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# 2019

## Epro MMS6210 Datasheet



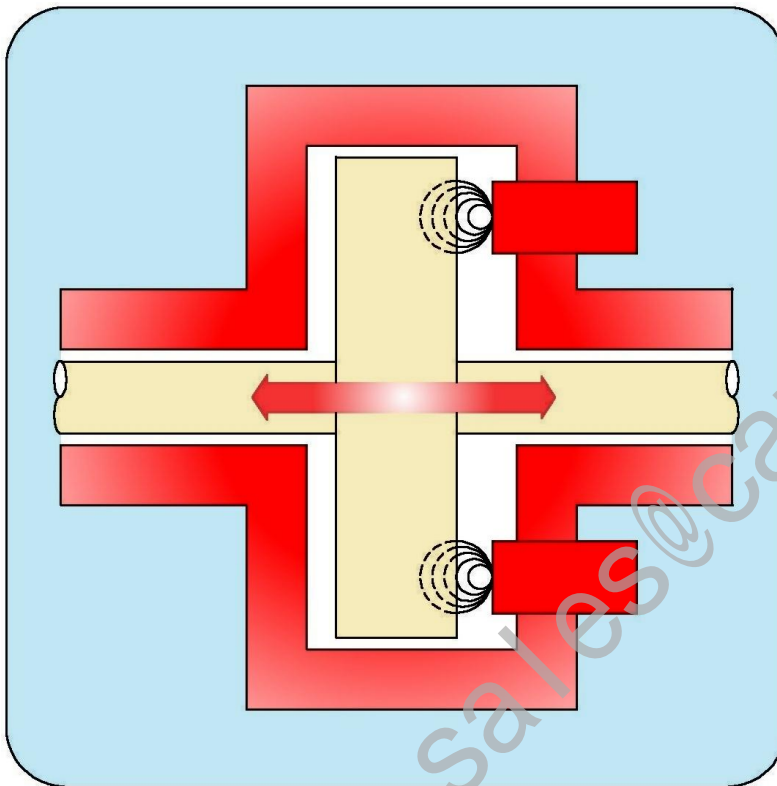
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2019/3/25

# MMS 6210

## Dual Channel Shaft Displacement Monitor



- Part of the MMS 6000 System
- Replaceable during operation; stand alone use possible, redundant supply inputs
- Extended selfchecking facilities; built in sensor-self-test facilities; password protected operating levels
- For use with eddy-current type transducer systems PR 6422 / ... to PR 6426 / ... with CON / ...
- Readout of all measured data via RS 232 / RS 485
- Built-in linearisation facilities
- RS 485 interface for communication with epro's Analysis and Diagnostic System MMS 6850

### Applications:

The **Dual Channel Shaft Displacement Measuring Module MMS 6210** measures shaft movements such as: axial shaft positions at shafts ends, rectangular or conical discs also in tandem configurations, differential and thermal expansions as well as radial shaft positions and shaft bendings. It uses outputs from eddy-current type

displacement transducers. These measurements are recommended among and together with others to build up Turbomachine Protection Systems and provide the inputs requested by Analysis and Diagnosis Systems and to provide the inputs requested by Analysis and Diagnostic Systems, Field Bus Systems, Distributed Control Systems, plant/host

computers and networks as e. g. WAN/LAN, Ethernet. Such Systems are also suitable to build up systems to increase the performance and efficiency, the safety of operation and extend the lifetime of machines such as steam-gas-hydro turbines as well as compressors, fans, centrifuges and other turbomachines.

