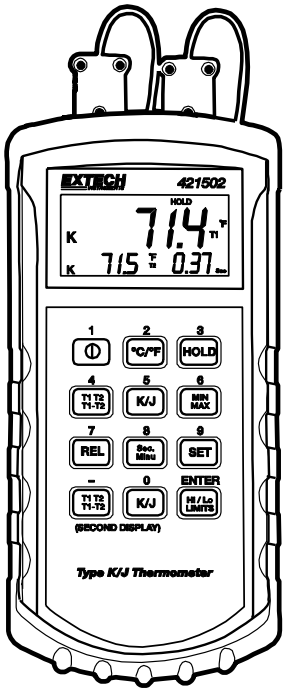
EXTECH®

User Manual

Dual Input Type J/K Digital Thermometer

Model 421502



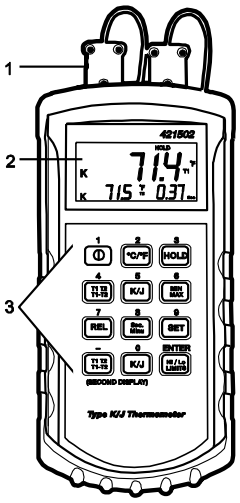
Introduction

Thank you for selecting the Extech 421502 Digital Thermometer. The 421502 features dual thermocouple inputs, T1, T2, and T1 – T2 displays, MIN-MAX-AVG recording, selectable units of measure, high/low alarms, automatic power OFF, and data hold. This professional meter, with proper care, will provide years of safe reliable service.

Meter Description

1. Thermocouple Input Jacks (T1 and T2)
2. LCD Display. The primary temperature display is the readout in large digits on the top row. The secondary displays are shown on the bottom row (smaller digits) and include a temperature reading (lower left) and the real time clock (lower right). Temperature readings can be set to show T1, T2, or T1 minus T2 temperatures
3. Dual-function control buttons. Primary function printed on buttons and secondary function printed above buttons (numerical keypad and ENTER button)

Note: The battery compartment (not pictured) is located on back of meter. The meter's protective jacket must be removed to gain access to the compartment.



Operation

Meter Power

Ensure that a fresh 9V battery is installed (rear compartment) before powering the meter. Press the power button (upper left button) to switch the meter ON or OFF. The meter is equipped with an APO utility where it switches off automatically after 30 minutes of inactivity. If the SET or MIN-MAX-AVG mode is engaged, APO is disabled, and the meter cannot be powered down manually. Exit these modes before attempting to power down. Long press the "MIN-MAX" button to exit the MIN-MAX-AVG mode. To exit the SET mode, use the "ENTER" button to step back to the normal operating mode.

Connecting Thermocouples

The thermocouples connect to the T1 and T2 input jacks on the top of the meter (observe correct polarity). The meter accepts type J or K thermocouples, select the thermocouple

type in the SET mode. A type-K thermocouple is supplied. **Safety note**: The supplied thermocouple can only be used to measure temperature to 260°C (500°F). To measure higher temperatures please obtain a thermocouple rated for higher temperature.

Temperature Units

Press the "°C/°F" button to toggle the temperature units. The meter recalls the selected unit of measure when power is cycled.

Data Hold

Press the "HOLD" button to freeze the displayed reading. The "HOLD" indicator will appear. Press "HOLD" again to return to normal operation. In MIN-MAX-AVG mode, pressing the "HOLD" button pauses MIN-MAX-AVG recording (pressing "HOLD" again resumes recording).

Primary and Secondary Display Modes (T1, T2, or T1 - T2)

Use the "T1 T2 / T1 - T2" button (the button with the number “4” overlay), to select the mode for the meter's primary display (top, large digits). Press the "T1 T2 / T1 - T2" button (the button with the minus sign [-] overlay) to select the mode for the meter's secondary display (lower, smaller digits).

Choose "T1 or T2" to select thermocouple input 1 or 2 for display. Select "T1 - T2" to display the difference between the two thermocouple measurements. In T1 - T2 mode, a reading of zero indicates that both thermocouples are reading the same temperature.

