Vibrating Probe Level Sensors

Reliable Solutions for Accurate Point Level Detection

BinMaster vibrating probe level sensors deliver dependable point-level detection in powders and bulk solids—even in the toughest industrial conditions. Designed to perform where other level sensors can't, they handle fluctuating dielectric constants, humidity, extreme temperatures, and material densities as low as 1.25 pounds per cubic foot (lb./ft.^{3}). With a wide selection of models featuring specialized sensing elements, industry certifications, and customizable options—including compact designs, sediment detection, and extended probes—BinMaster offers smart sensor solutions for your most complex material handling challenges.

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POINT LEVEL DETECTION USING

DAMPED VIBRATION

Principle of Operation

BinMaster vibrating probe level sensors operate on a simple yet highly effective principle. At the heart of each sensor is a resonating piezoelectric element that energizes the probe, causing it to vibrate at a precise frequency. When the probe is exposed to air—its uncovered state—it vibrates freely. But when material—even low dielectric or light solids— contacts the probe, the vibration is damped. This change is instantly detected by the sensor's internal electronics, which triggers a relay to signal a "covered" condition.

When the material level drops and the probe is once again exposed, vibration resumes automatically, and the relay switches back to indicate an "uncovered" state. This dependable, maintenance-free technology ensures accurate point-level detection in a wide range of materials and challenging process conditions—all without the need for calibration.

- **Engineered for Reliability:** BinMaster vibrating rods deliver consistent performance in demanding bulk solids and powders, performing in lightweight and low-dielectric materials not well-suited for other point-level indicators.
- **Low-Maintenance by Design:** They feature self-cleaning operation, have no moving parts, and require no calibration—saving time and contributing to reliability and long service life.
- **Versatile and Dependable:** Vibrating sensors handle everything from fine powders to lightweight, low-dielectric, or fine materials. Their inherent vibration helps dislodge material buildup and eliminates routine maintenance.
- **Adjustable Sensitivity Settings:** Settings can be set using a switch on the sensor board inside the housing, accommodating two sensitivity settings. Position 1 is for high sensitivity and to detect light or fluffy materials. Position 2 is for low sensitivity and is used for materials that might tend to cling to the blade or heavy materials.
- **An Alternative to a Rotary Paddle Indicator:** Vibrating rods perform in very light materials where the paddle may continue to rotate when it does not meet a material heavy enough to provide resistance.

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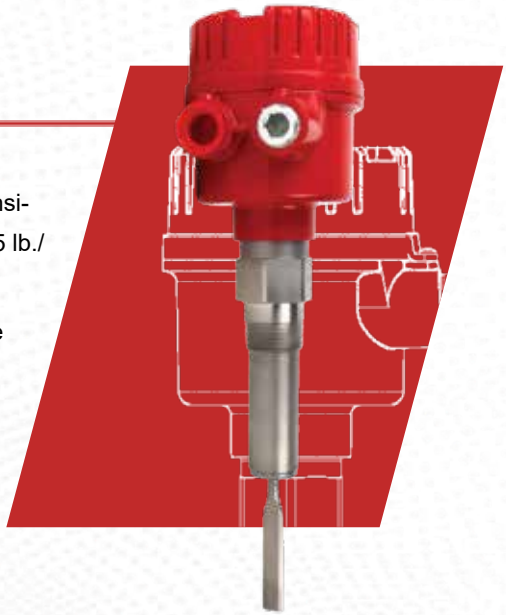
VIBRATING PROBE ELEMENTS FOR

