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VEGETABLE OIL INK

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Piezoelectric Acceleration / Velocity Transducers

CA • CV Series

CA·CV Series

SHINKAWA

Shinkawa acceleration and velocity sensors are compact and robust. Ideal for measurement, monitoring, and analysis of casing or bearing vibration, as specified in ISO 10816 and API 670, these transducers measure a broad band of frequencies.

Overview of Shinkawa Connected Monitors

VM-7 Series

Fully digital and API 670 compliant, the VM-7 Series monitors are configurable from a computer and can be connected directly to vibration analysis and diagnostic systems. Ideal for monitoring turbines, compressors, and other rotating machinery at petrochemical and power plants.

- API 670 compliant
- External data acquisition unit not required, connects directly to analysis and diagnostic systems
- Redundant power supply and communications modules
- Hot-swappable modules
- Reliable and easy to maintain
- High density – accommodates up to 44ch for vibration
- Flexible system design configurable from a PC
- Customizable alarm relays. Each monitor module includes 6 relays and can be expanded with 9 or 18ch relay modules

VM-5 Series

The VM-5 Series monitors are also designed to meet API 670, and are flexible and configurable to meet a varying scale of machinery.
Choose between a single or redundant power supply, in a rack mounted 19 inch configuration, or as a standalone monitor.

- API 670 compliant
- Backlit LCD displays measurement values
- Some settings are field changeable by opening front panel, no PC is required.
- Accepts communication via Modbus to host systems e.g. DCS (rack-mounted configuration only)
- Available as an independent 2ch monitor with a single-unit enclosure with power supply and relays (Model VM-5G)

VM-15/16 Series

VM-15 and VM-16 Series monitors are compact, lightweight and a cost effective solution for general purpose machinery.
They feature an easy to read digital or colour LCD display, alarm and data output capability.
Data can be saved via CompactFlash memory card or a USB connection.

- VM-15 monitors 4ch
- VM-16 monitors up to 12ch
- Monitor displacement, velocity, acceleration, thrust*, and temperature*

*VM-16 only

VM-21 Series

These signal conditioners convert input signals from transducers on rotating machinery into isolated 4–20 mADC or 1–5 VDC signals.

- Product line for displacement, velocity, acceleration vibration, thrust, rotation, and LVDT
- Slim 30 mm profile; flush installation supported
- Flexible DIN rail or wall-mounted installation
- Detects input errors (burn-down)
- Vibration waveform output for precise diagnostics

* Contact your nearest Shinkawa dealer for information on other vibration analysis/diagnostics and remote monitoring system.

Features

- Connects directly to vibration signal conditioners / monitors.
- Built-in amp, 2-wire transducer (no external charge amp needed).
- Intrinsically safe (TIIS, NEPSI, KTL) / marine certified (NK, LR).
- Dust / water resistance (IP67).
- Can be mounted on the machine with single M6 stud bolt.

Applications

Fans | Motors | Pumps | Compressors | Centrifuges | Gearboxes | Machine Tools

and more

CA-302 ACCELERATION TRANSDUCER

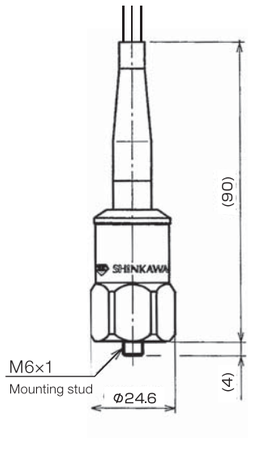
Overview

CA-302 piezoelectric acceleration transducers are designed for constant monitoring of: pumps, fans, gearboxes, and other rotating machinery.
These sensors are internally amplified and have an integral cable type.

Ordering Information

CA-302-00-□ /EX□

Armor		Intrinsically safe	
0	Without	0	TIIS Ex ia ⅡB T3 X
1	With	1	TIIS Ex ia ⅡB T4 X
		2	TIIS Ex ia ⅡC T3 X
		7	NEPSI Ex ia ⅡC T4
		8	KTL Ex ia ⅡC T4



Specifications

Sensitivity	100mV/9.8m/s² (100mV/ g REF.) pk±10% at 100Hz, and 25 ˚C	Power Supply	20 to 30VDC, 2 to 10mA (non-intrinsically safe) 20 to 25.5VDC, 2 to 10mA (intrinsically safe)
Acceleration Range	490m/s² (50g REF.) pk	Temperature Response	Within ±10% (Around the operating temperature range)
Vibration Limit	4,900m/s² (500g REF.) pk	Operating Temperature range	-20 to +120℃ (non-intrinsically safe) -20 to +60℃ (intrinsically safe：EX0,EX2,EX7) -20 to +40℃ (intrinsically safe：EX1) -50 to +120℃ (intrinsically safe：EX8)
Shock Limit	9,800m/s² (1,000g REF.) pk		
Linearity	±1% of F.S.		
Natural Frequency	30kHz	Relative Humidity	100%RH
Frequency Response	2 to 5,000Hz±10%, 1 to 10,000Hz±3dB	Protection Rating	IP67
		Weight	Approx.90g
Transverse Sensitivity	Max.10%	Case Material	Stainless steel
Output Impedance	100Ω	Cabling	2-conductor shielded, Cable length : Approx.5m
Grounding	case isolated, internally shielded	Accessory	M6 Mounting stud (1 piece)

