High New Feeling!

First White LED Module in the world

Outstanding Excellent Top Elegance

FY

Digital PID Temperature Controllers / Process Controllers

High Quality High Reliability

NEW

FY401   FY901   FY801   FY701

FY400   FY700   FY800   FY900   FY600

CE   RoHS Pb compliant   Autotuning   Fuzzy   Programmable   MODBUS   CT HBA

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.

Add functional Module stand & jumper, supply customer easy to change Relay SSR.4~20mA/TC.DPT100. Add new white LED module break the traditional vision, opening the new LED century.

Available in 4 sizes , the models and sizes are as below:

FY401：48X48mm (DIN 1/16)
FY801：48X96mm (DIN 1/8)
FY701：72X72mm (DIN 3/16)
FY901：96X96mm (DIN 1/4)

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 3/16)
FY900：96X96mm (DIN 1/4)
FY100：175X110mm
FY101：90X90mm

NEW

FY401   FY701   FY801   FY901

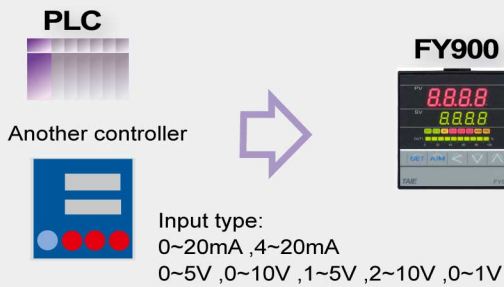**FY600   FY400   FY700   FY800   FY900**

CE cRUus 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

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

Heater Break Alarm (HBA)

(Heater Break Alarm)

AL1 NO NC
     COM   CT

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

HMI   Controller
      MODBUS
      MODBUS

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)

Before AT   After AT
PV   PV

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

Auto/Manual mode

A/M
Click!

Conveniently switched between auto/manual output mode by clicking "A/M" key(except "FY400/FY401").

Various Indication Lamps

OUT1 OUT2 AT AL1 AL2 AL3 MAN PRO

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

Bar-Graph

OUT1   %
    0 20 40 60 80 100

Ouput percent displayed on the bar-graph in 10 LEDs resolution(except "FY400/FY401").

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.
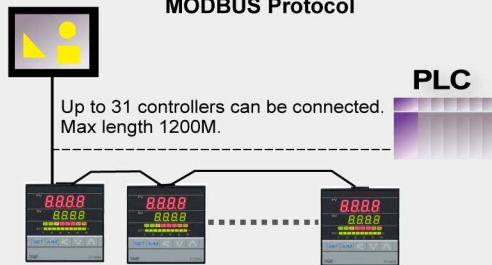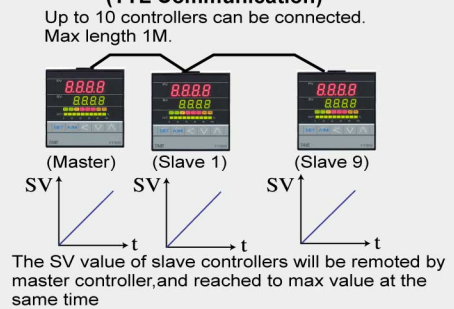
Various I/O Types

(TC)

(RTD)

(mA/V/mV)

Input

FY900

Output

NO O ● NC
O COM (Relay)

(mA/V)

M Motor Valve Control

Voltage pulse
(SSR drive)

SCR/TRIAC Trigger

Peripheral Options

Remote SV

PLC

Another controller

FY900

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

Transmission

FY900

Recorder

Display

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

Up to 31 controllers can be connected.
Max length 1200M.

PLC

Communication

(TTL Communication)
Up to 10 controllers can be connected.
Max length 1M.

