



ergolines
INNOVATION PARTNER

MTM/BPS – MOULD THERMAL MONITORING AND BREAKOUT PREVENTION SYSTEM.

The mould is the most important section of the caster, where liquid steel forms a first solid skin. Incorrect growth of the shell can cause sticking, which in turn can result in breakage of the solid shell (breakout). This results in system downtime and expensive repair operations.

The MPS/BPS system performs real-time monitoring and analysis of the temperature map of the mould walls, by means of a matrix of high-accuracy type-K thermocouples.

Thanks to sophisticated algorithms, the MTM/BPS system enables identification of sticking in the mould, thus reducing the probability of a breakout.

Thermal monitoring also makes it possible to:

- › Check that the mould has been designed properly (proper conicity)
- › Monitor the proper operation of the lubricating powders
- › Signal any process problems or uneven cooling in the mould.



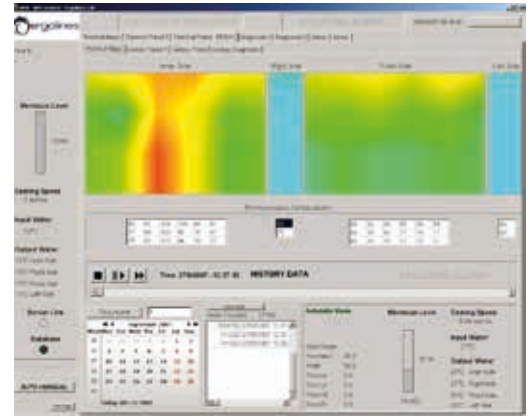
INSTRUMENT MAIN FEATURES

The advantages of the MTM/BPS are set forth below:

- › the system can be updated with new recognition algorithms at any time during operation
 - › there is a built-in historic database of recorded data, on which it is always possible to perform new analyses, statistical data processing, simulations of operating conditions, final post-process summaries, etc.
 - › It is possible to accurately fine-tune the system and improve its efficiency thanks to offline adjustment of recognition parameters/thresholds, by using the data stored from events (for example, sticking and breakouts). The events can be recreated with different settings of the recognition algorithms
 - › The third row of thermocouples provides further thermal data to better recognise the dynamic temperature curves that lead to stickers and reject false alarms
 - › All data is stored for post-processing analyses and to improve the analysis algorithms.
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HOW IT WORKS

When sticking occurs, the liquid steel is closer to the mould, generating a sudden increase in the temperature of the wall itself. The temperature of the mould is monitored constantly by two or more rows of thermocouples. The temperature detected by each thermocouple is then analysed mathematically in real-time, and when sticking is recognised, an alarm is triggered which is sent to the PLC of the strand. The PLC initiates a casting speed slowing procedure which allows restoration of the solid shell, preventing sticking and resulting breakouts.



SYSTEM COMPONENTS

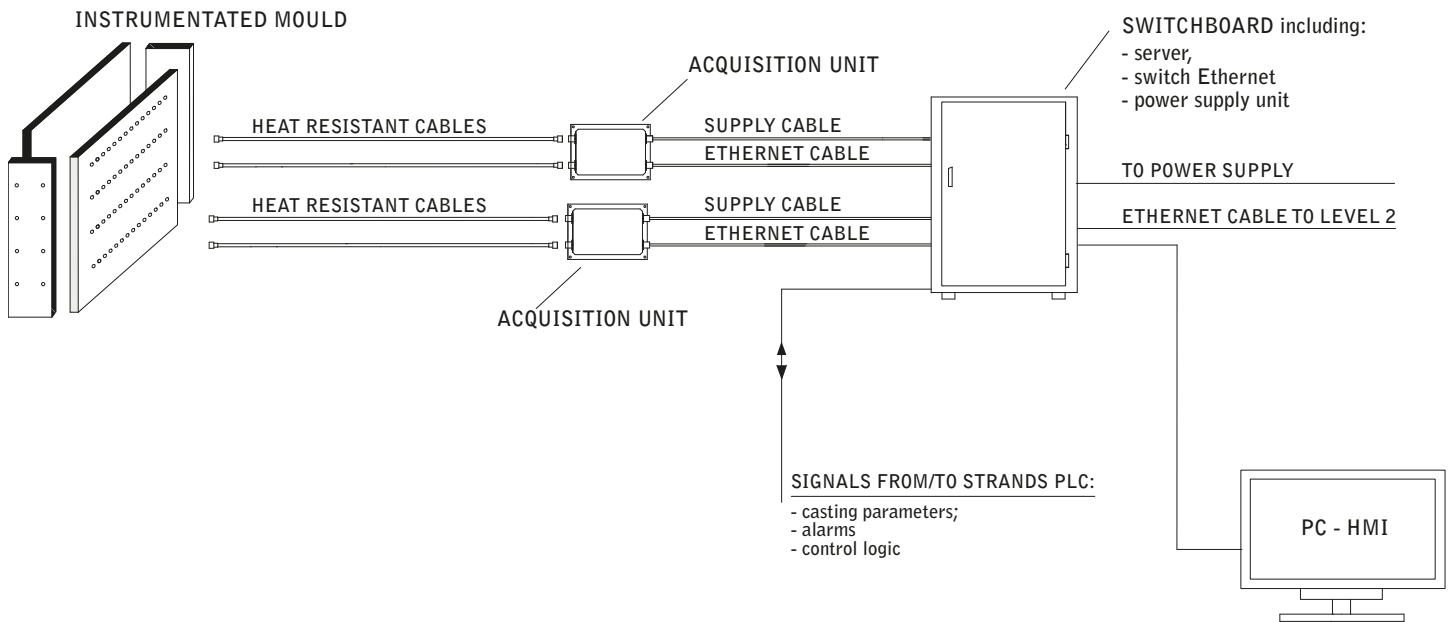
The system is made up of the following components:

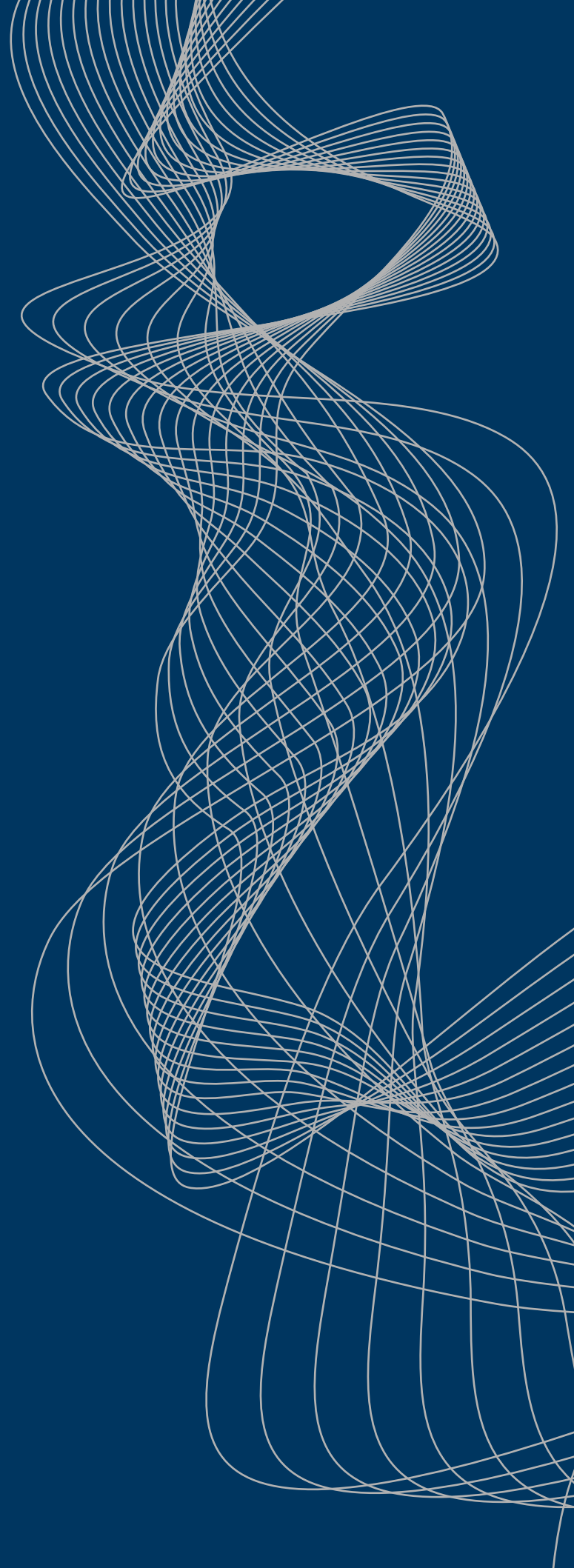
- › thermocouples installed on the mould
 - › compensating cables
 - › connectors
 - › data acquisition unit /junction box
 - › central unit
 - › I/O unit
 - › ethernet switch
 - › monitoring unit
 - › database
 - › PLC.
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INSTALLATION

The MTM/BPS system is designed for installation on plate moulds, and therefore in bloom or slab casters. Installation involves working the copper plates to allow insertion of the thermocouples which are fastened to the back plates.

A special installation is also available for billet moulds, thus allowing thermal monitoring of the crystalliser in order to optimise the design and obtain the best metallurgical results by studying the evenness of cooling in the mould.





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