FE Series Controller

FE400 FE700
FE800 FE900

New-Generation FE Series

Digital PID Temperature Controller

TAIE

TAIWAN INSTRUMENT & CONTROL CO., LTD

High Reliability

Low Cost

Easy Operation

Bringing Brand New Value To The Temperature Controller

High Performance Low Cost Process Control

Accuracy±0.2%

RS-485 speed upper to 115200 bps

Panel Space Saving

Compared to the FY series, the body is greatly reduced to suit smaller operating space (except FE400)

Large LED Display

Excellent visibility to allow operators to minimize movement distance to optimize production efficiency.

Certification & Universal Voltage

All models are CE-certified.
Operate on any voltage from AC 85~265V at 50/60 Hz.
DC 24V is also available (optional function)

Function Key Customization

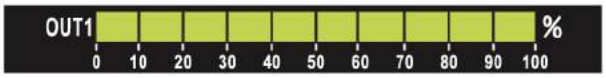
FUN key to snap-activate to-be-executed event.
EX: manual / auto switch,SV switch,run / stop switch etc. (except FE400)

Status Indicator Light

Timely visual access to indicator status of Output (OUT1 / OUT2), Alarm (AL1 / AL2 / AL3), Auto-Tuning (AT), Communication Response (COM) and Manual Output (MAN).

Bar-Graph Indicator Light

The output percentage is directly displayed on the panel with a BAR-GRAPH indicator. 10 LED's each corresponding to every 10% differential in output (0-100%). (except FE400)



High Accuracy

Input with 14 bits A/D resolution, 0.2% accuracy of FS.
Built in "AutoZero & AutoSpan" function , so as to maintain accuracy in long-term usage.

Parameter Lock-Up Function

All parameters are distributed across 3 operation levels (Level1~Level3)
Each parameter at any given level can be hidden or locked to prevent accidental changes by unauthorized users.

Function block diagram

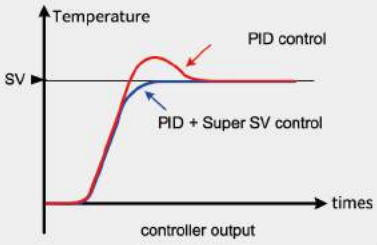
Features

Various I/O Types

Excellent Control Performance

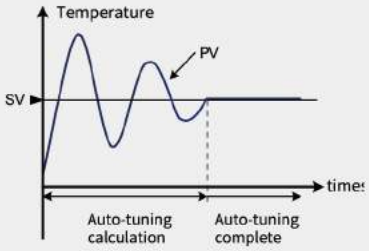
PID Control

Built-in super SV function to effectively inhibit temperature overshoot.



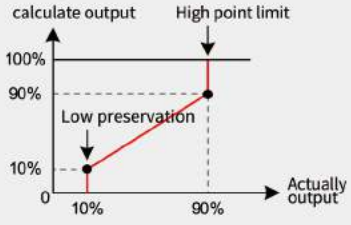
Auto-Tuning

Automatic tuning to obtain optimal system PID value, in order to achieve accurate temperature-control effect.



Limit Setting

Output high Limit
→To present temperature overshoot
Output low maintain
→To present valve total shut-down



Fast and Stable Communication

RS-485 maximum connections up to 31 units

- Compatible with Modbus RTU communication protocol
- Compatible with Competitor's register address
- Industry's fastest communication speed 115200 bps

Features

Transmission Output

The controller transmission function allows parameters SV, PV, SV2, PV2,OP1(digital value) transmitted to an external device, via analog signals.

