**MONITORING AND DIAGNOSIS OF CRITICAL MACHINES**

The self-contained and intelligent ONEPROD MVX system is intended for continuous multi-channel monitoring of rotating machinery, enabling the early detection of faults, even on the most complex machines. It is the culmination of ONEPROD’s 25 years’ experience of machinery monitoring throughout the industrial sector.

ONEPROD MVX is a versatile system offering 8 to 32 data acquisition channels for all signal types (IEPE, AC voltage, DC voltage, 4-20 mA, impulses). With its flexible configuration options and extensive calculation capacity, this system makes it possible to implement intelligent and targeted localized monitoring.

### General

<table>
<thead>
<tr>
<th>Monitoring</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Number of channels</td>
<td>8, 16, 24 or 32</td>
</tr>
<tr>
<td>Type of inputs</td>
<td>IEPE AC, IEPE DC, 4-20 mA, voltage input (AC+DC), DC, impulse counter</td>
</tr>
<tr>
<td>Logical inputs</td>
<td>4 or 8 logical inputs</td>
</tr>
<tr>
<td>Long-time waveform option (DAT)</td>
<td>Up to 82 s of signal on 30 channels regardless of the sampling frequency with a max of 4 Msamples</td>
</tr>
<tr>
<td>Management of variable operating conditions</td>
<td>Up to 10 operating conditions per machine (including a default condition in case of communication loss with the PLC or OPC server)</td>
</tr>
<tr>
<td>Number &amp; type of operating parameters</td>
<td>Up to 6 parameters (3 process scalar information + 3 logical inputs)</td>
</tr>
<tr>
<td>Monitoring frequency</td>
<td>Up to real-time capabilities</td>
</tr>
<tr>
<td>Low-speed shaft monitoring</td>
<td>Suited for low-speed shafts starting from a few RPM. Automatic early fault detection with Shock Finder algorithm</td>
</tr>
<tr>
<td>Storage to database</td>
<td>Periodic, condition-based, alarm-based, triggered manually</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Interfaces</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Modbus</td>
<td>I/O (RS485 or TCP/IP)</td>
</tr>
<tr>
<td>OPC</td>
<td>I/O</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Physical</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Dimensions</td>
<td>MVX-160: 350 x 171 x 86 mm</td>
</tr>
<tr>
<td></td>
<td>MVX-320: 350 x 171 x 100 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>about 3.1 kg (or 6.8 lbs)</td>
</tr>
<tr>
<td>Casing matter</td>
<td>galvanised steel</td>
</tr>
<tr>
<td>Mounting</td>
<td>DIN TS 35 rail; optional: pre-equipped cabinet</td>
</tr>
<tr>
<td>Transportable version</td>
<td>Check our ONEPROD VMS datasheet (transportable case with BNC inputs)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Environmental</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection</td>
<td>IP 20</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>from -20 to +60°C</td>
</tr>
<tr>
<td>Humidity</td>
<td>95% max, with no condensation</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>from -20 to +75°C</td>
</tr>
<tr>
<td>Vibrations</td>
<td>NF60-002 compliant according the following limits: 0.4 m/s between 5 Hz and 20 Hz 5g pick between 20 Hz and 120 Hz</td>
</tr>
<tr>
<td>Cooling system</td>
<td>through forced air</td>
</tr>
<tr>
<td>Air flow rate</td>
<td>up to 35 m³/h</td>
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</table>

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## Processing Details

### General
- **Frequency range**: 50 Hz; 100 Hz; 200 Hz; 500 Hz; 1 kHz; 2 kHz; 5 kHz; 10 kHz; 20 kHz.
- **Number of lines**: 400; 800; 1,600 or 3,200.
- **Number of averages**: from 1 to 4,096.
- **Multichannel acquisition type**: independent or synchronous.
- **Type of average**: linear, exponential, peak.
- **Overlap**: 0%; 50%; 75%.
- **High-pass filter**: 2 Hz; 10 Hz; 3 kHz.
- **Integration**: none, 1 or 2.
- **Zoom factor**: none; x2; x4; x8; x16; x32; x64; x128.
- **Windowing**: Hanning; Rectangular; Flat-top.
- **Frequency range**: 50 Hz; 100 Hz; 200 Hz; 500 Hz; 1 kHz; 2 kHz; 5 kHz; 10 kHz; 20 kHz.
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### Embedded post-processing of time waveforms
- **SFI (Shock Finder)**: Automatic abnormal periodic shock detection; binary result; number of shocks. requires DAT option.

### Embedded post-processing of FFT
- **Number max of post-processed parameters**: Up to 10 indicators can be defined from a spectrum.
- **Broadband indicators**: RMS, equivalent peak or equivalent peak-to-peak level between two fixed frequencies.
- **Narrow band indicators**: RMS, equivalent peak or equivalent peak-to-peak level defined over a few spectral lines centered on a fixed or variable frequency. The number of lines can be parameterized. The center frequency is defined by two coefficients, A and B (integer), and by the following formula: \( F_c = A \cdot F_0 + B \) (with \( F_0 \) = rotation frequency).

