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UNIVERSAL MHD DEVICE FOR AUTOMATION OF CASTING CONTROL OF ALUMINUM

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General view of the equipment of the mixer

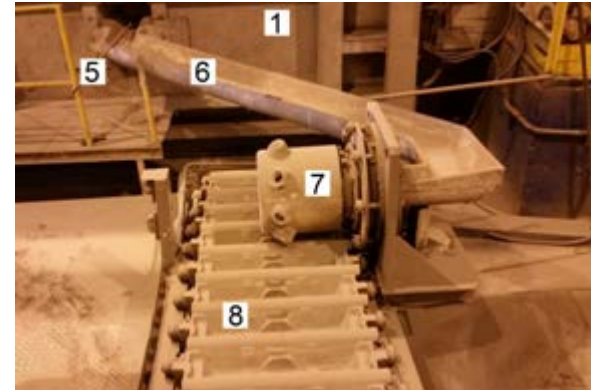
Tap hole in the mixer wall



- 1 – mixer
- 2 – tap hole
- 3 – receiving trough
- 4 – molten aluminum



Foundry device and melt crystallizer

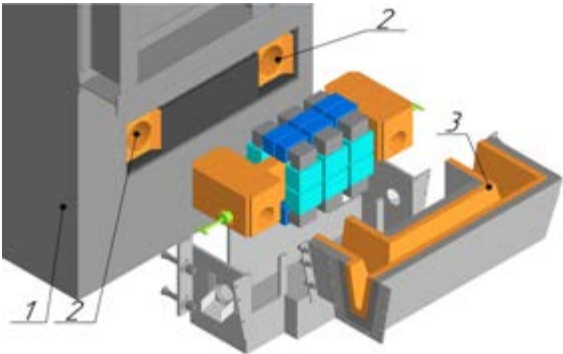
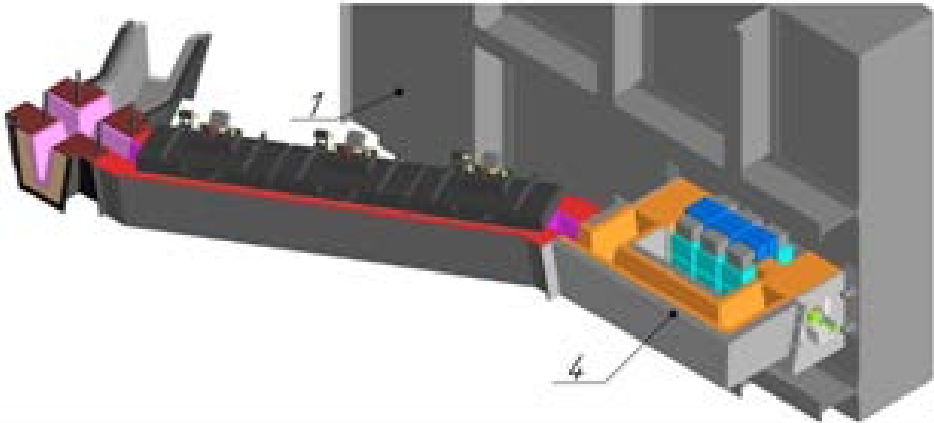


- 5 – foundry lance
- 6 – transport tray
- 7 – casting drum
- 8 – conveyor with molds