Type : 0~20mA DC, 4~20mA DC,
0~5V DC, 1~5V DC, 0~10V DC, 2~10V DC

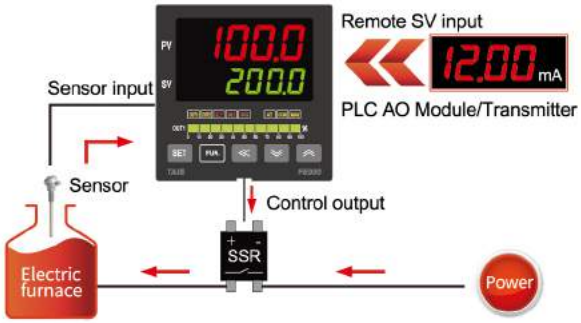
Output parameters : SV, PV, SV2, PV2,OP1

Remote SV

To control the parameter values of temperature controller, via analog signal mode, from an external device.

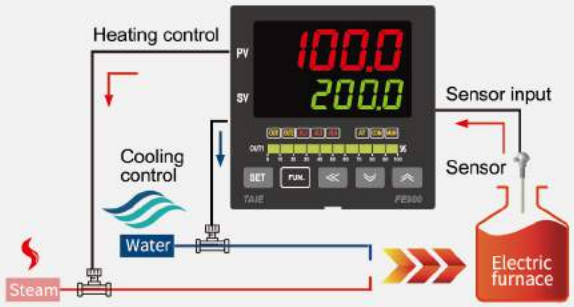
Type : 0~20mA DC, 4~20mA DC,
0~5V DC, 1~5V DC, 0~10V DC, 2~10V DC

Output parameters : SV



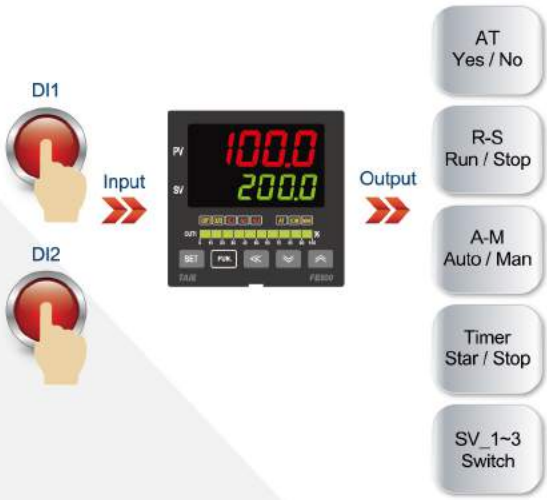
Heating and Cooling Control

Using two outputs of the controller, a device can control the heating / cooling equipment.



Digital Input

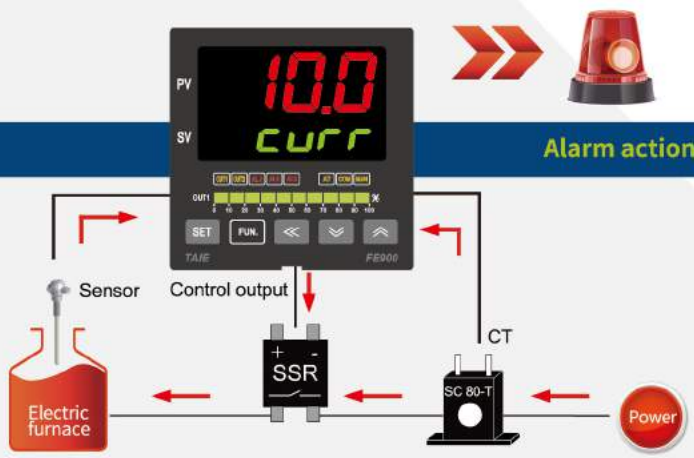
Provide two-point digital input, through external switch to change SV value or execute others events.



