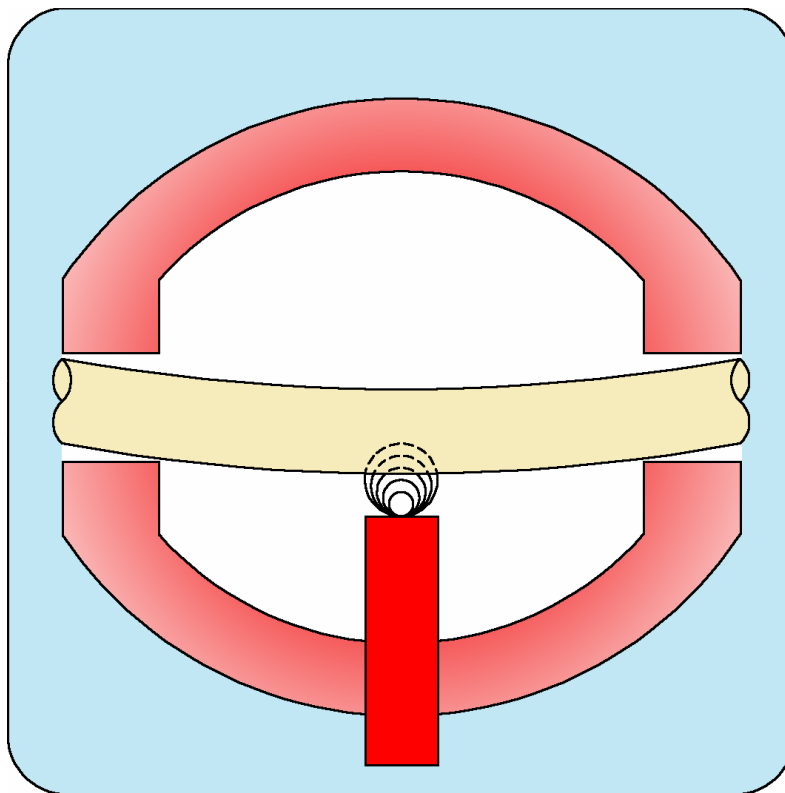


# MMS 6220

## Dual Channel Eccentricity Monitor



- Part of the MMS 6000 machine monitoring system
- Integrated micro controller
- Usable with epro eddy current sensors of the PR 642X series
- Recording and storing of characteristic values of the last run-up resp. run-down.
- Self-test functions for electronic circuits and transducers
- RS 232 interface for configuration and reading out of measuring results
- RS 485 interface for connection to epro's MMS 6850 analysis and diagnosis system or to host computers

### Applications:

The **MMS 6220** dual channel eccentricity monitor processes relative radial shaft vibration signals of eddy current sensors with the following signal evaluations:

- peak – peak
- minimum / maximum

These measurements serve the construction of turbine protection systems.

They provide signals for analysis and diagnosis systems to be further processed in field bus systems host computers and networks

The cards of the **MMS 6000** family are suitable to build up systems for increasing performance, efficiency and operational safety of the monitored units such as steam, gas- and water turbines and to extend the machines' life times.

By means of a laptop computer connected to the RS 232 interface, parameters and operation modes of the monitor may be configured. Moreover, the measured characteristic values, the order analysis as well as data of the last run-up or run-down can be visualized.

## Technical Data:

### Sensor inputs:

Two independent signal inputs for eddy current measuring chains. The signal inputs are differential inputs, galvanically isolated from the power supply.

**Input impedance:**  
≥100 kOhm

**Input voltage range:**  
-1...-23 V DC

**Signal frequency range:**  
0,017...70 Hz  
(1,02...4200 rpm)

**Signal voltage range:**  
**Minimum range:**  
0...400 mV<sub>peak</sub>  
**maximum range:**  
0...8000 mV<sub>peak</sub>

within this range any value freely selectable

### Sensor supply:

Each sensor has an own output buffer, galvanically isolated from all system voltages and the power supply of the monitor. Open circuit and short-circuit proof. Parallel connection with other monitors possible without mutual influences.

**Nominal voltage:**  
-26,7 V DC

**Maximum supply current:**  
typ. 20 mA; max. 35 mA

### Control inputs:

Common logic inputs for both channels.

