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Küppers Elektromechanik GmbH

Certified according to DIN EN ISO 9001

Technical Datasheet

KVO Series

Vortex Flow Meter

Description

The KVO Vortex flow meters utilize two primary sensing elements a vortex shedding velocity sensor and a RTD temperature sensor to measure the mass flow rate of gases, liquids and steam.

Systems that use external process measurements to calculate mass flow may not provide adequate compensation for the fact that process conditions can change radically between the point of velocity measurement and the point where upstream or downstream pressure and temperature measurements are being made. Because the KVO multivariable flowmeter measures all of these parameters in a single location, it delivers a more accurate process measurement.

Integrating multivariable output capability with a single line penetration also simplifies system complexity and helps reduce initial equipment cost, installation cost and maintenance costs.

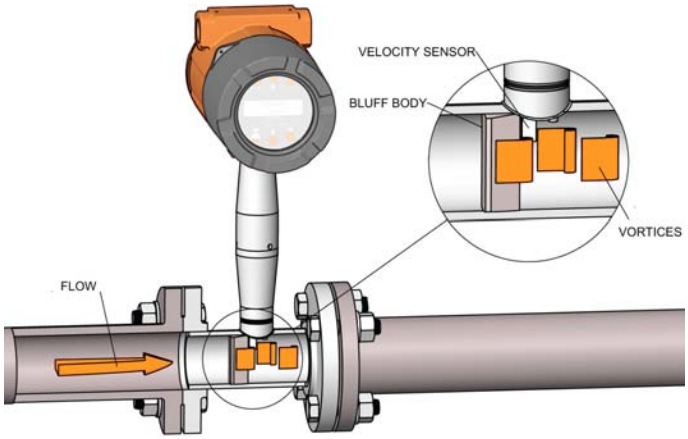
The product line is available with a wide range of options and meter configurations to meet your specific application requirements.

Principle

Vortex flowmeters measure flows of liquid, gas and steam by detecting the frequency at which vortices are alternately shed from a bluff body. According to proven laws of physics, the frequency at which the vortices are alternately shed is directly proportional to the flow velocity.

As flow passes a bluff body in the flow stream, the vortices create low and high pressure zones behind the bluff body, or shedder bar. The KVO uses a piezoelectric crystal sensor to detect the pressure exerted by the vortices on the velocity sensor. The piezoelectric converts these “pulses” into electrical signals.

The meter uses an all welded sensor design to create a robust sensor and to minimize potential leakages.



Application

- Volumetric or mass flow monitoring of most liquids, gases and steam
- Mass flow, temperature, pressure and density readings from a single installed device
- Compensated mass flow reading of liquids, gases and steam

Features

- High accuracy with rangeability up to 100:1
- Temperature up to 400°C
- Pressure up to 64 bar
- 4-20mA loop–powered Mass Meter design saves on energy costs
- HART protocol communications - Standard
- Modbus communications available
- FM, FMC, ATEX, IECEx Approved

