

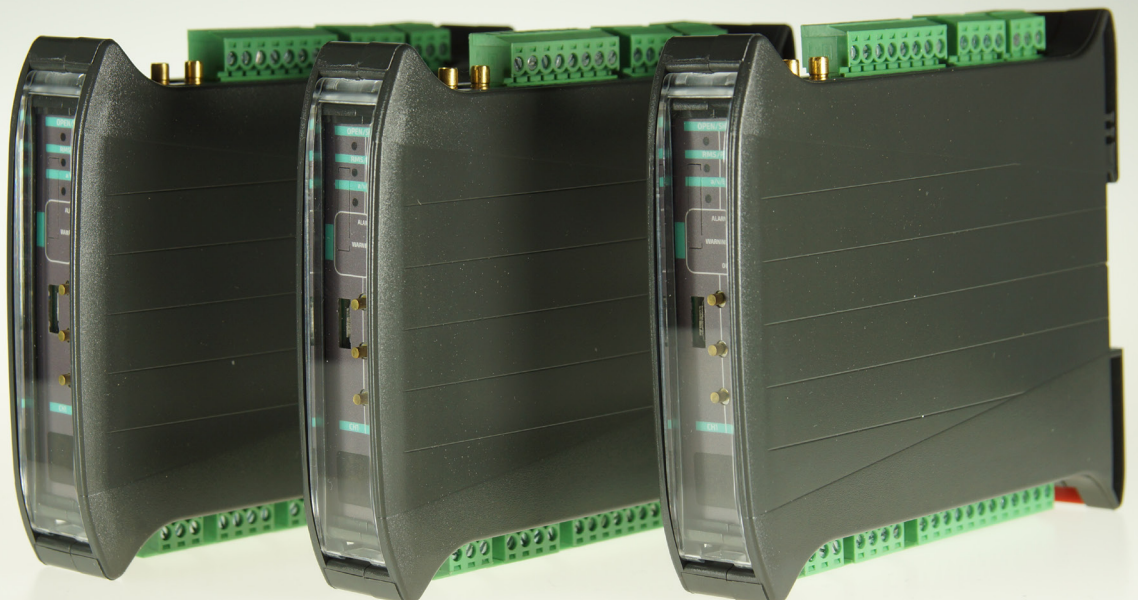


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## **AV MONITOR 2000**

dual channel devices for  
monitoring and diagnostics  
of rotating machinery



# system description

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**AMC VIBRO MONITOR 2000** series is a dual-channel, fully programmable device for online condition monitoring of rotating machinery. It is designed for a small or large rotating machines with fixed or variable rotational speed. One of AVM 2000 versions is specially suited for reciprocating compressors. This device detects and locates among other things: bearing faults, gearbox faults, unbalance, misalignment, looseness, overload and cavitation.

## ALL VERSIONS OF AVM 2000 HAVE:

- 2 IEPE (ICP®) analog input channels,
- 2 speed/ phase marker input channels (PM),
- 5 relay outputs,
- 2 analog outputs (4–20mA),
- RS-485 MODBUS data interface.

## BASIC FEATURES OF AVM 2000:

- fully configurable and independent relay outputs,
- warning and alarm for each channel and each analysis,
- IEPE open-loop/short-circuit detection,
- easy integration with PLC systems,
- dedicated PC configuration software,
- compact design and DIN rail installation,
- embedded LED display,
- buffered outputs for raw vibration signals.

## VERSIONS:

- **AV MONITOR 2105D** – for general purpose constant speed rotating machines (fans, pumps, compressors etc.). The device can detect damage of the monitored machine.
- **AV MONITOR 2105DV** – for general purpose rotating machines (fans, pumps, compressors, etc.). The device enables to detect and locate of machines damage, i.e. indicate a specific gear stage or a damaged bearing. This version can save calculated estimates / analysis to the SD memory card.
- **AV MONITOR 2105DK/DP** – for reciprocating compressors. The device performs measurements in 36 sections of full rotation of the machine. It has built-in rotational speed stability analysis function to avoid false alarms. The DK type works in accordance with the IEPE (ICP®) standard. The DP type has been designed as working with proximity vibration sensors (eddy-current), it enables among others to monitor sliding bearings. This version allows to save calculated estimates / analysis to the SD memory card.
- **AV MONITOR 2115DA** – for accurate monitoring of machines with variable rotational speed. The device carries out calculations of advanced estimates: harmonics amplitude and order, as well as spectrum analysis. There is option to measure temperature and working with eddy-current sensors (choice occurs at order stage). This version allows to save calculated estimates / analysis to the SD memory card.

