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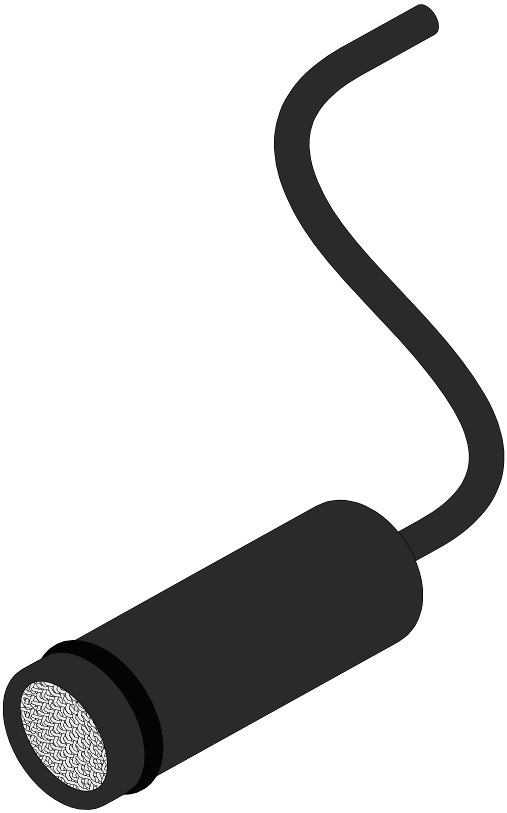


1. INTRODUCTION

Thank you for choosing the ATMOS 14 temperature and relative humidity (RH) sensor from METER Group.

The ATMOS 14 is designed to measure the following:

- Air temperature
- RH
- Barometric pressure
- Vapor pressure

A rugged design allows the ATMOS 14 to withstand long-term exposure to hostile conditions, making it ideal for a wide range of applications including standard meteorological monitoring, evapotranspiration measurement, greenhouse monitoring and control, and building humidity monitoring for mold prevention and remediation.

Verify that ATMOS 14 and radiation shield (if ordered) appear in good condition.

This manual pertains specifically to the ATMOS 14 Gen 1, which has been replaced by the ATMOS 14 Gen 2. The two sensor generations can be differentiated by color of the sensor body (Gen 1 is black; Gen 2 is white) and on the heat shrink label on the sensor cable. The ATMOS 14 Gen 2 is a direct drop-in replacement but represents several important improvements over its predecessor, detailed at metergroup.com/atmos14-gen2.

NOTE: The manual for the ATMOS 14 Gen 1 can be found at metergroup.com/atmos14-gen1.

2. OPERATION

Please read all instructions before operating the ATMOS 14 to ensure it performs to its full potential.

⚠ PRECAUTIONS

METER sensors are built to the highest standards, but misuse, improper protection, or improper installation may damage the sensor and possibly void the manufacturer's warranty. Before integrating ATMOS 14 into a system, follow the recommended installation instructions and have the proper protections in place to safeguard sensors from damage.

2.1 INSTALLATION

In general, temperature and humidity measurements become more accurate as wind speed increases. For most outdoor and greenhouse measurement scenarios, the ATMOS 14 must be housed in a radiation shield with adequate air flow to allow the sensor to come into equilibrium with air temperature. For nongreenhouse, indoor monitoring applications, a radiation shield is not critical because the radiation loading is small.

Follow the steps listed in Table 1 to set up the ATMOS 14 and start collecting data.

Table 1 Installation

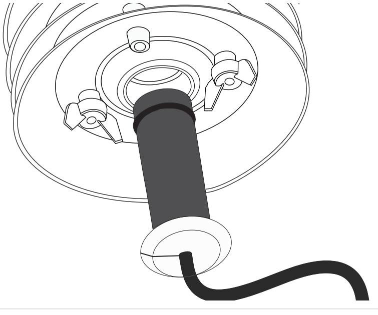
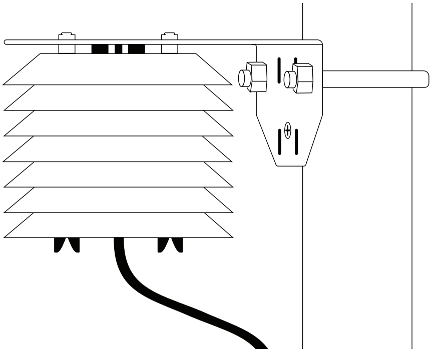
Tools Needed	**Wrench** **Mounting pole**
Preparation	**Consider the Surroundings** Ensure that site selection is far from wind obstruction and objects that can store heat. **Conduct System Check** Plug the sensor into the logger (Section 2.2) to make sure the sensor is functional. **Adjust Pole Height** **Check Radiation Shield** Ensure the sensor is securely installed in the radiation shield. 

