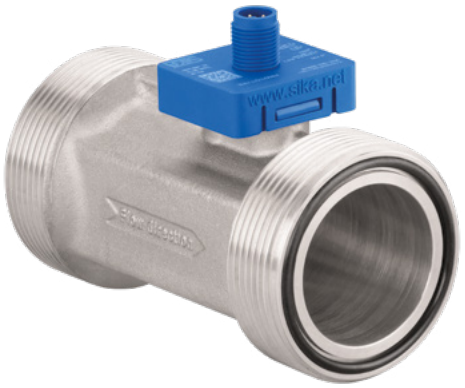
Vortex flow sensors // VVX

US version available

VVX32 brass



US version available

VVX40 stainless steel

The US versions are separate products. The units are not converted, but pre-configured at the factory for the respective variants.

100 %

- Final water flow test
- Adjustment of output signal and calibration at 3 test points
  → Traceable measurement performance
- Recording of the test data
  → Test protocols available for customers
- Traceability via serial number

Combination sensor

- Combination of flow and temperature measurement
- Flow measurement with no moving parts
- Fast responding temperature measurement

On the test bench: 100% Final water flow test

µController

- Customisation through approx. 60 software parameters
- Software filter (optional)
  → exact flow measurement even with vibrations

encapsulated piezoceramic sensor element

Reliable

- Piezoceramic sensor element completely encapsulated
  → no direct medium contact
  → dirt-resistant and fail-safe
- Robust metal body
- CE Marking
- OEM product developed and produced in Germany

Test reports for customers

- SIKA test labs - many qualification tests
  → Temperature shock
  → Contamination
  → and many other tests
- Sample devices can be supplied with works test certificate

Reliable partnership with SIKA

- More than 45 years of experience with flow sensors in heaters
- Leading heat pump manufacturers trust in SIKA Vortex flow sensors

General information on the principle of operation

Alternate vortices rotating in opposite directions are generated behind a bluff body immersed in a flow. The vortices detach from the edges of the bluff body and form a Kármán vortex street in the fluid stream. The distance between the single vortices is constant. The frequency of the vortices flowing past a sensor depends on the flow rate and is proportional to the flow. The sensor detects these vortices which are then converted to an electrical frequency signal.

- *Minimal flow obstruction → low pressure drop*
- *Independent of the conductivity of the medium*
- *High long-term stability / no zero drift*

Technical Data	VVX32	VVX40
Nominal diameter	DN 32	DN 40
Nominal pipe size	1½"	2"
Process connection	G 1½-ISO 228 male, incl. O-rings	G 2-ISO 228 male, incl. O-rings
Process connection	1½" NPT	2" NPT
Inner diameter [mm]	Ø 32	Ø 40
Inner diameter [inch]	1.3	1.6
Medium	Water and aqueous solutions	
Pressure rating	PN 16	
Pressure rating	Max. 232 psi	
Degree of protection EN 60529	IP65 and IP67 (each with plugged on coupling socket)	
Flow measuring		
Flow range [l/min]	12...250	22...400
Flow range [US gpm]	3.2...66	5.8...106
Accuracy	±2 % of range*, deviations with high viscous media	
Repeatability	±0.5 % or ±1 %, see temperature ranges ambient	
Temperature measuring		
Measuring range	0...90 °C	
Measuring range	32...194 °F	
Accuracy	±1 k	
Response time		
t_{50}	approx. 1 s	
t_{90}	approx. 3 s	
Temperature ranges		
Medium	-20...90 °C	
Medium	-4...194 °F	
Ambient	-20...70 °C	
Ambient	-4...158 °F	
Electrical data		
Electrical connection	5-pin plug connector M12 x 1	
Power supply		
Push Pull (optional NPN)	8...30 V DC	
NPN	5 V DC	
4...20 mA or 0...10 V	12...24 V DC	
Current consumption	< 15 mA	
Approvals		
	WRAS APPROVED PRODUCT	
	Intertek • Conforms to ANSI UL Std.61010-1 • Cert. to CAN/CSA C22.2 No.61010-1	

* Test conditions:
→ Test medium water
→ Media temperature 20...30 °C / 68...86 °F
→ Defined inlet and outlet pipes (see operating manual)

