PX-series digital temperature controller
Example of Applications and Parameter Functions

Introduction

This document provides examples of applications and major functions of three types of digital controllers (types PXH, PXF, PXG and PXR).
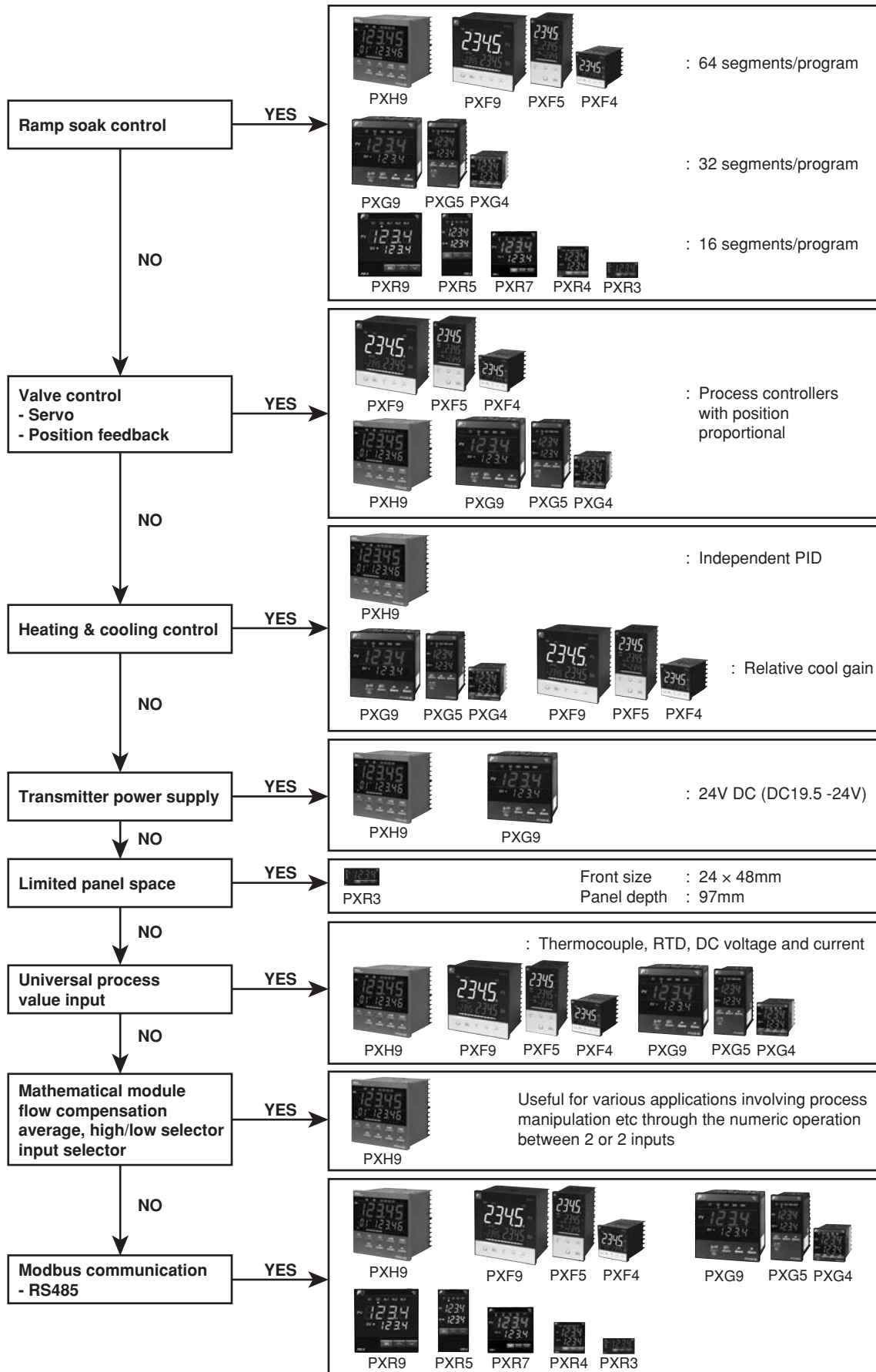
Contents

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FLOW CHART OF FUJI TEMPERATURE CONTROLLER

Ramp soak control — YES →
- PXH9 PXF9 PXF5 PXF4 : 64 segments/program
- PXG9 PXG5 PXG4 : 32 segments/program
- PXR9 PXR5 PXR7 PXR4 PXR3 : 16 segments/program

NO ↓

Valve control
- Servo
- Position feedback — YES →
- PXF9 PXF5 PXF4
- PXH9 PXG9 PXG5 PXG4 : Process controllers with position proportional

NO ↓

Heating & cooling control — YES →
- PXH9 : Independent PID
- PXG9 PXG5 PXG4 PXF9 PXF5 PXF4 : Relative cool gain

NO ↓

Transmitter power supply — YES →
- PXH9 PXG9 : 24V DC (DC19.5 -24V)

NO ↓

Limited panel space — YES →
- PXR3 Front size : 24 × 48mm Panel depth : 97mm

NO ↓

Universal process value input — YES →
: Thermocouple, RTD, DC voltage and current
- PXH9 PXF9 PXF5 PXF4 PXG9 PXG5 PXG4

NO ↓

Mathematical module flow compensation average, high/low selector input selector — YES →
- PXH9 Useful for various applications involving process manipulation etc through the numeric operation between 2 or 2 inputs

NO ↓

Modbus communication - RS485 — YES →
- PXH9 PXF9 PXF5 PXF4 PXG9 PXG5 PXG4
- PXR9 PXR5 PXR7 PXR4 PXR3

I. Example of Applications

1 Controlling both heating and cooling with a single controller

• Only one controller is required to keep the temperature of a cattle shed constant all year round, by cooling down the hot summer heat with a fan and warming up the cold winter air with a heater.
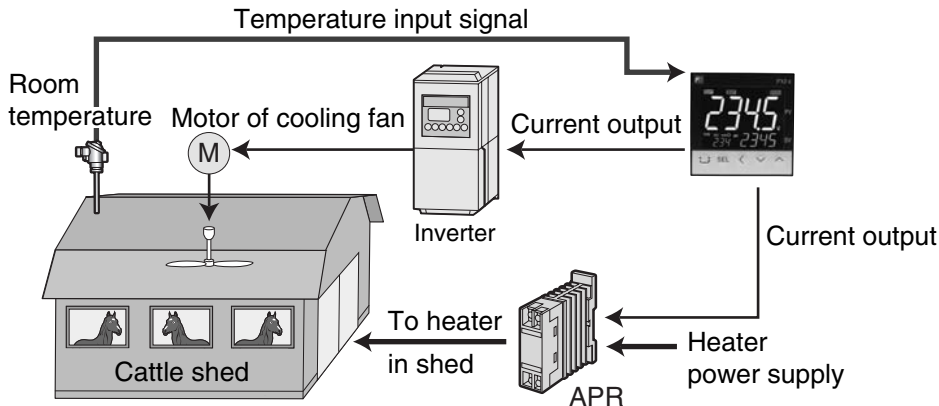
Parameter	Description	Parameter setting by type			
		PXF	PXR	PXG	PXH
_____	Specifies the type of dual control (control outputs 1 and 2).	○	○	○	○

2 Collectively displaying information accumulated in multiple controllers using communication function

• By connecting a controller, recorder, and inverter using the communication function, you can display information collectively on an indicator or a PC. Settings can also be changed through communication.
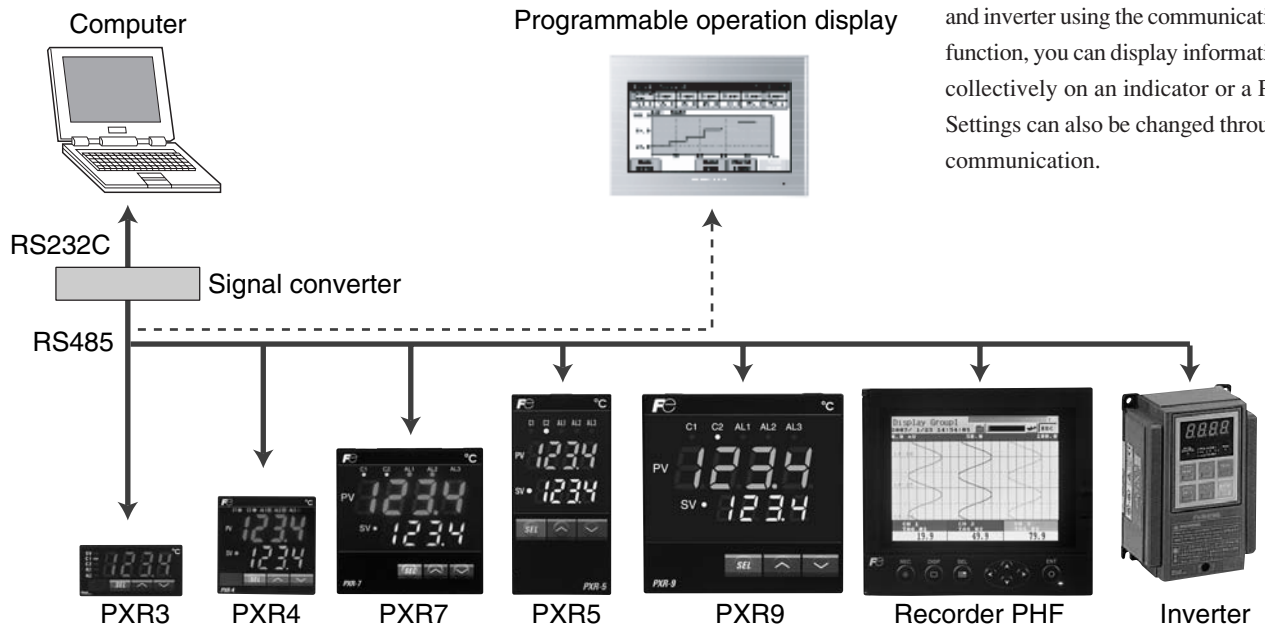
Parameter	Description	Parameter setting by type			
		PXF	PXR	PXG	PXH
_____	Selects the type of communication function (if provided).	○	○	○	○

3 Preventing workers at site from changing the settings carelessly

PXG9

- Carelessly touching a button on the front face of the temperature controller may change the settings, thus disabling proper control.
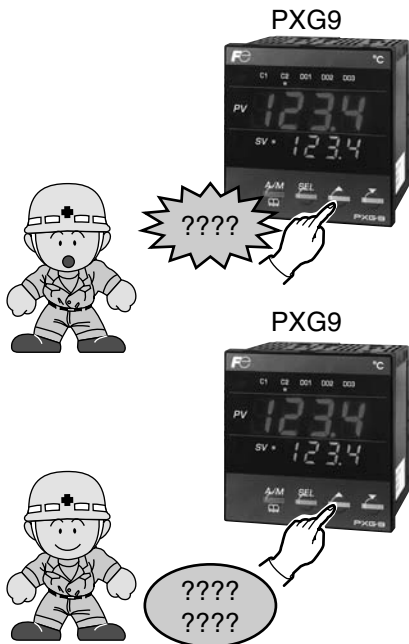- The key lock function and password function can be used to prevent such operating errors.

