FY

| Series
| Controller

FY400 · FY700
FY600 · FY800
FY900

New-Generation FY Series
Digital PID Temperature Controller

TAIE

TAIWAN INSTRUMENT & CONTROL CO., LTD

Classical Re-evolution

High Performance
With Best Process Control

High Quality

Precise Control

High Reliability

Sampling Time 50ms

PV **25.0**

SV **90.0**

OUT1 0 20 40 60 80 100 %

SET A/M

TAIE

FY900

High Accuracy ±0.1%

Speed upper to 115200 bps

Excellent Anti-Interference Ability

Adopt new anti-interference algorithm and pass the highest level of EMC verification in CE certification.It can resist electromagnetic interference in heavy noise environment.

EMC Shielding ✔

High Speed Sampling and High Accuracy

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

50ms
ADC
18bit

Customize Function Key

It can be quickly executed the event by A/M key.
Ex: auto/manual switch, run/stop switch etc.

A/M

Status Indicator Light

Real time monitor the status of output(OUT1/OUT2)、alarm(AL1/AL2/AL3),auto-tunning(AT),manual output(MAN) and program execute(PRO).

OUT1 OUT2 AT AL1 AL2 AL3 MAN PRO

IP65 Proof

IP65 dust & water proof is available for all models (optional function).

IP65

Certification and Universal Voltage

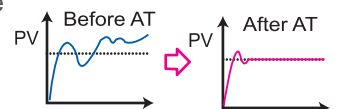All models get CE approval.operate on any voltage from AC 85~265V at 50/60 Hz,DC 24V is also available.

C€

Autotuning(AT)

AT Function can calculate the optimize PID value for your control system, without trying.

