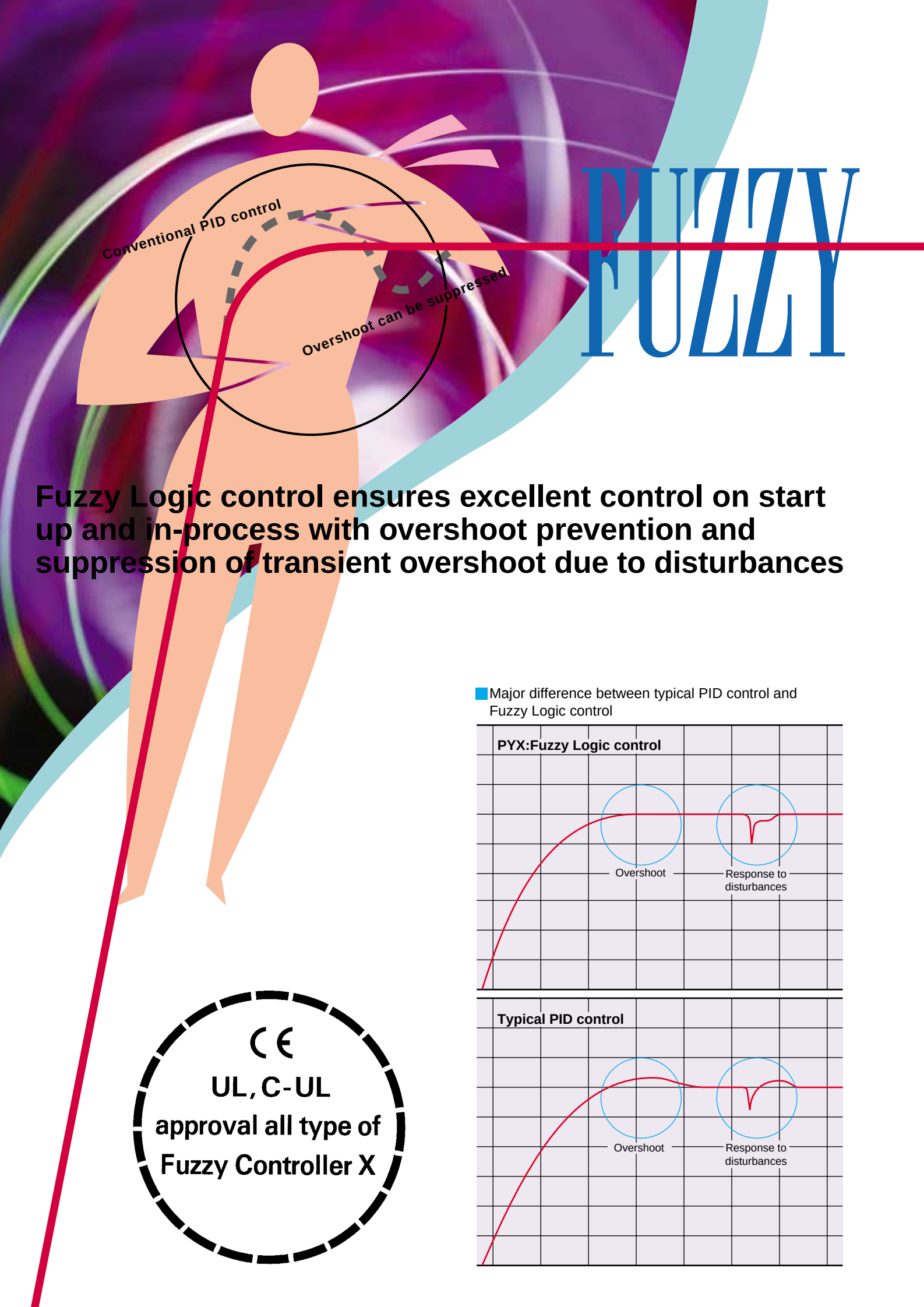
FUJI ELECTRIC

Fuji Instrumentation & Control

Z Series Fuzzy Temperature Controller

Fuzzy Controller X

ECNO:1119e



FUZZY

Fuzzy Logic control ensures excellent control on start up and in-process with overshoot prevention and suppression of transient overshoot due to disturbances

CE
UL, C-UL
approval all type of
Fuzzy Controller X

Major difference between typical PID control and Fuzzy Logic control

PYX4(48mmX48mm)

Type: PYX4(48mmX48mm)

