PID Temperature Controller

INKBIRD

Manual

Model: ITC-100

Thank you very much for selecting INKBIRD products.
Read the instruction manual carefully before use, for right application and maintenance.

Safety Precautions

- Ensure the product using within the specification.
- Do not touch the terminals at least while power is being supplied. Doing so may occasionally result in injury due to electric shock.
- Do not allow pieces of metal, wire clippings, or fine metallic shaving or filings from installation to enter the product. Doing so may occasionally result in electric shock, fire, or malfunction.
- Do not use the product where subject to flammable or explosive gas. Otherwise, injury from explosion may occasionally occur.
- Never disassemble, modify or repair the product or touch any of the internal parts. Electric Shock, fire, or malfunction may occasionally occur.
- If the output relays are used past their life expectancy, contact fusing or burning may occasionally occur. Always consider the application conditions and use the output relays within their rated load and electrical life

The life expectancy of output relays varies considerably with the output load and switch conditions.

Main Features

- Front Panel Dimension: DIN (48WmmX48Lmm), Cutout size: 45x45mm
- Support Multiple Thermocouples and Resistance Sensors (K, S, Wre, T, E, J, B, N, CU50, PT100)
- Wide Controlling Range: -50～1300ºC (K sensor)
- High Accuracy of Displaying and Controlling 0.1ºC, Accuracy of Measurement ±0.2%FS
- PID and ON/OFF Control Mode, High Standard Self-adjusting Function
- Multiple Outputs and Alarm Modes
- Build-in Adjustable Digital Filter Reduce Interference
- The Self-adjusting Function and Intelligent Control of the Instrument Ensure the Long-term Stability
- High Luminance, 0.39" height LED display, Anti-glare panel
- Built-in Switch Power Supply, Wide Voltage Range and Low-power Consumption

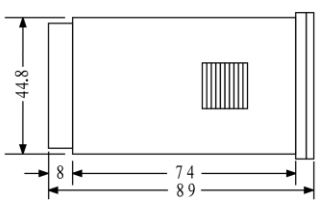
Specification

- Units: Degree Celsius (＜1000ºC)
- Power Supply Voltage: AC 100-240V ±10% 50/60Hz
  AC/DC 12-24V ±10% 50/60Hz
  DC 12-24V ±10%
- Operating voltage range: 85～110% Rated voltage
- Power Consumption: Approx. 5VA (100～240VAC)
  Approx. 4VA (12～24VAC)
  Approx. 3W (12～24VDC)
- Display Character: PV: 4 digital 9.9mm height Red LED Letters
  SV: 4 digital 8mm height Green LED Letters
- Display Accuracy: ±0.2%FS 0.1ºC (＜1000ºC); 1ºC (≥1000ºC)
- Period of Sampling: 0.5S
- Temperature Compensation: 0-50ºC
- Main Output: Relay Contact Output (ITC-100R): AC250V 3A (Resistive load) ON/NC.
  Alarm 1 AC250V 3A (Resistive load) ON/NC.
  Voltage Pulses Output (ITC-100V): DC 12V, 30mA;
  Alarm 1 AC250V 3A (Resistive load) ON/NC
- Life Expectancy of Relay: Mechanical≥10,000,000 operations Electrical≥10,000,000 operations
- Weight: Approx. 140g
- Environmental Conditions: -10～55ºC (no icy or condensation), RH 35-85% Humidity
- Storage Temperature: -25～65ºC (no icy or condensation)
- Data Storage: 10year
- Mounting Method: Flush mounting and screw terminals

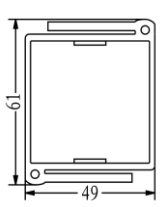
Connection

Dimension (unit: mm)

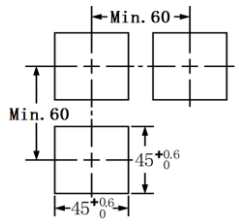
Shell



Mounting bracket



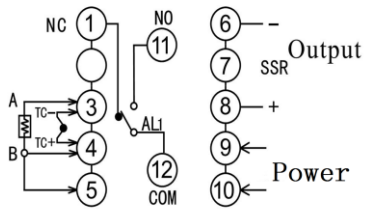
Panel Cutout



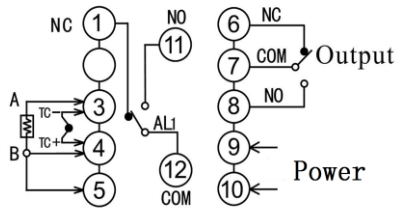
•Push the instrument into the hole of panel and insert mounting bracket from back side, ensure that there are no gaps between the panel and mounting bracket, and then screw cap down.
•Ensure that the ambient temperature should not be exceed the specified working temperature, especially when installed more than two instruments.