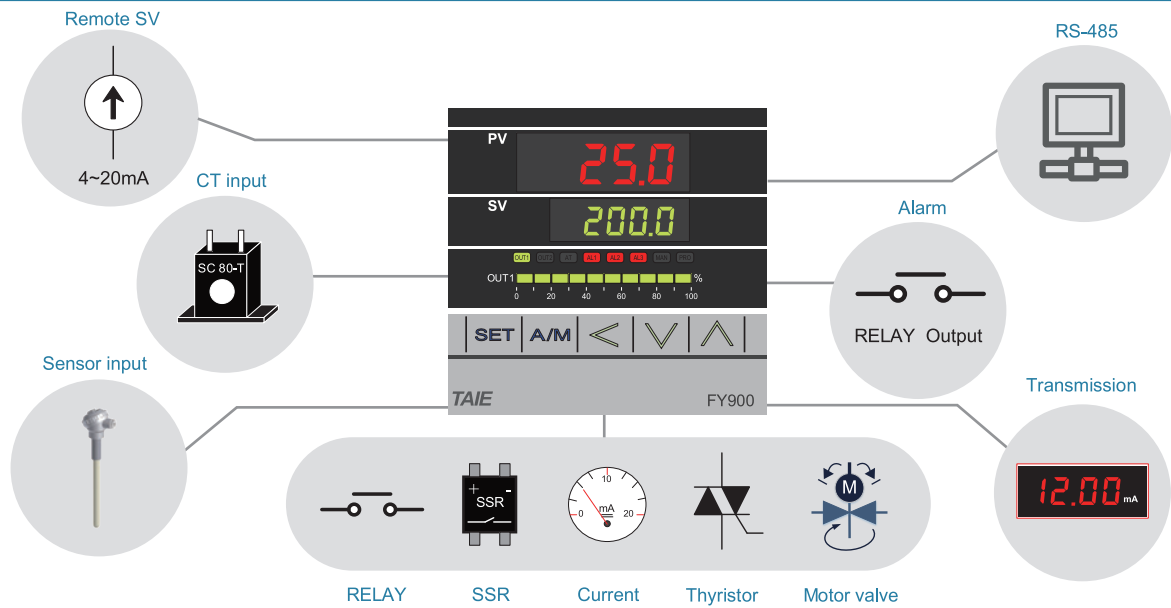PV Before AT   PV After AT

Bar-Graph

The output percentage is directly displayed on the panel with a bar-graph indicator 10 LED's corresponding to every 10% differential in output (0~100%) (except FY400).
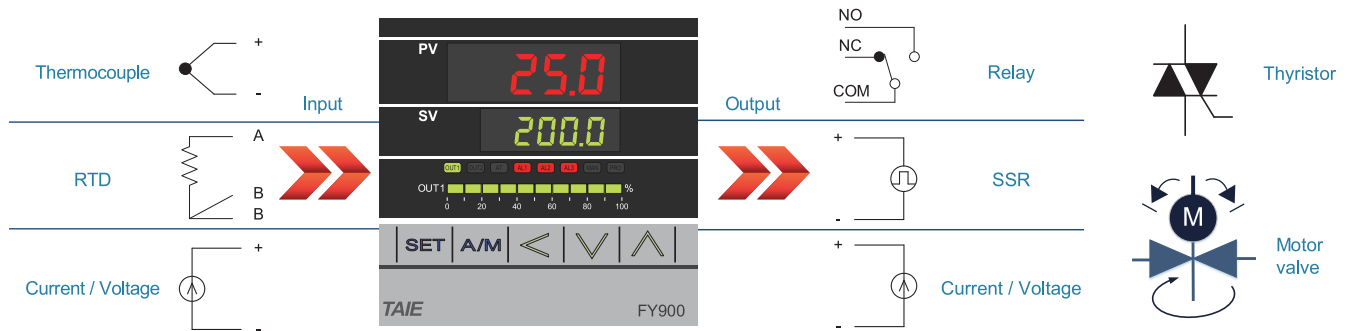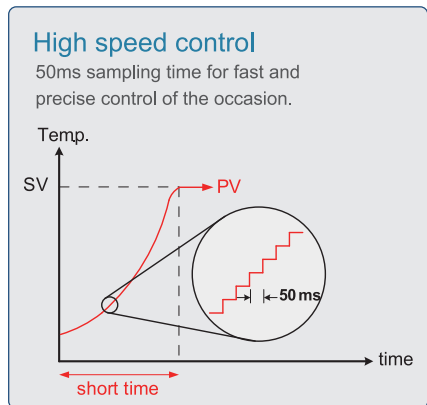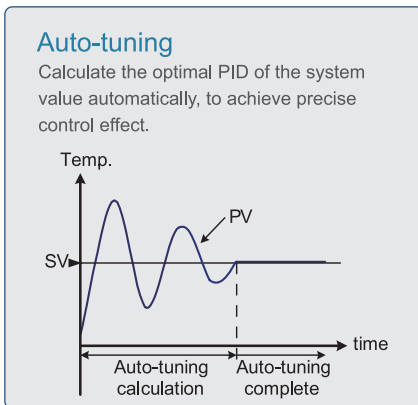
OUT1 0   20   40   60   80   100 %

Function block diagram

Remote SV

4~20mA

CT input

SC 80-T

Sensor input

PV **25.0**
SV **200.0**
OUT1 ▮▮▮▮▮▮▮▮▮▮▮ %
0 20 40 60 80 100

SET A/M < ∨ ∧

TAIE FY900

RS-485

Alarm

RELAY Output

Transmission

12.00 mA

RELAY SSR Current Thyristor Motor valve

Features

Various I/O Types

Thermocouple

Input

RTD

Current / Voltage

PV **25.0**
SV **200.0**
OUT1 ▮▮▮▮▮▮▮▮▮▮▮ %
0 20 40 60 80 100

SET A/M < ∨ ∧

TAIE FY900

Output

NO
NC
COM

Relay

SSR

Current / Voltage

Thyristor

Motor valve

Excellent Control Performance

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

Temp.

SV

PID control

PID + Super SV

controller output

time

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

Temp.

SV

PV

Auto-tuning calculation

Auto-tuning complete

time

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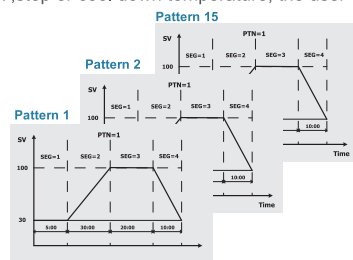50ms sampling time for fast and precise control of the occasion.

Temp.

SV

PV

50 ms

short time

time

Powerful Program Control

Provides 18 patterns of 18 segments of program control, each segment can be arbitrarily set to ramp, soak ,step or cool down temperature, the user can be arbitrary according to the demand, the maximum can support to 144 segments program control.

Execute by communication

Execute by key

PV **25.0**
SV **200.0**
OUT1 ▮▮▮▮▮▮▮▮▮▮▮ %
0 20 40 60 80 100

SET A/M < ∨ ∧

TAIE FY900

Pattern 15

Pattern 2

Pattern 1
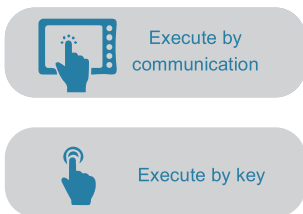
Features

Heating and Cooling Control

Sensor Input

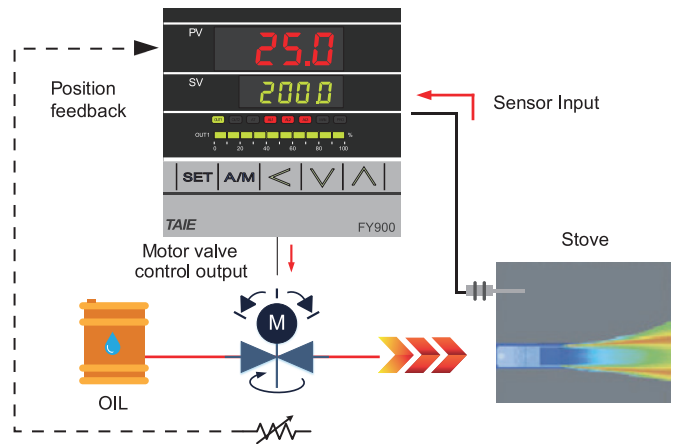sensor

| PV | 25.0 |
| SV | 200.0 |

SET A/M

TAIE   FY900

Dual PID
(Heating/Cooling)