????

PXG9

- Key lock: Prohibits the setting of all the parameters.
  <LOC> : Prohibits the setting of parameters except for SV.

- Password: Use the password function to prohibit parameter setting. There are three levels of prohibition.

????
????

Parameter	Description	Parameter setting by type			
		PXF	PXR	PXG	PXH
LOC	Specifies whether the parameter settings are allowed to be changed or not.	○	○	○	○

4 Recording the temperature data obtained

- The temperature of oil in the fryer can be captured into the recorder and the data recorded.
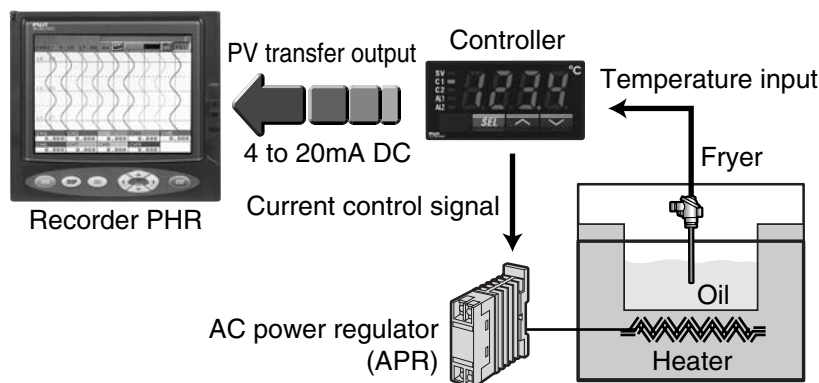
PV transfer output

Controller

Temperature input

4 to 20mA DC

Fryer

Recorder PHR

Current control signal

Oil

AC power regulator (APR)

Heater

Parameter	Description	Parameter setting by type			
		PXF	PXR	PXG	PXH
AO-T	Sets the type of transfer output.	○	○	○	○

5 Preventing measurement fluctuations
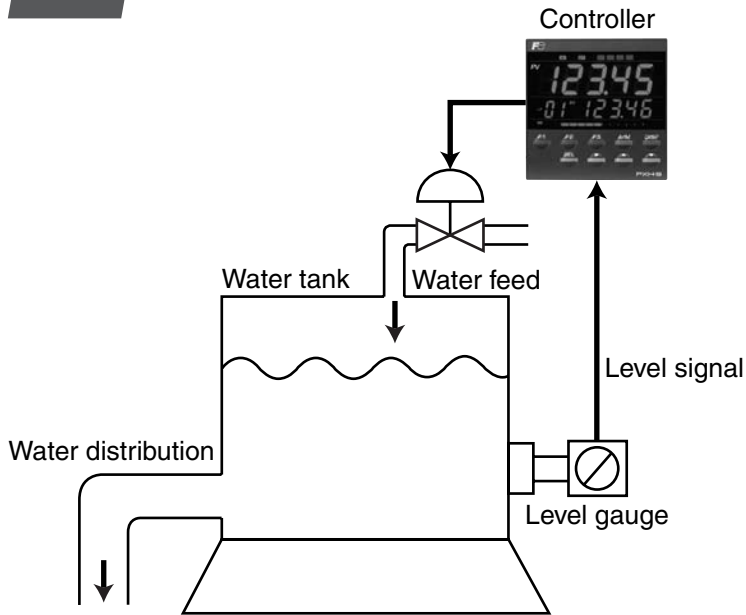
Controller

- Sudden changes in incoming signals to a level gauge of a water tank can be smoothed.
- The water feed valve can be controlled automatically according to the water level in the tank measured with a level gauge.
- The filter function reduces measurement fluctuations caused by waves on the water surface.

Water tank   Water feed

Level signal

Water distribution

Level gauge

Parameter	Description	Parameter setting by type			
		PXF	PXR	PXG	PXH
P-DF	Sets the constant of the input filter.	○	○	○	○

Note: Select PXH or PXF for controlling high flow rate and pressure.

6 Ratio control

- The flow rate of chlorine fed to tap water can be controlled at a constant level.

Controller

Flow rate signal 2

Flow rate signal 1

Flow rate 1 (SV)

Ratio

Flow rate 2

(M) Valve

Chlorine

Tap water →
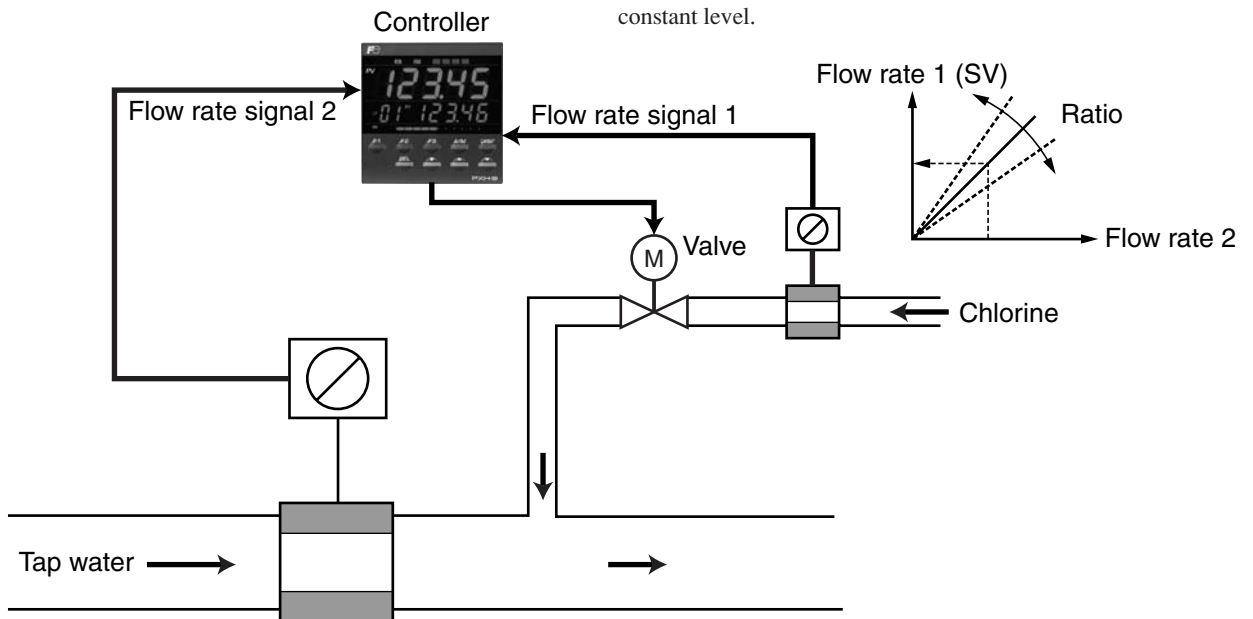
Parameter	Description	Parameter setting by type			
		PXF	PXR	PXG	PXH
CALC	Selects an operational expression.	✕	✕	✕	○

3

7 Equalizing the temperature within a furnace

- The setting of controller No.1 is treated as the input setting of other controllers to equalize the temperature within a tunnel furnace.
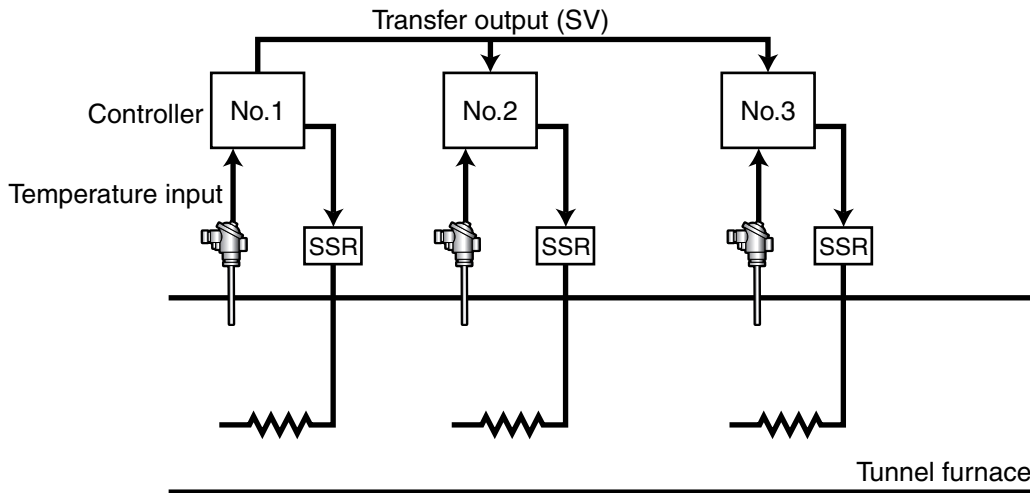
Transfer output (SV)

Controller   No.1   No.2   No.3

Temperature input

SSR   SSR   SSR

Tunnel furnace

Parameter	Description	Parameter setting by type			
		PXF	PXR	PXG	PXH
AO-T	Sets the type of transfer output.	○	○	○	○

8 Controlling temperature patterns

- The setting (SV) can be changed with time according to the program pattern selected beforehand.
  Ramp soak of up to 8 steps can be programmed with type PXR, and up to 16 steps with type PXG, and up to 64 steps with type PXH and PXF.

