

Application report

On a A. Monforts - RNC 500 Multiturn Rotation Center



With the monitoring system

Toolinspect

Data transfer:

CNC-control:

Spindle capacity:

Processing:

Digital

Fanuc

22Kw

Stahl

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The tool and process monitoring system **Toolinspect[®]** shows the following advantages:

- At the NC program only minimal modifications are required.
- A brief instruction held by the operator is sufficient for Toolinspect
- An auto-optimized working monitoring algorithm helps to reduce machine set-up times and running-in periods and adapts the monitoring parameters automatically to the different operating conditions (temperature, tool wear, etc.).
- The system is at A.Monforts – CNC machines with different chipping processes (rotating, milling, drilling, galling, winch etc.)
- Toolinspect can be carried out with the current CNC controls.
- **(Siemens 840D/840Dsl, Bosch Rexroth, Fanuc, Indramat, Bosch, Heidenhain)**
- **Automatically system protection and data protection** on an extern CF card.
- Extern modul with an own mobile processor.
- Automatically cognition of tool change through the tool magazine and therefore no service necessary.
- **Adaptive regulation of chipping processes.**
- Turning moment data are read-out of the CNC control. Hereby higher machining speeds can be achieved.
- Selection of processing in three single segments. Hereby can be guaranteed an exact monitoring:

Contact of material (fluctuations)
Principal chipping (processing remains the same)
Final processing (possible fluctuations)

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- Fluctuations at the process are recognized automatically and the monitoring boundaries adapt themselves to the modifications without the operator's intervention.
- **Diagnosis tools for the optimization of processes** are available through Standard-Office programs.
- Processing's with really short process times <0,2s can be monitored.
- The computer's resources of the CNC control are strained only slightly.
- An expansion for the allocation of MDE/BDE data from the SPS is possible.

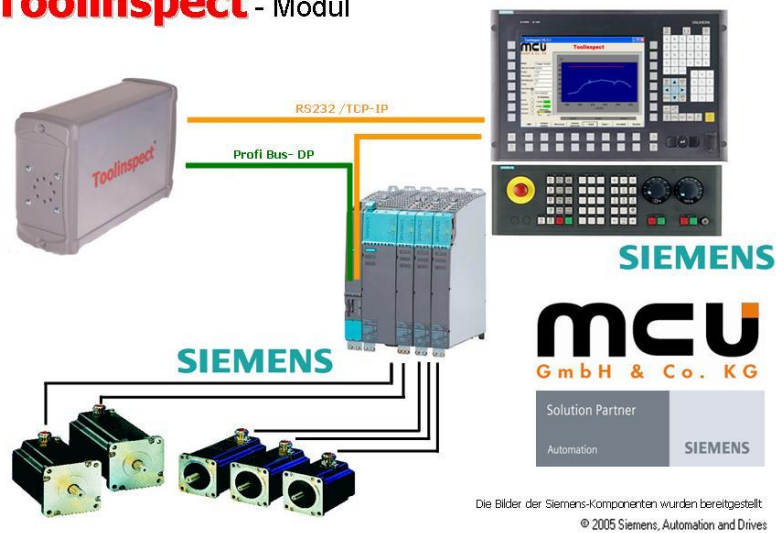
Monitoring system:

The device **Toolinspect** serves as a monitoring of tools and chipping machines. The data that is needed for this task are transferred over a Profibus-DP interface. The monitoring strategy is closed self-dependently through integrated software. The required parameters are detected by MCU GmbH & Co. KG once or by the tool machine manufacturer and are then inserted.

