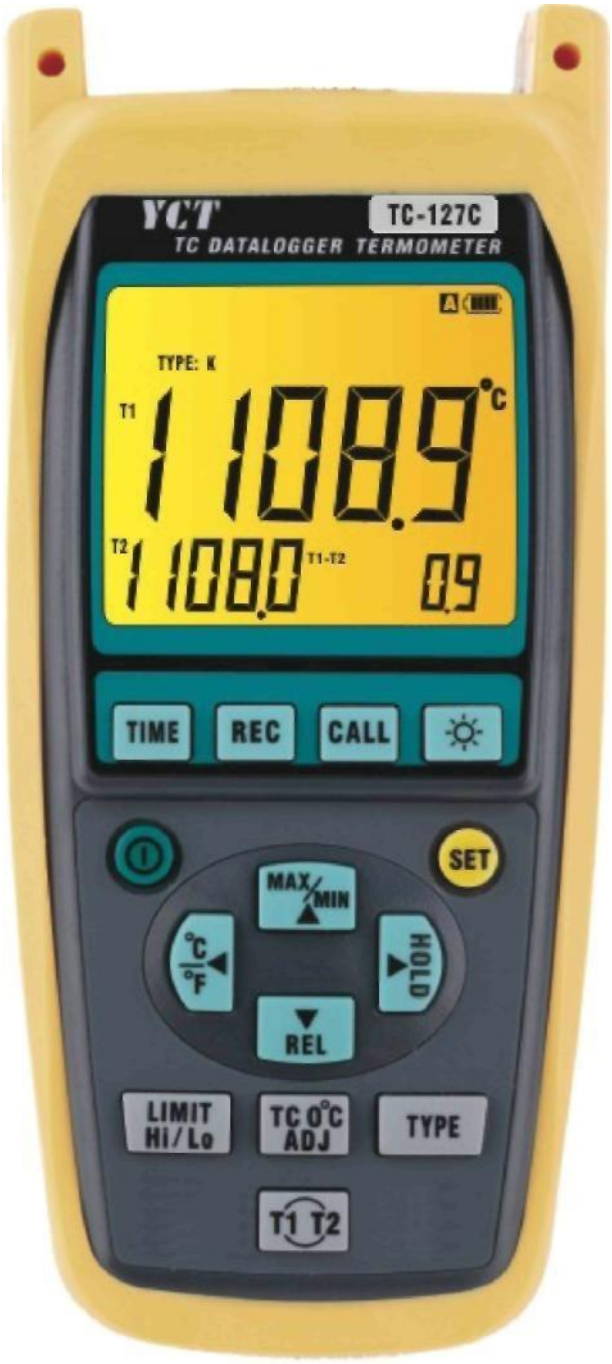
HAND-HELD THERMOMETER -DATALOGGER
MODEL : TC-127C



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Introduction

Hand-held thermometers of the TC-1XXX series are digital thermometers with a microprocessor. The model is determined based on the following table:

TC – 1X1X2X3

X1	**1**	**T1**	**Input: thermocouple**
	2	**T1 * T2**	
X2	**1**	**K**	**Thermocouple type**
	2	**K - J**	
	3	**K- J - T**	
	4	**K - J -T- E**	
	5	**K-J -T-E-R**	
	6	**K-J-T-E-R-S**	
	7	**K-J- T-E-R-S-N**	
X3	**Empty**	**It does not have an IrDA output port, a datalogger and a connection to a computer**	
	A	**With the possibility to connect to a computer**	
	B	**With a datalogger and the possibility to connect to a computer**	
	C	**With datalogger, equipment for recording and saving electronic diagrams and communication with a computer**	

TC-127C device supports IrDA output port and communication with a computer (USB or RS232)

- **Using a computer and a USB port for communication, you must select IrDA-USB for signal transmission**
- **Using a computer and RS232 port for communication, you must select IrDA-RS232 for signal transmission**

■ Equipment (accessories)

General (common) equipment (accessories)

- **Batteries DC-1.5V /UM-4 x 4 pieces**
- **Device – 1 piece**
- **K-type thermocouple (X1=1 "one thermocouple"; X1=2 "two thermocouples")**
- **User manual – 1 piece**

For communication with a computer: for model X_3=A, B, C

- **User manual for Temp Monitor software – 1 piece**
- **IrDA-USB or IrDA-RS232 communication cable – 1 piece**
- **Temp Monitor software on CD – 1 piece**

