TMAC MP

TOOL MONITORING ADAPTIVE CONTROL

I M P R O V E

PERFORMANCE PRODUCTIVITY PROFITABILITY

OVER 30 YEARS OF MACHINE TOOL MONITORING EXPERTISE

CARON ENGINEERING

TMAC MP

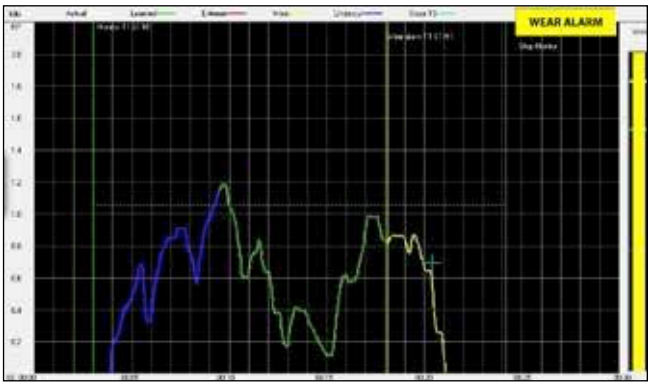
STOP THIS...

FROM BECOMING THIS...

SAVE TIME & MONEY WITH REDUCED CYCLE TIME

Protect Your CNC Machine

Tool Monitoring reduces the high costs associated with broken tools, lost production, and damaged parts by measuring wear in real-time. Adaptive Control regulates feedrates to maintain a constant spindle motor power for optimum cutting and reduced cycle time, also preventing tools from breaking. TMAC maximizes your investment in the entire machining process through optimization and the elimination of downtime, resulting in more profitability.



Protect Your CNC Machine

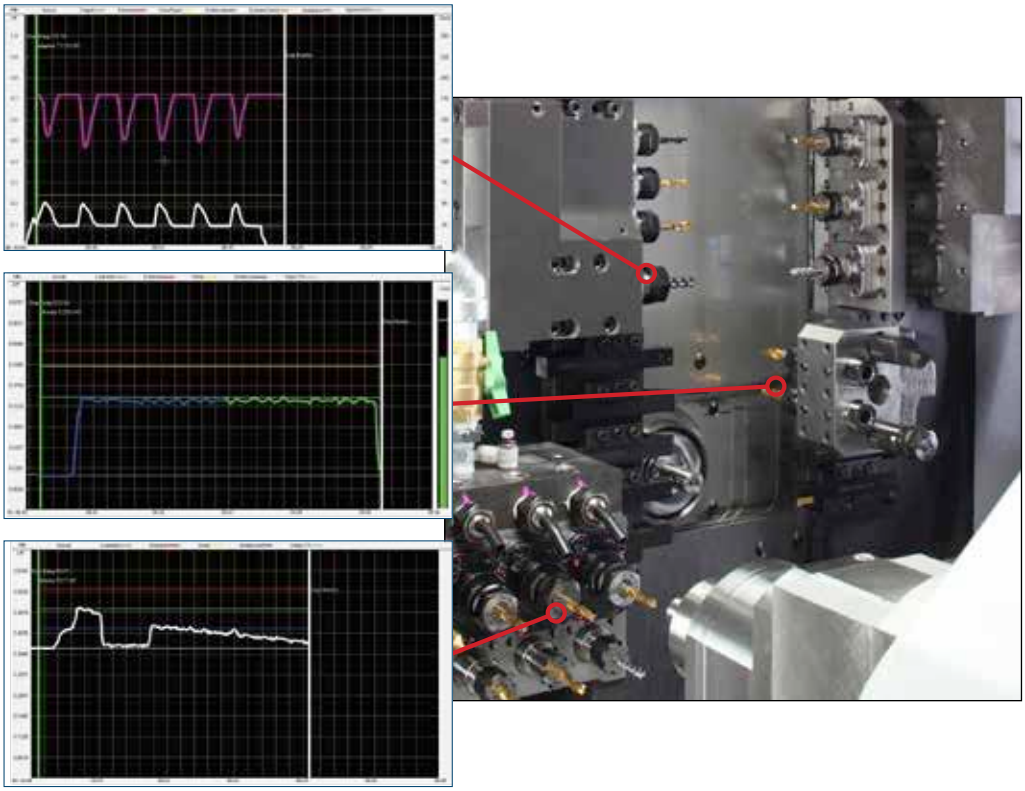
TOOL MONITORING

- Maximizes tool life by monitoring power, not guessing with cycle count or time in cut
- Immediate machine stop and retract when a tool breaks to minimize damage
- Extreme sensitivity - 0.001 hp resolution for small tools and light cuts
- Graphical display of cutting data for analysis
- Remote notification of machine alarms
- Excellent for unattended operation

Multi-Process

CAN HANDLE MANY PROCESSES SIMULTANEOUSLY

- A machine like this may have multiple tools cutting simultaneously requiring multiple separate monitoring processes.



