

## 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

### µController

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

### On the test bench: 100% Final water flow test



**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)	
<b>Flow measuring</b>		
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	
<b>Temperature measuring</b>		
Measuring range	0...90 °C	
Measuring range	32...194 °F	
Accuracy	±1 k	
Response time		
t <sub>50</sub>	approx. 1 s	
t <sub>90</sub>	approx. 3 s	
<b>Temperature ranges</b>		
Medium	-20...90 °C	
Medium	-4...194 °F	
Ambient	-20...70 °C	
Ambient	-4...158 °F	
<b>Electrical data</b>		
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	
<b>Approvals</b>		
		
	 <ul style="list-style-type: none"> <li>• Conforms to ANSI UL Std.61010-1</li> <li>• Cert. to CAN/CSA C22.2 No.61010-1</li> </ul>	

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

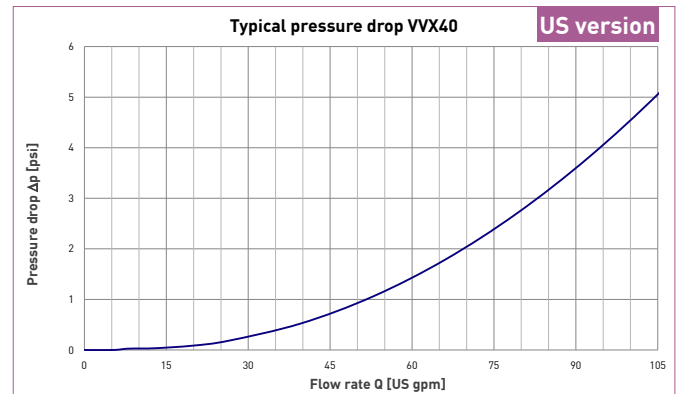
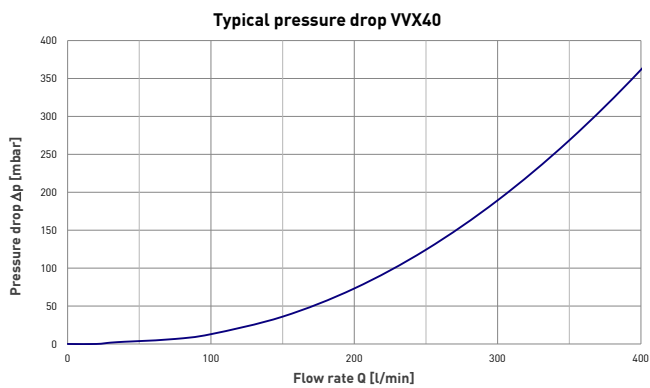
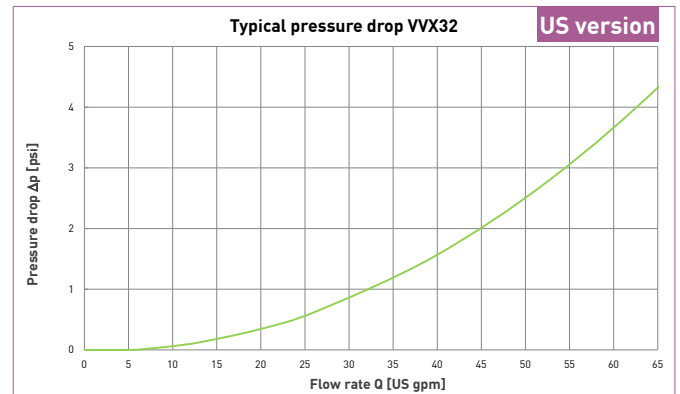
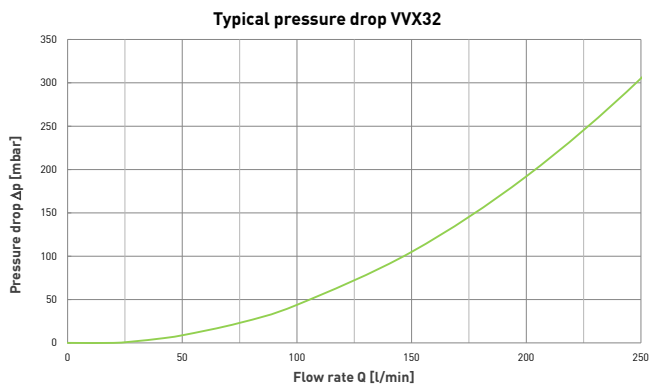
Three different versions available:

- Frequency output (1)
- Analogue 0.5...3.5 V and frequency output (1 + 2)
- Analogue 0...10 V or 4...20 mA and frequency output (1 + 3)

