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FY series

Digital PID

Temperature Controllers / Process Controllers

New Release

New LED Module

FY101 FY100

Autotuning | Fuzzy | Programmable | NEW MODBUS | NEW CT HBA

RoHS Pb compliant

CE

FY400 FY700 FY800 FY900 FY600

BEST CHOICE
FOR PROCESS AND TEMPERATURE CONTROL

Application:Control temperature , humidity , pressure , flow and PH.

FY series controllers are microprocessor based controllers.Which have been designed with high accuracy input , various ouput selection , useful options and good reliability at a competitive price.

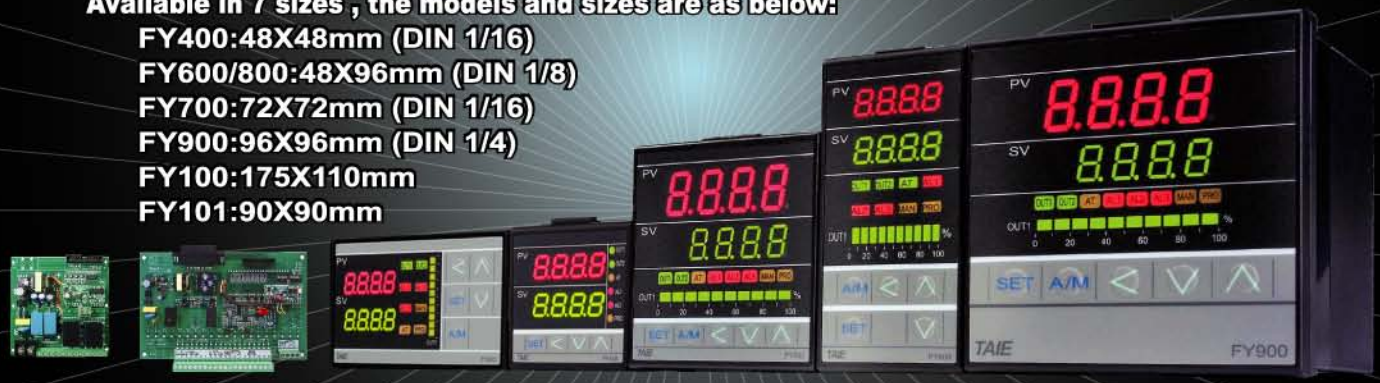
FY series use "PID+FUZZY" algorithm to implement excellent control.
The output status is displayed on the built in "Bar-Graph" display.

FY series not only provide the basic control output selections but also plus advanced options such as "Motor Valve Control" , "SCR/TRIAC Trigger" , and "Programmable RAMP/SOAK".

FY series support MODBUS protocol. Communication with HMI is more convenient.
New addtional HBA function with competitive price, user can upgrade system safety easy.

Available in 7 sizes , the models and sizes are as below:

- FY400:48X48mm (DIN 1/16)
- FY600/800:48X96mm (DIN 1/8)
- FY700:72X72mm (DIN 1/16)
- FY900:96X96mm (DIN 1/4)
- FY100:175X110mm
- FY101:90X90mm



FY101 FY100 FY600 FY400 FY700 FY800 FY900

Approval & free power

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

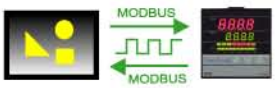
IP65 Proof

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

Heater Break Alarm (HBA)

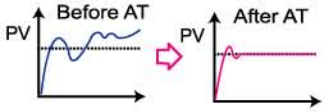
Heater current flowing through CT can be displayed on controller. If heater current is less than HBA set value,AL1 will be activated (optional function).

MODBUS Communication



FY series suport both MODBUS RTU and MODBUS ASCII protocol. Communication between controller and HMI or other equipment is more conveniet(optional function).

Autotuning (AT)



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

Auto/Manual mode

Click!

Conveniently switched between auto/manual output mode by clicking "A/M" key(except "FY400").

Various Indication Lamps

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

Bar-Graph

Ouput percent displayed on the bar-graph in 10 LEDs resolution(except "FY400").

High Accuracy

Input with 14bit A/D resolution,0.2% accuracy of FS.
Built in "AutoZero-AutoSpan" function keep good accuracy.