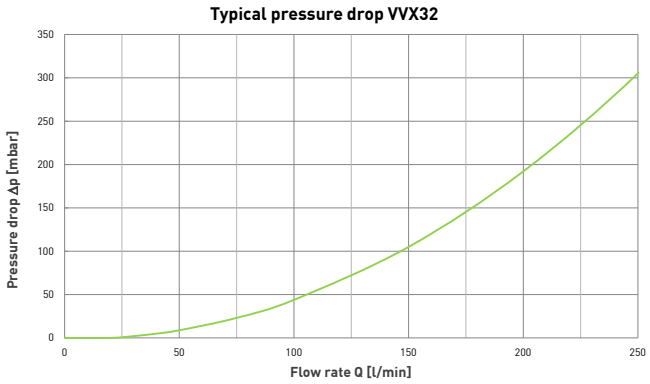
Three different versions available:

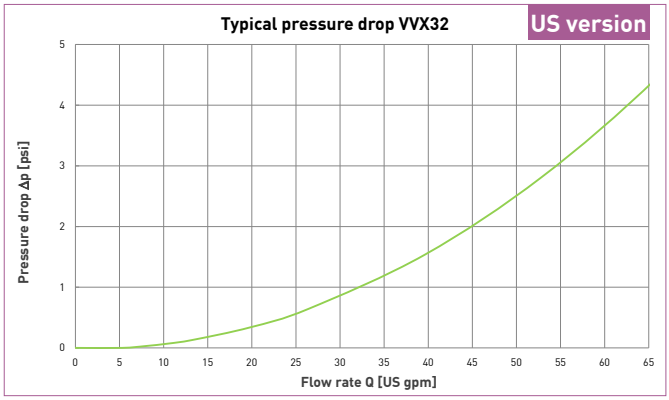
- Frequency output (❶)
- Analogue 0.5...3.5 V and frequency output (❶ + ❷)
- Analogue 0...10 V or 4...20 mA and frequency output (❶ + ❸)

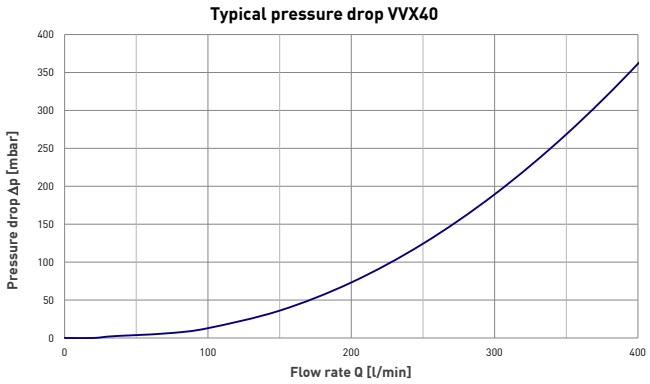
Frequency output ❶	**VVX32**	**VVX40**
Output signal flow	Frequency signal, square wave, pulse duty ratio 50:50, signal current max. 20 mA	
Pulse rate [1/l]	100	50
Pulse rate [pulses/gallon]	400	200
Output signal temperature	Pt1000 2 wire, class B or NTC 10.74k, B 0/100 3450 or none	

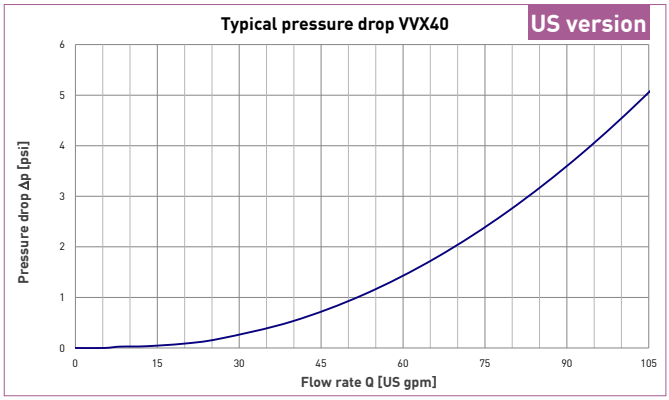
Analogue output ❷	**VVX32**	**VVX40**
Output signal flow	0.5...3.5 V	
Scaling [l/min]	12...250	22...400
Scaling [US gpm]	3.2...66	5.8...106
Voltage rate [V / l/min] → 0.5...3.5 V	0.0126	0.0079
Voltage rate [V / US gpm] → 0.5...3.5 V	0.0478	0.0299
Output signal temperature	Voltage signal 0.5...3.5 V corresponds to 0...90 °C / 32...194 °F or none	

