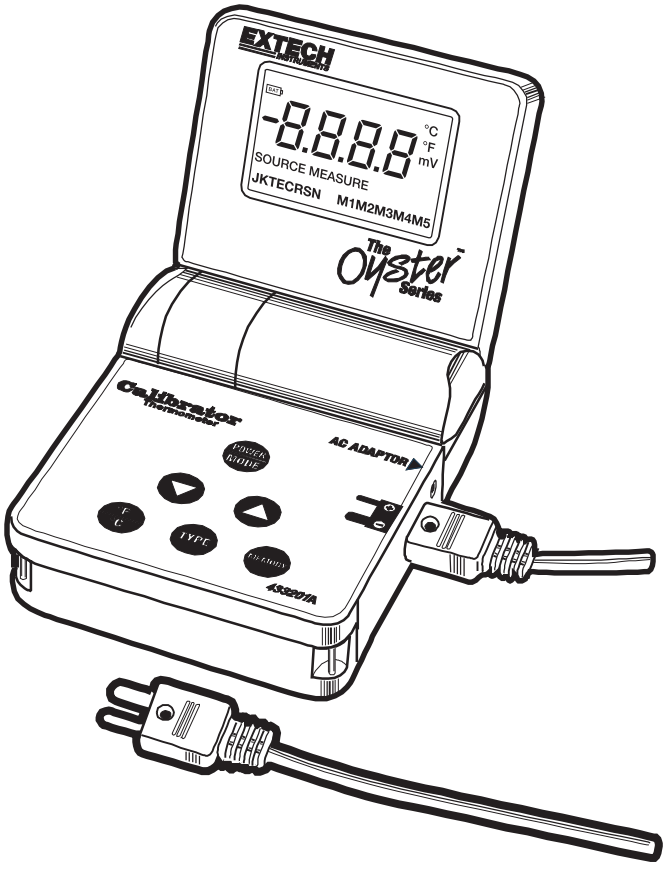
User's Guide

EXTECH INSTRUMENTS

Microprocessor Calibrator/Thermometer

Models 433201A and 433202A



Introduction

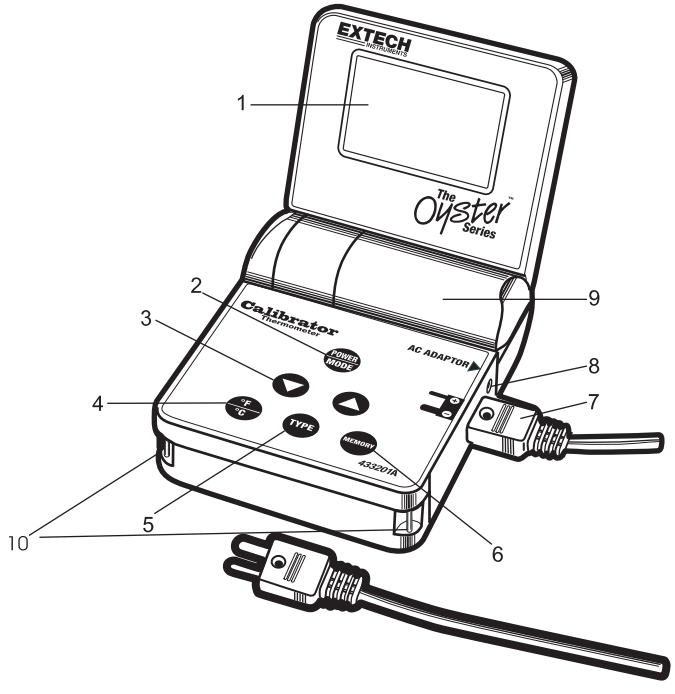
Congratulations on your purchase of the Extech 433201A (115V) or 433202A (220V) Microprocessor Thermocouple Calibrator/Thermometer.

In the 'Measurement' mode, a millivolt (mV) signal is accepted from a thermocouple and is displayed on the 4-digit LCD display. A built-in temperature offset feature can be used to compensate for variations found in standard thermocouples. By adjusting the offset, measurement accuracy for a particular thermocouple can be optimized for a particular temperature.

In the 'Source' mode, a millivolt signal is output to an external device with the corresponding temperature (according to standard temperature tables) displayed on the LCD display. Preset temperature settings (source mode only) according to thermocouple type are stored in five memory locations for easy recall.

If desired, the meter can be switched to the mV mode where Measurement and Source values can be displayed in millivolts rather than temperature.

Careful use of this device will provide years of reliable service.