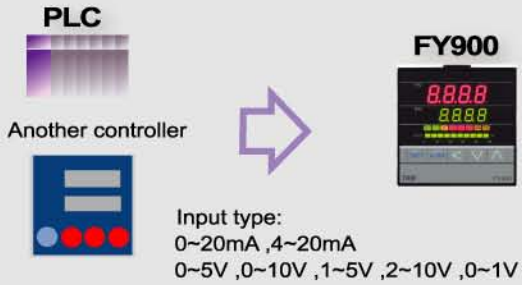
Data Lock Function

All parameters are seperated in 3 operation levels.
Each parameter can be hidden or locked to prevent unauthorized changes.

Various I/O Types

Peripheral Options

Remote SV



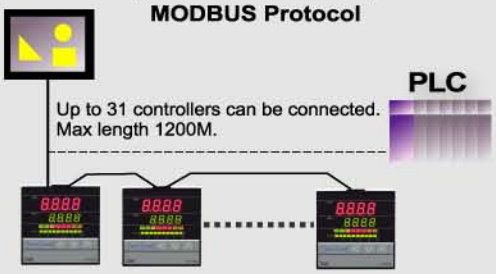
Input type:
0~20mA ,4~20mA
0~5V ,0~10V ,1~5V ,2~10V ,0~1V

Transmission

Signal type : PV,SV
Output type : 0~20mA ,4~20mA
0~5V ,0~10V ,1~5V ,2~10V ,0~1V

Communication

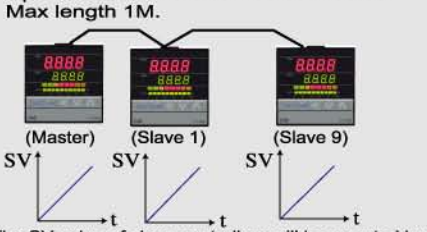
(RS485 Communication)
MODBUS Protocol



Communication

(TTL Communication)

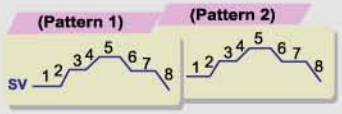
Up to 10 controllers can be connected.
Max length 1M.



The SV value of slave controllers will be remoted by master controller,and reached to max value at the same time

Special Application

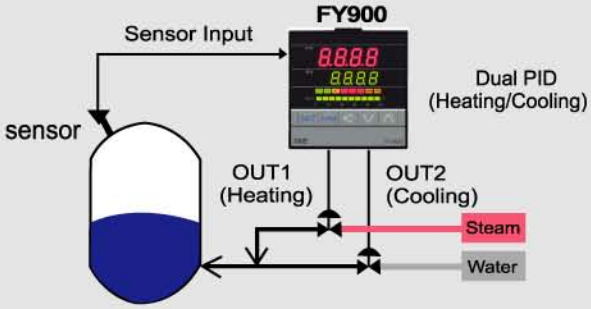
Ramp/Soak Program



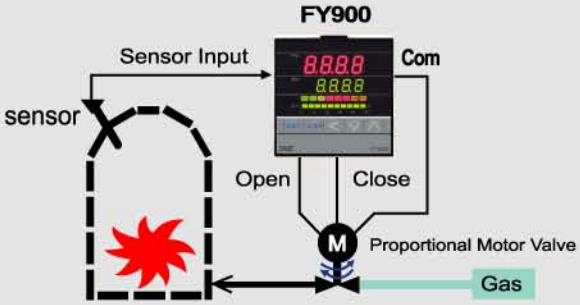
There are 2 patterns by 8 segments can be used in ramp/soak program.

There are 2 patterns can be linked together as16 segments in ramp/soak program.