■ Safety information

⚠ Warning

Warnings identify conditions and actions that may cause danger to the user. To avoid electric shock or any malfunction, please follow the instructions below:

- **Before using the thermometer, check the housing. Do not use the thermometer if it is damaged. Note any cracks or missing plastic. Pay special attention to the insulation around the connector.**
- **Disconnect the thermocouple from the thermometer before opening the housing.**
- **When the battery symbol ( ) appears on the display, and you hear a piercing sound similar to a buzzing sound, then you must replace the battery urgently. A possible wrong reading can lead to damage.**
- **Do not use the thermometer if it is inoperative. Protection may be reduced. If there is any doubt as to the correctness of the thermometer, you must send it for service.**
- **Do not use the thermometer in an area with explosive gas, fumes or dust.**
- **Do not expose the thermometer to a higher voltage than is marked on the thermometer, between thermocouples or between any thermocouple and earthing.**
- **The use of voltage on the thermocouple or earthing is not recommended.**
- **The use of thermocouples for direct measurement on generators or equipment is not recommended, the occurrence of a strong electric shock that can cause bodily injury is possible.**
- **When measuring simultaneously with thermocouples, there is a possibility that a difference in voltage will appear and thus create an error in the readings. You need to use better insulation for the thermocouples.**

- **Do not use the thermometer when the thermometer cover is open.**
- **Do not use a thermometer to measure temperature in microwave ovens.**
- **When a thermocouple measures high or low temperatures, it must be used carefully, properly, or a person may be injured.**

ATTENTION!

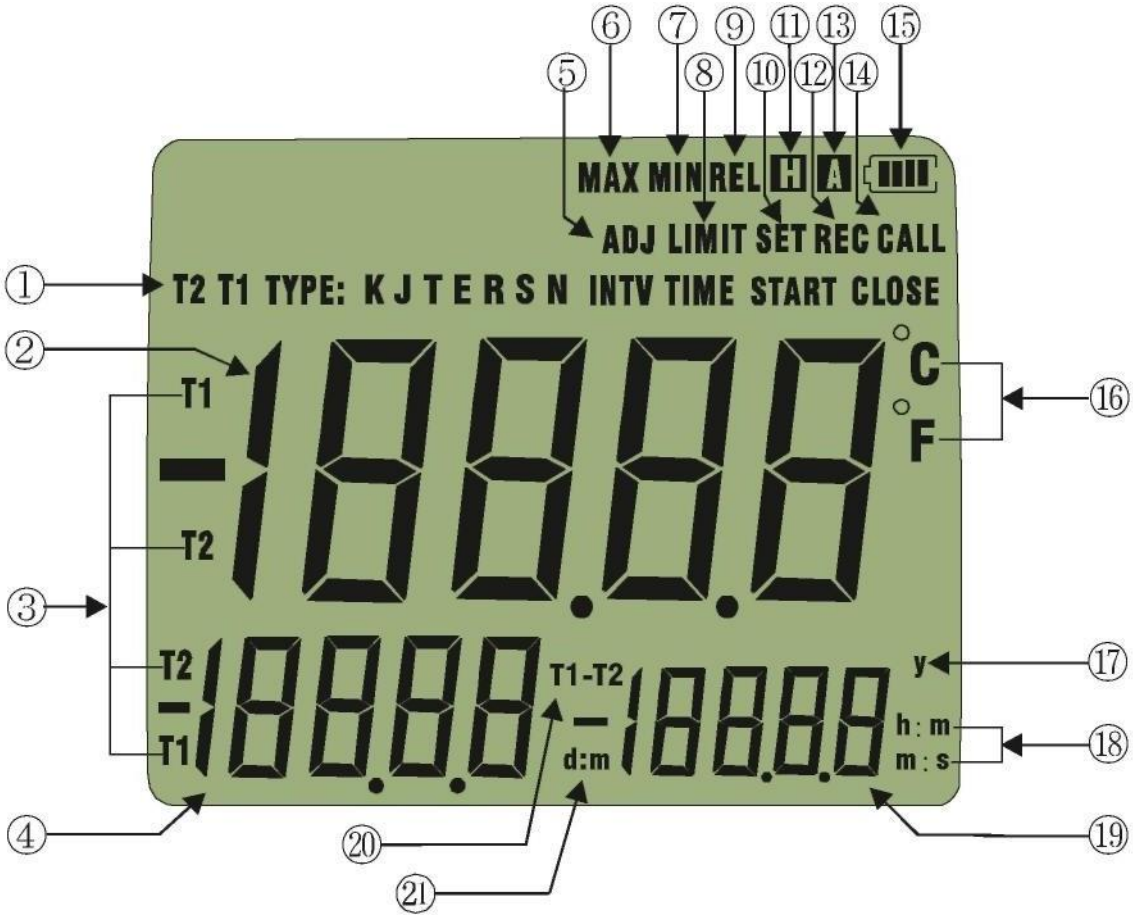
ATTENTION identifies conditions and actions that can cause damage to the thermometer and equipment during testing.