Description

1. LCD display – Temperature values can be displayed in °C/°F or in millivolts. The adjustable display can be easily moved to the best viewing angle.
2. POWER/MODE button – Press to power meter on/off and to select the desired mode of operation. With the meter powered on, momentarily press the POWER/MODE button (<2 sec) to toggle between MEASURE and SOURCE mode. In MEASURE mode the meter displays the temperature or mV value for an attached thermocouple or thermocouple simulator. In the SOURCE mode, the meter outputs a mV signal.
   To power off, press and hold the POWER/MODE button for more than 2 seconds.
3. FINE/COARSE output adjustment buttons – Use the ▼/▲ buttons to set the desired temperature. Press and hold for COARSE adjustment; momentarily press for FINE adjustment.
4. °C/°F button – Press to select the desired unit of measure
5. TYPE button – Press to select a thermocouple type
6. MEM – In SOURCE MODE, the Memory button provides access to five memory locations with preset output values depending on which thermocouple type is being used.

Memory Location	Type J, K, C, R, S, N	Type T	Type E	mV
M1	32.0°F (0.0°C)	32.0°F (0.0°C)	32.0°F (0.0°C)	0mV
M2	212.0°F (100.0°C)	212.0°F (100.0°C)	212.0°F (100.0°C)	10.00mV
M3	932.0°F (500.0°C)	392.0°F (200.0°C)	482.0°F (250.0°C)	25.00mV
M4	1382.0°F (750.0°C)	572.0°F (300.0°C),	932.0°F (500.0°C)	40.00mV
M5	1832.0°F (1000.0°C)	752.0°F (400.0°C)	1382.0°F (750.0°C)	50.00mV

7. Output/Input mini connector – Thermocouples, thermocouple wire, and calibration cables are connected here.
8. AC adaptor/recharger jack
9. Battery compartment – Houses the supplied 9V Nickel Metal Hydride rechargeable battery. An alkaline battery can also be used.
10. Neck Strap Posts- Attach the neck-strap to the two posts on the front corners of the meter.

Operation

Measurement Mode

1. Open the meter lid and press the POWER/MODE button to turn the meter on. “MEASURE” will be displayed on the LCD screen. Check the battery if the meter display does not switch on.

   Note: For best accuracy, remove any input connectors before turning the unit ON. The meter will not perform a correct self calibration if there is an input connected.

2. Select the thermocouple type using the **TYPE** button. The T/C type selected will be indicated along the bottom of the display. Each time the **TYPE** button is pressed the indicator will advance one type.

3. Select °C or °F via the **°C/°F** button.

4. Carefully insert the thermocouple probe into the sub-miniature female connector on the side panel.

5. Read the temperature on the LCD display.

6. To turn the meter off, press and hold the POWER/MODE button for more than 2 seconds.

Offset Adjustment

Thermocouples produce an output signal that is non-linear. In some instances it may be necessary to offset the reading to compensate for the non-linearity of the thermocouple.

1. In Measurement Mode, press and hold the ▼/▲buttons together until ”OFS” is displayed on the LCD.
2. Use the ▼/▲ buttons to adjust the offset from -9.0 to 9.0°F (-5.0 to 5.0°C)
3. Press and hold the ▼/▲buttons together for less than 2 seconds to save the offset and return to Measurement Mode.

Source Mode

1. Open the meter lid and press the POWER/MODE button to turn the meter on. Check the battery if the meter display does not switch on.
2. Momentarily (<2 sec) press the **POWER/MODE** button to select the SOURCE mode. “SOURCE” will be displayed on the LCD screen.
3. Select the thermocouple type of the device to be calibrated using the **TYPE** button. The T/C type selected will be indicated along the bottom of the display. Each time the **TYPE** button is pressed the indicator will advance one type
4. Select °C or °F via the **°C/°F** button.
5. Carefully insert the calibration cable into the sub-miniature female connector on the side panel.

   Note: For greater accuracy, especially if there is a difference between the internal temperature of the calibrator and the device under calibration, use a thermocouple cable rather than the copper cable that is supplied with the calibrator. The thermocouple cable must match the thermocouple type of the device under calibration.
6. Connect the other end of the cable to the device to be calibrated.

   Note: The **SOURCE** icon will blink until the output has stabilized.
7. Allow time for the calibrator and the external device to settle to the same temperature. This may take up to 30 minutes or longer if the devices were stored or carried from a colder/warmer environment prior to use.
8. Use the ▼/▲ FINE/COARSE adjustment buttons or the MEM button to select the desired output temperature. The output temperature is displayed on the LCD display.
9. To turn the meter off, press and hold the POWER/MODE button for more than 2 seconds.

Displaying in mV units

Press and hold the **°F/°C** button for more than 2 seconds until “mV” appears on the LCD display. Press and hold the button again for more than 2 seconds to return to temperature units (^{o}F/^{o}C).