DIVERSE APPLICATIONS

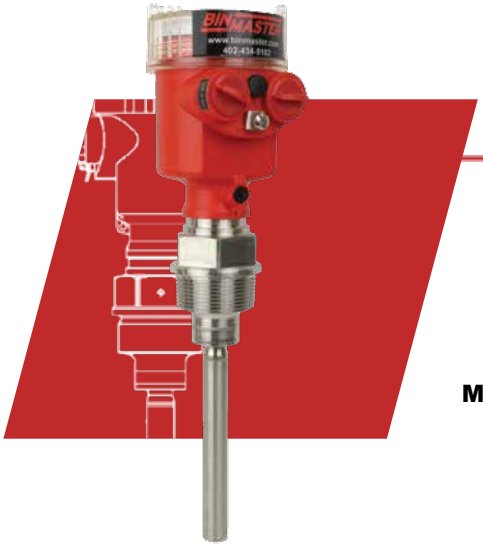
Vibrating Blades



BinMaster's buildup-resistant, slender, sword-like blade is designed to detect lightweight, lowdensity materials. Its wide, flat surface area creates stronger vibration and increased sensitivity, making it ideal for powders, flakes, and aerated solids with bulk densities as low as 1.25 lb./ft³.

A single blade prevents bridging which can be associated with tuning fork designs. Its unique sword shape encourages material to easily flow by it, thus preventing buildup. The sensor is appropriate for a wide range of materials such as Styrofoam®, sawdust, carbon black, chalk, flour, and other light materials that can be hard to measure.

Models: VRX21, VRX31, VRX41, VRX51, VRX61, VRX71

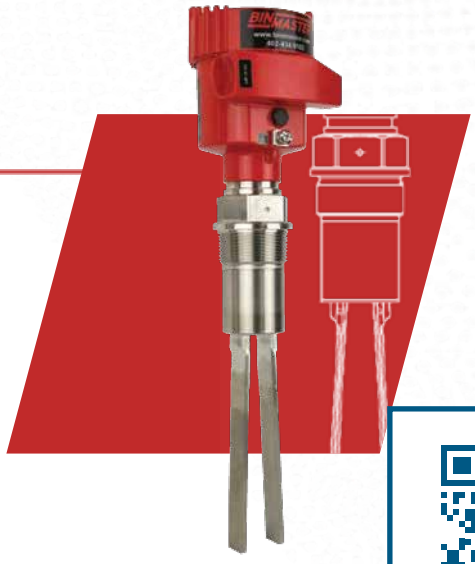


Vibrating Rods

A round, single stainless-steel rod vibrates at its natural frequency until material contacts the rod. When the vibration is damped by material, it triggers a switch signal. The rod's rugged, one-piece design makes it ideal for applications in powders and bulk solids, even in harsh, dusty, or low-density environments.

Models: VR-90, VR-92, VR-93

Vibrating Forks



Vibrating fork sensors use two tines (or "forks") that vibrate in unison. When material surrounds the forks, the vibration stops, signaling a full condition. They're best suited for fine powders or granules that won't lodge or bridge between the forks. They are often used in sanitary or highprecision applications where sensitivity is critical.

Models: VF-90, VF-92, VF-93

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STANDARD, EXTENDED, & COMPACT

Standard Length Vibrating Probes

Vibrating probes come in various configurations— including extended and compact models— to suit different applications. Top-mounted, extended probes are particularly effective for deeper vessels or constrained spaces and offer flexible installation options such as pipe or cable extensions for more complex setups. Compact models are ideal for small hoppers and tight spaces.

VRX21

Sword-shaped vibrating blade with 7.5” insertion length

VRX31

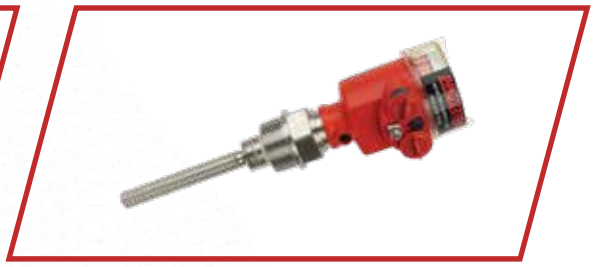
Sword-shaped, easy clean vibrating blade with sanitary 2” SS tri-clover fitting with 11.81” insertion length

VRX61

(formerly SHT-120): Sword-shaped vibrating blade with 7.25” insertion length for high-temperature operations up to 482°F (250°C)

VF-90

Vibrating fork with SS 5.91” insertion length



VR-90

Vibrating probe with 4.92” buildup-resistant round rod

Features

- Preconfigured lengths for general applications
- Suitable for detecting powders and bulk solids
- Easy installation and setup
- Ideal for low-dielectric and light powders and granules

Common Applications

Ideal for bins, silos, and hoppers in industries such as agriculture and plastics

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STANDARD, EXTENDED, & COMPACT

Extended Vibrating Probes

Vibrating probes come in various configurations— including extended and compact models— to suit different applications. Top-mounted, extended probes are particularly effective for deeper vessels or constrained spaces and offer flexible installation options such as pipe or cable extensions for more complex setups. Compact models are ideal for small hoppers and tight spaces.

