# Signal Conditioner Socket VM-21G

## Specification

<table>
<thead>
<tr>
<th>Model Code No.</th>
<th>VM-21G Signal Conditioner Socket</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminal Screw Size</td>
<td>M3</td>
</tr>
<tr>
<td>Number of Mountable Signal Conditioners</td>
<td>1</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>0°C to 60°C (32°F to 140°F)</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>10% to 90% RH (no condensation)</td>
</tr>
<tr>
<td>Installation</td>
<td>DIN rail, wall-mounted</td>
</tr>
<tr>
<td>External Dimensions</td>
<td>Width: 29.5 mm, Height: 72 mm, Depth: 30 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>Approx. 50g (0.11 lb)</td>
</tr>
</tbody>
</table>

For Marking: Refer to SHINWA Sensor Technology, Inc. (specified in a separate document).

### Terminal Arrangement

![Terminal Arrangement Diagram]

**VM-21G Series**

(VIBRATION, THRUST, REVOLUTION, LVDT, TEMPERATURE, PROCESS)

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SHINKAWA Intelligent Conditioners. The Smart

The latest technology for maintaining safety in large industrial complexes. Up to now, plant maintenance was performed according to the TBM (Time Based Maintenance) system, that is, a preventive maintenance schedule was set up based on the MTBF (Mean Time Between Failures) obtained by analyzing the data of past failures.

However, examined from the aspect of cost, this method results in long maintenance cycles as well as reduced productivity and increased maintenance costs due to plant stoppages. And from the aspect of safety, the potential of an unforeseen breakdown touching off a major accident should be kept in mind. The CBM (Condition Based Maintenance) system is a new maintenance system that satisfies the difference requirements for plant safety and efficiency and has rapidly been gaining popularity in recent years.

In this system, trouble is detected early by continuous monitoring of the condition of the equipment, i.e., maintenance can be performed before trouble actually occurs. Other typical concepts aimed at unmanned maintenance and reduction of maintenance costs include centralized monitoring through continuous monitoring systems, DCS (Distributed Control System) and different means of data acquisition.

The VM-21 series, still more compact and fully geared to satisfy the requirements of engineers making the move toward continuous monitoring systems. A new trendsetter in plant maintenance.

### Typical Application

- **Acceleration Transducer**
- **Fan/Blower**
- **Pump**
- **Compressor**
- **VM-21B Acceleration input Vibration Signal Conditioner**
- **PLC**
- **Expert System**

### Model Code No. (Ordering Information)

#### VM-21E

<table>
<thead>
<tr>
<th>Input Voltage</th>
<th>Output Voltage</th>
<th>Insulation Voltage</th>
<th>Operating Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>24VDC</td>
<td>1 to 5VDC, 4 to 20mA</td>
<td>2,000VDC</td>
<td>-5 to 55°C</td>
</tr>
<tr>
<td>100-240VAC/DC</td>
<td>1 to 5VDC, 4 to 20mA</td>
<td>2,000VDC</td>
<td>-5 to 55°C</td>
</tr>
</tbody>
</table>

#### VM-31E

<table>
<thead>
<tr>
<th>Input Voltage</th>
<th>Output Voltage</th>
<th>Insulation Voltage</th>
<th>Operating Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>24VDC</td>
<td>1 to 5VDC, 4 to 20mA</td>
<td>2,000VDC</td>
<td>-5 to 55°C</td>
</tr>
<tr>
<td>100-240VAC/DC</td>
<td>1 to 5VDC, 4 to 20mA</td>
<td>2,000VDC</td>
<td>-5 to 55°C</td>
</tr>
</tbody>
</table>

### Specification

- **Model**
- **Input Range**
- **Input Resistance**
- **Output (isolated)**
- **I/O Conversion Accuracy**
- **Response Time**
- **Reception Resistance**
- **Supply Permissible Voltage**
- **Power Consumption**
- **Insulation Resistance**
- **Withstanding Voltage**
- **Operating Temperature**
- **Relative Humidity**
- **Casing Material (color)**
- **Wight**
- **CE Marking**

