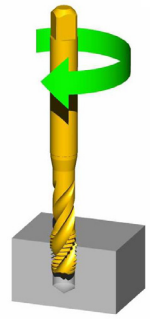
Process and quality monitored threading

The **process monitoring** happens during the machining

The **system**
Due to the integrated measuring and evaluation system the process parameters are analyzed during the machining, what gives the possibility to automatically intervene in the process before the part or tool gets damaged.

The **process optimization**
Cutting speed and parameter optimization
Cutting oil and tool optimization
Tool life optimization
Cycle time optimization
Process analysis



Profits
No additional monitoring system necessary
Detection of errors and deficiencies
Higher productivity
Shorter cycle times
Reduction of material rejects
Tool protection
Lower tool wear
Process evaluation
Quality assurance
Reduction of costs

Examples: Process deviation and error during the machining.
Monitoring of the maximum torque is always active to protect the tool.
The minimum torque is optional adjustable.
Additional parameters are evaluated in combination with the torque, i.e.: Depth, time, feed orientation etc.

The torque is visualized as arrow around the tapping tool:

green → correct torque
blue → torque too low
red → torque too high or error

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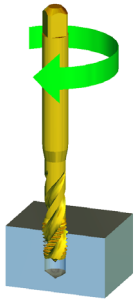
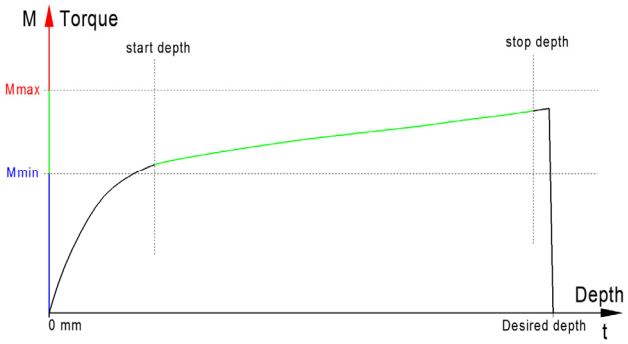
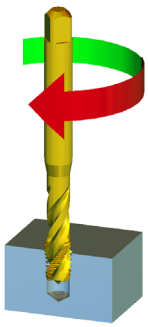
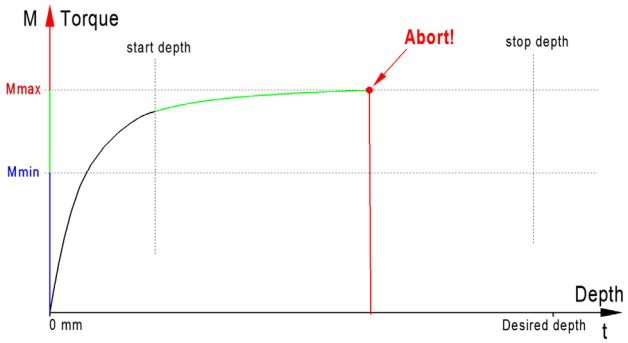
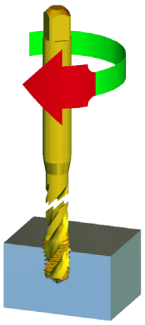
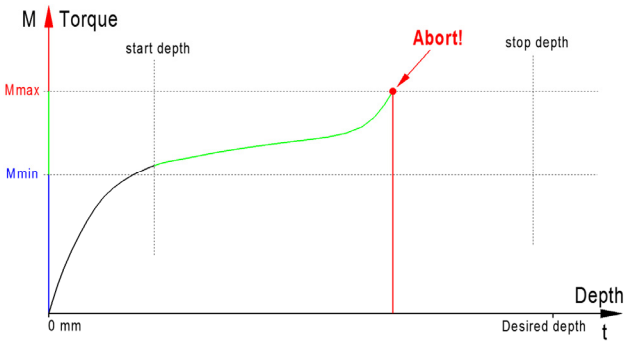
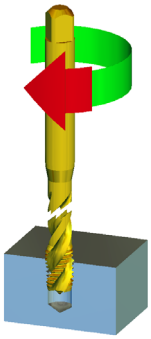
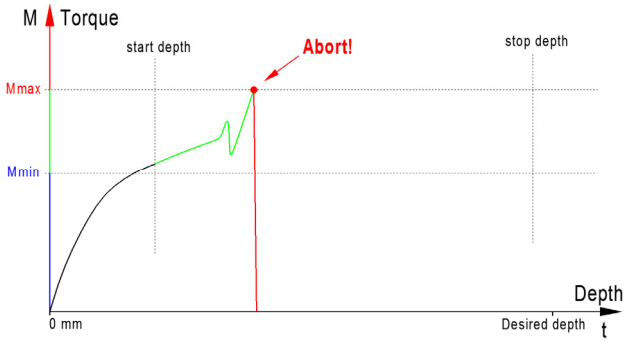
Application	Message / indication	Torque curve of the thread machining
	No Error The thread complies with the required quality ✓	
	Tool wear Detection of a worn tool ✗ **Abort! Maximum number of reversions Depth not reached**	
	Prevention of tool breakage due to too low drilling depth ✗ **Abort! Torque exceeded Depth not reached**	
	Prevention of tool breakage due to fatigue ✗ **Abort! Torque exceeded Depth not reached**	

