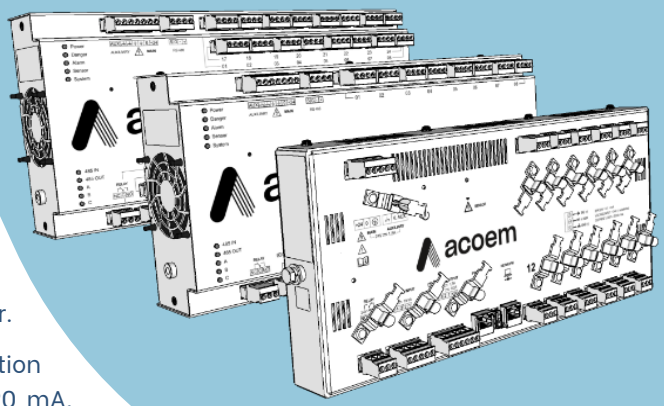
MV-x Technical Datasheet

Real Time Monitoring and Diagnosis of critical assets



The self-contained and intelligent Acoem MV-x system is intended for real time 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 50 years' experience of machinery monitoring throughout the industrial sector.

ACOEM MV-x is a versatile system offering 6 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 localised monitoring.

Real Time Monitoring & Diagnostic capabilities

Real Time Monitoring

Real Time Overalls	Standard Overalls	Acceleration, velocity, absolute displacement, relative displacement, relative position, 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
	Scanrate	Every 80ms after first value calculation at monitoring start up
Alarming	Alarm levels	up to 4 alarm levels per indicator (pre-alarm, alarm, danger and error)
	Alarms type	High, Low, In range, Out of range
	Prevention against false alarms	Alarm Hysteresis settings Alarm retention (alarm must be valid during user defined period to be validated) Management of alarm thresholds per operating condition with Acoem MCT™
Multi-physical monitoring	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).	

Variable speed machine management with Acoem MCT™

Real Time Machine Condition Tracking	Machine operating status is updated every 80ms for real time reactivity to any event
Management of variable operating conditions	Up to 10 operating conditions can be defined per machine for a tailored monitoring
Fallback condition management	In case of communication loss with the process info, MV-x keeps monitoring the asset in Fallback condition (user customizable)
Number & type of operating parameters	Up to 6 parameters (3 scalars + 3 binary) can be used to define the operating ranges
Machine Operating Condition validation Criteria	Settings available to improve data quality: RPM Stability (%), Temporization (s), Condition Stability during measurement (Permanent or none),

Edge Computing (Smart built-in processings)

Embedded processing on Time waveforms	Acoem Shock Finder™ (SFI)	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 NESTi4.0 software
Embedded processing on FFT	Acoem Bearing Defect Factor™ (DEF)	Bearing Fault indicator processed in High frequency domain (>3kHz) reacting to bearing damage and lubrication problems. Absolute value ranging from 0 to 12, constantly growing over the bearing life cycle. Foolproof setup, easy to use
	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; the number of lines can be parameterized. The center frequency is defined by two coefficients, A and B (integer), and by the following formula: Fc = A.F0 + B (with F0= rotation frequency)
	Max nb of processed parameters	Up to 10 indicators can be defined from a spectrum
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)
	Broadband and narrow band extraction	FFT 400 / 800 / 1,600 / 3,200 / 6,400 / 12,800 / 25,600 lines FFT 1 kHz, 2 kHz, 5 kHz, 10 kHz or 20 kHz, FFT with 50% fixed overlapping
Acquisition	A/D Converter	24 bits
	Sampling frequency	51.2 kHz (Fmax 20kHz), suitable for all conventional vibration sensors and monitoring for high frequency phenomena (bearing faults, gear damages…)

Remote AI & diagnostic solution

Signal storage to database for expert analysis	Periodic, condition-based, alarm-based, on demand (manually)
FFT settings	Lines of resolution: 400 / 800 / 1,600 / 3,200 / 6,400 / 12,800 / 25,600 Averages: from 1 to 4,096; 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
Enveloping	Yes
Time Waveform length	1s to 30s on 32 channels simultaneously. Up to 480 s on 2 channels @51.2kHz
Accurex™ Automatic Diagnostic AI	Performed at each data storage in NESTi4.0 software for eligible assets created in Accurex mode (Electrical motors, Centrifugal Pumps, Fans, Rollers, Shafts, Centrifugal Compressors, Alternator, Gearboxes)
Data reduction strategies	Scalar values can be stored at a higher periodicity than raw signals (customizable) Storage on condition occurrence can be limited to “n” per time interval

