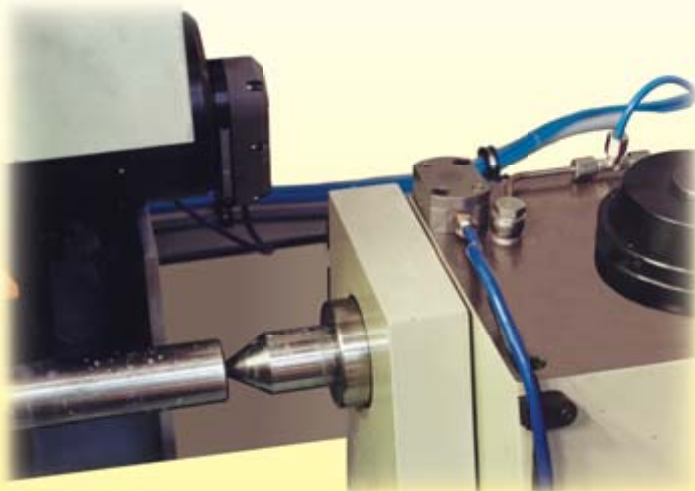
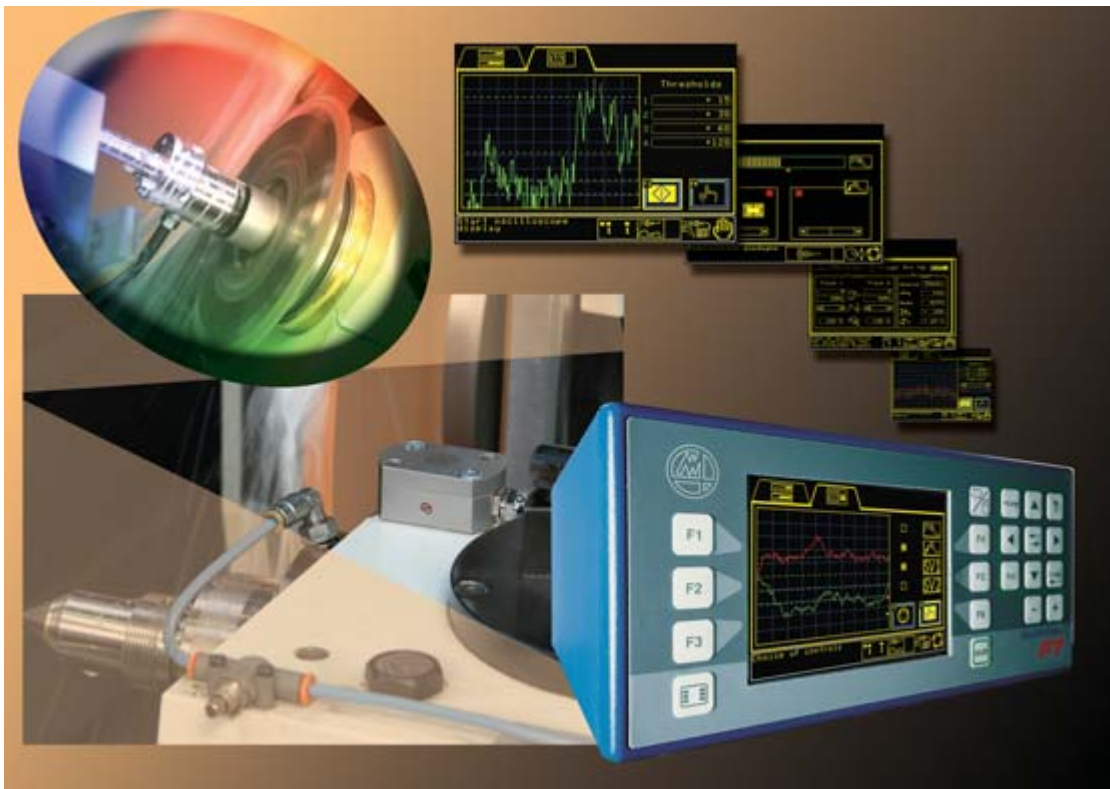


