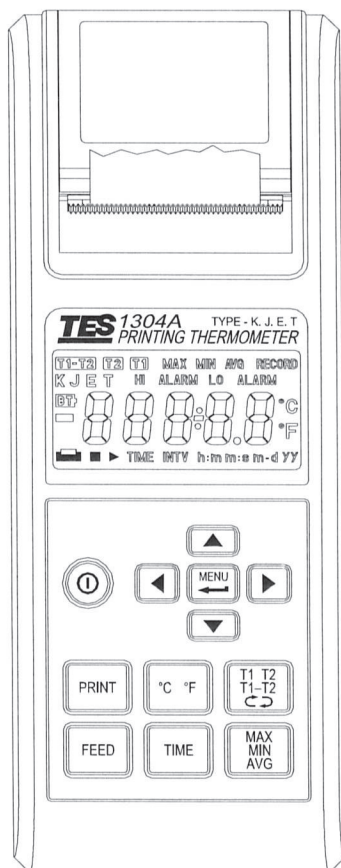


TES

TYPE - K.J.E.T. PRINTING THERMOMETER

TES-1304A

INSTRUCTION MANUAL



TES ELECTRICAL ELECTRONIC CORP.

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1. SAFETY INFORMATION

- ❑ Read the following safety information carefully before attempting to operate or service the meter.
- ❑ Use the meter only as specified in this manual; otherwise, the protection provided by the meter may be impaired.
- ❑ Caution when working with voltages above 60V_{DC} or 24V_{AC} RMS. Such voltages pose a shock hazard.

Environment conditions

- ① Altitude up to 2000 meters
- ② Indoor use only
- ③ Relatively humidity 90% max.
- ④ Operation Temperature 0 ~ 50°C (32°F ~ 122°F)

Maintenance & Clearing

- ① Repairs or servicing not covered in this manual should only be performed by qualified personnel.
 - ② Periodically wipe the case with a dry cloth. Do not use abrasives or solvents on this instruments.
- Do not use abrasives or solvents on this instruments.

U.S. Pat. No. Des. 460,923

Safety symbols

 Comply with EMC

2. SPECIFICATIONS

2-1 General Information

Display : 4 1/2 LCD

LCD Annunciator :

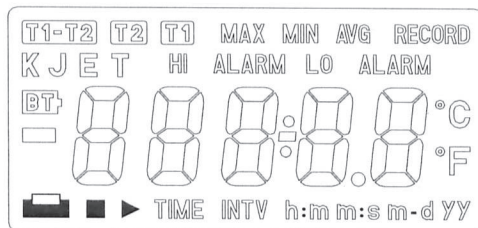


Fig-1

T1-T2, **T2**, **T1** : Indicating function at channel

MAX, MIN, AVG : Maximum or Minimum or Average of reading
Average = $\frac{1}{2}(\text{Previous reading} + \text{Current reading})$

K J E T : Type K, J, E, T thermocouple

HI ALARM : Over high temp point

LO ALARM : Under/Equal Low temp point

BT : Low battery symbol

 : Negative polarity; No symbol for positive polarity

°C, °F : Celsius unit or Fahrenheit

 : Printer action symbol

,  : Interval printing Start symbol/Stop symbol

TIME : Calendar time

INTV : Interval printing symbol

h:m : Hour : Minute symbol

m:s : Minute: Second symbol

m-d : Month – Day symbol

yy : Symbol year

 : Seven segments for decimal count

Over Range Indication :  or - appears

Low Battery Indication :

BT shows up when the battery's voltage below the operating voltage.

Sampling Rate : About 1 time per second

Power Requirement :

6pcs 1.5V size AAA alkaline batteries or 12V DC Adaptor /500mA minimum.

Battery Life (typ.) :

Approx. 125 hours. (interval printing = 60 minutes, excluding beeper)
135 hours (without printing & beeper)

Input protection : 60Vdc/24Vrms

Operating Temperature and Humidity :

0°C to 50°C (32°F to 122°F) below 90% RH

Storage Temperature and Humidity :

-10°C to 60°C (14°F to 140°F) below 70% RH

Dimensions : 193 (L) × 74 (W) × 38(H) mm

Weight :

Approx. 355g with batteries & thermo-paper.