Set the Thermocouple type

Choose Type-K or Type-J thermocouple using the “K/J” buttons. The “K/J” button with the number “5” overlay applies to the primary display (large digits). The “K/J” button with the “0” overlay applies to the secondary display (smaller digits). The selection must match the inserted thermocouple type for accurate temperature measurements. The meter remembers the selection when power is cycled.

Taking Temperature Measurements

The tips of thermocouple probes are used to sense temperature. Touch the tip of the probe to an object’s surface to measure its temperature. You can also use a thermocouple to measure the air temperature by placing the tip of the thermocouple in a room, enclosure, or other area. Use care when placing the thermocouple; do not place it in liquids or near live electrical circuitry.

MIN-MAX-AVG mode (Primary Display)

1. Press the "MIN-MAX" button to access the mode and to start recording the minimum, maximum, and average temperature readings
2. Use the “MIN-MAX” button to step through MIN, MAX, and AVG modes (the display icons MIN, MAX, and AVG will change with each button press)
3. When a new MIN or MAX is detected, the previous MIN or MAX is replaced. An audible beep alerts the user when a new MIN or MAX is recorded
4. Use the “HOLD” button to pause/resume recording
5. Long press the “MIN-MAX” button to exit and to reset the MIN-MAX-AVG memory
6. When recording is paused, the stored values are held in memory until MIN-MAX-AVG mode is canceled or resumed
7. The Auto Power OFF utility is disabled, and the meter cannot be manually powered OFF, in the MIN-MAX-AVG mode. Long press the “MIN-MAX” button to exit and return to normal operation.

Relative (REL) Mode (Primary Display)

Relative mode allows the user to store a reference temperature for comparison with subsequent measurements. The reference temperature can be automatically or manually set (for manual entry, see the SET mode section). For automatic entry, the displayed temperature is used as the reference value. Perform the steps below:

1. Press the “REL” button (the REL icon appears)
2. The currently displayed temperature becomes the reference value and subsequent measurements represent the actual temperature minus the reference temperature
3. Press the “REL” button to exit (the REL icon will switch OFF)

Real Time Clock and Elapsed Timer

The time display (bottom right) shows the real time clock. Refer to the SET mode section to set the real time clock. The clock can also be used as an elapsed timer by resetting the clock to zero. The clock allows you to see when MIN-MAX updates occur. Each time a new MIN or MAX value is updated, the associated time is stored.

SET Mode

Manually Setting the Relative (REL) Reference Value

Note: Refer to the Relative Mode section for setting the temperature reference value automatically, using the currently displayed temperature as the reference value.

To set the reference manually and to then use the Relative Mode, press the "SET" button; the display will show dashes " - - - -". Enter a reference temperature using the numeric buttons. You must use leading zeros; for example, enter 0050.0 to for a 50.0° reference temperature. Once the reference value is entered, press the "ENTER" button four times.

To display the difference between the actual temperature and a manually entered Relative value, press the REL key and then the SET key. The meter will now display actual temperature minus the reference temperature. Press the "REL" button to exit the mode.

Setting the Real Time Clock/Elapsed Timer

Press the "SET" button and then the "ENTER" button. Set the Hours, Minutes, and Seconds (HH:MM:SS) using the numeric buttons. When editing is complete, the clock will start to run. Press the "ENTER" button three times to exit. Use the "SEC/MIN" button to switch between Hours/Minutes (Min) and Minutes/Seconds (Sec) display modes.

Setting the Alarm High/Low Limits

Press the "SET" button and then press the "ENTER" button twice. Set the desired High Alarm limit using the numeric buttons. You must enter the value using all 5 digits, including leading zeros. Example: 25.0°C is entered as 0025.0.

Press the "ENTER" button once. Set the Low Alarm limit using the numeric buttons. You must enter the value using all 5 digits, including leading zeros. Example: 5.0°C is entered as 0005.0. Press "ENTER" to exit.