Table 1 Installation (continued)

Mounting	**Install on Mounting Pole** Use the radiation shield mounting bracket and bolt to mount the radiation shield to the mounting pole at the desired height.  **Secure the System** Use a wrench to tighten the bolts, securing the radiation shield to the mounting pole. **Secure and Protect Cables** **NOTE: Improperly protected cables can lead to severed cables or disconnected sensors. Cabling issues can be caused by many factors such as rodent damage, driving over sensor cables, tripping over cables, not leaving enough cable slack during installation, or poor sensor wiring connections.** Install cables in conduit or plastic cladding when near the ground to avoid rodent damage. Gather and secure cables between the ATMOS 14 and the data logger to the mounting mast in one or more places. **Connect to Data Logger** Plug the sensor into a data logger. Use the data logger to make sure the sensor is reading properly. Verify these readings are within expected ranges. For more instructions on connecting to data loggers, refer to Section 2.2.

2.2 CONNECTING

The ATMOS 14 works seamlessly with METER data loggers. The sensor can also be used with other data loggers, such as those from Campbell Scientific, Inc. For extensive directions on how to integrate the sensor into third-party loggers, refer to the ATMOS 14 Integrator Guide.

The ATMOS 14 sensor requires excitation voltages in the range of 3.6 to 15.0 VDC and operates at a 2.8- to 5.5-VDC level for data communication. The ATMOS 14 can be integrated using SDI-12 protocol. See the ATMOS 14 Integrator Guide for details on interfacing with data acquisition systems.

The ATMOS 14 sensors come with a 3.5-mm stereo plug connector (Figure 1) to facilitate easy connection with METER loggers. ATMOS 14 sensors may be ordered with stripped and tinned wires to facilitate connecting to some third-party loggers (Section 2.2.2).

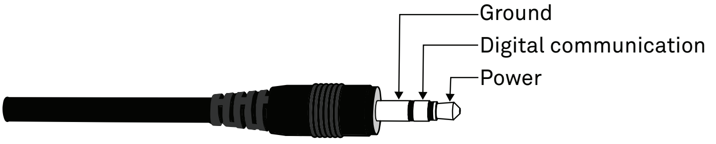


Figure 1 Stereo plug connector

The ATMOS 14 comes standard with a 5-m cable. It may be purchased with custom cable lengths for an additional fee (on a per-meter basis). In some instances, the cable can be extended beyond 75 m by the user, but this is discouraged for a variety of reasons. Please contact Customer Support for more details before extending or splicing cables.

2.2.1 CONNECT TO METER LOGGER

The ATMOS 14 works most efficiently with ZENTRA series data loggers. Check the METER downloads webpage for the most recent data logger firmware. Logger configuration may be done using either ZENTRA Utility (desktop and mobile application) or ZENTRA Cloud (web-based application for cell-enabled data loggers).

1. Plug the stereo plug connector into one of the sensor ports on the logger.
2. Use the appropriate software application to configure the chosen logger port for the ATMOS 14. METER data loggers will automatically recognize ATMOS 14 sensors.
3. Set the measurement interval.

   METER data loggers measure the ATMOS 14 every minute and return the average of the 1-min data across the chosen measurement interval.

ATMOS 14 data can be downloaded from METER data loggers using either ZENTRA Utility or ZENTRA Cloud. Refer to the logger user manual for more information about these programs.

2.2.2 CONNECT TO NON-METER LOGGER

The ATMOS 14 can be purchased for use with non-METER (third party) data loggers. Refer to the third-party logger manual for details on logger communications, power supply, and ground ports. The ATMOS 14 Integrator Guide also provides detailed instructions on connecting sensors to non-METER loggers.

ATMOS 14 sensors can be ordered with stripped and tinned (pigtail) wires for use with screw terminals. Refer to the third-party logger manual for details on wiring.