- **Use the prescribed thermocouples, functions, and ranges for your thermometer.**
- **Do not recharge dead batteries.**
- **To prevent explosions, do not dispose of batteries in fire.**
- **Follow applicable laws and regulations when disposing of dead batteries.**
- **Compare the + and - poles of the battery with the symbols on the housing.**

PART LABELS

①	**Housing**	⑥	**IrDA output port**
②	**LCD display**	⑦	**Tl- TC jack input**
③	**Buttons for control functions**	⑧	**T2-TC jack input (for X1=2)**
④	**Battery**	⑨	**Screw hole**
⑤	**Reset button**	⑩	**Battery cover**

DISPLAY ELEMENTS



1	Selecting thermocouple type T1 or T2	12	Switching to recording function
2	Main display	13	Automatic switch-off after 20 minutes
3	Main and secondary screens showing T1 or T2	14	Control of recorded records
4	Secondary display	15	Battery charge control
5	TC – 0°C switching, calibration function	16	Temperature unit
6	Main, secondary display for reading maximum values	17	Main display showing the "year"
7	Main, secondary display for reading minimum values	18	Third display showing "hours: minutes" or "minutes: seconds"
8	Main display for displaying alarm functions	19	Third display screen
9	Main display for reading relative value, third display for reading relative reference value	20	Third display for displaying "T_1-T_2" (Model X_1=1 does not have this function)
10	Performing the setting function	21	Secondary display showing time "day", "month"
11	Holding the reading on the display		

■ Symbol of battery charge and battery replacement

- Battery charge is shown by 5 divisions on the battery symbol ( ).
- When the battery symbol shows ( ) and a piercing sound like a buzzing sound is heard, it indicates that the battery is weak, you need to immediately turn off the device and replace the 1.5V batteries, to ensure reliability in the measurement reading.
- When the battery is weak, then the thermometer that works normally can automatically stop all the thermometer operations, main display will show BATT and the third display will show LO, after that immediately turn off the device, replace the 1.5V batteries and turn on the thermometer again.
- When replacing the battery, you must use a Phillips screwdriver to unscrew the battery cover, after replacing 4 new 1.5V batteries, put the battery cover back.
- When replacing the battery, first disconnect (take out) the thermocouple from the thermometer.
- When replacing the battery, pay attention to the poles, do not make a mistake.
- When the thermometer is not in use for a long time, please remove the batteries and reset the stored temperature, and protect it from moisture.
- If battery replacement takes longer than 30 seconds, the thermometer can be automatically reset and the calendar function can be entered directly.
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- If replacing the battery results in the display not being normal, you need to open the battery cover and press the RESET KEY with a small Phillips screwdriver, let the thermometer reset and directly enter the calendar function.

Buttons:

Thermometer switch on/off button

Assuming that the temperature unit is in °C, the main display will show the measured temperature T1. Using the X1=2 model, the secondary display shows the measured value of T2, and the third display shows the T1-T2 difference. If model X1=1 is used, the second display shows the date, month of the current calendar, and the third display shows the hour and minute. When the thermometer is off, preset the desired temperature value, then switch it on to regulate the off button.

Temperature unit button: Press the button to select the temperature display in (°C) or in (°F).

Maximum / Minimum button: Select the main display, the second display shows the maximum or minimum reading at the same time.

Button for holding temperature reading: **To hold the reading on the LCD display, press the button again to cancel this function.**

Ratio reading button: The main display shows the basic value reading, the third display shows the basic value, if the relative basic value is not assumed, press the "down" REL button, the main display will read it as the basic value. Press this button again to exit this function.

