PIEZOELECTRIC ACCELEROMETER

PV-97I

INSTRUCTION MANUAL

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Outline

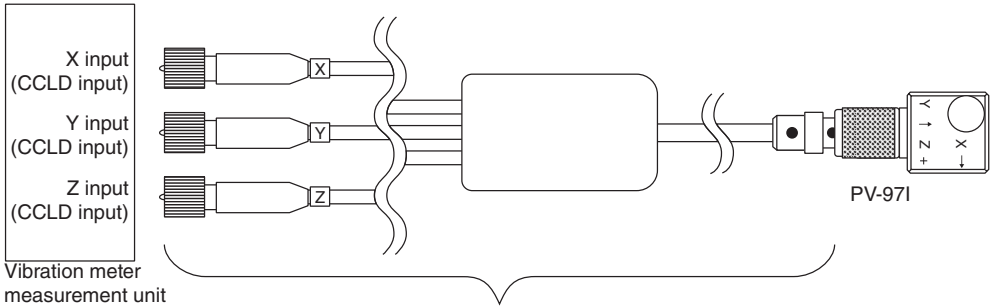
The PV-97I, a compact Piezoelectric Accelerometer can measure orthogonal triaxial vibrations simultaneously using integrated annular shear mode elements and constant current line drive (CCLD). Mounting to an object to be measured is done by using adhesive glue etc. The connector connects to the VP-51W triaxial cable with three 10-32 UNF connectors for use with the PV-97I accessory in one place.

Features

- Because of the compact light weight design, there is little accelerometer mass interference with the object being measured and it can be used in a wide variety of applications such as modal analysis and vibration measurement of light weight structured objects.
- Connects for use with devices such as a data recorder, analyzer and vibration meter which has constant current line drive input.

Accelerometer and measurement unit connection

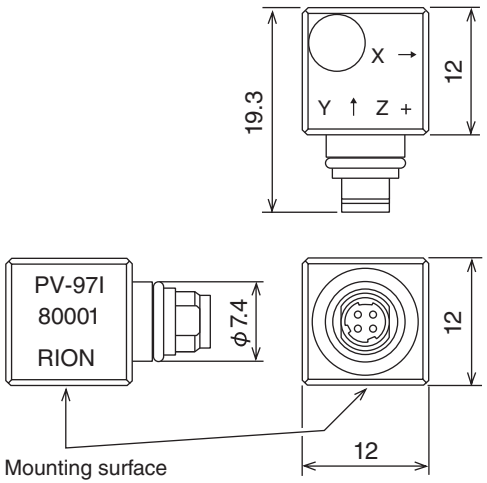
The PV-97I and measurement unit are connected with the accessory accelerometer cable as indicated in the following diagram.



Important

Make sure the connector is always inserted straight. Inserting on an angle may result in becoming wedged in the threads and being no longer able to turn.

Outside views



Unit: mm

Dimensional drawing

Method of mounting to an object to be measured

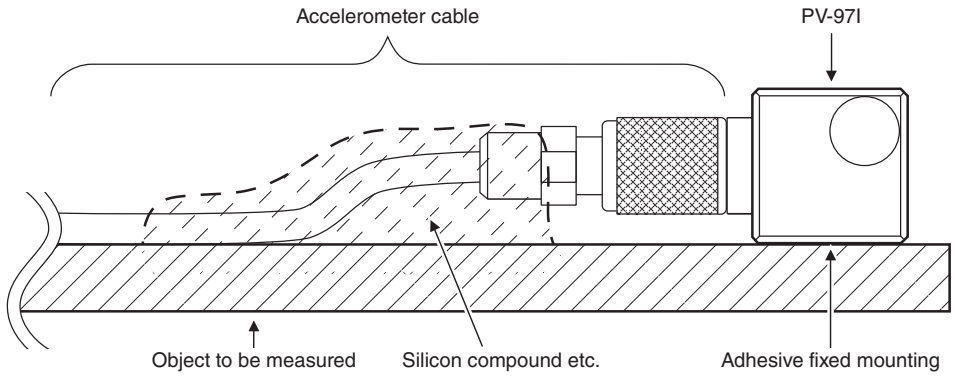
The accelerometer PV-97I is mounted to the mounting surface, on the measurement point of the object. Please use an adhesive glue etc., for the adhesive (please follow the appropriate instruction manual regarding mounting with adhesives etc.)
If the measurement point of the object is not rigid, flat and smooth, functions of the PV-97I will not work properly (frequency responses will be distorted etc.).

Important

When applying the adhesive, make sure to wipe off the measurement point of the object and mounting surface of the PV-97I such that it is not dirty with particles and oil etc.

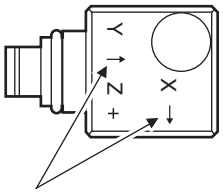
Accelerometer cable protection

When measuring vibrations, the accelerometer cable may change shape and break due to vibration and resonance. Please use a silicon compound within close proximity of the accelerometer to secure and protect the accelerometer cable. Additionally, as stress tends to easily concentrate at the base of the connector, the accelerometer cable may break if stress is continuously applied. Always handle the cable with care and especially avoid subjecting this section to a bending force etc.