OUT1
(Heating)

OUT2
(Cooling)

Steam

Water
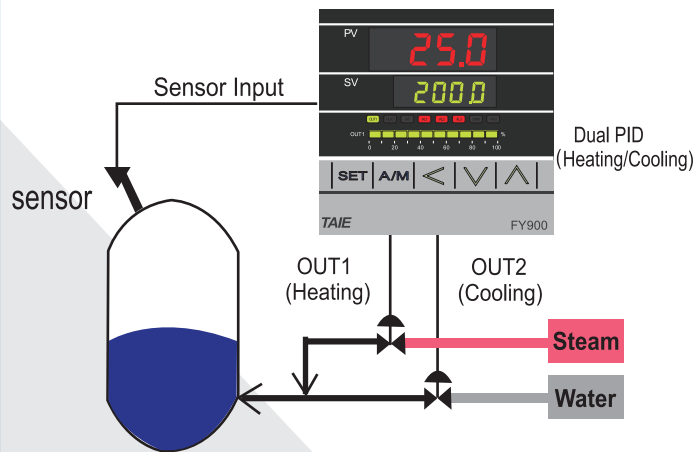
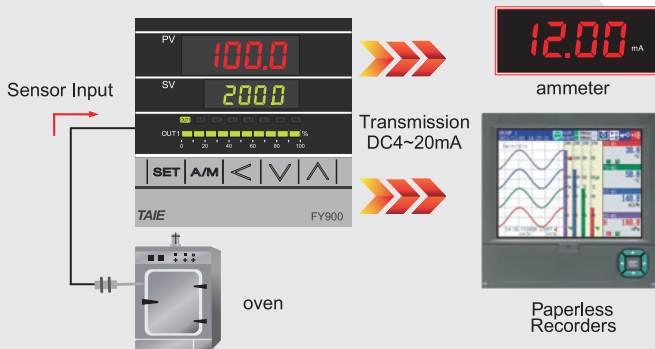## Motor Valve Control

Can use position feedback control of valve opening input or servo control without valve opening input.