Low Speed Shaft Monitoring

Low-speed shaft monitoring	Suited for low-speed shafts starting from a few RPM.
Acoem Shock Finder™	Automatic early fault detection with Shock Finder™ algorithm. Output: Shock Detection (Yes/No); Number of shocks
Long-time waveform	Up to 82 s of signal regardless of the sampling frequency with a max of 4 M samples
High Resolution FFT	Up to 25,600 lines of resolution

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Scalable & Evolutive Solutions

Versatile solution: 6 to 32 Analog channels

Product type	MVX1030100		MVX1001000H	MVX1002000H	
Reference	**MV-060**	**MV-120**	**MV-160**	**MV-240**	**MV-320**
Analog Channels (Synchronous)	6 (via license)	12	16	24 (via license)	32
Logical Inputs	4	4	4	8	8
Numerical Inputs	Up to 255 (Modbus TCP, OPC UA)		Up to 255 (Modbus RS485, Modbus TCP, OPC UA)		
Dimensions	371 x 171 x 65 mm (14.6 x 6.89 x 2.56 in)		350 x 171 x 86 mm (13.77 x 6.73 x 3.38 in)	350 x 171 x 100 mm (13.77 x 6.73 x 3.94 in)	
Weight	2.96 kg		about 3.1 kg (or 6.8 lbs)	about 3.1 kg (or 6.8 lbs)	
Mounting	DIN TS 35 rail; optional: pre-equipped cabinet				
Power Supply	24 VDC - 1,5A		24 VDC - 2,5A		
Embedded Storage	Flash memory (No spinning HDD): 1GB for about up to 100 full measurement sets (incl. FFT and Time waveform) Flash memory (No spinning HDD)				
Cooling System	Thermally-driven with electro-galvanic steel casing (No fan).		Through forced air. Air flow Up to 35 m3/h		
Casing material	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		from -20 to +75°C		
Altitude	Up to 4000 m				
Humidity	95% max, non-condensing at 60 ° C				
Compliances	Refer to EC marking certificate				

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MV-x Essential & Expert Versions

	Essential	Expert
Overall Monitoring of standard indicators Acceleration, Velocity, Absolute displacement, relative displacement	✓	✓
Edge computing of advanced indicators (Local interoperability in ModbusTCP) Broadband energy, peak extraction, Kurtosis, Bearing Defect Factor™, Shock Finder™	✓	✓
Real Time Machine operating condition management MCT™ (Machine Condition Tracking)	✓	✓
NESTi4.0 Health Matrix (Trending)	✓	✓
NESTi4.0 Signal Expert Vibration Analysis	⊗	✓
NESTi4.0 Post Processings	⊗	✓
NESTI4.0 Accurex™ Automatic Diagnostic AI compatibility (activation required)	⊗	✓

Interoperability & Cybersecurity

Cyber-security	Encrypted communication	Https / SSL encryption
	Certificate	Management of encryption certificate
	Local Authentication	Local device user management, protection by login/password
	PC Software Communication	All communication with NESTI4.0 software are at the initiative of the MV-x device Authentified software access required
Interfaces	OPC UA I/O	Managed via NESTi4.0 software
	Modbus TCP I/O	Managed from MV-x device
	Relay output	Integrity relay
Modbus architecture	Master	inputs from 3 RTU slaves / TCP servers, outputs up to 16 TCP clients
	Slave	inputs from 1 RTU master / TCP client, outputs up to 16 clients (RTU/TCP)
Connectivity	Ethernet	10/100 base T
	Number of Ethernet ports	2 ports. Typical use: 1 for the PLC Modbus TCP, 1 for the office network and communication with NEST software
	WiFi connectivity	Optional modem for up to 2km wireless data transmission
	4G/5G connectivity	Optional modem for isolated assets for long range wireless transmission

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