Heater Break Alarm (HBA)

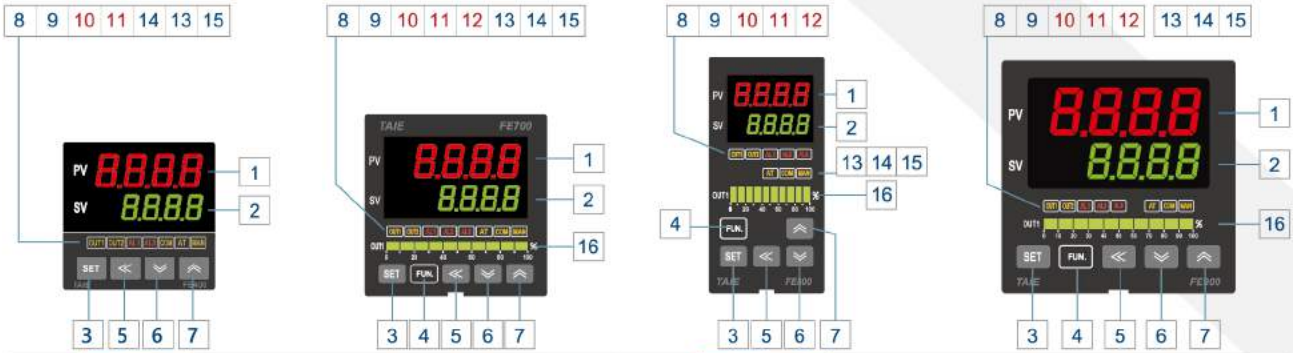
Coupling with CT (current transformer), via real-time monitoring, once abnormal drop in current value is detected, alarm signal will be output to inform users.

- Can be used as the ammeter
- Can be set break time
- Current value and alarm signal can be read by communication



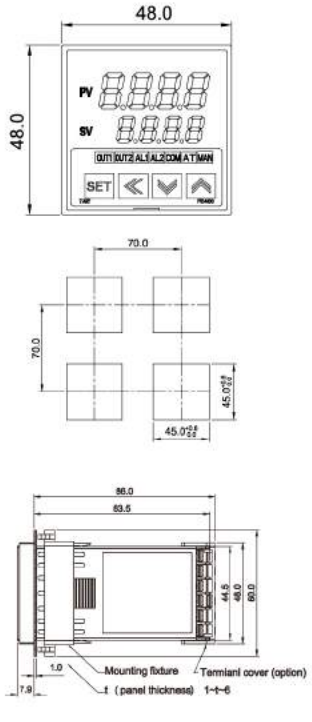
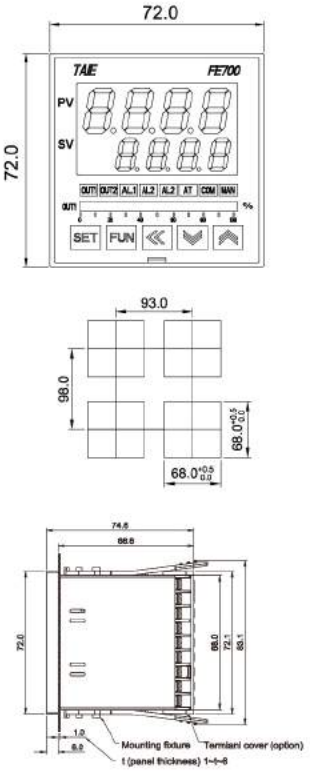
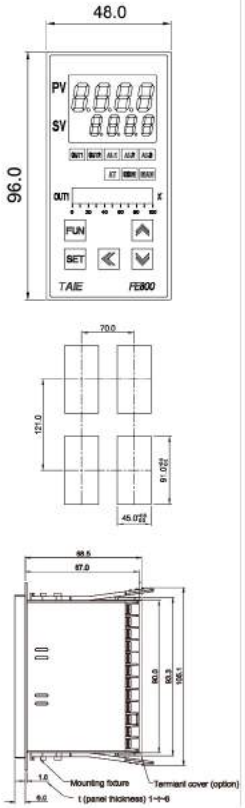
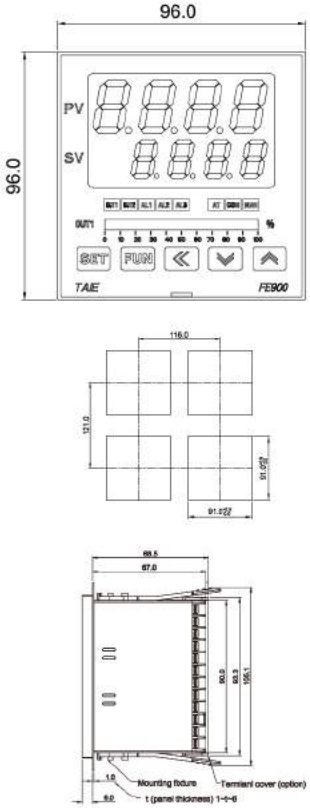
Appearance