Alarm function button: When the main display shows a temperature higher than the set value, the alarm will show "Hi", or vice versa, if the temperature is lower than the set value, the alarm will show "Lo", the alarm will send signals. Press this button again to cancel this function.

0°C thermocouple setting button: Using the end of the same thermocouple T1 to measure at 0°C, using the T1 input jack at 0°C (32°F) and T1 the measured value will show on the main or secondary display, the third display will show the measured value of the cold end. Press

button to the left, press

button to the right, press

button up, press once again , press

down to bring it to the unit. The third display reads the temperature of the cold end (the cold end is approximately set in the range of 0.0°C ~ 50.0°C/32°F ~ 122°F) exceeding this measurement range may cause Err to occur, which causes thermocouple T1 to read 0.0°C (32°F).

Another way to adjust the temperature of the cold end is to hold the button

for 2 seconds, so that the temperature of the cold end will automatically appear on the third display, which will cause the temperature of T1 to be 0.0°C (32°). Pressing the button

again will complete the adjustment of the cold end value and the T1 input of the thermocouple will be powered correctly.

If using model X1=2 which has input jack T2. When the main display shows T2, use the same type of thermocouple as T2 type of thermocouple, using the T2 input jack to measure at 0°C and the reading for T2 measurement will appear on the main display, the third display will show the cold end value.

Use the button

to the left, press button

to the right, press button

up, additionally one more time, press button

down.

Setting the third display to read the cold end value (the cold end is approximately set in the range of 0.0°C ~ 50.0°C/32°F ~ 122°F), exceeding this measurement range may cause Err to occur, which causes thermocouple T2 to read 0.0°C (32°F).

Another way to adjust the temperature of the cold end is to hold the button

for 2 seconds, so that the temperature of the cold end will automatically appear on the third display, which will cause the temperature of T2 to be 0,0°C (32°F).
Pressing the button

again will complete the adjustment of the cold end value and the T2 input of the thermocouple will be powered correctly.

By switching off the device and switching it on again, the set values of the cold end for T1 and T2 may be lost.

***Button for optional selection of thermocouple type*:** Display shows the appropriate symbols of the selected thermocouple type. This is achieved by pressing the button 

to the left, the button 

to the right. Pressing it again completes the function of selecting the type of thermocouple.

Buttons T1 * T2 (for model X1=2: **The main and secondary displays show temperatures T1 and T2.**

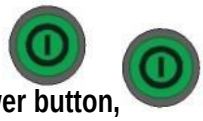
Time display button: Main display shows (20xx) year, secondary display shows (XX. XX) date.month, third display shows (XX: XX) hour:minute, press again to exit this function.

Button for recording function (for model X3=B, C)

Real-time recording function: Press the real-time button, the REC symbol appears on the display, the time interval (INTV) of the current recording is also set at the same time, the third display shows the current number of records, but when the third display shows the OU symbol, it means that the device is filled with records and can no longer receive data. Pressing it again cancels this function.

Setting the preset recording function - before this function appears, establish a certain recording time to be able to start this function. Hold down the REC button for two seconds, the display will show three symbols REC, START, CLOSE at the same time, indicating that the recording function has been established and waiting for the recording time to be set. When two symbols REC, START appear on the display, by quickly acting in accordance with the recording time interval, the recording will be performed. The third display shows the number of the record. When the two symbols REC, CLOSE appear again on the display, it indicates that one section of determining the record has been established and is awaiting the arrival of another section of the record. Pressing the button again and holding it for two seconds clears this function.

Energy saving during preset recording (for model X3=C) – when the preset recording function is performed in a time interval (INTV) ≥ 10 seconds to enable start.

***First level of energy savings*: Pressing the power button,** 

The symbol 

will light up which signals that only the power that is on the thermocouple is consumed, the other power supply is turned off. The main and secondary displays show values with a time interval (INTV) whereby the value of the record can be self-renewed.

Pressing the button  **again clears this function.**

Second level of energy savings: **Holding the button**  **for two seconds,**

the display will show the symbol 

, and REC symbol flashes and signals the end of any consumption in terms of displaying value and time of the record interval, whereby records and time of the record interval are displayed only in the time when the measurement is performed. Press the button

 again, for two seconds to switch the device off.

Button for viewing recorded values (for model X3=B, C)

The main, secondary display shows the last recorded value, and the third display shows the serial number of the current record. Press the button  to the left, button  to the right, button  up, once again. Press and hold the button   for two seconds to get a fast setting. Hold and press the button   for two seconds to slow down the display setup.

