TM360 TEMP-SEEKER®

PRECISION THERMO-PSYCHROMETER

OPERATION MANUAL

GENERAL INFORMATION

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TM360 Overview

The **TM360 TEMP-SEEKER**® is a high resolution thermo-psychrometer adaptable to accommodate all your temperature, humidity, dry/wet bulb and dew point measurements. The instrument offers 4 separate temperature channels for high accuracy thermistor probes, and an auxiliary port to connect a state of the art solid state RH / DB probe. The TM360's memory functions continuously store the MIN and MAX readings from all the ports. Press the **SCAN** key and the display will alternate between all 4 ports in three second intervals providing continuous monitoring of multiple probe points during critical system diagnosis. The TM360 has an illuminated, low power LCD display making it easy to take readings in poorly illuminated machine rooms as well as provisions to connect to an external power adaptor to conserve battery life during extended monitoring applications. Designed in a rugged polyethylene case the TM360 is engineered to provide laboratory accuracy in rough field conditions. A generous probe storage area is provided for housing all your job specific probes directly in the unit itself. Probes can remain plugged in, reducing life shortening stress on the components.

Features:

- Four discrete temperature channels
- High accuracy silicon humidity transducer probe port
- Large, 4-digit, easy-to-read, backlit display
- Min / Max and memory functions
- Temperature differential between any 2 of the 4 temperature ports
- Direct relative humidity and wet bulb measurements
- Calibrated to NIST traceable standards
- Auto-off after 10 minutes of non-use or continuous ON mode
- Operates 30 continuous hours on 1 9V alkaline battery
- Integrated battery eliminator jack
- Rugged polyethylene carrying case
- Large probe storage area
- Switchable ˚C / ˚F
- 1 year warranty

GENERAL INFORMATION

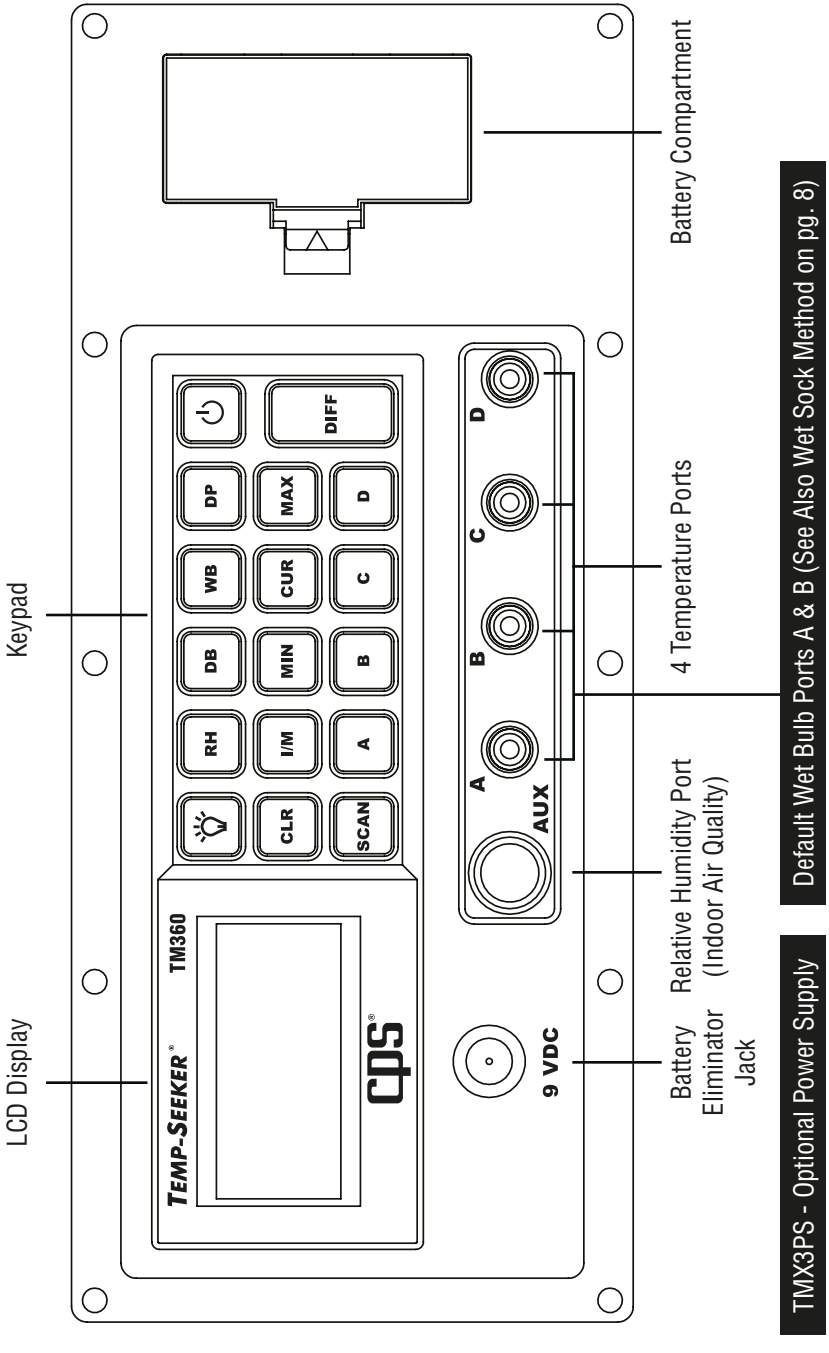
TM360 Unit Specifications	
Resolution	±0.1˚F or ˚C
Temperature Accuracy	±0.4˚F / ±0.2˚C from 14.0 to 158˚F / -10.0 to 70˚C; 0.6˚F / 0.3˚C elsewhere in the range
RH Range	0 to 100%RH
RH Accuracy (TMX3RH)	±1.8%RH from 10 to 90%RH; ± 3% elsewhere in the range
DB Accuracy (TMX3RH)	±1.2% of reading ± 1.0˚F from -40˚F to 200˚F (± 1.2% of reading ± 0.5˚C from -40˚C to 90˚C)
Power Source	9V alkaline battery or optional TMX3PS AC adapter for 100 to 240VAC (40 to 60 Hz)
Battery Life	30hrs. continuous use
Automatic Power Off	After 10 minutes of non-use or user selectable continuous ON mode
Backlight	15 seconds
Dimensions	12" X 10" X 3" (30.5cm x 25.4cm x 7.6cm)
Weight	3lb (1.4 kg) with probes
Warranty	1 year
Calibrated to NIST traceable standards	

