



Vibration Transmitter
VM-90D Series
Specifications

Model: VM-90DA
VM-90DV
VM-90DVL

Manufacture: **IMV CORPORATION**
Specification No.: TVE-5-3509
Total page: 20



History of Drawing

- Rev0 21st Sep, 2001 Edits TVE-5-3437 as TVE-5-3509 corresponding to “SER. No. D0201～”
due to the partial modification in specifications.
(Addition of Set, Stop and Press Switch, Improvement of logger function)
- Rev1 30th June, 2005 It reviews and apart is corrected.
- Rev2 10th Feb, 2007 Renewal of certification number of barrier.
- Rev3 12th Apr, 2016 It reviews and change of layout.



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Standard Specifications

1. Introduction

VM-90D series are designed to monitor the vibration at all times for the safety check, detection of abnormal operation, fatigue phenomenon and maintenance of rotational machines such as turbines and blowers etc. under running.

The vibration pickup detects the vibration of turbine or blower etc. The detected signal is sent to vibration monitor and processed. Alarm circuit in it compares the signal with the preset alarm level and alarm relay operates when the signal level exceeds the preset level.

VM-90D series enables to measure the vibration at multi-mode with the use of DSP in signal processing circuit and to collect the customized and logged data with the connection of computer via communication cable. The ideal measuring condition to the measured object can be set and more accurate vibration measurement is possible.

2. Features

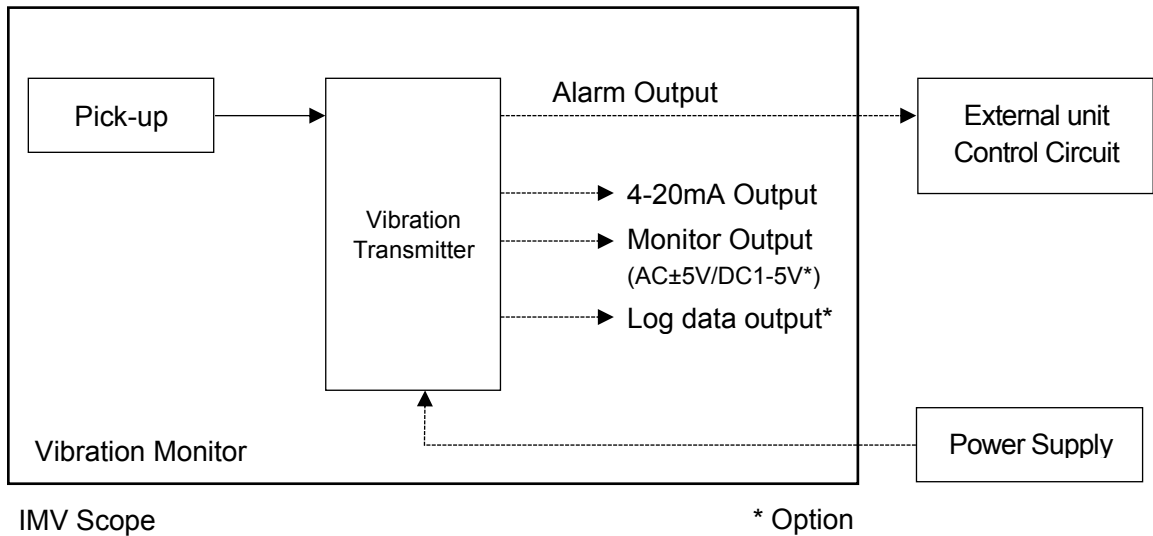
- High reliability by electronic method
- Vibration measurement by the selection of measuring mode and range
 - VM-90DA: Acceleration/Velocity/H-function/H-function CF*
 - VM-90DV • VM-90DVL : Velocity/Displacement
- 4-20mA Output
- ± 5 VAC monitor output
- Alarm 1-step output
- Customized function (Option)
 - Logger function by CSV data format
 - 1-5VDC monitor output setting
 - 4-20mA output response setting

* H-function is envelope detection of 2k to 15kHz. H-function CF is crest factor (peak/rms) of H-function.

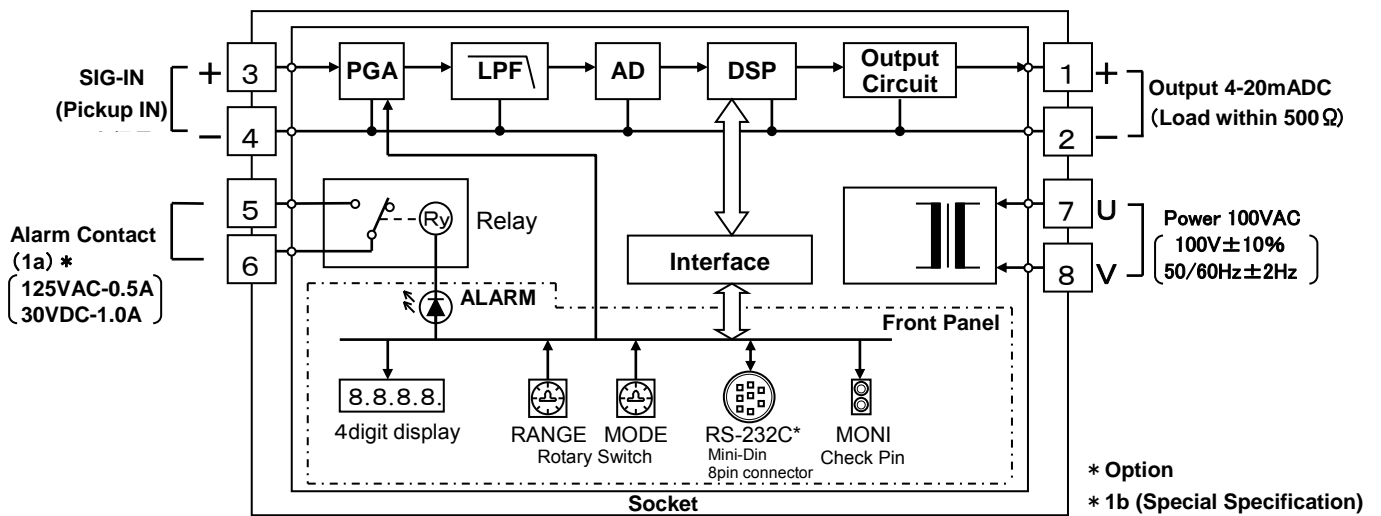


3. Composition

3-1. General Composition



3-2. Block Diagram



⚠ If the pickup fitting position indicates the vibration level at no vibration, it seems to be subjected to the induction noise as power hum.
In this case, it may be necessary to prepare the earth line externally to ground the “-” terminal (4-pin) of signal via condenser (0.1μ approx.).

(Please ask IMV in detail.)



