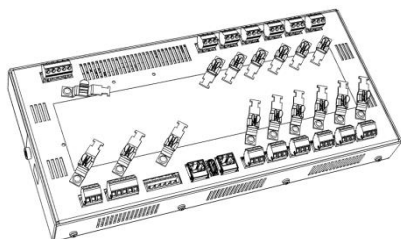


## Online Monitoring and diagnosis of critical machines



The self-contained and intelligent ACOEM MV-120 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 ACOEM's 30 years' experience of machinery monitoring throughout the industrial sector.

ACOEM MV-120 is a versatile system offering 12 data acquisition channels for all signal types (IEPE, AC voltage, DC voltage, 4-20 mA, tacho). With its flexible configuration options and extensive calculation capacity, this system makes it possible to implement intelligent and targeted localized monitoring.

### Condition Monitoring System

|                   |                                             |                                                                                                                                                                                                                                                                                                               |
|-------------------|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Monitoring</b> | Number of channels                          | 12 (synchronous)                                                                                                                                                                                                                                                                                              |
|                   | Analog inputs                               | All sensors needed for an efficient monitoring can be connected : Accelerometers, Tachometers, Current clamp, Thermocouple... Each channel can be configured individually to adapt to any type of input: IEPE AC, IEPE DC, 4-20 mA, voltage input (AC+DC, DC), impulse counter, tacho input (0.2Hz to 17kHz). |
|                   | Management of variable operating conditions | Up to 10 operating conditions can be defined per machine for a tailored monitoring. A fallback condition in case of communication loss with the PLC or OPC server allows storing data for more security. Data can be easily compared over time through trends filtered by operating conditions.               |
|                   | Number & type of operating parameters       | Up to 6 parameters (3 scalars + 3 binary)                                                                                                                                                                                                                                                                     |
|                   | Monitoring                                  | Continuous or Real-time                                                                                                                                                                                                                                                                                       |
|                   | Long-time waveform                          | Up to 82 s of signal on 12 channels regardless of the sampling frequency with a max of 4 M samples                                                                                                                                                                                                            |
|                   | Low-speed shaft monitoring                  | Suited for low-speed shafts starting from a few RPM.<br>Automatic early fault detection with Shock Finder algorithm                                                                                                                                                                                           |
|                   | Prevention against false alarms             | Customizable parameters: Hysteresis, stabilization delay, operating condition time-out<br>Management of alarm thresholds per operating condition<br>Up to 4 alarm levels per indicator (pAL, AL, DG and error)                                                                                                |
|                   | Storage to database                         | Periodic, condition-based, alarm-based, on demand (manually)<br>Scalar values can be stored at a higher periodicity than raw signals (customizable)                                                                                                                                                           |
| <b>Modbus</b>     | Type                                        | TCP/IP (Ethernet port)                                                                                                                                                                                                                                                                                        |
|                   | Master                                      | inputs from 3 TCP servers, outputs up to 16 TCP clients                                                                                                                                                                                                                                                       |
|                   | Slave                                       | inputs from 1 TCP client, outputs up to 16 TCP clients                                                                                                                                                                                                                                                        |
| <b>Inputs</b>     | Numerical inputs (Modbus TCP)               | Values of operating parameters; Values of indicators (temperature...) can be collected from the PLC. Up to 255 parameters per system.                                                                                                                                                                         |
|                   | Logical inputs                              | 4 logical inputs                                                                                                                                                                                                                                                                                              |
| <b>Outputs</b>    | Available data on Modbus TCP server         | Number of indicators, Values of indicators, Status of indicators, Units of indicators, Values of operating parameters, values of thresholds. Always published                                                                                                                                                 |
|                   | Logical output                              | 4 logical outputs                                                                                                                                                                                                                                                                                             |
|                   | OPC Server (through NEST software)          | Publishing of machine alarm status and expert advice; publishing of parameters values and alarm statuses                                                                                                                                                                                                      |
|                   | Management of communication loss            | Data integrity guaranteed with embedded storage and automatic retry in case of communication failure. 3G compatible.                                                                                                                                                                                          |
|                   | E-mail notification                         | On any alarm status change or aggravating status change only, through NEST software.                                                                                                                                                                                                                          |
|                   | Integrity relay                             | NC or NO it provides hardware status                                                                                                                                                                                                                                                                          |
| <b>Network</b>    | Ethernet                                    | 10/100 base T ports can be used; compatible with Wi-Fi, 3G modems.                                                                                                                                                                                                                                            |
|                   | Number of Ethernet ports                    | 2 ports. Typical use: 1 for the PLC Modbus TCP, 1 for the office network and communication with NEST software                                                                                                                                                                                                 |