(Master)   (Slave 1)   (Slave 9)

SV   SV   SV

t   t   t

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

(Pattern 1)   (Pattern 2)

SV 1 2 3 4 5 6 7 8   1 2 3 4 5 6 7 8

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

(Pattern 0)

SV 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

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

Heating and Cooling Control

FY900

Sensor Input

sensor

Dual PID
(Heating/Cooling)

OUT1
(Heating)

OUT2
(Cooling)

Steam

Water

Motor Valve Control

FY900

Sensor Input

Com

sensor

Open   Close

M Proportional Motor Valve

Gas

SCR/TRIAC Trigger

TRIAC

Load

SCR

Load

FY900

Method : 1φ / 3φ Zero Cross Control
1φ / 3φ Phase Angle Control
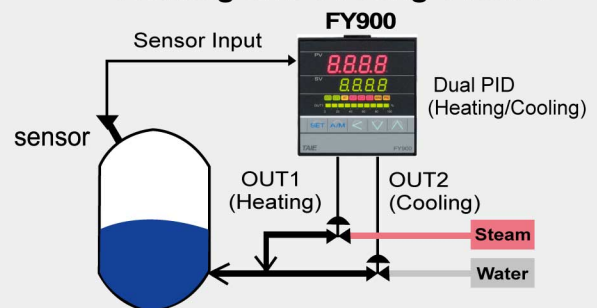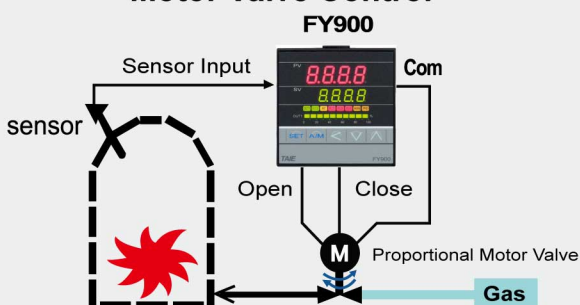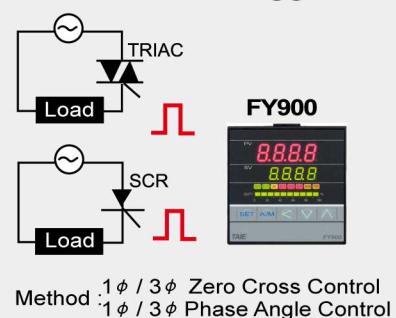
Easy to change Relay/SSR/4~20mA 3 types of OUTPUT   NEW

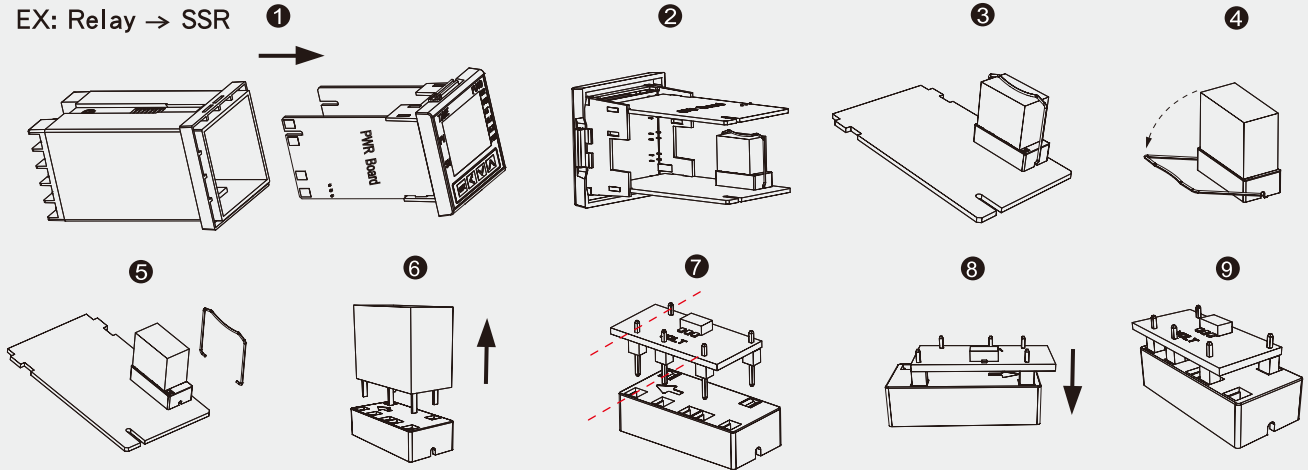EX: Relay → SSR ❶   ❷   ❸   ❹

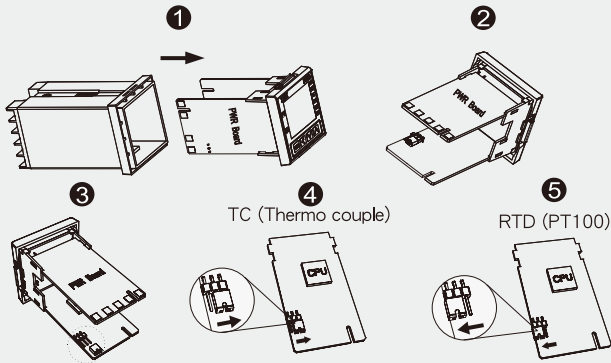❺   ❻   ❼   ❽   ❾

1. Pull controller out from the case.
2. Turn controller to see the module stand.
3. Relay Module has a spring clip to lock it.
4. Take the spring clip to left.
5. Open th spring clip to show Relay.