Code Symbols

1	2	3	4	5	6	7	8		9	10	11	12	13	Description
P	Y	X	4	M				1	—					**Front panel size (mm)** 48X48
			4											
				M										**Kinds of input** TC / Pt / voltage / current input
					Y									**Control output 1** Without
					A									Relay (SPST reverse action)
					B									Relay (SPST direct action)
					C									SSR drive (reverse action)
					D									SSR drive (direct action)
					E									4 to 20mA DC (reverse action)
					F									4 to 20mA DC (direct action)
					G									Relay (SPDT reverse action)
					H									Relay (SPDT direct action)
						Y								**Control output 2** Without
						A								Relay (SPST reverse action)
						B								Relay (SPST direct action)
						C								SSR drive (reverse action)
						D								SSR drive (direct action)
							0							**Alarm function** Without
							1							1 point
							2							2 points
							3							HB detection
							4							HB detection+1 point
														Input range code See input range table
									Y					**Additional function** Without
									P					SV selection command input (DI)
									Q					4 ramp / soak+start / reset
									R					RS-485*(1)
									S					RS-485*(1) +4 ramp / soak
									M					RS-485*(2)
									N					RS-485*(2) +4 ramp / soak
									A					Re-transmission
									B					Re-transmission+4 ramp / soak
									C					Remote SV
										E				**Front panel label** ℃
										F				℉
										K				%

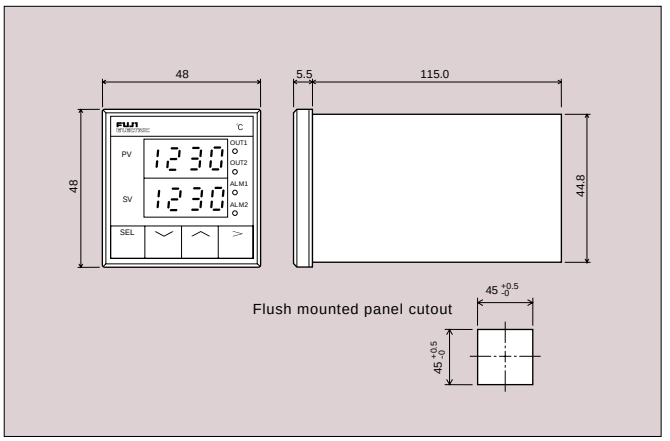
Note:*(1) Fuji Electric CC data line protocol.
*(2) Modbus® RTU protocol.

Option combination

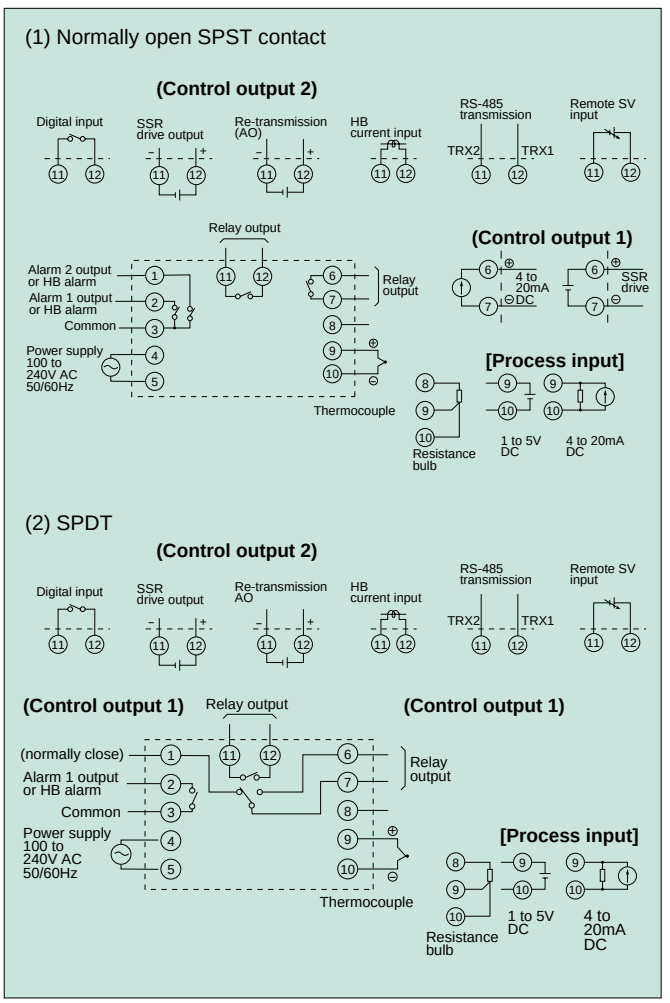
Code Symbol														
Column "7"				Column "9"				Column "12"						
Control Output 2				Alarm				Additional function						
A	B	C	D	1	2	3	4	P	Q	R,M	S,N	A	B	C
Dual function				1 point	2 points	HB	HB+1 point	SV Selection	4 ramp/ soak+start/ reset	RS-485	RS-485+ 4 ramp/ soak	Re-trans mission	Re-trans mission+ 4 ramp/soak	Remote SV
Combination														
Yes				Yes	No	No	No	No						
No				Yes	No	No	No	Yes						
				No	Yes*(1)	No	No							
				No	No	Yes*(2)	No	No						
					No	No	Yes*(3)							

