

Sysmac Library for NJ/NX/NY Controller

SYSMAC-XR007

Temperature Control Library



Improve product quality and reduce cycle time with optimal temperature control.

Issue 1 Uneven heating of a hotplate causes differences in product temperature. This reduces the yield.

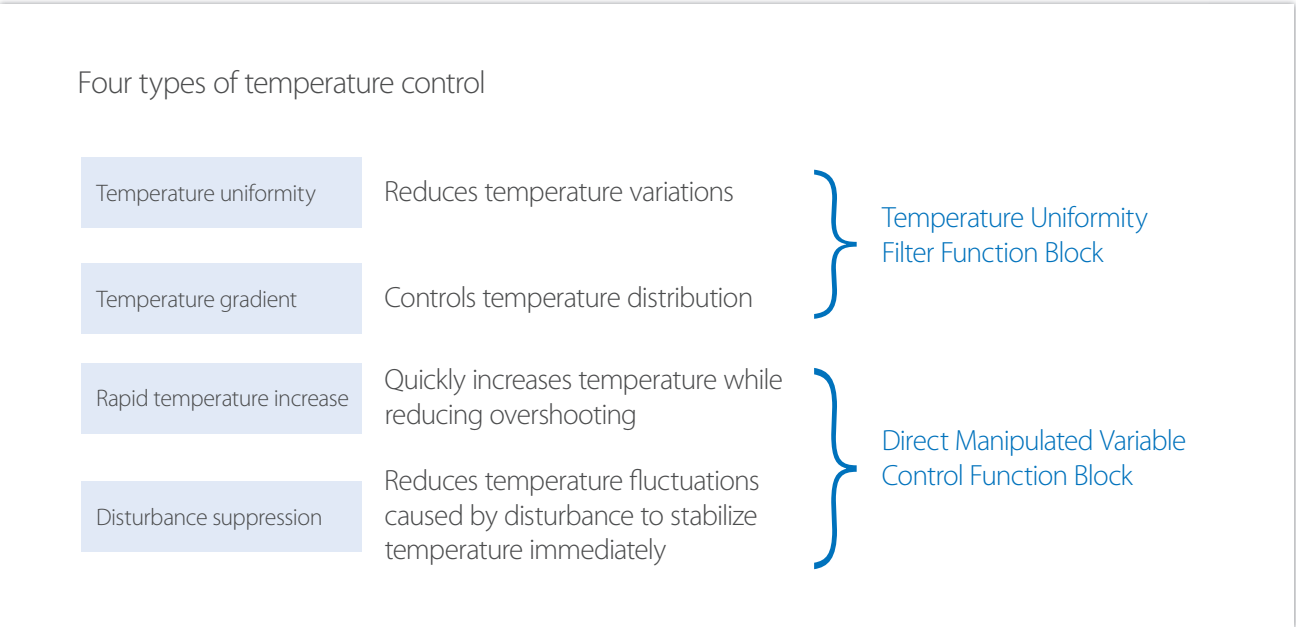
Issue 2 In PID control, it takes time to increase the temperature while avoiding overshooting.

Issue 3 Placing objects (disturbance) lowers the heater temperature, which results in poor product quality. It takes time to raise the temperature again after the disturbance in PID control.

