FE

Rail Type Controller

FE250
FE251
FE300

Digital Process Controller

FE250-00100C

FE251-00100C

FE300-00100C

TAIE

台灣儀控股份有限公司
TAIWAN INSTRUMENT & CONTROL CO., LTD

High-Performance Process Control

Precise control

High Reliability

High Accuracy ± 0.1 %

Sampling Time 50 ms

Speed upper to 115200 bps

PV

SV

FE251-00100C

INPUT | PT1

DIGITAL PID CONTROLLER

OUT1 | None

SUPPLY | AC 85~265V 50/60HZ 6VA

AMB.TEMP. 50°C MAX

TAIE

RS 485
(B-) (A+)

DIN rail mounting

OUT AL1 AL2 AT COM

PV

SV

SET

FE300

FE300-00100C

Excellent Anti-Interference Ability

EMC shielding

Passing the highest level of EMC verification in CE certification. It can resist electromagnetic interference in heavy noise environment.

High Speed Sampling And High Accuracy

ADC
18bit / 50ms

Input can perform 50ms high-speed sampling, enabling stable control and response. Built-in 18-bit high resolution ADC circuit provides up to 0.1% accuracy.

DIN Rail Mounting

DIN-rail installation, thin type of body can save lots of space also easy to use in multi-point control and communication.

Status Indicator Lamp

OUT1 OUT2 AL1 AL2
FE250/251

OUT AL1 AL2 AT COM
FE300

Real time monitor the status of output (OUT1/OUT2), alarm(AL1/AL2), communication(COM) and auto-tuning(AT).

Ultra Low Temperature Drift

Any operating conditions have been considered in the design, even if in temperature variety ambience, it also not affects PV and control performance.

Certification And Universal Voltage

CE

All models get CE approval. operate on any voltage from AC 85~265V at 50/60 Hz, DC 24V is also available.
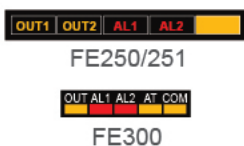
Parameter Lock Function

All parameters are separated in five operation levels (Level1~Level5). Each parameter can be hidden or locked to prevent users unauthorized changes.
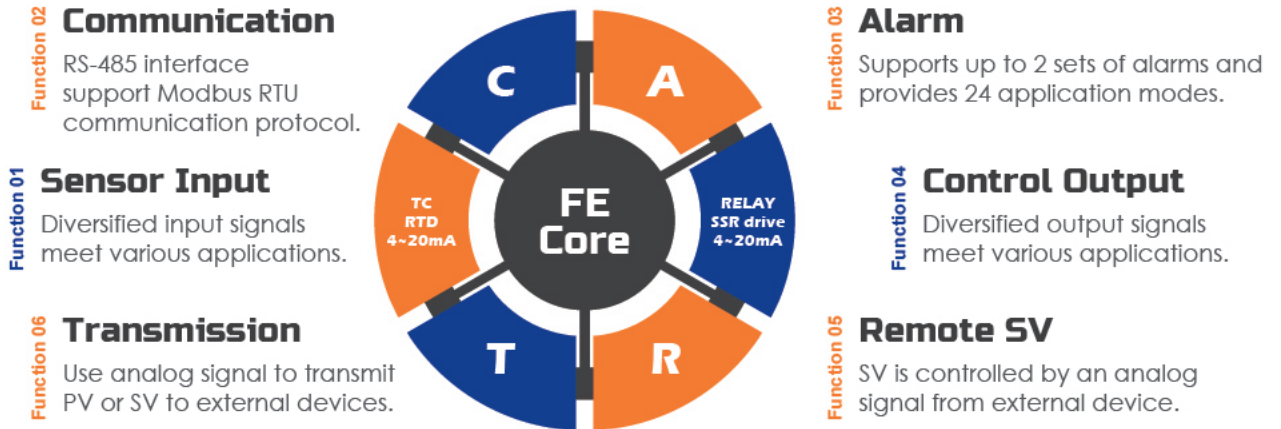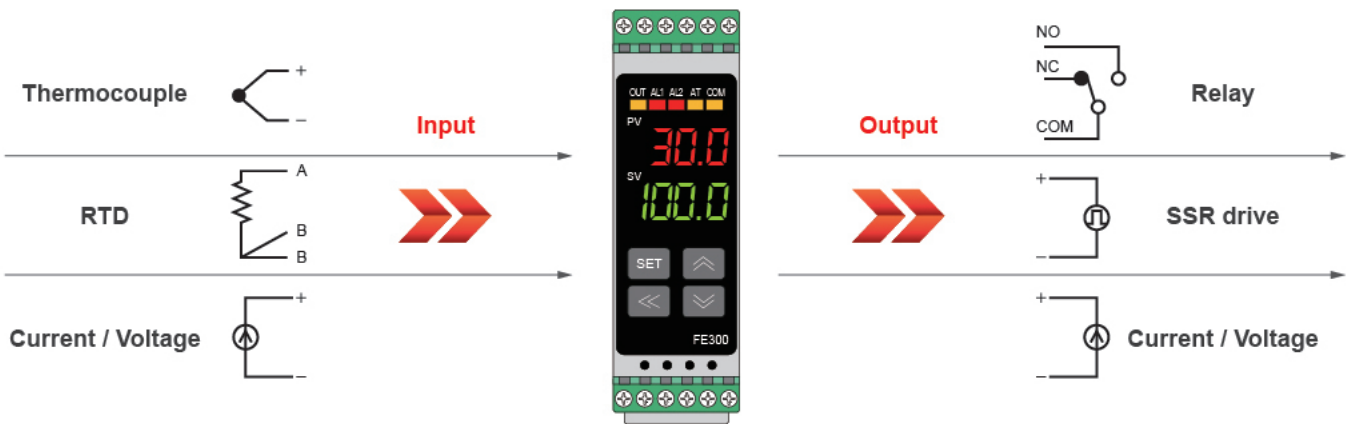
Register Mapping