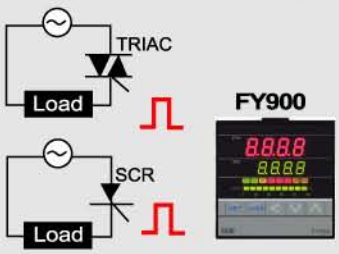
Heating and Cooling Control



Motor Valve Control



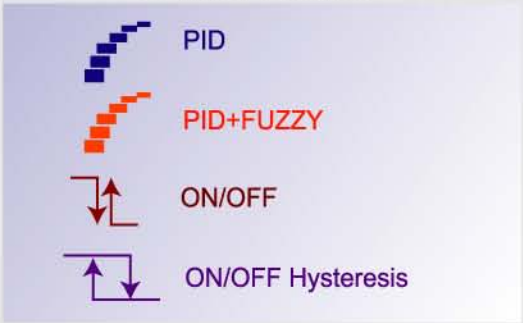
SCR/TRIAC Trigger



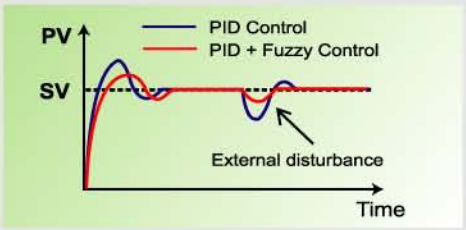
Method : 1φ / 3φ Zero Cross Control
1φ / 3φ Phase Angle Control

Excellent Control

Control Method

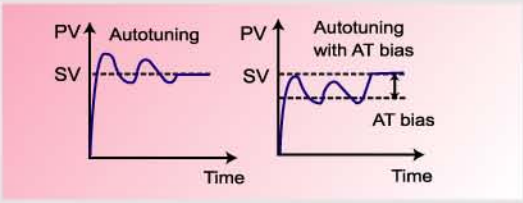


Fuzzy Logic



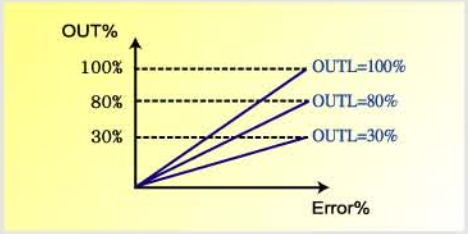
Built in fuzzy logic suppress the overshoot due to SV changes or external disturbance.

Autotuning (AT)



When autotuning acts ,it will make PV hunting 1~2 cycle to calculate optimize PID value. To protect user's device , FY series controller can perform PV hunting below SV by setting AT bias value(ATVL) .

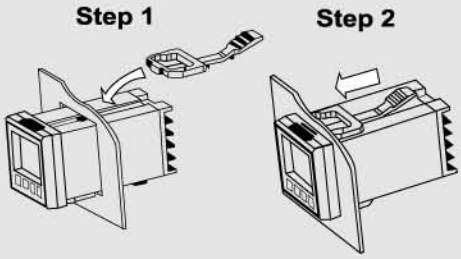
Limit Setting



Built in output limit function. Use this function to get different gradient output and set limit for output.

Convenient Installation

Easy Mounting



Just push the mounting bracket to panel. Without using any screws.

New Display Module

New display module design more clear display and easy to read

Alarm Function

Alarm Types

Maximum with 3 sets of alarm.

Alarm types list as below:

Deviation

Deviation High Alarm
Deviation Low Alarm
Deviation High/Low Alarm
Band Alarm

System

System Failed Alarm
System Normal Alarm

PV

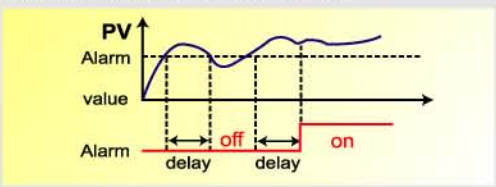
PV High Alarm
PV Low Alarm

Program

Program Run Alarm
Program End Alarm
Segment End Alarm

Delay Time

Use this function can avoid alarm acts frequently or acts due to external disturbance.

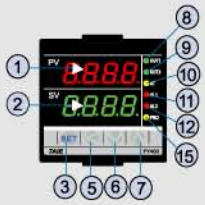


Hold Function

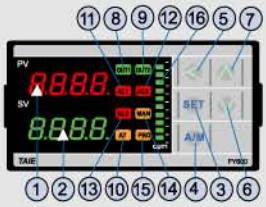
Use this function can avoid alarm acts at start-up. The alarm action is suppressed at start-up until PV enters the non-alarm range.

