



VQ Series Tuning Fork Level Sensor

Ideal for liquid detection as built-in sensor for small devices

Products Overview

VQ is a compact level sensor ideal for integration into machinery. Wetted parts, the fork and process connection, are 316L stainless steel offering high corrosion resistance. The cover has a window. The user can check operation status through it by LED without opening the cover. The fork assembly incorporates a piezo-electric crystal. This crystal oscillates the detecting element, the fork, at a frequency. The frequency changes when the fork is covered by the material. The electronics of the sensor detects this change in frequency, and gives an output for presence or absence of the material.



Features

- **Intrinsically safe (JPEX) approval is available**

EX ia IIB T5 Ga (-40°C to 80°C)

EX ia IIB T3 Ga (-40°C to 150°C)

- **Compact and no limitation of mounting direction**

Since the protrusion inside the tank is small and the housing can be rotated by 330 degree, the mounting direction is free and it is ideal for mounting in small equipment.

- **Excellent durability and corrosion resistance, compatible with most of the liquids.**

The standard wetted parts material is 316LSS, which has achieved outstanding corrosion resistance. ECTFE coating is optionally available.

- **No adjustment and maintenance**

No adjustment is required even if the type of liquid is changed, and it can be used without adjustment after installation. (*1)

(*1) This means that tuning fork types are in general free from the influence against detection by different chemical characteristics of each fluid (Often with resistance, conductivity, or capacitance factor inherent to each fluid.) and this does not necessarily mean that our standard VQ can cover temperature, viscosity, corrosiveness of all the fluids. Please see the Model code tree and option offer for each application conditions, or consult us.

- **AC/DC Free supply power is available**

24-240V AC \pm 10% 50/60Hz / 24-54V DC \pm 10% (Two wire type)

100-240V AC \pm 10% 50/60Hz / 24-54V DC \pm 10% (Relay type)

- **With operation check and failure diagnosis function**

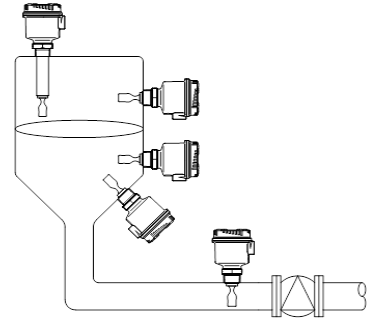
Operation can be checked externally with the built-in LED. In case of failure, the built-in LED flashes, blinks 5 times and turn off 1 second.

- **Test Switch is available**

By pressing the test button, the operation output is reversed, so you can easily check the loop during installation and maintenance.

Applications

- High/Low Alarm in small tank
- Pump control (Charge/Discharge control)
- Short fork design for Flow/Empty detection in small pipe



Typical applications



- Hydraulic machine
- Machine tool
- Water treatment device
- Chemical machine device
- F&B machine device
- Equipment requiring liquid level control in a compact design
- For built in sensor in small devices



Main Specifications

- Mounting: Plug, Flange, Sanitary Ferrule
- Process pressure: -0.1~6MPa Max.
- Process temperature: -40~150°C
- Material of wetted parts: 316LSS, Bni-2 (Nickel based alloy)
- Total length of probe: 3000mm Max.
- Coating type for corrosion resistance: ECTFE on wetted part, L=65mm or L=95~440mm
- Housing protection: IP65/67 (330° rotatable)