Position feedback

| PV | 25.0 |
| SV | 200.0 |

SET A/M

TAIE   FY900

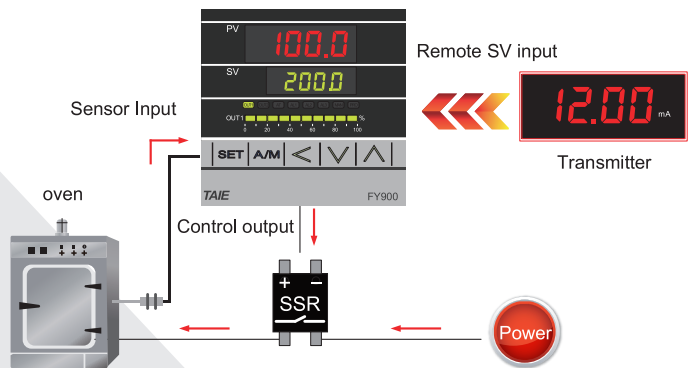Sensor Input

Motor valve control output

OIL

M

Stove

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

| PV | 100.0 |
| SV | 200.0 |

SET A/M

TAIE   FY900

oven

Transmission DC4~20mA

| 12.00 | mA |

ammeter

Paperless Recorders

Remote SV

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

signals : 0~20mA , 4~20mA , 0~5V , 1~5V , 0~10V …

parameters : SV

| PV | 100.0 |
| SV | 200.0 |

SET A/M

TAIE   FY900

Sensor Input

oven

Control output

SSR

Remote SV input

| 12.00 | mA |

Transmitter

Power

Communication

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

USB to RS-485 Converter

KA301

RS-485 up to 31 units

| PV | 25.0 |
| SV | 200.0 |

SET A/M

TAIE   FY900

IDNO: 1

| PV | 25.0 |
| SV | 200.0 |

SET A/M

TAIE   FY900

IDNO: 2

| PV | 25.0 |
| SV | 200.0 |

SET A/M

TAIE   FY900

IDNO:3

| PV | 25.0 |
| SV | 200.0 |

SET A/M

TAIE   FY900

IDNO:31
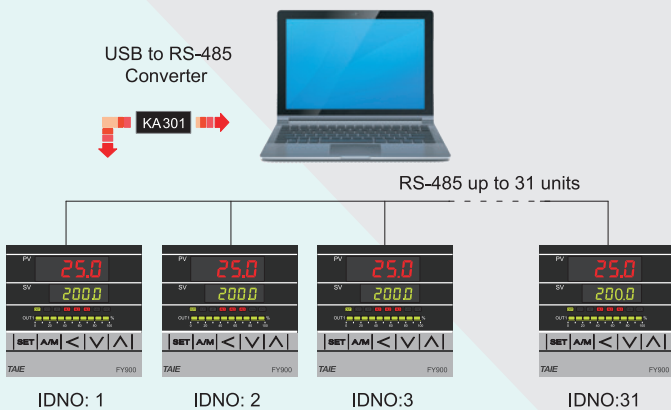
Heater Break Alarm(HBA)

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.

| PV | HbCU |
| SV | 10.0 |

SET A/M

TAIE   FY900

Sensor Input

oven

Control output

SSR

CT

SC 80-T

Alarm action

Power
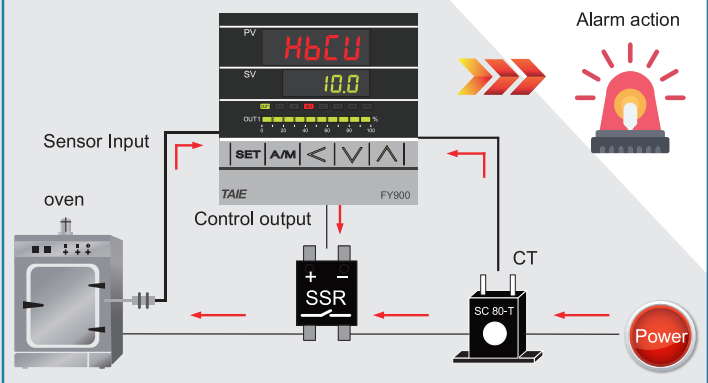
Appearance

Parts Description

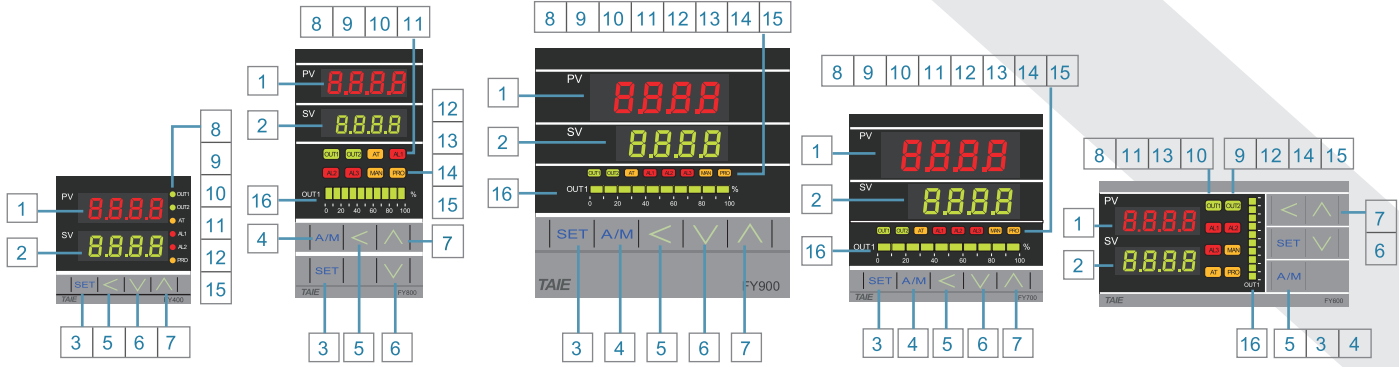| NO.	NAME	Function	NO.	NAME	Function
1	PV	Indicates PV (measured value) and character information such as parameter codes and error codes (Red)	9	OUT2	Lamp lit when OUT2 is activated (Green)
2	SV	Indicates SV (target set value) and parameter Values (Green)	10	AT	Lamp lit when Auto-tuning is activated (Orange)
3	SET	Used for parameter calling up and set value registration	11	AL1	Lamp lit when Alarm 1 is activated (Red)
4	A/M	Auto/manual switch or others function start	12	AL2	Lamp lit when Alarm 2 is activated (Red)
5	<	Shift digits when settings are changed	13	AL3	Lamp lit when Alarm 3 is activated (Red)
6	∨	Decrease Key (-1000,-100,-10,-1)	14	MAN	Lamp lit when controller in manual mode or get error condition (Orange)
7	∧	Increase Key (+1000,+100,+10,+1)	15	PRO	Lights when program running (Orange)
8	OUT1	Lamp lit when OUT1 is activated (Green)	16	OUT%	Output percentage (Green)