Accessories :

Caring case, Instruction manual, Batteries, 2 Rolls of thermal-paper,
Alarm (OVER, UNDER) MINI DIN cable, Type K probe.

Printer :

Thermo-printing type with 16 characters per line using 38mm width plain thermo-paper.

Instant printing : Press-on printing anytime with 2 line of printing.

Interval printing : Range from 00:00:03 to 23:59:59, according to interval time, continuous printing, can be set in two ways, stopped in three ways.

2-2 Electrical Specifications

Accuracy at $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$, below 80%RH

Type K: $\pm(0.01\% \text{ rdg} + 0.5^{\circ}\text{C})$ ($0 \sim 1372^{\circ}\text{C}$)

$\pm(0.01\% \text{ rdg} + 0.9^{\circ}\text{F})$ ($32 \sim 2501^{\circ}\text{F}$)

Type J : $\pm(0.01\% \text{ rdg} + 0.5^{\circ}\text{C})$ ($0 \sim 1200^{\circ}\text{C}$)

$\pm(0.01\% \text{ rdg} + 0.9^{\circ}\text{F})$ ($32 \sim 2192^{\circ}\text{F}$)

Type E: $\pm(0.01\% \text{ rdg} + 0.5^{\circ}\text{C})$ ($0 \sim 1000^{\circ}\text{C}$)

$\pm(0.01\% \text{ rdg} + 0.9^{\circ}\text{F})$ ($32 \sim 1832^{\circ}\text{F}$)

Type T: $\pm(0.01\% \text{ rdg} + 0.5^{\circ}\text{C})$ ($0 \sim 400^{\circ}\text{C}$)

$\pm(0.01\% \text{ rdg} + 0.9^{\circ}\text{F})$ ($32 \sim 752^{\circ}\text{F}$)

Type K/J/E/T: $\pm(0.01\% \text{ rdg} + 1.0^{\circ}\text{C})$ ($-200 \sim 0^{\circ}\text{C}$)

$\pm(0.01\% \text{ rdg} + 2.0^{\circ}\text{F})$ ($-328 \sim 32^{\circ}\text{F}$)

Resolution: $0.1^{\circ}\text{C}/0.1^{\circ}\text{F}$

Temperature Coefficient:

0.1 times the applicable accuracy specification per $^{\circ}\text{C}$ from 0°C to 18°C and 28°C to 50°C (32°F to 64°F and 82°F to 122°F)

Measurement Range:

Type K: $-200 \sim 1372^{\circ}\text{C}$ ($-328 \sim 2501^{\circ}\text{F}$)

Type J: $-200 \sim 1200^{\circ}\text{C}$ ($-328 \sim 2192^{\circ}\text{F}$)

Type E: $-200 \sim 1000^{\circ}\text{C}$ ($-328 \sim 1832^{\circ}\text{F}$)

Type T: $-200 \sim 400^{\circ}\text{C}$ ($-328 \sim 752^{\circ}\text{F}$)

