

CONTENTS

■ TU-6100 specifications-----	1
■ Instrument descriptions-----	2
■ Display descriptions-----	3
■ Key descriptions-----	4
■ Instructions-----	5
■ RS-232 transfer protocol-----	8
■ Precautions-----	11

■ TU-6100 specifications

Input type (RTD)	PT-100Ω PT-1000Ω ($\alpha = 3850$, ITS-90) Two Channel input (four wire RTD)
Measuring Range	PT-100Ω :- 200.00 ~ + 850.00 °C, -328.00 ~ +1562.0 °F PT-1000Ω:- 200.00 ~ + 850.00 °C, -328.00 ~ +1562.0 °F
Accuracy	$\pm 0.05\%$ of rdg + 0.1°C (In 25±5°C operating environment) $\pm 0.1\%$ of rdg + 0.2°C (Out off 25±5°C operating environment)
Resolution	0.01°C (Full Measuring Range) ; 0.01°F (under 999.99°F) · 0.1°F (above 1000.0°F)
Sampling rate	Approx 0.5 sec
Main Functions	Hi/Lo Alarm setting, T1-T2, Data hold, Max./Min./Avg values record, Switchable °C/°F, Digital USB / RS-232 output, Battery sign and low battery warning, Outside calibration function, LED Back-light, IP66 water and dust proof.
Output	USB, RS-232 , 0.01°C/ 1 BIT (protocol provided)
Power source	One 9 V battery or AC Adaptor
Dimensions	150 x 75 x 28 mm, Approx. 320g (battery included)
Input connection	Four wire connector waterproof socket
Standard Applications	TU-6100 High accuracy thermometer LP-12U Immersion temperature probe (Class A) - ϕ 2.8 × L150mm LP-32U Needle temperature probe (Class A) - ϕ 2.8 × L120mm TU-655C Pouch case TU-609 Battery 9V006P Instruction manual and warranty ※temperature probe can be specified
Operating environment	-30 ~ + 60°C ; 0 ~ 100 %RH
Approvals	CE ; ROHS ; IP66

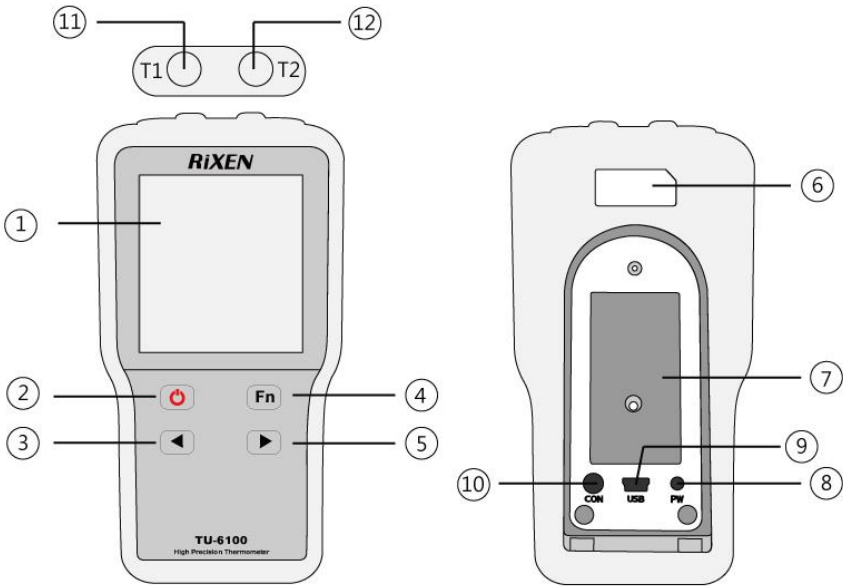
Accessories

PT100Ω Temp. probe	customized
PT1000Ω Temp. probe	customized
TU-RS232-C	specified RS-232 computer interface cable and windows software
TU-USB-C	specified USB computer interface cable and windows software
TU-6019/ 6029	AC Adaptor · TU-6019 (AC100V±10%) TU-6029 (AC220V±10%)

※Above accuracy and sampling rate excludes errors generated by Temperature probe.

