



# Specifications and Instruction Manuals

Direct Output Vibration Pickup

Model:

VP-420 (4-20mA Velocity Type)

VP-421 (4-20mA Velocity + AC Acceleration Type)

Manufacturer:	<b>IMV CORPORATION</b>
Specification No.:	VP-420: TVE-5-5676E VP-421: TVE-5-5677E
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## Introduction

Thank you for purchasing Direct Output Vibration Pickup "VP-420" or "VP-421".

Read this instruction manuals carefully to ensure the best performance and longest product life of the device. In addition, pay attention to the cautions described below to use the product safety.

### ◆ Caution



- (1) Direct Output Vibration Pickup (hereinafter referred to as "pickup") is a device that diagnoses various vibration for industrial equipment such as electric motors and pumps, and consumer equipment. Do not use it for any other purpose.
- (2) When wiring pickup, make sure that power supply source is "off" before performing the work.
- (3) Signal line from pickup should not be bundled with the power line or the signal line that generates noise but should be laid in a separate system.

## Safety Precautions

It describes the items that you should follow in order to prevent harm to customers and other people and damage to property, and to use this product safely. Please be sure to read this instruction manuals and attached documents before use, and fully understand the contents for use.

After reading this manual, be sure to place it in a location so that you can always refer to it.

### Expressions of Safety Instructions

Indication	Meaning of Indication
 <b>Warning</b>	Indicates the contents that may cause a dangerous situation of death or serious injury if mishandled.
 <b>Caution</b>	Indicates the contents that may cause serious injury or property damage if mishandled.
<b>Note</b>	Describes cases where there is no risk of injury to the operator, but it is expected to cause damage or failure to this product or other equipment or devices.

\* "Serious injuries" are those with residual aftereffects such as blindness, injury, burns, electric shock, fractures, poisoning etc., and those requiring hospitalization or long-term hospital visits for treatment.

\* "Minor injuries" are those that do not require hospitalization or long-term hospital visits for treatment (other than the "serious injuries" above).

In addition to the danger level classification, this document also uses the following notation:

Memo: "Memo" describes supplementary explanations that could not be explained in the text and information that is useful to know.



◆ For Safe Use

 **Warning**

- (1) Do not use this product as a life-threatening alarm device.
- (2) When installing this product or peripheral devices in a high place, be sure to use a workbench such as a stepladder.
- (3) Do not use in abnormal conditions such as smoke, strange odor, or noise. Also, do not disassemble or modify this product regardless of whether it is normal or abnormal. It may cause electric shock, fire, or malfunction.
- (4) When installing near a moving part of the machine, make sure that the machine is stopped before installing it. Do not perform any installation work while the machine is in operation.

 **Caution**

- (1) Be sure to wear a helmet when working at heights.
- (2) When installing this product or peripheral devices in a high place, fix them firmly. If this product or peripheral devices fall, an accident may occur.
- (3) When the product is energized, do not touch the terminal block etc. carelessly.

**Note**

- (1) When wiring pickup, check the method that matches the specifications of the device to be connected. Improper connection may cause the product or connected devices to breakdown or be damaged.
- (2) Use this product in the environment described in this manual. If you use it in an environment not described in this manual, unexpected problems may occur. In addition, if the main unit is damaged or peripheral devices are damaged due to the above reasons, the warranty will be void.
- (3) Do not attach this product to the interference point or operating point of the object to be measured. The object to be measured may damage.

Memo

- (1) This product is a precision device. Please handle with care.
- (2) When performing automatic measurement operation using this product, it may not be possible to record measurement data as expected if the settings are not correct. Please check in the actual environment whether the measurement data can be obtained as expected, and after confirming that there are no problems, start operation at full scale.



## 1. Outline

This product has 4-20mA DC output which is proportional to the vibration level and the capability of interfacing direct into PLC, BMS or 4-20mA input module.

### ◆ Feature

- (1) Velocity measurements based on ISO10816 which defines the vibration severity is possible by this product.
- (2) Output is 4-20mA DC which is proportional to the vibration level.
- (3) This product has the capability of interfacing direct into PLC, BMS or 4-20mA input module.

### ◆ Typical Applications

- (1) Vibration Sensors of Vibration Monitoring systems for manufacturing plants or machine tools.
- (2) Built-in vibration sensors for fans, motors, Compressors, etc.



