Nidec
All for dreams

Case study
175T/25T Heavy Lift Crane
NASA Vehicle Assembly Building (VAB)

Project Summary

Project: 175T/25T Heavy Lift Crane
Location: NASA Vehicle Assembly Building (VAB) Cape Canaveral, FL, USA
Client: NASA
Application: Heavy Lift Crane
NASA Vehicle Assembly Building (VAB)
Commissioned: 2016
Technology: Nidec Redundant AC Drive Technology and Nidec UL Certified Control System
Crane Capacity: 175T/25T

Nidec's role

NASA's SLS program requires the use of heavy lift cranes with very precise operation. Retrofitting the existing obsolete control system was a requirement for the support of this program. The existing crane was mechanically sound and originally designed to CMAA requirements.

[1] Equipment provided by NIS Americas included: three Active Front Ends (AFE), eleven common bus AC drives, automation programmable logic controller (PLC), safety PLC (SIS) monitoring PLC (PES), operator control console and CraneView diagnostic system.

Due to the critical nature of the cargo and precision needed during assembly; no single point of failure can stop the crane from operating.

Design specification called out stand-alone AC drives with capacitor base power factor correction equipment [2]. NIS Americas' engineering and sales team provided an

alternate proposal utilizing common-bus AC drive technology. Multiple active front ends (AFE's) were supplied so that a failure of one unit would not stop the crane from working at full capacity. In addition, the AFE units provide unity power factor back to the main power system [2]. Based converters also provided power back to the grid which could be reused in place of losing it through heat in resistor banks.

Each section of the crane had multiple motors for operation. Hoist sections had two motors which were designed to allow the crane to operate on one if needed. Travel motions were also designed with multiple motors in case of failure. NIS provided redundant AC inverter drives that could operate as either a hoist or travel section. This reduced the number of drives required for back-up mode of the cranes.

All electrical equipment required for the project had to meet UL requirements. Panels were manufactured to UL 508 [3] which also included a site inspection of the equipment in order to certify the system installation. Control equipment also had to meet UL519 at the main power feed of the crane. NIS AFE's provided the PF correction and harmonic filtering that met the UL519 specification.

References:

[1] CMAA 70, 2010, ("Specification for Top Running Bridge and Gantry Type Multiple Girder Electric Overhead Traveling Cranes")
[2] Underwriters Laboratories, UL519:1994, Standard for Impedance-Protected Motors
[3] UL508, 2010, Power Conversion Equipment