CA-72 □ ACCELERATION TRANSDUCER

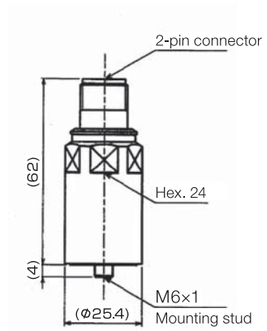
Overview

CA-72 series piezoelectric acceleration transducers are designed for constant monitoring of: pumps, fans, gearboxes, and other rotating machinery. These heavy-duty acceleration transducers are internally amplified, highly noise resistant, and measure a broad frequency range.

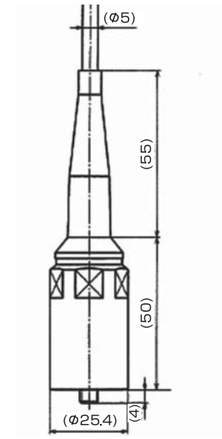
Ordering Information

CA-72□

Cable Type	
1	Connector Type
2	With integral cable type (2-conductor shielded cable 3m standard)



CA-721
Connector type



CA-722
With integral cable type

Specifications

Sensitivity	100mV/9.8m/s² (100mV/g REF.) pk±5% at 100Hz, 25℃(77°F REF.)	Power Supply	18 to 30VDC, 2 to 10mADC (constant current)
		Temperature Response	Within ±10% (Around the operating temperature range)
Acceleration Range	490m/s² (50g REF.) pk	Operating Temperature range	-50 to +120℃(-58 to +248°F REF.)
Vibration Limit	4,900m/s² (500g REF.) pk	Relative Humidity	100%RH
Shock Limit	49,000m/s² (5,000g REF.) pk	Protection Rating	IP67 (CA-721 & CW-□□□F-FF, CA-722)
Linearity	±1% of F.S.		
Natural Frequency	26kHz	Weight	Approx.120g(CA-721) Approx.230g(CA-722(including cable))
Frequency Response	3 to 5,000Hz ±5%, 2 to 7,000Hz ±10%, 1 to 15,000Hz ±3dB	Case Material	Stainless steel
		Cabling	CA-721: Twisted pair shielded cable CA-722: 2-conductor shielded cable (intergral cabling type)
Transverse Sensitivity	Max.5%		
Output Impedance	100Ω (typical)		
Grounding	case isolated, internally shielded	Accessories Supplied	M6 Mounting stud

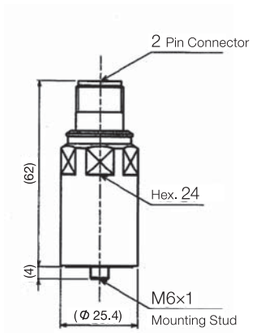
CV-86 □ VELOCITY TRANSDUCER

Overview

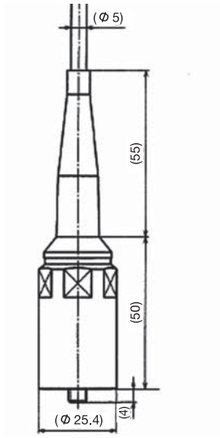
As with piezoelectric acceleration transducers, the CV-86 series of piezoelectric velocity transducers employ a piezoelectric element to detect acceleration, which is then converted to a velocity signal by the built-in integrator.

CV-86 □ /EX □

Cable Type		Instrinsically Safety	
1	Connector Type	1	TIIS (Ex ia ⅡA T4 X)
2	With integral cable type (Coax. cable 3m standard)	7	NEPSI (Ex ia ⅡA T4)
		8	KTL (Ex ia ⅡA T4) ※CV-861 only



