

Operation Manual



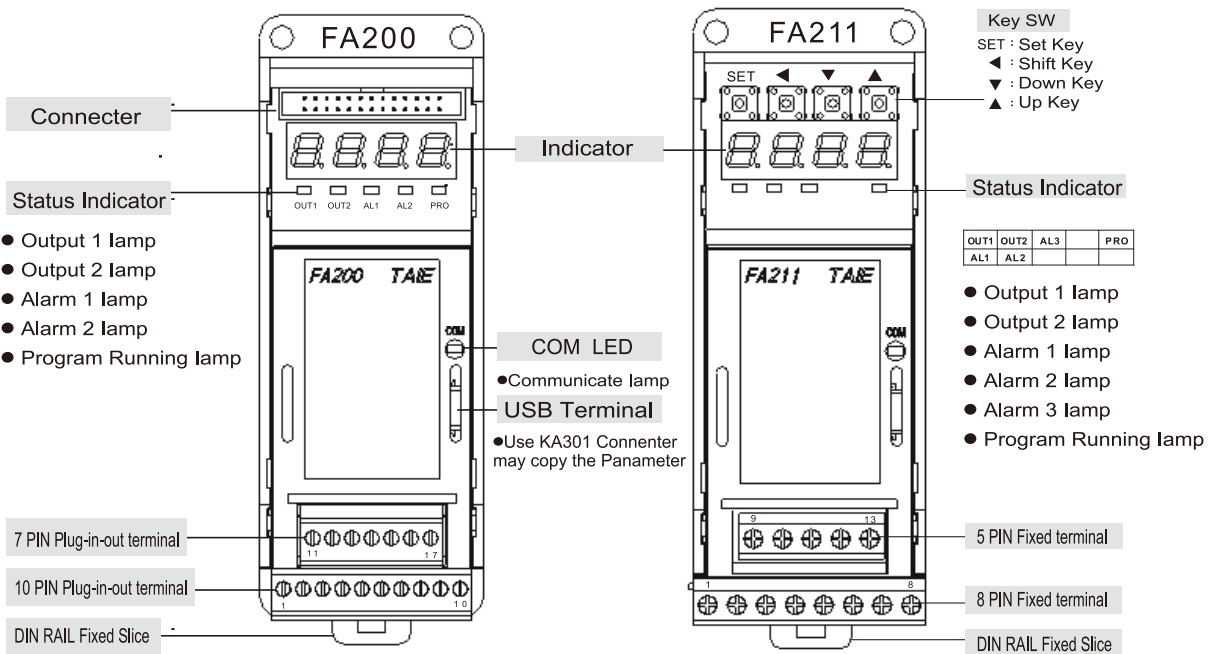
FA200 / FA211 Modular DIN Rail Miniature Digital PID Temperature & Process Controllers

No.FA2EV1

Thanks for selecting and using our new products FA series Digital PID Temperature & Process Controllers. FA series provide super power and accurate signal analysis of analogy input and have the ability of monitor, control and high noise resistance. Provided the advance SMT manufacturing system, compact module assembly design, and high quality and high reliability to satisfy customers requirements.

FA module controllers are divided two types FA200 Advance FA211 Economic

FA200 Advance Type	Plug in out terminal, External operating box with double displays
FA211 Economic Type	Fixed terminal, Build in 4 operating keys, Single display



Please be sure the category of input signal and range before selecting & using the controllers to perform the utmost efficiency. To understand output types and specifications is match your requests or not. Please refer to this Operation Manual. Please visit our website www.fa-taie.com.tw ~ www.fa-taie.com or call for our agents for assistance.

1. Notice

⚠ Danger

1. Danger! Electric Shock!
2. Don't touch AC power wiring terminals when controller has been powered on.
3. Keep the power off until all of the wirings are completed.

