



# SM-25

## Variable Area Flowmeter with Flange Connection, Irrespective of Viscosity



## Features

- / For fluids and gases
- / Operating pressures PN16, PN40, PN63, PN100 as standard, higher pressures up to 700 bar on request
- / Operating temperatures up to +370°C
- / Scales for all operational conditions, individually designed
- / Local display, MIN. MAX. contacts or analogue output
- / Measuring tube fully st. steel 1.4404
- / Optionally with PTFE lining

## Description:

The SM-25 series of flowmeters operates according to the proven variable area principle. The float is introduced into a conical measuring tube where the medium's viscosity has nearly no effect on the float's movement. The flowing medium moves the float in the direction of flow. The movement of the float is magnetically transferred to a display unit situated outside the measuring tube. The display unit is provided with a scale that is designed to match the operational conditions. Additionally, it can also be equipped with contacts or an analogue output.

## Application:

The SM-25 series of variable area flowmeters is intended for measuring and monitoring fluid or gaseous media of any type. Due to the fact that for all wetted parts high quality stainless steel 1.4404 has been used, the device is excellently suited for hostile media as well as for use in the food-processing industry (by using Tri-Clamp or milk tube joints).



# How to order:

1. Choose a version
2. Select the desired process connections from the Table „Process connections“
3. Select the operating range as per the Tables „Operating ranges“
4. Select the display component and the desired output signals
5. Determine the required options

## 1. Versions

Depending on the medium the SM-25 series of flowmeters is available in fully stainless steel 1.4404 (SM-25.1) or with PTFE lining versions for all wetted parts (SM-25.2).

Other materials such as Monel, Hastelloy, tantalum are available on request (SM-25.9).

## Technical specifications:

<b>Measurable media /</b>	fluids, steam and gases
<b>Operating ranges /</b>	see tables 3a and 3b
<b>Ratio of op. range /</b>	10 : 1
<b>Accuracy /</b>	
SM-25.1:	Class 1.6 (DN15 - DN100)
SM-25.1:	Class 2.5 (DN125 - DN150)
SM-25.2:	Class 2.5 (DN15 - DN100)
<b>Process connection /</b>	siehe Tabelle „Prozessanschlüsse“
<b>max. Pressure /</b>	see Table „Process connections“ (op. pressures up to 700 bar on request)
<b>Operating temperature /</b>	
SM-25.1:	-180. . .370°C
SM-25.2:	-80. . .130°C
	(Note max. operating temperatures of display unit and possible options)
<b>Materials /</b>	
SM-25.1:	all wetted parts are st. steel 1.4404, (AISI 316 L)
SM-25.2:	all wetted parts are st. steel 1.4404, (AISI 316 L) with PTFE coating
<b>Mounting position /</b>	vertical
<b>Direction of flow /</b>	from bottom
<b>Mounting length /</b>	see Table „Process connections“
<b>Straight inlet /</b>	
DN 15-65:	none
DN 80-100:	min. 5D
<b>Protection class /</b>	IP 66 with stainless steel housing IP 66 with aluminium housing IP 66/67 NEMA 4, 4x, 6 (not available for Ex d housings)

## Ordering Codes:

<b>Order no.</b>	<b>SM-25.</b>	<b>1.</b>	<b>121.</b>	<b>1.</b>	<b>321.</b>	<b>1.</b>	<b>0.</b>	<b>104</b>
<b>SM-25 Variable area flowmeter</b>								
<b>Version /</b>								
1 = st. steel version								
2 = wetted parts PTFE-coated								
<b>Process connection /</b>								
101. . .678 = process conn. as per Table 2								
999 = special connection (please specify in detailed text)								
<b>Media /</b>								
1 = water / fluids								
2 = air / gas								
3 = steam (please specify operating conditions)								
<b>Operating range /</b>								
101. . .666 = operating range as per Table 3								
999 = special range (please specify in detailed text)								
<b>Housing design /</b>								
0. . .2 = housing material as per Table 4a								
<b>Contact components /</b>								
0. . .5 = contacts as per Table 4b								
<b>Analogue output and Supply voltage /</b>								
1. No:								
0. . .3 = analogue output as per Table 4c								
2.-3. No:								
00. . .13 = supply voltage as per Table 4d								
<b>Please specify optional specifications in detailed text /</b>								
<b>Ordering details /</b>								
<b>1. Model number as per Ordering codes</b>								
<b>2. a. Name of the medium</b>								
b. Temperature								
c. Pressure								
d. Viscosity								
e. Density								
<b>3. For gases: point of reference</b>								
<b>4. Options:</b>								
a. Model number as per list of options								
b. Customer-specific instructions								



