

# PROGRAMMABLE CONTROLLER

## SERIES FP21

- High Accuracy  $\pm 0.1\%$
- Programmable 9 Patterns and 9 Steps (81 Steps Max.)
- Auto-Tuning PID
- RA / DA Selectable
- User-Selectable Inputs (Thermocouple)
- User-Selectable Ranges
- Programmable Scaling (DC mV, DC mA)
- User-Friendly Operation (Menu-Driven)
- Universal Power Supply (90~264V AC)
- Interface RS-422A / RS-232C
- 96 (H)  $\times$  96 (W)  $\times$  140 (D) mm (Panel Depth: 125mm)



## SPECIFICATIONS

Display:	
Digital Display:	7-segment LED PV (Process value) = Red LED (14.3mm high) SV (Set value) = Green LED (10.0mm high) PTN and STP = Green LED (10.0mm high)
LCD Display:	16 Alpha-Numerical $\times$ 2 Lines (with backlight)
Display Tolerance:	$\pm (0.1\% + 1 \text{ digit})$ / standard accuracy at $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$
Display Resolution:	Scaling-dependent (0.1 or 1)
Input:	
Thermocouples: (User-Selectable) :	B, R, S, K, E, J, T, N, PL II, PR40-20, WRe5-26, U and L (DIN 43710) -Multi-range External resistance = $100\Omega$ max. Input impedance = $500\text{k}\Omega$ min. Burnout circuit = Standard feature (Up-scale)
R.T.D.:	Pt100-JIS / DIN - Multi-range Lead wire tolerable range = $5\Omega$ max. / wire Amperage=1mA
DC Voltage (User-Selectable) :	-10~10mV, 0~10mV, 0~20mV, 0~50mV, 10~50mV, 0~100mV or -1~1V, 0~1V, 0~2V, 0~5V, 1~5V, 0~10V DC - Programmable range Input impedance= $500\text{k}\Omega$ min.
DC Current (user-Selectable) :	4~20mA and 0~20mA DC - Programmable range Receiving impedance= $250\Omega$
Sampling Cycle:	0.25 sec.max.
PV Bias:	0~ $\pm 999$ unit
Digital Filter:	0~200 times (input sampling setting)

Control:	
Control Mode:	Auto-tuning PID Proportional band (PB) = 0.1~999.9% / FS Integral time (IT) = 1~6000 sec. Derivative time (DT) = 0~3600 sec. (PI mode at 0 setting)
Auto / Manual Selection:	Balanceless bumpless
Manual Control Range:	-10.0~110.0% (resolution = 0.1%)
Control Outputs:	Contact (Y) = 240V AC 2.5A / Resistive load, 1A / Inductive load Current (I) = 4~20mA DC, Load resistance: 600Ω max. RA / DA Voltage (V) = 0~10V DC, Load current: 2mA max. RA / DA SSR voltage (P) = 15V DC 20mA / Output rating
Proportional Cycle:	1~120 sec. variable (Y and P onl y)
Alarm:	
Alarm Mode:	Two individual alarms can be set independently from High Limit, Low Limit, High Deviaton, Low Deviation and Absolute Deviation, etc.
Alarm Setting:	By front key switch
Alarm Setting Range:	Deviation = High limit / 0~999, Low limit / -999~0 Absolute = Within measuring range for both high limit and low limit Absolute deviation = 0~999
Alarm Output Rating:	Contact / 240V AC, 2.5A / Resistive load. 1A / Inductive load
Alarm Sensitivity:	0.1~5.0% of measuring range
Inhibit / Non-inhibit:	Individual setting for AL1 and AL2
Program Pattern Control:	
Setting Method:	Local setting (by front key), remote setting available by interface function (option)
No.of Patterns:	9 max.
No.of Steps:	9 / pattern
No.of Memory Steps:	81 max.
Pattern Repeat:	9999 times max.
Pattern Link:	9 patterns max.
Pattern Link Repeat:	999 times max.
Program Setting Range:	Same as measuring range
Time 1:	0~99hr. and 59 min./ step
Time 2:	0~99 min. and 59 sec./ step
Ramp Setting:	Automatic calculation
Range Setting Resolution:	0.1 or 1
Time Setting Resolution:	1 min. or 1 sec.
Optional Functions:	
Analog Output:	2 outputs, one each for PV and SV
Analog Output Signal:	0~10V DC, Max.load current: 2mA max. 0~10mV DC, Output resistance: 10 Ω 4~20mA DC, Load resistance: 500 Ω max.
Analog Output Accuracy:	±0.1% FS vs. display
Analog Output Resolution:	0.01% FS, max.
Interface Signal:	RS-232C and / or RS-422A
Interface Speed:	1200, 2400 or 4800 bps selectable
Data Bit:	7-bit
Stop Bit:	1-bit
General Specifications:	
Memory Protection:	Non-volatile memory protection
Operating Ambient Temperature Range:	-10~50°C
Operating Ambient Humidity:	90% RH max.
Power Supply:	100~240V AC, 50 / 60Hz
Power Consumption:	Approx. 17VA
Insulation Resistance:	500V DC 20MΩ between input terminal and power supply terminal 500V DC 20MΩ between power supply terminal and ground terminal
External Dimensions:	96 (H) × 96 (W) × 140 (D) mm (panel depth 125mm)
Panel Thickness:	1.0~3.5mm
Panel Cutout:	92 (H) × 92 (W) mm (+0.8 / -0mm)
Installation:	Push-in panel (no mounting hardware necessary)
Weight:	Approx. 750g