Digital input
Ramp soak operation command
ON: Start
OFF: Reset

1234
1234

Temperature input
Thermocouple
Furnace

SSR drive output
SSR

Set value

SV-1 SV-2 SV-3 SV-4 SV-5 SV-6 SV-7 SV-8

Time
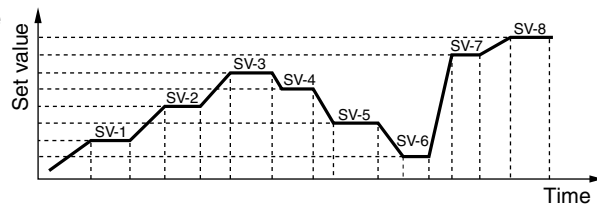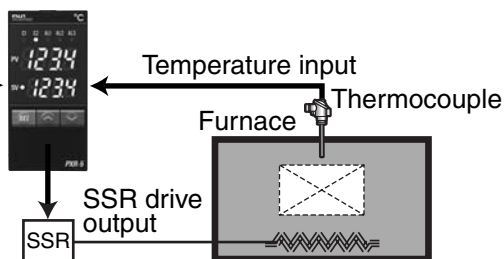
Parameter	Description	Parameter setting by type			
		PXF	PXR	PXG	PXH
PT-N	Sets the ramp soak function.	○	○	○	○

4

9 Energy-saving operation on standby

• Energy-saving operation is allowed with the setting switched between 20°C (on standby) and 400°C (during operation) with an external command switch.
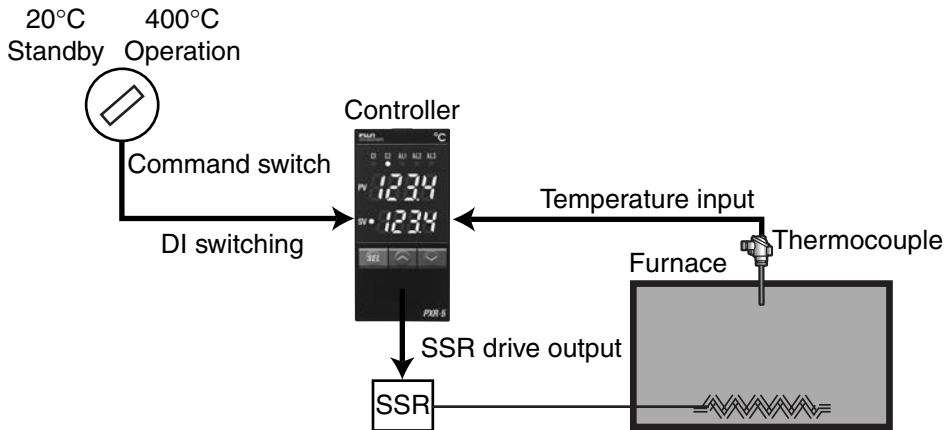
Parameter	Description	Parameter setting by type			
		PXF	PXR	PXG	PXH
DI-1	Sets the operation of DI1.	○	○	○	○

10 Control loop error detection

• In a loop that uses an AC power regulator (APR), judgment on issuance of a heater break alarm cannot be made by a current detector (CT). The controller type PXG and PXF detects an error of the loop based on the operation output and the width of temperature fluctuation.
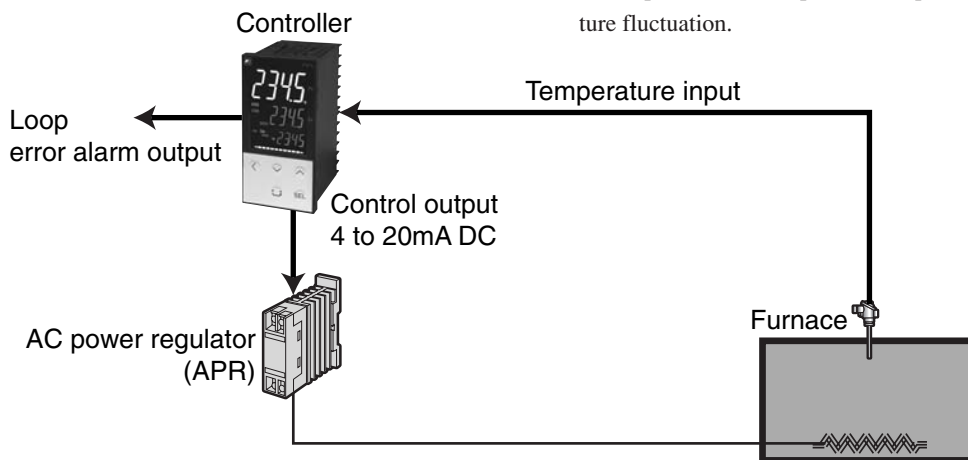
Parameter	Description	Parameter setting by type			
		PXF	PXR	PXG	PXH
LBTM	Sets a loop break alarm.	○	×	○	×

5

11 Drying control of washers

- When washing parts with water kept at constant temperature, once the washing is completed, the parts are lifted out of the washing water and then dried for a specified length of time.
  The timer function notifies you when the work is completed.
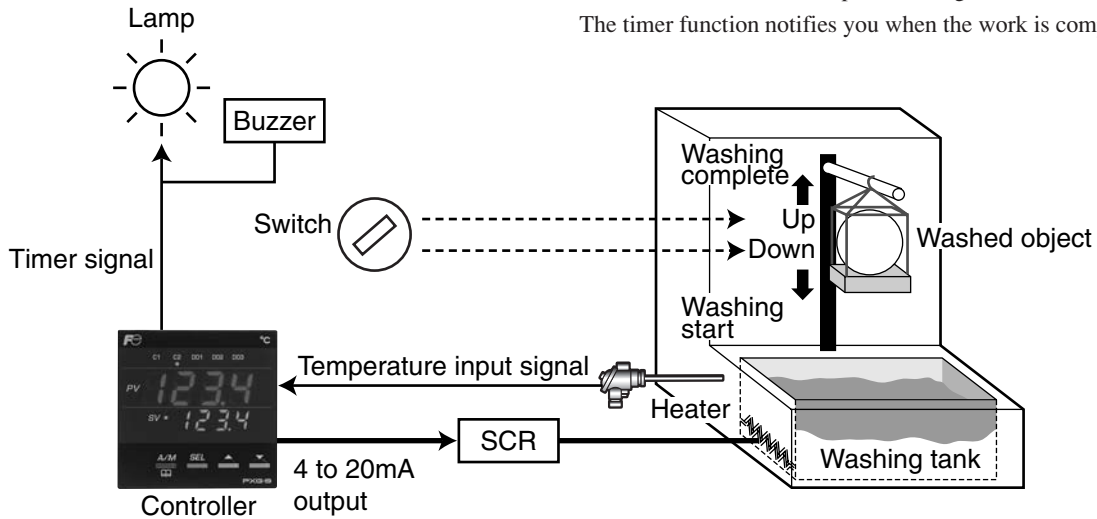
Parameter	Description	Parameter setting by type			
		PXF	PXR	PXG	PXH
TN-1	Displays the remaining time of timer 1 operation.	○	○	○	✕

12 Controlling 90% of the setting at constant control output

- The operation output (MV) is determined based on external input until 90% of the concentration setting of an ozone generator is reached, while the concentration exceeding 90% is controlled with a controller.
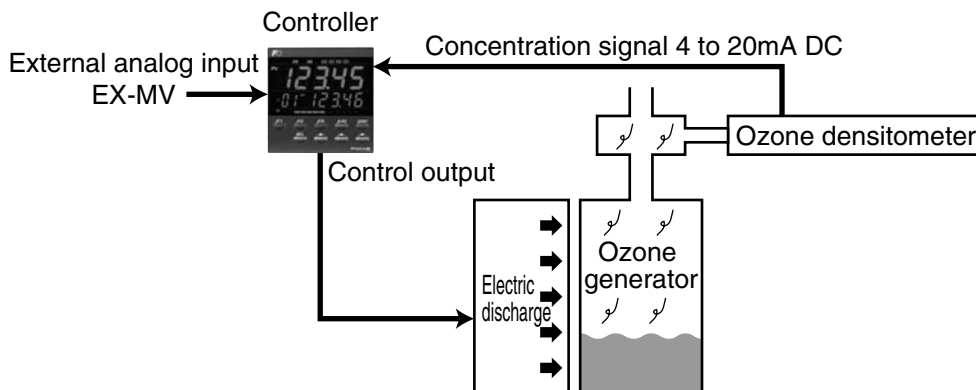
Parameter	Description	Parameter setting by type			
		PXF	PXR	PXG	PXH
EXM1	Sets the external output value.	△ (Note 1)	△ (Note 1)	△ (Note 1)	○

Note 1: If the output is kept at a constant level, the standby function allows you to perform the same control.

13 Performing control by selecting input signals

- Control can be performed by selecting the highest or lowest temperature detected by three sensors.
  Switching between high and low inputs can be made by an external event (Di).
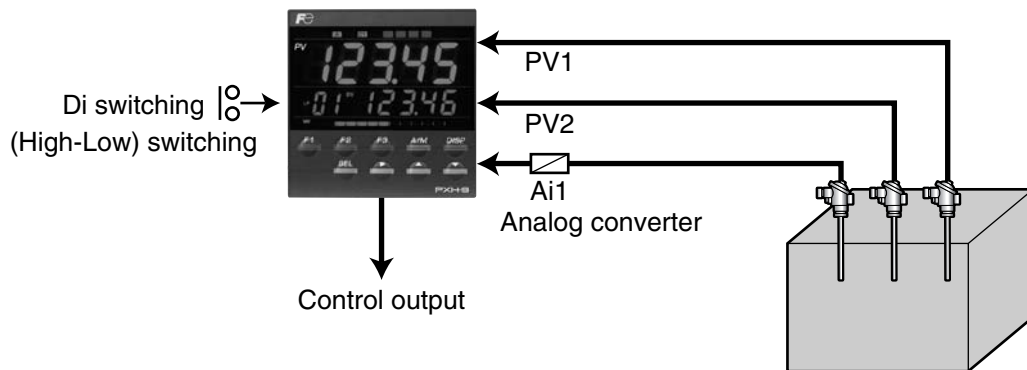
Parameter	Description	Parameter setting by type			
		PXF	PXR	PXG	PXH
OTYP	Sets the type of control output selector.	✕	✕	✕	○

14 Controlling the flow rate of dry gas

- The calculation function eliminates the need for an external calculation device.
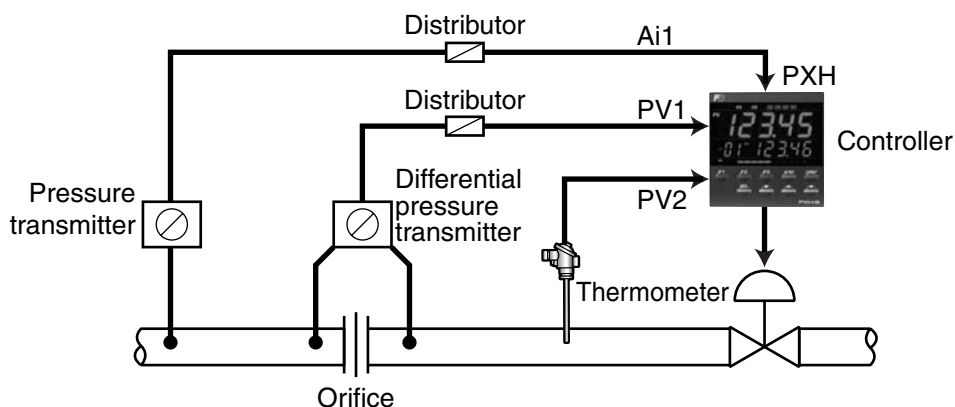
Parameter	Description	Parameter setting by type			
K01		PXF	PXR	PXG	PXH
∫	Sets the constant to be used for calculations.				
K16		✕	✕	✕	○

7

15 Stopping the output of temperature regulator (Standby setting)

- This setting is useful for stopping the output of a temperature regulator depending on production information.
  Use of an external event (Di) also facilitates stopping.
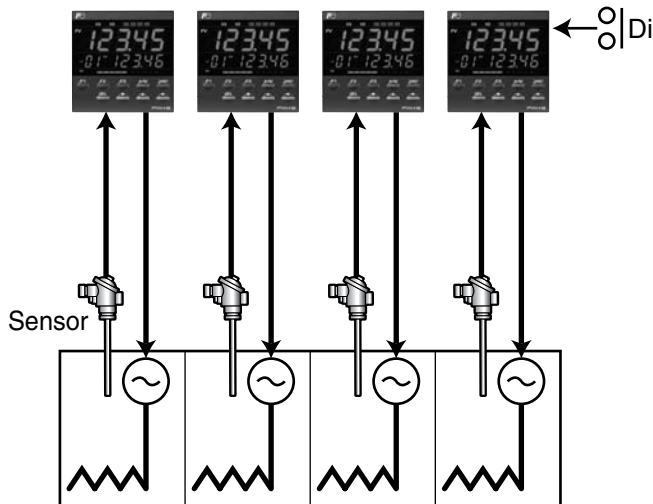
Parameter	Description	Parameter setting by type			
		PXF	PXR	PXG	PXH
STBY	Switches between control and standby.	○	○	○	○

16 Switching frequently-used parameters at the touch of a key

- By assigning operations to user function keys, you do not have to call up parameters every time a parameter change is required; simply touch the corresponding key to make the necessary changes.
  - Remote/auto switching
  - Standby
  - Alarm latch clear
  - Auto tuning

User function key

Parameter	Description	Parameter setting by type			
		PXF	PXR	PXG	PXH
⎯⎯	Assigns operations to user function keys.	○ (Note)	✕	○ (Note)	○

Note: In case of PXG, only one key is available for this user function

17 Operating the setting of a temperature regulator on your PC (PC loader software)

- The PC loader software supplied as standard makes it easy to upload and download parameters on your PC.
- The software is convenient to frequently change the parameters of a temperature regulator by product. (A dedicated cable is available as an option.)