Wide Variation

<p>Plug Mounting (Standard Type)</p> <p>VQ22-R Series (Non explosion proof)</p> <p>VQ63/65-R Series (Explosion proof)</p> <p>Standard Type</p> <ul style="list-style-type: none"> ● L=51mm (Fixed) *1 ● Approx. 0.5kg ● Mtg: R1" <p>Long Type</p> <ul style="list-style-type: none"> ● L=95 to 3000mm *2 ● Approx. 2.5kg *3 ● Mtg: R1" 	<p>Plug Mounting (Small Fork Type)</p> <p>VQ32-R Series (Non explosion proof)</p> <p>Standard Type</p> <ul style="list-style-type: none"> ● L=48mm (Fixed) *6 ● Approx. 0.5kg ● Mtg: R3/4" *7 <p>Long Type</p> <ul style="list-style-type: none"> ● L=80 to 3000mm *2 ● Approx. 1.8kg *3 ● Mtg: R3/4" *7 
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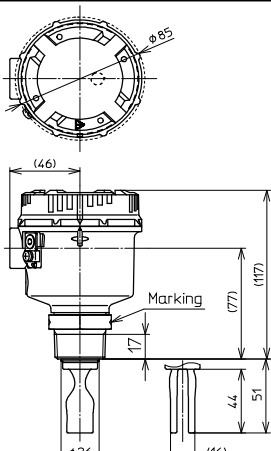
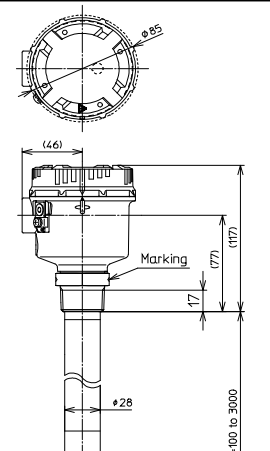
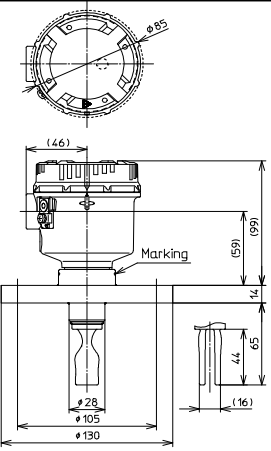
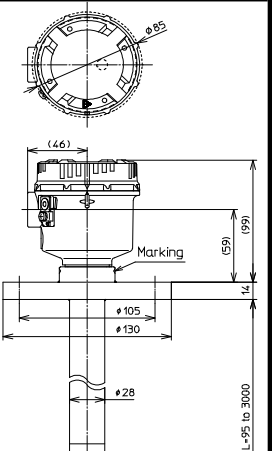
<p>Ferrule Mounting (Standard Type)</p> <p>VQ63/65-R Series (Explosion proof)</p> <p>Standard Type</p> <ul style="list-style-type: none"> ● L=72mm (Fixed) *1 ● Approx. 0.7kg ● Mtg: ISO 2" <p>Long Type</p> <ul style="list-style-type: none"> ● L=95 to 3000mm *2 ● Approx. 2.5kg *3 ● Mtg: ISO 2" 	<p>Plug Mounting (Small Fork Type)</p> <p>VQ32-S Series (Non explosion proof)</p> <p>Standard Type</p> <ul style="list-style-type: none"> ● ISO 1.5 L=51mm (Fixed), ISO 2 L=54mm (Fixed) *6 ● Approx. 0.8kg ● Mtg: ISO 1.5 or 2 <p>Long Type</p> <ul style="list-style-type: none"> ● L=80 to 3000mm *2 ● Approx. 2.1kg *3 ● Mtg: ISO 1.5 or 2 
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<p>Flange Mounting (Standard Type)</p> <p>VQ22-F Series (Non explosion proof)</p> <p>VQ63/65-F Series (Explosion proof)</p> <p>Standard Type</p> <ul style="list-style-type: none"> ● L=65mm (Fixed) *1 ● Approx. 1.9kg ● Mtg: JIS5K50A *5 <p>Long Type</p> <ul style="list-style-type: none"> ● L=95 to 3000mm *2 ● Approx. 3.6kg *3 ● Mtg: JIS5K50A *5 	<p>Flange Mounting (Small Fork Type)</p> <p>VQ32-F Series (Non explosion proof)</p> <p>Standard Type</p> <ul style="list-style-type: none"> ● L=54mm (Fixed) *6 ● Approx. 1.1kg ● Mtg: JIS5K25A <p>Long Type</p> <ul style="list-style-type: none"> ● L=80 to 3000mm *2 ● Approx. 2.6kg *3 ● Mtg: JIS5K25A 
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<p>Flange Mounting (Standard · Coating Type)</p> <p>VQ22-F Series (Non explosion proof)</p> <p>VQ63/65-F Series (Explosion proof)</p> <p>Standard Type</p> <ul style="list-style-type: none"> ● L=65mm (Fixed) *1 ● Approx. 1.9kg ● Mtg: JIS5K50A *5 <p>Long Type</p> <ul style="list-style-type: none"> ● L=95 to 440mm ● Approx. 2.6kg *4 ● Mtg: JIS5K50A *5 
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- *1 Length from mounting. Length of fork is 44mm.
- *2 L is mentioned in mm.
- *3 The mentioned mass is a reference value for L=1000mm.
- *4 The mentioned mass is a reference value for L=440mm.
- *5 JIS5K50A or bigger size is available.
- *6 Dimension is mentioned including mounting part. Dimension of fork is 38mm.
- *7 R1/2 is optionally available.