3-3. System Composition

(1) Main composition

Item	Model or dimensions	Q'ty	Remark
Vibration Transmitter	Select among below VM-90DA VM-90DV VM-90DVL	1	Model is determinate by the used pick-up.
Pick-up	Select among below VP-A51IW (*1) VP-A4345I (*1, *4) VP-90VC/VD (*2) VP-91VC/VD (*3) VP-92VC/VD (*3)	1	*1 : for VM-90DA *2 : for VM-90DV *3 : for VM-90DVL *4 : intrinsically safe explosion Barrier (MTL-728+) is required.
Pick-up Cable x m	RG-58A/U/x/TF	1	for VM-90DA with TNC connector and gum cap

(2) Option

Item	Model or dimensions	Q'ty	Remark
Customized function		1	
Communication Cable	RS-232 Cable 2m	1	Mini-Din 8pin to D-sub 9pin
Check pin for monitor output		1	2pcs/set



4. Specifications

4-1. General Specifications

Sort	Item	Specifications	
Signal output	Converted Output	4-20mA 1-output (Time constant 3 sec *1)	
	Monitor Output	±5VAC FS±5% (from “MONI” Pin with front Panel) *3	
Alarm Output	Alarm Contact	1-step 1a contact 125VAC-0.5A, 30VDC-1A (at resistance load)	
	Alarm Setting Range	Any setting of 0 to 100% for full scale range (1% step)	
	Alarm Operation	Operation at the over preset level (automatic reset) Alarm delay time 5 seconds (any setting of 3 to 99 sec)	
Display Function	Panel Indicator	Red 7-segment LED (4-digit display)	
		Vibration Value	5-step switch over display by mode setting Flickers at 120% of range full scale
		CAL Output Value (mA)	4-20mA
		Alarm Setting (%)	0 to 100% to full scale *2
		Pick-up Sensitivity (%)	80 to 120% to reference sensitivity
Ambient Condition	Temperature Range	-5 to 55 °C	
	Humidity Range	30 to 90%RH (Not due condensation)	
	Power Supply	100VAC±10% 50/60Hz±2Hz	
	Consumed Power	10VA or less	
Other	Mounting	Wall or mounting with DIN rail (DIN rail contact attachable)	
	Terminal board	M3.5 screw on rear panel	
	Case Material	Resin	
	Dimensions	W50×H80×D127mm	
	Weight	300g approx.	

*1 : Changeable by option

*2 : With setting to 0%, alarm output function will be invalid.

*3 : It uses it only for the easy check.

(When accelerometer is used, it is effective only in the acceleration mode.)

(When velocity type pick-up is used, it is effective only in the velocity mode.)



4-2. Specifications of Vibration Transmitter

(1) VM-90DA (for Accelerometer with build-in pre-amplifier)

Measuring Mode	Item	Specifications
Acceleration *	Measuring Range	10, 20, 50, 100 or 200 [m/s ² rms]
	Frequency Range	10Hz to 4kHz ±1dB 10Hz to 10kHz +1dB, -3dB
Velocity *	Measuring Range	5, 10, 20, 50 or 100 [mm/s rms]
	Frequency Range	10Hz to 1kHz +1dB, -2dB
H-function *	Measuring Range	10, 20, 50, 100 or 200 [m/s ² rms]
	Frequency Range	DC to 1kHz (Envelop detection for 2kHz to 15kHz)
H-function CF	Measuring Range	5, 10, 20, 50 or 100
	Frequency Range	DC to 1kHz (peak/rms in H-function)

(2) VM-90DV (for Velocity pick-up of medium frequency)

Measuring Mode	Item	Specifications
Velocity *	Measuring Range	5, 10, 20, 50 or 100 [mm/s rms]
	Frequency Range	10Hz to 1kHz ±1dB
Displacement *	Measuring Range	50, 100, 200, 500 or 1000 [μm ^{P-P}]
	Frequency Range	10 to 500Hz ±1dB

(3) VM-90DVL (for Velocity pick-up of low frequency)

Measuring Mode	Item	Specifications
Velocity *	Measuring Range	5, 10, 20, 50 or 100 [mm/s rms]
	Frequency Range	5 to 500Hz ±1dB
Displacement *	Measuring Range	50, 100, 200, 500, 1000 [μm ^{P-P}]
	Frequency Range	5 to 500Hz ±1dB

* Selectable Measuring mode by MODE switch. Measurable up to range over 20%. Error between range is within ±1%.

Selection of Measuring Range and Mode

Model VM-90DA		RANGE Switch									
		0	1	2	3	4	5	6	7	8	9
MODE Switch	0 (ACC: m/s ²)	10	20	50	100	200	4mA	CAL LEVEL *	ALARM SET *	ALARM DELAY *	SETTING VALUE DISPLAY
	1 (VEL: mm/s)	5	10	20	50	100					
	2 (H: m/s ²)	10	20	50	100	200					
	3 (H: C.F.)	5	10	20	50	100					
	4 to 8 (No use)										
9 (Sensitivity)	Pick-up Sensitivity *										

Model VM-90DV / VM-90DVL		RANGE Switch									
		0	1	2	3	4	5	6	7	8	9
MODE Switch	0 (VEL: mm/s)	10	20	50	100	200	4mA	CAL LEVEL *	ALARM SET *	ALARM DELAY *	SETTING VALUE DISPLAY
	1 (DISP: μm ^{P-P})	50	100	200	500	1000					
	2 to 8 (No use)										
	9 (Sensitivity)	Pick-up Sensitivity *									

* Rotate Level Volume



4-3. Specifications of Option

Function	Item	Specifications	
Customized Function • Customized Software • Communication Cable	Logger Setting *1	Logging Start Setting Value *1	1 to 99% any setting of range of full scale (Hysteresis is fixed at 5% of setting value) *2
		Log Start	Selected 1) Continuous logging 2) Logging over preset log start value
		Logging Rate	Select among 1, 10, 60 sec, 10, 60min
		Logging Mode	Selected 1) 1024 point/1-block ×10 block 2) Continuous (Max. 10240 points)
		Logging Data Down load	Selected saved log data from the list and download in CSV format
	Monitor Output Response Setting	Select ±5VAC or 1-5VDC	
	4-20mA Output Response Setting	Selected output response of 4-20mA from 0 to 10 sec.	

*1: It is effective in case Log start condition is 2). When the signal lower than preset log start level is detected, the logging completes and is ready for till the detection of next log start setting level.

*2: 0% setting is ineffective for logger function.

See another Instruction manual for Customized function.