## 2. Process Connections

DN	Process connection	Measuring-tube No.	Connection Code No.	Mount-length L (mm)	
<b>15</b> (½")	Flange DN15 PN40 B1	1	101	250	
	Flange ANSI ½" 150 lbs.	1	102	250	
	Flange ANSI ½" 300 lbs.	1	103	250	
	G ½" female PN40	1	104	295	
	½" NPT female PN40	1	105	295	
	Flange DN15 PN100 B2	2	206	250	
	R ½" female PN25	2	209	295	
	½" NPT female PN25	2	210	295	
<b>20</b> (¾")	Flange DN20 PN40 B1	1	111	250	
	Flange ANSI ¾" 150 lbs.	1	112	250	
	Flange ANSI ¾" 300 lbs.	1	113	250	
	R ¾" female PN25	1	114	295	
	¾" NPT female PN25	1	115	295	
	Flange ANSI ¾", 150 lbs.	2	217	250	
	Flange ANSI ¾", 300 lbs.	2	218	250	
	G ¾" female PN40	2	219	295	
	¾" NPT female PN40	2	220	295	
	<b>25</b> (1")	Flange DN25 PN40 B1	1	121	250
Flange ANSI 1" 150 lbs.		1	122	250	
Flange ANSI 1" 300 lbs.		1	123	250	
Thread socket DN25 PN40 (male) as per DIN 11851		1	126	275	
Tri-Clamp DN25 / 1		1	127	250	
Flange DN25 PN40 B1		2	228	250	
Flange ANSI 1" 150 lbs.		2	229	250	
Flange ANSI 1" 300 lbs.		2	230	250	
Thread socket DN25 PN40 (male) as per DIN 11851		2	233	275	
Tri-Clamp DN25 / 1"		2	234	250	
Flange DN25 PN40 B1		3	335	250	
Flange ANSI 1", 150 lbs.		3	336	250	
Flange ANSI 1", 300 lbs.		3	337	250	
R 1" female PN16		3	338	310	
1" NPT female PN16		3	339	310	
<b>32</b> (1 ¼")		Flange DN32 PN40 B1	1	140	250
		Tri-Clamp DN32	1	141	250
		Flange DN32 PN40 B1	2	242	250
		Flange ANSI 1 ¼" 150 lbs.	2	243	250
		Flange ANSI 1 ¼" 300 lbs.	2	244	250
	Tri-Clamp DN32	2	245	250	
	Flange ANSI 1 ¼", 150 lbs.	3	347	250	
	Flange ANSI 1 ¼", 300 lbs.	3	348	250	
	G 1 ¼" female PN40	3	349	310	
	1 ¼" NPT female PN40	3	350	310	

DN	Process connection	Measuring-tube No.	Connection Code No.	Mount-length L (mm)	
<b>40</b> (1 ½")	Tri-Clamp DN40 / 1 ½"	1	151	250	
	Tri-Clamp DN40 / 1 ½"	2	252	250	
	Flange DN40 PN40 B1	3	353	250	
	Flange ANSI 1 ½", 150 lbs.	3	354	250	
	Flange ANSI 1 ½" 300 lbs.	3	355	250	
	<b>50</b> (2")	Flange DN50 PN40 B1	3	356	250
Flange ANSI 2" 150 lbs.		3	357	250	
Flange ANSI 2" 300 lbs.		3	358	250	
Thread socket DN50 PN25 (male) as per DIN 11851		3	359	275	
Tri-Clamp DN50 / 2"		3	360	250	
Flange DN50 PN40 B1		4	461	250	
Flange ANSI 2" 150 lbs.		4	462	250	
Flange ANSI 2" 300 lbs.		4	463	250	
R 2" female PN10		4	464	325	
2" NPT female PN10		4	465	325	
<b>65</b> (2 ½")	Thread socket DN65 PN25 (male) as per DIN 11851	4	466	275	
	G 2 ½" female PN40	4	467	325	
	2 ½" NPT female PN40	4	468	325	
	<b>80</b> (3")	Thread socket DN80 PN25 (male) as per DIN 11851	4	469	275
Tri-Clamp DN65 / 3"		4	470	300	
Flange DN80 PN40 B1		5	571	250	
Flange ANSI 3", 150 lbs.		5	572	250	
Flange ANSI 3", 300 lbs.		5	573	260	
Flange DN100 PN16 B1		5	571a		
<b>100</b> (4")		Thread socket DN100 PN25 (male) as per DIN 11851	5	574	300
		Tri-Clamp DN100 / 4"	5	575	250
	Flange DN100 PN16 B1	6	676	250	
	Flange DN100 PN40 B1	6	677	250	
	Flange ANSI 4", 150 lbs.	6	678	250	
	Flange ANSI 4", 300 lbs.	6	679	270	