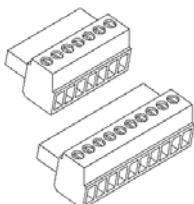
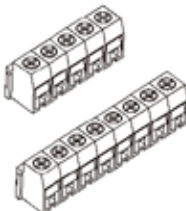
⚠ Warning

1. The wiring Terminals of FA200 / FA211 are Pin-1 and Pin-2
2. Please check the AC power wiring to controller correcting or not, otherwise it will be caused a
3. serious damage on controller after power on. Be sure to use the rated power supply for wiring terminals (AC Power ~ Sensor Input ~ Output ~ Alarm)

2. Assembly & Wiring

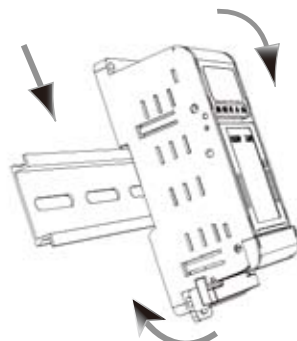
For FA200, please use plug-in-out wiring terminal => using width 2.4mm “—” screwdriver

For FA211, please fixed wiring terminal => using width 3.0mm “+” screwdriver

plug-in-out terminal M2.0 using “—” screwdriver	fixed terminal M2.6 using “+” screwdriver
	

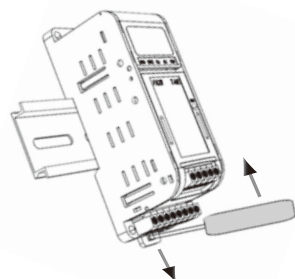
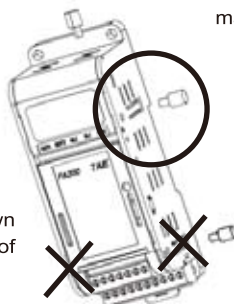
Selecting suitable electric wire of AWG 16 ~ AWG22 Lock screw torque : 0.3 N.m (3 kgf.cm)

1. Please prevent the controllers from the environment of high noise, corrosive gas and high temperature and high humidity when controllers are assembling. (Normal operating environment : 0 ~ 50°C · 20 ~ 90%RH)
2. Power wiring must be distant from main power and load power to avoid the interference of noise.
3. To extend the wires of thermocouple input, please use the correspondent compensation leading wires.
4. To extend the wires of RTD input, please use shield wires which have the same materials among 3 wires with low resistance.
5. Please vertically install FA series by crabwise direction, hear the light voice of “Ka” to sure fixing and no loose when assembling FA series with on DIN rail.

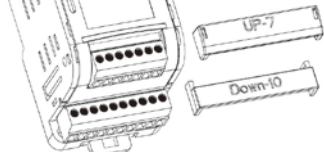
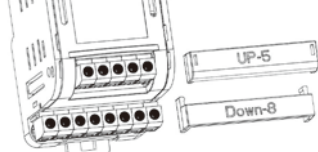


Please use attached a small interval stick in the up half both of controllers to assure the heat issuing good when many controllers set up together.

Do not insert a small interval stick in the down half both of controllers to prevent the efficiency of compensating normal temperature.



6. Separated secure cover of terminals are divided to up and down of two covers, please avoid the mistake and assure fixing when assembling

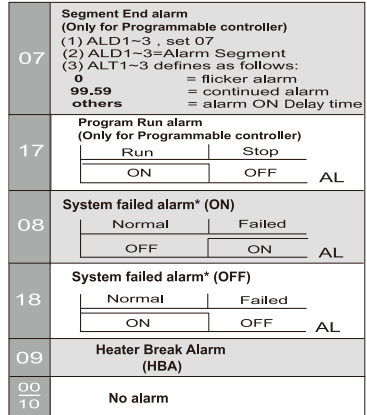
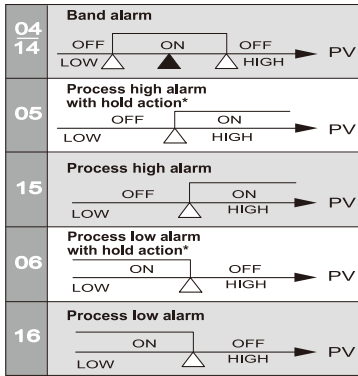
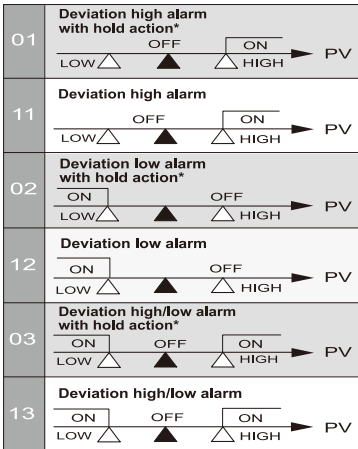
FA200	FA211
	