Compatible with FY series controller, parameter address can be switched by software, without changing original HMI or PLC program.
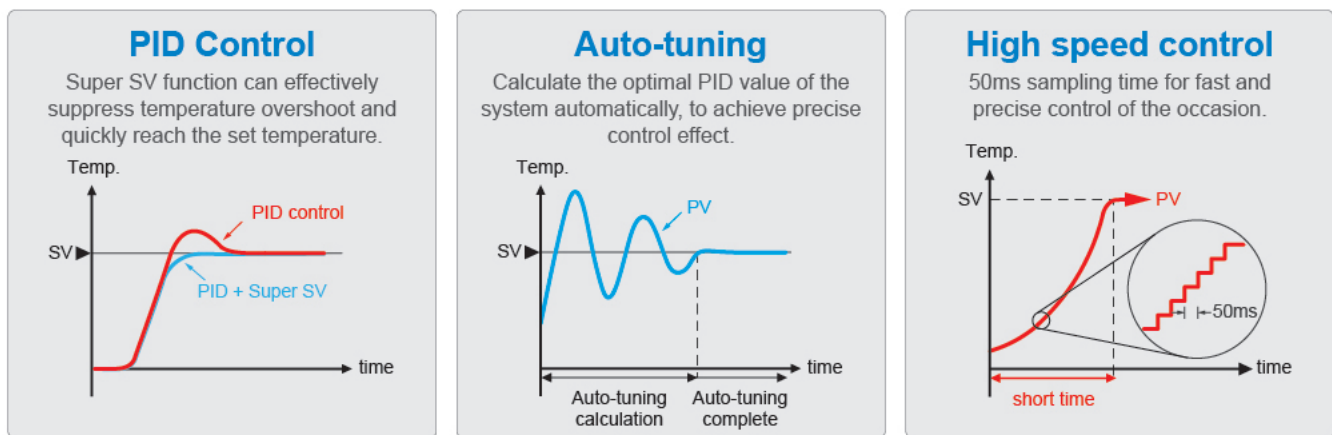
Function Block Diagram

Communication
RS-485 interface support Modbus RTU communication protocol.

