

Sales Application Note

Cooling Tower Control Systems

APPLICATION

In big refrigeration equipment, water that extracts the heat from refrigerator condenser is cooled down again in cooling towers. The temperature is decreased by evaporating a part of this water in surrounding air.

Forced air cooling towers increase cooling capacity by installing a fan (the fan increases air flow, thus increases water evaporation).



Using Fuji Electric frequency inverters for controlling the speed of cooling tower fan allows keeping the cool water temperature constant thanks to the powerful set of PID functions in the inverter. Great energy savings can be achieved by combining built-in automatic energy savings function and wet-bulb temperature presumption control.

APPLICATION REQUIREMENTS

Basic control strategy is based on a PID control of cool water temperature. According to this temperature, inverter will vary the fan speed to control the evaporation of water. Fast control response for keeping the temperature constant regardless of operating conditions is mandatory. Proper interface for connecting to temperature sensors might be also appreciated. Catch spinning motor and other fan control specific functions are required.

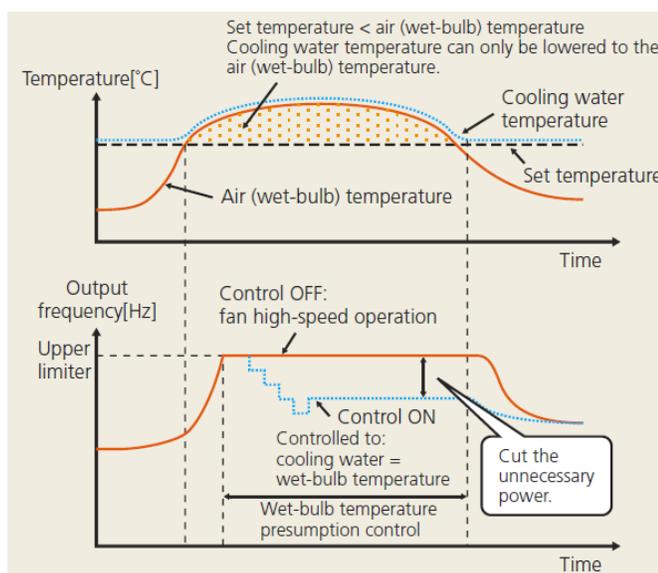
FUJI ELECTRIC SOLUTION

Basic Fuji Electric solution for cooling towers' fan control is based on FRENIC-HVAC inverter, using the inverter built-in PID control. Temperature sensors can be easily connected by using OPC-PT optional card. Wet-bulb temperature presumption control, unique function which is built in the inverter, can lead to additional energy savings.



ADVANTAGES OF FUJI ELECTRIC SOLUTION

- Powerful PID control is built in the inverter (1 main PID, 2 gains set and 3 auxiliary PID).
- OPC-PT optional card for connecting up to 2 temperature sensors: 2 channels available for JPt100, Pt100, Ni100, Pt1000 or Ni1000 sensor types
- Automatic energy savings function, which allows reaching higher energy savings' rates at low speeds.
- Energy consumption can be reduced by using unique wet-bulb temperature presumption control: Inverter minimizes wasted energy when surrounding air conditions limit water evaporation.



- Automatic Speed search at starting: inverter can check fan speed to pick up the motor smoothly from the current speed.
- DC Reactor and EMC filter are built in up to 90kW (C2 supported, 2nd environment supported), EMC filter is built in 110kW to 710kW (C3 supported, 2nd environment).
- Protective structure IP21 or IP55 can be selected with the model up to 90kW.