Analogue output ❸	**VVX32**	**VVX40**
Output signal flow	0...10 V or 4...20 mA	
Scaling [l/min]	0...250	0...400
Scaling [US gpm]	0...66	0...106
Voltage rate [V / l/min] → 0...10 V **Current rate [mA / l/min]** → 4...20 mA	0.04000 0.06400	0.02500 0.04000
Voltage rate [V / US gpm] → 0...10 V Current rate [mA / US gpm] → 4...20 mA	0.1515 0.2424	0.0943 0.1509

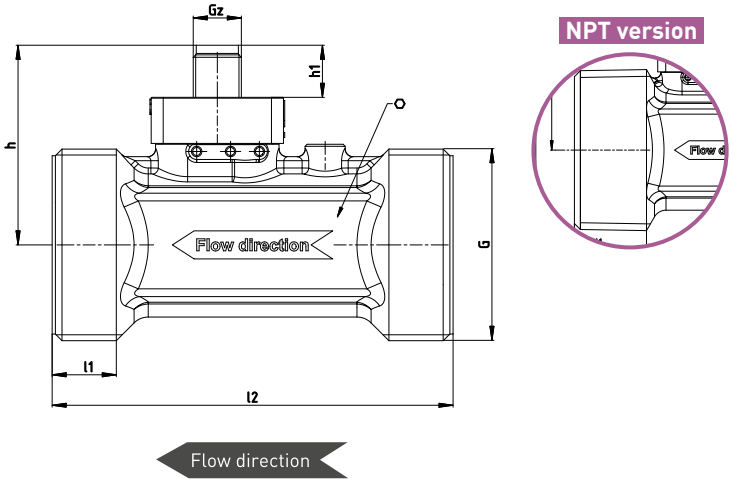








VVX

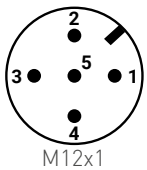


Dimensions [mm]	h	h1	l1	l2	G	Gz	⬡ Width across flats
VVX32	50	13	16	100	G 1½	M12 x 1	36
VVX40	53.8	13	18	110	G 2	M12 x 1	46
Dimensions [inch]							
VVX32	1.961	0.512	1.024	4.135	1½ - 11.5 NPT	M12 x 1	1.5
VVX40	2.118	0.512	1.063	4.528	2 - 11.5 NPT	M12 x 1	1.875

Wiring

Pin assignment

The pin assignment depends on the chosen configuration of the device.



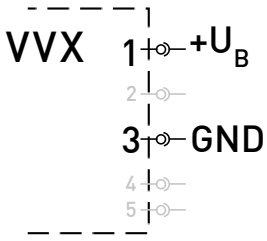
M12x1

Possible pin assignments:
Pin 1: **+U_B**
Pin 2: U_{Flow} • R_{Temp} • Analog U/I • Alarm*1
Pin 3: **GND**
Pin 4: Frequenzy • Analogue U/I • Alarm*1
Pin 5: U_{Temp} • R_{Temp}

*1 The alarm output is only possible with the corresponding firmware and has been determined during the order.

Wire the connecting cable according to your device version and the pin assignments shown on the type plate.