# technical data

PARAMETER	DESCRIPTION
Power supply	+24 VDC (18 - 36 VDC)
Operating temperature	-20 °C... +80 °C
I/O insulation	1 kV
Power consumption	max. 4W
Degree of enclosure protection and device installation	IP20   DIN rail
Low-power status / warning / alarm relay outputs	<b>4 x relay output:</b> <ul style="list-style-type: none"> <li>contacts type: NC or NO</li> <li>maximum switching voltage: 32 VDC</li> <li>rated current: 100 mA</li> <li>maximum contact resistance: 8 Ω (typical 4.8 Ω)</li> <li>maximum switching power: 400 mW</li> </ul>
High-power status /warning / alarm relay output	<b>1 x relay output:</b> <ul style="list-style-type: none"> <li>three contacts: NC, Common, NO</li> <li>maximum switching voltage: 32 VDC</li> <li>rated current: up to 2 A</li> <li>maximum switching power: 50 W</li> </ul>
IEPE (ICP®) inputs – D, DV, DK, DA versions Proximity probe inputs – DP version	<b>2 x IEPE (ICP®) vibration sensor input:</b> <ul style="list-style-type: none"> <li>working with IEPE 2-wire sensors,</li> <li>measuring range setting is possible by the operator panel (10, 25, 100 at 100mV/g sensors),</li> <li>parallel processing of 2 channels, 16bit, 40 kSPS ,</li> <li>sensor circuit status: OPEN/SHORT/OK,</li> <li>changing of IEPE sensor sensitivity is possible by the panel from</li> <li>10 mV/G to 990 mV/G (default 100 mV/g).</li> <li><b>The maximum standard measuring range is 100</b> (mm/s, m/s<sup>2</sup>) for 100mV/g sensors.</li> </ul>
4-20 mA outputs	<ul style="list-style-type: none"> <li>2 x current output (4-20 mA)</li> <li>current loop voltage range: +7.5 VDC to +36 VDC, resolution 12 bits</li> </ul>
Speed/ Phase Marker (PM) inputs	<ul style="list-style-type: none"> <li>2 x Phase Marker (PM) OC PNP (PushPull)</li> <li>the input frequency range for low speed machinery phased-locked mode is 60 - 1200 rpm</li> </ul>
Measurement	<b>Measured value is vibration acceleration. Calculated estimates:</b> <ul style="list-style-type: none"> <li>RMS - 0-Peak vibration acceleration (m/s<sup>2</sup>)</li> <li>RMS - 0-Peak vibration velocity (mm/s)</li> <li>Envelope RMS and Peak-Peak</li> <li>Analysis in 8 defined bands (BEC) - DV and DA version</li> <li>Measurements in 36 sections of full rotation - DK/DP version</li> <li>Order and harmonics amplitude analysis - DA version</li> <li>Capability to average 1-10 measurements</li> <li>Learning option - automatically setting alarm and warning thresholds (except version D)</li> </ul>
Temperature measurement (optionally for DA version)	The measurement using resistance temperature detector – Pt100. For the RTD input can be chosen 2-, 3- or 4-wire measurement. 15-bit resolution (0.003125°C).
Interfaces	<ul style="list-style-type: none"> <li>RS485 – Modbus RTU protocol</li> <li>USB – service and configuration</li> <li>microSD memory card (except version D)</li> </ul>
Panel	<ul style="list-style-type: none"> <li>2 x 7-segment display with decimal points</li> <li>3 x configuration buttons</li> <li>9 x Signal / Status LED</li> </ul>

# technical data

	AVM 2105D	AVM 2105DV	AVM 2105DK/DP	AVM 2115DA
<b>Inputs</b>	2 x IEPE (ICP®) (or optionally 2 x proximity probe for DP version)   2 x Speed/ Phase Marker (PM) 1 x Temperature measurement (optionally for DA version)			
<b>Outputs</b>	5 x Relay (NO, NC)   2 x Analog (4-20mA)   RS-485 MODBUS data interface			
<b>SD card</b>	✗	✓	✓	✓
<b>Sensor type</b>	IEPE accelerometer - D, DV, DK, DA versions   Eddy-current proximity probe - DP version and optionally DA version			
<b>Damage detection</b>	✓	✓	✓	✓
<b>Damage location</b>	✗	✓	✓	✓
<b>CALCULATED ESTIMATES</b>				
<b>Acceleration and velocity RMS</b>	✓	✓	✓	✓
<b>Acceleration and velocity 0-Peak</b>	✓	✓	✓	✓
<b>Envelope RMS and Peak-Peak</b>	✓	✓	✓	✓
<b>Acceleration or velocity RMS in 8 bands (BEC)</b>	✗	✓	✗	✓
<b>Sections of full rotation</b>	✗	✗	✓	✗
<b>Order spectrum analysis</b>	✗	✗	✗	✓
<b>Amplitude analysis</b>	✗	✗	✗	✓
<b>Application</b>	General for rotating machines	General for rotating machines	Reciprocating machines	Variable speed machines and/or sliding bearings
<b>Examples of monitoring machines</b>	<ul style="list-style-type: none"> <li>• fans</li> <li>• pumps</li> <li>• compressors</li> <li>• motors</li> </ul>	<ul style="list-style-type: none"> <li>• fans</li> <li>• pumps</li> <li>• compressors</li> <li>• motors</li> </ul>	<ul style="list-style-type: none"> <li>• reciprocating compressors,</li> <li>• piston engines</li> </ul>	<ul style="list-style-type: none"> <li>• wind turbines</li> <li>• industrial steam turbines,</li> <li>• complex gears</li> </ul>
<b>Examples of detected failures</b>	<ul style="list-style-type: none"> <li>• increase in the vibration energy</li> </ul>	<ul style="list-style-type: none"> <li>• damage to the bearing</li> <li>• unbalance</li> <li>• cavitation</li> </ul>	<ul style="list-style-type: none"> <li>• valve analysis</li> <li>• detection of the piston ring degradation</li> </ul>	<ul style="list-style-type: none"> <li>• diagnosis of damage of individual bearing components</li> <li>• identification of gear failure</li> <li>• cavitation</li> </ul>

amc VIBRO Sp. z o.o.

Pilotow 2e  
31-462 Krakow  
Poland

Phone:

T: +48 (12) 362 97 60

Sales:

T: +48 (12) 362 97 63

info@amcvibro.pl  
www.amcvibro.pl