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## ORDERING INFORMATION

ITEMS		CODE	SPECIFICATIONS
SERIES	FP21-		MPU-Based Auto-Tuning Programmable Controller, DIN 96 × 96mm
INPUT	1		Thermocouples, User-selectable inputs and ranges
	2		R. T. D. (Pt100), User-selectable ranges
	3		DC voltage, User-selectable -10~10, 0~10, 0~20, 0~50, 10~50, 0~100mV linear inputs and ranges
	4		DC current, User-selectable 4~20, 0~20mA linear inputs and ranges
	6		DC voltage, User-selectable -1~1, 0~1, 0~2, 0~5, 1~5, 0~10V linear inputs and ranges
CONTROL OUTPUT	Y-		Contact: PC 1~120 sec. variable, Capacity: 240V AC 2.5A / Resistive load, 1A / Inductive load
	I-		Current: 4~20mA DC, Load resistance: 600Ω max. ( Factory-set = RA)
	P-		SSR voltage: PC 1~120 sec. variable, Output rating: 15V DC / 20mA max.
	V-		Voltage: 0~10V DC, MAX. load current: 2mA max. ( Factory-set = RA)
ANALOG OUTPUT (TRANSMISSION)	00		None
	13		1-output, Voltage: 0~10mV DC / Output resistance: 10Ω
	14		1-output, Current: 4~20mA DC / Output resistance: 500Ω max.
	16		1-output, Voltage: 0~10V DC / Load current: 2mA max.
	23		2-output, Voltage: 0~10mV DC / Output resistance: 10Ω
	24		2-output, Current: 4~20mA DC / Load resistance: 500Ω max.
INTERFACE	0		None
	6		RS-422A
	7		RS-232C
PLUG CORD FOR EXTERNAL I / O	0		None
	1		24-pin plug w / 1m wire
REMARKS	0		Without
	9		With (Please consult before ordering.)

## STANDARD RANGE & USER-PROGRAMMABLE SCALING

Since the Series FP21 has been designed for user-selectable inputs, user-selectable ranges and user-programmable scaling, the unit will be shipped with one factory-set standard range.

If a range selection other than the standard is required, user-selectable inputs (T / C's) and user-selectable ranges (T / C's and R.T.D.) are available as listed below at the specific application.

### Standard Range (Factory-Set When Shipped)

Input	Standard / Rating	Range
1 Thermocouple	JIS (K)	0~800.0°C
2 R.T.D.	JIS Pt100	0~200.0°C
3 DC Voltage	0~10mV	0~100.0%
4 DC Current	4~20mA	0~100.0%
6 DC Voltage	0~10V	0~100.0%

\* 1 = Effective range: 400~1800°C (750~3300°F)