Connect the ATMOS 14 wires to the data logger as illustrated in Figure 2 and Figure 3, with the power supply wire (brown) connected to the excitation, the digital out wire (orange) to a digital input, and the bare ground wire to ground.

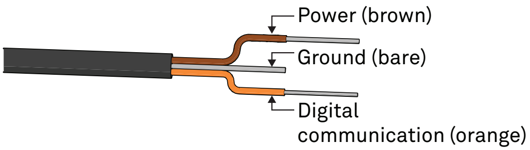


Figure 2 Pigtail wiring

NOTE: The VP-4 (predecessor to ATMOS 14) may have the older Decagon wiring scheme where the power supply is white, the digital out is red, and the bare wire is ground.

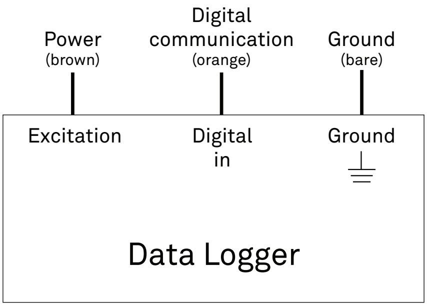


Figure 3 Wiring diagram

NOTE: The acceptable range of excitation voltages is from 3.6 to 15.0 VDC. To read the ATMOS 14 with Campbell Scientific data loggers, power the sensors off a switched 12-V port.

If the ATMOS 14 cable has a standard stereo plug connector and needs to be connected to a non-METER data logger, use one of the following two option

Option 1

1. Clip off the stereo plug connector on the sensor cable.
2. Strip and tin the wires.
3. Wire it directly into the data logger.

This option has the advantage of creating a direct connection and minimizes the chance of the sensor becoming unplugged. However, it then cannot be easily used in the future with a METER readout unit or data logger.

Option 2
Obtain an adapter cable from METER.

The adapter cable has a connector for the stereo plug connector on one end and three wires (or pigtail adapter) for connection to a data logger on the other end. The stripped and tinned adapter cable wires have the same termination as in Figure 3: the brown wire is excitation, the orange is output, and the bare wire is ground.

NOTE: Secure the stereo plug connector to the pigtail adapter connections using adhesive-lined heat shrink to ensure the sensor does not become disconnected during use.

2.3 COMMUNICATION

The SDI-12 protocol requires that all sensors have a unique address. ATMOS 14 sensor factory default is an SDI-12 address of 0. To add more than one SDI-12 sensor to a bus, the sensor address can be changed using a ZSC Bluetooth® sensor interface and the ZENTRA Utility Mobile app as described below:

NOTE: The sensor SDI-12 address must be returned to 0 to work with ZENTRA loggers.

1. Using a mobile device, open the ZENTRA Utility Mobile app.
2. Connect the sensor to the ZSC.
3. Under Sensor Information, select the SDI Address dropdown.
4. Scroll through the options and select the desired SDI-12 address.

   NOTE: Address options include 0-9, A-Z, and a-z.

The sensor address can also be changed using the PROCHECK handheld device.

1. Using a PROCHECK connected to the sensor, press the **Menu** button to bring up the `CONFIG` menu.

   NOTE: If the PROCHECK does not have this option, please upgrade its firmware to the latest version following the Updating Your Procheck Firmware instruction sheet.

2. Scroll down to `SDI-12 Address`. Press **Enter**.
3. Press the **UP** or **DOWN** arrows until the desired address is highlighted.

   Address options include 0...9, A...Z, and a...z.

4. Press **Enter**.

Detailed information can also be found in the application note Setting SDI-12 addresses on METER digital sensors using Campbell Scientific data loggers and LoggerNet.

When using the sensor as part of an SDI-12 bus, excite the sensors continuously to avoid issues with initial sensor startup interfering with the SDI-12 communications.

3. SYSTEM

This section describes the ATMOS 14 sensor.

3.1 SPECIFICATIONS

MEASUREMENT SPECIFICATIONS

Relative Humidity (RH)	
Range	0–100% RH (0.00–1.00)
Resolution	0.1% RH
Accuracy	Sensor measurement accuracy is variable across a range of RH. Refer to the chart in Figure 4.