Only qualified service personnel should operate this unit. Some countries, states, etc…may require the user to be licensed. Please check with your local government agency.

Always wear gloves

Always wear safety glasses

UNIT OPERATION

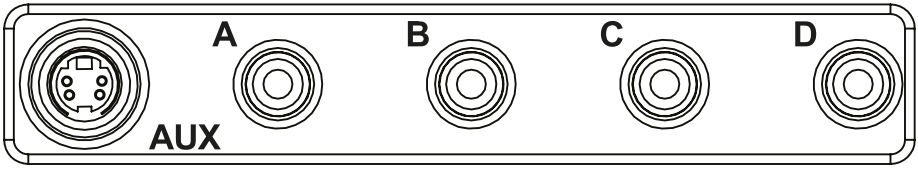


TMX3PS - Optional Power Supply

Default Wet Bulb Ports A & B (See Also Wet Sock Method on pg. 8)

UNIT OPERATION

KEY	FUNCTION
⏻	Press to turn ON, press and hold for 3 sec. to turn OFF
A, B, C, D	Press to display probe measurement of that channel
RH,DB,WB,DP	Press to display relative humidity, dry bulb, wet bulb or dew point temperatures. Use TMX3RH accessory probe or wet-sock method
MIN,CUR,MAX	Press to display the lowest (MIN), current (CUR) or highest (MAX) value of the channel selected
CLR	Press to clear the MAX/MIN values of channel selected to current (NORM)value. Press and hold while turning instrument ON to enable or disable the Automatic Power Off feature
DIFF	Press this key followed by any two of the A, B, C or D keys to display the algebraic difference between the two selected channels
SCAN	Press to display the measurements of each temperature channel in 3 second intervals
I / M	Press to select Metric or Imperial units of measurement
💡	Press to turn on the LCD backlight for 15 seconds



The display defaults to Channel A when initially turned ON.

Channel AUX: Designated for use with the **TMX3RH** accessory probe to provide direct **RH**,**DB**,**WB** and **DP** measurements.

Channel A: General purpose temperature measurements and the default dry bulb channel for humidity measurements obtained using the Wet Sock method **(See page 7 for more information)**.