Pic. Siemens 840D / PCU50

Siemens 840Dsl PCU mit Toolinspect Ti/DP1

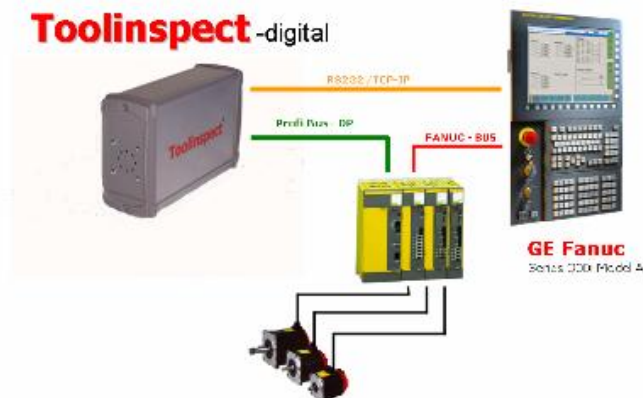
Toolinspect - Modul



Pic. GE Fanuc Series 300i Integration

GE Fanuc Series 160i bis 300i – Toolinspect TI/DP1

Toolinspect -digital



The hardware communicates with the CNC control through Profibus-DP or also through analog signals. The visualization on the control panel is connected through a TCP/IP or RS232 interface with the hardware.

A.Monforts machine tools GmbH & Co. KG Turning Centers:

The RNC-series develop flexibility for more productivity

Serial production on a high level: The RNC-series fulfills the costumers`preferences. Y-arbors, hard turning packets, automatically charge units and unload as well as extern tool gauging stations are possible. The spectrum goes in a maximal turning length from 600 mm to 1500 mm, for the swing from 420 mm to 720 mm. Naturally, there is going to make a bill on all aspects of the operational safety and of the human engineering. The working chambers of the machines are easily accessible, the doors of easy motion, the control panel is clearly arranged. The double-walled safety door has a puncture-proofed special slice and is electrically locked.

Machine models:

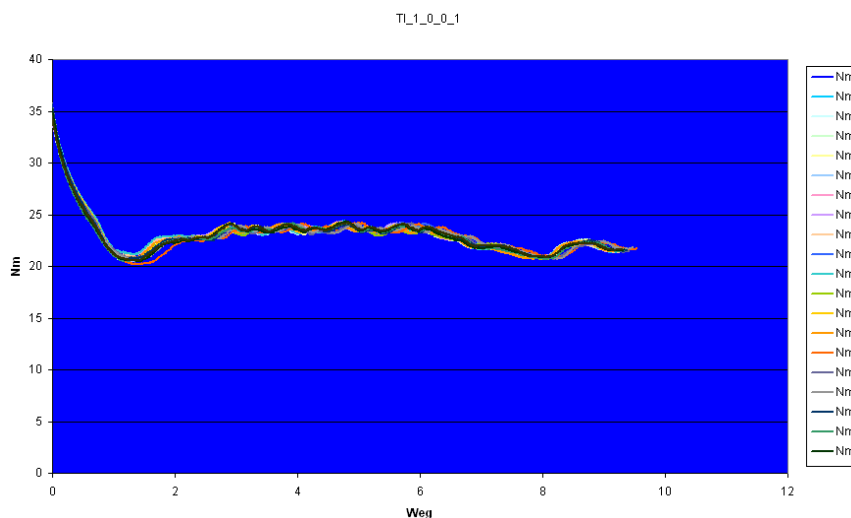
The RNC Single Turn is one of our CNC-heavy duty-2-arbors-turning machines.

The RNC MultiTurn-construction (identically constructed) additionally comes with powered tools and C-arbor.

The RNC DuoTurn-construction (identically constructed) additionally comes with an opposed spindle including a radial revolver with powered tools and C-arbor.

Chronicles:

At the installation the machine was operated with or without work pieces. The Toolinspect system could determine automatically the boundaries and parameters for the chipping.



Test result:

After the installation the machine was operated with steel work pieces. Through the Toolinspect System all the processing's such as drilling up to 4,0mm and turning could be monitored on a safe way.

As the system operation was realized through a 3 function key, a short instruction by the operator was enough.