Sensor Input
Diversified input signals meet various applications.

Transmission
Use analog signal to transmit PV or SV to external devices.

Alarm
Supports up to 2 sets of alarms and provides 24 application modes.

Control Output
Diversified output signals meet various applications.

Remote SV
SV is controlled by an analog signal from external device.

FE Core

C   A   T   R

TC RTD 4~20mA   RELAY SSR drive 4~20mA

Features

Various I/O Types

Thermocouple

RTD

Current / Voltage

Input

Output

Relay — NO / NC / COM

SSR drive

Current / Voltage

PV 30.0
SV 100.0
OUT AL1 AL2 AT COM
SET
FE300

Excellent Control Performance

PID Control
Super SV function can effectively suppress temperature overshoot and quickly reach the set temperature.

Temp.
PID control
SV
PID + Super SV
time

Auto-tuning
Calculate the optimal PID value of the system automatically, to achieve precise control effect.

Temp.
PV
SV
time
Auto-tuning calculation | Auto-tuning complete

High speed control
50ms sampling time for fast and precise control of the occasion.

Temp.
SV
PV
50ms
short time
time

Fast and Stable RS-485 Communication

Compatible with Modbus RTU communication protocol to quickly establish links with HMI, PLC or SCADA software.

Modbus

PLC

IDNO   1   2   3   4 31
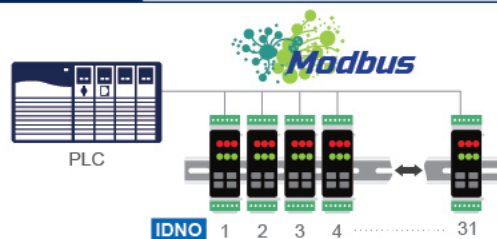
Features

Heating and Cooling Control

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

Heating Control
Cooling Control
Sensor Input
Water
Steam
OVEN
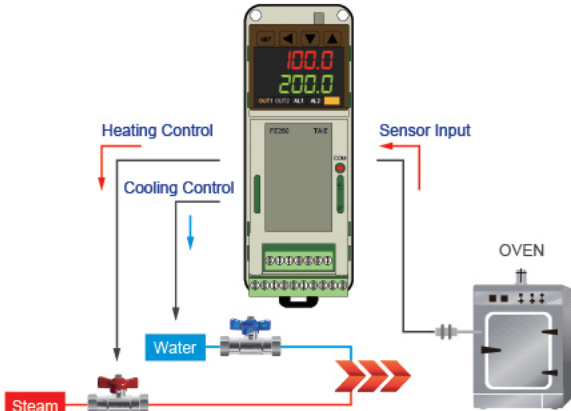
Heater Break Alarm

With a CT (current transformer) to monitor the heater current in real time, when the current value is abnormally reduced an alarm signal can be output to notify the user.

Sensor Input
Alarm Action
Control Output
CT Input
SSR
Power
OVEN
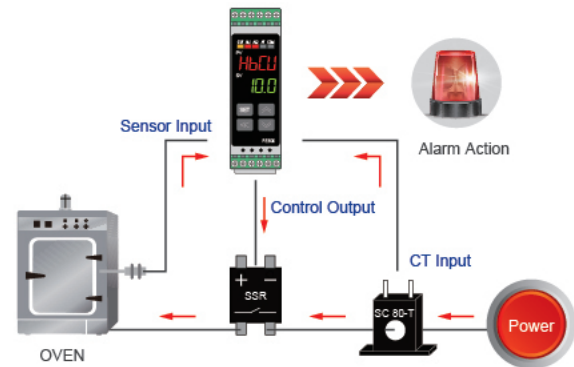
Transmission

Transfer parameter digital values as analog signals to external devices.

signals:	0~20mA	4~20mA	0~5V
	1~5V	0~10V......	

parameters:	SV1	PV1	MV1......