MARPOSS



MONITORING

THE GRINDER'S SIXTH SENSE



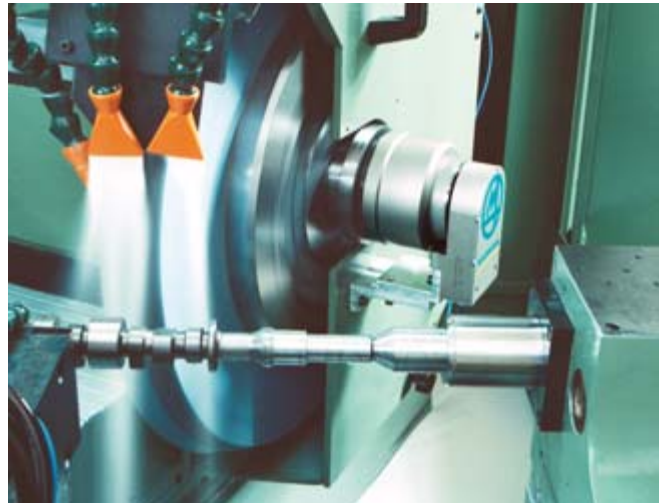
Increased productivity and reduced maintenance costs are key elements of an economic process. The optimum solution is real-time control of events not belonging to part machining or machine conditions. Controlling events such as the grinding wheel - part, grinding wheel - dresser approach speeds and dressing depth of the machine, increases the productivity. The real-time control of machine conditions eliminates the unexpected causes of machine stoppages, allowing planned maintenance which is synonymous with efficient and astute use of systems.

MARPOSS

makes available, in this control sector, a package of solutions/sensors for the control of acoustic emissions, vibrations and other parameters which allow most types of grinder to be monitored; providing solutions able to satisfy the requirements of an individual application with the most complete integration.

Demand for reliable, flexible machining processes is constantly growing and this is why the grinding process must become increasingly smart. The increasing shortage of skilled operators has made the need for an increasingly autonomous grinding process more urgent.

Thanks to the significant development of sensor technologies, the possibility of controlling the grinding process without human intervention continues to grow. The use of Personal Computers in the CNC platform has increased the chances of obtaining more reliable and flexible monitoring systems. More and more grinders are made with grinding wheels consisting of super abrasive materials such as CBN and diamond and this is another reason for automatically controlling the machining process. These super abrasives are very expensive compared with grinding wheels made of conventional materials, so they must be used with the minimum consumption possible.



Part machining process



Grinding wheel conditioning process

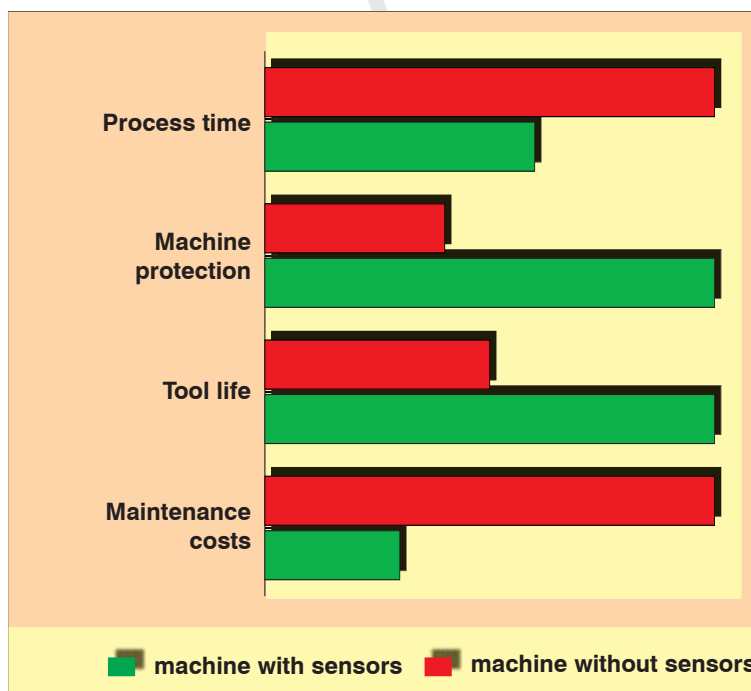
Therefore, the grinding operation may be divided into two processes:

- Part machining
- Grinding wheel conditioning

For part machining the monitoring systems must provide data useful for optimising the process in terms of the total time and cost of machining.

Main part machining process monitoring functions include:

- Balancing wheel positioning relative to the part to be ground on all grinding wheel faces (lateral and front)
- Optimisation of grinding wheel stock removal capability to limit wheel wear
- Crash control during all movements both during the machining process and grinding wheel conditioning



The grinding wheel conditioning process becomes necessary after the part machining process to restore the grinding wheel profile to its original condition and is extremely important when expensive super abrasive grinding wheels are used.

Main grinding wheel conditioning process monitoring functions include:

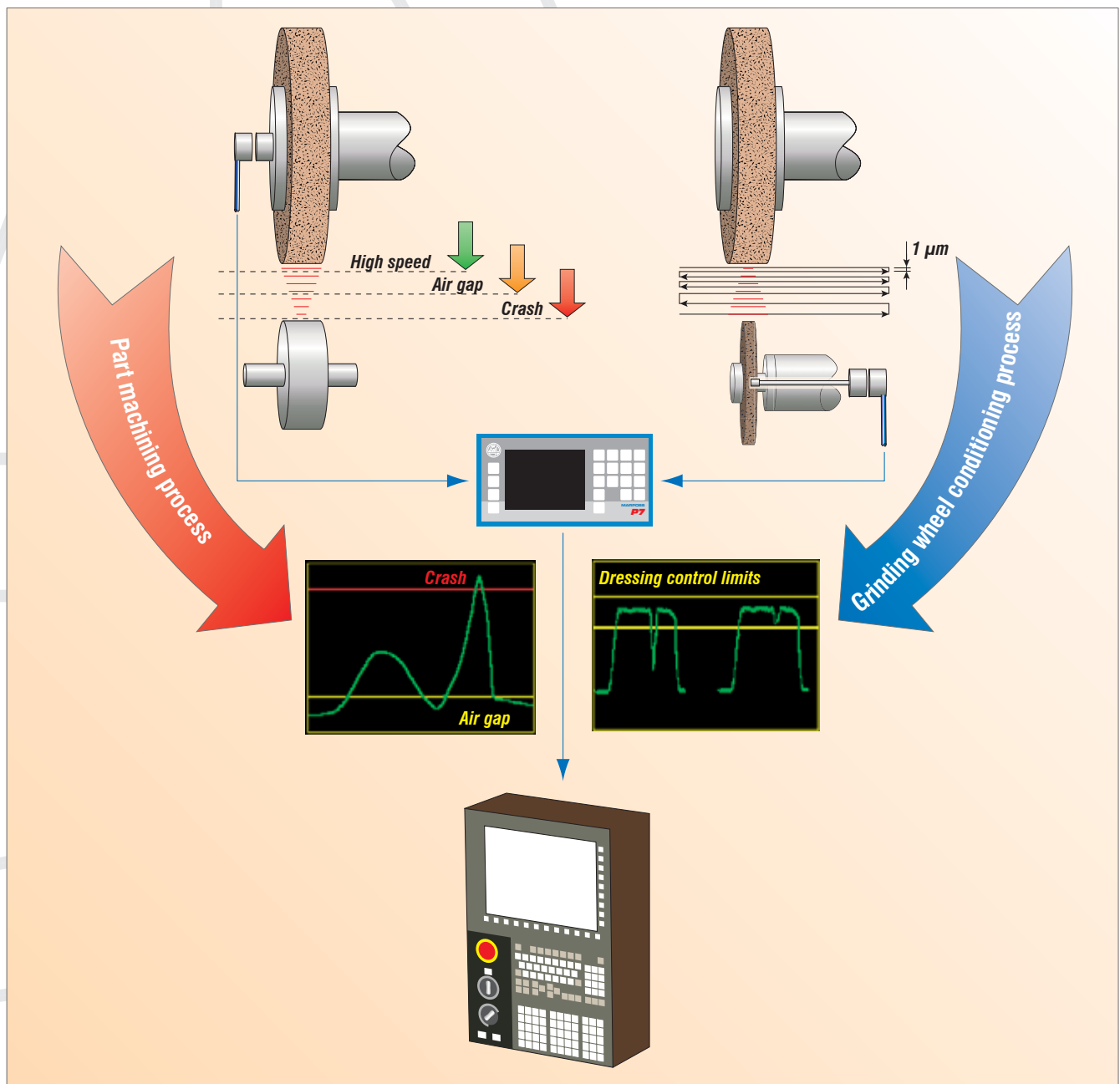
- Grinding wheel positioning relative to the dresser on all grinding wheel faces (lateral and front).
- Optimisation of the dress cycle to limit wheel wear during dressing.