## Acquisition &amp; embedded processing details

|                                       |                                                        |                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------------|--------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| General                               | A/D Converter                                          | 24 bits                                                                                                                                                                                                                                                                                                                                    |
|                                       | 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                                       | None, 2 Hz; 10 Hz; 3 kHz                                                                                                                                                                                                                                                                                                                   |
|                                       | Integration                                            | none, 1 or 2                                                                                                                                                                                                                                                                                                                               |
|                                       | Zoom factor                                            | none; x2; x4; x8; x16; x32; x64; x128; Maximum resolution: 30 MHz                                                                                                                                                                                                                                                                          |
|                                       | Windowing                                              | Hanning; Rectangular; Flat-top                                                                                                                                                                                                                                                                                                             |
|                                       | Synchronous analysis                                   | YES                                                                                                                                                                                                                                                                                                                                        |
|                                       | Envelope detection                                     | YES                                                                                                                                                                                                                                                                                                                                        |
| Monitoring indicators                 | Standard indicators                                    | Acceleration, velocity, absolute displacement, relative displacement, relative position, bearing defect factor. High pass and low pass filters can be selected depending on the type of indicator.                                                                                                                                         |
|                                       | Value calculated per indicator (customizable)          | RMS value; "equivalent peak" value; "equivalent peak-to-peak" value; "true peak" value; "true peak-to-peak" value                                                                                                                                                                                                                          |
| Embedded processing on Time waveforms | SFI (Shock Finder™)                                    | Automatic abnormal periodic shock detection: gives a binary result (presence of shocks Y/N) and the number of shocks detected.                                                                                                                                                                                                             |
|                                       | Kurtosis                                               | Classic shock detection indicator. Kurtosis alarming can be smoothed thanks to band-kurtosis indicator available as post processing in NEST software                                                                                                                                                                                       |
|                                       | Others                                                 | Statistical analysis and filtering are available as post processing in NEST 3.0 software                                                                                                                                                                                                                                                   |
| Embedded processing on FFT            | Number max of post-processed parameters                | Up to 10 indicators can be defined from a spectrum                                                                                                                                                                                                                                                                                         |
|                                       | Broadband energy indicators                            | RMS, equivalent peak or equivalent peak-to-peak level between two fixed frequencies                                                                                                                                                                                                                                                        |
|                                       | Narrow band peak extraction indicators                 | RMS, equivalent peak or equivalent peak-to-peak level defined over a few spectral lines centered on a fixed or variable frequency<br>the number of lines can be parameterized<br>the center frequency is defined by two coefficients, A and B (integer), and by the following formula: $F_c = A.F_0 + B$ (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<br>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:<br>GCI-h: number of particles detected in the last hour<br>GCI-d: number of particles detected in the last 24 hours (performed in a slipping mode)<br>GCI-t: 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<br>FFT 1 kHz, 2 kHz, 5 kHz, 10 kHz or 20 kHz,<br>FFT with 50% fixed overlapping                                                                                                                                                                                                               |
| Time wave on event                    | Fixed sampling rate                                    | 51.2 kHz.                                                                                                                                                                                                                                                                                                                                  |
|                                       | Length                                                 | 1s to 80s on 12 channels simultaneously. Up to 480 s on 2 channels                                                                                                                                                                                                                                                                         |
|                                       | Pre-trigger duration                                   | 0 to total time wave length                                                                                                                                                                                                                                                                                                                |

## General

|               |                           |                                                                                                |
|---------------|---------------------------|------------------------------------------------------------------------------------------------|
| Physical      | Model                     | MVX1030100                                                                                     |
|               | Dimensions                | 371 x 171 x 65 mm (14.6 x 6.89 x 2.56 in)                                                      |
|               | Weight                    | 2.96 kg                                                                                        |
|               | Mounting                  | DIN TS 35 rail                                                                                 |
|               | Power supply              | 24 VDC - 1,5A                                                                                  |
|               | Embedded storage solution | Flash memory (No spinning HDD): up to 100 full measurements sets (incl. FFT and Time waveform) |
|               | Cooling system            | Thermally-driven with electro-galvanic steel casing (No fan).                                  |
| Environmental | Casing matter             | Painted galvanised steel                                                                       |
|               | Protection                | IP20 ; must be installed inside an enclosure                                                   |
|               | Operating temperature     | from -20 to +60°C                                                                              |
|               | Storage temperature       | from -20 to +70°C                                                                              |
|               | Altitude                  | Up to 4000 m                                                                                   |
|               | Humidity                  | 95% max, non-condensing at 60 ° C                                                              |
|               | Compliances               | Refer to EC marking certificate                                                                |



## Software management

|                          |                           |                                                                                                                                                                                                                                   |
|--------------------------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Software Post-processing | On time waveforms         | Filters: High Pass, Low Pass, Band Pass, Shock Finder smart filter<br>High Resolution Spectra (400 to 6,400 lines)<br>Automatic parameters: Statistical levels (RMS, peak, peak-peak, mean...), Kurtosis and band-Kurtosis        |
|                          | On spectra                | Automatic parameters: Peak Extraction, Energy Narrow band Level, Energy broadband Level<br>Bearings frequencies, gear frequencies<br>Cepstra (automatic or manual)<br>FFT concatenation (merged spectrum) for productive analysis |
|                          | On parameters             | Logic combination of parameters                                                                                                                                                                                                   |
|                          | Alarm thresholds levels   | 4 levels (pre Alarm, Alarm, Danger, Error)                                                                                                                                                                                        |
|                          | Standard thresholds types | HIGH level thresholds, LOW level threshold, IN RANGE thresholds, OUT OF RANGE thresholds,                                                                                                                                         |
| Advanced thresholds      | Advanced thresholds types | Evolution vs. previous control, Evolution vs. reference date, Statistics, Forecast                                                                                                                                                |
|                          | Operating condition       | Trends filtered per operating condition for variable operating condition machines                                                                                                                                                 |
| Data mining              | History                   | Trends, waterfall<br>Filter on control history from parameter trend.                                                                                                                                                              |
|                          | Comparison                | Superimposition of parameters, spectra, time waves from one or several machines                                                                                                                                                   |
|                          | Quick access to results   | Health matrix: the machine condition in one view of all alarm status                                                                                                                                                              |

## VERSIONS & SPECIFIC ACCESSORIES



### Pre-equipped cabinet

500 x 500 x 260mm

With 24VDC - 3A power supply

