

# Panasonic

ideas for life



## Panasonic Automation Products Solutions for Temperature Control

# Highlights and Background

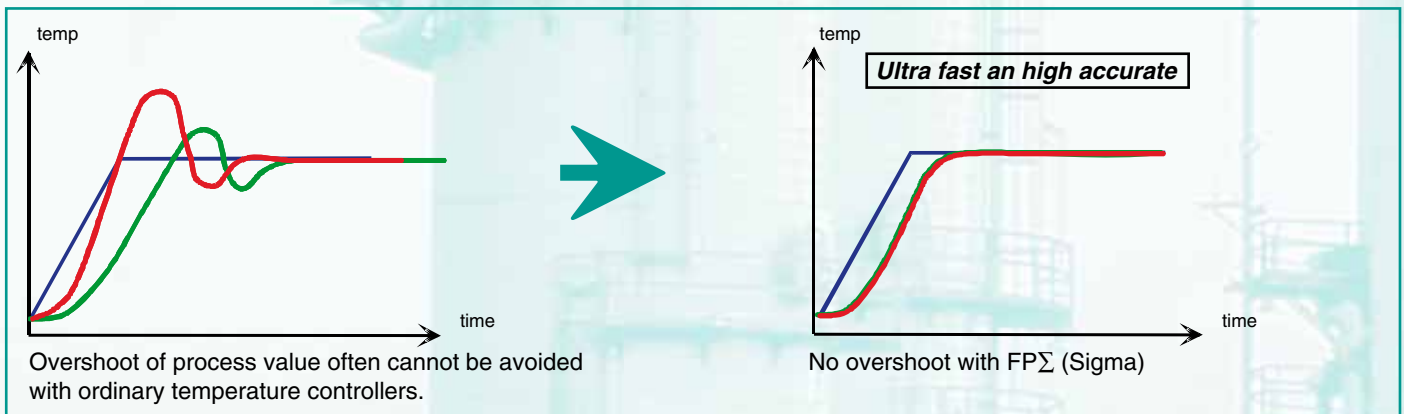
## PLC-based Temperature Controllers

We offer a new unique combination: intelligent PLCs with new temperature control methods and high quality units with several different temperature inputs.

- ▶ Ultra fast
- ▶ High accuracy
- ▶ Flexible
- ▶ Multiple timings
- ▶ Up to 4 communication interfaces
- ▶ Multiple parameter sets can be predefined, e.g. for different production steps
- ▶ Up to 18 RTD / 24 TC inputs for FPΣ (Sigma)/FP0
- ▶ Math calculations



FPΣ (Sigma) Programmable Controller for sophisticated temperature control applications



## KT-Series Temperature Controller

Stand alone components, especially designed for efficient and accurate temperature control.

- ▶ Easy to use
- ▶ Small
- ▶ Accurate
- ▶ Multifunctional
- ▶ Multi-input



KT2

KT2 Pattern control





# Product Overview

## KT Temperature Controllers

A wide range of products means that there is an optimal solution for your specific application.



- ▶ Wide range of different sensors / inputs and outputs
- ▶ The easy way to control temperature
- ▶ Network communication via RS485 / Modbus optional

[More details ▶ Page 5](#)

## PLCs with Thermocouple, RTD and Thermistor Inputs

Powerful PLC features with new temperature control methods and several different temperature input units can solve temperature control problems which could not be solved before. A wide variety of CPUs and combinations are available.



- ▶ Intelligent and multifunctional
- ▶ Fast and accurate

[More details ▶ Page 6](#)

FP0	FP0-TC4	FP0-TC8	FP0-RTD6
10 to 16 E/A 6 to 16 inputs 4 to 16 outputs	4TC inputs	8TC inputs	6 RTD inputs



FP-e

- ▶ "All in one" PLC, 2 Thermocouple inputs, Display



FPΣ (Sigma)

- ▶ Thermistor inputs or with FP0 thermocouple and RTD units

## Special Solution for Sealing of Plastic Packaging Materials

A special Panasonic designed heat timing guarantees perfect sealing and long life of the tool.



Impulse Heat Controller



Sealing result

- ▶ High-speed temperature control
- ▶ Perfect quality sealing
- ▶ Saves energy costs

[More details ▶ Page 7](#)