### 3. Operating ranges

#### a) SM-25.1 - Stainless Steel Version

Measuring tube Nr.	Operating range code	Water / Fluids (20°C)					Air / Gas (20°C, 1 bar abs.)				
		Operating range (m³/h)	Meas. cone Nr.	Float Nr.	Pressure drop (mbar)	max. Viscosity (mPas)	Meas. cone (m³/h)	Meas. cone Nr.	Float Nr.	Pressure drop (mbar)	
1	101	<b>0.0025 . . 0.025</b>	43	S0	40	10	<b>0.075 . . 0.75</b>	43	S0	45	
	102	<b>0.004 . . 0.04</b>	44	S0	40	80	<b>0.12 . . 1.2</b>	44	S0	45	
	103	<b>0.0063 . . 0.063</b>	47	S0	40	80	<b>0.18 . . 1.8</b>	47	S0	45	
	104	<b>0.01 . . 0.1</b>	51	S0	40	80	<b>0.3 . . 3</b>	51	S0	45	
2	206	0.01 . . 0.13	53	L1	12	50	<b>0.55 . . 5.5</b>	53	M1	21	
	207	<b>0.016 . . 0.16</b>	53	M1	15	100	-	-	-	-	
	208	0.022 . . 0.22	54	L1	12	50	<b>0.65 . . 6.5</b>	54	L1	13	
	209	<b>0.025 . . 0.25</b>	53	S1	40	100	0.9 . . 9	54	M1	21	
	210	0.032 . . 0.32	57	L1	12	50	<b>1 . . 10</b>	57	L1	13	
	211	<b>0.04 . . 0.4</b>	54	S1	40	50	1.4 . . 14	57	M1	21	
	212	0.05 . . 0.5	61	L1	12	50	<b>1.6 . . 16</b>	61	L1	13	
	213	<b>0.063 . . 0.63</b>	57	S1	40	50	2.2 . . 22	61	M1	21	
	214	-	-	-	-	-	<b>2.5 . . 25</b>	62	L1	13	
	214a	0.08 . . 0.8	62	L1	12	50	-	-	-	-	
	215	<b>0.1 . . 1</b>	61	S1	40	100	3.4 . . 34	62	M1	21	
	216	0.1 . . 1	62	M1	15	100	<b>5 . . 50</b>	62	S1	45	
	217	<b>0.16 . . 1.6</b>	62	S1	40	100	-	-	-	-	
	218	<b>0.22 . . 2.2</b>	62	V1	45	50	-	-	-	-	
3	319	0.13 . . 1.3	63	L2	17	50	<b>4 . . 40</b>	63	L2	19	
	320	0.21 . . 2.1	64	L2	17	50	5 . . 50	63	M2	23	
	321	<b>0.25 . . 2.5</b>	63	S2	42	30	<b>6 . . 60</b>	64	L2	19	
	322	0.25 . . 2.5	64	M2	17	10	<b>8.5 . . 85</b>	64	M2	23	
	323	<b>0.4 . . 4</b>	64	S2	42	10	<b>12 . . 120</b>	64	S2	47	
	324	<b>0.6 . . 6</b>	64	V2	43	50	-	-	-	-	
4	425	0.32 . . 3.2	67	L5	13	50	<b>10 . . 100</b>	67	L5	16	
	426	0.5 . . 5	71	L5	13	50	13 . . 130	67	M5	25	
	427	<b>0.63 . . 6.3</b>	67	S5	47	30	<b>16 . . 160</b>	71	L5	16	
	428	0.85 . . 8.5	72	L5	13	30	<b>20 . . 200</b>	71	M5	25	
	429	<b>1 . . 10</b>	71	S5	47	5	-	-	-	-	
	430	-	-	-	-	-	25 . . 250	72	L5	16	
	431	1.6 . . 16	72	S5	47	5	34 . . 340	72	M5	25	
	432	<b>2.5 . . 25</b>	72	V5	63	5	50 . . 500	72	S5	54	
	5	533	<b>2.5 . . 25</b>	73	V8	60	10	<b>55 . . 550</b>	73	L8	30
		534	<b>4 . . 40</b>	74	V8	60	10	-	-	-	-
535		<b>6.3 . . 63</b>	77	V8	60	10	<b>85 . . 850</b>	74	L8	30	
536		-	-	-	-	-	-	-	-	-	
537		-	-	-	-	-	140 . . 1400	77	L8	30	
6	638	<b>10 . . 100</b>	81	11	70	10	-	-	-	-	
6	639	<b>13 . . 130</b>	82	11	70	10	-	-	-	-	