Auto Power Off

When the meter is turned on, the auto power off function is enabled. It will automatically shut the meter off 10 minutes after the last button press. To disable Auto Power Off, press and hold the **TYPE** button for 2 seconds until “nAtP” is displayed.

Battery Replacement and Recharging

- If the meter is to be used for an extended period of time, use of the AC adaptor is recommended.
- For portable operation or quick checks use the rechargeable 9V Nickel Metal Hydride battery or a 9V alkaline battery.
- Turning the meter OFF when not in use will prolong battery life.
- When the battery icon flashes, replace or recharge the battery. Note that only the supplied 9V NiCad battery can be recharged.
- Replace the battery using the following procedure:
    1. Fully open the meter.
    2. Insert a coin or flat screwdriver into the slot at the back of the meter.
    3. Pop the battery compartment cover and then carefully remove it in the direction of the arrow.
    4. Replace the battery and snap the cover back in place.
- Recharge the supplied 9V Nickel Metal Hydride battery using the following procedure:
    1. Turn the meter off.
    2. Ensure that the rechargeable battery is installed.
    3. Plug the charger/adaptor into the meter.
    4. Plug the charge/adaptor into an AC outlet source.
    5. Charge the battery for 24 to 48 hours before its first use. An overnight charge will enable continuous use for approximately 45 minutes. A full charge will provide one hour of continuous use.

Specifications

Calibration & Measurement Ranges		Resolution	Accuracy
Type J	-58 to 1830°F (-50 to 1000°C)	0.1° to 999.9°	± (0.15% of reading
Type K	-58 to 2498°F (-50 to 1370°C)	1° above 999.9°	+ 1.8°F or 1°C)
Type T	-184 to 752°F (-120 to 400°C)		
Type E	-58 to 1382°F (-50 to 750°C)		
Type C	32 to 3272°F (0 to 1800°C)	1°	
Type R	32 to 3182°F (0 to 1750°C)		
Type S	32 to 3182°F (0 to 1750°C)		
Type N	-58 to 2372°F (-50 to 1300°C)		
Voltage	-5.00mV to +55.00mV	0.01mV	±2digits

General Specifications	
Cold junction compensation	0.02°F per °F (0.03°C per °C)
Input impedance	10MΩ
Maximum voltage applied between any terminal and earth ground or between any two terminals	60mV
Storage temperature:	-30C to +80C
Operating temperature:	-5C to +70C
Relative humidity:	0-85%
Approvals	CE
Thermocouple Standard and Scale	NIST 175, ITS-90
Sampling time	Two (2) readings per second
Display	4-digit (0 to 9999) LCD display with thermocouple type status indication
Power	9V alkaline battery, 9V Nickel Metal Hydride rechargeable battery, or AC adaptor/charger
Supplied accessories	Thermocouple calibration cable (white) terminated with sub-miniature connectors, K-type Thermocouple cable (yellow) terminated with sub-miniature connectors, 9V Nickel Metal Hydride rechargeable battery, neck-strap, AC adaptor/charger, carrying case.
Dimensions	4.7 x 3.8 x 1.8” (118 x 96 x 45mm)
Weight	15 oz. (426g)

Warranty

EXTECH INSTRUMENTS CORPORATION warrants this instrument to be free of defects in parts and workmanship for **one year** from date of shipment (a six month limited warranty applies to sensors and cables). If it should become necessary to return the instrument for service during or beyond the warranty period, contact the Customer Service Department at (781) 890-7440 ext. 210 for authorization or visit our website www.extech.com for contact information. A Return Authorization (RA) number must be issued before any product is returned to Extech. The sender is responsible for shipping charges, freight, insurance and proper packaging to prevent damage in transit. This warranty does not apply to defects resulting from action of the user such as misuse, improper wiring, operation outside of specification, improper maintenance or repair, or unauthorized modification. Extech specifically disclaims any implied warranties or merchantability or fitness for a specific purpose and will not be liable for any direct, indirect, incidental or consequential damages. Extech's total liability is limited to repair or replacement of the product. The warranty set forth above is inclusive and no other warranty, whether written or oral, is expressed or implied.

Calibration and Repair Services

Extech offers repair and calibration services for the products we sell. Extech also provides NIST certification for most products. Call the Customer Service Department for information on calibration services available for this product. Extech recommends that annual calibrations be performed to verify meter performance and accuracy.

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Support line (781) 890-7440

Technical support: Extension 200; E-mail: support@extech.com

Repair & Returns: Extension 210; E-mail: repair@extech.com

Product specifications subject to change without notice

For the latest version of this User's Guide, Software updates, and other up-to-the-minute product information, visit our website: www.extech.com

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