Intelligent Cloud-Based IoT Control System for Industrial Kitchen Appliances

Consistent dish quality and maximum preparation efficiency are essential in system catering. At the same time, the kitchen equipment must be flexible to be adapted to the different requirements of daily operations. National Control Corporation (NCC), a business of AMETEK, offers innovative food service chains an end-to-end control system with a cloud connection to meet these requirements.

9 a.m. in a typical food chain restaurant: the breakfast menu with eggs, bagels and pancakes is on offer. A few hours later, the menu changes to classic burgers and wraps with beef and chicken. Over the course of the day, dozens of different dishes must be prepared by the kitchen quickly and with consistently high quality. Frequent and efficient recipe changeovers depend on experienced kitchen staff - or they can be automated using intelligent control systems.

At National Controls Corporation (NCC) we have been designing and manufacturing intelligent display-based controls for the leading foodservice equipment manufacturers in the industry for many years. NCC controllers are characterized by their flexible programming interface for a broad variety of different applications. In collaboration with OEM customers, NCC develops powerful, customized solutions for industrial kitchens, from fryer and oven controls to air filtration systems and holding cabinets.

In conjunction with our controllers the new NCC Internet of Things (IoT) gateway offers OEM's and operators cloud-based process management and ERP software connectivity. The benefits include, among others:

- Condition monitoring
  Equipment owners can remotely access information on operating times, temperature curves, error codes, cleaning cycles performed and other valuable information (see below for complete list). This operating data can be used to optimize maintenance intervals to avoid unplanned device downtimes. Service personnel can be requested at the right time without negatively impacting restaurant operations. Equipment availability increases, as does the productivity of kitchen operations.
  In addition, restaurant operators and catering chains gain detailed insight into the use of kitchen appliances by kitchen staff.

- Cloud-based recipe management
Digital recipe management via the cloud enables restaurants to optimize their menu according to demand. Menus can be adjusted automatically on a daily or time-specific basis, and the equipment can be operated accordingly. In addition, special offers can be uploaded to either select restaurants or the entire chain within seconds via remote access.

- Digital tutorials
Preparation instructions can be provided via the cloud to guide and assist kitchen staff, especially when combined with our display-based controllers. This enables even less experienced employees to prepare all dishes according to specifications without any loss of quality.

- Operational efficiency
The increased level of automation through cloud-based connectivity frees up staff resources to improve the customer experience. Restaurant staff can devote more time to providing restaurant visitors with the best possible service.

- Labor shortage
Automating restaurant operations can help mitigate the shortage of skilled workforce, especially in structurally weak regions. With the help of digital guidance and automated processes, less skilled staff can prepare more complex dishes without affecting quality and consistency.

Technical requirements

Any kitchen equipment equipped with an NCC touch display controls (available in 4.3, 7 or 10-inch versions) can be upgraded with the IoT gateway to become cloud-connected. The controller records the sensor data from the appliance and forwards it to the NCC IoT gateway via the RS485 interface. The data is then transferred to cloud-based ERP and process systems (e.g. based on Azure or AWS) via a wireless internet connection.

What data can be recorded and transmitted?

Available for all devices: Usage statistics, status displays, recipe and ingredient lists, software information and IoT status (download status, update activities), error messages, event logs

Available for deep fryers: Oil temperature, core temperature of the dish (temperature probe required), oil filter status and maintenance history, event log on critical errors (heating up without oil, critical temperature curves)

Available for ovens: Heating chamber temperature, core temperature of the dish (temperature probe required), fan speed, humidity (for steam ovens)

Available for grills: Surface temperature, event log of critical errors (error in drive system or holding system)

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