME MFC-3M.
Drain hole	: On request
β (d/D)	: 0,5 and 0,6; other β on request.
Accuracy	: +/- 1,2 %
Rangeability	: 8 : 1
Repeatability	: better than 0,1 %
Pressure loss	: typical 150 mbar (values are given at full flow)
Reynolds No	: Re > 5000
Allowable differential pressure	: max 2,5 bar
Output signal	: analogue 4 - 20 mA or Digital communication via protocol, HART, PROFIBUS, Foundation Fieldbus or others.
Local indicator (option)	: LCD showing flowing units or %
Power supply	: 14 - 36 Vdc, typical 24 Vdc.
Max load (24 Vdc)	: 700 Ohm
Enclosure	: IP 67
Ex protection	: intrinsically safe EEx ia IIC T6 Explosion proof EEx d IIC T6
Temperature	: Ambient : -40 - +80°C



Sizes

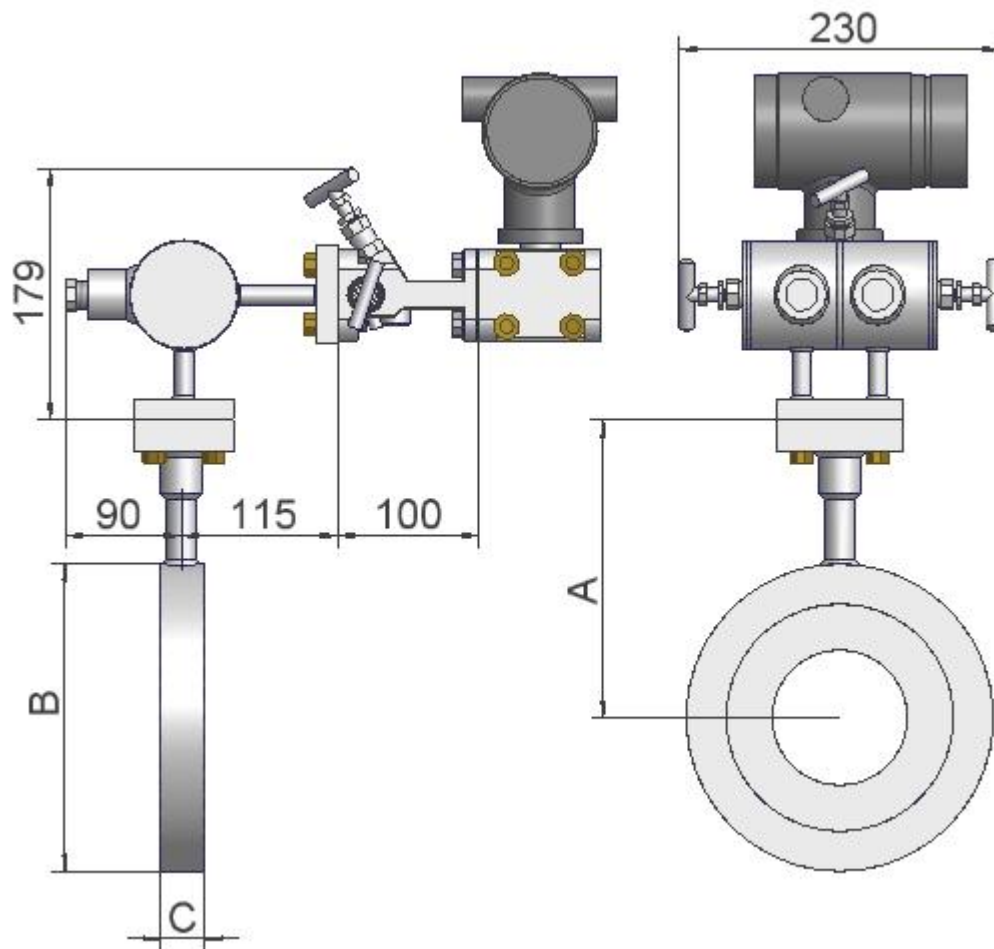
DIN flanges

Size	Pipe OD	Pressure rating	Inner pipe diameter	$\beta = 0,5$ Bore	$\beta = 0,6$ Bore
DN 50	60,3	PN 40	54,5	27,3	32,0
DN 65	76,1	PN 40	70,3	35,0	42,0
DN 80	88,9	PN 40	82,5	41,0	49,5
DN 100	114,3	PN 16	107,1	54,0	64,0
DN 100	114,3	PN 40	107,1	54,0	64,0
DN 125	139,7	PN 16	131,7	66,0	79,0
DN 125	139,7	PN 40	131,7	66,0	79,0
DN 150	168,3	PN 16	159,3	80,0	96,0
DN 150	168,3	PN 40	159,3	80,0	96,0
DN 200	219,1	PN 16	207,3	104,0	124,4
DN 200	219,1	PN 25	206,5	104,0	124,4
DN 200	219,1	PN 40	206,5	104,0	124,4
DN 250	273	PN 16	260,4	130,0	156,0
DN 250	273	PN 25	258,8	130,0	156,0
DN 250	273	PN 40	258,8	130,0	156,0
DN 300	323,9	PN 10	309,7	155,0	185,0
DN 300	323,9	PN 16	309,7	155,0	185,0
DN 300	323,9	PN 25	307,9	155,0	185,0
DN 300	323,9	PN 40	307,9	155,0	185,0
DN 350	355,6	PN 10	341,4	170,0	204,0
DN 350	355,6	PN 16	339,6	170,0	204,0
DN 350	355,6	PN 25	339,6	170,0	204,0