Channel B: General purpose temperature measurements and the default wet bulb channel for humidity measurements obtained using the Wet-Sock method **(See page 7 for more information)**.

Channel C: General purpose temperature measurements.

Channel D: General purpose temperature measurements.

UNIT OPERATION

Turning the instrument ON and Off: Press the ⏻ key to turn the instrument on; the LCD will initially display all characters, the software version used (CPS 110 or similar) and whether the automatic power off feature is enabled or not (APO ON or APO OFF). The instrument will then default to displaying the measurement read in channel A. To turn the unit off, press and hold the power key for approximately 3 to 5 seconds until the letters **BYE** appear on the LCD, then release the key and the unit will turn off.

Memory Function: The instrument will record and store the high and low values of all channels as long as the instrument remains **ON**. To view, press the **MAX**,**CUR**,**MIN** key until the desired reading is displayed. **MX** or **MN** characters will appear on the LCD to indicate which value is being displayed. At any time, the displayed units can be changed from Imperial to Metric by pushing the **I/M** key.

APO ON/OFF: This feature, when enabled, turns the TM360 off after 10 minutes if no key has been pressed. To toggle the feature **ON** or **OFF**, press and hold the **CLR** key and turn the instrument on. Hold the **CLR** key down untill the APO ON or OFF message appears on the display, then release the CLR key. The selection is stored in the memory of the TM360 until it is changed by the user.

Temperature Differential: The instrument can display the temperature difference between any two of the four available temperature channels. This is done by pressing the **DIFF** key followed by the keys representing the two channels for which the temperature difference is desired. For instance, the sequence DIFF ➨ A ➨ C displays the algebraic difference between the temperature values at channel A and C.

Display Units: At any time the displayed units can be changed from Imperial to Metric by pushing the **I/M** key.

Scan Key: Press this key to display the measurements from temperature channels **A** through **D** in approximately 3 second intervals. The measurements displayed can either be the current (**CUR**), maximum (**MAX**) or minimum (**MIN**) readings of each channel depending on the selection of the MAX,CUR,MIN key. The (**CLR**) key can be used to clear the MIN and MAX values and replace them with the current reading.

Backlight: An efficient **EL** panel illuminates the LCD when the 💡 key is activated and remains on for 15 seconds.

Low Battery Indicator: The symbol **BAT** will appear on the LCD when 10% battery life remains.

OP/SP: The **OP** symbol appearing on the display means the selected temperature channel either has no probe connected or the probe is open. Verify that a probe is firmly connected to the channel's RCA connector. If a probe is connected, try rotating the connector; if the symbol persists on the display, the probe is defective. The **SP** symbol appearing on the display means the probe is shorted and must be replaced.

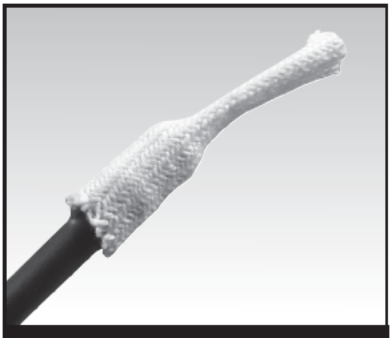
TMX3RH METHOD

The **TMX3RH** is a high accuracy silicon device for the measurement of relative humidity and dry bulb temperature. Both sensors are integrated in one small silicon chip, factory calibrated and conditioned to give accurate and fast reponse. The TM360 uses this accurate data to compute the wet bulb and the dew point temperatures using the latest software algorithms.

The computed **Wet Bulb** and **Dew Point** specifications
Wet Bulb Temperature Accuracy (1 Atmosphere): +/-1.5% or +/- 1.0˚F (+/-0.5˚C) from 32˚F to 120˚F (0˚C to 50˚C) and 20% to 80% RH.
Dew Point Temperature Accuracy (1 Atmosphere): +/-1.5% +/-1.0˚F(+/-0.5˚C) from 32˚F to 120˚F (0˚C to 50˚C) and 20% to 80% RH.

WET-SOCK METHOD

This method can be used to obtain relative humidity, dry/wet bulb and dew point measurements using two standard **TMX2G** temperature probes and channels A and B. There are two options for **Step 4**. Both options provide accurate readings and are merely a method of user preference.



TMX2G w/ 2" cotton sock

Step 1: Connect a **TMX2G** probe to **Channel A** and another to **Channel B**.