※Specifications are subject to change without notice.

■ Instrument descriptions



① Large LCD Display

② Power switch

③ Setting and °C/°F switching

④ Function key

⑤ Setting and RTD changing

⑥ Model No. and Serial No.

⑦ Battery cover

⑧ AC Adaptor Input

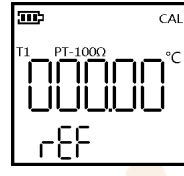
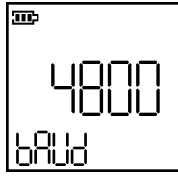
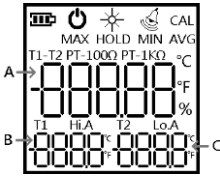
⑨ USB Output port

⑩ RS-232 Output connector

⑪ T1 Probe input connector

⑫ T2 Probe input connector

■ Display descriptions



Display	Descriptions
	Battery Power Symbol
	Manual shut down
	LED Back light on
	Buzzer on
CAL	Under Calibrating
MAX	Maximum Value
HOLD	Data Hold
MIN	Minimum Value
AVG	Average Value
T1	T1 probe
T2	T2 probe
PT-100Ω/PT-1KΩ	Temperature Probe Type
Hi.A	High point Alarm
Lo.A	Low point Alarm
Area Digit A.B.C.	Testing Value, Alarm setting Value, T1,T2 indicating
°C/°F	°C : Celsius units · °F: Fahrenheit units

Abnormal displays

A. When Area A shows, ----- please let go off all keys.










































B. When Area A shows, **ERROR** the situations below may be the causes:

1. Temp. over 850.00°C(1562.0°F) or under -200.00°C(-328.00°F)
2. The Temp. probe is broke or not inserted.
3. When showing the T1 - T2 real temp. display either one testing probe is Abnormal ·
4. Temperature Probe Type is wrong.
5. If is appears when turning on the instrument, please let go off all keys and tune Instrument on again.

■ Key descriptions

※The RTD type and the °C/°F is changeable only under the testing mode.

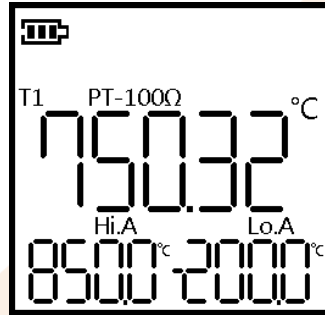
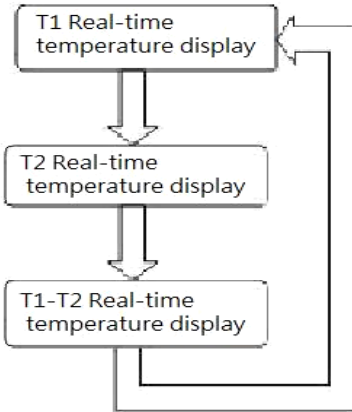
※After inserted the probe will run internal calibration in few seconds.

Key	Function	Descriptions	LCD display
	Power On/Off	Press  once for power on or off. (If the instrument is left without any button operation, it will automatically turn off after five minutes.)	
 	Manual turn off	Hold  key, then hold  key to turn on, entering the manual turn off mode. When  appears, please let this two keys release.	
	Hold mode	Under testing mode, press  to enter the reading HOLD mode. Use  and  to change display functions. Press  to leave.	
 (2s) Baud Rate, Hi/Lo Alarm Ref., Span	Setting Mode	Under testing mode, press  for over 2 sec. until the area B shows HOLD enter the setting mode. Push  key and  key to change the baud rate, after data confirmed; please press  for over 2 seconds again. For enter the next level. Push  key to increase the value. Push  key to reduce the value. Push  key to change digit. Determine the value re-hold  key for over 2 seconds, into the next level, who wish to skip the other settings, hold down  key will be automatically set to the last, the complete contents of each set will be automatically saved, and return to the testing mode.	
 (2s)	Left Key	Under any mode press  key to change data. Under testing mode, hold  key for over 2 seconds to change °C/°F. After changed please let go.	-- °C ↔ °F
 (2s)	Right Key	Under any mode press  key to change data. Under testing mode, hold  key for over 2 seconds to change PT100Ω/PT1kΩ When exchanged, The instrument will run Internal calibration. Please wait for 4 seconds to turn back to testing mode.	-- PT-100Ω ↑↓ PT-1KΩ
 + 	Back Light on	Under any mode, press  and  key the back light will be turned on. <u>Note: When the battery power is under 25% · the LED back light will not be able to function.</u>	
	Alarm On(2s)	Under any mode, press  and  key after 2 seconds the buzzer will be turned on. The mark  appeared.	

