

CW-219/220

VIBRATION MONITOR



The CW-219/220 range of vibration monitors offers a new and particularly application and user-friendly concept for monitoring the status of vibration levels and bearings in rotating machinery to provide vital early warning of impending damage.

High-performance hardware guarantees extremely flexible measurement value acquisition, analyses, output and communication. This makes it possible to offer the user a variety of task and price oriented models encompassing different monitoring functionalities. Concentrating on the „essentials“ in conjunction with a learning modus reduces complexity for the user – and considerably cuts down the time required for installation and start-up.

Distinguishing features of the individual versions of this product range vary with regard to their digital interfaces to support control tasks as well as their range of functions. The basic version CW-219A offers efficient algorithms to monitor RMS values and transient shock pulses as often occur when roller bearings develop defects over time. The CW-219B and CW-219C offer extended functionality, such as crest factor, more flexible RMS settings as well as a longterm trend recorder. Adjustable alarm thresholds that respond to process-input variables are as equally possible as it is to monitor narrow band levels. The CW-220C offers the complete range of functions to meet the demands of even more complex monitoring tasks, including in conjunction with variable speeds.

PERFORMANCE CHARACTERISTICS

- Simultaneously monitor up to 4 machine parameters: 1x vibration (IEPE(ICP®), 3 custom process variables, such as speed, load, force, temperature, pressure, differential pressure and so forth
- Particularly user-friendly operator control concept: convenient, simple and reliable!
- Favourable price/performance ratio
- Machine-specific evaluation and monitoring functions
- Wide variety of options available to output measurement values and signals (including long-term trend records)
- Fast and simple to install and configure parameters
- Easy to extend and scale thanks to bus capability (CAN, LAN, USB)

HIGH LEVELS OF FLEXIBILITY

The concept behind the CW-200 range, and above all the spatial distance between the measuring sensors and where signals are evaluated, offers the user extremely high levels of flexibility when installing the vibration monitor and selecting the appropriate sensor to meet application

HIGH-PERFORMANCE HARDWARE

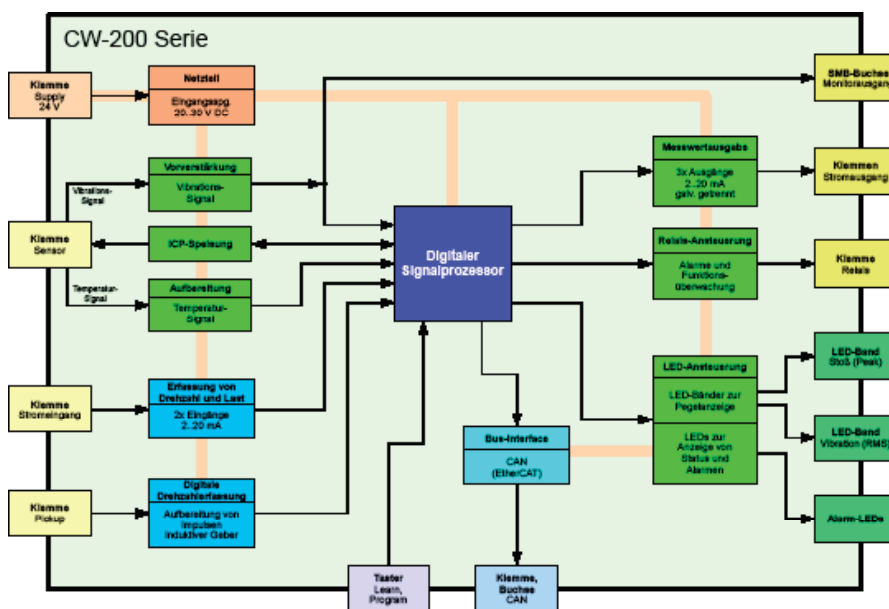
The machine condition monitors of the CW-200 range are 100% digital, DSP-based systems. Each device offers connection options for ICP® sensors (accelerator sensors, pressure transducers, microphones), for temperature sensors as well as inputs to measure speed or even current and voltage signals (measure power consumption). The CW-220C systems are also equipped with inputs to directly connect inductive/digital speed or position reference sensors.

requirements (sensitivity, frequency response, design type, costs). Because different sensor design types are available to meet requirements, this concept allows the sensor to be installed in the most suitable position – even in the harshest of conditions (e.g. high ambient operating temperatures).

