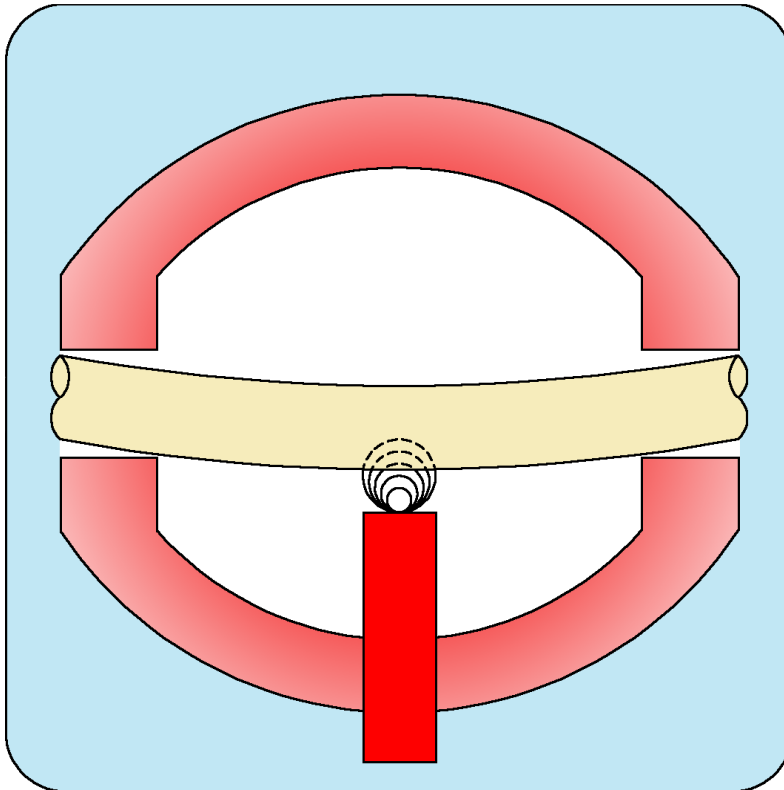


# A6220/BD

## Dual Channel Shaft Eccentricity Monitor - Bending Detector



- Part of the EMERSON / epro CSI 6000 Machine Monitoring System
- Special version of CSI A6220 monitor with patented unique algorithm for shaft eccentricity (bend) detection
- Applicable with standard eddy current shaft vibration sensors
- Self-test functions for electronic circuits and sensors
- Part of advanced diagnostics of rotor condition
- Designed for operation of a rotor with the help of a turning gear (speed  $\geq 2$  RPM)
- This document is a supplement to the datasheet of standard A6220 monitor

### Applications:

Turbine rotors are influenced by plenty of various circumstances while operated. One of them is a heterogeneous temperature field that appears within preheating a turbine and its particular parts in terms of commissioning, rotor – stator contact and other possible effects. This kind of circumstance causes temporary deformation – bend of a rotor, which is professionally denoted as *eccentricity*.

Operation of the rotor being bent is very risky especially while passing its critical speeds with fair damping. Amplitudes of rotor vibrations get increased and this can cause machine damage or wreck as the worst case.

Shaft bending detector provides precise information to machine operators about actual rotor eccentricity.

The eccentricity diagnostics proceeds along any constant angular speed of the rotor up to 500 RPM. Operation of the rotor with the help of turning gear is one of the most frequent regimes when the diagnostics is carried out.

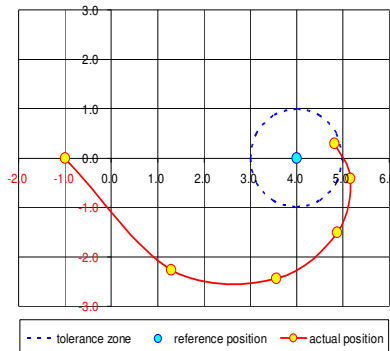
The knowledge of actual rotor eccentricity can lead to proper modifications of machine operation in order to guarantee sufficient rotor alignment before start-up (for example prolongation of the preheating period).

## Functional description:

Rotor eccentricity is represented by an instantaneous position of the first harmonic component phasor of a signal from a proximity probe in the complex plane. The signal from the proximity probe is measured along a low constant angular speed of a rotor when dynamical forces are not around.

This means that the methodology consists in determination of time development of the phasor position. Identification of the position is sequentially performed within several revolutions of a rotor and visualized.

There is established a reference position of the phasor in the complex plane together with a tolerance zone. The reference position together with the tolerance zone corresponds to the rotor being sufficiently aligned. The reference position is identified along rotation of a flat rotor. The tolerance zone is calculated and the computation is based on a static catenary curve of the rotor.



Functionality of the rotor eccentricity diagnostics is presented on the figure mentioned beneath. When the actual position of the endpoint of the phasor is found inside the tolerance zone and does not move, the rotor is sufficiently aligned and a machine can be run up. On the contrary, when the actual position of the endpoint of the phasor is found outside the tolerance zone, the rotor is bent and operators have to take actions in order to make the rotor get aligned (for example prolongation of the preheating period or turning gear operation).

## Technical data:

CSI A6220/BD hardware equals to a standard monitor CSI A6220 with the following exceptions:

Analog outputs of the 1<sup>st</sup> harmonic component:

Current outputs:

0(4)..10(12)..20 mA = -X μm..0..X μm, real part of the component

“NGL” outputs:

0..5..10 V = - X μm..0..X μm, imaginary part of the component

Binary limit outputs are not operational.

The lowest measured speed value:  
2 RPM

## Patents list:

1. EUROPEAN PATENT EP 3 055 661 B1 - A METHOD FOR DETERMINING CURRENT ECCENTRICITY OF ROTATING ROTOR AND METHOD OF DIAGNOSTICS OF ECCENTRICITY OF ROTATING ROTOR
2. KOREAN PATENT 10-1741885
3. UNITED STATES PATENT US9,593,998 B2

## Ordering information:

The A6220/BD (Note: this signification is equal to the older one MMS6220/10) card is to be ordered only via PROFESS company due to a specific configuration and testing carried out before delivery.

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



### Distributor:

PROFESS, spol. s r.o.  
Květná 5, CZ-326 00 Plzeň  
CZECH REPUBLIC  
Tel.: +420 377 454 411  
Fax.: +420 377 240 472  
email: mms@profess.cz  
Internet: www.profess.cz