Parts Description



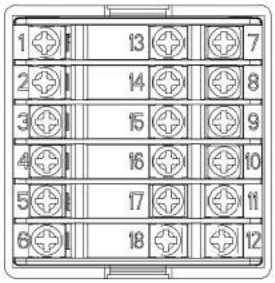
No	symbol	function	No	symbol	function
1	PV	Indicates PV (measured value,Red)	9	OUT2	Lamp lit when OUT2 is activated (Orange)
2	SV	Indicates SV (target set value) and parameter Values (Green)	10	AL1	Lamp lit when Alarm 1 is activated (Red)
3	SET	Used for parameter calling up and set valueregistration	11	AL2	Lamp lit when Alarm 2 is activated (Red)
4	FUN	DI1 Function starts	12	AL3	Lamp lit when Alarm 3 is activated (Red)
5	≪	Shift digits when settings are changed	13	AT	Lamp lit when Auto tuning is activated (Orange)
6	≫	Decrease numerals	14	COM	Lamp lit when controller response data (Orange)
7	≪	Increase numerals	15	MAN	Lamp lit when controller in manual mode or get error condition (Orange)
8	OUT1	Lamp lit when OUT1 is activated (Orange)	16	OUT1%	Output% is displayed on 10 dot LEDs (Green)

External and Panel Cutout Dimensions

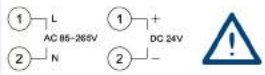
FE400	FE700	FE800	FE900
			

Terminal Arrangement

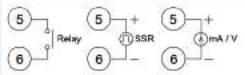
FE400



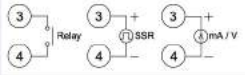
Power



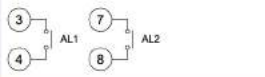
Output-1



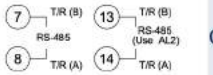
Output-2



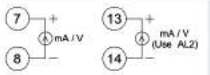
Alarm-1
Alarm-2



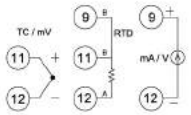
Communication



Remote SV



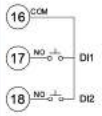
Input



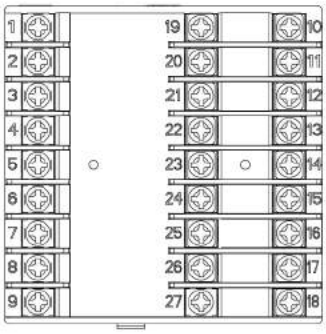
CT Input

TRS

DI Input

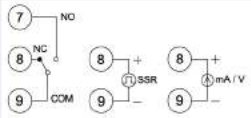


FE700

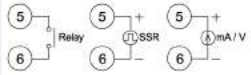


Power

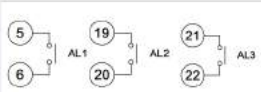
Output-1



Output-2



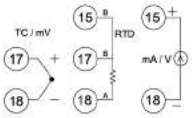
Alarm-1
Alarm-2
Alarm-3



Communication

Remote SV

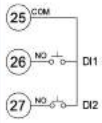
Input



CT Input

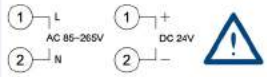
TRS

DI Input

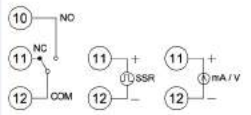


FE800

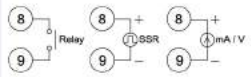
Power



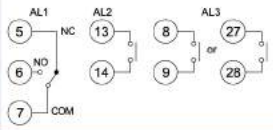
Output-1



Output-2



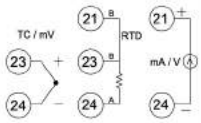
Alarm-1
Alarm-2
Alarm-3



Communication

Remote SV

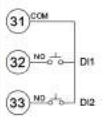
Input



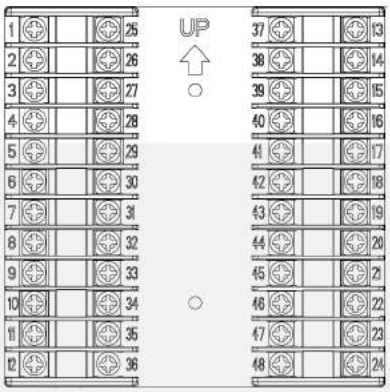
CT Input

TRS

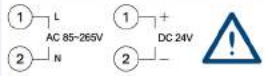