HUMIDITY (%RH)	0°C	10°C	20°C	30°C	40°C	50°C	60°C	70°C	80°C
100%	±5%	±5%	±5%	±5%	±5%	±5%	±5%	±6%	±10%
95%	±5%	±5%	±4%	±4%	±4%	±4%	±4%	±5%	±8%
90%	±5%	±4%	±2%	±2%	±3%	±3%	±4%	±5%	±8%
85%	±5%	±4%	±2%	±2%	±3%	±3%	±4%	±5%	±8%
80%	±4%	±4%	±2%	±2%	±3%	±3%	±3%	±4%	±6%
75%	±4%	±4%	±2%	±2%	±3%	±3%	±3%	±4%	±6%
70%	±4%	±4%	±2%	±2%	±3%	±3%	±3%	±4%	±6%
65%	±4%	±4%	±2%	±2%	±3%	±3%	±3%	±4%	±6%
60%	±4%	±3%	±2%	±2%	±2%	±2%	±2%	±3%	±5%
55%	±4%	±2%	±2%	±2%	±2%	±2%	±2%	±3%	±5%
50%	±4%	±2%	±2%	±2%	±2%	±2%	±2%	±3%	±5%
45%	±4%	±2%	±2%	±2%	±2%	±2%	±2%	±3%	±4%
40%	±4%	±2%	±2%	±2%	±2%	±2%	±2%	±3%	±4%
35%	±4%	±3%	±2%	±2%	±2%	±2%	±2%	±3%	±4%
30%	±4%	±3%	±2%	±2%	±2%	±2%	±2%	±3%	±4%
25%	±4%	±3%	±2%	±2%	±2%	±2%	±2%	±3%	±4%
20%	±4%	±4%	±2%	±2%	±3%	±3%	±3%	±3%	±4%
15%	±5%	±4%	±2%	±2%	±3%	±3%	±4%	±4%	±5%
10%	±8%	±5%	±3%	±3%	±4%	±4%	±4%	±5%	±8%
5%	±8%	±8%	±5%	±5%	±5%	±5%	±5%	±6%	±10%
0%	±12%	±12%	±5%	±5%	±6%	±6%	±6%	±10%	±12%

TEMPERATURE (°C)

Figure 4 RH sensor accuracy

Equilibration Time (τ, 63%)	<40 s (response time in 1 m/s air stream)
Hysteresis	<1% RH, typical
Long-Term Drift	<0.5% RH/year, typical
Temperature	
Range	−40 to 80 °C
Resolution	0.1 °C

Accuracy	Sensor measurement accuracy is variable across a range of temperatures. Refer to the chart in Figure 5.

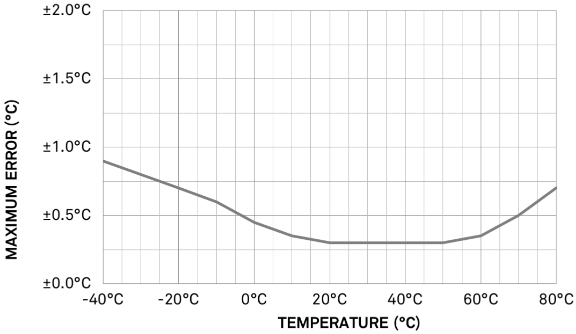


Figure 5 Temperature sensor accuracy

Equilibration Time (τ, 63%)	<400 s (response time in 1 m/s air stream
Long-Term Drift	<0.04 °C/year, typical
Vapor Pressure	
Range	0–47 kPa
Resolution	0.01 kPa
Accuracy	Sensor measurement accuracy is variable across a range of temperatures and RH. Refer to the chart in Figure 6.