CV-861
Connector type



CV-862
With integral cable type

Specifications

Sensitivity	3.94mV/mm/s (100mV/in/s REF.) pk±5% at 100Hz, 25℃(77°REF.)	Power Supply	18 to 30VDC, 2 to 10mADC (constant current)
		Temperature Response	Within ±10%(around the operating temperature range)
Max.Velocity	1,270mm/s (50in/s REF.)pk	Operating Temperature range	-50 to +120℃ (-58 to +248°F REF.) -20 to +60℃ (Transducer, Cable : EX1, EX7) -50 to +120℃ (Transducer, Cable : EX8)
Vibration Limit	2,450m/s² (250g REF.)pk		
Shock Limit	24,500m/s² (2,500g REF.) pk (non-Intrinsically Safe) 23,520m/s² (2,400g REF.) pk (Intrinsically Safe)	Relative Humidity	100%RH
		Protection Rating	IP67 (CV-861 & CW-□□□F-FF, CV-862)
Linearity	±1% of F.S.		
Natural Frequency	15kHz	Weight	Approx. 145g (CV-861) Approx. 250g (CV-862 (including cable))
Frequency Response	2.5 to 3,500Hz ±10%, 2 to 7,000Hz ±3dB	Case Material	Stainless Steel
Transverse Sensitivity	Max. 5%	Cabling	CV-861 : Twisted pair shielded cable CV-862 : Coax. cable (Intergral cabling type)
Output Impedance	200Ω (typical)		
Grounding	Case isolated, internally shielded	Accessories Supplied	M6 mounting stud

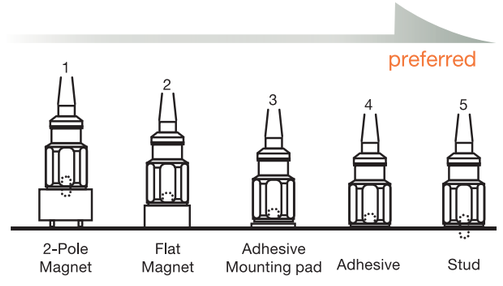
Appendix 1 Selection Guide of an Optimal Vibration Transducer

Measuring the health of your rotating machinery begins at the transducer. Before choosing a transducer, a thorough understanding of the machine type, application and transducer's specifications must be taken into account. The following chart is an overview of applications for displacement, velocity and acceleration measurements. Please consult a vibration expert to find out what is right for your plant.

Type	Eddy-Current Displacement Transducer	Piezoelectric Velocity Transducer	Piezoelectric Acceleration Transducer
Relevant Machinery	• Steam turbines • Large or medium pumps • Compressors (sleeve bearing journal bearing) • Gas turbines • Generators • Motors (sleeve bearing, journal bearing) • Fans (sleeve bearing, journal bearing) • Gearboxes (sleeve bearing, journal bearing)	• Gas turbines • Medium-sized pumps • Generators • Motors • Fans	• Motors (rolling bearing) • Pumps (rolling bearing) • Gearboxes (rolling bearing)
Applications	• Detects relative radial displacement vibrations from low to high speed • Detects axial position and rotation speed	• Detects bearing or casing velocity vibrations for machinery rotating at low to medium speeds • Detects absolute displacement vibrations by applying first-order integration.	• Detects bearing, casing, or gearbox acceleration vibrations for machinery rotating at high speeds • Detects absolute velocity vibrations by applying first-order integration.
Specifications	• Linear range 2,000 m • Sensitivity 787 mV/100 m • Frequency response DC–10 kHz (-3 dB) • Sensor operating temperatures -35 to 177°C • Power -24 VDC ±10% (Shinkawa model FK-202F)	• Max. velocity vibration 1,270 mm/s pk • Sensitivity 3.94 mV/mm/s pk • Frequency response 2 Hz–7 kHz (±3 dB) • Sensor operating temperatures -50 to +120°C • Power 18–30 VDC, 2–10 mA (Shinkawa model CV-861)	• Measurement range 490 mm/s² pk • Sensitivity 100 mV/9.8 m/s² pk • Frequency response 1 Hz–10 kHz (±3 dB) • Sensor operating temperatures -20 to +120°C • Power 20–30 VDC, 2–10 mA (Shinkawa model CV-302)
Notes	• Run-out (noise) will occur in output when measuring points subject to residual magnetic fields or non-uniform materials. • Sensitivity varies depending on the electrical properties of the target material. • Beat noise from interference may arise if multiple sensors are placed close to each other.	• Due to unwanted low-frequency phase characteristics, care must be taken when measuring phase analysis. • Secured with stud bolt to avoid unwanted high-frequency characteristics due to installation with magnets or adhesive.	• May be unreliable in low-frequency ranges, particularly if displacement is obtained by second-order integration. • Secured with stud bolt to avoid unwanted high-frequency characteristics due to installation with magnets or adhesive.

Appendix 2 Mounting Methods and Frequency Characteristics

Inherent vibration will vary depending on how the acceleration sensor is mounted on the vibrating body. For optimal measurement conditions, place the bottom of the sensor in closest possible contact with the vibrating body.



CA-302 frequency characteristics (typical values)