Connection

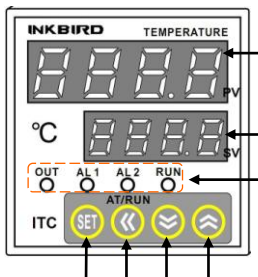
ITC-100V



ITC-100R



Front Panel and Operation



- **PV Process Value**
  Measured Value/Mode Value
- **SV Set Value**
  Set Value/ Mode Context Value
- **Status Display LED**
  OUT: Output pilot lamp
  AL1: Alarm1 pilot lamp
  AL2: Alarm2 pilot lamp
  RUN: Manual pilot lamp
- **Up Key:** Increase the value in setting, Keep pressing can increase value quick.
- **Down Key:** Decrease the value in setting, Keep pressing can increase value quick.
- **Move Key:** When setting temperature value or parameter, press "《" Key to switch to the value needed
- **Self-Adjustment Key:** When SV/PV at normal display, keep pressing the "《" Key more than 2S to start or end self-adjusting function.
- **Shift Key:** When SV/PV at normal display, press "《" Key less than 1S to shift between automatic and manual control modes.
- **SET Key:** When SV/PV at normal display, press the SET key to check PV and SV value, keep pressing it more than 2 seconds can access parameter setting mode.

Operation Process

●Input Type (Table1)

Input Type	Input	Value	Measuring Range
Thermocouple	K	0	-50～1300ºC
	S	1	-50～1700ºC
	Wr	2	-0～2300ºC
	T	3	-2000～350ºC
	E	4	0～1000ºC
	J	5	0～1000ºC
	B	6	0～1800ºC
	N	7	0～1300ºC
Cu resistance	CU50	20	-50～150ºC
Platinum resistance	PT100	21	-200～600ºC

●Alarm Function Setting（Table 2）

Alarm Output	Alarm Type	ALP Value
AL1 Output	Upper Alarm Limit	0
	Lower Alarm Limit	0
	Maximum Deviation Alarm	0
	Minimum Deviation Alarm	0
AL2 Output	Upper Alarm Limit	1
	Lower Alarm Limit	2
	Maximum Deviation Alarm	4
	Minimum Deviation Alarm	8

The Combined Alarm Setting: Choose ALP Values from Table2 and added them up, set in ALP.

●Error Display (Fault Diagnosis)

SV Display	Explain	Remedy
orAL （orAL）	Input Sensor Selected Error	Input the correct value consistent with parameters of sensor
	Signal Wire Connected Error	Correct the Connecting Signal Wire
	Sensor Fault	Check the sensor

●Operating instruction

●After power-on, PV screen displays current measured value and SV screen displays current set value, the instrument is in this normal status.
If PV/SV screen displays "orAL" alternately, it means that input value is out of range （or sensor is open circuit） or input setting is incorrect.
When there is alarm output, SV screen displays character related with alarms: HiAL （Upper Alarm Limit）, LoAL（Lower Alarm Limit）,dHAL（Maximum Deviation Alarm）,dLAL（Minimum Deviation Alarm）.

●Checking Output Value: Press "SET" Key （no more than 1S）, If SV screen displays "A",（ e.g. A 100 ）, the status is automatic control output; If SV demo display "M",（ e.g.: M 100 ）, the status is manual control output.

●Auto/Manual Switch: Press "《"Key （no more than 1S）,can switch the instrument between automatic control and manual control status. In automatic control status, RUN pilot lamp is off; in manual control status, RUN pilot lamp is on. （Remarks: If status of setting function is "2: No manual", it cannot operate like this.）

●Temperature Setting: When SV screen displays setting value, press "≪"key（or"≫"key）can increase（ or decrease）setting value. Press"《"key can move the place of update data. If keep pressing "≪"Key （or"≫"Key）, can set the value quick.