Adapt to Changing Conditions

OUR ADAPTIVE CONTROL IS THE ANSWER

CNC programmers are challenged with varying material, cutting conditions and other factors. They are forced to program slower feedrates to handle any of these conditions. TMAC Adaptive Control takes the guesswork out of this process. TMAC learns the best horsepower for each tool and continuously maintains a constant tool load. The result? Decreased cycle time, longer cutter life, and more machine uptime, especially with difficult to machine materials.

ADAPTIVE CONTROL ADVANTAGES

- Typical cycle time savings 20% - 40%
- Allows tools to run at optimum feedrates
- Adjusts for variations in material and tooling
- Gives operators the confidence to let machines run unattended
- Adjusts feedrates smoothly versus CAD/CAM programs that can only adjust per line in the program

MONITOR YOUR TOOLS

- TMAC monitors true power (a more linear and accurate measurement of a tool's cutting force)
- TMAC can monitor vibration caused by the tool
- Both power and vibration levels increase as the tool gets dull
- All monitored data is stored and can be exported in various formats
- TMAC can also monitor low coolant flow or pressure, using optional sensors, and stop the machine before damage occurs

BENEFITS

- Alarms for extreme, wear, & undercut limits per tool
- Automatic real-time data graphing
- Easy set up to monitor tapping
- Universal interface easily adapts to CNC controls
- Monitors multiple cutting paths simultaneously
- Increased machine tool utilization with less downtime

OPTIONAL ADVANCED FEATURES

- Remotely view live data from any TMAC system on your network
- GE P11TF12 Compliant
- Alarm notifications sent via email. TMAC alarms can be emailed to any person on a list. The email includes the machine name, tool number and alarm. Text messages are also possible
- MTConnect

  TMAC data can be transferred to third party software via the industry standard MT Connect protocol

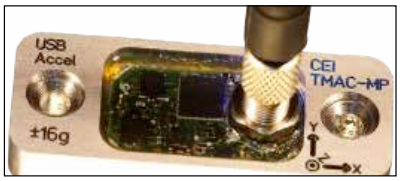
MULTIPLE SENSING OPTIONS TO MEET SPECIFIC NEEDS

POWER TRANSDUCER

Measuring true power, our Power Transducer provides a 0-10 Volt signal respective of the power being utilized. It is settable by the system to any range from 1.5-68 KW (standard).

MULTI-RANGE VIBRATION SENSORS

A single axis sensor capable of measuring vibration to 22KHZ at 64KSPS. This sensor has adjustable sensitivity and is typically used to measure tool condition.



ACCELEROMETER

A three (3) axis accelerometer is used to measure vibration in three (3) directions. These sensors can be mounted to any spindle, tooling slide or axis of motion.

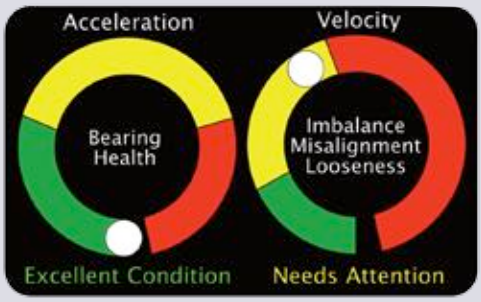
THEY CAN BE USED TO…

- Monitor the machine for impact
- Record bearing vibration
- Determine excessive bar feeder vibration

TMAC MONITORS MACHINE HEALTH

BEARING ANALYSIS

A vibration sensor is attached to the spindle, hardwired to TMAC, and the bearing analysis is initiated in the CNC part program. Results are displayed within 5 seconds and TMAC saves reports to a file for analysis.



The vibration signal is analyzed for acceleration to detect the health of the bearings, and velocity to detect misalignment, imbalance, and looseness.

MICRO TOOL SENSORS

A strain gauge sensor that is embedded in a tool holder to allow the monitoring of very small tools in a static swiss-type holder. Examples are drills, boring bars, and turning tools.