Parts Description

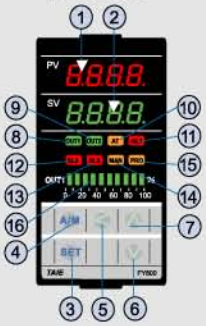
FY400



FY600



FY800



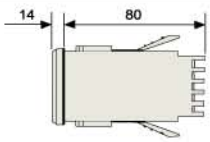
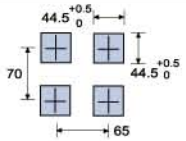
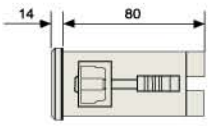
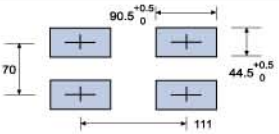
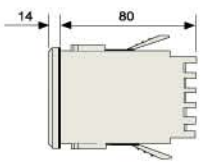
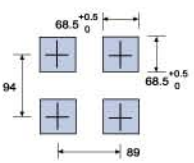
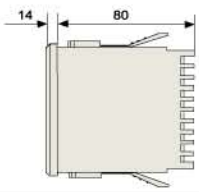
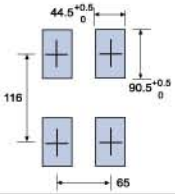
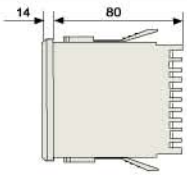
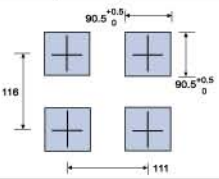
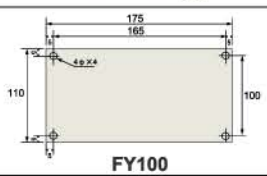
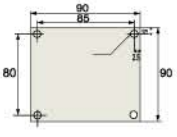
FY700/900
FY100/101 External Interface Unit.

SYMBOL		NAME	FUNCTION
PV	①	Measured value (PV)display	Displays PV or various parameter symbols(Red)
SV	②	Setting value (SV)display	Displays SV or various parameter values(Green)
SET	③	Set Key	Used for parameter calling up and set value registration
A/M	④	Auto/Manual key	Switches between Auto(PID) output mode and Manual output
<	⑤	Shift Key	Shift digits when settings are changed
V	⑥	Down Key	Decrease numbers (*Only for programmable controller)
∧	⑦	Up Key (*Program Run)	Increase numbers (*Only for programmable controller)

SYMBOL		NAME	FUNCTION
OUT1	⑧	OUT1 lamp	Lights when OUT 1 is on(Green)
OUT2	⑨	OUT2 lamp	Lights when OUT 2 is on(Green)
AT	⑩	Autotuning lamp	Lights when Autotuning is activated(Orange)
AL1	⑪	Alarm 1 lamp	Lights when Alarm 1 is activated(Red)
AL2	⑫	Alarm 2 lamp	Lights when Alarm 2 is activated(Red)
AL3	⑬	Alarm 3 lamp	Lights when Alarm 3 is activated(Red)
MAN	⑭	Manual output lamp	Lights when manual output is activated (Orange)
PRO	⑮	Program Running lamp	Flashes when program running (Only for programmable controller)
OUT%	⑯	Output % Bar-Graph display	Output % is displayed on 10-dot LEDs