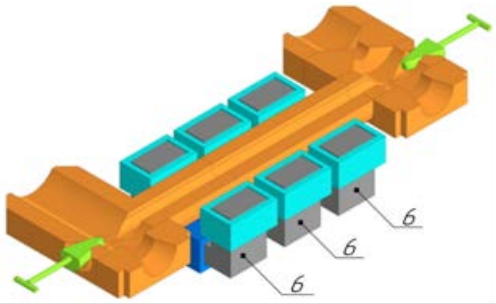


Designing an MHD device for casting automation

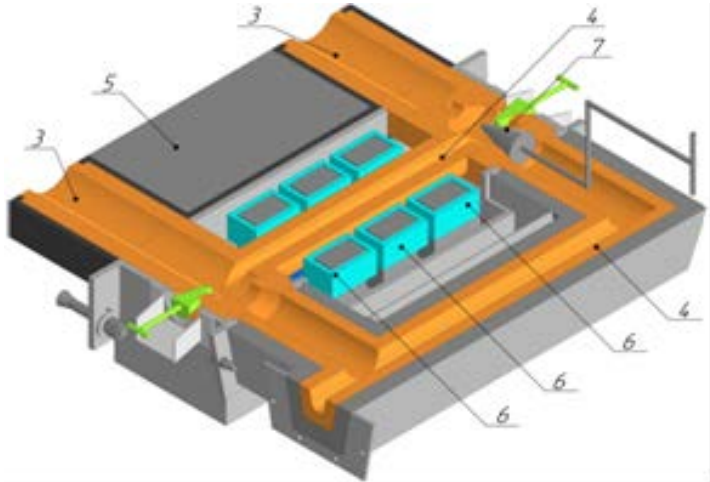
MHD device near the mixer wall



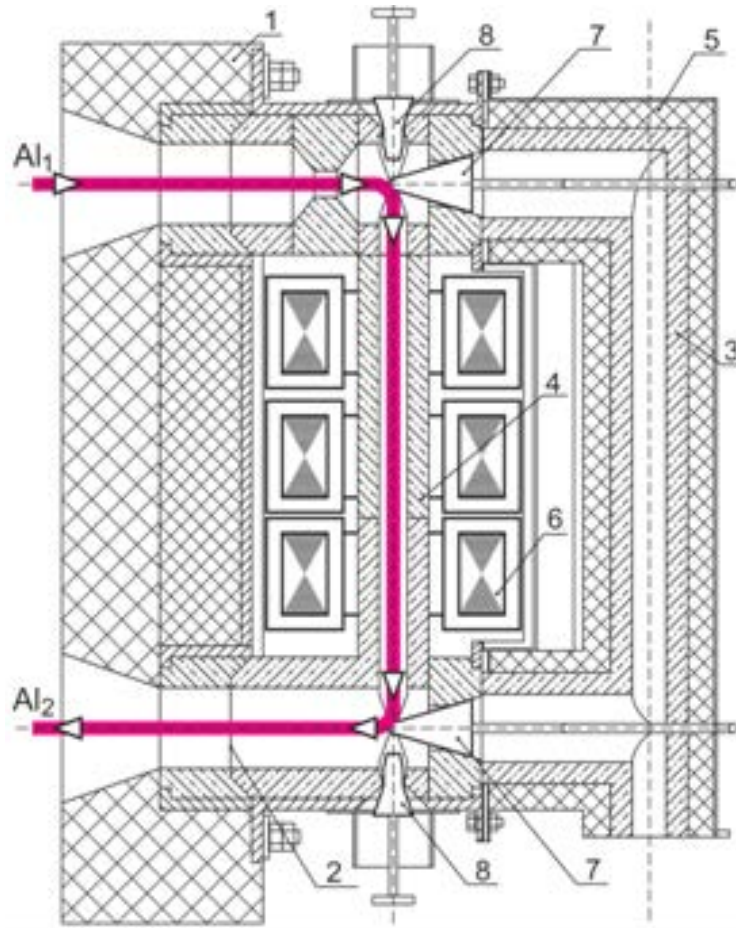
Melt refractory trough



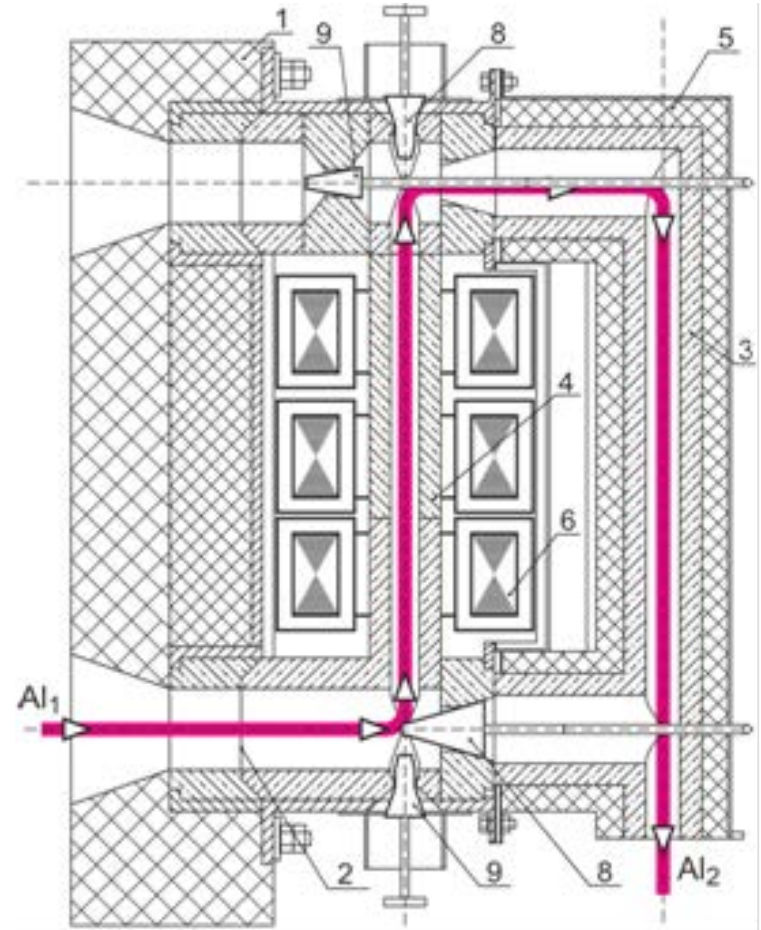
