



VA40 | VA45 Technical Datasheet

Variable-area flowmeter

- Robustly built for many uses
- Local display without auxiliary power
- Excellent long-term stability
- Adaptable to meet customers' requirements
- Replaceable mounting parts



VA40 VA45 Variable-area flowmeters

The VA40 flowmeter is suitable for measuring the volume or flow rate of liquids or gasses.

The VA45 flowmeter is suitable for measuring gasses at low operating pressures.



Universal device connections can be used

Highlights

- Consistently used overall length concept
- Low loss of pressure for gas applications
- Low maintenance
- Limit monitors are optional
- Simple installation and start-up
- Easy feeding of suspended solid particle (can also be installed at a later date)
- Fragment protection

Industries

Can be used in all industrial sectors, for example:

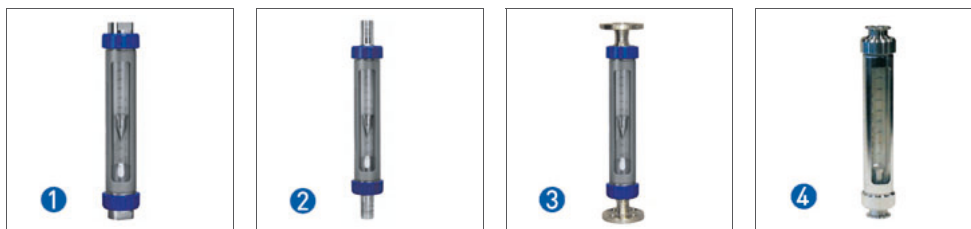
- Chemical
- Food and beverages
- Heating, cooling, and air conditioning
- Iron, steel and metal
- Mining and building materials
- Oil and gas
- Pharmaceutical
- Power plants
- Mechanical engineering
- Paper and pulp
- Water
- Furnace construction

Applications

- Measuring gas
- Burner controlling
- Compressor monitoring
- Water circuits

The VA40 VA45 product family

Variable-area flowmeters of the type VA40



For flow rates of 0.04 l/h and greater (water) and 0.7 l/h (air):

- ❶ VA40V - with screw fitting - with max. two limit monitors, NAMUR or potential-free Reed contact
- ❷ VA40V - with tube nozzle - with max. two limit monitors, NAMUR or potential-free Reed contact
- ❸ VA40V - with flange connection - with max. two limit monitors, NAMUR or potential-free Reed contact
- ❹ VA40V - with food and pharmaceutical connection - with max. two limit monitors, NAMUR or potential-free Reed contact

Variable-area flowmeters of the type VA45



For water flow rates of 150 l/h air and greater:

- ❶ VA45V - with screw fitting
- ❷ VA45F - with flanged connection
- ❸ VA45F - with tube nozzle

For flow meters with valves and differential pressure controller

Variable-area flowmeters of the type DK glass



- ❶ DK46 - max. NAMUR two limit monitors or three-wire and inlet and outlet pressure regulator
- ❷ DK800 - max. NAMUR two limit monitors or three-wire and inlet and outlet pressure regulator
- ❸ DK47 - max. NAMUR two limit monitors or three-wire and inlet and outlet pressure regulator
- ❹ DK48 - max. NAMUR two limit monitors or three-wire and inlet and outlet pressure regulator

Technical data

Application range VA40	Flow measurement of liquids, gases and vapors
Application range VA45	Flow measurement of gasses
Measuring accuracy VA40	± 1.0% acc. to directive VDI / VDE 3513, sheet 2
Measuring accuracy VA45	± 4.0% acc. to directive VDI / VDE 3513, sheet 2
Inlet run	≥ 5 x DN
Outlet run	≥ 3 x DN
Operating pressure PS	Directive 97/23/ EC, April 29, 1999
Test pressure PT	Pressure equipment directive 97/23/EC or AD 2000-HP30
Max. permitted operating pressure PS at TS = 100°C	
VA40 - DN15, DN25	10 bar ①
VA40 - DN40	9 bar ①
VA40 - DN50	7 bar ①
VA45	1 bar ①