## 2. Specifications

<b>VP-420</b>	
Velocity Range (rms)	<input type="checkbox"/> 0 to 10mm/s <input type="checkbox"/> 0 to 20mm/s <input type="checkbox"/> 0 to 25mm/s <input type="checkbox"/> 0 to 50mm/s <input type="checkbox"/> 0 to 100mm/s (Nominal: within $\pm 10\%$ at 80Hz and 22°C)
<b>VP-421</b>	
Velocity Range (rms) and Acceleration Sensitivity (AC Output)	<input type="checkbox"/> 0~10mm/s      10.2mV/(m/s <sup>2</sup> )      (Max Acc. 294m/s <sup>2</sup> ) <input type="checkbox"/> 0~20mm/s      10.2mV/(m/s <sup>2</sup> )      (Max Acc. 294m/s <sup>2</sup> ) <input type="checkbox"/> 0~25mm/s      10.2mV/(m/s <sup>2</sup> )      (Max Acc. 294m/s <sup>2</sup> ) <input type="checkbox"/> 0~50mm/s      5.1mV/(m/s <sup>2</sup> )      (Max Acc. 588m/s <sup>2</sup> ) <input type="checkbox"/> 0~100mm/s      5.1mV/(m/s <sup>2</sup> )      (Max Acc. 588m/s <sup>2</sup> ) (Nominal: within $\pm 10\%$ at 80Hz and 22°C)
AC Output Bias Voltage	3VDC (Nominal)
Frequency Response	10 to 1000Hz $\pm 5\%$ (Frequency range according to ISO10816 that prescribes vibration severity)
Output Current	4 to 20mADC (proportional to "mm/s rms")
Supply Voltage	15 to 30VDC
Power Consumption	Approx. 1W (Using 24VDC Power Supply)
Settling Time	Approx. 2 seconds
Ambient Temperature	-25 to 90°C
Structure	<input type="checkbox"/> Drip-proof Direct-connect Type: IP65 (Dust-proof, Drip-proof) <input type="checkbox"/> Water-proof Connector Type: IP67 (Dust-proof, Water-proof) <input type="checkbox"/> Water Resistant Type: IP68 (Dust-proof, Water Resistant) Submersible Depth: max 100m, 10bar
Output Impedance	Loop Resistance 600Ω max at 24VDC
Dimensions * Detail Reference: "3. Outer Dimensions"	<input type="checkbox"/> Drip-proof Direct-connect Type: $\phi 27.5 \times 45$ mm (Excluding Protrusions) <input type="checkbox"/> Water-proof Connector Type: $\phi 27.5 \times 56$ mm (Excluding Protrusions) <input type="checkbox"/> Water Resistant Type: $\phi 27.5 \times 69$ mm (Excluding Protrusions)
Weight (Excluding Cable)	<input type="checkbox"/> Drip-proof Direct-connect Type: Approx. 135g <input type="checkbox"/> Water-proof Connector Type: Approx. 150g <input type="checkbox"/> Water Resistant Type: Approx. 140g
Case Material	Stainless Steel (SUS303)
Output Cable	<input type="checkbox"/> Drip-proof Direct-connect Type: 2 Core Shielded Cable Direct Leading, Sheath: Stainless Mesh <input type="checkbox"/> Water-proof Connector Type: 2 Core Shielded Cable (Sold separately) * Detail Reference: "8. Outline View of Connector Cable" <input type="checkbox"/> Water Resistant Type: 2 Core Shielded Cable Direct Leading, Sheath: Silicon
Producible Length of Output Cable (Standard Length 5m)	<input type="checkbox"/> Drip-proof Direct-connect Type: 5 to 100m (5m step) <input type="checkbox"/> Water-proof Connector Type: 5 to 100m (5m step) <input type="checkbox"/> Water Resistant Type: 5 to 100m (5m step)
Maximum Laying Length of Output Cable	1000m (However, it is desirable to wire at the shortest possible distance.)
Mounting Adapter (Quick Fit)	<input type="checkbox"/> MS-AS001 (for Glue Face) <input type="checkbox"/> MS-AS002 (M8 Male) <input type="checkbox"/> MS-AS003 (M6 Male) <input type="checkbox"/> MS-AM005 (Magnet: $\phi 25.4$ mm Pole Piece) * Detail Reference: "4. Outer Dimensions of Mounting Adapter"