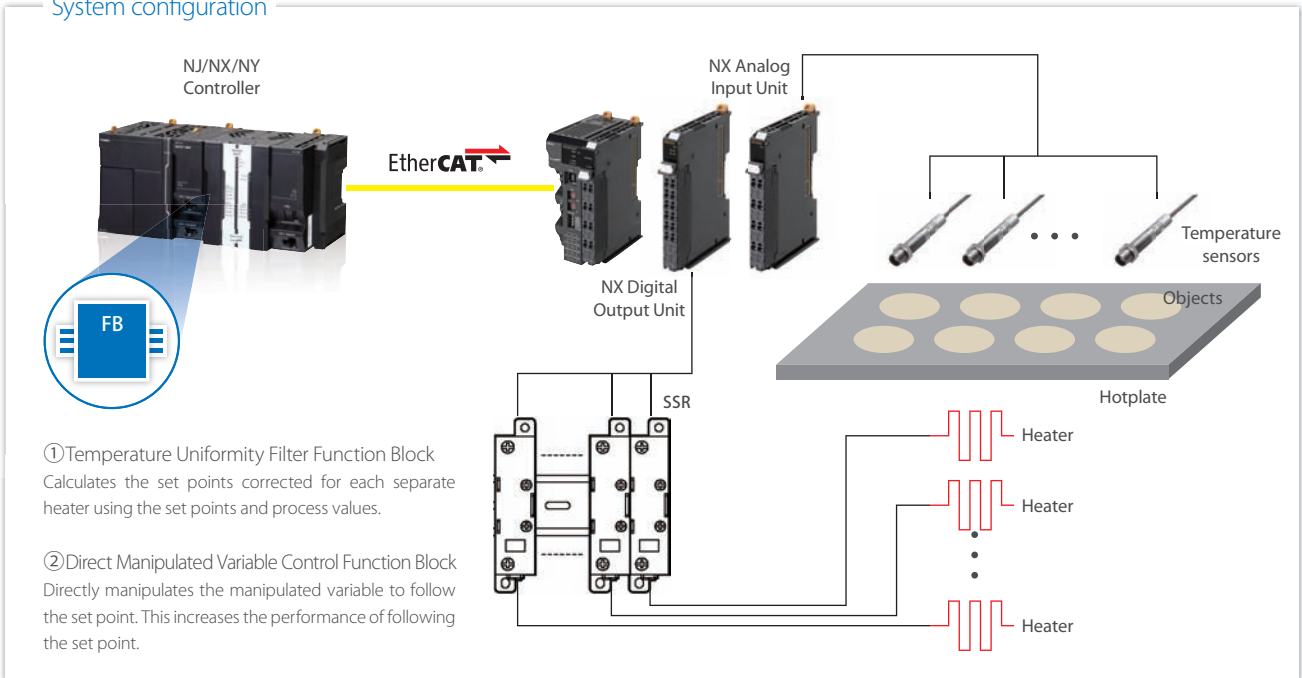
Temperature Control Library offers solution!

The Temperature Uniformity Filter Function Block reduces in-furnace temperature variations or maintains different heater temperatures.

The Direct Manipulated Variable Control Function Block quickly raises the temperature while reducing overshooting or reduces the drop in temperature to stabilize the heater temperature immediately.



System configuration

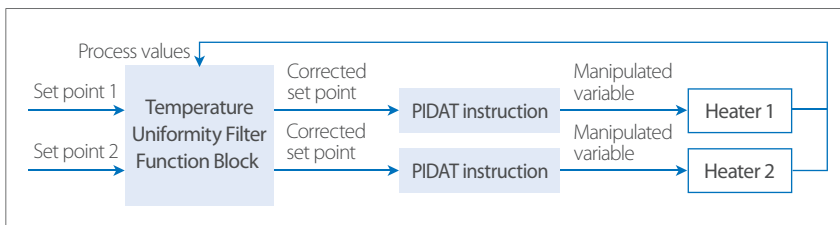


Applications

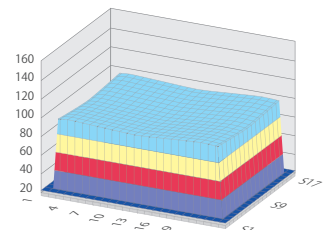
Temperature uniformity/Temperature gradient

Issue The temperature of where an object is placed drops. This causes differences in the hotplate temperature. As the chemical reaction time of objects varies depending on temperature, the yield is reduced.

