Tool wear and breakage monitoring system

WattPilote Evolution

www.digitalwaygroup.com

Multi-station special machines and transfer machines

WattPilote Transfer has been especially designed for multi-station machines which perform only a few operations on each machining unit: multi-station special machines and transfer machines.

Monitor tools without any loss in cycle time

The monitoring is performed in real-time during the machining cycle, with no impact on the cycle time. Any tool breakage is immediately signaled to the machine.

Monitor multi-spindle heads

Multi-spindle heads can provide high-performance in production, but tool breakages are more difficult to detect on these heads than on single-spindle heads, and they can cause serious consequences to the part quality and to machine downtime. Mechanical breakage monitoring solutions are complex to put into production. WattPilote Transfer has been designed to ensure machining quality while maintaining a high machine output rate. By combining high measurement accuracy with powerful control algorithms, WattPilote Transfer can detect the breakage of one drill in eighteen.

Detection at the end of cycle — **Energy control**

Tool wear
Missing tool
Missing part.

Instantaneous detection — **Power control**

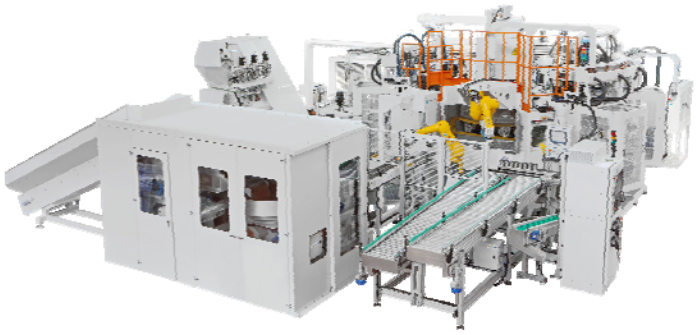
Tool breakage
Missing tool
Double machining

Instantaneous detection — **Derivative control**

Tool breakage
Insert breakage
Part in wrong position

Installed outside of the machining environment

Only one box, containing power measurement sensors and the data-processing hardware, is mounted in the electrical cabinet. The system is easy to install and insensitive to machining conditions (cutting oil, swarf, temperature, mechanical vibrations, electromagnetic noise).



Diagnostic and supervision functions available on a central unit

Visu-CN-C software can be loaded directly onto an industrial supervision PC for the machine or onto a PC-compatible numeric control. The operator can display the machining cycles, tool wear condition, and the fault curves for each station. He can also modify the control tolerances, and acknowledge faults and tool changes.

Autonomous control for each unit

It is necessary to install one WattPilote Transfer to control each machining station. Self-contained, it has its own inputs/outputs wired in the electric cabinet. The WattPilote systems on the same machine are part of a network and are connected to a central supervision system. This distributed intelligence architecture is ideal for use with input / output modules.