External and Panel Cutout Dimensions

FY400	FY600	FY700	FY800	FY900
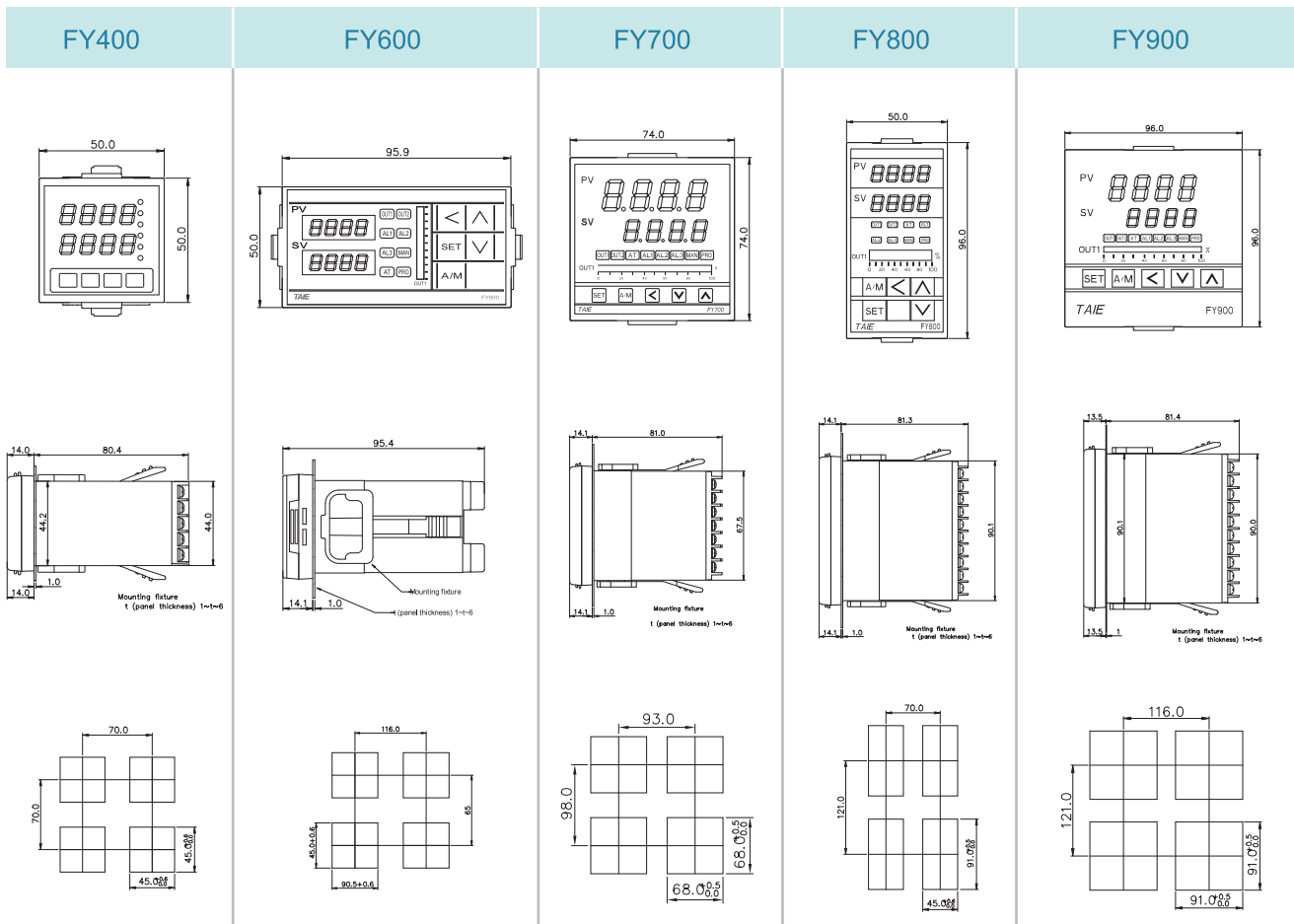
Terminal Arrangement