3. NAME OF PARTS AND POSITION

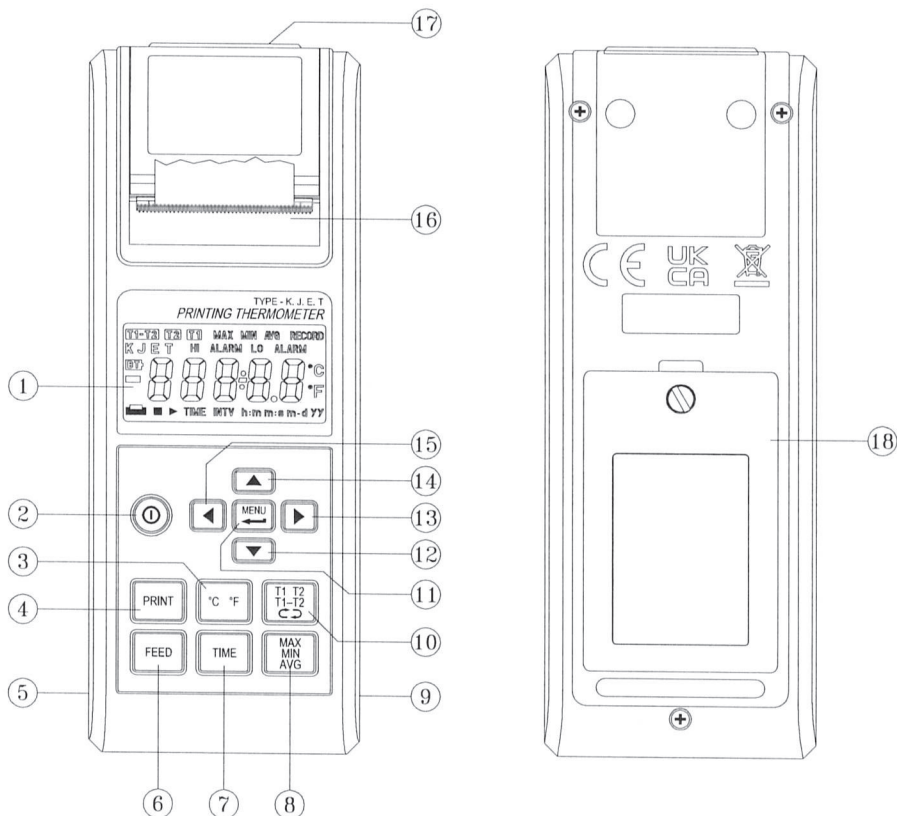


Fig-2

1. LCD :
Measured values, unit, symbols, and decimal points are displayed.
2. POWER :
Button for power on/off
3. UNIT :
Button for exchanging temperature unit °C and °F.

4. PRINT :

① Button for start printing currently. The format as below:

LINE 1 1 0 : 5 1 : 1 2 1 1 - 0 2

LINE 2 T 1 K - 0 0 2 3 . 0 °C

Line 1 printing time hour: minute: second, month- day, line 2 printing measuring channel, type, value and unit.

② Stop interval printing at any time and printer will print current data.

③ Press this button for 2 seconds, the printer will be set to interval printing status, and won't stop unless this button is pressed again or FEED button is pressed.

5. 12V 1A ADAPTOR SOCKET (3.5 ϕ)

6. FEED PAPER (Fig-3) :

① Button for moving forward thermo-paper one line.

② Perform force stop printing, and skip any printing data.

7. TIME :

Button for calendar.

8. MAX/MIN/AVG :

Button for circularly selecting maximum, minimum and average of reading on measuring channel T₁/ T₂/ T₁-T₂. Press this button for 3seconds to exit this mode.

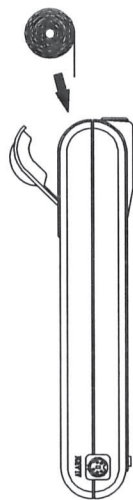


Fig-3

9. Hi/ Low Alarm output connector :

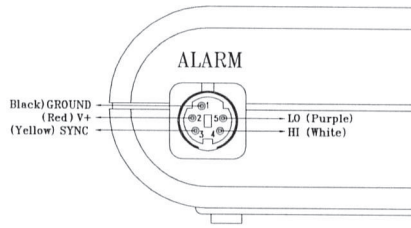


Fig-4

Pin 1: GND (external supply low voltage)

Pin 2: VCC (external supply high voltage)

Pin 3: SYNC (external trigger signal)

Pin4 (HiAlarm) and pin5 (LowAlarm) signals have to be synchronized with pin3. The pin5 and pin4 will not function (always low) unless SYNC (pin3) is in the high state. If SYNC is a low signal, then pin4 and pin5 will be in the low state.

Pin 4: HiAlarm

If the reading is higher than the high alarm point, then (pin 4) will be in high state, otherwise, in Low state.

Pin 5: LoAlarm

If the reading is lower than / equal the low alarm point, (pin 5) will be in high state, otherwise, in low state.

Description of the MINI DIN cable:

- ① Red wire : VCC (external supply high voltage)
- ② Black wire : GND (external supply low voltage)
- ③ Yellow : SYNC (external trigger signal)
- ④ White : HiAlarm
- ⑤ Purple : LowAlarm

$$\text{GND} \leq \text{SYNC} \leq \text{VCC}$$


10. $T_1/T_2/T_1-T_2$ measuring :

Button for select display methods, T_1 , T_2 , T_1-T_2 , cycle and normal cycle mode means it will perform T_1 , T_2 , T_1-T_2 measuring circularly.