For choosing operating mode and limit values for „warning“ and „danger“:

- open circuit or closed circuit mode
- locking of monitor

Measuring range multiplier to modify the alarm limits during run-up or run-down.

### Adjustable range:

1,000 to 4,999  
24 V Logic

**Input resistance:**  
≥ 30 kOhm

### Key pulse input:

One pulse per revolution; input for system control  
24 V logic

**Input resistance:**  
≥ 30 kOhm

**Pulse duration:**  
Min. 10 μs (edge triggering)

### Voltage inputs:

Two, one for each channel.  
0...10 V

**Input impedance:**  
≥100 kOhm

**Resolution:**  
10 bit

## Measuring modes:

Each channel must individually be configured via the available interfaces. The configuration may be changed any time during operation (in this case the measuring operation of the monitor will be interrupted for approx. 60 sec, the alarms will be enabled again after another 60 sec).

### Measuring modes for the dual channel mode:

- peak – peak measurement
- minimum / maximum measurement
- continuous gap measurement

## Programmable measuring parameters:

- Measuring range
- Measuring units
- Sensor sensitivity
- Warning and alarm limits
- Channel identification:  
Adjustable by means of KKS numbers or freely selectable designations.

## Limit supervision:

Four separately adjustable limit values per channel. The alarms may be disabled by means of the monitor-locking function, error messages or with an external signal. After loading configuration parameters, the alarm function is disabled for a period of approx. 120 sec (delay time 60 sec plus alarm enable after another delay time of 60 sec).

**Adjustment range limit values:**  
5...100% of f.s.d

**Resolution and reproducibility:**  
1‰ of f.s.d

**Delay time:**  
1-2-3-4-5-6 s, adjustable

**Switching characteristics:**  
rising signal level

### Switching hysteresis:

configurable (standard 5%, only at falling signal levels)

### Outputs:

via potential-free optocoupler outputs at the rear connector

$U_{\max}$  = 48 V DC  
 $I_{\max}$  = 100 mA

## Prerequisites:

**Since an eccentricity measurement requires a full shaft revolution, the triggering of the measuring amplifier with a key signal is necessary.**

To obtain a key-signal, a trigger mark on the shaft, a sensor to measure the key-signal (e.g. PR 6423/.. with CON 011) as well as a MMS 6310 module for processing the key-signal are required.

Please refer also to data sheets MMS 6310 or MMS 6312.

## Monitor / Sensor supervision:

The internal module supervision comprises the following functions:

- Sensor signal within a predefined good range
- Wiring between sensor and monitor (short-circuit, interruption)
- System supply voltage within predefined limits
- Configuration and parameter setting OK
- Measuring values within measuring range

- Operating temperature of the monitor
  - System Watch - Dog
- During the change from the error to the ok-state and after power-on of the module, all functions of the module are blocked for a delay time of 60s (alarm enable after a delay time of another 60sec).
- „A green LED on the module front indicates the "Channel clear" state. During an error state, this LED is switched off, during the delay period it flashes.

The states for both channels are output to the connecting strip at the rear via optocouplers for the purpose of galvanical isolation.

$$U_{\max} = 48 \text{ V DC}$$

$$I_{\max} = 100 \text{ mA}$$

Reasons for module disturbances can be read out in detail via the communication interface. This permits the technicians to remove the reason for the fault immediately.

## Signal outputs at the connecting strip:

### Connecting strip:

according to type F48M, DIN41612 communication interface RS485

### One current output per channel:

proportional to chosen measuring quantity and range.

### Nominal range:

0/4...20 mA  
open circuit and short-circuit proof

### Permissible burden:

≤ 500 Ohm

### Resolution:

16 bit

### Accuracy:

±1% of f.s.d

### Settling time:

0...10 sec, adjustable in steps of 1 sec separately for each channel.

### One voltage output per channel:

proportional to chosen measuring quantity and range.

### Nominal range:

0...+10 V  
open circuit and short-circuit proof

### Load resistance:

≥ 10 kOhm

### Resolution:

8 bit

### Accuracy:

±1% of f.s.d

### One voltage output per channel:

proportional to the sensor signal.