RS-232C

Signal converter

Up to 31 units can be connected.
RS485 (MODBUS) communication

Parameter setting/change screen
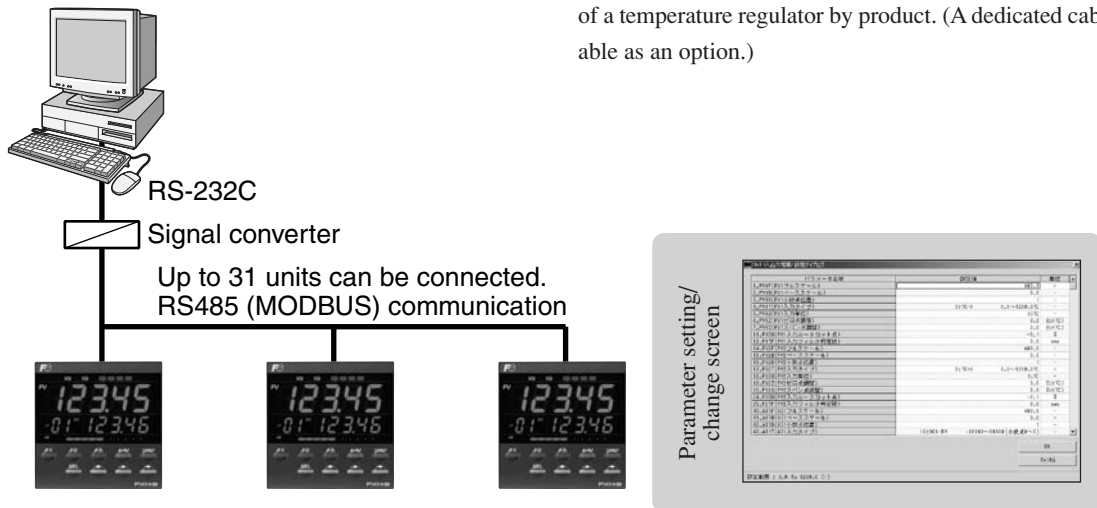
Parameter	Description	Parameter setting by type			
		PXF	PXR	PXG	PXH
――	The PC loader software facilitates uploading/downloading parameters.	○	×	○	○

18 Performing backup control of host control system

- The operation output of the host system is output without manipulation in the normal state. If the host system goes down, the regulator backs up the control.

Host system

PID

Back-up

Di

Temperature sensor

Parameter	Description	Parameter setting by type			
		PXF	PXR	PXG	PXH
EXM1	Sets the external output value.	×	×	×	○

9

19 Decreasing control output at the start of temperature control

- If the output of the controller increases to 100% at the start of temperature control, the heater or the machine may be damaged by heat shock. To avoid this, the output can be controlled using the soft start function.
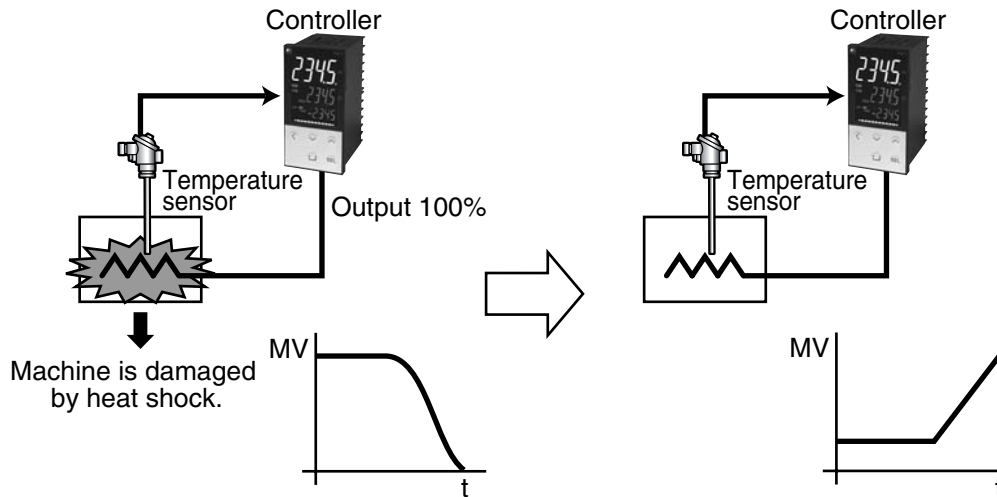
Parameter	Description	Parameter setting by type			
		PXF	PXR	PXG	PXH
SF01					
SF02	Sets the control output value for soft start.	○	✕	○	✕

20 Using sensor signals as communication converters

- The PX-series controllers can be used as communication converters installed at site using their communication function.
- Since sensor signals are converted into communication data at site, the amount of wiring and labor required can be reduced.
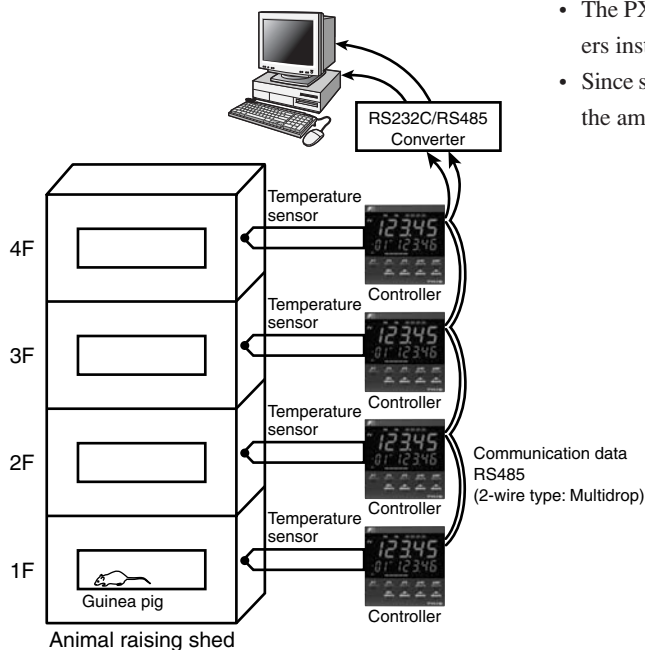
Parameter	Description	Parameter setting by type			
		PXF	PXR	PXG	PXH
____	Specifies the type of communication functions.	○	○	○	○

21 Using a temperature controller as an operating device

Measurement ....

Operation output value ....

Up/down of operation output
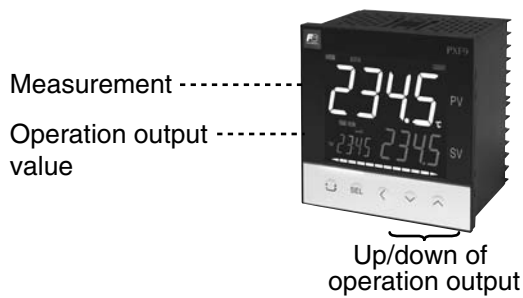
- The PX-series controllers can be used as manual operating devices using transfer output (4 to 20mA DC).

(1) Specify "SV" as the transfer output type and connect transfer output signals to the operation terminal.
(2) The operation output appears at the bottom of the front panel, and operation can be made using the $\triangle$ $\triangledown$ keys at any time.
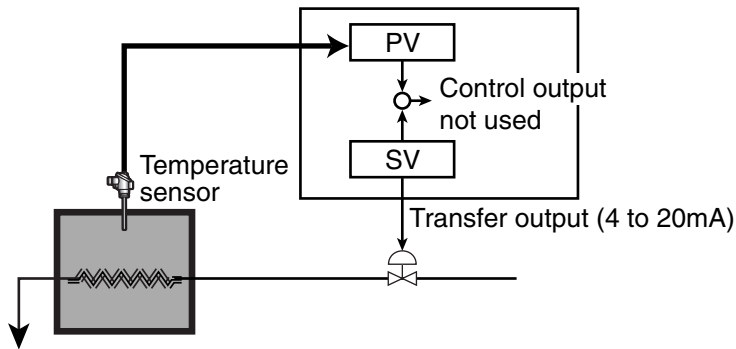
PV

Control output not used

Temperature sensor

SV

Transfer output (4 to 20mA)

Parameter	Description	Parameter setting by type			
		PXF	PXR	PXG	PXH
AO-T	Sets the type of transfer output.	○	○	○	○

II. Parameter Functions

1 Alarm

	Alarm type	Operation chart
Absolute value alarm	Upper limit absolute	ALn → PV
	Lower limit absolute	ALn → PV
	Upper limit absolute (with hold)	ALn → PV
	Lower limit absolute (with hold)	ALn → PV
Deviation alarm	Upper limit deviation	ALn / SV → PV
	Lower limit deviation	ALn / SV → PV
	Upper/lower limit deviation	ALn ALn / SV → PV
	Upper limit deviation (with hold)	ALn / SV → PV
	Lower limit deviation (with hold)	ALn / SV → PV
	Upper/lower limit deviation (with hold)	ALn ALn / SV → PV
Range alarm	Range upper/lower limit deviation (Independent ALM1/2 operations)	ALn ALn / SV → PV
	Range upper/lower limit absolute	AL2 AL1 → PV
	Range upper/lower limit deviation	AL2 AL1 / SV → PV
	Range upper limit absolute lower limit deviation	AL2 / SV AL1 → PV
	Range upper limit deviation lower limit absolute	AL1 / AL2 SV → PV

An alarm is output with measurements (temperature signals) compared with the value specified beforehand.