6. Pull the Relay out.
7. Insert SSRdrv Module.（The front of two aperture is parallel)
8. Insert the module gently than push down to the base.
9. Make sure it's bilateral.(Volt & mA Module don't need spring clip)

Input Type Change of TC ◄─► RTD

Convenient Installation

❶   ❷

New High Light LED Module Display

Provide Red & white light to choose

❸   ❹   ❺
         TC（Thermo couple)   RTD (PT100)

To mount panel easily

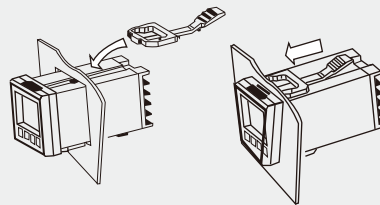1.Take out the main body from outer case: adjust the jumper to the correct place
2.Start power after setting jumper to the correct place
3.Amend the input type from the front membrane to enter in Level 3 to set.
4.Please be sure to cut off power and start again after amending input type so that
   the new parameters could be effective.
5.To change input type of TC or RTD is available but linear input is unavailable.
   Please ask our local distributor for help.

Excellent Control

Fuzzy Logic

PV
    ─── PID Control
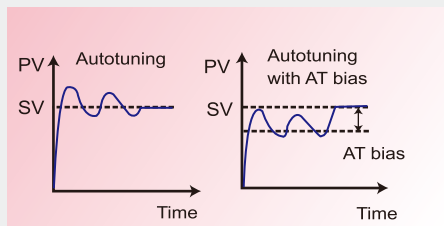   ─── PID + Fuzzy Control
SV

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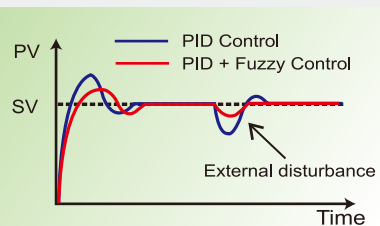
Built in fuzzy logic suppress the
overshoot due to SV changes or
external disturbance.

Autotuning (AT)

PV Autotuning   PV Autotuning
                          with AT bias
SV   SV
                              AT bias
    Time   Time

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
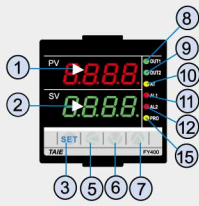perform PV hunting below SV by setting AT
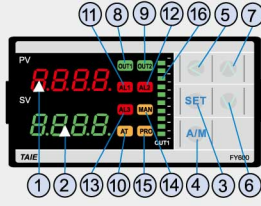bias value(ATVL) .

Limit Setting

OUT%   Output limit %
100%   OUTL=100%
80%   OUTL=80%
30%   OUTL=30%

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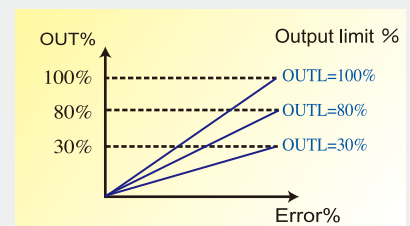
Built in output limit function. Use this
function to get different gradient output
and set limit for output.