External Dimension

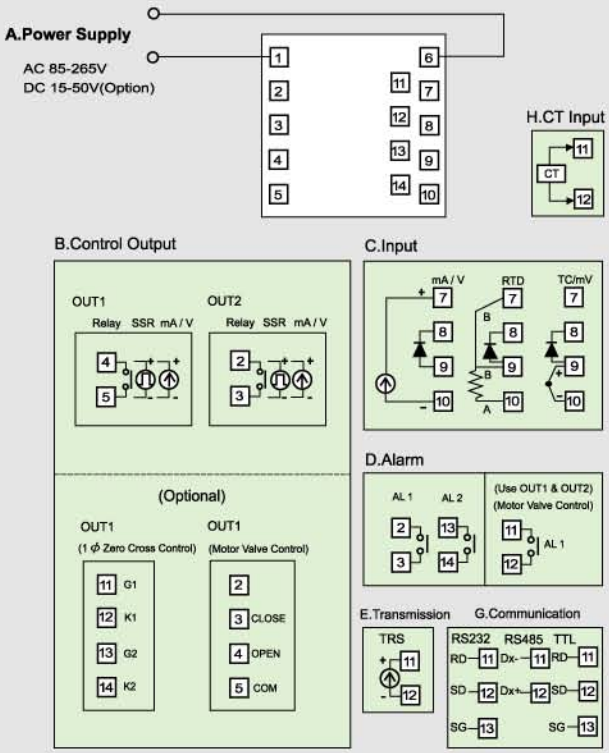
Unit : mm

FY400			
FY600			
FY700			
FY800			
FY900			
FY100 FY101	 FY100	 FY100	 FY101	 FY101

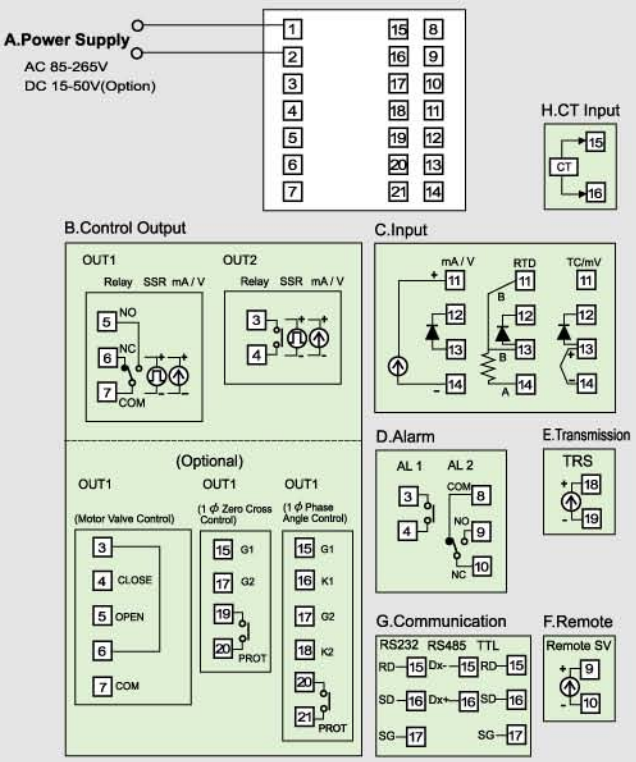
Terminal Arrangement

FY Series — Digital PID Controller

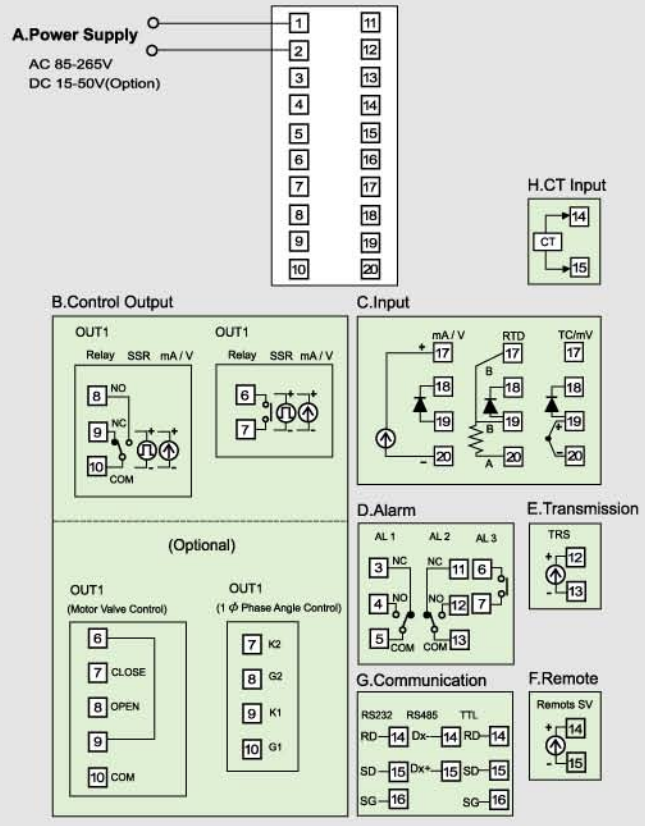
FY400



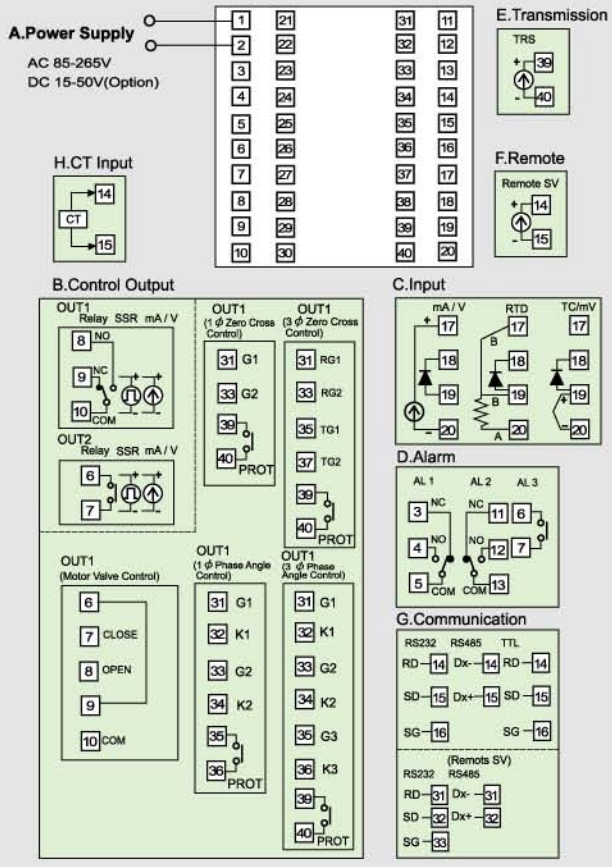
FY700



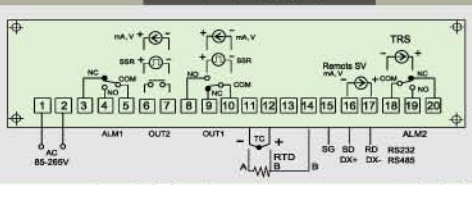
FY600/800



FY900



FY100



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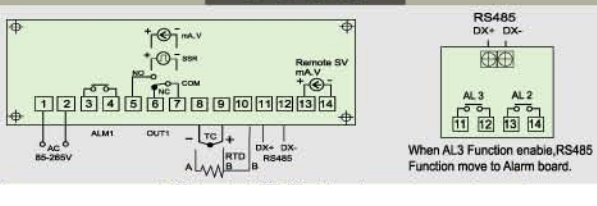

When AL3 Function enabie,RS485 Function move to Alarm board.

Specifications

Standard Spec.

Model	FY400	FY600	FY700	FY800	FY900	FY100	FY101
Dimension	48X48mm	96X48mm	72X72mm	48X96mm	96X96mm	175X110mm	90X90mm
Supply voltage	AC 85~265V , DC24V (Optional)					AC 85~265V	
Frequency	50/60 HZ						
Power Consumption	approx 3VA	approx 4VA	approx 3VA	approx 4VA	approx 4VA	approx 4VA	approx 3VA
Memory	Non-volatile memory E^2 PROM						
Input	Accuracy : 0.2%FS,Sample time : 250ms						
TC	K , J , R , S , B , E , N , T , W5Re/W26Re , PL2 , U , L						
RTD	DPT100 , JPT100 , JPT50						
mA dc	4~20mA , 0~20mA						
Voltage dc	0~1V , 0~5V , 0~10V , 1~5V , 2~10V -10~10mV , 0~10mV , 0~20mV , 0~50mV , 10~50mV						
DP Position	0000 , 000.0 , 00.00 , 0.000 (available for mA or Voltage dc input)						
Output 1	Main control output						