Note: *(1) This selection is inhibited when Column "6" is "G" or "H"
*(2) This selection is inhibited when Column "6" is "C" or "D" or "E" or "F"
*(3) This selection is valid only when Column "6" is "A" or "B"

Outline Diagram(unit: mm)



Terminal Wiring



PYX5(48mmX96mm)
PYX9(96mmX96mm)

PYX5(48mmX96mm)

PYX9(96mmX96mm)

Code Symbols

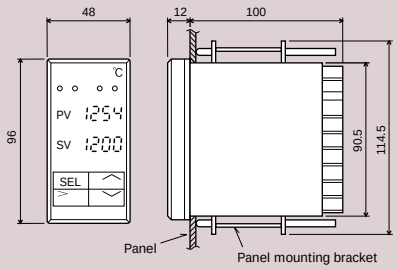
1 2 3 4 5 6 7 8 9 10 11 12 13

P	Y	X		M			1	—						Description
			5 9											**Front panel size (mm)** 48X96 96X96
				M										**Kinds of input** TC / Pt / voltage / current input
					Y C D E F G H J K									**Control output 1** Without SSR drive (reverse action) SSR drive (direct action) 4 to 20mA DC (reverse action) 4 to 20mA DC (direct action) Relay (SPDT reverse action) Relay (SPDT direct action) Universal (reverse action) *(1) Universal (direct action)
						Y C D E F G H								**Control output 2** Without SSR drive (reverse action) SSR drive (direct action) 4 to 20mA DC (reverse action) 4 to 20mA DC (direct action) Relay (SPDT reverse action) Relay (SPDT direct action)
							0 1 2 3 4							**Alarm function** Without 1 point 2 points HB detection *(2) HB detection+1 point
														Input range code See input range table
									Y P Q R S M N A B C					**Additional function** Without SV selection command input (DI) 4 ramp / soak+start / reset RS-485*(4) RS-485*(4) +4 ramp / soak RS-485*(5) RS-485*(5) +4 ramp / soak Re-transmission Re-transmission+4 ramp / soak Remote SV *(3)
											E F K			**Front panel label** ℃ ℉ %

Note:*(1) Available for the 7th digit code "Y" of control output 2
*(2) Available for the 6th digit code "G", "H" and the 12th digit code "Y"
*(3) Available for the 7th digit code "Y" and the 9th digit code "0" "1" "2"
*(4) Fuji Electric CC data line protocol.
*(5) Modbus® RTU protocol.

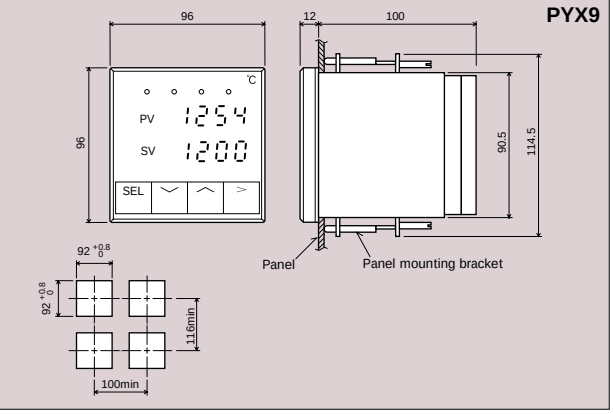
Outline Diagram(unit: mm)

PYX5



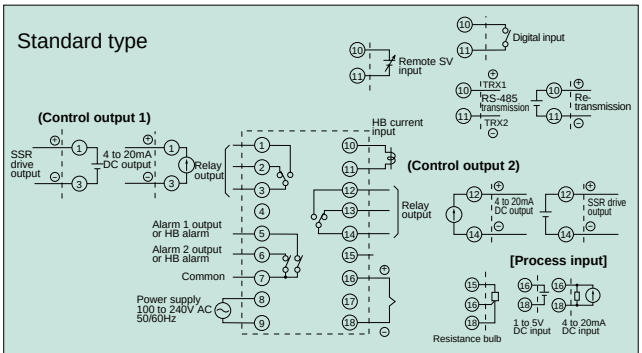
No. of unit	2	3	4	5	6
a	93	141	189	237	285