Parts Description

FY400 (Red light)
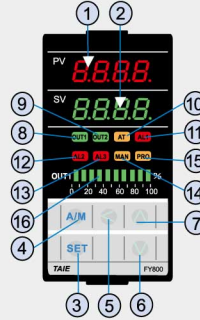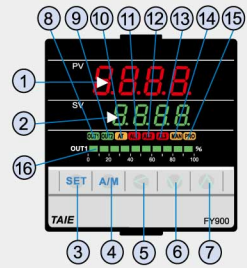**FY401** (White light)

FY600 (Red light)

FY800 (Red light)
FY801 (White light)

FY700/900 (Red light)
FY701/901 (White light)

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)
OUT1%	⑯	Output 1% Bar-Graph display	Output 1% is displayed on 10-dot LEDs

External Dimension
Unit : mm

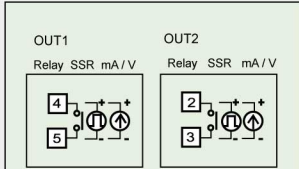|				
FY400 (Red light) **FY401** (White light)		14 / 80	Terminal Cover (Option) NEW	44.5 +0.5 / 0 ; 70 ; 44.5 +0.5 / 0 ; 65
FY600 (Red light)		14 / 80	Terminal Cover (Option)	90.5 +0.5 / 0 ; 70 ; 44.5 +0.5 / 0 ; 111
FY700 (Red light) **FY701** (White light)		14 / 80	Terminal Cover (Option)	68.5 +0.5 / 0 ; 94 ; 68.5 +0.5 / 0 ; 89
FY800 (Red light) **FY801** (White light)		14 / 80	Terminal Cover (Option)	44.5 +0.5 / 0 ; 116 ; 90.5 +0.5 / 0 ; 65
FY900 (Red light) **FY901** (White light)		14 / 80	Terminal Cover (Option)	90.5 +0.5 / 0 ; 116 ; 90.5 +0.5 / 0 ; 111
FY100 **FY101** (Require KA601 External Operating Box)	FY100	175 / 165 / 110 / 100 FY100	FY101	90 / 85 / 80 / 90 FY101

FY400(Red light)/FY401(White light)

A. Power Supply
AC 85-265V
DC 15-50V(Option)

F. Remote
Remots SV

H. CT Input

B. Control Output
OUT1 Relay SSR mA/V
OUT2 Relay SSR mA/V
(Optional)
OUT1 (1 φ Zero Cross Control)
OUT1 (Motor Valve Control)

C. Input
mA/V   RTD   TC/mV
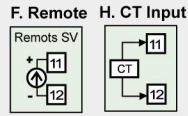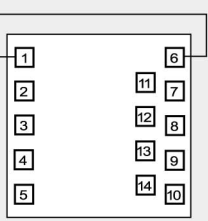
D. Alarm
AL 1   AL 2   (Use OUT1 & OUT2) (Motor Valve Control)
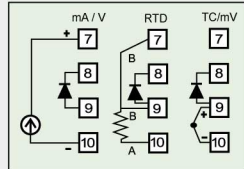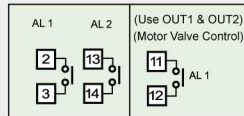
E. Transmission G. Communication
TRS
RS232 RS485 TTL
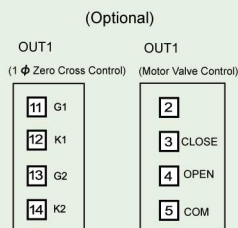
FY700(Red light)/FY701(White light)

A. Power Supply
AC 85-265V
DC 15-50V(Option)
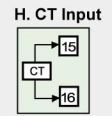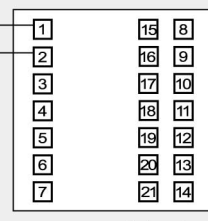
H. CT Input

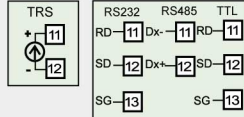B. Control Output
OUT1 Relay SSR mA/V
OUT2 Relay SSR mA/V
(Optional)
OUT1 (Motor Valve Control)
OUT1 (1 φ Zero Cross Control)
OUT1 (1 φ Phase Angle Control)

C. Input
mA/V   RTD   TC/mV

D. Alarm
AL 1   AL 2   AL 3
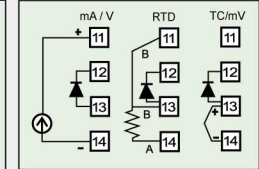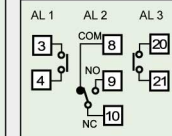
E. Transmission
TRS