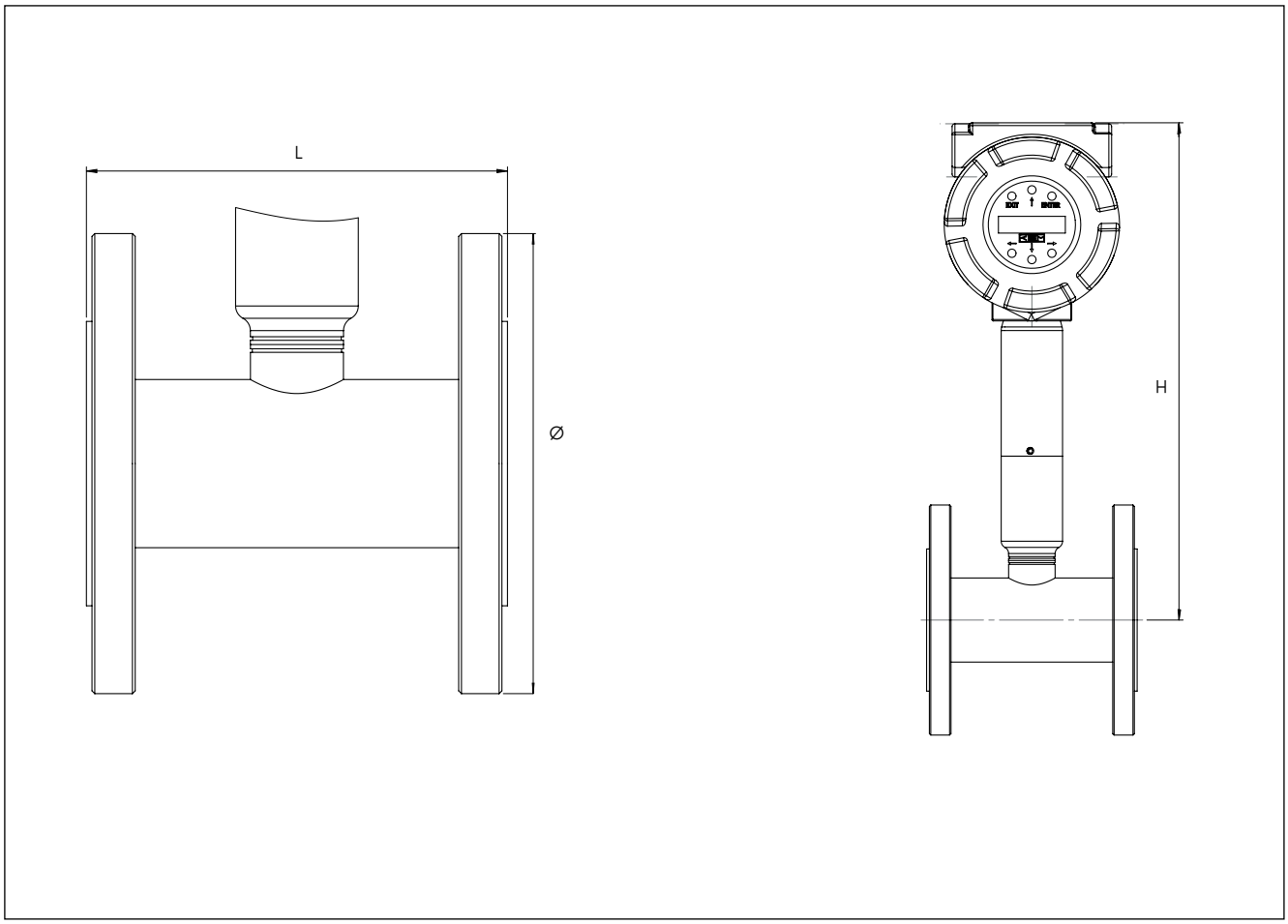
Technical Data - KVO

Process variables		DN 15	DN 20	DN 25	DN 40	DN 50	DN 80
Min. flow (m³/h) water		0.2	0.3	0.5	1.3	2.1	4.7
Max. flow (m³/h) water		5	9	15	38	63	140
Min. flow (kg/h) steam @ 15 bar		9	17	29	71	119	266
Max. flow (kg/h) steam @ 15 bar		241	569	1236	3036	5073	11347
Min. flow (nm³/h) air @ 15 bar		11	21	34	85	142	317
Max. flow (nm³/h) air @ 15 bar		442	1044	2265	5565	9299	80801
Accuracy							
Volumetric accuracy (of rate)	liquids	±0.7%					
	gas & stream	±1%					
Mass accuracy (of rate)	liquids	±1%					
	gas & stream	±1.5%					
Temperature accuracy	liquids	±1°C					
	gas & stream	±1°C					
Pressure accuracy (of full scale)	liquids	±0.3%					
	gas & stream	±0.3%					
Density (of reading)	liquids	±0.3%					
	gas & stream	±0.5%					
Repeatability							
Mass flow rate (of rate)		±0.2%					
Volumetric flow rate (of rate)		±0.1%					
Temperature		±1°C					
Pressure		±0.05%					
Density		±0.1%					
Stability							
Mass flow rate (of rate)		±0.2%					
Volumetric flow rate (of rate)		±negligible					
Max. pressure		64 bar					
Process temperature		-200°C to 260°C					
Ambient temperature		-40°C to 60°C					
Storage temperature		-40°C to 85°C					
Ingress protection		IP 66					
Wetted materials		316L stainless steel (optional: hastelloy C)					