① other pressures upon request

Process connection

		Type V		Type S	Type F		Type A	
		Internal thread acc. to			Flange acc. to		Pipe connections	Clamp-connect.
Nominal size	Inch	ISO 228	ASME B.1.20	Ø in [mm]	EN 1092-1	ASME B 16.5	DIN 11851	ISO 2852
DN15	1/2"	G3/8" ... G1/2"	1/4" NPT	15	DN15	1/2"	SC15 ①	17.2 ①
DN25	1"	G3/4" ... G1"	1" NPT	28	DN25	1"	SC25 ①	25 ①
DN40	1 1/2"	G1 1/2"	1 1/2" NPT	42	DN40	1 1/2"	SC40 ①	40 ①
DN50 ①	2" ①	G2" ①	2" NPT ①	52 ①	DN50 ①	2" ①	SC50 ①	51 ①

① only VA40

Temperatures

	Temperature [°C]
Max. measuring temperature TS	+100
Min. measuring temperature TS	-20
Max. ambient temperature Tamb.	+100
Min. ambient temperature Tamb.	-20

Materials

Threaded connection VA.../R	Stainless steel 1.4404 [316 L]
Threaded connection VA.../ST	Steel, galvanized and chromitized
Tube nozzle	Stainless steel 1.4404 [316 L]
Flange connection VA.../R	Stainless steel 1.4404 [316 L]
Threaded connection / tube nozzle VA.../PV	PVDF
Housing	Stainless steel 1.4301 [316 L], electropolished
Screw cap	Aluminum / powder coated, option: Stainless steel
Measuring cone	Borosilicate glass
Suspended solid particle VA45	Aluminum
Suspended solid particle VA40 (also for use with food)	Stainless steel, 1.4571 [316 Ti], Hastelloy C2000, PTFE/insert,
Suspended solid particle VA40 (not for use with food)	TFM (PTFE), Aluminum, hard rubber
Suspended solid particle and insert	PVDF (conforms to FDA)
Seals	NBR (Perbunan), EPDM, FPM

