EXTECH INSTRUMENTS

User's Guide

Pinless Moisture/Humidity Meter with Memory + IR Thermometer

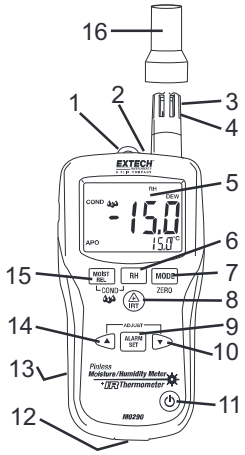
Model MO295

Introduction

Congratulations on your purchase of the Extech MO295 Pinless Moisture Meter with Built-in IR Thermometer and 20 Point Memory. Monitor moisture in wood and other building materials with no surface damage with the Pinless Moisture sensor (Pin-type Moisture Probe included). Measure Humidity and Air Temperature with built-in probe plus non-contact InfraRed Temperature with IR design. Advanced functions provide Grains per Pound, Dew Point and Vapor Pressure calculations. This meter is shipped fully tested and calibrated and, with proper use, will provide years of reliable service.

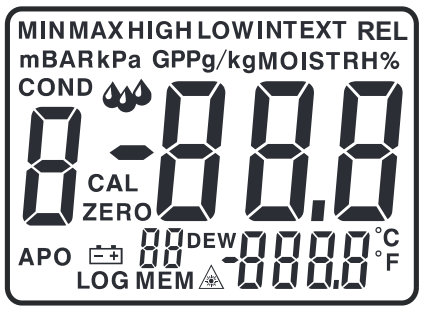
Meter Description

1. IR temperature sensor
2. Laser pointer
3. Humidity sensor
4. Temperature sensor
5. LCD display
6. Relative Humidity button
7. Mode/Zero Button
8. IR thermometer button
9. Alarm set button
10. Alarm adjust down button
11. ON/OFF power button
12. Remote pin probe input jack (bottom)
13. Battery compartment (rear)
14. Alarm adjust up button
15. Moisture/Relative button
16. Protective cap



LCD Display

1. **MIN MAX** – Minimum and maximum value
2. **HIGH LOW** – Alarm limits
3. **INT EXT** – Internal/External probe
4. **mBar** – Vapor pressure
5. **kPa** – Vapor pressure
6. **GPP** – Grains per Pound
7. **g/kg** – Grains per kilogram
8. **MOIST** – Moisture mode
9. **RH%** - Relative Humidity mode
10. **COND** – Condensation mode
11. **APO** – Auto power off
12. **DEW** – Dew Point temperature
13. **C/F** – Temperature units
14. - Low battery
15. **MEM** - Memory location indicator
16. - Laser pointer On



Safety

- Use extreme caution when the laser pointer beam is on
- Do not point the beam toward anyone's eye or allow the beam to strike the eye from a reflective surface
- Do not use the laser near explosive gases or in other potentially explosive areas

Features

- Quickly indicates the moisture content of materials with Pinless technology without damaging the surface;
- Optional remote Pin-type probe (MO290-P) allows for moisture readings at different penetration levels (3ft/0.9m cable length);
- Easy to read, large dual display with backlit feature;
- Simultaneously displays % moisture of wood or material being tested and Air Temperature, IR Temperature, or Humidity
- Designed with IR design to measure non-contact surface temperature; 8:1 distance to spot ratio with 0.95 fixed emissivity
- Built-in Humidity/Temperature probe measures Relative Humidity,
- Air Temperature plus Grains Per Pound (GPP) and Dew Point (DP)
- Ambient and Surface Vapor Pressure
- Automatic calculation of differential Temperature (IR - DP)
- Min/Max and Data Hold
- 20 point internal memory
- Auto power off and low battery indication

Battery Replacement

1. Turn off the meter.
2. Remove one Philips head screw and lift off the rear battery cover.
3. Replace the 9V battery.
4. Secure the rear battery cover.

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.

Other Battery Safety Reminders

- Never dispose of batteries in a fire. Batteries may explode or leak.
- Never mix battery types. Always install new batteries of the same type.

Operation

Powering the meter

1. Remove the RH sensor protective cap before use.
2. Press the power ⏻ button to turn the meter on.
3. If the symbol appears or the meter does not turn on, replace the battery.