FY400
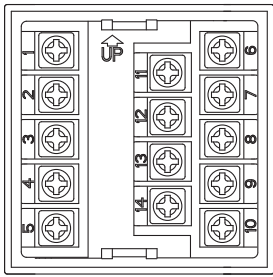
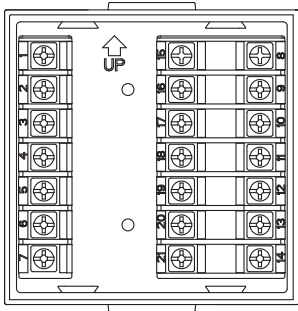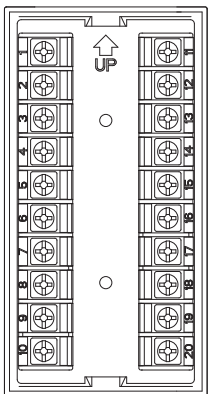| Power	Communication	Remote/CT Input
AC 85~265V (1 L, 6 N) / DC 24V (1 −, 6 +) ⚠	T/R (B) 11, T/R (A) 12 RS-485	mA / V (11 +, 12 −) / CT (11, 12)
Output-1: Relay (4, 5) / SSR (4 +, 5 −) / mA / V (4 +, 5 −)	1 Φ Zero cross: G1 11, K1 12, G2 13, K2 14	TRS: mA / V (11 +, 12 −)
Output-2: Relay (2, 3) / SSR (2 +, 3 −) / mA / V (2 +, 3 −)		
Alarm-1 Alarm-2: AL1 or (2,3) / (11,12) / AL2 (13,14)	Motor valve: 2, 3 CLOSE, 4 OPEN, 5 COM	Input: TC / mV (9, 10) / RTD (7 B, 9, 10 Δ) / mA / V (7 +, 9, 10 −)

FY700

Power	Alarm-1 Alarm-2 Alarm-3	CT Input
AC 85~265V (1 L, 2 N) / DC 24V (1 −, 2 +) ⚠	AL1 (3,4), AL2 (8 COM, 9 NO, 10 NC), AL3 (20, 21)	CT (15, 16) / CT (18, 19)
Output-1: NO 5, NC 6, COM 7 / SSR (6 +, 7 −) / mA / V (6 +, 7 −)	Communication: T/R (B) 15, T/R (A) 16 RS-485	1 Φ Zerocross Phaseangle: G1 15, K1 16, G2 17, K2 18 (1 Φ Zero cross) / (1 Φ Phase angle)
Output-2: Relay (3, 4) / SSR (3 +, 4 −) / mA / V (3 +, 4 −)	TRS: mA / V (18 +, 19 −)	
Motor valve: 3, 4 CLOSE, 5 OPEN, 6, 7 COM	Remote: mA / V (9 +, 10 −) / (15 +, 16 −) / (18 +, 19 −)	Input: TC / mV (13, 14) / RTD (11 B, 13, 14 Δ) / mA / V (11 +, 13, 14 −)

FY600/800

Power	Motor valve	TRS
AC 85~265V (1 L, 2 N) / DC 24V (1 −, 2 +) ⚠	6, 7 CLOSE, 8 OPEN, 9, 10 COM	mA / V (12 +, 13 −) / mA / V (14 +, 15 −)
Output-1: NO 8, NC 9, COM 10 / SSR (9 +, 10 −) / mA / V (9 +, 10 −)	Alarm-1 Alarm-2 Alarm-3: AL1 (3 NC, 4 NO, 5 COM), AL2 (11 NC, 12 NO, 13 COM), AL3 (6, 7)	Remote/CT Input: mA / V (14 +, 15 −) / CT (14, 15)
Output-2: Relay (6, 7) / SSR (6 +, 7 −) / mA / V (6 +, 7 −)	Communication: T/R (B) 14, T/R (A) 15 RS-485	Input-1: TC / mV (19, 20) / RTD (17 B, 19, 20 Δ) / mA / V (17 +, 19, 20 −)

FY900
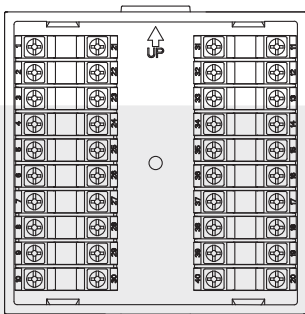
Power	Alarm-1 Alarm-2 Alarm-3	Input-1
AC 85~265V (1 L, 2 N) / DC 24V (1 −, 2 +) ⚠	AL1 (3 NC, 4 NO, 5 COM), AL2 (11 NC, 12 NO, 13 COM), AL3 (6, 7)	TC / mV (19, 20) / RTD (17 B, 19, 20 Δ) / mA / V (17 +, 19, 20 −)
Output-1: NO 8, NC 9, COM 10 / SSR (9 +, 10 −) / mA / V (9 +, 10 −)	Communication: T/R (B) 14, T/R (A) 15 RS-485 or T/R (B) 31, T/R (A) 32	1 Φ / 3 Φ Zero cross: G1 31, K1 32, G2 33, K2 34 (1 Φ Zero cross) / RG1 31, RK1 32, RG2 33, RK2 34, TG1 35, TK1 36, TG2 37, TK2 38 (3 Φ Zero cross)
Output-2: Relay (6, 7) / SSR (6 +, 7 −) / mA / V (6 +, 7 −)	TRS: mA / V (39 +, 40 −)	
Motor valve: 6, 7 CLOSE, 8 OPEN, 9, 10 COM	Remote/CT Input: mA / V (14 +, 15 −) / CT (14, 15)	1 Φ Phase angle: G1 31, K1 32, G2 33, K2 34

TAIWAN INSTRUMENT & CONTROL CO., LTD

Specifications

Standard Spec.