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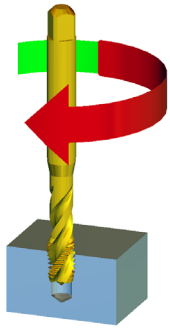
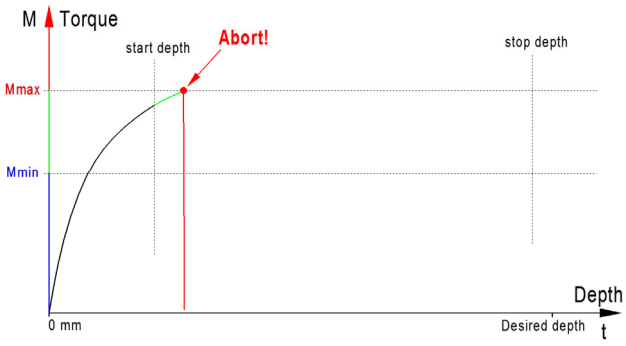
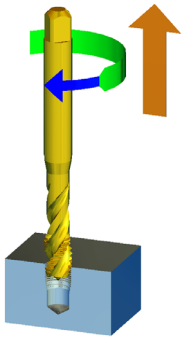
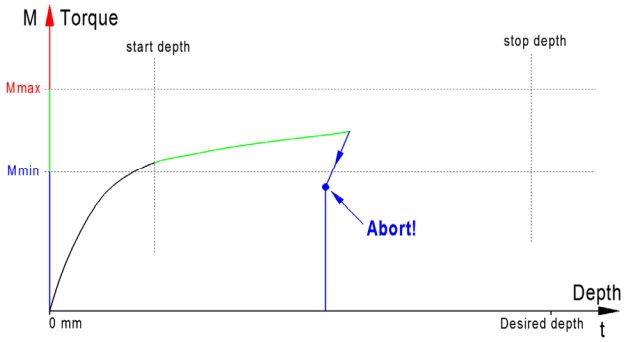
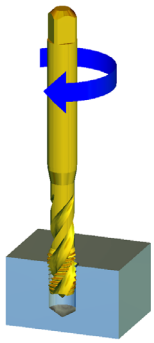
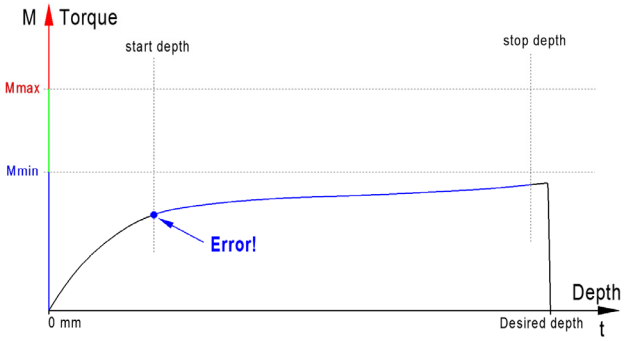
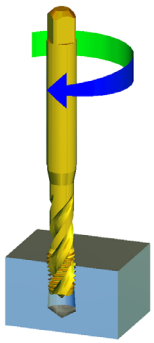
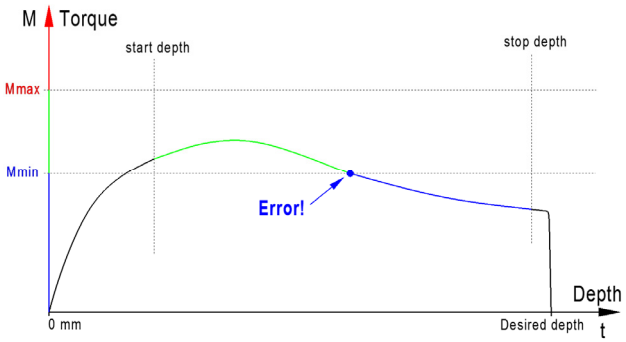
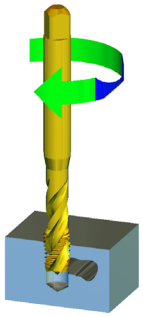
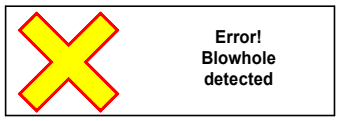
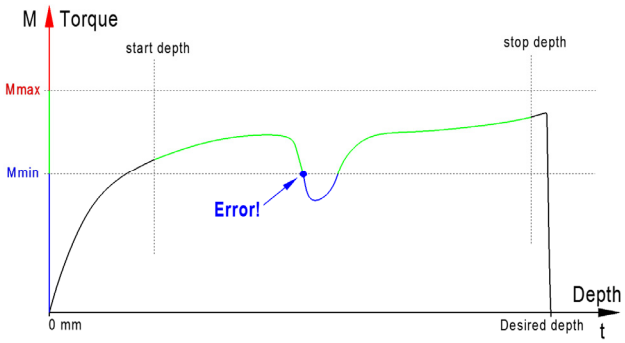
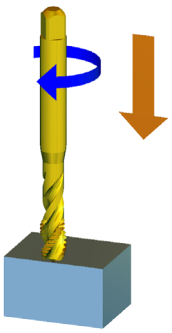
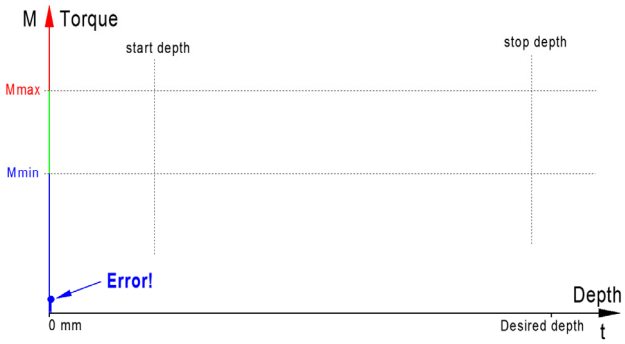
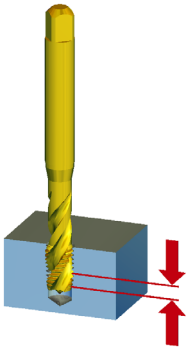
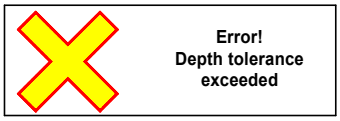
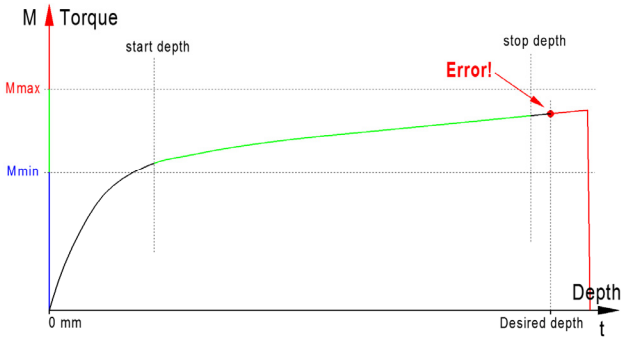
Application	Message / indication	Torque curve of the thread machining
	Drilling too small Detection of a too small drilling **Abort!** **Torque exceeded** **Depth not reached**	
	Detection of torn out threads **Abort!** **No** **depth progress**	
	Drilling too large Detection of a too large tap drill diameter **Error!** **Below** **torque range**	
	Detection of a conical drilling **Error!** **Below** **torque range**	

Application	Message / indication	Torque curve of the thread machining
	Detection of cavities (air pockets and blow holes) within castings 	
	Detection of a missing drilling 	
	Detection of a differing thread depth 	

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