\* 2 = Not our standard accuracy

### User-Selectable Range (Thermocouple and R.T.D.)

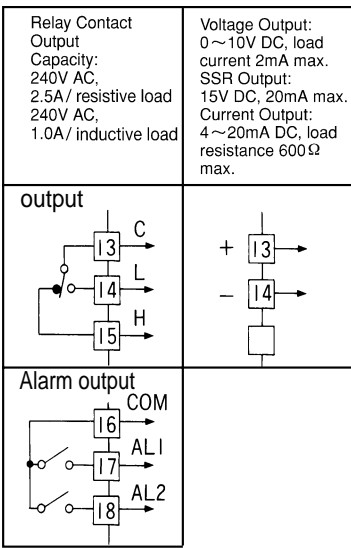
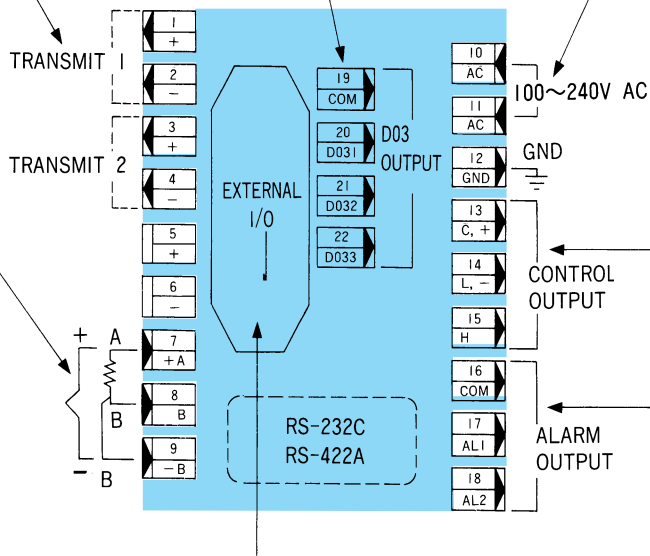
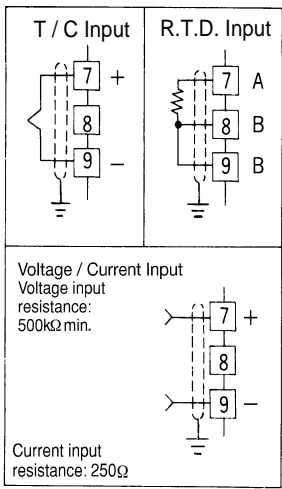
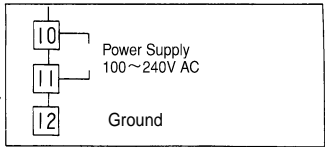
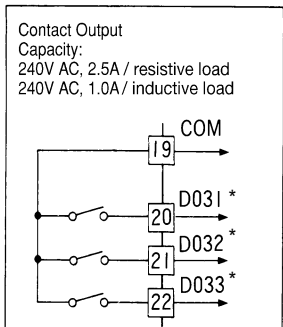
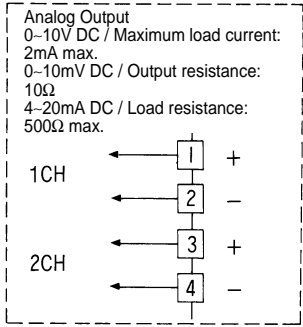
INPUT	TYPE	JIS ANSI	DIN	OTHERS	°C	°F
THERMOCOUPLES	T	○	○		-199.9 ~ 200.0	-300 ~ 400
	J	○	○		0 ~ 600.0	0 ~ 1100
	E	○	○		0 ~ 700.0	0 ~ 1300
	K	○	○		-100.0 ~ 400.0	-150 ~ 750
	K	○	○		0 ~ 800.0	0 ~ 1500
	K	○	○		0 ~ 1200	0 ~ 2200
	N			○	0 ~ 1300	0 ~ 2300
	PL II			○	0 ~ 1300	0 ~ 2300
	R	○	○		0 ~ 1700	0 ~ 3100
	S	○	○		0 ~ 1700	0 ~ 3100
	B *1	○	○		0 ~ 1800	0 ~ 3300
	PR40-20			○	0 ~ 1800	0 ~ 3300
	WRe5-26			○	0 ~ 2300	0 ~ 4200
P.T.D. (Pt100)	U (DIN 43710)		○		-199.9 ~ 200.0	-300 ~ 400
	L (DIN 43710)		○		0 ~ 600.0	0 ~ 1100
	Pt100	○	○		-199.9 ~ 600.0	-300 ~ 1100
	Pt100	○	○		-100.0 ~ 100.0	-150.0 ~ 200.0
	Pt100	○	○		-100.0 ~ 300.0	-150.0 ~ 600.0
	Pt100	○	○		-40.0 ~ 60.0	-40.0 ~ 140.0
	Pt100 *2	○	○		0.00 ~ 50.00	0 ~ 120.0
	Pt100	○	○		0 ~ 100.0	0 ~ 200.0
Pt100	○	○		0 ~ 200.0	0 ~ 400.0	
Pt100	○	○		0 ~ 500.0	0 ~ 1000	

### User-Programmable Scaling

DC Voltage and DC Current Inputs

For DC voltage and DC current inputs, user programmable scaling is available with a scaling range of-1999~9999 digits.