Specifications

		VQ22-R□0	VQ22-R□X	VQ22-F□0	VQ22-F□X
		Plug Mounting		Flange Mounting	
		Standard	Extended probe	Standard	Extended probe
					
Measuring Object		Liquids			
Specific Gravity		0.6 to 2.0			
Viscosity		0.2 mPa·s to 10 Pa·s			
Switching Point (Water)		Approx. 13.5mm from tip (Vertical) Approx. 3mm above the center line (Horizontal)			
Mounting (*1)		R1		IOS 2"	
Probe Length		51mm	100 to 3000mm	72mm	95 to 440mm
Supply power	2-wire	24-240V AC±10% 50/60Hz / 24-54V DC±10%			
	Relay	100-240V AC±10% 50/60Hz / 24-54V DC±10%			
	3-wire	24V DC±10%			
Relay Output	2-wire	2-wire, ON by detection/OFF by detection selectable			
	Relay	Dry contact relay (SPDT), ON by detection/OFF by detection selectable			
	3-wire	NPN/PNP open collector, ON by detection/OFF by detection selectable			
Delay Timer		Approx. 0.5 to 30 seconds selectable			
Insulation Resistance		100 MΩ or more, 500V DC (Between power and E Terminal)			
Withstand Voltage		2200V AC for 5 seconds (Between power and E terminal)			
Operating Temperature	Housing	- 40 to 80°C (Get rid of dew)			
	Vibration Rod	- 40 to 150 °C			
Operating Humidity		85% RH Max.			
Operating Pressure		6 Mpa Max. (Except a mounting part)			
Material	Housing	Glass reinforced PBT (With anti-static agent), PC (Window of LED)			
	Vibration Rod	316LSS, BNi-2 (Nickel based alloy)		316LSS, BNi-2 (Nickel based alloy) Surface finishing #400 buffing	
Protection	Housing	IP65 / IP67			
	Vibration Rod	IP68 (10 Mpa, Static Pressure 15 Minutes)			
Housing rotation		330°			
Cable Entry		G1/2 or equivalent			

*1 The mounting size can be optionally changed with customer's request. (Subject to our final confirmation)