Supply voltage	AC 85 ~ 265V, DC 24V DC24V DC ±10%
Power Consumption	AC approx. 6VA / 240V AC DC approx. 4W
Memory	Non-volatile memory Maximum writes : 1,000,000 times Data retention : 10 years
Operating temperature	0 ~ 50℃(32 ~ 122)℉
Humidity range	20% ~ 90% RH
Weight	FY400 approx. 120g FY600 approx. 170g FY700 approx. 150g FY800 approx. 170g FY900 approx. 230g
Dimension (mm)	FY400 48W X 48H X 95.5L (1/16 DIN) FY600 96W X 48H X 95.5L (1/8 DIN) FY700 72W X 72H X 95.5L (3/16 DIN) FY800 48W X 96H X 95.5L (1/8 DIN) FY900 96W X 96H X 95.5L (1/4 DIN)
Operating environment	Non-corrosive, flammable gas, slight dust ring environment, no high frequency, no direct shock, places the sun is not directly exposed.

Input

Accuracy	Cold junction compensation diode external ±(0.1% of reading+1 digit)
	Cold junction compensation diode inside ±(0.3% of reading+1 digit)
Sampling time	50ms
TC	K、J、R、S、B、E、N、T、W、PLⅡ、L
RTD	PT100
mA dc	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	First-order low-pass filter Time constant : 0.1 to 10.0 sec. (when set to 0, the filter is off)

Output

Set	Maximum 2 sets

Control	1. PID, P, PI, and PD control
	  (including AT function)
	2. ON/OFF control
	3. Heat and Cooling PID control
	  (including AT function)

Relay	1. SPST-NO, 250VAC, 5A
	  Electrical life:100,000 times
	2. SPDT-NO, 250VAC, 5A
	  Electrical life: 50,000 times
	3. SPDT-NC, 250VAC, 2A
	  Electrical life: 20,000 times

SSR	ON：24V OFF 0V Maximum load current : 20mA With short circuit protection circuit
mA	Resolution : 10 bits Signal type : 4~20mA、0~20mA、 0~5V、0~10V、1~5V、2~10V

Heater Break Alarm(HBA)

CT model	SC 80-T’SC 100T
Maximum current	SC 80-T : 80A、SC 100-T : 100A
Accruacy	SC80-T: ±3%'SC100-T: ±5%
Aperture	SC 80-T : 5.9mm'SC 100-T : 12.6mm
Output	Free load alarm 1~3

Alarm

set	Maximum 3 sets
Mode	Program end' System error' HBA' Soak timer' Deviation high' Deviation low' Process high' Process low' Program run' System normal' Ramp Soak Timer' Counter

Relay specifications (resistive load)	1. SPST-NO, 250VAC, 5A
	  Electrical time : 100,000 times
	2. SPDT-NO, 250VAC, 5A
	  Electrical time : 50,000 times
	3. SPDT-NC, 250VAC, 2A
	  Electrical time : 20,000 times

Transmission

set	1 set
Resolution	14 bits
Accuracy	0.1%
Parameters	PV、SV
Signal Type	4~20mA' 0~20mA' 0~5V' 0~10V' 1~5V' 2~10V

Remote

set	1 set
Resolution	18 bits
Parameters	Local SV
Signal Type	4~20mA' 0~20mA' 0~5V' 0~10V' 1~5V' 2~10V