Figure-1. Outer Dimension of Vibration Transmitter

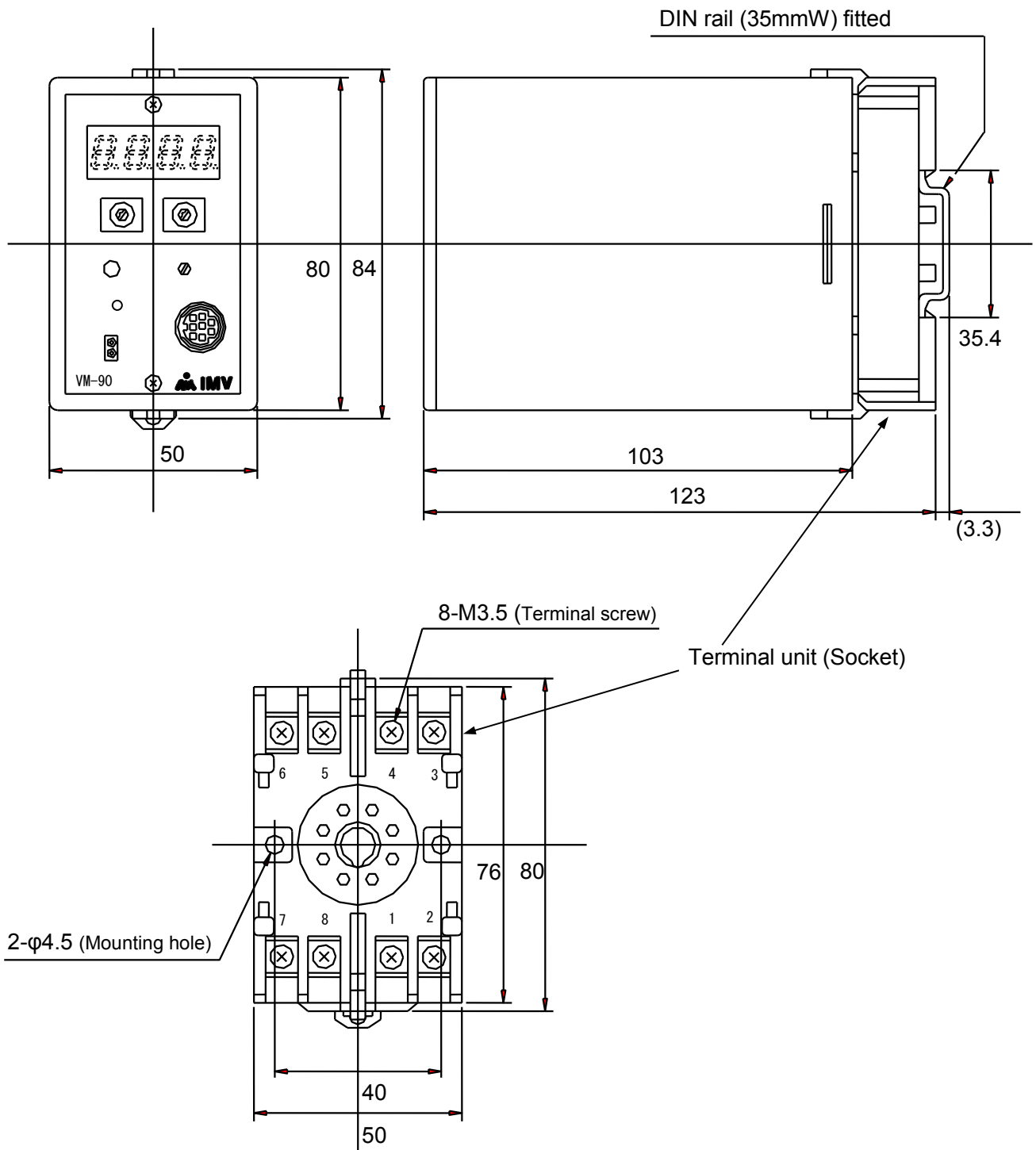
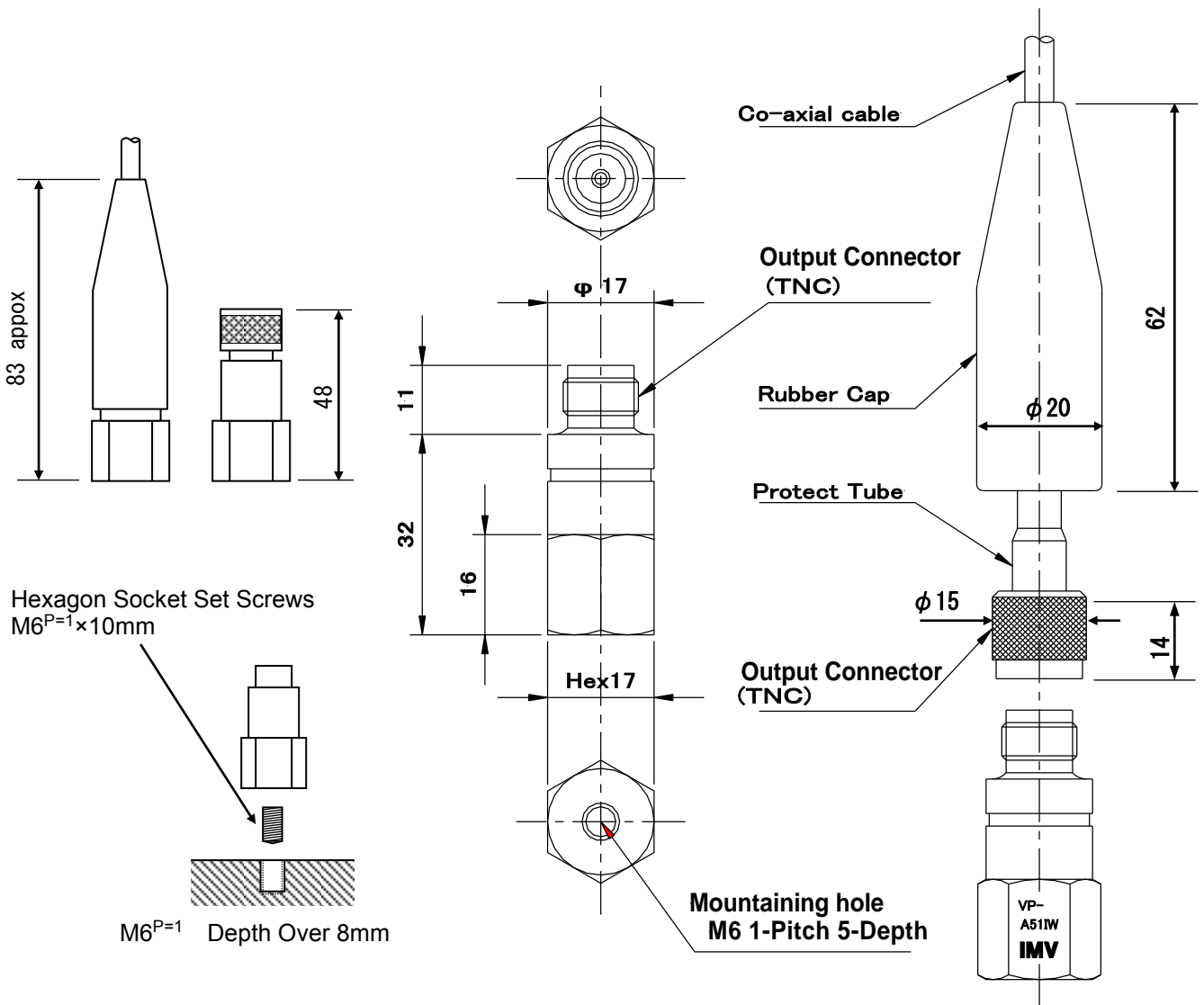




Figure-2. Specification of Acceleration (for VM-90DA)

Model:	VP-A511W
Detecting Method:	Piezo-electric sharing (Build-in pre-amplifier)
Resonance Frequency:	Circa 30,000Hz
Measuring Frequency Range:	5 to 10,000Hz ± 3 dB
Voltage Sensitivity:	5mV/(m/s ²) $\pm 10\%$
Maximum Allowable Acceleration:	5,000m/s ²
Maximum Measuring Acceleration:	900m/s ²
Power Supply:	Constant current 0.5 to 10mA, DC 12 to 24V
Output Impedance:	50 Ω or less
Ambient Temperature:	-30 to +110 °C
Structure:	Isolative housing and Waterproof
Cable Connector:	5.0-diameter coaxial cable RG-58A/U with TNC Connector
Weight:	Approximately 50g
Housing Material:	Stainless Steel (SUS303)
Dimension:	See below figure