3. Specifications

Standard Spec.			
Model	Advance Type FA200	Economic Type FA211	
Outer case color	two colors of deep black & light gray are available		
Wiring terminal	Plug in out terminal	fixed terminal	
Parameter setting	by external control box or by communication	build in 4 operating keys or by communication	
Assembly	DIN rail, M4 screw hole, magnetic seat		
Display	External control box with double display + PV single display	single display	
Standard accessories	1 Output + 1 Alarm		
Maximum expansibility	1 Output + 2 Alarms or 2 Outputs + 1 Alarm		
Additional Option	Programmable 2 patterns by 8 segments	Yes (Option)	Yes (Option)
	High life SSR	Yes (Option)	Yes (Option)
	Communication	Yes (Option)	Yes (Option)
	Motor Valve Control	Yes (Option)	No
	TRS	Yes (Option)	No
	Remote SV	Yes (Option)	No
	Heater Break Alarm (HBA)	Yes (Option)	No
General Spec.			
Supply Voltage	AC 85-265V		
Frequency	50 / 60 HZ		
Power Consumption	Approx 4VA		
Data Protection	EEPROM, Endurance : 1 Million write cycles, Data Retention : 10 years		
Isolated resistance	main loop –case(ground) ∖ control loop – case(ground) DC500V > 10MΩ		
Dielectric Strength	main loop –case(ground) AC 1500V 1min / control loop – case(ground) AC 1000V 1min		
Vibration Endurance	10~55HZ 0.5mm (MAX 2G) XYZ various direction 2h		
Assault Endurance	100m/s ² (Approx 10G) XYZ various direction 3 times		
Protection Configuration	IP00		
Display Height of Control box	LED Module PV : 14mm SV : 10mm	without control box	
Display Height of single range LED	7 section digital display : 7mm		
Dimension	40 x 107 x 43 mm		
Weight	Appro x 115g		
Operating Ambient temperature	0~50°C		
Operating Ambient humidity	correspondent humidity 20-90% RH without dew		
Reserved Temperature	-25°C ~ + 65°C		
Control Features			
Control method	Heating, Cooling single output or Heating & Cooling both output PID, PI, PD, P, ON/OFF(P=0), FUZZY		
PID Parameter	P : 0.0 - 200.0% I : 0 ~3600 sec. D : 0 ~900 sec.		
Control Cycle	0~150 sec.		
Input Features			
Input	The point of signal point	1 point	
	Accuracy	0.2 % Full Scale ± 1digit	
	Sample time	250 ms	
	TC	K , J , R , S , B , E , N , T , W5Re/W26Re , PLII , U , L	
	RTD	PT100 , JPT100	
	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 Option 0000 000.0 00.00 0.000	When using the input of sensor signal, DP position for PV can be selected the sensor code No. 1~ 52 When using the input of DC mA or Voltage, DP position for PV can be selected code No. 61 ~96 by DP Parameter.	
Output Features			
Output 1	Relay	Advance Type FA200	Economic Type FA211
	For external SSR drive	SPDT type (a point 8A, b point 3A 220V)	SPST type (1a point 8A 220V)
	4-20mA / 0-20mA	ON : 24V , OFF : 0V , Max. load current 20mA	
	0-5V , 0-10 V	Max. load resistance 560 Ω	
	SSR high life relay	Max. load current 20mA	
Output 2	Relay	1A TRIAC SSR (Option)	
	For external SSR drive	SPST type 8A 220V	
	4-20mA / 0-20mA	ON : 24V , OFF : 0V , Max. load current 20mA	
	0-5V , 0-10 V	Max. load resistance 560 Ω	
	High life relay	Max. load current 20mA	
Communications	Interface	RS-485 two wires Half Duplex	
	Protocol	Modbus RTU ∖ Modbus ASCII ∖ TAIE	
	Data bit	8 bit	
	Start bit	1 bit	
	Stop bit	1 bit or 2 bit	
	Baud rate	38400 ∖ 19200 ∖ 9600 ∖ 4800 ∖ 2400 bps ◦	
	Error examine	Parity even ∖ odd or CRC-16 (in Modbus)	
	Connective pieces	Maximum 32 pcs	
Communicate range	Maximum 1200 m		
Alarms			
Alarm 1 Relay	SPDT type (a point 8A, b point 3A 220V)	SPST type 1a point 8A 220V	
Alarm 2 Relay	SPST type 8A 220V		
Alarm setting range	-1999~9999 (Dot positions are different depended on the various Input Types)		