## Technical data:

<b>Sensor inputs:</b> Two independent inputs for eddy-current type sensor systems. Sensor inputs are of the differential type, galvanically separated from the power supply. Input resistance: > 100 kOhm Input voltage range: 0 ... -22 V dc Input frequency range: 0 ... 8 Hz (10 Hz / 3 dB)	These outputs are galvanically separated from all system-voltages as well as from the system supply-voltage. Open and shortcircuit proof. Can be operated in parallel with other modules without interference. Nominal voltage: - 26,7 Volts dc, Available current: nom. 20 mA / max. 35 mA	24 V logic Input resistance: > 10 kOhm  <b>Key pulse input:</b> Key pulse (1 puls per rev.) input for system control 24 V logic Input resistance: >10 kOhm Pulsduration: min. 10 microsec. (slope triggering)
<b>Measuring ranges:</b> Continuously adjustable with the configuration software.	<b>Control inputs:</b> Common logic binary inputs for both channels: To select optocoupler mode: „alert“; make or brake mode „danger“; make or brake mode. Channel or module inhibit. Measuring range multiplication to change the alarm levels during start-up and castdown; adjustable with a factor of 1,0000 ... 4,9999.	<b>Voltage inputs:</b> two, one for each channel Only for FFT applications. 0 ... 10 Volts Input resistance: >100 kOhm resolution: 10 bit
<b>Sensor supply:</b> For each of the two sensor input channels a separate buffered sensor supply output is available.		

## Measuring modes:

(Each channel to be individually configured) Different measuring modes can be configured via an externally connected laptop (RS 232 connector on the frontpanel of the module) or via the communication bus. Measuring modes can be changed at any time during operation (function of the module is interrupted for approx. 15 sec.).	<b>Modes for each individual channel:</b> Axial shaft movements Axial shaft positions Measures against rectangular and conical discs Measures differential and thermal expansions Measures radial shaft positions and shaft bendings	<b>Modes for the two channels in combined use:</b> Measurements in tandem configuration Minimum/maximum out of two channels Measurements on conical discs with compensation of e. g. temperature or radial shaft displacements Measurements on double conical shaft parts Double channel measurements acc. to API 670
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## Programmable measuring parameters:

Measuring range Engineering units Sensorsensitivity Warning and alarm levels Channel identification: By means of KKS numbers or a freely selectable name.	Order analysis functions: The following parameters derived from an order analysis carried out in the moduls built in microcontroller are available via the RS 485 / RS 232 communication bus:
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## Limit supervision:

For each channel two separately adjustable alarm levels are available. The alarm functions can be blocked by the channel clear/circuit fault function or by an external input. After downloading of a new configuration the alarms are blocked for 15 sec. settling time.	Adjustable range: 5...100 % of fsd. Resolution and reproducibility: 1 ‰ of fsd Delay time: 1-2-3-4-5-6 sec. selectable Switching characteristic: with increasing signal level	Switching hysteresis: 5 % of fsd (only effective during decreasing signal values) Outputs: Via potential free opto couplers on the rear strip connector. $U_{max} = 48 \text{ V dc}$ $I_{max} = 100 \text{ mA}$
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## Module and sensor supervision:

Channel clear/circuit fault sensing system; the internal modul supervision circuitry continuously supervises the following functions: Sensor signal is within a preset window. Cabling between sensor and modul is ok (no shortcircuit, no break). System supply voltages are within preset windows. Configuration and parameter settings are correct. Measuring range not overloaded.	Internal temperature not overloaded. System watch dog. During changing from a sensor malfunction into the ok status or after switching on the modul a delay time of 15 sec. is operable. "Channel clear" is visualised on the front of the module by means of a green LED; this LED switches off during a "channel fault"; during the delay time the LED flashes. The channel status is also indicated via a	binary output, separately for each of the two channels. $U_{\max} = 48 \text{ V dc}$ $I_{\max} = 100 \text{ mA}$ The reasons for a "channel fault" indication can be read out via the communication buses; which enables service personnel to take immediate corrective measures.
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## Signal outputs at the connecting strip:

Terminal strip on rear side: acc. to DIN 41 612, version F 48 M	in increments of 1 sec. separately for each channel.	open and shortcircuitproof. Nominal range: $0 \dots 20 \text{ V}_{pp}$ Permissible load: $> 10 \text{ k}\Omega$ Frequency range: $0,1 \text{ Hz} \dots 16 \text{ KHz}$ ( $\pm 20\% / -3 \text{ dB}$ )
<b>RS 485 communication interface.</b>	<b>Two independent voltage outputs:</b> One for each channel; outputs are proportional to the selected operating mode	<b>Two independent voltage outputs:</b> One for each channel; proportional to the DC part of the signal (shaft position) are available. open and shortcircuit proof. Nominal range: $0 \dots 10 \text{ Volt dc}$ Permissible load: $> 10 \text{ k}\Omega$ Accuracy: $\pm 1\%$ of range; Resolution: 12 bit
<b>Two independent current outputs:</b> One for each channel; outputs are proportional to the selected operating mode (e. g. shaft vibration amplitude $S1_{op}$ ) $0/4 \dots 20 \text{ mA}$ ; configurable, open- and shortcircuit proof Permissible load: $< 500 \text{ Ohms}$ Accuracy: 16 bit resolution; $\pm 1\%$ of full range Settling time: $0 \dots 10 \text{ sec.}$ ; configurable	<b>Two independent voltage outputs:</b> One for each channel; proportional to the DC part of the signal are available; one for each channel.	

## Operating elements at the module front:

<b>Two independent voltage outputs:</b> identical to the transducer system inputs are available via SMB sockets; one for each channel. Range: $-1 \dots -24 \text{ Volts}$ Load: $> 100 \text{ k}\Omega$	<b>2 green LED's:</b> Indicate "channel clear" separately for channel 1 and channel 2.  <b>4 red LED's:</b> Indicate "alert" and "danger" separately for channel 1 and channel 2, for two positive and two negative values.	<b>1 Mini-DIN diode type socket:</b> As input for the configuration cable RS 232 communication interface.  <b>Handle:</b> To pull out or insert modul with identification labelling facility
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## 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.  <b>Supply voltage:</b> $18 \dots 24 \dots 31,2 \text{ V DC}$ according to IEC 654-2, class DC4	<b>Power consumption:</b> max. $6 \text{ W}$ (max. $250 \text{ mA}$ at $24 \text{ V}$ )  Other supply voltages can be realized with additional system power supplies.	At standalone operation, unlimited number of modules.  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.
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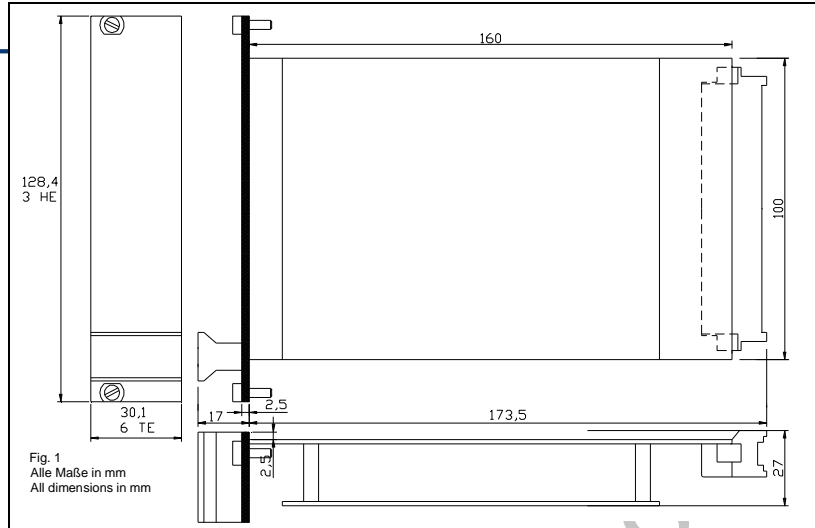
## System design:

## Environmental conditions:

<b>Protection class:</b> Module: IP 00 according to DIN 40050 Front plate: IP21 according to DIN 40050	<b>Permissible relative humidity:</b> $5 \dots 95\%$ , non condensing	<b>Permissible shock:</b> according to IEC 68-2, part 29 peak value of acceleration: $98 \text{ m/s}^2$ nominal shock duration: 16 ms
<b>Climate conditions:</b> according to DIN 40040 class KTF operating temperature range: $0 \dots +65^\circ\text{C}$	<b>Permissible vibration:</b> according to IEC 68-2, part 6 <b>Vibration amplitude:</b> $0,15 \text{ mm}$ in range $10 \dots 55 \text{ Hz}$	<b>EMC resistance:</b> according to EN50081-1 / EN50082-2
<b>Temperature range for storage and transport:</b> $-30 \dots +85^\circ\text{C}$	<b>Vibration acceleration:</b> $16,6 \text{ m/s}^2$ in range $55 \dots 150 \text{ Hz}$	