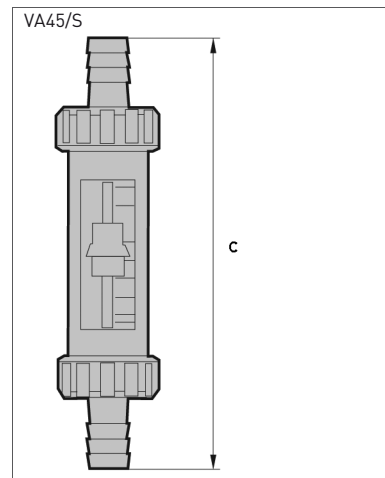
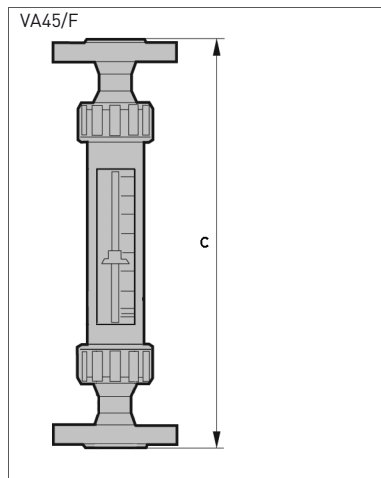
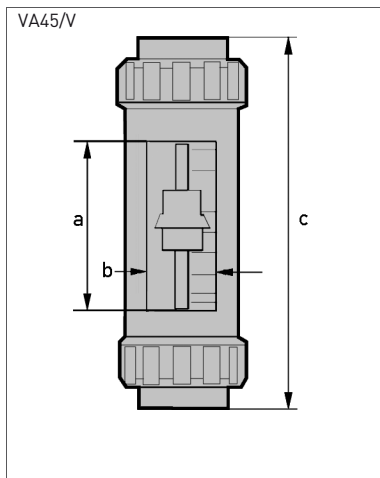
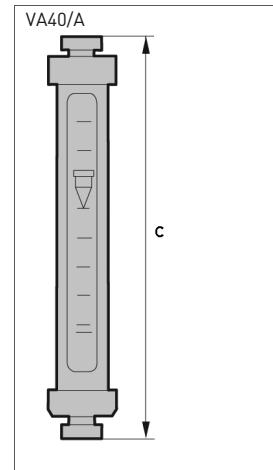
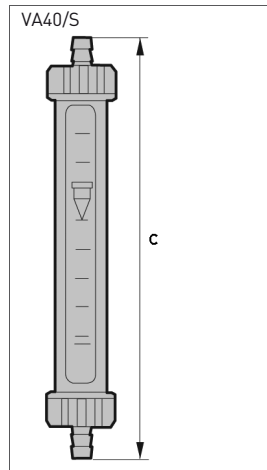
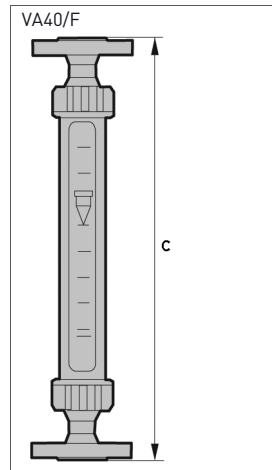
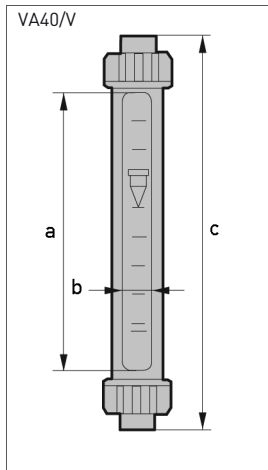
Weights

Weights [kg]	VA40		VA45	
	Type V, S, A	Type F	Type V, S	Type F
Nominal width				
DN15	0.5	1.8	0.5	1.7
DN25	1.3	3.8	1.2	3.7
DN40	2.3	6.8	2.2	6.7
DN50	3.6	9.2	-	-

Dimensions

Device	Nominal size	Inch	a	b	Type V c	Type S c	Type F c	Type A c
VA40	DN15	1/2"	239	26	375	400	425 ①	375
	DN25	1"	239	36	375	450	425 ①	375
	DN40	1 1/2"	235	46	375	450	425 ①	375
	DN50	2"	227	62	375	450	425 ①	375
VA45	DN15	1/2"	118	26	254	279	304	-
	DN25	1"	118	36	254	329	304	-
	DN40	1 1/2"	114	46	254	329	304	-

① option 500 mm



Limit monitors

(only VA40)

Limit monitor types

Type	Switching function	Connection	Shape	Note
RC10-14-N0	monostable	Two-wire NAMUR	Ring signal transmitter	
RC10-14-N3	bistable	Two-wire NAMUR	Ring signal transmitter	
RC15-14-N0	monostable	Two-wire NAMUR	Ring signal transmitter	
RC15-14-N3	bistable	Two-wire NAMUR	Ring signal transmitter	
RB15-14-E2	bistable	3-wire open collector	Ring signal transmitter	Non Ex
MS 14/I	bistable	Two-wire potential-free	Reed contact	Suspended solid particles with magnet required
TG 21	bistable	Two-wire NAMUR	Slot-type initiators	Suspended solid particles with magnet required

Use of the limit monitor

Nominal width	Cone No.	Limit monitor
DN15	G 13.11	-
	G 14.06	-
	G 14.08	-
	G 15.07	RC10
	G 15.09	RC10
	G 15.12	RC10
	G 16.08	RC15
	G 16.12	RC15
	G 17.08	RC15
	G 17.12	RC15
	N 18.07	MS14/I
	N 18.09	MS14/I
	N 18.13	MS14/I
	N 19.09	MS14/I
	N 19.13	MS14/I
	N 19.19	MS14/I
N 19.26	MS14/I	