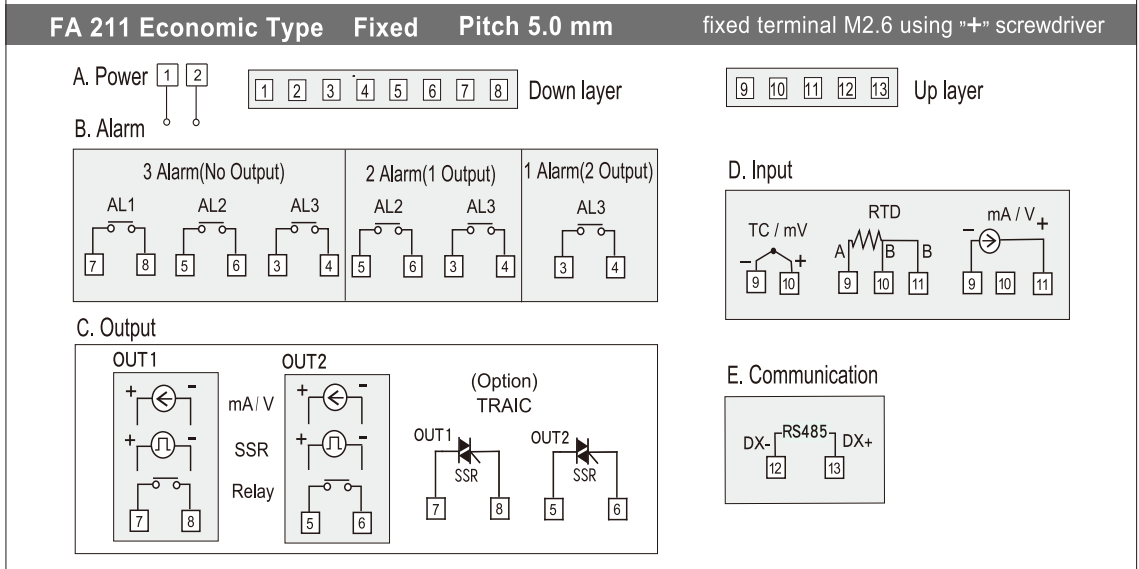
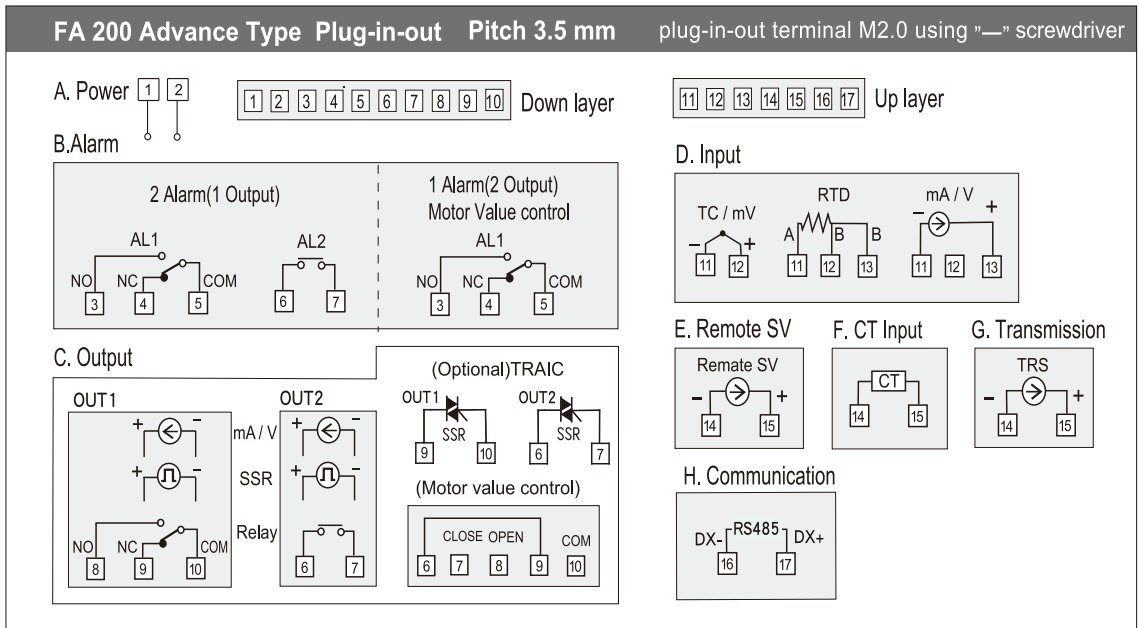
Alarm mode type (Referenced for ALD1/ALD2/ALD3) (▲ SV △ Alarm set value)