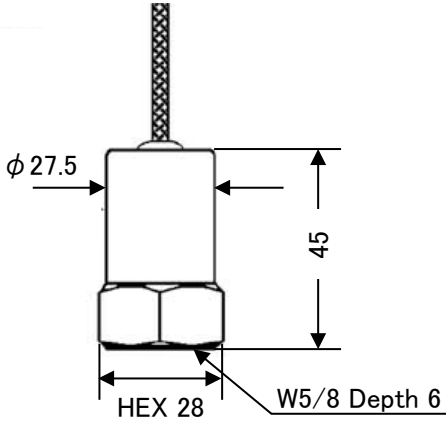
\* The contents of this specification are subject to change without notice.



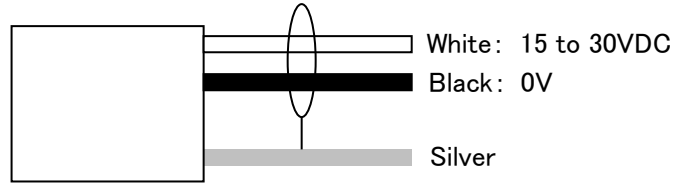
### 3. Outer Dimensions

(See "2. Specifications" about structure and weight. Dimension unit is "mm".)

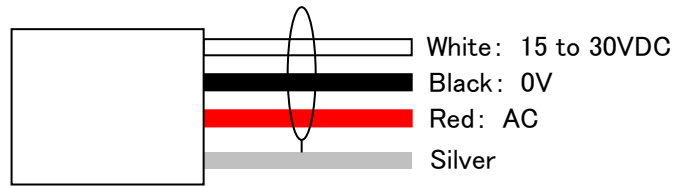
#### □ Drip-Proof Direct-Connect Type



Sensor Body

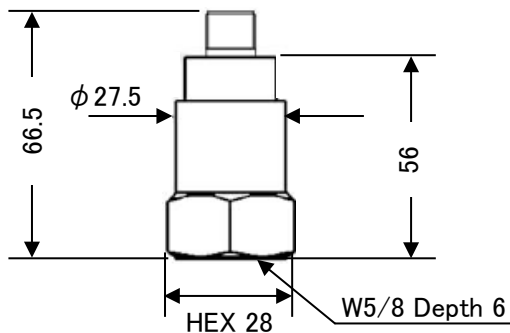


VP-420 Cable

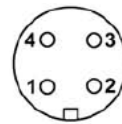


VP-421 Cable

#### □ Water-Proof Connector Type



Sensor Body



Pin1 : NC  
 Pin2: 15 to 30VDC (White)  
 Pin3: NC  
 Pin4: 0V(Black)

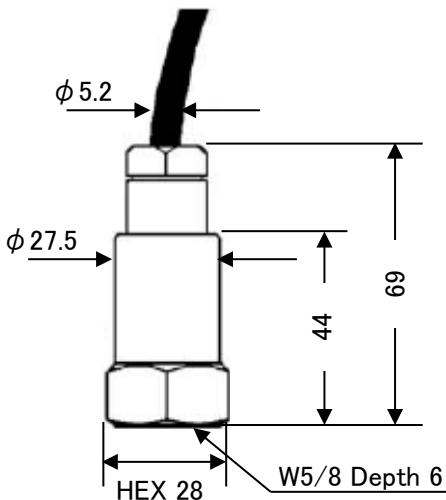
VP-420 Pin Assign



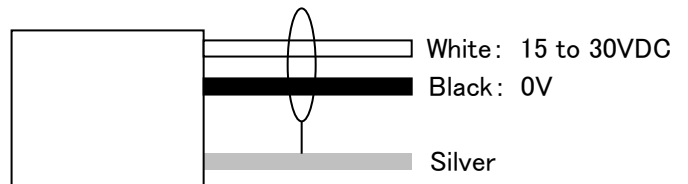
Pin1 : AC (Brown)  
 Pin2: 15 to 30VDC (White)  
 Pin3: NC  
 Pin4: 0V(Black)