VRX41

The top-mounted VRX41 uses a rigid pipe extension with a vibrating blade. It can be extended from 13" to 13'. Uses include level or plugged chute detection in heavy, medium, and light materials. It is sensitive enough to detect light, fluffy materials with a dielectric as low as 1.25 lb./ft³.

VRX51

The top-mounted VRX51 has a flexible cable extension with a sword-shaped blade. The steel-rope reinforced cable can be extended from 19" to 19.5" down into the vessel. This flexible extension resists damage from falling material.

VRX71

(formerly SHT-140): Sword-shaped vibrating blade with 7.37" insertion length for high-temperature operations up to 482°F (250°C). It can be extended from 10.25" to 13.3"

VR-92

Cable-extended round vibrating rod available in lengths up to 230".

VF-92

Cable-extended vibrating fork available in lengths up to 240".

VR-93

Rod-extended round vibrating rod available in lengths up to 120".

VF-93

Rod-extended vibrating fork available in lengths up to 120".

Features

- Extended-length probes for top mounting in deeper vessels
- Suitable for high, mid, or low-level detection depending on length
- Performance in heavy materials and dusty conditions
- Robust design for challenging environments

Common Applications

Top-mounted in taller silos and tanks across various industries

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STANDARD, EXTENDED, & COMPACT

Compact Vibrating Probes

For constrained spaces and small hoppers, the CVR-625 and CVR-600 offer simple installation. These miniature round vibrating rods have an insertion length of about 6”.

CVR-600

Compact vibrating rod level sensor for 1” NPT mounting

CVR-625

Compact vibrating rod level sensor for 1.25” NPT mounting

Features

- Space-saving design for tight installations
- Ideal for small bins and hoppers
- Reliable detection in confined spaces
- Suitable for powders, flakes, and pellets

Common Applications

- Suitable for food processing and chemical industries
- Plastic injection molding plants

Use a compact vibrating probe on small applications such as dryer hoppers for high or low level detection.

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SANITARY & HIGH TEMP

Sanitary Vibrating Rod Sensor

Designed with easy cleanability, VRX31 with a vibrating rod is tailored to food or pharmaceutical applications. This model features a 2" sanitary stainless-steel fitting with a removable tri-clover clamp connection for clean-in-place or sterilize-in-place applications. It can be customized with an optional stainless-steel extension in lengths from up to 6.56'.

VRX31

Clean-in-place design for sanitary applications

High Temperature Vibrating Rod Sensors

The VRX61 and VRX71 feature a diamond-shaped vibrating rod blade suitable for high process temperatures up to 482°F (250°C). These units have an explosion-proof, cast aluminum housing and an insulation tube to protect the electronics from excessive heat. The VRX61 has a standard length of 7.25", while the VRX71 can be extended an additional 10.25" to 13.3'.

VRX61

Vibrating Probe with sword-shaped probe for high temperatures; standard 7.25" insertion length

VRX71

Extended Vibrating Probe for high temperatures with rigid pipe extension from 10.25" to 13.3'

Common Applications

The VRX61 and VRX71 are commonly used in high-temperature applications like those found in cement and power plants.