Each of the CW-219/220 devices is equipped with two galvanically isolated relay outputs for signalling or alerting to practically unlimited user-definable events (pre-alarm or main alarm).

The output socket on the front of the device facilitates direct pick-up of the measurement signal from the ICP® sensor for analysis by means of an oscilloscope or FFT analyzer.

System Overview of the CW-219/220-Hardware



1) Subject to change without prior notice

Up to three galvanically isolated current sinks (4-20 mA) guarantee signal transmissions to the higher-level monitoring system or controller (PLC). The user is free to assign the output and relevant measurement variables. Configuration, parameter settings as well as online out-

Reliability concepts

The CW-219/220 is equipped with an extensive range of internal safeguarding mechanisms. For instance, it is only possible for a main alarm to be triggered when all components are functioning properly.

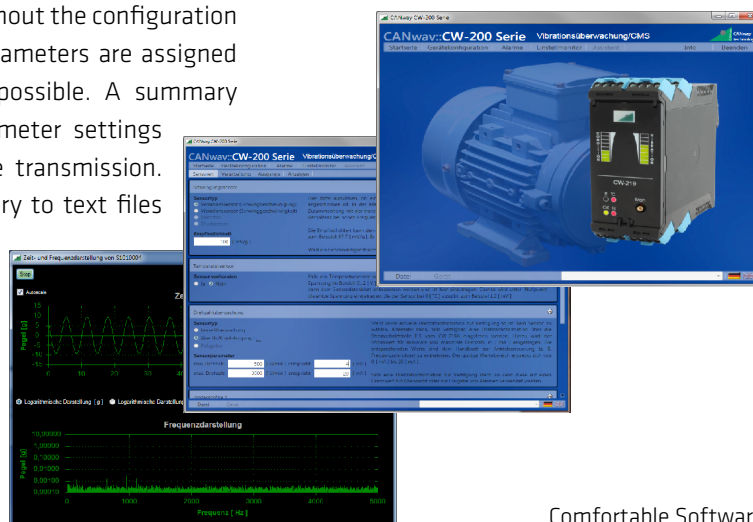
A watchdog signal continuously checks the processor to ensure it is functioning correctly. A self-test mode also conti-

put of measurement and analyzer data are implemented via CAN bus; other interfaces (LAN) are optional. An adapter cable that allows direct USB connection to a PC is included in the scope of supply.

continuously checks the entire ICP® measuring chain through to the sensor: short-circuits and cable breaks along the sensor line are detected immediately; a designed-in safeguard that prevents false alarms. It is optionally possible to signalize a malfunction by activating one of the two output relays.

USER-FRIENDLY OPERATING CONCEPT

All inputs and outputs, measurable variables, evaluation processes and limit values are configured using a PC. The parameters are transmitted via CAN bus (interface option 01) or Ethernet (interface option 02). The clearly structured and intuitively understandable user interface of the software belonging to the CW-200 series guides the user through all the settings. Online recommendations and comprehensive explanations detailing the significance of settings for machine monitoring support the user throughout the configuration process. This ensures CW-219/220 parameters are assigned error-free within the shortest time possible. A summary allows users to check their CW parameter settings and approve the configuration before transmission. It is also possible to save the summary to text files for documentation purposes, for example. Final approval is required before device settings including alarms become active and machine monitoring started.