Sensor Input
12.00 mA
Ammter
Transmission DC 4~20mA
OVEN
Paperless Recorders

Remote SV

SV is controlled by an analog signal from an external device.

signals:	0~20mA	4~20mA	0~5V
	1~5V	0~10V......	

parameters:	SV

Remote SV Input
12.00 mA
Transmitter
Sensor Input
Control Output
SSR
Power
OVEN
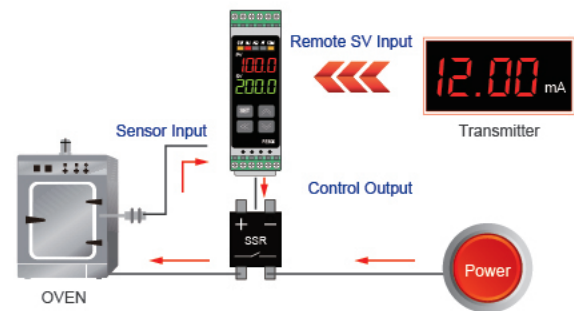
Bumpless Transfer

When the automatic mode is changed to manual mode, the current manipulated value will be loaded, make sure the system not be impacted by sudden changes.

AUTO control 50%
switch
MANUAL control 50%
Smooth Change
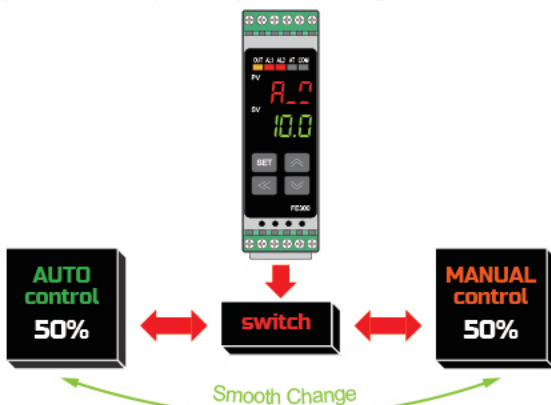
MV% Maintain and Limit

In the high manipulated value can be limited, to protect the system avoid overheating.
In the low manipulated value can be keep, to maintain the system running.

MV%
HIGHT Limit 90%
LOW Maintain 10%
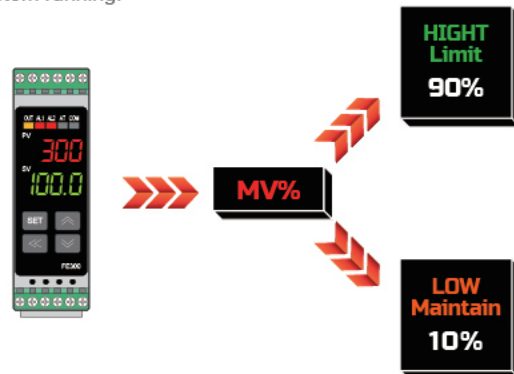
Appearance

FE250 / FE251
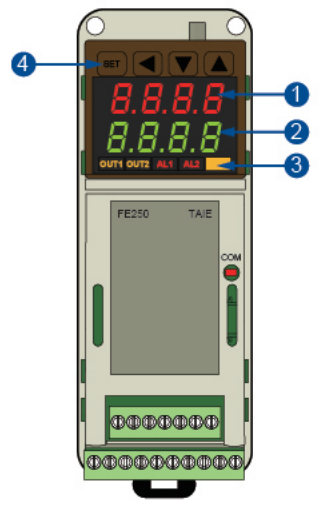
| 1	PV		Indicates PV (measured value) and character information such as parameter codes and error codes (Red)
2	SV		Indicates SV (target set value) and parameter Values (Green)
3	LED	OUT1	Lamp lit when OUT1 is activated (Orange)
		OUT2	Lamp lit when OUT2 is activated (Orange)
		AL1	Lamp lit when Alarm 1 is activated (Red)
		AL2	Lamp lit when Alarm 2 is activated (Red)
		☐	Lamp lit when Auto-tuning is activated (Orange)
		COM	Lights when controller response data (Green)
4	Keypad	SET · SET	For parameter call-up and set value registration
		◀ SHIFT	Shift digits when changing settings
		▼ DOWN	Decrease numerals
		▲ UP	Increase numerals