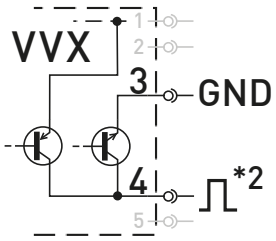
Supply voltage



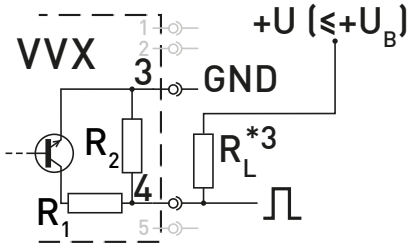
VVX with frequency output

Flow

Push-Pull*1

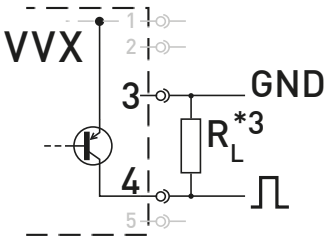


NPN Open Collector



R1 ⩽ 47 Ω / R2 ⩾ 10 kΩ

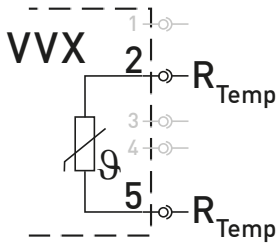
PNP Open Collector



*1: Not at 5 V.
*2: Do not wire the push-pull switch outputs of multiple VVX devices in parallel.
*3: Recommended pull-up / pull-down resistance R_L ~5 kΩ.

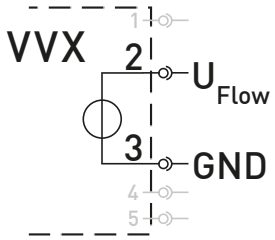
VVX with temperature (optional)

NTC / Pt 1000

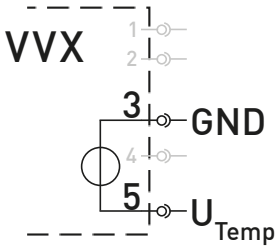


VVX with analogue output 0.5...3.5 V (optional)

Flow U_{Flow}



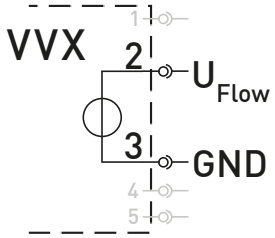
Temperature U_{Temp}



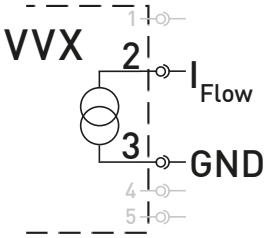
VVX with voltage 0...10 V or current output 4...20 mA (optional)

Flow

0...10V



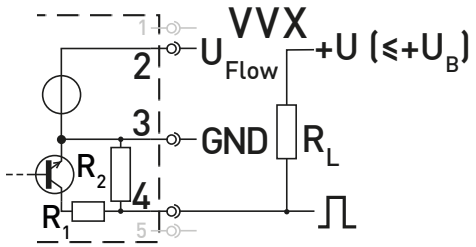
4...20 mA



Use of frequency output and optional functions

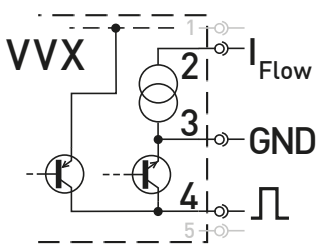
The frequency output can be wired together with the optional functions. However, not every combination is possible.
In principle, the pins 2, 4 and 5 can only be assigned with one function at a time. A multiple assignment is not possible.
The wiring results from an overlay of the circuit diagrams of the corresponding functions, as shown in the two following examples.

Flow NPN + Analogue 0.5...3.5V



R1 ⩽ 47 Ω / R2 ⩾ 10 kΩ
Recommendation for resistance R_L ~5 kΩ

Flow Push-Pull + current 4...20 mA



Materials		
In contact with fluid	**G thread**	**NPT thread**
Body / tube	Brass CW617N-DW or stainless steel 1.4581	Brass CW724R or stainless steel 1.4581
Sensor	ETFE Tefzel®	
O-rings	EPDM	
Immersion sleeve	Brass CW724R or stainless steel 1.4571	
Bluff body	PPS Fortron® 40 % glass fiber reinforced	

Version frequency output

Order code						
Nominal diameter						
VVX32, DN 32, brass	VVXDDS		B			51U
VVX40, DN 40, brass	VVXEES		P			52X
VVX32, DN 32, stainless steel	VVXDDS		B			51M
VVX40, DN 40, stainless steel	VVXEES		P			52O
Power supply						
8...30 V DC		G			1	
5 V DC		N			2	
Output signal temperature						
Pt1000				RRRP		
NTC 10.74K				RRRN		
None				0000		
Example order number	**VVXDDS**	**G**	**B**	**RRRP**	**1**	**51U**