●Start the Self-adjusting Function: At the first-time use, please use self-adjusting function to determine the control parameters （M50, P and T parameter）, so it can obtain ideal controlling. Keep pressing the "《"key for more than 2S, SV screen displays "AT" alternately （Character: At ）, the instrument is in self-adjusting status. In this status, the instrument will execute position adjustment by 2 - 5 times oscillations, then it will turn out PID control parameter automatically （M50, P and T parameter）. The instrument will return to PID automatic control status at the end of self-adjustment. If user want to quit in the course of self-adjusting, keep pressing "《" key for more than 2S, till "AT" character in the SV screen disappears.

●**Attention:** If user wants to use self-adjusting function again after first using, user needs to set "CtrL" to be "2" to start it （more information please check "Parameter Setting and Defining"）. The parameter values of adjusting control are not the same at the different setting temperatures, so please execute self-adjustment at the most common setting value of the system. If the setting values change often, user can modulate with the median.

Parameter Setting and Defining

After power-on, keep pressing the "SET" key for more than 2S to enter setting mode. User can use "≪"Key（or"≫"Key）to set the value. After finishing, press "SET" key to confirm and enter next function setting. PV/SV screen will be in normal display after setting.

Note: If there are modified operations in setting mode, the instrument will save current value automatically after no operation for more than 10 seconds, and return to normal status.

Function Setting		Description	Setting Range	Unit	Remarks	Factory Default
Code	Name					
HI AL	HIAL	Upper Alarm Limit	-1999～+9999	1℃		9999
LoAL	LoAL	Lower Alarm Limit	-1999～+9999	1℃		-1999
dHAL	dHAL	Maximum Deviation Alarm	0～9999	1℃		9999
dLAL	dLAL	Minimum Deviation Alarm	0～9999	1℃		9999
dF	dF	Hysteresis	0～200.0	0.1℃		0.3
CtrL	CtrL	Control Output	0：ON/OFF 1/3：PID 2:Self-adjustment			3
M 50	M50	Integral	0～9999	0.1℃	0：Cancel	1000
P	P	Differential	0～9999	0.01S/℃		500
t	t	Hysteresis Time	1～9999	S		120
Ctl	Ctl	Control Period	1～120	S		4
Sn	Sn	Input Sensor	0～42		Table 1	0
diP	diP	Decimal Point Position	0～3			1
diL	diL	Input Lower Limit Value	-1999～+9999	1 Digital		0
diH	diH	Input Upper Limit Value	-1999～+9999	1 Digital		1000
SC	SC	Sensor Calibration	-199～+999			0
oP1	oP1	Output Mode	0/2：Time Duty 1：0-10mA			0
oPL	Opl	Output Lower Limit	0～220	1%		0
oPH	Oph	Output Upper Limit	0～220	1%		100
ALP	ALP	Alarm Function	0～31		Table 2	0
CF	CF	System Function	2：Heater 3:Cooler			2
Addr	Addr	Address	0～63			1
bAud	Baud	Baud Rate	0～4800			9600
dL	dl	Input Digital Filter	0～20		Filter Effect	0
run	run	Run Mode	0：Manual 1：Automatoc 2：No Manual			2
Loc	LOC	Lock Function	0～999			40
EP1 EP8	EP1 ～EP8	8 User-defined Parameters	Select any Parameter from this Table		Except LOC and EP1～EP8	none

●User-defined Parameter: In the process of setting parameters, the display modes of last eight parameters are difference from the previous. PV screen displays prompt EP1 - EP8, SV screen displays various prompts of technical parameters Setting （e.g. HiAL, LoAL, dHAL and so on）. Press "≪"Key（or"≫"Key）, The technical parameters in SV screen will be listed in proper order as the above parameters table. After that, press "SET" key confirm and enter next setting. "none" needs to be set if user don't need to use the user-defined parameter. Press "SET" key to set these 8 user-defined parameters till all to be set, and then return to normal status.

●Datalock （LOC）: When the setting values of LOC are not "2", "40" or "808", the instrument only allows to set 0-8 self-defined parameters and LOC parameters themselves. User can set all parameters only when setting LOC value is "2", "40" or "808". Details are as follows:
Loc=0， Temperature setting value and EP1-EP8 can be revamped.
Loc=1， Data can not be revamped, only can be checked.（Except LOC parameters）
Loc=2，40，808，all of parameters can be revamped.

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