Nominal width	Cone No.	Limit monitor	
DN25	N 21.09	MS14/I	TG21
	N 21.13	MS14/I	TG21
	N 21.18	MS14/I	TG21
	N 21.25	MS14/I	TG21
DN40	N 41.09	MS14/I	TG21
	N 41.13	MS14/I	TG21
	N 41.19	MS14/I	TG21
DN50	N 51.10	MS14/I	TG21
	N 51.15	MS14/I	TG21
	N 51.21	MS14/I	TG21



Example: VA40/V with limit monitor MS14

Technical data RC RB

Clamp-type terminal	Connection box M16 x 1.5				
Cable diameter	5...10 mm				
Limit monitors	RC10-14-N3	RC15-14-N3	RC10-14-N0	RC15-14-N0	RB15-14-E2
Switching function	Bistable, NAMUR	Bistable, NAMUR	Monostable, NAMUR	Monostable, NAMUR	Bistable, 3-wire
Connection technology	NAMUR, two-wire	NAMUR, two-wire	NAMUR, two-wire	NAMUR, two-wire	Three-wire
Rated voltage U0	8V	8V	8V	8V	
Current consumption	1 mA passage ↓		3 mA - sphere beyond the limit monitor		
Current consumption	3 mA passage ↓		1 mA - sphere is in limit monitor		
Operating voltage Ub					10...30 Vdc
Operating current Ib					0...100mA
No-load current					20mA
Output Ua - passage ↓					≤ 1 V
Output Ua - passage ↑					≥ Ub - 3 V

Technical data MS14

Contact type	N/C or N/O, can be reversed
Switching reproducibility	< 2% of the measurement range end value
Contact rating	12 V A
Max. switching voltage	30 Vdc
Max. switching current	0.5 A
Ambient temperature	- 25 °C ... + 60 °C
Protection class	Acc. to EN 60529 / IEC 529 IP 44

Technical data, TG21

Rated voltage	8 Vdc
Current consumption, active surface free	3 mA
Current consumption, active surface covered	1 mA
Type of protection according to EN 60529 / IEC 529	IP 67 (NEMA 6)
Ambient temperature	-25°C ... +100°C

Measuring ranges

Measuring span 10 : 1

Flow values 100%

Materials, suspended solid particles:

1 Stainless steel or Hastelloy - 2 PTFE - 3 TFM - 4 aluminum - 5 hard rubber

Measuring ranges VA40

Cone	Material ▶	Flow, water [l/h]			Flow, air [[m3/h]				Max. pressure loss [mbar]				
		1	2	3	1	3	4	5	1	2	3	4	5
G 13.11	DN15	0.4	-	-	0.016	-	0.007	-	2	-	-	1	-
G 14.06		0.63	-	-	0.025	-	0.012	-	3	-	-	2	-
G 14.08		1	-	-	0.04	-	0.02	-	4	-	-	3	-
G 15.07		1.6	-	-	0.06	-	0.03	-	4	-	-	3	-
G 15.09		2.5	-	-	0.09	-	0.04	-	5	-	-	4	-
G 15.12		4	-	-	0.14	-	0.06	-	6	-	-	5	-
G 16.08		6.3	-	-	0.2	-	0.1	-	6	-	-	5	-
G 16.12		10	-	-	0.3	-	0.16	-	7	-	-	6	-
G 17.08		16	-	-	0.5	-	0.25	-	7	-	-	6	-
G 17.12		25	-	-	0.8	-	0.4	-	8	-	-	7	-
N 18.07		40	25	13	1.5	0.6	0.8	0.5	9	6	2	3	1
N 18.09		63	40	22	2.2	0.95	1.2	0.7	9	7	3	3	2
N 18.13		100	63	35	3	1.5	1.8	1.2	9	8	3	4	2
N 19.09		160	100	55	5	2.2	2.8	1.8	13	9	4	5	2
N 19.13		250	160	85	8	3.3	4.5	2.8	16	11	4	5	2
N 19.19		400	250	140	-	-	-	-	21	14	5	7	3
N 19.26		630	400	230	-	-	-	-	27	17	6	10	4
N 21.09	DN25	630	400	230	18	9	11	7	22	14	6	8	3
N 21.13		1000	630	350	28	14	18	12	23	17	6	8	4
N 21.18		1600	1000	600	49 ①	-	28 ①	17 ①	26	25	7	10	6
N 21.25		2500	1600	950	70 ①	-	42 ①	26 ①	33	40	8	12	9
N 41.09	DN40	1600	1000	600	45	22	28	18	32	18	9	11	5
N 41.13		2500	1600	900	70 ①	36	45 ①	28 ①	34	20	10	12	5
N 41.19		4000	2500	1500	128 ①	-	76 ①	46 ①	38	24	11	15	8
N 51.10	DN50	4000	2500	1500	120	56	70	45	43	25	12	15	7
N 51.15		6300	4000	2400	190 ①	90	110 ①	70 ①	47	30	13	16	7
N 51.21		10000	6300	3500	310 ①	-	170 ①	118 ①	55	42	14	20	10

① only possible with guided float

Reference condition:

Water 20°C

Air 20°C - 1.013 bar abs.

The operating pressure should be at least twice the pressure loss for liquids and five times the pressure loss for gasses.

The indicated pressure losses apply for water and air at maximum flow.

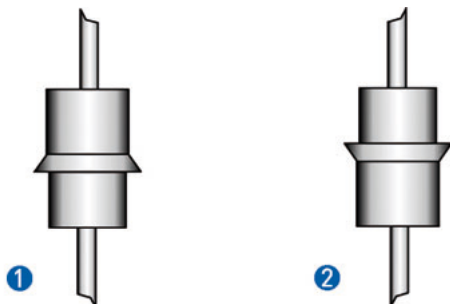
Other flow rate measuring ranges can be provided upon request.

The conversion of other materials or operating data (pressure, temperature, density, viscosity) is done at KROHNE with the help of the calculation procedure as detailed in VDE /VDI Directive 3513

Measuring ranges VA45

Measuring span 10 : 1

Flow values 100%



- 1 Suspended solid particle shape C
- 2 Suspended solid particle shape D

	Cone no.	Suspended solid particle shape	Flow [l/h]	Max. pressure loss [mbar]
DN15	N -15.01	C	1500 ... 2300	3
		D	2300 ... 4800	3
	N -15.02	C	5500 ... 9000	3
		D	9000 ... 16000	3
DN25	N -25.01	C	3000 ... 5000	3
		D	5000 ... 7500	3
	N -25.02	C	7500 ... 16500	3
		D	16500 ... 25000	4
DN40	N -40.01	C	17000 ... 26000	4
		D	26000 ... 34000	4
	N -40.02	C	34000 ... 60000	4
		D	60000 ... 75000	4

Reference condition:

Air 20°C - 1.013 bar abs.

The indicated pressure losses apply for air at maximum flow.

Other flow rate measuring ranges can be provided upon request.

The conversion of other materials or operating data (pressure, temperature, density, viscosity) is done at KROHNE with the help of the calculation procedure as detailed in VDE /VDI Directive 3513



KROHNE Product Overview

- Electromagnetic flowmeters
- Variable area flowmeters
- Mass flowmeters
- Ultrasonic flowmeters
- Vortex flowmeters
- Flow controllers
- Level measuring instruments
- Pressure gauges
- Temperature measuring instruments
- Water solutions & analysis
- Oil and gas turnkey solutions

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