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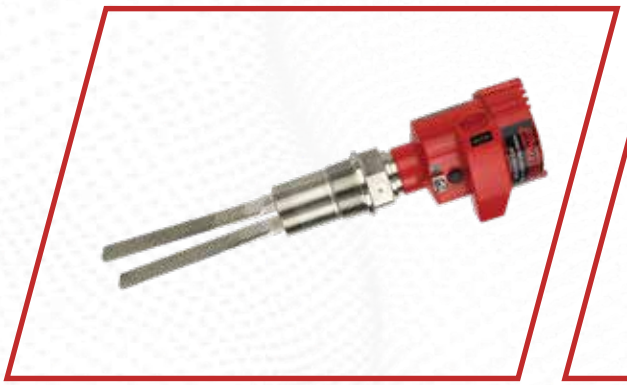
FORKS & RODS

Vibrating Forks & Rods

The VF-90 uses a tuning fork-like element to detect material levels by measuring changes in its vibrational frequency. Designed for heavy-duty applications with enhanced sensitivity, the VF-90 vibrating fork is for universal use in dry powders and fine-grained solids. This tuning fork-style level detector is ideal for use in light solids or powders that a capacitance probe cannot sense.

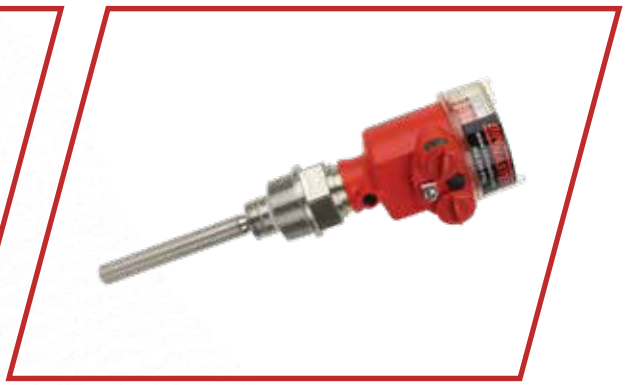
It is often used in construction materials, animal feed ingredients, and powdered or flaked plastics. When ordered with a stainless-steel housing, it can also be used in foodstuffs and pharmaceuticals.

The VR-90 features a round, stainless steel rod suitable for a variety of coarse-grained solids and granules. It can also be used in food and pharmaceuticals when ordered with the stainless-steel enclosure option. The VR-90 is a good option for vessels where the material is often changed. It is available with hazardous location approvals if needed.



VF-90

Vibrating Fork Level Sensor



VR-90

Vibrating Rod Level Sensor

Features

The VF-90 vibrating fork is used in light, dry solids, powders, or flakes that are not prone to bridging or lodging between the forks. The VR-90 round vibrating rod is suitable for heavier materials used in mining, aggregates, and other heavy industries.