Basic conditions:

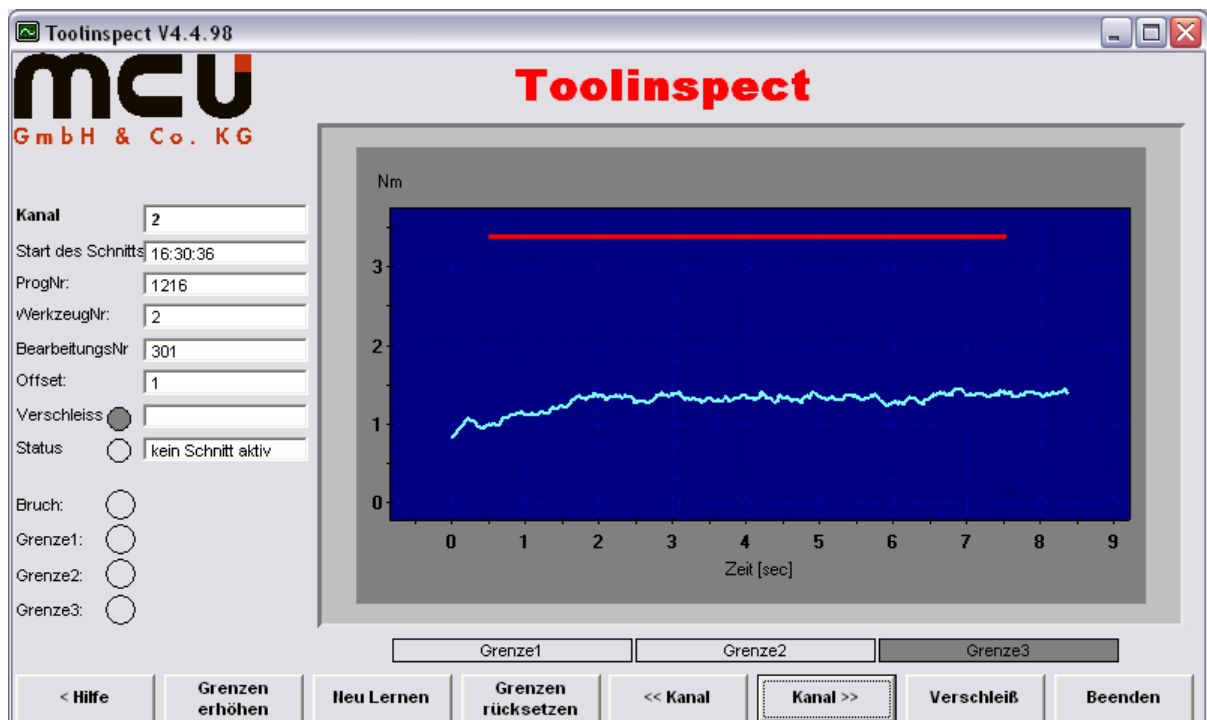
The process data were read out from the drive readout and the machine co-ordinates.

The A.Monforts RNC 500 Multiturn turning centers had an arbor with a 20Kw actuating power and revolvers with powered tools.

At this juncture the requirement was to identify a broken die.

The following pictures show an arbor as well as shunting signal values.

Pic.1 processing evaluation with a mixed signal of arbors:
Tool: Drill (Ø5mm) with chipping



Pic.2 processing evaluation with a mixed signal of arbors.
 Tool: cutting chisel (face turning) with chipping