11. MENU :

Button for moving to the desired parameter.

Parameters (in sequence):

K/J/E/T (type of thermocouple)

00/01 (interval printing enable or disable)

$^{\circ}\text{C}/^{\circ}\text{F}$ (high/ low alarm temperature unit)

Hi/Lo Alarm (high/low alarm point ranging from measure highest and measure lowest of temp type.)

Ex: K Type (1372 ~ -200.0 $^{\circ}\text{C}$)

J Type (1200 ~ -200.0 $^{\circ}\text{C}$)

INTV (printing interval ranging from 00h:00m:03s to 23h:59m:59s)

Interval printing start / stop time (ranging from 00h:00m to 23h:59m)

Calendar year (ranging from 1900 to 2999 year)

Calendar month-day (ranging from 01-01 to 12-31)

Calendar hour-minute (ranging from 00h:00m to 23h:59m)

Calendar minute-second (ranging from 00m:00s to 59m:59s)

12. UP :

Button for increasing the value of parameters, increasing the parameter rapid.

13. RIGHT : Button for moving to the desired parameter.

14. DOWN : Button for decreasing the value of parameters.

15. LEFT :

Button for start/stop set-up parameters mode.

The value will be increased much fast if user do not release the key.

16. Way out for thermo-paper.

17. Temperature probe sockets.

18. Battery cabinet and cover :

6 pcs 1.5V size AAA alkaline batteries.

4. PRECAUTIONS AND PREPARATIONS FOR MEASUREMENT

1. Before getting use of this instrument, examine it to make sure no shipping damage occurring. Otherwise notify your dealer.
2. Save all packing materials until you are sure that this unit can normally operate.
3. Be sure that batteries are correctly placed in the case or adaptive 12V Adaptor is in correct connection.
4. An unsecured battery cover will cause error measuring.
5. To avoid battery leakage problem, remove batteries if this meter will not be used for a long time.
6. Do not use or store this meter outside the operating / storage environment.

5. OPERATIONAL GUIDE

- A. This meter can be supplied with batteries or 12V Adaptor, If using batteries :

Remove the rear cover, and install batteries, pay attention to the polarity of battery socket. If using 12V Adaptor, make sure that it is in good connection to the Adaptor socket of the meter. Choose the right temperature probe for your application and insert it into the tempture probe socket.

- B. Press the  button to power on the meter. If “” appears, it indicates no temperature probe or the probe is broken.

- C. To start the parameter setting, press “” button, to stop, press it again. Press left and right switch ( or  button) to select the type of parameter; up and down switch ( or  button) to increase or decrease the value of parameters. When modifying parameters, the symbol will flick.

The parameter in detail sequence:

1. INTERVAL PRINTING STATUS (01/ENABLE, 00/DISABLE):
LCD displays as Fig-5

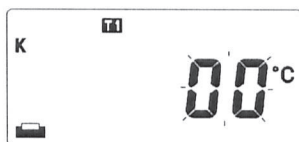


Fig-5

2. TYPE OF THERMOMETER (K/J/E/T) : LCD displays as Fig-6



Fig-6

3. ALARM UNIT ($^{\circ}\text{C}/^{\circ}\text{F}$): LCD displays as Fig-7



Fig-7

4. FIRST THREE DIGITS IN HI ALARM (-399~399):
LCD displays as Fig-8

Example :

Hi Alarm = 1234.5 $^{\circ}\text{C}$



Fig-8

5. LAST TWO DIGITS IN HI ALARM (00~99):
LCD displays as Fig-9



Fig-9

6. FIRST THREE DIGITS IN LO ALARM (-399~399):
LCD displays as Fig-10

Example :

Lo Alarm = -50.8 $^{\circ}\text{C}$



Fig-10

7. LAST TWO DIGITS IN LO ALARM (00~99):
LCD displays as Fig-11



Fig-11

8. HOUR OF INTERVAL PRINTING (00~23):

LCD displays as Fig-12



Fig-12

9. MINUTE OF INTERVAL PRINTING (00~59):

LCD displays as Fig-13



Fig-13

10. SECOND OF INTERVAL PRINTING (03~59):

LCD displays as Fig-14

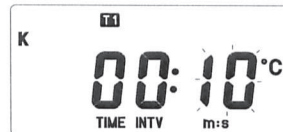


Fig-14

11. HOUR OF START INTERVAL PRINTING TIME (00~23):

LCD displays as Fig-15



Fig-15

12. MINUTE OF START INTERVAL PRINTING TIME(00~59):

LCD displays as Fig-16



Fig-16

※ NOTE : Start print time must less than stop print time.