### Nominal range:

0...10 V DC (NGL)  
open circuit and short-circuit proof

### Load resistance:

≥ 10 kOhm

### Accuracy:

± 1% of f.s.d.

### Resolution:

12 bit

## Operating elements on the module front:

Two sensor signal outputs, independently from each other, one for each channel:

The signals are proportional to the sensor signals and can be tapped at the SMB sockets on the module front.

Range: 1...-24 V  
open circuit and short-circuit proof  
Load resistance: ≥ 100 kOhm  
Internal resistance: 1 kOhm  
Frequency range: 0...16 kHz; ±20%

### 2 green LED's:

indicate "Channel Clear" separately for channel 1 and channel 2.

### 4 red LED's:

indicate pre and main alarm separately for both channels.

### Alarm:

LED flashes

### Danger:

LED permanently switched on

### 1 Mini DIN diode socket:

RS232 interface for connection of a computer for configuration purposes and data interchange with the monitor.

### Handle:

To pull out and insert the monitor and for labeling purposes.

## Power supply:

Redundant supply input via two supply inputs, decoupled via diodes. At least one supply input is required for the supply of the module.

### Supply voltage:

18...24...31.2 V DC according to IEC 654-2, class DC4

### Power consumption:

max. 6 W (max. 250 mA at 24 V)

Other supply voltages can be realized with additional system power supplies.

## Max. system extension:

At standalone operation, the number of modules in a system is unlimited.

Max. 31 modules / 62 channels may be operated at one RS 485 bus.

If more modules / channels are necessary, e.g. with an MMS 6815, another RS 485 bus must be installed.

## Environmental conditions:

### Protection class:

Monitor: IP 00 according to DIN 40050  
Front plate: IP21 according to DIN 40050

### Climate conditions:

according to DIN 40040 class KTF  
Operating temperature range:  
0...+65°C

### Temperature range for storage and transport:

-30...+85°C

### Permissible relative humidity:

5...95%, non condensing

### Permissible vibration:

according to IEC 68-2, part 6

### Vibration amplitude:

0.15 mm in range 10...55 Hz

### Vibration acceleration:

16.6 m/s<sup>2</sup> in range 55...150 Hz

### Permissible shock:

according to IEC 68-2, part 29 peak value of acceleration:

98 m/s<sup>2</sup>

nominal shock duration:

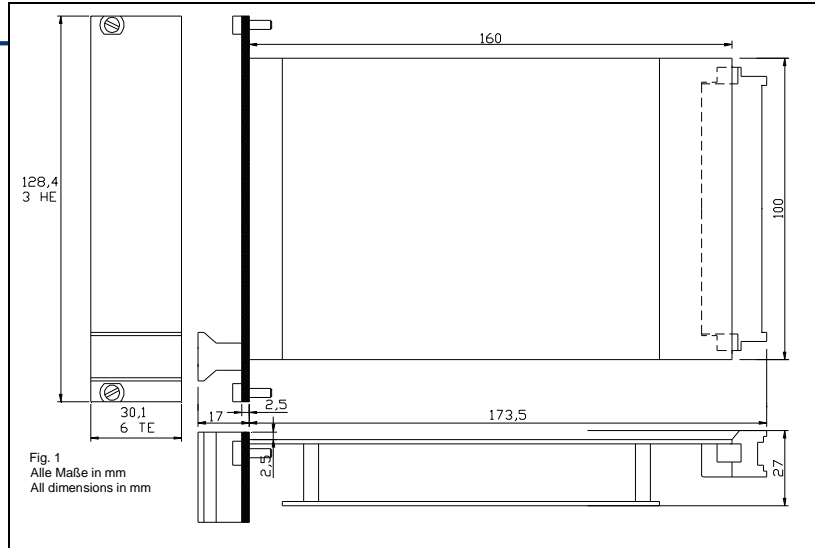
16 ms

### EMC resistance:

according to EN50081-1 / EN50082-2

**Dimensions:**

PCB/euro card format according to DIN 41494 (100 x 160 mm)  
 Width: 30,0 mm (6 TE)  
 Height: 128,4 mm (3 HE)  
 Length: 160,0 mm  
 Net weight: approx. 320 g  
 Gross weight: approx. 450 g including standard export packing  
 Packing volume: approx. 2.5 dm<sup>3</sup>  
 Required space: 14 Monitors (28 channels) per 19" frame