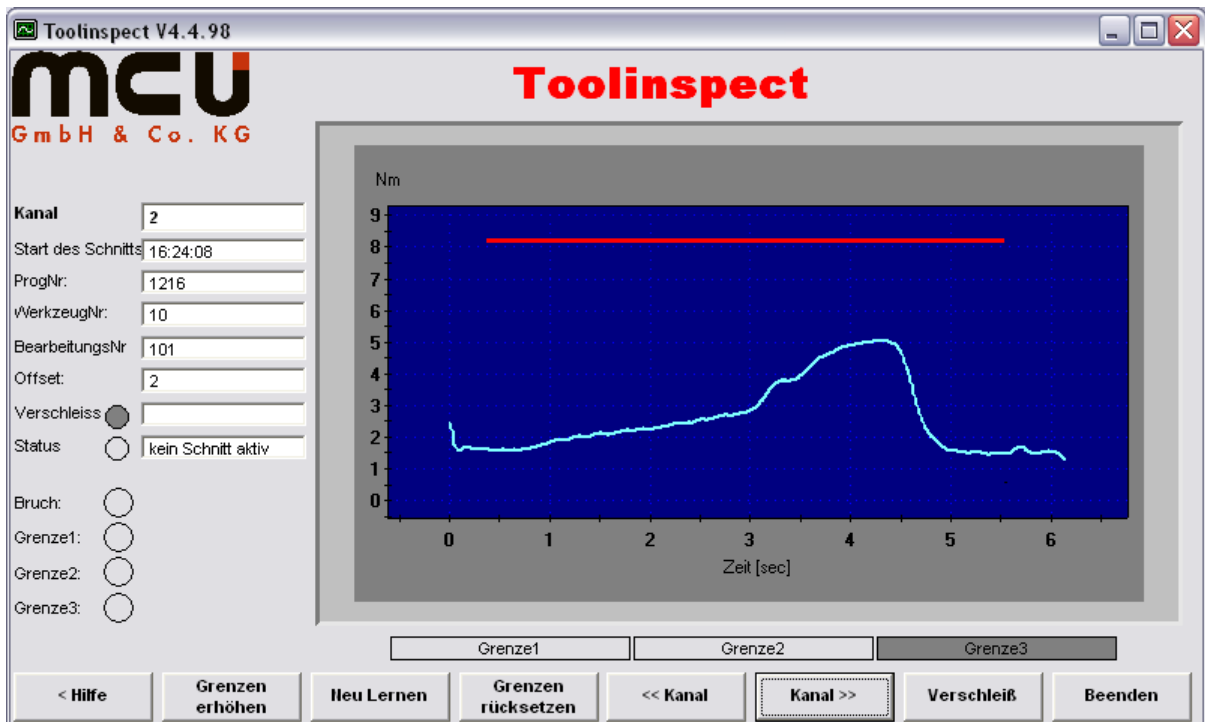
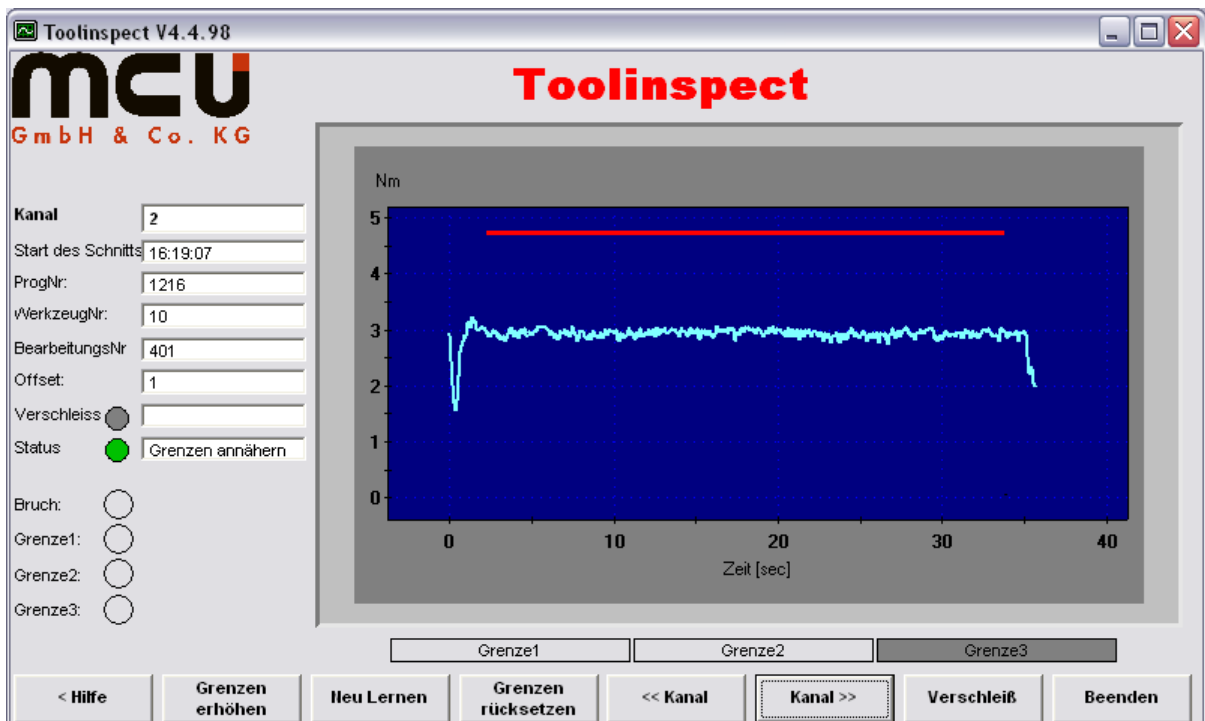
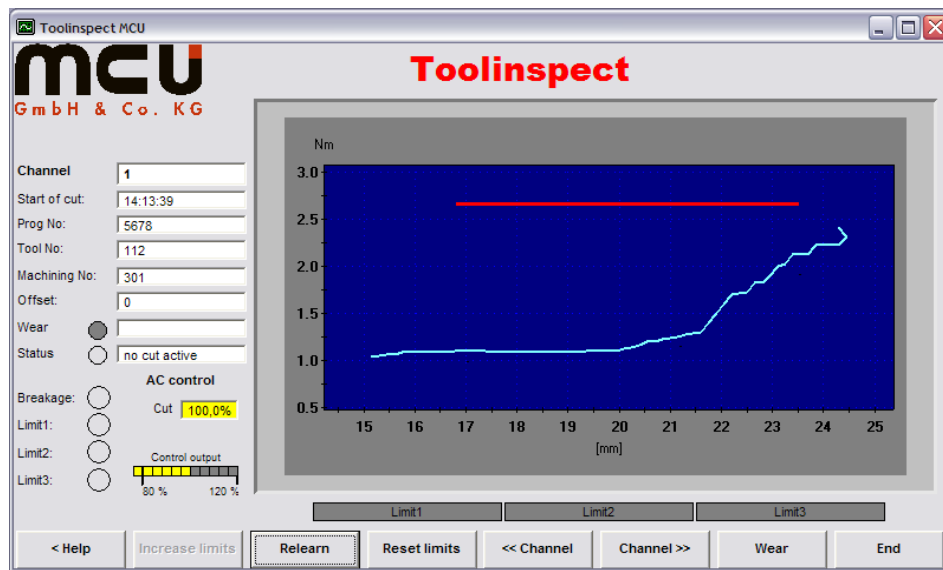