Order code						
Nominal pipe size						
VVX32, 1 ½" NPT, brass	VVXDFE		2			510
VVX40, 2" NPT, brass	VVXEGE		T			529
VVX32, 1 ½" NPT, stainless steel	VVXDFE		2			51Y
VVX40, 2" NPT, stainless steel	VVXEGE		T			52Z
Power supply						
8...30 V DC		G			1	
5 V DC		N			2	
Output signal temperature						
Pt1000				RRRP		
NTC 10.74K				RRRN		
None				0000		
Example order number	**VVXDFS**	**G**	**2**	**RRRP**	**1**	**510**

Version analogue output (0.5...3.5 V) and frequency output

Order code					
Nominal diameter					
VVX32, DN 32, brass	VVXDDSNB	UI			51U
VVX40, DN 40, brass	VVXEESNP	UM			52X
VVX32, DN 32, stainless steel	VVXDDSNB	UI			51M
VVX40, DN 40, stainless steel	VVXEESNP	UM			52O
Output signal temperature					
0.5...3.5 V			U1		
none			00		
Power supply					
8...30 V DC				1	
5 V DC				2	
Example order number	**VVXEESNP**	**UM**	**U1**	**1**	**52X**

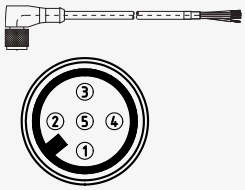
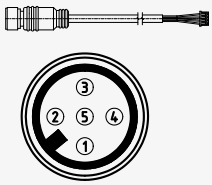
Order code					
Nominal pipe size					
VVX32, 1 ½" NPT, brass	VVXDFEN2	UO			510
VVX40, 2" NPT, brass	VVXEGENT	UT			529
VVX32, 1 ½" NPT, stainless steel	VVXDFEN2	UO			51Y
VVX40, 2" NPT, stainless steel	VVXEGENT	UT			52Z
Output signal temperature					
0.5...3.5 V			U1		
none			00		
Power supply					
8...30 V DC				1	
5 V DC				2	
Example order number	**VVXDFSN2**	**UO**	**U1**	**1**	**510**

Version analogue output (0...10 V or 4...20 mA) and frequency output

Order code			
Nominal diameter			
VVX32, DN 32, brass	VVXDDSGB		X00351U
VVX40, DN 40, brass	VVXEESGP		Y00352X
VVX32, DN 32, stainless steel	VVXDDSGB		X00351M
VVX40, DN 40, stainless steel	VVXEESGP		Y00352O
Output signal flow			
0...10 V		V	
4...20 mA		A	
Example order number	**VVXDDSGB**	**A**	**X00351U**

Order code			
Nominal pipe size			
VVX32, 1 ½" NPT, brass	VVXDFEG2		D003510
VVX40, 2" NPT, brass	VVXEGEGT		Z003529
VVX32, 1 ½" NPT, stainless steel	VVXDFEG2		D00351Y
VVX40, 2" NPT, stainless steel	VVXEGEGT		Z00352Z
Output signal flow			
0...10 V		V	
4...20 mA		A	
Example order number	**VVXDFSG2**	**V**	**D003510**

Order code	
Service	**Order number**
Works calibration certificate for sample devices	VVXWPS01

Order code					
Type	**Accessories**		**Length [m]**	**Length [ft]**	**Order number**
VVX32 **VVX40**		Connection cable with 5 pin cable socket M12 x 1, angle type molded lead 5 x 0.34 mm², sheathing material PVC (Tmax = 80 °C / 176 °F)* UL approval, Pins: 1=brown, 2=white, 3=blue, 4=black, 5=grey,	1 2 3	 10 16 33	XVVX040 XVVX051 XVVX039 XVVX017 XVVX018 XVVX019
		Connection cable with 5 pin cable socket M12 x 1, molded lead 5 x 0.34 mm², sheathing material PVC, 4 pin Molex MicroBlade wire-to-board housing, (Tmax = 80 °C / 176 °F) Pins: 1=brown, 2=white, 3=blue, 4=n.c., 5=black	1.5	5	XVVX065

* Connection cables with UL approval on request