### Block Diagram

#### VM-21E Process

- **Input**
- **Output**
- **Isolation circuit**
- **Power supply circuit**

### Notes

1. The output mode is not changeable on the field.
2. Specifications, outline drawings and other written information can be changed without notice.
### Block Diagram

#### VM-21P  3-Wire LVDT (LS Series)

![Diagram of VM-21P 3-Wire LVDT (LS Series)]

#### VM-21D  6-Wire LVDT (LF Series)

![Diagram of VM-21D 6-Wire LVDT (LF Series)]

### Specification

<table>
<thead>
<tr>
<th>Model</th>
<th>VM-21A</th>
<th>VM-21B</th>
<th>VM-21D</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model</strong></td>
<td>Displacement Input Vibration</td>
<td>Velocity Input Vibration</td>
<td>Acceleration Input Vibration</td>
</tr>
<tr>
<td><strong>Input Transducer</strong></td>
<td>24VDC</td>
<td>24VDC</td>
<td>24VDC</td>
</tr>
<tr>
<td><strong>Input Sensitivity</strong></td>
<td>790mV/100m/s²</td>
<td>3.5mV/m/s²</td>
<td>0 to 10g pk</td>
</tr>
<tr>
<td><strong>Input Resistance</strong></td>
<td>50kΩ</td>
<td>50kΩ</td>
<td>50kΩ</td>
</tr>
<tr>
<td><strong>Measuring Range</strong></td>
<td>1 to 5VDC (output resistance: 24VDC)</td>
<td>1 to 5VDC (percentalizable load resistance: 600Ω)</td>
<td>100mV/9.8m/s² pk (100mV/g pk REF.)</td>
</tr>
<tr>
<td><strong>Output (Load)</strong></td>
<td>1 to 0.8VDC</td>
<td>1 to 0.8VDC</td>
<td>1 to 0.8VDC</td>
</tr>
<tr>
<td><strong>Frequency Response</strong></td>
<td>10Hz to 5kHz (3dB), 10Hz to 1kHz (3dB)</td>
<td>10Hz to 2kHz (3dB), 10Hz to 1kHz (3dB)</td>
<td>10Hz to 2kHz (3dB)</td>
</tr>
<tr>
<td><strong>Buffered Output</strong></td>
<td>100mV/9.8m/s² pk (100mV/g pk REF.)</td>
<td>100mV/9.8m/s² pk (100mV/g pk REF.)</td>
<td>100mV/9.8m/s² pk (100mV/g pk REF.)</td>
</tr>
<tr>
<td><strong>Power Supply Output</strong></td>
<td>24VDC</td>
<td>24VDC</td>
<td>24VDC</td>
</tr>
<tr>
<td><strong>Power Consumption</strong></td>
<td>24VDC: 1W, 100% (100% of F.S.)</td>
<td>24VDC: 2W, 100% (100% of F.S.)</td>
<td>24VDC: 1W, 100% (100% of F.S.)</td>
</tr>
<tr>
<td><strong>Operating Temperature</strong></td>
<td>0 to 50°C</td>
<td>0 to 50°C</td>
<td>0 to 50°C</td>
</tr>
<tr>
<td><strong>Relative Humidity</strong></td>
<td>90% (no condensation)</td>
<td>90% (no condensation)</td>
<td>90% (no condensation)</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>Approx. 115g</td>
<td>Approx. 115g</td>
<td>Approx. 115g</td>
</tr>
</tbody>
</table>

---

*Specifications, circuit drawings and other written information can be changed without notice.*
**Model Code No. (Ordering Information)**