HUMIDITY (%RH)	0°C	10°C	20°C	30°C	40°C	50°C	60°C	70°C	80°C
100%	± 0.05	± 0.09	± 0.16	± 0.29	± 0.49	± 0.81	± 1.30	± 2.62	± 6.32
95%	± 0.05	± 0.09	± 0.14	± 0.24	± 0.41	± 0.68	± 1.08	± 2.26	± 5.27
90%	± 0.05	± 0.07	± 0.09	± 0.15	± 0.33	± 0.54	± 1.06	± 2.23	± 5.20
85%	± 0.05	± 0.07	± 0.08	± 0.15	± 0.33	± 0.53	± 1.05	± 2.19	± 5.13
80%	± 0.04	± 0.07	± 0.08	± 0.15	± 0.32	± 0.53	± 0.83	± 1.84	± 4.07
75%	± 0.04	± 0.07	± 0.08	± 0.14	± 0.31	± 0.52	± 0.82	± 1.80	± 4.00
70%	± 0.04	± 0.07	± 0.08	± 0.14	± 0.31	± 0.51	± 0.81	± 1.77	± 3.93
65%	± 0.04	± 0.07	± 0.08	± 0.13	± 0.30	± 0.50	± 0.79	± 1.73	± 3.86
60%	± 0.04	± 0.05	± 0.07	± 0.13	± 0.22	± 0.36	± 0.57	± 1.38	± 3.30
55%	± 0.04	± 0.04	± 0.07	± 0.13	± 0.22	± 0.35	± 0.56	± 1.34	± 3.23
50%	± 0.03	± 0.04	± 0.07	± 0.12	± 0.21	± 0.34	± 0.55	± 1.31	± 3.16
45%	± 0.03	± 0.04	± 0.07	± 0.12	± 0.20	± 0.33	± 0.53	± 1.27	± 2.60
40%	± 0.03	± 0.03	± 0.07	± 0.12	± 0.20	± 0.33	± 0.52	± 1.24	± 2.53
35%	± 0.03	± 0.05	± 0.06	± 0.11	± 0.19	± 0.32	± 0.50	± 1.20	± 2.46
30%	± 0.03	± 0.05	± 0.06	± 0.11	± 0.19	± 0.31	± 0.49	± 1.17	± 2.39
25%	± 0.03	± 0.04	± 0.06	± 0.10	± 0.18	± 0.30	± 0.48	± 1.14	± 2.32
20%	± 0.03	± 0.06	± 0.06	± 0.10	± 0.25	± 0.41	± 0.67	± 1.10	± 2.25
15%	± 0.03	± 0.05	± 0.05	± 0.10	± 0.24	± 0.40	± 0.85	± 1.39	± 2.67
10%	± 0.05	± 0.07	± 0.08	± 0.14	± 0.31	± 0.52	± 0.84	± 1.67	± 4.08
5%	± 0.05	± 0.10	± 0.12	± 0.22	± 0.38	± 0.64	± 1.03	± 1.96	± 5.00
0%	± 0.08	± 0.15	± 0.12	± 0.22	± 0.45	± 0.75	± 1.22	± 3.21	± 5.92

TEMPERATURE (°C)

Figure 6 Vapor pressure sensor accuracy

Barometric Pressure	
Range	50–110 kPa
Resolution	0.01 kPa
Accuracy	±0.4 kPa

COMMUNICATION SPECIFICATIONS

Output

DDI serial or SDI-12 communication

Data Logger Compatibility

Any data acquisition system capable of 3.6- to 15.0-VDC power and serial or SDI-12 communication.

PHYSICAL SPECIFICATIONS

Dimensions	
Diameter	2.0 cm (0.8 in)
Height	5.4 cm (2.1 in)

Operating Temperature Range	
Minimum	−40 °C
Typical	NA
Maximum	+80 °C

NOTE: Sensors may be used at higher temperatures under certain conditions; contact Customer Support for assistance.

Cable Length

5 m (standard)
75 m (maximum custom cable length)

NOTE: Contact Customer Support if a nonstandard cable length is needed.

Connector Types

3.5-mm stereo plug connector or stripped and tinned wires

ELECTRICAL AND TIMING CHARACTERISTICS

Supply Voltage (VCC to GND)	
Minimum	3.6 VDC
Typical	NA
Maximum	15.0 VDC
Digital Input Voltage (logic high)	
Minimum	2.8 V
Typical	3.6 V
Maximum	5.0 V
Digital Input Voltage (logic low)	
Minimum	–0.3 V
Typical	0.0 V
Maximum	0.8 V
Digital Output Voltage (logic high)	
Minimum	NA
Typical	3.6 V
Maximum	NA
Power Line Slew Rate	
Minimum	1.0 V/ms
Typical	NA
Maximum	NA
Current Drain (during measurement)	
Minimum	4.50 mA
Typical	4.75 mA
Maximum	5.00 mA
Current Drain (while asleep)	
Minimum	NA
Typical	0.03 mA
Maximum	NA

Power Up Time (DDI serial)	
Minimum	NA
Typical	NA
Maximum	100 ms
Power Up Time (SDI-12)	
Minimum	100 ms
Typical	1,100 ms
Maximum	1,100 ms
Measurement Duration	
Minimum	NA
Typical	550 ms
Maximum	600 ms

COMPLIANCE

2004/108/EC and 2011/65/EU

EN61326-1:2013

EN50581:2012

3.2 COMPONENTS

The ATMOS 14 sensor consists of electronics potted in marine-grade polyurethane encapsulant (Figure 7). The sensor can then be inserted into a radiation shield (Section 3.2.1).

