



The Mini Ice Plant Training System (KR-112) provides a learning platform for students to understand various freezing methods in terms of Industrial 4.0 practice through wireless transmission and remote control, the structures of the components, and the operating principles of ice plant systems.

The system allows students to learn how to operate the brine cycle refrigeration and practice adjusting the concentration in brine, which can be made by various raw materials, such as salt, alcohol, and ethylene glycol. Furthermore, students can examine the influence of brine concentration on different frozen objects.

KR-112 adopts an industrial way of ice plant. Forced air cooling and water cooling are two cooling methods in the system. Different from forced air cooling by a fan under similar room temperature at a time, our transparent cooling tower enables users to simulate different heat dissipation capacity by water cooling and with variable air volume. Students can observe different effects on ice plant from changes in surrounding temperature. The Forced air cooling and water cooling can be used at the same time or separately to test different effects.

System should include the Human Machine Interface with build in programs which are the standard control method for the system operation, and the control interface is modifiable (the system provides the original program).

List of Experiments

- Calculation of cooling water
Using the refrigeration capacity to calculate the required amount of the cooling water Learning how to select suitable water pumps in the future
- Calculation of chilled water
Learning how much brine volume is required for different ice and various frozen products that would like to be produced
- Calculation of refrigeration capacity
Using the discharge capacity of compressor to calculate the refrigeration capacity
- Adjustment of brine concentration
Adjusting the brine concentration to change the temperature of the sink
- Calculation of condenser capacity
Using the Mollier Chart to calculate the capacity of the condenser and compare it with the capacity of the cooling tower
- Study the rate of change in ice plant
Adjusting the brine flow to adjust the speed of making ice
- Testing of the capacity of the cooling tower
 - Adjusting the cooling capacity by changing the air volume of the cooling tower
 - Observing the temperature changes of water in the high pressure area of the system
- Testing of the capacity of the evaporator
Adjusting the temperature of the evaporator by changing refrigerant pressure and observing the effects
- Testing of the capacity of the compressor
 - Adjusting the temperature of the evaporator by changing refrigerant pressure
 - Observing the changes in output power on the compressor
- Troubleshooting practices
Adjusting the Refrigerant pressure or protection switch to simulate fault

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