Various alarm operations can be selected according to applications.

(1) Absolute value alarm

An alarm is issued when the measurement reaches the alarm set value irrespective of the setting (SV) of the temperature regulator.

(2) Deviation alarm

An alarm is issued based on the deviation from the setting (SV) of the temperature regulator.

(3) Range alarm

An alarm is issued when the temperature is kept between alarm settings.

Temperature input → Alarm output

4-20mA output

AC power regulator (APR)

Fryer / Oil / Heater
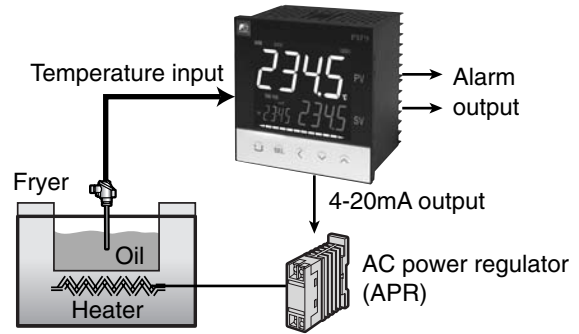
Parameter	Description	Parameter setting by type			
		PXF	PXR	PXG	PXH
AL1 AL2	Sets the alarm type and the alarm settings.	○	○	○	○

2 Alarm hold

Temperature measurement

Lower limit alarm (AL)

Alarm output

ON

OFF
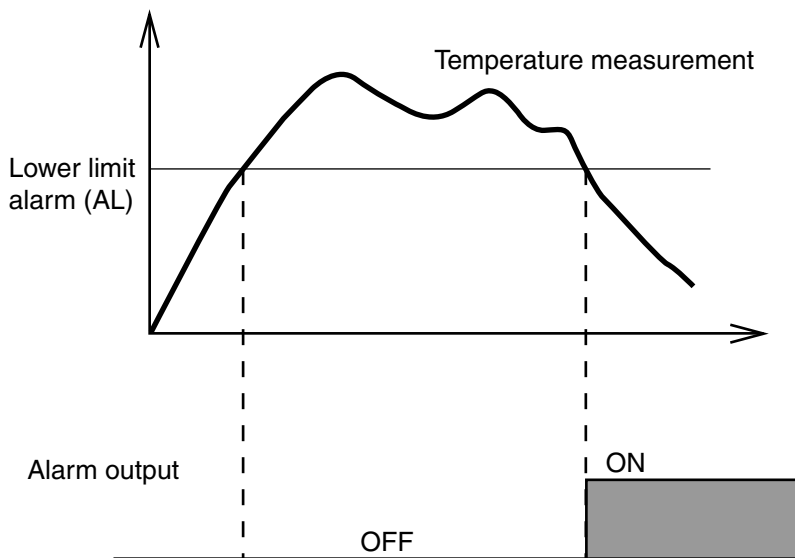
The temperature may fall within the alarm range from the beginning, such as when temperature control is started. In such cases, an alarm is issued at first under normal alarm operations. To avoid this, "with hold" can be selected. Then, after the power is turned on or the control is started, whether the temperature is outside the alarm range is checked, and then alarm detection is started.

Parameter	Description	Parameter setting by type			
		PXF	PXR	PXG	PXH
AL1 AL2	Sets "with hold" for alarm type.	○	○	○	○
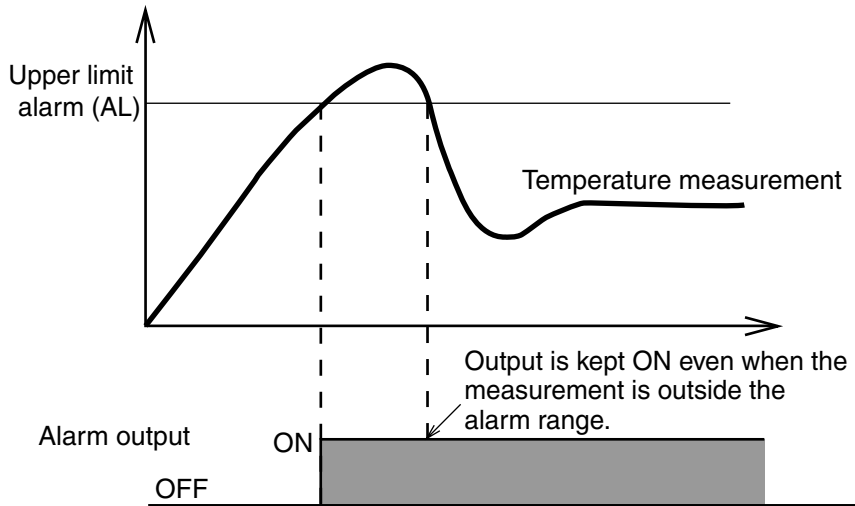
3 Alarm latch

Once temperature measurement departs from the alarm range, the alarm output is set to OFF. To prevent this from occurring, the alarm latch function holds the output to ON even when the measurement does not fall within the alarm range. After checking the alarm, the operator can reset the alarm latch using one of the following methods:

- Turning on the power of the temperature regulator again
- Setting the alarm latch parameter to OFF
- Resetting the alarm latch on the alarm latch reset screen
- Resetting the alarm latch using Di input
- Resetting the alarm latch using communication

Output is kept ON even when the measurement is outside the alarm range.

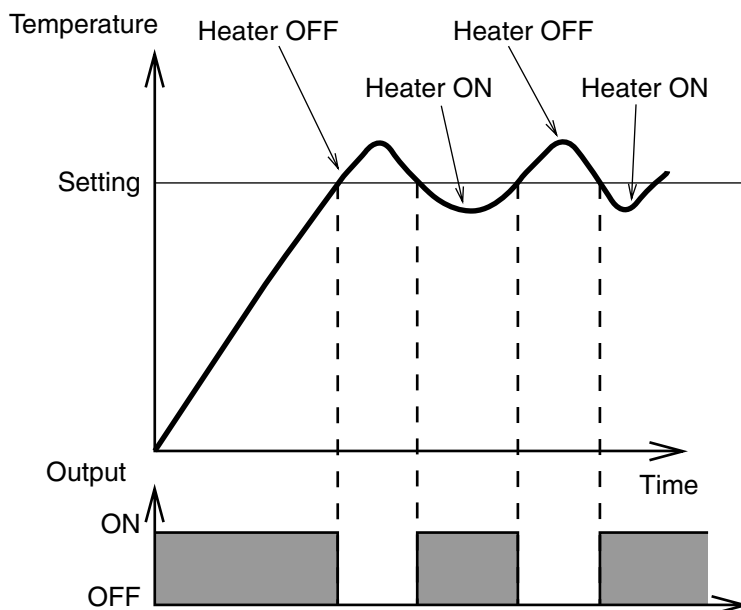| Parameter	Description	Parameter setting by type			
		PXF	PXR	PXG	PXH
———	Sets the alarm latch function to latch alarms.	○	○	○	○

4 Two-position control (ON-OFF control)

Two-position control (ON-OFF control) can be used to perform simple temperature control.

When the measurement is smaller than the SV setting → The output is set to ON.

When the measurement is larger than the SV setting → The output is set to OFF.

The heater is kept on until the set temperature is reached. Once the setting is reached, the switch is turned off. The switch is turned on again when the temperature decreases to a certain level.

Set the proportional band to 0.0 to use the two-position control (ON-OFF control).

Parameter	Description	Parameter setting by type			
		PXF	PXR	PXG	PXH
P HYS	Set the proportional band (P) to 0.9 to perform ON-OFF control (two-position control).	○	○	○	○

5 PID, fuzzy control

Two-position control (ON-OFF control)

Temperature

Setting

Fluctuates.

Time

PID control

Temperature

Setting

Overshoots.

Does not fluctuate.

Time

Fuzzy control

Temperature

Setting

Time
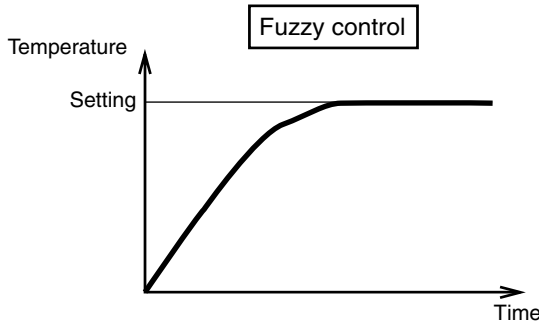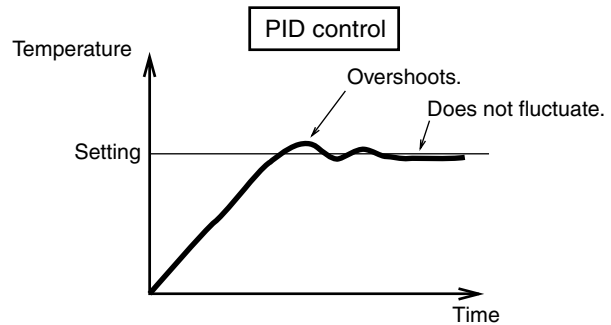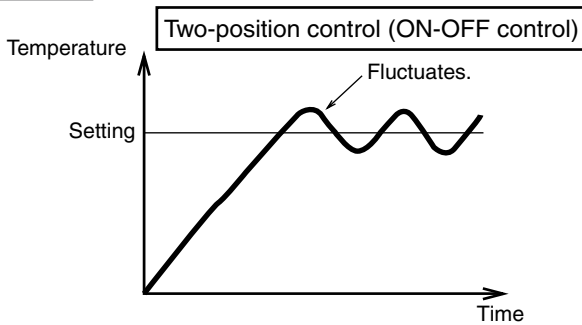
- Although two-position control (ON-OFF control) is convenient for simple temperature control, the control results may fluctuate.
- To improve controllability and eliminate fluctuations, use PID control. Note that overshoot is generated when the temperature increases.
- Use fuzzy control to prevent overshoot.

Parameter	Description	Parameter setting by type			
		PXF	PXR	PXG	PXH
CTrL	Selects a control method.	◯	◯	◯	◯ (Note)

Note: Not provided with fuzzy control.

6 Auto tuning and self tuning

A T

Use auto tuning to find optimum parameters, but it will take a little longer to obtain the results.

C T r l

S E L F

Select SELF, and the parameters can be automatically found. It's simple, but the controllability is slightly worse than with auto tuning.

To perform PID control for improving controllability, optimum PID parameters should be selected. Auto tuning and self tuning functions can be used to find the optimum PID parameters.

Features and notes on auto tuning
- PID parameters optimum to the process can be found.
- Since ON-OFF operation is performed while auto tuning is in progress, the PV may fluctuate significantly depending on the process. Do not use the auto tuning function for a process in which significant PV fluctuations are not allowed.
- It may take several minutes to several hours to find the optimum PID parameters (the time required depends on the process).