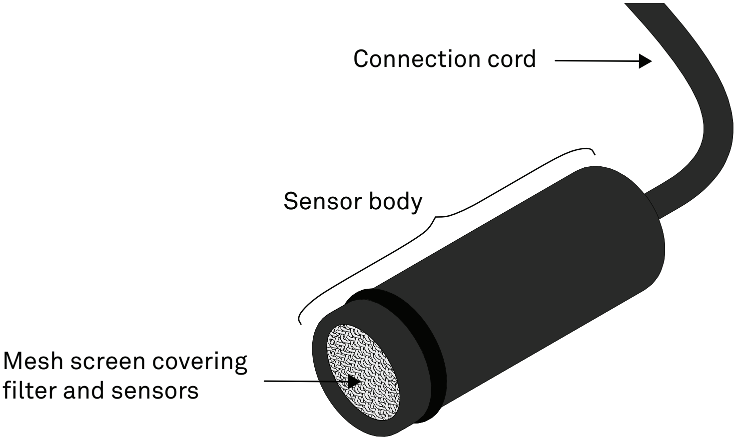


Figure 7 ATMOS 14 components

The ATMOS 14 uses a primary sensor chip to measure RH and air temperature (Section 3.2.2) and a secondary chip to measure barometric pressure (Section 3.2.3). A microprocessor within the ATMOS 14 calculates vapor pressure from the RH and temperature measurements. Calibration coefficients are applied before data are output. Air temperature, RH, vapor pressure, and barometric pressure are output from the sensor.

The sensor chips are protected by a hydrophobic porous Teflon™ filter that is water- and dustproof but has an extremely high vapor conductance, allowing fast sensor equilibration with the surrounding atmosphere. A stainless steel screen protects the filter and sensors from impact and abrasion.

3.2.1 RADIATION SHIELD

The radiation shield comprises a mounting bracket and seven discs. The shield prevents direct sunlight from coming into contact with the sensor. This isolation from solar radiation prevents false readings of elevated temperatures, allowing for accurate measurement of ambient air temperature.

3.2.2 RELATIVE HUMIDITY AND TEMPERATURE SENSOR

The ATMOS 14 utilizes a capacitance-type RH sensor chip to measure the RH and temperature of the surrounding air. For RH to be an accurate representation of the atmospheric humidity, it is critical that the humidity sensor be at air temperature. For most measurement scenarios, the ATMOS 14 should be housed in the radiation shield with adequate airflow to allow the sensor to come into equilibrium with air temperature.

Each sensor chip is verified as accurate before prior to shipment. However, all capacitance RH sensors drift over long periods of exposure to environmental conditions. The sensor chip typically drifts less than 0.5% RH per year. METER recommends that ATMOS 14 sensors be calibrated every 1 to 2 years under normal use conditions (Section 4.1).

3.2.3 BAROMETRIC PRESSURE SENSOR

The barometric pressure sensor measures the atmospheric pressure of the environment in which the ATMOS 14 is deployed. With a range from 49 to 109 kPa, it is suitable for measurement across a wide range of elevations, but the magnitude of sensor output will depend chiefly on the installation altitude with subtle changes caused by weather.

3.3 THEORY

This section explains how the ATMOS 14 sensor measures vapor pressure, RH, and temperature.

3.3.1 VAPOR PRESSURE

Vapor pressure is calculated from the primary measurements of RH and temperature. First, the saturation vapor pressure (e_s) is calculated from the sensor temperature using the Magnus-Tetens equation for calculating saturation vapor pressure over liquid water formulated by Murray (1967) Equation 1:

$$e_s = a\exp\left(\frac{bT}{T+c}\right)$$

Equation 1

with coefficients defined by Buck (1981):

a = 0.611 kPa

b = 17.502,

c = 240.97 °C, and

T = temperature in degrees Celsius.

