

Advanced Temperature Control

For enhanced packaging performance



Temperature
control
algorithms
for **sealing**
applications

Manage temperature control in sealing processes to prevent costs and reputation damage from product recalls, ensuring consistent quality even with thin materials. These adaptable solutions fit any machine complexity, from traditional on-panel temperature controllers to those integrated with PLC systems, ensuring consistent quality and maintaining your brand's integrity.

- Increase production by shortening the temperature heat-up time.
- Minimize scrap by controlling seal-jaw temperature precisely - even with very thin/sustainable packaging materials.
- Collect real-time data for predictive maintenance and decision-making.
- Quick integration with ProfiNet®, Ethernet/IP™, EtherCAT®, and MQTT.





Boost production by maintaining a consistent temperature, even during machine restarts

Common challenge in horizontal/vertical flow wrapper machines:

Each time a seal is made, the film absorbs heat from the seal-jaw, causing its temperature to drop. To prevent this fluctuation, it's important to synchronize the temperature of the sealing with the motion of the machine. This synchronization helps maintain consistent heat levels, ensuring effective sealing performance.

Product Name	Product Family
Machine controller	NX102 and NX502 Units
Remote NX coupler	NX-ECC203 (EtherCAT), NX-EIC202 (EtherNet IP), NX-PNC202 (PROFINET)
NX IO units	NX-TS Temperature Input IO, NX-OD Digital Output IO, and NX-TC Temperature Controller IO
Sysmac Library for NX Controllers	Direct Power Control (SYSMAC-XR007)



Minimize scrap with precise control of seal-jaw temperature

Common challenge in horizontal/vertical flow wrapper machines:

Temperature sensors are sometimes positioned too far from the heating bar's sealing surface, leading to a discrepancy between the actual temperature of the sealing surface and the temperature being controlled. Implementing a dedicated sensor and filter algorithm can help manage and minimize this issue.

Product Name	Product Family
Remote NX coupler NXR-ILM08C-ECT (EtherCAT™) NXR-ILM08C-EIT (EtherNet/IP)	NX-ECC203 (EtherCAT) NX-EIC202 (EtherNet IP) NX-PNC202 (PROFINET) NXT Series IO-Link Master
In-panel Temperature Controller Units	NX-TC NX IO
Temperature Sensors	E52 Series

Product Name	Product Family
On-panel Temperature Controller	E5CC/E5GC
Temperature Sensors	E5CC/E5GC



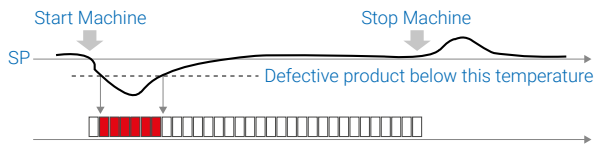
Data-driven maintenance decision-making

Common challenge in tray sealers and thermo-form, fill and seal machines:

During the forming and sealing processes, maintaining temperature uniformity is critical due to factors such as heater degradation, incorrect sensor placement, or material adhesion on the sealing bar surface. The NX-HTC automatically converts temperature fluctuations and manipulated variables during temperature changes into feature values to immediately detect unusual equipment behavior.

Product Name	Product Family
In-panel Temperature Controller	NX-HTC
Remote NX coupler	NX-ECC203 (EtherCAT), NX-EIC202 (EtherNet IP), NX-PNC202 (PROFINET)

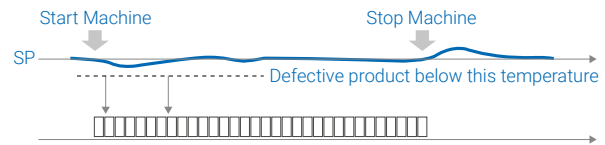
Standard P. I. D. control with no-sync



Standard PID Control effectively heats the seal-jaw to the appropriate temperature during ongoing production. However, challenges may arise when production needs to stop and start.