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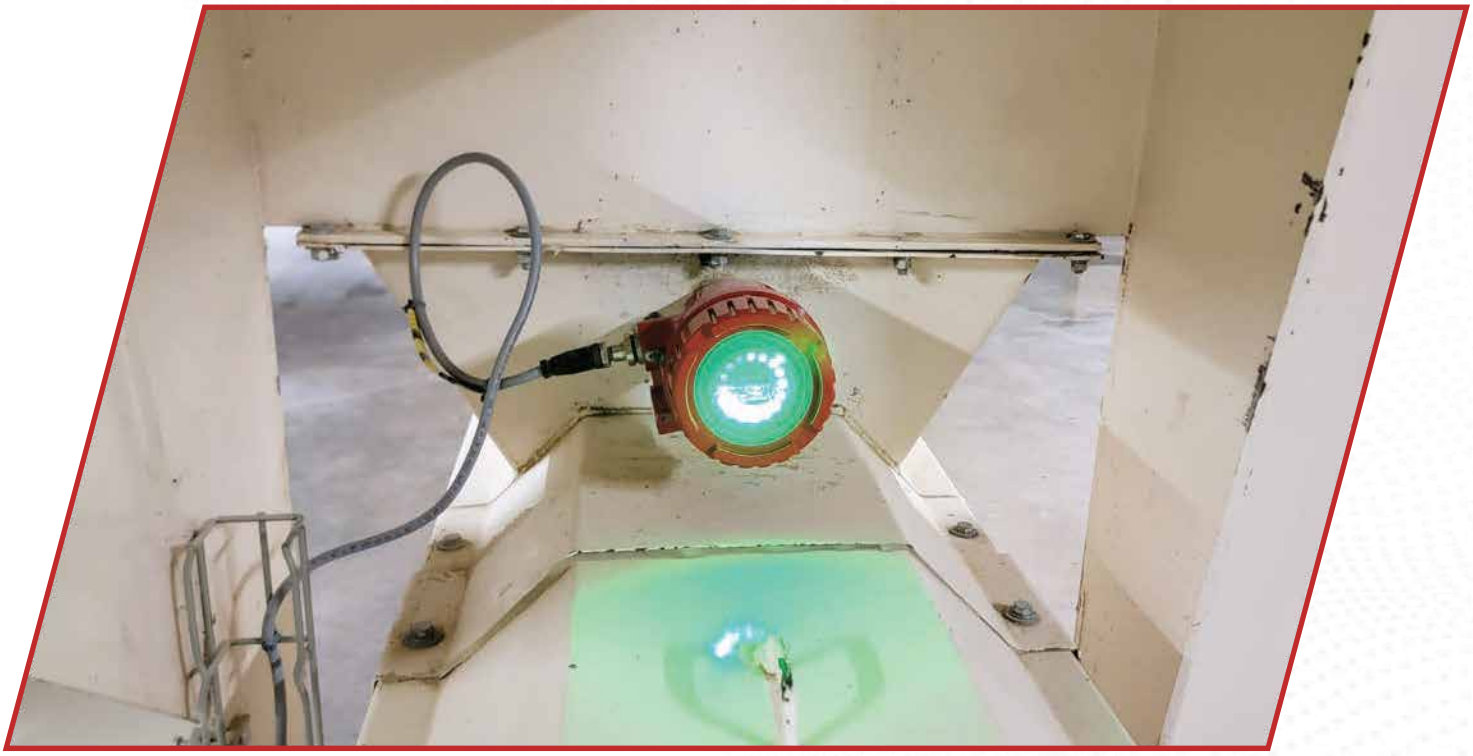
INSTALLATION OPTIONS



Mounting Location

- Use vibrating rods to detect high material levels by mounting them on the vessel's roof.
- Alternatively, they can be mounted on the side for high, mid, or low-level alerts.
- Used in the cone of the bin or a hopper, they can detect when the vessel is almost empty.

Mounting Plates

- Vibrating rods can be mounted on flat or sloped bin roofs.
- Powder-coated carbon steel mounting plates are available in 0°, 5°, 10°, and 30° angles.
- For mounting in the cone or on the side of the bin, use a 0° mounting plate.

Custom Manufacturing

- BinMaster can customize vibrating rods with extensions and for sediment detection.
- Remote electronics are offered for high-vibration environments.
- In-house CNC machining and US manufacturing ensure short lead times and fast shipping.

Quick Connectors

- Order a vibrating rod with a quick connect option that allows for simple removal and replacement of the sensor without the hassle of disconnecting and reconnecting wires.

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TOP APPLICATIONS

High or Low-Level Detection in Bins & Silos

Industry

Agriculture, cement, plastics, mining

Material

Grains, plastic pellets, cement powder, limestone

Overfill Protection in Storage Tanks

Industry

Chemicals, food & beverage, pharmaceuticals

Material

Light materials, powders, fine granules

Material Flow Detection in Conveying Systems

Industry

Mining, Food Processing, Cement

Material

Bulk solids, powders

Dust Collection System Monitoring

Industry

Manufacturing, woodworking, power generation

Material

Fine dust, fly ash, sawdust

Level Monitoring in Feed Hoppers

Industry

Plastics, pharmaceuticals, packaging

Material

Resin pellets, powders, fine granules

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TOP APPLICATIONS

Dry Material Sensing in Mixing or Blending Equipment

Industry

Food & Beverage, Chemicals, Cosmetics

Material

Sugar, flour, powdered chemicals

Fail-Safe Alerts in Hazardous Material Containers

Industry

Oil & Gas, Petrochemical

Material

Combustible or hazardous powders and liquids

Level Control in Boilers or Furnaces (ash, dust bins)

