GEAR TOOTH HEATING

A rotary table machine uses an induction heater and servo system with electronic divider stops to precisely harden each gear tooth surface.

Description

Large gears require heating of the finished gear tooth to harden the metal surfaces. Hardened gear tooth surfaces are required to extend the life of the gear. The machine is for general use with custom gears of various numbers of teeth. The whole gear cannot be heated nor can consecutive teeth be heated without warping the gear.
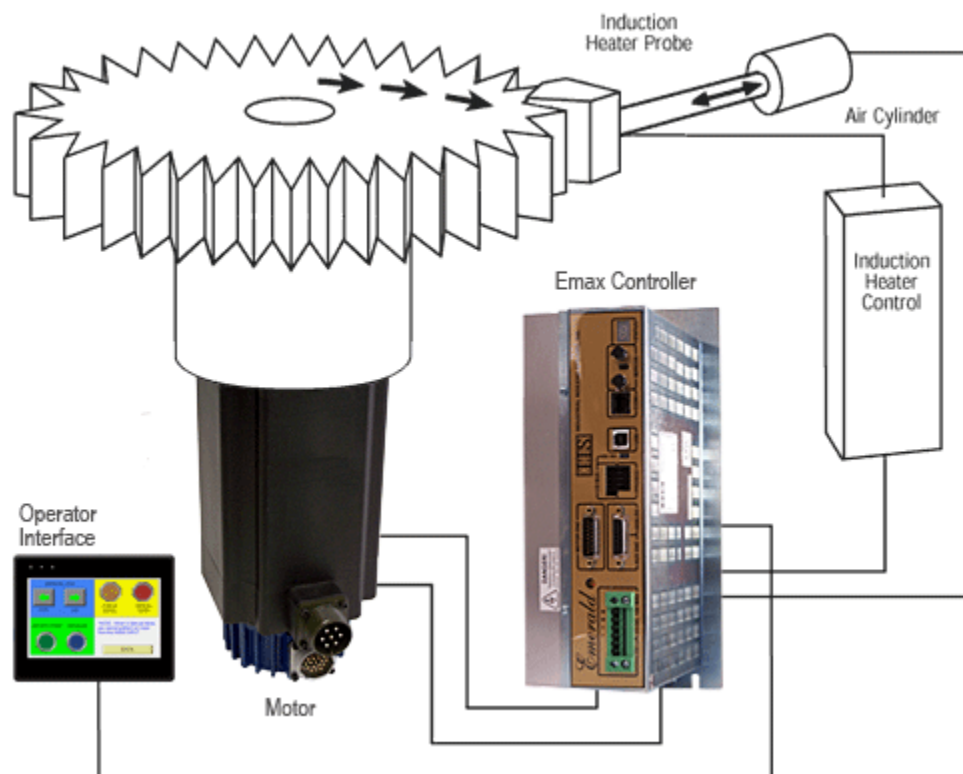
Solution

The EMAX 1-1/2 axis controller provides the servo motion, operator interface functions and heater control for this application.

An application program for the EMAX controller is developed using the Emerald Motion Language (EML) PC software to create the following sequence:

- The operator loads the gear to be heat treated onto the servo driven turntable and jogs the gear to align the first tooth with the induction heater.

- The operator then enters the number of teeth on the gear and how many teeth to skip between heating cycles. Skipping teeth evenly distributes the heat and prevents warping of the gear.

- The EMAX calculates the incremental motion needed between each heating cycle and how many turns the gear must make on the table to complete each and every tooth.

- The air cylinder is extended to place the induction heater between the gear teeth. Then the induction heater is turned on.

- The heater is left on for programmable period of time and then retracted.

- The gear is indexed to skip the programmed number of teeth and induction heater is extended and turned on.

- This process is repeated until all the teeth are heated.

https://www.iis-servo.com/applications/gear-tooth-heating/