Features and notes on self tuning
- Specify self tuning, and PID parameters can be automatically found during control.
- The result of control with PID parameters determined automatically by self tuning is slightly worse than the result with PID parameters determined by auto tuning.

Parameter	Description	Parameter setting by type			
		PXF	PXR	PXG	PXH
AT SELF	Finds optimum PID parameters by auto tuning or self tuning.	◯	◯	◯	◯

7 Switching PID

PID switching function

Front key or Di

P parameter
I parameter
D parameter
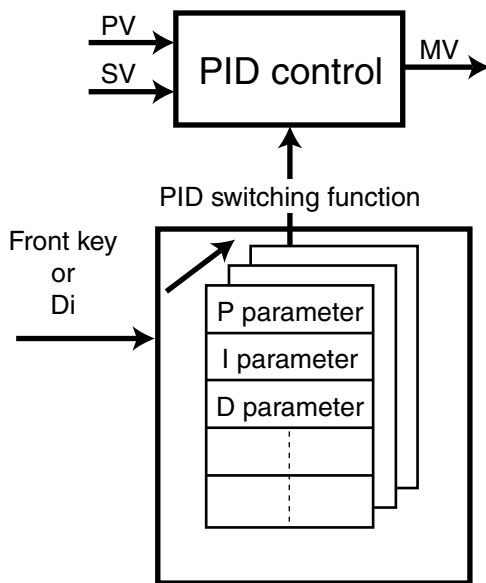
When manufacturing various products with only one machine, optimum PID parameters may vary depending on the products to be manufactured. In such cases, use the PID switching function. This function allows you to use sets of PID parameters specified beforehand, which can then be switched using the keys on the front panel or using Di.

It's convenient in the following cases:

- Performing control with optimum parameters for each SV when the machine is used with SV switched
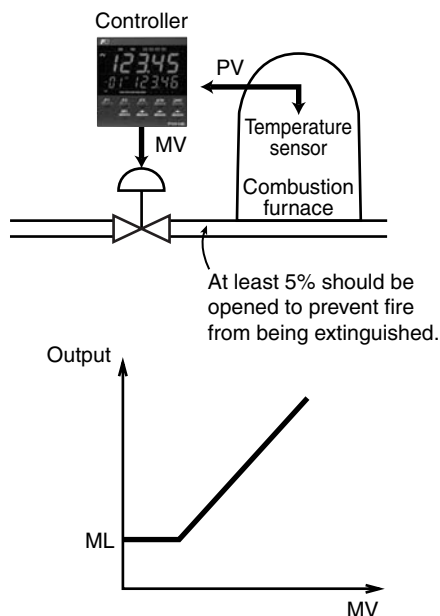- Performing control with optimum parameters for each product when controllability varies depending on the item to be manufactured
- Performing control with optimum parameters when characteristics of the operation unit differ depending on the process to be controlled, such as heating and cooling processes

Parameter	Description	Parameter setting by type			
		PXF	PXR	PXG	PXH
——	Sets the palette PID.	○	×	○	○

8 MV limit

At least 5% should be opened to prevent fire from being extinguished.

The value 5% or smaller is regarded as 0%.

The value 95% or higher is regarded as 100%.

In some cases such as incineration control, MV should not be decreased to less than a certain level. Use ML (limit) of MV limit in such cases to prevent MV from decreasing to less than ML.
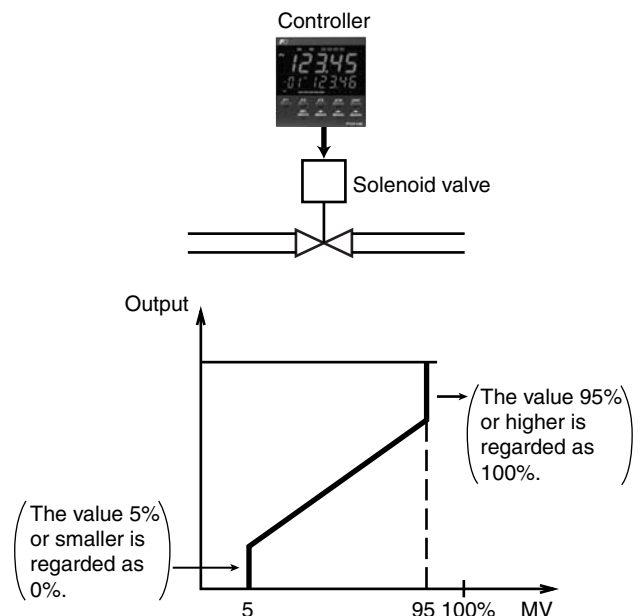
When solenoid valves are used, setting may be necessary to disable reaction when the MV value becomes less than a certain level. Use MV limit MH and ML (scale off) in such cases.

Parameter	Description	Parameter setting by type			
		PXF	PXR	PXG	PXH
MH, ML	Sets the limit value of operation output (MV).	○	○	○	○

9 SV limiter

Controller

PV — Machine

MV

Who made this setting? The materials are smoldering!

Controller

PV — Machine

MV

It's safe because setting can be made only within the specified temperature range.
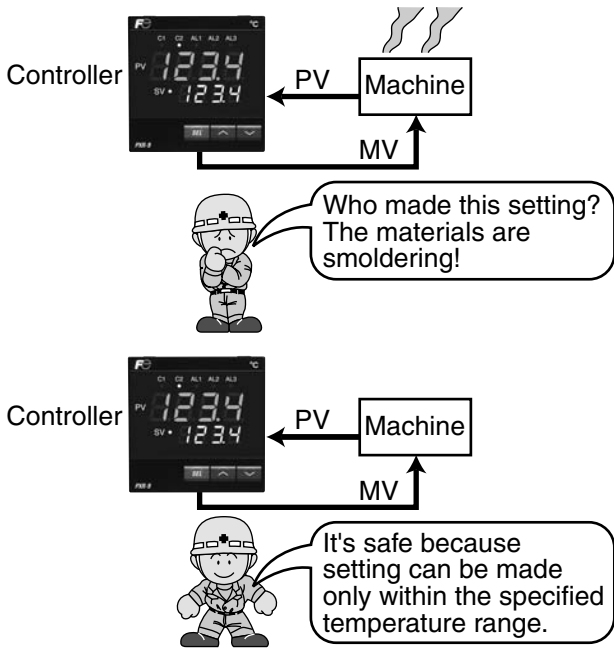
You may not want to set the temperature exceeding a certain level.

⇩

In such cases, you can use SV lower limiter setting and SV upper limiter setting to control the range in which SV can be set.

SV-H —
SV-L —

SV setting is allowed only within the set range.
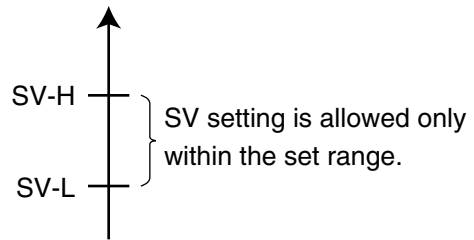
Parameter	Description	Parameter setting by type			
		PXF	PXR	PXG	PXH
SV-L SV-H	Sets the upper and lower limiter settings to determine the range in which SV can be set.	◯	◯	◯	◯

10 Parameter mask

It's confusing because there are so many parameters.

? ?? ?

It's easy because only the parameters we need are displayed.
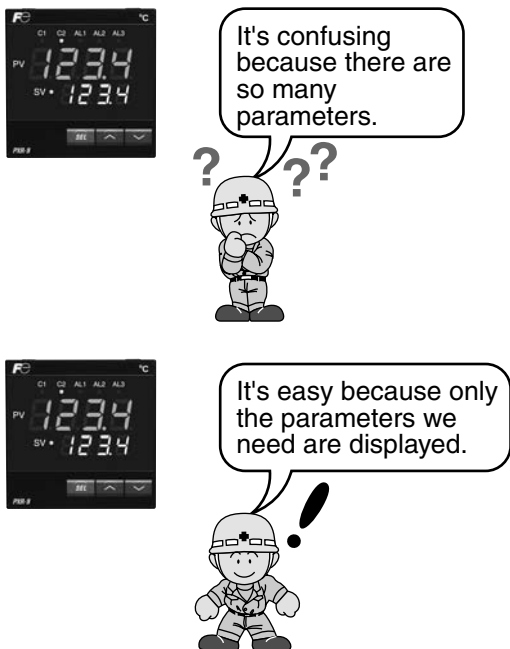
Although a temperature regulator has many parameters, relatively few parameters are used in most actual applications.

⇩

Use the display mask function to mask the parameters that are not to be used.

Advantages

• Operation is easier because only those parameters to be changed are displayed.

• Prevents parameters from being modified by mistake.

Parameter	Description	Parameter setting by type			
		PXF	PXR	PXG	PXH
dSP	Sets display/nondisplay of each parameter.	◯	◯	◯	◯

11 Guarantee soak

When PV does not reach SV during ramp soak operation, the progress of SV can be made to be on standby.

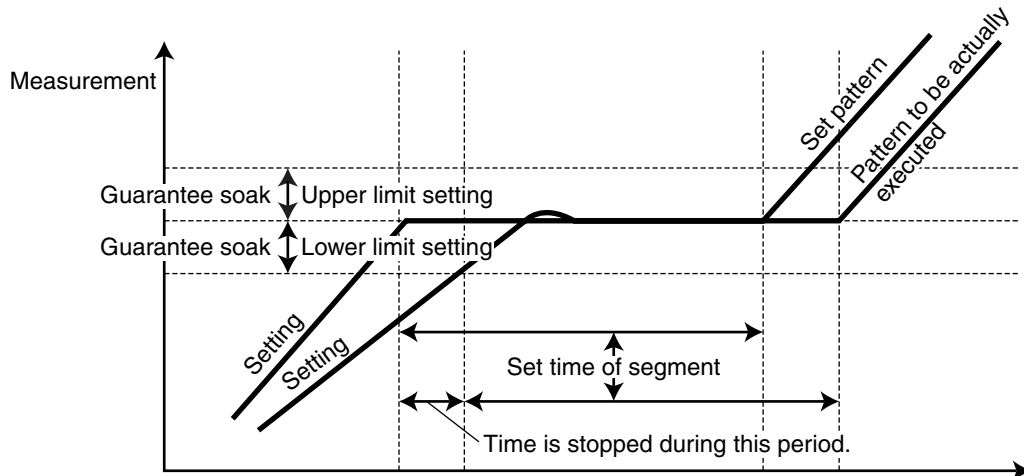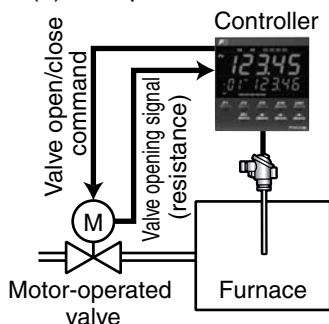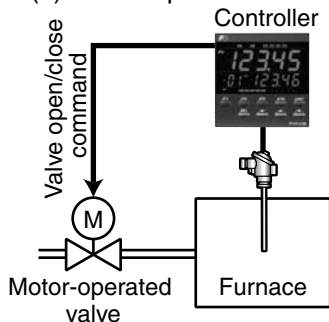| Parameter	Description	Parameter setting by type			
		PXF	PXR	PXG	PXH
GSOK GS-L GS-H	Sets ON/OFF, upper limit, and lower limit of guarantee soak.	○	✕	○	✕

12 Motor-operated valve control

(1) With position feedback

(2) Without position feedback

Select a motor-operated valve control type from "with" and "without" position feedback when using a motor-operated valve.