Motor Valve

set	1 set
Resolution	18 bits
Parameters	PV2
Signal Type	1KΩ、560Ω

Communication

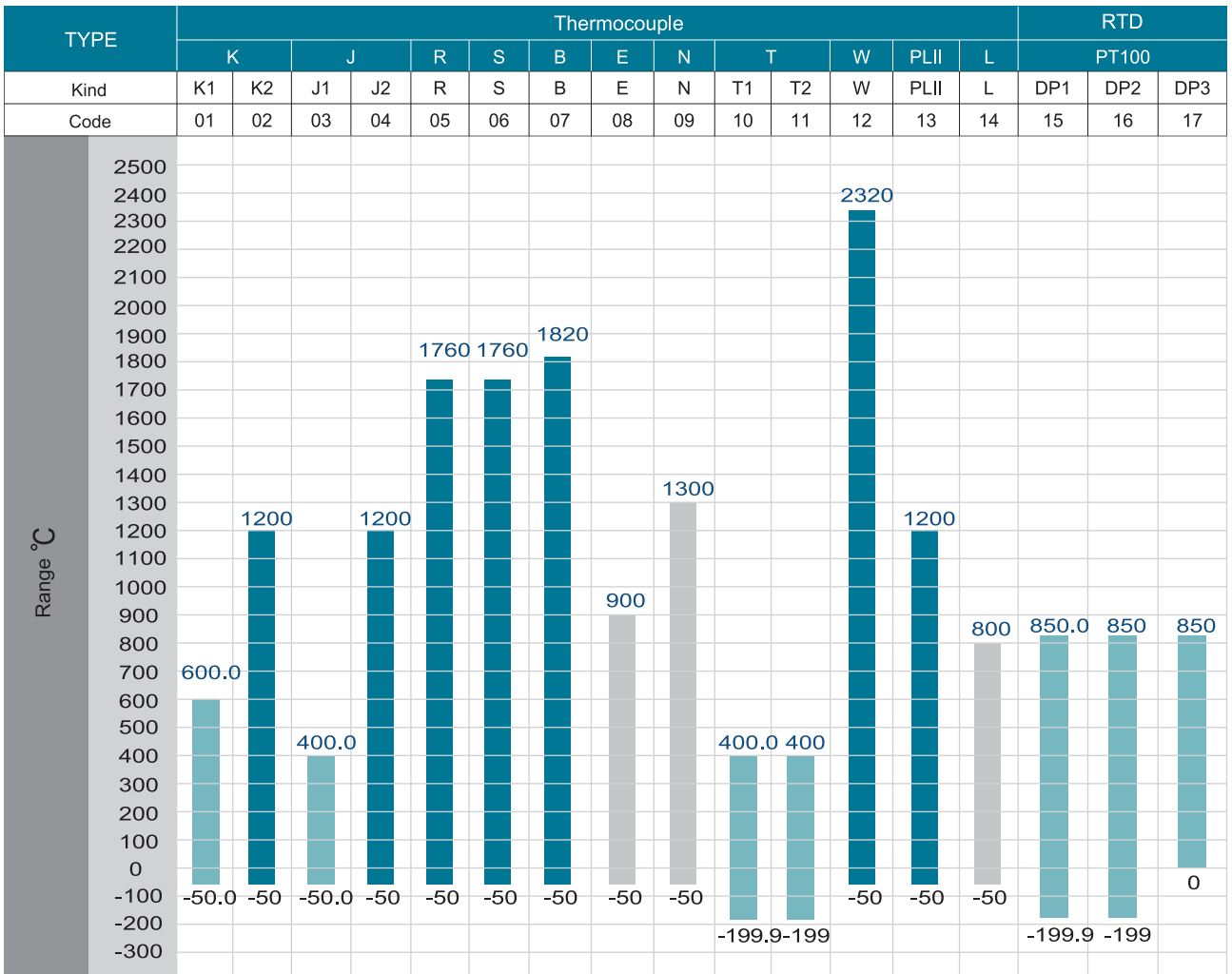|	
Communication	RS-485
Protocol	Modbus RTU' TAIE
Baud rate	2400' 4800' 9600' 19200' 38400' 57600' 115200 bps
Communication format configuration	1. Starting bit : 1 2. Information bits : 8 3. Bit check : None' Odd' Even 4. Stop bits : 1 or 2
Reponses time	0~250ms
Maximum connections	31pcs

Order Information

Block means optional functions with additional charge

Model	Output 1	Output 2	Alarm	TRS	Remote	COMM	Input type	Power	Accessories
1	**0**	**1**	**0**	**0**		**0**	**0 1**	**A**	**N**

Model
- FY900(Red/Green light)
- FY901(Blue/White light)
- PFY900(Program)

FY400	48x48mm
FY600	96x48mm
FY700	72x72mm
FY800	48x96mm
FY900	96x96mm

PFY400 / 401	48x48mm
PFY600	96x48mm
PFY700 / 701	72x72mm
PFY800 / 801	48x96mm
PFY900 / 901	96x96mm

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
- 5 1ΦSCR zero cross control
- 6 3ΦSCR zero cross control
- 7 Motor valve control
- 8 1ΦSCR phase angle control

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 1Set
- 2 2Sets
- 3 3Sets
- A HBA
- B HBA+AL2
- C HBA+AL2+AL3

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
- M Motor valve control feedback

COMM
- 0 None
- 3 TTL
- B RS-485

Input type
- See input type table code

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

Accessories
- N None
- T Terminal Cover
- W IP65
- R Terminal Cover +IP65

※ HBA :Heater Break Alarm (HBA must use AL 1 as alarm relay)

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	DP1	DP2	DP3
Code	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17

Range °C (high / low):
- K1: 600.0 / -50.0
- K2: 1200 / -50
- J1: 400.0 / -50.0
- J2: 1200 / -50
- R: 1760 / -50
- S: 1760 / -50
- B: 1820 / -50
- E: 900 / -50
- N: 1300 / -50
- T1: 400.0 / -199.9
- T2: 400 / -199
- W: 2320 / -50
- PLII: 1200 / -50
- L: 800 / -50
- DP1: 850.0 / -199.9
- DP2: 850 / -199
- DP3: 850 / 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.