DI Input



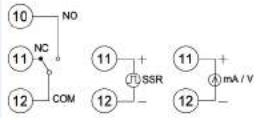
FE900



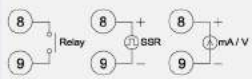
Power



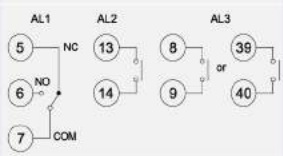
Output-1



Output-2



Alarm-1
Alarm-2
Alarm-3



Communication

Remote SV

Input

CT Input

TRS

DI Input

Specifications

General Specification	
Power supply voltage	AC 85~265V AC 50/60Hz DC 24V DC ±10%
Power consumption	AC Maximum 6VA at 240V AC DC Maximum 330mA
Memory backup	Backed up by non-volatile memory Maximum Allowable Write-In: 1000,000 times Data retaining period : Approx. 10 years
Operating temperature	0 to 50℃ (32 to122℉)
Allowable humidity range	45 to 85% RH
Weight (approx.)	FE400 approx. 120g FE700 approx. 150g FE800 approx. 170g FE900 approx. 230g
External dimensions (mm)	FE400 48W X 48H X 91L (1/16 DIN) FE700 72W X 72H X 73L (1/8 DIN) FE800 48W X 96H X 73L (3/16 DIN) FE900 96W X 96H X 73L (1/4 DIN)
Operating environmental conditions	Free from corrosive and flammable gas and dust. Free from external vibration, shock and exposure to direct sunlight.
Measured Input	
Indication accuracy	±(0.2% of reading + 1 digit)
Sampling rate	250ms
thermocouple	K、J、R、S、B、E、N、T、W、PL Ⅱ、L
RTD	PT100
Voltage / Current	0~5V、0~10V、0~2V、1~5V 2~10V、0~25mV、0~50mV、 0~20mA、4~20mA、0~1V、10~50mV、0~70mV
Input filter	Low-pass filter PV digital filter : 0.1 to 10.0 sec. (OFF when 0 is set.)
PV bias	-span to +span-span to +span (range -1999 to 9999)
Controlled Output	
No. of points	Up to 2
Control action	1. PID, P, PI, and PD control(with auto-tuning function) 2. ON/OFF control 3. Heat/Cool type PID control(with auto-tuning function)
Relay contact output	1. SPST-NO, 250VAC, 8A Electrical life :100,000 operations(rated load) 2. SPDT-NO, 250VAC, 5A Electrical life : 50,000 operations (rated load) 3. SPDT-NC, 250VAC, 2A Electrical life : 20,000 operations (rated load)
SSR drive output	ON: 24 V OFF: 0V Maximum load current :20mA With short protect circuit
Current / Voltage output	Resolution : 10 bits Type : 4~20mA, 0~20mA, 0~5V, 0~10V, 1~5V, 2~10V
Heater break alarm(HBA)	
Current transformer	SC 80-T, SC 100-T
Max. continuous current	SC 80-T : 80A, SC 100-T : 100A
Accuracy	SC 80-T : ±3%, SC 100-T : ±5%
Aperture	SC 80-T : 5.9mm, SC 100-T : 12.6mm
Output	Alarm1~3