Comfortable Software

MACHINE CONDITION INDICATION

Two LED arrays on the front of the device ensure operating personnel are quickly able to assess the condition of the monitored machine. According to configuration settings, these indicate the current level of vibration as well as a further pre-determined condition variable (for example, transient shock level). The LEDs indicate if the vibration value exceeds a previously defined limit as well as if the temperature or speed limit values are exceeded. Moreover, the device also signals that the complete measuring chain is functioning without any faults.

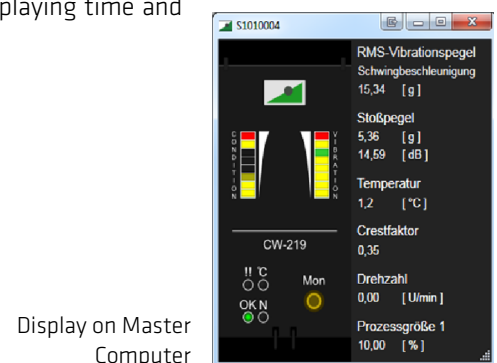
In addition, it is also possible to graphically display the indicator elements used to monitor and analyze the condition of the machine on a master computer or PC.

EXTENDED SOFTWARE MODULES

It is possible to extend the operating software of the CW-200 range of models with various software modules to increase signal recording and analysis options:

For fault analysis purposes, a short-term mode scans and stores selected measurable variables in millisecond cycles. To facilitate trend analyses, it is possible to store peak or mean values of calculated condition variables on a daily basis or even per shift in the long-term mode.

To provide the user with an additional form of support when setting and checking configuration parameters, the CW-200 series also offers the option of carrying out orientation measurements displaying time and frequency.



Display on Master
Computer

SPEED MEASUREMENTS

CW-219 series models are able to measure (constant) speeds by means of a current input. This allows the user to define speed-dependent alarm thresholds, for example. Scaled accordingly, the measured speed information can in turn be forwarded via a 4-20 mA interface and utilized for control and monitoring purposes.

The CW-220 model has been designed for monitoring tasks in systems operating at variable speeds, including the monitoring of speed-dependent narrow band levels (with selectable relative or absolute bandwidth). This model is equipped with a speed input with corresponding signal conditioning for direct connection with an inductive or digital rotary encoder.

FUNCTION EXTENSIONS

It is possible to extend the functionality of the CW-200 range at any time vis-a-vis the number of channels and algorithms. Controlled via a single bus and a common configuration screen, it is possible to deploy practically any number of devices independent of one another. In addition to the option to extend the number of channels, CW-220 type models are also designed to facilitate cascading and synchronization.

It is possible to control the devices jointly or individually via CAN bus (CW-102/103 also via Ethernet) and extend their functionality at any time by implementing upgrades.

CUSTOM SOLUTIONS OEM PLATFORM

All models belonging to the CW-200 series utilize a modern signal processor for monitoring and analyzing purposes: this makes it possible to implement additional application and customer-specific evaluation processes for

OPTIONS AND ACCESSORIES

Hardware and software modules are available to extend the basic functions of the CW-200 range of products:

1. Interface option 01: CAN-USB connection via cable adapter CW-101
2. Interface option 02: Ethernet by additional interface CW-102 for LAN
3. SW module 01: Several selectable frequency bands to monitor associated RMS value
4. SW module 02: Low-speed options for speed ranges up to max. 600 rpm on request

atypical monitoring tasks. As a consequence, the CW-200 series offers a flexible and efficient platform to meet your requirements - including special and OEM solutions.