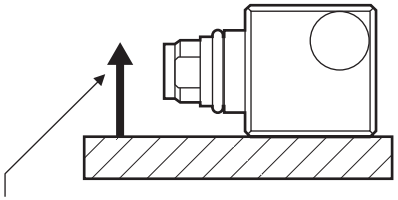


Operation

X and Y are positive output with an acceleration in the direction of the arrow indicated on the PV-97I.
Z is positive output with an acceleration in a vertical upper direction of the mounting surface.



Accelerometer X and Y output outputs + voltage (DC output bias voltage reference) with an acceleration in the direction of the arrow



Accelerometer Z output outputs + voltage (DC output bias voltage reference) with a mounted surface vertical upper acceleration

Removing an accelerometer

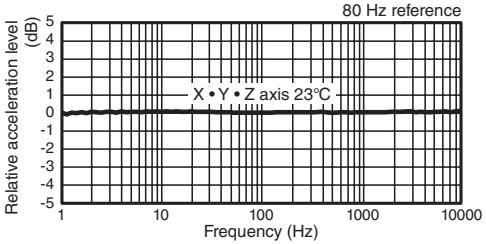
You can remove it by hand if secured using dual-sided tape.
If secured using adhesive glue, you can remove by applying a glue thinning agent to weaken the bond of the adhesive glue and using a spanner etc, grip the side of the PV-97I and turn it to remove.

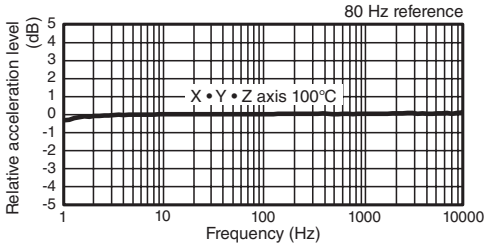
Disposing of the Accelerometer

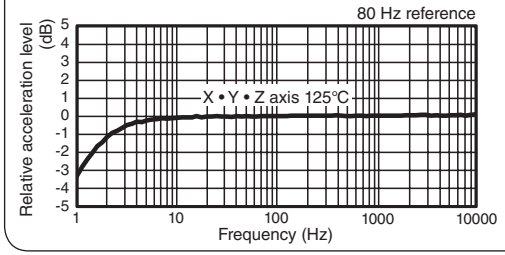
When disposing of the Piezoelectric Accelerometer, please follow the local and national government regulations and laws.

Typical frequency response of the PV-97I

The following graph indicates the typical frequency response of the PV-97I.







Specifications

Method	Piezoelectric Accelerometer detection Annular shear mode
Axis	Triaxial (3 axis direction Cartesian coordinates)
Voltage sensitivity	1.1 mV/(m/s²) (80 Hz)
Voltage sensitivity temperature coefficient	-0.2%/°C
Vibration frequency range	For atmosphere at 100°C or lower 1 to 5000 Hz (±10%) (X axis, Y axis) 1 to 7000 Hz (±10%) (Z axis) For atmosphere over 100°C (125°C and below) 5 to 5000 Hz (±10%) (X axis, Y axis) 5 to 7000 Hz (±10%) (Z axis)
Transverse response	5% or lower (30 Hz)
Maximum measurable acceleration	5000 m/s² (supply voltage 24 V when supplied at 23°C) details are indicated in the following table

Operating temperature	Acceleration (m/s²)	Vibration frequency range (±10%)
-20°C ≤ t ≤ 100°C	1000 m/s² or below	1 Hz to 5 kHz or 7 kHz*
	3000 m/s² or below	2 Hz to 5 kHz or 7 kHz*
	5000 m/s² or below	10 Hz to 5 kHz or 7 kHz*
100°C < t ≤ 125°C	1000 m/s² or below	5 Hz to 5 kHz or 7 kHz*
	3000 m/s² or below	20 Hz to 5 kHz or 7 kHz*
	5000 m/s² or below	200 Hz to 5 kHz or 7 kHz*

* 5 kHz is the frequency upper limit of X axis and Y axis, 7 kHz is the frequency upper limit of Z axis

Base distortion sensitivity	0.1 (m/s²)/μstrain or below (when using 3 Hz high-pass filter)
Thermal transient response	1.0 (m/s²)/°C or below (when using 3 Hz high-pass filter)
Output impedance	200 Ω or below
Residual noise	30 μV (rms) or below (vibration frequency range 1 Hz to 10 kHz)
Supply voltage	DC 18 V to 30 V (2 to 4 mA/unit)
DC output bias voltage	Approximately 10 V
Connector	Small 4-pin connector
Grounding	Signal ground is connected to the case
Case material	Titanium
Mounting	Adhesive
Operating temperature range	-20 to 125°C
Storage temperature range	-20 to 125°C
Dimensional outline and mass	Approx. 12 mm (W) × 12 mm (H) × 12 mm (D) (excluding connector), approx. 8 g
Supplied accessories	PV-97I triaxial cable with three 10-32 UNF connectors VP-51W (Temperature upper limit for use is 105°C) Calibration chart PV-97I Instruction manual (This manual) Instruction manual Accelerometer PV Series Inspection Certificate
Optional accessories	PV-97I heat-proof triaxial cable with three 10-32 UNF connectors VP-51WA (compliant to 125°C) Mounting clip VP-57E

* When not specified, the values are typical at 23°C.