Abb.3 processing evaluation with a mixed signal of arbors.
 Tool: cutting chisel (longitudinal turning) with chipping



Operation with Visualization:



“Reset limits” button

This button resets the system for the active program (the program which is displayed in the interface under Prog. no. :) to the original values and relearn is carried out. Machining operations which have been increased via the “Increase limits” button are reset.

“Relearn” button

This button is used to carry out “relearn”. The program-specific data (increased limits) are not reset. The limits readjust to the actual values in the following machine cycles. This function is required when changes have been made in the CNC program or for other reasons all monitoring limits should be recalculated.

“Increase limits” button

If Toolinspect repeatedly generates an incorrect message during the same operation, the “Increase limits” function can be used to **permanently** raise the switching threshold that generates the fault message. Increasing the limit value only affects the limit value for this specific cut and not for the tool as a whole. The increase is indicated graphically by a yellow marking of the limit or in the tool table. If the alarm is still generated in spite of the increase, the button can be activated again. In the case of limits 1 -3, this leads to deactivation (orange colour). The breaking limit can be increased any number of times and will not be deactivated.

“Help” button

This button is used to call the Help function. A second menu page is activated. It is described in section 3.9.6 “Extra Functions”.

Summary:

A monitoring with digital power data is guaranteed.

The operation is very easy and only little adaptations are to be held at the CNC program. After the construction of new programs there are no adaptations to be made by the operator. The system adapts itself automatically to different operation situations (abrasion, temperature change, etc.)

The installation arranged itself easily. The adaptation at the SPS program, the integration in the control and the data connection through Profibus-DP or TCP/IP is extremely flexible and clearly structured.

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Information's to the data paper

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Subject to alterations!

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