Specifications

		VQ22-F□0E	VQ22-F□XE	VQ32-S□0B	VQ32-S□XB
		Coating		Sanitary Ferrule	
		Standard	Extended probe	Standard	Extended probe
Measuring Object		Liquids			
Specific Gravity		0.6 to 2.0			
Viscosity		0.2 mPa·s to 10 Pa·s			
Switching Point (Water)		Approx. 13.5mm from tip (Vertical) Approx. 3mm above the center line (Horizontal)			
Mounting (*1)		JIS5K50A FF		ISO1.5S	
Probe Length		65mm	95 to 440mm	51mm	80 to 3000mm
Supply power	2-wire	24-240V AC±10% 50/60Hz / 24-54V DC±10%			
	Relay	100-240V AC±10% 50/60Hz / 24-54V DC±10%			
	3-wire	24V DC±10%			
Relay Output	2-wire	2-wire, ON by detection/OFF by detection selectable			
	Relay	Dry contact relay (SPDT), ON by detection/OFF by detection selectable			
	3-wire	NPN/PNP open collector, ON by detection/OFF by detection selectable			
Delay Timer		Approx. 0.5 to 30 seconds selectable			
Insulation Resistance		100 MΩ or more, 500V DC (Between power and E Terminal)			
Withstand Voltage		2200V AC for 5 seconds (Between power and E terminal)			
Operating Temperature	Housing	- 40 to 80°C (Get rid of dew)			
	Vibration Rod	- 40 to 150 °C			
Operating Humidity		85% RH Max.			
Operating Pressure		6 Mpa Max. (Except a mounting part)			
Material	Housing	Glass reinforced PBT (With anti-static agent), PC (Window of LED)			
	Vibration Rod	316LSS, BNI-2 (Nickel based alloy) ECTF Coating		316LSS	
Protection	Housing	IP65 / IP67			
	Vibration Rod	IP68 (10 Mpa, Static Pressure 15 Minutes)			
Housing rotation		330°			
Cable Entry		G1/2 or equivalent			

*1 The mounting size can be optionally changed with customer's request. (Subject to our final confirmation)

Specifications

		VQ63-R00	VQ65-R00	VQ63-R0X	VQ65-R0X
		Plug Mounting Standard		Plug Mounting Extension Probe	
		EX ia II B T3 Ga	EX ia II B T5 Ga	EX ia II B T3 Ga	EX ia II B T5 Ga
Measuring Object		Liquids			
Specific Gravity		0.6 to 2.0			
Viscosity		0.2 mPa·s to 10 Pa·s			
Switching Point (Water)		Approx. 13.5mm from tip (Vertical) Approx. 3mm above the center line (Horizontal)			
Mounting (*1)		R1		ISO1.5S	
Probe Length		51mm (Fixed)		100 to 3000mm	
Supply power		8V DC (Supplied by safety barrier)			
Relay Output		EN60947-5-6 (NAMUR) Equivalent, 2-wireoutout ON by detection/OFF by detection selectable			
Delay Timer		Approx. 0.5 to 30 seconds selectable			
Withstand Voltage		To ensure lightning protection performance, discharge is started at a voltage of approx. 15 V or more between the intrinsically safe circuit and ground. Do not use in an environment where a withstand voltage is required between each terminal and ground.			
Operating Temperature	Housing	VQ63 series: - 40 to 50°C (Get rid of dew) / VQ65 series: - 40 to 80°C (Get rid of dew)			
	Vibration Rod	VQ63 series: - 40 to 150 °C / VQ65 series: - 40 to 80 °C			
Operating Humidity		85% RH Max.			
Operating Pressure		6 MPa Max. (Except a mounting part)			
Material	Housing	Glass reinforced PBT (With anti-static agent), PC (Window of LED)			
	Vibration Rod	316LSS, BNi-2 (Nickel based alloy)			
Protection	Housing	IP65 / IP67			
	Vibration Rod	IP68 (10 Mpa, Static Pressure 15 Minutes)			
Housing rotation		330°			
Cable Entry		G1/2 or equivalent			

*1 The mounting size can be optionally changed with customer's request. (Subject to our final confirmation)

*2 Intrinsically safe types require a separate safety barrier, which must be connected between the sensor and the power supply.

Recommended safety barrier: KFD2-SR2-Ex1.W, KFD2-SR2-Ex1.W.LB, KFD2-SR2-Ex2.W (PEPPERL + FUCHS)