13. HOUR OF STOP INTERVAL PRINTING TIME (00~23) : LCD displays as Fig-17



Fig-17

14. MINUTE OF STOP INTERVAL PRINTING TIME (00~59): LCD displays as Fig-18



Fig-18

15. FIRST TWO DIGITS OF CALENDAR YEAR (19~29): LCD displays as Fig-19



Fig-19

16. LAST TWO DIGITS OF CALENDAR YEAR (00~99): LCD displays as Fig-20



Fig-20

17. MONTH DIGITS OF CALENDAR MONTH-DAY (01~12): LCD displays as Fig-21

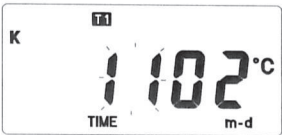


Fig-21

18. DAY DIGITS OF CALENDAR MONTH-DAY (01~31):

LCD displays as Fig-22



Fig-22

19. HOUR DIGITS OF CALENDAR HOUR-MINUTE (00~23):

LCD displays as Fig-23



Fig-23

20. MINUTE DIGITS OF CALENDAR HOUR-MINUTE (00~59):

LCD displays as Fig-24



Fig-24

21. SECOND DIGITS OF CALENDAR MINUTE-SECOND (00~59) : LCD

displays as Fig-25



Fig-25

If interval printing is enabled by setup parameters, then the printer will action as below:

11 : 54 : 00 11-02
INTV : 00 : 00 : 10

First two lines:

Line1: hour:minute:second month-day (start printing time)
Line2: interval printing time hour:minute:second

Following two lines:

Line1: hour:minute:second month-day (interval printing time)
Line2: measuring channel, type, value and unit.

Last two lines:

Line1: hour:minute:second month-day (stop pointing time)
Line2: interval printing time hour:minute:second

※ NOTE : If print button is pressed during this period, then the last two lines won't be printed.

If print button is hold for 2 seconds, it will perform as the following :

12 : 58 : 18 11-02
INTV : 00 : 00 : 10

12 : 58 : 28 11-02
T1 K - 0039.5 °C

12 : 58 : 38 11-02
T1 K - 0L. °C

12 : 58 : 48 11-02
T1 K - 0L. °C

12 : 58 : 58 11-02
T1 K - 0035.2 °C

12 : 59 : 08 11-02
T1 K - 0L. °C

12 : 59 : 18 11-02
T1 K - 0037.0 °C

12 : 59 : 20 11-02
T1 K - 0L. °C

First two lines:

Line1: hour:minute:second month-day

Line2: interval printing time hour:minute:second

Following lines:

Line1: hour:minute:second month-dat (interval printing time)

Line2: function test channel, type and reading with polarity,
decimal point and unit.

To stop printing, press PRINT button, or FEED button if FEED button is pressed,
skip printing if PRINT button is pressed last two lines data.

Thermo-paper prints approx 610 datas.

6. HOW TO SETUP INTERVAL PRINT

1. Setup interval print with 24 hours limitation.

- ① Entering menu mode by pressing MENU button.
- ② Enable interval print bit as described in page 11 fig-5 by pressing  /  button.
- ③ Use  /  to change menu function to interval print function as described in page 13 fig-12.
- ④ Setup Interval/Start/Stop print time by pressing  /  button as described in Page 13, 14, Fig-12 to fig-18, note that the start print time must less than the stop print time in this mode.
- ⑤ Set the interval time in scan mode, ranging from minimum 00:00:07 to maximum 23:59:59.
- ⑥ Press MENU again to enter normal function. The INTV symbol will be shown on LCD.