DN 350	355,6	PN 40	338,0	170,0	204,0
DN 400	406,4	PN 10	392,2	195,0	234,0
DN 400	406,4	PN 16	390,4	195,0	234,0
DN 400	406,4	PN 25	388,8	195,0	234,0
DN 400	406,4	PN 40	384,4	195,0	234,0

ANSI flanges

Size	Pipe OD	Pressure rating	Sch. 10S	Sch. 40	Sch. 80	$\beta = 0,5$ Bore	$\beta = 0,6$ Bore
			Inner pipe dia.	Inner pipe dia.	Inner pipe dia.		
2"	60,3	150 lbs	54,7	52,5	49,3	26,0	31,5
		300 lbs					
3"	88,9	150 lbs	82,8	77,9	73,7	39,0	47,0
		300 lbs					
4"	114,3	150 lbs	108,2	102,3	97,2	51,0	61,0
		300 lbs					
6"	168,3	150 lbs	161,5	154,1	146,3	77,0	92,5
		300 lbs					
8"	219,1	150 lbs	211,5	202,7	193,7	101,0	121,6
		300 lbs					
10"	273	150 lbs	264,6	254,5	242,8	127,0	153,0
		300 lbs					
12"	323,9	150 lbs	314,7	303,2	289,1	150,0	180,0
		300 lbs					
14"	355,6	150 lbs	346	333,3	317,5	165,0	198,0
		300 lbs					
16"	406,4	150 lbs	396,8	381	363,6	190,0	228,0
		300 lbs					

Overall dimensions



Installation requirements

The STEEMCO-MAS flow meter can be mounted in a horizontal or vertical pipe. The condensing pot arrangement shall be mounted horizontally with the outlet pointing downwards.

To insure high accuracy of measurement, long straight pipe runs upstream from the flow meter is necessary. The required straight pipe run depends on the disturbance upstream. To maintain the 1,2% accuracy the minimum straight pipe run upstream shall be 14 x inner pipe diameter and 6 x downstream

If an additional inaccuracy of ½ % is acceptable the required straight pipe runs are reduced to half of the above values.

Saturated steam is covered by STEEMCO flowmeters with multi variable transmitter without temperature input.