- Manual PID values adjustment is needed to maintain temperature control
- Not suitable for temperature sensitive materials

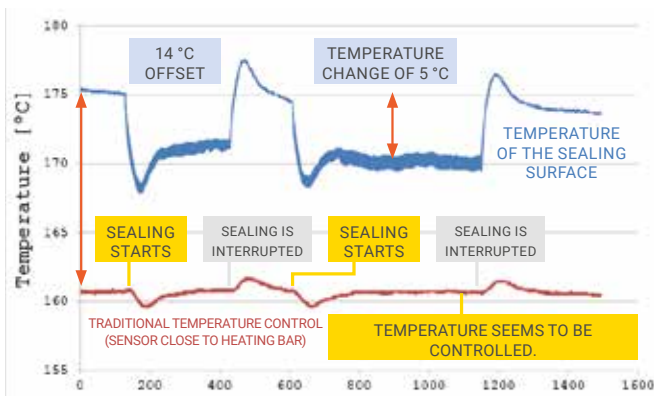
P. I. D. control in sync with motion



Direct Power Control FB (in NX PLC) and **Pre-boost function** (in NX-TC controller) use the machine start signal to "prepare" the seal-jaw temperature for the imminent drop and compensate for it in sync with the machine's motion.

- Higher machine throughput
- Ready for modern packaging materials

Generic temperature sensors



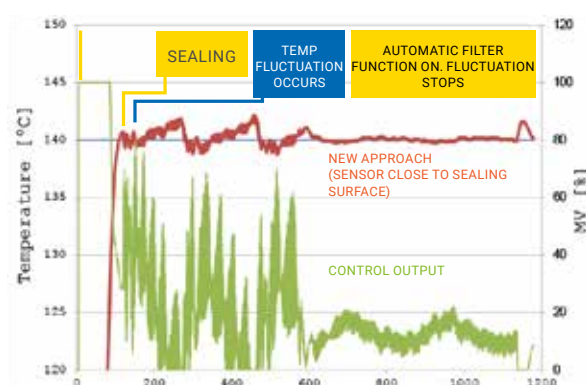
High temperature fluctuation

The sealing surface temperature fluctuates during the sealing process.

Performance affected by machine status.

Very wide offset whenever the machine starts/stops or when sealing speed changes (pcs/min).

Seal-jaw temperature sensors



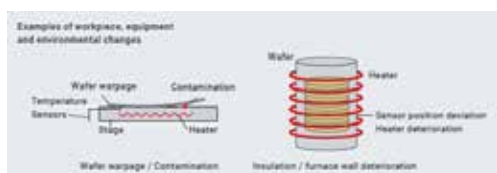
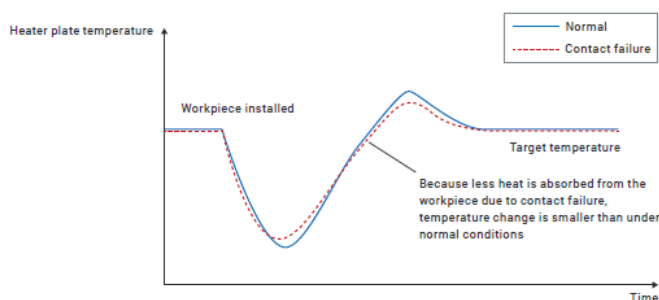
Measure and control of the correct temperature

Locating temperature sensor near seal-jaw surface using dedicated sensors (E52-E).

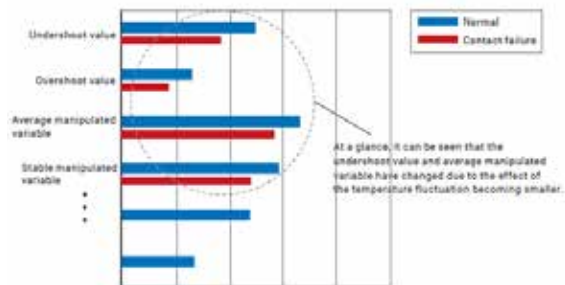
Keep same PID performance as before

"Automatic filter adjustment function" suppresses seal-jaw surface temperature fluctuations, delivering high-performance temperature control.

Slight changes cannot be noticed just by monitoring raw temperature



Monitoring feature values enables detection of slight changes



Feature Visualization is a function that automatically calculates 12 types of feature values. These values are derived from Omron's extensive experience in temperature control and are particularly sensitive to changes in the workpiece, equipment, and environment. The values are calculated using data on temperature and manipulated variables during production.

Temperature Control Facts

OMRON is the world's preferred supplier for Temperature Controllers

Every 30 seconds, an OMRON temperature controller is implemented worldwide.

270,000 hours

Mean time between failure, exceeding the highest quality standards.

2-PID Control

OMRON's 2-PID algorithm offers two degrees of freedom, enabling both effective step response and disturbance response. The best part is that no special action is required on your part; the controller's built-in technology handles everything automatically, ensuring optimal performance without additional intervention.