To activate the high/low alarms, press the "HI/LO Limits" button, the meter will beep, and the audio icon will appear. The meter will produce a continuous tone when a high or low alarm limit is reached. Press the "HI/LO Limits" button to silence the alarm (see Alarm Operation section below for more information).

Alarm Operation

Press the "HI/LO Limits" button to enable the alarm mode (the meter will beep, and the audio icon will appear). Set the low and high alarm limits in the SET mode. When the actual temperature reaches the low or high alarm limit a continuous tone will be produced. To silence the alarm (and to disable the alarm mode), press the “HI/LO Limit” button (the audio icon will disappear).

Battery Replacement

Replace the 9V battery when the low battery icon appears on the upper left or when the meter will not power up. To replace the battery, remove the meter’s protective jacket and remove the two screws that secure the rear battery compartment cover. Remove the battery, install a new battery observing correct polarity, secure the battery compartment, and replace the meter’s protective jacket.

Battery Safety: Please dispose of batteries responsibly and never dispose of batteries in a fire, batteries may explode or leak. When storing the meter for 60 days or more, remove the battery and store separately.

Never dispose of used batteries or rechargeable batteries in household waste. As consumers, users are legally required to take used batteries to appropriate collection sites, the retail store where the batteries were purchased, or wherever batteries are sold.

Disposal: Do not dispose of this instrument in household waste. The user is obligated to take end-of-life devices to a designated collection point for the disposal of electrical and electronic equipment.

Calibration and Repair Services

FLIR Systems, Inc. offers calibration and repair services for the Extech brand products we sell. We offer NIST traceable calibration for most of our products. Contact us for information on calibration and repair availability, refer to the contact information below. Annual calibrations should be performed to verify meter performance and accuracy. Product specifications are subject to change without notice. Please visit our website for the most up-to-date product information:

Specifications

Display	5-digit multifunction LCD
Battery Power	9V (NEDA 1604, IEC 6F22, or 006P)
Auto Power OFF (APO)	Meter switches OFF after approx. 30 mins. of inactivity
Battery life	160 hours typical with carbon zinc battery
Dimensions / Weight	192 x 91 x 52.5mm (7.5 x 3.6 x 2.1") / 365g (11.7 oz.)
Type-J thermocouple range	-200 ~ 1050°C (-328 ~ 1922°F)*
Type-K thermocouple range	-200 ~ 1370°C (-328 ~ 2498°F)* ***Safety note**: The supplied type-K thermocouple can only be used to measure temperature to 260°C (500°F). To measure higher temperatures please obtain a thermocouple rated for higher temperature
Resolution	0.1°C (0.2°F)
Temperature units	Selectable °C / °F
Accuracy	± (0.05% rdg + 0.3°C) -50°C ~ 1370°C
	± (0.05% rdg + 0.7°C) -50°C ~ -200°C
	± (0.05% rdg + 0.6°F) -58°F ~ 2498°F
	± (0.05% rdg + 1.4°F) -58°F ~ -328°F
Temperature Coefficient	0.1 times the applicable accuracy specifications per °C from 0°C ~ 18°C and 28°C ~ 50°C (32°F ~ 64°F and 82°F ~ 122°F)
Water resistant housing	Gasket protected front panel
Input Protection	24VDC or 24VAC rms max. input on any combination of inputs
Measurement rate	One reading per second
Input connectors	Accepts standard miniature thermocouple connectors
Supplied thermocouple	Type-K with Teflon® insulation. Cable length: 4 ft. (1.2m) Max. insulation temperature: 260°C (500°F)* Accuracy: ± 2.2°C (4°F) or ± 0.75% of reading (whichever is greater) ***Safety note**: The supplied thermocouple can only be used to measure temperature to 260°C (500°F). To measure higher temperatures please obtain a thermocouple rated for higher temperature.
Operating conditions	0 to 50°C (32 to 122°F); less than 80% RH
Storage conditions	-20 to 60°C (-4 to 140°F); less than 70% RH
Alarm beeper volume	95dB