Section of a 3D model of an MHD device



Automatic melt transfer paths



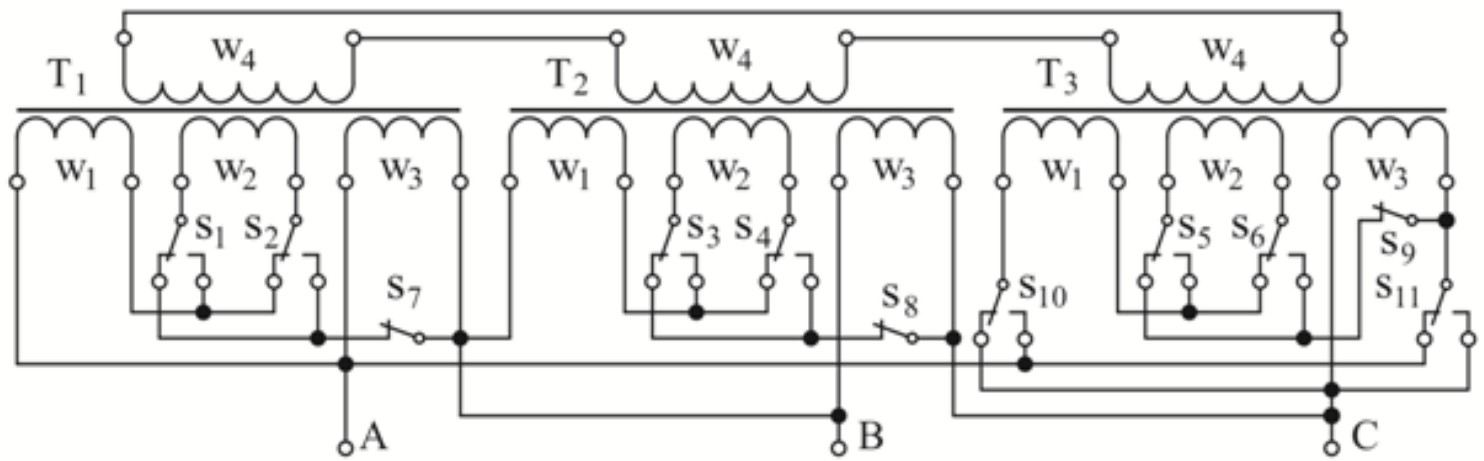
Melt stirring mode



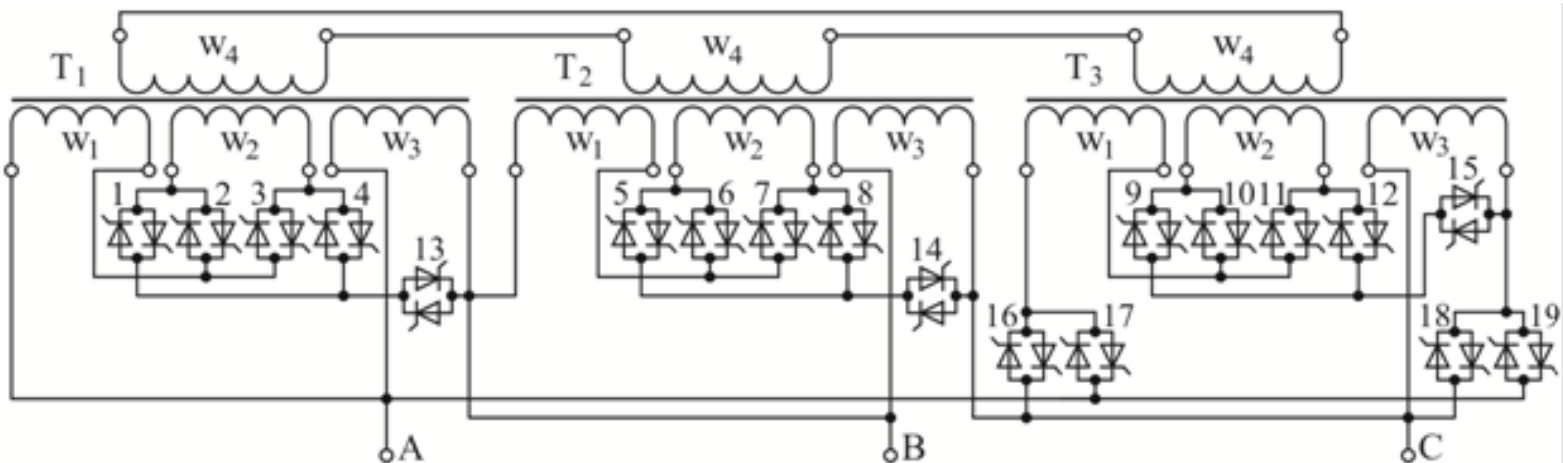
Melt pumping mode

Circuitry of MHD device