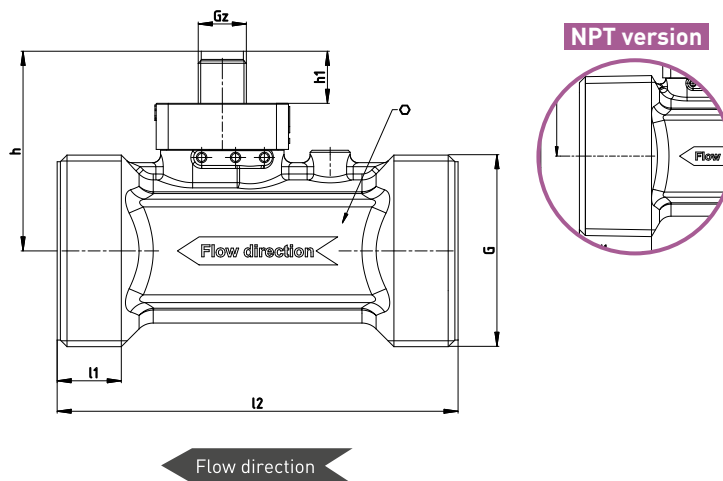
Frequency output ①	VVX32	VVX40
Output signal flow	Frequency signal, square wave, pulse duty ratio 50:50, signal current max. 20 mA	
Pulse rate [1/l]	100	50
Pulse rate [pulses/gallon]	400	200
Output signal temperature	Pt1000 2 wire, class B or NTC 10.74k, B 0/100 3450 or none	

Analogue output ②	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 ③	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	0.04000	0.02500
Current rate [mA / l/min] → 4...20 mA	0.06400	0.04000
Voltage rate [V / US gpm] → 0...10 V	0.1515	0.0943
Current rate [mA / US gpm] → 4...20 mA	0.2424	0.1509



## VVX

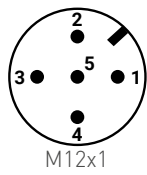


Dimensions [mm]	h	h1	l1	l2	G	Gz	○ Width across flats
VVX32	50	13	16	100	G 1½	M12 x 1	36
VVX40	53.8	13	18	110	G 2	M12 x 1	46
Dimensions [inch]							
VVX32	1.961	0.512	1.024	4.135	1½ - 11.5 NPT	M12 x 1	1.5
VVX40	2.118	0.512	1.063	4.528	2 - 11.5 NPT	M12 x 1	1.875

# Wiring

## Pin assignment

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



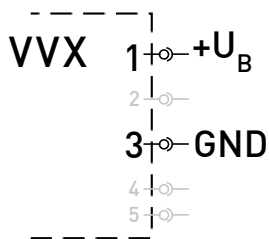
Possible pin assignments:

- Pin 1:  $+U_B$
- Pin 2:  $U_{Flow}$  •  $R_{Temp}$  • Analog U/I • Alarm\*<sup>1</sup>
- Pin 3: **GND**
- Pin 4: Frequency • Analogue U/I • Alarm\*<sup>1</sup>
- Pin 5:  $U_{Temp}$  •  $R_{Temp}$

\*<sup>1</sup> 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.

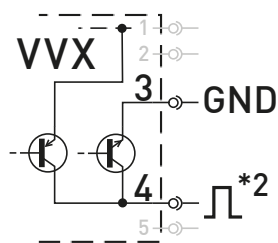
## Supply voltage



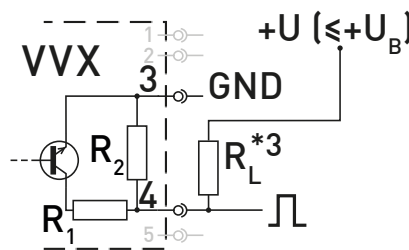
## VVX with frequency output

### Flow

Push-Pull\*<sup>1</sup>

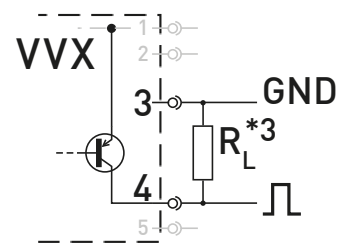


### NPN Open Collector



$$R1 \leq 47 \Omega / R2 \geq 10 \text{ k}\Omega$$

### PNP Open Collector



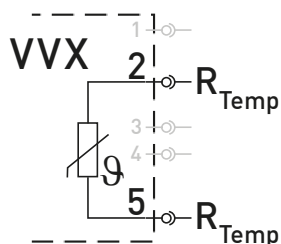
\*<sup>1</sup>: Not at 5 V.

\*<sup>2</sup>: Do not wire the push-pull switch outputs of multiple VX devices in parallel.

\*<sup>3</sup>: Recommended pull-up / pull-down resistance  $R_L \sim 5 \text{ k}\Omega$ .