* Hold action:
When Hold action is ON, the alarm action is suppressed at start-up until the measured value(PV) enters the non-alarm range.

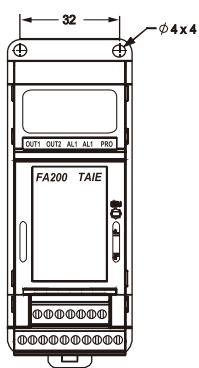
* System failed:
It means that the controller display error message with one of following : " UUU1 " or" NNN1 " or" CJCE"

4. Terminal Wiring Diagram

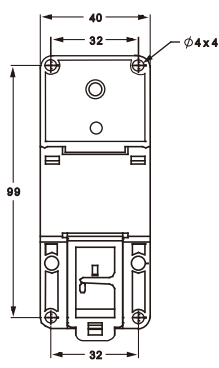


5. Outer Dimension

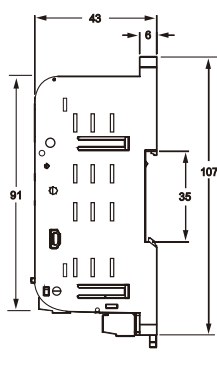
front drawing



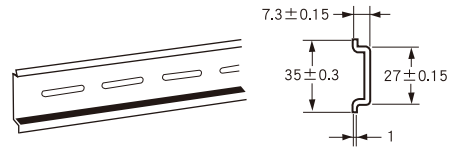
back drawing



side drawing

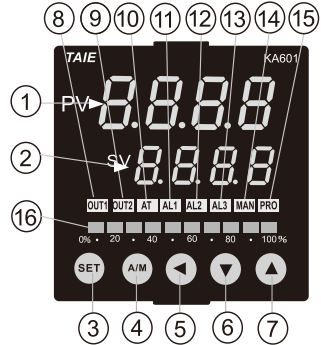


DIN Rail Dimension (reference)



6. KA601 External Control Box

KA601 Outer Dimension
74 x 76 x 16 mm
Cable length 150 cm

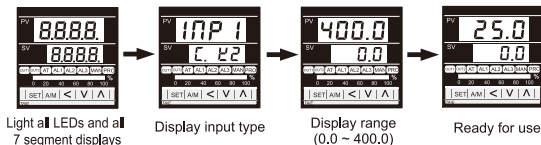


SYMBOL		NAME	FUNCTION
PV	①	Measured value (PV)display	Displays PV or various parameter symbols (Red)
SV	②	Setting value(SV)display	Displays SV or various parameter values (Green)
SET	③	Set Key	Pressing "SET" key before and after setting or shifting parameters to call up or save the setting value.
A/M	④	Auto/Manual Key	Switching between Auto (PID) and Manual output mode.
<	⑤	Shift Key	Shifting digits when settings are changed
∨	⑥	Down Key	Decrease the parameters or digit being modified *Program Hold <Only for programmable controller>
∧	⑦	Up Key (*Program Run)	Increase the parameters or digit being modified *Program run <Only for programmable controller>
OUT1	⑧	OUT1 lamp	Lights when OUT1 is on (Green)
OUT2	⑨	OUT2 lamp	Lights when OUT2 is on (Green)
AT	⑩	Autotuning lamp	Lights when Auto tuning is activated (Orange)
AL1	⑪	Alarm1 lamp	Lights when Alarm 1 is activated (Red)
AL2	⑫	Alarm2 lamp	Lights when Alarm 2 is activated (Red)
AL3	⑬	Alarm3 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	OUT% Bar-Graph display	Output % is corresponded to display on 10-dot LED

7. Operations

1.Power ON:

Controller will display as following



Light all LEDs and all 7 segment displays

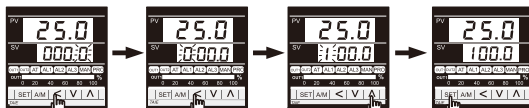
Display input type

Display range (0.0 ~ 400.0)

Ready for use

2.Change the Set Value(SV):

Change SV from 0.0 to 100.0



Press < Key
The SV number started to flash. The flashing digit indicates which digit can be set.