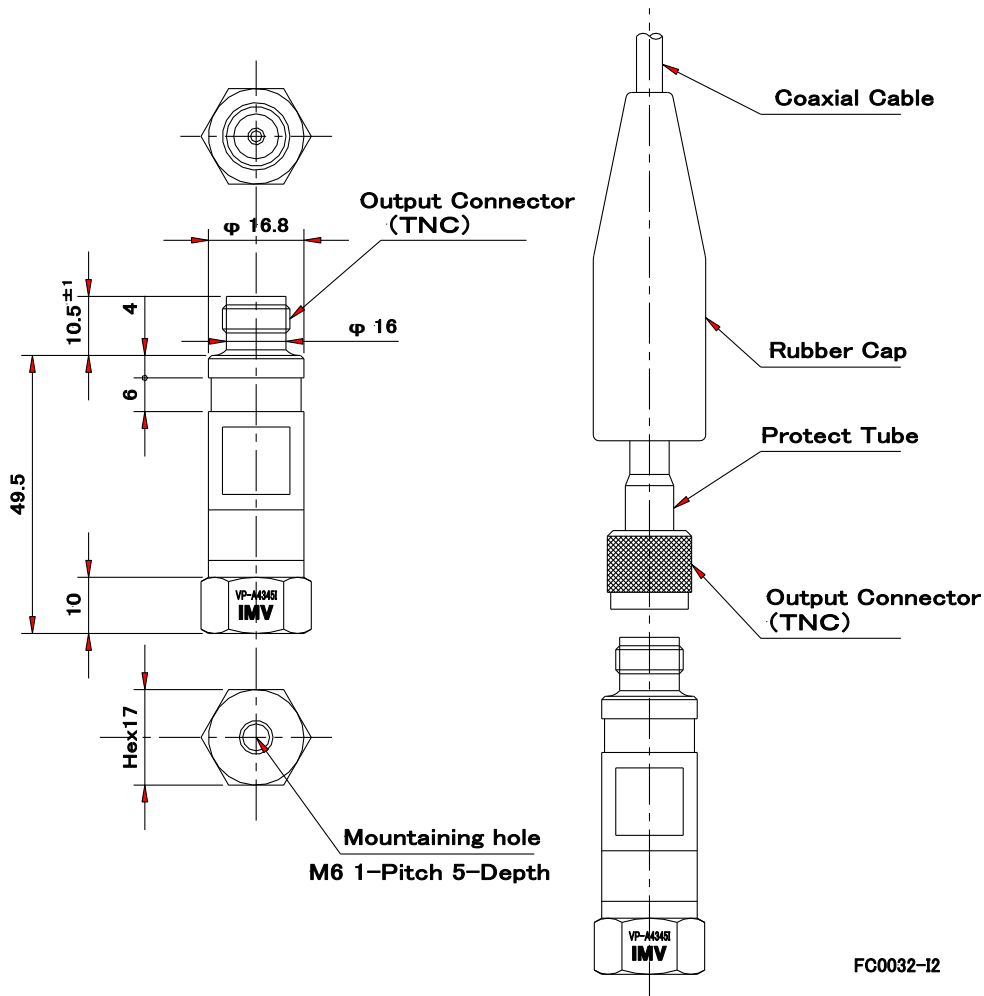


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Figure-3. Specification of Acceleration (for VM-90DA)

Model:	VP-A4345I
Detecting Method:	Piezo-electric sharing (Build-in pre-amplifier)
Resonance Frequency:	Circa 25 kHz
Measuring Frequency Range:	5Hz to 15kHz
Voltage Sensitivity:	5mV/(m/s ²) +5,-15% at 1 kHz
Connector:	TNC Connector
Power supply:	Constant current 0.5 to 5.0mA, DC 15 to 24V
Output impedance:	100Ω or less
Maximum Measuring Acceleration:	800m/s ²
Maximum Allowable Acceleration:	5,000m/s ²
Ambient Temperature:	-20 to +80°C (60°C for Intrinsically safe requirements)
Structure:	Intrinsically safe explosion-proofing IIBT4 Approved number TC17029
Insulate housing (with MTL-728+)	
Cable capacitance:	0.048μF or less
Cable inductance:	2.75mH or less
Weight:	approximately 70g
Housing material:	stainless steel (SUS303)
Dimension:	17(Hex) × 60(H)



FC0032-12



Specification of Safety Barrier

Model:	MTL-728+
Name:	Safety Barrier (for 4 to 20mA)
Non-safe Circuit	
Allowable voltage:	V_{max} AC 250 V DC 250 V
Intrinsically Safe Circuit	
Allowable Current:	I_{cc} 93mA
Allowable Voltage:	V_{max} 28V
Allowable Power:	P_{max} 0.65W
Working Current and Voltage:	DC 50mA, DC 25.5V
Explosion Class:	II C Approved number TC13185
Ambient Temperature:	60°C
Dimension:	14.2×61.5×93.5mm (See figure below)
Weight:	125g

Terminal	About Cable Connection	Connectable Cable
①(SIG)	Strip and insert	Coaxial Cable(VM side) Side of Safe area
②(COM)	Shield line (worked to insert)	
③(SIG)	Strip and insert	Coaxial Cable(PU side) Side of Hazardous area
④(COM)	Shield line (worked to insert)	
⑤Earth Terminal	Fasten with the nut	Earth Plate etc.

Safety Barrier MTL-728+

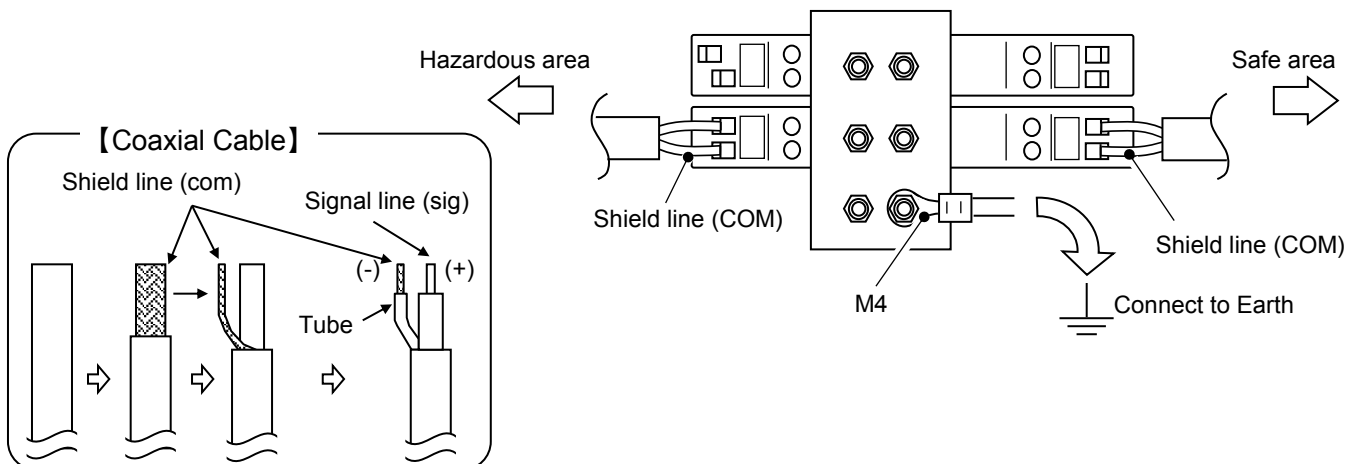
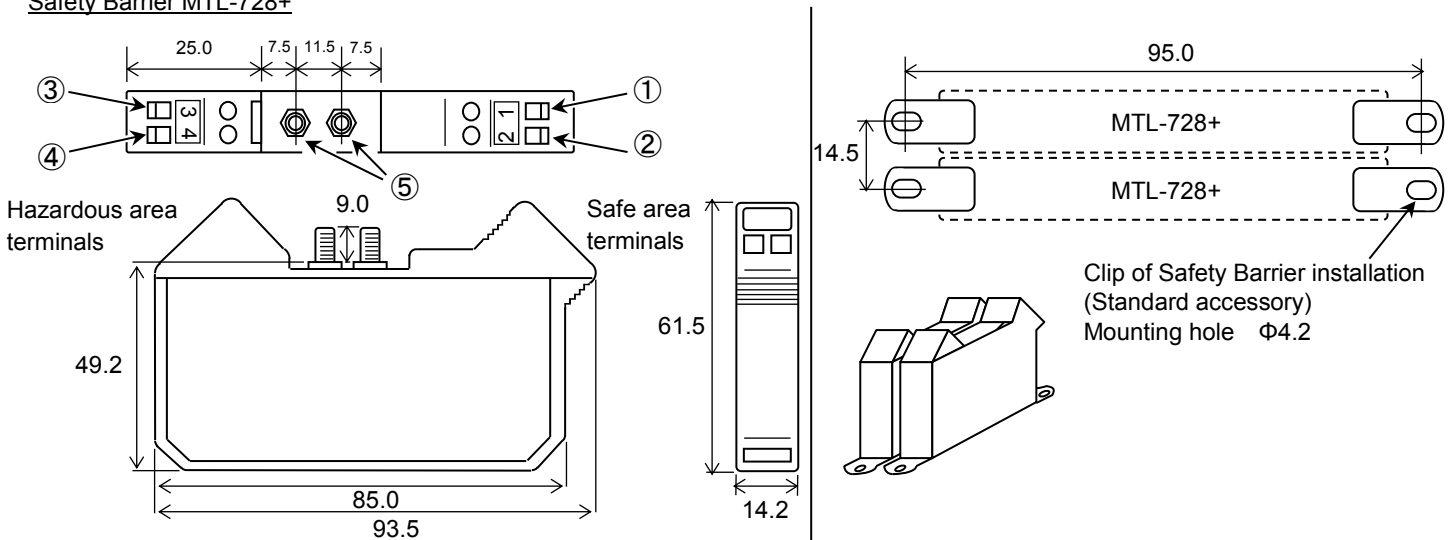
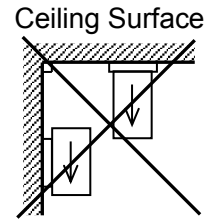


