

Power-OM Exploitable Results

Embedded solution for Machine-Tool monitoring and health assessment

Nowadays, most of the available commercial process monitoring and control systems remain as add-on external hardware systems integrated to machine tool CNCs, with various available communication standards (Ethernet, Profibus, CAN, etc.), and with a clear trend towards higher HMI (Human Machine Interface) integration level as additional and flexible software modules into PC-based CNCs.

Power-OM proposed to install in each machine a module for early detection of faults using current data, by means of a method of data processing and analyzing mechanisms. To achieve the desired result, the CbM Module based on current analysis will rely on the idea that all the failures of the driven load will transform in a variation of the motor load. Current signature method can also be applied and the learning process can be simplified to do it during machine tuning. The machine in operation will perform pre-defined cycles (without load) to test and predict future failures.

In addition, the power based predictions could be complemented with the added value information that could come from the CNC and other sensors if there are present in the machine to take advantage of better failure prediction.

The fingerprint is the recorded data obtained periodically when monitoring a sensorized machine doing the same set of predefined operations. After analyzing it each fingerprint is resumed in a small amount of characteristics values.

With fingerprint it is possible to follow the status of the machine relevant components as spindle and linear axis, from its initial healthy condition. Any malfunctioning on these machine components will be reflected in the signals acquired when compared to a healthy fingerprint.

In parallel, working conditions can be also monitored as non real time data obtained from the machine. This data can be pre-processed to register the usage of the machine in, e.g. a daily basis.

These two groups of data are then made accessible to the remote server (KASEM platform) for:

- Further fleet health assessment analysis at aggregated level.
- Machine use analysis.

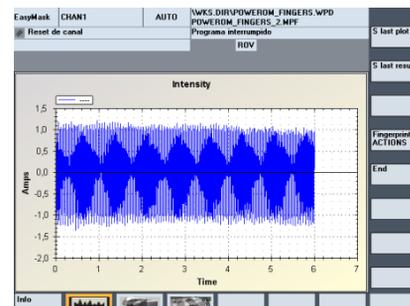
Hardware and software architecture

The proposed component can be plugged into different CNC controls as FAGOR CNC (8070) and SIEMENS (840D with Power Line and Solution Line) in different configurations. Genior Modular OA from ARTIS can be also plugged as real-time data processor/logger.

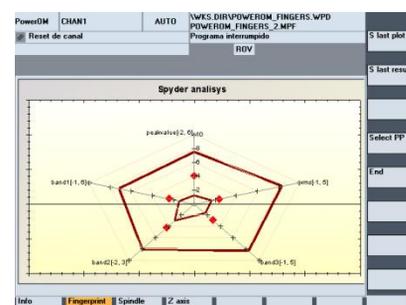
Requirements:

- SIEMENS configuration: CNC with PC based Operator Panel on Windows OS
- Access to internal CNC data option available/active:
 - FAGOR: configuration: Api8070.dll / Datalogger
 - SIEMENS configuration: OPC server / MyHMI .Net
- Recommended: Internet connection.

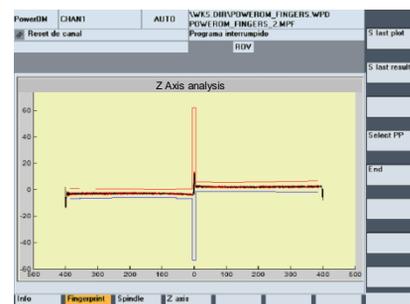
More information can be found on www.power-om.eu



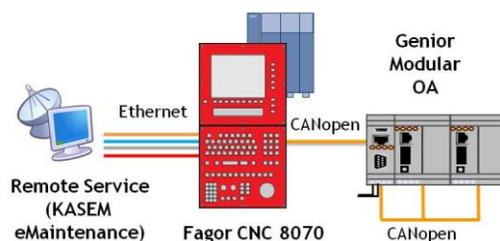
1) Embedded solution integrated in the CNC



2) Machine component (spindle) health assessment



3) Machine component (axis) health assessment



4) Architecture based on FAGOR CNC + Genior Modular OA