VP-421 Pin Assign

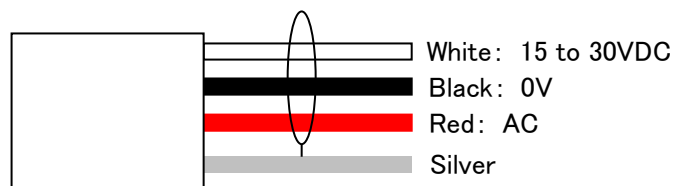
#### □ Water-Resistant Type



Sensor Body



VP-420 Cable

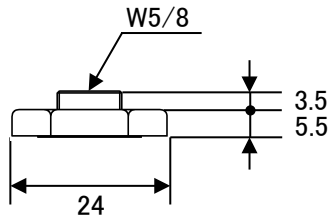


VP-421 Cable

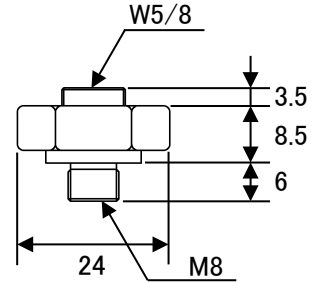


#### 4. Outer Dimensions of Mounting Adapter (Quick Fit)

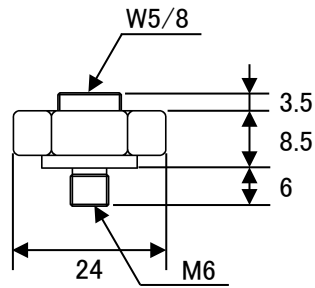
□ MS-AS001 (for Glue Face)



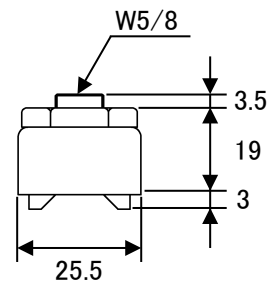
□ MS-AS002 (M8 Male)



□ MS-AS003 (M6 Male)

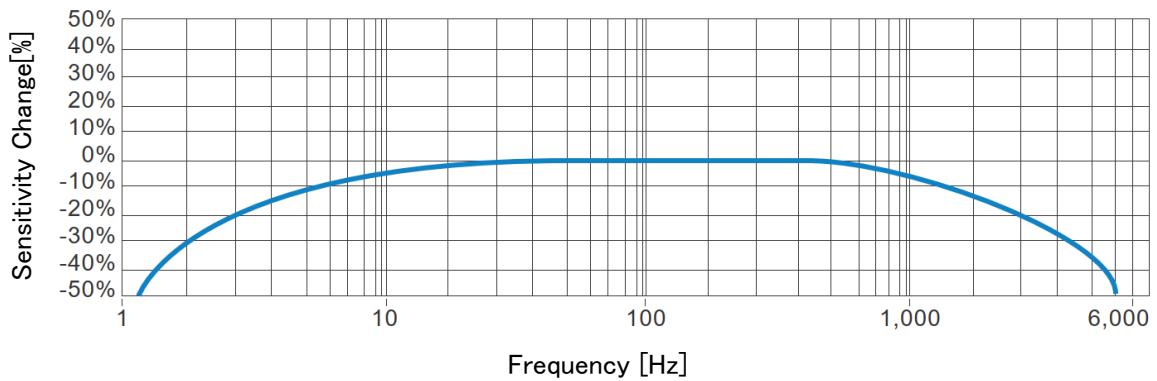


□ MS-AM005 (Magnet: φ25.4mm Pole Piece)



(Unit is "mm")