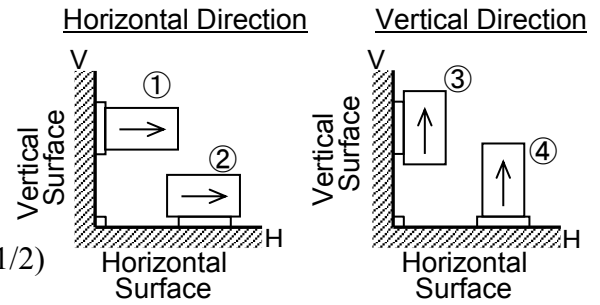


Figure-4. Specifications of Electrodynamic Velocity Pick-up (for VM-90DV)

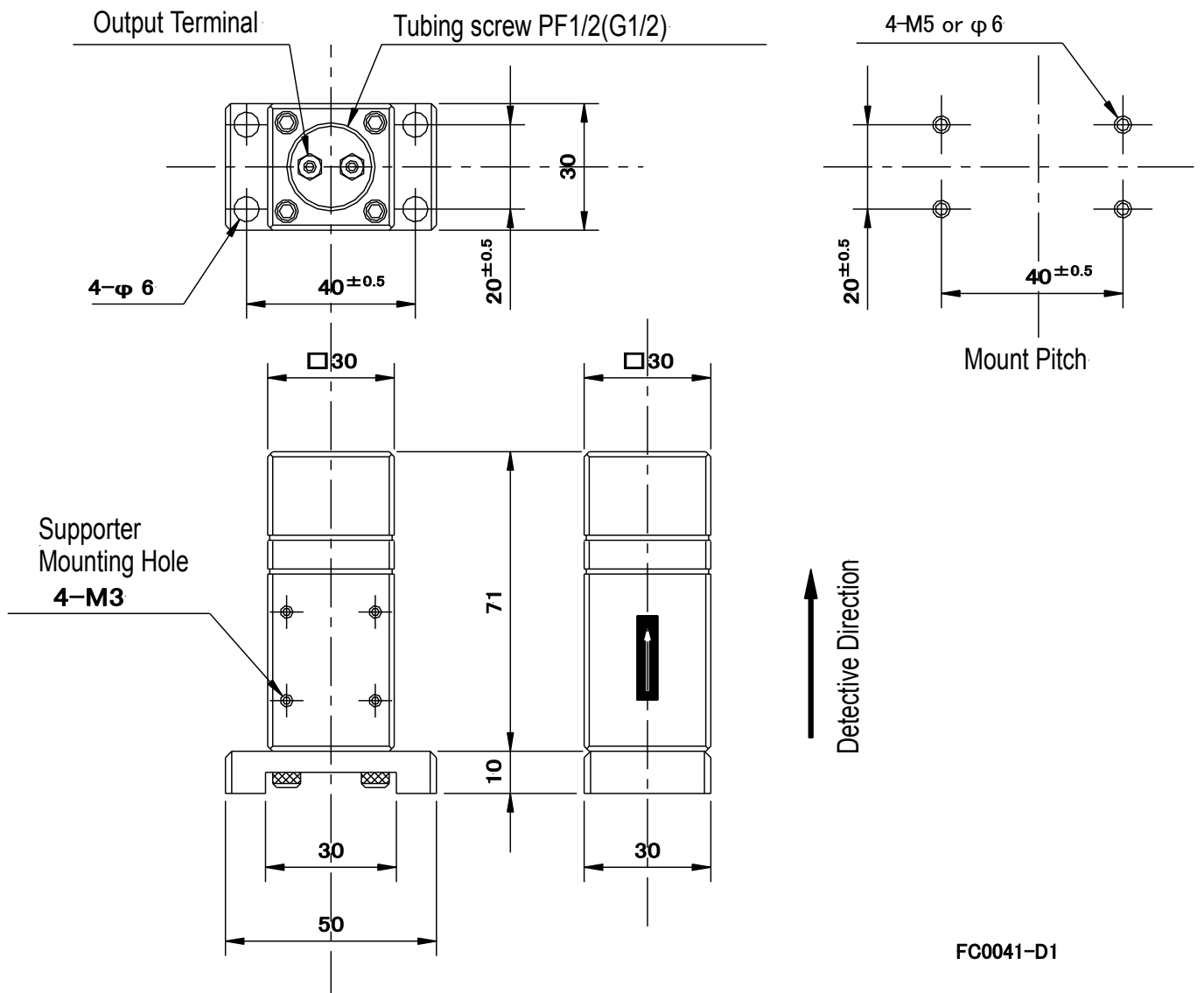
Model:	VP-90VC
Detecting Method:	Electrodynamic velocity type
Detecting Direction:	Horizontal or Vertical 1 direction
Natural Frequency:	14Hz
Sensitivity:	10mV/(mm/s)
Max. Allowable Acceleration:	100m/s ²
Max. Measurable Displacement:	1000μm ^{P-P}
Ambient Temperature:	0 to 80°C
Structure:	Drip-proof
Case Material:	Aluminum
Surface Finish:	Black alumite
Weight:	200g
Suitable Cable:	2-core shield cable
Cable Leading:	Tubing Screw G1/2(PF1/2)
Outside View:	See below figure