Considering the number of records AND the value of records, press the button again to cancel this function. Viewing the recorded values under the function can ask for the current number of records and record time according to the 

button, the main display shows the year, the secondary display shows the date and time, the third display shows the hours and minutes, pressing the  or  button on the third display shows the seconds. Pressing the  or  button again returns the hours and minutes to the third display.

Pressing the  button again, the time display of the record is lost.

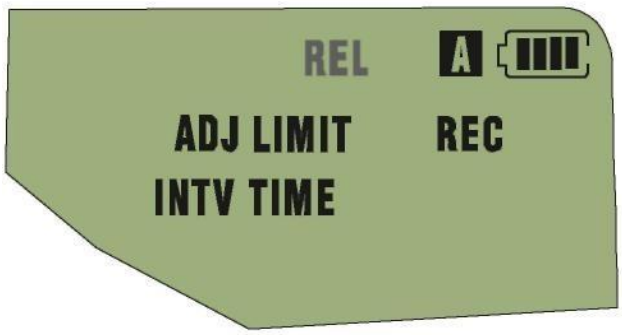
Viewing the recorded values within the function by holding button RECor and pressing the button  on the main display will print CLEA, pressing the button  the recorded values will be cleared, and the record viewing function will be canceled.

Display lighting button (for model X3= A, B, C): the button turns on the LCD lighting, after one minute it turns off automatically, pressing the button again turns off this function.

Reset button: With the help of a small Phillips screwdriver, open the battery cover and press the reset button, the system will start the reset function and return to the initial state. Except for SET ADJ (setting and adjusting the temperature from 0°C) all other values will be set. If you want to remove SET ADJ (setting and adjustment) and return to the factory-set parameter values, unlock the reset button again and press the button  continuously. When the TC-127C regains power and a short beep is heard, the SET ADJ settings will be reset to the factory settings. Release the RESET function and allow the device TC-127C to be powered, then SET TIME (set the continuous calendar) in the SET UP function and complete the entire setting by pressing the button  , after which it directly switches to normal operation mode.

SET function buttons

The SET function buttons: Enter the selection of SET functions, the display shown in the form of a map



shows the symbols of the selected functions, using the button and the button, select the symbol of the function the selected function will lit up, pressing the button again confirms the selected function .

SET REL (relative basic value): The display shows the SET and REL symbols on the clear main display, at the same time the secondary display shows the value, and the third display shows the basic value. If the basic value has never been set or it is the first use, the character 0 will be displayed, using the button to the left, the button to the right, the button up, additionally one more time, the button down to set the relative basic value.

When there is no relative basic value, hold the button, and press the button after which the third display will show CLEA, then press the button which will lead to the deletion of the basic value, at the same time, the third display will show 0. When the basic value is set Correctly, press the button to complete the basic value setting.

SET ADJ (setting – setting the thermocouple to 0°C); When the main display shows the value for T1, the setting display will appear. The SET and ADJ symbols and the T1 symbol will be shown simultaneously on the main display, and the secondary display will not show anything. Use a thermocouple of the same type as the T1 type, at the T1 input to measure 0°C (32°F) and the measurement for T1 will be shown on the main display.

The third display will show the reading of the cold end. Using the button to move to the left, the button to move to the right, the button to move up, the button to move down, to set the cold end value on the third display (the cold end setting range is approximately between 0°C ~ 50°C / 32°F ~122°F, if these values are exceeded, Err appears), which brings the reading for T1 to 0°C, pressing the button again completes the T1 thermocouple setting to 0°C.

For the X1=2 model that also has a T2 input: When the main display shows the value for T2, the setting display will appear.

The SET and ADJ symbols and the T2 symbol will be shown simultaneously on the main display, and the secondary display will not show anything. Use a thermocouple of the same type as the T2 type, at the T2 input to measure 0°C (32°F) and the measurement for T2 will be shown on the main display. The third display will show the reading of the cold end. Using the button

to move to the left, the HOLD button, to move to the right, the MAX/MIN button, to move up, the REL to move down, to set the cold end value on the third display (the cold end setting range is approximately between 0°C ~ 50°C / 32°F ~122°F, if these values are exceeded, Err appears), which brings the reading for T2 to 0°C, pressing the SET button again completes the T2 thermocouple setting to 0°C.