2. Setup interval print without 24 hours limitation.

- ① Entering Menu mode by pressing MENU button.
- ② Disable Interval Print bit as described in page 11 fig-5 by pressing  /  button.
- ③ Setup Interval Print Time by pressing  /  button as page 13, fig-12 to fig-14.
- ④ Set the interval time in scan mode, ranging from minimum 00:00:07 to maximum 23:59:59.
- ⑤ Press MENU again to enter normal function.
- ⑥ Press and hold PRINT button for about 3 second, the INTV symbol will be shown on LCD.

3. During the Interval Print period, no button can be available except PRINT and FEED button. When the PRINT button has been pressed, one more line be printed, and the printing function will be stoped at once when the FEED button has been pressed.

4. Sample printing

normal printing T1 status :

11 : 53 : 32 02-17
T1 K 0020.7°C

normal printing T2 status :

11 : 54 : 00 02-17
T2 K -0020.0°C

normal printing T1-T2 status :

11 : 54 : 09 02-17
T12K OL.°F

scan printing status :

11 : 54 : 22 02-17
T1 K 0021.6°C

11 : 54 : 23 02-17
T2 K 0021.6°C

11 : 54 : 26 02-17
T12K 0000.0°C

7. BATTERY CHECK-UP & REPLACEMENT

1. As battery power is not sufficient, **BT** will be shown on LCD. Replace with 6 pcs new of 1.5V size AAA batteries is required.
2. After temperature probe is disconnected and the meter is power off, remove the battery cover.
3. Remove batteries from the holder and replace it with 6 pcs of 1.5V size AAA alkaline batteries.
4. Secure the battery cover.

5. Prevention of battery fluid leakage:

- ① When the battery power is low, replace the new battery in order to avoid the further battery fluid leakage possibility.
- ② In long-term, when the instrument is not in use, to avoid the battery liquid leak damage, please remove battery out of the instrument.

4. Sample printing

normal printing T1 status :

11 : 53 : 32 02-17
T1 K 0020.7°C

normal printing T2 status :

11 : 54 : 00 02-17
T2 K -0020.0°C

normal printing T1-T2 status :

11 : 54 : 09 02-17
T12K OL.°F

scan printing status :

11 : 54 : 22 02-17
T1 K 0021.6°C

11 : 54 : 23 02-17
T2 K 0021.6°C

11 : 54 : 26 02-17
T12K 0000.0°C

7. BATTERY CHECK-UP & REPLACEMENT

1. As battery power is not sufficient, **BT** will be shown on LCD. Replace with 6 pcs new of 1.5V size AAA batteries is required.
2. After temperature probe is disconnected and the meter is power off, remove the battery cover.
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4. Secure the battery cover.

5. Prevention of battery fluid leakage:

- ① When the battery power is low, replace the new battery in order to avoid the further battery fluid leakage possibility.
- ② In long-term, when the instrument is not in use, to avoid the battery liquid leak damage, please remove battery out of the instrument.

8. OPTIONAL ACCESSORY

Type K thermocouple

Model	Range	Tolerances	Description
TP-K01 Bead probe	-50°C to 200°C -58°F to 392°F	±2.2°C or ±0.75% ±3.6°F or ±0.75%	100cm length with tape in salvation. Maximum insulating temperature : 200°C
TP-K02 immersion probe	-50°C to 600°C -58°F to 1112°F	±2.2°C or ±0.75% ±3.6°F or ±0.75%	130mm handle with 100cm Compensating wire
TP-K03 Surface probe	-50°C to 400°C -58°F to 752°F	±2.2°C or ±0.75% ±3.6°F or ±0.75%	100mm handle with 100cm Compensating wire

TP-K01: Available for general condition, especially for complex and any place hard to reach.

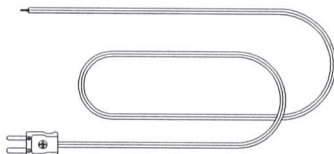


Fig-26

TP-K02: Available for temperature measurement of liquid, gels or air

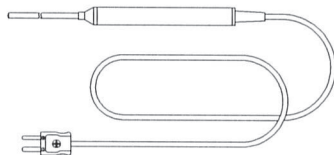


Fig-27

TP-K03: Available for flat or curved surface measurement

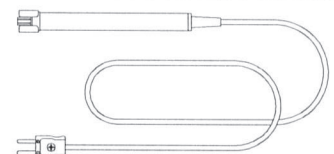


Fig-28



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