The sensors fitted to the grinder become the “sixth sense” of machine and operator, since the current level of machining process automation no longer allow the operator to see the part directly due to the high operating pressures used for lubricants and coolants utilized in high speed machining.

Optimisation of grinding conditions can be achieved if the operator understands the life span of the grinding wheel and that removal of large amounts of material reduce wheel life. This means that if an optimum amount of material is removed, machining times and the relative costs benefit from it enormously.

When the grinding wheel reaches the end of its useful life, the machining process suffers, with defects such as chatter marks, burns and deterioration of the part surface finish.

Therefore, the monitoring system must be able to check for these defects relative to grinding wheel life, operating in synergy with the In-Process measuring system, where the part is continuously measured during the grinding process and the machine cycle is regulated according to the machining allowance to be removed.

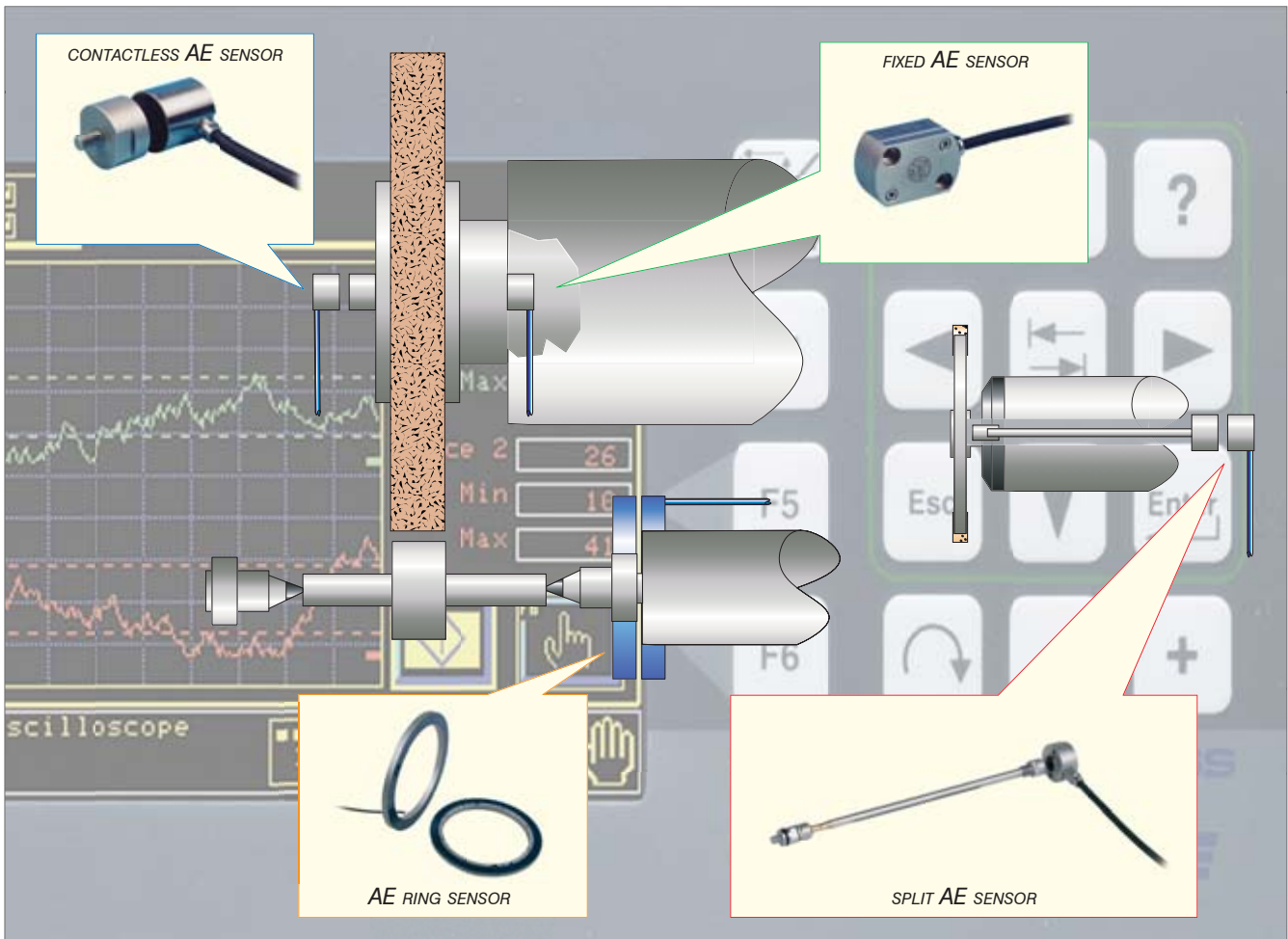


Today the experience Marposs has acquired in control and monitoring on grinding machines is consolidated in a complete line of acoustic sensors, able to satisfy all specific application requirements for the complete management of machining and grinding wheel conditioning processes.