Specifications

		VQ63-S00B	VQ65-S00B	VQ63-S0XB	VQ65-S0XB
		Sanitary Ferrule Standard		Sanitary Ferrule Extension Probe	
		EX ia II B T3 Ga	EX ia II B T5 Ga	EX ia II B T3 Ga	EX ia II B T5 Ga
Measuring Object		Liquids			
Specific Gravity		0.6 to 2.0			
Viscosity		0.2 mPa·s to 10 Pa·s			
Switching Point (Water)		Approx. 13.5mm from tip (Vertical) Approx. 3mm above the center line (Horizontal)			
Mounting (*1)		ISO25			
Probe Length		72mm (Fixed)		95 to 3000mm	
Supply power		8V DC (Supplied by safety barrier)			
Relay Output		EN60947-5-6 (NAMUR) Equivalent, 2-wireoutout ON by detection/OFF by detection selectable			
Delay Timer		Approx. 0.5 to 30 seconds selectable			
Withstand Voltage		To ensure lightning protection performance, discharge is started at a voltage of approx. 15 V or more between the intrinsically safe circuit and ground. Do not use in an environment where a withstand voltage is required between each terminal and ground.			
Operating Temperature	Housing	VQ63 series: - 40 to 50°C (Get rid of dew) / VQ65 series: - 40 to 80°C (Get rid of dew)			
	Vibration Rod	VQ63 series: - 40 to 150 °C / VQ65 series: - 40 to 80 °C			
Operating Humidity		85% RH Max.			
Operating Pressure		6 MPa Max. (Except a mounting part)			
Material	Housing	Glass reinforced PBT (With anti-static agent), PC (Window of LED)			
	Vibration Rod	316LSS, BNi-2 (Nickel based alloy), "400 buffing on surface			
Protection	Housing	IP65 / IP67			
	Vibration Rod	IP68 (10 Mpa, Static Pressure 15 Minutes)			
Housing rotation		330°			
Cable Entry		G1/2 or equivalent			

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*2 Intrinsically safe types require a separate safety barrier, which must be connected between the sensor and the power supply.

Recommended safety barrier: KFD2-SR2-Ex1.W, KFD2-SR2-Ex1.W.LB, KFD2-SR2-Ex2.W (PEPPERL + FUCHS)

Specifications

		VQ63-F00	VQ65-F00	VQ63-F0X	VQ65-F0X
		Flange Mounting Standard		Flange Mounting Extension Probe	
		EX ia II B T3 Ga	EX ia II B T5 Ga	EX ia II B T3 Ga	EX ia II B T5 Ga
Measuring Object		Liquids			
Specific Gravity		0.6 to 2.0			
Viscosity		0.2 mPa·s to 10 Pa·s			
Switching Point (Water)		Approx. 13.5mm from tip (Vertical) Approx. 3mm above the center line (Horizontal)			
Mounting (*1)		JIS5K50A			
Probe Length		65mm (Fixed)		95 to 3000mm	
Supply power		8V DC (Supplied by safety barrier)			
Relay Output		EN60947-5-6 (NAMUR) Equivalent, 2-wireoutout ON by detection/OFF by detection selectable			
Delay Timer		Approx. 0.5 to 30 seconds selectable			
Withstand Voltage		To ensure lightning protection performance, discharge is started at a voltage of approx. 15 V or more between the intrinsically safe circuit and ground. Do not use in an environment where a withstand voltage is required between each terminal and ground.			
Operating Temperature	Housing	VQ63 series: - 40 to 50°C (Get rid of dew) / VQ65 series: - 40 to 80°C (Get rid of dew)			
	Vibration Rod	VQ63 series: - 40 to 150 °C / VQ65 series: - 40 to 80 °C			
Operating Humidity		85% RH Max.			
Operating Pressure		6 MPa Max. (Except a mounting part)			
Material	Housing	Glass reinforced PBT (With anti-static agent), PC (Window of LED)			
	Vibration Rod	316LSS, BNI-2 (Nickel based alloy)			
Protection	Housing	IP65 / IP67			
	Vibration Rod	IP68 (10 Mpa, Static Pressure 15 Minutes)			
Housing rotation		330°			
Cable Entry		G1/2 or equivalent			

*1 The mounting size can be optionally changed with customer's request. (Subject to our final confirmation)

*2 Intrinsically safe types require a separate safety barrier, which must be connected between the sensor and the power supply.

Recommended safety barrier: KFD2-SR2-Ex1.W, KFD2-SR2-Ex1.W.LB, KFD2-SR2-Ex2.W (PEPPERL + FUCHS)

Bleeder resistor [In case of non explosion proof type (2 wire)]

If the current rate of relay connected to the non-explosion-proof type is 12mA or less, or if the resetting capacity current of relay (*1) is 5mA or less, it is necessary to connect a bleeder resistor in parallel with the relay.