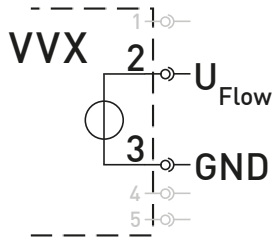
## VVX with temperature (optional)

### NTC / Pt 1000

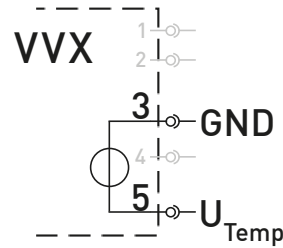


### VVX with analogue output 0.5...3.5 V (optional)

Flow  $U_{\text{Flow}}$

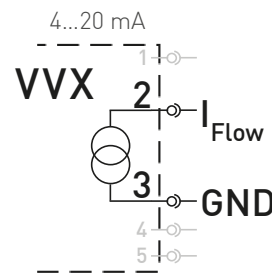
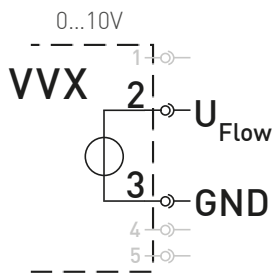


Temperature  $U_{\text{Temp}}$



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

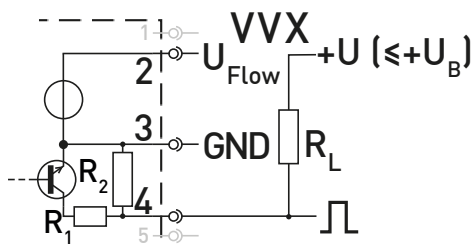
Flow



### 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.

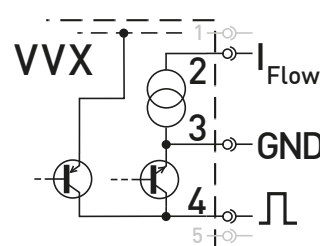
Flow NPN + Analogue 0.5...3.5V



$$R_1 \leq 47 \Omega / R_2 \geq 10 \text{ k}\Omega$$

Recommendation for resistance  $R_L \sim 5 \text{ k}\Omega$

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						
VX32, DN 32, brass	VXDDS		B			51U
VX40, DN 40, brass	VXEES		P			52X
VX32, DN 32, stainless steel	VXDDS		B			51M
VX40, DN 40, stainless steel	VXEES		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		
<b>Example order number</b>	<b>VXDDS</b>	<b>G</b>	<b>B</b>	<b>RRRP</b>	<b>1</b>	<b>51U</b>

Order code						
Nominal pipe size						
VX32, 1 1/2" NPT, brass	VXDFE		2			510
VX40, 2" NPT, brass	VXEGE		T			529
VX32, 1 1/2" NPT, stainless steel	VXDFE		2			51Y
VX40, 2" NPT, stainless steel	VXEGE		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		
<b>Example order number</b>	<b>VXDFS</b>	<b>G</b>	<b>2</b>	<b>RRRP</b>	<b>1</b>	<b>510</b>



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

Order code					
Nominal diameter					
VX32, DN 32, brass	WXDDSNB	UI			51U
VX40, DN 40, brass	WXEESNP	UM			52X
VX32, DN 32, stainless steel	WXDDSNB	UI			51M
VX40, DN 40, stainless steel	WXEESNP	UM			52O
Output signal temperature					
0.5...3.5 V			U1		
none			00		
Power supply					
8...30 V DC				1	
5 V DC				2	
<b>Example order number</b>	<b>VXEESNP</b>	<b>UM</b>	<b>U1</b>	<b>1</b>	<b>52X</b>



Order code					
Nominal pipe size					
VX32, 1 1/2" NPT, brass	WXDFEN2	UO			510
VX40, 2" NPT, brass	WXEGENT	UT			529
VX32, 1 1/2" NPT, stainless steel	WXDFEN2	UO			51Y
VX40, 2" NPT, stainless steel	WXEGENT	UT			52Z
Output signal temperature					
0.5...3.5 V			U1		
none			00		
Power supply					
8...30 V DC				1	
5 V DC				2	
<b>Example order number</b>	<b>WXDFS2</b>	<b>UO</b>	<b>U1</b>	<b>1</b>	<b>510</b>

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

Order code					
Nominal diameter					
VX32, DN 32, brass	WXDDSGB				X00351U
VX40, DN 40, brass	WXEESGP				Y00352X
VX32, DN 32, stainless steel	WXDDSGB				X00351M
VX40, DN 40, stainless steel	WXEESGP				Y00352O
Output signal flow					
0...10 V				V	
4...20 mA				A	
<b>Example order number</b>	<b>WXDDSGB</b>	<b>A</b>			<b>X00351U</b>

Order code					
Nominal pipe size					
VX32, 1 1/2" NPT, brass	WXDFEG2				D003510
VX40, 2" NPT, brass	WXEGEGT				Z003529
VX32, 1 1/2" NPT, stainless steel	WXDFEG2				D00351Y
VX40, 2" NPT, stainless steel	WXEGEGT				Z00352Z
Output signal flow					
0...10 V				V	
4...20 mA				A	
<b>Example order number</b>	<b>WXDFS62</b>	<b>V</b>			<b>D003510</b>

Order code	
<b>Service</b>	<b>Order number</b>
Works calibration certificate for sample devices	VXWPS01

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

\* Connection cables with UL approval on request