### Real-time processing
- **High-pass filter**: 2 Hz or 10 Hz.
- **Signal integration**: 0 or 1.
- **Low-pass filter**: 1,000 Hz or no filter (i.e., 20 kHz).
- **Processing**: RMS, pk or pk-pk.
- **Averaging**: continuous exponential with time constant between 1 s and 25 s. Averaged DC level (for process and GAP signals).
- **BGI indicator (Blade Guard Index)**: Specific indicator dedicated to the monitoring of structural resonance, particularly suitable for wind turbine blades.
- **GCI indicator (Gearbox Condition Index)**: Oil particle counting interface with GASTOPS METALSCAN unit. The following indicators are available:
  - GCI-h: number of particles detected in the last hour
  - GCI-d: number of particles detected in the last 24 hours (performed in a slipping mode)
  - GCI-H: Total number of detected particles.
- **Broad band and narrow band extraction on real-time FFT**: FFT 400 pts, 800 pts, 1,600 pts or 3,200 pts. FFT 1 kHz, 2 kHz, 5 kHz, 10 kHz or 20 kHz. FFT with 50% fixed overlapping.
- **Fixed sampling rate**: 51.2 kHz.
- **Length**: 1s to 30 s on 32 channels. Up to 480 s on 2 channels.
- **Pre-trigger duration**: 0 to total time wave length.

### Time wave on event
- **requires DAT option**

### Electrical monitoring ESA (Electrical Signature Analysis)
- **Type of inputs**: Voltage transducers (typically, AV100-750, covering voltages ranging from 100 V to 750 V RMS); Current transducers (typically, HASxxx-SB, HTRxxx-SB, HOPxxx-SB, covering currents ranging from a few amps to 2,000 A RMS).
- **Additional accessories (required)**: Mandatory connection through MVX EIM modules.
- **Automatic diagnosis**: Rotor bar damage, Static eccentricity, Dynamic Eccentricity, etc.
Communication Details

Ethernet
10/100 base T ports can be used; compatible with Wi-Fi, 3G modems.

Number of Ethernet ports
2 ports

Modbus
RS485 or TCP/IP (Ethernet port)

Modbus mode
MVX is Modbus Slave. In this case MVX can exchange data in both directions (input and output) with one PLC.

MVX is Modbus Master. In this case MVX can read data (input) on 1 to 3 PLCs.

Available data on Modbus output
Number of indicators, Values of indicators, Status of indicators, Units of indicators, Values of operating parameters

Available data on Modbus input
Values of operating parameters; Values of indicators

Logical output
4 or 8 logical alarm outputs + 1 integrity relay

OPC Server (through NEST software)
Publishing of machine alarm status and expert advice, publishing of parameters values and alarm statuses

CMMS interface (through NEST software)
Automatic triggering of work requests, monitoring of updates on work orders

Management of communication loss
Data integrity guaranteed with embedded storage and automatic retry in case of communication failure. 3G compatible.

SMS / E-mail sending
On any alarm status change or aggravating status change only, through NEST software.

VERSIONING

Function | EASY | PREMIUM
--- | --- | ---
Time acquisition | ☑ | ☑
Spectral acquisition | ☑ | ☑
Continuous monitoring | ☑ | ☑
Taking into account of operating conditions | ☑ | ☑
Elaboration of "standard" indicators (*) | ☑ | ☑
Elaboration of indicators based on other filters | ☑ | ☑
Elaboration of Kurtosis indicators | ☑ | ☑
Elaboration of Smaxp indicators | ☑ | ☑
Elaboration of Blade Guard Index (BGI) | ☑ | ☑
Elaboration of Shock Finder Index (SFI) | ☑ | ☑
Elaboration of Gear Condition Index (GCI) | ☑ | ☑
Calculation of the RMS value | ☑ | ☑
Calculation of the "equivalent peak" value | ☑ | ☑
Calculation of the "equivalent peak-to-peak" value | ☑ | ☑
Calculation of the "true peak" value | ☑ | ☑
Calculation of the "true peak-to-peak" value | ☑ | ☑
Calculation of broad-band indicators from spectrum | ☑ | ☑
Calculation of narrow-band indicators from spectrum | ☑ | ☑
Envelope spectra | ☑ | ☑
Short term trend | ☑ | ☑
ESA (requires DAT option and XPR software) | ☑ | ☑
Real-time monitoring capability: 100% of signal | ☑ | ☑
Time wave on event with pre-trigger | ☑ | Requires DAT option
DAT mode (long-time signal) | (Option) | (Option)

*List of standard indicators:
- Broad-band 2 Hz / 20 kHz acceleration
- HF 3 kHz / 20 kHz acceleration
- 2 Hz / 1,000 Hz velocity
- 10 Hz / 1,000 Hz velocity
- 2 Hz / 1,000 Hz absolute displacement
- 10 Hz / 1,000 Hz absolute displacement
- 2 Hz / 20 kHz relative displacement
- Relative position (GAP)
- Bearing defect factor

SPECIFIC VERSION AND ACCESSORIES

ONEPROD VMS transportable case
16 or 32 channels with BNC connectors
(Available with different functionality levels and with or without PC)

ONEPROD MVX Pre-equipped cabinet
(solution on request)

ONEPROD EIM connection box
for ESA Electrical Monitoring
MVX30003000