# Typical Applications/Product Selection

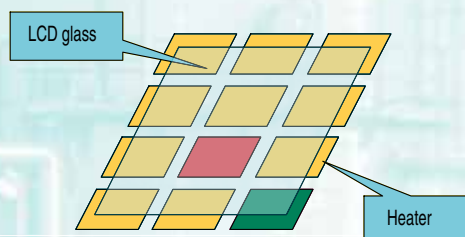
Application	Task	Characteristics	Solution
Plastic thermal welding machine	Control temperature and time of the plastic thermal welding	Good display, PID control, easy to use, small size	KT4 Temperature Controller
LCD glass caking oven	Temperature has to be raised evenly to avoid breaking caused by uneven expansion	Synchronization of 50 to 400 different heaters / measurement points	FPΣ (Sigma)
Sealing of plastic bags for packaging	High-speed heating with high accuracy and low current consumption	High-speed temperature measuring High-speed, precision PID, High-speed heater control, profile storage, network communication	Impulse Heat Controller
Varnishing service for cars	Control three 900W Heaters	Fast, several control loops with one unit, competitive system price	PID control loops running in an FPΣ (Sigma) plus infrared temperature sensors and phase control
IC screening equipment	Temperature control of heating irons used for the embossed-tape packaging of ICs	Ease of use, precision, multi-input, selectable sensor, DIN rail mounting	KT7 Temperature Controller
Water quality surveillance in many locations	Remote by controllable temperature measuring and control system	Liquid controlled to $180 \pm 0.5K$	FPΣ (Sigma) and FP Modem-EU

## Application Examples

Device for sealing of plastic packaging materials.



LCD glass caking



Synchronization of multiple temperature measurement points/heaters.

Quality control system for polymers by OCS.



Contains FPΣ (Sigma) PLC with self-optimizing PID control, continuous display and monitoring of all temperature settings. Up to 7 temperature ranges can be individually set.

# KT Temperature Controllers



KT2  
(48 x 24 x 98.5mm)



KT4  
(48 x 48 x 95mm)



KT8  
(48 x 96 x 98.5mm)



KT9  
(96 x 96 x 98.5mm)



KT7  
(22.5 x 75 x 100mm)

## Highlights

- ▶ Ultra small size: KT2, KT4, KT7
- ▶ Very accurate:  $\pm 0.2\%$  of span
- ▶ Simple operation
- ▶ 4 sizes for front panel mounting: KT2, KT4, KT8, KT9
- ▶ DIN rail mounting with KT7
- ▶ Heating and cooling control with optional OUT2
- ▶ Heater-burn out alarm available
- ▶ Up to 2 alarm outputs
- ▶ RS485 ASCII/Modbus communication available
- ▶ Multi-input (see below)
- ▶ 9-step pattern control (ramp function) for KT2
- ▶ 2-set values possible for KT8 and KT9 (external selectable)

## Multi-input

- ▶ Thermocouples K, J, R, S, B, E, T, N, PL-II, C
- ▶ RTD Pt100, JPt100
- ▶ DC Current 0/4 – 20mA
- ▶ DC Voltage 0 – 1/5/10V

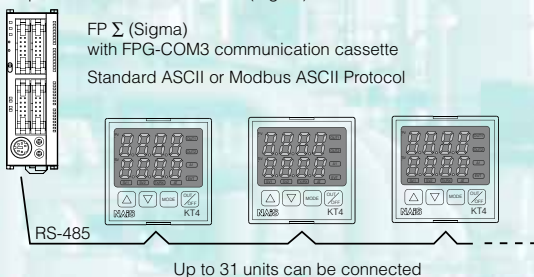
## Control Features

PID Control, auto-tuning, auto-reset (automatic offset for P control), anti-rewind-setup (ARW)

	Sensor type	Temperature range
Thermocouple	K	-200 to 1380°C
	K, T	-199.9 to 400°C
	J	-200 to 1000°C
	R, S	0 to 1760°C
	B	0 to 1820°C
	E	-200 to 800°C
	N	-200 to 1300°C
	PL-II	0 to 1390°C
	C/WRe5-26	0 to 2315°C
RTD	Pt100	-200 to 850°C
	JPt100	-200 to 500°C

## Communication via RS485 and Standard (ASCII) or Modbus Protocol

Multidrop communication with a FPΣ (Sigma) PLC



For more information please order the brochure ▶ 6205euen KT Temperature Controller



# Programmable Controllers

## The FP $\Sigma$ (Sigma) control unit with thermistor inputs enables efficient temperature control with a new method

- ▶ Two thermistor inputs, which cost less than thermocouples, can be connected to the FP $\Sigma$  (Sigma) via thermistor inputs.
- ▶ Using the simple linearization command F282\_SCAL, measuring the temperature with a thermistor can be programmed easily.