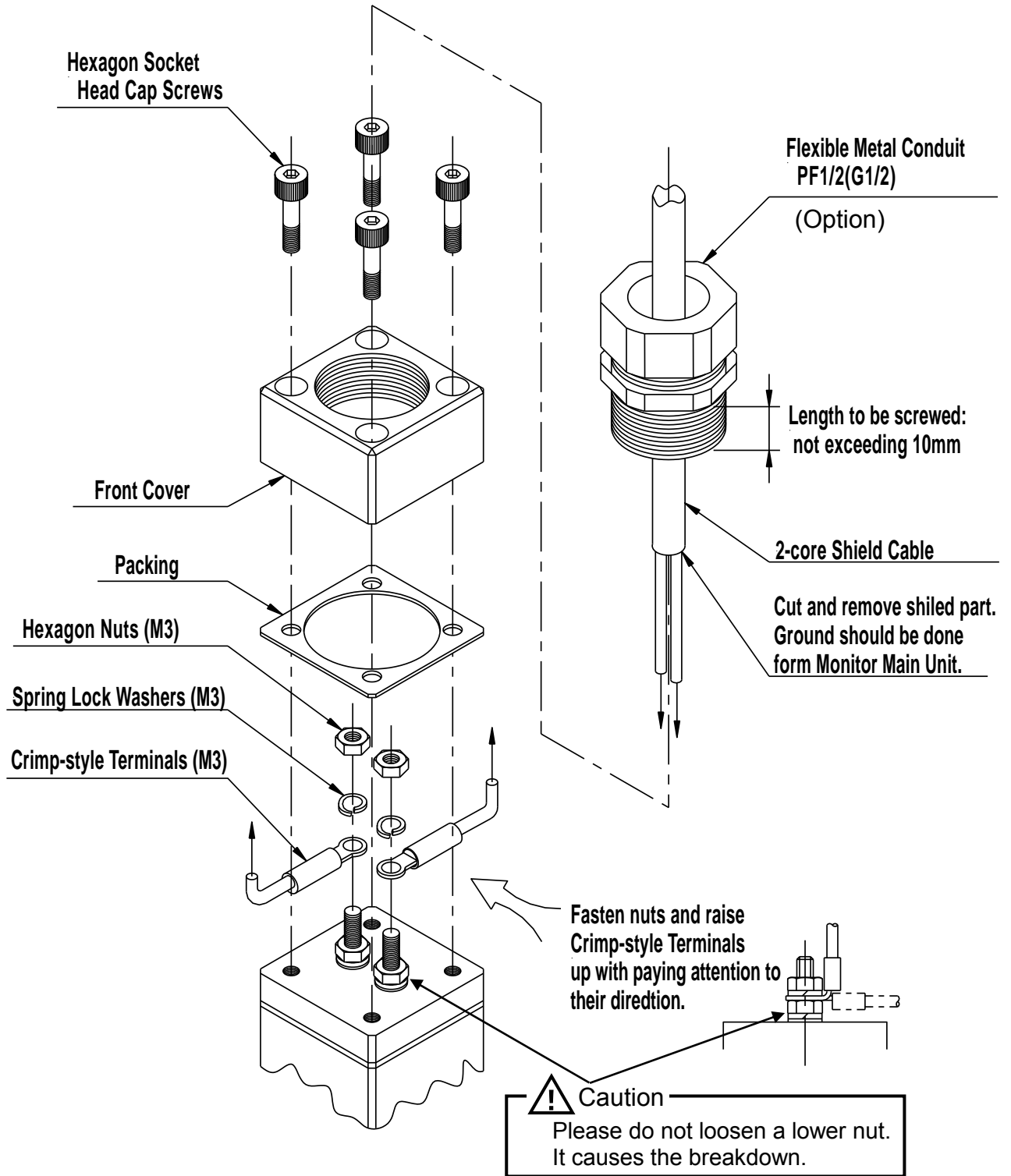
It is not possible to set it up as shown in figure above.



【fig. Detecting Direction and Mounting Direction】



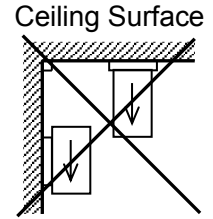
FC0041-D1



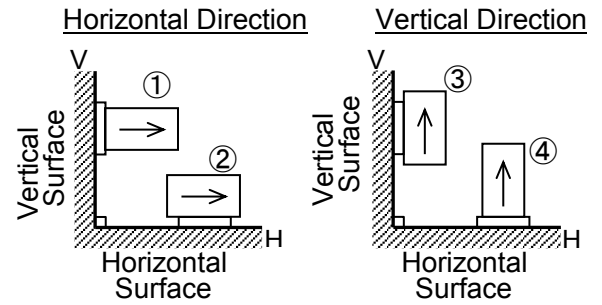
FC0030-M1



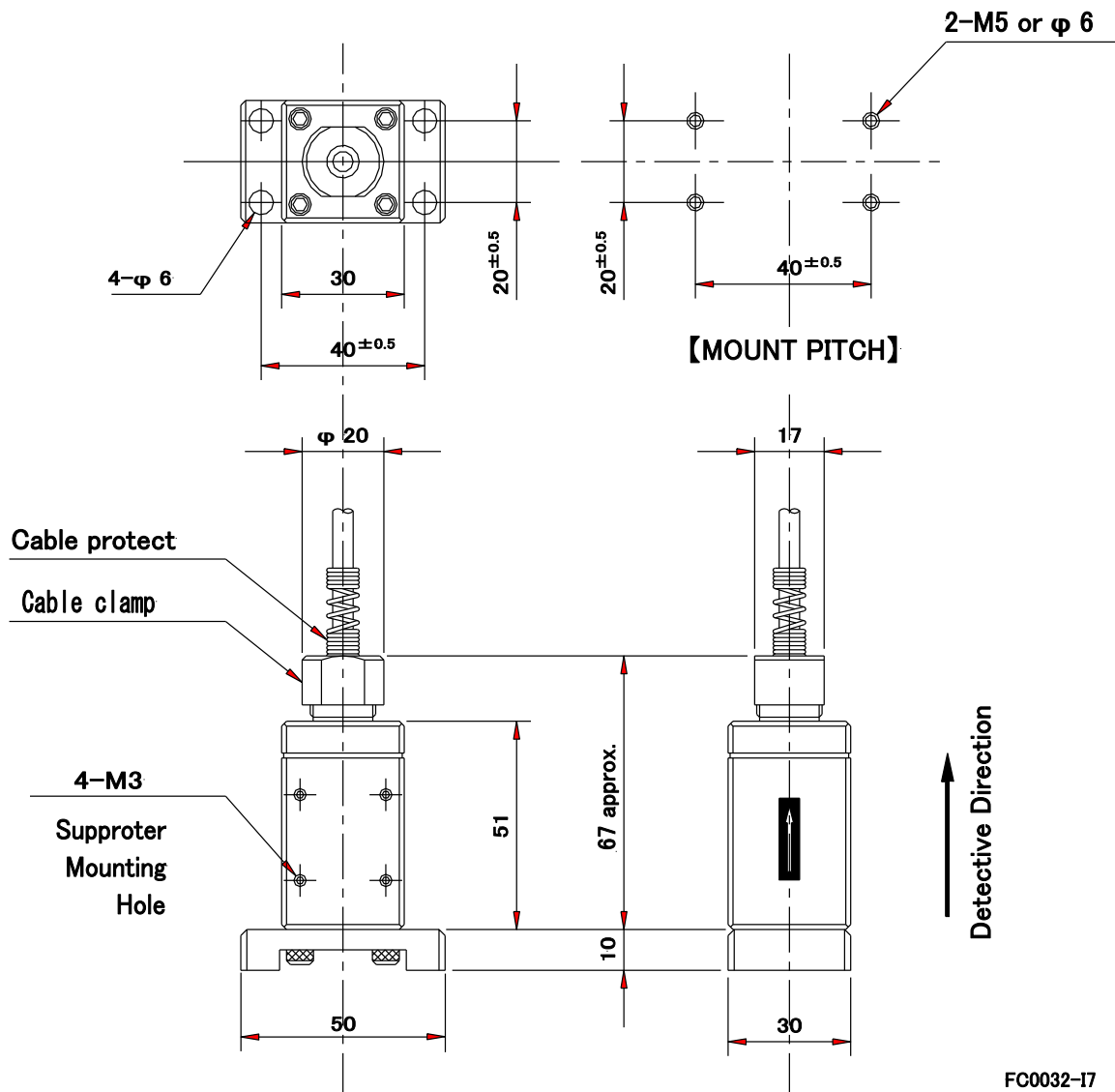
Model: VP-90VD
 Detecting Method: Electrodynamic velocity type
 Detecting Direction: Horizontal or Vertical 1 direction
 Natural Frequency: 14Hz
 Sensitivity: 10mV/(mm/s)
 Max. Allowable Acceleration: 100m/s²
 Max. Measurable Displacement: 1000μm^{P-P}
 Ambient Temperature: 0 to 80°C
 Structure: Drip-proof
 Case Material: Aluminum
 Surface Finish: Black alumite
 Weight: 200g
 Suitable Cable: 2-core shield cable
 Cable Leading: Clamp direct leading
 Outside View: See below figure



It is not possible to set it up as shown in figure above.