■ Instructions

A. Testing Mode:

Press ◀ and ▶ to switch display conditions.



Normal conditions	Probe condition, Probe type, warning data condition, Power indication
T1 Real-time Temperature display	T1 Temp. data, (Area A) T1 Hi.A data (Area B), T1 Lo.A data(Area C)
T2 Real-time Temperature display	T2 Temp. data, (Area A) T2 Hi.A data (Area B), T2 Lo.A data (Area C)
T1-T2 Real-time Temperature display	T1 - T2 Temp. data(Area A) T1 data (Area B), T2 data, (Area C)

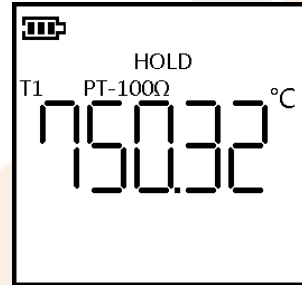
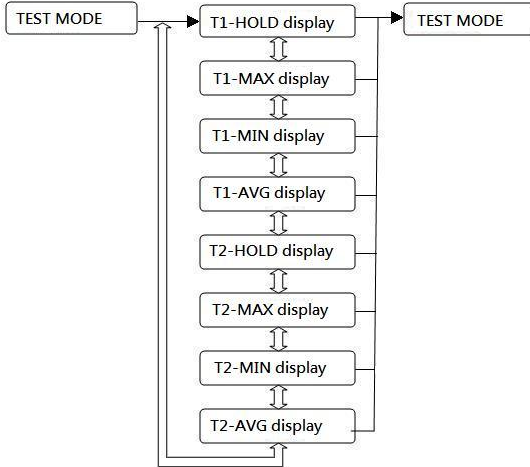
※Warning alert

When the temperature is higher than the **HI.A**, the **HI.A** symbol will flash.
 When the temperature is lower than the **LO.A**, the **LO.A** symbol will flash.
 The buzzer will make the warning sound if it is turned on.

※Please let go off all keys, while waiting for the reading test mode and setting mode to return to the testing mode.

B. Readings hold mode

Under the testing mode, press **[Fn]** to enter hold mode, and press **[Fn]** to return to the testing mode. Press **[◀]** and **[▶]** key to switch the display condition. The data will be deleted when the mode or system are changed.



Condition	Display content
T1-HOLD display	Lock the T1 Temperature data
T1-MAX display	T1 Maximum Temperature data
T1-MIN display	T1 Minimum Temperature data
T1- AVG display	T1 Average Temperature data
T2-HOLD display	Lock the T2 Temperature data
T2-MAX display	T2 Maximum Temperature data
T2-MIN display	T2 Minimum Temperature data
T2-AVG display	T2 Average Temperature data

C. Setting Mode

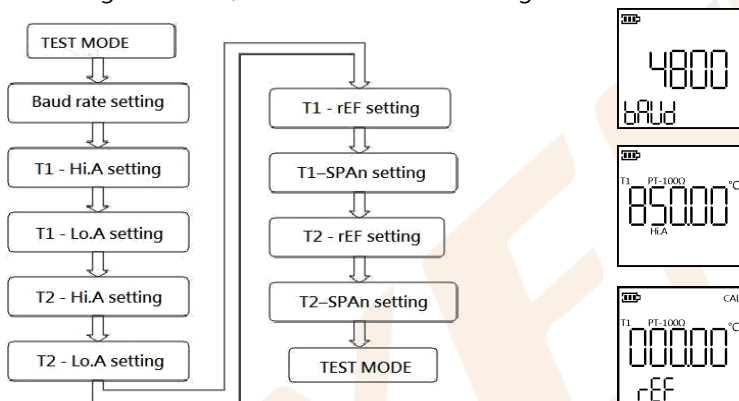
Under the testing mode, press **[Fn]** over 2 seconds to enter the setting mode.

