

Coolers

Key Issues:

- Humidity
- Spiral conveyor
- Weight loss of product
- Heat exchange > recovery

Equipment Used:

- Variable speed drives
- PLC
- HMI



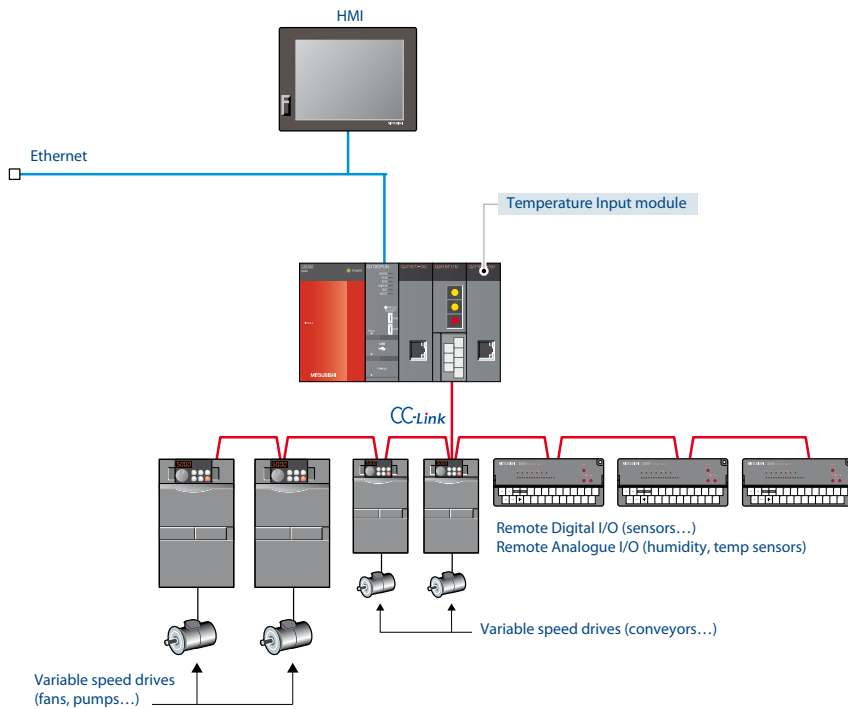
Achieve the correct temperature whatever the product

Optimum cooling

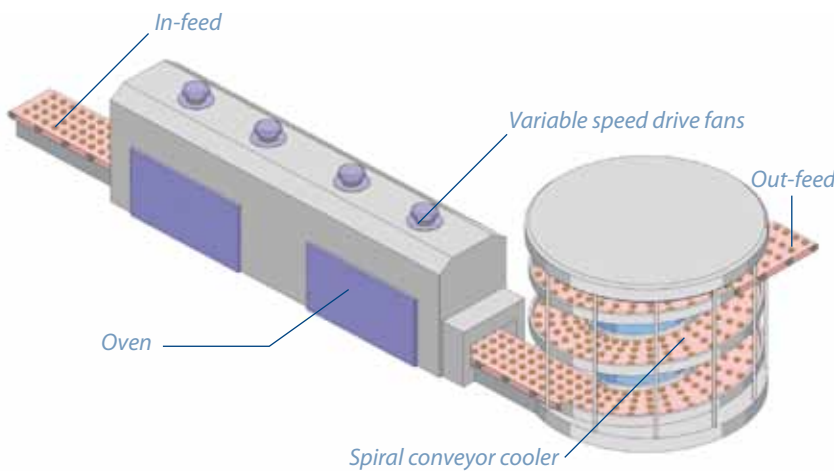
The cooling stage allows the freshly baked bread to cool to the optimum temperature for slicing and packing. The core temperature of the bread coming out of the oven is over 95°C and it has to be brought down to a maximum of 30°C. To do it too slowly would affect productivity, but to cool the bread too quickly would significantly affect its quality and its slicing characteristics as well as encouraging unnecessary weight loss.

Spiral coolers are commonly used in most large bakeries. Loaves are fed through them from the oven and cool by the time they reach the top. Typically, the control system monitors the temperature and humidity at a number of points in the spiral and adjusts the speed of the conveyor or the forced draught fans to maintain the optimum cooling profile.

There is increasing interest from many parts of the bakery industry to reduce energy consumption, and the cooling process is a prime candidate for assessment. Heat, which traditionally simply vented to atmosphere can be recovered and used elsewhere in the plant, perhaps to pre-warm the provers or the hot water supply to the washrooms.



The control system monitors temperature and humidity



Cooling to the optimum temperature is key for slicing and packaging



Create the optimum cooling conditions

Heat recovery

The theory of heat recovery is simple: run the hot air through a heat exchanger to transfer the thermal energy to glycol flowing through pipe work or a radiator. This is then pumped to another exchanger where the heat is given up to another process. In practice however considerable control is required to optimise the process, this is achieved using sensors, thermocouples, solid state controllers and local graphic display operator interfaces.

Only a few years ago cooling was an uncontrolled process. Now it can be optimised to maintain product quality and weight, enhance slicing and packing, and by recovering heat that would otherwise be wasted, help reduce the overall cost of production.

Mitsubishi Automation System Solutions:

- General control
- Energy saving
- Optimum cooling conditions
- Cooling profiles