COOLANT FLOW

Monitors coolant flow. Available for a wide variety of coolant flow and pressure levels.

COOLANT PRESSURE

Measures coolant pressure in real time and allows graphing of all data. Alarms if out of specification.

SPINDLE SPEED

Accepts input from a spindle encoder or proximity switch to accurately measure spindle speed independent of the CNC control.

OTHER PRODUCTS FROM CARON ENGINEERING

SMART LIGHT

INTUITIVE STATUS LIGHT SYSTEM

- Lights provide easy assessment of a part's progress and machine condition
- Works with most existing CNC controls
- Lights can be mounted anywhere on the machine
- Status lights can be in "Steady State", "Blinking", "Flashing" or all of the above
- Controllable through the PLC
- Can replace existing 24V I/O stacklight

BASIC FEATURES

- Three different mode types (Segment, Level & Runout)
- Up to 255 different custom modes
- Six different colors (white, blue, green, yellow, red, orange), plus one (1) user defined color
- RS232 Compatible
- Programmable via USB
- Eight sourcing inputs (24V)
- Audible Alarm

AUTOCOMP

AUTOMATIC TOOL OFFSETTING

Processes gauge data and updates the tool offsets automatically, providing fast, error free tool offset control.

- Eliminates operator data entry errors
- Notifies machine operator when a tool change is needed
- Statistically controls your tool offsets to maintain acceptable tolerances of your machined parts
- Compiles and reports historical tool-wear measurements
- Accepts part measurements from most electronic gauges including Wi-Fi gauges
- The PartView feature displays dimension data superimposed on a picture of your part

TOOL CONNECT

TOOL IDENTIFICATION INTERFACE FOR THE MACHINE TOOL SIDE USING RFID

Tool Connect is a simple and cost effective way to automate the setting of tool offsets through an interface with a tool pre-setter, and RFID tags in tool holders.

- Standard control interface for:
  - Fanuc (Focas 1 or 2)
  - Okuma P controls
  - Heidenhain
  - Mitsubishi
  - Siemens
- Easy to understand operator screens
- Easy to adapt to your current system
- Simple to add additional tool ID information