Select a desired size from our broad lineup, from 48mm ☐ to 96mm ☐.

	Advantage	Disadvantage
With position feedback	• Since the actual valve opening is read, a motor-operated valve with characteristic distortion does not pose major problems. The motor-operated valve requires a feedback resistor.	The motor-operated valve requires a feedback resistor. → Increased cost, and troubles could occur due to a faulty feedback resistor
Without position feedback	• The motor-operated valve does not require a feedback resistor. → Decreased cost, and troubles due to a faulty feedback resistor are avoided • Lower opening frequency of the motor-operated valve • Decreased cost of controller	Not suitable for motor-operated valves with significant valve characteristic distortion because the actual valve opening is not used for control calculation.

Parameter	Description	Parameter setting by type			
		PXF	PXR	PXG	PXH
____	Sets the type of motor-operated valve control.	○ (Note)	✕	○ (Note)	○

Note: Position feedback is not allowed with the 48×48mm type.

13 Control operation and burnout direction

A break of a sensor disables the function of the controller. ON (100%) or OFF (0%) can be selected as the control output of the controller in such cases.

What temperature (°C) is it now?

Break of the sensor

Electric furnace

Heater

MG

Example 1: Heater is set to OFF to avoid danger
Output lower limit

Example 2: Heater is set to ON to avoid temperature decrease
Output upper limit
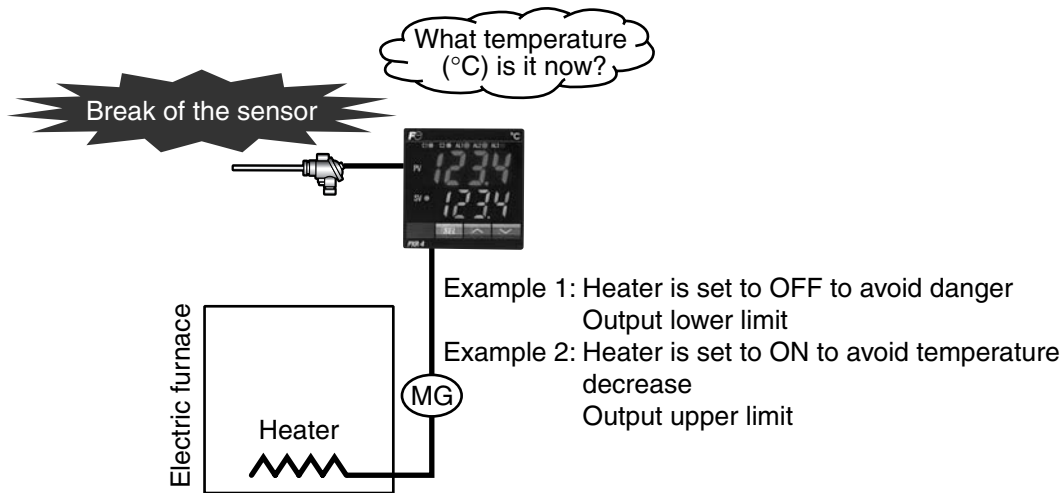
Parameter	Description	Parameter setting by type			
		PXF	PXR	PXG	PXH
P-n1	Sets the control operation and the burnout direction.	○	○	○	○

14 User adjustment and PV shift

Controller

PV

SV

Recorder

Furnace
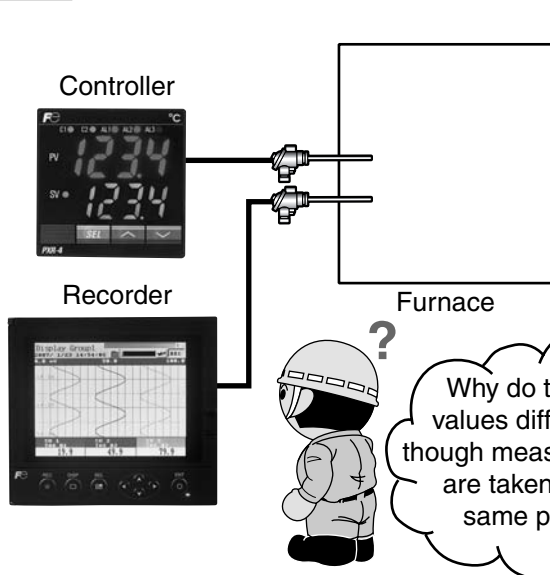
Even when a temperature regulator is operating with a recorder at the same place, the PV value displayed on each device may not coincide due to a sensor error, etc.

In such cases, the difference of PV values (measurements) can be corrected.

Note: Control is performed with the PV value displayed (PV measurement with PV shift value added).

?

Why do the PV values differ even though measurements are taken at the same place?

Parameter	Description	Parameter setting by type			
		PXF	PXR	PXG	PXH
PVOF ADJO	Sets PV (measurement) shift and user adjustment value.	○	○	○	○

18

15 PID tuning status check (loader)

PXH 100···110···120°C

Controller

? ? ? PID ? ?

PXH

Controller

PV
MV
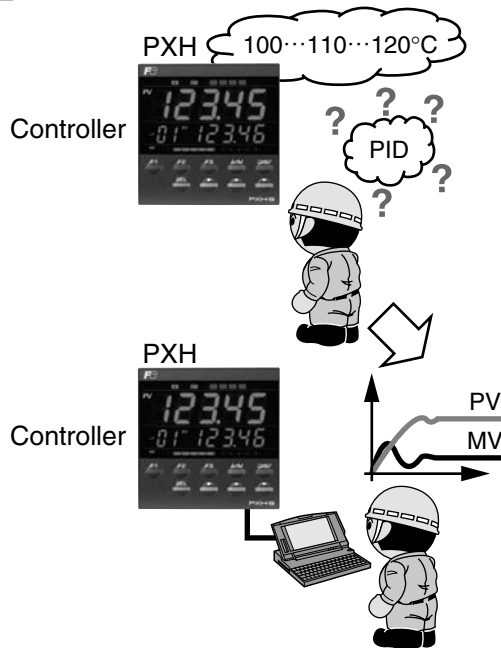
More accurate results can be obtained more quickly if PID tuning is performed while PV trend is checked.

Check the trend of measurement (PV), setting (SV), and the operation output (MV) on the "PID tuning status screen" of the loader to facilitate PID setting.
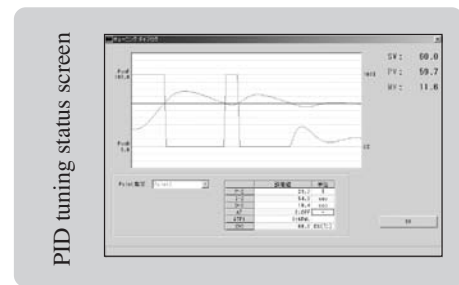
PID tuning status screen

Parameter	Description	Parameter setting by type			
	Use the supplied PC loader software to view the PID tuning status on your PC.	PXF	PXR	PXG	PXH
——		×	×	×	○

16 Universal input

Failure
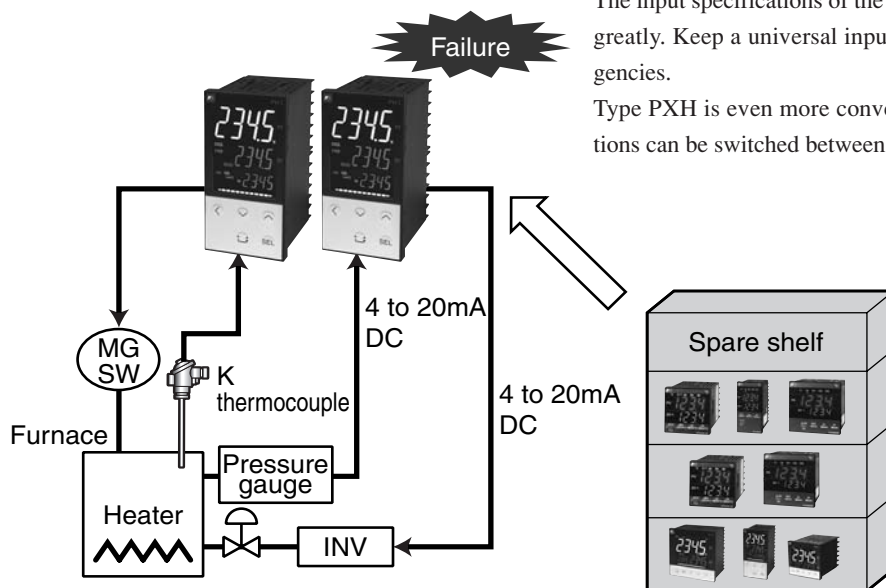
The input specifications of the controllers used at various sites vary greatly. Keep a universal input type controller to cope with emergencies.

Type PXH is even more convenient because the output specifications can be switched between contact output and current output.