PYX9

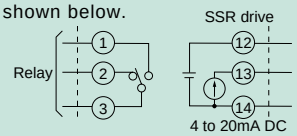


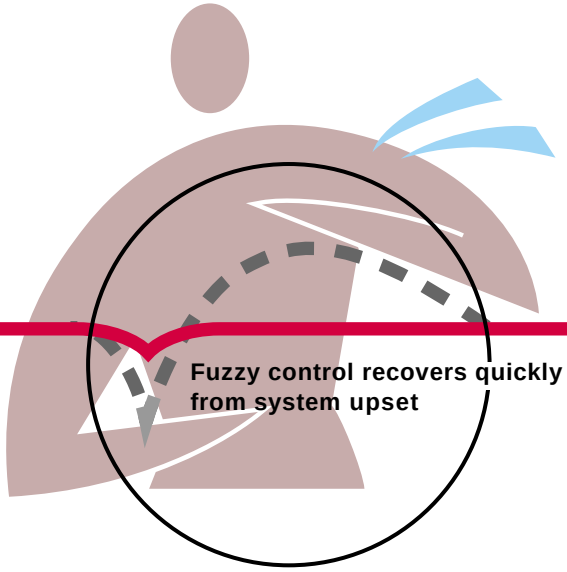
Terminal Wiring

Standard type



Remark: For universal output (SSR drive/current/contact output), terminal wiring for control output1 is required as shown below.





Features

1 aPYX4 controller is the world's first and only Fuzzy Logic 1/16 DIN controller

The Fuzzy Logic decision making is exercised while detecting an overshoot or a disturbance, both creating a variance from set-point. The Fuzzy controller will learn your process; and thus, the time taken for returning to the set value can be shortened, and the variation width can be narrowed.

2 Auto/Manual

Change auto-mode to manual-mode and manual operation can be done using front panel keys.

3 Universal input

3 kinds of input part are provided

(1)Thermocouple (TC)/Resistance bulb (RTD) input (11 kinds of TC and 2 kinds of RTD)

(2)Voltage/current input
(1 to 5V DC, 0 to 5V DC, 4 to 20mA DC)

(3)Universal input
TC/RTD/voltage/current are available

4 Communication function (option)

Installed with a genearal purpose interface (RS-485)*, a small-scale centralized monitoring/ setting system can readily be confiqured.

5 A wide variety of optional functions

(1)AO re-transmission (1 point)
AO is recordable in connection with Fuji's microjet recorder PHA/PHC.

(2)Programmable alarm (2 points max.)
2 points of alarm action can be registered selected from 18 kinds.

(3)Dual output
Dual control of heating and cooling operations are allowed.

(4)Heater break alarm
Use ALM1 or ALM2 output for heater break alarm.

(5)Ramp/soak function
4 ramp/soak-pair patterns are registrable.

(6)External DI function (1 point)
SV (setting value) can be changed a predetermined value according to external command input (DI).

(7)Remote SV function (1 point)
SV (setting value) can be controlled by external 1 to 5V DC analog input.

Indication and Function of Each part

① Process variable (PV) indication:
PV is indicated in 4 digits of 7-segment LED.

② Set value (SV) indication:
SV is indicated in 4 digits of 7-segment LED.

③ Control output 1 indication lamp:
Lit when control output 1 is turned ON.

④ Control output 2 or Remote SV indication lamp:
Lit when control output 2 is turned ON, or Lit when Remote SV function.

⑤ Alarm 1 indication lamp: Lit when alarm 1 is issued.

⑥ Alarm 2 indication lamp: Lit when alarm 2 is issued.

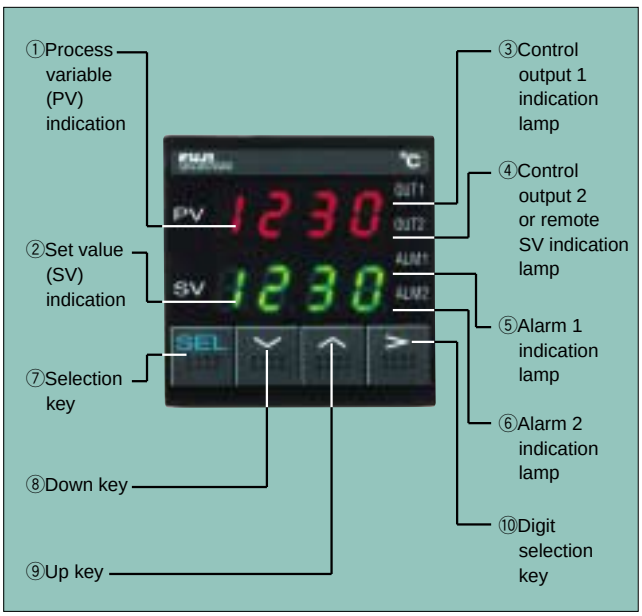
⑦ Selection key: Used for entrance into parameter setting mode and calling out parameters in order.