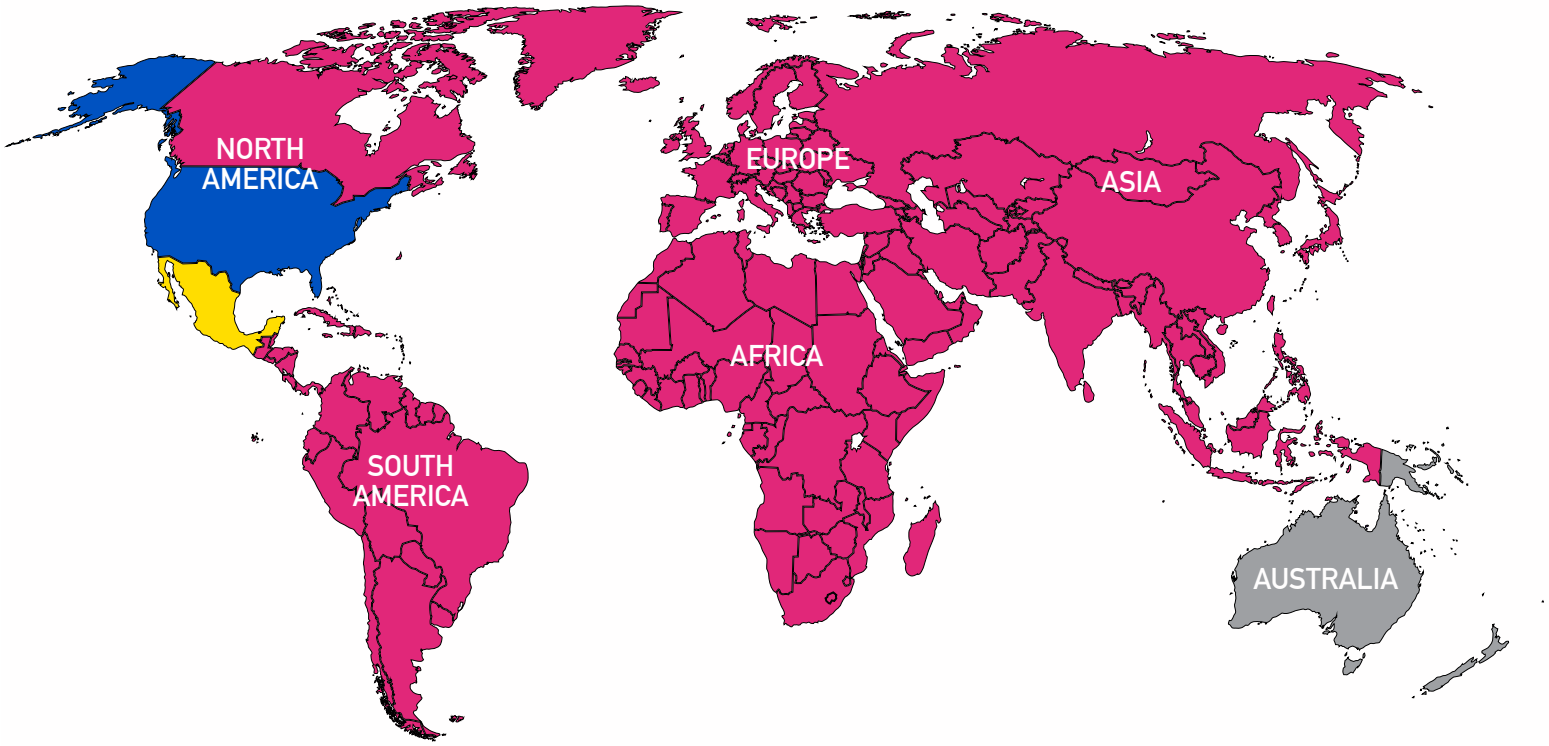
DTect IT

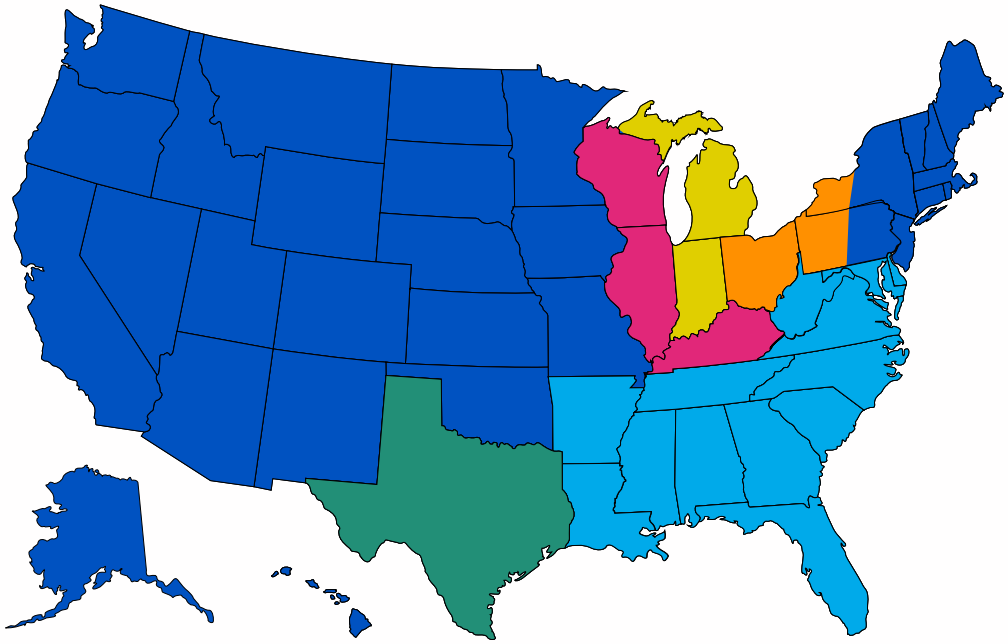
DETECTS MACHINE IRREGULARITIES

DTect-IT will monitor any area of concern on your CNC machine tool or fixture using Caron Engineering USB sensors, including vibration, strain, and analog.

- Monitoring modes include: Limit Analysis, Spindle Bearing Analysis, Fault Detection, and Data Collection Analysis
- Built-in audio sensor can record from any recognized audio device on the Windows PC and graph the data
- Limits available for lower, warning, and upper, with adjustable sensitivity
- Limits can be latched to ensure alarms are not missed
- Easily detects excessive bar feeder vibration (i.e. bent bar)
- Runs on any Windows PC with an available USB Port
- User can select any connected sensors to be monitored and graphed
- Runs standalone or easily integrates with the CNC control

CERTIFIED INTEGRATOR TERRITORIES





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