Switching windings of transformers-inductors

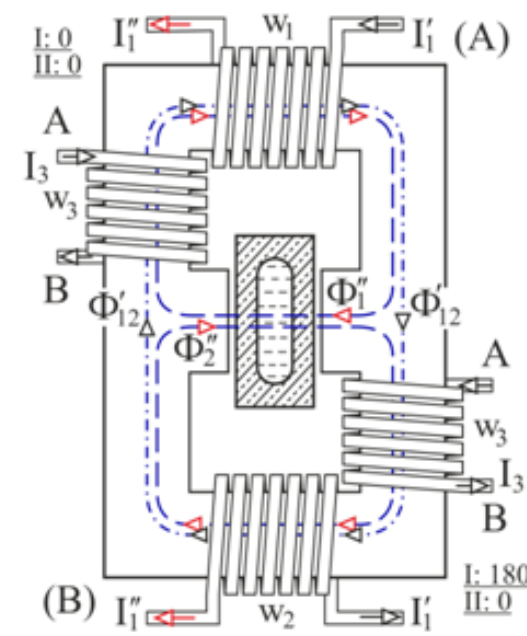


The use of electronic keys associated with the controller



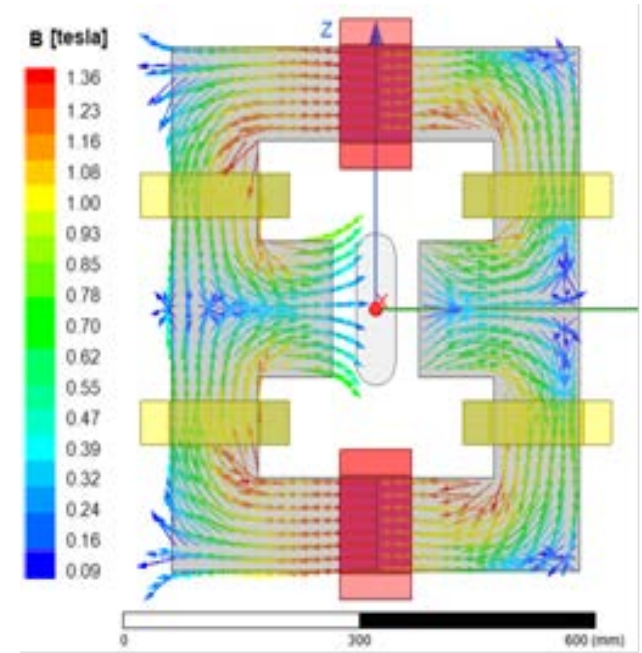
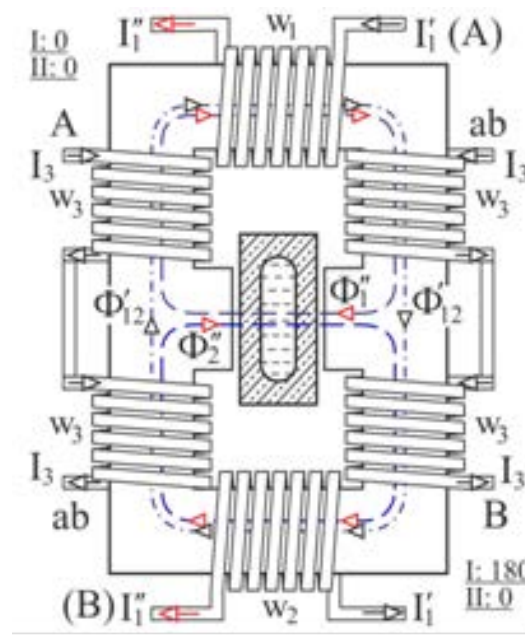
Calculation and simulation results