Using these acoustic sensors, mounted directly on the grinding wheel flange, the tailstock, the dressing tool or in the dressing electrospindle, Marposs systems can guarantee extremely high levels of sensitivity. In particular, during dressing, said sensitivity allows "detection" of increases of less than half a micron by the dresser on the surface of the grinding wheel.

These excellent results may be attributed to the wide range of frequencies of Marposs acoustic sensors and the ability to isolate the machine background noise from the signal produced during dressing.

Other transducers may be connected to the acoustic sensors, to detect variations in process variables such as power, force, speed which, if managed appropriately by the electronic control unit, may contribute to the complete monitoring of unmanned systems and machines.



MARPOSS
www.marposs.com

For a full list of address locations, please consult the Marposs official website

D6100008G0 - Edition 10/2005 - Specifications are subject to modifications
© Copyright 2005 MARPOSS S.p.A. (Italy) - All rights reserved.

MARPOSS, ® and Marposs product names/signs mentioned or shown herein are registered trademarks or trademarks of Marposs in the United States and other countries. The rights, if any, of third parties on trademarks or registered trademarks mentioned in the present publication are acknowledged to the respective owners.

Marposs has an integrated system to manage the Company quality, the environment and safety, attested by ISO 9001, ISO 14001 and OHSAS 18001 certifications. Marposs has further been qualified EAQF 94 and has obtained the Q1-Award.