**VM-21T**

- **Thrust**

**VM-21R**

- **Revolution**

---

**Block Diagram**

VM-21T

1. **Buffered output**
2. **Input**
3. **Output**
4. **Supply**

VM-21R

1. **Input**
2. **Buffered output**
3. **Output**
4. **Supply**

---

**Specification**

**VM-21T**

- **Thrust**

**VM-21R**

- **Revolution**

---

**Model Code No. (Ordering Information)**

**VM-21T**

- **Thrust**

**VM-21R**

- **Revolution**

---

**Block Diagram**

VM-21T

1. **Buffered output**
2. **Input**
3. **Output**
4. **Supply**

VM-21R

1. **Input**
2. **Buffered output**
3. **Output**
4. **Supply**

---

**Specification**

**VM-21T**

- **Thrust**

**VM-21R**

- **Revolution**

---
### Model Code No. (Ordering Information)

<table>
<thead>
<tr>
<th>Model Code</th>
<th>3-Wire LVDT (LS Series)</th>
<th>6-Wire LVDT (LF Series)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VM-21P</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VM-21A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VM-21B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VM-21C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VM-21D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VM-21E</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VM-21F</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VM-21G</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VM-21H</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### VM-21P 3-Wire LVDT (LS Series)

- **Power supply**: 100 to 240VAC/DC
- **Input LVDT**: Full range of input LVDT
- **Output**: 1 to 5VDC
- **Conditioner socket**: BUF, ZS

#### VM-21D 6-Wire LVDT (LF Series)

- **Power supply**: 100 to 240VAC/DC
- **Input LVDT**: Full range of input LVDT
- **Output**: 1 to 5VDC, 4 to 20mADC
- **Conditioner socket**: BUF, ZS

### Specification

#### Model
- **VM-21P**: 3-Wire LVDT
- **VM-21D**: 6-Wire LVDT

#### Input LVDT
- **Measuring Range**: LS Series: 120mm, LF Series: 150mm
- **Output**: LS Series: 1 to 5VDC, LF Series: 4 to 20mADC

#### Output circuit
- **Power supply**: 24VDC
- **Measuring range**: 1 to 5VDC, 4 to 20mADC

#### Zero/SPAN adjusting
- Can be performed with zero/SPAN adjusting circuit

#### Band pass processing
- Can be performed with band pass processing circuit

#### Rectification circuit
- Can be performed with rectification circuit

#### Isolation circuit
- Can be performed with isolation circuit

#### Constant voltage circuit
- Can be performed with constant voltage circuit

#### Constant current circuit
- Can be performed with constant current circuit

#### Supply circuit
- Can be performed with supply circuit

#### I/O Conversion Accuracy
- ±0.1% of F.S. at 50% RH

#### Response Speed
- 3 Ms after input

#### polarity
- **CAN be changed by wiring**

#### Burst-recovery Function
- **Does not allow loss of power and output***

#### Power Consumption
- LS Series: 0.5W, LF Series: 1.5W

####(Isolation Resistance
- LS Series: 1GΩ at DC500V, LF Series: 1GΩ at DC1000V

#### Mechanical Specifications
- **±0.1% of F.S. at 25°C, ±0.2% of F.S. at 50°C**

#### Mechanical Dimensions
- **±0.1% of F.S. at 25°C, ±0.2% of F.S. at 50°C**

#### Weight
- Approx. 15g (320g max.)

#### CE Marking
- Only as for 24VDC power supply specifications.

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*Abnormal condition:
- When there is an abnormality in the LVDT or signal cable (breaking in LVDT wiring, breaking or short-circuit in signal cable).
- When there is an abnormality in the LVDT excitation output (oscillation has stopped).

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### Block Diagram

#### VM-21K Displacement Input Vibration

- **Buffered output**
- **Input**
- **Output**

#### VM-21U Velocity Input Vibration / VM-21B Acceleration Input Vibration

- **Buffered output**
- **Input**
- **Output**

#### VM-21A Vibration

- **Buffered output**
- **Input**
- **Output**
### Specification

**VM-21F**

#### Power Supply

<table>
<thead>
<tr>
<th>Power supply</th>
<th>Measuring range</th>
<th>Input transducer</th>
<th>Output</th>
<th>Conditioner socket</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 24VDC</td>
<td>± 2 mV to 10VDC</td>
<td>K Type J</td>
<td>± 2 mV</td>
<td>4 to 20mA/DC</td>
</tr>
<tr>
<td>2 100-240VAC/DC</td>
<td>± 2 mV to 10VDC</td>
<td>N Type K</td>
<td>± 2 mV</td>
<td>4 to 20mA/DC</td>
</tr>
</tbody>
</table>