#### 5. Frequency Response

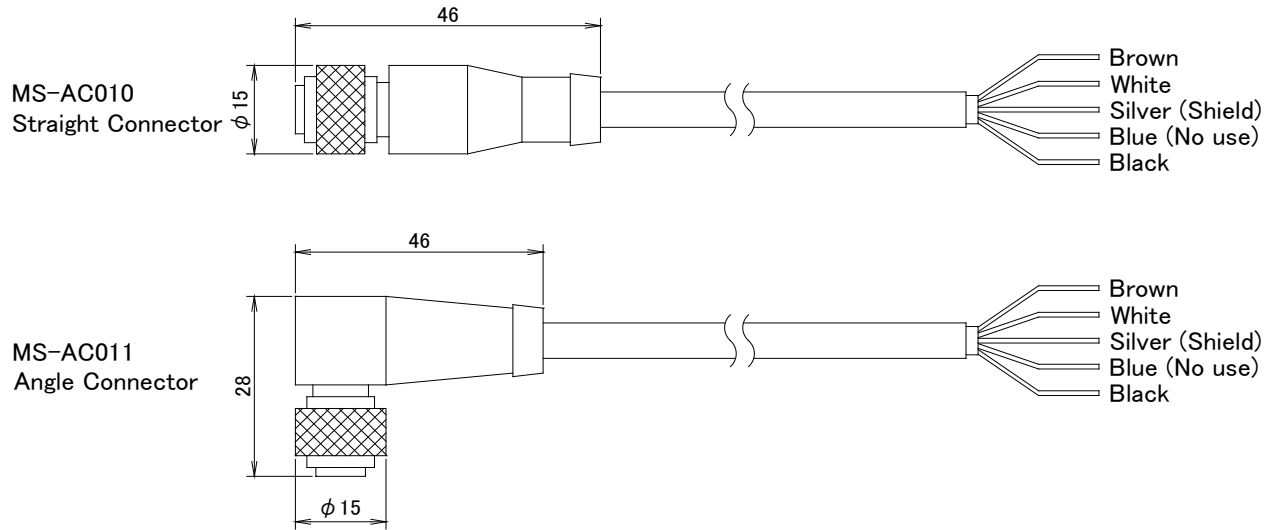






## 6. Outline View of Connector Cable

Sheath Material: PUR  
Cable Outer Diameter:  $\phi 5.9$  (Standard)  
Outline View: See below Figure



Outline View of Connector Cable



## 7. Instructions

### 7-1. Installation of Pickup

Attach Quick Fit to the bottom of pickup and install it to the vibration measurement point (see Fig.7-1).

Ideally, the surface of the equipment on which the pickup will be installed should be as flat as possible, and the contact surface should be coated with silicone grease or oil.

For a Water-Proof Connector Type pickup, fix pickup and then connect the dedicated cable.

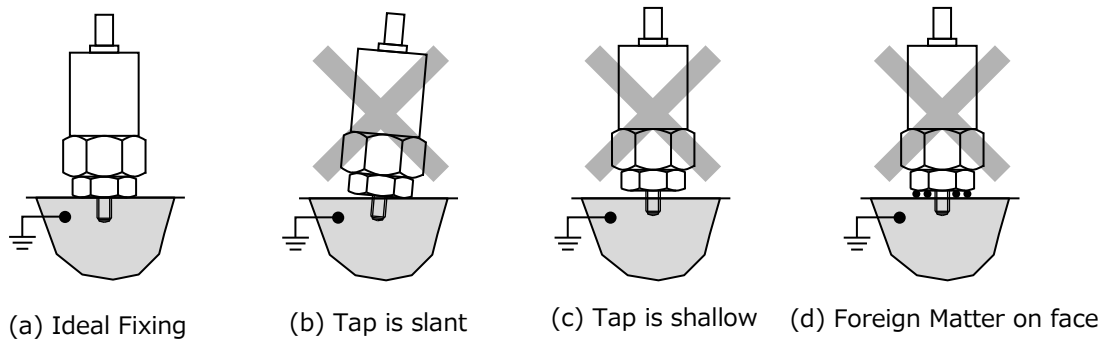


Fig.7-1 Installation of Pickup (Example of MS-AS002 and MS-AS003)

### Caution

Be sure to check the following items before installing pickup.

- (1) Is the instrument to be measured grounded

**If pickup mounting surface (measurement target instrument) is not properly grounded, pickup may become charged and pickup may fail.**

- (2) Is the pickup mounting surface cleanly finished

**Completely remove dirt, dust, paint, etc.** Also, make sure that the tapped holes are upright with no foreign matter on the threads.

### 7-2. Laying of Pickup Cable

- (1) Pickup cable fix away from the device to be measured and at the location closest to the pickup, and then fix the cable appropriately so that there is no slack.
- (2) When relaying the pickup cable, use a junction box, and use a twisted pair shielded cable that takes the installation environment into consideration. Also, keep the wiring as short as possible.

### Note

- (1) If pickup cable is parallel to power line of the inverter, etc., noise from the inverter may affect the measurement. Install pickup cable as far away from power line as possible.
- (2) When relaying pickup cable using junction box, install it in an environment with as little noise as possible (in a place where noise countermeasures have been taken).



### 7-3. Wiring Method

#### 7-3-1. Wiring Method of VP-420

Connect VP-420 according to the example shown in Fig.7-2 below.