Electrical Data

General	
Supply voltage	12 to 36 VDC or 100 to 240 VAC (50/60 Hz)
EMC	according to EN 61000-6-4 an EN 61000-6-2
Power consuption	loop powered 1W; multiparameter mass options max. 9W
Display	Alphanumeric 2 line x 16 character LCD digital display; Six pushbuttons for full field configuration Pushbuttons can be operated with magnetic wand without removal of enclosure covers; Display can be mounted in 90° intervals for better viewing
Output signals	
Analog	4-20 mA
Alarm	Solid state relay, 40 VDC
Totalizer Pulse	50 millisecond pulse, 40 VDC
Volumetric or Loop Powered Mass	One analog, one totalizer pulse, HART
Multivariable option	Up to three analog signals, three alarms, one totalizer pulse, HART, Modbus
Approvals	
ATEX	pending
IECEx	pending

Dimensional drawing (mm) KVO



Type	H	L	Ø DIN-Flange PN16	Ø DIN-Flange PN40	Ø DIN-Flange PN64	Nominal size DN
KVO 1515	344	116	95	95	150	15
KVO 2020	347	122	105	105	not available	20
KVO 2525	348	125	115	115	140	25
KVO 4040	355	140	150	150	170	40
KVO 5050	361	152	165	165	180	50
KVO 8080	373	175	200	200	215	80

Type	H	L	Ø ANSI 150 lbs	Ø ANSI 300 lbs	Ø ANSI 600 lbs	Nominal size
KVO 1515	344	116	88,9	95,2	95,2	1/2“
KVO 2020	347	122	98,6	117,3	117,3	3/4“
KVO 2525	348	125	108	124	124	1“
KVO 4040	355	140	127	155,4	155,4	1 1/2“
KVO 5050	361	152	152,4	165,1	165,1	2“
KVO 8080	373	175	190,5	209,6	209,6	3“

Ordering code

KVO	V	1515	S	A150	L00	D	DCL	10H	S	P000
	VT	2020	H	A300	Rxx	N	DCH	11H	H	P002
	VTP	2525		A600			ACH	11M		P007
		4040		W600				33H		P020
		5050		PN16				33M		P034
		8080		PN40						P100
				PN64						

Parent Number Code
KVO In-line Multivariable Vortex Flowmeter

Sensor
V Volumetric flowmeter for liquid, gas and steam
VT Velocity and temperature sensors
VTP Velocity, temperature and pressure sensors

Flow Body
1515 1/2" flange, 1/2-inch nominal bore
2020 3/4" flange,3/4-inch nominal bore
2525 1" flange,1-inch nominal bore
4040 1.5" flange,1.5-inch nominal bore
5050 2" flange,2-inch nominal bore
8080 3" flange,3-inch nominal bore

Meter Body Material
S 316 stainless steel
H Hastelloy

Process Connection
A150 ANSI 150# flange
A300 ANSI 300# flange
A600 ANSI 600# flange
W600 Wafer ANSI 600#
PN16 PN 16 flange
PN40 PN 40 flange
PN64 PN 64 flange

Electronics Enclosure
L00 NEMA 4X enclosure
Rxx Remote electronics NEMA 4X, Specify cable length in meter for “xx”

Display Option
D Digital display and programming buttons
N No display

Input Power
DCL 12-36VDC required on loop powered meters and 1AHL only
DCH 12-36VDC four wire - use with 1AH, 1AM, 3AH, 3AM
ACH 85-240VAC 50/60 Hz line power, 12 watts - used with 1AH, 1AM, 3AH, 3AM