## RTD input unit for the FP0/FP $\Sigma$ (Sigma) PLCs

- ▶ Pt100, Pt1000, Ni1000 resistance inputs
- ▶ 6 inputs per unit / up to 18 inputs / PLC
- ▶ Input Resolution 0.1/0.01K (depending on selected range)
- ▶ Broken RTD detection
- ▶ 3-wire connection
- ▶ 5 DIP switches:
  - 4 for sensor type selection
  - 1 for cycle time selection slower cycle time results in higher accuracy



FP0-RTD6  
6 inputs

Part no. FP0-RTD6	Resolution 0.1K Temperature ranges	Resolution 0.01K Temperature ranges
Pt100	-200 to +500°C	-80 to +80°C
Pt1000	-200 to +300°C	-80 to +80°C
Ni1000	-30 to +150°C	-30 to +80°C
Resistance	20 to 2200 $\Omega$	20 to 1630 $\Omega$

## Thermocouple input unit for FP0/FP $\Sigma$ (Sigma) PLCs

- ▶ Supports K, J, T and R thermocouples
- ▶ 16-bit internal resolution
- ▶ Accurate cold junction compensation
- ▶ Average function
- ▶ Broken thermocouple detection
- ▶ 5 DIP switches:
  - 2 for sensor type selection
  - 1 for unit selection °C/°F
  - 2 for input channel selection: CH01, CH0 to CH3, CH0 to CH5, CH0 to CH7



FP0-TC4  
4 inputs



FP0-TC8  
8 inputs

Thermocouple	Temperature ranges
K, J	-100 to 500°C
T	-100 to 400°C
R	0 to 1500°C

For more information please order the brochure ▶ 4093euen FP0 Series PLCs  
▶ 4136euen FP $\Sigma$  (Sigma) PLCs

# Impulse Heat Controller

## Highly Precise Control System for Rapid Heating

for sealing plastic packaging materials

### Typical Applications:

Impulse sealers and vacuum packaging machines



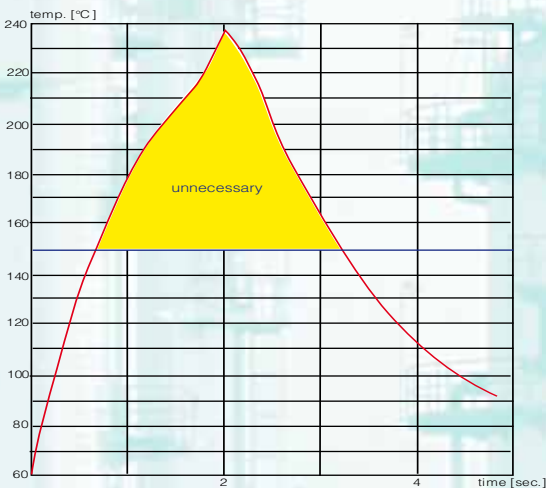
Impulse Heat Controller  
AAD01010



Phase Detection Unit  
AAD02010

- ▶ Control of both temperature and time
- ▶ Quick heating
- ▶ Temperature input conversion time 18ms
- ▶ Temperature input range -30 to 600°C
- ▶ Temperature sensor K-type thermocouple
- ▶ 1 TC input, 8 digital inputs, 6 digital outputs
- ▶ Peripheral equipment is controllable as well
- ▶ Remote monitoring via RS232 COM port

- ▶ Ultra high-speed temperature control
- ▶ High-speed temperature measuring
- ▶ High-speed, precision PID
- ▶ High-speed heater control

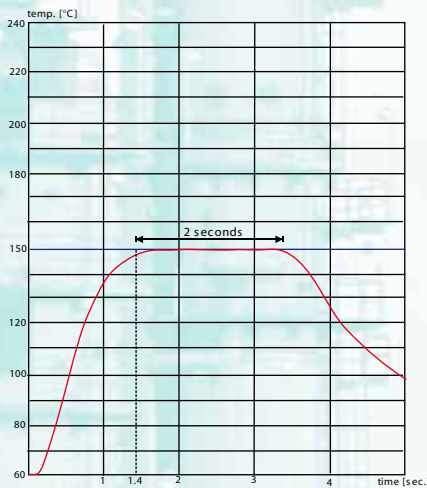


### Timer based control

- ▶ Life of heater is shortened
- ▶ Seal is overheated

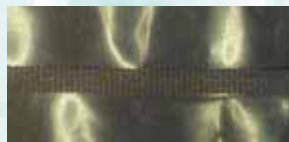


Timer based sealing



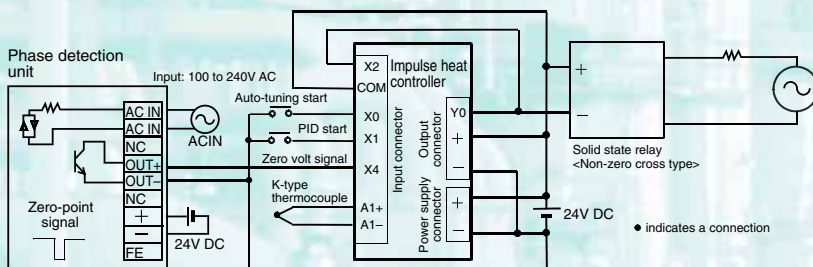
### With Impulse Heat Controller

- ▶ No temperature overshoot
- ▶ Saves energy
- ▶ Stable sealing



High quality sealing with  
Impulse Heat Controller

## Wiring scheme





North America

Europe

Asia Pacific

China

Japan

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