FE300
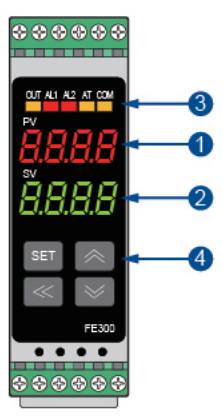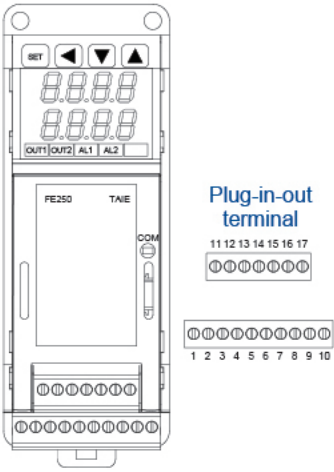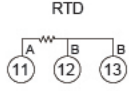
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		AT	Lamp lit when Auto-tuning is activated (Orange)
		COM	Lights when controller response data (Orange)
4	Keypad	SET · SET	For parameter call-up and set value registration
		≪ SHIFT	Shift digits when changing settings
		⌄ DOWN	Decrease numerals
		⌃ UP	Increase numerals

External And Dimensions

FE250/251	FE300
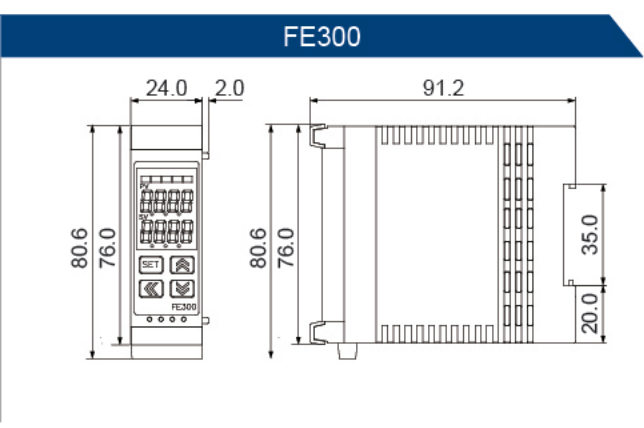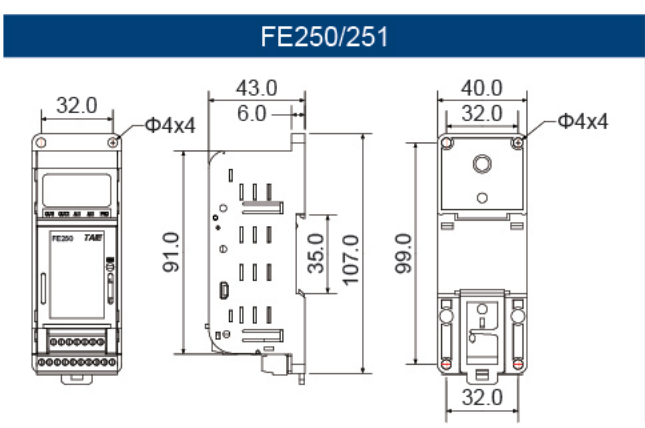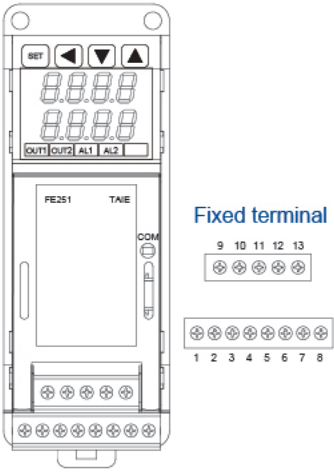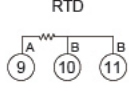
Terminal Arrangement