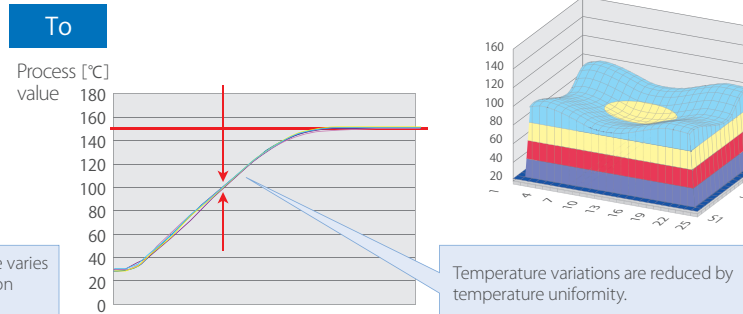
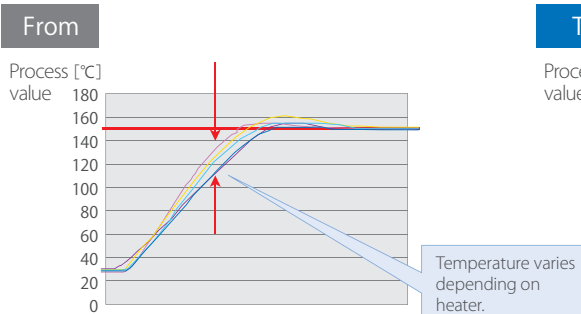
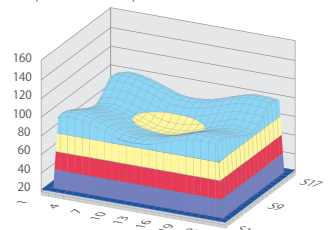
Solution Temperature uniformity/gradient can be achieved by controlling temperatures based on the set points corrected by the Temperature Uniformity Filter Function Block.



Temperature uniformity
Reduces temperature variations and makes surface temperature uniform



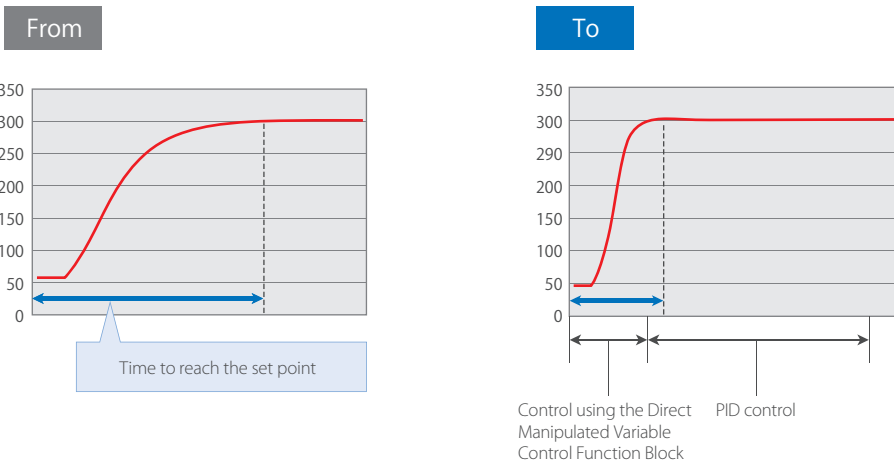
Temperature gradient
Controls temperatures to produce a specified temperature distribution



Rapid temperature increase

Issue Reduce the time to raise the temperature of a reflow oven without overshooting to Improve productivity. PID control can avoid overshooting, but it takes time to increase the temperature.