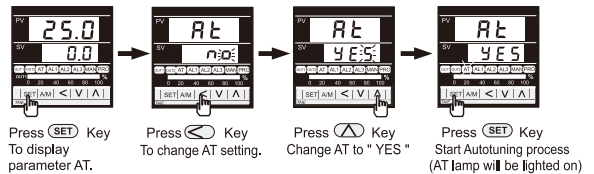
Press < Key
To select the hundreds digit.

Press < Key
To change the number to 1.

Press SET Key
To store the new set value.

3.Autotuning (AT):

Use AT function to automatically calculate and set the optimize PID value for your system.



Press SET Key
To display parameter AT.

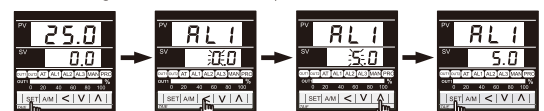
Press < Key
To change AT setting.

Press < Key
Change AT to "YES"

Press SET Key
Start Autotuning process (AT lamp will be lighted on)

4.Change the Alarm value:

Change AL1 value to "5.0" (AL1 active, if PV exceeds SV over 5.0)



Press SET Key
To display parameter AL1

Press < Key
To change AL1 value

Press < Key
Increase AL1 value

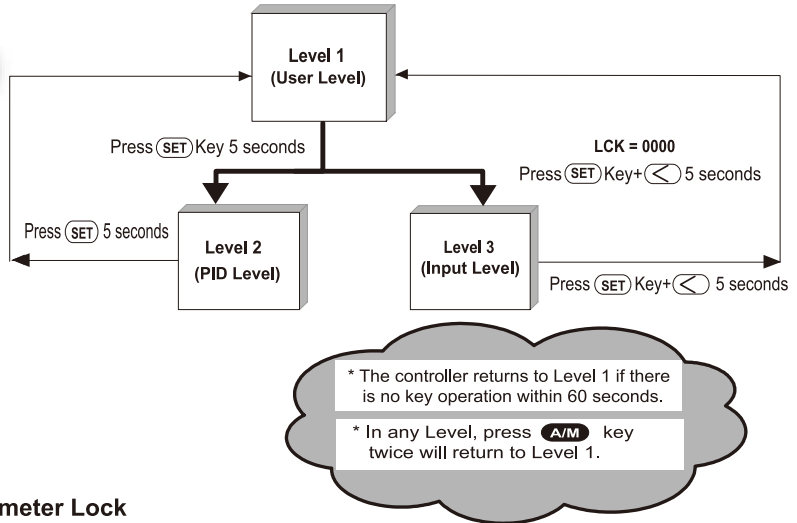
Press SET Key
Store the new value of AL1

* There are total 16 alarm mode types, referenced as below:

* To change Alarm mode, press SET + < key 5 seconds to enter Level 3 (Input Level) and then change the value of ALD1/ALD2/ALD3.

8. Levels Explanation

8.1 Levels Diagram



8.2 Levels in and out & Parameter Lock

Please enter in level 2 (PID level) to set the parameter LCK which can be changed

LCK	Levels entering available			Parameters which can be changed
	Level 1 (User Level)	Level 2 (PID Level)	Level 3 (Input Level)	
0000	Yes	Yes	Yes	All parameters (Factory set value)
1111	Yes	Yes	No	
0100	Yes	Yes	No	
0110	Yes	Yes	No	Parameters in Level 1
0001	Yes	Yes	No	SV" and "LCK"
0101	Yes	Yes	No	Only "LCK"

9. Parameters List

Level 1 (User Level)

Process Value Set Value	P1 5.0
Output Limit	OUTL 1000
Autotuning	At YES/NO
Alarm 1 set value	AL1 0.0
Heater current display (HBA set value)	c 0.0 0.0
Alarm 2 set value	AL2 0.0
Alarm 3 set value	AL3 0.0