Humidity (Dew point, GPP, g/kg) Measurements

1. Press the power ⏻ button to turn the meter on.
2. Press the RH button
3. Relative Humidity will be displayed in the primary display and the temperature will be displayed in the secondary display.
4. Press the up or down arrow button to change the temperature units.
5. Press the MODE button to display the DEW point.
6. Press the MODE button to display GPP (°F) or g/kg (°C). Press the ▲or ▼button to toggle between GPP or g/kg.

Pinless Moisture Measurements

1. Press the power ⏻ button to turn the meter on.
2. Press the MOIST button to select Moisture measurement.” MOIST”, and “INT” (internal pinless sensor) will appear in the display.
3. Hold the meter so that the rear sensor is away from any surface or your hand. The reading should be near 0.0. If not, press and hold the ZERO button for more than 2 second and the ZERO icon appears.
4. Place the rear sensor on the surface of the material to be tested and read the relative moisture content.

Pin Type Moisture Measurements

1. Connect the external pin probe to the jack on the bottom of the meter.
2. Press the power ⏻ button to turn the meter on.
3. Press the MOIST button twice to select Moisture measurement.” MOIST”, and “EXT” (external pin probe) will appear in the display.
4. Press the probe pins into the material and read the % moisture content in the display.

Infrared Temperature Measurements

1. Press the power ⏻ button to turn the meter on.
2. Press the IRT button to enable the IR thermometer and the laser pointer. The laser pointer icon will flash while the mode is active.
3. Aim the laser pointer at the surface to be measured and read the surface temperature in the secondary display.
4. Release the IRT button. The last temperature measured and the laser icon will remain on the display for approximately 10 seconds before returning to ambient temperature measurement.

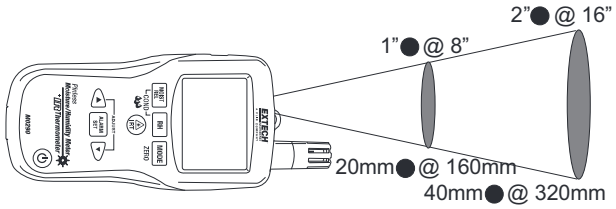
IRT MAX MIN display:

The meter can be set to display only the maximum or minimum temperature measured during an IR scan.

1. With the meter in the IR hold mode, press the MODE button. “MIN” will appear in the display.
2. Press the IRT button to enable the IR thermometer. The meter will display the minimum temperature measured and will update only when a lower temperature is measured.
3. Press the MODE button twice to enable the MAX mode and proceed as stated above for the maximum temperature.
4. The MAX or MIN temperature is not stored when the function is exited. The unit automatically exits MAX/MIN mode after approximately 10 seconds.

IR Field of View

Ensure that the desired target is larger than the spot size. As the distance from an object increases, the spot size of the area measured by the meter becomes larger. The meter’s field of view ratio is 8:1, meaning that if the meter is 8 inches (cm) from the target, the diameter (spot) of the object under test must be at least 1 inch (cm). Refer below to the field of view diagram.



WARNING: Do not directly view or direct the laser pointer at an eye. Low power visible lasers do not normally present a hazard, but may present some potential for hazard if viewed directly for extended periods of time.

Condensation Mode

The Condensation feature alerts the user when the surface temperature as measured by the IR thermometer is close to or has reached the Dew Point temperature.

1. Press the power ⏻ button to turn the meter on.
2. Simultaneously press the MOIST and RH buttons. The “COND” icon will appear.
3. Point the meter at a surface, press the IRT button to measure the surface temperature. The small display will indicate the IR surface temperature and the large display will indicate the difference between the IR temperature and the Dew Point temperature.
4. The meter will then report the potential for condensation on that surface in the following manner
   - If the temperature of the IRT is more than 14°C (25°F) above the Dew Point, the temperature difference shall be displayed, with no other warning.
   - If the temperature of the IRT is 3-14°C (5-25°F) above the Dew Point, the temperature difference shall be displayed, along with a standard Condensation Indicator icon. The meter shall beep once to confirm that the reading is in the risk area.
   - If the temperature of the IRT is less than 3°C (5°F) above the Dew Point, the temperature difference shall be displayed, along with a flashing Condensation Indicator icon. The meter shall beep twice to confirm that the reading is in the high-risk area.
5. Press the RH button to exit the mode.

Vapor Pressure Mode

Ambient Vapor Pressure

1. With the Condensation mode active, press the MODE button to display the Vapor Pressure in mBAR (°F) or kPa (°C). Press the ▲or ▼button to toggle between mBAR or kPa.
2. Press the MODE button to exit the Vapor Pressure mode.