Para más información, visite nuestra página web:
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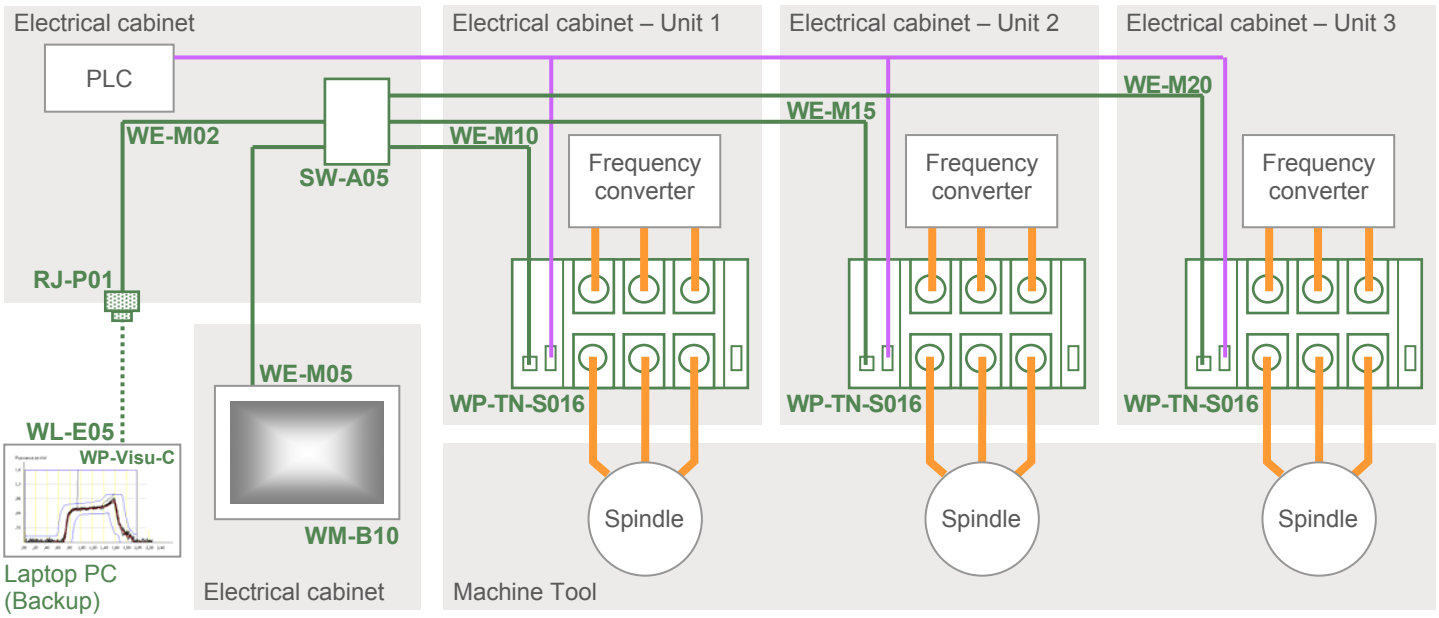
Transfer

Evolution Model range



Transfer machine, 3 units with supervision on WM-B10 monitor

Drilling
- Wear
- Drill breakage
- Missing tool

Boring
- Wear
- Double boring
- Reamer breakage
- Insert breakage

Tapping
- Wear
- Double tapping
- Tap breakage

Deep hole drilling
- Wear
- Drill breakage
- Missing tool

Milling
- Wear
- Double milling
- Insert breakage

General characteristics — Evolution

Max number of different machining cycles	15
Minimum machining cycle time	0.07 sec.
Maximum machining cycle time	50 minutes
Reaction speed	0.005 sec.
Saved machining cycle curves	last 30
Saved faults	last 30
Saved wear rate	last 65,000
Power, derivative, energy control	Simultaneous
Measurement accuracy	0.01 %

Technical characteristics — Transfer

Power supply	24 VDC ± 10%, 0.5A
PLC Protocol - Fieldbus	ProfiNet IO-RT
	Profibus-DP I/O Slave
	DeviceNet Slave
	Ethernet/IP
	EtherCat
	Smart (Digital I/O)
Supervision interface	Ethernet - 10/100 Base TX
Fast Inputs	24 VDC type II, 15 mA
Fast Outputs	Work contact static relay 24VDC
Ambient temperature	0 ... 50°C
Assembly	Symmetrical rail DIN EN50 023
Dimensions	L 170 mm, W 105 mm, H 96 mm
Protection rating	IP 20
Weight	1kg 260

WattPilote Transfer Evolution reference — Part Nr.

WP–T X – X 000

ProfiNet IO-RT :	**N**	**000**	: Power rating in kW
ProfiBus DP Slave :	**B**	**S**	: Three-phase spindle motor
DeviceNet Slave :	**D**	**H**	: High-frequency three-phase spindle motor
Ethernet TCP/IP :	**E**	**A**	: Three-phase axis motor
Smart Interface :	**S**	**D**	: Direct current motor

Example - WP-TN-S016 : WattPilote Transfer Evolution – 16KW three-phase spindle – ProfiNet interface