Then vapor pressure is calculated as the product of saturation vapor pressure and RH (Equation 2), with RH expressed as a unitless ratio ranging from 0 to 1.

$$\text{Vapor pressure} = e_s \times RH$$

Equation 2

Vapor pressure is conservative across temperature differences and small spatial scales. This means that the vapor pressure of the atmosphere near the ATMOS 14 is the same as the vapor pressure at the ATMOS 14 sensor, even if the ATMOS 14 is not at the same temperature as the atmosphere. Additionally, it is the vapor pressure of the atmosphere (not RH) that controls the rate of vapor phase water transport (e.g., evaporation, transpiration, and distribution of water vapor). As discussed, RH measurements below a temperature of 0 °C introduce errors due to the use of liquid water as the reference. However, because the Buck (1981) formulation for liquid water is used to calculate vapor pressure over the full temperature range, ATMOS 14 vapor pressure output values are correct over the full temperature range.

The METER ZENTRA system calculates and outputs vapor pressure deficit (VPD) in the standard data stream. VPD is simply $e_s(T_{\text{air}}) - e_a$ and gives a good indication of evaporative demand.

3.3.2 RELATIVE HUMIDITY

The ATMOS 14 sensor provides an RH measurement that is referenced to saturation vapor pressure over liquid water, even at temperatures below freezing, where ice is likely to be present (WMO, 2008). Although this is the standard way to define RH, it has the disadvantage of providing incorrect RH values below freezing when referenced to ice.

Figure 8 shows the maximum RH the ATMOS 14 measures at saturation over ice. RH values over ice can be corrected by dividing reported vapor pressure values by saturation vapor pressure calculated with the Magnus-Tetens equation (Equation 1) using the ice phase coefficients of b = 21.87 and c = 265.5 °C. Note that supercooled liquid water is often still present at temperatures well below 0 °C, and the liquid water coefficients should be used in those cases.

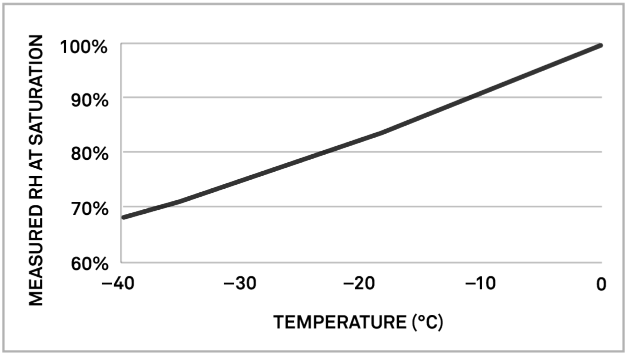


Figure 8 RH value corrections

3.3.3 TEMPERATURE

The ATMOS 14 has a band gap temperature sensor integrated into the sensor electronics. The temperature sensor accurately measures the sensor temperature. Sensor temperature should remain close to air temperature if the ATMOS 14 radiation shield is adequately shielded and aspirated.

4. SERVICE

This section describes the calibration and maintenance of ATMOS 14. Troubleshooting solutions and customer service information are also provided.

4.1 CALIBRATION

Prior to shipping, the RH sensors are verified over salt solutions at 25%, 50%, and 76% RH to ensure that they are properly functioning. METER recommends that ATMOS 14 sensors be recalibrated every 1 to 2 years under normal use conditions to ensure best possible accuracy. For safety-critical or high-accuracy applications, more frequent calibration is recommended. Contact Customer Support for more information.

If sensors have been exposed to chemicals and conditioning fails to restore accurate measurements, the sensors should be sent back to METER for evaluation and possible calibration (Section 4.2).

4.2 CLEANING AND MAINTENANCE

The ATMOS 14 sensor does not require any regular cleaning or maintenance. The radiation shield should be cleaned with a damp cloth to remove dirt, debris, and nesting insects or webs as these will reduce the airflow through the radiation shields and may reduce its effectiveness.

However, the polymer RH sensing element in the ATMOS 14 can be poisoned by exposure to volatile organic compounds, solvents, and other chemicals. The effects of exposure to these chemicals can range from subtle loss of accuracy to catastrophic failure. If the ATMOS 14 may have suffered chemical exposure (evident in questionable RH measurements), check the sensor accuracy using known RH conditions.