Surface Vapor Pressure

1. Enter the Vapor Pressure mode as described above.
2. Press the IRT button and aim the laser pointer at the surface to be measured to display the Surface Vapor Pressure in mBAR (°F) or kPa (°C).

Alarm High and Low Limit Setting

High and Low alarm points can be set for Humidity and Moisture measurements.

Humidity Alarm Set Procedure:

1. With RH% displayed, simultaneously press the RH and MODE buttons.
2. The “HIGH” icon will appear on the display.
3. Press the ▲or ▼button to set the high limit desired.
4. Press the STORE/ALARM SET button to save the value and proceed to the LOW set value.
5. With the “LOW” icon in the display, Press the ▲or ▼button to set the low limit desired.
6. Press the STORE/ALARM SET button to save the value and to return to the normal mode.
7. If the humidity measurement is lower than the low alarm setting or higher than the high alarm setting, the meter will beep once every second.

Moisture Alarm Set Procedure:

1. With MOIST displayed, simultaneously press the MOIST and MODE buttons.
2. The “HIGH” icon will appear on the display.
3. Press the ▲or ▼button to set the high limit desired.
4. Press the STORE/ALARM SET button to save the value and proceed to the LOW set value.
5. With the “LOW” icon in the display, Press the ▲or ▼button to set the low limit desired.
6. Press the STORE/ALARM SET button to save the value and to return to the normal mode.
7. If the moisture measurement is higher than the LOW alarm setting, the meter will beep once every second
8. If the moisture measurement is higher than the HIGH alarm setting, the meter will beep continuously.

Memory Mode

Saving Readings:

1. With the meter in the desired measurement mode, press the STORE button for 2 seconds until the unit beeps to save a reading into the internal memory. The numeric display above the MEM icon will indicate the memory location the reading is stored to.
2. When the 20 memory locations are full, the unit will overwrite old saved readings starting with memory location 01.

Recalling Stored Readings:

1. Press the ▲and ▼buttons simultaneously to display stored readings. The numeric display above the MEM icon will flash.
2. Use the ▲or ▼button to scroll through the memory locations.
3. To return to normal operating mode, press the STORE button.

Clearing Stored Data:

1. To clear stored data, press and hold the ▲and STORE buttons simultaneously until CLR appears on the display.

Auto Power Off

The meter will enter a sleep mode after 30 minutes of inactivity. The meter will emit a warning beep 15 seconds before shutting down.

To disable the APO feature, press the MODE button when turning the meter ON. The “APO” icon will not appear, indicating it is disabled.

Change Temperature units from F to C or C to F

1. Press the power ⏻ button to turn the meter on.
2. Press the IRT button to turn on the IR thermometer and then release the button.
3. Press the ▲or ▼button to set the desired temperature unit

Specifications

Function	Range	Accuracy
Pinless Moisture	0 to 99.9	Relative only
External - Moisture in wood	6-99 %	± 5%
External - Moisture in building materials	13-99 %	± 5%
Pinless Depth	Up to 0.75” (19mm)	
RH Measurement	0 to 10%	± 3%RH
	11 to 90%	± 2.5%RH
	91 to 100%	± 3%RH
Air Temperature	-20 to 170°F (-29 to 77°C)	3.6 (2.0)
IR Temp	-4 to 31	9
	32°F	± 2°F
	33 to 392	Greater of 3.5% or 9
	-20 to-1	4.5
	0	1
	1 to 200	Greater of ±3.5% or ± 4.5°C

Display	3-digit primary display, 4-digit secondary display
Vapor Pressure	0 to 20.0kPA, calculated from temperature and RH measurements
Dew Point	-30 to 100°C (-22 to 199°F)
Mixing Ratio	0 to 160g/kg (0-999GPP)
Sample Rate	2 per second
Backlight	White LED
Memory	20 point memory
Operating Temperature	4 to 43°C (40 to 110°F)
Storage Temperature	-30 to 60°C (-14 to 140°F)
Operating Humidity	90%, 0-30°C (32-86°F), 75%, 30-40°C (86-104°F), 45%, 40-50°C (104-122°F)
Storage Humidity	90%
Power Supply	9V battery
Battery Life	6-8 weeks (4 hrs/day use), using alkaline batteries
Auto Power Off (APO)	After 30 minutes (nominal) inactivity. The APO function can be disabled by the user.
APO Quiescent Current	50µA maximum
Dimensions	165x70x38mm (6.5x2.8x1.5’)
Weight	210g (7.4oz)