Relay	SPST type	SPDT type	SPDT type	SPDT type	SPDT type	SPDT type	SPDT type
	3A , 220V , electrical life : 100,000 times or more(under the rated load).						
Voltage Pulse	For SSR drive. ON:24V , OFF:0V , maximum load current:20mA.						
mA dc	4~20mA , 0~20mA .Maximum load resistance:560 Ω						
Voltage dc	0~5V , 0~10V ,1~5V ,2~10V. Maximum load current:20mA.						
Alarm 1	SPST type	SPDT type	SPST type	SPDT type	SPDT type	SPDT type	SPST type
	3A , 220V , electrical life : 100,000 times or more(under the rated load).						
Control algorithms	PID , P , PI , PD , ON/OFF(P=0) , FUZZY						
PID range	P:0~200% , I:0~3600 Secs , D:0~900 Secs						
Isolation	Output terminal (control output , alarm ,transmission) and Input terminal are isolated separately.						
Isolated resistance	10M Ω or more between input terminals and case(ground) at DC 500V 10M Ω or more between output terminals and case(ground) at DC 500V						
Dielectric strength	1000V AC for 1 minute between input terminals and case(ground) 1500V AC for 1 minute between output terminals and case(ground)						
Operating temperature	0~50° C						
Humidity range	20~90% RH						
Weight (approx)	approx 150g	approx 225g	approx 225g	approx 225g	approx 300g	approx 130g	approx 80g
Display Height	PV:7mm SV:7mm	PV:7mm SV:7mm	PV:14mm SV:10mm	PV:7mm SV:7mm	PV:14mm SV:10mm	External Interface Unit.	External Interface Unit.

