

Case study

Automation and control system

Project Summary

Project: Electrical distribution, automation and safety systems

Application: Metals plant environmental protection system

Nidec's Role

A German steel manufacturer selected Nidec Industrial Solutions to design, install and commission complete electrical distribution, automation and functional safety systems for two Ruhrstahl Heraeus (RH) metals plants.

Scope of Supply

- Nidec ARTICS Automation and Safety SW
- A redundant 4000A, 500V power center
- 16 Nidec power and automation electrical boards
- 9 PLC units
- 31 RIO boards
- 8 motor protection panel boards
- 134 local control panels
- Wireless safety system



The challenge:

To power, automate and improve the safety of two new metals plants' environmental protection systems

Comprised of multiple subsystems and a variety of different technologies, RH metals plants are among the most complex structures in a steel mill. Their job is to help ensure steel quality by improving steel purity and preventing reoxidation, nitriding and carburizing of the melt. Other RH plant processes involve lowering steel's carbon content, deoxidating and reducing hydrogen and nitrogen content, and minimizing to allow burn-off of oxygen-affine elements such as aluminum and titanium.

A German steel company constructing two new RH plants was seeking an electrical design and construction partner with in-depth experience in all the electrical components of these plants, including electrical distribution, automation and functional safety systems. Its goal was to construct RH plants in a timely manner that delivered safe, reliable performance. It selected Nidec Industrial Solutions to perform the turnkey assignment.

The solution:**Power supply and ARTICS automation systems that were simulated in-house prior to installation**

After studying the electrical protection system and protection settings needed to guarantee performance, Nidec Industrial Solutions designed a low-voltage power supply system and hardware and software for a Level 1 automation system, including interface with HMI and level 2 automation. Nidec's electrical board design called for rated voltage of 500V \pm 15% and short circuit current of 55 kA.

The new plants' automation systems were designed to interface with the steel mill's other plants and units. The primary automation functions designed, implemented and commissioned by Nidec included:

- Oxygen lance burner control and lance lifting systems
- Vacuum generating systems, including water ring pumps and steam injector systems
- New water treatment system and interfaces
- New material handling systems and interfaces, including recipe management and prioritization
- Dedusting systems, wire injection stands and ladle and maintenance cars

To reduce commissioning time and guarantee the systems' quality, Nidec arranged to simulate the steel mill's operation in its offices, where it tested the electrical and automation systems prior to installation. This testing enabled Nidec to complete any necessary debugging prior to installation, which served to speed the commissioning process and improve system quality.

To help assure smooth start-up and long-term operation, Nidec also compiled detailed technical documentation of all the plants' hardware, software, subsystems and package units.