Event / Alarm function	
No. of points	Up to 3
Alarm type	Deviation high, Deviation low Deviation high/low, Band PV high, PV low SV high, SV low Error(system failed)
Relay specifications (resistive load)	1. SPST-NO, 250VAC, 8A Electrical life : 100,000 operations(rated load) 2. SPDT-NO, 250VAC, 5A Electrical life : 50,000 operations(rated load) 3. SPDT-NC, 250VAC, 2A Electrical life : 20,000 operations(rated load)
Timer	
No. of points	Up to 3
Time format	Hour : minute
Maximum times	99.59 (hours.minutes)
Output	Alarm1~3
Transmission	
No. of points	1 point
Accuracy	14 bits
Output contents	SV, PV, SV2, PV2, OP1
Type	4~20mA, 0~20mA, 0~5V, 0~10V, 1~5V, 2~10V
Remote SV	
No. of points	1 point
Accuracy	14 bits
Parameter	Local SV
Type	4~20mA, 0~20mA, 0~5V, 0~10V, 1~5V, 2~10V
Digital input	
No. of points	Up to 2
Input method	Non-voltage contact input OFF(open state): 500KΩ or more ON(close state) : 10Ω or less
Function	1. SV toggle 2. Auto-tuning run/stop 3. Run-Stop 4. Auto manual switch 5. Timer start/stop 6. Power saving start/stop
Communication	
Interface	RS-485 half-duplex bit serial, asynchronous communication
Protocol	Modbus RTU, TAIE
Baud rate	2400, 4800, 9600, 19200, 38400, 57600, 115200 bps
Code type	1. Start bits : 1 2. Data bits : 8 3. Parity bits : None, Odd, Even 4. Stop bits : 1 or 2
Interval time	0~250ms
Maximum unit	Up to 31 units