Placement and connection of windings transformer inductor



I - pump mode, II - heating mode

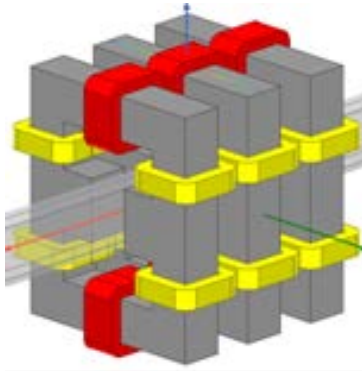
Modeling of electromagnetic field



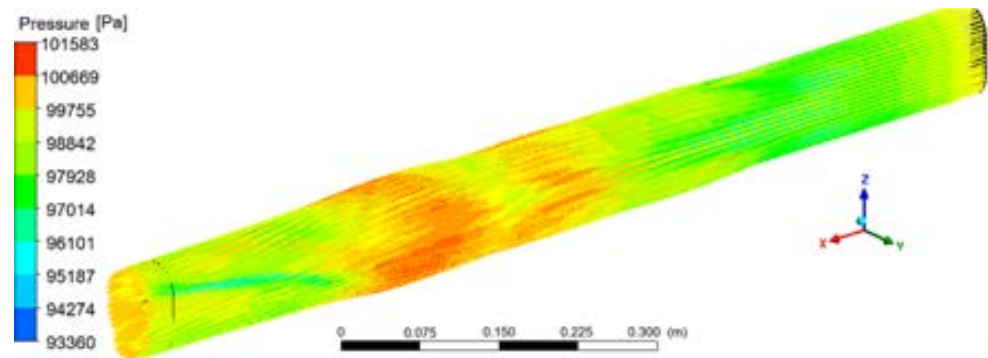
Industrial design model

Calculation and simulation results

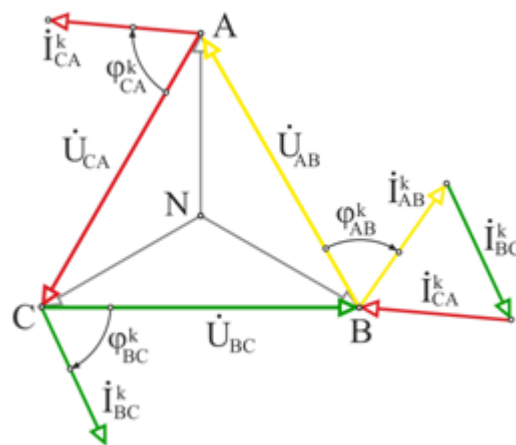
Modeling traction in Ansys



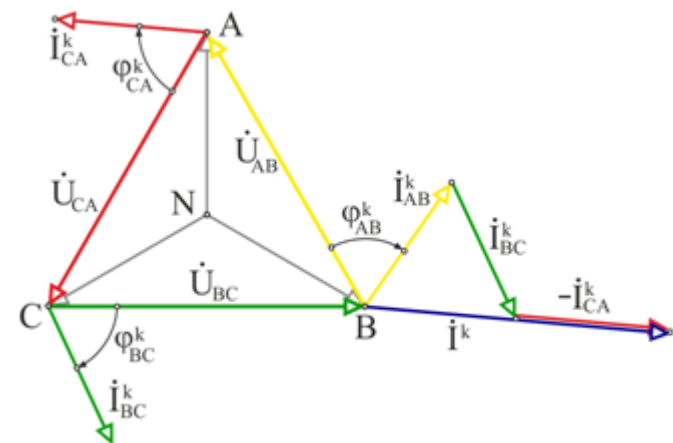
Industrial design model



Channel pressure distribution



Vector chart for symmetrical mode



Vector chart for open triangle

Conclusion

A universal MHD device has been developed for casting automation

Functionality

- MHD pump
- MHD dispenser
- MHD stirrer

Advantages

- Casting automation
- Electronic control
- Three phase power supply
- Simplicity of construction
- Convenience of docking with a mixer
- Cheapness
- Reliability