⑧ Down key: Decrements data during data setting.

⑨ Up key: Increments data during data setting.

⑩ Digit selection key: Shifts digit and registers data.

* The communication protocol conforms either the Fuji Electric CC data line or Modbus® RTU.
* Modbus® is a registered trademark of Gould Modicon.



Basic Specifications

Input	Type	Thermocouple/resistance bulb (RTD)/voltage/current (universal input)	
	Burnout	Thermocouple or RTD connections	
	Heater current	Primary current 1 or 50A/50 or 60Hz	
Setting and indication accuracy		0.5% of full scale ±1 digit (±1: in case of TC)	
Control cycle		0.5 sec	
Indication mode		PV and SV independently indicated. 7 seg LED in 4 digit×2	
Controll action		● PID action 2-position action when P=O, Autotuning, Normal /reverse action ● FUZZY feedback action	In case of DUAL output, both heating and cooling operations are performed according to the same PID values
Alarm		18 kind alarm such as high/low limit deviation, high/low absolute, heater break and loop break	
Output	Control output	Relay output rated at AC 220V 3A (SPDT or SPST) Cycle time: 1 to 120sec	
		Current 4 to 20mA DC: load resistance below 600Ω	
		SSR drive: ON 9; to 24V DC, 20mA MAX. OFF; below 0.5V	
	Loop break	Available	
	Heater break	Available (option)	
	Alarm	SPST, relay rated at AC 220V 1A	
	AO re-transmission	1 to 5V DC 1 point (option)	
Transmission		RS-485 (option: Protocol=Fuji Electric CC data line or Modbus® RTU)	
Other function	Remote SV	1 to 5V DC 1 point (option)	
	Auto tuning	ON/OFF pulse method	
	Self-diagnosis	Watch-dog timer	
	Memory protection	Retention in non-voltage memory	
Power supply		85 to 264V AC	
Enclosure		Plastic housing	
External dimensions (H×W×D)mm		PYX4: 48×48×115mm, PYX5: 96×48×100mm, PYX9: 96×96×100mm	
External terminals		Screw terminal M3.5	
Weight		PYX4: 200g, PYX5: 300g, PYX9: 400g	
External color		Munsell N1.5 (black)	

Input range

Kinds of input		Code	Temperature range [℃]	Temperature range [℉]	0.1℃ display	0.1℉ display
Resistancebulb IEC	Pt100	00	0 to 150	32 to 302	○	○
		01	0 to 300	32 to 572	○	○
		02	0 to 500	32 to 932	○	○
		03	0 to 600	32 to 1112	○	×
		04	—50 to 100	—58 to 212	○	○
		05	—100 to 200	—148 to 392	○	○
		06	—150 to 600	—238 to 1112	○	×
		07	—150 to 850	—238 to 1562	○	×
Thermocouple	J	20	0 to 400	32 to 752	○	○
	J	21	0 to 800	32 to 1472	○	×
	K	22	0 to 400	32 to 752	○	○
	K	23	0 to 800	32 to 1472	○	×
	K	24	0 to 1200	32 to 2192	×	×
	R	25	0 to 1600	32 to 2912	×	×
	B	26	0 to 1800	32 to 3272	×	×
	T	27	—199.9 to 200	—328 to 392	○	×
	T	28	—150 to 400	—238 to 752	○	×
	E	29	0 to 800	32 to 1472	○	×
	E	2A	—199.9 to 800	—328 to 1472	○	×
	S	2B	0 to 1600	32 to 2912	×	×
	N	2C	0 to 1300	32 to 2372	×	×
	U	2D	—199.9 to 400	—328 to 752	○	×
	WRe5-26	2E	0 to 2300	32 to 4172	×	×
	PL-Ⅱ	2F	0 to 1300	32 to 2372	×	×
Voltage	1 to 5V DC	40	Scale settable within —1999 to 9999 Connect 250Ω between terminal No. 16 and 18 (1/4, 1/8 DIN), No. 9 and 10 (1/16 DIN) in case of current input			
	0 to 5V DC	41				
Current	4 to 20mA DC	40*				

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