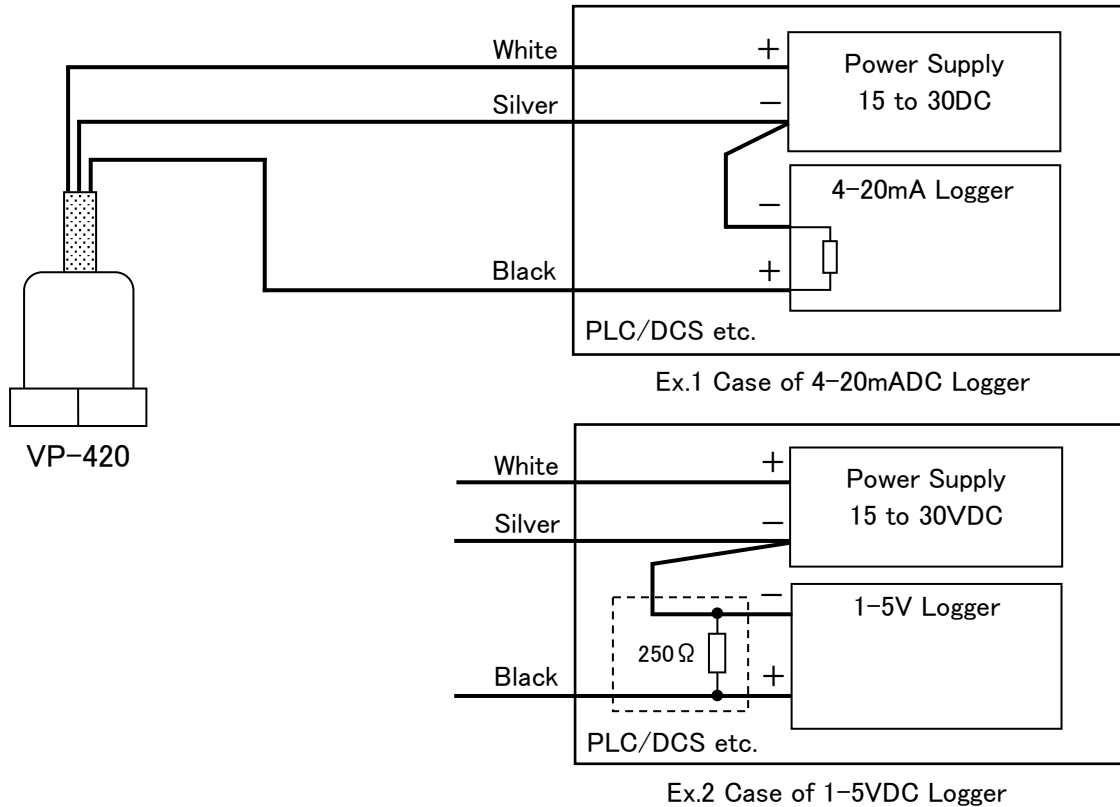


Fig.7-2 Example of Wiring Method about VP-420

### Note

- (1) Confirm “+” and “-” polarity first. If the polarity is opposite, sensor cannot operate.
- (2) Do not supply power voltage more than the specification. It will cause breakdown on pickup.
- (3) Shield wire (Silver) connect on minus side of power supply.
- (4) In case of using any receiver such as logger with 1-5V, connect 250Ω resistance with it in parallel.

× ㊦

Fig.7-2 is just an example of wiring. For details on connecting pickup to the receiver (Logger/PLC/DCS etc.), refer to the instruction manual of the receiver.

Also, check the instruction manual of the receiver for how to connect pickup to the receiver that supports connection of the 2-wire transmitter.

We cannot provide individual answers regarding how to connect to the receiver.



### 7-3-2. Wiring Method of VP-421

Connect VP-421 according to the example shown in Fig.7-3 below.