Industry

Power Plants, Industrial Boilers

Material

Ash, slag, soot

Detection in Dust Filter Receivers or Pneumatic Conveying

Industry

Food Processing, Cement, Plastics

Material

Fine powders, granulated products

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VRX21, VRX31 & VRX41

SPECIFICATIONS

	VRX21	VRX31	VRX41
Minimum Material Density	1.9 lb/cu ft (30 g/liter)	1.9 lb/cu ft (30 g/liter)	1.9 lb/cu ft (30 g/liter)
Ambient Temperature (Electronics)	-4° F to +140° F (-20° C to +60° C)	-4° F to +140° F (-20° C to +60° C)	-4° F to +140° F (-20° C to +60° C)
Process Temperature (Probe)	STD probe: -4° F to +176° F (-20° C to +80° C) HT probe: -4° F to +284° F (-20° C to +140° C)	-4° F to +176° F (-20° C to +80° C)	-4° F to +176° F (-20° C to +80° C)
Conduit Entries	3/4” NPT	3/4” NPT	3/4” NPT
Enclosure Material	Die cast aluminum USDA approved powder coat finish	Die cast aluminum USDA approved powder coat finish	Die cast aluminum USDA approved powder coat finish
Enclosure Rating	NEMA Type 4X	NEMA Type 4X	NEMA Type 4X
Power Supply	24 VDC or 115/230 VAC	24 VDC or 115/230 VAC	24 VDC or 115/230 VAC Model Dependent
Pressure			
Relay Output Rating	DPDT contacts 5 Amps 250 VAC	DPDT contacts 5 Amps 250 VAC	DPDT contacts 5 Amps 250 VAC
Time Delay	Configurable	Configurable	Configurable
Mounting	1-1/4” NPT 1-1/2” NPT	2” Tri-clamp	1-1/2” NPT
Approvals	C/US CLASS II Div 1 IECEX-ATEX ZONE 20, 21 ▪ Harzarduos locations C/US Class II, Div 1 ▪ IECEX-ATEX Zone 20, 21 ▪ Ordinary locations	C/US CLASS II Div 1 IECEX-ATEX ZONE 20, 21 ▪ Harzarduos locations C/US Class II, Div 1 ▪ IECEX-ATEX Zone 20, 21 ▪ Ordinary locations	C/US CLASS II Div 1 IECEX-ATEX ZONE 20, 21 ▪ Harzarduos locations C/US Class II, Div 1 ▪ IECEX-ATEX Zone 20, 21 ▪ Ordinary locations

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VRX51, VRX61 & VRX71

SPECIFICATIONS

	VRX51	VRX61	VRX71
Minimum Material Density	1.9 lb/cu ft (30 g/liter)	1.9 lb/cu ft (30 g/liter)	1.9 lb/cu ft (30 g/liter)
Ambient Temperature (Electronics)	-4° F to +140° F (-20° C to +60° C)	-4° F to +140° F (-20° C to +60° C)	-4° F to +140° F (-20° C to +60° C)
Process Temperature (Probe)	-4° F to +176° F (-20° C to +80° C)	-4° F to +500° F (-20° C to +260° C)	-4° F to +500° F (-20° C to +260° C)
Conduit Entries	3/4” NPT	3/4” NPT	3/4” NPT
Enclosure Material	Die cast aluminum USDA approved powder coat finish	Die cast aluminum USDA approved powder coat finish	Die cast aluminum USDA approved powder coat finish
Enclosure Rating	NEMA Type 4X	NEMA Type 4X	NEMA Type 4X
Power Supply	24 VDC or 115/230 VAC	24 VDC or 115/230 VAC	24 VDC or 115/230 VAC
Pressure			
Relay Output Rating	DPDT contacts 5 Amps 250 VAC	DPDT contacts 5 Amps 250 VAC	DPDT contacts 5 Amps 250 VAC
Time Delay	Configurable	Configurable	Configurable
Mounting	1-1/2” NPT	1-1/2” NPT	1-1/2” NPT
Approvals	None	C/US CLASS II Div 1 IECEX-ATEX ZONE 20, 21 ▪ Harzarduos locations C/US Class II, Div 1 ▪ IECEX-ATEX Zone 20, 21 ▪ Ordinary locations	C/US CLASS II Div 1 IECEX-ATEX ZONE 20, 21 ▪ Harzarduos locations C/US Class II, Div 1 ▪ IECEX-ATEX Zone 20, 21 ▪ Ordinary locations