FE250
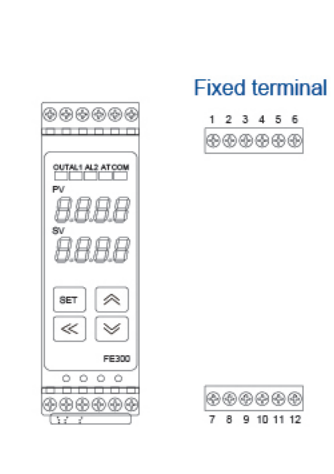
	Input		Power	
	TC / mV (11 12), RTD (11 12 13), mA / V (11 12 13)		AC 85~265V (L 1, N 2), DC 24V (1 2)	
Transmission	mA / V (14 15)	Alarm-1 Alarm-2	AL1 (NO 3, NC 4, COM 5), AL2 (6 7)	
Remote SV/ CT Input	mA / V (14 15), CT (14 15)	Output-2	Relay (6 7), SSR (6 7), mA / V (6 7)	
Communication	RS-485 T/R (B-) (16), T/R (A+) (17)	Output-1	Relay (NO 8, NC 9, COM 10), SSR (9 10), mA / V (9 10)	

Plug-in-out terminal 11 12 13 14 15 16 17

FE251

	Input		Power	
	TC / mV (9 10), RTD (9 10 11), mA / V (9 10 11)		AC 85~265V (L 1, N 2), DC 24V (1 2)	
Transmission	mA / V (12 13)	Alarm-1 Alarm-2	AL1 (3 4), AL2 (5 6)	
Remote SV/ CT Input	mA / V (12 13), CT (12 13)	Output-2	Relay (5 6), SSR (5 6), mA / V (5 6)	
Communication	RS-485 T/R (B-) (12), T/R (A+) (13)	Output-1	Relay (7 8), SSR (7 8), mA / V (7 8)	

Fixed terminal 9 10 11 12 13

FE300

	Power		Remote SV/ CT Input	
	AC 85~265V (L 1, N 2), DC 24V (1 2)		mA / V (11 12), CT (11 12)	
Output	Relay (5 6), SSR (5 6), mA / V (5 6)	Communication	RS-485 T/R (B-) (11), T/R (A+) (12); RS-485 (No Alarm) T/R (A+) (3), T/R (B-) (4)	
Transmission	mA / V (11 12), mA / V (No Alarm) (3 4), mA / V (No Output) (5 6)	Input	TC / mV (7 8), RTD (8 9); mA / V (7 8 9)	
Alarm-1 Alarm-2	AL1 (3 4), AL2 (11 12)			