VIBRATION MONITOR SERIES CW-200				
	Machines operating at constant speeds			Machines operating at variable speeds
	CW-219A	CW-219B	CW-219C	CW-220C
MEASUREMENT VARIABLES/INPUTS				
Vibration, ICP® input	✓	✓	✓	✓
Process variable 1: Current input (4-20 mA)	✓	✓	✓	✓
Process variable 2: Current input (4-20 mA)	✓	✓	✓	✓
Process variable 3: Voltage input (0-2 V)	✓	✓	✓	✓
Speed, inductive or digital sensor				
Difference input (position mark)			On request	On request
CALCULATED QUANTITIES				
RMS value vibration acceleration	✓	✓	✓	✓
RMS value vibration velocity	✓	✓	✓	✓
Shock level to monitor bearings	✓	✓	✓	✓
Crest factor		✓	✓	✓
Narrow band level		2 bands	3 bands	3 bands
Speed-controlled narrow band level				3 bands
OUTPUTS				
Scalable current outputs (4-20 mA)	2	3	3	3
Relay outputs	2	2	2	2
CAN-Bus ²	✓	✓	✓	✓
LAN (with CW-102)	Optional	Optional	Optional	Optional
Vibration time signal (monitor socket)	✓	✓	✓	✓
OTHER FUNCTIONS				
Learning mode	✓	✓	✓	✓
Extended RMS frequency band settings		✓		
Flexible RMS frequency band settings			✓	✓
Long-term trend memory (flexible setting options)			✓	✓
Process-variable dependent alarm thresholds		✓	✓	✓
Multi-dimensional performance data sets for alarm			On request	On request

² CAN-USB-adapter CW-101 included in scope of supply

MEASURING VIBRATION

Sensor type	Combined sensor to measure vibration and temperature or discrete vibration sensors: Vibration: IEPE (ICP®), 4 mA at 20-30 V Sensitivity 10-1000 mV/g Resolution 4 mg with a sensitivity of 100 mV/g
Signal ranges	Dynamic: autoranging up to 50 g
Digital weighting filter	Transient shock: HP 1 kHz, 2 kHz, 4 kHz, 6 kHz (selectable) Up to 50 kHz to sense transients RMS value: For each CW-219/220 (default): 10 Hz to 1 kHz to DIN ISO 10816-1 and 2 Hz to 1 kHz, 2 kHz, 3 kHz, 5 kHz (selectable) For CW-219B only: Additional lower cut-off frequencies: 20/50/100 Hz For CW-219C/CW-220C only: User-adjustable lower cut-off frequency: 2-500 Hz User-adjustable upper cut-off frequency: 200-5000 Hz

INPUTS

Process variable 1	Current (0-20 mA), scalable signal range, e.g. for speed, temperature, load, pressure, etc.
Process variable 2	Current (0-20 mA), scalable signal range, e.g. for force, load, speed, differential pressure, etc.
Process variable 3	Voltage (0-2 VDC), scalable signal range, e.g. for combined vibration/temperature sensor

ROTARY/SHAFT-ANGLE ENCODERS (for CW-220C only)

Speed input	Active or passive rotary encoder (e.g. inductive sensor)
Number of pulses	1 to 720 pulses per rotation, adjustable
Maximum frequency	36 kHz
Reference pulse	1x per rotation to determine position

OUTPUTS

Current interface	4-20 mA signal range, galvanically isolated, with 2 mA alarm (adjustable), displays <ul style="list-style-type: none"> RMS value vibration, linear, absolute Transient shock level in dB, reference: learn value Temperature, linear, absolute Alternative speed, linear, absolute
Switching relays	1x NO, 1x NC with safety control circuit configurable alarms Max. switching voltage: 48 VDC; max. switching current: 1 A
Monitoring	Non-weighted analogue sensor signal (picked up behind pre-amplifier)

INTERFACES

Configuration and online mode	CAN (optional: CANopen, CAL, etc.) USB in conjunction with CW-101 LAN,
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POWER SUPPLY

Supply voltage	24 VDC nominal (20-30 VDC)
Current consumption	Approx. 80 mA at 24 VDC
Galvanic isolation	Current interfaces, CAN

GENERAL

Temperature range	-10°C to +70°C
Degree of protection	IP20
Housing	Top-hat rail housing with screw terminals (WxHxD: 45 mm x 120 mm x 120 mm)