Step 2: Press the **RH** key and then the **MIN** key to display the minimum value of the RH.

Step 3: Slip a supplied **2" cotton sock*** over the end of the **TMX2G** probe connected to **Channel B** and wet it with distilled water.

Step 4 (Option 1): Grip both probes approximately **18"** from the ends in one hand. Proceed to swing the probes in a circular motion through the air until the display reading stabilizes. At that point you can stop swinging the probes.

Step 4 (Option 2): Place both probes in front of an air stream from air handler or register. For best results the air should flow at about 9 feet per second (3 m. second) over the wet sock ensuring that no radiant heat flows into the probe such as direct sunlight or heat from machinery. The correct measurement is obtained when the display stabilizes.

Step 5: Press the **CLR** key to erase the readings during the stabilization period and display the current values. Pressing the **RH**,**DB**,**WB** or **DP** keys will display the current value of the relative humidity, dry bulb, wet bulb, or dew point temperatures.

*** TMX3WB 2" cotton socks for RH measurement using wet sock method (6 pieces)**

RH Range	20 to 80% RH
RH Accuracy	±3.0% RH from 20 to 80%RH and 32 to 120˚F / 0 to 50˚C
Dry & Wet Bulb Range	-50.0°F to 300˚F / -45.0°C to 150˚C
Dry & Wet Bulb Accuracy	±0.4°F / ±0.2˚C from 14.0 to 158˚F / -10.0 to 70˚C; 0.6˚F / 0.3˚C elsewhere in the range
DP Accuracy	+/-2.0F / +/- 1.0˚C from 32.0 to 120˚F / 0 to 50˚C and 20 to 80% RH

PSYCHROMETRIC CHART

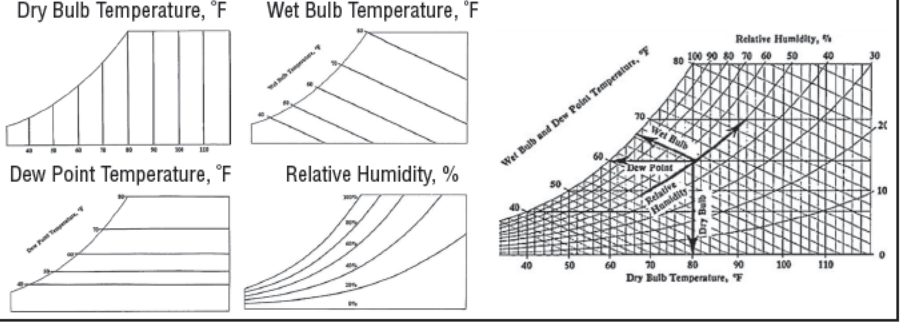
Psychrometry is the science which studies the properties of moist air. A psychrometric chart graphically illustrates the relationship between air temperature and relative humidity as well as other properties. **Air Temperature** is a measure of the heat content of air.

Three different temperature measurements are used in the pychrometric chart.

1. **Dry Bulb** temperature refers basically to the ambient air temperature not affected by the moisture in the air. The dry bulb scale is located at the base of the chart. Vertical lines indicate constant dry bulb temperatures.
2. **Wet Bulb** temperature reflects the cooling effect of evaporating water. The cooling effect of the evaporating water causes a lower temperature compared to the the dry bulb air temperature. The wet bulb temperature scale is located along the curved upper left portion of the chart. The sloping lines indicate equal wet bulb temperatures.
3. **Dew Point** is the temperature at which water vapor starts to condense out of the air; the temperature at which air becomes completely saturated. Water will condense on a surface, such as a building wall or pitcher of ice water, that is at or below the dew point temperature of the air. Above this temperature the moisture will stay in the air. The dew point temperature scale is located along the same curved portion of the chart as the wet bulb temperature scale. However, horizontal lines indicate equal dew point temperatures. ***If the dew point temperature is close to the the air temperature, the relative humidity is high, and if the dew point is well below the air temperature, the relative humidity is low***.

Relative Humidity is a measure of how much moisture is present compared to how much moisture the air could hold at that temperature expressed as a percentage. Lines representing conditions of equal relative humidities sweep from the lower left to the upper right of the psychrometric chart. The 100 percent relative humidity (saturation) line corresponds to the wet bulb and the dew point temperature scale line. The line for zero percent relative humidity falls along the dry bulb temperature scale line.