Press **[Fn]** for over 2 seconds to switch to the next setting mode.

Push **[◀]** key to increase the value, Push **[▶]** key to reduce the value

Push **[Fn]** key to change digit

When all settings are done, it will return to the testing mode.



Display content	Description
baud display	Baud Rate data options
T1 - Hi.A display	T1 Temp. high point alert settings
T1 - Lo.A display	T1 Temp. low point alert settings
T2 - Hi.A display	T2 Temp. high point alert settings
T2 - Lo.A display	T2 Temp. low point alert settings
T1 - rEF display	T1 Temp. low point ref settings
T1 - SPAn display	T1 Temp. high point span settings
T2 - rEF display	T2 Temp. low point ref settings
T2 - SPAn display	T2 Temp. high point span settings

※The initial setting of baud rate is 4800.

Limitation Range Settings:

Alarm settings highest value: + 850.0°C (+1562.0°F)

Alarm settings Lowest value: - 200.0°C (- 328.00°F)

Deviation setting range: ± 100.00°C; Start with 0.00°C (± 180.00°F; Start with 0.00°F)

Span setting range: 0.00% ~ 200.00%; starts with 100.00%

■ RS-232 transfer protocol

RS-232 the transmission end is one way transfer via the three wires (touch ground) to input and output.

Using the original transmission line or cable under 10m is recommended.

Baud rate: 57600, 19200, 9600, 4800

Transfer status: / 8 / N / 1

Transfer content: (8BIT)

Read Holding Registers by Function 03H

A. Request Data Frame

Ex: Read the data from address 0x0000 (Read 4-byte of data from address 0x0000)

Slave address	Function	Starting address Hi	Starting address Lo	No. of Byte Hi	No. of Byte Hi	CRC Lo	CRC Hi
01H	03H	00H	00H	00H	04H	44H	09H

Response Data Frame

Ex Response value=4-Byte

Response Data= " 80003"

Slave address	Function	Byte count	Data Hi	Data Middle	Data Lo	Data Last	CRC Lo	CRC Hi
01H	03H	04H	00H	01H	38H	83H	F9H	92H

$0x00013883=80003 \cdot \text{Real value} = 80003/100 \cdot \text{Real value} = 800.03$

B. Request Data Frame

Ex: Read the data from address 0x0000 (Read 8-byte of data from address 0x0000)

Slave address	Function	Starting address Hi	Starting address Lo	No. of Byte Hi	No. of Byte Hi	CRC Lo	CRC Hi
01H	03H	00H	00H	00H	08H	44H	0CH

Response Data Frame

Ex Response value= 8-Byte Response Data' s = " 80003" and " 81067"

Slave address	Function	Byte count	Data(1) Hi	Data(1) Middle	Data(1) Lo	Data (1) Last
01H	03H	08H	00H	01H	38H	83H

Data(2) Hi	Data (2) Middle	Data(2) Lo	Data (2) Last	CRC Lo	CRC Hi
00H	01H	3CH	ABH	C5H	0EH

0x00013883=80003 · Real value = 80003/100 · Real value = 800.03

0x00013CAB=81067 · Real value = 81067/100 · Real value = 810.67

☆°C and °F set is data of MOD "bit 05" at address 0x000A

C .Request Data Frame

Ex: Read the data from address 0x0008 (Read 10-byte of data from address 0x0008)

Slave address	Function	Starting address Hi	Starting address Lo	No. of Byte Hi	No. of Byte Hi	CRC Lo	CRC Hi
01H	03H	00H	08H	00H	0AH	44H	0FH

Response Data Frame

Ex Response value= 10-Byte

Slave address	Function	Byte count	Data(1) Hi	Data(1) Middle	Data(1) Lo	Data (1) Last
01H	03H	0AH	03H	E8H	FCH	18H