A convenient method for generating known RH conditions is through the use of salt solutions. For an initial check, prepare a saturated NaCl solution, which has an equilibrium RH of 0.75 (75%):

1. Pour laboratory-grade NaCl into a sealable container that is large enough to accommodate a salt solution and the ATMOS 14.
2. Mix in enough water that there is a thin layer of liquid water present over a thick slurry of NaCl crystals.
3. Seal the ATMOS 14 sensor into the container, making sure that the ATMOS 14 is held or suspended above the salt solution .

   NOTE: Ensure the ATMOS 14 sensor is at the same temperature as the salt solution or large errors in the measured RH occur.

Salt solutions in a wide range of RH can be carefully prepared with pure, dry salts using the ratios in Table 2 or are available from METER. METER salt solutions are specified accurate to within ±0.3% RH.

Table 2 Salt solutions

Equilibrium RH (% saturation)	Salt	Molality (mol salt/kg water)
25	LiCl	13.41
50	LiCl	8.57
76	NaCl	6.00

If the ATMOS 14 sensor has lost accuracy due to exposure to solvents or other chemicals, the following conditioning procedure may bring the sensor back to the original calibration state:

1. Bake the sensor in dry heat at 100 to 105 °C for 10 h.
2. Rehydrate the sensors by exposing them to a ~75% RH environment at 20 to 30 °C for 12 h.

   A 75% RH environment can be conveniently established by sealing the sensor in a headspace over prepared saturated NaCl.

4.3 TROUBLESHOOTING

Table 3 lists common problems and their solutions. Most issues with the ATMOS 14 sensor may manifest themselves in the form of no reading from communication problems, catastrophic sensor failure, or highly inaccurate measurements due to sensor poisoning by volatile chemicals. If the problem is not listed or these solutions do not solve the issue, contact Customer Support.

Table 3 Troubleshooting the ATMOS 14

Problem	Possible Solutions
Data logger not receiving readings	Check that the connections to the data logger are correct and secure. Ensure that data logger batteries are not dead or weakened. Check sensor cables for nicks or cuts that could prevent communication. Check the configuration of the data logger in ZENTRA Utility to make sure the ATMOS 14 is selected.
Sensor not reading RH accurately	Check the screen and filter for contamination or obstructions. Airflow must not be restricted through the filter. Breathe heavily on sensor and check for a corresponding change in measured RH to see if adequate airflow is present. Recondition the sensor as described in Section 4.2.

Table 3 Troubleshooting the ATMOS 14 (continued)

Problem	Possible Solutions
Sensor not reading barometric pressure accurately	Check the screen and filter for contamination or obstructions. Airflow must not be restricted through the filter. Seal and pressurize the sensor (e.g., with mouth or hand) and check for a corresponding change in measured barometric pressure to see if adequate airflow is present.
Sensor not reading air temperature accurately	Ensure that ATMOS 14 sensor body is not exposed to solar radiation (make sure it is fully shaded). This includes direct, diffuse, incident, and reflected solar radiation. Ensure that the ATMOS 14 radiation shield is mounted in a location with adequate ventilation/wind speed to bring the sensor to air temperature. Ensure that the ATMOS 14 sensor body is not exposed to high levels of thermal radiation. This is could be important in some industrial applications. Test to see if the sensor responds to changes in temperature by holding sensor body in hand (or at different temperature from ambient) for 2 min and check for corresponding change in temperature measurement.

4.4 CUSTOMER SUPPORT

NORTH AMERICA

Customer service representatives are available for questions, problems, or feedback Monday through Friday, 7:00 am to 5:00 pm Pacific time.

Email: support.environment@metergroup.com
sales.environment@metergroup.com

Phone: +1.509.332.5600

Fax: +1.509.332.5158

Website: metergroup.com

EUROPE

Customer service representatives are available for questions, problems, or feedback Monday through Friday, 8:00 to 17:00 Central European time.

Email: support.europe@metergroup.com
sales.europe@metergroup.com

Phone: +49 89 12 66 52 0

Fax: +49 89 12 66 52 20

Website: metergroup.de

If contacting METER by email, please include the following information:

Name	Email address
Address	Instrument serial number
Phone	Description of the problem

NOTE: For products purchased through a distributor, please contact the distributor directly for assistance.

4.5 TERMS AND CONDITIONS

By using METER instruments and documentation, you agree to abide by the METER Group, Inc. Terms and Conditions. Please refer to metergroup.com/terms-conditions for details.

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