**TERMINAL ARRANGEMENT**



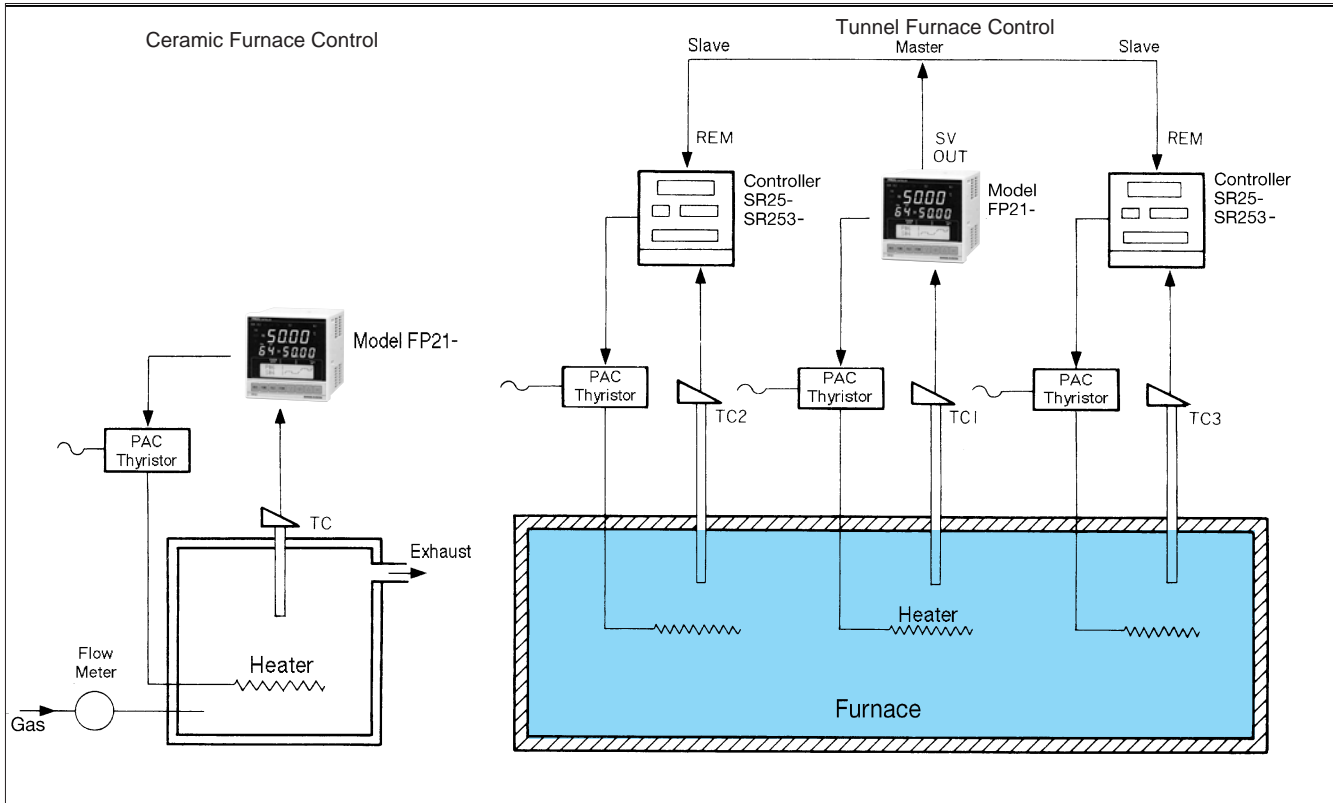
Status Output	External Contact Input / Output (24-pin)		External contact Input
	<b>OUTPUT</b>	<b>INPUT</b>	Non-Voltage Contact: Max 2mA Max 5V DC
OUT PUT D01 (Open Collector Output) Max 5mA Max 24V DC On Voltage ≤ 0.6V	24 DO-COM 23 DO17 (GUA) 22 DO16 (ADV) 21 DO15 (HLD) 20 DO14 (RUN or RST) 19 DO13 (FIX) 18 DO12 (MAN)	DI-COM 12 (RUN) DI 18 11 (HLD) DI 17 10 (ADV) DI 16 9 (SEL16 or AT) DI15 8 (SEL8) DI 14** 7 (SEL4) DI 13** 6 (SEL2) DI 12** 5 (SEL1) DI 11** 4	
OUT PUT D02 (Open Collector Output) Max 50mA Max 24V DC On Voltage ≤ 1.5V	17 DO11 (AT) 16 D023 * 15 D022 * 14 D021 * 13	3 2 1	when AT selected BIN CODE =Level Input =Edge Input