Output
10H 1x analog output (4-20mA), 1x pulse, HART - **DCL** input power only
11H 1x analog output (4-20mA), 1x pulse, HART, 1x alarm - **DCH**, **ACH** option only
11M 1x analog output (4-20mA), 1x pulse, MODBUS, 1x alarm - **DCH**, **ACH** option only
33H 3x analog output (4-20mA), 1x pulse, HART (**VT** and **VTP** only), 3x alarm - **DCH**, **ACH** option only
33M 3x analog output (4-20mA), 1x pulse, MODBUS (**VT** and **VTP** only), 3x alarm - **DCH**, **ACH** option only

Temperature Option
S Standard temperature -330°F to 500°F (-200°C to 260°C)
H High temperature -330°F to 750°F (400°C)

Pressure Option
P000 No pressure sensor
P002 Maximum 30 psia (2 bara), Proof 60 psia (4 bara)
P007 Maximum 100 psia (7 bara), Proof 200 psia (14 bara)
P020 Maximum 300 psia (20 bara), Proof 600 psia (41 bara)
P034 Maximum 500 psia (34 bara), Proof 1000 psia (64 bara)
P100 Maximum 1500 psia (100 bara), Proof 2500 psia (175 bara)

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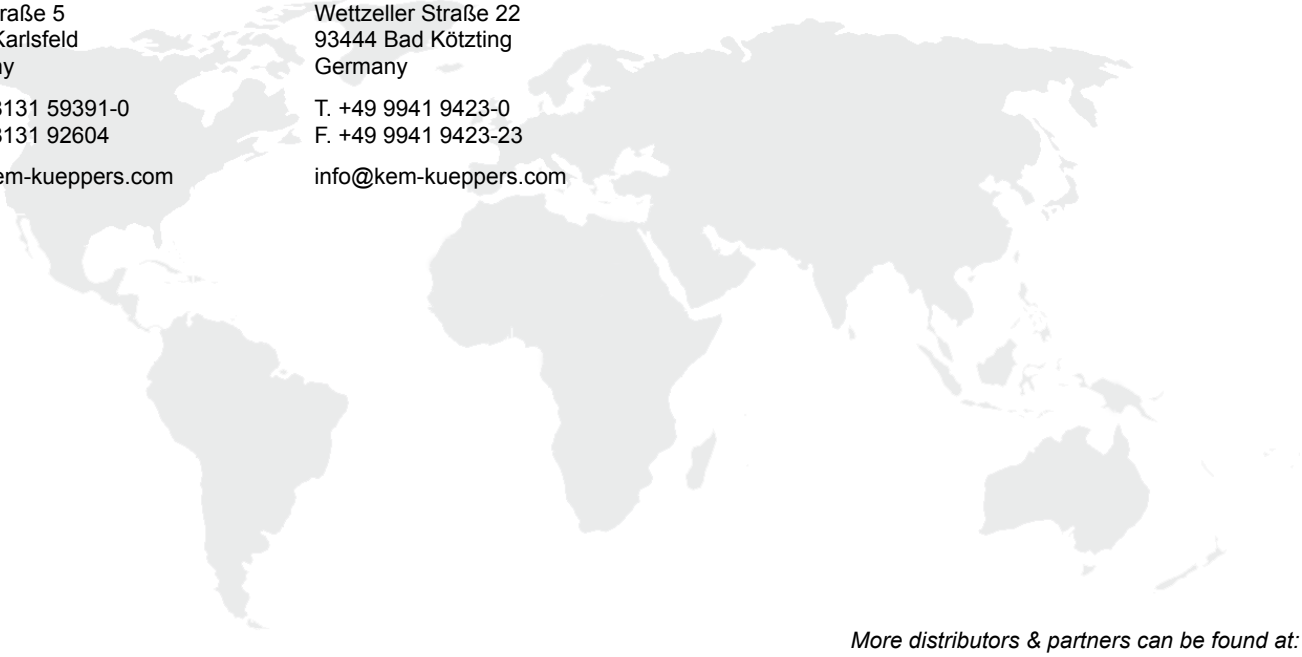

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