**Dimensions:**

PCB/EURO card format acc. 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: app. 320 g  
 Gross weight: app. 450 g  
 incl. standard export packing  
 Packing volume: app. 2,5 dm<sup>3</sup>  
 Space requirements:  
 14 modules (28 channels) fit into each  
 19" rack



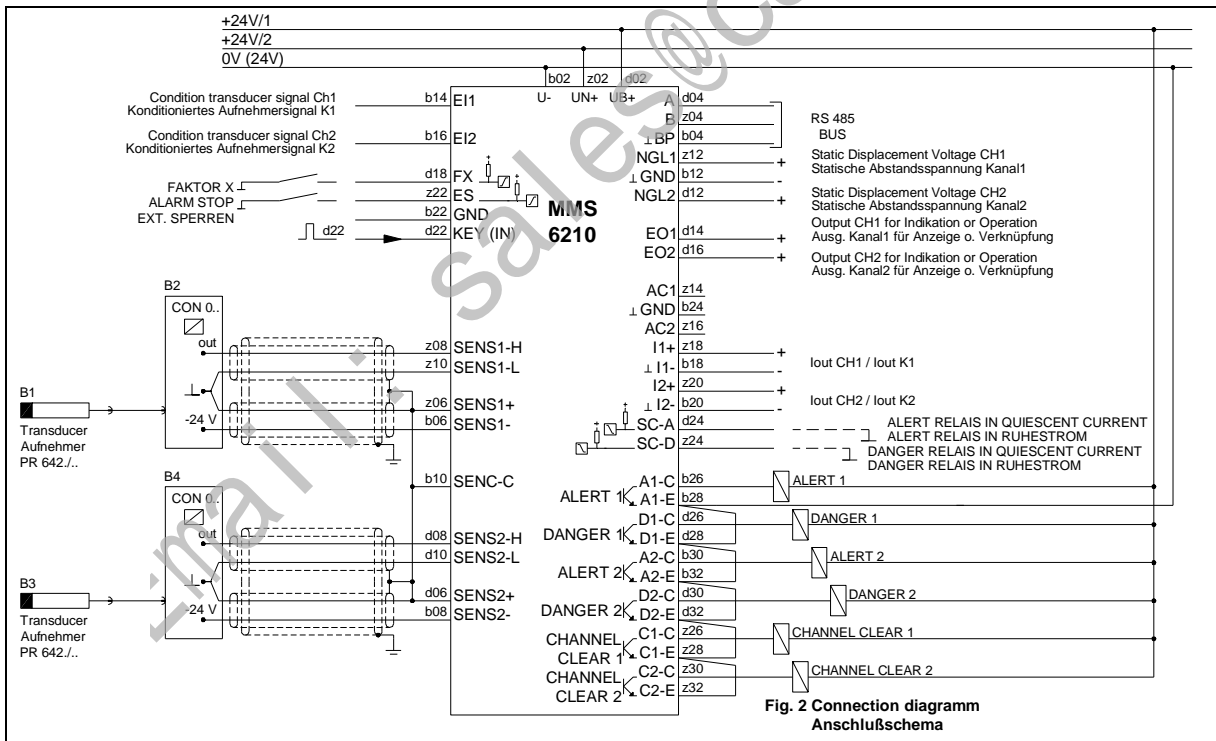
**Requirements on configuration PC:**

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:**  
 486 DX, 33 MHz  
**Interfaces:**  
 one free RS 232 interface (COM 1 or COM 2) with FIFO type 156550 UART

**Capacity of fixed disk:**  
 min. 5 MB  
**Required working memory:**  
 min. 620 KB  
**Operating system:**  
 MS DOS Version 6.22 or higher or  
 WIN® 95/98 or NT 4.0

**Connection diagram:**



**Order number:**

<b>MMS 6210</b>	Dual Channel Shaft Displacement Monitor.....	<b>9100 – 00002</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 F48M mating connector has to be ordered separately depending on the intended wiring technology.

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