Bold operating ranges are preferred.



## b) SM-25.2 - Wetted parts with PTFE-lining

Measuring tube Nr.	Operating range code	Water / Fluids (20°C)					Air / Gas (20°C, 1 bar abs.)			
		Operating range (m³/h)	Meas. cone Nr.	Float Nr.	Pressure drop (mbar)	max. Viscosity (mPas)	Meas. cone (m³/h)	Meas. cone Nr.	Float Nr.	Pressure drop (mbar)
2	250	0.01..0.1	51	A1	16	50	0.35..3.5	51	A1	20
	251	0.016..0.16	52	A1	16	50	0.5..5	52	A1	20
	252	0.025..0.25	53	A1	16	50	0.85..8.5	53	A1	20
	253	0.04..0.4	54	A1	16	50	1.3..13	54	A1	20
	254	0.063..0.63	57	A1	16	50	2..20	57	A1	20
	255	0.1..1	61	V1	18	50	3.4..34	61	V1	22
3	356	0.16..1.6	62	A2	20	30	5..50	62	A2	25
	357	0.25..2.5	63	A2	20	10	8.5..85	63	A2	25
	358	0.4..4	63	V2	22	50	-	-	-	-
4	459	0.4..4	64	A5	20	30	13..130	64	A5	25
	460	0.63..6.3	67	A5	20	30	20..200	67	A5	25
	461	1..10	71	A5	20	05	35..350	71	A5	25
	462	1.6..16	71	V5	22	10	-	-	-	-
5	563	1.6..16	72	V8	25	10	50..500	72	V8	27
	564	2.5..25	73	V8	25	10	85..850	73	V8	27
	565	4..40	74	V8	25	10	-	-	-	-
6	666	6.3..63	77	10	30	10	-	-	-	-

## 4. Display Unit

Basically, the display unit consists of a stainless steel or aluminium housing with an indicator magnetically coupled to the float. The scale may be designed for units of flow or in percentage. In the display unit, measuring transmitter and contact components can be mounted.

### 4a. Housing designs

Material	Code No.
st. steel 14301	0
Aluminium, coated yellow	2

### 4b. Contact components

Type of Contact	Code No.
none	0
1 min.-contact	1
1 max.-contact	2
1 min.-contact + 1 max.-contact	3
2 min.-contact	4
2 max.-contact	5

### 4c. Analogue outputs

Type	Code No.
none	0
electrical measuring transmitter	1
electrical measuring transmitter (Ex)	2

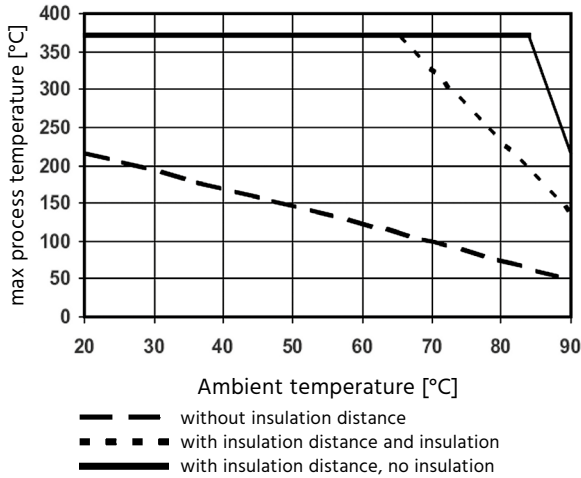
### 4d. Supply voltage and output signal