\* On Terminals DO21, DO22, DO23, DO31, DO32, DO33, only one each Status Signal comes out selected from TS1, TS2, TS3, TS4, SO, RUN, END, EXT

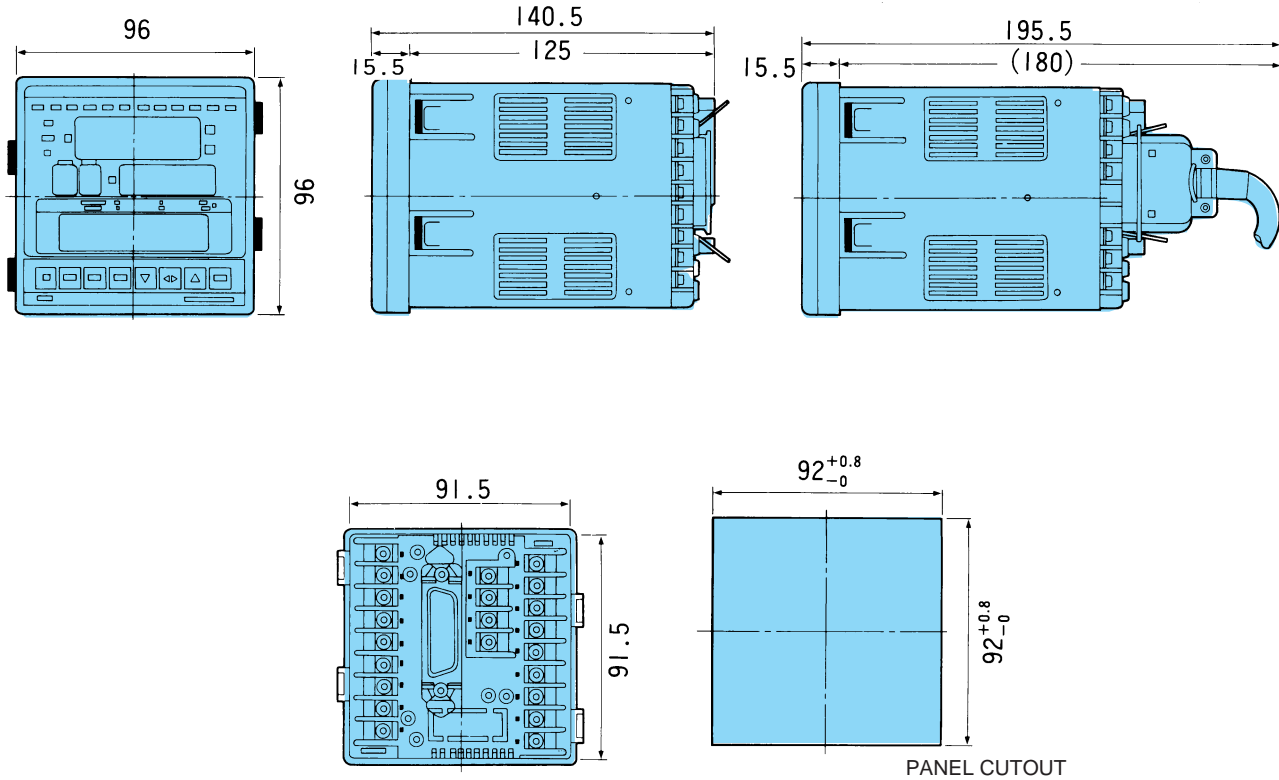
\*\* SEL1, SEL2, SEL4, SEL8 (SEL16) BIN Code Input

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## APPLICATION EXAMPLE



## EXTERNAL DIMENSIONS



Unit: mm

DUE TO CONTINUOUS PRODUCT IMPROVEMENT, THE DESIGN AND TECHNICAL SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT PRIOR NOTICE.

ISO 9001

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