Note: Once set, the cold end compensation value of the thermocouple at 0°C will be permanently stored for all future measurements, except in the case of activating the RESET button, when this value returns to the factory calibrated value. For more detailed explanations, see the RESET function explanation.

SET LIMIT (SETTING THE LIMIT VALUES) – warnings for limit values: The display shows SET and LIMIT, the main display shows Hi.Lo, the secondary display shows the upper limit warning, and the third display shows the lower limit warning.
The secondary and third displays will show the limit values, if they are already preset. If they are not set or if it is the first use of the device, the thermocouple TYPE selection function and °C / °F transformation function are used, then the upper limit value warning shows the highest value of the used thermocouple type, and the lower limit value warning shows the lowest value of the used thermocouple type. Pressing the SET button again completes the limit value warnings.

SET REC (programming of the recording time): For model X3 = B, C. programming the recording can be established through a maximum of nine sections, only one (1) can be selected for use in 24 hours, a maximum of nine sections during daily cyclic executions; (2) in a year, a maximum of nine sections during every year for cyclical executions, (1) (2) the setting method can be made through the TIME button but settings in (1) and (2) sections cannot be made via this button.

24-hour programming – the display shows SET, REC, START. When you have section setting programming, the main display shows the next section number to complete the section setting, the third display shows the shutdown time. In the unprogrammed section setting, the main display shows 1 and the third display shows 00:00 (hour:minute). If setting in fractions of minutes is required by pressing the HOLD button, the third display will show: 00(:seconds). Now set the second value in tens; by pressing the °C/°F button, the third display will return to hours and minutes.

Use °C/°F button to move to the left, the HOLD button to move to the right, the MAX/MIN button to move up, the REL button to move down to set the time on the third display. Press the SET button to complete the programming of the section start time, at the same time the display will show SET, REC and CLOSE symbols and start the programming of the section shutdown time. Based on the setting of the third display shown above, perform the setting and by pressing the SET button, the section programming setting is completed, and the program of the next section is entered.

When programming sections, there may be an error in terms of overlapping the timing of two or more sections. Then on the main display, the symbol 9 starts flashing, which indicates that there is an error in one of the sections.

Then you can check the start time of the previous section with the 

button, the start time of the next section with the 

button, the time of the section shutdown with the 

button (for example, during shutdown, press the 

button, the third display will show the hours: hours:minutes of the checked section, seconds are not included in the check), , by pressing the 

button we check the start time (e.g. during shutdown, press the 

button, the third display will show hours:minutes of the checked section, seconds are not included in the check.

To view the set times of the sections, hold down the 

button and simultaneously press the 

button, then the main display shows the sections and according to the previous instructions, the set times for the sections can be seen. If you want to go back, hold down the 

button and press the 

button at the same time.

If you want to delete the programmed sections, hold down the 

button and simultaneously press the 

button, then the display will show SET, REC and START, the main display will show 1 and the third display will show 00:00 (hour:minute). If you want to leave the setting of the programmed recording function, keep the 

button pressed for two seconds.

One year programming – display shows symbols SET, REC, START. When you have section setting programming, the main display shows the next section number to complete the section setting, the third display shows the shutdown time. In the unprogrammed section setting, the main display shows 1, the secondary display shows 01:01 (date:month), and the third display shows 00:00 (hour:minute). If setting in fractions of minutes is required by pressing the 

button, the third display will show : 00(:seconds). Now set the second value in tens; by pressing the 

button, the third display will return to hours and minutes.

Use the 

button to move to the left, the 

button to move to the right, the 

button to move up, the 

button to move down, to set date and month on the secondary display, and time on the third display. Priess the

SET button bi se to complete the programming of the section start date and time, at the same time the display will show SET, REC and CLOSE symbols and start programming the section shutdown date and time. Based on the setting of the third display shown above, perform the setting and by pressing the SET button, the section programming setting is completed and the program of the next section is entered.

When programming sections, an error may occur in terms of overlapping dates and times of two or more sections. Then on the main display, the symbol 9 starts flashing, which indicates that there is an error in one of the sections. Then the date and time of the start of the previous section can be checked with the REL button, with the MAX/MIN button

the date and time of the start of the next section, with the °C/°F button date and time of shutdown of the section (e.g. for the date and time of shutdown, press the HOLD button,

the third display will show hours: hours: minutes of the checked section, seconds are not included in the check), by pressing the HOLD button,

we check start time (e.g. during shutdown press the °C/°F button, the third display will show the hours:minutes of the checked section, the seconds are not included in the check.