Type of Contact	Code No.
none	00
115 VAC, 0..20 mA, 4-wire	01
115 VAC, 4..20 mA, 4-wire	02
230 VAC, 0..20 mA, 4-wire	03
230 VAC, 4..20 mA, 4-wire	04
24 VDC, 0..20 mA, 3-wire	07
24 VDC, 4..20 mA, 2-wire	08
24 VDC, 4..20 mA, 3-wire	09

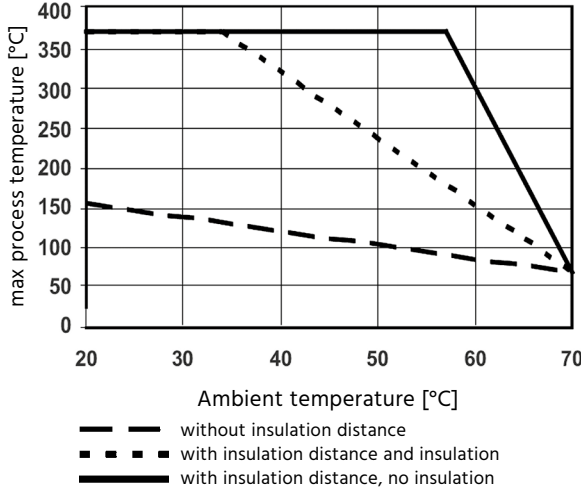


**Temperature curves:**  
for metal versions, standard and Ex-i

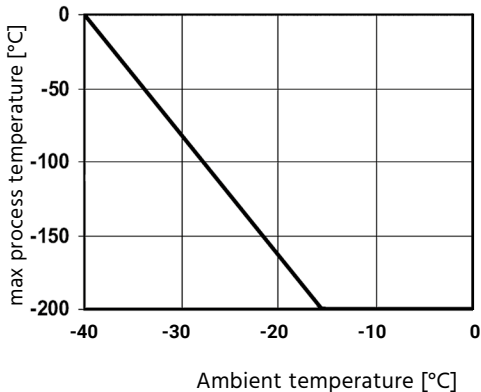
**SM-25** – only with indicator



**SM-25** – with limit switches  
– with electronic transmitter



**SM-25** – with limit switches  
– with electronic transmitter



# Technical Spec. (Display):

## Indicator mechanical /

Media temp.: -25...+110°C (for higher or lower operating temperatures from -80...+370°C order option „Insulation distance“)

## Contacts /

Type: inductive proximity switch SC3.5-NO as per DIN EN 60947-5-6 (NAMUR)

Media temp.: -25...+120°C at T<sub>amb</sub> = +60°C (outside this temperature range order option ‘Insulation distance’)

Nominal voltage: 8 VDC

Output signal: ≤ 1 mA or ≥ 3mA

Explosion prot.: Ex ia IIC T6

Recomm. acc.: isolated switch amplifier Type SE01 (see under “Options”)

## Electrical measuring transmitter /

Output signal: 0...20 mA, 4...20 mA

Display: LCD, 8-digit (programmable for display of units of flow or as non-reversible total volume counter)

Auxiliary power: see Table 4d

max. Load: 4-wire: ≤ 500 Ohm  
2/3-wire: ≤ (U-14,0 V) / 20 mA, max. 500 Ω

Op. temperature: -25...+70°C (outside this temperature range order option ‘Insulation distance’)

El. connection: M16 x 1,5 or 1/2" NPT

## Intrinsically safe Electrical measuring transmitter /

Technical specifications like standard version, except:

Output signal: 4...20 mA

Op. temperature: -25...+70°C (outside this temperature range order option ‘Insulation distance’)

Ex-protection: Ex ia IIC T6 Gb acc. to Ex certificate

Recomm. acc.: feeding device Type SE11 (see under “Options”)

Pulse output: on request

**The temperature graphs** are reference values for size DN100. They may be influenced negative by trapped heat, external heat sources or radiated heat and influenced positive for smaller sizes. Insulation means rock wool between tube and indicator. Units with electronic transmitter can show the temperature of the internal transmitter on the display. Units with PTFE lining are usable up to 130°C. For units with explosion proof certification the temperature limits according the certificate of conformity must be regarded. The minimum ambient temperature for indicators is -25°C (lower temperatures on request).