(*1) Capacity current of relay = current rate of relay [mA] x resetting voltage[%] x 0.01

1 Select a resistance value of bleeder resistor that satisfies Fig 1 or Fig 2.

$$\text{Resistance value } R \text{ [k}\Omega\text{]} \leq \frac{(\text{Ira} \times \text{Vrel} \times 0.008)}{5 - (\text{Ira} \times \text{Vrel} \times 0.008)} \times \frac{\text{Vra}}{\text{Ira}} \quad (\text{Fig 1})$$

Ira: Current rate of relay [mA]

Vra: Voltage rate of relay [V]

Vrel: Resetting voltage of relay [%]

$$12 \leq \text{Ira} + \frac{\text{Vra}}{R^{*2}} \leq 500 \quad (\text{Fig 2})$$

(*2) Select a resistance value lower than the resistance value obtained in Fig 1.

2 Select a power capacity of bleeder resistor that satisfies Fig 3.

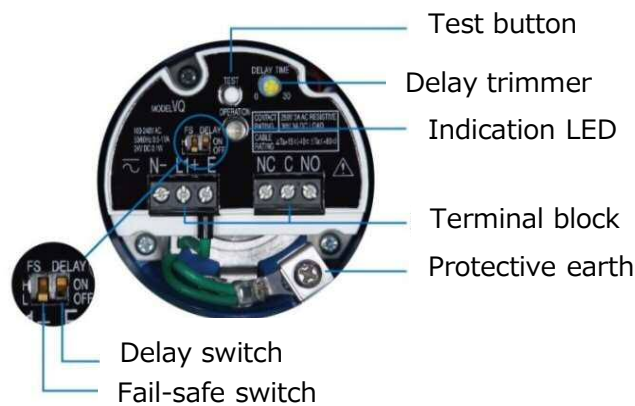
Since the temperature of the resistor is expected to rise, it is recommended to select a resistor with a large power capacity.

$$\text{Power capacity } P \text{ [W]} \geq \frac{\text{Vra}^2}{R \times 1000} \times 5 \quad (\text{Fig 3})$$

Reference example of bleeder resistor

Manufacturer	Model	Rating		
		In case of 100V AC	In case of 200V AC	In case of 24V DC
OMRON	MY Series	8.2kΩ 10W	12kΩ 20W	0.82kΩ 5W
	MM Series	Bleeder resistor is not required.		
IDEC	RM Series	8.2kΩ 10W	12kΩ 20W	0.68kΩ 5W
	RY Series			
Fuji Electric FA	HH5 Series			0.82kΩ 5W

Nomenclature



Model number configurators

VQ -

Model	
22	Standard (Sanitary ferrule not available)
21	CE Marked (Only available with relay output)
32	Small fork type
63	Intrinsically safe (Ex ia IIB T3 Ga)
65	Intrinsically safe (Ex ia IIB T5 Ga)

Mounting	
R	R thread
F	Flange
S	Sanitary ferrule

Output	
0	2 wire
1	3 wire (NPN/PNP open collector)
2	Dry contact relay (SPDT)

Insertion length	
0	R thread: 51mm (48mm for VQ32)
	Flange: 65mm (54mm for VQ32)
	Sanitary ferrule: 72mm (51mm for VQ32)
	ECTFE coating: 65mm (VQ32 is not available.)
X	R thread: 100 to 3000mm (80mm to 3000mm for VQ32)
	Flange: 95 to 3000mm (80mm to 3000mm for VQ32)
	Sanitary ferrule: 95mm to 3000mm (80mm to 3000mm for VQ32)
	ECTFE coating: 95 to 440mm (VQ32 is not available.)

Others	
E	ECTFE coating (Flange version only)
B	#400 buffing (Sanitary ferrule only, VQ32 is not available.)

Due to product improvement, specifications are subject to change without notice.

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