4 to 20mA DC

Spare shelf

4 to 20mA DC

MG SW

K thermocouple

Furnace

Pressure gauge

Heater

INV

Parameter	Description	Parameter setting by type			
		PXF	PXR	PXG	PXH
——	Specify PXF or PXG or PXH.	○	×	○	○

19

17 Switching between forward and reverse operations

Air conditioning control is performed in forward operation in summer and in reverse operation in winter. The operations can be switched with digital input.
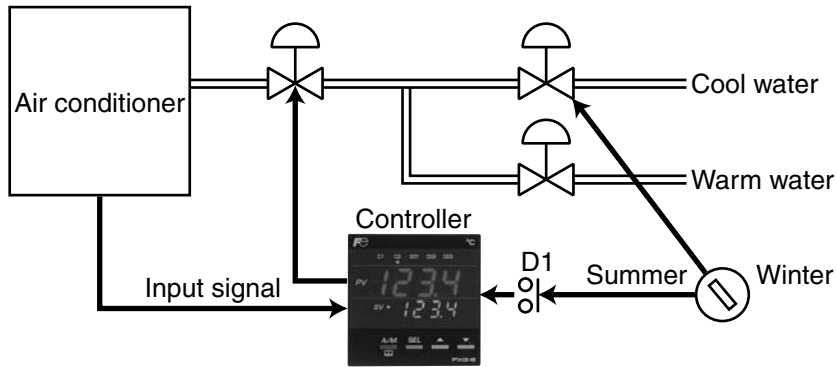
Parameter	Description	Parameter setting by type			
		PXF	PXR	PXG	PXH
DI-1	Sets the function to DI-1.	○	✕	○	✕

18 Operating days alarm

Indicates the number of days PXF has been operated.
Alarm is triggered when the operated days reach the value you set.
Application: Alerting the user when to perform maintenance work

Example) alarm for 3554 days
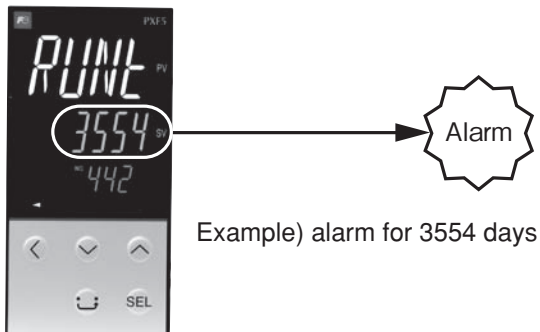
Parameter	Description	Parameter setting by type			
		PXF	PXR	PXG	PXH
NO: 567	Sets the trigger value (number of days) for operating days alarm. (0 to 5000 days)	○	✕	✕	✕

19 Watt-hour metering function
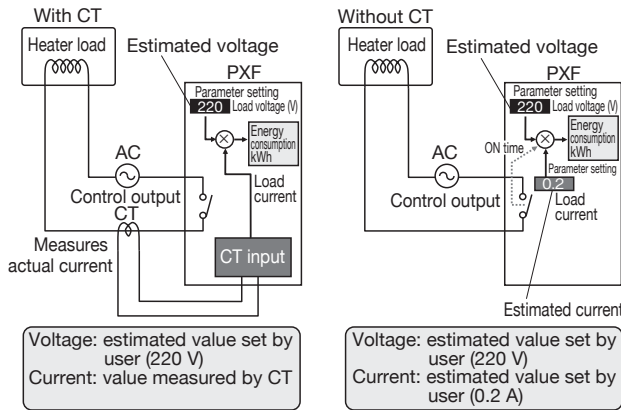
Measures the electric power used by a device such as a heater, by using simple calculation method.
There are the following two methods:

(1) Calculates the electric power based on the current value detected by a current transformer (CT) and a fixed voltage value.

(2) Calculates the electric power based on a fixed current value and a fixed voltage value.

You can use the electricity alarm by setting the trigger value.

Note: Select an appropriate current transformer from either of the following:
1 to 30 A: ZOZ*CCTL-6-S-H
20 to 100 A: ZOZ*CCTL-12-S 36-8

Parameter	Description	Parameter setting by type			
		PXF	PXR	PXG	PXH
NO:561 NO:562	① Without CT: sets the voltage value. ① With CT: sets the current and the voltage values.	○	✕	✕	✕

20 Multidrop master function

(1) Cooperative operation function

SV can be transmitted to multi-PXFs through communication.
Synchronous temperature rise control is available in combination with 2-degrees-of-freedom PID.
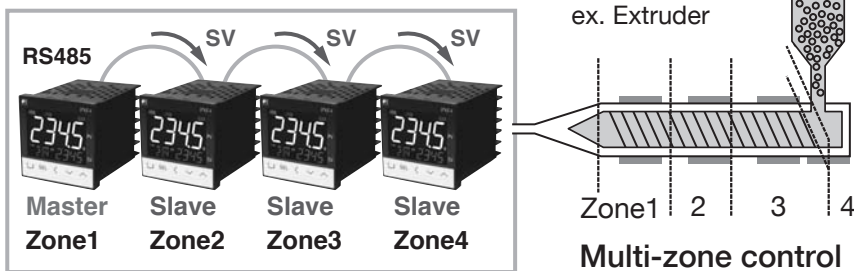
(2) Parameter copy function

Parameter settings can be copied to multi-PXFs simultaneously and easily through communication.

Parameter	Description	Parameter setting by type			
		PXF	PXR	PXG	PXH
NO:760	Selects type of communication (1: Cooperative operation)	○	✕	✕	✕

21 High-speed communication (user address mapping function)

You can make a list of your most necessary parameters (max. 32 words) to quickly acquire those data at a time.
RS485 Communication speed: max. 115.2 kbps

Address	Parameter
30001	PV
30002	SV(Read)
30003	DV
30004	MV1
⋮	⋮
40003	SV(Write)
40004	STBY
40005	AT
40006	P
40007	I
40008	D
⋮	⋮

Max.32 words

Address	Parameter
30001	PV
30002	SV(Read)
40003	SV(Write)
30004	MV1
40006	P
40007	I
40008	D
⋮	⋮
–	–
–	–
–	–

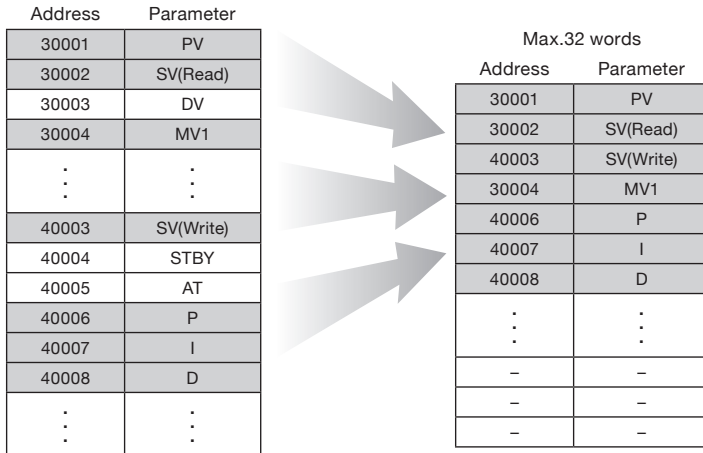| Parameter	Description	Parameter setting by type			
		PXF	PXR	PXG	PXH
NO:769 to 800	MODBUS user address setting	○	✕	✕	✕

22 Programless communication (RS-485)

PXF can be connected with PLC without a program.
Supported PLCs
· Mitsubishi PLC Q series
· Siemens PLC S7 series

Program-less host communication

Temperature control PXF4

Reflow soldering device

PXF5

PXF9
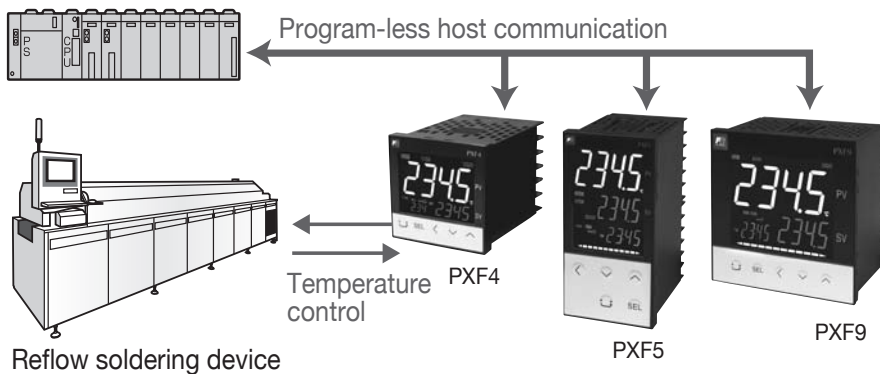
Parameter	Description	Parameter setting by type			
		PXF	PXR	PXG	PXH
NO:760	Selects type of communication (2:Programless communication)	○	✕	✕	✕

Digital Controller Function List

	Type	PXH	PXF	PXG	PXR
Front panel dimensions	96 × 96mm	●	●	●	●
	48 × 96mm	–	●	●	●
	72 × 72mm	–	–	–	●
	48 × 48mm	–	● (Note 1)	● (Note 1)	●
	24 × 48mm	–	–	–	●
Number of displayed digits		5 digits	4 digits	4 digits	4 digits
Input accuracy		0.1%	0.2%	0.3%	0.5%
Calculation intervals		50mS	50mS	200mS (Note 7)	500mS
Input signal	Measurement input	● (Universal)	● (Universal)	● (Universal)	●
Optional device (Note 2)	Remote SV input	●	●	●	● (Select either one.)
	Heater current detection input	–	●	●	
	Valve opening input	●	● (PXF5/9 only)	● (PXG5/9 only)	–
	Digital input	Up to 9 points	Up to 5 points (PXF5/9) Up to 3 points (PXF4)	Up to 5 points (PXG5/9) Up to 3 points (PXG4)	Up to 2 points
Output signal	Control output	Relay contact output SSR/SSC drive output Current output Motor-operated valve operation output	Relay contact output SSR/SSC drive output Voltage output Current output (Note 3) Motor-operated valve operation output (Note 4)		Relay contact output SSR/SSC drive output Current output (Note 3)
Optional device	Transfer output	4-20mA DC: 2 points (With transmitter power supply: 1 point)	4-20mA DC or 0-10V DC: 1 point (Selection not allowed for motor-operated valve output and dual output.)		4-20mA DC: 1 point (Selection not allowed for dual output.)
	Alarm/event output	Up to 9 points	Up to 5 points (PXF5/9) Up to 3 points (PXF4)	Up to 5 points (PXG5/9) Up to 3 points (PXG4) (Note 5)	Up to 3 points (PXR5/9) Up to 3 points (PXR4/7) (Note 6)
Control method	ON-OFF control	●	●	●	●
	PID control	●	●	●	●
	Remote control	●	●	●	●
	Control output tracking (EX-MV)	●	–	–	–
	Motor-operated valve control	●	●	●	–
	Heating/cooling control	●	●	●	●
	Auto tuning PID	●	●	●	●
	Fuzzy control	–	●	●	●
	Self tuning	–	●	●	●
Function	Ramp soak function	64 steps	64 steps	16 steps	8 steps (Option)
	Number of PID combinations	8 points	8 points	8 points	–
	SV switching	8 points	8 points	8 points	Up to 4 points (Option)
	Manual operation	●	●	●	–
	Key for user assignment	3 keys	1 key	1 key	–
Communication	RS485 (MODBUS)	● (38.4Kbps)	● (115.2Kbps)	● (19.2Kbps)	● (9.6Kbps)
	T-LINK	● (500Kbps)	–	–	–

Note 1: Options that can be selected for the panel size 48 × 48mm are limited compared to the panels of other dimensions.
Note 2: The valve opening input can be selected only when motor-operated valve operation output is selected as the control output. The heater current detection input can be selected when relay contact output or SSR/SSC drive output is selected as the control output. "Without DO" cannot be selected. The maximum number of digital input points varies depending on the combination with other optional functions.
Note 3: If current output is selected, heater current detection input or transfer output cannot be selected.
Note 4: If motor-operated valve operation output is selected, heater current detection input cannot be selected.
Note 5: Up to 2 points for the type with heating/cooling control, motor-operated valve operation output (PXG), heater break alarm function, or transfer output function.
Note 6: Up to 2 points for the type with heating/cooling control, heater break alarm function, or transfer output function. The ambient temperature should be 40°C or lower.
Note 7: Position feedback type: 300ms.

Fe Fuji Electric Co., Ltd.

Information in this catalog is subject to change without notice.