Optional Spec.

Model	FY400	FY600	FY700	FY800	FY900	FY100	FY101
RAMP/SOAK Program	2 Patterns with 8 segments each . The 2 patterns can be linked together as 16 segments use						
Output 2	For heating and cooling control use						
Relay	SPST type	SPST type	SPST type	SPST type	SPST type	SPST type	SPST type
Voltage Pulse	For SSR drive. ON:24V , OFF:0V , maximum load current:20mA.						
mA dc	4~20mA , 0~20mA .Maximum load resistance:560 Ω						
Voltage dc	0~5V , 0~10V ,1~5V ,2~10V. Maximum load current:20mA.						
Alarm 2	SPST type	SPDT type	SPDT type	SPDT type	SPDT type	SPDT type	SPST type
Alarm 3	None	SPST type	SPST type	SPST type	SPST type	SPST type	SPST type
Heater Break Alarm (HBA)	Display Range of Heater Current:0.0~99.9A , Accuracy : 1%FS						
	Included CT :SC_80_T (5.8mm dia , 0.0~80.0A) or SC_100_T(12mm dia , 0.0~99.9A)						
	Alarm Relay : AL1						
Transmission	Available for PV or SV transmission						
mA dc	4~20mA , 0~20mA. Maximum load resistance : 560 Ω						
Voltage dc	0~5V,0~10V,1~5V,2~10V. Maximum load current : 20mA.						
Remote SV Input	4~20mA , 0~20mA , 0~5V , 0~10V , 1~5V , 2~10V are available						
Communication	Protocol : MODBUS RTU,MODBUS ASCII, TAIE						
	Interface : RS232 , RS485 , TTL						
	Baudrate : 38400, 19200 , 9600 , 4800 , 2400 bps.						
	8 bit , Start bit : 1 bit , Parity : Odd or Even , Stop bit : 1 or 2 bit						
WaterProof/DustProof	IP65					None	None

Order Information

Model & Suffix codes

Model	Output1	Output2	Alarm	TRS	Remote SV	Communication	Input Type	Power	Water/Dust Proof
FY400 —	1	0	1	0	0	0	02	A	N

Model

FY400	48x48mm	
FY600	96x48mm	
FY700	72x72mm	
FY800	48x96mm	
FY900	96x96mm	
Board Type		
FY100	175x110mm	
FY101	90x90mm	
(STANDARD)		
PFY400	48x48mm	
PFY600	96x48mm	
PFY700	72x72mm	
PFY800	48x96mm	
PFY900	96x96mm	
Board Type		
PFY100	175x110mm	
PFY101	90x90mm	
(RAMP/SOAK Programmable)		

Output1

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	1φ SCR zero cross control
6	3φ SCR zero cross control
7	Motor valve control
8	1φ SCR phase angle control
9	3φ SCR phase angle control

Output2

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
3	3 Sets
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 SV

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

Communication

0	None
3	TTL
A	RS232_MODBUS
B	RS485_MODBUS

Input Type

See Input Codes

Power

A	AC 85~265V
D	DC 24V
B	Board Type AC85~265V pluggable terminal block

Water/Dust Proof

N	None
W	IP65

* ▢ : Block means optional functions with additional charge

* HBA : Heater Break Alarm(HBA must use AL1 as alarm relay)