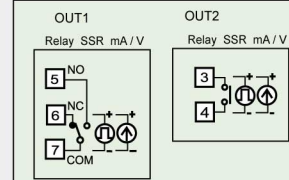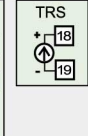G. Communication
RS232 RS485 TTL
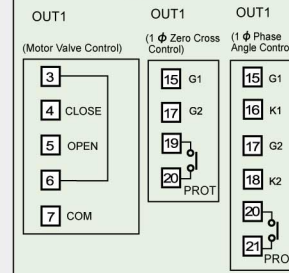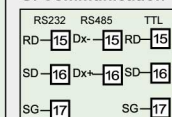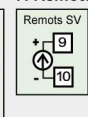
F. Remote
Remots SV

FY600.800(Red light)/FY801(White light)

A. Power Supply
AC 85-265V
DC 15-50V(Option)
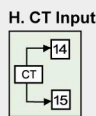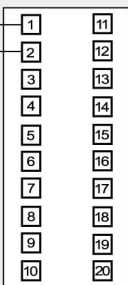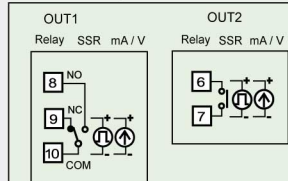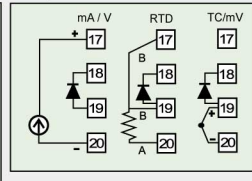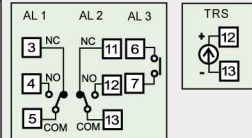
H. CT Input

B. Control Output
OUT1 Relay SSR mA/V
OUT2 Relay SSR mA/V
(Optional)
OUT1 (Motor Valve Control)
OUT1 (1 φ Phase Angle Control)

C. Input
mA/V   RTD   TC/mV

D. Alarm
AL 1   AL 2   AL 3

E. Transmission
TRS

G. Communication
RS232 RS485 TTL

F. Remote
Remots SV

FY900(Red light)/FY901(White light)

A. Power Supply
AC 85-265V
DC 15-50V(Option)

H. CT Input

E. Transmission
TRS

F. Remote
Remote SV

B. Control Output
OUT1 Relay SSR mA/V
OUT1 (1 φ Zero Cross Control)
OUT1 (3 φ Zero Cross Control)
OUT2 Relay SSR mA/V
OUT1 (Motor Valve Control)
OUT1 (1 φ Phase Angle Control)
OUT1 (3 φ Phase Angle Control)

C. Input
mA/V   RTD   TC/mV

D. Alarm
AL 1   AL 2   AL 3

G. Communication
RS232 RS485 TTL
(Remots SV)
RS232 RS485

FY100

mA,V   SSR   mA,V   TRS   Remots SV mA,V
NC COM NO
ALM1 OUT2 OUT1   TC   SG SD RD RS232 ALM2
AC 85-265V   RTD   DX+ DX- RS485

FY101

mA,V   SSR   Remote SV mA,V
ALM1 OUT1   TC   DX+ DX-
AC 85-265V   RTD   RS485

RS485
DX+ DX-

AL 3   AL 2
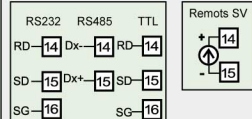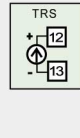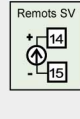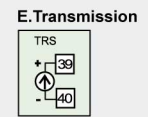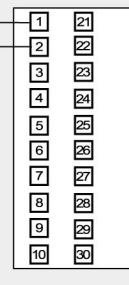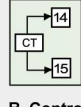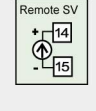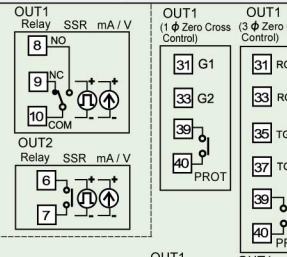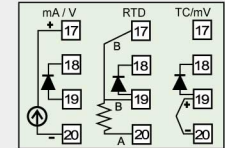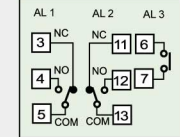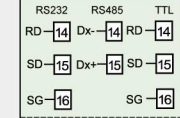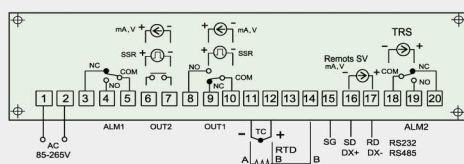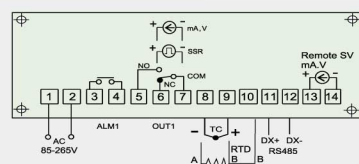
When AL3 Function enabic,RS485
Function move to Alarm board.