Fixed terminal 1 2 3 4 5 6 / 7 8 9 10 11 12

Specifications

Model	FE300	FE251	FE250
Terminal	Fixed terminal		Plug-in-out terminal
Supply Voltage	AC 85 ~ 265V, DC 24V (Optional Functions)		
Power Frequency	50/60 Hz		
Power Consumption	Approximately 6VA		
Memory	Non-Volatile Memory EEPROM		
Sensor Input ※ Please refer to Input Range Table	Accuracy : 0.1%		
	Sample time : 50ms		
	Thermocouple : (K, J, R, S, B, E, N, T, W, PLII, L)		
	RTD: PT100		
	DC Linear Analog Input: 0~20mA, 4~20mA 0~1V, 0~5V, 0~10V, 0~2V, 1~5V, 2~10V 0~25mV, 0~50mV, 0~70mV		
Output — OUT1 Relay	1a		1c
	1a SPST-NO, 250 VAC, 5A (resistive load), electrical life: 100,000 operations 1c SPDT-NO, 250 VAC, 5A (resistive load), electrical life: 50,000 operations SPDT-NC, 250 VAC, 2A (resistive load), electrical life: 20,000 operations		
Output — OUT2 Relay	-		1a
	SPST-NO, 250 VAC, 5A (resistive load), electrical life: 100,000 operations		
Output — SSR Drive	ON: 24 V OFF: 0V max. load current: 20mA, with short circuit protection circuit		
Output — linear	4~20mA, 0~20mA, 0~5V, 0~10V, 1~5V, 2~10V		
Control Method	ON-OFF or P, PI, PID control		
Alarm — Alarm 1	1a		1c
	1a SPST-NO, 250 VAC, 5A (resistive load), electrical life: 100,000 operations 1c SPDT-NO, 250 VAC, 5A (resistive load), electrical life: 50,000 operations SPDT-NC, 250 VAC, 2A (resistive load), electrical life: 20,000 operations		
Alarm — Alarm 2	1a		
	SPST-NO, 250 VAC, 5A (resistive load), electrical life: 100,000 operations		
TRS — Re-transmitted Signal	4~20mA, 0~20mA, 0~5V, 0~10V, 1~5V, 2~10V		
TRS — Source of Re-transmission	SV1, PV1, MV1, SV1R, PV1R, MV1R, SV2, PV2, MV2, SV2R, PV2R, MV2R		
TRS — Accuracy	0.1%		
TRS — Resolution	14 bit		
Remote SV — Signal	4~20mA, 0~20mA, 0~5V, 0~10V, 1~5V, 2~10V		
Remote SV — Resolution	18 bit		
Remote SV — Controlled by	SV		
Communication — Interface	RS-485 Half duplex Communication MAX. 31 units, MAX. distance 1200 meters		
Communication — Protocol	Modbus RTU, TAIE		
Communication — Parity bit	NONE, ODD, EVEN		
Communication — Data bit	8 bit		
Communication — Stop bit	1 or 2 bit		
Communication — Baud rate	2400, 4800, 9600, 19200, 38400, 57600, 115200 bps		
Malfunction vibration	10~55 Hz 20m / s2 , for 10 mins. each in X, Y and Z directions.		
Vibration resistance	10~55 Hz 20m / s2 , for 2 hrs. each in X, Y and Z directions.		
Malfunction shock	100m / s2 , 3 times each in X, Y and Z directions.		
Shock resistance	300m / s2 , 3 times each in X, Y and Z directions.		
Operating environment Temperature/ Humidity	0 ~ 50°C (in the case of no freezing or condensation) / 20% ~ 90% RH		
Storage environment Temperature	-25 ~ 65°C (in the case of no freezing or condensation)		
Dimension (mm)	W26 x H81 x D90	W40 x H107 x D43	
Weight	Appox.90g	Appox.105g	

Oder Information

Block means optional functions with additional charge

	Output 1	Output 2	Alarm	TRS	Remote	COMM	Input type	Power
Model	1	0	1	0	0	0	01	A

Model

Plug-in-out terminal
FE250

Fixed terminal
FE251
FE300

Output 1
- 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

Output 2
- 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

Alarm
- 0 None
- 1 1 Set
- 2 2 Sets
- A HBA
- B HBA+AL2

TRS
- 0 None
- 1 4-20mA
- 2 0-20mA
- A 0-5V
- B 0-10V
- C 1-5V
- D 2-10V

Remote
- 0 None
- 1 4-20mA
- 2 0-20mA
- A 0-5V
- B 0-10V
- C 1-5V
- D 2-10V

COMM
- 0 None
- 3 TTL
- B RS-485 (OLD FE)
- C RS-485

Input type
See input type table code

Power
- A AC 85-265V
- D DC 24V

Input Type Table

TYPE	Thermocouple														RTD		
	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	PT1	PT2	PT3
Code	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17

Range °C

K1	K2	J1	J2	R	S	B	E	N	T1	T2	W	PLII	L	PT1	PT2	PT3
600.0	1200	400.0	1200	1760	1760	1820	900	1300	400.0	400	2320	1200	800	850.0	850	850
-50.0	-50	-50.0	-50	-50	-50	-50	-50	-50	-199.9	-199	-50	-50	-50	-199.9	-199	0

TYPE	LINEAR											
	AN1	AN2						AN3	AN4			
Code	18	19	20	21	22	23	24	25	26	27	28	29
Range	0~25mV	0~50mV	0~20mA	0~1V	0~2V	0~5V	0~10V	0~70mV	4~20mA	10~50mV	1~5V	2~10V
	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.