#### Measuring Range

<table>
<thead>
<tr>
<th>Measuring Range</th>
<th>Input Transducer</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>± 2 mV to 10VDC</td>
<td>K Type J</td>
<td>± 2 mV</td>
</tr>
<tr>
<td>± 2 mV to 10VDC</td>
<td>N Type K</td>
<td>± 2 mV</td>
</tr>
</tbody>
</table>

#### I/O Conversions Accuracy

<table>
<thead>
<tr>
<th>I/O Conversion</th>
<th>Accuracy %</th>
</tr>
</thead>
<tbody>
<tr>
<td>± 2 mV to 10VDC</td>
<td>± 0.1 %</td>
</tr>
<tr>
<td>± 2 mV to 10VDC</td>
<td>± 0.1 %</td>
</tr>
</tbody>
</table>

#### Input/Output Current

<table>
<thead>
<tr>
<th>Input/Output Current</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>± 2 mV to 10VDC K</td>
<td>1.10A</td>
</tr>
<tr>
<td>± 2 mV to 10VDC N</td>
<td>1.10A</td>
</tr>
</tbody>
</table>

#### Operating Temperature

<table>
<thead>
<tr>
<th>Operating Temperature</th>
<th>± 0.1 °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>± 2 mV to 10VDC K</td>
<td>25 ± 1°C</td>
</tr>
<tr>
<td>± 2 mV to 10VDC N</td>
<td>25 ± 1°C</td>
</tr>
</tbody>
</table>

#### Relative Humidity

<table>
<thead>
<tr>
<th>Relative Humidity</th>
<th>± 0.1 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>± 2 mV to 10VDC K</td>
<td>95 ± 5%</td>
</tr>
<tr>
<td>± 2 mV to 10VDC N</td>
<td>95 ± 5%</td>
</tr>
</tbody>
</table>

#### Casing Material (color)

<table>
<thead>
<tr>
<th>Casing Material (color)</th>
<th>± 0.1 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modified polyphenylene oxide (black)</td>
<td>95 ± 5%</td>
</tr>
</tbody>
</table>

#### Weight

<table>
<thead>
<tr>
<th>Weight</th>
<th>± 0.1 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>± 2 mV to 10VDC K</td>
<td>175g (0.376lbs)</td>
</tr>
<tr>
<td>± 2 mV to 10VDC N</td>
<td>175g (0.376lbs)</td>
</tr>
</tbody>
</table>

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### Choice For Continuous Monitoring Predictive Maintenance

With the use of VM-21G stand-alone sockets, the VM-21 signal conditioners require the space of mere 30mm width for mounting. VM-21 only weights 100g, and it has achieved the total miniaturization.

Both the wall-mounting and DIN-Rail-mounting are available with VM-21G stand-alone socket for an easy mounting design.

VM-21 has buffered output of raw waveform signal available for diagnostics of rotating machinery. The signal can be sent to analysis and diagnostics equipment for spectral and vector analysis.

VM-21 product lineup caters for various vibration sensors of displacement, velocity and acceleration.

A variety of power supplies are available: 100 to 240VAC, 100 to 240VDC and 24VDC.

Each of VM-21 module has an input abnormal detection function, which sends out burn-down output (less than 0.8mA/DAC or 0.2V/DC) as soon as input abnormality, such as sensor breaking, occurs. This special feature can be a great contribution to the reliability of a plant operation.

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### Outline Drawing

**VM-21F Signal Conditioner**

![VM-21 Signal Conditioner Diagram](image1)

**VM-21G Signal Conditioner Socket**

![VM-21G Signal Conditioner Socket Diagram](image2)

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* Note: Refer to specifications page for terminal arrangement.