【fig. Detecting Direction and Mounting Direction】

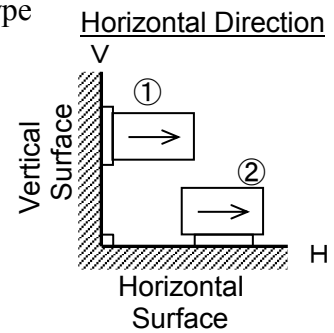


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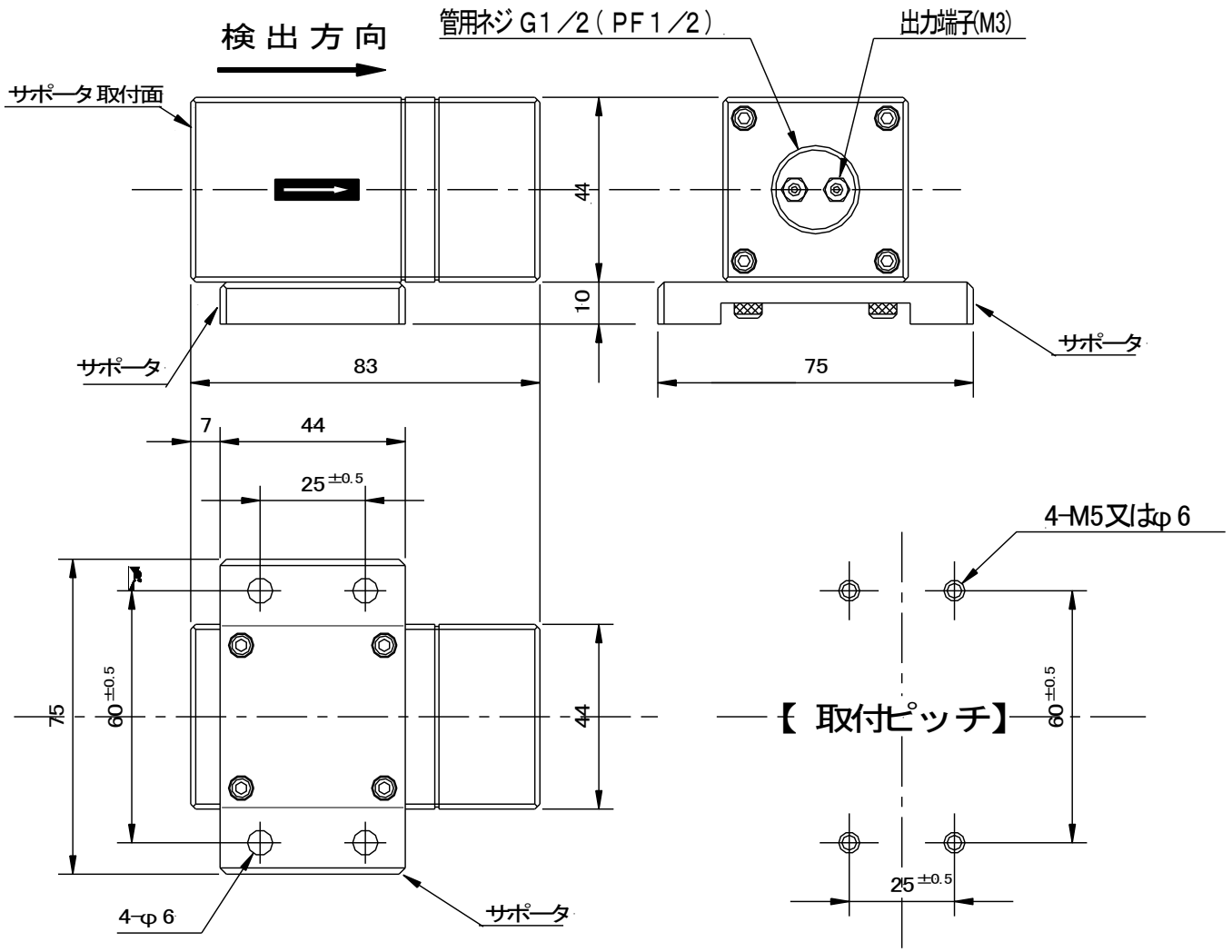


Figure-5. Specifications of Electrodynamic Velocity Pick-up (for VM-90DVL)

Model:	VP-91VC
Detecting Method:	Electrodynamic velocity type
Detecting Direction:	Horizontal 1 direction
Natural Frequency:	4.5Hz
Sensitivity:	17.5mV/(mm/s)
Max. Allowable Acceleration:	30m/s ²
Max. Measurable Displacement:	1000μm ^{P-P}
Ambient Temperature:	0 to 65°C
Structure:	Drip-proof
Case Material:	Aluminum
Surface Finish:	Black alumite
Weight:	500g
Suitable Cable:	2-core shield cable
Cable Leading:	Tubing Screw G1/2(PF1/2)
Outside View:	See below figure