Level 2 (PID Level)

P1 3.0	Proportional band 1 (For output 1)	Range : 0.0~200.0% ON/OFF control if set to 0 (0.0)
,1 240	Integral time 1 (For output 1)	Range : 0~3600 seconds PD control if set to 0
d1 60	Derivative time 1 (For output 1)	Range : 0~900 seconds PI control if set to 0
dbl 0	Dead-band time	Don't care
AtL 0	Auto tuning offset value	Range : 0~USPL
CYt1 10	Output 1 cycle time	Range : 0~150 seconds Relay output :10 Voltage pulse output : 1, mA output :0
HYS1 1	Hysteresis for output 1 ON/OFF control	Range : 0~1000
P2 3.0	Proportional band 2 (For output 2)	The same with P1
,2 240	Integral time 2 (For output 2)	The same with I1
d2 60	Derivative time 2 (For output 2)	The same with D1
CYt2 10	Output 2 Cycle time	The same with CYT1
HYS2 1	Hysteresis for output 2 ON/OFF control	The same with HYS1
GAP1 0	Control gap 1 (For output 1)	Set point of output 1 (Heating side) =SV - GAP1
GAP2 0	Control gap 2 (For output 2)	Set point of output 2 (Cooling side) =SV + GAP2
LCK 0000	Function lock	

Return to "P1"

* it will show, when HBA function enable





































Display if P1=0

Display if P2=0

Display if output2 is provided

Level 3 (Input Level)

Set LCK to "0000" and then press **SET** Key+shift (◀) Key 5 seconds to enter level 3

	Input type selection			Output 2 high limit calibration (Used for mA and V output)	The same with CHO1
	Analog input low limit calibration (Used for mA and V input)	Range : -1999 ~ 9999		Retransmission low limit calibration	The same with CLO1
	Analog input high limit calibration (Used for mA and V input)	Range : 0 ~ 9999		Retransmission high limit calibration	The same with CHO1
	Decimal point position (Available for mA and V input)	0000 , 000.0 00.00 , 0.000		Full run time of proportional motor (Used for proportional motor valve control output)	Range : 5~200 seconds
	Lower Set-Point Limit	Scaling Low Limit		Used for programmable controller to wait continued operation	0=Not wait Others=Wait value
	Upper Set-Point Limit	Scaling High Limit			
	Remote input low limit calibration	Range : -1999 ~ 9999		Communication Protocol Selection	MODBUS RTU / MODBUS ASCII / TAIE
	Remote input high limit calibration	Range : 0 ~ 9999		Communication Bits Configuration	O_81 / O_82 / E_81 / E_82
	Alarm mode of AL1	Range:00~19 Refer to "Alarm mode type"		ID number	Range : 0 ~ 255
	Alarm time of AL1	Range : 0~99 Min 59 Secs 0=Flicker Alarm , 99:59=Continued Others=On delay time (If ALD=07 , ALT means alarm on time)		Baudrate	2400 / 4800 / 9600 / 19200 / 38400 bps
	Alarm mode of AL2	The same with ALD1		SV compensation	Range : -1000~1000
	Alarm time of AL2	The same with ALT1		PV compensation	Range : -100.0~500.0
	Alarm mode of AL3	The same with ALD1		Unit of PV & SV	C(°C) / F(°F) / A(Analog)
	Alarm time of AL3	The same with ALT1		PV Filter	PV will response faster if PVFT is smaller.
	Hysteresis of all Alarm	Range : 0~1000		Reserved	
	Output 1 low limit calibration (Used for mA and V output)	Range : 0 ~ 9999		Action mode	Heat / Cool
	Output 1 high limit calibration (Used for mA and V output)	Range : 0 ~ 9999		Control algorithm	PID / Fuzzy
	Output 2 low limit calibration (Used for mA and V output)	The same with CLO1		Frequency	50 / 60HZ

Return to "INP1"