The versatility of the psychrometric chart lies in the fact that by knowing just two properties of moist air, the other properties can be determined.



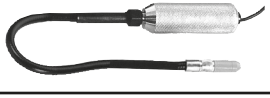
ACCESSORY PROBES / ACCESSORIES

Models	
TM360	Includes: TMX2A (1) TMX2G (1) TMX2S (1)
TM360A	Includes: TMX3C (1) TMX2GA (1) TMX2FP (1)
TM360C	Includes: TMX2A (1) TMX3C (1) TMX2S (1)

Accessories	
TMX3PS	Optional A/C power supply (100-240V)
TMX3WB	6pk of 2" cotton socks for use with the Wet Sock Method (pg.8)

TMX2A Moving Air Probe	
All probes have 15ft / 4.5m leads	
Probe Type	Air
Common Uses	Ducting / Registers / Air movement across condensers / Ambient Air
Response Time	6 seconds
Range	-40˚F to 221˚F /-40C TO +105˚C

TMX3C Clamp-On-Probe	
All probes have 15ft / 4.5m leads	
Probe Type	Surface
Common Uses	Surface temperatures of copper piping from 3/16" (5mm) to 1 1/8" (29mm)
Response Time	12 seconds
Range	-40˚F to 221˚F /-40C TO +105˚C

TMX2FP Flexible Surface Probe	
All probes have 15ft / 4.5m leads	
Probe Type	Surface
Common Uses	Hard to reach areas
Response Time	10 seconds
Range	-40˚F to 221˚F /-40C TO +105˚C

ACCESSORY PROBES / ACCESSORIES

TMX2G General Purpose Probe	
All probes have 15ft / 4.5m leads	
Probe Type	Surface / Air / Liquids
Common Uses	Copper pipe / Ambient Air / RH wet-sock method
Response Time	6 seconds
Range	-40˚F to 257˚F / -40˚C TO +125˚C

TMX2GA General Purpose Air Probe	
All probes have 15ft / 4.5m leads	
Probe Type	Air / Surface / Liquids
Common Uses	Ambient air / Ducting / Registers / Air movement across condensers
Response Time	12 seconds
Range	-40˚F to 257˚F / -40˚C TO +125˚C

TMX2P Puncture Probe	
All probes have 15ft / 4.5m leads	
Probe Type	Surface / Liquids (shaft only)
Common Uses	Internal temperatures of frozen materials / Air ducts
Probe Shaft Length	6 in
Response Time	6 seconds
Range	-40˚F to 257˚F / -40˚C TO +125˚C

TMX2S Velcro Strap Pipe Probe	
All probes have 15ft / 4.5m leads	
Probe Type	Surface
Common Uses	Surface temperatures of copper piping
Response Time	15 seconds
Range	-40˚F to 257˚F / -40˚C TO +125˚C

ACCESSORY PROBES / ACCESSORIES

TMX3RH RH/DB/WB/DP Probe (TM360)	
All probes have 15ft / 4.5m leads	
Probe Type	Specialty RH probe
Common Uses	Measuring indoor air quality, setting/troubleshooting humidity devices
Response Time	10 seconds in moving air, 20 seconds in still air
Temperature Range	-40˚F to 194˚F / -40˚C TO +90˚C
Temperature Accuracy	±1.0˚F from -40˚F to 200˚F or ±1.2 % of reading ±1.2˚C from -40˚C to 90˚C or ±0.5% of reading
RH Range	0 to 100% RH
RH Accuracy	±1.8%RH from 10 to 90%RH; ± 3% elsewhere in the range
Wet bulb Accuracy	±1.4˚F from 32˚F to 120˚F / ±0.7˚C from 0˚C to 50˚C
Dew Point Accuracy	±1.4˚F from 32˚F to 120˚F / ±0.7˚C from 0˚C to 50˚C

WARRANTY / CONTACT INFORMATION

CPS® Products, Inc. guarantees that all products are free of manufacturing and material defects to the original owner for one year from the date of purchase. If the equipment should fail during the guarantee period it will be repaired or replaced (at our option) at no charge. This guarantee does not apply to equipment that has been altered, misused or solely in need of field service maintenance. All repaired equipment will carry an independent 90-day warranty. This repair policy does not include equipment that is determined to be beyond economical repair.

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