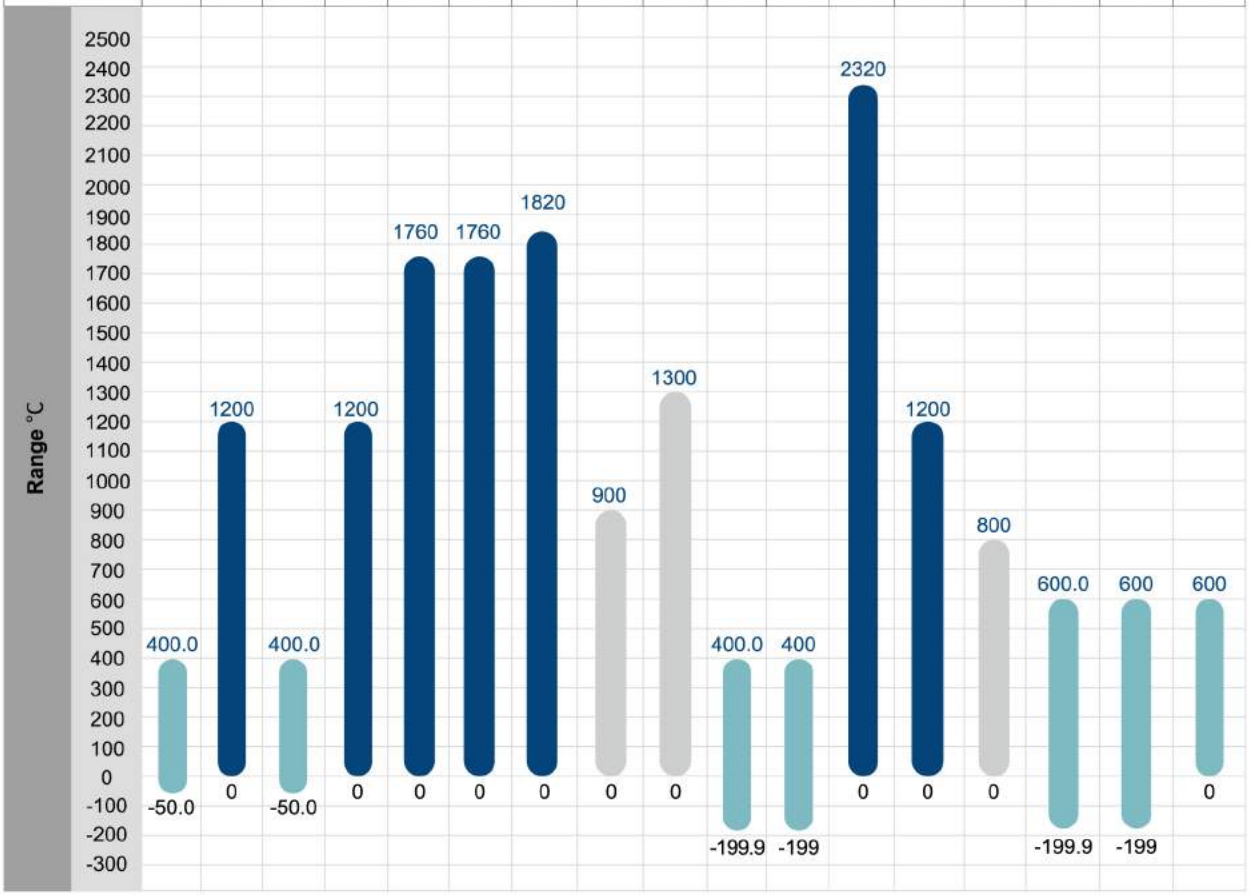
Oder Information

Block means optional functions with additional charge.

	Output 1	Output 2	Alarm	TRS	Remote	COMM	Input type	Power
	1	0	1	0	0	0	01	A
FE400 FE700	0 None 1 Relay 2 Voltage Pulse (SSR Drive) 3 4-20mA 4 0-20mA A 0-5V B 0-10V C 1-5V D 2-10V	0 None 1 Relay 2 Voltage Pulse (SSR Drive) 3 4-20mA 4 0-20mA A 0-5V B 0-10V C 1-5V D 2-10V	0 None 1 1set 2 2set 3 3set A HBA B HBA+AL2 C HBA+AL2+AL3	0 None 1 4-20mA 2 0-20mA A 0-5V B 0-10V C 1-5V D 2-10V	0 None 1 4-20mA 2 0-20mA A 0-5V B 0-10V C 1-5V D 2-10V E DI F Remote+DI	0 None B RS-485	See input type code	A AC 85-265V D DC 24V
FE800 FE900								

Input Type Table

Type	K		J		R	S	B	E	N	T		W	PLII	L	PT100		
Kind	K1	K2	J1	J2	R	S	B	E	N	T1	T2	W	PLII	L	DP1	DP2	DP3
Code	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17



Type	AN1	AN2										AN3
Code	18	19	20	21	22	23	24	25	26	27	28	29
Range	0~25mV	0~50mV	0~20mA	4~20mA	0~1V	0~5V	0~10V	0~2V	1~5V	2~10V	other	0~70mV
	4 kinds of choices : -1999~9999 -199.9~999.9 -19.99~99.99 -1.999~9.999											

Before operating this product, read the instruction manual carefully to avoid incorrect operation.
This product is intended for use with industrial machines, test and measuring equipment.
It is not design for use with medical equipment.
If it is possible that an accident may occur as a result of the failure of the product or some other abnormality, an appropriate independent protection device must be installed.

TAIE