To view the set times of the sections, hold down the MAX/MIN button and press the SET button, at the same time, then the main display shows the sections and according to the previous instructions, the set times for the sections can be seen. If you want to go back, hold down the REL SET button and at the same time press the SET button.

If you want to delete the programmed sections, keep the REC button and at the same time press the SET button, then the display shows the symbols SET, REC and START, the main display will show 1, the secondary display will show 01:01 (date:month) and the third display will show 00:00 (hour:minute). If you want to leave the setting of the programmed recording function, keep the SET button pressed for two seconds.

SET INTV (Recording time interval): SET and INTV are shown on the display, while the interval time is shown on the third display, in case it is already set, otherwise the time 00:01 is assumed (minute:second).

Use the °C/°F button to move to the left,

the °C/°F button to move to the right, the MAX/MIN button to move up, the REL button to move down. When setting the interval time on the third display, the longest possible interval time is 59 minutes 59

seconds, by pressing the button. Press the 

button to complete the setting the record interval time.

SET TIME (calendar time). Display shows the symbols SET and TIME, at the same time display shows (20XX) year, the secondary display shows (XX.XX) date.month, the third display shows (XX:XX) hour:minute, use the 

button to move to the left, the 

button to move to the right, the 

to move up, the 

to move down, to set year, date, month and time on the main, secondary and third display, press the 

button to complete the calendar.

■ General specification

Display	4 1/2-digit LCD, with max. 19999 readings	
Pole indication	There is no indication for positive pole, for the negative pole “-”	
Overload indicator	Positive overload is shown with the symbol "OL", negative overload is shown with the symbol "- OL"	
Low battery indication	When the symbol () appears instead of 5 dashes, replace the batteries.	
Power supply	UM-4 / 1.5V batteries x 4 pcs.	
Self-switch off	If no button is pressed for 20 minutes, the device will switch off by itself, pressing the button  for 3 seconds  will cancel the self-switch off function and the symbol  will disappear.	
Fast readings	4 times/sec	
Battery life	Common use	Approximately 250 hours for alkaline batteries
	First method of saving	Approximately 3000 hours (interval = 15 minutes) for alkaline batteries
	Second method of saving	Approximately 6 months (interval = 15 minutes) for alkaline batteries
Temperature and humidity of working environment	+0°C~ 50°C (32°F~122°F); <80% RH	
Temperature and humidity in storage conditions	-10°C~ 60°C (-4°F~140°F); <70% RH	
Dimensions	164mm x 76mm x 32mm	
Weight	Approximately 415g (including batteries)	

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Electrical specification

Measuring range	**TC**	**K-TYPE: -200°C~ +1372°C (-328°F~ +2501°F)** **J-TYPE : -210°C~ +1200°C (-346°F~ +2192T)** **T-TYPE : -250°C~ +400°C (-418°F~ +752°F)** **E-TYPE: -210°C~ +1000°C (-346°F~ +1832°F)** **R/S-TYPE: 0°C~ +1767°C (+32°F~ +3212T)** **N-TYPE : -150°C~ +1300°C (-238T- +2372T)**
Resolution	**0.1**	**K; J; T; E; N <+2000°C/°F** **K; J; T; E; N >-2000°C/°F** **R / S <+1000°C/-1832°F** **R / S >-1000°C/-1832°F**
	1	**K; J; T; E; N >+2000°C/°F** **K; J; T; E; N <-2000°C/°F** **R / S >+1000°C/-1832°F** **R / S <-1000°C/-1832°F**
Accuracy	**K * J * T * E * N: ± [0.05% of reading +0.3°C (0.6°F)]** **[below-100°C (-148T): K; J; T; E + 0.15% of reading N: + 0.45% of reading]R - S :** **± [0.05% of reading +1°C (1.8°F)]**	
Temperature coefficient	**0.01% of reading +0.03°C/ °C (0.06°F /°F) out of the specified; +18°C do 28°C (+64°F to +82°F) in the range [below -100°C (-148T): K - J - T - E + 0.04% of reading** **N; + 0.08% of reading]**	
Temperature scale	**ITS-90**	
The error is specified for an ambient temperature between 18°C (64°F) and 28°C (82°F). **For the specifications stated above, thermocouple error is not included.**		