Specifications

※ FY400. FY600.FY700.FY800.FY900 Red light Series / FY401.FY701.801.FY901White light Series

Standard Spec.

Model	FY400/**401**	FY600	FY700/**701**	FY800/**801**	FY900/**901**	FY100	FY101
Dimension	48X48mm	96X48mm	72X72mm	48X96mm	96X96mm	175X110mm	90X90mm
LED Display(PAT.)	high light technology, Red/Green/Orange with in one Module					Reguire KA601 External Operating Box	
Supply voltage	AC 85~265V , DC24V (Optional)					AC 85~265V	
Frequency	50/60 HZ						
Power Consumption	approx 4VA						
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 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			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	0~65℃ / 0~50℃						
Humidity range	20~90% RH						
Weight (approx)	approx 150g		approx 225g		approx 300g	approx 130g	approx 80g

Optional Spec.

Model	FY400/401	FY600	FY700/701	FY800/801	FY900/901	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						
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			SPST type
Alarm 3	None			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

Model & Suffix codes

Model	Output1	Output2	Alarm	TRS	Remote SV	Commu-nication	Input Type	Power	Accessories
FY400 (Red light) / FY401 (White light) —	1	0	1	0	0	0 —	02 —	A	N

Model

- FY400/ 401 — 48×48mm
- FY600 — 96×48mm
- FY700/ 701 — 72×72mm
- FY800/ 801 — 48×96mm
- FY900/ 901 — 96×96mm
- Board Type
- FY100 — 175×110mm
- FY101 — 90×90mm
- (STANDARD)

- PFY400/401 — 48×48mm
- PFY600 — 96×48mm
- PFY700/701 — 72×72mm
- PFY800/801 — 48×96mm
- PFY900/901 — 96×96mm
- Board Type
- PFY100 — 175×110mm
- PFY101 — 90×90mm
- (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

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

* ▒ : Block means optional functions with additional charge
* HBA : Heater Break Alarm(HBA must use AL1 as alarm relay)

Combination of options and models
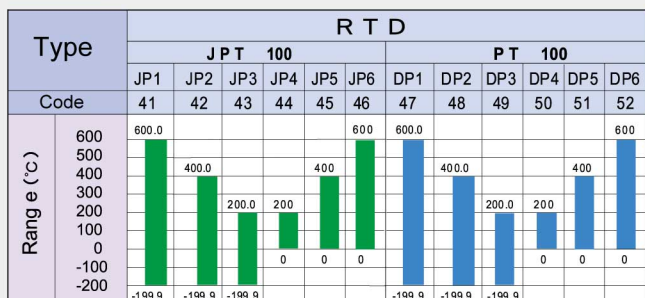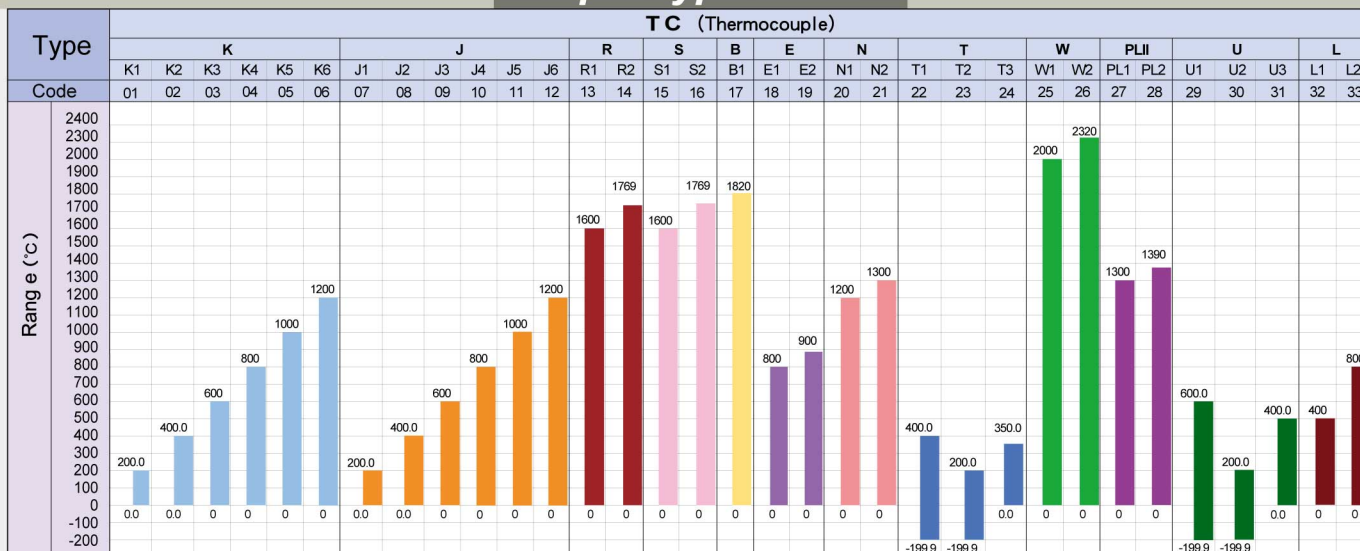
Model \ Options	RAMP/SOAK PROGRAM	1φ SCR_Z	3φ SCR_Z	Motor valve control	1φ SCR_P	3φ SCR_P	Output2	Alarm2	Alarm3	HBA	Transmission	Remote SV	Communication	DC 24V Power
FY400/ 401	◯	◯	—	◯	—	—	◯	◯	—	◯	◯	◯	◯	◯
FY600	◯	—	—	◯	◯	—	◯	◯	◯	◯	◯	◯	◯	◯
FY700/ 701	◯	◯	—	◯	◯	—	◯	◯	◯	◯	◯	◯	◯	◯
FY800/ 801	◯	—	—	◯	◯	—	◯	◯	◯	◯	◯	◯	◯	◯
FY900/ 901	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯
FY100	◯	—	—	◯	—	—	◯	◯	◯	◯	◯	◯	◯	—
FY101	◯	—	—	◯	—	—	◯	◯	◯	◯	◯	◯	◯	—