**Requirements on configuration PC:**

Configuration of modules is made via the RS 232 interface on the module front or via the RS 485 bus by means of a computer (laptop) with the following minimum specifications:

**Processor:**

Intel Pentium®, 266 MHz

**Interfaces:**

one free RS 232 interface (COM 1 or COM 2) with FIFO type 16550 UART

**Capacity of hard disk:**

30 MB

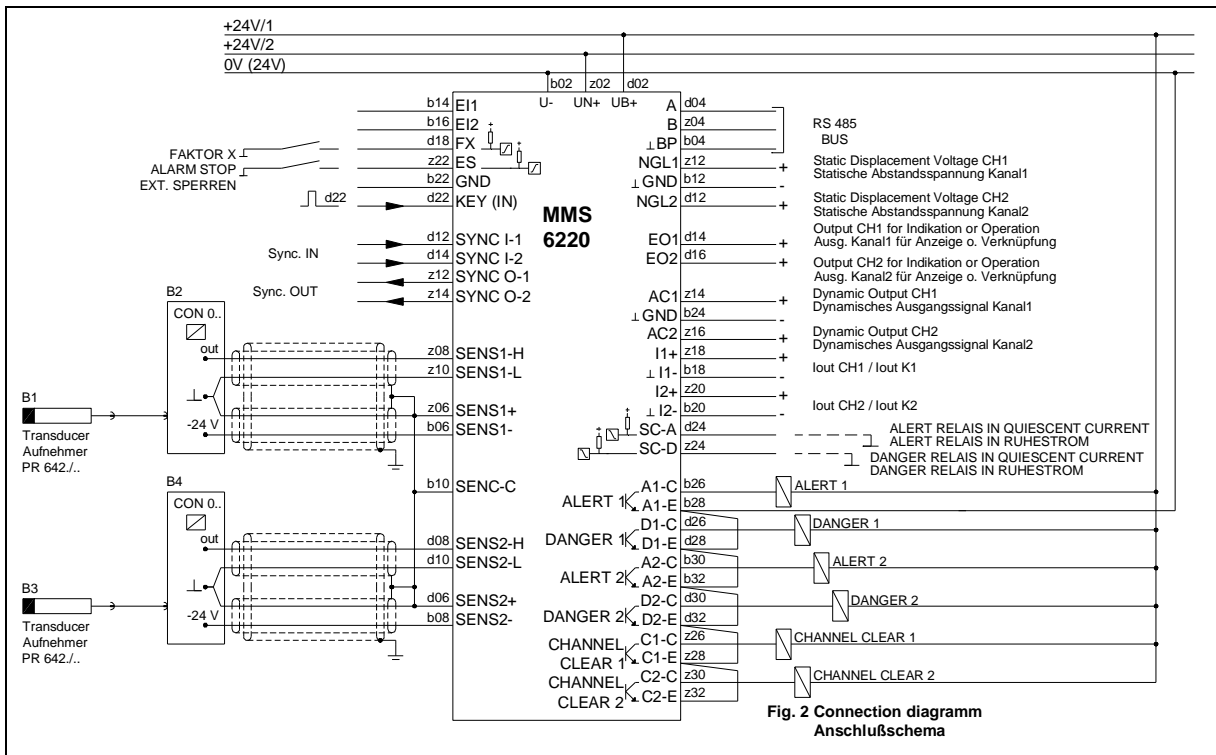
**Required working memory:**

32 MB RAM

**Operating system:**

Windows® 95/98, NT 4.0, 2000 or XP

**Connection diagram:**



**Order numbers:**

|                   |  |                     |
|-------------------|--|---------------------|
| <b>MMS 6220</b>   | Dual channel measuring amplifier for eccentricity measurement .....                                    | <b>9100 – 00009</b> |
| <b>MMS 6910 W</b> | Operating accessories .....  | <b>9510 – 00001</b> |
|                   | consisting of: operating and installation manual, configuration software and various connection cables |                     |

The F48 M mating connector has to be ordered separately, depending on the intended wiring technology.

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