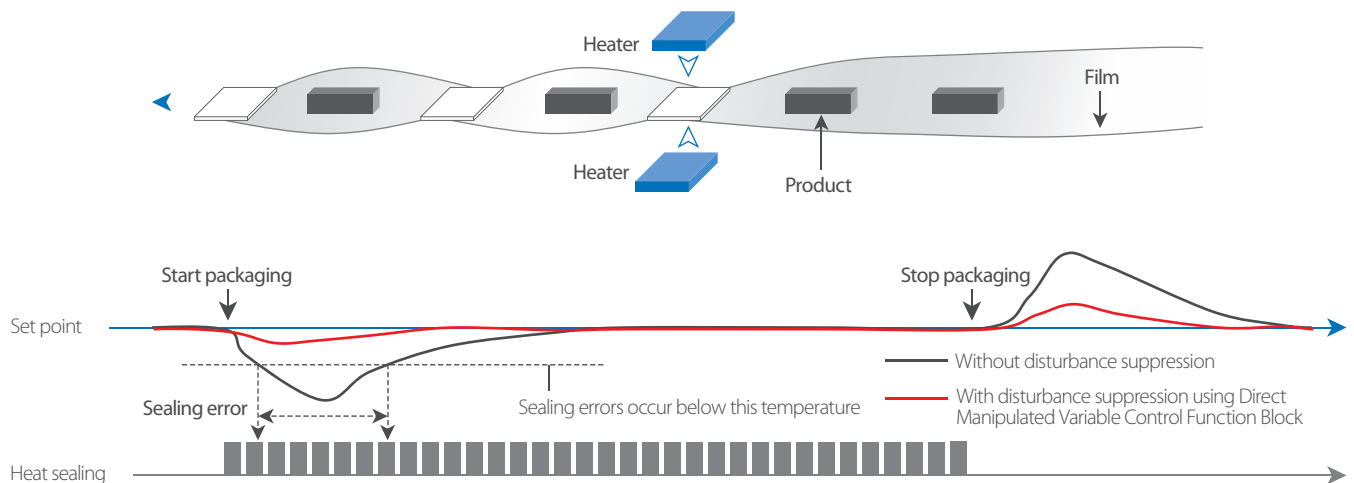
Solution The Direct Manipulated Variable Control Function Block controls manipulated variables when the temperature is increased. Then the control is changed to PID control. This control enables a rapid temperature increase while suppressing the overshooting.



Disturbance suppression

Issue Disturbance, such as placing products on a packaging machine, lowers the heater temperature, resulting in heat sealing error. Once disturbance occurs, it takes some time before the heater temperature is stabilized.

Solution The Direct Manipulated Variable Control Function Block controls manipulated variables when packaging starts. Then the control is changed to PID control. This control reduces the drop in temperature to stabilize the heater temperature immediately.



Compatible Models

Name	Model	Version
Machine Automation Controller NJ/NX CPU Unit	NX701-□□□□/ NJ101-□□□□	Version 1.10 or later
	NJ501-□□□□/ NJ301-□□□□	Version 1.02 or later
	NX1P2-□□□□□□(1)	Version 1.13 or later
Industrial PC Platform NY IPC Machine Controller	NY5□□-1	Version 1.12 or later
Automation Software Sysmac Studio	SYSMAC-SE2□□□	Version 1.14 or higher

Function Block (FB) Specifications

Name	FB name	Description
Temperature Uniformity Filter	TempUniformityFilter	Calculates the set points suitable for each separate heater.
Direct Manipulated Variable Control	DirectPowerControl	Directly manipulates the manipulated variable to follow the set point in temperature control. You can use it to increase the performance of following the set point.

Sysmac is a trademark or registered trademark of OMRON Corporation in Japan and other countries for OMRON factory automation products. EtherCAT® is registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany. Other company names and product names in this document are the trademarks or registered trademarks of their respective companies.

Note: Do not use this document to operate the Unit.

OMRON Corporation Industrial Automation Company
Kyoto, JAPAN

Contact: www.ia.omron.com

Regional Headquarters

OMRON EUROPE B.V.

Wegalaan 67-69, 2132 JD Hoofddorp
The Netherlands
Tel: (31)2356-81-300/Fax: (31)2356-81-388

OMRON ELECTRONICS LLC

2895 Greenspoint Parkway, Suite 200
Hoffman Estates, IL 60169 U.S.A.
Tel: (1) 847-843-7900/Fax: (1) 847-843-7787

OMRON ASIA PACIFIC PTE. LTD.

No. 438A Alexandra Road # 05-05/08 (Lobby 2),
Alexandra Technopark,
Singapore 119967
Tel: (65) 6835-3011/Fax: (65) 6835-2711

OMRON (CHINA) CO., LTD.

Room 2211, Bank of China Tower,
200 Yin Cheng Zhong Road,
PuDong New Area, Shanghai, 200120, China
Tel: (86) 21-5037-2222/Fax: (86) 21-5037-2200

Authorized Distributor:

© OMRON Corporation 2015 All Rights Reserved.
In the interest of product improvement,
specifications are subject to change without notice.

CSM_2_1_1116
Cat. No. P100-E1-01

1115(1115)