## 5. Options:

### 5a. Insulation distance (SM-25.A):

For media temperatures outside the values specified under Technical specifications, an insulation distance of 95 mm is created between the measuring tube and display unit. With this the temperature resistance can be increased up to values as specified for the measuring tube.

### 5b. Attenuation (SM-25.D):

It is recommended to provide attenuation of the float for gas applications under the following conditions:

Float type	Operating pressure $\geq$	
SM-25.D.1:	L	1 bar
SM-25.D.2:	M	5 bar
SM-25.D.3:	S	10 bar

(for SM-25.1 only (stainless steel))

### 5c. Heating:

Heating elements (steam cover) are meant for maintaining a certain media temperature in the measuring tube. Heating elements with 3 different process connections are available:

SM-25.H.1:	DIN-flange DN15 PN40
SM-25.H.2:	DIN-flange DN25 PN40
SM-25.H.3:	NPT 1/4" female thread

(see also Table 1, „Process connections“)

### 5d. Oil and grease-free (SM-25.F):

For applications with oxygen the devices free of oil and grease can be supplied.

### 5e. Tests and certifications

on request

### 5f. Measuring point labels,

customer-specific scale labeling:

Please specify exact text for labels.

### 5g. Isolated switching amplifier (Type SE-01):

Version:

as per DIN EN 50227 (NAMUR)

Supply voltage output:

SE-21.1: 230VAC/DC, 1 channel, 1 change-over contact

SE-21.2: 230 VAC/DC, 2 chan., 2 change-over contact

SE-21.3: 24 VDC, 1 channel, 1 change-over contact

SE-21.4: 24 VDC, 2 channel, 2 change-over contact

Switching load:

max. 250 VAC, max. 2A

Control power circuit

intrinsically safe [EEx ia] IIC

### 5h. Transm. power supply for intrinsically safe operation

(Type SE-11):

Output:

0/4...20 mA, with galvanic

separation of inlet and outlet

Supply voltage:

SE-11.1: 230 VAC

SE-11.2: 24 VAC/DC

max. load:

750 Ohm

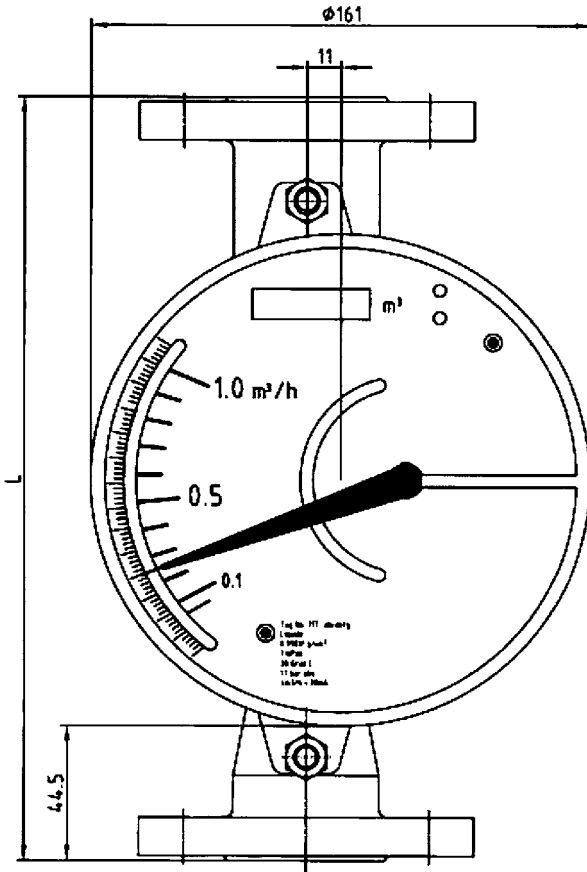
Control power circuit:

intrinsically safe [EEx ia] IIC



## Dimensions in mm:

SM-25 – Housing Type 0 (st. steel)



SM-25 – Housing Type 2 (aluminium)