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CVR-600 & CVR-625

SPECIFICATIONS

	CVR-600	CVR-625
Input Voltage	Wide range 20...250V AC/DC	Wide range 20...250V AC/DC
Power Consumption	3 VA	3 VA
Relay	SPDT 5A 250 VAC	SPDT 5A 250 VAC
Time Delay	1 second from stop of vibration	1 second from stop of vibration
	2 to 5 seconds for start of vibration	2 to 5 seconds for start of vibration
Temperature Range	Ambient for electronics: -4°F to +140°F	Ambient for electronics: -4°F to +140°F
	Process temperature standard: -4°F to +175°F	Process temperature standard: -4°F to +175°F
	Process temp high temperature: -4°F to +300°F	Process temp high temperature: -4°F to +300°F
Minimum Material Density	3.5 lb./ft.3	2 lb./ft.3
Maximum Pressure	145 psi	145 psi
Wiring Cable	½"	½"
Mounting	1" NPT	1-¼" NPT
Enclosure	Diecast aluminum NEMA4	Diecast aluminum NEMA4
Probe	AISI 302 stainless steel	AISI 302 stainless steel

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SPECIFICATIONS

	VR-90	VF-90
Process temperature	-58° to +482°F (-50° to +250°C)	-58° to +482°F (-50° to +250°C)
Process pressure	-1 to +25 bar/-100 to +2500 kPa (-14.5 to +363 psig)	-1 to +16 bar/-100 to +1600 kPa (-14.5 to +232 psig)
Ambient temperature	-40° to +176°F (-40 to +80 °C)	-40° to +176°F (-40 to +80 °C)
Bulk density	> 0.008 g/cm³ (0.0003 lb./in.³)	> 0.0007 lb./in.³ (0.02 g/cm³)
Process fitting	Thread from G1½, 1½ NPT Flanges from DN 50, 2”	Threaded 1.0”, 1.25”. and 1.5” NPT 2.0” flange 2.0” clamp
Power	20 to 253 V AC, 50/60 Hz, 20 to 253 V DC	20 to 253 V AC, 50/60 Hz, 20 to 253 V DC
Signal output	Relay (DPDT) Transistor (NPN/PNP) Two-wire output Contactless electronic switch	Relay (DPDT) Transistor (NPN/PNP) Two-wire output Contactless electronic switch
Switching relay	When being covered: 0.5 second When being uncovered: 1 second	When being covered: 0.5 second When being uncovered: 1 second
Housing material	Plastic, aluminum, stainless steel (precision casting), stainless steel (electropolished)	Standard, detection of solids in water
Protection rating	IP 66/IP 67 (NEMA Type 4X)	Plastic, aluminum, stainless steel (precision casting), stainless steel (electropolished)
Approvals	FM (NI) Class I, Div 2, Groups A, B, C, D (DIP) Class II, III, Div 1, Groups E, F, G FM (IS) Class I, II, III Div 1, Groups A, B, C, D, E, F FM (XP) Class I, Div 2, Groups A, B, C, D (DIP) Class II, III, Div 1, Groups E, F, G CSA (NI) Class I, II, III Div 2, Groups A, B, C, D, E, F, G CSA (CSA (XP) Class I, II, III Div 1, Groups A, B, C, D, E, F, GIS) Class I, II, III Div 1, Groups A, B, C, D, E, F, G	FM (NI) Class I, Div 2, Groups A, B, C, D (DIP) Class II, III, Div 1, Groups E, F, G FM (IS) Class I, II, III Div 1, Groups A, B, C, D, E, F FM (XP) Class I, Div 2, Groups A, B, C, D (DIP) Class II, III, Div 1, Groups E, F, G CSA (NI) Class I, II, III Div 2, Groups A, B, C, D, E, F, G CSA (IS) Class I, II, III Div 1, Groups A, B, C, D, E, F, G CSA (XP) Class I, II, III Div 1, Groups A, B, C, D, E, F, G

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