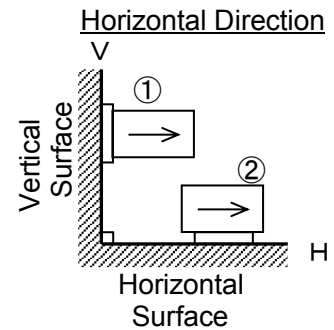


【fig. Detecting Direction and Mounting Direction】

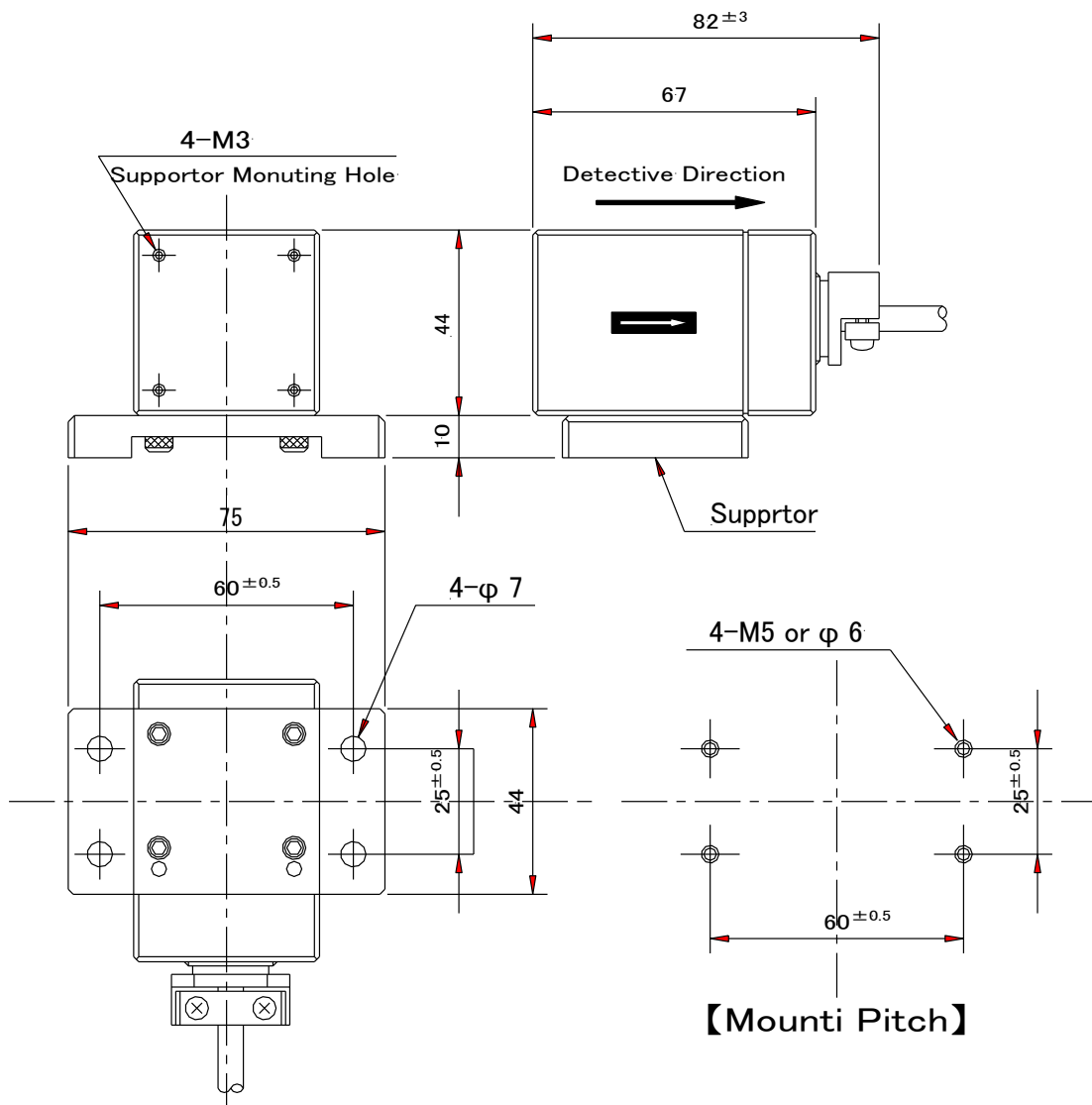




Model:	VP-91VD
Detecting Method:	Electrodynamic velocity type
Detecting Direction:	Horizontal 1 direction
Natural Frequency:	4.5Hz
Sensitivity:	17.5mV/(mm/s)
Max. Allowable Acceleration:	30m/s ²
Max. Measurable Displacement:	1000μm ^{P-P}
Ambient Temperature:	0 to 65°C
Structure:	Drip-proof
Case Material:	Aluminum
Surface Finish:	Black alumite
Weight:	500g
Suitable Cable:	2-core shield cable
Cable Leading:	Clamp direct leading
Outside View:	See below figure



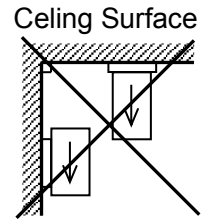
【fig. Detecting Direction and Mounting Direction】



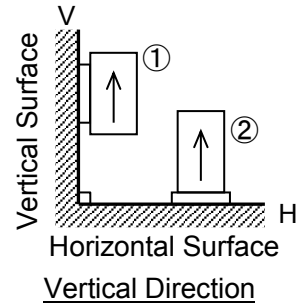
【Mounti Pitch】



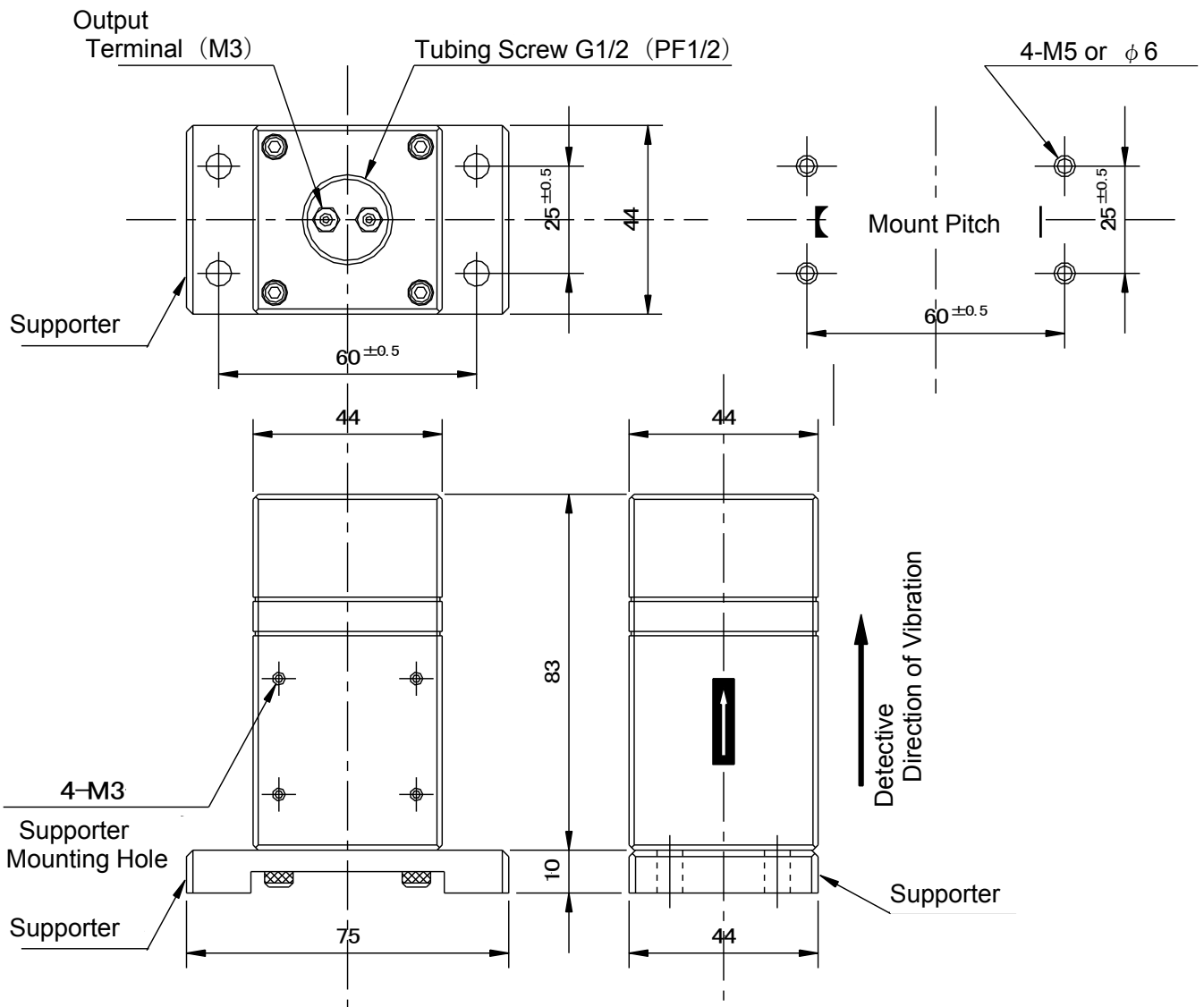
Model: VP-92VC
 Detecting Method: Electrodynamic velocity type
 Detecting Direction: Vertical 1 direction
 Natural Frequency: 4.5Hz
 Sensitivity: 17.5mV/(mm/s)
 Max. Allowable Acceleration: 30m/s²
 Max. Measurable Displacement: 1000μm^{P-P}
 Ambient Temperature: 0 to 65°C
 Structure: Drip-proof
 Case Material: Aluminum
 Surface Finish: Black alumite
 Weight: 500g
 Suitable Cable: 2-core shield cable
 Cable Leading: Tubing Screw G1/2(PF1/2)
 Outside View: See below figure



It is not possible to set it up as shown in figure above.

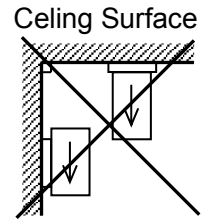


【fig. Detecting Direction and Mounting Direction】

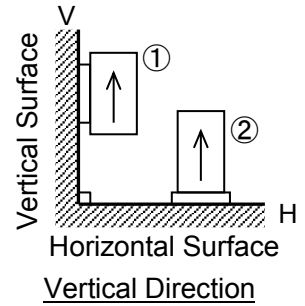




Model:	VP-92VD
Detecting Method:	Electrodynamic velocity type
Detecting Direction:	Vertical 1 direction
Natural Frequency:	4.5Hz
Sensitivity:	17.5mV/(mm/s)
Max. Allowable Acceleration:	30m/s ²
Max. Measurable Displacement:	1000μm ^{P-P}
Ambient Temperature:	0 to 65°C
Structure:	Drip-proof
Case Material:	Aluminum
Surface Finish:	Black alumite
Weight:	500g
Suitable Cable:	2-core shield cable
Cable Leading:	Clamp direct leading
Outside View:	See below figure



It is not possible to set it up as shown in figure above.



【fig. Detecting Direction and Mounting Direction】