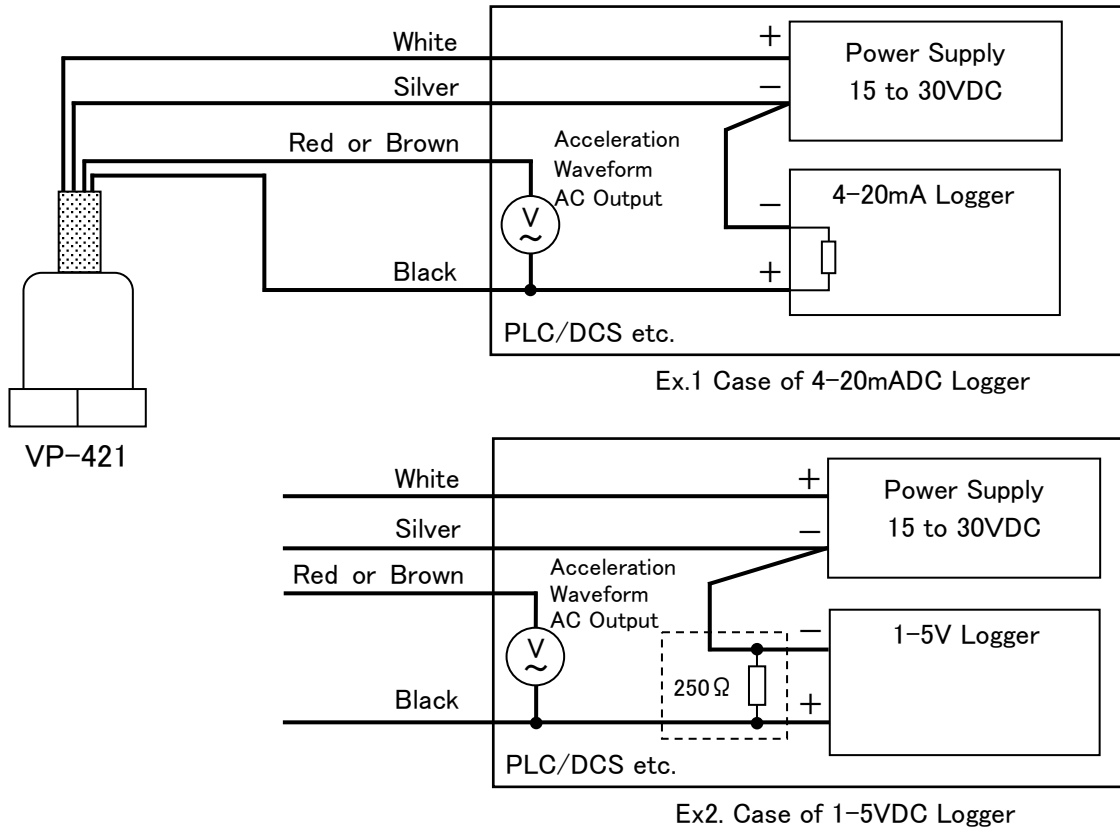


Fig.7-3 Example of Wiring Method about VP-421

#### Note

- (1) Confirm “+” and “-” polarity first. If the polarity is opposite, sensor cannot operate.
- (2) Do not supply power voltage more than the specification. It will cause breakdown on pickup.
- (3) Shield wire (Silver) connect on minus side of power supply.
- (4) In case of using any receiver such as logger with 1-5V, connect 250Ω resistance with it in parallel.

× ㊦

Fig.7-3 is just an example of wiring. For details on connecting pickup to the receiver (Logger/PLC/DCS etc.), refer to the instruction manual of the receiver.

Also, check the instruction manual of the receiver for how to connect pickup to the receiver that supports connection of the 2-wire transmitter.

We cannot provide individual answers regarding how to connect to the receiver.



## 8. Handling precautions

### **Caution**

- (1) Avoid moving pickup during vibration measurement. When moving, turn off power supply to converter before moving.
- (2) Use a DC power supply for this product and use a stable power supply with little external noise (noise surge pulse).

### **Note**

When storing this product for a long period of time, avoid places exposed to direct sunlight, high humidity, and dusty places, and store it in a place within the operating temperature and humidity range.

#### Memo

When disposing of this product, dispose of it as industrial waste.

## 9. Warranty

If this product has the fault caused by the responsibility of IMV as the defect under production and material during warranty period, we will repair or replace free of charge.

In this case, it is limited to the warranty period. The warranty period of this product is one year from the date of delivery. However, even within the warranty period, repairs will be charged in the following cases.

- (1) Any damage and breakdown caused by natural disaster such as fire, earthquake, flood, lightning damage.
- (2) Any transporting, moving, or dropping which does not related us after finishing our delivery.
- (3) Any error operation, unusual power supply input, and the fault caused by disassembling/repairing/modifying by customer.