10. Order Information

★ Factory basic value: FA200-101000-02A FA211-101000-02A

Model	Output 1	Output 2	Alarm	Transmission	Remote SV	Communication	Input Type	Power
FA 200 (Programmable)	1	0	1	0	0	0	02	A
PFA 200 (Programmable)	0 None	0 None	0 None	0 None	0 None	0 None	See Input Codes	A AC 85~265V
Plug-in-out terminal (Advance Type)	1 (Relay)	1 (Relay)	1 1Set	1 4~20mA	1 4~20mA	B RS485 - MODBUS		
FA 211 (Economic Type)	2 Voltage Pulse (SSR Drive)	2 Voltage Pulse (SSR Drive)	2 2Sets	2 0~20mA	2 0~20mA			
PFA 211 (Programmable)	3 4~20mA	3 4~20mA	A HBA	A 0~5V	A 0~5V			
	4 0~20mA	4 0~20mA	B HBA+AL2	B 0~10V	B 0~10V			
	A 0~5V	A 0~5V		C 1~5V	C 1~5V			
	B 0~10V	B 0~10V		D 2~10V	D 2~10V			
	C 1~5V	C 1~5V						
	D 2~10V	D 2~10V						
	T TRIAC (SSR)	T TRIAC (SSR)						
	7 Motor value control							

★ Factory set value K2, code 02
 ★ TC Input(K, J, R, S, B, E, N, T, W, PLII, U, L...) setting, can be changed to any types by user
 ★ RTD(JPT 100, PT100) setting, can be changed to any type by user
 ★ TC, RTD, LINEAR can be changed each other but need to change the parts of hardware. For more details, please contact local agents.

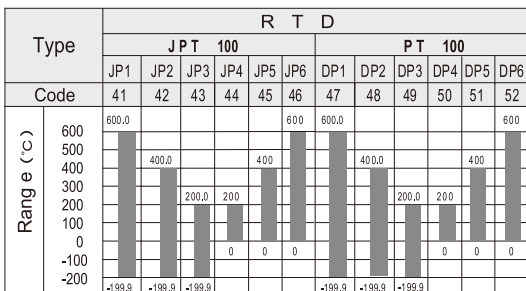
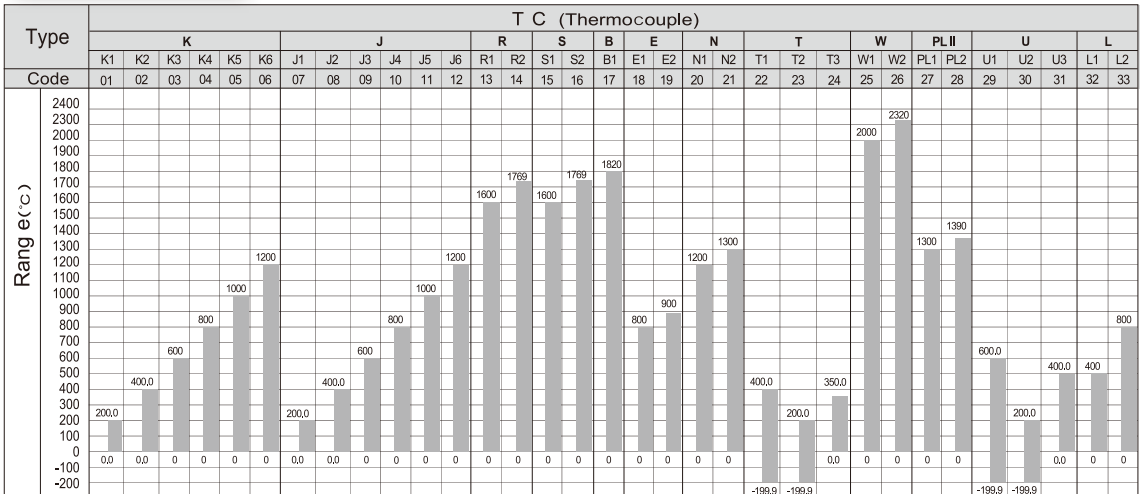
■ Above black blocks are optional functions with additional agents.

11. Function Option

★ Maximum expand is 1 Output 2 Alarm or 2 Output 1 Alarm
 ★ "HBA" & "Remote" function can not be selected at the same time.

Type	RAMP/SOAK PROGRAM	Communication	★ Output 1		★ Output 2	★ Alarm 2	HBA	Transmission	Remote SV
			Motor value control	TRIAC SSR					
FA 200	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FA 211	Yes	Yes	No	Yes	Yes	Yes	No	No	No

12. Input Types



Distributor

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