Data(2) Hi	Data (2) Middle	Data(2) Lo	Data (2) Last	Data(3) Hi	Data(3) Lo	CRC Lo	CRC Hi
0BH	B8H	07H	D0H	00H	02H	CDH	81H

Data(1) Hi and Data(1) Middle is value of T1-Hi.A=0x03E8=1000

Data(1) Lo and Data(1) Last is value of T1-Lo.A=0xFc18=-1000

Data(2) Hi and Data(2) Middle is value of T2-Hi.A=0x0BB8=3000

Data(2) Lo and Data(2) Last is value of T2-Lo.A=0x07D0=2000

Data(3) Hi and Data(3) Lo is value of MOD=0x0002

Bit 15~bit 6 no use

1. bit 05 is °F/°C >>> 0=°C
 >>> 1=°F
2. bit 04 is PT100/PT1K >>> 0=PT100
 >>> 1=PT1K
3. bit 03 is T2-Error >>> 1= T2 ERROR
4. bit 02 is T1-Error >>> 1= T1 ERROR
5. bit 01~bit 00 is Power >>> 2=Power 74~50%

Example

Set mode 1. Temperature unit=°C

2. RTD=PT100

3. T1 no ERROR

4. T2 no ERROR

5. Power74~50%

Address	Data name	Data size
0000h	T1 Real-Time Data(Hold)	4-Byte
0001h	T1 Max	4-Byte
0002h	T1 Min	4-Byte
0003h	T1 Avg	4-Byte
0004h	T2 Real-Time Data(Hold)	4-Byte
0005h	T2 Max	4-Byte
0006h	T2 Min	4-Byte
0007h	T2 Avg	4-Byte
0008h	First 2-byte = T1-Hi.A Last 2-byte = T1-Lo.A	4-Byte
0009h	First 2-byte = T2-Hi.A Last 2-byte = T2-Lo.A	4-Byte
000Ah	Set mode = MOD	2-Byte

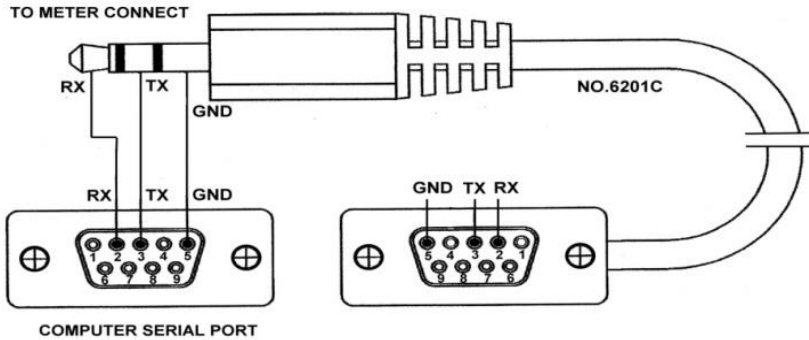
Set mode MOD

Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 09	Bit 08
X	X	X	X	X	X	X	X

Bit 07	Bit 06	Bit 05	Bit 04	Bit 03	Bit 02	Bit 01~ Bit 00
X	X	°F=1 °C=0	PT100=0 PT1K=1	T2 Error=1	T1 Error=1	Power

☆Power Meter is divided into 4 parts 11=100~75% 10=74~50%
 01=49~25% 00=24~0%

D. RS-232 connecting cable



■ Precautions

1. This instrument has a waterproof function; please do not use it in a high temperature Environment or with corrosive materials to avoid leakage or damage.
2. To avoid the problems that might occur when connecting to the computer, the Rixen USB computer interface cable and windows software (Model No. TU-USB-C) is recommended.
3. Please keep the temperature stabled when measuring the temperature of an object to obtain a more accurate result.
4. When the instrument shows power shortage warning, please immediately replace the batteries to avoid incorrect readings.
5. When the instrument is not in use for a long time, please put the instrument and all Accessories in the protective case, and kept it in a clean and dry environment, and please avoid direct sunlight
6. If there are any operation questions or malfunction, please contact your local distributor or our service department