◯ Available — Not available

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

Input type table

TC (Thermocouple)

Type	K						J						R		S		B	E		N		T			W		PLII		U			L	
	K1	K2	K3	K4	K5	K6	J1	J2	J3	J4	J5	J6	R1	R2	S1	S2	B1	E1	E2	N1	N2	T1	T2	T3	W1	W2	PL1	PL2	U1	U2	U3	L1	L2
Code	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33

Range (°C) — approximate bar chart values:

Type	Max (°C)	Min (°C)
K1	200.0	0.0
K2	400.0	0.0
K3	600	0
K4	800	0
K5	1000	0
K6	1200	0
J1	200.0	0
J2	400.0	0
J3	600	0
J4	800	0
J5	1000	0
J6	1200	0
R1	1600	0
R2	1769	0
S1	1600	0
S2	1769	0
B1	1820	0
E1	800	0
E2	900	0
N1	1200	0
N2	1300	0
T1	400.0	-199.9
T2	200.0	-199.9
T3	350.0	0.0
W1	2000	0
W2	2320	0
PL1	1300	0
PL2	1390	0
U1	600.0	-199.9
U2	200.0	-199.9
U3	400.0	0
L1	400	0
L2	800	0

RTD

Type	JPT 100						PT 100					
	JP1	JP2	JP3	JP4	JP5	JP6	DP1	DP2	DP3	DP4	DP5	DP6
Code	41	42	43	44	45	46	47	48	49	50	51	52
Max (°C)	600.0	400.0	200.0	200	600	600.0	600.0	400.0	200.0	200	400	600
Min (°C)	-199.9	-199.9	-199.9	0	0	0	-199.9	-199.9	-199.9	0	0	0

LINEAR

Type	AN1				AN2	AN3
Code	61	62	63	64	71	76
RANGE	-10~10mV	-2~2V	-5~5V	-10~10V	0~10mV	0~20mV

Four Kinds of choices: -1999~9999 -199.9~999.9 -19.99~99.99 -1.999~9.999

Type	AN4							AN5			
Code	81	82	83	84	85	86	87	91	92	93	94
RANGE	0~50mV	0~20mA	0~1V	0~5V	0~10V	0~5KΩ	0~2V	10~50mV	4~20mA	1~5V	2~10V

Four Kinds of choices: -1999~9999 -199.9~999.9 -19.99~99.99 -1.999~9.999

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