Combination of options and models

Options / Model	RAMP/SOAK PROGRAM	Output 1					Output2	Alarm2	Alarm3	HBA	Transmission	Remote SV	Communication	DC 24V Power
		1φSCR_Z	3φSCR_Z	Motor valve control	1φSCR_P	3φSCR_P								
FY400	○	○	–	○	–	–	○	○	–	○	○	○	○	○
FY600	○	–	–	○	○	–	○	○	○	○	○	○	○	○
FY700	○	○	–	○	○	–	○	○	○	○	○	○	○	○
FY800	○	–	–	○	○	–	○	○	○	○	○	○	○	○
FY900	○	○	○	○	○	○	○	○	○	○	○	○	○	○
FY100	○	–	–	○	○	–	○	○	○	○	○	○	○	–
FY101	○	–	–	○	–	–	○	○	○	○	○	○	○	–

○ Available — – Not available

* Remote SV function is not availadle,if HBA Function has been specified.

Input type table

		Type	Code	Range	Type	Code	Range	Type	Code	Range
TC	K	K1	01	0.0~200.0°C(392.0°F)	K2	02	0.0~400.0°C(752.0°F)	K3	03	0~600°C(1112°F)
		K4	04	0~800°C(1472°F)	K5	05	0~1000°C(1832°F)	K6	06	0~1200°C(2192°F)
	J	J1	07	0.0~200.0°C(392.0°F)	J2	08	0.0~400.0°C(752.0°F)	J3	09	0~600°C(1112°F)
		J4	10	0~800°C(1472°F)	J5	11	0~1000°C(1832°F)	J6	12	0~1200°C(2192°F)
	R	R1	13	0~1600°C(2912°F)	R2	14	0~1769°C(3216°F)			
	S	S1	15	0~1600°C(2912°F)	S2	16	0~1769°C(3216°F)			
	B	B1	17	0~1820°C(3308°F)						
	E	E1	18	0~800°C(1472°F)	E2	19	0~900°C(1652°F)			
	N	N1	20	0~1200°C(2192°F)	N2	21	0~1300°C(2372°F)			
	T	T1	22	-199.9~400.0°C(752.0°F)	T2	23	-199.9~200.0°C(392.0°F)	T3	24	0.0~350.0°C(662.0°F)
	W	W1	25	0~2000°C(3632°F)	W2	26	0~2320°C(4208°F)			
	PLII	PL1	27	0~1300°C(2372°F)	PL2	28	0~1390°C(2534°F)			
	U	U1	29	-199.9~600.0°C(999.9°F)	U2	30	-199.9~200.0°C(392.0°F)	U3	31	0.0~400.0°C(752.0°F)
	L	L1	32	0~400°C(752°F)	L2	33	0~800°C(1472°F)			
RTD	JPT 100	JP1	41	-199.9~600.0°C(999.9°F)	JP2	42	-199.9~400.0°C(752.0°F)	JP3	43	-199.9~200.0°C(392.0°F)
		JP4	44	0~200°C(392°F)	JP5	45	0~400°C(752°F)	JP6	46	0~600°C(1112°F)
	PT 100	DP1	47	-199.9~600.0°C(999.9°F)	DP2	48	-199.9~400.0°C(752.0°F)	DP3	49	-199.9~200.0°C(392.0°F)
		DP4	50	0~200°C(392°F)	DP5	51	0~400°C(752°F)	DP6	52	0~600°C(1112°F)
	JPT 50	JP.1	53	-199.9~600.0°C(999.9°F)	JP.2	54	-199.9~400.0°C(752.0°F)	JP.3	55	-199.9~200.0°C(392.0°F)
		JP.4	56	0~200°C(392°F)	JP.5	57	0~400°C(752°F)	JP.6	58	0~600°C(1112°F)

	Type	Code	Range	
LINEAR	AN1	61	-10~10mV	-1999~9999 or -199.9~999.9 or -19.99~99.99 or -1.999~9.999
		62	-2~2V	
		63	-5~5V	
		64	-10~10V	
	AN2	71	0~10mV	
	AN3	76	0~20mV	
	AN4	81	0~50mV	
		82	0~20mA	
		83	0~1V	
		84	0~5V	
		85	0~10V	
		86	0~5K ohm	
		87	0~2V	
	AN5	91	10~50mV	
		92	4~20mA	
		93	1~5V	
		94	2~10V	

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